

ALGAE – ECONOMY BASED ECOLOGICAL SERVICE OF AQUATIC ECOSYSTEMS
(LIFE17 ENV/LT/000407)

Use of remote sensing methods for monitoring of Lithuanian waters

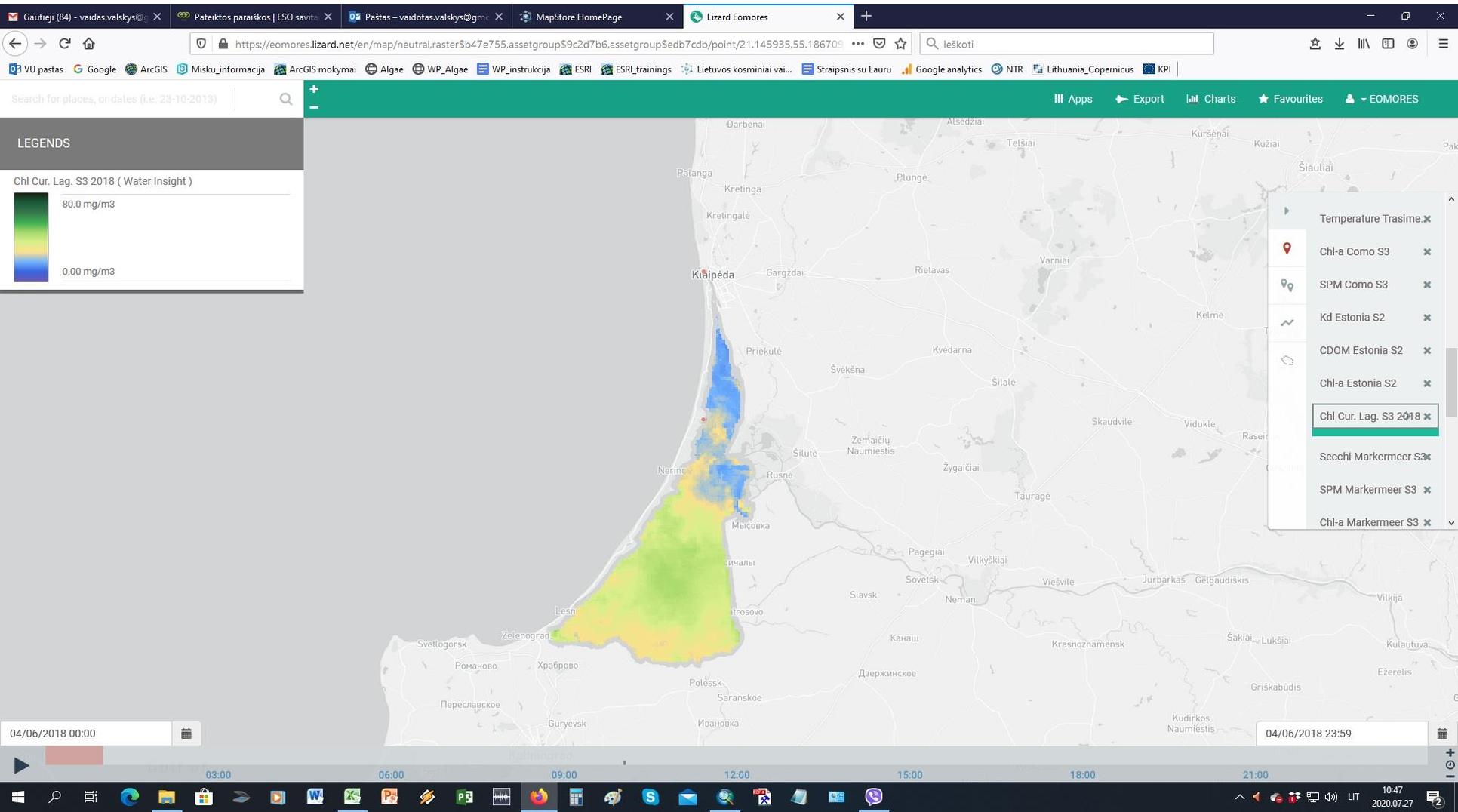
Dr. Ričardas Skorupskas
Vilnius University, Institute of Geoscience
Antanas Gedvilas
External expert

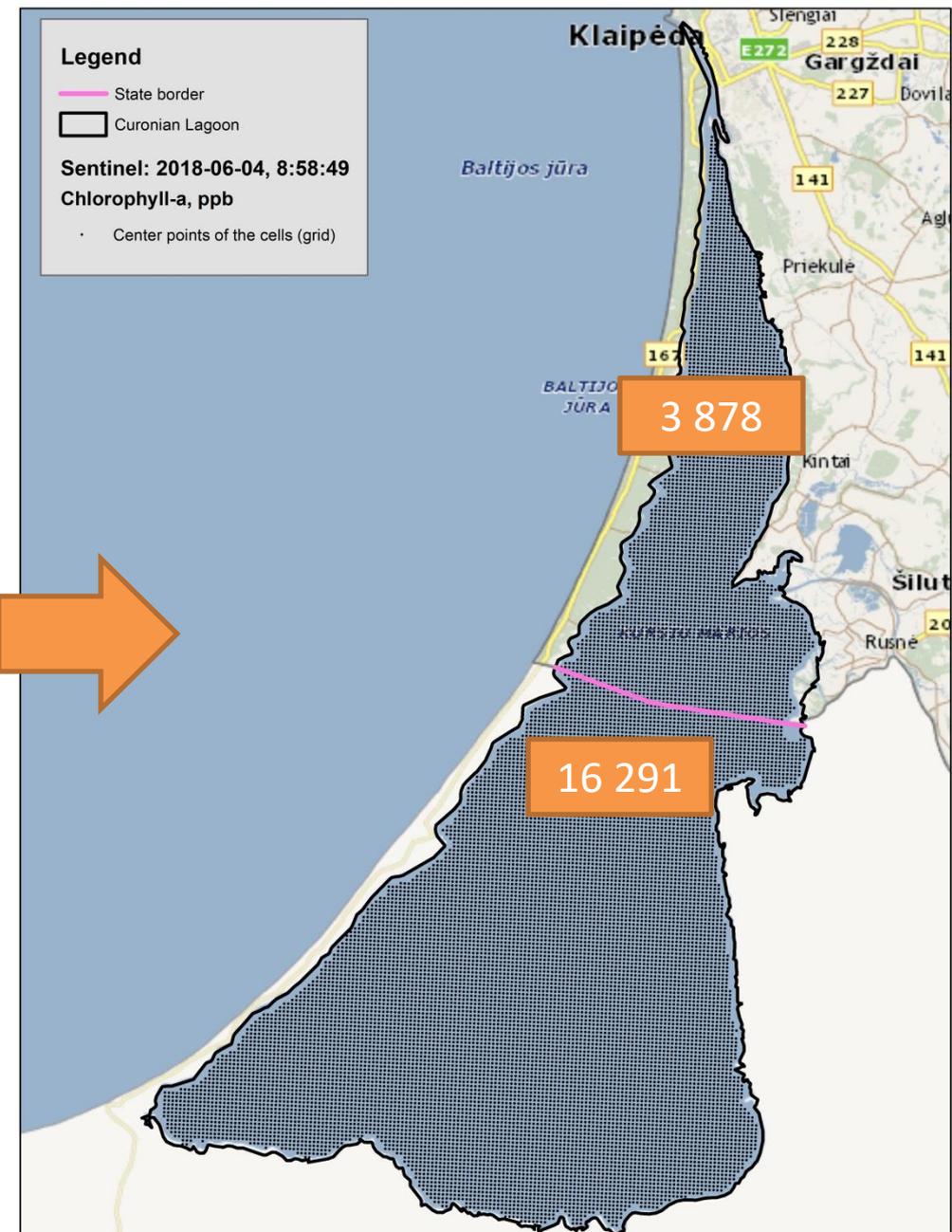
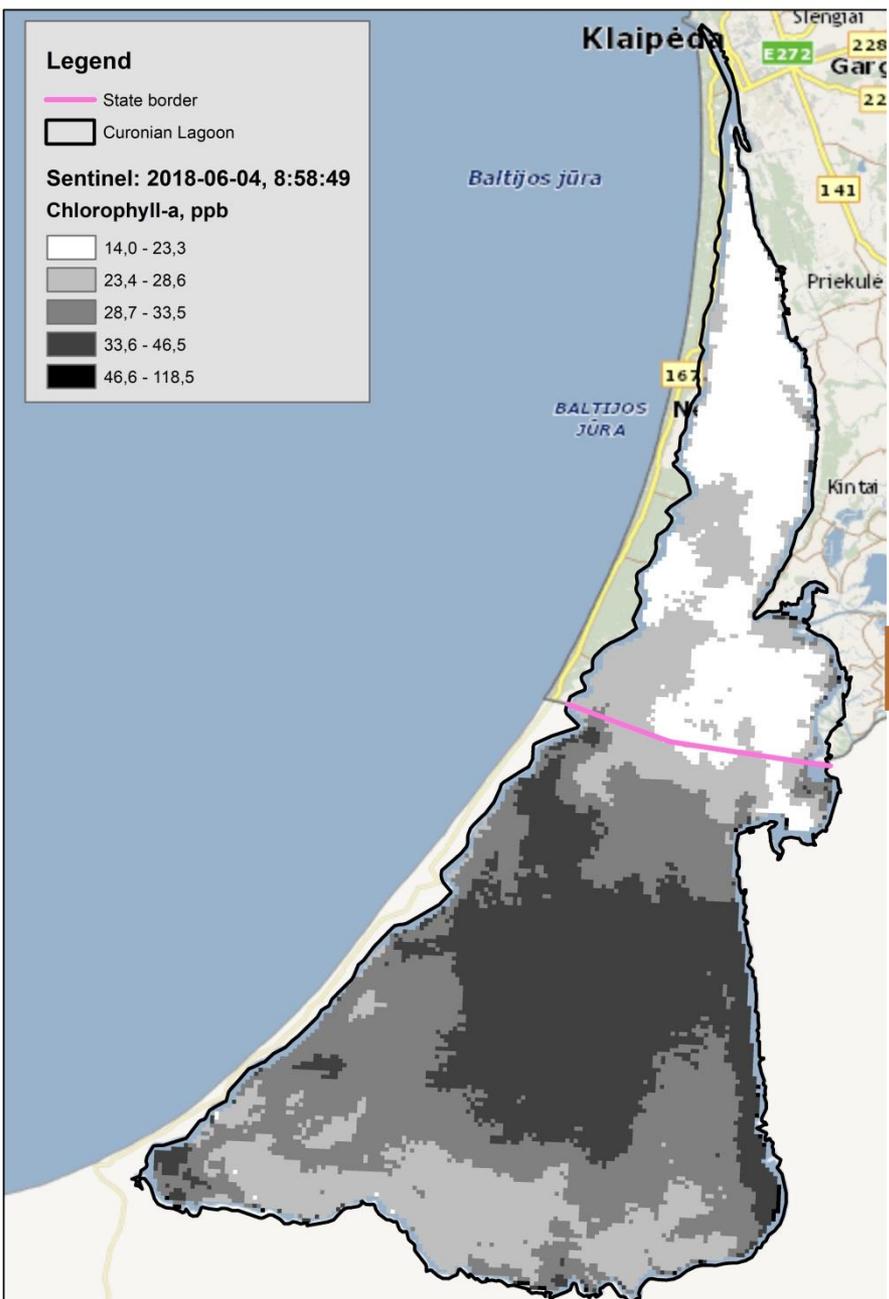
Dr. Vaidotas Valskys
Nature Heritage Fund

2021.08.26

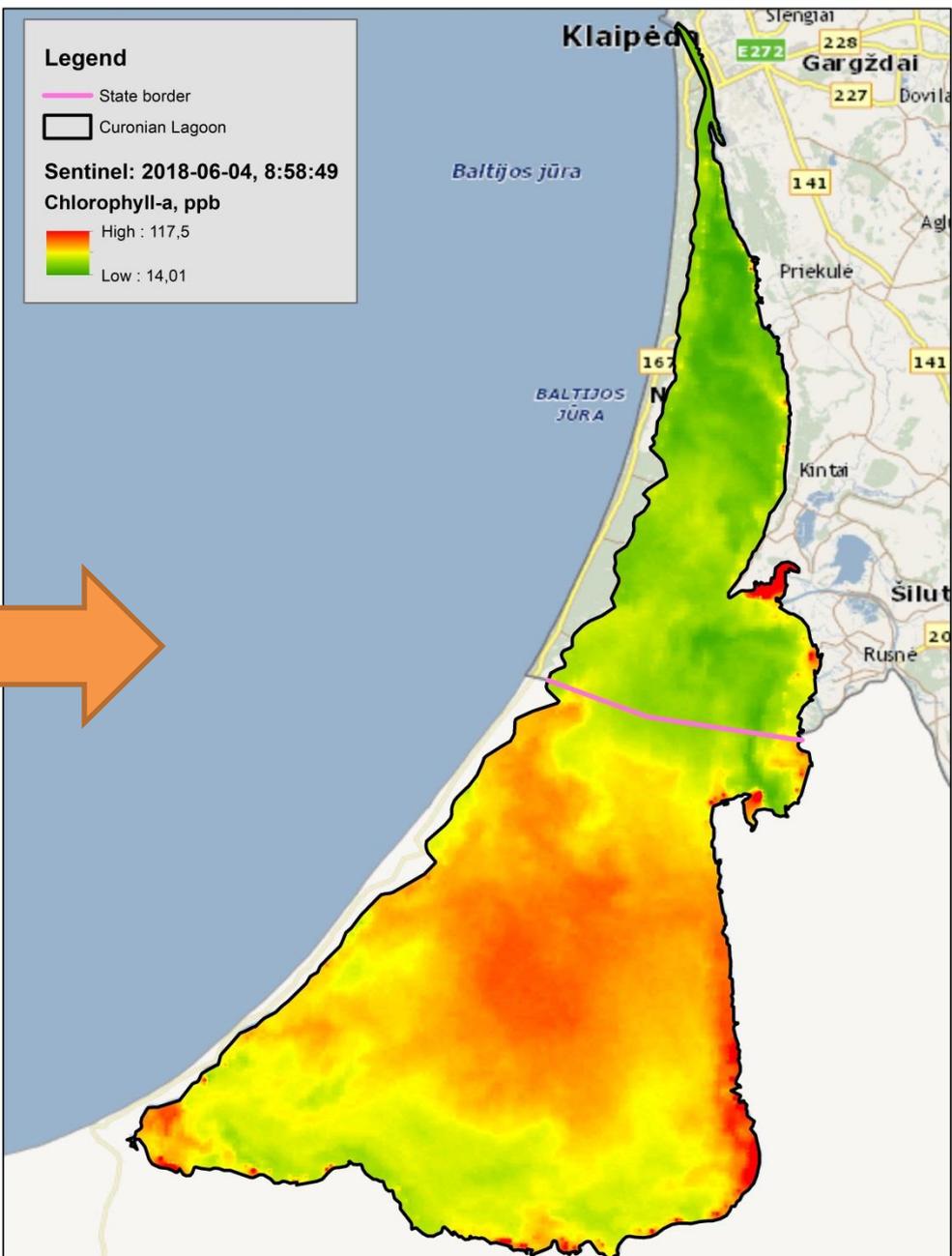
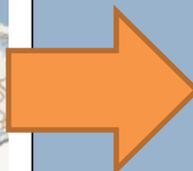
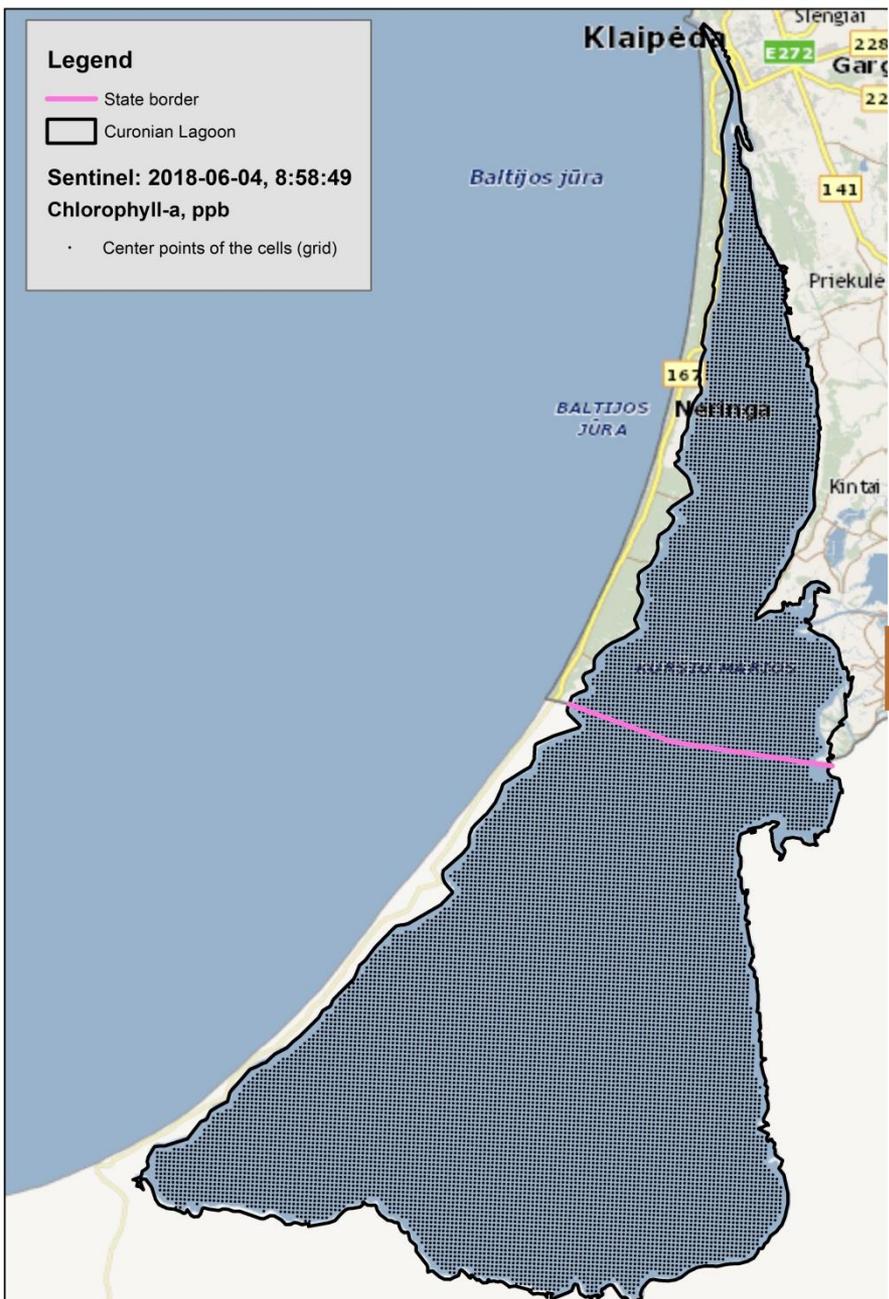
Analysis of satellite images

EOMORES LIZARD geoportal for SENTINEL data overview and download

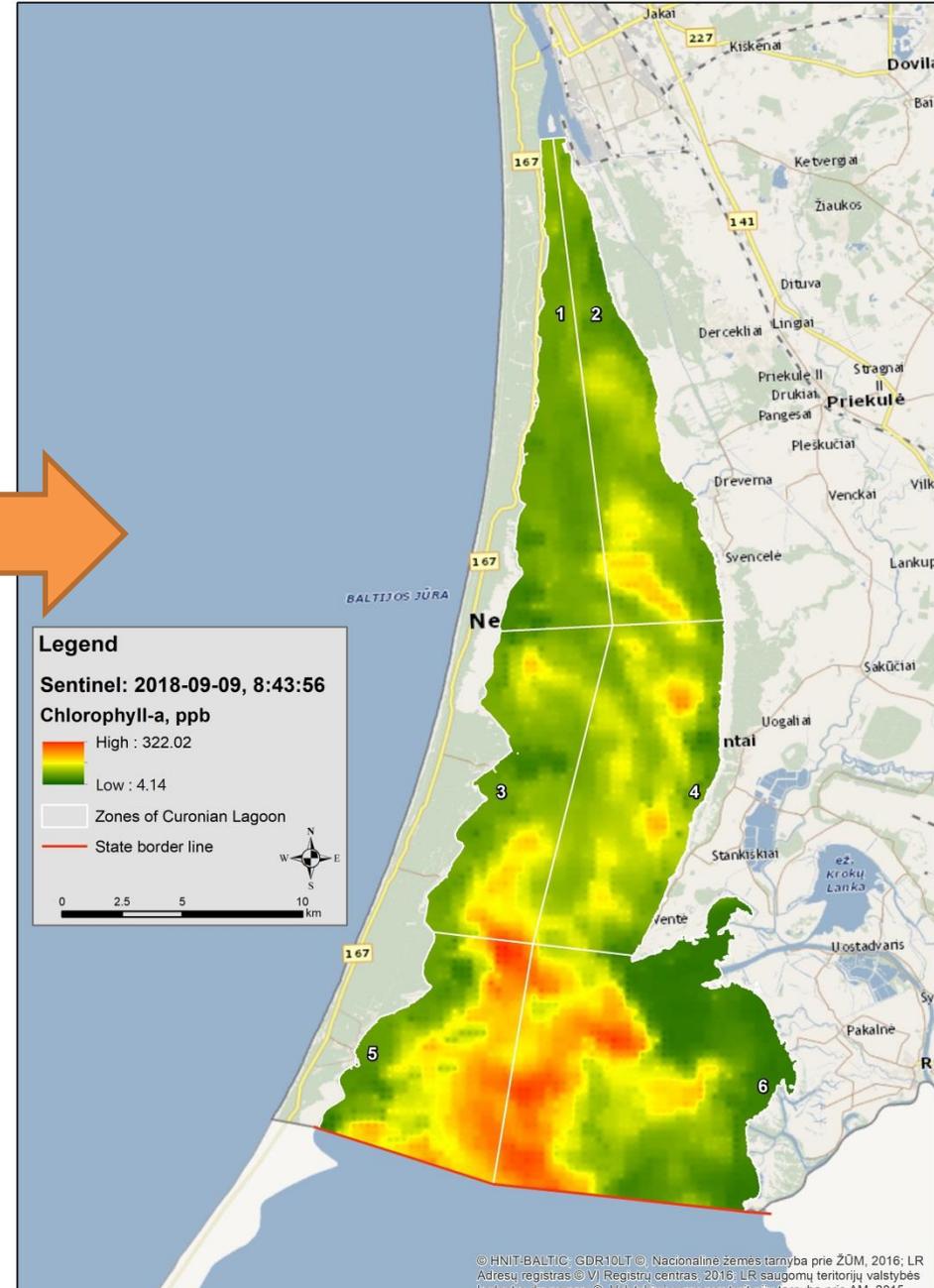
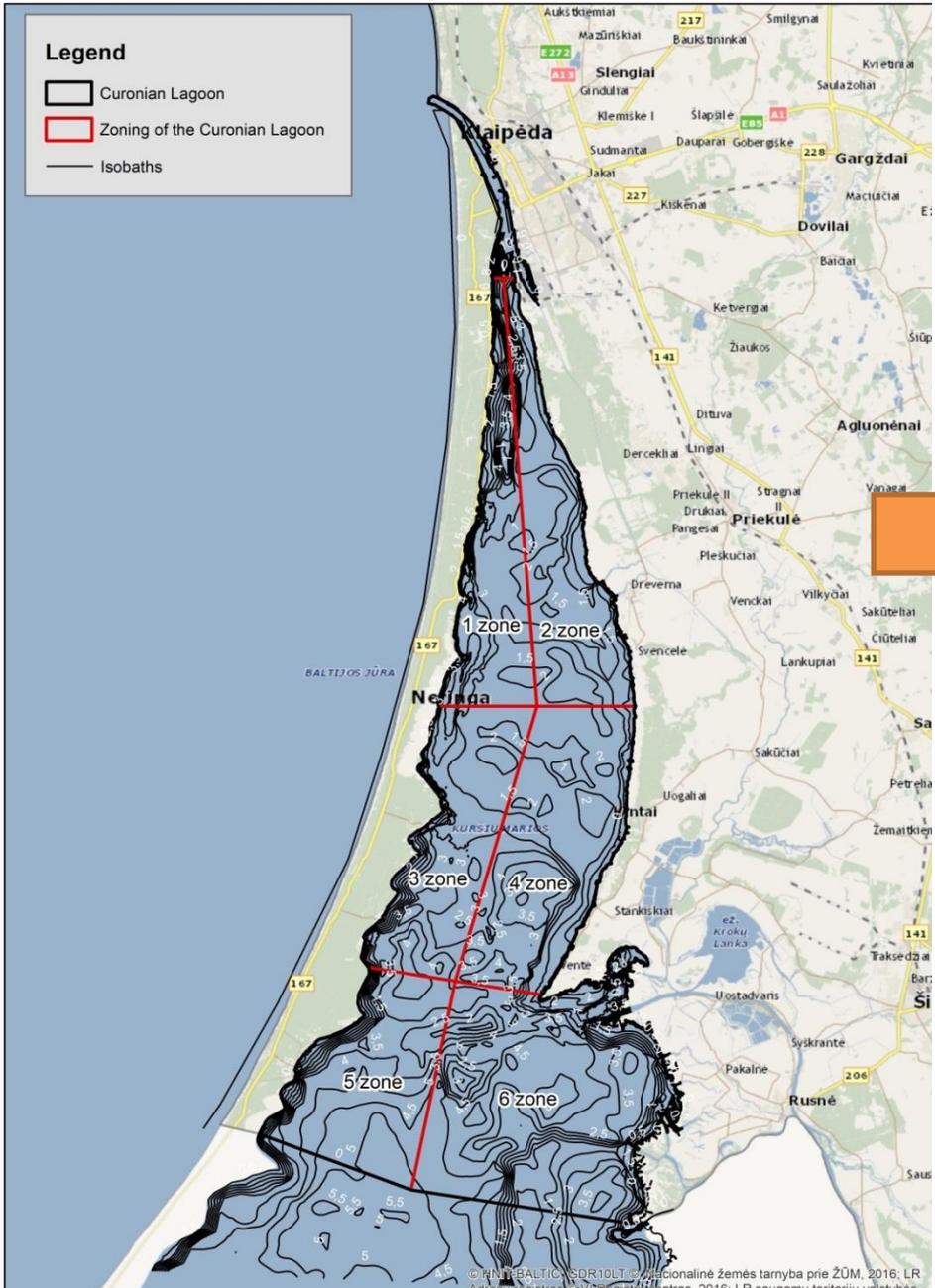




Downloaded data is imported in ArcMap 10.8.1 software and raster dataset converted to point layer. Each point contains Chlorophyll-a concentration in ppb in attribute table of the layer.



Point data layer is then used for IDW (Inverse Distance Weighting) interpolation. This method allows to highlight the hot-spots of the phenomenon that is analyzed.



Data can also be separated by intersection of desired zoning. In this case dataset is separated into 6 zones of Curonian Lagoon in territory of Lithuania.

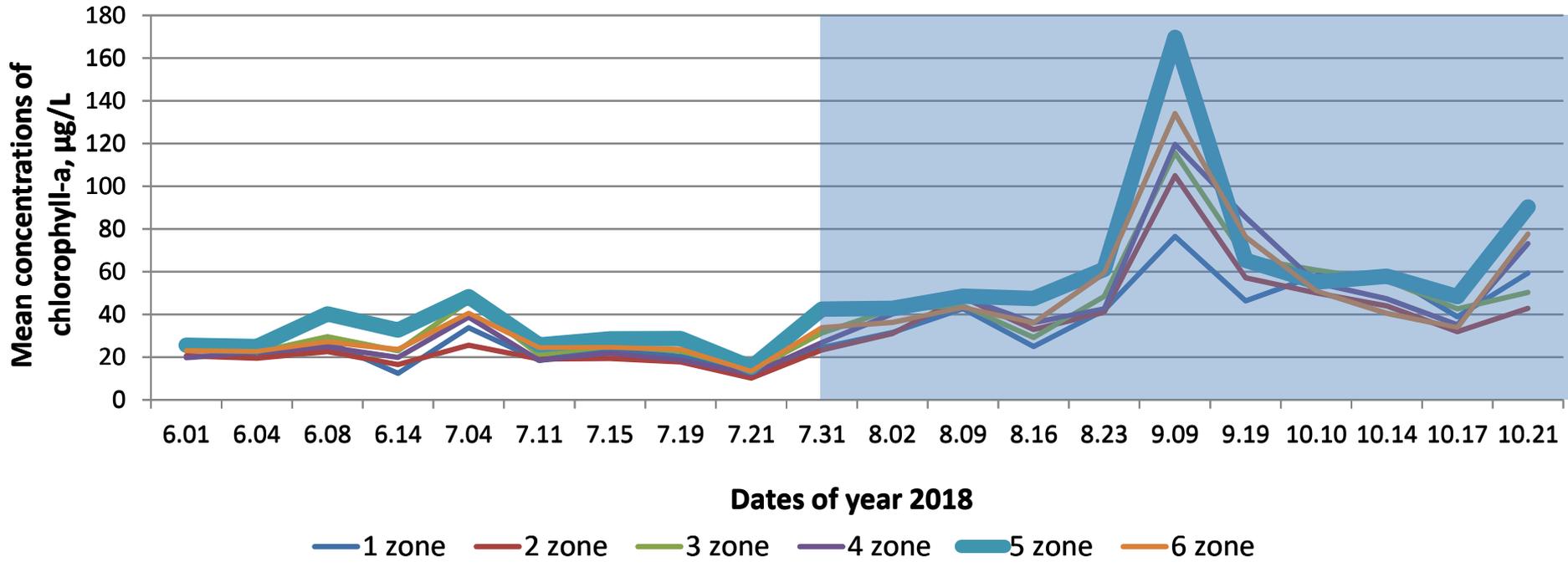
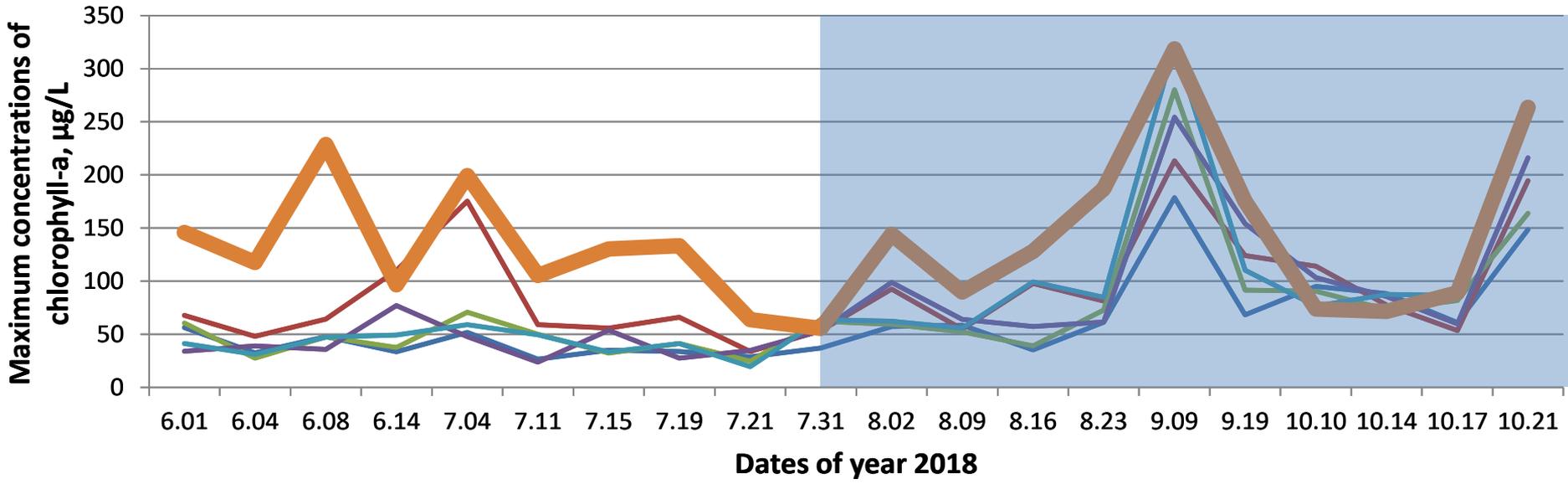
Datasets analyzed

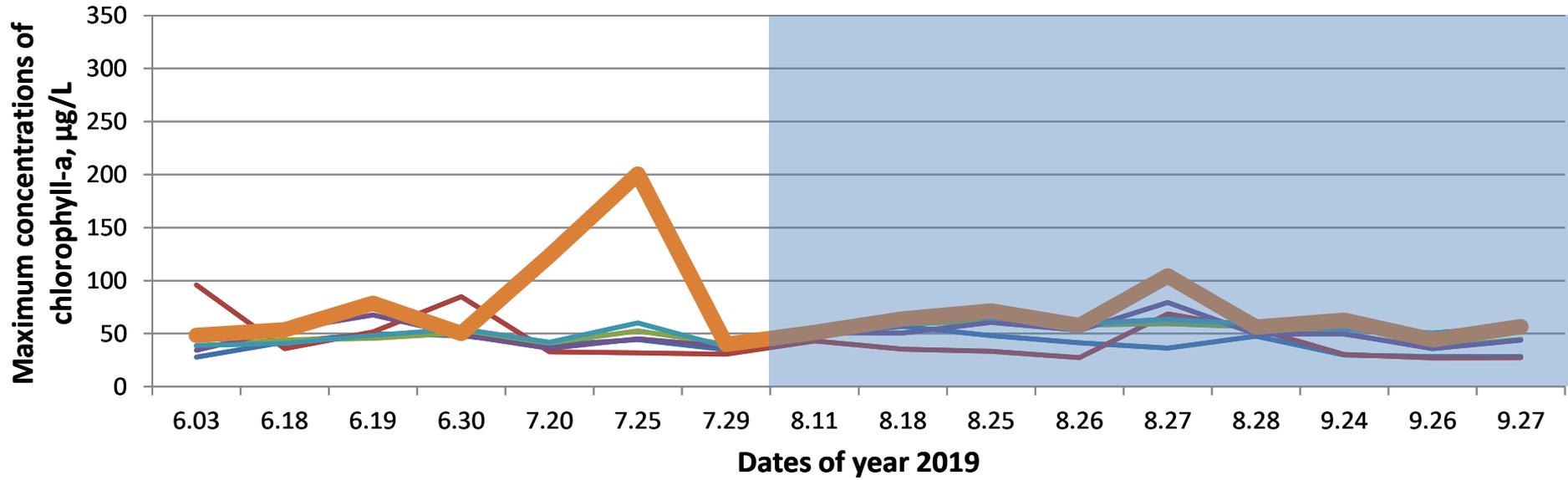
2018

20180601T083623_S3A_UTM300_chl.tif
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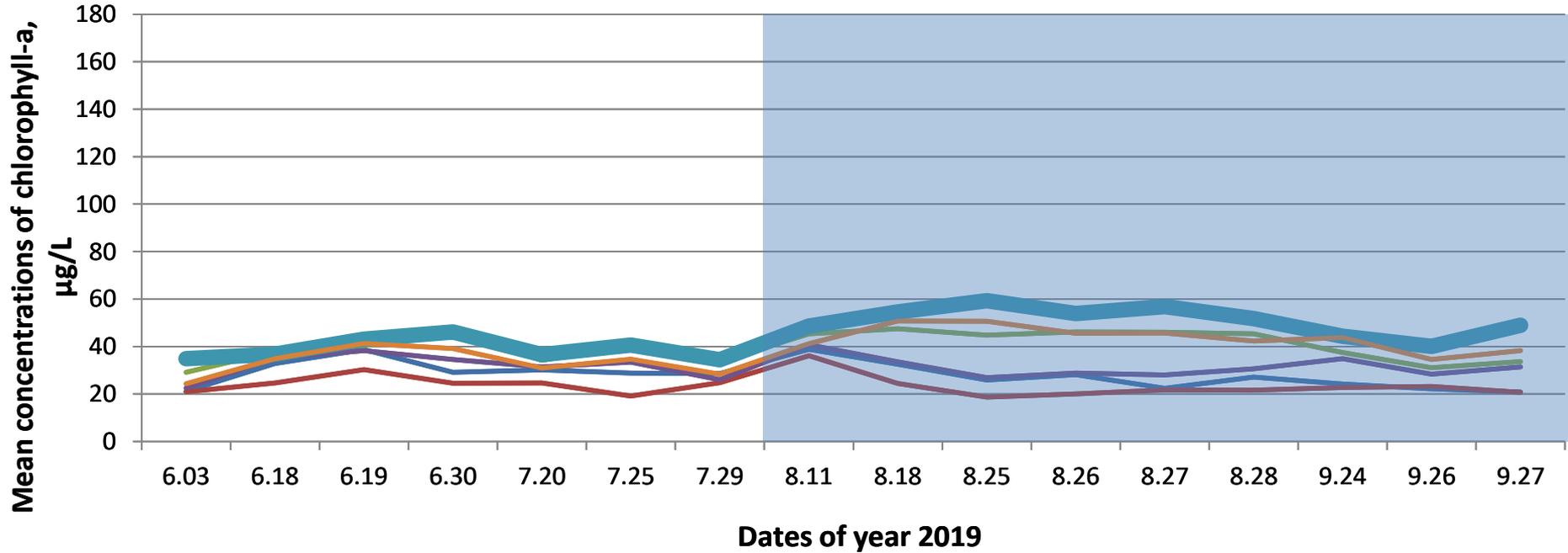
2019

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20190927T091531_S3B_CL_chl.tif





1 zone 2 zone 3 zone 4 zone 5 zone 6 zone



1 zone 2 zone 3 zone 4 zone 5 zone 6 zone

Legend

Sentinel: 2018-09-09, 8:43:56

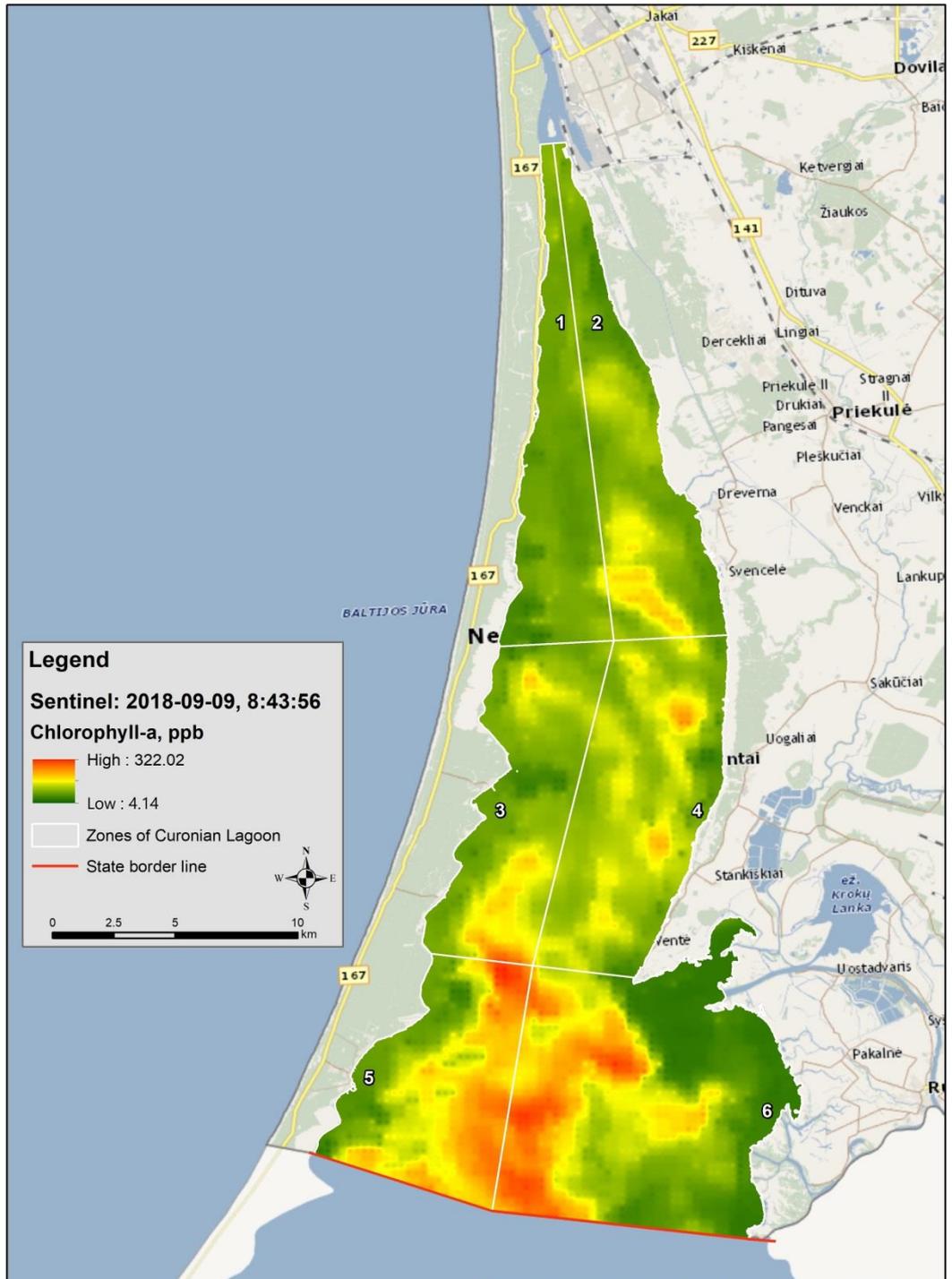
Chlorophyll-a, ppb

High : 322.02

Low : 4.14

Zones of Curonian Lagoon

State border line

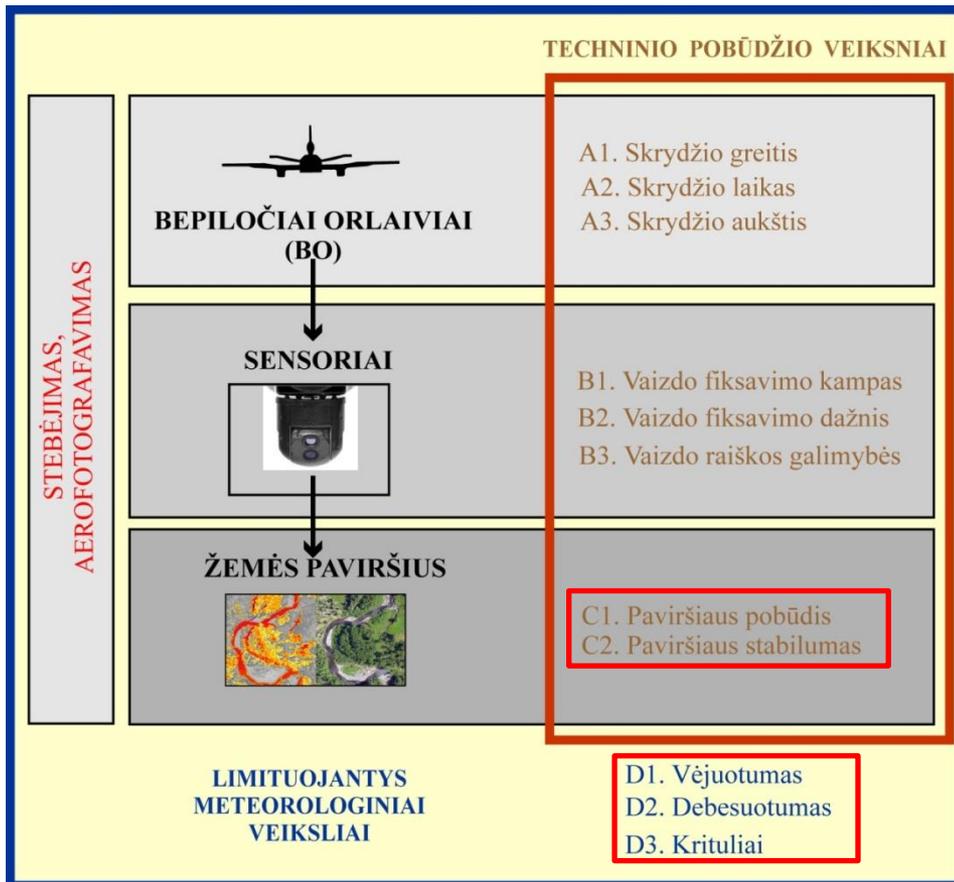


Analysis of UAV images

- **Remote sensing tools used for the research:**
- Unmanned aerial vehicle system consisting of:
 - (A) Fixed wing unmanned aerial vehicle (UAV)
 - B) Visual spectrum and IR cameras



- **Research implementation strategy**



The main factors determining the research results:

Technical factors:

- C1. Nature of the surface
- C2. Surface stability**

Meteorological factors:

- D1. Windiness
- D2. Cloudiness**
- D3. Precipitation**

- **Software:**

- **Agisoft PhotoScan Profesional** (Aerial photogrammetry)
- **eCognition Developer** (Automated segmentation)
- ***ArcMap*** (Spatial data analysis, accounting and visualization)

The phasing of the research process is closely related to the use of the mentioned software.

Research results

I Stage Preparation of aerial photograph material



Jura-0-0



Jura-0-1



Jura-0-2



Jura-1-0



Jura-1-2



Jura-1-3



Jura-1-4



Jura-2-2



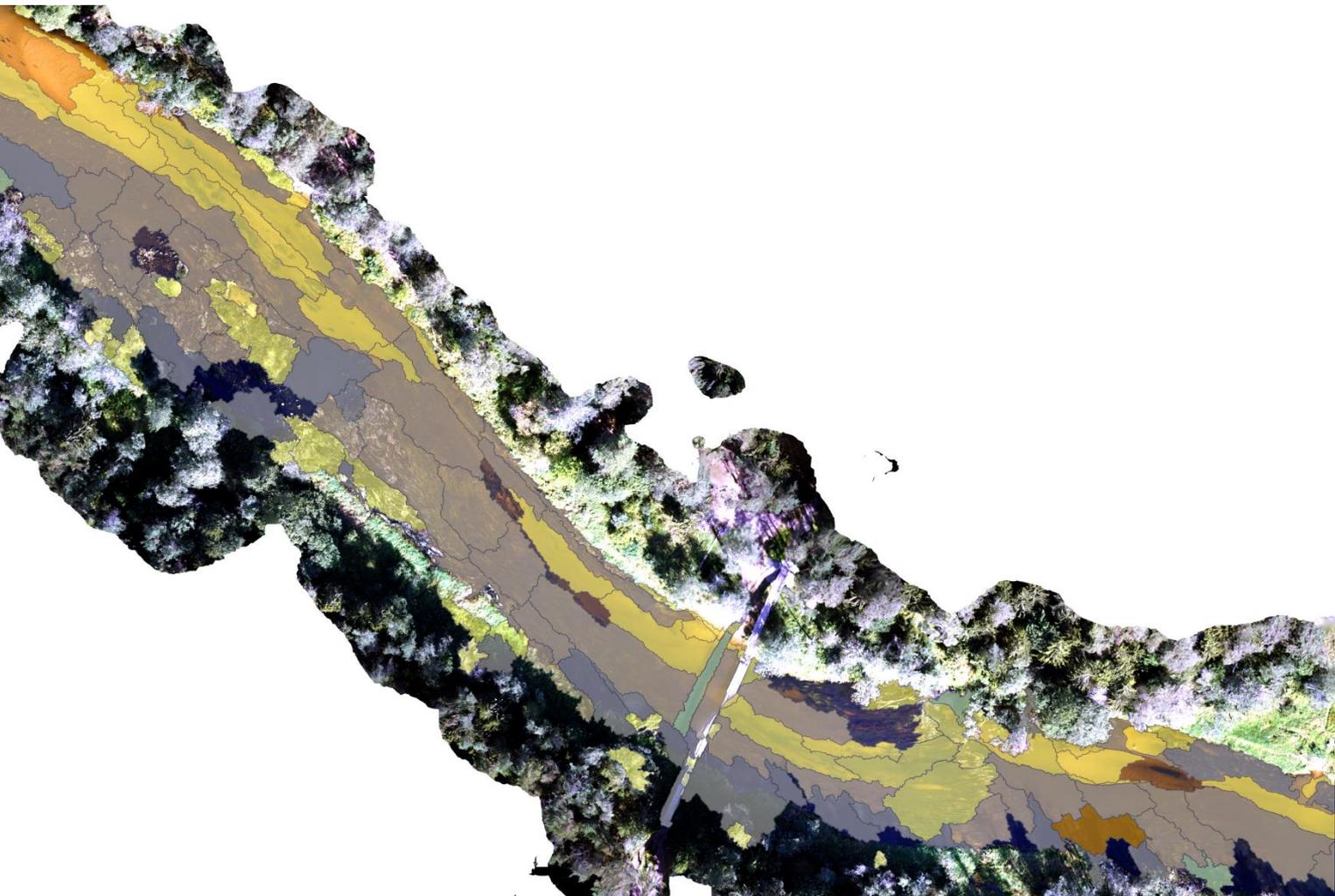
Jura-2-3

II Stage Decoding and analysis of aerial material



Segmentation and classification of riverbed according to bottom and surface properties:

- A. Algae in water mass and surface;
- B. Algae in the bottom and in the water mass;
- C. Algae at the bottom;
- D. Sandy bottom with single plants;
- E. Sandy bottom.



Segmentation and classification of the Šventoji river bed (in the section Mikieriai - Andrioniškis) according to the nature of the bed bottom and surface.

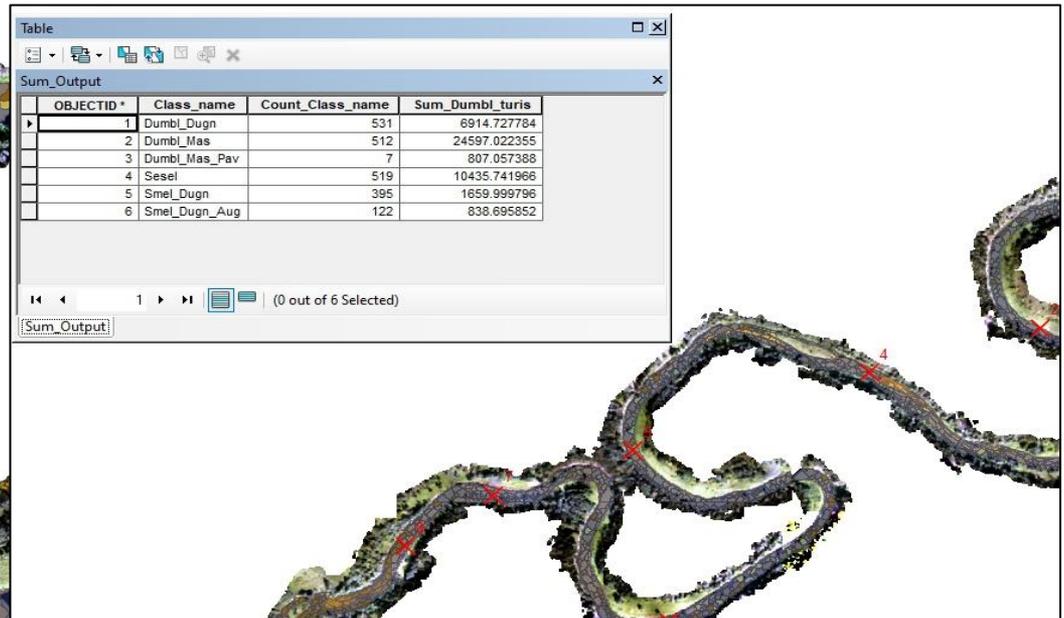
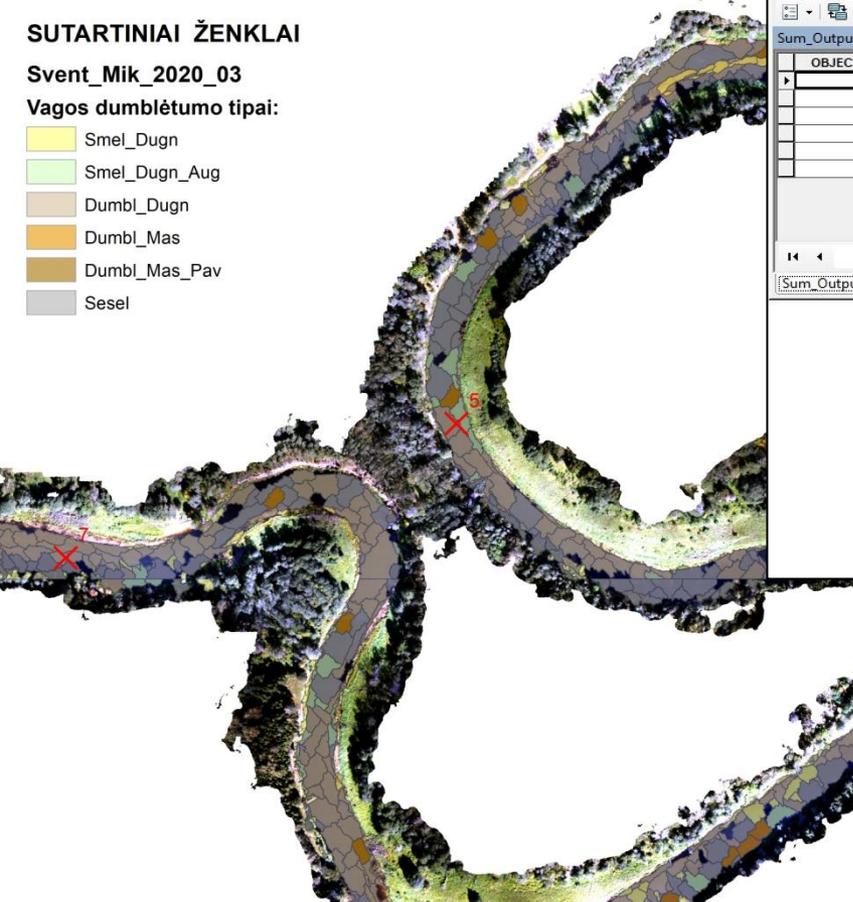
III Stage Algae accounting and resource estimation

SUTARTINIAI ŽENKLAI

Svent_Mik_2020_03

Vagos dumblių tipoi:

-  Smei_Dugn
-  Smei_Dugn_Aug
-  Dumbli_Dugn
-  Dumbli_Mas
-  Dumbli_Mas_Pav
-  Sesel

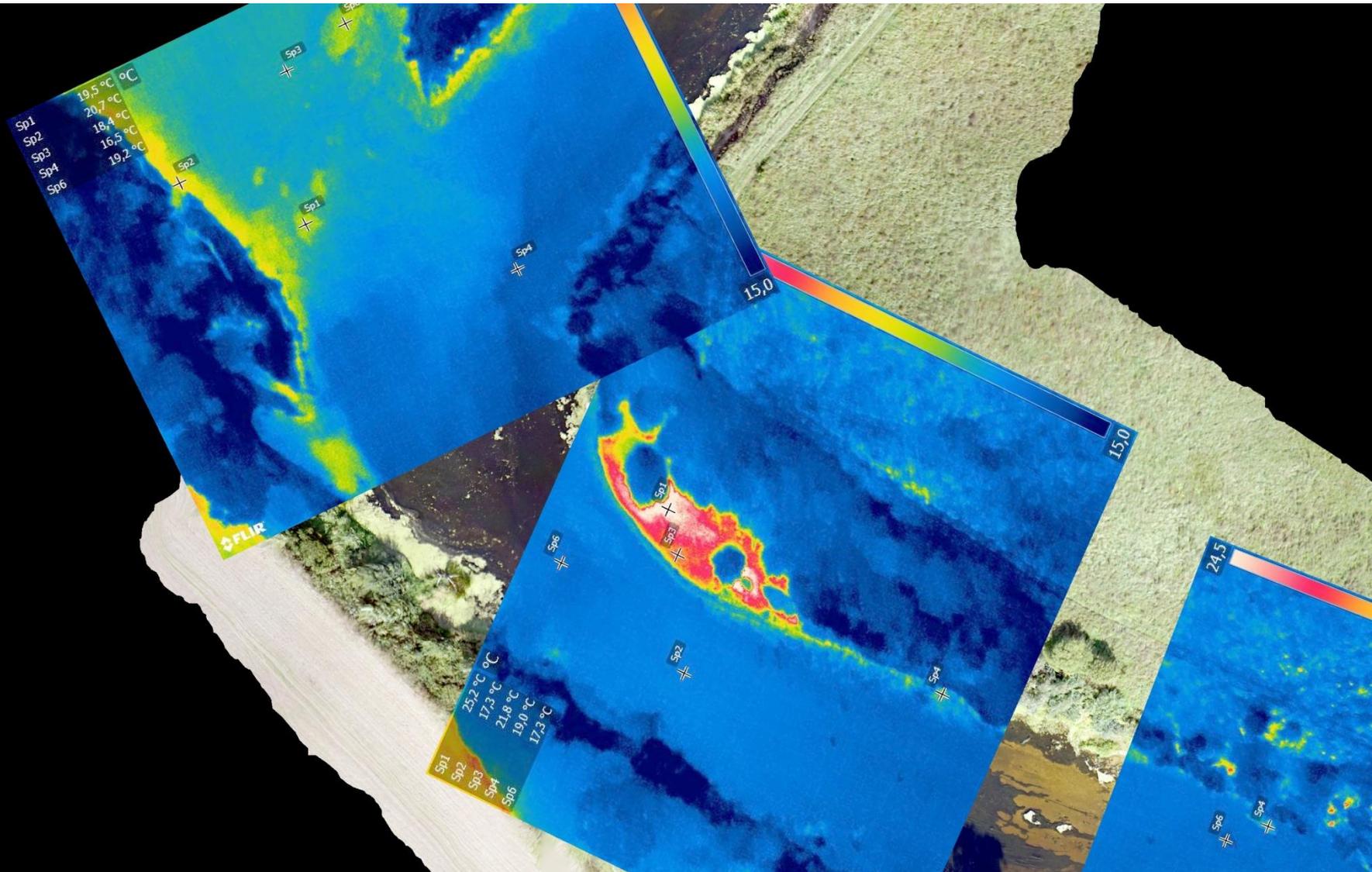


III Stage Algae accounting and resource estimation

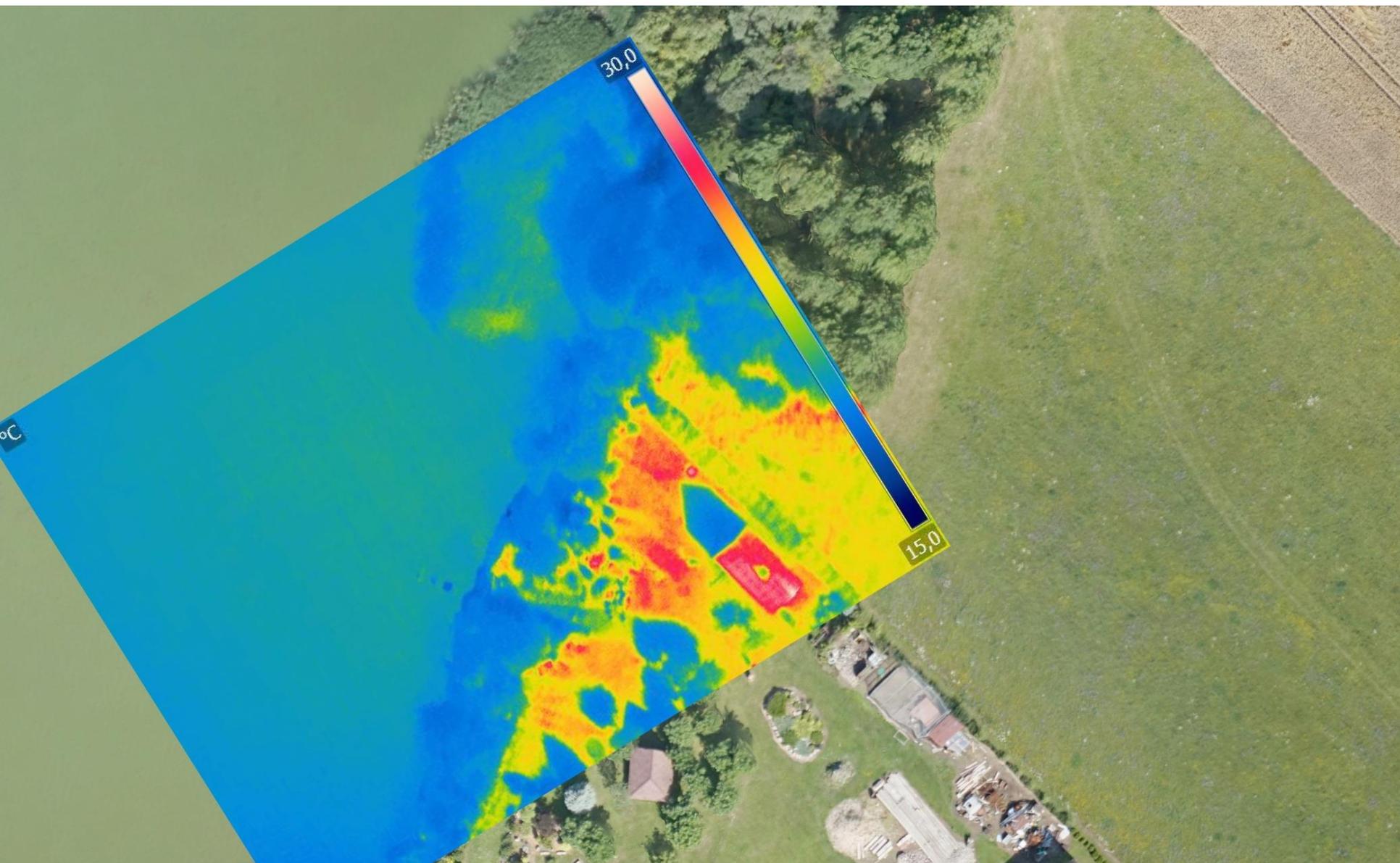
Distribution of areas and volumes of filamentous algae in the section of the Šventoji river (between Mikieriai and Andrioniškis) according to the nature of the river bed.

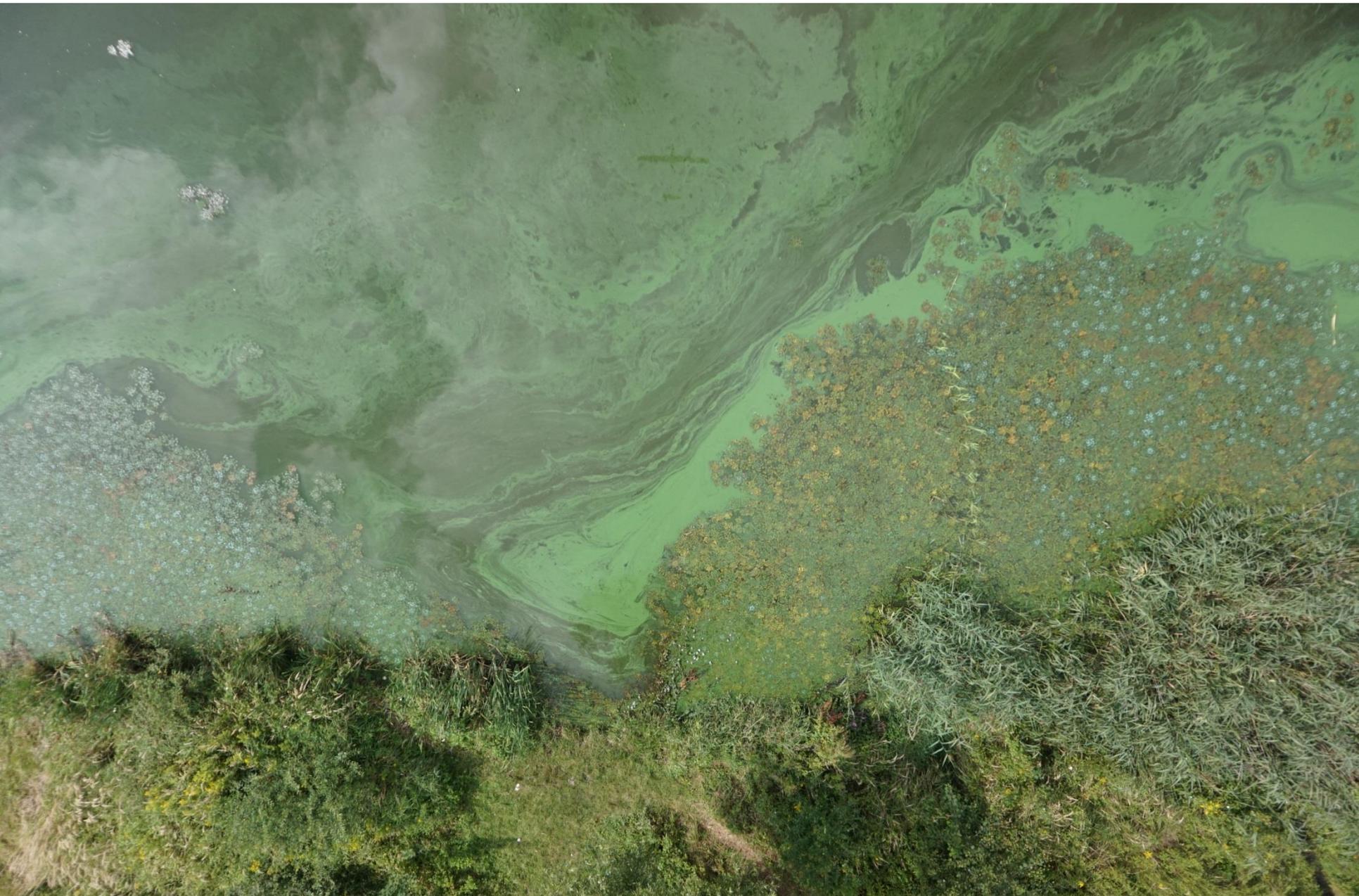
Vagos dugno tipai	Bendras tipui priskiriamų arealų plotas (ha)	Dugno tipo ploto dalis nuo viso tiriamo ploto (%)	Bendras tipui priskiriamų arealų dumblių tūris m ³	Tipo dalies tūris nuo viso tūrio
Dumbliai dugne	69,147	35,36	6914	16,17
Dumbliai vandens masėje	49,149	25,13	24597	57,53
Dumbliai vandens masėje ir paviršiuje	1,008	0,52	807	1,89
Smėlėtas dugnas	15,699	8,03	0	0
Smėlėtas dugnas su augalų tarpais	8,386	4,29	0	0
Šešeliuoti plotai	52,178	26,68	10435	24,41
VISO	195,567	100	42753	100

Possibilities of application of additional algal resource identification methods



Possibilities of application of additional algal resource identification methods





An aerial photograph of a pond with a blue semi-transparent overlay. The pond is surrounded by green vegetation and a dirt path. The text "Thank You" is centered in white on the blue overlay.

Thank You