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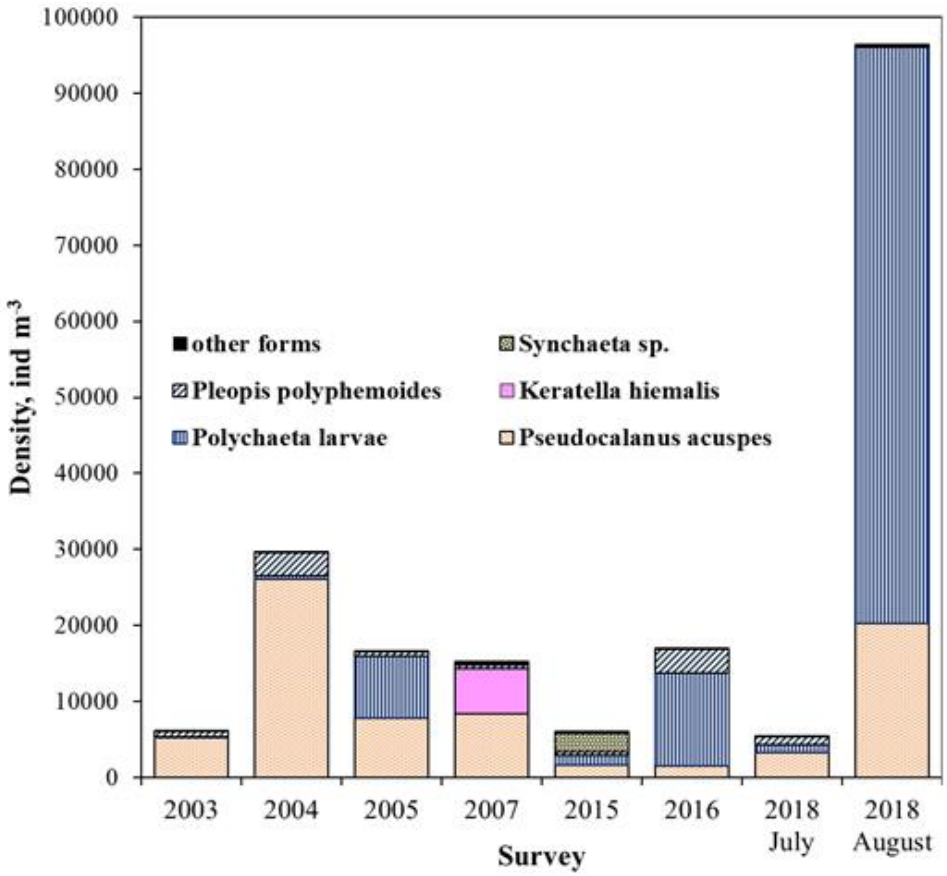
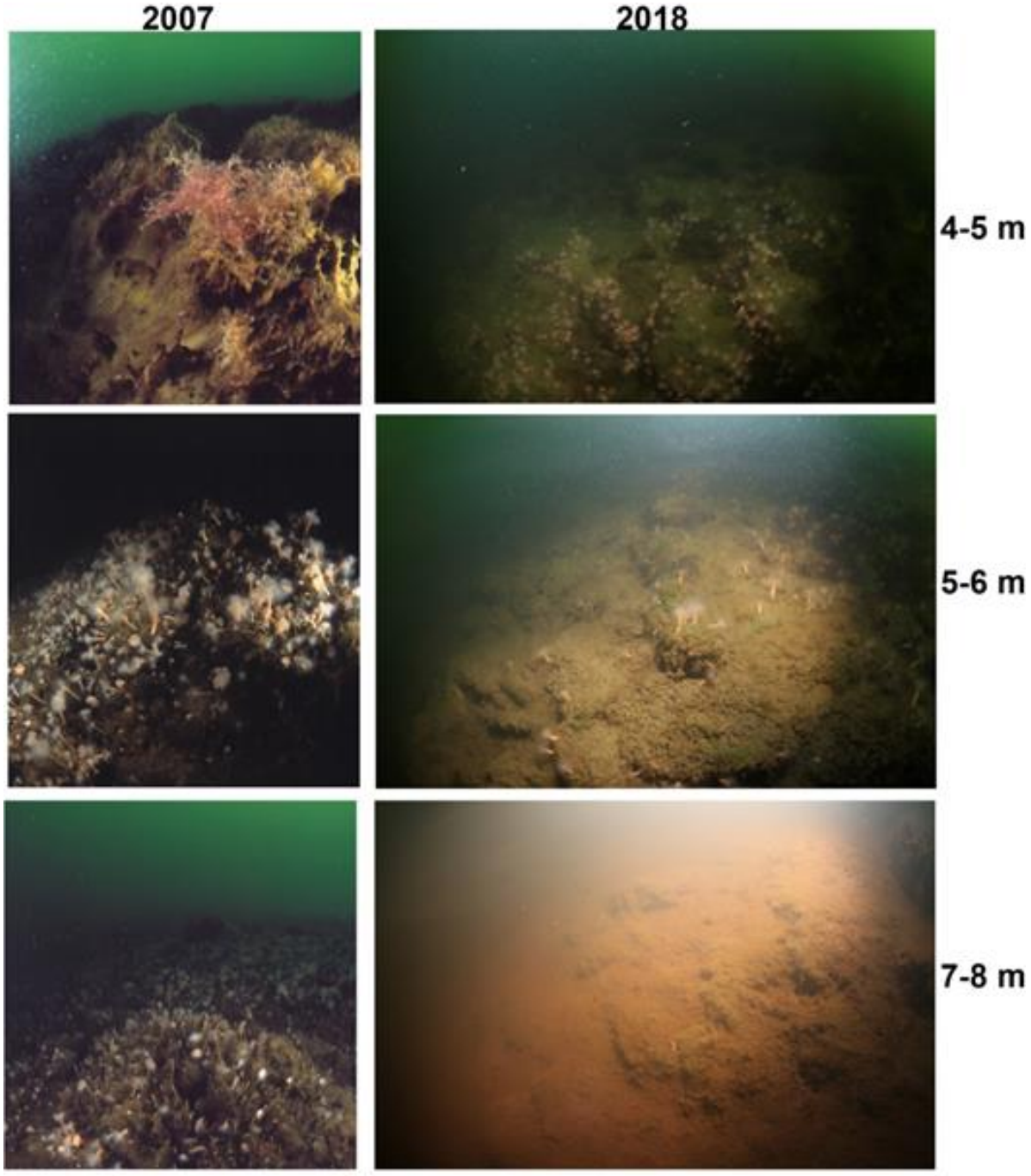
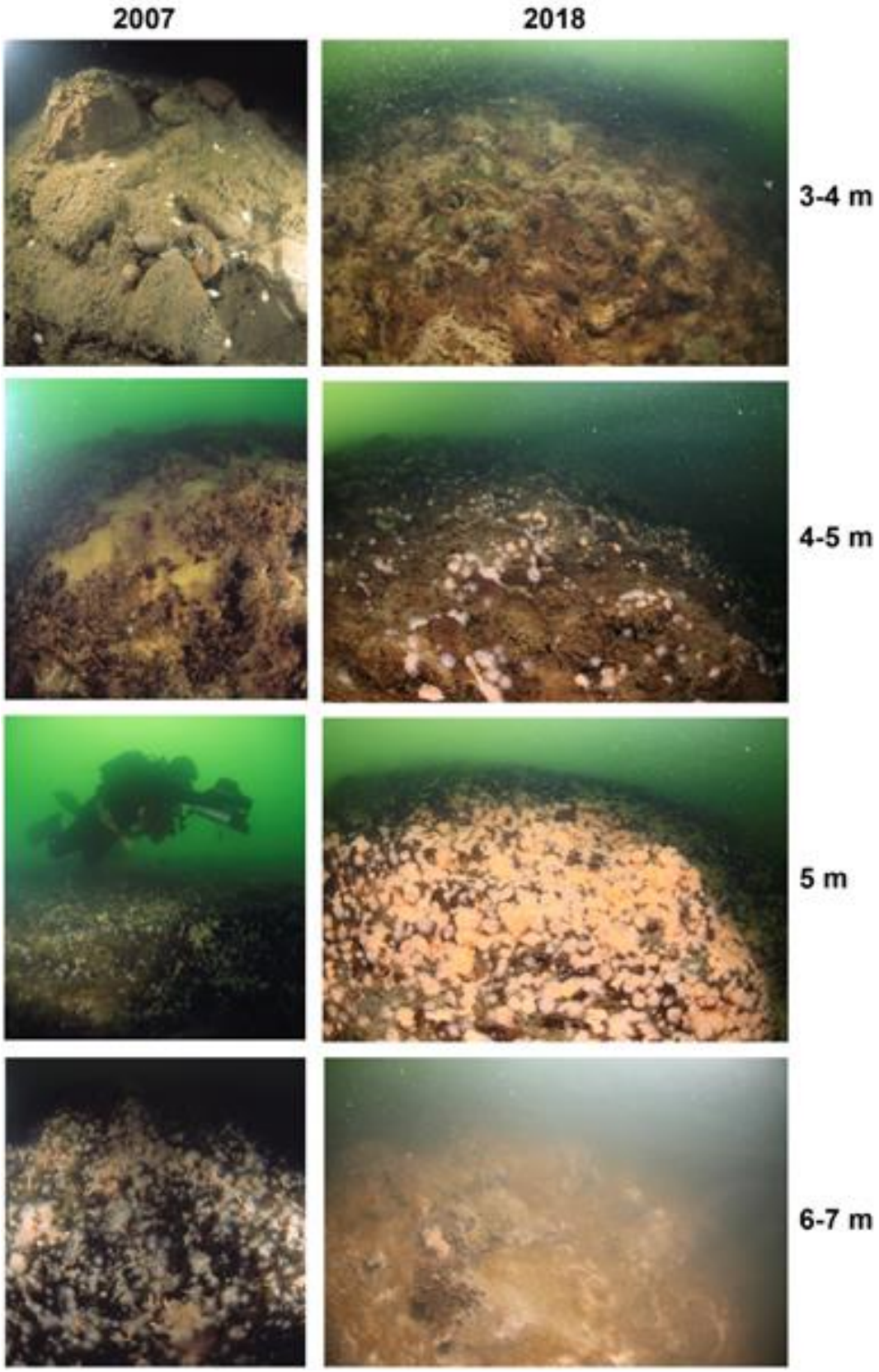


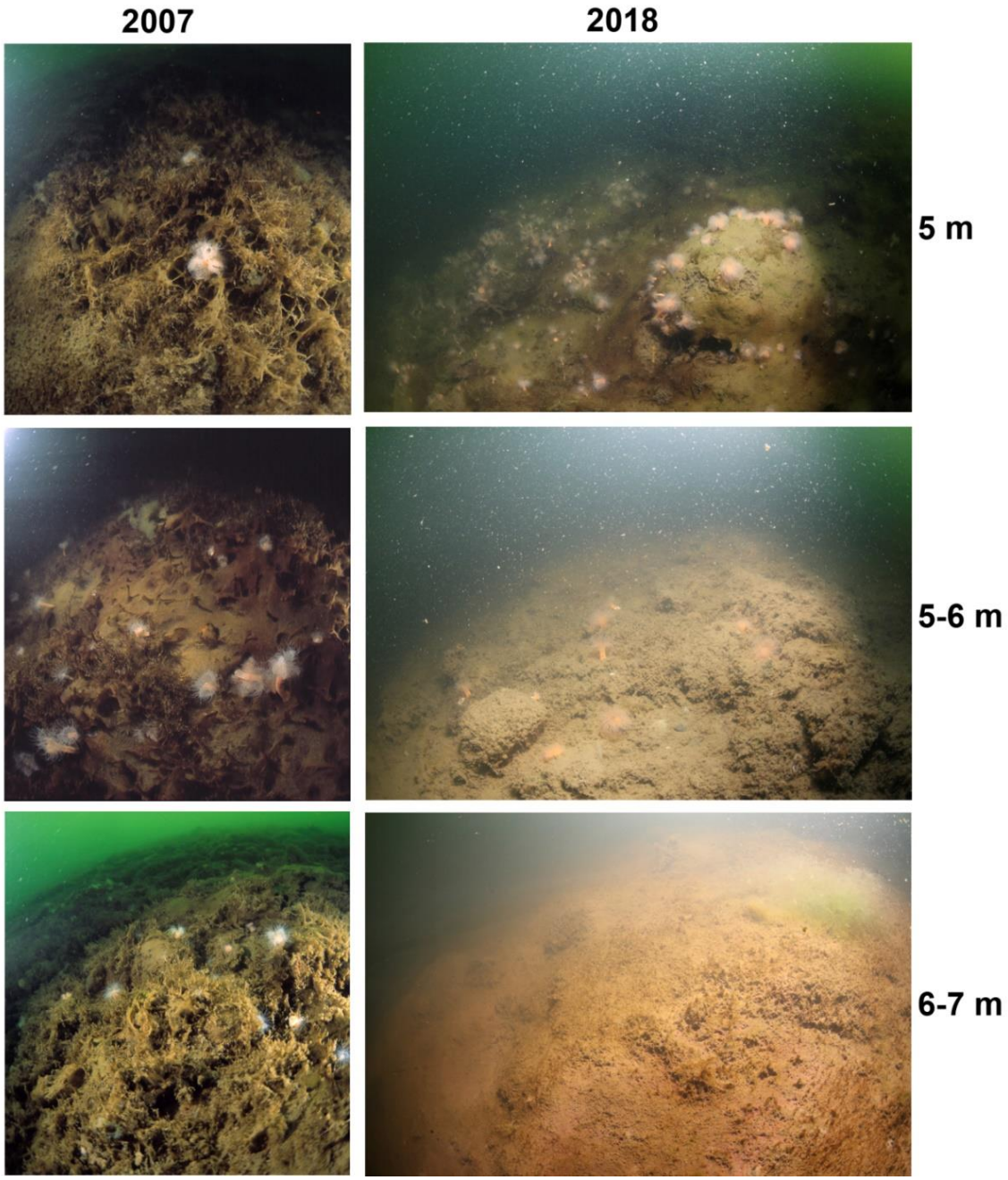
Supplementary Fig. S1. Zooplankton density (ind*m^{-3}) in Lake Mogilnoe in different years. Sampling was performed in the oxic zone, which was at 0-10 m depth in 2003-07 and at 0-8 m depth in 2015-18.



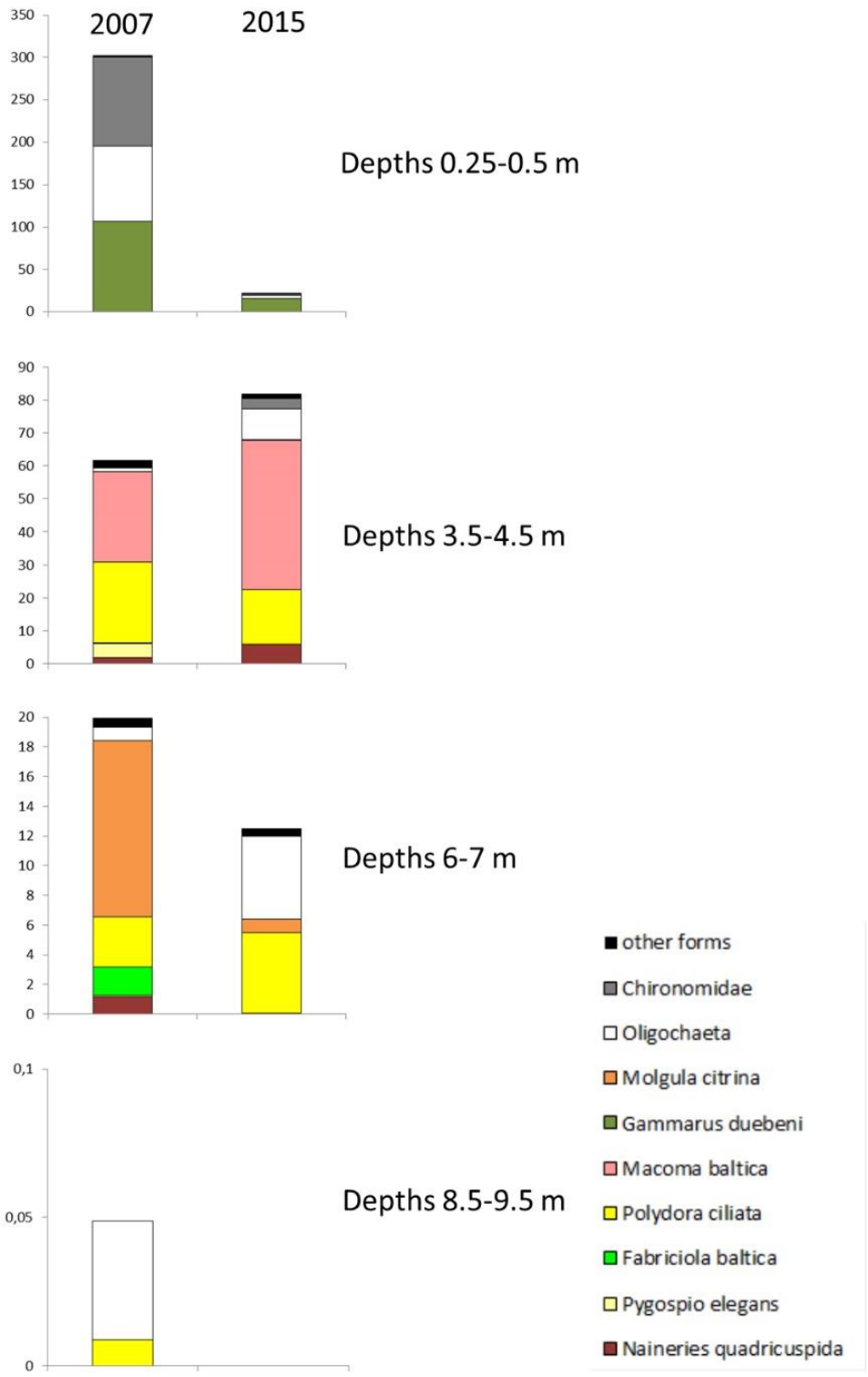
Supplementary Fig. S2. Temporal changes in benthic communities of Lake Mogilnoe along the transect starting at coordinates N 69°19.03', E34°21.05'. Year of survey and depth are indicated.



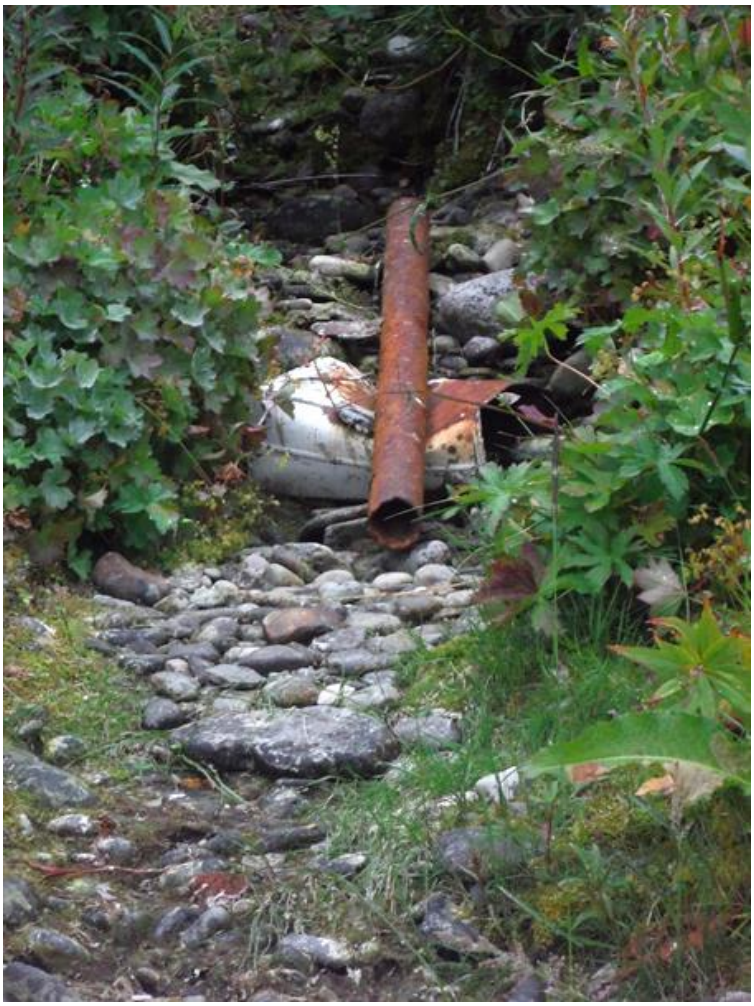
Supplementary Fig. S3. Temporal changes in benthic communities of Lake Mogilnoe along the transect starting at coordinates N 69°19.04', E34°21.01'. Year of survey and depth are indicated.



Supplementary Fig. S4. Temporal changes in benthic communities of Lake Mogilnoe along the transect starting at coordinates N 69°19.06', E34°20.53'. Year of survey and depth are indicated.



Supplementary Fig. S5. Vertical distribution of zoobenthos biomass ($g*m^{-3}$) in Lake Mogilnoe in 2007 and 2015. Note that the y axis scale changes between graphs.



Supplementary Fig. S6. Dried creek bed, photographed on 2 August 2016.

Supplementary Table S1. (a) The vertical distribution of salinity in Lake Mogilnoe in July and August in 1894, 1900, 1901, 1906, 1909, 1921 (reviewed by Derjugin 1925), 1968, 1969 (Gurevich & Shirokolobov 1975, graphs on p. 41), 2006 (Emelyanov et al. 2010), 2003, 2004, 2007 (Strelkov et al. 2014) and 2015, 2016, 2018 (our data). (b) Temperature data (for 2003, 2004, 2007, 2015, 2016, 2018) and oxygen (for 2004, 2015 and 2018) are also provided (the same sources). In 2003, 2004, 2007, 2015, 2016 and 2018 water samples were taken at the point N 69° 19.09', E 34° 21.01'.

(a)

	Salinity (PSU)																
Year	1893	1894	1900	1901	1906	1909	1921	1969	1968	2003	2004	2006	2007	2015	2016	2018	2018
Date	23.08	31.07	8.08	11.08	11.08	03.08	28.08	July	Aug.	25.08	29.07	3-12.07	04.07	21.07	05.08	27.07	23.08
Depth (m)																	
0	1.4	2.1	2.1	2.4	3.5	2.3	3.7	2.3	2.3	2.7	3.25	4.8	3	7.5	6	5.5	7.5
1				2.5	3.5		3.7				3.75	4.8	3	7.5	6	5.6	7.5
2		2.1	2.1	2.5	3.5	2.3	3.7			2.7	4.25	4.8	3	8.0	6.5	5.5	7.5
3				2.5	3.5		3.7				5	4.8	3	15.5	11	14.4	10
4			2.2	2.5	3.5		3.7	5	3		9.25	16	9	23.0	14	17.6	18
5		2.1		2.5	3.5		3.7		5	15.4	19.5	20	15	25.0	22	21.8	20
6			11.7	2.5	12.7	6.0	16.1	10	10		21	23	19	28.0	22	26.2	26
7		4.8		5.5	21.3		23.0	20			23	26.3	24	28.0	24	27.5	26
8		5.2	23.6	15.7	25.2	18.2	26.1	25	20	26.3	25	28.7	28	29.0	26	27.9	28

	Salinity (PSU)																
Year	1893	1894	1900	1901	1906	1909	1921	1969	1968	2003	2004	2006	2007	2015	2016	2018	2018
Date	23.08	31.07	8.08	11.08	11.08	03.08	28.08	July	Aug.	25.08	29.07	3-12.07	04.07	21.07	05.08	27.07	23.08
Depth (m)																	
9		5.6		21.6	27.8		27.9				28	28.8	30	30.0	27	28.1	29
10			28.6	25.4	29.4	25.8	29.0	29			28.5	28.8	31	31.0	28	28.4	30
11		22.1		27.8	30.5		30.0			29.4	29.75	29.8	31	31.5	29.5	29.4	30.50
12			31.7	29.0	31.6		31.5		30		30	30	31	32.0	30.5	29.6	30.5
13				30.1	31.8		31.7	30			30.5	30	30	32.0	30.5	29.8	30.5
14				31.9	32.0	30.6	31.7				28.2	30.2	30	31.5	31	29.9	30.5
15	32.5	32.1	31.0	32.0	32.0		31.7	30.52	30.77	30.4	28	30.4		31.5	31.5	29.9	30.5

(b)

	Temperature (°C)					Oxygen (mg/l)					
Date	25.08.03	29.07.2004	04.07.2007	21.07.15	05.08.16	25.07.18	23.08.18	29.07.2004	21.07.15	25.07.18	23.08.18
Depth (m)											
0	13.4	17.8	11.75	11.1	15.7	22.8	14.4	9.1	9.9	8.34458	10.5

1		17.4	11.63	11.1	15.7	22.8	14.5	8.9	9.9	8.0	10.6
2	13.3	17.4	11.63	11.3	15.5	22.8	14.5	8.8	9.7	8.1	10.8
3		16.9	11.58	12.5	16.3	16.7	15.8	8.7	13.0	10.1	11.0
4		15.8	10.44	12.6	16	14.2	16.1	9.1	14.1	11.7	10.8
5	12.8	14.0	8.57	12.3	15.4	11.8	14.4	9.0	10.1	12.8	12.9
6		13.2	7.97	12.0	15.1	11.8	13.6	8.5	5.0	0.6	4.6
7		11.9	8.78	12.1	14.5	11.8	12.9	8.5	0.6	0.6	2.5
8	11	11.4	9.80	10.6	13	10.5	12.1	7.3	0.5	0.0	0.0
9		11.5	9.61	8.3	11.5	9.6	10.7	3.4	0.4	0.0	0.0
10		11.4	8.47	8.2	11.2	9.5	10.2	2.0	0.3	0.0	0.0
11	10.6	11.6	8.26	8.2	10.3	9.4	9.8	1.4	0.0	0.0	0.0
12		10.7	8.03	8.0	9.5	9.2	9.6	1.3	0.0	0.0	0.0
13		10.4	7.90	8.0	9.5	9.1	9.3	1.1	0.0	0.0	0.0
14		10.1	7.67	8.0	9	9	9.3	1.0	0.0	0.0	0.0
15	10.3	12.0	7.61	8.0	9.2	8.9	9.3	0.9	0.0	0.0	0.0

Supplementary Table S2. Total list of zooplankton species registered in Lake Mogilnoe. Taxon occurrence is denoted by a cross. Unless otherwise indicated, the samples were collected in July–September. Data sources are as follows: 1898-1915 (Derjugin 1925), 1967 (Fomin 1975), 1997-98 (Drobysheva 2001), 2003-07 (Strelkov et al. 2014) and 2015-18 (our data). Species names used in previous studies are given in parentheses. Synonymization was based on WoRMS (www.marinespecies.org) and literature sources listed at the end of the document.

Taxon	Form[d]	Year of survey															
		1898	1900	1901	1906	1909	1915	1967	1997/98	2003	2004	2005	2007	2015	2016	25 July 2018	21 Aug. 2018
Hydrozoa																	
Rathkea octopunctata Sars (*Margellium* (*Rathkea*) *octopunctata* Sars)	M	-	-	+	-	+	+	-	-	-	-	+	+	-	+	-	-
Scyphozoa																	
Cyanea arctica Péron & Lesueur	M	+	-	-	-	+	-	-	-	+	+	+	+	+	+	+	+
Aurelia aurita L.	M	-	-	-	-	-	-	+	-	-	-	-	-	-	+	-	-
Polychaeta																	
Spionidae larvae	M	+	-	-	+	-	+	-	+	+	+	+	+	+	+	+	+
Rotifera																	
Keratella quadrata Müller	F	-	+	-	-	-	-	+	+	+	-	-	+	-	-	-	-
Synchaeta sp.	M	+	-	-	-	-	-	-	+	-	-	-	-	+	-	-	+
Rotifer sp.[a]	F	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-
Cephalodella sp. (*Diaschiza* sp.)[a]	F	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-
Euchlanis oropha Gosse[a]	F	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-

Taxon	Form[d]	Year of survey															
		1898	1900	1901	1906	1909	1915	1967	1997/98	2003	2004	2005	2007	2015	2016	25 July 2018	21 Aug. 2018
Colurella dicentra Gosse (*Colurus dicentrus* Gosse)	F	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-
Colurella colurus Ehrenberg (*Monura colurus* Ehrenberg)[a]	F	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-
Lepadella patella Ehrenberg (*Metopidia oblonga* Ehrenberg, *Metopidia similis* Lucks)[a]	F	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-
Testudinella elliptica Ehrenberg (*Pterodina elliptica* Ehrenberg)[a]	F	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-
Notholca striata Müller	F	-	-	-	-	-	+	+	-	-	-	-	-	-	-	-	-
N. bipalium Muller (*N. spinifera* Gosse)[a]	F	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-
Cladocera																	
Podon leuckarti Sars	B	-	+	+	+	-	-	-	+	+	+	+	+	+	-	+	-
Pleopis polyphaemoides Leuckart (*Podon polyphemoides* Leuckart)	B	-	+	-	-	-	+	-	-	+	+	+	+	+	+	+	+
Daphnia pulex Leydig	F	-	+	+	-	-	+	-	+	-	-	-	-	-	-	-	-
Bosmina (Eubosmina) coregoni Baird[b]	B	-	-	-	-	-	-	-	-	-	-	-	-	+	+	-	-
Evadne nordmanni Loven	B	-	+	-	-	-	+	-	-	-	+	-	-	-	-	-	-

Taxon	Form[d]	Year of survey															
		1898	1900	1901	1906	1909	1915	1967	1997/98	2003	2004	2005	2007	2015	2016	25 July 2018	21 Aug. 2018
Macrothrix hirsuticornis Norman & Brady	F	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-
Chydorus sp.	F	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-
Copepoda																	
Centropages hamatus Lillejeborg	M	-	-	+	+	-	-	+	-	+	+	+	+	+	+	-	+
Calanus finmarchicus Gunnerus[c]	M	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pseudocalanus acuspis (*Pseudocalanus elongatus* Boeck)	M	-	-	+	+	-	+	-	+	+	+	+	+	+	+	+	+
Temora longicornis Müller	M	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-
Acartia sp.	M	-	-	+	+	-	-	-	+	-	-	-	-	-	-	-	-
Microsetella norvegica Boeck (*Microsetella atlantica* Brady & Robertson D.)	M	-	+	-	-	-	-	-	+	+	+	-	-	-	-	-	-
Tachidius sp.	B	-	+	-	-	-	-	-	-	+	+	+	+	-	-	-	-
Oithon asimilis Claus	M	-	+	-	+	-	-	-	-	-	-	-	-	-	-	-	-
Cyclops sp.	F	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-
Tisbe furcata Baird (*Idyaea furcata* Baird)	M	-	+	+	+	-	-	-	-	-	-	-	-	+	+	+	+
Halectinosoma curticorne	M	-	+	-	-	-	+	-	-	-	-	-	-	-	-	-	-

Taxon	Form[d]	Year of survey															
		1898	1900	1901	1906	1909	1915	1967	1997/98	2003	2004	2005	2007	2015	2016	25 July 2018	21 Aug. 2018
Boeck (*Ectinosoma curticorne* Boeck)																	
Nitokra spinipes Boeck (*Nitocra spinipes* Boeck)	M	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-
Mesochra sp.	F	-	-	-	+	-	+	-	-	-	-	-	-	-	-	-	-
Diaptomus sp.	F	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-
Cirripedia																	-
Cirripedia nauplius	M	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-
Echinodermata														-	-	-	-
Ophiopluteus	M	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mollusca																	
Bivalvia veliger	M	-	-	-	-	-	-	-	-	-	+	+	-	+	-	-	-
Gastropoda veliger	M	-	-	-	-	-	+	-	-	-	+	-	-	-	-	-	+

[a] Species registered only in near-bottom samples from the freshwater layer. [b] Exo-skeletons of Bosmina were observed in 2003. [c] *C. finmarchicus* was recorded outside the July–September season (Derjugin 1925) and so is listed as absent in the early 20th century surveys. [d] Classification of forms in regard to salinity—marine (M), freshwater (F), brackish (B)—is supplemented by information presented by Derjugin (1925) and Fomin (1975).

Supplementary Table S3. Total list of benthic taxa registered in Lake Mogilnoe. Taxon occurrence is denoted by a cross. The 1898-1921 data are from Derjugin (1925), 2003-07 from Strelkov et al. (2014) and 2015 from the present study. Synonymization was based on WoRMS (www.marinespecies.org) and literature sources listed at the end of the document. Old species names as given by Derjugin (1925) are given in parentheses.

	Period of studies		
Form	1898-1921	2003-07	2015
Porifera			
Protosuberites epiphytum Lamark (Suberites sp.)	+	+	+
Dendoricella flabelliformis Hansen (*Homoeodictya flabelliformis* Hansen)	+	-	-
Terpios gelatinosa Bowerbank (*Terpios fugax* Duchassaing & Michelotti)	+	-	-
Cnidaria			
Lafoea dumosa Fleming (*Lafoea parvula* Hincks)	+	-	-
Obelia geniculata L.	+	-	-
Hydrallmania falcata L.	+	-	-
Symplectoscyphus tricuspidatus Alder (*Sertularella tricuspidata* Alder)	+	-	-
Dynamena pumila L. (Sertulariapumila L.)	+	-	-
Halecium mirabile Schydlowsky	-	+	-
Leuckartiara abyssi Sars	-	+	-
Coryne pusilla Gaertner	+	+	-
Metridium senile L. (*Metridium dianthus* Ellis)	+	+	+
Nemertini			
Lineus sp.	+	+	+
Nematoda			

Form	Period of studies		
	1898-1921	2003-07	2015
Nematoda gen. sp.	+	+	+
Annelida			
Pherusa plumosa Müller (*Stylarioides plumosa* Müller)	+	-	-
Capitella capitata Fabricius	+	-	-
Pygospio elegans Claparède	-	+	+
Fabriciola baltica Friedrich	-	+	+
Hesionidae gen. sp.	-	+	+
Nainereis quadricuspida Fabricius	+	+	+
Polydora ciliata Johnston (*Polydora* sp.)	+	+	+
Pseudopotamilla reniformis Müller	+	+	-
Tubificoides benedeni Udekem (*Tubifex (Peloscolex) bendeni*)	+	+	+
Olygochaeta gen. sp.	+	+	+
Pantopoda			
Pycnogonum litorale Ström	+	-	-
Mollusca			
Stenosemus albus L. (*Ischnochiton albus* L.)	+	-	-
Margarites helicinus Phipps (*Margarita helicina* Phipps)	+	-	-
Littorina littorea L.	+	-	-
Onoba aculeus Gould (*Rissoa aculeus* Gould)	+	-	-
Coryphella verrucosa Johnston (*Coryphella rufibranchialis* Johnston)	+	-	-
Skeneopsis planorbis Fabricius (*Skenea planorbis* Fabricius)	+	+	-

Form	Period of studies		
	1898-1921	2003-07	2015
Mytilus edulis L.	-	+	+
Macoma calcarea Gmelin (*Tellina calcarea* Chemnitz)	+	-	-
Astarte borealis Schumacher	+	-	-
Macoma baltica L. (*Tellina baltica* L.)	+	+	+
Astarte montagui Dillwyn *(Astarte banksii* Leach in Ross*)*	+	+	-
Arthropoda			
Munna sp.	-	+	-
Jaera marina Fabricius	+	+	+
Gammarus duebeni Liljeborg (*Gammarus locusta* L.)	+	+	+
Gammarus locusta L.	-	-	+
Cricotopus sp.	+	+	+
Bryozoa			
Bowerbankia imbricata Adams	-	+	-
Electra crustulenta Pallas (*Membranipora muelleri* Bidenkap)	+	+	+
Echinodermata			
Stephanasterias albula Stimpson (*Stichaster albulus* Stimpson)	+	-	-
Ophiura robusta	-	-	+
Tunicata			
Molgula citrina Alder & Hancock (*Caesira nana* Kupffer)	+	+	+
Molgula manhattensis De Kay (*Caesira ampulloides* Beneden)	+	-	-
Molgula griffithsii Macleay (*Caesira crystallina* Müller)	+	-	-

Form	Period of studies		
	1898-1921	2003-07	2015
Styela rustica L. (*Tethyum rusticum* L.)	+	-	-
Styela coriacea Alder & Hancock (*Goniocarpa coriacea* Alder & Hancock)	+	+	-
Ascidia prunum Müller (*Phallusia prunum* Müller)	+	-	-
Ciona intestinalis L.	+	-	-
Eugyra sp. (*Eugyrioides glutinans* Müller)	+	-	-

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