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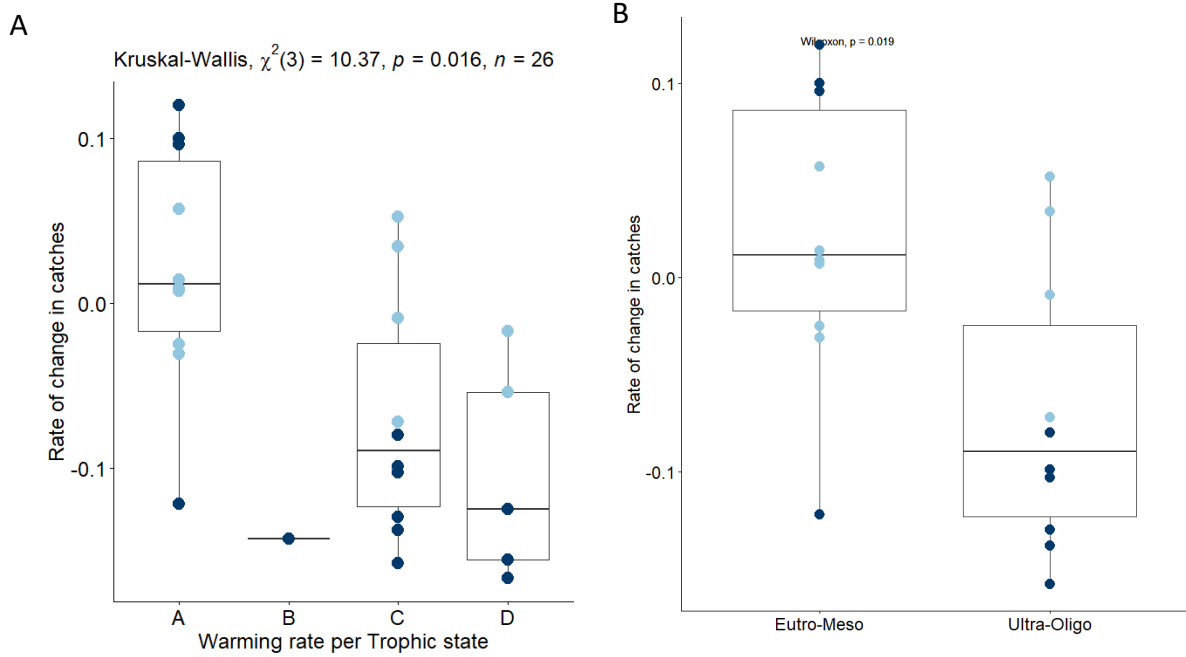
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1135 **Supplementary Fig1.** Hill & Smith analysis of rate of change in catches and environmental
 1136 variables. The 3 lakes (*L. Peipsi*, *Vänern* and *Vättern*) where trends in catches could be
 1137 influenced by strong changes in fishing effort were not included in the analysis. A: projection
 1138 of the seven variables onto the first factorial plane of the Hill & Smith analysis (axis 1
 1139 horizontal and axis 2 vertical) with SON-trend, JJA-trend and MAM-trend being for autumn
 1140 (September-November), summer (July-August) and spring (March-May) air temperature
 1141 trends respectively. B-C: projection of the lakes onto the first factorial plane of the Hill &
 1142 Smith analysis and barycenter of the group of lakes showing significant and non-significant
 1143 increase or decrease (Increase, IncreaseNs, Decrease, DecreaseNs respectively) in their
 1144 catches. The group of lakes with significant catch declines segregated significantly
 1145 (Discriminant analysis, p -value<0.05) from the other lakes, indicating that the selected
 1146 variables were strong predictors of decline in coregonine catches.

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1152 *Supplementary Figure 2. A. Comparison of rate of changes in catches among four lakes*

1153 *categories (A: nutrient-rich in a fast warming area, B: nutrient-rich in a slow warming area,*

1154 *C: nutrient-poor in a fast warming area, D: nutrient-poor in a slow warming area). B.*

1155 *Comparison of rate of changes between nutrient-rich and nutrient-poor lakes located in fast*

1156 *warming area. The color of the circles indicates the level of significance of the long-term trend*

1157 *in catches (p -value <0.05 : dark blue; not significant: light blue).*

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1161 *Supplementary Table 1: Information on the taxonomic composition of coregonines catches*
1162 *(“No”: only one form was recorded; “Yes”: multiple species or forms were recorded; “Not*
1163 *indicated”: no information available), fishing practices and stressors that have been*
1164 *identified as main drivers of coregonine stocks over the last decades.*

1165 *Cited references:* ¹ Frossard V. et al. 2023 - Rapport SILA - Campagne 2023. ² Izmet'eva et
1166 al. 2016. ³ Jenny J.-P. et al. - Rapport CISALB - Campagne 2023. ⁴ DeWeber J.T., Baer J.,
1167 Rösch R., and Brinker A., 2022. ⁵ ECCC and US EPA (2022) : Environment and Climate
1168 Change Canada and the U.S. Environmental Protection Agency. 2022. State of the Great
1169 Lakes 2022 Technical Report. Cat No. En161-3/1E-PDF. EPA 905-R22-004. ⁶ Tran-Khac et
1170 al. Rapport CIPEL - Campagne 2023. ⁷ Bourinet et al. 2023. ⁸ Rösch et al. 2018. ⁹ Gugele et
1171 al. 2023. ¹⁰ Anneville et al. 2017. ¹¹ Rook et al. 2022. ¹² Tammiksaar and Kangur, 2020.

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Lake	Multiple species and species complex of catch data	Duration of fishing period (months)	Commercial fishing method	Fishermen have to submit catch report	Are catch reports carefully validated	Are catch details open access
Annecy	No	10	Gillnets	Yes	Not indicated	No
Baikal	Yes: vendace and whitefish	6	Gillnets	Yes	Yes	Yes
Bienne	Not indicated	Not indicated	Gillnets	Not indicated	Not indicated	
Bourget	No	10	Gillnets	Yes	Not indicated	No
Brienz	Not indicated	Not indicated	Gillnets	Not indicated	Not indicated	
Constance	Yes: whitefish	10	Gillnets	Yes	Yes	No
Erie	Yes: whitefish and cisco	12	Gillnets, trapnets	Yes	Yes	Partially, a request to management agency is required for the complete data. The request should go to GLFC.
Geneva	No	10	Gillnets	Yes	Not indicated	No
Great-Slave-Lake	No	Open water fishing (5) and ice fishing (4)	Gillnets	Yes	Yes	No
Hallwil	Not indicated	Not indicated	Gillnets	Not indicated	Not indicated	
Huron	Yes: whitefish and cisco	12	Gillnets, trapnets	Yes	Yes	Partially, a request to management agency is required for the complete data. The request should go to GLFC.
Maggiore	Not indicated	Not indicated	Gillnets	Not indicated	Not indicated	
Lugano	Not indicated	Not indicated	Gillnets	Not indicated	Not indicated	
Michigan	Yes: whitefish and cisco	12	Gillnets, trapnets	Yes	Yes	Partially, a request to management agency is required for the complete

						data. The request should go to GLFC.
Morat	Yes: whitefish and cisco	Not indicated	Gillnets	Not indicated	Not indicated	
Neuchatel	Not indicated	Not indicated	Ginnlets	Not indicated	Not indicated	No
						Partially, a request to management agency is required for the complete data. The request should go to GLFC.
Ontario	Yes: whitefish	12	Gillnets, trapnets	Yes	Yes	
Peipsi	Yes: vendace and whitefish	2	Gillnets, fence traps	Yes	Not indicated	No
Lucerne	Yes: vendace and whitefish	Not indicated	Gillnets	Not indicated	Not indicated	
Sempach	Not indicated	Not indicated	Gillnets	Not indicated	Not indicated	
						Partially, a request to management agency is required for the complete data. The request should go to GLFC.
Superior	Yes: whitefish and cisco	12	Gillnets, trapnets	Yes	Yes	
Thun	Not indicated	Not indicated	Gillnets	Not indicated	Not indicated	
						Upon request. Information on individual fishermen anonymized. Published annually in a report by Statistics Sweden and the Swedish Agency for Water and Marine Management
Vänern	Yes: whitefish and vendace	9	Gillnets	Yes	Yes	
						Upon request. Information on individual fishermen anonymized. Published annually in a report by Statistics Sweden and the Swedish Agency for Water and Marine Management
Vättern	Yes: whitefish and vendace	12	Gillnets	Yes	Yes	
Walen	Not indicated	Not indicated	Gillnets	Not indicated	Not indicated	
Zug	Not indicated	Not indicated	Gillnets	Not indicated	Not indicated	

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Zurich Not indicated Not indicated Gillnets Not indicated Not indicated

Lake	Temporal detail	Fishing effort availability for the studied period (2000-2019)	Change in trophic state	Referenced main environmental drivers of coregonine stocks over the last decades
Annecy	Daily	Yes	Reoligotrophisation ¹	Fishery management ⁷
Baikal	Annual	Likely available upon request to the management agency, but not guaranteed	No ²	
Bienne	Annual	Gap from 2002 to 2003, likely available upon request	Reoligotrophisation	-
Bourget	Daily	Yes	Reoligotrophisation ³	Food abundance ⁷
Brienzi		Gap from 2002 to 2011, likely available upon request	Reoligotrophisation	-
Constance	monthly	Yes, likely available upon request to the management agency	Reoligotrophisation ⁴	Trophic state - Temperature - Food abundance - Invasive species ^{8,9}
Erie	Daily	Could be requested from multiple management agencies that obtain records, but no lakewide compilation available	Reoligotrophisation ⁵	Trophic state & Temperature ¹⁰ - Food abundance ⁷
Geneva	Daily	Yes	Reoligotrophisation ⁶	
Great-Slave-Lake	Annual	No	No	
Hallwil		Starting in 2019	Reoligotrophisation	-
Huron	Daily	Could be requested from multiple management agencies that obtain records, but no lakewide compilation available	Reoligotrophisation ⁵	Dreissenid mussels - low productivity ¹¹ - Commercial exploitation likely acted as an additional stressor on lake whitefish stocks ¹¹
Maggiore		Starting in 2014, likely available upon request	Reoligotrophisation	-

Lugano		Starting in 2014, likely available upon request	Reoligotrophisation	-
Michigan	Daily	Could be requested from multiple management agencies that obtain records, but no lakewide compilation available	Reoligotrophisation ⁵	Dreissenid mussels - low productivity ¹¹ - Commercial exploitation likely acted as an additional stressor on lake whitefish stocks ¹¹
Morat		Starting in 2018, likely available upon request	Reoligotrophisation	-
Neuchatel	Daily	Yes	Reoligotrophisation	Temperature ⁷
Ontario	Daily	Could be requested from multiple management agencies that obtain records, but no lakewide compilation available	Reoligotrophisation ⁵	-
Peipsi	Annual	No	Eutrophication	Eutrophication – heatwaves – overfishing ¹² - fishery regulation
Lucerne		Starting in 2017, likely available upon request	Reoligotrophisation	-
Sempach		No	Reoligotrophisation	-
Superior	Daily	Could be requested from multiple management agencies that obtain records, but no lakewide compilation available	No ⁵	Low productivity - Commercial exploitation likely acted as an additional stressor on lake whitefish stocks ¹¹
Thun		Gap from 2002 to 2011, likely available upon request	Reoligotrophisation	-
Vänern	Monthly	Limited	Reoligotrophisation	Oligotrophication - High level of dioxins and PCBs - > lower fishing effort
Vättern	Monthly	Available from 1970 to 2018	Reoligotrophisation	Oligotrophication - lower effort in fisheries due to high level of dioxins and PCBs - shift target to the introduced signal crayfish
Walen		No	Reoligotrophisation	-
Zug		No	Reoligotrophisation	-

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1186 *Supplementary Table 2 : Metadata of the datasets used in the analysis and details on data availability*
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Lake	Nature and source of fisheries statistics	Data_provider	Data_availability	Name_data_provider	Email
Annecey	Commercial fisheries - Direction Départementale des Territoires	INRAE-OLA	upon request	Fabien Bourinet/Chloé Goulon	fabien.bourinet@inrae.fr / chloe.goulon@inrae.fr
Baikal	Data bases; State Report on the State of Lake Baikal	ISU; Ministry of Natural Resources	upon request	Eugene Silow	eugenecilow@gmail.com
Bienne	Commercial fisheries - BAFU website (www.fischereistatistik.ch)	www.fischereistatistik.ch	free access	Diego Dagani	Diego.Dagani@bafu.admin.ch
Bourget	Commercial fisheries - Direction Départementale des Territoires	INRAE-OLA	upon request	Fabien Bourinet/Chloé Goulon	fabien.bourinet@inrae.fr / chloe.goulon@inrae.fr
Brienz	Commercial fisheries - BAFU website (www.fischereistatistik.ch)	www.fischereistatistik.ch	free access	Diego Dagani	Diego.Dagani@bafu.admin.ch
Constance	ibkf.org	IBKF	free access	Alexander Brinker	alexander.brinker@lazbw.bwl.de
Erie	Commercial fisheries- GLFC website (www.glfc.org)	https://www.glfc.org/gr-eat-lakes-databases.php	free access	David "Bo" Bunnell	dbunnell@usgs.gov
Geneva	Commercial fisheries - Direction Départementale des Territoires	INRAE-OLA	upon request	Fabien Bourinet/Chloé Goulon	fabien.bourinet@inrae.fr / chloe.goulon@inrae.fr
Great-Slave-Lake	Scientific survey - DFO	DFO-Zhu	upon request	Xinhua Zhu	Xinhua.Zhu@dfo-mpo.gc.ca
Hallwil	Commercial fisheries - BAFU website (www.fischereistatistik.ch)	www.fischereistatistik.ch	free access	Diego Dagani	Diego.Dagani@bafu.admin.ch
Huron	Commercial fisheries- GLFC website (www.glfc.org)	https://www.glfc.org/gr-eat-lakes-databases.php	free access	David "Bo" Bunnell	dbunnell@usgs.gov
Maggiore	Commercial fisheries - BAFU website (www.fischereistatistik.ch)	www.fischereistatistik.ch	free access	Diego Dagani	Diego.Dagani@bafu.admin.ch
Lugano	Commercial fisheries - BAFU website (www.fischereistatistik.ch)	www.fischereistatistik.ch	free access	Diego Dagani	Diego.Dagani@bafu.admin.ch
Michigan	Commercial fisheries- GLFC website (www.glfc.org)	https://www.glfc.org/gr-eat-lakes-databases.php	free access	David "Bo" Bunnell	dbunnell@usgs.gov
Morat	Commercial fisheries - BAFU website (www.fischereistatistik.ch)	www.fischereistatistik.ch	free access	Diego Dagani	Diego.Dagani@bafu.admin.ch
Neuchâtel	Commercial fisheries - BAFU website (www.fischereistatistik.ch)	www.fischereistatistik.ch	free access	Diego Dagani	Diego.Dagani@bafu.admin.ch
Ontario	Commercial fisheries- GLFC website (www.glfc.org)	https://www.glfc.org/gr-eat-lakes-databases.php	free access	David "Bo" Bunnell	dbunnell@usgs.gov
Peipsi	https://pta.agri.ee/ettevotjale-tootjale-jaturustajale/kutseline-kalapuuk/puugistatistika#2018-aasta-ja-varas	the Estonian Agriculture and Food Board https://pta.agri.ee/	upon request	Küllli Kangur	kylli.kangur@emu.ee
Lucerne	Commercial fisheries - BAFU website (www.fischereistatistik.ch)	www.fischereistatistik.ch	free access	Diego Dagani	Diego.Dagani@bafu.admin.ch

Sempach	Commercial fisheries - BAFU website (www.fischereistatistik.ch)	www.fischereistatistik.ch	free access	Diego Dagani	Diego.Dagani@bafu.admin.ch
Superior	Commercial fisheries- GLFC website (www.glfc.org)	https://www.glfc.org/gr eat-lakes-databases.php	free access	David "Bo" Bunnell	dbunnell@usgs.gov
Thun	Commercial fisheries - BAFU website (www.fischereistatistik.ch)	www.fischereistatistik.ch	free access	Diego Dagani	Diego.Dagani@bafu.admin.ch
Vänern	Commercial fisheries- SWaM	SWaM	upon request	Alfred Sandstrom	alfred.sandstrom@slu.se
Vättern	Commercial fisheries - SWaM	SWaM	upon request	Alfred Sandstrom	alfred.sandstrom@slu.se
Walen	Commercial fisheries - BAFU website (www.fischereistatistik.ch)	www.fischereistatistik.ch	free access	Diego Dagani	Diego.Dagani@bafu.admin.ch
Zug	Commercial fisheries - BAFU website (www.fischereistatistik.ch)	www.fischereistatistik.ch	free access	Diego Dagani	Diego.Dagani@bafu.admin.ch
Zurich	Commercial fisheries - BAFU website (www.fischereistatistik.ch)	www.fischereistatistik.ch	free access	Diego Dagani	Diego.Dagani@bafu.admin.ch

1190 *Sup. Table 3: A) Mann-Kendal p-values of the long-term trend in catches and Sen's slopes*
 1191 *values for each lake. B) Results of correlation analysis that were performed on the set of lakes*
 1192 *showing significant (p-value<0.05) long-term trends in catches.*

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A.

<i>Lake</i>	<i>Kendal p-value</i>	<i>Sen's slope</i>
Annecy	0.5	0.034
Baikal	<0.05	NA
Bienne	<0.05	-0.122
Bourget	<0.05	0.100
Brienz	<0.05	-0.103
Constance	<0.05	-0.158
Erie	<0.05	-0.143
Geneva	0.21	0.057
Great_Slave	<0.05	-0.125
Hallwil	0.42	-0.031
Huron	<0.05	-0.167
Lucerne	<0.05	-0.138
Lugano	<0.05	0.120
Maggiore	0.11	0.052
Michigan	<0.05	-0.156
Morat	<0.05	0.096
Neuchâtel	0.92	-0.009
Ontario	0.15	-0.054
Peipsi	<0.1	0.009
Sempach	0.92	0.007
Superior	0.5	-0.017
Thun	<0.05	-0.130
Vänern	<0.05	-0.080
Vättern	<0.05	-0.099
Walen	<0.1	-0.072
Zug	0.26	0.014
Zurich	0.59	-0.025

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B. ONLY LAKES SHOWING SIGNIFICANT LONG-TERM TREND

<i>Relationship between the rates of change in catches and variables (Table 2)</i>	<i>Spearman p-value</i>	<i>Spearman R</i>
lake_lat_decdeg	0.39	0.25
elevation_m	0.97	-0.011

avg_depth_m	0.8	-0.077
max_depth_m	0.5	-0.2
Logarea_km2	0.028	-0.6
Logavg_vol_km3	0.018	-0.62
TP	0.085	0.48
LakeSSWTtrend	0.67	-0.18
SenSlopeT_Winter	0.62	0.14
SenSlopeT_Spring	0.15	0.41
SenSlopeT_Summer	0.12	0.44
SenSlopeT_Autumn	0.088	0.47

**ONLY LAKES SHOWING SIGNIFICANT LONG-TERM TREND
AND WITHOUT L. VÄNERN AND VÄTTERN**

<i>Relationship between the rates of change in catches and variables (Table 2)</i>	<i>Spearman p-value</i>	<i>Spearman R</i>
lake_lat_decdeg	0.59	0.17
elevation_m	0.38	0.28
avg_depth_m	0.73	0.11
max_depth_m	0.83	-0.07
Logarea_km2	0.0074	-0.75
Logavg_vol_km3	0.0039	-0.76
TP	0.057	0.56
LakeSSWTtrend	0.12	-0.7
SenSlopeT_Winter	0.064	0.55
SenSlopeT_Spring	0.098	0.5
SenSlopeT_Summer	0.035	0.61
SenSlopeT_Autumn	0.035	0.61

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