

Reduction of cyprinid fish populations at Lake Nimmern by seine fishing, autumn 2023

General

The biomanipulative autumn seining at Lake Nimmern aims to improve the lake's water quality by reducing cyprinid fish populations which cause internal nutrient loading. Earlier fishing in autumns 2017-2020 produced a catch of 83000 kg and 212 kg/ha which was over the level of calculatory minimum target catch 180 kg/ha ¹⁾. The fishing produced marked improvement in late autumn secchi depth from 0,45 (2017) to 2,6 m (2020) and a very strong population of big predatory perch ²⁾. A negative consequence of the improved water clarity was a significant increase in the growth of the invasive water plant *Elodea canadensis*. In summer 2023 the water quality worsened again due to heavy blooming of blue-green algae. Thus, a short four-day period of seining was considered necessary to:

1. survey the present situation in lake's fish community
2. decrease cyprinid fish populations

The seining and catches 2023

The seining took place 24th- 27th September, about one month earlier than in 2017-2020. The fishing included four fishing days and 8 seine hauls (Fig. 1). The conditions during the fishing were good and all hauls were technically successful. The autumn was unusually warm and water temperature was 16-17 °C. Secchi depth was 0,6 m and water colour green.

The biomanipulation catch in the four days was 11500 kg and consisted mostly of small roach (mört 76 %), small and big bream (braxen 17 %) and bleak (benlöja 3 %). The average catches per seine haul and per fishing day were 2880 and 1440 kg.

About 1190 kg predatory fishes were released back to the lake in good condition. They consisted mostly of perch (abborre >15 cm 2507 ind., 560 kg) and pike (gädda, 316 ind., 632 kg). All observed pikeperch were small and same size (about 10 cm) and one or two summer old (gös, 21 individuals, 1 kg). The prey-predator ratio in the catch was 9,6.

Observations on fish community

Because the water temperature was still high and secchi depth low, fish were seen sparsely in all parts of echo sounded areas. Most of the fish echoes were from small < 10 cm roach, bleak and bream, in order of numbers. They produced good echoes in vertical soundings but were hardly seen in side scanners. When the densest occurrences of this fish were seined, the catch was on a moderate 150 kg/ha level. In contrast to this, at some areas small roach also shoaled intensely and these seine hauls produced catches over 1000 kg/ha. The obvious reason for the regional shoaling was the strong presence of predatory perch at those places. The population of predatory perch seems still strong. Also, the pike population is good and the prey-predator ratio in the catch was under 10 which is at a satisfactory level. The population of big pikeperch seemed very low but this may be a result of seining at rather shallow areas (Fig 1). Big roach and bream, which were the main catch in 2017-2020, still occurred in the catch but their populations seem to be at a relatively low level.

Conclusions and suggestions

In the previous fishing report (Hautala and Kiiskilä 2020) we suggested repeating the reduction fishing every 2-5 years and scheduling the fishing more precisely according to water sample results, visual observations and catches. Now it seems to be a good time for the fishing. There is a great number of young fast-growing

cyprinids in the lake and the next one or two years should be a right time to prevent their emergence to even bigger problem. Reserving a maximum 10 days seining period for the autumn 2024 could be a good idea. The eventual number of days could be decided according to development of daily catches. An optimal time for the fishing would be when secchi depth is about 1...1,5 meters (early October?). The target fishes are now smaller than in 2017...2020 and if the water gets too clear, instead of shoaling to deep water they will escape into the littoral vegetation, as was the case in late autumn 2020.

Thanks!

Thanks again for all the help during the fishing and for the excellent organization and handling of the catch at the shore for Nimmerns Fiskevårdsområdesförening.

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- 1) Target catch (kg) = $16.9 \times (\text{TP ug/l})^{0.52}$. (TP=total phosphorus during vegetation period 15th June – 15th September). Jeppesen, E. & Sammalkorpi, I. 2002. Lakes. In: Davy, A.J. & Perrow, M.R.(ed.). Handbook of ecological restoration. Vol. II. Restoration in practice. Cambridge University Press: 297-324
- 2) Hautala A and Kiiskilä A 2020: Reduction of cyprinid fish populations at Lake Nimmern by seine fishing, autumn 2023. -Report, 6 pages.

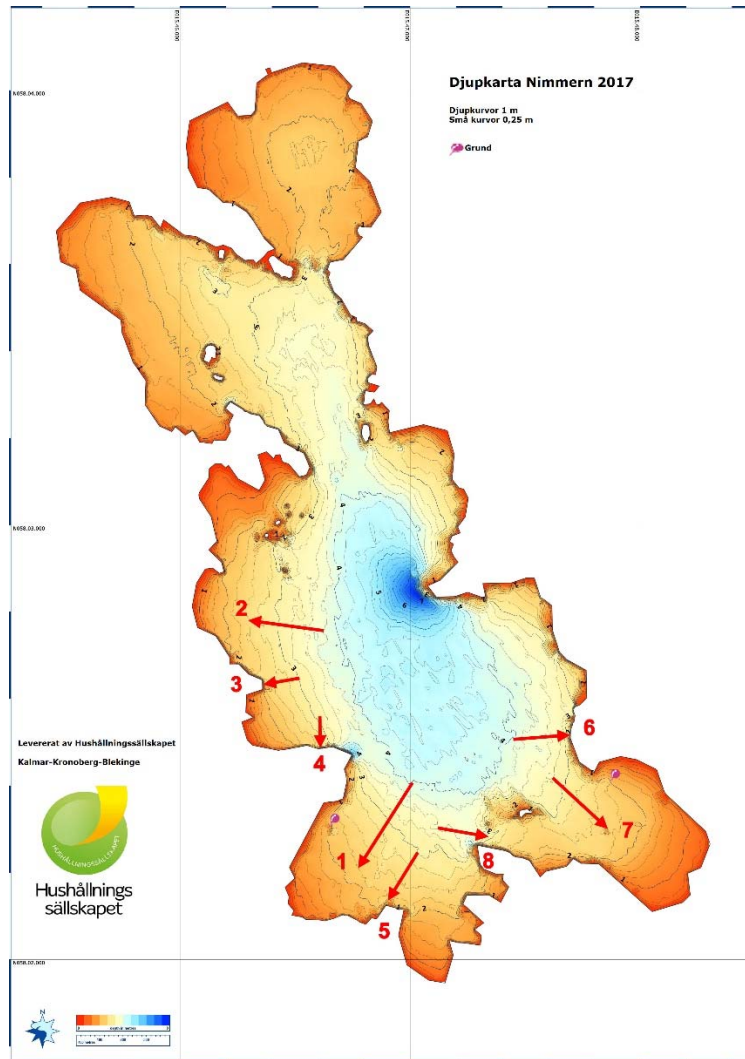


Figure 1. The locations of 8 seine hauls made in the survey/reduction fishing of cyprinids by seining in Lake Nimmern in autumn 2023

Table 1. The hauls and catches in the survey/reduction fishing of cyprinids by seining in Lake Nimmern in autumn 2023. An excel file with a more complete fishing diary has been sent separately for the client.

DRAG				FÅNGST kg								ROVFISKAR						
nummer	dag	lengd m	yta ha	braxen	mört	gers	abborre				Biomanipulering	gös		gädda		abborre >15 cm		Rovfiskar
							<15 cm	benlöja	ruda	sutare		fångst kg	e	st.	kg ²	st.	kg ³	
1	24.9.2023	300	6	350	1400	50	44	50	2	4	1900	0	0	47	94.0	275	83	177
2	24.9.2023	210	4.2	350	180	20	20	26	0	4	600	0	0	37	74.0	314	94	168
3	25.9.2023	130	2.6	120	1320	25	10	20	0	5	1500	0	0	15	30.0	231	46	76
4	25.9.2023	120	2.4	134	2300	50	10	100	2	4	2600	0	0	22	44.0	239	48	92
5	26.9.2023	210	4.2	188	750	30	20	0	2	10	1000	0	0	67	134.0	385	77	211
6	26.9.2023	200	4	280	1000	30	20	50	0	20	1400	13	0.65	38	76.0	207	41	118
7	27.9.2023	300	6	150	1430	30	20	50	0	20	1700	1	0.05	58	116.0	690	138	254
8	27.9.2023	150	3	350	385	30	10	20	0	5	800	7	0.35	32	64.0	166	33	98
			32.4	1922	8765	265	154	316	6	72	11500	21	1	316	632	2507	560	1193
				17 %	76 %	2 %	1 %	3 %	0 %	1 %	29.4 kg/ha							

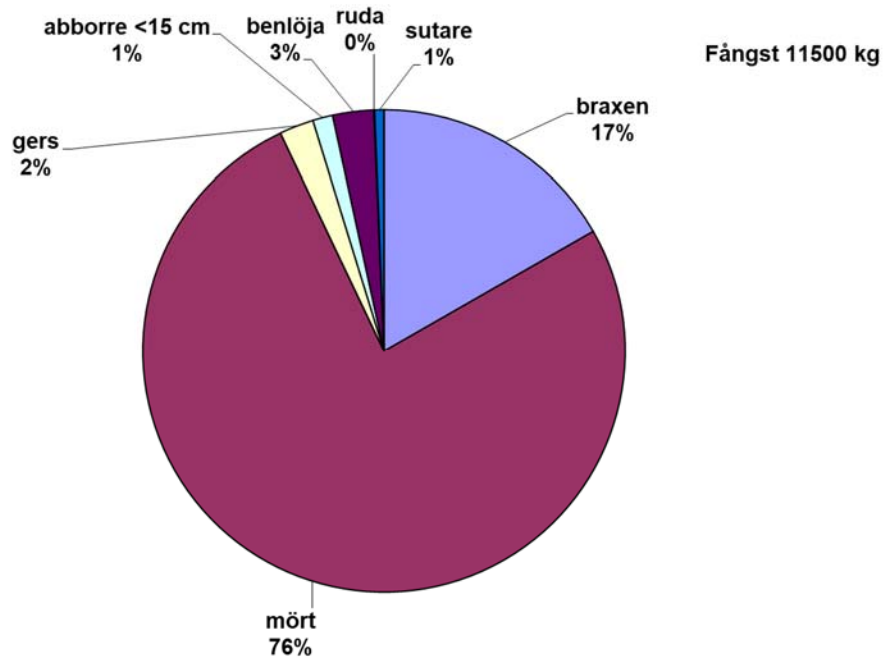


Figure 2. The composition of catch in the reduction fishing of cyprinids by seining in Lake Nimmern in autumn 2023



The main catch consisted of 8...10 cm roach. Many crayfish were observed too when seine was pulled near stony shorelines.