

## Reduction of cyprinid fish populations at Lake Nimmern by seine fishing, autumn 2019

### 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 2017 and 2018 produced a catch of 71600 kg and 181 kg/ha which is already at a level of calculatory minimum target catch <sup>1)</sup>. This year's fishing aimed to:

1. survey the efficiency of earlier fishing and its impact on lake's present fish populations
2. still increase the reduction catch

### The seining and catches 2019

The seining took place on 24th-29th October including 6 days of fishing and 7 seine hauls (Fig. 1). The conditions during the fishing were suboptimal. The weather during the first four days was windy and rainy and kept the water temperature at a steady level. Decreasing temperature usually enhances cyprinid shoaling and thus catches and steady or increasing temperature vice versa. Also there was a mass presence of some unidentified Diatom algae, which stacked to seine nets and made pulling unusually heavy due to increasing water pressure against moving nets. The pressure might have banished especially bigger fish from the seine. The autumnal Diatom algae problems are familiar to all seine fishermen and they occur randomly in all kinds of northern lakes. In worst occasions seining is eventually impossible. The case at Lake Nimmern was however manageable. At the deepest area wind induced strong currents enhanced the problems while at shallow areas they were dampened.

The biomanipulation catch in the seven days was 7420 kg and consisted of small perch (abborre 43 %), ruffe (gärs 24 %) and roach (mört 19 %). Other species (brax, löja, ruda, sutare) made about 14 % of the catch. (Tab. 1, Fig. 2). An average catches per seine haul and per fishing day were 675 and 1237 kg.

About 917 kg predatory fishes were released back to the lake in good condition. They consisted of pikeperch (gös, 187 individuals, 123 kg), pike (gädda, 146 ind., 274 kg) and predatory perch (abborre >15 cm 1610 ind., 521 kg). (Tab. 1).

### Some notices and conclusions

The fish populations in the lake had changed markedly from previous years. The cyprinid catches were much lower and neither roach nor bream shoals were observed by echo sounding at the fishing area. However there were some bottom gatherings of unidentified coarse fish (altogether maybe 10 000 -15 000 kg) at the fishing restricted northern part of the lake.

In the previous 2017-2018 fishing reports we anticipated that cyprinid spring migration from the deeper and colder Lake Åsunden might cease some of the benefits of reduction fishing. Now it seems that no significant migration has occurred, which is a good news.

The most typical consequence from an effective reduction of cyprinids is an emergence of a strong year class of perch. This had happened also at Lake Nimmern during the spring 2019. The one summer old perch shoals were observed in all parts of the lake and about 99 % of the perch catch consisted of these. The average weight of perch juveniles was measured as 1,6 g and thus the catch (3195 kg) consisted of 2 milj. individuals, 5100 ind./ha. On their first summer perch juveniles are pelagic and eat zooplankton. There are studies showing that an amount of 10-15000 one summer old perch/pikeperch can cause depletion of

pelagic zooplankton and , as a food chain consequence, algae problems. The amount of perch juveniles in summer 2019 has undoubtedly exceeded this level. However, there should not be problems in the next years and a strong 1+ and older perch population is working for the benefit of water quality.

It would be nice to make comparing statistics about the changes in the catches 2017-2019. However, the conditions for the fishing were so different in this autumn that the results would be questionable especially for adult roach, bream and predators. Instead echo sounding screens do not mind about algae and we are convinced that cyprinid populations are depleted to a minor fraction from the original biomass in 2017. And there are no signs of efficient recovery of roach and bream as a form of new strong juvenile year classes. The caught roach and bream were now in very good condition, even fat, which also shows that their numbers are low.

It seems that a yearly reduction fishing is not necessary at Lake Nimmern. It is though hard to say anything sure about a good frequency. All lakes are individuals. At this moment a 1-2 years pause might be a good idea. On the other hand a few days regular test seining would help to reveal further needs.

### 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.

October 30<sup>th</sup>, 2019

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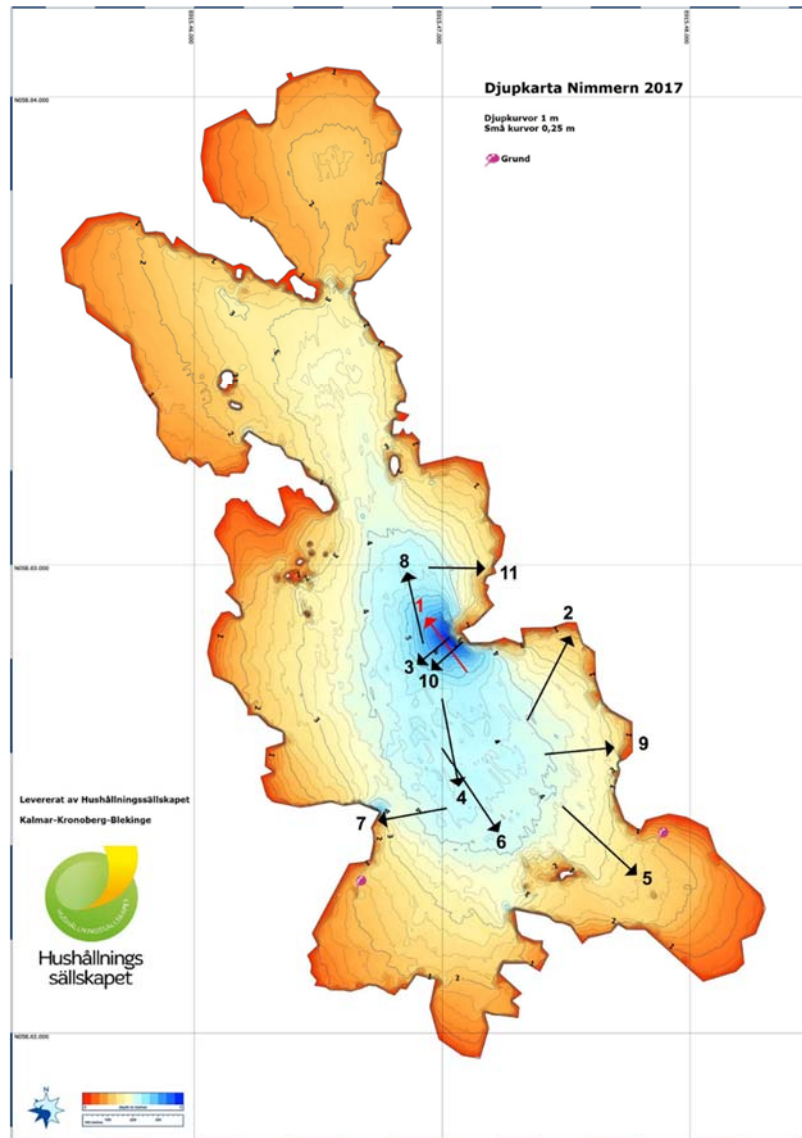
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WWW.VÅRDFISKE.FI

1) Target catch (kg) =  $16.9 \times (\text{TP ug/l})^{0.52}$

(TP=total phosphorus during vegetation period 15<sup>th</sup> June – 15<sup>th</sup> September)

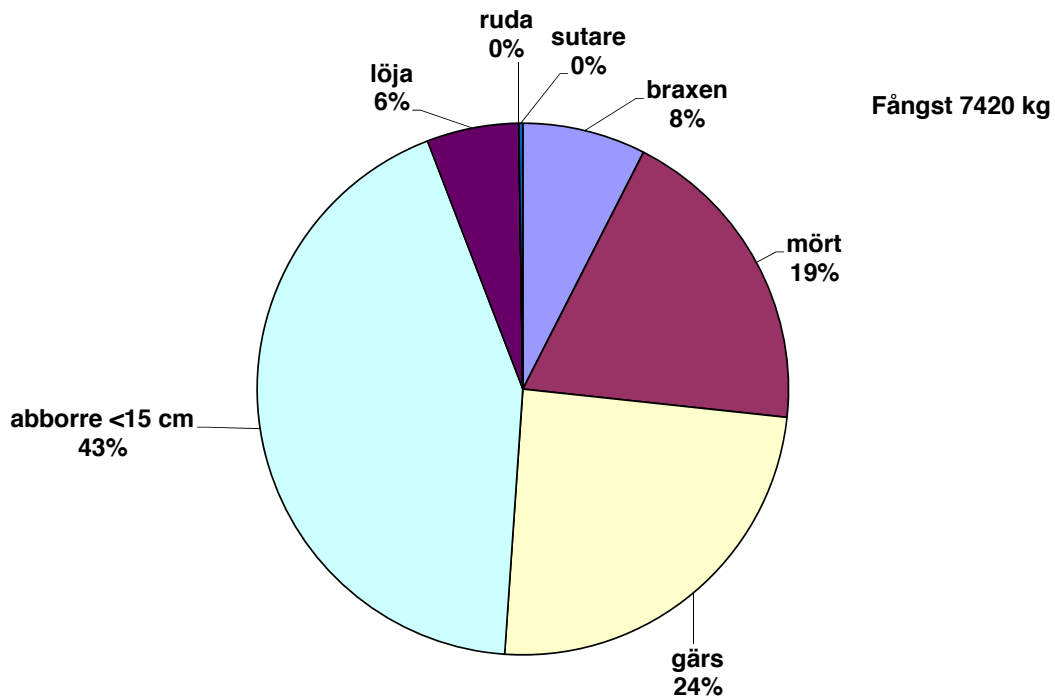
Jeppesen, E. & Sammalkorpi, I. 2002. Lakes. In: Davy, A.J. & Perrow, M.R.(ed.). Handbook of ecological restoration. Vol. II. Restoration in practice. Cambridge University Press: 297-324



**Figure 1.** The locations of 7 hauls made in the reduction fishing of cyprinids by seining in Lake Nimmern in autumn 2019

**Table 1.** The hauls and catches in the reduction fishing of cyprinids by seining in Lake Nimmern in autumn 2019. An excel file with a more complete fishing diary has been sent separately for the client.

DRAG				FÅNGST kg								ROVFISKAR		gädda		abborre >15 cm		Rovfiskar	
nummer	dag	lengd m	yta ha	braxen	mört	gärs	<15 cm	löja	ruda	sutare	Biomanipulering fångst kg	e	gös st.	kg <sup>2</sup>	st.	kg <sup>3</sup>	st.	kg <sup>4</sup>	tillsammans kg
1	24.10.2018	270	5,4	30	8	0	0	2	0	0	40		0	0	0	0,0	0	0,0	0
2	25.10.2019	320	6,4	10	600	300	300	90	0	0	1300		8	0,8	28	42,0	465	186,0	229
3	25.10.2019	190	3,8	50	1	10	0	15	0	4	80		4	2	2	4,0	6	1,2	7
4	26.10.2019	220	4,4	100	100	100	150	48	0	2	500		47	9,4	9	13,5	7	2,1	25
5	26.10.2019	320	4,8	20	110	325	845	0	0	0	1300		45	13,5	24	48,0	361	144,4	206
6	27.10.2019	320	6,4	10	35	150	100	5	0	0	300		28	19,6	9	18,0	48	19,2	57
7	27.10.2019	250	5	5	50	295	600	50	0	0	1000		18	9	16	32,0	39	7,8	49
8	28.10.2019	300	6	200	250	40	40	10	0	10	550		25	62,5	11	22,0	22	3,3	88
9	28.10.2019	280	4,2	30	30	30	350	10	0	0	450		4	4	20	40,0	417	83,4	127
10	29.10.2019	200	4	2	10	10	10	166	0	2	200		2	0,6	2	4,0	5	1,5	6
11	29.10.2019	230	4,6	100	230	550	800	20	0	0	1700		6	1,2	25	50,0	240	72,0	123
			50,4	557	1424	1810	3195	416	0	18	7420		187	123	146	274	1610	521	917
												19,0 kg/ha							



**Figure 2.** The composition of catch in the reduction fishing of cyprinids by seining in Lake Nimmern in autumn 2019



A typical catch in autumn 2019: a lot of small perch and ruffe and some fat roach