

Reduction of cyprinid fish populations at Lake Nimmern by seine fishing, autumn 2018 (and 2017)

The seining and catches

The seining took place on 23rd-31st October including nine days of fishing and 16 seine hauls. The fishing took place in rather suitable conditions. Water temperature decreased markedly from 10 to 5 °C during the period which promoted the daytime shoaling of cyprinid fishes to the deep areas of the lake. Also Secchi depth rose from 0,8 to 1,1 m during the period. These figures had about doubled from the previous fishing period in autumn 2017, and improved shoaling as well. The weather was however rather windy which caused some problems with echo sounding and seining.

During the period roach moved day by day closer to the 8 m deep spot in the middle of the lake but eventually did not shoal to but stayed around it. On the last day(s), when roach shoals had already been depleted heavily, shoals were not found by echo sounding anymore. This autumn big bream was found to shoal beside the 8 m deep spot in about 6 m depth. A bit smaller bream was found all the time in the same areas as the roach shoals but their share of the biomass there was low.

The total biomanipulation catch was 43000 kg and consisted mainly of roach (mört 60 %) and big bream (braxen 36 %). Other species (löja, ruda, sutare, små abborre) made about 4 % of the catch. (Table 1, Figure 1). An average catch per seine haul and per fishing day were 2690 and 4780 kg. The fishing cost for the catch was 3 Skr/kg (just fishing, without other costs). Both catches per effort and costs were about the same as in 2017.

About 3100 kg predatory fishes were released back to the lake in good condition. They consisted of pikeperch (gös, 976 individuals, 301 kg), pike (gädda, 520 ind., 1218 kg) and predatory perch (abborre >15 cm, 5262 ind., 1558 kg). (Table 1). Pikeperch and pike catches were relatively at the same level as in 2017 but the population of predatory perch seemed to have doubled during the year. The prey-predator ratio (kg/kg) in the catch was now 14 and markedly lower than the figure 30 in 2017.

Some notices and conclusions

This autumn further confirmed the conclusion from 2017: autumn seining is an effective and, specially, a very cost-effective method in reducing the cyprinid fishes in Lake Nimmern.

The lake has been very eutrophic with a mean total phosphorus content 140 ug/l and common algae bloomings. It is obvious that the nutrient load to the lake should be decreased. However, the lake's runoff area is only about three times the lake area (12 vs. 4 km²) which means that the delaying time of the lake's water is rather long and therefore the internal loading caused by cyprinid fishes can affect markedly the condition of the lake during the summer seasons. And consequently, the hydrology of the lake Nimmern makes it very suitable for water quality improvement by reduction of cyprinid fishes.

According to a formula presented by Jeppesen and Sammalkorpi¹⁾, the target catch for Nimmern should be about 150-200 kg/ha/1-2 years. This target is now achieved decently by the total catch of 71600 kg and 181 kg/ha/1 year. In the fishing report 2017 we anticipated that achieving of the target catch could halve the phosphorus content to ca. 70 ug/l and increase Secchi depth to ca. 1-1,5 m (during the summer months). We still expect the same and hope that water quality will be surveyed sufficiently during the year 2019.

If external loading is not reduced, there will be a need to repeat the fishing at time to time, maybe once in 3-5 years. The target catch then can be lower, for example 50-100 kg/ha. Because the Lake Nimmern is

shallow and warms up rather quickly during the springtime, there will remain a risk of cyprinid (spawning) migration from much deeper Åsunden. This might mitigate some of the benefits from reduction fishing. However, the most sure and direct result from reduction fishing is already achieved. The biomass of cyprinid fishes contain 0,8 % phosphorus and 2,5 % nitrogen¹⁾. Therefore the fishing has so far removed 573 kg phosphorus and 1790 kg nitrogen from the lake's ecosystem.

1) Target catch (kg) = 16.9 x TP ug/l 0.52 ; 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

Thanks!

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Table 1. The hauls and catches in the reduction fishing of cyprinids by seining in Lake Nimmern in autumn 2018. 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	gärs	abborre			Biomaniplering			gös		gädda		abborre >15 cm		Rovfiskar tillsammans kg
							e <15 cm	löja	ruda	sutare	fångst kg	#	st.	kg ²	st.	kg ³	st.	kg ⁴	
1	23.10.2018	270	5,4	200	410	20	8	50	2	10	700	#	21	3,15	17	42,5	126	50,4	96
2	23.10.2018	230	2,3	800	130	30	16	22	0	2	1000	#	15	2,25	16	32,0	100	40,0	74
3	24.10.2018	360	7,2	150	1000	20	18	10	0	2	1200	#	78	39	31	46,5	215	43,0	129
4	24.10.2018	320	6,4	250	1150	33	25	40	0	2	1500	#	67	13,4	39	78,0	310	93,0	184
5	25.10.2018	440	6,6	300	3000	40	10	40	0	10	3400	#	208	62,4	58	116,0	615	246,0	424
6	25.10.2018	300	6	50	490	50	60	0	0	0	650	#	28	19,6	15	30,0	94	37,6	87
7	26.10.2018	290	4,5	46	1600	30	10	10	2	2	1700	#	21	10,5	35	70,0	84	16,8	97
8	26.10.2018	310	6,2	256	1650	25	25	40	0	4	2000	#	38	11,4	29	58,0	240	36,0	105
9	27.10.2018	320	4,8	150	960	30	40	18	0	2	1200	#	138	27,6	34	68,0	420	126,0	222
10	27.10.2018	340	6,8	170	5700	100	50	150	0	30	6200	#	145	43,5	61	122,0	2050	615,0	781
11	28.10.2018	320	6,4	180	3700	50	40	30	0	0	4000	#	87	17,4	42	126,0	358	107,4	251
12	28.10.2018	240	4,8	100	4400	40	40	18	0	2	4600	#	9	4,5	51	153,0	300	60,0	218
13	29.10.2018	210	4,2	12500	400	50	44	0	0	6	13000	#	92	27,6	30	90,0	168	50,4	168
14	30.10.2018		0								0	0	0	0,0		0,0		0,0	0
15	30.10.2018	210	4,2	30	1400	20	20	28	0	2	1500	#	21	6,3	40	120,0	174	34,8	161
16	31.10.2018	220	4,4	330	15	2	2	1	0	0	350	#	8	12	22	66,0	8	1,6	80
			56,2	15512	26005	540	408	457	4	74	43000		976	301	520	1218	5262	1558	3077

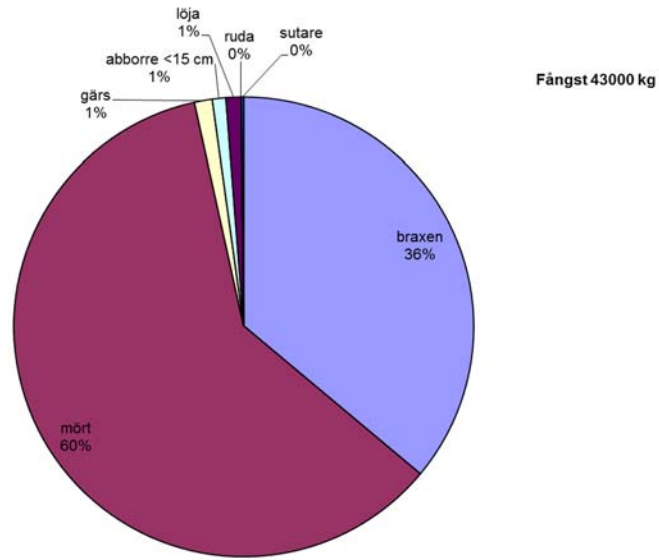


Figure 1. The composition of catch in the reduction fishing of cyprinids by seining in Lake Nimmern in autumn 2018

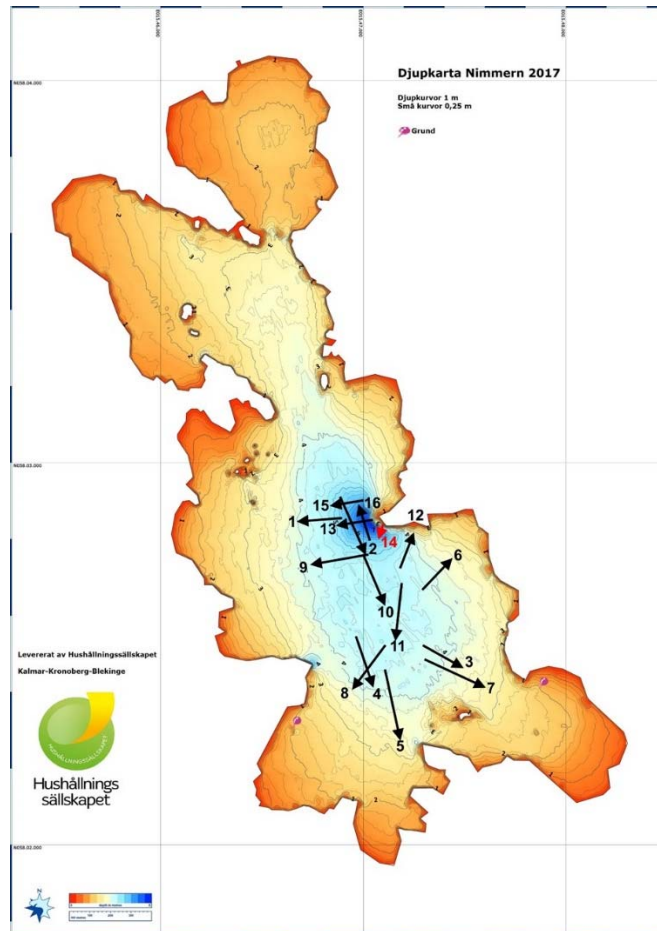


Figure 2. The locations of 16 hauls made in the reduction fishing of cyprinids by seining in Lake Nimmern in autumn 2018