IP(08)10

Fisheries Management Focus Area Report

Iceland

ICELAND

Management of Salmon Fisheries

Focus Area Report

(Draft)

April 2008

Introduction

The Council has asked each Party or jurisdiction to prepare a fisheries management focus area report to provide a more in-depth assessment of:

- the measures already in place that address the NASCO agreements relating to fisheries management;
- further actions proposed within their Implementation Plans to meet these agreements;
- progress with implementing these actions.

This report is a step in order to follow the NASCO agreement. For ease of review and standardization we decided to follow the guidelines of the *Ad Hoc* review Group (CNL40.517) listed under headlines 1-10 in this report. This report is inevitably considerably condensed but further details on various issues can be obtained from the Icelandic Implementation Plan IP(07)8 with subsequent amendments.

Salmonid management is the responsibility of the Salmonid Management Division of the Directorate of Fisheries, which in subsequent text will be referred to as the "Competent Management Authority".

1. A brief description of the fisheries, including an overview of the stocks exploited, gear types, fishery location, magnitude of the fishery, current management restrictions and others planned.

The principles of the Icelandic Salmon Management system are shown in brief form in table 1. It is important to note that since 1932 coastal fisheries for salmon have been prohibitted by law although some 12 netting location with heritable rights were exempted. These were gradually phased out and from 1997 onwards all harvest of salmon in Iceland has been in fresh water after a permanent buy-out agreement between the owners of the fishing rights and the Icelandic Government was enacted.

Table 1. Principles of the Icelandic Salmon Management System

Ocean fishery:	Forbidden
Fishing rights:	Go with the adjoining land
Local Management Authority:	River (Fisheries) Associations mandatory
Fishing gear allowed:	Rod and gillnets
Number of rods and nets:	Restricted
Annual fishing time:	Max 105 days from 20 April – 30 September (90 days most common)
Daily fishing hours in rod fishery:	12 hours 7AM - 10PM
Weekly netting closure:	Half week **,** Friday 10 PM - Tuesday 10 AM
Reporting of catch:	Mandatory in log-books in rod fisheries, daily recordings in net fisheries

Management responsibility: Fisheries associations are responsible for the local management under the auspices of the Salmon Management Division of the Directorate of Fisheries. Fisheries Associations for each jurisdiction have to make an "Effort Plan" for their salmon stock that specify the maximum number of angling rods for a minimum period of 8 years (from 2006). The "Effort Plan" can otherwise be a fairly flexible document but needs to be approved by the "Competent Management Authority".

1.1. By-catch of salmon in oceanic fisheries

In 2004 and 2005 the by-catch of salmon in the fisheries of the Icelandic Fishing fleet was estimated (Guðbergsson and Sigþórsson 2006, ICES 2006). The estimate was conducted through a questionaire which reached half of the fishermen that were registered on a ship during this period. The outcome of the surveys shows approximately the same results for both years giving a figure of 5.110 (3.165-7.055) salmon taken as by-catch in marine fisheries per annum. The fish were mainly caught by large ships in pelagic fisheries. Over 80 % were regarded as medium or large salmon and 84,5% were caught during the summer months (April-September). Of the observed by-catch of salmon 38 % were taken outside the Icelandic EEZ. No information on the origin of the fish is available. See also CNL(03)27 on by-catches of salmon in pelagic herring fisheries.

1.2. Enhancement programs

Enhancement programs have been used in Icelandic rivers for decades. Enhancement programs can be building of fish ladders, release of hatchery reared fry, parr or smolts. An increasing trend has been in the release of hatchery reared smolts to enhance the salmon run. The aim is to improve the rod catch in rivers or river parts where nursery areas are poor. Releases into established salmon rivers need to be the progeny of the native stock. If enhancement programs are conducted each Fisheries Association needs to make an enhancement plan, which must be renewed every 5 years. The enhancement plan must be approved by the Competent Management Authority after receiving a comment from the Institute of Freshwater Fisheries.

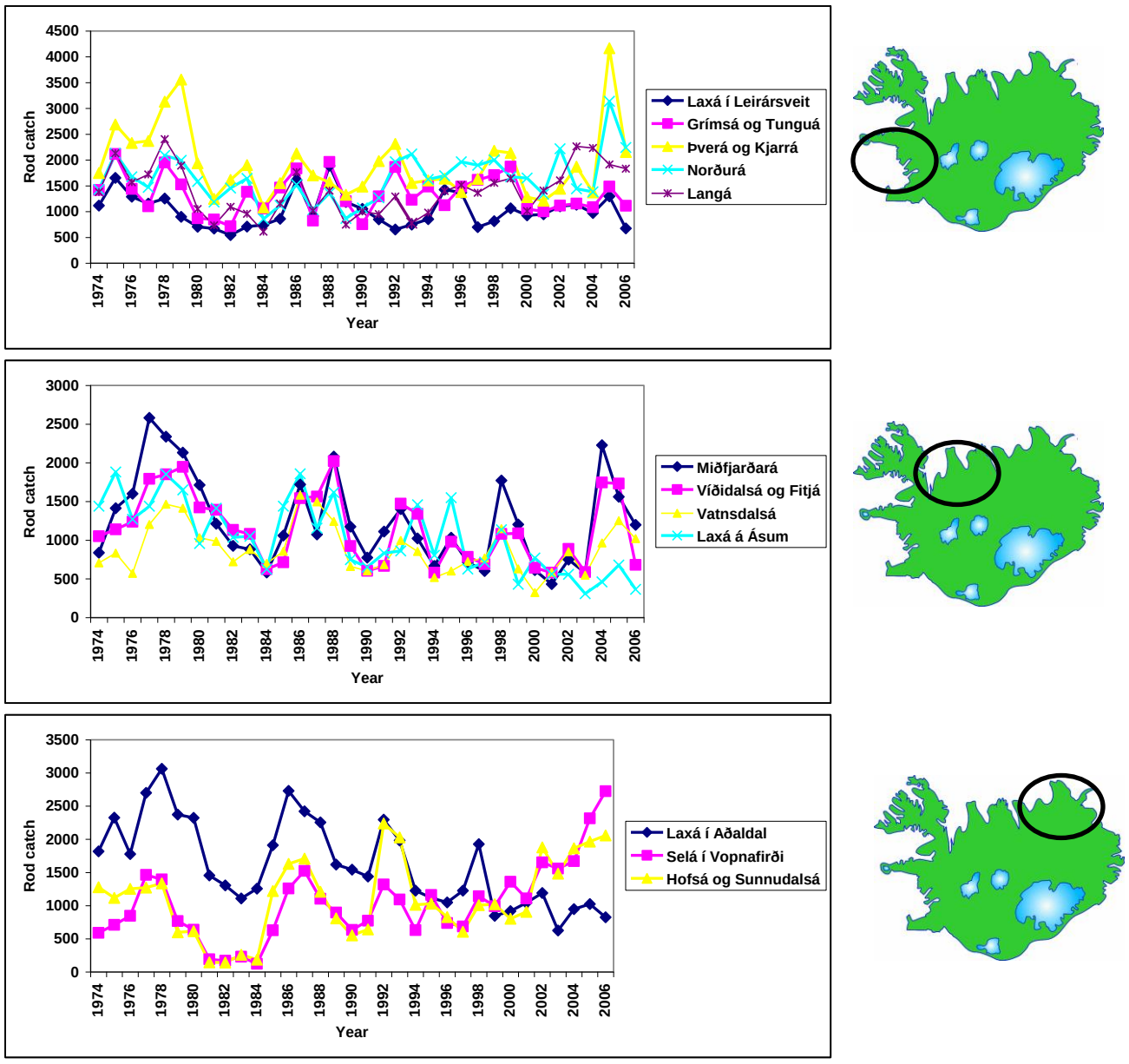
1.3. Salmon rivers

According to NASCO definition salmon rivers should be listed by estuaries. However, when it comes to salmon management, tributaries are considered management units for most Icelandic salmon rivers. Salmon rivers in Iceland are listed in Annex 1 with information on rivers by order. Annex 1 also includes information on stream type, conductivity, pH, length of accessible natural salmon habitat, length of salmon habitat opened up with fish ladders, drainage area and glacier coverage. Information on wetted area if available based on in river assessments as well as estimates on production units. Average catch (max, min) in the period 1974-2007, the number of approved rods and the existence of a net fishery are also shown.

1.4. Estimation of the salmon run

Fluctuations in salmon catches are known to occur within areas in Iceland with higher amplitudes in northern and eastern Iceland than in southern and western Iceland (Figure 1). Where available salmon runs estimated with fish counters show that abundance is significantly reflected by the rod catch. This can be seen for 1SW and 2SW fish. Exploitation rate is on the average close to 50% and 70% for 1SW and 2SW salmon respectively. A 65 year study in the river Elliðaár shows that exploitation rate is slightly lower when the run is high than when it is low. The study also shows that the exploitation rate is not affected by five fold changes in effort (rod days) in that period (Gudbergsson and Antonsson 2008).

The observed connections between salmon run and catch show that salmon catch statistics can to a high degree be regarded to reflect the status of salmon stocks.



Figur 1. Salmon rod catch in Icelandic salmon rivers shown for different areas.

1.5. Salmon production in Icelandic rivers

Icelandic rivers are of different origin although direct runoff rivers are most common (Annex 1). Springfed rivers and rivers draining lakes have much higher production per ha than direct runoff rivers (Figure 2). This needs to be taken into account for the estimate of reference point due to different levels of replacement values. If the freshwater and ocean

mortality is similar for the rivers shown in figure 2 River Elliðaár needs 27 times higher number of eggs per unit area than River Hafralónsá.

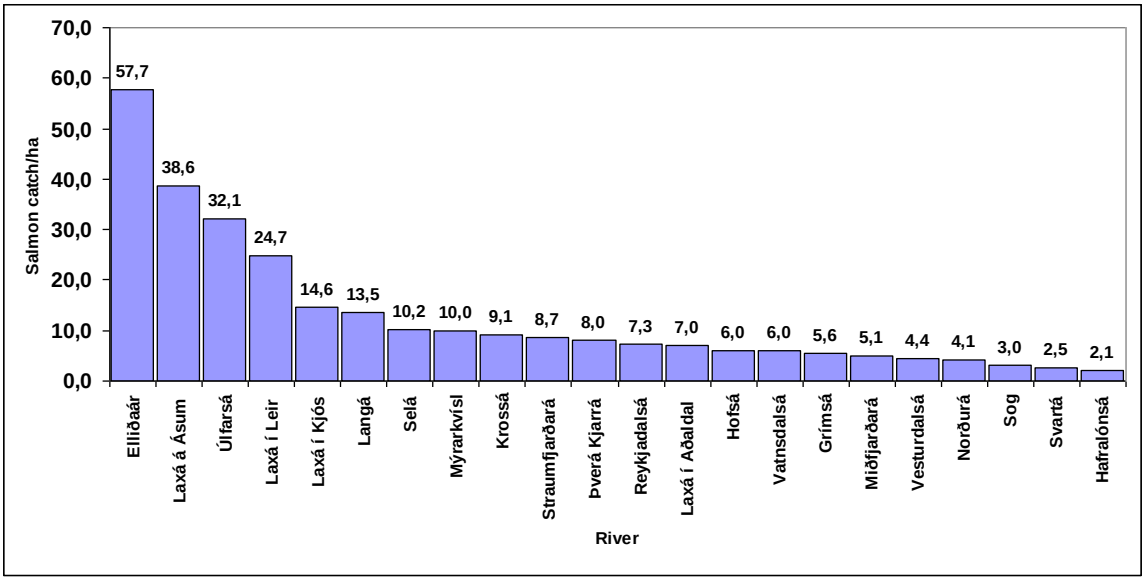


Figure 2. Average salmon catch per ha in Icelandic salmon rivers.

The productivity of Icelandic salmon rivers is also affected by the fact, that only 3 species of salmonids, i.e. salmon, brown trout and char have historically been found in Icelandic rivers, including the sea-run varieties of these species. Most salmon fisheries are thus mono-species or with very limited quantities of other salmonids in specific river sections.

2. Identification of exploited stocks and the reference points (conservation limit and/or management target) or alternative measures used to define adequate abundance of the stock.

All Icelandic salmon rivers (stocks), except the few harvested with gillnets, are exploited through the lease of fishing rights to anglers or angling clubs. The revenue, for the average salmon caught in rod fisheries is 20 – 30 times higher than the revenue for salmon sold in a fish market. The average price of a fishing license is thus strongly related to the average catch per rod. A reduction in catch will lead to lower income for the river owners, angling companies and angling clubs.
Since the fishing rights are leased in an open market system, supply and demand decide the market price. This system stimulates enhancement programs and opening up of impassible river areas, as increased income is used to pay for the investment in fish passages and hatchery reared parr and smolts.

As there is no interannual change in effort and good recording of the catch in log-books, the catch reflects the approximate state of the stock and a poor stock status should be detected.

No information is available on the distribution of salmon, by river of origin, within the Icelandic EEZ as sea-fisheries for salmon are prohibitted in those areas. Recoveries of Carlin-tagged as well as coded-wire tagged Icelandic salmon from the Faroes fishery and the West Greenland fishery are available from 1967 through 1995 indicating that Icelandic 2SW salmon are found in those areas (Árni Ísaksson et al, 2002). Salmon from North and East Iceland were recovered to a greater extent in the Faroese long-line fishery while salmon from South and West Iceland were recovered in the West Greenland salmon fishery. Based on theses tag recoveries salmon stocks form North and East Iceland are grouped with Northern NEAC stock complex and South and West Iceland with Southern NEAC stock complex. The PFA estimates are therefore calculated separately for these two areas. The PFA estimates, as calculated by the North Atlantic Salmon Working Group, show that the number of spawners has been above the "Conservation limit" in both areas for the past 4 years (ICES 2008). The estimated exploitation rates on the other hand have been decreasing in Iceland due to an increase in "catch and release" in the salmon fisheries.

The production of salmon as catch per ha, shows a wide range for Icelandic rivers (figure 2). This will obviously lead to a wide range of conservation limits. Information on size of the estimated spawning stock in numbers of eggs, wetted area and recruitment is available for 11 Icelandic rivers showing that the number of eggs giving MSY is from 1,8 eggs/m^2 to 83,3 eggs/m^2 (table 2).

Table 2. Size of production area for Atlantic salmon, conservation limit based on the number of eggs spawned and densities of 1 and 2 year parr in electorfishing surveys. The attainment of CL is calculated.

River name	Wettet area m^2	Hectar	Average catch	Catch/ ha	Conservation limit MSY eggs/m2	Spawning requierment Number of eggs	Average no eggs past 5 year average	% of CL
Elliðaár	199.711	19,97	1.152	57,68	59,30	11.842.862	2.312.540	19,53
Laxá á Ásum	274.189	27,42	1.057	38,55	20,40	5.593.456	1.101.538	19,69
Selá	962.800	96,28	980	10,18	1,40	1.347.920	4.138.897	307,06
Krossá	114.270	11,43	104	9,10	1,80	205.686	440.850	214,33
Laxá í Aðaldal	2.369.370	236,94	1.651	6,97	4,30	10.188.291	4.067.776	39,93
Hofsá	1.792.090	179,21	1.082	6,04	1,00	1.792.090	3.765.653	210,13
Vatnsdalsá	1.486.643	148,66	887	5,97	1,70	2.527.293	2.167.261	85,75
Grímsá	2.395.118	239,51	1.345	5,62	3,00	7.185.354	2.447.041	34,06
Miðfjarðará	2.453.913	245,39	1.243	5,07	1,20	2.944.696	1.980.848	67,27
Vesturdalsá	495.900	49,59	216	4,36	1,40	694.260	246.925	35,57
Sog	1.293.500	129,35	390	3,02	7,60	9.830.600	733.290	7,46

The results indicate that there is high variation for conservation limits for these rivers. Most of the rivers in table 2 are based on direct run-off flow, but the rivers Elliðaár, Laxá á Ásum, Laxá í Aðaldal and Sog are all springfed rivers draining lakes. For the run-off rivers MSY is from 1-3, 0 eggs/m^2 with 1,6 eggs/m^2 on the average. The knowledge of wetted area, catch/ha and the origin of the rivers can be used to group Icelandic rivers into categories of CL. This table should, however, be looked at as preliminary results and the actual values for CL as incomplete. It should , however, be pointed out that the above rivers represent well over 10 % of all Icelandic salmon rivers and could possibly be used as indexes for certain areas. The work on setting conservation limits for Icelandic salmon stocks will continue in the years to come.

3. The status of the stock relative to the abundance criteria specified

As presented in table 2, the estimated average number of eggs spawned for the past 5 years are from as low as 8 % of the spawning requirement to a high of 307 %. This indicates that river owners and the "Competent Management Authority" need to refine these techniques and increase their effort in evaluating conservation limits for more salmon rivers.

The value of salmon fisheries is to large extent based on catch. There is thus a heavy competition between rivers for anglers. Setting CLs for Icelandic salmon rivers and using them thus needs to be based on scientifically acknowledged methods as incorrect estimates and resulting regulatory measures can be quite costly for the fishery associations in question.

The salmon catch in Icelandic rivers is faithfully recorded in log-books that the owners are, by law, obliged to keep. This log-book system, which has been under development since 1946, provides recording of almost all salmon caught with related information on catch date, length, weight, sex, beat and bait. As mentioned previously the catch figures can to a large extent be regarded to reflect the status of stocks (Table 3).

From existing data there is no concrete evidence showing that any Icelandic salmon stocks are suffering from inadequate recruitment but certain rivers seem to be close to unacceptable CL levels and need to be watched carefully. The observed problems can almost exclusively be traced to a major decline in the 2-SW component, which is discussed in section 4.

4. The extent to which the stock is meeting other diversity criteria (e.g. age groups, size groups, populations), if such information is available.

In general Icelandic salmon stocks spend 1 or 2 winters at sea. The sea-age groups can be separated by weight where 2-SW females are bigger than 3,5kg and 2-SW males bigger than 4,0 kg. Aging of salmon from scales supports this and shows little overlap between sea-age groups. In the 1970s the number of 1SW and 2SW salmon in the salmon catch reflected the natural composition of the stocks (Figure 3). In the early 1980s there was a decline for both stock components. After 1985 the catch of 1SW salmon improved again but the 2-SW stock component is still declining. Changes in sea-age composition for Icelandic salmon stocks has earlier been detected but not for such a long period (Gudjonsson et al. 1995).

Before 1980 there was a strong relationship between the catch of 1SW fish and 2SW fish in the subsequent year (Scarnecchia 1983). After 1985 the abundance of 2SW salmon has been declining in all Icelandic salmon rivers (Figure 4). This has led to a general request to salmon anglers from the Institute of Freshwater Fisheries, the Federation of River Owners and the Federation of Icelandic Angling Clubs to release all MSW salmon. In 2006 19 % of the 1SW catch were released and 32 % of the MSW salmon.

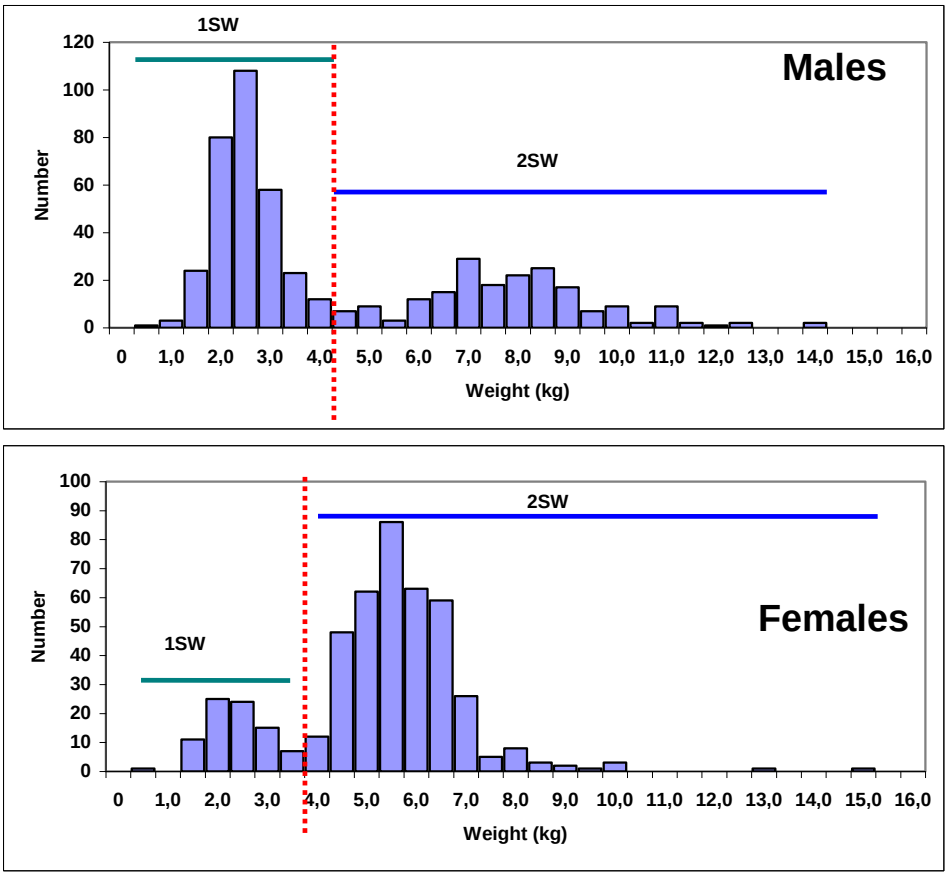


Figure 3. An example of the weight distribution of the salmon catch in River Laxá, North-East Iceland.

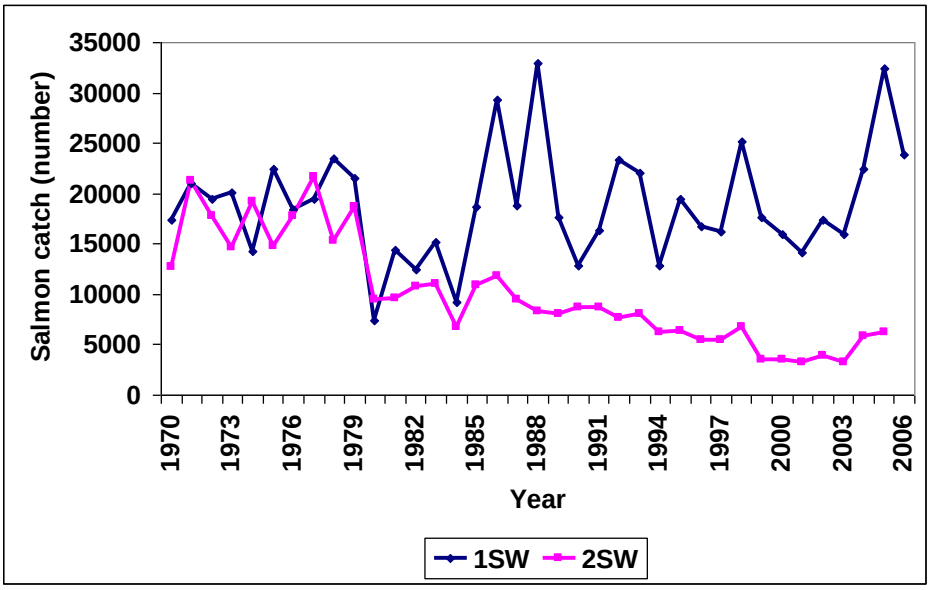


Figure 4. The catch of 1SW and MSW salmon in Icelandic salmon rivers from 1970 – 2006 including 88% of the total salmon catch in Iceland.

Table 3. Salmon rod catch in Icelandic rivers 1974-2007.

River	Y E A R																																		Average	Max	Min
	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	catch	catch	catch
Elliðaár	2033	2071	1692	1328	1383	1336	938	1074	1219	1508	1331	1157	1083	1175	2006	1773	1384	1127	1393	1390	1132	1088	1211	568	492	424	592	414	478	472	645	954	900	936	1152	2071	414
Úlfarsá (Korpa)	357	438	406	361	327	215	110	166	158	450	225	303	376	245	709	440	306	238	517	457	338	316	339	217	248	162	223	185	215	273	244	207	206	210	305	709	110
Leirvogsá	332	739	544	474	463	386	136	213	322	514	320	438	324	291	1057	458	489	435	556	428	490	520	552	411	540	467	487	434	529	558	812	744	299	379	483	1057	136
Laxá í Kjós	1270	1901	1973	1677	1648	1508	950	1290	927	1545	1273	871	1043	933	3422	1819	1370	1328	1053	1103	683	866	629	985	1192	1171	940	916	1483	1457	1305	1312	844	623	1308	3422	629
Bugða	158	269	410	263	136	125	212	260	232	450	461	283	201	230	389	314	226	265	191	163	100	154	143	162	173	126	132	90	156	200	204	276	174	180	224	461	90
Brynjudalsá	205	271	185	173	98	100	11	24	120	177	68	29	44	59	287	118	385	235	154	118	88	597	186	76	102	120	136	95	109	77	171	163	152	164	149	597	11
Botnsá	247	194	158	146	171	242	121	77	92	100	70	54	117	33	209	80	105	148	97	61	58	127	65	20	92	73	124	94	139	123	120	116	102	74	114	247	20
Laxá í Leirársveit	1116	1654	1288	1154	1252	899	707	670	545	708	742	860	1610	914	1887	1186	1052	850	652	747	853	1425	1368	697	816	1065	925	948	1102	1133	972	1294	675	820	1034	1887	545
Andakílsá	235	331	262	187	237	138	69	104	89	108	106	101	145	136	203	122	97	134	85	109	125	118	154	184	63	177	79	95	94	245	129	233	268	246	147	331	63
Hvítá	393	521	388	401	788	573	555	364	348	213	326	597	469	514	439	301	263	572	520	622	560	407	502	213	692	504	425	571	560	918	509	631	554	1238	491	918	213
Grímsá og Tunguá	1419	2116	1439	1103	1952	1527	869	845	717	1382	1061	1463	1836	825	1963	1200	756	1294	1864	1228	1485	1123	1484	1613	1705	1872	1048	1005	1116	1156	1085	1486	1114	1110	1345	2116	717
Flókadalsá	411	613	432	263	547	377	266	181	234	281	303	351	384	282	293	182	241	350	322	387	341	288	233	319	360	347	380	362	473	334	523	410	437	438	346	613	181
Reykjadalsá	156	275	185	112	120	105	56	80	100	91	58	42	69	42	33	75	77	157	107	40	25	97	36	94	95	73	72	33	80	156	183	205	107	196	101	275	25
Þverá og Kjarrá	1748	2690	2330	2368	3132	3558	1938	1245	1616	1901	1082	1550	2127	1703	1567	1327	1485	1979	2314	1554	1605	1638	1381	1633	2181	2136	1281	1210	1444	1872	1373	4165	2156	2404	1910	4165	1082
Norðurá	1428	2132	1675	1470	2089	1995	1583	1185	1455	1643	856	1121	1523	1034	1359	867	1070	1267	1965	2117	1625	1697	1964	1899	2001	1676	1650	1337	2217	1444	1382	3138	2242	1447	1621	3138	856
Gljúfurá	150	522	356	400	461	286	130	101	184	225	110	138	280	73	181	133	97	171	286	192	150	356	209	240	152	134	104	99	167	88	166	255	185	220	206	522	73
Langá	1379	2131	1568	1720	2405	1893	1049	735	1090	960	610	1155	1765	1023	1409	748	1000	951	1290	777	978	1400	1517	1366	1560	1641	1011	1407	1605	2263	2232	1912	1831	1456	1392	2405	610
Urriðaá				84	112	202	102	65	151	162	142	103	55	16	105	63	34	13	19	54	15	37	47	29	42	62	22	24	40	80	53	115	101	45	71	202	13
Álftá	154	341	204	300	386	255	265	267	396	485	268	333	399	202	443	283	245	274	333	242	247	263	283	266	191	275	132	187	228	278	299	343	195	210	283	485	132
Hítará	383	525	351	346	649	314	167	252	202	201	151	203	506	273	428	225	257	393	255	279	206	424	355	217	311	443	404	418	493	448	611	706	543	563	356	706	151
Haffjarðará	613	559	595	624	950	701	494	465	562	625	549	562	1131	521	875	661	599	711	818	617	672	735	602	560	752	793	672	532	943	1007	1133	1290	1077	1079	716	1290	465
Straumfjarðará	451	755	433	466	648	391	320	437	350	360	215	327	378	161	334	300	267	308	233	260	253	315	269	226	297	260	198	191	342	379	475	671	502	451	352	755	161
Vatnsholtsós og vötn					290	325	112	175	140	171	135	200	143		183	126	101	88	107	105	98	119	108	68	63	69	88	25	97	59	105	208	17		126	325	17
Fróðá		182	199	254	225	234	130	94	75	100			58	61	71	51	50	51	52	105	29	26	13	13			29	23	23	15	23	41	63	114	82	254	13
Grísholtsá og Bakká	60	55	75	70	125	61	24	48	37	64	60	27	38																	5	28	54	11	20	52	125	5
Setbergsá					244	167	81	192	170	173	147	215	233	100	296	134	203	117	120	76	40	0	80	44	63	44	39	7	16	47	34	32	21	20	111	296	0
Laxá á Skógarströnd	99	167	114	190	179	177	109	183	121	201	189	277	218	117	242	103	106	101	72	68	33	41	94	46	121	98	75	81	63	169	84	170	92	70	128	277	33
Dunká				83	76	142	58	138	85	129	52	135	124	68	126	71	96	104	125	103	50	76	150	62	39	47	45	96	88	169	103	162	109	106	97	169	39
Skrauma	6	10		22	23	18	10			32	16	16	23				0	3	6	10	4	0	16			0	0								11	32	0
Hörðudalsá	74	55	55	51			51	55	27	87	50	79	43	18	116	78	62	77	68		17	17	23	17	13	5		17			1	7	14		45	116	1
Miðá og Tunguá	117	245	121	146	135	203	85	182	132	161	128	46	101	35	200	118	90	88	214	112	42	58	48	31	103	93	40	80	60	159	76	258	218	134	119	258	31
Haukadalsá	810	914	904	862	926	643	408	814	598	886	633	499	817	650	1232	511	540	703	776	632	407	394	626	331	916	646	348	577	426	640	455	710	522	640	664	1232	331
Laxá í Dölum	341	547	488	419	533	630	324	671	650	947	903	1600	1907	1408	2385	1006	1049	1227	1124	929	625	764	1032	764	1432	938	607	877	879	1394	1533	1881	1076	1145	994	2385	324
Fáskrúð	202	298	136	242	226	261	140	190	154	214	165	257	449	381	464	203	226	183	330	212	96	157	187	144	265	145	143	221	170	182	194	283	178	322	223	464	96
Flekkudalsá	300	462	343	342	467	509	293	255	237	249	189	133	244	129	360	140	145	241	262	247	100	109	192	148	226	131	108	131	229	284	227	290	217	174	241	509	100
Krossá á Skarðsströnd	106	120	109	81	106	156	115	157	126	203	93	27	117	51	208	99	30	100	125	114	44	100	72	28	50	71	33	52	134	95	208	187	196	106	104	208	27
Búðardalsá	35				100	120	131	71	54	71	32	51	55	56	111	81	106	146	131	56	41	31	45	59	42	43	45	105	158	245	335	341	300	322	100	341	31
Hvolsá og Staðarhólsá	126	136	185	163	180	90	18	140	111	100	144	137	323	101	768	163	331	327	306	274	243	313	83	25	61	18	26	46	27	41	78	73		128	161	768	18
Fjarðarhornsá				8	0	38	8	18	34	60	31		29	12	16	4	8	33	24	12	4	2	2	2		0		1	18	33	18	74	115	111	22	115	0
Laugardalsá í Ísafj.djúp	309	601	245	681	703	596	276	288	250	181	125	421	386	190	501	280	161	284	220	265	157	223	111	135	343	149	156	257	309	324	591	390	299	229	316	703	111
Ísafjarðará	10	27		52	29	25	12	12	9		5	6	14	3	23	16	14	55	15	12	3	8	5	4	13	4	4	7	8	14	22	35	30	26	16	55	3
Langadalsá	78	172	170	189	203	277	206	111	101	98	31	54	112	67	95	130	88	217	292	241	72	251	192	133	186	82	76	94	106	150	341	444	329	226	158	444	31
Hvannadalsá	57		56		120	101	47	30	45	27	24	71			110	23	42	304	71	51	41											164	145	136	77	304	23
Selá í Steingrímsfirði	34	22		27	17	17	23	6	7	0	7	44	22	18	60		66	95	81	8	64	20	49		4	11	0	19	12	19	38	29	34	78	28	95	0
Staðará í Steingrímsf.	44	100	108	124	101	95	72	46	41	26	25	28	64	40	71	62	118	82	169	43	26	101	57	45	29	6	14	41						11	64	169	6
Víðidalsá í Steingrímsf	182	49	54	61	93	104	98	34	54	12	16		56					29	29	8		59	23	32	47	39	20	0		8	45	69	62	147	49	182	0
Hrófá		20		22	56	74	48	41	29	14	21	54	62	23	85	41	32	94	93	64	23	57	61	25	93	23	25	17	70	29	63	75	54	61	48	94	14
Krossá í Bitru				49	140	125	151	153	109	90	41	109	180	121	88	79	39	19	63	65	52	61	37	45	85	114	76	47	68	29	98	88	111	76	83	180	19
Víkurá	5	38	92	68	121	219	125	174	61	75	45	70	100	40	89	40	38	28	77	70	20	98	43	54	119	90	81	78	95	39	151	116	98	83	80	219	5
Prestbakkaá	44			66	93	105	21	40		57	39	85	115	43	123			51	73	45	12	38	33	33	13	37	17	19	30	8	44	36	42	28	49	123	8
Laxá í Hrútafirði	9	32	18	23	17	39	43	61	45	126	165	133	98	69	69	11	47	96	84	47	12	33	16	51	75	48	14	17	3	2	13	18	12	14	48	165	2

Table 3. Continued.

River	Y	E	A	R	Average	Max	Min
	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	catch	catch	catch
Hrútafjarðará og Síká	194	291	228	262	346	312	253	288	220	287	195	345	536	259	532	252	200	359	459	411	176	288	205	201	243	218	141	126	168	164	631	514	339	431	291	631	126
Miðfjarðará	837	1414	1601	2581	2337	2132	1714	1213	926	882	583	1059	1719	1073	2081	1175	774	1112	1401	1023	668	1032	714	602	1772	1203	612	433	749	577	2228	1561	1198	1150	1243	2581	433
Tjarnará á Vatnsnesi			34		112	82	53	56	36	53	23	55	25	0		40	18	51	23	40	9	30	0	37	61	32	10	6	39	36	53	52	50	37	38	112	0
Víðidalsá og Fitjá	1051	1140	1238	1792	1851	1948	1423	1392	1132	1082	625	713	1541	1563	2023	924	604	667	1473	1342	580	981	783	691	1081	1089	644	581	887	588	1745	1732	682	728	1153	2023	580
Vatnsdalsá	706	832	571	1203	1466	1413	1033	985	721	879	699	856	1582	1496	1243	660	604	683	998	853	516	601	723	769	1149	629	323	584	850	547	964	1252	1020	848	887	1582	323
Laxá á Ásum	1439	1881	1270	1439	1854	1650	956	1413	1036	1050	625	1440	1857	1157	1617	749	651	833	861	1458	805	1549	627	715	1136	430	770	562	559	308	462	679	365	536	1057	1881	308
Blanda	1173	2363	1485	1367	2147	906	778	1412	861	511	495	766	1814	1243	1217	375	607	568	432	404	357	519	600	877	1984	1191	706	1086	833	504	1386	1591	1199	1107	1017	2363	357
Svartá	420	232	96	46	295	469	444	125	73	147	132	330	391	462	275	118	105	108	363	495	400	547	244	532	619	213	170	283	260	276	398	221	303	301	290	619	46
Laxá á Refasveit	79	58	41	71	94	146	153	71	39	57	70	111	144	132	140	96	156	117	297	227	144	143	104	139	179	105	69	88	169	82	154	254	242	208	126	297	39
Hallá				171	185	197	138	96	57	111	86	109	55	62	62	50	30	45	56	53	28	48	57	38	38	31	8	22	0		53	91				71	197	0
Fossá á Skaga	5	6		34	62	98	94	26	14	25	8	22	32	20	22	24	12	22	20	25	10	16	14	17	17	13	15	16	32	12	29	21	28	30	25	98	5
Laxá á Skaga	120	134	73	140	200	220	245	161	113	93	74	134	138	176	137	70	103	70	144	106	26	30	38	41	79	10	0	0	0	0	0	0	24		88	245	0
Sæmundará	115	116	160	212	303	112	70	52	29	75		139	94									62	25	54	103	43	25	59	78	18	66	137	216	141	93	303	18
Húseyjarkvísl	112	118	141	158	194	84	107	52	54	90	77	105	104	101	73	113	89	103	245	160	80	73	71	70	94	39	32	47	52	63	162	110	150	161	101	245	32
Hofsá í Vesturdal	23	2		15		12	16	10	23														0												13	23	0
Kolka						12	12	11	7			24													58	5	10	27	17	28	52	15			21	58	5
Hrolleifsdalsá	20	24	28	41	41	65	17	4	4	7	4	25	15	24	10	18	16	18	16	55	7		4	1	13	1	4	11	6	3	8	12	16	8	17	65	1
Flókadalsá í Fljótum					71	40	22	54	2	10		22	68	38	64	119	135	44	164	136	15	2	21	15	40	30	12	22	37	24	36	23	18	11	47	164	2
Fljótaá	204	189	173	269	316	199	165	125	71	60	68	83	150	112	93	323	388	135	282	203	78	102	73	119	284	51	49	114	152	49	256	259	86	90	160	388	49
Eyjafjarðará						27	71	21	14	7	11	11	13	13	10	6	40	22	54	33	15	17	10	15	27	8	3	10	3	12	16	10	5	2	18	71	3
Fnjóská	386	268	250	273	554	446	527	257	323	98	107	120	144	93	124	112	121	135	554	411	128	60	95	156	286	157	197	146	311	166	444	460	383	346	247	554	60
Skjálfandafljót	92	67	412	288	336	317	426	108	169	100	165	679	721	503	379	431	493	318	862	907	379	273	353	277	263	520	379	208	472	346	932	556	675	747	406	932	67
Laxá í Aðaldal	1817	2326	1777	2699	3063	2372	2324	1455	1304	1109	1256	1911	2730	2422	2255	1619	1543	1439	2295	1983	1226	1116	1047	1227	1928	845	916	1042	1189	624	947	1025	825	1055	1651	3063	624
Reykjadalsá og Eyvind	337	264	133	593	657	492	321	271	114	210	155	344	373	241	435	241	272	191	280	249	110	119	132	109	65	64	39	87	25	90	89	138	102	43	222	657	25
Mýrarkvísl	210	201	121	181	221	197	169	242	179	248	215	388	490	252	287	239	188	243	390	266	139	234	160	270	212	122	49	83	258	103	357	385	306	49	230	490	49
Ormarsá	123	117	147	275	286	119	124	54	45	87	73	203	350	275	278	264	187	156	335	366	169	163	181	141	134	108	163	143	199	233	295	216	187	182	188	366	45
Deildará	158	189	168	224	357	164	111	93	27	55	69	234	253	178	173	145	142	88	281	391	173	206	82	141	192	65	144	122	194	93	273	177	135	257	167	391	27
Svalbarðsá	234	172	155	240	257	158	167	51	36	41	29	161	171	176	198	238	135	136	289	384	145	215	177	98	159	124	92	143	236	291	231	292	283	302	176	384	29
Sandá	288	238	315	474	418	411	380	138	53	47	35	257	340	403	290	182	81	100	354	434	204	209	152	91	177	190	143	128	212	151	197	260	268	268	230	474	35
Hölkná	135	118	92	219	130	66	73	26	26	25	11	109	121	131	144	105	91	55	150	130	45	78	44	36	53	47	59	77	84	105	84	140	135	101	88	219	11
Hafralónsá	343	302	227	312	276	264	180	36	60	52	25	132	223	296	361	313	223	123	266	402	147	234	222	221	260	254	315	303	294	237	206	365	424	481	234	402	25
Miðjarðará við Bakkafj.	147	144	183	248	242	135	80	39	15	39	32	116	168	206	186	235	136	101	192	172	60	170	96	101	145	116	108	98	165	152	141	195	155	198	136	248	15
Selá í Vopnafirði	589	711	845	1463	1394	767	637	192	168	229	123	627	1258	1523	1102	895	634	772	1318	1092	631	1160	737	685	1140	991	1360	1108	1653	1558	1670	2316	2726	2227	980	2316	123
Vesturdalsá	391	329	326	513	498	268	141	42	34	61	47	280	197	380	231	226	163	116	264	321	218	329	201	216	159	71	129	124	269	175	88	102	104	158	216	513	34
Hofsá og Sunnudalsá	1277	1117	1253	1273	1336	599	615	145	141	258	185	1219	1631	1710	1210	809	552	642	2238	2028	1012	1028	826	607	1008	1020	804	906	1877	1483	1864	1965	2058	1423	1082	2238	141
Selfljót og Gilsá				77	32	19	7		6	15	16	65	70	32	12	5	26	42	90	98	16	32	8	18	25	20	22	41	26	31	47	60	45	103	35	98	5
Fjarðará í Borgarf.eystri				44	27	13	5	1									6									12	5	8	10	9	38	20	43	63	17	44	1
Breiðdalsá	126	123	76	248	412	248	153	41	20	21	4	78	158	257	185	104	91	116	226	130	72	180	92	63	85	128	171	233	325	202	700	815	937	873	184	815	4
Laxá í Nesjum																							32	8	21	18	41	81	135	88	202	103	92		75	202	8
Geirlandsá í V-Skaft.	56	162	59	99	91	88	65	59	42	51	46	49	26	32	62	47	74	93	66	27	20	38	52	47	30	12	14	31	41	36	19	13	23	35	50	162	12
Eldvatn í Meðallandi	24	51	13	43	33	45	12	17	11	17	3	9	11	11	37	14	15	13	24	18	5	17	8	11	6	3	2	1	3	3	17	10	7	21	16	51	1
Tungufljót			14	34	43	74	46	16	20	36	28	23	36	20	25	9	11	21	49	63	35	22	28	10	30	8	7	11	22	25	31	21	8	42	27	74	7
Kerlingardalsá og Vatnsá					28	33	16	57	48	90	49	47			144	78	107	107	169	130	95	73	75	80	98	65	41	32	60	38	42	42		446	71	169	16
Rangárnar	29	57	95	46	82	98	65	80	65	22	10	17	78	32	53	80	1622	453	521	1041	1576	1523	1298	2960	3848	2536	3744	5466	1791	3443	6285	7413	6930	7525	1791	7525	10
Stóra-Laxá í Hreppum	157	340	293	266	571	272	76	242	218	481	707	183	166	113	115	188	200	286	420	384	278	440	456	359	336	194	183	282	229	423	299	432	709	238	300	707	76
Brúará	88	84	57	49	64	49	19	57	32	63	92	48	58	76	37	34	44	72	43	80	49	54	44	42	76	14	20	15	22	46	35	14	27	40	49	92	14
Sog		593	589	537	620	439	223	329	343	248	361	424	497	490	714	325	397	396	341	429	283	300	254	252	413	491	249	317	289	370	257	307	345	669	390	714	223
Hvítá í Árnessýslu		1175	1159		1169	1028	299	762	634	846	941	550	990	965	788	680	486	456	687	938	723	580	596	405	418	190	204	250	262	244	228	298	361	306	623	1175	190
Ölfusá		298	549		825	503	6	102	368	237	381	254	405	393	535	616	315	249	293	515	375	366	192	185	224	155	258	172	186	118	159	204	138	324	309	825	6
Kálfá í Gnúpverjahr.			69	42	4	4	8	10			19		11	15	66	104	87	37	2	14	40	30	54	39	60	87	56	61	26	31	130	118	93	72	45	130	2
Vatnas. Baugstaðaós									59	20	20	9	14	11	21	8	16	36	20	23	16	16	21	26	23	8	14	16	38	28	27	27	34	39	22	59	8

5. For mixed stock fisheries, the information in numbers 3 and 4 should be presented for each contributing stock.

At present, legal mixed stock fisheries can only operate in two glacier rivers with salmon production to some extent in the main stem but mostly in clear water tributaries. There are traditional rights of gillnet fisheries in these glacier rivers, which have been severely regulated by laws and regulations for decades.

A mixed stock net fishery only takes place in two glacial rivers on Iceland´s south coast, the Ölfusá and Þjórsá, where the salmon spawn partly in clear water tributaries and partly in the glacial streams. The average catch during the past 5 years has been 5.700 salmon which represents approximately 90 % of the Icelandic net catch. In 2007 about half of the number of gillnets in the Ölfusá were leased by angling interests. This development is likely to continue, which will further protect any small stock components in these mixed stock net fisheries in the near future.

As stated earlier there is no legal coastal fishery for salmon in Icelandic waters after a buy-out of the few remaining costal fisheries in 1996. Gillnet fisheries in lower reaches of Hvítá in Borgarfjörður, where the main salmon production is in clear water tributaries, have since 1991 been leased annually by the river associations in the tributaries . This is economical because of the price difference between salmon caught in net fishery and the much higher price paid for the rod fishery. An assessment of the effect of the netting lease gives that this has increased the catch in the tributaries between 28-32% (Einarsson and Gudbergsson 2003).

6. The management actions that will be employed to control harvest, including measures that will be used to address any failure or trend in abundance or diversity.

In 2006 a new Act on freshwater fisheries was passed by the Icelandic Parliament. This new Act increases the responsibility of Fishery Associations with respect to the management of salmon stock within their jurisdiction under the supervision of the Competent Management Authority. Every Fishery Association needs to make an "Effort Plan" for their fish stock, specifying number of rods, bait or bag limitations or any other measures of salmon conservation. The "Effort Plan" must be approved by the Freshwater Management Division of the Directorate of Fisheries after receiving a comment from the Institute of Freshwater Fisheries. The purpose is to increase the responsibilities of the Fishing Associations as well as to increase their obligations to gather information of the status of stock. Through this process the precautionary principle can be introduced and applied by the "Competent Management Authority". This is also likely to facilitate the process of gathering the basic information needed to determine Conservation Limits. At least in the long run keeping the salmon stock level above CL that is based on maximum sustainable yield (MSY) will be highly beneficial for the fishing right owners.

The "Competent Management Authority" can thus request a modification of an Effort Plan" in a river where CLs indicate that a stock is threatened. If the Fisheries Association fails to react there are emergency measures embedded in the new Act which can be enacted unilaterally by the "Competent Management Authority".

7. The extent to which the following issues are taken into account:

7.1. Uncertainty in the assessments.

As mentioned previously the CLs which are currently available for selected rivers probably have high confidence limits. The confidence in those values will probably increase with more experience in estimating CL´s. It must, however, always be the primary objective to conserve the salmon stocks in line with the "Precautionary Approach" where lack of sufficient information does not lead to non-action, if other evidence suggests that there is a problem.

7.2. Abundance of the stock/diversity of the stock.

The abundance and diversity of the salmon stocks are clearly key issues in any management plan. Catch and release has been practiced in many Icelandic rivers for a number of years and anglers have been encouraged to release all 2-SW salmon for the last 4 years. All angled salmon are released in one river and most rivers have specific limits in the number of salmon retained per day. Bait limitation is also quite common and fly fishing is getting to be the primary angling method. All the above issues are quite important elements of the mandatory "Effort Plan".

7.3. Selectivity of the fisheries.

The only selective fisheries in Iceland would be the remaining in-river net fisheries, which partly are harvesting salmon, which would not be harvested by any other means. There is anecdotal evidence that different forms of bait would be harvesting different age classes of salmon but this needs to be confirmed.

7.4. Any non-fishery factors affecting the stock.

There are a number of factors e.g. of environmental origin which may affect the stocks in Icelandic rivers. Salmon fishing is highly dependent on good water flow and favourable conditions during the fishing season. Low water and high temperatures may decrease wetted areas and reduce the salmon habitat and increase the danger of disease outbreaks. Man-made threats are easier to avert due to the high value of the salmon fishing and fishery associations are eager to protect the rivers from pollution, gravel mining activity as well as hydropower development, which has been minimal on salmon rivers.

7.5. Other fisheries exploiting the stock.

The information about other fisheries e.g. for marine species harvesting Icelandic salmon are anecdotal in nature and this information can not be quantified. Same is true for coastal net fisheries for char. As there are no coastal sea-fisheries targeting salmon the overall effects on the salmon stocks just prior to freshwater entry are probably minimal.

8. The expected extent and timescale of effects.
A successful development of CLs for all Icelandic rivers will take some time since this is based on several actions including legal actions and costly surveys of salmon rivers, which mostly will be financed by the respective Fishery Associations. This gathering of physical and basic biological datasets also takes time. It is thus probably realistic to aim for a timeframe of 5-10 years before the proper management tools for the most valuable salmon rivers have been developed. It seems likely that the progress in minor salmon rivers will be considerably slower.

9. An explanation of how socio-economic factors are applied in the development of fisheries management actions and how this affects the attainment of NASCO's goals.

The Icelandic angling fisheries are driven by economical factors. In many cases an angling club or outfitter pays a fixed annual price for the river for a period up to 5-10 years. This contract assumes that the river is entitled to a certain number of rods for angling, which are marketed up to a year or two in advance of the fishing season. This system clearly puts considerable strain on any day to day management and is probably the best example of the influence of socioeconomic factors on salmon management in Iceland.

Another example of socio-economic factors is the lease of netting rights to anglers and environmental groups in order to enhance angling in upstream tributaries. This of course is facilitated by the great value difference between angled and net-caught salmon. This trend is likely to continue.

Since the angling fisheries are in fact limited entry fisheries and the fisheries associations and angling clubs can manipulate the effort through "catch and release" as well as bait and bag limitations it does not seem likely that these factors are affecting the attainment of NASCO´goals with respect to salmon conservation.

10. Programs that will be used to monitor the effect of the management measures and identify information deficiencies and timeframe resolution.

The efficient collection of angling statistics throughout the salmon season provides an excellent platform for estimating run sizes into individual rivers, as the salmon statistics have been shown to reflect the run size to a great extent. There are plans to record statistics on-line in certain selected rivers, which will speed up the gathering of the statistics. If runs seem to be dangerously low the "Competent Management Authority" is enabled to instruct the Fisheries Association on the river to enact some conservation measures, probably through a change in the "Effort plan". In extremely serious circumstances emergency measures could be introduced for the following year or years in close cooperation with the River (Fisheries) Association on the relevant river.

Conclusion

It can be concluded that the Icelandic Salmon Management System, which has its roots in a Salmonid Fisheries Act set in 1932 has been relatively efficient in preserving the salmon stocks. The major pillars of this development are the following:

1. A total ban on any coastal fisheries for salmon.
2. Severely restricted terminal fisheries in freshwater (rod + nets).
3. Fixed maximum number of rods on all salmon rivers.
4. Very accurate catch statistics for all angling and most netting fisheries.
5. Fixed number of netting engines on some glacial rivers with restricted fishing effort.
6. Lease of netting engines in freshwater in areas where such an act can benefit angling.
7. Considerable limitation in the use of bait and the number of retained salmon.
8. Voluntary "catch and release"

Despite this the Icelandic salmon fisheries have been subject to a declining marine survival of 2-SW salmon in many areas, which poses great challenges for Fisheries Associations as well as the Salmon Management Authorities.

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Annex 1. Some key information regarding Icelandic salmon rivers.

	River	1st Order Tributary	2end order Tributary	3rd order Tributary	River Type	Cond-ductivity µS/cm	pH	Length km	Lentht opend km	Catchement area km2	Glacier km2	Wetted area m2	Production units	Average catch	Max catch	Min catch	Average catch ha	Fishing method Rod	Number of rods	Fishing method nets	Recording log-book	Counter installed	Counting period	Exploi-tation %
1	Elliðaár				L+S+D	83		6		280		199711	5832	1152	2071	414	57,7	1	6		1	1	1935	42
		Hólmsá			D+S	84			11					+				1			1			
		Suðurá			L	85								+				1			1			
1	Úlfarsá (Korpa)				S+D+L	84		3	4	54		95111	1715	305	709	110	32,1	1	2		1			
1	Leirvogsá				D	73	8,1	10		85				483	1057	136		1	3		1	1	2000	40
1	Kiðafellsá				D	86		4						+				1	1		1			
1	Laxá í Kjós				D+S	50		1	19,2	211		894266	17619	1308	3422	629	14,6	1	12		1			
		Bugða			D+S	57		4		64				224	461	90		1			1			
			Meðalfellsvatn		S									20				1			1			
			Dælisá		D	46				21				+				1						
1	Brynjudalsá				D	33		0,5	9,5	42				149	597	11		1	2		1			
1	Botnsá				D+S	64		3	8	79				114	247	20		1	4		1			
1	Laxá í Leirársveit				D+S			13	9,1	142		418683	11524	1034	1887	545	24,7	1	7		1	1	2000	
		Selós			S			0,5						+				1			1			
		Þverá			S			1						+				1			1			
			Vötn í Svínadal		S									+				1			1			
1	Leirá í Leirársveit				D	66		7		44				20				1	1		1			
1	Hvítá í Borgarfirði				D+L+J	66		56		3880				461	788	213		1	12	1	1			
		Andakílsá			D+S	57		8		214				147	331	63		1	2		1			
		Grímsá			D+S	77		31		313		2395118	28254	1345	2116	717	5,6	1	12		1			
			Tunguá		D	83		11		67				+				1			1			
		Flókadalsá			D	79		5	14	160				346	613	181		1	4		1			
		Reykjadalsá			D+L	133		25		210		994824	14588	98	275	25	1,0	1	2		1			
		Þverá			D	93	8,0	18		482		2380544	54630	1910	4165	1082	8,0	1	12		1			
			Kjarrá		D	96	8,2	31		200		827001		+				1			1			
			Litla-Þverá		D	113		14		122		346908		+				1			1			
		Norðurá			D	48	8,4	15	67			3919304	53289	1621	3138	856	4,1	1	16		1	1	2002	
		Norðlingafljót			D+L+J	70	8,5	66		920	200			+				1			1			
		Gljúfurá			D	54		5	8	50				206	522	73		1	3		1			
		Gufuá			D	113		17		40				+				1	1		1			
1	Langá				D+S	44	8,5	0,5	22	206		1028518	22736	1392	2405	610	13,5	1	13		1	1	2000	
		Urriðaá				156		20		56				71	202	13		1	1		1			
1	Álftá				L+D	74	7,8	10	15	118				283	485	132		1	3		1			
1	Hítará				S+D	70	7,9	16	13	318				356	706	151		1	6		1			
1	Haffjarðará				L+D+S			13		300				716	1290	465		1	7		1			
1	Núpá í Eyjahreppi				D	59		9						+				1			1			
1	Laxá í Miklaholtshr.				D			10						+				1			1			
1	Straumfjarðará				D+S	68	7,7	8	1,5	221		402320	10677	352	755	161	8,7	1	4		1			
1	Vatnasvæði Lýsu				D	74		3,3						126	325	17		1	2		1			
1	Staðará					73		8						+				1	2		1			
1	Gríshólsá				D			5						52	125	5		1	1		1			
		Bakkaá			D									+				1						
1	Fróðá				D+L			4	4					82	254	13		1	2		1			
1	Setbergsá				D	62	7,6	1,5	11	37				111	296	0		1	2		1			
1	Laxá á Skógarströnd				D	68		2		46				128	277	33		1	2		1			
1	Svínafossá í Heydal				D	74	7,8	0,7		41				43	43	43		1			1			
1	Dunká				D	57		4,5		44				97	169	39		1	1		1			
1	Hörðudalsá				D	48	7,7	18		94				45	116	1		1	2		1			
1	Skrauma				D	70		2,5		59				11	32	0		1	2		1			
1	Miðá				D		7,8	22		220				119	258	31		1	2		1			
		Tunguá			D			3		32				+				1			1			
1	Haukadalsá neðri				D+S	54		6		239				664	1232	331		1	6		1			
		Haukaldalsvatn			S									+				1						
		Haukadalsá efri			D			10		34				19	27	9		1	2		1			
1	Laxá í Dölum				D	88		24		256				994	2385	324		1	8		1			
1	Fáskrúð				D	51		8		133				223	464	96		1	3		1			
1	Glerá				D			1,5		61				+				1			1			
1	Ljá				D	128		8		35				+				1			1			
1	Laxá í Hvammssveit				D	67		3,5		97				+				1			1			
1	Flekkudalsá				D	44		2	18	147				241	509	100		1	3		1			
1	Krossá				D	59		2	10	47		114270	3072	104	208	27	9,1	1	2		1	1	1999	
1	Búðardalsá				D	34	7,5	0,3	11,9	66				100	341	31		1	2		1			
1	Staðarhólsá				D	80		6		55				161	768	18		1	4		1			
		Hvolsá			D	78		9		68				+				1			1			
1	Gufudalsá				D	36		6		53				+				1			1			
1	Þorskafjarðará				D	38		5						+				1			1			
1	Fjarðarhornsá				D	40		6						+				1	1		1			
1	Mórudalsá				D									+				1			1			
1	Suðurfossá				D			3		37				+				1						
1	Langadalsá				D	32		20		334				158	444	31		1	4		1			
1	Ísafjarðará				D	29	7,5	4		68				16	55	3		1	0,5		1			
1	Laugardalsá				D+S			0,3	10	56				316	703	111		1	4		1			
1	Hvannadalsá				D	44	7,6	5		90				77	304	23		1	1		1			
1	Selá í Skjaldfannardal				D+J			8		210	25			+				1			1			
1	Bjarnarfjarðará				D			9		152				+				1						
1	Selá í Steingrímsf.				D			8		218				28	95	0		1	1		1			
1	Staðará í Steing.				D	30		12,5		170				64	169	6		1	0,5		1			
1	Víðidalsá í Steingr.				D			1		72				49	182	0		1	2		1			
1	Hrófá				D			7		74				48	94	14		1	1		1			
1	Prestbakkaá				D	140		8		40				49	123	8		1	0,5		1			
1	Krossá				D	53		6		55				83	180	19		1	1		1			
1	Víkurá				D	76		11		57				80	219	5		1	1		1			
1	Laxá í Hrútafirði				D	128		5		57				48	165	2		1	1		1			
1	Hrútafjarðará				D	57		9		367				291	631	126		1	3		1			
		Síká			D	82		3,2		107				+				1						

Annex 1. (continued)

	River	1st Order Tributary	2end order Tributary	3rd order Tributary	River Type	Cond-ductivity µS/cm	pH	Length km	Lentht opend km	Catchement area km2	Glacier km2	Wetted area m2	Production units	Average catch	Max catch	Min catch	Average catch ha	Fishing method Rod	Number of rods	Fishing method nets	Recording log-book	Counter installed	Counting period	Exploi-tation %
1	Tjarnará				D				2,5	6	72				38	112	0		1	0,5		1		
1	Hamarsá				D		78	8,2	9		54				10				1	1		1		
1	Miðfjarðará				D		90		33		790								1	11		1		
		Vesturá			D		139		16	21	286								1			1		
		Austurá			D				11	12	213								1			1	1	2000
		Núpsá			D		139		33		107								1			1		
1	Víðidalsá				D+S		106		23		914		2453913	75618	1153	2023	580	4,7	1	8		1		
		Fitjá			D		91		12	18	283				+				1					
1	Vatnsdalsá				D+S		81		32	2	1170		*1486643*		887	1582	323	6,0	1	6		1		
		Álka			D				2		291				+				1					
1	Gilá				D		80		2		94				10				1	1		1		
1	Gljúfurá				D		63		1,1	25,9	107				50				1					
1	Laxá á Ásum				S+D		92		13		294		274189	9468	1057	1881	308	38,6	1	2		1		
		Fremri Laxá á Ásum			S+D				6	19	241				10				1	2		1		
1	Blanda				D+J		71	8,4	77		2370	183			1017	2363	357		1	13			1	1982
		Svartá			D		80				480		1147259	11932	290	619	46	2,5	1	3		1	1	1982-1985
			Hlíðará		D		57				59				+				1			1		
		Auðólfsstaðaá			D		59								+				1					
		Gilsá			D+S		69		0,1						extinct									
		Galtará			D		126		3				0,024		extinct									
		Haugakvísl			D		125		15				0,17		extinct									
		Herjólfslækur			D		109		8				0,03		extinct									
		Sandá			D		99		1				0,002		extinct									
		Kúlukvísl			D+L		95		3				0,02		extinct									
		Seyðisá			L		70		15		330		+		extinct									
1	Laxá á Refasveit				D		64		2	8,2	168				126	297	39		1	2		1		
		Norðurá			D						55				+				1					
1	Hallá				D		94		14		57				71	197	0		1	1		1		
1	Laxá í Nesjum				S+D				2						10				1	1		1		
1	Fossá á Skaga				D+S				1,5		68				25	98	5		1	0,5		1		
1	Laxá á Skaga				D		71		23		150				88	245	0		1	2		1		
1	Héraðsvötn				D+J						3650	239			20				1	8	1	1		
		Húseyjarkvísl			D		106		30		481				101	245	32		1	3		1		
		Sæmundará			D		95		24		172				93	303	18		1	2		1		
		Norðurá í Skagafirði			D				15		400				+				1			1		
		Hofsá			D+(J)		72				482	29			10				1			1		
1	Kolka				D+J				3		483	17,5			21	58	5		1			1		
		Hjaltadalsá			D+J		29		22		306	8			+				1					
		Kolbeinsdalsá			D+J		33		15		160	9,5			+				1					
1	Hrolleifsdalsá				D		87		7		83				17	65	1		1	2		1		
1	Flókadalsá				D+S		54		9		95				47	164	2		1	2		1		
1	Fljótaá				S+D		58		7,5		144				160	388	49		1	3		1		
		Brúnastaðaá			D				1		34				+									
1	Ólafsfjarðará				S+D				9		157				+				1			1		
1	Svarfaðardalsá				D+J		41		25		450	20			+				1			1		
1	Þorvaldsdalsá				D		36		2		118				+				1	2		1		
1	Hörgá				D+J		26		28		710	10			+				1			1		
		Öxnadalsá			D				27		292				+				1					
1	Eyjafjarðará				D		30		45		1300				18	71	3		1	0,5		1		
1	Fnjóská				D		36		3	30	1310				247	554	60		1	7		1		
1	Skjálfandafljót				D+L+J		74		21	52	3860	140			406	932	67		1	2		1		
		Djúpá			S+D		40		7		112				44	85	10		1			1		
1	Laxá í Aðaldal				L+S		157	9,2	26		2150		2369370	16650	1651	3063	624	7,0	1	18		1		
		Reykjadalsá			L+D+S		80		30		234		306000		222	657	25	7,3	1	4	1	1		
		Mýrarkvísl			L+D+S		89		7	20	263		230515		230	490	49	10,0	1	3		1		
			Þverá		D+L		70		7						+									
1	Litluárvötn				L		145								+				1			1		
		Skjálftavatn			S										+				1					
1	Jökulsá á Fjöllum				J+L+D		118	8,2			7750	1400			+									
		Brunná			L+D		94				265				+				1			1		
1	Deildará				D+S		100		12		46				167	391	27		1	2		1		
1	Ormarsá				L+D		89		30		232				188	366	45		1	5		1		
1	Svalbarðsá				D		93		4		350				176	384	29		1	2		1		
1	Sandá				D		68	8,0	10		257				230	474	35		1	2		1		
1	Hafralónsá				D		68		28		562		1097050	30952	234	402	25	2,1	1	9		1		
		Kverká			D						157				+				1			1		
1	Kverká						68								+				1	1		1		
1	Hölkná				D		73		11		70				88	219	11		1	2		1		
1	Miðfjarðá				D		90		3,2		300				136	248	15		1	2		1		
		Kverká			D										+				1			1		
1	Selá í Vopnafirði				D		76		7,5	20	750		962800	23788	980	2316	123	10,2	1	7,3		1	1	2004
1	Vesturdalsá				D		127		28		190		495900	13774	216	513	34	4,4	1	3		1	1	1996
1	Hofsá				D		79		20	20	110		1792090	32913	1082	2238	141	6,0	1	7		1		
		Sunnudalsá			D		62				200				+				1					
1	Selfljót				D		22		42		458				35	98	5		1	8		1		
		Gilsá			D		20								+				1					
1	Lagarfljót				D+S+J		54		22	111	2900	140			+				1		1	1	1	2004
		Kelduá			D+J						445	5			+				1					
		Eyvindará			D+L		32	7,8			230				+				1					
		Rangá			D		75	6,8			130				+				1					
		Grímsá			D		44				585				+				1					
1	Fjarðará, Borgarf.				D						128				17	44	1		1			1		
1	Fjarðará, Seyðisfirði.				D						71				+				1			1		
	Norðfjarðará				D										+				1			1		
1	Fjarðará, Loðmundarf.				D										+				1			1		
	Fjarðará Hellisfirði				D						31				+				1			1		
	Reyðarfjarðará				D		21								+				1			1		

Annex 1. (continued)

	River	1st Order Tributary	2end order Tributary	3rd order Tributary	River Type	Cond-ductivity µS/cm	pH	Length km	Lentht opend km	Catchement area km2	Glacier km2	Wetted area m2	Production units	Average catch	Max catch	Min catch	Average catch ha	Fishing method Rod	Number of rods	Fishing method nets	Recording log-book	Counter installed	Counting period	Exploi-tation %
1	Breiðdalsá				D	57		10	23	370				1				1	8		1	1	2004	
		Tinnudalsá			D	26				151				184	815	4		1						
1	Geithellnaá				D	28				184				+				1						
1	Laxá í Nesjum				D	80				55				75	202	8		1			1			
1	Skaftá				J+L+D	69		52		3000				5	13	0		1		1	1			
		Fossálar			D	55		15						+				1			1			
		Geirlandsá			D	53		22						51	162	12		1	2		1			
			Stjórn		D	72		1		36				+				1						
			Þverá		L+S	59		1						+				1						
		Hörgsá á Síðu			D	50		10		40				12	20	9		1						
		Fjaðrá			D	75		2		35				+				1						
1	Grenlækur				L	112		30						5	20	0		1			1	1	1998	
1	Eldvatn í Meðallandi				L	113		26						16	51	3		1			1			
1	Kúðafljót				D			33		182				+				1		1	1			
		Tungufljót			D	76		9						27	74	8		1	6		1			
1	Kerlingardalsá				J+D+L	103		12		93	22			71	169	16		1			1			
		Vatnsá			S+D+L	103		2		20				+				1			1			
		Heiðarvatn			S									+				1			1			
1	Skógaá				D+L	56				78	3			+				1			1			
1	Markarfljót				J+D+L	105				1200	240			+				1						
		Seljalandsá			L					11				+										
1	Affall, A-Landeyjum				L									+				1			1			
1	Hólsá				L					1860				+				1			1			
		Ytri-Rangá			L	177		17	51	1000				+				1	10		1	1	2000	
		Þverá			L	178				784	8			+				1	14		1			
			Eystri-Rangá		L	101	8,5	28		562	8			+				1	13		1			
1	Þjórsá				D+J+L	83		48	57	7530	1010			N1950	5532	784				1	1	1	1997	
		Minnivallarlækur			L	99								+				1			1			
		Kálfá			D	95		11		85				45	130	2		1	2		1			
		Fossá			D+L					223				+				1			1			
		Þverá			D									+				1						
1	Ölfusá				L+D+J+S	75				6100	620			N3458	7415	1186		1	14	1	1			
														S350	825	6					1			
		Þorleifslækur			D+L	208		13		115				+				1	8					
		Sog			L+S	75		8		1200		1293500	11849	390	714	223	3,02	1	6		1			
			Ásgarðslækur			95								20				1	1		1			
			Tunguá		D+L									+				1						
		Hvítá			L+D+J	62		69		4500	620			N2761	8480	1215		1	22	1	1			
														S708	1169	190					1			
			Brúará		L	56		19		225				49	92	14		1			1			
				Hagaós	L+S					278				+				1	2		1			
				Hólaá	L+S	81								+				1						
				Fullsæll	D+L									+				1						
			Tungufljót		L+J	51		11		770	250			+				1	2		1	1	2007	
			Höskuldslækur											+				1						
			Litla-Laxá		D	83				105				20				1	2		1	1	2007	
			Stóra-Laxá		D	53		37		512				300	707	76		1	10		1			
			Dalsá		D					31				+				1	1		1			
			Fossá		D					30				+				1	1		1			
1	Hróarsholtslækur				L			15	16,5					22	59	8		1			1			