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## *Supplementary Information of*

## **Status and future perspectives of pink salmon in the Nordic region**

***Staveley et al.***

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Table S1. Summary of answers from each country including sources of data. The questions were as follows: 1. How do we get pink salmon observations/reports of adult spawners? 2. How do we get pink salmon observations/reports of juveniles? 3. What are the management actions (e.g. local, national levels, rules, plans, decisions)? 4. Is there any research being conducted on pink salmon? 5. Is it possible to report pink salmon? Ease of reporting, economical rewards, open and use of data, increase knowledge. 6. Is there mandatory or motivational reporting of fish catches, including pink salmon? 7. Has there been any awareness/ educational work?

Country/ Question	1	2	3	4	5	6	7
Sweden	<p>Catch reports from anglers. Online reporting website (though underused).</p> <p>A camera fish counter in 1 river (Ätran).  <a href="https://fiskdata.se/raknare/live/live-user.php?locationId=1">https://fiskdata.se/raknare/live/live-user.php?locationId=1</a></p> <p>eDNA monitoring.</p>	<p>Trials in electrofishing and eDNA in some rivers where spawners were detected from eDNA.</p>	<p><a href="#">Overview, risk assessment and proposed measures for pink salmon</a> report 2018.</p> <p>Advice from the Swedish Agency for Marine and Water Management: If pink salmon has been caught, it must be killed immediately and not thrown back into the water.</p> <p>Active in international organisations and projects – e.g. NASCO pink salmon working group, NASCO PINKTrack.</p>	<p>There is a research project, <a href="#">pink salmon in Sweden</a> 2023-2024, funded by the Swedish Research Council FORMAS. Aims: establish the distribution of pink salmon in rivers along the west and southern coasts and to detect if there are signs of reproduction.</p> <p>Involved in the NASCO PINKTrack eDNA project.  <a href="https://salmonatsea.com/eu-funded-research/pinktrack/">https://salmonatsea.com/eu-funded-research/pinktrack/</a></p>	<p>Huge effort to communicate the reporting of pink salmon catches in 2023. Portal for reporting of aquatic species exists through SLU Swedish Species Information Centre – open data. Stickers, posters and website created with links/QR code to the portal.</p>	<p>All reporting of recreational fish catches are voluntary. There have been no rewards or incentives to report pink salmon.</p>	<p>Swedish Agency for Marine and Water Management and research project website created with species information, ID, and where to report. Stickers, posters distributed to relevant stakeholders individuals. Signs at fishing places by rivers. Webinars and presentations given. Information at fishing and boat exhibitions. TV, magazine and newspaper articles. Social media.</p>
Norway	<p>Mandatory catch reports from anglers in rivers.</p>	<p>Electrofishing surveys in selected rivers in</p>	<p>Massive removal of pink salmon as a national strategy from</p>	<p>There are several research projects, but they are often under</p>	<p>Mandatory reporting of catches of anadromous</p>	<p>See response to question 5. Reporting of catches is</p>	<p>There has been a high level of attention on pink salmon in general</p>

	<p>Mandatory catch reports from licenced bag net fisheries at sea. Catch reports from sport fishers/anglers at sea, there is a reporting system but little used so highly underreported.</p> <p>Publicly available data: <a href="http://www.ssb.no">www.ssb.no</a> (Statistics Norway) and <a href="http://www.miljodirektoratet.no">www.miljodirektoratet.no</a></p> <p>Daily catch reports from traps aimed at fishing out pink salmon – traps in 50 rivers in 2023.</p> <p>Daily catch reports from others removal efforts in rivers, e.g. with nets, harpoon, taking out of fish ways etc.</p>	<p>northern Norway and some net/trap fishing. eDNA (in Tana/Teno watershed).</p>	<p>government (250 000 pink salmon fished out in 2023). Regional authorities heavily involved in the counties in Northern Norway. Local people heavily involved in organising and performing the removal of pink salmon in each river. Traps in lower parts of 51 rivers in 2023, sometimes combined with net fishing. Some rivers without traps fish out pink salmon by use of nets, harpooning, taking fish out from fishways etc. The government has funded measures in most of the rivers, but in some cases where it has not been funding available from the government, local organisations and people have performed removal on a voluntary basis (but they need permissions</p>	<p>budgeted, opportunistic and to a little extent coordinated with each other.</p> <p>Several Master theses on pink salmon. There are no grants or programs from the research council, government etc. to study the impacts of pink salmon on other salmonids, non-salmonid fish, and ecosystems. Therefore, there is very little knowledge of the effects of pink salmon in rivers, estuaries, fjords and at sea.</p>	<p>salmonids (on the level of individual fish) has been in place for decades, so there are well-established systems for reporting salmonids including pink salmon from angling in rivers and for the licenced coastal bag net fisheries. However, the reporting system for sport fishing catches at sea (angling) is not well known and not much used. Reporting of daily catches in traps and other mitigation measures is via an app, which has been easy for people to use. People are motivated to use it to show the results of their efforts.</p>	<p>mandatory for angling in rivers, catches during mitigation measures, licenced bag net fisheries at sea, and angling at sea. Angling catches at sea are highly underreported though, even if mandatory because of little focus on this.</p>	<p>since 2017, with numerous newspaper articles in national, regional and local newspapers. High level of information from governmental bodies, organisations (national and regional/local levels of hunter- and fishers organisations, landowners, sea fishers etc.) and research institutions in media, press releases, web page, social media and through meetings. Regular lectures for biology, fisheries, and aquaculture students at the University of Tromsø.</p> <p><a href="https://www.nina.no/english/Biodiversity/Alien-Species/Pink-salmon">https://www.nina.no/english/Biodiversity/Alien-Species/Pink-salmon</a></p>
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Finland	<p>Catch reports from anglers and net fishers.</p> <p>Monitoring programs for Atlantic salmon produce data on development in distribution and abundance of pink</p>	<p>Sampling at spawning sites (digging, electrofishing).</p> <p>Sampling migrating juveniles with fyke nets and seine.</p>	<p>Bilateral fishing agreement between Finland and Norway: a captured pink salmon must be killed and not released back into the water.</p> <p>Special fishing permits to local fishing right holders to fish for pink salmon in the</p>	<p>Monitoring (sonars, video cameras, snorkelling...). produce data on distribution and abundance.</p> <p>Studies at spawning sites (location, timing, behaviour, egg development etc.).</p>	Reporting of pink salmon catches alongside with regular reporting of Atlantic salmon and sea trout catches.	Semi-mandatory reporting of Atlantic salmon, sea trout, pink salmon catches (per individual fish captured).	<p>Lots of information distributed and made available over the latest years, esp. since 2017.</p> <p>Public meetings and lectures locally, seminars and webinars nationally.</p>

	salmon (sonars, video cameras, snorkelling...). eDNA.		<p>Teno/Tana river in 2023 (currently Atlantic salmon fishing ban). Applicants informed their plans to fish for pink salmon and means to avoid Atlantic salmon catches (methods, sites, time etc.).</p> <p>Pink salmon listed on the national strategy on invasive species, need to be monitored.</p>	<p>Studies on juvenile pink salmon migration using traps and seine: timing, fish size &amp; growth, feeding (stomach samples, SIA).</p> <p>eDNA surveys across different tributaries of the large Teno/Tana river.</p> <p>Study on the effects of a pink salmon trap and fence at the Teno/Tana river.</p>			<p>Articles in national, regional and local newspapers and magazines.</p> <p>Links: <a href="#">popular literature review</a>, <a href="#">website</a>, <a href="#">youtube video</a></p>
Iceland	<p>Mandatory catch reports from anglers/fishing associations in rivers.</p> <p>Several rivers with daily monitoring in fishways, video monitoring, fish counters etc.</p>	<p>Fyke-net operated in selected rivers, catching out-migrating smolts in even years. Electrofishing also applied in same selected rivers.</p>	<p>Fishing associations in salmon rivers may trap fish with Seine-nets to remove pink salmon.</p> <p>Seine-netting in rivers is not allowed in general, but the Fisheries Directive in Iceland made a temporal exemption from the rules to allow for such removals of pink salmon for the 2023-2025 seasons.</p>	<p>Research study in cooperation with colleagues at Queen Mary University, UK.</p> <p>Marine and Freshwater Research Institute (MFRI) handed one-time extra governmental funding to study the impact of pink salmon.</p>	<p>Catch reports via logbooks from anglers and fishing association, has been mandatory for several decades, and since the 2023 season the MFRI has opened an online, open-source, internet application to register catch.</p>	<p>All catches in-river are mandatory and need to be registered.</p>	NA

Faroe Islands	Due to the increased occurrence of pink salmon in the Faroes in 2017, a citizen science project was launched in 2019. Since then, anglers have been encouraged to report or donate pink salmon to Firum.	We don't.	Not to my knowledge.	Since the number of reported pink salmon in the Faroes has been consistently low, with fewer than 10 specimens in odd-numbered years, I believe no action will be taken unless there is a significant increase in their population.	In 2019, reports of pink salmon catches were financially incentivized. However, this practice has since been discontinued, and anglers now report their catches voluntarily, primarily by telephone.	Only motivational registrations.	Outreach efforts for the previously mentioned citizen science project have been interviews on the radio, newsletters, and short articles.
Denmark	<p>Reports from recreational angler catches in freshwater, and the collection of broodstock salmon through electrofishing, where reporting of pink salmon is also possible.</p> <p>Additionally, DTU Aqua conducts studies on salmon runs in selected watercourses, where reporting of</p>	<p>In Denmark, make "Fish Care Plans", which is a research program covering 5,000 locations all over Denmark, 800 of which are examined annually, including 500 through electrofishing every year.</p> <p>Additionally, further studies, through electrofishing, are often conducted in selected watercourses. Here, any findings of</p>	Due to the limited occurrence of pink salmon in Danish watercourses, the formal setup is restricted. Upon the capture of pink salmon during the collection of broodstock, the culling of pink salmon will be permitted.	Tissue samples and reports of pink salmon have been sent to foreign research institutions. Genetic tests have also been conducted on pink salmon caught in Danish watercourses.	<p>It is possible to submit online reports of pink salmon. Here is the info:</p> <p>"If you catch a pink salmon in Denmark DTU Aqua would like to receive information if you have caught pink salmon in Denmark in 2023. Information about pink salmon is important for monitoring the occurrence of this species in Danish watercourses and</p>	DTU Aqua is closely monitoring the reporting platform for freshwater fish catches, and based on these recorded observations, direct contact has been made with those who have caught pink salmon. Reporting of catches of pink salmon is not mandatory in Denmark.	<p>Every odd-numbered year, news has been published highlighting the possibility of incoming pink salmon and informing the public about the importance of reporting catches. <a href="https://www.fiskepleje.dk/fiskebiologi/laks/trusler-mod-laks/pukkellaks">https://www.fiskepleje.dk/fiskebiologi/laks/trusler-mod-laks/pukkellaks</a>.</p> <p>A newsletter has also been sent to many thousands of subscribers regarding the annual status of</p>

	pink salmon is mandatory.	juvenile pink salmon will be recorded.			waters. The information can be sent via email to DTU Aqua, or you can fill out this form – Form for reporting pink salmon catches in 2023. Formular til fangst af pukkellaks i 2023 “		incoming pink salmon. Additionally, there has been an emphasis on social media regarding the importance of reporting.
Greenland	Social media call for observations.  Mandatory reporting of catch of Atlantic salmon includes Pink salmon information.  eDNA monitoring.	A project was planned in 2024 in Kapisillit river and near Kuumiut in East Greenland by scientists from UK. Kapisillit was cancelled due to low observations of adult Pink salmon.	Not to my knowledge.	Kapisillit river has been monitored since 2020 using eDNA. Published in 2024. PINKTrack eDNA will take place in 2025. Facebook call for observations will continue.	Reporting can be done to the Greenland authorities online when reporting catch of Atlantic salmon. Can also be reported to GINR here <a href="https://arcg.is/rXuue">https://arcg.is/rXuue</a>	In non-commercial recreational/ household fishery Only Atlantic salmon fishery has licence and reporting requirements. When reporting Atlantic salmon, pink salmon has a separate reporting column.	Call for observations through social media annually since 2019.

Fig. S1. Numbers of rivers in Norway (count) showing the number of pink salmon reported from 2017-2023 (odd years only).

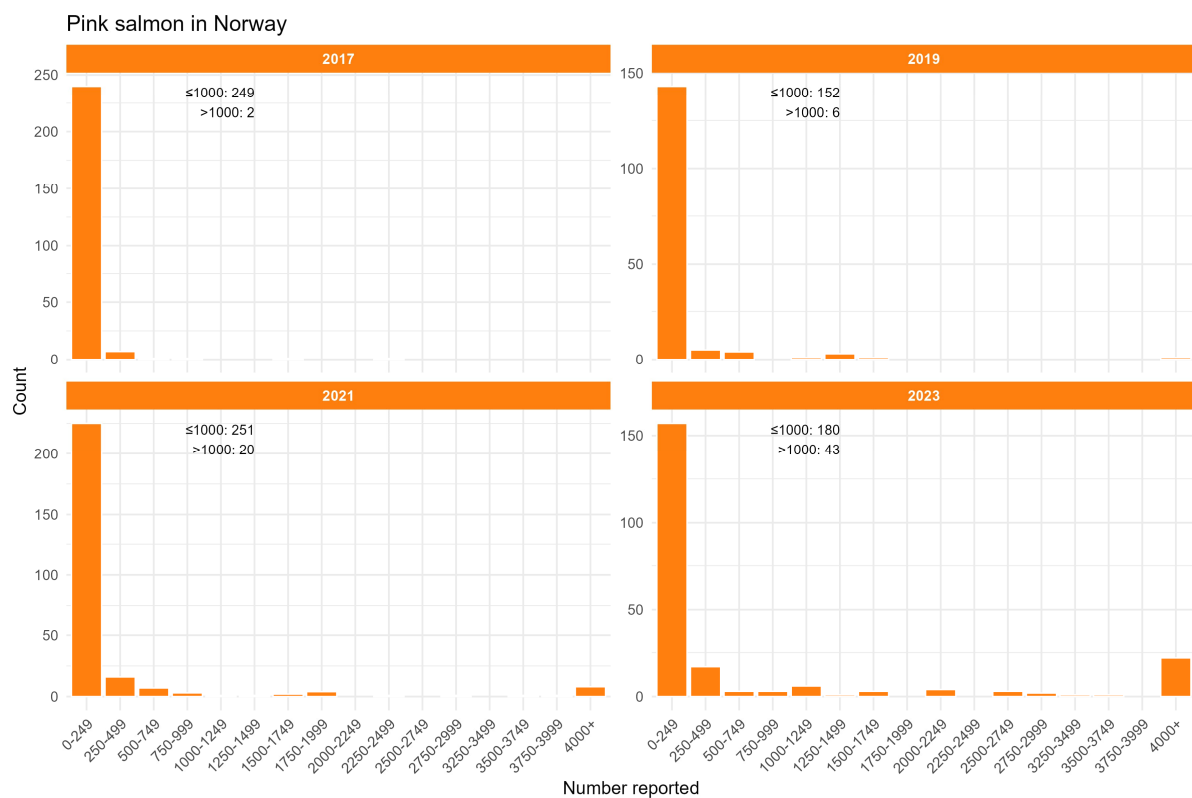


Fig. S2. Numbers of rivers in Norway (count) showing the number of returning Atlantic salmon from 2002-2023. The majority of rivers in Norway during this time are well below 1000 Atlantic salmon threshold. Data source: <https://vitenskapsradet.no/VurderingAvEnkeltbestander/#/map>

