

# Monitoring of function of spawning sites within project ReBorN (LIFE15 NAT/SE/000892)

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## Summary

To monitor one of the expected results, that the number of spawning sites for Atlantic salmon and brown trout will increase and to ensure that the sites are functional and used by the targeted fish species we have monitored a sample of created spawning sites within the project.

During 2016-2021 we have monitored spawning areas in the Counties of Norrbotten and Västerbotten. The results show that spawning has occurred on 165 out of 347 (47, 6 %) occasions.



*Spawning salmon at a restored spawning area in river Linaälven, project area Kalixälven, 2018.*

*Photo: Mikael Nilsson, Fiskmiljö Nord AB*

## Background

One of the objectives in the ReBorN project was to create 2300 spawning sites.

To control their function, a minimum of 30 restored spawning areas will be visited during year 3, 4 and 5 of the project.

This action is necessary to monitor one of the expected results of action C.2., i.e. that the number of spawning sites for Atlantic salmon and brown trout will increase. Although the number of spawning sites restored during the project is known, we need to ensure that the sites are functional and really used by the targeted fish species.

A spawning site (bed) is considered to be around 6 m<sup>2</sup> in size. In larger rivers huge spawning areas can be created and they can be as large as 2000 m<sup>2</sup>.



*Spawning bed. Right size of gravel and water velocity through the bed is essential for successful hatching.*

*Photo: Mikael Nilsson, Fiskmiljö Nord AB*

## Method

By using waders and bathyscope the created spawning sites are visually checked whether they have been used by salmon and/or trout. It is possible to see spawning fish at the sites if they are functional, and it is also possible to see tracks in the gravel from previously spawning fish (spawning pits). The action is done during September and October, which is the spawning time of salmon and trout.



*By using a bathyscope it is easier to see if the spawning bed has been used by fish.*

*Photo: Sofia Perä, CABN*

## Results

### The County of Norrbotten

In the County of Norrbotten a total number of 99 spawning sites have been monitored in all project areas between 2017-2021. 71 have been use for spawning. (table 1)

**Table 1.** Number of spawning areas in the County of Norrbotten where spawning has occurred.

<b>River</b>	<b>2017 (number of used spawning beds)</b>	<b>2018 (number of used spawning beds)</b>	<b>2019 (number of used spawning beds)</b>	<b>2020 (number of used spawning beds)</b>	<b>2021 (number of used spawning beds)</b>
River Vassaraälven (within project area Kalixälven)	3 of 5	14 of 26	Not monitored	21 of 31	Not monitored
River Linaälven (within project area Kalixälven)	0 of 1	2 of 3	Not monitored	Not monitored	Not monitored
River Stockforsälven (within project area Piteälven)	Not monitored	1 of 3	2 of 3	Not monitored	Not monitored
River Vitbäcken (within project area Piteälven)	Not monitored	Not monitored	1 of 2	Not monitored	Not monitored
River Åbyälven	Not monitored	1 of 2	2 of 2	Not monitored	4 of 4
River Byskeälven	Not monitored	1 of 3	1 of 2	Not monitored	2 of 3
River Råneälven	Not monitored	Not monitored	2 of 3	Not monitored	Not monitored
River Rutnajoki (within project area Råneälven)	Not monitored	1 of 2	2 of 2	Not monitored	Not monitored
River Solälven (within project area Råneälven)	Not monitored	1 of 2	Not monitored	Not monitored	Not monitored
Total number of monitored spawning beds	6	41	14	31	7
Total number of confimed use of spawning beds	3	21	10	31	6

In the project area Kalixälven (Vassaraälven and Linälven) spawning beds have been monitored at 66 occasions and on 40 of those spawning had occurred.

In the project area Piteälven (Stockforsälven and Vitbäcken) spawning beds have been monitored at 8 occasions and on 4 of those spawning had occurred.

In the project area Åbyälven spawning beds have been monitored at 8 occasions and on 7 of those spawning had occurred.

In the project area Byskeälven spawning beds have been monitored at 8 occasions and on 4 of those spawning had occurred.

In the project area Råneälven (Råneälven, Rutnajoki and Solälven) spawning beds have been monitored at 9 occasions and on 6 of those spawning had occurred.

## The County of Västerbotten

In the County of Västerbotten a total number of 248 spawning sites have been monitored in two different rivers between 2016-2021 (table 2). 94 have been use for spawning.

**Table 2.** Number of spawning sites in the County of Västerbotten where spawning has occurred.

<b>River</b>	<b>2016 (number of used spawning beds)</b>	<b>2017 (number of used spawning beds)</b>	<b>2018 (number of used spawning beds)</b>	<b>2019 (number of used spawning beds)</b>	<b>2020 (number of used spawning beds)</b>	<b>2021 (number of used spawning beds)</b>
Lögdeälven	6 of 6	1 of 1	11 of 15	17 of 40	5 of 14	1 och 1
Mjösjöån	Not monitored	3 of 3	Not monitored	17 of 59	25 of 59	8 of 50
Total number of monitored spawning areas	6	4	15	99	73	51
Total number of confimed use of spawning areas	6	4	11	34	30	9

In river Lögdeälven spawning beds have been monitored at 77 occasions and on 41 of those spawning had occurred. No actual monitoring was made 2021 due to high flow, still one spawning was noticed at a newly constructed spawning area.

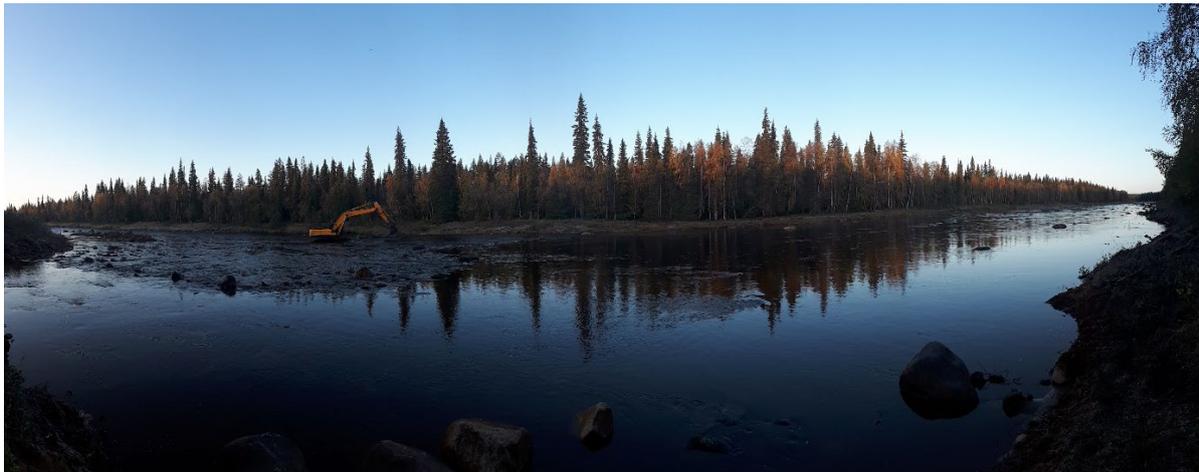
In river Mjösjöån spawning beds have been monitored at 171 occasions and on 53 of those spawning had occurred. In 2021 we only monitored a bit too early in the season and we were able to see some early activity. Very high waterflow during the spawning time made more monitoring impossible.

## In total (the County of Norrbotten and Västerbotten)

In total 347 spawning sites have been monitored between 2016 – 2021 in the two counties. Traces of spawning activity have been noticed on 165 (47,6 %) sites.

## Discussion

One of the objectives in the ReBorN project was to create 2300 spawning sites (6 m<sup>2</sup>). By the end of the project more than 14 000 spawning sites have been created. Smaller areas or single sites are mainly created or restored in small brooks. Larger areas that are made up of many sites are restored in larger rivers like the main channels of the rivers Råne-, Kalix- and Lögdeälven. These spawning areas can be as big as 2000 m<sup>2</sup> at some places where lots of gravel in the right sizes where found and other conditions where favorable. The spawning areas are usually located at the top of a rapid (river neck, where calm water pass over into a rapid).



*A large spawning area (~ 2000 m<sup>2</sup>) at Snasko in river Råneälven. It stretches from the river neck and 200 meters upstream.*

*Photo: Andreas Broman, CABN*

The number of spawning sites has increased over the years as the project been running. This means that spawning fish in the river get more and larger areas for spawning by every year and hopefully don't have to compete amongst themselves in order to find good spawning beds. When they reproduce, Atlantic salmon and brown trout return to the area where they were born. If salmon is to colonize new reproduction new sites, the abundance of reproducing adults and the competition for space must be high enough to force some individuals to continue their migration to new areas.

The result is also depending on the amount of fish that is spawning, both stationary fish and anadromous fish that migrates up into the river for spawning each year. More mature fish in the river, the more signs of activity will be noticed.

The monitoring in 2020 and 2021 was not complete due to a couple of different factors. In the County of Västerbotten there was very high water levels in the autumn, both 2020 and 2021 when the monitoring was taken place which made the monitoring difficult. In the County of Norrbotten it was snow and cold making the monitoring though.



*Monitoring of spawning area in river Vassaraälven, project area Kalixälven, in October 2020.*

*Photo: Fiskmiljö Nord AB*

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