



Environmental monitoring

Grundatangi Industrial Area

The results of the environmental monitoring for the Grundartangi Industrial Area in 2025 for air quality, fresh water, grass and ocean show that all the thresholds set in the operating permits and relevant regulations were met. For those parameters for which reference values are not available, results of measurements are compared to background values and measurements from previous years.

The companies that participate in the environmental monitoring are Elkem Ísland ehf., Norðurál Grundartanga ehf. and Alur Álvinnsla ehf. The environmental monitoring of the industrial area at Grundartanga is carried out according to the environmental monitoring plan made in accordance with work permits and is approved by the Icelandic Environment and Energy Agency.

Reports on the results can be obtained from the website of the Icelandic Environment and Energy Agency, www.uos.is



www.alur.is



www.elkem.is



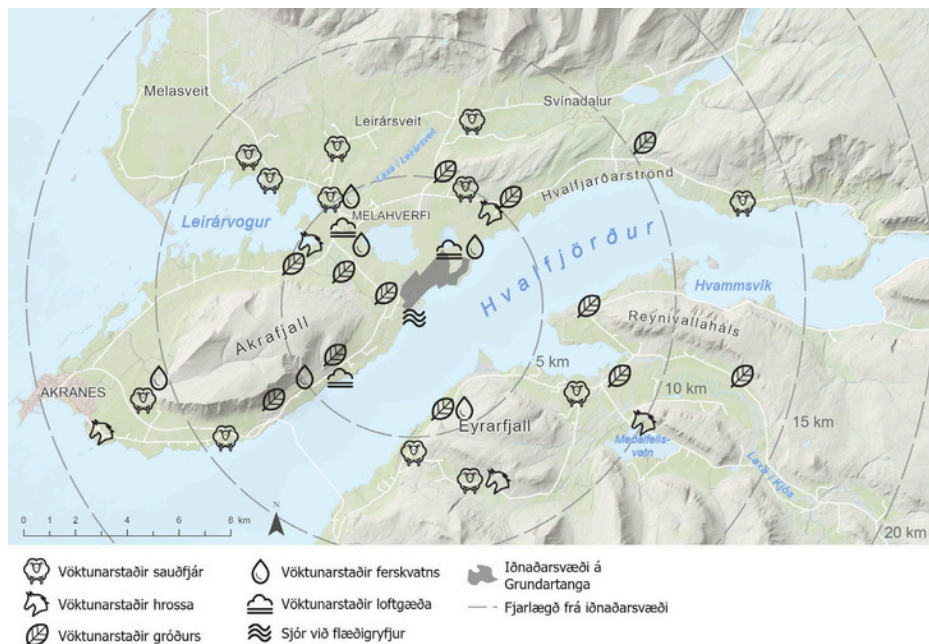
www.nordural.is

Results

Receptor	Parameter	Below threshold	State of affairs 2025
 AIR QUALITY	Fluoride Sulfur Other substances		Fluoride, sulfur and other substances were in all cases below defined environmental limits.
 FRESHWATER	Fluoride Sulfur Other substances		The amount of fluoride has not changed in spring-fed rivers, but has increased in Kalmansá and Urriðará compared to 1997.
 OCEAN OUTSIDE THE TIDAL LANDFILLS	Metals Cyanide Fluoride Other substances		Insignificant effects are detected outside the seawater basins, similar to recent years.
 VEGETATION	Fluorine		Fluoride in vegetation was in all cases below the tolerance limit of vegetation and below the regulatory limit for the amount of fluoride in fodder. Fluoride in grass and leaves is higher than it was in 1997.
 SHEEP	Fluoride Teeth Forefoot joints		Fluoride in lambs and adult sheep is higher than it was in 1997, and similar or lower than it was in 2007. Fluoride in adult sheep is within the range that has been observed since 2008. There is no detectable effect of fluoride on the teeth and joints of sheep.
 HORSES	Teeth Forefoot joints		There is no detectable effect of fluoride on the teeth and joints of horses.

When applicable, the results are compared with the results of 1997, before Norðurál's smelter started operating, and with 2007 when all the smelter's cells (pots) became operational.

Monitoring sites 2025



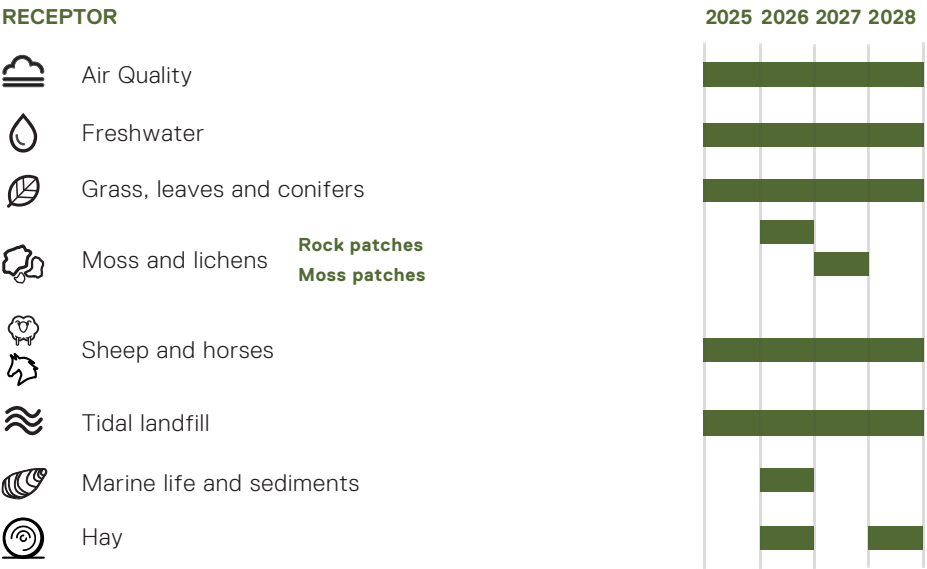
The environmental monitoring in Hvalfjörður is one of the most extensive environmental monitoring carried out in Iceland. It includes research and monitoring by independent parties with more than 75 parameters in and around Hvalfjörður. In 2025, about 420 samples were taken from 120 sampling sites. Provisions in Icelandic regulations or in the companies' operating licenses exist for about 30 of these parameters. For those parameters for which Icelandic environmental limits have not been defined, the results were compared with background values and results from previous years.

Key metrics



Environmental monitoring schedule

Obtained from the website of the Icelandic Environment and Energy Agency, www.uos.is





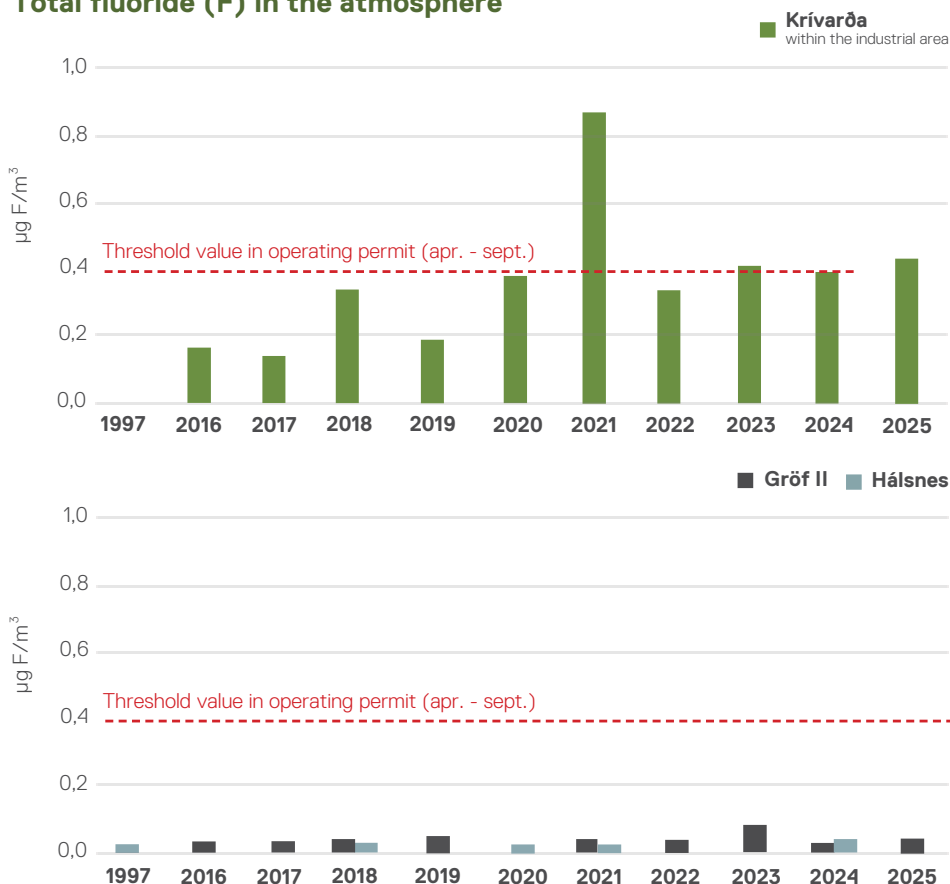
Air quality

Fluoride in the atmosphere (HF and F)

The Icelandic Environment and Energy Agency has amended the operating permits for Elkem and Norðurál in order to repeal provisions on dilution zones. Threshold values therefore now apply outside the industrial zone. Threshold values therefore no longer apply for measurements from Kríuvárða monitoring station as it is located within the boundaries of the industrial zone.

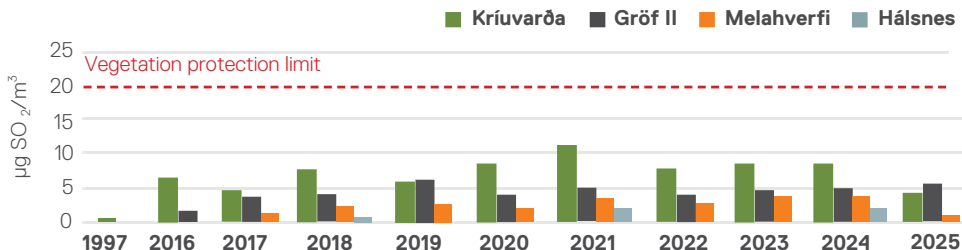
Fluoride was measured at two monitoring stations, Kríuvárða and Gröf II. The concentration of gaseous fluoride (HF) in the atmosphere as well as that of total fluoride (F), i.e. the combined concentration of HF and fluoride bound in dust was below the threshold as defined in the operating permit in all cases.

Total fluoride (F) in the atmosphere



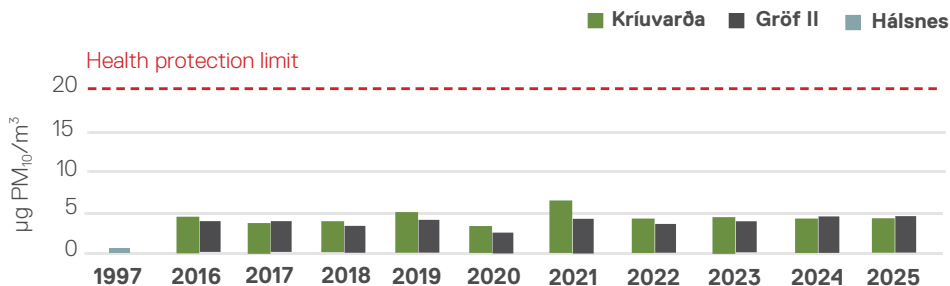
Sulfur dioxide (SO₂) in the atmosphere

Sulfur dioxide was measured at three monitoring stations, Kríuvarða, Gröf II and Melahverfi. At all monitoring sites SO₂ concentrations were similar or lower than previous years and in all cases below all defined thresholds.



Particulate matter (PM₁₀) in atmosphere

Particulate matter was measured at two monitoring stations, Kríuvarða and Gröf II. The concentration was similar to previous years.



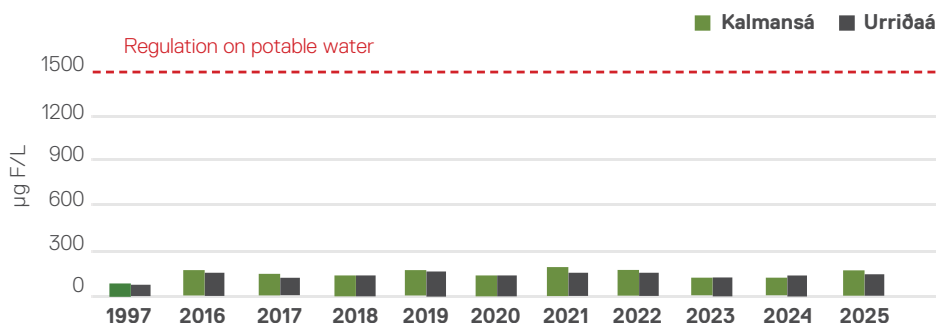
At all air quality monitoring stations, concentrations of hydrogen sulfide, nitrogen oxides, particulate matter (PM_{2.5}) and benzo(a)pyrene were in all cases below defined limits.

Fresh water



Fluoride in fresh water

Fluorine was measured in six rivers in Hvalfjörður. Sources of two rivers are lakes located very close to the industrial area (Kalmansá and Urriðaa), while other rivers are fed by direct runoff (Berjadalsá, Fossá, Laxá and Kúludalsá). Fluoride measured about five times lower in the runoff streams than in other monitoring streams. The acidity and average concentration of fluoride and sulfate in all rivers were within the limits defined in Icelandic regulation on potable water.





Ocean outside tidal landfills



Metals, cyanide, fluoride and other substances are measured in ocean samples taken at 10 sites just outside the tidal landfill by the industrial zone.

Average concentration of chemicals in ocean samples

Insignificant levels of pollution can be observed outside the tidal landfill, and the monitoring results for the year 2025 are similar or lower than those measured in recent years. Concentration in all samples was below the concentration considered to be able to affect sensitive ecosystems and are below thresholds as defined in Norðurál's operating permit.

	As µg/L	Cr µg/L	Cu µg/L	Ni µg/L	Pb µg/L	Zn µg/L	Al* µg/L	Fe** µg/L	F* mg/L	CN** mg/L
2016	1,7	1,6	0,6	1,3	<0,3	3,4		67	0,8	<0,005
2017	1,8	0,4	1,0	0,35	<0,3	1,5	22	56	1,3	<0,005
2018	1,5	0,27	1,0	0,66	<0,3	3,4	32	39	1,3	<0,005
2019	1,6	0,23	0,5	0,54	<0,3	1,4	28	35	1,4	0,005
2020	2,1	0,24	0,6	0,55	<0,3	<2	28	34	1,4	<0,005
2021	1,8	0,56	0,6	0,89	<0,3	2,4	30	48	1,3	<0,001
2022	1,5	0,23	0,8	1,01	<0,3	1,4	39	33	1,3	<0,002
2023	1,6	0,22	0,7	0,51	<0,3	<2	23	30	1,3	<0,010
2024	1,7	0,57	1,2	0,63	<0,3	1,9	19	26	1,3	<0,001
2025	1,7	0,33	0,72	0,96	<0,3	<2	21	26	***	<0,001

The colors indicate the environmental limitvalues according to reg. 769/1999.

Very low or no risk of impact Low risk of impact

* Limit values specified in Norðurál's operating permit for cooling water discharged to the sea: aluminium < 20 mg/l og fluoride ≤ 50 mg/l

** No environmental limit values established.

*** Samples for fluoride measurements were lost during the handling by the testing laboratory.

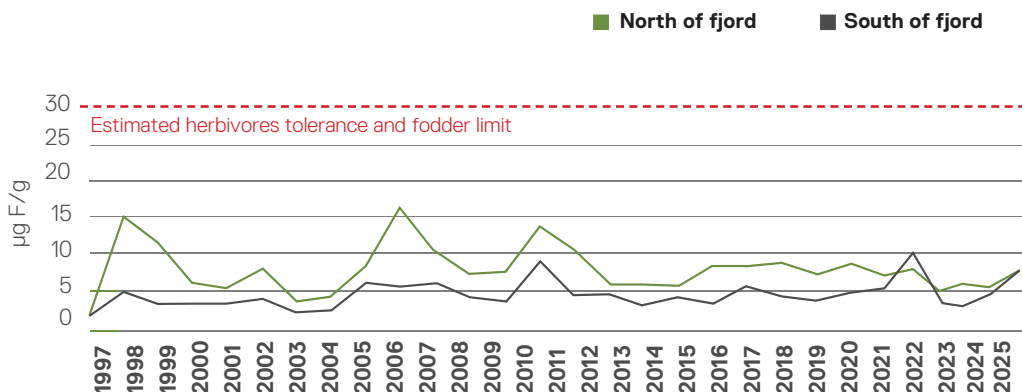
Vegetation



Fluorine in grass

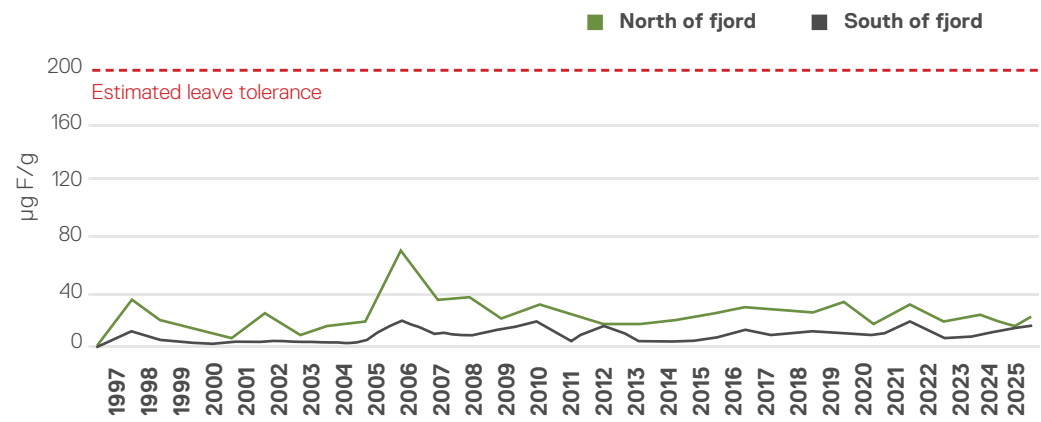
Samples of grass were collected from 12 monitoring sites in Hvalfjörður. Fluorine was in all grass samples below the fodder reference values and the estimated tolerance limits of herbivores. Fluorine in grass in 2025 increased slightly from the previous year.

There was an increase in the average concentration of fluoride in grass both north and south of the fjord, compared to 1997.



Fluorine in leaves and conifer

Samples in leaves and conifer were collected from 12 monitoring sites in Hvalfjörður. Fluorine was in all samples below the tolerance limit of deciduous and coniferous trees. The average concentration of fluorine in leaves in 2025 was similar to the concentration in previous years. There has been an increase in the average concentration of fluorine in leaves both north and south of the fjord, compared to 1997.



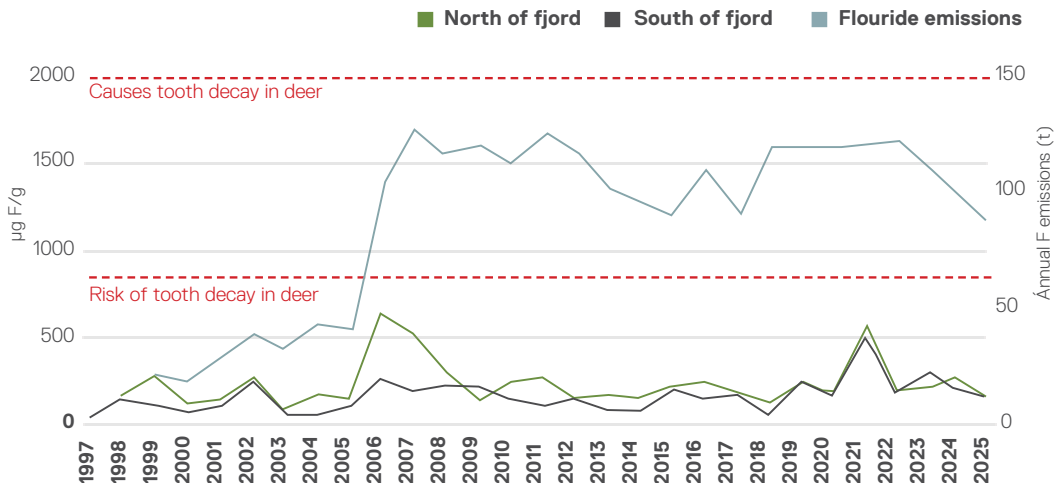


Herbivores



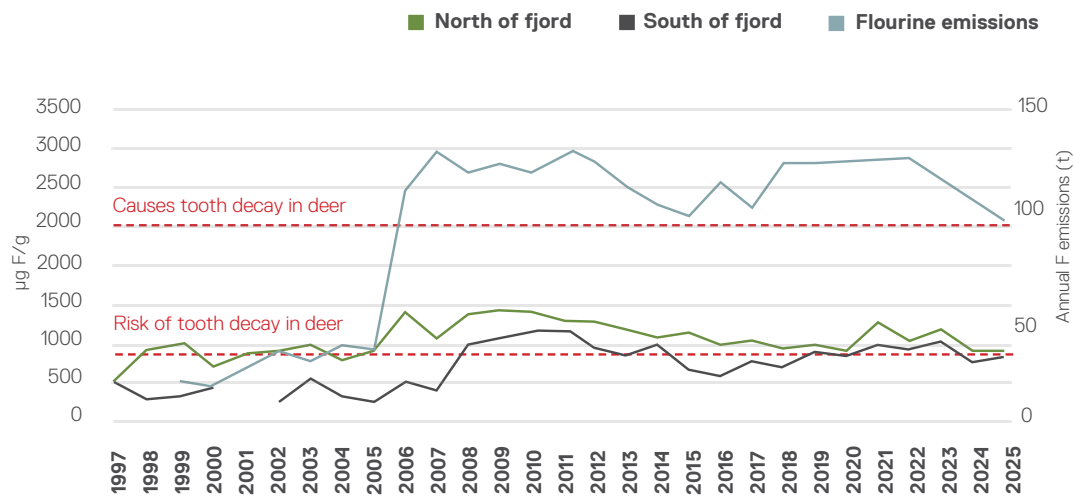
Lambs - North and south of Hvalfjörður

Fluoride is measured in the jawbones of lambs from 12 farms north and south of Hvalfjörður. The average fluoride concentration in lambs north and south of Hvalfjörður was significantly higher than that measured in 1997, but no significant change has been measured as compared to 2007. Research is not available on the effect of fluoride on the teeth of sheep. As a reference a Norwegian study from 1990-1996 on young deer (1.5 years old) near an aluminum smelter are used as a reference that was updated in 2021. In 2025 the average concentration of fluoride in lambs north and south of the fjord was within the range that has been observed since 2008.



Adult Sheep - North and south of Hvalfjörður

Fluoride was measured in adult sheep (six years or older) from 12 farms north and south of Hvalfjörður. In 2025, there was no significant change in the average concentration of fluoride in adult sheep north of Hvalfjörður compared to 2007, but a significant increase compared to 1997. South of the fjord, there was a significant increase measured in the average concentration compared to 2007 and 1997. In 2025, the average concentration of fluoride in adult sheep north and south of the fjord was within the range that has been observed since 2008.



There is no detectable effect of fluoride on the teeth and joints of sheep and horses. The condition of the teeth of horses and sheep was assessed as normal, and no changes were observed in the joints of the animals that were examined.

