

National Land Survey of Iceland Annual Report 2020



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Address by Director General

Challenges and Opportunities

The year 2020 was in many ways memorable for the National Land Survey of Iceland (NLSI), just like it was for the rest of the world. This was a year of challenges that also brought success and new opportunities.

COVID-19 affected the agency's activities, which was reflected in increased telecommuting and travel restrictions. Most meetings in 2020 were hosted on Teams and employees were quick to adapt to the use of video conference

equipment. What is most important, is that nobody at the institution was affected by the Coronavirus, so the operation ran at full capacity throughout the year and yielded good results.

New Data and Improved Accessibility

In the beginning of 2020, the NLSI provided free access to high resolution national coverage satellite imagery. This was, the first step taken towards ensuring open access to an image base for everyone. A new digital elevation model was an important addition to open spatial data, and we could argue that with the access to the new DEM, public spatial data in Iceland has been fully modernized. Access to public spatial information has generally improved as the NLSI worked systematically to assist other institutions in improving access to their data.



Eydis LINDAL Finnbogadóttir Director General

Fun Maps with Geographical Names

During the year, we made efforts to make our data more visible by opening a new homepage that emphasized building a better connection with users. One of those endeavors resulted in thematic maps for geographical names e.g., a horror map around Halloween.

The Future Is in Cooperation

Data, professional knowledge and dissemination of all material from the NLSI is based on the institute's staff. During the year, many people worked from home and it has shown how strong the employees are and how much adaptability they have regarding their work. After the experiences of 2020, it is clear, that the challenges of the future workplace lie in the integration of teleworking while maintaining a strong physical network. This has been proven by studies that have shown that innovation increases when employees meet in-person rather than in teleconferencing. Other major challenges affecting the future are the increasing environmental issues and rapid technological changes. It will be necessary to make better use of the expertise that institutions offer and the data and technology that will be created. However, the best results will be achieved through a combined interdisciplinary effort and decisions need to be made on the basis, of reliable data. This data needs to have an overall picture of ecosystems in mind and have access to secure and updated information. This is the NLSI's vision when preparing the institute's new policy and it will be worked on in the new year.





The Old Lighthouse in Akranes

Turning Points in Work Environment

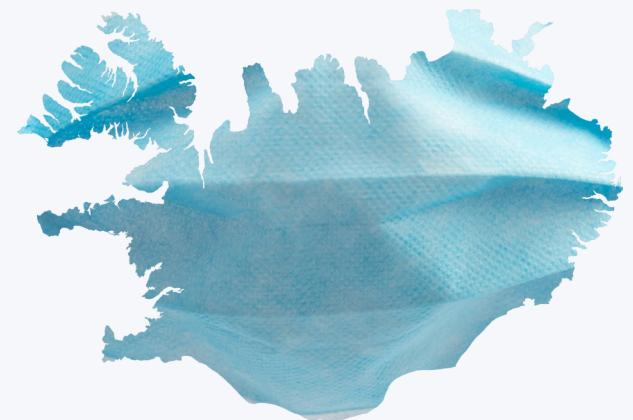
In 2020, there were several turning points in the work environment of most institutions and companies due to the COVID-19 pandemic and operations had to adapt to a new reality. It is estimated that about 40% of employees worked from home for most of the year which altered the communication system greatly. This resulted in more teleconferencing which created a significant reduction in sick days and allowed the staff association to organize several fun electronic events such as family bingo and a beer presentation.

Employee Exchange

In the autumn, the NLSI and the Icelandic Institute of Natural History made an agreement on the exchange of employees. The Institute of Natural History's Archivist worked one day a week for the NLSI organizing the file system. At the same time, the NLSI's IT manager worked for the Institute of Natural History one day a week assisting with technological issues. These exchanges have been successful, and we hope to continue this working relationship.

Shorter Working Time

Following the last wage agreements, NLSI began working to shorten the labour hours and different possibilities were discussed and presented to the employees. Now, full-time employees have a workday that is shorter by 48 minutes allowed by giving up 35 minutes of lunch time in addition to the 13 minutes, as agreed in the wage agreements. The new arrangement took effect on 1 December 2020 and will be tested for six months.





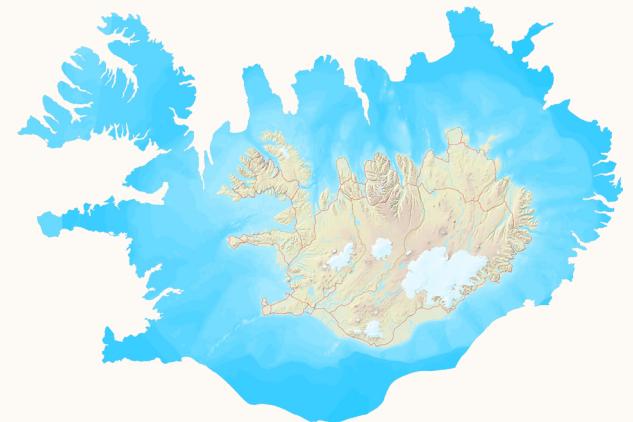
Access to Data

Interconnection of Marine Spatial Information

In the second half of the year, employees of the NLSI were hired to lead a project on behalf of the Ministry of Industry and Innovation. The project involved the collaboration of institutions that work with spatial information of the sea. The goal is to increase the overview of the legal status as well as various information e.g., fishing closures, information on species and licensing. The Directorate of Fisheries, the Marine & Freshwater Research Institute, and the Icelandic Food and Veterinary Authority are participants in the project but in addition, data from other institutes are involved. We at NLSI are excited about the future of this pilot program.

Dashboard and Accessibility of Spatial Data

The implementation of the infrastructure for digital spatial data has been one of the NLSI's major projects in recent years. The NLSI has advised public bodies on their obligations towards the Infrastructure Act, as well as advising how data should be disseminated in a standardized manner. Metadata on public spatial information should be accessible in the metadata portal, the data is supposed to be viewable in view services (WMS), and copies of data should be accessible in download services. The implementation of the data from Icelandic government institutions can be monitored on a dashboard prepared by the NLSI. There you can see how many datasets each organization maintains and how many metadata records, view services (WMS) and download services are accessible. The dashboard is based on the European dashboard model for the INSPIRE Directive.



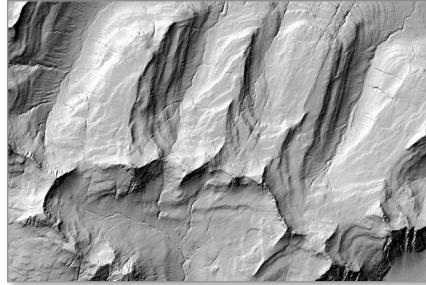
The Environment Benefits from Data Accessibility

The NLSI operates spatial information and metadata portals where metadata and web services of spatial information of public bodies in Iceland are registered. The purpose of these portals is to improve access to spatial information that supports environmental policies and projects. Government agencies are increasingly interested in disseminating their data. It is important for Icelandic institutions to fulfill their obligations towards the implementation of the INSPIRE Directive, as the aim is for the data to be used to support decision-making in the European Green Deal, a comprehensive climate action, aimed at balancing carbon emissions by 2050.





January. The new registration site for place names was launched. Employees traveled extensively domestically and taught rural registrants how to use the web tool. Icelanders have great interest in registering and preserving place names.



February. A new DEM of the country, free of charge and open to everyone, was published. The new elevation model is mostly made from ArcticDEM data as well as Lidar and drone data.



March. The annual report was published. It is a review of the year's projects and the institute's multifaceted activities and includes an overview of the institute's international co-operation projects.

The Highlights



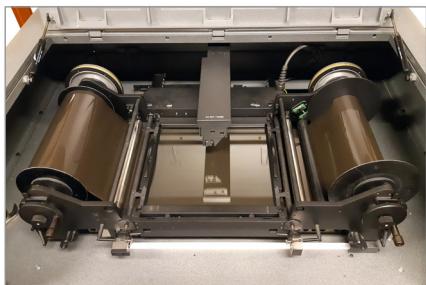
April. The NLSI agreed on access to an image database of the country for all state institutions to use as a background in map services and for general mapping. These are satellite images from the company Maxar.



May. Employees went on a cycling tour in the capital. We cycled around in pleasant weather under the expert guidance of two employees who live in Reykjavík.



June. A new version of IS 50V was released. Since the first edition of the database was published in 2004, there have generally been two updates per year. The database is used throughout the community and it is important to keep it as accurate and precise as possible.



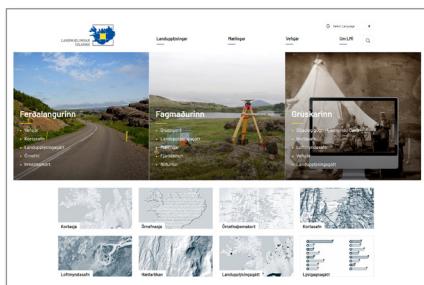
July. Most employees were on summer vacation in July, however, the scanning of aerial photographs continued. The scanning process is highly automated and allows film reels to be inserted without interruption.



August. A DORIS (Doppler Orbitography and Radiopositioning Integrated by Satellite) surveying station was set up at the NLSI observatory in Höfn in Hornafjörður. The main purpose of DORIS is to determine the exact orbits of satellites used for environmental monitoring. It mainly monitors changes in sea level.



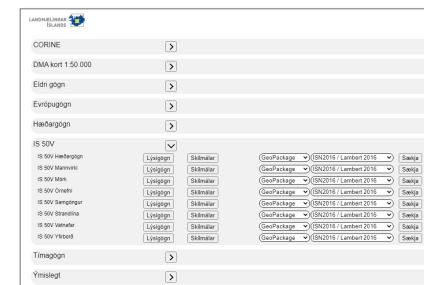
September. After the increased public interest in place names, the NLSI published several thematic maps with relevant place names on its Facebook page. The response from the public was encouraging.



October. The institute's new website was updated and debuted. The website gives a fresh view of the activities happening at the NLSI with an emphasis on making better connections with users of data.



November. Land surveying is steadily increasing the number of stations in the NLSI permanent station network. This will increase the accuracy of the system for monitoring and performance measurements.



December. The download page for NLSI's open data was completely redesigned. You can now choose between 5 data formats and 7 coordinate systems for each data set. Efforts are constantly being made to digitize the agency's data.



New Appearance

A New Look for The Home Page

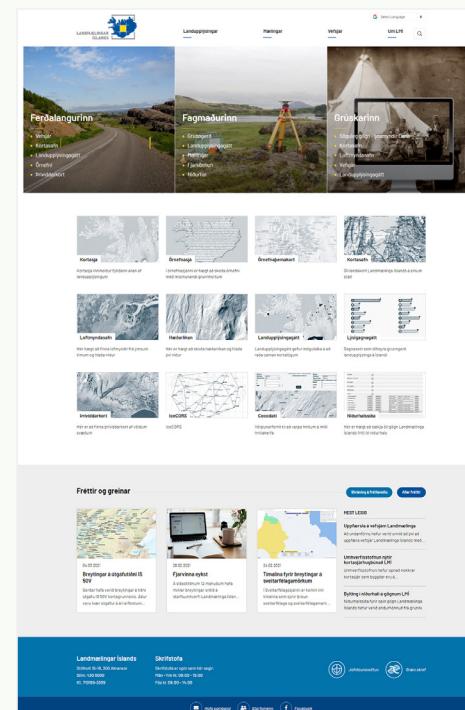
In the year 2020, the NLSI's homepage was refurbished. The new look provided an updated view of operations for our data users that equates to the level of the institution's professional field. The content of the website has also been reviewed and we will continue to work on updates and innovations for our users.

New Interface for Map Viewers

A new interface was developed for the institute's map viewers with the intention to make it easier to view various basic and thematic maps of Iceland. The new interface is entirely made with open-source software. The new map viewers are designed to be easier to make changes that update for all viewers simultaneously, thus facilitating maintenance and updating.

Redesigned Download Page

The download page for open data from the NLSI has been redesigned from scratch. The redesign is intended to make it easier for users to access data. You can now choose between five data formats and seven coordinate systems for each data set. In addition, you can view metadata and terms for it. The data that the NLSI has in its possession is generally open and using it is free of charge in the download page. We are constantly working to bring the institute's data into digital form, and the biggest project there is a scan of the NLSI's aerial photograph collection. Examples of open data are the IS 50V spatial database, aerial photos and scanned maps.



Municipal Map Viewer

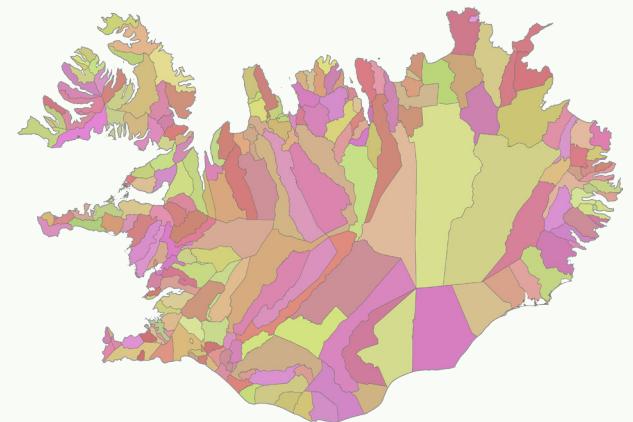
The Municipal Map Viewer shows the development of municipal boundaries from the present dating back to the year 1904, which is the oldest source in the institute's possession.

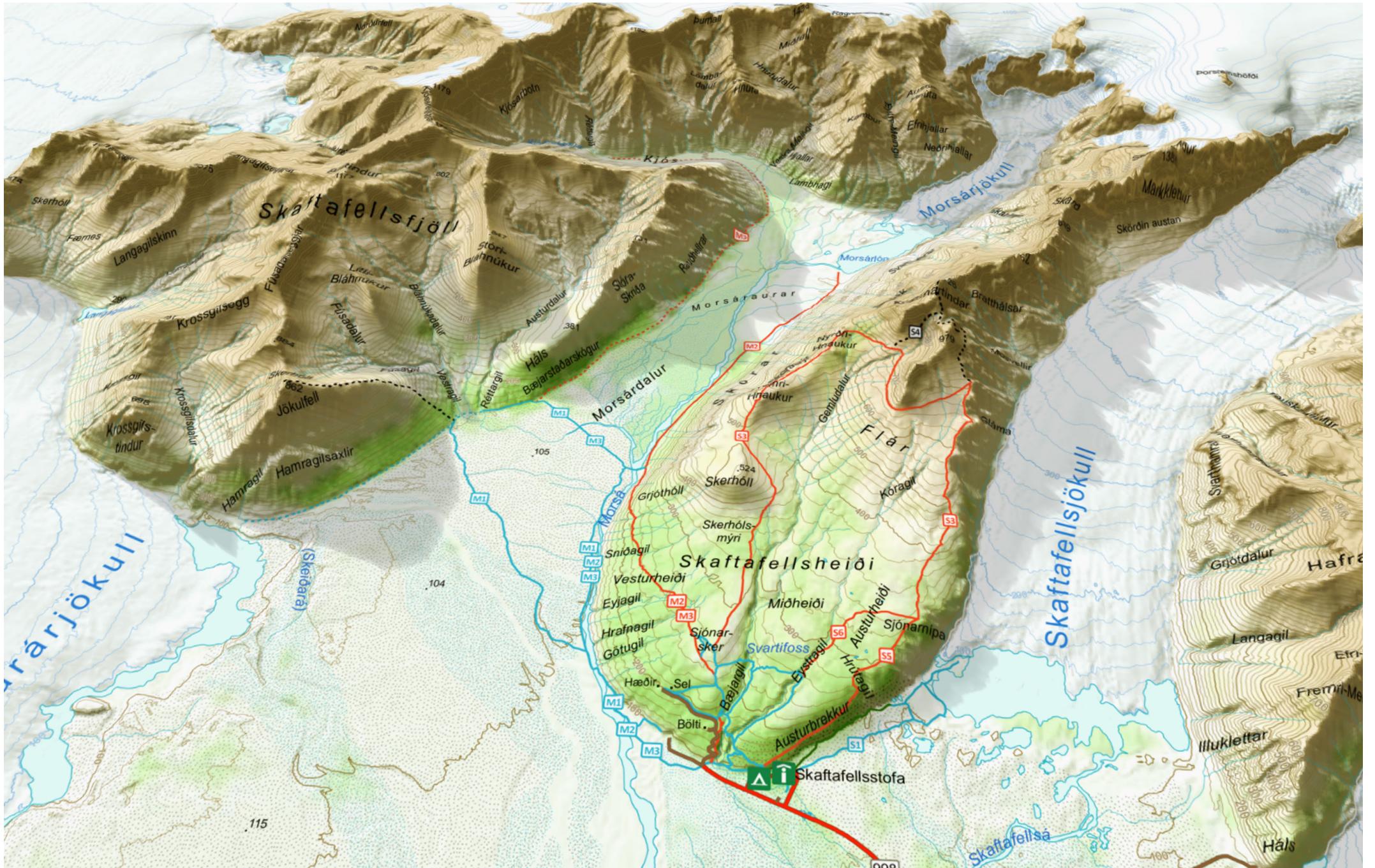
A New Life for Old Maps

Following the introduction of our new precise elevation model, ÍslandsDEM, we have been able to use it to give older maps a makeover. Now, these older maps can be viewed in 3-D like the maps of the Vatnajökull National Park.

Terms

From 30 September 2020, open data from the NLSI is published according to Creative Commons Attribution 4.0 International License, or CC 4.0 BY. Under that permission, users may copy and distribute the material in any format or medium and recycle, convert, and build on the material for any purpose, even for a fee.





Surveying

Increased Accuracy

In just a few years, technological developments in GNSS (GPS) technology have made tremendous progress. Now, most people own smartphones that have a positioning accuracy of about 10 meters. This kind of accuracy is sufficient, enough, for daily mobile users, but it is not enough to be used in mapping. In connection with the mapping of hiking trails in Vatnajökull National Park we have now developed methods for correcting location data from smartphones so that the accuracy is about one meter instead of ten. Affordable and simple measuring instruments have also been tested and their accuracy increases from one meter to 10 cm with the same methods.

Permanent Stations on Lighthouses

The NLSI permanent station network is important to Icelanders, especially when monitoring and implementing surveys. The accuracy of the system as well as its efficiency, increases with more stations. In 2020 the NLSI had an agreement with the Icelandic Road and Coastal Administration to use the facilities at several lighthouses in the country. Many lighthouses have great locations for permanent stations, usually by the ocean. More permanent stations will follow in 2021, but for now, there are a total of 28 of these stations in the NLSI system. The system will eventually be fully equipped with 33 permanent stations.



The Country's Position is Important

The NLSI operates an observatory at Höfn in Hornafjörður. In the autumn of 2020, a DORIS (Doppler Orbitography and Radiopositioning Integrated by Satellite) surveying station was set up at the observatory. The main purpose of DORIS is to determine the exact orbits of satellites used for environmental monitoring and with that in mind, the location of Iceland is important. The project is a collaboration between the NLSI and IGN (Institut national de l'information géographique et forestière) in France. IGN owns and operates the equipment, but the NLSI provides facilities and services for the equipment, as needed.





Geographic Names

To position of Geographic Names

Geographic names have historically been of great importance in human communication. This is proven by the 14,000 place name descriptions stored at the Árni Magnússon Institute for Icelandic Studies that lists over half a million place names throughout the country.

The NLSI has been working to register geographic names in the place name database for more than a decade. To position the place names, the place name group at the NLSI needs help from locals. Many people have recorded place names from areas they know well. In 2020 alone, there were close to two hundred new sources and registrars, with people positioning place names on satellite images or directly in a database via the Internet. Every year, about ten thousand place names are added to the place name database, and by the end of 2020, about 137,000 geographic names had been registered in it. There are still hundreds of thousands of names to be registered and located, but the main challenge regarding place names is to mobilize people who know the location of these place names. Access to place name registers improved significantly during the year with the introduction of the project <https://nafnid.arnastofnun.is/>, which was led by the Árni Magnússon Institute.



Remote Sensing

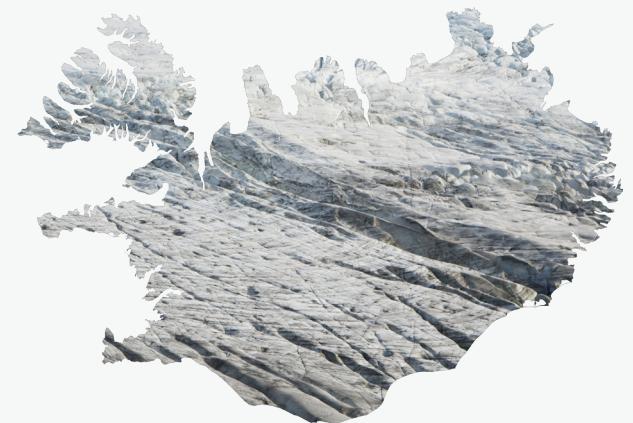
Four Billion Tons of Glacial Ice is Lost Annually

The country's glaciers have shrunk a lot in recent decades, and researchers from the University of Iceland, the Icelandic Meteorological Office, the National Land Survey of Iceland, and Landsvirkjun have recently presented interesting results of the total loss of glacial ice in Iceland. During the work, the surface of the glaciers was mapped with, for example, aerial photographs, laser altitude measurements, altitude measurements and satellite data from different times, dating back to 1945. Open data was used in the work.

The size of glaciers in Iceland peaked shortly before 1900 and the results show that since then they have lost an average of four billion tons (Gt) of glacial ice annually. This means that the total loss of glacial ice during the period is about 16%, and about half of it was lost in the years 1994-2019.

Collaborative Projects

The NLSI is in close and constant contact with professional institutions and companies, both domestically and abroad. A network like this is very important for a small organization that is unable to have experts in every field, but it also helps us to create project-related income. This connection has been successfully maintained with video conference equipment during the year, and in many areas the cooperation has become more flexible than before. The main tasks of the NLSI in this field are the management of the Arctic SDI project, participation in various Nordic projects, being Iceland's representatives in the European Union's Copernicus program, processing CORINE, participation in INSPIRE working groups, and numerous domestic working groups.





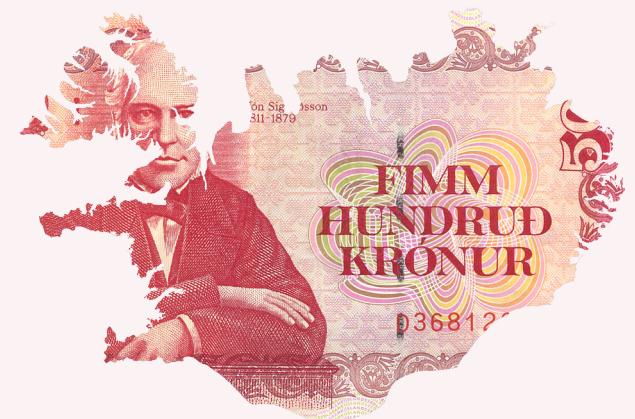
Environment

The environmental issues that we face are an important part of the NLSI's core activities, and environmental goals are set annually within the institute. During the year, a climate and transport policy was approved, according to which employees are encouraged to walk or cycle to and from work. In connection with this, the agency received a silver certification for a bicycle-friendly workplace. The agency's driving and flights were fully carbon offset with an agreement with the Icelandic Wetland Fund. The NLSI only owns three cars; one is battery electric vehicle, another is a hybrid, petrol/electric, and the third is a diesel car.



Finances

Operations in 2020 were in balance. Plans had been made for part of the principal being used. The main reasons for the positive result are that expenses decreased due to fewer trips abroad and that not all vacancies were filled.. Four employees retired and resigned during the year and only half of them were replaced. The total turnover for the year was ISK 343.8 million, while the state's contribution to operations was ISK 319.2 million, and total expenses were ISK 343.4 million. The largest cost item was personnel costs of ISK 244.3 million. Profit for the year was ISK 0.5 million. According to the balance sheet on 31.12.2020, the agency's principal is ISK 30.4 million. Contribution to investments in 2020 was ISK 7 million. 4.9 million was invested and deferred income due to investment funding was ISK 35.8 million.



Rekstrarreikningur árið 2020

Income statement in 2020

Tekjur (Revenue)	2020	2019
Ríkisframlag (State contribution)	319.200.000	302.900.000
Seld þjónusta (Other revenues*)	4.703.752	2.347.960
Aðrar tekjur (Other sales**)	13.079.084	18.137.687
Tekjufærsla frestaðra tekna fyrri ára (Deferred income)	6.860.575	6.592.629
Tekjur samtals (Total revenue)	343.843.411	329.978.276
Gjöld (Expenditure)		
Laun og launatengd gjöld (Salaries and related expenses)	244.311.883	242.180.591
Annar rekstrarkostnaður (Other operational expenses)	92.185.179	91.773.506
Afskriftir (Depreciation)	6.860.575	6.592.629
Gjöld samtals (Total expenses)	343.357.637	340.546.726
Afkoma (tap) fyrir fjármagnsliði	485.774	(10.568.450)
Profit (loss) before financial items		
Vaxtatekjur, verðbætur og gengishagnaður (Finance income)	1.185	8.793
Vaxtagjöld, verðbætur og gengismunur (Finance costs)	(6.794)	(46.396)
	(5.609)	(37.603)
Afkoma (halli) ársins (Profit (Loss of the year))	480.165	(10.606.053)

Efnahagsreikningur 31. desember 2020

Balance sheet, December 31, 2020

Eignir (Assets)	31.12.2020	31.12.2019
Fastafjármunir (fixed assets)		
Áhöld, tæki og búnaður	25.231.534	25.555.144
Farartæki og vélar	7.953.725	9.622.074
Aðrar eignir	391.751	399.220
Fastafjármunir samtals (Total fixed assets):	<u>33.577.010</u>	<u>35.576.438</u>
Veltufjármunir (Current assets)		
Viðskiptakröfur (Accounts receivables)	1.021.432	986.500
Kröfur á tengda aðila	54.791.197	49.127.952
Aðrar kröfur og fyrirframgreiddur kostnaður (Other claims and related costs)	638.539	878.369
Handbært fé (Cash)	9.829.606	4.669.615
Veltufjármunir samtals (Total current assets):	<u>66.280.774</u>	<u>55.662.436</u>
Eignir samtals (Total assets):	<u>99.857.784</u>	<u>91.238.874</u>
Eigið fé og skuldir (Equity and liabilities)		
Eigið fé samtals (Total liabilities) 01.01.2018	29.892.473	40.498.526
Afkoma ársins	480.165	-10.606.053
Eigið fé samtals (Total liabilities):	<u>30.372.638</u>	<u>29.892.473</u>
Skuldir (Liabilities)		
Viðskiptaskuldir (Accounts payable)	11.667.892	3.036.404
Ýmsar skammtímaskuldir (Short-term liabilities)	21.999.907	23.082.075
Frestun tekjufærslu fjárfestingaheimilda	35.817.347	35.227.922
Skuldir samtals (Total liabilities):	<u>69.485.146</u>	<u>61.346.401</u>
Eigið fé og skuldir samtals (Total assets and liabilities):	<u>99.857.784</u>	<u>91.238.874</u>

Sjóðstreymi árið 2020

Cash flow in the year 2020

Rekstrarhreyfingar (Cash flows from operating activities)

Hreint veltufé frá rekstri:	
Afkoma ársins	480.165
Rekstrarliðir sem hafa ekki áhrif á sjóðstreymi:	
Afskriftir	6.860.575
Tekjufærsla vegna frestaðra tekna fyrri ára	(6.860.575)
Veltufé frá rekstri (Working capital from perating astivities)	480.175

Lækkun (hækkun) rekstartengdra eigna (Decrease(increase) operating assets):

Viðskiptakröfur - aðrar skammtímakröfur	204.898
Hækkun (Lækkun) rekstratengdra skulda	
Skammtímaskuldir	7.549.320
	<u>7.754.218</u>

Handbært fé frá rekstri (Cash flows from operating activities): **8.234.383**

Fjárfestingahreyfingar (Cash flows from financing activities):

Kaupverð varanlegra rekstrarfjármuna	(4.861.147)
Söluverð varanlegra rekstrarfjármuna	450.000
	<u>(4.411.147)</u>

Fjármögnunarahreyfingar (Cash flows from financing activities):

Tengdir aðilar	(5.663.245)
Fjárfestingaframlag	7.000.000
Fjármögnunarahreyfingar samtals:	<u>1.336.755</u>

Hækkun (lækkun) á handbæru fé (Cash and cash equivalents - Increase (decrease))	5.159.991
Handbært fé í ársbyrjun (Cash and cash equivalents at beginning of year)	4.669.615
Handbært fé í lok ársins (Cash and cash equivalents at year-end)	<u>9.829.606</u>

Staðfesting forstjóra

Forstjóri Landmælinga Íslands staðfestir hér með ársreikninga stofnunarinnar árið 2020 með áritun sinni.

Akranesi 17. mars 2021

Eydís Líndal Finnbogadóttir

Eydís Líndal Finnbogadóttir

