"Endurskógrækt"
"Reforestation"

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RESEARCH ICELAND
Nature

Terrain

Lakes and Rivers

Forest cover before first settlers

98% of tourist who go to Iceland go there by airplane to Reykjavik.

Forest cover today

Many tourists visit Reykjavik and go on just one excursion to the golden circle which includes some of the more famous tourist attractions.

Future vision

Spread of tourists

• 48%
• 50%
• 31%

• 97%
• 71%
A four day site visit to Iceland starting in Reykjavik. This map shows out two day trips. One along the western Iceland down to Vik, the other shorter one up to Akranäs.
Iceland, situated on the mid-Atlantic ridge in the juncture between the Arctic and the north Atlantic oceans, is an island that should be not so much different from its closest neighbor Greenland. But it is.

Iceland is a geologically active island with many volcanoes. Because of the gulf stream that surrounds the island the climate is milder than expected close to the polar circle. In the lowlands the climate is sub-arctic to continental while the highlands have more of an arctic climate. The highlands are a mix of sand, mountains and lava fields while the lowlands, because of the fertile volcanic soils and warmer climate, are mostly vegetated.

The prevailing high pressure system over Greenland and the traveling lows over Iceland, results in strong northerly and southerly winds across the land.

Due to a history of heavy deforestation and the exposed situation of the island, trees are very uncommon. The landscape has become bare and open. It is actually one of the reasons why Iceland has become so popular with tourists in recent years. Last year 1.7 million people visited Iceland. This is a strong contrast to the 348 500 people living there today. It is estimated that as much as 65% of these tourists came there only because of their interest in nature. This vast and almost alien landscape attract hikers, bikers and road trippers. Tourism has even become one of the country’s three largest economical pillars; next to fishing and farming.

Tourism today has slowed down to a more stable flow compared to the peak from previous years, but it is still seen as a problem because of the pressure it puts on some towns and cities. There is a concern that the high flow of tourists adds more stress to the Icelandic nature, in a time when it is already struggling with problems of erosion, deforestation and loss of other vegetation.

Iceland is often referred to as the untouched wilderness that you can see nowhere else in the world. It is true that it is a very unique landscape and it is famously a wilderness with few roads, few villages and even fewer inhabitants, but it is not untouched.

This landscape is as shaped by the wind as it is shaped by man. History tells us Iceland used to be forested from shore to mountain. That is 40% of the landmass. Today forest covers not even 2%, but 1.8% of the landmass.

But what constitutes a forest? According to the Food and Agriculture Organisation of the United Nations, FAO, a forest is “a minimum area of land of 0.5-1 hectare with tree crown cover of more than 10-30% with trees with the potential to reach a min height of 2.5 m at maturity”. Using this definition, only 0.5% of Iceland’s landmass is currently covered by forests.

Because of the lack of trees, the wind easily scrapes away the top soil. This leads to the ground vegetation disappearing and there is a risk that Iceland could eventually become a cold desert. Already today there are sand storms so severe that the visibility drops to a few meters.

Another thing trees do is they clean the atmosphere by helping reducing the CO2 outlet. Iceland actually had a problem with this because they deforested their land and also used to drain their wetlands for farming. Realizing wetlands also contribute to cleaning the atmosphere they have now forbidden the destruction of more wetlands as well as invested time and money into reforestation.

There is a large interest in reforestation, especially from the Icelandic forestry association, but they lack funding and manpower. Their goal is to restore the dried wetlands, increase afforestation and revegetation and to increase carbon sequestration in forestry and land reclamation.
After doing research on this subject, as well as a short site visit to Iceland, I arrived at this question:

How can tourism become a helpful force instead of a destructive one?

My idea for solving this problem is to create a second center to Reykjavik on the eastern part of Iceland. They already have an international airport and you can reach the same destinations with the same amount of days just from another starting point. Doing this will distribute the tourists better across the country.

This part of Iceland is known for hiking and that is the kind of tourists I want to attract. These people, such as hikers, trekkers and strollers, are people who go to Iceland merely because of their interest in nature.

These 65% are the tourists I want to focus on. This project aims to promote a new kind of eco-tourist. A tourist that can directly interact with and influence nature in a positive way.

This center will be located in the city of Egilsstaðir which is already the largest city of the east with 2200 people living there. This is also where the airport, hospital and college is situated. Egilsstaðir is located on the banks of the river Lagarfjöll which runs all the way from the ocean to the end of the valley where the glaciers run out.

This valley is glacially sculpted and runs in a southwest to northeast direction. This region is the only place where proper birch stands have been found and it is also a region that is typically more continental than other places in Iceland because of the southerly foehn winds and the distance to the sea.

The idea is to create a hiking center that is also a tree nursery. By combining these two, you can invite the tourist to bring a seedling on their hike to plant at the end of their trail.

The hiking center will be connected to a number of hiking cabins with different trails leading up to different outlooks. These cabins will frame the nature outside and they are simply designed to provide shelter and warmth.

Their shape and design originate from the history of Icelandic housing and trekking cabins from different areas of Iceland. Taking into account their shape and function to create something that will not take away from the scenery but be there to help frame it.

Although the cabins will offer different kinds of overnight stays, the seedling center will not provide accommodation but instead these tourists should seek their overnight stay in the city of Egilsstaðir. Only 27% of all tourists visit this part of Iceland and of those only 11% spend the night. This has resulted in a lot of hotels and hostels ending up empty. I hope that the tourists that the seedling center attracts could solve that problem.

Progress in Time

This is a vision that is dependent on time. Planting will take place during years and years and the effects will be slow. In time the valley will have become a forest. The bare ground will no longer be as visible as before and the vegetation of both trees and grass will disrupt the view. There will be more flowers and color but the distant mountains will not appear as distinct as before. Inside the cabins the landscape will be framed by the windows which are directed towards specific views. The placements of the windows are thought to function as a focus to direct the persons attentions towards selected scenery.

In time the wooden facades of the buildings will have darkened, being weathered from past storms and rains. They might have had to be repaired and this will also show because of the lighter color of the wood. But the frame will still be there. The interior will still warm the visitors and the windows will still frame the surrounding landscape.

Conclusion

This way I believe we can make tourism become a helpful force and not a destructive one. Planting one tree at a time.
Egilsstadir is the largest city of the eastern part of Iceland. It is where the college, airport and different service centers are located. The villages around the city work in either the fishing industry or farming. There is also the island's only international cruise ship harbor here in Seyðisfjörður.
Calculating hiking time through trails with Nasmith's rule.

TRAIL
Egilsstadir, Fjotsdalur

Diagram showing distances and times for various trail paths.
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2 DAY HIKE - TREKKERS

More advanced hike with some elevation as well as via ferrata - harness needed

3 guys straight out of college decides to do a challenge before they head back to start work in August.

There is Pontus, who is 26 and who regularly practic basketball and has generally good fysik, since he is also very tall he does an average of 8 km an hour even in slight elevation.

Then we have Erik who is 26 and goes running as well as climbing regularly, since he is very active he easily does 6 km per hour. Slight elevation only has a small difference.

There is also Nicklas who is 28, even though he is very athletic his smoking takes its toll on a longer hike and he therefore does 5 km per hour.

Total speed: 5km/hour

3 sticklings, packing of personals (2 days change of clothes) 4 portions of food per person + snacks & water

Total weight of bag p/p:

- 1 kg frame
- 5 kg plant box
- 3 kg fertilizer
- 2 kg water (per day/ refill at night stop)
- 2 kg personals
- 1 kg food
- .3 kg harness

11.3kg / p

They head out on their hike at 08.00 the 20th of June and the weather is clear with some clouds but no rain.

They want a challenge and have therefore decided to make the trip in only 2 days. They walk the north trail towards hammock house. Their challenge lies in the second day which have some elevation up to inbetween cabin and a shorter section of ferrata towards Stedling center.

Highest elevation 400 m
NORTH TRAIL

Hiking time calculation based on Naismith’s rule taking the group’s own physical into account.

North Trail

Length: 38 km
Completion time: 9 - 10 hours
Terrain: light hike
Elevation: top elevation 30 m
Stops: 2
Overnight stays: Hammock house
2 DAY HIKE - HIkers

Light hike with close to no elevation
- kayaking day 2

A couple arrives in Iceland by airplane on the 3rd of September. They are here to do some hiking for their 3 year anniversary.

There is Matilda, who is 27. She is a very active person who does a lot of climbing and hiking, she has an average pace at 6 km an hour even in slight elevation. She has no trouble carrying heavier loads and therefore carries more water.

Then we have Anna who is 24, although she is very fit she does not do as well with heavy weights as matilda and therefore tries to carry lighter packs. She does a lot of kayaking and is generally faster with a kayak than at hiking. She averages between 5-6 km per hour.

Total speed: 5 - 6km/ hour

3 sticklings, packing of personal 82 days change) and 4 portion of food per person + snacks & water

Total weight of bag p/p:
- 1 kg frame
- 5 kg plant box
- 2 kg fertilizer
- 1 kg personal
- 1 kg food

Matilda = 12kg
Anna = 8kg

They head out on their hike at 09:00 3rd of September and although the weather is somewhat cloudy they are lucky and there is no rain either days. Therefore they have decided to hike south inland towards kayak house to be able to kayak back the second day. Since the winds are favorable towards the north.
South Trail

Length: 39.1 km
Completion time: 9 - 10 hours
Terrain: light hike
Elevation: top elevation 10 m
Stops: 2
Overnight stays: Canoeing box
A family of 3 arrives in Iceland by airplane on the 4th of May at 8 o'clock.

There is Mats, who is 52 and even though he was very active at a young age, work caught up and now his hiking days are close in mind and far back in time. Still he has an average speed and does around 4 km an hour even in slight elevation.

Then we have Inger who is 45. She is more active on a daily basis doing some running and golfing. Because of her better fysik she could easily do 5 km per hour.

Their daughter Maria is 12 and has more energy than patience. Because of this she gets easily tired after about 30 min and therefore her speed is about 4 km per hour.

<table>
<thead>
<tr>
<th>Item</th>
<th>Weight (kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frame</td>
<td>1</td>
</tr>
<tr>
<td>Plant box</td>
<td>5</td>
</tr>
<tr>
<td>Fertilizer</td>
<td>2</td>
</tr>
<tr>
<td>Water</td>
<td>0.5</td>
</tr>
<tr>
<td>Personal items</td>
<td>0.5</td>
</tr>
<tr>
<td>Food</td>
<td>0.5</td>
</tr>
<tr>
<td>Total weight</td>
<td>9.5</td>
</tr>
<tr>
<td>Maria's weight</td>
<td>7.0</td>
</tr>
</tbody>
</table>

Total weight of bag per person: 9.5 kg

Total speed: 4 km/hour

3 sticklings, lighter packing of personal and just one portion of food per person + snacks & water

They head out on their hike at 10:00 the 4th of May and the weather is somewhat cloudy with some rain in the middle of the day.

Therefore they have decided to hike up to cliff cabin where they can seek shelter during the rain.

Highest elevation 600 m
THE SEEDLING CENTER

This building is the heart of the project and is placed between the airport and the city Egilssta-
dir. When the tourists arrives they are welcomed here and brought through the process of the birch seedling. Some will take the opportunity to go on a hike and others will just continue their journey through Iceland. Some will have come here just for this occasion and already know which trail they will choose.

In any case, here in the seedling center, the tourist will turn in his or her own bag for a seedling bag. They will only pack the essentials and maybe buy some more food if they will stay out a longer period. Tent, sleeping mats and kitchen will be available at any cabin they choose to visit, so these things they will not have to carry. This takes some weight off for adding the seedling that they will bring, when the tourist has done this and now has packed the bag they will go through the working space where the whole process from seed to plant is happening to reach the coffee where they might have a coffee just before they head off. Here they will also pick up their seedling and the manual that goes with.

The building is made from a wooden frame that repeats every 6 meters. It works as a shell the lets in light and directs the visitors view outwards. The core is made of concrete and heated with geothermal energy. There is also an elevated bridge on the second floor suspended over the working space so that tourists can look down on the process or just have an elevated walk through the building. This center provides the tourist with all they might need for their time on the trail.
SEEDLING CENTER
Between the airport and the city
SEADLING CENTER
Renting the seadling bag and other equipment

PACKING LIST:

**DAY TRIP**
- Water bottle
- Food & snacks
- Rain & Wind jacket/pants
- Headlamp

**2 DAYS TRIP**
- Change of clothes
- Water bottle
- Sleeping bag
- Food & snacks
- Rain & wind jacket/pants
- Earplugs
- Headlamp

**3-4 DAYS TRIP**
- Change of clothes
- Water bottle
- Sleeping bag
- Food & snacks
- Rain & wind jacket/pants
- Earplugs
- Headlamp

INCLUDED IN RENTED EQUIPMENT:

- Backpack frame
- Trowel
- Harness
- Waterbag
- Birch seadling
- Detachable personal pack
- Shovel
- Measurement rope
- Tent
- Mattress

SEADLING MANUAL

**Step 2:**
Dig a hole that is 60 x 60 cm and 30 cm deep

**Step 3:**
Place seadling in hole and make sure it is planted at the same depth as in the carrying box

**Step 4:**
Fill hole and then finish with a layer of fertilizer (in the bottom of the carrying box)

As the downy birch mature lower branches are dropped, due to lack of light. Eventually stronger trees overshadow the weaker trees which gradually die. In the end the surviving birches have more space between them. They will start to broaden and take their place.

Planting Seadling

Tools:
- Shovel
- Measurement rope

Windbreaks

Stage 1: Windbreak
Stage 2: City Planting
Stage 3: Tourism Planting
SEADLING CENTER
From airport
SEEDLING CENTER
workspace, from picking to sowing
SEEDLIGN CENTER
From direction of town, Egilsstadir
HAMOCK HOUSE

At the end of the northern trail there is the hamock house. This is a shelter for the hikers that provides a place to dry clothes and seedling bag, to shower and sauna, to eat and hang out as well as to sleep. The beds in this shelter are actually hamocks. The windows are placed so that when lying down in these hamocks you see the horizon all the way around the room.

When arriving here you will have walked a whole day, about 39 km depending on which route you take, if you take a shortcut, or if you get lost. It happens. In any case, you will be tired and this is a place where you will be able to wind down.

This house is also constructed with a wooden frame that repeats every 6 meters. It is not as high as the seedling center but it does give some height in selected room. I have chosen this height to reflect the open surroundings. This shelter is right by the ocean, on a long stretched shore that is framed on both sides by the end of mountains diving into the sea.

The only place that is more intimate is the shower rooms and the sauna. In there you are shielded from the outside and the view is hidden until you step out on the deck to dive into the ocean and cool down from the sauna.
NORTHERN TRAIL
Hammock house
THE KAYAK HOUSE

If you have chosen to take the southern trail you will end up at the back of the valley and right at the end of the lake lagnarfjót. Here the Kayak houses are situated.

These houses are more compact and designed with the measurements of a kayak in mind. I have used the length of the kayak, 4 meters, to determine the height of this house. They could be described as a module for the storage of the kayak that have also turned into a shelter for the hiker that might use them on their way back to the seedling center.

The plan is that you can have a small meal and cook in the entrance floor and then there is a small second floor where there are beds. The windows here are also placed so that when lying down, you can look out on the horizon and also up into the sky.

After spending the night here you can then from the inside spin the kayak wall around and then start your journey back. This also works the other way around where someone could arrive to the kayak house with their kayak and enter the house via the spinning wall.
The In Between Cabin

On your way north on the northern trail, you can with an elevation of 960 meters reach the in between cabin. It is named so because it is situated in a small platform between two higher peaks. It looks out over the valley in a western direction.

This cabin is a lot simpler with only tents for sleeping in as well as manual heating. This is because this cabin is more remote for hikers as well as the people who take care of it to reach.

The construction is again a wooden frame that repeats with 6 meters. the height is similar to the hammock house but with a steeper roof. There are kitchens and sleeping mattresses to borrow and there is some space on the upper floor to hang out and warm up before going to bed.
THE CLIFF CABIN

If you are on the southern trail you can take the slightly more advanced trail to end up at the cliff cabin at an elevation of 400 meters above the sea level. This cabin looks out towards Hallormsstadskogur which is Iceland's largest forest today. It is situated along the river lagarfljot and is in the end of the southern hike just before the kayak huts.

This cabin is a version of the in between cabin, being more remote and slightly simpler that the hammock house and the kayak house.

It is called the Cliff house because it is laced on the edge of the cliff stretching out towards the landscape underneath.

The idea for this house was a roadstop in Norway, with just a bridge stretching out like an outlook.
CONSTRUCTION IDEA

The shelter buildings are designed very similar with the difference in the wooden frame creating slightly difference in appearance. The placement of the windows are also exclusively decided by the framing of the outside scenery and the position of the person inside.

In all buildings there are skylights to bring in the light to limit the need for artificial lighting. The wooden frames are 300mm thick and at the thinnest 500mm. At the junctions there are a minimum of 1000mm.

For heating, some shelter will have geothermal energy and the more remote cabins manual heating via fireplace.

The interior will be wood panel and flooring except for more exposed areas where the floor will be concrete. On the outside there will be shingle facade and roofing.

You could imagine these houses as being sections that are put together, where one section is 2 wooden frames and the 6 meter wall and roof part. Every section will have their own drainage on the side of one of the frames.
FOREST DEVELOPMENT
The growth of the forest alongside the growth of the city