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”Långforsens Naturcenter”
”Långforsen Nature Center”
We are a nation surrounded and penetrated by water, be it streams, rivers, lakes, or seas. We have gone from being gatherers, for whom fishing was essential, to Viking traders, whose longboats travelled far and wide, to a society that has been using streaming water as a power source for almost a thousand years. During the early 20th century, however, we have started producing electricity through hydro powerplants. Industrial and civilian sectors alike demanded ever-increasing amounts of power, and subsequently we have started building more powerplants.

During the 20th century, electricity has dominated production, diverting rivers for power. Today, we have about 2100 powerplants situated on more than 80% of our streams and rivers. Of our 25 larger rivers only four are unregulated.

LÅNGFORSEN NATURE CENTER

Background

Being an avid fly fisher, I have spent many days and nights in the woods and mountains of western Jämtland. During the years, I have become more and more aware of the strain we put on nature. On the most basic level there is fishing, something that has become increasingly restricted in the last few years. If we continue on a fast we have other types of problems that affect the environment on a larger scale. Some are obvious, like the use of leaded fuels, but others are more insidious. I have chosen to write about one of the less noticeable problems. It is commonly thought of as a clean and renewable resource, but in reality it is extremely harmful to nature and fishers.

“A man is but a product of his environment; but as a man he stands free. He is the master of his fate, the captain of his soul, the creator of his destiny.”

- Henry David Thoreau
The site, being a part of the Offerdal area, rests on a solid foundation of slate with a thin layer (less than 0.5 meters) of overburden. Due to the properties of the material, and the large amount of available material after excavation, it is an integral part of the project. It excels as a roofing material, and as paving for floors or outdoor areas. Due to the inherent layering of clay, the material has a distinct beauty that is often used in architecture.

Slate

The most direct problem with hydro power is the turbine. To generate power, a water flow (caused by a difference in height) runs through a housing with an impeller that in turn is connected to a generator. When fish try to go down stream after spawning in a regulated river, they need to go through the dam. A number of companies have solved this with fauna passages, but at the vast majority of dams the fish have no other way to go than through the turbine. In Sweden, it is estimated that this kills approximately 50% of the spawning salmon (adult or fry) every year.

A hazard

Small scale hydro power efficiency

About 90% of Sweden’s hydro power plants are small scale by definition, which means they produce less than 300kW each. Långforsen falls into this category. Comparing the output of the small scale plants to the total output (including large scale plants), we get: 69% of the power plants contribute about 6% of the total, while the remaining, large scale power plants, make up for the rest.

Is it necessary?

On the surface, hydro power is clean and renewable. However, the effects on nature is undeniable. And do we really need it? According to the Långforsen owners, Jämtfors, an upgraded turbine and generator would provide electricity for about 600 homes every year. That is the equivalent of a little more than 1/4 of the power one modern wind turbine produces in the same period of time.

An alternative

In 2015, 1.6 million Swedes spent SEK 14.9 billion on recreational fishing, including buying gear, travel, food, lodging, etc. This figure only describes one part of our treatment of our country’s assets like hydro power, hunting, or any of the hobbies we enjoy in nature are not included. Money is an obvious factor, but I believe nature is to be enjoyed by everyone. A power plant designed to deliver electricity to 650 homes, and in an inefficient and harmful manner at that, should not be allowed to destroy something that should be free and available to all.

The river Långan

Långforsen is one of Sweden’s foremost rivers for fly fishing for grayling and brown trout, but also holds pike, perch, Arctic char, lake trout, and smelt. Due to heavy exploitation, fish stocks have been in steep decline since the 1970s. Due to rising awareness and the work of several non-profit organizations, however, the future is looking tentatively positive. Långforsen, located at the Långan-Gysån confluence, is currently one of most intact in tanks of similar developing eco tourism in Jämtland.
Due to its construction, the shelter can be placed on ground or in a slope. By cutting the shape to fit the slope, you can easily adapt the shell to the site. To enhance the notion of being in nature, I have opted to dig out a slate base to put the shell on. This way, the shelter becomes more of a cave, letting nature enclose the visitor or all sides.

By using the "waffle" or "eggcrate" method, you get an interlocking structure that is light yet strong. Using locally sourced wood cut in a CNC-router, the shell is incredibly easy to assemble. The shell is put on an elevated surface, such as a rock or brick, to keep it off the ground and away from moisture.

By excavating the site for the center, and the base for the shelters, a large amount of raw slate is produced. The material can be processed on site to make roof panels. The wooden structure is made with hook fixtures in mind since nail fixtures demand a higher level of precision and are subject to cracking and leakage in wood and metal. The wooden structure is made with hook fixtures in mind since nail fixtures demand a higher level of precision and are subject to cracking and leakage in wood and metal. The material can be processed on site to make roof panels. The shelter is a unique version of a cave, and the structure is flexible.
1. Apartment for two employees
2. Employee WC/shower/washing facilities
3. Employee/back kitchen
4. Guest WC
5. Reception area
6. Resting area
7. Indoor social space
8. Outdoor social space and restaurant
9. Outdoor kitchen with fireplace
10. Wood chopping/fish cleaning
Floor/slab
1. 10mm slate floor tiles
2. 2mm underlayment membrane
3. 300/100mm concrete
4. 75mm foam insulation
5. Gravel for water dissipation
6. Bedrock

Wall
1. 20mm recycled wood panel
2. 45mm wood sleeper with insulation
3. 150mm mineral wool
4. 150x45mm stud
5. 50mm mineral wool outside stud
6. 50x45 stud
7. 5mm weather protection panel
8. 20mm air gap
9. ~60mm mortared slate exterior

Roof
1. 20mm recycled wood panel
2. 200mm mineral wool
3. 200x45 stud
4. 20mm air gap
5. 20x45 stud
6. 20mm wood panel
7. 1mm waterproof membrane
8. 1mm abrasion protection membrane
9. 50mm mineral wool for soil retention
10. 80mm soil
11. Grass/plants
12. Wood panel cap to keep soil in place
13. Panel hook to keep cap in place
14. “Drop nose” sheet metal

Column
1. 200x200mm concrete core
2. 20mm air gap
3. 50mm mortared slate exterior
Excavating for the center yields about 700m³ raw slate which is used for roofs, walls, floors, and paths.