Universidade do Minho
Escola de Ciências

Carla Patrícia Garcia de Viveiros

Geotourism value of the Golden Geopark of Lapland (Finland) sites: assessment and promotion

Outubro de 2016

Geotourism value of the Golden Geopark of Lapland (Finland) sites: assessment and promotion

Carla Patrícia Garcia de Viveiros

Uminho | 2016

Universidade do Minho
Escola de Ciências

Carla Patrícia Garcia de Viveiros

Geotourism value of the Golden Geopark of Lapland (Finland) sites: assessment and promotion

Dissertação de Mestrado
Mestrado em Geociências ramo de
Património Geológico e Geoconservação

Trabalho efetuado sob a orientação do
Professor Doutor Paulo Jorge Silva Pereira

Outubro de 2016

Acknowlegdments

To all who believed and helped me during my work, namely:

To my family for all the support and trust on me, for being always optimistic and make me do not give up.

To Sami who always believed and helped me. Even busy with his work he always found time to help me with translations of Finnish to English of some articles, in my field trips and sharing his knowledge of the area with me.

To my supervisor professor Paulo Pereira for his good advices, patience, dedication and for helping me always when I needed.

To Heli, Hanna, Kauko, Saari and the rest of the staff from the International Gold Prospector Museum, my host institution, for providing me important information and for the good relationship and friendship.

To Antti Peronius for checking the geological part of the thesis, to Venla Karkola for giving me information about the geopark, to Pirjo Seurajärvi and Siiri Tolonen from the Natural Heritage Services (Metsähallitus) for providing me important information for this work.

Abstract

The 57 sites (24 geosites, 25 gold historical sites and 8 other sites) from the Golden Geopark of Lapland project were assessed in terms of touristic value as well as their degradation risk using two methodologies: points and percentage. For the assessment of the touristic value four main criteria were used: a) Availability; b) Use; c) Logistics; d) Perceptiveness. These criteria include eighteen sub-criteria: 1. Seasonal occupancy; 2. Terrestrial availability; 3. Availability according with people´s physical conditions when the activity is walking or hiking; 4. Boat and/or canoe access; 5. Visibility; 6. Safety in case of an accident; 7. Safety in the site and its access; 8. Signage; 9. The current use of the site in terms of geological/historical interest; 10. The current use of the site for other interests; 11. Use limitations of the site; 12. Cleanliness; 13. Toilets; 14. Restaurants; 15. Accommodation; 16. Local buses; 17. Aesthetics and 18. Interpretative potential. The results obtained following the percentage and points methodologies were grouped in five categories for a better guidance: Insufficient (values between 0% - 49% and 0 – 4.8 points); Sufficient (values between 49.5% - 69% and 4.9 – 5.9 points); Good (values between 69.5% - 79% and 6 -7.9 points); Very Good (values between 79.5% - 89% and 8 – 8.9 points) and finally Excellent (values between 89.5% - 100% and 9 – 10 points). It was possible to find that the average touristic value of geosites and gold historical sites is not high using both methodologies, being included in the category "Sufficient" (58.34% and 5.86 for the geosites and 59.64% and 5.79 points for the gold historical sites). Best results in touristic value were obtained by the other sites, with their average value being included in the "Good" category (70.33% and 7.07 points). Analyzing all the 57 sites, the average score of the touristic potential was 62.77% and 6.24 points, corresponding to the "Sufficient" category in percentage methodology but in the in "Good" category in the points methodology. Based on the data obtained regarding tourism value and degradation risk, some actions were proposed to improve the sites.

Avaliação do valor turístico dos sítios do projecto de Geoparque de Ouro da Lapónia (Finlândia): avaliação e promoção.

Resumo

Os 57 sítios (24 geosítios, 25 sítios históricos do ouro e 8 outros sítios) do projecto Geoparque de Ouro da Lapónia ("*Golden Geopark of Lapland*") foram avaliados em termos do seu valor turístico e do seu risco de degradação. Foram usadas duas metodologias: pontos e percentagem. Para a avaliação do valor turístico foram usados quatro critérios principais: a) Disponibilidade; b) Uso; c) Logística; d) Sentidos. Esses critérios incluem dezoito subcritérios: 1. Ocupação sazonal; 2. Acessibilidade terrestre; 3. Acessibilidade de acordo com as condições físicas da pessoa quando a actividade é caminhar ou excursionismo; 4. Acessibilidade através de barco e/ou canoa; 5. Visibilidade; 6. Segurança em caso de acidente; 7. Segurança no sítio e no seu respectivo acesso; 8. Sinalização; 9. Uso actual do sítio em termos de interesse geológico/histórico; 10. Uso do sítio para outros tipos de interesse; 11. Limitações de uso do sítio; 12. Limpeza; 13. Instalações sanitárias; 14. Restaurantes; 15. Alojamento; 16. Transportes públicos; 17. Estética e 18. Potencial interpretativo. Os resultados obtidos foram divididos em cinco categorias para uma melhor organização: Insuficiente (resultados entre 0% e 49% e 0 – 4.8 pontos); Suficiente (valores entre 49.5% - 69% e 4.9-5.9 pontos); Bom (resultados entre 69.5% - 79% e 6 – 7.9 pontos); Muito Bom (resultados entre 79.5% - 89% e 8 – 8.9 pontos) e Excelente (resultados entre 89.5%-100% e 9-10 pontos). Foi possível verificar que o valor turístico médio dos geosítios e sítios históricos do ouro não é muito elevado, sendo incluído na categoria "Suficiente" (com 58.34% e 5.86 pontos para os geosítios e 59.64% e 5.79 pontos para os sítios históricos do ouro). Os melhores resultados foram obtidos pelos outros sítios, com um valor médio incluído na categoria "Bom" (com 70.33% e 7.07 pontos). No total, os valores médios dos 57 sítios analisados são de 62.77% e 6.24 pontos, correspondendo à categoria "Suficiente" na metodologia da percentagem e à categoria "Bom" na metodologia dos pontos. Com base nos resultados obtidos no que diz respeito ao valor turístico e ao risco de degradação, algumas acções foram propostas no sentido de melhorar o valor turístico dos sítios.

Content

Figure Content

Table Content

1. Introduction

1.1. Scope, goals and methods

This work has as main goal to create a quantitative assessment of the touristic value and the degradation risk of the 57 inventoried sites (24 geosites, 25 gold historical sites and 8 other sites) of the Golden Geopark of Lapland project. The quantification of the scientific value of the geosites, gold historical sites and other sites is not included though it could be added afterwards to a more effective management of the sites.

Therefore this work has as main goals:

- ✓ The touristic value assessment of the sites of the Golden Geopark of Lapland project.
- ✓ Development of proposals for valuing geotourism.

The specific goals are:

(i) characterization of the sites of the Golden Geopark of Lapland project;

(ii) implementation of a quantitative methodology for the touristic value using criteria of use and vulnerability;

(iii) development of interpretative material for the sites according to their touristic value;

(iv) proposals of improvements in the sites (signs, access, infrastructures, among others);

(v) proposal of interpretative trails according to the type of sites and their touristic value.

1.2. Geoconservation, geotourism and geoparks

Geoconservation is related with the need of conservation of a certain geosite where the value of the geosite and its threats are taken into consideration, being the geoparks an important tool to develop strategies of conservation (Brilha, 2005). The origins of the geoparks started in June of 2000 when it was created the European Geoparks Network (EGN) by four members: Resérve Géologique de Haute-Provence

(France); The Petrified Forest of Lesvos (Greece); Geopark Gerolstein/Vulkaneifel (Germany) and Maestrazgo Cultural Park (Spain), as a volunteer organization with mutual cooperation and founding from an European program, later under the auspices of UNESCO the program was extended to all world creating in this way the Global Geoparks Network (Carcavilla Urquí and García Cortés [no date]). On November 2015 in the UNESCO General Conference, the 195 Member States of UNESCO ratified the creation of a new label The UNESCO Global Geoparks, until this moment there is 120 UNESCO Global Geoparks in 33 countries (www.unesco.org).

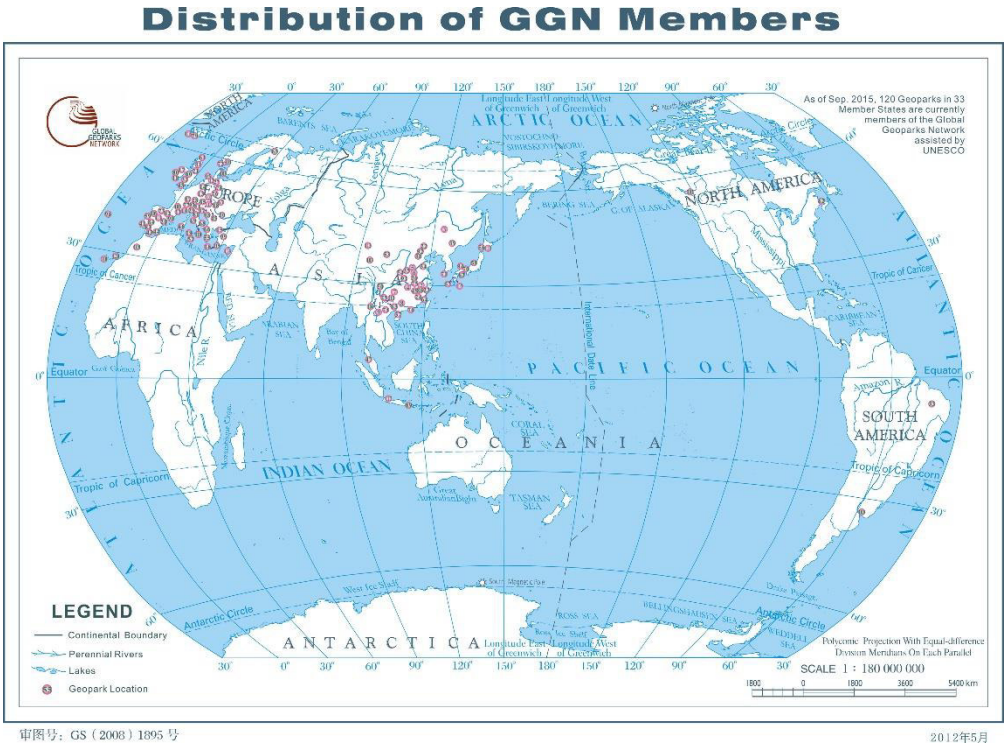


Figure 1.1. Global Geoparks Network (http://www.globalgeopark.org/).

A geopark is a well-defined territory with clear boundaries where the outstanding Geological Heritage is the basis for a sustainable strategy to promote the well-being of the population and the respect for the environment (Carcavilla Urquí and García- Cortés [no date]). In this way the three main goals of a geopark are:

- ✓ **Geoconservation:** creation of a strategy to preserve and promote the geosites as a way to protect the geological heritage for future generations (www.azoresgeopark.com).
- ✓ **Environmental education:** creating knowledge and consciousness in population about the importance of the geological heritage as well as promoting

the scientific research and dissemination, the sharing of the information between scientists and local community (www.azoresgeopark.com).

- ✓ **Sustainable development:** concerning for the creation of a sustainable development and well-being of local population, where the geotourism is the main key to give value to geological heritage and cultural heritage while benefits the well-being of the local population and where a good geotourism strategy can be sustainable (www.azoresgeopark.com).

1.3. Sites value and assessment criteria

For a correct and sustainable management of the geosites it is need to have a management plan made by six different stages: inventory, quantification, classification, conservation, promotion and monitoring (Brilha, 2005), the first two stages are related with the geosites assessment and the last four are related with their management (Pereira, 2006). This work is focused in the management (second part of the management plan) specifically in the touristic quantification of the 24 geosites, 25 gold historical sites and 8 other sites as well as their degradation risk of the Golden Geopark of Lapland project sites, selected previously in the inventory stage. The quantitative assessment of the scientific value of the 57 sites is not developed in this work.

There are still few works related with the development of a quantitative methodology for touristic value like for example Pralong (2005), Rybár (2010), Pereira and Pereira (2012) and Gonçalves (2013). The present work will do an adaptation from the previous works done by Pereira and Pereira (2012) and Gonçalves (2013) with some adaptation to the reality of the Finnish Lapland.

2. Golden Geopark of Lapland Project

2.1. Location and description of the Golden Geopark of Lapland project

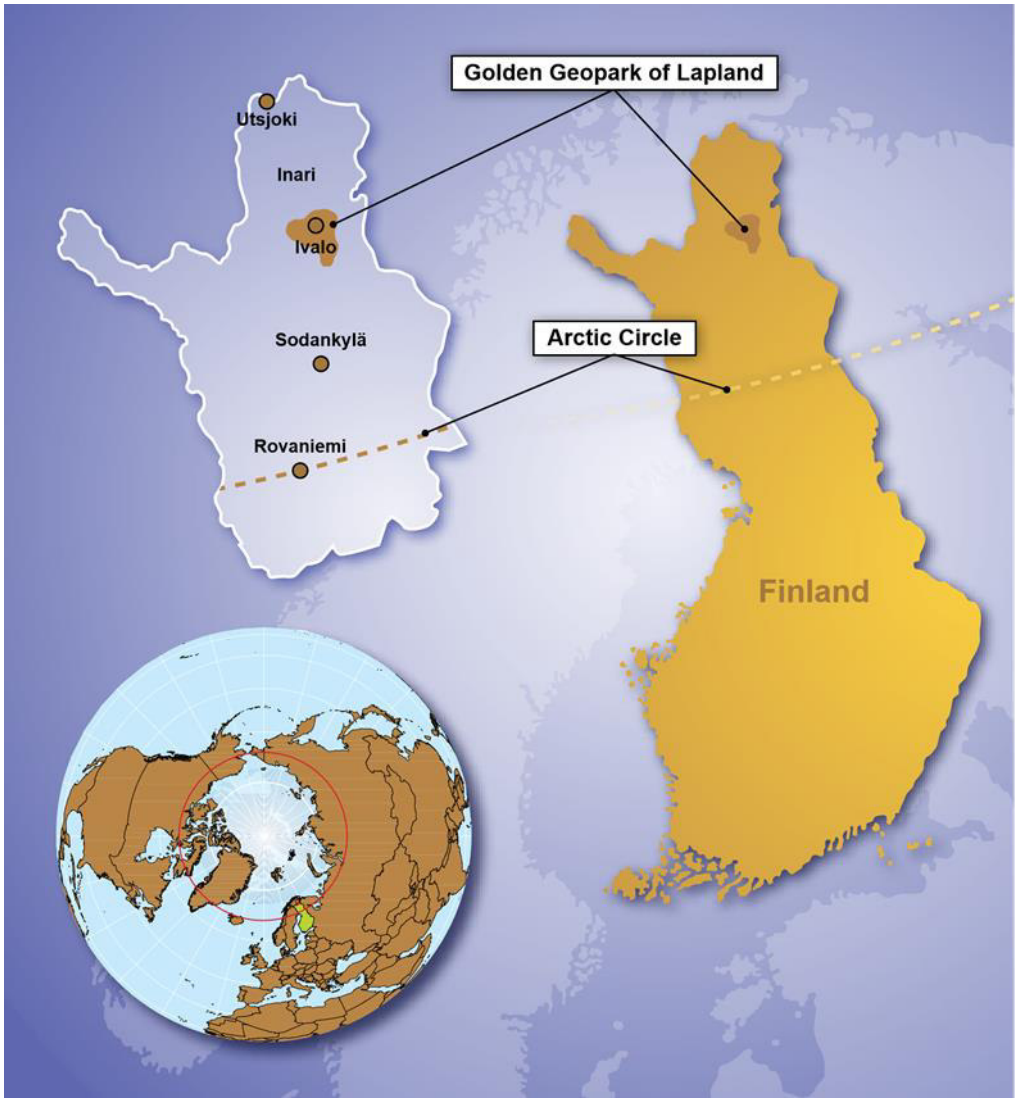
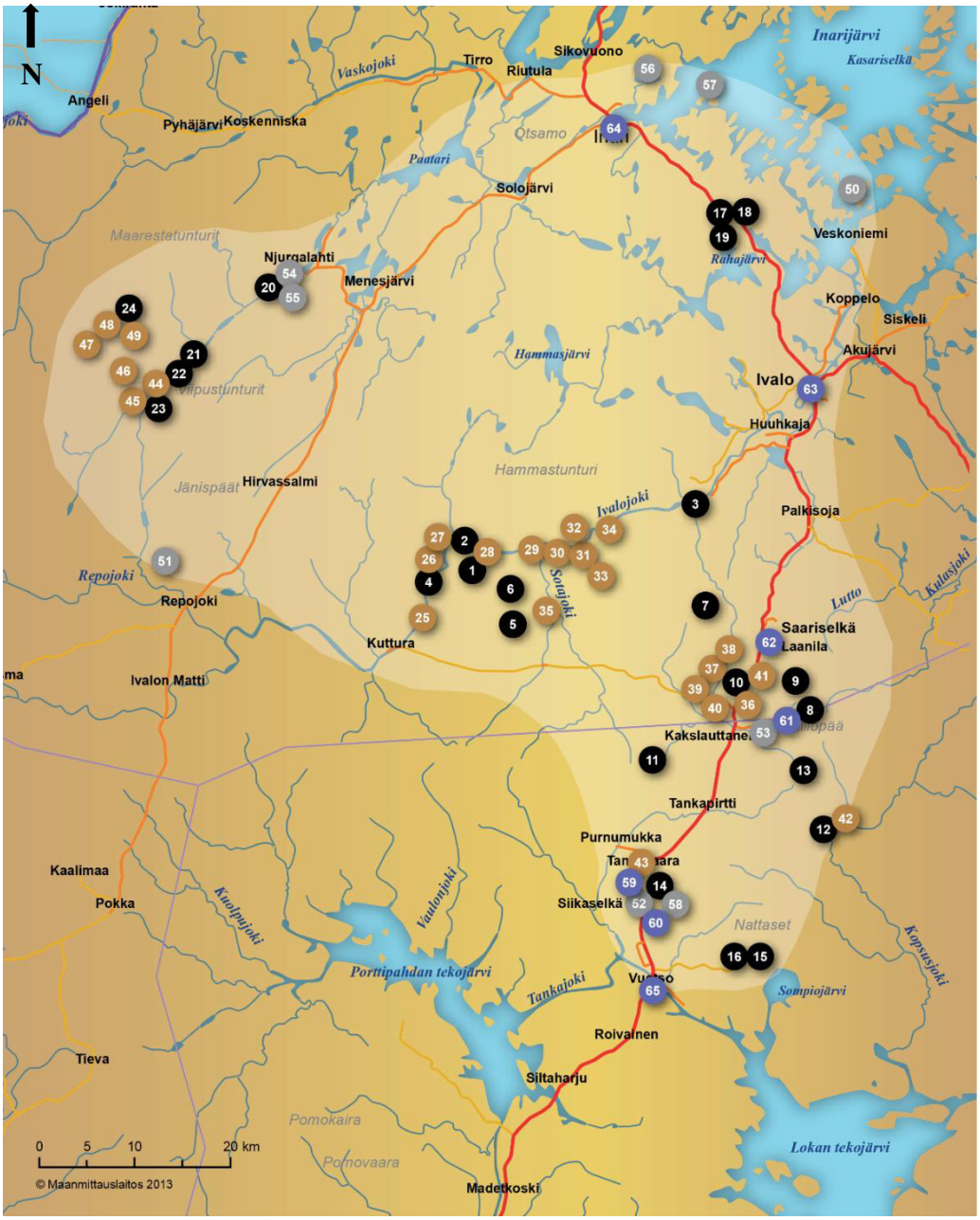


Figure 2.1. Location of the Golden Geopark of Lapland project (Golden Geopark of Lapland brochure [no date]).

Lapland - located on north of Finland (Figure 2.1.) inside of the Arctic Circle and heart of a wilderness area – is home of the Golden Geopark of Lapland project. The geopark project has 5125 km^2 of area, comprises two municipalities, Inari and Sodankylä, and it is home of 24 geosites, 25 gold historical sites and 8 other sites (Figure 2.2.), the geosites represent the ancient bedrock, gold deposits, the weathering processes and the Quaternary geology, and the gold historical sites and other sites the rich Gold History of Lapland, the Sámi Culture and a glimpse of the Lapland War. In

this far north where the geopark is located there is huge contracts during all year round being the summertime with the midnight sun while in wintertime is quite much the opposite, the night stays for couple months giving origin to the polar nights well known in Finnish language as "*Kaamos"*. Besides the contrasts between day and night, also it has a rich nature where in summer time the ground is made of ground-hugging shrubs, mosses and lichens, lakes and native birch and pine forest; in autumn the colors of nature turn to red and yellow and the time when it starts to get dark – September - the best northern lights begin. In winter, which is the longest season of the year, everything is covered by snow, hard low temperatures that can reach sometimes -40 degrees Celsius and the sky gives dark and with luck the famous northern lights, the spring time the snow starts to melt and the lighter days announces the coming of warmer days.

They were three projects with the aim to establish the Golden Geopark of Lapland being the first one in 2011-2012 under the administration of the Gold Museum Foundation; the second one from July until December of 2013 under the administration of Inari Municipal Business & Development Nordica and finally the third from January 2014 until April 2015. After the projects, since January until December of 2015 the geopark project operated under Inari Municipal Business & Development Nordica and funded by Inari and Sodankylä municipalities and Metsähallitus. In September 2015 in the European Geoparks Network held in the only Finnish Geopark (Rokua Geopark) when announcing the new geopark members the Golden Geopark Project did not entered (www.goldengeopark.fi).



Legend:

- Geosites
- Gold Historical Sites
- Other Sites
- Information centres

Figure 2.2. Map of the Golden Geopark of Lapland project with the geosites, the gold hisotrical sites, the other sites and the information centres. The information centre number 65 Lemmenjoki Nature Information Hut does not exist anymore and in the other sites, site number 52. War Historical Trail does not exist anymore (Golden Geopark of Lapland Application [no date]).

Table 2.1. Geosites, Gold Historical Sites and Other Sites and their location (coordinates ETRS-TM35FIN).

Golden Geopark of Lapland	
Geosites	**Coordinates**
1. The Lihr rock and its bedrock outcrops	ETRS-TM35FIN N:7599024 E:486702
2. Potholes at Ivalojoen Kultala	ETRS-TM35FIN N:7599166 E:486696
3. The Ivalojoki esker at Toloskoski rapids	ETRS-TM35FIN N:7603794 E:509751
4. The Saarnaköngäs rapids	ETRS-TM35FIN N:7595676 E:482118
5. The Ainikkaharju esker	ETRS-TM35FIN N:7591280 E:490786
6. The Puoliväli spring	ETRS-TM35FIN N: 7594864 E:490674
7. The Kulmakuru gorge	ETRS-TM35FIN N:7593226 E:510898
8. The Kiilopää ice lake and its spillways	ETRS-TM35FIN N:7582187 E:521332
9. The Rumakuru gorge	ETRS-TM35FIN N:7585394 E:520320
10. The quartz vein at Hangasoja	ETRS-TM35FIN N:7585224 E:513984
11. The Nälkäaapa mire	ETRS-TM35FIN N:7577483 E:506016
12. The Kopsusjärvi delta	ETRS-TM35FIN N:7569838 E:523150
13. Lateral drainage channels at Teräväkivenpää	ETRS-TM35FIN N:7575992 E:521000
14. Melt water erosional forms on Tankavaara fell	ETRS-TM35FIN N:7563978 E:506009
15. Tor formations at Pyhä-Nattanen	ETRS-TM35FIN N:7556558 E:515405
16. Block field covering the Nattaset fells	ETRS-TM35FIN N:7556603 E:514949
17. Karhunpesäkivi	ETRS-TM35FIN N:7634256 E:512657
18. Hummocky moraine area at Kirakkaköngäs	ETRS-TM35FIN N:7634182 E:513319
19. The Rahajärvi collapsed cliff	ETRS-TM35FIN N:7631918 E:512742
20. The Sotkajärvi esker and kames	ETRS-TM35FIN N:7626194 E:467024
21. The Ravadasköngäs waterfall	ETRS-TM35FIN N:7619439 E:457801
22. A cascade at the mouth of Morgam-Viibus stream	ETRS-TM35FIN N:7617941 E:456729
23. Talus deposit on the shore of Morgamjärvi lake	ETRS-TM35FIN N:7616681 E:454477
24. Lateral drainage channels on the top of the Jäkäläpää fell	ETRS-TM35FIN N:7622307 E:449068
Gold Historical Sites	**Coordinates**
1. Gold Prospectors' Huts at the Mouth of Kyläjoki	ETRS-TM35FIN N:7592074 E:481607
2. Ruikanmutka	ETRS-TM35FIN N:7597034 E:483470
3. The Lappi Farm at the Mouth of the Appisjoki	ETRS-TM35FIN N:7599846 E:484792
4. Kultala Crown Station	ETRS-TM35FIN N:7599297 E:486927
5. The River Bank of the Sotajoki Confluence	ETRS-TM35FIN N:7599307 E:493346

6. The Liljeqvist Dredge and its Surroundings	ETRS-TM35FIN N:7599044 E:496224
7. Ritakoski's Kultala Gold Village	ETRS-TM35FIN N:7599066 E:497058
8. Ritakoski steam engine	ETRS-TM35FIN N:7599847 E:497845
9. Palsinoja (Raahe cabin)	ETRS-TM35FIN N:7597447 E:499557
10. Nulkkamukka - the Birth Place of the Gold Rush	ETRS-TM35FIN N:7601577 E:501056
11. Kultala (Gold Village) along Pahaoja Brook	ETRS-TM35FIN N:7592904 E:494253
12. The Kerkelä mining village	ETRS-TM35FIN N:7585211 E:514225
13. The Laanila white quartz rock and shaft	ETRS-TM35FIN N:7585225 E:513984
14. The Kuivakuru panning facility	ETRS-TM35FIN N:7586521 E:512674
15. General's mine shaft	ETRS-TM35FIN N:7585286 E:512760
16. Carl Gustaf mine shaft	ETRS-TM35FIN N:7582758 E:512270
17. Prospector's mine shaft	ETRS-TM35FIN N:7586867 E:517432
18. The old cabin at Suomunruoktu	ETRS-TM35FIN N:7570912 E:525797
19. The memorial to Sauva-Aslak	ETRS-TM35FIN N:7564005 E:503998
20. Kultahamina	ETRS-TM35FIN N:7616093 E:453831
21. The site where gold was first found	ETRS-TM35FIN N:7615338 E:452521
22. Morgamoja Kultala	ETRS-TM35FIN N:7618031 E:450463
23. Pihlajamäki	ETRS-TM35FIN N:7620720 E:446623
24. Karhu Korhonen's Library	ETRS-TM35FIN N:7622703 E:449420
25. Korhonen	ETRS-TM35FIN N:7622037 E:451049
Other sites	**Coordinates**
1. The korkia-Maura Ice Cave	ETRS-TM35FIN N:7636510 E:526006
2. Sallivaara Reindeer Round-Up Site	ETRS-TM35FIN N:7597865 E:454519
3. The Pitfalls at the Sotkajärvi Ridge Chain	ETRS-TM35FIN N:7626194 E:467024
4. Ruijanpolku	ETRS-TM35FIN N:7580536 E:517400
5. The Grounds of Kaapin Jouni	ETRS-TM35FIN N:7627798 E:467584
6. Pielpajärvi Wilderness Church	ETRS-TM35FIN N:7648897 E:504646
7. Ukonsaari Island	ETRS-TM35FIN N:7647564 E:511740
8. Geological Trail	ETRS-TM35FIN N:7562608 E:504133

2.2. Geological Setting

In the area of the Golden Geopark of Lapland project is possible to observe: a) a very old Precambrian bedrock, older than many geoparks in Middle and Southern Europe; b) weathering processes; c) the Ice Age that left its legacy on top of the old bedrock and d) the gold deposits that also created a huge historical background in Lapland.

The bedrock of northern Finland belongs to the Fennoscandian Shield, also called Baltic Shield (Figure 2.3.), which is an ancient shield area similar to the Canadian and Australian shields and it corresponds to the bottom of an ancient mountain range like the one nowadays in Alps. The Fennoscandian Shield is in south of Norway, eastern Finnmark, the southern and eastern parts of Sweden, all Finland and parts of northwest of Russia being the oldest rocks of this shield formed between 3.2 and 2.5 billion years ago and occurred in eastern Finmark, north-eastern Finland and north-western Russia.

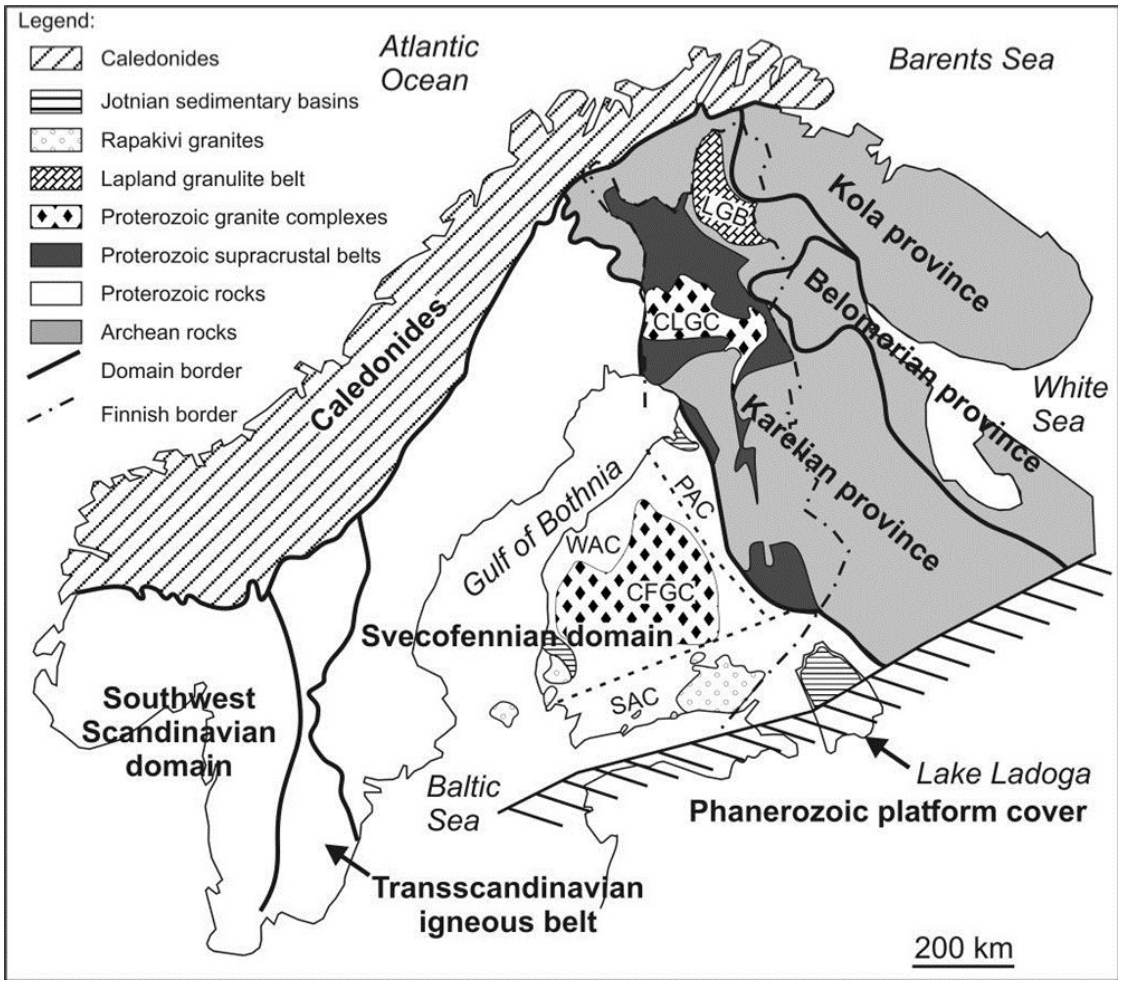


Figure 2.3. "Geology and major structural units of the Fennoscandian shield. PAC—Primitive arc complex; WAC—Arc complex of western Finland; SAC— Arc complex of southern Finland; CFGC— Central Finland granitoid complex; CLGC— Central Lapland granite complex; LGB—Lapland granulite belt. Right-diagonal ruling marks the northern edge of platform sediments." (From Koistinen et al. (2001) and Vaasjoki et al. (2005)).

The area of the Geopark of Lapland is in the Paleoproterozoic Lapland Greenstone Belt (LGB) where underlies the Archean rocks. The greenstone belts are a characteristic of all Archean terraces of the world (Vaasjoki et al., 2005) and the LGB is the largest coherent greenstone terrain exposed in the Fennoscandian Shield (Schlöglova et al., 2014) comprising northern Norway, the geopark area and finally Russia in Kola Peninsula (Johansson [no date]), with 400 km long and 90 km wide (Tuisku et al., 2006) being the main rock quartz feldspar gneiss (Figure 2.4.). The LGB has been affected by the intensive deformed and metamorphosed Svecokarelian orogeny (a continent-continent collision between the Karelian province and Kola province) of about 1.9 billion years ago where volcanic activity took place and the rocks went in the deep Earth´s crust suffering a tremendous pressure and heat, reason for the strong

foliation nowadays in the rocks. It was in this environment described before that gave origin to the rocks and its minerals in present day. The LGB also presents intercalations norites and enderbites (Barbey and Raith, 1990). In the southern part of the geopark it is possible to observe a younger rock, a granite intrusion of 1.77 billion years old, the Nattaset fells and on the margins of the Granulite belt garnet-hornblende gneiss and hornblende gneiss (Johansson [no date]).

The Svecokarelian orogeny, besides the rock types in the area of the geopark, created mountains chains that eroded down to its roots during hundreds of millions of years giving place to a peneplane - it is important to mention that the erosion and weathering processes were faster when Finland was in southern parts of the globe (Johansson [no date]; Tikkanen, 2002). In 30-50 million years ago, in Tertiary period, there were block movements that made the fells rose above their surrounding area and the fractures zones and faults formed at their edges originated valleys like Ivalojoki, Lemmenjoki, Tolosjoki, among others.

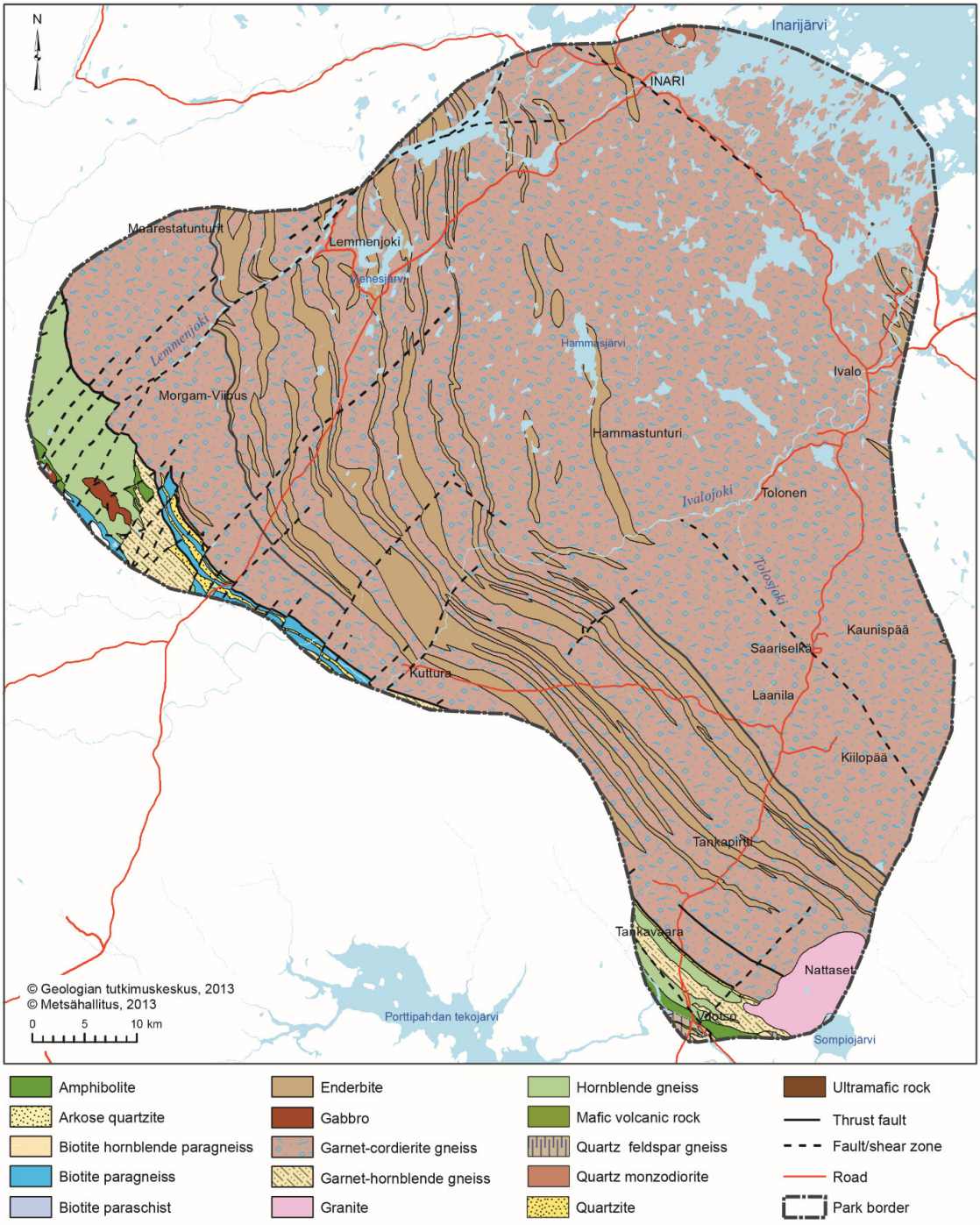


Figure 2.4. Lapland Greenstone Belt (Golden Geopark of Lapland Application).

The history of the rocks in this area is far from its end, a very important factor happened here as well, the weathering. The rocks suffered chemical and mechanical (or physical) weathering during millions of years, which made the granulite rock into loose material, in some places the rock is so loose that is possible to excavate it with a shovel (Johansson et al., 2009). Many of this weathering, known as frost weathering, can be

seen on the tops of upper slopes of the fells where it is possible to observe a field of blocks, this happened when the water enters in fractures of the rock, freezes, increases its size and after that breaks the surface of the rock, examples of geosites are the geosite number 16. Block field covering the Nattaset fells, geosite number 19. The Rahajärvi collapsed cliff and other example to observe is on top of the Jäkäläpää fell. Other rocks are more resistant against weathering, for example the geosite number 15. Tor formations at Pyhä-Nattanen where the weathering has been slower than the surrounding area. In other areas the weathered rock, loosened by frost weathering, falls from vertical canyon walls and stays in the shores of the rivers like it happens on the geosite number 23. Talus deposit on the shore of Morgamjärvi lake. This process (weathering) is very slow in nature.

Also the ice age played a crucial rule here. The area has been place for many ice ages during the times, being the oldest signs of glaciation about 2.3 billion years ago (Luhta, 2003). The last glaciation, the Weichselian Glaciation, is responsible for many Quaternary deposits (the most common one is till), various landforms and erosional forms (Figure 2.5.). The Weichselian Glaciation started more than 110 000 years ago reaching its peak about 18 000-20 000 years ago and ended about 9000 years ago, having at least 10 different stages and the same amount of warm stages, called interglacial stage- nowadays we are living an interglacial stage. The northern Lapland, where the geopark project is, the ice melted in a supra-aquatic environment that resulted in erosional and depositional landforms (Johansson, 2007), different from what happened in central and southern parts of Finland, where in south existed subaquatic environment (Johansson, 2007). In this far north only small episodes of subaquatic environment happened here when the Arctic Ocean entered in the river valleys of Teno and Lutto and into the Inari Lake basin (Nikonov 1964, Saarnisto 1973, cited in Johansson, 2007 p. 48).

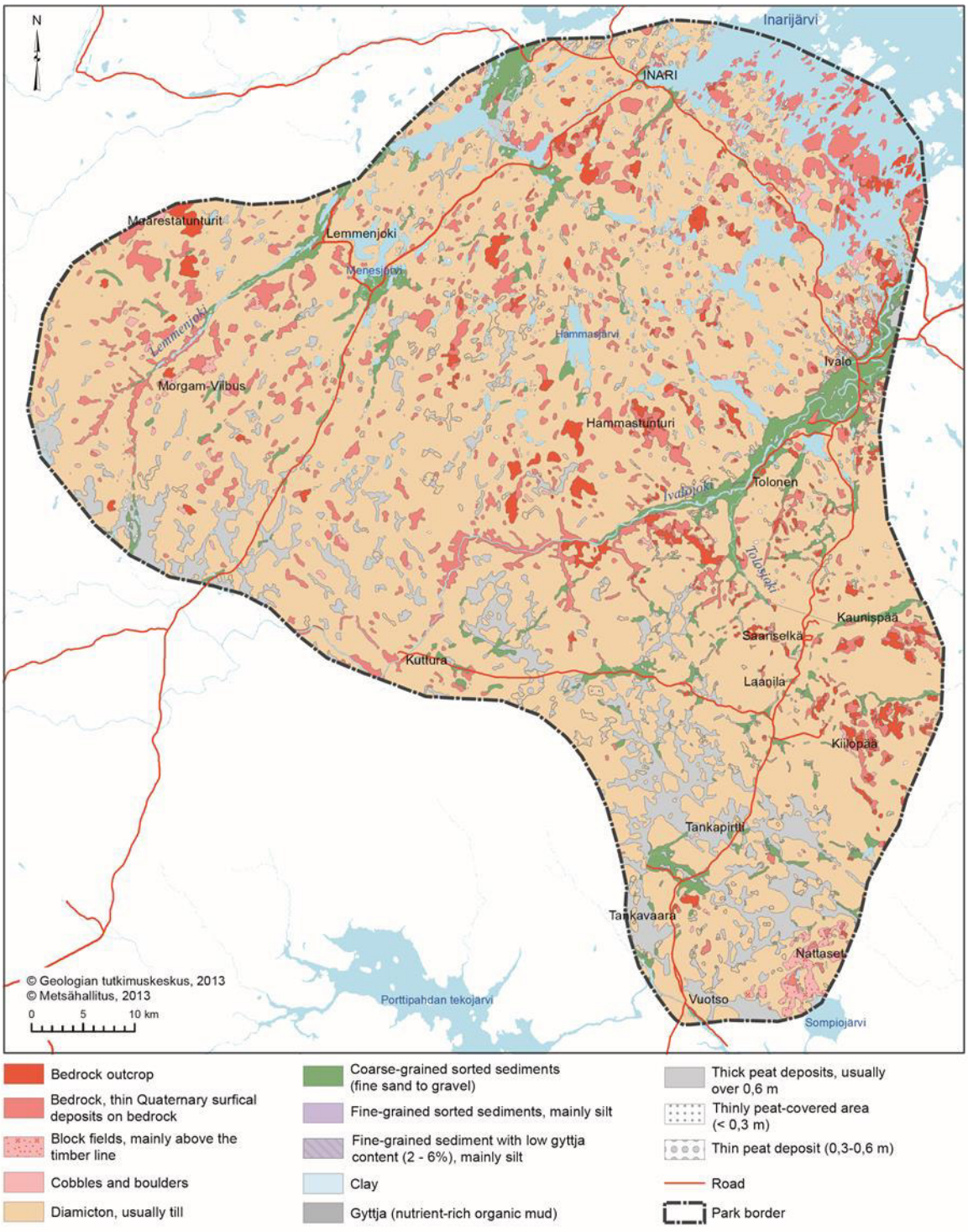


Figure 2.5. Quaternary deposits in the area of the Golden Geopark of Lapland (Golden Geopark of Lapland Application).

Some examples of evidences of the ice age:

Eskers: long, narrow hill of gravel and sand which is formed by waters that flow in the melting ice penetrating into cracks of the ice and depositing debris on the bottom of the meltwater tunnels. The eskers are in the same direction with the melting ice.

Kames: small cone shaped hills made of sand and gravel by the streams on top of the glaciers.

Subglacial gorges: very deep and narrow valleys with very steep valley side slope. It forms when the meltwater of the glaciers and its materials (debris) crosses a fell ridge and the rock on tunnel floor is already fractured, the water erodes it for a long time forming in this way deep gorges.

Potholes: circular or cylindrical hole in the riverbed produced by the force of a very turbulent water and abrasion. Very turbulent quantities of melt water from a glacier and its sediments start to spin with the eddy and since it is greater than the resistance of the rock drills down forming in this way potholes.

Lateral drainage: parallel "lines" and slope gently downward formed during the deglaciation stage when the ice progressively got thinned each year and eroded a channel in the slope parallel to the edge of the ice (Johansson et al., 2009). This happened between the ice margin of the glacier and the adjacent hillside.

Overflow channels: formed when the ice sheet starts to melt and the meltwater accumulates between the ice sheet and the lowest parts of the fell, eroding what is in their way and creating deep gorges (Johansson et al., 2009).

Aapa mires: areas with large watery flarks and its middle parts without trees, also there are between them low ridges called strings (Johansson [no date]). This type of mire is formed when the ice melts and dead plants starts to accumulate in the wet environment and during thousands of years originates a peat. They can be found in depressions in the landscape and in areas with water between hills for example.

Hummocky moraines: also named as dead-ice moraine or moraine mounds are a group of moraines with no specific orientation or organization, size, spacing or slope.

Glacial deltas: formed when streams of meltwater coming from the ice entered into the lakes or when it is associated with an esker chain, being the delta in this way the final stage of the esker formation.

Marginal channels: formed in the margin of the ice sheet the same way as the lateral drainage, the difference between both rely on the fact that in the marginal channels the quantity of water is much bigger.

Erratics: a rock/ boulder transported and deposited by a glacier in a different area than the original having in this way a different lithology than the bedrock.

To finalize the geological setting it is crucial to mention the gold plays a very important rule in this area in terms of geology as well as history. Gold is a yellow and shinning precious metal, being one of the heaviest metals in nature and considered to be a "noble" metal (an alchemistic term) because it does not oxidize under ordinary conditions. Its chemical symbol is "Au" from the Latin word "aurum" and it is a good conductor of electricity and heat. The gold also is used in many other areas such as jewelry, gilding, dentistry, coins, aircraft-aerospace industry, arts, medical and chemical fields and electronics.

It is believed this precious metal has extraterrestrial origin which means that gold is formed when a supernova star explodes or collides and creates all heavier elements beyond iron (Fe), where the atoms of the gold originated as well. An interstellar gas cloud travels into the space and ended up in Earth at about 4.6 billion years ago. When the Earth was not in a solid state gold and other heavier elements went to the centre of the Earth, while lighter elements stayed on the surface.

The gold was formed during millions of years where it precipitated on the ocean floor or into deep volcanoes and it was able to rise high in the mountains. The weathering and erosion in the mountain region during a period of hundreds of millions of years and in the Tertiary Period when block movements made the fells rose above their surroundings the gold nuggets detached from the weathering rocks and ended up in the crustal faults (Halla and Wuthenau, 2015).

Other ore formations processes, besides the orogenic (above explained), forms the gold in Lapland, like for example porfyric, hypotermic, mesotermic, epitermic, sedimendic, among others. The sedimentic process has a sub-group, the placer process, which is divided in many placers but here the most important are the glasifluvial, glasial and alluvial to understand the journey of the gold in this area. Even though there is placer gold formations, until today was not found their mother lodges (primary ores).

2.2.1. Geosites description

1. The Lihr rock and its bedrock outcrops: in the Ivalojoki canyon is possible to observe the strong schistose appearance and mineral content of the granitic gneiss and quartz diorite gneisses resulted of the tremendous pressure and heat the rock suffered. When hiking the 12 km trail from Pahaoja to Kultala Gold Mining Village visitors can see this geosite, also on the other side of the river, when crossing the suspension bridge that links the two shores is possible to visit the Kultala Gold Village (Golden Geopark of Lapland Application [no date]).

2. Potholes at Ivalojoen Kultala: the potholes here are about 0.1-1.2 metres deep and with a diameter vary between 0.2 and 1.5 metres. They were formed by the last ice age about 11,000 years ago in the marginal zone of the melting ice sheet produced by the force of the very turbulent water and abrasion where boulders carried by those waters started to spin with the eddy and since this force is greater than the resistance of the rock drills down forming in this way the potholes. It is possible to see this geosite under the suspension bridge that leads to Kultala Gold Village, the geosite belongs to the 12 km trail from Pahaoja to Kultala Gold Mining Village (Golden Geopark of Lapland Application [no date]).

3. The Ivalojoki esker at Toloskoski rapids: this esker is part of an esker sequence over 100 km long that extends from south-west to north-east towards Inari Lake and the village of Nellim. From Ritakoski Gold Village down to the river valley, the esker ridge enlarges into a valley train. This originates due to the glacial river that transports the sediments and deposited on the bottom of the valley, these eskers reach the surface level at about 155 m, which is the water level of the ancient ice lake at Inari. "*When the level of the water later lowered, the Ivalojoki river began to carve its channel through the gravel and sand deposits*." (Golden Geopark of Lapland Application [no date]).

4. The Saarnaköngäs rapids: on the western side of the Ivalojoki river bank there is a large pothole carved in the cliff, also there are more potholes on the banks of the river which depths vary between 0.1 and 0.3 metres and with diameters of 0.2 -0.7 metres. Saarnaköngäs in Finnish means "sermon rapids" due to the fact that it is believed the priest used this pothole to deliver his sermons to the gold-prospectors of the area (Golden Geopark of Lapland Application [no date]).

5. The Ainikkaharju esker: it is an esker ridge of 7 km long belonging to a long esker sequence that extends from south-west to north-east towards the Ivalojoki river valley. It was formed when the debris were transported on the bottom of the meltwater channel and after that deposited as an elongated ridge of gravel and sand (Golden Geopark of Lapland Application [no date]).

6. The Puoliväli spring: springs occur mostly on the lower slopes of fells, hills and at the foot of eskers when the groundwater reaches the ground surface (Johansson et al., 2009). At the bottom of Patatunturi fell the waters of Puoliväli spring goes in its way to the surface through the sandy layers on the bottom. This geosite is in the 12 km trail from Pahaoja to Gold Kultala Gold Mining Village (Golden Geopark of Lapland Application [no date]).

7. The Kulmakuru gorge: this gorge has an angular form as a result of the crossing fracture zones in the bedrock, it is a gorge more than 20 metres deep with very steep slopes and in the bottom is covered with jagged stones that have fall down from the slopes. Also in this area there is a small esker ridge formed in the meltwater conduit at the bottom of the retreating glacier that goes into the Kulmakuru meltwater gorge at the 375 m level and runs further to the Eskottijoki river valley where there are again glaciofluvial hillocks, proving in this way that esker ridges and this gorge belong to the same sub-glacial meltwater system (Golden Geopark of Lapland Application [no date]).

8. The Kiilopää ice lake and its spillways: when continental ice sheet from the last glaciation was melting, about 10, 500 years ago, the ground started to be exposed and the water was collected into ice lakes between the margin of the glacier and the fells, like it happen in Kiili-oja river valley. This ice lake discharged its waters over the lowest points of the fell range towards northeast eroding deep gorges (overflow channels) into the bedrock (Johansson et al., 2011). North of Kiilopää exists a series of overflow channels at heights between 446 m and 336 m which functioned one after the other as a discharge channel for the Kiilopää ice lake (Golden Geopark of Lapland Application [no date]).

9. The Rumakuru gorge: this gorge due to its orientation and location was formed early than the melting stage of the last glaciation, when the last glaciation was in his area it was not able to destroy it or fill it, with the exception of the floors and slopes which are partially covered by a thin blanket of till. This gorge has 50 metres deep

because of the long time of erosion made by the meltwater and the underlying rock was already fractured (Golden Geopark of Lapland Application [no date]).

10. The quartz vein at Hangasoja: when the gold in the riverbanks started to be scarse the attention turned to the gold in the bedrock. In this way in 1898, a geological expedition was send to search for minerals in Lapland and it was found close to Hangasoja brook a spot where a white quartz vein cut through the syenite bedrock, considering this a very promising chance for gold prospecting, the gold miner Henry Kerkelä had the information and made a claim in the place in May of 1902. This geosite belong to the Laanila Gold trail were is possible also to see some historical sites (Golden Geopark of Lapland Application [no date]).

11. The Nälkäaapa mire: this mire was formed in the depressions of the terrain and in waterlogged areas that were left as the glacier melted. Remnants of dead plants accumulates on the humid substrate and during a period of thousands of years several metres of peat were formed by the process of huminification (Johansson, 2009). The mire, like the others, is an open bog without tress in the middle, watery flarks and between them low ridges called strings.

12. The Kopsusjärvi delta: is a glaciofluvial delta that was formed at the margin of the continental ice sheet. There is an esker chain running from south-west representing the final stage of the esker formation, and the delta is composed by sand and gravel material rising 315 metres above sea level (refers to the water level elevation in the Kopusjärvi ice lake during the deglaciation). The sides of the delta are steep and the surface flat (Golden Geopark of Lapland Application [no date]).

13. Lateral drainage channels at Teräväkivenpää: "*glacial meltwater channels which are almost parallel and slope gently down the sides of the fell*." (Annexes, Golden Geopark of Lapland [no date]). Each channel is few hundreds of metres to a kilometre long, open at the both ends, 1-3 metres deep and having a distance between them that varies between 10 and 20 metres. The lateral channels are very important for calculate the annual retreat of the ice margin. "*They were formed in spring by meltwater flowing from the ice sheet and eroding a channel in the slope parallel to the edge of the ice. When became thinner in summer, its surface sank a few metres. The next spring a new channel was again formed below the preceding one*." (Johansson et al., 2009).

14. Melt water erosional forms on Tankavaara fell: when the deglaciation came to this area the waters from the glacier crossed Tankavaara fell under an huge pressure that carried away rock material that eroded from the walls and the bottom of the gorge and were deposited at its mouth. Marginal channels were formed later and since the amount of water flowing in those channels was huge originated channels with several metres deep and frequently over a kilometre long (Golden Geopark of Lapland Application [no date]).

15. Tor formations at Pyhä-Nattanen: is a group of high cone shaped hills in Sompio Nature Reserve with about 500 metres high being the highest Terävä-Nattanen with 544 metres, it belongs to a 1. 77 billion years old granite intrusion that is one of the youngest rock types in the area. "*The Nattaset fells consist of red, coarse-porphyritic or even-grained, homogeneous granite that is composed of plagioclase, quartz and K-feldspar in equal proportions. Biotite is the main mafic mineral and accessory phase include magnetite, allanite, titanite, and zircon*" (Front et al., cited in Johansson et al., 2014, p.34). These tors probably belong to the most durable parts of the granitic rock, being the weathering process slower here than in the surrounding area. There is an hiking trail to this geosite (Golden Geopark of Lapland Application [no date]).

16. Block field covering the Nattaset fells: the frost weathering that occurs in this area makes the surface of the rock shrink and expand forming in this way small fractures, after this the water penetrates on these fractures freezes and widens breaking the rocks. This is what happened in this geosite, and still going on in a very slow process. There is a hiking trail to see this geosite as well as to geosite number 15 (Golden Geopark of Lapland Application [no date]).

17. Karhunpesäkivi: in English means the "bear´s Den Rock" and it is situated near the lake Myössäjärvi in Inari on the slope of Myössävaara hill and it is well-known for being the largest cavity of a tafone weathering formation in Finland. When the continental ice sheet flowed to the area, from the southwest, carried with it many erratics in its melting process, one of the most famous and largest is the Bear´s Dan Cave with 6m x 6m x 4m in outer extend and 2m x 2m x 3m inside cavity (Johansson et al., 2014). It is formed through tafoni weathering mainly by disintegration due to the differences in temperature between the surface of the cavity and the inner rock, the changes in temperature and humidity still erode the walls of the cavity (Kielosto et al. 1985, cited in Johansson et al., 2014, p. 56). This erratic was before mistaken as a

pothole that had been turned upside down. It is possible to visit the inside of the erratic through a hole, there are stairs that lead to this geosite and it is not far from a parking car area.

18. Hummocky moraine area at Kirakkaköngäs: this area is characterized by tens of hills and ridges of 5 -15 metres high and composed by very stony and blocky till. The stones are angular, originating from the local bedrock meaning that the rock underneath is fractured and the glacial erosion in the area was very strong mixing till with the angular rocks. (Golden Geopark of Lapland Application [no date]).

19. The Rahajärvi collapsed cliff: this geosite is a result of physical weathering. When there are differences of temperature the surface of the rock expands and contracts alternately resulting in this way in small fractures in the rock. When it rains the water enters in this fractures and when temperatures are below zero the water freezes and expands in the fractures, after this the fracture becomes so big that the rock splits and the break piece rolls down to the bottom of the slope and spilt into dozens of pieces. This process is very slow (Golden Geopark of Lapland Application [no date]).

20. The Sotkajärvi esker and kames: this esker is part of a long esker sequence, 150 km, running from south-west to north-east rising in Lemmenjoki canyon about 30 metres. "*At Njurkulahti, the unbroken, steep-sided ridge enlarges into rolling kame topography consisting of several parallel ridges. Dead ice holes are found between them that formed as ice blocks transported by the meltwater stream were buried in the gravel."* (Golden Geopark of Lapland Application [no date]).

21. The Ravadaskköngäs waterfall: this geosite has several falls in a row being originally an old glacial meltwater channel. In addition, there is in the upper part of the waterfall potholes-like forms made by the erosive action of the glacial meltwater in the final phase of the last glaciations. The Ravadaskköngäs gorge and the 7 metre high waterfall cascade situated near the mouth of the Ravadasjoki river are a very famous destination in Lemmenjoki, being possible to see this geosite through a hiking trail or in an easier way by boat (Golden Geopark of Lapland Application [no date]).

22. A cascade at the mouth of Morgam-Viibus stream: three small waterfalls with their steep and narrow channels indicating the brooks are young. The highest and most impressive is situated at the mouth of the Morgam-Viibus stream. (Golden Geopark of Lapland Application [no date]).

23. Talus deposit on the shore of Morgamjärvi lake: the talus deposit on the south-eastern shore of Morgamjärvi lake are the result of the physical weathering, having the material fallen from the vertical canyon walls and came to the lower parts of the canyon forming in this way talus deposits. Rock and snow avalanches in late winter are also common events in this area.

24. **Lateral drainage channels on the top of the Jäkäläpää fell:** "*glacial meltwater channels which are almost parallel and slope gently down the slopes of the Jäkäläpää fell"* (Golden Geopark of Lapland Application [no date]).). Each channel is a few hundreds of metres to a kilometre long, open at the both ends and 1-3 metres deep. The lateral channels are very important for calculate the annual retreat of the ice margin. "*They were formed in spring by meltwater flowing from the ice sheet and eroding a channel in the slope parallel to the edge of the ice. When became thinner in summer, its surface sank a few metres. The next spring a new channel was again formed below the preceding one*." (Johansson et al., 2009).

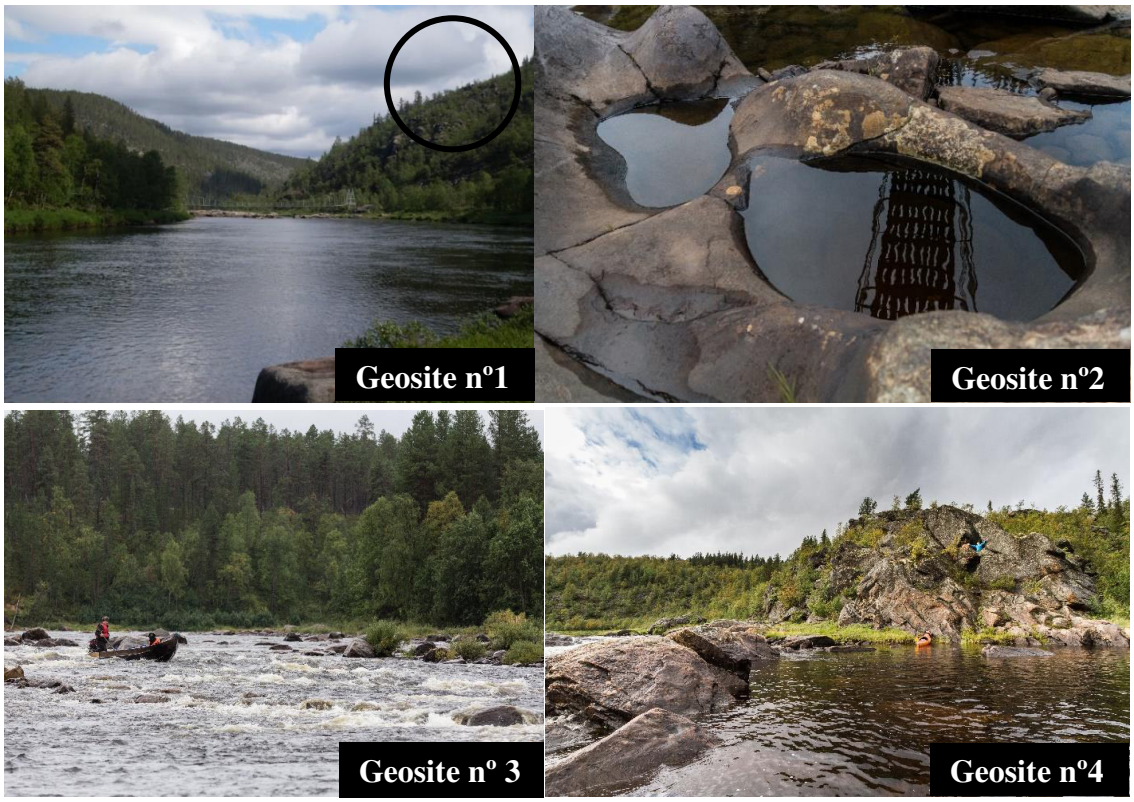


Figure 2.6. Geosites of the Golden Geopark of Lapland project (the photos of the geosites number 2, 3, 4, 5, 6, 7, 8, 11, 12, 13, 22, 23 and 24 are from the Golden Geopark of Lapland).

Figure 2.6. Geosites of the Golden Geopark of Lapland project (the photos of the geosites number 2, 3, 4, 5, 6, 7, 8, 11, 12, 13, 22, 23 and 24 are from the Golden Geopark of Lapland).

Figure 2.6. Geosites of the Golden Geopark of Lapland project (the photos of the geosites number 2, 3, 4, 5, 6, 7, 8, 11, 12, 13, 22, 23 and 24 are from the Golden Geopark of Lapland).

Figure 2.6. Geosites of the Golden Geopark of Lapland project (the photos of the geosites number 2, 3, 4, 5, 6, 7, 8, 11, 12, 13, 22, 23 and 24 are from the Golden Geopark of Lapland).

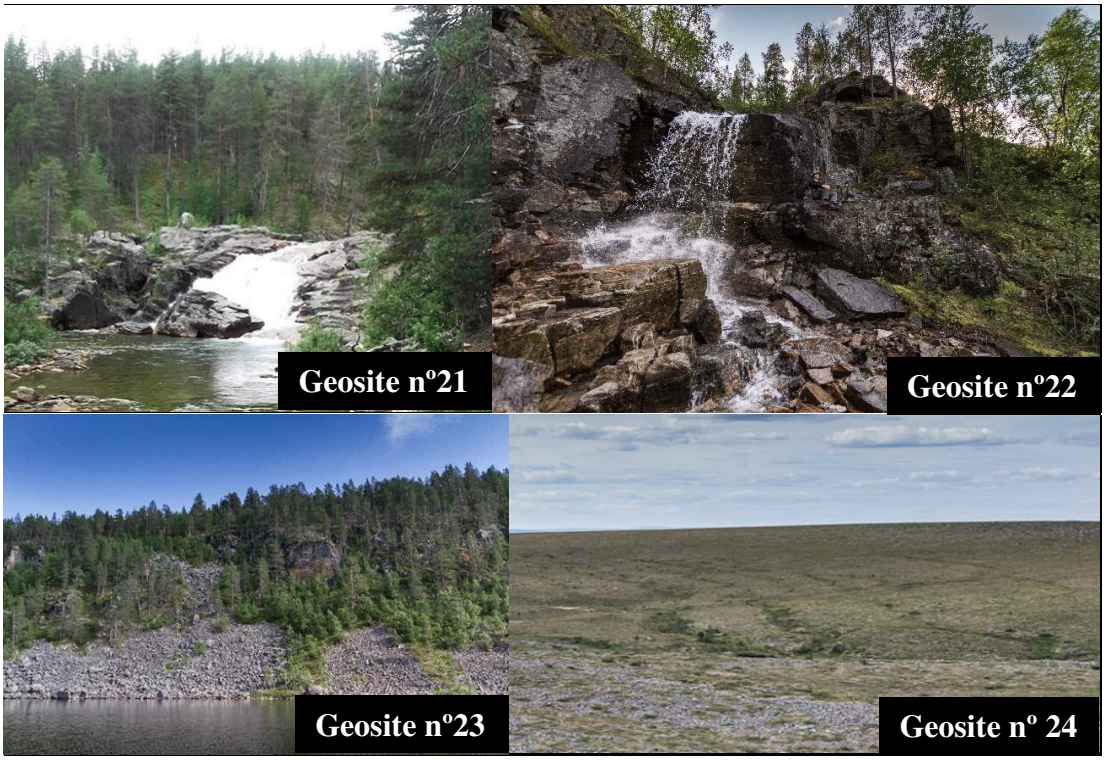


Figure 2.6. Geosites of the Golden Geopark of Lapland project (the photos of the geosites number 2, 3, 4, 5, 6, 7, 8, 11, 12, 13, 22, 23 and 24 are from the Golden Geopark of Lapland).

2.3. Gold History: Past and Present

Even though the discovery of gold in Lapland had a shy start with some failed attempts (the oldest reference about gold dates back in 1546 by Georg Agricola), its official beginning came much later, in 1868 in Ivalojoki River and continued after that in other areas like Lemmenjoki, Laanila and Tankavaara bringing a new fascinating chapter in Lapland History. Nowadays visitors can see some buildings, ruins, engines, shafts, piles of stones, among others in the gold fields throughout the good hiking trails in the area, like for example Lemmenjoki trail (49, 20 km all hiking route, shorter if visitors take boat and hike for a while), Pahaoja – Kultala Gold Mining Village trail (12 km) and the Golden Route of Laanila (8.10 km); pan for gold in some places and understand a little bit more of gold history thanks to the International Gold Museum of Tankavaara.

Ivalojoki: the gold was found in 1868 in Nulkkamukka by Joahn Conrad Lihr (a mining engineer and the manager of the Mint) and his team and the gold rush reached its climax

in 1880s (http://www.kultamuseo.fi/en/historia.htm). The gold historical sites possible to found here are: 1. Gold Prospectors' Huts at the Mouth of Kyläjoki; 2. Ruikanmutka; 3. The Lappi Farm at the Mouth of the Appisjoki; 4. Kultala Crown Station; 5. The River Bank of the Sotajoki Confluence; 6. The Liljeqvist Dredge and its Surroundings; 7. Ritakoski's Kultala Gold Village; 8. Ritakoski steam engine; 9. Palsinoja (Raahe cabin); 10. Nulkkamukka - the Birth Place of the Gold Rush; and 11. Kultala (Gold Village) along Pahaoja Brook.

Laanila*:* here was the place for mining companies like the Finnish companies Prospektor, Kerkelä, Lapin Kulta Oy and Ivalojoki Oy and some foreign as well trying to search for the mother lodge of gold in the first decades of the 20th century. The companies entered in bankrupt after few years of activity giving place to individual gold prospectors and until nowadays individual people search for gold in this area (http://www.kultamuseo.fi/en/historia.htm). The gold historical sites possible to found here are: 12. The Kerkelä mining village; 13. The Laanila white quartz rock and shaft; 14. The Kuivakuru panning facility; 15. General's mine shaft; 16. Carl Gustaf mine shaft (all sites before belonging to Laanila´s gold trail) and finally 17. Prospector's mine shaft.

Tankavaara*:* the gold was found by a local person called Aslak Peltovuoma (a smith and joiner) in 1934 (http://www.kultamuseo.fi/en/historia.htm). Nowadays the area has the Gold Village with restaurant and accommodation and the Gold Museum. In his museum visitors can find the history of gold in Lapland and in other countries around the world and some temporary exhibitions are developed, like for example the one which explains geologically the origin of gold in Lapland. Besides these two infrastructures – Gold Village and Museum- a Mineral exhibition and *"Auraria"* (a square with scale model replicas of buildings from gold rush centres all over the world) can be seen in Tankavaara. The place also has every summer the Finnish Gold Panning Championships where Finnish people and foreigners can participate and the general public can see the competitions. The gold historical sites possible to found here are: 19. The memorial to Sauva-Aslak and a little far from Tankavaara, 18. The old cabin at Suomunruoktu in Urho Kekkonen National Park.

Lemmenjoki*:* this area had its first gold experience in 1902 without any further success, being after that forgotten for four decades. Only in 1945 when three brothers, Niilo, Uula and Veikko Rantilla found gold in the tributary Morgamoja (Lemmenjoki)

this area entered in the gold History of Lapland (http://www.kultamuseo.fi/en/historia.htm). The gold historical sites possible to found here are: 20. Kultahamina; 21. The site where gold was first found; 22. Morgamoja Kultala; 23. Pihlajamäki; 24. Karhu Korhonen's Library and 25. Korhonen.

2.3.1. Gold Historical Sites description

1. Gold Prospectors' Huts at the Mouth of Kyläjoki: Viktor Koivula settled here in 1972 to dig gold, the cottages built by this gold prospector are already decaying. Near this place, at the Timanttiköngäs rapids there is a traditional Sámi-style dwelling, a "*Kammi*", which has been dug partially underground and lined with timber and peat also there is a sauna and an underground cellar (Golden Geopark of Lapland Application [no date]).

2. **Ruikanmutka:** this place has been one of the most productive gold sites on the river Ivalojoki. Here many gold prospectors staked their claims due to its richness, being Unto Koivunen the most recent permanent gold prospector in this area living in his cabin all year round. It is possible to see the remains of Koivunen's old hut, chimneyless sauna, cold cellar, shed and outhouse in Ruikanmutka. The newer hut burned down in 1995. Also here was built a big house but few evidences have been preserved until these days, the house belonged to Matti Yliruikka which found so much gold that made him able to build here a house (Golden Geopark of Lapland Application [no date]).

3. The Lappi Farm at the Mouth of the Appisjoki: in this place lived the Lappish family of Gabriel Aikio at the beginning of the 20th century. Gabriel sold food and other supplies to local gold prospectors who paid their purchases in gold (Launonen and Partanen, 2000). According to the legend, he hid his gold by the path running from the mouth of Appisjoki to Kultala. Only two more people knew it where it was, his farmhand and his maid, when Gabriel died the maid went in search for the treasure and found it but gave her such a fright that she fled from the side. Until this day the gold is still there if the rumors are truth. This place is in ruins (Golden Geopark of Lapland Application [no date]).

4. Kultala Crown Station: on the spring of the year 1868 the Senate send an official expedition led by Joahn Conrad Lihr, a mining engineer and the manager of the Mint, to explore the rivers of Lapland to find gold and on September of the same year the precious metal was found on the River Ivalojoki in a place called Nulkkamukka (http://www.kultamuseo.fi/en/historia.htm), giving in this way birth to the gold rush in Lapland. The gold rush in Ivalojoki took about 3 summers with an amount of 500 gold diggers, some of them were lucky enough to get 2 kilos of gold in a short period of time (couple weeks). With the huge number of prospectors in the area it was necessary to keep the order and support people´s needs in the gold fields, in this way in 1870 on the bank of Ivalojoki river many infrastructures were created like for example the Kultala Crown Station, the headquarters for government officials to control the area (e.g.: issuing licenses for gold prospecting, purchased all the gold recovered on the claims, plotted maps of the claims, etc.), as well as a sauna, a saloon, a bakery, log cabins to accommodate gold prospectors and a small hospital built further down on this river. When the gold rush was over, the Kultala building was renovated to serve as an investigation centre for Finnish geophysicists to study northern lights in 1882. It is possible to visit this place and see the buildings through the 12 km hiking trail from Pahaoja to Kultala Gold Mining Village (Golden Geopark of Lapland Application [no date]).

5. The River Bank of the Sotajoki Confluence: at the mouth of Sotajoki people have been here to prospect for gold since the early days of the gold rush (1870s). The first person to stake a claim at the mouth of Sotajoki was Johan Tallgren from Helsinki being the results of the first 10 years over 30 kilos of gold. In 1879 Tallgren sold his claim to a baker, Fredrick Ekberg, founder of Helsinki´s well-known Ekberg´s coffee house. At the end of the 1880s the northern bank of the mouth of Sotajoki was claimed by Xenofon Nordling the head of the Ivalo-Sotajonen huuhdontayhtiö gold panning company where several-kilometre-long ditches along which water was led from the Sotajoki to the panning site and huge piles of rock, the ruins of the cabins and huts also probably date back to those days. Also two mining companies, Prospector Oy and Ivalojoki Oy, worked in this area (Golden Geopark of Lapland Application [no date]).

6. The Liljeqvist Dredge and its Surroundings: the engineer Toivo Liljeqvist built this large dredger (known also as “the dinosaur”) in 1953-54 in Tolonen and dragged it along a cable wire upstream to the Vaskisuvanto backwater, it had a bucket and an

extractor operated by a diesel-powered engine. It was believed the machine could collect gold from the river that was left in the ground from digging by hand but the dredge did not worked as planned. The dredge was abandoned being gradually damaged by the years and floods in spring time, fortunately in 1992 this incredible machine was restored. Nowadays is possible to see this machine on the shore of Vaskisuvanto (Golden Geopark of Lapland Application [no date]).

7. Ritakoski's Kultala Gold Village: Ritakoski has been a very important location for gold prospecting. Feodor Oesterreich of Saint Pertersburg was the first who staked a claim in this area, quitting quite soon after his bad results of prospecting. The busiest times came with Heikki Kivekäs in 1914 who had big plans to this place, building all kinds of houses in the place like for example a cowshed, stable and a barn as well as a sauna, a mining cabin, a timber hut, a workshop, a peculiar dog house that stood on a pedestal, a sawmill and a planning mill. He also started to build his own gold village but he never managed to finish. After Kivekäs was the time for mining companies like for example Ivalojoki Oy and Luttojoen Kulta Oy, the second company mentioned here employed, among others, Laura Francisca Elvira Bono, known as Moppe. She was a wife of a famous Finnish painter, she had a private little cabin at the bank of Ritakoski. (Launonen and Partanen, 2000). Of the old buildings in this area, the main building, a storehouse and the cowshed and stable were restored being the storehouse used as a hut for hikers. The doghouse and the log restroom also can been seen until nowadays, the rest of the buildings are in ruins around the place.

8. Ritakoski steam engine: the steam engine was made by the English company R. Garret & Sons Engineers from Leiston with the main goal of starting a major mining activity. This machine was carried to Ritakoski during winter time, through a wide path stamped by reindeers, in a sleigh transported by horses and the river Ivalojoki was crossed on the ice. The steam engine is in an open shelter possible to be visited (Golden Geopark of Lapland Application [no date]).

9. Palsinoja (Raahe cabin): Palsinoja is a tributary of the river Ivalojoki, having the gold history started here in 1871 when an engineering student, Johan Albert Piponious, staked a claim along Palsinoja, near the mouth of the tributary, and panned almost 100 grams of gold in the first few days. Next summer Piponius sold the claim to the police officer Xenofon Nordling who hired 25 men to work on the claim and received 3.4 kilograms in gold. Slightly higher upstream along Palsinoja, Anders Leppäluoto, a

sailor from Raahe, staked his claim in the summer of 1873 and had a crew of eleven people to dug up more than two kilos of gold at the claim. The workers from Raahe left behind a hut, known as Raahen Pirtti, on the site. The hut was renovated in 1980 decade and again in 2012 serving today as a Metsähallitus rental hut and other remnants of old buildings built by the men from Raahe can be seen in the area. A road to Palsinoja was built in 1980 decade and a former helicopter pilot, Heikki Korhonen, established a tourism centre and an automated gold panning facility by the river, the business was a success but in autumn of 1985 the Katriina cabin that served as the touristic café burned down coming to an end his career in this area. Until today gold prospectors continue to work in Palsinoja (Golden Geopark of Lapland Application [no date]).

10. Nulkkamukka - the Birth Place of the Gold Rush: the Senate of the then Grand Duchy of Finland send an expedition led by Johan Conrad Lihr, assistant Director of the Mint and mining engineer, in 1868 to explore the big rivers of the north in hopes to find gold. On 16th of September of 1868 gold was found and a new chapter in Ivalojoki region started with this. With the discovery of gold in this area, the International Gold Prospector Museum of Tankavaara erected in 1986 a monument in honour of Lihr, located about 300 metres up-stream from the mouth of Louhioja and it can be seen until nowadays (Golden Geopark of Lapland Application [no date]).

11. Kultala (Gold Village) along Pahaoja Brook: gold digging in the area became more efficient when the company Lapin Kulta Oy built a base in this area in 1925. The gold prospecting through machines made that railways, bucket conveyors and steam power machines were transported here, unfortunately without success - not much gold was found and rocks made the mechanical digging difficult. In 1948 a team of gold prospectors, Jaakko Isola, Heikki Kokko, Kullervo Korhonen and Jukka Pellinen in high hopes to find more gold collected an huge amount of land mines, grenades and other explosives abandoned by the German army few years earlier. The explosives were dug into a long row, wired together to explode and for the explosion it was used a bicycle dynamo. This experiment was not succeed as expected and these gold prospectors moved the following year to the gold fields of Lemmenjoki (Launonen and Partanen, 2000). The 300 metre channel that was exploded across a spit of land downstream from Pahaoja brook is an evidence of their activities that can be still seen until nowadays. As this place was abandoned when other areas in Lapland were more appealing to search for gold, the buildings fell into ruin and in 1970s by the initiative of

the Lapin Kultala Foundation, the National Board of Antiquities renovated the buildings and a shelter was built for the steam engine and a suspension bridge across the River Sotajoki, also a trail was created (12 km long) to link this place with Kultala Crown Station. To see this site, visitors walk short path and easy and is quite near to a parking place (Golden Geopark of Lapland Application [no date]).

12. The Kerkelä mining village: the magic word "gold" spread in this area and gold mining companies came to try their luck. Henry Kerkelä (an experienced gold prospector who worked as a miner in America and searcher for rock gold in the Ivalojoki gold fields) founded the Kerkelän Kultakaivos Oy Pohjola gold company having in 1902 150 claims and employing 45 men but without any success (only 25 grams of gold were found). Due to his failure, the shareholders hired Hans von Post, a mining engineer, from Stockholm to inspect the job sites and Hans after take several samples conclude that there was a very few amount of gold in the area. Even though the results were unsatisfactory, von Post advised to Kerkelä continue to prospect because his lack of success may have been due to this lack of experience, inadequate equipment and the methods used. The report made by von Post did not convince the partners and the business was closed, still some of the shareholders had faith in Kerkelä and he was able to establish another mining company that soon proved to be hopeless. Kerkelä managed to sell his mine in 1906 to the Finnish-American Mining company, involving the Joutsen brothers, two men who had struck it rich in Klondike gold fields. This collaboration ended up in the courthouse of Inari, where the company was sued for hundreds of thousands of marks in unpaid shares. The six mine shafts in the area and remnants of a dam and a building of Kerkelä can be seen in this area through the 7 km trail, Laanila Gold Trail (Golden Geopark of Lapland Application [no date]; Launonen and Partanen, 2000).

13. The Laanila white quartz rock and shaft: the discovery of gold brought many people into the gold fields to try their luck and also the curiosity to find the mother lodge. In 1898 the geologist J.J. Sederholm detected syenite and quartz seams that cut across each other by the Hangasoja brook and decided it could be better to have a look in this area. When Kerkelä was in the area he had a mine shaft that reached a depth of 10 metres and he said he had seen quartz, iron glance and gold in the cracks of the granulite gneiss. Before other people could prove what he was saying the shaft filled with water. Kerkelä dug another 125 metres from the previous one and found large

amounts of gold, in this way he continued to dig more shafts finding iron ore seams and send the samples to be analyzed. The analyzes concluded that the gold in the samples was significant and people believed in the mother lodge of Lapland. This gold historical site belongs to the 7 km Laanila Gold Trail (Golden Geopark of Lapland Application [no date]).

14. The Kuivakuru panning facility: this gold historical site is one of the most famous and richest gold panning areas, being many of the largest nuggets in Finnish gold prospecting history found here. Here is possible to observe ruins of several old cabins and a newer one built in 1960s and still used by gold prospectors in 2000s, as well as steam-powered machines and more modern ones. This site belongs to the 7 km Lannila Gold Trail (Golden Geopark of Lapland Application [no date]).

15. General's mine shaft: gold digging is still an active activity in present days in nearby areas of this gold historical site. The mine mineral of the shaft is goethite having on the waste area of the shaft plenty of goethite crystals. This site belongs to the 7 km Laanila Gold Trail (Golden Geopark of Lapland Application [no date]).

16. Carl Gustaf mine shaft: this site is located near Kuttura road, probably the name comes from Carl-Gustaf Standertskjöld, one of the shareholders of the mining company (Launonen and Partanen, 2000). The best samples were proven to have more than 50 grams of gold per tonne. Digging was quite intensive in this site and the deepest shafts in the area are found here. In this way is possible to see here the shafts and pile of waste stone. This site belongs to the 7 km Laanila Gold Trail (Golden Geopark of Lapland Application [no date]).

17. Prospector's mine shaft: the Prospektor Oy mining company was established in 1901 influenced partially by the promising gold findings of Henry Kerkelä. The company acquired 470 claims with the goal of prospecting for rock and river gold. As in that time the place was in pure wilderness the company had to build living quarters for workers and clerks, laboratories and smelters. Other important detail to live in such a remote area was the creation of roads, organization of post and food deliveries and have educated engineers. In 1902 the company employed 78 men and the most important of the six shafts was in Laanila, which employed 30 men. As the company paid to its employees, the machinery as well as payments for research expeditions in America, the money problem started to appear and to solve it was needed to convince the

shareholders that more gold would be found. The company received more money and in this way more machines were bought and more workers hired. The mining focused mainly on the shafts by the Luttojoki and Hangasoja, reaching the Lutto shaft more than 50 metres and the Carl Gustaf shaft by the Hangasoja more than 30 metres. The company ran out of money again despite the efforts and the mining company had to sell off its equipment and the funds collected from the selling and those collected from shareholders allowed the company close with honor. The trails in Saariselkä area and Lannila lead to this site. It is possible to see the Prospektor mining shaft which is inside of a cabin and in the surrounding area some objects and a pile of stones from the prospecting activity (Golden Geopark of Lapland Application [no date]).

18. The old cabin at Suomunruoktu: this site is in the Urho Kekkonen National Park and has witnessed many different uses. It is believed that originally was built as a sauna for gold prospectors in 1935 being in the following decade renovated for hiking purposes and in the war time was used as a military patrol base. Today is a historical site from the national park (Golden Geopark of Lapland Application [no date]).

19. The memorial to Sauva-Aslak: in Tankavaara the gold was found thanks to a dream that Aslak Peltovuoma (a smith and joiner) had. In his dream there was an old man with white beard showing him a place to find gold. As he used crutches, Aslak sent his nephew to the place he dreamt about but the boy came back without any gold (Launonen and Partanen, 2000). In this way Aslak went himself to the place and for his surprise he found gold and after his discovery the deposit of gold was worked by people from Aslak village and later outsiders also went to explore the place staking their claims here.

20. Kultahamina: is the starting point for the Gold Trail in Lemmenjoki National Park. Here people can reach the site by tourist boat or by hiking (Golden Geopark of Lapland Application [no date]).

21. The site where gold was first found: Lemmenjoki had its first gold experience in 1902 without any further success, being this area forgotten for four decades. Only in 1945 when three brothers, Niilo, Uula and Veikko Rantilla found gold in the tributary of Morgamoja (Lemmenjoki), this area entered in the gold History of Lapland. With the discovery of gold by the three brothers the news spread out bringing in this way more gold prospectors to the area and originated the gold rush in Lemmenjoki. A small metal

plaque is mounted on a stone near the site of the discovery. The site belongs to the Lemmenjoki Gold Trail (Golden Geopark of Lapland Application [no date]).

22. Morgamoja Kultala: the site is famous for receiving four famous gold diggers, Jukka Pellinen, Heikkki Kokko, Kullervo Korhonen and Jaakko Isola. Being the cabin a central spot during the gold rush times it housed a post office, cafeteria and even a general store. From the original buildings, only the traditional Lapland storehouse, sauna and cellar still exist and the existing hut was constructed to resemble the old cabin. This belongs to the Lemmenjoki Gold Trail (Golden Geopark of Lapland Application [no date]).

23. Pihlajamäki: this site is valuable for its old buildings and structures which includes the Pihlajamäki cabin, a traditional storehouse from Lapland, a sauna, a cellar for smoking fish and meat, a swing and a doghouse, besides this buildings and structures, gold prospecting objects are on display on the yard. A machine to prospect gold is still working in this area. People can reach this place by hiking (Golden Geopark of Lapland Application [no date]).

24. Karhu Korhonen's Library: near Jäkäläpää fell stands the former service building of the Jäkäläpää fell wilderness airfield owned by the Union of Lapland Gold Prospectors and the Finnish Transport Safety Agency/Trafi. This building is well known as "Karhu Korhonen Library" or the Jäkäläpää Cultural Centre, having inside books that hikers can borrow and in return, if they want, leave their own books for others to read. Pictures about gold prospecting are in the walls. A trail leads to this site (Golden Geopark of Lapland Application [no date]).

25. Korhonen: this gold historical site has the cabin of the late gold prospector Yrjö "Karhu" Korhonen and it is the operational machine prospecting area of Joukko Korhonen. A trail leads to this site (Golden Geopark of Lapland Application [no date]).

Figure 2.7. Gold Historical Sites of the Golden Geopark of Lapland project (the photos of the golden historical sites number 1, 3, 5, 9, 11, 15, 18, 20 (a) and 22 are from the Golden Geopark of Lapland).

Figure 2.7. Gold Historical Sites of the Golden Geopark of Lapland project (the photos of the golden historical sites number 1, 3, 5, 9, 11, 15, 18, 20 (a) and 22 are from the Golden Geopark of Lapland).

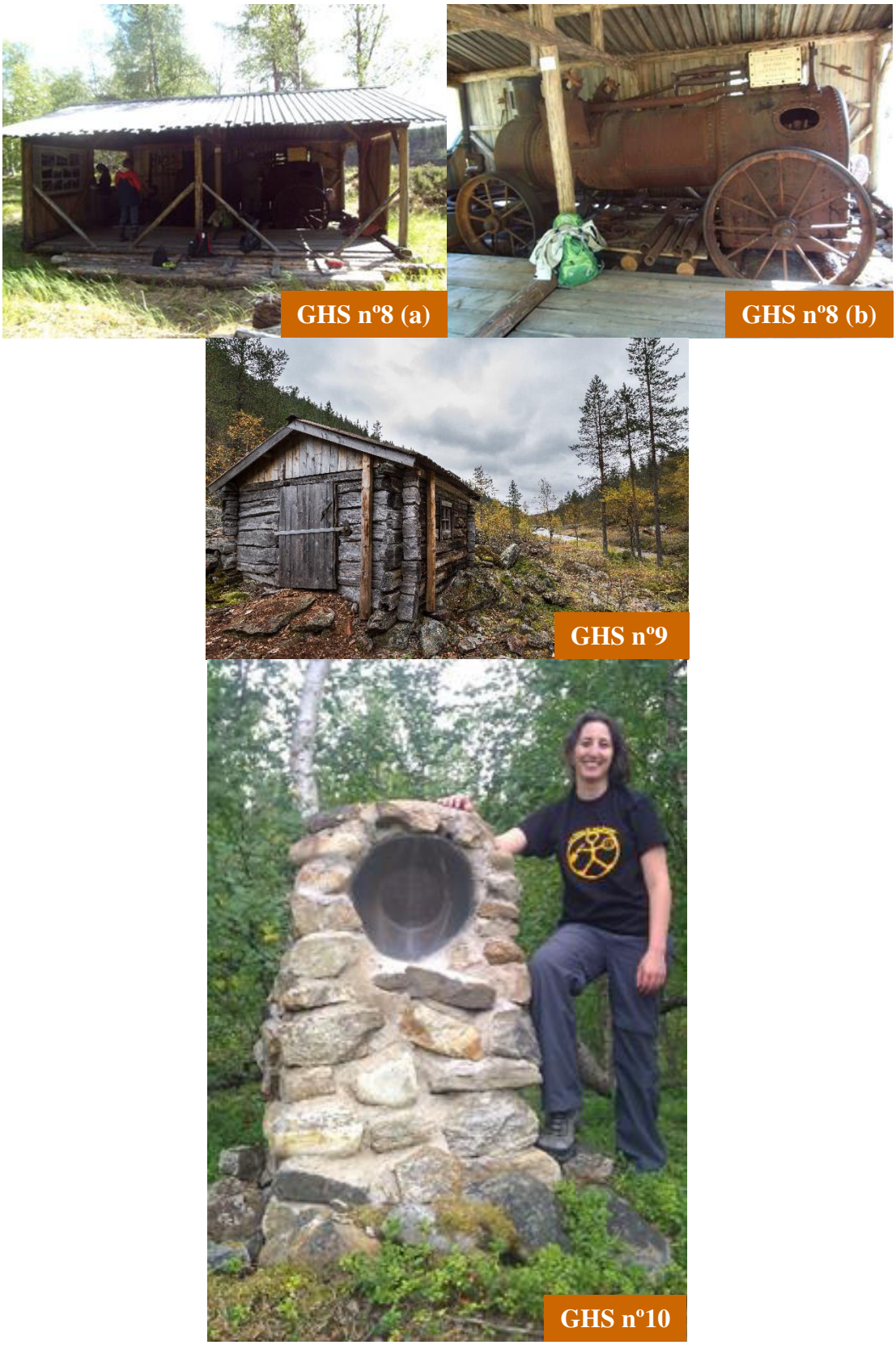


Figure 2.7. Gold Historical Sites of the Golden Geopark of Lapland project (the photos of the golden historical sites number 1, 3, 5, 9, 11, 15, 18, 20 (a) and 22 are from the Golden Geopark of Lapland).

Figure 2.7. Gold Historical Sites of the Golden Geopark of Lapland project (the photos of the golden historical sites number 1, 3, 5, 9, 11, 15, 18, 20 (a) and 22 are from the Golden Geopark of Lapland).

Figure 2.7. Gold Historical Sites of the Golden Geopark of Lapland project (the photos of the golden historical sites number 1, 3, 5, 9, 11, 15, 18, 20 (a) and 22 are from the Golden Geopark of Lapland).

Figure 2.7. Gold Historical Sites of the Golden Geopark of Lapland project (the photos of the golden historical sites number 1, 3, 5, 9, 11, 15, 18, 20 (a) and 22 are from the Golden Geopark of Lapland).

Figure 2.7. Gold Historical Sites of the Golden Geopark of Lapland project (the photos of the golden historical sites number 1, 3, 5, 9, 11, 15, 18, 20 (a) and 22 are from the Golden Geopark of Lapland).

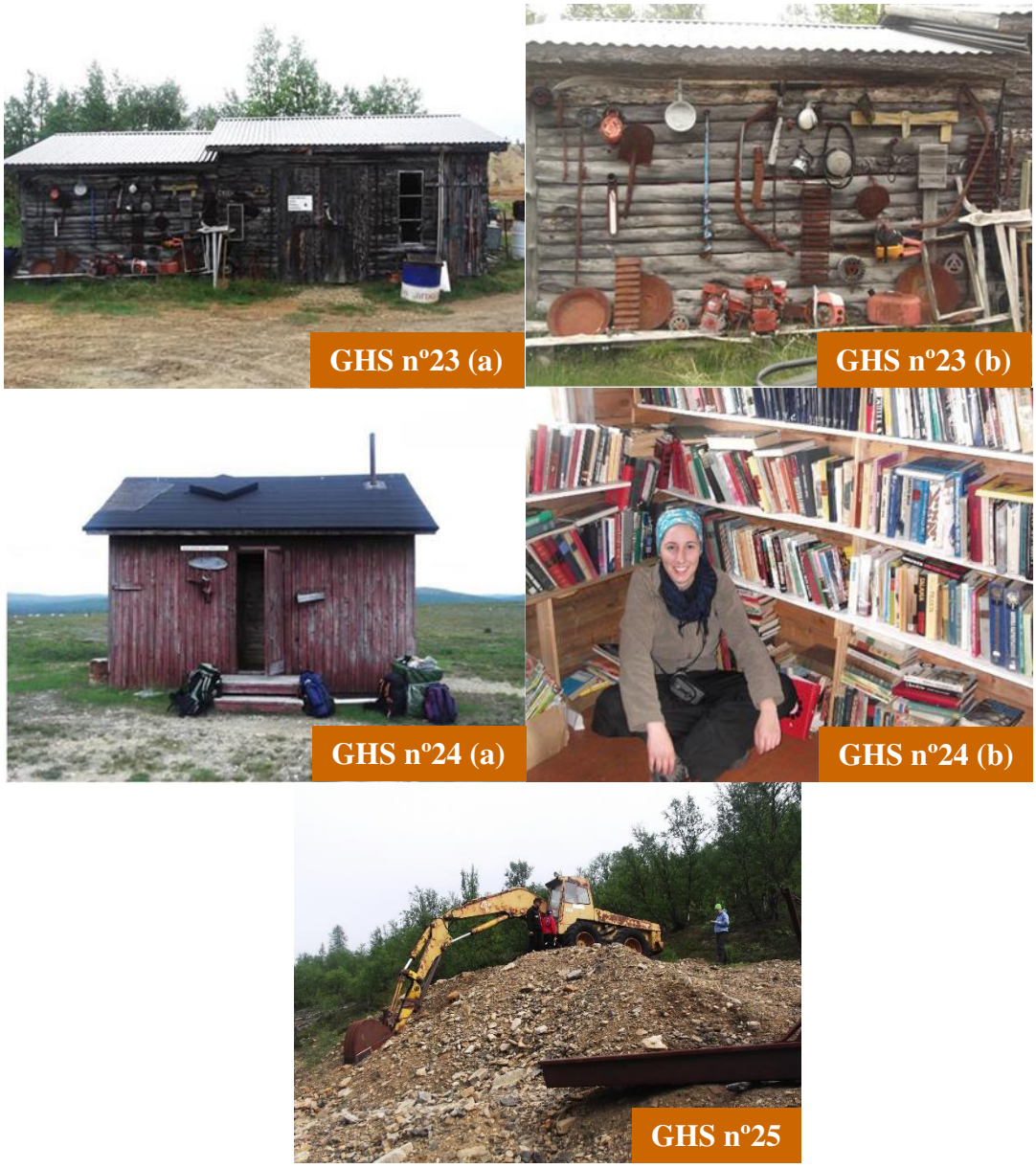


Figure 2.7. Gold Historical Sites of the Golden Geopark of Lapland project (the photos of the golden historical sites number 1, 3, 5, 9, 11, 15, 18, 20 (a) and 22 are from the Golden Geopark of Lapland).

2.4. The land for indigenous people: The Sámi

The Sámi are a group of indigenous people living nowadays in northern and middle of Norway, Sweden, Finland and Kola Peninsula in Russia having their own languages, rich and colorful costumes, handicraft, traditions, sacred places, news and radio with their own language, a Sámi Parliament, etc. It is believed that Sámi arrived to this far north even before the borders of the countries were formed and they lived from what the sea and forests gave to them. Nowadays there are about 72 000 Sámi

people, 40 000 in Norway, 20 000 in Sweden, 10 000 in Finland and 2 000 in Russia (Näkkäläjärvi and Aromäki, 2014). This indigenous people are more and more in tourism sector due to the recent decline in reindeer herding and the increase of interest on tourism entrepreneurship showed by younger Sámi (Pettersson, 2007). In this way Sámi people are in the tourism sector increasing and developing activities such as guiding, handicraft, exhibitions, among others and the area of the geopark is inside of their land. Actually one of the main Sámi towns is also inside of the geopark area, Inari village, and Siida Museum is a partner of the future geopark. This Museum which is a museum which shows to the visitors the culture of these indigenous people and the nature of northern of Lapland (the permanent exhibition) also it shows changing exhibitions on culture, art and nature all year round and in summer time there is an outside exhibition where visitors can find many different types of constructions like "*kota"*, house for horses, traps for some animal, house, etc. Also the geopark has some sites to represent the Sámi culture like for example the Ukonsaari Island, the Pielpajärvi Wilderness Church, the Sallivaara Reindeer Round-Up and the ground of Kaapin Jouni site.

2.4.1. Other Sites description

1. The korkia-Maura Ice Cave: this cave is famous for its permafrost. The layer of ice on the bottom of the 15 metre long, 1-3.5 metre wide and 1.5-4 metre high cave never melted for hundreds of years. This kind of permafrost is called microclimatic permafrost and can be seen in caves, eskers and mines. This is formed when the winter cold is preserved throughout the summer, but in the recent years this cave has begun to thaw during summer due to the heat that visitors bring with them. This place also was known as a fish cellar for fisherman of Inarijärvi in the old times. This cave is in an island on the Lake Inarijärvi and in summer visitors can go to visit the cave with a local boat and in spring (when the ice is still hard) with skis (Golden Geopark of Lapland Application [no date]).

2. Sallivaara Reindeer Round-Up Site: this is a site representing the Sámi culture and the traditions of their ancestors like the reindeer husbandry. It comprises buildings and structures that gives the idea how people lived and still live. The fences and the cabins were restored in late 1980s and the structures are protected as a monuments to Sámi

reindeer husbandry with valuable industrial and cultural history. There is a 6 km hiking trail that leads to this place (Golden Geopark of Lapland Application [no date]).

3. The Pitfalls at the Sotkajärvi Ridge Chain: settlements in river valleys have been chosen since the prehistoric times. Here is possible to see signs of human activities from hundreds of years ago, being found about 700 pitfalls used for hunting wild forest reindeer until 1800s. In the village of Njurkulanti the main source of livelihood today is still reindeer herding and tourism. The trail to this place starts in Njurkulahti village and it is well-marked (Golden Geopark of Lapland Application [no date]).

4. Ruijanpolku trail: this trail has 35 km being the starting point in Laanila and its end in Sompiojärvi Lake. This trail was originally part of an ancient route named Ruijanreitti which before ran from the Botnian Bay, cross Saariselkä fell area and all the way to Finnmark by the Arctic Ocean, and it is believed to be the oldest route in Lapland (Golden Geopark of Lapland Application [no date]).

5. The Grounds of Kaapin Jouni: this site is the homestead of a famous Sámi family, being Jouni Aikio (better known as Kaapin Jouni) the most well-known man of the family. He was the "reindeer lord" of his time and the head of the family. His family was not the first who lived here, being the founder of the homestead Antti Juhaninpoika Morottaja, the homestead was established on late 19th century and remained occupied ever since. The last member of the founding family moved away from the homestead in 2004. The buildings and the homestead are preserved. It is possible to see this place with local enterprises (Golden Geopark of Lapland Application [no date]).

6. Pielpajärvi Wilderness Church: this church was built in 1760 and it is one of the oldest buildings in northern Lapland. This church is the old centre of the old winter village of Inari. This church and the nearby areas form a nationally valuable cultural heritage area. To reach this church there is a well- marked hiking trail with few kilometres (Golden Geopark of Lapland Application [no date]).

7. Ukonsaari Island: this site is the most famous sacred place for worshiping amongst Sámi people in Finland. Families and individual people made sacrifices on this place until the 19th century and it is known that reindeer antlers were still brought here later. Fishermen, according with some legends, used to throw a coin in the Lake Inarijärvi close to this island and wish for fair winds. Also it was found a silver filigree head jewelry belonging to a lady´s circlet, which was not worn in Finland or in the rest of the

Nordic countries, similar jewelry was worn in Russia in 13th century and it is believed the circlet may have come in a barter deal to Inari (http://www.nationalparks.fi/en/ukonsaariisland). Today it is an important site to Sámi people, an archeological site and a touristic destination, been proposed to made into a UNESCO world heritage site for its cultural values. It is possible to visit this island through a boat connection from Inari village to the island (Golden Geopark of Lapland Application [no date]).

8. Geological Trail: the trail has 7 km, is marked and presents information boards explaining the geology during the trail. In this trail hikers learn about the geological evolution of the area including information about gold as well as mires, weathered bedrock and Quaternary deposits formed by the continental ice sheet and its meltwaters (Johansson et al, 2014).

Figure 2.8. Other Sites of the Golden Geopark of Lapland project (the photos of the other sites number 2, 3, 5 and 6 are from the Golden Geopark of Lapland).

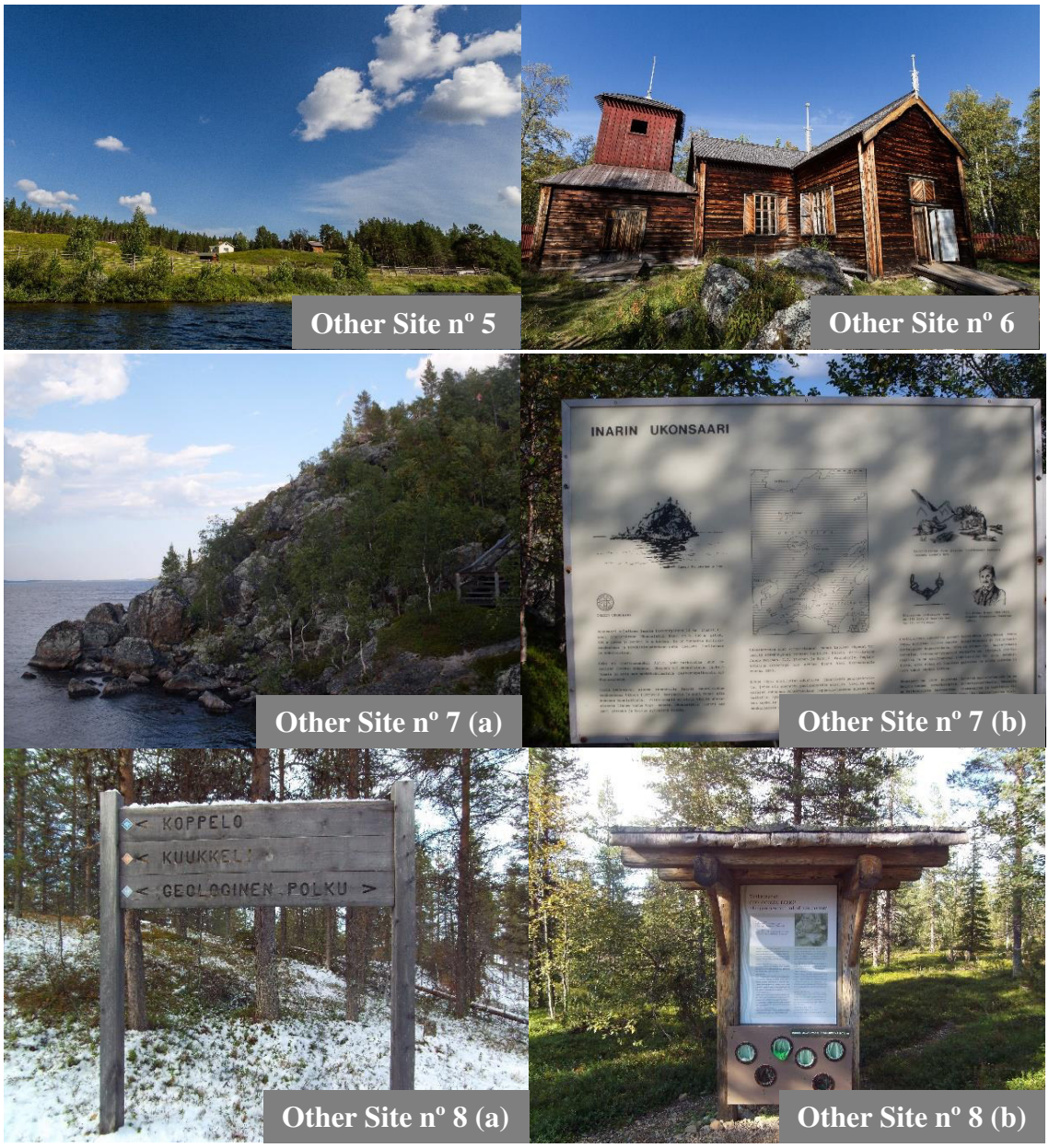


Figure 2.8. Other Sites of the Golden Geopark of Lapland project (the photos of the other sites number 2, 3, 5 and 6 are from the Golden Geopark of Lapland).

Figure 2.8. Other Sites of the Golden Geopark of Lapland project (the photos of the other sites number 2, 3, 5 and 6 are from the Golden Geopark of Lapland).

3. Touristic Value Assessment

3.1. Methodology

3.1.1. Touristic Value Assessment

The scarce number of works related to geosites' touristic value assessment may reflect the little attention that has been given to this subject by geopark managers and researchers. This work intends to be a contribution to that theme, following previous proposals by Pralong (2005), Rybár (2010), Pereira and Pereira (2012) or Gonçalves (2013). Regarding the reality and specificities of the Finnish Lapland environment, the applied methodology was slightly modified from these proposals, mainly from those of Pereira and Pereira (2012) and Gonçalves (2013).

The touristic value assessment was applied to the 24 geosites, 25 gold historical sites and 8 other sites of the Golden Geopark of Lapland project and the same criteria, sub-criteria and scores (Table 3.1.) were used for all sites (57 in total) for a better comparison between them. Four main criteria were used: A. Availability, B. Use, C. Logistics and D. Perceptiveness (with some subjectivity, depending on the sensitivity and understanding by the person who is seeing the site). Each of the main criteria is divided in sub-criteria. The "A. Availability" criterion includes six or seven (depending if the site has boat and/or canoe access or not) sub-criteria: A.1 Seasonal Occupancy (Pralong, 2005); A.2. Terrestrial Accessibility; A.3. Availability according with people´s physical conditions when the activity is hiking or walking (adapted from Rybár, 2010); A.4. Boat and/or canoe access (optional); A.5. Visibility; A.6. Safety (in case of an accident); A.7. Safety in the geosite/gold historical site/other site and its access. The "B. Use" criterion includes four sub-criteria: B.1. Signage; B.2. The current use of the geosite/ gold historical site/other site in terms of geological/historical interest; B.3. The current use of the geosite/ gold historical site/other site for other interests and B.4. Use limitations of the geosite/ gold historical site/other site for other interests. The "C. Logistics" criterion includes five sub-criteria: C.1. Cleanliness, C.2. Toilets; C.3. Restaurants; C.4. Accommodation; and C.5. Local buses. The "D. Perceptiveness" criterion includes two sub-criteria: D.1. Aesthetics and D.2. Interpretative potential. A score ranging from 0 to 10 was used, where 0 is the minimum and 10 the maximum

points for each sub-criteria, making the total of 170 or 180 points (depending if a site has or not the boat/canoe access).

From the criteria proposed by Pereira and Pereira (2012) and Gonçalves (2013) new sub-criteria were added. In the criterion "A. Availability" four new sub-criteria were created: A.1. Seasonal Occupancy, A.3. Availability according with people physical conditions when the activity is hiking or walking, A.4. Boat or canoe access, and A.6. Safety (in case of an accident). The sub-criterion "A.1. Seasonal Occupancy" had to be considered here since the Golden Geopark of Lapland has some sites that can be closed in winter time and sometimes in other seasons as spring and autumn due to the thick snow cover and the potential danger linked with that, like for example avalanches. It is also important to refer that, in some cases, when a site has open-access all year round it is very important to check every time the safety of the site when planning a trip. Sometimes the site can be safe to visit in winter but in some night or week it snowed more than the usual and it can happen to be closed due to the high quantities of snow, danger of an avalanche, trees possible falling due to the huge weight of snow, among others. In this sub-criterion it was not possible to check if the sites which are closed in winter time could be open in winter and if they were safe to be open in this time of the year. Other sub-criterion added in the criterion "A. Availability" was "A.2. Availability according with people´s physical conditions when the activity is hiking or walking". It was important to add this sub-criterion since the area of the geopark is a wilderness area full of good hiking trails and most of the sites are far, requiring a hike to be seen. The addition of the sub-criterion "A.4. Boat and/or canoe access" was also considered necessary because some sites can be visited during summer time only by boat and/or canoe, like the case of Korkia-Maura ice cave and Ukonsaari Island. Other sites can be visited by aquatic and terrestrial access, boat and/or canoe and by car or hiking. Unfortunately it was not possible to add a sub-criterion about the "availability according to people´ physical conditions when the activity is canoeing" like it was made for hiking and walking. Another item added was the criterion "A.6. Safety (in case of an accident)", which is related with the possibility of a visitor to call an ambulance or go to a near hospital when suffering an accident. Even in the summer time it is possible to face some risks like for example getting lost. Wild animals like wolves and bears live in the area of the geopark but they weren´t take into account in this method since the attacks from those animals are extremely rare and they are afraid

of humans. In the criterion “C. Logistics” the sub-criterion “C.5.Local buses” was added, since the distances in Lapland are very long and the public transportation is scarce, worthing the consideration of this item. In the criteria “B. Use” and “D. Perceptiveness” the sub-criteria were the same used in the original proposal (Pereira and Pereira, 2012; Gonçalves, 2013).

Besides adding new sub-criteria, the items of some sub-criteria proposed in Pereira and Pereira (2012) and Gonçalves (2013) were changed to better adapt to the reality of Finnish Lapland. In the “A.2. Terrestrial accessibility” the item “the access to the geosite/gold historical site/other site is possible but the route in winter time is longer than the other used in the rest of the year” was added. It is due to the fact that some roads in winter are closed or transformed into snowmobile routes. Besides, the term “forest vehicle road” is used to describe those roads where cars can go but are made with gravel. In the sub-criterion “A.5. Visibility” the item “The visibility of the geosite/gold historical site/other site is good to all or the most important geological/historical element(s) even with snow and darkness (in the dark it is used artificial light to observe the geosite/gold historical site/other site)” was added. The visibility in winter time was considered since some geosites/gold historical sites/other sites can be quite difficult to see in this time of the year while others are easily seen even in the dark hours and/or covered with snow, with a support of an artificial light. In the sub-criterion B.2. “the current use of the geosite/gold historical site/other site in terms of geological/historical interest” it was decided to join the internet promotion and the information board in same item “geosite/gold historical site/other site with geological/historical promotion only in internet and leaflets, books, maps and/or in the site, e.g.: information board”. Regarding this, Gonçalves (2013) proposed that the information panels should be more valued than the internet and leaflets. Our proposal is related to the fact that mostly of the sites are in the wilderness far away from the main roads and putting there an information board could affect the sensation of wilderness Besides, the maintenance cost of this boards in such far areas is quite high. In the sub-criterion “B.3. The current use of the geosite/gold historical site/other site for other types of interests” the types of hiking trail, sky trail and boat and/or canoe route were considered, as well as their circularity by the possibility of the visitors to leave the car on the same place without doing an extra walk or route to get into the transportation. In the sub-criterion “C.1.Cleanliness” some adaptations were also considered as necessary

to be closer to the reality of Lapland. The infrastructures for making pic-nicks and the possibility to swim were desconsidered being only mentioned the existence of rubbish bins on or near the sites. In the sub-criteria "C.3. Restaurants" and "C.4. Accommodation" the influence of seasonality led to the necessity of adaptions because infrastructures like restaurants and hotels can be closed in specific times of the year. Other minor changes were made from the Pereira and Pereira (2012) and Gonçalves (2013) proposals, as presented in the Table 3.1.

Table 3.1. Criteria, sub-criteria and scores: Touristic Value Assessment (adapted from Prereia and Pereira (2012) and Gonçalves (2013)).

TOURISTIC VALUE ASSESSMENT: GEOSITES, GOLD HISTORICAL SITES AND OTHER SITES	
A. AVAILABILITY - how to access the geosite/gold historical site/other site by car, bus, hiking and/or by boat and/or canoe, how easy or not it is to arrive there depending for example on the terrain, physical conditions of the visitor and security **(60%).**	
A.1. Seasonal occupancy - how many days per year the geosite/gold historical site/other site is used (20%).	Score
From 1 to 90 days (one season) for example summer time.	**2.5**
From 91 to 180 days (two seasons) for example summer and autumn time.	**5**
From 181 to 270 days (three seasons) for example summer, autumn and spring time.	**7.5**
From 271 to 360 (four seasons) summer, autumn, winter and spring time.	**10**
A.2. Terrestrial accessibility - how the visitor reach the geosite/gold historical site/ other site by car, bus and/ or hiking (2.5% or 5%).	Score
Impossible to reach the geosite/gold historical site/other site.	**0**
The access to the geosite/gold historical site/other site is very difficult, only possible with special equipment (boat, canoe, ropes, etc.).	**1**
The access to the geosite/gold historical site/other site is possible but the route in winter time is longer than the other used in the rest of the year.	**2**
The access to the geosite/gold historical site/other site is possible and the geosite/gold historical site/ other site is located more than 4 km from a	**3**

paved road or a forest vehicle road.	
The geosite/gold historical site/other site is located between 2 and 4 km from a paved road or a forest vehicle road.	**4**
The geosite/gold historical site/other site is located between 1 and 2 km from a paved road or a forest vehicle road.	**5**
The geosite/gold historical site/other site is located between 500 metres and 1 km from a paved road or a forest vehicle road.	**6**
The geosite/gold historical site/other site is located between 200 and 500 metres from a paved road or a forest vehicle road.	**7**
The geosite/gold historical site/other site is located between 50 and 200 metres from a paved road or a forest vehicle road.	**8**
The geosite/gold historical site/other site is located less than 50 metres from a paved road or forest vehicle road.	**9**
The geosite/gold historical site/other site is located less than 50 metres from a paved road or forest vehicle road with parking area for a bus.	**10**
A.3. Availability according with people´s physical conditions when the activity is hiking or walking (2.5%).	Score
Very difficult for people reach the geosite/gold historical site/other site, only for people with excellent physical conditions.	**1**
Moderate difficulty, at least good physical conditions.	**5**
Easy even for people with no great physical conditions.	**7.5**
Very easy, even for children.	**10**
A.4. Boat and/or canoe access - how the visitor reach the geosite/gold historical site/other site by boat and/ or canoe in summer time (2.5%).	Score
The access to the geosite/gold historical site/other site is possible and the geosite/gold historical site/other site is located more than 4 km from a boat and/or canoe.	**1**
The geosite/gold historical site/other site is located between 2 and 4 km from a boat and/or canoe.	**3**
The geosite/gold historical site/other site is located between 1 and 2 km from a boat and/or canoe.	**5**
The geosite/gold historical site/other site is located between 500 metres and 1 km from a boat and/or canoe.	**7**

The geosite/gold historical site/other site is located between 200 and 500 metres from a boat and/or canoe.	**8**
The geosite/gold historical site/other site is located between 50 and 200 metres from a boat and/or canoe.	**9**
The geosite/gold historical site/other site is located less than 50 metres from a boat and/ or canoe.	**10**
A.5. Visibility - if the visitor can see easily or not the geological/historical element(s) on the geosite/gold historical site/ other site due to some factors like for example: the distance from the geosite/gold historical site/other site; vegetation and/ or buildings covering the geosite/gold historical site/other site; among others. The first 6 items for the visibility refer to the time when there is no snow, the last item, 7th is related with the visibility of a geosite/gold historical site/other site when there is snow (2.5%).	Score
The geosite/gold historical site/other site is not visible.	**0**
It is very difficult to see the geosite/gold historical site/other site (only visible with special equipment, ropes, climbing material, etc.).	**1**
The visibility of the geosite/gold historical site/other site is low, limited by, for example, vegetation, buildings, etc.	**2**
The visibility of the gesoite/gold historical site/other site is medium, forcing to go closer to see better the geological/historical element(s).	**5**
The visibility of the geosite/gold historical site/other site is good to all geological/historical element(s).	**7**
The visibility of the geosite/gold historical site/other site is excellent to all geological/historical element(s).	**9**
The visibility of the geosite/gold historical site/other site is good to all or the most important geological/historical element(s) even with snow and darkness (in the dark it is used artificial light to observe the geosite/gold historical site/other site).	**10**
A.6. Safety - in case of an accident, if there is a near hospital, mobile phone coverage to call an ambulance, etc. (15%).	Score
Geosite/gold historical site/other site impossible to be visited due to the high danger on it.	**0**
Geosite/gold historical site/other site with no safety facilities (fences, stairs,	**1**

handrails, etc.), no mobile phone coverage and located more than 50 km from the nearest hospital.	
Geosite/gold historical site/other site with no safety facilities (fences, stairs, handrails, etc.) and more than 50 km from the nearest hospital but with mobile phone coverage.	**2**
Geosite/gold historical site/other site with safety facilities (fences, stairs, handrails, etc.), but no mobile phone coverage and located more than 50 km from the nearest hospital.	**3**
Geosite/gold historical site/other site with safety facilities (fences, stairs, handrails, etc.), mobile phone coverage but located more than 50 km from the nearest hospital.	**5**
Geosite/gold historical site/other site with no safety facilities (fences, stairs, handrails, etc.) but with mobile phone coverage and located less than 50 km from the nearest hospital.	**7**
Geosite/gold historical site/other site with safety facilities (fences, stairs, handrails, etc.), with mobile phone coverage and located less than 50 km from the nearest hospital.	**8**
Geosite/gold historical site/other site with safety facilities (fences, stairs, handrails, etc.), mobile phone coverage and located less than 20 km from the nearest hospital.	**9**
Geosite/gold historical site/other site with safety facilities (fences, stairs, handrails, etc.), mobile phone coverage and located less than 5 km from the nearest hospital.	**10**
A.7. Safety in the geosite/gold historical site/ other site and its access - related with the potential danger in the geosite/gold historical site/other site like for example no signs to indicate the route, floods, slippery floor, mass movements, avalanches, etc. (15%).	Score
Geosite/gold historical site/other site and its access without any safety.	**0**
Geosite/gold historical site/other site with high danger (no signs to indicate the route so visitors need to have good orientation skills, floods, mass movements, avalanches, slippery floor, very steep floor, etc.).	**1**
High danger in the access to the geosite/gold historical site/other site (no signs to indicate the route so visitors need to have good orientation skills,	**2**

floods, mass movements, avalanches, slippery floor, very steep floor, etc.).	
Geosite/gold historical site/other site with moderate danger (no signs to indicate the route so visitors need to have good orientation skills, floods, mass movements, avalanches, slippery floor, very steep floor, etc.).	**5**
Moderate danger in the access to the geosite/gold historical site/other site (no signs to indicate the route so visitors need to have good orientation skills, floods, mass movements, avalanches, slippery floor, very steep floor, etc.).	**6**
Safe geosite/gold historical site/other site (only with a little precaution) and safe access.	**8**
Safe access (only with a little precaution) and safe geosite/gold historical site/other site.	**9**
Geosite/gold historical site/other site and access without any danger for the visitor.	**10**
B. USE (10%)	
B.1. Signage - if there is good or bad signage system: signs near to the main road that gives access to the geosite/gold historical site/other site and in the geosite/gold historical site/other site itself that shows to visitors that place is a geosite/gold historical site or a touristic place (2%).	Score
No signs in the access road to the geosite/gold historical site/other site neither in the geosite/gold historical site/other site.	**0**
Signs only in the access roads.	**2.5**
Signs only near to the geosite/gold historical site/other site or in the place.	**5**
Signs on the main road access and in the geosite/gold historical site/other site showing it is a touristic place, historical site or geological site.	**7.5**
Signs in the main road access and in the geosite/gold historical site/other site showing it is a "geosite"/"historical site"/ "other site" from the geopark.	**10**
B.2. The current use of the geosite/gold historical site/other site in terms of geological/historical interest - promotion of the geosite/gold historical site/other site in internet, leaflets, information boards and interpretative centres (2%).	Score
Geosite/gold historical site/other site without any geological/historical promotion.	**0**

Geosite/gold historical site/other site with geological/historical promotion only in internet.	**2.5**
Geosite/gold historical site/other site with geological/historical promotion only in internet and leaflets, books, maps and/ or in the geosite/gold historical site/other site (e.g. information board).	**7.5**
Geosite/gold historical site/other site with an interpretative centre explaining the geosite/gold historical site/other site (not necessary to have the interpretative centre in the geosite/gold historical site/other site, it can be in other place).	**10**
B.3. The current use of the geosite/gold historical site/other site for other types of interests - the existence of other natural and cultural values as well as their promotion and use (2%).	Score
Geosite/gold historical site/other site without other type of interest, promotion and/or use.	**0**
Geosite/gold historical site/other site with other types of interest, without promotion and/or use.	**1**
Geosite/gold historical site/other site integrated in a non-circular walking trail and ski trail or non-circular trail (walking or ski trail) and non-circular boat/canoe route.	**3**
Geosite/gold historical site/other site integrated in a circular walking trail or sky trail or site integrated in a circular boat/canoe route.	**5**
Geosite/gold historical site/other site with a circular walking trail and ski trail or circular trail (walking or ski trail) and circular boat/canoe route.	**7**
Geosite/gold historical site/other site with other type of interest(s), with promotion but not use.	**9**
Geosite/gold historical site/other site with other type of interest(s), with promotion and use.	**10**
B.4. Use limitations of the geosite/gold historical site/other site - related with the land status, the existence of fences, opening hours, payment to enter, etc. (4%).	Score
Without any possibility to visit the geosite/gold historical site/other site.	**0**
Geosite/gold historical site/other site with restrictions (e.g. private property, opening hours, etc.).	**2.5**

Geosite/gold historical site/other site with physical restrictions (fences, obstacles, etc.).	**7.5**
Geosite/gold historical site/other site without any restriction to visit.	**10**
C. LOGISTICS (25%)	
C.1. Cleanliness - if in the geosite/gold historical site/other site there is rubbish bin and if is dirty or not (5%).	Score
Geosite/gold historical site/other site without any cleanliness, full of rubbish spread all over the place.	**0**
Geosite/gold historical site/other site not so clean but with rubbish bins.	**2.5**
Clean geosite/gold historical site/other site but without rubbish bins.	**5**
Clean geosite/gold historical site/other site without a rubbish bin but located less than 5km from the geosite/gold historical site/other site.	**7.5**
Clean geosite/gold historical site/other site with rubbish bins.	**10**
C.2. Toilets (5%).	Score
Toilets more than 5 km from the geosite/gold historical site/other site.	**1**
Toilets less than 5 km from the geosite/gold historical site/other site.	**2.5**
Toilets less than 1 km from the geosite/gold historical site/other site.	**5**
Toilets less than 200 metres from the geosite/gold historical site/other site.	**7.5**
Toilets on the geosite/gold historical site/other site.	**10**
C.3. Restaurants (5%)**.**	Score
There is no restaurants less than 20 km from the geosite/gold historical site/other site.	**0**
There is restaurant(s) between 5km and 20 km from the geosite/gold historical site/other site and it opens seasonally (e.g. summer and autumn time)	**1**
There is restaurant(s) between 5km and 20 km from the geosite/gold historical site/other site.	**2**
There is restaurant(s) between 1km and 5km from the geosite/gold historical site/other site and it opens seasonally (e.g. summer and autumn time)	**3**
There is restaurant(s) between 1km and 5km from the geosite/gold historical site/other site.	**4**
There is only café in the geosite/gold historical site/other site or less than	**5**

1km from the geosite/gold historical site/other site and it opens seasonally (e.g. summer and autumn time).	
There is only café in the geosite/gold historical site/other site or less than 1km from the geosite/gold historical site/other site.	**6**
There is restaurant(s) less than 1km from the geosite/gold historical site/other site and opens seasonally (e.g. summer and autumn time).	**7**
There is restaurant(s) less than 1km from the geosite/gold historical site/other site.	**8**
There is restaurant(s) in the geosite/gold historical site/other site (less than 300 metres) and it opens seasonally (e.g. summer and autumn time).	**9**
There is restaurant(s) in the geosite/gold historical site/other site (less than 300 metres).	**10**
C.4. Accommodation (5%).	Score
There is no accommodation less than 20 km from the geosite/gold historical site/other site.	**0**
There is a hut (for rent or for free with room for few people) for hikers in the hiking trail and/or in the geosite/gold historical site/other site.	**1**
The nearest accommodation is about 5 km from the geosite/gold historical site/other site and it is seasonal (e.g. summer and autumn time) and with few rooms (less than 10 rooms).	**2**
The nearest accommodation is about 5 km from the geosite/gold historical site/other site and it is seasonal (e.g. summer and autumn time) and with many rooms (more than 10 rooms).	**3**
There are many types of accommodation less than 20 km and they open seasonally (e.g. summer and autumn time).	**4**
There are many types of accommodation less than 20 km.	**5**
There are many types of accommodation less than 5 km and they open seasonally (e.g. summer and autumn time).	**6**
There are many types of accommodation less than 5 km.	**7**
There are many types of accommodation less than 1 km and they open seasonally (e.g. summer and autumn time).	**8**
There are many types of accommodation less than 1 km.	**10**
C.5. Local buses - if a visitor wants to use a public transportation to reach	Score

a geosite/gold historical site/other site (5%).	
The geosite/gold historical site/other site is more than 20 km from a bus stop for a local bus.	**0**
The geosite/gold historical site/other site is between 10 km and 20 km from a bus stop for a local bus.	**2**
The geosite/gold historical site/other site is between 5 km and 10 km from a bus stop for a local bus.	**4**
The geosite/gold historical site/other site is between 1km and 5 km from a bus stop for a local bus.	**6**
The geosite/gold historical site/other site is less than 1km from a bus stop for local bus.	**8**
There is a bus stop in the geosite/gold historical site/other site (less than 300 metres).	**10**
D. PERCEPTIVENESS (5%)	
D.1. Aesthetics – landscape attractiveness, the impact that the landscape has when a visitor is seeing it (2.5%).	Score
Unpleasant geosite/gold historical site/other site and/or surrounded by unpleasant elements such as rubbish.	**0**
Geosite/gold historical site/other site without any kind of beauty.	**1**
Pleasant geosite/gold historical site/other site, without any outstanding beauty.	**4**
Pleasant geosite/gold historical site/ other site, with some moderately attractive elements (small dimension).	**5**
Pleasant geosite/gold historical site/other site, with attractive elements, with visual impact.	**7**
Very attractive geosite/gold historical site/other site, with a strong visual impact.	**8**
Geosite/gold historical site/other site extremely attractive, with a strong visual impact.	**9**
All the elements of the geosite/gold historical site/other site are extremely attractive, with a huge visual impact.	**10**
D.2. Interpretative potential - if a visitor, when seeing the geosite/gold historical site/other site and its element(s), can understand easily what it is	Score

in there (2.5%).	
Only geologists, historians, archeologists and other experts understand what it is in the geosite/gold historical site/other site.	**0**
The visitor needs to have an huge background in geology area/gold digging/ Sámi history to understand what is in the geosite/gold historical site/other site.	**2.5**
The visitor needs to have some geological/historical background to understand the geological/historical element(s) of the geosite/gold historical site/other site.	**5**
The geosite/gold historical site/other site presents geological/historical elements in a very clear and understandable way for all types of public.	**10**

The quantification of each geosite, gold historical site and other site was based on two numerical methodologies: points and percentage. The use of two numerical methodologies is important mainly to compare the similarity (or not) of the results. The points methodology considers a weight of 60 % to the criterion "A. Availability", where: 20% goes to "A.1 Seasonal Occupancy"; 2.5 % or 5% to "A.2. Terrestrial accessibility" (if the site has accesses by boat/canoe and terrestrial, the terrestrial accessibility will have 2,5% and the boat and/or canoe access 2.5%, if it has only one type of access – terrestrial - it will have 5%); 2.5% to "A.3. Availability according with people physical conditions when the activity is hiking or walking", "A.4. Boat and/or canoe access" and "A.5. Visibility"; 15% to "A.6. Safety (in case of an accident)" and "A.7. Safety in the geosite/gold historical site/other site and its access".

A weight of 10 % is given to the "B. Use" criterion, considering the sub-criteria "B.1. Signage", "B.2. The current use of the geosite/gold historical site/other site in terms of geological/historical interest" and "B.3. The current use of the geosite/gold historical site/other site for other types of interests" with 2% each one and the sub-criterion "B.4. Use limitations of the geosite/gold historical site/other site" with 4%.

The "C. Logistics" criterion has a total of 25%, where each sub-criterion has 5%. The "D. Perceptiveness" criterion has a total of 5%, with its sub-criterion having 2,5% each.

The final score of the site is the result of the sum of the points given to each item multiplied by the weight of each sub-criterion.

The other type of numerical quantification (the percentage method) is based on the score of the site, divided for 170 points or 180 points (depending if the site has or not boat and/or canoe access) and multiplied by 100.

After these calculations, it is necessary to have guidelines to express the results, meaning if a geosite, gold historical site and other site is good, medium or bad regarding of touristic potential.

For this, different categories are considered (Table 3.2.) where:

0%-49% or 0-4.8 points (in red color) means “Insufficient” in terms of touristic potential, reflecting that the site is not good enough and it is not so well prepared to receive tourists (e.g.: restaurants, toilets, parking area is very far, no interpretative material about the site);

49.5%-69% or 4.9-5.9 points (in orange color) means “Sufficient”, the site already has something which meets the needs of the tourists but still is not enough;

69.5%-79 % or 6-7.9 points (in yellow color) means “Good”, the site is well prepared to receive tourists;

79.5%-89% or 8-8.9 points (in dark green color) means “Very Good”, the site is very well prepared to receive tourists (e.g.: restaurants, toilets, parking area near);

89.5%-100% or 9-10 points (in light green color) means “Excellent”, the site is already very well prepared with tourism and has everything what is needed to receive tourists.

Table 3.2. Considering the final results, the touristic value can be divided in five categories: “Insufficient”, “Sufficient”, “Good”, “Very Good” and “Excellent”.

	Percentage scale	**Points scale**
	0%-49% Insufficient	0-4.8
	49.5%-69% Sufficient	4.9-5.9
	69.5%-79% Good	6-7.9
	79.5%-89% Very Good	8-8.9
	89.5%-100% Excellent	9-10

3.1.2. Degradation Risk

Also the degradation risk was taken into consideration in this work to help to have a clearer idea of the sites with higher and lower risk of degradation. The degradation risk here will be related with the probability of the geological and historical features being damaged or destroyed due to human activity and due to natural processes. This procedure is important for a clearer and better management, where the degradation risk shows sites with low degradation risk and high touristic potential should be promoted being in this way in tourism plans like for example new routes, interpretative information, among others; on the other hand, sites with high degradation risk, even if they have high touristic potential, should be promoted only after being created conditions for protection and conservation (Brilha, 2005).

In the degradation risk the geosites, gold historical sites and other sites will have the same criteria, sub-criteria and scores. The proposal chosen here was from Brilha (2016) with some adaptations to better represent the reality of the area of the Golden Geopark of Lapland. It was used five main criteria: “A. Legal Protection”; “B. Proximity to areas/activities with potential to cause degradation”; “C. Deterioration of the geological/historical elements”; “D. Proximity with villages, cities and touristic places”; “E. Accessibility” with the sub-criteria: “E.1. Terrestrial accessibility” and “E.2; Accessibility by boat and/or canoe”. In terms of scores it was used a score from 0 to 10, where 0 is the minimum and 10 the maximum points, for each criteria and sub-criteria making the total of 150 or 160 points (depending if a site has or not the boat and/or canoe access). On the criterion “B. Proximity to areas/activities with potential to cause degradation” had to be added the item “small scale degrading area/activity (example: gold digging)” because gold digging can´t be compared with other big industrial mining activities. In gold digging the use of machines is extremely rare and there is an huge environmental control on this activity being a very green type of gold digging (only water from the rivers is used not being aloud any kind of chemicals, when finishing the activity it is a rule to leave the landscape clean and in its original state –try to put it equal of what it was before the digging activity-, among other many rules which help to protect the environment, not forgetting to mention that the gold digging is only possible during summer time). The big industrial mining activities are outside of the geopark area and the urban areas are quite small populated being mostly small villages and quite far from each other, there are no railways and there is only a main

road (highway E75) which runs close to the east edge of the area of the geopark and other small roads link to the main road, making in this way the area of the geopark in wilderness. On the criterion "C. Deterioration of geological/gold historical elements" it was added the "small possibility" and "the possibility of deterioration" since some sites are more suitable to deteriorate than others. On the criterion "D. Proximity with villages, cities and touristic places" the number of people living in a place had to be adapted from the original since the population living in Lapland is few with some sparse villages and cities. The last criterion "E. Accessibility" was divided in two sub-criteria as some sites are easier to reach by water than terrestrial access or the only way to visit them is via a boat and/or canoe or by land. Other minor changes were made from Brilha (2016) proposal, as presented in the table 3.3.

Table 3.3. Criteria, sub-criteria and scores: Degradation Risk (adapted from Brilha, 2016).

DEGRADATION RISK: GEOSITES, GOLD HISTORICAL SITES AND OTHER SITES	
A.LEGAL PROTECTION – if a geosite/gold historical site/other site is in an area with legal protection or not; if there is control of access like for example opening hours, fences, private property, among others (20%).	Score
Geosite/gold historical site/other site located in an area with no legal protection and no control of access.	**10**
Geosite/gold historical site/other site located in an area with no legal protection but with control of access.	**7.5**
Geosite/gold historical site/other site located in an area with legal protection but no control of access.	**5**
Geosite/gold historical site/other site located in an area with legal protection and control of access.	**1**
B.PROXIMITY TO AREAS/ACTIVITIES WITH POTENTIAL TO CAUSE DEGRADATION - urban areas near, roads and railways, industrial mining activities, etc. (20%).	Score
Geosite/gold historical site/other site located less than 50 metres from a potential degrading area/ activity.	**10**
Geosite/gold historical site/other site located less than 200 metres from a potential	**9**

degrading area/ activity.	
Geosite/gold historical site/other site located less than 500 metres from a potential degrading area/ activity.	**7**
Geosite/gold historical site/other site located less than 1 km from a potential degrading area/ activity.	**5**
Geosite/gold historical site/other site located more than 2 km from a potential degrading area/ activity.	**3**
Geosite/gold historical site/other site located between 50 metres and 1 km from a small scale degrading area/ activity (for example: gold digging).	**2**
Geosite/gold historical site/other site located between 1 km and 5 km from a small scale degrading area/ activity (for example: gold digging).	**1**
Geosite/gold historical site/other site located more than 5 km from a potential degrading area/ activity and/ or small scale degrading area/ activity (for example: gold digging).	**0**
C.DETERIORATION OF GEOLOGICAL/HISTORICAL ELEMENTS – possibility of loss of the geological/ historical element(s) due to human activity and natural actions (35%).	Score
Deteriorated geological elements/ in ruins the historical elements.	**10**
Geosite already deteriorated/ gold historical site or other site in ruins but with some small actions of protection and conservation.	**9**
Possibility of deterioration of the main geological/historical elements.	**8**
Small possibility of deterioration of the main geological/historical elements.	**7**
Possibility of deterioration of secondary geological/historical elements.	**5**
Small possibility of deterioration of secondary geological/historical elements.	**3**
Any danger of deterioration.	**0**
D.PROXIMITY WITH VILLAGES, CITIES AND TOURISTIC PLACES - if a geosite/gold historical site/other site is near places where people live, higher can be the chances of inappropriate use of the site by people like for example vandalism (10%).	Score
The geosite/gold historical site/other site is less than 5 km from a bigger city (e.g.: >15 000 inhabitants).	**10**
The geosite/gold historical site/other site is less than 5 km from a big village (e.g.:<15 000 and > 5000).	**7.5**

The geosite/gold historical site/other site is less than 5 km from a small village (couple hundred inhabitants) or touristic place.	**5**
The geosite/gold historical site/other site is more than 5 km from a city, village or touristic place.	**2.5**
The geosite/gold historical site/other site is in the wilderness.	**0**
E.ACCESSIBILITY – a geosite/gold historical site/other site with an easier access is more likely to be damaged by people than the ones which are far and with difficult access (15%).	
E.1. Terrestrial accessibility (7.5%)	Score
Geosite/gold historical site/other site located less than 100 metres from a paved road with a bus parking area.	**10**
Geosite/gold historical site/other site located less than 100 metres from a paved road.	**7**
Geosite/gold historical site/other site located less than 100 metres from a forest vehicle road or geosite/gold historical site/other site located between 100-500 metres from a paved road.	**5**
Geosite/gold historical site/other site located more than 100 metres from a forest vehicle road or geosite/gold historical site/other site located more than 500 metres from a paved road.	**1**
E.2. Accessibility by boat and/or canoe (7.5%)	Score
Geosite/gold historical site/other site located less than 100 metres from a boat and/or canoe place.	**10**
Geosite/gold historical site/other site located between 100-500 metres from a boat and/or canoe place.	**7**
Geosite/gold historical site/other site located between 500 metres and 1 km from a boat and/or canoe place.	**5**
Geosite/gold historical site/other site located more than 1 km from a boat and/or canoe place.	**1**

The quantification of each geosite, gold historical site and other site was based on two numerical methodologies: points and percentage, like it happened in the touristic value assessment of the sites. The use of two numerical methodologies is important to compare the similarity (or not) of the results. The points methodology considers a

weight of 20% to the criterion “A. Legal Protection”; a weight of 20% to the criterion “B. Proximity to areas/activities with potential to cause degradation”; a weight of 35% to the criterion “C. Deterioration of the geological/historical elements”; a weight of 10% to the criterion “D. Proximity with villages, cities and touristic places”; and finally, a weight of 15% to the criterion “E. Accessibility”. The last criterion was divided in two sub-criteria “E.1. Terrestrial accessibility” and “E.2. Accessibility by boat and/or canoe”, where each one have a weight of 7.5%. If there is no boat and/or canoe access the sub-criterion E.1. will have a weight of 15%.

The final score of the site is the result of the sum of the points given to each item multiplied by the weight of each sub-criterion. The other type of numerical quantification (the percentage) uses the sum of each score, divide for 150 points or 160 points (depending if the site has or not boat and/or canoe access) and multiply by 100.

After these calculations, it is necessary to have guidelines to express the results, meaning if a geosite, gold historical site and other site is low, medium or high regarding of degradation risk.

For this, different categories are considered (Table 3.4.) where:

100%-49.5% or 10-4.9 points (in red color) indicates the site is in “High Danger” meaning is the worst scenario for a site and rules of protection and conservation are a must before promoting the site to the public;

49%- 36.5% or 4.8-3.9 points (in orange color) the site is in “Danger” meaning rules of protection and conservation are still necessary and the site here should be the next ones to take care of after the sites in “High Danger”;

36%-24.5% or 3.8-2.9 points (in yellow color) the site has “Moderate Danger” meaning the site has not so high but also not so low degradation risk;

24%-12.5% or 2.8-1.9 points (in dark green) the site has “Very Small Danger” meaning there is no emergency actions because it is in a good condition and can be promoted;

12%-0% or 1.8-0 points (in light green) the site has “Any Danger” meaning the site is not deteriorated, and is safe to promote to the public.

Table 3.4. Considering the final value, the degradation risk can be divided in five categories: "High Danger", "Danger", "Moderate Danger", "Very Small Danger" and "Any Danger".

	Percentage scale	Points scale
	49.5%-100% High Danger	4.9-10
	36.5%-49% Danger	3.9-4.8
	24.5%-36% Moderate Danger	2.9-3.8
	12.5%-24% Very Small Danger	1.9-2.8
	0%-12% Any Danger	0-1.8

3.2. Results

The assessment of the touristic value and the degradation risk of all geosites, gold historical sites and other sites (57 in total) are expressed in the tables 3.5 to 3.10. To perform this assessment various field trips were made in the field, with some made in the month of October of 2015 but mostly of them in May, June and July of 2016. Some sites were checked in winter time (December) to confirm if they were open or not because of the winter season. The field work form and record performed to each site is presented in the Annexe I. The distances between the sites and other places were made with the help of the website http://www.retkikartta.fi. For the assessment of the degradation risk the website http://gtkdata.gtk.fi/kaivosrekisteri/ was used to see where the gold panning places were and to measure the distances between the gold panning sites and the sites.

Table 3.5. Touristic value assessment of the geosites of the Golden Geopark of Lapland (the colors – red, orange, yellow, dark green and light green- represent the categories where the geosites are - "Insufficient", "Sufficient", "Good", "Very Good" and "Excellent").

GEOSITES: TOURISTIC VALUE ASSESSMENT

		Score	1. The Lihr rock and its bedrock outcrops	2. Potholes at Ivalojoen Kultala	3. The Ivalojoki esker at Toloskoski rapids	4. The Saarnaköngäs rapids	5. The Ainikkaharju esker	6. The Puoliväli spring	7. The Kulmakuru gorge	8. The Kiilopää ice lake and its spillways	9. The Rumakuru gorge	10. The quartz vein at Hangasoja	11. The Nälkäaapa mire	12. The Kopsusjärvi delta	13. Lateral drainage channels at Teräväkivenpää	14. Melt water erosional forms on Tankavaara fell	15. Tor formations at Pyhä-Nattanen	16. Block field covering the Nattaset fells	17. Karhunpesäkivi	18. Hummocky moraine area at Kirakkaköngäs	19. The Rahajärvi collapsed cliff	20. The Sotkajärvi esker and kames	21. The Ravadasköngäs waterfall	22. A cascade at the mouth of Morgam-Viibus stream	23. Talus deposit on the shore of Morgamjärvi lake	24. Lateral drainage channels on the top of the Jäkälipää fell
A.AVAILABILITY	A.1.	2.5																								
		5	X	X	X	X	X	X				X	X	X	X		X	X	X	X	X					X
		7.5																								
		10							X	X	X					X							X	X	X	
	A.2.	0																								
		1			X	X																		X		
		2							X																	
		3	X	X							X			X	X									X		X	X
		4					X	X								X											
		5								X							X	X				X					
		6										X	X														
		7																									
		8																	X	X							
		9																			X						
		10																									
	A.3.	1																								
		5	X	X		X	X	X						X	X		X	X					X	X	X	X
		7.5			X						X		X									X					
		10							X	X		X				X			X	X	X						
	A.4.	1					X	X															X				X
		3																									
		5																						X			
		7																							X		

		8																										
		9																								X		
		10	X	X	X	X																						
B.USE	A.5.	0																										
		1																										
		2																										
		5			X																					X		
		7	X			X	X																					
		9		X				X		X		X	X	X	X		X	X	X	X	X	X	X		X	X	
		10							X		X					X												
	A.6	0																										
		1	X			X	X	X					X	X	X							X		X	X	X	
		2															X	X										
		3		X																				X				
		5														X												
		7			X				X	X	X	X								X	X							
		8																										
		9																	X									
		10																										
	A.7.	0																										
		1																										
		2																										
		5																			X							
		6			X		X						X															
		8	X															X						X	X		
		9		X		X					X			X	X	X	X							X			X	
		10						X	X	X		X								X	X		X					
	B.1.	0		X	X	X	X	X	X	X			X		X						X	X			X			
		2.5																								X	X	
		5	X											X														
		7.5									X	X				X	X	X	X			X	X					
		10																										
	B.2.	0																										
		2.5																										
		7.5	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		10																										
	B.3.	0																										
		1					X						X								X	X						
		3	X	X	X	X		X									X	X										
		5										X		X	X								X		X	X		
		7							X	X	X					X												
		9																										
		10																	X					X			X	

	B.4.	0																										
		2.5			X																							
		7.5				X																					X		
		10	X	X			X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X
C.LOGISTICS	C.1.	0																										
		2.5																										
		5			X				X				X	X	X		X	X										
		7.5	X	X		X	X	X		X		X				X			X	X	X	X	X		X	X		
		10									X																X		
	C.2.	1			X								X															
		2.5				X	X	X	X	X		X			X								X	X				X	
		5												X							X				X		X		
		7.5	X	X															X	X									
		10									X					X	X									X			
	C.3.	0	X	X		X	X	X																			X	X	
		1																							X	X			
		2			X				X				X	X	X		X	X											
		3																				X	X						
		4								X	X	X				X													
		5																			X	X							
		6																											
		7																											
		8																											
		9																											
		10																											
	C.4.	0																											
		1	X	X		X	X	X																			X	X	
		2																											
		3																											
		4																									X		
		5			X				X				X	X	X		X	X	X	X	X	X	X						
		6																											
		7								X	X	X				X													
		8																											
		10																											
	C.5.	0	X	X		X	X	X																X	X	X	X	X	
		2			X								X	X	X		X	X											
		4							X																				
		6								X	X					X					X								
		8										X																	
		10																		X	X								
		0																											
		1										X	X	X															

D.PERCEPTIVENESS																											
D.1.	4	X	X		X		X		X					X				X	X	X				X	X
	5			X		X																				
	7							X							X							X		X		
	8									X							X						X			
	9																										
	10															X											
D.2.	0																										
	2.5																										
	5	X																									
	10		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Total(%)		49.72 %	52.5 %	46.94 %	45%	40.83 %	44.72 %	64.11 %	68.52 %	78.52 %	68.82 %	46.47 %	52.64 %	50%	77.35 %	62.94 %	59.70 %	79.41 %	67.05 %	59.70 %	63.23 %	66.38 %	53.88 %	53.05 %	48.88 %
Total Points		4.71	5.23	4.97	4.48	3.97	4.63	7.19	7.66	8.12	6.85	4.35	4.97	4.82	7.79	5.71	5.38	7.72	6.97	5.84	6.43	6.72	5.97	5.67	4.65

Table 3.6. Touristic value assessment of the gold historical sites of the Golden Geopark of Lapland (the colors – red, oreange, yellow, dark green and light green- represents the categories where the gold historical sites are- "Insufficient", "Sufficient", "Good", "Very Good" and "Excellent").

GOLD HISTORICAL SITES: TOURISTIC VALUE ASSESSMENT

	Score	1. Gold Prospectors' Huts at the Mouth of Kyläjoki	2. Ruikanmutka	3. The Lappi Farm at the Mouth of the Appisjoki	4. Kultala Crown Station	5. The River Bank of the Sotajoki Confluence	6. The Liljeqvist Dredge and its Surroundings	7. Ritakoski's Kultala Gold Village	8. Ritakoski steam engine	9. Palsinoja (Raahe cabin)	10. Nulkkamukka - the Birth Place of the Gold Rush	11. Kultala (Gold Village) along Pahaoja Brook	12. The Kerkelä mining village	13. The Laanila white quartz rock and shaft	14. The Kuivakuru panning facility	15. General's mine shaft	16. Carl Gustaf mine shaft	17. Prospector's mine shaft	18. The old cabin at *Suomunruoktu*	19. The memorial to *Sauva-Aslak*	20. Kultahamina	21. The site where gold was first found	22. Morgamoja Kultala	23. Pihlajamäki	24. Karhu Korhonen's Library	25. Korhonen
A	2.5																									
	5	X	X	X	X	X	X	X	X	X	X	X							X	X		X		X	X	X

A.AVAILABILITY		7.5																										
		10												X	X	X	X	X	X			X		X			
	A.2.	0																										
		1		X					X	X																		
		2																										
		3			X	X	X	X				X								X		X	X	X	X	X	X
		4	X													X	X											
		5									X																	
		6											X	X	X				X		X							
		7																X										
		8																										
		9																										
		10																										
	A.3.	1		X			X																					
		5	X		X	X		X	X	X	X	X								X		X	X	X	X	X	X
		7.5																										
		10											X	X	X	X	X	X	X		X							
	A.4.	1											X												X	X	X	X
		3									X														X			
		5																										
		7																										
		8																										
		9																										
		10	X	X	X	X	X	X	X	X		X													X			
	A.5.	0																										
		1																										
		2																										
		5		X																								
		7																										
		9	X		X		X	X		X		X		X	X	X	X	X			X	X	X				
		10				X			X		X		X						X	X				X	X	X	X	
	A.6.	0																										
		1	X	X	X		X	X	X	X	X	X								X					X	X	X	
		2																			X							
		3				X																X	X	X				
		5											X															
		7												X	X	X	X	X	X									
		8																										
		9																										
		10																										
	A.7.	0																										
		1																										
		2		X																								

		5																										
		6					X	X												X					X	X	
		8																										
		9	X		X	X			X	X	X	X									X	X	X	X			X
		10											X	X	X	X	X	X	X									
B.USE	B.1.	0						X				X								X	X				X		X
		2.5																								X		
		5		X	X		X		X	X									X				X				
		7.5	X			X					X		X	X	X	X	X	X					X		X			
		10																										
	B.2.	0																										
		2.5																										
		7.5																										
		10	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	B.3.	0									X																	
		1																			X							
		3	X	X	X		X	X	X	X		X	X															
		5												X		X	X	X		X		X	X	X	X		X
		7																	X									
		9																										
		10				X									X												X	
	B.4.	0																										
		2.5																							X		X	
		7.5		X					X	X																		
		10	X		X	X	X	X			X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
C.LOGISTICS	C.1.	0																										
		2.5																										
		5									X	X								X								
		7.5		X				X	X	X			X	X	X	X	X	X			X		X		X	X	X	
		10	X		X	X	X												X			X		X				
	C.2.	1														X												
		2.5		X										X	X		X	X							X	X	X	
		5										X									X		X					
		7.5						X																				
		10	X		X	X	X		X	X	X		X						X	X		X		X				
	C.3.	0	X	X	X	X	X	X	X	X	X	X	X									X	X	X	X	X	X	X
		1																										
		2														X				X								
		3																										
		4												X	X		X	X	X									
		5																										
		6																										
		7																										

		8																				X						
		9																										
		10																										
	C.4	0																										
		1	X	X	X	X	X	X	X	X	X	X	X										X	X	X	X	X	X
		2																										
		3																										
		4																										
		5														X	X			X								
		6																										
		7												X	X			X	X									
		8																										
		10																				X						
	C.5.	0	X	X	X	X	X	X	X	X	X	X	X										X	X	X	X	X	X
		2																			X							
		4																										
		6														X	X	X	X									
		8												X	X							X						
		10																										
D.PERCEPTIVENESS	D.1.	0																										
		1												X	X							X						
		4	X	X	X						X	X				X	X	X	X					X			
		5					X	X	X	X			X									X				X	X	X	X
		7				X																	X					
		8																										
		9																										
		10																										
	D.2.	0																										
		2.5																										
		5																										
		10	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Total (%)			60.27%	41.94 %	58.33 %	66.94 %	55%	51.66 %	55.55 %	55 %	53.05 %	50%	61.66 %	73.23 %	76.17 %	69.41 %	71.47 %	74.41 %	80%	55.29 %	65.58 %	66.38 %	53.61 %	61.94 %	41.38 %	49.72 %	43.05 %
Total Points			5.41	3.43	5.33	5.92	4.81	4.56	5.11	5.08	4.97	4.73	6.03	7.9	8	7.5	7.67	7.92	8.39	4.85	6.24	6.8	5.17	6.6	3.85	4.3	4.3

Table 3.7. Touristic value assessment of the other sites of the Golden Geopark of Lapland (the colors – red, orange, yellow, dark green and light green- represents the categories where the other sites are- “Insufficient”, “Sufficient”, “Good”, “Very Good” and “Excellent”).

OTHER SITES: TOURISTIC VALUE ASSESSMENT

		Score	1. The korkia-Maura Ice Cave	2. Sallivaara Reindeer Round-Up Site	3. The Pitfalls at the Sotkajärvi Ridge Chain	4. Ruijanpolku	5. The Grounds of Kaapin Jouni	6. Pielpajärvi Wilderness Church	7. Ukonsaari Island	8. Geological Trail
A.1.AVAILABILITY	A.1.	2.5								
		5		X		X				
		7.5	X							
		10			X		X	X	X	X
	A.2.	0								
		1	X				X		X	
		2								
		3		X						
		4						X		
		5								
		6			X					
		7								
		8								X
		9								
		10				X				
	A.3.	1								
		5				X				
		7.5	X	X				X		X
		10			X		X		X	
	A.4.	1								
		3								
		5						X		
		7								
		8								
		9								
		10	X		X		X		X	
	A.5.	0								
		1								
		2								
		5								

		7								
		9	X		X	X				X
		10		X			X	X	X	
	A.6.	0								
		1								
		2		X	X					
		3				X				
		5					X	X	X	X
		7								
		8	X							
		9								
		10								
	A.7.	0								
		1								
		2								
		5								
		6								
		8	X							
		9				X				
		10		X	X		X	X	X	X
B.USE	B.1.	0								
		2.5								
		5			X		X			
		7.5	X	X		X		X	X	X
		10								
	B.2.	0								
		2.5								
		7.5	X							
		10		X	X	X	X	X	X	X
	B.3.	0								
		1								
		3		X		X				
		5	X		X			X		
		7								X
		9								
		10					X		X	
	B.4.	0								
		2.5					X	X	X	
		7.5	X							
		10		X	X	X				X
		0								

C.LOGISTICS	C.1	2.5								
		5							X	
		7.5	X				X	X		
		10		X	X	X				X
	C.2.	1							X	
		2.5						X		
		5								
		7.5								
		10	X	X	X	X	X			X
	C.3.	0		X		X				
		1								
		2						X	X	
		3			X		X			
		4	X							
		5								
		6								
		7								
		8								X
		9								
		10								
	C.4.	0								
		1		X		X				
		2								
		3								
		4								
		5			X		X	X	X	
		6								
		7	X							
		8								
		10								X
	C.5.	0		X	X		X			
		2	X							
		4							X	
		6						X		
		8								X
		10				X				
	D.1.	0								
		1								
		4								

		5		X	X		X			
		7						X		X
		8	X			X				
D.PERSPECTIVENESS		9							X	
		10								
	D.2.	0								
		2.5								
		5								
		10	X	X	X	X	X	X	X	X
Total(%:)			70.55%	61.17%	72.22%	70.88%	68.88%	64.72%	67.77%	86.47%
Total Points			7.26	5.62	7.25	6.46	7.27	7.03	7	8.67

Table 3.8. Degradation risk of the geosites of the Golden Geopark of Lapland (the colors – red, orange, yellow, dark green and light green- represents the categories where the geosites are- "High Danger", "Danger", "Moderate Danger", "Very Small Danger" and "Any Danger").

GEOSITES DEGRADATION RISK

	Score	1. The Lihr rock and its bedrock outcrops	2. Potholes at Ivalojoen Kultala	3. The Ivalojoki esker at Toloskoski rapids	4. The Saarnaköngäs rapids	5. The Ainikkaharju esker	6. The Puoliväli spring	7. The Kulmakuru gorge	8. The Kiilopää ice lake and its spillways	9. The Rumakuru gorge	10. The quartz vein at Hangasoja	11. The Nälkäaapa mire	12. The Kopsusjärvi delta	13. Lateral drainage channels at	14. Melt water erosional forms on Tankavaara fell	15. Tor formations at Pyhä-Nattanen	16. Block field covering the Nattaset fells	17. Karhunpesäkivi	18. Hummocky moraine area at Kirakkaköngäs	19. The Rahajärvi collapsed cliff	20. The Sotkajärvi esker and kames	21. The Ravadasköngäs waterfall	22. A cascade at the mouth of Morgam-Viibus stream	23. Talus deposit on the shore of Morgamjärvi lake	24. Lateral drainage channels on the top of the
A.20%	10										X							X	X	X					
	7,5																								
	5	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X				X	X	X	X	X
	1																								
B. 20%	10																								
	9																								
	7																								
	5																								
	3																								

	2	X	X								X													X	X	
	1				X	X	X	X		X		X			X								X	X		
	0			X					X				X	X		X	X	X	X	X	X					
C. 35%	10																									
	9																									
	8																									
	7																									
	5																									
	3																									
	0	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
D. 10%	10																									
	7,5																									
	5								X	X	X															
	2,5			X				X						X	X			X	X	X	X					
	0	X	X		X	X	X					X	X			X	X					X	X	X	X	
E. 15%	E.1. 10																		X							
	E.1. 7																									
	E.1. 5																	X		X						
	E.1. 1	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X	X
	E.2. 10	X	X	X	X																					
	E.2. 7																					X				
	E.2. 5																							X		
	E.2. 1					X	X																X		X	
Total %		30 %	30 %	30.83 %	28.33 %	13.33 %	13.33 %	19 %	22 %	24 %	36 %	14 %	12 %	17 %	19 %	12 %	12 %	35 %	45 %	35 %	17 %	23.33 %	13.33 %	21.66 %	15 %	
Total Points		2.22	2.22	2.07	2.02	1.35	1.35	1.6	1.65	1.85	3.05	1.35	1.15	1.4	1.6	1.15	1.15	3	3.75	3	1.4	1.8	1.35	1.85	1.55	

Table 3.9. Degradation risk of the gold historical sites of the Golden Geopark of Lapland (the colors – red, orange, yellow, dark green and light green - represents the categories where the gold historical sites are- "High Danger", "Danger", "Moderate Danger", "Very Small Danger" and "Any Danger").

GOLD HISTORICAL SITES DEGRADATION RISK

	Score	1. Gold Prospectors' Huts at the Mouth of Kyläjoki	2. Ruikanmutka	3. The Lappi Farm at the Mouth of the Appisjoki	4. Kultala Crown Station	5. The River Bank of the Sotajoki Confluence	6. The Liljeqvist Dredge and its Surroundings	7. Ritakoski's Kultala Gold Village	8. Ritakoski steam engine	9. Palsinoja (Raahe cabin)	10. Nulkkamukka - the Birth Place of the Gold Rush	11. Kultala (Gold Village) along Pahaoja Brook	12. The Kerkelä mining village	13. The Laanila white quartz rock and shaft	14. The Kuivakuru panning facility	15. General's mine shaft	16. Carl Gustaf mine shaft	17. Prospector's mine shaft	18. The old cabin at *Suomunruoktu*	19. The memorial to *Sauva-Aslak*	20. Kultahamina	21. The site where gold was first found	22. Morgamoja Kultala	23. Pihlajamäki	24. Karhu Korhonen's Library	25. Korhonen
A 20%	10												X	X	X	X	X	X								
	7,5																									
	5	X	X	X	X	X	X	X	X	X	X	X							X	X	X	X	X	X	X	X
	1																									
B. 20%	10																									
	9																									
	7																									
	5																									
	3																									
	2	X		X	X			X	X	X		X	X	X	X	X	X			X	X	X	X	X	X	X
	1		X			X	X				X							X								
	0																		X							
C. 35%	10	X	X	X																						
	9												X	X	X	X	X									
	8					X																				
	7																		X				X			
	5																									
	3																									
	0				X		X	X	X	X	X	X						X		X	X	X		X	X	X
D. 10%	10																									
	7,5																									
	5												X	X	X	X	X	X								
	2,5																			X						
	0	X	X	X	X	X	X	X	X	X	X	X							X		X	X	X	X	X	X
E.	10																									
	7																									

E.15%		5																	X									
		1	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X
	E.2.	10	X	X	X	X	X	X	X	X		X											X					
		7																										
		5																										
		1									X		X											X	X	X	X	X
Total %			46.66 %	45 %	46.66 %	30 %	41.66 %	28.33 %	30 %	30 %	15 %	28.33 %	15 %	54 %	54 %	54 %	54 %	62 %	34 %	26 %	21 %	30 %	15 %	26.66 %	15 %	15 %	15 %
Total Points			5.72	5.52	5.72	2.22	4.82	2.02	2.22	2.22	1.55	2.02	1.55	6.2	6.2	6.2	6.2	6.8	2.85	3.6	1.8	2.22	1.55	4	1.55	1.55	1.55

Table 3.10. Degradation risk of the other sites of the Golden Geopark of Lapland (the colors – red, orange, yellow, dark green and light green - represents the categories where the other sites are- "High Danger", "Danger", "Moderate Danger", "Very Small Danger" and "Any Danger").

OTHER SITES DEGRADATION RISK

	Score	1. The korkia-Maura Ice	2. Sallivaara Reindeer Round-Up Site	3. The Pitfalls at the Sotkajärvi	4. Ruijanpolku	5. The Grounds of Kaapin Jouni	6. Pielpajärvi Wildemess Church	7. Ukonsaari Island	8. Geological Trail
A. (20%)	10								
	7,5	X						X	
	5		X	X	X		X		X
	1					X			
B. (20%)	10								
	9								
	7								
	5								
	3								
	2								
	1								X
	0	X	X	X	X	X	X	X	
	10								
	9								
	8								

C.(35%)		7	X							
		5								
		3								
		0		X	X	X	X	X	X	X
D. (10%)		10								
		7,5								
		5								
		2,5	X	X				X	X	X
		0			X	X	X			
E.(15%)	E.1.	10								
		7								
		5								X
		1	X	X	X	X	X	X	X	
	E.2.	10	X		X		X		X	
		7								
		5								
		1						X		
Total %			46.66%	17%	26.66%	12%	20%	15.83%	35%	27%
Total Points			5.02	1.4	1.82	1.15	1.02	1.4	2.57	2.2

3.3. Discussion

3.3.1. Touristic Value Assessment

Touristic Value Assessment of the Geosites

A) Percentage Methodology

Starting from the table of the touristic value assessment of the geosites (Table 3.5.) is possible to see that none of the geosites in the percentage methodology reached the "Excellent" or "Very Good" categories being only three geosites inside of the "Good" category, from the highest to the lowest, 79.41% geosite nº 17. Karhunpesäkivi; 78.52% geosite nº 9. The Rumakuru gorge and 77.35% geosite nº 14. Melt water erosional forms on Tankavaara fell. In the "Sufficient" category there are fifteen geosites, geosites number 1, 2, 7, 8, 10, 12, 13, 15, 16, 18, 19, 20, 21, 22 and 23 being the highest one with 68.82% (10. The quartz vein at Hangasoja) and the lowest one with 49.72% (1. The Lihr rock and its bedrock outcrops). Inside of the "Insufficient" category are the geosites number 3, 4, 5, 6, 11 and 24, being the highest one with 48.88% (24. Lateral drainage channels on the top of the Jäkäläpää fell), almost inside of the "Sufficient" category, and the lowest one with 40.83% (5. The Ainikkaharju esker).

B) Points Methodology

In the points methodology the geosites have better results than in the percentage methodology. In this way, none of the geosites reached the "Excellent", starting with a geosite with "Very Good" (none of the geosites was in this category in the percentage methodology) with 8.12 points, geosite nº 9. The Rumakuru gorge; eight geosites in "Good" category, geosites number 7, 8, 10, 14, 17, 18, 20 and 21 (more than in the percentage methodology) being the highest one with 7.79 points (14. Melt water erosional forms on Tankavaara fell) and the lowest one with 6.43 points (20.The Sotkajärvi esker and kames). In the "Sufficient" category there are eight in total (less than in percentage methodology) geosites number 2, 3, 12, 15, 16, 19, 22 and 23, being the highest one with 5.97 points (22. A cascade at the mouth of Morgam-Viibus stream) and the lowest one with 4.97 points (3. The Ivalojoki esker at Toloskoski rapids). The geosites which received less points, "Insufficient", are seven (one more than in the percentage methodology), they are the geosites number 1, 4, 5, 6, 11, 13 and 24, being

the highest one with 4.82 points (13. Lateral drainage channels at Teräväkivenpää) and the lowest one with 3.97 points (5. The Ainikkaharju esker).

After comparing and analysing the results from both methodologies, is possible to conclude that in the percentage methodology and in the points methodology the results didn´t change so much, having the points methodology slightly better results but without remarkable differences.

Touristic Value Assessment of the Gold Historical Sites

A) Percentage Methodology

Related with the gold historical sites in the percentage methodology, none of the sites reached the category "Excellent", being in the "Very Good" category gold historical site number 17. Prospector´s mine shaft with 80%; four inside of the "Good" category, sites number 12, 13, 15 and 16, being the highest one with 76.17% (13. The Laanila white quartz rock and shaft) and the lowest one with 71.47% (15. General's mine shaft); seventeen in the "Sufficient" category, gold historical sites number 1, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 18, 19, 20, 21, 22 and 24, being the highest one with 69.41% (14.The Kuivakuru panning facility), almost in "Good" category, and the lowest one with 49.72% (24. Karhu Korhonen's Library); there are only three inside of the "Insufficient" category, from the highest to the lowest, gold historical site number 25. Korhonen with 43.05%; 2. Ruikanmutka with 41.94%; and finally 23. Pihlajamäki with 41.38%.

B) Points Methodology

When speaking of points methodology none of the gold historical sites reached the "Excellent" but two reached the "Very Good" (one more than in the percentage methodology) being the highest one with 8.39 points (17. Prospector's mine shaft) and the lowest one with 8 points (13.The Laanila white quartz rock and shaft); in the "Good" category there are eight gold historical sites 11, 12, 14, 15, 16, 19, 20 and 22 (more than in the percentage methodology) being the highest one with 7.92 points (16. Carl Gustaf mine shaft) and the lowest one with 6.03 points (11. Kultala -Gold Village along Pahaoja Brook); in the "Sufficient" category there are seven sites (less 10 than in

the percentage methodology) they are gold historical sites number 1, 3, 4, 7, 8, 9 and 21 being the highest 4. Kultala Crown Station with 5.92 points and the lowest 9.Palsinoja (Raahe cabin) with 4.97 points. In the "Insufficient" category there are a total of eight gold historical sites while in the percentage methodology were only three, they are sites number 2, 5, 6, 10, 18, 23, 24 and 25 being the highest one with 4.85 points (18. The old cabin at Suomunruoktu) and the lowest one with 3.43 points (2. Ruikanmutka).

After comparing and analyzing the results from both methodologies, at this time for the gold historical sites, is possible to see that more sites entered in the "Insufficient" category in the points methodology than in percentage methodology but still the points methodology showed slightly better results for the rest of the sites.

Touristic Value Assessment of the Other Sites

A) Percentage Methodology

The percentage methodology showed here that none of the sites reached the "Excellent" category starting in this way with a site inside of "Very Good", site n.º 8.Geological trail with 86.47%; three in "Good" category, sites number 3, 4 and 1, with the highest points 72.22% (3.The Pitfalls at the Sotkajärvi Ridge Chain) and the lowest points 70.55% (1. The korkia-Maura Ice Cave); four sites in "Sufficient", sites number 2, 5, 6 and 7, being the highest one with 68.88% (5.The Grounds of Kaapin Jouni) and the lowest one with 61.17% (2. Sallivaara Reindeer Round-Up Site), none of the sites being inside of the "Insufficient" category.

B) Points Methodology

Also here none of the sites reached the "Excellent" starting with one site in the "Very Good" category, site n.º 8.Geological trail with 8.67 points, this site is in the same category as in the percentage methodology; six on the "Good" category, sites number 1, 3, 4, 5, 6 and 7 being the highest one with 7.27 points (5.The Grounds of Kaapin Jouni) and the lowest one with 6.46 points (4. Ruijanpolku); there is only one in the "Sufficient" category, 2. Sallivaara Reindeer Round-Up Site with 5.62 points; and none inside of the "Insufficient".

Here the results from the points methodology were in general better than in the percentage methodology.

To conclude the results from both methodologies, it is possible to say that the geosites, gold historical sites and other sites in the points methodology showed in general better results than in the percentage methodology, only in the "Insufficient" category the points assessment had more than in the percentage methodology.

3.3.2. Degradation Risk

In the degradation risk was used both methodologies too, percentage and points, for the geosites, gold historical sites and other sites, the only difference between the touristic value assessment and the degradation risk assessment is that in the touristic value assessment when higher the results better the site in terms of touristic potential, in the degradation risk is exactly the contrary, when lower the results better the site, meaning that it can be promoted to the public but if there is an high value the site has to be taking care of instead of being promoted to the public.

Degradation Risk of the Geosites

A) Percentage Methodology

Here is possible to observe that none of the geosites was inside of "High Danger" category, only one in the "Danger" category with 45% (18. Hummocky moraine area at Kirakkaköngäs); seven inside of "Moderate Danger", geosites number 1, 2, 3, 4, 10, 17 and 19, being the lowest one 4.The Saarnaköngäs rapids with 28.33% and the highest one 10.The quartz vein at Hangasoja with 36%; thirteen inside of "Very Small Danger" category, geosites number 5, 6, 7, 8, 9, 11, 13, 14, 20, 21, 22, 23 and 24, being the lowest one 5.The Ainikkaharju esker, 6. The Puoliväli spring and 22. A cascade at the mouth of Morgam-Viibus stream all with 13.33% and the highest one 9. The Rumakuru gorge with 24% and three in "Any Danger" category, 12. The Kopsusjärvi delta; 15. Tor formations at Pyhä-Nattanen and 16. Block field covering the Nattaset fells all with 12%.

B) Points Methodology

In the points methodology the geosites didn´t reach the "High Danger" or "Danger" categories; starting with three in "Moderate Danger" being the lowest ones with 3 points (17. Karhunpesakivi and 19. The Rahajärvi collapsed cliff) and the highest one with 3.75 points (18.Hummocky moraine area at Kirakkaköngäs); four in "Very Small Danger", geosites number 1, 2, 3 and 4, being the lowest 4. The Saarnaköngäs rapids with 2.02 points and the highest ones 1. The Lihr rock and its bedrock outcrops and 2. Potholes at Ivalojoen Kultala both with 2.22 points and finally sixteen with "Any Danger", geosites number 5, 6, 7, 8, 9, 11, 12, 13, 14, 15, 16, 20, 21, 22, 23 and 24, being the lowest 12.The Kopsusjärvi delta, 15.Tor formations at Pyhä-Nattanen and 16. Block field covering the Nattaset fells all with 1.15 points and the highest 9. The Rumakuru gorge and 23. Talus deposit on the shore of Morgamjärvi lake both with 1.85 points.

After comparing and analyzing the results, the points methodology showed better results than in the percentage methodology, having sixteen geosites in the category "Any Danger" and none in "Danger" or "High Danger" while in the percentage methodology was only three in "Any Danger" category and one in "Danger" category.

Degradation Risk of the Gold Historical Sites

A) Percentage methodology

In the percentage methodology five gold historical sites were inside of the "High Danger"category, gold historical sites number 12, 13, 14, 15 and 16, being the lowest 12. The Kerkelä mining village; 13. The Laanila white quartz rock and shaft; 14. The Kuivakuru panning facility and 15. General's mine shaft all with 54% and the highest 16. Carl Gustaf mine shaft with 62%. In the "Danger" category there are four, sites number 1, 2, 3 and 5, being the lowest one 5. The River Bank of the Sotajoki Confluence with 41.66% and the highest the 1.Gold Prospectors' Huts at the Mouth of Kyläjoki and 3. The Lappi Farm at the Mouth of the Appisjoki both with 46.66%; nine in "Moderate Danger" category, sites number 4, 6, 7, 8, 10, 17, 18, 20 and 22 being the lowest 18. The old cabin at Suomunruoktu with 26% and the highest 17. Prospector's mine shaft with 34%; in the "Very Small Danger" there is seven being the lowest ones (six) 9. Palsinoja (Raahe cabin); 11. Kultala (Gold Village) along Pahaoja Brook; 21.

The site where gold was first found; 23. Pihlajamäki; 24. Karhu Korhonen's Library and 25. Korhonen all with 15% and the highest 19. The memorial to Sauva-Aslak with 21%, none of them reached the "Any Danger" category.

B) Points Methodology

In the points methodology there are eight gold historical sites in "High Danger" (more three than in the percentage methodology) sites number 1, 2, 3, 12, 13, 14, 15 and 16 being the lowest 2. Ruikanmutka with 5.52 points and the highest one 16. Carl Gustaf mine shaft with 6.8 points; in the "Danger" there are two being the lowest one 22. Morgamoja Kultala with 4 points and the highest 5. The River Bank of the Sotajoki Confluence with 4.82 points; one in the "Moderate Danger" 18. The old cabin at Suomunruoktu with 3.6 points; seven in "Very Small Danger", sites number 4, 6, 7, 8, 10, 17 and 20, being the lowest 6. The Liljeqvist Dredge and its Surroundings and 10. Nulkkamukka - the Birth Place of the Gold Rush both with 2.02 points and the highest 17. Prospector's mine shaft with 2.85 points, finally seven in "Any Danger" sites number 9, 11, 19, 21, 23, 24 and 25 being the lowest (six) all with 1.55 points 9. Palsinoja (Raahe cabin); 11. Kultala (Gold Village) along Pahaoja Brook; 21. The site where gold was first found; 23. Pihlajamäki; 24. Karhu Korhonen's Library and 25. Korhonen and the highest 19. The memorial to Sauva-Aslak with 1.8 points.

After analyzing and comparing the results from both methodologies, it is possible to see that many gold historical sites had better points than percentage, for example in the points methodology seven reached the "Any Danger" category while in the percentage methodology none reached this category being the best "Very Small Danger" but when it is the "High Danger" category more sites from the points methodology are inside of this category (8 in total) while there is only five in the percentage methodology.

Degradation Risk of the Other Sites

A) Percentage Methodology

Here there is no site in "High Danger" category, starting in this way with one site in "Danger" 1. The korkia-Maura Ice Cave with 46.66%; three in "Moderate

Danger", sites number 3, 7 and 8, being the lowest 3. The Pitfalls at the Sotkajärvi Ridge Chain with 26.66% and the highest 7.Ukonsaari Island with 35%; three in "Very Small Danger" sites 2, 5 and 6, being the lowest 6. Pielpajärvi Wilderness Church with 15.83% and the highest 5.The Grounds of Kaapin Jouni with 20% and only one reached the "Any Danger" the 4. Ruijanpolku with 12%.

B) Points Methodology

In terms of points methodology, one site had "High Danger" 1.The korkia-Maura Ice Cave with 5.02 points; none had "Danger" or "Moderate Danger", having two "Very Small Danger" 8. Geological Trail with 2.2 points and 7.Ukonsaari Island with 2.57 points and five "Any Danger" being the lowest 5. The Grounds of Kaapin Jouni with 1.02 points and the highest one with 1.82 points 3. The Pitfalls at the Sotkajärvi Ridge Chain.

The results from both methodologies (percentage and points) shows the results from the points methodology for the other sites were in general better than in the percentage methodology.

It is possible to see the same thing happened in the degradation risk assessment, like in the touristic value assessment, in the points methodology the results were better but also this methodology had more sites in "High Danger" than in the percentage methodology. Only the geosites didn´t had any site in "High Danger" in both methodologies, this can´t be said for the gold historical sites that in the percentage methodology were only five and in the other methodology were eight, and in the other sites none was inside of the "High Danger" in the percentage methodology but in the points methodology there was one site.

Table 3.11. The best and the worst places of the geosites in the touristic value assessment and their degradation risk.

GEOSITES							
Place	**Geosites**	**TV (%)**	**DR (%)**	**Place**	**Geosites**	**TV(PTS)**	**DR(PTS)**
1.	17.Karhunpesäkivi	79.41%	35%	**1.**	9. The Rumakuru gorge	8.12	1.85
2.	9. The Rumakuru gorge	78.52%	24%	**2.**	14. Melt water erosional forms	7.79	1.6

					on Tankavaara fell		
3.	14. Melt water erosional forms on Tankavaara fell	77.35%	19%	**3.**	17. Karhunpesäkivi	7.72	3
4.	10.The quartz vein at Hangasoja	68.82%	36%	**4.**	8. The Kiilopää ice lake and its spillways	7.66	1.65
5.	8. The Kiilopää ice lake and its spillways	68.52%	22%	**5.**	7.The Kulmakuru gorge	7.19	1.6
6.	18. Hummocky moraine area at Kirakkaköngäs	67.05%	45%	**6.**	18. Hummocky moraine area at Kirakkaköngä	6.97	3.75
7.	21.The Ravadasköngäs waterfall	66.38%	23.33%	**7.**	10. The quartz vein at Hangasoja	6.85	3.05
8.	7. The Kulmakuru gorge	64.11%	19%	**8.**	21.The Ravadasköngäs waterfal	6.72	1.8
9.	20. The Sotkajärvi esker and kames	63.23%	17%	**9.**	20.The Sotkajärvi esker and kames	6.43	1.4
10.	15. Tor formations at Pyhä-Nattanen	62.94%	12%	**10.**	22. A cascade at the mouth of Morgam-Viibus stream	5.97	1.35
11.	16. Block field covering the Nattaset fells	59.70%	12%	**11.**	19.The Rahajärvi collapsed cliff	5.84	3
12.	19. The Rahajärvi collapsed cliff	59.70%	35%	**12.**	15.Tor formations at Pyhä-Nattanen	5.71	1.15
13.	22. A cascade at the mouth of Morgam-Viibus stream	53.88%	13.33%	**13.**	23.Talus deposit on the shore of Morgamjärvi lake	5.67	1.85
14.	23. Talus deposit on the shore of Morgamjärvi lake	53.05%	21.66%	**14.**	16. Block field covering the Nattaset fells	5.38	1.15
15.	12.The Kopsusjärvi delta	52.64%	12%	**15.**	2. Potholes at Ivalojoen Kultala	5.23	2.22
16.	2. Potholes at	52.5%	30%	**16.**	12.The	4.97	1.15

	Ivalojoen Kultala				Kopsusjärvi delta		
17.	13.Lateral drainage channels at Teräväkivenpää	50%	17%	**17.**	3. The Ivalojoki esker at Toloskoski rapids	4.97	2.07
18.	1. The Lihr rock and its bedrock outcrops	49.72%	30%	**18.**	13.Lateral drainage channels at Teräväkivenpää	4.82	1.4
19.	24.Lateral drainage channels on the top of the Jäkäläpää fell	48.88%	15%	**19.**	1. The Lihr rock and its bedrock outcrops	4.71	2.22
20.	3. The Ivalojoki esker at Toloskoski rapids	46.94%	30.83%	**20.**	24.Lateral drainage channels on the top of the Jäkäläpää fell	4.65	1.55
21.	11. The Nälkäaapa mire	46.47%	14%	**21.**	6. The Puoliväli spring	4.63	1.35
22.	4.The Saarnaköngäs rapids	45%	28.33%	**22.**	4.The Saarnaköngäs rapids	4.48	2.02
23.	6. The Puoliväli spring	44.72%	13.33%	**23.**	11.The Nälkäaapa mire	4.35	1.35
24.	5.The Ainikkaharju esker	40.83%	13.33%	**24.**	5.The Ainikkaharju esker	3.97	1.35

Table 3.12. The best and the worst places of the gold historical sites in the touristic value assessment and their degradation risk.

GOLD HISTORICAL SITES							
Place	**Gold historical sites**	**TV(%)**	**DR(%)**	**Place**	**Gold historical sites**	**TV(PTS)**	**DR(PTS)**
1.	17. Prospector's mine shaft	80%	34%	**1.**	17. Prospector's mine shaft	8.39	2.85
2.	13.The Laanila white quartz rock and shaft	76.17%	54%	**2.**	13.The Laanila white quartz rock and shaft	8.0	6.2
3.	16.Carl Gustaf mine shaft	74.41%	62%	**3.**	16.Carl Gustaf mine shaft	7.92	6.8

4.	12.The Kerkelä mining village	73.23%	54%	**4.**	12.The Kerkelä mining village	7.9	6.2
5.	15. General's mine shaft	71.47%	54%	**5.**	15. General's mine shaft	7.67	6.2
6.	14.The Kuivakuru panning facility	69.41%	54%	**6.**	14.The Kuivakuru panning facility	7.5	6.2
7.	4.Kultala Crown Station	66.94%	30%	**7.**	20. Kultahamina	6.8	2.22
8.	20. Kultahamina	66.38%	30%	**8.**	22.Morgamoja Kultala	6.6	4
9.	19.The memorial to Sauva-Aslak	65.58%	21%	**9.**	19.The memorial to Sauva-Aslak	6.24	1.8
10.	22.Morgamoja Kultala	61.94%	26.66%	**10.**	11.Kultala (Gold Village) along Pahaoja Brook	6.03	1.55
11.	11.Kultala (Gold Village) along Pahaoja Brook	61.66%	15%	**11.**	4.Kultala Crown Station	5.92	2.22
12.	1.Gold Prospectors' Huts at the Mouth of Kyläjoki	60.27%	46.66%	**12.**	1.Gold Prospectors' Huts at the Mouth of Kyläjoki	5.41	5.72
13.	3. The Lappi Farm at the Mouth of the Appisjoki	58.33%	46.66%	**13.**	3. The Lappi Farm at the Mouth of the Appisjoki	5.33	5.72
14.	7.Ritakoski's Kultala Gold Village	55.55%	30%	**14.**	21.The site where gold was first found	5.17	1.55
15.	18. The old cabin at Suomunruoktu	55.29%	26%	**15.**	7. Ritakoski's Kultala Gold Village	5.11	2.22
16.	8.Ritakoski steam engine	55%	30%	**16.**	8.Ritakoski steam engine	5.08	2.22
17.	5. The River Bank of the Sotajoki	55%	41.66%	**17.**	9.Palsinoja (Raahe cabin)	4.97	1.55

	Confluence						
17.	21. The site where gold was first found	53.61%	15%	**18.**	18. The old cabin at Suomunruoktu	4.85	3.6
18.	9. Palsinoja (Raahe cabin)	53.05%	15%	**19.**	5. The River Bank of the Sotajoki Confluence	4.81	4.82
20.	6.The Liljeqvist Dredge and its Surroundings	51.66%	28.33%	**20.**	10. Nulkkamukka - the Birth Place of the Gold Rush	4.73	2.02
21.	10. Nulkkamukka - the Birth Place of the Gold Rush	50%	28.33%	**21.**	6.The Liljeqvist Dredge and its Surroundings	4.56	2.02
22.	24.Karhu Korhonen's Library	49.72%	15%	**22.**	24.Karhu Korhonen's Library	4.3	1.55
23.	25. Korhonen	43.05%	15%	**23.**	25. Korhonen	4.3	1.55
24.	2. Ruikanmutka	41.94%	45%	**24.**	23. Pihlajamäki	3.85	1.55
25.	23. Pihlajamäki	41.38%	15%	**25.**	2. Ruikanmutka	3.43	5.52

Table 3.13. The best and the worst places of the other sites in the touristic value assessment and their degradation risk.

OTHER SITES							
Place	**Other sites**	**TV(%)**	**DR(%)**	**Place**	**Other sites**	**TV(PTS)**	**DR(PTS)**
1.	8.Geological Trail	86.47%	27%	**1.**	8.Geological Trail	8.67	2.2
2.	3.The Pitfalls at the Sotkajärvi Ridge Chain	72.22%	26.66%	**2.**	5.The Grounds of Kaapin Jouni	7.27	1.02
3.	4.Ruijanpolku	70.88%	12%	**3.**	1.The korkia-Maura Ice Cave	7.26	5.02
4.	1. The korkia-	70.55%	46.66%	**4.**	3.The Pitfalls at	7.25	1.82

	Maura Ice Cave				the Sotkajärvi Ridge Chain		
5.	5.The Grounds of Kaapin Jouni	68.88%	20%	**5.**	6. Pielpajärvi Wilderness Church	7.03	1.4
6.	7.Ukonsaari Island	67.77%	35%	**6.**	7.Ukonsaari Island	7	2.57
7.	6.Pielpajärvi Wilderness Church	64.72%	15.83%	**7.**	4.Ruijanpolku	6.46	1.15
8.	2. Sallivaara Reindeer Round-Up Site	61.17%	17%	**8.**	2.Sallivaara Reindeer Round-Up Site	5.62	1.4

It is important to mention that these charts should be only a guideline to the touristic value and the degradation risk since it was taken into consideration only these two indicators, further work can be developed to do also the scientific value assessment and other methodology, additional to this one, to analyse these three indicators together (touristic value, scientific value and degradation risk). A good option could be the final ranking developed by Pereira (2006) who created a ranking obtained due to the sum of the positions of each indicator (the touristic value, the scientific value and the degradation risk) being the final value better ranked when lower is the value of this sum. Below there is a simple example of the final ranking made for the other sites only for the percentage methodology and only with the touristic value and degradation risk. If in the final ranking there are two sites with the same value, one thing that could make the difference is the degradation risk, in this way the one which had less degradation risk stays higher in the ranking than the one with higher degradation risk. As a result of the simulation, the final ranking has the site number 4. Ruijanpolku as first place instead of the 8. Geological trail.

Table 3.14. Final ranking for the other sites of the Golden Geoaprk of Lapland with the touristic value assessment and degradation risk, not having the scientific value.

OTHER SITES Final Ranking						
Place	**Other Sites**	**TV(%)**	**Place**	**Other Sites**	**DR(%)**	**Final Ranking**
1.	8.Geological Trail	86.47%	1.	4.Ruijanpolku	12%	4.Ruijanpolku(4 points)
2.	3.The Pitfalls at the Sotkajärvi Ridge Chain	72.22%	2.	6.Pielpajärvi Wilderness Church	15.83%	3.The Pitfalls at the Sotkajärvi Ridge Chain (7 points)
3.	4.Ruijanpolku	70.88%	3.	2.Sallivaara Reindeer Round-Up Site	17%	8.Geological Trail (7 points)
4.	1. The korkia-Maura Ice Cave	70.55%	4.	5.The Grounds of Kaapin Jouni	20%	6.Pielpajärvi Wilderness Church (9 points)
5.	5.The Grounds of Kaapin Jouni	68.88%	5.	3.The Pitfalls at the Sotkajärvi Ridge Chain	26,66%	5.The Grounds of Kaapin Jouni (9 points)
6.	7.Ukonsaari Island	67.77%	6.	8.Geological Trail	27%	2. Sallivaara Reindeer Round-Up Site (11 points)
7.	6.Pielpajärvi Wilderness Church	64.72%	7.	7.Ukonsaari Island	35%	1.The korkia-Maura Ice Cave (12 points)
8.	2.Sallivaara Reindeer Round-Up Site	61.17%	8.	1. The korkia-Maura Ice Cave	46.66%	7.Ukonsaari Island (13 points)

Besides the tables developed, it was important to create column charts to compare the average of the geosites, gold historical sites and other sites for the touristic value and for the degradation risk (first two charts below have colors – blue and gray- which were selected randomly) and to see in general the average of all 57 sites for the touristic value and degradation risk (last two charts have the colors of the categories for the touristic value assessment and degradation risk).

In this way the first column charts show that in the touristic value assessment, from the percentage and points methodologies, the other sites had higher percentage average, with 70.33%, than the geosites and gold historical sites, making it inside of the "Good" category as well as its 7.07 points. In the percentage methodology, the average of the gold historical sites was 59.64% and the geosites was a little bit less, with 58.34%, but in the points methodology the geosites has higher points, 5.86 points than the gold historical sites with only 5.79 points. Both methodologies makes the average of the geosites and gold historical sites inside of the category of "Sufficient".

In the degradation risk when comparing separately the average of the 24 geosites, 25 gold historical sites and 8 other sites, it shows that the gold historical sites had the highest degradation risk average in both methodologies, with 33.29% and 3.51 points being both in the category of "Moderate Danger". Also in the category of "Moderate Danger" the other sites are with 25.01%, while the geosites are in the category of "Very Small Danger" with 22.42%. In the points methodology the geosites had 1.87 points making it in "Any Danger" category and the other sites received 2.07 points having "Very Small Danger".

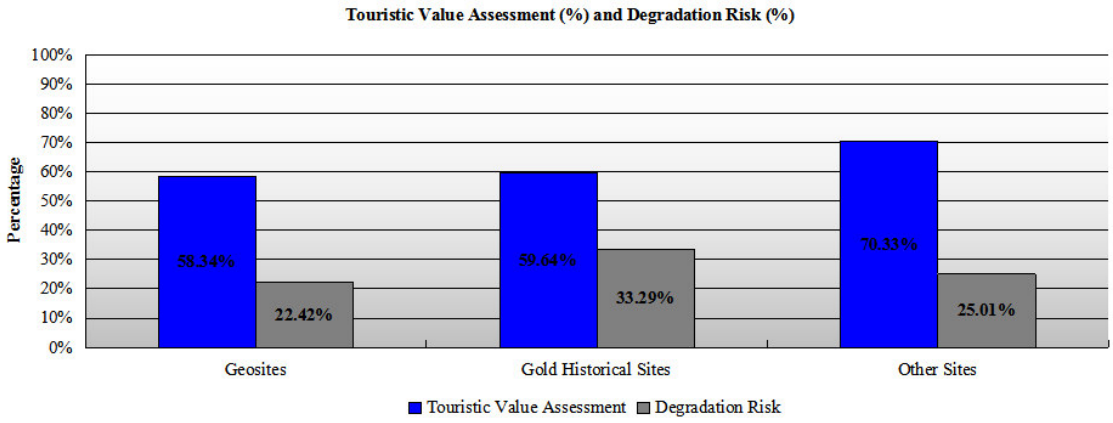


Figure 3.1. The average of the geosites, the gold historical sites and the other sites in the percentage methodology.

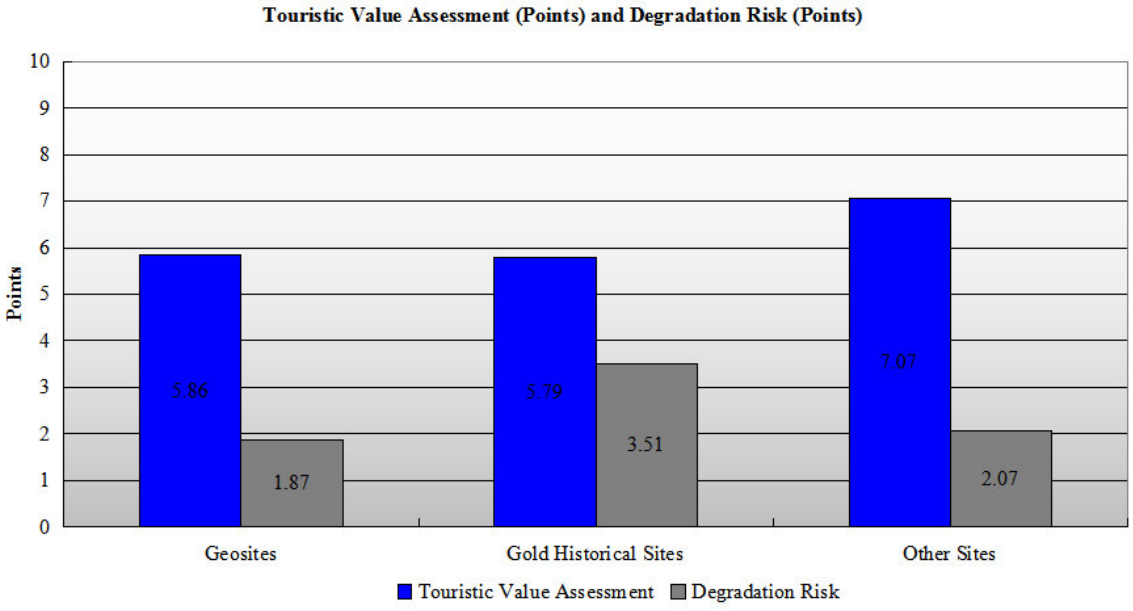


Figure 3.2. The average of the geosites, the gold historical sites and the other sites in the points methodology.

When the results are analyzed as a total is possible to observe that the average for the touristic value of the 57 sites in the percentage methodology is 62.77% and in the points methodology is 6.24, making the percentage result inside of the "Sufficient" category (orange color) and the points inside of the "Good" category (yellow color). Related with the degradation risk average, in the percentage methodology is 26.90% making it inside of the "Moderate Danger" category (yellow color) while the 2.48 points goes to "Very Small Danger" (dark green color).

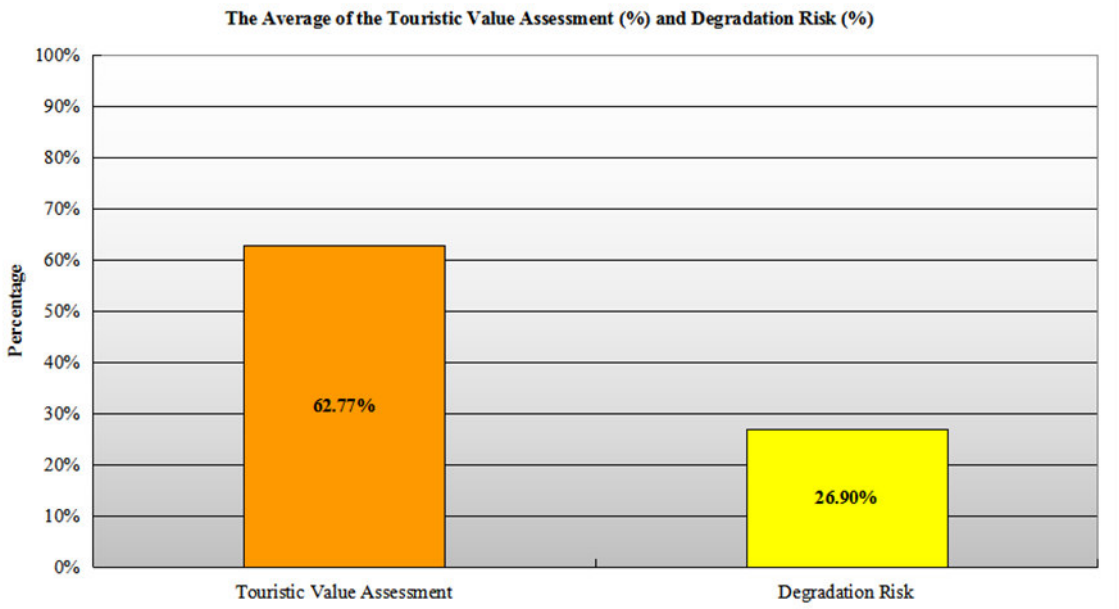


Figure 3.3. The touristic value and the degradation risk average of all sites in percentage methodology.

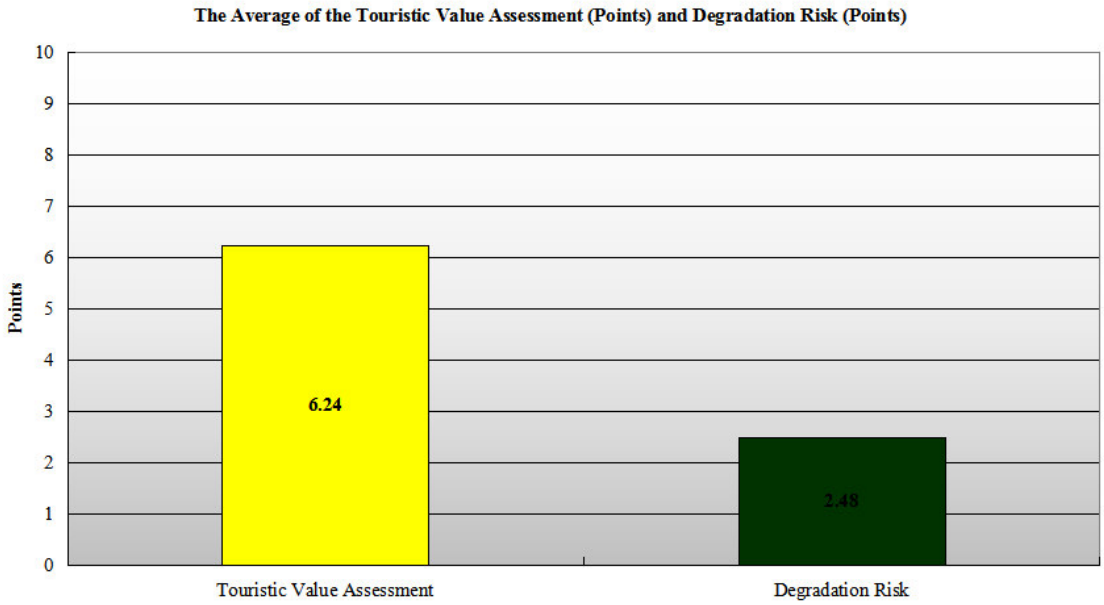


Figure 3.4. The touristic value and degradation risk average of all sites in points methodology.

4. Geotourism promotion

When thinking about Finnish Lapland and the Golden Geopark area, tourists are attracted by the wilderness and by the very different environment being the nature tourism a key of development for Lapland since the beginning of the 1980s (Pashkevich, 2014). In summer time tourists (mostly from Finland) are interested in explore the wilderness doing hiking, camping, canoeing and gold panning; in autumn time is mostly the autumn colors that gives to the landscape colors like red and yellow (majority are Finnish hikers); in winter and spring time the snowy environment and northern lights are sold with activities like snowmobiling, skiing, snowshoeing, reindeer and husky safaris and the famous Santa Klaus, attracting mostly foreigners (Pashkevich, 2014).

In terms of the area of the geopark and related with geotourism, it is possible to see some trails –being or not geosites - with some information board with geological explanation like for example in Tankavaara Geological trail, Lemmenjoki trails and in some of Saariselkä trails (Figure 4.1.). Besides the geological trail of Tankavaara, the International Gold Prospector Museum of Tankavaara has a temporary exhibition with the explanation of how gold came to our Planet and to Finland and has a mineral exhibition.

Figure 4.1. Geological information on the trails of Tankavaara (a) and (b); Lemmenjoki (c) and Saariselkä (d); exhibition in the International Gold Prospector Museum of Tankavaara with the explanation of the origins of gold (e).

Related with published materials already developed about geological interpretation and/ or geotourism in the area of the geopark, the first steps took place with two geological outdoor maps with guide books. The first map was created in the year 2000 and covers the western part of Urho Kekkonen National Park and Ivalojoki area "Kultakaira Ivalojoki-Saariselkä Geological Outdoor Map 1: 50 000" (Figure 4.2. (a)) and the second was developed two years later from the area of Lemmenjoki National Park (Figure 4.2.(a)), on these maps is showed rock types and glacial and postglacial formations (Johansson et al., 2015) as well as gold historical sites, some touristic infrastructures like campfires, parking places, information boards, marked trails, accommodation, among others. The guidebook explains geology, gold history among other important characteristics of each place. Other publication was taken in 2014 when a guidebook "Barents Tour for Geotourists" in English, Norwegian, Finnish and Russia languages was created to explore nature, landscape history and geological sights comprising northern Norway and Finland and north-western Russia, where it is described 26 places in those countries with a circular route– 14 in Finland, 4 in Norway

and 8 in Russia with the main goals to preserve the nature (biotic and abiotic) and make people aware of the nature and its features (Figure 4.2. (b)). Other materials are published by the Geological Survey of Finland for the general public.

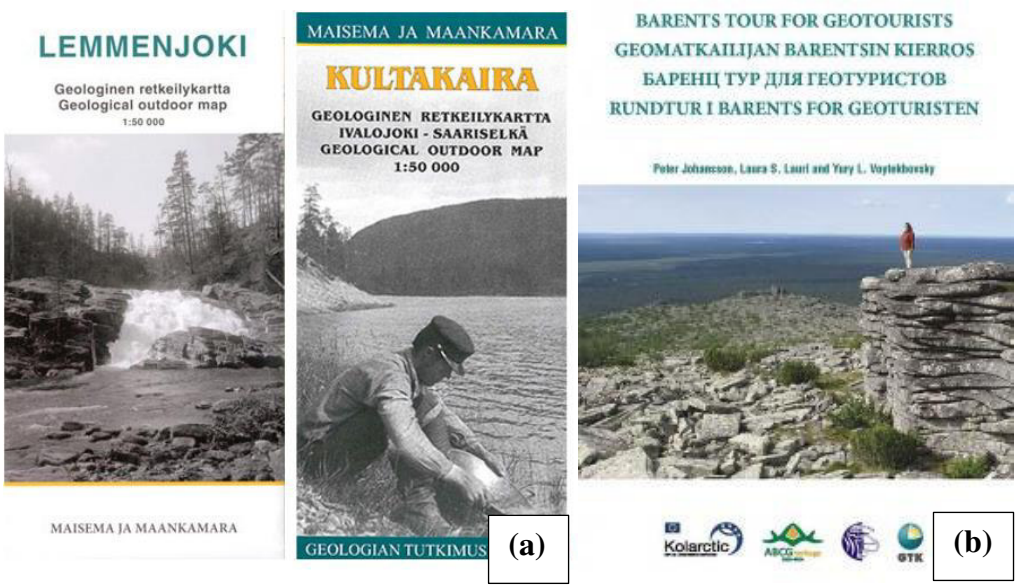
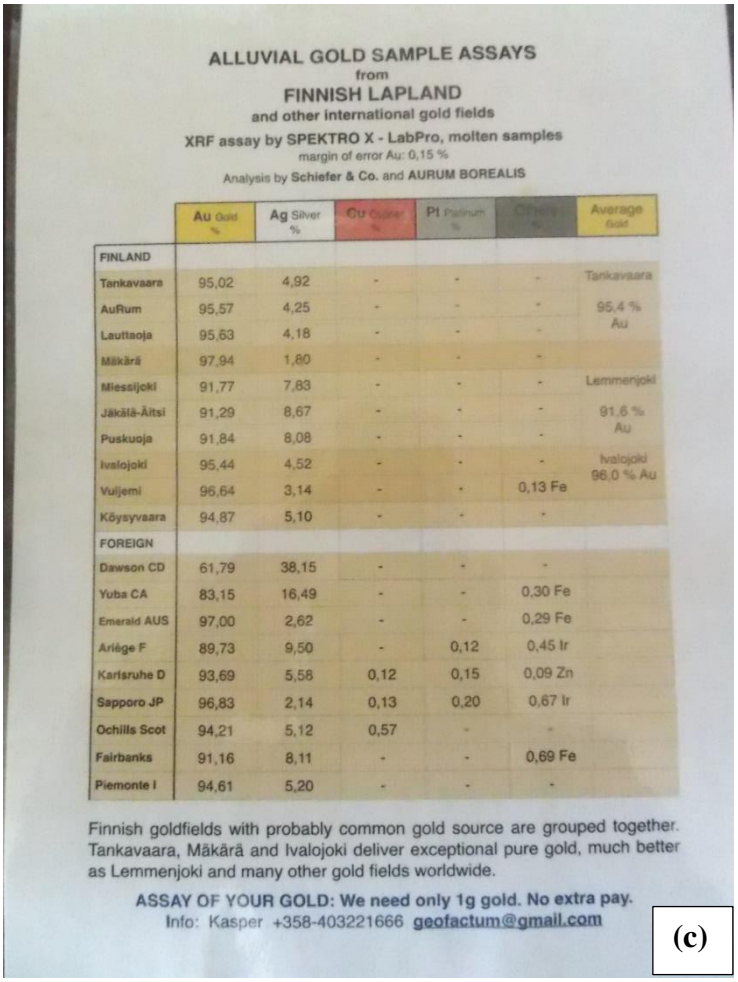


Figure 4.2. Geological guide books and maps (a) and a guidebook comprising northern Norway and Finland and north –western Russia (b).

Besides the information boards and published materials, also in some guiding tours like for example in Tankavaara when visitors pan for gold, they receive geological information from a geologist. During the gold panning activity it is compared the weight of gold with other materials (Figure 4.3. (a)); an explanation of gemstones that visitors can find in their pan (Figure 4.3. (b)) and comparison between different types of gold from Finland and other countries (Figure 4.3. (c)).



ALLUVIAL GOLD SAMPLE ASSAYS
from
FINNISH LAPLAND
and other international gold fields
XRF assay by SPEKTRO X - LabPro, molten samples
margin of error Au: 0,15 %
Analysis by Schiefer & Co. and AURUM BOREALIS

	Au Gold %	Ag Silver %	Cu Copper %	Pt Platinum %	Others %	Average Gold
FINLAND						
Tankavaara	95,02	4,92	-	-	-	Tankavaara
AuRum	95,57	4,25	-	-	-	95,4 % Au
Lauttaoja	95,63	4,18	-	-	-	
Mäkärä	97,94	1,80	-	-	-	
Miessijoki	91,77	7,83	-	-	-	Lemmenjoki
Jäkälä-Äitsi	91,29	8,67	-	-	-	91,6 % Au
Puskuoja	91,84	8,08	-	-	-	
Ivalojoki	95,44	4,52	-	-	-	Ivalojoki 96,0 % Au
Vuljemi	96,64	3,14	-	-	0,13 Fe	
Köysyvaara	94,87	5,10	-	-	-	
FOREIGN						
Dawson CD	61,79	38,15	-	-	-	
Yuba CA	83,15	16,49	-	-	0,30 Fe	
Emerald AUS	97,00	2,62	-	-	0,29 Fe	
Ariége F	89,73	9,50	-	0,12	0,45 Ir	
Karlsruhe D	93,69	5,58	0,12	0,15	0,09 Zn	
Sapporo JP	96,83	2,14	0,13	0,20	0,67 Ir	
Ochills Scot	94,21	5,12	0,57	-	-	
Fairbanks	91,16	8,11	-	-	0,69 Fe	
Piemonte I	94,61	5,20	-	-	-	

Finnish goldfields with probably common gold source are grouped together. Tankavaara, Mäkärä and Ivalojoki deliver exceptional pure gold, much better as Lemmenjoki and many other gold fields worldwide.

ASSAY OF YOUR GOLD: We need only 1g gold. No extra pay.
Info: Kasper +358-403221666 geofactum@gmail.com

(c)

Figure 4.3. Material presented while visitors pan for gold in Tankavaara.

In this way it is possible to see inside of the area of the geopark are already some actions made to interpret the geology and develop the geotourism, the creation of the geopark will improve the information and services.

4.1. Priority actions in the geosites, gold historical sites and other sites

As the Golden Geopark of Lapland is still a project – at its beginning stage - some of the criteria didn't had so good results, this is the reason the work developed below analyzes every single criteria (from the tables 3.5 to 3.10) and see which are the criteria that could be improved through the creation of some solutions for the geosites, gold historical sites and other sites. In this way this will increase the touristic value and minimize the degradation risk.

4.1.1. Touristic Value Assessment

Touristic Value Assessment of the Geosites

In all four criteria the ones which had better average was D. Perceptiveness with 7.37 points, next A. Availability with 6.36 points; B. Use with 6.12 points and finally C. Logistics with 4.15 points. When the four main criteria have different weights is possible to observe the A. Availability had 3.76 points in a total of 6; B. Use 0.66 points in 1 point; C Logistics 1.02 in 2.5 points and finally in the criterion D. Perceptiveness 0.36 points in 0.5 points.

A. Availability (60%):

A.1. Seasonal Occupancy (20%):

More than half of the geosites (sixteen) had 5 points due to the fact they open only two seasons, the rest of them – 8 geosites – open all year round. So none of the geosites had the minimum points 2.5 (open one season) and none had 7.5 points (open three seasons). This happens because many sites are quite danger to visit in winter time and also some of them are quite expensive to maintain open in this season, only very few which are closed in winter could be changed and be open all year round. This sub-criterion received as an average of 6.6 points or 1.32 points in a maximum of 2 points.

Priority actions in the geosites to improve the sub- criterion A.1.:

- ✓ **17. Karhunpesäkivi:** open all year round instead of two seasons, making the cleaning of the snow from the stairs which lead to the cave and the cave itself, having 10 points instead of 5 points.
- ✓ **19. Rahajärvi collapsed cliff:** open all year round and clean the road and parking place, having 10 points instead of 5 points.

These two sites could be open all year round, in this way the average would not change so much but it could get 7.08 points or 1.41 points in a maximum of 2 points.

A.2. Terrestrial accessibility (2.5% or 5%)

This sub-criterion had a considerable number of geosites (8 geosites) located more than 4 kilometres from a paved road or a forest vehicle road (3 points) due to the fact that many are integrated in hiking trails. Three geosites had 1 point, 3. The

Ivalojoki esker at Toloskoski rapids, 4. The Saarnaköngäs rapids and 22. A cascade at the mouth of Morgam-Viibus stream because it is very difficult to visit them, the only way is to cross the river and there is no bridges, the only safer way to go is by boat or canoe; the geosite nº 7. The Kulmakuru gorge had only 2 points because in summer time the trail is shorter (a little bit more than one kilometre) than the one in winter time (more or less 8 km). Three geosites had 4 points (between 2 and 4 km from a paved road or forest vehicle road); four geosites had 5 points (between 1 and 2 km from a paved road or forest vehicle road). Only five geosites were about 1 km and less than 1 km, and none reaching the maximum points, 10 points.

In general the geosites are quite far forcing a hike, making the average of this sub-criterion 4.08, which is not so high, or 0.102 points in 0.25 points.

Priority actions in the geosites to improve the sub- criterion A.2.:

- ✓ **3. The Ivalojoki esker at Toloskoski rapids:** construction of a bridge for people to cross the river, if this is possible it will have instead of 1 point, 5 points;
- ✓ 4**. The Saarnaköngäs rapids:** construction of a bridge near this geosite, having in this way instead of 1 point, 3 points.

Related with the distances, it is quite difficult to change them, the only thing that was possible to do was improve the access when this one is no so easy, like it happen with the geosite number 3 and 4 above mentioned. The average here also doesn´t change so much but it could have 4.33 points or 0.108 points in 0.25.

A.3. Availability according with people´s physical conditions when the activity is hiking or walking (2.5%)

In this sub-criterion none of the geosites received the lowest points (1 point: being very difficult to reach the geosite only for people with excellent physical conditions) starting with thirteen geosites with 5 points (moderate difficulty, at least good physical condition); four with 7.5 points (geosites are easy to hike or walk not requiring huge physical conditions), in the geosite number 3. The Ivalojoki esker at Toloskoski rapids is difficult to cross the river and it is not a good idea to do it, the hiking is very short and easy. A good quantity of geosites, seven, were very easy even

for children, receiving in this way 10 points. Making the average of this sub-criterion 6.87 or 0.17 points in 0.25 points.

Priority actions in the geosites to improve the sub- criterion A.3.:

Here nothing was changed because it depends mostly of the person´s good physical conditions or not, if he/she is able to walk many kilometres or not or if a child can manage to do some small distances, and mostly of the paths are in good conditions only having in some of them longer distances, rocky places and some with parts requiring more physical effort.

A.4. Boat and/or canoe access (2.5%)

In this sub-criterion there were 10 geosites with boat and/or canoe access and the rest of them no boat and/or canoe access at all. The ones which have the option of boat and/or canoe, three geosites where situated more than 4 km from a boat and/or canoe having in this way the lowest points (1 point); one between 1 and 2 km (5 points); one between 500 metres and 1 km (7 points); one between 50 and 200 metres (9 points) and four reaching the maximum points (10 points) which are located less than 50 metres from the boat and/ or canoe, making this sub-criterion with a good average of 6.4 or 0.16 points in 0.25.

Priority actions in the geosites to improve the sub-criterion A.4.:

Also here nothing could be done because it is impossible to change the distance between a canoe and/or boat place and the geosite.

A.5. Visibility (2.5%)

The results here were very satisfactory, starting with two geosites with 5 points, meaning the visibility is medium requiring a closer look to see better the geosites; three with 7 points where the visibility was good to all geological elements; a big number of geosites, sixteen, had an excellent view to all geological elements (9 points) and the only geosites with the maximum points (10 points) being the visibility good even with snow and darkness were three because they were the only ones even covered with snow it was possible to observe them, they are: 7. The Kulmakuru gorge; 9. The Rumakuru gorge and 14. Melt water erosional forms on Tankavaara fell. This sub-criterion had quite good results being the average 8.54 points or 0.21 in 0.25 points.

Priority actions in the geosites to improve the sub-criterion A.5.:

- ✓ **17. Karhunpesäkivi:** if it is possible to open this geosite all year round, the visibility will be also improved because to access this geosite the entrance has to be clean and the cave too, in this way it will have instead of 9 points, 10 points.
- ✓ **22. A cascade at the mouth of Morgam-Viibus stream:** as the only way is going by canoe or boat to see this geosite and there are trees covering the geosite, one possibility is to cut some trees and other vegetation which hides this geosite. In this way the geosite instead of 5 points could reach 9 points.

The rest of the geosites don´t need improvements due to the good results on this sub-criterion and the ones which are impossible to observe in winter time is not possible to do something because of the high danger on doing it and in some cases the impossibility to provide a better visibility in winter time but if the geosites above could be improved (geosites number 17 and 22) this sub-criterion could have an average of 8.75 points or 0.21 of 0.25 points.

A.6. Safety – in case of an accident (15%)

As many geosites are in the wilderness, the distances are quite long to reach them, the phone coverage many times does not exist and to access an hospital is quite difficult because it is far, these were the reasons why this sub-criterion didn´t had so good average. This sub-criterion doesn´t mean the geosites are dangerous or safe to visit, it means in case of an accident or emergency if it is easy to call the emergency number and go to hospital. In this way there are eleven geosites with 1 point meaning the sites are without any safety facilities, no mobile phone coverage and more than 50 km from the nearest hospital; two with 2 points, geosites with no safety facilities, more than 50 km from the nearest hospital but with mobile phone coverage; two with 3 points, geosite with safety facilities but no mobile phone coverage and more than 50 km from the nearest hospital; one with 5 points, geosite with safety facilities, mobile phone coverage but more than 50 km from the nearest hospital; seven with 7 points, geosite whithout any safety facilities but with mobile phone coverage and located less than 50 km from the nearest hospital and finally the best ranked was geosite number 17. Karhunpesäkivi with 9 points having safety facilities, mobile phone coverage and located less than 20 km from the nearest hospital.

This sub-criterion had very low results making it with an average of 3.5 points or 0.52 in 1.5 points.

Priority actions in the geosites to improve the sub-criterion A.6.:

- ✓ **3. The Ivalojoki esker at Toloskoski rapids:** the creation of a bridge to cross the river, in this way it could have instead of 7 points, 8 points.
- ✓ **15. Tor formations at Pyhä-Nattanen:** this geosite doesn´t need a safety facility but in its access is necessary because near this geosite there is a block field that visitors have to cross to reach the tor formations and when it is raining or starts to have ice it is quite slippery making it necessary to create for example a wooden boardwalk. In this way it could have instead of 2 points, 5 points.
- ✓ **16. Block field covering the Nattaset fells:** as this is a block field, when it rains or there is frost it is quite danger and very slippery, so it could be important to create a wooden boardwalk in this geosite, making it instead of 2 points, 5 points.
- ✓ **19. The Rahajärvi collapsed cliff:** some stairs to make easier the access of the geosite and a fence to protect people from the falling rocks from the cliff, in this way it could have instead of 7 points, 8 points.

Related with the cellphone coverage and the hospitals, nothing can be done. Some geosites didn´t had safety facilities but they are not dangerous. In this way with the improvements above described the average could rise a little bit, being 3.83 points or 0.57 in 1.5 points.

A.7. Safety in the geosite and its access (15%)

The safety in the geosite and its access had better results than the safety in case of an accident (A.6.). This sub-criterion starts with one geosite with 5 points (site with moderate danger) geosite number 19. The Rahajärvi collapsed cliff where it is advised to have some attention when it comes to be closer to the geosite, some rocks can fall, and when there is snow more danger is added. Three geosites with 6 points having moderate danger in their access; four with 8 points, means the geosite requires a little bit of precaution and the access is safe; nine sites with 9 points, being the access safe (requiring a little bit of precaution) and safe geosite. Finally, seven geosites reached the

maximum points (10) being the geosite as well its access safe. This sub-criterion reached a high average with 8.58 or 1.28 on 1.5 points.

Priority actions in the geosites to improve the sub-criterion A.7.:

- ✓ **3. The Ivalojoki esker at Toloskoski rapids:** the creation of a bridge to cross the river and a good well-marked trail, in this way it could have instead of 6 points, 10 points.
- ✓ **5. The Ainikkaharju esker:** there is no marked trail to this geosite making it difficult to find if a person doesn´t have good orientation skills, so it will be important to have a well-marked trail that leads to this geosite, in this way the geosite instead of 6 points could have 9 points.
- ✓ **11. The Nälkäaapa mire:** there is no marked trail to this geosite making it difficult to find if a person doesn´t have good orientation skills, so it will be important to create signs showing in a clear way where the geosite is, in this way instead of 6 points, the geosite could have 8 points.
- ✓ **15. Tor formations at Pyhä-Nattanen:** this geosite doesn´t need a safety facility but in its access is necessary because near this geosite there is a block field that visitors have to cross to reach the tor formations and when it is raining or starts to have ice it is quite slippery making it necessary to create for example a wooden boardwalk, in this way it could be instead of 9 points, 10 points.
- ✓ **16. Block field covering the Nattaset fells:** as this is a block field, when it rains or there is frost it is quite danger and very slippery, so it could be important to create a wooden boardwalk in this geosite, making it instead of 8 points, 10 points.
- ✓ **19. The Rahajärvi collapsed cliff:** some stairs to make the access easier and a fence to protect people from the falling rocks from the cliff, in this way it could have instead of 5 points, 10 points.

Having the geosites above improved the average can reach 8.58 or 1.28 points to 9.29 points or 1.39 in 1.5 points.

B. Use (10%)

B.1. Signage (2%)

As the geopark is at the beginning stage, none of the geosites have yet the sign saying “geosite”, some of them which has some kind of sign are not well signed, others don´t have signs at all and few have clear signs making this sub-criterion not so good ranked. Twelve geosites had 0 points due to the fact that there is no signs in the access road to the geosite neither in the geosite, making it quite impossible to locate; two geosites with 2.5 points, with sings only in the access roads; two with 5 points, which means there is signs only near the geosite or in the geosite; and finally, eight reached the 7.5 points which means there is signs in the main road which lead to the site and in the site showing it as a touristic place or a geological site; none reaching the maximum points (10 points: signs showing it is a “geosite”). The lack of signs in access roads to the geosites and also in the geosites gave a very low average in this sub-criterion, only with 3.12 points or 0.06 in 0.2 points.

Priority actions in the geosites to improve the sub-criterion B.1.:

- ✓ All the geosites must have the sign saying “geosite” of the Golden Geopark and as there is only a main road in the geopark that links to secondary ones it is important to put in the main road (E75) signs saying “geosite” and in the roads that leads to the geosites. Related with the trails, mostly of them have a board information at the starting point of the trail being important to mention the geosites on them.

This is a sub-criterion that can have 10 points or 0.2 in 0.2 points, having in this way the maximum points.

B.2. The current use of the geosite in terms of geological interest (2%)

Fortunately this sub-criterion was good, being all geosites (24 geosites) with 7.5 points meaning that the geological information is in internet, leaflets, maps, books and also in some board information, not having reached the 10 points - an interpretative centre for the geosites. In this way it had an average of 7.5 points or 0.15 in 0.2 points.

Priority actions in the geosites to improve the sub-criterion B.2.:

- ✓ Having a small interpretative centre for example in Tankavaara Visitor Centre or in the mineral exhibition from Tankavaara International Gold Museum or other partner with a space to do an exhibition, could rise the points from 7.5 or 0.15 to

10 or 0.2 points but of course it is not a must cause the information is already in internet, leaflets, books, maps and it is very easy to access.

B.3. The current use of the geosite for other types of interest (2%)

In this sub-criterion none of the geosites had the minimum points (0 points) - any kind of type of interest, promotion and/or use; starting with four with 1 point, geosite with other types of interest but without promotion and/or use; eight geosites with 3 points, meaning that the geosite is integrated in a non-circular walking trail and ski trail or non-circular trail (walking or ski trail) and non-circular boat/canoe route; five geosites with 5 points, geosite integrated in a circular walking trail or sky trail or geosite integrated in circular boat/canoe route; four with 7 points, meaning that the geosite has a circular walking trail and ski trail or circular trail (walking or ski trail) and circular boat/canoe route. None having 9 points, meaning the geosite has other type of interest, with promotion but not use; the best points (10) geosite with other type of interest(s), promotion and use being here three geosites. This sub-criterion had an average of 4.41 points or 0.08 points.

Priority actions in the geosites to improve the sub-criterion B.3.:

- ✓ **5. The Ainikkaharju esker:** this geosite is not signed at all, so it could be important to create a well-marked trail showing this geosite, having in this way instead of 1 point, 3 points.
- ✓ **11. The Nälkäaapa mire:** the creation of a small hiking trail to see this geosite, in this way it could have instead of 1 point; 3 points.
- ✓ **18. Hummocky moraine area at Kirakkaköngäs** and **19. The Rahajärvi collapsed cliff:** the creation of a circular hiking trail to link these geosites and the 17. Karhunpesäkivi geosite too, it could be developed two routes - one smaller and other bigger - linking those three geosites, having in this way instead of 1 points, 5 points. In the future a circular ski trail could be also implemented here having in this way 7 points the geosites nº 18 and nº19.

With small improvements this sub-criterion can have 5.12 points or 0.10 in 0.2 points and if the geosite number 17, 18 and 19 can have a circular hiking trail and ski trail the average will rise a little bit more reaching 5.29 points or 0.10 points in 0.2.

B.4. Use limitation of the geosite (4%)

The sub-crierion of use limitations has a really good score with most of the geosites being possible to visit without any restrictions (10 points), only one had restrictions like private property (2.5 points: 3. The Ivalojoki esker at Toloskoski rapids) and two had physical restrictions (7.5 points: like fences, obstacles). This sub-criterion had maximum of 9.47 or 0.37 points in 0.4 points.

Priority actions in the geosites to improve the sub-criterion B.4.:

As this sub-criterion had really good average nothing was changed. The geosites with physical restrictions are possible to be visited and even the 3. The Ivalojoki esker at Toloskoski rapids has private properties before reaching the geosite is still possible to be visited and there is the option of canoe where there is no private properties to cross.

C. Logistics (25%)

C.1. Cleanliness (5%)

Here the results were satisfactory, there weren´t dirty geosites, full of rubbish spread all over the place giving a bad look to the site. All the geosites were clean, and the ones with less points, seven geosites with 5 points, were clean only without rubbish bins; the majority of the geosites, fifteen geosites, had 7.5 points, meaning that the geosites were clean without a rubbish bin but they were located less than 5 km from the geosite. Only two reached the 10 points, meaning that the geosite had rubbish bins. This sub-criterion had an average of 6.97 or 0.34 points in 0.5 points.

Priority actions in the geosites to improve the sub-criterion C.1.:

Here nothing needs to be changed, of course to reach the 10 points all the geosites must have a rubbish bin but as all the geosites are clean even if they don´t have a rubbish bin, it is not so important to improve this sub-criterion.

C.2. Toilets (5%)

Here the results were in the middle (not so good but also not so bad) due to the fact that even in the wilderness the trails are prepared with dry toilets for outdoor people, so there were sites with the minimum points (1 point) and maximum as well (10 points), being a big part of the geosites with 2.5 points. In this way two geosites had 1

point meaning that the geosites have toilets more than 5 km; ten with 2.5 points, toilets less than 5 km; four geosites with 5 points, toilets less than 1 km from the geosites; four geosites with 7.5 points, toilets less than 200 metres from the geosite; four geosites with 10 points, toilets on the geosite. The average here is 4.87 points or 0.24 points in 0.5 points.

Priority actions in the geosites to improve the sub-criterion C.2.:

Even though the average of this sub-criterion was not so high, it is not a must to improve it since in the wilderness far from the cities and villages there are always dry toilets for people when hiking, canoeing, etc. One thing which could justify the creation of more dry toilets or other types of toilets is for example if the number of visitors doing outdoor activities increases in a considerable number.

C.3. Restaurants (5%)

The sub-criterion here was not good, being the maximum points 5 and only for two geosites and the rest under this value. In this way there were seven geosites with 0 points, meaning there is no restaurants less than 20 km; two geosites with 1 point, being the nearest restaurants between 5 km and 20 km but opening seasonally; seven geosites with 2 points, being the nearest restaurant between 5 km and 20 km open all year round; two geosites with 3 points, having a restaurant between 1 km and 5 km opening seasonally; four geosites with 4 points, having a restaurant between 1 km and 5 km opening all year round; finally two geosites with 5 points (only a café in the geosite or less than 1 km from the geosite and it opens seasonally), the two geosites with 5 points are: 17. Karhunpesäkivi and 18. Hummocky moraine area at Kirakkaköngäs. The sub-criterion had so few points that makes the average here quite low, having only 2 points or 0.1 points in 0.5 points.

Priority actions in the geosites to improve the sub-criterion C.3.:

This was also a sub-criterion that nothing could be changed, of course in the trails there are fireplaces to make food but restaurants are quite far and of course it would be very expensive to create a restaurant in the geosites which are far. Also here only when the geopark starts to work and there is a justification for that it could be changed something, for example opening a café or restaurant all year round instead of shorter time or the construction of a new one.

C.4. Accommodation (5%)

In the accommodation the results were not so good but better than in C.3. In this way there are seven geosites with the minimum points (1 point), meaning there is a hut for hikers in the hiking trail or in the geosite; one geosite with 4 points, many types of accommodation less than 20 km and it opens seasonally; twelve geosites with 5 points having many types of accommodation less than 20 km; and finally, four geosites with 7 points having many types of accommodation less than 5 km. Having in total of 4.12 points or 0.2 points in 0.5 points.

Priority actions in the geosites to improve the sub-criterion C.4.:

Here, like it happened in the restaurants, nothing can be changed at the moment, maybe in the future if it justifies.

C.5. Local buses (5%)

As the public local buses are quite few and working only couple hours per day, this sub-criterion was low ranked having ten geosites with 0 points, geosite more than 20 km from the bus stop for a local bus; six geosites with 2 points, geosite between 10 km and 20 km from the bus stop for a local bus; one geosite with 4 points, between 5 km and 10 km from a bus stop for a local bus; four geosites with 6 points, geosite between 1 km and 5 km from a bus stop for a local bus; one with 8 points, geosite less than 1 km from the bus stop for a local bus; finally, two reached the maximum points (10 points), there is a bus stop in the geosite (less than 300 metres): 17. Karhunpesäkivi and 18. Hummocky moraine area at Kirakkaköngäs. This sub-criterion received an average of 2.83 points or 0.14 points in 0.5 points.

Priority actions in the geosites to improve the sub-criterion C.5.:

Also here it is very difficult to change something at the moment only in the future if it justifies, the other options is to rent a car or go by taxi.

D. Perceptiveness (5%)

D.1. Aesthetics (2.5%)

This sub-criterion was the most subjective (based on the opinion of one viewer) and according to the viewer´s point of view the results here were not so satisfactory being only a geosite with 10 points and mostly of them with 4 points, fortunately none

of them had 0 points. In this way three geosites had 1 point, being a geosite without any kind of beauty; eleven with 4 points, being a pleasant geosite, without any outstanding beauty; two with 5 points, pleasant geosite, with some moderately attractive elements (small dimension); four geosites with 7 points being a pleasant geosite, with attractive elements, with visual impact; three with 8 points being very attractive geosite, with a strong visual impact; and only one geosite reached 10 points, being all the elements of the geosite extremely attractive, with a huge visual impact: 15. Tor formations at Pyhä-Nattanen. This sub-criterion had an average of 4.95 points or 0.12 points in 0.25 points.

Priority actions in the geosites to improve the sub-criterion D.1.:

As this sub-criterion is subjective, depends on the person´s opinion when is looking to the geosite, it can´t be changed and since there is no geosite with negative impact (rubbish spread all over the place) this sub-criterion will have the same results as before.

D.2. Interpretative potential (2.5%)

In this one, twenty three geosites had the maximum points, all the geological elements are presented in a very clear way and understandable for all types of public, only one geosite had 5 points, the visitor need to have some geological background to understand the geological element(s) of the geosite: 1. The Lihr rock and its bedrock outcrops. This sub-criterion had a successfully 9.79 points average or 0.24 in 0.25 points.

Priority actions in the geosites to improve the sub-criterion D.2.:

- ✓ **1. The Lihr rock and its bedrock outcrops:** was the only geosite receiving 5 points instead of 10 points due to the fact that is a little bit difficult to understand its features but with a good geological explanation it can reach the 10 points easily, making in this way an average of 9.79 or 0.24 points to 10 points or 0.25 points in this sub-criterion.

Touristic Value Assessment of the Gold Historical Sites

In all four criteria the one which had better average was B. Use with 7.12; next D. Perceptiveness with 7.1; A. Availability with 6.05 and finally C. Logistics with 4.1 points. When the four main criteria have different weights is possible to observe the A. Availability had 3.67 points in a total of 6; B. Use 0.74 points in a total of 1 point; C. Logistics 1.01 in 2.5 points and finally in the criterion D. Perceptiveness 0.35 points in 0.5 points.

A. Availability (60%)

A.1. Seasonal Occupancy (20%)

In the seasonal occupancy the average was the same as in the geosites, being 6.6 points or 1.32 in 2 points. In this way seventeen sites were open two seasons (5 points) and eight all year round (10 points), none of them being open one season (2.5 points) or three (7.5 points).

Priority actions in the gold historical sites to improve the sub-criterion A.1.:

- ✓ **19. The memorial to Sauva-Aslak:** could be open all year round, so instead of 5 points it could have 10 points.

It is difficult to know if the ones with 5 points could be open all year round because the costs to maintain them and the safety can be factors to keep them closed. If this gold historical site above mentioned could be open all year round the points will not change so much but this sub-criterion could have 6.8 points or 1.36 points in 2 points.

A.2. Terrestrial accessibility (2.5% or 5%)

In this sub-criterion the results were not satisfactory, with an average of 3.72 or 0.09 points, being lower than in the geosites. The gold historical sites are between 1 point and maximum 7 points, none reaching more than this, this happens due to the fact that many gold historical sites are in the wilderness having the visitor to walk to see them. In this way there is three gold historical sites with 1 point, 2. Ruikanmutka*;* 7. Ritakoski's Kultala Gold Village and 8. Ritakoski steam engine being the access to these sites very difficult only possible with special equipment like for example a boat or canoe; twelve gold historical sites with 3 points being the access possible and located

more than 4 km from a paved road or forest vehicle road; three with 4 points, being the historical site located between 2 km and 4 km from a paved road or forest vehicle road; one gold historical site with 5 points, being the site located between 1 km and 2 km from a paved road or a forest vehicle road; five sites with 6 points, being the site between 500 metres and 1 km from a paved road or a forest vehicle road and finally the only site reaching 7 points, located between 200 and 500 metres from a paved road or forest vehicle road, site number 16. Carl Gustaf mine shaft.

Priority actions in the gold historical sites to improve the sub-criterion A.2.:

- ✓ **2. Ruikanmutka*:*** the construction of a bridge because it is very difficult and dangerous to cross the river to see this site, having instead of 1 point, 3 points.
- ✓ **7. Ritakoski's Kultala Gold Village** and **8. Ritakoski steam engine:** the construction of a bridge near these two sites since the nearest bridge to cross the river stays quite far (about 10 km), having both in this way instead of 1 point, 2 points each.

The distances to reach the gold historical sites can´t be changed, only the number 2, 7 and 8 were changed due to its difficult access. In this way the average didn´t increase so much having 3.96 points or 0.099 in 0.25 points.

A.3. Availability according to people´s physical conditions when the activity is hiking or walking (2.5%)

This sub-criterion didn´t had so much difference from the geosites, being here the average of 6.28 points or 0.15 in 0.25 points while in the geosites it was 6.87 or 0.17 points. This is related with the long distances to reach the gold historical sites, like it happened with the geosites. In this way there are two sites with 1 point, being the site very difficult to reach only possible for people with excellent physical conditions; fifteen with 5 points, being the site with moderate difficulty at least for people with good physical conditions; and finally eight sites reached the maximum points (10 points), being those sites very easy, even for children, in these sites the distances are quite short and the paths are in good conditions.

Priority actions in the gold historical sites to improve the sub-criterion A.3.:

Here nothing was changed because it depends mostly on the person´s physical conditions, if he/she is able to walk many kilometres or not or if a child can manage some small distances, and mostly of the paths are in good conditions only having in some of them (mostly on the shores of Ivalojoki River) some ups and downs, rocky parts and very steep areas which requires from the person a good physical preparation and good outdoor gear.

A.4. Boat and/or canoe access (2.5%)

In twenty five gold historical sites, seventeen had the option of boat and/or canoe being here the average of 4.6 or 0.16 points in 0.25. There were four sites with 1 point, being the site more than 4 km from a boat and/or canoe; two with 3 points, site between 2 and 4 km from a boat and/or canoe; one with 5 points, site between 1 km and 2 km from a boat and/or canoe; and finally, ten had 10 points being very close to a boat and/or canoe (less than 50 metres).

Priority actions in the gold historical sites to improve the sub-criterion A.4.:

Also in this sub-criterion nothing could be changed relatively to the distances between the gold historical sites and the boat and/or canoe place.

A.5. Visibility (2.5%)

In this sub-criterion the average was very good being 9.24 points or 0.23 in 0.25 points, better than in the geosites. Here, only a site had 5 points having the need to go closer to see better all the historical elements and the rest of them with 9 and 10 points. The ones which received 9 points are fourteen, the visibility to all historical elements is excellent; with 10 points are ten, the visibility of the gold historical site is good to all or the most important historical elements even with snow and darkness.

Priority actions in the gold historical sites to improve the sub-criterion A.5.:

- ✓ **2. Ruikanmutka:** cleaning the vegetation around the buildings, in this way could have 9 points instead of 5.

In the rest of the sites nothing was changed since they are good ranked and if they are not so perfectly visible in winter time is not a problem at all, in this way the average could slightly rise from 9.24 or 0.23 points to 9.4 or 0.23 in 0.25 points.

A.6. Safety - in case of an accident (15%)

In the safety in case of an accident the results were very bad, only with 2.96 or 0.44 in 1.5 points, being even lower than in the geosites. This low results are related with the fact that many of the gold historical sites are in the wilderness far from hospitals and without cellphone coverage. None of the sites had 0 points (site impossible to visit due to the high danger on it); starting with thirteen sites with 1 point (site without any safety facilities, no mobile phone coverage and located more than 50 km from the nearest hospital); one with 2 points (no safety facilities, more than 50 km from the nearest hospital but with mobile phone coverage); four with 3 points (with safety facilities but more than 50 km from the nearest hospital and no mobile phone coverage); one with 5 points (with safety facilities, mobile phone coverage but located more than 50 km from the nearest hospital); and finally, six sites reached 7 points (site with no safety facilities but with mobile phone coverage and located less than 50 km from the nearest hospital).

Priority actions in the gold historical sites to improve the sub-criterion A.6.:

- ✓ **2. Ruikanmutka:** the construction of a bridge for hikers to cross the river, having in this way instead of 1 point, 3 points.
- ✓ **7. Ritakoski's Kultala Gold Village** and **8. Ritakoski steam engine:** the construction of a bridge for hikers to cross the river, having in this way instead of 1 point, 3 points each site.

The rest of the gold historical sites nothing much could be done since the mobile phone coverage and the distances from the nearest hospital are quite difficult to change and the gold historical sites which don´t have safety facilities don´t make them dangerous, actually mostly of the paths are quite well preserved and taking care of. If the gold historical sites above mentioned could be improved, the average could change slightly having 3.2 points or 0.48 in 1.5 points.

A.7. Safety in the gold historical site and its access (15%)

The results were really good being the average of 8.4 points or 1.26 in 1.5 points, slightly lower than in the geosites. In this way, only one gold historical site had 2 points (high danger in the access to the site): 2. Ruikanmutka, very dangerous to cross the river; five with 6 points (moderate danger in the access to the site); the rest of the

sites had good points having twelve 9 points (safe access only with a little precaution and safe site) and seven 10 points (safe access and site).

Priority actions in the gold historical sites to improve the sub-criterion A.7.:

- ✓ **2. Ruikanmutka:** the construction of a bridge for hikers to cross the river, having in this way instead of 2 points, 9 points.
- ✓ **7. Ritakoski's Kultala Gold Village** and **8. Ritakoski steam engine:** the construction of a bridge for hikers to cross the river, having in this way instead of 9 points, 10 points each.
- ✓ **18. The old cabin at Suomunruoktu:** as this cabin is in the wilderness, orientation skills are required to find this site, in this way it will be better for the safety of the hikers to have a well-marked path, having this gold historical site instead of 6 points, 9 points.
- ✓ **23. Pihlajamäki:** in the area where this gold historical site is located is quite common to have thick fog making quite difficult to see something, so it will be important to mark quite well the trail with poles closer to each other showing the way. This will make instead of 6 points, 9 points.
- ✓ **24. Karhu Korhonen's Library:** having poles closer to each other to sign the path because is quite common fog and bad weather in this area, having in this way instead of 6 points, 9 points.

If this actions above mentioned could be practiced the average will rise from 8.4 points or 1.26 points to 9.12 points or 1.36 points in 1.5 points.

B. Use (10%)

B.1. Signage (2%)

The results here were quite spread, having some sites low points and others high points making in this way an average of 4.8 or 0.096 in 0.2 points, more than in the geosites. As the gold history in this region is very rich, some of the gold historical sites have good signage, the only thing missing in all of them are signs showing that they are gold historical sites from the geopark. In this way there are six gold historical sites with 0 points (no signs in the access road to the site neither in the site); one with 2.5 points (signs only in the access road); seven with 5 points (signs only near the site or in the place); eleven sites with 7.5 points (signs on the main road access and in the site

showing it is a touristic place, historical site or geological site); and none reaching the 10 points.

Priority actions in the gold historical sites to improve the sub-criterion B.1.:

- ✓ All the gold historical sites need signs in the access roads and in the site saying is a gold historical site from the Golden Geopark. As there is only a main road that links to secondary ones it is important to put in the main road (E75) and in the roads that leads to these sites the signs. Related with the trails, mostly of them have a board information at their starting point where it is necessary to mention the historical sites. In this way the average will be 10 points or 0.2 in 0.2 points.

B.2. The current use of the gold historical site in terms of historical interest (2%)

Until now this was the best sub-criterion from the gold historical sites and from the geosites, with all the sites having 10 points, making in this way the average of 10 points or 0.2 points in 0.2 points due to the fact that all gold historical sites are represented in a museum, the International Gold Museum of Tankavaara.

B.3. The current use of the gold historical site for other interests (2%)

The results here were not good, with 4.6 or 0.09 points in 0.2 points, a little bit lower than in the geosites. Mostly of the sites (nineteen sites) had 3 and 5 points and only three reached the 10 points. In this way there is one site with 0 points (site without other type of interest, promotion and/ or use); one site with 1 point (site with other types of interest but without promotion and/ or use); nine with 3 points (site integrated in a non-circular walking trail and ski trail or non-circular trail, walking or ski trail, and non-circular boat/canoe route); ten sites with 5 points (site integrated in a circular walking trail or sky trail or site integrated in circular boat/canoe route); one with 7 points (site with a circular walking trail and ski trail or circular trail, walking or ski trail, and circular boat/canoe route) and three with 10 points (site with other type of interest(s), with promotion and use).

Priority actions in the gold historical sites to improve the sub-criterion B.3.:

- ✓ **19. The memorial to Sauva-Aslak:** on the path that leads to this memorial there is some remains of the Lapland War like old bombs, mines, grenades that could

be better preserved and with some structure like showcases in the trail instead of being on the floor and getting damage like it happens right now (Figure 4.4.). In this way not only gold history will be held but also a little bit of Lapland War history, having this sub-criterion instead of 1 point, 10 points.

Related with the other gold historical sites, is not a must to change them since they are already integrated for example in hiking trails, ski trails, canoe routes. The average can rise a little bit from 4.6 or 0.092 points to 4.96 or 0.099 points if the site above could be improved.

Figure 4.4. Bombs, grenades, mines from the Lapland War left on the path.

B.4. Use limitations of the gold historical site (4%)

In this sub-criterion the average of the sites was very good, having 9.1 points or 0.36 in 0.4 points, a little bit less than in the geosites. The majority of the sites (twenty sites) had 10 points (site without any restrictions); three with 7.5 points (site with physical restrictions like fences, obstacles, etc.) and two with 2.5 points (site with

restrictions like opening hours, private property, etc.), none of them having 0 points (without any possibility to visit the site).

Priority actions in the gold historical sites to improve the sub-criterion B.4.:

Here nothing needs to be changed since the average is very good and all gold historical sites can be visited even if they have restrictions.

C. Logistics (25%)

C.1. Cleanliness (5%)

This sub-criterion has a good average of 7.9 points or 0.39 points in 0.5 points, a little bit more than in the geosites. Being none of the gold historical sites with 0 points (site without any cleanliness, full of rubbish spread all over the place) and 2.5 points (site not so clean but with rubbish bins), being the minimum points 5 for three sites (clean site but without rubbish bins); fifteen with 7.5 points (clean site without rubbish bins but located less than 5 km from the site) and seven with 10 points (clean site with rubbish bins).

Priority actions in the gold historical sites to improve the sub-criterion C.1.:

Like it happened in the geosites, this sub-criterion doesn´t need changes, of course to reach the 10 points it could be arrange in every sinlge gold historical site a rubbish bin but as all the sites are clean even when they don´t have a rubbish bin, it is not a must to change this sub-criterion.

C.2. Toilets (5%)

This sub-criterion had not so bad results, having an average of 6.54 points or 0.32 points in 0.5 points, higher than in the geosites. There is only one site with the minimum points (1 point) having the toilets more than 5 km from the site; eight with 2.5 points, toilets less than 5 km from the site; three with 5 points, toilets less than 1 km from the site; one with 7.5 points, toilets less than 200 metres from the site; and twelve with 10 points, toilets in the site.

Priority actions in the gold historical sites to improve the sub-criterion C.2.:

In this sub-criterion is not a must to improve it since there is always dry toilets in mostly of the trails for people when hiking, canoeing, etc. One thing which could justify

the creation of more dry toilets or other types of toilets is for example if the amount of visitors doing outdoor activities increases in a considerable number.

C.3. Restaurants (5%)

This sub-criterion had very bad average, only reaching 1.28 points or 0.06 in 0.5 points, worse than in the geosites. As many gold historical sites are in the wilderness the restaurants are quite far from the sites, in this way seventeen gold historical sites have 0 points (there is no restaurants less than 20 km from the site); two with 2 points (restaurant between 5 km and 20 km); five with 4 points (restaurant between 1 km and 5 km from the site); one with 8 points (restaurant less than 1 km from the site); and none reached the 10 points (restaurant in the site, less than 300 metres).

Priority actions in the gold historical sites to improve the sub-criterion C.3.:

This was also a sub-criterion that nothing could be changed, of course in the trails there are fireplaces to make food but restaurants are quite far and it would be very expensive to create a restaurant in such a remote areas. Also here only when the geopark starts to work it could be changed something, for example opening a café or restaurant all year round instead of shorter time or a construction of a new one if it justifies.

C.4. Accommodation (5%)

Here the results were lower than in the geosites, being the average of the gold historical sites for accommodation only 2.8 points or 0.14 points in 0.5, being seventeen sites with 1 point (there is a hut for hikers in the hiking trail and/or in the site); three with 5 points (many types of accommodation less than 20 km); four with 7 points (many types of accommodation less than 5 km) and only one with 10 points (many types of accommodation less than 1 km).

Priority actions in the gold historical sites to improve the sub-criterion C.4.:

Here, like it happened with the restaurants, nothing can be changed at the moment, maybe in the future if it justifies.

C.5. Local buses (5%)

This sub-criterion had very low average due to the same thing that happened in the geosites, few buses working in a very short time and long distances from the sites.

In this way this sub-criterion had 2 points or 0.1 points in 0.5 points, a little bit lower than in the geosites. None of the gold historical sites reached the 10 points (bus stop in the site, less than 300 metres); seventeen had 0 points (site more than 20 km from a local bus stop); one with 2 points (site between 10 km and 20 km from the bus stop for a local bus); four with 6 points (site between 1 km and 5 km from a local bus stop); and finally, three sites with 8 points (site less than 1 km from the bus stop for a local bus).

Priority actions in the gold historical sites to improve the sub-criterion C.5.:

Also here it is very difficult to change something at the moment, only in the future if it justifies, the other options is to rent a car or go by taxi.

D. Perceptiveness (5%)

D.1. Aesthetics (2.5%)

In the aesthetics, the gold historical sites had 4.2 points of average or 0.1 in 0.25 points, a little bit lower than in the geosites. Here there was no site with 10 points being the highest points 7 and the majority of the sites were between 4 and 5 points. In this way there is three sites with 1 point (site without any kind of beauty); ten sites with 4 points (pleasant site, without any outstanding beauty); ten sites with 5 points (pleasant gold historical site, with some moderately attractive elements – small dimension); and finally two with 7 points (pleasant site, with attractive elements, with visual impact).

Priority actions in the gold historical to improve the sub-criterion D.1.:

As this sub-criterion is subjective, depends on the viewer´s point of view when is looking to the gold historical sites, it won´t be changed and since there are no gold historical sites with negative impact (rubbish spread all over the place, for example) this sub-criterion will have the same average as before.

D.2. Interpretative potential (2.5%)

As there is a museum (Tankavaara Gold Museum), publications, among other materials explaining the gold historical sites, it is easy to general public understands in a very clear way all gold historical sites, having in this way the average of 10 points or 0.25 in 0.25 points.

Touristic Value Assessment of the Other Sites

Here the highest sub-criterion was D. Perceptiveness with 8.37 points; after that A. Availability with 7.61; B. Use with 7.35 and C. Logistics with 5.54 points. When the four main criteria have different weights is possible to observe the A. Availability had 4.52 points in a total of 6; B. Use 0.71 points in a total of 1 point; C. Logistics 1.36 points in a total of 2.5 points and finally the criterion D. Perceptiveness 0.41 points in a total of 0.5 points.

A. Availability (60%)

A.1. Seasonal occupancy (20%)

The average for this sub-criterion was 8.43 points or 1.68 points in 2 points, better than in the gold historical sites and the geosites. Being only two sites with 5 points (open two seasons); one with 7.5 points (open three seasons) and the rest of the five with 10 points (open all year round).

Priority actions in the other sites to improve the sub-criterion A.1.:

- ✓ **2. Sallivaara Reindeer Round-Up Site:** it could be open all year round, having in this way instead of 5 points, 10 points.
- ✓ **4. Ruijanpolku:** it could be open all year round, having in this way instead of 5 points, 10 points.

In this way the average will rise from 8.43 points or 1.68 points to 9.68 or 1.93 points.

A.2. Terrestrial accessibility (2.5% or 5%)

In the terrestrial accessibility the results were not so satisfactory, having an average of 4.25 or 0.1 in 0.25 points, not so different from the geosites and the gold historical sites. None of the sites had 0 points but the results were quite spread, three with 1 point (the access to the site is very difficult, only possible with special equipment: boat, canoe, etc.); one with 3 points (the access to the site is possible and it is located more than 4 km from a paved road or forest vehicle road); one with 4 points (site located between 2 km and 4 km from a paved road or forest vehicle road); one with 6 points (site located between 500 metres and 1 km from a paved road or forest vehicle

road); one with 8 points (site located between 50 metres and 200 metres from a paved road or forest vehicle road); and one with 10 points (site located less than 50 metres from a paved road or forest vehicle road with a parking area for a bus).

Priority actions in the other sites to improve the sub-criterion A.2.:

The accessibility is quite good and the sites which had 1 point have already transportation like boats from local enterprises, the rest of the sites the distances can´t be changed.

A.3. Availability according with people´s physical conditions when the activity is hiking or walking (2.5)

Here the average was quite good having 8.12 points or 0.2 in 0.25 points, better than in the geosites and the gold historical sites. None of the sites had 1 point (very difficult to reach the site, only for people with excellent physical conditions); starting with 5 points one site (moderate difficulty, at least good physical conditions); four with 7.5 points (easy even for people with no great physical conditions) and three with 10 points (very easy, even for children).

Priority actions in the other sites to improve the sub-criterion A.3.:

Here nothing was changed because it depends mostly on the person´s good physical conditions or not, if he/she is able to walk many kilometres or not or if a child can manage some small distances, and the trails are in good conditions and mostly of them without big difficulties.

A.4. Boat and/or canoe access (2.5%)

Here in eight sites, five had canoe and/or boat access being four with the maximum points, 10 points (site located less than 50 metres from a boat and/or canoe) and one with 5 points (site located between 1 km and 2 km from a boat and/or canoe) having an average of 9 points or 0.22 in 0.25 points, better average than in the geosites and gold historical sites.

Priority actions in the other sites to improve the sub-criterion A.4.:

Nothing will be changed since this sub-criterion had very good average and also it is quite difficult to change the distances between the sites and the boat and/or canoe places.

A.5. Visibility (2.5%)

In the visibility the average was very good having 9.5 points or 0.23 in 0.25 points, being similar with the geosites and gold historical sites. Here none of the sites had 0 or less than 9 points, being four sites with 9 points (the visibility is excellent to all geological/historical elements) and four reached the 10 points (good visibility to all or the most important historical/ geological elements even with darkness and snow).

Priority actions in the other sites to improve the sub-criterion A.5.:

Since the visibility results were quite satisfactory, changes in this sub-criterion were not necessary.

A.6. Safety (15%)

The average here was a little bit better than in the geosites and the gold historical sites, having an average of 4.37 points or 0.65 in 1.5 points and none of the sites had 0 points neither reached the 10 points. In this way the sites with less points were two with 2 points (site with no safety facilities and more than 50 km from the nearest hospital but with mobile phone coverage); one with 3 points (site with safety facilities - fences, stairs, handrails, etc.- but no mobile phone coverage and located more than 50 km from the nearest hospital); four with 5 points (site with safety facilities - fences, stairs, handrails, etc. -, mobile phone coverage but located more than 50 km from the nearest hospital) and one with 8 points (site with safety facilities, with mobile phone coverage and located less than 50 km from the nearest hospital).

Priority actions in the other sites to improve the sub-criterion A.6.:

Here nothing needs to be changed even when the sites don´t have safety facilities because they are not dangerous. Related with the distances from the hospital and mobile phone coverage, these factors are quite difficult to change.

A.7. Safety in the other site and its access (15%)

In this sub-criterion the results were better than in the geosites and the gold historical sites, having an average of 9.62 points or 1.44 in 1.5 points. Here none of the sites had 0 points or less than 8, starting from 8 points one site (safe site – only with a little precaution- and safe access); one with 9 points (safe access – only with a little precaution- and safe site) and six sites with 10 points (site and access without any danger for the visitor).

Priority actions in the other sites to improve the sub-criterion A.7.:

Another sub-criterion where nothing needs to be done. The site which received 8 points, 1. The Korkia-Maura Ice Cave, visitors should be careful to not fall in the rocks when entering in the cave but is still quite safe, and the site which received 9 points, 4. Ruijanpolku, is a safe hiking trail well singed and with some support structures for hikers but is always important when hiking to pay attention to the surrounding environment.

B. Use (10%)

B.1. Signage (2%)

Here the average was higher than in the geosites and the gold historical sites, having in this way 6.87 points or 0.13 in 0.2 points. None of the sites had 0 points or 2.5, starting with two sites with 5 points (signs only near to the site or in the site) and six with 7.5 points (sings on the main road access and in the site showing it is a touristic place, historical place or geological site).

Priority actions in the other sites to improve the sub-criterion B.1.:

- ✓ All must have sings showing “other sites” from the Golden Geopark. Since there is only a main road that links to secondary ones it is important to put in the main road (E75) and in the roads that leads to these sites signs showing is “other site” from the Golden Geopark. Related with the trails, mostly of them have a board information at their starting point being also important to mention the other sites on these information boards.

In this way the average could rise from 6.87 or 0.13 points to 10 points or 0.2 points.

B.2. The current use of the other site in terms of geological/historical interest (2%)

Here the average was very good with 9.68 points or 0.19 points in 0.2 points, better than in the geosites but lower than in the gold historical sites. None of the sites had 0 or 2.5 points (site without any type of promotion or site with promotion only in internet); being only one site with 7.5 points (promotion in internet and books, leaflets, maps or in information board), and seven with the maximum points (interpretative centre explaining the site).

Priority actions in the other sites to improve the sub-criterion B.2.:

- ✓ **1. The Korkia-Maura Ice Cave:** having a small interpretative centre for example in Tankavaara Visitor Centre or in the mineral exhibition from Tankavaara International Gold Museum or other partner with a space to do an exhibition could rise the points of this site from 7.5 to 10, but as there is already a board information in this site and all information centres know this place is not a must to create something more.

This sub-criterion could have instead of 9.68 or 0.19 points, the maximum points 10 or 0.2 points.

B.3. The current use of the other site for other types of interests (2%)

This sub-criterion didn´t had so much high average being only 6 points or 0.12 in 0.2 points but still better than in the geosites and in the gold historical sites. The results vary between two sites with 3 points (site integrated in a non-circular walking trail and ski trail or non-circular trail, walking or ski trail, and non-circular boat/canoe route); three with 5 points (site integrated in a circular walking trail or sky trail or site integrated in circular boat/canoe route); one with 7 points (site with a circular walking trail and ski trail or circular trail, walking or ski trail, and circular boat/canoe route) and finally two with 10 points (site with other type of interest(s), with promotion and/ or use). Fortunately, none had 0 or 1 points (site without any kind of interest, promotion and/or use or site with other types of interest without promotion and/ or use).

Priority actions in the other sites to improve the sub-criterion B.3.:

As mostly of the sites have some kind of hiking trail, ski trail or canoe route even if they are not all circular routes it is not a must to do alterations in the sites.

B.4. Use limitations of the other site (4%)

In this sub-criterion the average was lower than in the geosites and in the gold historical sites, with 6.87 or 0.27 in 0.4 points. None of the sites had 0 points (site impossible to be visited); starting with three sites with 2.5 points (site with restrictions like private property, opening hours, etc.); one with 7.5 points (physical restrictions like fences, obstacles, etc.) and four with 10 points (without any restrictions).

Priority actions in the other sites to improve the sub-criterion B.4.:

Here nothing needs be changed since all the sites can be visited.

C. Logistics (25%)

C.1. Cleanliness (5%)

This sub-criterion had an average of 8.43 or 0.42 in 0.5 points, higher than in the geosites and in the gold historical sites. There was no sites with cleaning problems (0 or 2.5 points) being all the sites clean but with some differences between them, one received 5 points being clean but without rubbish bins; three with 7.5 points being clean and with a rubbish bin less than 5 km from the site, and four with 10 points, clean site with rubbish bins.

Priority actions in the other sites to improve the sub-criterion C.1.:

Like it happened in the geosites and gold historical sites, here is not necessary to do alterations, of course to reach the 10 points it could be placed in every single site a rubbish bin but as all sites are clean even when they don´t have a rubbish bin, it is not a must to do changes in this sub-criterion.

C.2. Toilets (5%)

Here the average was 7.93 points or 0.39 in 0.5 points, better than in the geosites and gold historical sites. Having here one site with 1 point (site located more than 5 km from a toilet); one with 2.5 points (site located less than 5 km from a toilet); none of the sites had 5 points (toilets less than 1 km from the site) or 7.5 points (toilets less than 200 metres from the site), and being the rest of the sites (six) with 10 points (toilets in the site).

Priority actions in the other sites to improve the sub-criterion C.2.:

In this sub-criterion is not a must to improve since there is always dry toilets in mostly of the trails for people when hiking, canoeing, etc., one thing which could justify the creation of more dry toilets or other types of toilets is for example if the number of visitors doing outdoor activities increases considerably.

C.3. Restaurants (5%)

In this sub-criterion the average was quite low, with 2.75 points or 0.13 in 0.5 points but still a little bit better than in the geosites and gold historical sites. None of the sites reached the 10 or 9 points (restaurant less than 300 metres from the site and open seasonally or all year round); being one site with 8 points (restaurant less than 1 km from the site); one site with 4 points (restaurant between 1 km and 5 km); two sites with 3 points (restaurant between 1 km and 5 km and it opens seasonally); two sites with 2 points (restaurant between 5 km and 20 km) and two sites with 0 points (no restaurants less than 20 km from the site).

Priority actions in the other sites to improve the sub-criterion C.3.:

This was also a sub-criterion that nothing could be changed, of course in the trails there are fireplaces to make food but restaurants are quite far and of course it would be very expensive to build a restaurant in such a remote area. Also here only when the geopark starts to work it could be changed something, for example opening a café or restaurant all year round instead of shorter time or a construction of a new one if necessary.

C.4. Accommodation (5%)

The average here was not so much satisfactory having only 4.87 points or 0.24 in 0.5 points, still a little bit better than in the geosites and gold historical sites. Here is possible to observe two sites with 1 point (there is a hut for hikers in the trail or in the site); four sites with 5 points (many types of accommodation less than 20 km); one with 7 points (many types of accommodation less than 5 km) and one with 10 points (many types of accommodation less than 1 km).

Priority actions in the other sites to improve the sub-criterion C.4.:

Here, like it happened with the restaurants, nothing can be changed at the moment, maybe in the future if necessary.

C.5. Local buses (5%)

This sub-criterion had also very low average, only with 3.75 points or 0.18 in 0.5 points but the results were better than in the geosites and gold historical sites. Being three sites with 0 points (site more than 20 km from the bus stop for a local bus); one with 2 points (site located between 10 km and 20 km from the bus stop for a local bus); one with 4 points (site between 5 km and 10 km from a local bus stop); one with 6 points (site between 1 km and 5 km from the bus stop); one with 8 points (site less than 1 km from a bus stop) and one with 10 points (site with a bus stop – less than 300 metres).

Priority actions in the other sites to improve the sub-criterion C.5.:

Also here it is very difficult to change something at the moment, only in the future if necessary, the other options is renting a car or go by taxi.

D. Perceptiveness (5%)

D.1. Aesthetics (2.5%)

The results here were better than in the geosites and gold historical sites, with an average of 6.75 points or 0.16 points in 0.25 points, having three sites 5 points (pleasant site, with some moderately attractive elements -small dimension); two 7 points (pleasant site, with attractive elements, with visual impact); two 8 points (very attractive site, with a strong visual impact); and one 9 points (site extremely attractive, with a strong visual impact); none reaching the maximum points (10 points).

Priority actions in the other sites to improve the sub-criterion D.1.:

As this sub-criterion is subjective, depends on the person´s opinion when is looking to the sites, it will not be changed and since there is no sites with negative impact (rubbish spread all over the place) this sub-criterion will have the same average as before.

D.2. Interpretative potential (2.5%)

This one had an average of 10 points or 0.25 in 0.25 points, the same as in the gold historical sites only being the geosites with lower results, this means that all the geological or historical elements are understandable to all types of public.

Table 4. 1. Touristic value and degradation risk before and after the improvement actions, the blue color means they have better results after implementing some actions.

		Touristic Value Assessment: improving the criteria											
		Geosites				Gold Historical Sites				Other Sites			
		Touristic Value		Touristc Value Improved		Touristic Value		Touristic Value Improvement		Touristic Value		Touristic Value Improvement	
Criteria	Sub-Criteria	Average	Weight	Average	Weight	Average	Weight	Average	Weight	Average	Weight	Average	Weight
A. Availability	A.1. Seasonal Occupancy	6.6	1.32	7.08	1.41	6.6	1.32	6.8	1.36	8.43	1.68	9.68	1.93
	A.2.Terrestrial Accessibility	4.08	0.10	4.33	0.10	3.72	0.09	3.96	0.09	4.25	0.1	4.25	0.1
	A.3. Availability according to people´s physical conditions when the activity is hiking or walking	6.87	0.17	6.87	0.17	6.87	0.17	6.87	0.17	8.12	0.2	8.12	0.2
	A.4. Boat and/or canoe access	6.4	0.16	6.4	0.16	4.6	0.16	4.6	0.16	9	0.22	9	0.22
	A.5. Visibility	8.54	0.21	8.75	0.21	9.24	0.23	9.4	0.23	9.5	0.23	9.5	0.23
	A.6. Safety	3.5	0.52	3.83	0.57	2.96	0.44	3.2	0.48	4.37	0.65	4.37	0.65
	A.7. Safety in the site and its access	8.58	1.28	9.29	1.39	8.4	1.26	9.12	1.36	9.62	1.44	9.62	1.44
	Total	6.36	3.76	6.65	4.01	6.05	3.67	6.27	3.85	7.61	4.52	7.79	4.77
B. Use	B.1. Signage	3.12	0.06	10	0.2	4.8	0.096	10	0.2	6.87	0.13	10	0.2
	B.2. The current use of the site in terms of geological/historical interest	7.5	0.15	7.5/10	0.15/0.2	10	0.2	10	0.2	9.68	0.19	10	0.2

	B.3. The current use of the site for other interests	4.41	0.08	5.12/5.29	0.10/0.10	4.6	0.09	4.96	0.09	6	0.12	6	0.12
	B.4. Use limitations of the site	9.47	0.37	9.47	0.37	9.1	0.36	9.1	0.36	6.87	0.27	6.87	0.27
	Total	6.12	0.66	8.02/8.69	0.82/0.87	7.12	0.74	8.51	0.85	7.35	0.71	8.21	0.79
C. Logistics	C.1. Cleanliness	6.97	0.34	6.97	0.34	7.9	0.39	7.9	0.39	8.43	0.42	8.43	0.42
	C.2. Toilets	4.87	0.24	4.87	0.24	6.54	0.32	6.54	0.32	7.93	0.39	7.93	0.39
	C.3. Restaurants	2	0.1	2	0.1	1.28	0.06	1.28	0.06	2.75	0.13	2.75	0.13
	C.4. Accommodation	4.12	0.2	4.12	0.2	2.8	0.14	2.8	0.14	4.87	0.24	4.87	0.24
	C.5. Local buses	2.83	0.14	2.83	0.14	2	0.1	2	0.1	3.75	0.18	3.75	0.18
	Total	4.15	1.02	4.15	1.02	4.10	1.01	4.10	1.01	5.54	1.36	5.54	1.36
D. Perceptiveness	D.1. Aesthetics	4.95	0.12	4.95	0.12	4.2	0.1	4.2	0.1	6.75	0.16	6.75	0.16
	D.2.Interpretative potential	9.79	0.24	10	0.25	10	0.25	10	0.25	10	0.25	10	0.25
	Total	7.37	0.36	7.47	0.37	7.1	0.35	7.1	0.35	8.37	0.41	8.37	0.41

4.1.2. Degradation Risk

Degradation Risk of the Geosites

A. Legal Protection (20%)

Mostly of the geosites are located in an area with legal protection but no control of access, having here twenty geosites with 5 points and the rest of the sites had 10 points (sites in an area with no legal protection and without control of access). The average here is not so low but also not so high, having 5.83 or 1.16 points in 2 points.

B. Proximity to areas/activities with high possibilities to cause degradation (urban areas near, roads and railways, industrial mining activities, etc. (20%)):

The average here was quite low having only 0.79 points or 0.15 in 2 points, this happens because in the area of the geopark there is only gold panning made by enthusiasts but nothing related with big industrial mining. In this way, ten geosites had 0 points (geosite located more than 5 km from a potential degrading area/activity and/or small scale degrading area/activity like for example gold prospecting); nine with 1 point (geosite located between 1 km and 5 km from a small scale degrading area/activity, for example gold digging); and finally five geosites with 2 points (geosite located between 50 metres and 1 km from a small scale degrading area/activity, for example gold digging); none having more than this.

C. Deterioration of geological elements (35%)

Here were the best results (0 points) being all geosites safe, without danger of deterioration. Of course in a future it is important to create a geoconservation plan to manage these geosites but fortunately the scenario is not an emergency.

D. Proximity with villages, cities and touristic places (10%)

Here none of the geosites was close to a bigger city (more than 15000 inhabitants) or a bigger village (smaller than 15000 and bigger than 5000 inhabitants), being only three geosites less than 5 km from a village with couple hundred inhabitants or a touristic place (5 points); eight more than 5 km from a city, village or touristic place (2.5 points); and finally, thirteen in the wilderness (0 points). This makes this criterion with 1.45 points or 0.145 points in 1 point.

E. Accessibility (15%)

E.1. Terrestrial Accessibility (7.5%)

Here mostly of the geosites, twenty one, were located more than 100 metres from a forest vehicle road or geosite located more than 500 metres from a paved road (1 point); two with 5 points, located less than 100 metres from a forest vehicle road or geosite located between 100-500 metres from a paved road; and only one with 10 points, located less than 100 metres from a paved road with bus parking area (18. Hummocky moraine area at Kirakkaköngäs). The average here is very low having 1.70 or 0.12 points in 1 point.

E.2. Boat and/or canoe access (7.5%)

In twenty four geosites, ten have boat and/or canoe access being four geosites with 10 points (located less than 100 metres from a boat and/or canoe place); one with 7 points (located between 100-500 metres from a boat and/or canoe place); one with 5 points (located between 500 metres -1 km from a boat and/or canoe place); and finally, four with 1 point (located more than 1 km from a boat and/or canoe place). Having here an average of 5.6 points or 0.42 points in 0.75 points.

The nature conservation and protection in Finland is very effective and strict resulting in a very impressive variety of protected areas. Furthermore, the population in this far north is quite sparse with some villages and no big cities, and all geosites are in quite good conditions making in this way an easier task to conserve the geosites. Of course it will be important in the future to create a specific plan to manage all the geosites since there is not yet one developed.

Degradation Risk of the Gold Historical Sites

A. Legal Protection (20%)

In terms of legal protection there is nineteen gold historical sites with 5 points (located in an area with legal protection but no control of access) and six with 10 points (located in an area with no legal protection and no control of access), none being locate in an area with legal protection and control of access or in an area without legal

protection but with control of access, making the average of 6.2 points or 1.24 in 2 points.

B. Proximity to areas/activities with high possibilities to cause degradation (urban areas near, roads and railways, industrial mining activities, etc. (20%))

In the area of the geopark there is only gold panning made by enthusiasts but nothing related with big industrial mining activities, in this way none of the gold historical sites had more than 2 points. Having 2 points nineteen gold historical sites (site located between 50 metres and 1 km from a small scale degrading area/activity, for example gold prospecting); five 1 point (located between 1 km and 5 km from a small scale degrading area/activity, for example gold prospecting); and one 0 points (located more than 5 km from a potential degrading area/activity and/or small scale degrading area/activity, for example gold prospecting). In this way the average here is very low, with 1.72 points or 0.34 points in 2 points.

C. Deterioration of the historical elements (35%)

Unfortunately here there were gold historical sites with 10 points, three sites (deteriorated/in ruins already); five with 9 points (site already deteriorated/in ruins but with some small actions of protection and conservation); one with 8 points (possibility of deterioration of the main historical elements); two with 7 points (small possibility of deterioration of the main historical elements); and fourteen with 0 points (any danger of deterioration). Having in this way 3.88 of average or 1.35 points in 3.5 points.

D. Proximity with villages, cities and touristic places (10%)

Here none of the gold historical sites was close to a bigger city (more than 15000 inhabitants) or a bigger village (smaller than 15 000 inhabitants and bigger than 5000 inhabitants), being only six sites less than 5 km from a small village with couple hundred inhabitants or a touristic place (5 points); one site more than 5 km from a city, village or touristic place (2.5 points); and finally, eighteen in the wilderness (0 points). Having a good average here with 1.875 or 0.14 points in 1 point.

E. Accessibility (15%)

E.1. Terrestrial Accessibility (7.5%)

In this sub-criterion only one site had 5 points (located less than 100 metres from a forest vehicle road or located between 100-500 metres from a paved road, gold historical site nº 16. Carl Gustaf mine shaft) and the rest of them with 1 point (located more than 100 metres from a forest vehicle road or located more than 500 metres from a paved road), having this sub-criterion 1.16 of average or 0.087 in 0.75 points.

E.2. Boat and/or canoe accessibility (7.5%)

In twenty five gold historical sites, seventeen had boat and/or canoe access, being ten sites with 10 points (sites located less than 100 metres from a boat and/or canoe place) and seven with 1 point (gold historical sites located more than 1km from a boat and/or canoe place), being the average of 6.29 or 0.47 points in 0.75.

Even though mostly of the gold historical sites are in an area with legal protection (like it happens with the geosites), they are in remote areas and mostly of them are made of wood – material which gets bad with time. The critical cases are for example the sites 12. The Kerkelä mining village; 13. The Laanila white quartz rock and shaft; 14. The Kuivakuru panning facility; 15. General's mine shaft and 16. Carl Gustaf mine shaft (all belong to Laanila Gold Trail), those sites have board information and fences to protect the ruins (Figure 4.5.) still they are open (exposed to weathering that makes them degrading faster) and made of wood, in this way it could be implemented a more effective method to protect the ruins, like for example some kind of glass structure to cover the sites and people still could see them. The other gold historical sites which are in bad shape (already in ruins) because it is difficult to reach them and take care of all, the best scenario would be the restoration of all or, the other solution, the creation of some replicas but since this is a difficult task, the best option could be the continuation of the restoration and preservation works of some sites. The ones which are already in ruins and nothing can be done, a memorial on the place where they were could be a good idea. The International Gold Prospector Museum of Tankavaara does research and mapping of the old gold fields and with the collaboration of National Heritage Services (Metsähallitus) creates volunteer camps to restore some historical buildings, it could be developed more camps and including now the younger generations like for example students and scouts to create consciousness and awareness about these sites.

Figure 4.5. Wood from the shaft exposed to the weathering in the Gold Trail of Laanila.

Other Sites Degradation Risk

A. Legal Protection (20%)

Here, mostly of the sites were in an area with legal protection but no control of access (five sites with 5 points); two with 7.5 points (being in a rea with no legal protection but with control of access); and one with 1 point (having control of access as well as being in an area with legal protection); none of them being in an area with no legal protection and no control of access (10 points). Having in this way an average of 5.12 or 1.02 in 2 points.

B. Proximity to areas/activities with high possibilities to cause degradation (urban areas near, roads and railways, industrial mining activities, etc. (20%))

In this criterion the results were very good being seven sites with 0 points (located more than 5 km from a potential degrading area/activity and/or small scale degrading area/activity, for example gold prospecting) and only one with 1 point (site located between 1 km and 5 km from a small scale degrading area/activity, for example gold digging); having this criterion a very low average of 0.12 points or 0.024 in 2 points.

C. Deterioration of geological/historical elements (35%)

Also here the average was very good having only 0.87 points or 0.3 points in 3.5 points, being seven sites with 0 points (with no danger of deterioration) and only one, 1. The Korkia-Maura Ice Cave, with 7 points (having a small possibility of deterioration of the main geological elements).

D. Proximity with villages, cities and touristic places (10%)

Here none of the sites had more than 2.5 points, having 2.5 points five sites (more than 5 km from a city, village or touristic place); and three with 0 points (site in the wilderness), reaching in this way an average of 1.56 points or 0.156 points in 1 point.

E. Accessibility (15%)

E. 1. Terrestrial Accessibility (7.5%)

The accessibility was quite good having only an average of 1.5 or 0.11 points in 0.75 points, being seven sites with 1 point (located more than 100 metres from a forest vehicle road or site located more than 500 metres from a paved road) and one with 5 points (located less than 100 metres from a forest vehicle road or located between 100-500 metres from a paved road).

E.2. Boat and/or canoe access (7.5%)

In eight sites, five have canoe and/or boat access being four sites with 10 points (located less than 100 metres from a boat and/or canoe place) and only one with 1 point (located more than 1km from a boat and/or canoe place), being the average here quite high with 8.2 or 0.61 in 0.75 points.

Here mostly of the sites are in an area with legal protection and the degradation risk is very low. The most problematic site is the number 3. The Korkia-Maura Ice Cave since its permafrost started to thaw in summer time due to the visits of tourists to this cave, even if the only way to go to this site is by boat which controls a little bit the number of visitors, maybe in the future it will be necessary to have a more strict entrance in the cave (for example: only one time per week with a little amount of people visiting or visitation only two times per month).

4.2. Interpretative contents for visitors (leaflets, panels, trails)

- ✓ **Härkäselän Kultala – Gem and Mineral Exhibition of Tankavaara International Gold Prospector Museum**

The Gem and Mineral Exhibition is a separate building from the museum which is going to hold an improved exhibition. There are three floors, the first one is not going be renovated due to the good quality of the exhibition but the last two are going to be rebuilt next summer (2017). Some ideas from the museum are being developed and others in this work (next it will be presented both, ideas from the museum and from this work): the second floor will hold some stones from Lapland with a very small explanation of each one and a simple geological time scale that tells the geological history of Finland, maybe this geological time scale could be done by students from a local school. The third floor will be presented with some history of geology where it is planned to show some cases of the most notorious Finnish geologists as well as other prominent scientists in this area. Also in a different building from this museum or even in the interpretative centre of Tankavaara could be developed the explanation of each geosite of the Golden Geopark.

- ✓ **Sámi Museum and Northern Lapland Nature Centre Siida**

As this museum has a permanent and temporary exhibition, in the temporary one could be developed diferent types of exhibitions in different times of the year with subjects like geoparks, geoconservation, geotourism, among others related with those subjects. It could have also a temporary exhibition for a photograph competition for the geosites, gold historical sites and other sites, and the best photos receive a prize.

- ✓ **Information boards:**

Related with the information boards in the Golden Geopark of Lapland, it could be used only in the geosites (mostly because the gold historical sites and the other sites have more information boards) nearer the road (less than 2 km from the road) like for example 18. Hummocky moraine area at Kirakkaköngäs; 19. The Rahajärvi collapsed cliff, among others. In the most remote geosites no information boards at all because the creation for each geosite an information board takes the feeling of being in such a remote area (in the wilderness) and of course the costs to maintain them are higher than the ones nearer the road.

- ✓ **Books**

It could be developed a practical book with a map to take to the hiking/canoeing/boat trip. The visitors could buy or borrow these materials from an information centre (partner of the geopark) or from the nearest point of the trail like an accommodation place, restaurant, etc. The book and the map should have three levels for three different types of public (level 1, 2 and 3 - like it happens with some materials of the Basque Coast Geopark where they develop information for different types of public): the first level is a very basic map and book for children and people who wants simple information, the second level is more difficult for children to understand and adults have to have a certain interest for the subject and the third level is for adults who knows at least a little bit more geology than the rest of the general public, being this last level the information more detailed. The books and maps should be made from a material very resistant to water and practical to open and read.

- ✓ **Downloaded information**

As many sites are in the wilderness and there is no internet connection at all, one thing that could be developed is for example information to be downloaded for the cellphone before starting a trail. This could be created to Lemmenjoki area and Ivalojoki area too, where information about geosites, gold historical sites, other sites and other helpful content are presented. People should be aware that there is no electricity in the trails, so saving the battery of the cellphone is something important.

- ✓ **Hiking trails, ski trails and canoe routes**

The area of the Golden Geopark of Lapland is an excellent place for nature lovers providing good hiking trails, ski trails, canoe routes (many well-marked and others not marked for people with more experience and orientation skills); trails for different types of public (adventure people, families, among many others) all with day huts and overnight huts, fireplaces and dry toilets, having this area many ways to see the geosites, the gold historical sites and the other sites. Some details need to be improved in the trails, like for example in the Lemmenjoki trail and the Pahaoja – Kultala Gold Mining Village trail, at the beggining of both there is an information board (Figure 4.6.) for hikers about the rules, the infrastructures (huts, firepalces, dry toilets, among others) and a map showing everything in the area, for a better map should be mention the geosites, the gold historical sites and the other sites of the area as well as the canoe

and ski routes. Some parts of these trails should be better signed and it is necessary to create in some areas new trails (already explained in 4.1.1.Touristic value assessment).

Finishing the ideas about the trails, the trails in the area of the geopark don´t need to have a specific theme (e.g.: one trail talks about the ice age; other about the Greenstone belt), instead of this one trail can be used for different types of themes (e.g.: in one trail is possible to talk about the Ice Age, the Greenstone Belt, The Era of Weathering, among others). Some geosites are far from the road so there is no information boards making in this way more flexible to explain different types of themes, if it has a board information is not a problem because is still possible to connect to other subjects.

(a)

Figure 4.6. Lemmenjoki map (a) and Pahaoja – Kultala Gold Mining Village map (b).

Related with the canoe and boat routes, there should be signs like an high pole with a distinctive color that is not similar with the colors of the surrounding nature on the river banks to show the geosites, the gold historical sites and the other sites for canoeists and people with a boat.

- ✓ **Other interpretative materials and activities**

In the geological trail of Tankavaara there is an information board at the beginning of the trail about the geological features of the area as well as six boxes under it that are made for play a game (Figure 4.7). In this game, inside of those boxes are some leaves, stones, wood sticks among other natural materials and people have to try with their hands to guess what it is inside of each box. This game could be changed a little bit to geological purposes, like for example guessing by taking a stone away from a box which stone it is and after that check the information about the stone which is inside of each box, other idea could be a game where outside of each box there is an image (without a name) of some geological features like an esker, gorge, hill, and so

on, and students should guess which image is by writing down in a paper the name (esker, gorge, hill, etc.) and put it inside of the box where they think is the right image (this game could be played with teachers). This system could be implemented in more trails.

Figure 4.7. Begining of the Geological trail with a board information about the geology of the place and six boxes with some stones, leaves, among other materials from nature.

- ✓ **Libraries**

Publications of the Golden Geopark (eg.: application, papers from symposiums, conferences and future works) could stay in the library of Ivalo village in a small corner. Also the library car (a car that stops in each village and city to provide books for people) could have a place with the geopark publications or at least people could order them from this car.

4.3. Definition of a geotourism strategy (web, marketing, publications, events, etc.)

- ✓ **Promotion**

The Golden Geopark should promote itself as an area in the wilderness where people can explore the nature doing outdoor activities like hiking, canoeing, bicycling, gold prospecting, skiing, snowshoeing, among others, in a safe environment and with facilities for all kinds of public (outdoor people, families, younger and older groups) where geology, gold history and indigenous people are the main theme of the geopark. As the tourism in this area is quite seasonal, the geopark can help to promote Lapland all year round due to the creation of more activities and quality service.

✓ **Website of the Golden Geopark of Lapland project**

Related with the website of the Golden Geopark of Lapland (http://goldengeopark.fi), some parts have to be improved. One of these parts is in the description of each geosite, gold historical site and other site and their accesses, where there is a map of the access (Figure 4.8.), these maps should show better how to get to the sites or at least a link to the Excursion maps (https://www.retkikartta.fi); other crucial point is to show which sites are open or not all year round because in the website is not so well explained.

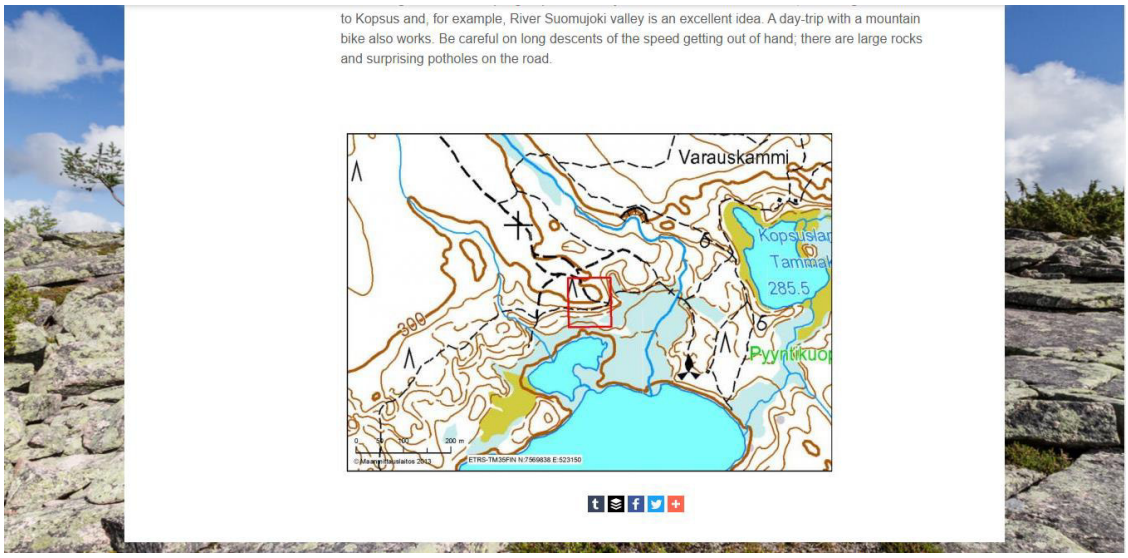


Figure 4.8. Map on the Golden Geopark of Lapland website showing how to reach one of the sites. Some improvements should be done.

Other small improvements should be done like for example in the introduction of the geopark. The website when speaks about the Golden Geopark of Lapland it just explains the projects which aimed to establish the geopark in this area, informing which were the responsible entities for the projects and its collaborators but it doesn´t say more, the only place which clarifies more is a link for the application of the geopark. For this reason, inside of the geopark website, it should have a little bit more of explanation about the geopark (a brief description of which is the main goal of the geopark, its philosophy, what is interesting to see in terms of geology, gold history and Sámi culture) not being only this information in the application form. Another idea, in the future, that could be applied in the geopark website, is a link promoting the partners with touristic activities (snowshoeing, snowmobile, ice-fishing, gold panning, etc.) and

the partners with accommodation. One other good idea in the future, used in the Basque Coast Geopark, is to create a calendar in the website of the geopark showing its activities and people could book directly from the website. Also this website should be promoted in the touristic websites of the area as well as the activities of the geopark (eg.: inarisaariselka.fi).

- ✓ **Touristic magazines, newspapers and other places**

The geopark should promote itself in local touristic magazines and newspapers as well as its activities and events. Taking the idea from the Azores Geopark, where they have in their regional newspaper a regular page published twice a month talking about the geosites, other geoparks, promotion of the partners, events/actions made by the geopark, etc., the Golden Geopark could also promote itself in regional newspapers and magazines with interesting subjects. With this newspapers and magazines create competitions, quizzes too, involving in this way more people in the subjects of the geopark.

The "capital" of Lapland is Rovaniemi (outside of the area of the geopark), being the entrance to Lapland, this makes this place an important point for information, for example put geopark information in the information centres of the city to promote the geopark.

- ✓ **Works to be developed by students**

It is a very important task for all geoparks to involve younger generations, for this reason the Golden Geopark should promote works/activities with students. One example that can be practiced is with the students of the University of Lapland in areas such as marketing, tourism, geology and environment. The activity/works can include work groups under the supervision of professors from the university and the groups could try to develop ideas, activities, strategies of nature conservation, marketing, among others in the area of the geopark. Also the development of summer camps or students exchange programs where students from other countries visit the Golden Geopark and develop some work related with the areas above mentioned it is an interesting task.

- ✓ **For bus groups and individual visitors who do not want to do outdoor activities**

As many geosites, gold historical sites and other sites are quite far from a road, requiring in this way at least an hike, it should be developed some sites near the roads for these kind of public to explain the geology of the area as well as the gold history and the Sámi culture. The sites can be sites already existed in the geopark (near to the road, not requiring big effort or long time to reach them) or new ones, like for example in Kaunispää view point (where it is possible to see a 360º view of the area), the Ukonjärvi Panorama Café, the view point near Karhunpesäkivi, among other points where a bus can stop and people don´t need to walk so much. Related with the gold historical sites and the other sites there is already museums, so the creation of points to see them is not so necessary as in the geosites.

- ✓ **Development of touristic packages for different groups**

The Golden Geopark should create packages for different groups like for example families, schools, bus groups, people who like nature, very adventurous people and for different times of the year (winter, spring, autumn and summer). It should include accommodation, restaurants, trails, other nature activities and a different package for the most adventurous ones who like to spend the night in nature and like to do long distances.

Conclusions

The work developed here had the 57 sites of the Golden Geopark of Lapland project assessed in terms of their touristic value as well as their degradation risk. For the touristic value assessment this work was mainly based on the proposals by Pereira and Pereira (2012) and Gonçalves (2013) and for the degradation risk an adaptation was made from the proposal of Brilha (2016). The scientific value assessment was not developed here but it is a very important item to take into consideration in the future because it may give a clearer idea of the value of the sites.

For the touristic value assessment and the degradation risk it was necessary to do field work to check each geosite, gold historical site and other site. The field work took place in October of 2015 and May, June and July of 2016 since in winter time is quite difficult to check the sites. For the touristic value assessment it was defined four main criteria and eighteen sub-criteria using two methodologies, percentage methodology and points methodology, to compare the results. The results obtained were placed in different categories ("Insufficient", "Sufficient", "Good", "Very Good" and "Excellent"). The geosites and the gold historical sites in both methodologies did not have so good results being the other sites with better values. When analysing all of them (57 sites) the results were not so high but also not so low being 62.77% and 6.24 points. Related with the degradation risk, the gold historical sites had higher values than the geosites and the other sites.

As the Golden Geopark of Lapland is at a beginning stage and still a project (failing to achieve the membership of the Geoparks Network in September 2015) more work has to be developed. The Geopark is already in an area with a very strong link to the tourism; great network of trails (marked ones and for the more adventurous and with orientating skills not marked trails), canoe routes, bike routes, ski routes, among others; with infrastructures to support people´s needs during the outdoor activities; good interpretative centres and a network of hotels, restaurants and other infrastructures for tourists. On the other hand, the long distances to reach the sites; the long distances to reach infrastructures like hotels, restaurants, hospitals, among others; the lack of recognition of the geopark in the area (for example none of the sites had the logo of the geopark and some were quite difficult to locate due to the lack of signs) are negative

points that can be changed during the time finding the right solutions, the work created here can be a step for improving some of these gaps on the geopark.

To conclude, the main goals of this work were achieved and it has the main purpose to help the geopark to improve. In this way, the geopark can implement and create actions of conservation, promotion and mostly the valorisation of the sites. With the touristic improvement of the geosites, gold historical sites and other sites the geopark can provide a quality product and different in Lapland, enriching the area, always being the main goals the conservation and valorisation of the sites of the geopark.

Bibliography

Bibliographic references

Barbey, P. & Raith, M. (1990). The Granulite Belt of Lapland. In: Vielzeuf, D. & Vidal, Ph. Granulites and Crustal Evolution. Vol 311, NATO ASI Series, pp. 111-132. 10.1007/978-94-009-2055-2_7

Brilha, J. (2005). Património Geológico e Geoconservação – A conservação da Natureza na sua vertente Geológica. Palimage Editora, Viseu, p. 190.

Brilha, J. (2016). Inventory and Quantitative Assessment of Geosites and Geodiversity Sites: a Review. Geoheritage 8:119. DOI: 10.1007/s12371-014-0139-3.

Carcavilla Urqui, L. & Garcia Cortés, A. [no date]. Geoparques. Significado y funcionamiento. Instituto Geológico y Minero de España [PDF]. Available at: http://www.igme.es/patrimonio/Geoparques-IGME2014-1.pdf [Accessed at: 25 June 2016].

Gonçalves, B. (2013). Avaliação do valor turístico dos geossítios do Geoparque Terras de Cavaleiros. Dissertação de Mestrado em Património Geológico e Geoconservação. Escola de Ciências. Universidade do Minho, Portugal. 133 p.

Grönholm, S.; Alviola R.; Kinnunen, K. A., Kojonen, K.; Kärkkäinen, N., & Mäkitie, H. (2011). Retkeilykartat kiviopas. Geologian tutkimuskeskus, p 88.

Halla, J. & von Wuthenau, K. (2015). From starts into sluice box: a story of a gold nugget. International Gold Prospector Museum of Tankavaara.[exhibition]. International Gold Prospector Museum of Tankavaara and Luomus: Finnish Museum of Natural History.

Heinäaho, H., Mattila, H., Syrjänen, I. & Launonen, K. (2012). Kultajoki kertoo. Stories from the golden river Ivalojoki. Kultamuseum julkaisuja, publications of the Gold Prospector Museum, no 32, 112 p.

Hicks, C. [no date] Historical Synopsis of the Sámi/United Nations Relationship. The Arctic. Available at:

http://www.thearctic.is/articles/topics/samisynopsis/kafli_0100.htm [Accessed on 3rd of February 2016]

Johansson, P. (2007). Late Weichselian deglaciation in Finnish Lapland. In Johansson, P. & Sarala, P. (eds.) Applied Quaternary research in the central part of glaciated terrain. Geological Survey of Finland, Special Paper 46, 47-54.

Johansson, P. [no date]. Geological history of the Golden Geopark of Lapland and descriptions of geological sites. Golden Geopark of Lapland, Geological Heritage, pp. 5-10.

Johansson, P., Lunkka J-P. and Sarala, P. (eds.) 2011. Late Pleistocene glacigenic deposits from the central part of the Scandinavian Ice Sheet to Younger Dryas End Moraine Zone. Excursion guide and abstracts of the INQUA Peribaltic Working Group Meeting and Excursion in Finland, 12-17 June 2011. Geological Survey of Finland, Rovaniemi, p. 142.

Johansson, P.; Huhta, P.; Nenonen, J. & Hirvasniemi, H. (2000). Kultakaira: Geologinen retkeilykartta, geological outdoor map Ivalojoki – Saariselkä 1: 50 000. Rovaniemi: Geologian tutkimuskeskus. 1 map + guidebook, p. 44.

Johansson, P.; Karkola, V. & Seurujärvi, J. (2015). The infrastructure at the geosites in Golden Geopark of Lapland. In Saari, K.; Saarinen, J. & Saastamoinen, M. (eds.): European Geoparks Conference. Book of Abstracts. Oulu, Finland, p. 33.

Johansson, P.; Launonen, K. & Seurujärvi, J. (2012). Ivalojoki placer gold area in Finnish Lapland: a potential geopark. In: Sá, A.A., Rocha, D., Paz, A. & Correia, V. (eds.) 2012. Proceedings of the 11th European Geoparks Conference. AGA – Associação Geoparque Arouca, Arouca, pp. 159-160.

Johansson, P.; Lauri, L. S., Voytekhovsky, Y. L. (2014). Barents Tour for Geotourists. Geomatkailijan Barentsin Kierros. БАРЕНЦ ТУР ДЛЯ ГЕОТУРИСТОВ. Rundtur I Barents for Geotursten. Geological Survey of Finland and Geological Institute of the Kola Science Centre of the Russian Academy of Sciences, Rovaniemi, p. 117.

Johansson, P.; Manninen, T.; Nenonen, J. & Tranberg, J. (2009). Lemmenjoki Geologinen retkeilykartta, Lemmenjoki Geological Outdoor Map 1: 50 000. Rovaniemi: Geologian tutkimuskeskus. 1 map + guidebook, p. 46.

Launonen, K. & Partanen, S. J. (2000). Opas Lapin Kultamaille. Kultamuseon julkaisuja, nro 21, 2. Tarkistettu painos. H-Hetki Oy, Hyvinkää. p. 76.

Lauri, L. S., Nironen, M., & Rämö, O. T. (2005). The Finnish Precambrian in a nutshell. In: Rämö, O.T., Halla, J., Nironen, M., Lauri, L.S., Kurhila, M. I., Käpyaho, A., Sorjonen-Ward, P. & Äikäs, O. (2005). Eurogranites 2005 – Proterozoic and Archean Granites and Related Rocks of the Finnish Precambrian. Eurogranites 2005 Field Conference, Semptember 11-17, 2005. Publications of the Department of Geology A1, pp. 14-17.

Luhta, V. (2003). Inarin Luonnonhistoria. In Aikio, Samuli; Carpelan, Christian; Enbuske, Matti; Lehtola, Veli-Pekka; Luhta, Vesa; Nahkiaisoja, Tarja; Onnela, Samuli & Vahtola, Jouko (2003). Inari/ Aanaar – Inarin historia jääkaudesta nykypäivään. Inarin Kunta, Oulu, pp. 12-27.

Luiro, S. (2013). Lapland tourism development and strategy. Reginal Council of Lapland [PDF]. Available at: http://matkailu.luc.fi/loader.aspx?id=1aacbbe8-cb33-46e0-a892-cece0b24a9b6 [Accessed at: 18 June 2016].

Luukkonen, E. J. & Sorjonen-Ward, P. (1998). Arkeeinen kallioperä – ikkuna 3 milijardin vuoden taakse. In Lehtinen, M et al. Teoksessa Suomen kallioperä: 3000 vuosimilijoonaa. Helsinki, Suomen Geologinen Seura ry, pp. 106-139.

Näkkäläjärvi, J. & Aromäki, M. (2014). Using of Key Enabling Technologies (KET) as a tool in maintaining the indigenous culture. Brussels.

Pashkevich, A. (2014). Artic Tourism: realities & Possibilities. In: Dr. Lassi Heininen (ed), Arctic Yearbook 2014: Scholarly Articles, Section II: Regional Economy & Properity. Artic Portal, pp. 1-17.

Pereira, P. & Pereira, D. (2012). Assessment of geosites tourism value in geoparks: the example of Arouca Geopark (Portugal). Proceedings of the 11th European Geoparks Conference, Arouca, pp. 231-232.

Pereira, P. (2006). Património geomorfológico: conceptualização, avaliação e divulgação. Aplicação ao Parque Natural de Montesinho. Dissertação para obtenção do grau de Doutor em Geologia. Escola de Ciências. Universidade do Minho, Portugal, 370 p.

Pettersson, R. (2007). Tourism Experiences of Sami Culture. In Mika Kylänen: Articles on Experiences 2. University of Lapland Press, Rovaniemi, 82-103.

Plant, J.A., Whittaker, A., Demetriades, A., De Vivo, B. & Lexa J. (2005). The Geological and Tectonic Framework of Europe. In: Salminen, R. et al.: Geochemical Atlas of Europe. Part 1 - Background Information, Methodology and Maps. Geological Survey of Finland. Espoo, Finland.

Pralong, J.P. (2005). A method for assessing tourist potential and use of geomorphological sites. Geomorphologie: relief, processus environnement, 2005/3, pp. 189-196.

Raham, H. (2014). Tourism Development in Finland: case study- tourism development in Lapland and its socio-economic impacts. Degree Program in Tourism. Centria University of Applied Sciences, p. 58. Available at: https://www.theseus.fi/bitstream/handle/10024/71566/Rahman_Md%20Habibur.pdf?sequence=1 [Accessed at 24 July 2016].

Rybár, P. (2010). Assessment of attractiveness (value) of geotouristic objects. Acta geoturistica, 1(2), pp. 13-21.

Schlöglova, K.; Lecumberri-Sanchez, P.; Steele-MacInnis, M. & Heinrich, C.A. (2014). Ore deposits, magmatism and Precambrian geology of Finland. Field Trip Guide Book. Department of Earth Sciences, p. 183. Available at: https://www.segweb.org/pdf/students/student-chapters/eth-zurich/Field-Trip-Report-Supplement.pdf [Accessed at: 5 December 2015].

Tikkanen, M. (2002). The changing landforms of Finland. Fennia – International Journal of Geography. 180:1-2, pp. 21-30.

Tuisku, P.; Mikkola, P. & Huhma, H. (2006). Evolution of Migmatic Granulite Complexes: Implications from Lapland Granulite Belt, Pat I: Metamorphic geology. Vol. 78. Bulletin of the Geological Society of Finland, pp. 71-105.

Websites:

- Natural Heritage Services: http://www.metsa.fi/web/en, accessed 9 November 2015.
- International Gold Prospector Museum of Tankavaara: http://www.kultamuseo.fi/museo/pages/en/gold-museum/gold-history-of-finland.php?lang=EN, accessed 12 November 2015.
- Bus timetables: https://www.matkahuolto.fi/en/, accessed 13 November 2015.
- Excursions maps: https://www.retkikartta.fi/, accessed 14 June 2016.
- Golden Geopark of Lapland website and Application: www.goldengeopark.com, accessed 30 July 2016.
- UNESCO: http://www.unesco.org/new/en/natural-sciences/environment/earth-sciences/unesco-global-geoparks/, accessed 30 July 2016.
- Azores Geopark: http://www.azoresgeopark.com/geoparques/index.php accessed 1 August 2016.
- Tukes - Gold Panning, exploration and mining: http://gtkdata.gtk.fi/kaivosrekisteri/ , accessed 5 August 2016.

Annexes

Annex I

TOURISTIC POTENTIAL: FIELD WORK FORM AND RECORD

Date: 15/10/2015

GEOSITE IDENTIFICATION

Number and name of the geosite: 15. Thor formations at Pyhä-Nattanen

Coordinates: ETRS-TM35FIN N:7556558 E:515405

A. AVAILABILITY

A.1. Seasonal occupancy (how many days per year the geosite is used)

From 1 to 90 days (one season) for example summer time.	**2.5**	
From 91 to 180 days (two seasons) for example summer and autumn time.	**5**	**X**
From 181 to 270 days (three seasons) for example summer, autumn and spring.	**7.5**	
From 271 to 360 (four seasons) summer, autumn, winter and spring.	**10**	

A.2. Terrestrial accessibility - how the visitor reach the geosite/gold historical site/ other site by car, bus and/ or hiking.

Impossible to reach the geosite/gold historical site/other site.	**0**	
The access to the geosite/gold historical site/other site is very difficult, only possible with special equipment (boat, canoe, ropes, etc.).	**1**	
The access to the geosite/gold historical site/other site is possible but the route in winter time is longer than the other used in the rest of the year.	**2**	
The access to the geosite/gold historical site/other site is possible and the geosite/gold historical site/ other site is located more than 4 km from a paved road or a forest vehicle road.	**3**	
The geosite/gold historical site/other site is located between 2 and 4 km from a paved road or a forest vehicle road.	**4**	
The geosite/historical site/other site is located between 1 and 2 km from a paved road or a forest vehicle road.	**5**	**X**

The geosite/gold historical site/other site is located between 500 metres and 1 km from a paved road or a forest vehicle road.	**6**	
The geosite/gold historical site/other site is located between 200 metres and 500 metres from a paved road or a forest vehicle road.	**7**	
The geosite/gold historical site/other site is located between 50 metres and 200 metres from a paved road or a forest vehicle road.	**8**	
The geosite/gold historical site/other site is located less than 50 metres from a paved road or forest vehicle road.	**9**	
The geosite/gold historical site/other site is located less than 50 metres from a paved road or forest road with parking area for a bus.	**10**	

How to get there?

Take the national road E75 towards Vuotso village, if coming from the south turn to the right if coming from the north turn to the left to a forest vehicle road, drive about 11 km, after that there is a parking area at Sompiontie or, closer to the trail, a small area for maximum 2 cars near to the starting of the trail (map at the end of the field work record sheet).

A.3. Availability according with people physical conditions when the activity is hiking or walking.

Very difficult for people reach the geosite/gold historical site/other site, only for people with excellent physical conditions.	**1**	
Moderate difficulty, at least good physical conditions.	**5**	**X**
Easy even for people with no big physical conditions.	**7.5**	
Very easy, even for children.	**10**	

A.4. Boat and/or canoe access.

YES	**X NO**	
The access to the geosite/gold historical site/other site is possible and the geosite/gold historical site/other site is located more than 4 km from a boat and/or canoe.	**1**	
The geosite/gold historical site/other site is located between 2 km and 4 km from a boat and/or canoe.	**3**	
The geosite/gold historical site/other site is located between 1km and 2 km	**5**	

from a boat and/ or canoe.		
The geosite/gold historical site/other site is located between 500 metres and 1 km from a boat and/or canoe.	**7**	
The geosite/gold historical site/other site is located between 200 metres and 500 metres from a boat and/or canoe.	**8**	
The geosite/gold historical site/other site is located between 50 metres and 200 metres from a boat and/or canoe.	**9**	
The geosite/gold historical site/other site is located less than 50 metres from a boat and/or canoe.	**10**	

A.5. Visibility

The geosite/gold historical site/other site is not visible.	**0**	
It is very difficult to see the geosite/gold historical site/other site (only visible with special equipment, ropes, climbing material, etc.) in summer time.	**1**	
The visibility of the geosite/gold historical site/other site is low, limited by, for example, vegetation, buildings, etc.	**2**	
The visibility of the gesoite/gold historical site/other site is medium, forcing to go closer to see better the geological/historical element(s).	**5**	
The visibility of the geosite/gold historical site/other site is good to all geological/historical elements.	**7**	
The visibility of the geosite/gold historical site/other site is excellent to all geological/historical elements.	**9**	**X**
The visibility of the geosite/gold historical site/other site is good to all or the most important geological/historical elements even with snow and darkness (in the dark it is used artificial light to observe the geosite/gold historical site/other site).	**10**	

A.6. Safety.

Geosite/gold historical site/other site impossible to be visited due to the high danger on it.	**0**	
Geosite/gold historical site/other site with no safety facilities (fences, stairs, handrails, etc.) no mobile phone coverage and located more than 50 km from the nearest hospital.	**1**	

Geosite/gold historical site/other site with no safety facilities (fences, stairs, handrails, etc.) and more than 50 km from the nearest hospital but with mobile phone coverage.	**2**	**X**
Geosite/gold historical site/other site with safety facilities (fences, stairs, handrails, etc.), but no mobile phone coverage and located more than 50 km from the nearest hospital.	**3**	
Geosite/gold historical site/other site with safety facilities (fences, stairs, handrails, etc.), mobile phone coverage but located more than 50 km from the nearest hospital.	**5**	
Geosite/gold historical site/other site with no safety facilities (fences, stairs, handrails, etc.) but with mobile phone coverage and located less than 50 km from the nearest hospital.	**7**	
Geosite/gold historical site/other site with safety facilities (fences, stairs, handrails) with mobile phone coverage and located less than 50 km from the nearest hospital.	**8**	
Geosite/gold historical site/other site with safety facilities (fences, stairs, handrails, etc.), mobile phone coverage and located less than 20 km from the nearest hospital.	**9**	
Geosite/gold historical site/other site with safety facilities (fences, stairs, handrails, etc.), mobile phone coverage and located less than 5 km from the nearest hospital.	**10**	

A.7. Safety in the geosite/gold historical site/ other site and its access.

Geosite/gold historical site/other site and its access without any safety.	**0**	
Geosite/gold historical site/other site with high danger (no signs to indicate the way to go so visitors need a good orientation skills, floods, mass movements, avalanches, slippery floor, very steep floor, etc.).	**1**	
High danger in the access to the geosite/gold historical site/other site (no signs to indicate the way to go so visitors need a good orientation skills, floods, mass movements, avalanches, slippery floor, very steep floor, etc.).	**2**	
Geosite/gold historical site/other site with moderate danger (no signs to indicate the way to go so visitors need a good orientation skills, floods, mass movements, avalanches, slippery floor, very steep floor, etc.).	**5**	

Moderate danger in the access to the geosite/gold historical site/other site (no signs so visitors need a good orientation skills, floods, mass movements, avalanches, slippery floor, very steep floor, etc.).	**6**	
Safe geosite/gold historical site/other site (only with a little precaution) and safe access.	**8**	
Safe access (only with a little precaution) and safe geosite/gold historical site/other site.	**9**	**X**
Geosite/gold historical site/other site and access without any danger for the visitor.	**10**	

It is necessary a little bit of precaution when arriving to the geosite since there is a block field covering the top of the hill where the geosite is and when the cold season starts, September/October, the block field is covered with a thin layer of ice making it very slippery which requires more precaution when visiting the geosite.

B. USE (10%)

B.1. Signage

No signs in the access road to the geosite/gold historical site/other site neither in the geosite/gold historical site/other site.	**0**	
Signs only in the access roads.	**2.5**	
Signs only near to the geosite/gold historical site/other sire or in the place.	**5**	
Signs on the main road access and in the geosite/gold historical site/other site showing it is a touristic place, historical site or geological site.	**7.5**	**X**
Signs in the main road access and in the geosite/gold historical site/other site showing it is a "geosite"/"gold historical site"/"other site" from the geopark.	**10**	

B.2. The current use of the geosite/gold historical site/other site in terms of geological/historical interest.

Geosite/gold historical site/other site without any geological/historical promotion.	**0**	
Geosite/gold historical site/other site with geological/ promotion only in internet.	**2.5**	

Geosite/gold historical site/other site with geological/historical promotion only in internet and leaflets, books, maps and/or in the geosite/gold historical site/other site e.g. information board.	**7.5**	**X**
Geosite/gold historical site/other site with an interpretative centre explaining the geosite/gold historical site/other site (not needed to have the interpretative centre in the geosite/gold historical site/other site, it can be on other place).	**10**	

B.3. The current use of the geosite/gold historical site/other site for other types of interests.

Geosite/gold historical site/other site without other type of interest, promotion and/or use.	**0**	
Geosite/gold historical site/other site with other types of interest, without promotion and/or use.	**1**	
Geosite/gold historical site/other site integrated in a non-circular walking and ski trail or non-circular trail – walking or ski trail – and non-circular boat/canoe route.	**3**	**X**
Geosite/gold historical site/other site integrated in a circular walking trail or sky trail or site integrated in circular boat/canoe route.	**5**	
Geosite/gold historical site/other site with a circular walking trail and ski trail or circular trail - walking or ski trail - and circular boat/canoe route .	**7**	
Geosite/gold historical site/other site with other type of interest(s), with promotion but not use.	**9**	
Geosite/gold historical site/other site with other type of interest(s), with promotion and/ or use.	**10**	

B.4. Use limitations of the geosite/gold historical site/other site.

Without any possibility to visit the geosite/gold historical site/other site.	**0**	
Geosite/gold historical site/other site with restrictions (e.g. private property, opening hours, etc.).	**2.5**	
Geosite/gold historical site/other site with physical restrictions (fences, obstacles, etc.).	**7.5**	
Geosite/gold historical site/other site without any restriction to visit.	**10**	**X**

C. LOGISTICS (25%)

C.1. Cleanliness.

Geosite/gold historical site/other site without any cleanliness, full of rubbish spread all over the place.	**0**	
Geosite/gold historical site/other site not so clean but with rubbish bins.	**2.5**	
Clean geosite/gold historical site/other site but without rubbish bins.	**5**	**X**
Clean geosite/gold historical site/other site without a rubbish bin but located less than 5km from the geosite/historical site/other site.	**7.5**	
Clean geosite/gold historical site/other site with rubbish bins.	**10**	

C.2. Toilets

Toilets more than 5 km from the geosite/gold historical site/other site.	**1**	
Toilets less than 5 km from the geosite/gold historical site/other site.	**2.5**	
Toilets less than 1 km from the geosite/gold historical site/other site.	**5**	
Toilets less than 200 metres from the geosite/gold historical site/other site.	**7.5**	
Toilets on the geosite/gold historical site/other site.	**10**	**X**

C.3. Restaurants

There is no restaurants less than 20 km from the geosite/gold historical site/other site.	**0**	
There is restaurant(s) between 5 km and 20 km from the geosite/gold historical site/other site and opens seasonally (e.g. summer and autumn time)	**1**	
There is restaurant(s) between 5 km and 20 km from the geosite/gold historical site/other site.	**2**	**X**
There is restaurant(s) between 1 km and 5km from the geosite/gold historical site/other site and opens seasonally (e.g. summer and autumn time)	**3**	
There is restaurant(s) between 1 km and 5 km from the geosite/gold historical site/other site.	**4**	
There is only cafe in the geosite/gold historical site/other site or less than 1 km from the geosite/gold historical site/other site and it opens seasonally	**5**	

(e.g. summer and autumn time).		
There is only cafe in the geosite/gold historical site/other site or less than 1 km from the geosite/gold historical site/other site.	**6**	
There is restaurant(s) less than 1km from the geosite/gold historical site/other site and opens seasonally (e.g. summer and autumn time).	**7**	
There is restaurant(s) less than 1km from the geosite/gold historical site/other site.	**8**	
There is restaurant(s) in the geosite/gold historical site/other site (less than 300 metres) and opens seasonally (e.g. summer and autumn time).	**9**	
There is restaurant(s) in the geosite/gold historical site/other site (less than 300 metres).	**10**	
On the national road E75 towards north, on the right site of the road there is a restaurant called Tankavaara Gold Village.		

C.4. Accommodation (5%)

There is no accommodation less than 20 km from the geosite/gold historical site/other site.	**0**	
There is a hut (for rent or for free with room for maximum 6 people) for hikers in the hiking trail and/or in the geosite/gold historical site/other site.	**1**	
The nearest accommodation (about 5 km from the geosite/gold historical site/other site) is seasonal (for example opened four or three months only) and with few rooms (about 10 rooms).	**2**	
The nearest accommodation (about 5 km from the geosite/gold historical site/other site) is seasonal (for example opened four or three months only) and many rooms (more than 10 rooms).	**3**	
There is many types of accommodation less than 20 km and opens seasonally (e.g. summer and autumn time).	**4**	
There is many types of accommodation less than 20 km.	**5**	**X**
There is many types of accommodation less than 5 km and opens seasonally (e.g. summer and autumn time).	**6**	
There is many types of accommodation less than 5 km.	**7**	
There is many types of accommodation less than 1 km and opens	**8**	

seasonally (e.g. summer and autumn time).		
There is many types of accommodation less than 1 km.	**10**	
On the village of Vuosto there is a small accommodation (Vuotso Maja) only with 5 rooms and 8 kilometres towards North Tankavaara Gold Village with more rooms.		

C.5. Local buses.

The geosite/gold historical site/other site is more than 20 km from a bus stop for local bus.	**0**	
The geosite/gold historical site/other site is between 10 km and 20 km from a bus stop for local bus.	**2**	**X**
The geosite/gold historical site/other site is between 10 km and 5 km from a bus stop for local bus.	**4**	
The geosite/gold historical site/other site is between 5km and 1 km from a bus stop for local bus.	**6**	
The geosite/gold historical site/other site is less than 1km from a bus stop for local bus.	**8**	
There is a bus stop in the geosite/gold historical site/other site (less than 300 metres).	**10**	

D. PERCEPTIVENESS (5%)

D.1. Aesthetics		
Unpleasant geosite/gold historical site/other site and/or surrounded by unpleasant elements such as rubbish.	**0**	
Geosite/gold historical site/other site without any kind of beauty.	**1**	
Pleasant geosite/gold historical site/other site, without any outstanding beauty.	**4**	
Pleasant geosite/gold historical site/ other site, with some moderately attractive elements (small dimension).	**5**	
Pleasant geosite/gold historical site/other site, with attractive elements, with visual impact.	**7**	
Very attractive geosite/gold historical site/other site, with a strong visual impact.	**8**	
Geosite/gold historical site/other site extremely attractive, with a strong	**9**	

visual impact.		
All the elements of the geosite/gold historical site/other site are extremely attractive, with a huge visual impact.	**10**	**X**

D.2. Interpretative potential.

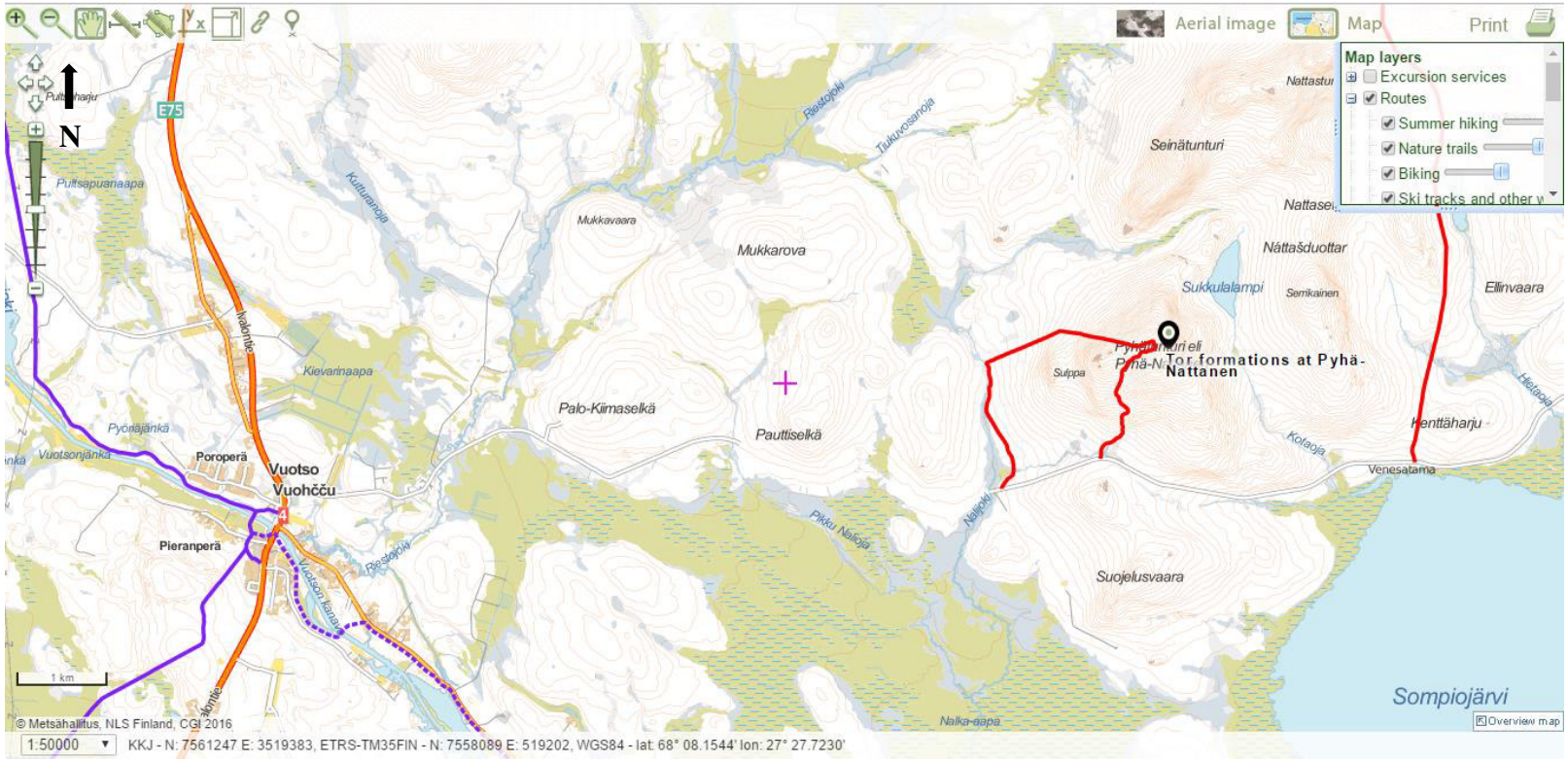
Only geologists, historians, archeologists and other experts understand what it is in the geosite/gold historical site/other site.	**0**	
The visitor need to have a huge background in geology area/gold digging/ Sámi history to understand what is in the geosite/gold historical site/other site.	**2.5**	
The visitor need to have some geological/historical background to understand the geological/historical element(s) of the geosite/gold historical site/other site.	**5**	
The geosite/gold historical site/other site presents geological/historical elements in a very clear way and understandable way for all types of public.	**10**	**X**

PHOTOS OF THE GEOSITE

Figure 5.1. Geosite.

Figure 5.2. Well-marked trail to the geosite.

MAP OF THE GEOSITE



Legends:

Geosite Hiking trail

Figure 5.3. Map of the geosite (Source: http://www.retkikartta.fi/index.php?lang=en).

TOURISTIC POTENTIAL: FIELD WORK FORM AND RECORD

Date: 17/10/2015

GOLD HISTORICAL SITE IDENTIFICATION

Number and name of the gold historical site: 4. Kultala Crown Station

Coordinates: ETRS-TM35FIN N:7599297 E:486927

A. AVAILABILITY

A.1. Seasonal occupancy (how many days per year the gold historical site is used)

From 1 to 90 days (one season) for example summer time.	**2.5**	
From 91 to 180 days (two seasons) for example summer and autumn time.	**5**	**X**
From 181 to 270 days (three seasons) for example summer, autumn and spring.	**7.5**	
From 271 to 360 (four seasons) Summer, autumn, winter and spring.	**10**	

A.2. Terrestrial accessibility - how the visitor reach the geosite/gold historical site/ other site by car, bus and/or hiking.

Impossible to reach the geosite/gold historical site/other site.	**0**	
The access to the geosite/gold historical site/other site is very difficult, only possible with special equipment (boat, canoe, ropes, etc.).	**1**	
The access to the geosite/gold historical site/other site is possible but the route in winter time is longer than the other used in the rest of the year.	**2**	
The access to the geosite/gold historical site/other site is possible and the geosite/gold historical site/ other site is located more than 4 km from a paved road or a forest vehicle road.	**3**	**X**
The geosite/gold historical site/other site is located between 2 and 4 km from a paved road or a forest vehicle road.	**4**	
The geosite/gold historical site/other site is located between 1 and 2 km from a paved road or a forest vehicle road.	**5**	
The geosite/gold historical site/other site is located between 500 metres and 1 km from a paved road or a forest vehicle road.	**6**	

The geosite/gold historical site/other site is located between 200 metres and 500 metres from a paved road or a forest vehicle road.	**7**	
The geosite/gold historical site/other site is located between 50 metres and 200 metres from a paved road or a forest vehicle road.	**8**	
The geosite/gold historical site/other site is located less than 50 metres from a paved road or forest vehicle road.	**9**	
The geosite/gold historical site/other site is located less than 50 metres from a paved road or forest road with parking area for a bus.	**10**	

How to get there?

Take the national road E75, if coming from the south turn to the left if coming from the north turn to the right to a forest vehicle road, driving for more or less 20 km, after that park the car in the area and a well-marked trail of 12 km (Pahaoja – Kultala Gold Mining Village) leads to this site (map on the last page of the field work record sheet).

A.3. Availability according with people physical conditions when the activity is hiking or walking.

Very difficult for people reach the geosite/gold historical site/other site only for people with excellent physical conditions.	**1**	
Moderate difficulty, at least good physical conditions.	**5**	**X**
Easy even for people with no big physical conditions.	**7.5**	
Very easy, even for children.	**10**	

A.4. Boat and/or canoe access.

X YES	**NO**	
The access to the geosite/gold historical site/other site is possible and the geosite/gold historical site/other site is located more than 4 km from a boat and/ or canoe.	**1**	
The geosite/gold historical site/other site is located between 2 km and 4 km from a boat and/or canoe.	**3**	
The geosite/gold historical site/other site is located between 1 km and 2 km from a boat and/or canoe.	**5**	
The geosite/gold historical site/other site is located between 500 metres and 1 km from a boat and/or canoe.	**7**	

The geosite/gold historical site/other site is located between 200 metres and 500 metres from a boat and/or canoe.	**8**	
The geosite/gold historical site/other site is located between 50 metres and 200 metres from a boat and/or canoe.	**9**	
The geosite/gold historical site/other site is located less than 50 metres from a boat and/or canoe.	**10**	**X**

A.5. Visibility

The geosite/gold historical site/other site is not visible.	**0**	
It is very difficult to see the geosite/gold historical site/other site (only visible with special equipment, ropes, climbing material, etc.) in summer time.	**1**	
The visibility of the geosite/gold historical site/other site is low, limited by, for example, vegetation, buildings, etc.	**2**	
The visibility of the gesoite/gold historical site/other site is medium, forcing to go closer to see better the geological/historical element(s).	**5**	
The visibility of the geosite/gold historical site/other site is good to all geological/historical elements.	**7**	
The visibility of the geosite/gold historical site/other site is excellent to all geological/historical elements.	**9**	
The visibility of the geosite/gold historical site/other site is good to all or the most important geological/historical elements even with snow and darkness (in the dark it is used artificial light to observe the geosite/gold historical site/other site).	**10**	**X**

A.6. Safety.

Geosite/gold historical site/other site impossible to be visited due to the high danger on it.	**0**	
Geosite/gold historical site/other site with no safety facilities (fences, stairs, handrails, etc.), no mobile phone coverage and located more than 50 km from the nearest hospital.	**1**	
Geosite/gold historical site/other site with no safety facilities (fences, stairs, handrails, etc.) and more than 50 km from the nearest hospital but with mobile phone coverage.	**2**	

Geosite/gold historical site/other site with safety facilities (fences, stairs, handrails, etc.), but no mobile phone coverage and located more than 50 km from the nearest hospital.	**3**	**X**
Geosite/gold historical site/other site with safety facilities (fences, stairs, handrails, etc.), mobile phone coverage but located more than 50 km from the nearest hospital.	**5**	
Geosite/gold historical site/other site with no safety facilities (fences, stairs, handrails, etc.) but with mobile phone coverage and located less than 50 km from the nearest hospital.	**7**	
Geosite/gold historical site/other site with safety facilities (fences, stairs, handrails, etc.), with mobile phone coverage and located less than 50 km from the nearest hospital.	**8**	
Geosite/gold historical site/other site with safety facilities (fences, stairs, handrails, etc.), mobile phone coverage and located less than 20 km from the nearest hospital.	**9**	
Geosite/gold historical site/other site with safety facilities (fences, stairs, handrails, etc.), mobile phone coverage and located less than 5 km from the nearest hospital.	**10**	

A.7. Safety in the geosite/gold historical site/ other site and its access.

Geosite/gold historical site/other site and its access without any safety.	**0**	
Geosite/gold historical site/other site with high danger (no signs to indicate the way to go so visitors need a good orientation skills, floods, mass movements, avalanches, slippery floor, very steep floor, etc.).	**1**	
High danger in the access to the geosite/gold historical site/other site (no signs to indicate the way to go so visitors need a good orientation skills, floods, mass movements, avalanches, slippery floor, very steep floor, etc.).	**2**	
Geosite/gold historical site/other site with moderate danger (no signs to indicate the way to go so visitors need a good orientation skills, floods, mass movements, avalanches, slippery floor, very steep floor, etc.).	**5**	
Moderate danger in the access to the geosite/gold historical site/other site (no signs so visitors need a good orientation skills, floods, mass movements, avalanches, slippery floor, very steep floor, etc.).	**6**	

Safe geosite/gold historical site/other site (only with a little precaution) and safe access.	**8**	
Safe access (only with a little precaution) and safe geosite/gold historical site/other site.	**9**	**X**
Geosite/gold historical site/other site and access without any danger for the visitor.	**10**	

The trail to this site is well-marked, safe and with a bridge to cross the river, still is always good to be aware and pay attention to the sourroundings.

B. USE (10%)

B.1. Signage

No signs in the access road to the geosite/gold historical site/other site neither in the geosite/gold historical site/other site.	**0**	
Signs only in the access roads.	**2.5**	
Signs only near to the geosite/gold historical site/other sire or in the place.	**5**	
Signs on the main road access and in the geosite/gold historical site/other site showing it is a touristic place, historical place or geological site.	**7.5**	**X**
Signs in the main road access and in the geosite/gold historical site/other site showing it is a "geosite"/"gold historical site"/"other site" from the geopark.	**10**	

B.2. The current use of the geosite/gold historical site/other site in terms of geological/historical interest.

Geosite/gold historical site/other site without any geological/historical promotion.	**0**	
Geosite/gold historical site/other site with geological/ promotion only in internet.	**2.5**	
Geosite/gold historical site/other site with geological/historical promotion only in internet and leaflets, books, maps and/ or in the geosite/gold historical site/other site e.g. information board.	**7.5**	
Geosite/gold historical site/other site with an interpretative centre explaining the geosite/gold historical site/other site (not needed to have the	**10**	**X**

interpretative centre in the geosite/gold historical site/other site, it can be on other place).		

B.3. The current use of the geosite/gold historical site/other site for other types of interests.

Geosite/gold historical site/other site without other type of interest, promotion and/or use.	**0**	
Geosite/gold historical site/other site with other types of interest, without promotion and/ or use.	**1**	
Geosite/gold historical site/other site integrated in a non-circular walking trail and ski trail or non-circular trail (walking or ski trail) and non-circular boat/canoe route.	**3**	
Geosite/gold historical site/other site integrated in a circular walking trail or sky trail or site integrated in circular boat/canoe route.	**5**	
Geosite/gold historical site/other site with a circular walking trail and ski trail or circular trail (walking or ski trail) and circular boat/canoe route.	**7**	
Geosite/gold historical site/other site with other type of interest(s), with promotion but not use.	**9**	
Geosite/gold historical site/other site with other type of interest(s), with promotion and/ or use.	**10**	**X**

B.4. Use limitations of the geosite/gold historical site/other site.

Without any possibility to visit the geosite/gold historical site/other site.	**0**	
Geosite/gold historical site/other site with restrictions (e.g. private property, opening hours, etc.).	**2.5**	
Geosite/gold historical site/other site with physical restrictions (fences, obstacles, etc.).	**7.5**	
Geosite/gold historical site/other site without any restriction to visit.	**10**	**X**

C. LOGISTICS (25%)

C.1. Cleanliness.

Geosite/gold historical site/other site without any cleanliness, full of rubbish spread all over the place.	**0**	

Geosite/gold historical site/other site not so clean but with rubbish bins.	**2.5**	
Clean geosite/gold historical site/other site but without rubbish bins.	**5**	
Clean geosite/gold historical site/other site without a rubbish bin but located less than 5km from the geosite/gold historical site/other site.	**7.5**	
Clean geosite/gold historical site/other site with rubbish bins.	**10**	**X**

C.2. Toilets

Toilets more than 5 km from the geosite/gold historical site/other site.	**1**	
Toilets less than 5 km from the geosite/gold historical site/other site.	**2.5**	
Toilets less than 1 km from the geosite/gold historical site/other site.	**5**	
Toilets less than 200 metres from the geosite/gold historical site/other site.	**7.5**	
Toilets on the geosite/gold historical site/other site.	**10**	**X**

C.3. Restaurants

There is no restaurants less than 20 km from the geosite/gold historical site/other site.	**0**	**X**
There is restaurant(s) between 5 km and 20 km from the geosite/gold historical site/other site and opens seasonally (e.g. summer and autumn time)	**1**	
There is restaurant(s) between 5km and 20 km from the geosite/gold historical site/other site.	**2**	
There is restaurant(s) between 1km and 5km from the geosite/gold historical site/other site and opens seasonally (e.g. summer and autumn time)	**3**	
There is restaurant(s) between 1km and 5km from the geosite/gold historical site/other site.	**4**	
There is only cafe in the geosite/gold historical site/other site or less than 1km from the geosite/gold historical site/other site and it opens seasonally (e.g. summer and autumn time).	**5**	
There is only cafe in the geosite/gold historical site/other site or less than 1km from the geosite/gold historical site/other site.	**6**	
There is restaurant(s) less than 1km from the geosite/gold historical site/other site and opens seasonally (e.g. summer and autumn time).	**7**	

There is restaurant(s) less than 1km from the geosite/gold historical site/other site.	**8**	
There is restaurant(s) in the geosite/gold historical site/other site (less than 300 metres) and opens seasonally (e.g. summer and autumn time).	**9**	
There is restaurant(s) in the geosite/gold historical site/other site (less than 300 metres).	**10**	

C.4. Accommodation (5%)

There is no accommodation less than 20 km from the geosite/gold historical site/other site.	**0**	
There is a hut (for rent or for free with room for maximum 6 people) for hikers in the hiking trail and/or in the geosite/gold historical site/other site.	**1**	**X**
The nearest accommodation (about 5 km from the geosite/gold historical site/other site) is seasonal (for example opened four or three months only) and with few rooms (about 10 rooms).	**2**	
The nearest accommodation (about 5 km from the geosite/gold historical site/other site) is seasonal (for example opened four or three months only) and many rooms (more than 10 rooms).	**3**	
There is many types of accommodation less than 20 km and opens seasonally (e.g. summer and autumn time).	**4**	
There is many types of accommodation less than 20 km.	**5**	
There is many types of accommodation less than 5 km and opens seasonally (e.g. summer and autumn time).	**6**	
There is many types of accommodation less than 5 km.	**7**	
There is many types of accommodation less than 1 km and opens seasonally (e.g. summer and autumn time).	**8**	
There is many types of accommodation less than 1 km.	**10**	

C.5. Local buses.

The geosite/gold historical site/other site is more than 20km from a bus stop for local bus.	**0**	**X**
The geosite/gold historical site/other site is between 10km and 20 km from a bus stop for local bus.	**2**	

The geosite/gold historical site/other site is between 10 km and 5 km from a bus stop for local bus.	**4**	
The geosite/gold historical site/other site is between 5km and 1 km from a bus stop for local bus.	**6**	
The geosite/gold historical site/other site is less than 1km from a bus stop for local bus.	**8**	
There is a bus stop in the geosite/gold historical site/other site (less than 300 metres).	**10**	

D. PERCEPTIVENESS (5%)

D.1. Aesthetics

Unpleasant geosite/gold historical site/other site and/or surrounded by unpleasant elements such as rubbish.	**0**	
Geosite/gold historical site/other site without any kind of beauty.	**1**	
Pleasant geosite/gold historical site/other site, without any outstanding beauty.	**4**	
Pleasant geosite/gold historical site/ other site, with some moderately attractive elements (small dimension).	**5**	
Pleasant geosite/gold historical site/other site, with attractive elements, with visual impact.	**7**	**X**
Very attractive geosite/gold historical site/other site, with a strong visual impact.	**8**	
Geosite/gold historical site/other site extremely attractive, with a strong visual impact.	**9**	
All the elements of the geosite/gold historical site/other site are extremely attractive, with a huge visual impact.	**10**	

D.2. Interpretative potential.

Only geologists, historians, archeologists and other experts understand what it is in the geosite/gold historical site/other site.	**0**	
The visitor need to have a huge background in geology area/gold digging/ Sámi history to understand what is in the geosite/gold historical site/other site.	**2.5**	

The visitor need to have some geological/historical background to understand the geological/historical element(s) of the geosite/gold historical site/other site.	**5**	
The geosite/gold historical site/other site presents geological/historical elements in a very clear way and understandable way for all types of public.	**10**	**X**

PHOTOS OF THE GOLD HISTORICAL SITE

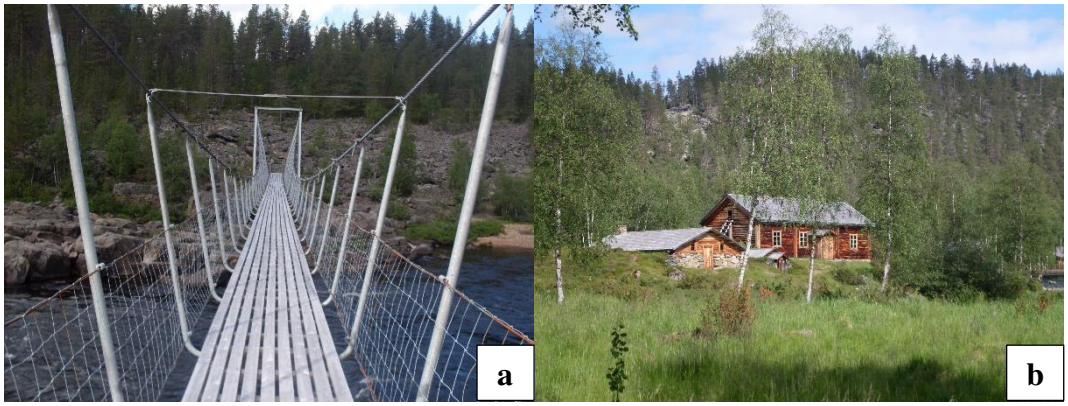
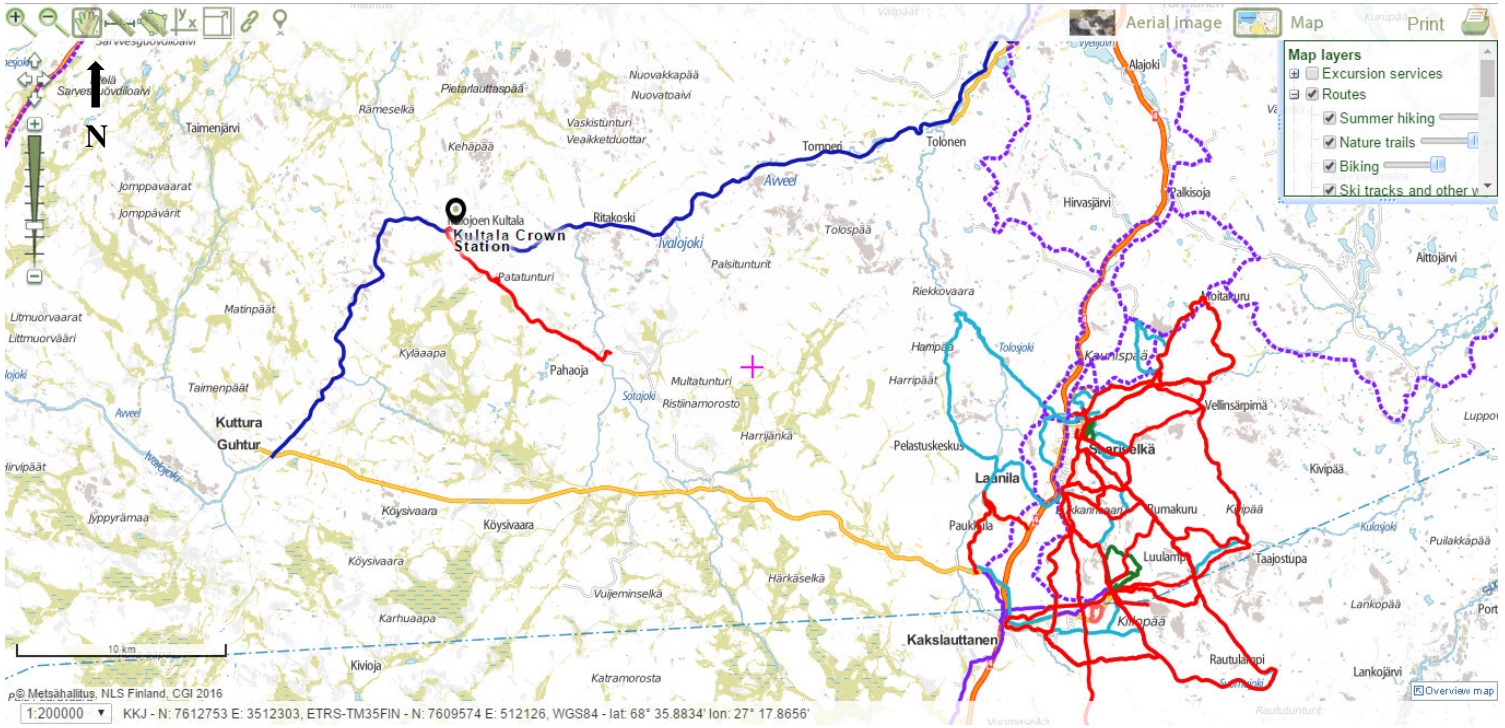


Figure 5.4. Bridge to cross the river (a) and Kultalla Gold Village (b).

Figure 5.5. Inside of the main buiding of Kultalla Gold Village.

MAP OF THE GOLD HISTORICAL SITE



Legends:

Gold Historical Site — Hiking trail — Boat and/ or canoe route

Figure 5.6. Map of the gold historical site (Source: https://www.retkikartta.fi/?lang=en).

TOURISTIC POTENTIAL: FIELD WORK FORM AND RECORD

Date: 28/10/2015

OTHER SITE IDENTIFICATION

Number and name of the other site: 7. Ukonsaari Island

Coordinates: ETRS-TM35FIN N:7647564 E:511740

A. AVAILABILITY

A.1. Seasonal occupancy (how many days per year the geosite is used)

From 1 to 90 days (one season) for example summer time.	**2.5**	
From 91 to 180 days (two seasons) for example summer and autumn time.	**5**	
From 181 to 270 days (three seasons) for example summer, autumn and spring.	**7.5**	
From 271 to 360 (four seasons) summer, autumn, winter and spring.	**10**	**X**

A.2. Terrestrial accessibility - how the visitor reach the geosite/gold historical site/ other site by car, bus and/ or hiking.

Impossible to reach the geosite/gold historical site/other site.	**0**	
The access to the geosite/gold historical site/other site is very difficult, only possible with special equipment (boat, canoe, ropes, etc.).	**1**	**X**
The access to the geosite/gold historical site/other site is possible but the route in winter time is longer than the other used in the rest of the year.	**2**	
The access to the geosite/gold historical site/other site is possible and the geosite/gold historical site/ other site is located more than 4 km from a paved road or a forest vehicle road.	**3**	
The geosite/gold historical site/other site is located between 2 km and 4 km from a paved road or a forest vehicle road.	**4**	
The geosite/gold historical site/other site is located between 1 km and 2 km from a paved road or a forest vehicle road.	**5**	
The geosite/gold historical site/other site is located between 500 metres and 1 km from a paved road or a forest vehicle road.	**6**	

The geosite/gold historical site/other site is located between 200 metres and 500 metres from a paved road or a forest vehicle road.	**7**	
The geosite/gold historical site/other site is located between 50 metres and 200 metres from a paved road or a forest vehicle road.	**8**	
The geosite/gold historical site/other site is located less than 50 metres from a paved road or forest vehicle road.	**9**	
The geosite/gold historical site/other site is located less than 50 metres from a paved road or forest road with parking area for a bus.	**10**	

How to get there?

It is in Inari village, in a small building in the opposite side of Siida Museum, is in this small building that visitors buy the tickets and go by boat to this site. In winter time when the lake turns to ice is possible to visit this site with skiis or snowmobile.

A.3. Availability according with people physical conditions when the activity is hiking or walking.

Very difficult for people reach the geosite/gold historical site/other site only for people with excellent physical conditions.	**1**	
Moderate difficulty, at least good physical conditions.	**5**	
Easy even for people with no big physical conditions.	**7.5**	
Very easy, even for children.	**10**	**X**

A.4. Boat and/or canoe access.

X YES	**NO**	
The access to the geosite/gold historical site/other site is possible and the geosite/gold historical site/other site is located more than 4 km from a boat and/or canoe.	**1**	
The geosite/gold historical site/other site is located between 2 km and 4 km from a boat and/or canoe.	**3**	
The geosite/gold historical site/other site is located between 1 km and 2 km from a boat and/or canoe.	**5**	
The geosite/gold historical site/other site is located between 500 metres and 1 km from a boat and/or canoe.	**7**	
The geosite/gold historical site/other site is located between 200 metres and	**8**	

500 metres from a boat and/or canoe.		
The geosite/gold historical site/other site is located between 50 metres and 200 metres from a boat and/or canoe.	**9**	
The geosite/gold historical site/other site is located less than 50 metres from a boat and/or canoe.	**10**	**X**

A.5. Visibility

The geosite/gold historical site/other site is not visible.	**0**	
It is very difficult to see the geosite/gold historical site/other site (only visible with special equipment, ropes, climbing material, etc.) in summer time.	**1**	
The visibility of the geosite/gold historical site/other site is low, limited by, for example, vegetation, buildings, etc.	**2**	
The visibility of the gesoite/gold historical site/other site is medium, forcing to go closer to see better the geological/historical element(s).	**5**	
The visibility of the geosite/gold historical site/other site is good to all geological/historical elements.	**7**	
The visibility of the geosite/gold historical site/other site is excellent to all geological/historical elements.	**9**	
The visibility of the geosite/gold historical site/other site is good to all or the most important geological/historical elements even with snow and darkness (in the dark it is used artificial light to observe the geosite/gold historical site/other site).	**10**	**X**

A.6. Safety.

Geosite/gold historical site/other site impossible to be visited due to the high danger on it.	**0**	
Geosite/gold historical site/other site with no safety facilities (fences, stairs, handrails, etc.), no mobile phone coverage and located more than 50 km from the nearest hospital.	**1**	
Geosite/gold historical site/other site with no safety facilities (fences, stairs, handrails, etc.) and more than 50 km from the nearest hospital but with mobile phone coverage.	**2**	
Geosite/gold historical site/other site with safety facilities (fences, stairs,		

handrails, etc.), but no mobile phone coverage and located more than 50 km from the nearest hospital.	**3**	
Geosite/gold historical site/other site with safety facilities (fences, stairs, handrails, etc.), mobile phone coverage but located more than 50 km from the nearest hospital.	**5**	**X**
Geosite/gold historical site/other site with no safety facilities (fences, stairs, handrails, etc.) but with mobile phone coverage and located less than 50 km from the nearest hospital.	**7**	
Geosite/gold historical site/other site with safety facilities (fences, stairs, handrails, etc.), with mobile phone coverage and located less than 50 km from the nearest hospital.	**8**	
Geosite/gold historical site/other site with safety facilities (fences, stairs, handrails, etc.), mobile phone coverage and located less than 20 km from the nearest hospital.	**9**	
Geosite/gold historical site/other site with safety facilities (fences, stairs, handrails, etc.), mobile phone coverage and located less than 5 km from the nearest hospital.	**10**	

A.7. Safety in the geosite/gold historical site/ other site and its access.

Geosite/gold historical site/other site and its access without any safety.	**0**	
Geosite/gold historical site/other site with high danger (no signs to indicate the way to go so visitors need a good orientation skills, floods, mass movements, avalanches, slippery floor, very steep floor, etc.).	**1**	
High danger in the access to the geosite/gold historical site/other site (no signs to indicate the way to go so visitors need a good orientation skills, floods, mass movements, avalanches, slippery floor, very steep floor, etc.).	**2**	
Geosite/gold historical site/other site with moderate danger (no signs to indicate the way to go so visitors need a good orientation skills, floods, mass movements, avalanches, slippery floor, very steep floor, etc.).	**5**	
Moderate danger in the access to the geosite/gold historical site/other site (no signs so visitors need a good orientation skills, floods, mass movements, avalanches, slippery floor, very steep floor, etc.).	**6**	
Safe geosite/gold historical site/other site (only with a little precaution) and		

safe access.	**8**	
Safe access (only with a little precaution) and safe geosite/gold historical site/other site.	**9**	
Geosite/gold historical site/other site and access without any danger for the visitor.	**10**	**X**

B. USE (10%)

B.1. Signage

No signs in the access road to the geosite/gold historical site/other site neither in the geosite/gold historical site/other site.	**0**	
Signs only in the access roads.	**2.5**	
Signs only near to the geosite/gold historical site/other site or in the place.	**5**	
Signs on the main road access and in the geosite/gold historical site/other site showing it is a touristic place, historical place or geological site.	**7.5**	**X**
Signs in the main road access and in the geosite/gold historical site/other site showing it is a "geosite"/"gold historical site"/"other site" from the geopark.	**10**	

B.2. The current use of the geosite/gold historical site/other site in terms of geological/historical interest.

Geosite/gold historical site/other site without any geological/historical promotion.	**0**	
Geosite/gold historical site/other site with geological/ promotion only in internet.	**2.5**	
Geosite/gold historical site/other site with geological/historical promotion only in internet and leaflets, books, maps and/ or in the geosite/gold historical site/other site e.g. information board.	**7.5**	
Geosite/gold historical site/other site with an interpretative centre explaining the geosite/gold historical site/other site (not needed to have the interpretative centre in the geosite/gold historical site/other site, it can be on other place).	**10**	**X**

B.3. The current use of the geosite/gold historical site/other site for other types of interests.

Geosite/gold historical site/other site without other type of interest, promotion and/or use.	**0**	
Geosite/gold historical site/other site with other types of interest, without promotion and/ or use.	**1**	
Geosite/gold historical site/other site integrated in a non-circular walking trail and ski trail or non-circular trail (walking or ski trail) and non-circular boat/canoe route.	**3**	
Geosite/gold historical site/other site integrated in a circular walking trail or sky trail or site integrated in a circular boat/canoe route.	**5**	
Geosite/gold historical site/other site with a circular walking trail and ski trail or circular trail (walking or ski trail) and circular boat/canoe route.	**7**	
Geosite/gold historical site/other site with other type of interest(s), with promotion but not use.	**9**	
Geosite/gold historical site/other site with other type of interest(s), with promotion and/ or use.	**10**	**X**

B.4. Use limitations of the geosite/gold historical site/other site.

Without any possibility to visit the geosite/gold historical site/other site.	**0**	
Geosite/gold historical site/other site with restrictions (e.g. private property, opening hours, etc.).	**2.5**	**X**
Geosite/gold historical site/other site with physical restrictions (fences, obstacles, etc.).	**7.5**	
Geosite/gold historical site/other site without any restriction to visit.	**10**	

C. LOGISTICS (25%)

C.1. Cleanliness.

Geosite/gold historical site/other site without any cleanliness, full of rubbish spread all over the place.	**0**	
Geosite/gold historical site/other site not so clean but with rubbish bins.	**2.5**	
Clean geosite/gold historical site/other site but without rubbish bins.	**5**	**X**
Clean geosite/gold historical site/other site without a rubbish bin but	**7.5**	

located less than 5km from the geosite/gold historical site/other site.		
Clean geosite/gold historical site/other site with rubbish bins.	**10**	

C.2. Toilets

Toilets more than 5 km from the geosite/gold historical site/other site.	**1**	**X**
Toilets less than 5 km from the geosite/gold historical site/other site.	**2.5**	
Toilets less than 1 km from the geosite/gold historical site/other site.	**5**	
Toilets less than 200 metres from the geosite/gold historical site/other site.	**7.5**	
Toilets on the geosite/gold historical site/other site.	**10**	

C.3. Restaurants

There is no restaurants less than 20 km from the geosite/gold historical site/other site.	**0**	
There is restaurant(s) between 5km and 20 km from the geosite/gold historical site/other site and opens seasonally (e.g. summer and autumn time)	**1**	
There is restaurant(s) between 5km and 20 km from the geosite/gold historical site/other site.	**2**	**X**
There is restaurant(s) between 1km and 5km from the geosite/gold historical site/other site and opens seasonally (e.g. summer and autumn time)	**3**	
There is restaurant(s) between 1km and 5km from the geosite/gold historical site/other site.	**4**	
There is only cafe in the geosite/gold historical site/other site or less than 1km from the geosite/gold historical site/other site and it opens seasonally (e.g. summer and autumn time).	**5**	
There is only cafe in the geosite/gold historical site/other site or less than 1km from the geosite/historical site/other site.	**6**	
There is restaurant(s) less than 1km from the geosite/gold historical site/other site and opens seasonally (e.g. summer and autumn time).	**7**	
There is restaurant(s) less than 1km from the geosite/gold historical site/other site.	**8**	
There is restaurant(s) in the geosite/gold historical site/other site (less than	**9**	

300 metres) and opens seasonally (e.g. summer and autumn time).		
There is restaurant(s) in the geosite/gold historical site/other site (less than 300 metres).	**10**	
The Inari village offers some restaurants.		

C.4. Accommodation (5%)

There is no accommodation less than 20 km from the geosite/gold historical site/other site.	**0**	
There is a hut (for rent or for free with room for maximum 6 people) for hikers in the hiking trail and/or in the geosite/gold historical site/other site.	**1**	
The nearest accommodation (about 5 km from the geosite/gold historical site/other site) is seasonal (for example opened four or three months only) and with few rooms (about 10 rooms).	**2**	
The nearest accommodation (about 5 km from the geosite/gold historical site/other site) is seasonal (for example opened four or three months only) and many rooms (more than 10 rooms).	**3**	
There is many types of accommodation less than 20 km and opens seasonally (e.g. summer and autumn time).	**4**	
There is many types of accommodation less than 20 km.	**5**	**X**
There is many types of accommodation less than 5 km and opens seasonally (e.g. summer and autumn time).	**6**	
There is many types of accommodation less than 5 km.	**7**	
There is many types of accommodation less than 1 km and opens seasonally (e.g. summer and autumn time).	**8**	
There is many types of accommodation less than 1 km.	**10**	

C.5. Local buses.

The geosite/gold historical site/other site is more than 20 km from a bus stop for local bus.	**0**	
The geosite/gold historical site/other site is between 10km and 20 km from a bus stop for local bus.	**2**	
The geosite/gold historical site/other site is between 10 km and 5 km from a bus stop for local bus.	**4**	**X**

The geosite/gold historical site/other site is between 5km and 1 km from a bus stop for local bus.	**6**	
The geosite/gold historical site/other site is less than 1km from a bus stop for local bus.	**8**	
There is a bus stop in the geosite/gold historical site/other site (less than 300 metres).	**10**	
The bus stops in the parking area where visitors buy the tickets to the boat.		

D. PERCEPTIVENESS (5%)

D.1. Aesthetics		
Unpleasant geosite/gold historical site/other site and/or surrounded by unpleasant elements such as rubbish.	**0**	
Geosite/gold historical site/other site without any kind of beauty.	**1**	
Pleasant geosite/gold historical site/other site, without any outstanding beauty.	**4**	
Pleasant geosite/gold historical site/ other site, with some moderately attractive elements (small dimension).	**5**	
Pleasant geosite/gold historical site/other site, with attractive elements, with visual impact.	**7**	
Very attractive geosite/gold historical site/other site, with a strong visual impact.	**8**	
Geosite/gold historical site/other site extremely attractive, with a strong visual impact.	**9**	**X**
All the elements of the geosite/gold historical site/other site are extremely attractive, with a huge visual impact.	**10**	

D.2. Interpretative potential.

Only geologists, historians, archeologists and other experts understand what it in the geosite/gold historical site/other site.	**0**	
The visitor need to have a huge background in geology area/gold digging/ Sámi history to understand what is in the geosite/gold historical site/other site.	**2.5**	
The visitor need to have some geological/historical background to	**5**	

understand the geological/historical element(s) of the geosite/gold historical site/other site.		
The geosite/gold historical site/other site presents geological/historical elements in a very clear way and understandable way for all types of public.	**10**	**X**

PHOTOS OF THE SITE

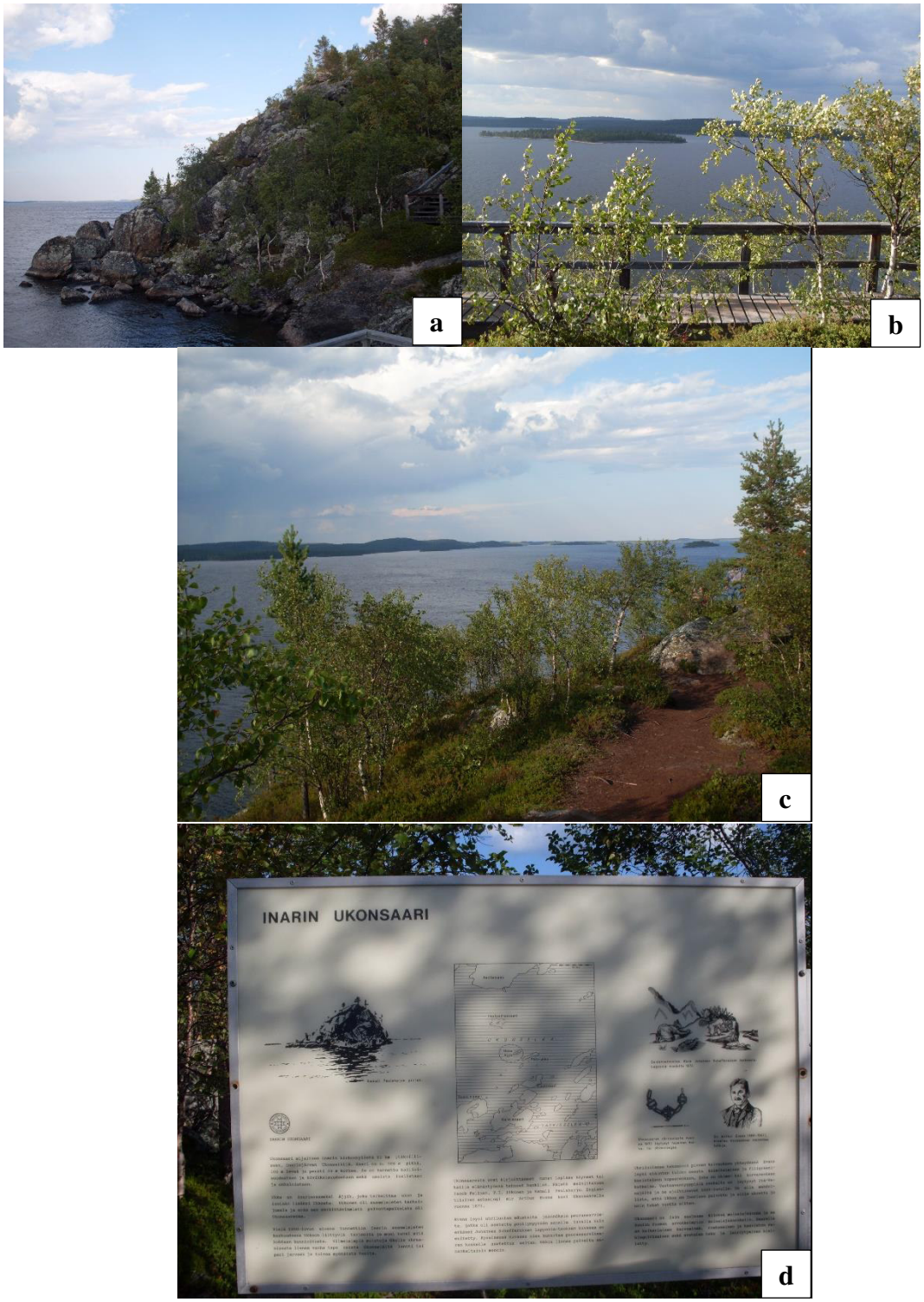
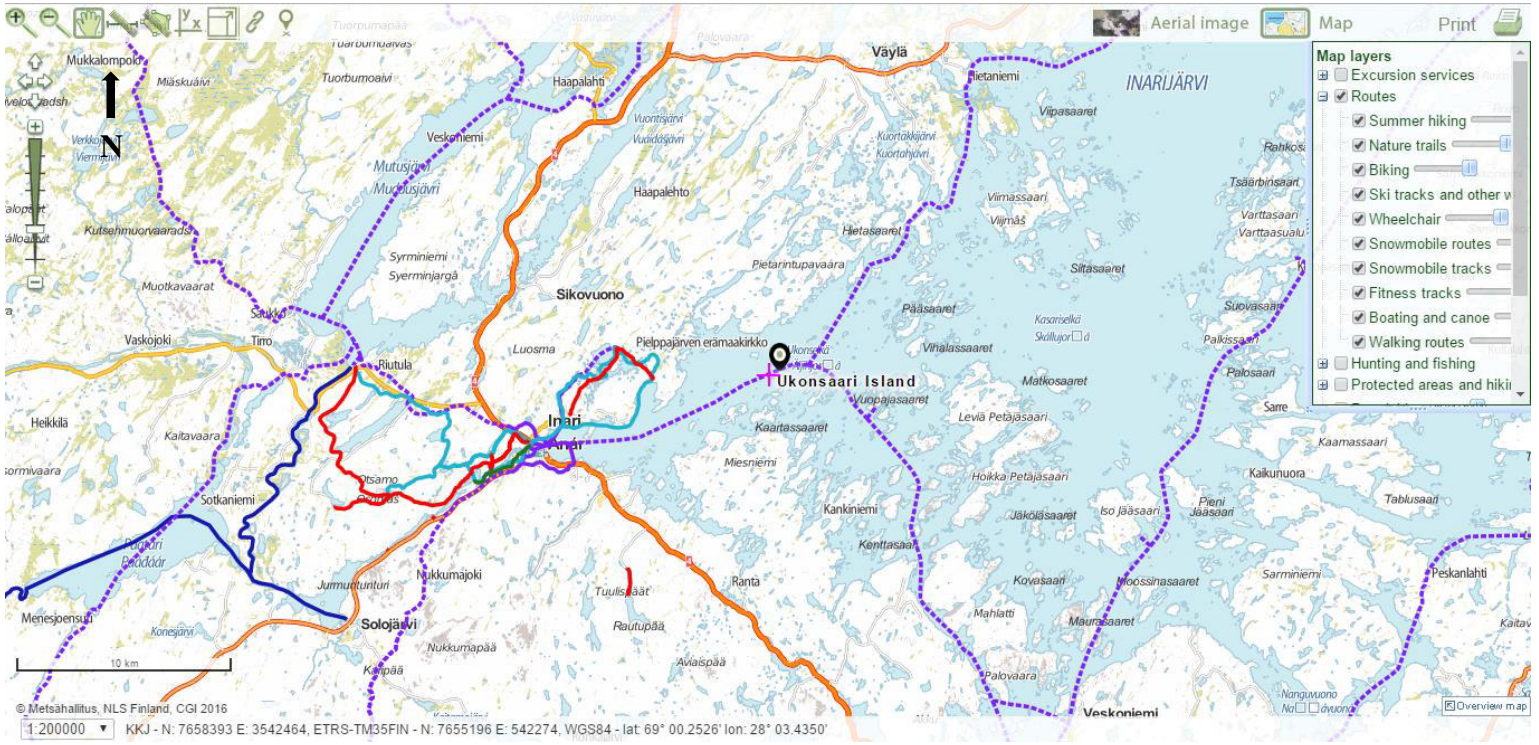


Figure 5.7. a) side to access to the island; b) and c) views from the island and d) information board in the island.

MAP OF THE OTHER SITE



Legends:

Other Site — Snowmobile route — Hiking trail — Boat and/or canoe route

Figure 5.8. Map of the other site (Source: https://www.retkikartta.fi/?lang=en).

Annex II

DEGRADATION RISK: GEOSITES, GOLD HISTORICAL SITES AND OTHER SITES		15. Thor formations at Pyhä-Nattanen	4.Kultala Crown Station	7.Ukonsaari Island
A.LEGAL PROTECTION – if a geosite/gold historical site/other site is in an area with legal protection or not; if there is control of access like for example opening hours, fences, private property, among others (20%).	Score			
Geosite/gold historical site/other site located in an area with no legal protection and no control of access.	**10**			
Geosite/gold historical site/other site located in an area with no legal protection but with control of access.	**7.5**			**X**
Geosite/gold historical site/other site located in an area with legal protection but no control of access.	**5**	**X**	**X**	
Geosite/gold historical site/other site located in an area with legal protection and control of access.	**1**			
B.PROXIMITY TO AREAS/ACTIVITIES WITH POTENTIAL TO CAUSE DEGRADATION - urban areas near, roads and railways, industrial mining activities, etc. (20%).	Score			
Geosite/gold historical site/other site located less than 50 metres from a potential	**10**			

degrading area/ activity.				
Geosite/gold historical site/other site located less than 200 metres from a potential degrading area/ activity.	**9**			
Geosite/gold historical site/other site located less than 500 metres from a potential degrading area/ activity.	**7**			
Geosite/gold historical site/other site located less than 1 km from a potential degrading area/ activity.	**5**			
Geosite/gold historical site/other site located more than 2 km from a potential degrading area/ activity.	**3**			
Geosite/gold historical site/other site located between 50 metres and 1 km from a small scale degrading area/ activity (for example: gold digging).	**2**		**X**	
Geosite/gold historical site/other site located between 1 km and 5 km from a small scale degrading area/ activity (for example: gold digging).	**1**			
Geosite/gold historical site/other site located more than 5 km from a potential degrading area/ activity and/ or small scale degrading area/ activity (for example: gold digging).	**0**	**X**		**X**
C.DETERIORATION OF GEOLOGICAL/HISTORICAL ELEMENTS – possibility of loss of the geological/ historical element(s) due to human activity and natural actions (35%).	Score		(The Gold Museum and The Natural Heritage Services take care of this site)	

Deteriorated geological elements/ in ruins the historical elements.	**10**			
Geosite already deteriorated/ gold historical site or other site in ruins but with some small actions of protection and conservation.	**9**			
Possibility of deterioration of the main geological/historical elements.	**8**			
Small possibility of deterioration of the main geological/historical elements.	**7**			
Possibility of deterioration of secondary geological/historical elements.	**5**			
Small possibility of deterioration of secondary geological/historical elements.	**3**			
Any danger of deterioration.	**0**	**X**	**X**	**X**
D.PROXIMITY WITH VILLAGES, CITIES AND TOURISTIC PLACES - if a geosite/gold historical site/other site is near places where people live, higher can be the chances of inappropriate use of the site by people like for example vandalism (10%).	Score			
The geosite/gold historical site/other site is less than 5 km from a bigger city (e.g.: >15 000 inhabitants).	**10**			
The geosite/gold historical site/other site is less than 5 km from a big village (e.g.:<15 000 and > 5000).	**7.5**			
The geosite/gold historical site/other site is less than 5 km from a small village (couple hundred inhabitants) or touristic place.	**5**			
The geosite/gold historical site/other site is more than 5 km from a city, village or touristic place.	**2.5**			**X**

The geosite/gold historical site/other site is in the wilderness.	**0**	**X**	**X**	
E.ACCESSIBILITY – a geosite/gold historical site/other site with an easier access is more likely to be damaged by people than the ones which are far and with difficult access (15%).				
E.1. Terrestrial accessibility (7.5%)	Score			
Geosite/gold historical site/other site located less than 100 metres from a paved road with a bus parking area.	**10**			
Geosite/gold historical site/other site located less than 100 metres from a paved road.	**7**			
Geosite/gold historical site/other site located less than 100 metres from a forest vehicle road or geosite/gold historical site/other site located between 100-500 metres from a paved road.	**5**			
Geosite/gold historical site/other site located more than 100 metres from a forest vehicle road or geosite/gold historical site/other site located more than 500 metres from a paved road.	**1**	**X**	**X**	**X**
E.2. Accessibility by boat and/or canoe (7.5%)	Score	No boat and/ or canoe access		
Geosite/gold historical site/other site located less than 100 metres from a boat and/or canoe place.	**10**		**X**	**X**

Geosite/gold historical site/other site located between 100-500 metres from a boat and/or canoe place.	**7**			
Geosite/gold historical site/other site located between 500 metres and 1 km from a boat and/or canoe place.	**5**			
Geosite/gold historical site/other site located more than 1 km from a boat and/or canoe place.	**1**			