



# Overview of landscape research by expert group 1

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# Landscape Value(s)

- Landscape has featured prominently in Iceland since the earliest Act on nature conservation (1956).
- Landscape as such was, however, not defined in nature conservation law until Act 60/2013 came in effect.
- Act 60/2013 includes an article (nr. 50) concerning the establishment of landscape protected areas (IUCN V).
- The first National Planning Strategy (2015-2026) places strong emphasis on landscape.
- Icelandic signed the *European Landscape Convention* in 2012; its ratification has been approved (March 2019).





### Values

Attributes

Classes	subclasses	richness, diversity	rarity	size, completeness fragmentation disturbance	inter- national responsi- bility	information & symbolic value	visual value
Geology & hydrology	bedrock unconsolidated sediments & processes subterranean water (incl. groundwater & geothermal) rivers & lakes						
Species	vascular plants birds freshwater fish freshwater invertebrates thermophilic microbes						
Ecosystems and soils	ecosystems/habitats soils						
Landscape &	wilderness						
wilderness	landscape						
Cultural heritage	archaeological, historical, legends, superstitions						





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# Some problems

- No official method for landscape analysis in Iceland:
  - no formal system of landscape classification
  - no established methology for landscape evaluation
- Landscape research is not included in the mandate of any government agency:
  - no ongoing, systematic research on landscapes, natural or cultural
- Landscape has limited recognition in protected areas:
  - has "general protection" e.g. within national parks but tools are lacking to protect – and understand – landscape as landscape







Íslenskt landslag Sjónræn einkenni, flokkun og mat á fjölbreytni

Unnið fyrir Orkustofnun vegna Rammaáætlunar um nýtingu vatnsafls og jarðvarma



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## Rammaáætlun, 2nd Phase

Icelandic Landscape Project (2006-2010) intended to:

(a) Develop a method for the classification of natural and semi-natural landscapes





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 The goal of the ILP was to produce a classification that would include all the major landscape types in Iceland. The project was field based, i.e. all sites were visited and data collected in situ. A systematic sampling design was used, based on the  $10 \times 10$  km grid system of the Icelandic Institute of Natural History, selecting a third of the grids, yielding a total sample size of 130. In the end, 16 sites were not sampled for various reasons; inaccessibility, prohibitively high costs of access in time and money and unfavourable weather.







Variable	Summary description
Basic landscape contour	From highly concave (1) through flat (3) to highly convex (5)
Landscape depth	From shallow and enclosed (mean visible distance $\leq$ 3km) to open with distant horizon (mean visible distance > 40 km).
Elevational range	From flat plain to highly mountaineous (>1000 m elevational difference within 20 km distance range)
Forms and lines	Includes five variables: 1) straight lines and linear forms, 2) rolling shapes and lines, 3) angular shapes and lines that meet at acute angles, 4) sinuous shapes and lines, 5) diversity of forms and lines.
Repeated forms	Clusters or series with several, dozens or hundreds of the same or similar landscape features.
Vegetation cover	From barrens ( $\leq$ 5% cover, score of 1 or occasionally 0 if there were litterally no plants visible) to complete cover (5).
Vegetation diversity	Diversity of different vegetation types.
Patterns	Includes two variables: Patch size from coarse (score 1) to fine (5) and patch diversity estimated as number of different patch types.
Texture	Includes three variables: prominence of smooth surfaces, prominence of rough surfaces and texture diversity.
Water	Includes three variables: area of water cover (from 0 to large area, score 5), current (from 1 for still water to 5 for waterfall) and diversity of expression.
Sea	Degree of prominence scored
Snow	Degree of prominence scored
Glaciers and ice	Degree of prominence scored separately. In the final analysis, only glaciers were included.
Colour diversity	From virtually monochromatic (1) to extremely colourful (5).
Visual diversity	Compound variable including elevational range, the diversity of forms & lines, vegetation, colour and texture, patch diversity and size of mosaic, and the

prominence and diversity of water expressions.

The classification system is based on visual characteristics (23 variables), observed in the field.

> Table 1. The variables included in the Icelandic Landscape Project for a description and classification based on visual properties.





Basic shape convex Angular shapes prominent Fine grained patchiness High colour diversity Basic shape flat High landscape depth

High vegetation cover

Coarse grained patchiness



Basic shape highly concave High vegetation cover Low landscape depth

# Examples of characteristics



Linear features v. prominent Angular forms present Very low landscape depth



Sinuous forms prominent High elevational range Water colour grey



Very fine grained patchiness High score for coarse texture High texture diversity



Very high landscape depth Smooth surface texture V. coarse grained patchiness Very low texture diversity Very low colour diversity



Rolling forms very prominent Water prominent High colour diversity (note red colour right)



High diversity site: glacier, high elevational range, diversity of water expressions, high diversity of textures, colours and vegetation types.





The aim of the ILP was to produce a hierarchical classification allowing groups to be compared with a quantitative similarity measure. To this end, Cluster Analysis (CA) was utilized, whose product may be displayed as a tree-like dendrogram, where each object is placed at the end of a branch that links to all other objects with a distance representing similarity. CA is agglomerative, i.e. starts by calculating the distance between all objects and then clusters the two most similar. This is iterated until all objects have been placed. The final step is the demarcation of classes. The classes are objective, generated by the data themselves.



The multivariate cluster analysis produced 11 major landscape groups of different sizes. The single glacier site was the first to diverge and formed a sister group to the rest of the sample. The next major split in the tree was into vegetated and barren land. The better-vegetated land fell into five major classes: fjords (N = 10)with a subgroup of a further 3 that are flat coastal sites by high mountains), flat coasts and islands (N = 10), well vegetated but homogeneous lowlands and heathlands (N = 20), deep, well vegetated glaciated valleys (N = 20) and finally a group of 14 sites that are characterized by high visual diversity but are otherwise not a uniform group.







## **Phase 3: Focus on evaluation**

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"Bara hver hluti landsins er einstakur" Rýnihópagreining á viðhorfum til íslensks landslags og gildi þess	Gildi landslags: Fagurferði, menningarminjar og saga
	Forrannsóknir til greiningar og mats á gildi landslags, unnar fyrir faghóp I, 3. áfanga Rammaáætlunar
Rammaáætlun Kelagsvisindastofnun Haskola islands	Mars, 2016 Birna Lárusdóttir Edda R.H. Waage Gísli Pálsson Guðbjörg R. Jóhannesdóttir

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## Phase 4: Focus on windfarms

- Research, begun in Phase 3, was completed on pilot projects concerning (a) landscape evaluation based on qualitative methods and (b) on the cultural-historical value of landscapes in the Central Highland.
- Work has started on developing methods for gauging landscape impacts of proposed windfarms. This involves data collection (based on the ILP checklist), as well as the use of new software for visibility analysis.
- This is the first phase of work which is expected to be continued in 2020, with the main focus on evaluation.



#### Fagurferðilegt gildi landslags

á áhrifasvæðum virkjanakosta við Hvamm í Þjórsá, og Trölladyngju, Austurengjahver og Krýsuvík á Reykjanesskaga

Forrannsókn til greiningar og mats á gildi landslags, unnin fyrir faghóp I, 3. áfanga Rammaáætlunar

Mars, 2019

Edda R.H. Waage Guðbjörg R. Jóhannesdóttir



容 Rammaáætlun

Minjar og menningarsögulegt gildi landslags á hálendi Íslands



BIRNA LÁRUSDÓTTIR RITSTJÓRI ragnheiður gló gylfadóttir Höfundur

FS736-16171 Reykjavík 2019 Fornleifastofnun Íslands







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Kort 1: Yfirlit yfir alla hnitsetta minjastaði á miðhálendinu. Gráu línurnar eru sýslumörk.



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## Thank You!



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