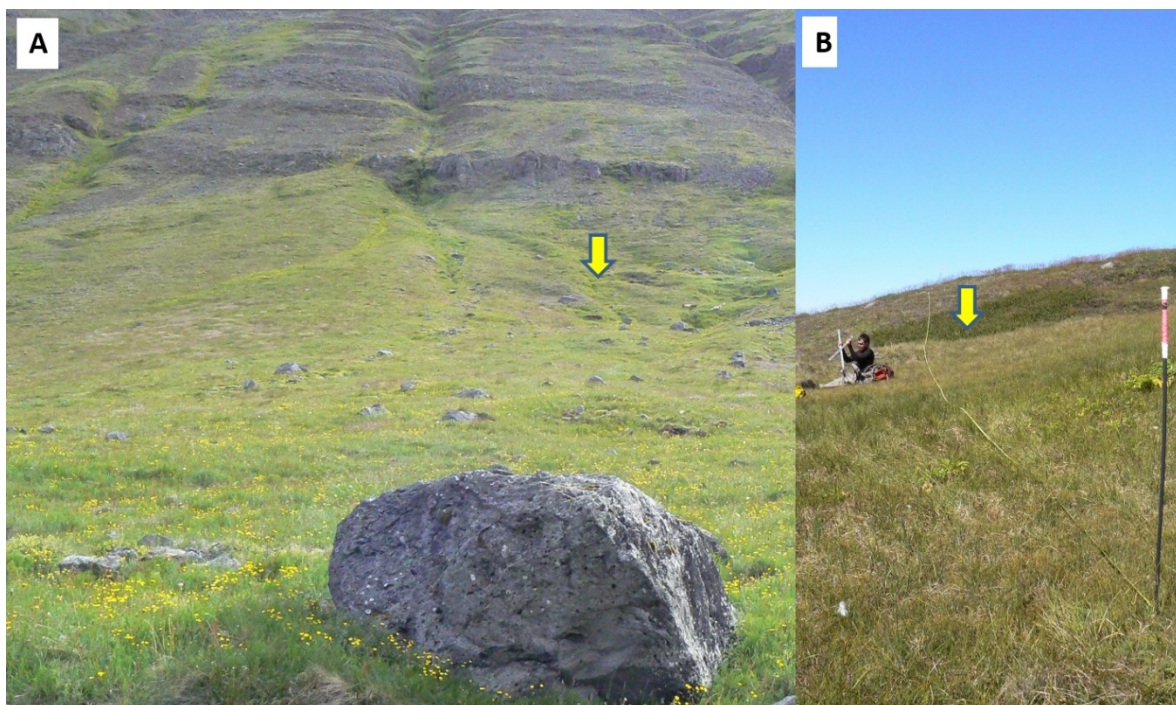
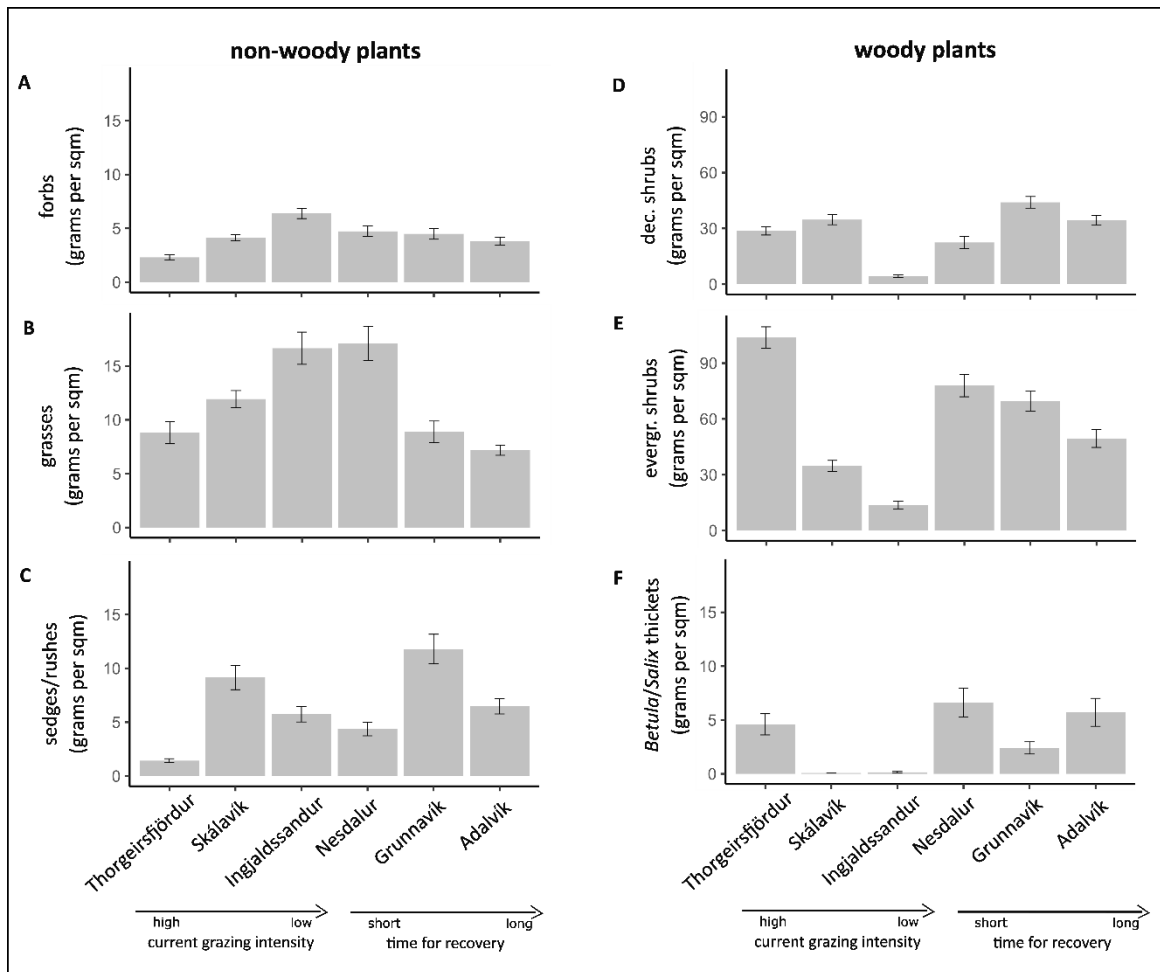


Supplementary Material

1 Supplementary Figures



Supplementary Figure 1. (A) Alluvial fans that characterize the surface topography of valley slopes. The approximate edge of the fan is marked by the yellow arrow and had to be subjectively placed in the field. (B) The edge of alluvial fans was used only to place the center of a 30 m measuring tape. Both ends of the tape were stretched into the respective landforms and we started sampling systematically from both ends of the tape.



Supplementary Figure 2. Average biomass of non-woody (A-C) and woody (D-F) plant growth forms within valleys of our study. Data is based on the small spatial grain size of assessments and error bars represent one standard error.

2 Supplementary Tables

Supplementary Table 1. This table is included as separate Excel file to the supplementary material.

Supplementary Table 2. Structure of models for estimating *alpha* and *beta* diversity on three spatial grain sizes

grain size	response variables	estimated effects (fixed)	design variables (random)
small	alpha diversity (species richness; Gini-Simpson)	grazing regime (presently grazed -> recovering) landform unit (concave -> convex)	valley/slope aspect/elevation
	beta diversity (Jaccard; MG2)	grazing regime (presently grazed -> recovering)	valley/slope aspect/elevation
inter- mediate	alpha diversity (species richness; Gini-Simpson)	grazing regime (presently grazed -> recovering) elevation (high -> low)	valley/slope aspect
	beta diversity (Jaccard; MG2)	grazing regime (presently grazed -> recovering)	valley/slope aspect
large	alpha diversity (species richness; Gini-Simpson)	grazing regime (presently grazed -> recovering) slope aspect (east facing -> west facing)	Valley
	beta diversity (Jaccard; MG2)	grazing regime (presently grazed -> recovering)	Valley

Supplementary Table 3. Structure of models for estimating soil variables, plant growth form biomass and total vascular plant biomass at small and intermediate spatial grain size.

grain size	response variables	estimated effects (fixed)	design variables (random)
small	soil pH, soil C, soil N, soil C:N ratio; plant growth form biomass; total vascular plant biomass	grazing regime (presently grazed -> recovering) landform (concave -> convex)	valley/slope aspect/elevation
intermediate	soil pH, soil C, soil N, soil C:N ratio; plant growth form biomass; total vascular plant biomass	grazing regime (presently grazed -> recovering) elevation (high -> low) grazing * elevation interaction (only for soil C as response)	valley/slope aspect

Supplementary Table 4. Model estimates and the effects of recovery from grazing and landform curvature on plant growth form, and total vascular plant biomass (grams * m⁻²). Estimates, including the ones of effect sizes, are presented on log scale.

plant growth form	effects	effect size	std. error	Df	t-value	p-value
forbs	Intercept	1.06	0.36			
	grazed -> recovering	-0.29	0.48	4	-0.59	0.587
	concave -> convex	-0.49	0.22	119	-2.24	0.027
grasses	Intercept	1.99	0.31			
	grazed -> recovering	-0.25	0.42	4	-0.59	0.589
	concave -> convex	-0.11	0.18	119	-0.62	0.537
sedges/rushes	Intercept	0.65	0.46			
	grazed -> recovering	0.04	0.22	4	0.06	0.956
	concave -> convex	-0.19	0.28	119	-0.67	0.502
deciduous woody	Intercept	1.73	0.84			
	grazed -> recovering	0.86	1.17	4	0.74	0.502
	concave -> convex	0.04	0.26	119	0.14	0.891
evergreen woody	Intercept	2.13	0.89			
	grazed -> recovering	0.65	1.23	4	0.53	0.625
	concave -> convex	0.07	0.36	119	0.18	0.856
<i>Betula pubescens</i> and <i>Salix</i> shrubs	Intercept	1.44	0.11			
	grazed -> recovering	0.26	0.14	4	1.86	0.136
	concave -> convex	0.00	0.10	119	0.06	0.949
total vascular plant biomass	Intercept	4.39	0.23			
	grazed -> recovering	0.30	0.31	4	0.94	0.400
	concave -> convex	0.02	0.10	119	0.16	0.875

Supplementary Table 5. Model estimates and the effects of recovery from grazing and elevation on plant growth form, and total vascular plant biomass (grams * m⁻²). Estimates, including the ones of effect sizes, are presented on log scale.

plant growth form	effect	effect size	std. error	df	t-value	p-value
forbs	Intercept	1.41	0.35			
	grazed -> recovering	-0.28	0.47	4	-0.60	0.580
	high -> low	-0.46	0.19	59	-2.40	0.020
grasses	Intercept	1.89	0.27			
	grazed -> recovering	-0.18	0.36	4	-0.51	0.638
	high -> low	0.58	0.17	59	3.47	0.001
sedges/rushes	Intercept	0.33	0.48			
	grazed -> recovering	-0.03	0.64	4	-0.04	0.969
	high -> low	1.13	0.34	59	3.29	0.002
deciduous woody	Intercept	2.35	0.82			
	grazed -> recovering	1.02	1.14	4	0.90	0.420
	high -> low	-0.67	0.29	59	-2.28	0.027
evergreen woody	Intercept	3.14	0.71			
	grazed -> recovering	0.66	0.99	4	-0.66	0.543
	high -> low	-0.37	0.26	59	-1.41	0.163
<i>Betula pubescens</i> and <i>Salix</i> shrubs	Intercept	-0.80	0.40			
	grazed -> recovering	1.09	0.51	4	2.14	0.099
	high -> low	-0.49	0.35	59	-1.40	0.167
total vascular plant biomass	Intercept	4.59	0.20			
	grazed -> recovering	0.27	0.28	4	0.96	0.392
	high -> low	0.03	0.08	59	0.36	0.723