WORKFLOW

1) <u>Add Raster Values to Features</u> (SAGA). I added the attributes Slope, Aspect and Direction of Movement (obtained with the r.cost algorithm during the computation of the first cumulative cost map with rivers as barriers) to the rivers with Strahler order above 4: *river4_sl_as_dir*

2) <u>Rasterize (vector to raster)</u> (GDAL). I rasterized *river4_sl_as_dir* 3 times, each time using a different burn-in value: *river_slope*, *river_aspect*, *river_mov_dir*

3) Using Krist's formula for adjusted slope Sa = S cos (At – A) (Van Leusen, P. M. (2002). Pattern to process: methodological investigations into the formation and interpretation of spatial patterns in archaeological landscapes. 6.6), I calculated it by using this expression in the raster calculator:

$$river\_adj\_slope = river\_slope * cos(river\_mov\_dir – river\_aspect)$$

4) <u>Reclassify by table</u>. I reclassified *river_adj_slope* using the following table:

From	To	Value (km/h)
-29	-6	2
-5,9	6	4
6,9	31	6

I obtained *river_speed*, and by dividing 60 for it, I got the *river_pace_min_km*

5) <u>Merge (GDAL)</u>. I merged *river_pace_min_km* with *Rhone_mov_min_km* (which is the pace for cattle walking on land): *Rhone_basin_pace*

6) <u>Reclassify by layer</u>. I reclassified *Rhone_basin_pace* using the following excel table:

0,0000	10,0000	1,0000	River
11,0000	20,0000	2,0000	River
21,0000	30,0000	3,0000	River
58,8234	100,8235	4,0000	Land
100,8236	143,8235	5,0000	Land
143,8236	186,8235	6,0000	Land
186,8236	230,8235	7,0000	Land
230,8236	273,8235	8,0000	Land
273,8236	853419163648,0000	15,0000	Land

And created: *Rhone_basin_pace_reclass*

7) I summed in cost surface *Rhone_slope_reclassified* (which is the slope reclassified during the creation of the first cumulative cost map, on the basis of cattle preferences) and *Rhone_basin_pace_reclass*: *Rhone_basin_cost_map*

8) <u>R.cost</u> (GRASS). I obtained the cumulated cost *Rhone_basin_cumulative*