

# Authoring Consistent Landscapes with Flora and Fauna

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## 1 SUPPLEMENTARY MATERIAL

This supplementary material provides a list of notations used in our paper, a detailed list of species parameters that are used in our ecosystem analysis as well as detailed results of the user studies.

Table 2. Animal parameters showing [*min*; *max*] for each category.

	Group size	Mass	Presence in	
			Ecosystem 1	Ecosystem 2
<i>Bison Priscus</i>	[10; 35]	[700; 1000]	1.16%	0.88%
<i>Cervus Elaphus</i>	[30; 45]	[70; 250]	41.28%	10.62%
<i>Dama Roberti</i>	[5; 14]	[30; 80]	34.30%	1.77%
<i>Equus Mosbachensis</i>	[6; 20]	[227; 900]	1.74%	0.88%
<i>Hermitragus Bonali</i>	[2; 23]	[36; 90]	2.91%	0.88%
<i>Ovis Ammon</i>	[2; 100]	[130; 160]	5.81%	7.08%
<i>Rangifer Tarandus</i>	[50; 150]	[100; 300]	2.33%	69.03%
<i>Ursus Arctos</i>	[80; 600]	1		1.77%
<i>Ursus Spelaeus</i>	[200; 500]	1	1.16%	
<i>Lynx Spelaeus</i>	[11; 15]	1	1.16%	0.88%
<i>Canis Mosbachensis</i>	[23; 80]	[5; 9]	1.74%	0.88%
<i>Vulpes Vulpes</i>	[3; 14]	1	1.16%	0.88%
<b>Total</b>			<b>94.75%</b>	<b>95.55%</b>

Table 1. User study results with expert paleontologists.

Expert	Level of expertise	Completeness	User control	Realism
1	5	5	5	5
2	4	4	5	5
3	4	5	4	5
4	2	3	4	4
5	5	4	4	3
6	2	3	3	4
7	2	3	3	3
8	4	4	4	4
9	4	4	5	3

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Table 3. Mathematical notations used in the paper.

Notation	Meaning
$FCL$	Food Chain Level
$K$	Number of $FCL - 1$
$S^i$	Set of species in $FCL^i$
$s$	Species
$C$	Confinement region
$R(s)$	Set of resources in a region accessible by species $s$
$r$	Resource
$c(s, r)$	Consumed resource for species $s$ and resource $r$
$[r_{min}, r_{max}]$	Temporal variation of resource $r$
$\mathcal{F}(s, r)$	Fitness ranges $[\mathcal{F}_{min}(s, r); \mathcal{F}_{max}(s, r)]$ for species $s$ and resource $r$
$fit(s, R)$	Fitness of species $s$ in region $R$
$q(r, C)$	Quantity of resource $r$ available in the region $C$
$RAG$	Resource Access Graph
$v, e, h$	Vertices, spatial edges and hierarchical edges of the $RAG$
$t(v_1, v_2)$	Traveling time between vertices $v_1$ and $v_2$
$\ s\ $	Number of specimen of species $s$
$m_s$	Average mass of species $s$
$P_s(v)$	Probability of presence of an animal of species $s$ on the $RAG$ node $v$
$P_s(v'   v)$	Probability of species $s$ to go to node $v'$ if it is currently in node $v$
$w_{vv'}$	Weight of the $RAG$ edge between nodes $v$ and $v'$
$t(s, v)$	Average time spent by species $s$ on a vertex $v$
$Planning(h)$	List of visited nodes and their timing for a specific herd $h$

Table 4. Plant parameters. Triplets denote ( $min, max, consumption$ ) and geological viability represents specific viability of a species per soil type (limestone, water, marl, fallen rocks, alluvium)

	Illumination	Temperature	Moisture	Texture	Geological viability
<i>Cupressaceae</i>	(7, 9, 2)	(2, 9, 0)	(2, 4, 2)	(2, 8, 0)	(1, 0, 1, 1, 1)
<i>Pinus</i>	(7, 9, 5)	(6, 9, 0)	(2, 5, 3)	(1, 7, 0)	(1, 0, 1, 1, 1)
<i>Pistacia</i>	(7, 9, 2)	(7, 9, 0)	(3, 4, 2)	(3, 4, 0)	(1, 0, 1, 1, 1)
<i>Alnus</i>	(7, 9, 5)	(2, 8, 0)	(4, 8, 5)	(1, 4, 0)	(0, 0.8, 0, 0, 1)
<i>Apiaceae</i>	(3, 9, .2)	(1, 9, 0)	(2, 6, .2)	(1, 7, 0)	(1, 0, 1, 1, 1)
<i>Cichorium</i>	(7, 9, 2)	(6, 9, 0)	(4, 6, .2)	(3, 4, 0)	(1, 0, 1, 1, 1)
<i>Poaceae</i>	(5, 9, .2)	(1, 9, 0)	(1, 8, .2)	(1, 9, 0)	(1, 0, 1, 1, 1)
<i>Asteraceae</i>	(4, 9, .2)	(3, 9, 0)	(1, 7, .2)	(1, 8, 0)	(1, 0, 1, 1, 1)
<i>Quercus</i>	(7, 9, 5)	(5, 8, 0)	(3, 6, 5)	(2, 5, 0)	(1, 0, 1, 1, 1)
<i>Artemisia</i>	(7, 9, .2)	(2, 5, 0)	(2, 8, .2)	(2, 6, 0)	(1, 0, 1, 1, 1)
<i>Betula</i>	(7, 9, 3)	(3, 5, 0)	(4, 7, 3)	(1, 6, 0)	(1, 0, 1, 1, 1)
<i>Carpinus</i>	(6, 7, 5)	(6, 7, 0)	(4, 5, 4)	(3, 4, 0)	(1, 0, 1, 1, 1)
<i>Corylus</i>	(5, 6, 4)	(5, 6, 0)	(4, 5, 4)	(3, 4, 0)	(1, 0, 1, 1, 1)
<i>Plantago</i>	(5, 9, .2)	(1, 9, 0)	(2, 7, .2)	(2, 5, 0)	(1, 0, 1, 1, 1)
<i>Pinus mugo</i>	(7, 9, 3)	(2, 4, 0)	(3, 7, 3)	(2, 7, 0)	(1, 0, 1, 1, 1)
<i>Quercus ilex</i>	(7, 9, 4)	(7, 9, 0)	(4, 7, 4)	(2, 6, 0)	(1, 0, 1, 1, 1)
<i>Rubiaceae</i>	(3, 9, .2)	(2, 9, 0)	(2, 6, .2)	(1, 9, 0)	(1, 0, 1, 1, 1)
<i>Fabaceae</i>	(6, 9, .2)	(2, 9, 0)	(2, 6, .2)	(2, 8, 0)	(1, 0, 1, 1, 1)

Table 5. User study results with end users

User	Gender	Age	Domain of expertise	Career	Level of expertise	Completeness	User control	Realism
1	Male	18-25	Video games, animation	Industry	5	4	4	4
2	Male	18-25	Computer graphics (CG)	Academic	4	4	5	4
3	Female	18-25	CG	Academic	3	5	4	4
4	Male	18-25	CG	Academic	3	4	5	4
5	Female	26-39	CG	Academic	4	4	4	5
6	Male	26-39	Animation, cinematography	Industry	3	5	3	3
7	N/A	40-65	Museography	Industry	5	5	5	5
8	Female	18-25	Animation	Industry	3	4	3	5
9	Male	18-25	CG	Academic	3	5	5	5
10	Female	18-25	CG, Animation, cinematography	Industry	4	4	4	4