Authoring Consistent Landscapes with Flora and Fauna

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ACM Reference Format:
Pierre Ecormier-Nocca, Guillaume Cordonnier, Philippe Carrez, Anne-Marie Moigne, Pooran Memari, Bedrich Benes, and Marie-Paule Cani. 2021. Authoring Consistent Landscapes with Flora and Fauna. *ACM Trans. Graph.* 40, 4, Article 105 (August 2021), 2 pages. https://doi.org/10.1145/3450626.3459952

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 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

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

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

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0730-0301/2021/8-ART105 $15.00
https://doi.org/10.1145/3450626.3459952

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
$\text{fit}(s, R)$	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
$P_s(v' \mid v)$	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**
Cupressaceae	(7, 9, 2)	(2, 9, 0)	(2, 4, 2)	(2, 8, 0)	(1, 0, 1, 1, 1)
Pinus	(7, 9, 5)	(6, 9, 0)	(2, 5, 3)	(1, 7, 0)	(1, 0, 1, 1, 1)
Pistacia	(7, 9, 2)	(7, 9, 0)	(3, 4, 2)	(3, 4, 0)	(1, 0, 1, 1, 1)
Alnus	(7, 9, 5)	(2, 8, 0)	(4, 8, 5)	(1, 4, 0)	(0, 0.8, 0, 0, 1)
Apiaceae	(3, 9, .2)	(1, 9, 0)	(2, 6, .2)	(1, 7, 0)	(1, 0, 1, 1, 1)
Cichorium	(7, 9, .2)	(6, 9, 0)	(4, 6, .2)	(3, 4, 0)	(1, 0, 1, 1, 1)
Poaceae	(5, 9, .2)	(1, 9, 0)	(1, 8, .2)	(1, 9, 0)	(1, 0, 1, 1, 1)
Asteraceae	(4, 9, .2)	(3, 9, 0)	(1, 7, .2)	(1, 8, 0)	(1, 0, 1, 1, 1)
Quercus	(7, 9, 5)	(5, 8, 0)	(3, 6, 5)	(2, 5, 0)	(1, 0, 1, 1, 1)
Artemisia	(7, 9, .2)	(2, 5, 0)	(2, 8, .2)	(2, 6, 0)	(1, 0, 1, 1, 1)
Betula	(7, 9, 3)	(3, 5, 0)	(4, 7, 3)	(1, 6, 0)	(1, 0, 1, 1, 1)
Carpinus	(6, 7, 5)	(6, 7, 0)	(4, 5, 4)	(3, 4, 0)	(1, 0, 1, 1, 1)
Corylus	(5, 6, 4)	(5, 6, 0)	(4, 5, 4)	(3, 4, 0)	(1, 0, 1, 1, 1)
Plantago	(5, 9, .2)	(1, 9, 0)	(2, 7, .2)	(2, 5, 0)	(1, 0, 1, 1, 1)
Pinus mugo	(7, 9, 3)	(2, 4, 0)	(3, 7, 3)	(2, 7, 0)	(1, 0, 1, 1, 1)
Quercus ilex	(7, 9, 4)	(7, 9, 0)	(4, 7, 4)	(2, 6, 0)	(1, 0, 1, 1, 1)
Rubiaceae	(3, 9, .2)	(2, 9, 0)	(2, 6, .2)	(1, 9, 0)	(1, 0, 1, 1, 1)
Fabaceae	(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