

## MATERIAL SUPLEMENTARIO

**Material Suplementario 1.** Listado de los censos con ubicación geográfica, año y autores. Los censos que comienzan con M (en la segunda columna) corresponden a la metodología de monitores MARAS. Los restantes son censos Braun-Blanquet.

**Supplementary Material 1.** List of vegetation relevés with geographic coordinates, year and authors. Relevés that start with letter M were performed using MARAS methodology, the rest of them were performed following Braun-Blanquet.

Número	Censo	Latitud	Longitud	Año	Autor
1	Ce1	-51°31'37.4"	-70°40'12.9"	2016	Humano-Oliva-Paredes-Schenkel
2	Ce2	-51°32'21.2"	-70°42'10.1"	2016	Humano-Oliva-Paredes-Schenkel
3	Ce3	-51°33'43.0"	-70°44'23.4"	2016	Humano-Oliva-Paredes-Schenkel
4	Ce4	-51°35'34.2"	-70°47'19.3"	2016	Humano-Oliva-Paredes-Schenkel
5	Ce5	-51°36'26.6"	-70°49'07.7"	2016	Humano-Oliva-Paredes-Schenkel
6	Ce6	-51°38'50.6"	-70°53'00.8"	2016	Humano-Oliva-Paredes-Schenkel
7	Ce7	-51°39'07.2"	-70°53'00.0"	2016	Humano-Oliva-Paredes-Schenkel
8	Ce8	-51°27'42.9"	-70°10'08.3"	2016	Humano-Oliva-Paredes-Schenkel
9	Ce9	-51°27'38.3"	-70°09'03.8"	2016	Humano-Oliva-Paredes-Schenkel
10	Ce10	-51°45'20.5"	-69°19'24.2"	2016	Oliva-Paredes-Schenkel
11	Ce11	-51°46'14.0"	-69°18'12.9"	2016	Oliva-Paredes-Schenkel
12	Ce12	-51°53'16.3"	-69°08'44.1"	2016	Oliva-Paredes-Schenkel
13	Ce13	-51°53'12.1"	-69°08'43.9"	2016	Oliva-Paredes-Schenkel
14	Ce14	-51°53'02.8"	-69°06'52.3"	2016	Oliva-Paredes-Schenkel
15	Ce15	-51°53'09.9"	-69°06'46.3"	2016	Oliva-Paredes-Schenkel
16	Ce16	-51°52'00.6"	-69°02'43.3"	2016	Oliva-Paredes-Schenkel
17	Ce17	-51°51'46.0"	-68°58'08.0"	2016	Oliva-Paredes-Schenkel
18	Ce18	-51°52'19.3"	-68°55'03.0"	2016	Oliva-Paredes-Schenkel
19	Ce19	-51°51'48.6"	-68°52'34.3"	2016	Oliva-Paredes-Schenkel
20	Ce20	-51°51'41.8"	-68°50'07.1"	2016	Oliva-Paredes-Schenkel
21	Ce21	-51°48'32.7"	-68°50'06.2"	2016	Oliva-Paredes-Schenkel
22	Ce22	-51°53'02.9"	-69°28'24.1"	2016	Humano-Oliva-Paredes-Schenkel
23	Ce23	-51°53'04.0"	-69°28'10.0"	2016	Humano-Oliva-Paredes-Schenkel
24	Ce24	-51°55'17.3"	-69°30'47.9"	2016	Humano-Oliva-Paredes-Schenkel
25	Ce25	-51°55'20.4"	-69°31'02.3"	2016	Humano-Oliva-Paredes-Schenkel
26	Ce26	-51°56'53.6"	-69°40'15.6"	2016	Humano-Oliva-Paredes-Schenkel
27	Ce27	-51°57'11.2"	-69°40'11.5"	2016	Humano-Oliva-Paredes-Schenkel
28	Ce28	-51°57'11.8"	-69°40'04.5"	2016	Humano-Oliva-Paredes-Schenkel
29	Ce29	-51°59'16.9"	-69°45'24.7"	2016	Humano-Oliva-Paredes-Schenkel
30	Ce30	-51°52'02.0"	-69°30'48.5"	2016	Humano-Oliva-Schenkel-Vivar
31	Ce31	-51°52'00.4"	-69°37'24.0"	2016	Humano-Oliva-Schenkel-Vivar
32	Ce32	-51°51'19.2"	-69°37'18.6"	2016	Humano-Oliva-Schenkel-Vivar
33	Ce33	-51°51'10.4"	-69°36'23.4"	2016	Humano-Oliva-Schenkel-Vivar
34	Ce34	-51°51'00.1"	-69°37'00.9"	2016	Humano-Oliva-Schenkel-Vivar
35	Ce35	-51°51'34.8"	-69°37'19.6"	2016	Humano-Oliva-Schenkel-Vivar
38	Ce38	-51°07'09.3"	-71°17'01.2"	2016	Oliva-Vivar
39	Ce39	-51°09'38.8"	-71°16'57.7"	2016	Oliva-Vivar
40	Ce40	-51°10'52.3"	-71°16'56.0"	2015	Oliva-Vivar
41	Ce41	-51°11'52.6"	-71°14'05.9"	2015	Oliva-Vivar
42	Ce42	-51°37'33.5"	-70°51'13.9"	2018	Oliva-Vivar
43	Ce43	-51°15'53.8"	-69°07'57.9"	2018	Oliva-Vivar
44	Ce44	-51°10'34.9"	-69°07'13.9"	2018	Oliva-Vivar
45	Ce45	-51°08'59.2"	-69°09'06.5"	2018	Oliva-Vivar
46	Ce46	-51°39'39.5"	-69°51'17.7"	2018	Oliva-Vivar
47	Ce47	-51°40'02.2"	-69°48'39.4"	2018	Oliva-Vivar
48	Ce48	-51°40'17.1"	-69°50'28.1"	2018	Oliva-Vivar
49	Ce49	-51°40'39.7"	-69°54'47.3"	2018	Oliva-Vivar
50	Ce50	-51°34'04.0"	-69°49'52.7"	2018	Oliva-Vivar
51	Ce51	-51°34'54.1"	-69°49'00.9"	2018	Oliva-Vivar

52	Ce52	-51°59'57.9"	-69°46'25.4"	2018	Humano-Oliva-Paredes-Schenkel
53	Ce53	-51°56'07.5"	-69°38'34.0"	2018	Humano-Oliva-Paredes-Schenkel
54	Ce54	-51°27'53.1"	-69°19'19.2"	2018	Humano-Oliva-Paredes-Schenkel
55	Ce55	-51°27'27.6"	-69°18'54.0"	2018	Humano-Oliva-Paredes-Schenkel
56	Ce56	-51°19'58.7"	-69°14'57.0"	2018	Humano-Oliva-Paredes-Schenkel
57	Ce57	-51°19'53.8"	-69°12'12.9"	2018	Humano-Oliva-Paredes-Schenkel
58	Ce58	-51°19'34.3"	-69°10'46.7"	2018	Humano-Oliva-Paredes-Schenkel
59	Ce59	-51°19'05.5"	-69°08'38.7"	2018	Humano-Oliva-Paredes-Schenkel
60	Ce60	-51°26'07.5"	-69°17'00.3"	2018	Humano-Oliva-Paredes-Schenkel
61	Ce61	-51°53'10.6"	-69°12'18.5"	2018	Humano-Oliva-Schenkel
62	Ce62	-51°32'03.0"	-69°09'02.4"	2018	Humano-Oliva-Schenkel
63	Ce63	-51°28'26.0"	-70°09'18.8"	2018	Humano-Oliva-Schenkel
64	Ce64	-51°32'03.0"	-70°03'59.4"	2018	Humano-Oliva-Schenkel
65	Ce65	-51°33'54.5"	-70°00'08.3"	2018	Humano-Oliva-Schenkel
66	Ce66	-51°35'30.0"	-69°56'13.5"	2018	Humano-Oliva-Schenkel
67	Ce40(bis)	-51°03'10.4"	-69°10'23.0"	2018	Oliva-Paredes-Schenkel
68	Ce41(bis)	-51°03'21.4"	-69°10'16.0"	2018	Oliva-Paredes-Schenkel
69	C1	-51°34'24.2"	-69°30'53.9"	2015	Ferrante-Oliva
70	C3	-51°25'21.9"	-69°16'4.3"	2015	Ferrante-Oliva
71	C4	-51°22'22.9"	-69°18'09.1"	2015	Ferrante-Oliva
72	C5	-51°40'40.7"	-69°28'10.8"	2015	Ferrante-Oliva
73	C6	-51°41'45.9"	-69°49'16.5"	2015	Ferrante-Oliva
74	C7	-51°47'37.3"	-70°15'39.0"	2015	Ferrante-Oliva
76	C35	-51°37'37.5"	-71°20'33.0"	2015	Ferrante-Oliva
77	C36	-51°36'48.9"	-71°04'25.8"	2015	Ferrante-Oliva
78	PP1	-51°24'18.4"	-69°37'53.5"	2004	Paredes
79	PP4	-51°37'27.8"	-69°51'31.3"	2004	Paredes
81	PP7	-51°53'55.2"	-69°39'39.3"	2004	Paredes
82	PP MA	-51°30'52.0"	-70°08'44.0"	2004	Paredes
83	PPWilly	-51°57'0.68"	-70°26'46.2"	2004	Paredes
84	PPMA	-51°53'47.6"	-69°39'39.2"	2004	Paredes
85	PPPPerro	-51°56'02.0"	-70°26'08.6"	2004	Paredes
86	M01	-51°56'38.2"	-70°26'24.2"	2008	Humano-Suarez
87	M07	-51°30'06.1"	-69°20'26.0"	2009	Humano
88	M130	-51°27'27.0"	-69°14'24.4"	2015	Vivar
89	M131	-51°28'31.2"	-69°21'13.3"	2015	Humano-Vivar
90	M132	-51°23'39.2"	-69°15'50.0"	2014	Cepeda-Ferrante-Oliva-Vivar
91	M133	-51°29'37.2"	-69°15'29.1"	2014	Cepeda-Ferrante-Oliva-Vivar
92	M134	-51°22'58.7"	-69°20'07.3"	2015	Cepeda-Humano-Vivar
93	M136	-51°54'35.5"	-70°24'14.6"	2016	Humano-Oliva-Paredes-Vivar
94	M20	-51°35'26.0"	-69°54'13.3"	2009	Ferrante
95	M27	-51°25'46.3"	-69°38'38.9"	2009	Acosta
96	M28	-51°52'00.6"	-69°02'43.3"	2009	Acosta
97	M29	-51°18'09.0"	-69°15'01.0"	2009	Suarez
98	M48	-51°52'02.0"	-69°30'48.6"	2011	Paredes
99	M52	-52°03'27.3"	-69°47'30.7"	2011	Humano
100	M53	-52°02'32.5"	-69°46'29.4"	2011	Oliva-Paredes
101	M56	-51°51'02.8"	-70°30'35.6"	2011	Paredes
102	M62	-51°30'33.4"	-70°17'40.3"	2012	Ferrante-Oliva
103	M63	-50°54'00.9"	-69°16'10.4"	2012	Chamorro-Lewis
104	M65	-51°3'39.24"	-69°12'40.7"	2012	Chamorro-Lewis
105	M66	-51°31'01.6"	-69°03'12.2"	2012	Chamorro-Lewis
106	M67	-51°30'56.1"	-70°26'17.0"	2012	Suarez-Rivera
107	PP6bis	-51°52'18.3"	-69°02'40.0"	2004	Paredes

**Material Suplementario 2.** Composición florística de censos típicos de cada estado.

C: Coironal de *F. gracillima*, Cs: Coironal de *F. gracillima* con subarbustos de *N. bryoides*, Cp: Coironal de *F. gracillima* y *N. bryoides* invadido por *P. chrysophylla*, S: Estepa Subarbusativa de *N. bryoides* o *N. ulicina* y Sp: Estepa Subarbusativa de *N. bryoides* o *N. ulicina* invadida por *P. chrysophylla*.

**Supplementary Material 2.** Floristic composition of typical vegetation relevés of each state. C: Tussock grassland of *F. gracillima*; Cs: Tussock grassland of *F. gracillima* with dwarf *N. bryoides* shrubs; Cp: Tussock grassland of *F. gracillima* with dwarf *N. bryoides* shrubs and *P. chrysophylla*; S: Dwarf shrubland with *N. bryoides* or *N. ulicina*; Sp: Dwarf shrubland with *N. bryoides* or *N. ulicina* and *P. chrysophylla*.

		C	Cs	Cp	S	Sp
		Los Pozos Puesto	Los Pozos Laguna	Alaska	Potrok Aike Campo Grande	Bella Vista
		51°29'53.7'' 69°19'33.9''	51°22'58.7'' 69°20'07.3''	51°10'52.3'' 71° 16' 56.0''	51°54'35.5'' 70°24'14.6''	70°42'10.1'' 51°32'21.2''
		SC07	SC134	Censo 40	SC136	Censo 2
	Riqueza (n° especies)	24	22	19	26	18
	Cobertura %	73.6	62.8	57.9	70.8	38.9
	Shannon	-2.1	-2.1	-1.8	-2.3	-2.0
Grupo						
Funcional	Especie	%	%	%	%	%
Coirones	<i>Festuca gracillima</i>	30.9	17.6	15.0	10.1	
	<i>Pappostipa chrysophylla</i>	0.2		5.0	0.2	10.0
Hierbas	<i>Acaena poeppigiana</i>	1.3		0.1	1.6	1.0
	<i>Acaena splendens</i>			0.1		
	<i>Acaena</i> spp.		0.6			
	<i>Adesmia lotoides</i>	0.4			0.5	
	<i>Arjona patagonica</i>					0.1
	<i>Armeria maritima</i>				0.4	
	<i>Astragalus</i> sp.					
	<i>Azorella filamentosa</i>		0.4		0.4	
	<i>Calceolaria uniflora</i>		0.5		0.7	0.1
	<i>Cerastium arvense</i>	1.9	2.3	1.0	0.5	
	<i>Erigeron myosotis</i>	0.2				
	<i>Hamadryas delfinii</i>		0.2			
	<i>Hypochoeris incana</i>				0.2	
	<i>Luzula chilensis</i>	0.8	0.4	0.1	0.7	
	<i>Silene magellanica</i>				0.4	
	<i>Sisyrinchium</i> sp.					0.1
	<i>Viola maculata</i>	0.2				
<i>Bromus setifolius</i>	1.7	0.6	0.1	0.9		
<i>Carex andina</i>	9.2	6.3	10.0	6.6	5.0	
<i>Carex argentina</i>		0.4				
<i>Avenella flexuosa</i>	2.5					
<i>Hordeum comosum</i>	0.6	0.4	0.1			
Pastos cortos	<i>Poa spiciformis</i>	10.4	9.7	2.0	19.2	2.0
	<i>Rytidosperma virescens</i>	2.5	1.2	1.0	3.2	
	<i>Trisetum spicatum</i>	0.2			1.1	
	<i>Agrostis</i> spp.	0.4				0.1
	<i>Festuca magellanica</i>	1.9	2.3	1.0	2.3	0.1

Subarbustos	<i>Clinopodium darwinii</i>	1.9	0.5	1.0	0.7	2.0
	<i>Colobanthus lycopodioides</i>	1.3	0.4		1.8	0.1
	<i>Euphorbia collina</i>				0.2	0.1
	<i>Junellia o'donelli</i>				1.1	2.0
	<i>Mulinum microphyllum</i>	0.2		0.1		
	<i>Nardophyllum bryoides</i>	2.2	15.3	1.0	13.1	10.0
	<i>Nassauvia aculeata</i>	0.6	1.0	0.1	0.2	
	<i>Nassauvia darwinii</i>		0.2		0.2	0.1
	<i>Nassauvia fuegiana</i>	0.4				
	<i>Nassauvia ulicina</i>					5.0
	<i>Perezia recurvata</i>		0.2		4.3	
	<i>Philippiella patagonica</i>					0.1
	<i>Polygala darwiniana</i>		0.2		0.2	
	<i>Senecio magellanicus</i>			0.1		
<i>Valeriana carnososa</i>			0.1			
Arbustos	<i>Berberis microphylla</i>	1.7				
	<i>Mulguraea tridens</i>		2.1	20.0		

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**Material Suplementario 3.** Mínimo (Min), máximo (Max), promedio (Prom), mediana (Med) y constancia (Const) de cobertura para especies clave de cada estado clasificadas en recientes (C), decrecientes (D) o indeterminadas (I) con respecto al pastoreo (Oliva et al. 1998).

**Supplementary Material 3.** Minimum (Min), maximum (Max), mean (Prom), median (Med) and constance (Const) for key species of each state classified as increasers (C), decreaseers (D) or indeterminate (I) in relation to grazing (Oliva et al. 1998).

	C o D	Coironal de <i>F. gracillima</i>					Coironal Subarbustivo					Coironal de <i>F. gracillima</i> y <i>N. bryoides</i> con <i>P. chrysophylla</i>					Estepa Subarbustiva de <i>N. bryoides</i> o <i>N. ulicina</i>					Estepa Subarbustiva de <i>N. bryoides</i> o <i>N. ulicina</i> y <i>P. chrysophylla</i>				
		C					Cs					Cp					S					Sp				
		Min	Max	Prom	Med	Const	Min	Max	Prom	Med	Const	Min	Max	Prom	Med	Const	Min	Max	Prom	Med	Const	Min	Max	Prom	Med	Const
COIRONES																										
<i>Festuca gracillima</i>	D	16	40	25.7	25	1	16	30	21.7	21	1	0.1	30	17.4	15	0.92	0.1	15	9.4	10	0.82	1	10	3.4	1.7	0.6
<i>Pappostipa chrysophylla</i>	C	0.1	2.4	0.7	0.2	0.29	0.1	2	0.7	0.1	0.36	3.4	50	15.1	10	1	0.1	2	0.7	1	0.41	4	20	8.9	7.5	1
HIERBAS																										
<i>Acaena poeppigiana</i>	I	0.1	4.4	1.2	1	0.9	0.1	2	0.6	0.2	0.5	0.1	3.3	0.6	0.1	0.67	0.1	2	0.6	0.1	0.86	0.1	1	0.3	0.1	0.8
<i>Acaena</i> sp.	I	0.1	1	0.4	0.3	0.19	0.1	0.6	0.4	0.4	0.14															
<i>Cerastium arvense</i>	C	0.1	2.8	1.1	1	0.81	0.1	2.8	0.9	0.7	0.79	0.1	6.7	1.5	1	0.75	0.1	1	0.3	0.1	0.73	0.1	2.6	0.7	0.1	0.7
PASTOS CORTOS																										
<i>Bromus setifolius</i>	D	0.1	4.8	1.1	1	0.67	0.4	5	1.3	0.8	0.5	0.1	2.8	0.9	0.1	0.58	0.1	5	1.1	0.9	0.59	0.1	2.1	0.8	0.1	0.6
<i>Carex andina</i>	C	0.7	20	8.5	8.8	1	0.1	14	5.1	5	0.86	5	11	8.8	10	0.75	1	20	5.6	5	0.77	0.5	10	5.1	5	0.8
<i>Poa spiciformis</i>	D	6.2	21	12.2	10	1	5	15	10.5	10	1	0.1	13	4.7	3.5	0.83	1	19	8.8	10	1	2	25	7.1	5	0.9
<i>Rytidosperma virescens</i>	D	0.1	15	5.1	5	1	0.1	10	3.8	2.4	0.86	0.1	2	1.2	1.2	0.5	0.1	10	4	4.8	0.68	0.1	2	1	1	0.5
SUBARBUSTOS																										
<i>Colobanthus lycopodioides</i>	C	0.1	2	0.7	0.7	0.9	0.1	7.2	1.3	0.6	0.89	0.1	0.8	0.3	0.1	0.4	0.1	5	1.1	0.9	0.89					
<i>Nardophyllum bryoides</i>	C	0.1	6	2.8	2.5	0.76	8.8	25	13.8	14	1	0.1	6.7	2.1	1	0.58	0.1	30	12.8	12	1	0.1	20	11.6	11	0.7
<i>Nassauvia darwinii</i>	C	0.1	1.2	0.2	0.1	0.48	0.1	1.1	0.3	0.1	0.71	0.1	1	0.6	0.6	0.17	0.1	0.9	0.2	0.1	0.59	0.1	0.1	0.1	0.1	0.3
<i>Nassauvia ulicina</i>	C	0.1	0.3	0.2	0.2	0.1						0.1	0.1	0.1	0.1	0.17	0.1	25	11	11	0.27	5	20	13	15	0.5
Riqueza		15	33	25.1	25	1	13	33	22.2	22	1	2	26	18.3	19	1	11	29	20.6	22	1	13	27	18.1	18	1
Cobertura		46	87	72.1	75	1	52	90	68.3	68	1	12	82	57.9	60	1	36	85	57.1	57	1	36	76	51	53	1
Shannon		-2.7	-1.7	-2.1	-2	1	-2.5	-1.5	-2	-2	1	-3	-0.5	-1.7	-1.8	1	-2.7	-1.3	-2	-2	1	-2.2	-1.6	-1.9	-1.9	1



**Material Suplementario 4.** Catálogo fotográfico de estados.

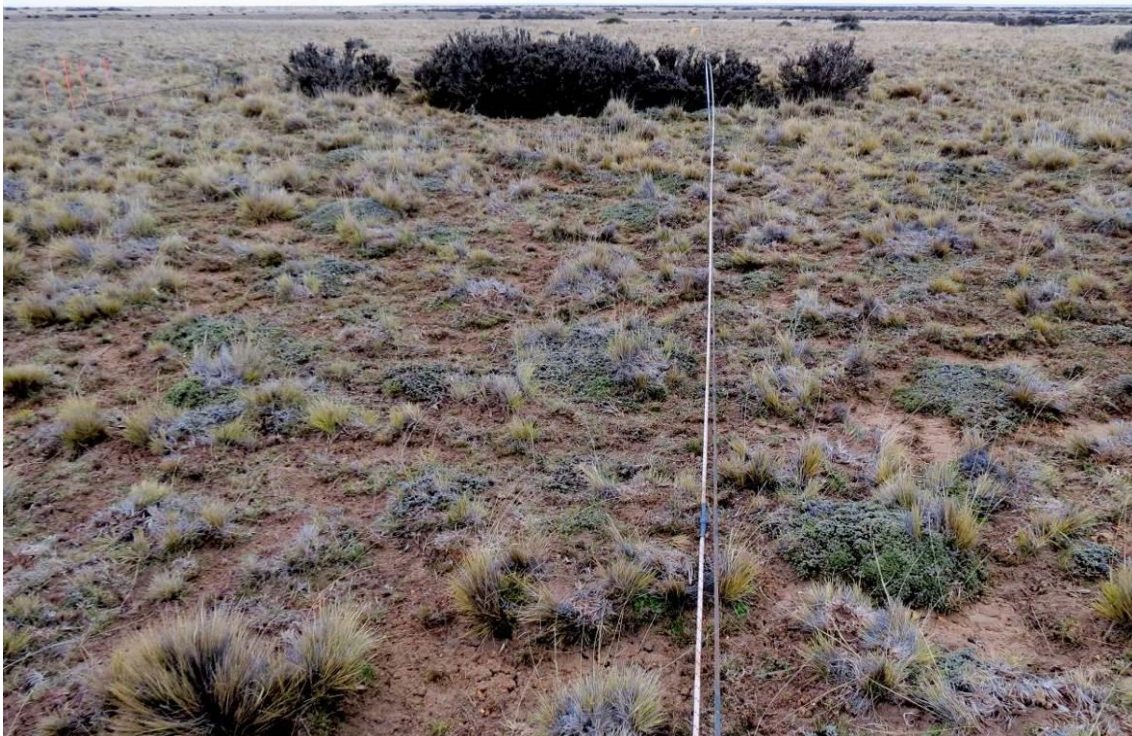
**Supplementary material 4.** Photographs of states.

C: Coironal de *F. gracillima*





Cs: Coironal Subarbustivo





Cp: Coironal de *F. gracillima* y *N. bryoides* con *P. chrysophylla*





S: Estepa Subarbustiva de *N. bryoides* o *N. ulicina*





Sp: Estepa Subarbusciva de *N. bryoides* o *N. ulicina* con *P. chrysophylla*

