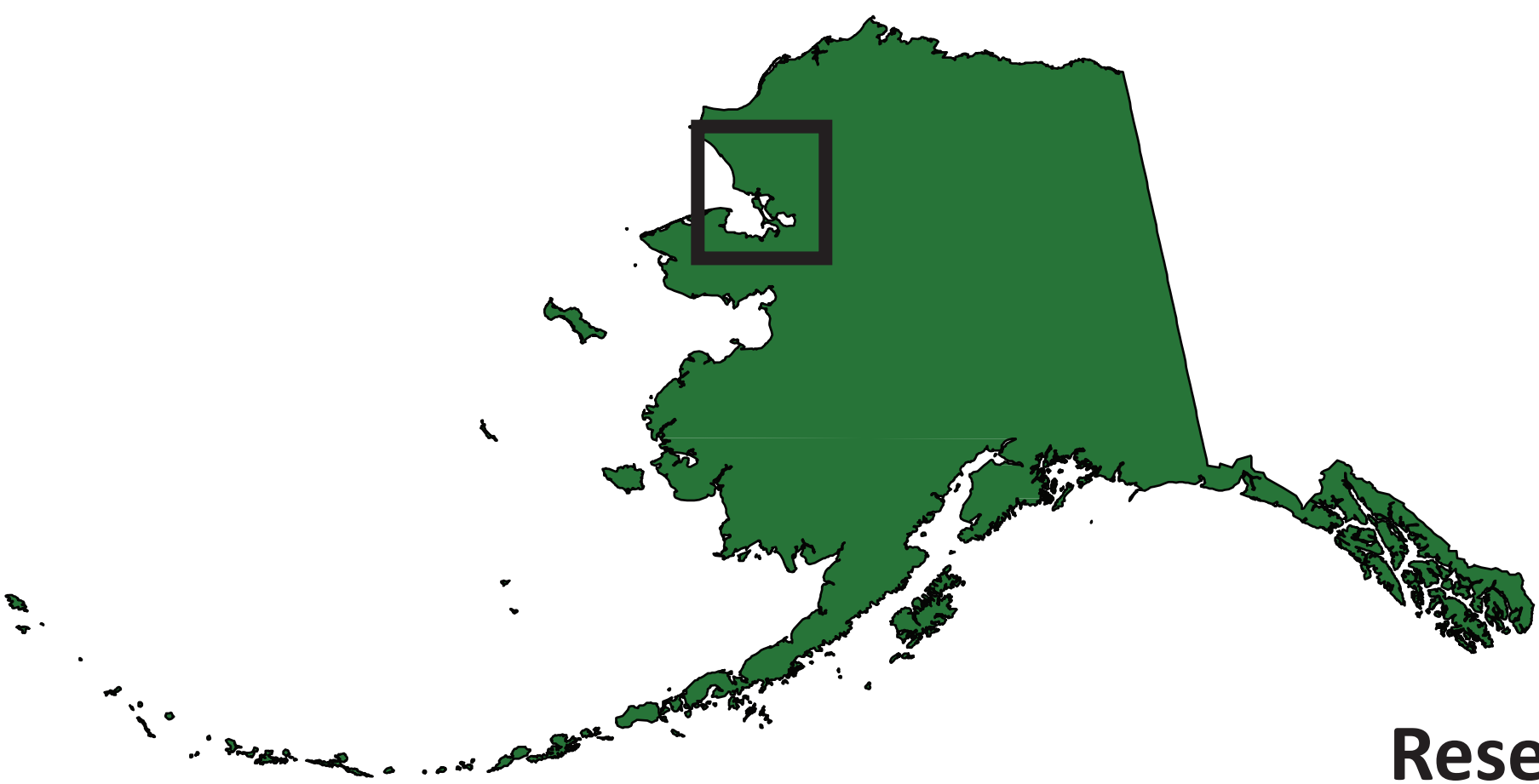


Prehistoric Settlement Pattern Assessment:

An Evaluation of the Resource Habitat Model in Northwest Alaska

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Research Question:

Does the distance from subsistence resources affect the location of prehistoic Alaskan settlements between 1500 and 200 years before present (BP)?

Resource Data:

- Coastline: Alaska Ecoregion data, Alaska Statewide Digital Mapping Initiative's (SDMI).
- Rivers and lakes: USGS Digital Line Graph (DLG) maps.
- Caribou migration: Northern Alaska Environemtal Center.
- Watersheds: USGS, USDA-NRCS-National Cardographic and Geospatial Center (NCGC).
- Archaeological Sites: Alaska Heritage Resources Survey (AHRS).

Methods:

The resource habitat model is based of an archaeological site assessment conducted by Douglas Kennett and Bruce Winterhalder (Kennett 2005; Kennett et al. 2009; Winterhalder et al. 2010). Centroids for each watershed were generated to measure the distances to each resource type. The distances were calculated and a rank order of each resource type was produced. The rank order of each recourse type was combined for a total rank order of the resource habitats. All resources types and the combined data were breakdown into three levels (Rich, Diminished, and Marginal) depicting the habitats relative value.

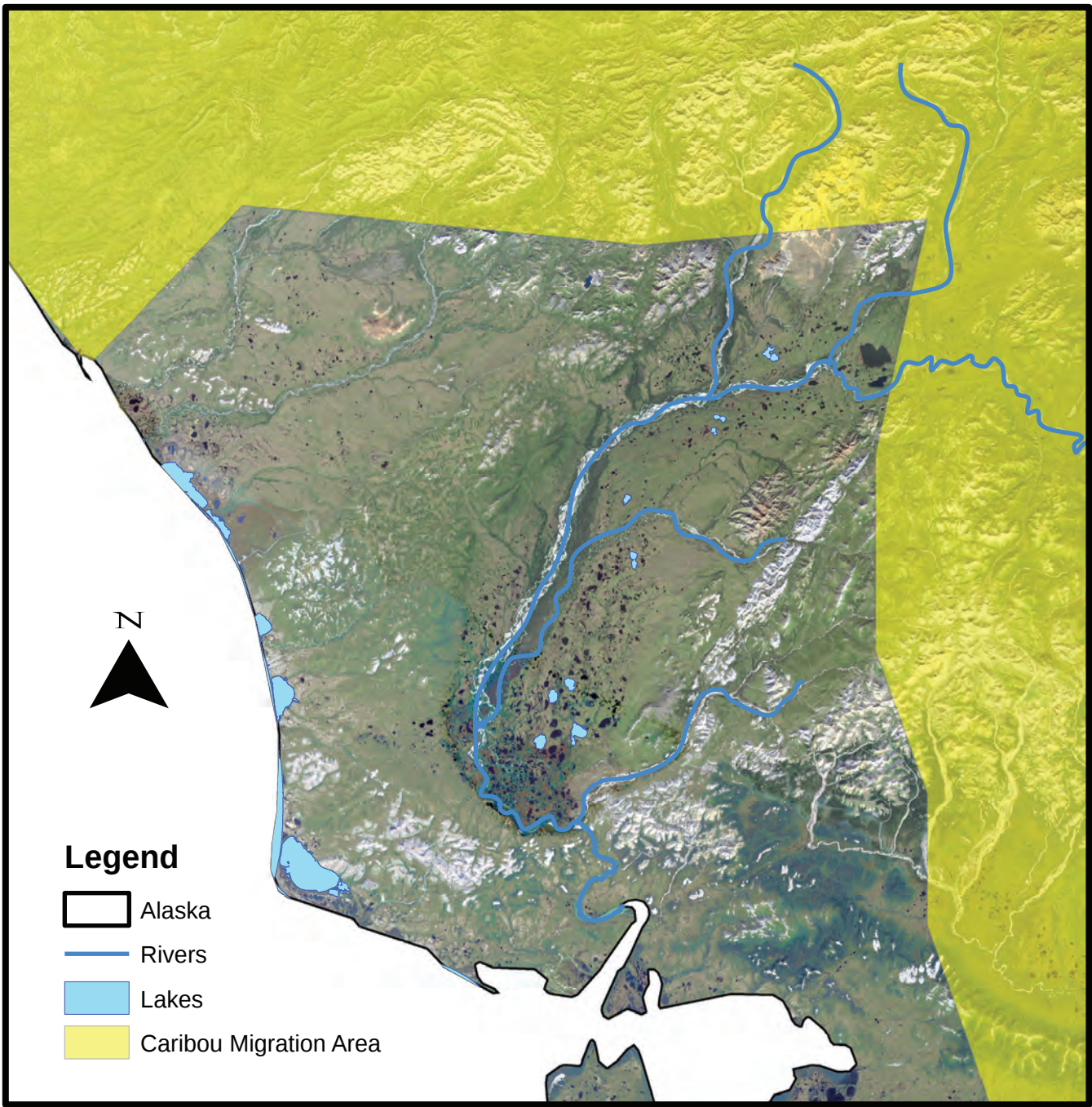
The study period (1500-200 BP) was divided into three equal 400 year periods. The number of periods that the settlement was occupied was converted into a ranked order depending on the individual periods that it was used. A site that was occupied during all three periods was given a rank of 1. Sites that were occupied during two consecutive periods was given a rank of 2.5. Those sites that were occupied during period 1 and 3 were given a rank of 4 due to the period 2 abandonment. All sites that were occupied for only one period were given a rank of 5.

Settlement data was acquired and compiled for a K-mean cluster analysis using IBM SPSS Statistics 21. The number of houses and the duration of occupation was during the three periods (Table 3). Site clusters were then added to the combined resource habitats.

Archaeological site data was geographically masked to protect the sites from looting and damage.

Table 1.
Site Types

Site Type	Houses
Large Village	>8
Small Village	3 – 7
Encampment	1 – 2



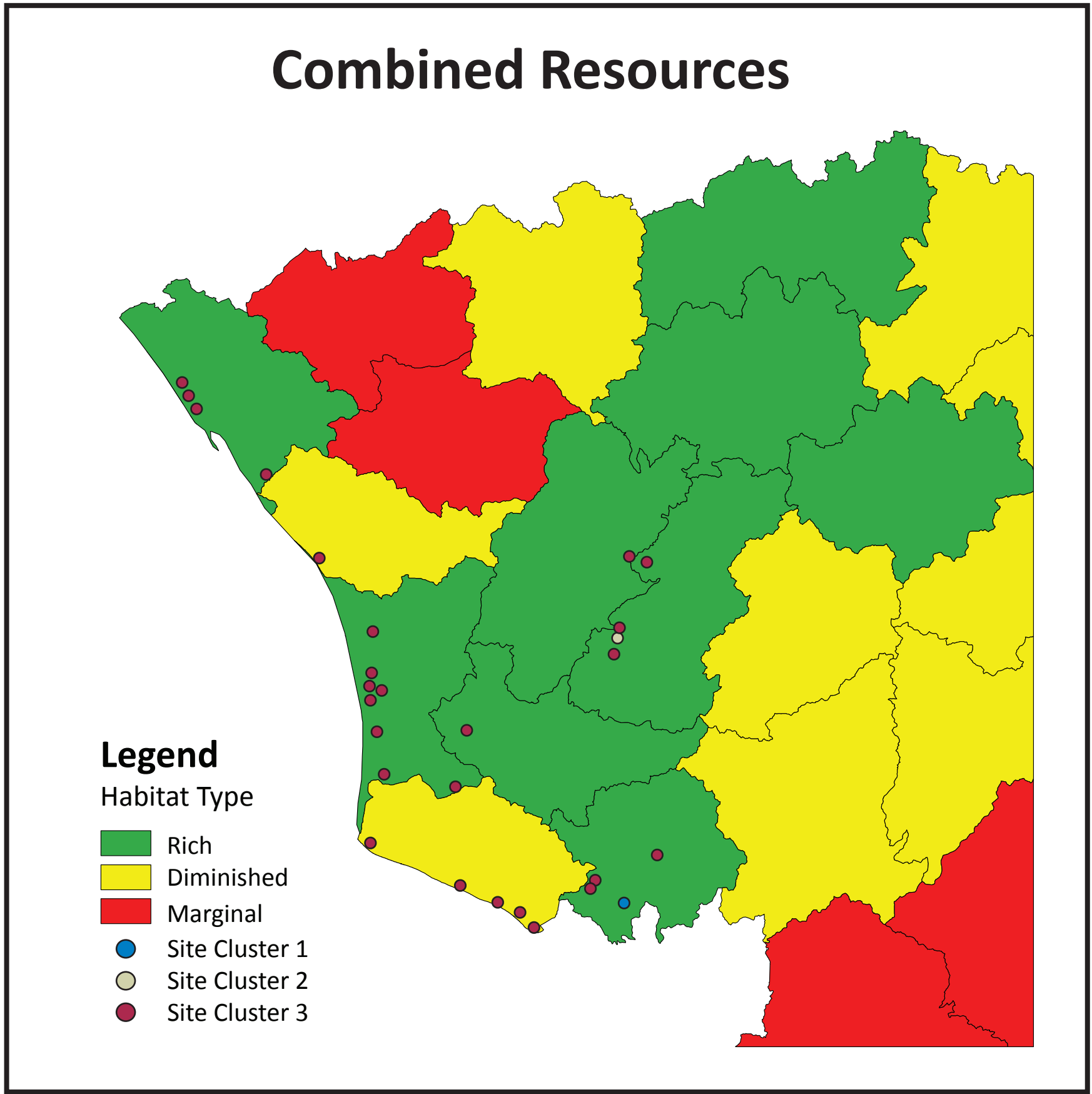
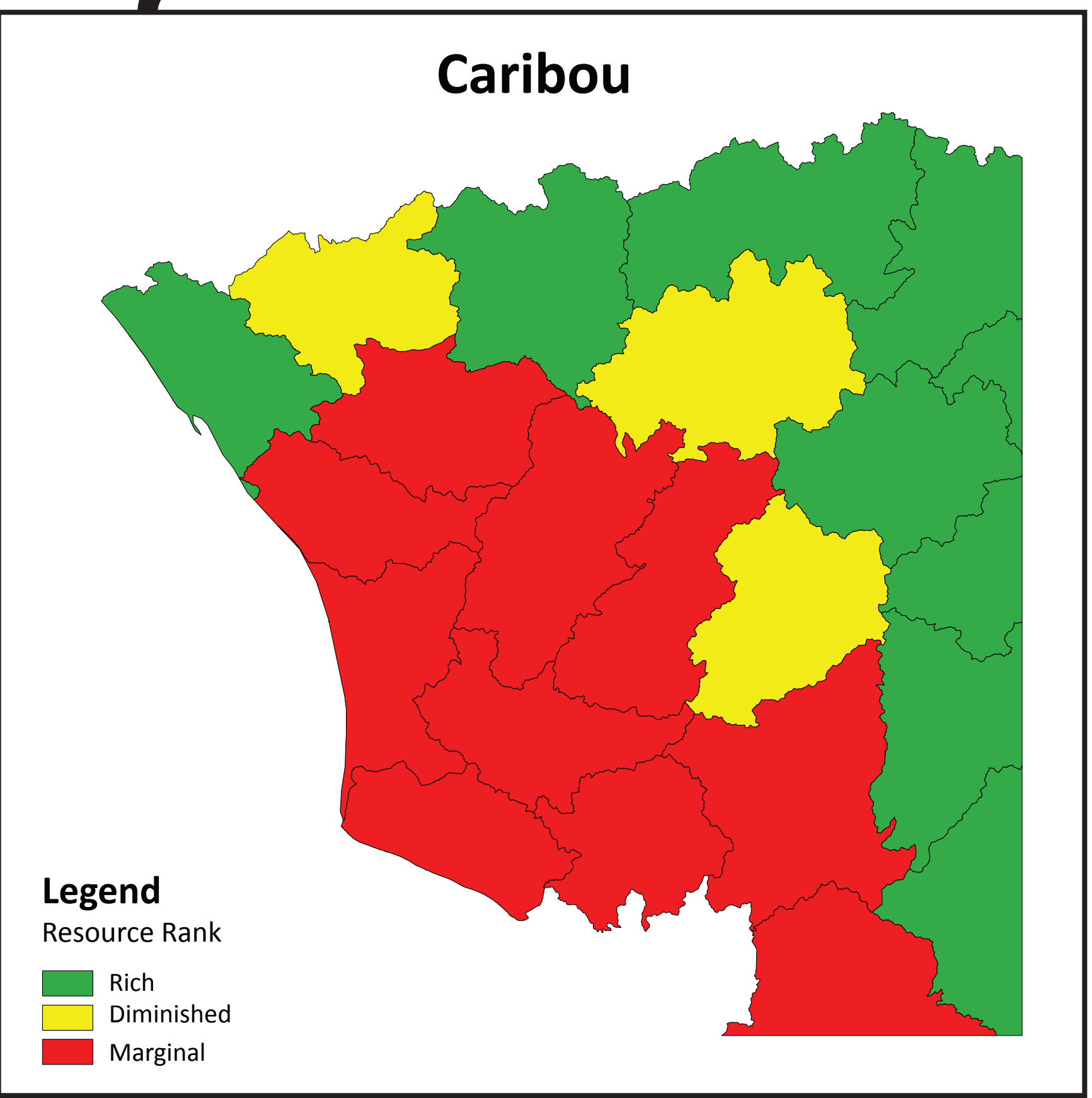
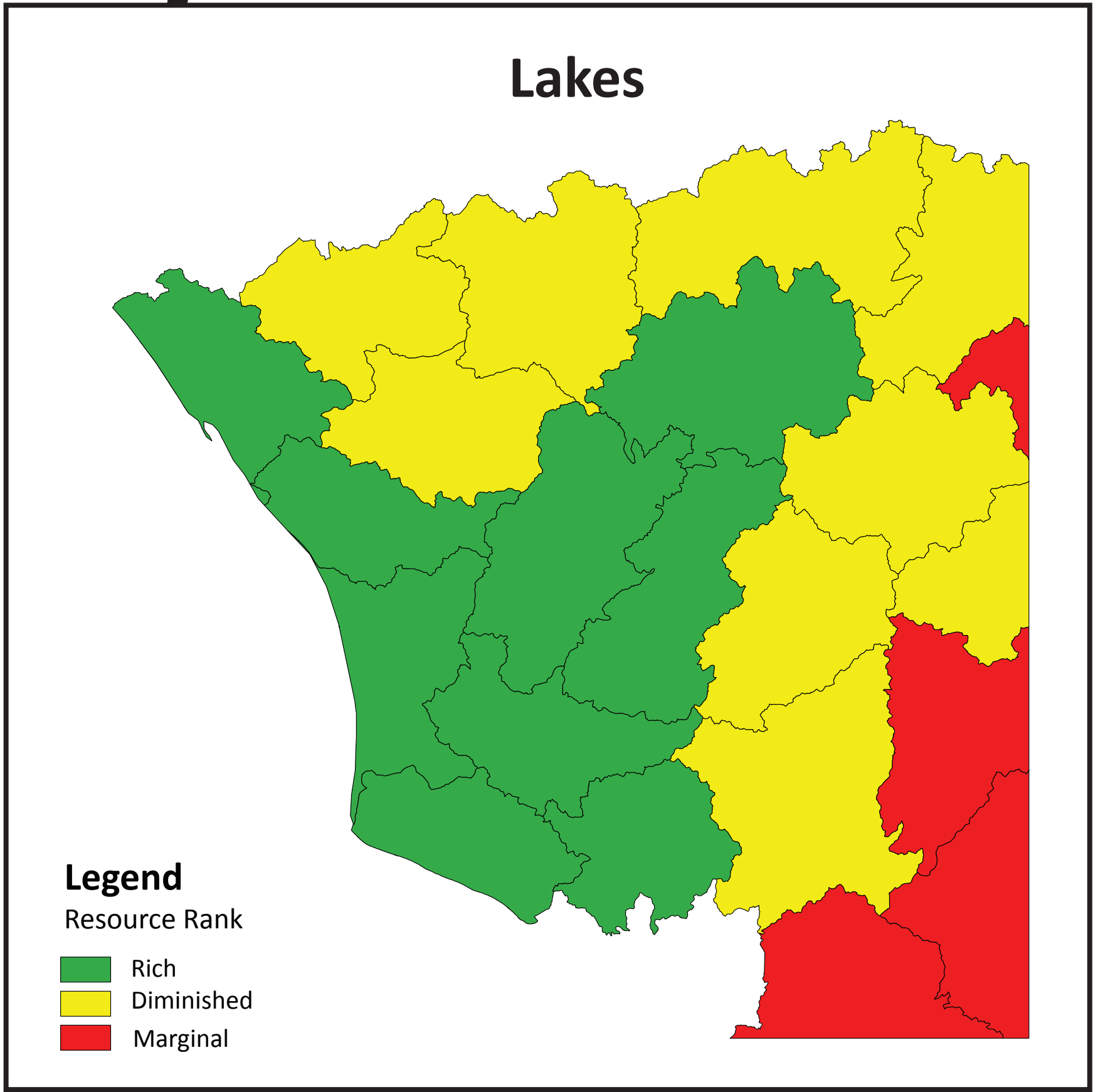
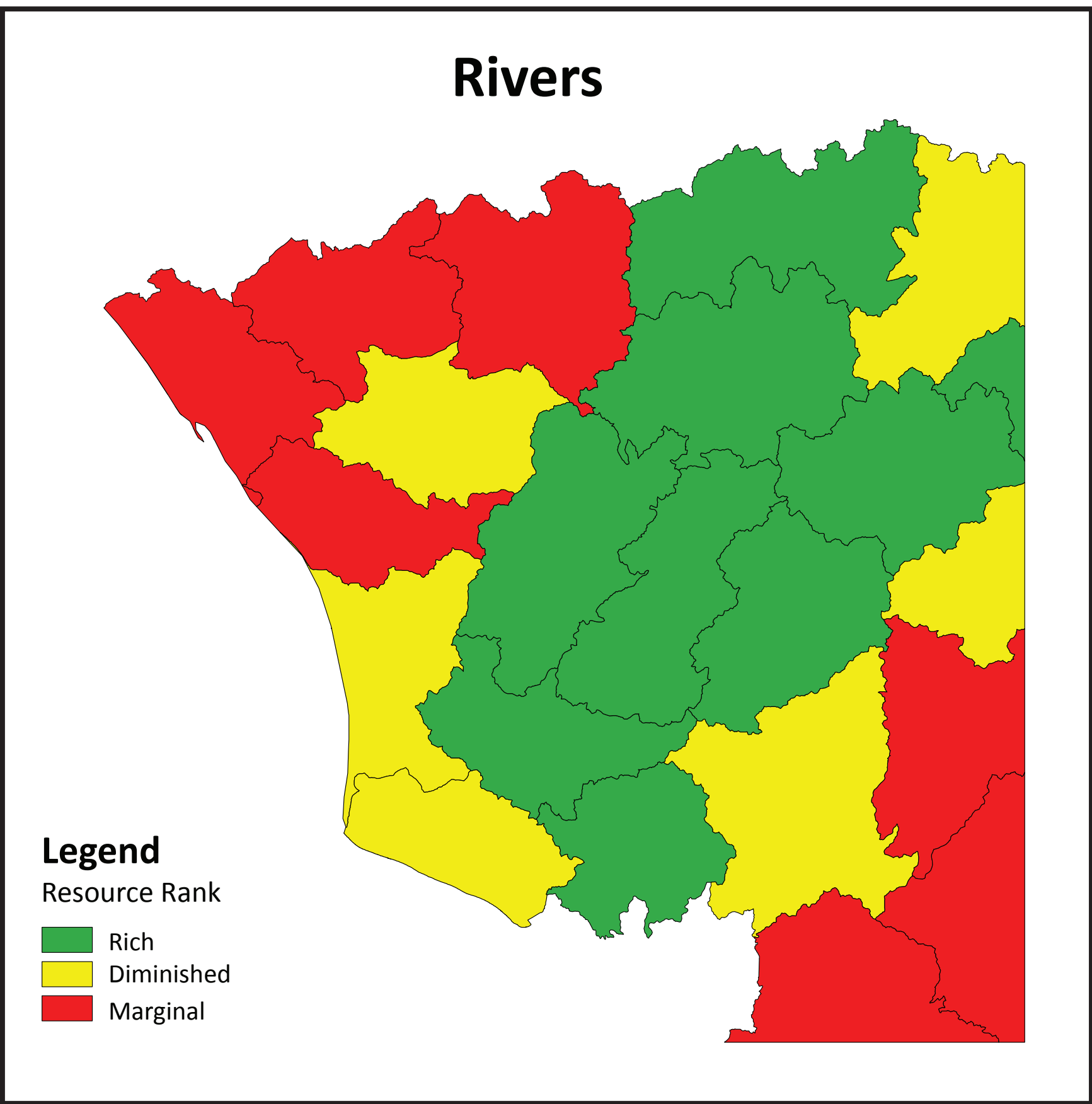
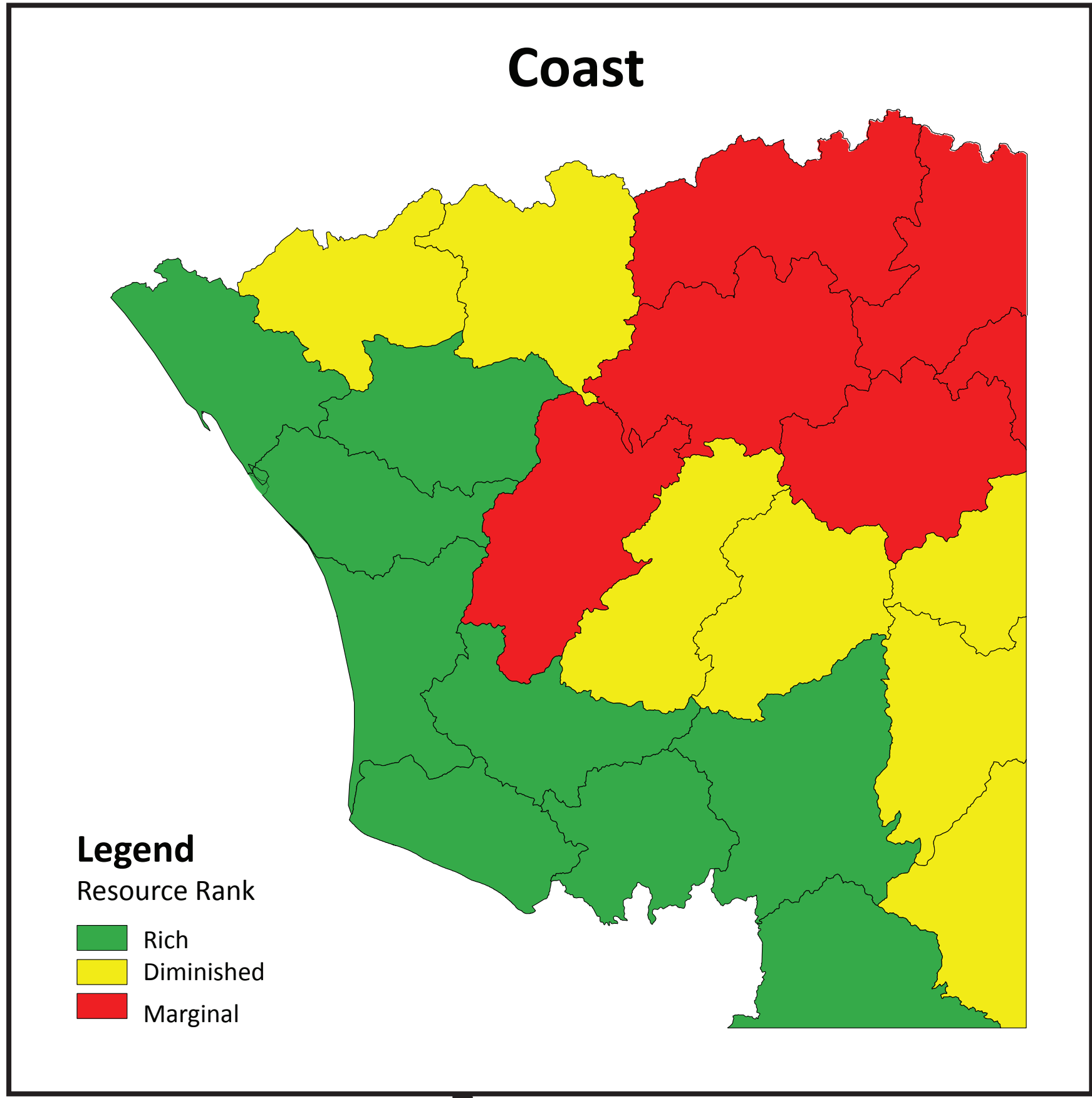
0 10 20 40 60 80 Miles

Table 2.
Resource Habitat Data

Habitat	Coast (m)	Order	Habitat Type	Rivers (m)	Order	Habitat Type	Lakes (m)	Order	Habitat Type	Caribou (m)	Order	Habitat Type	Total	Order	Habitat Type
1	9921	3	1	23210	12	2	6648	1	1	76958	27	3	43	6	1
2	12663	5	1	42952	20	3	11856	5	5	39000	23	3	53	15	2
3	10290	4	1	82747	27	3	29920	9	9	1	1	1	41	5	1
4	38637	9	1	35952	18	2	36245	12	12	24268	21	3	60	20	3
5	38761	10	2	63770	24	3	43240	14	14	2583	16	2	64	21	3
6	73228	16	2	36208	19	3	48100	16	16	1	1	1	52	13.5	2
7	8367	2	1	26202	13	2	12637	7	7	83344	28	3	50	11.5	2
8	2591	1	1	8347	5	1	28695	8	8	43325	24	3	38	2.5	1
9	30232	8	1	3697	3	1	6818	2	2	65934	26	3	39	4	1
10	62922	14	2	12142	8	1	33300	11	11	6945	17	2	50	11.5	2
11	66742	15	2	8580	6	1	9033	3	3	31104	22	3	46	8.5	1
12	50311	12	2	266	1	1	12454	6	6	46115	25	3	44	7	1
13	98216	20	3	6905	4	1	10934	4	4	8624	18	2	46	8.5	1
14	127725	22	3	2384	2	1	43162	13	13	1	1	1	38	2.5	1
15	140773	25	3	16698	11	2	56874	17	17	1	1	1	54	16	2
16	167381	27	3	35774	17	2	98126	23	23	1	1	1	68	24	3
17	186588	28	3	47519	23	3	134216	28	28	1	1	1	80	27	3
18	157906	26	3	27783	14	2	118568	25	25	1	1	1	66	23	3

Expectations:

- Sites that are occupied during all three periods will be in rich resource locations to support the population.
- Large village will be located in rich resource habitats to support the population.
- Small villages will be located in rich and diminished resource habitats.
- Encampments will be located in diminished and marginal resource habitats.



Results:

The resource habitat model generated an output that depicts the value of the habitats based on their relative rank (Table 2).

The cluster analysis indicated that 28 of the 30 sites were similar (Table 4). These sites are primarily encampments that were only occupied during single periods. Two sites was identified as statistically significant. These sites are clusters 1 and 2. they are also the only sites that fit the large village type.

The expectations that only large settlements are located in rich resource locations does not hold. The resource habitat model does predict where the majority of the sites are located. An adjustment of resource measurements or additional criteria may improve the output of the model.

Reference Cited:

Kennett, Douglas J.
2005 The Island Chumash: Behavioral Ecology of a Maritime Society. University of California Press, Berkeley and Los Angeles.
Kennett, Douglas J., Bruce Winterhalder, Jacob Bartruff, and Jon M. Erlandson
2009 An Ecological Model for the Emergence of Institutionalized Social Hierarchies of California's Northern Channel Islands. In Pattern and Process in Cultural Evolution edited by Stephen Shennan. University of California Press, Berkeley and Los Angeles.
Winterhalder, Bruce, Douglas J. Kennett, Mark N. Grote, and Jacob Bartruff
2010 Ideal Free Settlement of California's Northern Channel Islands. Journal of Anthropological Archaeology. 29: 469-490.

Table 3.
Site Clustering

Site Number	Houses	Occupational Period	Cluster
1	5	2	3
2	6	2	3
3	2	3.5	3
4	7	2	3
5	5	3.5	3
6	4	1	3
7	10	1	3
8	2	5	3
9	30	1	1
10	3	5	3
11	20	1	2
12	1	5	3
13	1	5	3
14	2	5	3
15	1	5	3
16	1	5	3
17	1	5	3
18	2	3.5	3
19	6	3.5	3
20	1	5	3
21	1	5	3
22	2	5	3
23	3	3.5	3
24	1	5	3
25	2	5	3
26	1	5	3
27	2	2	3
28	1	5	3
29	1	5	3
30	1	5	3

Table 4.
Cluster Membership

Site	Cluster	Distance
1	3	3.076
2	3	3.886
3	3	.854
4	3	4.769
5	3	2.378
6	3	3.294
7	3	7.919
8	3	1.194
9	1	0.000
10	3	1.033
11	2	0.000
12	3	1.945
13	3	1.945
14	3	1.194
15	3	1.945
16	3	1.945
17	3	1.945
18	3	.854
19	3	3.362
20	3	1.945
21	3	1.945
22	3	1.194
23	3	.610
24	3	1.945
25	3	1.194
26	3	1.945
27	3	2.129
28	3	1.945
29	3	1.945
30	3	1.945