Marine Reserves Working Group
Analysis of Reserve Concepts Using Ecological Criteria

Background

The Marine Reserves Working Group developed four reserve concepts on February 21, 2001.

The group attempted to incorporate the best available scientific and socioeconomic information into the design of reserve concepts to address a variety of issues, including conservation, fisheries management, economic viability of fisheries, education, cultural heritage, and research.

Concept A was developed to meet the goal for conservation of ecosystem biodiversity in the Channel Islands National Marine Sanctuary while accounting for unpredictable catastrophic events (such as oil spills) or changes in the environment.

Concept B was developed to meet the goal for conservation of ecosystem biodiversity and to sustain fisheries over the long term, with some consideration of economic impacts to commercial and recreational users.

Concept C was developed to maximize potential conservation and fisheries benefits while minimizing the impact to commercial and recreational users.

Concept D was developed to minimize the impact to commercial and recreational users. All members of the Marine Reserves Working Group agree that these areas should be included in reserves.

For additional information, contact

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Table 1. Summary of the ecological analysis of reserve concepts developed by the Marine Reserves Working Group on February 21, 2001.

Reserve Concept	A	B	C	D
Nearshore Habitats				
Oregonian	Well represented.	Well represented.	Rocky intertidal and sandy beach habitats are fairly well represented.	Rocky intertidal and sandy beach habitats are poorly represented.
Transition	Well represented.	Fairly well represented. High energy rocky intertidal habitat is not represented sufficiently.	Fairly well represented. High energy rocky intertidal habitat is not represented sufficiently.	Rocky intertidal and sandy beach habitats are poorly represented.
Californian	Fairly well represented. High energy rocky intertidal habitat is not represented sufficiently.	Fairly well represented. Sandy beach and high energy rocky intertidal habitat is not represented sufficiently.	Fairly well represented. Sandy beach and high energy rocky intertidal habitat is not represented sufficiently.	Rocky intertidal and sandy beach habitats are poorly represented.
Sediments and Depth Ranges				
Oregonian	Well represented.	Well represented.	Does not represent sufficiently all sediments (0-30 m), soft sediments (30-100), soft sediments (>200 m).	Does not represent sufficiently all sediments at all depths.
Transition	Well represented.	Does not represent sufficiently soft sediments (0-30 m), all sediments (30-100 m), soft sediments (>200 m).	Does not represent sufficiently soft sediments (0-30 m), all sediments (30-100 m), soft sediments (>200 m).	All sediments at all depths are poorly represented.
Californian	Fairly well represented. Does not represent sufficiently all sediments (100-200).	Does not represent sufficiently hard sediments (30-200), all sediments (100-200) all sediments (>200 m).	Does not represent sufficiently all sediments at all depths, except hard sediment (0-30 m).	All sediments at all depths are poorly represented.
Emergent Rocky Habitat				
Oregonian	Well-represented.	Well represented.	Nearshore rocks are not represented sufficiently. Does not represent emergent submarine canyon.	Nearshore rocks are not represented sufficiently. Does not represent emergent submarine canyon.
Transition	Fairly well represented.	Fairly well represented.	Fairly well represented.	Emergent rocks and submarine canyons are not represented sufficiently.
Californian	Well represented.	Well represented.	Emergent offshore rocks are not represented sufficiently.	Emergent rocks are not represented sufficiently.

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Table 1. Summary of the ecological analysis of reserve concepts developed by the Marine Reserves Working Group on February 21, 2001.

Reserve Concept	A	B	C	D
Kelp Forest				
Oregonian	Well represented.	Well represented.	Well represented.	Kelp is not represented sufficiently.
Transition	Well represented.	Well represented.	Fairly well represented.	Kelp is not represented sufficiently.
Californian	Fairly well represented.	Well represented.	Fairly well represented.	Kelp is not represented sufficiently.
Eelgrass				
Oregonian	Well represented.	Eelgrass is not represented sufficiently.	Eelgrass is represented poorly.	Eelgrass is represented poorly.
Californian	Fairly well represented.	Fairly well represented.	Fairly well represented.	Not represented.
Surfgrass				
Oregonian	Well represented.	Well represented.	Surfgrass is not represented sufficiently.	Surfgrass is represented poorly.
Transition	Well represented.	Surfgrass is not represented sufficiently.	Well represented.	Surfgrass is not represented sufficiently.
Californian	Well represented.	Well represented.	Well represented.	Surfgrass is not represented sufficiently.

Oregonian Province

Table 2. Total, 30% target, and actual representation of ecological criteria in each reserve concept developed by the Marine Reserves Working Group on February 21, 2001.

Criteria	Total	30% Target	A	B	C	D
1. Sandy Beach Habitat (miles)	25	7.5	14.5	10.6	3.0	0.3
2. Protected Rocky Intertidal (miles)	28.2	8.5	17.9	13.2	6.1	0.6
3. Exposed Rocky Intertidal (miles)	27.4	8.2	17.5	16.5	4.5	1.0
4. Soft Sediment (0-30 m) (nmi^2)	38.9	11.7	22.4	13.4	4.9	0.3
5. Hard Sediment (0-30 m) (nmi^2)	34.3	10.3	17.6	11.4	4.7	0.4
6. Soft Sediment (30-100 m) (nmi^2)	211.6	63.5	91.8	92.2	56.7	24.0
7. Hard Sediment (30-100 m) (nmi^2)	23.4	7	11.0	10.6	6.8	1.1
8. Soft Sediment (100-200 m) (nmi^2)	157	47.1	97	85	68.5	38
9. Hard Sediment (100-200 m) (nmi^2)						
10. Soft Sediment (>200 m) (nmi^2)	227	68.1	104	99	56	19
11. Hard Sediment (>200 m) (nmi^2)						
12. Emergent Nearshore Rocks (no.)	216	64.8	139	104	24	12
13. Emergent Offshore Rocks (0/1)	12	3.6	11	9	6	4
14. Submarine Canyons (0/1)	1	0.3	1	1	0	0
15. Kelp Forest (nmi^2)	16.1	4.8	8.7	4.8	0.8	0.1
16. Eelgrass (nmi^2)	0.3	0.1	0.3	0	0	0
17. Surfgrass (nmi^2)	13.4	4	7.8	6.5	2.4	0.1

nmi = nautical miles; 0/1 = absent or present in each 1x1 planning unit

Transition Zone

Table 3. Total, 30% target, and actual representation of ecological criteria in each reserve concept developed by the Marine Reserves Working Group on February 21, 2001.

Criteria	Total	30% Target	A	B	C	D
1. Sandy Beach Habitat (miles)	13.8	4.1	7.9	4.0	3.9	3.5
2. Protected Rocky Intertidal (miles)	11.6	3.5	7.5	5.2	4.4	0
3. Exposed Rocky Intertidal (miles)	13.6	4.1	6.2	1.9	2.8	0.5
4. Soft Sediment (0-30 m) (nmi^2)	29.6	8.9	13.6	5.4	5.7	1.8
5. Hard Sediment (0-30 m) (nmi^2)	7.2	2.1	4.0	2.4	1.9	0.9
6. Soft Sediment (30-100 m) (nmi^2)	63.6	19.1	17.6	10.5	12.3	1.8
7. Hard Sediment (30-100 m) (nmi^2)	10.1	3	4.0	2.0	1.2	0.3
8. Soft Sediment (100-200 m) (nmi^2)	62.9	18.9	29.9	26.7	25.9	3.5
9. Hard Sediment (100-200 m) (nmi^2)	7.3	2.2	7.3	4.8	4.6	1.5
10. Soft Sediment (>200 m) (nmi^2)	176.9	53.1	81.1	44.6	41.6	8.9
11. Hard Sediment (>200 m) (nmi^2)	14.6	4.4	10.9	8.9	8.9	2.6
12. Emergent Nearshore Rocks (no.)	208	62.4	147	102	96	40
13. Emergent Offshore Rocks (0/1)	27	8.1	5	5	4	4
14. Submarine Canyons (0/1)	30.6	10.2	15	16	16	7
15. Kelp Forest (nmi^2)	6	1.8	4.6	3.6	2.5	0.7
16. Eelgrass (nmi^2)	0.1		0.1	0.02	0.03	0
17. Surfgrass (nmi^2)	6.7	2	3.8	1.7	2.2	0.9

nmi = nautical miles; 0/1 = absent or present in each 1x1 planning unit

Californian Province

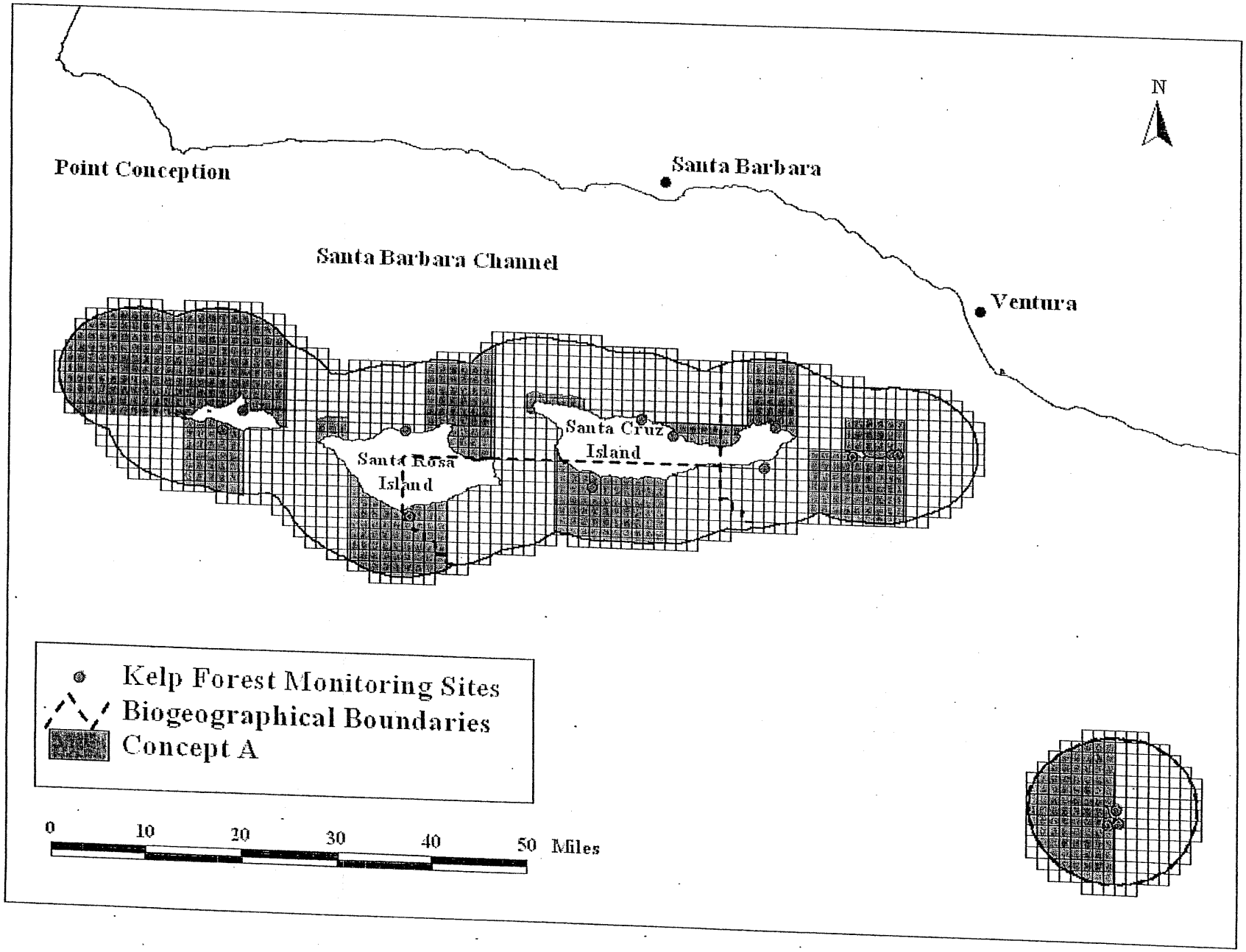
Table 4. Total, 30% target, and actual representation of ecological criteria in each reserve design developed by the Marine Reserves Working Group on February 21, 2001.

Criteria	Total	30% Target	A	B	C	D
1. Sandy Beach Habitat (miles)	4.7	1.4	1.7	0.6	0.6	0
2. Protected Rocky Intertidal (miles)	21.3	6.4	16	11.0	7.6	0
3. Exposed Rocky Intertidal (miles)	1.4	0.4	0	0	0	0
4. Soft Sediment (0-30 m) (nmi^2)	16.4	4.9	10.2	3.7	2.5	0
5. Hard Sediment (0-30 m) (nmi^2)	6.6	2	4.5	4.6	2.8	0
6. Soft Sediment (30-100 m) (nmi^2)	56.2	16.9	29.2	23.5	14.0	1
7. Hard Sediment (30-100 m) (nmi^2)	3.9	1.2	1.9	0.5	0.5	0
8. Soft Sediment (100-200 m) (nmi^2)	27.2	8.2	7	6	4.5	1
9. Hard Sediment (100-200 m) (nmi^2)	1.1	0.3	0	0	0	0
10. Soft Sediment (>200 m) (nmi^2)	160.7	48.2	58.2	14.5	22.5	7
11. Hard Sediment (>200 m) (nmi^2)	2.3	0.7	0.3	0	0	0
12. Emergent Nearshore Rocks (no.)	95	28.5	68	53	43	0
13. Emergent Offshore Rocks (0/1)	1	0.3	1	1	0	0
14. Submarine Canyons (0/1)	5	1.5	5	5	5	4
15. Kelp Forest (nmi^2)	1.8	0.6	0.4	0.5	0.4	0
16. Eelgrass (nmi^2)	0.2	0.06	0.02	0.02	0.02	0
17. Surfgrass (nmi^2)	3.2	0.9	1.2	0.9	0.8	0

nmi = nautical miles; 0/1 = absent or present in each 1x1 planning unit

Table 5. Area (mi^2) set-aside in reserve concepts developed by the Marine Reserves Working Group on February 21, 2001.

Reserve Size (1x1 nmi^2)	**Total Size**	**A**	**B**	**C**	**D**
Oregonian	786	461	378	268	96
Transition	402	194	139	121	28
Californian	316	147	65	59	11
Total Reserve Size	1500	802	582	448	135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Santa Barbara Channel
Ventura
Santa Cruz Island
Santa Rosa Island
Kelp Forest Monitoring Sites
Biogeographical Boundaries
Concept A
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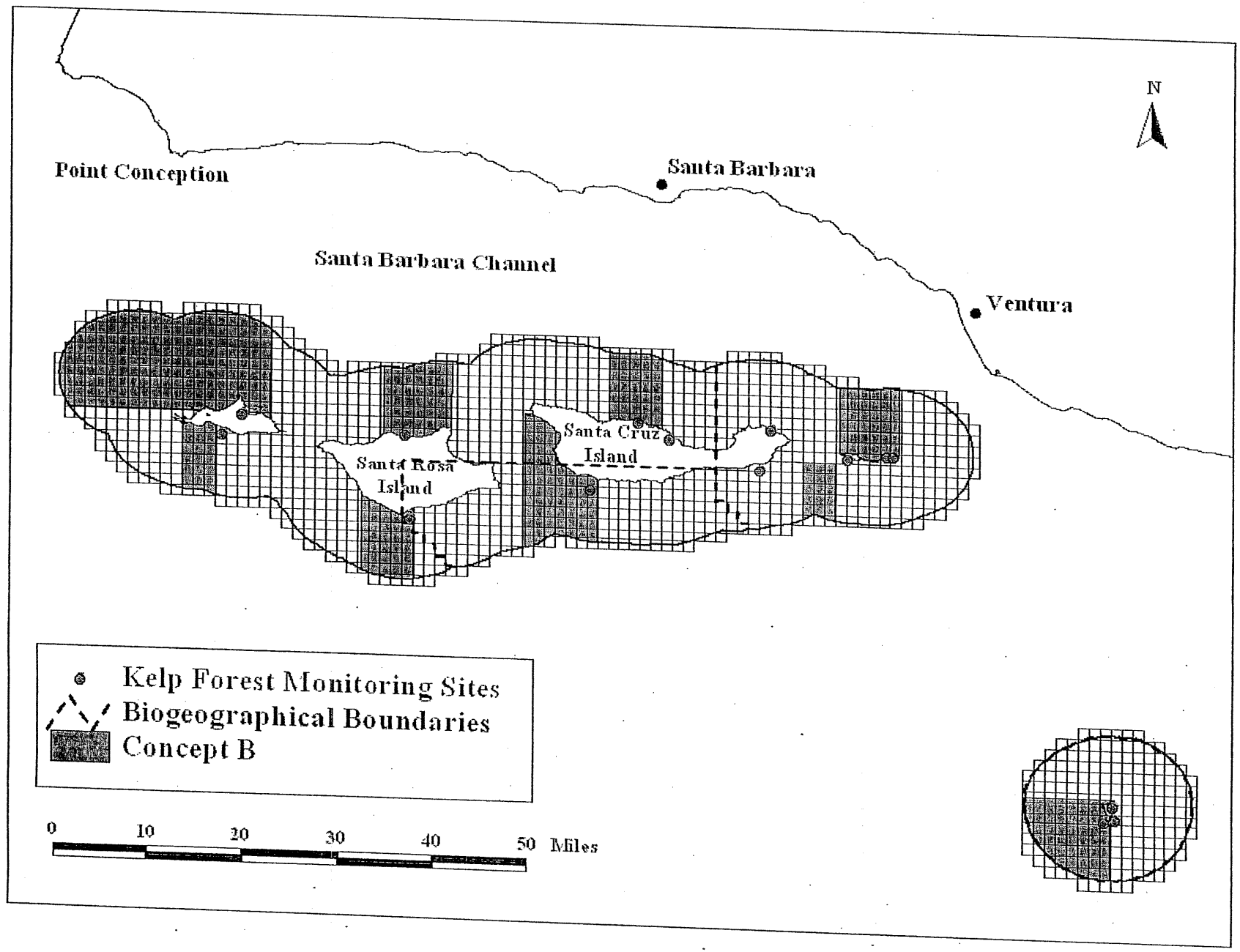
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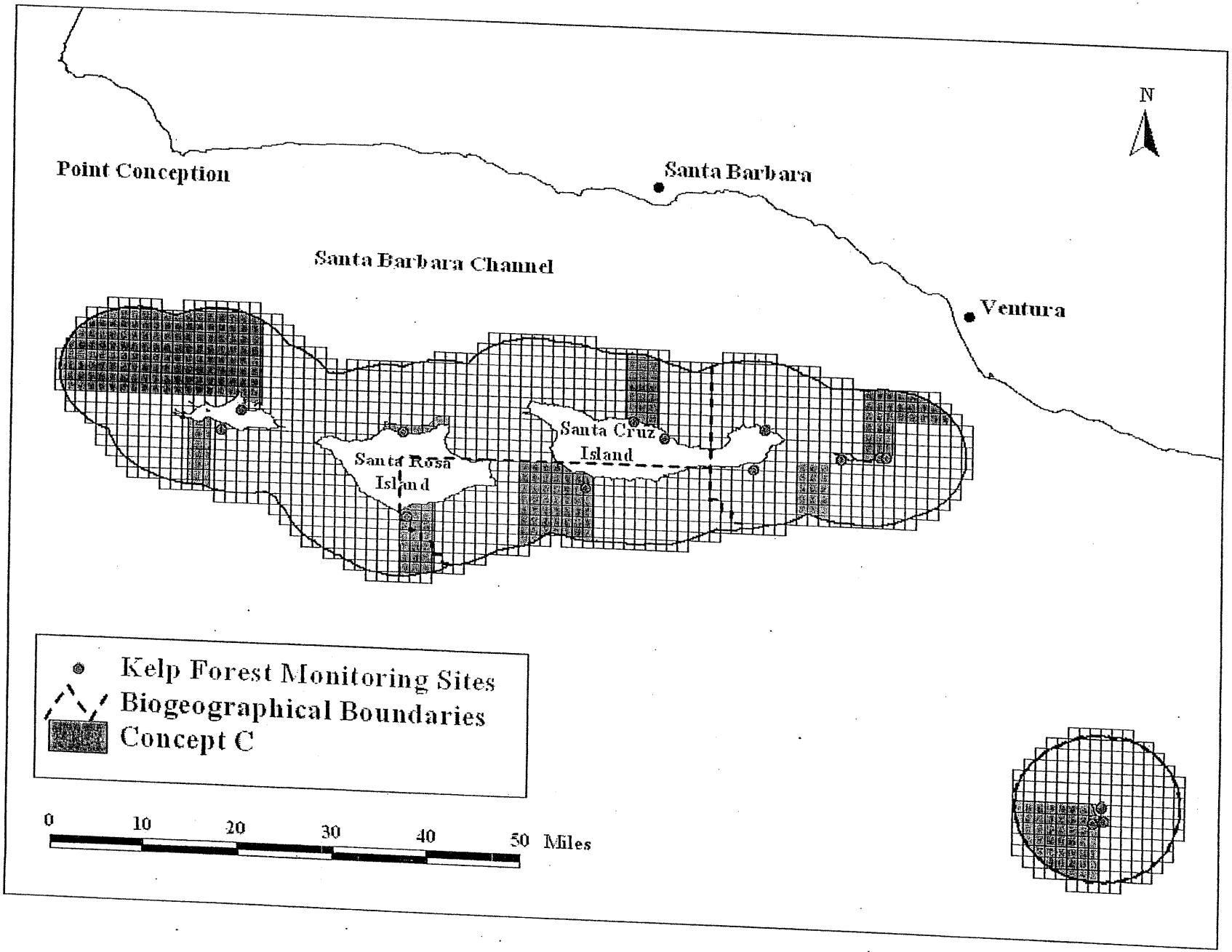
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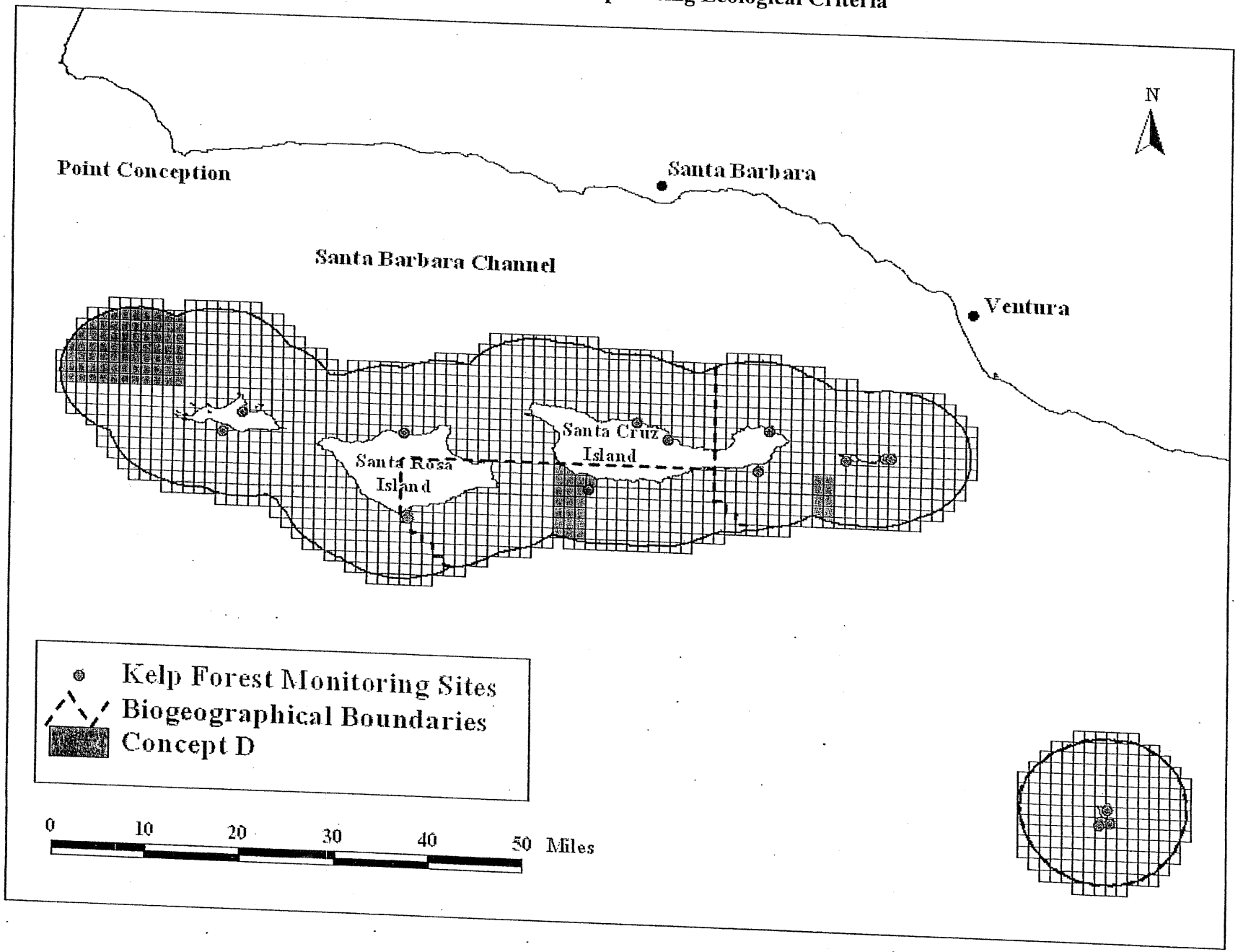
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