

Ethical considerations of conservation

Postulates about ethical value of nature

1. diversity is good
2. complexity in ecosystems is good
3. natural evolutionary development is good
4. biological diversity should be valued for and protected for itself regardless of utilitarian values

from Michael Soule, cofounder of Society for Conservation Biology

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Criteria for assessing threatened species

Observations	Degree of Threat		
	Critical	Endangered	Vulnerable
Range	< 100 sq km 1 location	< 5000 sq km < 10 locations	< 20,000 sq km < 10 locations
Population size	< 50 total < 50 at each location	< 250 < 250 at each location	< 1000 < 1000 at each location
Declining	80% decline	50% decline	20% decline
Population	per-decade or per-2 generations	per-decade or per-3 generations	per-decade or per-5 generations
Projected decline	>20% per-2 years or per-1 generations	>30% per-5 years or per-2 generations	>20% per-10 years or per-3 generations
Extinction probability	> 50% per-10 years or per-2 generations	>25% per-20 years or per-3 generations	>10% per-100 years

Source: Mace and Landis, 1991; Colwell, 1996.

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Range Collapse

FIGURE 16.3 Examples of geographic range collapse with decline in the number of species. The first map shows the original range of the brown bear across central and northern Europe. In Great Britain, the number of bears collapsed to a single population in the western part of the island. The second map shows the eastern US. The third map shows the eastern US.

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Species-area curves and extinctions

FIGURE 16.30 The species-area relationship is the relationship between the number of species and the area of a habitat. The number of species increases with the area of the habitat. The number of species is also affected by the number of habitats. The number of species is also affected by the number of habitats.

FIGURE 16.31 The species-area relationship can be used to predict changes in local diversity. Species richness among the island museum ranges of the Great South Bay as a result of climate warming. The number of species was predicted as a function of the area about 2000 m elevation. Arrows show the change in area and number of species predicted to be caused by climate warming. The upper circle at the base of each arrow indicates the area and number of species in each museum range and the solid circle at the point of the arrow indicates the number of species predicted to remain after a 2°C increase in average temperature. (After McConville and Rosen 1982.)

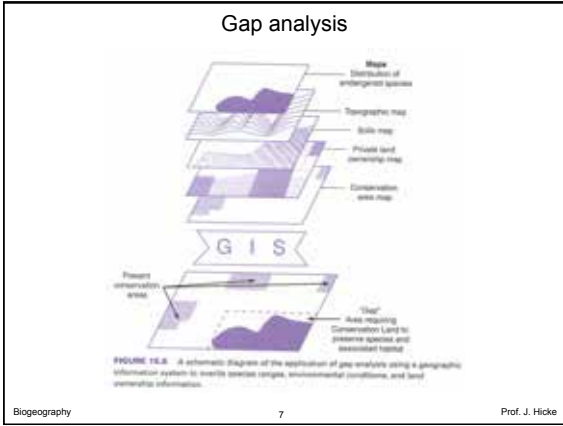
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Shapes of conservation areas

Better	Poorer

FIGURE 16.3 Different shapes and configurations of conservation areas compared. The area that provides the most amount of area. Shapes that provide the maximum amount of conservation habitat with the lowest ratio of perimeter to area. (Based on Whittaker and Whittaker 1975.)

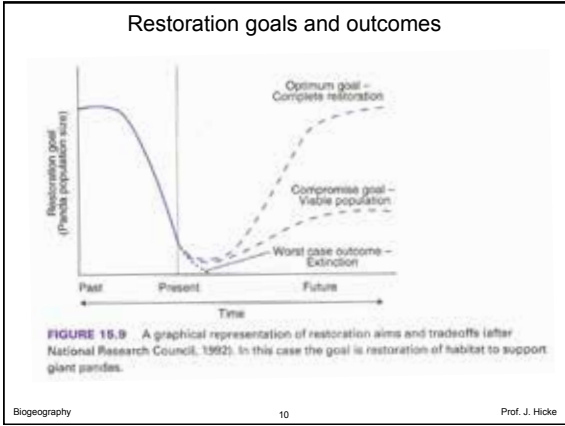
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Gap analysis for US

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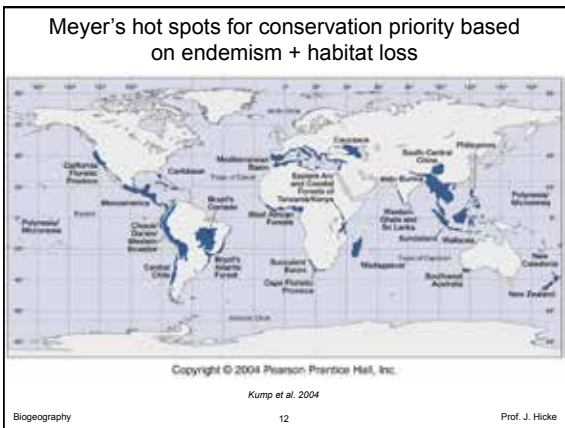
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Efforts to conserve keystone species

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TABLE 18-1

Biome	Remaining primary vegetation (ha) ¹ (% of original cover)	Plant species	Endemic plants (% of the 100,000 global plants)	Endemic vertebrates (% of 27,200 global vertebrates) ²
Tropical Andes	104,500 (25.0)	45,000	20,000 (6.7)	1,567 (5.7)
Mesoamerica	220,000 (20.0)	24,000	5,000 (1.7)	1,120 (4.2)
Caribbean	29,000 (11.7)	12,000	7,000 (2.3)	770 (2.8)
World's Atlantic Forest	8,500 (7.7)	20,000	8,000 (2.7)	867 (3.1)
South-Central Western Ecuador	60,000 (24.2)	9,000	2,250 (0.6)	468 (1.7)
World's Cerrado	206,000 (20.0)	10,000	4,400 (1.5)	117 (0.4)
Central Chile	90,000 (30.0)	3,429	1,000 (0.3)	86 (0.3)
California Floristic Province	90,000 (24.7)	4,426	2,123 (0.7)	70 (0.3)
Madagascar ³	39,000 (9.9)	12,000	9,700 (3.2)	770 (2.8)
Eastern Asia & Central Forests of Tanzania/Kenya	2,000 (0.7)	4,000	1,500 (0.5)	120 (0.4)
Western African Forests	126,500 (10.0)	9,000	2,250 (0.8)	270 (0.9)
Cape Floristic Province	10,000 (24.5)	8,200	5,000 (1.9)	51 (0.2)
Insular Karoo	30,000 (26.8)	4,000	1,900 (0.6)	41 (0.2)
Mediterranean Basin	110,000 (14.7)	25,000	13,000 (4.3)	220 (0.8)
Caucasus	90,000 (10.0)	5,300	1,800 (0.5)	90 (0.3)
Scrubland	125,000 (7.6)	25,000	15,000 (5.0)	700 (2.6)
Madagascar	32,000 (10)	10,000	1,500 (0.5)	120 (0.4)
Philippines	9,023 (12.0)	7,620	5,632 (1.9)	510 (1.9)
India-Burma	108,000 (14.0)	13,300	7,000 (2.3)	520 (1.9)
South-Central China	64,000 (16.0)	12,500	3,500 (1.2)	170 (0.6)
World's Ghats/Si Lanka	12,400 (16.4)	4,700	2,100 (0.7)	300 (1.1)
SW Australia	31,700 (10.0)	5,400	4,330 (1.4)	100 (0.4)
New Caledonia	1,200 (26.0)	3,100	2,000 (0.6)	80 (0.3)
New Zealand	90,400 (17.0)	2,300	1,800 (0.6)	130 (0.5)
Polynesia/Micronesia	10,024 (21.6)	6,500	3,334 (1.1)	220 (0.8)
Total	2,222,891 (12.2)	*	103,049 (44)	9060 (33.0)

¹Includes 100 ha.

²Biogeographic includes nearby islands of Mauritius, Reunion, Seychelles, and Comoros.

³Forest cannot be estimated because of overlap between biomes.

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