The ConsNet Portal 1.0

Systematic Conservation Planning Primer

CONSNET.ORG BIODIVERSITY AND BIOCULTURAL CONSERVATION LABORATORY SCP BLOG

M7: Review of Existing Conservation Areas

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Learning Objectives: This module allows the learner to gain knowledge of the importance of reviewir existing conservation areas within systematic conservation planning. Case studies are also presente to demonstrate the review process.

- The review of existing conservation area networks and plans is an essential part of systematic conservation planning.
  - The main purpose is to assess the extent to which the conservation targets (discussed ir **M6: Conservation Targets and Goals**) have already been met in existing conservation areas.
  - Review of existing conservation areas is an important part of systematic conservation planning because, in almost all circumstances, designating new conservation areas consists of selecting additional areas to augment an existing conservation area network.
  - The questions that must be asked are: To what extent are the existing conservation area successful? and What, if any, are the gaps in the representation of biodiversity in the existing conservation areas?
    - Often, the existing conservation areas fail to cover species and ecoregions that occur in the vicinity of human populations (Margules and Sarkar 2007).
  - Review of existing conservation area networks allows the conservation planning process develop and adapt with changing targets and goals.
  - Often, changes made to existing conservation area networks enhance a conservation pl as opposed to doing away with the original areas.

- The steps in the review of existing conservation area networks are:
  - Estimate the extent to which conservation targets and goals are met by the existing set c conservation areas;
  - Determine the prognosis for the existing conservation area network (CAN);
  - Refine the first estimate;

- Determine if some existing conservation areas are not relevant for biodiversity (even if th serve some other important sociopolitical purpose, e.g., recreation).

- Review should determine: (i) whether explicit present goals (see **M6: Conservation Targets an Goals**) are being met; and (ii) whether there may be other systematic problems
  - Goals to be met:
    - The representation of each surrogate should be calculated and compared to eac target.
    - Ecological design goals (e.g., shape, size, etc—see **M6: Conservation Targets and Goals** and **M9: Vulnerability and Persistence Analysis**).
  - Also determine whether there are systematic problems (e.g., invertebrates are usually no properly represented in conservation areas because invertebrate distributions are rarely available as field data.)

- Review should also determine the prognosis for biodiversity in the existing conservation area networks.
  - Rapid assessment (using previously collected data) of threats to existing conservation areas must be used, and is often based on expert knowledge.
  - Whether management practices (e.g., use of off-road vehicles and the extent of tourism) are consistent with long-term persistence of biodiversity must be assessed, again often using expert knowledge.
  - If it is determined that policy changes are necessary for adequate management of existin conservation areas, this information should be communicated to relevant personnel (wh are bound to be stakeholders in the planning process—see **M3: Stakeholder Identification and Involvement**).

- Refinement:
  - Drop areas with poor prognosis for any reason
  - Recalculate extent to which existing areas achieve conservation targets and goals.
  - Carry this out with a sliding scale when using the criteria for dropping particular areas.
    - For example, sensitivity analysis can be performed to assess the effect of removing the most vulnerable conservation area from the network. The representativeness of the network would then need to be recalculated without including the contribution, if any, made by the most vulnerable area. This proces can be iterated by calculating the effect of removing the second most vulnerable conservation area, etc.
    - This enables planners to assess different networks of conservation areas and select the one most suitable for the planning context.

- Determine the purpose for the inclusion of each area in an existing conservation area network. Several critical questions should be ask at this stage.
    - For what purpose was each conservation area originally established? Recreation? Scenic value? The representatior biodiversity?
    - If biodiversity conservation is the only goal of the ongoing systematic conservation planning exercise, can a particular existing protected area be safely delisted, that is, no longer designated as a conservation area? In other words, does it have high biodiversity value (as measured by complementarity)? Or does it have low biodiversity value? I the former case, continuing to protect the conservation area may be prudent. In the latter case, it may be acceptable to delist the conservation area.
    - From a planning standpoint, is it sensible to consider delisti
        - Is there a guarantee that a delisted area would be replaced by something more suitable? Or would the delisted area just be lost without anything suitable being substituted?

Example 7.1

Pressey's Review of Ad Hoc Reserves (Pressey 1994)

The representation of biodiversity is among the principal goals of systematic conservation planning. However, conservation areas are routinely established for purposes other than biodiversity representation. Pressey systematically investigates this phenomenon, which is attributable in part to the limited resources available for conservation. Pressey describes the types of *ad hoc* conservation areas as:

- "lands nobody wanted" – e.g., unsuitable for agriculture, mining, forestry, and commercial development; or
- reserves established for reasons not associated with biodiversity but with recreational value, beautiful scenery, potential for tourism and revenue, originally set

aside for private hunting, or to prevent soil erosion in agricultural lands. (e.g., Yellowstone National Park (USA) or Royal National Park (Australia)).

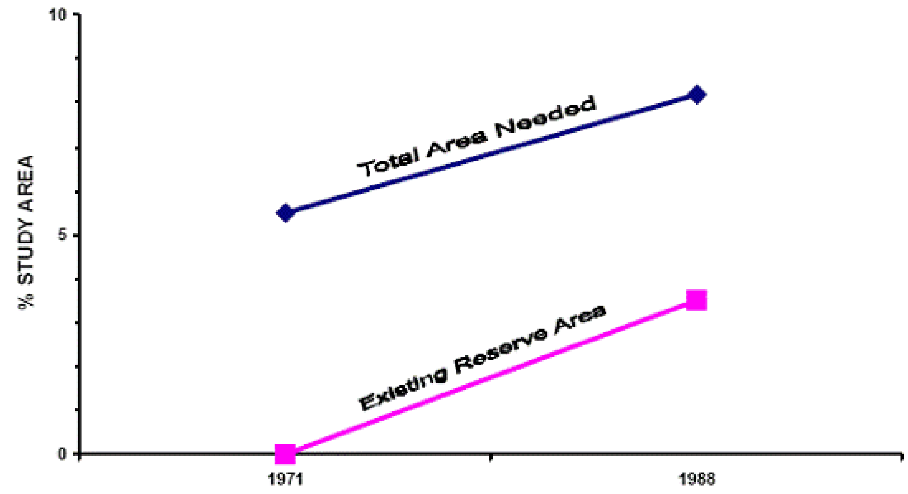
These biases of ad hoc reservation design create concern over what Pressey calls "the uncertain fate of the unreserved natural features…Once they disappeared, declined, or degraded the potential to protect their biodiversity is forgone or reduced." (p. 664) Some species exhibit a metapopulation structure in which there are discrete patches of habitat that are separated from one another by land that is unsuitable as habitat. At any given time, the species occupies only a small fraction of the suitable patches. A set of conservation areas established to protect a species with a metapopulation structure would need to accommodate the species' requirements for the spatial configuration of the habitat. Ad hoc reservations may well ignore this type of spatial requirement, which can result in the decline of species that occur as metapopulations. Often area prioritization exercises demonstrate that less sites are needed to represent all biodiversity features than are contained in the existing conservation areas. This shows that using systematic methods to prioritize areas typically requires less land (and less money) than ad hoc reserves.

The north-western region of New South Wales, Australia is primarily dedicated to rangeland for grazing sheep. In 1971, the New South Wales National Parks and Wildlife Service decided to develop a reserve in the area, and by 1988, 3.3% of the land consisted of protected areas, as demonstrated by the lower line in Figure 7.1. If the principle of complementarity had been used to represent each land system at least once, by 1988, the network would have represented 8.3% of the study region. This is the value that is needed for the representation of each land system only once and includes the existing reserves. Even though complementarity, as it was used here, was valuable in comparison to the previous model (lower line), both models demonstrate that the addition of conservation areas over time to the existing reserves did not add to the overall representation of land systems, demonstrated by the parallel slopes of the lines.

Figure 7.1

Using complementarity to augment existing conservation areas.

The blue line demonstrates representation of land systems using complementarity when starting with existing reserves. The pink line demonstrates representation of land systems built on existing reserves as designated by the New South Wales National Parks and Wildlife Service.



When Pressey simulated the selection of land systems using complementarity without using the existing reserves, representation of all land systems was achieved in a little less than half the land that is used when starting with the existing reserves. However, Pressey noted, importantly, that disregarding existing reserves in conservation planning is not realistic. Instead, the existing reserves that best represent biodiversity should be retained and the principle of complementarity should be used to augment these existing conservation areas.

Example 7.2

Breeding Birds in the British Isles (Williams et al. 1996)

Williams et al. (1996) measured the representativeness with respect to birds that breed in the British Isles of conservation area networks selected using three different algorithms: richness, rarity, and complementarity. In the richness-based prioritization, areas that ranked at or above the 95th percentile based on richness comprised 141 grid cells. These cells represented 149 species at least once (89% of the species). Areas in the 95th percentile based on rarity represented 98% of species. Remarkably, the prioritization based on complementarity represented all 213 species in only 1% of the grid cells. Thus, complementarity emerged as the most economical method for area prioritization. This is an interesting result because protected areas are often designated using richness (if biological criteria are used at all).

Table 7.2

(From Williams et al. 1996)

	Area-selection Methods			
			Complementarity areas	
Representation achieved (%)	Richness hotspots	Rarity hotspots	1 representation	6 representations
Occupied grid cells chosen (n = 2887)	5.0 (141)	5.0 (141)	1.0 (27)	4.9 (139)
Total species represented (n = 218)	89.0 (194)	97.7 (213)	100.0 (218)	100.0 (218)
Total number of records (n = 170, 098)	7.8 (13,208)	6.1 (10,329)	1.1 (1,954)	6.0 (10,141)

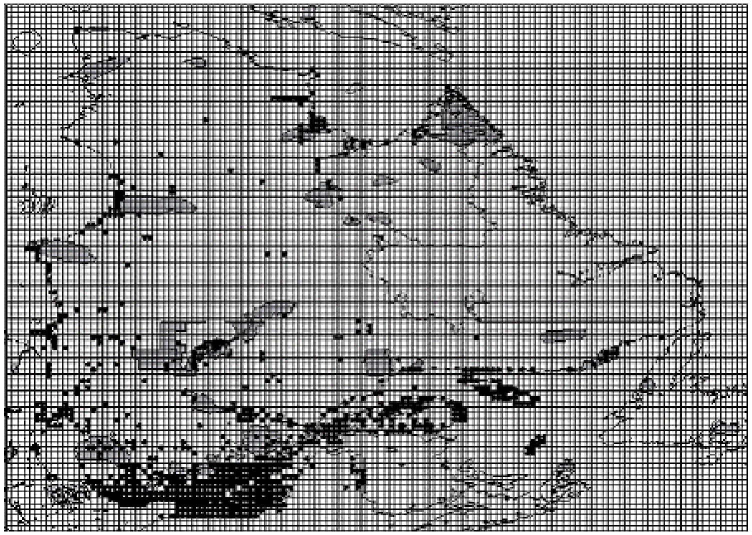
Example 7.3

Protected Area Network in Québec (Sarakinos et al. 2001)

In the conservation area network that existed in Québec in 1999, only 4.2% of the land area was protected by the provincial and national governments. However, the province had committed to put 12 % of each habitat type under conservation by 2001. Sarakinos et al. (2001) devised a plan to augment the existing network using 46 at risk plant species, 54 at risk animal species, 22 small mammal species native to the region, 6 game mammal species, and 92 fish species as true surrogates. They also studied the extent to which the existing network protected the at risk species. In the existing network, only 34.1% of these at risk plant species and 37% of at risk animal species were represented at all—see Figure 7.3a. This was in large part due to the fact that existing conservation areas were mainly selected for scenic and recreational value.

Figure 7.3a

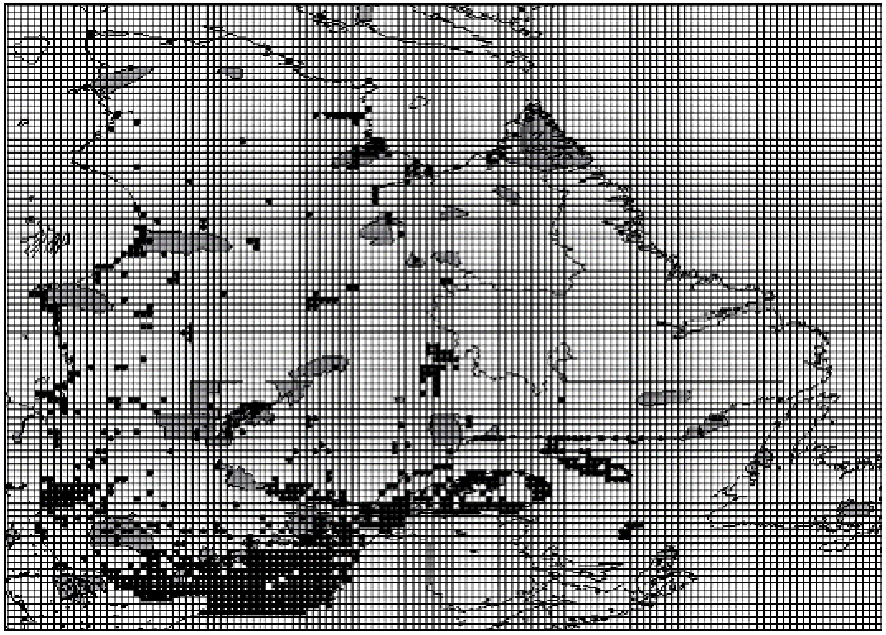
Point distribution of species at risk in Québec (black dots). The grey areas are the existing protected areas. Most species at risk records fall outside the grey areas. The data were a combination of presence-absence and presence-only data. From Sarakinos et al. (2001).



Sarakinos et al. also compared the 1999 conservation area network to other plans generated using complementarity, along with rarity and adjacency rules. In Figure 7.3b a target of 50 representations was used for of at risk species and 100 representations for the other species.

Figure 7.3b

Distribution of selected areas in Québec (black dots). The grey areas are the existing conservation areas. Note how almost all selected areas fall outside the grey areas. From Sarakinos et al. (2001).



The existing conservation area network were such a poor representation of the surrogate species that, even when Sarakinos et al. (2001) initiated area selection using the existing network, virtually the same new areas were selected as when areas were selected ignoring the existing network.

Assess Your Knowledge

Systematic Conservation Planning Modules