The ConsNet Portal 1.0

Systematic Conservation Planning Primer

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Abundance of a surrogate (such as a species) is the number of individuals present in a given area.

Adaptive Management involves the identification and subsequent procurement of areas for conservation purposes followed by the adoption of management procedures so as to guarantee the indefinite persistence of those biological units located on the procured areas. The current consensus framework for conservation biology takes adaptive management to be the subject of conservation biology.

Allometric relationships are mathematically well defined relationships that have been found to hold between some properties of organisms. An example of an allometric relationship is the relationship between the body mass of an organism and its basal metabolic rate.

Biodiversity is the variety of living features and processes at all levels of structural, taxonomic, and functional organization. Biodiversity does not include ecosystem services (e.g., nutrient cycling, the movement of water or energy) or culturally-based categories (e.g., cultural, spiritual, or aesthetic objects).

Biogeographical theory holds that conservation areas are analogous to oceanic islands. The theory thus calls for the design of conservation area networks as large circular reserves located closely to one another and connected by corridors.

Catchments are areas of land drained by a creek or river system; or a place set aside for collecting water which runs off the surface of the land.

Charismatic/Iconic species are species that are either well liked by people or in some way firmly associated with a particular geographic locale. As a consequence of their popularity charismatic and iconic species have often been used as surrogates for biodiversity.

Commercial importance is an importance attributed to those species that possess either existing or potential commercial value. Species possessing commercial importance are often afforded increased priority in conservation planning.

Complementarity is what new biodiversity features a new area brings relative to a group of already

selected areas; complementarity is thus a measure of beta diversity, measuring what is *different* about the new area. Complementarity is a measure of the contribution an area in a planning region makes to the full complement of biodiversity features (e.g., species). In systematic conservation planning, it refers to the relative contribution an individual area within a larger region makes toward a particular conservation goal. For example, if a particular area has few species that do not occur widely in the planning region, it may have higher complementarity than an area with many species that are widespread throughout the planning region. In other words, high complementarity is an area with high numbers of unrepresented species relative to other areas in the planning region. Complementarity supersedes (replaces) other measures of biodiversity in systematic conservation planning. The use of complementarity typically allows the representation of all species in as few areas as possible.

Complementary (see Complementarity).

Conservation Area Networks (CANs) are a network of geographically delineated terrestrial or marine regions (places) managed for the persistence of biodiversity features (taxa, communities, habitats, etc.) and processes. Each network consists of several conservation areas.

Conservation assessment is a term used to refer only to the assessment of the potential value of conservation areas. Such assessment is a necessary stage for the selection of CANs.

Conservation planning tools are software packages used for conservation planning purposes that: (i) can be used to guide decisions about conservation action for biodiversity (although they may also be used to plan for the conservation of other values such as scenery or ecosystem services); and (ii) at the very minimum can identify either (a) sets of complementary sites needed to achieve quantitative targets for biodiversity surrogates, or (b) the complementary contribution that individual sites make to biodiversity conservation within a planning region.

Conspicuous species are species used as surrogates for biodiversity representation due to the availability of records indicating their distribution. Mammal, bird, butterfly, and vascular plant species are often conspicuous.

Ecological communities are defined by groups of different species living together in a shared environment.

Effective population size is the size of an idealized population that would behave the same as an actual population. The ideal population is one in which there is random mating and no selection. The effective size of a population is typically smaller than its actual size.

Effects of habitat modification are the consequences of the modification of a given area for the organisms that reside with it. Habitat modification often requires the adoption of special management processes so as to so safeguard the persistence of biodiversity within the modified area.

Empirical studies are studies that have been performed in the field. They must be used to determine whether or not a particular management option is adequate for the persistence of biodiversity at a site.

Endemicity is the property of being uniquely located in a given place or region and not naturally located elsewhere.

Environmental classes are land classifications based on physical and climactic variables. Environmental classes may or may not incorporate biotic variables.

Environmental nomenclature is the naming system describing environmental characteristics, used by stakeholders that may not always be the same for each participant in a group of stakeholders.

Exact or Optimal algorithms are algorithms that are guaranteed to produce the optimal solution to a given problem.

GARP is a software package that allows for the prediction of the distribution of a species on the basis of geographically referenced records of its presence. GARP uses a genetic algorithm.

Geo-referencing or geographically referenced records/cells are geographically located records, with the longitude and latitude for each record being explicitly recorded.

Grid cells are regularly-shaped cells used to divide a geographical area (the conservation planning region) so as to cover it uniformly.

Habitat remnants are areas of untransformed original habitat types remaining in a landscape that have otherwise been changed, almost always due to human activities.

Habitat types are different classes of the environment in which species reside. In systematic conservation planning habitat types are often used as surrogates for biodiversity.

Herbaria are places devoted to the observation and study of plants and the maintenance of plant material collections.

Heuristic algorithms are algorithms that tradeoff optimality for speed. Heuristic algorithms are not guaranteed to produce the optimal solution to a given problem. However, they can be expected to produce a reasonable solution within an adequate period of time.

Iterative planning procedures, in conservation area network selection, are those in which the potential conservation value of all areas are reevaluated after each area is selected. The most important criterion for such a reevaluation is the **complementarity** value of the areas.

Keystone species are species critical to the continued persistence of a community.

Life zone diversity is the diversity of different ecological habitat types defined using a variety of features; especially, vegetation types and climatic variables such as patterns of temperature, precipitation, and humidity.

Lithographical data or lithography (in the systematic conservation planning context) are data from

maps, posters, and other visual media produced through the use of photographs.

Maxent is a software package that allows for the prediction of the distribution of a species on the basis of geographically referenced records of its presence. Maxent uses a maximum entropy method.

Metaheuristic algorithms are algorithms used to improve the results produced by a heuristic algorithm. Examples of metaheuristic algorithms include simulated annealing and Tabu search.

Metapopulation dynamics are changes in species that have been distributed across a landscape in discrete clusters marked by the presence of suitable habitat. The consideration of metapopulation dynamics results in the realization that targets must be set so as to guarantee the persistence of spatially separated populations.

Multiple Criteria Analysis or Multi-criteria analysis is a method to make decisions when multiple, potentially conflicting, criteria (for instance, cost, biodiversity content, and water quality) must be taken into account.

Niche modeling is a way to predict the geographic range of a species from occurrence (presence or presence/absence) data and information on the environmental characteristics of the individual areas in a region.

Non-iterative planning procedures in conservation area network selection are those which select all features that are going to be included in the network in one step.

Null models are models that do not assume the presence of a given biological phenomenon. When testing for the presence of a biological phenomenon null models are often considered first so as to guarantee that the proposed phenomenon is not merely stochastic.

Operationalize is to define a scientific concept in such a way that it can be quantitatively measured in the field.

Probabilistic expectations or abundances are the expected average number of individuals of a biodiversity surrogate (e.g., average number of individuals in a species) in an area.

ResNet is a software package used to select conservation area networks using rarity and complementarity.

Sites are places or areas being analyzed for potential conservation action.

Source habitat is a small percentage of habitat that provides the most recruits for other habitat sites.

Source-sink population structures are structures in which a small percentage of habitat provides the origin of most individuals while a small percentage of habitat provides the locale in which most individuals are lost.

Spatial autoecological requirements are requirements that a species may have regarding the spatial arrangement of its habitat.

Species as evolutionary units can be used to increase biodiversity through the encouragement of speciation.

Species assemblages are classifications of co-occurring species at a place. They also represent various alternative combinations of species and the interactions between them. Assemblages are more ecologically complex than individual taxa.

Successional pathways are stages through which a community proceeds when changing from one form to another.

Surrogates are measurable components of biodiversity used to represent biodiversity for the purposes of conservation planning.

Tenure parcels are units of land that are owned or managed in a particular way (e.g., individually owned properties or communally managed pastures)

Time horizon is the period of time over which a plan is considered when evaluating it.

Umbrella species are species whose protection is thought to guarantee the protection of other species as well.

Unique identifiers are tags that allow each of a set of geographically specified cells to be located exactly.

Vulnerability assessment is an assessment of the vulnerability of a potential conservation area from external threats (using techniques such as risk analysis) to plan for the persistence of biodiversity in a conservation area network.

Weighted average is an average of multiple values produced by assigning a weight to each value, multiplying each value by its weight, and then adding the results.

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M3: Stakeholder Identification and Involvement
M4: Data Compilation, Assessment, and Treatment
M5: Surrogacy Identification and Analysis
M6: Conservation Targets and Goals
M7: Review Existing Conservation Areas
M8: Place Prioritization

Systematic Conservation Planning Modules

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