The BioRap Biodiversity Assessment and Planning Study for Papua New Guinea

The priority setting process

The data base development provided biodiversity surrogate information based on modeled species distributions, "domains" summarising bioclimatic and other data, and vegetation types. However, BioRap biodiversity planning requires more than just the biodiversity surrogate information. Needed also is information on socio-economic factors that represent other land-use opportunities and/or constraints on land-use. PNGRIS (Bellamy and McAlpine 1995; Keig and Quigley 1995) provided population, land-use intensity, tenure, agricultural potential, and other information for the costs and constraints of priority-setting (see Faith *et al*. 2001b).

BioRap's priority setting tools were first described in Faith and Walker (1996a,b). The defining characteristic of the priority setting tools are their flexibility and ability to incorporate into the priority setting process a variety of biodiversity surrogates, as well as trade-offs and constraints, in a transparent and repeatable fashion. This enables the ready updating of priority allocations in the light of changing conditions and revised data. Conservation planning methods developed in Australia (Margules 1989; Pressey and Nicholls 1989ab) and now applied elsewhere (Williams *et al*. 1996) were originally designed to find sets of areas that fully represent biodiversity features, while minimising the required number of areas. The approach adopted in BioRap departs from these methods by incorporating into biodiversity planning important opportunity costs, such as forgone timber production and other constraints, using a trade-offs approach pioneered by Faith *et al*. (1994).

In the first paper in this issue on the priority setting process for PNG (Faith *et al*. 2001a), the role of biodiversity surrogates and biodiversity targets is addressed. The paper describes the link between targets and the appropriate level of summary of the hierarchical biodiversity variation based on environmental domains and vegetation types. In this approach, a nominated biodiversity target dictates the level within those hierarchies that is used. In departing from the conventional application of percentage targets that focuses on proportions of total area or on proportions of habitat types, the BioRap approach avoids the biases in these approaches, and their potential miss-use which can restrict the amount of biodiversity protected.

The new approach to percentage targets described in Faith *et al*. (2001a) depends on estimating the maximum diversity that could be protected by an unconstrained 10% of the total area of the country. That is, we determine the level of biodiversity representation/persistence that would have been possible using only 10% of the land area if there were no constraints on land allocation and no land use history. This quantity then becomes the working biodiversity target.

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The second paper (Faith *et al*. 2001b) describes the results of analyses that seek to find best-possible land allocations to meet that quantitative target in the face of actual constraints (e.g., existing reserves) and opportunity costs (e.g., forestry production potential). Allocation of 16.8% of PNG's land area to biodiversity protection was required, in order to achieve the target. This result minimizes potential conflict with forestry production opportunities. Faith *et al*. (2001b) also describe the framework for progressively moving towards such a country-wide conservation goal, while at the same time providing opportunities to alter the priority area set in light of new knowledge.

The third paper in this special issue (Faith *et al*. 2001c) describes the integration of both representativeness and "persistence" goals into the area prioritisation process. In part, this aspect of planning involves the crediting of "partial protection" provided by sympathetic management. The proposed methods also lead to modified ways to calculate biodiversity persistence contributions of areas; these are measurable contributions that are expected to change over time, as land-uses and other factors change. This new biodiversity "calculus" leads, for example, to a proposed system of environmental levies based on such biodiversity complementarity values (Faith *et al*. 2001c). An important property is that the assigned levy for an area may change to reflect its changing complementarity value in light of changes to protection status of other areas. Similarly, a carbon credits framework is suggested by Faith *et al*. that gives preference for "credits" to areas that have high biodiversity complementarity. A related biodiversity credits scheme, also based on complementarity, encourages investments in those areas that make greatest ongoing contributions to regional biodiversity representation and persistence. Faith *et al*. (2001c) propose, as part of future planning in PNG, a new "systematic conservation planning" that is not focused only on selecting sets of areas but utilizes complementarity values and changes in probabilities of persistence for a range of decision-making processes.

We conclude by noting that these BioRap outputs may contribute to other ongoing conservation initiatives in PNG. For example, the GEF-funded Conservation Trust Fund will support projects with conservation of biodiversity as a primary goal in conservation areas of global significance, and will rely on BioRap's representative network of priority biodiversity areas. As part of these efforts, PNG's Forest Inventory Management System (FIMS) will be expanded to access other sources of data and information on appropriate land uses, including BioRap. Further, these new projects intend to strengthen forest planning capacity, to better identify areas appropriate for sustainable forest management and/or conservation, using capacity built through BioRap

We have already highlighted the importance of knowledge transfer as part of the project. Training on priority setting methods was provided through technical and demonstration workshops held in Papua New Guinea. The final workshops covering the entire BioRap project were held in Port Moresby in 1998. The initial two-day technical workshop provided 'hands-on' training in application of the BioRap reserve selection module for 30 participants from PNG Government agencies, Universities, NGOs and private industry. The third day was a Decision Makers and Principal Stakeholders Workshop with some 40 participants from Government, NGOs, University departments and public utility companies. Two additional one day sessions were held for specific personnel from the Forestry and Planning Departments. Both workshops were adjudged highly successful in terms of exposing BioRap to a wide and relevant audience.

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