Partial degrees of protection and regional sustainability analysis

The simple scenarios .... viewed protection of biodiversity in an area as all-or-nothing; an area either contributed to the total representation of (protected) regional biodiversity or, if it was logged, was assumed to contribute nothing. This simplistic view ignores an important element of regional sustainability. This is the contribution that may be made at the level of individual areas, when (in our examples) both forestry and biodiversity opportunities are realised to some degree by a particular management regime. An example is presented here in which within-area sustainability contributions are taken into account in assessing overall regional sustainability.

An area can be assigned a partial degree of biodiversity protection (e.g. 50%) when that area has been allocated to some management regime that justifies a conclusion that (in the present context) there is some nominated level of biodiversity protection and forestry production. For an environmental space ...., the ED measure can be adjusted to take into account such partial-protection values and capture the change in the overall expected forgone biodiversity given by any set of areas that includes such partial protection assignments (Faith and Walker, in press c).

As an example.....two of the areas (1 and 8 ...). For each of these areas, the cost of protection (forgone forestry opportunity) remains as 10 units under full biodiversity-protection, but alternatively is assumed to be only 1 unit if the area is logged "sympathetically" such that 50% of the biodiversity of the area is expected to be protected.

The optimal allocation now can be re-evaluated for various weights on forestry. For a weight of 7, ... Area 9 ..., which is environmentally similar to area 8, is now logged rather than protected, saving a forgone-forestry cost of 5 units. Area 8 is now sympathetically logged at a 50% protection level and with a cost of only 1 unit. ....Further, for this weight, it remains optimal to protect area 2 ...and fully log areas 1 and 3. Area 2 fills such a large gap that the alternative of a 50% protection level on area 1 would not produce a comparable net benefit. Given the protection of area 2, the option of sensitive forestry of area 1 is not attractive, as a 50% contribution from this area is then not greater than its associated cost of 1 unit.

Under the scenario ... where partial protection is available for areas 1 and/or 8, application of a range of weights results in a new trade-off curve....(Fig. 10). ... Over this range of weights, one or both of areas 1 and 8 are chosen for sympathetic logging with partial protection.
Partial protection, equivalent to a form of "sustainability" within individual areas, therefore has a measurable pay-off at the regional level. .... Thus, the potential for sustainability contributions within areas has boosted the region's capacity for trading off conservation and forestry, with the result that regional allocations ignoring the potential for partial protection are not as sustainable.

This example also illustrates that the potential of an area to be sympathetically managed, and so appear to provide a level of sustainability within the area, does not automatically imply that such management will increase overall regional sustainability. Here, area 1, over a range of weights, actually made a greater contribution to overall sustainability when fully logged. Thus, the attractiveness of sustainable practices in individual areas ultimately must be evaluated at the regional level.

Figure 10 (re-drawn in colour)
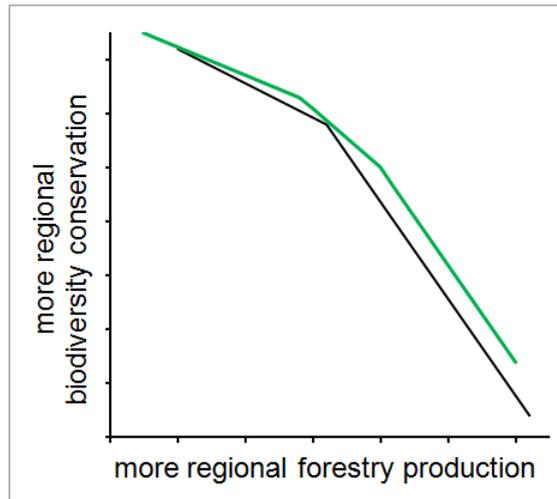
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In the trade-offs space, the region ideally would score in the upper right hand corner, but conflict among goals means that best-possible solutions fall along an efficiency-frontier curve.
For this simple partial protection scenario, the greater net benefits are indicated by the green curve. The black curve is that for the case where areas can be allocated either to biodiversity conservation or non-conservation forestry production.

For further details, see Faith, D. P. (1995) *Biodiversity and regional sustainability analysis*. CSIRO, Canberra. 30pp. Available at: http://australianmuseum.net.au/document/Biodiversity-and-regional-sustainability-analysis