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EDITORIAL NOTES

Recovery plans for insects: what should they contain, and what should they achieve?

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Species-focused conservation plans, under names such as recovery plans, action plans, management plans, or other similar epithet, have been produced as components and drivers of numerous insect conservation programmes. These titles imply rather different themes, but such documents overlap considerably in practice, and titles of some may simply reflect the specific wording in different governing regulation or legislations. Whatever the name, these documents signal that the focal species has/have in some way been selected or singled out for conservation need or consideration at some level, to promote either protection from decline and loss, or recovery from earlier such losses and reduce vulnerability. Most commonly, such documents flow from formal listing of the species as 'threatened' or 'protected' in some way. Recovery plans 'are the central documents available to decisionmakers and serve as guides for the management and recovery of threatened and endangered species' (Boersma et al. 2001). Collectively, they cover substantial numbers of different taxa, many parts of the world, and apply at scales ranging from global, through national, to local or municipal scenarios. They differ enormously in length, scope and complexity and range from rather superficial or bland 'motherhood statements' of good intent to detailed practical analyses of conservation needs and how to fulfill them, and can then include summaries of all relevant biological information. They may deal with one or more species either in isolation, or in the wider contexts of habitat, community or site conservation needs. Here, I address briefly some aspects of these documents for insects and how they operate in practice, as well as how they might operate better, based on experiences in Australia. Most such plans target single species. Those which include a group of related taxa are necessarily more general in broad scope, but usually incorporate individual considerations for each species, following wider initial comment and perspective. At this level, they intergrade with broader documents such as Red Data Books (which identify species needing conservation and promote their conservation) but may differ in practice in committing to action rather than being simply advisory in nature. Multi-species recovery plans may be invaluable in helping to define general protocols on which to found conservation action for any included species. The 'Threatened Weta Recovery Plan' for New Zealand (Sherley 1998) is one such case, based on overlapping aspects of the biology of included species. Other multiple plans may include treatments for 'better known' and 'poorly known' species, as in that for New Zealand Carabidae (McGuinness 2002).

Essentially, recovery plans have three major purposes, with priorities among these differing with context and constituency: (1) as 'appeasement' to fulfill, simply by their production, legal obligations conferred by listing the species in some formal way; (2) as public relations exercises, with importance in increasing awareness of the parlous plight of species and fostering commitment to their conservation; and (3) as comprehensive critical summaries of conservation need, and of the steps needed for effective practical conservation progress. Each of these may be viewed, at some level, as a facilitator for conservation to progress, but the needs visualised for a 'more political' document may differ considerably from those of one intended to dictate and drive practical conservation

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management. At the extreme, a Minister (or other authority) may seek to fulfill an obligation by simply producing 'a document', with little real intention to translate it to reality, simply to be seen to be 'doing something'. In such, fortunately increasingly limited, contexts, quantity (number of documents or species dealt with) may be more important than quality or scientific integrity and practicability. In several Australian legislations, a Minister is obliged to seek advice from, or consult, a scientific advisory committee, but not to heed that advice.

The capacity to produce sound plans for insect recovery is very limited in most State and Territory agencies within Australia, and a major recommendation by Yen and Butcher (1997, and echoed by Sands and New 2002) that an 'invertebrate expert' be appointed to each such body has not yet been entirely fulfilled. Outcomes of this lack are that plans for insects (and other invertebrates) may be drafted by people versed in vertebrate biology alone and against a background of threat criteria interpreted as for relatively well-known vertebrates, and also that such plans may be given only low priority in relation to others that such people feel more confident in producing. Likewise, the pool of consultants available to draft such plans for insects, or to review drafts, may be very limited, particularly if those involved in promoting the particular insect species earlier for listing are excluded as interested parties. Nevertheless, wide consultation is common in drafting insect recovery plans, but most such input involves the quality of information rather than the feasibility of implementation. Recovery teams, convened or appointed to oversee plans, normally include representatives of all interested parties on whom responsibility for the plan will devolve, and advisors.

Sound biological knowledge and understanding is a key element of any such plan, and integral to formulating both objectives and actions. Schultz and Hammond (2003) noted that the United States Endangered Species Act demands 'objective, measurable criteria' on which to base listing decisions, and this is fundamental also in management plans. Few conservation biologists would query the need for the best possible scientific information to underpin any recovery or other management strategy. However, Schultz and Hammond (2003) reviewed 27 recovery plans for United States listed insects, and showed that recovery criteria were usually linked very poorly to species biology. Other authors, also, have endorsed the essential and central role of scientifically-based recovery criteria (Clark et al. 2002, Gerber and Hatch 2002, both on ESA). In their absence, 'recovery' is commonly projected on the well being of sites on which the species resides, as the best interim measure for conservation. Thus, in treating five poorly-known species of *Synemon* (sun-moths, Castniidae) in Victoria, Douglas (2003) specified a number of intrended management actions to increase site security and prevent further degradation.

The task of practising insect conservation biologists is to bring the undertakings made in such plans to fruition, and it behoves us to 'interfere' and influence these as constructively as possible to ensure that their objectives are sound, sensible and feasible. Objectives must be enunciated very clearly, not least to assure optimal effect and progress, and as a prelude to determining actions. Following the broad objective (or 'mission' of the document, a listing of compartmentalised objectives commonly occurs. The need for 'SMART' objectives reflects that each objective should be Specific (unambiguous), Measurable (with criteria and timing for this stated), Appropriate (related to the long term over arching goal of the plan), Realistic (achievable within the time frame specified), and Time-bound (with a cut-off date for attainment). Some workers replace 'Realistic' for 'R' in the above acronym with 'Responsibility', to designate what agency or person will commit to the task. The objectives stated in many insect recovery plans fall far short of meeting all these criteria. The last (Time-bound) is particularly important in assuring commitment to action (so that the plans are not simply shelved) and, perhaps, is that most frequently not addressed. Many insect recovery plans include a stated 'review by' date, which (in common with those for other groups) may not be met because of logistic limitations or changed priorities. Linked with this, monitoring of progress is critical both to determine success and to render management adaptive and responsive to changing circumstances; a recovery plan should not be inflexible. Responsible review ensures that additional information will indeed be incorporated, and that the plan is dynamic; the converse is that an unreviewed plan will in time become suboptimal or, even, misleading.

Objectives should also be based on biological information to the greatest extent possible but, for the great majority of threatened insects specific information on population sizes and viability is not available for incorporation into this purpose (see Schultz and Hammond 2003 on a lycaenid, *Icaricia icarioides fenderi*, for application of such information). Nevertheless, information on the nature and intensity of threats and their abatement is at the core of formulating good management. Additional research on the biology of the focal species is almost always necessary to elucidate these, so that many recovery plans address the twin themes of 'research' and 'management'. It is all too easy for the research demands to become loosely focused in not specifying the precise information needed to enhance understanding for management. Again, specified timelines for both duties and review may be vital to ensure that such work does not become indefinite, notwithstanding the values of continuing to accrue data.

'Actions' flowing from objectives must also be very clearly formulated and, as for the objectives themselves, follow naturally from each objective and be accompanied by measurable criteria to enable monitoring. It is intriguing to contrast the plans with equivalent intent arising from the United States Endangered Species Act (US, as Recovery Plans) and the United Kingdom Biodiversity Action Plan (BAP, as Species Action Plans). Both suites of plans are the key references for conservation promotion and action. The disclaimer for US plans notes 'Recovery plans delineate reasonable actions which the best available science indicates are required to recover and/or conserve listed species', and plans 'are subject to modification as dictated by new findings, changes in species status, and the completion of recovery actions'. Details of recovery actions proposed in US plans are generally preceded by comprehensive summaries of the biology and conservation needs of the species, commonly occupying several tens of pages. Need for research may be reflected in 'Recovery' by such means as designating 'interim criteria' for meeting objectives, pending further research, and clear statements of the need for additional work in order to evaluate threats fully: see, for example Tansy (2006, on a poorly-known water beetle). Many objectives are local in application, such as for particular sites, and draw on knowledge of related species as appropriate. Many are also open-ended, and implementation schedules appear only irregularly. Objectives and actions are commonly accompanied by extensive 'step down' commentary, often including separate appraisals for the different sites from where the species is known. In contrast, the UK BAPs are typically very brief, of around two pages, with brief statements of biology, conservation status and needs. Proposed actions are simply listed, with lead agencies sometimes designated, but time lines and other aspects of 'SMART' may be difficult to discern, and appear to be largely outside the remit of these documents. A series of UK Butterfly Action Plans are rather more fulsome in content, with more comprehensive summaries of species biology and past conservation actions but, again, not committing most of the actions to any timing schedule. That for *Hesperia comma*, for example, contains these details for only two of 26 objectives ('Conduct surveys of all colonies and potential habitat every 5–10 years'; 'Review this Action Plan annually and up date in five years', elsewhere in the document specified as 'in 2000') (Barnett and Warren 1995). This same deadline persists in the most recently viewed web version of this plan (accessed 30 March 2007). However, in the working climate for insect conservation in the United Kingdom, such brevity may not be a disadvantage: awareness of conservation need is high, the interests of the numerous volunteer conservation groups and naturalists are not deterred by the formality of imposed action deadlines and reporting dates, and 'things get done'. Thus, the BAP for the hornet robberfly (*Asilus crabroniformis*) lists 18 more local British Action Plans specifying concerns for it; and that for the stag beetle (*Lucanus cervus*) a similar suite of 17 local plans. In such instances, more detail may indeed not be needed, notwithstanding the wider standard ideals implied earlier, and the central plan serves as an effective umbrella guide for others to elaborate and prosecute, often from considerable local knowledge, interest and expertise, and commonly backed up by regional meetings and open days for volunteers to meet and set priorities. Thus, surveys for *L. cervus* in 2002 involved some1300 recorders (Smith 2003), as a resource simply not available in most other parts of the world. UK species action plans range from promoting surveys to determining major practical recovery efforts (see Stewart and New 2007). Where education is a more important and central consideration, more background information is needed. Undertakings from many US plans must be pursued in arenas in which biological information is limited, and commonly through the lead of government agencies with substantial other interests and priorities; the comprehensive leads provided by detailed recovery plans may then be invaluable.

Australia poses a somewhat intermediate position, with interest and capability for insect conservation starting to gain momentum, but considerable further impetus and education necessary. As elsewhere, and emulating examples elsewhere in the world, insect recovery plans vary considerably in content and value, with no agreed national standards for these, and most designed at State level. That for the lycaenid *Hypochrysops piceatus* in Queensland (Lundie-Jenkins and Payne 2000) is a particularly valuable model, and contrasts markedly with the much less focused 'Action Statements' (these, however, designed with the lesser objective of being 'brief management plans') available for some listed insect species in Victoria. The hierarchy of general objective, specific objectives, recovery criteria and progress criteria for *H. piceatus* is clearly expressed, with the progress criteria linked firmly to specific objectives. Actions listed are precise, responsibility is defined, and all are budgeted appropriately.

As Boersma et al. (2001) noted, the effectiveness of recovery plans (with the desired stated outcome being 'recovery', where possible accompanied by de-listing, and with possible continued conservation interest as 'rehabilitated species': New and Sands 2003) can usually be measured only by some form of trend analysis rather than by an absolute outcome. Measuring such trends depends on objective criteria. They suggested that this capability improved in plans that have been revised, with the important caveat that this betterment might reflect duration of attention rather than just new information. Some revised plans revealed new knowledge but not revised management

recommendations. Such inferences from a critical review of US plans suggest that similar overviews elsewhere could be a valuable contribution to enhancing their value in assuring recovery.

At present, there is little room for universal complacency over the content and prosecution of recovery plans and related documents for insects. With the limited expertise available for practical long-term programmes for conservation of insects, any improvements we can foster are surely worthwhile in enhancing both the practice of insect species management, and its credibility. Focusing more clearly on well defined objectives whilst designing plans, ensuring their timely review and revision, and clearly integrating research and management components, appear to be highly rewarding aspects of such endeavour in helping us to derive maximum benefit for insects from the restricted resources at our disposal.

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