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SHORT COMMUNICATION

Butterfly conservation in Australia: the importance of community participation

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Introduction

Australia's butterflies and their conservation needs are now reasonably well understood—even though many aspects of distribution, species biology and the impacts of environmental changes remain to be clarified. However, undertaking practical conservation management for threatened species and subspecies, and gaining the additional information needed to refine conservation practice is difficult, not least because of the paucity of agency and institutional expertise throughout the country. Calls by Yen and Butcher (1997) and Sands and New (2002) for greater invertebrate expertise to become a core staffing duty within state or territory conservation agencies have been fulfilled only partially. The number of butterfly hobbyists and well-informed naturalists in Australia remains low, and constructive liaison between them and officialdom is sometimes difficult to achieve. Not least, a high proportion of managers charged with leading butterfly conservation programmes that flow from the listing of taxa are not entomologists and have little practical appreciation of insect biology and ecology. They are thus operating beyond their immediate comfort zone, perhaps with little confidence. Simply, Australia lacks the wider knowledge-based support networks for butterfly conservation and recording activities that are taken for granted in parts of the northern hemisphere. Calls for greater intersectoral networking for conservation are by no means novel in Australia, with a major symposium (Saunders et al. 1996) covering many relevant topics of how scientists, officialdom and the wider community may cooperate and form mutually beneficial interactions. However, Australian invertebrates are scarcely considered in that array.

Conservation management for butterflies draws on three main fields of continuing endeavour: background theory, scientific fact and practical field execution. The first two are largely the province of conservation biologists but enhanced by ideas and observations from any source, but the logistic inability to pursue management plans in practice is widely acknowledged as a major impediment in Australia. Since publication of Australia's national Butterfly Action Plan (BAP, Sands and New 2002), a number of butterfly conservation projects have indeed gained greater public profiles and agency acknowledgement, but further advances and understanding have come in large part through education and advocacy in the wider community. Without that support some projects simply could not proceed effectively. The theme of this paper is enhancement and promotion of this important aspect of butterfly conservation in Australia.

Community support

Enlisting support for insect conservation involves effective communication, education, considerable tact, and realistic expectation. It is emphatically not about scientists or managers dictating needs *ex cathedra*! A sense of community ownership of the project is vital, and BAP includes several references to how this has been fostered by adoption of local threatened butterflies as flagships or icons in various ways. Most taxa of conservation concern are indeed local endemics, some of them with a very small range and known from few populations, so that local pride can be justified on the existence of these unique entities.

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One approach is to publicise common names that emphasise local proprietal interest: epithets such as 'Eltham copper' and 'Richmond birdwing' help to reinforce local importance. For the lycaenid *Paralucia spinifera*, endemic to a small region of New South Wales, the name 'purple copper' is now used by some workers rather than either of the alternatives (Bathurst copper, Lithgow copper), as a more neutral term than favouring either of these two rival towns—but the luxury of such a dilemma is rare!

The very novelty of a butterfly conservation programme in Australia is likely to invoke initial enthusiasm and local support, but ensuring long term interest over many years is considerably more uncertain, and demands a more subtle set of interactions to constitute an enduring partnership (Williams 1996). Williams suggested that government agencies should 'provide community endeavours with honesty, support, expertise and a sensitivity to the community's concerns for conservation'. However, there is no single 'community' in a conservation constituency, because a considerable variety of sectoral interests will be represented, with a corresponding variety of sympathies, priorities and willingness to engage. Sectors might, for example, comprise traditional land owners, private land owners, industries of various kinds (extractive, manufacturing, agricultural), secondary and tertiary educational institutions, non-government environmental agencies, and natural history and local history interest groups, with memberships ranging from local to regional, national or international. The precise array and the balance between the sectors will differ in each case and reflect—for example—urban or rural environment, and local recreational and tourism activities. As Nally (2003) noted in discussing community involvement in conservation of *P. spinifera* 'There is no set approach for raising community awareness, and it is limited only by the boundaries of imagination'. However, as he also noted, there may be occasional tensions and constraints over needs for restricting information in some cases. Fears of unscrupulous collecting of this copper necessitated some secrecy in publicising precise localities of then known populations. Some mistrust may therefore occur, notwithstanding the best conservation intentions. Rarity or perceived threat may then become a deterrent to community involvement and such trust may be difficult to regain in the future. Effective communication is central to any lasting cooperations, and the caution raised by Masters (1996) (namely, that 'Some public servants and scientists do not have the ability to communicate easily with non-scientific members of the public.') is only gradually being overcome. 'Trust' is an essential ingredient of successful communication and cooperation, but is inherently fragile (Moore 1996), and some networks are necessarily founded in an atmosphere of initial mistrust, because of opposing political interests. The major attributes of trust are honesty (linked with reliability), benevolence (not being motivated solely by individualistic concerns) and reciprocity (the need to reciprocate for benefits received in order to keep receiving them). Trust applies across individuals, communities and organisations, and to both people and process.

Interdisciplinary approaches may enable community groups with varying priorities to incorporate conservation activities within their group interests with little change in priority; the groups can also choose how they may be able to contribute to the wider conservation programme. The initial need and impetus should thus be to increase community awareness of the scope and nature of activities needed, together with their practical relevance and purpose. At this stage, information released in small focused messages may be more effective than distributing it all together, which (especially when novel or unfamiliar) can seem overwhelming, and the community itself may participate very effectively in increasing awareness. Overall, the scope of initial community involvement needed may flow from the management plan, but community engagement in design of that plan may help to temper science alone by more realistic social considerations to aid practicality. Australia's Natural Heritage Trust's 'Skills Tool Kit' outlines the components of community-based conservation, but these have rarely been applied formally to insect conservation. The dynamics were exemplified by Nally (2003) in developing interests for *P. spinifera*, for which the three broad steps were (1) understanding the community and identifying opportunities for cooperation; (2) creating awareness; and (3) involving the community in recovery actions and further enhancing awareness. Direct personal contact may be far more effective in fostering interest than simply relying on questionnaires or other more remote survey methods.

'Networks of conservation agencies, scientists and volunteers are the future of nature conservation in Australia' (Masters 1996) and many of the possible liaisons between community sectors are discussed by authors in Saunders et al. (1996). However, involvement with species recovery plans can be coupled with gradual changes in attitude to link ownership (or stewardship) with acceptance that conservation management is a societal responsibility, and that cultural change occurs through incorporating a wide diversity of interest and opinions (Williams 1996). Likewise, conservation managers may become more receptive to community interests and priorities.

A fundamental need is to provide and discuss the basic information needed to understand (1) what to do and (2) how to do it. Many of the approaches likely to facilitate cooperations can be countered easily by others that will assuredly deter interests. Dictatorial demands, arrogance of managers, personality conflicts, unreasonable demands in relation to expertise and time, unforeseen personal costs, activities not seen as useful or relevant, and lack of

Table 1 Factors that may encourage or discourage community participation and interest in species conservation (adapted from Williams 1996)

1. Encourage
   a. Focus for conservation initiative that community identifies with personally
   b. Encourage community involvement from earliest stages of a conservation initiative
   c. Develop programmes that are beneficial to the community as well as to conservation
   d. Listen to the community's concerns
   e. Gain the community's trust
   f. Provide community with appropriate information at the appropriate level and at the appropriate time
2. Discourage
   a. Failing to recognize community's understanding of ecological concepts can create resentment
   b. Failing to appreciate what the community hopes to gain from participating can dampen enthusiasm
   c. Failing to provide appropriate support after community-based programmes have been initiated can threaten continued commitment
   d. When an agency starts to behave as if management belongs only to it, community is discouraged from developing a personal responsibility for conservation

discussion and feedback are amongst many possible factors that may thwart cooperations. The instances listed by Williams (1996) from her experiences with vertebrate and ecosystem recovery programmes (Table 1) apply equally in other contexts.

As one very pertinent example, the deterrent by officialdom to activities of butterfly hobbyists was a major barrier to obtaining the most definitive information on biology, distribution and conservation status needed for BAP: that largely unpublished bank of information on the rare and supposedly threatened species of greatest conservation concern by far exceeds any available from professional sources and, without it, many conservation status assessments would seriously lack credibility. Practical experience with butterfly survey and biology is a scarce commodity in Australia. Not least, hobbyists are the only people in some states/territories who may be able to advise constructively on the biological bases for major conservation needs, and on the reality of obtaining further critical information. A tentative agenda to help reduce tensions between agency personnel and butterfly enthusiasts, and increase cooperations between these groups was outlined in BAP. More broadly, participation of such citizen scientists in management teams is a critical resource (New 2009). Guidelines for constitution of species recovery teams under Australia's first relevant federal legislation (The Endangered Species Protection Act 1992) provided for community involvement in such teams where this was anticipated to constitute substantially to conservation need. Initiatives taken by hobbyists to promote butterfly conservation are clear evidence of their major contributions. Once the need for, and approach to, conservation are established, wider community interests are likely to emerge, in the design and execution of all stages of a management plan and monitoring the progress of that management. That support may be largely ad hoc, but may be enhanced markedly by effective coordination and integration of interests, perhaps through a local support or 'Friends' Group': the 'Friends of the Eltham copper', for example, was formed soon after conservation of this butterfly came to prominence in Victoria in the late 1980s, and its members continue to provide much-needed support and advocacy, and to be represented on a more formal management group established around the same time. Simple familiarity with the appearance of such distinctive taxa has led to discovery of additional populations.

A number of such community support groups have been founded through Australia's National Threatened Species Network (NTSN), operating since 1990 as a community-based network established with the major aim of linking the community into scientific research, management and education on endangered species. It was established jointly by the World Wide Fund for Nature and the then federal agency (Australian National Conservation Agency), so that NTSN has a defined scope of activities and contractual obligations—but also, reflecting organisation within State/Territory groups, considerable independent capability to focus on more local issues whilst maintaining national cohesion by identifying common ground and sharing ideas and information (Potter and Moore 1996).

The initial need for many butterflies suggested to be threatened is for further surveys and field exploration to refine their status and appraise real conservation need, and this recommendation was made repeatedly in BAP. Sands and New (2003) extended this to recommend systematic surveys of butterflies in major protected areas such as national parks. In order for these basic needs to proceed, recognition of the capability to undertake them effectively being largely restricted to hobbyists must be recognized, and two common aspects of conservation policy need to be reconsidered carefully. First, permits to survey and collect in national parks and some other protected areas on public lands are sometimes difficult to obtain by non-professional scientists. The complexity and uncertainty of the application

process is a deterrent to interest (Greenslade 1999). Second, take of voucher specimens is needed to verify identification, particularly within groups of Hesperiidae and Lycaenidae for which sight records alone lack credibility because of close resemblances between taxa, and detailed examination of morphological detail is necessary. For 'listed species', likely to be the primary focus in conservation surveys, prohibition of take is usually a legal condition, and lack of voucher material has demonstrably led to the published records of some putatively threatened taxa being an incomplete compendium of knowledge. Permits to collect limited numbers of specimens, particularly from localities from where the taxon has not previously been known, must be made available to *bona fide* hobbyists who agree to contribute records to a central registry. Steps toward this end have already occurred by permits being granted through the state conservation agencies to two leading entomological societies in their respective states.

A local informed and interested lepidopterist or group of lepidopterists may be amongst the most important community members to participate in the more entomologically specialised aspects of conservation management, and advise on these. But, as the cases discussed below illustrate, this may be only one of many components of a rounded management endeavour.

Some examples of community involvement in species management

Almost all of the rather few species-focused butterfly conservation campaigns in Australia have benefited from community participation. The two cases cited here illustrate the variety of these inputs, and how they may be orchestrated and integrated with conservation plans.

The Bathurst copper, *P. spinifera*

Community involvement with Bathurst copper conservation is a striking example of how suites of diverse interest may come together. It is centred on the town of Lithgow, close to some of the best-known sites for this narrowly endemic butterfly in central New South Wales, and flowed from personal approaches by the National Parks and Wildlife Service (NPWS) to key individuals in each main community sector (Nally 2003) to ask them directly about their group's objectives and activities. The exercise was logistically intensive but was thought far preferable to more impersonal questionnaire-based surveys. Groups were also asked about their knowledge of the copper and how they would like to be informed about future developments. These approaches revealed a considerable variety of environmentally-based activities in Lithgow, and several special-interest groups. Cooperations were fostered initially through NPWS, with increasing awareness generated through a range of media releases and activities, extensive distribution of information leaflets on the butterfly, information at seven country fairs, presentations to community groups and permanent NPWS office displays. This information/awareness phase laid foundations for direct approaches to community groups, simply presenting information without any presumption of dictating or presuming commitment or action.

However, a single exciting event turned the campaign into a new and constructive direction. The newly-opened 'Bellissimo Café' in Lithgow's main street identified themselves as a sponsor, styled the café on the butterfly, disseminated information leaflets and displayed management plans for patrons to read, and contributed financially to the recovery programme by sales of specially designed cakes and pasta and donation of tips. The Lithgow community were thus catalysed to internally generated interest in butterfly conservation at a grassroots level, and from an informed but formally undirected foundation. Subsequent developments emphasized need for Williams' (1996) conditions of community initiatives, community identification with the project, and direct benefits to the community and, in due course, a series of initially separate actions came together to contribute to key recovery actions of (1) preventing habitat change; (2) weed management; and (3) promoting connectivity between sites, all founded in various intersectoral connections and, in Nally's (2003) words, engendering 'levels of community trust, ownership and synergy that bode well for the perpetuation of community involvement in threatened species recovery.'

The Richmond birdwing, *Ornithoptera richmondia*

The abundance and range of the Richmond birdwing, one of Australia's most spectacular endemic butterflies, have decreased substantially since the beginning of the twentieth century, in parallel with losses of subtropical rainforest in southeastern Queensland and northern coastal New South Wales. Urban development continues to envelop small and increasingly isolated forest fragments, as a primary threat. The butterfly had thus disappeared from about two thirds of the former range (Sands et al. 1997), and its conservation, emphasizing recovery, has become a major community-driven enterprise focusing on habitat restoration and removal of key threats. The major threat, additional to massive losses of rainforest to leave only about 1% of the former extent of this vegetation, has been loss of the major larval foodplant (the vine *Pararistolochia praevenosa*) and the spread of another vine. This, a South American species (*Aristolochia elegans*, known as Dutchman's Pipe) widely planted as a garden ornamental but also spreading

extensively into natural environments, is highly attractive to female butterflies for oviposition, but the foliage is toxic to caterpillars.

The attractiveness of this butterfly has rendered it an important icon or flagship species for conservation interest, and a variety of community interests have been the mainstay of a conservation programme over two decades and which has seen the butterfly expand markedly in range. Most recently, the campaign has been under the aegis of the Richmond Birdwing Recovery Network Inc., now with well over 400 members (Sands D. personal communication 2009), and the history of this long term endeavour was discussed by Sands (2008), with more details by Sands and Scott (2002). Concerns for losses of the butterfly had become very obvious by the early 1990s, when its plight was outlined to a variety of community and school groups, initially in northern New South Wales. A major recovery need was to offset losses of *P. praevenosa* by planting additional vines. Several schools took up this challenge, and a native plant nursery (Balunyah Nursery, Coraki) started to propagate the vine commercially, founded on a stock of 600 seedlings raised by Sands in 1989. In 1991, 40 schools in New South Wales each planted six vines in their school grounds, and the success of this enterprise through monitoring the plants for arrivals of the birdwing was the stimulus for massive expansion of this interest and leading to much wider plantings.

In 1992, the Double Helix Science Club (a national CSIRO organisation dedicated to involving young people in science) in Brisbane became involved in coordinating planting of vines and by 1994 130 schools were involved, under guidance (Scott 2002) with observations and experiments on vine suitability. This number increased further, to 300 schools in 1997, by which time more than 29,000 vines had been distributed. An important component of the schools programme was the 'Adopt a Caterpillar' scheme, through which CSIRO supplied birdwing caterpillars to selected schools (together with the requisite holding permit issued through the Queensland Parks and Wildlife Service) for them to rear and monitor their development.

Since about 1999, the project has expanded much more widely into the community, initially through a grant-aided Environmental Caretaker Network based in Brisbane and liaising with Double Helix to promote the by now well-entrenched interests in habitat restoration into a wider landscape scale. Targeted replanting and enriching areas with *Pararistolochia* has been the core activity, extending currently occupied sites and imposing connectivity between breeding sites. Community workshops elicited considerable support, and—based on the Balunyah Nursery experience—several community nurseries in Queensland grew and supplied stocks of the vine. Potential habitat corridors were identified by mapping distribution of existing habitat and vine plantings, and each now has a 'Corridor Coordinator' through the Richmond Birdwing Restoration Network, who ensures effective coordination with local municipal authorities and generally integrates local group activities. For wider integration, the network is an effective 'umbrella guide'. It hosts talks, field days and community workshops (some of the most successful being to demonstrate birdwing colonization of planted vines), and publishes an informative illustrated newsletter. It recently raised funds to support construction of a large flight cage (15 m long), proposed for use in studying inbreeding and captive rearing of the birdwing. Initial encouraging trials were thwarted when the facility was lost in severe floods in early 2009.

A unique coup for this project was a presentation on the Richmond birdwing conservation programme to an international audience of journalists at the 2000 Olympic Games in Sydney.

This extended and continuing campaign has led to substantial expansion of *O. richmondia* numbers and distribution, so that participants are also encouraged constantly by seeing positive results from their efforts.

Discussion

The above two cases illustrate many aspects of community involvement in two very different campaigns for butterfly conservation. The levels of support obtained became to some extent self-fostering once an initial impetus had been generated, through novelty, demonstrated need, and individual enthusiasms. Once such networks are in place, and the needs for conservation understood by all parties involved, the achievements can be evaluated in both specific and general terms. Continuing coordination and informed advice may be needed to optimize progress towards mutually agreed targets. Tangible participation may take the form of fulfilling specific and, perhaps, unexpected needs, for example, as the volunteer help enlisted in a planting and translocation exercise for *P. spinifera* that arose when a colony was discovered in the path of a road realignment that was already well advanced (Mjadwesch and Nally 2008). It is, however, all too easy for managers to take the availability of such aid for granted. For an early exercise for *P. spinifera*, Nally (2003) cited a volunteer working bee promoted heavily by advertising and circulation of hundreds of flyers, with work coordinators organized in advance—and to which no-one came! The community had not seen it as relevant or beneficial, had no involvement in initiative or ownership, and the exercise entirely omitted Williams' (1996) criteria for successful participation. Exercises that a manager or scientist may consider routine may need to be explained carefully to others, particularly to show their purpose,

relevance and what participation may be especially valuable. Craig et al. (1996) recalled the Chinese proverb: 'Tell me and I'll forget; Show me and I may remember; Involve me and I'll understand.' as particularly relevant to organisation of conservation networks.

The practical needs and problems that may arise must also be assessed realistically in advance. In Victoria, monitoring exercises for the Eltham copper (*Paralucia pyrodiscus lucida*) have been supported by community participants since the early 1990s, in an administratively complex milieu in which different tiny urban habitat patches, some only a few hundred metres apart, fall under responsibility of different municipal or state authorities. Its conservation in each of the major centres in which the butterfly is known is supported by a community group, and wide familiarity with the appearance of the adult has led to discovery of additional populations as a consequence of increased awareness but without imposing 'duty'. On several of these sites, twin annual monitoring exercises involved early summer nocturnal counts of caterpillars, and later summer adult assessments based on transect counts, with need for effective coordination from experienced workers. One problem has been organising such events in advance, because inclement weather can necessitate sudden changes in plan—so that the coordinator must be able to contact all potential attendees, and have in place a reserve schedule for the exercises. Both have to be undertaken with considerable disciplined care, to ensure validity and to minimize damage to the sites, so supervision must be imposed tactfully—even to the extent of occasionally turning away volunteers if numbers are larger than expected, a tactic that has potential to prove disastrous in thwarting enthusiasm. It can be invaluable in countering this to have some additional worthy tasks in mind, and to which people can be directed simply and rapidly.

Public or community interest may flow simply from frustration over perceived lack of action or progress by authority, and wishes to overcome such inertia, particularly from stakeholders representing environmental action groups and similar interests. A broad platform for community involvement, in part recapitulating earlier comments (see Craig et al. 1996), may need the following planks: (1) identifying stakeholder groups as comprehensively as possible by direct consultation—it is critical that no major interest group is omitted and that there is provision for incorporating new interests as they are detected; (2) formulate common objectives as a mutual exercise and countering any hidden agendas that may emerge during discussions; (3) recognize the fundamental importance of trust, such as avoiding boundary disputes across the interests of different sectors, and that without credibility any potential cooperation may be doomed; (4) recognize that communication is vital to this and that various possible impediments to communication may need to be examined carefully across a range of widely differing sectoral values and priorities; and (5) recognise that education is a pivotal aspect of communication and can incorporate a variety of formal and informal activities.

Near Melbourne, the threatened sedgeland communities harbouring the Altona skipper (*Hesperilla flavescens flavescens*) are the focus for a continuing school programme in wetland ecology and management, and many secondary students have participated in exercises such as planting of additional *Gahnia* sedges for the butterfly. Many similar contexts can enable people to see results from their inputs and acquire considerable local knowledge that can contribute to wider capability. Much of the success of any such enterprise reflects a combination of community enthusiasm and how this may be fostered by local government or other authority, whose attitudes are of critical importance. Staff turnover in these agencies is commonly rapid, so that continuity of support and interest may be difficult to assure. Craig et al. (1996) noted also that the normal hierarchical arrangement in government agencies may lead them to act as owners rather than trustees of conservation resources. Likewise, many people tend to view scientists as elitist and non-participatory, and even irrelevant to their own priority interests. Frequent, friendly personal contact with demonstrated cooperative involvement and interest are important counters to this. An adjunct to this is that recovery teams can usefully be prepared for contacts from the community, and have a clear avenue (such as a defined contact person) for this. A personal encouraging, informative and non-overwhelming response to queries based on 'I've heard about x: what can I do to help?' especially if accompanied by a well-prepared information leaflet, can be a pivotal influence in later interest and involvement. Threatened butterfly conservation in Australia needs that involvement in every facet of its activities. And, at another level, preventing many other butterfly taxa from becoming threatened can benefit from attention from individual activities such as planting nectar plants and larval food plants in home gardens—the increased awareness generated through community participation can help set the examples from which very wide benefits may flow.

Community involvements of the kind demonstrated here can do much to compensate for the lack of a strong culture of interest in natural history and, in this case, for the dearth of local lepidopterists and conservation agency entomologists who lead such programmes so ably in parts of north western Europe, in particular. The meetings of interests, and increasing awareness of the needs and possibilities for insect conservation, already arising from the involvement of people in many different walks of life render their continued encouragement an important facet of the discipline for the future.

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