

WILD HARVESTING OF INSECTS FOR EXPORT

Introduction

The purpose of this application is to renew a Wildlife Trade Operation to export wild harvested insects.

Insects are to be collected on freehold properties in north Queensland. None of the species to be collected are protected by State or Federal legislation.

Environment Management Philosophy

The environmental management philosophy we follow involves the sustainable use of natural resources. The primary management strategy pursued is the reforestation/preservation of our properties. Reforestation at Wondecla also includes the surrounding vacant land (road reserves, lapsed mining leases and defunct rail reserve).

A brief description and recent history of Wondecla properties is as follows: Wondecla is situated west of the Great Dividing Range on the Evelyn Tableland north Queensland, and enjoys 1200 mm annual rainfall. Substantial tin deposits were discovered in the 1880's, mining commenced at this time and ran until the 1940's. During this period the original forest was cleared. After the 1940's and prior to our purchase, the properties were used by graziers who followed a fire regime designed to destroy all vegetation except grass.

When we purchased the property, it carried small numbers of 3 *Eucalypt* spp., 2 *Acacia* spp. (5 specimens) and 1 *Casuarina* sp. (3 specimens) set in a sea of highly flammable blady grass interspersed with bare eroded areas. To date we have planted approximately 4500 native plants of 450 species. These plantings currently cover an area of approximately 2.5 hectares. Although we do not hold legal tenure on the balance of these 2.5 hectares, it is to our advantage to reforest this land. Apart from improving the aesthetics of our properties, we are able to achieve a better plant biomass dependent microclimate. This optimises insect species diversity and abundance. As a result of our reforestation we are witnessing a steady increase in fauna species diversity and abundance.

Maximising Insect Ranching / Wild Harvest Potential

Our project is analogous to an intensive silviculture operation. Just as plantation forests (established for specific outcomes) are more productive than unmanaged forests, so our forest is vastly more productive than the surrounding depauperate forest. Plant species have been selected to maximise wild harvest potential. This same principle has been applied to Property 2.

Conservation Benefits

As reforestation has progressed on our properties and plant species enrichment progressed on Property 2, remarkable changes in the fauna have been witnessed. Species diversity and abundance of higher taxa (particularly birds) have also greatly benefited. Not only has insectivorous fauna benefited but so have foliage, nectar and sap feeders. One example of this is the Squirrel Glider. This species arrived

approximately 6 years ago. We can say this with certainty as we had not heard its distinctive call beforehand. We now have a resident “troupe”.

All listed properties are important refuges in their respective areas.

Boom And Bust / Recovery

Insects are well known for the boom and bust nature of their population cycles. This dynamic occurs as numbers fluctuate around optimal populations given available resources and factors working to reduce their numbers. Often numbers fluctuate wildly for no obvious reason. Climatic conditions may have been favourable over an extended period of time, yet insects not been as prolific as expected. Butterflies are probably the best known and studied insects. Breeding these insects, one is soon made aware of the array of pathogens and parasites limiting their hosts population. What is not generally appreciated is their breeding potential and their ability to rapidly recover from population crashes.

- Butterflies are fairly average in the insect breeding stakes. With survival of all offspring and starting with a single pair, 843 750 Birdwing butterflies could be produced in just 2 generations (4 months).
- Termite queens can lay 30 000 eggs per day.
- Starting with a single female and enjoying complete breeding success, a common house fly could produce a ball of maggots the diameter of the Earth in less than one year. Aphids reproduce even faster.
- There are approximately 200 million insects for every man, woman and child on the planet, that's 1.2 billion, billion insects (1 200 000 000 000 000).
- If insects stopped eating each other they could consume all of the Earth's terrestrial flora and all its oxygen within five weeks.
- If their habitat is left intact, numbers lost to mortality (starvation, parasites, predation, natural disasters, wild harvest) are soon replaced due to a higher rate of survival in succeeding generations.

The BBC video “*ALIEN EMPIRE – Inside the Kingdom of the Insects*” is an excellent introduction to this subject.

Wild Harvest or Captive Breeding?

The breeding biology of some insect species does not lend itself to captive breeding. The larval stage of dieback beetles feed on the roots of grasses and the adults feed on the foliage of trees. These particular requirements are very difficult to provide in a laboratory setting.

Dieback beetles get their common name from the damage they do to trees remaining as remnants in areas that have been extensively cleared. Dieback (foliage stripping and death of trees) has resulted from greatly increased food resource for the larval stage and greatly decreased food resource for the adult stage. Adults of dieback and other groups of beetles are very common, even encountered in plague proportions.

Captive Breeding resources are better devoted to groups that are not as common and/or whose breeding biology lends itself to captive breeding.

Economic / Environmental Benefits

Wild harvesting of insects is an environmentally friendly land use practise and helps "pay the bills", the bottom line of the economic system forced upon us. Such income derived enables us to improve/maintain the natural integrity of our properties.

Sustainable Land Use Practice / Environmental Awareness

Our insect business with its integral reforestation project, is an object lesson in sustainable land use practises. Initially our tree planting confronted the value system of some of the grazing fraternity. Fortunately, most now recognise that people with a conservation ethic can be productive members of society.

Our children are great ambassadors for conservation as they are actively involved in our project and delight in showing the local kids their latest discoveries, let alone the insect raising they do as class projects.

Being an active member of various natural history societies and associations the applicant is called upon to give talks on natural history subjects. A popular theme is, "Insects - Major End Users Of Terrestrial Plants".

Education

Our educational aim is to increase knowledge of our insect fauna. This is/will be achieved by:

- Giving talks on insects
- Giving support to teachers when planning units on insects/minibeasts
- Providing resources for schools such as butterfly breeding kits
- Providing specimens for research and teaching aids
- Providing identification of specimens where possible
- Maintaining a web site with identification photographs and copies of scientific papers
- Answering email inquiries of technical nature.
- Answering email inquiries of "I have a project on....."

Scientific Research

Unless insect species are of economic significance they generally receive low research funding priority. Australia's butterfly fauna is a good example of this. Most literature is generated by non-professional entomologists or professional entomologists researching out of personal interest.

Initiating captive breeding programmes and reforesting land for insect ranching/wild harvest purposes requires extensive research. Data obtained can then be published in scientific journals. Such publications increase our knowledge base and enable informed conservation assessments to be made. By a process of elimination, individual species in need of research/conservation assessment can then be identified. Concern over the conservation status of many insect species has proven unjustified in the light of scientific research.

1.1 Scientific names (see attached list of Families).

1.2 Common name – (see attached).

1.3 Location of harvest

Freehold properties at Wondecla, Bakerville (to the west of the Evelyn Tableland), Upper Barron and Miriwinni (coastal Wet-Tropics) north Queensland.

1.4 Description of what is to be harvested

Insects are to be harvested.

1.5 Is the species protected under State or Federal Legislation?

None of the species to be harvested are protected under State or Federal Legislation.

2. Statement of general goal/aims

Our aim is to increase the range of insect species we currently export. The ability to export wild harvested specimens compliments our captive breeding programme by increasing both the number of families and the number of species we can supply.

3. Harvest Details

As there are no State legislative requirements, the only legislative requirements to be met are at the Federal level.

This proposal covers the harvest of species included in the taxa listed in the attached list except for species listed under the *Environmental Protection and Biodiversity Conservation Act 1999* as threatened (excluding the conservation dependent category) or listed as endangered or vulnerable under Queensland Nature Conservation Regulation 2006.

The list can be amended by the Department of the Environment and Heritage if additional information becomes available on a particular taxon or species within that taxon. The list can be amended by:

- reducing the quota or stopping the harvest of a particular taxon or species; or
- including conditions relating to the harvest or export of that taxon or species.

The list is amended when DEH has notified the proponent of the amendment in writing.

3.1 Details of where harvesting is to take place.

Freehold properties at Wondecla, Bakerville, Upper Barron, and Miriwinni, north Queensland.

3.2 Details of land ownership

All properties are freehold. Please find attached permission to collect on the properties.

Property Descriptions

Property 1A, Wondecla, 0.4074 hectares. Reafforested Mabi, dry rainforest and vine thicket.

Property 1B, Wondecla, 0.4074 hectares. Turkeys nest dam and reafforested Mabi, dry rainforest and vine thicket.

Property 2, Bakerville, approximately 28 hectares. This property supports a complex of riverine forest, tall layered and low layered woodland and dry rain forest.

Property 3, Upper Barron, 73 hectares. This property carries seventy hectares of complex notophyll vine forest, most of the surrounding land has been cleared for dairy farming. This property has been set aside for conservation purposes and is the focus of scientific research and eco-tourism.

Property 4, Miriwinni, 16 hectares. This property carries approximately 4 hectares of complex mesophyll vine forest and 10 hectares of regrowth. Prior to its purchase by the current owners, (25 years ago) 12 hectares were under sugar cane. This portion is now a mosaic of tropical grassland and rainforest pioneers

3.3 Quantities to be harvested

<i>Property</i>	<i>Annual quota</i>	
Property 1A, Wondecla, 0.4074 hectares Property 1B, Wondecla, 0.4074 hectares	10 specimens per species	2 specimens per species of family Petaluridae
Property 2, Bakerville, 28 hectares	200 specimens per species	15 specimens per species of family Petaluridae
Property 3, Upper Barron, 73 hectares	350 specimens per species	25 specimens per species of family Petaluridae
Property 4, Miriwinni, 16 hectares	100 specimens per species	8 specimens per species of family Petaluridae

3.4 Methods of harvesting and equipment

Specimens are to be harvested with a hand held net, rotting fruit baits and artificial light sources. Method is selective as specimens are taken live, examined immediately and if worn returned to the wild. Method of collecting entails no environmental disturbance.

3.5 Timing and duration of harvesting period

Some species can be found as adults year round. Peak activity is from October to June, depending on seasonal factors.

4. Impact of harvest on the species and the relevant ecosystem.

Insect species respond very quickly to exploit any underutilised resource. The loss of individuals to predation or harvesting simply allows a higher percentage of the following generation to survive, by exploiting these underutilised resources. See *Boom and Bust/Recovery* section.

Because of the reforestation of Property 1, plant species enrichment of Property 2 and regeneration of Property 4, we have witnessed a steady increase in species diversity and numbers. All species targeted have large geographic ranges and enjoy secure status. The ecosystems where harvest is to take place are not disturbed in any way as collection methods are unobtrusive.

These ecosystems are well represented in various National Parks and Reserves and the vast majority of the Wet Tropics is World Heritage listed. Total area where wild

harvest is to take place is insignificant when compared to the areas occupied by the aforementioned estates.

The methods of collecting are inefficient, with many individuals avoiding capture. There will be insignificant impact on the conservation status of the species to be harvested and none on the ecosystems.

5. Monitoring and assessment.

We have monitored the areas to be harvested for numbers of years. Our own properties (Property 1) for 17 years, Property 2 for 23 years, Property 3 for 23 years and Property 4 for 21 years. Insect numbers fluctuate wildly from year to year regardless of whether or not we are harvesting.

For assessment see below.

5.1 Has there been a resource assessment of distribution and abundance (for example, population survey) for the harvest area? If yes, please provide.

Assessment of abundance (population survey) is almost unreliable enough to be meaningless if based on specimen counts. Populations fluctuate wildly for reasons outlined earlier. Techniques available for population survey are inadequate. Observation using binoculars is of limited use for a number of factors including unsuitable weather.

Using artificial light sources to attract nocturnal insects is useful but limited. Insect families and species show differential responses to light, some do not find light very attractive. Ambient light, unsuitable topography, physical nature of the vegetation, low temperature and low humidity impact negatively on this technique. Using rotting fruit as lures is also similarly impacted. Hand netting is limited by many factors and is also highly weather dependent.

Resource assessment

The only meaningful basis for making conservation status assessments on insects within these ecosystems is based on the availability of suitable food and habitat. For example, once an insect's food plants are known assessment can be made using the known distributions of those food plants.

It is highly unlikely that any insect species found within the areas where harvesting is to take place will be affected by harvesting.

6.MANAGEMENT STRATEGIES

Given how we manage our land we cannot conceive any scenario to which we would have to respond.

7.COMPLIANCE

There are no State legislative requirements to harvest non-protected insects. However, only legally obtained material is to be exported.

8. REPORTS

The proponent will report to DEH annually on harvest. The report will provide harvest details for each species by month for each property. The applicants will provide additional reports to DEH on particular taxa if required by DEH.

Aesthetic Australian Insects wild harvest proposal

Class Insecta Orders and Families	Breeding Biology
Odonata; Dragonflies	
Libellulidae	Adults predacious. Nymphs predacious, aquatic.
Gomphidae	As above
Petaluridae	As above
Blattodea: Cockroaches	
Blattidae	Adults and nymphs feed on detritus, rotting wood.
Polyphagidae	As above
Blattellidae	As above
Bladeridae	As above
Orthoptera: Crickets and Grasshoppers	
Stenopelmatidae	Adults and nymphs herbivorous or omnivorous.
Gryllacrididae	As above
Tetigoniidae	As above
Pyrgomorphidae	As above
Acrididae	As above
Hemiptera: Bugs	
Cicadidae	Adults and nymphs such sap from plants.
Tessaratomidae	As above
Nepidae	Adults and nymphs suck fluids from plants and prey.
Belastomatidae	As above
Coleoptera; Beetles	
Carabidae	Adults and larvae predacious
Dytiscidae	As above
Silphidae	Adults and larvae feed on carrion.
Staphilinidae	As above
Lucanidae	Adults feed on plant fluids, larvae on rotting wood.
Passalidae	Adults and larvae feed on rotten wood.
Trogidae	Adults and larvae feed on carrion.
Geotrupidae	Adults and larvae feed on dung.
Scarabaeidae	Adults and larvae feed on plant material.
Buprestidae	Adults feed on foliage and nectar, larvae in plant tissues.
Rhipiceridae	Breeding biology unknown
Callirhipidae	Larvae in rotting wood.
Elateridae	Adults feed on nectar, larvae predacious.
Tenebrionidae	Adults and larvae feed on detritus.
Mordellidae	Adults feed on nectar, larvae on plant material and fungi.
Ripiphoridae	Known larvae ectoparasitic.
Cerambycidae	Adults and larvae feed on wood.
Chrysomelidae	Adults and larvae feed on leaves.
Curculionoidea	Adults and larvae feed on wood.
Lepidoptera: Moths	
Hepialidae	Adults may not feed, larvae feed on plant stems.
Cossidae	As above

Geometridae	Larvae feed on plants.
Uraniidae	Adults feed on nectar, larvae on foliage.
Saturnidae	Adults may not feed, larvae on foliage.
Sphingidae	Adults feed on nectar, larvae on foliage.
Notodontidae	As above
Arctidae	As above
Noctuidae	As above
Agaristidae	As above
Hymenoptera: Ants, Bees, Wasps	
Formicidae	Various
Anthophoridae	Various liquids
Chrysididae	Predacious, parasitic