



*The result will be increased prosperity, sustainability and security for Australia and reduced 'green tape'.*

GeneBank Australasia will apply and advance the science of DNA Bar-coding in Australia so as to deliver structural improvements in our economic productivity. The result will be increased prosperity, sustainability and security for Australia and reduced 'green tape'.

DNA barcoding is a digital identification system for life. By reading the code of a small, standard strip of DNA sequence, a plant, animal or microbe can be identified, just like a supermarket barcode scanner reading the familiar black stripes on items you buy. Such a system in minutes, could tell us the name of any plant, animal or disease –for a fraction of the cost of current identification methods.

It is critical to be able to identify our 'bio-wealth' - the animals, plants and microbes that sustain life and productive systems. If we can cheaply identify the biodiversity and species in any area we can:

- Make fast accurate assessments and find opportunities to mitigate, in the most practical, cost effective and efficient ways, the impact of human development;
- Better understand the threats to Australian agriculture, animals, fisheries and environment from exotic species. Managing such invasive threats to Australian 'biosecurity' maintains our competitive advantage when exporting to overseas markets;
- Effective conservation, managing the native plants and animals in our country as climate and land-use

changes, can be far more economically efficient with accurate and fast species identification.

These advantages are particularly apparent with respect to Australia's mining exploration and development boom. Environmental Impact Assessments (EIAs) routinely contain basic errors in plant and animal identification. This results in delays for projects that should proceed and possibly unintentional destruction of rare and threatened species. The current species identification tools are the same as we used in the 1800's and are time consuming, expensive and often wrong. DNA

*DNA Barcoding leads directly to improvements in the regulation, promotion and protection of international trade.*

barcoding would dramatically reduce the cost and time of EIAs and radically improve accuracy. A similar approach has been successfully adopted for Aboriginal Heritage approvals and removes key constraints and risks for resource industries.

Similarly, maintaining Australia's Biosecurity protects many millions of dollars of food and other exports. DNA Barcoding leads directly to improvements in the regulation, promotion and protection of international trade. This not only increases international trade efficiencies, but also it improves Australia's ability to identify and contain serious threats to human health,

agricultural production and the environment.

For our environment, effective biodiversity conservation relies on understanding the distribution and abundance of Australia's unique and precious flora and fauna. DNA Bar-coding would profoundly change our understanding of the conservation status of Australia's biodiversity. This in turn gives environmental managers greater certainty about where to invest limited resources to achieve optimal returns. DNA Bar-coding may also open up new opportunities for biodiversity trading and bio-prospecting better enabling markets to contribute to Australia's conservation effort.

To realise these competitive advantages Australia needs a deliberate strategy and coordinated investment, focused on:

**Coordination and fast-tracking of 'bar coding' life forms;** with a focus on economically important diseases in the region, the provenance of targeted food and forestry products, and Australasian plants and animals; extending the capabilities created under BioPlatforms Australia. This will require:

- an up-scaling of DNA Barcoding technology from scientific to commercial scale and cost;
- the construction of databases for DNA barcoding outputs; and
- digitisation of specimen collections by collection institutes (museums and herbaria) and Atlas of Living Australia [ALA]) - a priority in the DIIRST infrastructure roadmap;

**Establishment of tissue and DNA banks** and whole genome analysis of key species;

**New image analysis technologies** for species identification (ALA and Australian Centre for Visual Technologies);

**Coordination of biological data collection and inputs** by the ALA collections institutes, government agencies (including the National Reserve System) and industries that require species identification for environmental assessment and pest management (eg. agriculture and mining) – making use of existing investments in the Terrestrial Ecosystem Research Network (TERN) and Australian Ecological Knowledge & Observation System (AEKOS);

**Education and training** to create a workforce that can apply this technology for Australia's benefit.