

Maximizing benefits from ‘biodiscovery’: a Coastal State resource providers perspective.

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Australia has a huge marine jurisdiction (70,000 km mainland coastline, 8.6 million km² continental marine territory, 16.1 million km² of oceanic territory), containing 60 marine bioregions that span all five oceanographic climatic zones, from tropical to polar, and all depth regimes from intertidal to the abyssal plains. These areas are known to contain a high diversity of marine biota, such as 360 coral species in Great Barrier Reef (GBR), 43 species of mangroves and 30 species of seagrasses (both amongst the highest in the world), and >5,000 species of sponges (~30% of the world’s estimated sponge fauna). Much of this biota is also highly endemic (genetically unique), with Gondwanan origins mixed (e.g. hybridised) with Tethyan faunas, demonstrating an average endemism of ~80% across some phyla (e.g. ~89% of inshore and freshwater fishes, ~90% of echinoderms). However, it is very true that we still know very little about our marine genetic resources, and the high costs associated with investigating the marine biome has generally impeded rapid progress. Nevertheless, for some marine phyla, funding from biodiscovery activities over recent years has contributed substantially to our current knowledge. Australia has had a successful history of marine biodiscovery collections on a relatively large scale spanning three decades, commencing with the Roche Research Institute of Marine Pharmacology (RRIMP) in partnership with Roche Pharmaceuticals (1974-1981), Australian Institute of Marine Science (AIMS) in partnership with the US National Cancer Institute (NCI) (1987-1992; 2003-present), and Natural Products Discovery (NPD) Griffith University, the Queensland Museum and Queensland Herbarium in partnership with AstraZeneca (AZ) (1993-present). In all these projects the Australian partner agencies undertook two roles: one of providing access to the native biota and also undertaking the marine collections, and the second of contributing to value-adding through derivation of extracts, screening for active compounds, isolation of active compounds, structure elucidation, and identification and supply of lead compounds to industry. Significantly, most of this work was undertaken in Queensland – containing Australia’s highest levels biodiversity and unique ecosystems such as the GBR. Much of this work to date, however, was undertaken in a relatively unregulated and uncertain legislative environment, characterised by a myriad of separate laws regulating different aspects of biodiscovery research, requirements for multiple permits from diverse government agencies, the lack of clarity on ownership, right of access, rights to commercialisation, or IP derived from the use of native biological resources. In November 2004 the Queensland government enacted the *Biodiscovery Bill 2004* to establish a streamlined legislative framework to regulate and provide certainty for use of native biological resources, to encourage investment in the State’s biodiscovery research and development sector, to ensure fair and equitable benefit sharing from biodiscovery to the State, and to enhance knowledge of the State’s biodiversity, promoting its conservation and ecologically sustainable use. These environmental data are arguably as equally valuable as any monetary benefits that may arise from the commercialisation of products. Using specific examples from the biological collections built during the NPD/ AZ partnership this presentation outlines some of the significant non-monetary benefits obtained, including the discovery of many new species, accurately defining species ranges and distributions, mapping biodiversity ‘hotspots’ (highly diverse areas) and areas that contain large numbers of endemic species, and the integration of these biological data into regional and national management plans developed by the Great Barrier Reef Marine Park Authority in their Bioregional Planning (Representative Areas Program), and National Oceans Office (National Marine Bioregionalisation of Australia initiative), leading to a better understanding of, and management tools to conserve and protect these diverse marine ecosystems.