A framework for the development of ethno-ecological heritage stories on Cape York Peninsula

Report for the
Queensland Dept of Environment and Resource Management

2010

Mark Ziembicki

ANU Enterprise Pty Ltd.

BUILDING 95, FULTON MUIR BUILDING
CORNER BARRY DRIVE & NORTH ROAD
THE AUSTRALIAN NATIONAL UNIVERSITY
CANBERRA ACT 0200
AUSTRALIA

ACN 008 548 650

INTRODUCTION

Cape York Peninsula is recognized for its remarkable cultural and biological diversity. Its ancient and variable geology overlaid with a diverse range of plant communities and its highly seasonal climate combine to produce a diverse range of environments. Much of the region's biological diversity is related to its closeness to the highly diverse regions of New Guinea and South-east Asia. As both bridge and barrier between these regions and Australia, Cape York Peninsula shares numerous plant and animal species and plays an important role in the ecological and evolutionary history of these regions.

Cape York's biological diversity is also reflected by the diverse cultures and practices of its Indigenous people. Indigenous groups in different areas perceive and use environments differently, while the relationship between Aboriginal and Melanesian peoples on Cape York Peninsula is unique and of particular significance. Owing in large part to the variety and distribution of ecosystems present, local people have been affected by their local environments in a range of ways. However, people have not only been shaped by their environments here – they have themselves played important roles in shaping them.

These two-way relationships between humans and their environments is the basis of ethnoecology – a field of study that considers how people understand, describe, relate to and affect the environments in which they live. This report describes how such relationships have come about, how they have been maintained over time and how they differ among the Indigenous people of Cape York Peninsula. Much of the information presented here is necessarily general largely because there has been relatively limited research and documentation of traditional ecological knowledge and practices in the region. Nonetheless, the overall aim here is to present a framework for developing and documenting the traditional ecological knowledge and practices of the region's Indigenous people, particularly in light of the role such heritage can play in declaring Areas of International Conservation Significance and suitable areas for World Heritage and National Heritage list nominations based on both their natural and cultural values.

WHAT IS ETHNO-ECOLOGICAL HERITAGE?

Ethno-ecological heritage is the traditional ecological knowledge (TEK) and practices that belong to an Indigenous group of people or society that have been developed, used and passed on in the course of people's interactions with their environments. In Australia, such knowledge and practices have been developed over tens of thousands of years among many different Aboriginal and Torres Strait Islander cultures through direct relationships with a variety of environments. This has led to a broad and detailed understanding of plants, animals, weather patterns and other natural features and events across the Australian continent, as well as the development and use of technologies and methods for exploiting a broad range of resources.

Research on Cape York Peninsula

Cape York Peninsula has long been regarded as a region of great importance and interest to researchers from many different fields of study because of its unique and outstanding natural and cultural values (Abrahams et al. 1995; Chase & Sutton 1981; Cordell 1995; Filer et al. 2004). Although there have been relatively few detailed ethno-ecological studies in the region, some of the studies that have been conducted here are among the most important and pioneering of their type in Australia and highlight the outstanding ethno-ecological heritage of the region's Indigenous people.

One of the earliest practitioners of ethnoecology in Australia (although he was around before the term 'ethnoecology' was first used) was Donald Thomson. Trained initially as a zoologist, much of Thomson's later anthropological work was influenced by his biological training (Chase 2005). Among two of his most important studies on Cape York Peninsula were 'The Dugong Hunters of Cape York' and 'The Seasonal Factor in Human Culture' (Thomson 1934, 1939). These studies focused upon different Aboriginal groups in the region whose social and cultural life was closely related to their local environments.

Other significant studies in the region included Hynes and Chase's (1978) work which described the influence of Aboriginal groups on local vegetation patterns through a process they called 'domiculture' (discussed in further detail below), and a study by Chase & Sutton (1981) who examined the diversity of approaches and seasonal variations in resource use by Aboriginal people of Cape York and how these were related to prevailing environmental conditions in different regions.

Although scientists have generally been slow to consider traditional ecological knowledge in their work, there is increasing recognition of the value and need for including ethno-ecological heritage in contemporary conservation and natural resource management practices. Unfortunately, this has come at a time of increasing concern that traditional knowledge is being rapidly lost as elder knowledge holders pass away. The need to document this knowledge base and allow Indigenous people to define and develop ways to use and pass on this heritage under their own terms and according to their aspirations is urgent. In this sense, Cape York Peninsula has and continues to play an important role in the development of Indigenous natural resource management programs and in developing ways ethno-ecological heritage can be used and preserved for future generations.

NATURAL AND CULTURAL FEATURES OF CAPE YORK

Natural features

The exceptional natural values of Cape York are well documented and widely recognized (Mackey *et al.* 2001; Abrahams *et al.* 1995). Many of the key natural values of the region are well summarised here:

> *Cape York Peninsula is an area of outstanding significance recognised for its biodiversity and natural integrity. Its extensive savannah along with its dune fields and deltaic fan deposits are amongst the best examples in the world, while the biogeography and evolutionary relationships of plants and animals to the biota of New Guinea provides important links and insights into evolutionary processes. The area features important heathlands, rainforest, riparian and wetland systems of high conservation significance, and is rich in invertebrates, freshwater fish, mangroves, seagrass and orchids. The region also contains Australia's highest concentrations of rare and threatened species as well as restricted endemics (Cape York Regional Advisory Group 1997).*

Indigenous people of Cape York

Prior to European arrival the Aboriginal population of the Cape York Peninsula region comprised several hundred small kin groups. North of approximately 16˚S there were about 45 distinct Aboriginal languages consisting of several hundred dialects (Chase & Sutton 1981). The west coast, far northern tip and Princess Charlotte Bay were areas of greatest language diversity. In general, population levels were highest along the coastlines and lowest inland. Clan groups and estates were made up of territories that were arranged into larger conglomerates that were largely linked by factors such as common dialects, interlinked ceremonial practices, kinship ties and shared localities (Chase & Sutton 1981; Hynes & Chase 1982). Ties were closer between groups along the narrow coastal strips than between coast and inland such that cultural and material influences, including the sharing of ethno-ecological heritage, tended to be more pronounced along the coasts. Northern Cape York Peninsula is also notable as the meeting point between two distinct peoples – the Melanesians of New Guinea and the south-west Pacific, represented on Cape York by the Torres Strait Islanders, and Australian Aborigines.

WORLD HERITAGE, AICS & NATIONAL HERITAGE

World Heritage Listing

Ethno-ecological heritage lies at the intersection between nature and culture therefore can play an important role in World Heritage applications based on natural and cultural values. The outstanding natural values of Cape York Peninsula have been documented elsewhere (e.g. Abrahams *et al.* 1995; Mackey *et al.* 2001) and it has been suggested that significant areas of the region could be nominated as World Heritage

sites under cultural criteria (Smyth & Valentine 2008). The ethno-ecological heritage values of the region are primarily relevant to World Heritage criteria *v* and *vi*.

> Criterion v) *to be an outstanding example of traditional human settlement, land-use, or sea-use which is representative of a culture (or cultures), or human interaction with the environment especially when it has become vulnerable under the impact of irreversible change*
>
> Criterion vi) *to be directly or tangibly associated with events or living traditions, with ideas, or with beliefs ,with artistic and literary works of outstanding universal significance. (The Committee considers that this criterion should be preferably used in conjunction with other criteria).*

Ethno-ecological heritage is also central to the idea of cultural landscapes, which represent the combined works of nature and humans and demonstrate the interconnectedness between people and their environments (Fowler 2003).

> *'Cultural landscapes are illustrative of the evolution of human society and settlement over time, under the influence of the physical constraints and/or opportunities presented by their natural environment, and of successive social, economic and cultural forces, both external and internal. Cultural landscapes should be selected for World Heritage status on the basis of both their outstanding universal value and of their representativeness in terms of a clearly defined geographical region, and also for their capacity to illustrate the essential and distinct cultural elements of such regions*.' (World Heritage Committee 1992)

Cultural landscapes must also meet one of the cultural criteria and be assigned to categories. It has been suggested that much of Cape York Peninsula could be classified as cultural landscapes on the basis of cultural landscape categories (ii.b) or (iii) set out in Paragraph 39 of the Operational Guidelines (modified from Fowler 2003) (Smyth and Valentine 2008).

> *ii. An organically evolved landscape results from an initial social, economic, administrative, and/or religious imperative and has developed its present form by association with and in response to its natural environment. Such landscapes reflect that process of evolution in their form and component features.* The sub-category that applies to much of Cape York Peninsula is:
>
> > *b) a continuing landscape is one which retains an active social role in contemporary society closely associated with a traditional way of life. It is continuing to evolve while, at the same time, it exhibits significant material evidence of its historic evolution*
>
> *iii. An associative cultural landscape is a landscape with definable powerful, religious, artistic or cultural associations with the natural element rather than material cultural evidence, which may be insignificant or even absent.*

In addition to satisfying the above criteria, areas nominated for World Heritage listing require a commitment that the features a place was listed for will be looked after and that natural and cultural values and cultural landscapes should satisfy tests for authenticity and/or integrity. These are discussed further in the final section below.

National Heritage listing

The National Heritage List includes places of outstanding natural, historic or Indigenous value to the nation. The criteria used to identify Natural Heritage sites are generally similar to those for World Heritage listing, but they are not exactly the same. In general they are less strict given that sites that may be of national significance are not necessarily of outstanding international significance.

Given the influence of Indigenous people on the Cape York environment many aspects of ethno-ecological heritage may relate to the natural criteria, as well as having inherent cultural values. It is suggested that

based on the traditional ecological knowledge and practices of people in the region that the following criteria for National Heritage listing may be met in parts of Cape York or in the region as a whole:

a) the place has outstanding heritage value to the nation because of the place's importance in the course, or pattern, of Australia's natural or cultural history;

(b) the place has outstanding heritage value to the nation because of the place's possession of uncommon, rare or endangered aspects of Australia's natural or cultural history;

(c) the place has outstanding heritage value to the nation because of the place's potential to yield information that will contribute to an understanding of Australia's natural or cultural history;

(d) the place has outstanding heritage value to the nation because of the place's importance in demonstrating the principal characteristics of:
(i) a class of Australia's natural or cultural places; or
(ii) a class of Australia's natural or cultural environments;

(g) the place has outstanding heritage value to the nation because of the place's strong or special association with a particular community or cultural group for social, cultural or spiritual reasons;

(i) the place has outstanding heritage value to the nation because of the place's importance as part of Indigenous tradition.

These World and National Heritage criteria are considered in further detail as they relate to specific aspects of ethno-ecological heritage presented in the main themes below both on a whole of Cape York scale and within and between regions as defined below.

CAPE YORK PENINSULA REGIONS

For the purposes of this report, to highlight the different ways people view, use and have been affected by the different environments of Cape York Peninsula the area is broadly divided into five regions (Figure 1a). These regions follow the distinctions made by Chase & Sutton (1981) in their comparisons of human - environment relationships in contrasting coastal regions of Cape York. They differ broadly in their environmental and cultural features. They are not intended to represent bioregions or to distinguish in detail between different ecosystems or language and cultural groups, rather they are used to compare and contrast aspects of ethno-ecological heritage based on broadly similar environments. Where appropriate more detailed reference is made to specific types of environments within each region.

There are of course differences in ethno-ecological heritage between language groups within these broadly defined regions and for this purpose, though to a lesser extent, comparisons are made based on community sub-regions as developed by DERM (Figure 1b). However, given the limited number and depth of ethno-ecological studies on Cape York detailed information for many aspects of traditional ecological knowledge as explored in the themes below is limited for several sub-regions. Furthermore, these areas often straddle very different environments and are largely based on contemporary communities consisting of people who in the past may not have interacted or been influenced as much by each other as by neighbours in nearby sub-regions. For this reason, there are often greater similarities in traditional ecological knowledge and practices among people sharing similar environments between sub-regions than people in different environments within a sub-region. For example, the ethno-ecological heritage of people from the coast in the Coen sub-region differed far more from people a few kilometres inland than it did from other coastal people as far away as the Northern Peninsula sub-region.

Table 1: Regions and community sub-regions that form the basis for comparisons of ethno-ecological heritage of Cape York Peninsula's Indigenous people (see also Fig. 1).

Region	Geographical area	General environmental features	Community sub-regions of CYP
East coast	Eastern coastline from Cape York south to Daintree River, excluding the area around Prince Charlotte Bay	This region has many estuaries, offshore islands, sandbars, cays, seagrass beds and coral reefs. The land edge includes beaches, rocky coastlines and areas of mangroves and in many areas there are sand dunes that run along the coast separated by swamps and saltpans. There is a variety of environments along this coastal strip including rainforest patches, heathland, forests and swamps.	Northern Peninsula Lockhart – Wuthathi Coen Hopevale-Cooktown Yalanji
West coast	Western coastline from Cape York south to approximately the Staaten River near Kowanyama	Differs from east coast because of the flatness of the area and very few islands and offshore reefs. The land edge has large areas of mudflats and flat open grass plains with low dune systems and wetlands. Other environments along this coast are areas of eucalypt and melaleuca forests, heathlands, vine thickets and mangroves in tidally influenced stretches closer to the coast. During the wet season the coastal plains are mostly underwater with only the sand ridges exposed.	Northern Peninsula Mapoon Napranum Aurukun Pormpuraaw Kowanyama
Prince Charlotte Bay & Cape Melville (PCB/CM)	Coastal region from Point Stewart to Cape Melville	This region shares environments that are similar to those that occur on both the east and west coasts. There are flat open floodplains with networks of channels that lie between parallel sand ridges. Flinders Island and other islands and reefs occur not far off the coast.	Lakefield-Kalpowar-Cape Melville-Starcke
Inland region	Regions inland from the coast where original inhabitants had limited or no access to coastal areas	Inland from the coast much of the land is hilly and mountainous with large areas of open woodland and forests. The area is much drier than the coastal areas. However, because of Cape York Peninsula's elongated shape and the intrusion of estuaries and rivers in some cases far inland, many areas are usually not much further than 100 km from the coastline.	Northern Peninsula Lockhart – Wuthathi Coen, Hopevale-Cooktown, Laura, Mapoon, Napranum, Aurukun, Pormpuraaw, Kowanyama
Torres Strait islands & northern Cape York	Torres Strait islands and far northern tip of Cape York that includes the traditional lands of the Gudang people	Islands, reefs and sea of the Torres Strait. The mainland area consists of rocky headlands and beaches, mangrove lined estuaries and a mosaic of vine thickets and coastal heath. The most northerly area of rainforest on Cape York is also found here.	Northern Peninsula Kuarareg

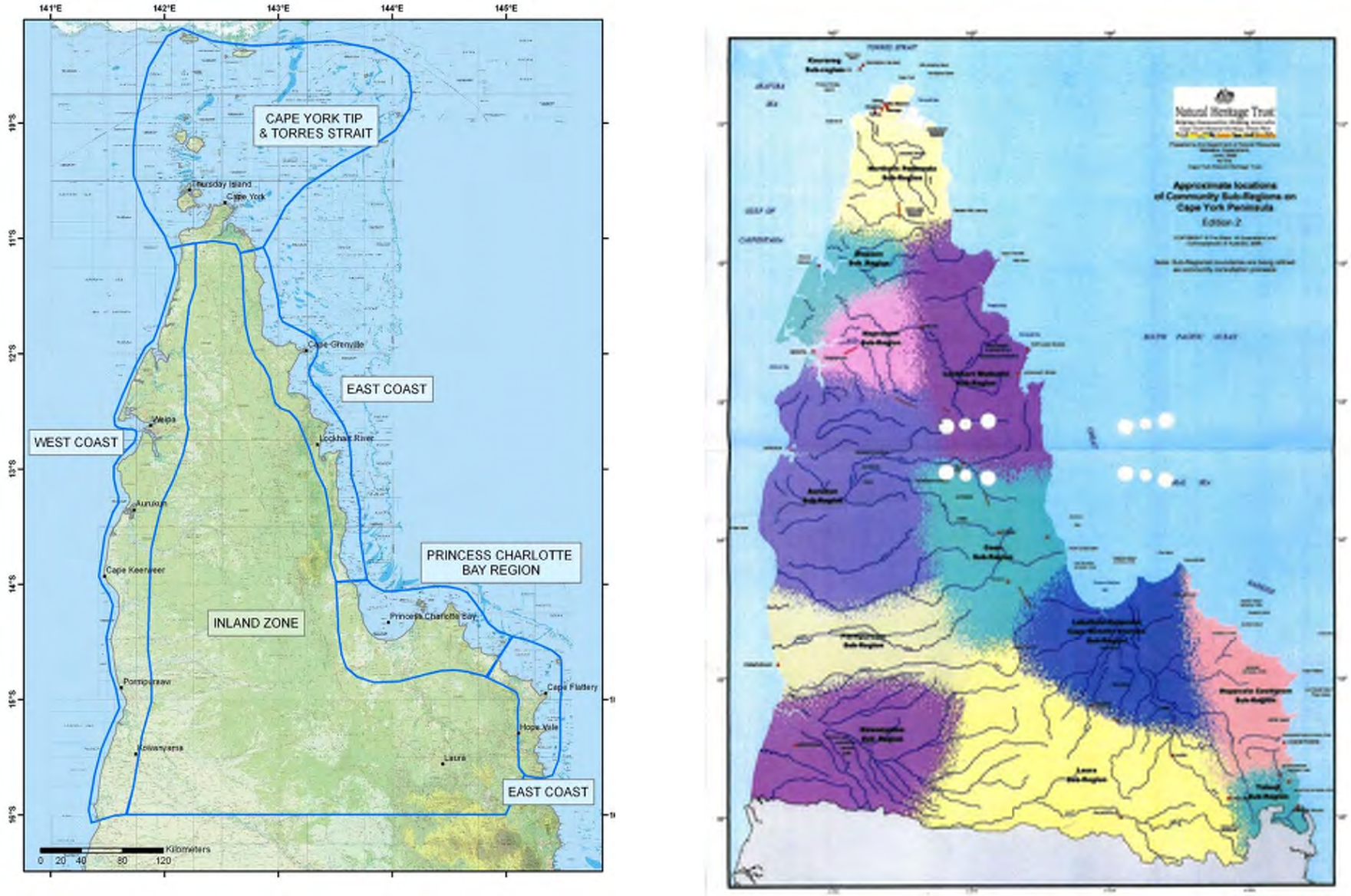

Figure 1: Regions (a - left) and community sub-regions (b - right) that form the basis of comparison of ethno-ecological heritage on Cape York Peninsula (see also Table 1)

MAJOR THEMES

The themes (and sub-themes) presented here form the framework for the development of ethno-ecological heritage stories on Cape York Peninsula. Many of these themes and sub-themes invariably overlap as much of the information is inter-related. The different aspects of traditional ecological knowledge and practices within each theme are considered according to region and, where possible, in further detail within each community sub-region as defined above. However, it should be noted that ethno-ecological heritage is generally poorly documented on Cape York (as it is more broadly in Australia), therefore, much of the discussion is necessarily general. The framework emphasizes which themes in which regions and sub-regions should be developed further in light of relevant World and National Heritage criteria. Key elements of culture as they relate to traditional knowledge and practices and priorities for further development of each theme and sub-theme are also summarized in the Tables 2-6 at the end of the document.

1. TRADITIONAL CONSERVATION PRACTICES & LAND AND SEA MANAGEMENT

Indigenous people all over the world have developed a range of methods to control access to resources and manage environments. Many of these methods directly or indirectly act to help conserve resources and ensure their sustainable use. On Cape York Peninsula, such methods are often specific to particular environments in which people live and may be highly specialized and unique to particular areas. In other cases, practices are more widely employed across the region and beyond.

a) Restriction of access to land through communal tenure

Communal tenure systems have played an important role in promoting the sustainable use of natural resources in many different cultures, and many systems and rules have been developed to control access to communal resources in order to protect them (Cordell 1995; Rigsby & Chase 1998; Smyth 2001). Under traditional arrangements use of land and sea estates was restricted to clan members and prohibited to outsiders unless permission was given. This ensured that access to resources was limited to owners who could control the degree to which they were exploited.

The Kaurareg people of the Torres Strait Islands had a form of marine tenure common to many Melanesian societies. They lived in communities on several islands around the island of Muralag and claimed ownership of the sea and its resources in the area. The limits of their territory, which was shared communally by all Kuarareg, were strictly enforced and they would kill anyone from the north caught hunting or fishing in their area (Southon & KuararegTribalElders 1998).

The territories of the Sandbeach people on the east coast of Cape York Peninsula consisted of a series of narrow strips running roughly parallel to each other from the inland mountains out to sea to include offshore reefs and small islands. They used small areas concentrating along the littoral coastlines and making forays out to offshore islands and to the immediate hinterland. In comparison, on the western coastline clan territories were less geographically consistent, reflecting different priorities in terms of use of the environment. Access to other's territories was limited and strictly enforced, possibly more vigilantly than anywhere else on Cape York Peninsula (Chase & Sutton 1981).

Key points to develop:

- How did such tenure systems vary more broadly between and within regions and how did they contribute to sustainable use of resources?
- To what extent are these systems still employed?
- What are the implications and uses of such systems for contemporary conservation and land management programs?

b) Totems and sacred sites: restriction of resource use to person and place

At the base of many traditional laws to do with hunting and resource use is a system of totems and taboos. Totems are an important part of the culture and spirituality of Indigenous groups because they are the basis of relationships between people and they signify the connection between people, ancestors and the landscape. Every Aboriginal person is associated with at least one totem, and people often retain detailed ethno-ecological information about their totemic species. In this sense, such information may also be particularly valuable for developing scientific insights into poorly known or threatened species.

People may have different relationships to their totems. For example, for many groups it is often prohibited for a person to eat their totemic animal, while for others the taboo only applies at certain times. In other cases certain foods can only be eaten depending on a person's age, sex, initiation status, marital status or other factors (Smyth 2001). Such rules often apply to highly valued foods such as dugongs, turtles, bustards and cassowaries for example. On Cape York, among communities of the east coast severe restrictions existed for dugong hunting in former times (Smith 1987) and it was only elders, clan leaders and initiated men that were allowed to eat dugong (Chase 1980; Thomson 1934). Such laws, at least indirectly, acted to preserve populations by restricting access to these finite and highly prized foods.

For many people totems may also be associated with the custodianship of a particular tract of land that they have responsibility for. In such cases the land may be a significant habitat or location for the totemic plant or animal, and the custodian has the responsibility for looking after the totem directly, as well as ensuring habitats are managed specifically for the totem. In effect, therefore, such areas often act as reserves for such species. Similarly, sacred sites are often associated with spiritual power and hunting and gathering, or even visiting such sites, may be prohibited. Such areas may act, therefore, as conservation reserves by restricting access to otherwise prized food resources.

Among many groups across Cape York traditional ecological knowledge must be earned and may only be passed down to worthy recipients. For example, among the Kuarareg in the Torres Strait initiation ceremonies in part served to transmit mythological and traditional ecological knowledge about the environment from elders to young men (Southon & Kuarareg Tribal Elders 1998). The elders taught young men how to harvest different resources and passed down detailed ethno-ecological knowledge about the effects of tides, weather, and aspects of the habitats and biology of different species. In this way, not just anyone could hunt. Worthy initiates acquired the knowledge and capacity and were sanctioned by the community to exploit particular resources. These practices, therefore, functioned to limit take.

Key points to develop:

- Develop detailed ethno-ecological studies of species of interest (threatened species, endemics, etc) based on knowledge base of individuals for whom the species is a totem among different language groups on Cape York Peninsula.
- What rules are associated with hunting or gathering totemic species in different regions?
- To what extent are areas of land managed for totemic species?
- Is hunting controlled at sacred sites? Do these then function as proxy conservation reserves for different species?
- To what extent is TEK associated with totemic or game species passed down to worthy recipients? How may this effect resource exploitation?

c) Seasonal harvesting and resource access restrictions

The exploitation of many food resources in the Cape York Peninsula region is dependent on seasonal availability and accessibility and is considered in further detail in a separate theme below. In addition, there are specific laws or customs that directly or indirectly restrict the use of certain resources to particular seasons. One notable example among the people of the east coast relates to the seasonal closures of beaches and hunting areas for turtles and dugongs (Smith 1987).

Many game animals and marine foods are also valued according their seasonal degree of fatness and are avoided when in poor condition. In this way animal populations that are stressed at tough times of the year are afforded protection at least indirectly from exploitation. Knowledge of seasonal patterns of 'fatness' or condition of game and other collected foods is also valuable information for scientists interested in assessing environmental influences on species, population processes, etc. It is information that is generally poorly known and can be difficult to collate for many species, hence is another notable example of how associated TEK can be utilized more broadly.

Key points to develop:

- What are the laws and customs associated with seasonal exploitation of resources in different regions of Cape York?
- Document knowledge regarding seasonal patterns of game condition and preferences for using exploited species among different groups.

d) Restrictions on quantity or type of resource used

Restrictions on take to prevent over-exploitation was a rule among many Indigenous groups. For example, among the Kaurareg in the Torres Strait, the main chief governed the use of fisheries on the island and determined how much of a resource could be taken (Southon & Kuarareg Tribal Elders 1998). There was a strong ethic of not taking more than what was assigned or required to satisfy immediate needs. To ensure against extravagant use of resources communities that exceeded their quotas were punished with strong sanctions by the elders and clan leaders

There were also restrictions or preferences concerning the harvesting of particular species based on factors such as gender, age and reproductive condition of individual animals (Smyth 2001). For example, dugong hunters of the east coast preferred female dugong and turtles over males. Similarly, among many Aboriginal groups, females (or males) with young of groups such as emus and bustards, kangaroos and other animals were not taken.

Some resources were not used unless there was specific traditional knowledge available to harvest or prepare the game correctly. For example, the hawksbill turtle is not eaten unless its poisonous glands are first removed requiring a person with the necessary specialized skills to butcher the animals correctly (Cooke & Guivera 1995).

There are also differences between cultural groups in relation to preferred foods that have differing implications for species between regions. At Mapoon on the west coast people avoided eating turtle eggs that had developing young. In contrast, such reservations were not evident among the Torres Strait Islanders and other groups (Cooke & Guivarra 1995).

In general, among all Aboriginal groups in the Cape York Peninsula region, but particularly for coastal people that have access to a greater range of abundant foods, resource bases were broad with a wide variety of aquatic and terrestrial ecosystems and species exploited at different times of the year. Cordell (1995) suggests that this very broad focus spreads fishing and hunting efforts across a range of habitats and species, hence is inherently more ecologically sustainable than commercial fisheries that by comparison target large quantities of single species (and often include a significant quantity of by-catch that is discarded).

Key points to develop:

- Document specific rules limiting exploitation of different species across Cape York.
- Is there specific knowledge associated with using or preparing certain species for consumption (e.g. the need for removing poison glands of hawksbill turtles prior to eating)?
- How do preferences among Indigenous groups vary regarding foods eaten or avoided that may affect harvesting patterns and species populations?

e) Manipulating the environment for desired outcomes

i) 'Bushtucker gardens' – Domiculture on Cape York Peninsula

In an important study of the relationship between Aboriginal people and plants on Cape York Peninsula Hynes & Chase (1982) used the term 'domiculture' to describe the way people changed vegetation communities to suit their needs. They described how vegetation communities were formed by cultivating wild plants in certain areas, but at the same time preserving the vegetation in a more or less natural state. Using a case study from the east coast they showed that through a long association of people with specific sites, local vegetation patterns were notably altered. Plants of high food value such as yams and fruit trees were planted deliberately or grew by throwing seeds or tubers away around campsites. Many of these campsites were found around shell middens. These new habitats created by people, provided enhanced conditions for growth and survival of selected edible species. Similar areas can be found along the western coastline of Cape York Peninsula (Cribb 1996) and it has even been suggested that certain plants, particularly *Dioscorea* yams, were taken to offshore islands to ensure food resources were available there when people visited or were sometimes isolated on the islands (Harris 1977; Harris 1978; Hynes & Chase 1982)

The types of vegetation communities that arose from these practices differ depending on local environments, numbers of people and their cultural practices. As such these vegetation communities vary in their species and structures both within and between regions and clan territories. For example, the Sandbeach people of the east coast camped in large numbers and did not move far often staying in large permanent camps (Thomson 1934; Chase & Sutton 1981). In such areas it may be expected that plant communities were influenced more than at temporary camps or in comparison to other groups that were more mobile and lived in low population densities (e.g. further inland).

Key points to develop:

- Document other examples of domiculture on Cape York Peninsula.
- Highlight the diversity of outcomes as a result of domiculture on vegetation communities in different regions as a result of factors such as local environmental conditions, human population density, configuration of clan estates and movement patterns.

ii) Traditional use of fire in the Cape York Peninsula landscape

Traditional fire management regimes have had a profound impact on the biota and environment of Australia (Bowman 1998). Aboriginal people have and continue to use fire across Cape York Peninsula at different scales, in different environments and for various reasons. Traditionally, fire was used to clear country to make walking easier, to attract animals for hunting, to protect campsites and important food areas or habitats and for spiritual or ceremonial purposes. The use of fire is common to most regions of Australia but there are local differences in how and why people may burn country depending on local environments and cultural reasons.

An important use of fire was to manipulate plant communities to suit people's needs, particularly to promote plants used for food, tools and shelter. Low, cool fires were used to back burn to protect campsites or valued fruit trees, or to stimulate fruiting and new growth. For example, the fruits of *Cycas media,* a common cycad species on Cape York, was an important food that was eaten after careful preparation to remove toxins (Thierret 1958). It has been suggested that burning promotes the fruiting of cycads, and that it helps stands of cycads by getting rid of species that are damaged by frequent fires (Beaton 1982).

Fire was also an important tool to manage patches of vine thickets and rainforest. In this way Aboriginal people played an important role in affecting the rainforest/savanna boundary (see also Theme 2b below). Monsoon vine thickets and rainforest areas are sensitive to too many and hot fires. Because these ecosystems provide important plant foods and shelter for Aboriginal people, they were protected by using fire in and around forest patches by burning firebreaks early in the dry season (Jones 1975). Many of these fire practices occurred all over Cape York, however, they were particularly important for people in large

areas of rainforest. For example, the Kuku-Yalanji people in the wet tropics regions employed fire to protect carbohydrate resources in and around rainforests (Hill & Baird 2003).

Over the broader landscape scale traditional use of fire to attract game and to 'clean up country' resulted in a mosaic of habitats with different fire histories. However, since the removal of Aboriginal people from the land, traditional fire management practices stopped and fire patterns have changed from an overall pattern of lower intensity, small fires early in the dry season to hotter, more frequent, larger and more destructive fires in the late dry season. This change may be responsible for significant changes to Cape York and northern Australian savanna landscapes (Woinarski et al. 2005). The ethno-ecological heritage retained by Aboriginal people in relation to the use of fire offers an opportunity to understand traditional fire patterns (and their effects on the environment), how current fire patterns (and their impacts) differ from traditional ones; and how better fire regimes may be used once again.

Key points to develop:

- Many aspects of traditional fire management are shared widely across northern Australia. Therefore, in order to highlight unique aspects of fire use on Cape York, the most notable avenues to develop regarding traditional knowledge and use of fire in the region relates to natural features that are unique or are represented as exceptional examples in the region. For example:
    - How is fire used in important Cape York environments (rainforests, deltaic fan deposits (floodplains) of Mitchell River, sand dune systems, etc)?
    - How do traditional fire regimes affect endemic or threatened species? Are specific fire regimes used to manage these species?

2. ECOLOGICAL PROCESSES & ECOSYSTEM INTERACTIONS

This theme considers traditional ecological knowledge in relation to some of the ecological processes and ecosystem interactions that are of particular importance on Cape York Peninsula. The region has one of the longest intact tropical coastlines in the world. The variety of peoples' views and connections between land and sea in the region are exceptional examples of cultural landscapes that are otherwise poorly represented in the World Heritage system. The role of people in how the rainforest/savanna boundary interacts is also of major significance. Finally, Cape York's role as bridge and barrier for ecological and evolutionary relationships between Australia and New Guinea and South-east Asia is among the most outstanding of its natural values, hence ethno-ecological heritage associated with this aspect is unique and of major significance.

a) The land and sea connection

The view of coastal Indigenous people that land and sea is closely connected, and their knowledge of how these environments relate to each other is of special importance on Cape York. Of particular significance is the variety of land-sea relationships in the region. The importance of these relationships has been widely documented in the region (Chase & Sutton 1981; Cordell 1995 and references within; Smith 1987). In a seminal study, Chase & Sutton (1981) consider how people lived in three different coastal regions of Cape York (these broadly correspond to the east, west and Prince Charlotte Bay regions defined here). Including the Torres Strait region, each lifestyle in these regions reflects the particular environmental and cultural contexts of its region. Considered on their own, each is an exceptional example of a hunter-gatherer cultural landscape. Considered collectively, the range of lifestyles makes the Cape York region as a whole a cultural landscape of outstanding global significance and diversity.

The systems of land and sea tenure as mentioned above demonstrate the link between these two environments for the region's Indigenous people. The clan estates of the east coast people include both land and sea and occur in narrow strips from a few kilometres inland out to sea to include islands, reefs, seagrass beds, coral cays and sandbars. These areas supported large populations of people who never

needed to move far (Thomson 1934). Such a lifestyle was made possible by the reliability and abundance of large amounts of food available from both environments (Thomson 1934; Chase & Sutton 1981).

The similarly large abundance of food resources along the west coast of Cape York also allowed for dense human populations. The lifestyle of people here, however, was quite different to the east coast because of different environmental conditions. Clan estates also included land and sea areas, however, they were more complex than those of the east coast. People here also relied less on the sea because it was more difficult to access and there were better options for hunting and gathering on the floodplains and tidal creeks inland. The lower importance of the sea to people on the west is reflected by the fewer names they have for animals such as dugongs and turtles compared to the many names the east coasters have. These differences are also reflected in their respective use of watercraft. While east coast people used outrigger canoes to access offshore areas, west coast people had simpler bark canoes that they used to access inland waters and to get around inundated floodplains during the wet season.

The people of the Princess Charlotte Bay area on the east coast were different again. This region shares environments common to both east and west coasts. The large near shore islands here allowed people to live on the islands for longer periods where they could use a broad range of land and sea resources (Chase & Sutton 1981). Highlighting their use of both land and sea was the language people of this region used which emphasized the difference between saltwater and freshwater environments. Animals for example, were named depending on which of these habitats they used (Chase & Sutton 1981).

The sea is the primary focus for Torres Strait Islanders as reflected by their use of it for food resources and their detailed knowledge of the marine environment. One example of such knowledge among the Kuarareg people relates to the region's very pronounced, complex and unusual tides. Local variation in land features add to the the tides' effects, leading to swift and complex patterns of tidal movements which the people understood well and which influenced their hunting and fishing practices (Johannes & MacFarlane 1991). Their detailed knowledge is also reflected by the many different words they use to speak of the region's tides and currents and how these interact with local wind and weather conditions (Southon & Kuarareg Tribal Elders 1998).

Another example of the land and sea connection is the use of certain land-based signs to indicate seasonal changes and availability of marine foods. On the east coast, for example, the flowering of certain *Acacia* species suggests that its time to start fishing for blue-tailed mullet. The first wet season storms suggest that shark livers are good to eat, while the arrival of Torresian Imperial Pigeons signals that stingrays are in season, that oysters are fat and that some fish have eggs (Smith 1987).

Key points to develop:

- Emphasise the diversity of lifestyles associated with the land-sea connection on Cape York.
- What TEK is associated with specific ecological processes that connect land and sea in different regions of Cape York? For example,
    - the role of mangroves
    - Nutrient interchange between land and sea (e.g. role of seabirds on coral cays, human extraction of resources from the sea, shell middens)

b) The rainforest-savanna interface

Cape York Peninsula has among the most significant areas of rainforest in Australia. Today's rainforests are remnants from a time when such forests covered a greater part of the Australian continent. These rainforests gradually retreated as the continent dried and fire played an increasing role in the landscape. As discussed in more detail in Theme 1e(ii), through the use of fire Aboriginal people have played a significant role in affecting rainforest – savanna boundaries. In some cases Aboriginal fire regimes aimed to protect rainforest patches by burning firebreaks early in the dry season. In other cases, fire regimes may have promoted savannas. Either way, the significance of these traditional practices to the Cape York Peninsula landscape are notable and are another example of the environment as a combined work of nature and man.

Key points to develop:

- Review and further document traditional fire management practices associated with different types of rainforest across Cape York, particularly in regions with significant rainforests (e.g. Lockerbie, Iron Range and Jardine areas).

c) Cape York Peninsula as bridge and barrier

Cape York is both bridge and barrier to a range of plant and animal species between Australia and New Guinea and South-east Asia to the north. According to Abrahams *et al.* (1995) in Australia the relationship of the Australian biota to that of New Guinea is best illustrated in the Jardine, Lockerbie and mid-Pensinsula rainforests. Like the Wet Tropics region further to the south, these remnants contain relicts of Gondawanan species and elements that invaded Australia from the Indo-Malay region following collision of the Australian and Asian plates. However, Mackey *et al.* (2001) note that Cape York rainforests retain much more of the tropical lowland biological elements that are shared with New Guinea than the Wet Tropics rainforests further to the south do.

The various species that are only found in these areas on Cape York are of importance to local Indigenous groups who have specific knowledge and uses for them. For example, many of the endemic plants of the region were used for foods, medicines and other purposes (Fell et al. 2009; Walker 1972). The importance of traditional fire uses in relation to rainforests and the potential for manipulation of vegetation communities through domicultural practices as outlined previously are also significant Aboriginal influences on the ongoing ecological and evolutionary relationships between the regions.

Another connection between New Guinea and Cape York and the rest of Australia is through the migration patterns of several bird species that move seasonally between these areas. The Torres Imperial Pigeon, for example, migrates in large numbers from New Guinea and Indonesia to northern Australia and occurs in particularly large numbers along the east coast of Cape York. These birds were a seasonally important food resource and were used for ceremonial purposes by several groups along the coast and in the Torres Strait. Limited TEK associated with this species and other migratory species has been documented.

Key points to develop:

- Document ethno-ecological heritage in relation to plant species that are endemic to Cape York, are Gondawanan relicts or are shared between Cape York and regions to the north.
- What TEK is associated with species that move between New Guinea and Australia?

3. SEASONAL USES OF LAND AND SEA

Cape York Peninsula's climate is strongly seasonal. Most of the region's rainfall occurs during a relatively shot but intense and reliable wet season and is followed by a long dry season. Wind patterns also differ between seasons significantly affecting how coastal people use their environments. Many food resources on Cape York Peninsula are highly seasonal and predictably abundant at specific times but in short supply at other times. Other food resources are found all year round but are less predictable, may be in low abundance, and are often difficult for people to access. The various ways in which people use these resources and respond to seasonal variability across the region is the subject of this theme.

a) Opportunistic and predictable resources

The variety and high productivity of coastal environments on Cape York Peninsula results in a range of seasonally and opportunistically available food resources (Fig. 1). However, the relative availability of these resources varies between regions and habitats and their use largely depends on local environmental conditions and whether local groups can and prefer to use them. These differences are evident by comparing the east and west coast regions. Although both regions include near shore areas with similar resources (e.g. fish, crustaceans, shellfish), they differ in the environmental characteristics of their off shore

and coastal land zones. The east coast has many coral reefs and islands, while its coastal land strip is a mosaic of highly variable and relatively densely vegetated coastal environments. In contrast, there are few if any islands and reefs on the west coast. Here, shallow offshore marine waters are bordered by mudflats that give way to broad flat open plains that are interspersed with channel systems, wetlands and dune systems. In this landscape seasonal inundation has a significant impact. Both regions are highly productive. However, while east coast people camp along the coastline and look towards the sea, people of the west coast focus on resources that occur in high concentrations along the coastal strip and inner inland regions. They only rarely venture out beyond the shoreline. A fundamental ecological difference between these regions is that food resources of the land and inner coastal zone of the west coast tend to be concentrated, immobile and seasonally specific, whereas many of the main marine resources of the east coast are more opportunistically available (Chase & Sutton 1981).

Figure 1: Seasonal exploitation of selected common food resources used by Aboriginal people of the Nesbit River region on the east coast of Cape York Peninsula (adapted from Chase & Sutton 1981). Relative importance by month is indicated by dark blue. Year round, opportunistic use is represented by light blue.

Along the east coast opportunistic fisheries mainly included the harvesting of dugong, turtle, crustaceans and several species of fish. The importance of dugong and turtles is reflected by the broad vocabulary used to describe them and in depth knowledge of each species. Other marine resources were exploited seasonally including threadfin salmon and mullet (Smith 1987), while seasonal variations in 'fatness' and accessibility also affected harvesting patterns. People here also made use of land based resources both opportunistically (e.g. hunting of kangaroos and wallabies) and seasonally. Waterfowl were an important resource in the mid-late dry season as were a range of plant species. People only occasionally made forays inland to make use of specific resources that were seasonally abundant. The continuous availability of a variety of fruiting trees and shrubs throughout the year was of importance, particularly late in the dry season when resource abundance was generally at its lowest (Chase & Sutton 1981).

The seasonal inundation of coastal floodplains along the west coast meant that people were concentrated on high coastal sand ridges during the wet season. However, despite their confinement they were able to exploit a range of foods in great abundance in adjacent habitats including breeding magpie geese and their eggs, yams and other foods (Thomson 1939; Chase & Sutton 1981). Access to inshore regions also meant they could exploit a variety of shellfish, crustaceans and fish, including sharks which were particularly favoured at this time (Sinnamon 1995). Once waters levels dropped access to broader areas was possible and people ranged over larger areas to exploit shellfish, red claw crayfish, freshwater turtles and shrimp among other favoured resources (Sinnamon 1995). Here, like in other resource rich coastal areas, the different fruiting and seeding times of various vines, trees and shrubs provided continuous availability of these foods throughout the year.

The people of the Princess Charlotte Bay area generally exploited a broad range of habitats and resources that included elements common to west and east coast people. Importantly, they could also access large

near shore islands. In terms of seasonal patterns of resource use and practices they were different from other coastal groups in their widely distributed network of major camping sites which they used independently of time of year (Chase & Sutton 1981). This was largely possible due to the nature of their local environment and distinguished them from the highly sedentary lifestyle of other east coast people and the limited use of dune systems by west coast people during the wet season.

Seasonal patterns of resource use in the Torres Strait centred on the relative availability, accessibility and eating preferences of marine resources. During the wet season the Kuarareg traditionally concentrated on dugong and avoided eating turtles and many species of fish. At this time these animals consume jellyfish that make them less palatable to the Islanders.

In contrast to coastal Cape York Peninsula, people of the inland were more similar to Aborigines in other parts of inland Australia. Although the seasons also affected the availability of resources in inland areas the overall abundance of food and diversity of habitats and resources was considerably lower. Fresh water was also limited. As a result, inland people had to move over much larger territories and their population densities were much lower than adjacent coastal regions. Nonetheless, in order to survive they had to possess detailed knowledge of the spatial and temporal availability of resources over broad areas.

Despite the differences in seasonal resource use between regions there are also many practices and resources shared by all Indigenous people of Cape York Peninsula. The importance of traditional fire regimes was noted earlier. The use of fire to attract game and for other reasons as the dry season began was a widespread and important practice. Another common practice or outcome of harvesting seasonally and concentrated resources was its importance as an event in the social calendar. For example, ceremonies whereby large numbers of people gathered were often conducted to coincide with a seasonally specific abundance of particular foods in an area (Chase & Sutton 1981). Such events also served as important opportunities for passing traditional ecological knowledge to younger generations.

Key points to develop:

- How does seasonal and opportunistic resource use vary among different regions and sub-regions of Cape York?

b) Seasonal calendars

The variety of perspectives people have of the regional environment on Cape York Peninsula is evident in the interpretation of seasonality. Between regions different numbers of seasons are recognized. These vary in their timing and duration and are characterized by specific conditions. For example, in the Nesbit River region on the east coast six seasons are recognized whereas at Cape Kerweer the year is divided into five seasons (Fig. 2) (Chase & Sutton 1981). In contrast, the Kuarareg of the Torres Strait recognise two main seasons based on the direction of prevailing winds, with the timing of the south-east winds equating to the dry season from March to November, and the north-west winds lasting from about December to March equating to the monsoon season (Southon 1998).

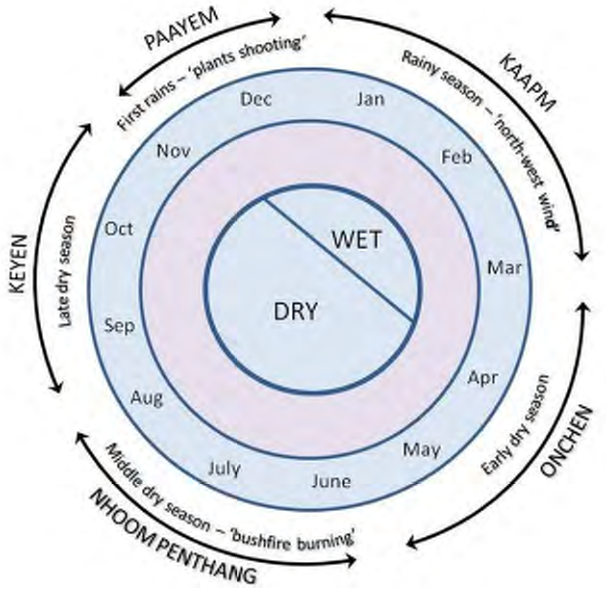

Figure 2: The seasonal calendar of the Wik-Ngathan speaking people of Cape Kerweer on the west coast of Cape York Peninsula (Chase & Sutton 1981).

Key points to develop:

- Document the seasonal calendars of different Indigenous groups across Cape York.

c) Seasonal indicators

An example of knowledge regarding seasonal resource exploitation is the use of indicators to signify the availability of specific resources. For example, among the Yir-Yoront of the south-west part of Cape York ripe spear grass signaled that Magpie Geese start laying eggs. Other examples as noted previously on the east coast included, the flowering of *Acacia* to signal the arrival of blue-tailed mullet, wet season storms suggesting that shark livers are good to eat, the arrival of Torresian Imperial Pigeons signaling that stingrays are in season, that oysters are fat and that some fish have eggs (Smith 1987).

Key points to develop:

- What seasonal indicators are used by people in different areas of Cape York?

4. SIGNIFICANT NATURAL AND CULTURAL VALUES AND SITES

Many natural and cultural sites have been identified on Cape York Peninsula as of outstanding significance (Abrahams *et al.* 1995; Mackey *et al.* 2001; Cordell 1995). The importance of several of these have been discussed in general terms in other themes. This theme considers the role of ethno-ecological heritage in relation to some of these values and sites on Cape York.

a) Natural values and sites

Traditional ecological knowledge can help identify sites that play particularly important roles in maintaining the functioning of the broader landscape as a whole. Such sites may include refuge areas in the landscape, for example, where food resources (such as yams or bush fruits) are particularly abundant at times when the rest of the landscape is largely barren; or important breeding sites for fish, birds and other species. As discussed in Theme 1 ethno-ecological heritage can also play an important role in the conservation and management of such sites or of specific components of the biota.

i) Wetlands of national significance

The wetlands of Cape York Peninsula are amongst the largest, most productive and diverse in Australia (Abrahams *et al.* 1995). Many are considered the best examples of their type in Australia and several coastal and near coastal wetlands are recognised as nationally significant waterbird habitats (Driscoll 1994). The region also has numerous complete river systems that are recognised as of high wilderness quality. The fan deposits of the Mitchell River delta are recognised as amongst the best examples of this type of geological landscape in the world. These wetlands have considerable significance to Aboriginal people who in many cases have detailed knowledge of how these systems and of the various species that are found in them.

ii) Coastal biological communities

As discussed in Themes 2a and 3 the importance of coastal areas and the land and sea connection to Indigenous people is a feature of the Cape York region. Further examples of Indigenous knowledge of specific coastal sites that are of ecological importance relates to the occurrence of fish and dugong breeding grounds, particularly along the east coast and in the Torres Strait region (Smith 1987; Southon 1998). Similarly, numerous shorebird and seabird habitats and islands now recognised as of national and international significance were known and used by Indigenous communities (e.g. Horn Island). Other notable coastal areas for which further ethno-ecological stories could be documented include the dunefields of eastern Cape York Peninsula around Shelburne Bay which are recognised as internationally significant examples of the evolution of sandy landscapes in the humid tropics (Abrahams *et al.* 1995).

iii) Rainforests and heathlands

The importance of Cape York Peninsula rainforests in terms of their species richness and biogeographic and evolutionary significance is well documented. The region also includes heathlands that are recognised as of

high wilderness quality. The importance of these two habitat types to Aboriginal people as sources of medical, food and other resources is documented in traditional ecological knowledge recording projects and studies (e.g. references in Cordell 1995; Filar *et al.* 2004). However, further detailed studies working with a broader range of communities and groups are required.

iv) Tropical savannas

The tropical savannas of Cape York are recognized as among the most extensive and intact in the world. Although many Aboriginal groups across northern Australia are associated with savannas, further detailed ethno-ecological research and documentation efforts are likely to yield further valuable insights regarding the ecology and significance of these ecosystems to Aboriginal people in the region.

v) Rare, threatened & endemic species

Cape York Peninsula has Australia's highest concentrations of rare and threatened species as well as restricted endemics (Abrahams *et al.* 1995; Mackey *et al.* 2001). Some of the most significant breeding sites for marine turtles occur off the north-east coast (Abrahams *et al.* 1995). Many rare and threatened species are of significance to Aboriginal people and some are totems to certain groups who retain specific ecological and cultural knowledge for them. For example, the Australian Bustard is an important species to many Aboriginal people in the tropical savannas. In certain regions, traditional ecological knowledge and customary law relating to the specialized mating system of the species governed harvesting patterns ensuring sustainable use of the species (Ziembicki 2010). Similar knowledge may be applicable to other species such as the Southern Cassowary (Latch 2007). The potential of ethno-ecological heritage to contribute to general knowledge and conservation of threatened and endemic species is potentially significant, and largely under-utilized. Systematic TEK recording efforts for such species focusing on aspects of the ecology, status or traditional conservation and management practices (as per Theme 1) across the entire Cape York region are warranted. Such efforts could be particularly useful by involving individuals and clans for whom species of particular interest are totems.

Key points to develop:

- Review and document ethno-ecological heritage in more detail in relation to specific sites of particular significance, particularly natural sites and areas of conservation significance as documented by Abrahams *et al.* (1995).
- Document TEK associated with rare, endemic and threatened taxa of interest (eg traditional management methods, seasonal use, status, diet, habitat requirements and other ecological information for species such as cassowaries, endangered flora, etc)

b) Cultural sites

Almost all important cultural sites or networks of sites are associated with cultural stories. Although the degree to which ethno-ecological heritage has been retained for cultural sites varies across Cape York, a more detailed review and assessment of specific areas may provide valuable insights. Some examples of significant sites include Cape Melville, which along with adjacent Pipon Island (Walmbaywi) are the site of a major carpet python myth from the area; the Quinkan rock art galleries which contain an exceptional variety and quality and some of the largest galleries of rock art paintings in the world; and the Wiepa shell mounds which include some of the largest middens in the world. The latter, as discussed earlier are important sites where people have significantly influenced local vegetation assemblages.

For the northern Kaanju people of the inland highlands the Wenlock River has particular significance. The river is represented as Pianamu (Rainbow Serpent) which is the Creator of all of Kaanju homelands. Other important story places on Kaanju homelands include Malandaji (Thunder, Lightening, Coming of wet season), Ching'ka (Quoll), Umaachi (Black-Headed Water Python) and Nhanthanji (Sea Eagle). According to Kaanju law and custom the people are obliged to 'look after' the stories and lands associated with these and related sites. The land through the ancestral beings will in return look after the people's physical, cultural and spiritual needs (Chuulangun Aboriginal Corporation 2010).

5. CULTURAL DIVERSITY: INTERACTIONS AND INFLUENCES

A feature of Cape York Peninsula is its cultural and language diversity. Cape York Peninsula is the meeting point between two very different cultures – the Melanesian people of Torres Strait (and the south-west Pacific) and the Aborigines of Australia. Despite their inherent differences both share hunter-gatherer lifestyles and both occupy similar environments. This theme considers some of the interactions and influences that cultural groups have had on each other from an ethno-ecological viewpoint. It asks, for example, how were traditional practices and knowledge passed between regions?

a) The Melanesian - Aboriginal connection

The most notable interaction between the Torres Strait Islander and Aboriginal populations of Cape York Peninsula appears to have been between the Kaurareg of the Prince of Wales Island region and the Gudang, a small Aboriginal group at the tip of Cape York. According to Moore (1978) the Kaurareg and the Gudang were in continuous close contact and even intermarried occasionally. The Gudang also appeared to have contact with other Torres Strait Islanders primarily at Mount Adolphus Island (Morilag) where people from various islands met at certain times of the year (Moore 1978). In contrast, contact between the Torres Strait Islanders and other mainland Aboriginal groups may have been more limited. It seems that "all the islanders had a feeling of distrust to the mainland Aborigines except the small group at the tip who are friendly" (Moore 1978).

The Kaurareg themselves took full part in trade with other Melanesian islanders trading articles from as far away as the highlands of New Guinea (Moore 1978). Moore suggests that if Morilag was claimed territory by the Gudang because of its rich resources, then there would have been some exchange for its use by the Torres Strait Islanders. In this case the Melanesians may have exchanged goods in return for access to the island's resources in effect providing the Aborigines with a foothold as fringe participants in the wider trading system of the Melanesians (Moore 1978).

Among the things that the Aborigines of the east coast had that were of Melanesian origin were bamboo smoking pipes, ceremonial drums, spears and harpoons and outrigger canoes. Canoes in particular had a great influence because they improved the ability of east coast people to use their offshore environment. However, it was not only goods that were traded. Influences extended to cultural and ceremonial practices and the transfer of knowledge (Moore 1978; Thomson 1933). It is reasonable to expect that there was also significant exchange of ethno-ecological information.

These cultural and material influences are thought to extend as far south as Princess Charlotte Bay along the east coast (Chase 1980), and as far south as Weipa on the west coast. An important question that arises is how did these influences and exchanges extend along the coastline of Cape York Peninsula? Did islanders undertake regular trading voyages down the east and west coasts or were the influences transferred by Aborigines between cultural groups and in this way filtered down to the more southerly regions? According to Moore (1978) it was more likely the latter. Either way the interactions between these markedly different cultures and the subsequent changes in technology, and relationships with environments were significant and unique.

Despite these interactions, the absence of particular influences between Melanesian and Aboriginal people are just as notable. Given the high productivity and diversity of Cape York Peninsula coastal environments and the interaction between these two cultural groups, two important questions as asked by Chase & Sutton (1981) arise: why is there a fairly constant pattern to the hunting and gathering lifestyle in Australia, and why did Aboriginal people of the region not adopt the tropical agricultural practices of their neighbours? These intriguing questions have been the subject of significant research interest (Chase & Sutton 1981; Harris 1977; Harris 1978; Walker 1972). As Chase & Sutton (1981) quoting Forde (1934) point out "human cultures cannot necessarily be seen as stages within a generalized model of economic development, but possess complete economies within themselves and these are the product of not only the availability of natural resources, but also of the cultural dimensions which result from people living in groups with established traditions."

Key points to develop:

- What features of ethnoecological heritage is shared and has been exchanged between Melanesians and Aborigines of the northern part of the peninsula?

b) Interactions between regions

As suggested above the interaction between Aboriginal groups along the coastlines allowed for the transmission of goods and intellectual knowledge for extended distances along the east coast and to a lesser degree along the west coast. On both the east and west coasts people tended to move along the coastline and coastal groups were inter-related based on kinship and ceremonial relationships. During the dry season, and often when there was high seasonal food resource abundance, people gathered in large numbers. At such times, ceremonies were conducted, intermarriages were arranged and goods and knowledge were exchanged.

Coastal people on both sides of Cape York Peninsula generally had little to do with inland people and did not travel more than a few kilometres inland. To the east coasters people of the inland were considered potentially dangerous. Nonetheless, in some areas groups immediately adjacent to coastal groups were engaged more than in others and were sometimes included in trading relationships, marriages and some ceremonies. Compared to coastal people the inlanders of Cape York Peninsula were more similar to other Australian Aborigines in their cultural and social characteristics. These differences were again primarily a function of their environment. For example, the Kaanju people of the uplands of central Cape York, living in a region with lower food resource abundance had considerably larger territories and were notably more nomadic than coastal groups – they had to be in order to gather enough food for survival.

Key points to develop:

- What aspects of TEK and practices are shared and have been passed along the coastlines between adjacent sub-regions?...and between coastal and inland regions?

c) Diversity of ethno-ecological heritage within regions

Although the defined regions in this review demonstrate the diversity of ethno-ecological heritage of Cape York Peninsula there is considerable diversity within both regions and sub-regions that is overlooked by the broader focus. This diversity is best demonstrated by considering an example of a region that has been relatively well studied. This example is drawn from Chase (1980) (via Smith 1987) and considers the Aboriginal occupants of the lands around Lockhart River on the east coast.

The Aboriginal people of the area traditionally identified themselves either with the beach or the inland. Among the beach people there was a division into four areas based on areas of common language each of which had their own customs and owned a particular major story or ceremony (Chase 1980). These language areas were further divided into sub-regions that included local estate groups composed of close relatives and operated as a unit. Geographically their estates ranged from the coastline inland for a short distance and out into the marine environment to include offshore reefs and islands. Each estate was associated with myths and specific totems which form the basis of kinship systems and signify the connection between people, ancestral beings and the landscape. At this level people had rights over particular resources. Accordingly, they had specific knowledge of these resources and retained detailed knowledge and 'the ceremony' for their totems and ceremonial sites. The number of estates each with different totems, ceremonies and bodies of knowledge suggest that the detail and diversity of ethno-ecological heritage, even within such relatively small areas, is significant.

Key points to develop:

- The example from Chase (1980) and Smith (1987) from the Lockhart River region demonstrates the diversity of ethno-ecological heritage within single groups and therefore the need to document TEK at fine scales.

ETHNO-ECOLOGICAL HERITAGE AND WORLD HERITAGE GUIDELINES

In addition to the criteria under which sites are nominated, the Operational Guidelines of the World Heritage Committee require a commitment to appropriate and sustainable management of the natural, cultural or cultural landscape values for which sites are nominated, and the requirement that sites meet tests of integrity and/or authenticity (World Heritage Committee 1992). Furthermore, nominations are fundamentally dependent on the demonstrated support of local communities, particularly of the Indigenous people of a region.

Use and promotion of Indigenous natural resource management systems is of particular importance given the need for a commitment to preservation of World Heritage areas nominated for their natural and cultural heritage values. Critically, in this case such a commitment also includes preservation of ethno-ecological heritage itself. Greater recognition of the value and use of traditional ecological knowledge will aid in the passing down of knowledge and promote its value among young Indigenous people. In doing so it may also encourage support from local communities and traditional owners for World Heritage listing.

Management of nominated World Heritage natural and cultural values and cultural landscapes

Ethno-ecological heritage and western science

Using traditional ecological knowledge offers the opportunity to increase scientific knowledge of biodiversity and ecological processes, and provides a particularly useful parallel to scientific approaches. This is partly because: (i) traditional ecological knowledge may be best in remote areas, where the amount of scientific information is generally least; (ii) traditional ecological knowledge offers an accumulation of information spanning many generations and is based on continual observations by long-term residents, whereas scientific knowledge (in many parts of northern Australia at least) is often based on relatively brief one-off surveys or studies in which the information gain may be limited; (iii) traditional ecological knowledge is based on very different methods and different perspectives to scientific studies, and hence may provide novel insights and contexts for knowledge about biodiversity; (iv) incorporation of, and respect for, ethno-ecological heritage may greatly aid in developing biodiversity conservation and natural resource management priorities and in promoting support for management actions amongst Indigenous landholders. Such landholders may find management priorities derived from only scientific approaches difficult to relate to, and hence regard such priorities as foreign and difficult to support.

Application of traditional ecological knowledge and practices in contemporary contexts

In many parts of Cape York Peninsula, Aboriginal people have been returning to live permanently on their traditional clan estates. Many Indigenous people in the region maintain a strong interest in the condition of their country and in preserving, using and passing on their ethno-ecological heritage and traditional customs. There are several notable examples of Indigenous land and sea management initiatives that have incorporated traditional ecological knowledge in biodiversity research and conservation management on Cape York. Here I briefly describe some examples of community-based initiatives in the region that serve as effective models for how traditional knowledge and practices might be used in contemporary settings. These examples also highlight that Cape York communities are in many ways leading the way in this important area.

Kaanju Ngaachi Homelands Development

The Kaanju people of the inland highlands of central Cape York Peninsula maintain strong spiritual, cultural and ecological relationships to their lands. Their lands are rich in plant, animal and mineral resources which continue to provide sustenance and medicine, as well as materials for traditional goods (e.g. baskets, spears

and other implements). Across their homelands are a network of significant Dreaming places, sacred ceremonial grounds and totemic sites, many of which play important roles in traditional land management and conservation practices as discussed for example in Theme 1. Among the most important landscape features in the region is the Wenlock River which has great cultural significance because it represents Pianamu (Rainbow Serpent) which created and sustains all Kaanju homelands. According to Kaanju belief the deterioration of the land is felt by Pianamu, and under the law if proper land management is not carried out Pianamu will not (through the land) provide for the people. According to law and custom, the Kaanju are therefore obliged to take care of their stories, significant sites and lands and in return, the land will look after the people's physical, cultural and spiritual needs (Chuulangun Aboriginal Corporation 2010).

As the northern Kaanju people move back to their homelands, these fundamental cultural and spiritual ties to their lands are at the basis of their aspirations for the reoccupation and future sustainable economic development of their lands. To this end they have developed a Land Management Framework and the Kaanju Homelands Wenlock and Pascoe Rivers IPA Management Plan which set out their plans for the protection of the cultural and ecological values of their homelands (Chuulangun Aboriginal Corporation 2010).

Traditional Knowledge Revival Pathways
The Traditional Knowledge Revival Pathways (TKRP) initiative is a pioneering project that aims to provide support and a framework for preserving, applying and passing down traditional ecological knowledge and practices to future generations for the benefit of the community and environment (TKRP 2010). Initiated by Kuku Thaypan elders, the success of the project has seen it expanded to include Wik communities, and several other communities in the Cape York region. It serves as an example of the vitality of Cape York Peninsula's Indigenous communities and the potential of broader application of such initiatives in other parts of Australia and beyond.

Other examples
Several other initiatives on Cape York illustrate that there is a strong desire to maintain and promote ethno-ecological heritage in the region (Edwards & Heinrich 2006). Another notable example is the community of Kowanyama's establishment of indigenous-controlled land and coastal management programs to manage their lands for protection of natural and cultural heritage values. They have established their own community ranger services, developed education programs for land management, and encourage collaborations with scientists in biological survey and the conduct of research and wildlife management projects (Baker et al. 2001).

Yet another example is the application of traditional ecological knowledge to the conservation management of marine turtles and dugongs, which has helped understand movement patterns, the distribution of food resources (such as sea-grass beds), and other aspects of the ecology of these groups (e.g. Smith 1987; Nursey-Bray 2006). Other initiatives as presented for example by Hill (1992) and within the various summaries presented in Cordell (1995) demonstrate that Indigenous resource management is alive and well on Cape York Peninsula.

Authenticity and integrity of ethno-ecological heritage

The operational guidelines for World Heritage nominations require satisfaction of the test of 'authenticity' for cultural criteria, and the test of 'integrity' for natural criteria. According to Fowler (2003) cultural landscapes should meet requirements for both 'authenticity' and 'integrity'. 'Authenticity' refers to the credibility of the information presented in relation to the cultural heritage values of the nominated site. In reference to natural values in the context of Cape York Peninsula 'integrity' relates to their intactness or completeness. As Smyth & Valentine (2008) point out, it is reasonable to expect in this case that if the 'authenticity' of cultural values and 'integrity' of natural values are established then requirements for cultural landscapes will be satisfied.

Given the erosion of ethno-ecological heritage since European settlement and the differing extents to which cultural relationships to the environment have been maintained between regions, groups and individuals, addressing issues associated with the 'integrity' and 'authenticity' of ethno-ecological heritage as it relates to cultural landscapes is required.

Variable loss of ethno-ecological heritage

The erosion of ethno-ecological heritage on Cape York Peninsula is related to the history of outside contact and the particular local influences and cultural interactions that have varied between places and groups. In general, Aboriginal populations in central and southern Cape York Peninsula were the first to experience wholesale changes as settlers and others moved into the region around the 1870s (Chase & Sutton 1981). As these newcomers moved north and populations grew with expanding pearling, trepang and other industries, the Aboriginal people of the east and north-west came under increasing pressure. By the early 1900s many people had been removed from their traditional lands to camps and larger settlements and some were recruited to work in local industries. Most of these industries were based on extracting natural resources of varying types, therefore, to different degrees some Indigenous recruits could continue to spend time 'on country' while also learning different methods of resource use and extraction. In addition, the availability of western foods resulted in a decreasing reliance on traditional bush foods. In general, the first elements of knowledge and practice to be lost were those that were no longer used, with those remaining being the most relevant to prevailing circumstances. The net result was that while some aspects of ethno-ecological heritage were benefited others were lost leading to varying degrees of disconnection to traditional lands, knowledge and practices.

By comparison, the history of some west coast people differed markedly to other regions. Owing to the remoteness of the region and initial interest of settlers in other areas, parts of the west coast were comparatively less affected than other parts of Cape York. Furthermore, a series of reserves and missions was set up which did much to decrease the worst effects of outside influences. These had most effect south of the Archer River, and today this area contains the largest populations of traditionally oriented people (Chase & Sutton 1981).

Dynamism of ethno-ecological heritage

An inherent feature of ethno-ecological heritage is its dynamism and resilience. Aboriginal and Torres Strait Islander cultures are living cultures within which knowledge and traditions continue to evolve. An example of this dynamism is the incorporation of introduced species into ceremonial practices and beliefs. For example, in several regions of northern and central Australia, the introduced cat has passed seamlessly into the Aboriginal belief systems and is a totem for several groups. A body of ethno-ecological knowledge has subsequently evolved around these species. On Cape York Peninsula, Smith (1987) notes the integration of western technology and technical knowledge into existing Aboriginal practices. He suggests that practices changed but that while outside tools and techniques were borrowed certain important aspects of cultural traditions which limited use of resources through various restrictions and constraints upon both individuals and groups were retained. Further notable examples of such dynamism, as outlined above, are the many initiatives that aim to incorporate traditional knowledge and practices into contemporary land management and conservation programs.

Assessing authenticity of ethno-ecological heritage

In light of changes to traditional lifestyles a key question that arises is how does the erosion of ethno-ecological heritage affect the 'authenticity' and 'integrity' of cultural landscapes? Since the 'integrity' of natural values are considered elsewhere, the discussion here focuses on the satisfaction of 'authenticity' as it relates to cultural values and the cultural landscapes concept. To quote Folwer (2003): "The essence of applying the test of authenticity … is in the verification of information sources about relevant values. That is, that they are truthful and that the site is a genuine and authentic representation of what it claims to be …". Cultural values may be expressed through a variety of features including form and design, materials and substance, use and function, traditions and techniques, location and setting, and spirit and feeling (Fowler 2003). Consequently, as Smyth & Valentine (2008) note, for Indigenous people to be prepared to have the credibility of their cultural heritage scrutinised their support of any nomination is essential. Again quoting

Smyth & Valentine (2008) avenues for demonstrating credibility include: direct contributions from Indigenous people (e.g. verbal, written, video presentations); academic research literature and testimony by researchers; claims books, transcripts, findings and determinations of land claims under the *Aboriginal Land Act 1991 (Qld)* and the *Native Title Act 1993*; and provisions of registered Indigenous Land Use Agreements under the *Native Title Act 1993.*

In addition, ethnobiologists and other researchers have developed a range of methods to test and maximize the reliability of information derived from informants where methods are largely based on interviews and oral histories. For example, Burbidge *et al.* (1988) in a study aimed to document the past and present status and distribution of mammals using Aboriginal knowledge across central Australian deserts cross-validated data they collected against other informants, experts and the research literature. Similarly, Smith (1987) documenting ethno-ecological knowledge in relation to fisheries on the east coast of Cape York, conducted interviews whereby a series of contrasting questions aimed at verifying the same information were asked over a prolonged study period. Informant reliability was tested by cross-referencing collated information concerning fishing and the biology of marine animals against answers that were already known. Other methods include active participant observation, whereby researchers are direct participants in activities and are able to personally verify the validity and reliability of information derived from less direct methods including interviews (Spradley 1979)

Intellectual property rights & culturally sensitive information

The appropriate use and management of ethno-ecological heritage is an important concern for Aboriginal people. Types of knowledge, who can possess it and how it is transmitted varies between regions and Indigenous groups. While some knowledge is public and freely available to everyone, other knowledge is strictly confidential and may be restricted to worthy or authorized persons only. Other types of knowledge may fall in between these categories. In many cases traditional laws and customs govern the use and ownership of knowledge. Hence, the development of respectful processes for engagement, collaboration and use of ethno-ecological heritage, recognizing the diversity of approaches to knowledge management across the region, is a fundamental for the further development of ethno-ecological stories on Cape York Peninsula. These processes should be developed through consultation with traditional land owners and knowledge holders, Indigenous representative bodies and other experts, including anthropologists, linguists and ethnobiologists with experience working in the region. In addition, reflecting the increase in collaborative projects between Indigenous and non-indigenous people, several recent publications provide informative guidelines for directing research methodology in northern Australia (e.g. Christie 2006; Fuary 2009; Holcombe 2009).

Acknowledgements

I would like to thank Peter Sutton for advice in the early stages of the development of this report and John Woinarski for discussions and contributions regarding the integration of traditional ecological knowledge with scientific perspectives.

REFERENCES

Abrahams, H., M. Mulvaney, D. Glasco, and A. Bugg. 1995. An assessment of the conservation and natural heritage significance of Cape York Peninsula. . Cape York Peninsula Land Use Strategy, Office of the Coordinator General of Queensland, Brisbane, Department of the Environment, Sport and Territories, Canberra, and Queensland Department of Environment and Heritage, Brisbane.

Baker, R., J. Davies, and E. Young, editors. 2001. Working on Country: Contemporary Indigenous Management of Australia's Lands and Coastal Regions. Oxford University Press, Melbourne.

Beaton, J. M. 1982. Fire and water: aspects of Australian aboriginal management of cycads. Archaeology in Oceana **17**:51-58.

Bowman, D. M. J. S. 1998. The impact of aboriginal landscape burning on the Australian biota. New Phytologist **140**:385-410.

Burbidge, A. A., K. A. Johnson, and R. I. Southgate. 1988. Aboriginal knowledge of the mammals of the central deserts of Australia. Australian Wildlife Research **15**:9-39.

Chase, A. 1980. Which way now? Tradition, continuity and change in a North Queensland Community. University of Queensland, Brisbane.

Chase, A. 2005. Anthropology through a biological lens in B. Rigsby, and N. Peterson, editors. Donald Thomson: the man and scholar. The Academy of the Social Sciences in Australia, Canberra.

Chase, A., and P. Sutton. 1981. Hunter-gatherers in a rich environment: Aboriginal coastal exploitation in Cape York Peninsula. . Pages 1817-1852 in A. Keast, editor. Ecological Biogeography of Australia. W. Junk., The Hague.

Christie, M. 2006. Transdisciplinary research and Aboriginal knowledge. Australian Journal of Indigenous Education **35**:1-12.

Cooke, P., and R. Guivera. 1995. A tangled web: management of land and sea at Old Mapoon. in J. Cordell, editor. Indigenous management of land and sea and traditional activities in Cape York Peninsula. Cape York Peninsula Land Use Strategy, Office of the Coordinator General of Queensland, Brisbane, Department of the Environment, Sport and Territories, Canberra, and Queensland Department of Environment and Heritage, Brisbane.

Cordell, J. 1995. Indigenous management of land and sea and traditional activities in Cape York Peninsula. . Cape York Peninsula Land Use Strategy, Office of the Coordinator General of Queensland, Brisbane, Department of the Environment, Sport and Territories, Canberra, and Queensland Department of Environment and Heritage, Brisbane.

Driscoll, P. V. 1994. Wetland Definition and Fauna Assessment of Cape York Peninsula. CYPLUS Natural Resources Analysis Program.

Edwards, S. E., and M. Heinrich. 2006. Redressing cultural erosion and ecological decline in a Far North Queensland Aboriginal community (Australia): The Aurukun ethnobiology database project. Environment, Sustainability and Development **8**:569-583

Fell, D. G., M. Lifu, S. McIntyre-Tamwoy, C. Roberts, A. J. J. Lynch, L. Leung, B. Charlie, and T. Lifu. 2009. Significant species and habitats of Greater Lockerbie Scrub: Cape York Peninsula, http://eprints.jcu.edu.au/8141/ (Accessed May 15, 2010) Queensland.

Filer, C., S. Haberle, R. Hide, G. Hitchcock, D. Lawrence, and B. Smith. 2004. Interactions Between Local/Indigenous Communities and the Natural Environment in Far North Queensland and Southern New Guinea. A Partial Review of Research To Date. Resource Management in Asia-Pacific Working Paper No. 52. Resource Management in Asia-Pacific Program, Research School of Pacific and Asian Studies, The Australian National University, Canberra.

Fowler, P. J. 2003. World Heritage Cultural Landscapes 1992-2002. UNESCO World Heritage Centre, Paris.

Fuary, M. 2009. An evaluation of previous and current methods and models for researching Indigenous resource use and purposes, with recommendations for 'best practice' research solutions. Marine and Tropical Sciences Research Facility. Reef and Rainforest Centre Limited, Cairns.

Harris, D. R. 1977. Subsistence strategies across Torres Strait. Pages 421-464 in J. Allen, editor. Sunda and Sahul: Prehistoric Studies in Southeast Asia, Melanesia and Australia. Academic Press, London.

Harris, D. R. 1978. Adaptation to a tropical rainforest environment: Aboriginal subsistence in north-eastern Queensland. Pages 113-134 in N. Blurton Jones, and V. Reynolds, editors. Human Behavior and Adaptation. Taylor and Francis, London.

Hill, R. 1992. Models for Aboriginal Involvement in Resource Management on Cape York. in J. Birckhead, T. DeLacy, and L. Smith, editors. Aboriginal Involvement in Parks and Protected Areas. Aboriginal Studies Press, Canberra.

Hill, R., and A. Baird. 2003. Kuku—Yalanji rainforest Aboriginal people and carbohydrate resource management in the Wet Tropics of Queensland, Australia Human Ecology **31**:27-52.

Holcombe, S. 2009. Guidelines for Indigenous ecological knowledge management (including archiving and repatriation). Natural Resource Management Board (NT), Darwin.

Hynes, R. A., and A. K. Chase. 1982. Plant sites and domiculture: Aboriginal influence upon plant communities in Cape York Peninsula Archaeology in Australia **17**:38-50.

Johannes, R. E., and J. W. MacFarlane. 1991. Traditional fishing in the Torres Strait Islands. CSIRO Division of Fisheries, Hobart.

Jones, R. 1975. The neolithic, palaeolithic and the hunting gardeners: Man and land in the Antipodes. Page Wellington in R. P. Suggate, and M. Cresswell, editors. Quaternary Studies. Royal Society of New Zealand, Wellington.

Latch, P. 2007. National recovery plan for the southern cassowary *Casuarius casuarius johnsonii*. Report to Department of the Environment, Water, Heritage and the Arts, Environmental Protection Agency., Canberra.

Moore, D. R. 1978. Cape York Aborigines: fringe participants in the Torres Strait trading system. Mankind **11**:319-325.

Rigsby, B., and A. Chase. 1998. The Sandbeach people and dugong hunters of eastern Cape York Peninsula: property in land and sea country in N. Peterson, and B. Rigsby, editors. Customary Marine Tenure in Australia. Oceania Publications, University of Sydney, Sydney.

Sinnamon, V. 1995. Fisheries of the Lower Mitchell River, North Queensland in J. Cordell, editor. Indigenous management of land and sea and traditional activities in Cape York Peninsula. Cape York Peninsula Land Use Strategy, Office of the Coordinator General of Queensland, Brisbane, Department of the Environment, Sport and Territories, Canberra, and Queensland Department of Environment and Heritage, Brisbane.

Smith, A. 1987. Usage of marine resources by Aboriginal communities on the east coast of Cape York Peninsula. Page 144. Great Barrier Reef Marine Park Authority, Townsville.

Smyth, D. 2001. Management of Sea Country: Indigenous People's Use and Management of Marine Environments. in R. Baker, J. Davies, and E. Young, editors. Working on Country: Contemporary Indigenous Management of Australia's Land and Coastal Regions. Oxford University Press, Oxford.

Smyth, D., and P. S. Valentine. 2008. Pathways to securing cultural and natural heritage of international conservation significance on Cape York Peninsula. Queensland Environmental Protection Agency.

Southon, M., and KuararegTribalElders. 1998. The sea of Waubin: the Kuarareg and their marine environment in N. Peterson, and B. Rigsby, editors. Customary Marine Tenure in Australia. Oceania Publications, University of Sydney, Sydney.
Spradley, J. P. 1979. The ethnographic interview. Holt, Rinehart & Wilson, New York.
Thierret, J. W. 1958. Economic botany of the cycads. Economic Botany **12**:3-41.
Thomson, D. F. 1933. The hero cult, initiation totemism on Cape York. Royal Anthropological Institute Journal **63**:453-537.
Thomson, D. F. 1934. The dugong hunters of Cape York. Journal of the Royal Anthropological Institute **64**:237-262.
Thomson, D. F. 1939. The seasonal factor in human culture: illustrated from the life of a contemporary nomadic group. Prehistoric Society Proceedings **5**:209-221.
Walker, D., editor. 1972. Bridge and Barrier: The Natural and Cultural History of Torres Strait. Research School of Pacific Studies, Department of Biogeography and Geomorphology. Australian National University, Canberra.
Woinarski, J. C. Z., R. J. Williams, O. Price, and B. Rankmore. 2005. Landscapes without boundaries: wildlife and their environments in northern Australia. Wildlife Research **32**:377-388.
WorldHeritageCommittee 1992. The Operational Guidelines for the Implementation of the World Heritage Convention. . UNESCO World Heritage Centre, Paris.
Ziembicki, M. 2010. Australian Bustard. CSIRO Publishing, Collingwood.

Websites referenced:

Chuulangun Aboriginal Corporation: www.kaanjungaachi.com.au/ accessed 8/9/2010
Traditional Knowledge Revival Pathways: www.tkrp.com.au Accessed 8/9/2010

Table 2: Pathways for development in Theme 1: traditional conservation practices and land & sea management

Theme	Region	Sub-region(s)	Key aspects of traditional culture & TEK	Follow up questions / points of interest
1a *Access to land through communal tenure*	CYP	• All regions	• Variety of communal tenure systems • Breakdown in controls over hunting laws has led to increasing concerns over sustainable use of resources	• Document the variety of tenure systems and how they relate to resource use patterns. • To what extent are hunting and gathering practices still governed by communal tenure laws? • What are the implications and uses of such systems for contemporary conservation and land management programs?
	East coast	• Coen • Lockhart • Northern Peninsula • Hopevale-Cooktown	• Narrow, small coastal estates extending from inland out to sea • People largely sedentary • Relatively high population densities • Coastal people mainly sea focused	• As above
	Inland	• All regions except Kuarareg	• Large estates • Nomadic movements • Low population density	• As above
	West coast	• Mapoon • Northern Peninsula • Naparanum • Aurukun • Pormpuraaw • Kowanyama	• More complex estates • Relatively high population densities • Coastal people but mainly inshore focus	• As above
	Torres Strait	• Kuarareg	• Ownership of islands, sea and its resources	• As above
1b *Totems & sacred sites*	All regions	• All regions	• Detailed knowledge of totemic species • Variable restrictions over use of totems, and may depend on person's age, gender, initiation status or marital status. • Totems associated with sacred sites or particular tracts of land • TEK may be passed down to worthy initiates only	• Develop detailed ethno-ecological studies of species of interest (threatened species, endemics, etc) based on knowledge base of individuals for whom the species is a totem among different language groups on Cape York Peninsula. • What rules are associated with hunting or gathering totemic species in different regions? • To what extent are areas of land managed for totemic species? • Is hunting controlled at sacred sites? Do these then function as proxy conservation reserves for different species?

				• To what extent is TEK associated with totemic or game species passed down to worthy recipients? How may this effect resource exploitation? • To what extent are such laws still used and enforced?
	East coast	• Coen • Lockhart • Northern Peninsula • Hopevale-Cooktown	• Traditionally, eating dugong was restricted to elders, clan leaders & initiated men	• How did such practices vary along the coast? • To what extent are they still practiced?
	Torres Strait	• Kuarareg	• Knowledge of environmental conditions (eg tides, weather) and hunting and fishing techniques passed down to initiated men only	
1c *Seasonal harvesting & access to foods*	East coast	• Coen • Lockhart • Northern Peninsula • Hopevale-Cooktown	• Seasonal closure of beaches and hunting areas for turtles and dugongs • Species seasonally harvested according 'fatness' (all regions)	• What are the laws and customs associated with seasonal exploitation of resources in different regions of Cape York? • Document knowledge regarding seasonal patterns of game condition and preferences for use of exploited among different groups.
1d *Restriction on type or quantity used*	CYP	• All regions	• Differences in food preferences between regions • Specific TEK required to harvest certain types of food	• Document specific rules limiting exploitation of different species across Cape York. • What specific knowledge is associated with certain species (e.g. the need for removing poison glands of hawksbill turtles prior to consumption – are there similar requirements for other species)? • How do preferences among Indigenous groups vary regarding foods eaten or avoided that may affect harvesting patterns and species populations?
	East coast West coast	• All sub-regions in these regions	• Spread of resource use across many different species and ecosystems so that single species were not over-exploited	
	West coast	• Mapoon	• Food preferences dictate types of foods eaten (e.g. turtle eggs with developing young not eaten at Mapoon)	
	Torres Strait	• Kuarareg	• Restrictions on quantity of a resource that could be taken to prevent excessive take determined by community leader	

1e(i) *Domiculture*	CYP	• All regions	• Population density, size of clan estates, food preferences and regularity and extent of people's movements differs between regions. People therefore affected vegetation communities differently across CYP.	• Document other examples of domiculture on Cape York Peninsula. • Highlight the diversity of outcomes as a result of domiculture on vegetation communities in different regions as a result of factors such as local environmental conditions, human population density, configuration of clan estates and movement patterns. •
	East coast	• Coen • Lockhart • Northern Peninsula • Hopevale-Cooktown	• Small estates, a sedentary lifestyle and large camps meant that vegetation communities could be significantly affected • Useful plants may have also been translocated to offshore islands	
	West coast & PCB area	• Mapoon • Naparanum • Aurukun • Pormpuraaw • Kowanyama	• More complex estates, movements in the dry season and confinement to sand ridges on floodplains during the wet season resulted in concentrated effects on vegetation patterns on sand ridges and more diffuse influences elsewhere	As above
	Inland	• Inland in most regions	• Large estates, people highly mobile. In comparison to other areas impacts more diffuse across the landscape.	As above
	Torres Strait		• Estates consist of islands – plants possibly moved between islands	
1e(ii) *Aboriginal use of fire*	CYP	All regions	• Fire used for different reasons • Under traditional fire regimes landscape dominated by mosaic of different fire patterns • Protection of vine thickets and rainforest areas • Significant effects on rainforest boundaries	• Many aspects of traditional fire management were shared widely across northern Australia. Therefore, the most notable avenues to develop regarding traditional knowledge and use of fire on Cape York relates to natural features that are unique or are represented as exceptional examples in the region. For example: ○ How is fire used in important Cape York environments (rainforests, deltaic fan deposits (floodplains) of Mitchell River, sand dune systems, etc)? ○ How do traditional fire regimes affect endemic or threatened species? Are specific fire regimes used to manage these species?
	East coast	• Yalanji	• Use of fire by the Kuku-Yalanji of the wet tropics to protect carbohydrate resources in and around rainforests unique in so	•

			far as such areas not used as such elsewhere	

Table 3: Pathways to develop in Theme 2: Ecological processes and ecosystem interactions

Theme	Region	Sub-region(s)	Key aspects of traditional culture & TEK	Follow up questions /points to develop (priority)
2a *The land and sea connection*	CYP region	• All coastal regions	• The diversity of TEK and lifestyles associated with the land sea connection across the entire CYP coastal region is of outstanding significance. • Terrestrial indicators of marine resource availability and vice versa are one example of the land sea link	• What TEK is specifically associated with how marine processes affect terrestrial ecosystems, flora and fauna (and vice versa) in each coastal region?
	East coast	• Coen • Lockhart • Northern Peninsula • Hopevale-Cooktown	• Tenure includes both land and sea areas • Integrated use of land & sea although primarily with a seaward outlook • Use of offshore islands & reefs by outrigger canoe	• As above
	West coast	• Mapoon • Northern Peninsula • Naparanum • Aurukun • Pormpuraaw • Kowanyama	• Focus on intertidal, estuary, channels & floodplains • Limited use of offshore areas because of limited accessibility and a preference for using the highly productive inshore and floodplain environment	• Document specific knowledge of land sea interactions, in this case as they relate to the main near shore and land based environments people were most closely associated with.
	PCB & Cape Melville	• Lakefield-Kalpowar-Cape Melville-Starcke	• Use of offshore islands and floodplain areas. • Presence of large islands in the Flinders Island group allowed people to spend extended periods there. • Differences between marine and freshwater based plants and animals emphasised	•
	Torres Strait	• Kaurareg • Northern Peninsula	• Primarily a sea based outlook • Detailed knowledge of tides and weather conditions, including effects of land and reefs on tide movements and their impact on food resource availability & accessibility • Detailed knowledge of these elements reflected by detailed language and vocabulary	
2b *Rainforest-savanna interface*	East coast West coast PCB Inland	• All regions	• Fire used to manage rainforest patches across the entire region significantly influencing rainforest boundaries & structure	• Review and further document traditional fire management practices associated with different types of rainforest across Cape York, esp significant rainforests (e.g. Lockerbie, Iron Range and Jardine areas)
2c *CYP as bridge &*	CYP	• All regions		• What TEK is associated with species of plants and animals that are relicts or affected by bridge and barrier effects? • What TEK associated with biogeographic patterns? Or migration?

barrier				

Table 4: Pathways to develop in Theme 3: Seasonal uses of land and sea

Theme	Region	Sub-region(s)	Key aspects of culture & TEK	Follow up questions / points to develop
3a *Opportunistic & predictable resources*	CYP	• All regions	• Highly seasonal environment affects preferences, availability and accessibility of resources used • Although the whole CYP region is notably affected by wet-dry seasonality a range of strategies were employed by people for resource exploitation depending on local environmental conditions	• How does seasonal and opportunistic resource use vary among different regions and sub-regions of Cape York?
	East coast	• Coen • Lockhart • Northern Peninsula • Hopevale-Cooktown	• Productive region that ensures broad range of available resources. Preference for opportunistic use of most valued resources (eg dugongs, turtles, fish, crustaceans) at any time of year. • Certain seasonally available resources also used. • Seasonally abundant foods facilitated ceremonial meetings of many people	As above
	West coast	• Mapoon • Northern Peninsula • Naparanum • Aurukun • Pormpuraaw • Kowanyama	• Greater reliance on resource use according to seasonal availability • Seasonal inundation of floodplains meant restriction to sand dune areas and limited movements during the wet season • Wider movements in the dry season across a range of environments	As above
	PCB	• Lakefield-Kalpowar-Cape Melville-Starcke	• Widely distributed network of camping sites that were used at any time of year. People here moved over larger areas than east coast people, and were not restricted to dune systems as the people of the west coast were.	As above
	Torres Strait	• Kuarareg	• Marine based diet. Wet season focus on dugong. Turtles & many fish species avoided because they consume jellyfish at these times	As above
	Inland	• All inland regions	• Large territories and broader movements to exploit seasonally and opportunistically available resources that were in lower abundance than other regions	As above
3b *Seasonal calendars*	CYP	• All regions	• Variable interpretations of seasonal year between regions. For example, people in the Lockhart River region recognize 6 seasons, people around Cape Kerweer Aurukun region refer to 5 seasons, while Kuarareg have 2 seasons based on the direction of prevailing winds.	• Document the seasonal calendars of language groups within each region. Highlight the diversity of perspectives and how these relate to local environmental conditions.
3c *Seasonal indicators*	CYP	• All regions	• Many different indicators are used by Indigenous people throughout the region that point to the availability of resources, changes in seasons and other aspects of the environment. These may be highly specific and localized.	• Document seasonal indicators used by different language groups across the region.

Table 5: Pathways to develop in Theme 4: Significant natural and cultural sites

Theme	Region	Sub-region(s)	Key aspects of culture & TEK	Further questions / points to develop
Natural & cultural sites:	CYP	All regions	• See below	• Review and document ethno-ecological heritage in more detail in relation to specific sites of particular significance, particularly natural sites and areas of conservation significance as documented by Abrahams *et al.* (1995).
4a(i) *Wetlands*	CYP	• All regions	• All nationally important wetlands are used and valued by Aboriginal people • Knowledge of medicinal and food plants, animals and environmental processes associated with wetland function. • Seasonal use of wetlands	• Identify which wetland of national significance is associated with which language group and estate and document key aspects of TEK associated with each. • Document TEK associated with seabird, shorebirds and other waterbirds, and significant areas for these groups?
	West coast	• Kowanyama • Mapoon • Northern Peninsula • Naparanum • Aurukun • Pormpuraaw	• Specialized use of coastal floodplains, mudflats, channels & wetlands • Seasonal use of floodplains and restriction to sand ridges during wet season	• As above
4a(ii) *Coastal areas*	East coast, West coast, PCB, Torres Strait	• All regions except inland	• As per Theme 2a the use of land & sea along coastal regions of CYP a feature of Indigenous ethno-ecological heritage on CYP	• Document use of and TEK associated with seabird, shorebirds and other waterbirds, and significant areas for these groups? • TEK associated with extensive mangrove and sea grass areas. • Use and TEK associated with important fish breeding grounds, turtle, dugong areas has been documented in several studies • Document TEK specifically associated with notable coastal systems (eg Shelburne Bay dunefields)
4a(iii) *Rainforests & heathlands*	East coast	• Coen • Lockhart • Northern Peninsula	• Gondwanan elements and processes are unique to the Cape	• What TEK is associated with Gondwanan elements
4a(iv) *Rare, endemic & threatened species*	CYP	• All regions	• Detailed knowledge of many specific taxa • Specialised knowledge of totems	• Document TEK associated with rare, endemic and threatened taxa of interest (eg traditional management methods, seasonal use, status, diet, habitat requirements and other ecological information for species such as cassowaries, endangered flora, etc
4b Cultural sites	CYP	• All regions	• Many stories and TEK are associated with important cultural sites	• What TEK is associated with important cultural sites?

Table 6: Pathways to develop in Theme 5: Cultural diversity: interactions and influences

Theme	Region	Sub-region(s)	Key aspects of culture & TEK	Further questions – points of interest
5a *Melanesian – Aboriginal connection*	• Tip & Torres Strait	• Torres Strait • Northern Peninsula	• Interaction between Melanesian and Aboriginal people is unique to this region. • Close continuous contact between Kuarareg & Gudang. • Interaction of Gudang with other Torres Strait groups. • Gudang were fringe participants in Melanesian trade	• What features of ethnoecological heritage is shared and has been exchanged between Melanesians and Aborigines of the northern part of the peninsula?
5b *Inter-regional interactions*	• East coast • West coast • PCB/Cape Melville	• Northern Peninsula • Mapoon • Napranum • Lockhart Wuthathi • Coen • Lakefield-Cape Melville	• Cultural influences from Torres Strait appear to extend as far south as Weipa on west coast and Cape Melville along the east coast • Interaction and close ties between people along the coastline and associated diffusion of TEK and material goods from Melanesian regions southwards along the coast • Generally limited social and cultural interaction with inland people	• What aspects of TEK and practices are shared and have been passed along the coastlines between these regions?
5c *Intra-regional and within clan ethnoecological diversity*	• CYP	• All regions • Lockhart River	• Considerable differences may exist in ethnoecological heritage and traditions within single language and even within clan groups • Specific TEK and practices associated with particular myths, totems and sacred sites that are unknown to other groups provide examples of such diversity within groups.	• The example from Chase (1980) and Smith (1987) from the Lockhart River region demonstrates the diversity of ethnoecological heritage within single groups. • It demonstrates the need for: ○ documenting TEK at fine scales ○ advantage of consulting with a broad range of people