ENVIRONMENT NEWSLETTER

Quarterly Newsletter of the South Pacific Regional Environment Programme

Contents:

NUMBER 11 **OCTOBER - DECEMBER 1987**

The South Pacific Commission's ENVIRONMENT NEWSLETTER commenced publication after having been in 'retirement' since issue No. 4 (March 1982). It is now produced on a quarterly basis commencing with No. 5 (April - June 1986). News articles and comments are welcomed for future issues.

South Pacific Regional Environment Programme

(SPREP)

South Pacific Commission

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The Environment Newsletter is produced by the South Pacific Regional Environment Programme, South Pacific Commission, Noumea, New Caledonia and reports on the various activities of the programme together with news of general environmental interest to readers in South Pacific countries.

SPREP's activities are co-ordinated by a group made up of the South Pacific Commission (SPC), the United Nations Environment Programme (UNEP), the South Pacific Bureau for Economic Co-operation (SPEC), and the Economic and Social Commission for Asia and the Pacific (ESCAP).

The United Nations Environment Programme, through its Oceans and Coastal Areas Programme Activity Centre (OCA/PAC) based in Nairobi has, since SPREP's inception, given considerable financial support to the programme's activities.

Much of the work undertaken by SPREP and supported by UNEP involves utilising skills of the Universities and Training Institutions within the South Pacific, members of whom have recently formed an Association of South Pacific Environmental Institutions (ASPEI) to facilitate this work.

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NEWS IN AND AROUND THE REGION

SPREP/UPNG PROJECT LOOKS AT WASTES FROM PAPUA NEW GUINEA COPPER AND GOLD MINES

As part of a major SPREP Project, funded by the United Nations Environment Programme (UNEP), researchers from the Chemistry and Biology Departments of the University of Papua New Guinea are actively monitoring rivers and coastal Papua New Guinea waters to determine heavy metal content in wastes from major mining activities. Mr Peter Haei and John Genolagani commenced a pilot sampling programme in August 1987 collecting bivalve molluscs at:

(1) the mouth of the Fly River, which carries tailings wastes from the large OK Tedi copper and gold mine and will receive wastes from the Porgera gold mine;

(2) the mouth of the Markham River and along the Morobe coast south of LAE; and

(3) Port Moresby Harbour and Bootless Bay.

Further bivalves, collected over the last eighteen months along the west coast of Bougainville island near the mouth of the Jaba River were forwarded to UPNG for analysis by the Environmental Section of Bougainville Copper Limited. The Jaba River receives all the tailings waste from the very large copper mine at Panguna on Bougainville Island.

Earlier sampling in the Jaba River

A long-term monitoring programme will be commenced after an evaluation of the results of the pilot sampling programme and analysis of the bivalves. The results of this work will be reported in a later SPREP Newsletter.

ORGANOCHLORINE MONITORING IN PAPUA NEW GUINEA

As part of the above project oyster samples, collected from four sites around Port Moresby and already analysed by Peter Haei for heavy metal residues, will be analysed by Mr Franck Griffin of UPNG's Chemistry Department to determine possible pesticide residue.

Close co-operation has developed between universities and research institutions working for SPREP under the umbrella of the Association of South Pacific Environmental Institutions (ASPEI) as evidenced by Mr Peter Haei's attachment to the Laboratoire d'Etude et de Surveillance de l'Environnement (LESE) in Tahiti for additional training to assist UPNG's pesticide and heavy metal monitoring capacity. The region's capacity to undertake further monitoring of heavy metal and organochlorine residues has also been greatly enhanced by the equipment (particularly the Atomic Absorption Spectrophotometer) provided with UNEP Funds for the SPREP project.

NEW ZEALAND RECOGNISES IMPORTANCE OF NATIONAL PARKS

As part of its celebrations in the centennial year of national parks, a special limited issue coin has been authorised by the New Zealand Government. This is only one of many activities undertaken in recognition of the value New Zealanders place upon protecting natural areas. This concern was reflected as early as 1887 when the paramount chief of the Tuwharetoa asked the government to accept land, the site of New Zealand's first national park, Tongariro, as a gift to all the people to be kept tapu (sacred) and protected. This became the fourth national park in the world and the first to be given by the indigenous people.

(Source: Centennial Contact, No. 8,
October-November, 1987)

WESTERN SAMOA CELEBRATES NATIONAL CONSERVATION WEEK

Western Samoa's Annual Conservation Week and Arbor Day was held 1-6 November 1987 with a programme produced by the staff of the Forestry Division and National Parks and Reserves and directed by a National Conservation Committee made up of government, business and religious leaders. The theme "O Oe Ma Lou Siosiomaga" (You and Your Environment) stressed the important relationship of individuals to their environment, particularly man's reliance upon his environment for survival and his need to protect it for future generations.

To ensure a healthy future, the main goal for this year's programme was to invite the Pulenuu (mayors) and Presidents of the Women's Committee from each village to attend a national conference enlisting the support of these important people who have the ability to influence village matters and increase people's awareness of environmental destruction within Samoa. Experts in several fields presented papers about the importance of conservation followed by audience questions to a discussion panel. The very full week of activities included:

O OE MA LOU SIOSIOMAGA

- Clergymen speaking to their congregations about the importance of conservation and its place in God 's design for life.
- The National Conservation Week opening day speech presented by the Honourable Member of the Council of Deputy, Afioga Mataafa, Faasuamaleaui Puela whose remarks were also nationally broadcast as was the following Conservation Conference.
- Presentation of awards to the winners of the nationwide stamp design contest which had six categories on the Conservation of Wildlife, Water, Forestry, Soils, Marine Resources and Culture.
- The Annual Conservation Quiz Competition in which over 200 students from 30 schools participated.
- Distribution of tree seedlings to the Members of Parliament in their home districts who each led their districts in the Annual Arbor Day celebrations with His Highness Malietoa Tanumafili II speaking to the nation about the need to conserve the forests of Samoa.
- Other programmes during the week included, the development of conservation posters which showed good and bad practices of conservation and were distributed to the primary school teachers to be used as a teaching tool.
- Printing of "Olu-tu le Lupe" and National Park and Reserves bumper stickers which were distributed by the business community, store owners giving the stickers to the public as they purchased goods from their stores.
- An educational radio programme in which school children were asked questions about conservation and received awards of their bus fare to and from school for one week.

YOU AND YOUR ENVIRONMENT

In the words of Malaki Iakopo, Chairman, Committee for Conservation contained in information provided to teachers:

> "Conservation. An important concept everyone needs to practice. Everyday as we go about our daily activities we change our surroundings. We must become aware that our activities do have an affect upon our island.
>
> When we fish our lagoons and take the very small fish to eat, we are reducing the number of fish our families will have next year and the following years.
>
> When we cut down trees to make our plantations, we are not taking care of our soil. In a few years, the bare, unprotected soil will no longer yield food. Our good soil will have been washed away by the rain.
>
> When people forget their past, their culture, people forget what it was that made their country special.
>
> These are some of the problems facing Samoa today. Help us, the Conservation Committee, to teach our children good conservation practices. The better informed our children, the stronger and healthier our country will be in the future."

NEW MEASURES TO CONTROL MARINE POLLUTION ADOPTED IN AUSTRALIA

Australia has introduced new measures developed by the United Nations International Maritime Organisation (IMO) to control marine pollution from ships in line with the International Convention for the Prevention of Pollution from Ships, (MARPOL). Oil and noxious liquid substances, including those resulting from ship operational discharges such as tank cleaning and deballasting, will now be more strictly controlled and prohibited in some areas including the Great Barrier Reef region. In fact, oil discharge will be prohibited within 80 km (50 miles) of the reef, such measures ensuring protection of one of Australia's and the world's most valuable resources - the Great Barrier Reef.

(Source: Australian Government Weekly Newsletter, Vol. 46, No. 3, p. 15)

MICRONESIAN STUDENTS UNDERTAKE TRAINING AND RESEARCH IN AGROFORESTRY THROUGH SPREP SUPPORT TO THE UNIVERSITY OF GUAM

In many of the islands of the Pacific, the forest is an integral component of the subsistence agriculture system and provides people with many of the basic necessities of life (food, timber, medicine, dyes, etc.). However with increasing development, population pressure and the increasing demands for agricultural production and resource exploitation, forests are rapidly being destroyed. Under conditions of high population pressure and scarce land resources as exist on some of our Pacific islands, the results have been an extremely rapid rate of environmental degradation, soil erosion, marginal agricultural returns and the destruction of the forest ecosystem.

There are many examples which suggest the need for forest protection in the South Pacific. Thaman and Ba (1979) report that fuelwood cutting accounts for 50-90 per cent of deforestation in the small Pacific islands, and that fuelwood is becoming more expensive to purchase and time consuming to gather. On Vanuabalavu, Fiji, deforestation has led to decreased stream discharges (Thaman and Ba, 1979). On Tongatapu, fuelwood and other culturally important trees are scarce because of population pressure and the increased commercialisation of agriculture, In the Gogol Valley of Papua New Guinea, the clearfalling of 36,750 hectares of rain forest has destroyed the subsistence base of 2 000 - 4 000 people (Seddon, 1984). Furthermore, it seems unlikely that reforestation, agricultural development and economic returns will compensate for the loss of this resource base. Myers (1981) estimates that with the current emphasis of resource exploitation, little will remain of Melanesia's lowland forests by 1990.

Concerns such as these have led to the development by the University of Guam of a SPREP-supported programme to teach students from Kosrae, Truk, Pohnpei, Yap, Palau and the Marshall Islands how to undertake research on their own systems of resource management, conservation, ecology, and traditional agroforestry.

(Source: Excerpts from Harley I. Manner, 'Agroforestry: An Appropriate Land Use System for the Pacific Islands')

Making best use of available land - Pulaka pits in Kiribati

SPREP ASSISTS MAJOR SURVEY OF BIOLOGICAL RESOURCES WITHIN THE SEVENTY ISLANDS GROUP, PALAU

At the invitation of the Palauan government SPREP planned and participated in a comprehensive assessment of biological resources within the Ngerukwid, also called the Seventy Islands, group in Palau - a protected area of world reknown. The 2 square mile Ngerukwid Wildlife Reservation, protected since 1956, has been described as a paradise with dozens of lush green islands rising steeply above legendary turquoise coloured lagoons.

The project was first proposed in 1985 by Mr Noah Idechong, Palau's delegate to the Third South Pacific National Parks and Reserves Conference held in Apia. He called for a survey to be undertaken to determine exactly what species lay within this protected area - both above and below sea level.

Particular concern was expressed that, in recent years, the number of giant clams in Palauan waters seemed to be decreasing at a rapid pace and an initial baseline study of resources, leading to the eventual development of a management plan, would assist in conservation efforts.

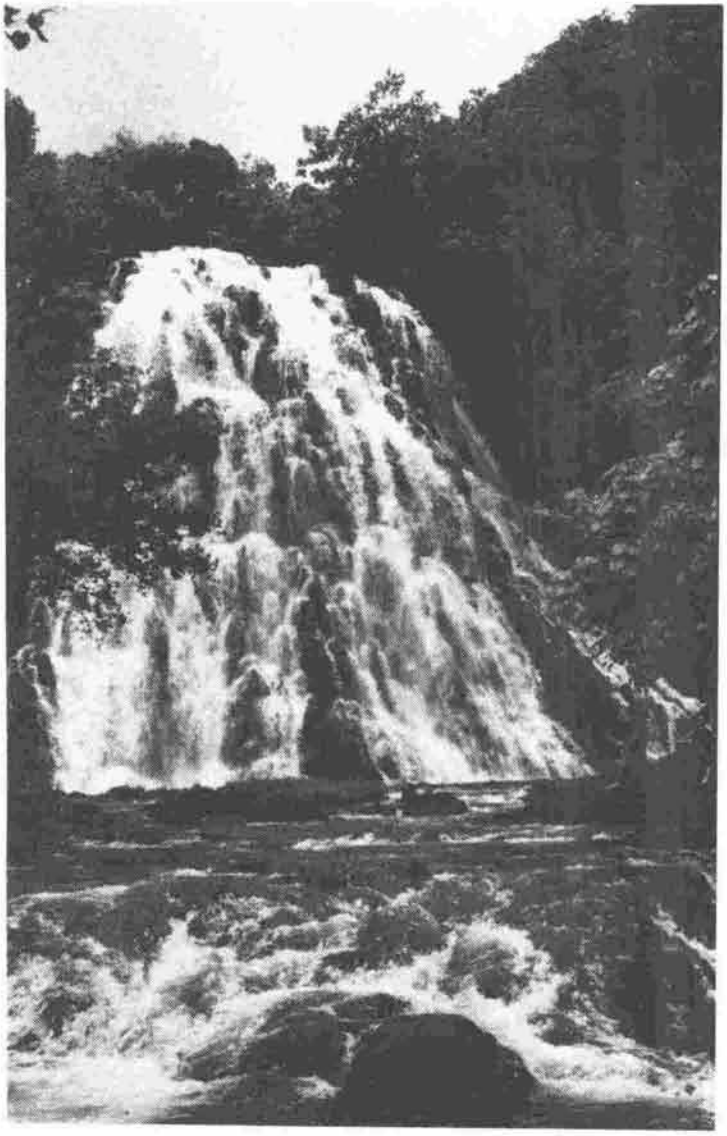
The SPREP-assisted survey involved a number of ecologically concerned groups, organisations and individuals including a team of marine and terrestrial biologists, botanists and geographers from the University of Guam, receiving partial financial assistance from the International Union for Conservation of Nature and Natural Resources (IUCN) and logistical support from the Marine Resources Division of the Government of Palau.

Probably the most outstanding feature of the survey was the overwhelming presence of so much scientific expertise assembled together to assess the huge variety of marine and terrestrial life - from crabs, corals, snails, sea slugs to spiders, birds, bats, lizards and trees.

Initial findings from the survey suggest that this precious protected area is not as "untouched" as might have been hoped. There were a number of giant clams alive and thriving but also an abundance of empty shells; five sea turtle nests were discovered on isolated beaches of which four had been poached by man; and there is evidence of more and more people having visited the area without appropriate recognition of its fragile ecology.

Seventy Islands Group, Palau

POHNPEI FOREST LAW ENACTED - ENSURING WATERSHED PROTECTION



After two and a half years of preparation, hearings, exhaustive discussions, and minor changes, the Pohnpei Watershed Forest Reserve and Mangrove Protection Act of 1987 passed the Legislature and was signed into law by Governor Resio Moses. The law recognises the value of forests in all aspects of life in Pohnpei and centres on the protection of soil, water, and mangrove ecosystems. Soil instability is the standard for designation of Watershed Forest Reserves. Uses allowed within the Reserves, include limited agriculture, research, dispersed recreation, gathering of wild plants, and some timber harvesting, provided environmental protection requirements are met. Uses forbidden within the Reserves include permanent occupancy, pesticide use, unauthorised tree cutting, land clearing by fire, and grazing.

An interesting feature of the new law is the way in which it deals with unstable soil areas that have already been settled upon. It recognises these as Important Watershed Areas (IWAs), and mandates these restrictions on them: (a) no additional building of roads or structures; (b) no rebuilding or improvement of structure now in existence; (c) strict enforcement of all regulations pertaining to location and design of toilets, septic tanks, drain fields, piggeries, fire, use of chemicals, and other pertinent regulations.

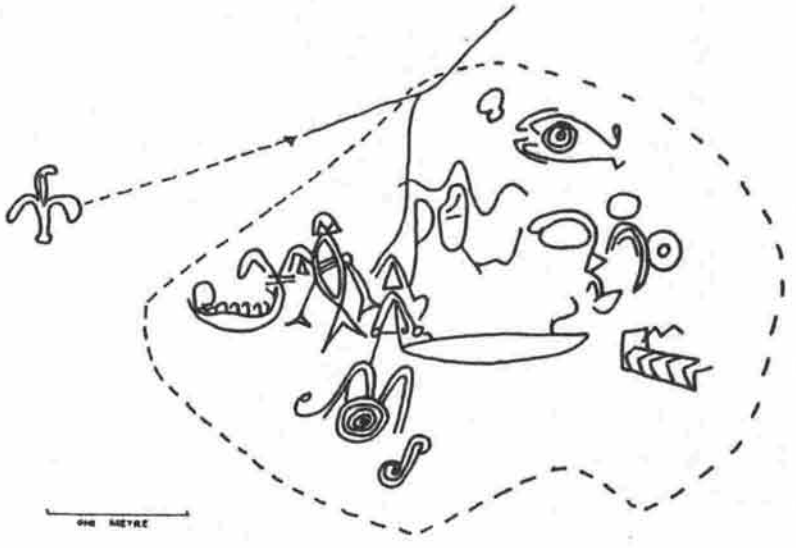
Some stiff penalties are mandated for those who break the law, including fines and jail sentences. Unauthorised cutting of trees in Watershed Forest Reserves and in Mangrove forests carry mandatory fines of one thousand dollars per tree cut. State Forester Herson Anson explained this is necessary to deter theft of high-value hardwoods, that could otherwise be cut and a lesser fine paid, and still be profitable.

(Source: Len Newell, A Report of New Watershed Protection Legislation, American Pacific Forestry News reported in Asia-Pacific Forest Watershed Newsletter, Issue No. 12, September 1987)

ARCHAEOLOGICAL TRAINING PROJECT IN WESTERN PROVINCE, SOLOMON ISLANDS ASSISTED BY SPREP

Financial support was provided by SPREP to assist the Solomon Islands Government with its Western Province Archaelogical Training Programme, the primary goal of which is to encourage the recording and passing on of traditional knowledge concerning custom places and ancient ways of life of the people of Western Province. Conducted under the auspices of the Province's Office of Cultural Affairs and directed by Provincial Archaeologist Rowland Reeve, the 3 month training programme consisted of a combination of classroom and field activities.

In the classroom the Solomon Island trainees undertook lectures examining existing knowledge of Western Solomons prehistory, including a review of the various linguistic, ethnographic and archaeological studies conducted to date with an emphasis on what each reveals about the growth and development of traditional Solomons Culture. They also received instruction in techniques of recording archaeological sites and interpreting their findings. The field work was undertaken in the Kusage cultural area with the objective of recording all the custom sites located in the region and collecting traditional lore about them.



Petroglyphs discovered in an earlier archaeological search in Western Province

In the past the traditional knowledge was passed orally from generation to generation. Now, however, with so many young people leaving the village for school or to work in towns, much traditional knowledge is simply not being handed down. For this reason one of the primary objectives of the training programme was to write up the gathered information in such a way as to make it accessible to the young people of Kusage and of the rest of the Western Province. In this way they will be able to read and remember the stories of their past, a past which might otherwise have been lost.

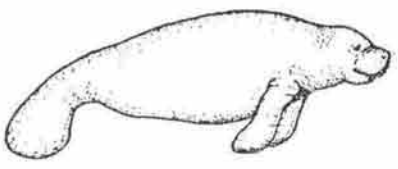
Cultural knowledge forms an important component of information relating to protection of the environment and training programmes such as this contribute greatly in ensuring that a pool of people skilled in archaeological data collection and interpretation exists in-country to undertake this work in the future.

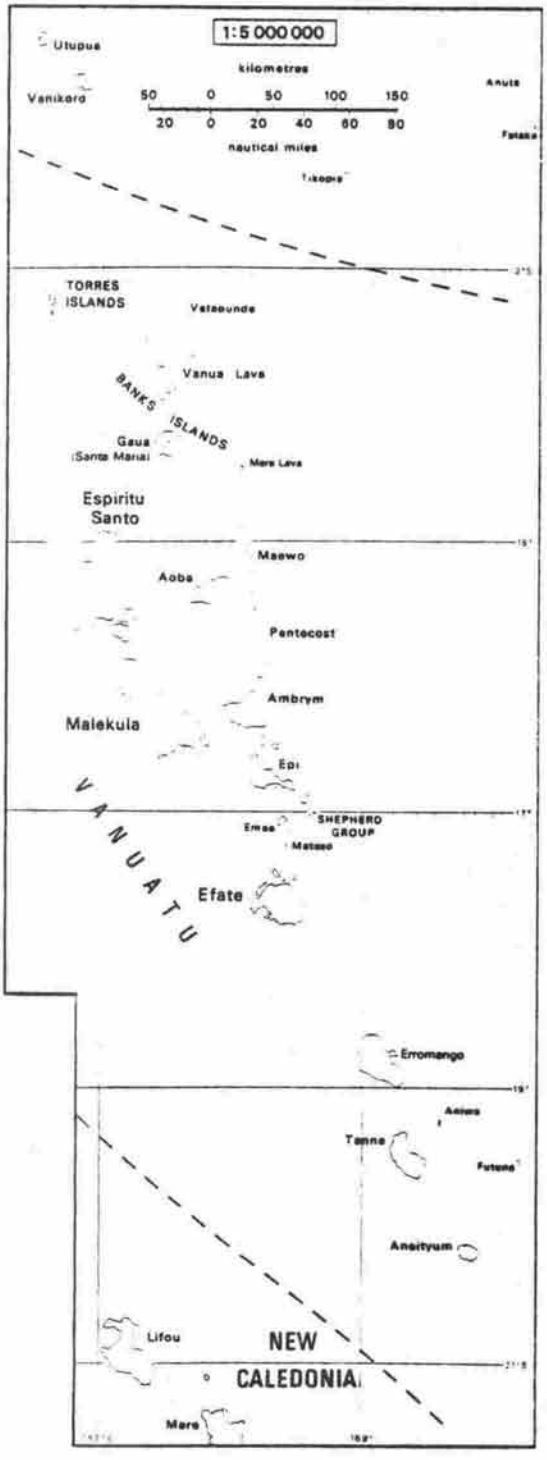
FEATURE

SPREP ASSISTS DUGONG SURVEY IN VANUATU

With financial assistance from SPREP, the Environment Unit of the Ministry of Lands in the Republic of Vanuatu undertook a questionnaire and aerial survey of Dugong between October and December 1987. Preliminary results show that the dugong is widely distributed in Vanuatu, from Aneityum in the south to the Torres in the north with all major islands reported to support dugong. Findings show that dugong generally occur in small numbers, mostly 1 or 2 being reported and rarely more than 3. They do no seem to be systematically hunted at all - rather they are only taken when stranded on beaches or in rock pools and appear to have little custom importance although some respondents referred to custom laws, lore and traditional hunting methods.

As a result of the aerial survey which was undertaken by Mrs Brydget Barker-Hudson, a consultant from Townsville with extensive experience in dugong aerial surveying, 1 000 km of coastline was flown between Tanna and the Torres. Eleven dugongs in pairs or alone were sighted from Efate island in the south to Malekula in the north which is consistent with the questionnaire survey that showed that dugongs are widespread but occur only in small numbers at any one locality.

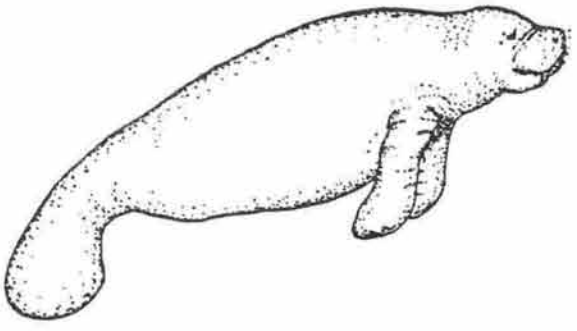




The Environment Unit of the Ministry of Lands, Energy and Rural Water Supply in Vanuatu undertook this study in an attempt to discover basic information about the dugong - where it occurs, in what numbers, seasonal movements methods and reasons for capture, numbers caught and custom laws and stories relating to it. Such information is required to determine whether, as in other parts of the world, their numbers are declining and conservation measures are required.

The dugong (kaofis in Bislama, vache marine in French) is Vanuatu's largest mammal, and also one of its least known. It grows to 3.3 metres in length and to over 400 kilogram in weight. This shy and gentle animal lives in clear, shallow, coastal waters throughout the Vanuatu archipelago, from Tanna to the Torres. It belongs to the group of animals known as sirenians, the only other living members of which are the manatees from the Carribean, West Africa and the Amazon river. Although the dugong superficially resembles a dolphin or small whale, the two groups of animals are not closely related. In fact, the nearest living relative to the sirenians is the elephant. Sirenians and elephants are believed to have evolved from a common ancestor.

The dugong occurs along tropical coastlines from east Africa, Asia and Australia to New Guinea. In the West Pacific it also occurs in New Caledonia, Solomons, Yap, Guam, Palau and Vanuatu. Its occurrence in Vanuatu is especially interesting therefore - this is the most easterly location of its worldwide distribution.



DUGONG ADAPTATIONS

The dugong is the worlds only truly marine herbivorous mammal. The manatees, also herbivorous, spend much of their time in rivers. The dugong lives entirely on sea grasses. Thus it is confined to localities in which these grasses are abundantly found - clear, shallow, sheltered waters of tropical regions. It is well adapted to eating sea grasses, leaves as well as roots and rhizomes. The lips form a horse shoe-shaped disc on the end of the snout. This disc is highly mobile and flexible, and together with stout bristles, is used to grasp and rake up food into the mouth. The mouth has few teeth. The sea grasses are ground up between horny pads that cover much of the upper and lower jaws. The front limbs of the dugong are used to support the animal whilst feeding and also to guide food towards the mouth. Another adaptation to its herbivorous way of life is its long intestine - about 37 metres in an adult. Each day the dugong needs a large amount of food - about 8-15% of its body weight. The large gut is needed to store this huge amount of food and to allow for the long time needed to digest the tough sea grasses. The dugong is very well adapted to living in the sea. The front limbs, besides being used to assist in feeding, are also used for steering whilst swimming. There are no rear limbs or flippers. The tail, with horizontal flukes rather like a whale, provides the main propulsion for swimming with steady up and down movements. Normally, the dugong is a slow, graceful swimmer but can make short sprints when alarmed. The skin, grey to bronze in colour but with white patches in older animals, is tough, thick and smooth. The body is stocky due to a thick layer of blubber underneath the skin. The head is large and the eyes small - dugong eyesight is believed to be rather poor. There are no external ears, the openings to the ears being small holes at the back of the head. The paired nostrils, which can be opened and closed, are situated on top of the snout allowing the dugong to breath air without raising head or body out of the water. When submerged, the nostrils are closed. Dugong bones are exceptionally dense and heavy. This adaptation allows them to sink and move along the sea bed with little expenditure of effort - rather like the heavy lead weights of a SCUBA diver.

DUGONG BEHAVIOUR AND LIFE CYCLE

The dugong can live for a long time - up to about 50 years. Females become mature at 8-18 years of age and give birth to single calves about 1.2 metres long, after a year's gestation. The mother and calf form a very strong bond between each other and remain together for 1-2 years. The calf will suckle the mother for much of this time although it can eat sea grasses quite soon after birth.

The late development of sexual maturity, coupled with the long calf-dependency period, means that most dugongs give birth to only five or six young during their lives. Thus dugongs have a very low rate of potential increase in numbers and this makes them vulnerable to exploitation.

Very little is known about mating and birth in dugongs. A few records indicate that the young are born in very shallow water - perhaps even on beaches, the mother and calf being re-floated on the incoming tide. Male dugongs possess a pair of tusks, enlarged upper incisors about 15 cm long that protrude for about 2 cm from the mouth. The precise function of these tusks is unknown, but it is thought that perhaps they are used to guide females into the correct position for mating.

EXPLOITATION AND HUNTING OF DUGONG

Throughout much of their range the dugongs have declined greatly in numbers and have become extinct in many areas. This decline is due to several reasons. Dugongs are hunted - a large animal yields up to 150 kilograms of meat and 5-8 gallons of oil. Other parts of the animal are used as well - tusks of males used to make cigarette holders, vertebrae for bracelets, skin for drums and belts, bones for making needles, hooks and kitchen utensils. Dugongs are also caught accidentally and drowned in fishing nets, killed in collisions with fast moving boats and poisoned in pollution incidents. Damage to and loss of sea grass beds has also caused dugongs to disappear in some areas.

As mentioned earlier, the dugong has a very slow rate of reproduction. In areas where the dugong is declining, it is clear that the mortality rate exceeds the rate of recruitment. In former times, the dugong could probably withstand hunting pressure by traditional means (usually spearing from canoes) for traditional purposes. However, newer methods of hunting, with rifles from high-powered boats, and the sale of meat in markets has caused much increased mortality rates. Combined with deaths from drowning, pollution and loss of sea grass areas, this has caused the declines and extinctions of modern times.

The dugong is officially recognised as an animal vulnerable to extinction. At worst, it could follow the Steller's sea cow and become totally extinct. This probably will not happen as there is now great concern for the welfare of dugongs. In Vanuatu for instance it is already protected by law; it is illegal to attempt or to catch them, offences punishable by fines of up to 10 million vatu (US$ 100 000). However very little is actually known about the dugong and hence the need for the study to ensure that they do not disappear from Vanuatu's waters in the future.

(Taken from 'The Dugong - Gentle Giant of Vanuatu's Seas',
M.R. Chambers, Environment Unit, P.O. Box 151, Port Vila, Vanuatu)

COURSES IN ENVIRONMENTAL SUBJECTS

New M.Sc. Course in Tropical Coastal Management,
Centre for Tropical Coastal Management Studies,
University of Newcastle upon Tyne

The course commences in September and takes place over a twelve month period consisting of two ten-week teaching terms, followed by an examination and then either a two-month research project (for the award of Diploma) or a four-month research project (for the award of M.Sc.). A limited number of scholarships may be available. For futher details contact:

Dr B.E. Brown
Centre for Tropical Coastal Management Studies
Department of Zoology
University of Newcastle Upon Tyne
NEWCASTLE UPON TYNE NE1 7RU
United Kingdom

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Environmental Impact Assessment
University of Aberdeen

The Centre for Environmental Management and Planning will run a three-month course on Environmental Impact Assessment, from July to September 1989. For further information contact:

Mrs Sandra Ralston
Conference and Training Manager
Centre for Environmental Management
and Planning
48 College Bounds
OLD ABERDEEN, AB9 1FX
Scotland
United Kingdom

CALENDAR OF EVENTS

INTERNATIONAL WETLANDS CONFERENCE — 19 - 23 September 1988
Rennes, France

Contact:

3rd International
Wetlands Conference
Museum national d'histoire naturelle
Laboratoire d'évolution des systèmes
naturels et modifiés
36, rue Geoffroy St-Hilaire
75231 PARIS CEDEX
France.

NATIONAL PARKS, NATURE RESERVES AND NEIGHBOURS — 31 October - 3 November 1988
Johannesburg

Contact:

Endangered Wildlife Trust
Private Bag XII
Parkview 2122
TRANSVAAL
South Africa

2ND INTERNATIONAL OCEAN AND COASTAL DEVELOPMENT EXHIBITION AND SYMPOSIUM 'OCEAN, MAN AND THE COMMUNITY', Kobe, Japan — 16 - 18 November 1988

Contact:

Mr S. Washimi
Techno Ocean '88
Technical Programme Committee
c/- World Import Mart Co. Ltd
3-1-3 Higashi-Ikebukuro
Toshima-Ku
TOKYO 170
Japan

ASIA AND PACIFIC REGIONAL CONFERENCE: POLLUTION IN THE URBAN ENVIRONMENT 'POLMET' 88 — 28 November - 2 December 1988

POLMET 88 Secretariat
c/- Hong Kong Institution of Engineers
9/F, Island Centre
No. 1 Great George Street
CAUSEWAY BAY
Hong Kong.

1989 PACIFIC BASIN CONFERENCE ON HAZARDOUS WASTE — April 1989

Contact:

Consortium Secretariat
Pacific Basin Consortium for
Hazardous Waste Research
c/- East-West Center
Environment and Policy Institute
1777 East-West Road
HONOLULU
Hawaii 96848
USA.

Telephone : (808) 944.7555
Telex : 989171
Cable : EASWESCEN.

HERITAGE CONSERVATION AND SUSTAINABLE DEVELOPMENT
Ottawa, Quebec City — 7 - 13 May 1989

Contact:

Gordon Nelson
University of Waterloo
ONTARIO
Canada

INTERNATIONAL CONFERENCE ON WETLANDS. 'THE PEOPLE'S ROLE IN WETLAND MANAGEMENT' — 5 - 8 June 1989

Contact:

'People's Role in Wetland Management'
c/- Leiden Congress Bureau
P.O. Box 16065
2301 GB LEIDEN
The Netherlands

Telephone : (0) 71-275 299
Telex : 39427 burut nl

PUBLICATIONS

As a result of UNEP-sponsored SPREP activities undertaken by the University of Guam, the following new and updated publications are available from SPREP:

- Directory of Coral Reef Researchers of the Pacific, 2nd Edition;

- Bibliography of Marine Ecosystems of the Pacific Islands;

- Marine Environmental Centres of the South Pacific.

Also available either through SPREP or the University of Papua New Guinea is:

- P.L.E.S. An Environmental Education Journal for the South Pacific Region, No. 3, 1987.