3 of 3

BALAZS (808) 286-2899

BALAZS

Mead

COMPOSITION

AUSTRALIA

JUNE 98 - MORETON BAY - FP

JUNE 99 - BRISBANE PROGRAM REVIEW P. 154

100 sheets • 200 pages • 100 hojas
9¾ x 7½ in/24.7 x 19.0 cm
wide ruled/réglage large/rayado ancho

NMFS, HONOLULU LAB
Marine Turtle Research
2570 Dole Street
Honolulu, HI 96822-2396

JANUARY 03 - HERON IS.

DECEMBER 03 - MON REPOS

MON REPOS CONSERVATION PARK

GEORGE H. BALAZS
ZOOLOGIST AND LEADER
MARINE TURTLE RESEARCH
and
Regional Vice Chairman for the Pacific Islands
IUCN Marine Turtle Specialist Group

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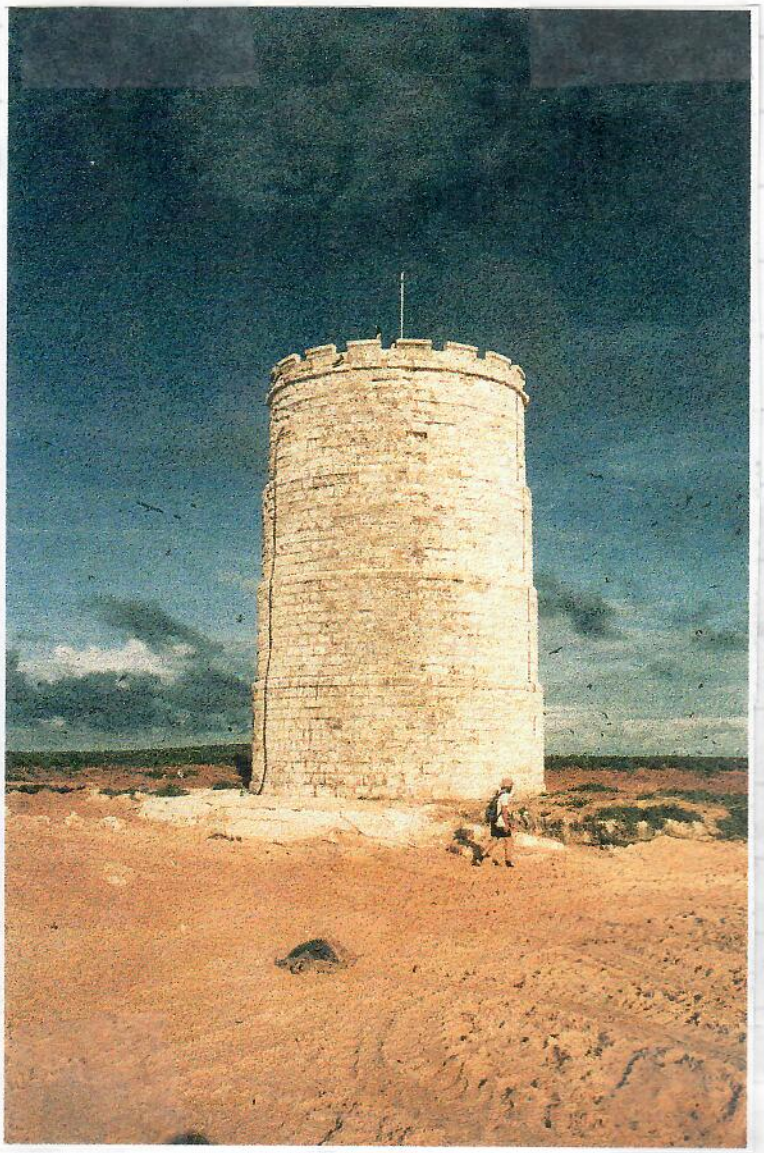
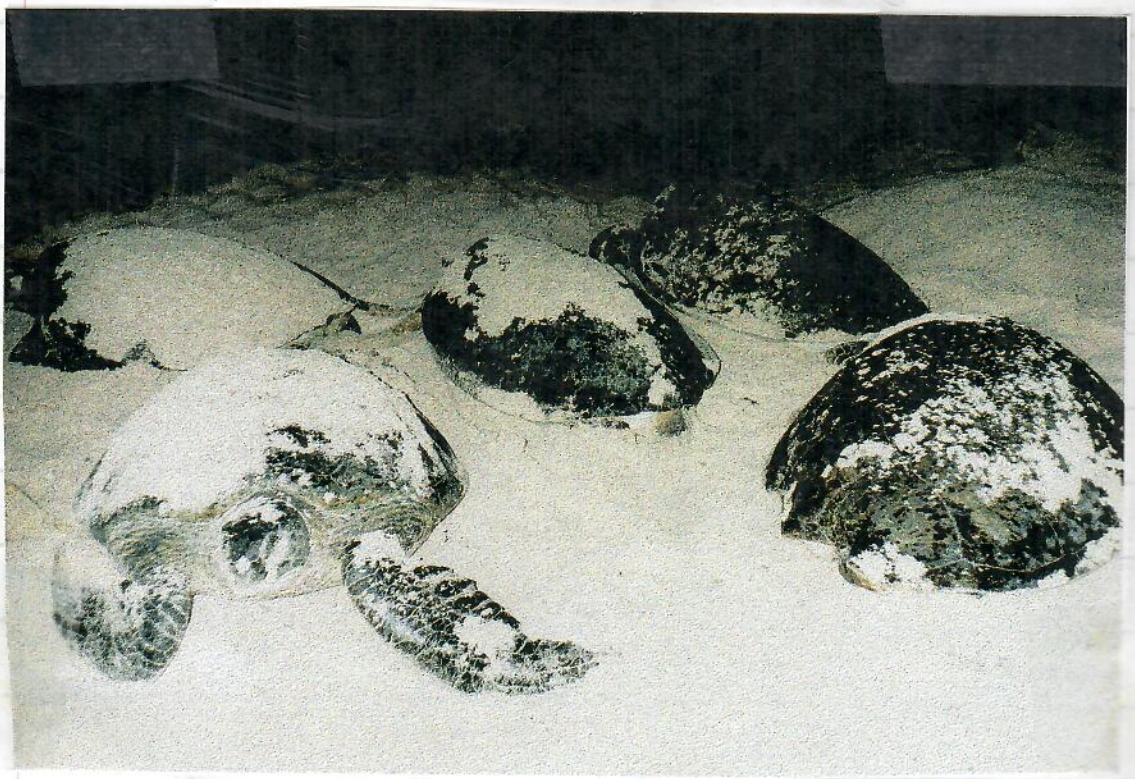
Oahu turtle strandings: (808) 983-5730

RAINE ISLAND



135

RAINE ISLAND



(139)

DATE ____________

TAG NOS. ____________ SPECIES ________ CCL ________ SEX ______

PATH NOS. ____________

TUMORS	#1	#2	#3	#4	TOTAL	REMARKS
RIGHT EYE						
LEFT EYE						
MOUTH						
NECK						
RIGHT FRONT FLIPPER						
LEFT FRONT FLIPPER						
RIGHT HIND FLIPPER						
LEFT HIND FLIPPER						
CLOACA/TAIL						
SEAMS/SCUTES						
INTERNAL						
TOTAL						

6/17/99 Thursday Notes

WHAT IS EXISTING STATE of KNOWLEDGE? ESP Act

federal listed = VULnerable Spain + QueensLAND

Green = 88

OVERALL TUMOR SCORE: ________

APPROXIMATE TUMOR SIZE CATEGORIES:

#1 = DETECTABLE PATCH TO 1CM DIAMETER
#2 = >1CM TO 4CM
#3 = >4CM TO 10CM
#4 = >10CM

NEW DIRECTOR

OTHER:

Applied Research & Monitoring

Where possible, applied research will be out-sourced, Monitoring also, as appropriate.

IS THERE A need? ARE SEA TURTLES A PRIORITY?

ARE GREENS A PRIORITY?

Period of reflection

GPS:

Notes 6-17-99 AM Hotel Room

Can only view from my own background / my context / my agency

executive session DISCUSSION/written

(*) Feedback session

Protocol for exam

FP Disease — All nesters: MINIMUM — COUNT by location; ALL IN-WATER. Score by size

RAINE - Abundance. TAKE representative Subsample,

Collect skin (hind flipper biopsy - leather punch) for DNA

2 Reviews - ~~15 years~~ no copies

(PROGRAMATIC =) OVERALL PROGRAM STRUCTURE — Queensland / Historical OUTLINE needed

understaffed / under resourced — OUTSOURCING — never saw the "BIG PICTURE" for CONTEXT — unclear / jumped into detail

→ 3 full time to SEA TURTLES ?
2 scientists, 1 technician

All others volunteers / graduate students ?

(4) need to focus, prioritize
→ Spread too thin. ~~Essential~~ need - professional facilitated neutral Periodic review of current results; plans for coming year

need

MARINE TURTLE
MISSION STATEMENT

Professional BASIC Facilitated workshop needed — Specific objectives Research Monitoring (2 years) Management

PLANNING EXERCISE needed - generate document STRATEGIC PLAN. History of program

~~Studies~~ Conducting research on marine turtles
1) loggerheads critically endangered
2) hawksbills - JBA support of hawksbill

no mandate for green turtles, although they are captured / studied incidental to loggerheads / greens?

Relationship with U Q ? graduate faculty? formal agreement?

notes (140)
6-17-99

Unclear relationship

Raine Corp & QPWS people personnel
intertwoven 2 entities
Clarification of roles, responsibilities needs to be achieved ~~that~~ so that each can better accomplish goals, (I.E.) ANNUAL reports; list of all project proposal titles by year; list of all funded; abstract copy of results/report.

RAINE

NO Budget
NO FINANCIAL BACKGROUND Documents Supplied This Review BASED ON Science & Programs

need copy 1992 ESP. Act

① Intergovernmental Coordination improved communication
other States
Commonwealth
CSIRO
PRIVATE(?) organizations
higher Education INSTITUTIONS

Indigenous Agencies

② ALL STAKEHOLDER Coordination & COLLABORATION w/other entities
Community COORDINATION

Raine Townsville-Raine workshop NO copy

one Sea Turtle workshop held, Periodic ~~others~~ needed

ONE SEA TURTLE COORDINATOR NATIONAL Appointed?

Recognition of
- Contribution
- Team players

page 141

Less than complete information

Background
Terms of Reference
Workshop 15-16 June
Attendance
presentations
DISCUSSIONS
Research

Descriptive

Deliberations &
Feedback ⟷ exchange
Executive Session
Recommendations

Hirth Synonyms TO MICK

Nesting Beach
SGBR
NGBR

In-Water
SGBR
N

Stranding
SGBR

Recov. plan
Fund Genetics

Charge - Review QPWS gt research with some special consideration of Raine Island / world renowned gt nesting site

6-17-99

Use of Contracting? deliverable reports
QPWS?
RAINE?
Commonwealth?

Potential & Promise of Genetics has not yet been realized
nearly a decade
How long?
What inhibits realizing
Sample collection and analysis

Potential of Modelling not yet realized.
(determination of sustainability)
How long? 6 months to PLATEAU

Greater exposure of publication

IN Closed session

(142)

Feedback Exchange

Productive discussions

6-17-99

~~Aquisition~~ ~~...~~ A of capturing turtles

AVAILABLE For 1 Consultation Post-report

DATA COLLECT

Phone conference call or video conference or email

RAINE

2 week period Fixed TIME

* overall AUSTRALIA coordination

- understaffed - constructive - Approach is high quality of product

Many of the suggestion can only be realized by adding staff or expanding partnerships outsourcing

Appropriate for statistics

Appropriate way of gathering animals

* safe capture by hand and net *

INFORMATION EDUCATION Conservation OUTREACH

Bench Mark sites needed In-water NGBR

Need to Deliver ^ research results Timely

To Build additional partnerships to research out Seas

groups feds

RAINE 1500-2000 per year #2.65 per year single tagged

Biomass productivity 10 years CSIRO Seagrass data

6-17-99 International Seaturtle (143)

cutting edge methodology

areas of research focus

1. Development Models
2. Molecular Genetics for Stock ID
3. Satellite telemetry & other telemetry technology
4. TAGS ??? TAGS
5. Stakeholder
6. GONAD ASSESSMENT LAPAROSCOPY for population research modelling
7. www for recent ... remote sensing involving satellite imaging, data logging
8. DISEASE: VIRAL SCREENING PCR, histopathologic technologies (modern diagnostics, outbreaks, wildlife)
9. ? Aerial Surveys
10. Climate Change, SO Index (oscillation outbreak)
11. Queensland exporters of Seaturtle technology & expertise
12. Training through volunteers in Queensland turtle research program (flagged it), productivity of feeding areas
13. Dietary sources (foraging pasture assessment)

MICK - STRAND Reports, workshop Reports, Proceedings, turtles as played, specific tools

COI =
- Excuses
- negative
- can't!
- Doing it already outside terms of reference
- Already tried that! ARE OUR current approaches "novel TAGS"?

How much faith?

e.g.

Research → Bycatch Reduction

Consider the use a web again to promote wisdom / caring about SUPERMAN project

Safe capture by hook off net

Diseases assays & histopathology analysis PCR, viral screening

Col — something to sell to Ministers

Monkeypox step to Heron

COAST WATCH aerial photo

Learn from someone else's MISTAKES

Life isn't long enough for you to make all own mistakes

6-17-99 (144)

~~COL's office — need Out line —~~

Terms of Refernce responses + Recommendations
future
midlength
immediate

Appropriate > Methodology
inappropriate

"Best Business Practice"

~~Constitution~~ Constructive INput

git "project"

Mick's Wife - Fly out of there as soon as you can.

Rec. Plan

~~Recommendation~~ for research

6-17-99

Jeff Miller Review Findings

Green Bi

6-17-99
COL's office

Hawksbill w/FP (IN TANK)

Funding outside the terms

Moreton Bay Col → Hawk FP

RAINETS: IS
Special to world, Australia; Queensland

6/17/99
PM my Hotel Room

General overall statements
Specific recommendations
High Priority
Lesser priority but nevertheless important to consider for action.

Recommendations outside terms of reference but nevertheless seem highly relevant
~~Cons~~ " Continue coordination
" Continue
" Review sooner than 15 years

OOKING DESK

e all your reservations
ay tours and attractions
here – at Sydney Tower
bservation Deck, the
NLY booking desk in
City Centre. We have
the information you
need to experience
ney and its surrounds.

(148)

Heron Island

Make tracks for a cocktail

Heron Daiquiri

A tropical combination of Bacardi Rum, Orange Liqueur, fresh fruit and lemon juice - your choice of strawberry, mango or traditional lime

Snorkellor's Slipper

The classic combination of Midori and Orange Liqueur with fresh lemon juice - your choice of frozen or shaken

Divemaster's Special

A deepened sensation of local Bundaberg Rum, Malibu and pineapple juice finished with fresh cream

Heron Sunset

The unforgettable taste of Tequila, Orange Liqueur and orange juice with a dash of Grenadine

Turtle Walk

A flapping mixture of Mint Liqueur, Chocolate Liqueur and fresh cream, shaken to perfection

Wistari Wiz

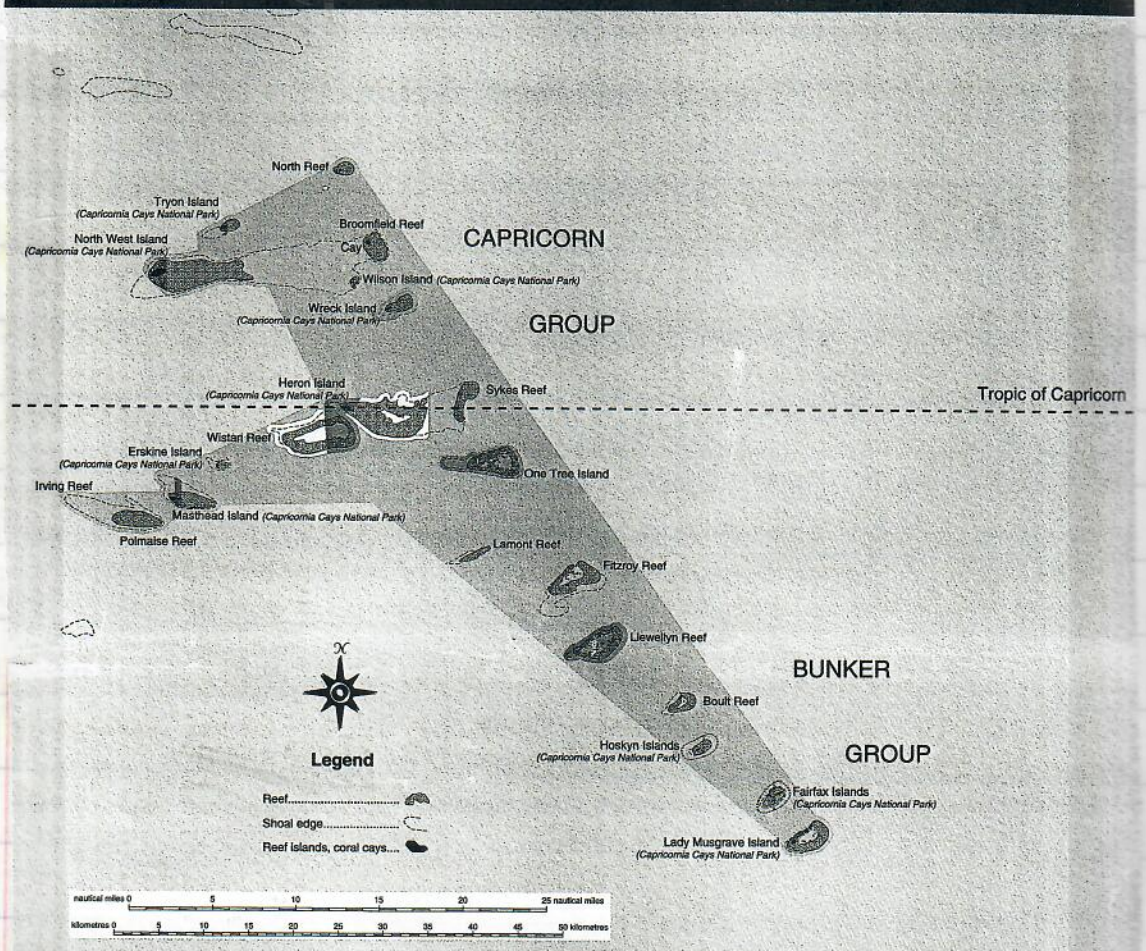
An exciting affair of Malibu and Melon Liqueur topped with pineapple juice and finished with a cream float

All cocktails $12.00

Capricorn and Bunker groups

Marine Parks

Great Barrier Reef Marine Park Authority — Department of Environment



Lady Elliot Island

MACKAY/CAPRICORN SECTION ACTIVITIES GUIDE

(see Zoning Plan for details)

	Bait netting and gathering	Camping	Collecting (recreational - not coral)	Collecting (commercial)	Commercial netting (fee also bait netting)	Crabbing and oyster gathering	Diving, boating, photography	Line fishing (bottom fishing, trolling etc)	Research (non-manipulative)	Research (manipulative)	Spearfishing	Tourist and education facilities and programs	Traditional hunting, fishing and gathering	Trawling
General Use 'A' Zone	Yes	Permit	Limited	Permit	Yes	Yes	Yes	Yes	Yes	Permit	Yes	Permit	Permit	Yes
General Use 'B' Zone	Yes	Permit	Limited	Permit	Yes	Yes	Yes	Yes	Yes	Permit	Yes	Permit	Permit	No
Marine National Park 'A' Zone	Yes	Permit	No	No	No	Limited	Yes	Limited	Yes	Permit	No	Permit	Permit	No
Marine National Park 'B' Zone	No	Permit	No	No	No	No	Yes	No	Yes	Permit	No	Permit	No	No
Scientific Research Zone	No	No	No	No	No	No	No	No	Permit	Permit	No	No	No	No
Preservation Zone	No	No	No	No	No	No	No	No	Permit	Permit	No	No	No	No
Seasonal Closure Area *	No	No	No	No	No	No	No	No	Permit	Permit	No	No	No	No

Emergencies. Access to all zones is allowed in emergencies

* only when in operation

Access and activities

Capricorn and Bunker groups

Great Barrier Reef Marine Park

Marine Parks

Great Barrier Reef Marine Park Authority

Department of Environment

Access — where can I go?

Public access is restricted in some areas of the Capricorn and Bunker groups in the Great Barrier Reef Marine Park.

1 One Tree Island. This is a **SCIENTIFIC RESEARCH ZONE** (orange on the zoning map) which has been set aside exclusively for scientific research. No access within 500m of the reef edge.

2 Wreck Island. This is a **PRESERVATION ZONE** (pink on the zoning map) where representative coral cay and reef habitats are preserved in an undisturbed state. It also protects a major sea turtle rookery area. No access within 500m of the reef edge.

3 Fairfax Islands and Hoskyn Islands. These islands are National Park (scientific) and no access is permitted. The surrounding reefs and seas may be subject to **SEASONAL CLOSURE AREAS** (surrounded by dotted lines on the map). This is to protect the significant breeding sites of the brown booby.

Vessel access is allowed to all other areas of the Capricorn and Bunker groups in the Great Barrier Reef Marine Park.

Anchoring — use care and minimise reef degradation

Some areas of the Great Barrier Reef Marine Park have been subject to heavy vessel use, resulting in significant damage to corals from boat anchors. Corals may look and feel quite strong but are easily damaged by careless anchoring. To help minimise reef degradation, the Great Barrier Reef Marine Park Authority and the Department of Environment are promoting a Code of Anchoring in the Reef Environment (CARE). Your support for this five-point plan will help protect our magnificent environment for future generations.

When boating or fishing:

1. Try to anchor in sand away from coral reefs.
2. Use a heavyweight reef pick with heavy plastic tubing over the anchor chain wherever possible.
3. When hauling in, motor toward the anchor to prevent damage.
4. Practise drift fishing over reefs.
5. Tie up to public mooring buoys where installed.

Pollution — ship it in and ship it out

Disposal of rubbish at sea degrades the reef environment. It not only looks unsightly, but can kill marine life. It is now an offence for boats to discharge oil, fuel, garbage, glass, metal or plastics in the Great Barrier Reef region, with heavy fines in place for infringements. Help to protect the reef environment by disposing of your rubbish in the correct manner.

Fishing — take only what you need

Fishing is not allowed in the following zones:

- Marine National Park B Zone (green)
- Scientific Research Zone (orange)
- Preservation Zone (pink)

Fishing is allowed in the Marine National Park A Zone (yellow), but only with one rod or line per person and only one hook or lure per line.

Recreational fishing is allowed in the remainder of the Capricorn and Bunker groups of the Great Barrier Reef Marine Park. This contains the General Use A (light blue) and General Use B (dark blue) Zones and covers approximately 80 percent of the entire Capricorn and Bunker groups. Be aware that Queensland Fisheries imposes bag and size limits.

The natural resources of the Great Barrier Reef are coming under increasing pressure from human impact. To help conserve fish stocks, take only what you need for your immediate requirements and leave some fish for the future.

Note: Potato Cod, Greasy Cod and Giant Gropers greater than 1200mm in length are **TOTALLY PROTECTED.**

Spearfishing — the finer points

Spearfishing using SCUBA gear and hooka is totally prohibited in the marine park.

Spearfishing using snorkel gear is allowed in the:

- General Use A Zone (light blue)
- General Use B Zone (dark blue)

Spearfishing using snorkel gear is not allowed in the:

- Marine National Park A Zone (yellow)
- Marine National Park B Zone (green)
- Scientific Research Zone (orange)
- Preservation Zone (pink)

Collecting — will I need a permit?

Collecting of shells or aquarium fish is allowed in some areas of the Marine Park. Depending on the quantity of material to be collected, a permit may be required.

Limited collecting is when you collect **no more than five of any one species in a 28-day period.**

Limited collecting is allowed in the:

- General Use A Zone (light blue)
- General Use B Zone (dark blue)

You do not need a permit for limited collecting.

Collecting more than five of any one species in any 28-day period is allowed in the:

- General Use A Zone (light blue)
- General Use B Zone (dark blue)

You do need a permit for this type of collecting. Permits can be obtained from the nearest Department of Environment Office.

Collecting of any kind is not allowed in the:

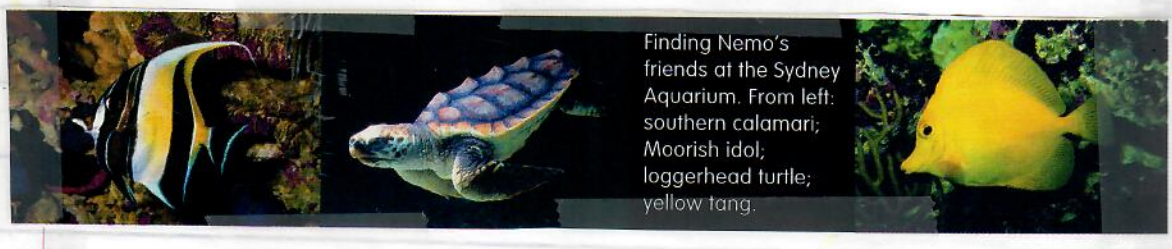
- Marine National Park A Zone (yellow)
- Marine National Park B Zone (green)
- Scientific Research Zone (orange)
- Preservation Zone (pink)

Note: The collecting of any coral, living or dead, requires a special permit from the Department of Primary Industries.

Need more information?

The Great Barrier Reef Marine Park Authority is the Commonwealth agency with overall responsibility for managing the Great Barrier Reef Marine Park. Day-to-day management activities in the park are carried out by the Queensland Department of Environment.

For further information contact:
Department of Environment
Centre Point Plaza
Goondoon Street
PO Box 5065
Gladstone QLD 4680
(07) 4972 6055



Finding Nemo's friends at the Sydney Aquarium. From left: southern calamari; Moorish idol; loggerhead turtle; yellow tang.

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FACTS ABOUT SYDNEY TOWER

Construction of Sydney Tower Centrepoint began in late 1970 with the first 52 shops opening in 1972. The office component was completed in 1974 and the final stage of the complex, the Sydney Tower, was opened to the public in August 1981.

Ranked as one of the safest buildings in the world the design has made the tower capable of withstanding earthquakes and extreme wind conditions. 56 cables stabilise the tower, and if the strands of these cables were laid end to end, they would reach from Sydney to Alice Springs, or from Sydney to New Zealand.

The turret has a capacity of 960 persons, and contains two levels of restaurants, a coffee lounge, an Observation Deck, two telecommunication transmission levels and three plant levels.

Three high speed double Deck Lifts take approximately 40 seconds to travel from top to bottom.

The 1504 stairs, constantly monitored by security, provide emergency exit from the tower. Divided into two fire-isolated sets of pressurised stairs, they allow patrons direct access to street level.

The 420 windows of the tower are cleaned by a semi-automatic window-cleaning machine, which recycles and filters 50 litres of water. This machine takes two days to clean all 420 windows.

A 162,000 litre water tank, the tower's primary damping system, one million dollars worth of fire protection equipment and countless sprinklers add to the safety standards which far exceed normal building requirements.

PODIUM LEVEL 100 MARKET ST SYDNEY NSW 2000
TELEPHONE 02 9223 0933 FACSIMILE 02 9223 0233
www.sydneyskytour.com.au

Arrive ~10 Am 14 June Monday Brisbane via Sydney
Departed Honolulu 0030 13 June

(154) Green Turtle Workshop, Brisbane
Hotel George Williams' - Brisbane

RAINE ISLAND Corporation +
Queensland Parks & Wildlife Service
BRIEF INTRODUCTION

14 June Queens Birthday
Chair - Raine Is. Corps, GREG Welland, then left
Queensland Parks & Wildlife The Service (Director, Planning & Research)

15 JUNE 99, Tues,
TUESDAY "Applied Research & Monitoring"
830 AM

Intent of Review
(1) Methodology being used
(2) Scope of data gathering
(3) other Methodologies ?
(4) Where focus "Research & Monitoring" of years

focused = Conservation outcome of research

Margaret Greenway - Seagrass studies Caribbean 25 years ago
Raine Is. Science Advisory Committee

845 Am → CoL need Broad overview
Methods =
Trends =
nesting beach
No. GBR Milman & ——— Reflect RAINE
S. GBR Heron

nothing they are doing seems to have resulted in any confidence of giving trends nesting or feeding

6-15-99 TUES. "What if?" Questions

Demographic Questions

Emphasis: Remigrations survivorship, recruitment rates

20 years - Heron, can't determine trends.

Feeding grounds - Tell ♂ ♀. Look at gonads

Size class by sex, maturity & Breeding rate.

At what size does a turtle start breeding?

From Mark/Recapture - learn Survivorship.

Tell size of herd. Craig Moritz Indo-Pacific geneticist

Jeff Miller - Seaturtle embryology. Andrea Phillipps - Microbial invasion Pitstwork. Impacts of pesticides.

Climate change. Neville ________.

11 year association " No 24 years.

Feeding areas. Encourage others to work with us" East Australia stocks.

Nutritional end - GBR Algal feeding is main source.

* Functioning of pastures - need. To understand functioning of turtle stocks. "Climate signals"

* Disease - *

Population Modelling

Aging studies. Age structure can't find anyone

Methodologies (Start slides) Inconel Pasture work = 76 Titanium = 1983

TAGS =

ID Measure CCL =

June 15, 99 BRISBANE

Sooo much!

Need/ SKIPPING AROUND
GRADUATE STUDENTS?

Tagging - PAINT 2 weeks / courtship
range of Tagging Systems
Satellite tagging — focus on Loggerheads (not greens) why not?

Feeding Ground Studies — Turtle Rodeo - Dive out of boat
Water less than 7 m deep.

nets??

OVARIES
Corpus Lutea - White Scars - healing scars ~~Bred~~ LAID - LAYING EGGS THIS SEASON
Corea Albercanti — bred more than 2 years ago
= small white dots on ovaries

↑ Approaches ↑ Quick thumb-nail sketch
Now
now / | Distribution & Migration
| Mixed STOCKS - genetics

Raine Island
STUDYING it
not focusing on others
By not studying sites
surrogate for Raine

↗

50-100 genetics Raine Island

Greens
Whereabouts are they nesting?
" " " feeding?

need: succinct methods
MISSION
objectives

157

closer COORDINATION
other teams

need program review - more often than 2 in 20 years, BIANNUAL
need sponsor workshop - coordinating meeting.
Can't do everything - need to step back + focus -
flipper Tag is chance encounter vs real time satellite
Multiple feeding ground study sites
BUT - so long, so much area How can they possibly sample all? Hence - Satellite tag
Bunce, Raine, Create new places, RANDOM sample

9°S - 33°S feeding areas

NGBR STOCK > genetic ID? cutoff place?
SGBR STOCK
skewed distribution North and west
focus
RAINE Island / Adjacent? or everything?

genetics = black box
so have done genetics & tagging IN combination

1-10
10-100
100-500
500-1000
1000-5000 etc.

(1988 arrive → crazy)

DISCUSSION of focus of exercise

1040AM TALK BY
CRAIG MORITZ - work locally
Genetics integrated w tagging data.

(158) Green Turtle Workshop

6-15-99 CRAIG MORITZ TALK
TUESDAY greens
Damien Broderick, Jeanette Norman, Nancy FitzSimmons

INdonesia — BlAck HOLE greens NOT SAmpled.
* Genetic markers to characterize breeding population — which ones are being impacted by harvest?
BONN Convention needs

N sample size — Alleles detected (Large table - Locations by Number sampled)
EIATO N=14, Ngulu 24, YAP

[Sufficient exchange up to a few hundred turtles
[Same genetic stock
SGBR-10% switching of adjacent nesting islands.

Regional GT stocks (no sig differences between "allele frequencies") Logical management units.

"Allele frequencies"

SGBR Coral Sea (winter nesting)	New Caledonia
Northern GBR (winter nesting)	Micronesia
(summer nesting) Bountiful Island	Turtle Islands
NW shelf	Sipidan Malaysia
Scott reef	PNG
Ashmore reef	Peninsular Malaysia
JAVA	Sarawak Malaysia

Need - * Sample genetics MARSHALL ISLANDS * ATOLL ADOPT (159)

6-15-99
Tuesday
Brisbane

Dutton - VAGRANT greens? what found? never sampled. Introduced to Marie Ann

need - Genetics of Males FFS
JULIE Roeth

Europa - different (close to Atlantic)
Seychelles / Tromelin (same allele frequency)

MALES (nuclear DNA) → Microsatellite genes (Fitzsimmons Norman)

Fitzsimmons & Norman Mitochondrial same - males are coming back, like females same place

NGBR - vs - SGBR
Males - "nuclear is indistinguishable"
Mitrochrondial - quite separate

MATED enroute from Gulf of Carpentaria to GBR
(Mated some distance hundred km from nesting beach)
(cross Limpus) But, "VAST Major of copulation off nesting beaches."

Modelling ⟷ Genetics

Need Flow Chart interplays

Limpus - "Courtship areas" Defined areas of high courtship activity
feeding — up to 150km — nesting
° important AREA of research to continue

Concept of "MATING on the Run"

6-15-99 —others represented (Recovery plan)

→ Introduce each person → FACILITATOR (needed)

(160) why here, what they hope to get out of contribute?

→ Project TO DO? mini proposal/ → Better structure needed TO Review

→ Recommendation write them — Terms of reference

—Col - give me list

RAINE-♀ genetics N=7100

SGBR — Heron

NGBR RAINE= pivotal is 2°C higher

RAINE -fewer eggs in clutch than Southern

Bramble - more clutches per season

ANIMAL SIZE?

CRAG ↑

1140 PM (COL) Talking

6-15-99 Census and assessment

VISUAL [Nesting ♀ annual number - overhead project overlaid w/ ~~slide~~ color of tagging on a beach.

"At 5 islands in Capricorn Group" Synchronized Heron "pal"

See graphic up to 1988.

Low flying AIRCRAFT 100 ft at 100 kts

Eastern Australia "Nighttime high tide not as high as daytime high tide"

" Can't use aerial survey for high density nests"

— RAINE Island
foreign person on Board or Science Committee
(International Shared resource)

— Helicopters
Sea planes

Dutton — ANNUAL Difference
(161)

Need — SIZE, STRUCTURE, Limiting factor of Australian indigenous Harvest

Before you can justify going to Indonesia to tell them what to do about their take.

—

for example Herald Cay Courageous → Coral Sea = 1000 ± Average years.

A Report from Environment Aust? (vertical)

ANCORA — Australian environment organization
CRAIG — work w/ Jeanne & Morton
Indian Ocean
+ Peter/George?

↑CRAIG↑

No shift IN Beaches being used 100–150 YRS AGO.

"Modelling of population function and indication of change"

1981/82 Heron Clutches per season mean 5.07
Heron — vs 5.67 N=42 (for a small year)

"UNtagged turtle has a good chance of being a new recruit
∴ Primary taggings are first-time breeders and — they are a few cm smaller in (CCL) carapace length.

6-15-99 (162)
TUESDAY

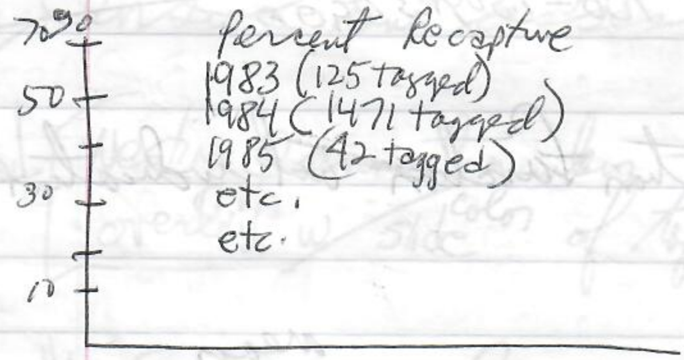
15-17 JULY 99 KOTA KINABALU, SABAH

50-60% Turtles tagged in past seasons
are present in any one season.
∴ 40-50% are UNTAGGED. See graphs

15% LAPS of "primary tagging"
showed they did breed before –
∴ jumped islands – 10-15%
shifts 10%

∴ 25% Recruitment ?? !!

26 km
Heron ⟺ Northwest IS,
within & between nesting seasons.



~50% tagged have come back to breed in subsequent season

Small numbers in a season had larger corapace sizes, VS large numbers in a season (has smaller corapace)

5-7 years between seasons.

JAW - remigration intervals

Add a pit tag

(163)

AIM = ?

Heron should be all double tagged + one PIT

Who will succeed? as a (researcher)

— BRAINSTORM everyone suggest - RoundTABLE

feeding ground evaluation good vs BAD?

ANCA = "ENVIRONMENT AUSTRALIA"

6-15-99

Lunch 1-2 pm

(CoL)

Maintained contact
Time window - early Dec.

Raine Is. MOULDER Kay 16KM AWAY
Cliff maintains separation of turtles and seabirds
dusk - 100's ashore

1977 Nesting Raine - Low 20 night
high - 14,000

Raine Standard sectors for sampling
Contracted for Customs/immigration
" "Coast watch" aerial photographs

10-15% ashore any one night are laying eggs
Eggs deposited underwater at the reef

Raine Resorption of follicles
large season, Biggest ever.
1996 - Dead eggs - water table - ~~Hurricane~~ Cyclone JUSTIN
Bramble Cay also.
Never seen this in SGBR

70
3.5
20
5
E/B/H₂O

(164) 6-15-99 RAINE only bird predators
Roffus Night Herons 1000 pair Breeding
Take first 20 clutches each night.
RAINE "TALLY COUNT" Census work
ANNUAL Breeding index for size of nesting population
Correlated with SGBR.
COL - PAINT on beach AND COUNT in-water around reef.
10's of Thousands Big years & associated w/ RAINE
High thousands — low years

RAINE Size of nesting females:
Primary tagging turtles and Small carapace
IN A then Remigrant turtles.
Big Season - 20-30 turtle night dying on beach
heating up 9AM when still nesting then.

RAINE ISSUE of Remigration   Miss of one year adversely impacted subsequent years of value of data
3 PM JEFF Miller
"TAGGING" MilMAN ISLAND   Hawksbill funded
Text Slides

Weighing = on back. Rolled over
No problem w/ torsion - volvus

Jeff Miller × Carapace ... Roll

MilMAN is A Reasonable Surrogate for Raine.

— Publications? peer review — investigate satellite imaging — Charter Boat? congratulate.
— Skeletochronology — Seaplanes? — Military? Helicopters?
— Tourism — ALDABRA As per Mortimer
— Thesis: "we cant study turtles at Raine well because:
6-15-99 Too many turtles;
Too costly to get there;
Too impacting to sea birds
Too isolated for restocking
~~Limpus + "technician" (Dun Aw)~~ — everyone else volunteer.

Flooding at Raine needs to be quantified.

COC — feeding ground studies.
Shoalwater Bay — Army training area. Public Restricted.
9M tidal range. Seagrass main diet, cat 30-50 day, + mangrove fruit ("Avicenia") Most are Adult size.
Females outnumber males.

Fastest growing = Moreton Slowest 13° N warm water —
Milani = K.B + Milani in press weight is poor to use for growth

Habitat quality Driving force.

Known age turtles marked as hatchlings:
5-8 year pelagic
~ 41.5 cm (CCL) mean recruit — Some longer)

166

6-15-99 TUESDAY

Jeff Miller - Reference / Student

Remankoss Oman Hawaii need

sensitivity of measurement data RATIO

TAIL Length { PLASTRON - TO - Cloaca Larger distance for Males

Compose Sex from necropsies Then apply TO ~~other~~ Live in pastures

Jeff: " ABORIGINAL Culture Rides on the back of the turtle."

Live a long distance away may have to resorb 1-2 clutches to fuel return trip.

Milani - reproductive life - ~15 years.

Mean age Survivorship 50-60 years.

— Strategic Allocation of Resources ... to answer critical questions

— consider Change address on toy; language.

(167) ABORIGINAL TAKE

Awritten Study plan

MICK QUESTIONS: ① ~~Stop~~ Single most contribution of Raine IS. Study?

② What is single most contribution of Queensland program TO understanding of Raine IS. Turtles?

Thesis - You know your program better than any of us. WHAT DO you propose? What do you want to do, given limited available resources?

6-15-99

DO COLS ~~answers~~ answer Modeling to answer what if? questions

GAP - Understanding hatchling production for Raine

John Parmeter - Great years Raine result in low hatchling production

Hydrogeology of Raine Island need to know Geomorphic

overabundance

Jeff answer:
① EL NINO effect
② egg mortality

Andrea - fungal infection studies.

Feeding pastures - need MINIMUM of 4 years of sampling.

~~Centered~~ Genesis of meeting:
Potential decline in size of turtles at Raine IS.

Haven't had a departmental funded green turtle project since 1992.

John Parmeter - "fear a core area approach."
Feeding far away - these are least important. Better if they are feeding close. More contribution.

Building CAPACITY
- SPREP (18)
= cooperation
= ASSISTANCE
RMTCP

inter-
PNG ⟷ RAINE
Relation Island

? — RAINE Bi Annual Rep
—

~~NO NAME~~ PLACARD

830AM
16 JUNE 99 (Col -) See TAKE MATRIX page
Sources of Mortality - IMPACTS

Wednesday - * col New green turtle nesting area (recently found in Eastern Arnhemland.)

col - 4 recent tag returns from ARNHAM LAND.

Col "Meeting is addressing needs of 2 agencies - green turtle program Whole of Queensland.

IAN statement Advisory Committee
Corporation wanted to know 17 years worth of money spent well. MOST went TO green turtle wor
Where we are at with Raine Island.
Only one other meeting about Raine Island Townsville - many years ago.

935AM ~~MILANI PRESENTATION~~ ~~Long Term Studies~~

~~need~~ Slide of Turtle on wooden pole platform

Bahamas git.
Density Depend growth MILANI & Bjorndal IN press Ecological Applications
STRONG year-effect of juveniles - growth.

"Long periods between pregnancy have significant effects on population dynamics"

DAMIEN – 40% allele still MISSING – hawksbills

MARK ARMSTRONG

6-16-99 – col giving all nearly 1 presentations –

– Skeletochronology of g.t. numbers – RAINE

– Dead on Raine Dermestid beetles? Rot?

[Inadequate Information] $1,000,000

DUCK HUNTER Ian – Rep. FAMILY – Raine Is. Corp. > SITS on Scientific Advisory BOARD

Nikola Butler → RAINE IS. Board GRANDPARENTS

Angela

CHRISTIN – GBR MARINE PARK sustainable TAKE

NANCY – Aust. Fish. Managers education work

RPS Project

Raine Sat. TAG. ① FOR INDONESIA PNG SP Sprel connection

Pacific Cooperative Conf. Raine ② Travel etc + train for SE asia/community project

INVITE TRAVEL MILANI TO Honolulu work w/JAN

Milani presentation

How many more years?

Threshold = 75% EGGS

drop TO abundance 0.75 stop harvesting!

"CLIMATIC FACTOR"

Pelagic/Benthic recruitment ratio." IMPORTANT – for more sensitive than nesting Beach Numbers

focus where field work should go

(170)

16 June 99 Wednesday

— TAGENGSTROM Report

— Follow Cohorts Remigration of nesters

DUNCAN'S prints of Track from RAINE

WebCam Tower at Raine

— Scholarship Indigenous

1120 AM Roundtable

Milani — Pelagic - benthic recruitment

Highest priority — Survivorship

MAKE PLACARDS

— Depot for recruits pelagic. ① New PLASMA ALBO FATTY ACIDS ② Markers in bone ♀ researchers 19th Symposium

— Monitoring — "Index of Abundance in foraging pastures" catch per effort

JOHN Parmenter — "put satellite tags on turtles during a very low nesting year in order to identify your best foraging areas" (or pasture closest?)

IAN Question TO Melani — "Do the people in the higher levels listen to the results of modelling? How much? Do they react?

MANAGEMENT SAYS: DRIVING FACTORS
- WTO EMBARGO
- Whole question of ways of trawling
- Endangered species issue

But, without data (modelling) it would have been a more TORTUOUS PROCESS

- Research | 16 JUNE 99 Wednesday | (171) — MANAGEMENT
- Monitoring
- CONSERVATION EDUCATION
- CAPACITY BUILDING / INDIGENOUS COMMUNITY PARTICIPATION

~~Tate / uncertainty of whether you will get to Raine~~ col that year.

→ TAG chapter email TO MICK; JOHN P.;

~~Improve returns from:~~ REPORTING ISSUES

- indigenous people
- Fishing By-catch
- Neighboring countries

* - EARLY morning indicators? — what sort of tools do managers want?
* - MANAGEMENT RISKS ?
* - POP. Models to support management
* — education issues / info gathering different segments of the community. ☆
* — ANNOUNCEMENTS need GOALS IN MONITORS

2 15 PM Session
Jeff Miller = TURTLE RAINE ISLAND CORP. annual proposals / Annual reports — MICK & I DON'T have

6-16-99

RAINE IS. CORP: CONTRACT ? MILANI ?
MTRP

Greens warrant Attention?
Standard things being done in Queensland need to be Standardized used in other states.

6-16-99 Wednesday PM (178)

Need Workshop
- Techniques/Standardize

"orchestrate"

RAINE Island spectacle

RAINE Island:
- Great wonder of the world
- Flag ship for green turtles

Col=

"

There is no green turtle @ PW Departmental project. Extramural funding only for what gt work has been done.

&

TAKE CREATIVE STEPS TO HIGHLIGHT

"World Heritage area"

Turtles are of reasons for GBR world Heritage Area

Natural and cultural values

do A MARKETING Strategy for RAINE

MICAN

RAINE need a STRATEGIC PLAN

-shed to do
- Impossible TASK -
politics entwined with research motivates

"MASS OF CONTRADICTIONS"

My Requests NOT ALL Honored

173

Pyramids comparison MILANI Retrospective Look AT HARVEST
(1) RAINE
(2) HERON

What was the effective.

PRAGMATIC
RAINE IS key

Singlemost important thing to do for NGBR stocks (Milani)

→ Andrew Burbidge ↙ AUST. ENVIRONMENT can support a workshop Milani
BIGE 6-16-99 330PM Margaret - Chair

"What is the single most important research or management issue that needs to be addressed with respect to NGBR gt stock?"

Migrate - Role Raine plays in migrations TO INDONESIA AND Malaysia
—— - Same, international politics come into play?
MARK - Determine if stock is in decline?
if yes - modelling etc
Milani - What is impact of New Caledonia harvest?
Ian RAINE
"UNIMAGINABLE numbers of gt,"
If it ever fails, etc.
- MARK - Flooding of nests
high unsuccessful nesting attempts
- Nest destruction, microbial infection
Fluctuation of water table

6/6/99 [Presentations
Background INADEQUATE
INcomplete]

pulling at one
another

(174) – Where are turtles coming from that nest in NGBA / Raine? Indonesia Bali harvest

– Develop recruit indices (1) Pelagic to benthic
(2) first nesting

Management – Model harvest data
Risk Assessment

NAVEL – Educational offices = Traditional Inhabitants
Torres Strait

What is actual population of Turtles in area?

Impact of Indonesia / PNG

Where does Torres Strait stock come from?

Henry Need people to come and tell us:
We don't know (turtle biology).
Will invite Col and Jeff to Torres.

Ford = Is NGBI stock stable?

Ilze – Is it possible to determine status of stock?
Impact of harvesting in Indonesia & Torres Strait.

Jeff Obtain data needed for model to manage. Such as:

JOHN Develop data for Model

Col Is the egg mortality leading to destruction?

used - Context of outside world - technologies being
are they up to world standards (175)

~~[illegible]~~

Guidance Critical issue of Raine in context
NARROW of big picture. ~~[illegible]~~
2 weeks
in December

NGBR REGION ⟷ RAINE ⟷ SGBR REGION

Recommendations Prioritized and even expand
— ~~Department should fund a g.t. program.~~ research
Qum... ~~develop~~ formulate management strategies.
— Complete the modelling - Milani -
Time is money 6 months.
need feedback continually.

Is it Significant stuff to be funding?
to plateau / completed what has been started.

Alliances - form partnerships multi group responsibilities.
- UNKNOWNS (TO TAKE indigenous)
- Complete level of model
Risky to stop collection of data

water table

| END |

- collaboration
- LINKS

(176)

Rame Skeleto Bare

"Decision Making Team"

Hawksbill project
Loggerhead project
> only 2 formal projects

6-17-99

A Review of green turtle research and monitoring efforts

A review of the status of green turtle research and monitoring in Queensland and the methodologies

A review of the status of green turtle research, monitoring and current used methodologies in Queensland, Australia and evaluation

→ A review of the status of green turtle research, monitoring and methodologies in Queensland, Australia with Recommendations for future action

6-17-99
Thursday

- 6AM - 8AM notes and Review and work in room
8AM - 10AM Breakfeast w/Mich - DISCUSS SCOPE
1030AM - 230pm 5 of us met - private meeting and discussions in Col's office feedback/exchange. Frank private discussions on review, program etc.

GT

TITLE:
Report Prepared by:
BACKGROUND / JM EB
TERMS of Reference
Description of PROCESS (and Presentation Workshop) JM EB
FINDINGS ←

RECOMMENDATIONS ←
HIGHEST PRIORITY

OTHER PRIORITY ACTIONS ~~FOR CONSIDERATION~~

List of PARTICIPANTS [Addresses Phone FAX email]
List of Relevant Background Publications

(178)

Needs | Thursday 6-17-99
Meeting w/ FAW
4-5 45pm
Heron
PAST TIMES Raine

→ Milani

→ A.R.B. obtain republish

→ ~~Xerox Mick's letter~~ +

→ Memo to file on this Assignment (self protection)
Listing inadequacies
deficiencies
near impossibilities of conducting this assignment in any meaningful manner

✓ → Borrow DUNCAN'S photos

This is what they proposed
Need
* TYPE UP STATEMENTS BY PARTICIPANTS - Appendix

6/17/99 Evening dinner Lisa, Col, Jeff Miller Mick & me AT (COL'S) his Home.

where 15 ?
96/97 ←
97/98 ←
98/99 ←

Notes on 95/96 Report Rowe (179)

↓

mean 105.4 CCL

CCL size decline for ~15 YRS

remigration interval 6.68 YRS "unusually long"

w/ wide representation of cohorts 84-92

TOTAL 95/96 60,000 ± 12,000 females

Recruitment rate of new females to breeding = 53% "This is atypically high"

How determined?

Since not full season coverage.

"population performance indicators (e.g. early warning indicators) should be tested"

This report commends the superior research and monitoring activities of the QPWS & RIC and recommends

(180)

Research and monitoring were adequate / state of knowledge

Summary report

Prepared by

G Balazs National Marine Fisheries Service

M. Guinea Southport 2540

In association with a workshop on green turtles ~~held in Brisbane~~ convened June 15-16, 1999 in Brisbane

Prepared for

Queensland Parks and Wildlife Service
and
Raine Island Corporation

June 1999

Post note
availability
FAX
phone

a IMPORTANT FINDINGS

~~The~~ and monitoring activities highly of green

- Research has significant application to management key component carried out every sense of word it is applied research

- Applied research and monitoring activities are appropriate strategies methodologies cutting edge and are be equal to or exceed international standards Techniques ie techniques used elsewhere successfully These include: Field sampling newer incorporation

- ~~Green turtles are endangered worldwide and there are few places outside of Australia where~~

- green turtles ~~in Aust~~ Queensland are used by and in areas that are significant in quantity and in globally elsewhere number indigenous peoples are extent ~~some~~ as hunted taken in large numbers ~~The sustainability~~ The full magnitude of this take is unknown but of a insufficiently collaboration magnitude to warrant ~~As an~~ urgent concern ~~and applied to~~ and response through addition applied research and monitoring

The status of the green turtle stock is uncertain, though possibly stable However overall

PRIORITY Recommendations

1. continue research and monitoring program actively green With emphasis WARMS Early indicators

2. Establish a ~~green~~ specific project with the needed for green turtles to do these actions resources within Strategic Certainty and consistency

modeller's prominent efforts

2 weeks 4 10

3. RAINE

Specific

Recommendations specific for Raine

4.

Retrospective "take" analysis

187 FINDING

There are two identifiable stocks of green turtles in Queensland — those of the NGBR and SGBR hereafter called ... current state of knowledge with direct application to the management of green turtles

The state of knowledge resulting from applied research and monitoring of green turtles is more advanced for the SGBR due mainly to historical emphasis (Heron and Capricorn group) greater ease of access to critical study sites ~~in the SGBR~~

The Raine Island ~~nesting site~~ and the density of green turtles ~~that~~ nesting there in ~~spectacular~~ densities has been globally [recognized] as a world treasure, ~~entrusted under Australian~~ entrusted to Australia for which Australia ... with few parallels in ... and research of Australia's ~~has been~~ is ~~the~~ ... stewardship of ~~the~~ of the Raine Island ecological wonder ~~has been~~ [has been well ~~known~~ an acknowledged well known and praised] is well known and ~~has been~~ frequently praised.

The ~~recognized~~ stewards of the resources are the QPWS and RTC and their roles has ~~as~~ has ... in research and monitoring, and development and management

JOHANNES report TO MICK ✓

Inadequate Time for preparation of report by workshop participants

on nesting beaches as in feeding ~~areas~~ pastures

(183)

Recommendations for Gulf of Carpentaria?

? Finding - EGG MORTALITY

✓ - Water table ~~concern~~ CONCERN - RAINE ~~general~~

✓ - Window of RAINE Sampling

concomittant

Recommendation expand / promote / enhance / intensify / continue to SGBR

CONSERVATION education RAINE

✓ - core study area for NGBR stock feeding pasture — need to be established for long-term research

- harvest data PNG / N.cal. / Indo. Torres Indigenous

(4) capacity Building / indigenous / community participation

(4) The tracking

vital role is recognized

other Recommendations of Priority

(184)

Sequestered

The two day workshop consisted of formal presentations by Dr. Colin Limpus including overview of green turtle biology, research activity and methodologies, stock distribution, nesting Movement feeding ground studies. In addition Dr. Craig Moritz gave a presentation on green turtle genetics research and issues of stock identification, and Mr. Milani Chaloupka presented the status of research on developing predictive models for the management of green turtles.

Dr. Jeff Miller Northern GBR biology censusing and feeding ground studies

by Dr. Colin Limpus, Dr. Craig Moritz (Molecular genetics - stock ID), Dr. Jeff Miller and Mr. Milani Chaloupka (Modeling)

~~Round table~~

(biology research methods management nest distribution, migration feeding ground studies)

emphasis on Northern GBR research

Consensus (   )

Frequent discussions, involving questions and answers and group interactions, were carried by the participants during all aspects of the workshop.

Following the workshop, on June 17, additional discussions, feedback and exchange of information were carried out between Col Limpus, Mr Burnea, Bakes, Miller and Brieze.

The authors want express appreciation to the QPWS, RIC, Col Limpus, and Dr. Jeff Miller, Ms Elze Breeze, Duncan Limpus and Ussa Ford for their considerable hospitality, and assistance during all aspects of this review as to the issues of importance. They demonstrate some support for next page level

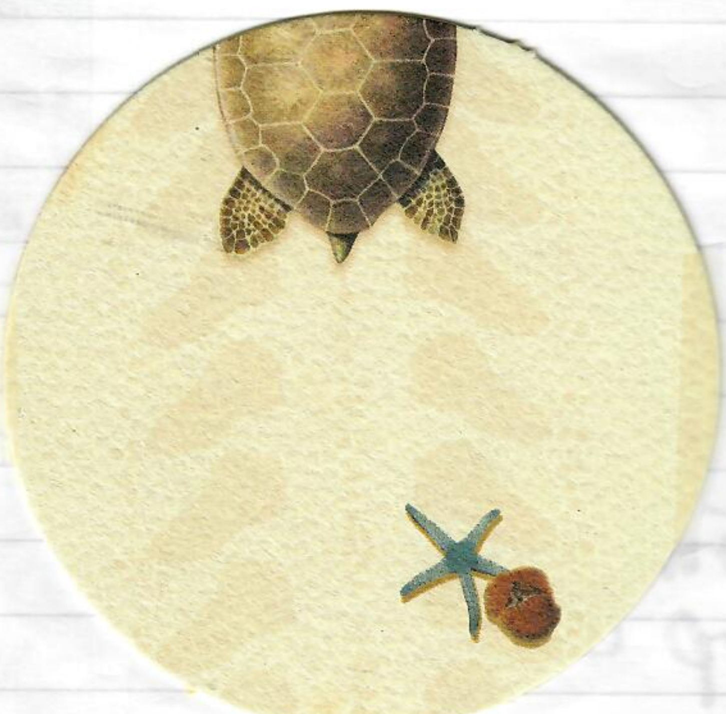
The following answers represent a high of consensus on the importance

186

~~The views were therefore~~
These views ~~were~~ played a significant role ~~to the authors when~~ in ~~drafting~~ formulating the recommendations of this review

- Approval model is very arduous for the SGBE open title stocks ~~and ment~~ ~~fruitution~~
neat
management
heavily
testing

The ~~peer-reviewed~~ Serial ~~journal~~ publications ~~that~~ have resulted from ~~the~~ the regular work of the Queensland Museum pages (numerous ~~voluminous~~ typically of all the highest calibre) and are a credit to



(188)

Supplies

1/03 SE or SHK

Description	Quantity	Catalog Description
Green top vacutainer, 7 ml	20	~~Tube, Plasma, 13 O.D. x 100mm,~~ 7.0mL, Vacutainer Glass, Green Conventional Closure, Paper Label. Additive: Lithium Heparin (Freeze-Dried), 100 USP Units.
10 cc syringes w/needles	10	
5 cc syringes w/needles	10	
Glass slides		Plain Glass Microscope Slides
		Frosted
Slide containers		Plastic Cases (5 slides, snap lid)
Refractometer		Vet
Water bottle		Fisherbrand Easy Squeeze Bottles
Cryovial Storage (Fisher pg. 354)		Freezer storage box (100 count) Yel
		Freezer storage box (100 count) Gre
Cryovials - external threads	20	1.2 ml Nalgene Vials
	60	5 ml Nalgene Vials
Cryoware markers		Nalgene cryoware markers (fine tips
U-Tek -23C Ice packs		
Histology Jars		120 mls
Buffered 10 % Formalin		
6mm Dermapunch	40	henry schein sterile, disposable
Dissecting Pan		
Rat Toothed Forceps	2	CANNOT FIND WITH FISHER
Scissors	2	Mayo Dissecting
Disposable scalpels	20	flat with grip (size 4)
Whirlpacks	40	18 oz with label
Latex Gloves	40 PAIR	large
To Buy Local/ Other Distributors		
Clipboards		
Tackel/Med Box		

Small Sharp container

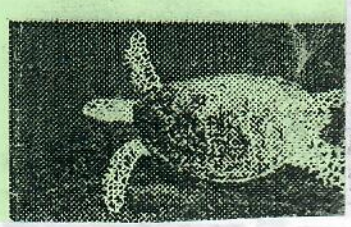
fine marking pen

189

UNIVERSITY OF QUEENSLAND

HERON ISLAND RESEARCH STATION

JANUARY 2003

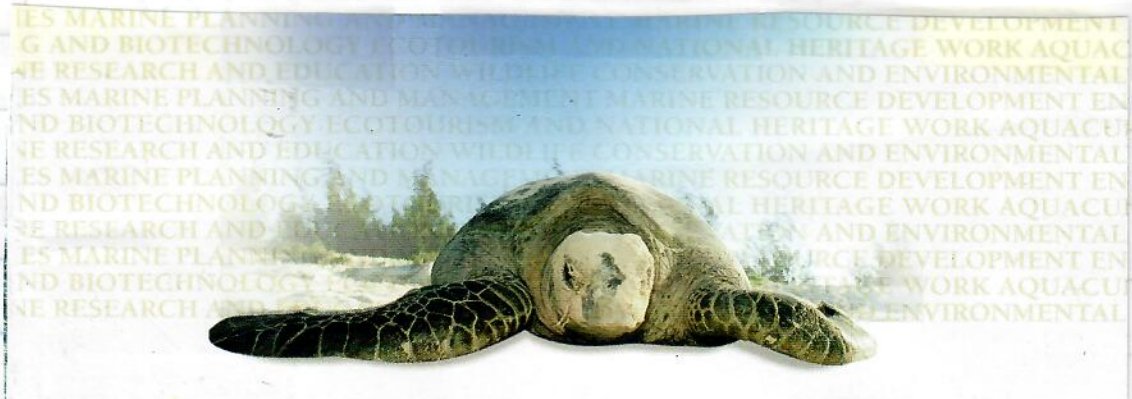


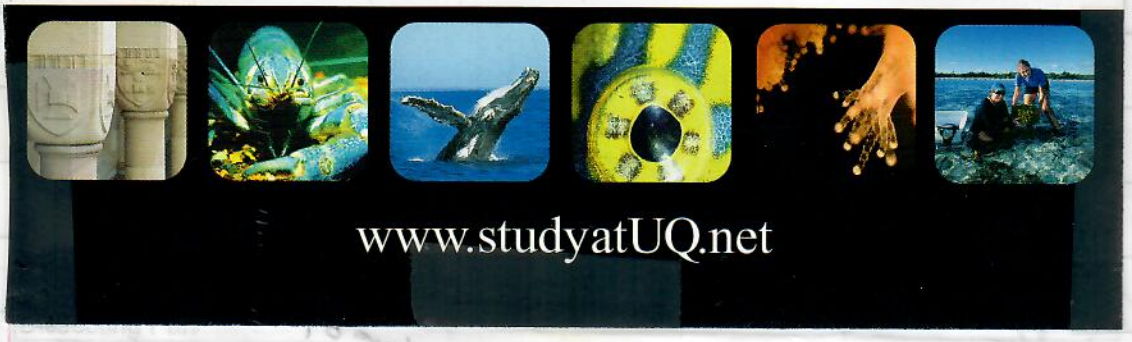
4 – 11 January 03
Dr Alonso Aguirre, Director for Conservation Medicine, Wildlife Trust, Palisades, NY, USA and K. Alexandra Doernath will be co-ordinating with National Parks in research into nesting turtles.

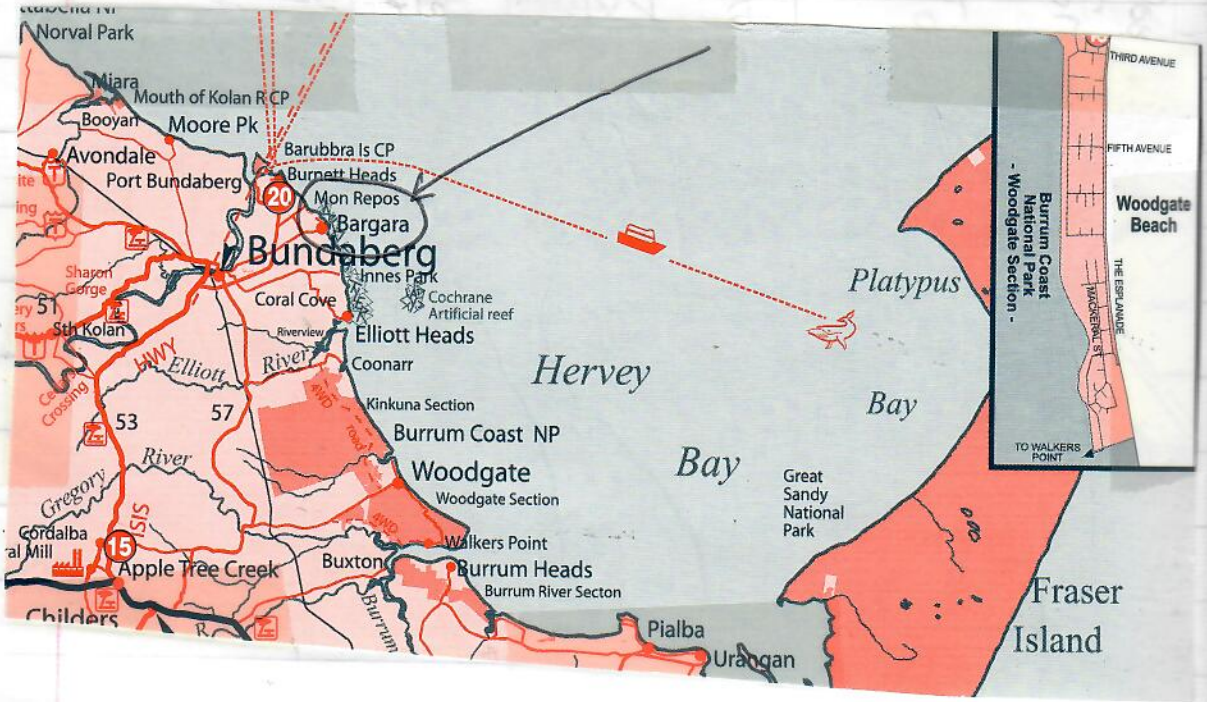
Sent

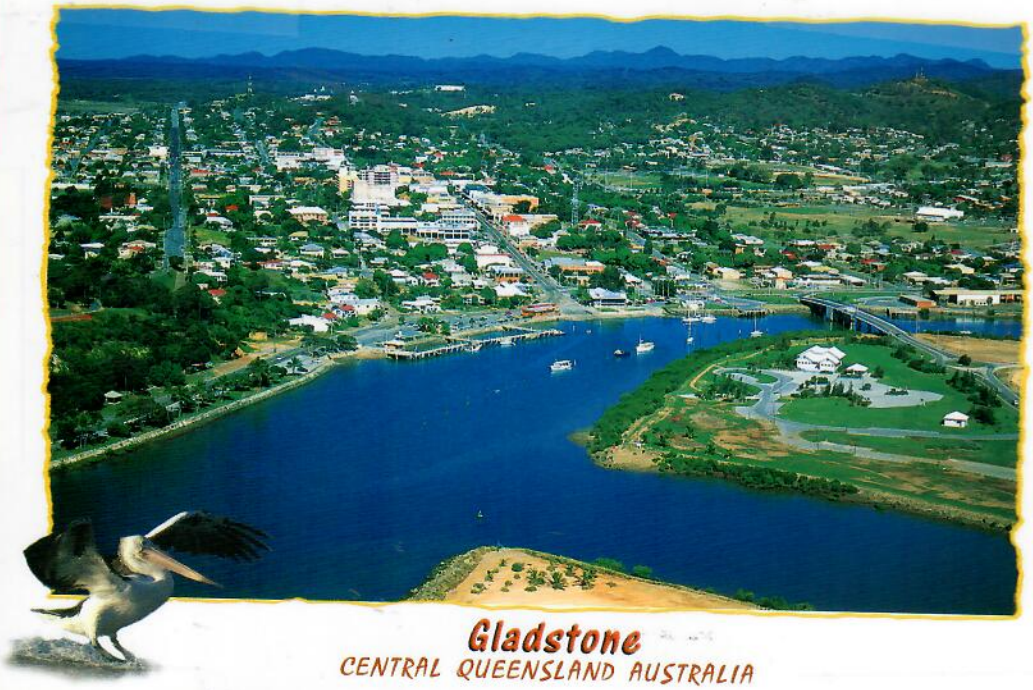
Tania Mirosevich
~~Carol & Ronan Schelling~~
5 Whalans Rd Greystanes
2145. NSW. AUSTRALIA

- picture of 3 people at shark cove - 1/03 Heron




www.studyatUQ.net


Norval Park
Miara
Mouth of Kolan R CP
Booyan
Moore Pk
Avondale
Barubbra Is CP
Port Bundaberg
Burnett Heads
Mon Repos
Bargara
Bundaberg
Innes Park
Sharon Gorge
Coral Cove
Cochrane Artificial reef
51
Sth Kolan
Riverview
Elliott Heads
HWY
Elliott
River
Coonarr
Hervey
Bay
Kinkuna Section
53
57
Burrum Coast NP
River
Woodgate
Woodgate Section
Gregory
Cordalba
Mill
15
Apple Tree Creek
Buxton
Walkers Point
Burrum Heads
Burrum River Secton
Burrum
Pialba
Urangan
Great Sandy National Park
Fraser Island
Platypus
THIRD AVENUE
FIFTH AVENUE
Burrum Coast National Park - Woodgate Section -
Woodgate Beach
THE ESPLANADE
MACKEREL ST
TO WALKERS POINT



Gladstone
CENTRAL QUEENSLAND AUSTRALIA

(192)


TO ROCKHAMPTON
MT LARCOM
PORT CURTIS WAY
Mt Larcom
Stuart Oil Shale Deposit
Ticor
QCL
The Narrows
CURTIS ISLAND
YARWUN
Orica
Graham Creek
Calliope River Historical Village
Calliope River
TO BILOELA
Rest Area
Power Station
CALLIOPE
DAWSON HIGHWAY
South End
North Point
Quoin Island
Farmers Point
KROOMBIT TOPS STATE FOREST
GLADSTONE
FACING ISLAND
Taragoola
BRUCE HIGHWAY
PORT CURTIS WAY
QAL
North West Island
Cedar Gallery
Polmaise Reef
Masthead Island
Gatcombe Head
Erskine Island
BSL
BOYNE ISLAND
Barmundu
LAKE AWOONGA
BENARABY
Wistari Reef
TANNUM SANDS
HERON ISLAND
Rest Area
Boynedale
MT CASTLETOWER
Wild Cattle Island
GREAT BARRIER REEF
Skyes Reef
Wietabba
Hummock Hill Island
One Tree Island
Nagoorin
Iveragh
MT STANLEY
Lamont Reef
Rodd's Harbour
Rodd's Peninsula
Ubobo
MANY PEAKS RANGE
Fitzroy Ree
Littlemore
BOROREN
Pancake Creek
TURKEY BEACH
Llewellyn Re
EURIMBULA NATIONAL PARK
Bustard Head
TO MONTO
Builyan
MIRIAM VALE
Middle Island
NATIONAL PARK
Many Peaks
Blackman's Gap
Eurimbula National Park
Boult Reef
Hoskyn Island
MT COLOSSEUM
Round Hill Head
ROUND HILL ROAD
TOWN OF 1770
Fairfax Island
AGNES WATER
BRUCE HIGHWAY
Granite Creek
DEEP WATER NATIONAL PARK
Lady Musgrave Island
"The Fingerboard"
PACIFIC OCEAN
Rest area
Foxtail Flats
LOWMEAD
Wreck Rock
WARTBURG
The Gladstone Region
Sealed road
Unsealed road
4WD road
Reef Access
TO BRISBANE
TO BUNDABERG
Rules Beach
BAFFLE CREEK

Gladstone City

Accommodation

Backpackers & Guesthouses

Casa Banca, 24 Franmaur Street, Gladstone Qld 4680, Ph: 07 4979 1434

Gladstone Backpackers - Hostel Accommodation
12 Rollo Street, Gladstone Qld 4680, Ph: 07 4972 5744, Fax: 07 4972 4266

Bed & Breakfast

- Auckland Hill Bed & Breakfast, 15 Yarroon Street, Gladstone Qld 4680
Ph: 07 4972 4907, Email: tnt@ahbb.com.au

Caravan Parks & Holiday Villages

- Barney Beach with the Sea Breeze Caravan Park, 10 Friend Street,
Gladstone Qld 4680, Ph: 07 4972 1366, Email: barneybeachqpark@ bigpond.com

Clinton Caravan Park, Dawson Highway, Gladstone Qld 4680
Ph/Fax: 07 4978 2718

Gladstone City Caravan Park, 185 Toolooa Street, Gladstone Qld 4680
Ph/Fax: 07 4979 1305, Email: elanora@selcon.com.au

Kin Kora Village Caravan And Mobile Home Park
Olsen Avenue, Kin Kora, Gladstone Qld 4680, Ph: 07 4978 5461, Fax: 07 4978 1741

Island & Resort Accommodation

Capricorn Lodge, 31 Seaview Esplanade, South End Curtis Island Qld 4680
Ph: 07 4972 0222, Email: alanandailsa@bigpond.com.au

- P & O Resorts Heron Island, Ph: 132 469 or Travel Agents
Email: resorts_reservations@poaustralia.com

Motels & Hotels

A1 Motel & Caravan Park, 84 - 86 Toolooa Street, Gladstone Qld 4680
Ph/Fax: 07 4972 1655

Camelot Motel, Cnr Agnes & Elizabeth Streets, Gladstone Qld 4680
Ph: 07 4979 1222, Fax: 07 4979 2700

- Country Plaza International, 100 Goondoon Street, Gladstone Qld 4680
Ph: 07 4972 4499, Email: counglad@fc-hotels.com.au

Gladstone Motel, 88 Toolooa Street, Gladstone Qld 4680
Ph: 07 4972 2144, Fax: 07 4972 8081

Harbour Lodge Motel, 16 Roseberry Street, Gladstone Qld 4680
Ph/Fax: 07 4972 6463

Harbour Sails Motor Inn, 23 Goondoon Street, Gladstone Qld 4680
Ph: 07 4972 3456, Email: haboursails@bigpond.com

Mawarra Motel 6 Scenery Street, Gladstone Qld 4680
Ph: 07 4972 1411, Email: mawarra@austarnet.com.au

Metro Hotel & Suites, 22 -24 Roseberry Street, Gladstone Qld 4680
Ph: 07 4972 4711, Email: highglad@ozemail.com.au

- Mid City Motor Inn, 26 Goondoon Street, Gladstone Qld 4680
Ph: 07 4972 3000, Email: midcitymotorinn@bigpond.com

Park View Motel, 42 Roseberry Street, Gladstone Qld 4680, Ph/Fax: 07 4972 3344

Rocky Glen Hotel, Dawson Highway, Gladstone Qld 4680
Ph: 07 4972 2977, Fax: 07 4972 2903

- Rusty Anchor Motor Inn, 167 - 169 Goondoon Street, Gladstone Qld 4680
Ph: 07 4972 2099, Email: rustyanchormotorinn@bigpond.com

- Siesta Villa Motor Inn, 104 Glenlyon Street, Gladstone Qld 4680
Ph: 07 4972 4922, Email: siesta.villa@bigpond.com

Suncourt Motor Inn, Far Street, Gladstone Qld 4680
Ph: 07 4972 2377, Fax: 07 4972 2536

- Sundowner Chain Motor Inn, Cnr Far Street & Dawson Highway, Gladstone Qld 4680
Ph: 07 4972 4322, Email: gladstone@sundownermotorinns.com.au

The Club Hotel Motel, Cnr Tank & Toolooa Streets, Gladstone Qld 4680
Ph: 07 4972 2219, Email: clubhotel@bigpond.com.au

Toolooa Gardens Motel, 79-83 Toolooa Street, Gladstone Qld 4680
Ph: 07 4972 2811, Email: toolooagardens@selcon.com.au

Why Not Motor Inn, 23 Coon Street, Gladstone Qld 4680
Ph: 07 4972 4222, Email: why-not@tpg.com.au

Units & Self-contained Accommodation

Auckland Gardens, 139-141 Auckland Street, Gladstone Qld 4680, Ph: 0411 569 475

Gracelee Units, Unit 13 Yarroon Street, Gladstone Qld 4680
Ph: 0418 736 569, Fax: 07 4975 7810

Parkview 2005 Self Contained Units, 187 Goondoon Street, Gladstone Qld 4680
Ph: 07 4972 4907, Fax: 07 4972 7300

194 Ching ✗ gaby.manfred@netway.at | GABY BUCKL MANFRED IMNITZER
A-2102 BISAMBERG, GEORG FRANZ KOLLERG. 3, AUSTRIA

~~need Ching~~ + Announcement (sent)
LES BAUER P.O. Box 1253, MAROOCHYDORE Q'LD 4558

need video
JODIE MURPHY 143 GARDNERS LANE, NTH NORTH MALENY QLD 4552

~~Rod MacKenzie family – need Ching~~

~~need Ching~~ + Announcement (sent)
Timon Berger 80 Fabian rd
Cornubia 4130 Qld

~~need Ching~~ + Announcement (sent)
JANINE FERGUSON P.O. BOX 248
(ME) HEALESVILLE VICTORIA 3777.
Email : mebythesea@hotmail.com. all lower case
" hsveto@zoo.org.au. " " "
ph 0359572830.

Tarrow 2003 Xmas
ALL ~~need Ching~~

HEATHER MACKENZIE
24 BELVIDERE AVE
BLACKHEATH NSW 2785
EMAIL : the_ankh_2000@yahoo.com

~~Ching~~
DEAN BOSWELL
Q.P.W.S HERON ISLAND
VIA GLADSTONE 4680

COLLETTE BAGNATO
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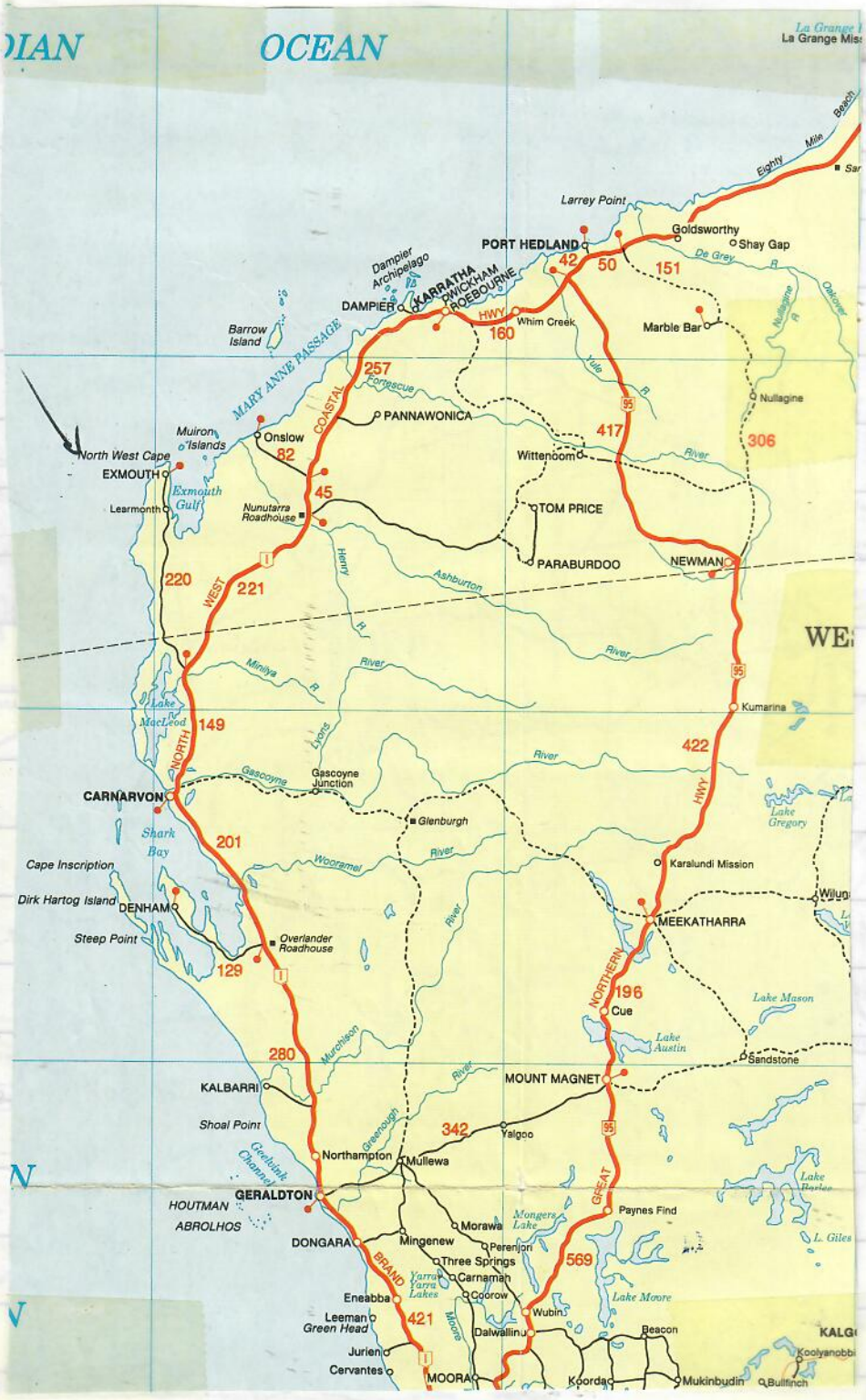
UQ
c.bagnato@mailbox.uq.ed


IAN
OCEAN
La Grange Bay
La Grange Mission
Beach
Eighty Mile
Larrey Point
Goldsworthy
Shay Gap
PORT HEDLAND
42
50
151
De Grey R.
Dampier Archipelago
KARRATHA
DAMPIER
WICKHAM
ROEBOURNE
HWY
160
Whim Creek
Marble Bar
Nullagine R.
Oakover
Barrow Island
MARY ANNE PASSAGE
257
Forrescue
COASTAL
Yule R.
95
Nullagine
PANNAWONICA
417
306
Muiron Islands
Onslow
82
Wittenoom
River
North West Cape
EXMOUTH
Exmouth Gulf
Learmonth
45
Nunutarra Roadhouse
TOM PRICE
PARABURDOO
NEWMAN
Henry
Ashburton
220
WEST
221
River
Minilya R.
Lake MacLeod
149
NORTH
Lyons
Gascoyne
Gascoyne Junction
River
422
HWY
Kumarina
CARNARVON
Glenburgh
Lake Gregory
Shark Bay
201
Wooramel
River
Karalundi Mission
Cape Inscription
Dirk Hartog Island
DENHAM
MEEKATHARRA
Steep Point
Overlander Roadhouse
129
NORTHERN
196
Cue
Lake Mason
Lake Austin
Sandstone
280
Murchison
River
MOUNT MAGNET
KALBARRI
Shoal Point
342
Yalgoo
Greenough
Northampton
Mullewa
Geelvink Channel
GERALDTON
HOUTMAN ABROLHOS
Morawa
Mongers Lake
Paynes Find
GREAT
Lake Barlee
L. Giles
DONGARA
Mingenew
Perenjori
BRAND
Three Springs
569
Yarra Yarra Lakes
Carnamah
Eneabba
Coorow
Lake Moore
Wubin
Leeman
Green Head
421
Moore
Dalwallinu
Beacon
KALG
Koolyanobbi
Jurien
Cervantes
MOORA
Koorda
Mukinbudin
Bullfinch

196


TIMOR SEA
Cape Londonderry
Cape Bougainville
Bonaparte Archipelago
Prince Frederick Harbour
Brunswick Bay
St George Basin
Adele Island
Buccaneer Archipelago
Collier Bay
Walcott Inlet
Cape Leveque
King Sound
Island
Beagle Bay Mission
DERBY
KING
LEOPOLD
RANGES
42
May R.
BROOME
34
GREAT
145
NORTHERN
214
Roebuck Bay
Fitzroy
FITZROY CROSSING
Gogo
River
HALLS CREEK
Ruby Plains
HWY
288
Christmas Creek
214
55
45
10.30
525
Lake McLarty
GREAT SANDY DESERT
ndfire Roadhouse
ROUTE
Lake Waukarlycarly
Percival Lakes
Tobin Lake


ARAFURA
SEA
Cape Van Diemen
Cobourg Peninsula
Croker Island
Pularumpi
Milikapiti
Bathurst Island
Melville Island
NGUIU
Murgenella
Beagle Gulf
Clarence Strait
Van Diemen Gulf
Junction Bay
Boucaut Bay
Drysdale Island
Wessel Islands
Elcho Island
GALIWINKU
Buckingham Bay
Cape Wilberforce
DARWIN
Mandorah
Howard Springs
Noonamah
Milingimbi Community
Ramingining Community
NHULUNBUY (GOVE)
Cape Arnhem
Arnhem Bay
Fog Bay
113
Batchelor
Bark Hut Inn
Cooinda
JABIRU
GOVE PENINSULA
Port Bradshaw
Camburinga
Caledon Bay
Anson Bay
Cape Scott
Adelaide River
Hayes Creek
Daly River
Pine Creek
ARNHEM LAND
Blue Mud Bay
Hyland Bay
Point
KATHERINE
Beswick
Moranboo
Umbakumba Community
GROOTE EYLANDT
Numbulwar Community
108
Mataranka
Roper Bar
Ngukurr Community
Limmen Bight
Maria Island
Timber Creek
Victoria River
Willeroo
Larrimah
Sir Edward Pellew Group
512
166
Daly Waters
Borroloola
Top Springs
36
Dunmarra
Cape Crawford
Kalkaringi
Newcastle Waters
Elliot
Lake Woods
12:00
12:30
Wollogorang
Calvert Hills
337
Lajamanu Community
Renner Springs
Motorists are warned against travelling in this area from early December to March owing to hazardous driving conditions and extremes in daily temperatures.
NORTHERN
TERRITORY
12:00
Three Ways
Warrego
BARKLY
187
25
TENNANT CREEK
TANAMI DESERT
Barkly H.S. Roadhouse
272
Camooweal
Rabbit Flat (Dam)
Wauchope
Wycliffe Well
Ali Curung
439
Barrow Creek
Georgina Downs
Urandangi
Ti Tree
Urapuntja
Sandover
HWY
RD
River

Turtle watch on Australia's Great Barrier Reef

by Dorothy Winslow Wright

All it took was the gift of a small wooden turtle to catapult me back to Heron island and the turtle we saw depositing its eggs in the sand. It happened at the end of an incredible week of snorkeling that began almost as soon as we stepped off the helicopter.

Our cottage, tucked among the pisona trees where noddy terns were nesting, was our home for a week. The birds didn't show the slightest concern when we strolled beneath them en route to the beach — noddies were used to people, as were the fish, who seemed to accept us as fellow creatures of the sea. We swam among manta rays with five-foot wingspans, all manner of fish, and foot-long Tridacna clams, whose mantles shimmered in glowing iridescent tones. I was completely hooked. We snorkeled every day, and when secure enough to snorkel in deep water, we took the dive boat out to "the bommics," which were huge rounded coral heads that rose like columns from the sea floor some sixty feet below.

Heron Island as seen from an incoming helicopter. Photo by A.A. Wright

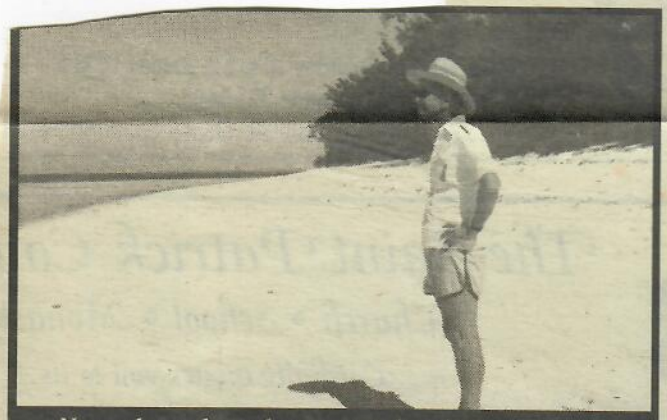
It was truly Neptune's garden, a water-world teeming with trumpet fish, gar, sea trout, parrotfish, and a moray eel whose head was as big as a man's thigh. We fluttered over staghorn coral while hundreds of small brilliantly colored fish swam beneath us flipping delicate fins, tiny mouths nibbling the coral. As the fish flashed around us, a deep-green sea turtle as big as a card table glided by, like the senior resident surveying his kaleidoscopic fiefdom.

We saw no more turtles until our last night, when we discovered three-foot-wide turtle tracks on the beach. We followed them up a shallow rise to find what appeared to be an elderly turtle, her sea-scarred back a tough collage of barnacles, digging a hole, her flippers scooping and tossing

she dug two holes, the larger to accommodate her body, a smaller, deeper one to accommodate her eggs. As her giant body heaved, I lived again the labor that brought me my beautiful babies so long ago.

A little after ten, she began to deposit her eggs in the smaller hole. For all her awkwardness on land, the delivery was absolutely beautiful, her eggs glossy and round as ping pong balls. When finished, she scattered sand over the eggs, not stopping until all were completely covered. She then began the tedious chore of filling the cavity that held her body. We stood silently by, watching her scoop the sand inward in such a way that it slipped under her massive body, slowly lifting it to the level of the surrounding ground.

It was slow, slow going, and about midnight we ended our vigil. The sky was full of stars. Orion's belt. A shooting star — a silvery flash, then darkness. A beautiful night for beginning life. I glanced back at the turtle as we walked toward our cottage. She was still at work, and I ached to stay until she returned to the sea, but we had a long day of travel ahead. We needed rest, but I found it difficult to go to sleep. I kept thinking of that exhausted turtle lumbering away, all alone in the dark of night.



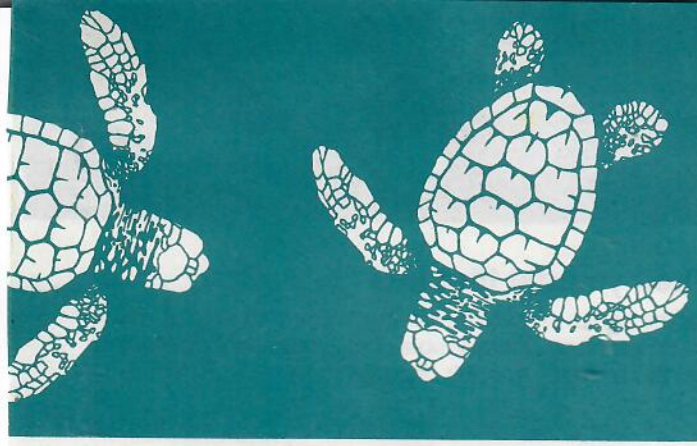
No turtle tracks at the moment, but this is the Heron Island beach where the turtle came in to lay her eggs.

In the morning there was no evidence that a turtle had ever been there. She had camouflaged the evidence, and returned to the beach by another route so that no tracks led to the eggs. It was a longer, more arduous route, but her instincts told her what had to be done to give her progeny a chance at life before she slipped back into the healing sea.

the sand in rhythmic grace. Occasional grains of sand flew into her eyes, yet she struggled on. How long she had been at it, we had no idea, but it was nine o'clock when we began our vigil.

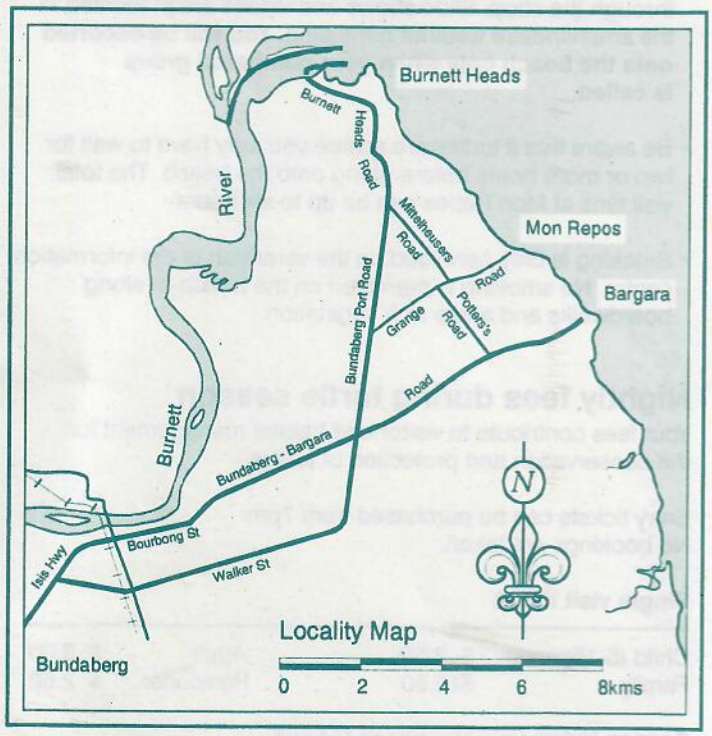
We stood a few feet back with our flashlights off, took no pictures, and talked in whispers as

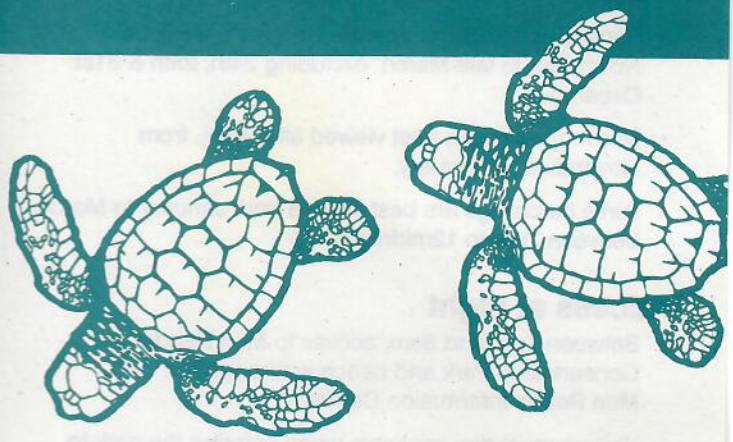
My little wooden turtle will never create life, but it will continue to remind me of the valiant sea turtle who laid her eggs with such maternal dignity on a small remote island in the heart of the Great Barrier Reef. Makes me proud that I am female, too.



Turtle watching guide

Mon Repos Conservation Park





Mon Repos supports the largest concentration of nesting marine turtles on the eastern Australian mainland and is one of the two largest loggerhead turtle rookeries in the South Pacific Ocean region. Successful breeding here is critical for the survival of this endangered species.

More people visit Mon Repos each year to watch nesting turtles and emerging turtle hatchlings. Turtles are easily disturbed; increasing crowds pose a threat to their successful breeding at Mon Repos.

To manage turtle watching, the Queensland Parks and Wildlife Service has implemented ticketed beach access. On some nights, this may mean that not all visitors will be able to view nesting turtles.

Please help us minimise human disturbance to nesting turtles by following the guidelines in this brochure and any instructions from park staff.

Queensland Government
Queensland Parks and Wildlife Service

BP532-11 Nov 2001
Recycled paper saves energy and resources

Planning a trip

Best time to view turtles

Please be aware that turtles are wild marine animals and we cannot guarantee you will see either nesting turtles or hatchlings. On occasional evenings turtles do not arrive.

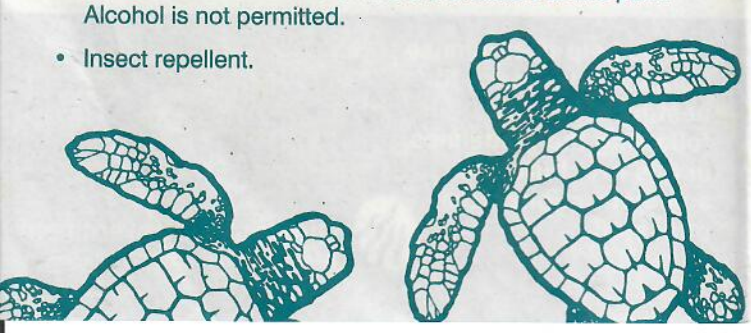
- Ranger guided tours operate 7 nights a week from November to late March, excluding 24th, 25th & 31st December.
- Nesting turtles are best viewed after dark, from November to February.
- Turtle hatchlings are best viewed from January to March between 7pm to 12midnight.

Access at night

- Between 7pm and 6am, access to Mon Repos Conservation Park and beach is through the Mon Repos Information Centre.
- Visitors must dim car lights when entering the park to minimise disturbance to nesting turtles and hatchlings.
- Caravan park residents should use the track starting at the Kanaka wall to reach the centre. Use of a small torch is allowed when on this track.

What to bring

- Footwear suitable for walking along a sandy beach at night.
- Rainjackets as shelter is limited during storms.
- Jumper or wind cheater as it can be cold, particularly on the beach.
- Cold and hot food and drinks are available at the park. Alcohol is not permitted.
- Insect repellent.



When you get there

- At the centre you will be given a numbered sticker, which must be worn, clearly visible. This ensures that visitors go on to the beach in order of arrival.
- In the centre take time to look at the displays and browse through the shop. Slide shows and videos are presented in the amphitheatre weather permitting. **You will be escorted onto the beach only when your numbered group is called.**
- Be aware that if turtles are scarce you may have to wait for two or more hours before going onto the beach. The total visit time at Mon Repos can be up to six hours.
- Smoking is only permitted on the verandah of the information centre. No smoking is permitted on the beach or along boardwalks and areas with vegetation.

Nightly fees during turtle season

Your fees contribute to visitor and habitat management for the conservation and protection of turtles.

Entry tickets can be purchased from 7pm.
No bookings are taken.

Single visit ticket

Child (5-15years)	$ 2.50	Adult	$ 5.00
Family	$12.50	Pensioner	$ 2.50

Season ticket (mid November / March):

Child (5-15years)	$ 7.00	Adult	$12.50
Family	$28.00	Pensioner	$ 7.00

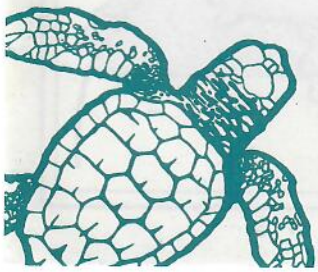
Access during the day

- Between 6am and 6pm, entry to the conservation park is via the park access road or the daytime boardwalk. Visitors are welcome to view the information centre.
- There is no charge for day access.

Guidelines for successful watching

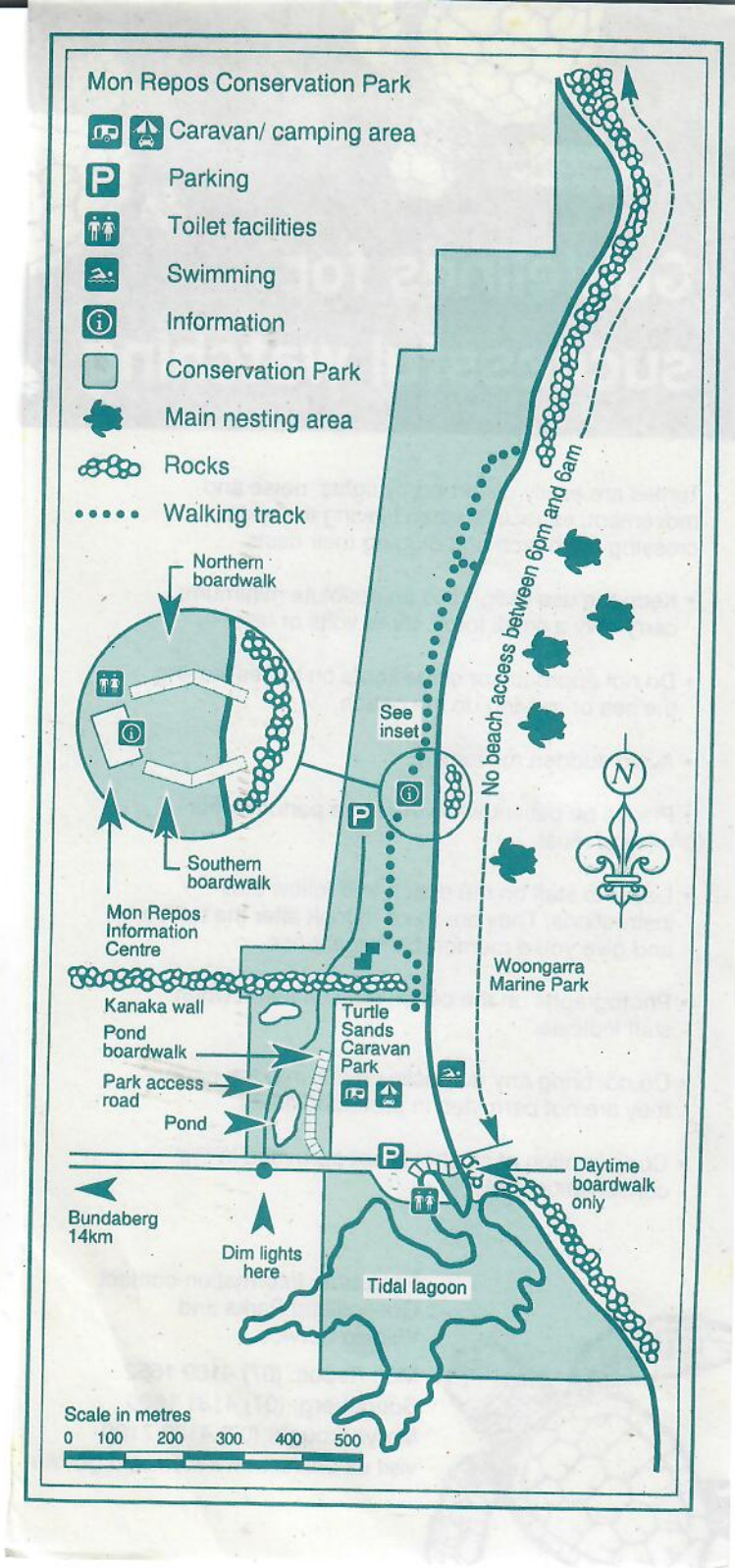
Turtles are easily disturbed by lights, noise and movement, especially when leaving the water, crossing the beach and digging their nests.

- Keep the use of lights to an absolute minimum; carry only a small torch, three volts or less.
- Do not approach or shine lights on turtles leaving the sea or moving up the beach.
- Avoid sudden movement.
- Please be patient while the turtle performs her nesting ritual.
- Listen to staff on the beach and follow their instructions. They are there to look after the turtles and give you a memorable experience.
- Photographs on the beach may be taken when staff indicate.
- Do not bring any domestic animal into the park; they are not permitted in protected areas.
- Consumption of alcohol is not permitted in the conservation park.



For further information contact
Queensland Parks and
Wildlife Service

Mon Repos: (07) 4159 1652
Bundaberg: (07) 4131 1600
Maryborough: (07) 4123 7100
visit us online at www.env.qld.gov.au


Mon Repos Conservation Park
Caravan/ camping area
Parking
Toilet facilities
Swimming
Information
Conservation Park
Main nesting area
Rocks
Walking track
Northern boardwalk
Southern boardwalk
Mon Repos Information Centre
See inset
No beach access between 6pm and 6am
N
Woongarra Marine Park
Kanaka wall
Pond boardwalk
Park access road
Pond
Turtle Sands Caravan Park
Daytime boardwalk only
Bundaberg 14km
Dim lights here
Tidal lagoon
Scale in metres
0 100 200 300 400 500

Sea Turtle Database Steering Committee, Attendees December 8-9, 2003 – Mon Repos

Job Opu	SPREP Marine Conservation Officer	P.O. Box 240, Apia, Samoa jobo@sprep.org.ws
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Zaidnudin Ilias	Department of Fisheries Malaysia, Turtle and Marine Ecosystem Center (TUMEC)	23050 Rantau Abang, Dungun, Terengganu, Malaysia zaiali01@yahoo.com
Peter William	SPC - Secretariat of the Pacific Community Tuna fishery database expert	SPC B.P. D5 - 98848 Noumea Cedex, New Caledonia PeterW@spc.int
George Balazs	National Marine Fisheries Service/Pacific Islands Fisheries Science Center - Protected Species Investigations/Sea turtle program	PIFSC 2570 Dole St. Honolulu, HI 96822 gbalazs@honlab.nmfs.hawaii.edu
Colin Limpus	Queensland Parks Authority Chief Scientist, Sea Turtle Primary Investigator	Queensland Parks Authority 160 Ann St. 8th Floor Brisbane, QLD P.O. Box 155, Brisbane Albert St. Queensland 4002, Australia col.limpus@env.qld.gov.au
Irene Kinan	WPRFMC Sea turtle program coordinator	WPRFMC 1164 Bishop St. #1400 Honolulu, HI 96813 irene.kinan@noaa.gov

WESTERN PACIFIC REGIONAL FISHERY MANAGEMENT COUNCIL

Database Meeting, Summary Document

June 4 and 5, 2003

Summary

Pacific sea turtle populations have markedly declined or become depleted over the last century due to a combination of influences such as direct harvest, habitat degradation and incidental catch in commercial fisheries. The Western Pacific Regional Fishery Management Council (WPRFMC or Council) is a significant stakeholder in the recovery of sea turtles, and in February 2002 they convened a *Western Pacific Sea Turtle Cooperative Research & Management Workshop* to gain direction for their sea turtle conservation program. Regional experts who participated at this meeting recommended a need to develop a region-wide database, as a preliminary and critical step to improving and understanding population trends for Pacific sea turtles.

Currently, various institutions in the Asia-Pacific and Pacific Islands region (i.e. western Pacific) have been tagging turtles and collecting a variety of ancillary data. These include government agencies, international and regional organizations such as SEAFDEC and SPREP, academic institutions, and non-government conservation organizations (NGO). Large volumes of information and seasonal population trends are being generated by these various efforts, but there appears to be no overall coordination of this work. In addition, the development of accurate populations models is essential to managing turtle populations and assessing the risks posed by various natural and man-made sources of mortality, however, the lack of data coordination throughout the region hampers any attempts to model turtle populations.

Clearly, there are many issues to be dealt with in developing a common region-wide database for turtles in the western Pacific region. However, the first step is to convene a meeting of principal international organizations and research agencies in the Pacific region. The first sea turtle database meeting was held June 4 & 5, 2003 in the offices of the Western Pacific Regional Fishery Management Council, Honolulu, Hawaii. This proved to be a highly productive meeting, with great exchange of information and progressive decisions made by the seven international, fishery and research based participants in attendance comprised of: SPREP, SPC, ASEAN-SEAFDEC, Colin Limpus (of Queensland Parks Authority), NOAA/PIFSC, and Council staff. The participants contact information and final meeting agenda is located in the Appendices.

Resulting from the meeting were eight action items or "work plan" agreements made by participants, or newly formed sea turtle database "steering committee." The final agreement was to convene the group again in December in Bundaberg, Australia near the Mon Repos Conservation Park. Objectives of the second database meeting are to review our progress and the design document for the database and view an active sea turtle ecotourism program.

Sea Turtle Database "Work Plan"

1) Group: Agrees to create a database in Microsoft Visual FoxPro (front end). A collaborative agreement has been made between Colin Limpus & SPC (and other necessary collaborators) for this initial design/development.

2) Group: Recognizes the first step is to develop a comprehensive design document for the database. Completion goal for this design document is by November.
   A) Colin Limpus will make his tagging manual available to SPC for the creation of this draft document.
   B) SPREP, ASEAN-SEAFDEC & George Balazs will forward the file structures of their tagging program to SPC for the design document (deadline: end July).
   C) Colin Limpus will be available, tentatively in September to collaborate with SPC and IT personnel.

3) SPREP: Agrees to work through the backlog of information/data and will visit member countries to gather missing data and will convene technical training workshops for member countries, with appropriate support.

4) ASEAN-SEAFDEC: Agrees to the principle of generating a common database (i.e. proposed database design). If such a database is generated, they will distribute it to their ten member countries for use. And with appropriate support, ASEAN-SEAFDEC will convene technical training workshops for member countries.

5) SPC & Qld Parks (CL): Offered manpower and technical assistance for database design and training.

6) WPRFMC: Will look into a formal request (by FFA, SPREP, CROP) for turtle bycatch data from fishery agencies (e.g. SPC).

7) WPRFMC: Offers to continue to support and maintain the coordination of future database meetings, and agrees to assist SPREP in acquiring an appropriate person (i.e. person with a biology background (ideally interested in turtles) with some IT skills) to cope with the backlog of data and assist in strengthening SPREP's regional capacity and the database.
   a. The Council's assistance to SPREP is to be considered a "pilot" project in terms of providing a bridge of relationship/partnership with SPREP, since SPREP's International Waters Program deals with pelagic issues and thus there is scope for mutual undertakings.

8) Next meeting of the Sea Turtle Database Steering Committee to convene in December in Bundaberg, Australia to review the design document for the database, and if possible, the draft database. Proposed dates for the next meeting are December 9 - 14 (preferred) or December 18 - 23.

Meeting Minutes: DAY 1: June 4, 2003

Kitty Simonds, executive director of the WPRFMC, opened the meeting and introduced the Council's objectives and support for regional sea turtle conservation and management. Paul Dalzell, WPRFMC pelagics coordinator, chaired the meeting. In attendance was Asterio Takesy (SPREP, director), Job Opu (SPREP, marine coordinator), Ahmad Ali (ASEAN-SEAFDEC, sea turtle coordinator), Kamarruddin Ibrahim (ASEAN-SEAFDEC, Fishery Dept in Malaysia, sea turtle coordinator), Peter William (SPC, tuna fishery database expert), George Balazs (NMFS/PIFSC); Collin Limpus (Queensland Parks Authority), and Irene Kinan (WPRFMC, sea turtle coordinator).

The first day consisted of presentations from Dr. Colin Limpus, Kamarruddin Ibrahim and Job Opu. In summary, Dr. Limpus provided background information and an overview of the turtle situation in the region, providing solid examples for why and how a regional database could benefit the region. He then followed up by introducing the CMS (GIS based) nesting database which is a collaborative project between himself, the World Conservation Monitoring Center (website development) and the UN Environment Program. Kamarruddin Ibrahim gave a comprehensive presentation regarding the turtle monitoring and hatchery research by the ASEAN-SEAFDEC member countries in particular, Malaysia. Job Opu presented current information and status of SPREP's tagging program and historic database.

Regional Expert

Dr. Limpus emphasized that identifying turtles trends are more than just tagging turtles, there exists numerous other types of data that projects may collect, above and beyond females nesting on beaches. For example, types of data collection may include:

pelagic stages (males, juveniles)	growth/maturity
environmental parameters	coastal waters, foraging areas
genetics	pelagic post hatchling phase
biological parameters	breeding migrations: foraging - breeding
internesting variation	courtship areas near nesting beaches
clutch variations	fidelity to sites: nesting/foraging

For each of the above listed data, there are dimensions to be collected for each record. These may include:

1. species
2. temporal: date/time

3. spatial: global parameters- lat & long, country, site name, sector, habitat
4. life history: sex & maturity, life history phase
5. measurements: (wide range of potential measurements) weights, health, injury, breeding condition, breeding cycles, remigration interval, scale counts
6. eggs: clutches per season, eggs per clutch, egg measurements & weight, nest depth & location, incubation & emergence success
7. hatchlings: measurements & weights
8. stranding information
9. our interactions: tags, capture methods, experiments performed, names & address of agencies, researcher/recorder

However, for all the above listed projects and their associated dimensions, there exists too much potential data to be processed in a single record. Therefore the data needs to be subdivided into manageable files, which entails sets of regularly used data. This is best managed in a "relational database" NOT in a spreadsheet.

For example, the Queensland turtle conservation project subdivides their data into six file registries:

1. TAG REGISTER - link records through time, organize tags, samples & contacts through time
2. CAPTURE REGISTER- organizes dates, locations, activity, health, experiments, basic measurements
3. CLUTCH REGISTER - organizes dates, egg & nest measurements
4. EMERGENCE REGISTER - organizes dates, incubation data
5. HATCHLING REGISTER - organizes hatchling data by clutch
6. SPECIAL MEASUREMENTS REGISTER - organizes extra measurements by species, date, tag and location

In addition, there are also:

7. SPECIALIZED FILES - contains info on: sat tag, PIT tags, lat/long, TDR, etc.
8. CENSUS REGISTER (for GIS) - species & population size by year
9. MIGRATION REGISTER (for GIS) - organizes migration data by: tag #, dates, lat/long, fate (tag return information)

The Queensland Parks sea turtle data can be so well organized because they employ a "customized front end" (i.e. menu screens) approach which: simplifies data entry; uses standardized codes; has built in checks to reduce transcription error (e.g. size vs. species); is customize to the reporting program; which at the same time simplifies statistical analysis and transforms data for analysis. It relies heavily on standardized data recording and thus if a regional database is to be successful, standardized data recording is essential.

Dr. Limpus concluded by introducing the CMS nesting database which is a collaborative project between himself, the World Conservation Monitoring Center (website developers) and the UN Environment Program. The CMS nesting database is a GIS based project focused on the Indian ocean and Southeast Asian region. It is designed to spatially define breeding sites, by

species and by abundance, aggregated by management units and linked to population summary images. It's goal is to include annual census data to identify temporal change in population and population status. The proposed regional database (the one to be developed) would coordinate and feed into this CMS nesting database.

ASEAN-SEAFDEC

Kamarruddin Ibrahim the sea turtle coordinator from the Department of Fisheries Malaysia /ASEAN-SEAFDEC, provided a comprehensive summary of the sea turtle monitoring program of the ASEAN-SEAFDEC member countries. The SEAFDEC Marine Turtle Conservation and Management Program began 1996 in Kuala Terengganu, Malaysia and has consisted primarily of tagging and hatchery management studies. In 1999, ASEAN and SEAFDEC merged and since then, the Turtle & Marine Ecosystem Center (TUMEC) has been created to coordinate the turtle program. Unfortunately SEAFDEC operates on a limited budget (with only $13k left before funds are depleted)

ASEAN-SEAFDEC have been progressive in the past convening numerous tagging workshops for their 10 member countries (Indonesia, Singapore, Brunei Darussalam, Malaysia, Philippines, Cambodia, Vietnam, Laos, Thailand and Myanmar (Burma). These workshop included: 1997 - regional tagging meeting; 1998 - regional training course, distributed inconel tags and applicators; 1999 - regional workshop on sea turtle conservation & management; 2001 - distribution of more tags; 2003 - draft of tagging manual & tagging database; distribution of 25 PIT tags to 5 countries, and standardized country tagging codes developed for all 10 countries.

Hatcheries are an important management and conservation measure for ASEAN-SEAFDEC, and they have discovered that hatcheries provide both a solution and a cost effective means to deal with poaching issues. A considerable amount of effort and research have been applied to hatchery methodology. Pivotal temperature for green turtles have been determined for their hatcheries (25° C = male; 29.5° C = 50/50; 33° C = female). In the past all hatcheries shaded nests (resulting in 31° C, thus hatchling production was skewed to females), but since 1997, with the understanding of pivotal temperature, shade is used to promote better sex ratios. Additional research has found that in-situ hatcheries produce better and higher quality hatchlings (i.e. swimming ability, endurance and size). Thus the shift is now to in-situ hatcheries rather than transplanted hatcheries

Satellite telemetry studies have identified post nesting green sea turtle foraging habitats and internesting migrations have given the ASEAN-SEAFDEC agency the necessary information to request aquatic habitat (in addition to nesting beach) protection from the government (e.g., Ma' Daerah, Malaysia – aquatic home range habitat approx. 15km x 14km, max depth = 38km). Kamarruddin reported that the Kai leatherback hunting still approximates 100 leatherback turtles per year and the Bali, Indonesian harvest continues to capture 19,000 green turtles per year.

SPREP

Job Opu, SPREP marine officer, concluded the first day with a presentation regarding the status of the current (outdated) database. There are two components of the database: 1) literature database, and 2) tagging and capture database. The literature database is current to the mid 90's and includes published and unpublished (gray) literature regarding sea turtle research in the region. The tagging database was set up in tabular format (Excel) and currently holds 6,000 entries.

The current tagging activities that SPREP oversees occurs in: PNG, Solomon Isl, Vanuatu, and New Caledonia. The current status of these programs includes:

A. PNG - Kamiali leatherback turtle conservation program
   - Village Development Trust (VDT)/Kamiali community
   - program started in 1999
   - more than 500 tags disbursed
   - raw data kept in Lae, PNG. Some data entered into excel worksheet by VDT
   - to date, SPREP has not received any raw data or anything back from VDT

B. Solomon Isl - Arnavon turtle tagging program (hawksbills and greens)
   - Allardyce beach program (leatherback turtle project)
   - data kept with TNC and Environment Unit
   - national turtle workshop convened Aug 2003
   - data gap for almost 5 years

C. Vanuatu - Wan Smolback and Vanua-Tai Monitors project
   - tagging and monitoring - only by chance, not an active beach tagging program
   - targeting all species (hawksbills & greens)
   - gap in data for the past 3 years

D. New Caledonia - ASNNC tagging program
   - targeting hawksbills & greens
   - over 1,000 tags disbursed
   - data for over the past 3 year have not been sent back
   - the program has recently requested 3,000 additional tags

There exists two main issues and/or needs regarding the database: 1) to collate and update backlog of tagging data, and 2) to upgrade the database. Recently the restoration of the existing database was given high priority at SPREP's Regional Marine Turtle Conservation Program (RMTCP) review in February 2003. Therefore, in addition to providing assistance to member countries with tagging programs, SPREP will work with other key players (namely Colin Limpus, George Balazs and SPC) to restore and upgrade the database for regional distribution and use by member countries.

PLENARY

This concluded presentations for the first day. General topics that were discussed during the subsequent open plenary session are included below, they are not be verbatim but give a general sense for what transpired and may trigger memories as to what exactly was discussed.

There was general discussion as to how to best assist SPREP in dealing with the backlog of data, and the necessary qualities of an individual whom may assist in updating the current database (i.e. where this person should be based and what their background should be). It was generally decided that a biology type person with some IT knowledge be the best suited individual. They could work along side SPREP, in SPREP's office or go out into the field and physically collect and enter data.

There were concerns expressed that although there may be support for a database and for turtles, support may be lacking in the region at the national level. The question still exists regarding how to generate support for this project and how it fits into the whole scheme of environmental awareness and resource management. In addition, although there may currently exist interest and funding support in Washington, how long is this support slated to last? This interest level could generate both short term and long term problems. It was discussed that increasing awareness and relevance to resource management issues over time may be achieved through training. For example, SPC offers support and service, through training, to empower countries to produce reports. They have found that this ensures the continuity of data collection and participation of member countries.

The discussion then moved away from politics and capacity building back to a technical database discussion. It was acknowledged that there is a recommendation is to use Access as the database. However, this was critiqued to not be the most effective as the language behind Access is difficult and it is complicated to get it to perform as it is meant to perform; often IT support is needed. On the other hand, Microsoft Visual FoxPro was introduced as a relationship database system that is easy to use and files are transferable. Access files can be opened in FoxPro, and vise versa. Queensland and SPC both use FoxPro and are happy with it. SPC (Williams) generously offered SPC's assistance in developing an appropriate system by their programming team who would supply the necessary computer/database assistance.

Additional topics that must be considered regarding database development included: database back up issues; where should the hard drive be stored; a copy of the database is a must; backing up must be forced on the system; copies need to be kept in separate places; and a checking program should be created for the master file.

Meeting minutes: DAY 2: June 5, 2003

SPC

The meeting began on day two with Peter Williams of SPC giving a brief overview of the activities conducted by the Oceanic Fisheries Programme (OFP). He provided details regarding the program's tuna tagging database, and concluded with a quick example of the functioning of

the tuna database and how it can be manipulated to access real time fishery information, stock assessments, CPUE, biomass, modeling etc.

Tuna tagging is the most reliable source of information to determine tuna movement, stock structure, population status and fishery interactions. Including valuable information on biology and other research-related data. The tagging database has been fundamental to the current understanding of tuna species. However, OFP has found that tagging goals need to be highly correlated with publicity and public relations to communicate the importance of the program's efforts. For example: target correct audience, posters, media press released, ensure adequate rewards for recoveries, provide regular tag release/recovery summaries, and provide timely, informative feedback for recovery information.

Many steps are involved in the process of managing the tuna database. In addition to human resource and confidentiality issues, other topics may include: establishing a manual for data collection procedures (i.e. standardization); the development of a relational database system; correct archiving of hard-copy data after data entry; tag release data quality control: manual checks, online error, control checks; tag inventory procedures: reconciliation with all tags manufactured, provided to the program, unreleased, released but not entered, released and entered, etc.; tag recovery procedures: data entry, immediate feedback to the finder, communication with finder regarding missing info; data quality control (data reliability flags); correct archiving of hard-copy recovery information; further research to validate recovery info; dissemination of summary information: summary of releases and recoveries, reports of in-country activities, donor reports; and preparation of data for analysis: development of a user-friendly query interface to extract information.

Mr. Williams concluded by providing a quick overview and description of the types of Database Systems that OFP uses (i.e. observer data, GIS systems, statistical programs). He expressed that a permanent staff of three people are needed develop software and programs. The design phase is the hardest and most time intensive, but software development flows fairly easily afterwards.

PLENARY

Dr. Limpus began discussion by pointing out the fact that biologists and researchers don't have much access to turtles in the early pelagic years. Most of the work is concentrated on nesting beaches. Thus people that have the opportunity to get in contact with turtles in those "lost years" should be encouraged and supported (i.e. fishers and fishery observers). To facilitate pelagic work, good tag retention (i.e. good tag application) and recaptures information is necessary. The opportunity to include fisheries in research and data collection should be taken seriously and fishers should be encouraged to tag because they are the most consistent. It can not be discounted that there may exist a turtle component to compliment the tuna tagging/observer collection program.

In regards to pelagic turtles, SPC has found that most turtle encounters are from Taiwanese and Chinese fishers because they appear to fish shallower. There are boats that have

a greater chance to encounter turtles and thus it is possible to target turtle studies based on this greater chance of interactions.

In support of other research methods, Dr. Limpus pointed out that there is currently a grad student looking at stomach contents of mahi mahi and other target species. Turtles are being found in these stomach contents and a surprising size range of turtles are being collected. In addition, turtles are coming to fishing boats during fishery operations and great information is being collected from dip netting these turtles coming to the lights of boats in the open ocean. Thus more proof that getting fishers and turtle biologist together can help to quantify some of the unknowns in regards to open pelagic stage and fishery related issues.

A discussion ensued regarding the reporting of tags (i.e., incentives). It is thought that conventional rewards work under some circumstances, but even when there are small rewards, reporting does not seem to work. Experiments, have found that exotic tags do get reported (e,g, Colin and George switched tags). On the other hand, as one would expect, when there appears to be a motivation for a regulation of a fishery, fisheries become less responsive to report tags. The only time that we (i.e. Colin Limpus) have found that there is not a problem is when fishers themselves do the tagging. In some more remote areas, there is a belief that tag equates ownership. Additionally, the campaign to encourage tag recovery worked in the early years (when lots of SPREP tags went out). It was concluded that the best thing may be to tag in coordination with a strong PR campaign.

In Malaysia turtles are tagged only at nesting beaches. Beaches are under state government control. Under the license system, beaches are identified and taggers go with egg collectors to tag turtles. However, very little green sea turtle tags are returned, sometime leatherback tags are reported but rarely greens. Additionally, there are no observers on fishing boats in Malaysia.

Discussions then migrated towards the time frame and length of existing tagging programs. The most extensive and longest running tagging program is in Sabah, Malaysia and data is used primarily by the Sabah management program. Monthly summary reports are generated, but access to their data is not available. The Philippines program started in the late 70's and includes decades of tagging and clutch counts. The Japanese have tagged for over 30 years, but their data is fairly inaccessible due to language barriers. Short duration programs include: a PNG program which began in the early 80's and ran two years at Long Island (one report was generated from this project). In Indonesia there is a SEAFDEC supported program, but there are other tagging programs in Indonesia that are not linked into the SEAFDEC program. There are tagging programs in Thailand, but there are language issues here as in the Japanese case. Unfortunately Thailand is not collaborating with SEAFDEC (delete this sentence) . In general there has not been a summary or overview of existing databases in each country.

The topic then changed quickly to address known stock information. There has been little to no information collected on stocks (i.e. stock assessments). The problem is that very few stocks have been identified. In most regions, there are mixed stocks in feeding grounds. The

imperative has not been to look at the big picture stuff. Most work has been localized and managers deal with immediate management concerns and/or needs.

There was some discussion regarding parallels which may be found between tuna and turtle stock assessments. Discussion then ensued regarding the need and/or ability to build a sea turtle population assessment model and if a population dynamics/population assessment/stock assessment person exists. The group considered turtle stock assessment and parameters that may work and/or "fit" for tuna vs. turtles. It is possible to itemize and prioritize the characteristics needed to build an assessment model, but the conclusion was that such a person and their skills are hard to define. It may be some hybrid person who has experience in many different disciplines that can be developed into a sea turtle stock assessment person.

PLENARY: Notes for Work Plan development:

1) Maintaining current tagging programs – ASEAN-SEAFDEC & SPREP are the two major institutions in the region with tagging programs and clearly they are limited by financial and human resources. It is important to note that minimum data collection standards have already been established by IUCN and MTSG.

   Agreement and support was provided by ASEAN-SEAFDECfor generation of a database that can be shared, for example, aggregated nesting data. It was noted that the pooling of information may prove difficult throughout the region. Written agreements may be necessary for people to return data, or a condition stipulated that any reports generated by the data is done through a collaborative regime. However, ASEAN-SEAFDEC is prepared to use and distribute a regional database it to their member countries, but notes that getting the data back may be challenging.

2) Agency objectives -
   A. ASEAN-SEAFDEC - hatcheries, nesting beach management, strandings
   B. SPREP - tagging, nesting beach management, hatcheries
   C. IO-SEA MoU - regional cooperation & management, facilitation of in-country work
   D. ASEAN-SEAFDEC - regional cooperation & management, facilitation of in-country work (within a smaller southeast Asian geographical area)
   E. WPRFMC - population assessment modeling, nesting beach management - financial resources, liaison capabilities
   F. NOAA Fisheries (region) - tagging, biology, ecology, training/capacity building, management, bycatch mitigation, stranding
   G. Queensland EPA - tagging, biology, ecology, training/capacity building, management, bycatch mitigation, sustainable harvest of indigenous folks, ecotourism
   H. Latin Am & East Pac – details needed
   I. Fishery bycatch organizations – (e.g. SPC)- Facilitate the flow of bycatch data to the database.

3) Resources

A) Financial – ASEAN-SEAFDEC: needs one person from each country to do data entry. Requests from the Council $200 x 8 to get this work done.
B) Manpower - SPC & Qld Parks (CL) has offered manpower and technical assistance; SPREP can offer short term help (but has no/limited funding)
C) Continuity – at least one person totally focused on turtles within SPREP; ASEAN-SEAFDEC to organize a regular training course (incl. data collection) at least once or twice a year for member countries. SPREP has a facility, but needs funding to bring people together. CMS supports regional capacity building and is a resource to bank on for workshop assistance.
D) Collaboration – ASEAN-SEAFDEC has good collaboration with Japan through SEASTAR 2000 (Southeast Asian Sea Turtle Associative Research). It is necessary to identify the areas where we (i.e. the region) can work together.

4) Technical
A. Recommendation to create a database in Visual Fox ro (front end) and customized for what SPREP and ASEAN-SEAFDEC requires.
B. Software - time frame for development – The first step is to put together a document for what is required (i.e. a design document). The actual development could take a couple of weeks. SPC can/will provide a document of a completed database so that the group can work from.
C. Standardized data entry will be essential to be required by the database.
D. Database maintenance - SPREP aims to cope with the backlog of data and will go visit each country to manually collect data.

APPENDICES

APPENDIX 1: Participants contact information.

Sea Turtle Database Steering Committee, Attendees June 4 & 5, 2003

Asterio Takesy	SPREP, Director	P.O. Box 240, Apia, Samoa asteriot@sprep.org.ws
Job Opu	SPREP, Marine Conservation Officer	P.O. Box 240, Apia, Samoa jobo@sprep.org.ws
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Kamarruddin bin Ibrahim	Department of Fisheries Malaysia, Turtle and Marine Ecosystem Center (TUMEC) Chief of Center	23050 Rantau Abang, Dungun, Terengganu, Malaysia kdin55@yahoo.com tumec_01@hotmail.com
Peter William	SPC - Secretariat of the Pacific Community Tuna fishery database expert	SPC B.P. D5 - 98848 Noumea Cedex, New Caledonia PeterW@spc.int
George Balazs	Pacific Islands Fisheries Science Center (formerly NMFS, Honolulu Laboratory) - Protected Species Investigations/Sea turtle program	PIFSC 2570 Dole St. Honolulu, HI 96822 gbalazs@honlab.nmfs.hawaii.edu
Colin Limpus	Queensland Parks Authority	Queensland Parks Authority 160 Ann St. 8th Floor Brisbane, QLD P.O. Box 155, Brisbane Albert St. Queensland 4002, Australia col.limpus@env.qld.gov.au
Paul Dalzell	WPRFMC, Senior Scientist, Pelagics	WPRFMC 1164 Bishop St. #1400 Honolulu, HI 96813 paul.dalzell@noaa.gov
Irene Kinan	WPRFMC, Protected species/Sea turtle coordinator	WPRFMC 1164 Bishop St. #1400 Honolulu, HI 96813 irene.kinan@noaa.gov

APPENDIX 2. Meeting Agenda

First Meeting to Establish a Comprehensive Turtle Tagging Database for the Western & Central Pacific

June 4-5, 2003

Western Pacific Regional Fishery Management Council
1164 Bishop Street, Suite 1400, Honolulu, Hawaii 96813

Final Agenda

June 4

9.00 am - 9.30	Introduction, meeting objectives and outcomes	Kitty Simonds/Paul Dalzell
9.30 am -noon	Australian turtle tagging database and it management Additional turtle tagging databases and data sources	Colin Limpus
	12 noon -1.30 pm lunch	
1.30 pm - 2.30	SEAFDEC: Current programs	Kamarruddin bin Ibrahim and Ahmad bin Ali
2.30 pm - 4.30	SPREP database Status, software, data holdings	Job Opu and Asterio Takesay
4.30 pm - 5.00	Wrap up and review of Day 1	Paul Dalzell

June 5

8.30 am - 9.30	The SPC-OFP: Tuna tagging database	Peter Williams
9.30 am - noon	Development of a joint database Arrangements and protocols for its administration	Plenary
	12 noon -1.30 pm lunch	
1.30 pm - 4.00	Tasks and responsibilities for developing joint database	Paul Dalzell
4.00 pm - 5.00	Meeting wrap up, provisional date of next meeting	Paul Dalzell/Kitty Simonds

MULTIPLICATION TABLE

1	2	3	4	5	6	7	8	9	10	11	12
2	4	6	8	10	12	14	16	18	20	22	24
3	6	9	12	15	18	21	24	27	30	33	36
4	8	12	16	20	24	28	32	36	40	44	48
5	10	15	20	25	30	35	40	45	50	55	60
6	12	18	24	30	36	42	48	54	60	66	72
7	14	21	28	35	42	49	56	63	70	77	84
8	16	24	32	40	48	56	64	72	80	88	96
9	18	27	36	45	54	63	72	81	90	99	108
10	20	30	40	50	60	70	80	90	100	110	120
11	22	33	44	55	66	77	88	99	110	121	132
12	24	36	48	60	72	84	96	108	120	132	144

CONVERSION TABLE

LENGTH

1 meter (m) =	100 cm =	1,000 mm
1 millimeter (mm)	=	.001 m
1 centimeter (cm)	=	.01 m
1 decimeter (dm)	=	.1 m
1 decameter (dkm)	=	10 m
1 hectometer (hm)	=	100 m
1 kilometer (km)	=	1,000 m

CAPACITY

1 liter (l) =	100 cl =	1,000 ml
1 milliliter (ml)	=	.001 l
1 centiliter (cl)	=	.01 l
1 deciliter (dl)	=	.1 l
1 decaliter (dkl)	=	10 l
1 hectoliter (hl)	=	100 l
1 kiloliter (kl)	=	1,000 l

WEIGHT

1 gram (g) =	100 cg =	1,000 mg
1 milligram (mg)	=	.001 g
1 centigram (cg)	=	.01 g
1 decigram (dg)	=	.1 g
1 decagram (dkg)	=	10 g
1 hectogram (hg)	=	100 g
1 kilogram (kg)	=	1,000 g

Annual Green Turtle Nesting at Heron Island, Great Barrier Reef, Australia.

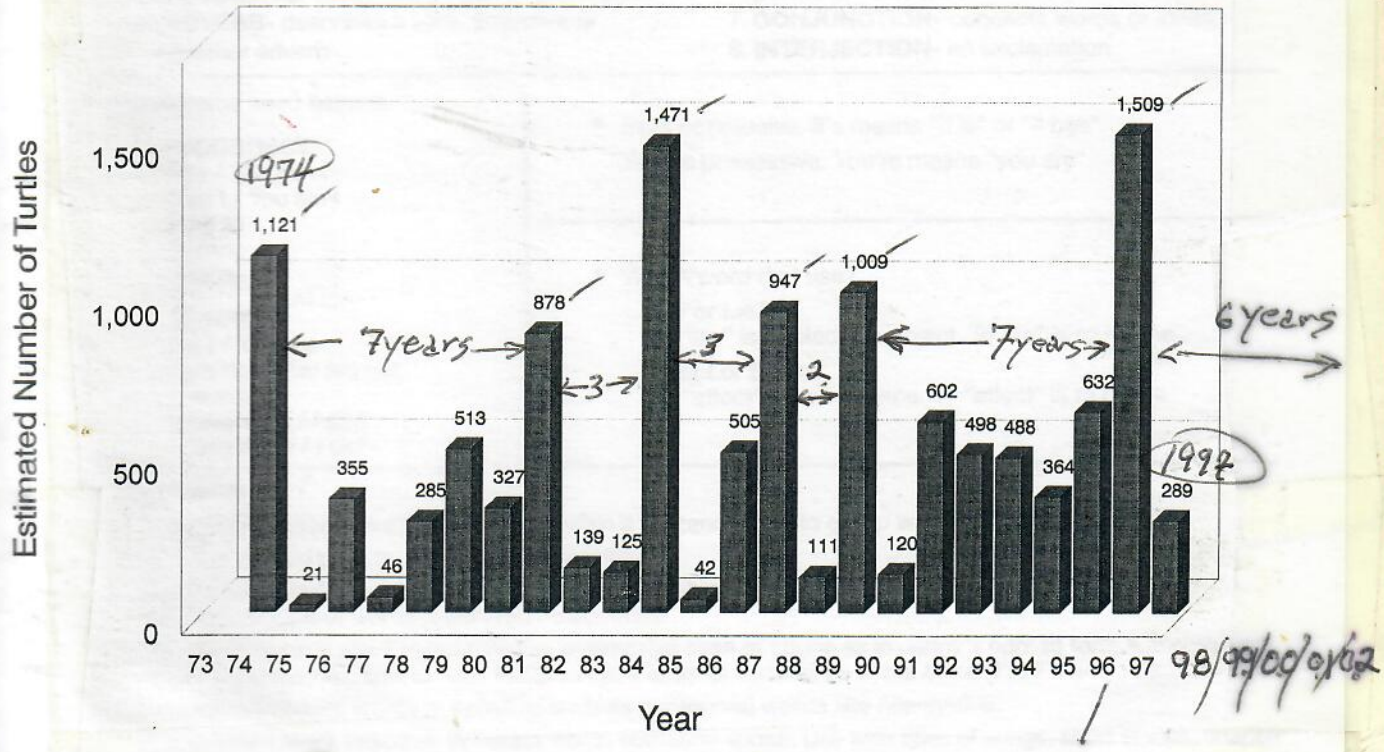

Figure 1. Historical trend for 24 nesting seasons, 1974-97.


Borneo
EQUATOR
N D O N E S I A
Java
New Guinea
PAPUA NEW GUINEA
Indian Ocean
Coral Sea
Great Barrier Reef
Darwin
NORTHERN TERRITORY
Cairns
Townsville
Alligator Creek
QUEENSLAND
Mackay
Rockhampton
TROPIC OF CAPRICORN
A U S T R A L I A
WESTERN AUSTRALIA
SOUTH AUSTRALIA
Brisbane
Perth
NEW SOUTH WALES
Sydney
Adelaide
Canberra, AUSTRALIAN CAPITAL TERRITORY
VICTORIA
Melbourne
Australian range of box jellyfish (Chironex fleckeri)
0
800
MILES AT TROPIC OF CAPRICORN
NGS CARTOGRAPHIC DIVISION
TASMANIA
Hobart