East Island Turtle Camp
Standard Operating Procedures
1997
(see update of 2012)

I. Preparations in Honolulu

    A. Supplies to order

    B. National Marine Fisheries Service-George Balazs:
        Arrange Meeting

    C. Tern Island: Turtle Room Inventory

        1. Appliances
        2. Chemicals
        3. Clothing
        4. Cooking Utensils
        5. Field Miscellaneous
        6. First Aid
        7. Furniture
        8. Housing
        9. Lighting
        10. Paint Supplies
        11. Power Tools
        12. Tool Kit

II. Turtle Camp Preparations on Tern Island

    A. Turtle camp preparations

    B. East Island Turtle Camp Equipment inventory

        1. Camp Equipment
        2. Tool Kit
        3. First Aid Kit
        4. Cooking

III. Turtle ID, Sighting, Daily Totals Field Forms; Field Notebook

    A. Turtle data and data forms

        1. Turtle ID Form
        2. Turtle Sighting Form
        3. Daily Totals Form
        4. Green Turtle Nest/ Hatching Success Form
        5. Field Notebook

IV. Computer: Turtle Database File

A. Notes

B. Turtle Identification DBF
1. Set Fields
2. Indexing File
3. Edit, Append and Print File
    4. Cross-checking data

C. Turtle Sighting DBF
1. Set Fields
2. Indexing File
3. Edit, Append and Print File
    4. Cross-checking data

D. Copying Data onto Floppy Disk

V. Field Work

A. Procedures

    1. Nightly Duties
    2. Approaching a Turtle
    3. Nesting Activity Determination
    4. Tagging and Collecting Data
    5. Tag Verification

B. Dremel Mototool

VI. Post-season Clean-up

A. Cleaning equipment

B. Inventory update

C. SOP update

D. Seasonal summary

I. Honolulu Preparations

A. Supplies to Order:

Review Turtle Room Inventory list from 1997 SOPs to determine equipment needs.

For the 1998 Turtle season, the following supplies need to be purchased:

80 - 100 AA cell batteries
60- 80 D cell batteries
1   medium field vest with multiple pockets
10-12 .5mm refillable lead pencils
2   pair leather gloves
2   12 gallon propane canisters for refrig.*
2   small propane canisters for Coleman stove*
10   Rite in the Rain data books (line ruled #391)*
3   cans White Easy Marker Spray Paint (short season supply)*
1   large metal turtle calipers

*   if the 1998 season is long (4+ months) - supply should be
     multiplied by three

B. National Marine Fisheries Service - George Balazs

Meet with George Balazs for training and guidelines.
He will give the following:

1) Turtle tag applicators (usually 4) plus extra spring
2) Turtle tags
3) Moto-tools
4) Turtle scutes for practice (for loan only)
5) Turtle Tag Recovery Tables

Discuss with George how he wishes to keep informed throughout the season: letter schedules, radio schedules, etc. Make triplicate copies of all correspondence to George Balazs: Honolulu office, George and Tern Island. Save lost and misapplied tags, make a list of them, and send them to George Balazs at the end of the season.

C. Tern Island: Turtle Room Inventory

1) Appliances:

1 Mansfield SaniPottie top (used in 1995-97)
3 Mansfield SaniPottie bottoms (used in 1995-97)
2 Mansfield SaniPottie tops and holding tanks - new
2 Mansfield SaniPottie tops (broken pump - for backup)
1 bag of SaniPottie parts (cap, pump, instructions)

2) Chemicals

31 packets "Waste-b-gone" Dry Holding Tank Deodorant (This is the best chem. to breakdown waste)
6 12-oz Pak-a-Potti Holding Tank Deodorant (also breaks down fecal stuff)
8 8-oz "Liquid Gold" holding tank deodorant
2.25 8-oz Perma-Kill 4 week tick killer
4 6-oz Cutters tick repellent (38% DEET)
7 6-oz Deep Woods Off insect repellent (38% DEET)
2 12-oz Cutters insect repellent (26% DEET)
26 rolls pie fly paper
3 12-oz Scotch-gard
9 12-oz Lysol spray
2 6-oz Lysol spray
1 16-oz Raid Ant and Roach killer
1 7.5-oz Johnston's "No Roach" fogger
3 Deet plus Insect repellent lotions

3) Clothing:

1 rain coats (1 heavy, 1 light - old)
2 rain pants (old)
2 rain ponchos
3 shower caps (keeps sand out of hair)
1 safety goggles
4 pairs pantyhose
3 pairs knee-highs
1 pack assorted pantyhose
2 turtle vests (very old, needs replacing)
1 turtle vest (old, but usable)

4) Cooking Utensils:

1 frying pan
2 cooking pots (1 small, 1 larger with lid)
1 hot water pot w/lid
3 plastic plates w/ divisions
2 oblong - oval plates
2 bowls
4 cups
1 spatula
1 can opener
1 Igniter Gun (to light stove)
1 Dish Tub
1 boxes matches
2 hot pads (1 square, 1 mit)
1 bottletop opener

5) Field- Miscellaneous

1 case (22-4 roll pkgs) Charmin Toilet paper
2 metal field clipboards
numerous index cards (3x5", 5x8")

turtle data cards
2 boxes #3 pencils
1 pencil sharpener (old)
6 small notebooks (green govt. kind)
1 box latex gloves (large)
2 alarm clock
1 small hand brooms
1 caliper for turtle hatchlings
1 large metal tape measure
8 tape measures (4 old, 4 new)
1 extra spring for applicator
1 flyswatter (new)
2 large blue tarps
1 red emergency blanket
Tent repair kit (material, needle and thread)

6) First Aid

1 tube Cortaid/Cortizone Cream
1 roll tape
1 box gauze pads
1 box Band-aids
1 4-oz baby powder
1 bottle caladryl
1 bottle hydrogen peroxide
1 bottle Betadine
1 6-oz bottle Solarcaine

7) Furniture:

2 large flat board for cots
1 medium PCs wood for shelves
2 pc wooden refrigerator stand: 1 bottom, 1 3-sided barrier for back of fridge
Refrigerator
4 six gallon water jugs*
3 three gallon water jugs*
   *jugs were treated with a small amount of chlorox at end
   of season - rinse well before use
1 ten gallon water jug (orange color)
1 bulk Conversion hose
1 bulk conversion adaptor
2 Hillary propane stoves (1 new, 1 used)
1 small fuel filter (for Colemans)
Tripod Chair
6 cots
2 mattresses for cots (2 new)
1 inflatable raft to use as sleeping pad
1 bag burlap bags
1 bag rough twine
1 Coleman oven
1 large Igloo cooler (to store food)

8) Housing:

1 8x12 ft tent (1 new-1993)
1 8x12 ft tent (1 old, cut-up to be used for parts)
2 ridge pole sets
2 tent fly (1 new-1993, 1 used)
13 tent poles
18 adjustable poles for fly
miscellaneous tent line (pre-cut)
2 spools line for tent (use pre-cut line first)
tent needles, thread material
1 small 1-2 man tent w/stakes
Tent repair kit

9) Lighting:

3 Fluorescent lamps (need 8 D-Cell batteries each)
3 large flashlights (D cell)
4 (AA) flashlights
2 metal mini-mag adjustable beam flashlights (AA)
1 solar lantern
3 fluorescent lamp bulbs
3 2.2v bulbs
1 Coleman Lantern (Dangerous)
6 (2 pks) Mantles for Coleman
1 headlamp
5 adjustable Velcro mini flashlight holders for head

10) Paint Supplies:

1 gallon Deco Rez
1 cans Growco spray paint
2 cans Power Paint Cartridge

11) Power Tools:

(All need to be obtained from George Balazs)
6 Dremel Moto Tools w/Wrench set and 3 rechargers
2 Dremel Bits - High Speed Steel Cutter (#115)
3 Dremel Bits - High Speed Steel Cutter (#131) (works best)
3 Dremel bits - High Speed Steel Cutter (#116)

12) Tool Kit:

1 large tool kit box
2 standard screwdriver
2 Phillips screwdrivers
nails
1 large wire cutter/plier
2 crescent wrenches
1 Hammer
1 set tools for MotoTool

2 cans wire - safety lock wire to attach fence to poles
1 can WD-40
Sand Paper
Electrical Tape
1 roll thread seal tape
1 kneedlenose pliers
1 wireclipper
1 adjustable pliers
1 exacto knife
1 pair safety goggles

13) Other

1 bottle Banana Boat sport sunscreen (15 SPF)
1 bottle Hawaiian Sun sunscreen (15 SPF)
4 bottles Hawaiian Sun sunscreen (30 SPF)
1 bottle Hawaiian Sun sunscreen (10 SPF)
3 15 oz bottles Prell shampoo (for washing body and hair)
2 boxes baking soda (to clean out water jugs before use)
1 small fire extinguisher
1 turtle decoy (very heavy)
1 Satellite Tagging Box (in pieces)
Various water jug pieces
Wooden squares (for placing beneath cot legs - IMPORTANT)
6 old style life jackets
25 pairs thick rubber gloves (for resin work)
3 boxes small paint brushes (for resin work)
1 dive bag
1 5-gallon solar shower
20 buckets
1 turtle satellite tagging cooler
2 Styrofoam coolers for transporting eggs
1 bucket of resin
1 bucket of hatchling solution

II. Turtle Camp Preparations on Tern Island

A. Turtle Camp Preparations:

1) Waterproof tent fly with Scotch-gard or water sealant if tent fly is "old" - 1995 was new fly
2) Fire up stoves to check
3) Hook up refrigerator to propane tank; let it run for at least one day to check
4) Fresh Water jugs: rinse w/ chlorox or baking soda and water
5) First Aid Kit: restock on bandaids,etc from Tern Island supplies - if possible
6) Use East Island Turtle Camp Equipment Inventory as reference for packing up for camp; use white buckets and trash bag lining for things to be kept dry.
7) See 1995 Additional Notes for helpful suggestions for future turtle camps. Also additions made in 1996-97. Additional Notes accompanies East Island Turtle Report, 1997.

B. East Island Turtle Camp Equipment Inventory

1. Camp Equipment

Equipment/Supplies are located in the Turtle Room unless otherwise specified.

8x12ft tent with three ridge pole (for front, back, center)
13 tent poles
tent fly
18 adjustable poles
tent line: including pre-cut pieces and spool
tent stakes - in wood shop building (labeled)
large metal stakes for fencing - in wood shop building (labeled)
rolls of fencing - in wood shop building (labeled)
cot
blanket
large board for cot
refrigerator- in generator building dry room
2 piece refrigerator stand
field camp-sized propane tanks- in propane shed
1 chair
wood for shelves
porta-potti set
3 fresh water jugs with spout
propane stove
1 small fuel filter
1 solar shower
mosquito net if available
Deet-type insect repellent
Prell (body and hair)

2. Tool Kit:

1   large tool kit box
1   standard screwdriver
2   Phillips screwdrivers
nails
1   large wire cutter/plier
2   crescent wrenches
1   Hammer
1   set tools for MotoTool
2   cans wire - safety lock wire to attach fence to poles
1   can WD-40
Sand Paper
Electrical Tape
2   rolls thread seal tape

3. First Aid Kit:

Complete, stocked kit w/ bandaids, 1st aid tape, cream, etc. **from Tern Island supplies**

Suggestions for a complete kit:
1   box Benadryl (24 tablets)
2   1-oz tubes Benadryl cream
1   1-oz bottle Hydrocortizone lotion
1   tube cortizone/Cortaid cream
1   0.5-oz Camphophenique
1   instant cold pack
1   roll bandage
1   box gauze pads
1   8-oz tube first aid cream
Bandaid (various types)
1   4-oz Baby powder
1   bottle Caladryl
Cotton balls
1   bottle hydrogen peroxide
1   bottle betadine
1   small baggy of Q-tips

4. Cooking:

1   frying pan
2   cooking pots (1 small, 1 larger with lid)
1   hot water pot w/lid
3   plastic plates w/ divisions
2   oblong - oval plates
3   bowls
4   cups
1   spatula
1   can opener
1   Ignitor Gun (to light stove
1   Dish Tub
1   boxes matches
2   hot pads (1 square, 1 mit)
Soap and sponge for washing dishes

III. Turtle ID, Sightings and Daily Totals Forms; Field Notebook

A. Turtle Data and Data Forms

The following information applies to the 1997 field season at French Frigate Shoals. The core of this system is three data sets. One for turtle identification purposes, one for recording sightings and one for recording the number of turtles up each night. In addition, the data sets for recording nest information and hatching success will be maintained for Tern Island nests by USFWS staff stationed at Tern Island. Data are entered from these forms into the computer database for all except Daily totals, nest information and hatching success. The Daily totals form is used to keep George Balazs informed of activity throughout the season. Nest information and hatchling success is written up in a separate report at the end of the nesting/hatching season.

Following are explanations of the 1997 turtle forms:

Note: To reduce confusion, all activity during a night will be entered on the previous day's date. For example, turtles found ashore at 2200 hours on 5 June and 0100 hours on 6 June will be recorded as up on 5 June.

1. Green Turtle Identification Form:

For every turtle identified, each old tag read or new tag applied will necessitate filling out a line on this form. Any repetitive data such as island or date can be signified by a continuation line (see example, "Green Turtle Identification Form"). Carapace length, tumors, and tumor positions only have to be completed once for each turtle.

After a turtle is fully identified: mototool number assigned, at least three good tags in place, carapace measurement taken, tumors noted, and etc., each subsequent trip ashore will only have to be logged-in on the "Nesting Female Sighting Form," until mid-season, when tag verification should begin (refer to tag verification section).

Data Variables:

Island: East, Tern, etc.

Date: Month/day

Mototool ID: the engraved letter and number for temporary identification: ("C-") and ("-C") were used on East and Tern, respectively in 1990; ("L-") and ("-L") on East and Tern, respectively during 1991; ("U-") and ("-U") on East and Tern, respectively in 1992. For example, the ID read "U-30" for an East Island turtle and "30-U" for a Tern Island turtle in 1992. In 1993-1996 mototool numbers were not assign for Tern Island nesting turtles. In 1997 "T" was assigned for Tern Island nesting turtles. For East Island the moto-tool letter was "S-" for 1993, "Z-" for 1994, "J-" for 1996 and "V" for 1997. In 1995 the researchers chose not to use a letter prefix due to mototool problems at the beginning of the season.

Turtles are numbered beginning with 40 to eliminate confusion in reading the mototool number. By starting at number 40, any mototool number beginning with a 4,5,6,7,8 or 9 will be a two digit number. If the number starts with a 1, 2, or 3 the number is a three digit number. Each year since 1973, there have been no more than 389 nesting females identified on East Island. Except in 1997, there were 481 nesting females identified on East Island. For the turtles that are identified on Tern Island, the mototool numbers should also begin with 40.

Tag #: Number of tag read or applied

Tag Position: (REFER TO TAG POSITION CODES p.10): LFL or RFL for primary tag sites on left and right flippers, respectively. Examples: L34 and R23 mean tag is between third and fourth scales on the left flipper and tag is between the second and third scales on the right flipper, respectively.

TAG POSITION CODES:

Right flap	RFL
First proximal scale on right flipper	R1
Second proximal scale on right flipper	R2
Third proximal scale on right flipper	R3
Fourth proximal scale on right flipper	R4
Fifth proximal scale on right flipper	R5

Between first and second scale on right flipper	R12
Between second and third scale on right flipper	R23
Between third and fourth scale on right flipper	R34
Between fourth and fifth scale on right flipper	R45
Right hind flipper	RHF
Left flap	LFL
First proximal scale on left flipper	L1
Second proximal scale on left flipper	L2
Third proximal scale on left flipper	L3
Fourth proximal scale on left flipper	L4
Fifth proximal scale on left flipper	L5
Between first and second scale on left flipper	L12
Between second and third scale on left flipper	L23
Between third and fourth scale on left flipper	L34
Between fourth and fifth scale on left flipper	L45
Left hind flipper	LHF

New or Old: Put a N in this category if a new tag was applied that night or that season; an O if an existing tag was read (the tag was applied during another nesting season).

Save lost and misapplied tags, make a list of them, and send them to George Balazs at the end of the season.

Carapace Length (Curved): curved carapace length in cm (to nearest tenth) to the longest point on the shell, not to the notch.

Carapace Length (Straight): straight carapace length in cm (to the nearest tenth), to the longest point on the shell, using the metal calipers. This is not a necessary measurement, and in very busy seasons will not be feasible. If possible, measure the straight carapace, but always measure the curved carapace first.

Tumor(s) Size and Tumor(s) Position (2 different variables on the data form):

"Tumor(s) Size": (REFER TO 'SIZE CODES FOR TUMORS' p. 13); Enter a size code (a digit) of EACH tumor.

"Tumor(s) Position": (REFER TO 'TUMOR POSITION CODES' p. 13); Enter a position of each tumor that corresponds with the size entered under "Tumor(s) size".

Example: Tumor(s) size input of 11 and Tumor Position input of N1F1 means the turtle has tumor size 1 at position N1 (left dorsal neck) and another tumor size 1 at position F1 (left distal of front flipper). Each size and corresponding position identifies one tumor.

SIZE CODES FOR TUMORS:

	Code:	
Small (1-3 cm diameter)		1
Medium (3-6 cm diameter)		2
Large (6-10 cm diameter)		3
X-Large (>10 cm diameter)		4

Examples for field estimations of sizes:
small-   the size of the tip of your little finger
medium- fits in the circle made by touching your index finger to your thumb (ok sign) but larger than small size

large-   smaller than the palm of your hand, but larger than size medium
x-large-   larger than the palm of your hand

TUMOR POSITION CODES:

Left jaw	Code:	J1
Right jaw		J2
Left eye		E1
Right eye		E2
Left dorsal of neck		N1
Left ventral of neck		N2
Right dorsal of neck		N3
Right ventral of neck		N4
Left distal of front flipper		F1
Left proximal of front flipper		F2
Right proximal of front flipper		F3
Right distal of front flipper		F4
Left distal of hind flipper		F5
Left proximal of hind flipper		F6
Right proximal of hind flipper		F7
Right distal of hind flipper		F8
Cloaca		T1
Proximal of tail		T2
Distal of tail		T3
Other		O

Comments: any pertinent information such as amputations, markings, etc.

2. Nesting Female Sighting Form:

Each time a female is ashore, she should be entered on this form. Each turtle is entered just once a night.

Data variables:

Island: East, Tern, etc.

Date: month/year

MotoTool ID: the engraved number and letter for temporary identification.

Verification Tag #: As a rule, any time a tag is read, enter it from field notebook to form to computer; if there is any doubt as to the temporary id, obtain a tag # to verify the turtle's identity.

Time UP and Time BACK: These are the times the turtle comes ashore and returns to the ocean. We will not always be able to record these data with accuracy - so just record the time the turtle is FIRST encountered that night. This should be entered as the "Time Up" variable. "Time Back" is usually the time a turtle is seen returning to the water, or was last observed on land with an estimation factor added.

To determine Time BACK for a turtle seen last on land the following estimation factors were used in the 1996-97 seasons:

For each activity, times should be added to the last time seen:

Crawling to water-	Add 2 minutes
Crawling around island-	Add 10 minutes
Digging (Bodypit, egg chamber or backfill)-	Add 30 minutes
Nesting (eggs seen)-	Add 1 hour
Pattycaking-	Add 1 hour

Activity: codes are as follows:

N = nested (eggs seen)

P = probably nested (eggs not seen but all the signs of a successful nesting are present, e.g. patty-caking)

M = maybe nested (not sure but turtle possibly nested, e.g.. seen backfilling)

X = digging (turtle was digging but did not nest)

C= crawling (turtle was ashore but only crawled; no digging)

Always enter the highest level of activity only; with N = nested the ultimate level.

Comments: any pertinent information

3. Daily Totals Form:

This form is kept up-dated nightly to pass to Honolulu offices when requested throughout the season.

Data Variables:

Date: year/month/day

Turtles Up: Total number of turtles ashore that night

New Turtles IDed: number of turtles identified for the first time that season. Do not include those turtles that were already mototooled or tagged that season, but are still on the needs list for tumor exam, etc. This total should equal the total number of turtles IDed at the end of the season. A turtle is recorded as a new turtle IDed only if she has been permanently IDed (tagged, tags read, or mototooled) that night (see p. 23 paragraph C).

Nests: The number of turtles that successfully nested that night. This should be equal to the total number of N, P, and M on the Nesting Female Sighting Form for that night.

Investigator: the researcher's initials

Comments: any pertinent information: weather, tides, full moon, turtle's seemed extremely jumpy, etc.

These data are not entered into the computer database.

4. Green Turtle Nest/Hatching Success Form (this section normally not used, Use only if advised by George Balazs)
This form was revised in 1991 to combine information regarding nests and hatches. This form is used on Tern Island primarily. (See example)

Data Variables:

Nest # : The number of the nest, in order of laying (i.e., first nest of the season is #1, last nest of the season is #103). Nests for which you are less than 50% sure label as "Maybe" nests. Mark them on this sheet with "M" as the prefix and then sequential numbers, i.e #M1 is the first "Maybe" nest of the season.

Lay date: The date on which the nest was laid, following the same rules applied to lay dates of East Island nests...this means that if you do a morning walk on the 23rd, any new nests encountered will be marked as being laid on the 22nd.

Location: Use the grid maps for Tern Island to determine the exact location of the nest. This is so at the end of the season, if the stake marking the nest has been lost, you can still find the nest.

ID# : If the female is known, record her ID# here. This is filled out only if the female is encountered laying the nest by researchers at night or during the morning walk; don't guess at the identity of the turtle laying the nest.

Hatch date: Date on which the nest hatches, as for lay dates. If you find a hatched nest on the morning walk of the 23rd, the nest hatched on the 22nd.

Pre-hatch Pit? : Approximately 50% of the time, there is a noticeable indentation in the sand, prior to hatching. If you notice this, record Y here. If unknown, mark ?, and if you're certain that there was no hatch pit, record N.

Total # of Eggs: Upon excavation of the nest, the total number of eggs found in the nest is recorded here.

Total Alive Hatch: Record the number of "hatched" eggshells you find in the nest here. Hatched shells are papery-dry and "cracked" open. These are assumed to be eggshells from turtles which hatched.

Trapd turts: The number of trapped turtles remaining in the nest.

Escape Unassi: The number of turtles which escaped, unassisted, from the nest. This number is derived by subtracting the number of trapped turtles from the number of Total Alive Hatch. The remaining hatched eggshells are assumed to be from turtles which escaped the nest unassisted.

Dead But Developed: This category is for those unhatched eggs which show some development, and it is somewhat subjective. Use your best judgement to determine the amount of development: fully, ¾, ½, ¼ developed.

Rot eggs: The number of "undeveloped" eggs in the nest. Rotten eggs are pink or yellow inside, and development is not apparent.

Comments: Any pertinent comments regarding substrate, the hatch, the nest itself, etc.

Data from the Green turtle nest/hatching success form are compiled at the end of the season annually and sent to the Honolulu Office.

5. Field Notebook:

Format:

The field notebook should be a journal of the night's activities. Two notebooks are kept: one for East Island activity, and a separate notebook for Tern Island's activity. The date and the next MOTOTOOL # to be used should be placed at the top of each page. A new page should be started each night, so that the first activity of the night will never be recorded halfway down the page. At the back of each notebook, a "needs list" should be kept where you can quickly cross-check what needs to be done to complete the identification of each turtle. A list of all tumored turtles should be maintained on this page as well (see example). In 1996-97 a tumored turtle list was not kept per George Balazs. Check with him to determine if one should be kept for the 1998 season. Be sure to update the needs list each day to assure that all information needed on turtles seen each night is collected.

Data Notation:

Upon discovering a turtle above the berm (and for our purposes, now considering a nesting turtle), these data should be collected and noted in the field notebook:

1. Identify the turtle

A. Previously identified female:

    I. record her mototool number, the time she is first observed and her activity

    II. check field notebook needs list for general needs, tumored needs, and tumor/control needs.

        a. if on the list, complete needed items (e.g. tag her, get measurement of her carapace)

        b. update the needs list if needed

    III. check field notebook tumored female list

        a. if on the list, mark her nest and fill out the tumored female form

        b. be sure to add a corresponding control nest to the tumor/control needs list. This should have the approximate location of the tumored nest so that you can be sure to get a control in the same general location as the tumored nest. Try to get the control and tumor nests as close together in both space and time.

    IV. After the second week of camp begin tag verification

        a. check that tags are still secure

        b. cross her off the verification list to indicate that her tags have been checked.

        c. record verified tag numbers under VERTAGNO in the sightings database (ESTSIG97.DBF)

B. New, unidentified female:

    I. determine her activity/record time first observed

    II. proceed with examination if crawling or pattycaking

    III. update the field notebook needs list and tumored female list if appropriate.

2. Record subsequent sighting times and activities throughout the night of each turtle encountered. Record the highest level of activity for each turtle next to the field notebook entry and on the Turtle Sightings form.

See the example of field notes for the format. For each turtle, leave at least five lines in the notebook, so all her activities for that night may be recorded in one place.

IV. Computer: Turtle Database File

A. Notes:

1. Enter all data and notes from Turtle ID and Turtle Sighting Field forms into computer after 4/5 day rotation so you don't have to decipher at later date. Always seems best to put as much data as possible into database from field books.

2. Two major Turtle Data Base Files (primary data sets):

    EASTID97.DBF
    ESTSIG97.DBF

3. Use all capitals for data entry

4. Right Justify everything except tumor(s) size and position.

5. If a turtle receives more than one mototool ID, make sure all entries are changed to the newest mototool ID, in both primary data sets.

6. All appending and editing should be done to the primary data sets.

7. After any data entry, BACK UP THE DATA!

8. A directory was set up, to access DBASE III:
    At C:\ >   Type cd DBASE <enter>
    At C:\DBASE >   Type DBASE <enter>

B. Turtle Identification DBF

For Turtle ID file name: EASTID97.DBF (Includes all turtles identified on East Island)

1. Set up Fields for: EASTID97.DBF
    **a disc has been set up for the 1998 season and is in the Tern Island dryroom with the previous years disks. The field have already been setup under EASTID98.DBF

Type in 'A' :   Database Management
Type in 'T' :   Turtle Study Database
Drive 'C' :   Modify menu: DBF

Field	Field Name	Type	Width	Decimal
1	Island	character	4	
2	Date	date	8	
3	MOTOID	character	4	
4	Tag No	character	5	
5	Tag Pos	character	3	
6	New/Old	character	1	
7	Carapace	numeric	5	1
8	Strtcarap	numeric	5	1
9	Tumor(s) Sz	character	6	
10	Tumor(s)Pos	character	12	
11	Sex or Age	character	1	
12	Activity	character	1	
13	Comments	character	100	

Fields can be changed any time: "Modify" menu: DBF

2. Indexing File: TURTID97.DBF

Type 'A'	(Database Management)
Type 'T'	(Turtle Study Database)
Database File	Push "Enter"
C:	"Enter"
TurtID97	"Enter"
"Organize"	"Enter"
What Variable?	Push f10 for fields
MOTOID	"Enter"
to C:	"Enter"
File name: MOTOID.ndx	"Enter"
return to "Organize"	"Enter"
What variable?	Push f10 for fields
TagNo	"Enter"
to C:	"Enter"
File name: TAGNO.ndx	"Enter"

3. To Edit, Append and Print EASTID97.DBF

Type 'A' for Database Management
Type 'T' for Turtle Study Database
You are now in the Database menu

Database File	push "Enter"
C:	"Enter"
TURTID93.DBF	"Enter"
Is File indexed?	"Y"
MOTOID.ndx	"Enter"
TAGNO.ndx	"Enter"

TO APPEND: move cursor to "Append" in the Update Menu. Push "esc" key to get dot prompt. At dot prompt, type ".Set carry on" then push Enter. At second dot prompt, type ".append". You will be able to append data.

TO PRINT EASTID97.DBF indexed by MOTOID, do steps 1-7 above, then go to the "Retrieve" menu and list EASTID97.DBF.

TO PRINT EASTID97.DBF indexed by TAGNO, do steps 1-6 and 8 then go to "Retrieve" menu and list EASTID97.DBF

After each 4-day rotation on an island, the computer databases are updated..

4. Cross-checking data base

Cross-checking your partner's field notes with the needs lists and data forms should be done routinely. Cross checking the data base file with the data forms should also be done after entering the data onto the computer. It is easier to make a print out for the EASTID97. DBF and have someone else read from the data sheets as you check the print out. By doing this cross checking throughout the season, you can minimize the amount of corrections that need to be made at the end of the season, keep the data clean and accurate for when reporting to George Balazs, and also, you can update and delete any turtles that may have not been deleted from the NEEDS list.

C. Turtle Sighting DBF

For Turtle Sighting data, file name: ESTSIG97.DBF

**a disc has already been setup for the 1998 season and is in the Tern Island dryroom with the previous years disks. All fields have been setup under ESTSIG97.DBF.

1. Set up Fields for C: ESTSIG97.DBF

Type 'A'	(Database Management)
Type 'T'	(Turtle Study Database)
Drive C:	"Modify" menu: DBF

Field	Field Name	Type	Width
1	Island	character	4
2	Date	date	8
3	MOTOSIG	character	4
4	Vertagno	character	15
5	Vertagno2	character	15
6	Time Up	numeric	4
7	Time Back	numeric	4
8	Activity	character	1

2. Indexing File: ESTID97.DBF

Follow the same instructions as those for indexing EASTID97.DBF except get into the ESTSIG97.DBF primary data set and index for: MOTOSIG.ndx (Master) and DATE.ndx (02).

18

3. Edit, Append and Print File: ESTSIG97.DBF

Type 'A'	for Database Management
Type 'T	for Turtle Study Database
Database File	push "Enter"
C:	"Enter"
ESTSIG97.DBF	"Enter"
Is file indexed?	"Y"
MOTOSIG.ndx	"Enter"
DATE.ndx	"Enter"

TO APPEND: move cursor to "Append" in the Update Menu. Push "esc" key to get dot prompt. At dot prompt, type ".set carry on" then push "enter". At second dot prompt, type ".append". you will be able to append and basic data (island, etc.) will not need to be changed.

TO PRINT ESTSIG97.DBF indexed by MOTOSIG and DATE: Go through steps 1-8 above, then go to "Retrieve" menu and use "list".

4. Cross-checking data base

Cross-checking is easily done on the computer in the "browse" mode with someone else reading from the data sheets. Move cursor to "Browse" when you're in ESTSIG97.DBF and edit directly from the screen to the data sheets. Cross-checking can also be done by printing out a copy of the database file during the daytime to proof at night during times of low power on Tern Island.

D. Copying Data onto 3½" or 5½" floppy

If a new floppy disc is used, you have to format it, to check if it's IBM compatible.

Go to the main menu and use DOS TOOLS to format your disk.

To copy: Move cursor to "Tools" Move cursor to "Copy File," push "Enter" Disc drive: C
Will get File List; use cursor to move and pick file (e.g. EASTID97.DBF, ESTSIG97.DBF); Be sure you pick the files that are DBF and not BAK. Then Push "Enter" Next, will ask which drive copying to. Push "A" or "B," depending on your backup disk size. Will ask what name for file? (the file will be same). push "enter" At the bottom of the screen, you should see the sentence: "Command: Copy file C: EASTID97.DBF to A: (or B:) ESTSIG97.DBF. Data will be copied from drive C to Drive A (or B). At end, push any key. Repeat procedure and copy accompanying Index (.NDX) files for primary database.

Primary database:	ESTSIG97.DBF	EASTID97.DBF
Master Index file:	MOTOSIG.NDX	MOTOID.NDX
Secondary Index:	DATE.NDX	TAGNO.NDX

Make sure to copy primary database and accompanying Index files each time, as they are copied individually. To check and make sure the transfer is successful, return to DBF but in A drive instead of C. The data should show up on the screen.

TO UPDATE DISC AFTER DATA ENTRY: Go through same procedure as when copying onto Drive A or B, but when it asks you which drive the data is to be copied to, you will get a question such as :"A: ESTSIG97.DBF already exists, overwrite it? (Y or N)" you will type in "Y" for yes, and the updated data will be copied onto the floppy. A file cannot be copied while you are in it, so push enter to get the dot prompt, and   then type "Close all." Then type "Assist" to get back to the menu, and go to "Tools" to copy.

*** The files for the 1995-97 season have been created, but not indexed.

V. FIELD WORK

A. Procedures

1. Nightly Duties

a) Each night, rounds should be made, starting just before sunset (to locate hauled out mom and pup pairs and memorize their locations so that further disturbance throughout the night is avoided), and continuing once every other hour until the cessation of the night's nesting activity (usually just after sunrise). Care should be made not to go out at night more than once an hour, unless a turtle needs to be identified or observed laying eggs, as in the case of tumored turtles. This is to minimize unneeded disturbance to nesting turtles, birds and sleeping seals.

b) Check-in with Tern Island via VHF radio (at 15:30 hrs and 02:00 each day) and pass the Daily Totals for the previous night's activity. Also pass needs from the Camp Checklist Form if it is the night before transfer day.

Camp Checklist Form:

Go over the checklist at least the day before the transfer so that there is plenty of time to prepare and "get things in order". It is only courteous to make sure, for instance, that there is plenty of toilet paper for your co-worker when they arrive. This will help the camp run very smoothly. Also, if supplies appear to be running short at Tern Island, inform the Refuge Manager so that they can be re-ordered.

c) Update ID, Sighting and Daily Totals forms each night, either in between rounds, or at the cessation of the night's activity. Do not put this off! Forms have a way of getting out of control if they're not filled out each night.   Remember when filling out the Daily Totals form that a new i.d is any turtle which has been permanently identified that night. If no mototool number or tags have been read/applied, and the turtle is unknown, she is not considered a new i.d on the form.

d) Check over field notes in the field notebook and make sure you've updated the needs list and tumored turtles list. Record a letter for the highest level of activity in the notebook next to each turtle entry (see example of field notebook).

e) For at least the past six field seasons, a two o'clock radio call has been made to Tern Island from East Island to help the researcher on East Island stay awake. It also helps the person on Tern stay on a night schedule, keep them informed of what's going on, and helps pass the time on East Island on those nights when the turtle action is slow.

2. Approaching a Turtle:

There is no set way to approach a turtle, because every situation will be different. Everybody will find a way that minimizes the stress and disturbance to the turtle, as well as being comfortable for the researcher. What has worked well is the following: Before setting out on the walk, check to see if the moon's light can be utilized. When there is a moon to walk by, you usually don't need a flashlight to see by, but you may need it to look into the bushes to see if any turtles are there. When it is dark, a flashlight will have to be used to spot the turtles (use other senses too. e.g. hearing, smell, dust in the eyes... to help locate the turtles). If you are using a flashlight and a seal happens to be looking in your direction, turn off the flashlight and slowly move away from the seal. Keep your distance from the seals at all times. When working with a turtle, and a flashlight needs to be used, try to make the beam as small as possible and avoid shining direct light into her eyes. The turtles get very skittish if they see something moving in front of them. They also are very jumpy if a shadow passes in front of them.

After determining in which direction to head out, proceed cautiously. Once a turtle is spotted, stay 2-10 meters away. If they see you, they tend to get jumpy. Before proceeding any closer, her activity should be noted. Wait and watch her. If she is unaware of your presence, or if you have undoubtedly scared her toward the water, look for a white, spray-painted mototool number on the lower right side of her carapace. If it is too dark to see without a flashlight, use a small beam of light on the back of her carapace to see if there is one. To get a small beam of light, you can cup your hand over the face of the flashlight while at the same time, open and close your hand to get the right amount of light. If there is no mototool number, assess her activity and proceed to identify her if conditions are right.

Basically, use your best judgement as to what is needed to get the job done with the least amount of disturbance to both the turtles and the other animals in the vicinity.

3. Nesting Activity Determination

A turtle can be engaged in at least six different activities:

a) **Crawling**-- the turtle is actively moving across the island and is not digging (recorded as "C" or crawling in the field notebook).

b) **Digging a Body Pit**-- the turtle uses all four flippers to dig a shallow pit in which she fits her body before digging an egg chamber (recorded as "DBP" or digging a body pit in the field notebook). Turtles commonly dig "false pits," and these can be recorded also, i.e., "Digging #3 BP just west of spit."

c) **Digging an Egg Chamber**-- this is the chamber in which the eggs will be placed. It is cylindrical and approximately .5 m in width and 1 m in depth. The turtle uses her hind flippers to carefully scoop out sand to make this chamber (Record this as "DEC," or digging an egg chamber in the field notebook). The percent completed is also a useful notation if you need to remember to catch her laying eggs.

d) **Laying Eggs**-- after completion of the egg chamber, eggs are laid inside it (recorded as EGGS in the field notebook --percent completion of laying can also be recorded).

e) **Pattycaking**-- after eggs are laid, the turtle will carefully fill the egg chamber with sand using her hind flippers. She will then "patty cake" the top until it is firm (recorded as pattycake in the field notebook).

f) **Backfill**-- after the eggs are covered, the nest is covered with sand, using her foreflippers. She vigorously sweeps sand over the eggs. Take care not to be in back of her in this stage! (recorded as "BF," or backfill in the field notebook).

4. Tagging and Collecting Data

On rounds, you should wear your tagging vest equipped with the following tools:

Cloth measuring tape, in cm
Tagging pliers
Tags
Two flashlights (one for backup)
Mototool with bit
Field notebook
2 pencils
Lysol (to spray pliers and mototool after each turtle)
White spray paint
Wire cutters to free entrapped turtles from exposed ground wires
Wrench (to tighten mototool bit if it becomes loose)

Always put tools back in the vest when done using them, for they tend to walk away and hide, forever! Also: remember to always put the moto-tool in the vest with the drill bit facing in. This way, if the moto-tool goes on unintentionally you can reach into the vest to turn it off. Empty film containers make a good cap for the mototool bit with some duct tape around the opening to make a tight seal.

To avoid making a turtle abandon her eggs, an intense examination of her (anything other than reading an existing mototool number on her carapace) should be performed only while she is crawling or pattycaking her nest. Data collection for her identification should be done in this order:

a) Approach her during crawl or pattycake/backfill and give her a mototool i.d. on her carapace, if needed.

b) Check her for tags.

c) Tag her if needed.

d) Take her curved carapace length, making sure to measure to the longest point of the shell, **not** to the notch.

e) Exam her for tumors/new injuries.

f) Record all data in the field notebook, and add or cross her off the needs list if pertinent. If she is a tumored female, add her to the tumored female list if needed.

When identifying a turtle, be sure to be thorough, but you don't need to have the flashlight blaring. A small, dim beam will do just fine.

5. Tag Verification

Around the second week of camp, tag verification on every identified female should commence, to be assured that tags which were fine at the beginning of the season have not become weakened or worn during the season. It should be noted on the TURT ID form and the tag verification sheets if: tags are o.k., new tags were applied, or a tag applied in the beginning of the season has been lost (see example).

6. Biopsy Punch

This procedure was done in the 1996 -97 season. However, this requires a special use permit and will be done in future seasons if needed.

Obtain biopsy punch instrument and preservative salt packs from George Balazs at the beginning of the season. Note: biopsy sampling should be done after tags have been applied, measurements taken and she has been checked for tumors. This is very important because only turtles which do not possess tumors are to be sampled and ID of the turtle is important to complete first.

Materials needed:
    Biopsy punch
    Preservative salt packs (1 bag per tissue sample)
    Solarcaine spray
    Lysol or rubbing alcohol
    Toothpicks
    Permanent freezer marker

Procedure:

a) BEFORE taking the first sample of the night, clean the biopsy punch thoroughly with rubbing alcohol or Lysol.

b) The tissue sample is taken from one hind flipper just anterior to the hind flipper tag site. Spray the sample site with Solarcaine to clean the area and numb it slightly.

c) Place the biopsy punch in position on the edge of the flipper. It works best to place the cutting edge of the punch over the edge of the flipper and only take 3/4 of the disc size. This allows the punch to pull away freely after cutting if the turtle reacts and moves her flipper away quickly (so you do not tear the tissue).

d) Give a hard squeeze to make a clean, quick cut.

e) Once you have the sample move away from the turtle so you don't disturb her any more than necessary.

f) Using a toothpick, push the tissue disk through the biopsy punch and into a preservative salt pack.

g) Using your fingers, knead the bag to press some of the salt into the tissue sample.

h) Close the bag and label the outside with the turtle's mototool number as well as one tag number with a permanent freezer marker.

I) CLEAN off the biopsy punch with Lysol or rubbing alcohol

A list should be kept of which turtles need a biopsy sample taken, and update this list after each turtle has been sampled. This can be added to the needs list if sampling will start at the beginning of the season. If it is to begin half way through the season, keeping a separate list would be more convenient so that every turtle (without tumors) that needs a biopsy taken does not have to be added to the needs list for every field notebook for the first half of the season.

7) Egg Collection

This procedure was not done in the 1997 season. However, it requires a special use permit and will be done in future seasons if needed.

If a permit is acquired for egg collection it will specify how many nests to sample from, and how many eggs may be taken from each nest.

Materials needed:

    Small Styrofoam coolers with holes punched in for ventilation
    Rags
    Permanent marking pens
    Towels or blankets
    Large pieces of foam (to cushion the eggs for boat/plane transfer)

Procedure:

a) Approach a nesting turtle with a very small flashlight beam (or no beam if the moonlight is bright enough to see by).

b) Place a 2 inch layer of sand from around the body pit into the bottom of the Styrofoam cooler.

c) Carefully reach in between her hind flippers and lift the eggs out of the egg chamber one at a time (collect only the number specified in the permit), being careful not to disturb her or knock sand into the egg chamber while kneeling on the edge of the body pit.

d) Place the eggs tightly together within the cooler the way they would be found in nest (ie: stack them into a pile if you can, or at least make sure they are all touching as much as possible).

e) Cover the eggs with sand from around the nest to approximately 3 inches from the top of the cooler.

f) Take the cooler back to camp, slightly moisten a rag with fresh water and place it on top of the sand. Place the lid on the cooler. Label the cooler with the date collected, the number of eggs collected, and the mototool number or a tag number of the turtle they were collected from.

e) Dig a hole inside the camp perimeter in which to place the cooler (choose an area where you don't need to walk around such as the back corner). Bury the cooler so that they are just below the surface of the ground. Mark the site so that you don't accidentally step on it later.

g) When the time comes to transfer the eggs to Tern Island, slightly moisten the rag again. When to transfer will depend on availability of planes and weather conditions during the turtle camp. IT IS VERY IMPORTANT NOT TO DISTURB THE EGGS, so a day must be chosen when the water is calm to transfer them by boat. Packing the coolers into a laundry basket 2 at a time with a foam lining on the bottom works well. Then towels can be placed around them to fit them in snugly (to keep them from getting bumped around on the boat).

h) Once back at Tern Island, if they are to stay a few days while waiting for a plane, they should be placed back in the turtle room. If ants are a problem, fill a tray with water and place the coolers on a box in the middle of the water. This will keep the ants from getting into the coolers.

I) When packing for the plane, first place the cooler in the sun for 1 hour prior to departure. Then place them into apple boxes lined with foam on the bottom and wrap them with towels or sheets, and then with blankets for insulation (it will be very cold on the plane). Then place the lid on the box and label well with the date collected, how many eggs are in the box, and a warning to be careful not to bump or disturb in any way.

8) Data Loggers

In the 1995-97 field seasons 12 data loggers were buried at French Frigate Shoals, 8 on East Island and 4 on Tern Island. They were placed in approximately the same locations both years and left for nearly 4 months (beginning of turtle camp until September).

Procedure:
a) Obtain the data loggers from George Balazs, he will have them programed and ready to be buried. They will be inside a plastic ziplock bag (for waterproofing) and tied with a long parachute cord which is colored and marked with a measurement of 40 cm.

b) Locations for sites on East Island can be approximated from the map attached at the end of the 1997 SOP's. Locations for sites on Tern Island can be found using the turtle nest grid map for 1997 to detect the exact location.

c) Bury them to the 40 cm mark, tie the cord to a stake and stretch the remainder of the cord along the surface for ease of finding the data loggers if they are disturbed by nesting turtles. On East Island the stake should be placed 1 meter to the west of the data loggers, on Tern Island place the stake 1 meter to the north.

d) Check occasionally to make sure they have not been dug up by nesting turtles. If so, rebury to the 40 cm mark and report date(s) found dug up and reburied to George Balazs and the Tern Island Refuge Manager.

B. Short Season Notation

Short season procedures (i.e. 1993-97) are almost identical to full seasons. However, more effort should be made to collect all data as soon as the turtle is seen. This includes getting at least one tag on every turtle seen as well as beginning the straight carapace measurements right away. This is due to the fact that the turtles may only be seen once in the season.

C. Dremel Mototool

1. Read all directions and precautions (can use safety goggles)

2. Drain tool COMPLETELY before recharging

3. Recharge tool for 3 hours ONLY

4. Found it best to leave the mototool bits on East Island and transfer the mototools only.

5. Engrave the Mototool# on the right side of the carapace on the 3rd lateral scute from the distal end. All researchers engraving in the same site will alleviate time in finding whether or not female has been ID'ed.

6. Sterilize the moto-tool bit. Put a rag soaked with betadine in the bottom of the 35mm film canister. Put the cannister on the bit tip between turtles to sterilize.

VI. POST-SEASON CLEAN-UP

A. Clean equipment and store in proper locations (where previously found).

B. UPDATE TURTLE ROOM INVENTORY!

C. Make a list of equipment/supplies that are needed for the following season and forward it to Honolulu.

D. Copy turtle data, printouts and floppy disc, for:

> National Marine Fisheries Service - George Balazs
> USFWS Honolulu office
> Tern Island office

E. Update and/or revise SOP's

TRANSFER DAY CHECKLIST

Turtle Supplies

Tags _____

Forms
    Daily Totals _____
    Turtle Sightings_____
    Turtle ID _____
    Verification _____
    Transfer Day Checklist _____
    Tumored Female's Nesting _____

Write-in-the-rain notebooks _____

Batteries
    AA _____
    D _____

Pens and Pencils _____

Other _____
    _____
    _____
    _____

Camp Supplies

Propane _____
Blazo _____

Toilet paper _____

Camp Supplies

Porta-pottie chemicals .. _____

Matches _____

Other _____
    _____
    _____
    _____

NOTES

27