

# CHAPTER 11

## PASSAGE PLANNING

Suggestions for alterations, improvements and additional material are welcome.

These should be sent via post or e-mail to the author:

[Ken\\_booth@rnli.com.org](mailto:Ken_booth@rnli.com.org)

Lt Cdr (SCC) K. G. Booth AFRIN RNR  
ASO (Sea) NW  
26.09.2005

### Reading/Video/CD ROM list

**Book/Charts – RYA Practice Navigation Tables and 2 Charts (8.75 in 2005)**

**Book – HMSO “Admiralty Manual of Navigation Vol 1” 1987Ed**

**MCA – Latest ‘MSN’ on Passage Planning**

## **1100 PASSAGE PLANNING**

### **1101 Preamble**

These notes are written with the intention of assisting Chartwork Instructors who may have no practical experience of the art of Passage Planning.

Passage Planning is included in the Cadet Chartwork syllabus for several reasons:

- To provide a logical conclusion to a Cadet/Adults Chartwork Training.
- To demonstrate the practical application of what has been taught and learnt.
- To encourage cadets to go to sea with the Corps and apply their newly acquired skills.
- To encourage interest and further study in the noble art of Chartwork/Navigation e.g. through the Royal Yachting Associations (RYA) Dayskipper courses.

### **1101a The Task**

1. Cadets are to plan a short daylight passage of between ? and ? miles.
2. The vessel used when setting the task is to be under 25 metres LOA. The Instructor is to set realistic draught and maximum speed.
3. The location of the passage along with its departure and arrival ports will depend on the materials available to the Instructor.

∇ Training suggestion:

Use the RYA charts and the associated Practice Navigation Tables (PNT). The PNT holds all the information required for a passage on those charts. The RYA charts are specially prepared British Admiralty (BA) training charts.

4. The task can be completed individually or as a group activity.

∇ Training suggestion:

Where possible split the group into teams of two cadets. The Instructor leads and demonstrates the skill and the Cadets apply the techniques.

∇ Training suggestion:

Once planned make it a 'virtual voyage'.

When the Instructor has approved the plan, exact dates, departure time etc can be given to the teams. With a little ingenuity the Instructor can (when the plan is presented for approval) plan in fixing information; put in Collision Regulation (Coll Regs) and safety situations; request ETA's etc etc.

This technique makes it doubly interesting and enjoyable – the next best thing to actually going to sea! – and has been used very successfully by the author when teaching Adult RYA courses.

The plan will form the basis of the Class I assessment.

### **1101B Assessment of Cadets**

The plan (charts and notebook) will form the basis of the Class I assessments. The assessor can ask questions and require demonstration of practical competence based around the passage.

### **1102 Introduction to Passage Planning**

Navigational passages must be carefully planned "Everyone is liable to make mistakes; over three quarters of all groundings are attributable to human error of some kind" (Admiralty Manual of Navigation). A sound passage plan may not prevent a grounding but it does reduce the chances of making mistakes.

In the notes the term 'Master' refers to the person in charge of the vessel. It is assumed that the vessel is less than 25 metres LOA as larger vessels have additional items to consider. All guidance refers equally to motor and sailing vessels.

Voyages (berth to berth) regardless of length can be split into two major parts:

- PREPARATION – This includes:
  - APPRAISAL (gathering information)
  - PLANNING (preparation of the detailed plan)
- EXECUTION – This includes:
  - ORGANISATION (tactics for execution of the passage)
  - MONITORING (of progress)

We will now explore each section in detail.

### **1103 The Plan: Preparation - Appraisal**

The risks of any voyage need to be assessed - Appraisal is the process of examining these risks. It is at this stage that all relevant information is gathered and a good foundation for the plan is laid.

#### INFORMATION SOURCES:

- BA Chart Catalogue  
NP109 – Covers North West Europe inc the British Isles. This publication is issued annually and is available gratis from Admiralty Chart Agents and most Chandlers.
- Navigational charts  
In the Corps we use BA charts. Commercial charts (e.g. IMRAY) are also available.
- Notice to Mariners (NTM)  
This is the publication – issued weekly – that contains chart corrections and updates/corrects BA publications. Charts should, of course, be up to date when used.
- Reeds Nautical Almanac  
Published yearly it contains all the information necessary for small vessel passage planning.

If using BA publications you require several publications. These include:

- Pilot books (NP various)  
These contain detailed passage/pilotage information.
- Admiralty Tide Tables (ATT) (Vol 1 NP201 )
- Admiralty List of Lights (ALL) Vol A NP74 )
- Admiralty List of Radio Signals (ALRS)  
Vol 6 lists Port and information services etc.
- Admiralty Tidal Stream Atlases (NP various)  
There are several books required to cover the British Isles.
- Mariners Handbook (NP100)  
A BA publication containing items of general interest.
- Electronic Navigation systems handbooks  
Operator's guides to the navigational systems fitted on the vessel.
- Weather information  
Obtaining the latest information covering the dates of the passage.

Full weather information is obtainable from a very wide variety of sources. These range from the traditional radio broadcasts via facsimile reception to the downloading of satellite images.

The timings for reception of weather information should be researched and noted.

- Vessels characteristics
  - Deepest draught – required for tidal calculations.
  - Air draught (maximum height) – to check overhead clearances such as bridges.
  - Length overall (LOA) – tip to toe fore and aft measurement.
  - Beam (maximum width) – required if entering marinas/locks etc.
- Personal experience

Has someone on the Crew been there before? If so their experience may be of use.

When the information is collected together the Master, in consultation with his officers, will make an overall appraisal of the passage

The main consideration at this stage will be to determine the distance tracks should be laid off coastlines and dangers.

The distances off any particular point will be determined by such factors as the vessels draught relevant to the availability of safe water etc.

Once the Master has made his appraisal he will delegate one of his Officers to plan the voyage. It is however the Master who carries the final responsibility for the plan.

#### **1104 The Plan : Preparation - Planning**

See Appendix 1

- Charts

Collect together all of the charts for the intended voyage. Place and number them in passage order. Check that charts are corrected to the latest NTM. Charts adjacent to the passage area or those for diversion ports should be included.
- No-go areas

Outline and crosshatch areas on the route where the vessel should not go. Be careful not to obscure important detail such as a navigational mark. In confined waters no-go areas will vary according to the time of passage – taking into account the height of tide. Areas less than your vessels draught (plus safety margin) will be considered no-go.
- Distances off

This will have been decided during the ‘broad brush strokes’ process of appraisal. This together with no-go areas will shape up the limits/areas available for the passage.
- Planned track

The decisions made (distances off and no-go areas) enable the track to be drawn from port to port on small-scale charts. This is the passage overview.

These tracks will enable distances and steaming/journey times to be obtained. When departure time is known the estimated times of arrival (ETA) at various points can be calculated.

The tracks are now transferred (with great care) to larger scale charts for navigational purposes. You always use the largest scale chart available.

The following can be marked on your track:

- Distances to run – a countdown mileage to the destination.
- The true (T°) direction of the track i.e. the course to be made good.
- Changes of chart – points where you transfer to another chart.
- Identifiable features.
- Tide, set and drift (TS&D). This information can be adjusted as required.

At this stage the Latitude and Longitude (LAT & LON) of course alteration points (etc) can be input to the Global Positioning System (GPS) navigator if fitted.

- Selection of objects for fixing  
If the vessel is fitted with radar – radar conspicuous targets and RACONS should be identified.  
  
Select leading marks, transits and conspicuous objects that can be used to fix your vessel.
- Tidal information  
Calculate tidal heights, times and ranges. Mark up tidal graphs as required. Check to ensure you have enough water for your purposes. Remember to allow a realistic under keel clearance.
- Radio  
Channels/times etc of Port radio services should be noted in the plan.
- Alternative strategy  
Have your 'bolt holes' planned – alternative ports or an anchorage – just case you run into problems e.g. bad weather, mechanical failure etc etc.  
You should also consider the possibilities of a port approach in bad visibility or at night i.e. if conditions deteriorate or you are running late!  
It is also a good idea to have a waiting area – off a port – in mind in case you have to wait to gain entry.
- Navigators notebook – see Appendix 2  
Write up the complete berth to berth plan including port (etc) sketches.
  - Port sketches – these are used to assist with port entry. You put in them the information you require.
- Completion  
On completion the plan must be submitted to the Master for approval.

### **1105 The Plan: Execution - Organisation**

- Tactics  
The methods used to carry out the plan and to make the best uses of resources. Final details of the plan can be confirmed when the actual timing of the passage is known  
This will include such areas as:
  - Up dating TS&D for actual departure.
  - ETA's for tide – expected ETA's to take advantage of the tide.
  - Always bear in mind that safe execution of the passage may only be achieved by modifying the plan.
- Crew briefing  
ALL concerned should be given details of the passage and their duties.
- Voyage/Bridge preparation

Checklists are most useful to ensure you have all necessary kit/documentation etc aboard.

Check lists can cover whatever you want. Appendix 3 gives an example for a small yacht. For our purposes it would include basic Chartwork kit like 2B pencils, parallel rules, dividers etc, etc. Also to be included - the testing of Electronic navigation equipment.

### **1106 The Plan: Execution – Monitoring of Progress**

Monitoring is ensuring that the vessel follows the passage plan.

It consists of following a series of actions, checking the results and taking action.

- Fixing – knowing your position and responsibilities.
  - The first requirement of monitoring is establishing the vessels position. This can be done in several ways:
    - A 3 bearing fix.
    - With radar
    - GPSRemember electronic equipment such as radar and GPS are aids to navigation not a single means of same.
  - Fixing should be accurate and regular. The frequency will depend on your circumstances e.g. more frequent in confined waters.
  - Each time the vessel is fixed an estimated position (EP) of the next fix is worked up. Should the next fix not coincide with the EP immediate action to check the reason(s) must be taken. GPS sets will give – cross track error – i.e. the side and distance you are off track.
- Soundings  
Should be observed by using the echo sounder in pilotage waters.
- Rule of the Road – IRPCS/Coll Reg situations  
On or off track you must still observe IRPCS requirements – nothing exempts you or your vessel from conforming to the rules.
- Debrief  
As we briefed the Crew at the start so should we discuss the passage after its completion. Any problems areas can be highlighted and lessons learned actioned in future passages.

### **1107 Authors note:**

Although this all seems an immense amount of work the reality is that you put into the plan the items you yourself require to plan a safe passage.

Also with practice and experience the time taken is much shorter than may appear after reading this tome!

### **1108 APPENDICES:**

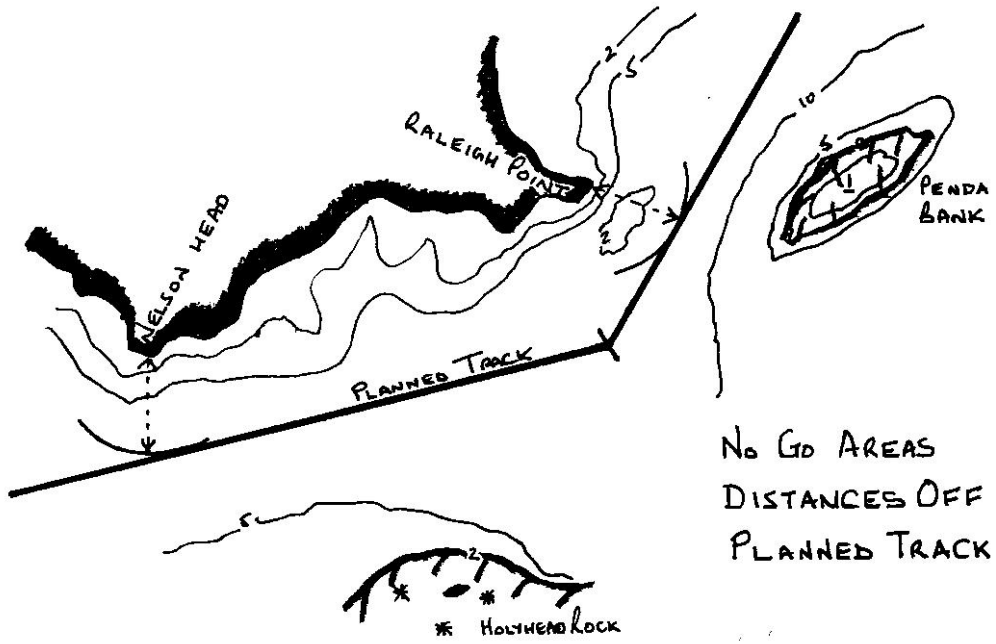
APPENDIX 1: Planning symbols

APPENDIX 2: The Navigators Note Book

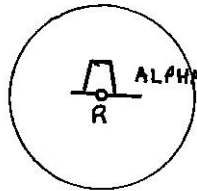
This contains samples of an actual Passage Plan from Dover to Boulogne plus Port Plans for Boulogne and Douglas in the Isle of Man.

APPENDIX 3: A sample check list for a small yacht

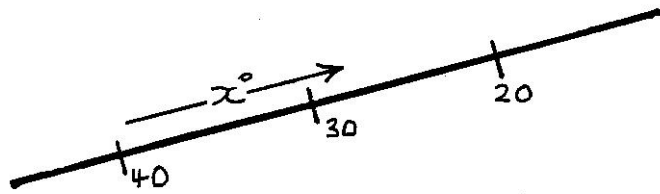
APPENDIX 1



NO GO AREAS  
 DISTANCES OFF  
 PLANNED TRACK

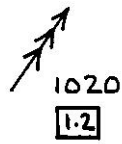


IDENTIFIABLE  
 FEATURES



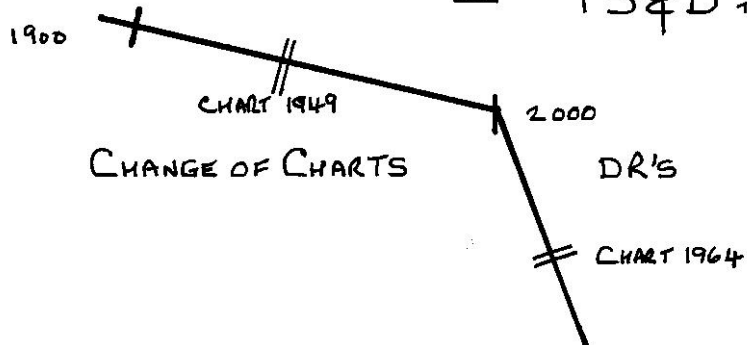
COUNTDOWN - DISTANCE  
 TO RUN

090°(T) (095°M) →



COURSE TO STEER

TS&D TIME & RATE





2003

C <sub>0</sub>	TS # D	C <sub>0</sub> T <sub>0</sub> V <sub>0</sub> D <sub>0</sub> C <sub>0</sub>	Dir Sp	ETA
209°(T) WPTZ	2-4 ASTER	209(T) 50.51°N 01.30°E	44 15	0917 WPT3 50.51°N 01.30°E
185°(T) WPT3	202(T) 2-7 208(T) 10-9	183(T)	67 15	0941 WPT4 50.46°N 01.29°E
100°(T) WPT4	025(T) 108	097(T)	18 10	0946A 1006B WPT5
ENTRANCE T.H.O	SEE HARBOUR PLAN			

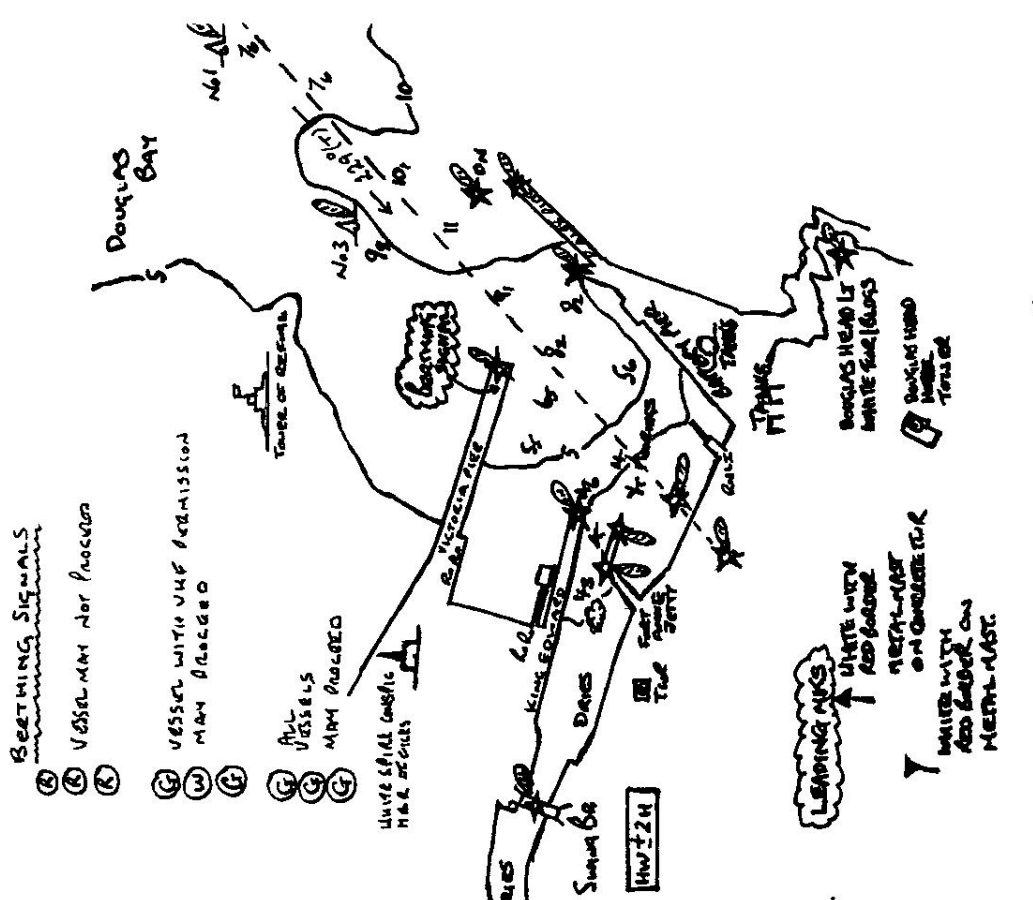
**ID** Iso Danger Mk. ZCZ By Radar Consac: Caprais-Nez.  
**FIX** RANGE RANGE & BANK OR RADAR RANGES.  
**SWAKES** NOTE START OF FERRY CHANNEL.  
**SWAKES** START OF E-SHORE TRAFFIC ZONE.

**ID** Boulogne: COLUMN GRANDEANNE CATH DOME  
 1NM FROM WPT4 **VHF** (ALL CONTROL TOWER BOULOGNE GRET CH12)  
 ETA ENT ——— **SWAKES** TIME ZONE B (BST) A +1HR.  
 ↘ CLEARED AWAY

**WPT4** **SWAKES** REDUCE TO 10KN.

**WPT5** POINT OF NO RETURN 1NM TO G TO ENTRANCE.  
**CONSIDER ACTION** GO AHEAD INCREASE IF REQD.  
**ENTRANCE** 1 CABLE TO GO **SWAKES** REDUCE TO 5KN  
**CHECK** SOUNDINGS





BERTHING SIGNALS

- (A) VESSEL MAY NOT PROCEED
- (B) VESSEL WITH VHF PERMISSION MAY PROCEED
- (C) ALL VESSELS MAY PROCEED

UNDEVELOPED GASOLINE H.B. & DIESEL

LEADING PUS  
 WHITE WITH RED BAND  
 WHITE WITH RED BAND ON METAL MAST

WHITE WITH RED BAND  
 METAL MAST ON CONCRETE PIER

DOUGLAS IOM CH 12 "DOUGLAS HARBOUR"

01624 686628

DATE 18.06.76...

HW L'POOL 1235 ± 8.7 m  
 DIFF DOUGLAS -0.4 -2.2 m  
 HW DOUGLAS 1331A 6.5 m

LW L'POOL 1856 ± 1.8 m  
 DIFF DOUGLAS -3.2 -0.3 m  
 LW DOUGLAS 1924A 1.5 m

R = 6.9 = M/S

HW DOVER 1319A

TS&D

MINIMUM EXPECTED DEPTH 9.8 m

BERTHING INSTRUCTIONS: ETA 1500A  
 Call Ch 12 2' off Head R. to R. Jettie @ 14 by  
 Corner Harb. Control when Secure. South E. IOM No. 6.

TRAFFIC NOTES:  
 AS LADY WITH MAIN DUE  
 No other movements.

PILOTAGE NOTES

KEEP TO NORTH OF LINE FT ANNE JETTY TO  
 No. 14 BERTH ON BATTERY PIER

SA C-41 28.12.97

APPENDIX 3

APPENDIX 3: A SAMPLE YACHTS CHECK LIST

**SAFETY EQUIPMENT**

Harnesses  
 harnesses ..... Num. \_\_\_\_\_  
 lines and fixings in cockpit ..... Num. \_\_\_\_\_

Flares  
 parachute rockets ..... Num. \_\_\_\_\_  
 hand-held flares ..... Num. \_\_\_\_\_  
 buoyant smokes ..... Num. \_\_\_\_\_  
 orange smokes ..... Num. \_\_\_\_\_

Other  
 Dan Buoy ..... Num. \_\_\_\_\_  
 Lifebuoys ..... Num. \_\_\_\_\_  
 Life raft ..... located \_\_\_\_\_  
 Lifejackets ..... Num. \_\_\_\_\_  
 EPIRB ..... Num. \_\_\_\_\_  
 Fire extinguishers ..... Num. \_\_\_\_\_  
 Dry Powder ( ) ..... Num. \_\_\_\_\_  
 Halon ( ) ..... Num. \_\_\_\_\_  
 CO<sub>2</sub> ( ) ..... Num. \_\_\_\_\_  
 Fire Blanket ..... Num. \_\_\_\_\_  
 Automatic in Engine Compartment .....  
 VHF .....  
 Radar reflector .....

**NAVIGATION**

Navigation instruments  
 Compass .....  
 Hand-bearing compass ..... Num. \_\_\_\_\_  
 Deviation chart .....  
 Log ..... Type \_\_\_\_\_  
 Log location .....  
 Spare impeller ? .....  
 Walker Log backup ..... Manual   
 GFS ..... Manual   
 RDF ..... Manual   
 Lead-line .....  
**Navigation Tools**  
 Parallel rulers .....  
 Bicon Plotter .....  
 Dividers .....

**SAFETY EQUIPMENT**

Pencils .....  
 Charts .....  
 Pilot Books .....  
 Tidal Atlas .....  
**Sailing instruments**  
 Speedo .....  
 Wind speed .....  
 Wind direction .....  
 Tell-tales .....  
**Other**  
 Autohelm .....  
 Signal flags .....  
 Day shapes .....  
**ELECTRICAL SYSTEM**  
 Generation and storage  
 Batteries .....  
 Battery switch .....  
 Switch panel .....  
 Charge meter .....  
**Navigation lights**  
 Masthead .....  
 Steaming .....  
 Compass lights .....  
 Deck lights .....  
**Other**  
 Water pump .....  
 Electric Bilge pump .....  
 Spare bulbs .....  
 Distilled water .....

**AUXILIARY POWER**  
 Diesel operation .....  
 Keys .....  
 Fuel filter location .....  
 Stern Glands .....  
 Access .....  
 Hand starting / cranking .....

**SALES, AND RIGGING**

Head sail  
 Reefing .....  
 Genoa .....  
 Jib 1 .....  
 Jib 2 .....  
 Jib 3 .....  
 Jib 4 .....  
 Storm jib .....  
**Mainsail**  
 Reefing (Roller) .....  
 Sheets ..... Num. \_\_\_\_\_  
 Sub-O) ..... Num. \_\_\_\_\_  
**Rigging**  
 Stays .....  
 forward stay .....  
 aft stay .....  
 Spare shackles .....  
 Spare sail battens .....  
**DECK GEAR**  
 Anchor ..... Chain .....  
 Spare anchor .....  
 Fenders ..... Num. \_\_\_\_\_  
 Warps .....  
 Boat hooks .....  
 Winch handles .....  
 Boarding ladder .....  
 Ensign .....  
 Tender .....  
 Tender outboard .....  
 Oars .....

**AUXILIARY GEAR**  
 Hand bilge pump .....  
 Tools .....  
 Boat cutters .....  
 Pliers .....  
 Socket set .....  
 Screw drivers .....  
 Spanners .....  
 Insulating tape .....  
 Duct tape .....  
 Bosons distir .....

**CABIN EQUIPMENT**

Galley  
 Cooker .....  
 Pans ..... Num. \_\_\_\_\_  
 Plates ..... Num. \_\_\_\_\_  
 Bowls ..... Num. \_\_\_\_\_  
 Glasses ..... Num. \_\_\_\_\_  
 Cups ..... Num. \_\_\_\_\_  
 Cutlery ..... Num. \_\_\_\_\_  
 Food Storage .....  
 Cold storage .....  
**Heads**  
 Pump toilet ( stop cock ) .....  
 Shower .....  
**Other**  
 Sleeping bags ..... Num. \_\_\_\_\_  
 Sleeping bag liners ..... Num. \_\_\_\_\_  
 Cushions ..... Num. \_\_\_\_\_

**FUELS AND FLUIDS**  
 Diesel ..... Ltr. \_\_\_\_\_  
 Gas ..... Bottles. \_\_\_\_\_  
 Fresh Water ..... Ltr. \_\_\_\_\_  
 Petrol for outboard ..... Ltr. \_\_\_\_\_  
 Two-stroke oil ..... Ltr. \_\_\_\_\_  
 Funnel .....  
 Dipstick .....

**NOTES**

.....  
 .....  
 .....  
 .....  
 .....