Navigating Barker Inlet: some exercises

Introduction

The Torrens Island and Environs map

A few things have changed since the Torrens Island and Environs (TIE) map was published. The most obvious from Barker Inlet is the new silo and bulk grain complex. Out of sight are the new marina and other changes in the Snowdens Beach area.

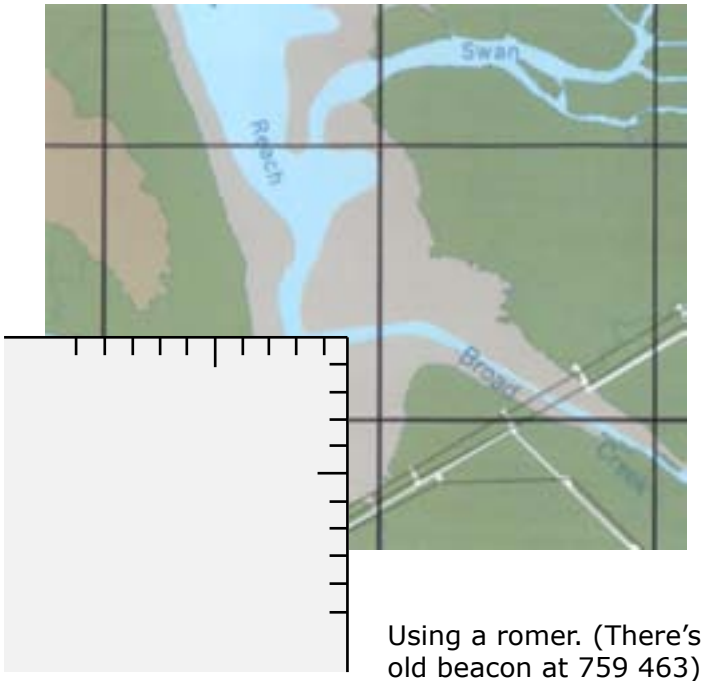
There are problems with the map itself. The grid lines are very faint, and the map scanned for this resource has had its grid overdrawn to make it obvious. Sandbanks and channels on the map are approximate. The entrance to Burrows Creek is shown clear, when in fact there is an extensive sandbar across the entrance. Google Earth and NearMap are excellent resources for extra detail.

Map and compass: the fundamental tools

Even in these days of GPS, fluent use of map and compass is a fundamental skill. Regard GPS as another aid, not the foundation.

For these exercises, we're assuming that you've read 'Navigate in tracked and easy untracked areas', and are familiar with grid references. The scale* of the TIE map makes it possible to use eight figure references in some cases (e.g. the end of North Arm Creek where it meets the embankment is at 7735 4355 (GPS will give you even more numerals)). It's easy to make a romer scale on the corner of a sheet of paper with the scale bar on the map to help with the estimation.

* The map's odd scale of 1:27,500 was chosen to fit the desired area to the A3 sheet.



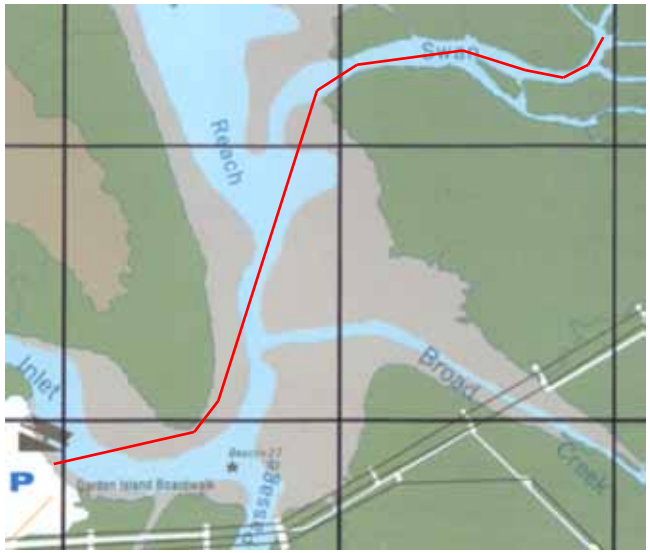
Using a romer. (There's an old beacon at 759 463)

Measuring distances

Straight tracks are easy, but to measure distances along coastlines or streams requires something different. The stepping along the edge of a sheet of paper method is described in the other resource, and with practice is reasonably accurate. Another method that has been used is to bend a length of plastic-coated tie wire to fit along the track and then pull it straight to measure.

Examples

1 How far is it from the Garden Island ramp (7495 4585) to the intersection of Swan Alley Creek and the embankment channel at 769 474?



Stepping off the distance: near enough to 3 km

2 How far is it from the Garden Island ramp to the end of Broad Creek? (You have to climb on to the embankment to see the iron hulk.)

3 What is the distance from the Garden Island ramp to the *Santiago* and return?

4 How far is it from the Garden Island ramp to the end of North Arm Creek at 7735 4355?

(Answers are on a later page.)

Bearings

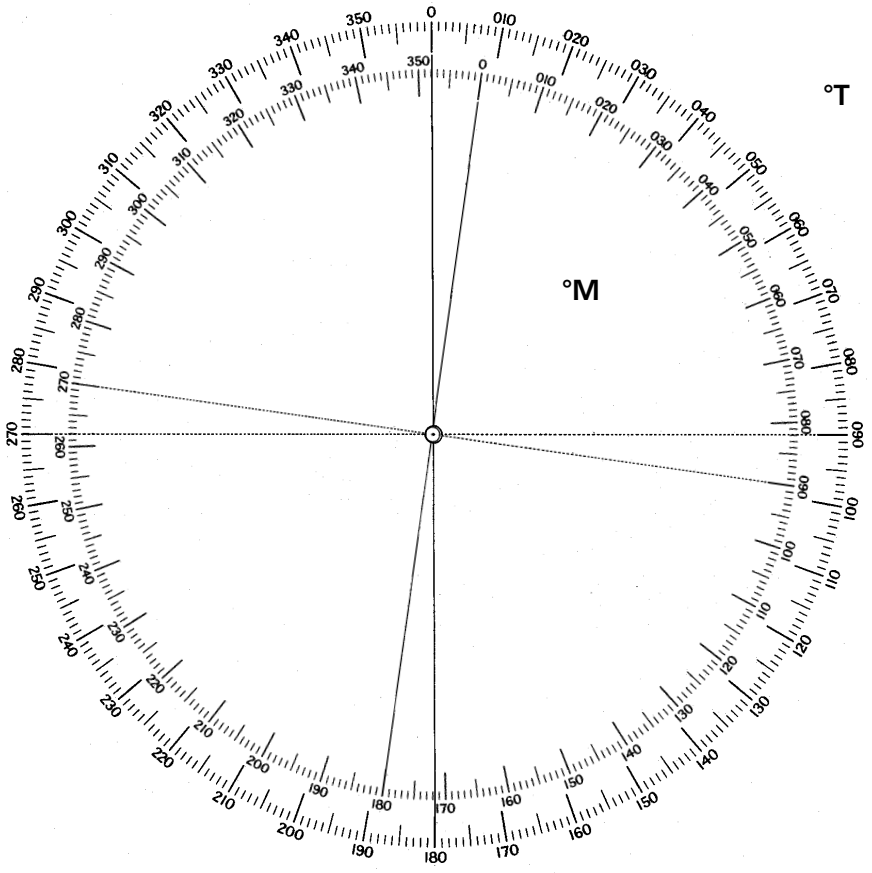
The neat thing about the orienteering compass is that it combines compass and protractor. The disadvantage is that it's difficult to take accurate bearings of landmarks: for precision a bearing compass and separate protractor (Douglas, Cras, etc) are better.

The catch with magnetic compasses is that magnetic North is not the same as true North. In our area the difference, the variation (also called declination), is about 8°E, that is magnetic north is 8°E of true north. In other words magnetic bearings will be 8° less than true or grid north (whichever we are using).

Looked at another way, subtract 8° from bearings you measure on the map to apply them to the compass. When you take bearings with the compass, add 8° to apply them to the map.

So if the bearing from A to B is 036°G from the map, you will steer 036 — 8 = 028°M. (And remember that bearings are always three figures.) If the bearing to D you take at C is 173°M, that will be 173 + 8 = 181°G when you plot it on the map.

Take a look at this double compass rose and think about it.

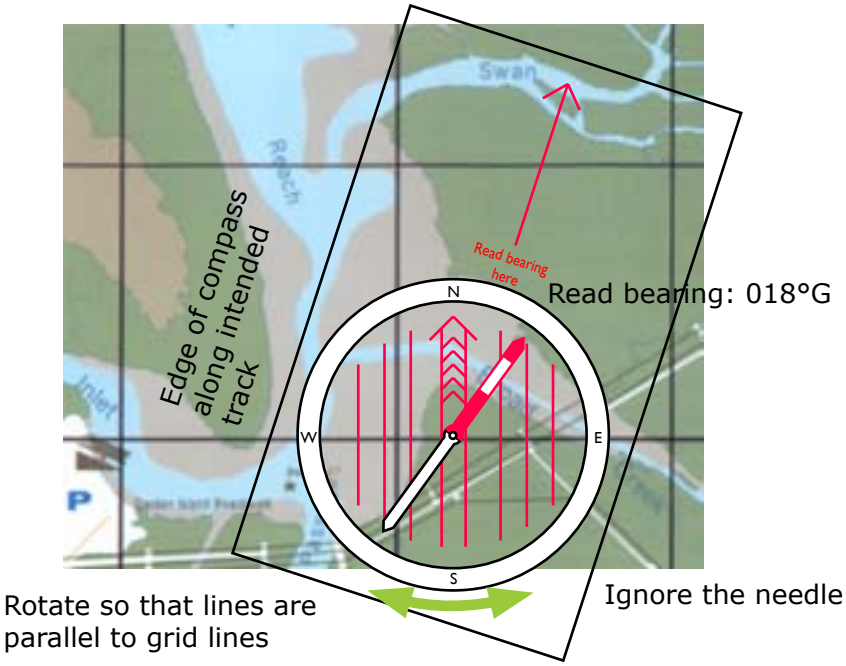


Setting a heading

You want to track direct from E to F. Put a long edge of the compass on the line between E and F and turn the compass housing until the arrow on the bottom is pointing north and the lines are parallel with the north–south grid lines. (Ignore the magnetic needle: the compass is just a protractor at this stage.) Read the bearing at the direction of travel line. This is a grid bearing: subtract 8° for the magnetic bearing. Rotate the housing to set that bearing.

At E, turn the whole compass until the lines in the bottom are aligned with the magnetic needle. The direction of travel arrow on the base-plate points the way. Use a landmark if there is one as an aiming point. From a distance, lines of mangroves are almost featureless, so the land-mark will probably be something beyond your destination.

Paddle on your bearing, checking as you go that you are holding the heading and tracking straight.

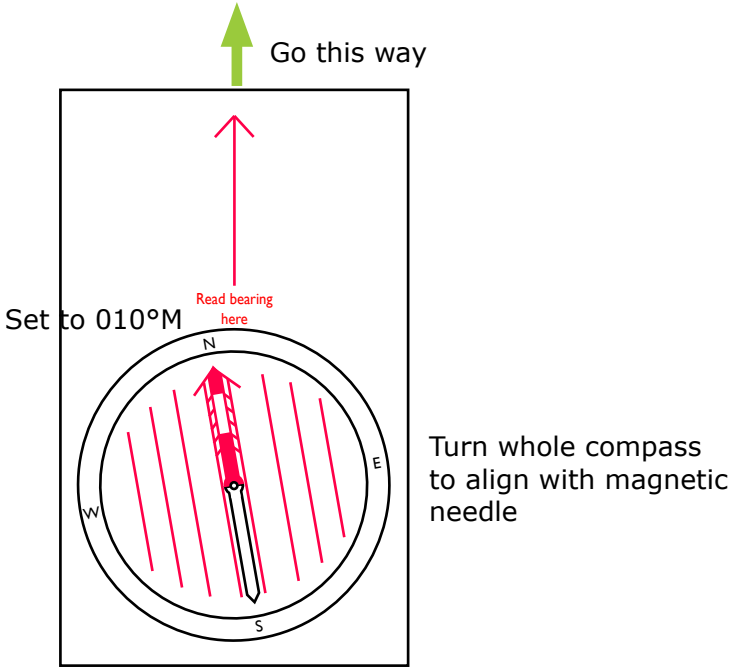


Examples

5 You want to enter Swan Alley Creek from the Garden Island ramp. You can't paddle direct from the ramp, so we'll set a heading from 765 460 to the creek. From the map, we measure the bearing as 018°G. Subtracting the variation, we have 010°M, so that's our heading.

6 What's the bearing to paddle from the mouth of Garnetts Creek to the beach at 732 507?

7 What heading would you paddle from the mouth of Swan Alley Creek to the little creek at 752 474. (This is easy at low tide states when you can see its channel in the sand. How could you find it more easily at high tide?)



Resection

How certain are you that you are where you think you are? Unless you're familiar with them, how would you distinguish between the mouths of Post and Garnetts Creeks? The answer is to take bearings of prominent features and plot them on the map.

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The Barker Inlet area has many excellent landmarks: the Torrens Island B chimney (the north-eastern one: the other, built first, is A), a pylon at 758 456, another pylon at 730 482, and the Pelican Point Power Station. Other possibilities are the Middle Ground Inner beacon and the quarantine station chimney. Not actually marked, but often visible is the cement works tower at 716 429 (between the g in 'Brighton' and the e in 'Centre').

Using a sighting compass (Silva Type 54). Both the bearing to a feature and its reciprocal are visible. (Having the camera this close causes a deviation of some 20°: the actual bearing was 229°M)

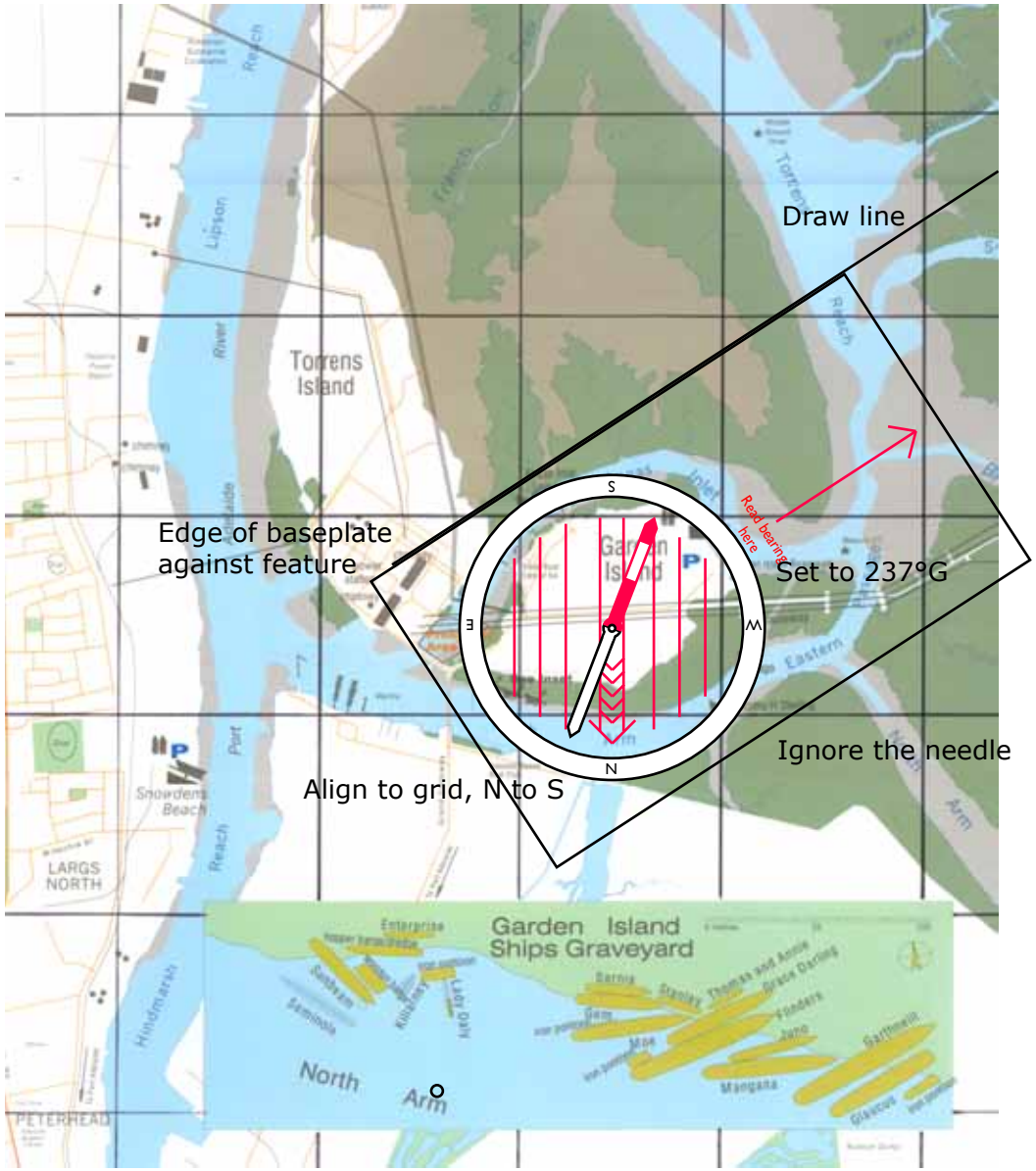
The more accurate your bearings the more precise will your 'fixes' be. A sighting compass can work to 1° accuracy, so it's the preferred type here.

Take bearings of at least three features, preferably with a wide spread between them. Convert the magnetic bearings to grid bearings: add 8°.

Set a grid bearing on the compass, then place it on the map, a long edge against the feature's position, and align the lines on the bottom of the compass with the grid, but with North pointing South. (This saves the trouble of calculating the reciprocal by ±180.) Draw a line towards your supposed position. Do the same for the other two bearings.

If you're using a separate protractor you can use the same S for N trick.

You should finish with a small triangle where the lines intersect: the more accurate you are the smaller will be the triangle. You should be within the triangle.



Set the compass to the first bearing and put the compass on the map as shown above, edge against the feature, the chimney in this case, with the compass capsule aligned with the grid, but N to S. Draw a line.

Examples

8 You think you've arrived at Burrows Creek and take bearings: Torrens Island B chimney 229°M, pylon at 730 482 275°M, cement works tower 216°M. Converting these to grid bearings we have 237°G, 283°G and 224°G respectively. The reciprocals, if you want to work that way, are 057°G, 103°G and 044°G.

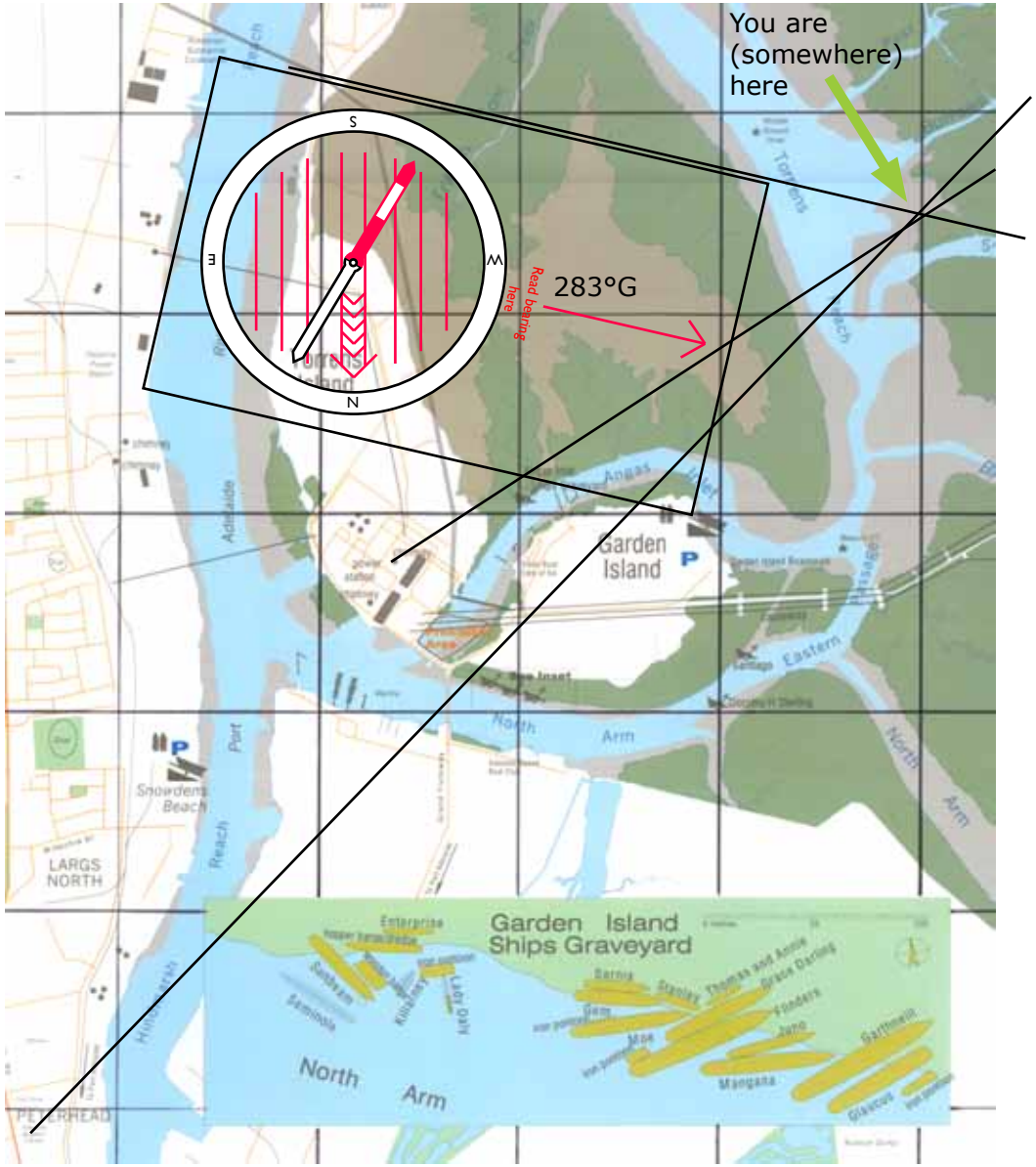
Now do the same for the other two bearings. Drawing the line for the pylon bearing is shown opposite; the line from the cement works is already drawn.
You should be within the triangle at the intersection of the lines. Are you at Burrows Creek?

9 At a certain site, the bearings are: pylon at 758 456 176.5°M, T Is B chimney 248°M, pylon 730 482 294.5°M, and pylon 7675 4612 099°M. Converted to grid bearings, they are 184.5°G, 256°G, 302.5°G, and 107°G, and the reciprocals are 004.5°G, 076°G, 122.5°G, and 287°G.

10 You want to be sure you're at the right creek: pylon at 758 456 170°M, T Is B chimney 217°M, Pelican Point PS 289°M. Calculate the grid bearings first. Where are you?

11 At this point: T Is B 192°M, Pelican Point PS 269°M, St Kilda castle 340°M, Quarantine Station chimney 233°M.

12 This one is up a creek: pylon 758 456 296°M, T Is B 274°M, pylon 769 455 046°M.



Answers

Distances

1 As the diagram suggests, 3 km. Answers may vary according to how accurately you work, time of day, etc. but you should be within 100 metres or so.

2 2.75 km

3 3.2 km (1.6 km * 2)

4 3.85 km

Bearings

5 You want to track 010°M, although at low tide you'll need to find and stay in the channel.

6 From the map, the bearing is 308°G. Converted, it's 300°M.

7 The grid bearing is 279°G, which converts to 271°M. Best to 'aim off' to one side or the other so that when you reach the mangroves you know which way to turn to begin searching.

Resection

8 You're about 350 m south of Burrows Creek (GPS position was 0275978 6147457). Follow the creek in this bay and you finish up in Swan Alley Creek.

9 The spot is 758 464, and at low tide you can see the remains of an unidentified launch. (The SOT is 459cm long, and that red object on the aft deck is some debris picked up along the way.)

(The remains of another launch are not far away at 764 465. How will you locate that spot without cheating with GPS? (And you will get your feet muddy at low tide.))

10 It's Post Creek, and the grid bearings are 178°G, 225°G, and 297°G.

11 At this point, 748 498, there's an isolated mangrove tree, seen below.

12 You should be at about 764 452. (Enter this creek under the trees at 7575 4552 at a reasonably high tide.)

Other resources

Google Earth has already been mentioned. Another source of aerial views is the Australian site NearMap: <www.nearmap.com>. It's browser-based, and has more recent and higher resolution images than Google. You can compare the effects of different tide levels by looking at images from different dates.

A site to make measuring distances easy is geodistance.com: <www.geodistance.com>. When you've found the area of interest, choose your units, turn satellite view on and Auto Center Map off.

There are numerous books on orienteering and coastal navigation, including kayak navigation, that may prove useful.

Acknowledgement

This resource was written and illustrated by Peter Carter, who maintains a Web page about the area at <www.users.on.net/~pcarter/canoe_sa/maps/ti_notes.html>.