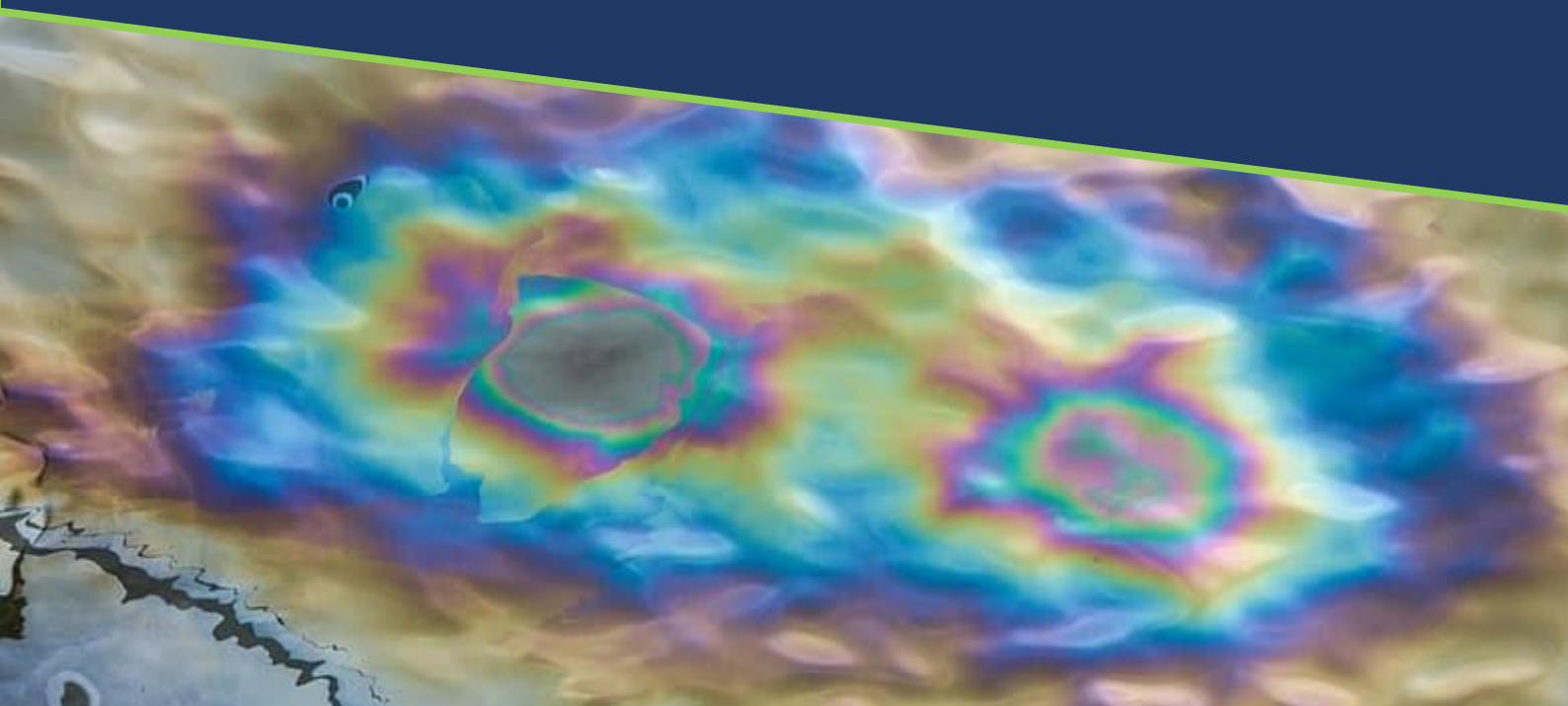


# Hawke's Bay Marine Oil Spill Contingency Plan

## Annex 5 Prediction of oil movement and behaviour



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### Annex 5 - Prediction of oil movement and behaviour

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## Annex 5 - Prediction of oil movement and behaviour

Oil moves at approximately 100 % of surface current and 3 % of wind speed. Refer to diagram below i.e. the influence of 3% of the wind speed combined with 100% of the current speed results in the movement of oil from A to B.

NB: Winds blow FROM the specified direction whereas currents flow TOWARDS the specified direction

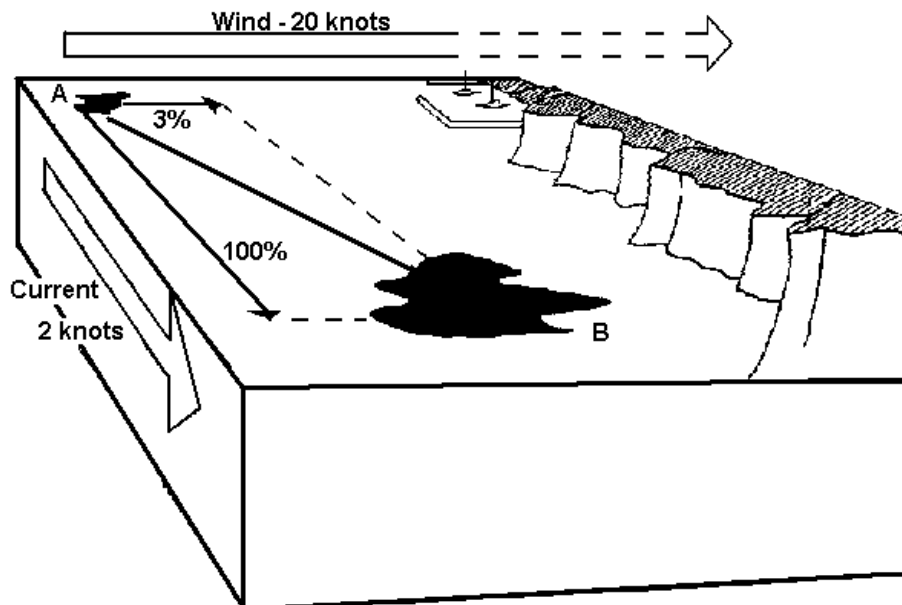


Figure 1 Movement of an oil slick

An assessment of spill movement should consider local variations to predicted values. For example, inside Napier Port the wind will generally have a greater effect on the direction of travel of an oil slick than the above formula suggests.

**A cautionary note: this calculation will not predict the movement of emulsified slicks (mousse).** The ADIOS computer program can be used to predict the changes in physical and chemical characteristics of the slick over time ie it is an oil fate modeller, not a tracker. Hence, it may be used to predict when mousse formation may occur. Program is filed here: <\\fileserv\Infoserv\ADIOS> There is further instructions and guidance on the NOAA website <http://response.restoration.noaa.gov/oil-and-chemical-spills/oil-spills/response-tools/downloading-installing-and-running-adios.html>

Maritime New Zealand is available to provide assistance with oil spill trajectory modelling utilizing OILMAP. Any request for OILMAP trajectory modelling should be made through the OSD0. NB: There are a few limitations around the software, mainly for nearshore or harbour spills where the current and wind data is not as accurate due to local conditions not matching the modelled date used in the calculations.

A program called 'Gnome' is also available to track an oil spill in the region. Instructions are sitting on the N Drive as a word document, file path as follows:

<N:\Oil Spill Response\Gnome\Gnome Oil Spill SOP.doc>

### 5.1 Tides, Currents, Wind and temperature

Broad tidal stream and current predictions are contained in Hydrographic charts and should be used in conjunction with tide tables for the appropriate day. Additional tidal stream information can be obtained from the New Zealand Tidal Streams Atlas. Special tidal forecasts can be obtained from NIWA. The appropriate Hydrographic charts, tide tables and Tidal Streams Atlas will be available at the Emergency Operations Centre (See Annex 4). The Napier Port Ltd also has a tide gauge recorder which gives detailed data on total height.

Approximate currents for Hawke's Bay are outlined on the following *North Island Current Map*. The Hydrographic charts of the Hawke's Bay region provide some current information. Copies of these are held by the Harbour Master, the Port Operations Centre and by Ian Price Limited, a local chart agent.

Wind speed and direction may be obtained for the site of the spill from local police, residents, airport, or fishing/ recreational boats. Predictions can be obtained from the Meteorological Office. Other wind and sea conditions can be obtained from HBRC buoy data, access via [www.hbrc.govt.nz](http://www.hbrc.govt.nz) web site or <http://ponlapp.napierport.co.nz/witswap/>

The rising flood tide travels around New Zealand's coastline in an anti-clockwise direction, and clockwise on the falling ebb tide. Therefore, tidal currents within Hawke's Bay set to the north on a rising (flood) tide and to the south on a falling (ebb) tide (Ridgway 1960, 1962; Bradford et al, 1980).

Spring tidal current velocities range from 0.13m/s for a rising tide. Neap tidal current velocities range from 0.10m/s for a rising tide to 0.08mm/s for a falling tide. At the Napier Port Ltd the average tidal current velocity is 0.04m/s (Ridgway and Stanton, 1969). (paragraph quoted from Pg. 8 of Coastal Processes HBRC TSD Report June 1994 TS 94/3).

The strongest tidal currents are experienced at the headlands of Cape Kidnappers and Mahia Peninsula.

Sea surface temperature information can be found at [www.swellmap.com](http://www.swellmap.com) which has sea surface temperatures at the bottom right of the 7-day forecasts.

### 5.2 Meteorological information & Currents

Previous, present and predicted weather information for the region can be obtained from:

Current Coastal Weather Conditions around VHF Channel 21 region, and regional forecast.

Marine Forecaster, Meteorological Office	04-470 0783 (6am-9pm) or 04-470 0794 (9pm-6am)
Main Desk (ask for Duty Marine Forecaster)	04 472 9379
Public Forecast (24 hours):	04 496 9380
Website	<a href="http://www.metservice.co.nz">www.metservice.co.nz</a> <a href="http://metservice.com/marine/recreational-marine/hawke-bay">http://metservice.com/marine/recreational-marine/hawke-bay</a>
Coastal Metphone (Area Portland)	0900 999 63
METFAX	0900 779 99
NI East Coast 5 day forecast	22 006
Satellite Picture	22 000
Situation WX Map	22 100

Forecast WX Map	22 110
HB Region 5 day forecast	11 662
Sea Surface Temp Central NZ (Cook Strait)	22 011
followed by own Fax Number 0-6-835-3601	

Also refer to the NZ Nautical Almanac.

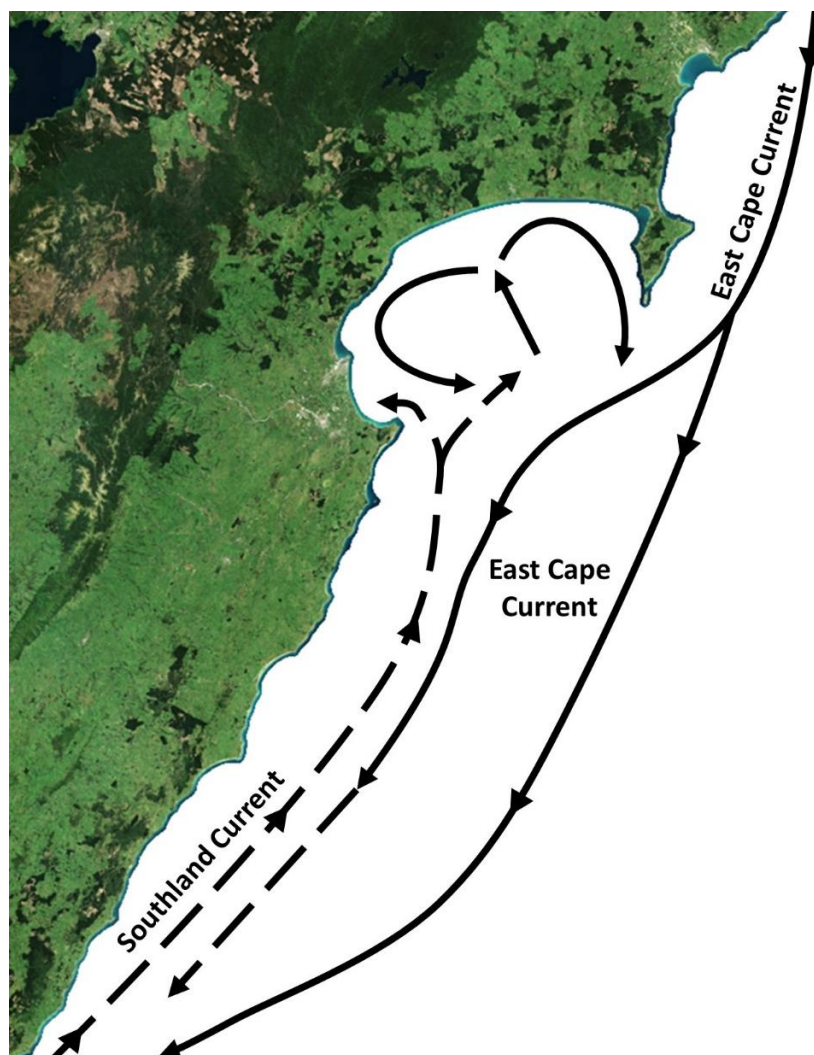
The Port Operations Centre and Regional Council Hydrology section hold copies of the 0500 weather map.

Napier Port Ltd receive forecast information from Metris (Howard Staines) forecasting service and Metocean Solutions Limited.

Weather information is also available 24hrs a day by way of the Internet. This service is available within the HBRC offices at Napier.

**Given the limited data about surface currents, their complex nature, and the way that they vary over time, and the vagaries of wind speed and direction, it is recommended that emphasis be placed on monitoring the fate of an oil spill at all times.**

A map showing the main Hawke's Bay currents is shown below.



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