A fragile ecology

by Dr Brian Cuming
Research Coordinator,
Westernport and Peninsula Protection Council (WPPC)

The 200th anniversary of the extraordinary journey of exploration by Surgeon George Bass in a 28 foot whaleboat, which set out from Sydney in December 1797, has recently been celebrated by a re-enactment of the voyage. On 5 January 1798 he entered a bay which he named Western Port, as it was at the time the most western 'port' from Sydney. For sailing ships it was indeed a good port, and when coal-fired, and later oil-powered ships came on the scene, its usage had become accepted because the danger they posed to the sensitive ecosystems of the bay was yet to be recognised.

It all started when the Victorian Government in 1963 gave approval to BP for the establishment of an oil refinery at Crib Point. Rachel Carson's seminal work, 'Silent Spring' had been in bookshops only a year. The understanding that we now have of people pressure on the global environment had just begun to emerge: there was no 'conservation movement' and there was no environmental legislation to call the decisions made into question. So this development, followed by an Esso terminal (to export crude oil from the newly discovered Bass Strait field) and John Lysaght's steel mill at Long Island Point, all happened without the environmental impact assessment which would be expected today.

Concerns about oil

In light of our present knowledge of the Bay, the WPPC believes Westernport is not a suitable port for oil-powered ships and is especially unsuitable for oil tankers. The evidence for this is compelling and undisputed, yet Shell and Mobil were given permission in 1994 by the Victorian government for a major new import operation (still mercifully 'on hold'). Most recently, in 1997, the management of the 'Port of Hastings' has been privatised, with a strong incentive for the managing company to expand its use without limit.

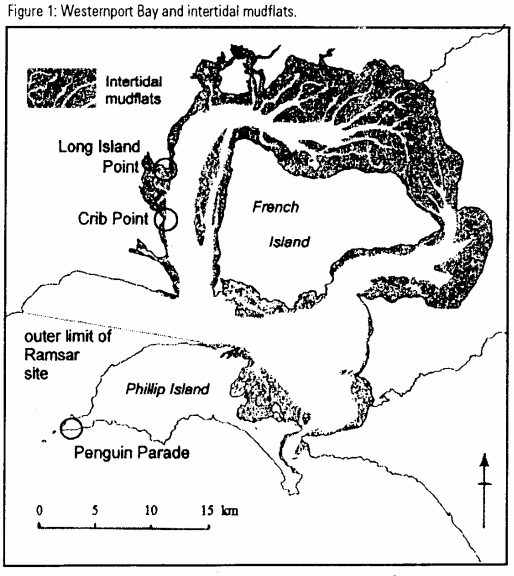
The case against oil in Westernport - and therefore against its development as a major industrial port - has been assembled in the past five years by community groups and endorsed by independent, well accredited consultants. Its essential elements are simple:

The birth of Westernport

The 'bay' is actually a sunken river system formed in recent geological times, resulting in two narrow channels flowing either side of French Island. Sedimentation over thousands of years has resulted in extensive intertidal mudflats which account for 40% of the total area (see Figure 1). Westernport is therefore a tidal, marine wetland of about 27,000 hectares which is filled and emptied by massive movement of water through the channels twice a day, raising and lowering the level by up to three metres. Anyone who has sailed or fished in the Bay will be very familiar with its rapid tidal currents which carry floating objects a distance of 12 to 20 kilometres on each tide.

In terms of James Lovelock's now well-recognised Gaia Theory, such a wetland is one of Gaia's 'vital organs.' It combines a well-irradiated, nutrient-rich bed of composted seagrass with plenty of water and a supply of oxygen which is constantly restored to near saturation by the water movement. It is therefore highly biologically productive - comparable with a rainforest - and

Figure 1: Westernport Bay and intertidal mudflats.



supports an extraordinary diversity of species. Over thirty species of migratory birds use this significant bay, which is recognised under the Ramsar Convention as a 'wetland of international importance, especially as waterfowl habitat'.

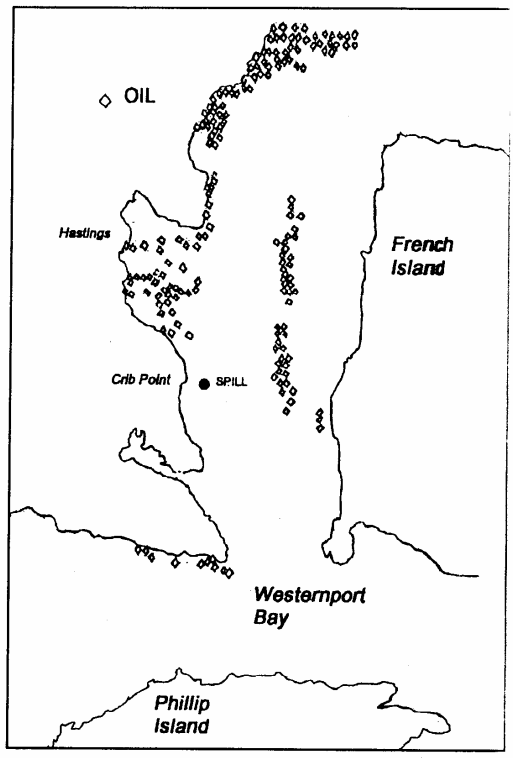
Some likely scenarios

Consider then, what would happen if there were a serious oil spill in Westernport. An accident involving a 150,000 tonne tanker typically results in rupture of at least one or two compartments, releasing upwards of 10,000 tonnes (or about 10,000 cubic metres) of oil. The oil immediately begins to spread and to send out a very thin 'sheen', but at the same time the oil is carried in and out on each tide a distance of 12 to 20 kilometres. Oil spilled in the North Arm (where the port is) is transported through a mudflat and mangrove lined.channel, and on a rising tide moves towards the extensive intertidal mudflats to the north and northeast.

If there were no wind, the spreading effect might take a few days to push the oil ashore, but there usually is wind, which typically changes both speed and direction almost constantly. In effect, the wind factor turns an oil spill into a game of pinball. Experiments show that material is moved along the surface at a speed approximately one thirtieth of the windspeed. Since the shoreline is never more than a nautical mile away, in a 15 knot breeze, which is pretty common, oil could be pushed ashore in a couple of hours, or in a 30 knot wind, just one hour. When oil reaches the mangroves, it coats their breathing tubes where they reach to the surface for oxygen; as the tide recedes a smear of oil is left also on the seagrass-covered intertidal mudflats. The seagrass and the mangroves are the base of the food chain in the Bay. Some scientists have estimated that for wetland systems like Westernport, recovery of the ecosystem could take up to a century. Any attempt to remove the oil makes things worse

A major environmental study of Westernport in the 1970s included extensive measurements and computer modelling of its water movements - its hydrodynamics. The WPPC has used those results, combined with an 'oil spill trajectory model' to look at ten possible scenarios based on different spill sites and some typical sequences of wind behaviour taken from historical weather bureau records. Of these, in two cases oil covered more than 20 km of coastline and in a further three cases, 10 to 15 km. Figure 2 shows the 'footprint' left on the coastal and mid-channel mudflats by one of these simulated spills. A feature of many of the scenarios was the uncertainty as to where oil would land and hence the improbability of choosing the right place to send response equipment - the pinball game! A computer screen display of the simulated oil movements reinforces this uncertainty.

Figure 2: "Footprint" of a simulated oil spill from near Crib Point jetty after 6 days.



Poor clean up

It is well accepted that the floating booms used to retrieve spilt oil will not work effectively in a strong current (which flows four times a day in Westernport!) or when waves are high, and this was borne out yet again in the Iron Baron spill in 1995 where only 2% was picked up. In world experience, it is rare that more than 10% is recovered. If only 10% was picked up in Westernport from a 10,000 tonne spill, 9,000 tonnes would remain on the mangroves and the mudflats!

The WPPC has also calculated from the hydrodynamic model what happens when dispersants are applied by oil companies and government safety authorities during clean-up operations. The result is the formation of an invisible emulsion underwater, with gradual distribution of the lethal droplets throughout the bay over a period of weeks, resulting in negligible dilution from the ocean (see Figure 3). Our investigations have shown, therefore, that with the best equipment in the world, effective response to a major (or even moderate) oil spill in Westernport is almost impossible. It is well documented that oil spills are predominantly

due to human error and can happen in the 'safest' of ports. Expansion of the port will make this risk progressively greater.

What next?

Westernport was a perfect port for tall sailing ships, but it should never have been a port for modern shipping. No plausible economic case has been made for expansion of the port, and we believe its use should be capped at present levels and down-graded as the Bass Strait oil field runs dry.

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Figure 3: Spreading pattern and tidal excursion of a dissolved or dispersed pollutant in Westernport Bay.