BACKGROUNDER – DRIFT CARD STUDIES AND STUDY SUMMARY

Drifters (eg. bottles etc.) have been used for millenia to convey messages and to learn about currents and ocean circulation. Drift cards are one such type of drifter. Typically about 4x6" in size and made of thin marine plywood designed to float in the surface layer, individually numbered drift cards are released in batches at recorded locations. The public is then asked to report recovery of the drift cards with location and time information, which allows the start point and end point of an individual cards drift to be determined. These results can then inform where floating objects (like drift cards or oil) may end up and how long it may take to get there. Although an exact track is not generated, inferences can be made given the start and end points, current knowledge and the time it took to travel there.

At least 50,000 drift cards have been released over the years in the Pacific Northwest/Salish Sea area. Notably, many of these studies were undertaken by US agencies, and while coverage along the Juan de Fuca Strait and Puget Sound is high, there have been few releases with easily available public information in the Canadian Gulf Islands or Strait of Georgia. There are also other studies ongoing by both government agencies and schools that continue to contribute information. For example, a 2006/2007 drift card study was undertaken in Puget Sound and the Strait of Georgia for the purposes of mapping potential locations vulnerable to the spread of *Spartina angelica*. These studies have been completed to inform ocean circulation with respect to oil spill trajectories and resultant shoreline oiling distribution, marine reserve planning, sewage outflows and marine pollution, amongst other objectives. None of these studies have looked specifically at mapping drifters from incidents along the shipping route to and from Vancouver.

A major threat to marine areas and shorelines exists from vessels (including tankers, freighters, container ships, barges, cruise ships, fishing vessels) transiting the waterways in the Salish Sea. While all large vessels carry significant amounts of fuel oil, by far the largest potential spill source is tankers carrying oil from Vancouver overseas. Where would oil go in the event of a grounding or collision? Oil spilled from ships tends to be transported primarily by surface currents, and can also be heavily influenced by wind, waves and other weather patterns. While there are many differences in the properties of drift cards and oil, some obvious, others not, we can use items that follow surface currents, and are influenced by wind and weather patterns in a similar manner as oil to make inferences on potential oil spill trajectories and locations where oil from a spill may be deposited on shore. When contrasting an oil slick or emulsified oil on the surface with drift cards, an important difference is the amount of area which a slick would cover versus any of the card drops, where only ~200 4x6" cards are used. Any slick could very easily break into many hundreds of smaller slicks or thousands of tarballs, leading to a much larger area of impact. Furthermore, a grounded or punctured vessel could easily leak oil for hours or days, or leak while drifting. As such, limited numbers of cards released at a point source are likely a conservative measure of the distribution of oil, especially given our expected recovery rate of only 30-50%.

Another confounding factor in the transport of oil or drifters is that bodies of waters are not uniform in their current structure. For example, in the center of the shipping channels like Haro Strait or Boundary Passage, flow tends to be more uniform and faster than close to shore, where intruding headlands and sub-surface reefs create turbulence and eddies. Cards dropped in the center of a channel will likely move in different manners than those dropped near shore, being transported much further initially. To look at this specific to the shipping route, we will be

dropping a series of cards in Haro Strait along a transect from the international boundary to where a fully loaded tanker would ground.

Our drop locations were selected to obtain a distribution of sites along the shipping route to Vancouver, where credible incidents such as groundings or collisions could occur. Incidents such as mechanical failures could occur at any point on the shipping route, leading to drifting vessels in fast currents. In the initial phase of this study, we plan to drop batches of individual cards (200-300 cards) at locations including: below Second Narrows in Vancouver, Burrard Inlet, Sand Heads off the mouth of the Fraser River, East Pt. near Saturna Island, near Turn Pt. between Haro Strait and Boundary Passage, in Haro Strait, off Discovery Island near Victoria, and near Race Rocks. All of these locations are sites where an incident resulting in the loss of bunker oil or crude oil could occur.

In cases where vessels are making transits along known routes, such as the shipping route to and from Vancouver and the Pacific Ocean, knowledge of local surface currents are essential in predicting and responding to oil spills. While considerable knowledge exists regarding tidal and other currents along the shipping route, specific combinations of currents, tides, seasons and wind patterns are hard to predict and can change quickly. Accordingly, it is our hope that the first set of drops (October 2013) will be followed by future drops at the same locations in different seasons, weather conditions and tidal periods to develop a suite of potential oil spill trajectories and distributions for many conditions.

For more information contact:

Andy Rosenberger – Raincoast – andy@raincoast.org