



# Surveying *the* Waters of BC

**T**he early surveyors on the waters of British Columbia were Greek, Russian, Danish, Spanish, British, and the First Nations people who all charted the many inlets, islands, and waterways of the expansive

coastline. To each of these, a small piece of history is attached. Remaining behind, long after they have passed on, their names grace the geographical names shown on our maps.

Their surveys helped future explorers and navigators avoid the many rocks and reefs that could suddenly end the voyage of a great ship. Although their surveying lacked the pinpoint accuracy of the geographic positioning systems used today, their maps and charts were amazingly accurate.

The use of aerial photography expanded the ability to more accurately depict the coastline, the rocks, and many reefs, making maps and charts more useful to shipping. Aerial photography is also useful in determining depth of water, as was proven by Gerry Andrews, BCLS Retired and former Surveyor General. His use of aerial photography was put to the test in 1944 with the Allied invasion on the beaches of Normandy.

The team he led used aerial photography and hydrodynamic equations to correlate the velocity of the waves approaching the beaches and the depth of the water below. This enabled the Allied forces to land on the beaches at low tide rather than the traditional high tide, thus surprising the German forces and resulting in a successful mission.

Maps and charts are useful for navigation but a tenure system requires significantly more accurate positioning to establish boundaries ensuring the protection of the tenure. In British Columbia, the land below the natural boundary is owned and controlled by the



province, with the exception of the federal harbours of Esquimalt, Victoria, Vancouver, New Westminster, Nanaimo, and Prince Rupert.

Within other jurisdictions such as Port Alberni and on the Fraser River, the province owns the bed of the water but has given management of the lands to a harbour authority or commission to manage the tenures, in an organized and well-planned-out manner. The province doesn't have the resources to manage these heavily used marine areas.

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All waterfront owners have certain rights associated with their ownership. These are called British common law riparian rights. These rights provide the upland owner with the right to access the water and moor a watercraft in front of his property. If the owner builds a wharf leading from his property onto the water, however, he is required to have the moorage licensed by the province and, depending on the particular size of wharf, this tenure may have to be surveyed.

A simple survey of this type of tenure requires survey monuments to be set on the shoreline, marking the upland corners of the water lot and also have range posts set along the production of the side boundaries further upland. The purpose of the range posts is to allow the tenure holder to site from the range post to the post on the shoreline and extend the boundary out into the water. This is the most simplified form of water survey.

In certain areas of the province, marinas are constructed to allow boat owners the opportunity of docking their boats in a secure environment. Marinas are tenured by the province and the surveys often become more complex. The surveyor has to survey all the wharves and finger floats to position them to ensure the constructed works are

contained wholly within the tenure. The perimeter survey is then completed in a similar manner with corner posts and range posts, but often additional survey posts are required to delimit the various bends in the boundaries because these surveys are not always simple rectangular parcels.

If the marina falls inside a bay, it is often practical to place survey posts in strategic locations on the shoreline to position all the boundaries. The same style of surveys would work for other industrial usages, as well.

In the waters off the southern end of Vancouver Island, the International Boundary runs southeasterly from the intersection of the centre of Georgia Strait with the 49th parallel of latitude, then jogs between the islands forming the San Juan Islands in the US and the Gulf Islands in Canada. Each jog in the boundary is referenced with survey monuments set on the shoreline of islands on both sides. The mid-point of the line joining the two monuments is the exact position of the jog of the International Boundary.

With modern technology, the geographic positions of the points can be accurately determined for positioning but the finite point still remains as the point referenced by the monuments because the physical monuments still govern the position.

The new challenge for BC will come when the moratorium on offshore drilling is lifted and large drill rigs have to be positioned in the middle of Queen Charlotte Sound or some other waterway along the coast. With the modern technology of geographic positioning from satellites, this will be simplified; the requirement to know and understand the technology, however, and the well spacing and grid layout of oil and gas tenures, will make the task very interesting.

Surveying the maritime waterways of British Columbia will always be a challenging task that land surveyors must be trained to meet. ▲

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