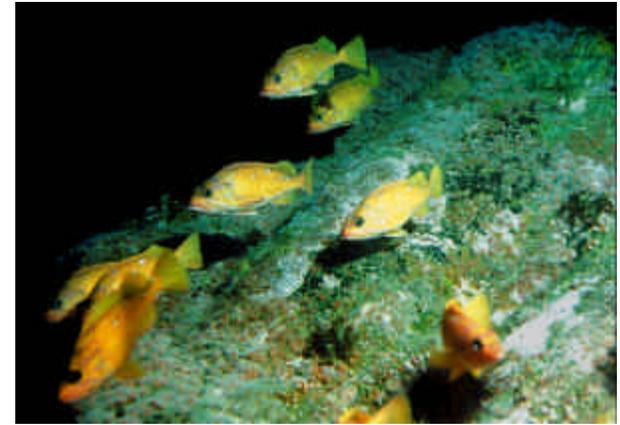
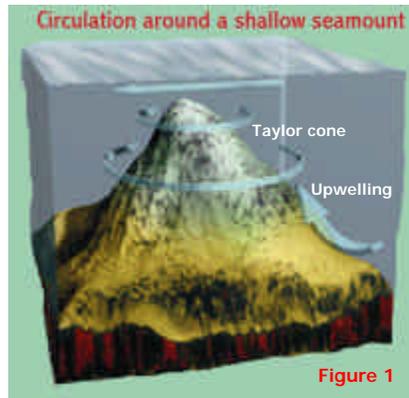


Physical and Biological Interactions Between Haida Eddies and Seamounts in the NE Pacific

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Interactions between currents and seamounts can produce a variety of flow phenomena including localized upwelling, increased turbulence, and the formation of quasi-permanent, recirculating, anticyclonic currents known as Taylor cones (Figure 1).

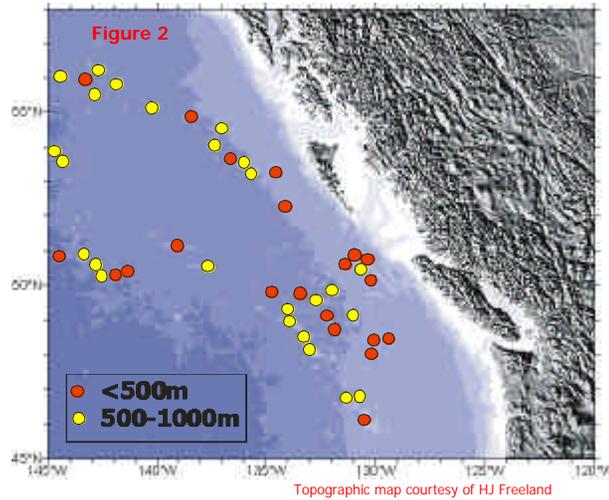


Courtesy of VJ Tunnicliffe

Shallow seamounts in the NE Pacific are often dominated by various *Sebastes* spp. It remains unclear, however, how these populations are maintained. Recent work suggests only limited genetic differentiation between rockfish on Bowie Seamount and those from the neighbouring Queen Charlottes, suggesting at least occasional communication with coastal rockfish populations. However, the age-structure of yelloweye rockfish (*Sebastes ruberrimus*) on Bowie shows a distinct lack of fish <15yrs old, indicating that recruitment to the seamount may be very episodic (L. Yamanaka, pers. comm, Figure 5).

Under some circumstances it appears that Haida eddies can actually become “stuck” to shallow seamounts. As Haida-2000a passed over Bowie Seamount (shallowest depth 25m) west of the Queen Charlottes (Figure 3), its westward motion slowed until the eddy essentially stalled, and thereafter remained associated with the seamount for about three months.

ADCP data collected in Sept 2000 (Figure 4) indicates that the circulation within Haida-2000 was significantly disrupted during this time: flow to the south of Bowie Seamount showed a typical anticyclonic rotation while velocities in the northern portion of Haida-2000a (over Bowie) were slower and often abruptly changed direction within a short distance.



Topographic map courtesy of HJ Freeland

In the NE Pacific there are at least 25 seamounts with summits shallower than 1000m, and another 21 that are shallower than 500m (Figure 2). There are at least another 50 seamounts in the region with summits between 1000-2000m. This is the same region of the NE Pacific where Haida Eddies track west-southwest from the Queen Charlotte Islands.

At least 15 Haida Eddies have been observed off the west coast of the Charlottes since 1992. Analysis of TOPEX/Poseidon sea-surface altimetry data from that period, 11 of these eddies have passed over at least one, and sometimes as many as three shallow seamounts as they move west-southwest from the Charlottes. Most of the remaining eddies generally passed within an eddy diameter of at least one shallow seamount.

TOPEX/Poseidon Altimetry of Haida 2000a Over Bowie Seamount Aug 31-2000

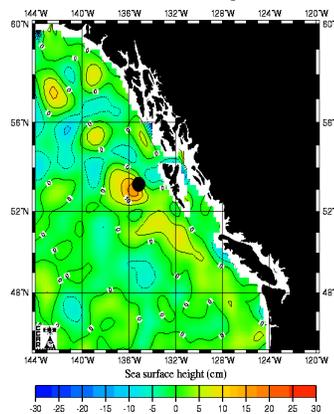


Figure 3

Detail of ADCP transects across Haida 2000a, Sept 18, 2000. Stick plots show current velocities, purple ovals are seamounts

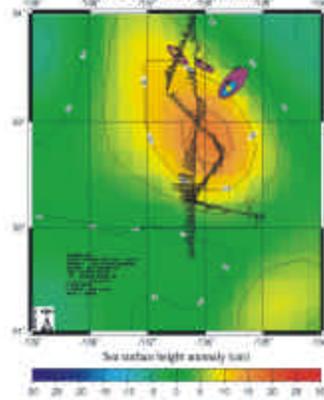


Figure 4

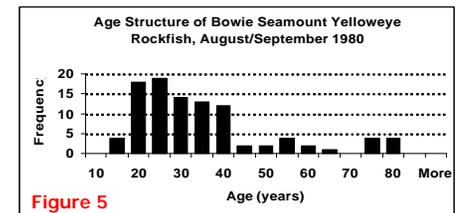


Figure 5

Since adult rockfish are not generally found offshore, it may be that Haida eddies function as an offshore transport corridor for larval and juvenile rockfish (plus other fish and benthic species) and provide an important connection between coastal populations and seamount populations in the NE Pacific. Sitka eddies may play a similar role in for seeding seamounts further north in the Gulf of Alaska. We have collected larval rockfish (and other fish species) from two Haida eddies since 2000. Our goal is to compare the elemental structure of otoliths from these larvae to archival rockfish otoliths from NE Pacific seamounts to determine whether any seamount rockfish originated in coastal waters.