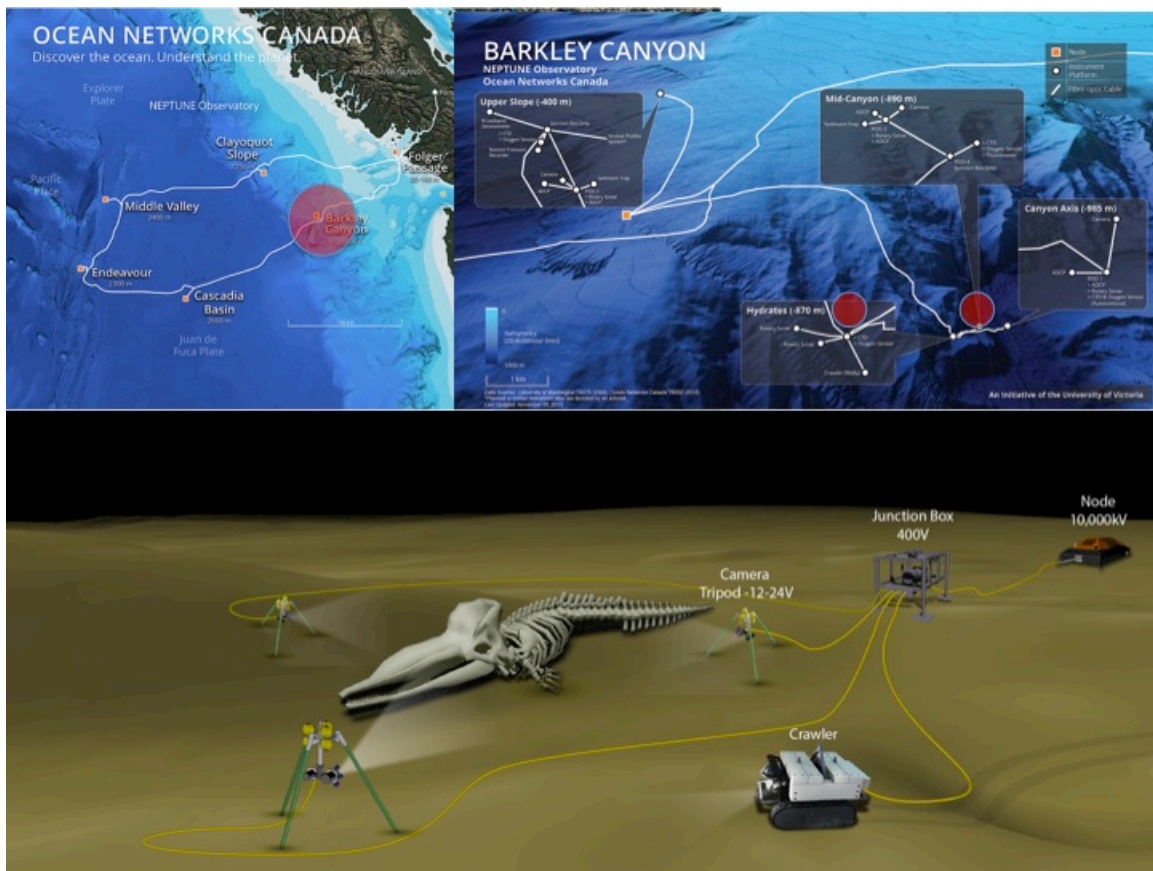


Whale fall colonization/succession experiment to be deployed and monitored in the NE Pacific

Interested parties:

Craig R. Smith, University of Hawaii at Manoa
Ocean Networks Canada, University of Victoria, BC
Rob MacAndrew – Renegade Pictures, London

Scenario 4 – Deploying a whale carcass in Barkley Canyon Description, logistics and costs.



Scenario 4 is a sensible alternative that we extensively discussed last Friday during a conference call with Prof. Craig Smith at UH Manoa and Kim Juniper, Steve Mihaly and myself at ONC. This scenario would benefit from already existing observatory infrastructure in Barkley Canyon, particularly available ports (power and communications) in Barkley POD3 and Barkley Hydrates (shown in the map above).

Other considerations:

1. Distances from shore (for comparison with Scenarios 1,2 and 3):

Cascadia Basin: 202 miles

Clayoquite Slope: 152 miles

Barkley Canyon: 47 miles

Those distances need also to be considered together with the distances in navigation between the ship dock and the site location of a candidate stranded whale.

2. Whale stranding frequency

A range of 10-15 strands per year in the NW Pacific Coast according with Craig (most commons are humpback, and grey, however fin whales also occur).

In theory the wait for a stranding to occur could take up an entire year. Maybe this time window could be used to get all the preparations needed with all the other shooting gear and seafloor infrastructure of the observatory.

3. Other advantages of selecting Barkley Canyon (logistics and costs):

- 1) 900 m of depth. Whale can be deployed at the seafloor with a much larger precision. This depth, which is already deep enough to be classified as a 'deep-sea' habitat, would also allow for a higher turn around of ROV dives (less time for ascent and descent freeing more time in the bottom for shooting the film footage)
- 2) Infrastructure already installed in Barkley Canyon. We have ports available in junctions boxes that could connect cameras, light towers saving a lot of the installation and hardware costs from scenarios 2 and 3.
- 3) In Barkley Canyon we have a success story with 'Wally', a tethered crawler developed in Germany that carries environmental samplers and a low-resolution camera. Wally has been successfully operational since May of 2012. We currently have two Wally's available. One crawler is swapped by its twin every year for maintenance and cleaning. For this film documentary, we could easily mount either a Mini-Zeus or a Zeus Plus HDTV camera and sets of LED light systems in the crawler and have the operator drive the crawler near and around the whale carcass. The crawler would be a good alternative to three fixed cameras systems envisioned by scenarios 1 and 2.
- 4) Additionally, in Barkley Canyon we have 3-meter high towers serving as anchors for rotary multi-beam sonars systems that could potentially be used for setting LED light systems to illuminate the whale way from above.

4. Timeline

Scenarios 2 and 3, with all the cable lays, manufacturing of new hardware (e.g., junction box, camera tripods, and development of drivers for the ethernet camera systems), etc, will allow implantation of the whale and live streaming of video optimistically only in the summer/fall of 2016. Scenario 4 will have a shorter timeline from beginning to end, but also always dependent on the timing of the whale stranding.

5. Summary of Costs of Scenario 4

Scenario 4	Unit price (\$)	Quantity	Total (\$)
Ship and ROV time			
Whale deployment	4,000	4 days	16,000
R/V Thompson*	42,000	3 days	126,000
R/V ROPOS*	42,000	3 days	126,000
Hardware			
Extension cable with two matable connectors (70 m)	30,000	1	30,000
Use of ONC's junction box	25,000/year	1	25,000
Instrument (camera) driver development	10,000	1-3	10,000-30,000
Crawler	120,000	1	120,000
Mini Zeus HDTV camera or	120,000	1	120,000
Zeus Plus HDTV CA	240,000	1	240,000ca
DSP&L LED lights - Matrix-3 SeaLite (400W HMI equivalent)	8,000	3	24,000
Cost range			617,000 - 737,000

* The availability of R/V Thompson and ROV ROPOS may be challenged by competition with other ONC activities and or other research programs conducted by other universities.

Other solutions in terms of Research Vessels, Fishing Trawler ships and also in terms of ROV providers are available. An example of alternative ROV is below:

Ocean Explorer ROV

<http://www.oceaneering.com/advanced-technologies/oceaneering-technologies-otech/search-and-recovery-rovs/>

Costs

- Daily operation rate: \$21,000/day
- \$2,000 /day for USBL (positioning system) plus fuel
- \$60,000 mobilization
- \$60,000 demobilization

- \$24,000 for mob- and demobilization of USBL system
- Easy mob and demobilization at relatively short notice

If the whale is to be deployed with the precision necessary to be placed near the already existing seafloor cables and instruments, it needs to be lowered hard-wired and connected to transponders, and a USBL navigation system for precise location. Smaller vessels do not have that system so we need to be aware of this and look for vessels with such capability. Last Friday we listed quite a few vessels that could reliably be used for this operation and we are now in the process of getting their rates.