



PORT METRO
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Port Metro Vancouver - Marine Mammal Monitoring Program and Initiatives

Workshop - Ocean Noise in Canada's Pacific

Darrell Desjardin
Director, Sustainable
Development

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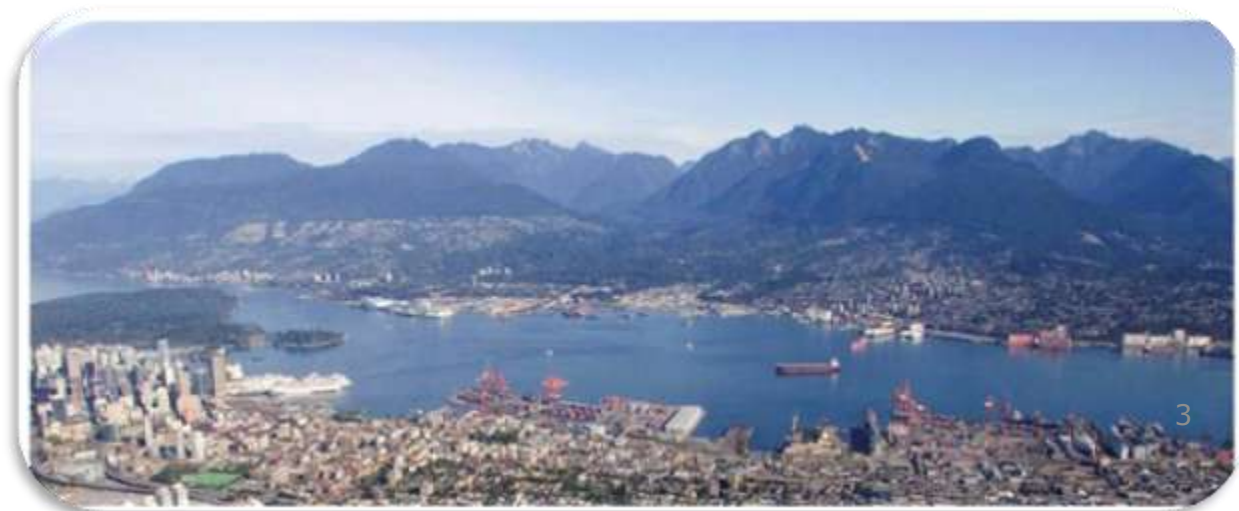
Presentation Overview

- About Port Metro Vancouver
- Port Growth and Vessel Traffic
- Deltaport Third Berth Underwater Acoustics and Marine Mammal Monitoring Program
- Ongoing Marine Mammal Monitoring Program
- Discussion



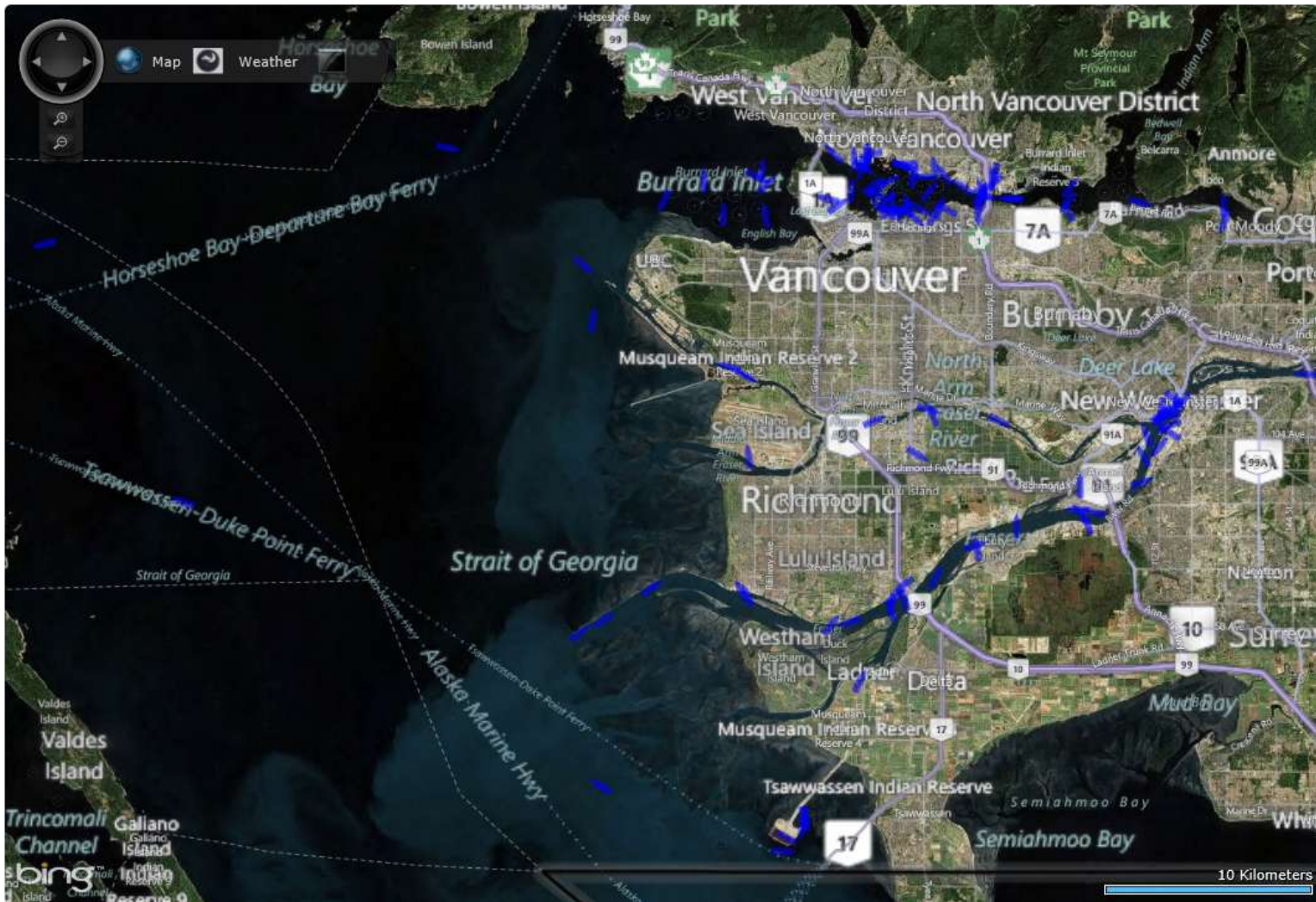
About Port Metro Vancouver

- Largest and busiest port in Canada
- Largest port in North America in total foreign exports
- Trade with more than 160 economies
- 28 major marine cargo terminals and three Class I railroads provide a full range of facilities and services
- Port Metro Vancouver handled over 118 million tonnes of cargo in 2010, up 16% from 2009
- Container throughput in 2010 was 2.5 million TEUs, an increase of 17% over 2009



Interactive Port Map

Jurisdiction

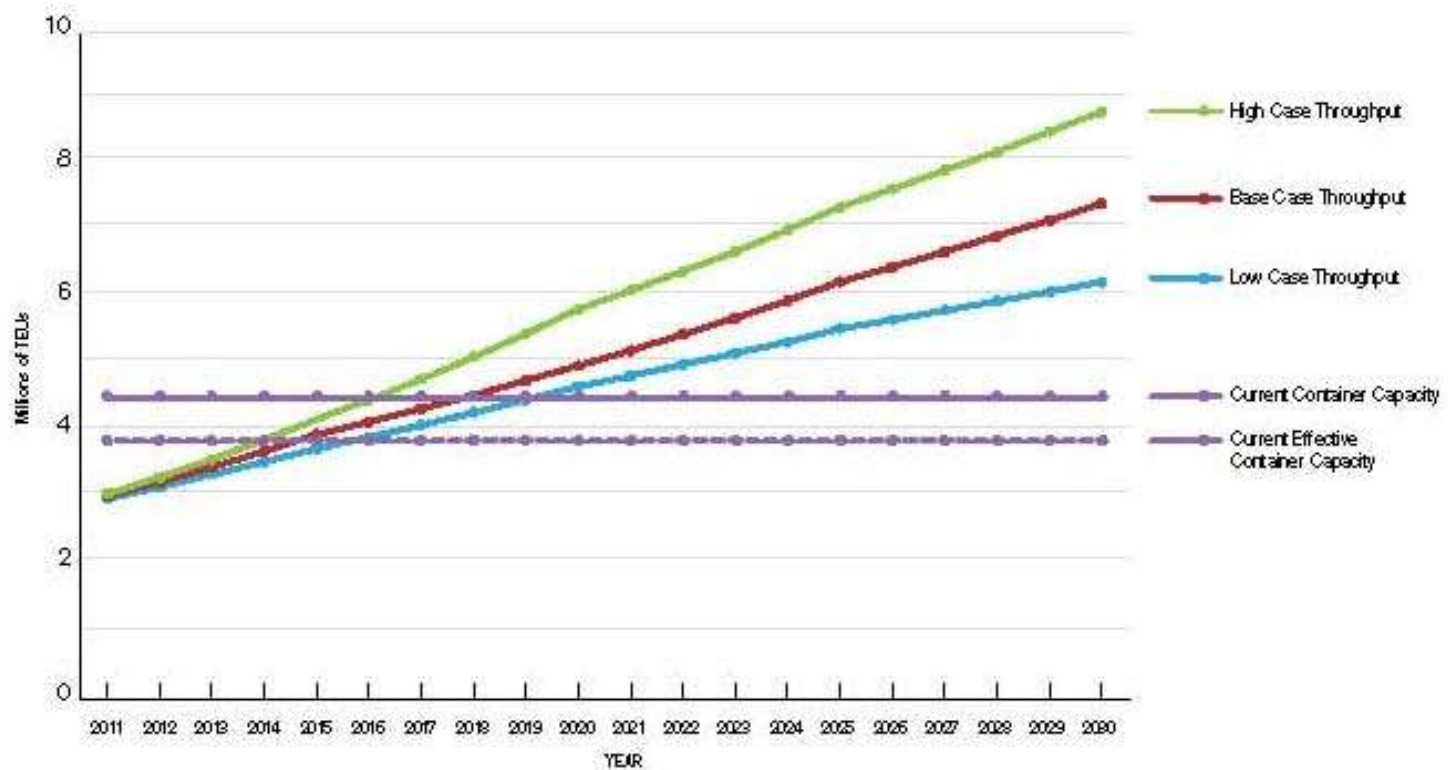


Business Sectors



BC Container Capacity Forecast

B.C. WEST COAST CONTAINER DEMAND FORECAST (SEAPORT, MAY 2011)



Source: Preliminary Container Traffic Projections for Port Metro Vancouver: 2011–2030
(Seaport Consultants, May 2011) – available online at WWW.PORTMETROVANCOUVER.COM/GCIP.

HOW MUCH A TV OR A CUP OF COFFEE?

- The transport cost element in the shelf price of goods varies but is ultimately marginal. For example, transport costs account for only 2% of a television shelf price and only 1.2% of a kilo of coffee.



2



Port Metro Vancouver Vessel Call Comparisons

- *2007* - 3,166 ship arrivals
 - (including 275 cruise arrivals)
- *2007* average vessel size of 30,400 gross tonnes.

- *2010* - 2,611 ship arrivals
 - (including 177 cruise arrivals)
- *2010* average vessel size of 43,460 gross tonnes

- In 2007 190 tugs with an estimated average size of 43 gross tons were active in Port Metro Vancouver waters. In 2010 192 tugs.

Shipping Fleet Characteristics

CONTAINER SHIP – 8500 TEU **PRINCE RUPERT / VANCOUVER / LONG BEACH**

- **Consumption 200 tons/day at 20 knots**
- **200 nm inbound**
200 nm outbound
1630 nm between ports
- **Sailing distance 2030 nm at 20 kts = 4.2 days**



HANDYMAX BULK CARRIER

- **Cargo intake 40,000 TONS**
- **consumption 30 tons/day**
- **200 nm at 13 knots = 15 hours (0.625/day x 2)**

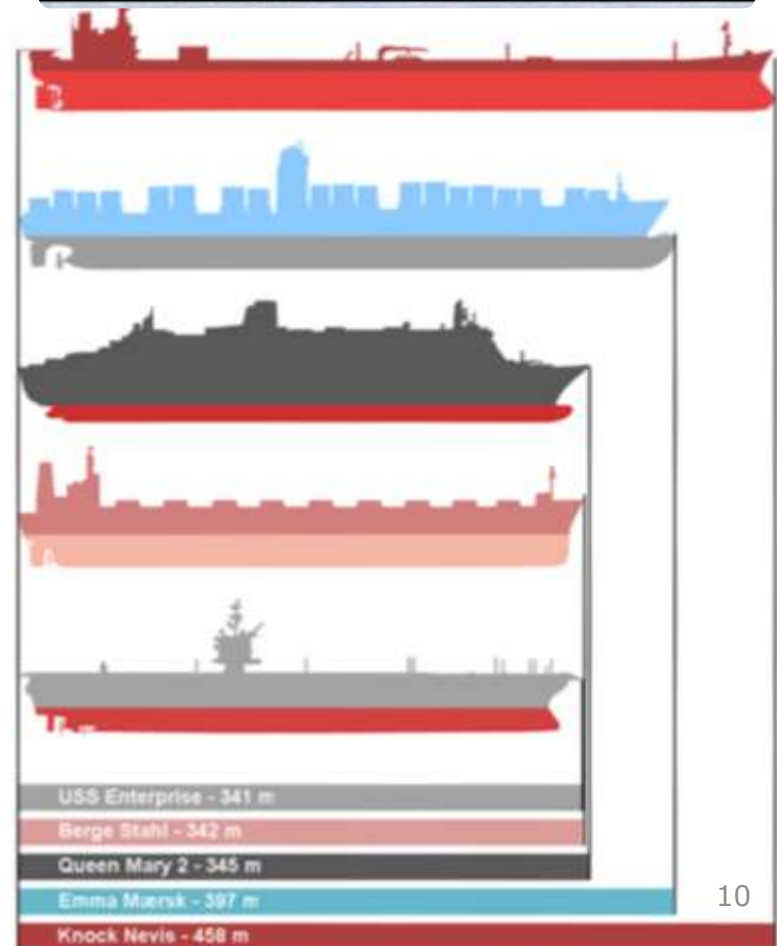


Emma Maersk

18, 500 TEU

Dimensions

Length overall (LOA)	1302' 6" (397 m)
Beam	183' 8" (56 m)
Gross Tonnage	170,974 bt
Cargo capacity	18,500 TEU
Net Deadweight (DWT)	55,396 nt
Power	156,907 DWT
	80,080 kW (109,000 hp)
	Engine: Wartsila 14RT-Flex96c plus 40,000 hp from five Caterpillar 8M32
Speed	more than 25.5 knots, Cruise Speed - 31 mi/h
	The ship has accommodation for 30 people, though the normal crew is only 13.
Crew	
First Trip	Sept. 08, 2006
Construction cost	US \$145,000,000+
Country of origin	Denmark



Deltaport Third Berth Background

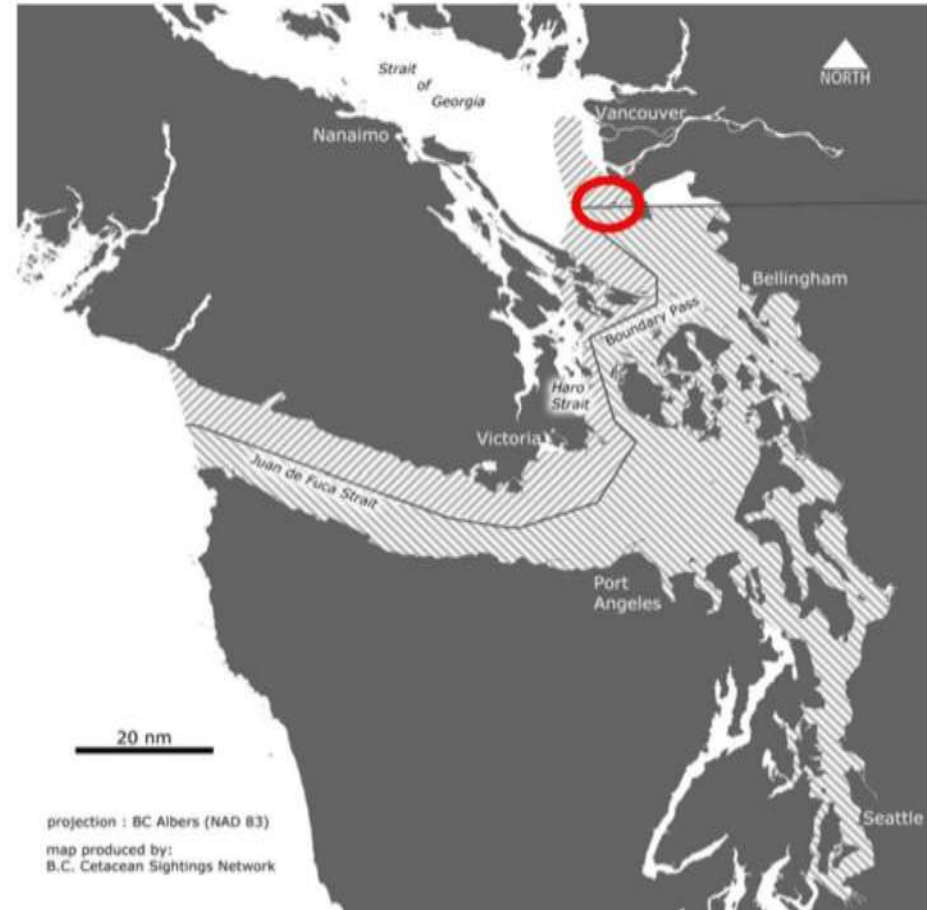
- Marine mammals (and specifically Southern Resident Killer Whales SRKW) identified as VECS for Deltaport Container Terminal expansion in 2003
- Killer whales use sound for:
 - Navigation
 - Communication
 - Foraging
- Potential Construction Effects
 - Dredging
 - Vibrodensification
- Potential Operation Effects
 - Vessel noise, size and frequency



SRKW Background for DP3



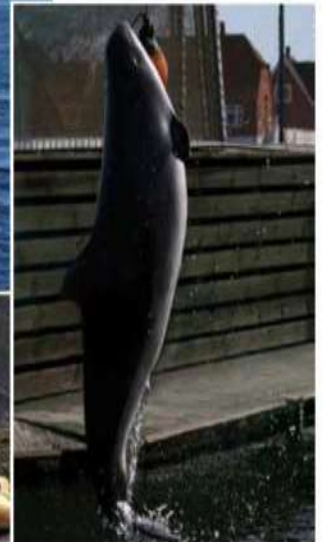
1. 2001 - Southern Resident Killer Whales listed as Endangered
2. 2003 - Deltaport Third Berth commences EA
3. 2008 - SRKW Critical Habitat Designation



Comprehensive Marine Mammal Program

Many other marine mammals that use this area may also be affected by construction noise:

- Harbour Seals
- Steller Sea Lions
- California Sea Lions
- Dall's Porpoises
- Harbour Porpoises
- Grey Whales
- Humpback Whales



Peak use of area



Summer-Fall



Program Design Overview

Task	Description
1	Acoustic Modeling (Pre-construction) <ul style="list-style-type: none">• Ambient noise measurements• Zones of Influence (ZOI) of noise on killer whales
2	Report and Recommendations for Marine Mammal Monitoring
3	Validation of Pre-construction Acoustic Modeling Results
4	Marine Mammal Monitoring and surveys
5	Deltaport 3 rd Berth Killer Whale Study and Report
6	Marine Mammal Awareness - Pamphlet

Acoustic Program

Why?

1. Collect noise data in project area
2. Predict noise levels
3. Update predictions based on real equipment



Hydrophone

How?

1. Field work to collect acoustic data
 - Background/ambient noise
 - *Columbia* dredge
 - Vibro-densification
2. Computer modeling of **Zones of Influence (ZOI)**

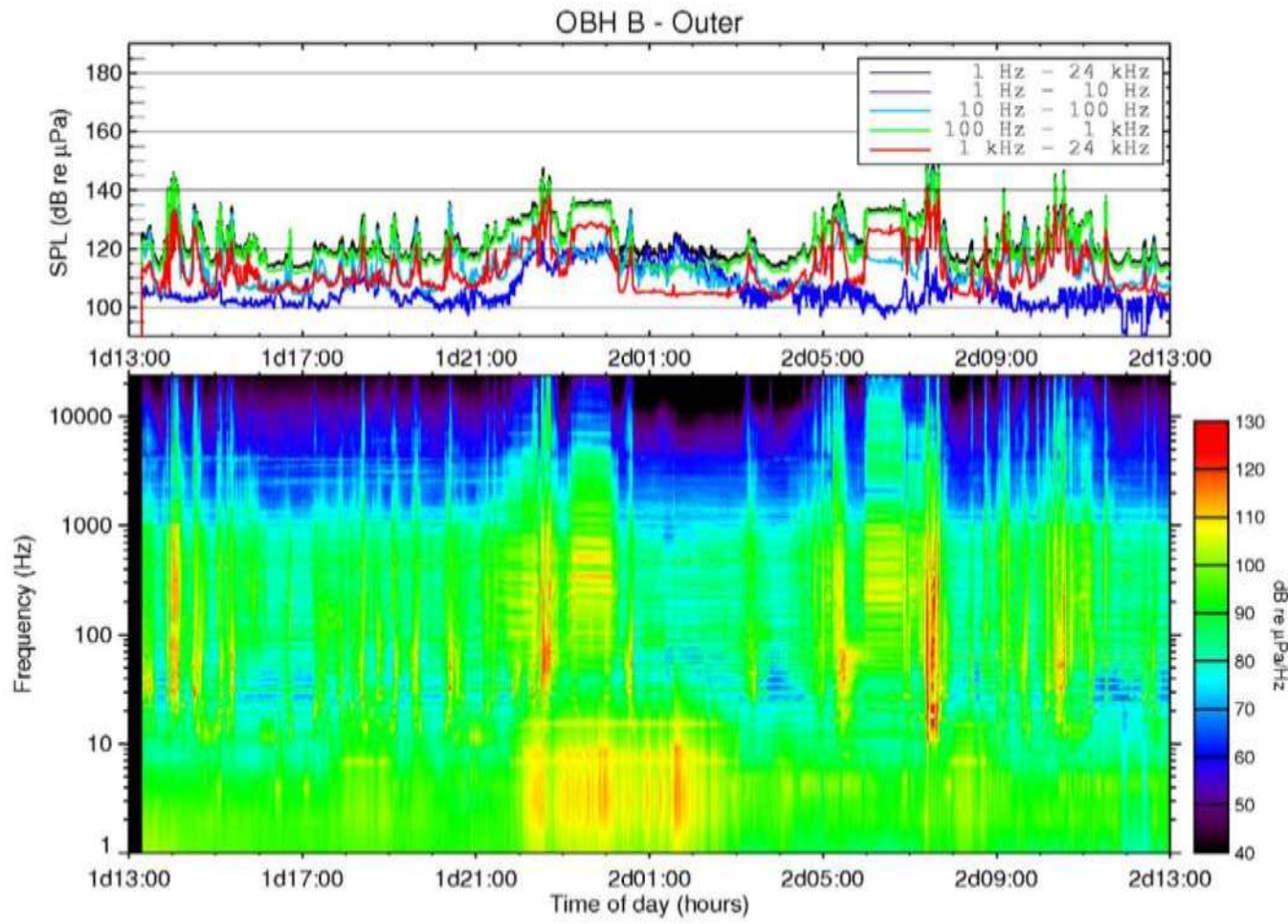
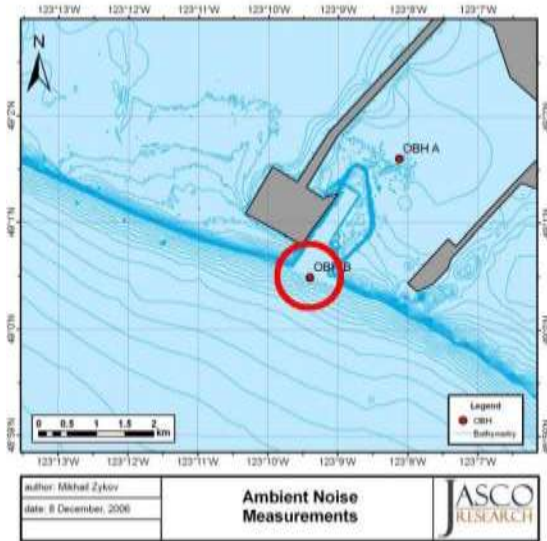


Columbia Dredge

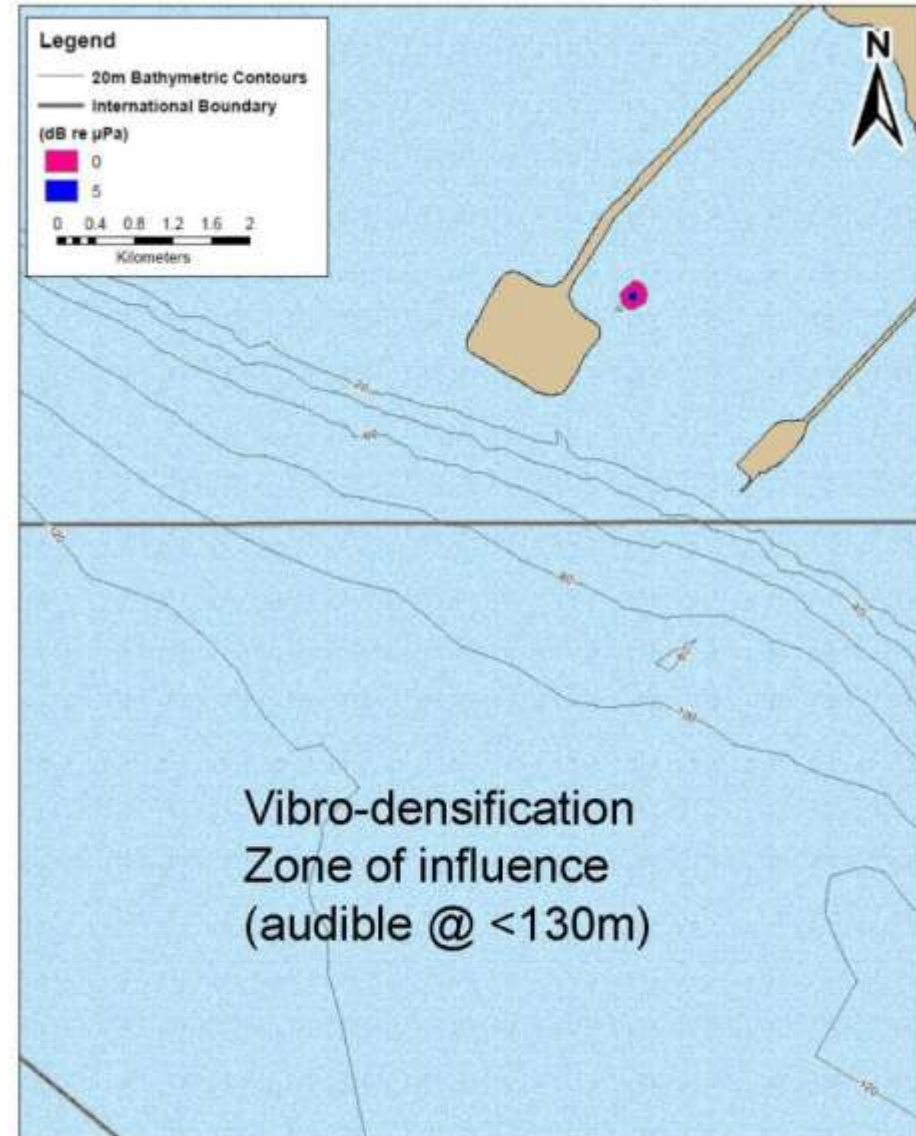
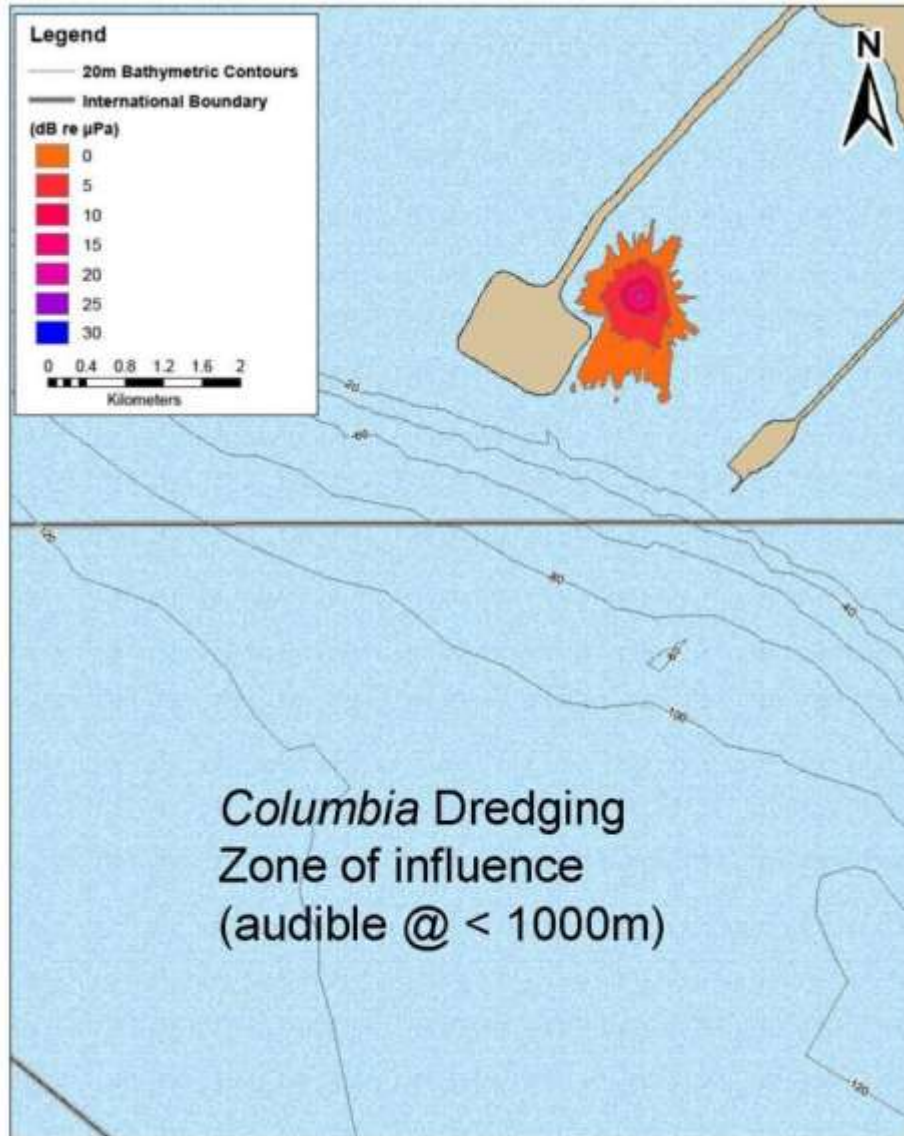


Vibro-densifier

Acoustic Results – Ambient Noise



Acoustic Results - Zone of Influence



Acoustic Program Conclusions



- Hearing damage unlikely; limited to areas very close to construction (< 10 metres)
- Potential behavioural disturbances limited inter-causeway (<1 km)
- Sound masking may take place outside of the inter-causeway
- One (1) km monitoring radius appropriate

Port Metro Vancouver Marine Mammal Observer Program



Noise and Underwater Acoustic Monitoring

- 2012 - permanent land based noise monitoring stations
- Web based with public interface
- Deployment of permanent underwater acoustic hydrophone monitoring station(s) on the Fraser River





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Thank you.

Discussion



Hydrophone

