



# Marine Environment Plans



# Marine Sediment Management Plan

# Marine Sediment Management Plan: Overview



## What

- The Marine Sediment Management Plan (MSMP) describes management of marine sediment disturbed during construction of the Westridge Marine Terminal, including:
  - Defining area and volume of marine sediment to be removed
  - Options for re-use and/or disposal of sediment
  - Mitigation measures to contain sediment suspended during in-water excavation
  - Monitoring during in-water excavation

## When

- The MSMP will guide the management of marine sediment during construction of the Westridge Marine Terminal

# Marine Sediment Management Plan

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## Proposed Activities

- In-water excavation of rip rap to allow for sheet pile wall installation
- Re-use of rock for habitat offsetting or disposal on land

## Potential Activities

- Disposal of sediment on land
- Dredging not planned at this time
  - If required, additional work will be conducted:
    - Additional sediment sampling to characterize potential contaminants
    - Plume modelling to assess potential dispersion of suspended sediment

# Marine Sediment Management Plan



## Mitigation Measures

- Use turbidity curtain to contain suspended sediments in work area during in-water excavation
- Conduct work during fisheries least-risk window

## Monitoring Measures

- Turbidity monitoring outside turbidity curtain during in-water excavation
- Monitoring sites 30 m seaward of curtain
  - Monitoring sites 100 m seaward of curtain
  - For first week of activity, sampling every day, three times per day
  - For second week onwards, sampling every two days, three times per day
- Turbidity measurements will be compared to BC Ministry of Environment turbidity guidelines



## Marine Fish Habitat Offsetting

# Offsetting Plan: Overview

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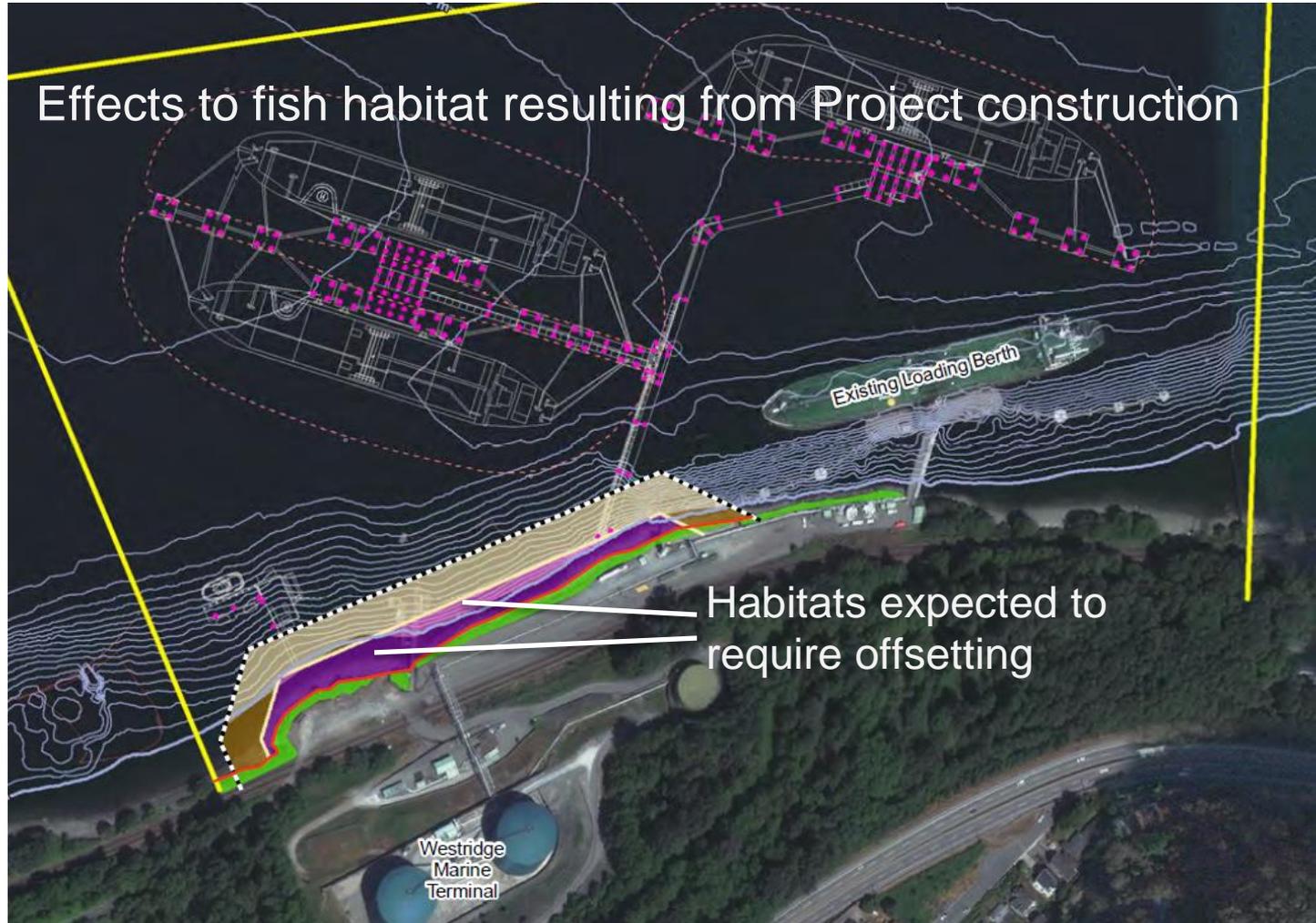
## What

- *Fisheries Act* requirement to offset effects to fish habitat that cannot be avoided or mitigated
- Offsetting must counter-balance *serious harm to fish* (i.e., death of fish, permanent alteration or destruction of fish habitat)
- Offsetting Plan developed following Fisheries and Oceans Canada (DFO) policy and guidance documents

## When

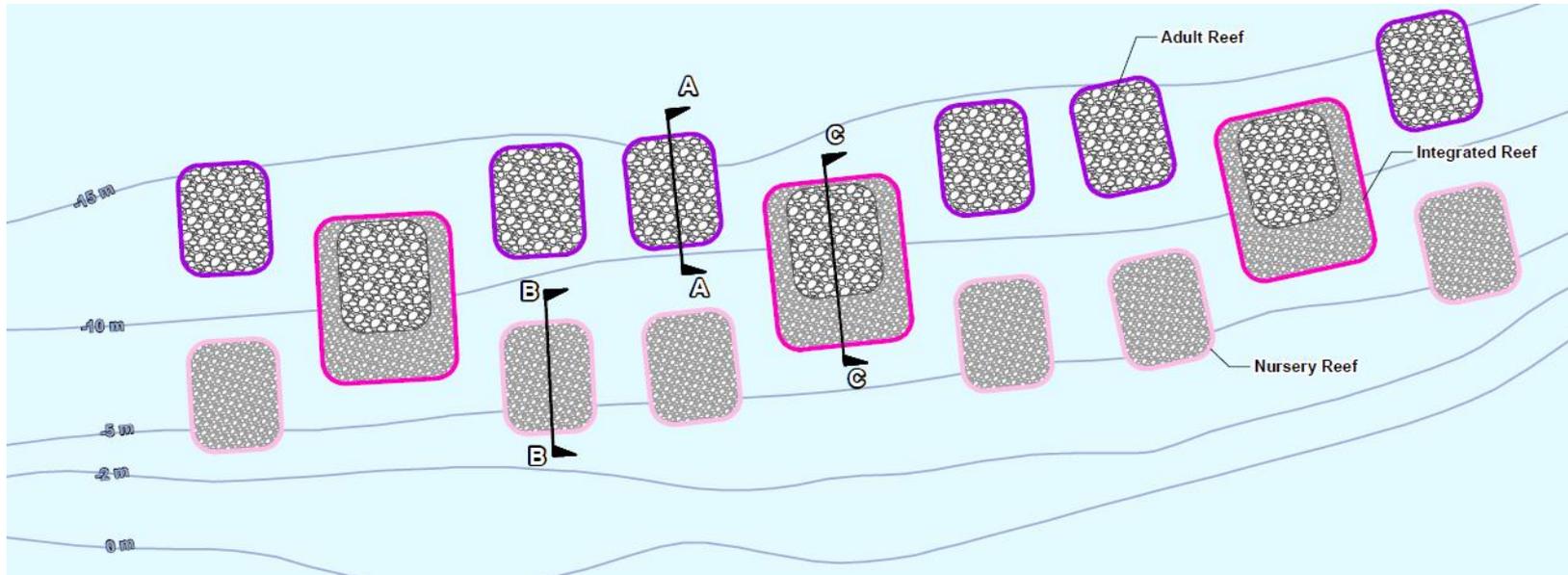
- Offsetting Plan to be submitted to Department of Fisheries and Oceans (DFO) as part of application for *Fisheries Act* authorization in early 2017
- Offsetting habitat to be built during construction of the Westridge Marine Terminal

# Effects to Fish Habitat



# Potential Offsetting

## Potential Subtidal Rock Reef Design



# Potential Offsetting

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## Benefits

- Subtidal rock reef complex will increase habitat complexity (rocky substrate) in Burrard Inlet, promoting colonization by algae and invertebrates
- Reef will provide habitat for species of commercial, recreational and Aboriginal (CRA) importance, including rockfish, lingcod and crabs

## Monitoring

- Compliance monitoring during construction, to confirm offsets are constructed according to the plan
- Effectiveness monitoring for five years after construction (dive surveys), to confirm that offsets are functioning as intended

## Next Steps

- Obtain feedback on potential offsetting plan
- Finalize plan and submit to DFO as part of application for *Fisheries Act* authorization and the Vancouver Fraser Port Authority application in early 2017



# Navigation and Navigation Safety

# Navigation and Navigation Safety Plan



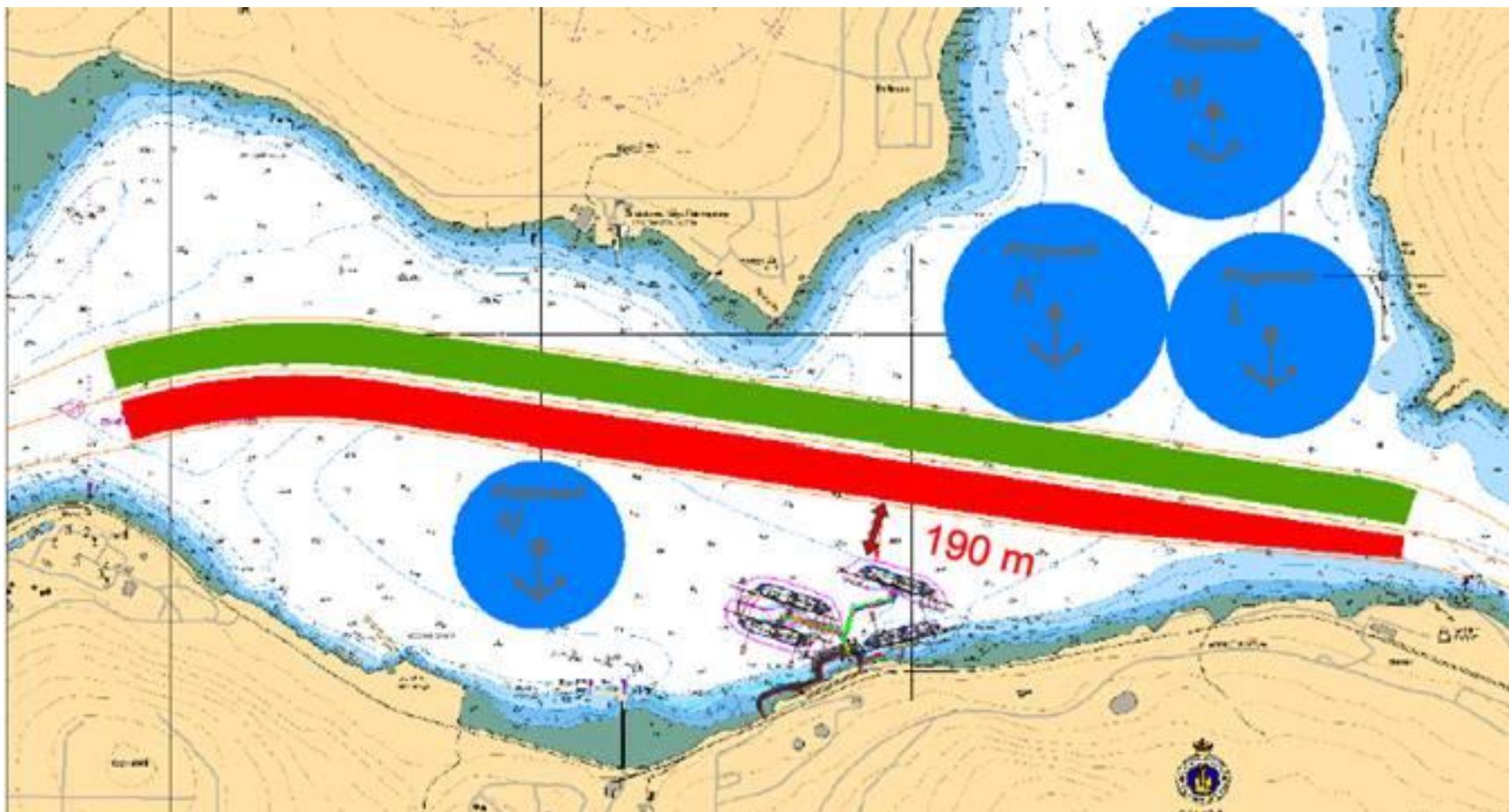
- What:
  - The Navigation and Navigation Safety Plan (NNSP) provides a list of navigable waterways affected by the Project and mitigation measures to address navigation and navigation safety
  - The navigable waterway that interacts with the Westridge Marine Terminal is Burrard Inlet
  - The NNSP does not apply to navigation effects of moving tankers; only presence of expanded marine terminal
- When:
  - Project construction and operations
- Additional Information:
  - NEB Condition 48
  - <https://www.transmountain.com/navigation-safety-plan>

# Navigation/Navigation Safety Mitigation



- Planned Mitigation, Marine Terminal:
  - Dock design and siting will not impede boating traffic
  - Continue to work with Vancouver Fraser Port Authority on permitting, design requirements
  - Seek input on strategies to communicate construction schedule and work areas to residents and others
  - Notify marine commercial and recreational operators of hazards associated with construction; place warning signs offshore and onshore near construction activities
  - Ensure barges for heavy equipment access are placed in appropriate areas; Project vessels operated at low speeds
  - Provide detailed design information to Canadian Coast Guard to evaluate need for additional navigational aids

# Navigation in Burrard Inlet



Ref: Passing Ship analysis

# Navigation safety during construction



- A Navigation and Navigation Safety plan for the Westridge area will be shared with marine waterway users and implemented after engaging with appropriate authorities and stakeholders
- During construction of Westridge Marine Terminal:
  - VFPA will be requested to implement the proposed passing ship channel described in the TMEP submission to the NEB
  - the working zone will be demarcated by navigation buoys and other means in consultation with the Canadian Coast Guard and Vancouver Fraser Port Authority
  - on-water safety vessels will provide guidance and assistance as required

# Communications

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- Trans Mountain will regularly communicate and update all marine waterway users, including boaters, commercial fishers and Aboriginal groups on construction activities in the construction area through a variety of methods, including:
  - meetings or workshops with key user groups;
  - neighbourhood resident mail-outs;
  - local advertising and public service announcements;
  - on-water and onshore signage;
  - website postings, email notifications, and social media
  - access to email and phone-line contacts