

# BP Cherry Point Dock Extension Gateway Pacific Terminal Vessel Traffic Study Findings

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# Disclaimer

- ERC conducted the vessel incident and oil/cargo outflow analyses for the BPCP and GPT studies as a subcontractor to The Glosten Associates (TGA)
- ERC is giving this presentation based solely on publicly-available study materials as a courtesy to help incorporate these findings into the Salish Sea Workshop discussions
- ERC does not represent SSA Marine/GPT, BP Cherry Point, Ecology, Lummi Nation, US ACE, TGA, or Cardno-Entrix

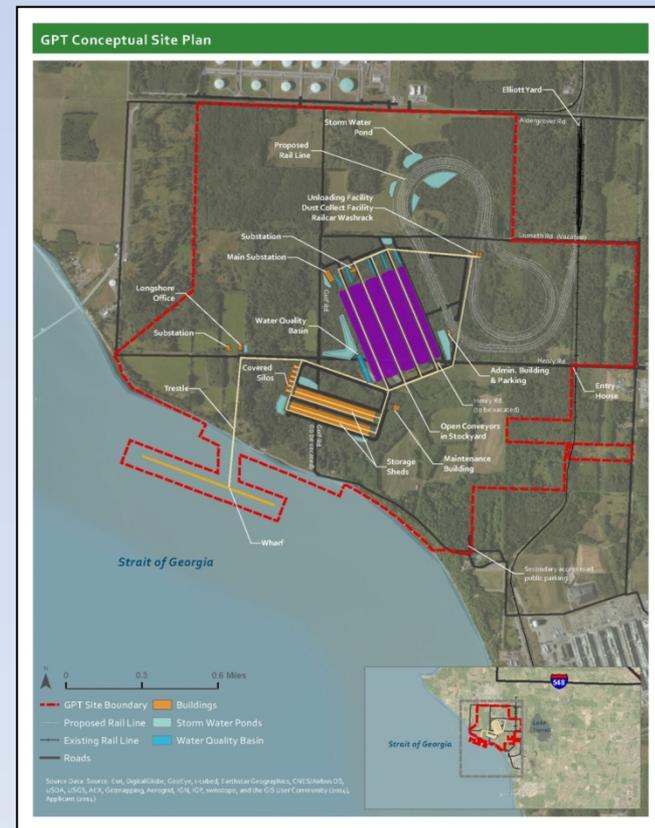


# Two Facility Projects

## BP Cherry Point Dock Extension



## Gateway Pacific Terminal



# Two Facility Projects

## BP Cherry Point Dock Extension

- Operational



## Gateway Pacific Terminal



# Two Facility Projects

## BP Cherry Point Dock Extension

- **Operational**



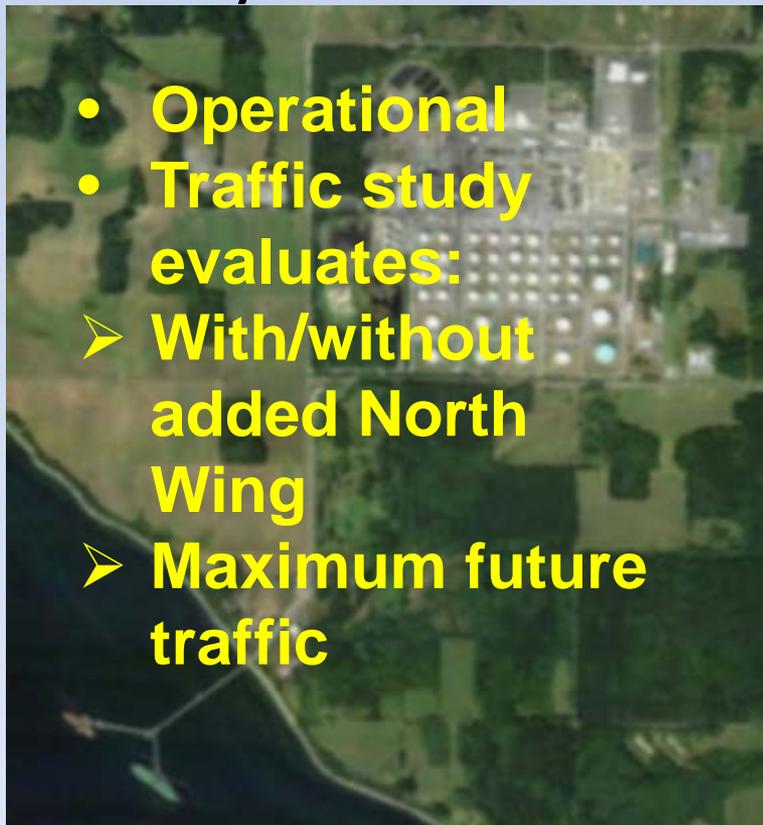
## Gateway Pacific Terminal

- **Proposed**



# Two Facility Projects

## BP Cherry Point Dock Extension

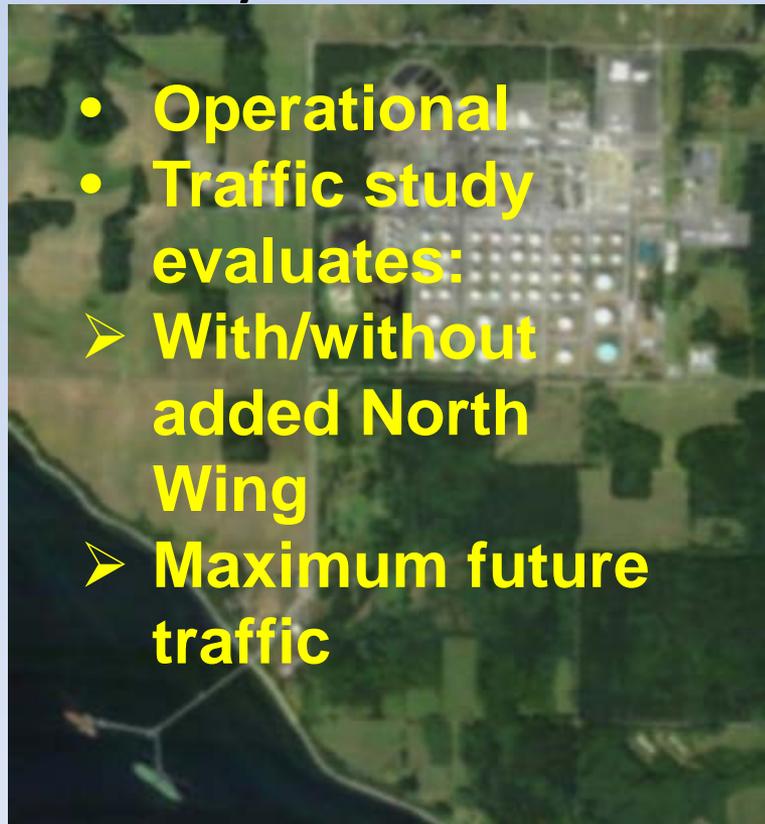


## Gateway Pacific Terminal



# Two Facility Projects

## BP Cherry Point Dock Extension



- **Operational**
- **Traffic study evaluates:**
  - **With/without added North Wing**
  - **Maximum future traffic**

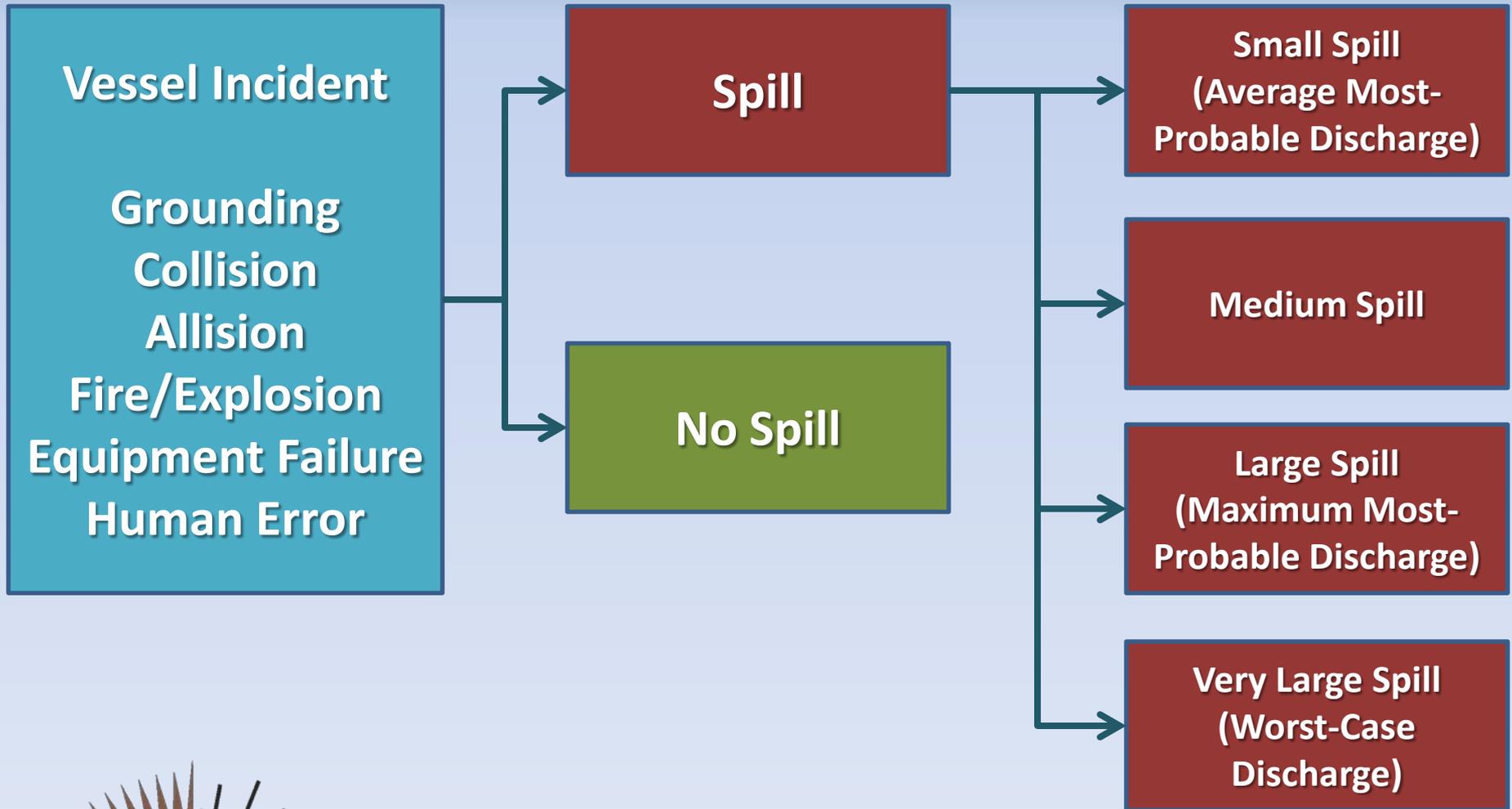
## Gateway Pacific Terminal



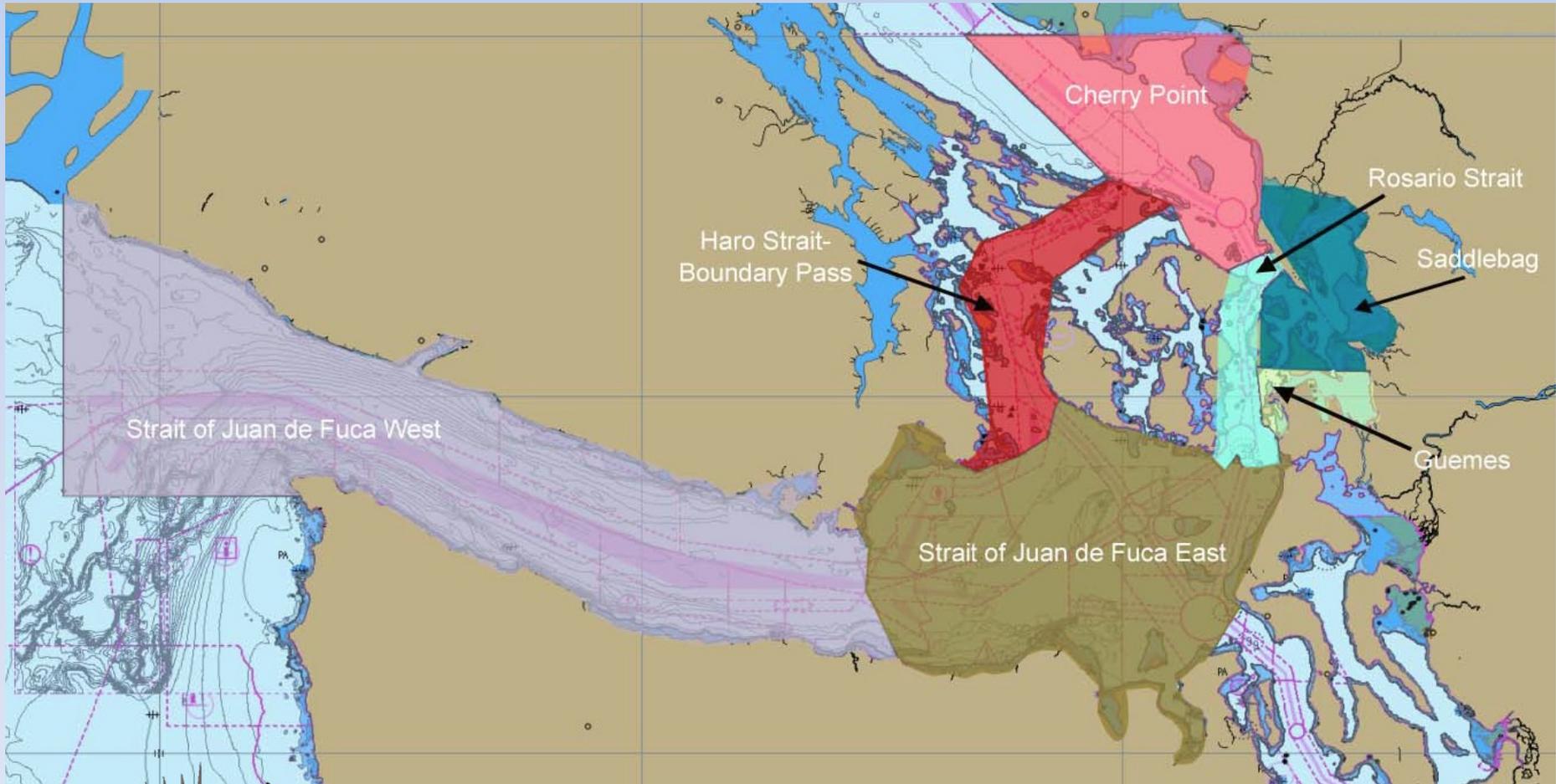
- **Proposed**
- **Traffic study evaluates:**
  - **Without GPT**
  - **With GPT**
  - **With GPT plus cumulative traffic (Shell CBR, Trans Mountain)**



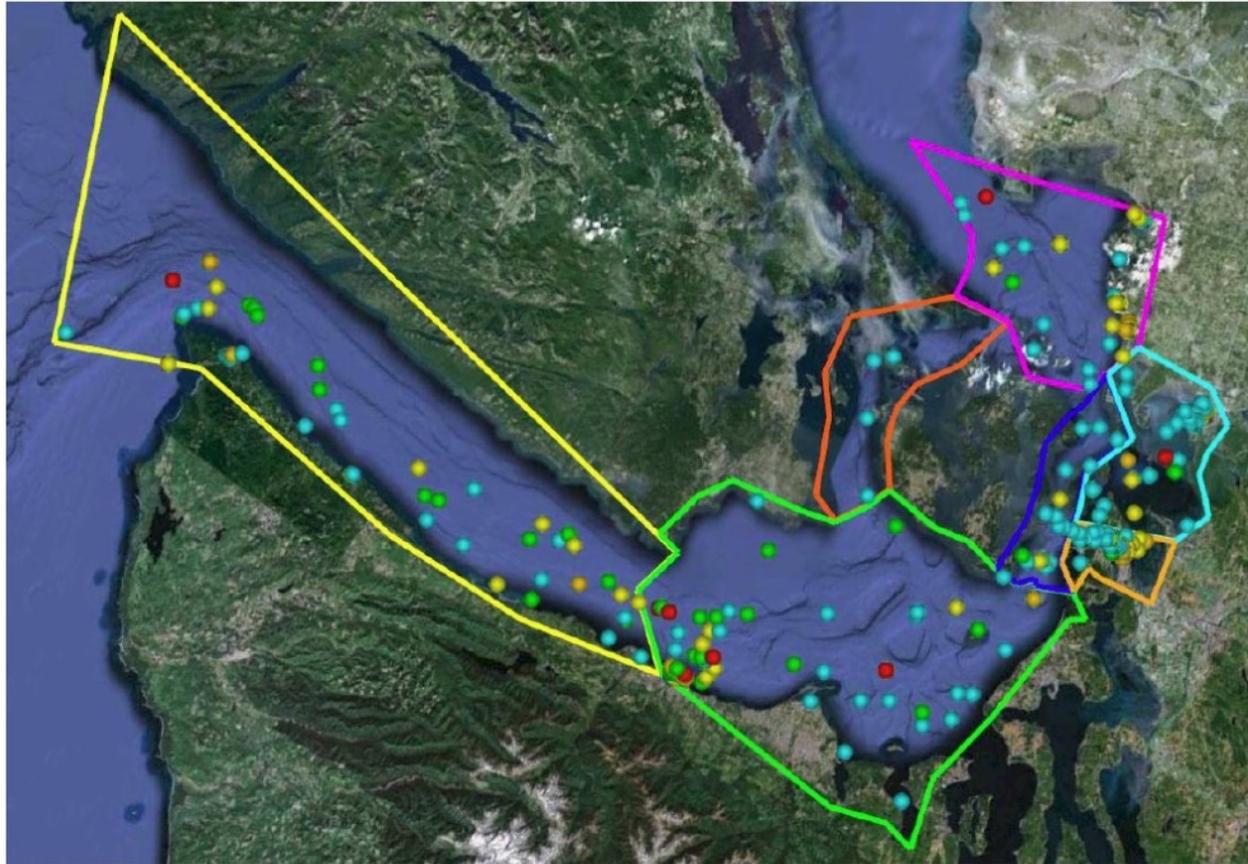
# Vessel Incidents vs Spills



# BP Cherry Point & GPT Study Subareas



# Historical Incident Data



## Dot Key

Red = Bulkers

Orange = Tank barges

Yellow = Tankers

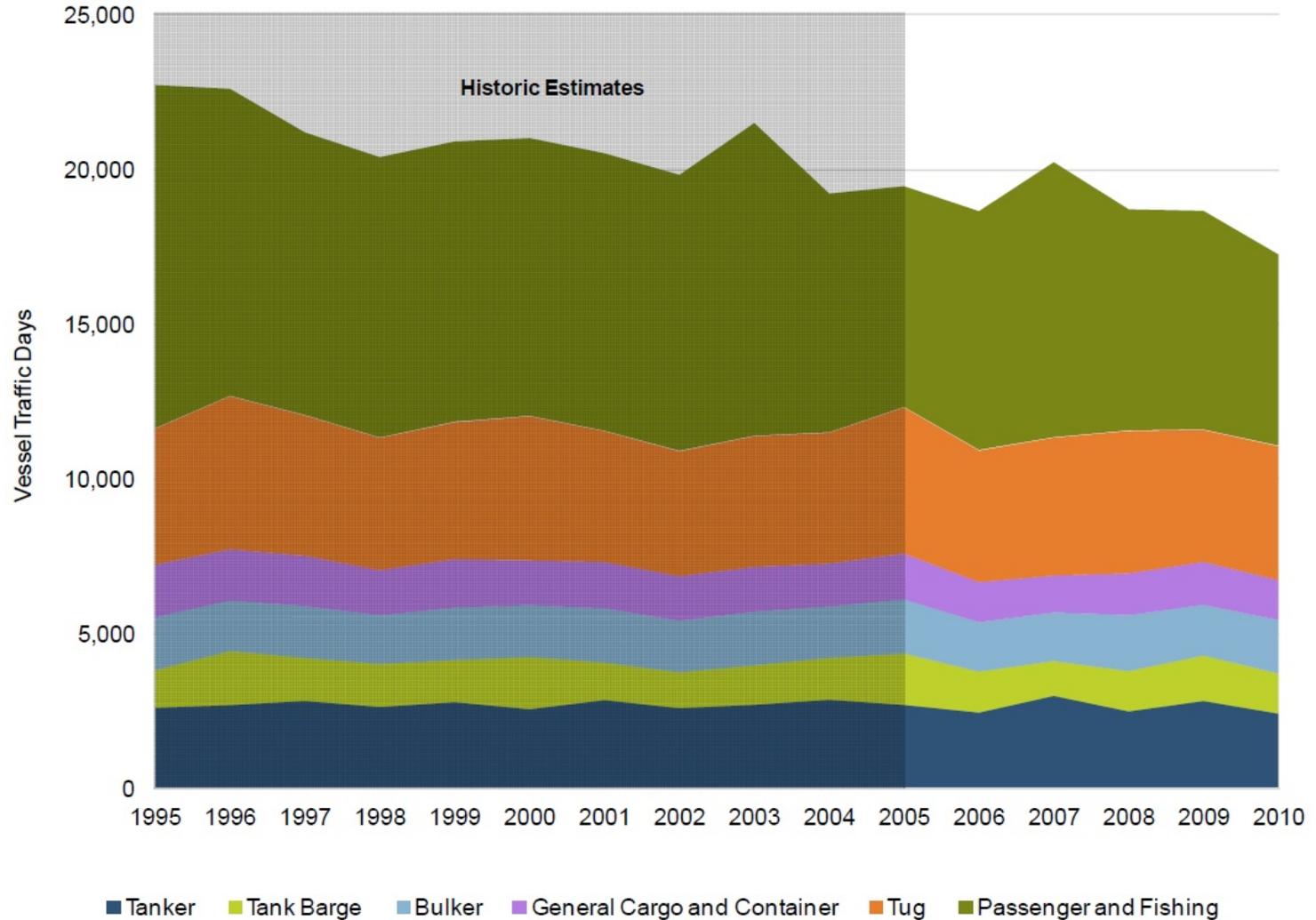
Green = General cargo vessels

Aqua = Tug, passenger, and fishing vessels > 60 ft

429 Vessel Incidents by Subarea (1995-2010)



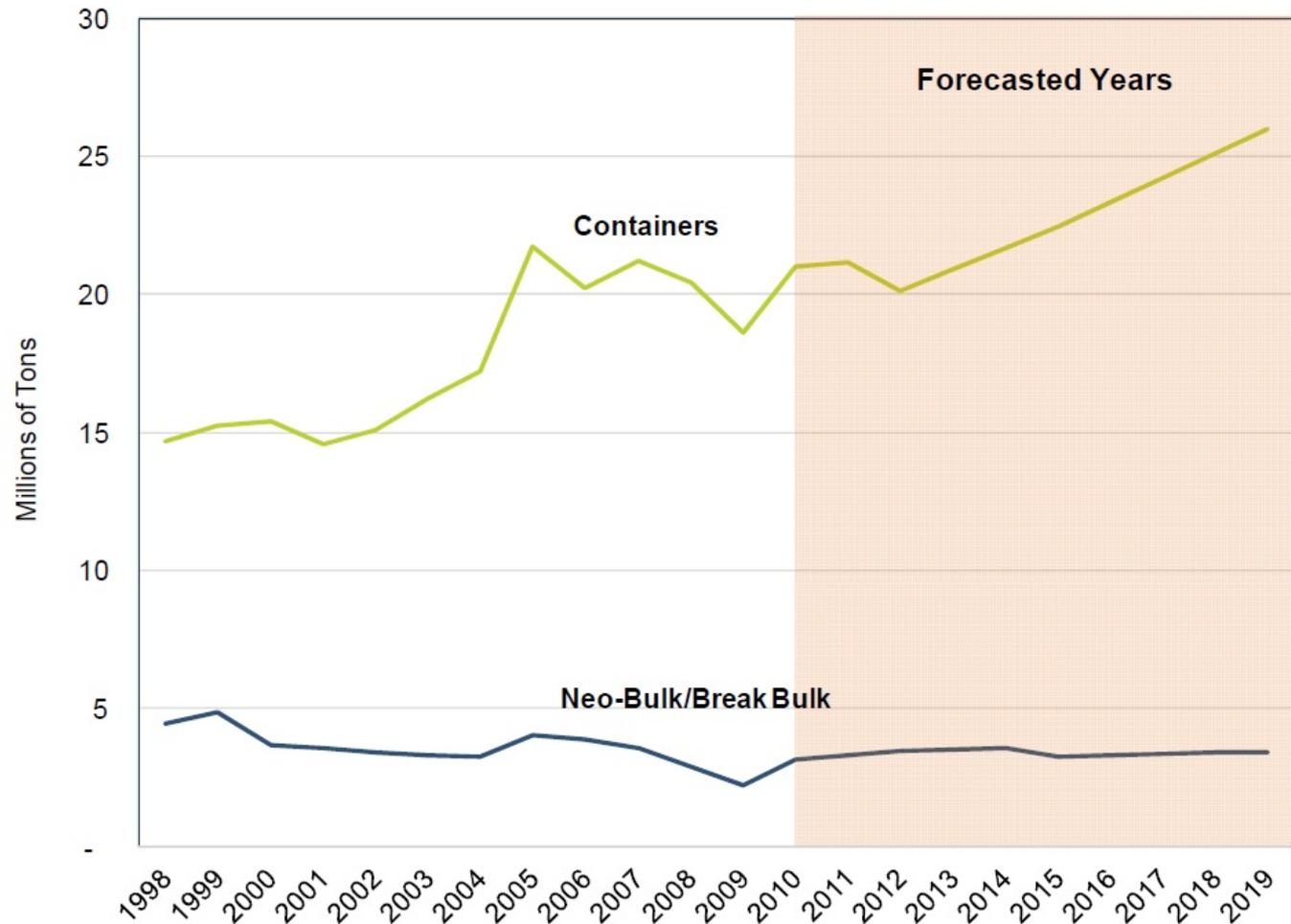
# Baseline Vessel Traffic



Total Vessel Days by Vessel Type, for all activity types and subareas



# Forecasted Vessel Traffic



Container and Neo Bulk/Break Bulk Commodity Volumes, 1998-2019



# BP Cherry Point Findings

| CASE  | 2010<br>w/o North<br>Max | 2010 w/o<br>North<br>Actual | 2010<br>w/<br>North<br>Actual | 2030<br>w/o North<br>Max | 2030<br>w/<br>North<br>420 calls | 2030<br>w/o North<br>Max | 2030<br>w/<br>North<br>420 calls |
|---|--------------------------|-----------------------------|-------------------------------|--------------------------|----------------------------------|--------------------------|----------------------------------|
| Traffic   | 2010                     | 2010                        | 2010                          | 2030<br>General          | 2030<br>General                  | General +<br>cumulative  | General +<br>cumulative          |
| Average<br>Incidents                              | 27.78                    | 27.62                       | 27.62                         | 34.35                    | 34.85                            | 46.14                    | 46.66                            |
| Average<br>Spills                                 | 9.99                     | 9.89                        | 9.88                          | 12.39                    | 12.68                            | 16.58                    | 16.97                            |
| Median<br>Spill<br>Volume                         | 985<br>gallons           | 975<br>gallons              | 961<br>gallons                | 1,109<br>gallons         | 1,193<br>gallons                 | 2,141<br>gallons         | 2,396<br>gallons                 |
| 95 <sup>th</sup><br>Percentile<br>Spill<br>Volume | 90,900<br>gallons        | 86,172<br>gallons           | 81,620<br>gallons             | 62,644<br>gallons        | 69,617<br>gallons                | 95,490<br>gallons        | 114,977<br>gallons               |



# BP Cherry Point Case Comparison

| Statistic                                | Current Conditions |                |                         | Future Conditions |                |                        |
|--|--------------------|----------------|-------------------------|-------------------|----------------|------------------------|
|  | S only             | N + S          | % Change                | S only            | N + S          | % Change               |
| Annual Incidents                         | 27.62              | 27.62          | 0<br>(0%)               | 34.35             | 34.85          | 0.50<br>(1%)           |
| Annual Spills                            | 9.89               | 9.88           | -0.01<br>(0%)           | 12.39             | 12.68          | 0.29<br>(2%)           |
| Median Spill Volume                      | 975 gallons        | 961 gallons    | -14 gallons<br>(-1%)    | 1,109 gallons     | 1,193 gallons  | 84 gallons<br>(8%)     |
| 95 <sup>th</sup> Percentile Spill Volume | 86,172 gallons     | 81,620 gallons | -4,552 gallons<br>(-5%) | 62,644 gallons    | 69,617 gallons | 6,973 gallons<br>(11%) |



# BP Cherry Point Subarea Risk Change

| Subarea      | Incidents          |                              |  | Spills             |                              |  |
|--------------|--------------------|------------------------------|--|--------------------|------------------------------|--|
|              | S v N+S<br>Current | S v N+S<br>Future<br>General | S v N+S<br>Future<br>General +<br>Cumulative | S v N+S<br>Current | S v N+S<br>Future<br>General | S v N+S<br>Future<br>General +<br>Cumulative |
| East Str JdF | 0                  | 1%                           | <b>27%</b>                                   | -3%                | -<1%                         | <b>33%</b>                                   |
| Haro Str     | 1%                 | -1%                          | <b>51%</b>                                   | 6%                 | 0%                           | <b>47%</b>                                   |
| Guemes       | -1%                | -<1%                         | <b>17%</b>                                   | 2%                 | -<1%                         | <b>16%</b>                                   |
| Saddlebag    | -1%                | 0%                           | <b>25%</b>                                   | -2%                | 0%                           | <b>22%</b>                                   |
| Rosario      | 5%                 | 1%                           | <b>27%</b>                                   | 8%                 | 8%                           | <b>19%</b>                                   |
| Cherry Pt    | <1%                | 5%                           | <b>30%</b>                                   | 0%                 | 8%                           | <b>28%</b>                                   |



# BP Cherry Point Risk Reduction Recommendations

- No additional risk mitigation measures proposed
- Existing system in place under USCG, CCG, and Ecology authority will avoid and minimize risk of accidents and spills



# Existing Risk Reduction Measures Identified in BP Cherry Point EIS

- USCG vessel certification
- OPA90 requirements
- Limitations on tankers to 125,000 DWT
- Pilotage requirements
- USCG COTP authority
- Vessel traffic systems
- Designated traffic lanes
- Additional rules in Special Operating Areas
- Tankship security zone of 1,500 ft.
- Tug escort assist requirements
- Limitations of vessel speed
- USCG crewing, equipment requirements
- USCG contingency planning requirements

- Puget Sound Harbor Safety Standards of Care
- Anchoring procedures
- Bridge management
- Bunkering procedures
- Advanced notice to Ecology of oil transfer
- Pre-booming
- Tug availability in certain weather
- Equipment failure procedures
- Heavy weather procedures
- Propulsion loss prevention procedures
- Under-keel clearance procedures
- Restricted visibility procedures
- Towing procedures



# Gateway Pacific Terminal 2019 Cases

| Traffic                  | Case A<br>No GPT | Case B<br>GPT | Case C<br>GPT +<br>Cumulative |
|--------------------------|------------------|---------------|-------------------------------|
| Historic extrapolation   | ●                | ●             | ●                             |
| Deltaport Expansion 2010 | ●                | ●             | ●                             |
| Westshore Expansion 2012 | ●                | ●             | ●                             |
| Second Westshore 2017    | ●                | ●             | ●                             |
| Neptune Expansion 2015   | ●                | ●             | ●                             |
| BP Rail 2013             | ●                | ●             | ●                             |
| Tesoro Rail 2012         | ●                | ●             | ●                             |
| Philips 66 Rail          | ●                | ●             | ●                             |
| GPT                      |                  | ●             | ●                             |
| Trans Mountain Expansion |                  |               | ●                             |
| Shell Rail Terminal      |                  |               | ●                             |



# Gateway Pacific Terminal Results

| Case                                     | Projected Annual Incidents 2019 |        |                             | Projected Annual Spills 2019 |        |                             |
|--|---------------------------------|--------|-----------------------------|------------------------------|--------|-----------------------------|
|  | Average                         | Median | 95 <sup>th</sup> Percentile | Average                      | Median | 95 <sup>th</sup> Percentile |
| Case A<br>Baseline                       | 28.31                           | 28     | 38                          | 10.62                        | 10     | 16                          |
| Case B<br>Baseline + GPT                 | 34.31                           | 34     | 44                          | 13.37                        | 13     | 20                          |
| Case C<br>Baseline + GPT +<br>Cumulative | 35.68                           | 36     | 46                          | 13.93                        | 14     | 21                          |
| Increase<br>Case B vs. A                 | 21.2%                           | 21.4%  | 15.8%                       | 25.9%                        | 30.0%  | 25.0%                       |
| Increase<br>Case C vs. A                 | 26.0%                           | 28.6%  | 21.1%                       | 31.2%                        | 40.0%  | 31.3%                       |



# Gateway Pacific Terminal Results

| Case                                  | Projected Annual Oil Outflow 2019 |                             |
|---------------------------------------|-----------------------------------|-----------------------------|
|                                       | Median                            | 95 <sup>th</sup> Percentile |
| Case A<br>Baseline                    | 656 gallons                       | 47,635 gallons              |
| Case B<br>Baseline + GPT              | 837 gallons                       | 64,960 gallons              |
| Case C<br>Baseline + GPT + Cumulative | 996 gallons                       | 73,472 gallons              |
| Increase<br>Case B vs. A              | 27.6%                             | 36.4%                       |
| Increase<br>Case C vs. A              | 51.8%                             | 54.2%                       |



# Gateway Pacific Terminal Traffic Findings

- Anchorage Capacity
  - Average 23.% utilization and daily average of 13.4 available anchorages
  - GPT bulkers would queue at-anchor awaiting berth
  - Probability that vessel queue number > available anchorages is <1%
  - USCG information suggests sufficient anchorages for increased GPT traffic
- Additional Bunkering
  - Increase of 122% - 243% over 2011 volumes (2.19 to 4.34 million bbls) within study area
  - Actual increase will depend on price different between Port Angles/Asia
- Potential vessel traffic increases
  - Additional 2,085 vessel traffic days/year in 2019
  - GPT vessels include bulkers, assist tugs, support vessels
  - Greatest traffic increase (33%) in Cherry Point



# Gateway Pacific Terminal Traffic Findings

- Potential cargo and fuel oil spills
  - Predicted increase of 2.75 (26%) in average number of dry bulk and fuel oil spills from proposed GPT traffic
  - Proposed GPT vessel traffic median outflow increase of 181 gallons (28%) predicted
  - Predicted potential increase in median total annual dry bulk cargo outflow from zero to 7, 736 cubic feet (less than 20 ft x 20 ft x 20 ft) with addition of proposed GPT traffic



# GPT Risk Event Stages

| Stage | Intervention Stage   | Description   |
|-------|----------------------|---|
| 0     | No cause             | No risk or inadequacies are assumed. A Stage 0 Risk Reduction Option is simply preventative and proactive. It studies or supports the underlying base conditions in the system and may also indirectly reduce risk in one or more later stages. |
| 1     | Basic and root cause | Inadequate skills, knowledge, equipment, management, maintenance  |
| 2     | Immediate cause      | Human error, equipment failure  |
| 3     | Incident             | Propulsion failure, steering failure, navigational aid failure, bunker error, cargo transfer error, other non-impact errors, impact accidents   |
| 4     | Spill                | Collision, grounding, allision, or other incident that resulted in spill  |
| 5     | Spill volume         | Consequence in this context is spilled contaminant volume.  |
| 6     | Environmental impact | Impact of contaminant outflow.  |



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# GPT Risk Reduction Options Classification

| Risk Reduction Option   | Stage 0 | Stage 1 | Stage 2 | Stage 3 | Stage 4 |
|---|---------|---------|---------|---------|---------|
| <b>VESSEL TRAFFIC MANAGEMENT</b>  |         |         |         |         |         |
| Vessel traffic separation voluntary near Cherry Point and Ferndale facilities               | ●       | ●       | ●       |         |         |
| Reduce speed to reduce mechanical energy in grounding, provide better situational awareness |         | ●       | ●       | ●       |         |
| Vessel arrival phasing  |         | ●       | ●       | ●       |         |
| Vessel routing – port access, one-way schemes   |         | ●       |         |         |         |
| Anchorage management for GPT tugs/barges  | ●       | ●       |         |         |         |
| Pilots and VTS coordinate movements outside shipping lanes                                  |         | ●       | ●       |         |         |
| <b>VETTING PROGRAMS AND VESSEL INSPECTION</b>   |         |         |         |         |         |
| Additional voluntary vessel inspection to assess compliance w/regulations or beyond         | ●       | ●       | ●       |         |         |
| Employ, train, deploy additional inspectors   | ●       | ●       |         |         |         |
| Request insurance for bulkers/tugs  |         | ●       |         |         |         |



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| Risk Reduction Option  | Stage 0 | Stage 1 | Stage 2 | Stage 3 | Stage 4 |
|--|---------|---------|---------|---------|---------|
| <b>CREWING</b>   |         |         |         |         |         |
| 2 <sup>nd</sup> officer on bridge west of Port Angeles                                   | ●       | ●       | ●       |         |         |
| Bridge resource management as per STCW   | ●       | ●       | ●       |         |         |
| Engine room management as per STCW   | ●       | ●       | ●       |         |         |
| <b>ON-BOARD TECHNOLOGY</b>   |         |         |         |         |         |
| Navigation systems, rudder monitor   | ●       | ●       | ●       | ●       | ●       |
| Redundant technology and propulsion  | ●       | ●       | ●       |         |         |
| Internally-protected fuel tanks (double hull)  |         |         |         |         | ●       |
| Tow bit integrity on bulk cargo ships  | ●       |         |         |         |         |
| <b>HIGH RISK VESSELS</b>   |         |         |         |         |         |
| Pre-deploy tugs under “high-risk vessel” by vessel profiling                             | ●       | ●       |         |         |         |
| <b>DATA COLLECTION: RISK ASSESSMENT, EMERGENCY NOTIFICATION &amp; RISK COMMUNICATION</b> |         |         |         |         |         |
| Near-miss reporting system for vessels’ time spent maneuvering, at anchor, at dock       | ●       |         |         |         |         |



# GPT Risk Reduction Options Classification

| Risk Reduction Option  | Stage 0 | Stage 1 | Stage 2 | Stage 3 | Stage 4 |
|--|---------|---------|---------|---------|---------|
| <b>STANDARD OPERATING PROCEDURES FOR VESSELS</b>   |         |         |         |         |         |
| Adopt PSHSC Standards of Care for fuel switching to reduce propulsion failures   |         | ●       | ●       | ●       |         |
| Conditional equipment monitoring program with sufficient crew and training   | ●       | ●       | ●       |         |         |
| Closed hatches to reduce fire/explosion risk during cargo transfer operations and transit  | ●       | ●       |         |         |         |
| <b>STANDARD OPERATING PROCEDURES &amp; TECHNOLOGY – MOORING</b>  |         |         |         |         |         |
| Complete engineering study of vessel mooring   | ●       |         |         |         |         |
| Mooring line technology specification  |         | ●       |         |         |         |
| Mooring line deployment and management – monitor mooring line tension; establish wind/wave thresholds for doubling mooring lines and arranging standby tug |         | ●       |         |         |         |



# GPT Risk Reduction Options Classification

| Risk Reduction Option   | Stage 0 | Stage 1 | Stage 2 | Stage 3 | Stage 4 |
|---|---------|---------|---------|---------|---------|
| <b>STANDARD OPERATING PROCEDURES &amp; TECHNOLOGY – OIL TRANSFER OPERATIONS</b>       |         |         |         |         |         |
| Effective bunkering training, testing, staffing                                       |         | ●       |         |         |         |
| Spill response equipment pre-staged   |         |         | ●       | ●       | ●       |
| Study preferable alternative bunkering locations, including at wharf                  | ●       | ●       | ●       | ●       |         |
| <b>STANDBY, RESCUE, ESCORT, AND ASSIST TUGS</b>                                       |         |         |         |         |         |
| Study potential effectiveness by location of standby emergency response towing vessel |         | ●       | ●       |         |         |
| Escort tugs for Capesize ships  | ●       | ●       | ●       | ●       | ●       |
| Review tug capacity (horsepower) available and needed for larger ships                | ●       |         |         |         |         |
| Review Canadian tug procedures for Capesize   | ●       |         |         |         |         |
| Tug pilot training program for large ships  | ●       |         |         |         |         |
| Establish standby tug protocols; queuing buoy, standby facility                       | ●       | ●       | ●       |         |         |



# GPT Risk Reduction Options Classification

| Risk Reduction Option  | Stage 0 | Stage 1 | Stage 2 | Stage 3 | Stage 4 |
|--|---------|---------|---------|---------|---------|
| <b>STANDBY, RESCUE, ESCORT, AND ASSIST TUGS – continued</b>  |         |         |         |         |         |
| Study tug routing – in or out of lanes; practice avoidance   | ●       | ●       |         |         |         |
| New technology in assist tugs – line handling, personnel safety  | ●       | ●       | ●       | ●       | ●       |
| Team training for tugs/bulkers at/near dock – simulate stoppage, practice maneuvers, appropriate pair fittings                       | ●       | ●       |         |         |         |
| <b>OTHER ACTIONS</b>   |         |         |         |         |         |
| Educational program for small vessel operators<br>Partnership with tribal nations (GPT, OTB)<br>Increase visibility of small vessels | ●       |         |         |         |         |
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| Educational program for small vessel operators<br>Partnership with tribal nations (GPT, OTB)<br>Increase visibility of small vessels |         |         | ●       |         |         |