

VESSEL TRAFFIC RISK ASSESSMENT (VTRA) 2010

3D Relative Risk Profile Comparison
Potential Collision Oil Loss

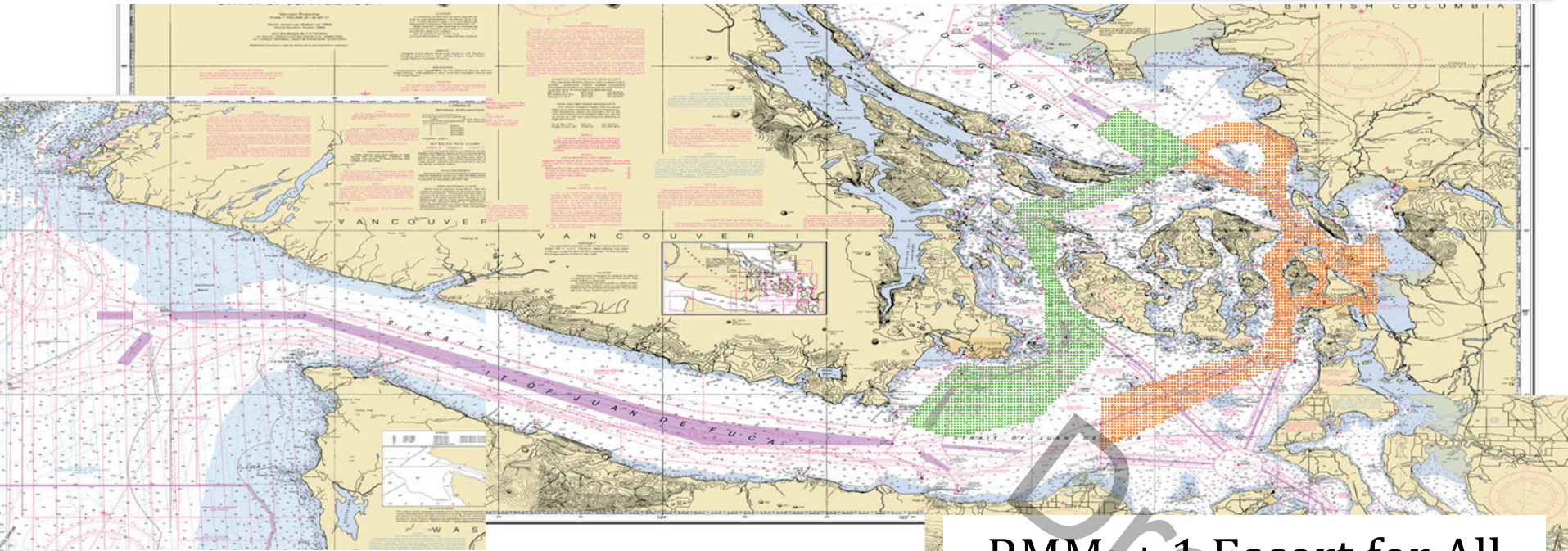
**CASE T: GW – KM – DP & +1 Escort for all
Focus Vessels on Haro Routes**

Dr. J. Rene van Dorp and Dr. Jason R.W Merrick

November 2013



VESSEL TRAFFIC RISK ASSESSMENT (VTRA) 2010

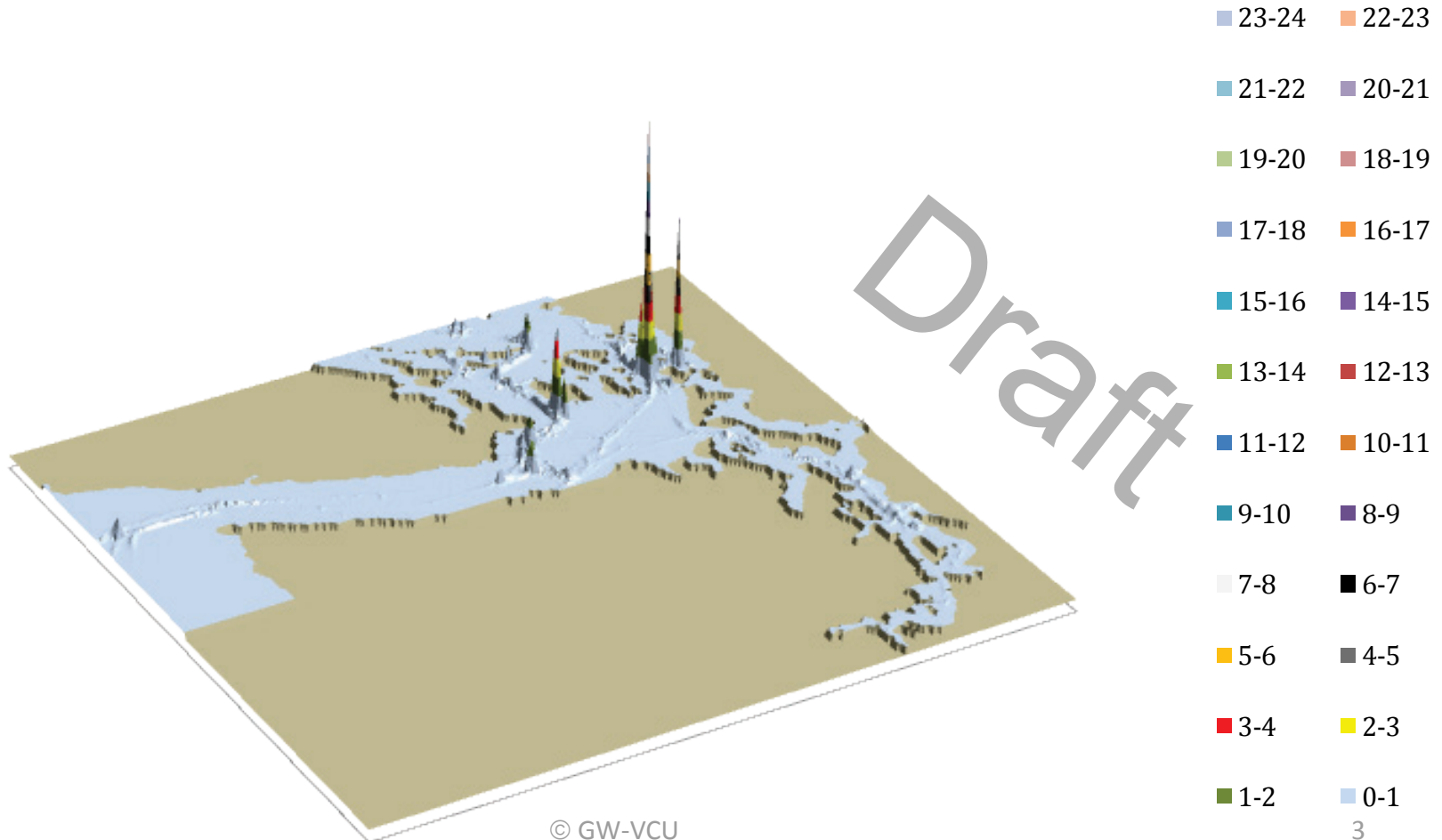


**DEFINITION OF ASSUMED LOCATIONS
FOR ADDED ESCORT VESSEL
FOR HARO-BOUNDARY ROUTES (GREEN)
AND
FOR ROSARIO ROUTES (ORANGE)**

RMM: + 1 Escort for All
Focus Vessels
Haro - Boundary Pass
Routes (Green)

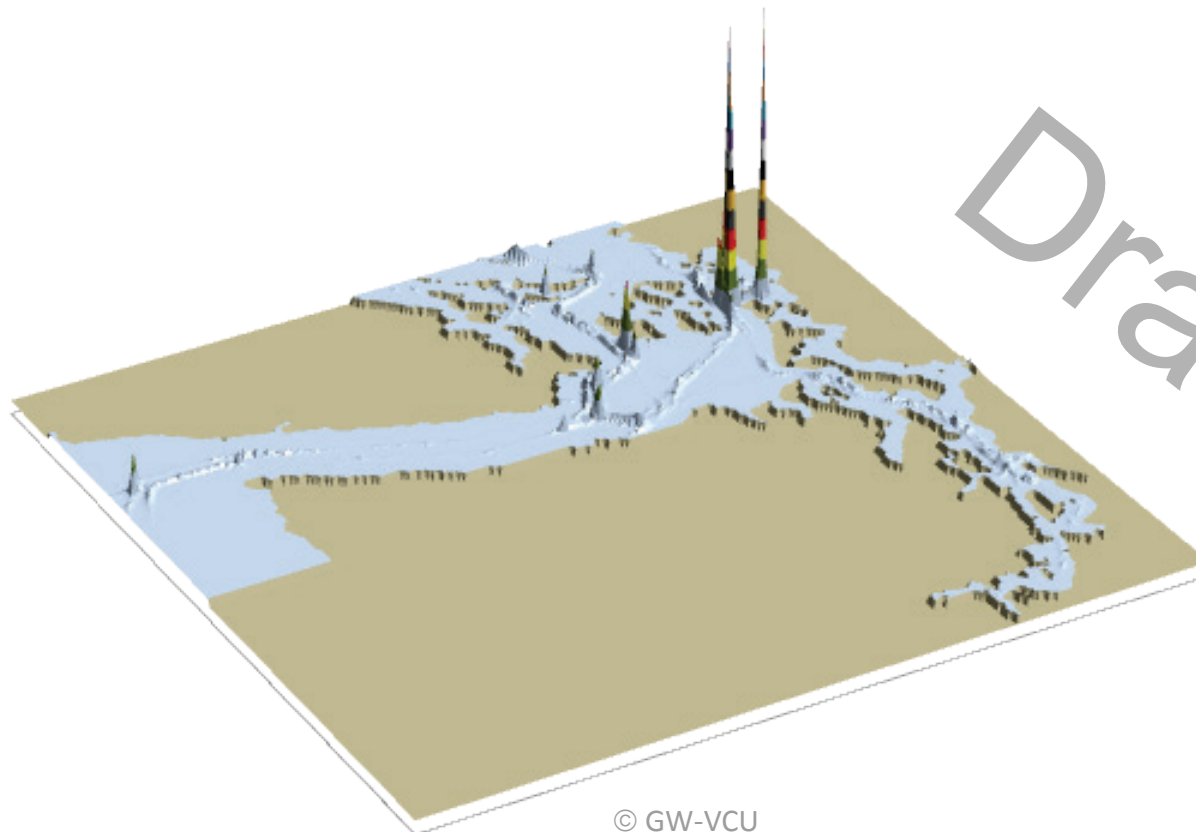
VESSEL TRAFFIC RISK ASSESSMENT (VTRA) 2010

T: GW - KM - DP 3D Risk Profile All FV - Pot. Collision Oil Loss: 189% of Base Case PCO



VESSEL TRAFFIC RISK ASSESSMENT (VTRA) 2010

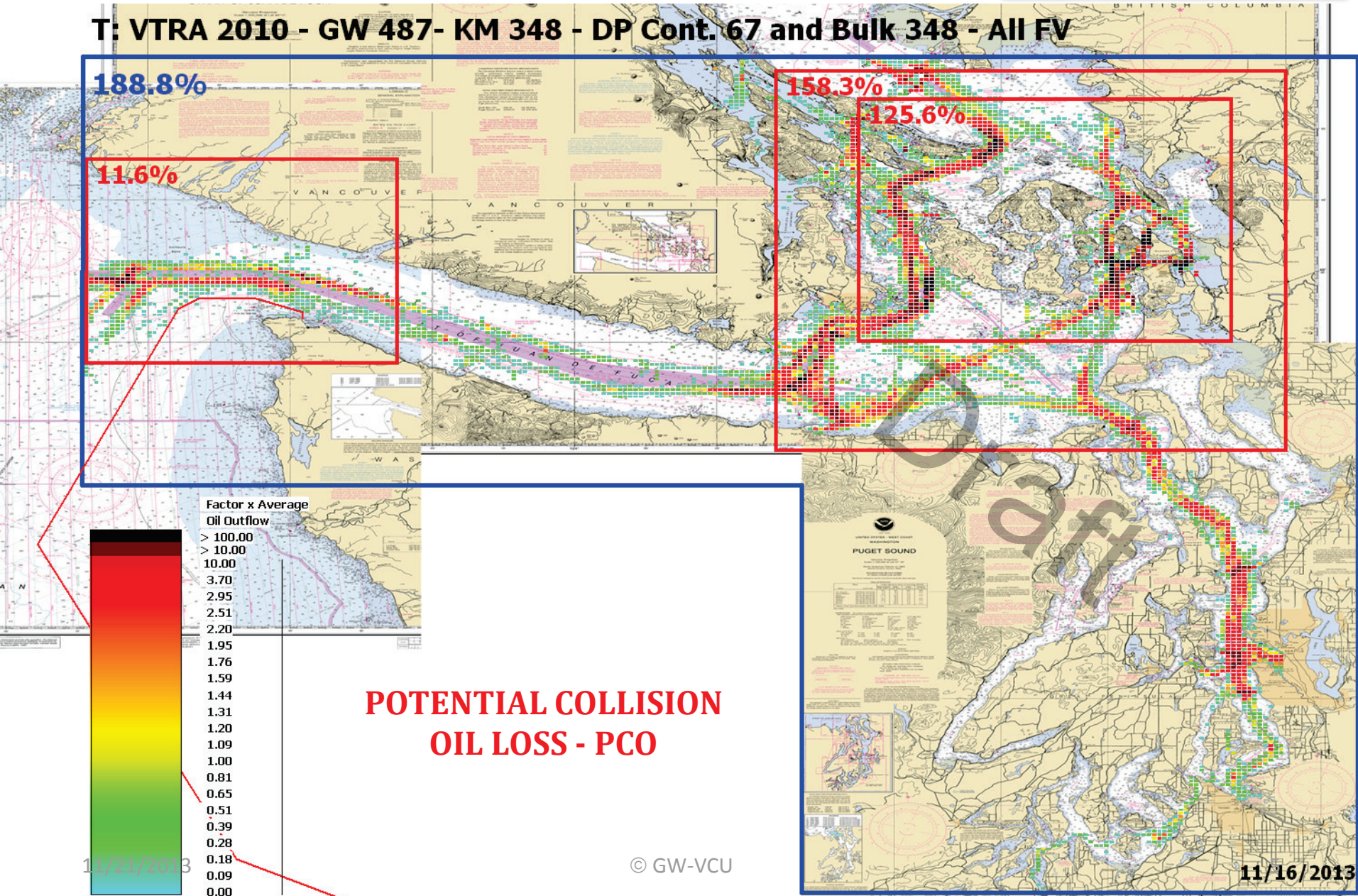
T: GW - KM - DP & EH 3D Risk Profile All FV - Pot. Collision Oil Loss: 170% of Base Case PCO



- | | |
|---------|---------|
| ■ 23-24 | ■ 22-23 |
| ■ 21-22 | ■ 20-21 |
| ■ 19-20 | ■ 18-19 |
| ■ 17-18 | ■ 16-17 |
| ■ 15-16 | ■ 14-15 |
| ■ 13-14 | ■ 12-13 |
| ■ 11-12 | ■ 10-11 |
| ■ 9-10 | ■ 8-9 |
| ■ 7-8 | ■ 6-7 |
| ■ 5-6 | ■ 4-5 |
| ■ 3-4 | ■ 2-3 |
| ■ 1-2 | ■ 0-1 |

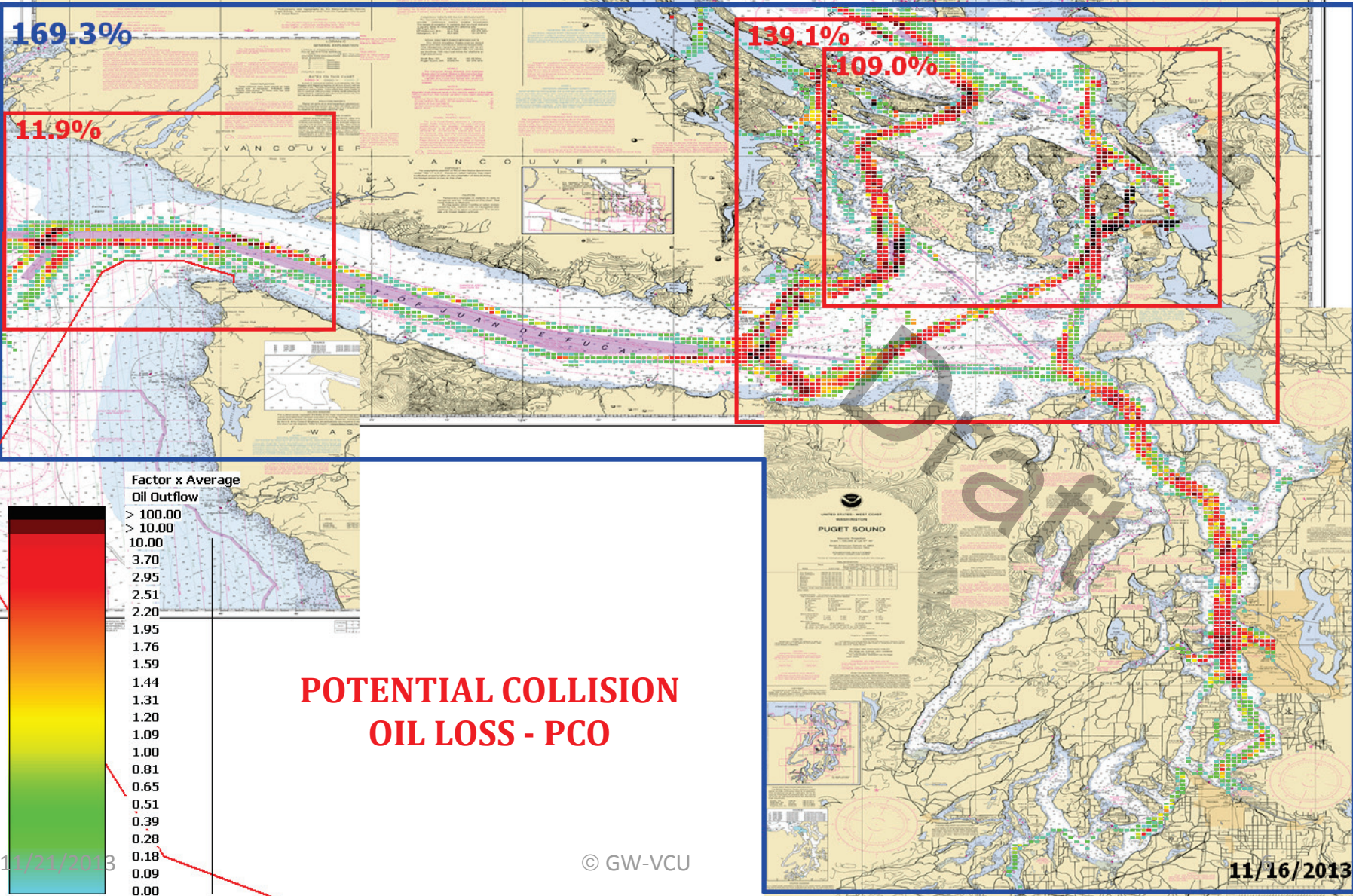
VESSEL TRAFFIC RISK ASSESSMENT (VTRA) 2010

T: VTRA 2010 - GW 487- KM 348 - DP Cont. 67 and Bulk 348 - All FV



VESSEL TRAFFIC RISK ASSESSMENT (VTRA) 2010

T: VTRA 2010 - GW - KM - DP & +1 ESCORT HARO-BOUNDARY - All FV



POTENTIAL COLLISION OIL LOSS - PCO

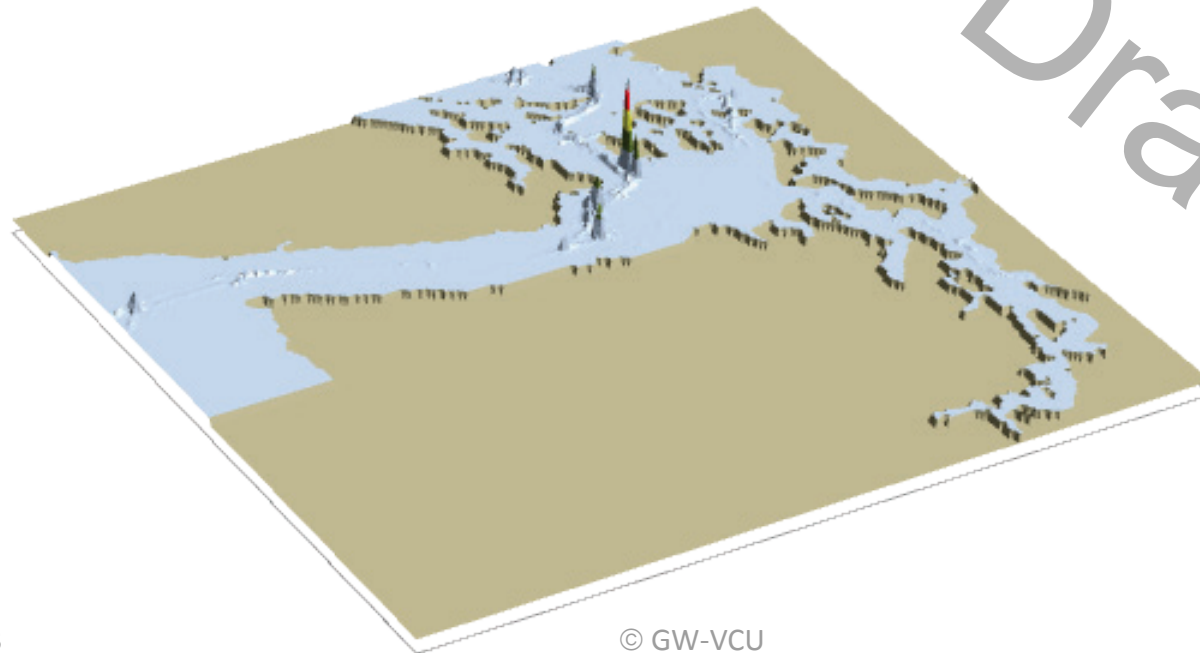
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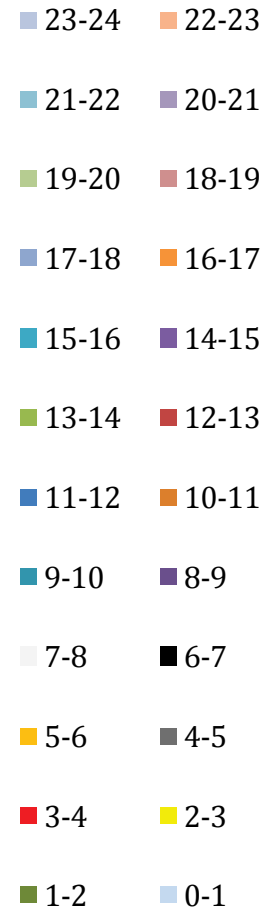
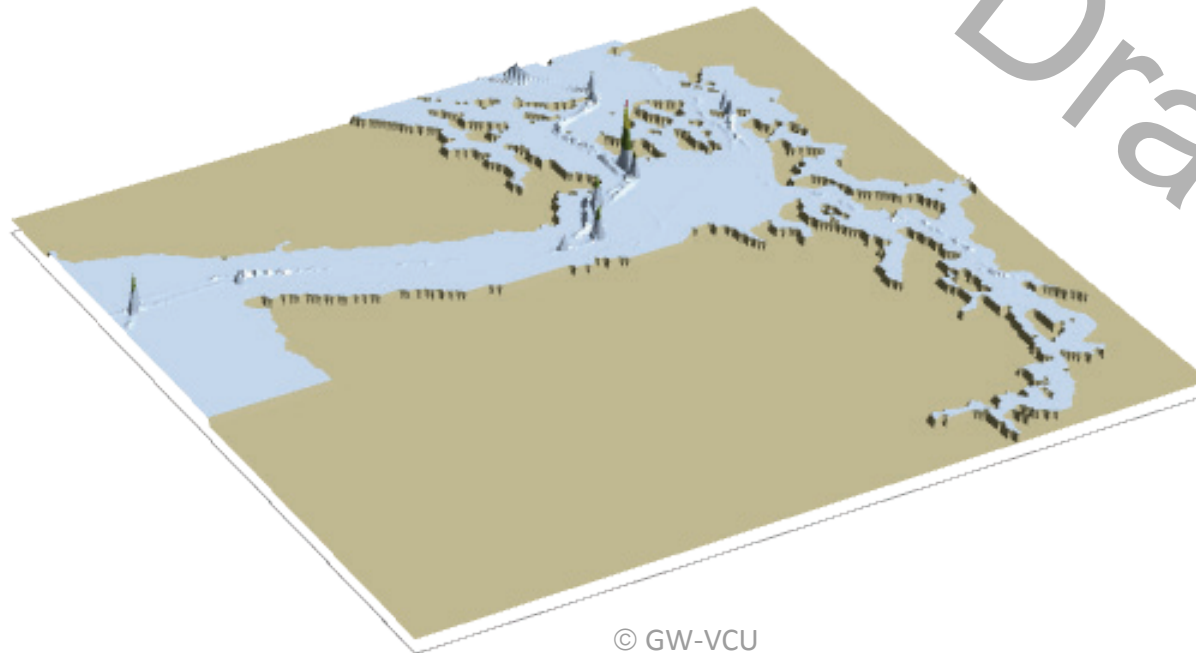
VESSEL TRAFFIC RISK ASSESSMENT (VTRA) 2010

T: GW - KM - DP 3D Risk Profile What If FV - Pot. Coll. Oil Loss: 62% of Base Case PCO



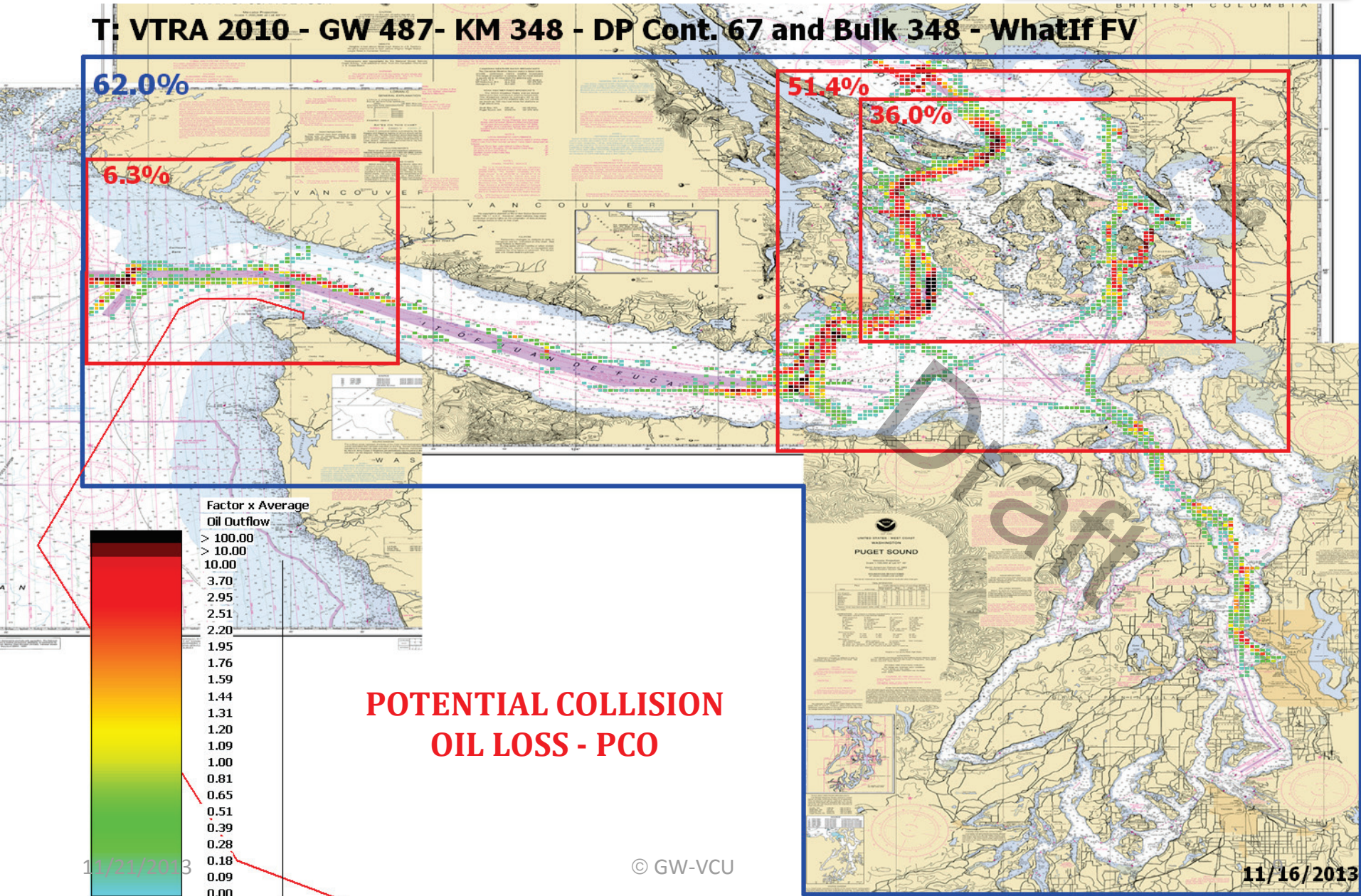
VESSEL TRAFFIC RISK ASSESSMENT (VTRA) 2010

T: GW - KM - DP & EH 3D Risk Profile What If FV - Pot. Coll. Oil Loss: 47% of Base Case PCO



VESSEL TRAFFIC RISK ASSESSMENT (VTRA) 2010

T: VTRA 2010 - GW 487- KM 348 - DP Cont. 67 and Bulk 348 - WhatIf FV



POTENTIAL COLLISION OIL LOSS - PCO

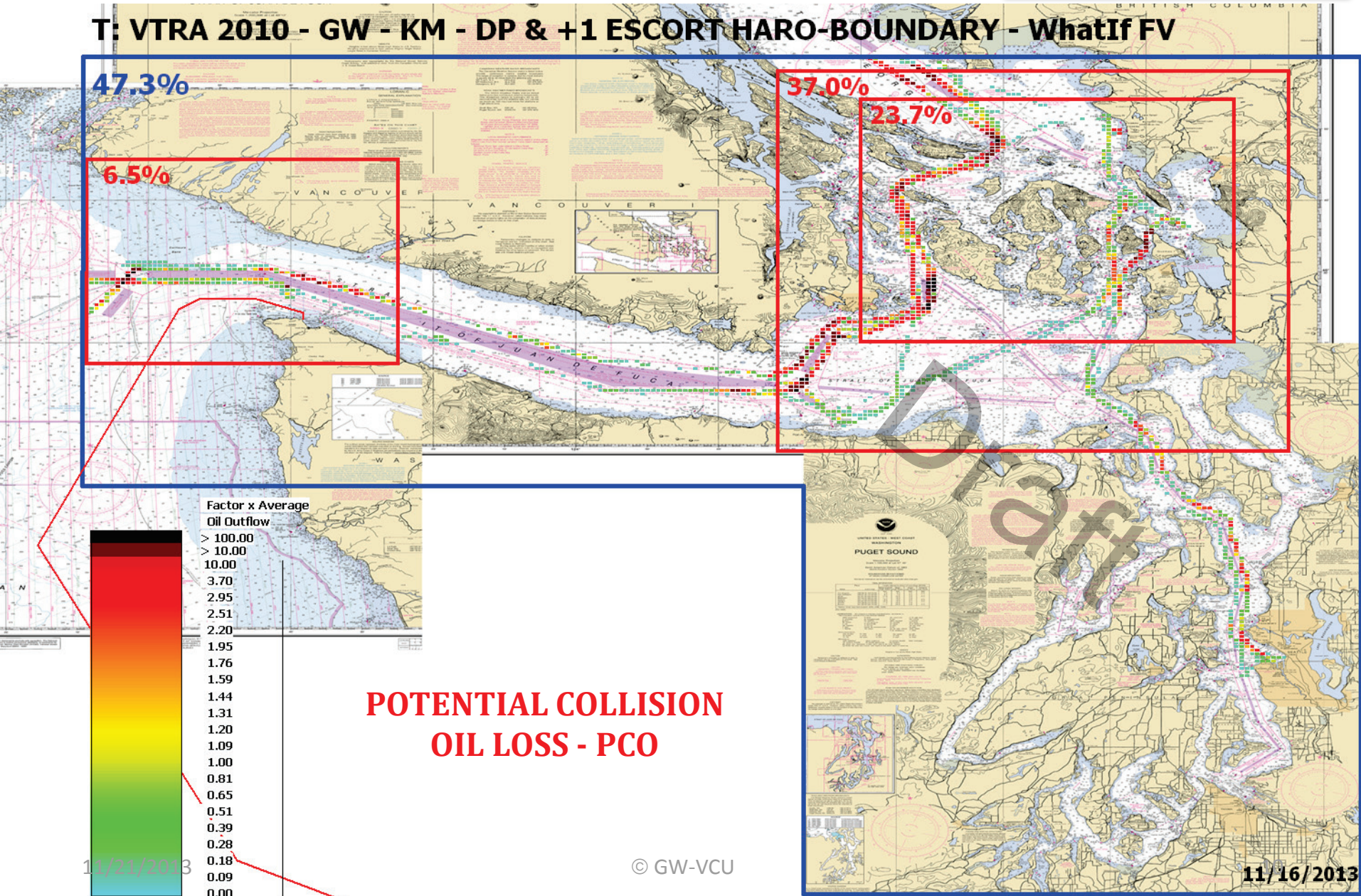
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VESSEL TRAFFIC RISK ASSESSMENT (VTRA) 2010

T: VTRA 2010 - GW - KM - DP & +1 ESCORT HARO-BOUNDARY - WhatIf FV



POTENTIAL COLLISION OIL LOSS - PCO

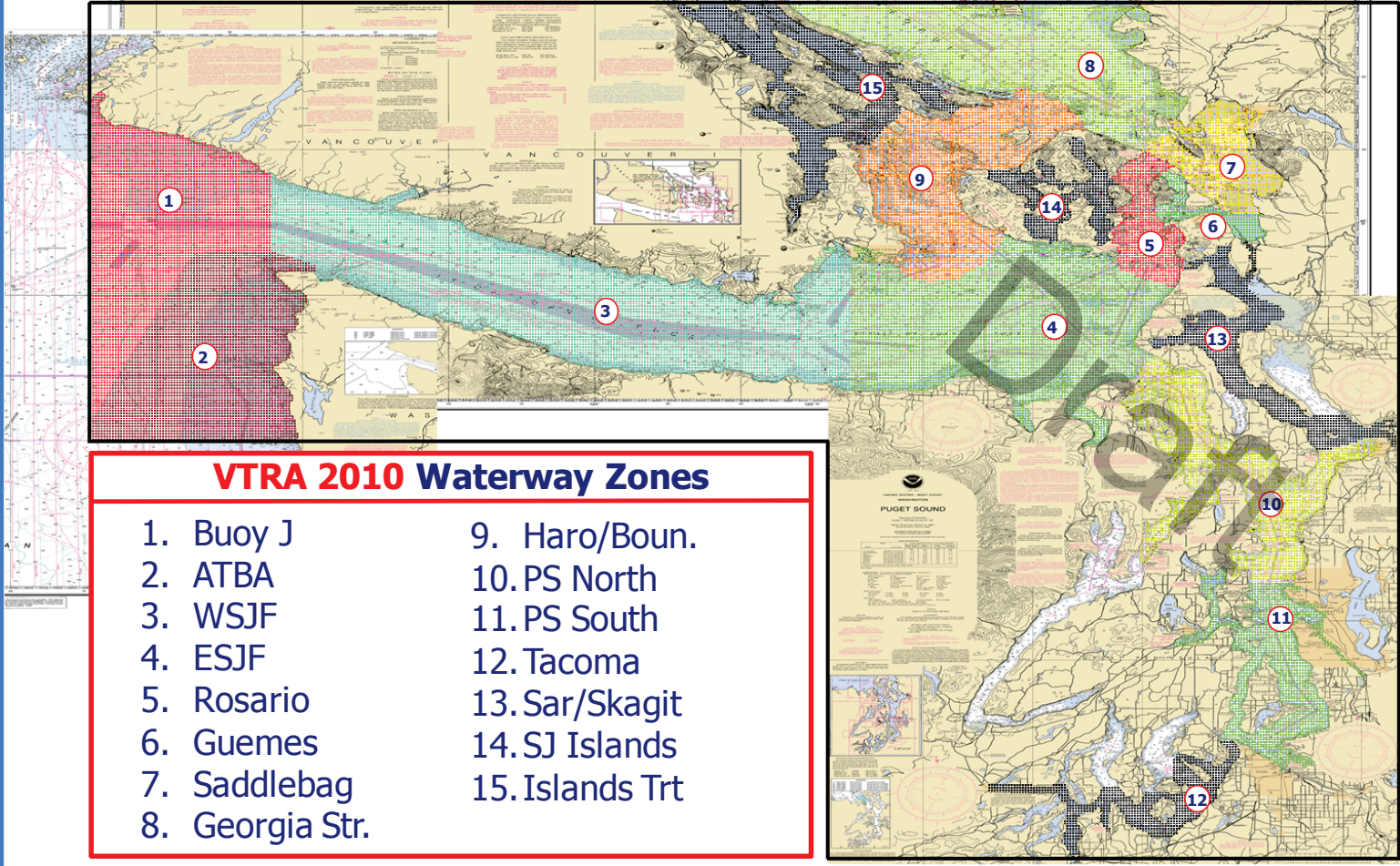
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VESSEL TRAFFIC RISK ASSESSMENT (VTRA) 2010

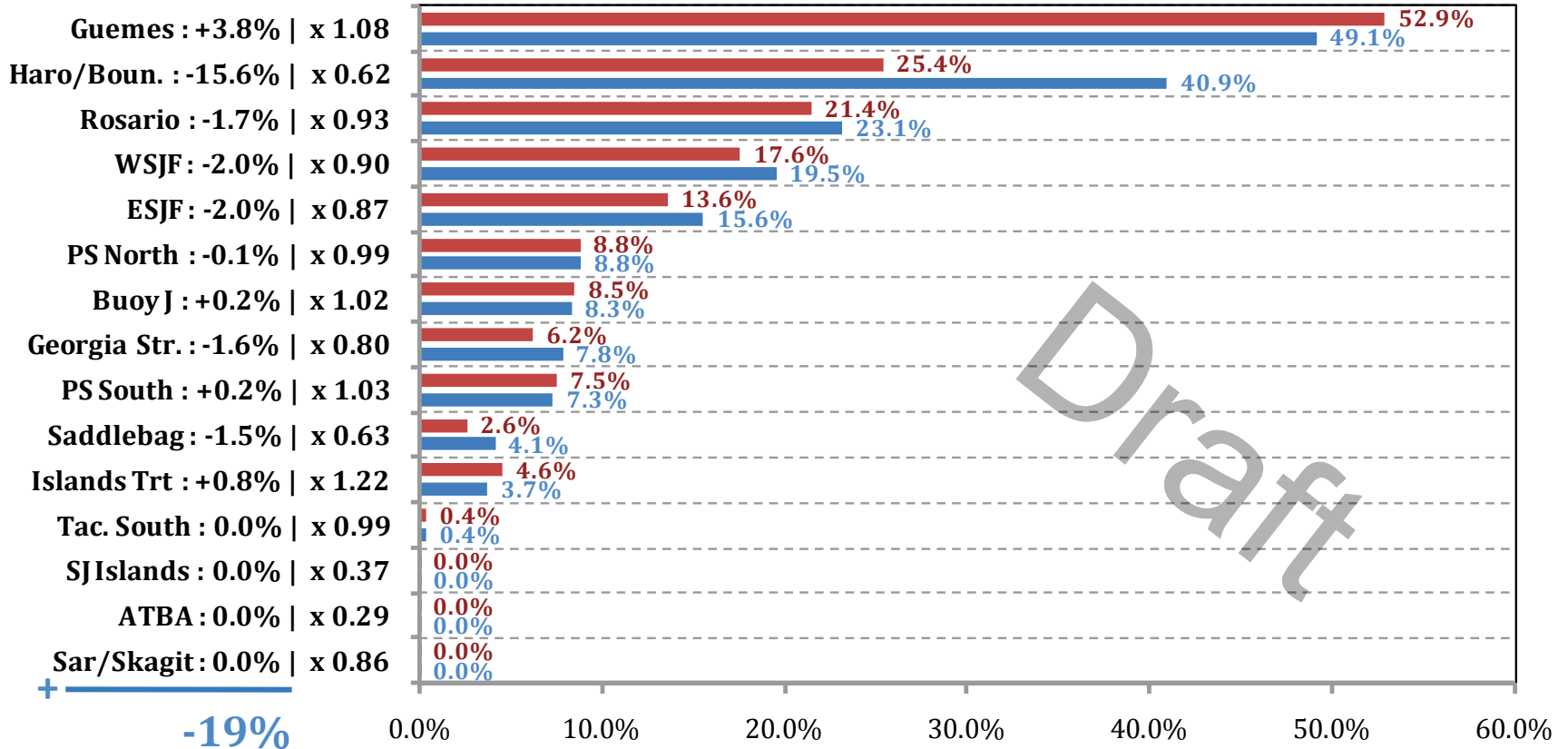
DEFINITION OF 15 WATERWAY ZONES



VESSEL TRAFFIC RISK ASSESSMENT (VTRA) 2010

% Base Case Collision Oil Loss - ALL_FV

Waterway Zone:



% of Base Case Annual Collision Oil Loss - ALL_FV

■ T:GW - KM - DP & EH: 169% (-19% | x 0.90)

■ T:GW - KM - DP: 189%

VESSEL TRAFFIC RISK ASSESSMENT (VTRA) 2010

% Base Case Collision Oil Loss - WhatIf

Waterway Zone:

