

VESSEL TRAFFIC RISK ASSESSMENT (VTRA) 2010

3D Relative Risk Profile Comparison
Potential Grounding Oil Loss

CASE S – DP 415 + Bunkering

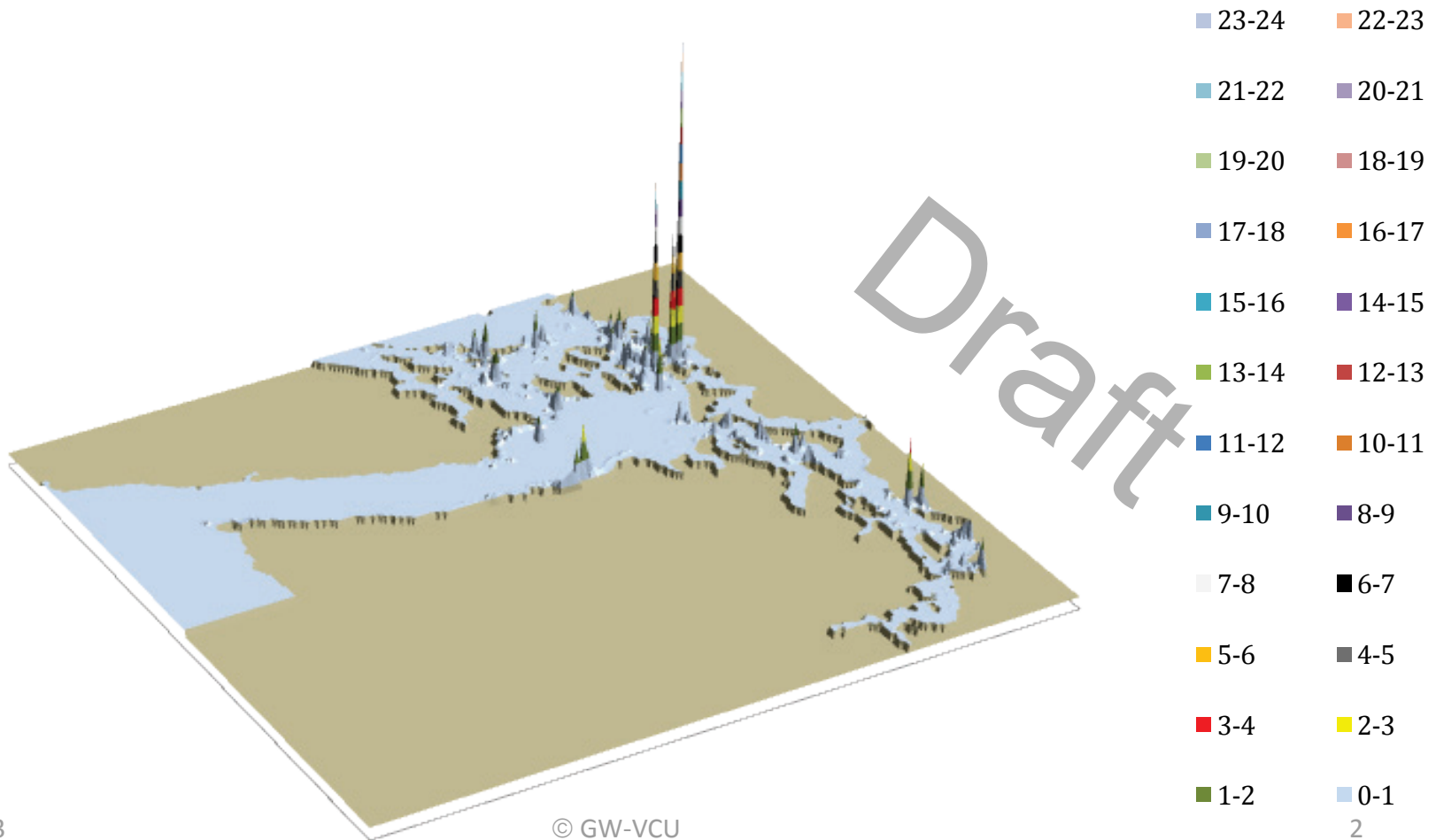
Dr. J. Rene van Dorp and Dr. Jason R.W Merrick

November 2013



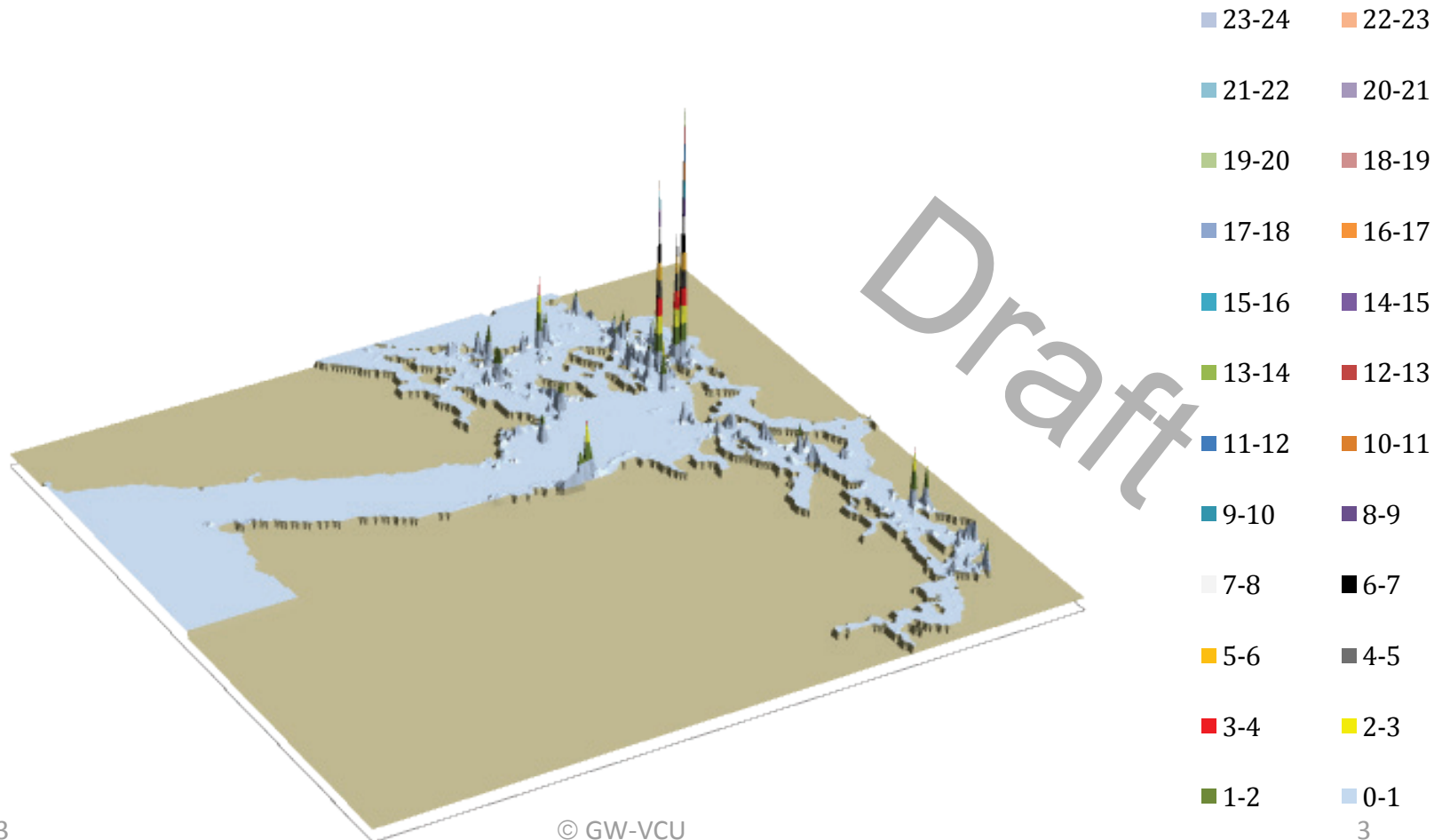
VESSEL TRAFFIC RISK ASSESSMENT (VTRA) 2010

P: Base Case 3D Risk Profile All FV - Pot. Ground. Oil Loss: 100% of Base Case PGO



VESSEL TRAFFIC RISK ASSESSMENT (VTRA) 2010

S: DP 415 3D Risk Profile All FV - Pot. Ground. Oil Loss: 105% of Base Case PGO



VESSEL TRAFFIC RISK ASSESSMENT (VTRA) 2010

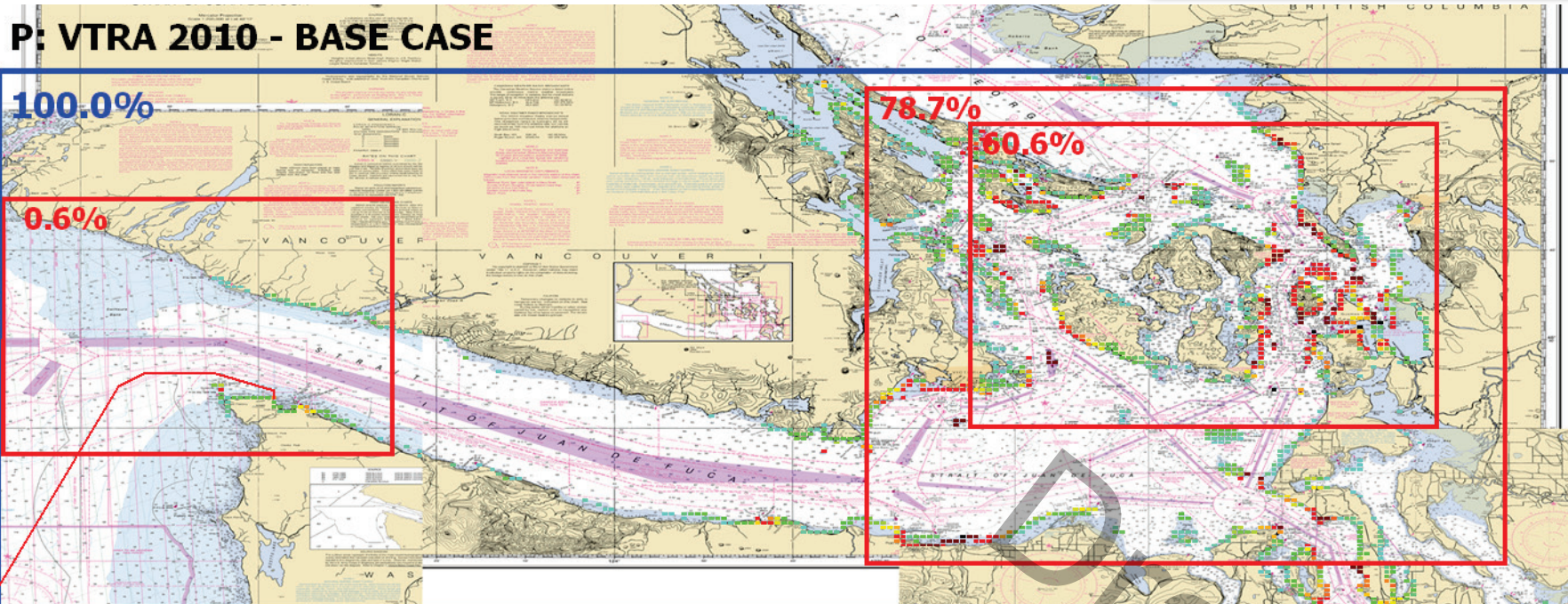
P: VTRA 2010 - BASE CASE

100.0%

0.6%

78.7%

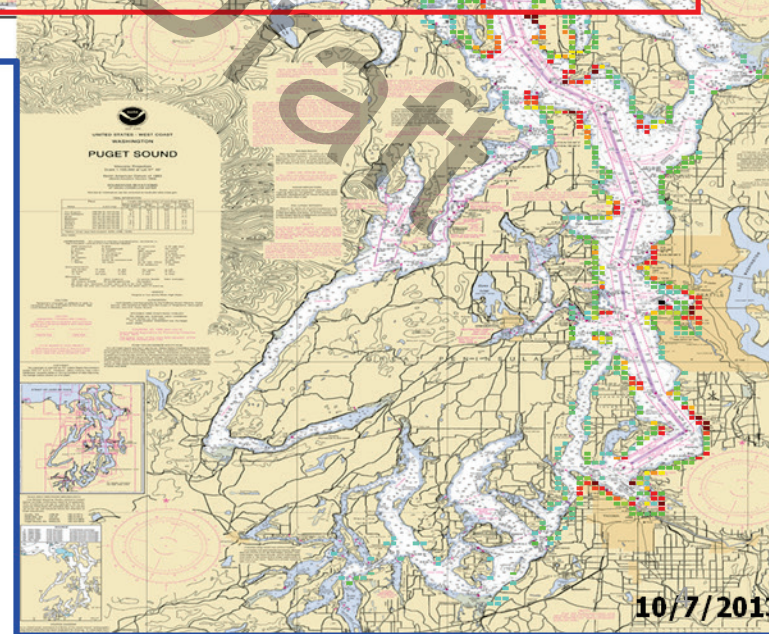
60.6%



Factor x Average
Oil Outflow

- > 100.00
- > 10.00
- 10.00
- 3.70
- 2.95
- 2.51
- 2.19
- 1.95
- 1.75
- 1.59
- 1.44
- 1.31
- 1.20
- 1.09
- 1.00
- 0.81
- 0.65
- 0.51
- 0.39
- 0.28
- 0.18
- 0.09
- 0.00

POTENTIAL GROUNDING OIL LOSS - PGO



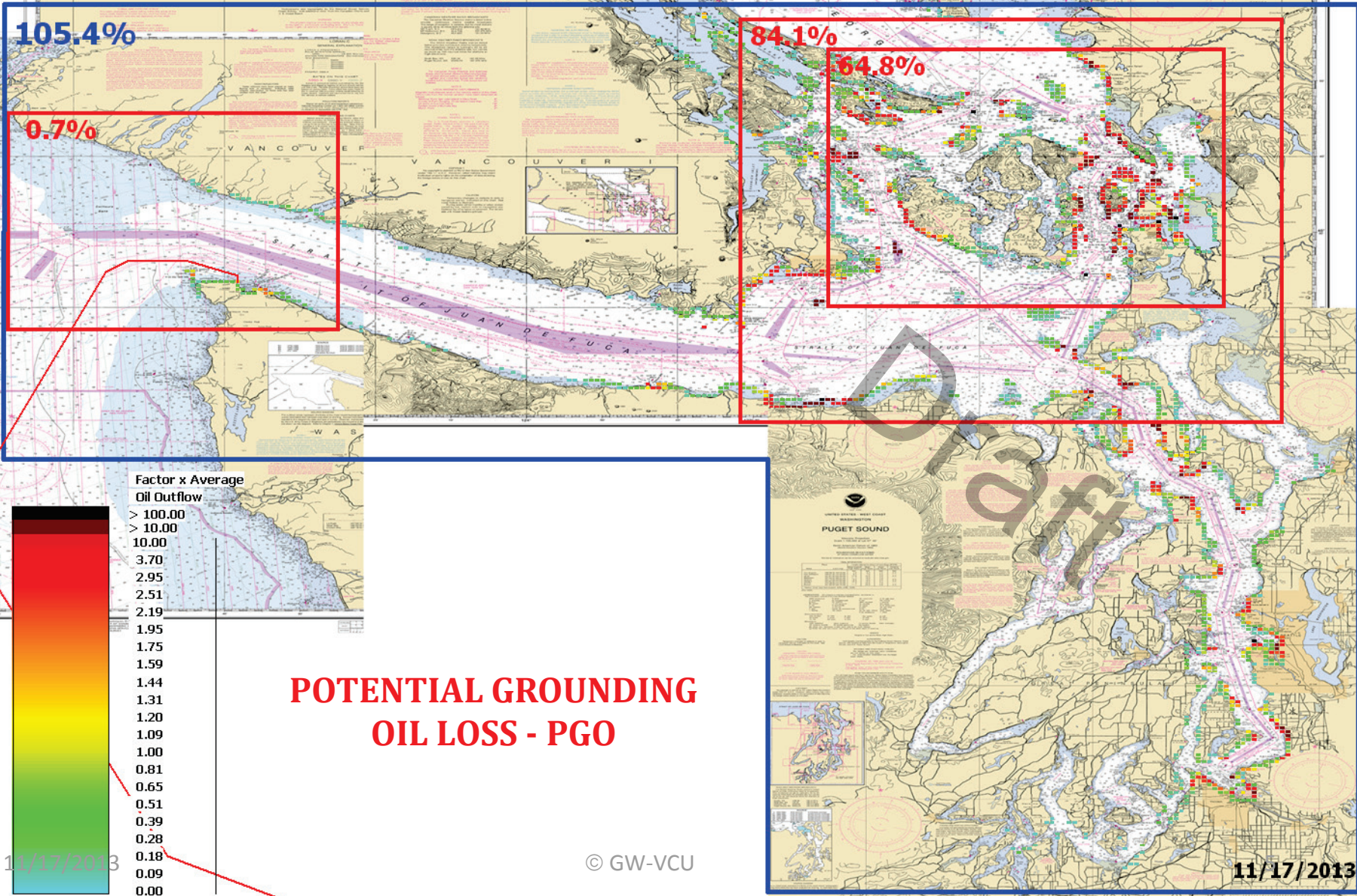
11/17/2013

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10/7/2013

VESSEL TRAFFIC RISK ASSESSMENT (VTRA) 2010

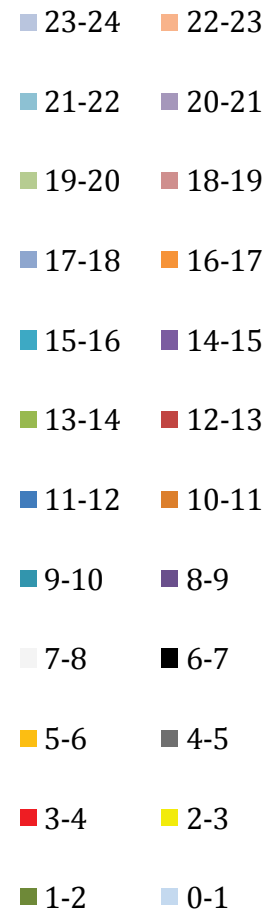
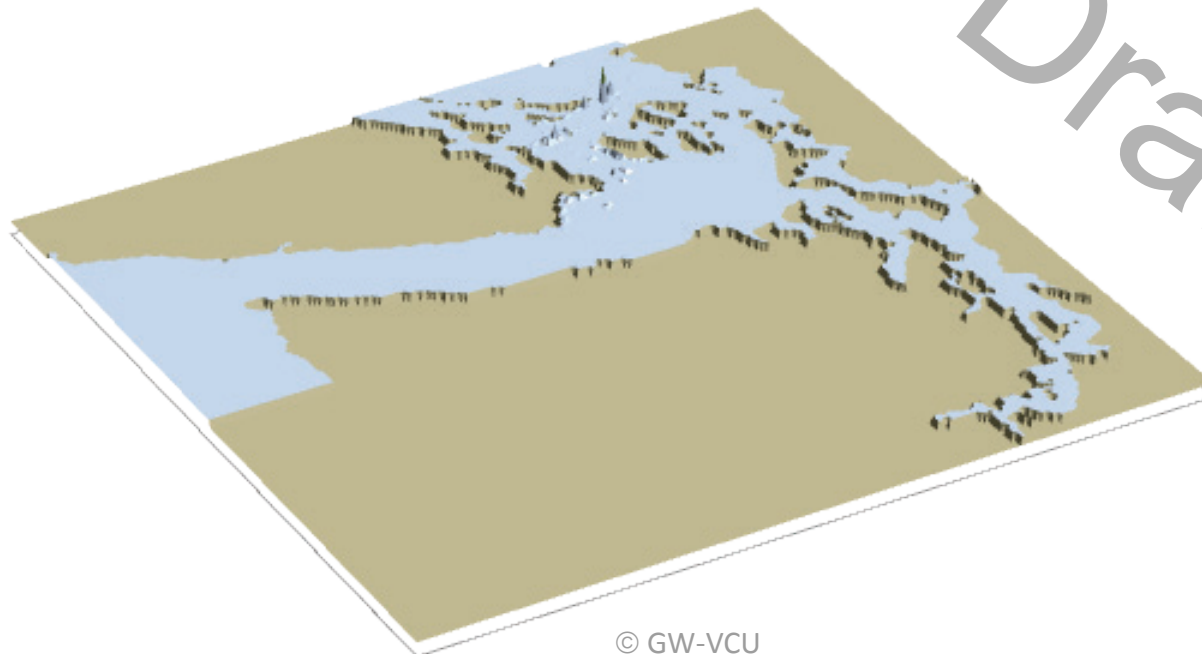
S: VTRA 2010 - Delta Port - Cont. 67 and Bulk 348 - ALL FV



POTENTIAL GROUNDING OIL LOSS - PGO

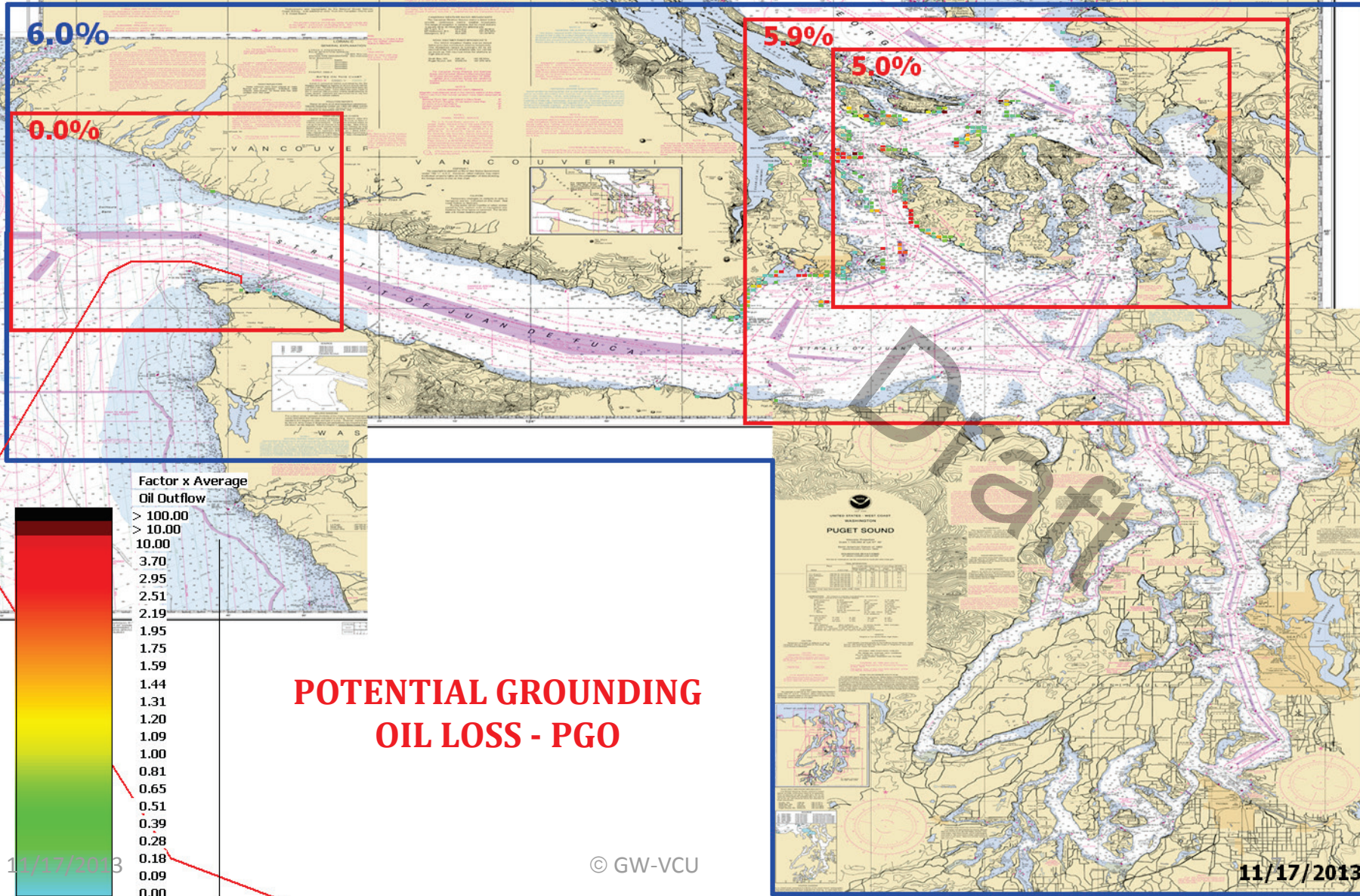
VESSEL TRAFFIC RISK ASSESSMENT (VTRA) 2010

S: DP 415 3D Risk Profile What-If FV - Pot. Grou. Oil Loss: 6% of Base Case PGO



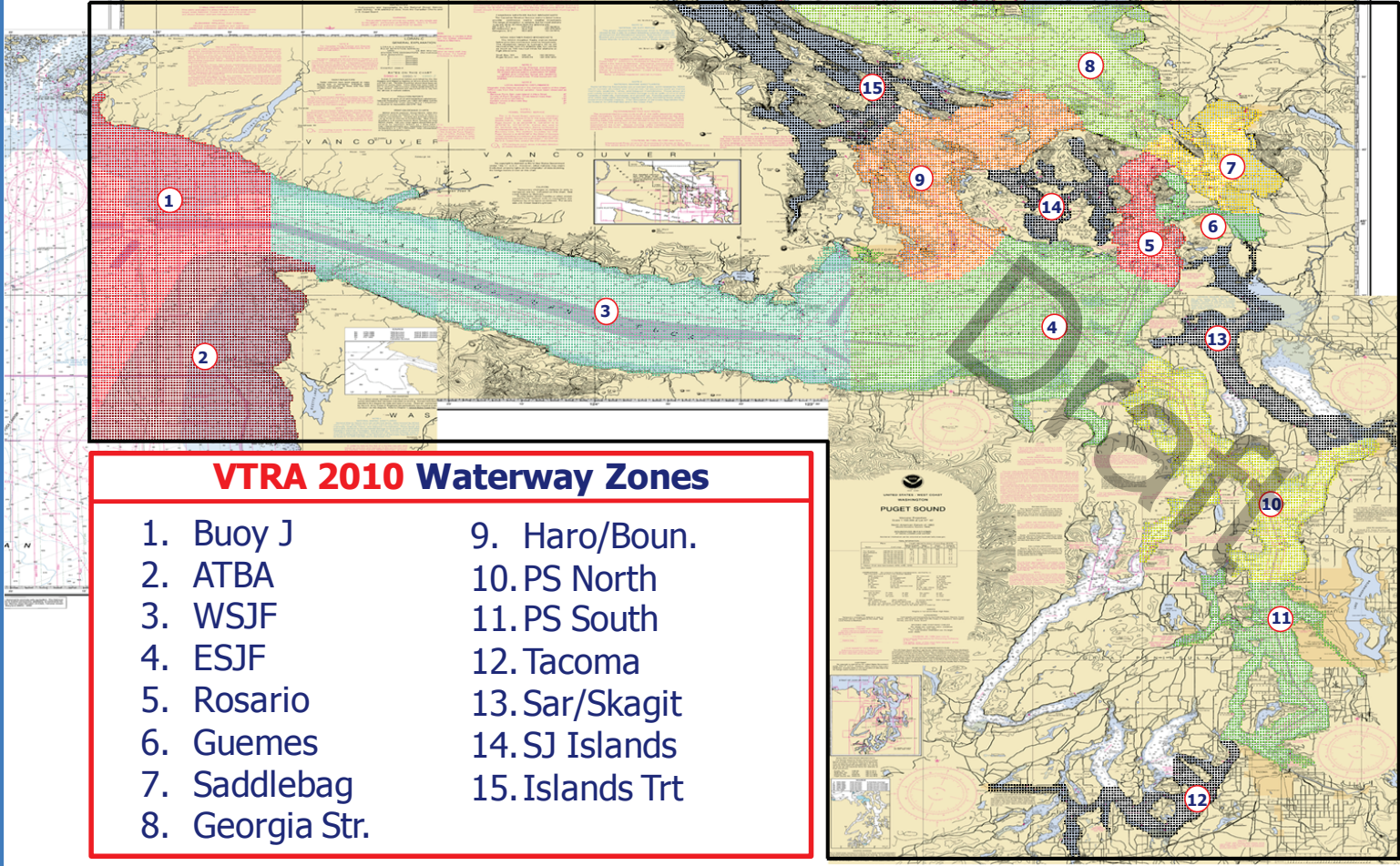
VESSEL TRAFFIC RISK ASSESSMENT (VTRA) 2010

S: VTRA 2010 - Delta Port - Cont. 67 and Bulk 348 - WhatIf FV



VESSEL TRAFFIC RISK ASSESSMENT (VTRA) 2010

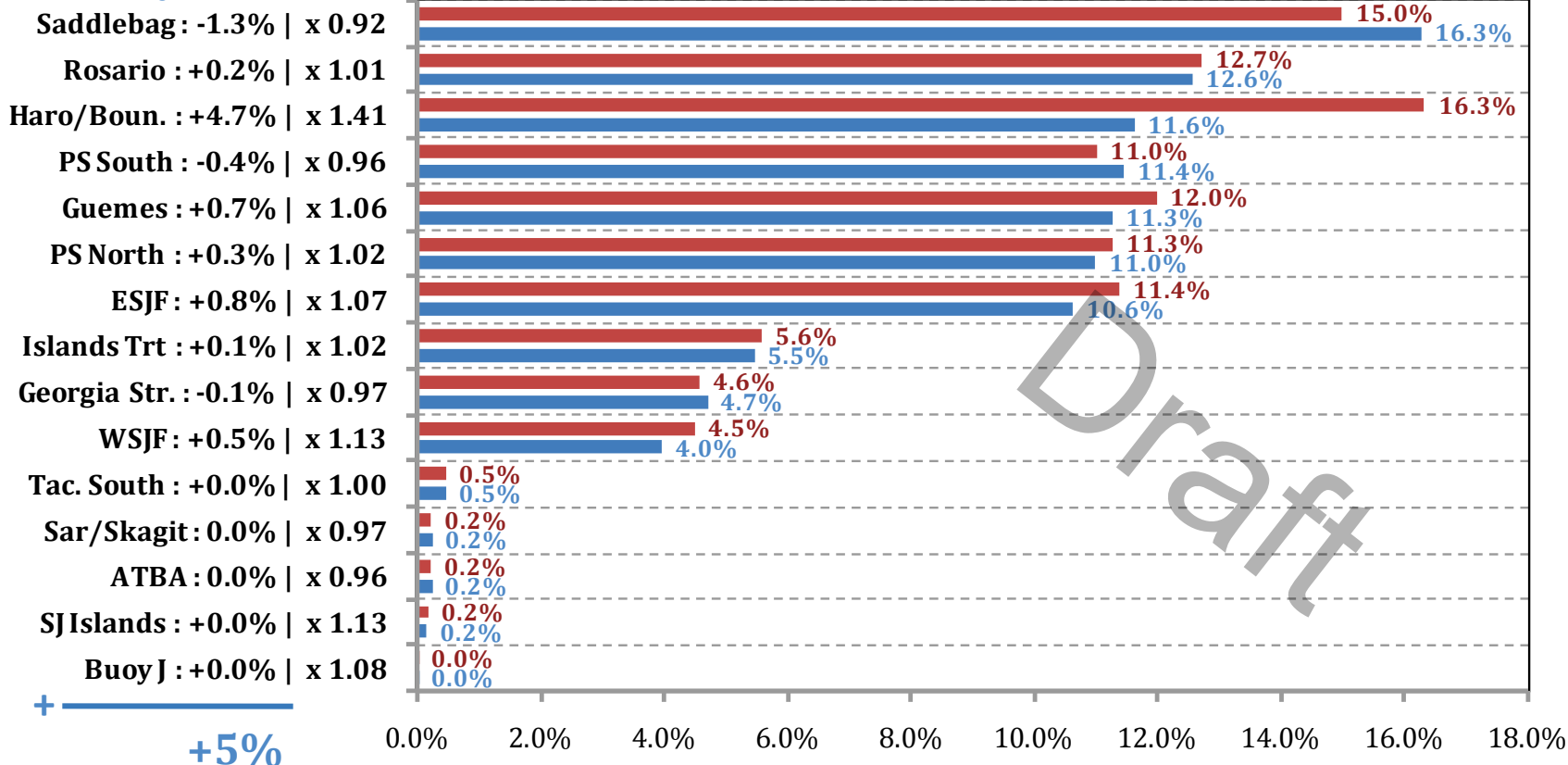
DEFINITION OF 15 WATERWAY ZONES



VESSEL TRAFFIC RISK ASSESSMENT (VTRA) 2010

% Base Case Grounding Oil Loss - ALL_FV

Waterway Zone:



% Base Case Grounding Oil Loss (GOL) - ALL_FV

■ S: DP- 415 : 105% (+5% | x 1.05)

■ P: Base Case : 100%

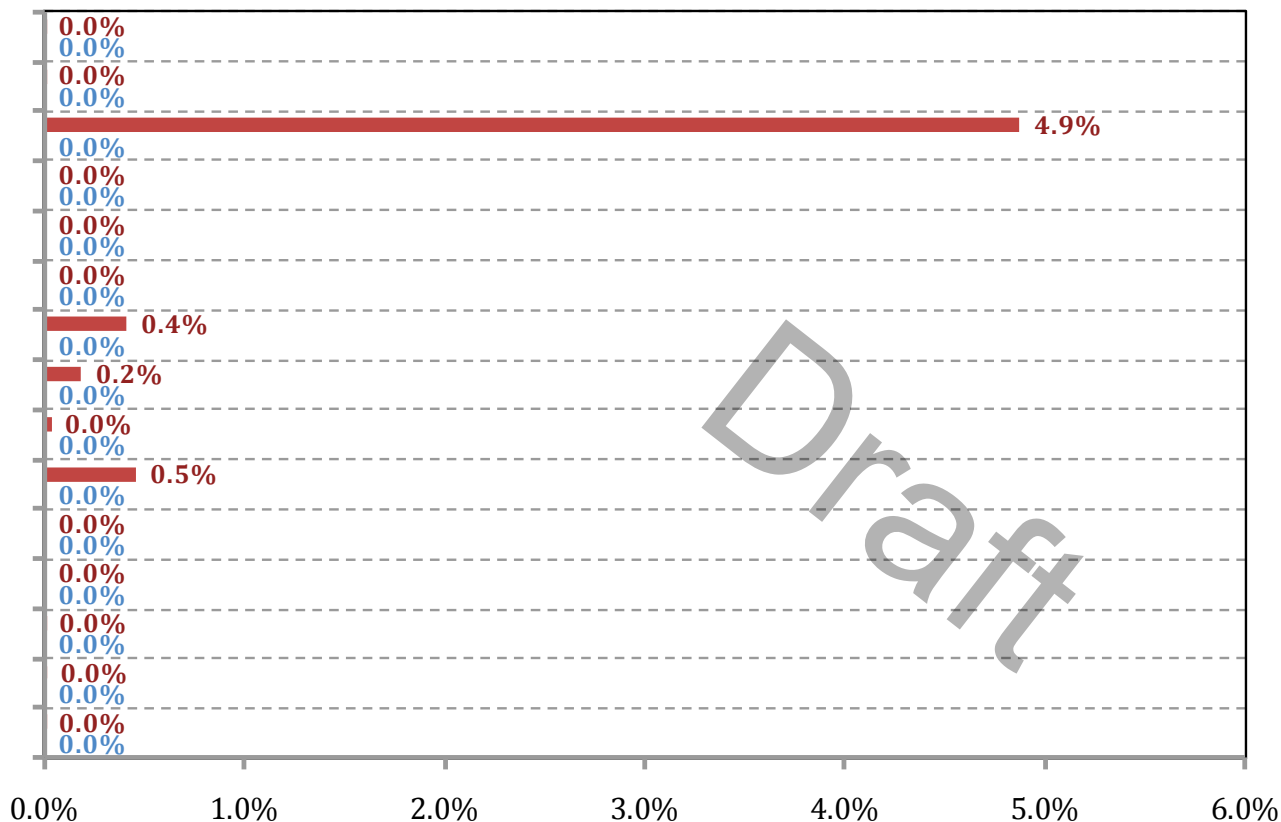
VESSEL TRAFFIC RISK ASSESSMENT (VTRA) 2010

% Base Case Grounding Oil Loss - WhatIf

Waterway Zone:

- Saddlebag : +0.0%
- Rosario : +0.0%
- Haro/Boun. : +4.9%
- PS South : +0.0%
- Guemes : +0.0%
- PS North : +0.0%
- ESJF : +0.4%
- Islands Trt : +0.2%
- Georgia Str. : +0.0%
- WSJF : +0.5%
- Tac. South : +0.0%
- Sar/Skagit : +0.0%
- ATBA : +0.0%
- SJ Islands : +0.0%
- Buoy J : +0.0%

+ **+6%**



% Base Case Grounding Oil Loss (GOL) - WhatIf

■ S: DP - 415 : 6% (+6%)

■ P: Base Case : 0%