

VESSEL TRAFFIC RISK ASSESSMENT (VTRA) 2010

3D Relative Risk Profile Comparison
Potential Collision Oil Loss

**CASE P: BASE CASE & 100% Double Hull Fuel Tank
Protection for All Deep Draft Vessels**

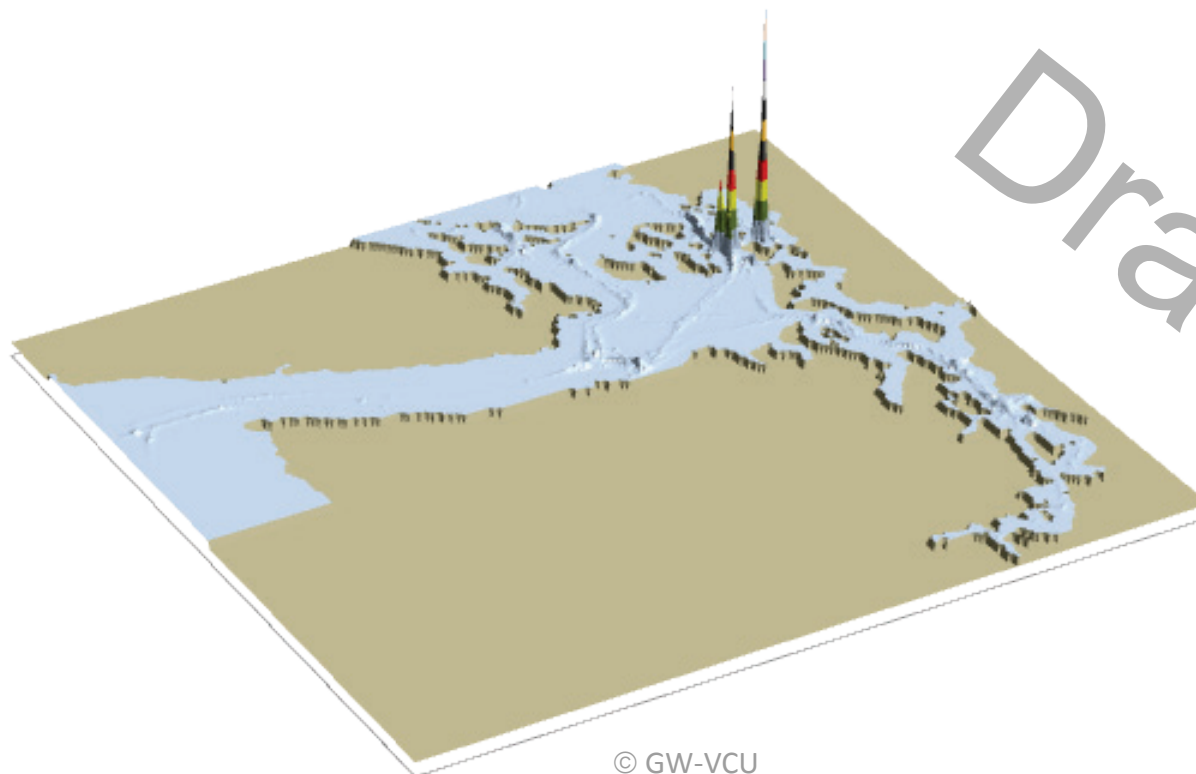
Dr. J. Rene van Dorp and Dr. Jason R.W Merrick

November 2013



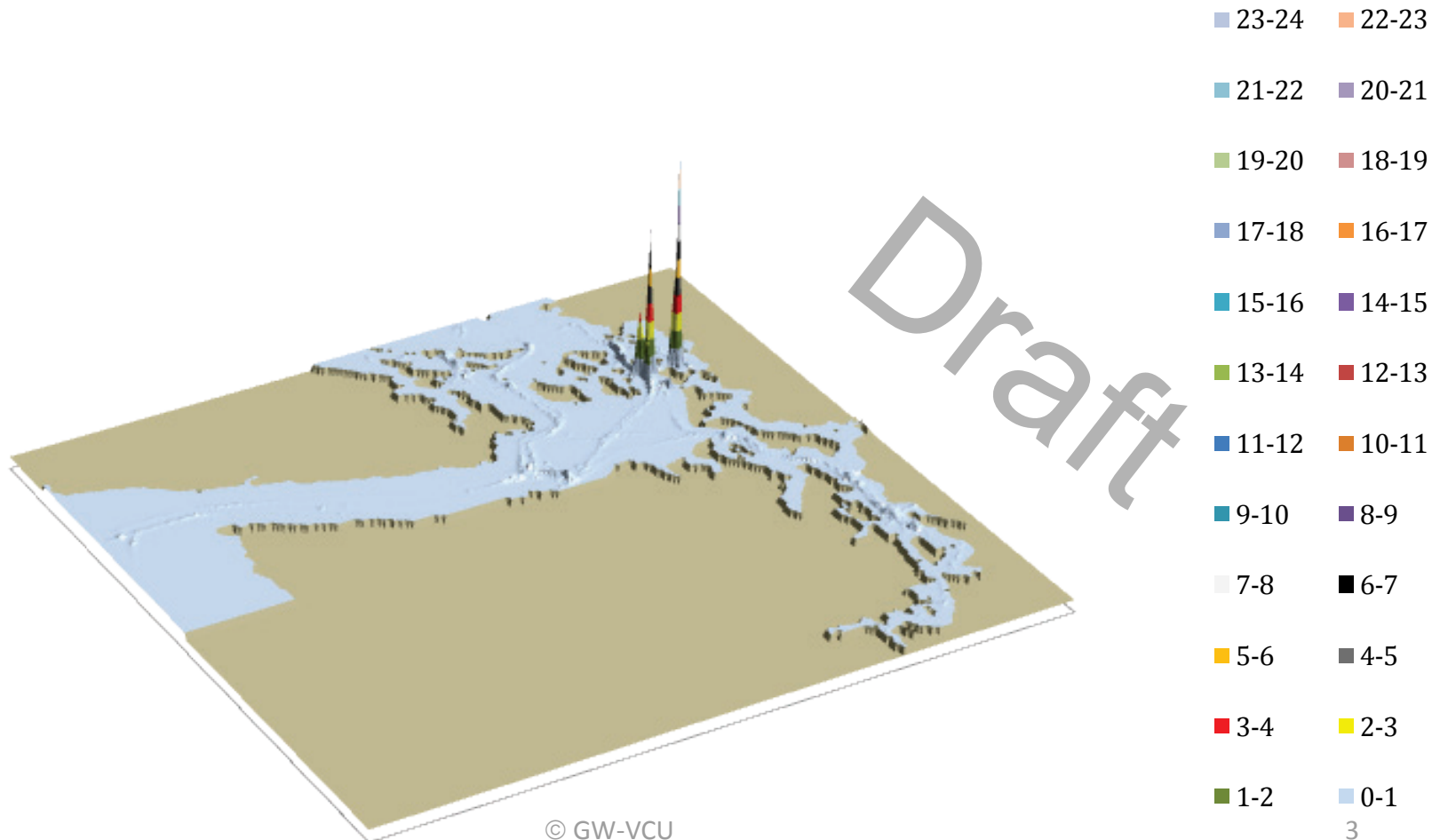
VESSEL TRAFFIC RISK ASSESSMENT (VTRA) 2010

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



VESSEL TRAFFIC RISK ASSESSMENT (VTRA) 2010

P: BC & DH100 3D Risk Profile All FV - Pot. Collision Oil Loss: 98% of Base Case PCO



VESSEL TRAFFIC RISK ASSESSMENT (VTRA) 2010

P: VTRA 2010 - BASE CASE - All FV

100.0%

2.8%

82.7%

67.5%

Factor x Average
Oil Outflow

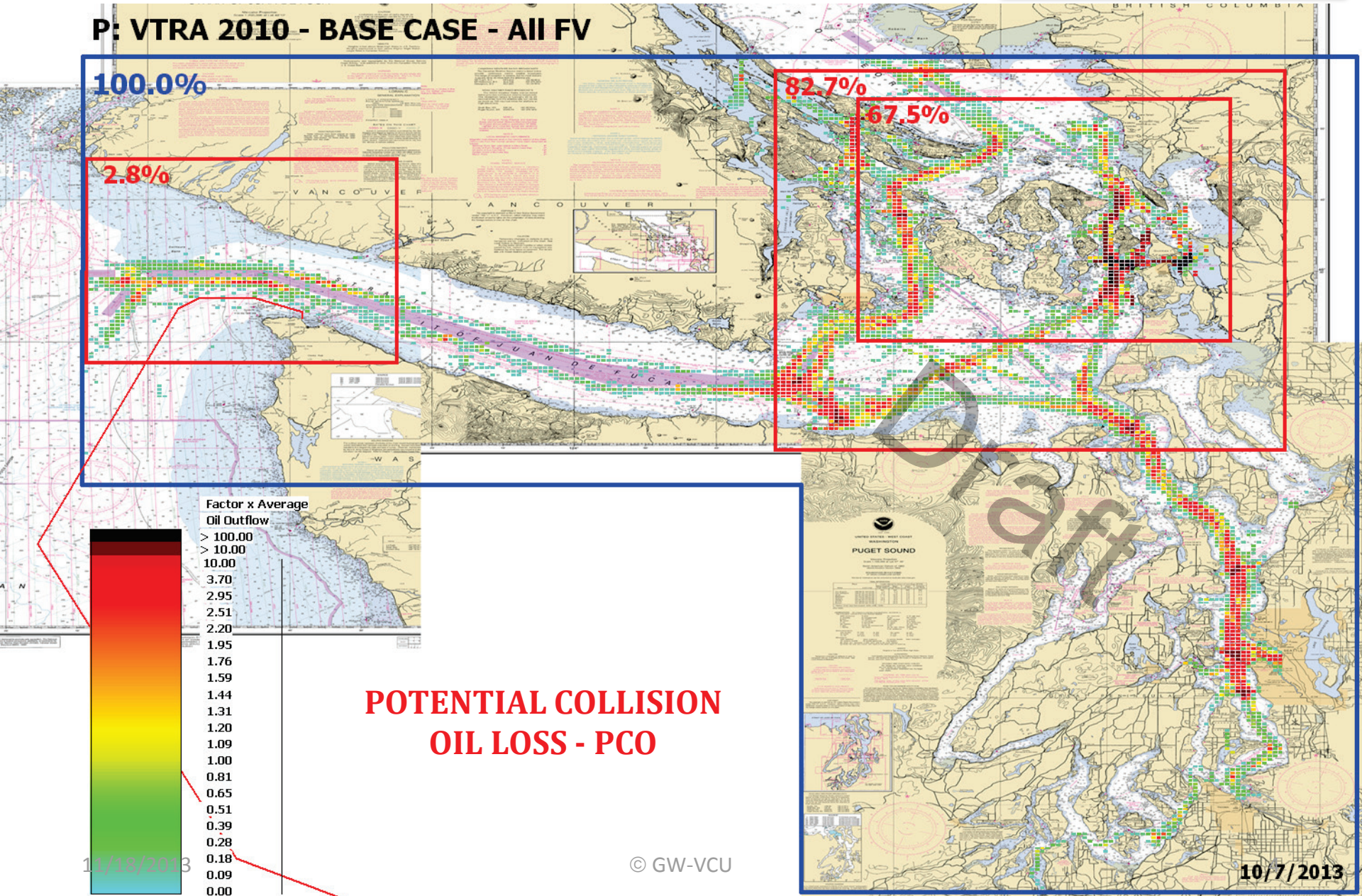
- > 100.00
- > 10.00
- 10.00
- 3.70
- 2.95
- 2.51
- 2.20
- 1.95
- 1.76
- 1.59
- 1.44
- 1.31
- 1.20
- 1.09
- 1.00
- 0.81
- 0.65
- 0.51
- 0.39
- 0.28
- 0.18
- 0.09
- 0.00

**POTENTIAL COLLISION
OIL LOSS - PCO**

11/18/2013

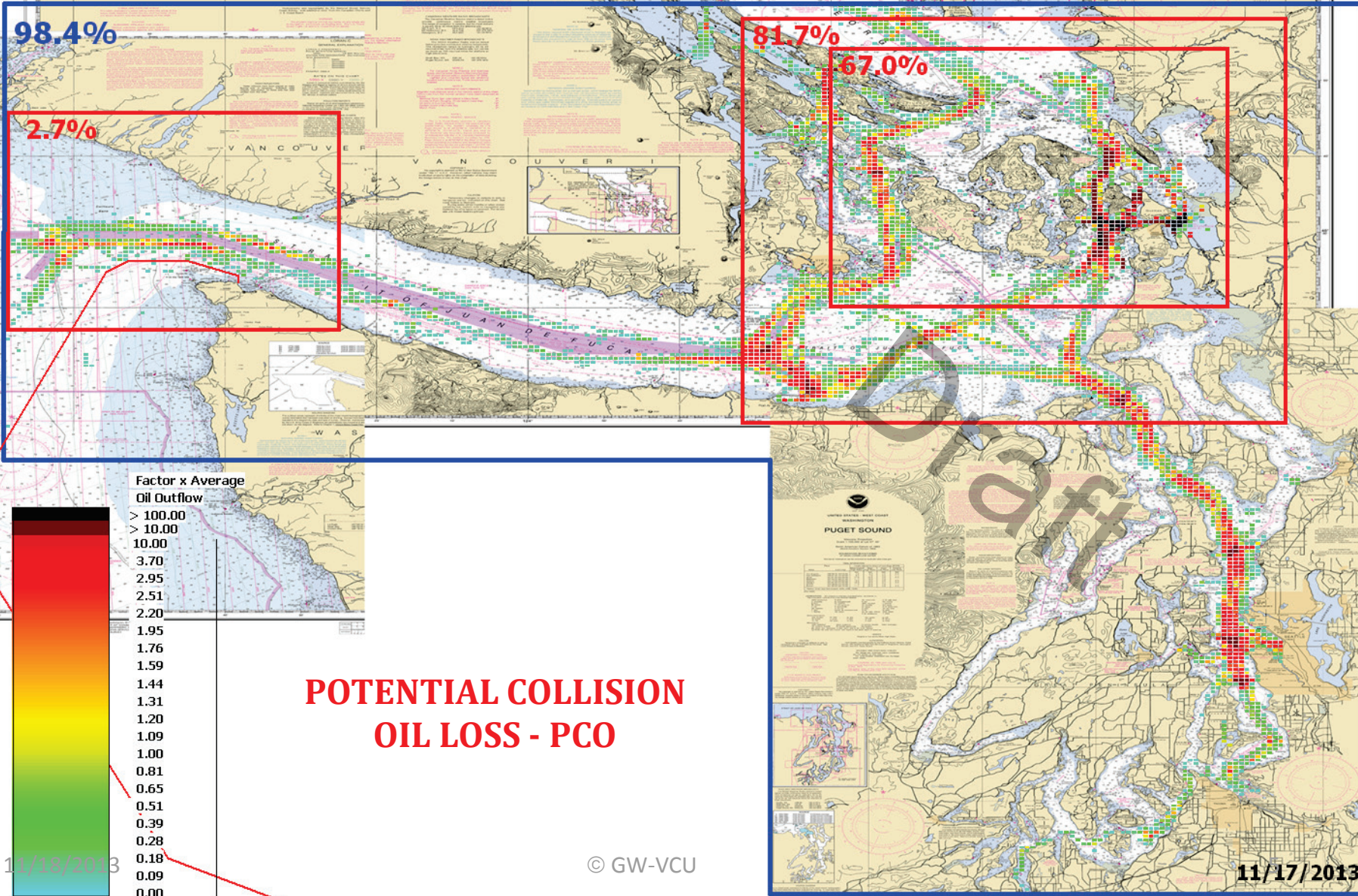
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10/7/2013



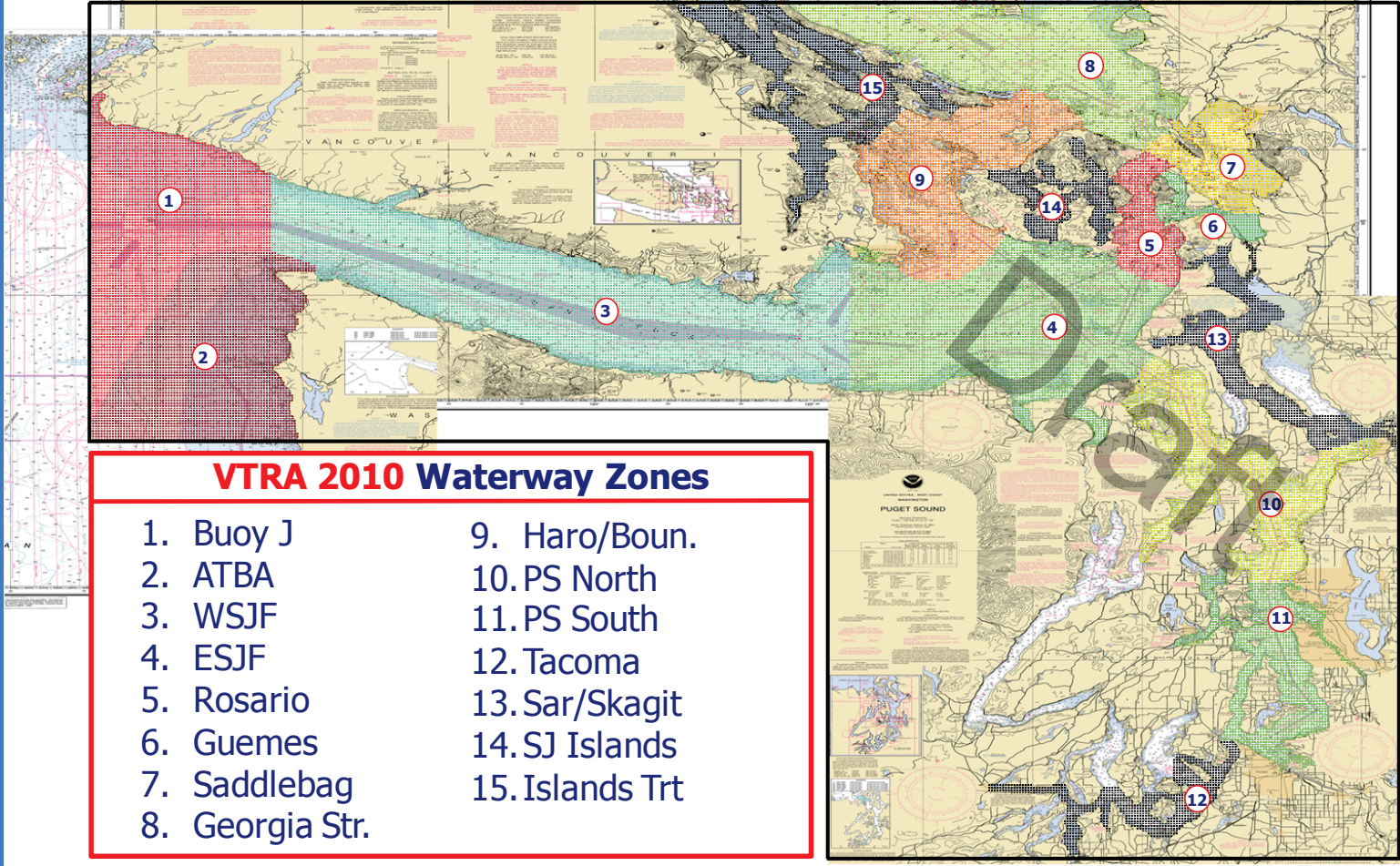
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P: VTRA 2010 - BASE CASE & 100% DH FUEL TANKS - All FV



VESSEL TRAFFIC RISK ASSESSMENT (VTRA) 2010

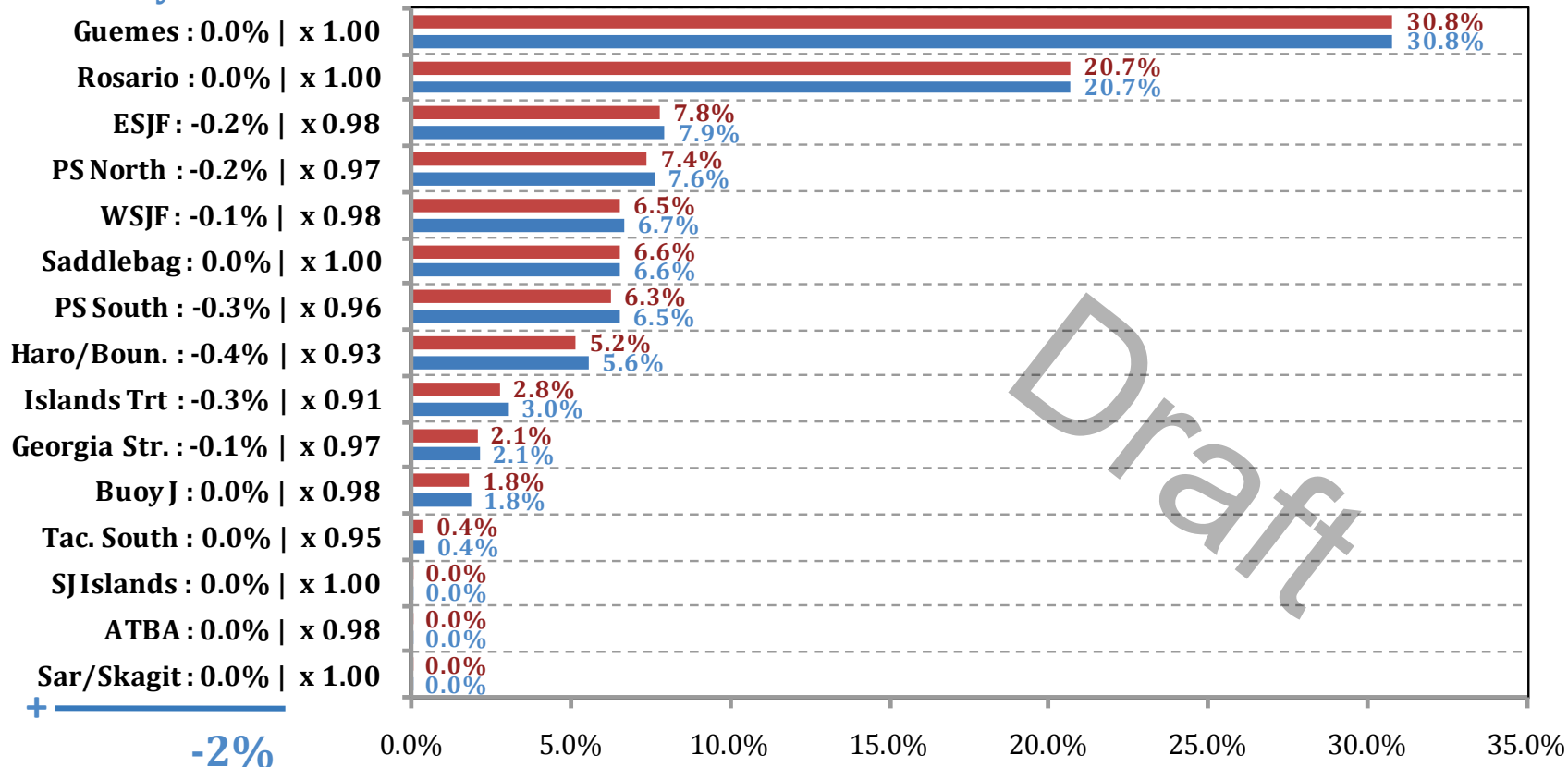
DEFINITION OF 15 WATERWAY ZONES



VESSEL TRAFFIC RISK ASSESSMENT (VTRA) 2010

% Base Case Collision Oil Loss - ALL_FV

Waterway Zone:



% of Base Case Annual Collision Oil Loss - ALL_FV

■ P: BC & DH100: 98% (-2% | x 0.98)

■ P: Base Case: 100%