

VESSEL TRAFFIC RISK ASSESSMENT (VTRA) 2010

3D Relative Risk Profile Comparison
Vessel Time Exposure

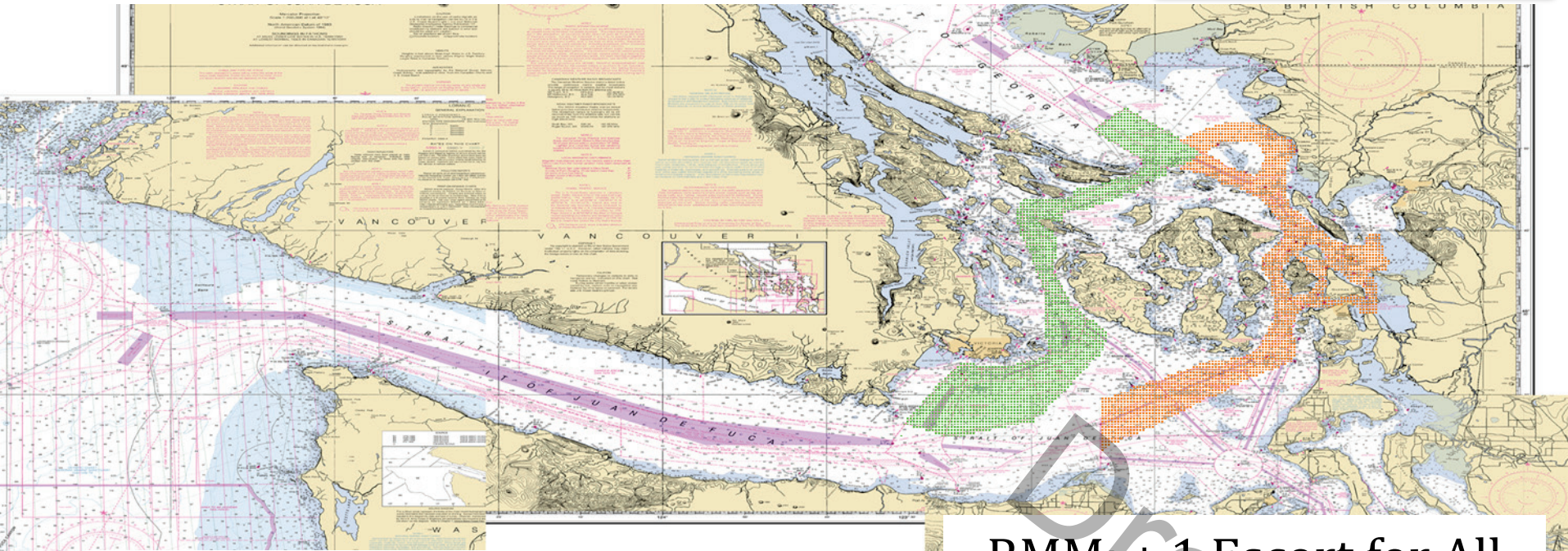
**CASE T: GW – KM – DP & +1 Escort for all
Focus Vessels on Haro Routes**

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

November 2013



VESSEL TRAFFIC RISK ASSESSMENT (VTRA) 2010

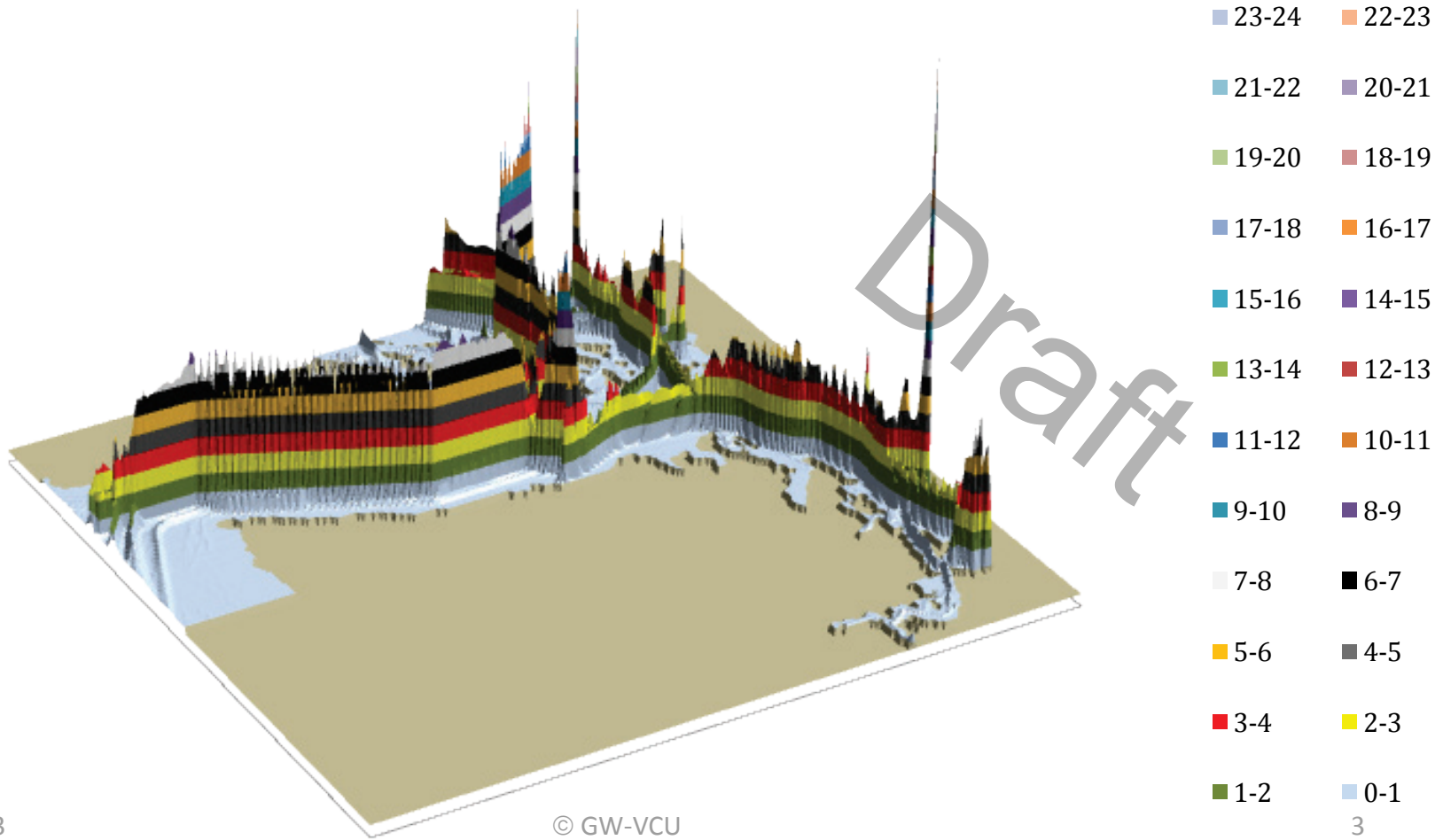


**DEFINITION OF ASSUMED LOCATIONS
FOR ADDED ESCORT VESSEL
FOR HARO-BOUNDARY ROUTES (GREEN)
AND
FOR ROSARIO ROUTES (ORANGE)**

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

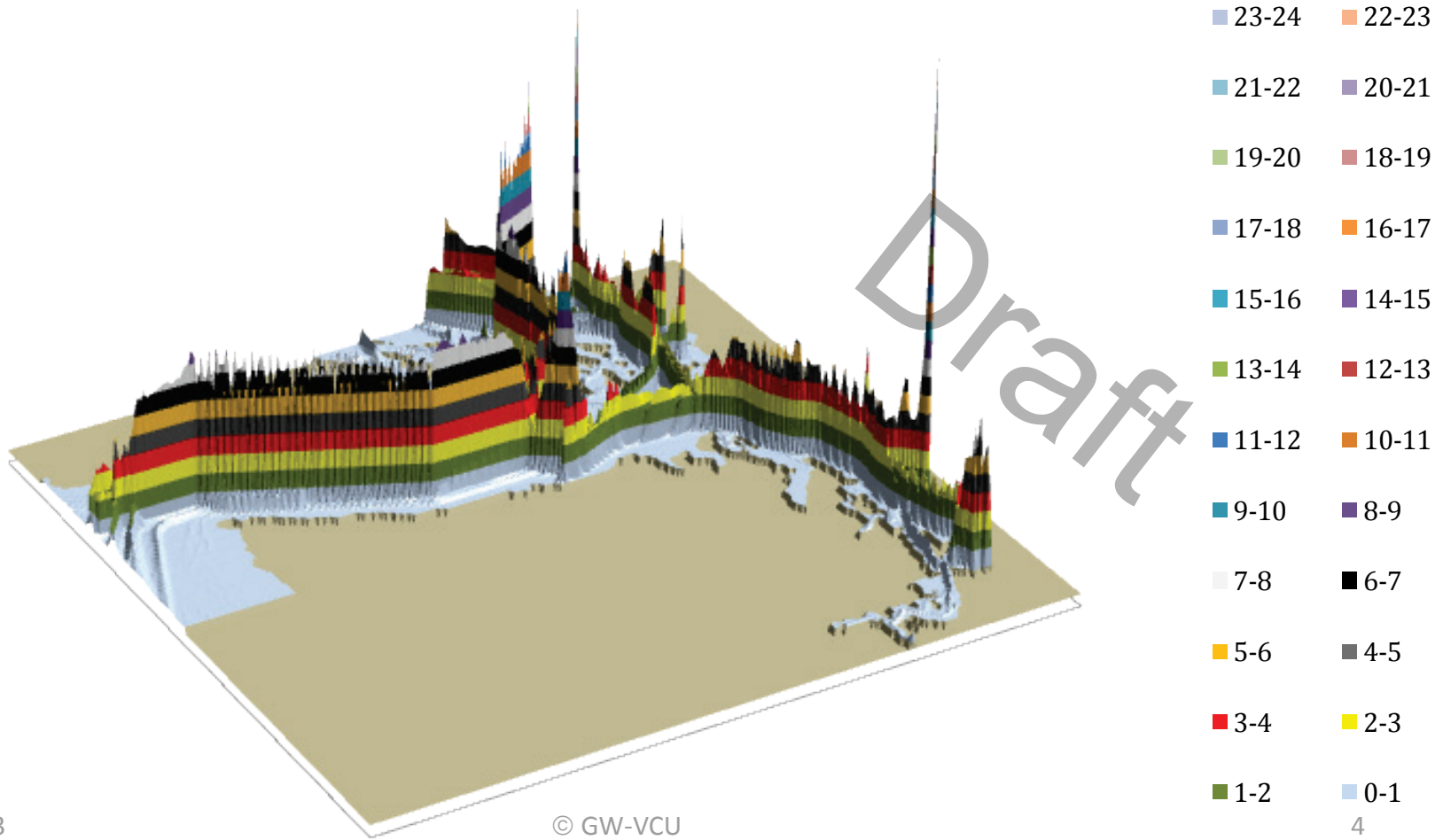
VESSEL TRAFFIC RISK ASSESSMENT (VTRA) 2010

T: GW - KM - DP 3D Risk Profile All FV - Vessel Time Exposure: 125% of Base Case VTE



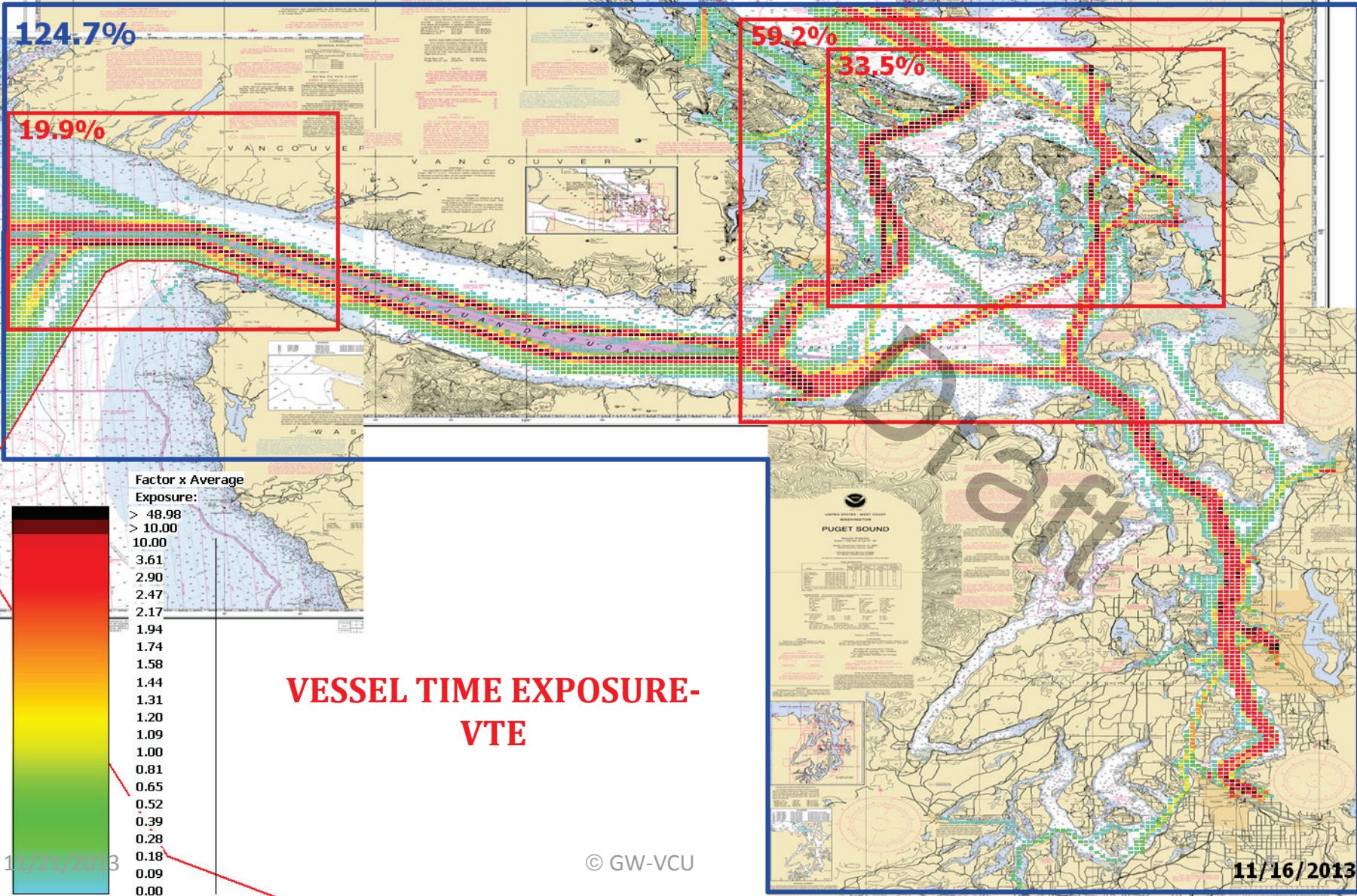
VESSEL TRAFFIC RISK ASSESSMENT (VTRA) 2010

T: GW - KM - DP & EH 3D Risk Profile All FV - Vessel Time Exposure: 125% of Base Case VTE



VESSEL TRAFFIC RISK ASSESSMENT (VTRA) 2010

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



VESSEL TIME EXPOSURE-
VTE

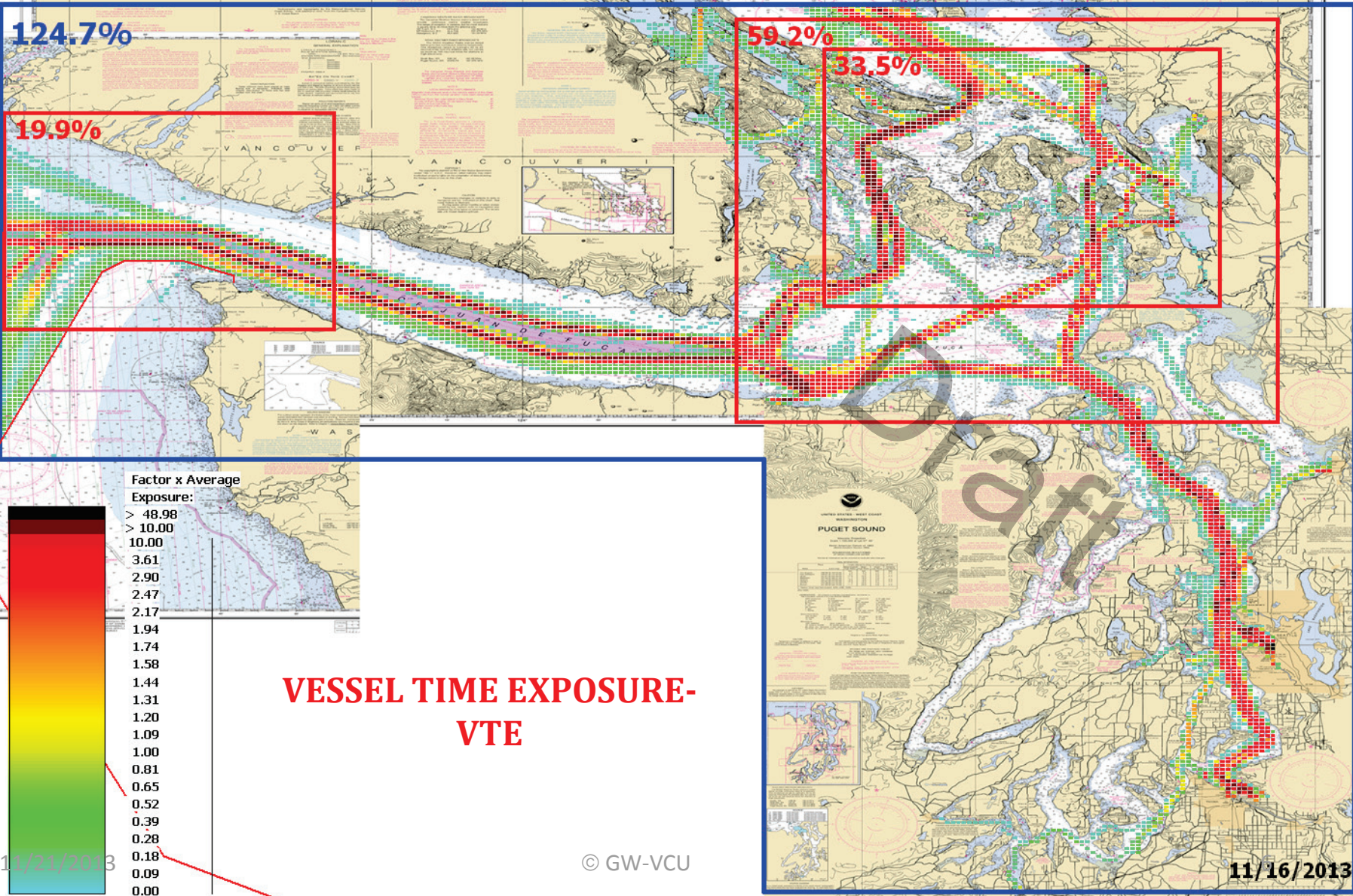
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VESSEL TRAFFIC RISK ASSESSMENT (VTRA) 2010

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



Factor x Average Exposure:

- > 48.98
- > 10.00
- 10.00
- 3.61
- 2.90
- 2.47
- 2.17
- 1.94
- 1.74
- 1.58
- 1.44
- 1.31
- 1.20
- 1.09
- 1.00
- 0.81
- 0.65
- 0.52
- 0.39
- 0.28
- 0.18
- 0.09
- 0.00

VESSEL TIME EXPOSURE- VTE

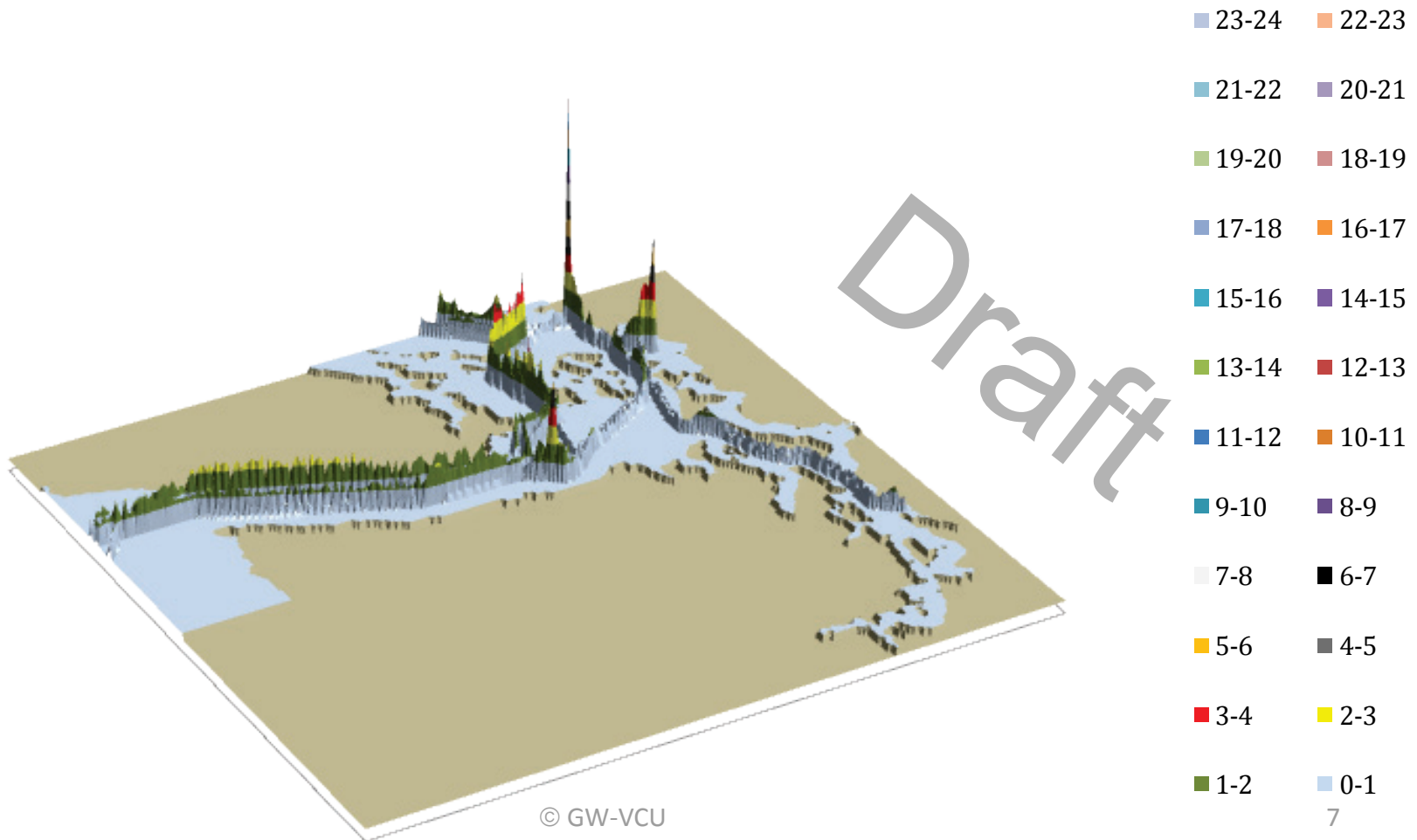
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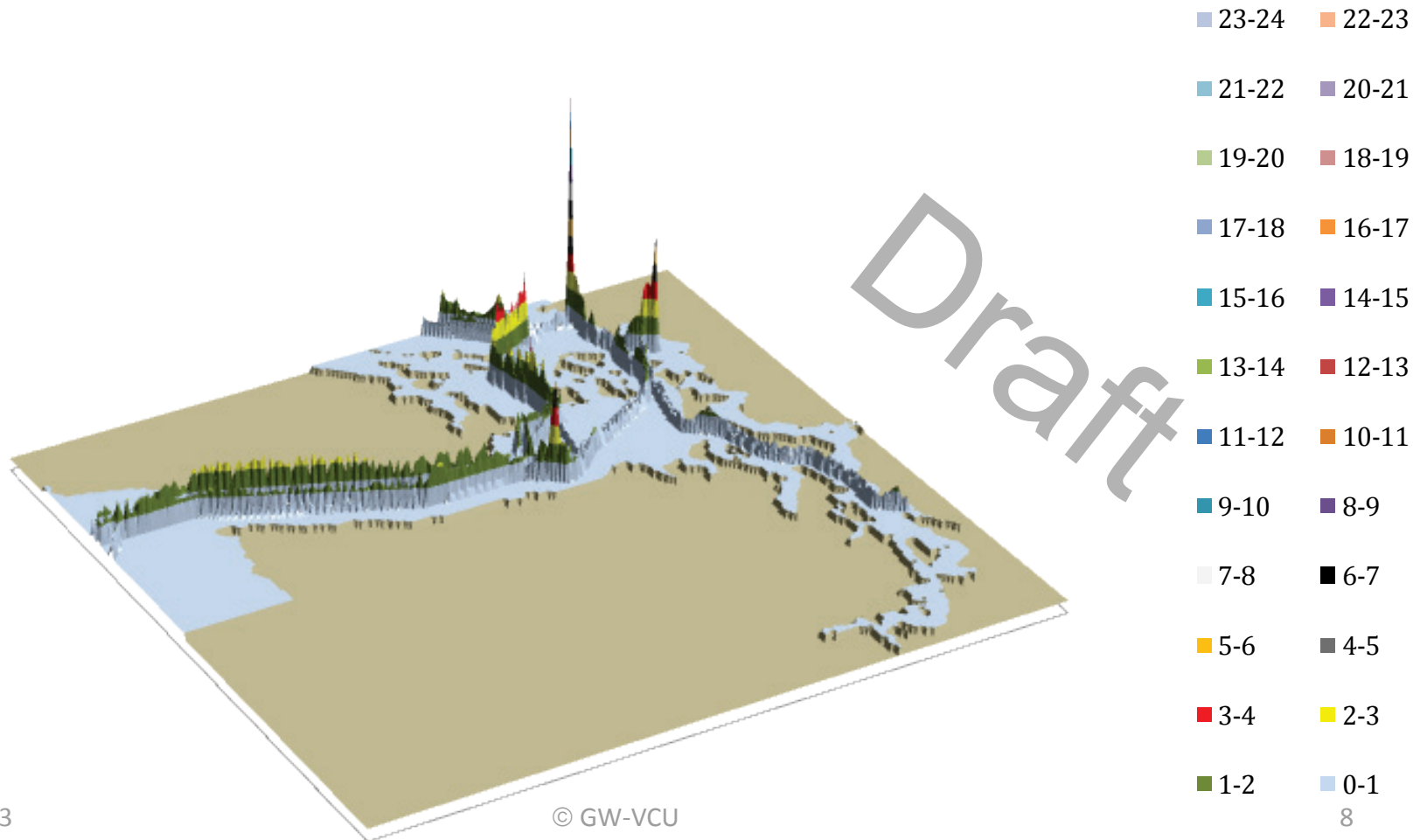
VESSEL TRAFFIC RISK ASSESSMENT (VTRA) 2010

T: GW - KM - DP 3D Risk Profile What-If FV - Vessel Time Exp.: 24% of Base Case VTE



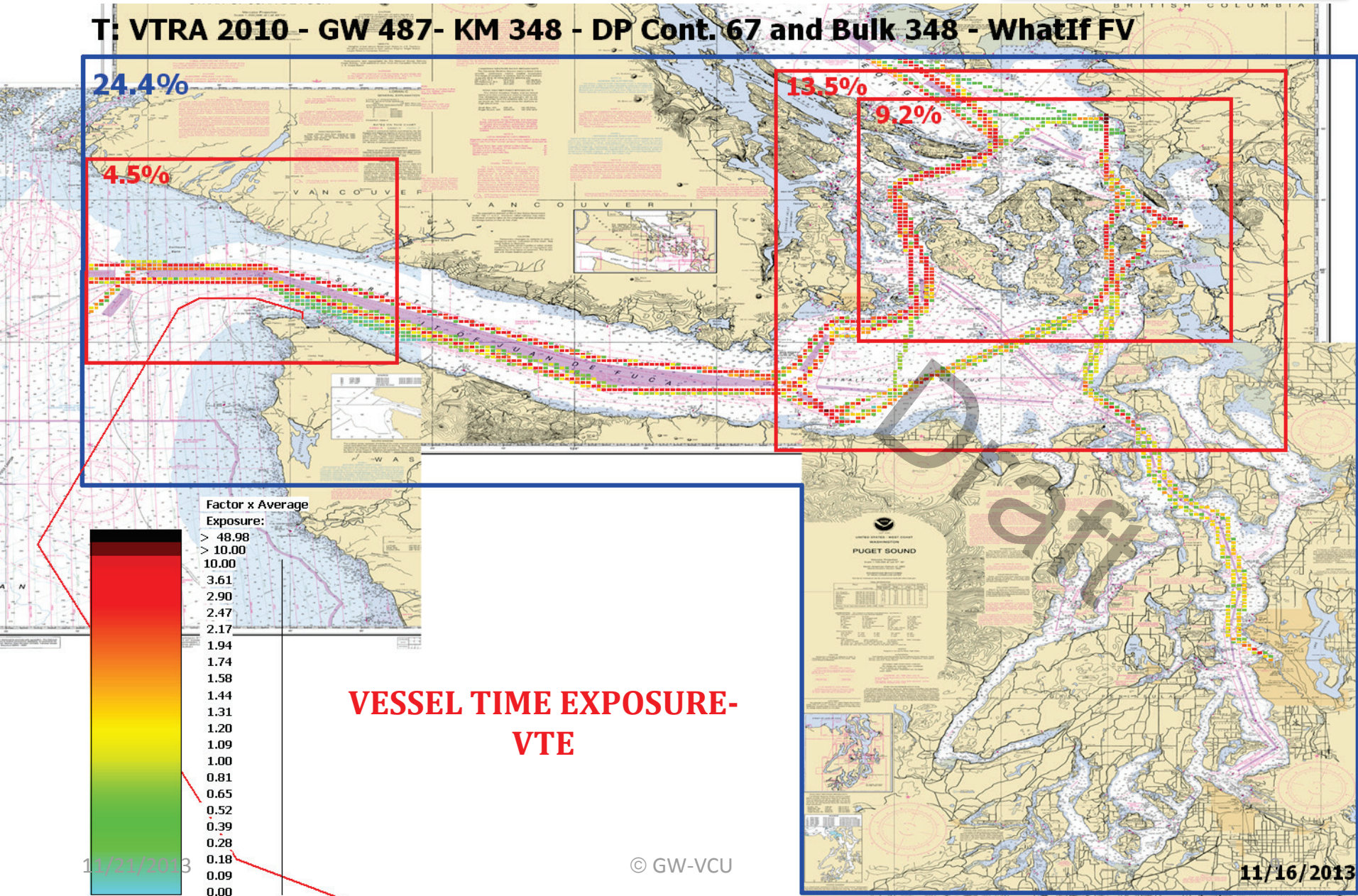
VESSEL TRAFFIC RISK ASSESSMENT (VTRA) 2010

T: GW - KM - DP & EH 3D Risk Profile What-If FV - Vessel Time Exp.: 24% of Base Case VTE



VESSEL TRAFFIC RISK ASSESSMENT (VTRA) 2010

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



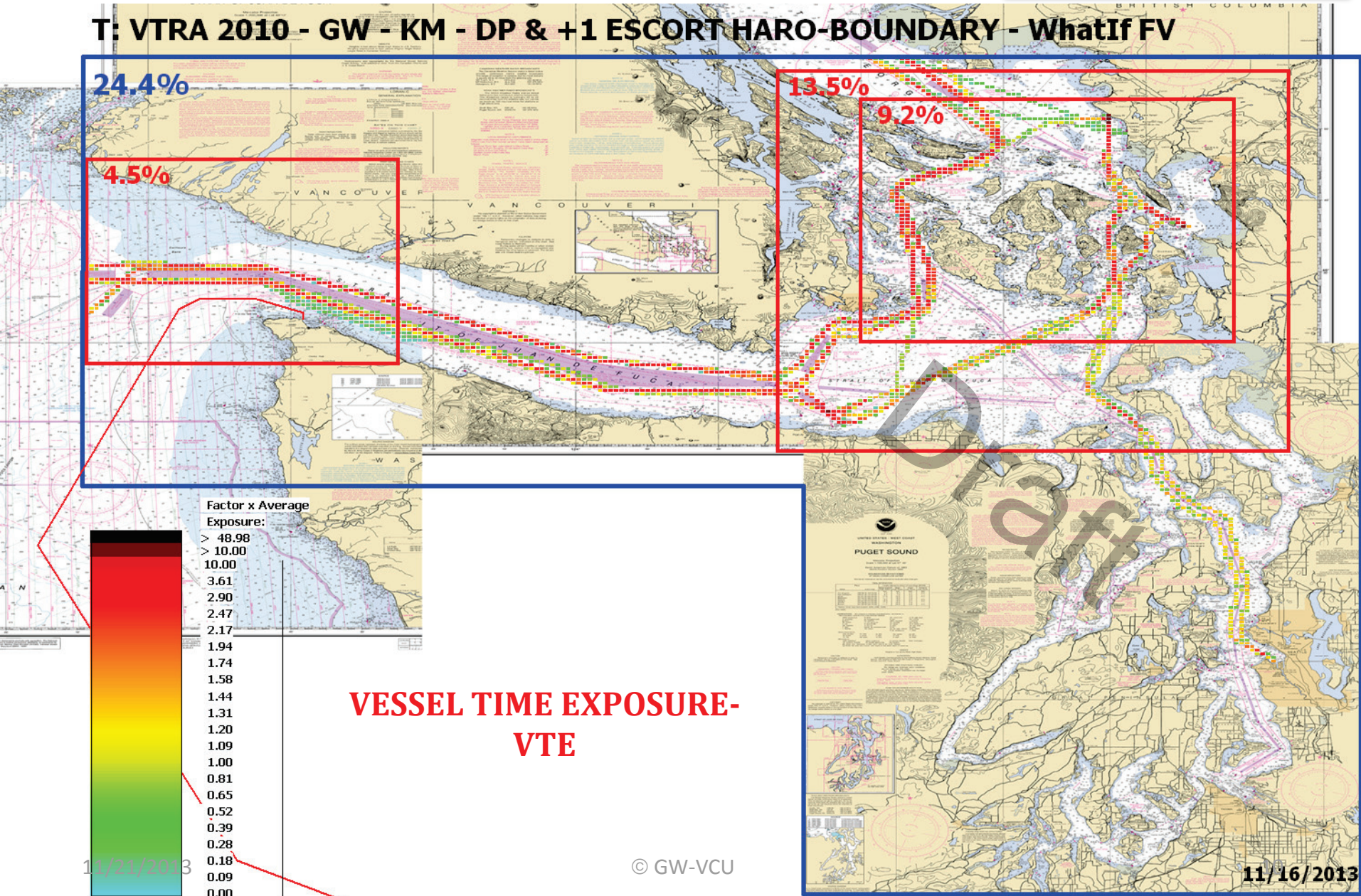
VESSEL TIME EXPOSURE-
VTE

11/21/2013

11/16/2013

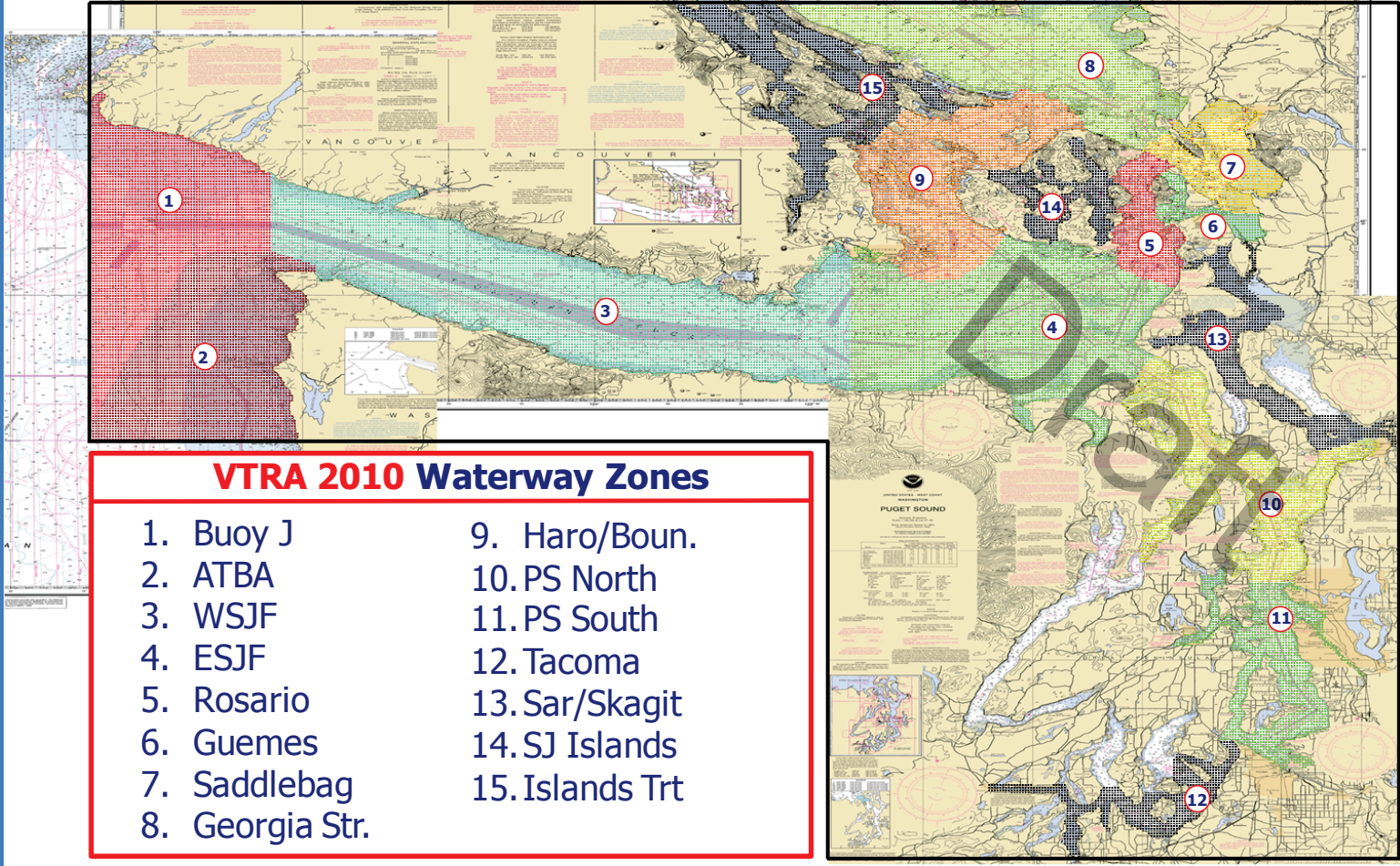
VESSEL TRAFFIC RISK ASSESSMENT (VTRA) 2010

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



VESSEL TRAFFIC RISK ASSESSMENT (VTRA) 2010

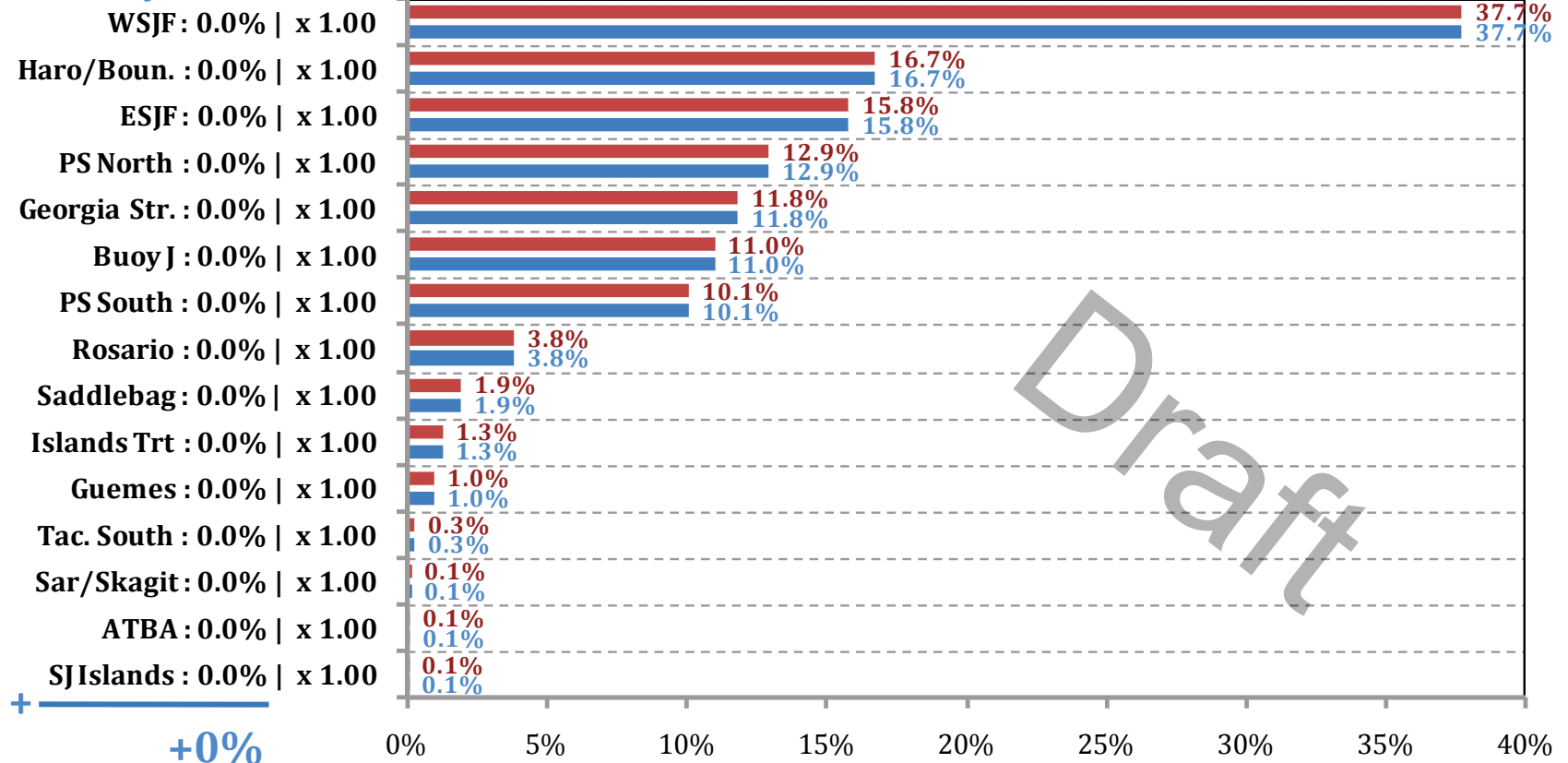
DEFINITION OF 15 WATERWAY ZONES



VESSEL TRAFFIC RISK ASSESSMENT (VTRA) 2010

% Base Case Vessel Time Exposure (VTE) - ALL_FV

Waterway Zone:



% Base Case Vessel Time Exposure (VTE) - ALL_FV

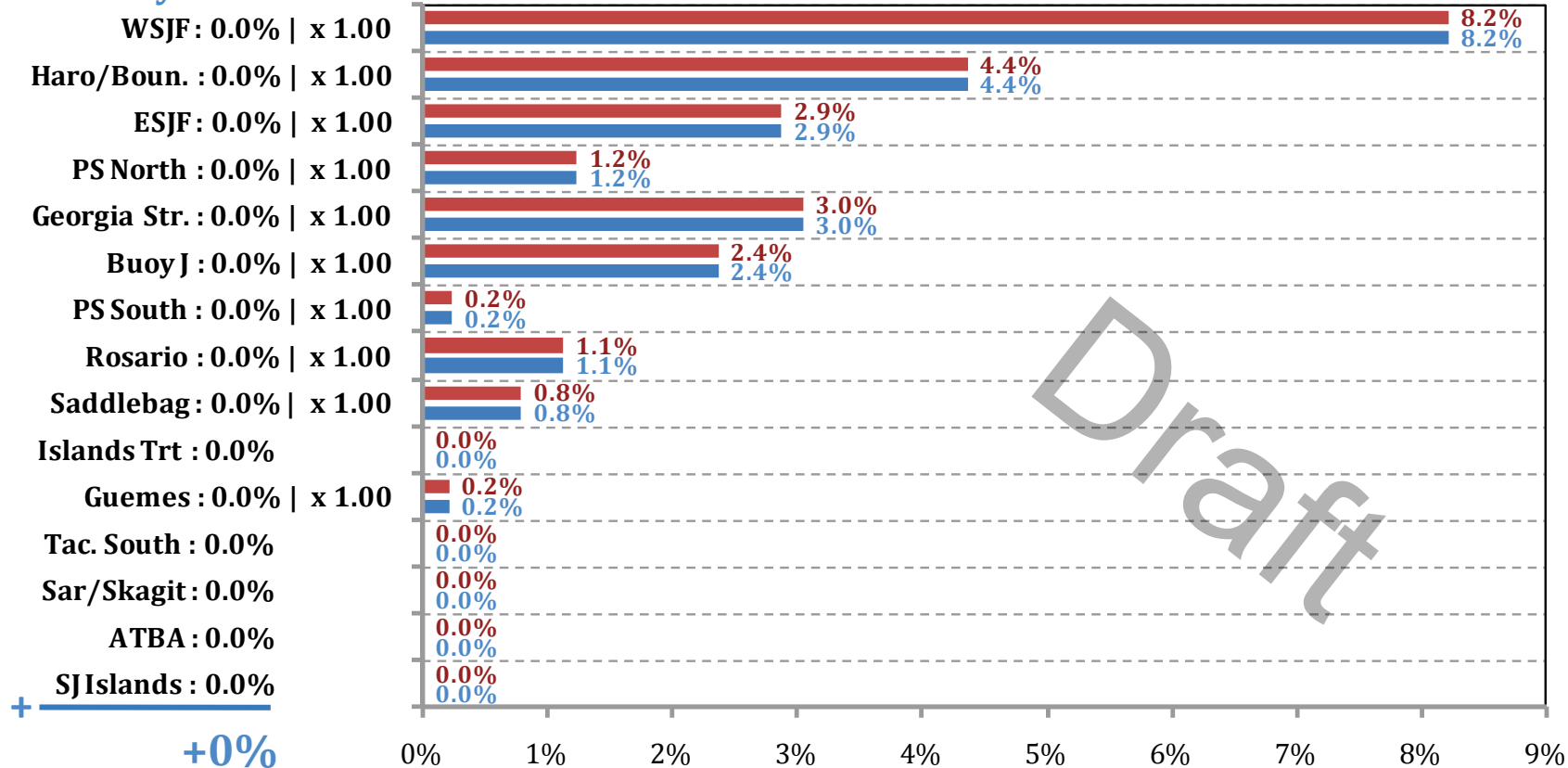
■ T: GW - KM - DP & EH: 125% (0% | x 1.00)

■ T: GW - KM - DP : 125%

VESSEL TRAFFIC RISK ASSESSMENT (VTRA) 2010

% Base Case Vessel Time Exposure (VTE) - WhatIf

Waterway Zone:



% Base Case Vessel Time Exposure (VTE) - WhatIf

■ T:GW - KM - DP & EH : 24% (+0% | x 1.00)

■ T:GW - KM - DP : 24%