

VESSEL TRAFFIC RISK ASSESSMENT (VTRA) 2010

3D Relative Risk Profile Comparison
Vessel Time Exposure

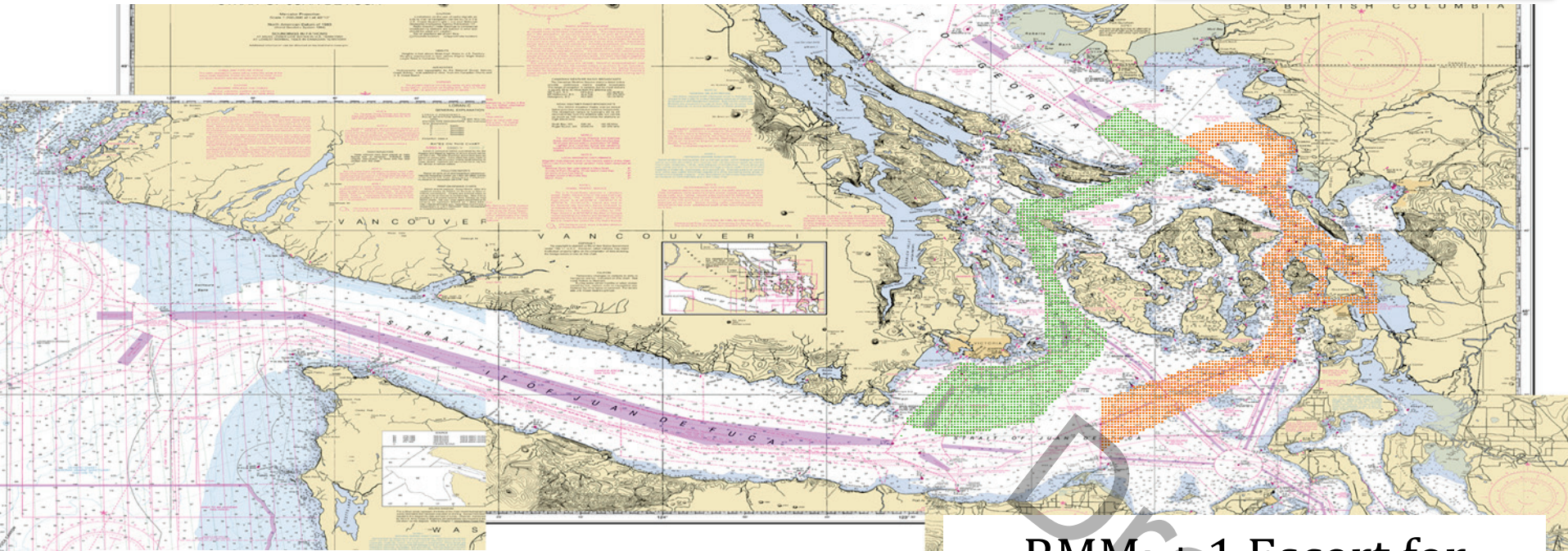
**CASE T: GW – KM – DP & +1 Escort Rosario – Laden
Tankers, Chem. Carrier, ATB & Cape Size Bulker**

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

November 2013



VESSEL TRAFFIC RISK ASSESSMENT (VTRA) 2010

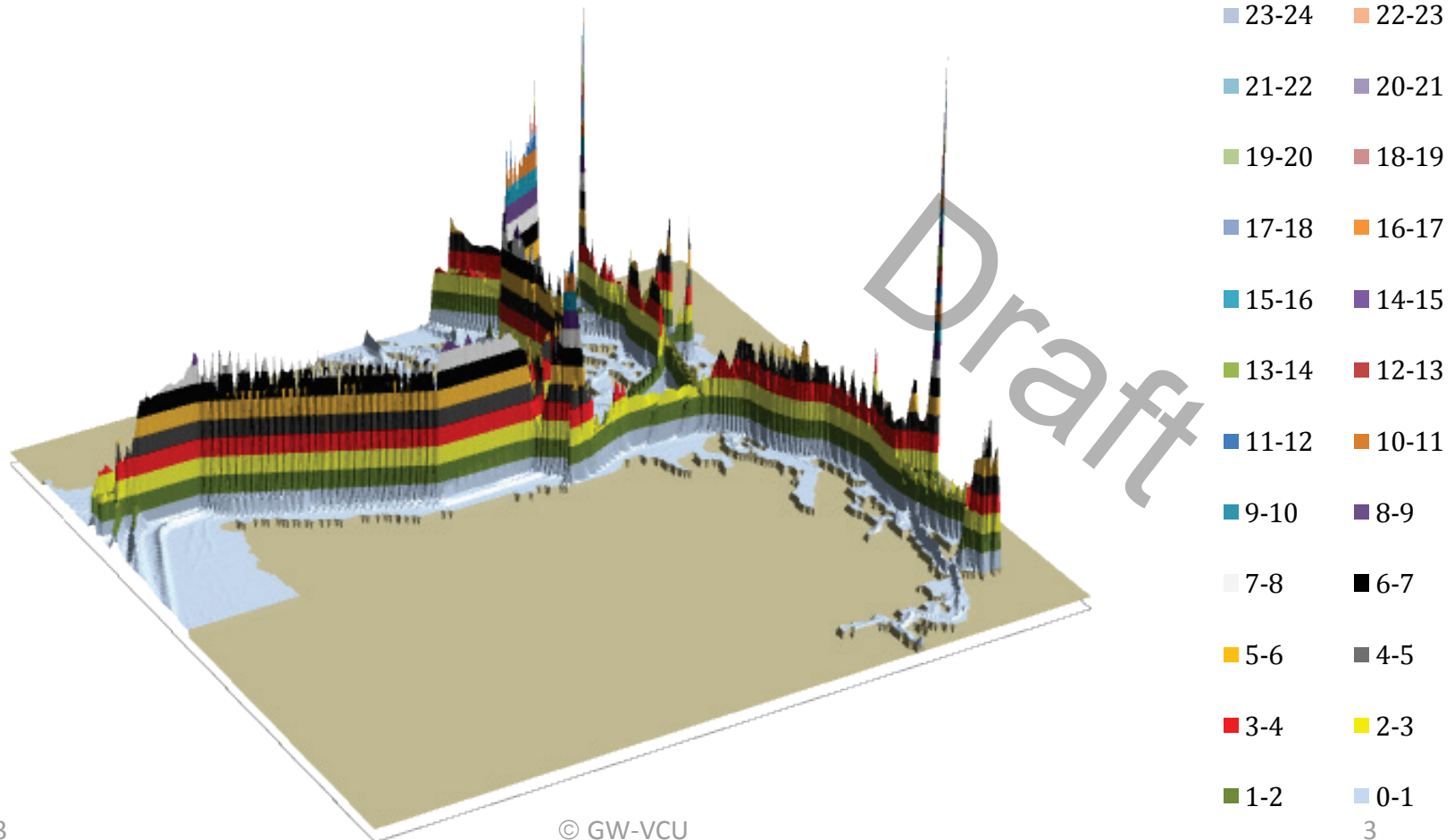


**DEFINITION OF ASSUMED LOCATIONS
FOR ADDED ESCORT VESSEL
FOR HARO-BOUNDARY ROUTES (GREEN)
AND
FOR ROSARIO ROUTES (ORANGE)**

RMM: + 1 Escort for
Laden Tankers, Chem.
Carrier, ATB & Cape Size
Bulkler on Rosario Routes
(Orange)

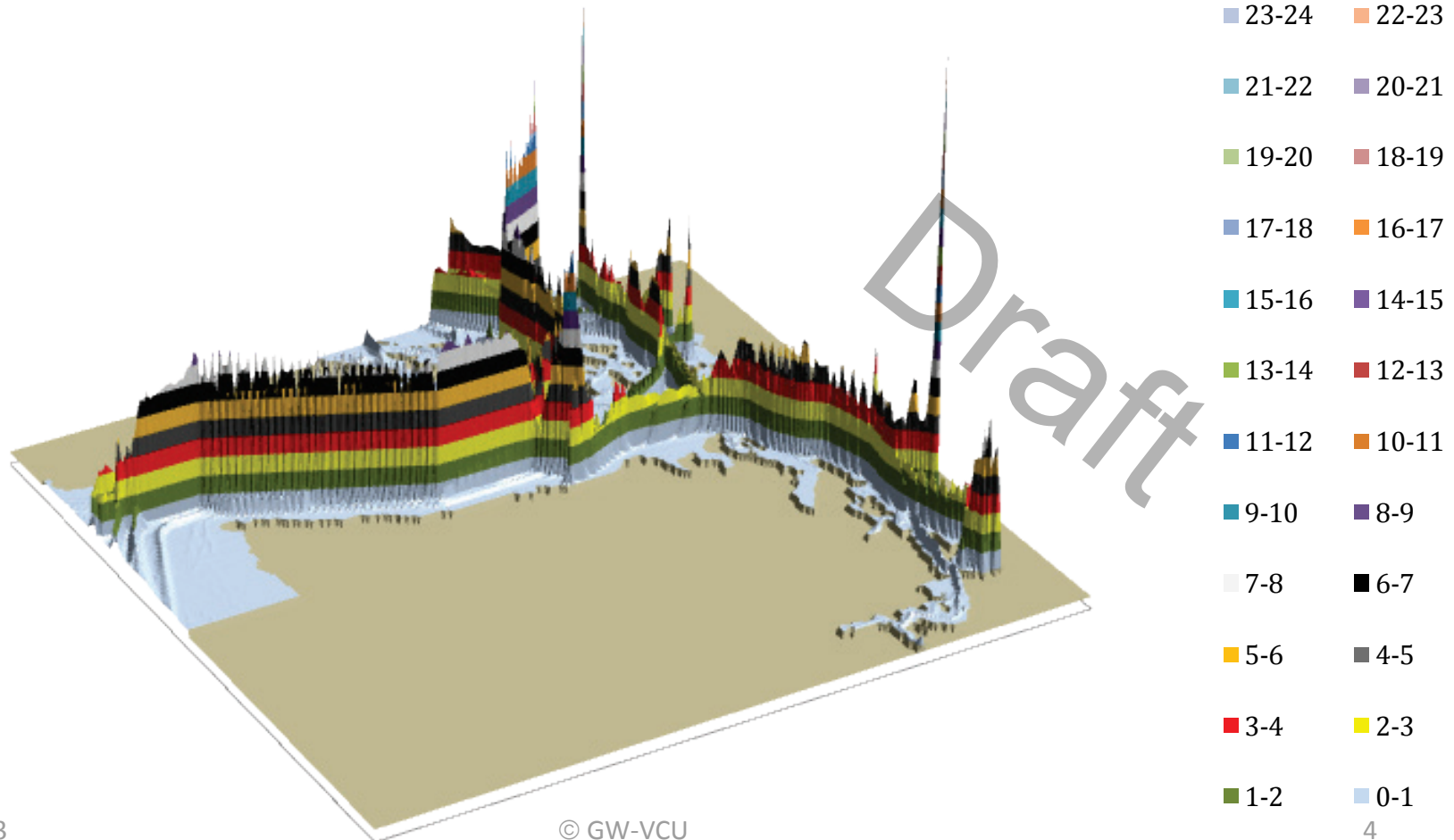
VESSEL TRAFFIC RISK ASSESSMENT (VTRA) 2010

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



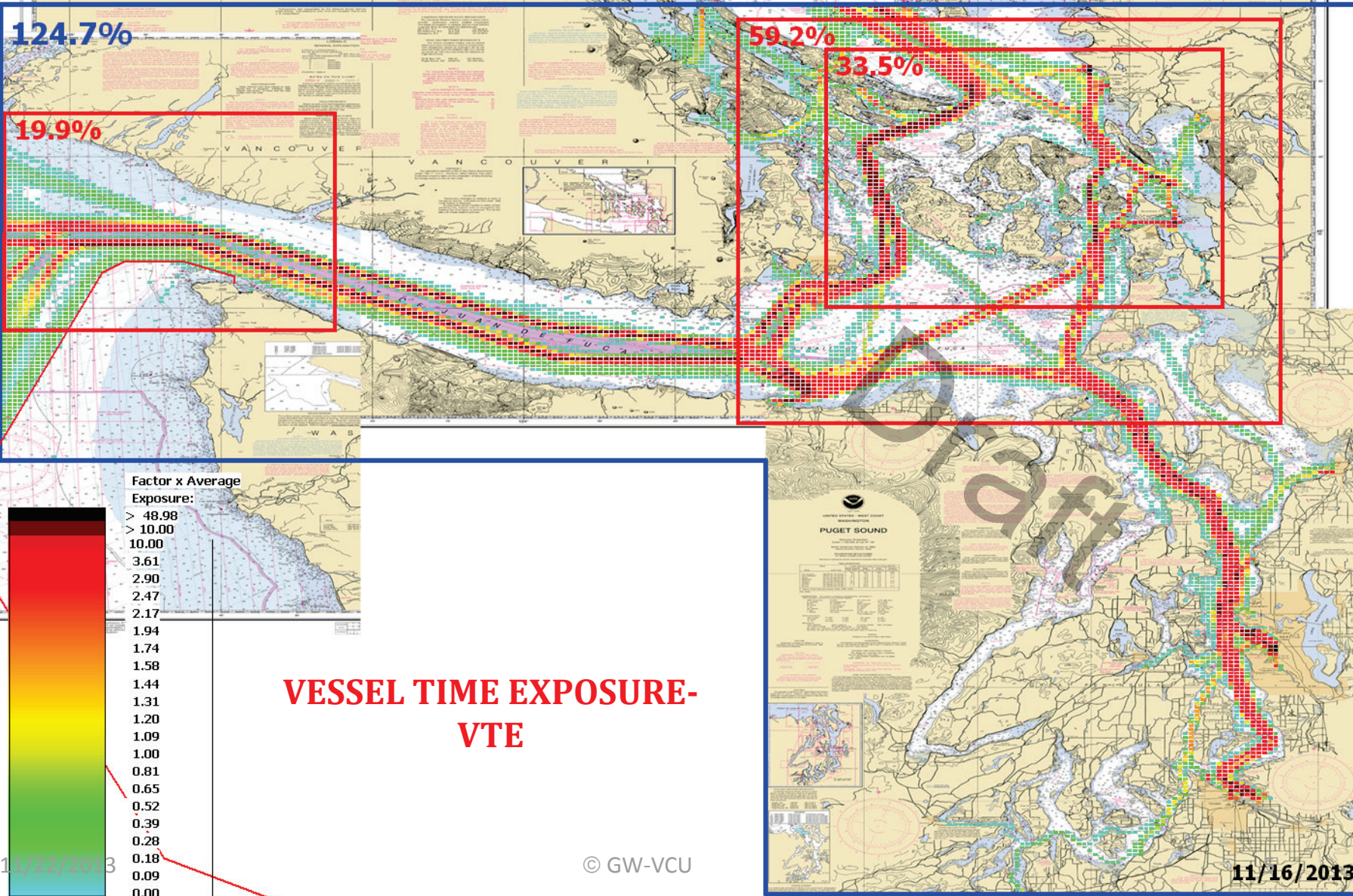
VESSEL TRAFFIC RISK ASSESSMENT (VTRA) 2010

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



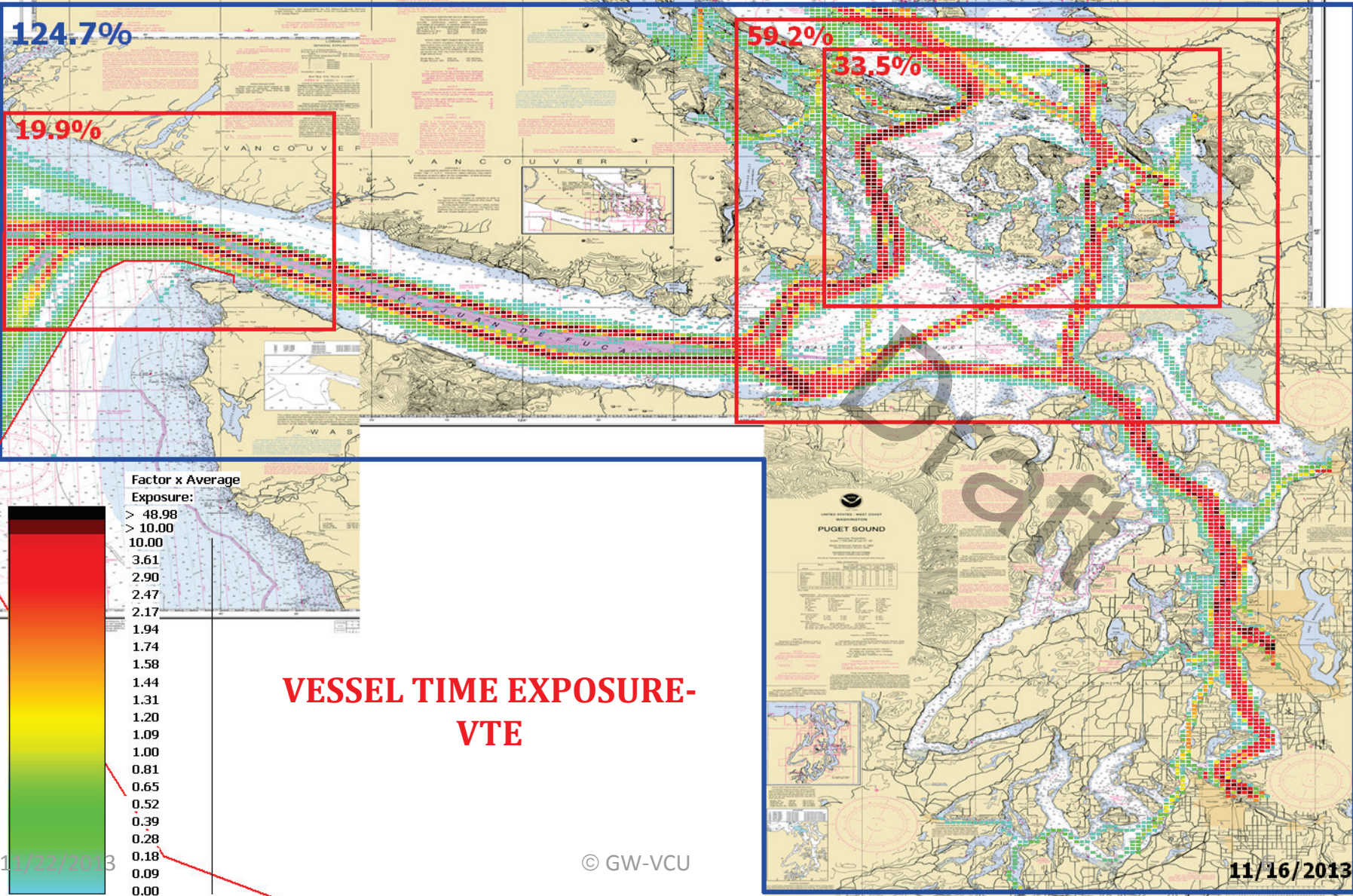
VESSEL TRAFFIC RISK ASSESSMENT (VTRA) 2010

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



VESSEL TRAFFIC RISK ASSESSMENT (VTRA) 2010

T: VTRA 2010 - GW - KM - DP & +1 ESCORT ROSARIO - 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

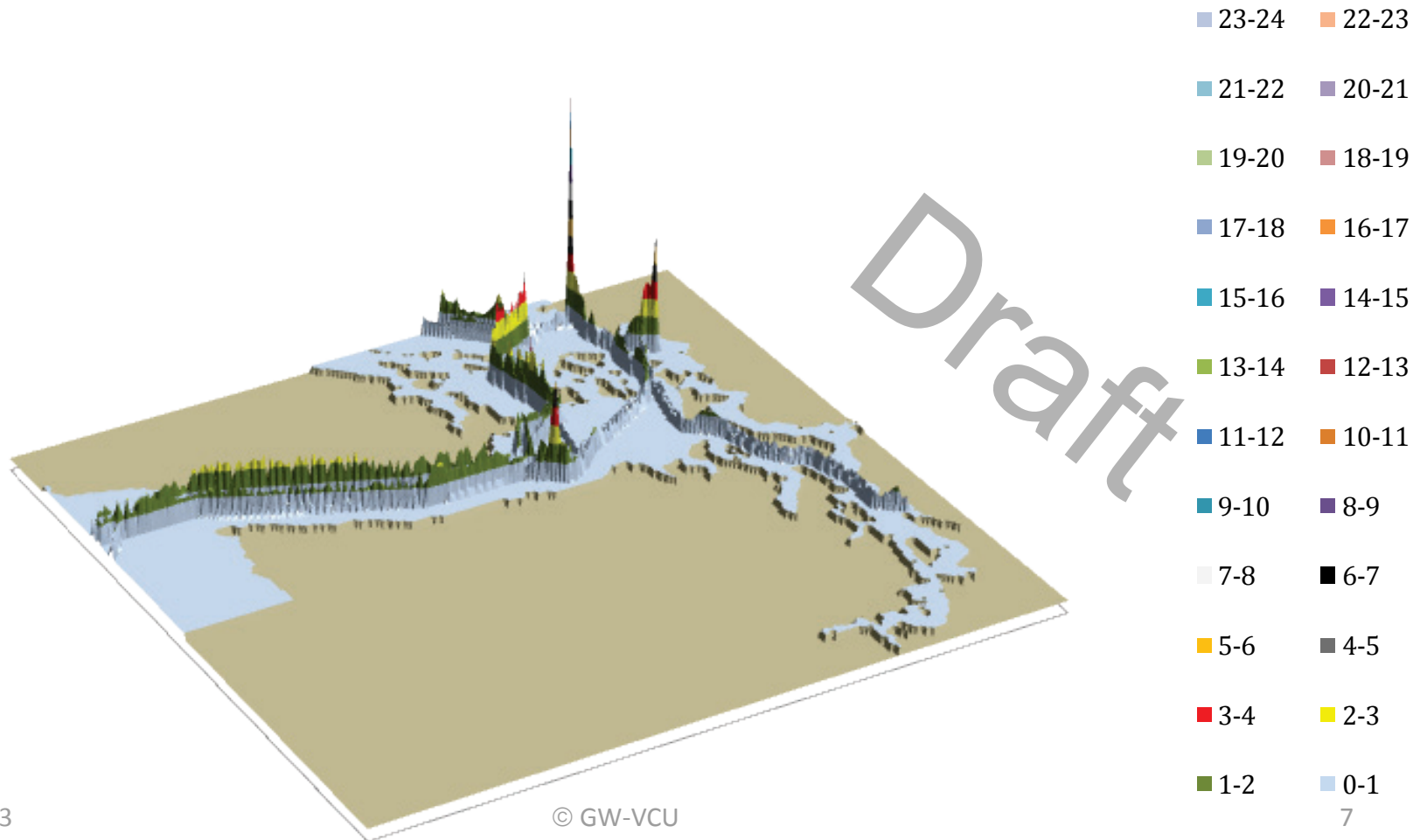
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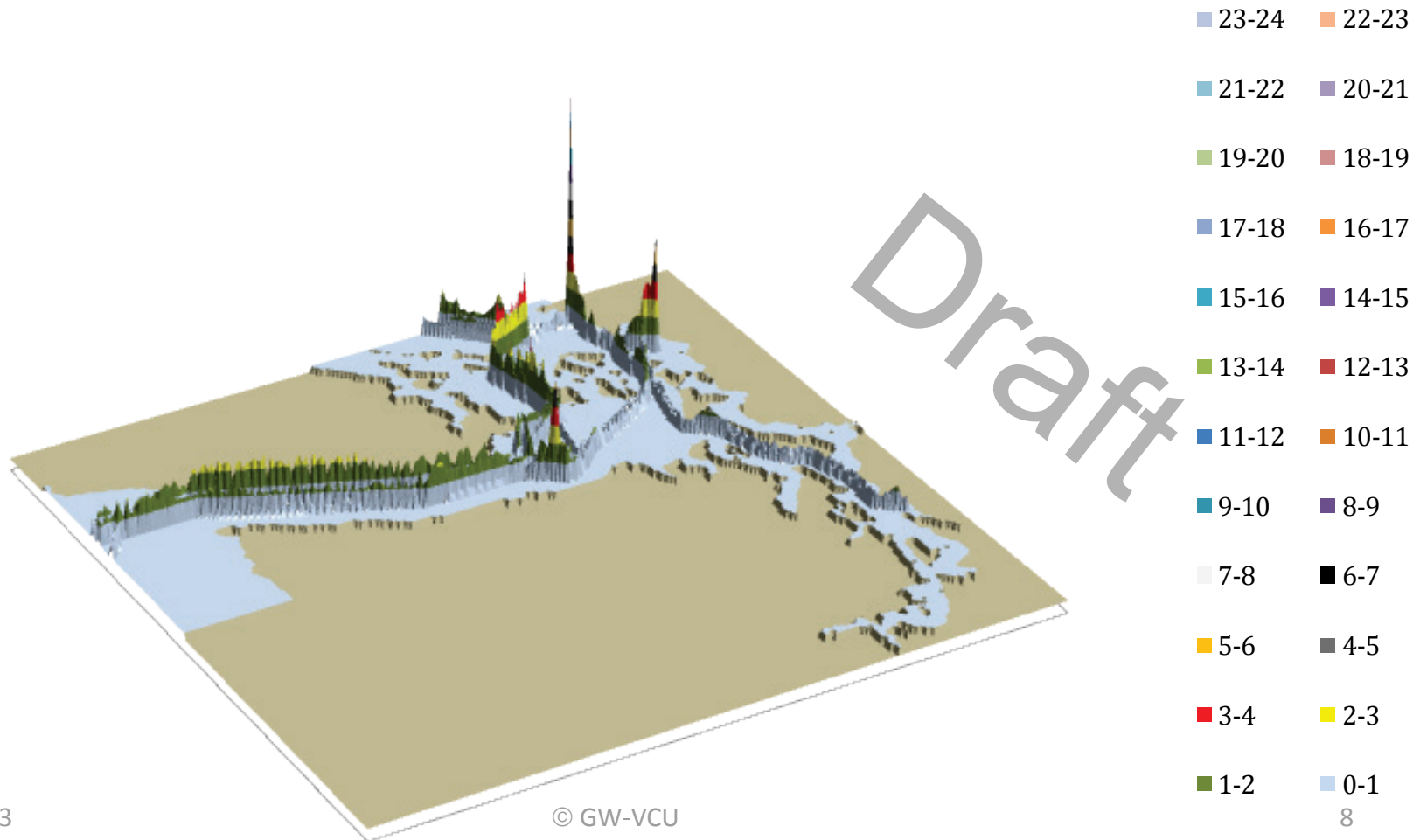
VESSEL TRAFFIC RISK ASSESSMENT (VTRA) 2010

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



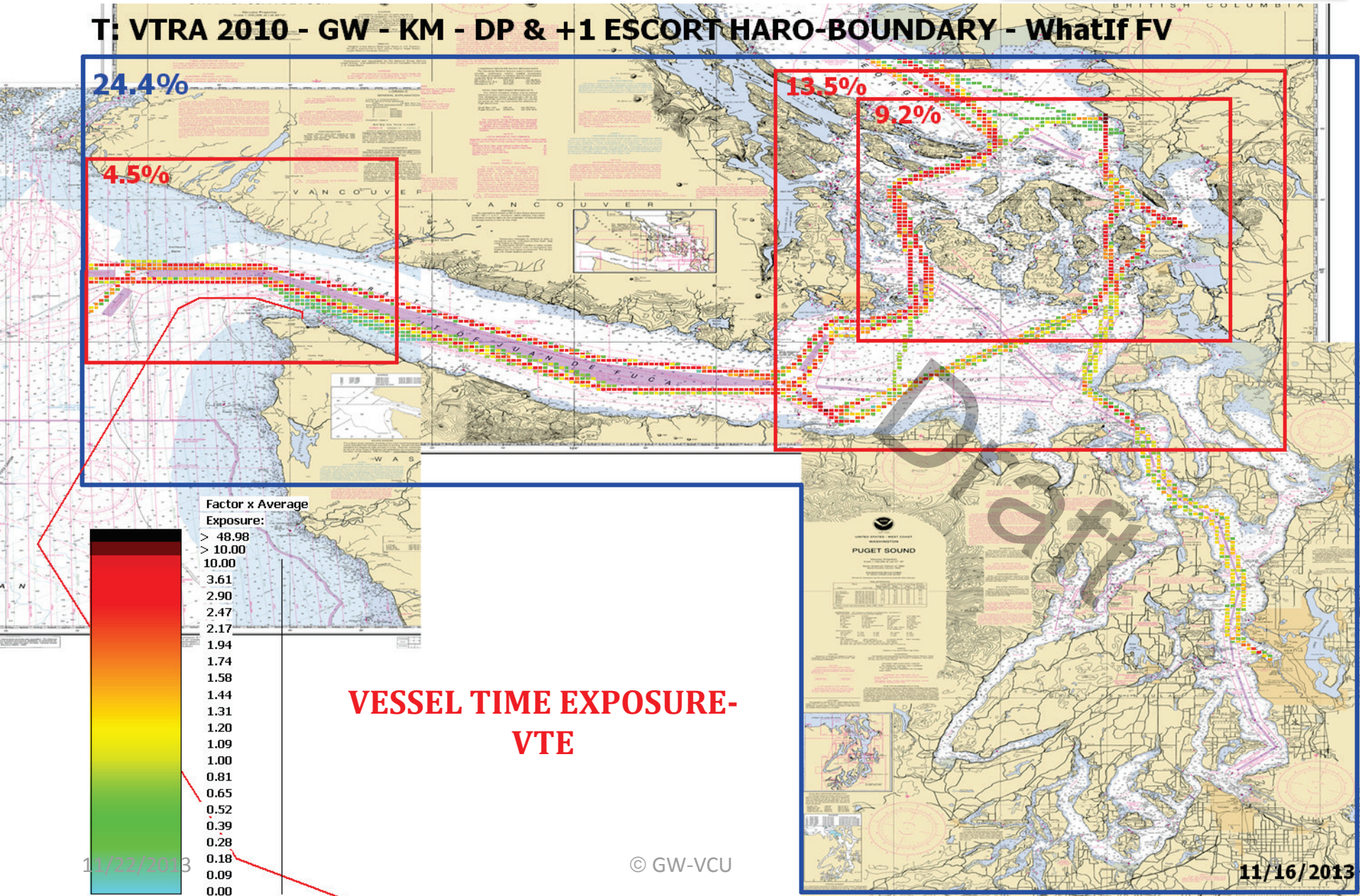
VESSEL TRAFFIC RISK ASSESSMENT (VTRA) 2010

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



VESSEL TRAFFIC RISK ASSESSMENT (VTRA) 2010

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



VESSEL TIME EXPOSURE-
VTE

- 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
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 - 0.39
 - 0.28
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 - 0.09
 - 0.00

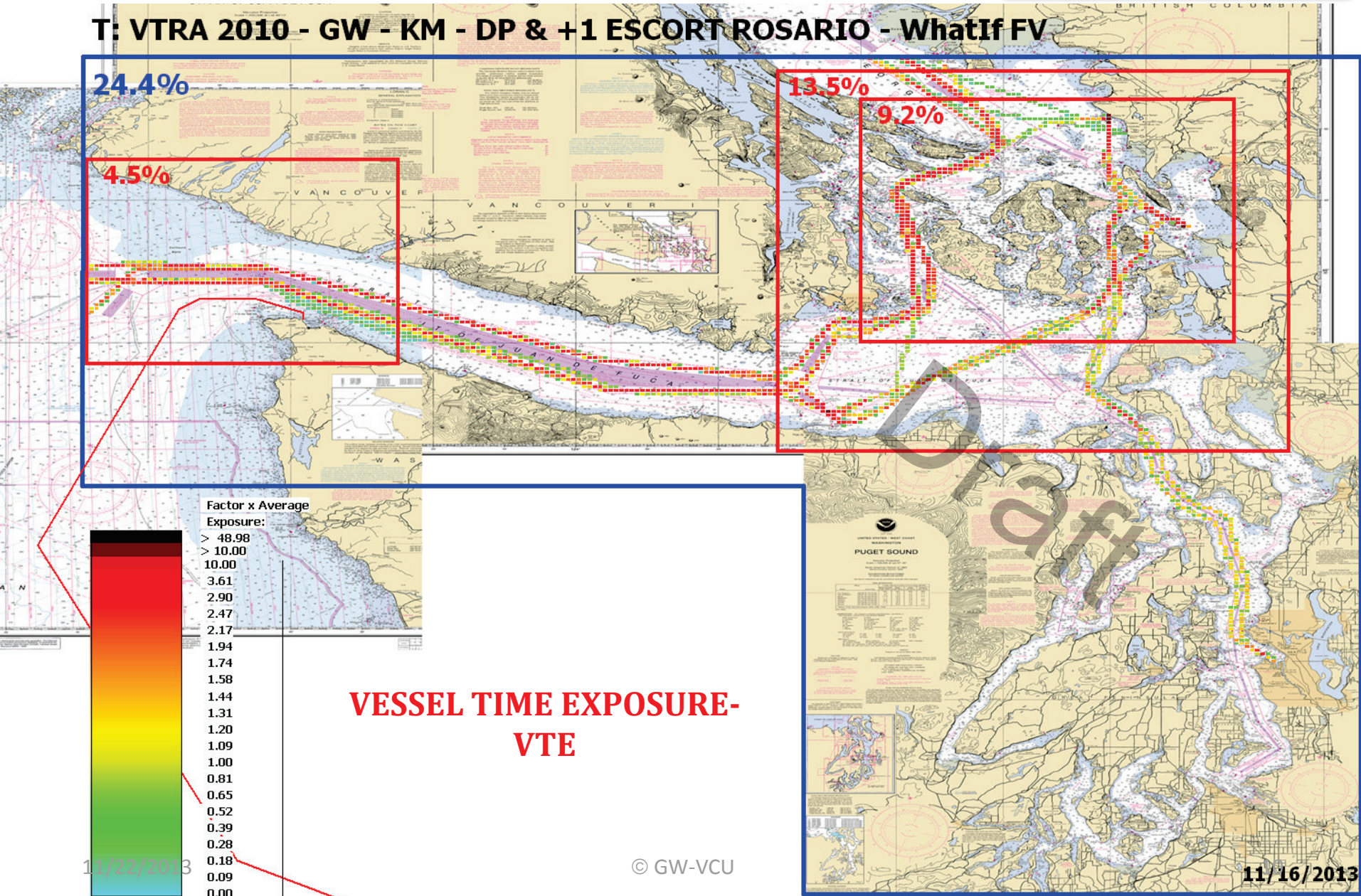
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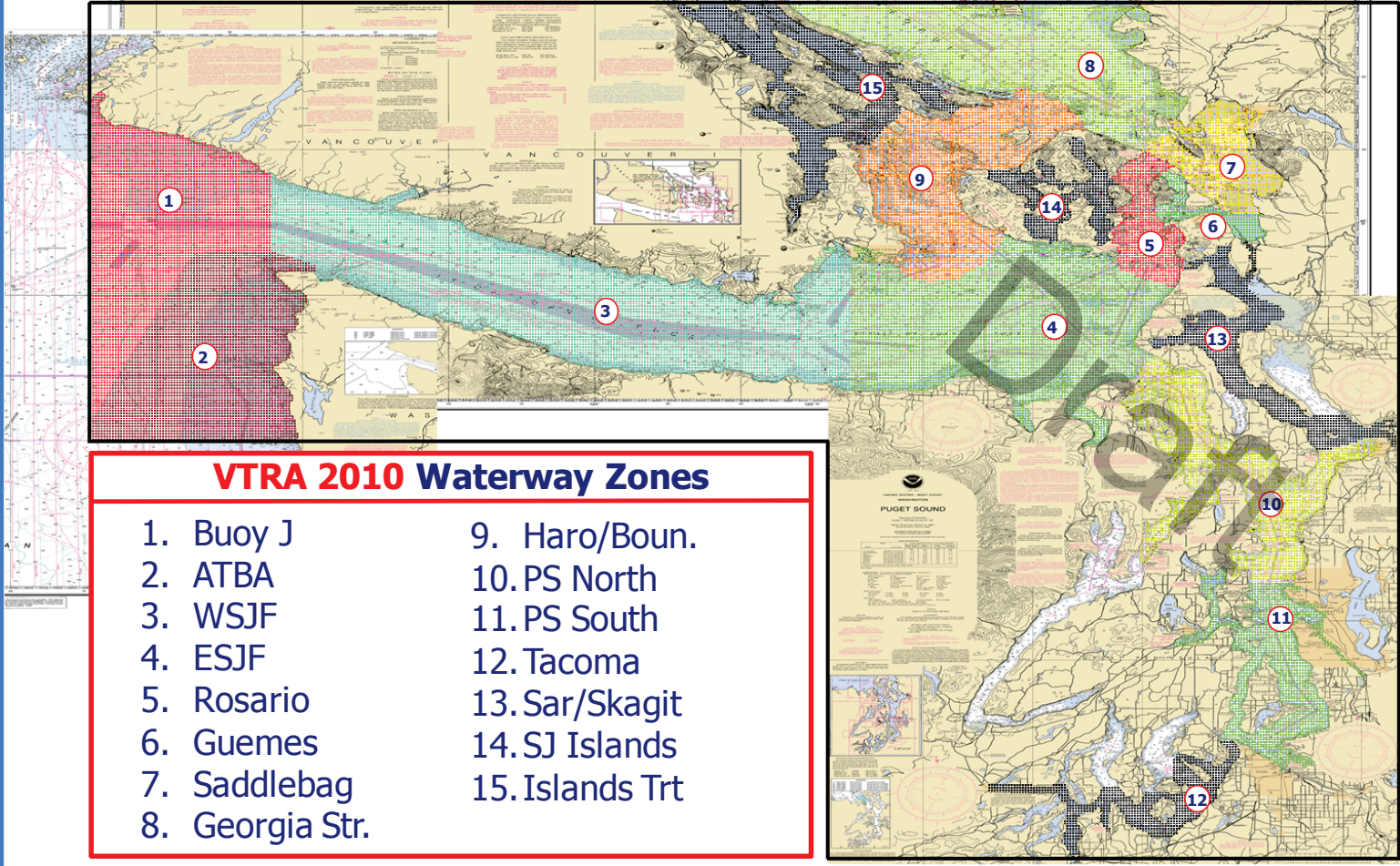
VESSEL TRAFFIC RISK ASSESSMENT (VTRA) 2010

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



VESSEL TRAFFIC RISK ASSESSMENT (VTRA) 2010

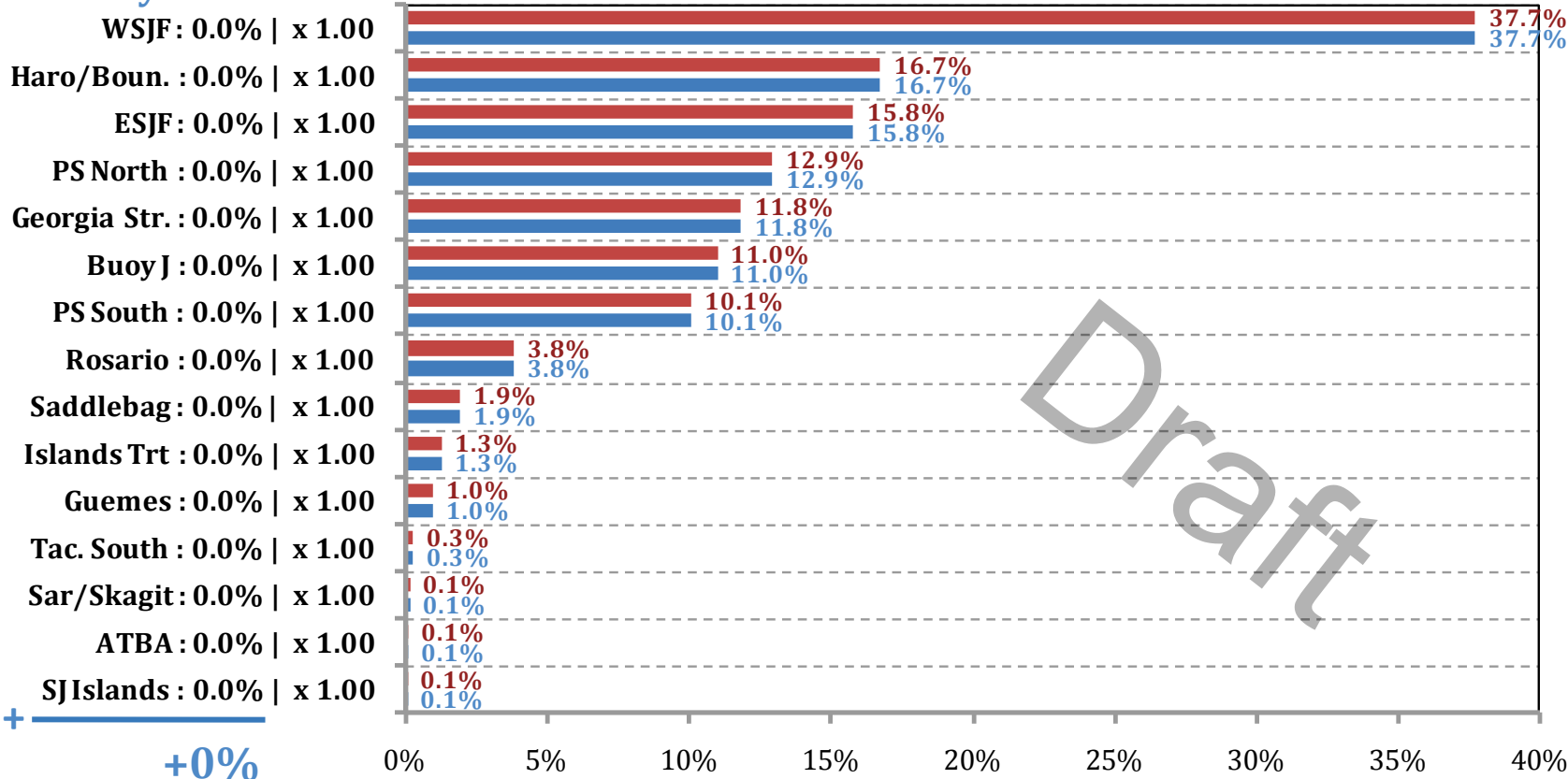
DEFINITION OF 15 WATERWAY ZONES



VESSEL TRAFFIC RISK ASSESSMENT (VTRA) 2010

% Base Case Vessel Time Exposure (VTE) - ALL_FV

Waterway Zone:



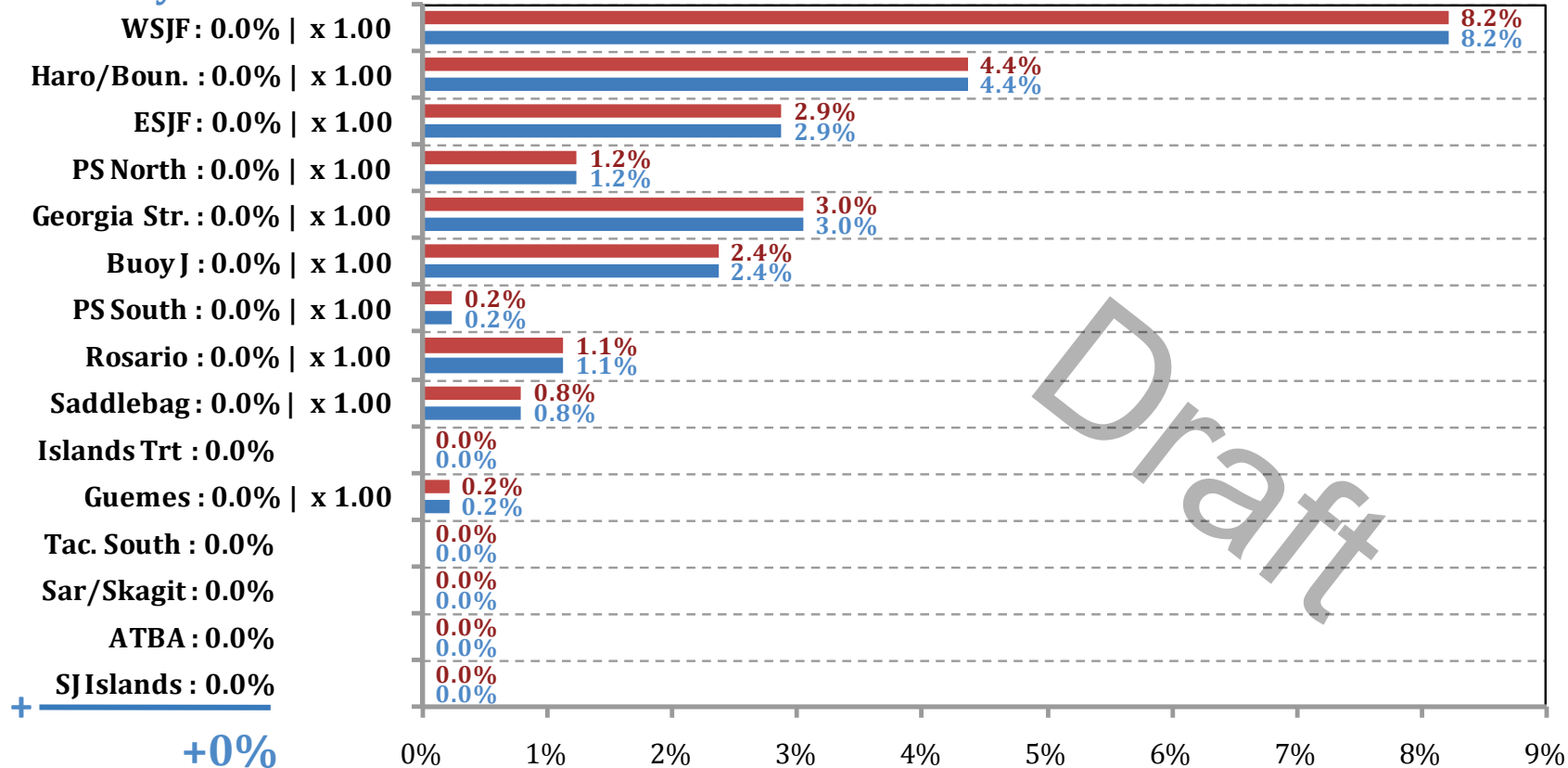
% Base Case Vessel Time Exposure (VTE) - ALL_FV

■ T:GW - KM - DP & ER : 125% (+0% | x 1.00) ■ T:GW - KM - DP & EH : 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 & ER : 24% (+0% | x 1.00)

■ T:GW - KM - DP & EH : 24%