

VESSEL TRAFFIC RISK ASSESSMENT (VTRA) 2010

3D Relative Risk Profile Comparison
Potential Collision Oil Loss

CASE T – GW – KM – DP & 6 RMM's

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

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VESSEL TRAFFIC RISK ASSESSMENT (VTRA) 2010



RMM 1: Max. Speed of Container Vessels at 17 knots.

RMM 2: Reduce Human Error incident on Oil Barges by 50%

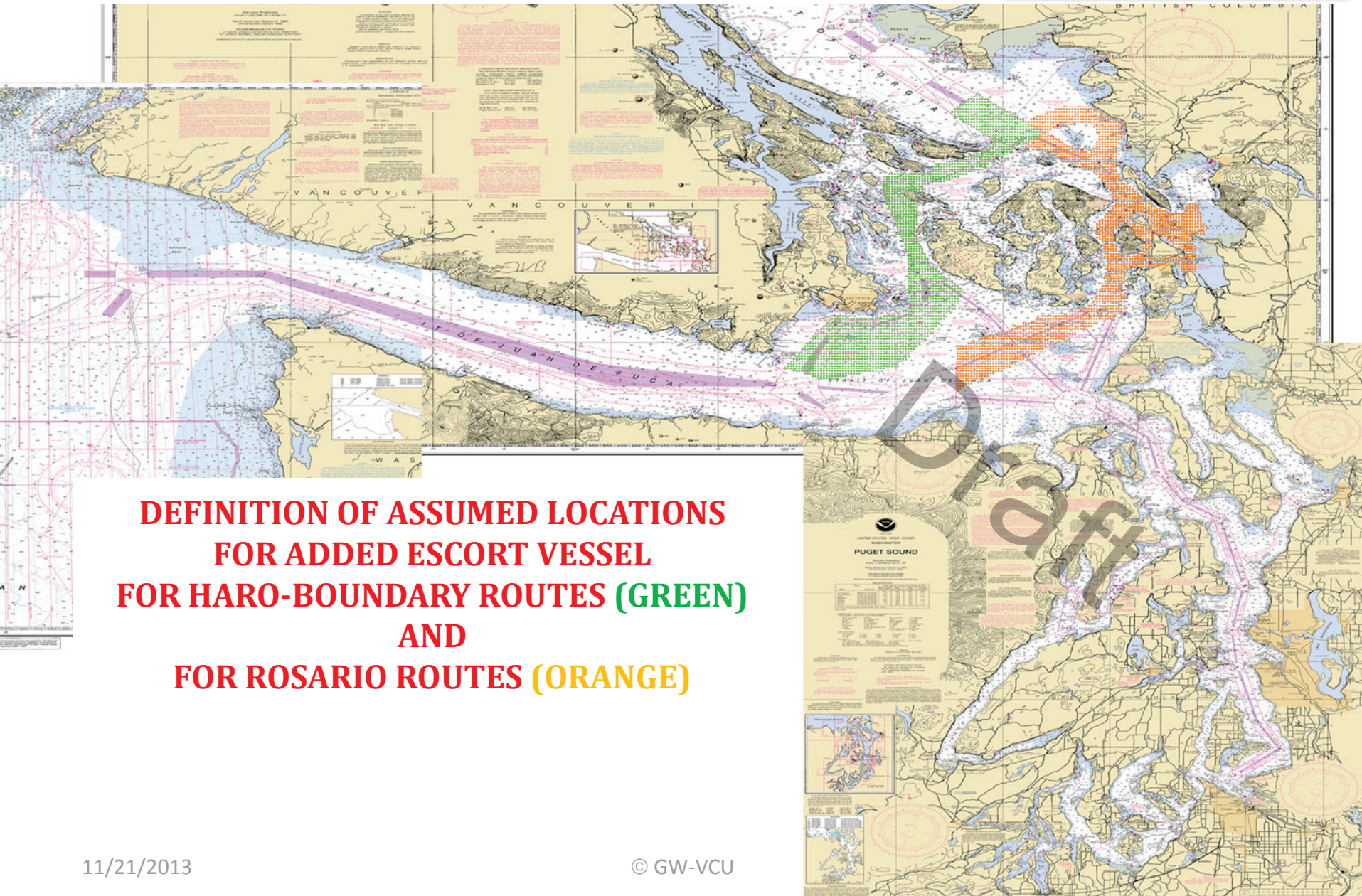
RMM 3: No Bunkering for Gateway Vessels

RMM 4: ATB Vessels obey Rosario one-way regime

RMM 5: + 1 Escort for Laden Tank Focus Vessels (except Oil Barges) and Cape size Bulk Carriers on Rosario Routes (see next page)

RMM 6: + 1 Escort for All Focus Vessels on Haro-Boundary Pass Routes (see next page)

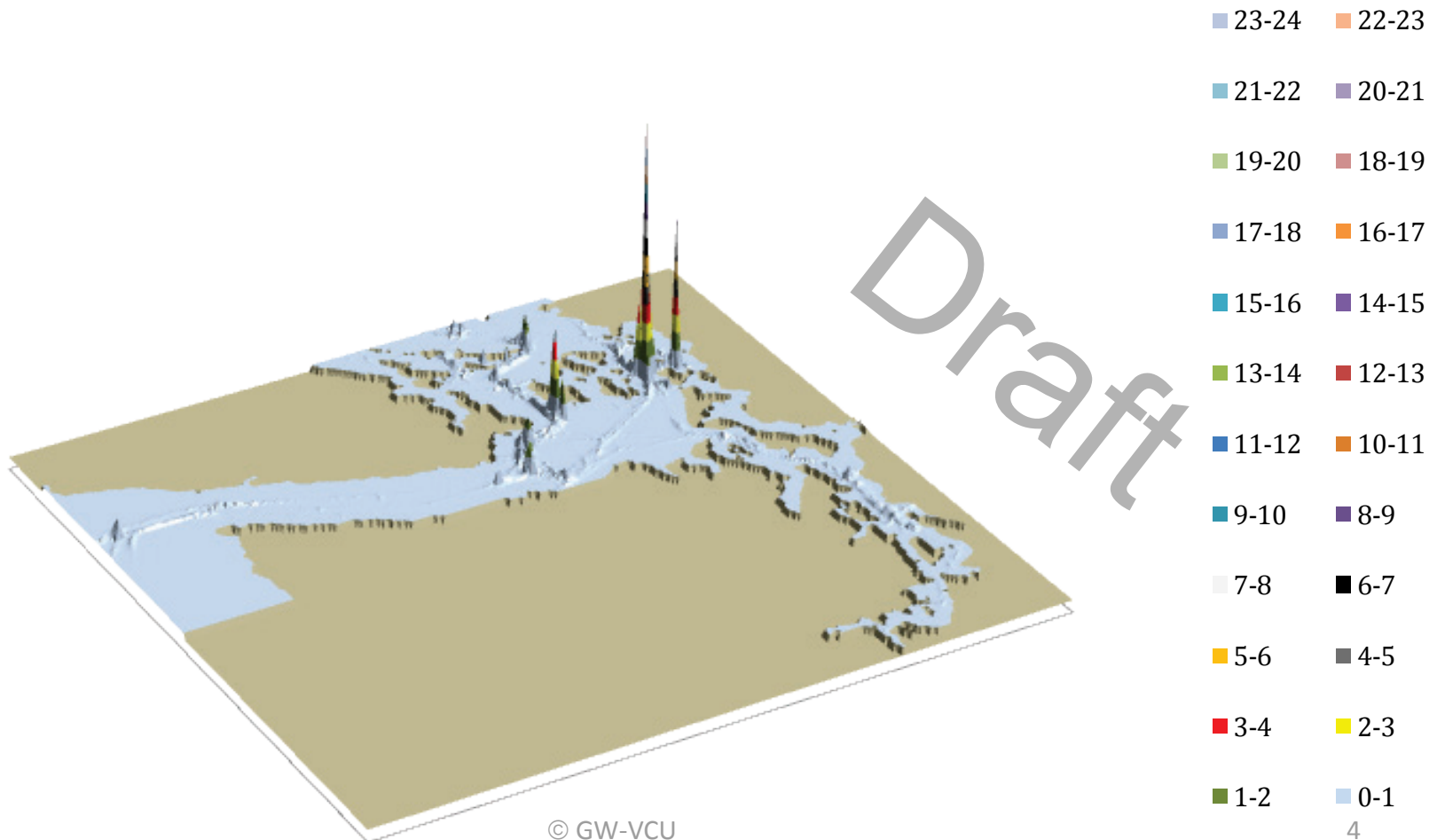
VESSEL TRAFFIC RISK ASSESSMENT (VTRA) 2010



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

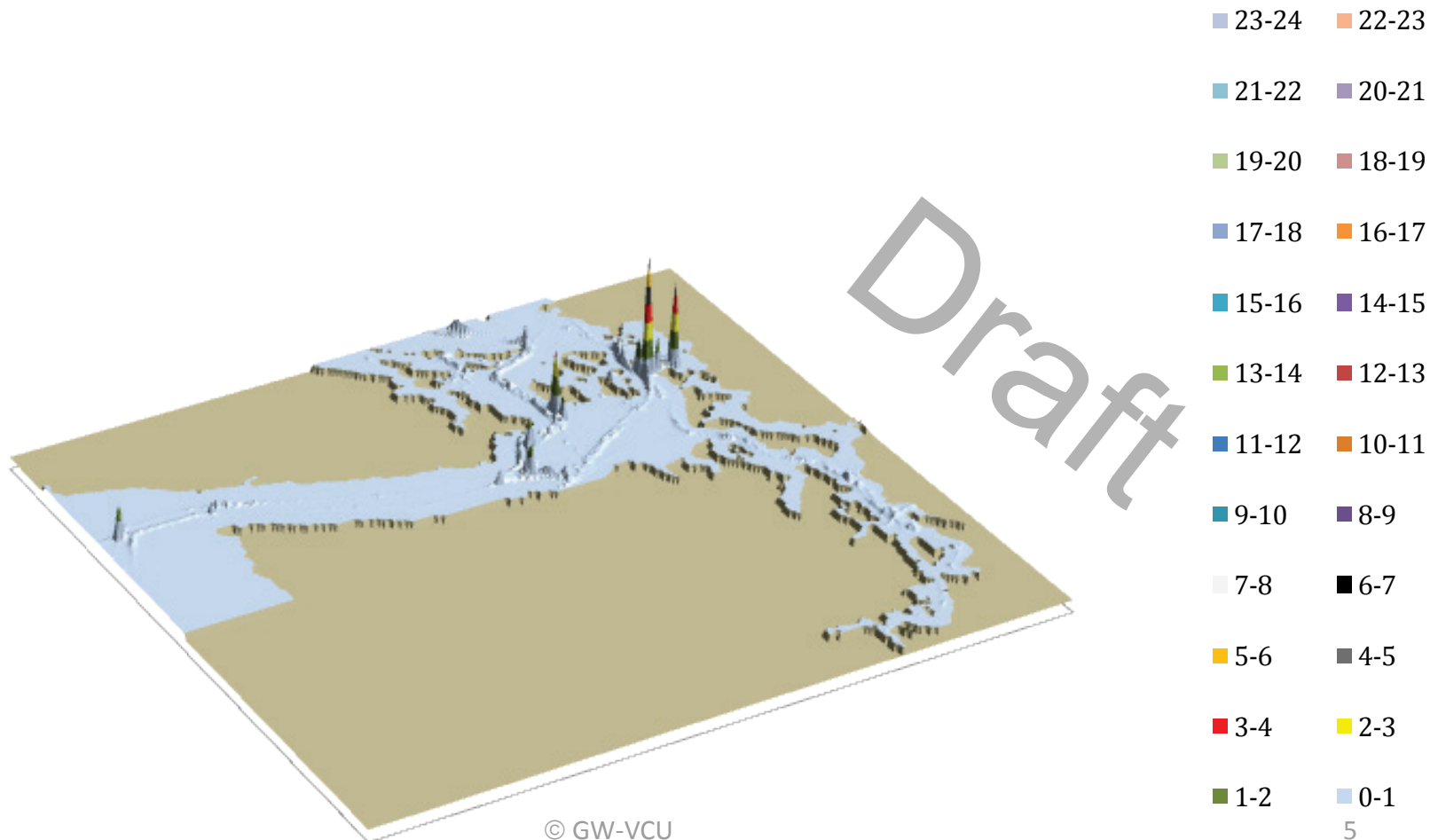
VESSEL TRAFFIC RISK ASSESSMENT (VTRA) 2010

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



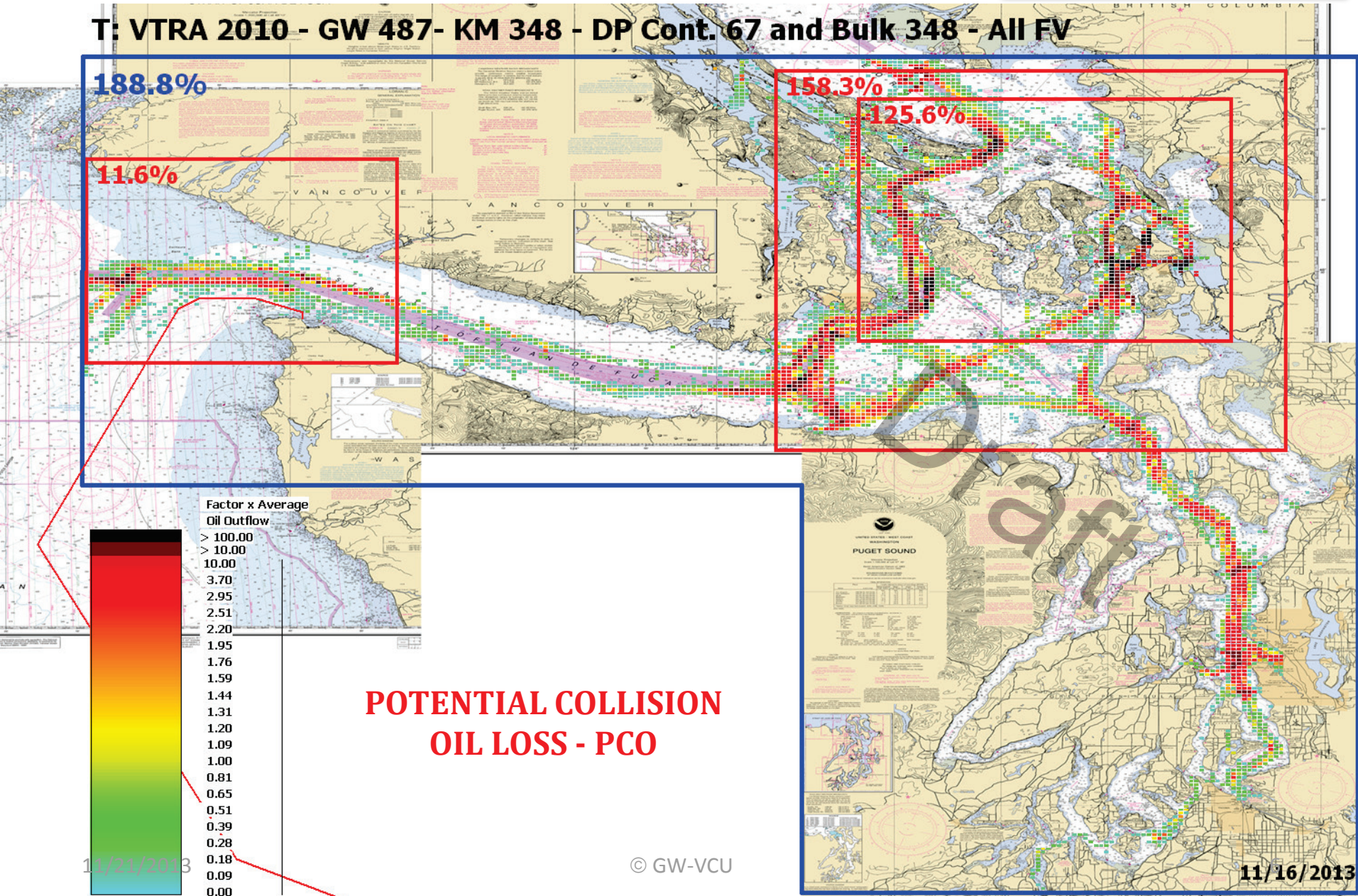
VESSEL TRAFFIC RISK ASSESSMENT (VTRA) 2010

T: GW - KM - DP & 6 RMM 3D Risk Profile All FV - Pot. Collision Oil Loss: 120% of Base Case PCO



VESSEL TRAFFIC RISK ASSESSMENT (VTRA) 2010

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



POTENTIAL COLLISION OIL LOSS - PCO

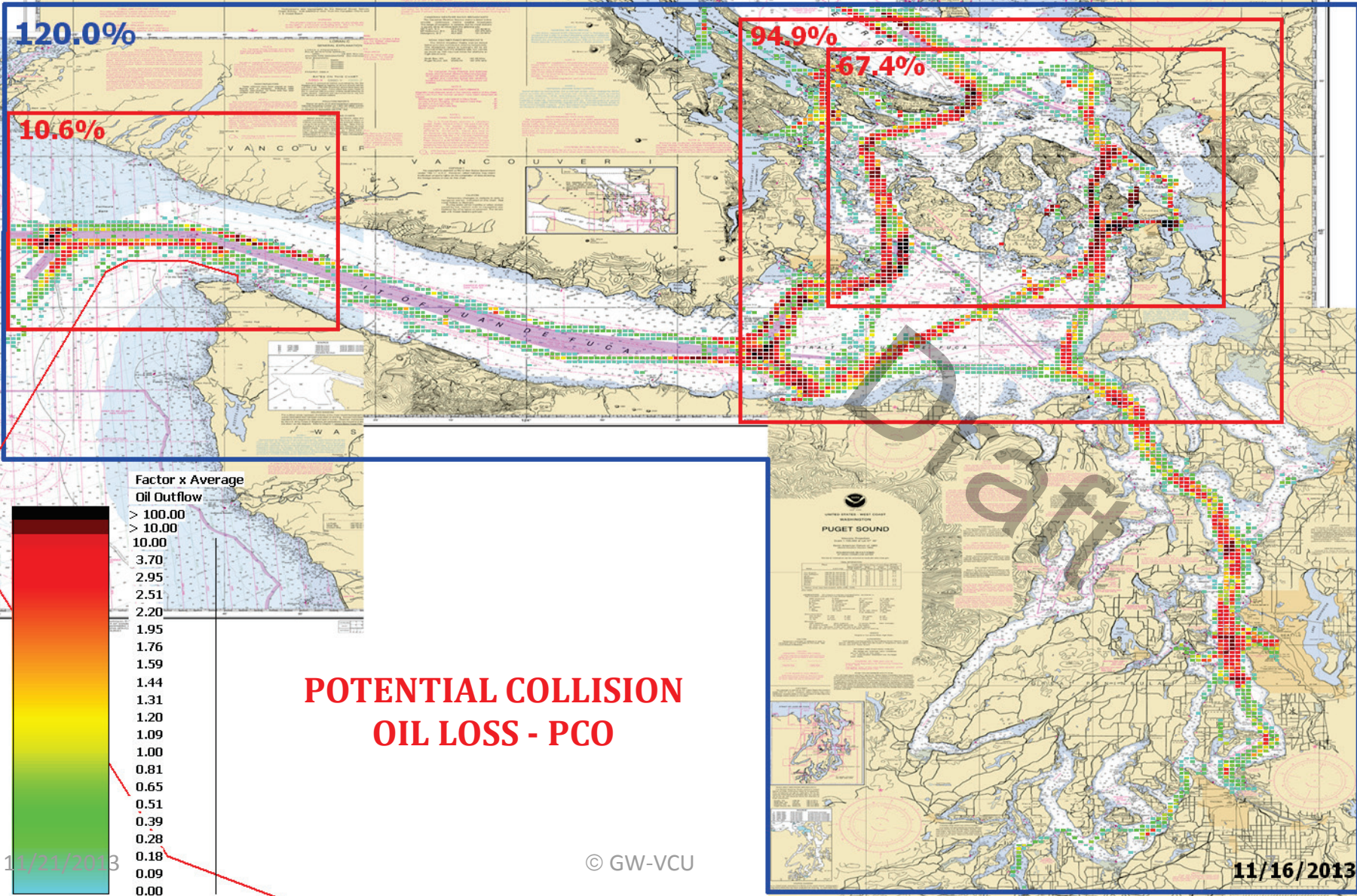
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VESSEL TRAFFIC RISK ASSESSMENT (VTRA) 2010

T: VTRA 2010 - GW - KM - DP & 6 RMM's - All FV



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

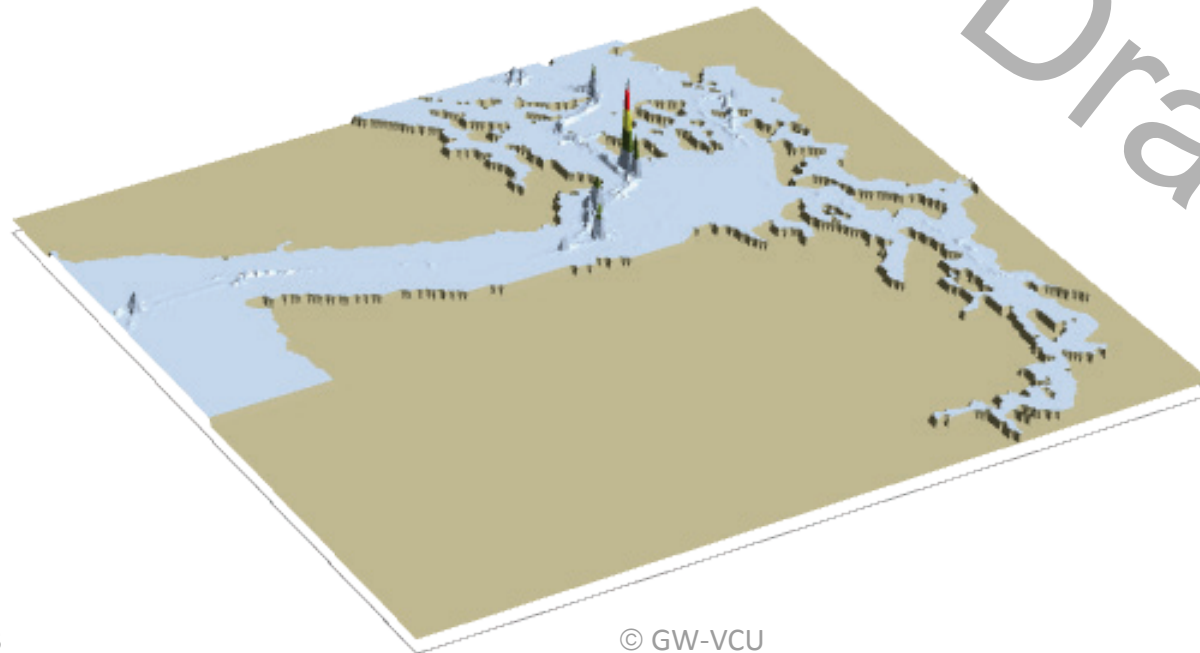
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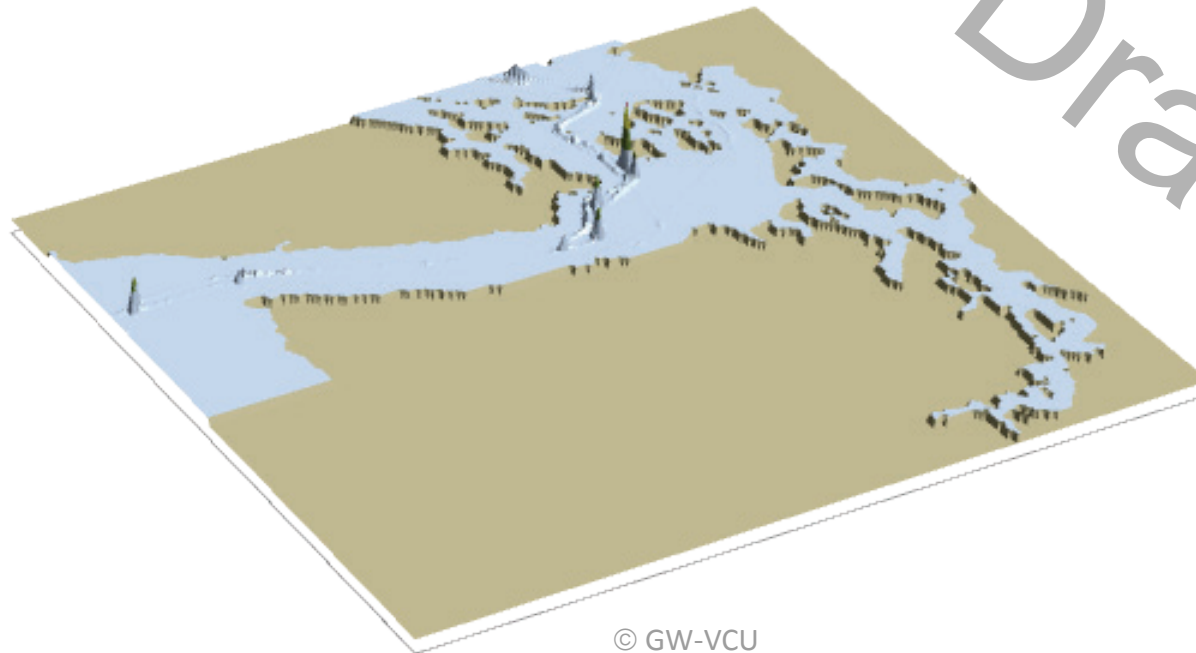
VESSEL TRAFFIC RISK ASSESSMENT (VTRA) 2010

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



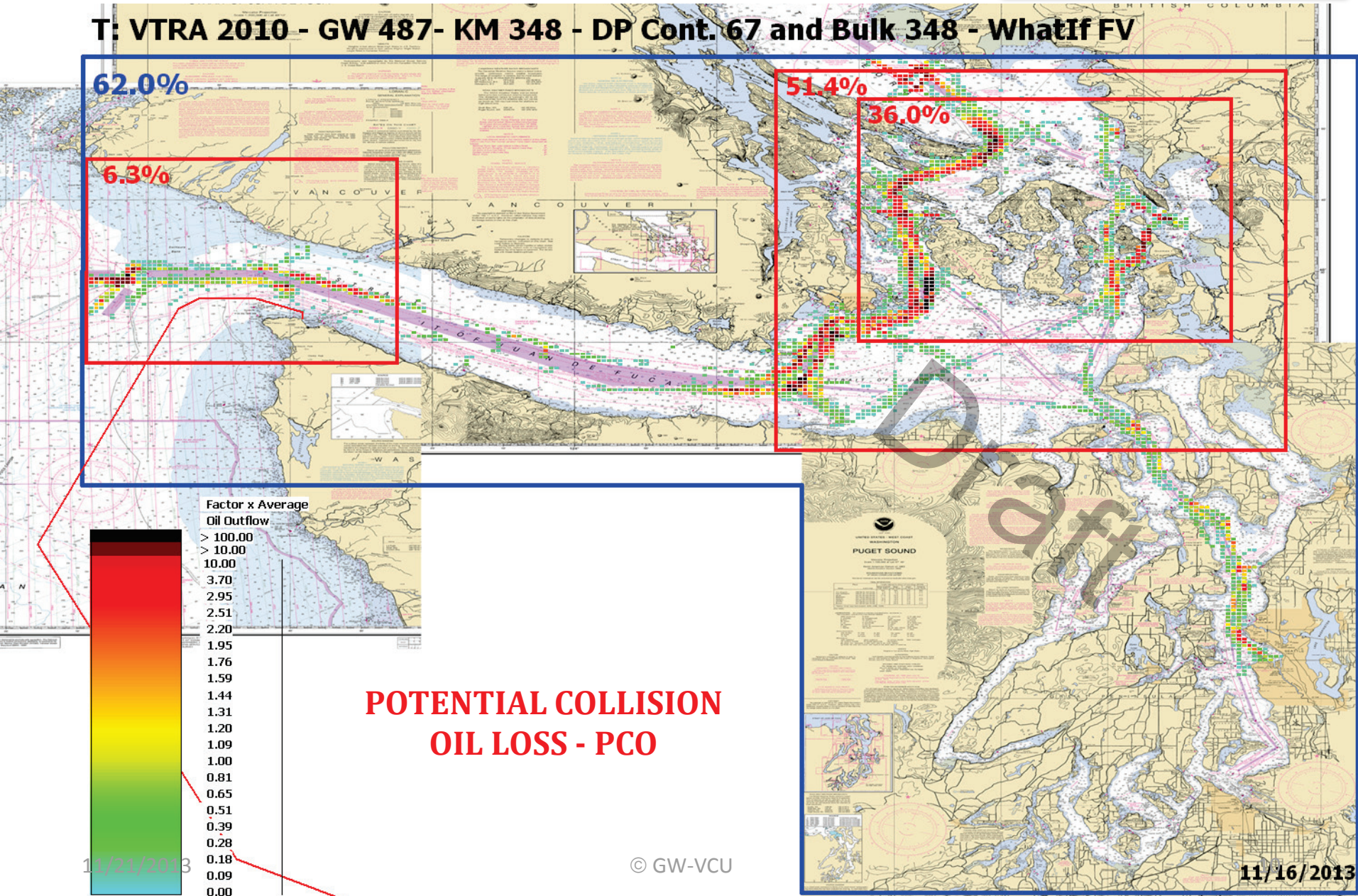
VESSEL TRAFFIC RISK ASSESSMENT (VTRA) 2010

T: GW - KM - DP & 6 RMM 3D Risk Profile What If FV - Pot. Coll. Oil Loss: 40% of Base Case PCO



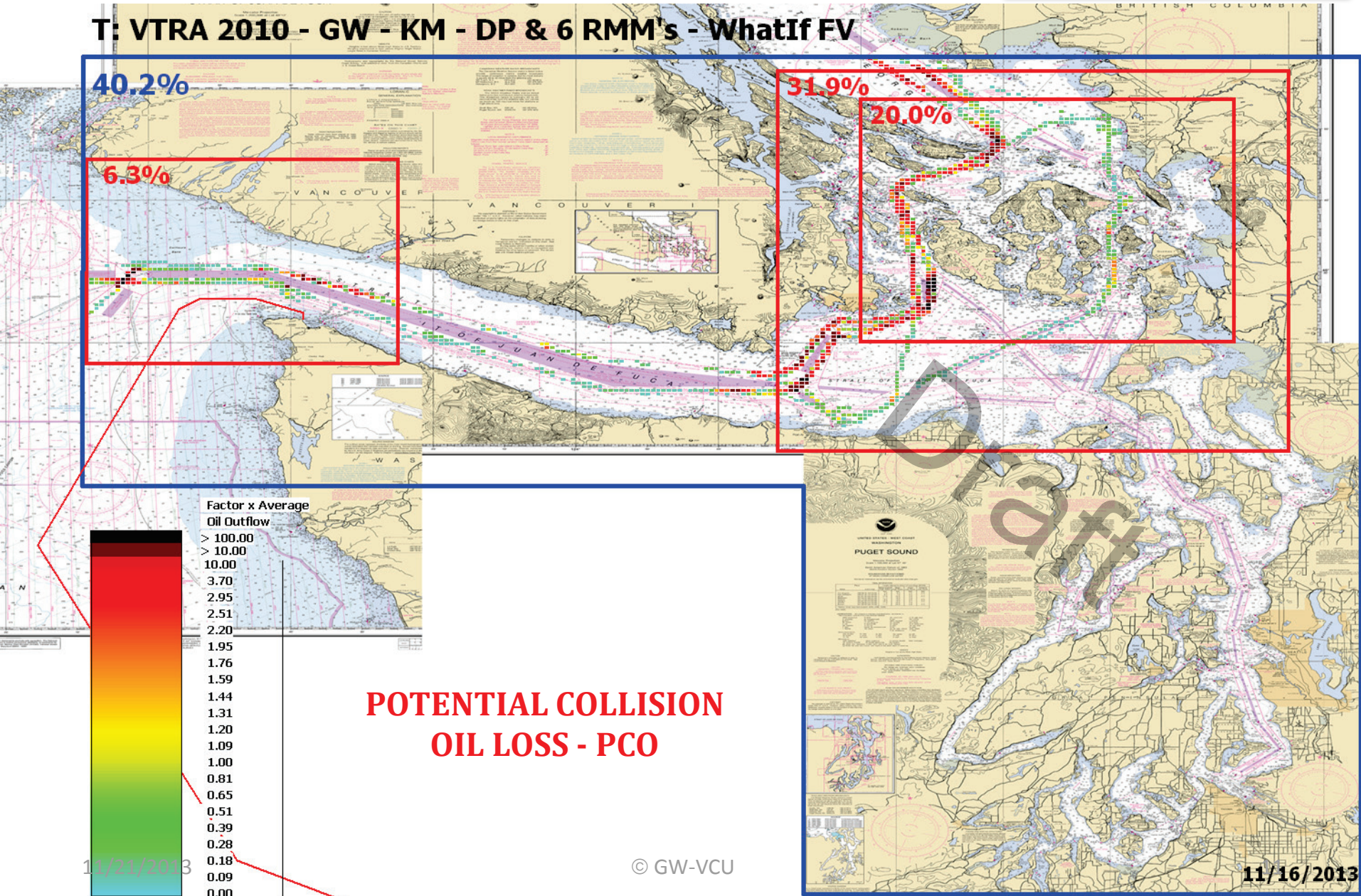
VESSEL TRAFFIC RISK ASSESSMENT (VTRA) 2010

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



VESSEL TRAFFIC RISK ASSESSMENT (VTRA) 2010

T: VTRA 2010 - GW - KM - DP & 6 RMM's - WhatIf FV



POTENTIAL COLLISION OIL LOSS - PCO

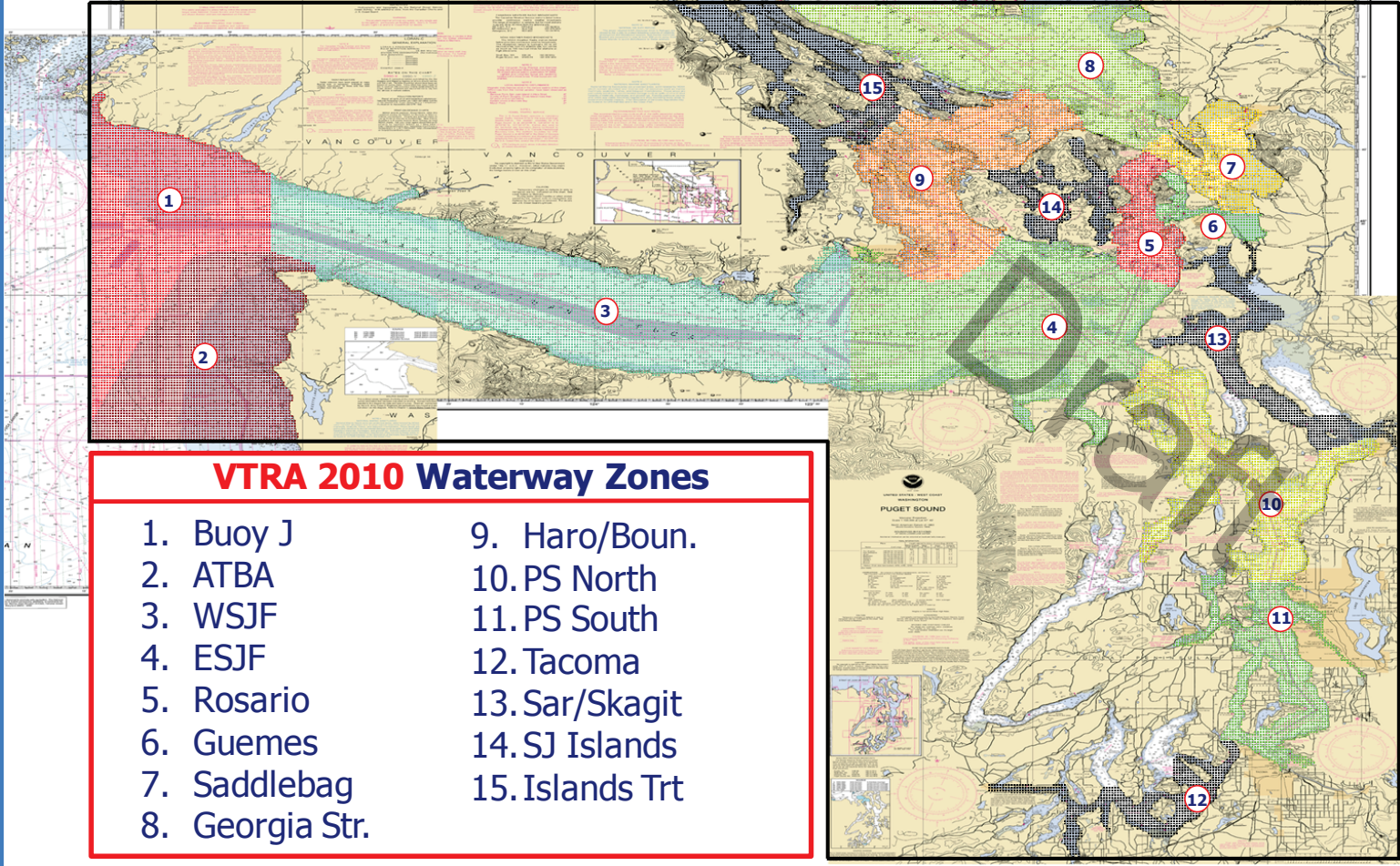
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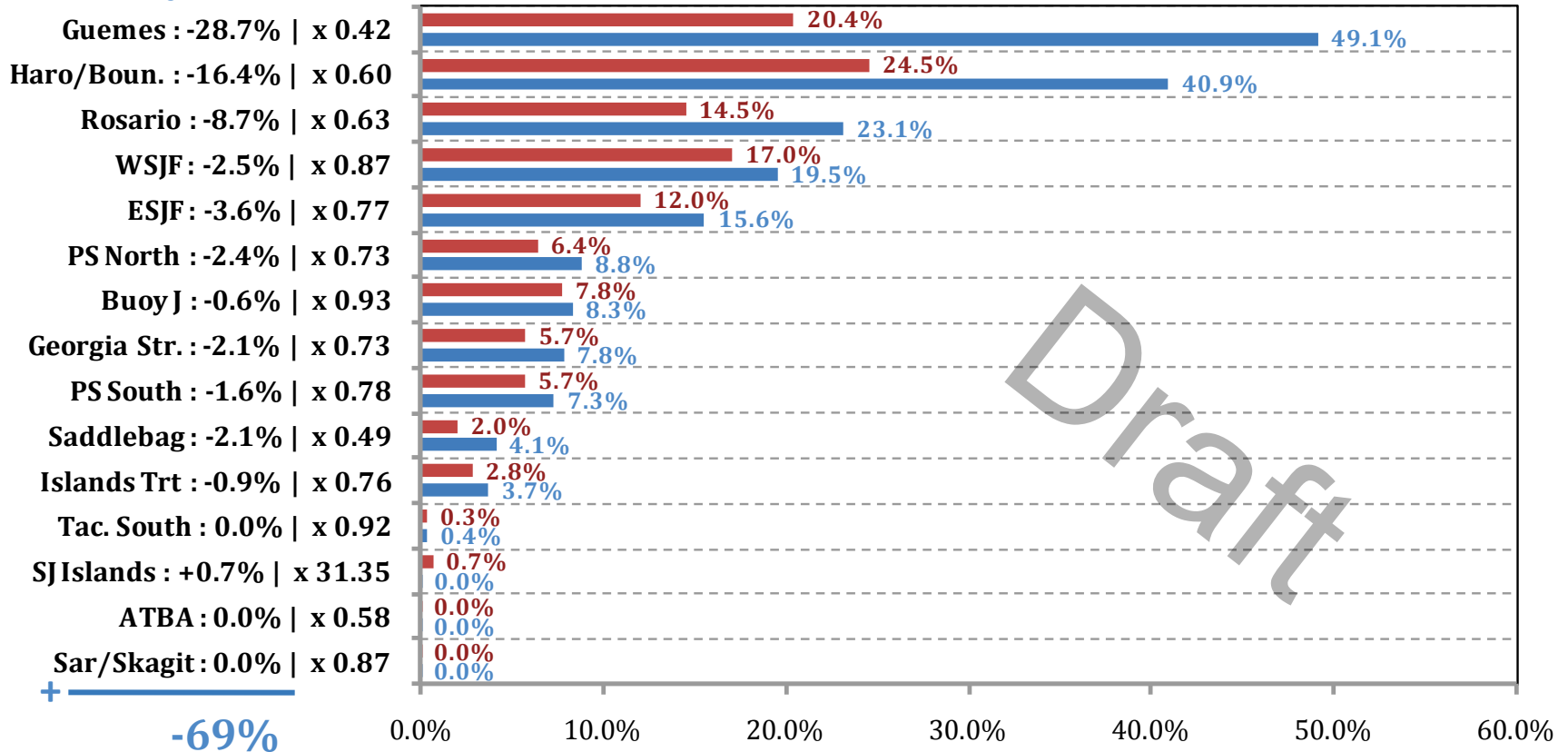
DEFINITION OF 15 WATERWAY ZONES



VESSEL TRAFFIC RISK ASSESSMENT (VTRA) 2010

% Base Case Collision Oil Loss - ALL_FV

Waterway Zone:



% of Base Case Annual Collision Oil Loss - ALL_FV

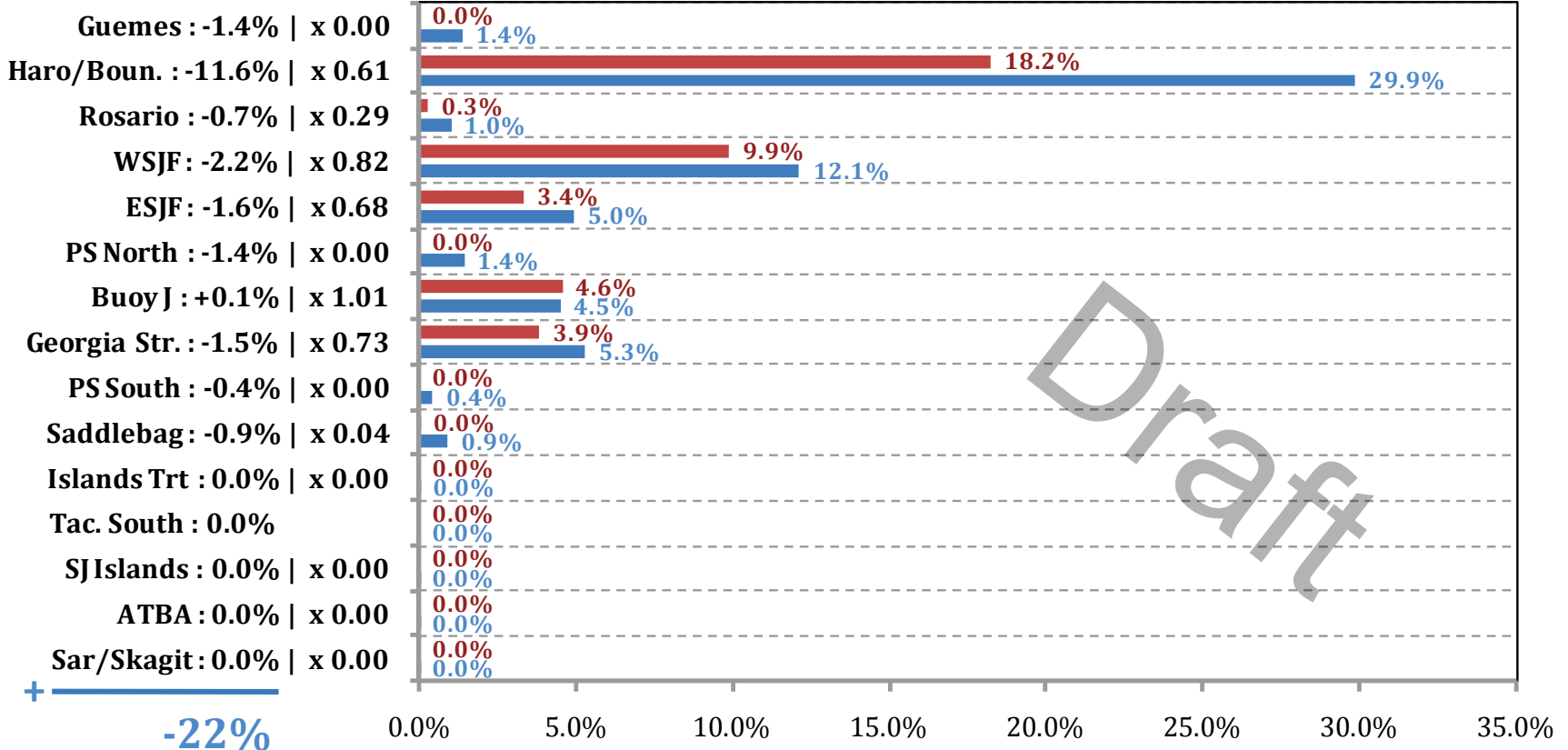
■ T:GW - KM - DP & 6 RMM : 120% (-69% | x 0.64)

■ T:GW - KM - DP : 189%

VESSEL TRAFFIC RISK ASSESSMENT (VTRA) 2010

% Base Case Collision Oil Loss - WhatIf

Waterway Zone:



■ T:GW - KM - DP & 6 RMM : 40% (-22% | x 0.65)

■ T:GW - KM - DP : 62%