

VESSEL TRAFFIC RISK ASSESSMENT (VTRA) 2010

3D Relative Risk Profile Comparison
Potential Collision Accident Frequency

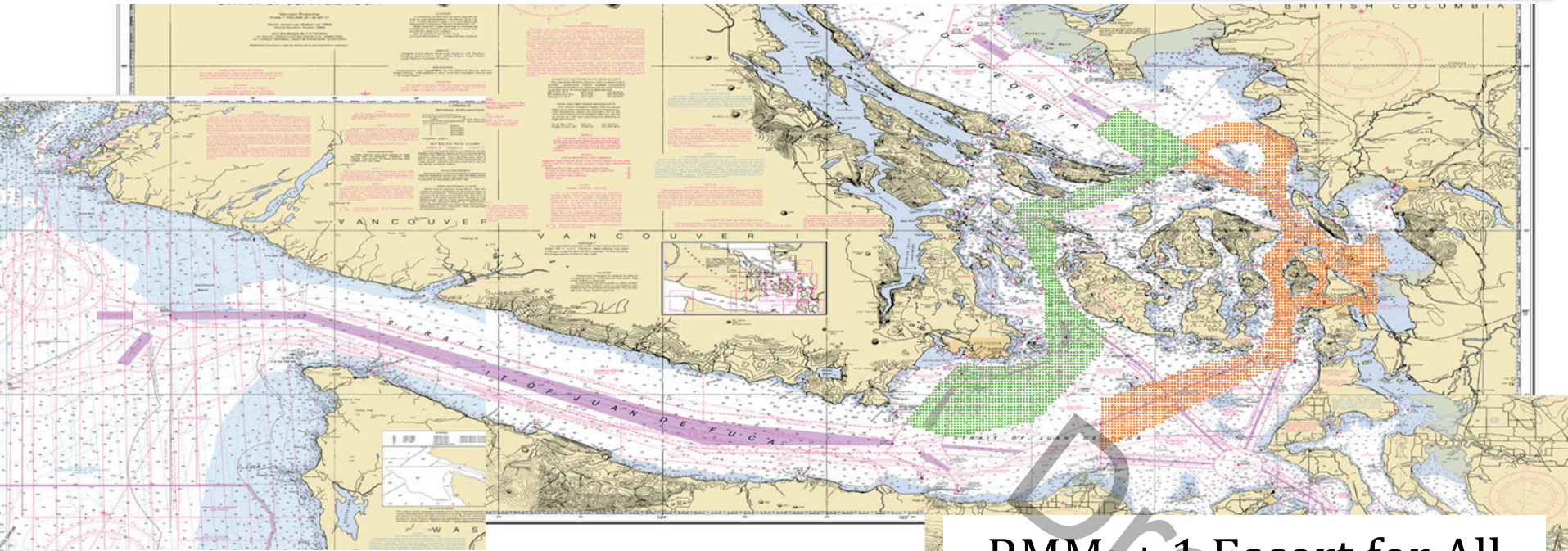
**CASE T: GW – KM – DP & +1 Escort for all
Focus Vessels on Haro Routes**

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November 2013



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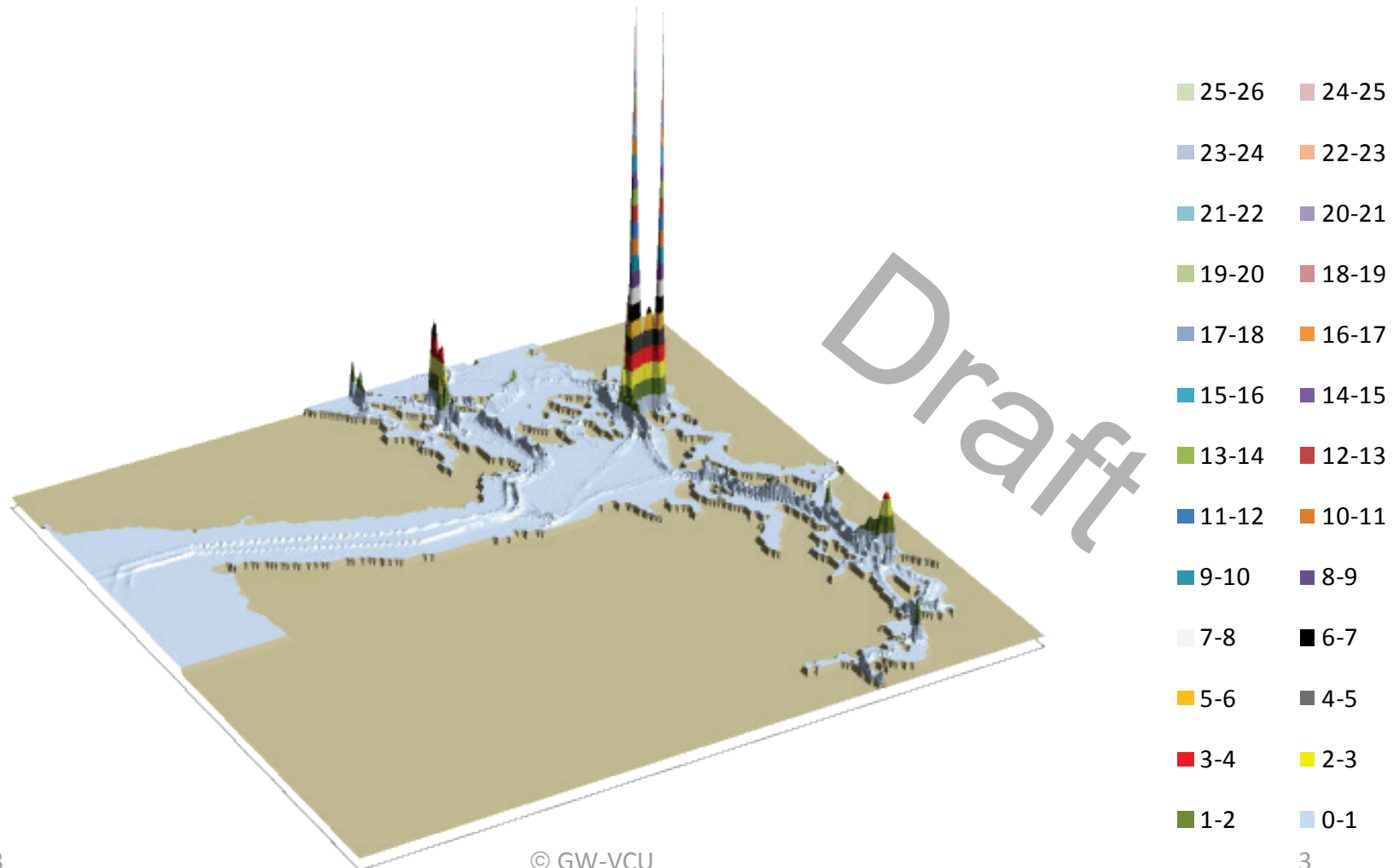


**DEFINITION OF ASSUMED LOCATIONS
FOR ADDED ESCORT VESSEL
FOR HARO-BOUNDARY ROUTES (GREEN)
AND
FOR ROSARIO ROUTES (ORANGE)**

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

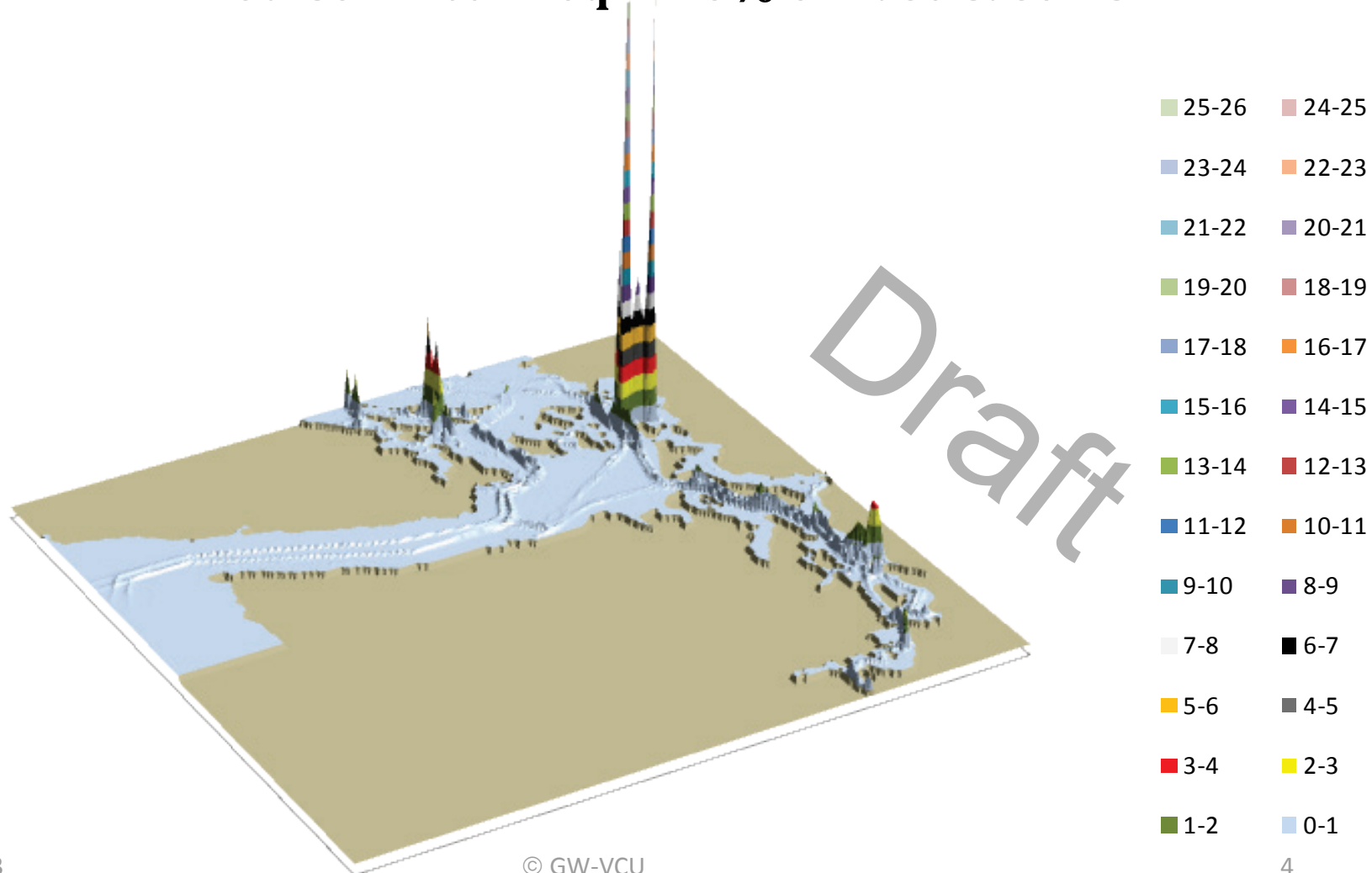
VESSEL TRAFFIC RISK ASSESSMENT (VTRA) 2010

T: GW - KM - DP 3D Risk Profile
All FV - Pot. Coll. Acc. Freq.: 121% of Base Case PCF



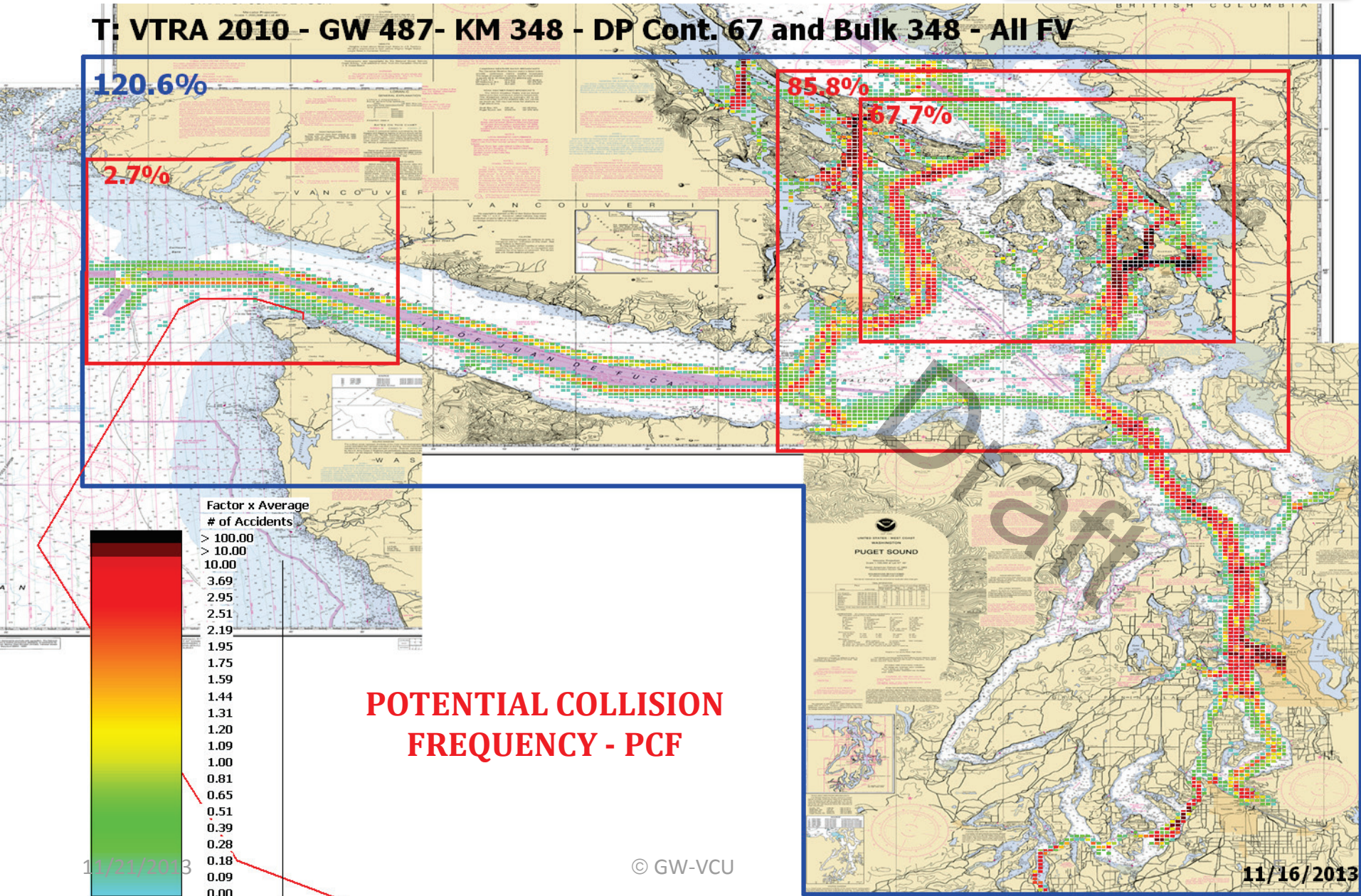
VESSEL TRAFFIC RISK ASSESSMENT (VTRA) 2010

T: GW - KM - DP & EH 3D Risk Profile
All FV - Pot. Coll. Acc. Freq.: 116% of Base Case PCF



VESSEL TRAFFIC RISK ASSESSMENT (VTRA) 2010

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



POTENTIAL COLLISION FREQUENCY - PCF

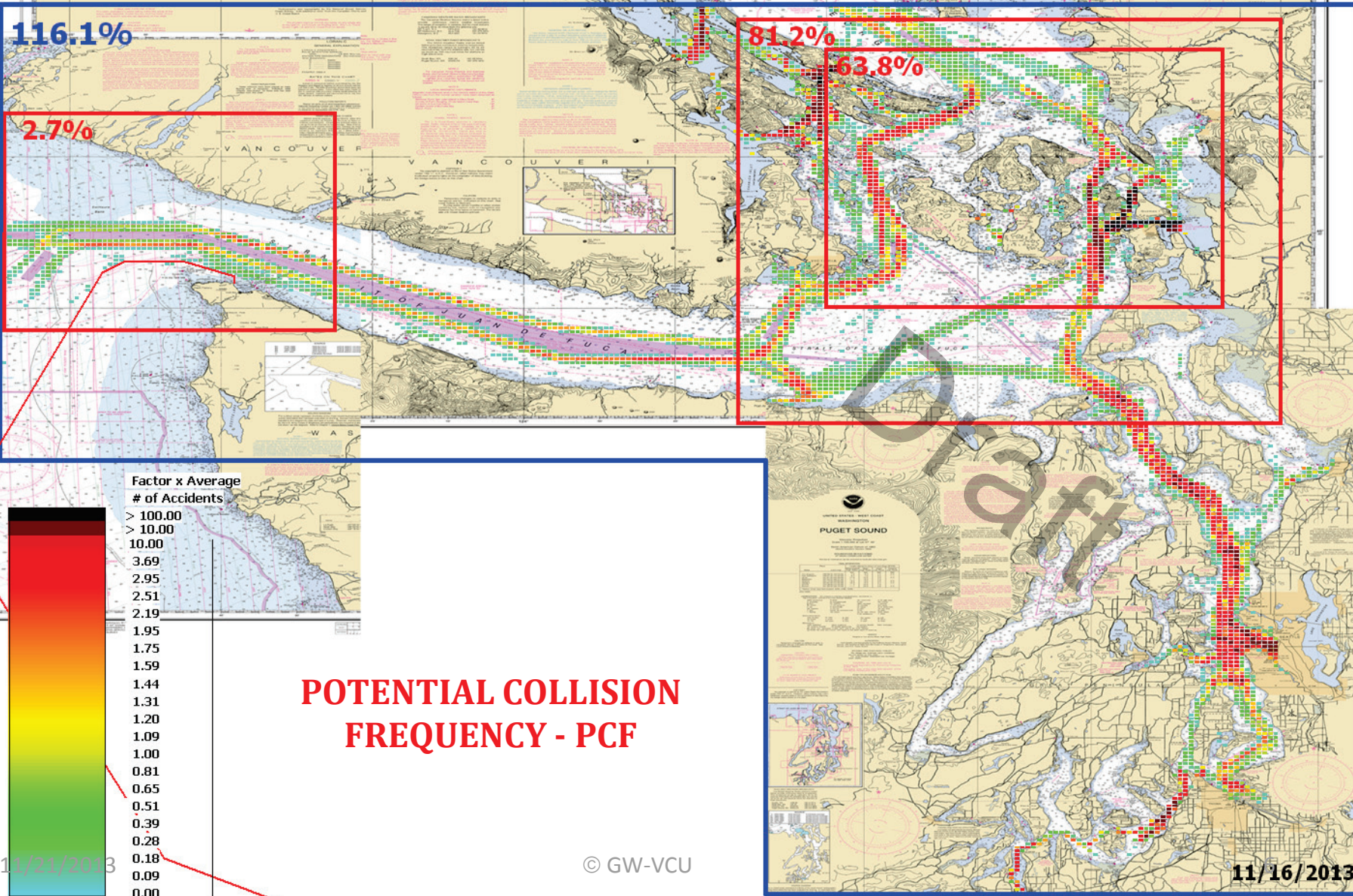
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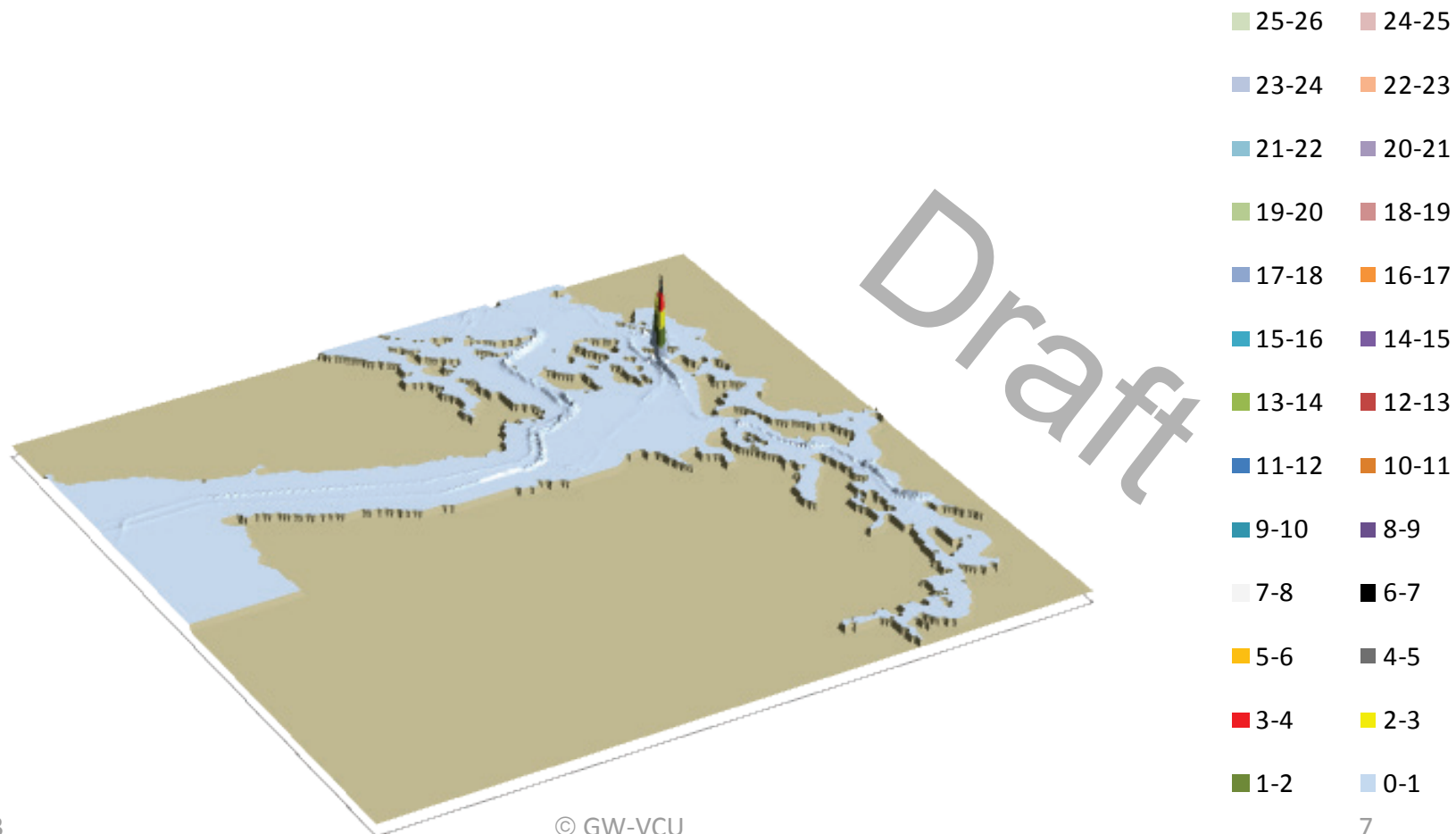
VESSEL TRAFFIC RISK ASSESSMENT (VTRA) 2010

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



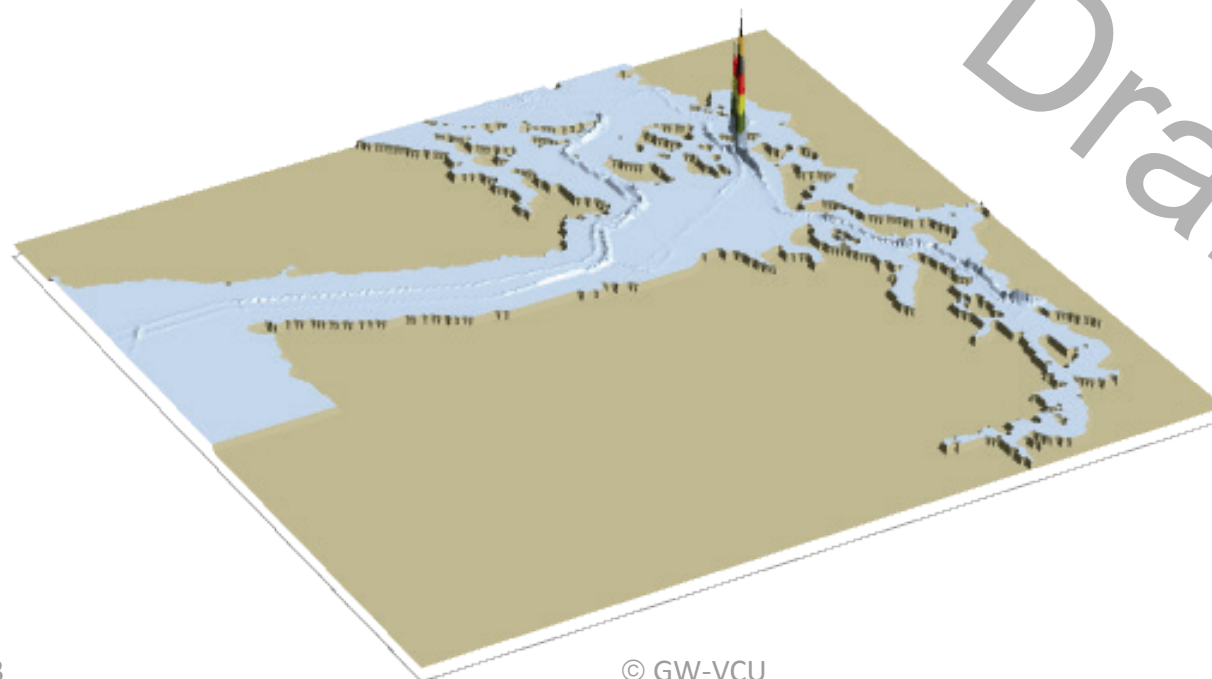
VESSEL TRAFFIC RISK ASSESSMENT (VTRA) 2010

T: GW - KM - DP 3D Risk Profile What If FV - Pot. Coll. Acc. Fr.: 18% of Base Case PCF



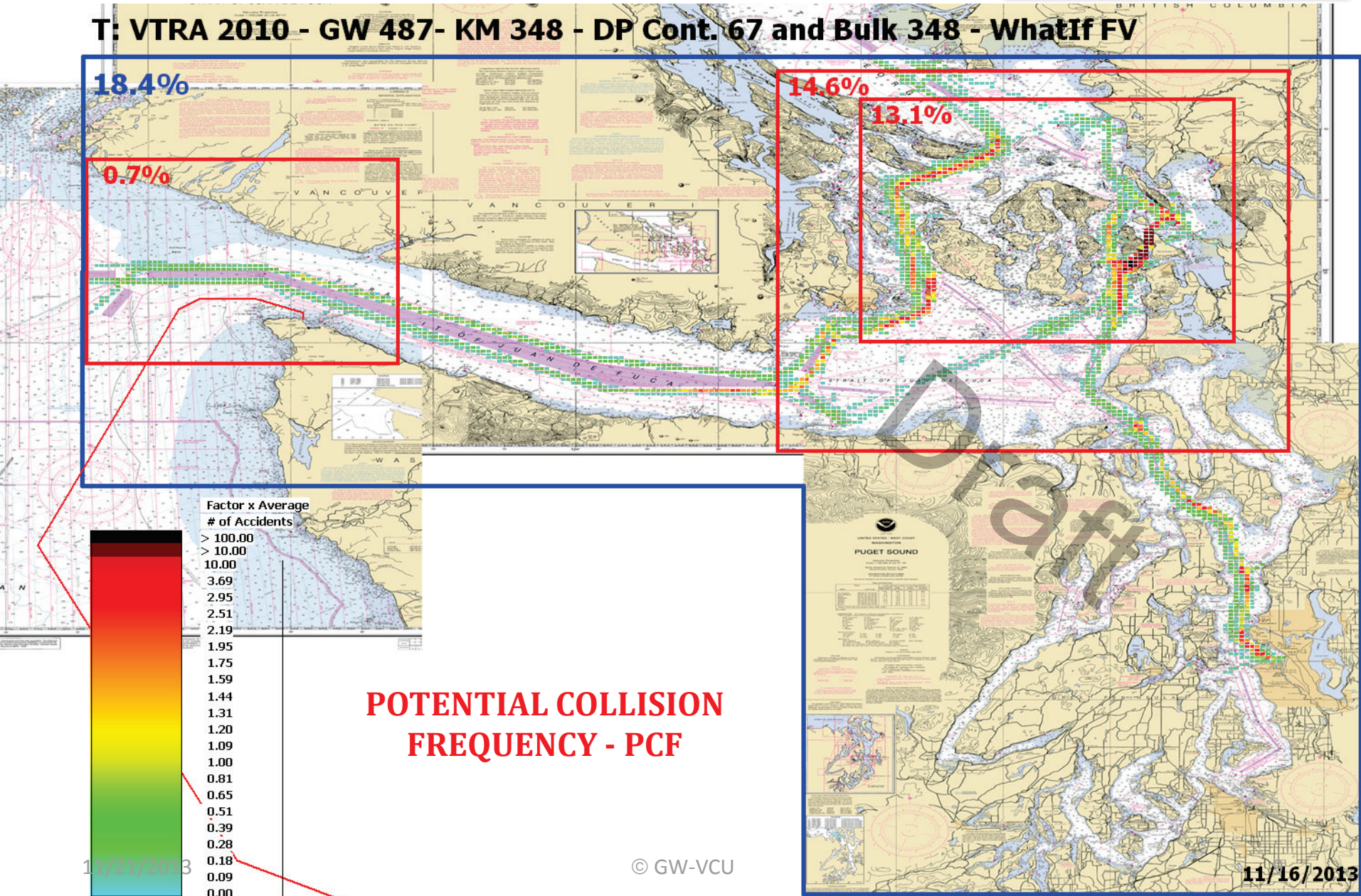
VESSEL TRAFFIC RISK ASSESSMENT (VTRA) 2010

T: GW - KM - DP & EH 3D Risk Profile What If FV - Pot. Coll. Acc. Fr.: 17% of Base Case PCF



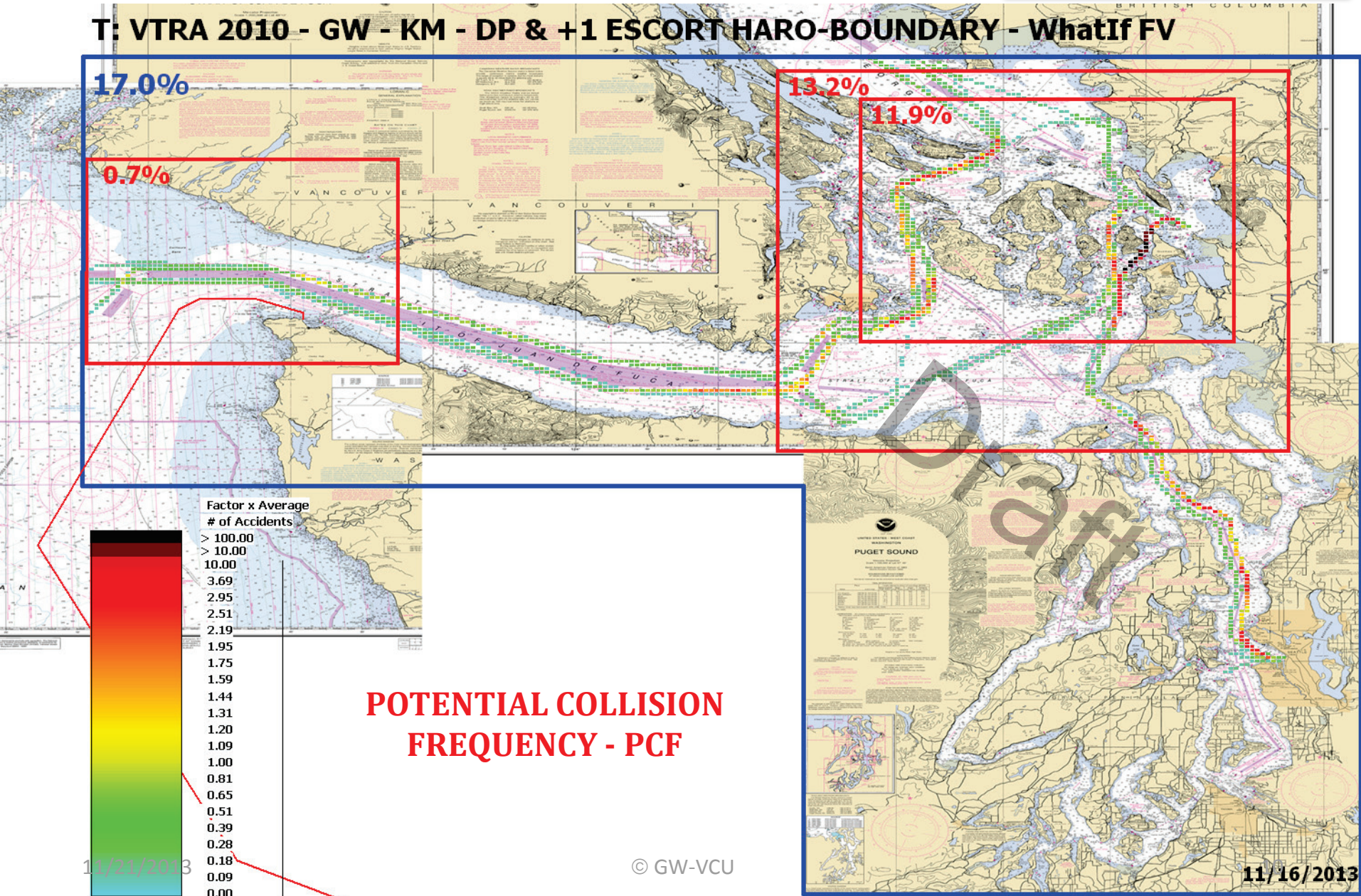
VESSEL TRAFFIC RISK ASSESSMENT (VTRA) 2010

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 & +1 ESCORT HARO-BOUNDARY - WhatIf FV



POTENTIAL COLLISION FREQUENCY - PCF

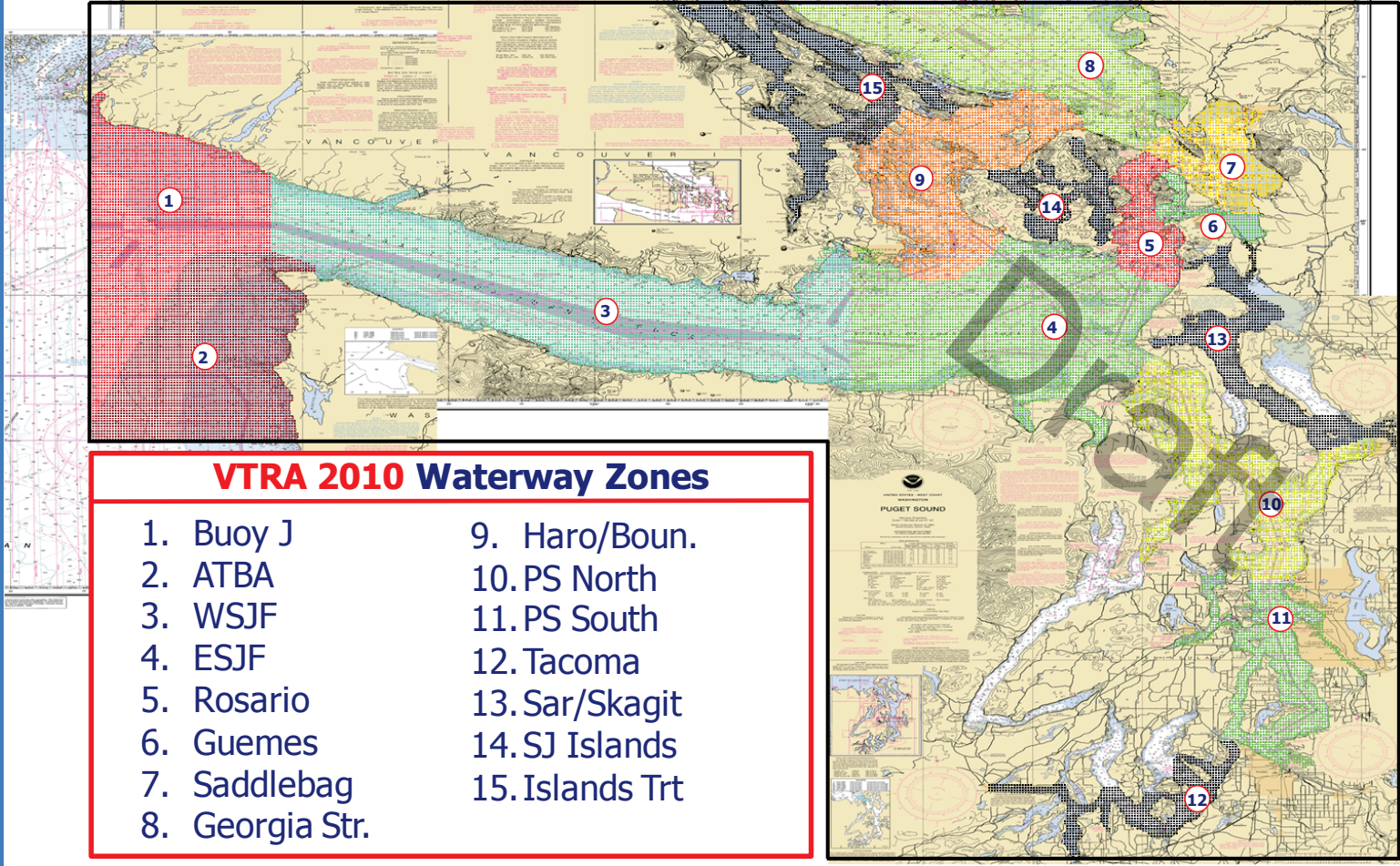
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VESSEL TRAFFIC RISK ASSESSMENT (VTRA) 2010

DEFINITION OF 15 WATERWAY ZONES



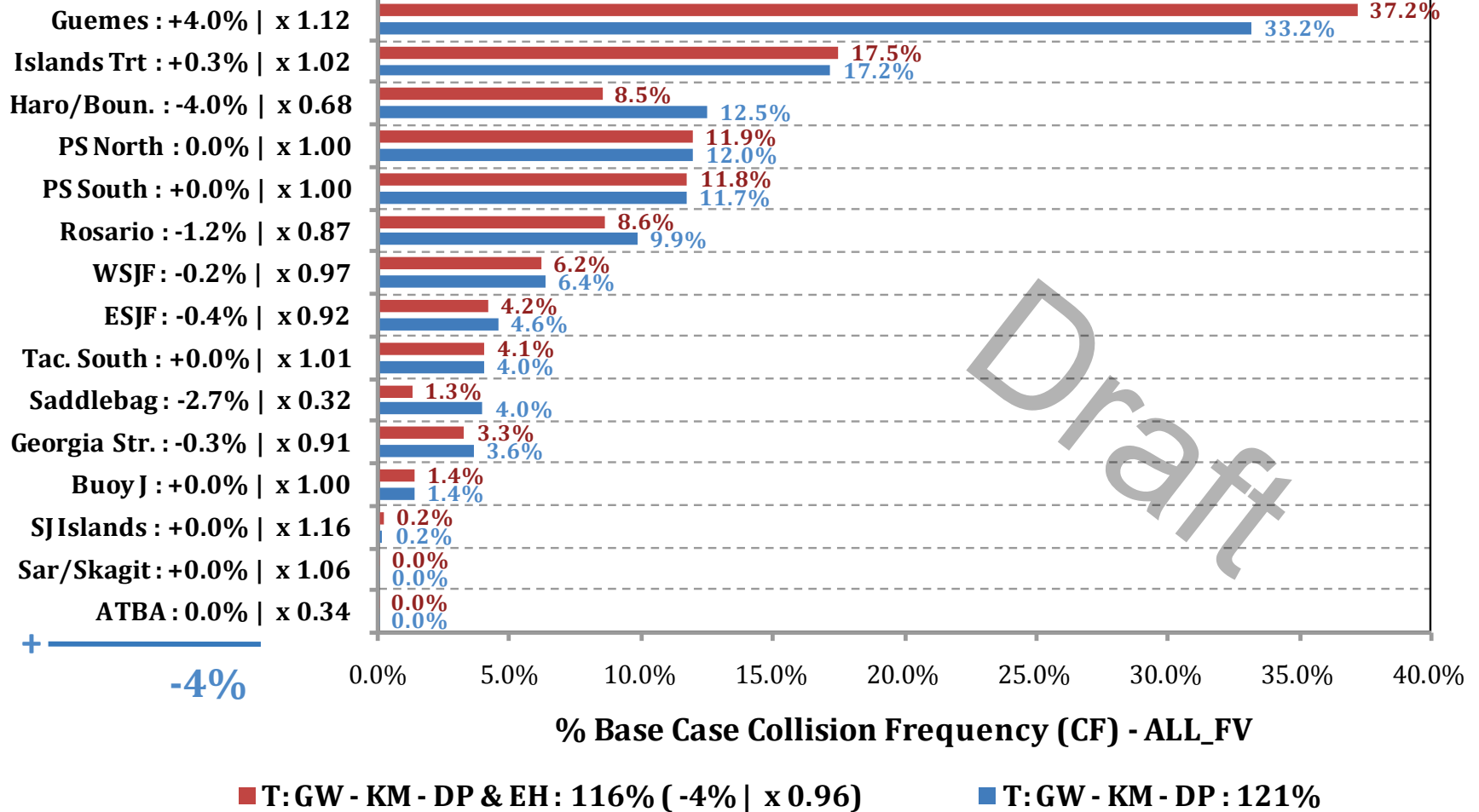
VTRA 2010 Waterway Zones

- | | |
|-----------------|-----------------|
| 1. Buoy J | 9. Haro/Boun. |
| 2. ATBA | 10. PS North |
| 3. WSJF | 11. PS South |
| 4. ESJF | 12. Tacoma |
| 5. Rosario | 13. Sar/Skagit |
| 6. Guemes | 14. SJ Islands |
| 7. Saddlebag | 15. Islands Trt |
| 8. Georgia Str. | |

VESSEL TRAFFIC RISK ASSESSMENT (VTRA) 2010

% Base Case Collision Frequency - ALL_FV

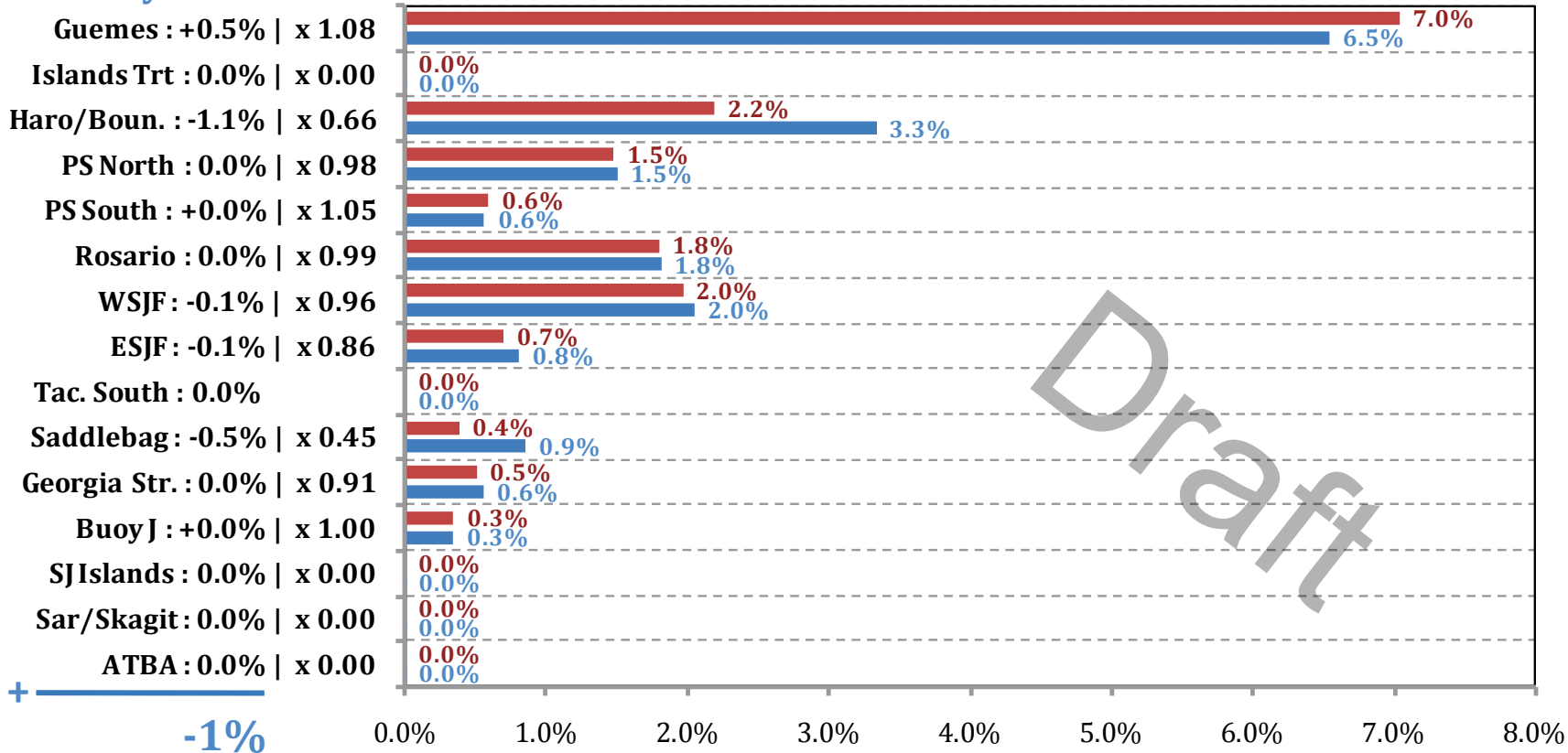
Waterway Zone:



VESSEL TRAFFIC RISK ASSESSMENT (VTRA) 2010

% Base Case Collision Frequency - WhatIf

Waterway Zone:



% Base Case Collision Frequency (CF) - WhatIf

■ T: GW - KM - DP & EH: 17% (-1% | x 0.93)

■ T: GW - KM - DP: 18%