

# VESSEL TRAFFIC RISK ASSESSMENT (VTRA) 2010

3D Relative Risk Profile Comparison  
Vessel Time Exposure

**CASE T – GW – KM – DP & 6 RMM's**

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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%

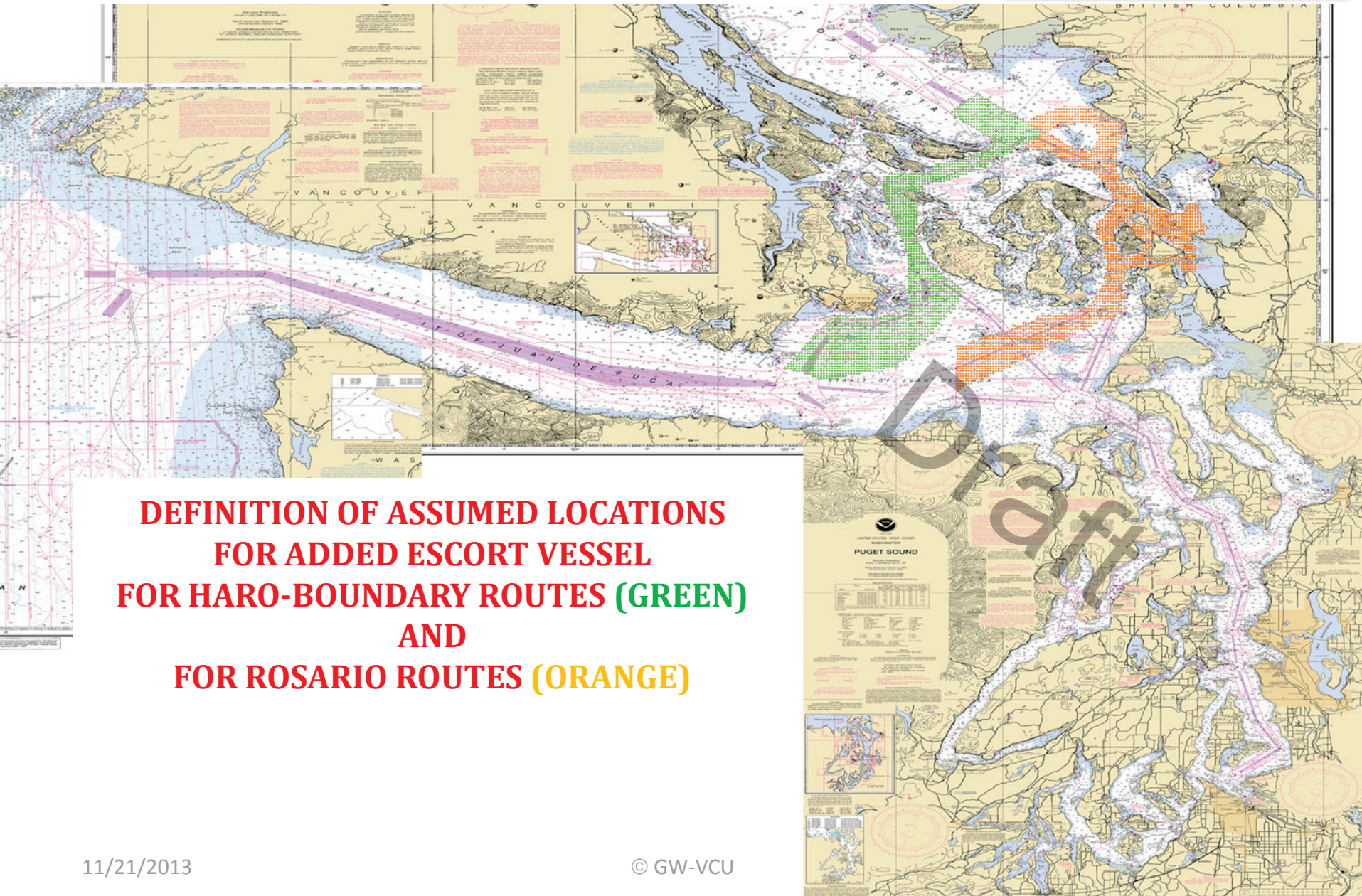
RMM 3: No Bunkering for Gateway Vessels

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)

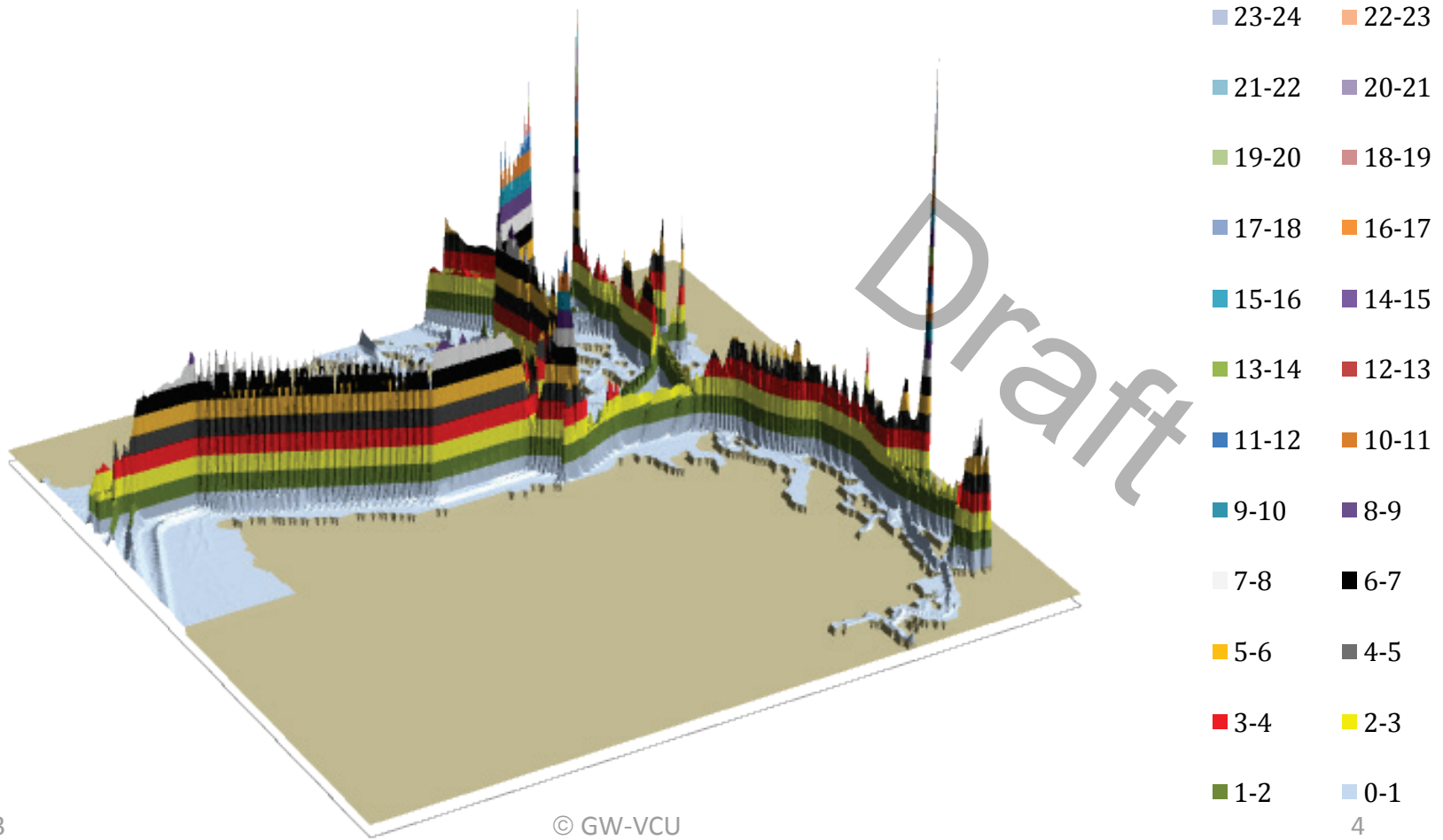
# VESSEL TRAFFIC RISK ASSESSMENT (VTRA) 2010



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

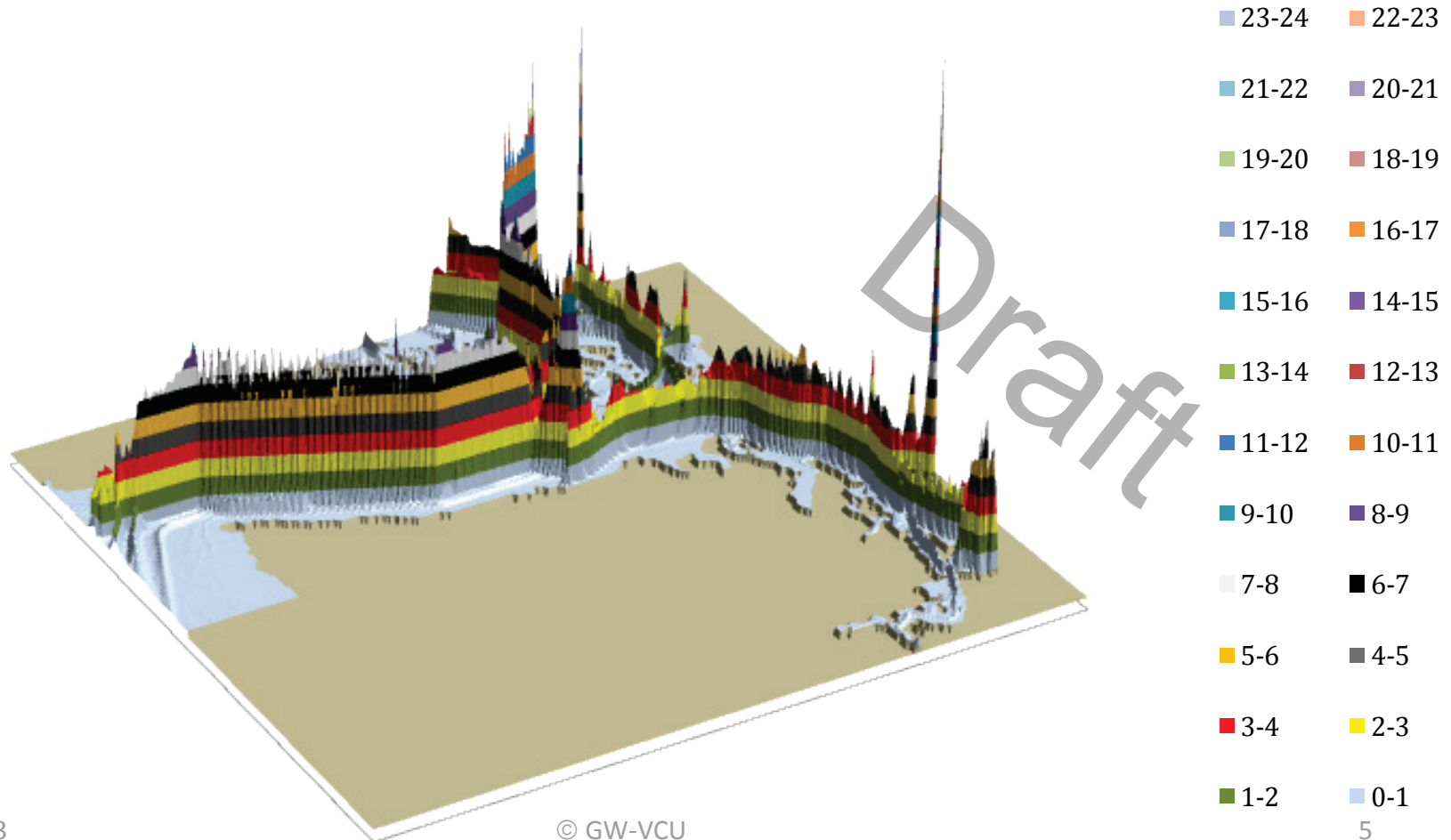
# VESSEL TRAFFIC RISK ASSESSMENT (VTRA) 2010

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



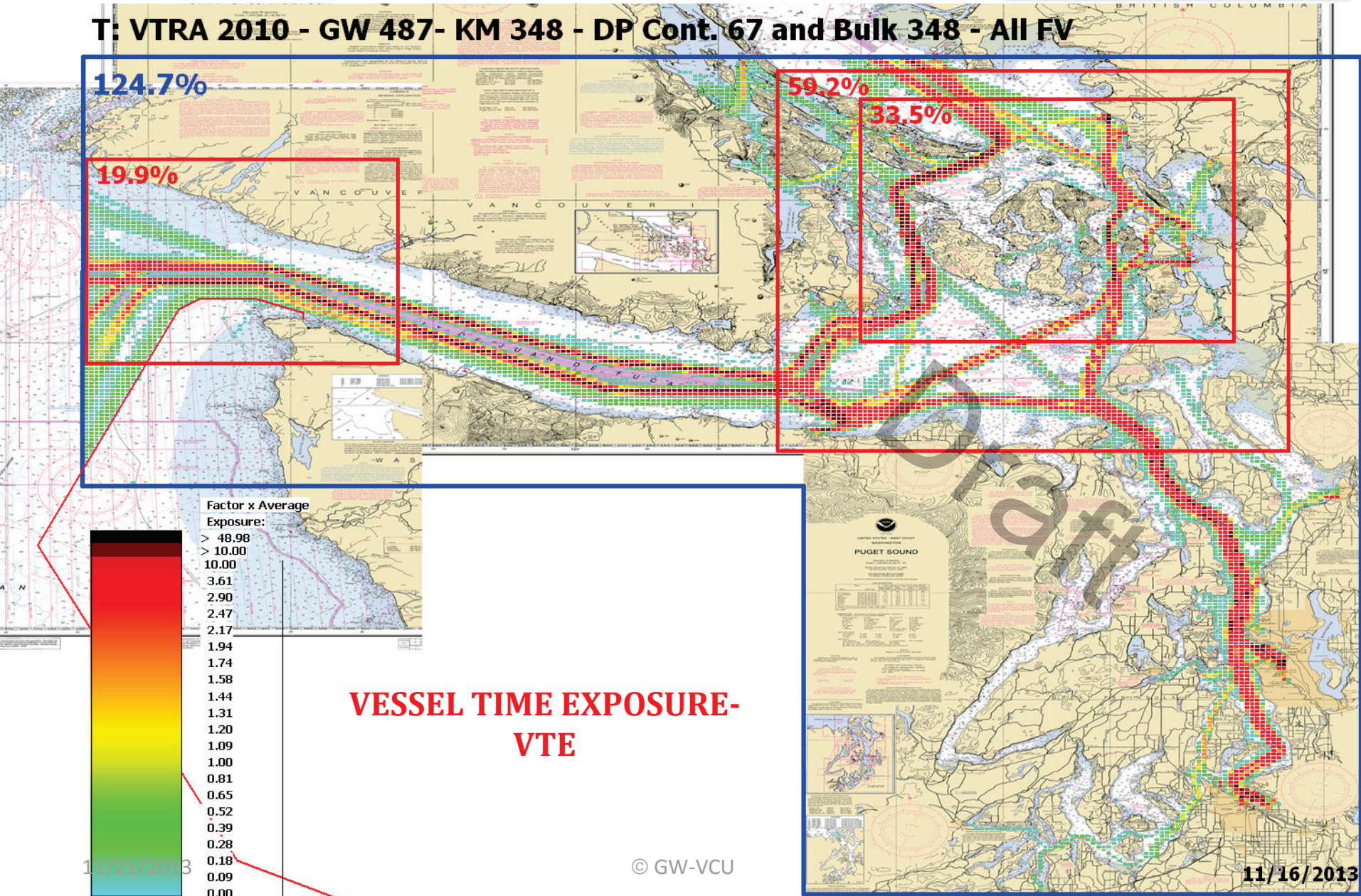
# VESSEL TRAFFIC RISK ASSESSMENT (VTRA) 2010

**T: GW - KM - DP & 6 RMM 3D Risk Profile**  
**All FV - Vessel Time Exposure: 128% 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 TRAFFIC RISK ASSESSMENT (VTRA) 2010

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

128.2%

20.6%

59.7%

33.5%

Factor x Average Exposure:

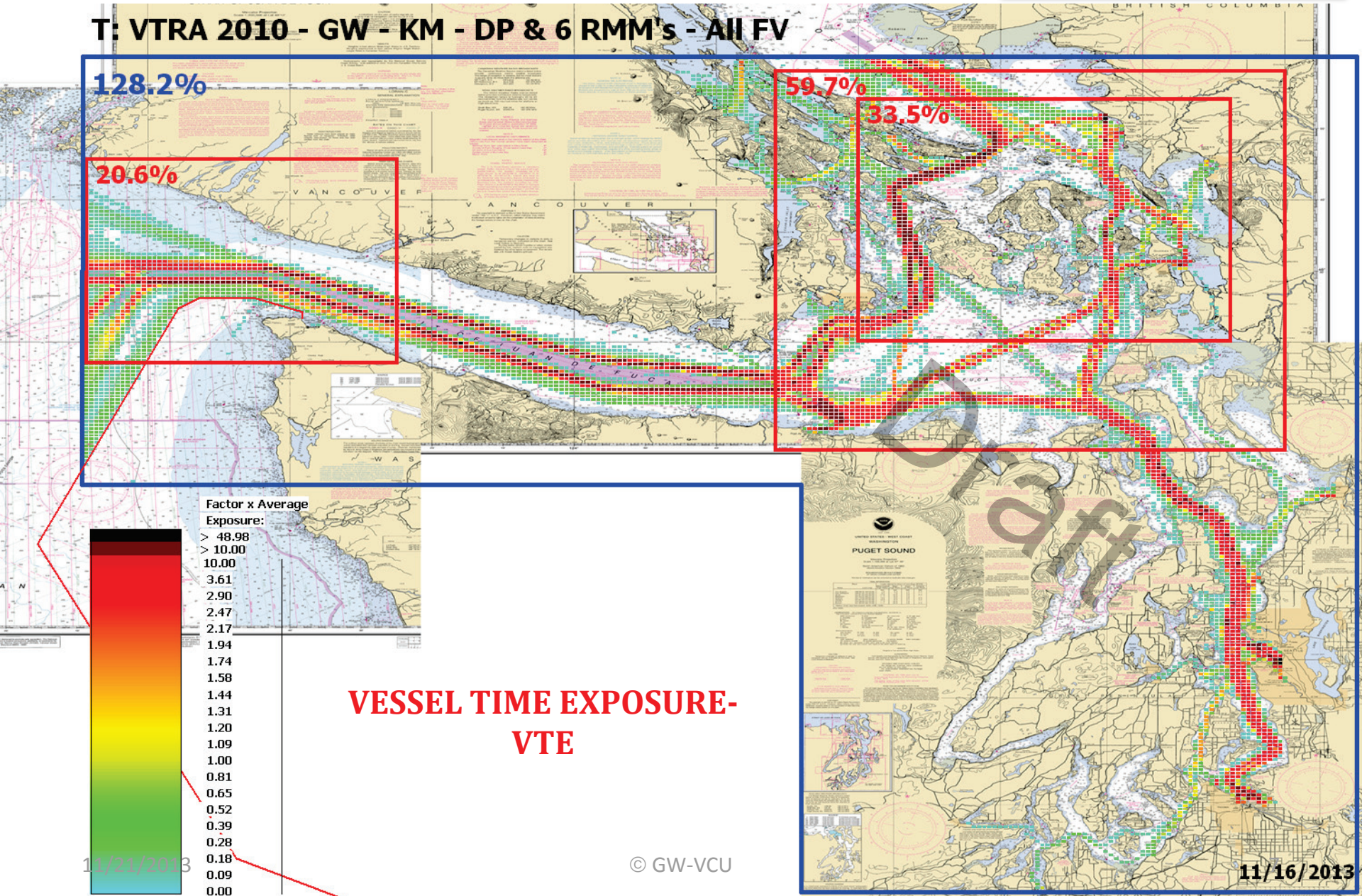
- > 48.98
- > 10.00
- 10.00
- 3.61
- 2.90
- 2.47
- 2.17
- 1.94
- 1.74
- 1.58
- 1.44
- 1.31
- 1.20
- 1.09
- 1.00
- 0.81
- 0.65
- 0.52
- 0.39
- 0.28
- 0.18
- 0.09
- 0.00

VESSEL TIME EXPOSURE- VTE

11/21/2013

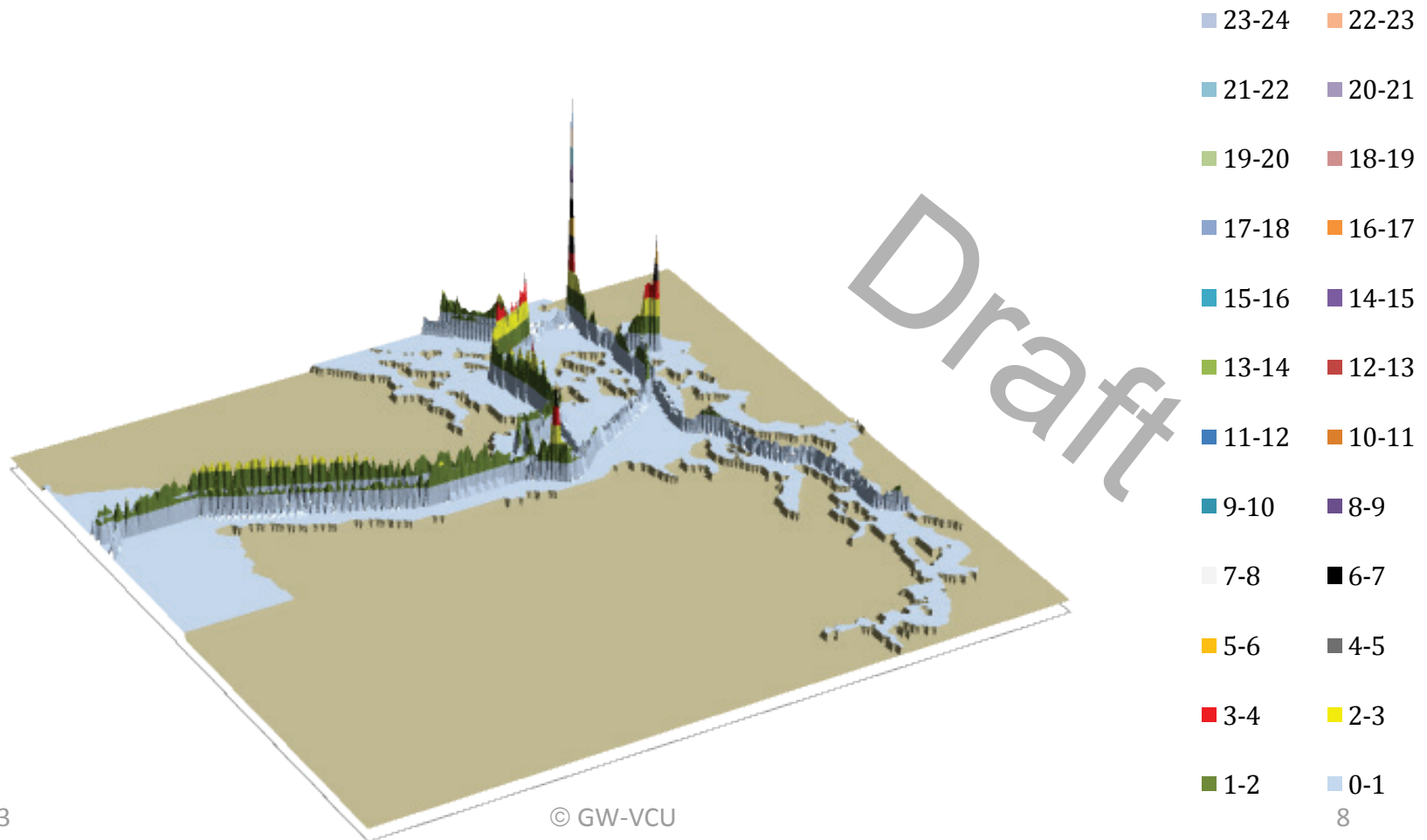
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# VESSEL TRAFFIC RISK ASSESSMENT (VTRA) 2010

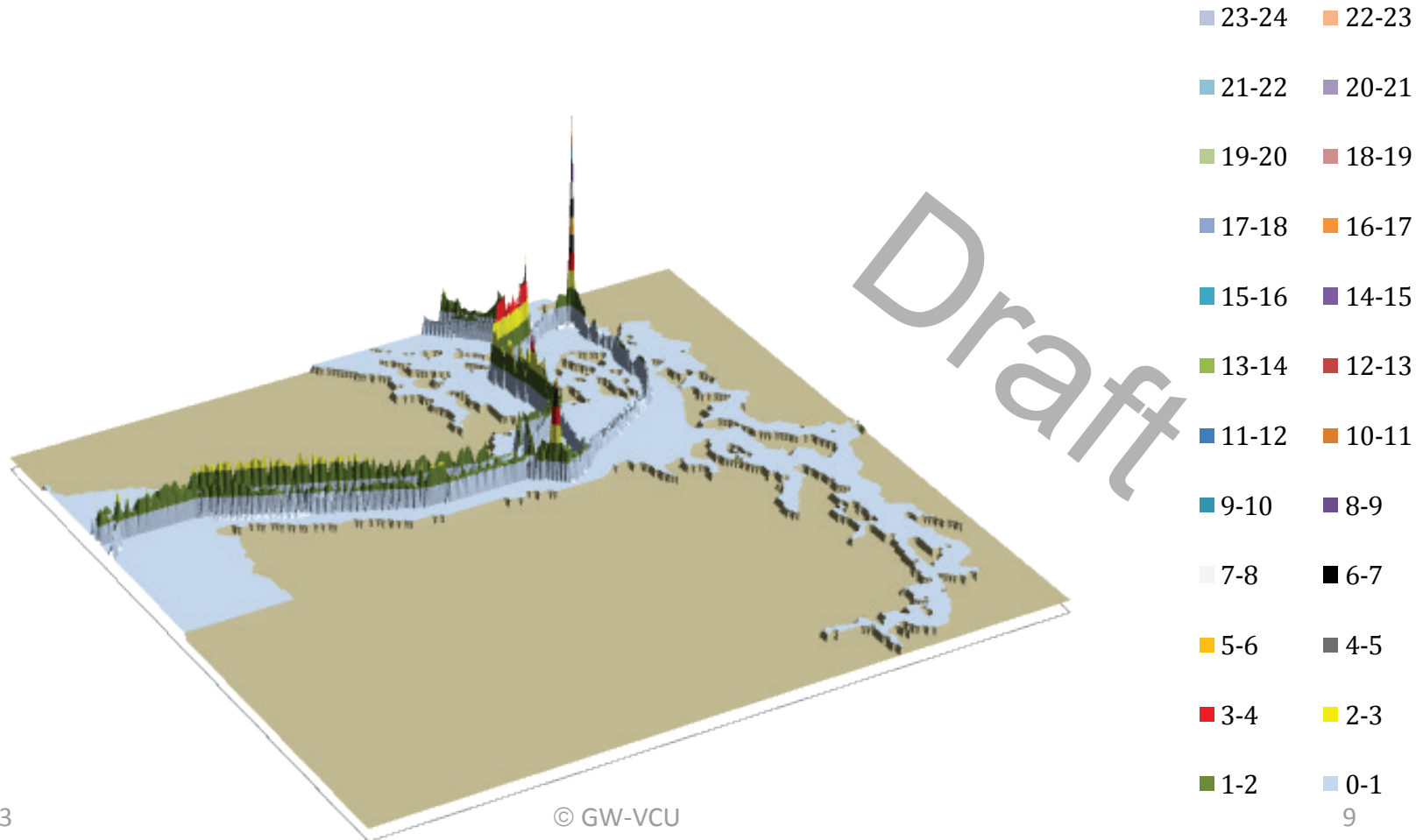
## T: GW - KM - DP 3D Risk Profile What-If FV - Vessel Time Exp.: 24.4% of Base Case VTE





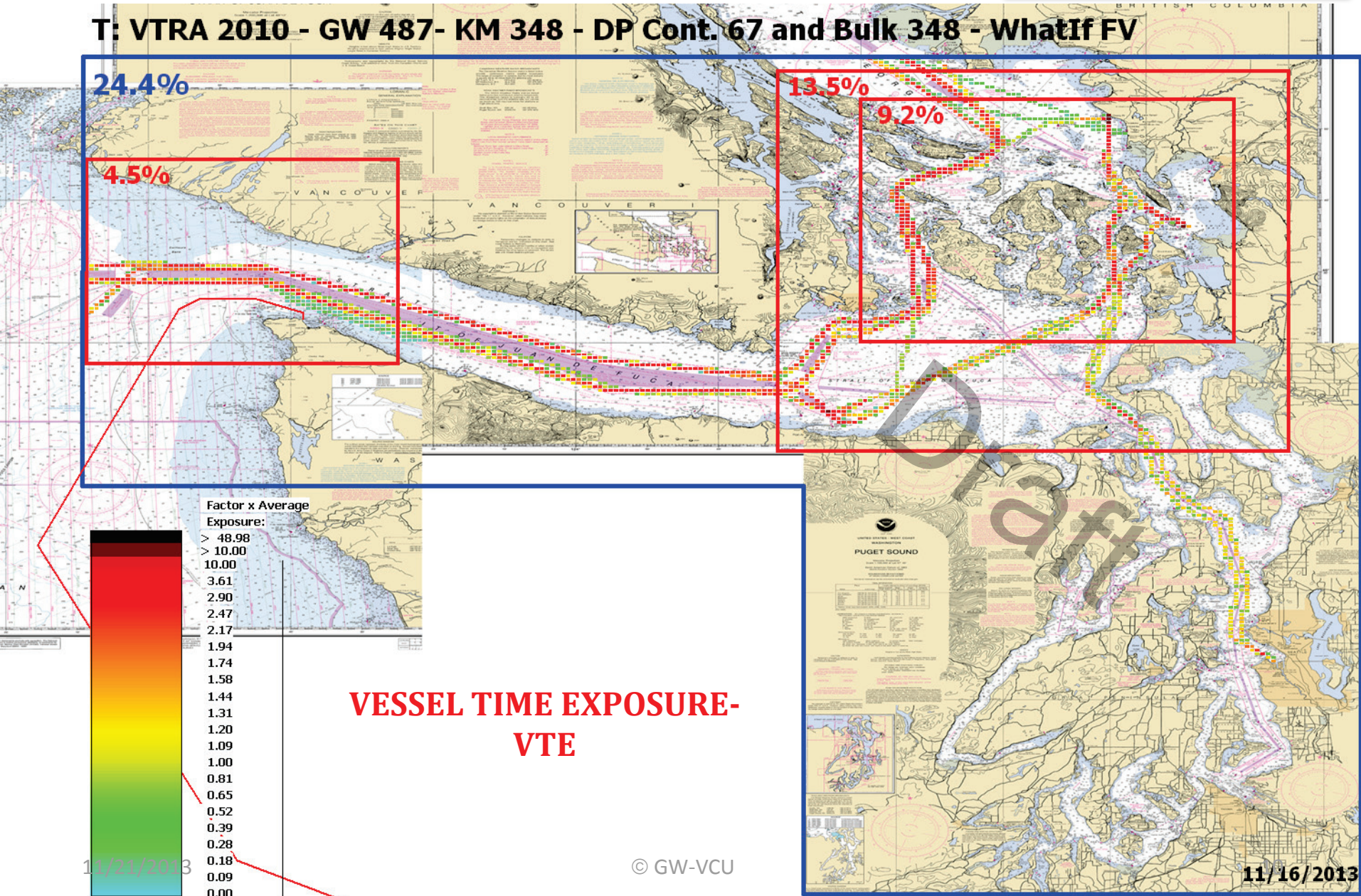
# VESSEL TRAFFIC RISK ASSESSMENT (VTRA) 2010

## T: GW - KM - DP & 6 RMM 3D Risk Profile What-If FV - Vessel Time Exp.: 22% of Base Case VTE



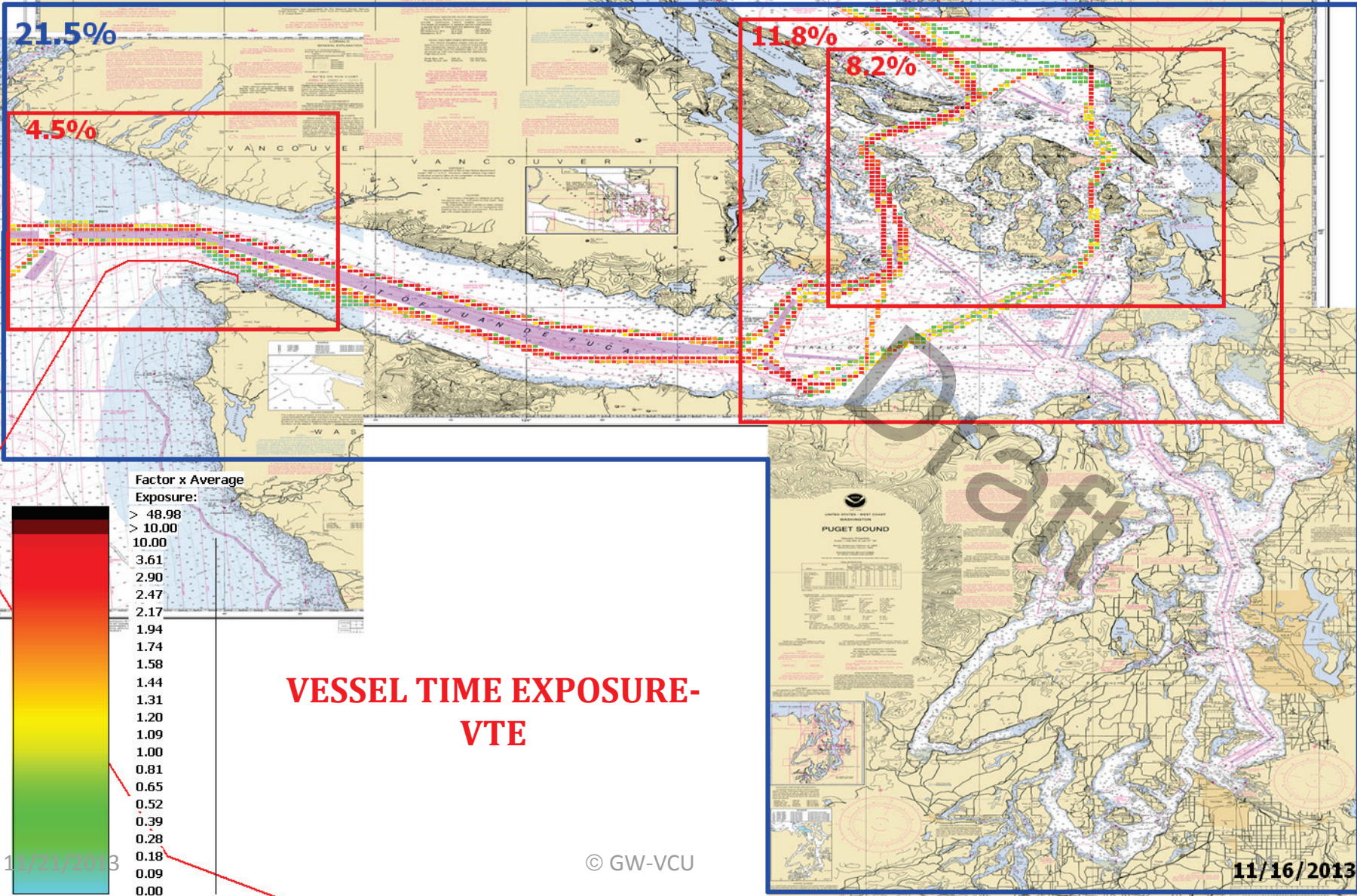
# VESSEL TRAFFIC RISK ASSESSMENT (VTRA) 2010

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



# VESSEL TRAFFIC RISK ASSESSMENT (VTRA) 2010

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



VESSEL TIME EXPOSURE-VTE

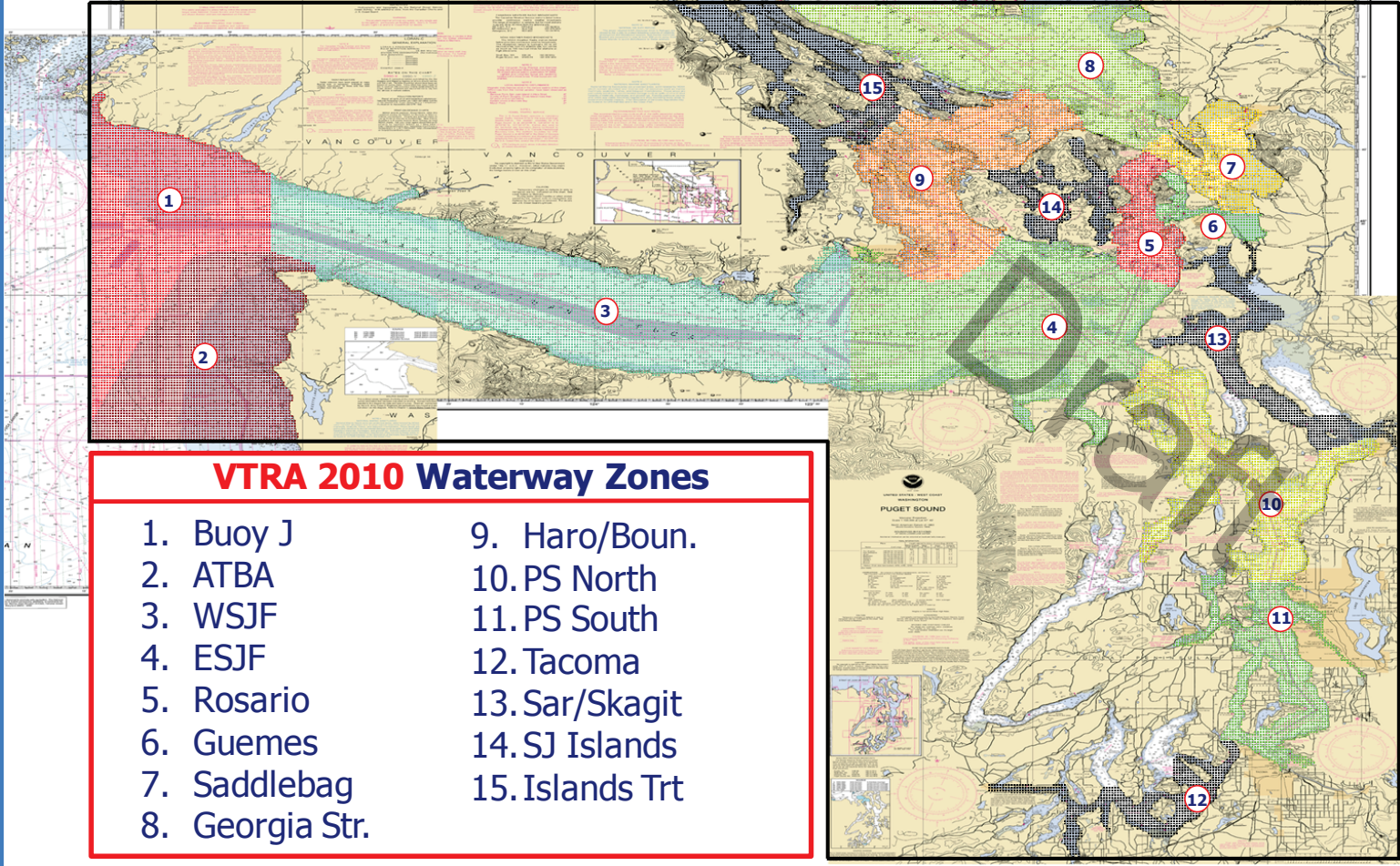
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# VESSEL TRAFFIC RISK ASSESSMENT (VTRA) 2010

## DEFINITION OF 15 WATERWAY ZONES



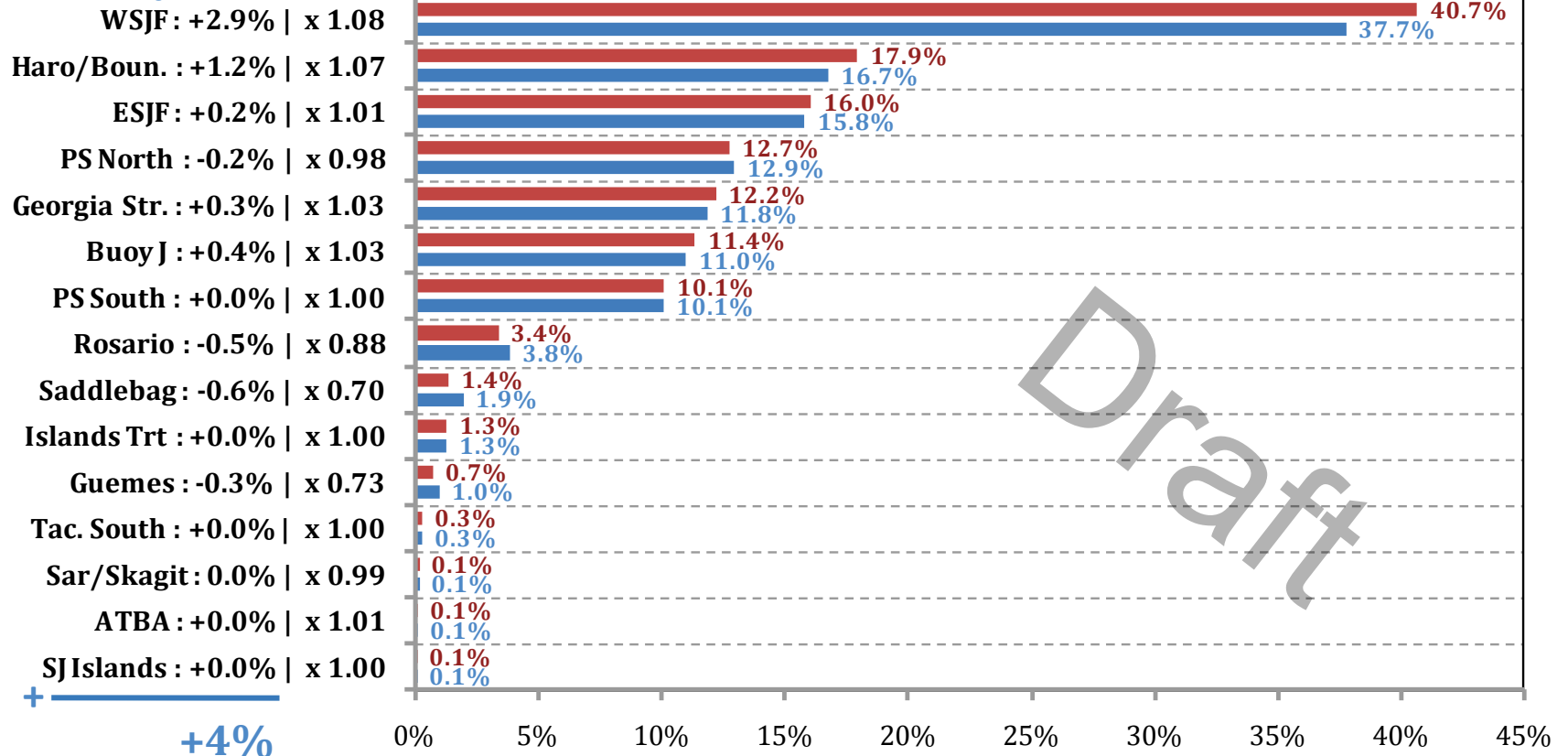
### VTRA 2010 Waterway Zones

- |                 |                 |
|-----------------|-----------------|
| 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 Vessel Time Exposure (VTE) - ALL\_FV

### Waterway Zone:



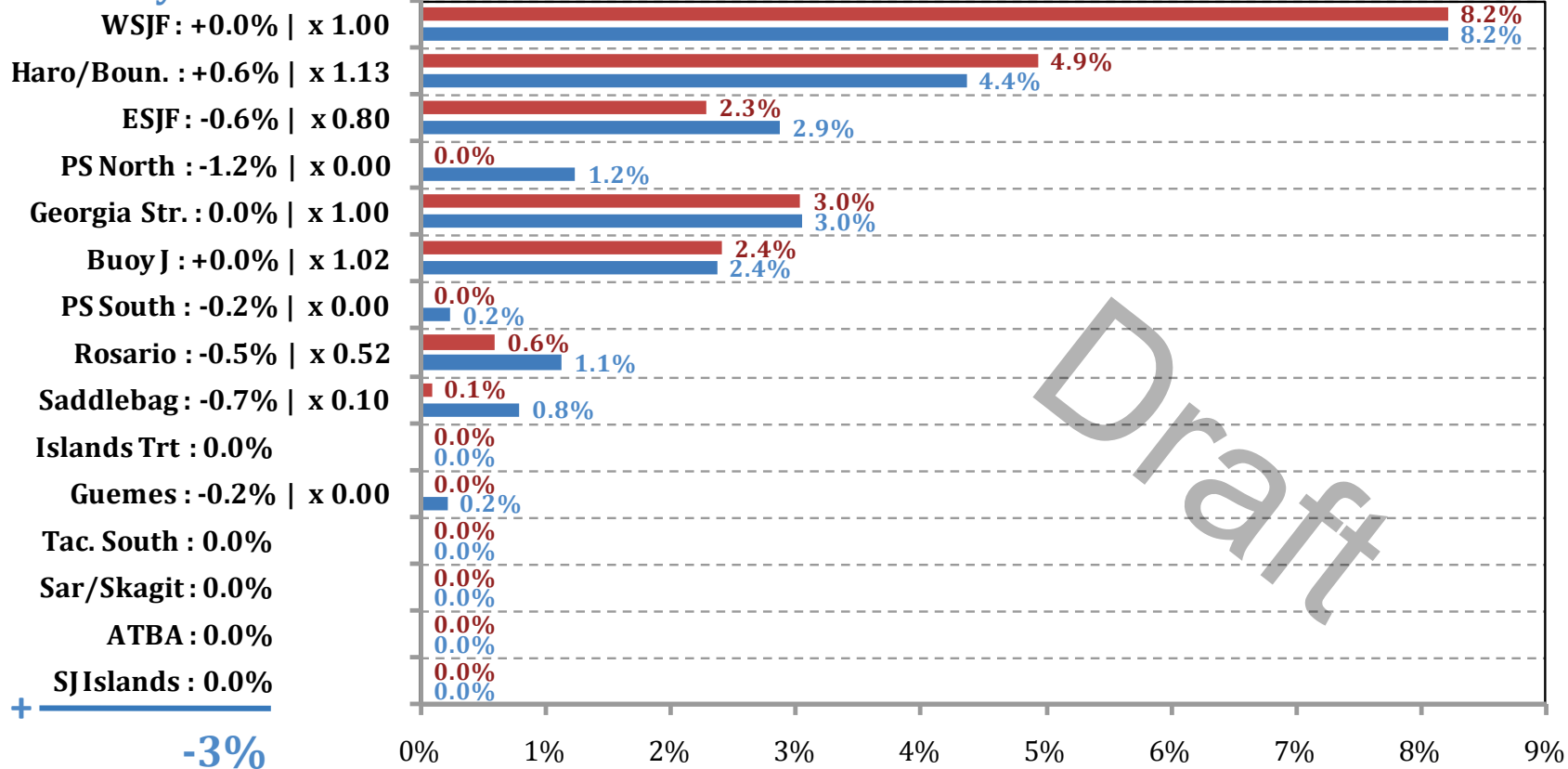
## % Base Case Vessel Time Exposure (VTE) - ALL\_FV

■ T:GW - KM - DP & 6 RMM: 128% (+4% | x 1.03)    ■ 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 & 6 RMM : 22% (-3% | x 0.88)      ■ T:GW - KM - DP : 24%