

VESSEL TRAFFIC RISK ASSESSMENT (VTRA) 2010

3D Relative Risk Profile Comparison
Oil Time Exposure

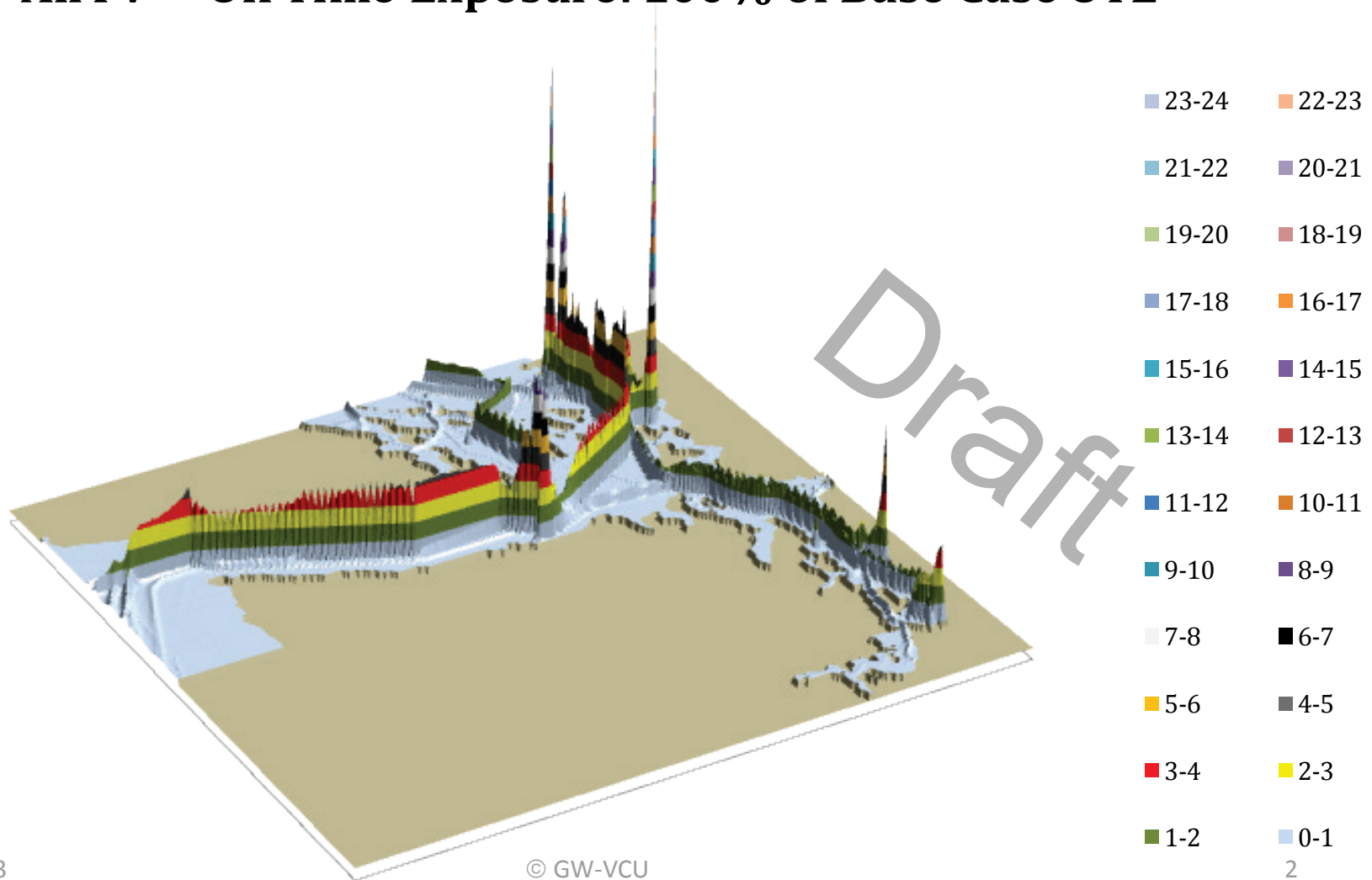
CASE T – GW 487 – KM 348 – DP 415

Dr. J. Rene van Dorp and Dr. Jason R.W Merrick
November 2013



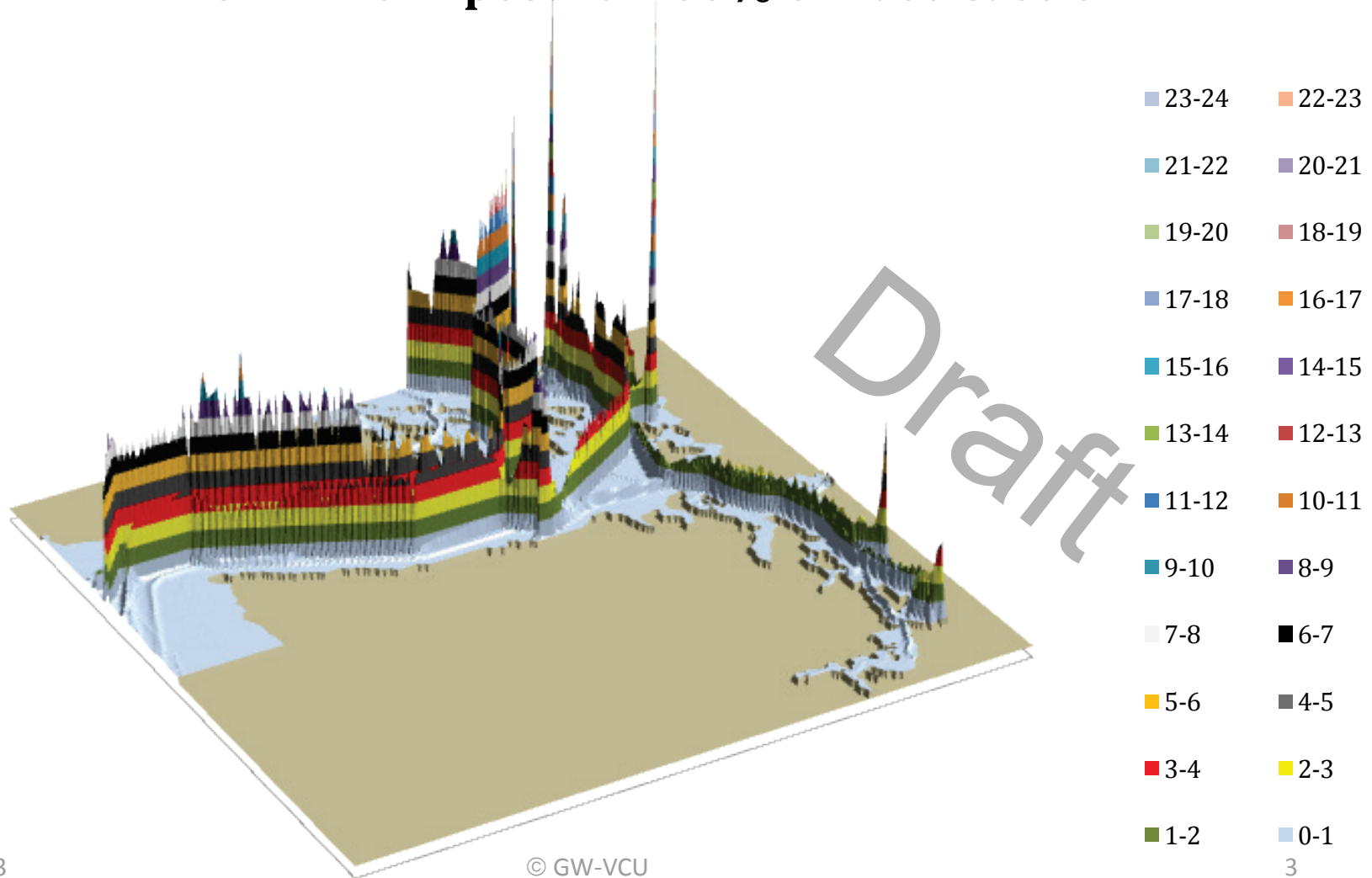
VESSEL TRAFFIC RISK ASSESSMENT (VTRA) 2010

P: Base Case 3D Risk Profile All FV - Oil Time Exposure: 100% of Base Case OTE



VESSEL TRAFFIC RISK ASSESSMENT (VTRA) 2010

T: GW - KM - DP 3D Risk Profile All FV - Oil Time Exposure: 160% of Base Case OTE



VESSEL TRAFFIC RISK ASSESSMENT (VTRA) 2010

P: VTRA 2010 - BASE CASE - All FV

100.0%

13.0%

54.4%

33.5%

Factor x Average
Oil Outflow

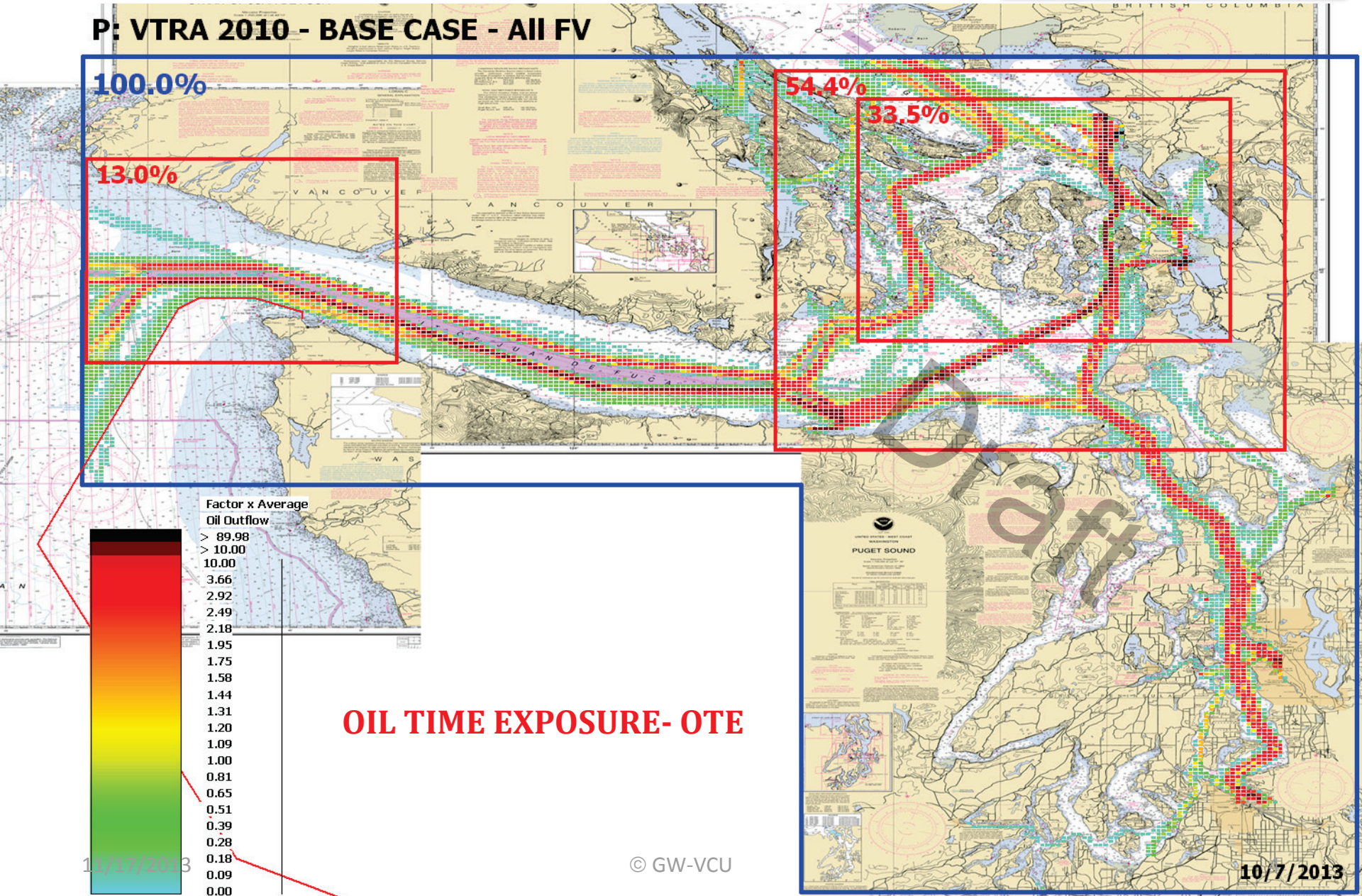
- > 89.98
- > 10.00
- 10.00
- 3.66
- 2.92
- 2.49
- 2.18
- 1.95
- 1.75
- 1.58
- 1.44
- 1.31
- 1.20
- 1.09
- 1.00
- 0.81
- 0.65
- 0.51
- 0.39
- 0.28
- 0.18
- 0.09
- 0.00

OIL TIME EXPOSURE- OTE

11/17/2013

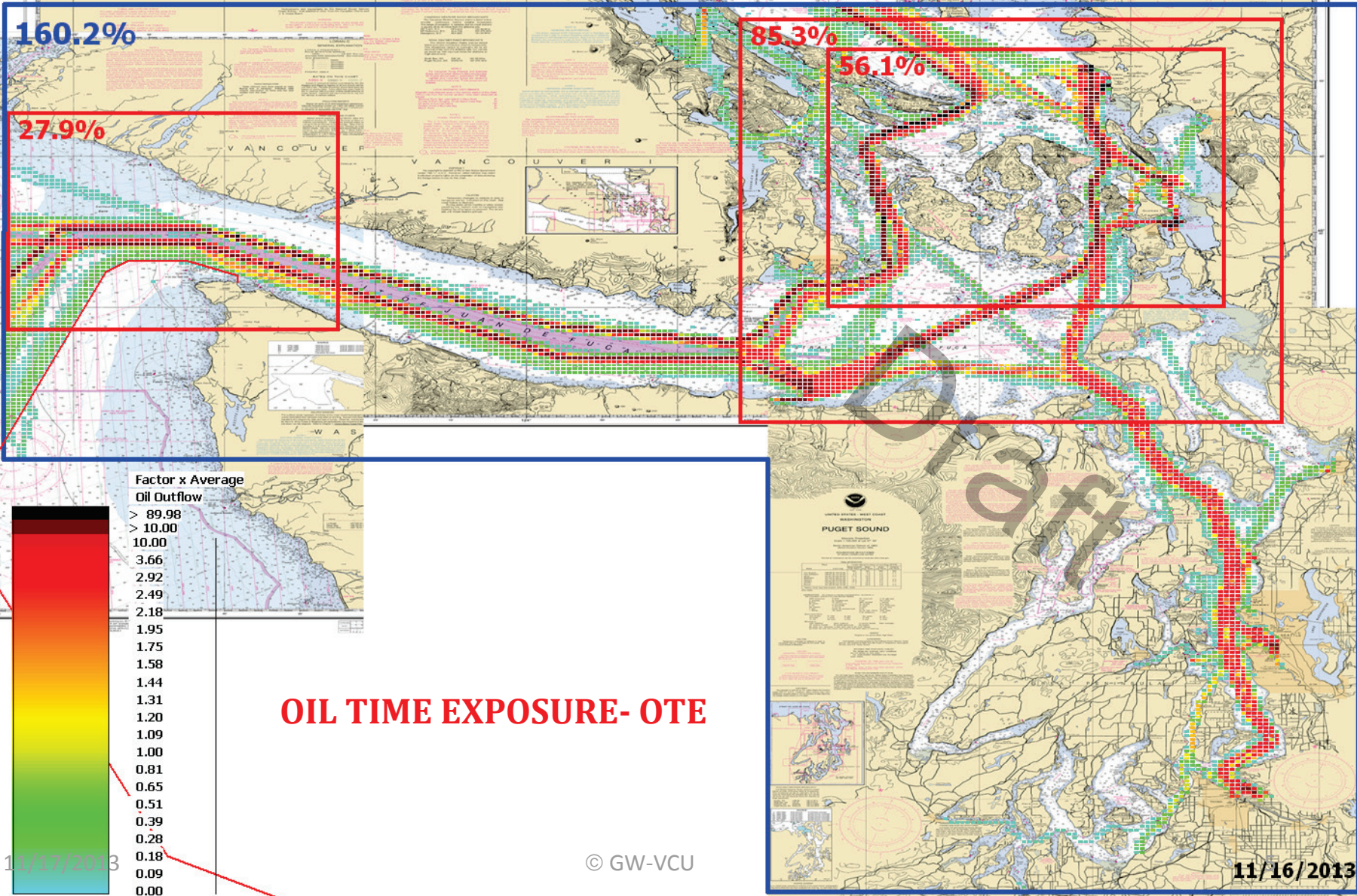
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10/7/2013



VESSEL TRAFFIC RISK ASSESSMENT (VTRA) 2010

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



OIL TIME EXPOSURE- OTE

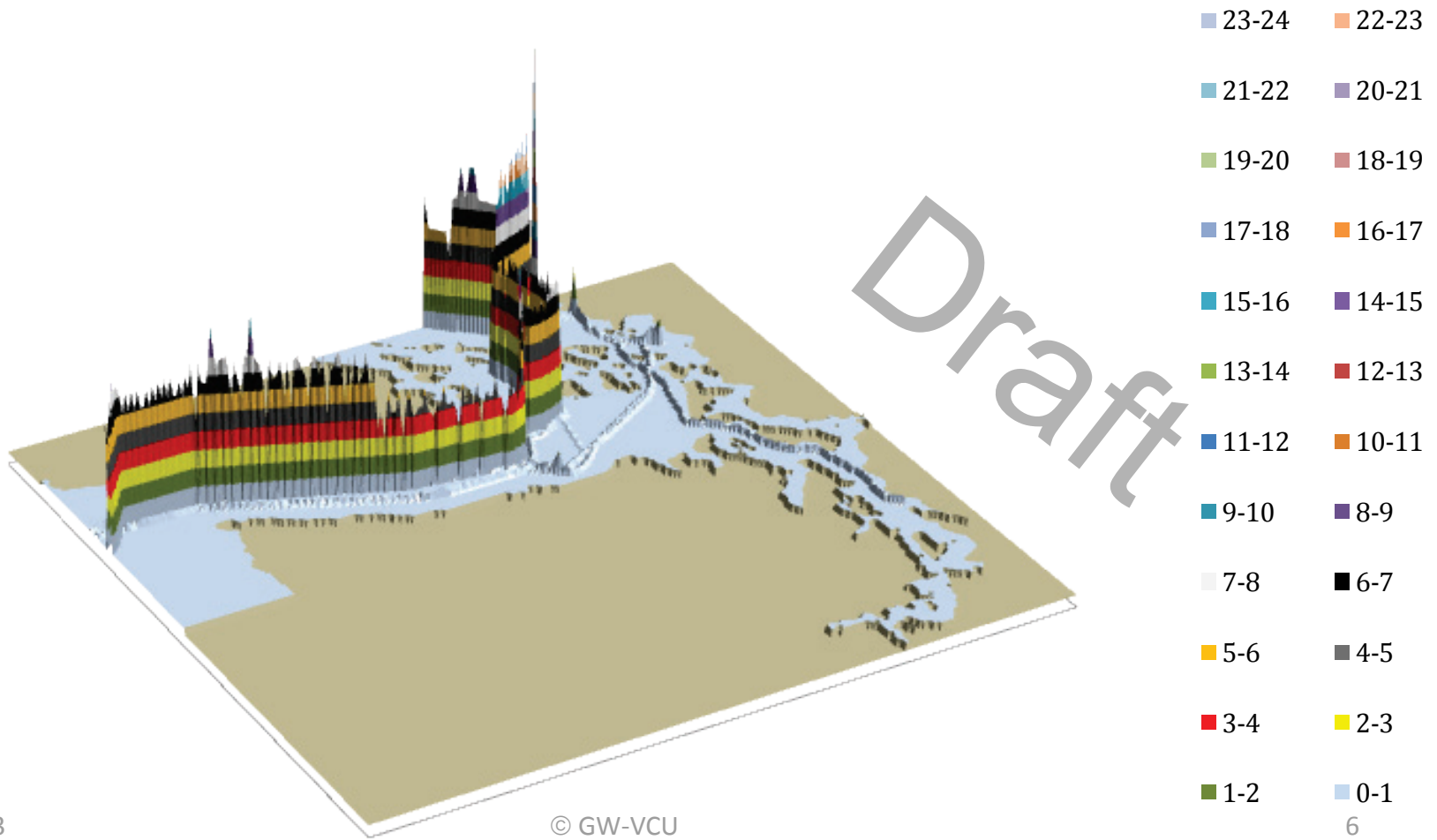
11/17/2013

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11/16/2013

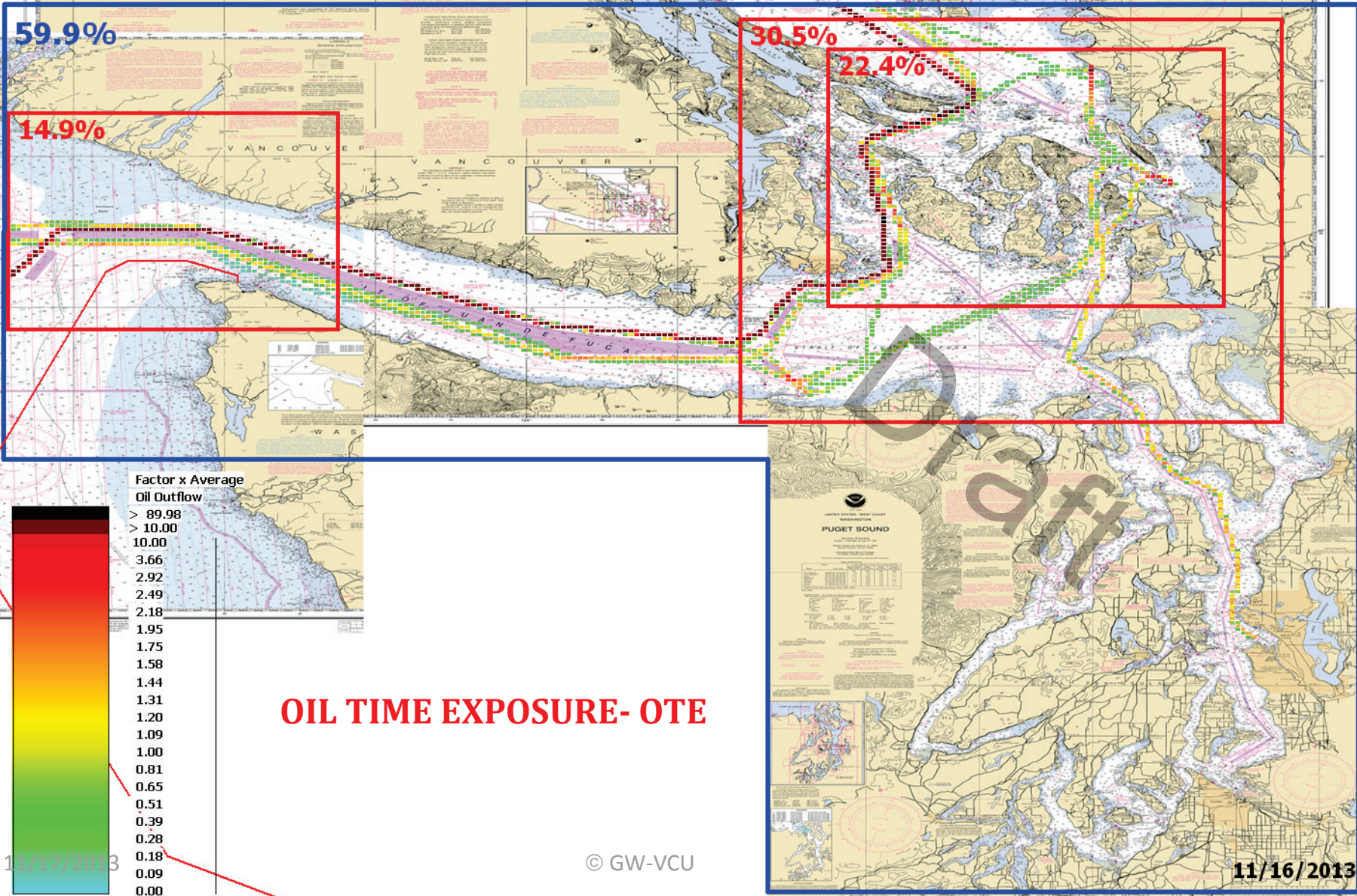
VESSEL TRAFFIC RISK ASSESSMENT (VTRA) 2010

T: GW - KM - DP 3D Risk Profile What-If FV - Oil Time Exposure: 60% of Base Case OTE



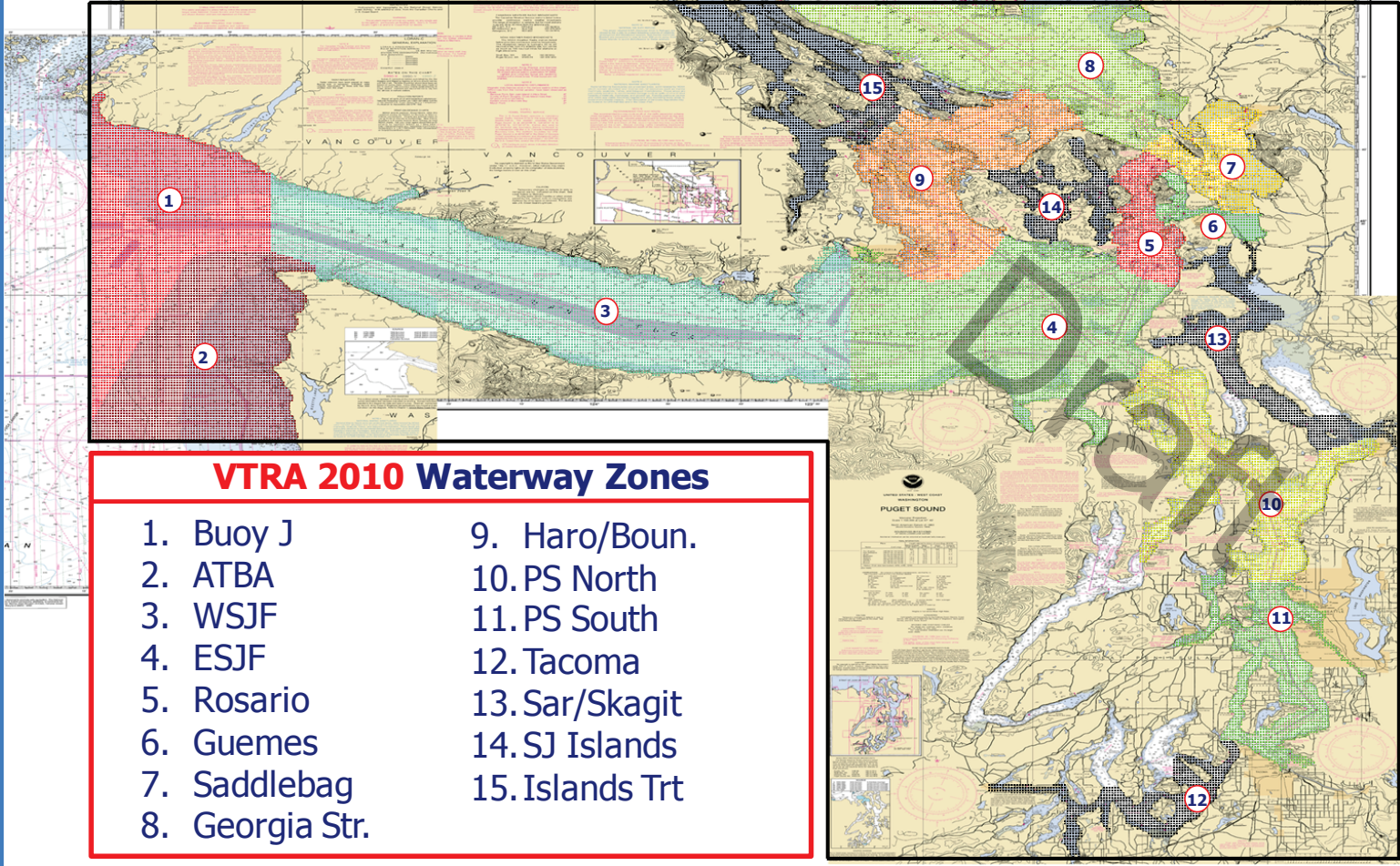
VESSEL TRAFFIC RISK ASSESSMENT (VTRA) 2010

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



VESSEL TRAFFIC RISK ASSESSMENT (VTRA) 2010

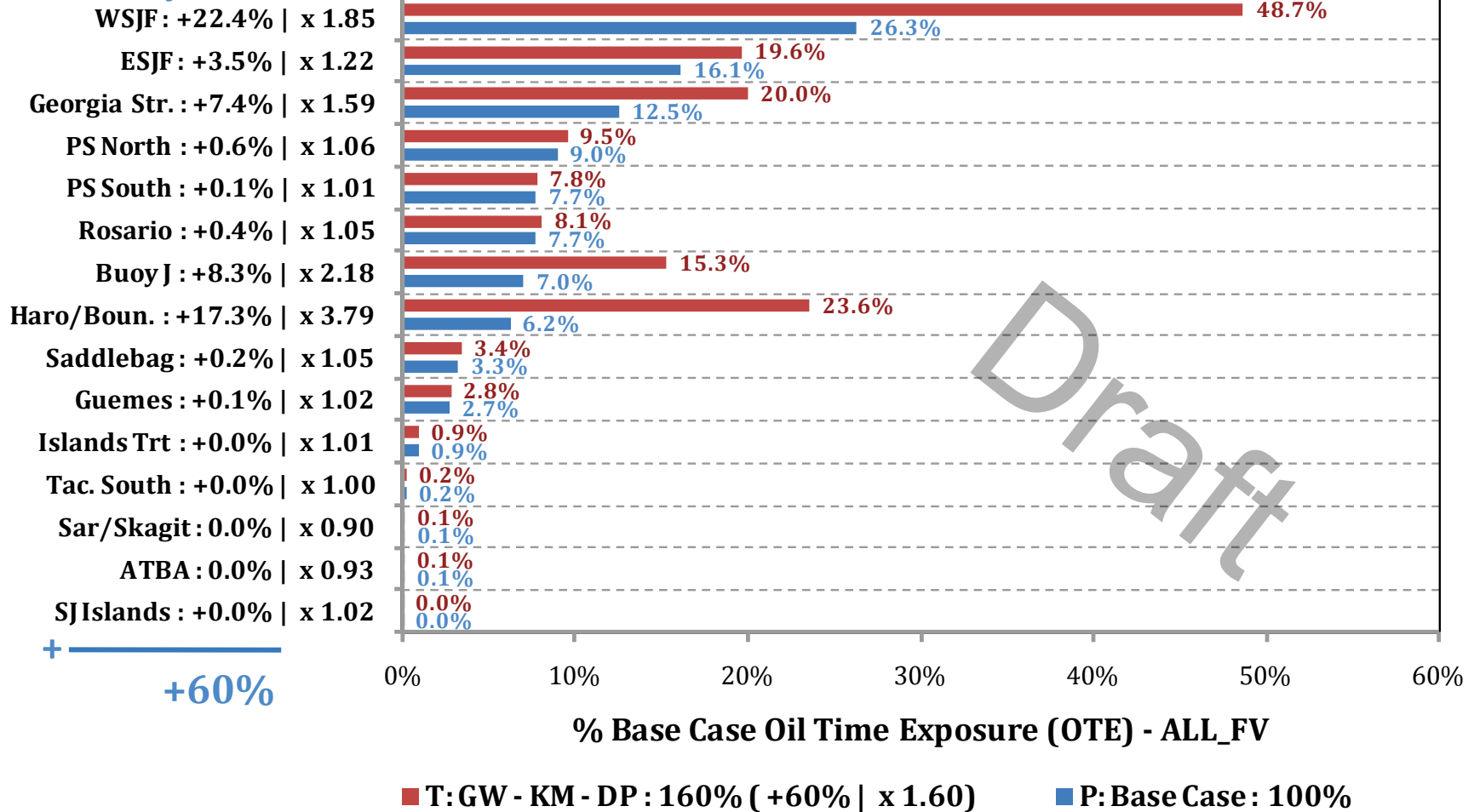
DEFINITION OF 15 WATERWAY ZONES



VESSEL TRAFFIC RISK ASSESSMENT (VTRA) 2010

% Base Case Oil Time Exposure - ALL_FV

Waterway Zone:

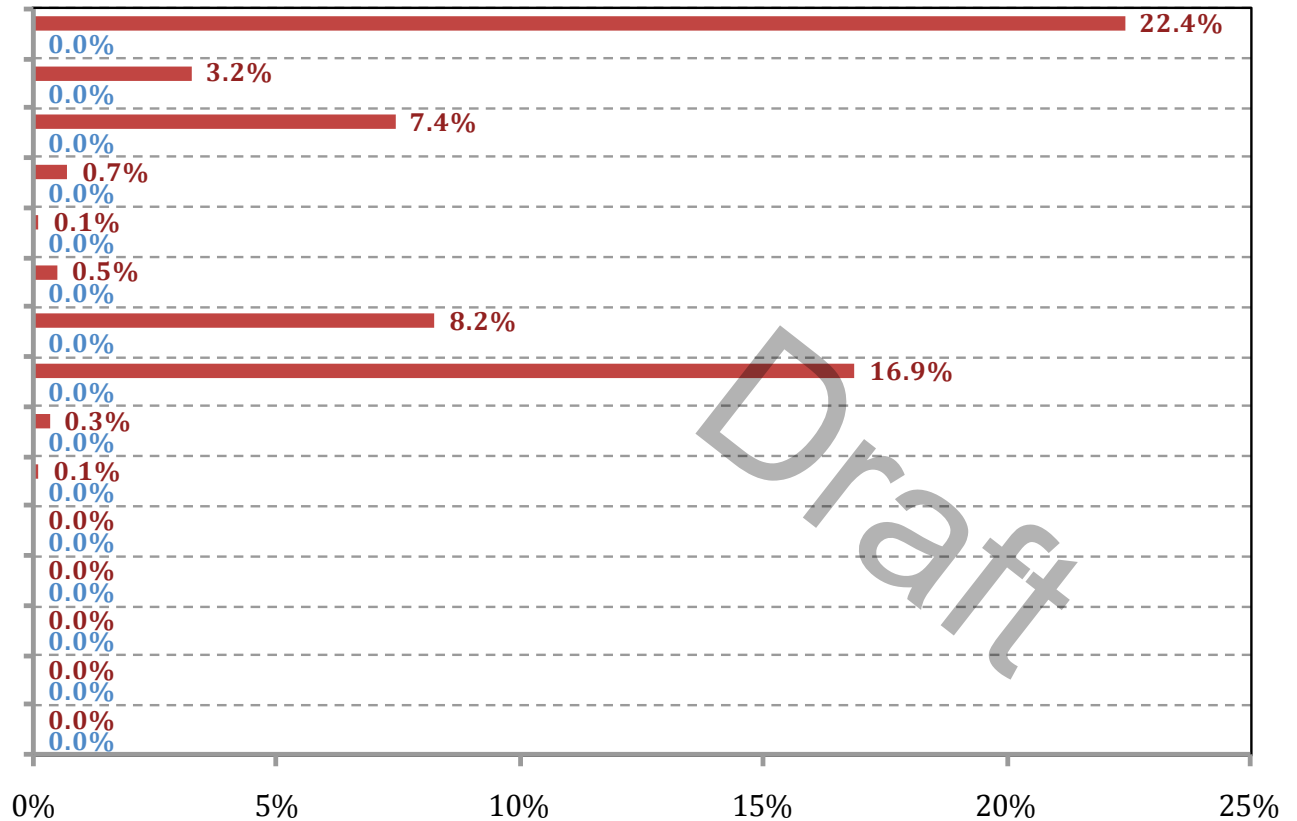


VESSEL TRAFFIC RISK ASSESSMENT (VTRA) 2010

% Base Case Oil Time Exposure - WhatIf

Waterway Zone:

WSJF : +22.4%
ESJF : +3.2%
Georgia Str. : +7.4%
PS North : +0.7%
PS South : +0.1%
Rosario : +0.5%
Buoy J : +8.2%
Haro/Boun. : +16.9%
Saddlebag : +0.3%
Guemes : +0.1%
Islands Trt : 0.0%
Tac. South : 0.0%
Sar/Skagit : 0.0%
ATBA : 0.0%
SJIslands : 0.0%
+ +60%



% Base Case Oil Time Exposure (OTE) - WhatIf

■ T: GW - KM - DP : 60% (+60%) ■ P: Base Case : 0%