

# VTRA CASES A through H

## TOTAL OIL OUTFLOW COMPARISON

Presentation by: J. Rene van Dorp



**GWU Personnel:** Dr. J. Rene van Dorp, Dr. Jack Harrald, Dr. Greg Shaw, Adil Caner Sener, Christian Salmon

**VCU Personnel:** Dr. Jason R. W. Merrick, Christina Werner

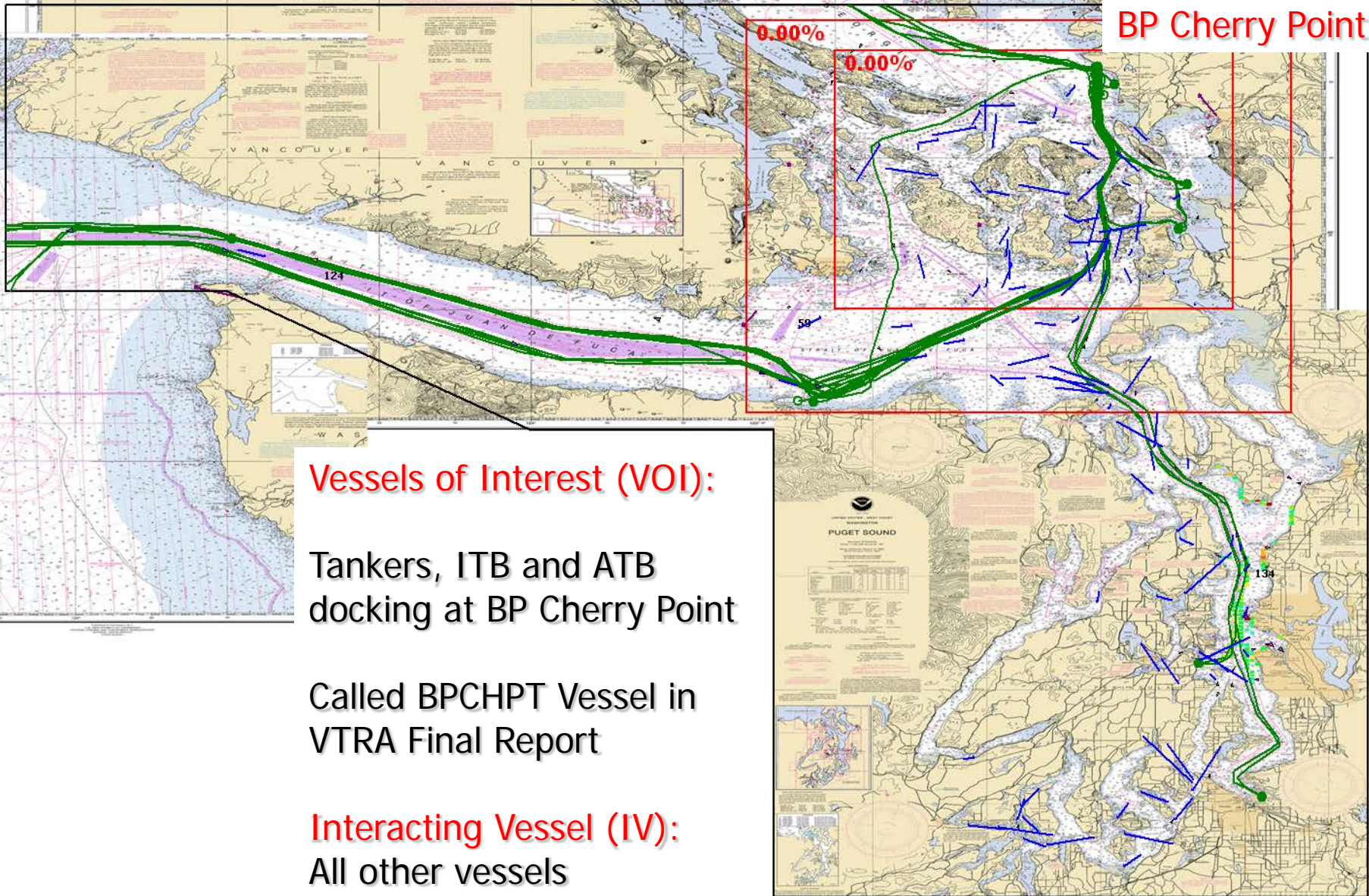
**RPI Personnel:** Dr. Martha Grabowski, Zhi Zhou, Michael Steward, Brittany Steward, Huawei Song, Zhuyu You

**TU Delft Personnel:** Giel van de Wiel

**Puget Sound Harbor Safer Committee Presentation April 2012**



# ROUTES OF BP CHERRY POINT VESSELS





# SUMMARY DEFINITION OF THE 15 VTRA CASES:

	Case	CP Traffic	Other Traffic	North Wing?	Saddlebags?	Extend Escorting?	Neah Bay?	Gate Way?
1	A	2000	2000	No	Yes	No	Yes	No
2	B	2005	2005	Yes	Yes	No	Yes	No
3	C	2005	2005	No	Yes	No	Yes	No
4	D	2025 Low	2025 Low	Yes	Yes	No	Yes	Yes
5	E	2025 Low	2025 Low	No	Yes	No	Yes	Yes
6	F	2025 Medium	2025 Medium	Yes	Yes	No	Yes	Yes
7	G	2025 Medium	2025 Medium	No	Yes	No	Yes	Yes
8	H	2025 High	2025 High	Yes	Yes	No	Yes	Yes
9	I	2025 High	2025 High	No	Yes	No	Yes	Yes
10	J	2005	2005	Yes	No	No	Yes	No
11	K	2025 High	2025 High	Yes	No	No	Yes	Yes
12	L	2005	2005	Yes	Yes	Yes	Yes	No
13	M	2025 High	2025 High	Yes	Yes	Yes	Yes	Yes
14	N	2005	2005	Yes	Yes	No	No	No
15	O	2025 High	2025 High	Yes	Yes	No	No	Yes

VTRA CASE B – 2005 : BOTH WINGS OPERATIONAL – **THE BASE CASE SCENARIO**

VTRA CASE C – 2005 : ONE WING OPERATIONAL – **2005 TRAFFIC LEVEL**

VTRA CASE A – 2000 : ONE WING OPERATIONAL – **2000 TRAFFIC LEVEL**

No future traffic level development required - just back casting from B to 2000

# SUMMARY DEFINITION OF THE 15 VTRA CASES:

	Case	CP Traffic	Other Traffic	North Wing?	Saddlebags?	Extend Escorting?	Neah Bay?	Gate Way?
1	A	2000	2000	No	Yes	No	Yes	No
2	B	2005	2005	Yes	Yes	No	Yes	No
3	C	2005	2005	No	Yes	No	Yes	No
4	D	2025 Low	2025 Low	Yes	Yes	No	Yes	Yes
5	E	2025 Low	2025 Low	No	Yes	No	Yes	Yes
6	F	2025 Medium	2025 Medium	Yes	Yes	No	Yes	Yes
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8	H	2025 High	2025 High	Yes	Yes	No	Yes	Yes
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12	L	2005	2005	Yes	Yes	Yes	Yes	No
13	M	2025 High	2025 High	Yes	Yes	Yes	Yes	Yes
14	N	2005	2005	Yes	Yes	No	No	No
15	O	2025 High	2025 High	Yes	Yes	No	No	Yes

VTRA CASE B – 2005 : BOTH WINGS OPERATIONAL – **THE BASE CASE SCENARIO**

VTRA CASE D – 2025 : BOTH WINGS OPERATIONAL – **LOW TRAFFIC + GATEWAY**

VTRA CASE E – 2025 : ONE WING OPERATIONAL – **LOW TRAFFIC + GATEWAY**

Future traffic level development from B required only for VTRA CASE D and VTRA CASE E

# SUMMARY DEFINITION OF THE 15 VTRA CASES:

	Case	CP Traffic	Other Traffic	North Wing?	Saddlebags?	Extend Escorting?	Neah Bay?	Gate Way?
1	A	2000	2000	No	Yes	No	Yes	No
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4	D	2025 Low	2025 Low	Yes	Yes	No	Yes	Yes
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6	F	2025 Medium	2025 Medium	Yes	Yes	No	Yes	Yes
7	G	2025 Medium	2025 Medium	No	Yes	No	Yes	Yes
8	H	2025 High	2025 High	Yes	Yes	No	Yes	Yes
9	I	2025 High	2025 High	No	Yes	No	Yes	Yes
10	J	2005	2005	Yes	No	No	Yes	No
11	K	2025 High	2025 High	Yes	No	No	Yes	Yes
12	L	2005	2005	Yes	Yes	Yes	Yes	No
13	M	2025 High	2025 High	Yes	Yes	Yes	Yes	Yes
14	N	2005	2005	Yes	Yes	No	No	No
15	O	2025 High	2025 High	Yes	Yes	No	No	Yes

VTRA CASE B – 2005 : BOTH WINGS OPERATIONAL – **THE BASE CASE SCENARIO**

VTRA CASE F – 2025 : BOTH WINGS OPERATIONAL – **MED. TRAFFIC + GATEWAY**

VTRA CASE G – 2025 : ONE WING OPERATIONAL – **MED. TRAFFIC + GATEWAY**

Future traffic level development from B required only for VTRA CASE F and VTRA CASE G

# SUMMARY DEFINITION OF THE 15 VTRA CASES:

	Case	CP Traffic	Other Traffic	North Wing?	Saddlebags?	Extend Escorting?	Neah Bay?	Gate Way?
1	A	2000	2000	No	Yes	No	Yes	No
2	B	2005	2005	Yes	Yes	No	Yes	No
3	C	2005	2005	No	Yes	No	Yes	No
4	D	2025 Low	2025 Low	Yes	Yes	No	Yes	Yes
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6	F	2025 Medium	2025 Medium	Yes	Yes	No	Yes	Yes
7	G	2025 Medium	2025 Medium	No	Yes	No	Yes	Yes
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9	I	2025 High	2025 High	No	Yes	No	Yes	Yes
10	J	2005	2005	Yes	No	No	Yes	No
11	K	2025 High	2025 High	Yes	No	No	Yes	Yes
12	L	2005	2005	Yes	Yes	Yes	Yes	No
13	M	2025 High	2025 High	Yes	Yes	Yes	Yes	Yes
14	N	2005	2005	Yes	Yes	No	No	No
15	O	2025 High	2025 High	Yes	Yes	No	No	Yes

VTRA CASE B – 2005 : BOTH WINGS OPERATIONAL – **THE BASE CASE SCENARIO**

VTRA CASE H – 2025 : BOTH WINGS OPERATIONAL – **HIGH. TRAFFIC + GATEWAY**

VTRA CASE I – 2025 : ONE WING OPERATIONAL – **HIGH. TRAFFIC + GATEWAY**

Future traffic level development from B required only for VTRA CASE H and VTRA CASE I



# SUMMARY DEFINITION OF THE 15 VTRA CASES:

	Case	CP Traffic	Other Traffic	North Wing?	Saddlebags?	Extend Escorting?	Neah Bay?	Gate Way?
1	A	2000	2000	No	Yes	No	Yes	No
2	B	2005	2005	Yes	Yes	No	Yes	No
3	C	2005	2005	No	Yes	No	Yes	No
4	D	2025 Low	2025 Low	Yes	Yes	No	Yes	Yes
5	E	2025 Low	2025 Low	No	Yes	No	Yes	Yes
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7	G	2025 Medium	2025 Medium	No	Yes	No	Yes	Yes
8	H	2025 High	2025 High	Yes	Yes	No	Yes	Yes
9	I	2025 High	2025 High	No	Yes	No	Yes	Yes
10	J	2005	2005	Yes	No	No	Yes	No
11	K	2025 High	2025 High	Yes	No	No	Yes	Yes
12	L	2005	2005	Yes	Yes	Yes	Yes	No
13	M	2025 High	2025 High	Yes	Yes	Yes	Yes	Yes
14	N	2005	2005	Yes	Yes	No	No	No
15	O	2025 High	2025 High	Yes	Yes	No	No	Yes

VTRA CASE B – 2005 : **THE BASE CASE SCENARIO** (Includes Saddlebags)

VTRA CASE J – 2005 : **BASE CASE TRAFFIC** - No Saddlebags

VTRA CASE H – 2025 : **HIGH TRAFFIC + GATEWAY** - Yes Saddlebags

VTRA CASE K – 2025 : **HIGH TRAFFIC + GATEWAY** - No Saddlebags

Future traffic level development from B required only for VTRA CASE K

# SUMMARY DEFINITION OF THE 15 VTRA CASES:

	Case	CP Traffic	Other Traffic	North Wing?	Saddlebags?	Extend Escorting?	Neah Bay?	Gate Way?
1	A	2000	2000	No	Yes	No	Yes	No
2	B	2005	2005	Yes	Yes	No	Yes	No
3	C	2005	2005	No	Yes	No	Yes	No
4	D	2025 Low	2025 Low	Yes	Yes	No	Yes	Yes
5	E	2025 Low	2025 Low	No	Yes	No	Yes	Yes
6	F	2025 Medium	2025 Medium	Yes	Yes	No	Yes	Yes
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11	K	2025 High	2025 High	Yes	No	No	Yes	Yes
12	L	2005	2005	Yes	Yes	Yes	Yes	No
13	M	2025 High	2025 High	Yes	Yes	Yes	Yes	Yes
14	N	2005	2005	Yes	Yes	No	No	No
15	O	2025 High	2025 High	Yes	Yes	No	No	Yes

VTRA CASE B – 2005 : **THE BASE CASE SCENARIO** (No Extended Escorting)

VTRA CASE L – 2005 : **BASE CASE TRAFFIC** - With Extended Escorting.

VTRA CASE H – 2025 : **HIGH TRAFFIC + GATEWAY** - No Extended Escorting.

VTRA CASE M – 2025 : **HIGH TRAFFIC + GATEWAY** - With Extended Escorting.

Future traffic level development required only for VTRA CASE K



# SUMMARY DEFINITION OF THE 15 VTRA CASES:

	Case	CP Traffic	Other Traffic	North Wing?	Saddlebags?	Extend Escorting?	Neah Bay?	Gate Way?
1	A	2000	2000	No	Yes	No	Yes	No
2	B	2005	2005	Yes	Yes	No	Yes	No
3	C	2005	2005	No	Yes	No	Yes	No
4	D	2025 Low	2025 Low	Yes	Yes	No	Yes	Yes
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6	F	2025 Medium	2025 Medium	Yes	Yes	No	Yes	Yes
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8	H	2025 High	2025 High	Yes	Yes	No	Yes	Yes
9	I	2025 High	2025 High	No	Yes	No	Yes	Yes
10	J	2005	2005	Yes	No	No	Yes	No
11	K	2025 High	2025 High	Yes	No	No	Yes	Yes
12	L	2005	2005	Yes	Yes	Yes	Yes	No
13	M	2025 High	2025 High	Yes	Yes	Yes	Yes	Yes
14	N	2005	2005	Yes	Yes	No	No	No
15	O	2025 High	2025 High	Yes	Yes	No	No	Yes

VTRA CASE B – 2005 : **THE BASE CASE SCENARIO** ( includes Neah Bay Tug)

VTRA CASE N – 2005 : **BASE CASE TRAFFIC** - No Neah Bay Tug

VTRA CASE H – 2025 : **HIGH TRAFFIC + GATEWAY** – Yes Neah Bay Tug.

VTRA CASE O – 2025 : **HIGH TRAFFIC + GATEWAY** - No Neah Bay Tug

Future traffic level development required only for VTRA CASE K

# VTRA CASE B: **AGGREGATED** RESULTS

## Assessment of Oil Spill Risk due to Vessel Traffic Docking at Cherry Point (BP), Washington

### GWU Personnel:

Dr. Jack R. Harrald, Dr. J. Rene van Dorp, Dr. Greg Shaw,  
Dr. Thomas A. Mazzuchi, Adil Caner Sener, Christian Salmon

### RPI Personnel:

Dr. Martha Grabowski, Zhi Zhou, Zhuyu You, Michael Steward

### VCU Personnel:

Dr. Jason R. W. Merrick, Christina Werner

**July 14, 2008**





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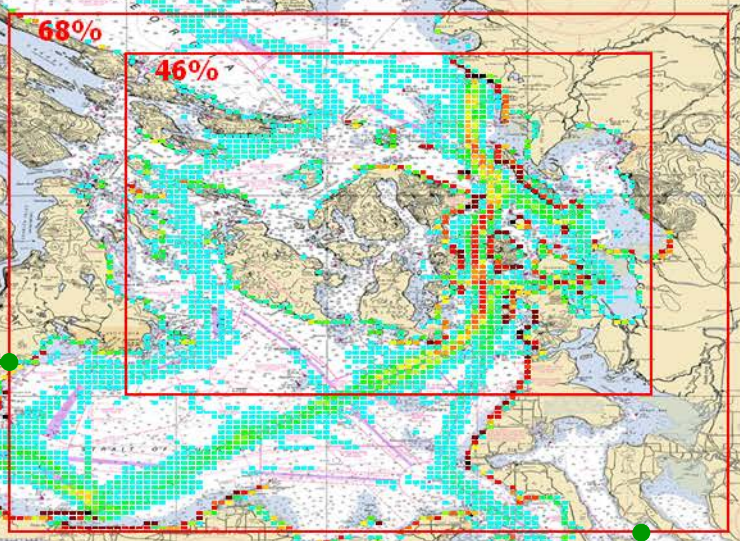
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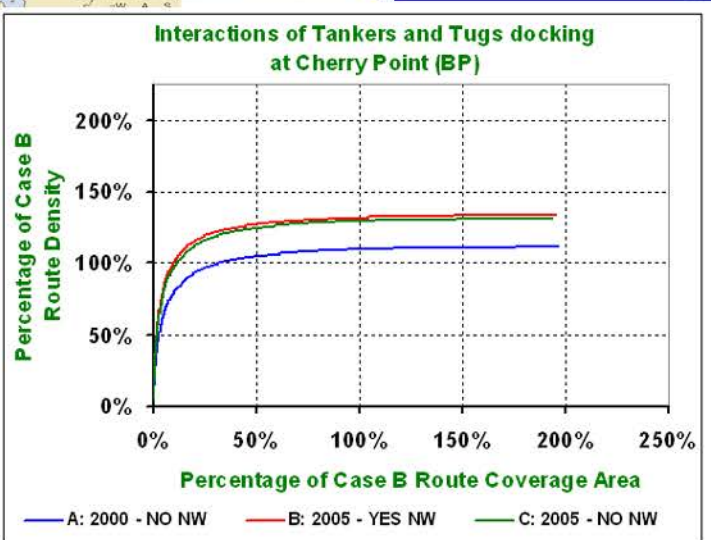
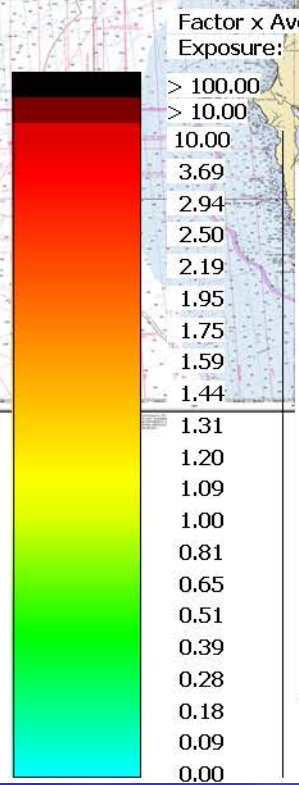
# VTRA CASE B: Year 2005 with north wing

100% of Case B Total

Only Average Grid Cell Potential  
Number of Interactions per Year  
(BP - Vessel, Power, Drift or Allisions)



Remaining 32%



Background map is a composite of official nautical NOAA electronic charts



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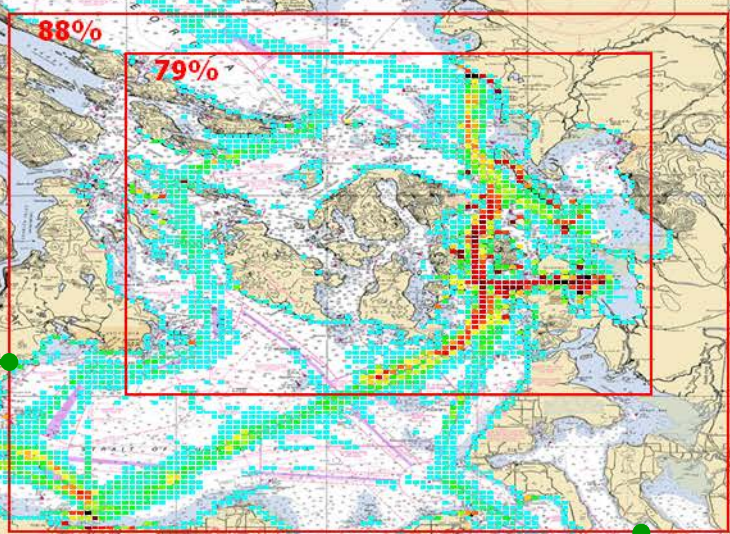
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**VCU**  
Rensselaer

# VTRA CASE B: Year 2005 with north wing

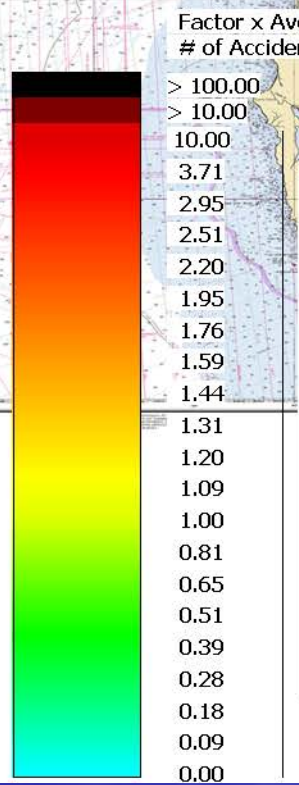
100% of Case B Total

Only Average Grid Cell Potential  
Number of Accidents per Year  
(BP - Collision, Power, Drift or Allisions)



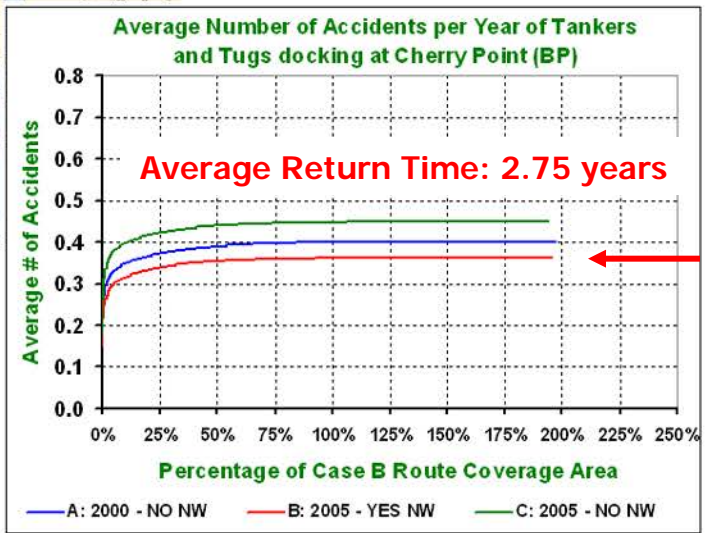
Remaining 12%

1 Collision,  
1 Grounding,  
2 Allisions =  
4 Accidents  
in 11 Years  
of Data



Factor x Average  
# of Accidents

- > 100.00
- > 10.00
- 10.00
- 3.71
- 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



Background map is a composite of official nautical NOAA electronic charts

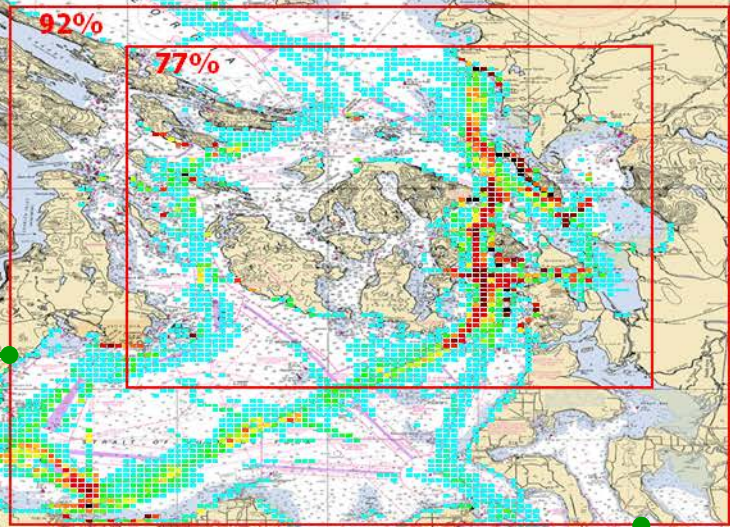




# VTRA CASE B: Year 2005 with north wing

100% of Case B Total

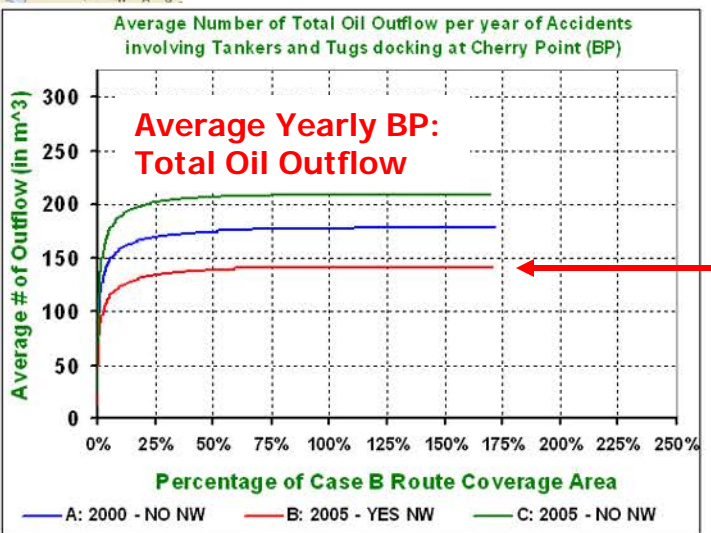
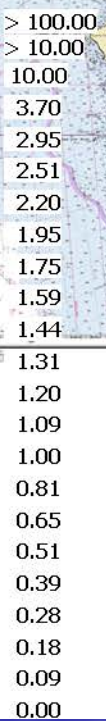
Only Average Grid Cell Potential **Volume** of Total Outflow per Year (BP - Collision, Power, Drift or Allisions)



Remaining 8%

141.0 Cubic Meters (100%) On Average Per Year due to Accidents above

Factor x Average Oil Outflow



Background map is a composite of official nautical NOAA electronic charts



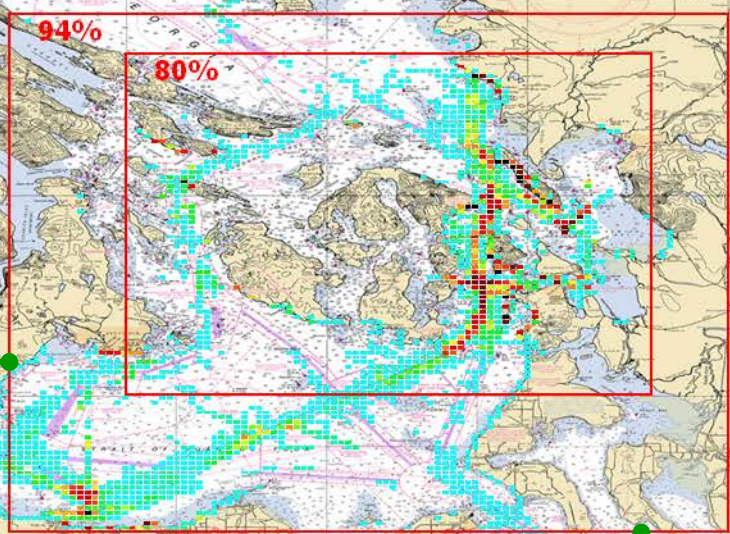


# VTRA CASE B: Year 2005 with north wing

100% of Case B Total

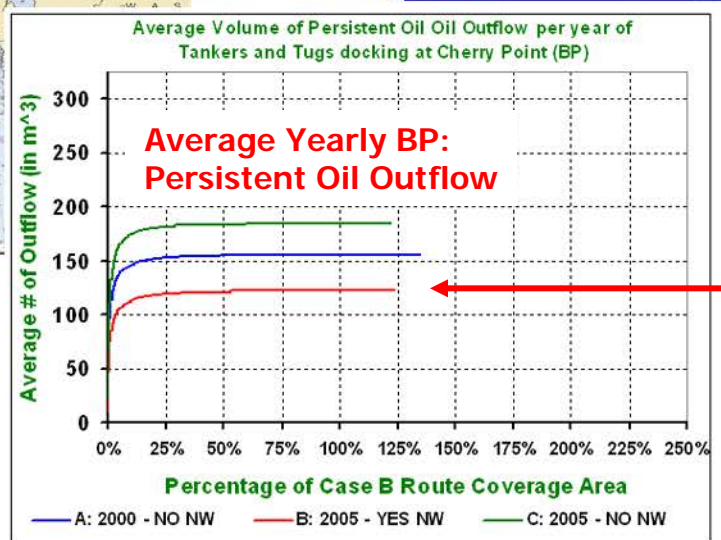
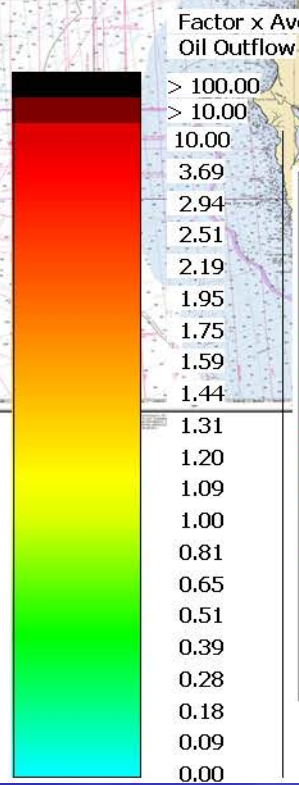
Only Average Grid Cell Potential **Volume**  
of BP Persistent Outflow per Year  
(BP - Collision, Power, Drift or Allisions)

5.2% of Total Oil  
Outflow (BP & IV)



Remaining 6%

122.1 Cubic  
Meters (86.6%)  
On Average  
Per Year  
due to  
Accidents  
above



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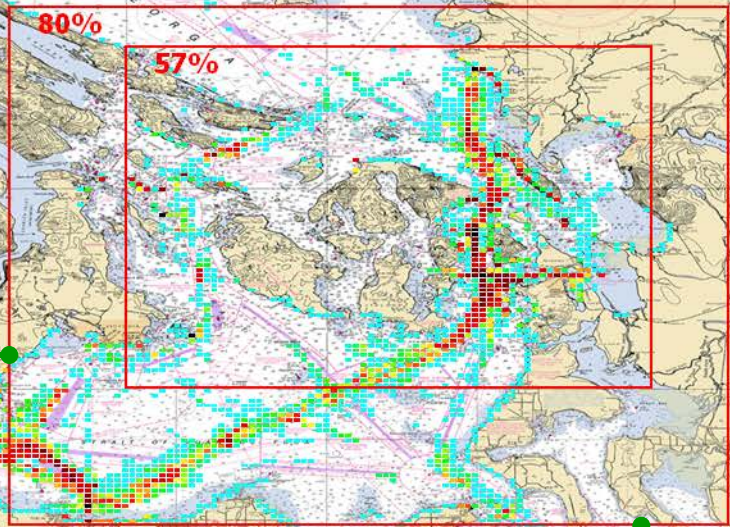


# VTRA CASE B: Year 2005 with north wing

100% of Case B Total

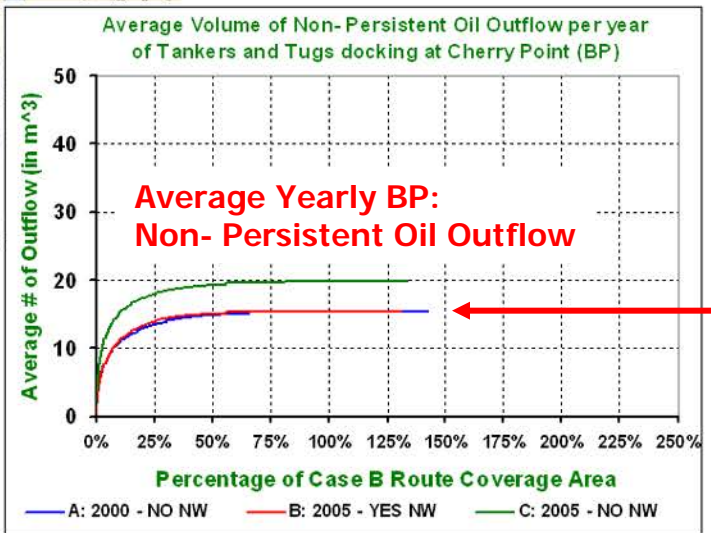
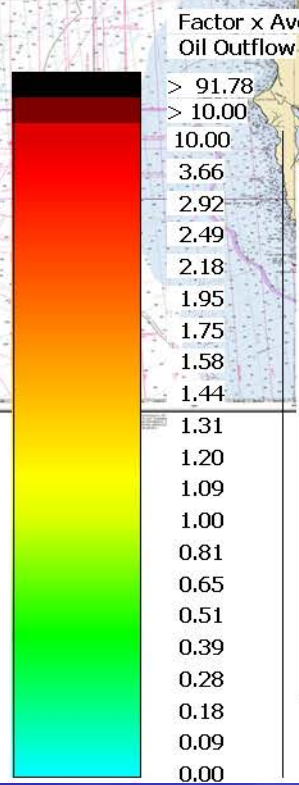
Only Average Grid Cell Potential **Volume**  
of **BP Non-Persistent Outflow per Year**  
(BP - Collision, Power, Drift or Allisions)

2.2% of Total Oil  
Outflow (BP & IV)



Remaining 20%

15.3 Cubic  
Meters (10.9%)  
On Average  
Per Year  
due to  
Accidents  
above



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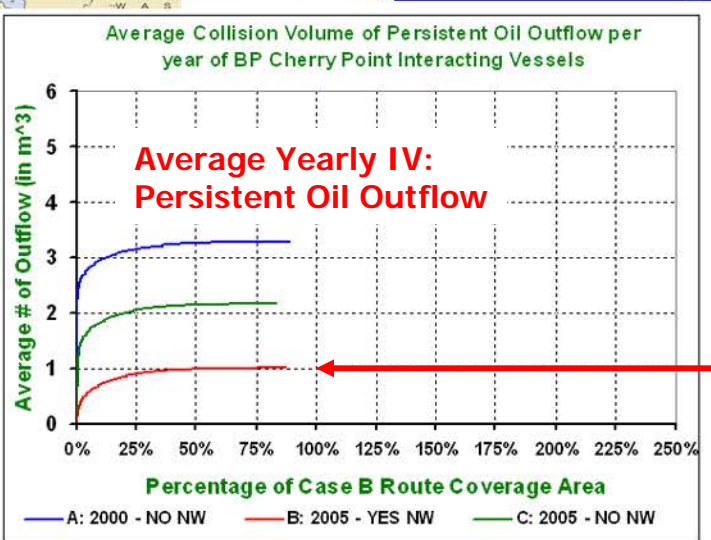
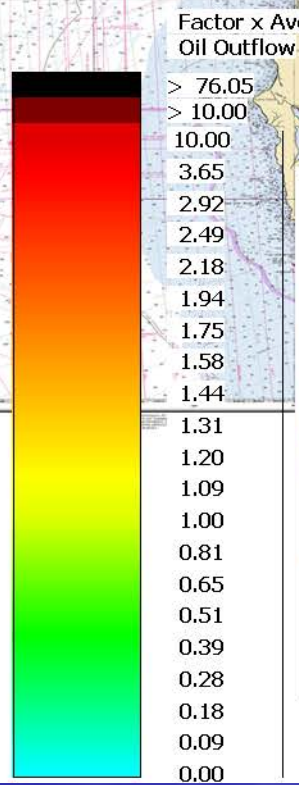
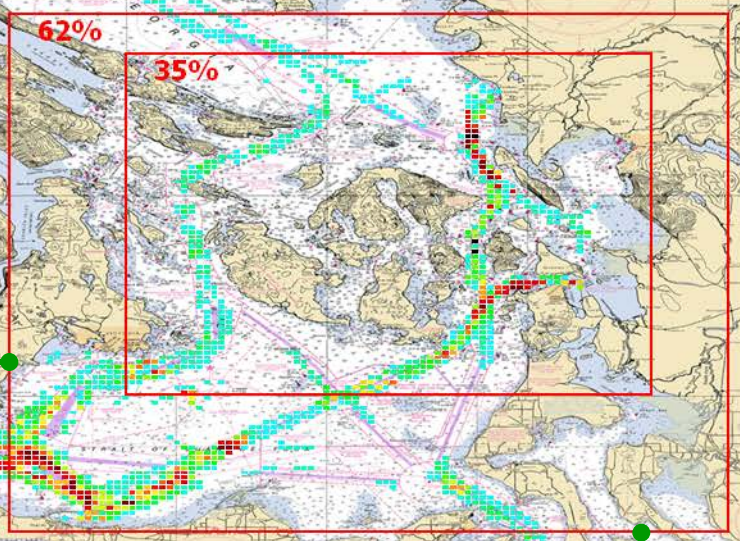


# VTRA CASE B: Year 2005 with north wing

100% of Case B Total

Only Average Grid Cell Potential Volume of Interacting Vessel Persistent Outflow per Year (BP - Collisions)

0.27% of Total Oil Outflow (BP & IV)



Remaining 38%

1.0 Cubic Meters (0.71%) On Average Per Year due to Accidents above

Background map is a composite of official nautical NOAA electronic charts



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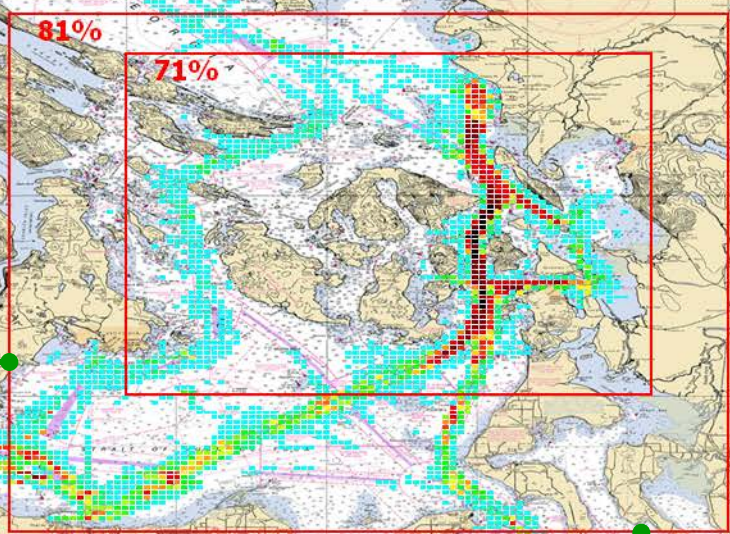
**VCU**  
Rensselaer

# VTRA CASE B: Year 2005 with north wing

100% of Case B Total

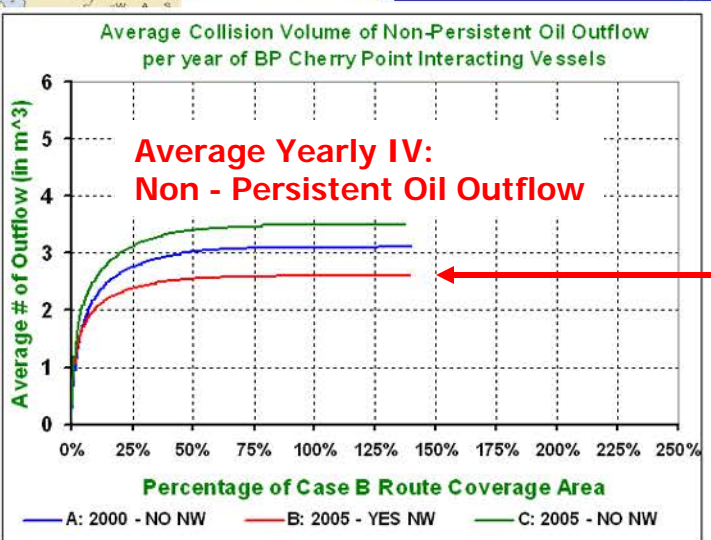
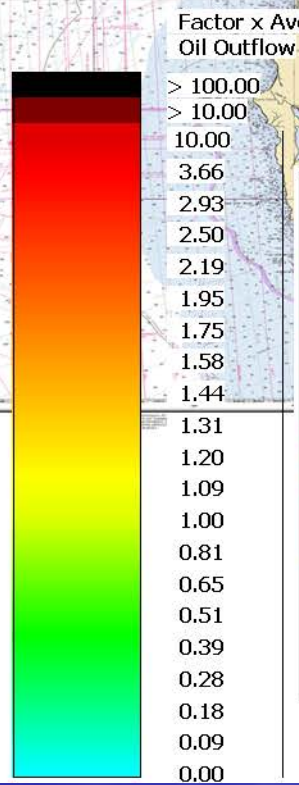
Only Average Grid Cell Potential **Volume**  
**of Interacting Vessel Non-Persistent**  
**Outflow per Year (BP - Collisions)**

0.35% of Total Oil  
Outflow (BP & IV)



Remaining 19%

**2.6 Cubic  
Meters (1.84%)  
On Average  
Per Year  
due to  
Accidents  
above**



Background map is a composite of official nautical NOAA electronic charts



# VTRA UPDATE: **AGGREGATED A-B-C** TOTAL OIL OUTFLOW COMPARISON

Assessment of Oil Spill Risk due to Vessel Traffic  
Docking at Cherry Point (BP), Washington

## GWU Personnel:

Dr. Jack R. Harrald, Dr. J. Rene van Dorp, Dr. Greg Shaw,  
Dr. Thomas A. Mazzuchi, Adil Caner Sener, Christian Salmon

## RPI Personnel:

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**July 14, 2008**



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4	D	2025 Low	2025 Low	Yes	Yes	No	Yes	Yes
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6	F	2025 Medium	2025 Medium	Yes	Yes	No	Yes	Yes
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9	I	2025 High	2025 High	No	Yes	No	Yes	Yes
10	J	2005	2005	Yes	No	No	Yes	No
11	K	2025 High	2025 High	Yes	No	No	Yes	Yes
12	L	2005	2005	Yes	Yes	Yes	Yes	No
13	M	2025 High	2025 High	Yes	Yes	Yes	Yes	Yes
14	N	2005	2005	Yes	Yes	No	No	No
15	O	2025 High	2025 High	Yes	Yes	No	No	Yes

VTRA CASE B – 2005 : BOTH WINGS OPERATIONAL – **THE BASE CASE SCENARIO**

VTRA CASE C – 2005 : ONE WING OPERATIONAL – **2005 TRAFFIC LEVEL**

VTRA CASE A – 2000 : ONE WING OPERATIONAL – **2000 TRAFFIC LEVEL**

No future traffic level development required - just back casting to 2000



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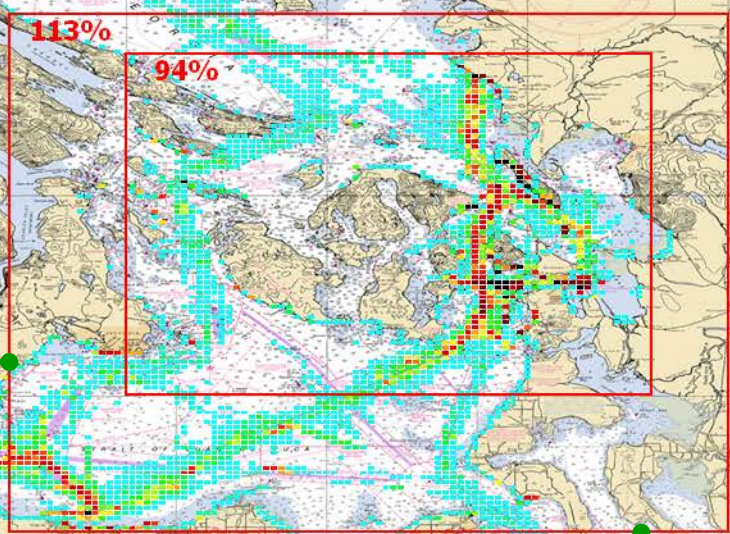
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# VTRA CASE A: Year 2000

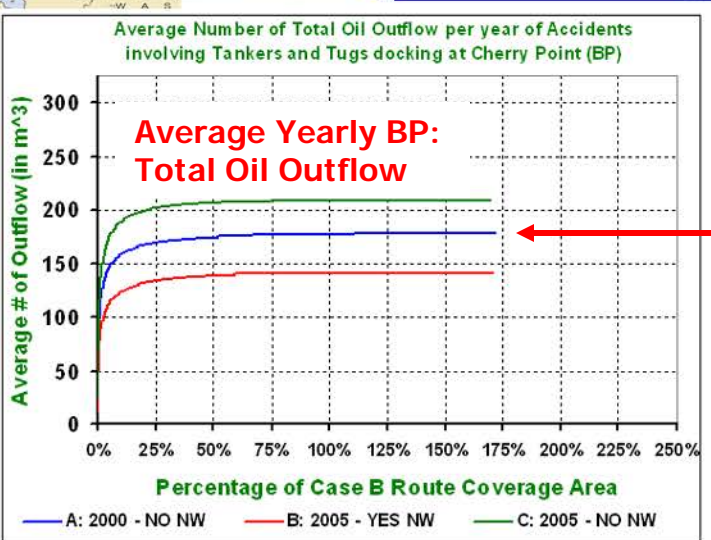
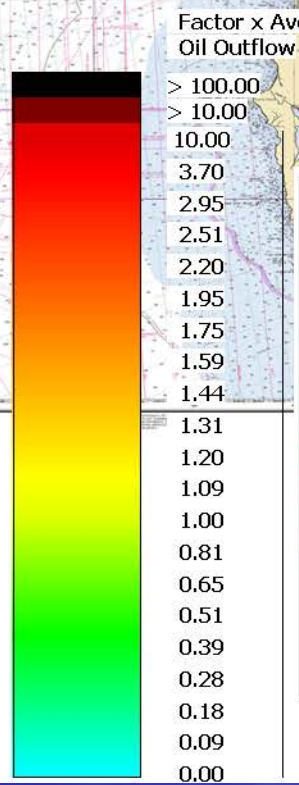
126% of Case B Total

Only Average Grid Cell Potential **Volume**  
**of Total Outflow per Year**  
**(BP - Collision, Power, Drift or Allisions)**



Remaining 13%

177.6 Cubic  
Meters  
On Average  
Per Year  
due to  
Accidents  
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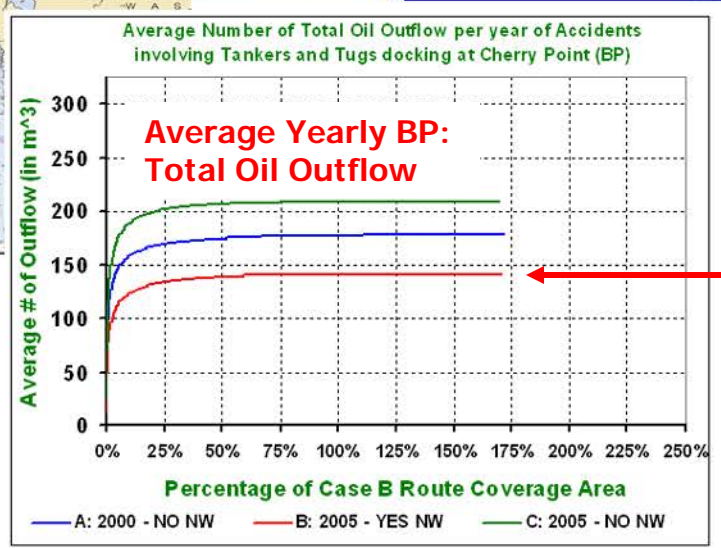
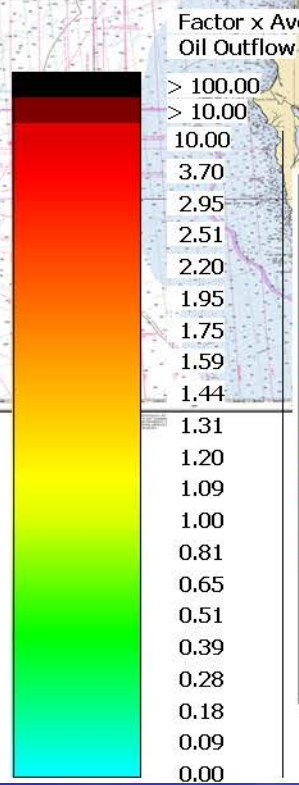
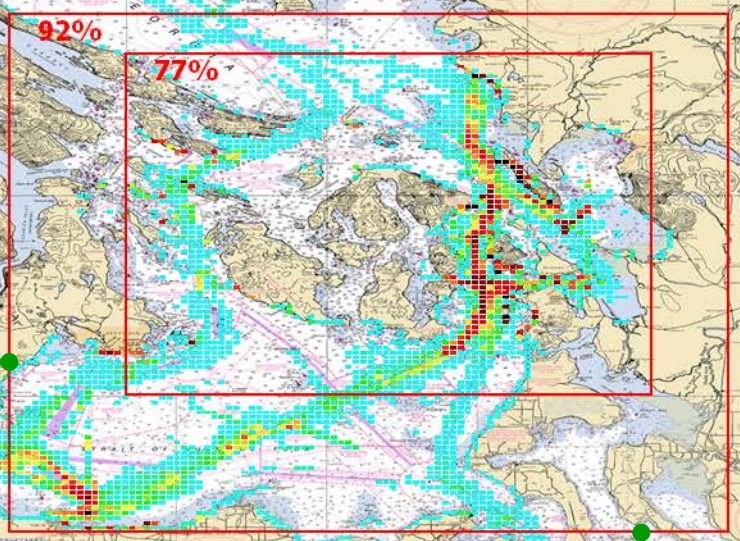
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WASHINGTON DC



# VTRA CASE B: Year 2005 with north wing

100% of Case B Total

Only Average Grid Cell Potential **Volume**  
**of Total Outflow per Year**  
**(BP - Collision, Power, Drift or Allisions)**



Remaining 8%

**141.0 Cubic Meters On Average Per Year due to Accidents above**

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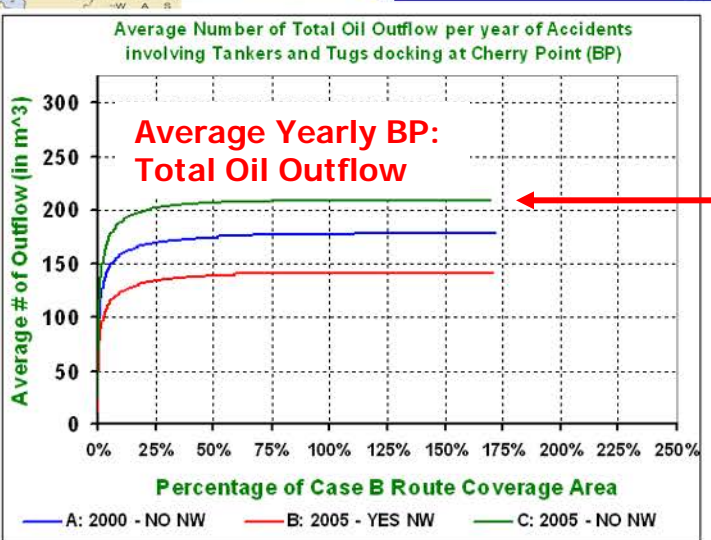
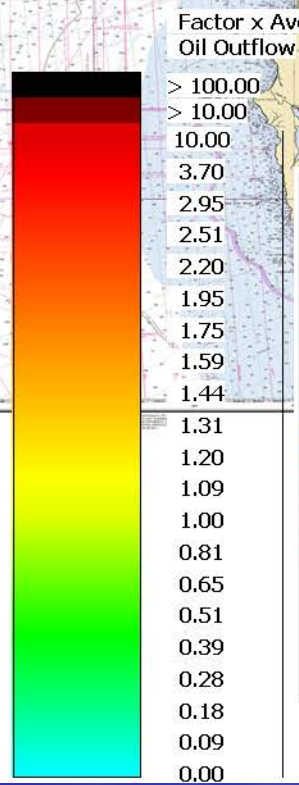
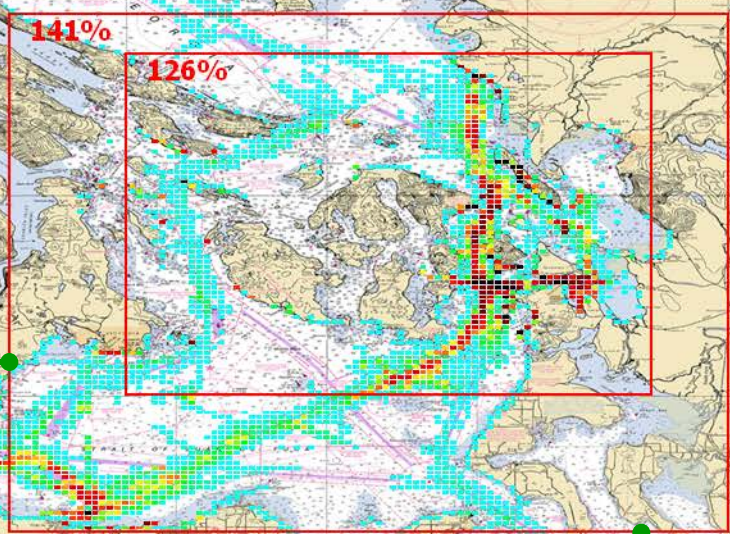
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# VTRA CASE C: Year 2005 without north wing

148% of Case B Total

Only Average Grid Cell Potential Volume of Total Outflow per Year (BP - Collision, Power, Drift or Allisions)



Remaining 7%

209.3 Cubic Meters On Average Per Year due to Accidents above

Background map is a composite of official nautical NOAA electronic charts



# VTRA UPDATE: **AGGREGATED B-F-G** TOTAL OIL OUTFLOW COMPARISON

Assessment of Oil Spill Risk due to Vessel Traffic  
Docking at Cherry Point (BP), Washington

## GWU Personnel:

Dr. Jack R. Harrald, Dr. J. Rene van Dorp, Dr. Greg Shaw,  
Dr. Thomas A. Mazzuchi, Adil Caner Sener, Christian Salmon

## RPI Personnel:

Dr. Martha Grabowski, Zhi Zhou, Zhuyu You, Michael Steward

## VCU Personnel:

Dr. Jason R. W. Merrick, Christina Werner

**July 31, 2008**





# SUMMARY DEFINITION OF THE 15 VTRA CASES:

	Case	CP Traffic	Other Traffic	North Wing?	Saddlebags?	Extend Escorting?	Neah Bay?	Gate Way?
1	A	2000	2000	No	Yes	No	Yes	No
2	B	2005	2005	Yes	Yes	No	Yes	No
3	C	2005	2005	No	Yes	No	Yes	No
4	D	2025 Low	2025 Low	Yes	Yes	No	Yes	Yes
5	E	2025 Low	2025 Low	No	Yes	No	Yes	Yes
6	F	2025 Medium	2025 Medium	Yes	Yes	No	Yes	Yes
7	G	2025 Medium	2025 Medium	No	Yes	No	Yes	Yes
8	H	2025 High	2025 High	Yes	Yes	No	Yes	Yes
9	I	2025 High	2025 High	No	Yes	No	Yes	Yes
10	J	2005	2005	Yes	No	No	Yes	No
11	K	2025 High	2025 High	Yes	No	No	Yes	Yes
12	L	2005	2005	Yes	Yes	Yes	Yes	No
13	M	2025 High	2025 High	Yes	Yes	Yes	Yes	Yes
14	N	2005	2005	Yes	Yes	No	No	No
15	O	2025 High	2025 High	Yes	Yes	No	No	Yes

VTRA CASE B – 2005 : BOTH WINGS OPERATIONAL – **THE BASE CASE SCENARIO**

VTRA CASE F – 2025 : BOTH WINGS OPERATIONAL – **MED. TRAFFIC + GATEWAY**

VTRA CASE G – 2025 : ONE WING OPERATIONAL – **MED. TRAFFIC + GATEWAY**

Future traffic level development required only for VTRA CASE F and VTRA CASE G



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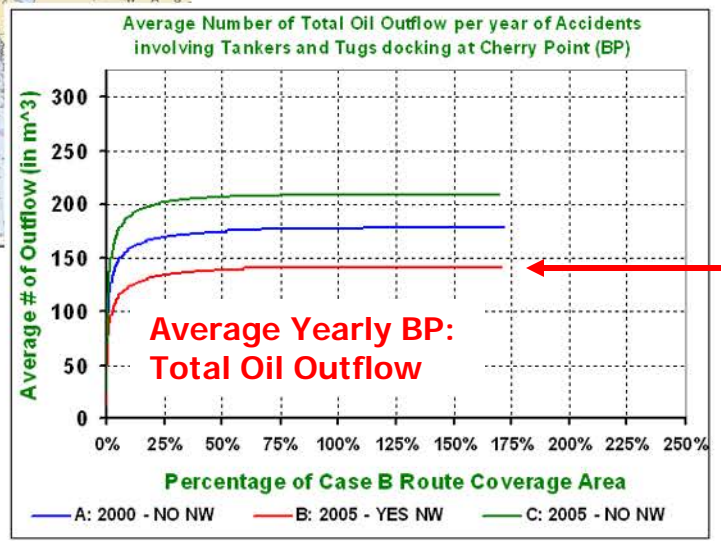
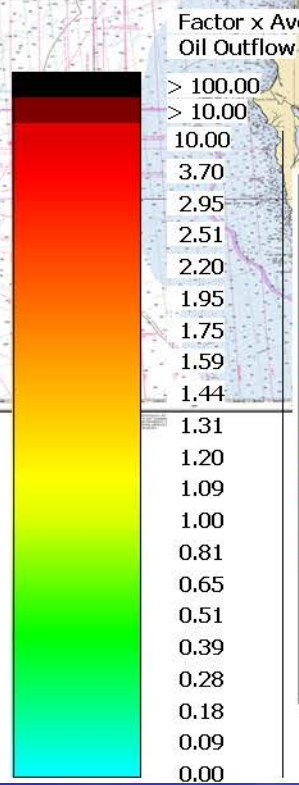
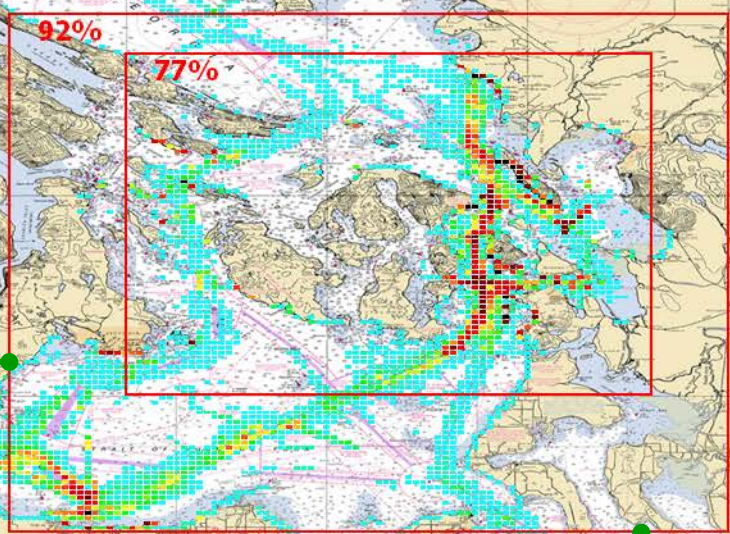
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# VTRA CASE B: Year 2005 with north wing

100% of Case B Total

Only Average Grid Cell Potential **Volume**  
**of Total Outflow per Year**  
**(BP - Collision, Power, Drift or Allisions)**



Remaining 8%

141.0 Cubic Meters On Average Per Year due to Accidents above

Background map is a composite of official nautical NOAA electronic charts



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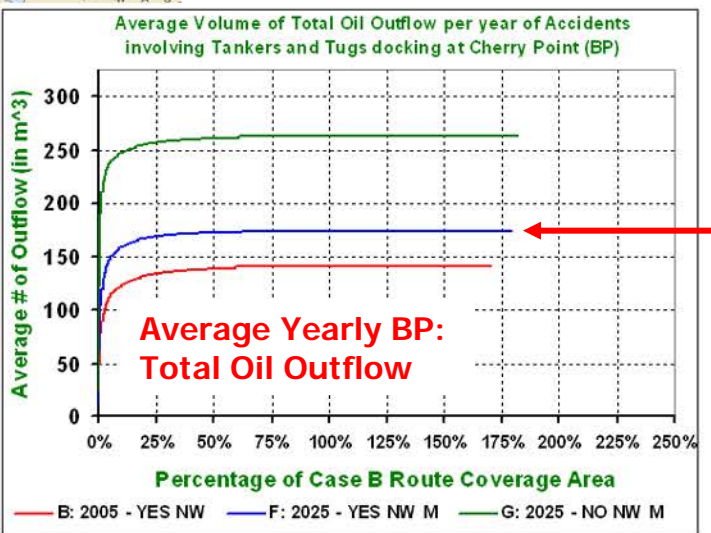
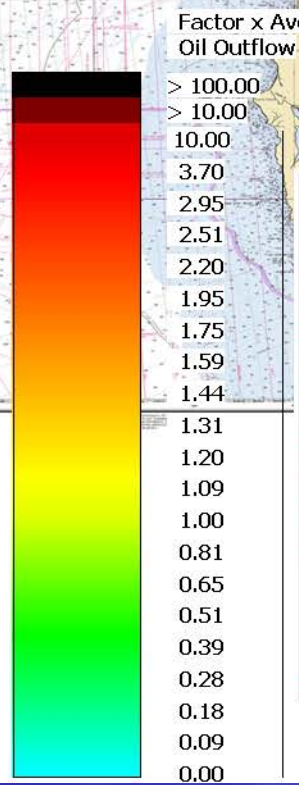
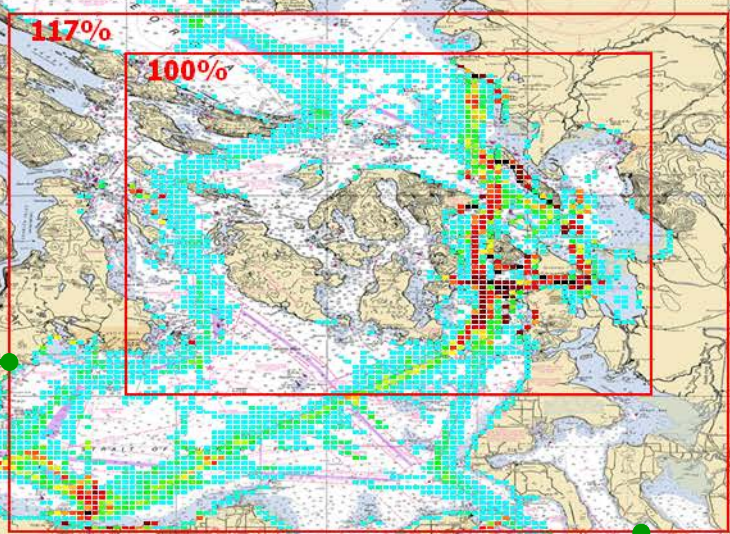
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# VTRA CASE F: Year 2025 Medium with north wing

124% of Case B Total

Only Average Grid Cell Potential **Volume**  
**of Total Outflow per Year**  
**(BP - Collision, Power, Drift or Allisions)**



Remaining 7%  
**174.4 Cubic Meters  
On Average  
Per Year  
due to  
Accidents  
above**

Background map is a composite of official nautical NOAA electronic charts

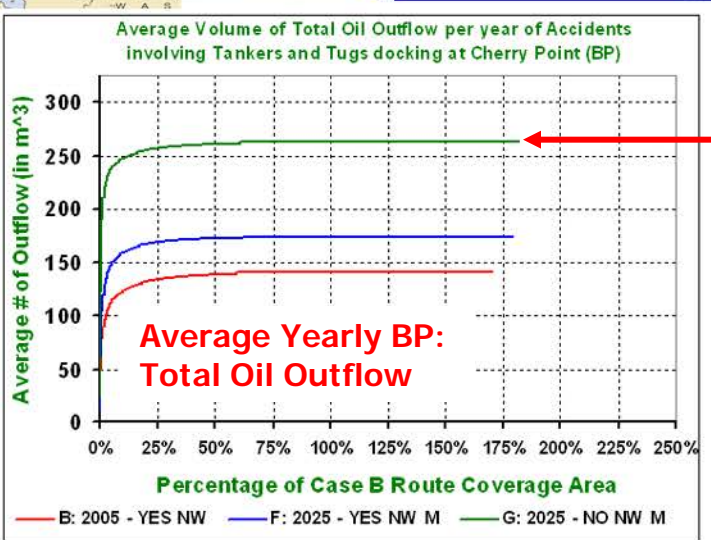
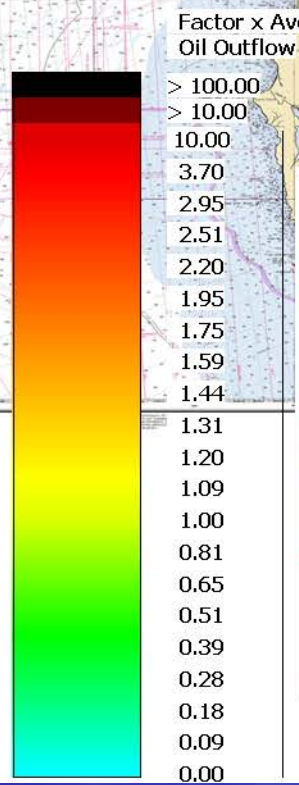
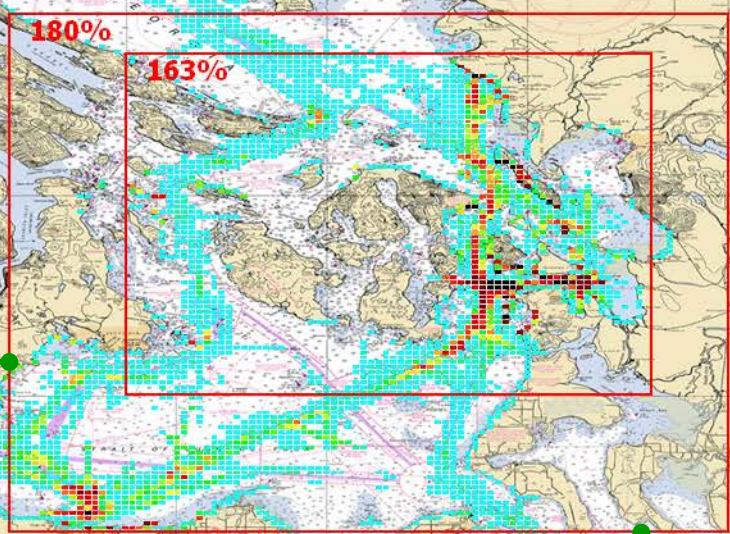




# VTRA CASE G: Year 2025 Medium without north wing

186% of Case B Total

Only Average Grid Cell Potential Volume of Total Outflow per Year (BP - Collision, Power, Drift or Allisions)



Remaining 6%

263.2 Cubic Meters On Average Per Year due to Accidents above

Background map is a composite of official nautical NOAA electronic charts



# VTRA UPDATE: **AGGREGATED B-H-I** TOTAL OIL OUTFLOW COMPARISON

Assessment of Oil Spill Risk due to Vessel Traffic  
Docking at Cherry Point (BP), Washington

## GWU Personnel:

Dr. Jack R. Harrald, Dr. J. Rene van Dorp, Dr. Greg Shaw,  
Dr. Thomas A. Mazzuchi, Adil Caner Sener, Christian Salmon

## RPI Personnel:

Dr. Martha Grabowski, Zhi Zhou, Zhuyu You, Michael Steward

## VCU Personnel:

Dr. Jason R. W. Merrick, Christina Werner

**July 31, 2008**





# SUMMARY DEFINITION OF THE 15 VTRA CASES:

	Case	CP Traffic	Other Traffic	North Wing?	Saddlebags?	Extend Escorting?	Neah Bay?	Gate Way?
1	A	2000	2000	No	Yes	No	Yes	No
2	B	2005	2005	Yes	Yes	No	Yes	No
3	C	2005	2005	No	Yes	No	Yes	No
4	D	2025 Low	2025 Low	Yes	Yes	No	Yes	Yes
5	E	2025 Low	2025 Low	No	Yes	No	Yes	Yes
6	F	2025 Medium	2025 Medium	Yes	Yes	No	Yes	Yes
7	G	2025 Medium	2025 Medium	No	Yes	No	Yes	Yes
8	H	2025 High	2025 High	Yes	Yes	No	Yes	Yes
9	I	2025 High	2025 High	No	Yes	No	Yes	Yes
10	J	2005	2005	Yes	No	No	Yes	No
11	K	2025 High	2025 High	Yes	No	No	Yes	Yes
12	L	2005	2005	Yes	Yes	Yes	Yes	No
13	M	2025 High	2025 High	Yes	Yes	Yes	Yes	Yes
14	N	2005	2005	Yes	Yes	No	No	No
15	O	2025 High	2025 High	Yes	Yes	No	No	Yes

VTRA CASE B – 2005 : BOTH WINGS OPERATIONAL – **THE BASE CASE SCENARIO**

VTRA CASE H – 2025 : BOTH WINGS OPERATIONAL – **HIGH. TRAFFIC + GATEWAY**

VTRA CASE I – 2025 : ONE WING OPERATIONAL – **HIGH. TRAFFIC + GATEWAY**

Future traffic level development required only for VTRA CASE H and VTRA CASE I



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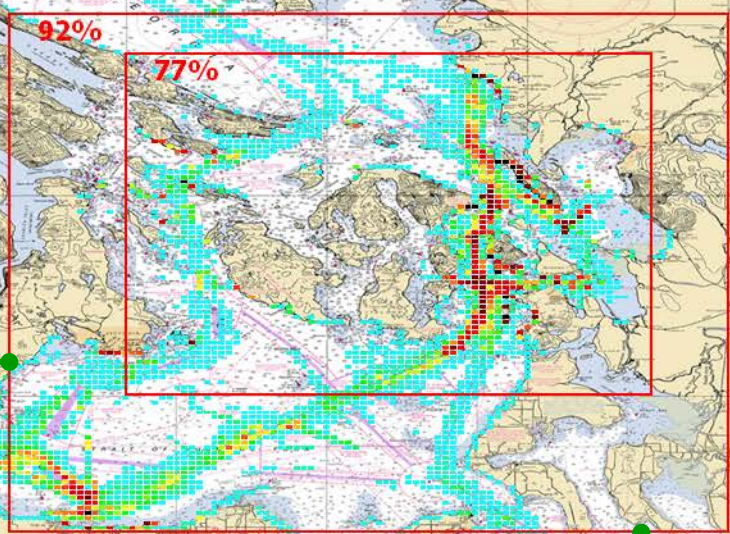
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# VTRA CASE B: Year 2005 with north wing

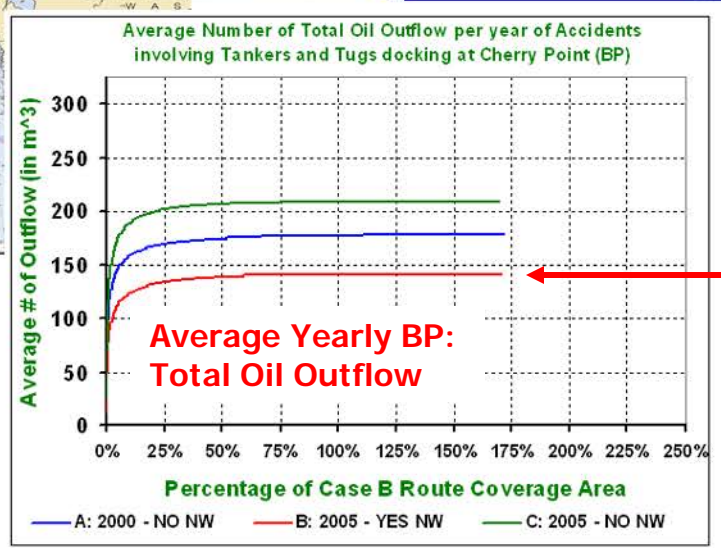
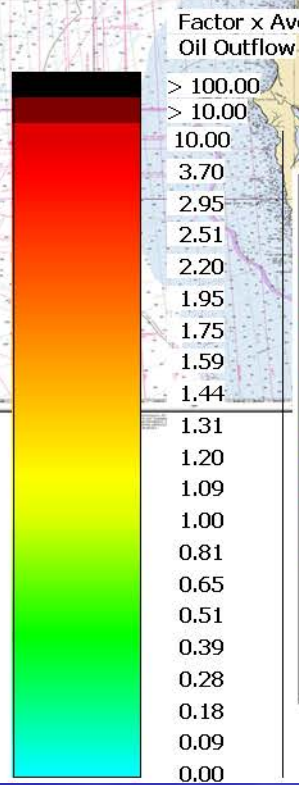
100% of Case B Total

Only Average Grid Cell Potential **Volume** of Total Outflow per Year (BP - Collision, Power, Drift or Allisions)



Remaining 8%

**2005 with NW:  
141.0 Cubic Meters  
On Average  
Per Year  
due to  
Accidents  
above**



Background map is a composite of official nautical NOAA electronic charts



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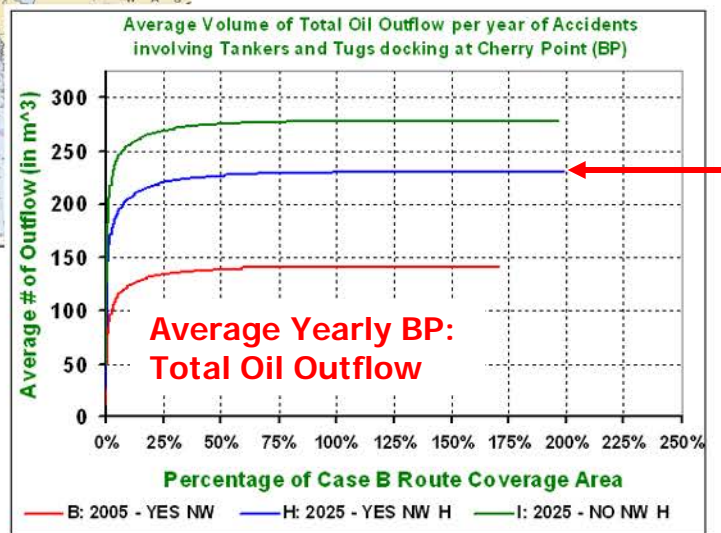
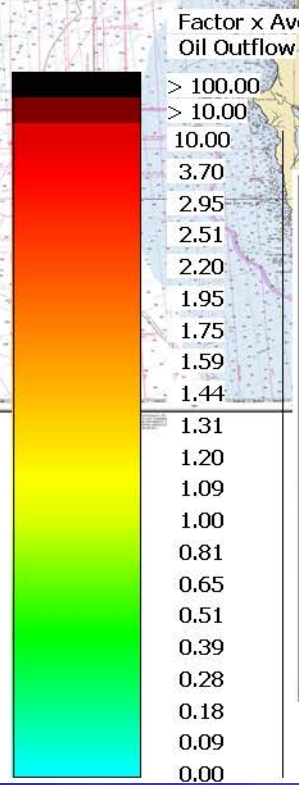
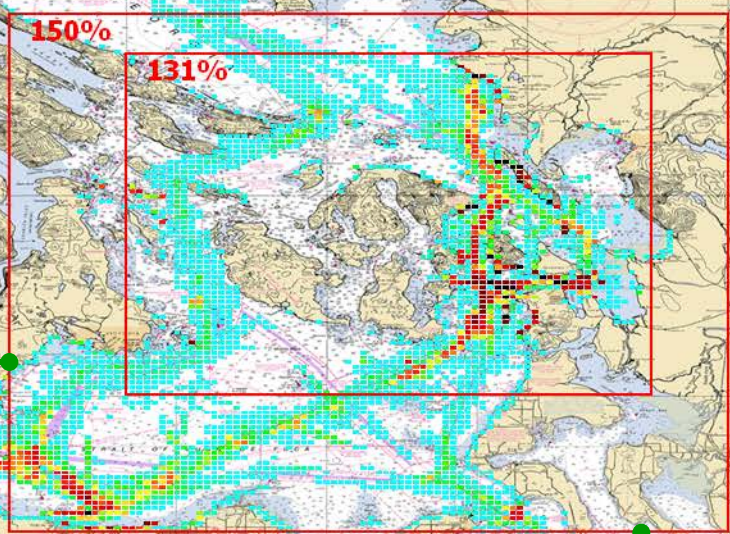
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**VCU**  
Rensselaer

# VTRA CASE H: Year 2025 High with north wing

163% of Case B Total

Only Average Grid Cell Potential **Volume** of Total Outflow per Year (BP - Collision, Power, Drift or Allisions)



Remaining 13%

**High with NW 229.9 Cubic Meters On Average Per Year due to Accidents above**

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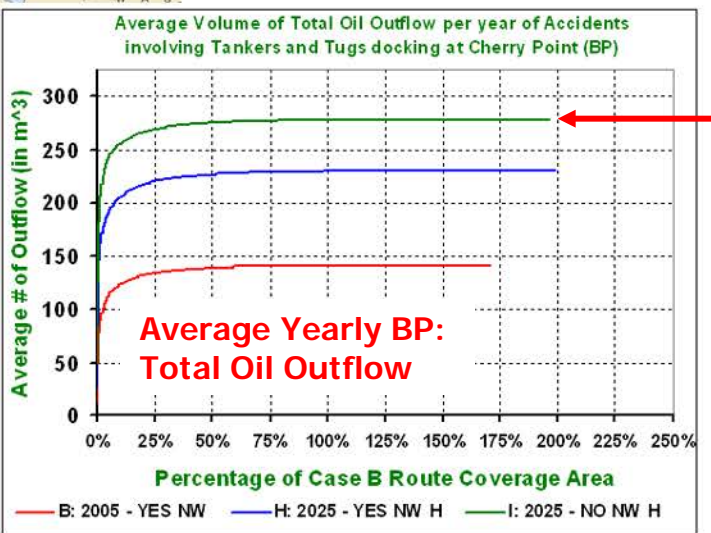
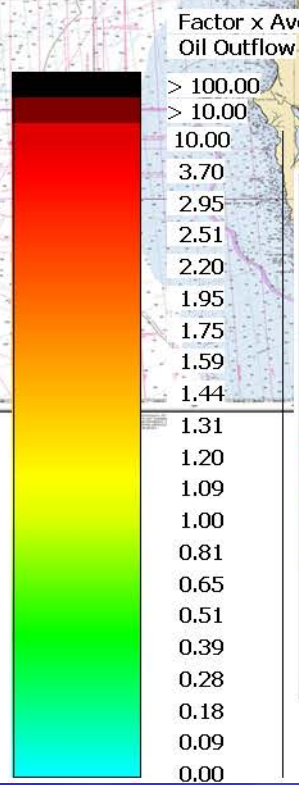
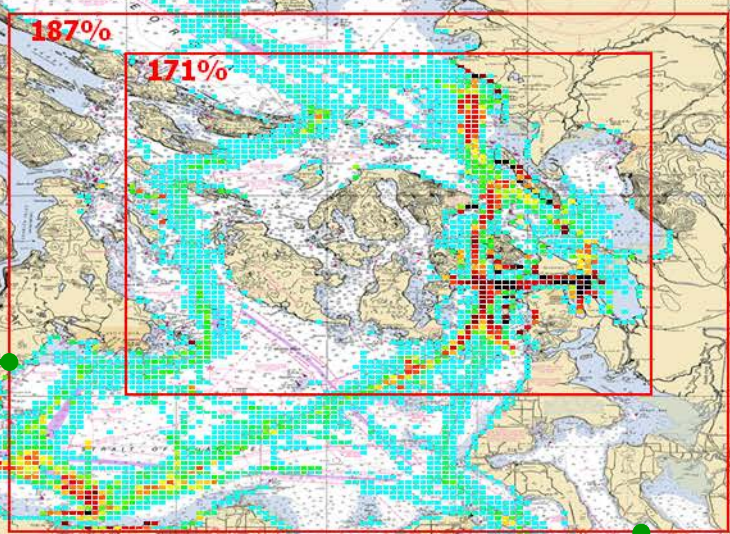
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# VTRA CASE I: Year 2025 High without north wing

197% of Case B Total

Only Average Grid Cell Potential **Volume**  
**of Total Outflow per Year**  
**(BP - Collision, Power, Drift or Allisions)**



Remaining 10%

**High no NW:  
278.5 Cubic  
Meters  
On Average  
Per Year  
due to  
Accidents  
above**

Background map is a composite of official nautical NOAA electronic charts



# VTRA UPDATE: **AGGREGATED B-D-E** TOTAL OIL OUTFLOW COMPARISON

Assessment of Oil Spill Risk due to Vessel Traffic  
Docking at Cherry Point (BP), Washington

## GWU Personnel:

Dr. Jack R. Harrald, Dr. J. Rene van Dorp, Dr. Greg Shaw,  
Dr. Thomas A. Mazzuchi, Adil Caner Sener, Christian Salmon

## RPI Personnel:

Dr. Martha Grabowski, Zhi Zhou, Zhuyu You, Michael Steward

## VCU Personnel:

Dr. Jason R. W. Merrick, Christina Werner

**June 31, 2008**





# SUMMARY DEFINITION OF THE 15 VTRA CASES:

	Case	CP Traffic	Other Traffic	North Wing?	Saddlebags?	Extend Escorting?	Neah Bay?	Gate Way?
1	A	2000	2000	No	Yes	No	Yes	No
2	B	2005	2005	Yes	Yes	No	Yes	No
3	C	2005	2005	No	Yes	No	Yes	No
4	D	2025 Low	2025 Low	Yes	Yes	No	Yes	Yes
5	E	2025 Low	2025 Low	No	Yes	No	Yes	Yes
6	F	2025 Medium	2025 Medium	Yes	Yes	No	Yes	Yes
7	G	2025 Medium	2025 Medium	No	Yes	No	Yes	Yes
8	H	2025 High	2025 High	Yes	Yes	No	Yes	Yes
9	I	2025 High	2025 High	No	Yes	No	Yes	Yes
10	J	2005	2005	Yes	No	No	Yes	No
11	K	2025 High	2025 High	Yes	No	No	Yes	Yes
12	L	2005	2005	Yes	Yes	Yes	Yes	No
13	M	2025 High	2025 High	Yes	Yes	Yes	Yes	Yes
14	N	2005	2005	Yes	Yes	No	No	No
15	O	2025 High	2025 High	Yes	Yes	No	No	Yes

VTRA CASE B – 2005 : BOTH WINGS OPERATIONAL – **THE BASE CASE SCENARIO**

VTRA CASE D – 2025 : BOTH WINGS OPERATIONAL – **LOW TRAFFIC + GATEWAY**

VTRA CASE E – 2025 : ONE WING OPERATIONAL – **LOW TRAFFIC + GATEWAY**

Future traffic level development required only for VTRA CASE D and VTRA CASE E



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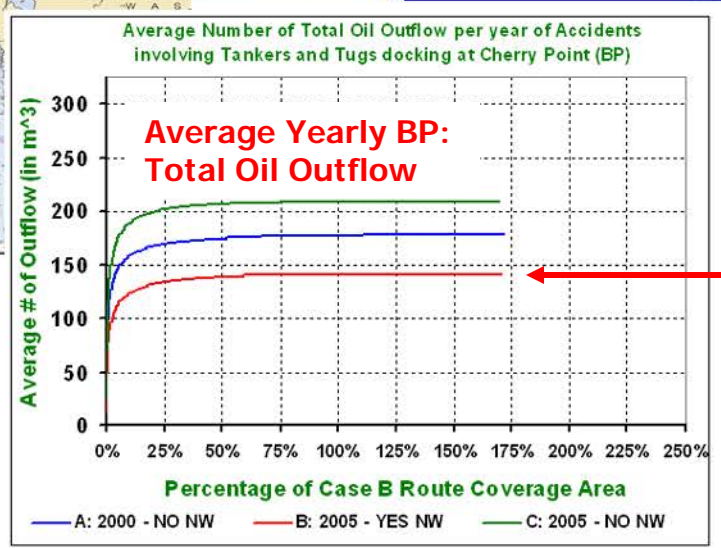
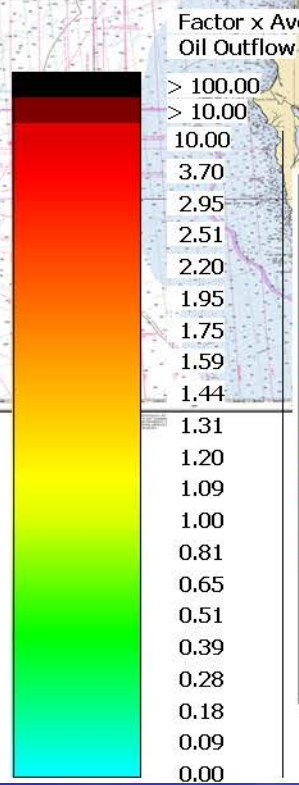
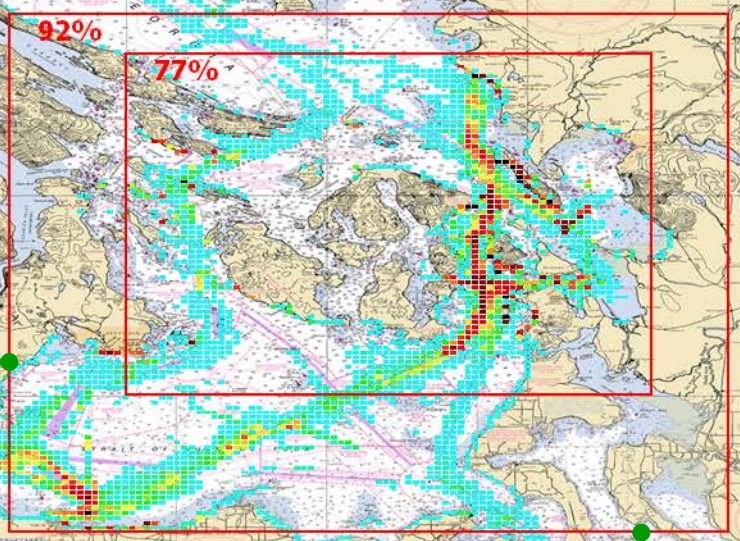
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# VTRA CASE B: Year 2005 with north wing

100% of Case B Total

Only Average Grid Cell Potential **Volume**  
**of Total Outflow per Year**  
**(BP - Collision, Power, Drift or Allisions)**



Remaining 8%

141.0 Cubic Meters On Average Per Year due to Accidents above

Background map is a composite of official nautical NOAA electronic charts

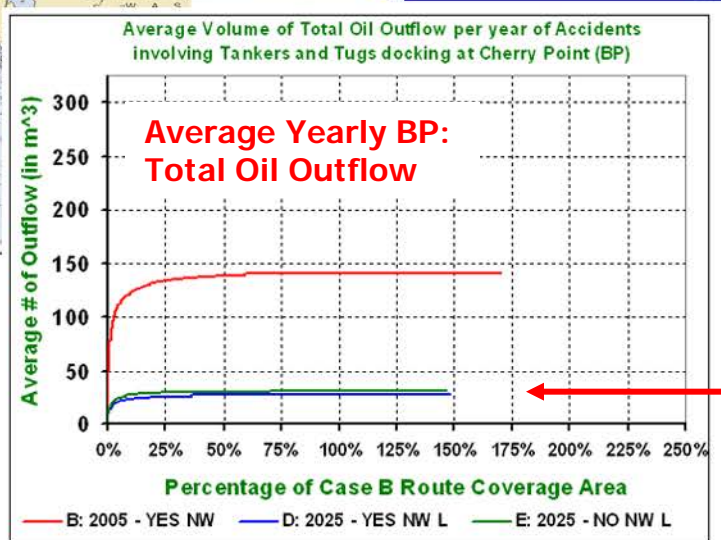
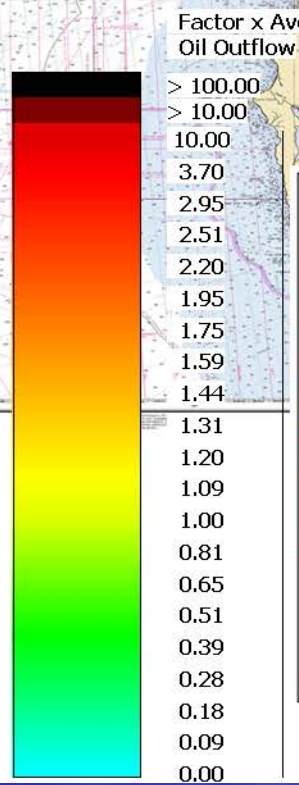
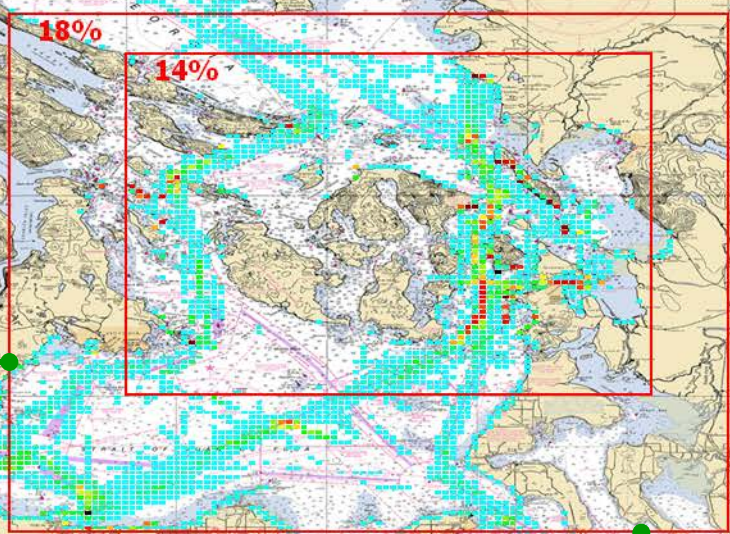




# VTRA CASE D: Year 2025 Low with north wing

19% of Case B Total

Only Average Grid Cell Potential **Volume**  
**of Total Outflow per Year**  
**(BP - Collision, Power, Drift or Allisions)**



Remaining 1%

**27.3 Cubic Meters**  
**On Average**  
**Per Year**  
**due to**  
**Accidents**  
**above**

Background map is a composite of official nautical NOAA electronic charts

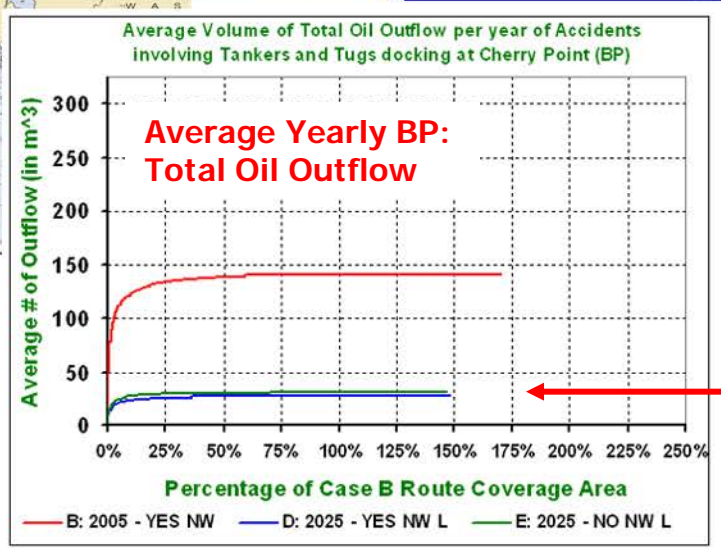
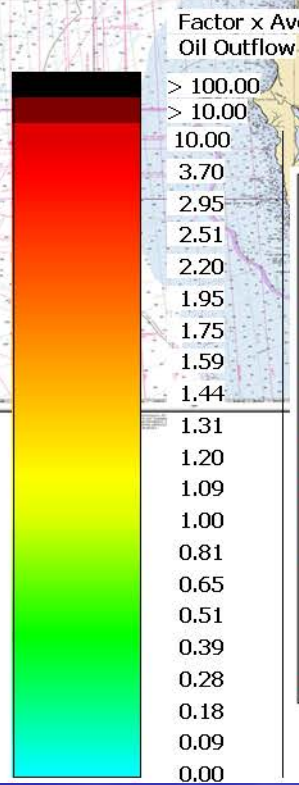
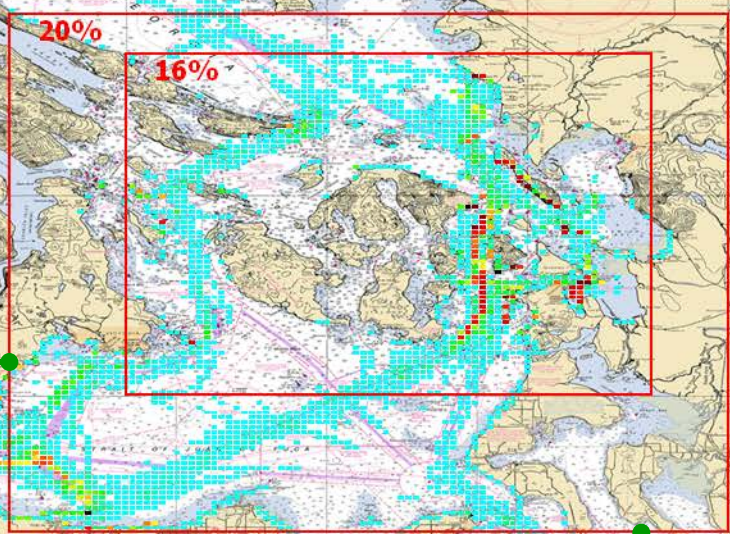




# VTRA CASE E: Year 2025 Low without north wing

22% of Case B Total

Only Average Grid Cell Potential **Volume** of Total Outflow per Year (BP - Collision, Power, Drift or Allisions)



Remaining 2%

30.6 Cubic Meters On Average Per Year due to Accidents above

Background map is a composite of official nautical NOAA electronic charts



# VTRA CASES SUMMARY COMPARISON: AGGREGATE CHANGES

## Assessment of Oil Spill Risk due to Vessel Traffic Docking at Cherry Point (BP), Washington

### GWU Personnel:

Dr. Jack R. Harrald, Dr. J. Rene van Dorp, Dr. Greg Shaw,  
Dr. Thomas A. Mazzuchi, Adil Caner Sener, Christian Salmon

### RPI Personnel:

Dr. Martha Grabowski, Zhi Zhou, Zhuyu You, Michael Steward

### VCU Personnel:

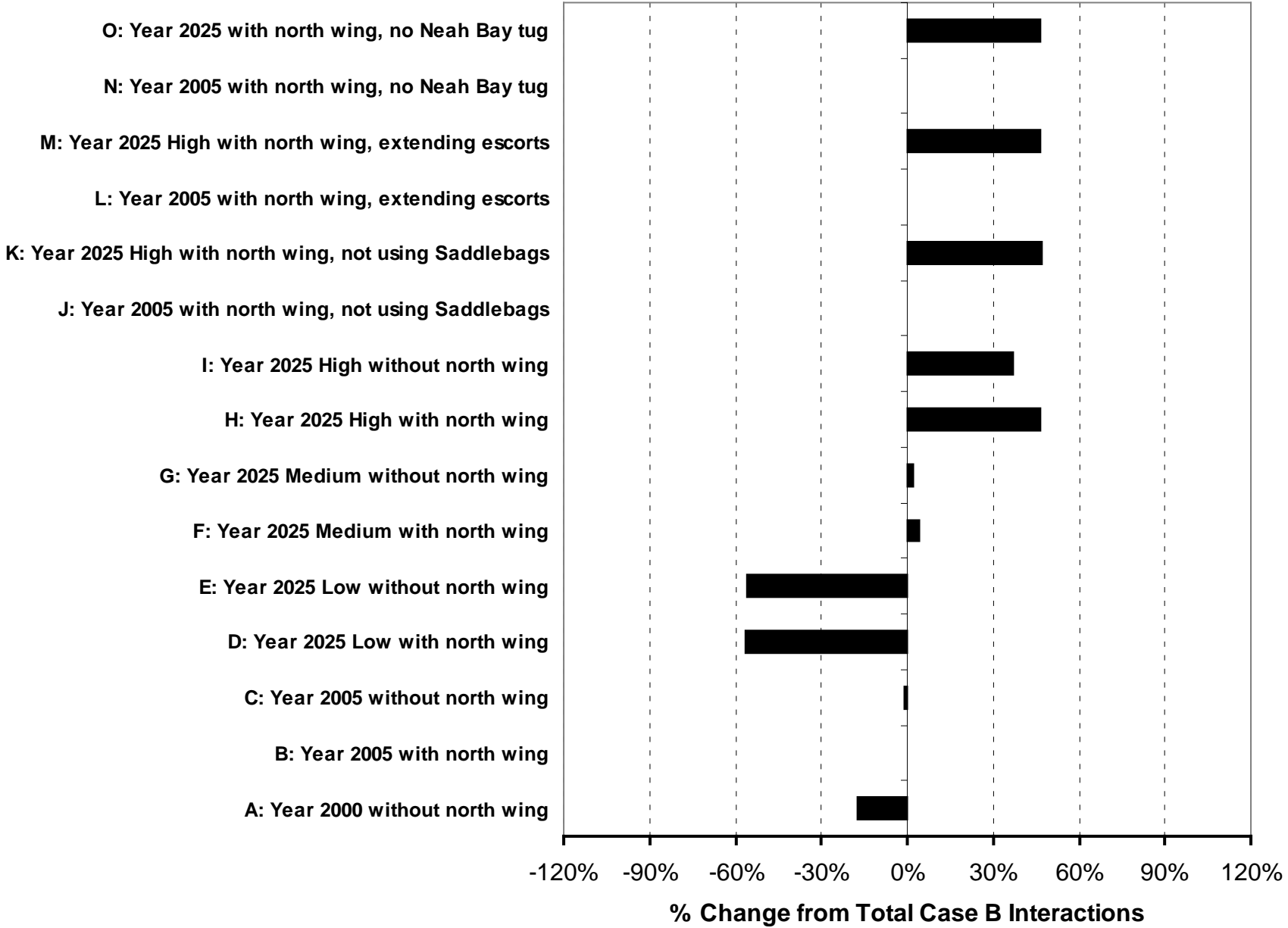
Dr. Jason R. W. Merrick, Christina Werner

July 14, 2008



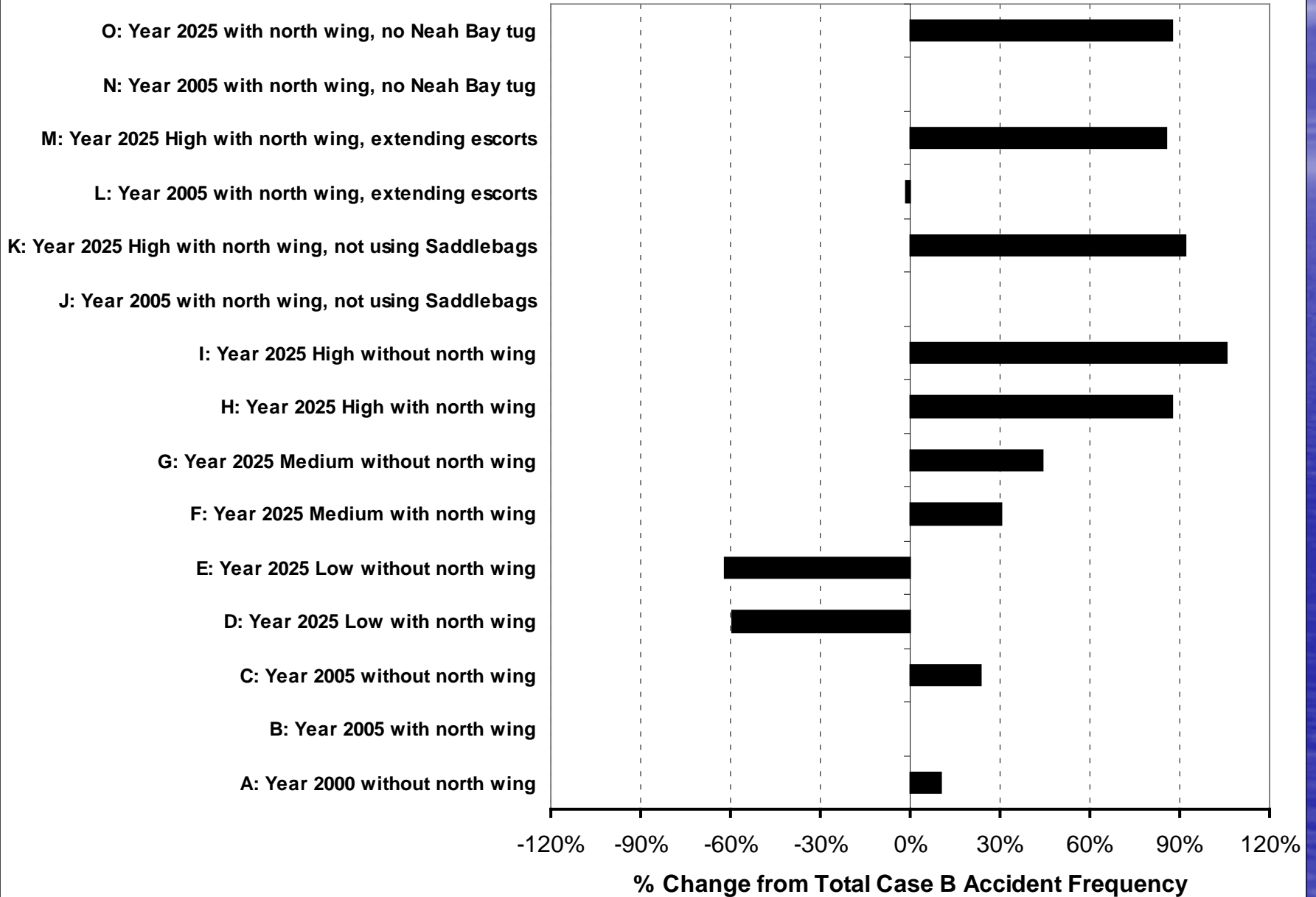


# ALL INTERACTIONS



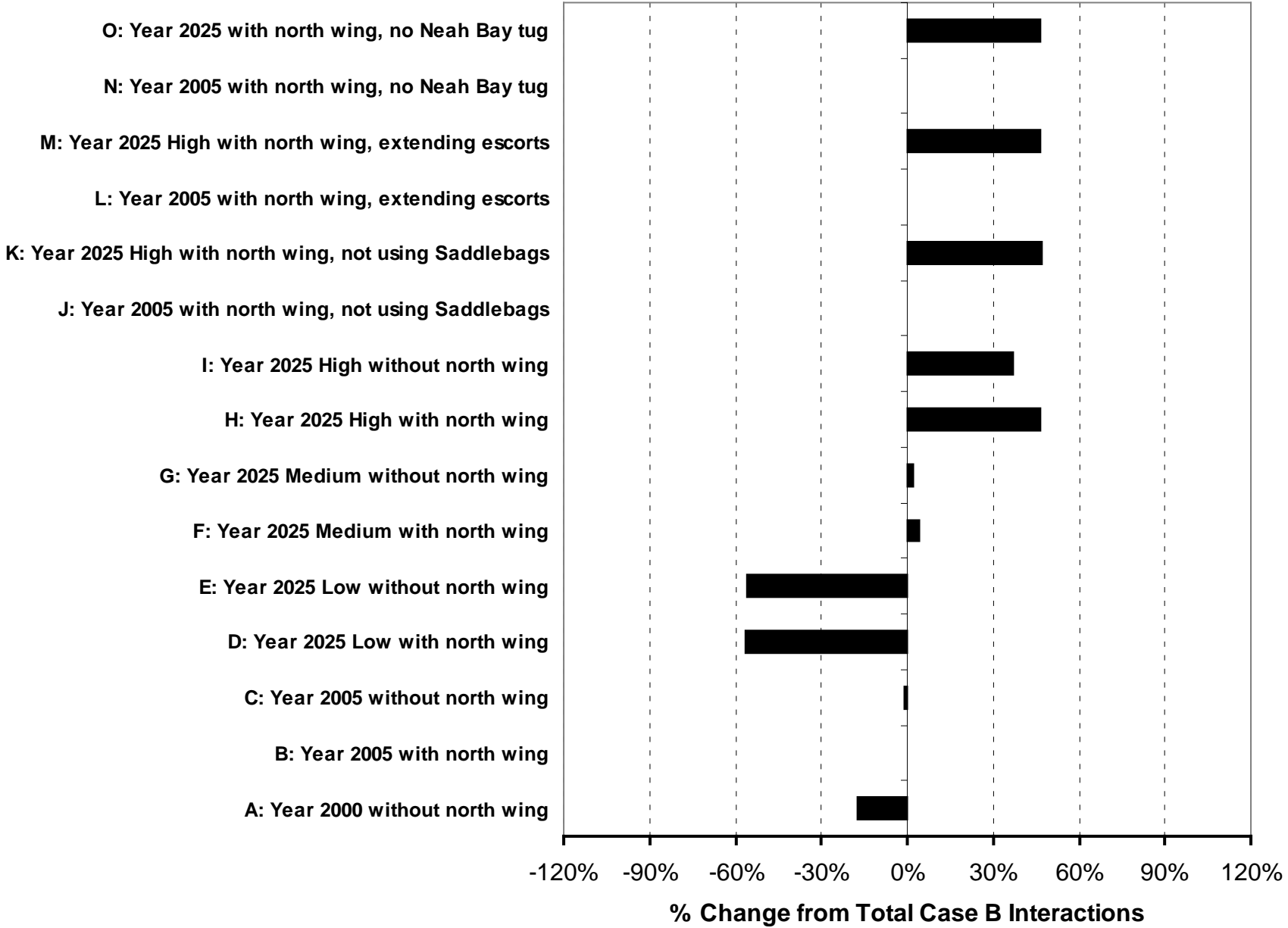


# OVERAL ACCIDENT FREQUENCY



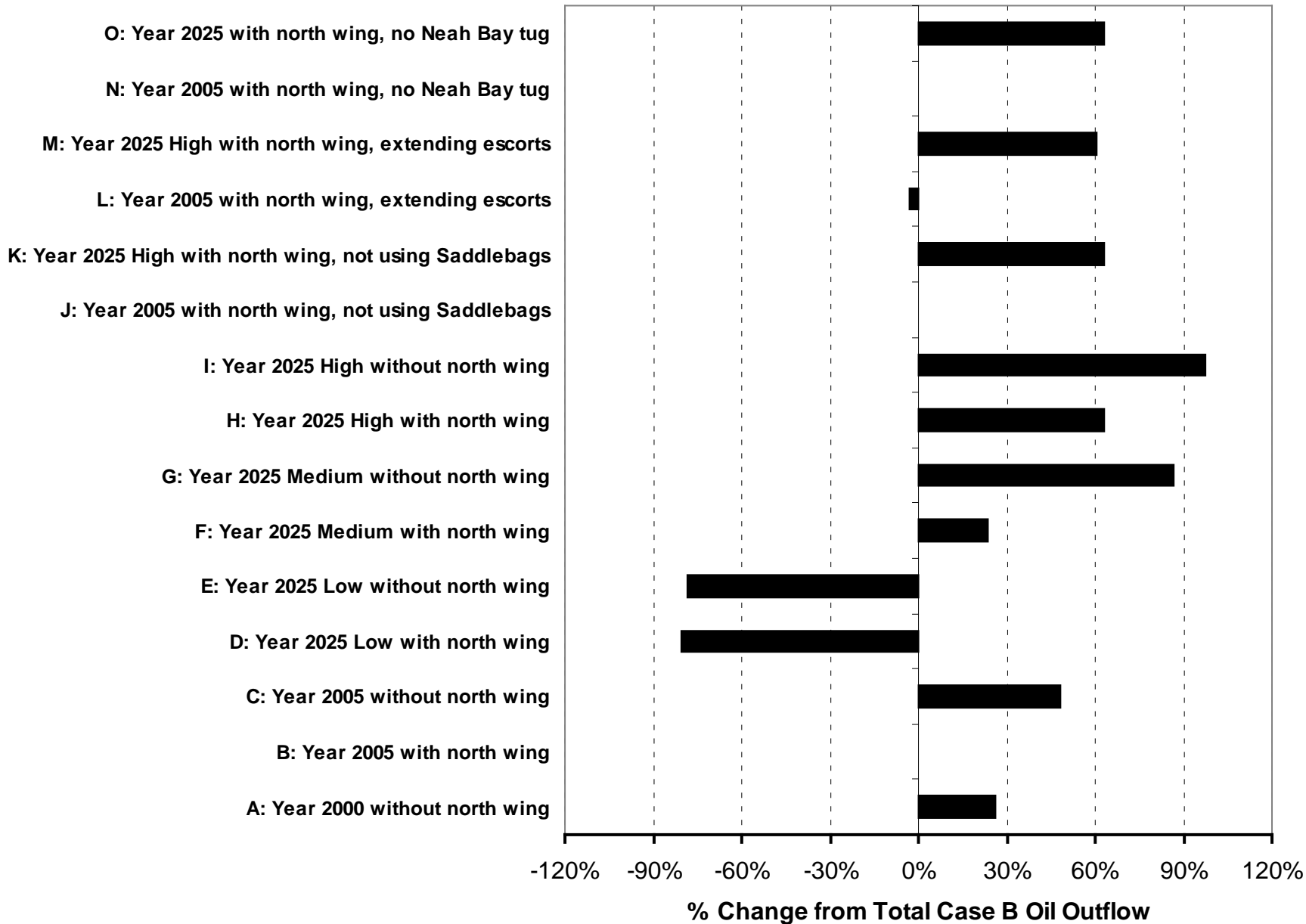


# ALL INTERACTIONS





# OVERAL OIL OUTFLOW CHANGES





# QUESTIONS?

