

NOTES

- The wind stick represent winds at Point Atkinson.
- The bottom graph represents the Fraser River discharge at Hope.

STATUS
ISSUED FOR USE

CLIENT

TRANS MOUNTAIN



TRANS MOUNTAIN OIL SPILL STUDY

Environmental Conditions: Winter 2012 Site A
Stochastic Modelling

PROJECT NO.
V13203022

OFFICE
EBA-VANC

DWN
AH

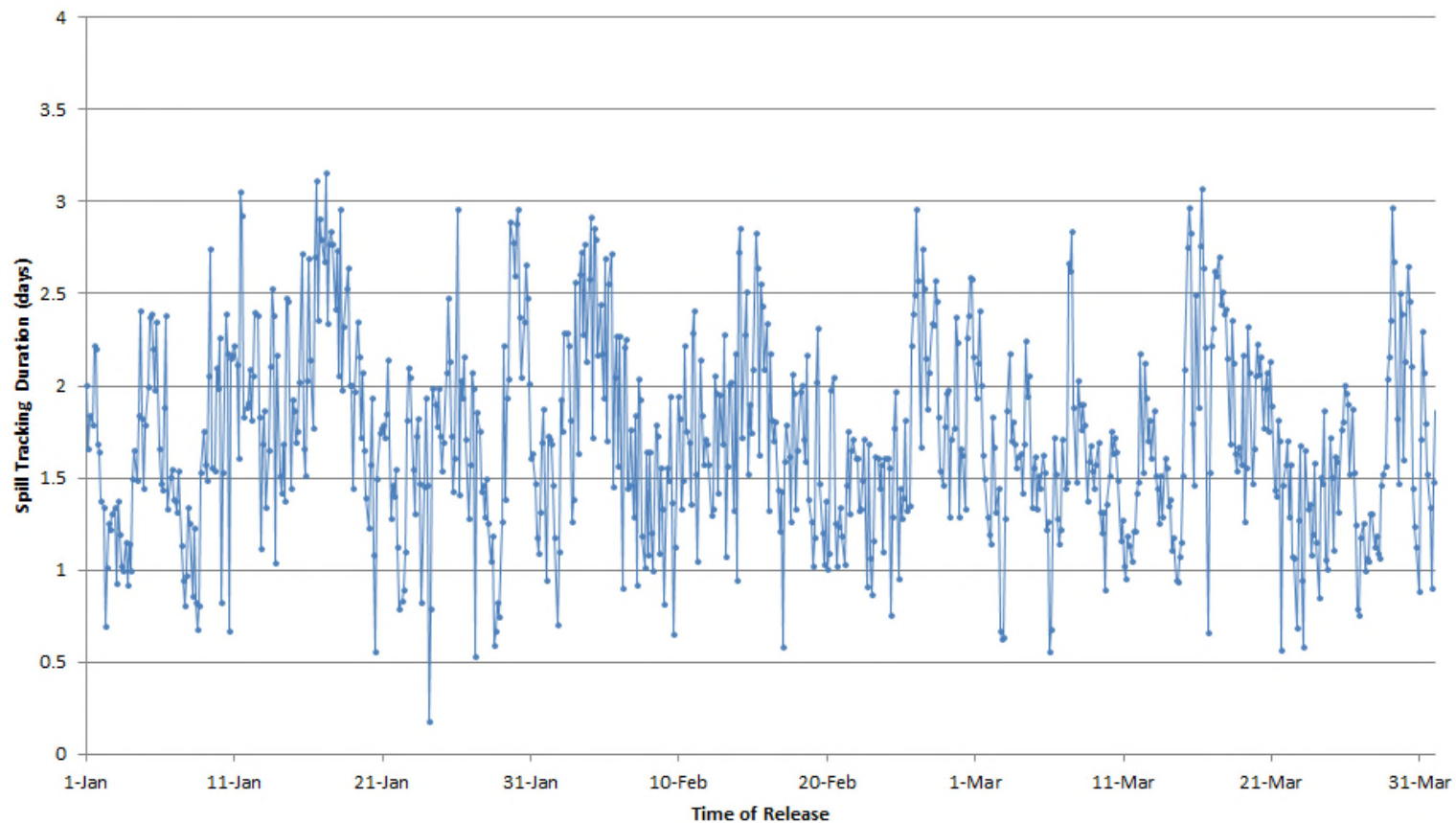
CHK
JAS

APVD
JAS

REV
0

DATE
August 2013

Figure A.1-1



NOTES

- The tracking time of each independant spill varied, based on the time necessary for the oil to be cleared out of water.
- This graph does not reflect the quantity of oil present in water.

STATUS
ISSUED FOR USE

CLIENT



TRANS MOUNTAIN OIL SPILL STUDY

Stochastic Simulation Winter 2012, Site A Duration of Simulation

PROJECT NO.
V13203022

DWN
AH

CKD
JAS

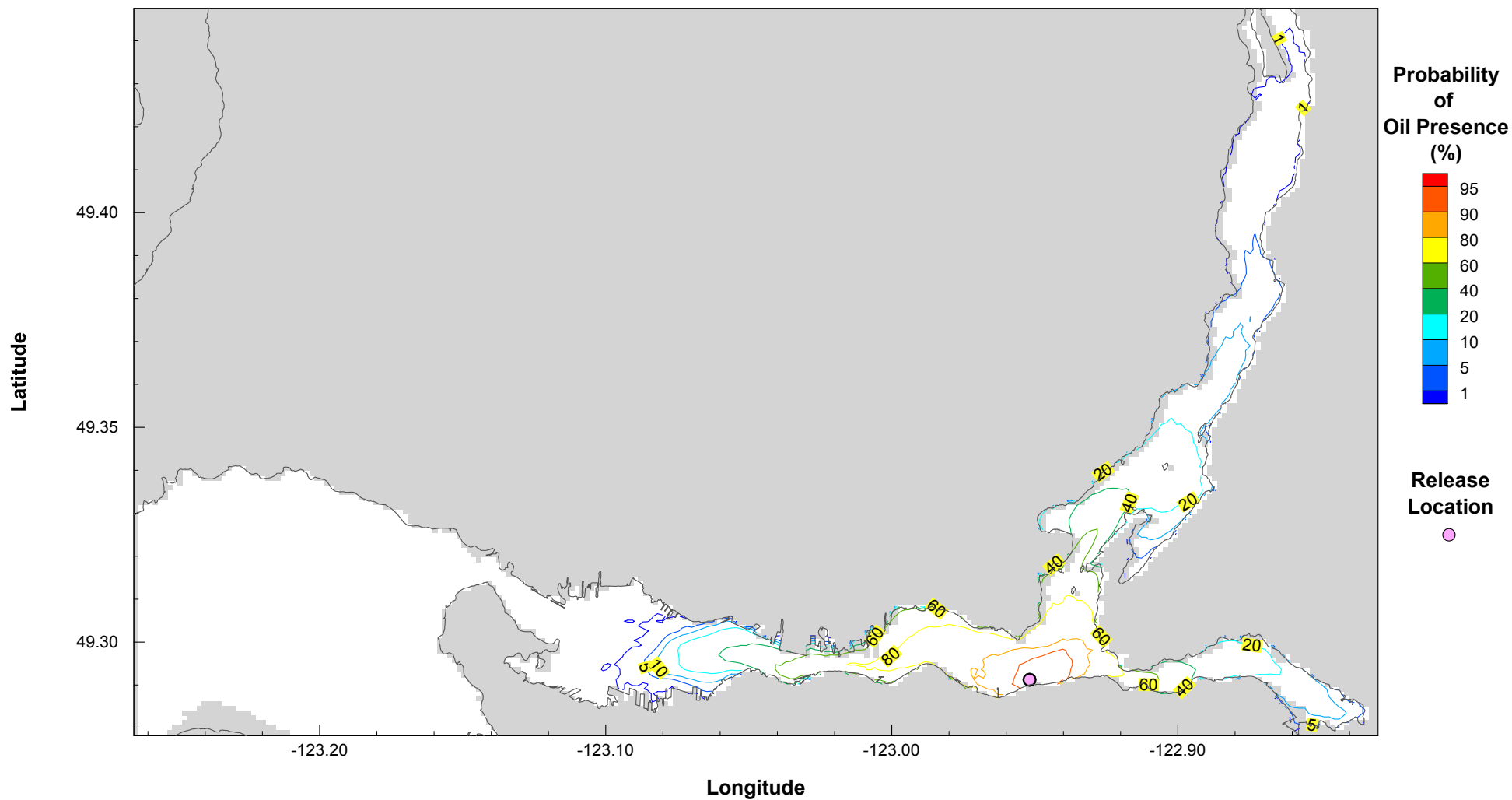
APVD
-

REV
0

OFFICE
EBA-VANC

DATE
August 26, 2013

Figure A.1-2



NOTES

- Statistical results based on independent spills occurring every 3 hours from January 01 00:00 to March 31 23:00, for a total of 728 independent spills.
- Probability of oil presence is the percentage of simulations in which oil was present at a given location.
- Spills were tracked until no oil left on water. Tracking time for each spill varied, based on the duration of oil on water.
- A 32 m³ release was modelled, corresponding to a 160 m³ operational spill at berth with 20%, i.e. 32 m³ distribution across the spill boom.

STATUS
ISSUED FOR USE

CLIENT

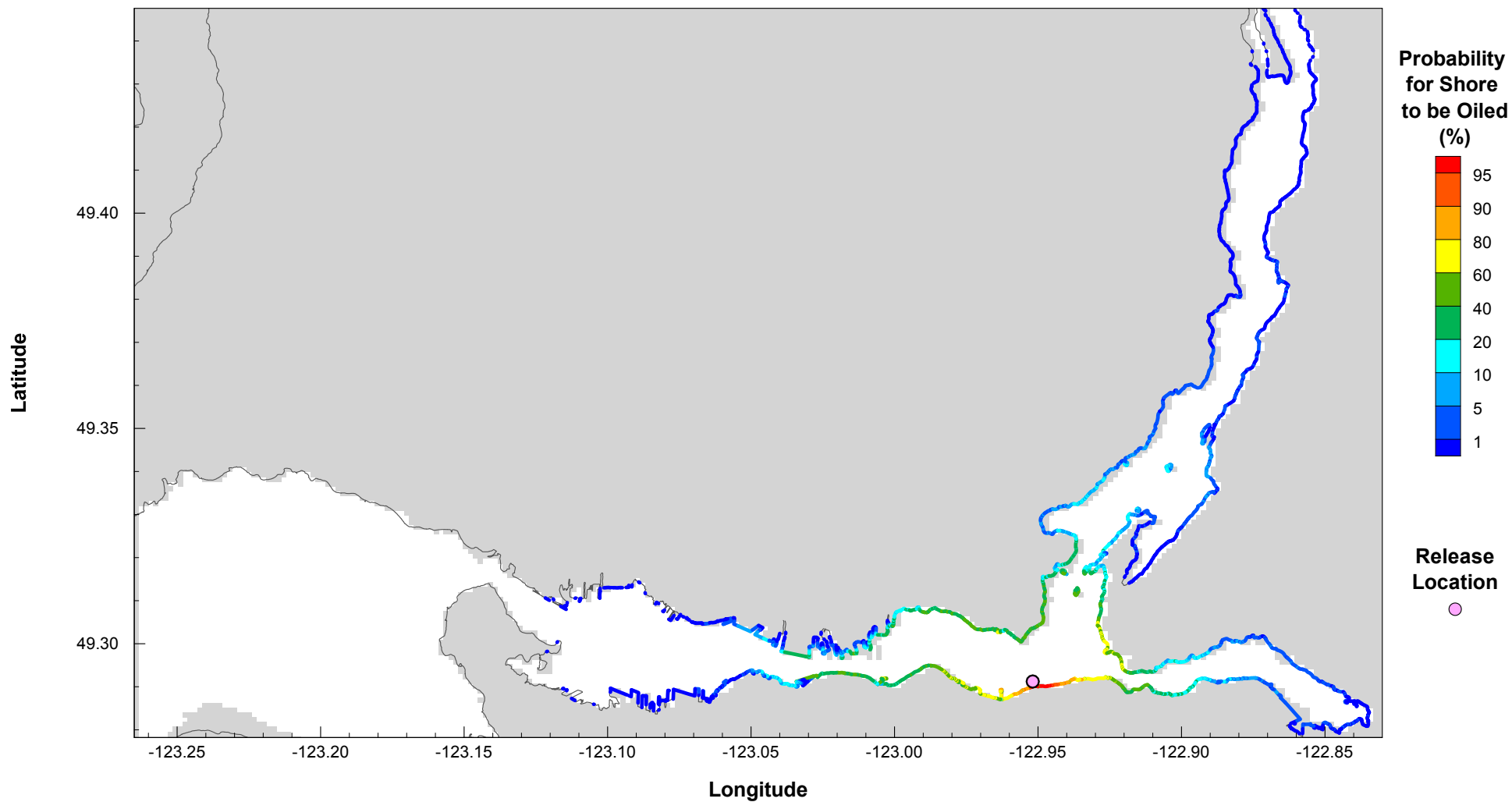


TRANS MOUNTAIN OIL SPILL STUDY

Stochastic Simulation Winter 2012, Site A Probability of Oil Presence

PROJECT NO. V13203022	DWN AH	CKD JAS	APVD -	REV 0
OFFICE EBA-VANC	DATE August 21, 2013			

Figure A.1-3



NOTES

- Statistical results based on independent spills occurring every 3 hours from January 01 00:00 to March 31 23:00, for a total of 728 independant spills.
- Probability of oil presence is the percentage of simulations in which oil was present at a given location.
- Spills were tracked until no oil left on water. Tracking time for each spill varied, based on the duration of oil on water.
- A 32 m³ release was modelled, corresponding to a 160 m³ operational spill at berth with 20%, i.e. 32 m³ distribution across the spill boom.

STATUS
ISSUED FOR USE

CLIENT

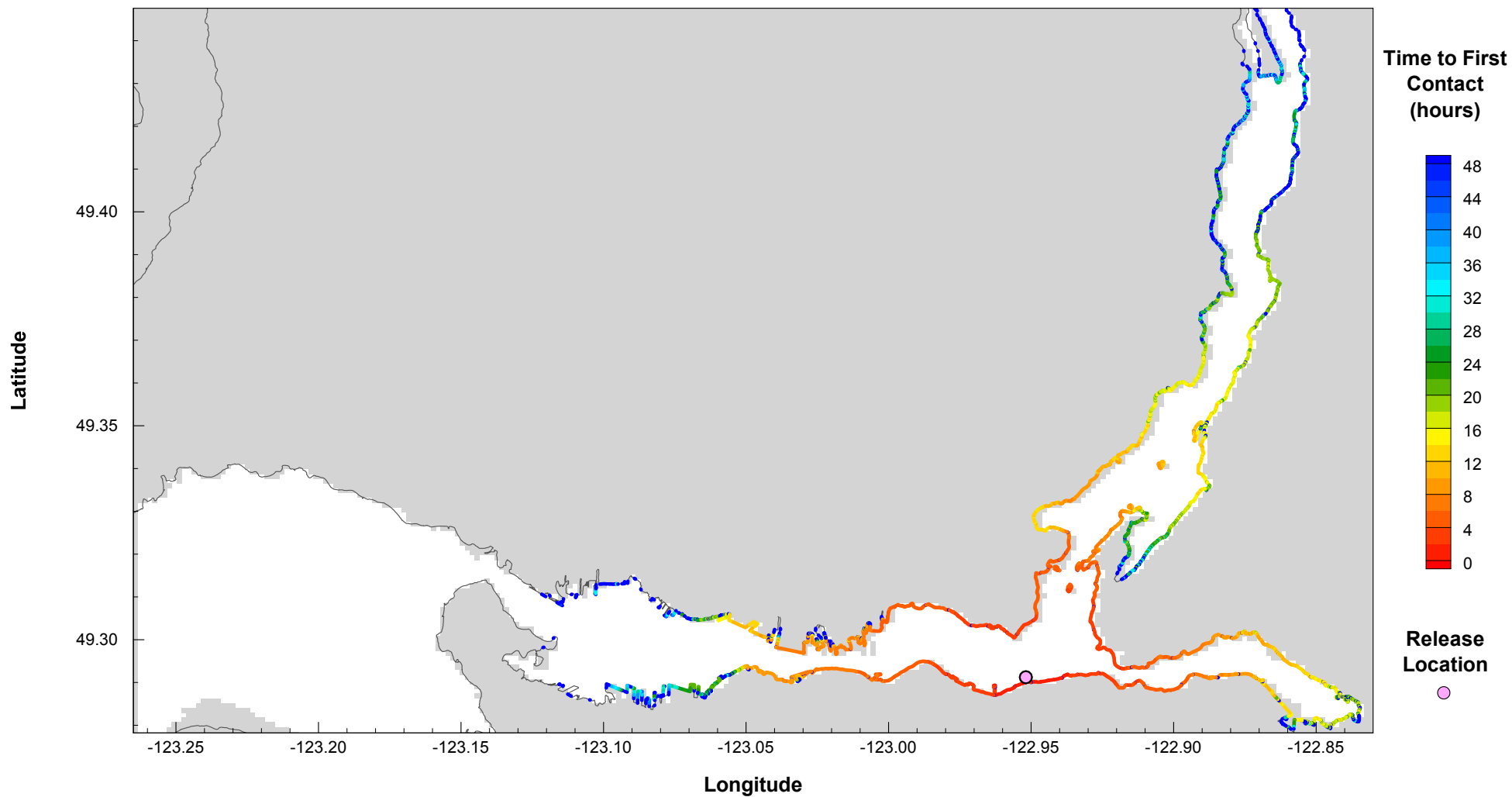


TRANS MOUNTAIN OIL SPILL STUDY

Stochastic Simulation Winter 2012, Site A Shoreline Oiled Probability

PROJECT NO. V13203022	DWN AH	CKD JAS	APVD -	REV 0
OFFICE EBA-VANC	DATE August 21, 2013			

Figure A.1-4



NOTES

- Statistical results based on independent spills occurring every 3 hours from January 01 00:00 to March 31 23:00, for a total of 728 independent spills.
- Time to first contact is the minimum time, over all simulations, for oil to reach a given shore segment.
- Spills were tracked until no oil left on water. Tracking time for each spill varied, based on the duration of oil on water.
- A 32 m³ release was modelled, corresponding to a 160 m³ operational spill at berth with 20%, i.e. 32 m³ distribution across the spill boom.

STATUS
ISSUED FOR USE

CLIENT

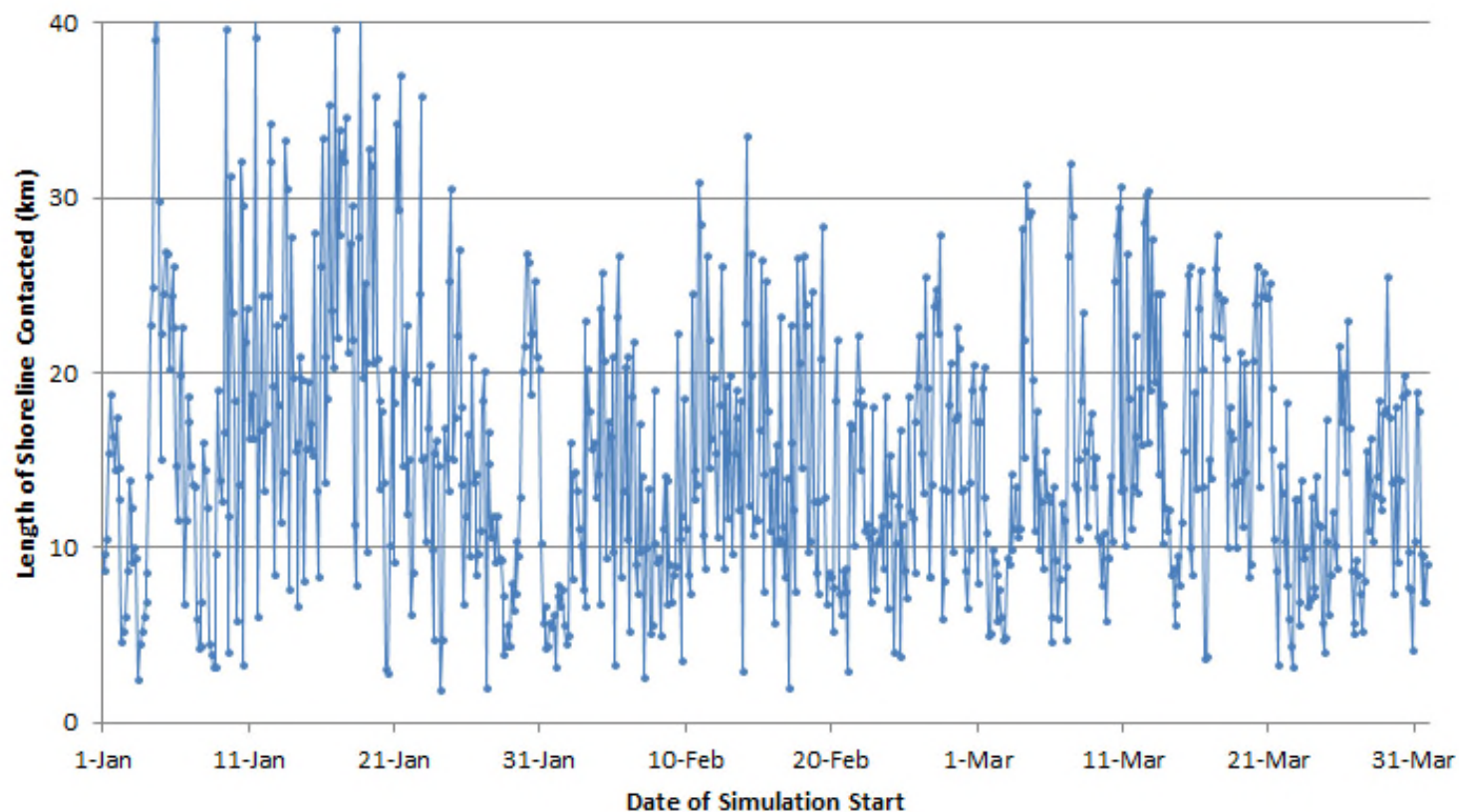


TRANS MOUNTAIN OIL SPILL STUDY

Stochastic Simulation Winter 2012, Site A Shoreline Time to First Contact

PROJECT NO. V13203022	DWN AH	CKD JAS	APVD -	REV 0
OFFICE EBA-VANC	DATE August 21, 2013			

Figure A.1-5



NOTES

- Statistical results based on independent spills occurring every 3 hours from January 01 00:00 to March 31 23:00, for a total of 728 independent spills.
- Tracking time for each spill was a maximum of 15 days.

STATUS
ISSUED FOR USE

CLIENT

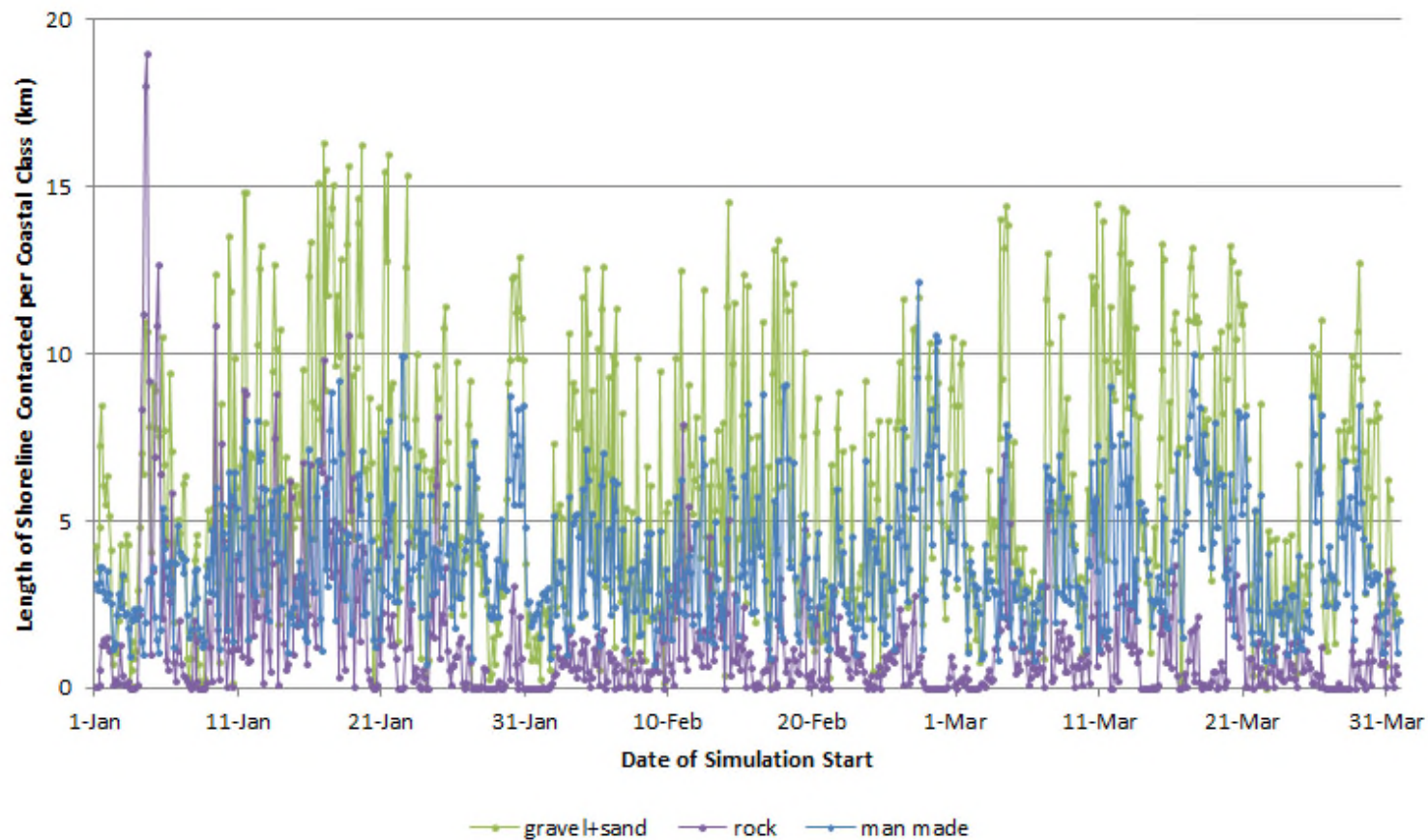


TRANS MOUNTAIN OIL SPILL STUDY

Stochastic Simulation Winter 2012, Site A Length of Shoreline Contacted

PROJECT NO. V13203022	DWN AH	CKD JAS	APVD -	REV 0
OFFICE EBA-VANC	DATE August 6, 2013			

Figure A.1-6



NOTES

- Statistical results based on independent spills occurring every 3 hours from January 01 00:00 to March 31 23:00, for a total of 728 independant spills.
- Tracking time for each spill was a maximum of 15 days.

STATUS
ISSUED FOR USE

CLIENT



TRANS MOUNTAIN OIL SPILL STUDY

Stochastic Simulation - Winter 2012 Site A Length of Shoreline Contacted Per Coastal Class

PROJECT NO.
V13203022

DWN
AH

CKD
JAS

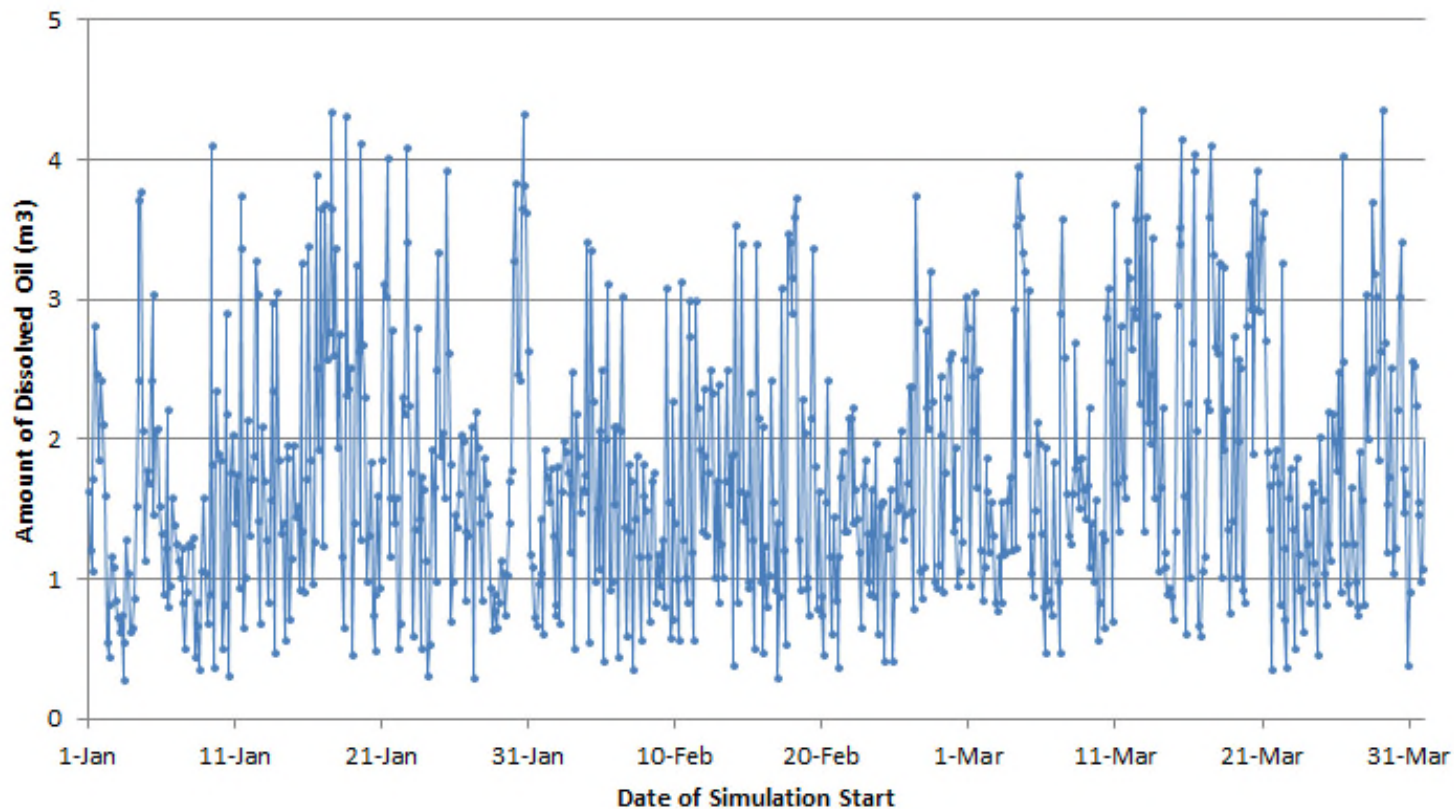
APVD
-

REV
0

OFFICE
EBA-VANC

DATE
August 22, 2013

Figure A.1-7



NOTES

- Statistical results based on independent spills occurring every 3 hours from January 01 00:00 to March 31 23:00, for a total of 728 independant spills.
- Tracking time for each spill was a maximum of 15 days.

STATUS
ISSUED FOR USE

CLIENT



TRANS MOUNTAIN OIL SPILL STUDY

Stochastic Simulation Winter 2012, Site A Amount of Dissolved Oil

PROJECT NO.
V13203022

DWN
AH

CKD
JAS

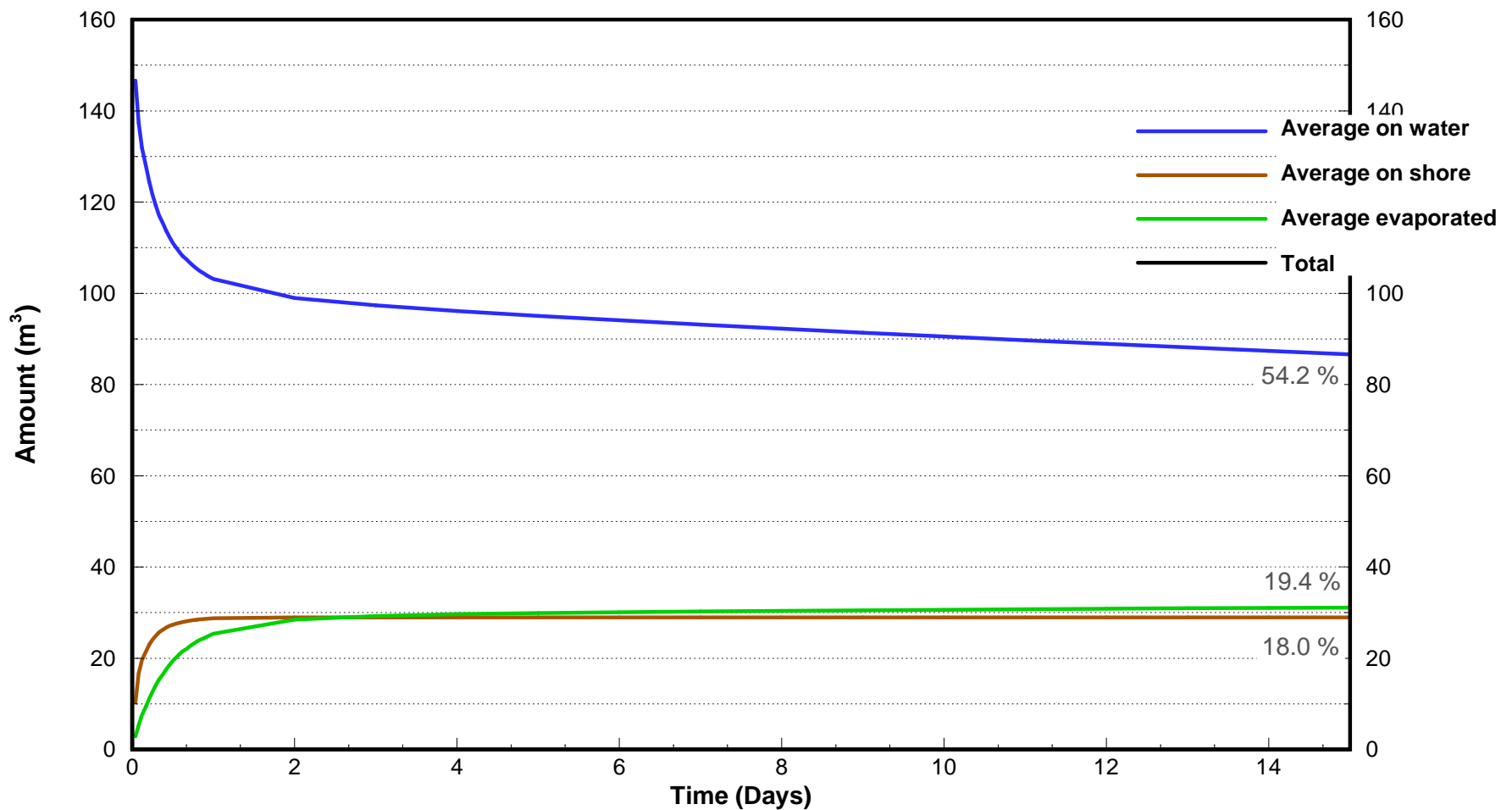
APVD
-

REV
0

OFFICE
EBA-VANC

DATE
August 7, 2013

Figure A.1-8



NOTES

- Statistical results based on independent spills occurring every 3 hours from January 01 00:00 to March 31 23:00, for a total of 728 independent spills.
- Tracking time for each spill was a maximum of 15 days.
- The major components of the mass balance are shown above.

STATUS
ISSUED FOR USE

CLIENT

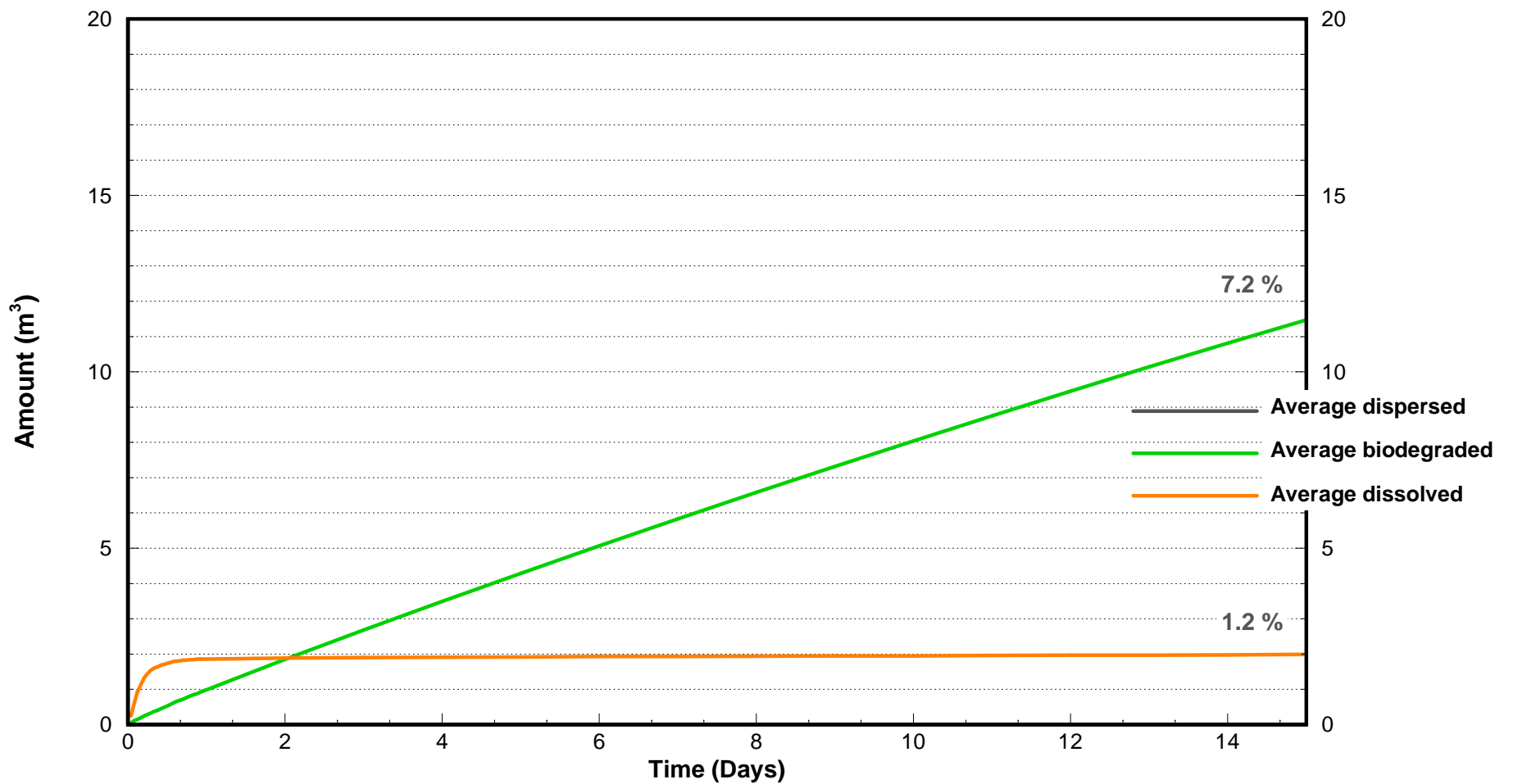


TRANS MOUNTAIN OIL SPILL STUDY

Stochastic Simulation Winter 2012, Site A Major Components of the Mass Balance

PROJECT NO. V13203022	DWN AH	CKD JAS	APVD -	REV 0
OFFICE EBA-VANC	DATE August 22, 2013			

Figure A.1-9



NOTES

- Statistical results based on independent spills occurring every 3 hours from January 01 00:00 to March 31 23:00, for a total of 728 independant spills.
- Tracking time for each spill was a maximum of 15 days.
- The minor components of the mass balance are shown above.

STATUS
ISSUED FOR USE

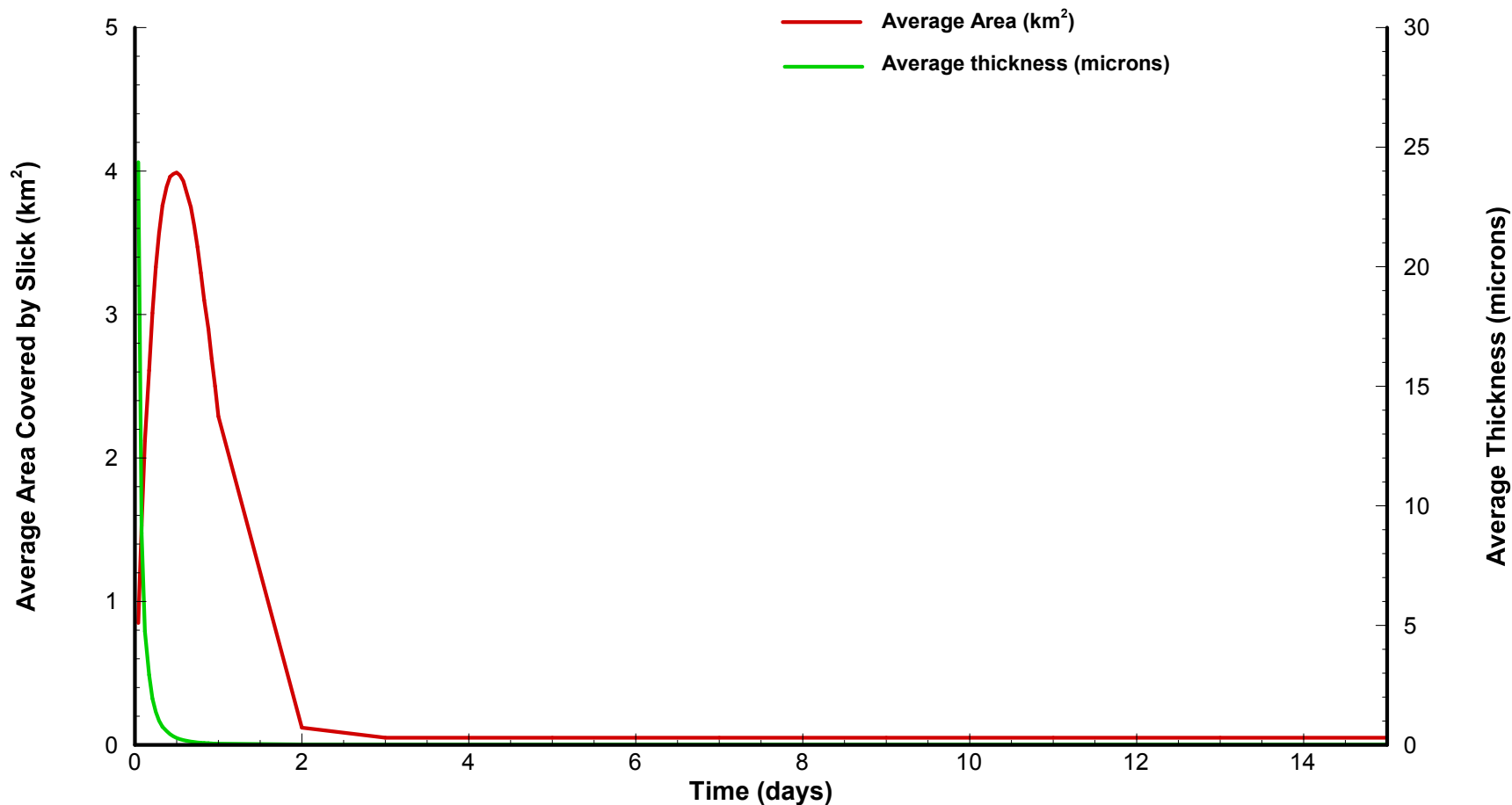
CLIENT



TRANS MOUNTAIN OIL SPILL STUDY

Stochastic Simulation Winter 2012, Site A Minor Components of the Mass Balance

PROJECT NO. V13203022	DWN AH	CKD JAS	APVD -	REV 0	Figure A.1-10
OFFICE EBA-VANC	DATE August 22, 2013				



NOTES

- Statistical results based on independent spills occurring every 3 hours from January 01 00:00 to March 31 23:00.
- The average thickness is based on a full coverage of each grid cell that contains oil.

STATUS
ISSUED FOR USE

CLIENT

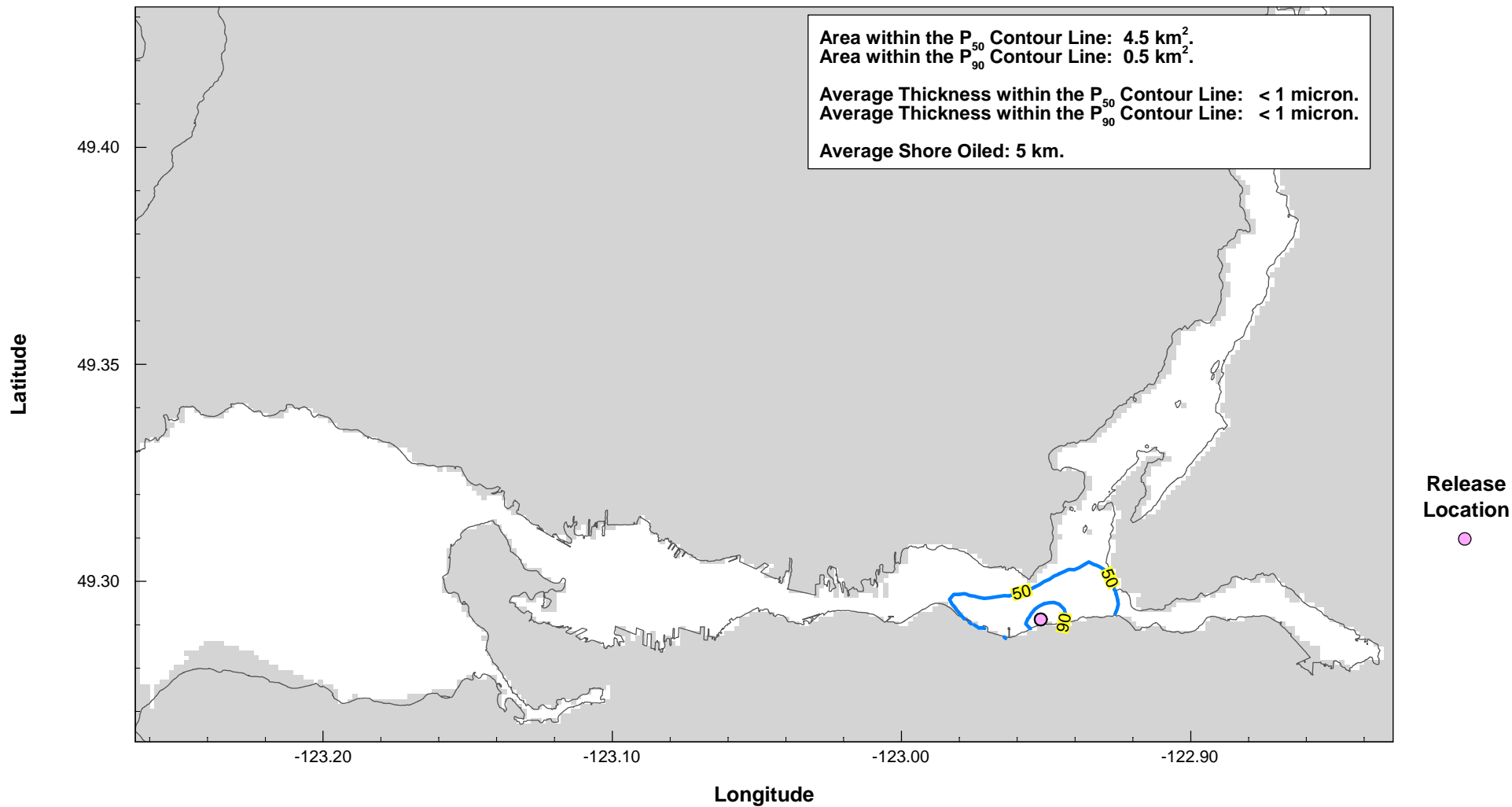


TRANS MOUNTAIN OIL SPILL STUDY

Stochastic Simulation Winter 2012, Site A Statistics on Area and Thickness

PROJECT NO. V13203022	DWN AH	CKD JAS	APVD -	REV 0
OFFICE EBA-VANC	DATE August 22, 2013			

Figure A.1-11



NOTES

- Statistical results based on independent spills occurring every 3 hours from January 01 00:00 to March 31 23:00, for a total of 728 independent spills.

Probability of oil presence is the percentage of simulations in which oil was present at a given location, based on the 32 m³ that escaped the pre-deployed boom.

P_{50} : after 6 hours, there is a 50% probability for the area within the P_{50} contour line to have been contacted.

P_{90} : after 6 hours, there is a 90% probability for the area within the P_{90} contour line to have been contacted.

- Tracking time for each spill was 6 hours.

- The average thickness is based on a full coverage of each grid cell that contains oil and within the contour line.

**STATUS
ISSUED FOR USE**

CLIENT



TRANS MOUNTAIN OIL SPILL STUDY

**Stochastic Simulation
Winter 2012, Site A
 P_{50} and P_{90} after 6 Hours**

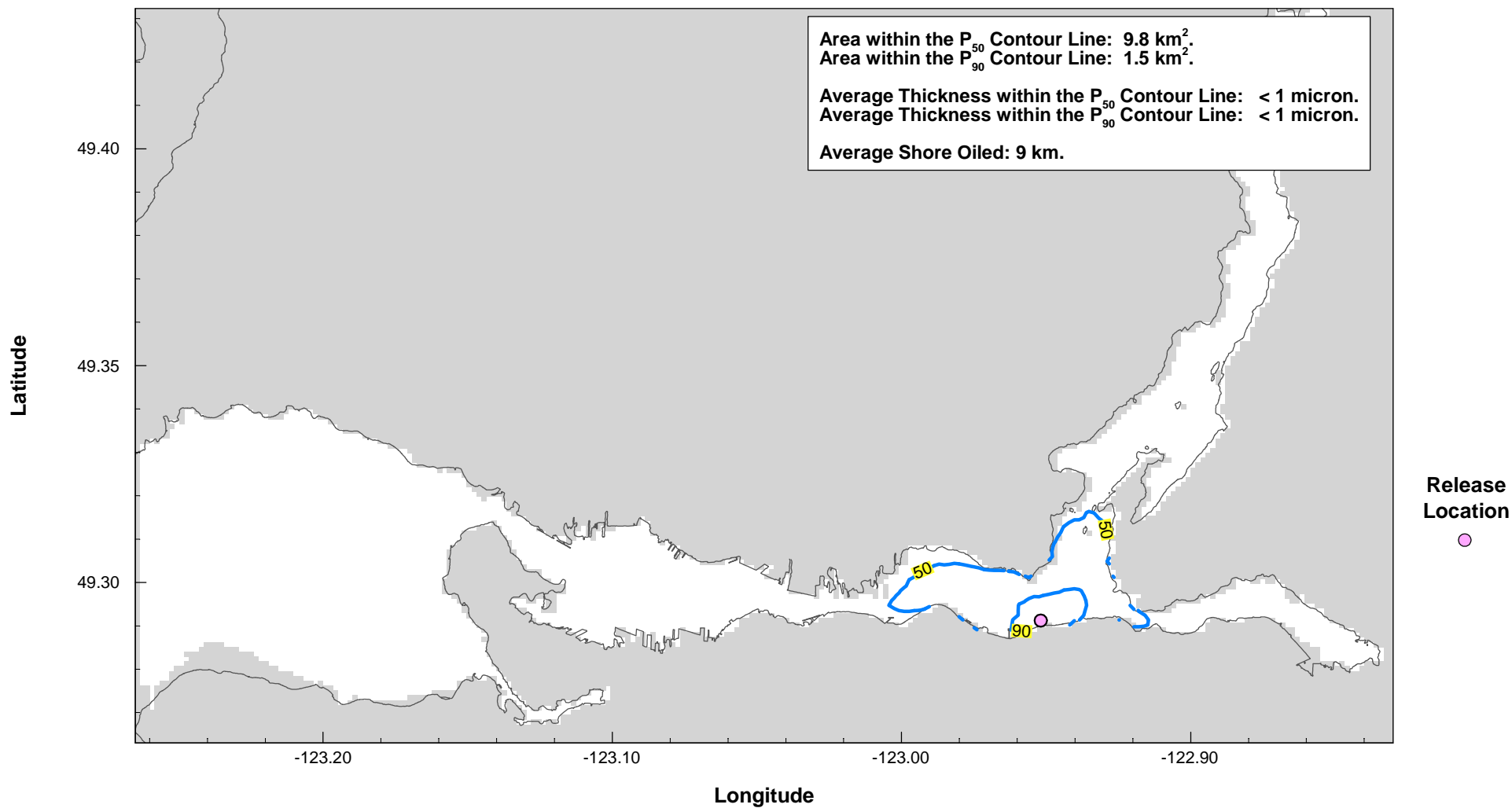
PROJECT NO.
V13203022

DWN **CKD** **APVD** **REV**
AH JAS - 0

OFFICE
EBA-VANC

DATE
October 16, 2013

Figure A.1-12



NOTES

- Statistical results based on independent spills occurring every 3 hours from January 01 00:00 to March 31 23:00, for a total of 728 independent spills.

Probability of oil presence is the percentage of simulations in which oil was present at a given location, based on the 32 m³ that escaped the pre-deployed boom.

P_{50} : after 12 hours, there is a 50% probability for the area within the P_{50} contour line to have been contacted.
 P_{90} : after 12 hours, there is a 90% probability for the area within the P_{90} contour line to have been contacted.

- Tracking time for each spill was 12 hours.

- The average thickness is based on a full coverage of each grid cell that contains oil and within the contour line.

STATUS
ISSUED FOR USE

CLIENT



TRANS MOUNTAIN OIL SPILL STUDY

Stochastic Simulation Winter 2012, Site A P_{50} and P_{90} after 12 Hours

PROJECT NO.
V13203022

DWN
AH

CKD
JAS

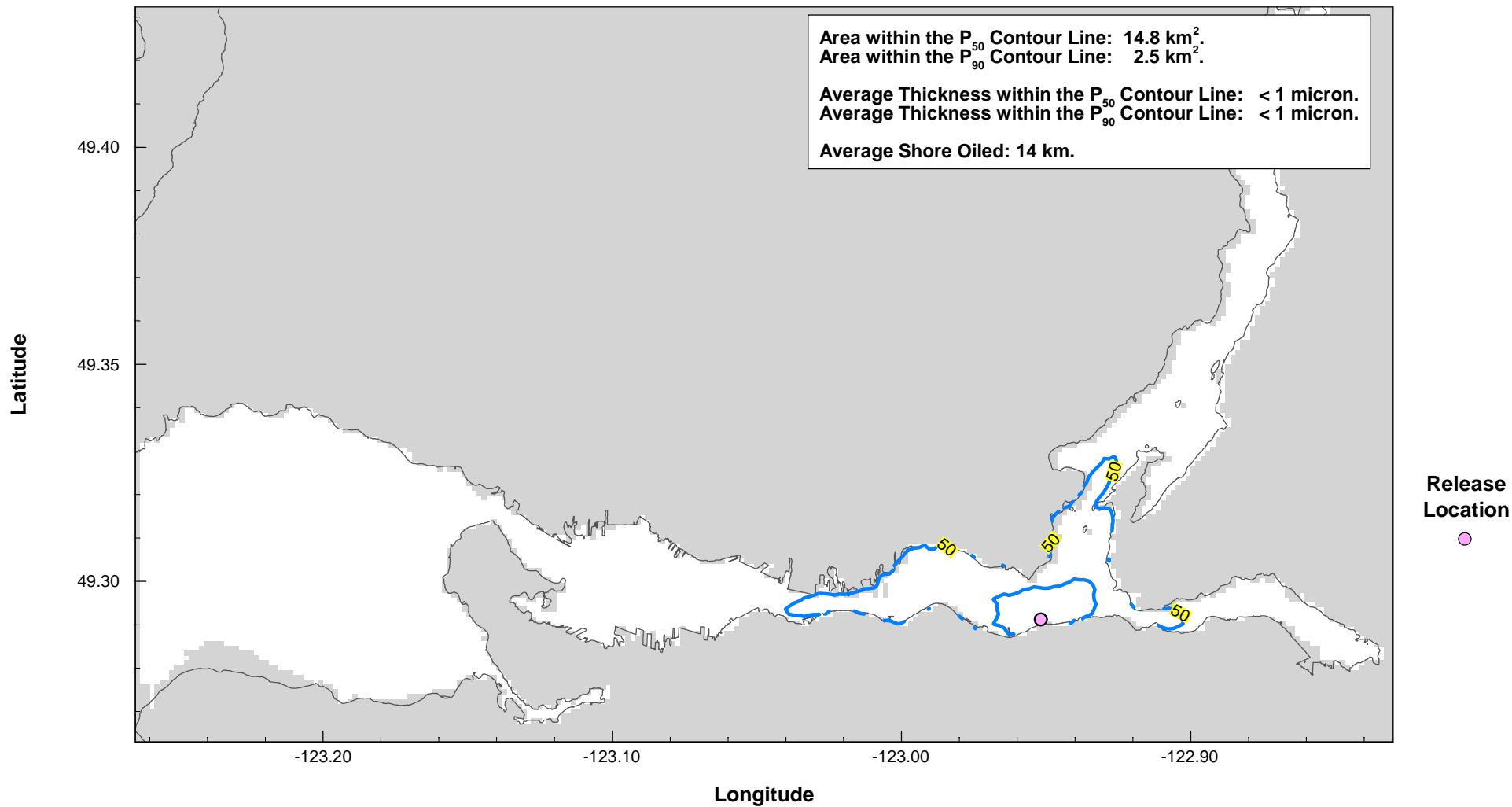
APVD
-

REV
0

OFFICE
EBA-VANC

DATE
October 16, 2013

Figure A.1-13



NOTES

- Statistical results based on independent spills occurring every 3 hours from January 01 00:00 to March 31 23:00, for a total of 728 independent spills.

Probability of oil presence is the percentage of simulations in which oil was present at a given location, based on the 32 m^3 that escaped the pre-deployed boom.

P_{50} : after 24 hours, there is a 50% probability for the area within the P_{50} contour line to have been contacted.
 P_{90} : after 24 hours, there is a 90% probability for the area within the P_{90} contour line to have been contacted.

- Tracking time for each spill was 24 hours.

- The average thickness is based on a full coverage of each grid cell that contains oil and within the contour line.

STATUS
ISSUED FOR USE

CLIENT



TRANS MOUNTAIN OIL SPILL STUDY

Stochastic Simulation Winter 2012, Site A P_{50} and P_{90} after 24 Hours

PROJECT NO.
V13203022

DWN
AH

CKD
JAS

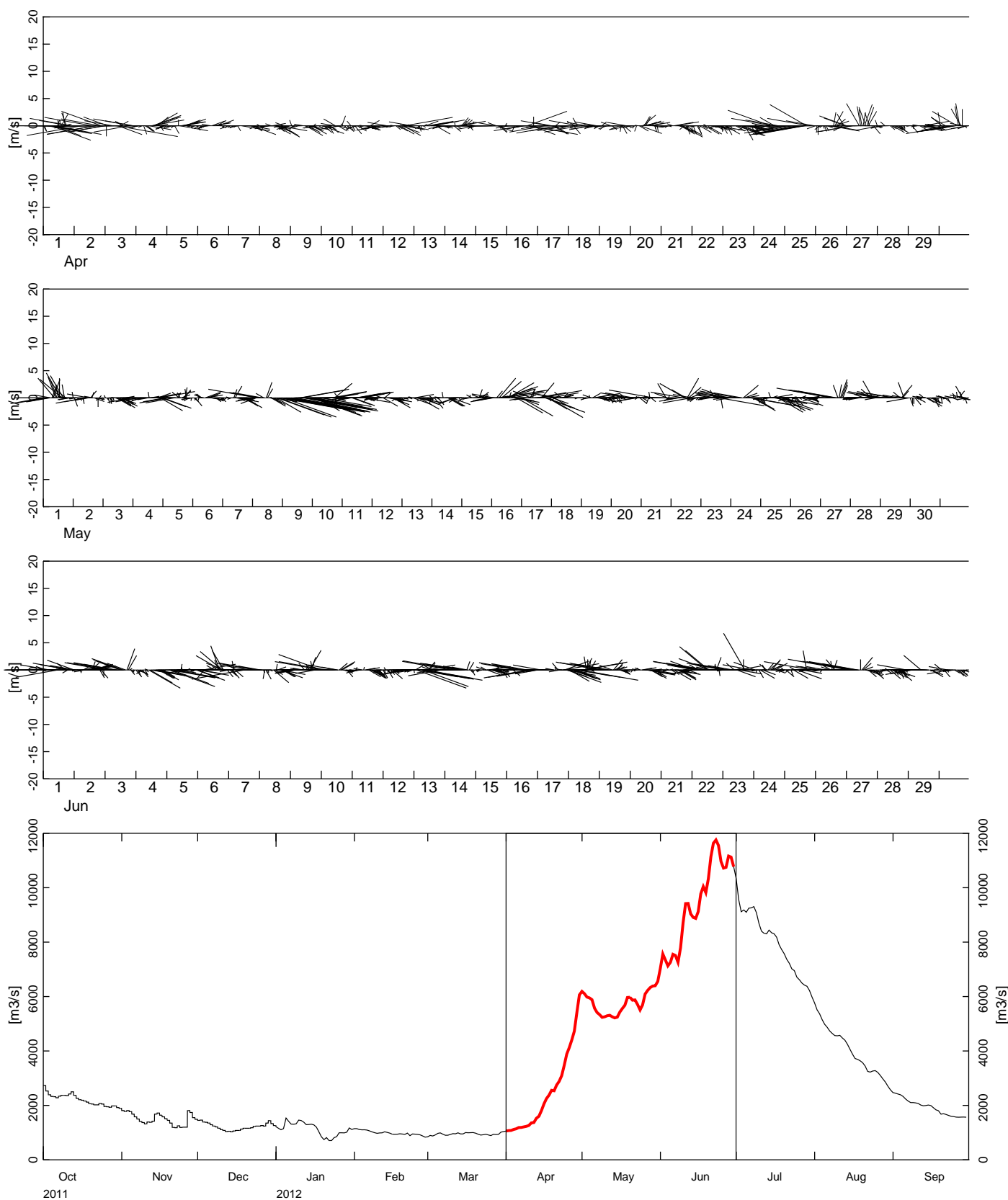
APVD
-

REV
0

OFFICE
EBA-VANC

DATE
October 16, 2013

Figure A.1-14



NOTES

- The wind stick represent winds at Point Atkinson.
- The bottom graph represents the Fraser River discharge at Hope.

STATUS
ISSUED FOR USE

CLIENT

TRANS MOUNTAIN



TRANS MOUNTAIN OIL SPILL STUDY

Environmental Conditions: Spring 2012 Site A
Stochastic Modelling

PROJECT NO.
V13203022

OFFICE
EBA-VANC

DWN
AH

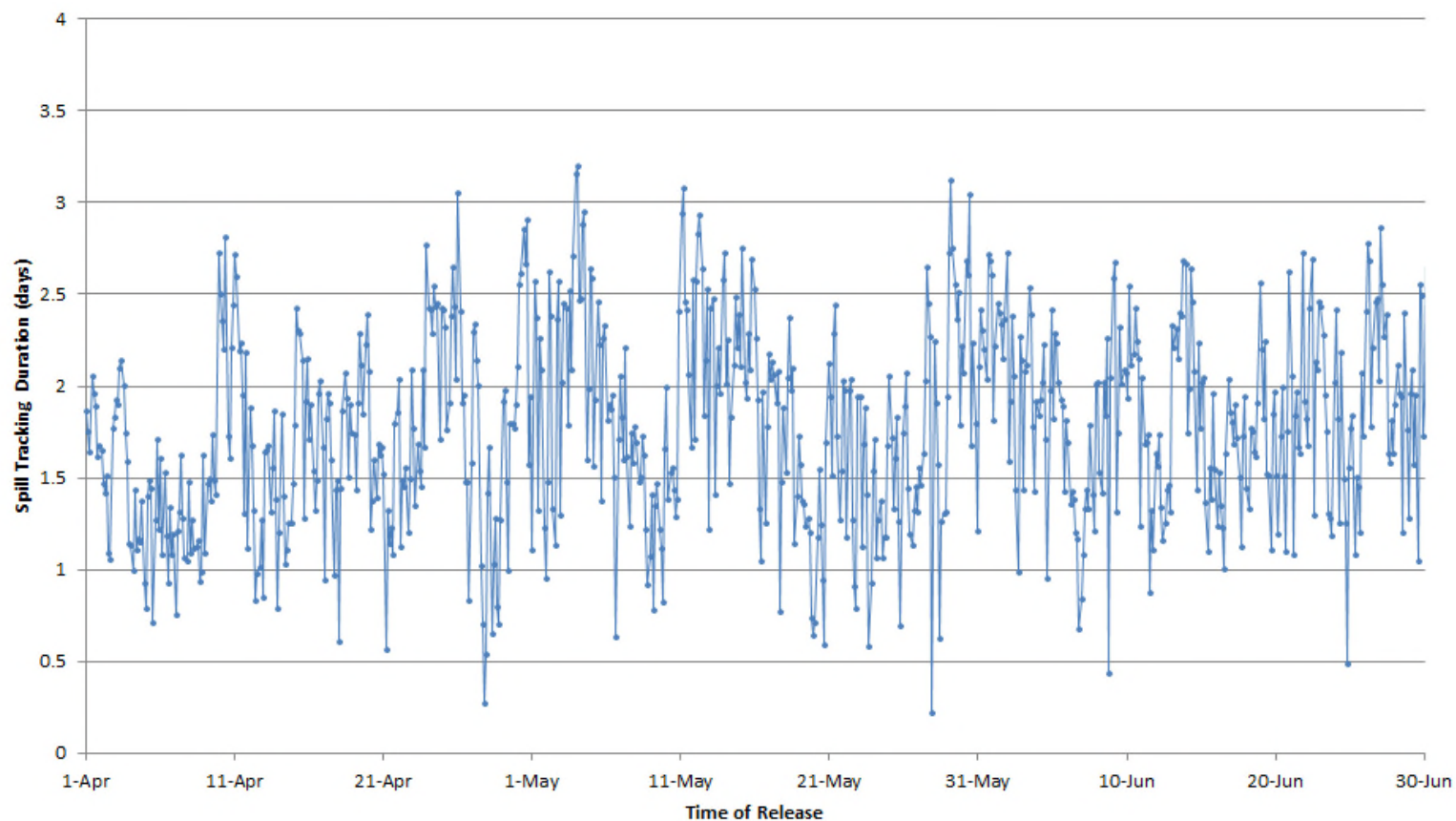
CHK
JAS

APVD
JAS

REV
0

DATE
August 2013

Figure A.2-1



NOTES

- The tracking time of each independant spill varied, based on the time necessary for the oil to be cleared out of water.
- This graph does not reflect the quantity of oil present in water.

STATUS
ISSUED FOR USE

CLIENT



TRANS MOUNTAIN OIL SPILL STUDY

Stochastic Simulation Spring 2012, Site A Duration of Simulation

PROJECT NO.
V13203022

DWN
AH

CKD
JAS

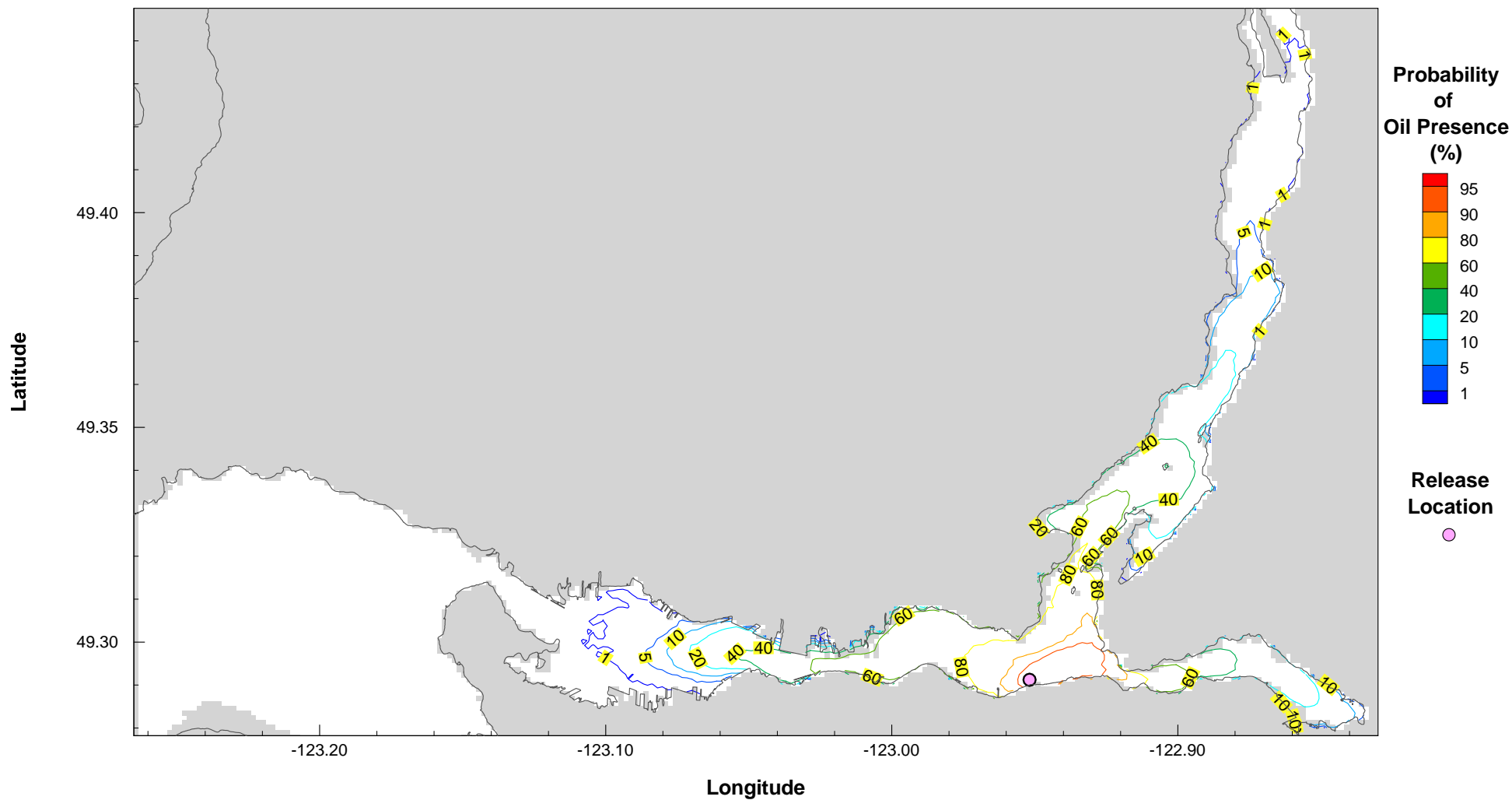
APVD
-

REV
0

OFFICE
EBA-VANC

DATE
August 26, 2013

Figure A.2-2



NOTES

- Statistical results based on independent spills occurring every 3 hours from April 01 00:00 to June 30 23:00, for a total of 728 independent spills.
- Probability of oil presence is the percentage of simulations in which oil was present at a given location.
- Spills were tracked until no oil left on water. Tracking time for each spill varied, based on the duration of oil on water.
- A 32 m³ release was modelled, corresponding to a 160 m³ operational spill at berth with 20%, i.e. 32 m³ distribution across the spill boom.

STATUS
ISSUED FOR USE

CLIENT

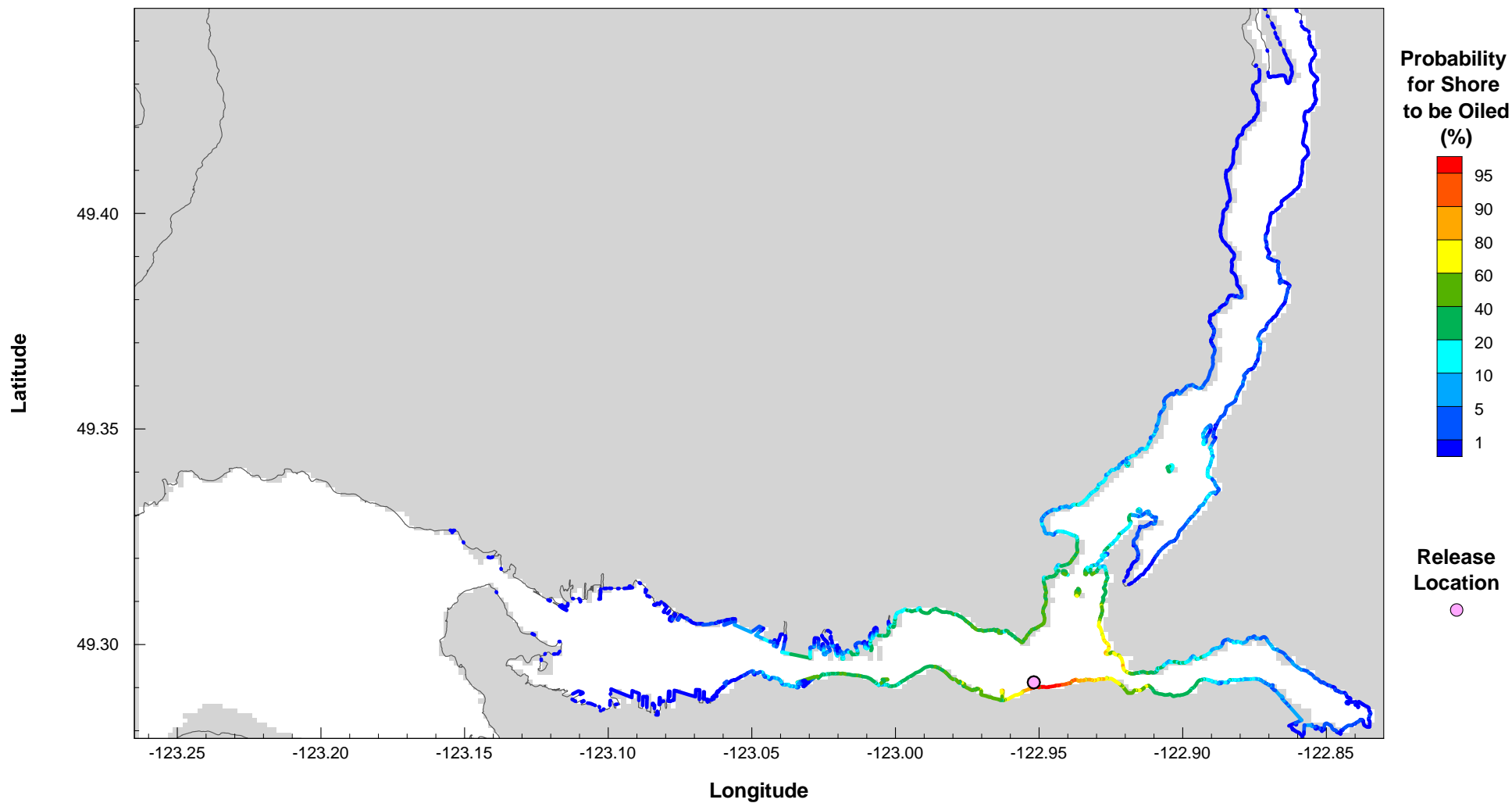


TRANS MOUNTAIN OIL SPILL STUDY

Stochastic Simulation Spring 2012, Site A Probability of Oil Presence

PROJECT NO. V13203022	DWN AH	CKD JAS	APVD -	REV 0
OFFICE EBA-VANC	DATE August 21, 2013			

Figure A.2-3



NOTES

- Statistical results based on independent spills occurring every 3 hours from April 01 00:00 to June 30 23:00, for a total of 728 independent spills.
- Probability of oil presence is the percentage of simulations in which oil was present at a given location.
- Spills were tracked until no oil left on water. Tracking time for each spill varied, based on the duration of oil on water.
- A 32 m³ release was modelled, corresponding to a 160 m³ operational spill at berth with 20%, i.e. 32 m³ distribution across the spill boom.

STATUS
ISSUED FOR USE

CLIENT

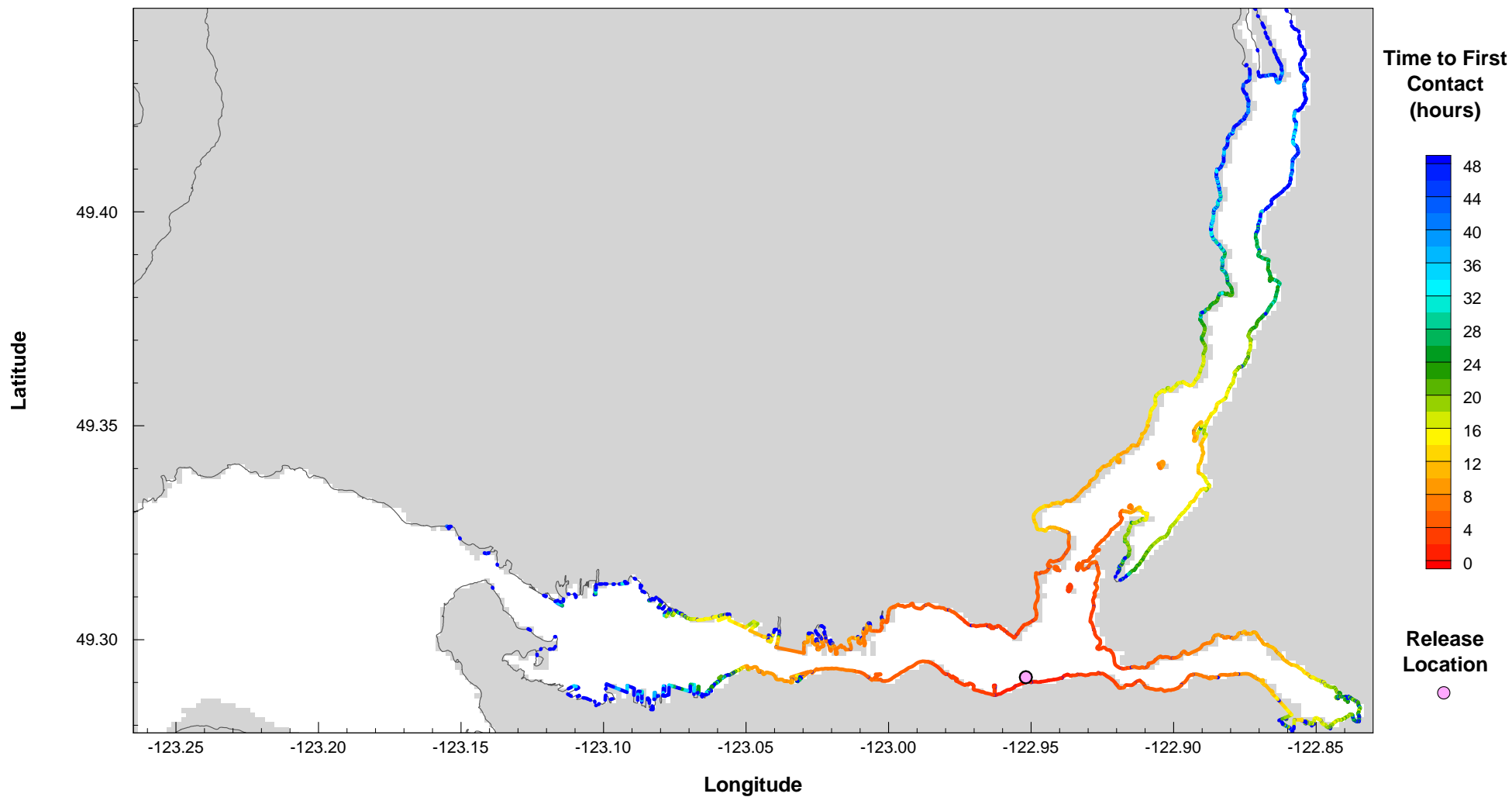


TRANS MOUNTAIN OIL SPILL STUDY

Stochastic Simulation Spring 2012, Site A Shoreline Oiled Probability

PROJECT NO. V13203022	DWN AH	CKD JAS	APVD -	REV 0
OFFICE EBA-VANC	DATE August 21, 2013			

Figure A.2-4



NOTES

- Statistical results based on independent spills occurring every 3 hours from April 01 00:00 to June 30 23:00, for a total of 728 independent spills.
- Time to first contact is the minimum time, over all simulations, for oil to reach a given shore segment.
- Spills were tracked until no oil left on water. Tracking time for each spill varied, based on the duration of oil on water.
- A 32 m³ release was modelled, corresponding to a 160 m³ operational spill at berth with 20%, i.e. 32 m³ distribution across the spill boom.

STATUS
ISSUED FOR USE

CLIENT

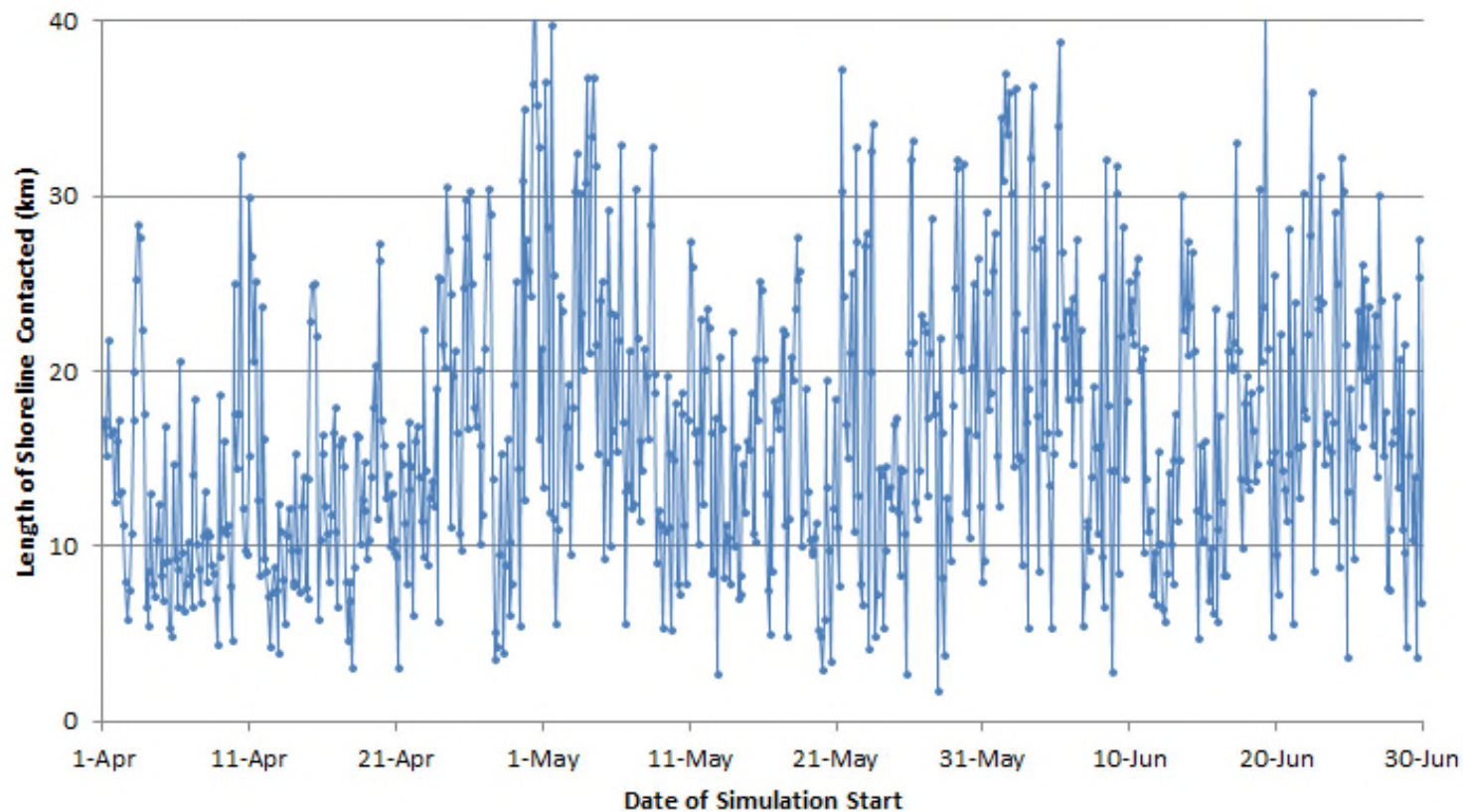


TRANS MOUNTAIN OIL SPILL STUDY

Stochastic Simulation Spring 2012, Site A Shoreline Time to First Contact

PROJECT NO. V13203022	DWN AH	CKD JAS	APVD -	REV 0
OFFICE EBA-VANC	DATE August 21, 2013			

Figure A.2-5



NOTES

- Statistical results based on independent spills occurring every 3 hours from April 01 00:00 to June 30 23:00, for a total of 728 independent spills.
- Tracking time for each spill was a maximum of 15 days.

STATUS
ISSUED FOR USE

CLIENT

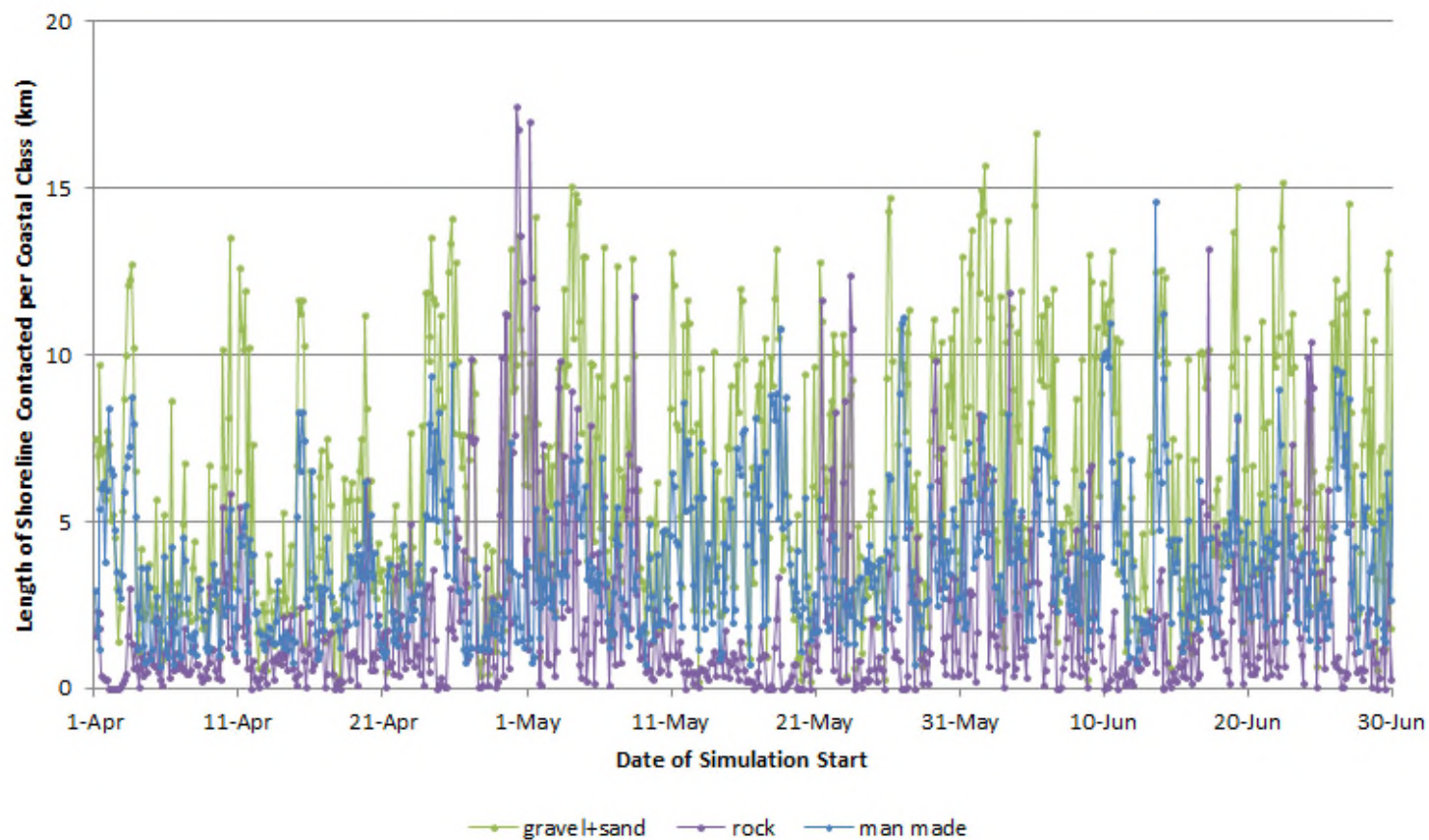


TRANS MOUNTAIN OIL SPILL STUDY

Stochastic Simulation Spring 2012, Site A Length of Shoreline Contacted

PROJECT NO. V13203022	DWN AH	CKD JAS	APVD -	REV 0
OFFICE EBA-VANC	DATE August 6, 2013			

Figure A.2-6



NOTES

- Statistical results based on independent spills occurring every 3 hours from April 01 00:00 to June 30 23:00, for a total of 728 independant spills.
- Tracking time for each spill was a maximum of 15 days.

STATUS
ISSUED FOR USE

CLIENT



TRANS MOUNTAIN OIL SPILL STUDY

Stochastic Simulation - Spring 2012 Site A Length of Shoreline Contacted Per Coastal Class

PROJECT NO.
V13203022

DWN
AH

CKD
JAS

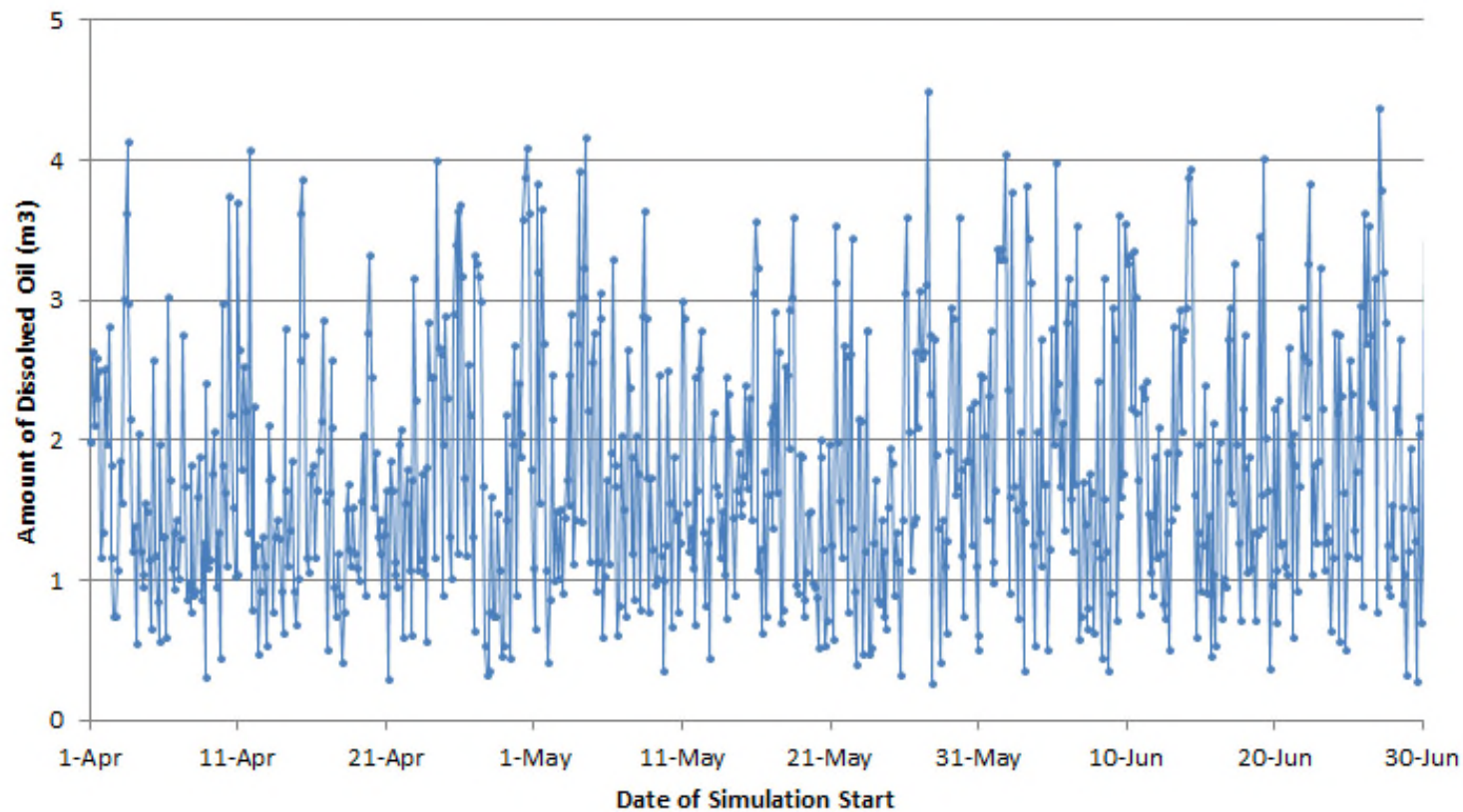
APVD
-

REV
0

OFFICE
EBA-VANC

DATE
August 22, 2013

Figure A.2-7



NOTES

- Statistical results based on independent spills occurring every 3 hours from April 01 00:00 to June 30 23:00, for a total of 728 independent spills.
- Tracking time for each spill was a maximum of 15 days.

STATUS
ISSUED FOR USE

CLIENT



TRANS MOUNTAIN OIL SPILL STUDY

Stochastic Simulation Spring 2012, Site A Amount of Dissolved Oil

PROJECT NO.
V13203022

DWN
AH

CKD
JAS

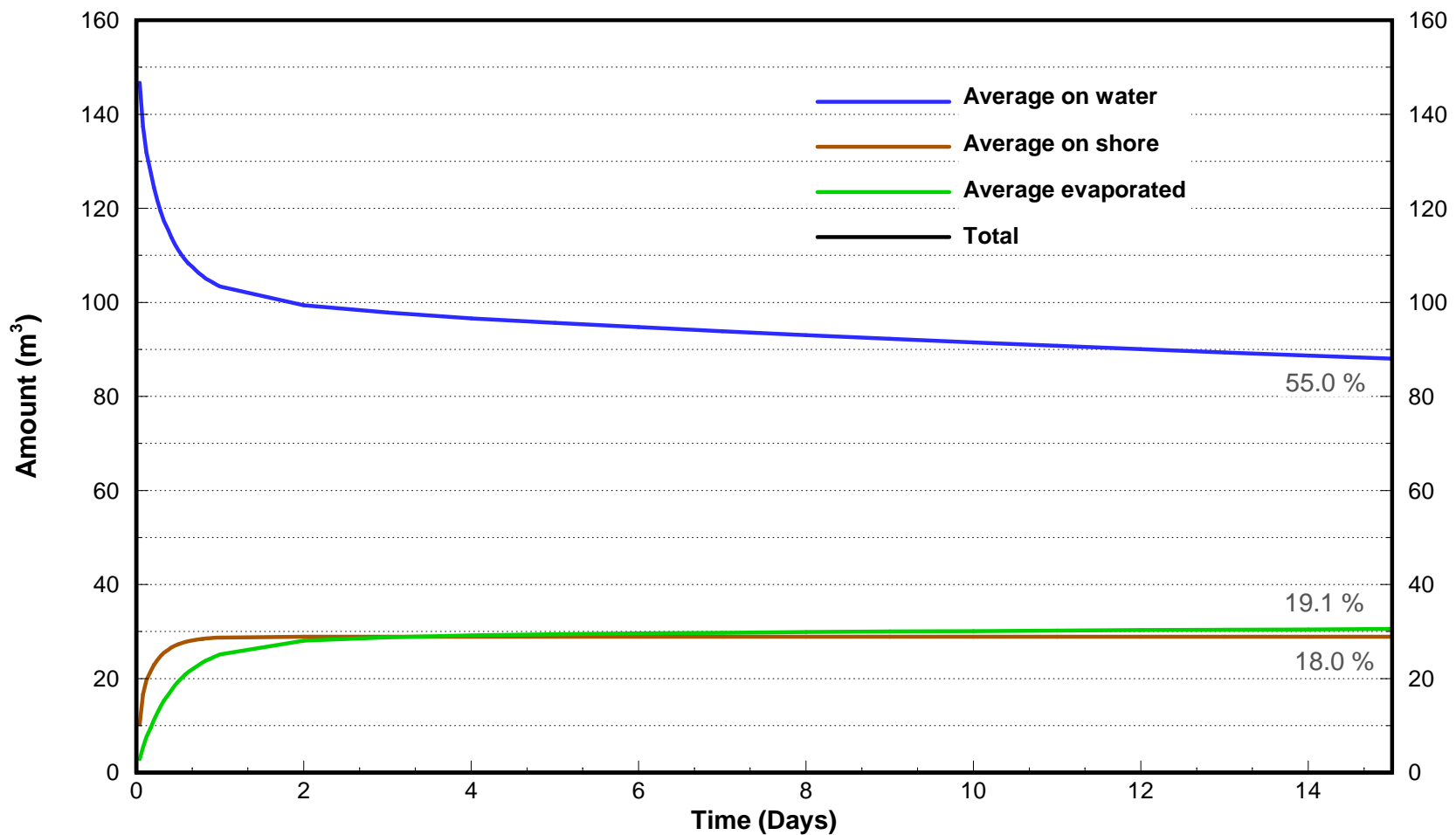
APVD
-

REV
0

OFFICE
EBA-VANC

DATE
August 7, 2013

Figure A.2-8



NOTES

- Statistical results based on independent spills occurring every 3 hours from April 01 00:00 to June 30 23:00, for a total of 728 independent spills.
- Tracking time for each spill was a maximum of 15 days.
- The major components of the mass balance are shown above.

STATUS
ISSUED FOR USE

CLIENT

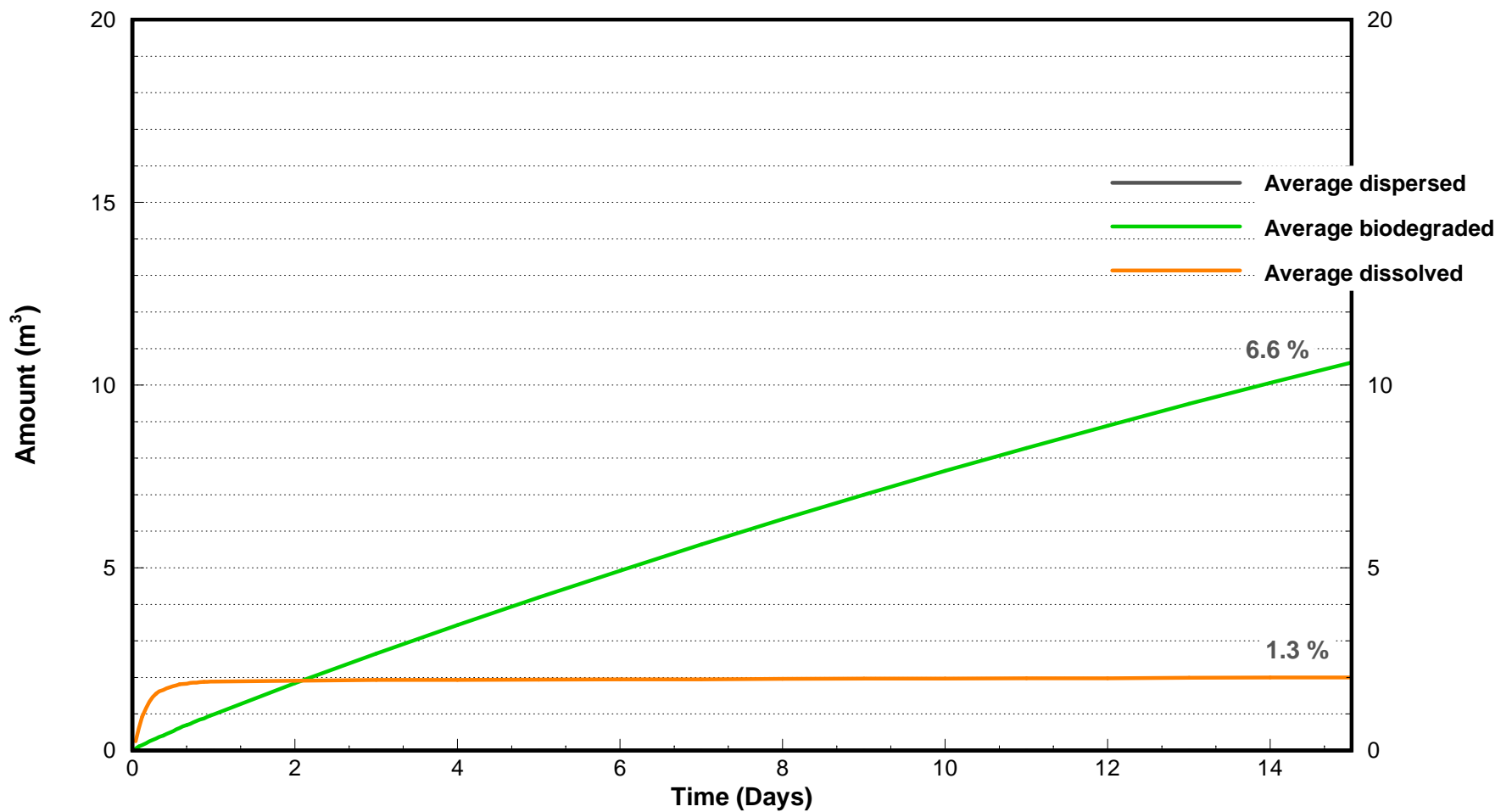


TRANS MOUNTAIN OIL SPILL STUDY

Stochastic Simulation Spring 2012, Site A Major Components of the Mass Balance

PROJECT NO. V13203022	DWN AH	CKD JAS	APVD -	REV 0
OFFICE EBA-VANC	DATE August 22, 2013			

Figure A.2-9



NOTES

- Statistical results based on independent spills occurring every 3 hours from April 01 00:00 to June 30 23:00, for a total of 728 independent spills.
- Tracking time for each spill was a maximum of 15 days.
- The minor components of the mass balance are shown above.

STATUS
ISSUED FOR USE

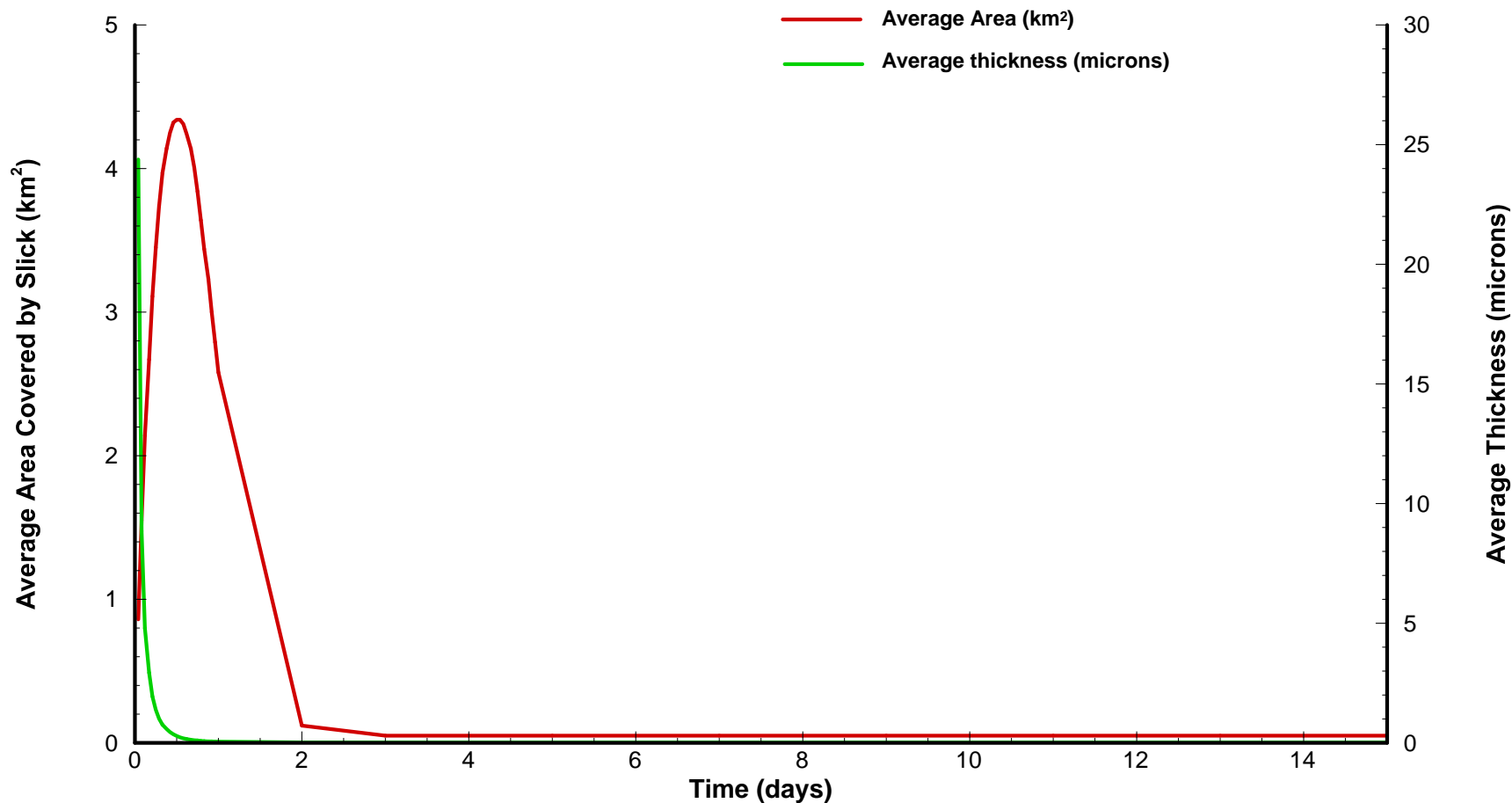
CLIENT



TRANS MOUNTAIN OIL SPILL STUDY

Stochastic Simulation Spring 2012, Site A Minor Components of the Mass Balance

PROJECT NO. V13203022	DWN AH	CKD JAS	APVD -	REV 0	Figure A.2-10
OFFICE EBA-VANC	DATE August 22, 2013				



NOTES

- Statistical results based on independent spills occurring every 3 hours from April 01 00:00 to June 30 23:00.
- The average thickness is based on a full coverage of each grid cell that contains oil.

STATUS
ISSUED FOR USE

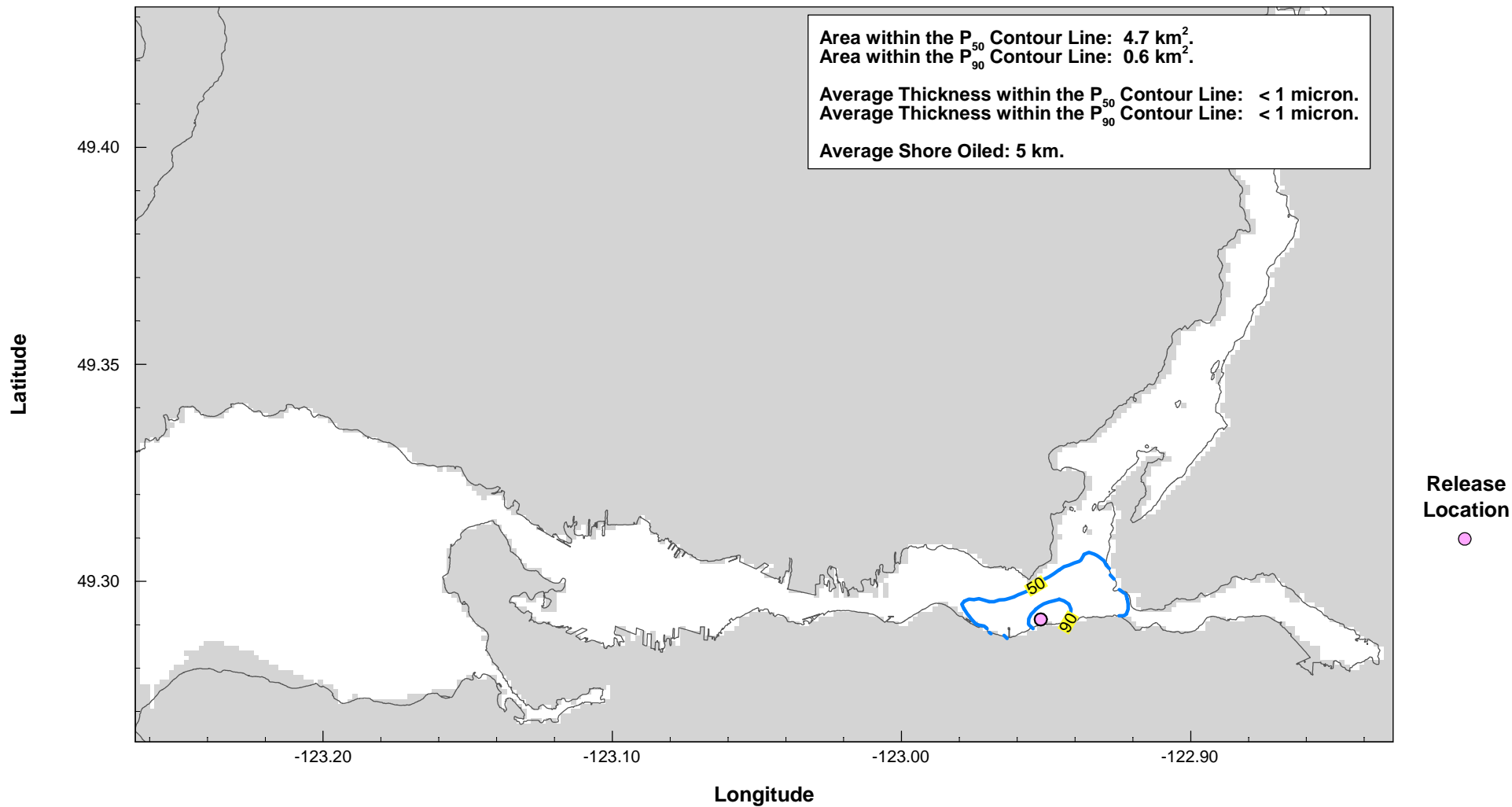
CLIENT



TRANS MOUNTAIN OIL SPILL STUDY

Stochastic Simulation Spring 2012, Site A Statistics on Area and Thickness

PROJECT NO. V13203022	DWN AH	CKD JAS	APVD -	REV 0	Figure A.2-11
OFFICE EBA-VANC	DATE August 22, 2013				



NOTES

- Statistical results based on independent spills occurring every 3 hours from April 01 00:00 to June 30 23:00, for a total of 728 independant spills.

Probability of oil presence is the percentage of simulations in which oil was present at a given location, based on the 32 m³ that escaped the pre-deployed boom.

P_{50} : after 6 hours, there is a 50% probability for the area within the P_{50} contour line to have been contacted.
 P_{90} : after 6 hours, there is a 90% probability for the area within the P_{90} contour line to have been contacted.

- Tracking time for each spill was 6 hours.

- The average thickness is based on a full coverage of each grid cell that contains oil and within the contour line.

**STATUS
ISSUED FOR USE**

CLIENT



TRANS MOUNTAIN OIL SPILL STUDY

**Stochastic Simulation
Spring 2012, Site A
 P_{50} and P_{90} after 6 Hours**

PROJECT NO.
V13203022

OFFICE
EBA-VANC

DWN
AH

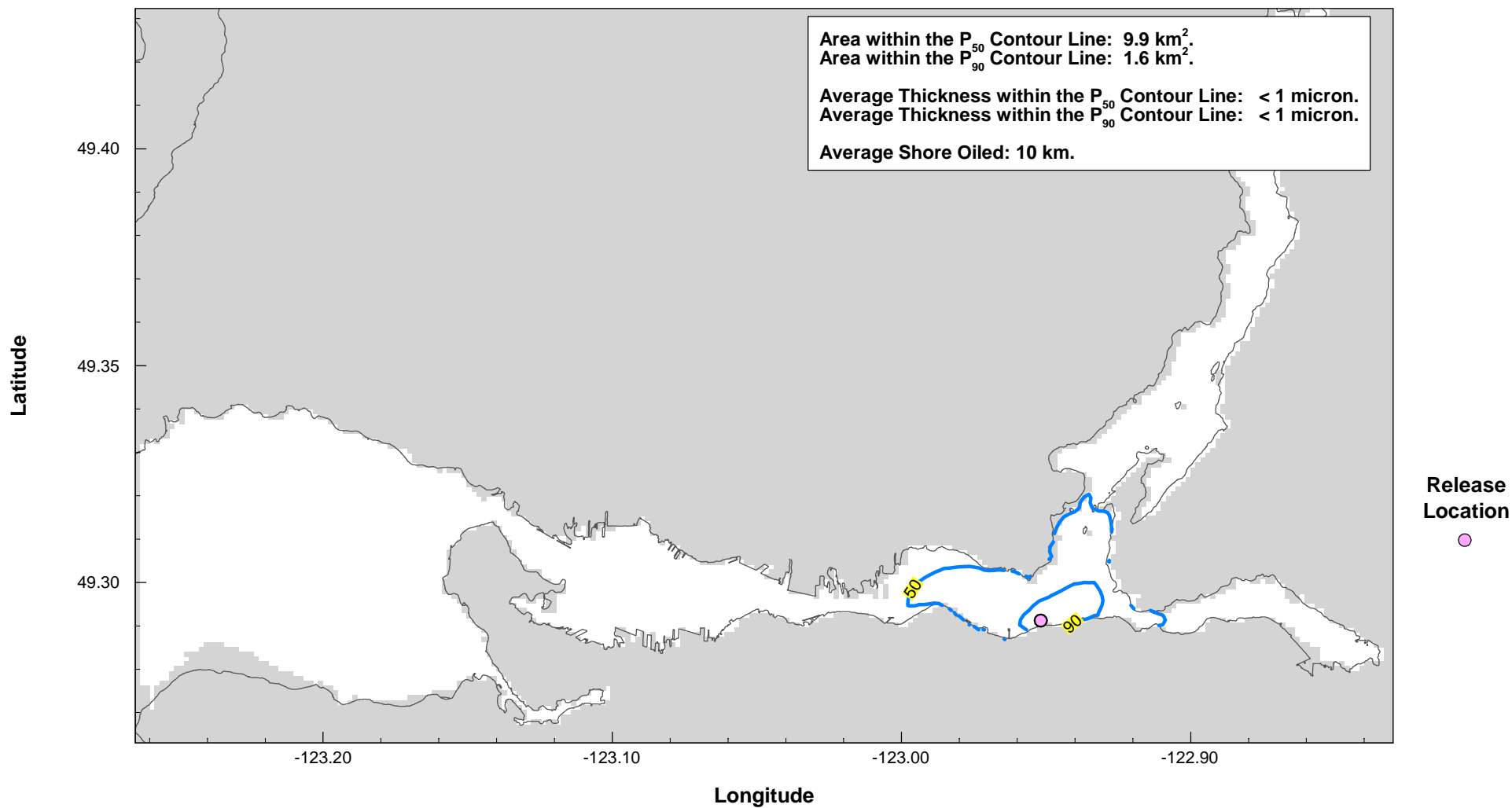
CKD
JAS

APVD
-

REV
0

DATE
October 16, 2013

Figure A.2-12



NOTES

- Statistical results based on independent spills occurring every 3 hours from April 01 00:00 to June 30 23:00, for a total of 728 independant spills.

Probability of oil presence is the percentage of simulations in which oil was present at a given location, based on the 32 m³ that escaped the pre-deployed boom.

P_{50} : after 12 hours, there is a 50% probability for the area within the P_{50} contour line to have been contacted.
 P_{90} : after 12 hours, there is a 90% probability for the area within the P_{90} contour line to have been contacted.

- Tracking time for each spill was 12 hours.

- The average thickness is based on a full coverage of each grid cell that contains oil and within the contour line.

**STATUS
ISSUED FOR USE**

CLIENT



TRANS MOUNTAIN OIL SPILL STUDY

Stochastic Simulation Spring 2012, Site A P_{50} and P_{90} after 12 Hours

PROJECT NO.
V13203022

DWN
AH

CKD
JAS

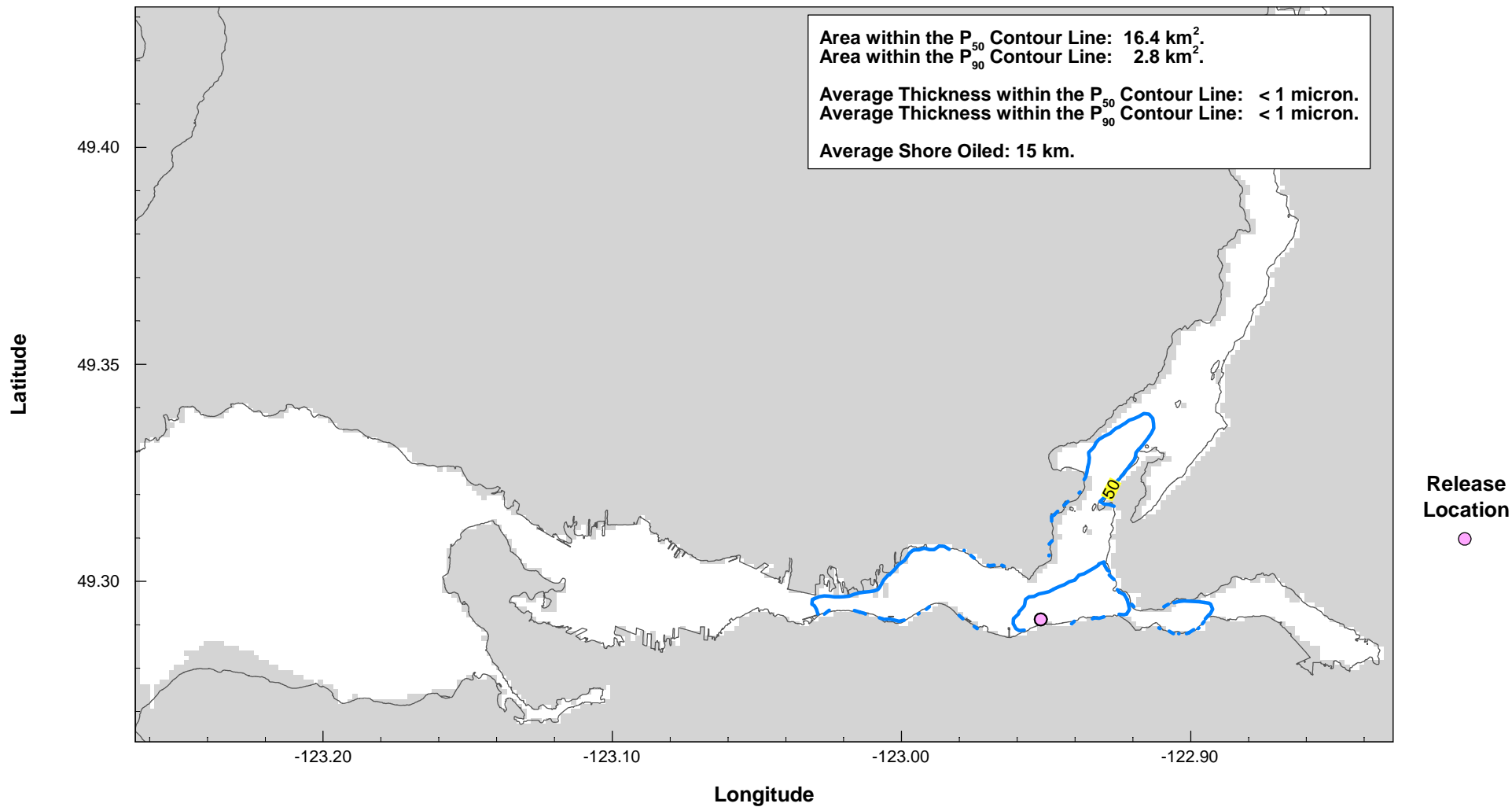
APVD
-

REV
0

OFFICE
EBA-VANC

DATE
October 16, 2013

Figure A.2-13



NOTES

- Statistical results based on independent spills occurring every 3 hours from April 01 00:00 to June 30 23:00, for a total of 728 independant spills.

Probability of oil presence is the percentage of simulations in which oil was present at a given location, based on the 32 m³ that escaped the pre-deployed boom.

P_{50} : after 24 hours, there is a 50% probability for the area within the P_{50} contour line to have been contacted.
 P_{90} : after 24 hours, there is a 90% probability for the area within the P_{90} contour line to have been contacted.

- Tracking time for each spill was 24 hours.

- The average thickness is based on a full coverage of each grid cell that contains oil and within the contour line.

STATUS
ISSUED FOR USE

CLIENT



TRANS MOUNTAIN OIL SPILL STUDY

Stochastic Simulation Spring 2012, Site A P_{50} and P_{90} after 24 Hours

PROJECT NO.
V13203022

DWN
AH

CKD
JAS

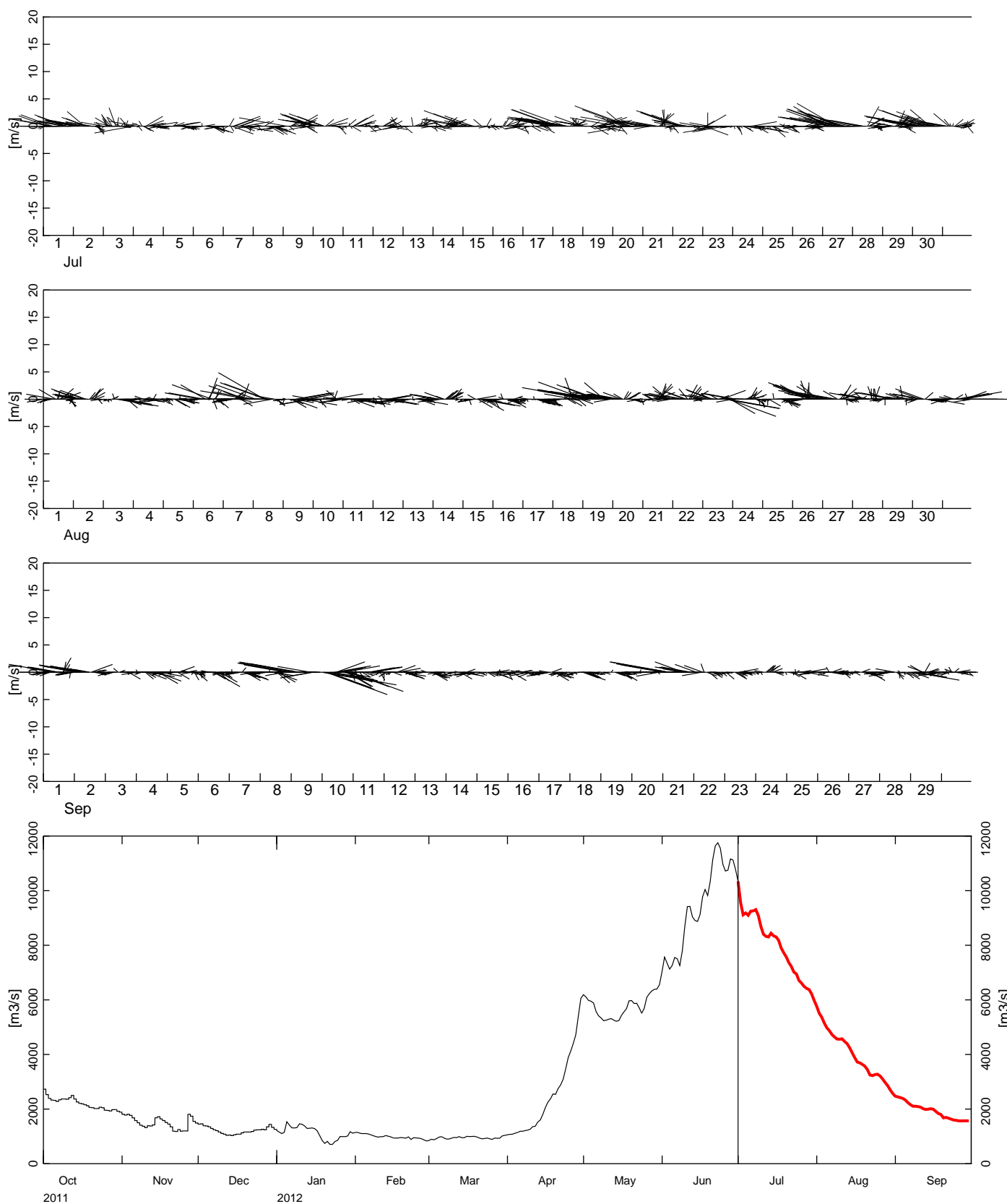
APVD
-

REV
0

OFFICE
EBA-VANC

DATE
October 16, 2013

Figure A.2-14



NOTES

- The wind stick represent winds at Point Atkinson.
- The bottom graph represents the Fraser River discharge at Hope.

STATUS
ISSUED FOR USE

CLIENT

TRANS MOUNTAIN



TRANS MOUNTAIN OIL SPILL STUDY

Environmental Conditions: Summer 2012 Site A
Stochastic Modelling

PROJECT NO.
V13203022

OFFICE
EBA-VANC

DWN
AH

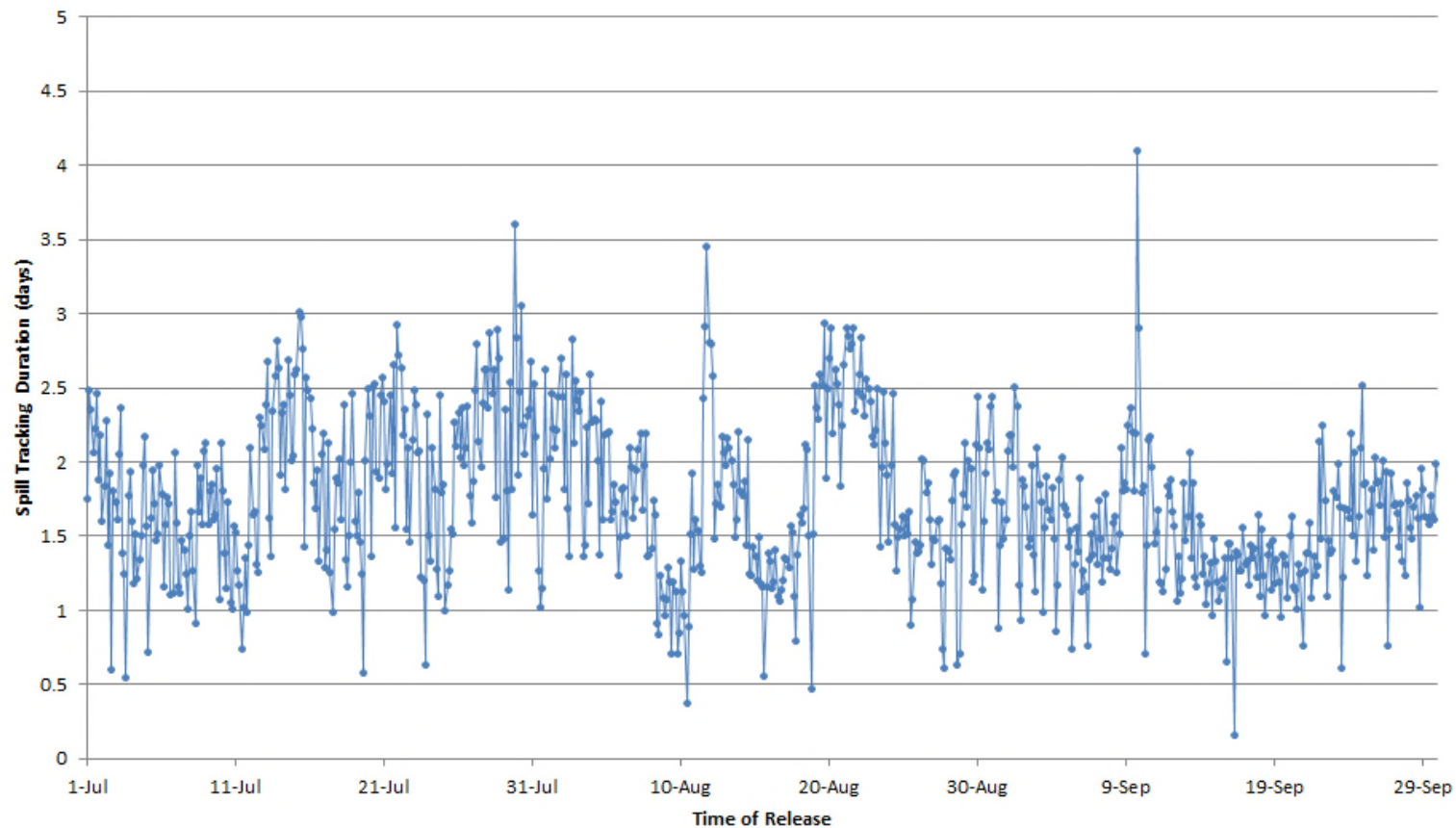
DATE
August 2013

CHK
JAS

APVD
JAS

REV
0

Figure A.3-1



NOTES

- The tracking time of each independant spill varied, based on the time necessary for the oil to be cleared out of water.
- This graph does not reflect the quantity of oil present in water.

STATUS
ISSUED FOR USE

CLIENT



TRANS MOUNTAIN OIL SPILL STUDY

Stochastic Simulation Summer 2012, Site A Duration of Simulation

PROJECT NO.
V13203022

OFFICE
EBA-VANC

DWN
AH

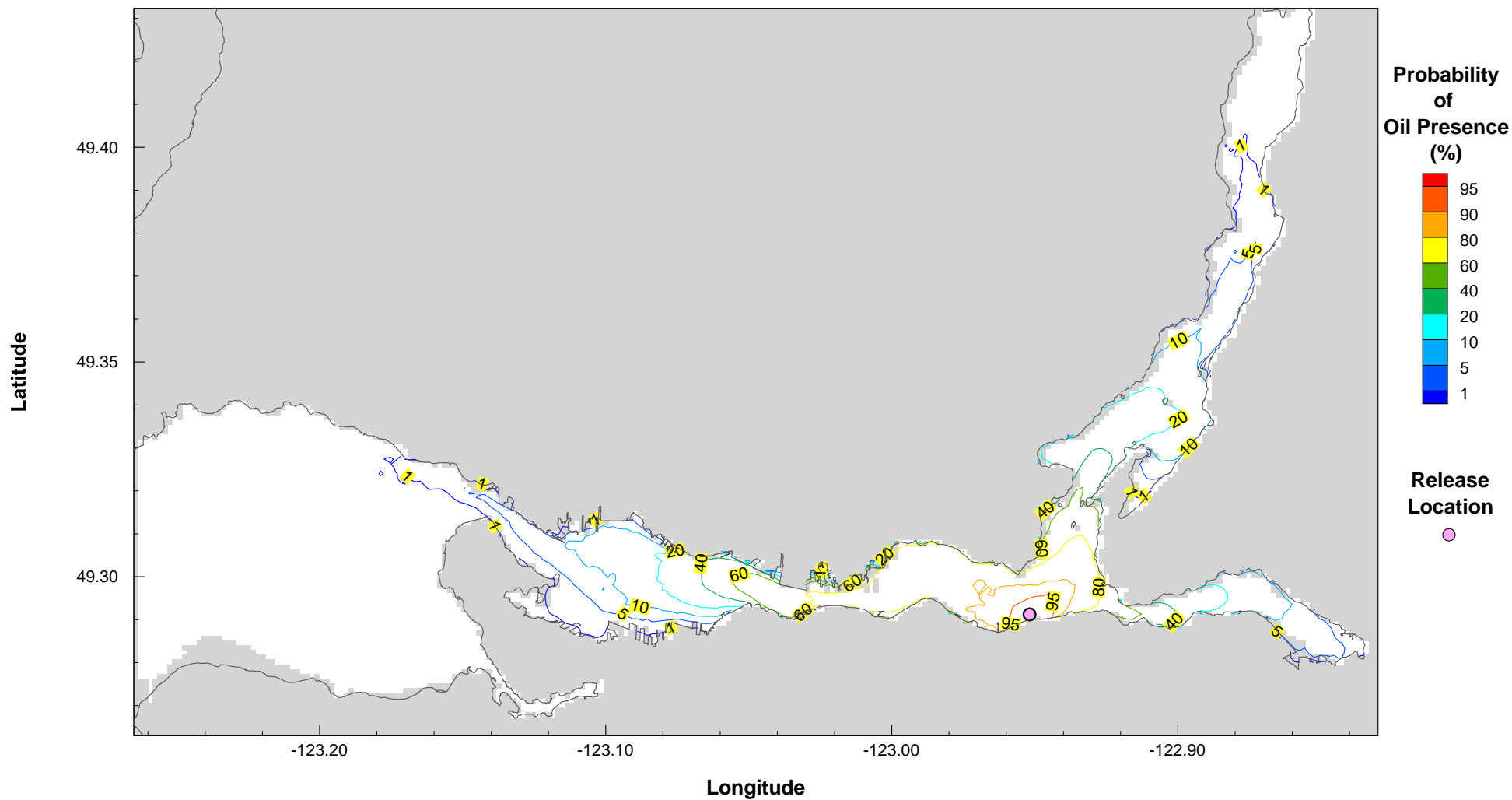
CKD
JAS

APVD
-

REV
0

DATE
October 16, 2013

Figure A.3-2



NOTES

- Statistical results based on independent spills occurring every 3 hours from July 01 00:00 to September 30 23:00, for a total of 736 independant spills.
- Probability of oil presence is the percentage of simulations in which oil was present at a given location.
- Spills were tracked until no oil left on water. Tracking time for each spill varied, based on the duration of oil on water.
- A 32 m³ release was modelled, corresponding to a 160 m³ operational spill at berth with 20%, i.e. 32 m³ distribution across the spill boom.

STATUS
ISSUED FOR USE

CLIENT



TRANS MOUNTAIN OIL SPILL STUDY

Stochastic Simulation Summer 2012, Site A Probability of Oil Presence

PROJECT NO.
V13203022

DWN
AH

CKD
JAS

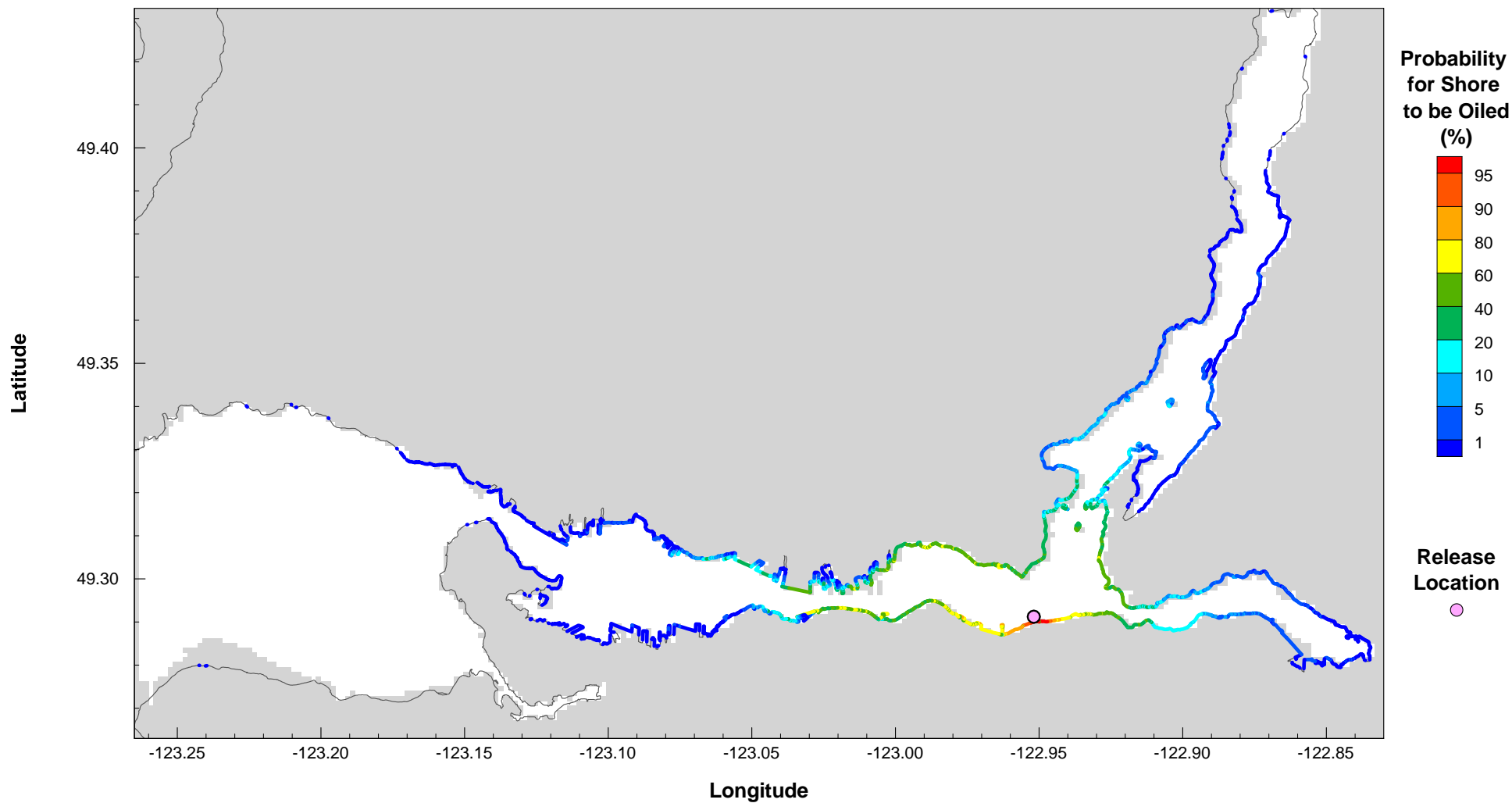
APVD
-

REV
0

OFFICE
EBA-VANC

DATE
October 16, 2013

Figure A.3-3



NOTES

- Statistical results based on independent spills occurring every 3 hours from July 01 00:00 to September 30 23:00 for a total of 736 independent spills.
- Probability of oil presence is the percentage of simulations in which oil was present at a given location.
- Spills were tracked until no oil left on water. Tracking time for each spill varied, based on the duration of oil on water.
- A 32 m³ release was modelled, corresponding to a 160 m³ operational spill at berth with 20%, i.e. 32 m³ distribution across the spill boom.

STATUS
ISSUED FOR USE

CLIENT

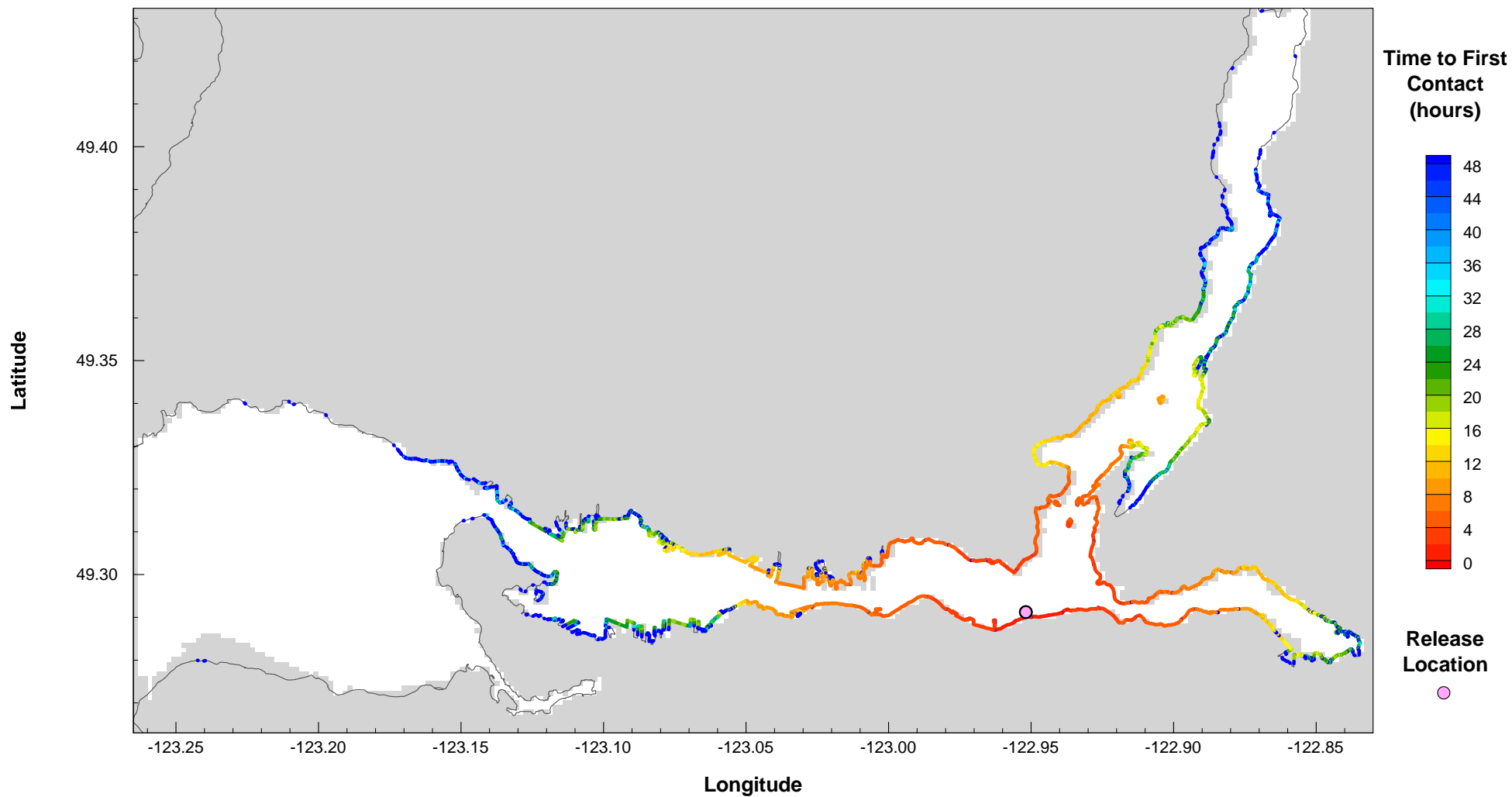


TRANS MOUNTAIN OIL SPILL STUDY

Stochastic Simulation Summer 2012, Site A Shoreline Oiled Probability

PROJECT NO. V13203022	DWN AH	CKD JAS	APVD -	REV 0
OFFICE EBA-VANC	DATE October 16, 2013			

Figure A.3-4



NOTES

- Statistical results based on independent spills occurring every 3 hours from July 01 00:00 to September 30 23:00 for a total of 736 independent spills.
- Time to first contact is the minimum time, over all simulations, for oil to reach a given shore segment.
- Spills were tracked until no oil left on water. Tracking time for each spill varied, based on the duration of oil on water.
- A 32 m³ release was modelled, corresponding to a 160 m³ operational spill at berth with 20%, i.e. 32 m³ distribution across the spill boom.

STATUS
ISSUED FOR USE

CLIENT

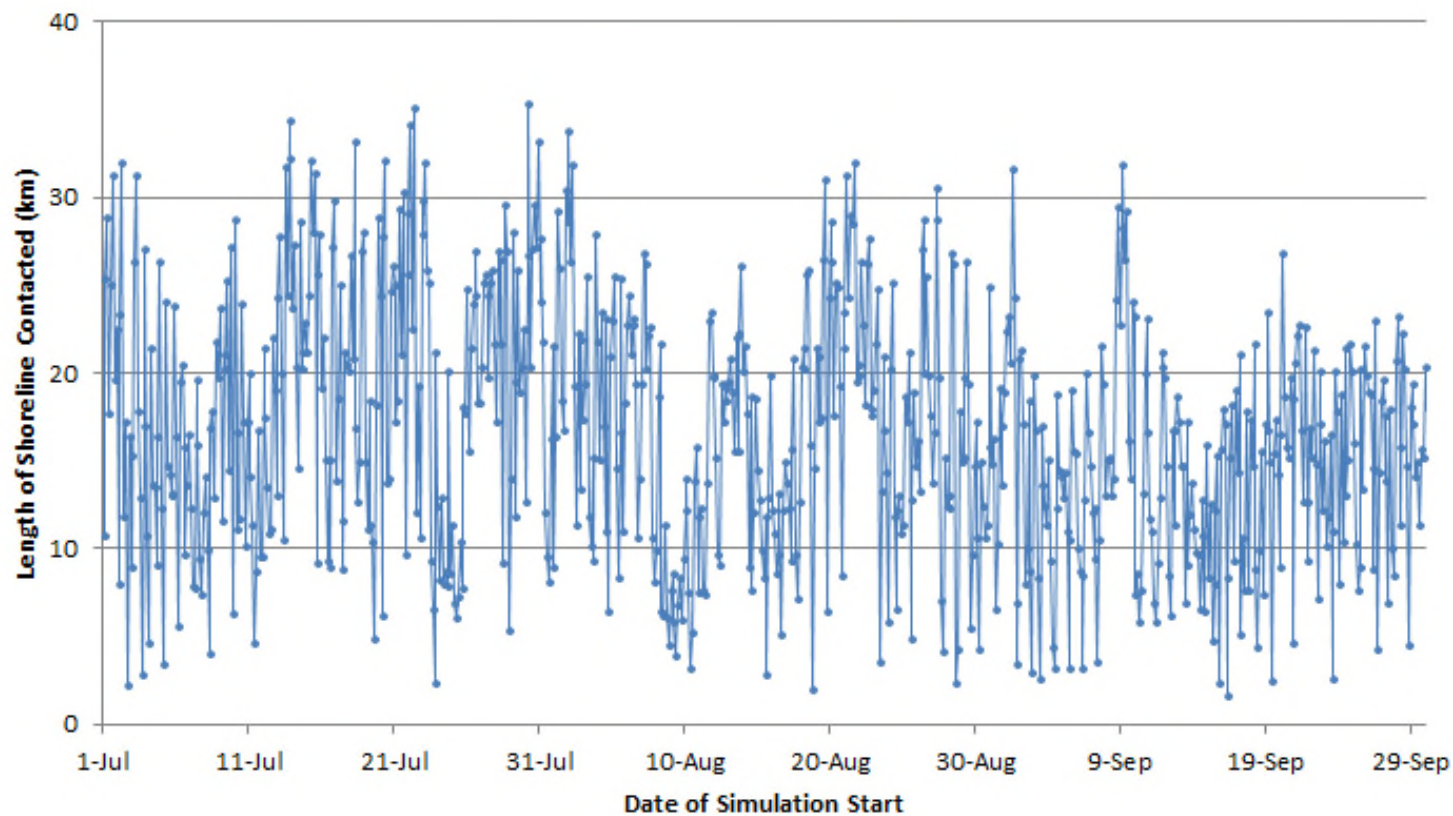


TRANS MOUNTAIN OIL SPILL STUDY

Stochastic Simulation Summer 2012, Site A Shoreline Time to First Contact

PROJECT NO. V13203022	DWN AH	CKD JAS	APVD -	REV 0
OFFICE EBA-VANC	DATE October 16, 2013			

Figure A.3-5



NOTES

- Statistical results based on independent spills occurring every 3 hours from July 01 00:00 to September 30 23:00, for a total of 736 independent spills.
- Tracking time for each spill was a maximum of 15 days.

STATUS
ISSUED FOR USE

CLIENT



TRANS MOUNTAIN OIL SPILL STUDY

Stochastic Simulation Summer 2012, Site A Length of Shoreline Contacted

PROJECT NO.
V13203022

OFFICE
EBA-VANC

DWN
AH

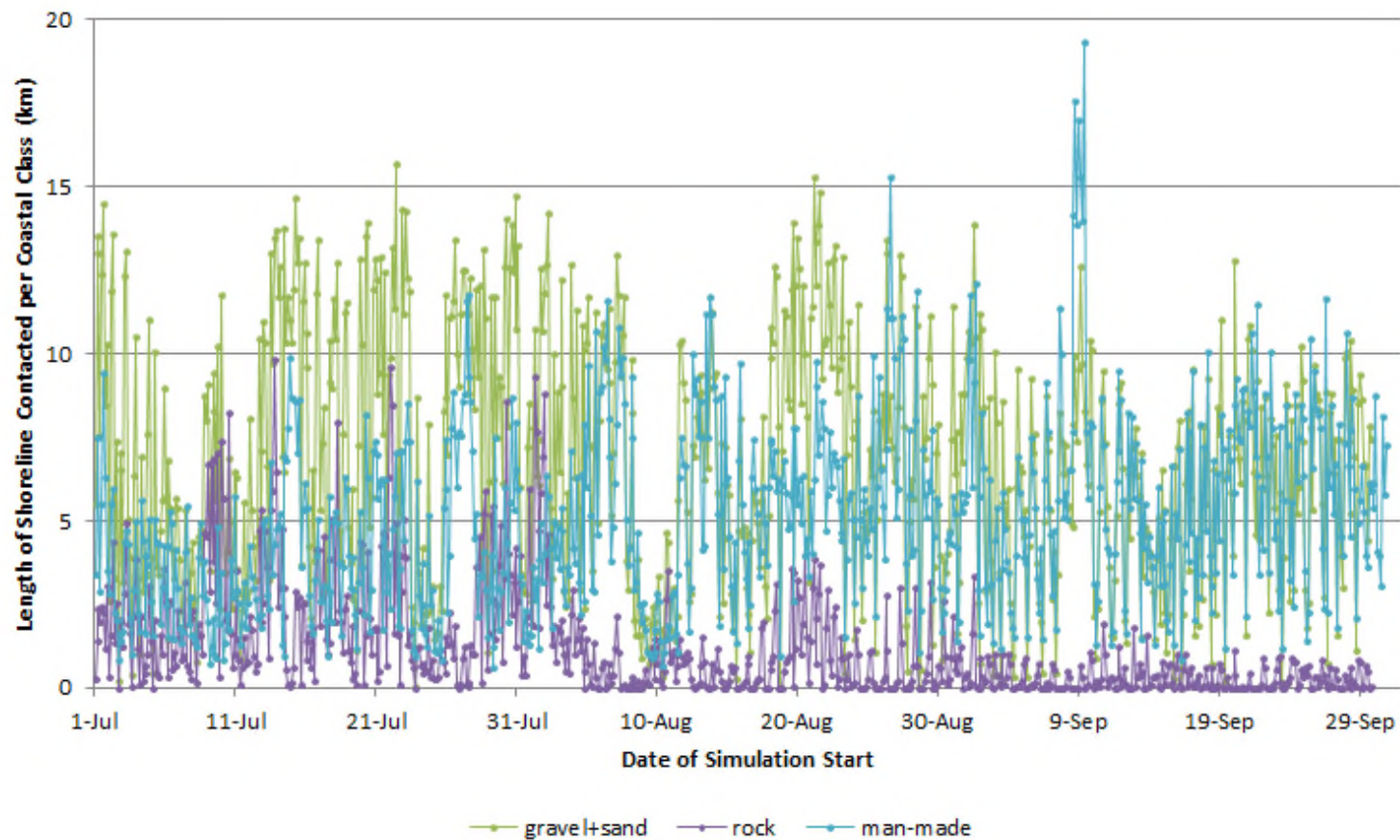
DATE
October 16, 2013

CKD
JAS

APVD
-

REV
0

Figure A.3-6



NOTES

- Statistical results based on independent spills occurring every 3 hours from July 01 00:00 to September 30 23:00, for a total of 736 independent spills.
- Tracking time for each spill was a maximum of 15 days.

STATUS
ISSUED FOR USE

CLIENT



TRANS MOUNTAIN OIL SPILL STUDY

Stochastic Simulation - Summer 2012 Site A Length of Shoreline Contacted Per Coastal Class

PROJECT NO.
V13203022

DWN
AH

CKD
JAS

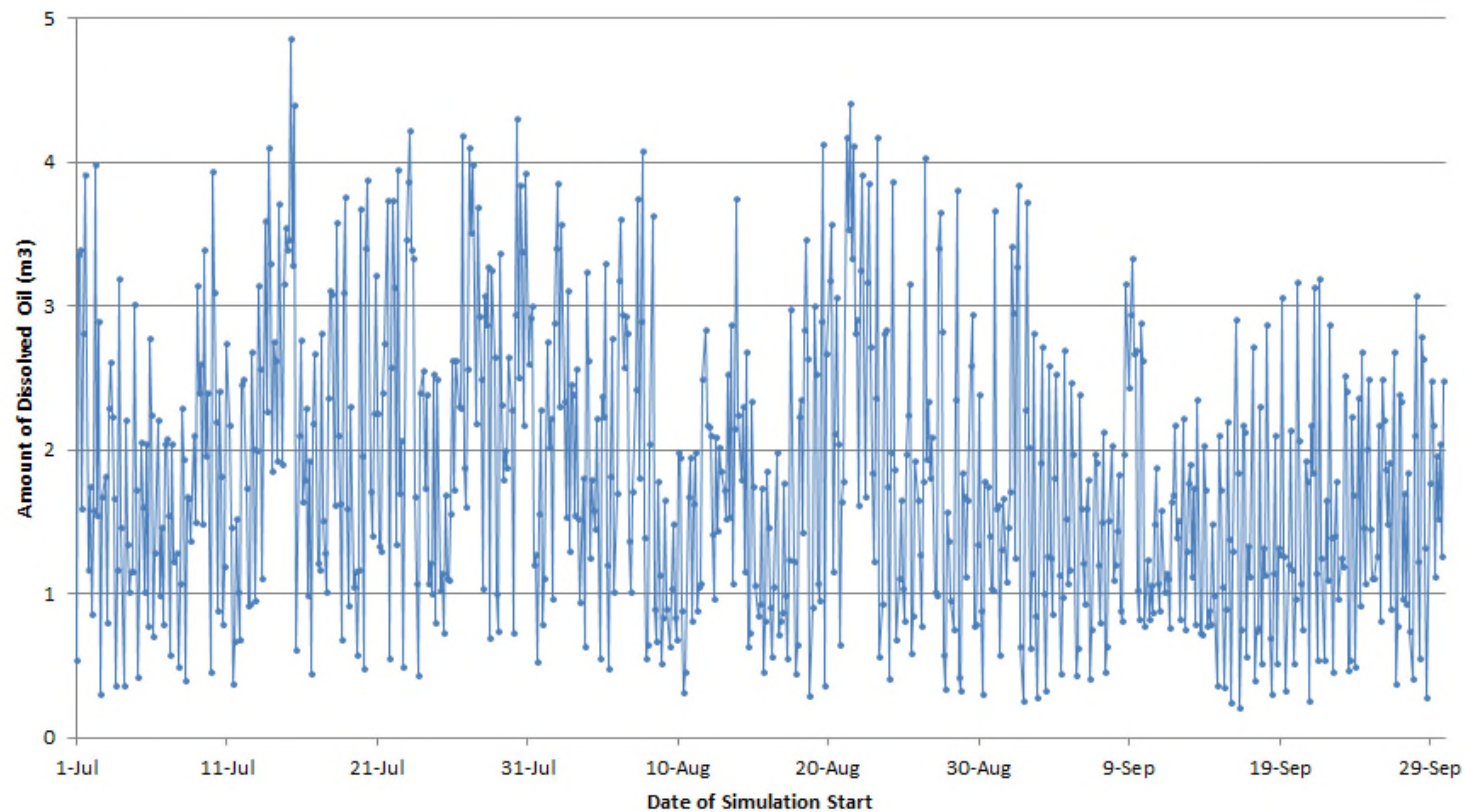
APVD
-

REV
0

OFFICE
EBA-VANC

DATE
October 16, 2013

Figure A.3-7



NOTES

- Statistical results based on independent spills occurring every 3 hours from July 01 00:00 to September 30 23:00, for a total of 736 independant spills.
- Tracking time for each spill was a maximum of 15 days.

STATUS
ISSUED FOR USE

CLIENT

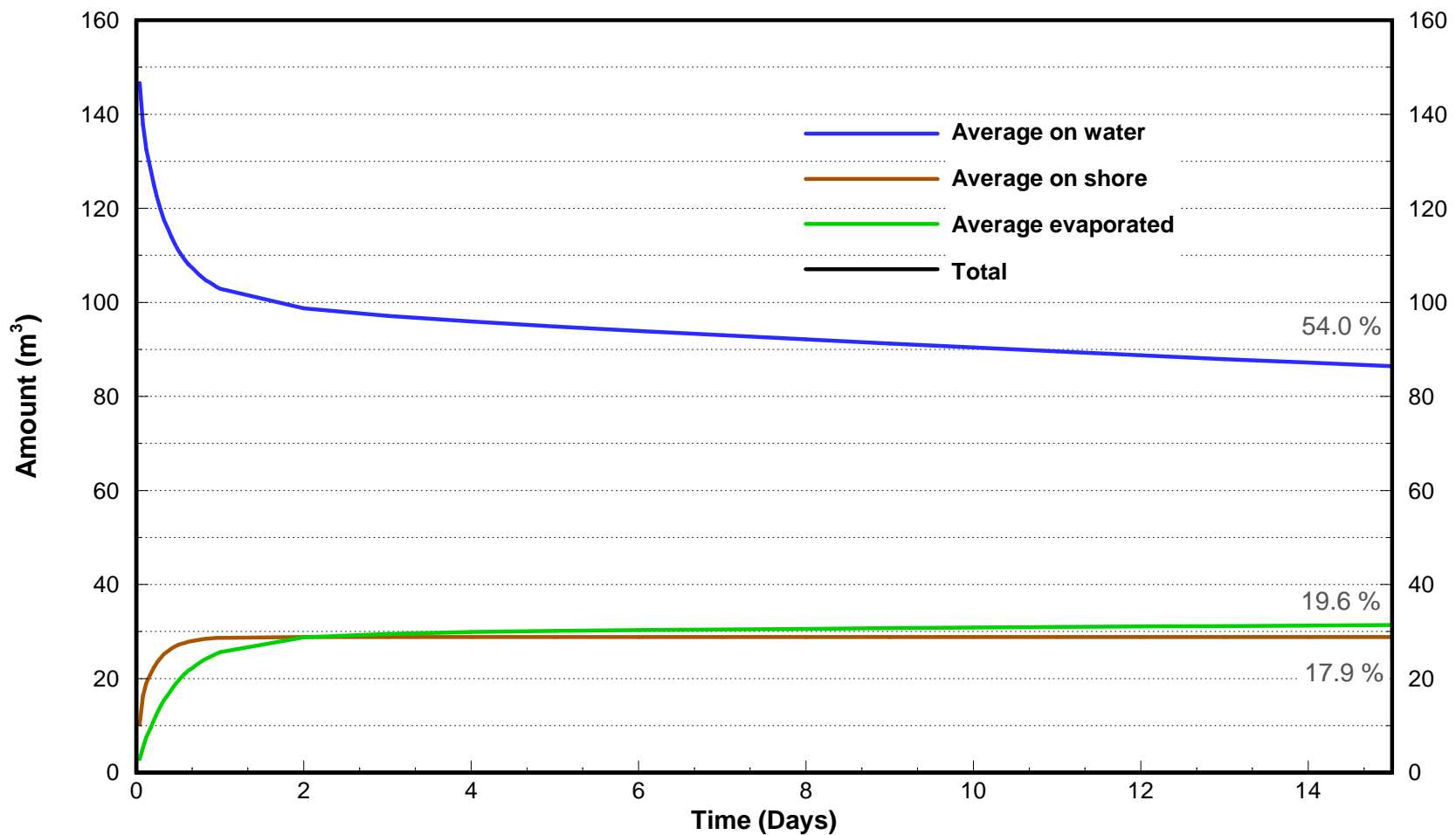


TRANS MOUNTAIN OIL SPILL STUDY

Stochastic Simulation Summer 2012, Site A Amount of Dissolved Oil

PROJECT NO. V13203022	DWN AH	CKD JAS	APVD -	REV 0
OFFICE EBA-VANC	DATE October 16, 2013			

Figure A.3-8



NOTES

- Statistical results based on independent spills occurring every 3 hours from July 01 00:00 to September 30 23:00, for a total of 736 independant spills.
- Tracking time for each spill was a maximum of 15 days.
- The major components of the mass balance are shown above.

STATUS
ISSUED FOR USE

CLIENT

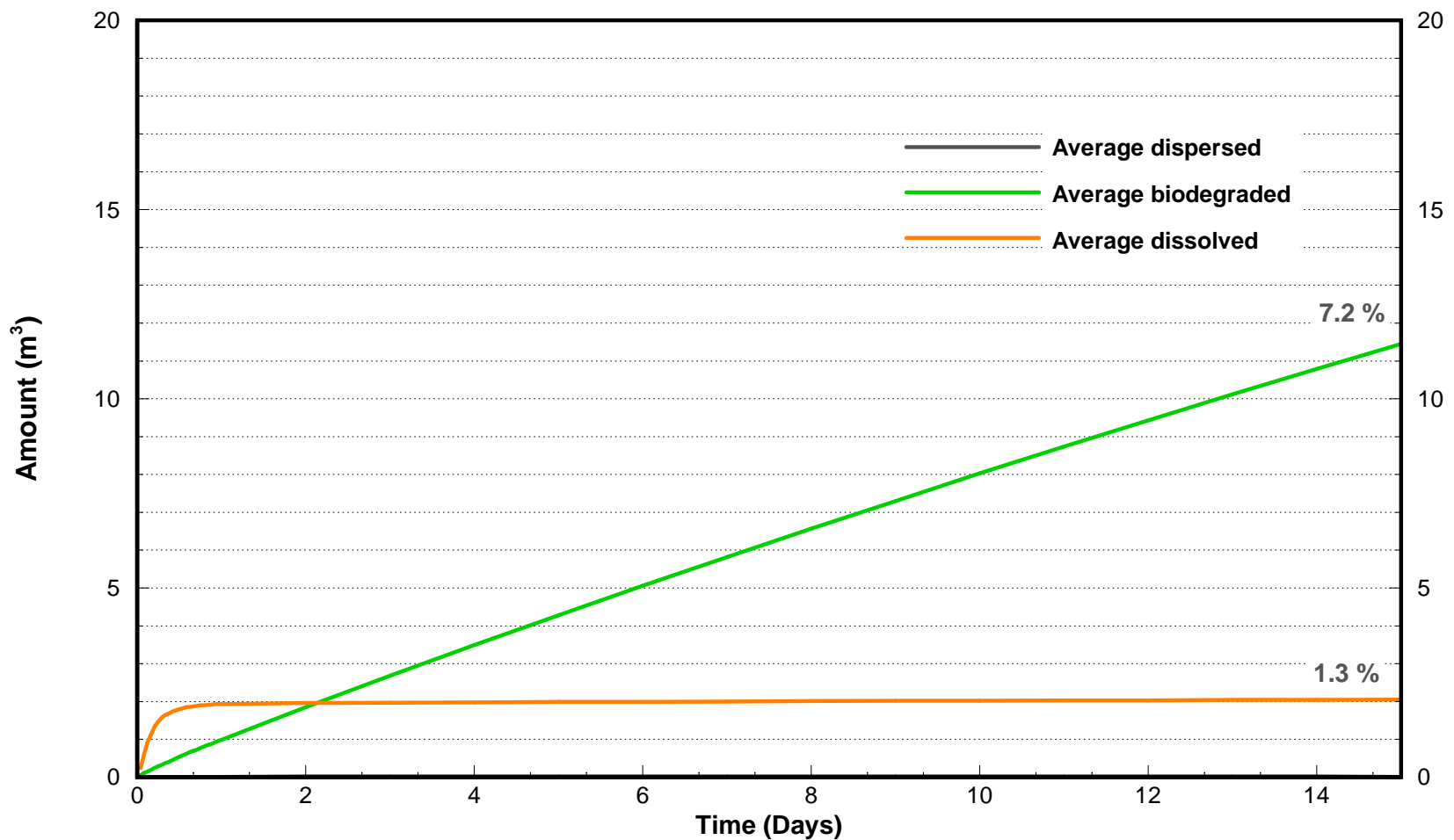


TRANS MOUNTAIN OIL SPILL STUDY

Stochastic Simulation Summer 2012, Site A Major Components of the Mass Balance

PROJECT NO. V13203022	DWN AH	CKD JAS	APVD -	REV 0
OFFICE EBA-VANC	DATE October 16, 2013			

Figure A.3-9



NOTES

- Statistical results based on independent spills occurring every 3 hours from July 01 00:00 to September 30 23:00, for a total of 736 independant spills.
- Tracking time for each spill was a maximum of 15 days.
- The minor components of the mass balance are shown above.

STATUS
ISSUED FOR USE

CLIENT

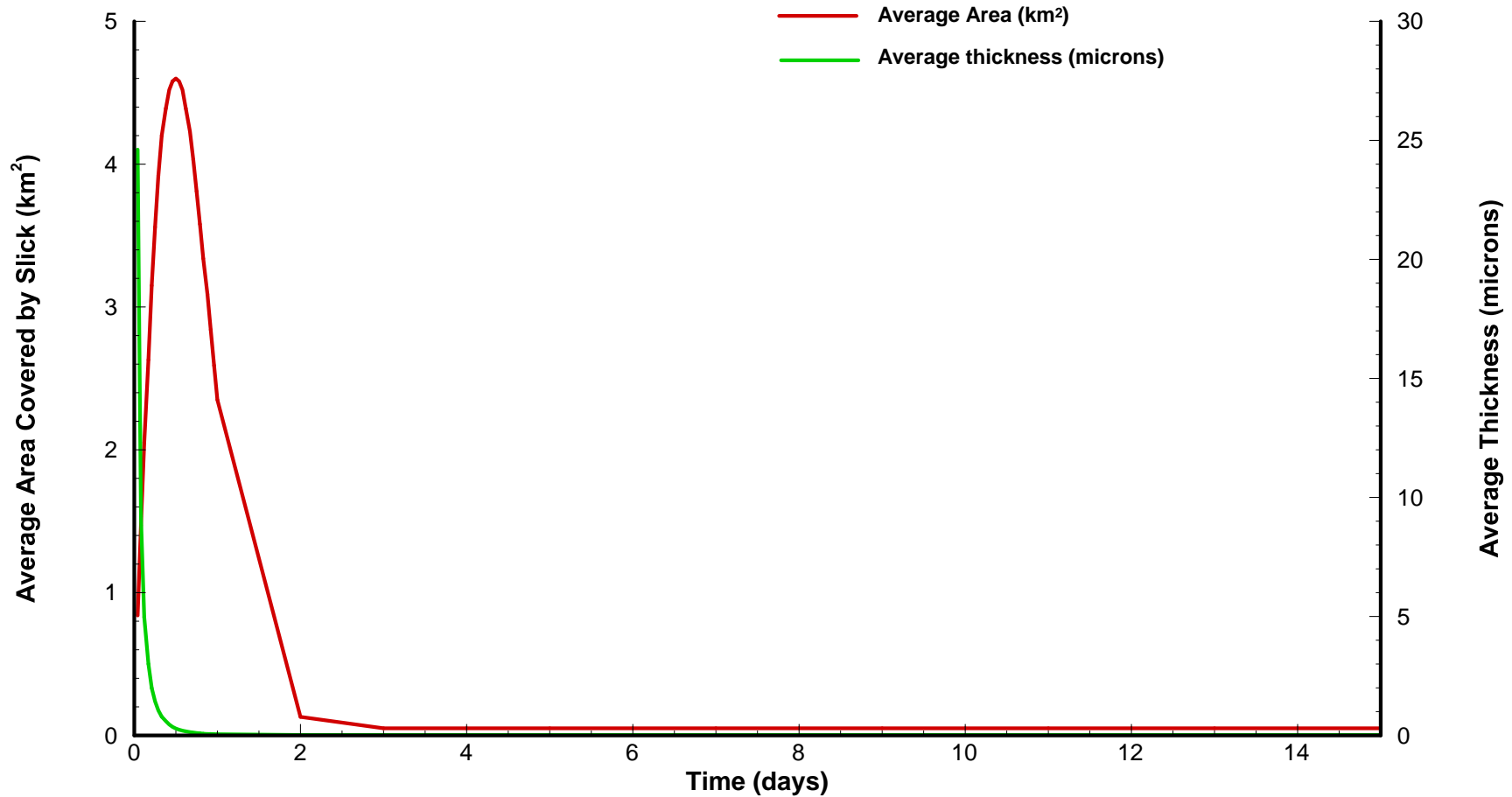


TRANS MOUNTAIN OIL SPILL STUDY

Stochastic Simulation Summer 2012, Site A Minor Components of the Mass Balance

PROJECT NO. V13203022	DWN AH	CKD JAS	APVD -	REV 0
OFFICE EBA-VANC	DATE October 16, 2013			

Figure A.3-10



NOTES

- Statistical results based on independent spills occurring every 3 hours from July 01 00:00 to September 30 23:00.
- The average thickness is based on a full coverage of each grid cell that contains oil.

STATUS
ISSUED FOR USE

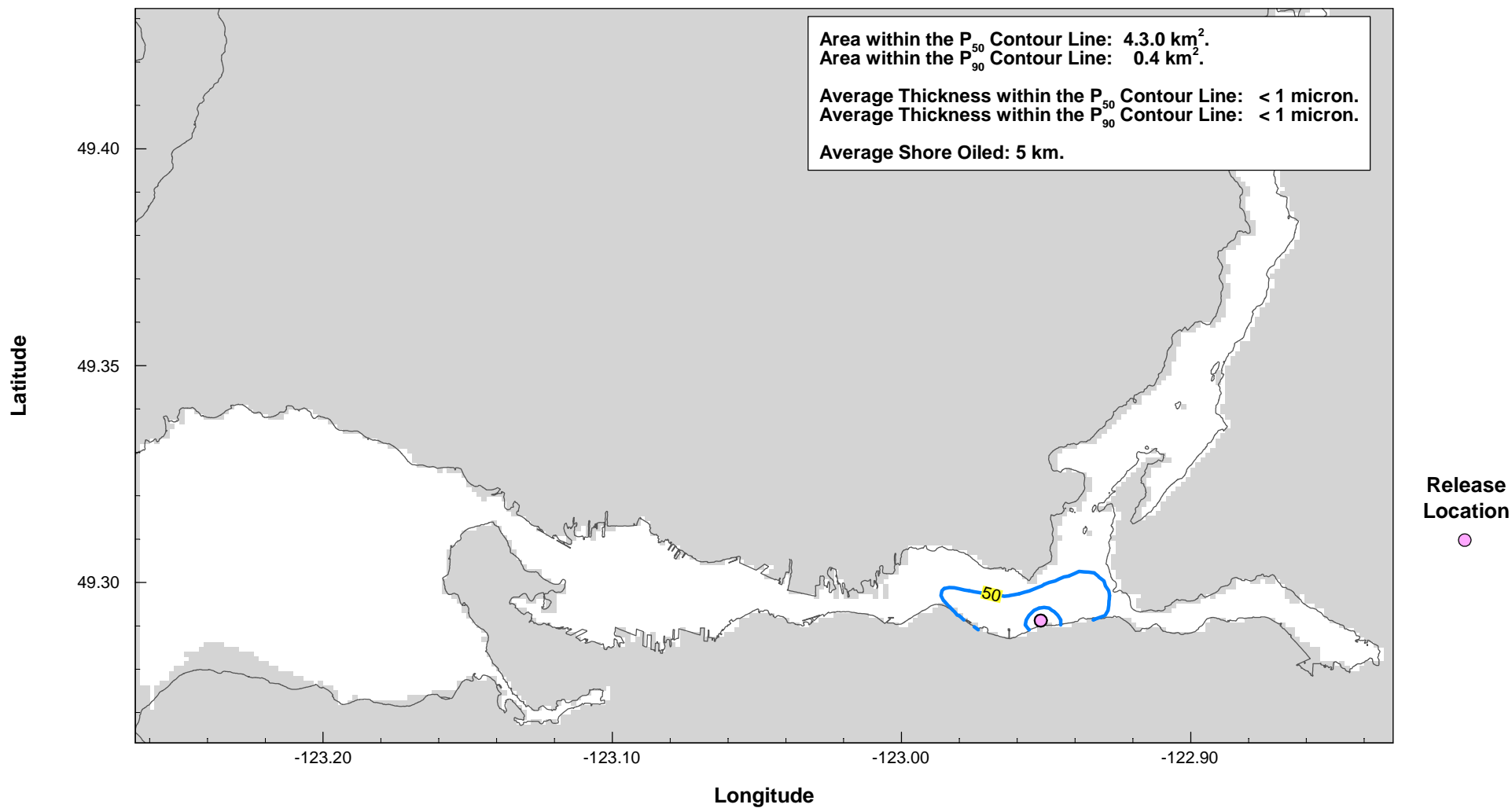
CLIENT



TRANS MOUNTAIN OIL SPILL STUDY

Stochastic Simulation Summer 2012, Site A Statistics on Area and Thickness

PROJECT NO. V13203022	DWN AH	CKD JAS	APVD -	REV 0	Figure A.3-11
OFFICE EBA-VANC	DATE October 16, 2013				



NOTES

- Statistical results based on independent spills occurring every 3 hours from July 01 00:00 to September 30 23:00, for a total of 736 independant spills.

Probability of oil presence is the percentage of simulations in which oil was present at a given location, based on the 32 m³ that escaped the pre-deployed boom.

P_{50} : after 6 hours, there is a 50% probability for the area within the P_{50} contour line to have been contacted.
 P_{90} : after 6 hours, there is a 90% probability for the area within the P_{90} contour line to have been contacted.

- Tracking time for each spill was 6 hours.
- The average thickness is based on a full coverage of each grid cell that contains oil and within the contour line.

STATUS
ISSUED FOR USE

CLIENT



TRANS MOUNTAIN OIL SPILL STUDY

Stochastic Simulation Summer 2012, Site A P_{50} and P_{90} after 6 Hours

PROJECT NO.
V13203022

DWN
AH

CKD
JAS

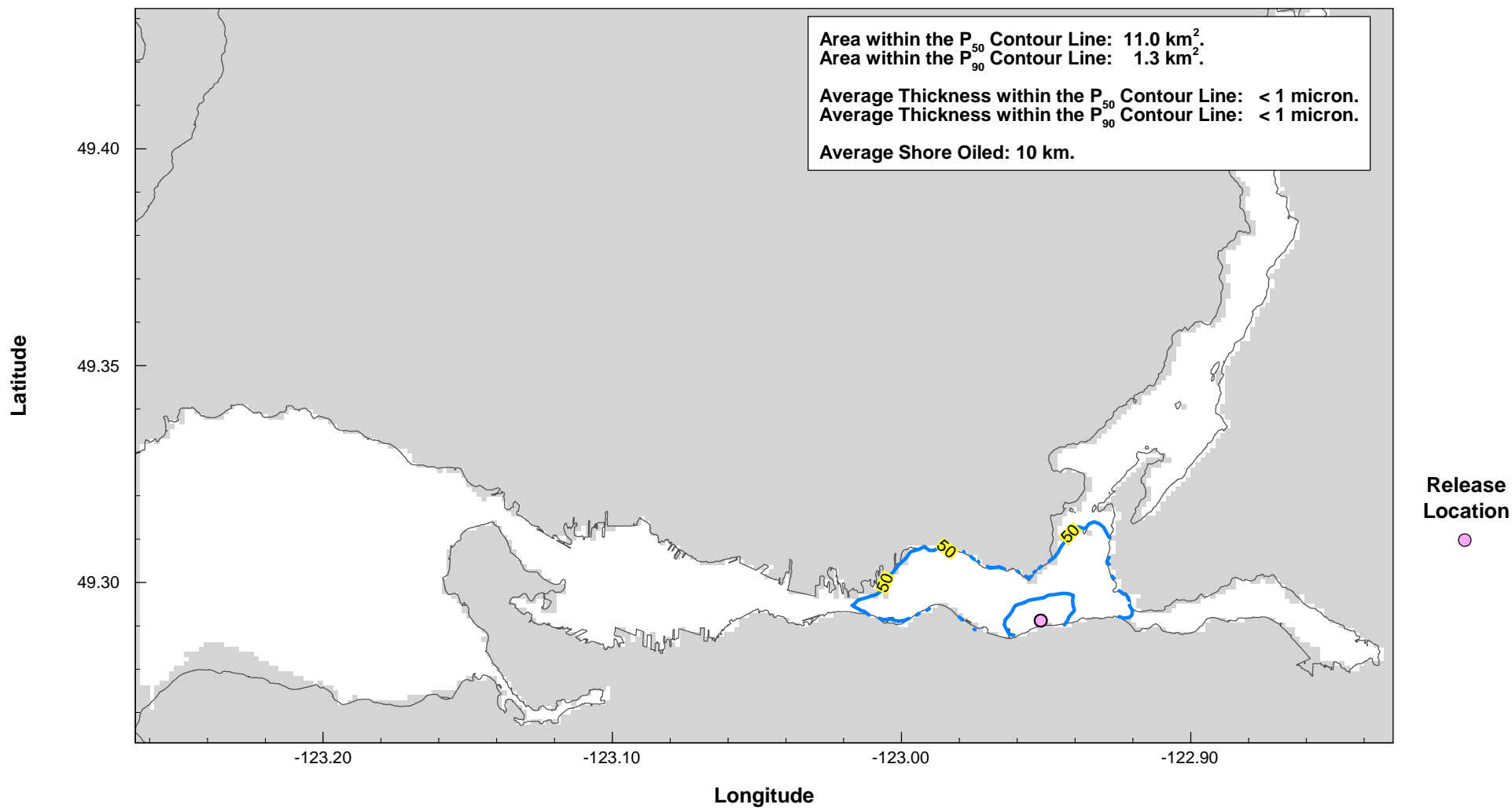
APVD
-

REV
0

OFFICE
EBA-VANC

DATE
October 16, 2013

Figure A.3-12



NOTES

- Statistical results based on independent spills occurring every 3 hours from July 01 00:00 to September 30 23:00, for a total of 736 independent spills.

Probability of oil presence is the percentage of simulations in which oil was present at a given location, based on the 32 m³ that escaped the pre-deployed boom.

P_{50} : after 12 hours, there is a 50% probability for the area within the P_{50} contour line to have been contacted.
 P_{90} : after 12 hours, there is a 90% probability for the area within the P_{90} contour line to have been contacted.

- Tracking time for each spill was 12 hours.

- The average thickness is based on a full coverage of each grid cell that contains oil and within the contour line.

STATUS
ISSUED FOR USE

CLIENT



TRANS MOUNTAIN OIL SPILL STUDY

Stochastic Simulation Summer 2012, Site A P_{50} and P_{90} after 12 Hours

PROJECT NO.
V13203022

DWN
AH

CKD
JAS

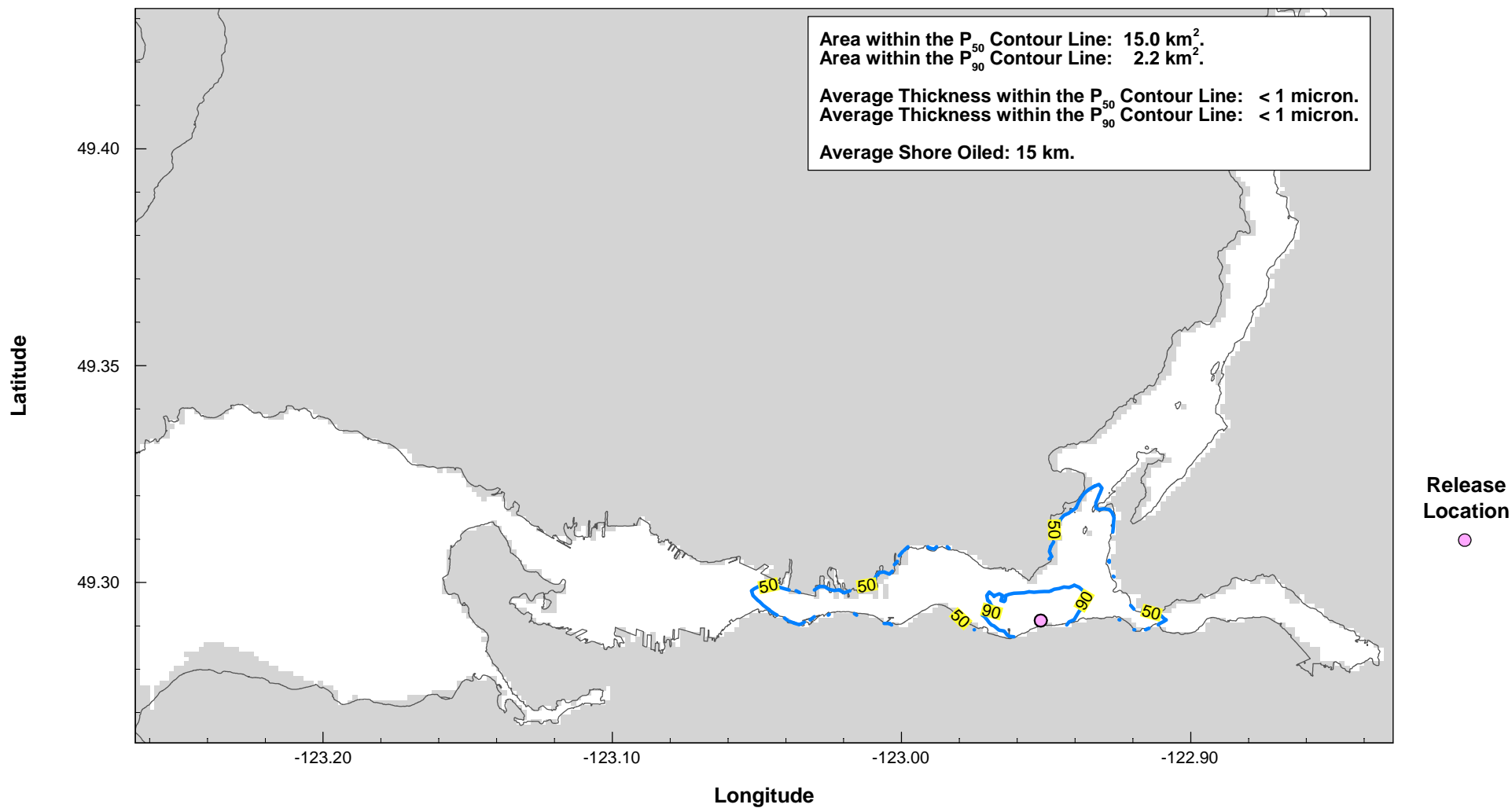
APVD
-

REV
0

OFFICE
EBA-VANC

DATE
October 16, 2013

Figure A.3-13



NOTES

- Statistical results based on independent spills occurring every 3 hours from July 01 00:00 to September 30 23:00, for a total of 736 independent spills.

Probability of oil presence is the percentage of simulations in which oil was present at a given location, based on the 32 m³ that escaped the pre-deployed boom.

P_{50} : after 24 hours, there is a 50% probability for the area within the P_{50} contour line to have been contacted.
 P_{90} : after 24 hours, there is a 90% probability for the area within the P_{90} contour line to have been contacted.

- Tracking time for each spill was 24 hours.

- The average thickness is based on a full coverage of each grid cell that contains oil and within the contour line.

STATUS
ISSUED FOR USE

CLIENT



TRANS MOUNTAIN OIL SPILL STUDY

Stochastic Simulation Summer 2012, Site A P_{50} and P_{90} after 24 Hours

PROJECT NO.
V13203022

DWN
AH

CKD
JAS

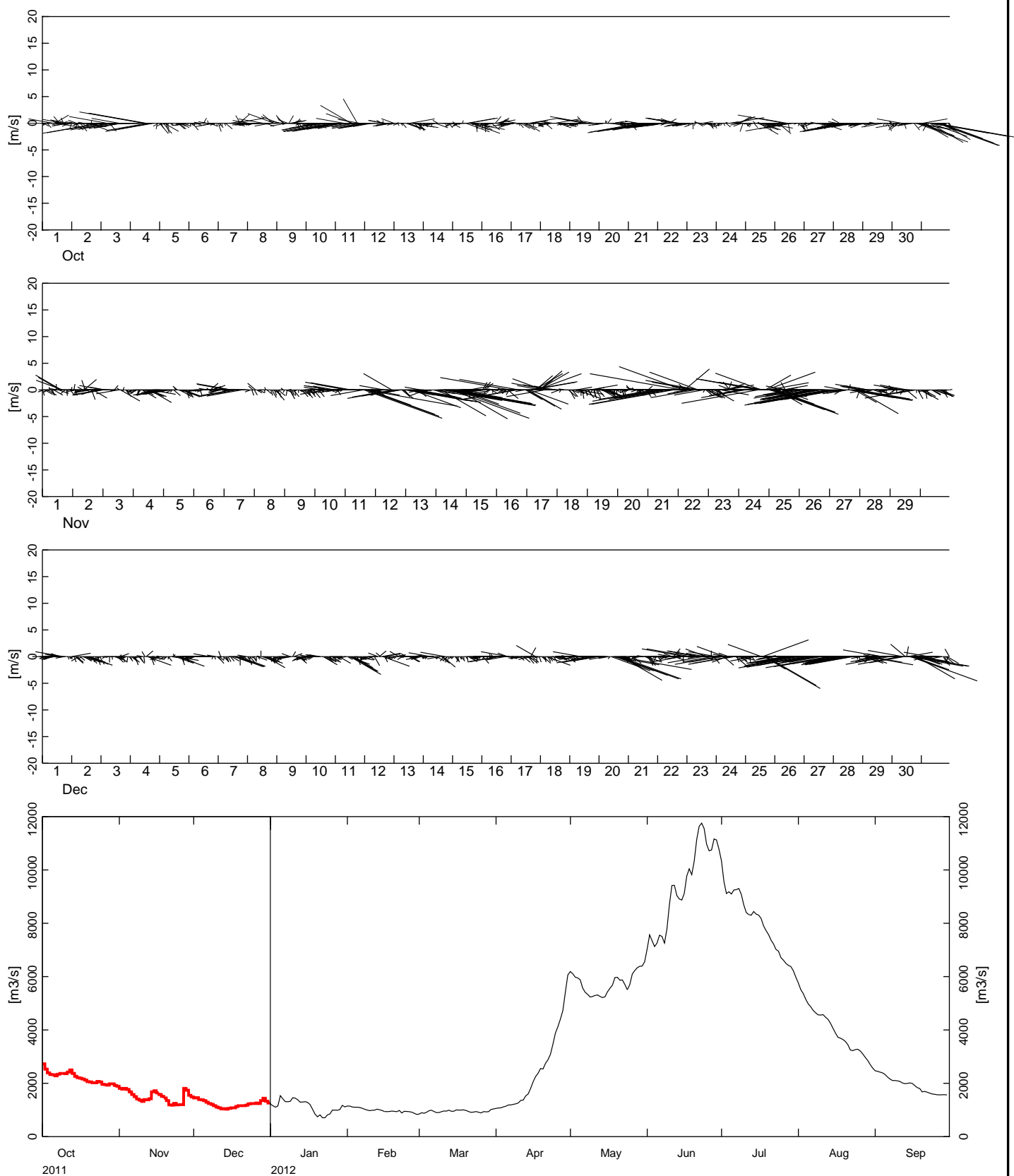
APVD
-

REV
0

OFFICE
EBA-VANC

DATE
October 16, 2013

Figure A.3-14



NOTES

- The wind stick represent winds at Point Atkinson.
- The bottom graph represents the Fraser River discharge at Hope.

STATUS
ISSUED FOR USE

CLIENT

TRANS MOUNTAIN



TRANS MOUNTAIN OIL SPILL STUDY

Environmental Conditions: Fall 2011 Site A
Stochastic Modelling

PROJECT NO.
V13203022

OFFICE
EBA-VANC

DWN
AH

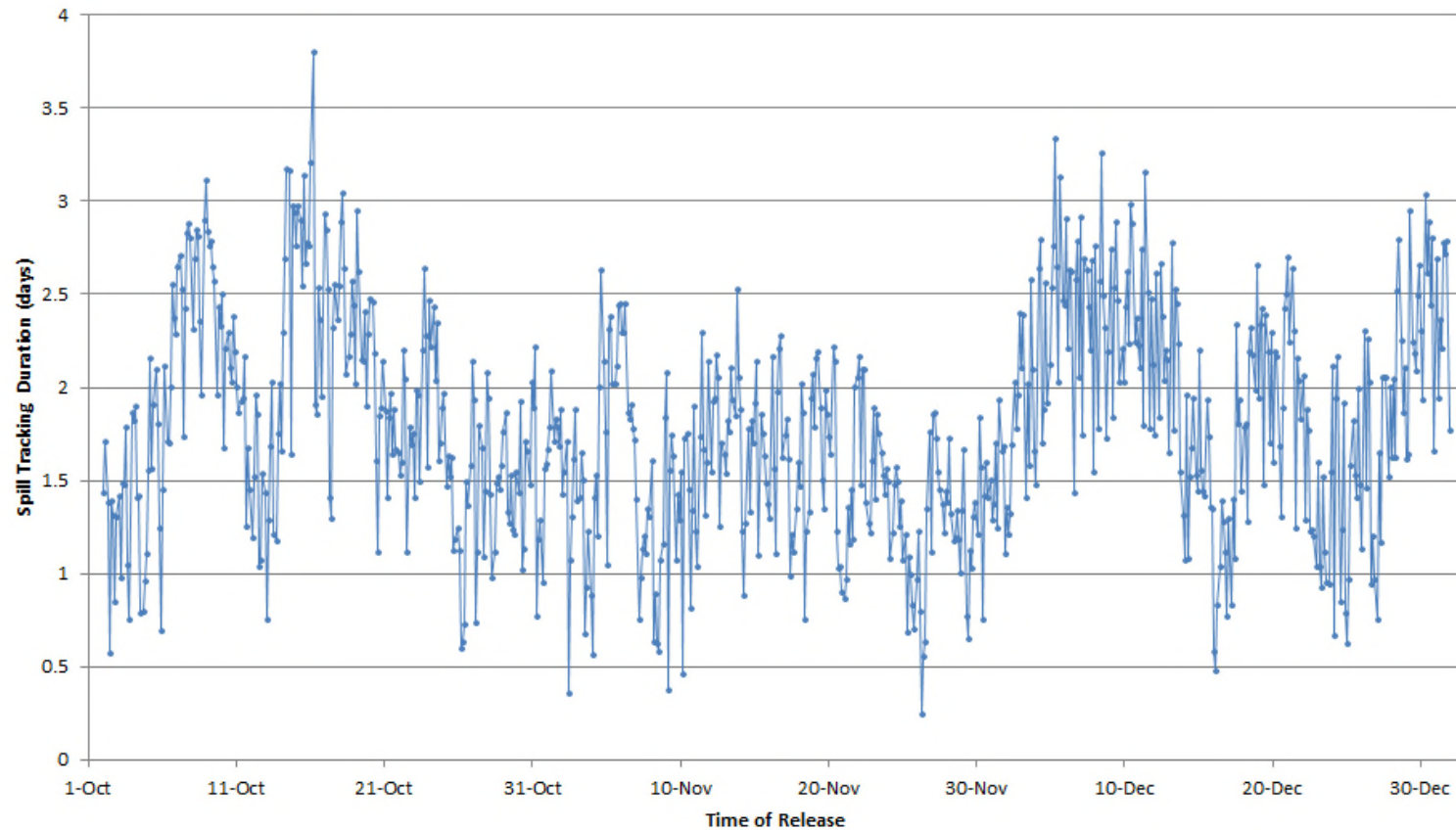
CHK
JAS

APVD
JAS

REV
0

DATE
August 2013

Figure A.4-1



NOTES

- The tracking time of each independant spill varied, based on the time necessary for the oil to be cleared out of water.
- This graph does not reflect the quantity of oil present in water.

STATUS
ISSUED FOR USE

CLIENT



TRANS MOUNTAIN OIL SPILL STUDY

Stochastic Simulation Fall 2011, Site A Duration of Simulation

PROJECT NO.
V13203022

DWN
AH

CKD
JAS

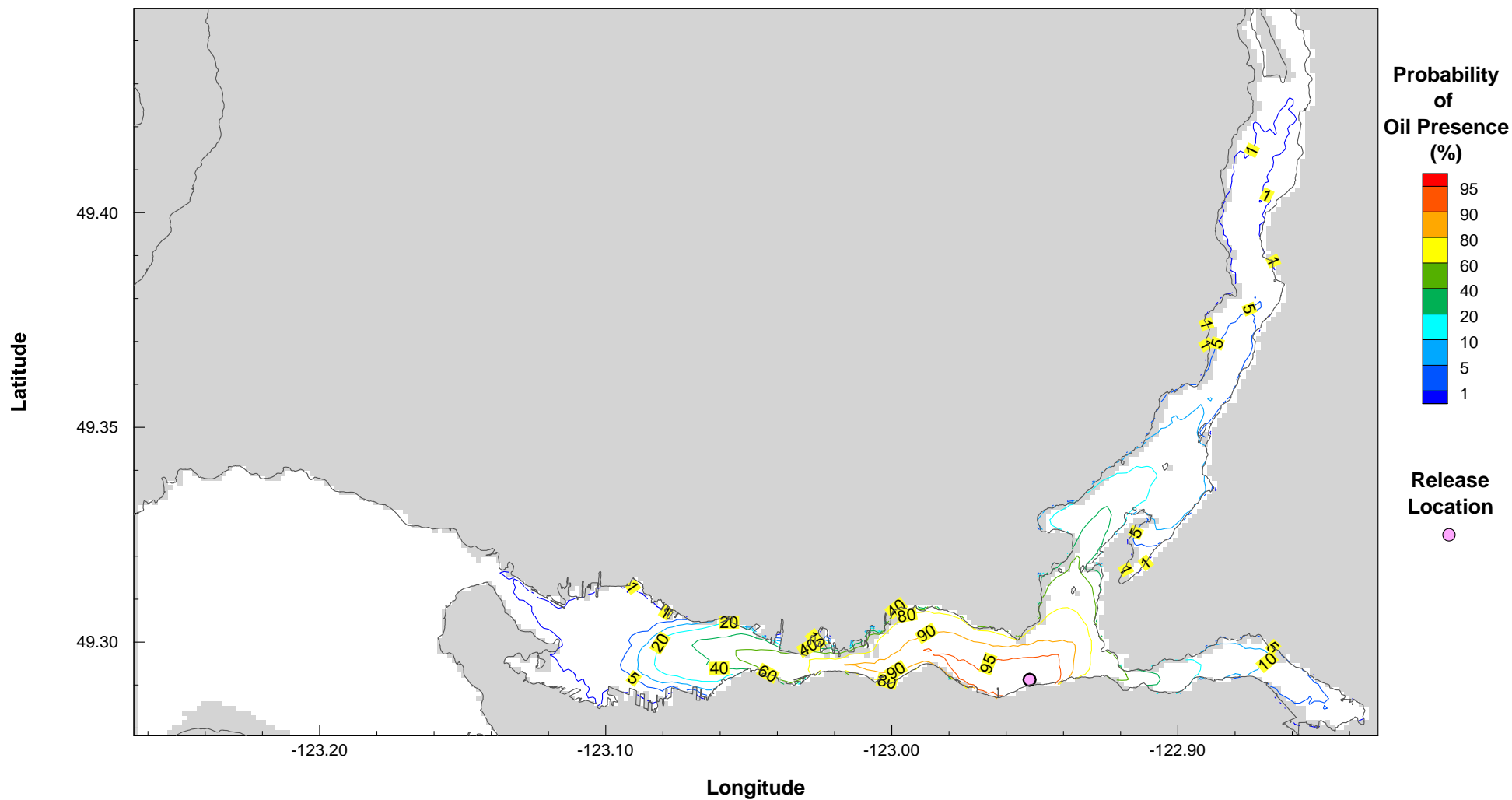
APVD
-

REV
0

OFFICE
EBA-VANC

DATE
August 26, 2013

Figure A.4-2



NOTES

- Statistical results based on independent spills occurring every 3 hours from October 01 01:00 to December 31 23:00, for a total of 728 independent spills.
- Probability of oil presence is the percentage of simulations in which oil was present at a given location.
- Spills were tracked until no oil left on water. Tracking time for each spill varied, based on the duration of oil on water.
- A 32 m³ release was modelled, corresponding to a 160 m³ operational spill at berth with 20%, i.e. 32 m³ distribution across the spill boom.

STATUS
ISSUED FOR USE

CLIENT

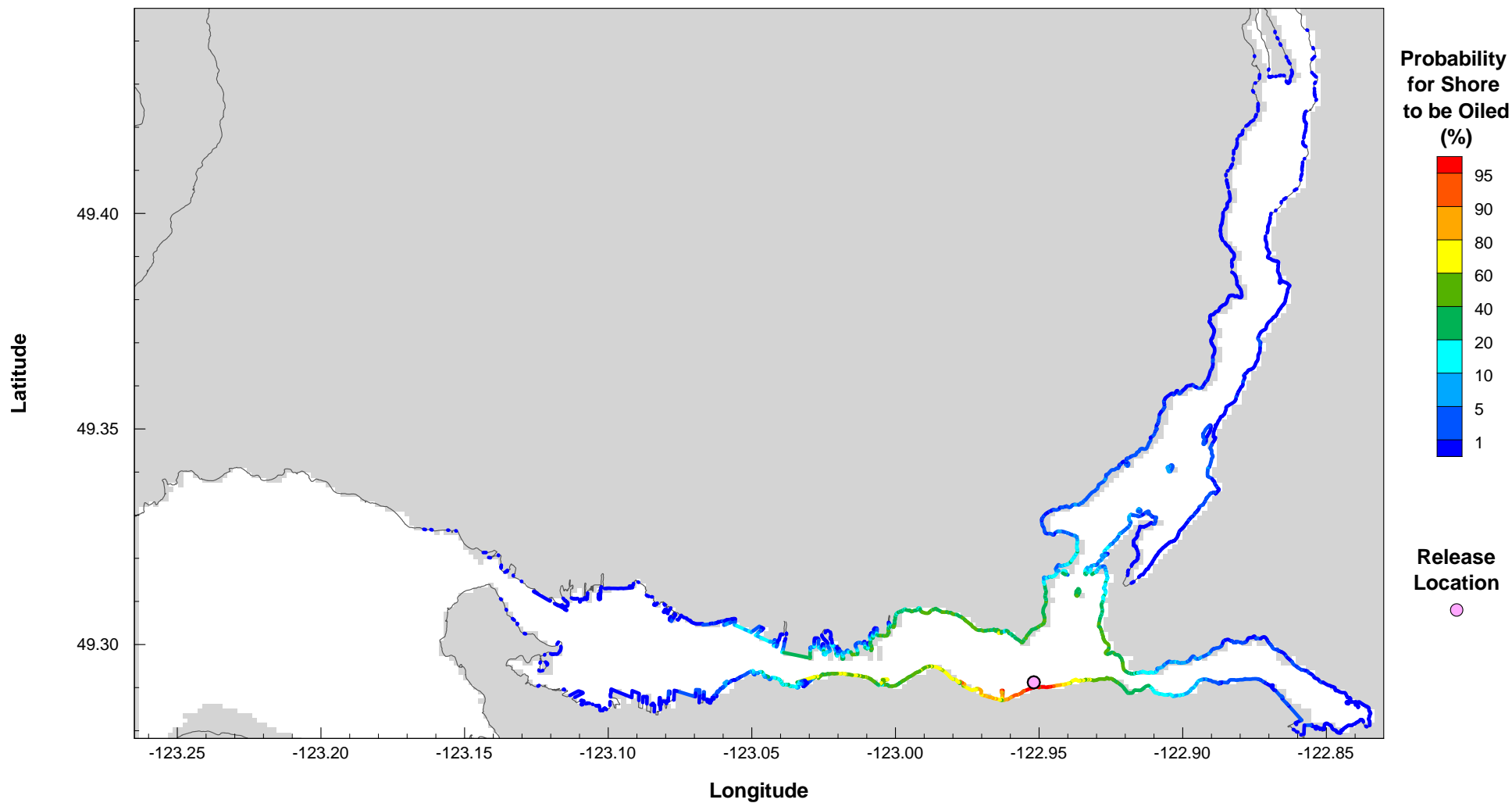


TRANS MOUNTAIN OIL SPILL STUDY

Stochastic Simulation Fall 2011, Site A Probability of Oil Presence

PROJECT NO. V13203022	DWN AH	CKD JAS	APVD -	REV 0
OFFICE EBA-VANC	DATE August 21, 2013			

Figure A.4-3



NOTES

- Statistical results based on independent spills occurring every 3 hours from October 01 01:00 to December 31 23:00, for a total of 728 independent spills.
- Probability of oil presence is the percentage of simulations in which oil was present at a given location.
- Spills were tracked until no oil left on water. Tracking time for each spill varied, based on the duration of oil on water.
- A 32 m³ release was modelled, corresponding to a 160 m³ operational spill at berth with 20%, i.e. 32 m³ distribution across the spill boom.

STATUS
ISSUED FOR USE

CLIENT

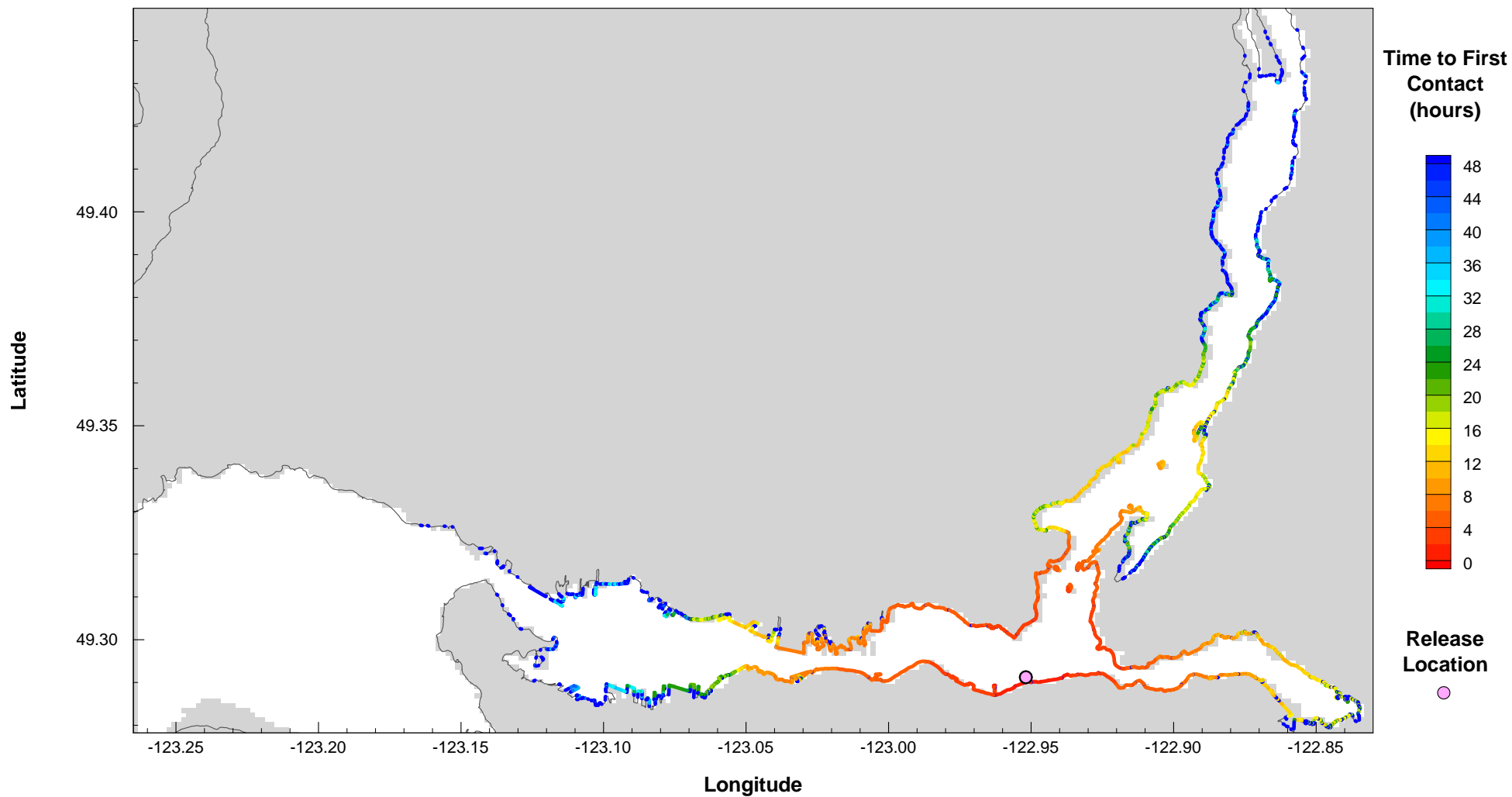


TRANS MOUNTAIN OIL SPILL STUDY

Stochastic Simulation Fall 2011, Site A Shoreline Oiled Probability

PROJECT NO. V13203022	DWN AH	CKD JAS	APVD -	REV 0
OFFICE EBA-VANC	DATE August 21, 2013			

Figure A.4-4



NOTES

- Statistical results based on independent spills occurring every 3 hours from October 01 01:00 to December 31 23:00, for a total of 728 independent spills.
- Time to first contact is the minimum time, over all simulations, for oil to reach a given shore segment.
- Spills were tracked until no oil left on water. Tracking time for each spill varied, based on the duration of oil on water.
- A 32 m³ release was modelled, corresponding to a 160 m³ operational spill at berth with 20%, i.e. 32 m³ distribution across the spill boom.

STATUS
ISSUED FOR USE

CLIENT

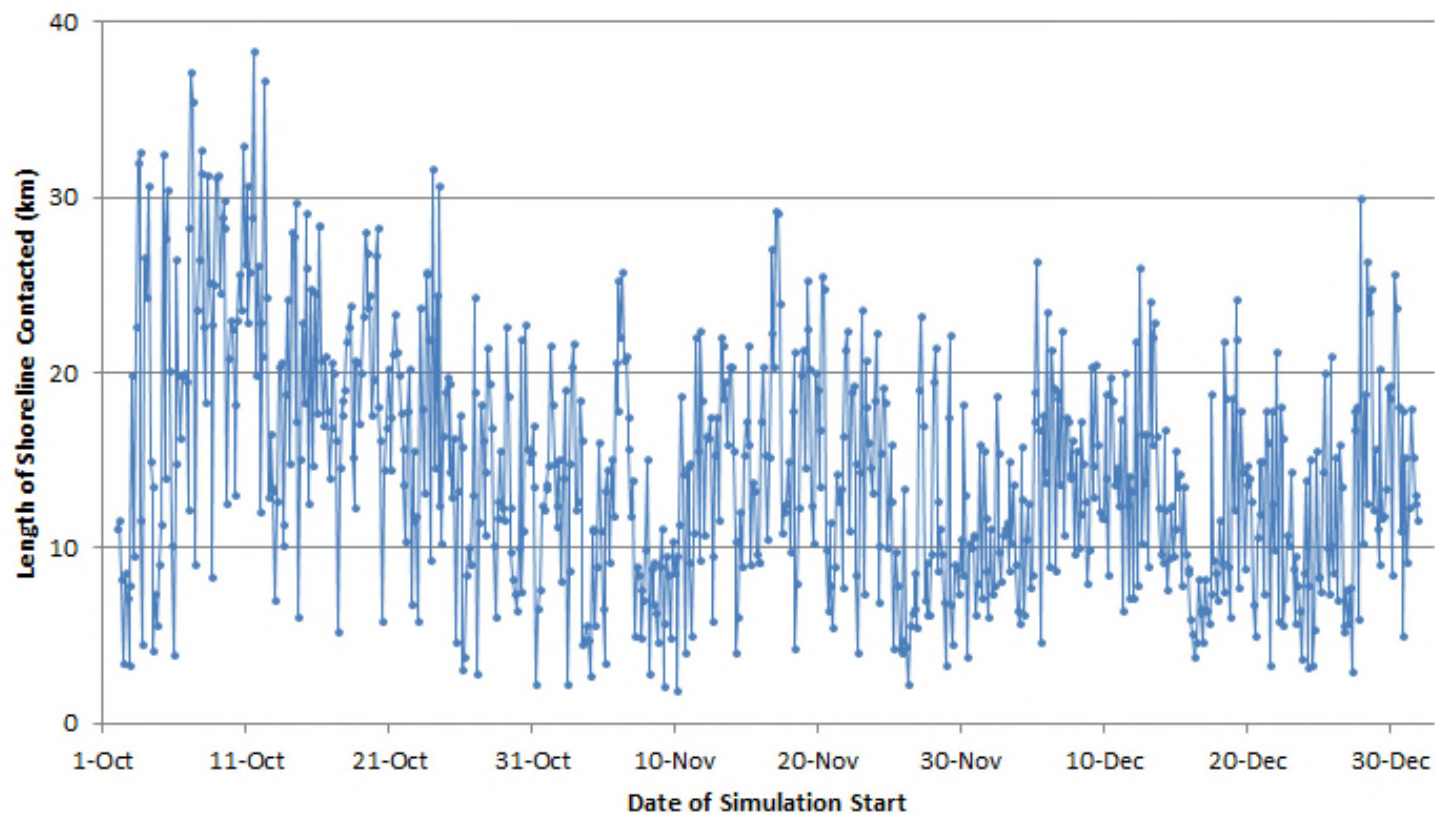


TRANS MOUNTAIN OIL SPILL STUDY

Stochastic Simulation Fall 2011, Site A Shoreline Time to First Contact

PROJECT NO. V13203022	DWN AH	CKD JAS	APVD -	REV 0
OFFICE EBA-VANC	DATE August 21, 2013			

Figure A.4-5



NOTES

- Statistical results based on independent spills occurring every 3 hours from October 01 01:00 to December 31 23:00, for a total of 728 independant spills.
- Tracking time for each spill was a maximum of 15 days.

STATUS
ISSUED FOR USE

CLIENT

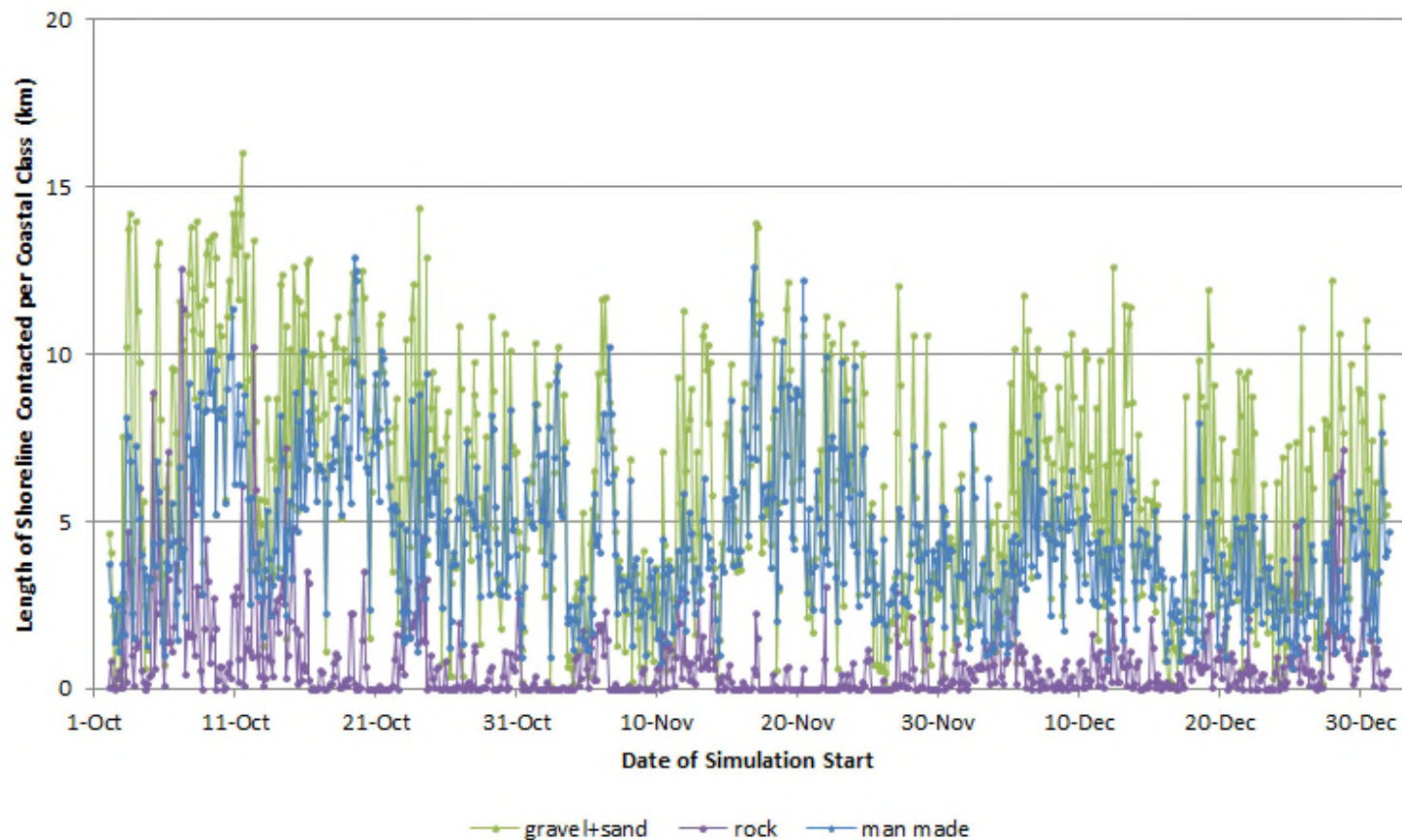


TRANS MOUNTAIN OIL SPILL STUDY

Stochastic Simulation Fall 2011, Site A Length of Shoreline Contacted

PROJECT NO. V13203022	DWN AH	CKD JAS	APVD -	REV 0
OFFICE EBA-VANC	DATE August 6, 2013			

Figure A.4-6



NOTES

- Statistical results based on independent spills occurring every 3 hours from October 01 01:00 to December 31 23:00, for a total of 728 independent spills.
- Tracking time for each spill was a maximum of 15 days.

STATUS
ISSUED FOR USE

CLIENT



TRANS MOUNTAIN OIL SPILL STUDY

Stochastic Simulation - Fall 2011 Site A Length of Shoreline Contacted Per Coastal Class

PROJECT NO.
V13203022

DWN
AH

CKD
JAS

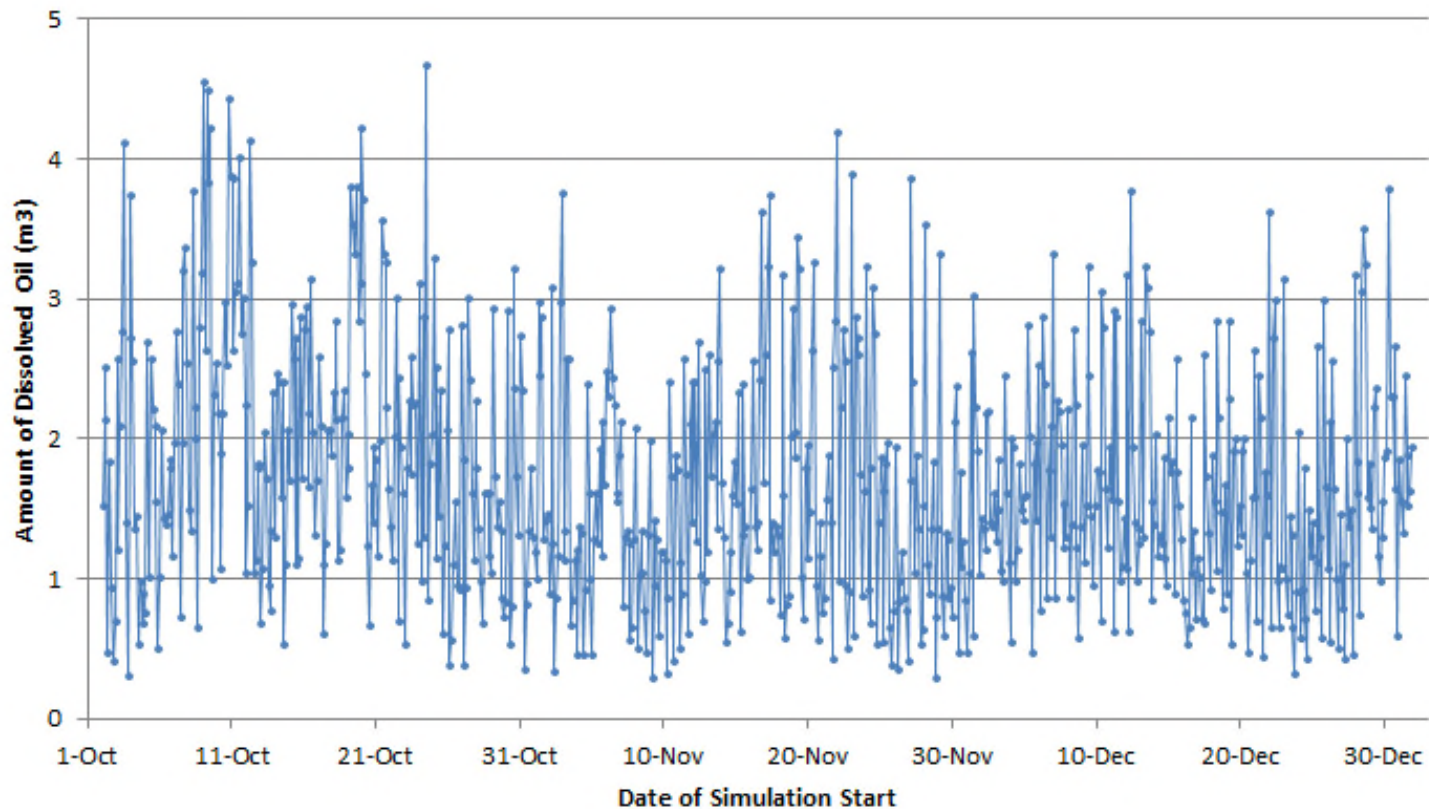
APVD
-

REV
0

OFFICE
EBA-VANC

DATE
August 22, 2013

Figure A.4-7



NOTES

- Statistical results based on independent spills occurring every 3 hours from October 01 01:00 to December 31 23:00, for a total of 728 independant spills.
- Tracking time for each spill was a maximum of 15 days.

STATUS
ISSUED FOR USE

CLIENT



TRANS MOUNTAIN OIL SPILL STUDY

Stochastic Simulation Fall 2011, Site A Amount of Dissolved Oil

PROJECT NO.
V13203022

DWN
AH

CKD
JAS

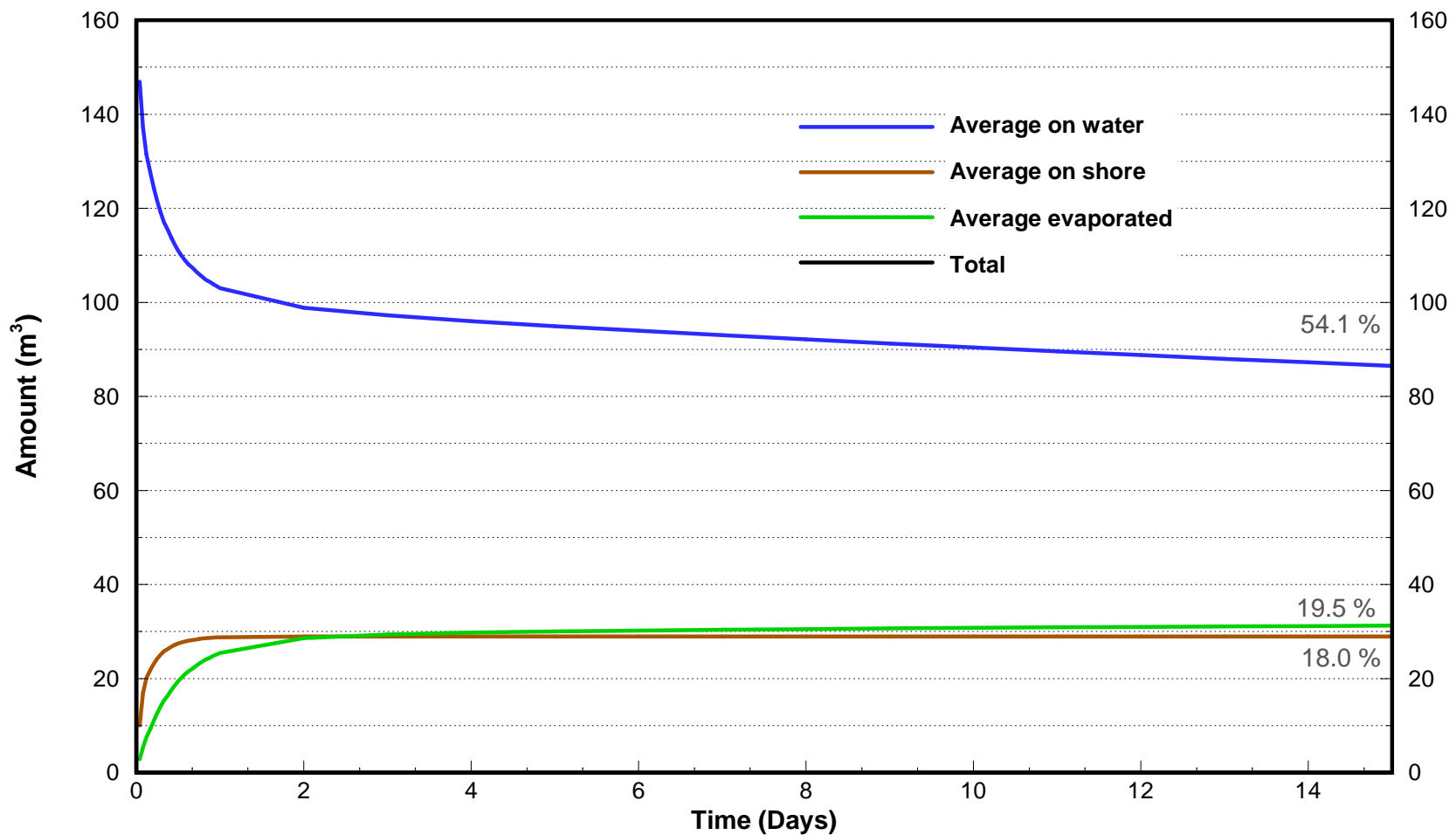
APVD
-

REV
0

OFFICE
EBA-VANC

DATE
August 7, 2013

Figure A.4-8



NOTES

- Statistical results based on independent spills occurring every 3 hours from October 01 01:00 to December 31 23:00, for a total of 728 independant spills.
- Tracking time for each spill was a maximum of 15 days.
- The major components of the mass balance are shown above.

STATUS
ISSUED FOR USE

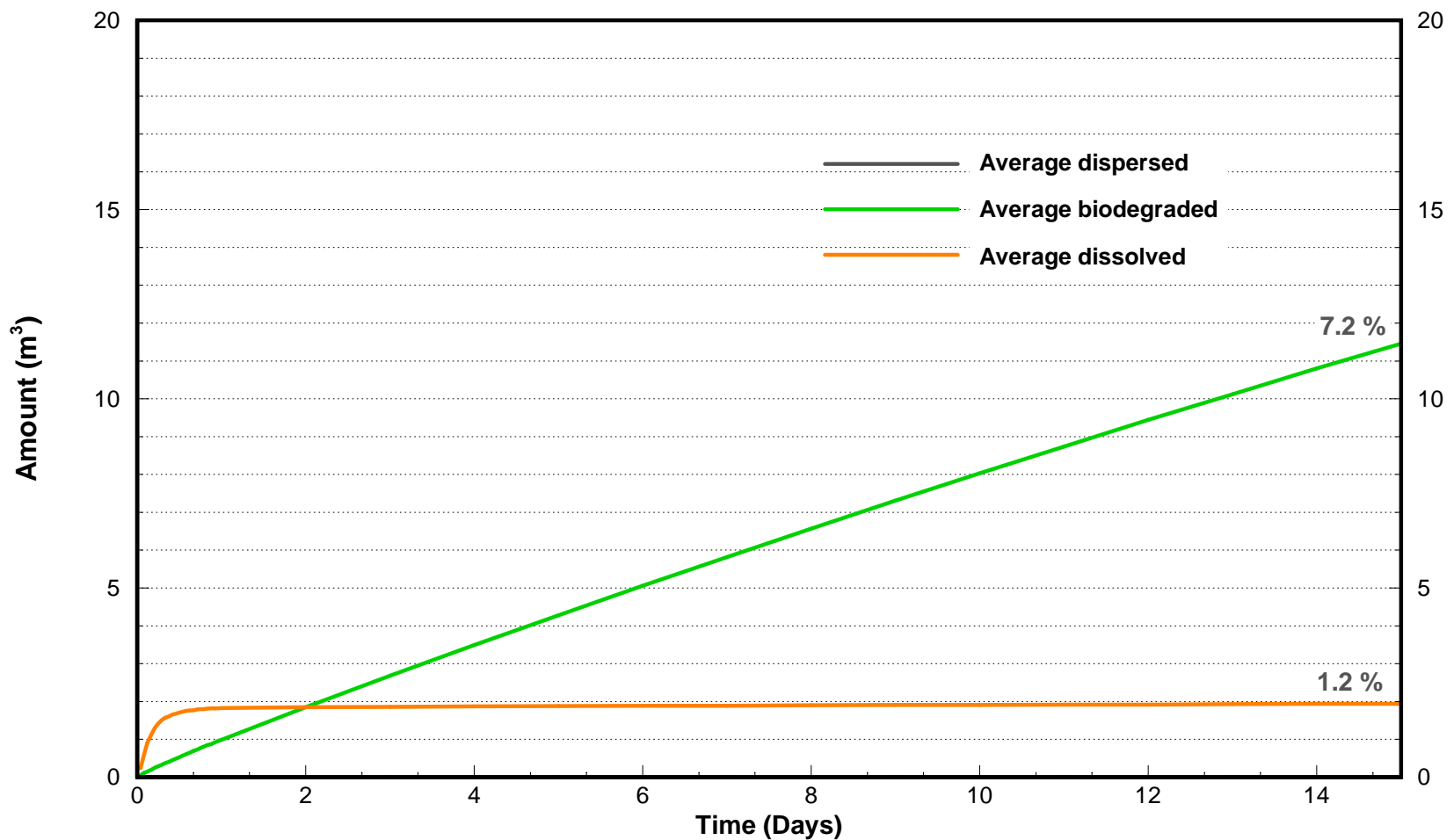
CLIENT



TRANS MOUNTAIN OIL SPILL STUDY

Stochastic Simulation Fall 2011, Site A Major Components of the Mass Balance

PROJECT NO. V13203022	DWN AH	CKD JAS	APVD -	REV 0	Figure A.4-9
OFFICE EBA-VANC	DATE August 22, 2013				



NOTES

- Statistical results based on independent spills occurring every 3 hours from October 01 01:00 to December 31 23:00, for a total of 728 independant spills.
- Tracking time for each spill was a maximum of 15 days.
- The minor components of the mass balance are shown above.

STATUS
ISSUED FOR USE

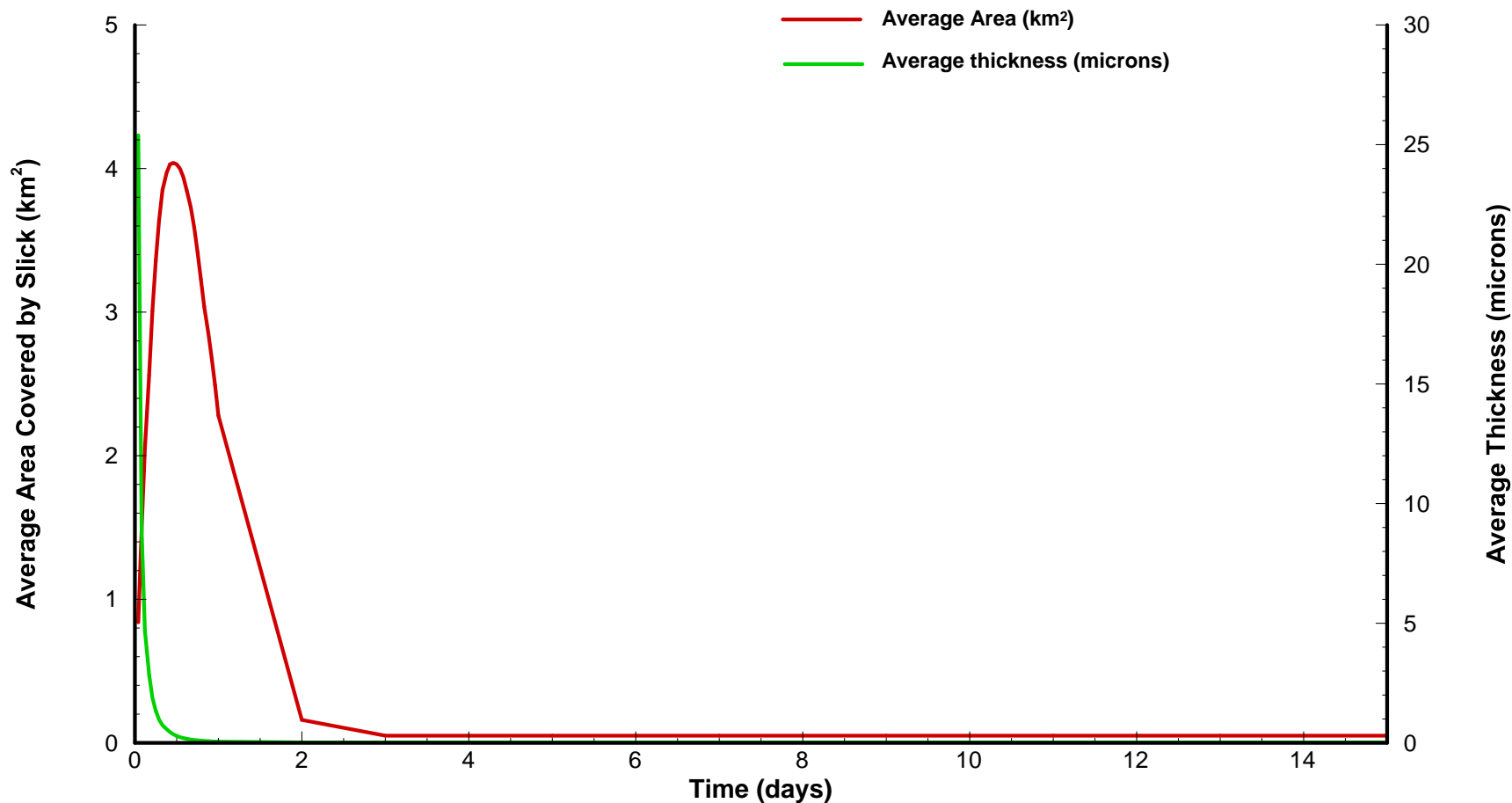
CLIENT



TRANS MOUNTAIN OIL SPILL STUDY

Stochastic Simulation Fall 2011, Site A Minor Components of the Mass Balance

PROJECT NO. V13203022	DWN AH	CKD JAS	APVD -	REV 0	Figure A.4-10
OFFICE EBA-VANC	DATE August 22, 2013				



NOTES

- Statistical results based on independent spills occurring every 3 hours from October 01 01:00 to December 31 23:00, for a total of 728 independent spills.
- The average thickness is based on a full coverage of each grid cell that contains oil.

STATUS
ISSUED FOR USE

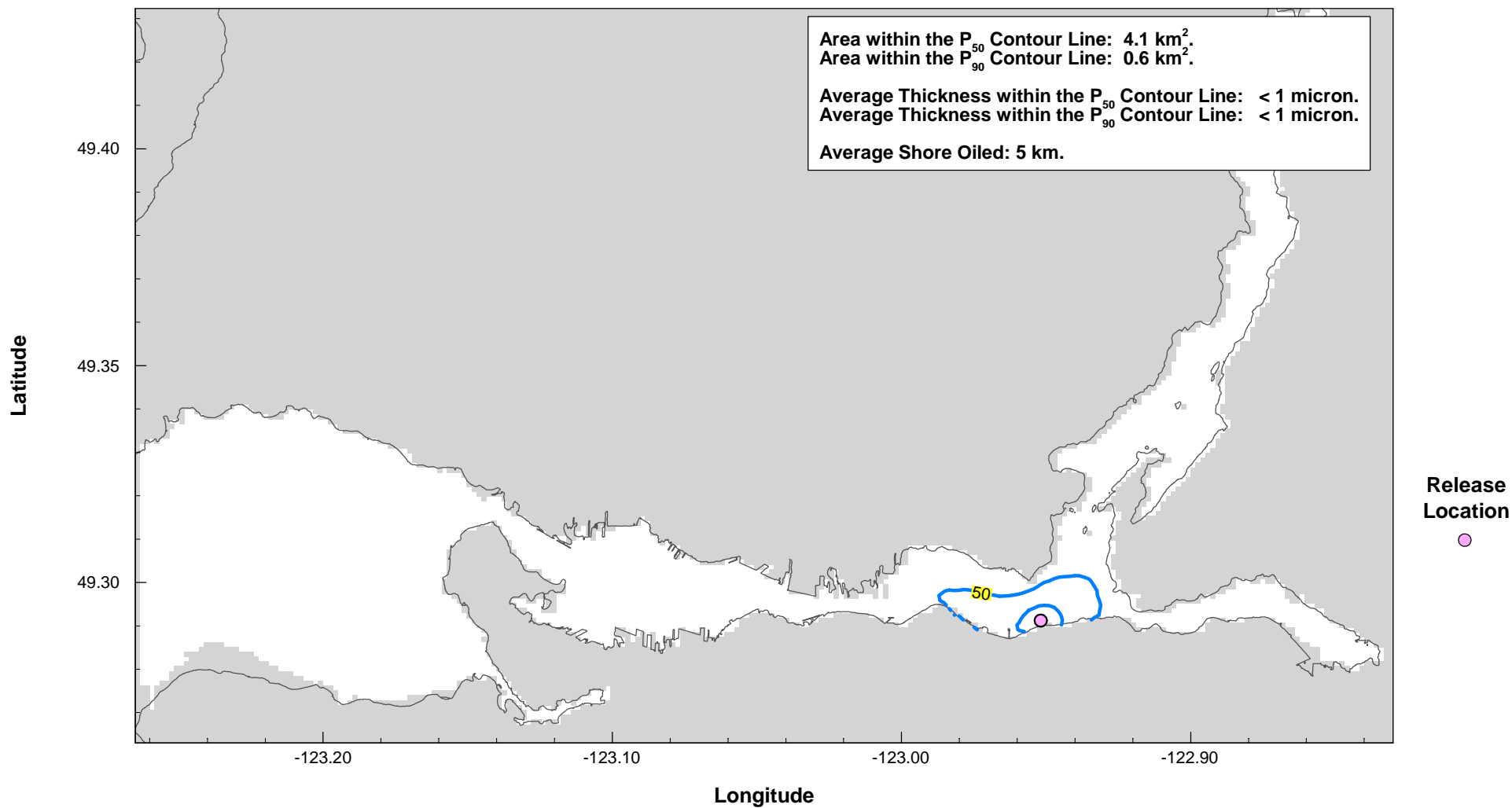
CLIENT



TRANS MOUNTAIN OIL SPILL STUDY

Stochastic Simulation Fall 2011, Site A Statistics on Area and Thickness

PROJECT NO. V13203022	DWN AH	CKD JAS	APVD -	REV 0	Figure A.4-11
OFFICE EBA-VANC	DATE August 26, 2013				



NOTES

- Statistical results based on independent spills occurring every 3 hours from October 01 00:00 to December 31 23:00, for a total of 736 independent spills.

Probability of oil presence is the percentage of simulations in which oil was present at a given location, based on the 32 m³ that escaped the pre-deployed boom.

P_{50} : after 6 hours, there is a 50% probability for the area within the P_{50} contour line to have been contacted.
 P_{90} : after 6 hours, there is a 90% probability for the area within the P_{90} contour line to have been contacted.

- Tracking time for each spill was 6 hours.

- The average thickness is based on a full coverage of each grid cell that contains oil and within the contour line.

**STATUS
ISSUED FOR USE**

CLIENT



TRANS MOUNTAIN OIL SPILL STUDY

Stochastic Simulation Fall 2011, Site A P_{50} and P_{90} after 6 Hours

PROJECT NO.
V13203022

OFFICE
EBA-VANC

DWN
AH

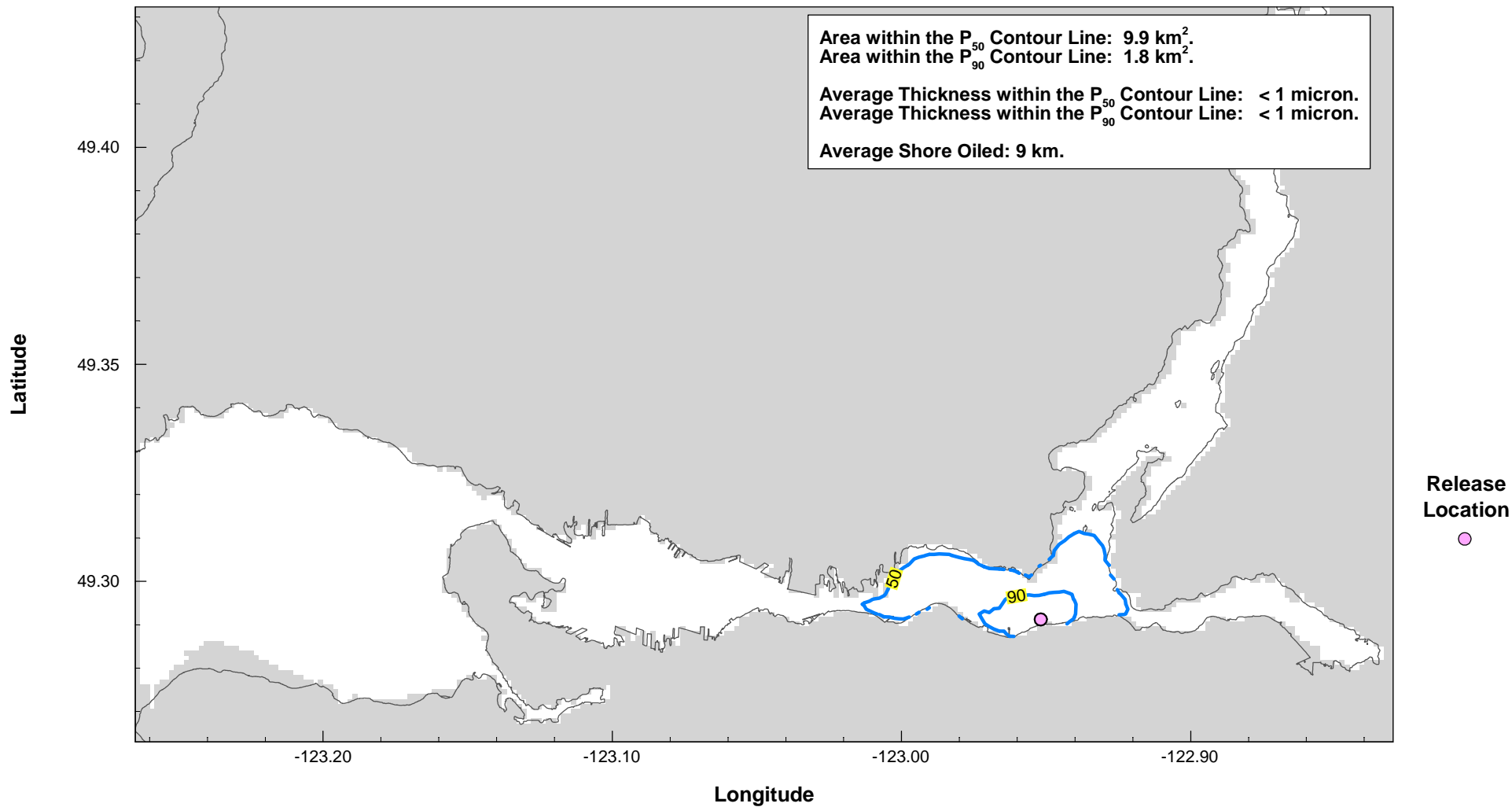
CKD
JAS

APVD
-

REV
0

DATE
October 16, 2013

Figure A.4-12



NOTES

- Statistical results based on independent spills occurring every 3 hours from October 01 00:00 to December 31 23:00, for a total of 736 independent spills.

Probability of oil presence is the percentage of simulations in which oil was present at a given location, based on the 32 m³ that escaped the pre-deployed boom.

P_{50} : after 12 hours, there is a 50% probability for the area within the P_{50} contour line to have been contacted.
 P_{90} : after 12 hours, there is a 90% probability for the area within the P_{90} contour line to have been contacted.

- Tracking time for each spill was 12 hours.

- The average thickness is based on a full coverage of each grid cell that contains oil and within the contour line.

STATUS
ISSUED FOR USE

CLIENT



TRANS MOUNTAIN OIL SPILL STUDY

Stochastic Simulation Fall 2011, Site A P_{50} and P_{90} after 12 Hours

PROJECT NO.
V13203022

DWN
AH

CKD
JAS

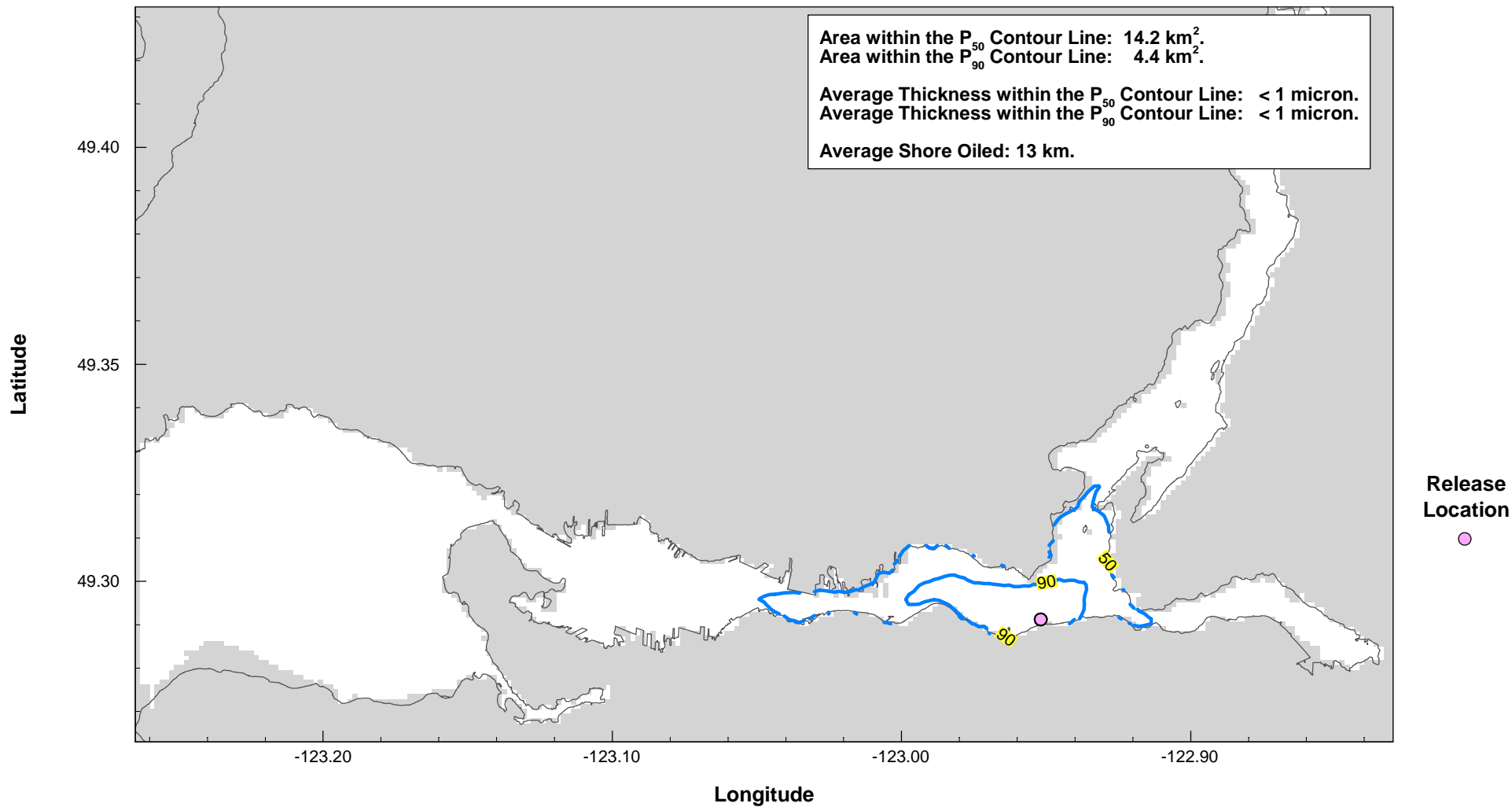
APVD
-

REV
0

OFFICE
EBA-VANC

DATE
October 16, 2013

Figure A.4-13



NOTES

- Statistical results based on independent spills occurring every 3 hours from October 01 00:00 to December 31 23:00, for a total of 736 independent spills.

Probability of oil presence is the percentage of simulations in which oil was present at a given location, based on the 32 m³ that escaped the pre-deployed boom.

P_{50} : after 24 hours, there is a 50% probability for the area within the P_{50} contour line to have been contacted.
 P_{90} : after 24 hours, there is a 90% probability for the area within the P_{90} contour line to have been contacted.

- Tracking time for each spill was 24 hours.

- The average thickness is based on a full coverage of each grid cell that contains oil and within the contour line.

**STATUS
ISSUED FOR USE**

CLIENT



TRANS MOUNTAIN OIL SPILL STUDY

Stochastic Simulation Fall 2011, Site A P_{50} and P_{90} after 24 Hours

PROJECT NO.
V13203022

DWN
AH

CKD
JAS

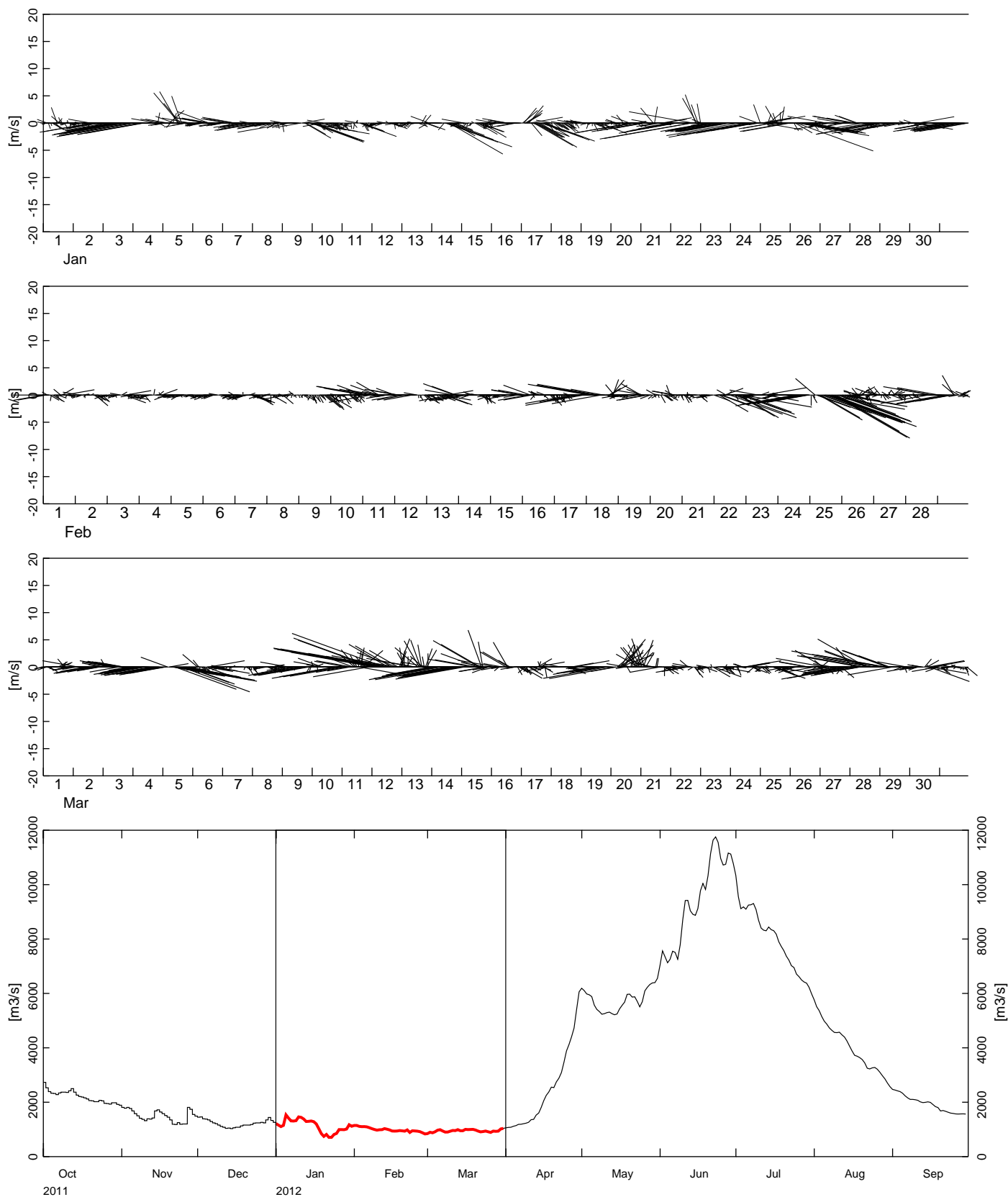
APVD
-

REV
0

OFFICE
EBA-VANC

DATE
October 16, 2013

Figure A.4-14



NOTES

- The wind stick represent winds at Point Atkinson.
- The bottom graph represents the Fraser River discharge at Hope.

STATUS
ISSUED FOR USE

CLIENT

TRANS MOUNTAIN



TRANS MOUNTAIN OIL SPILL STUDY

Environmental Conditions: Winter 2012 Site A
Stochastic Modelling

PROJECT NO.
V13203022

OFFICE
EBA-VANC

DWN
AH

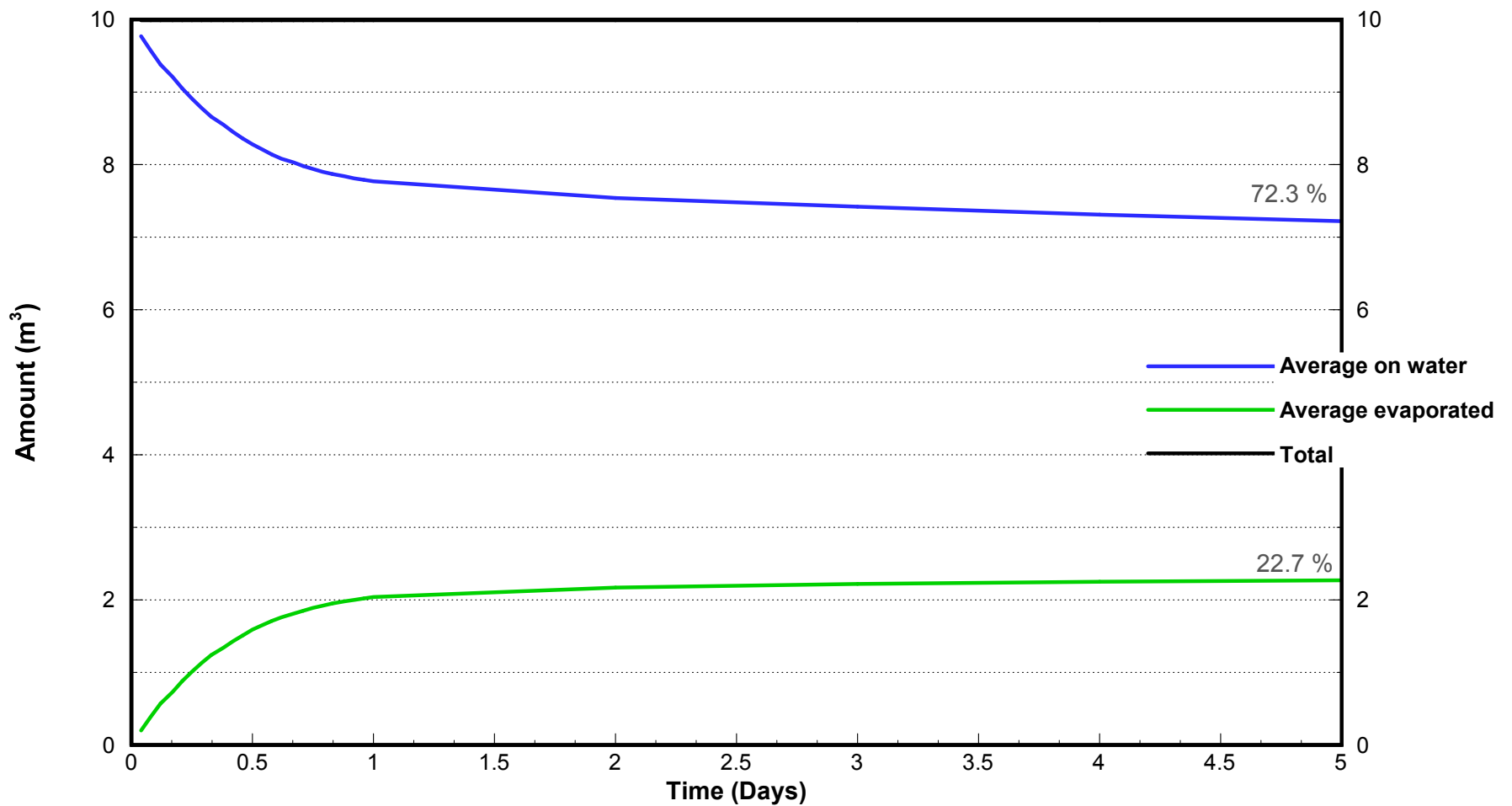
CHK
JAS

APVD
JAS

REV
0

DATE
August 2013

Figure A.1-1



NOTES

- Statistical results based on independent spills occurring every 6 hours from January 01 00:00 to March 31 23:00.
- Tracking time for each spill was 5 days.
- The major components of the mass balance are shown above.

STATUS
ISSUED FOR USE

CLIENT

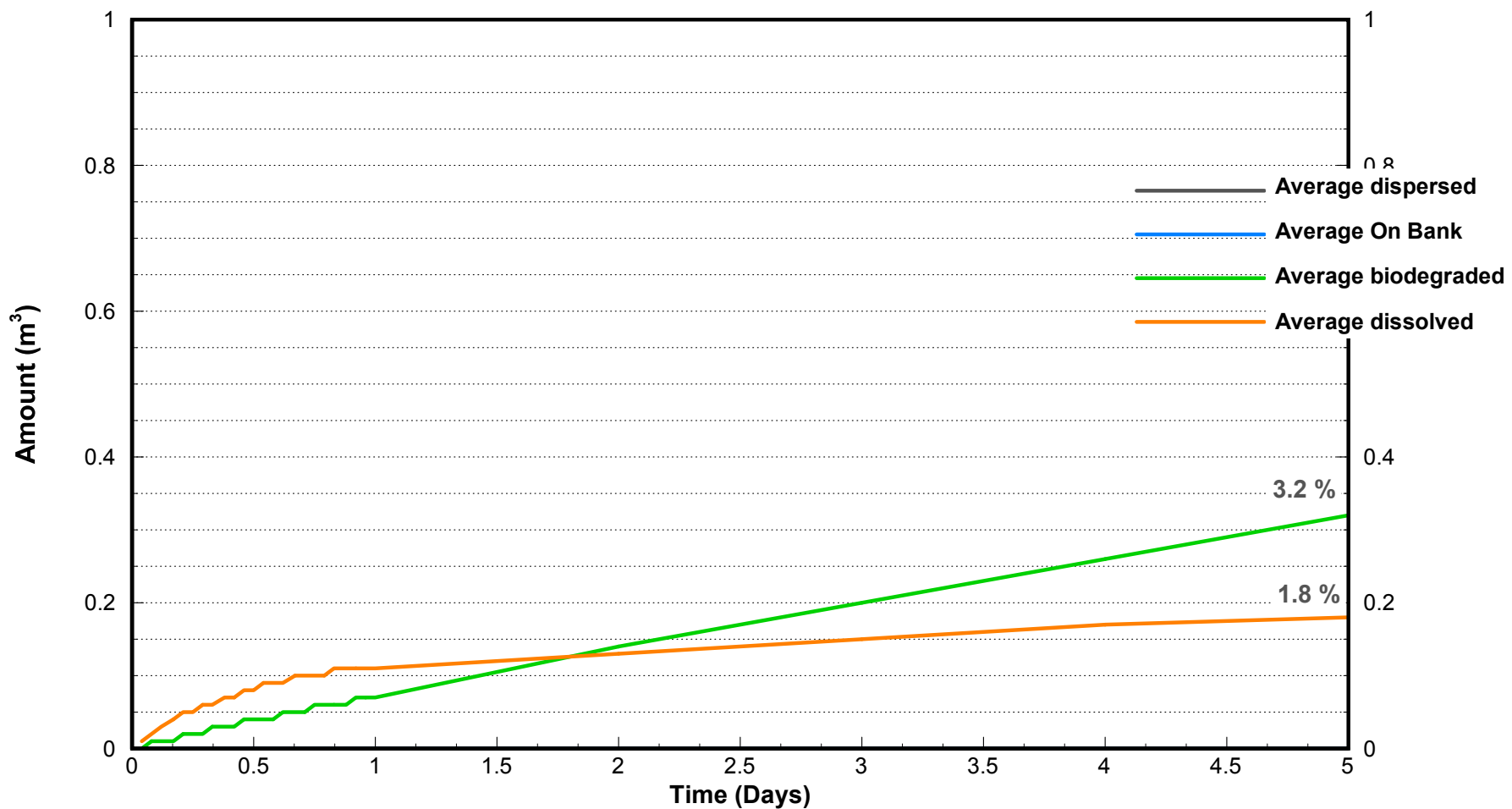


TRANS MOUNTAIN OIL SPILL STUDY

Stochastic Simulation Winter 2012, Site A (10 m³) Major Components of the Mass Balance

PROJECT NO. V13203022	DWN AH	CKD JAS	APVD -	REV 0
OFFICE EBA-VANC	DATE October 23, 2013			

Figure A.1-2



NOTES

- Statistical results based on independent spills occurring every 6 hours from January 01 00:00 to March 31 23:00.
- Tracking time for each spill was 5 days.
- The minor components of the mass balance are shown above.

STATUS
ISSUED FOR USE

CLIENT

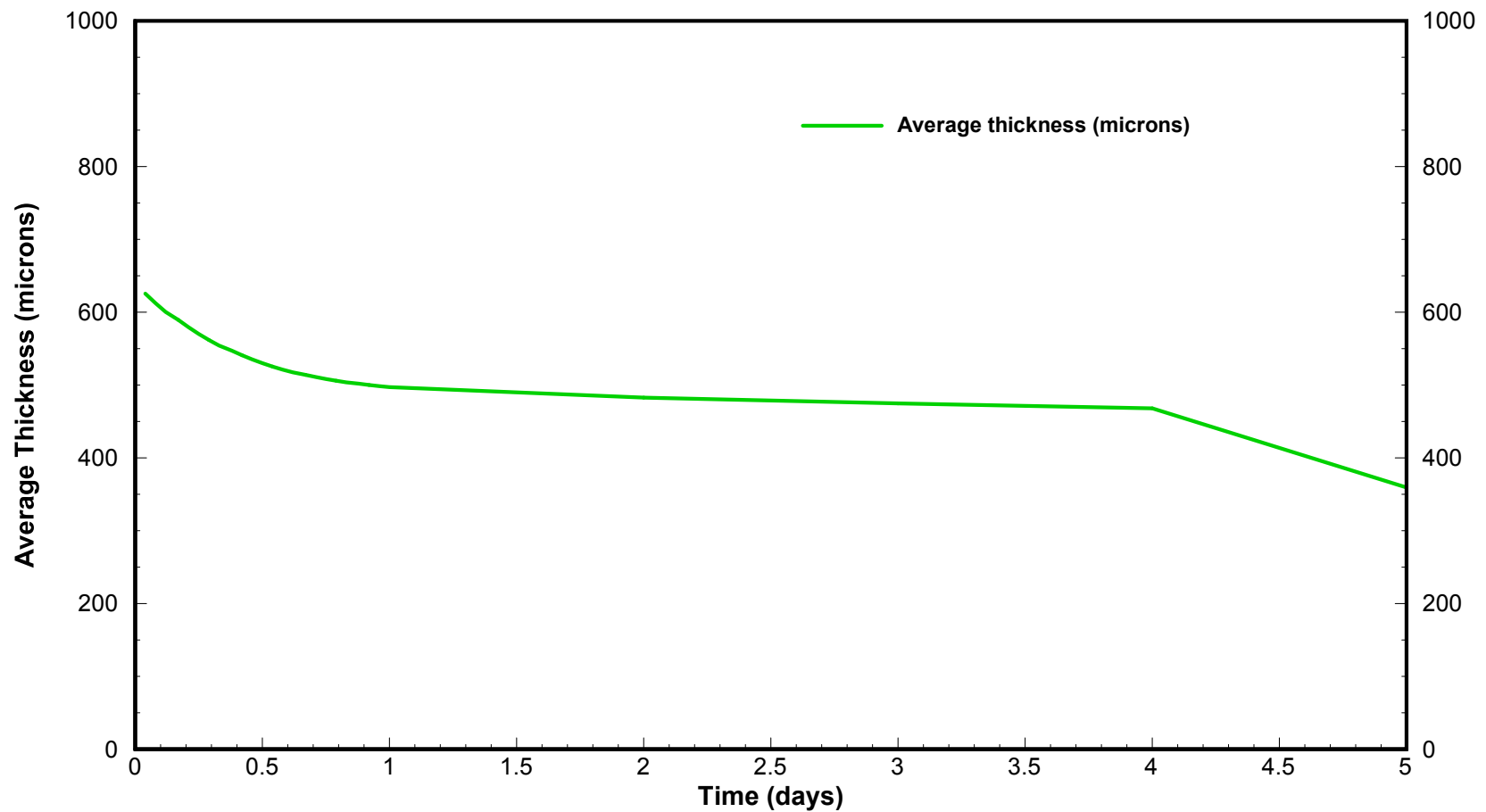


TRANS MOUNTAIN OIL SPILL STUDY

Stochastic Simulation Winter 2012, Site A (10 m³) Minor Components of the Mass Balance

PROJECT NO. V13203022	DWN AH	CKD JAS	APVD -	REV 0
OFFICE EBA-VANC	DATE October 23, 2013			

Figure A.1-3



NOTES

- Statistical results based on independent spills occurring every 6 hours from January 01 00:00 to March 31 23:00.
- The average thickness is based on the full coverage of the grid cell that contains oil.

STATUS
ISSUED FOR USE

CLIENT



TRANS MOUNTAIN OIL SPILL STUDY

Stochastic Simulation Winter 2012, Site A (10 m³) Statistics on Thickness

PROJECT NO.
V13203022

OFFICE
EBA-VANC

DWN
AH

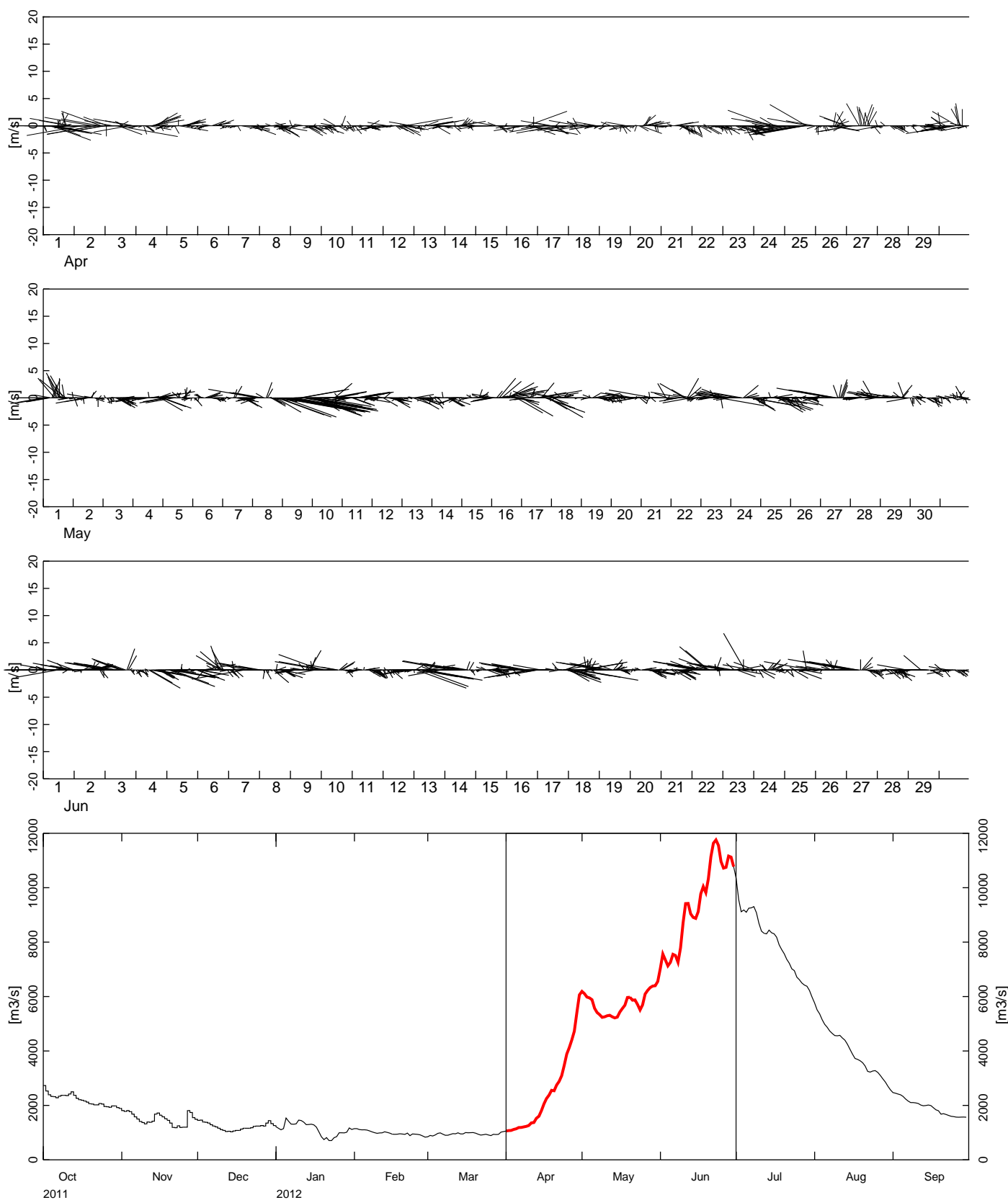
CKD
JAS

APVD
-

REV
0

DATE
October 21, 2013

Figure A.1-4



NOTES

- The wind stick represent winds at Point Atkinson.
- The bottom graph represents the Fraser River discharge at Hope.

STATUS
ISSUED FOR USE

CLIENT

TRANS MOUNTAIN



TRANS MOUNTAIN OIL SPILL STUDY

Environmental Conditions: Spring 2012 Site A
Stochastic Modelling

PROJECT NO.
V13203022

OFFICE
EBA-VANC

DWN
AH

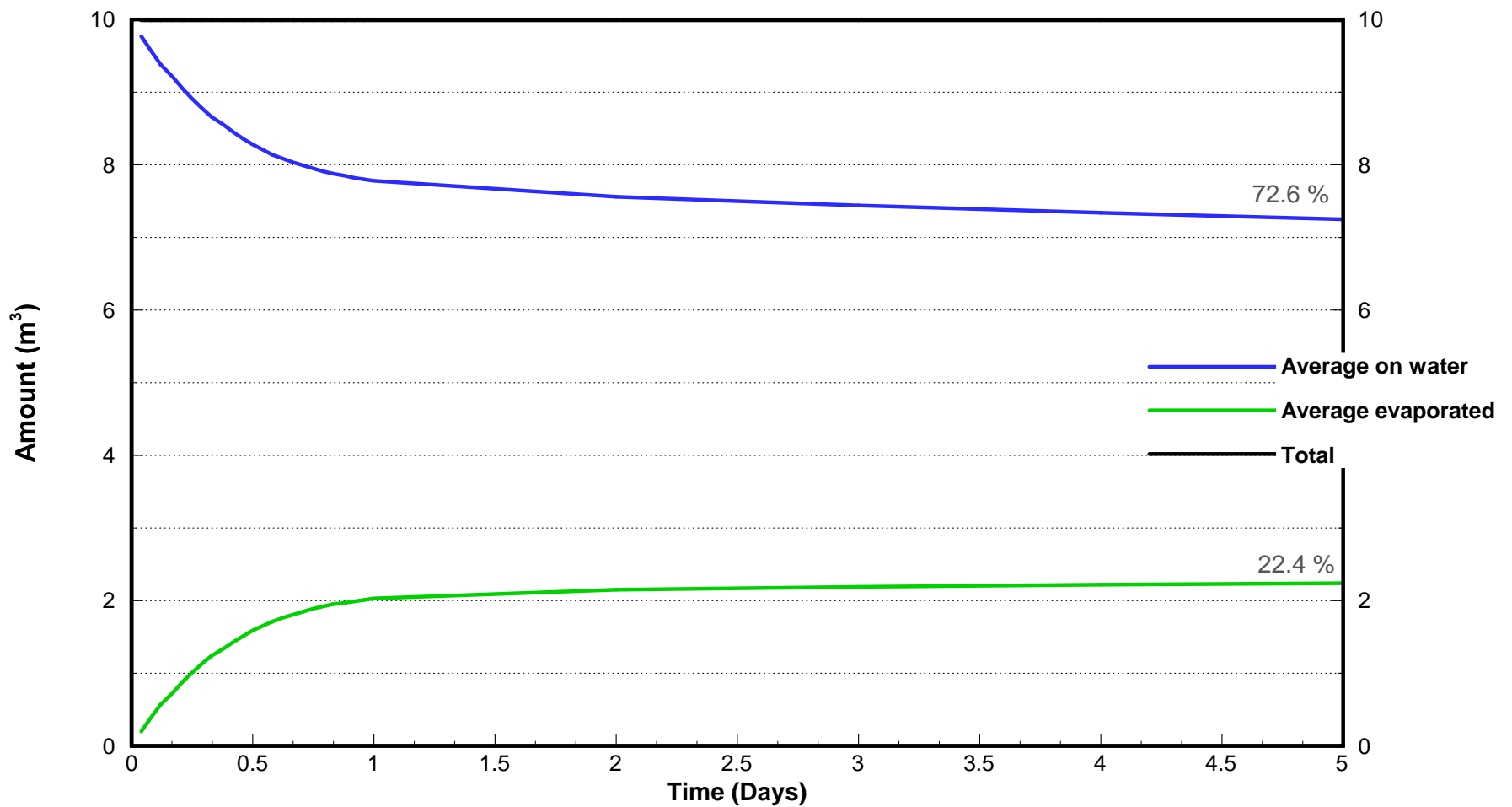
CHK
JAS

APVD
JAS

REV
0

DATE
August 2013

Figure A.2-1



NOTES

- Statistical results based on independent spills occurring every 6 hours from April 01 00:00 to June 30 23:00.
- Tracking time for each spill was 5 days.
- The major components of the mass balance are shown above.

STATUS
ISSUED FOR USE

CLIENT

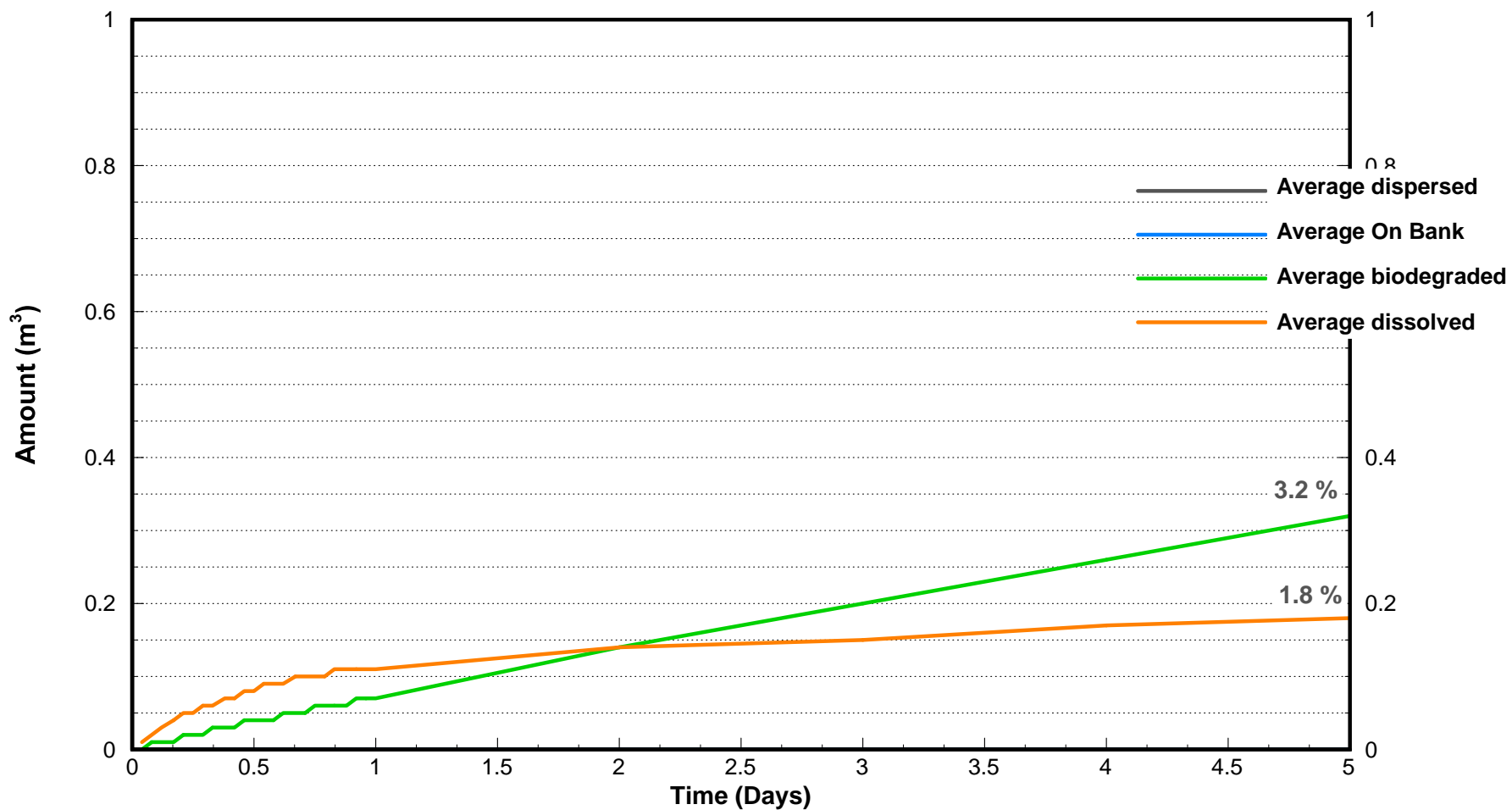


TRANS MOUNTAIN OIL SPILL STUDY

Stochastic Simulation Spring 2012, Site A (10 m³) Major Components of the Mass Balance

PROJECT NO. V13203022	DWN AH	CKD JAS	APVD -	REV 0
OFFICE EBA-VANC	DATE October 23, 2013			

Figure A.2-2



NOTES

- Statistical results based on independent spills occurring every 6 hours from April 01 00:00 to June 30 23:00.
- Tracking time for each spill was 5 days.
- The minor components of the mass balance are shown above.

STATUS
ISSUED FOR USE

CLIENT

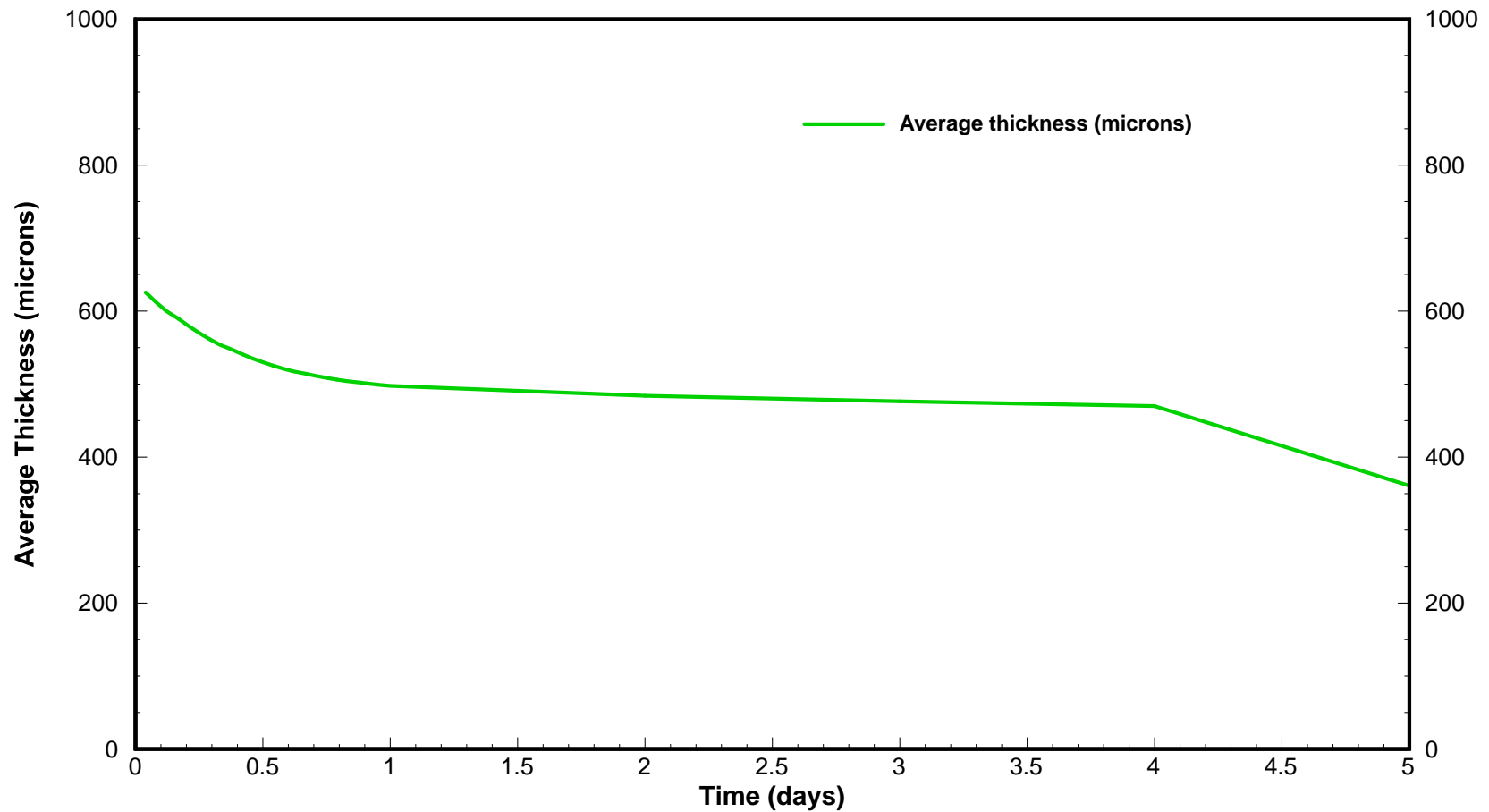


TRANS MOUNTAIN OIL SPILL STUDY

Stochastic Simulation Spring 2012, Site A (10 m³) Minor Components of the Mass Balance

PROJECT NO. V13203022	DWN AH	CKD JAS	APVD -	REV 0
OFFICE EBA-VANC	DATE October 23, 2013			

Figure A.2-3



NOTES

- Statistical results based on independent spills occurring every 6 hours from April 01 00:00 to June 30 23:00.
- The average thickness is based on the full coverage of the grid cell that contains oil.

STATUS
ISSUED FOR USE

CLIENT

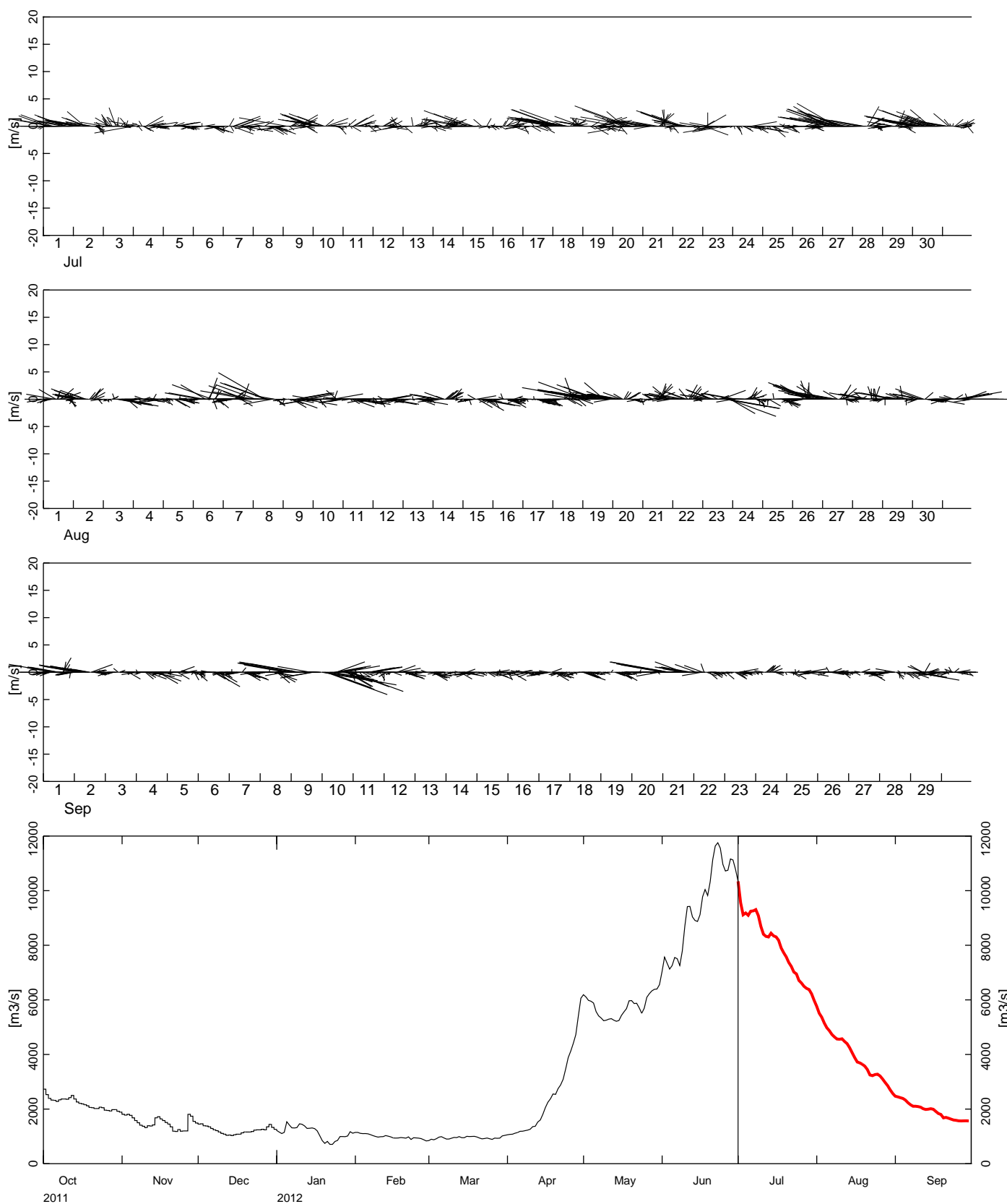


TRANS MOUNTAIN OIL SPILL STUDY

Stochastic Simulation Spring 2012, Site A (10 m³) Statistics on Thickness

PROJECT NO. V13203022	DWN AH	CKD JAS	APVD -	REV 0
OFFICE EBA-VANC	DATE October 21, 2013			

Figure A.2-4



NOTES

- The wind stick represent winds at Point Atkinson.
- The bottom graph represents the Fraser River discharge at Hope.

STATUS
ISSUED FOR USE

CLIENT

TRANS MOUNTAIN



TRANS MOUNTAIN OIL SPILL STUDY

Environmental Conditions: Summer 2012 Site A
Stochastic Modelling

PROJECT NO.
V13203022

OFFICE
EBA-VANC

DWN
AH

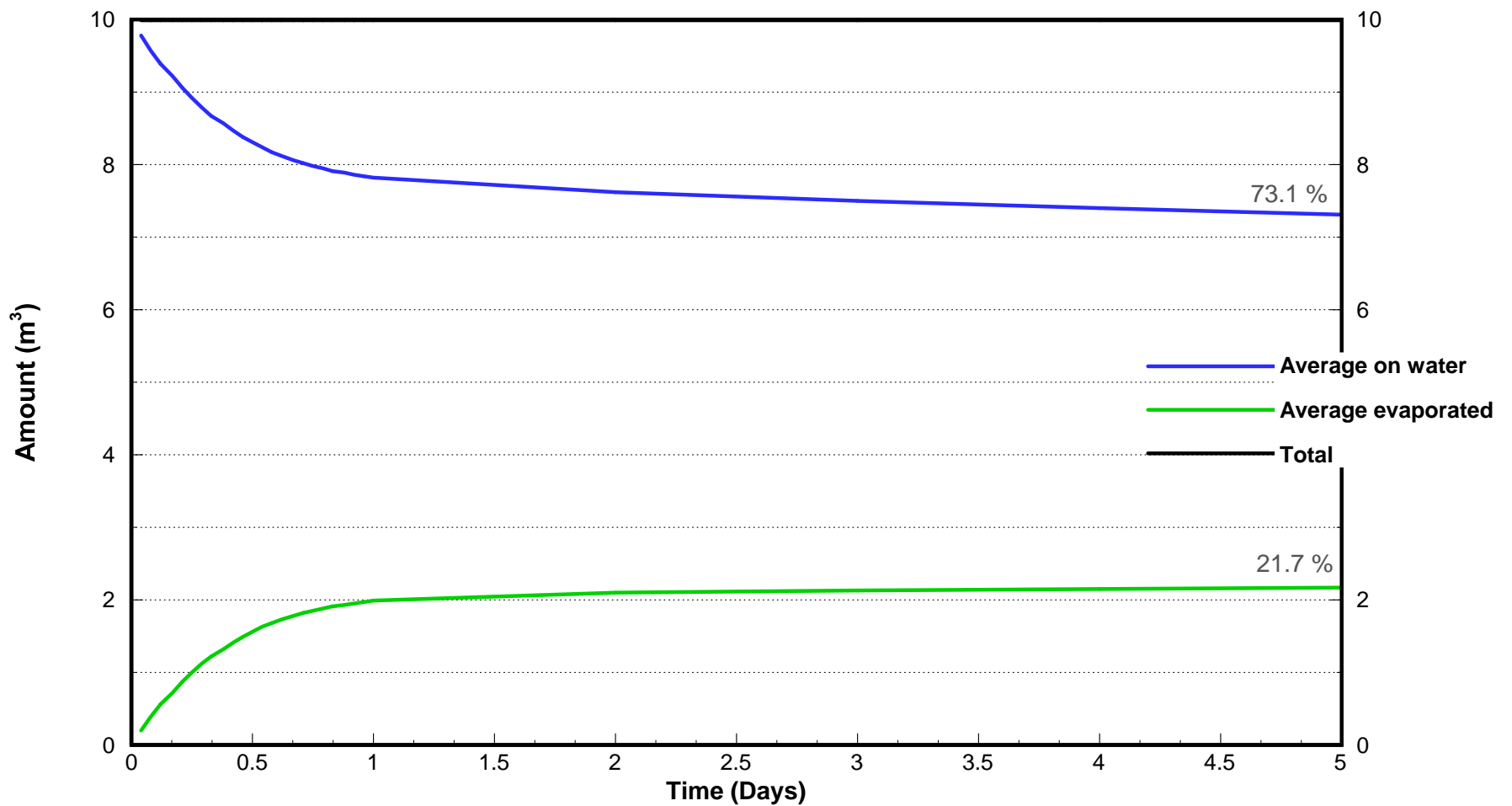
CHK
JAS

APVD
JAS

REV
0

DATE
August 2013

Figure A.3-1



NOTES

- Statistical results based on independent spills occurring every 6 hours from July 01 00:00 to September 30 23:00.
- Tracking time for each spill was 5 days.
- The major components of the mass balance are shown above.

STATUS
ISSUED FOR USE

CLIENT

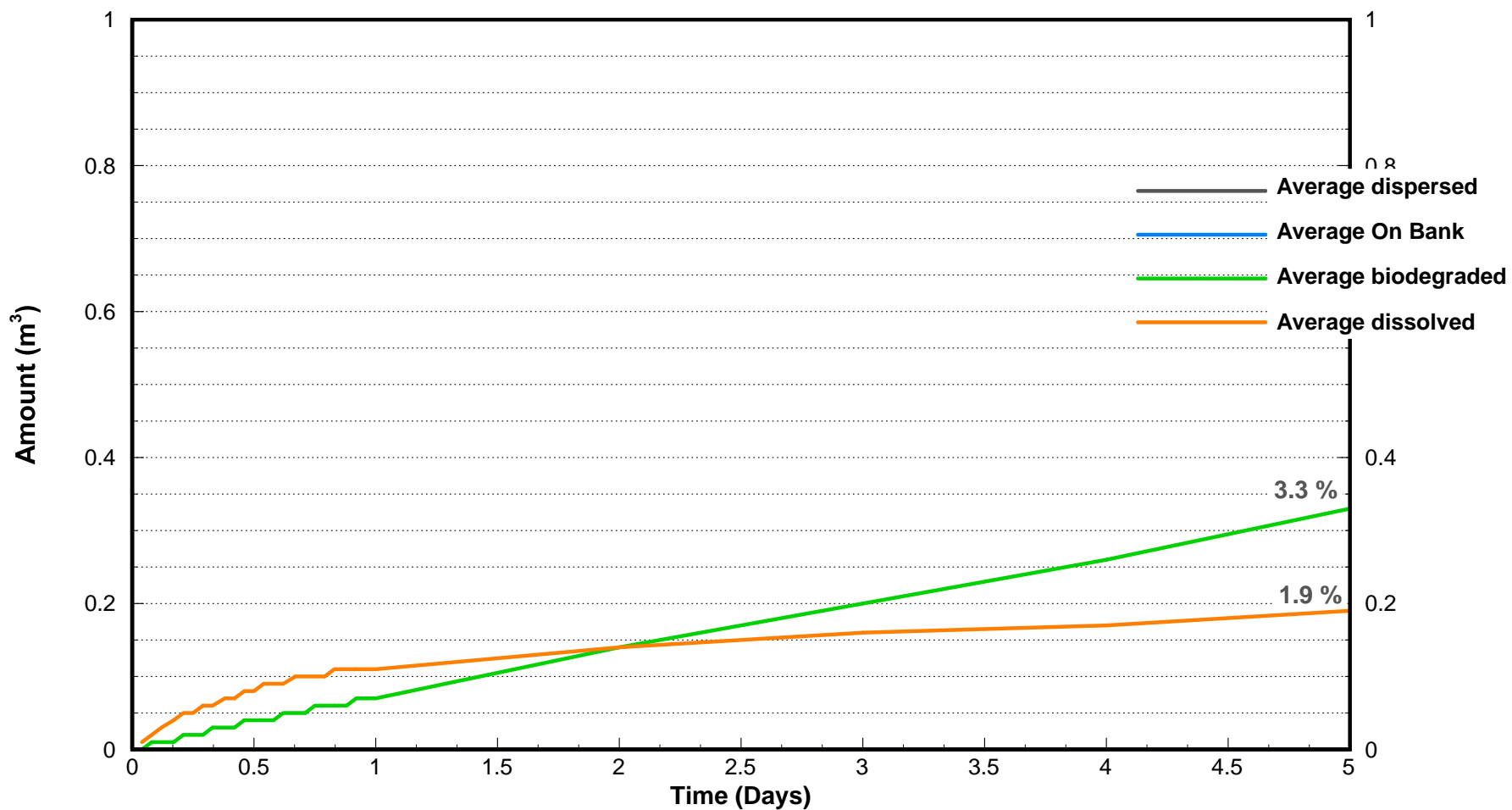


TRANS MOUNTAIN OIL SPILL STUDY

Stochastic Simulation Summer 2012, Site A (10 m³) Major Components of the Mass Balance

PROJECT NO. V13203022	DWN AH	CKD JAS	APVD -	REV 0
OFFICE EBA-VANC	DATE October 23, 2013			

Figure A.3-2



NOTES

- Statistical results based on independent spills occurring every 6 hours from July 01 00:00 to September 30 23:00.
- Tracking time for each spill was 5 days.
- The minor components of the mass balance are shown above.

STATUS
ISSUED FOR USE

CLIENT

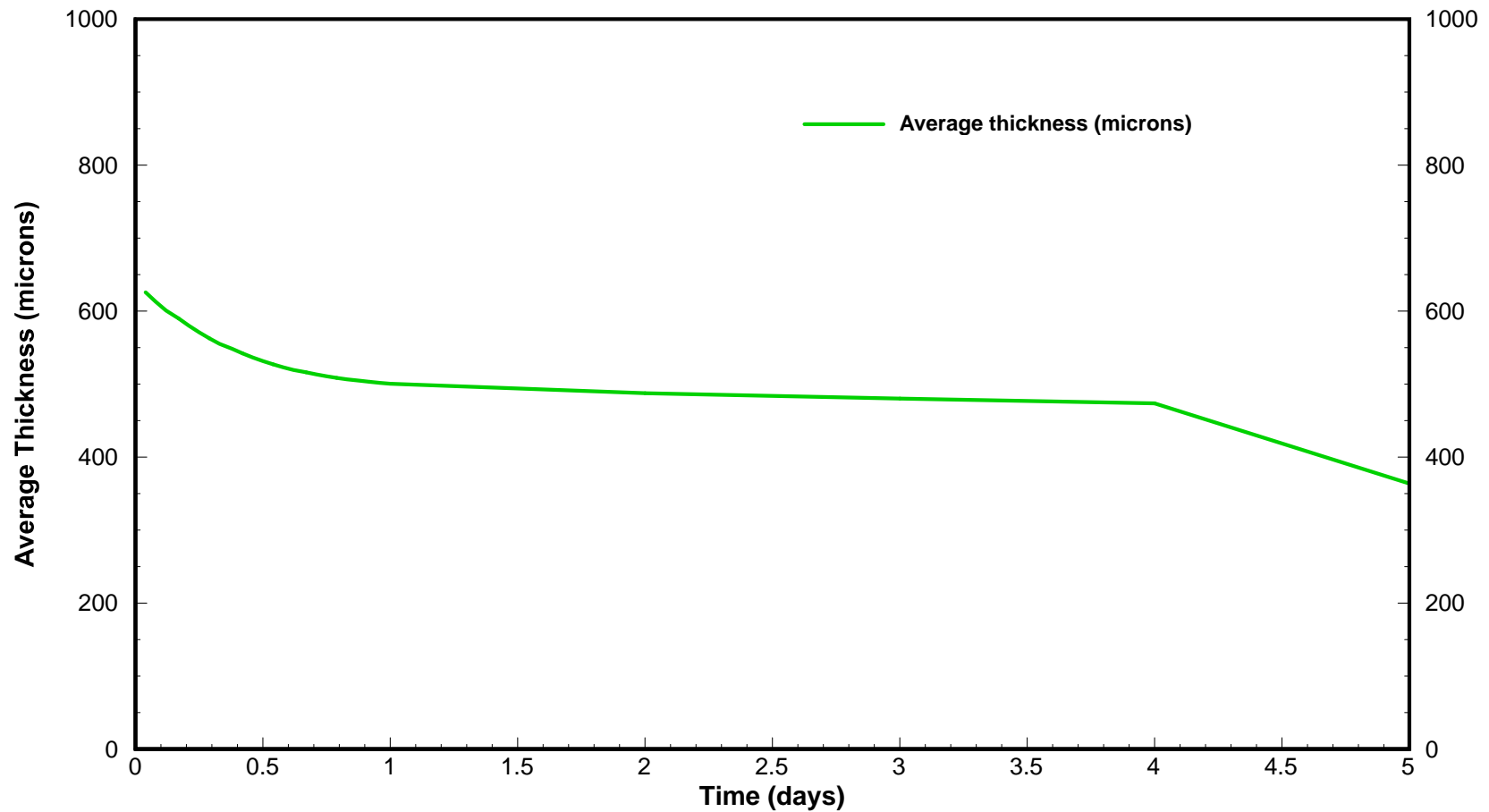


TRANS MOUNTAIN OIL SPILL STUDY

Stochastic Simulation Summer 2012, Site A (10 m³) Minor Components of the Mass Balance

PROJECT NO. V13203022	DWN AH	CKD JAS	APVD -	REV 0
OFFICE EBA-VANC	DATE October 23, 2013			

Figure A.3-3



NOTES

- Statistical results based on independent spills occurring every 6 hours from July 01 00:00 to September 30 23:00.
- The average thickness is based on the full coverage of the grid cell that contains oil.

STATUS
ISSUED FOR USE

CLIENT

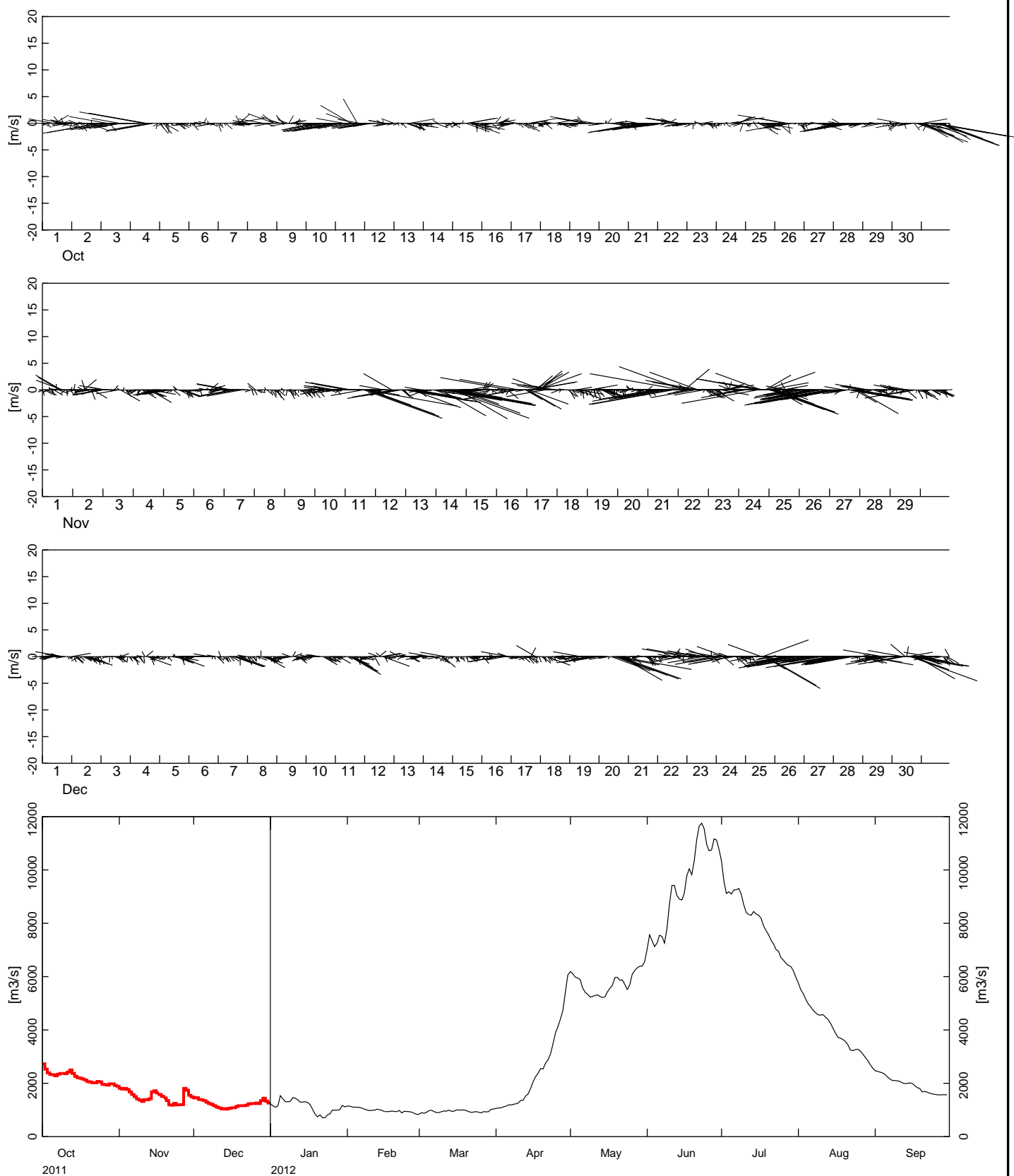


TRANS MOUNTAIN OIL SPILL STUDY

Stochastic Simulation Summer 2012, Site A (10 m³) Statistics on Thickness

PROJECT NO. V13203022	DWN AH	CKD JAS	APVD -	REV 0
OFFICE EBA-VANC	DATE October 21, 2013			

Figure A.3-4



NOTES

- The wind stick represent winds at Point Atkinson.
- The bottom graph represents the Fraser River discharge at Hope.

STATUS
ISSUED FOR USE

CLIENT

TRANS MOUNTAIN



TRANS MOUNTAIN OIL SPILL STUDY

Environmental Conditions: Fall 2011 Site A
Stochastic Modelling

PROJECT NO.
V13203022

OFFICE
EBA-VANC

DWN
AH

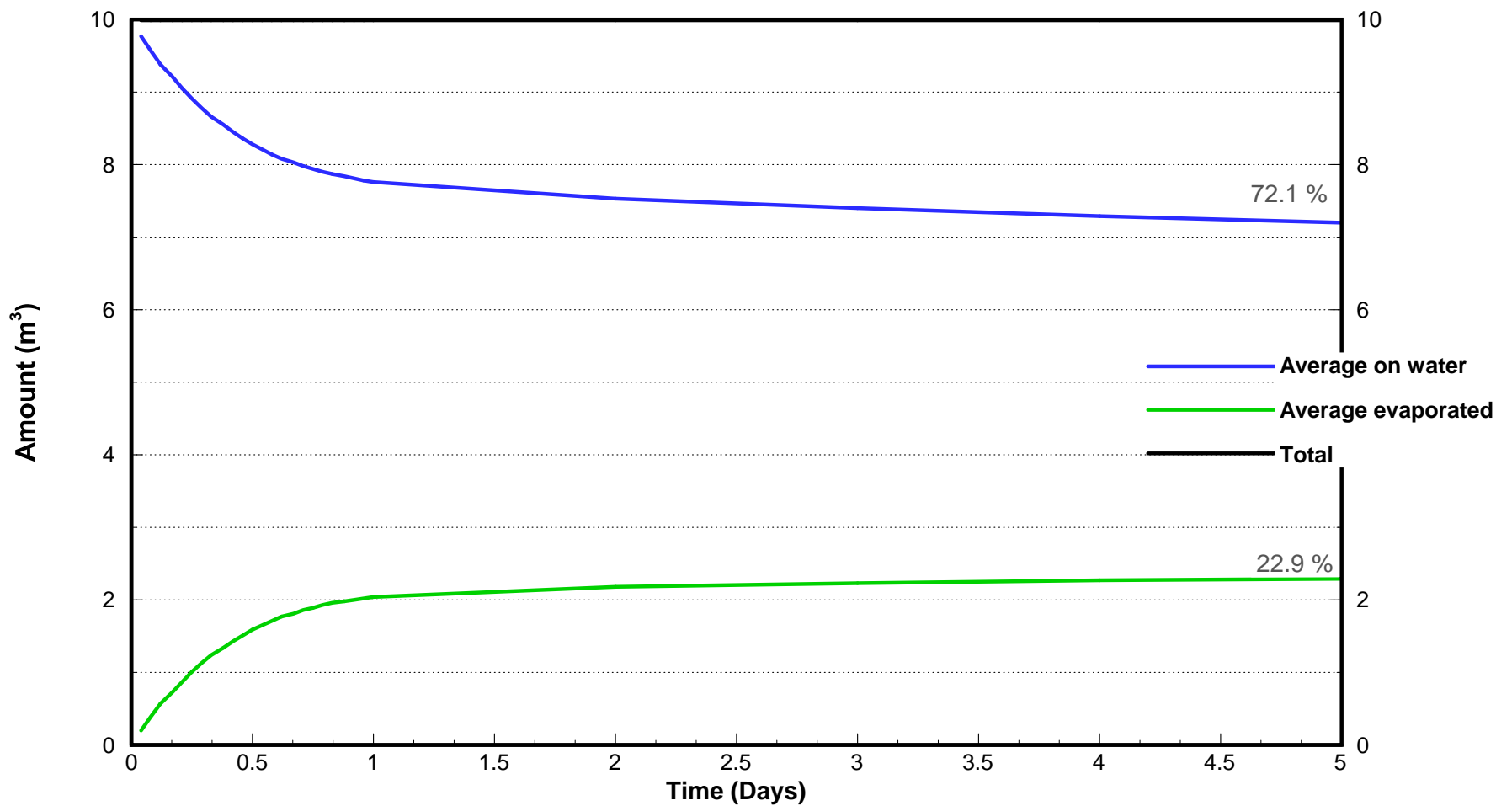
CHK
JAS

APVD
JAS

REV
0

DATE
August 2013

Figure A.4-1



NOTES

- Statistical results based on independent spills occurring every 6 hours from October 01 00:00 to December 31 23:00.
- Tracking time for each spill was 5 days.
- The major components of the mass balance are shown above.

STATUS
ISSUED FOR USE

CLIENT

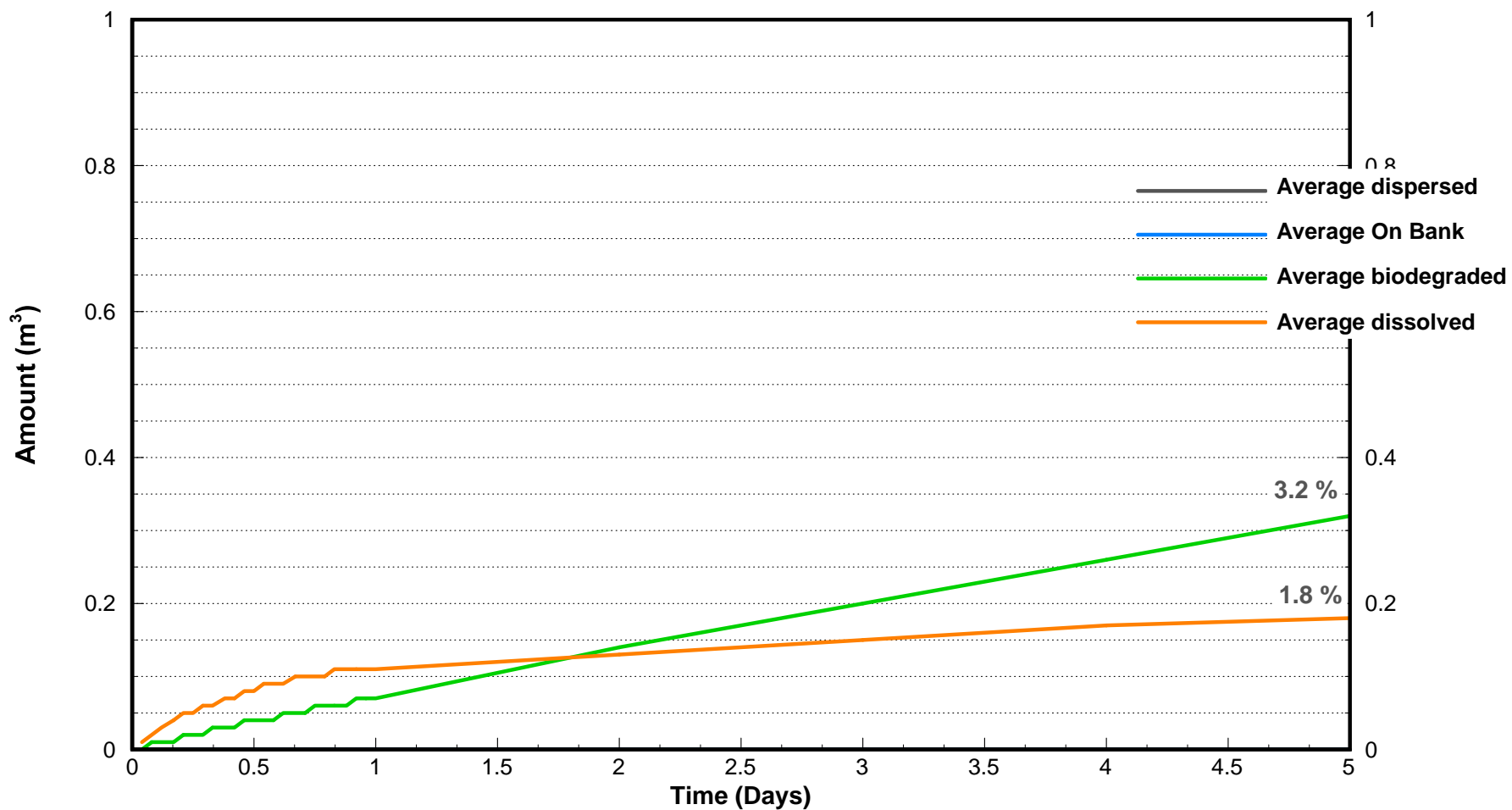


TRANS MOUNTAIN OIL SPILL STUDY

Stochastic Simulation Fall 2011, Site A (10 m³) Major Components of the Mass Balance

PROJECT NO. V13203022	DWN AH	CKD JAS	APVD -	REV 0
OFFICE EBA-VANC	DATE October 23, 2013			

Figure A.4-2



NOTES

- Statistical results based on independent spills occurring every 6 hours from October 01 00:00 to December 31 23:00.
- Tracking time for each spill was 5 days.
- The minor components of the mass balance are shown above.

STATUS
ISSUED FOR USE

CLIENT

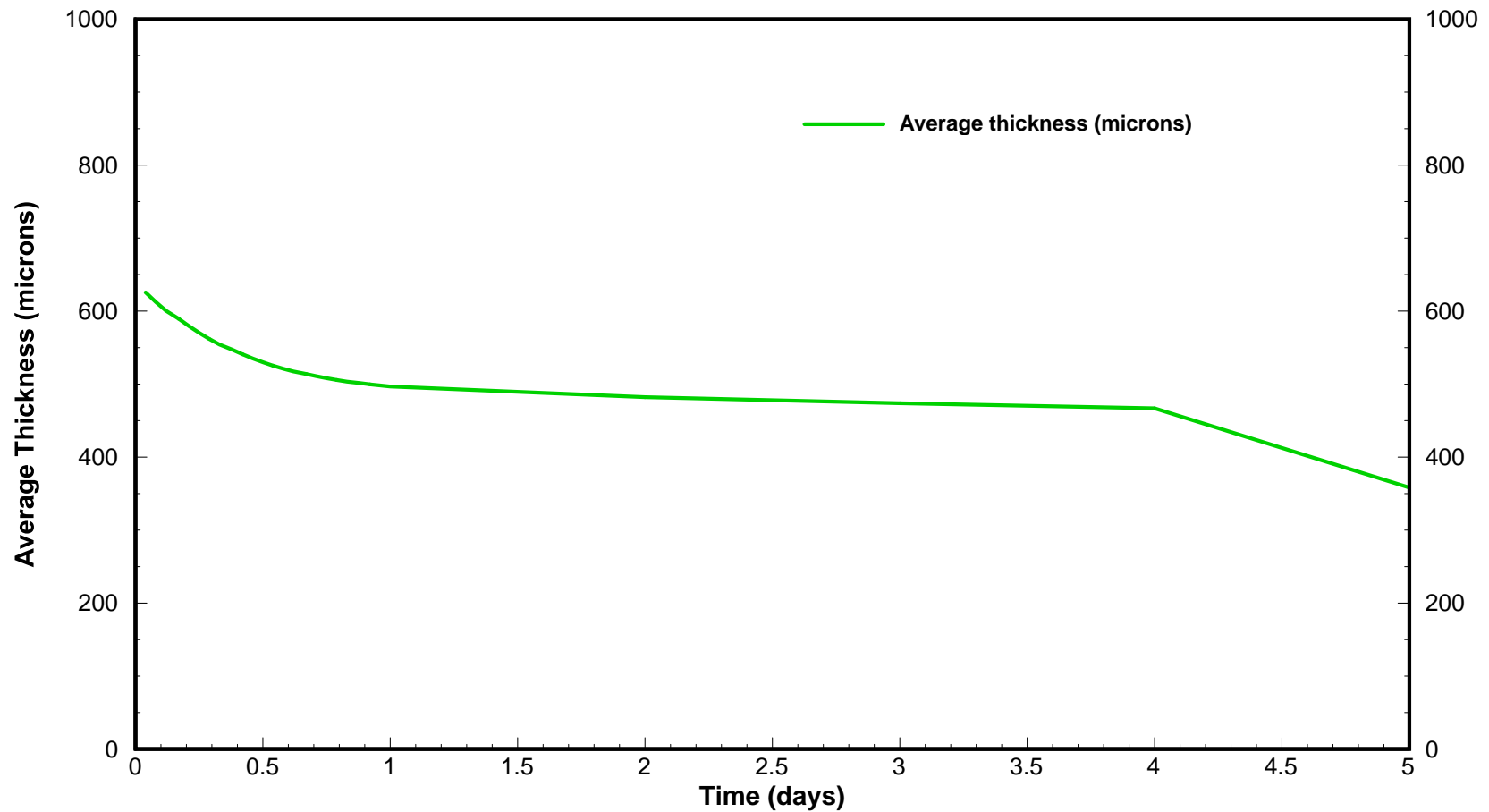


TRANS MOUNTAIN OIL SPILL STUDY

Stochastic Simulation Fall 2011, Site A (10 m³) Minor Components of the Mass Balance

PROJECT NO. V13203022	DWN AH	CKD JAS	APVD -	REV 0
OFFICE EBA-VANC	DATE October 23, 2013			

Figure A.4-3



NOTES

- Statistical results based on independent spills occurring every 6 hours from October 01 00:00 to December 31 23:00.
- The average thickness is based on the full coverage of the grid cell that contains oil.

STATUS
ISSUED FOR USE

CLIENT



TRANS MOUNTAIN OIL SPILL STUDY

Stochastic Simulation Fall 2011, Site A (10 m³) Statistics on Thickness

PROJECT NO.
V13203022

OFFICE
EBA-VANC

DWN
AH

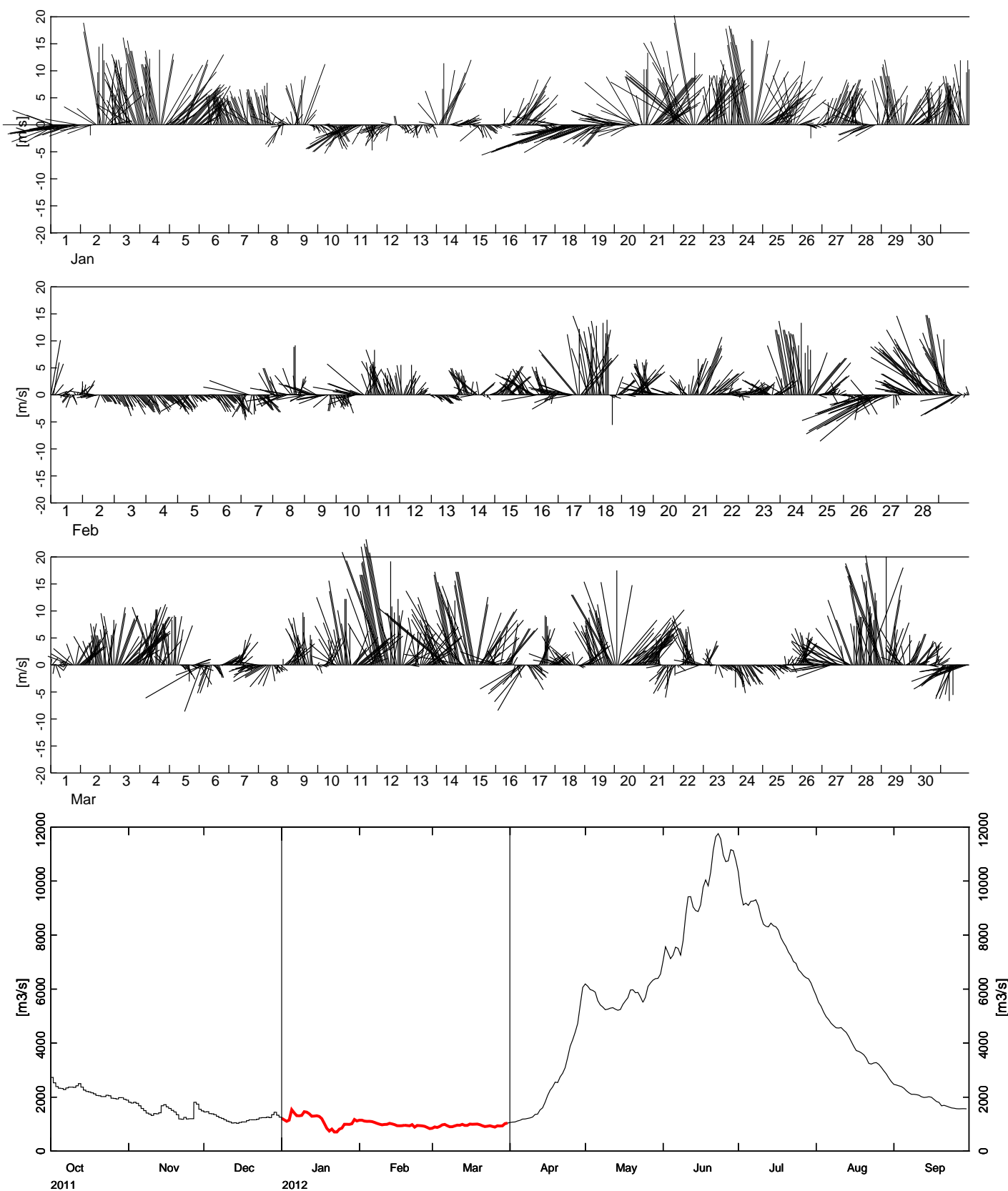
CKD
JAS

APVD
-

REV
0

DATE
October 21, 2013

Figure A.4-4



NOTES

- The wind stick represent winds at Saturna Island.
- The bottom graph represents the Fraser River discharge at Hope.

STATUS
ISSUED FOR USE

CLIENT

TRANS MOUNTAIN



TRANS MOUNTAIN OIL SPILL STUDY

Environmental Conditions: Winter 2012 Site D
Stochastic Modelling

PROJECT NO.
V13203022

OFFICE
EBA-VANC

DWN
AH

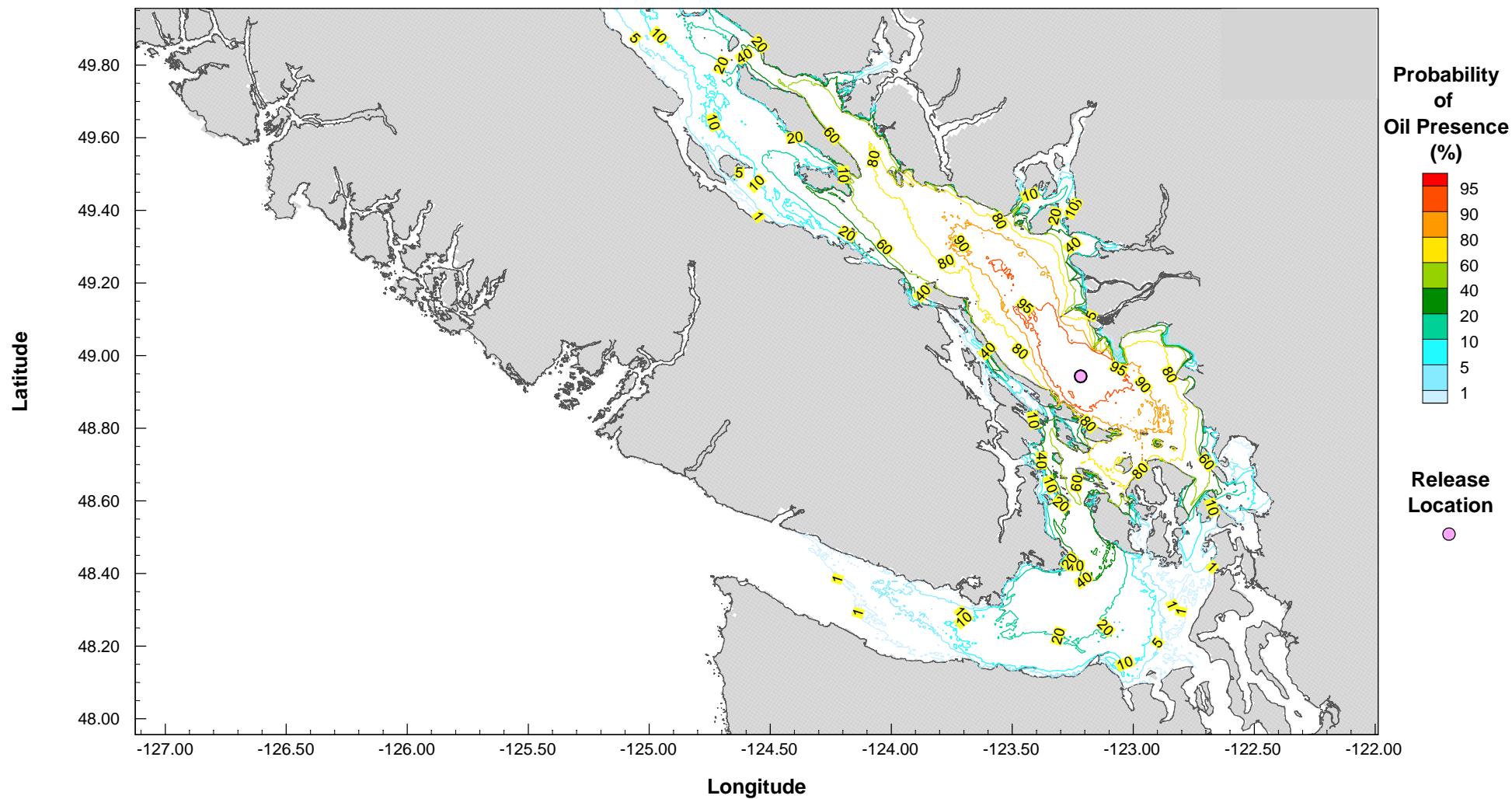
CHK
JAS

APVD
JAS

REV
0

DATE
October 2013

Figure D.1-1



NOTES

- Statistical results based on independent spills occurring every 6 hours from January 01 00:00 to March 31 23:00.
- Probability of oil presence is the percentage of simulations in which oil was present at a given location.
- Tracking time for each spill was 15 days.

STATUS
ISSUED FOR USE

CLIENT

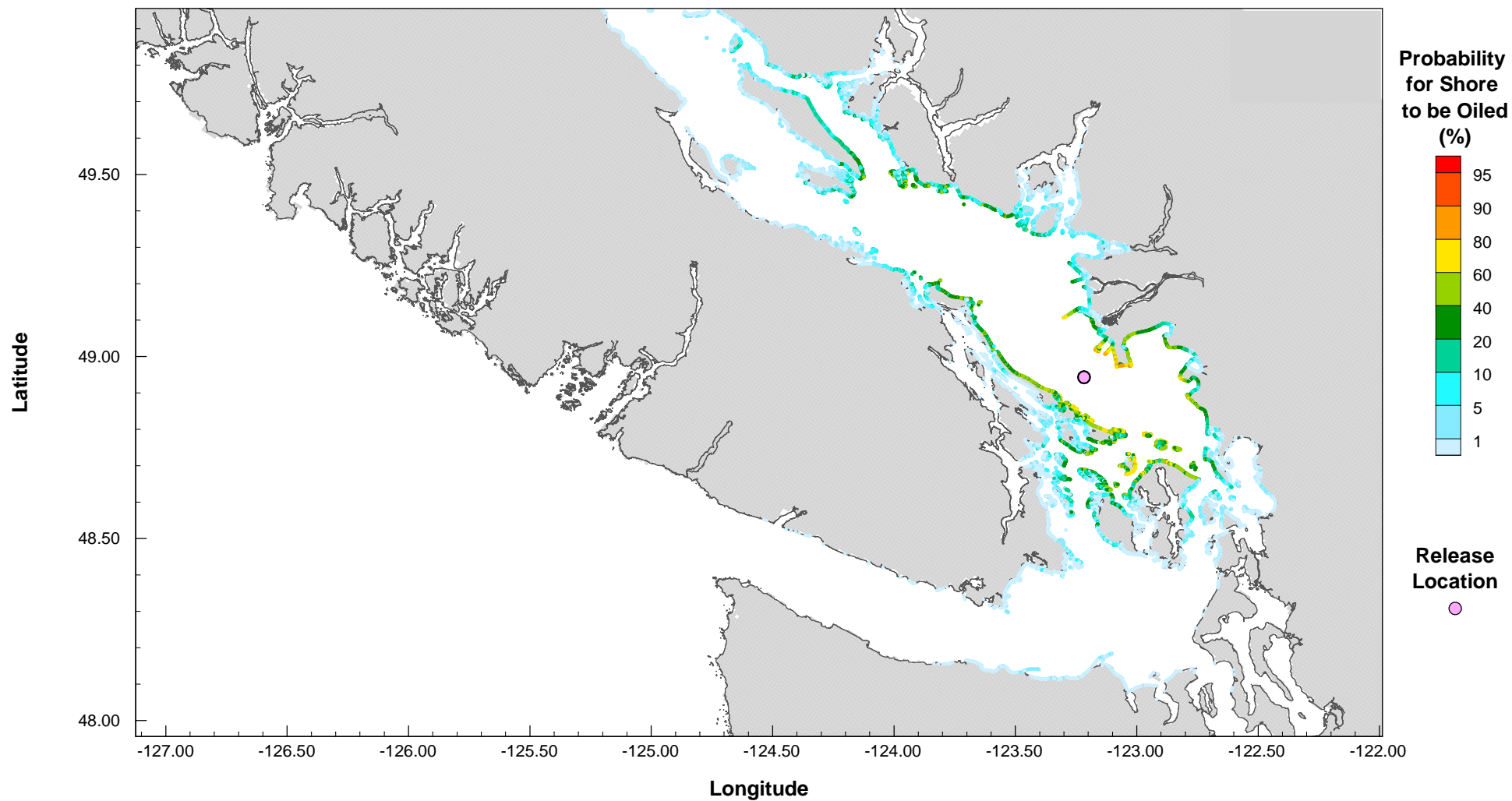


TRANS MOUNTAIN OIL SPILL STUDY

**Stochastic Simulation
Winter 2011, Site D (16,500 m³)
Probability of Oil Presence**

PROJECT NO. V13203022	DWN AH	CKD JAS	APVD -	REV 0
OFFICE EBA-VANC	DATE October 4, 2013			

Figure D.1-2



NOTES

- Statistical results based on independent spills occurring every 6 hours from January 01 00:00 to March 31 23:00.
- Probability of oil presence is the percentage of simulations in which oil was present at a given location.
- Tracking time for each spill was 15 days.

STATUS
ISSUED FOR USE

CLIENT



TRANS MOUNTAIN OIL SPILL STUDY

**Stochastic Simulation
Winter 2011, Site D (16,500 m³)
Shoreline Oiled Probability**

PROJECT NO.
V13203022

DWN
AH

CKD
JAS

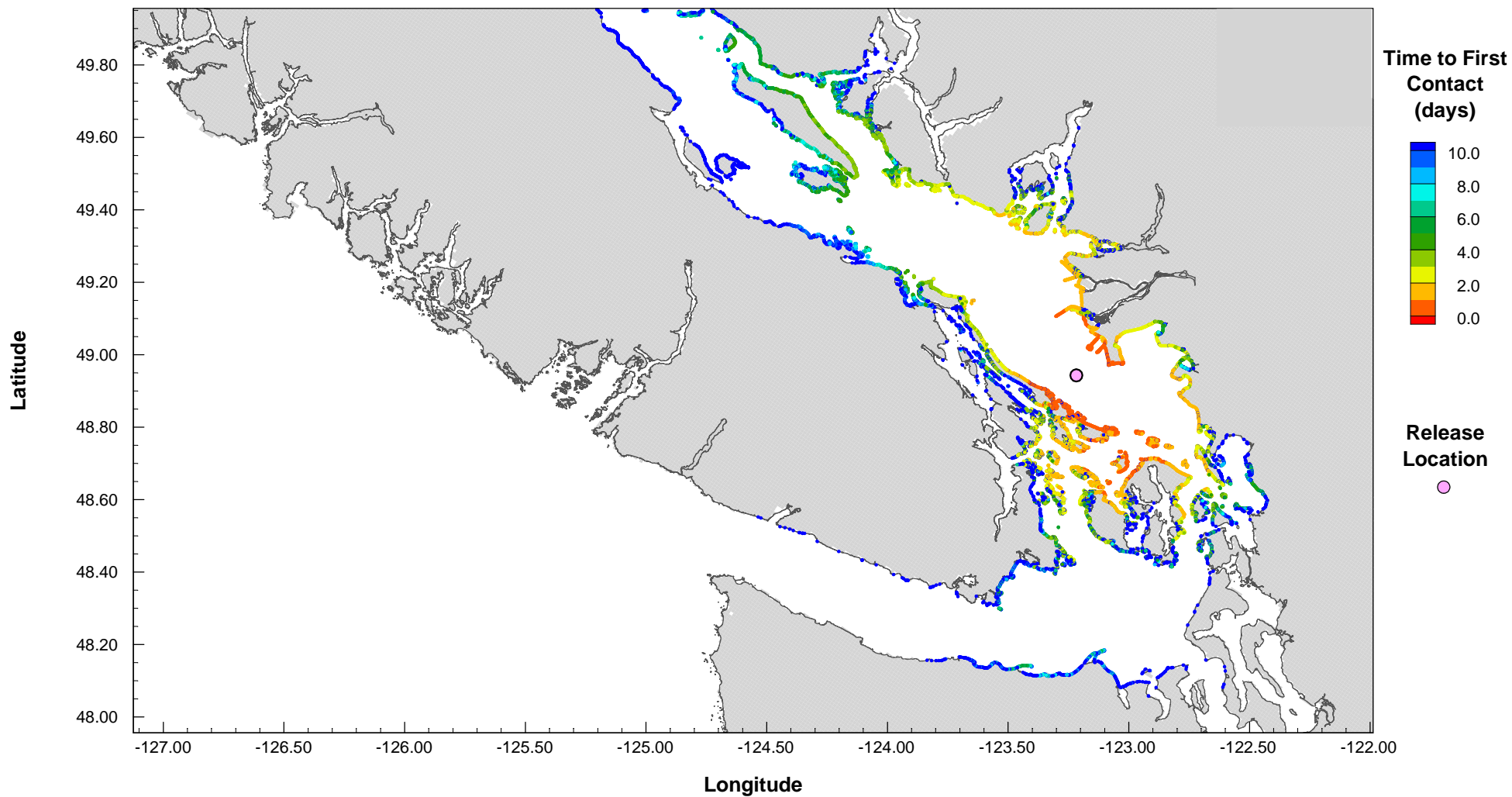
APVD
-

REV
0

OFFICE
EBA-VANC

DATE
October 4, 2013

Figure D.1-3



NOTES

- Statistical results based on independent spills occurring every 6 hours from January 01 00:00 to March 31 23:00.
- Time to first contact is the minimum time, over all simulations, for oil to reach a given shore segment.
- Tracking time for each spill was 15 days.

STATUS
ISSUED FOR USE

CLIENT

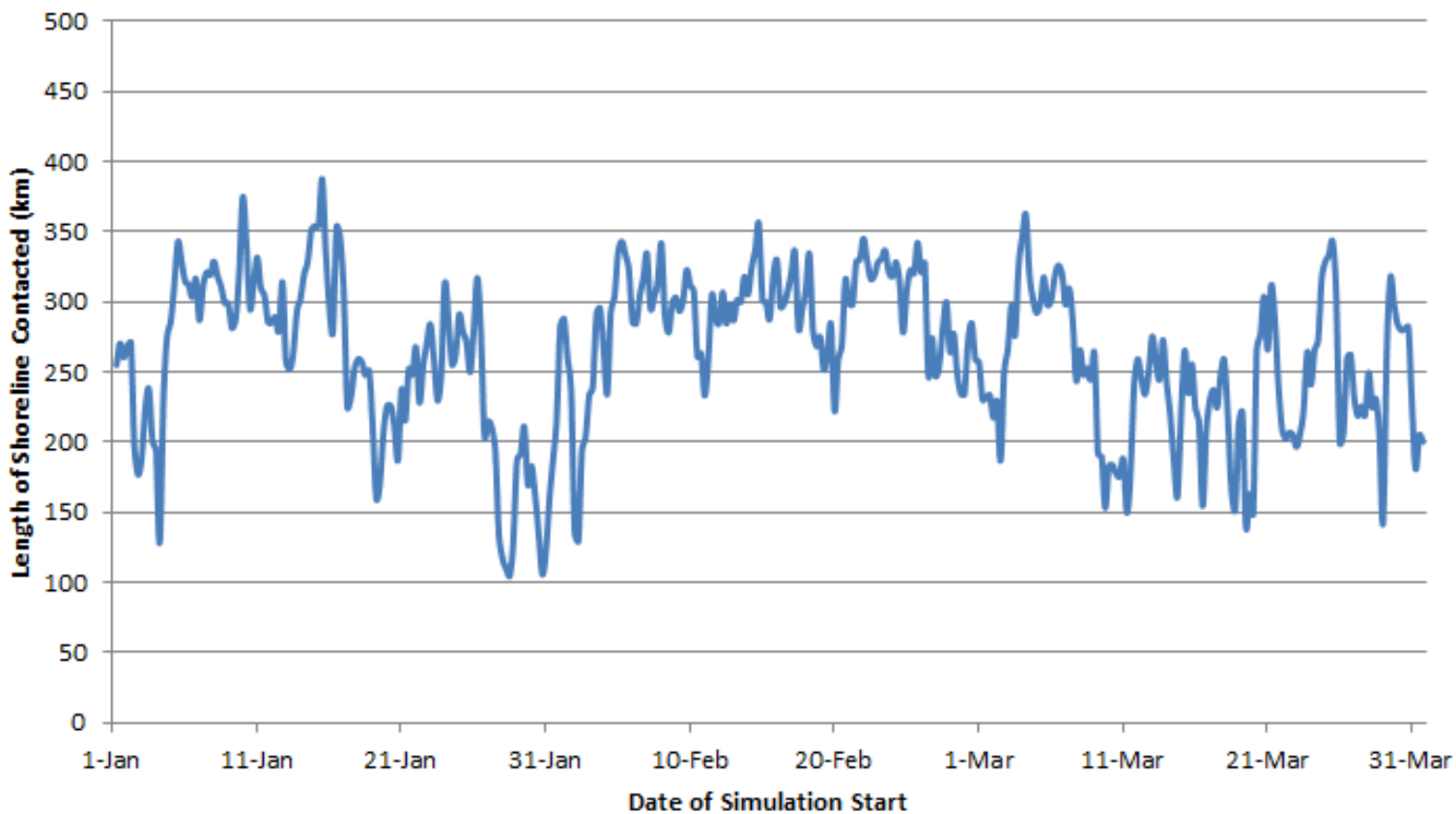


TRANS MOUNTAIN OIL SPILL STUDY

Stochastic Simulation Winter 2011, Site D (16,500 m³) Shoreline Time to First Contact

PROJECT NO. V13203022	DWN AH	CKD JAS	APVD -	REV 0
OFFICE EBA-VANC	DATE October 4, 2013			

Figure D.1-4



NOTES

- Statistical results based on independent spills occurring every 6 hours from January 01 00:00 to March 31 23:00, for a total of 364 independent spills.
- Tracking time for each spill was 15 days.

STATUS
ISSUED FOR USE

CLIENT



TRANS MOUNTAIN OIL SPILL STUDY

Stochastic Simulation Winter 2012, Site D (16,500 m³) Length of Shoreline Contacted

PROJECT NO.
V13203022

DWN
AH

CKD
JAS

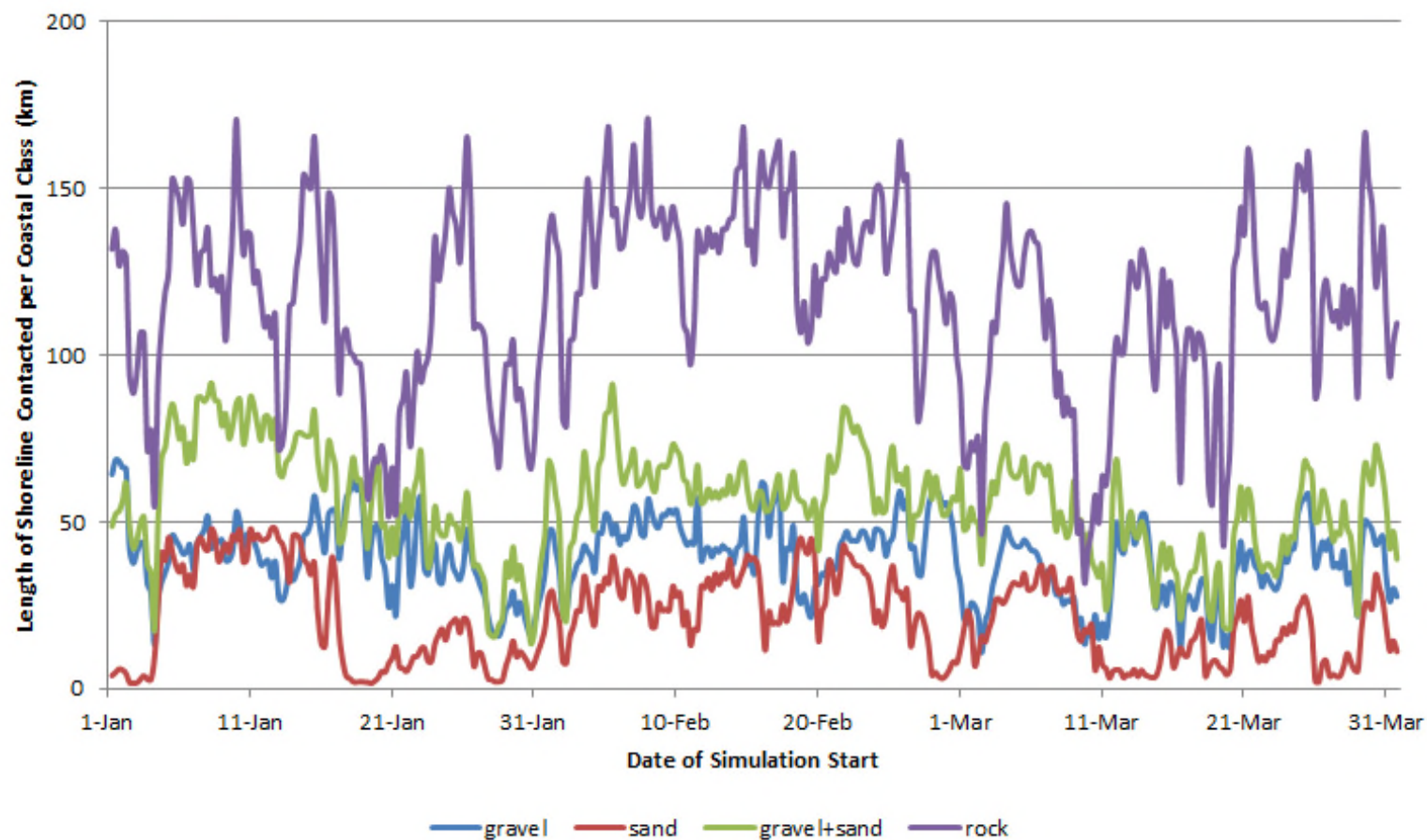
APVD
-

REV
0

OFFICE
EBA-VANC

DATE
October 15, 2013

Figure D.1-5



NOTES

- Statistical results based on independent spills occurring every 6 hours from January 01 00:00 to March 31 23:00, for a total of 364 independent spills.
- Tracking time for each spill was 15 days.

STATUS
ISSUED FOR USE

CLIENT

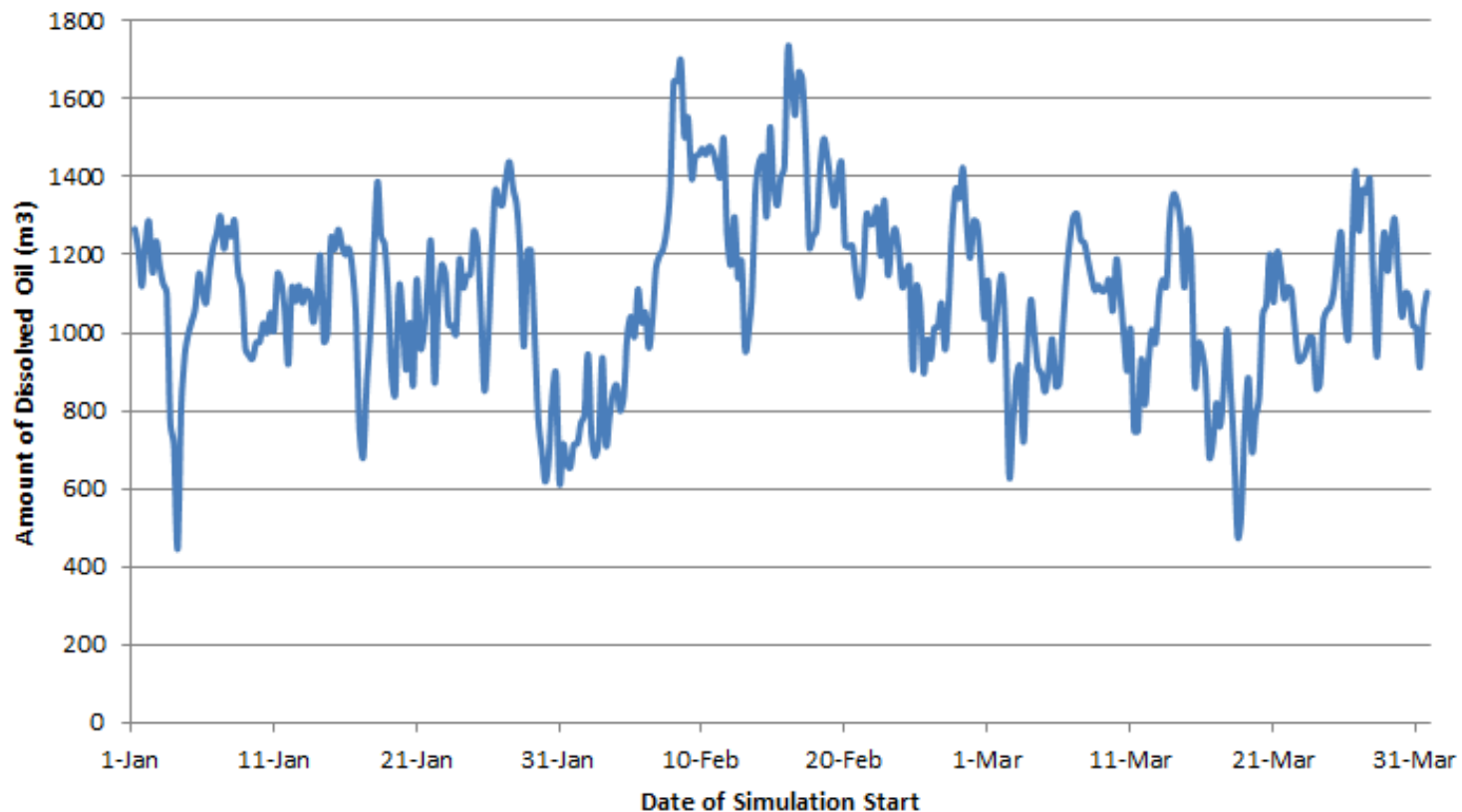


TRANS MOUNTAIN OIL SPILL STUDY

Stochastic Simulation - Winter 2012 Site D (16,500 m³): Length of Shoreline Contacted Per Coastal Class

PROJECT NO. V13203022	DWN AH	CKD JAS	APVD -	REV 0
OFFICE EBA-VANC	DATE October 15, 2013			

Figure D.1-6



NOTES

- Statistical results based on independent spills occurring every 6 hours from January 01 00:00 to March 31 23:00, for a total of 364 independent spills.
- Tracking time for each spill was 15 days.

STATUS
ISSUED FOR USE

CLIENT



TRANS MOUNTAIN OIL SPILL STUDY

Stochastic Simulation Winter 2012, Site D (16,500 m³) Amount of Dissolved Oil

PROJECT NO.
V13203022

OFFICE
EBA-VANC

DWN
AH

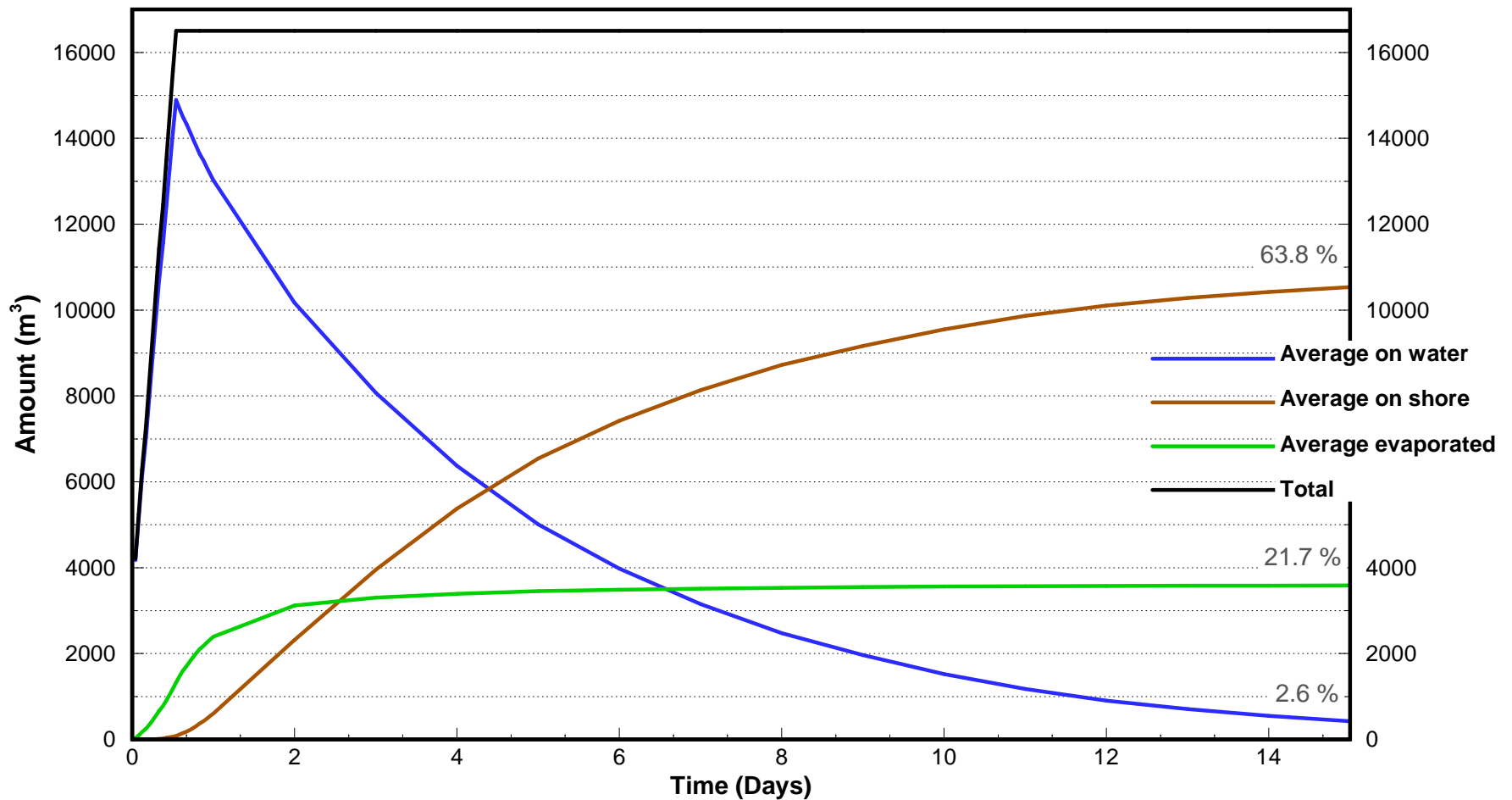
CKD
JAS

APVD
-

REV
0

DATE
October 15, 2013

Figure D.1-7



NOTES

- Statistical results based on independent spills occurring every 6 hours from January 01 00:00 to March 31 23:00.
- Tracking time for each spill was 15 days.
- The major components of the mass balance are shown above.

STATUS
ISSUED FOR USE

CLIENT

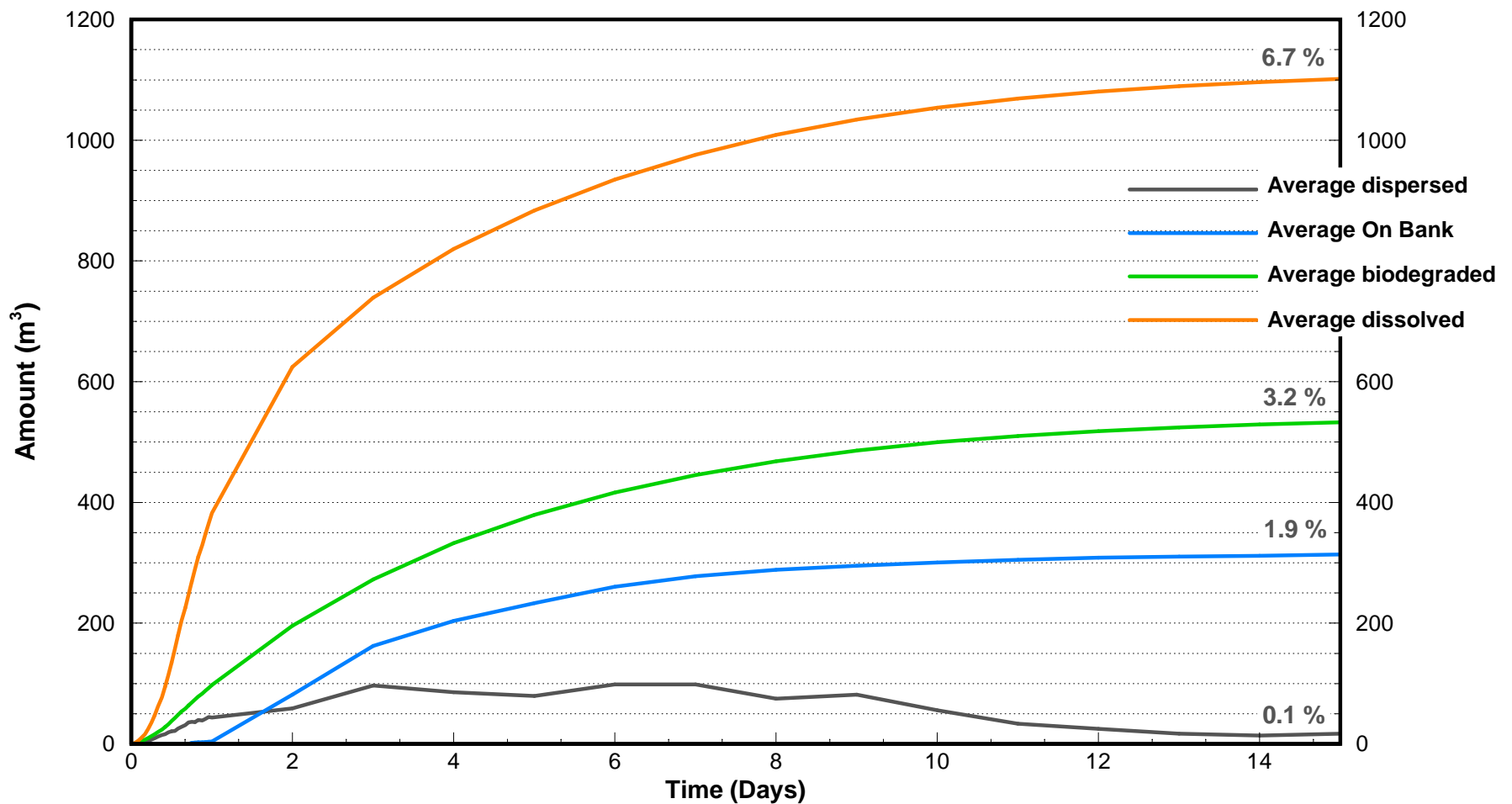


TRANS MOUNTAIN OIL SPILL STUDY

Stochastic Simulation Winter 2011, Site D (16,500 m³) Major Components of the Mass Balance

PROJECT NO. V13203022	DWN AH	CKD JAS	APVD -	REV 0
OFFICE EBA-VANC	DATE October 4, 2013			

Figure D.1-8



NOTES

- Statistical results based on independent spills occurring every 6 hours from January 01 00:00 to March 31 23:00.
- Tracking time for each spill was 15 days.
- The minor components of the mass balance are shown above.

STATUS
ISSUED FOR USE

CLIENT

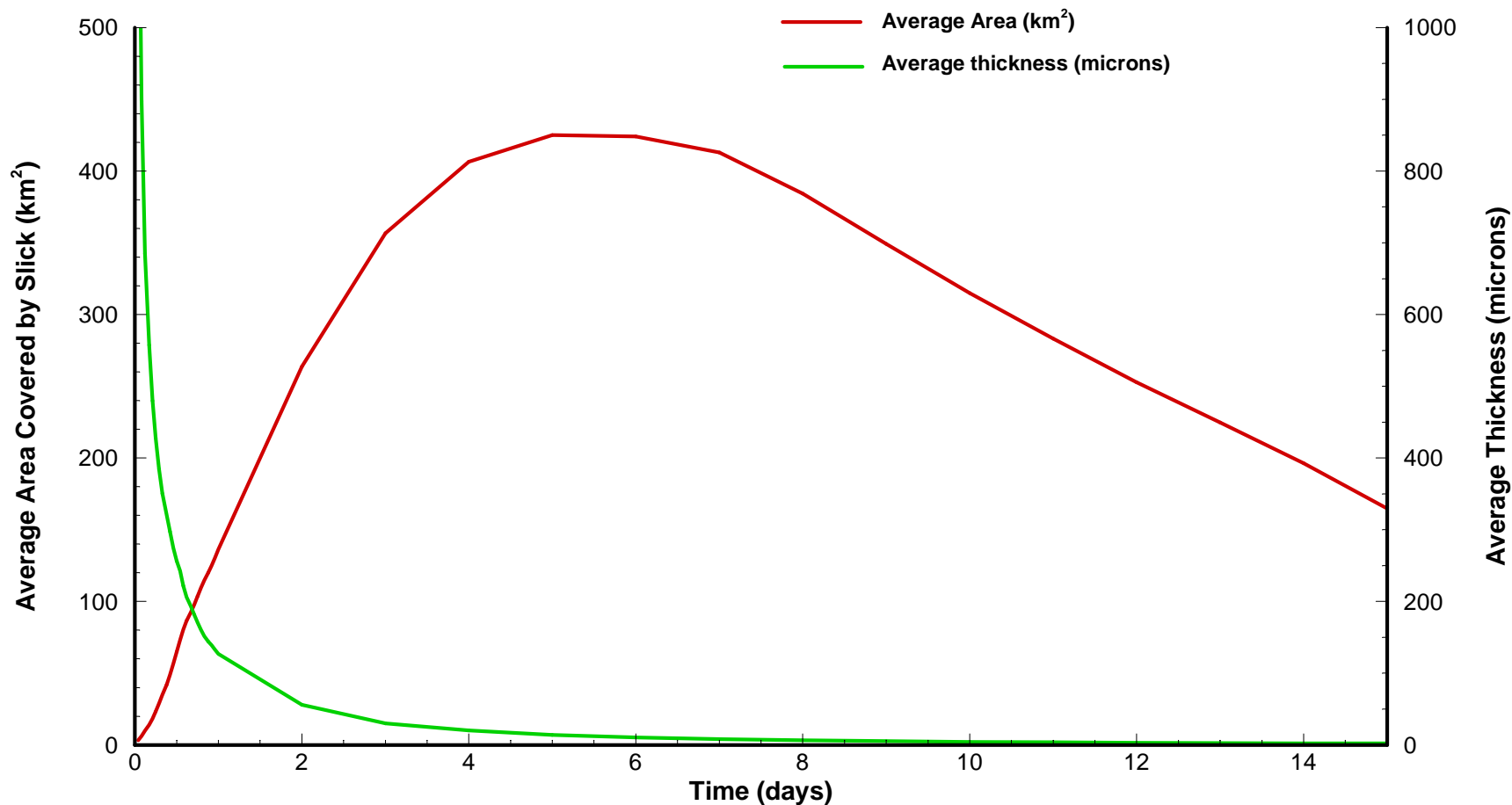


TRANS MOUNTAIN OIL SPILL STUDY

Stochastic Simulation Winter 2011, Site D (16,500 m³) Minor Components of the Mass Balance

PROJECT NO. V13203022	DWN AH	CKD JAS	APVD -	REV 0
OFFICE EBA-VANC	DATE October 4, 2013			

Figure D.1-9



NOTES

- Statistical results based on independent spills occurring every 6 hours from January 01 00:00 to March 31 23:00.
- The average thickness is based on a full coverage of each grid cell that contains oil.

STATUS
ISSUED FOR USE

CLIENT



TRANS MOUNTAIN OIL SPILL STUDY

Stochastic Simulation Winter 2011, Site D (16,500 m³) Statistics on Area and Thickness

PROJECT NO.
V13203022

OFFICE
EBA-VANC

DWN
AH

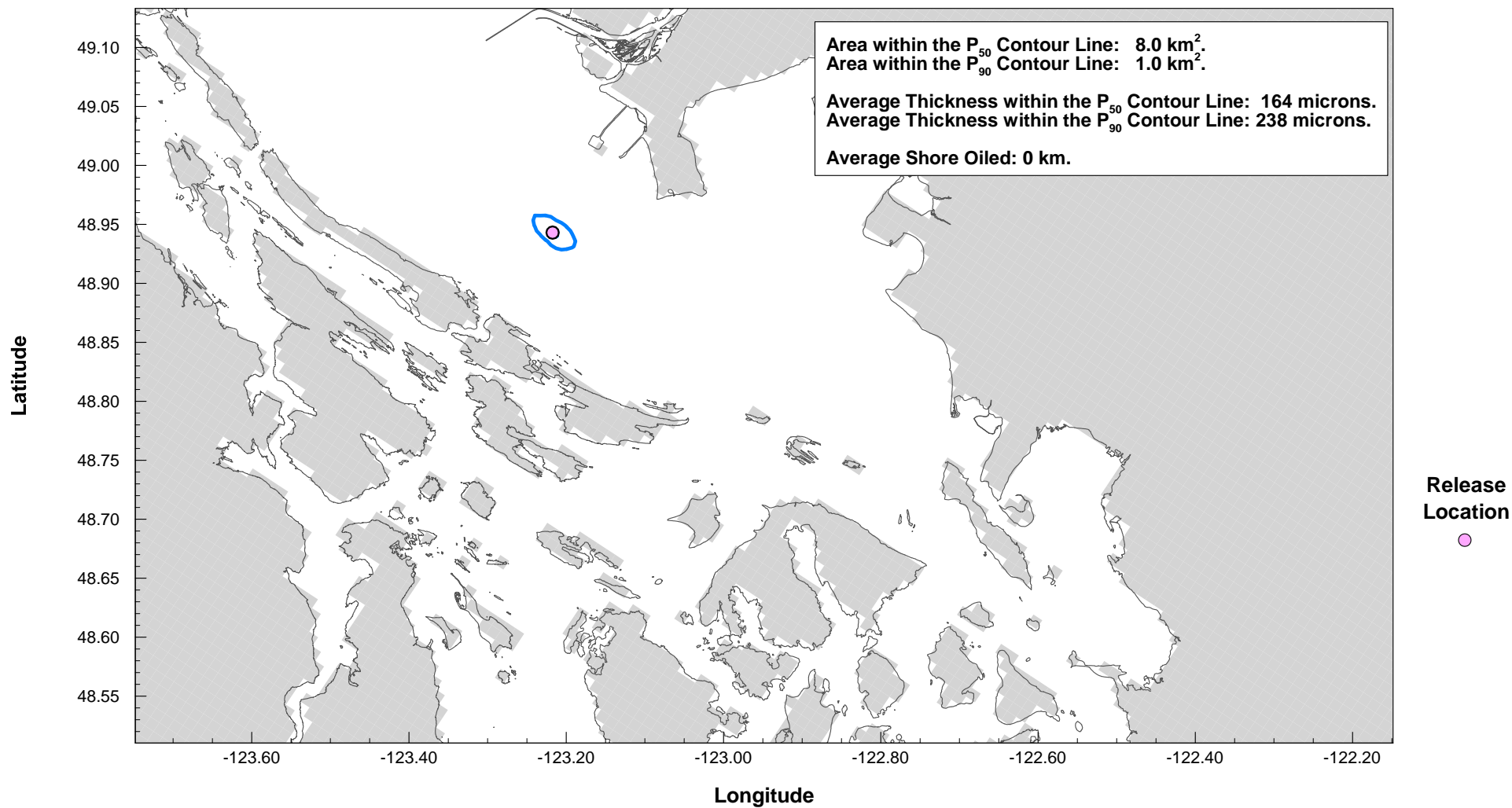
CKD
JAS

APVD
-

REV
0

DATE
October 4, 2013

Figure D.1-10



NOTES

- Statistical results based on independent spills occurring every 6 hours from January 01 00:00 to March 31 23:00.

Probability of oil presence is the percentage of simulations in which oil was present at a given location.

P_{50} : after 6 hours, there is a 50% probability for the area within the P_{50} contour line to have been contacted.

P_{90} : after 6 hours, there is a 90% probability for the area within the P_{90} contour line to have been contacted.

- Tracking time for each spill was 6 hours.

- The average thickness is based on a full coverage of each grid cell that contains oil and within the contour line.

STATUS
ISSUED FOR USE

CLIENT



TRANS MOUNTAIN OIL SPILL STUDY

Stochastic Simulation
Winter 2011, Site D (16,500 m³)
 P_{50} and P_{90} after 6 Hours

PROJECT NO.

V13203022

OFFICE

EBA-VANC

DWN

AH

CKD

JAS

APVD

-

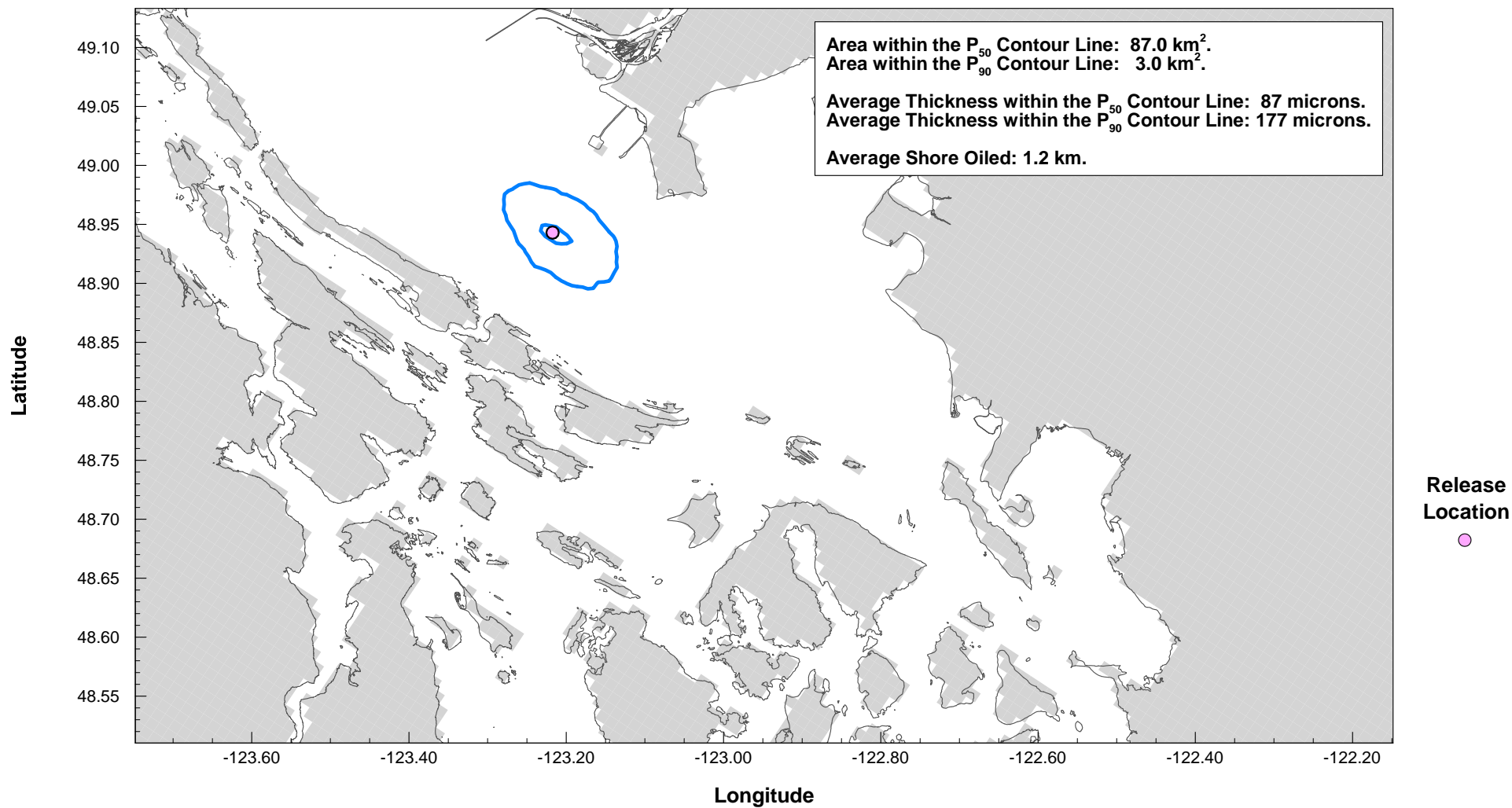
REV

0

DATE

October 4, 2013

Figure D.1-11



NOTES

- Statistical results based on independent spills occurring every 6 hours from January 01 00:00 to March 31 23:00.

Probability of oil presence is the percentage of simulations in which oil was present at a given location.

P_{50} : after 12 hours, there is a 50% probability for the area within the P_{50} contour line to have been contacted.

P_{90} : after 12 hours, there is a 90% probability for the area within the P_{90} contour line to have been contacted.

- Tracking time for each spill was 12 hours.

- The average thickness is based on a full coverage of each grid cell that contains oil and within the contour line.

STATUS
ISSUED FOR USE

CLIENT

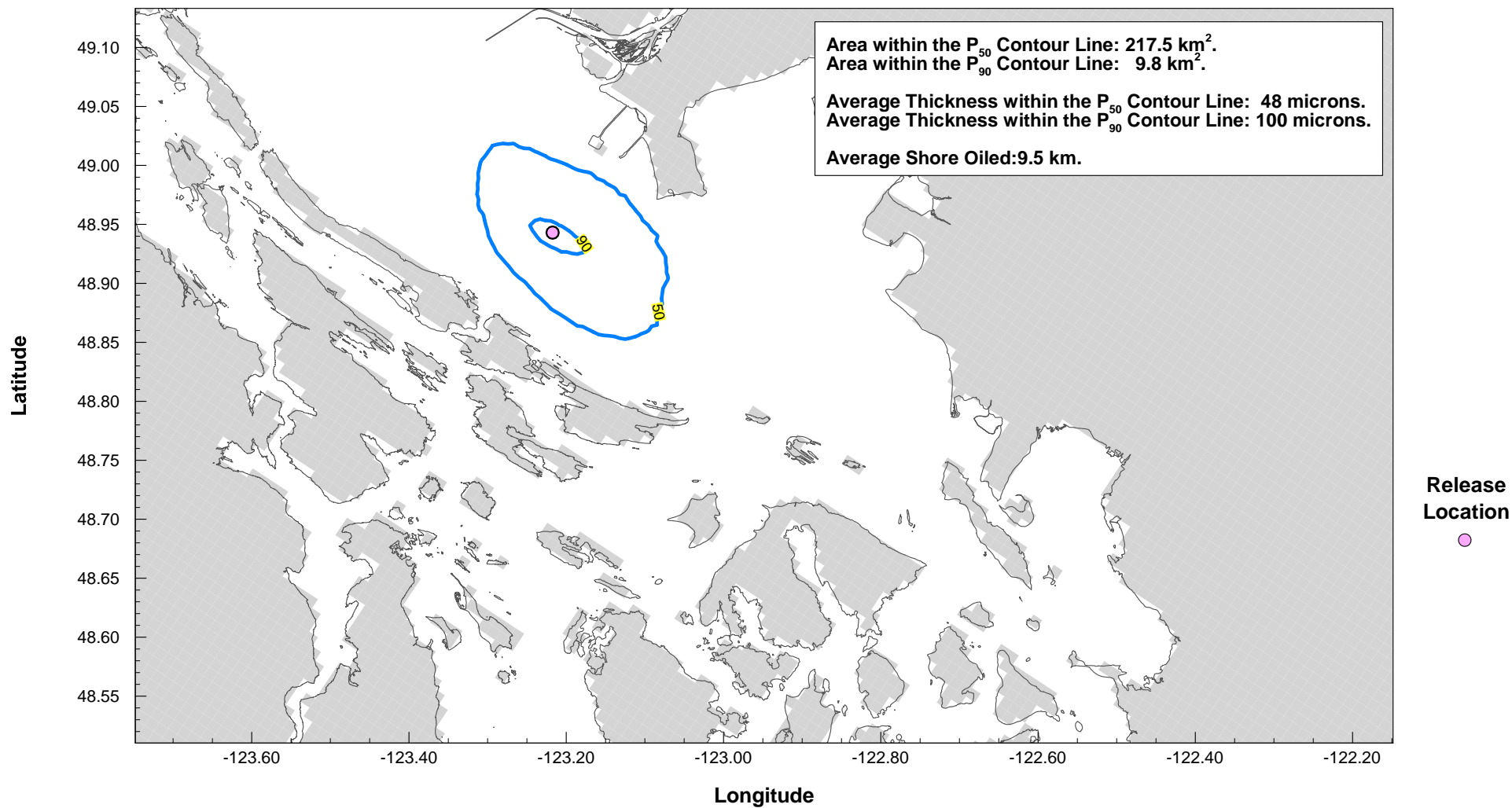


TRANS MOUNTAIN OIL SPILL STUDY

Stochastic Simulation
Winter 2011, Site D (16,500 m³)
 P_{50} and P_{90} after 12 Hours

PROJECT NO. V13203022	DWN AH	CKD JAS	APVD -	REV 0
OFFICE EBA-VANC	DATE October 4, 2013			

Figure D.1-12



NOTES

- Statistical results based on independent spills occurring every 6 hours from January 01 00:00 to March 31 23:00.

Probability of oil presence is the percentage of simulations in which oil was present at a given location.

P_{50} : after 24 hours, there is a 50% probability for the area within the P_{50} contour line to have been contacted.

P_{90} : after 24 hours, there is a 90% probability for the area within the P_{90} contour line to have been contacted.

- Tracking time for each spill was 24 hours.

- The average thickness is based on a full coverage of each grid cell that contains oil and within the contour line.

STATUS
ISSUED FOR USE

CLIENT

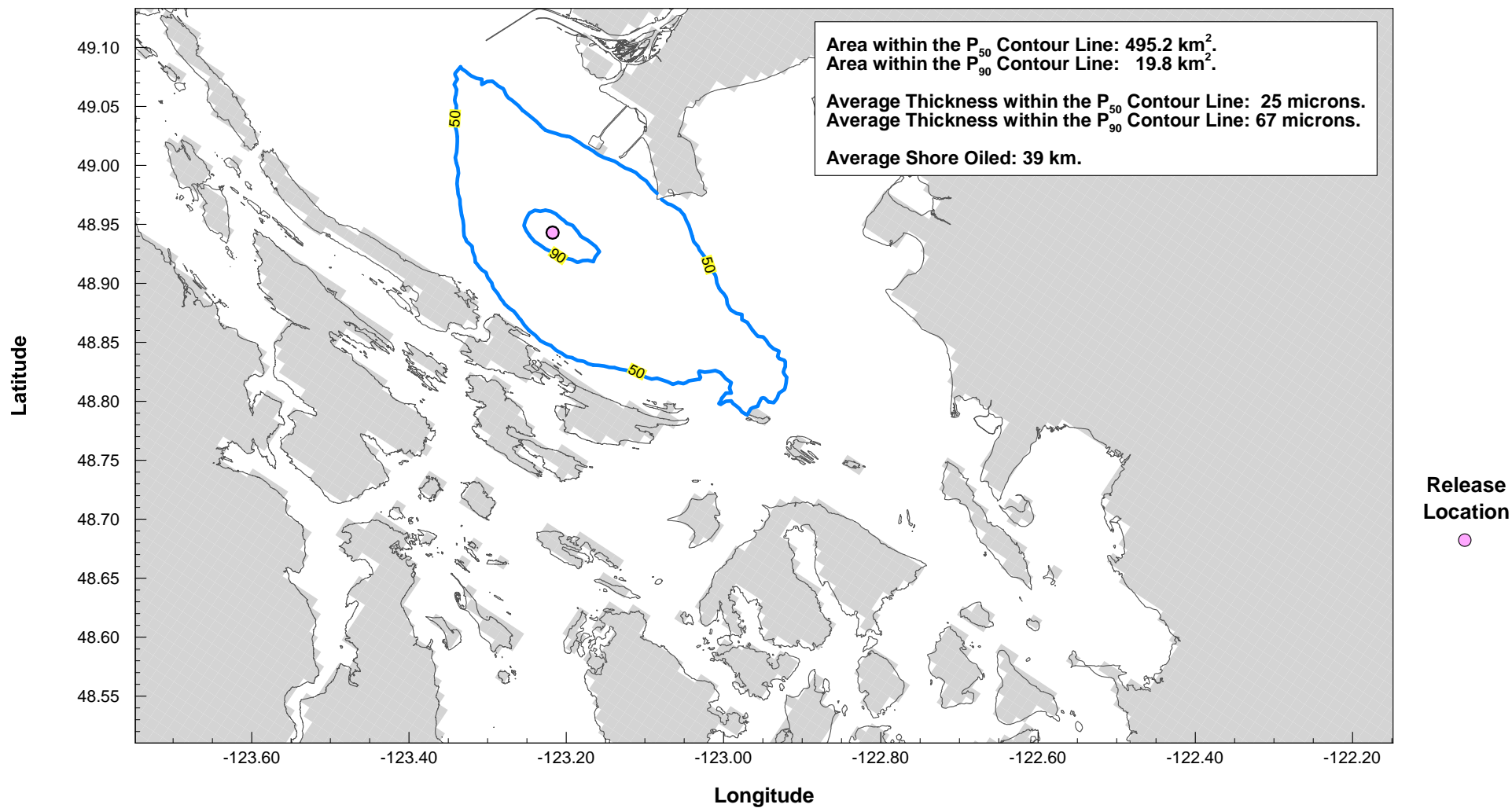


TRANS MOUNTAIN OIL SPILL STUDY

Stochastic Simulation
Winter 2011, Site D (16,500 m³)
 P_{50} and P_{90} after 24 Hours

PROJECT NO. V13203022	DWN AH	CKD JAS	APVD -	REV 0
OFFICE EBA-VANC	DATE October 4, 2013			

Figure D.1-13



NOTES

- Statistical results based on independent spills occurring every 6 hours from January 01 00:00 to March 31 23:00.

Probability of oil presence is the percentage of simulations in which oil was present at a given location.

P_{50} : after 48 hours, there is a 50% probability for the area within the P_{50} contour line to have been contacted.

P_{90} : after 48 hours, there is a 90% probability for the area within the P_{90} contour line to have been contacted.

- Tracking time for each spill was 48 hours.

- The average thickness is based on a full coverage of each grid cell that contains oil and within the contour line.

STATUS
ISSUED FOR USE

CLIENT

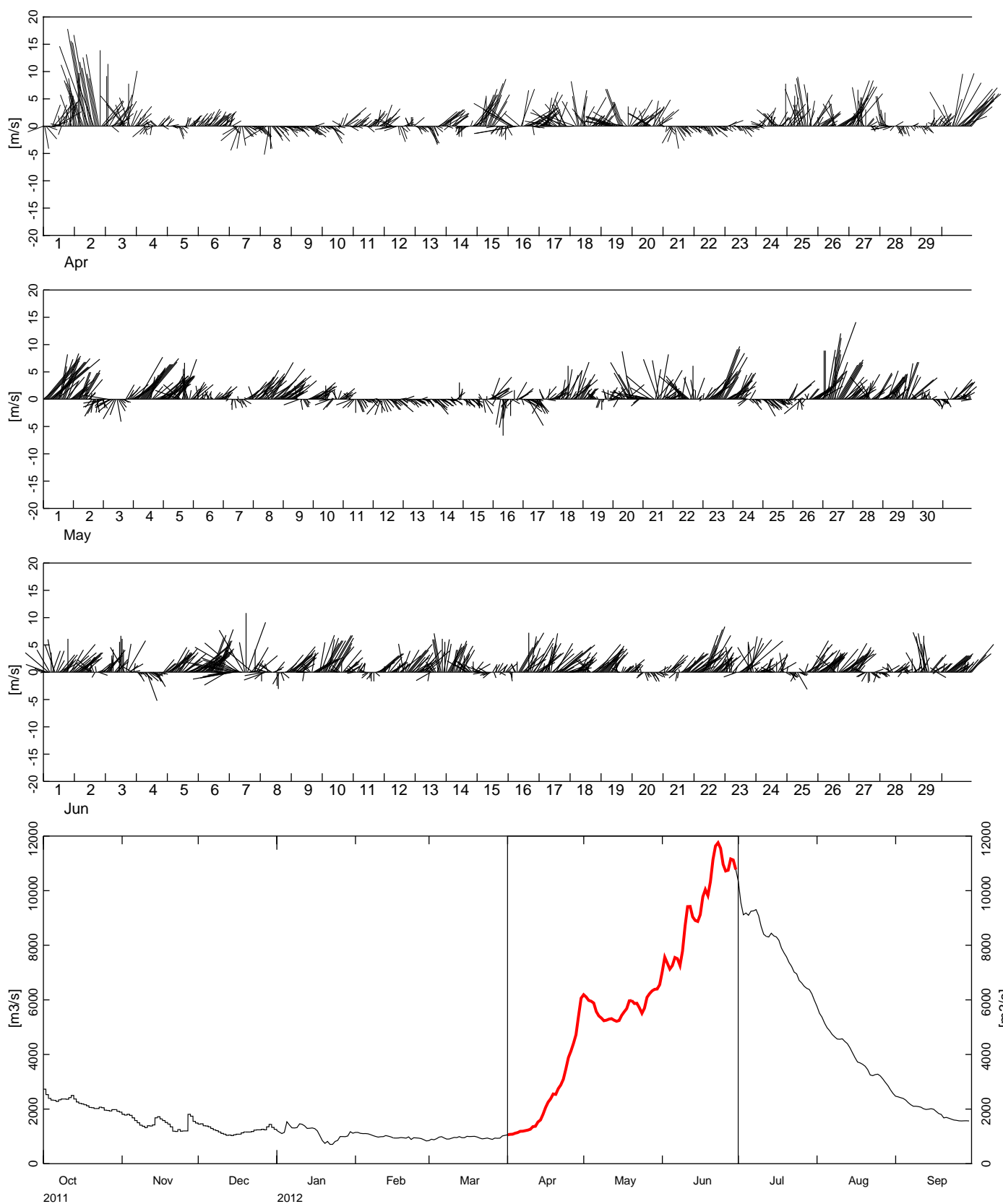


TRANS MOUNTAIN OIL SPILL STUDY

Stochastic Simulation
Winter 2011, Site D (16,500 m³)
 P_{50} and P_{90} after 48 Hours

PROJECT NO. V13203022	DWN AH	CKD JAS	APVD -	REV 0
OFFICE EBA-VANC	DATE October 4, 2013			

Figure D.1-14



NOTES

- The wind stick represent winds at Saturna Island.
- The bottom graph represents the Fraser River discharge at Hope.

STATUS
ISSUED FOR USE

CLIENT

TRANS MOUNTAIN



TRANS MOUNTAIN OIL SPILL STUDY

Environmental Conditions: Spring 2012 Site D
Stochastic Modelling

PROJECT NO.
V13203022

OFFICE
EBA-VANC

DWN
AH

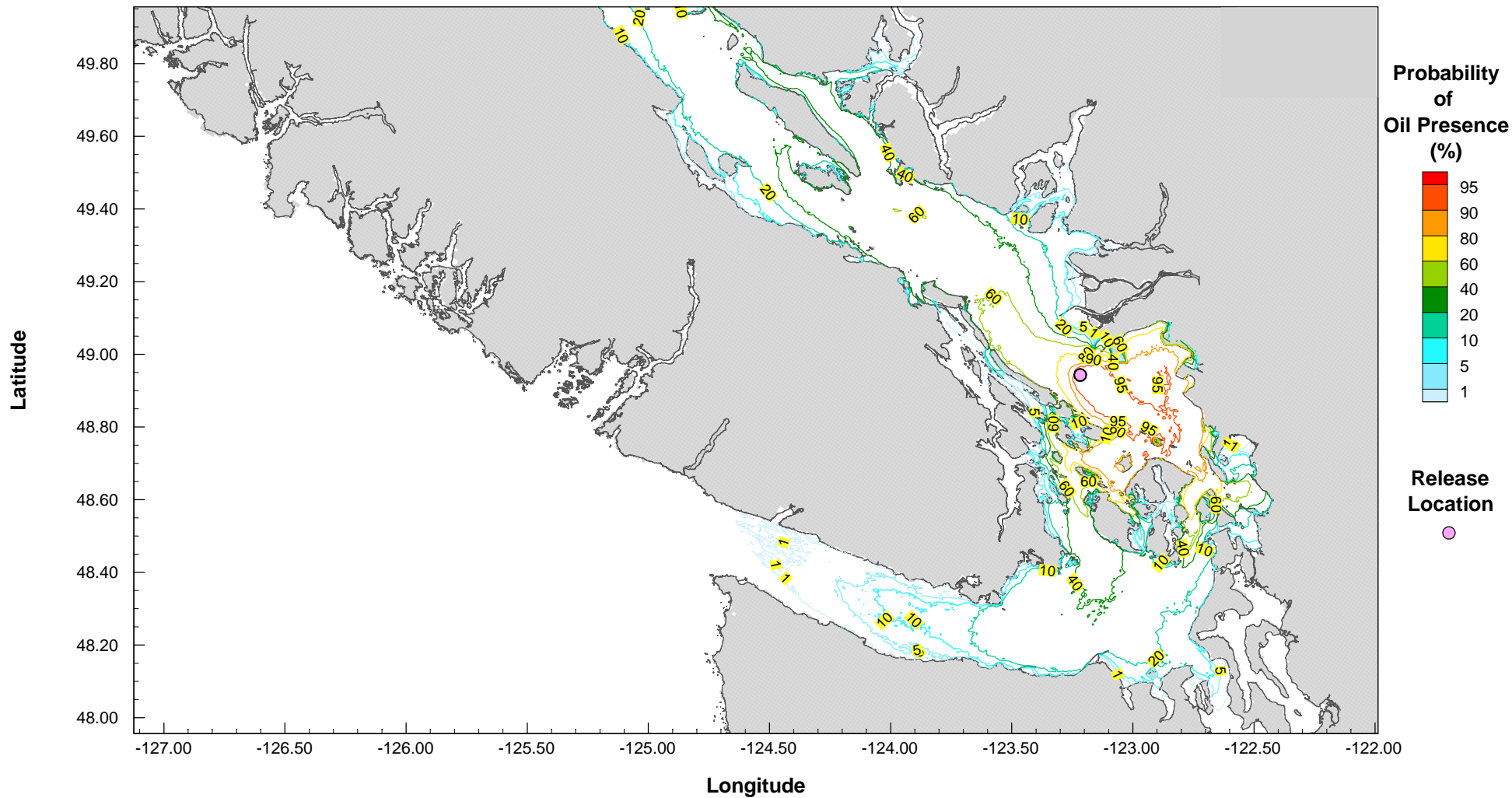
CHK
JAS

APVD
JAS

REV
0

DATE
October 2013

Figure D.2-1



NOTES

- Statistical results based on independent spills occurring every 6 hours from April 01 00:00 to June 30 23:00.
- Probability of oil presence is the percentage of simulations in which oil was present at a given location.
- Tracking time for each spill was 15 days.

STATUS
ISSUED FOR USE

CLIENT

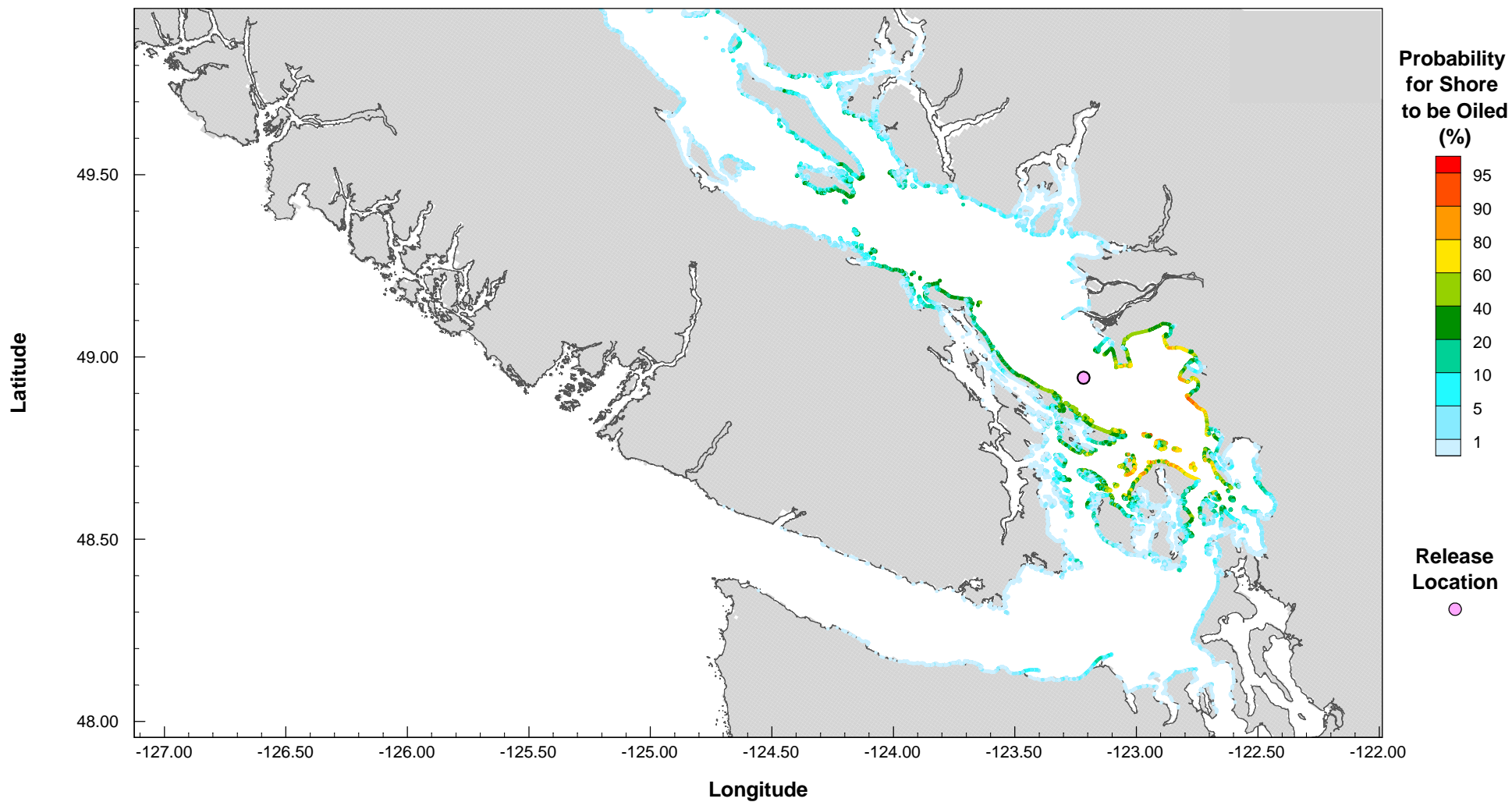


TRANS MOUNTAIN OIL SPILL STUDY

**Stochastic Simulation
Spring 2011, Site D (16,500 m³)
Probability of Oil Presence**

PROJECT NO. V13203022	DWN AH	CKD JAS	APVD -	REV 0
OFFICE EBA-VANC	DATE October 4, 2013			

Figure D.2-2



NOTES

- Statistical results based on independent spills occurring every 6 hours from April 01 00:00 to June 30 23:00.
- Probability of oil presence is the percentage of simulations in which oil was present at a given location.
- Tracking time for each spill was 15 days.

STATUS
ISSUED FOR USE

CLIENT

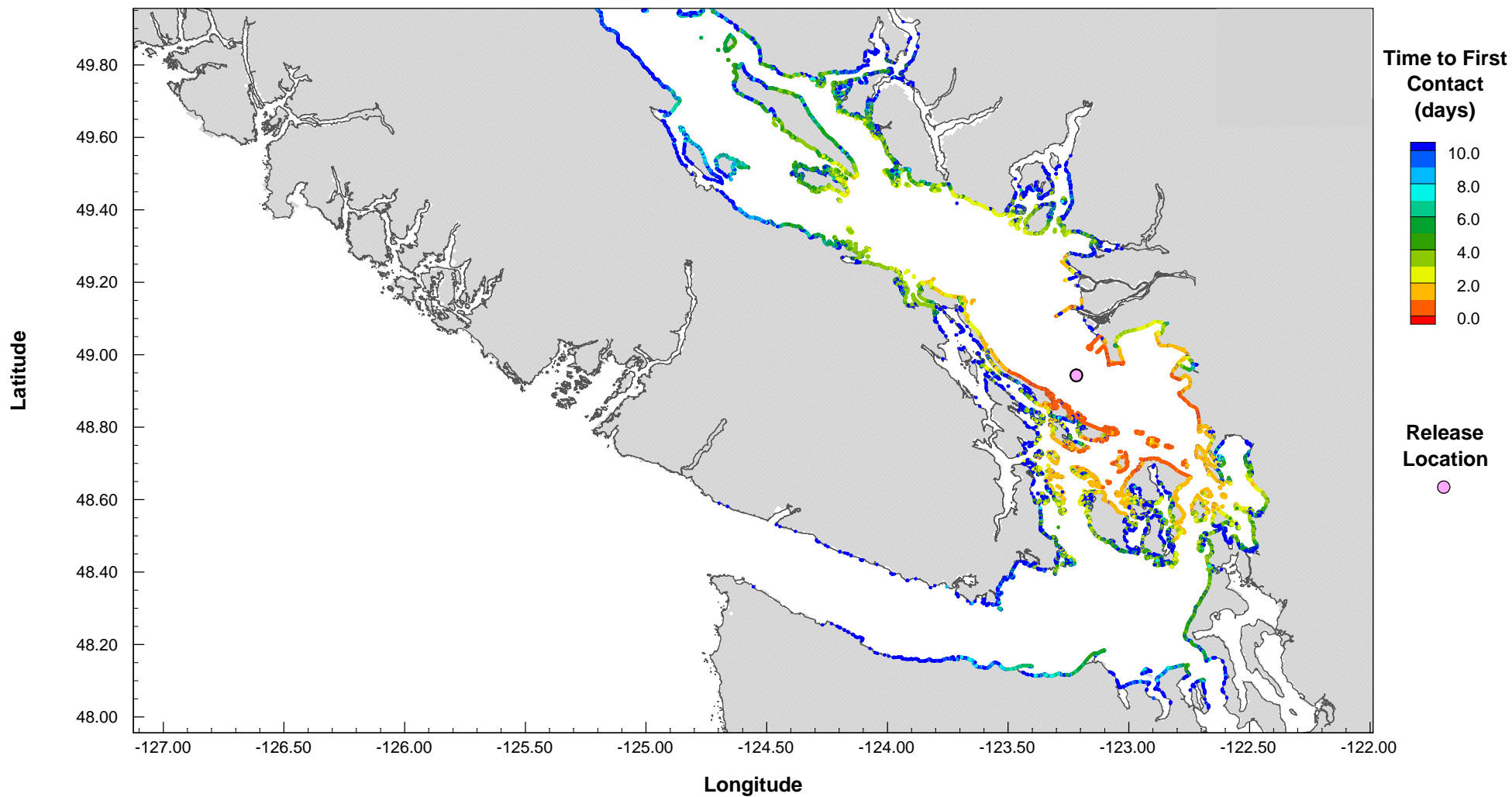


TRANS MOUNTAIN OIL SPILL STUDY

**Stochastic Simulation
Spring 2011, Site D (16,500 m³)
Shoreline Oiled Probability**

PROJECT NO. V13203022	DWN AH	CKD JAS	APVD -	REV 0
OFFICE EBA-VANC	DATE October 4, 2013			

Figure D.2-3



NOTES

- Statistical results based on independent spills occurring every 6 hours from April 01 00:00 to June 30 23:00.
- Time to first contact is the minimum time, over all simulations, for oil to reach a given shore segment.
- Tracking time for each spill was 15 days.

STATUS
ISSUED FOR USE

CLIENT

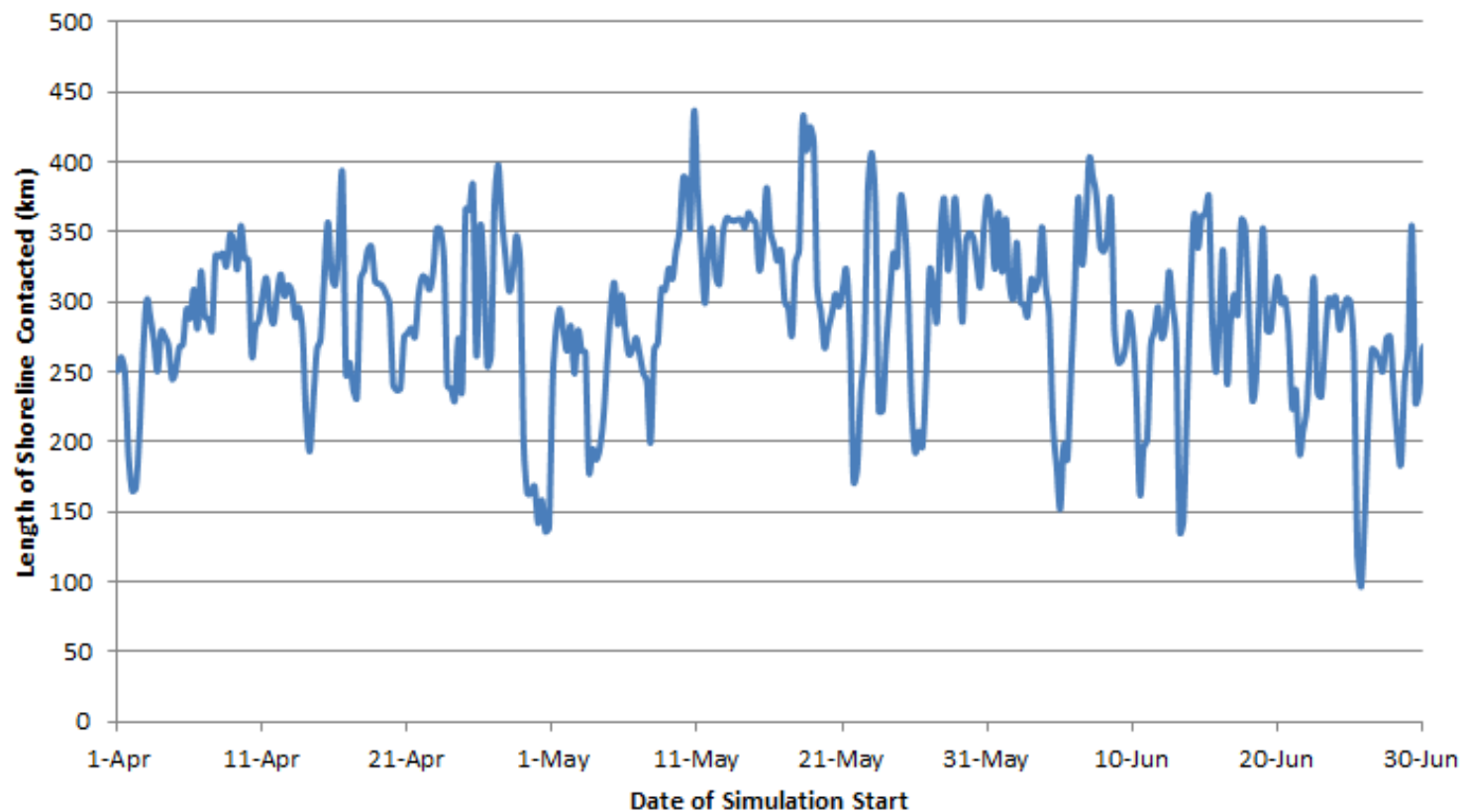


TRANS MOUNTAIN OIL SPILL STUDY

Stochastic Simulation Spring 2011, Site D (16,500 m³) Shoreline Time to First Contact

PROJECT NO. V13203022	DWN AH	CKD JAS	APVD -	REV 0
OFFICE EBA-VANC	DATE October 4, 2013			

Figure D.2-4



NOTES

- Statistical results based on independent spills occurring every 6 hours from April 01 00:00 to June 30 23:00, for a total of 364 independent spills.
- Tracking time for each spill was 15 days.

STATUS
ISSUED FOR USE

CLIENT

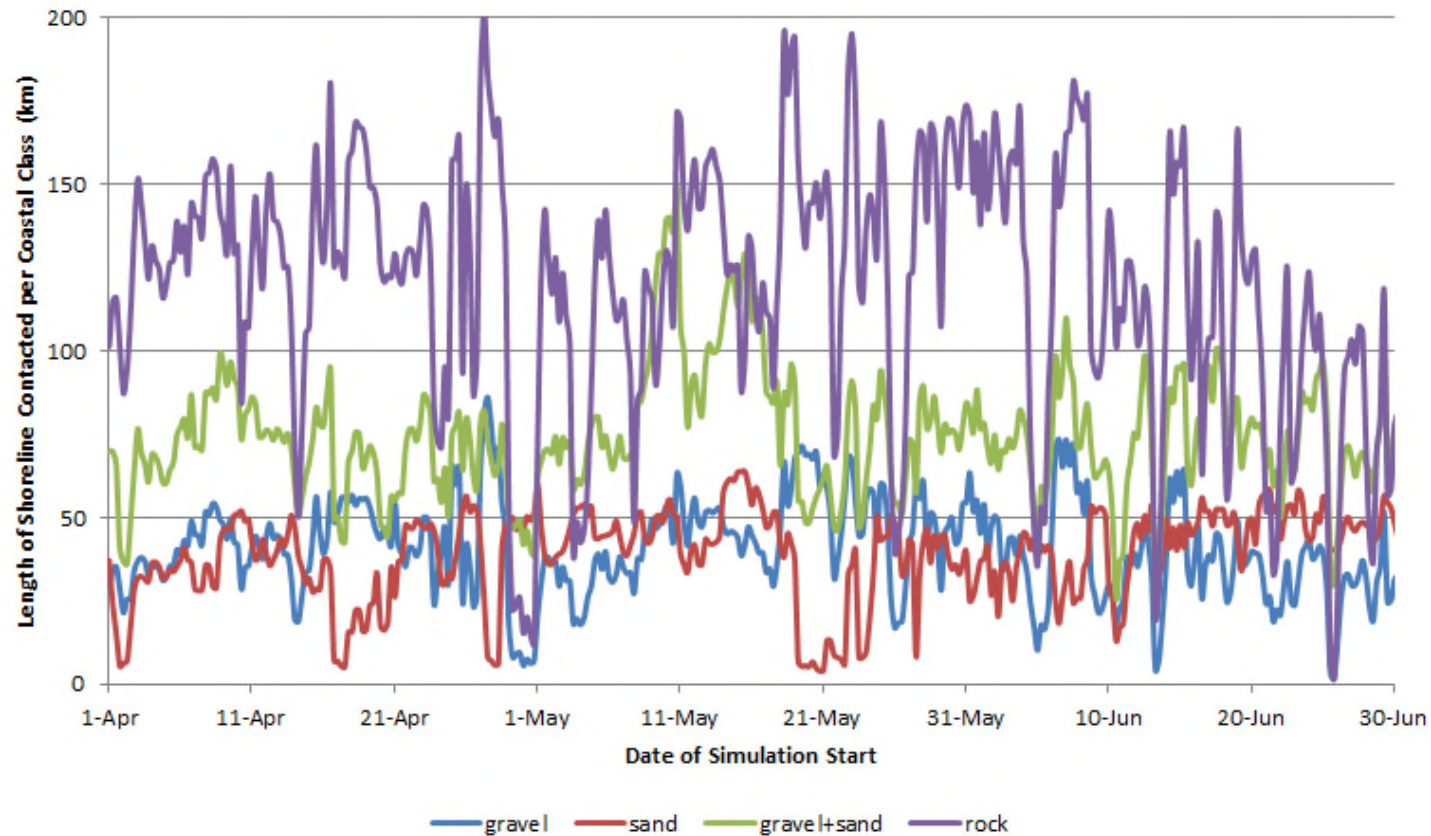


TRANS MOUNTAIN OIL SPILL STUDY

Stochastic Simulation Spring 2012, Site D (16,500 m³) Length of Shoreline Contacted

PROJECT NO. V13203022	DWN AH	CKD JAS	APVD -	REV 0
OFFICE EBA-VANC	DATE October 4, 2013			

Figure D.2-5



NOTES

- Statistical results based on independent spills occurring every 6 hours from April 01 00:00 to June 30 23:00, for a total of 364 independent spills.
- Tracking time for each spill was 15 days.

STATUS
ISSUED FOR USE

CLIENT



TRANS MOUNTAIN OIL SPILL STUDY

Stochastic Simulation - Spring 2012 Site D (16,500 m³): Length of Shoreline Contacted Per Coastal Class

PROJECT NO.
V13203022

DWN
AH

CKD
JAS

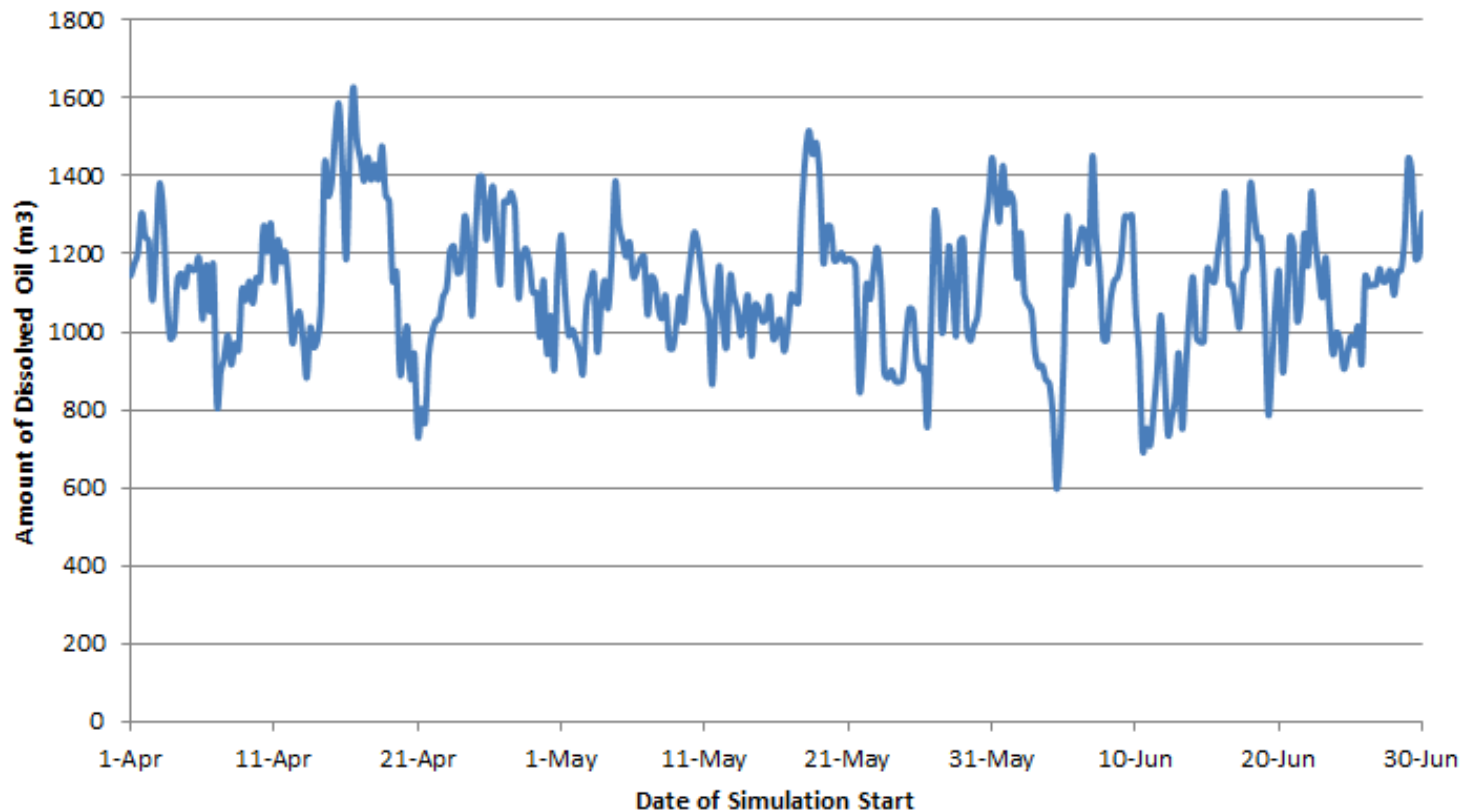
APVD
-

REV
0

OFFICE
EBA-VANC

DATE
October 4, 2013

Figure D.2-6



NOTES

- Statistical results based on independent spills occurring every 6 hours from April 01 00:00 to June 30 23:00, for a total of 364 independant spills.
- Tracking time for each spill was 15 days.

STATUS
ISSUED FOR USE

CLIENT

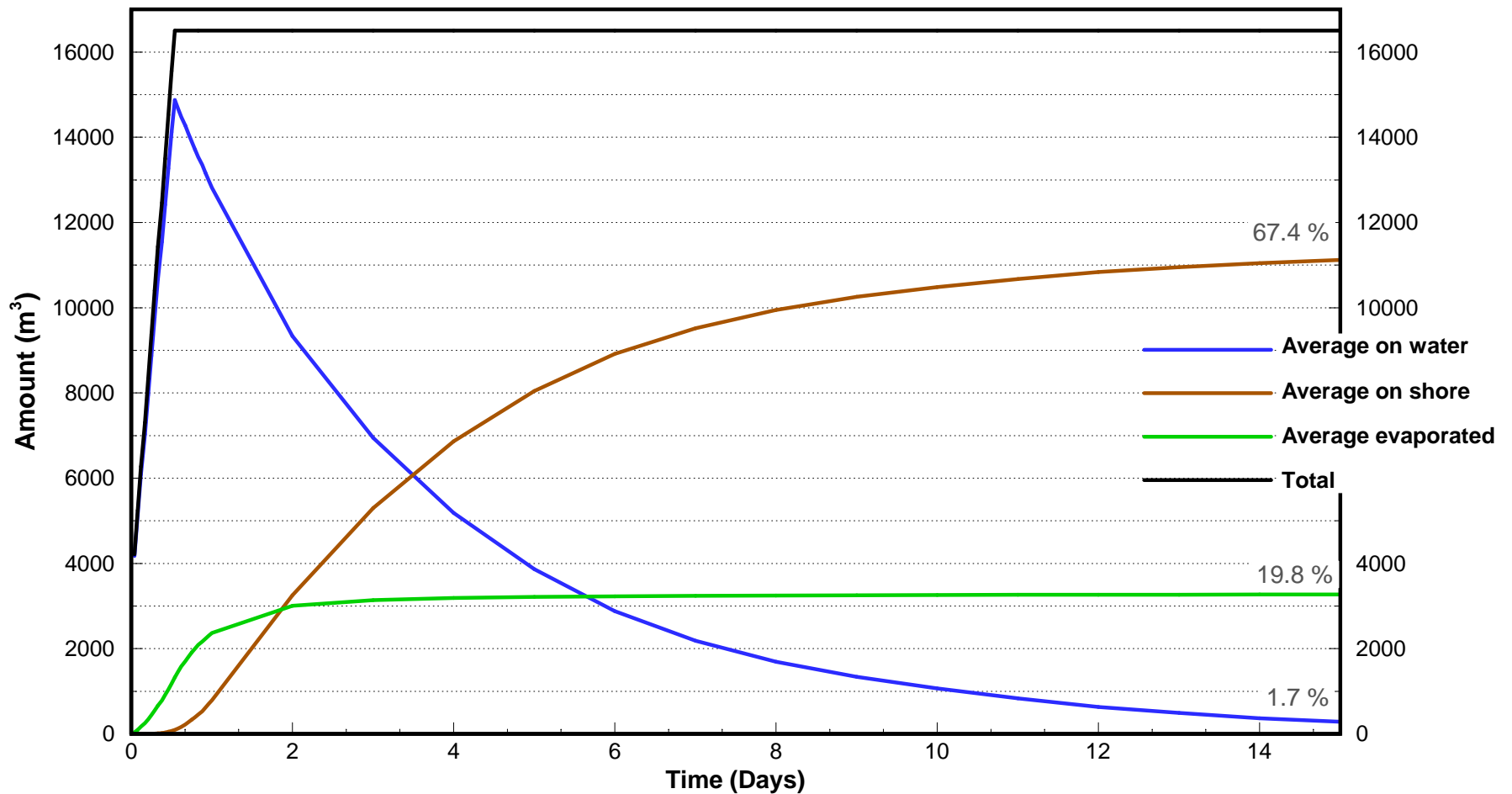


TRANS MOUNTAIN OIL SPILL STUDY

Stochastic Simulation Spring 2012, Site D (16,500 m³) Amount of Dissolved Oil

PROJECT NO. V13203022	DWN AH	CKD JAS	APVD -	REV 0
OFFICE EBA-VANC	DATE October 4, 2013			

Figure D.2-7



NOTES

- Statistical results based on independent spills occurring every 6 hours from April 01 00:00 to June 30 23:00.
- Tracking time for each spill was 15 days.
- The major components of the mass balance are shown above.

STATUS
ISSUED FOR USE

CLIENT

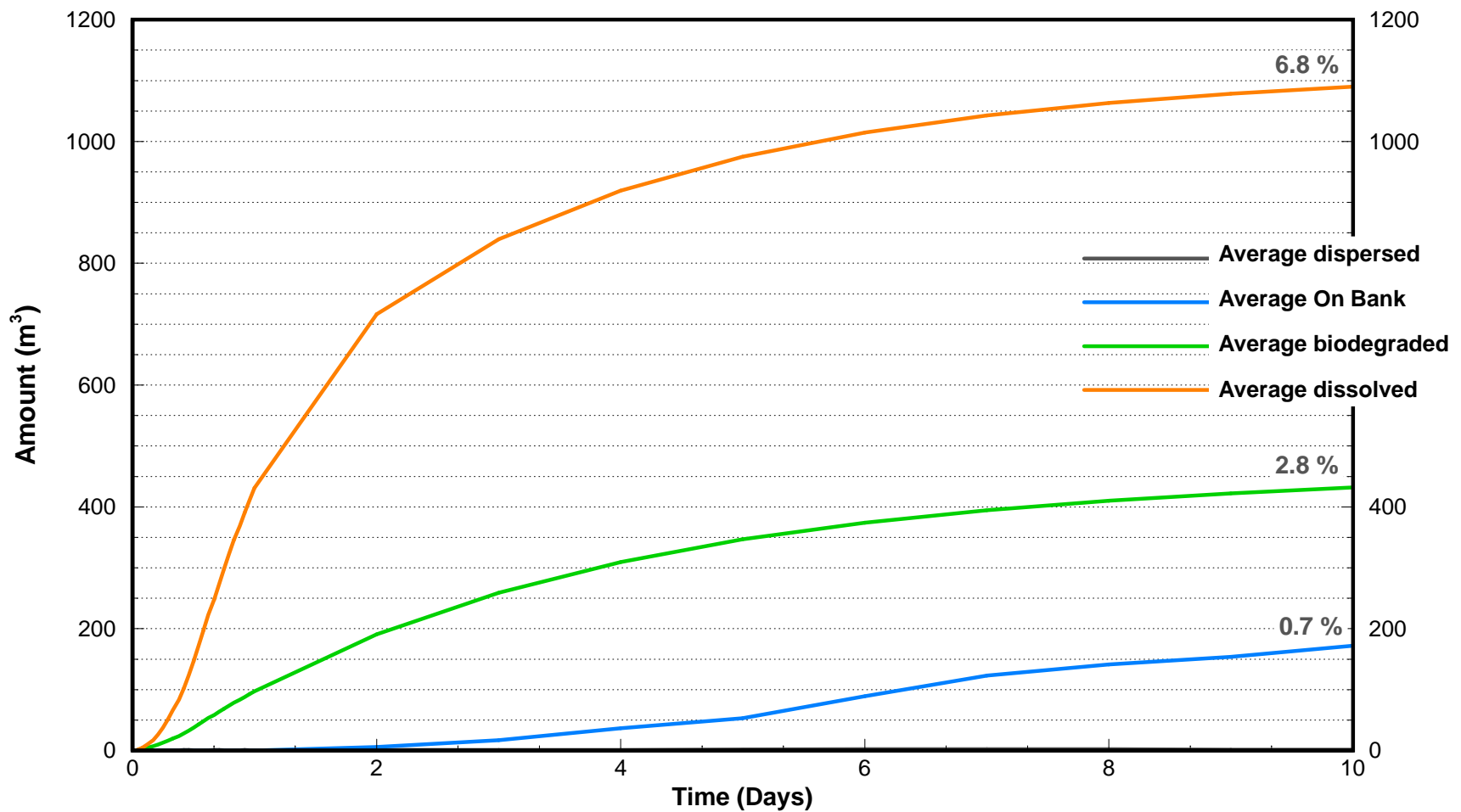


TRANS MOUNTAIN OIL SPILL STUDY

Stochastic Simulation Spring 2011, Site D (16,500 m³) Major Components of the Mass Balance

PROJECT NO. V13203022	DWN AH	CKD JAS	APVD -	REV 0
OFFICE EBA-VANC	DATE October 4, 2013			

Figure D.2-8



NOTES

- Statistical results based on independent spills occurring every 6 hours from April 01 00:00 to June 30 23:00.
- Tracking time for each spill was 15 days.
- The minor components of the mass balance are shown above.

STATUS
ISSUED FOR USE

CLIENT

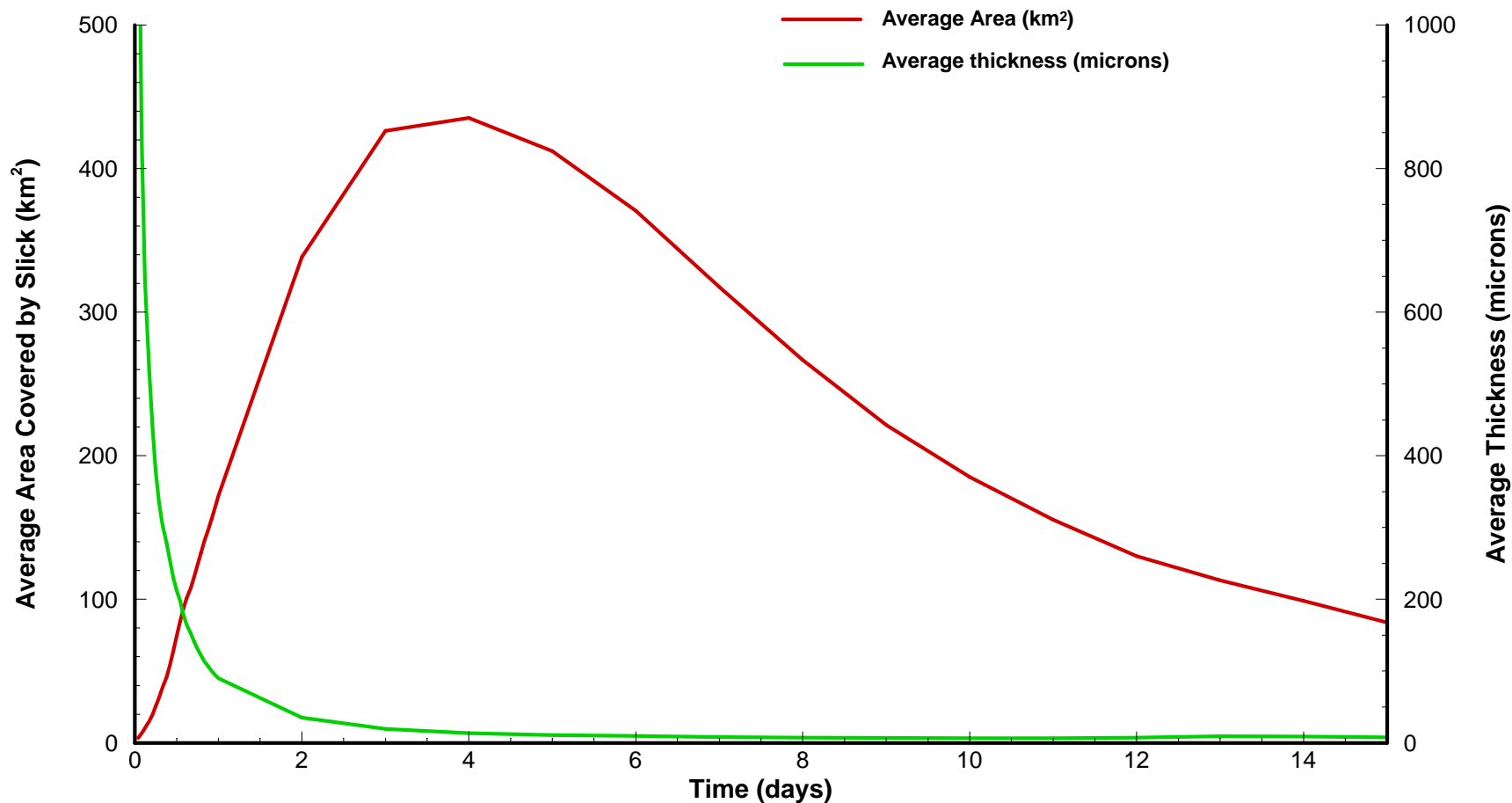


TRANS MOUNTAIN OIL SPILL STUDY

Stochastic Simulation Spring 2011, Site D (16,500 m³) Minor Components of the Mass Balance

PROJECT NO. V13203022	DWN AH	CKD JAS	APVD -	REV 0
OFFICE EBA-VANC	DATE October 4, 2013			

Figure D.2-9



NOTES

- Statistical results based on independent spills occurring every 6 hours from April 01 00:00 to June 30 23:00.
- The average thickness is based on a full coverage of each grid cell that contains oil.

STATUS
ISSUED FOR USE

CLIENT

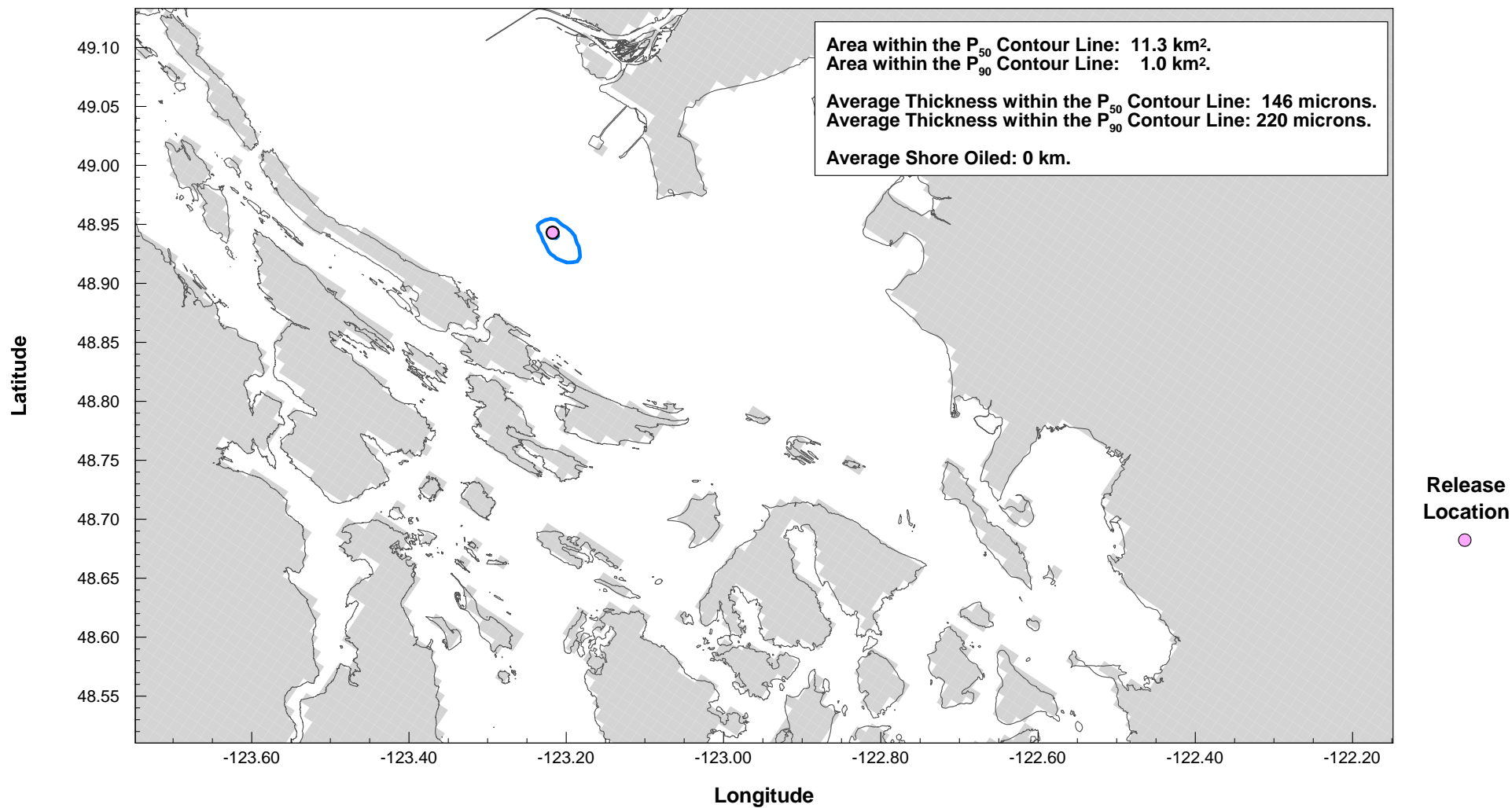


TRANS MOUNTAIN OIL SPILL STUDY

Stochastic Simulation Spring 2011, Site D (16,500 m³) Statistics on Area and Thickness

PROJECT NO. V13203022	DWN AH	CKD JAS	APVD -	REV 0
OFFICE EBA-VANC	DATE October 4, 2013			

Figure D.2-10



NOTES

- Statistical results based on independent spills occurring every 6 hours from April 01 00:00 to June 30 23:00.

Probability of oil presence is the percentage of simulations in which oil was present at a given location.

P_{50} : after 6 hours, there is a 50% probability for the area within the P_{50} contour line to have been contacted.

P_{90} : after 6 hours, there is a 90% probability for the area within the P_{90} contour line to have been contacted.

- Tracking time for each spill was 6 hours.

- The average thickness is based on a full coverage of each grid cell that contains oil and within the contour line.

STATUS
ISSUED FOR USE

CLIENT

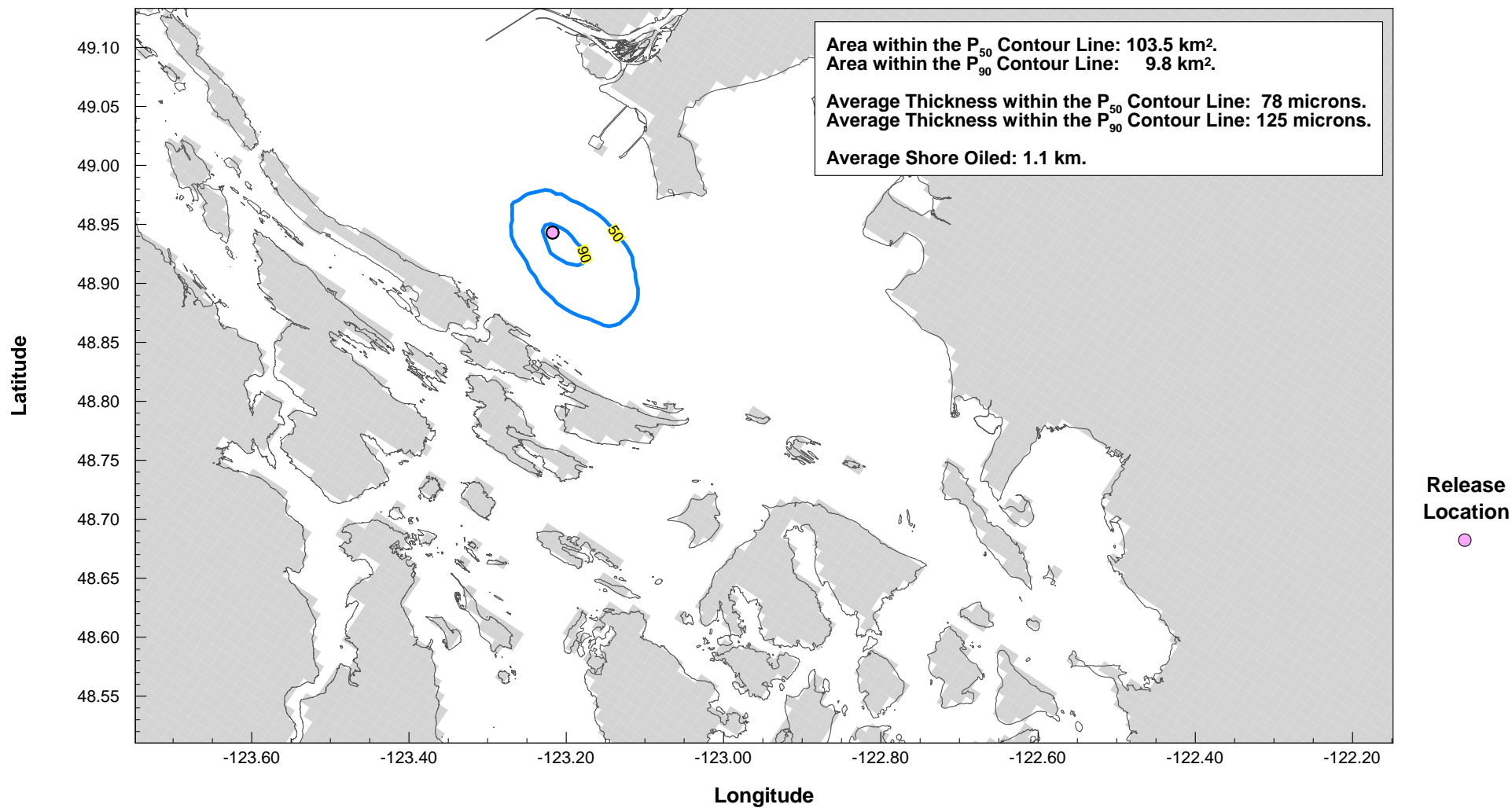


TRANS MOUNTAIN OIL SPILL STUDY

Stochastic Simulation
Spring 2011, Site D (16,500 m³)
 P_{50} and P_{90} after 6 Hours

PROJECT NO. V13203022	DWN AH	CKD JAS	APVD -	REV 0
OFFICE EBA-VANC	DATE October 4, 2013			

Figure D.2-11



NOTES

- Statistical results based on independent spills occurring every 6 hours from April 01 00:00 to June 30 23:00.

Probability of oil presence is the percentage of simulations in which oil was present at a given location.

P_{50} : after 12 hours, there is a 50% probability for the area within the P_{50} contour line to have been contacted.

P_{90} : after 12 hours, there is a 90% probability for the area within the P_{90} contour line to have been contacted.

- Tracking time for each spill was 12 hours.

- The average thickness is based on a full coverage of each grid cell that contains oil and within the contour line.

STATUS
ISSUED FOR USE

CLIENT



TRANS MOUNTAIN OIL SPILL STUDY

Stochastic Simulation
Spring 2011, Site D (16,500 m³)
 P_{50} and P_{90} after 12 Hours

PROJECT NO.
V13203022

DWN
AH

CKD
JAS

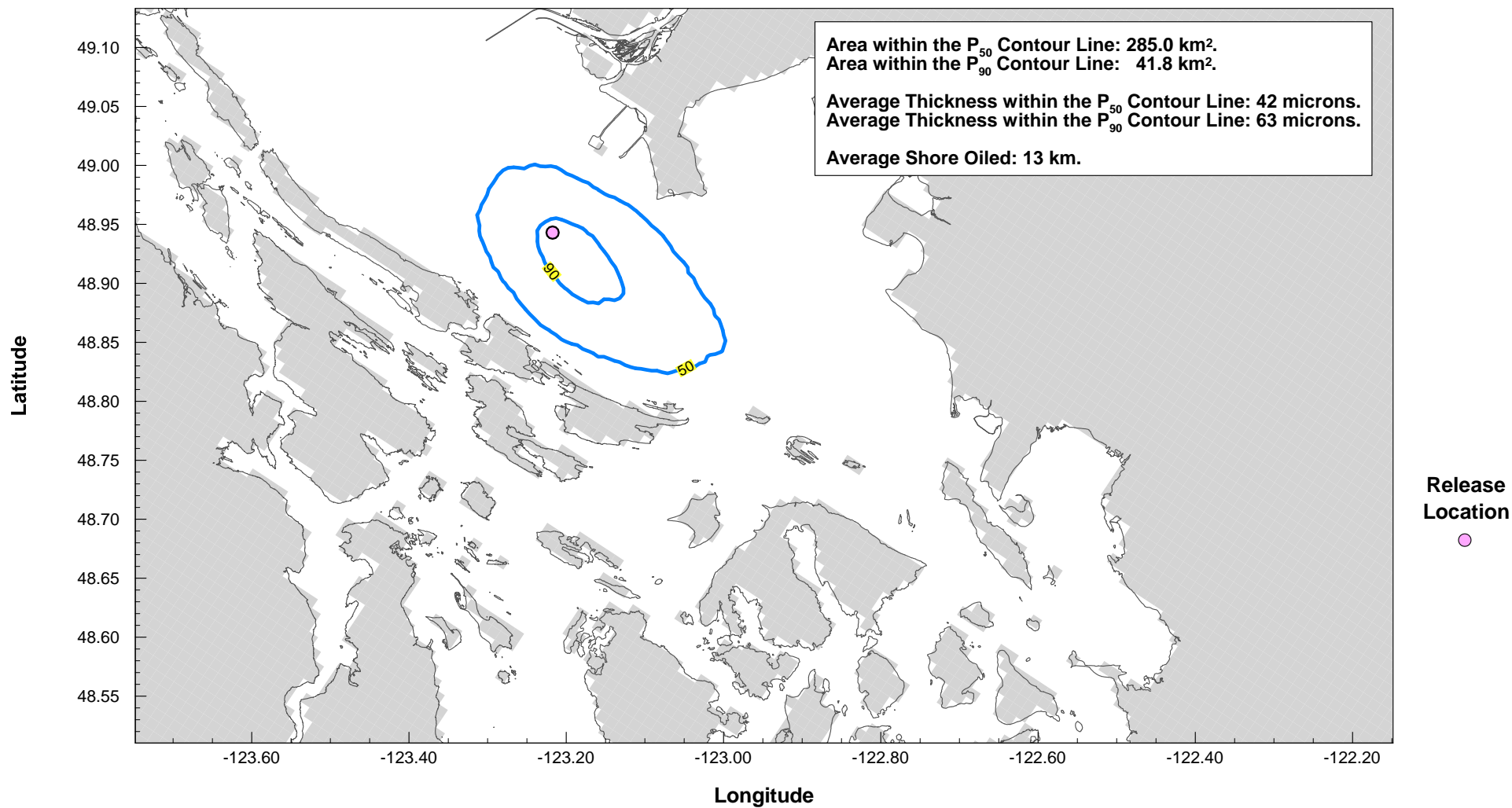
APVD
-

REV
0

OFFICE
EBA-VANC

DATE
October 4, 2013

Figure D.2-12



NOTES

- Statistical results based on independent spills occurring every 6 hours from April 01 00:00 to June 30 23:00.

Probability of oil presence is the percentage of simulations in which oil was present at a given location.

P_{50} : after 24 hours, there is a 50% probability for the area within the P_{50} contour line to have been contacted.

P_{90} : after 24 hours, there is a 90% probability for the area within the P_{90} contour line to have been contacted.

- Tracking time for each spill was 24 hours.

- The average thickness is based on a full coverage of each grid cell that contains oil and within the contour line.

STATUS
ISSUED FOR USE

CLIENT

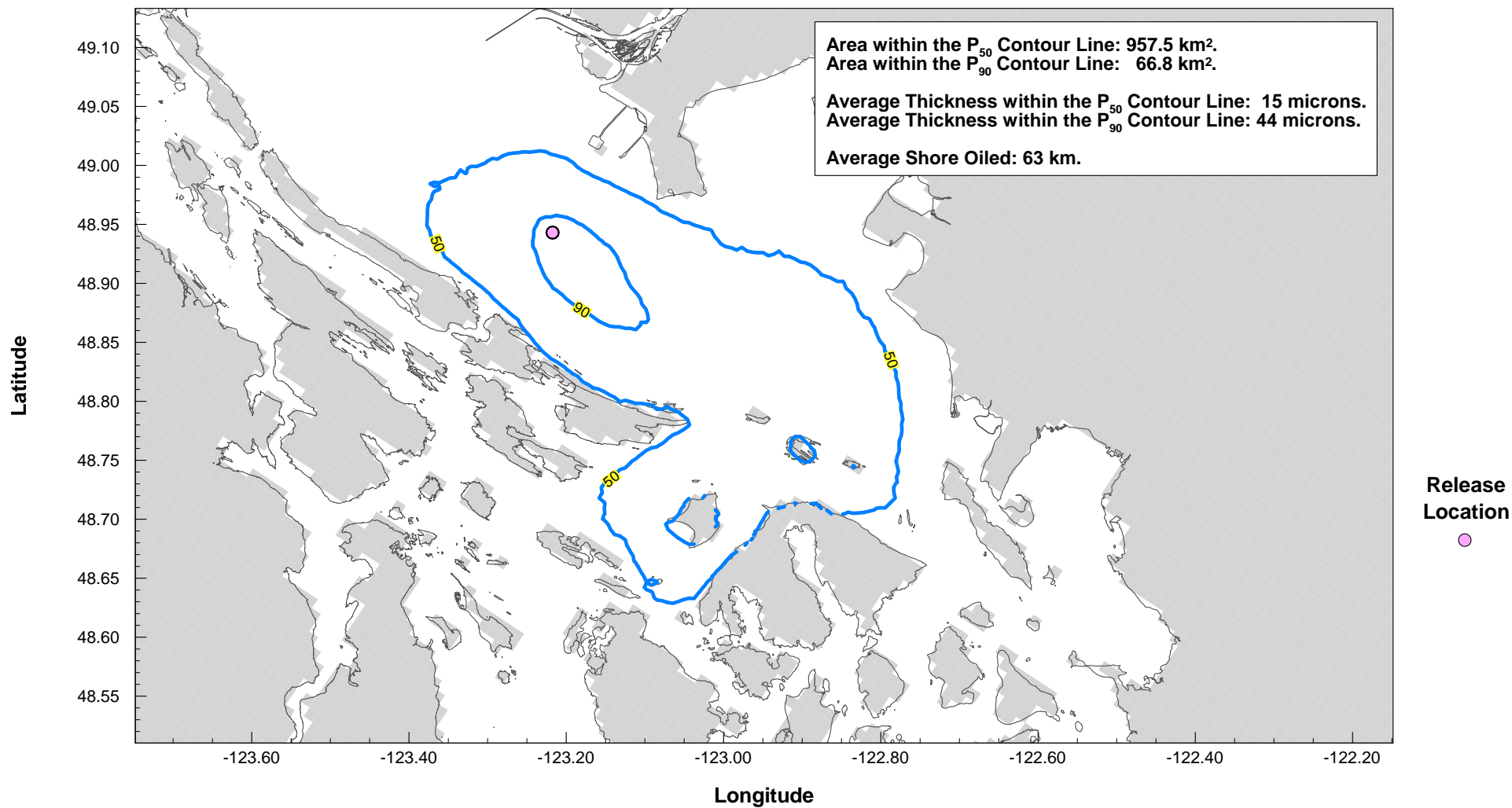


TRANS MOUNTAIN OIL SPILL STUDY

Stochastic Simulation
Spring 2011, Site D (16,500 m³)
 P_{50} and P_{90} after 24 Hours

PROJECT NO. V13203022	DWN AH	CKD JAS	APVD -	REV 0
OFFICE EBA-VANC	DATE October 4, 2013			

Figure D.4-13



NOTES

- Statistical results based on independent spills occurring every 6 hours from April 01 00:00 to June 30 23:00.

Probability of oil presence is the percentage of simulations in which oil was present at a given location.

P_{50} : after 48 hours, there is a 50% probability for the area within the P_{50} contour line to have been contacted.

P_{90} : after 48 hours, there is a 90% probability for the area within the P_{90} contour line to have been contacted.

- Tracking time for each spill was 48 hours.

- The average thickness is based on a full coverage of each grid cell that contains oil and within the contour line.

STATUS
ISSUED FOR USE

CLIENT



TRANS MOUNTAIN OIL SPILL STUDY

Stochastic Simulation
Spring 2011, Site D (16,500 m³)
 P_{50} and P_{90} after 48 Hours

PROJECT NO.

V13203022

OFFICE

EBA-VANC

DWN

AH

CKD

JAS

APVD

-

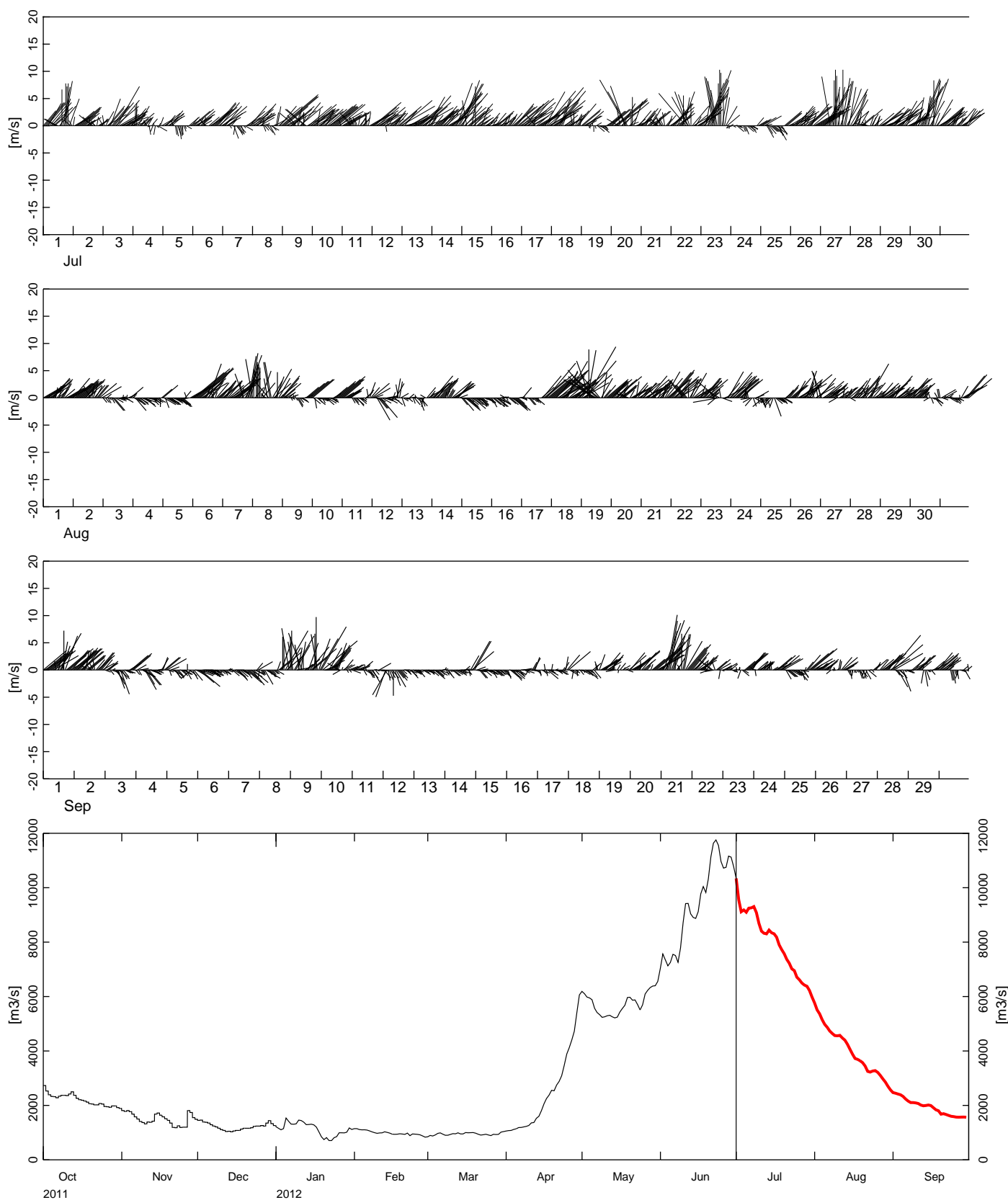
REV

0

DATE

October 4, 2013

Figure D.2-14



NOTES

- The wind stick represent winds at Saturna Island.
- The bottom graph represents the Fraser River discharge at Hope.

STATUS
ISSUED FOR USE

CLIENT

TRANS MOUNTAIN



TRANS MOUNTAIN OIL SPILL STUDY

Environmental Conditions: Summer 2012 Site D
Stochastic Modelling

PROJECT NO.
V13203022

OFFICE
EBA-VANC

DWN
AH

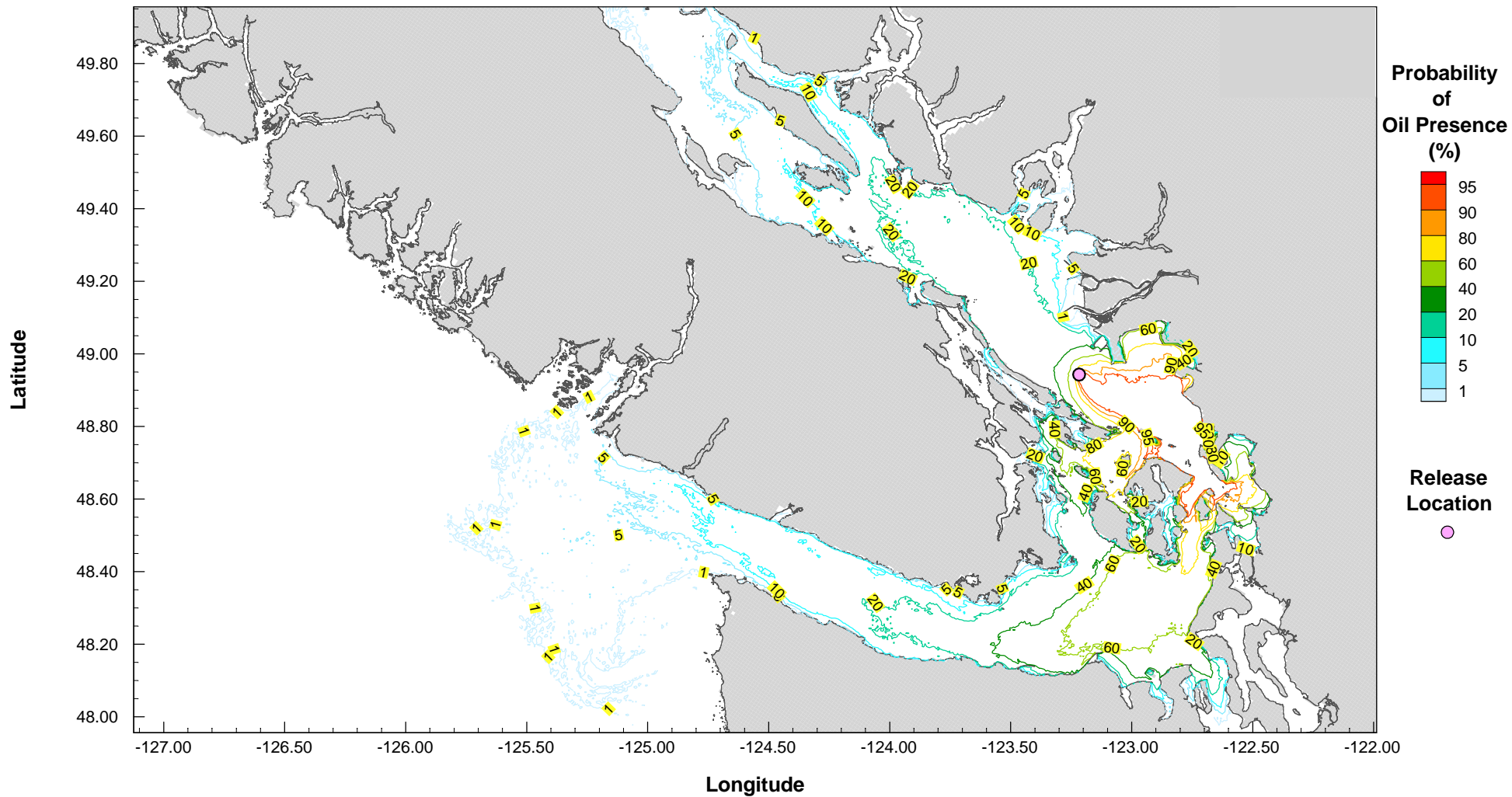
CHK
JAS

APVD
JAS

REV
0

DATE
October 2013

Figure D.3-1



NOTES

- Statistical results based on independent spills occurring every 6 hours from July 01 00:00 to September 30 23:00.
- Probability of oil presence is the percentage of simulations in which oil was present at a given location.
- Tracking time for each spill was 15 days.

STATUS
ISSUED FOR USE

CLIENT

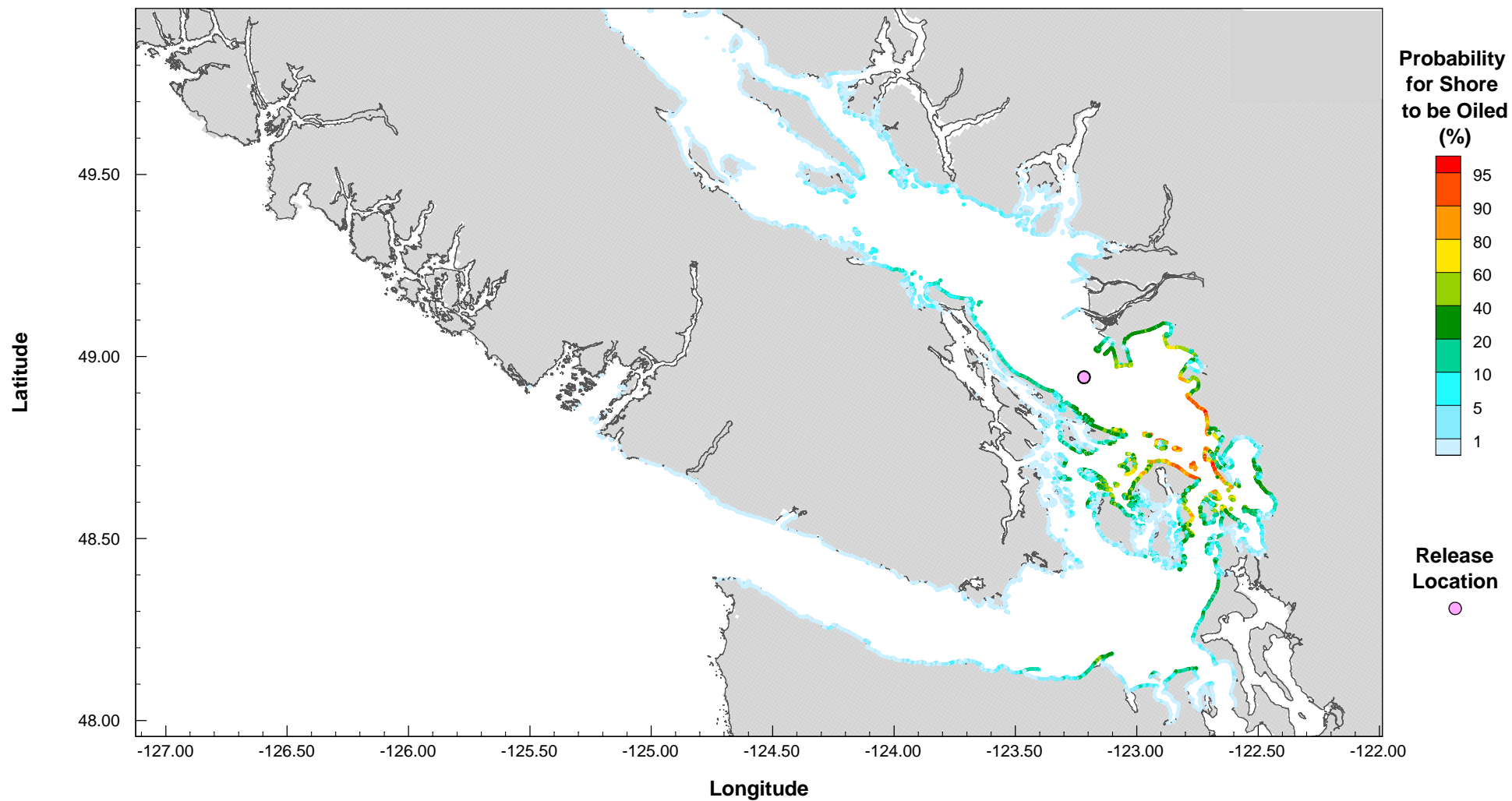


TRANS MOUNTAIN OIL SPILL STUDY

Stochastic Simulation Summer 2011, Site D (16,500 m³) Probability of Oil Presence

PROJECT NO. V13203022	DWN AH	CKD JAS	APVD -	REV 0
OFFICE EBA-VANC	DATE October 4, 2013			

Figure D.3-2



NOTES

- Statistical results based on independent spills occurring every 6 hours from July 01 00:00 to September 30 23:00.
- Probability of oil presence is the percentage of simulations in which oil was present at a given location.
- Tracking time for each spill was 15 days.

STATUS
ISSUED FOR USE

CLIENT

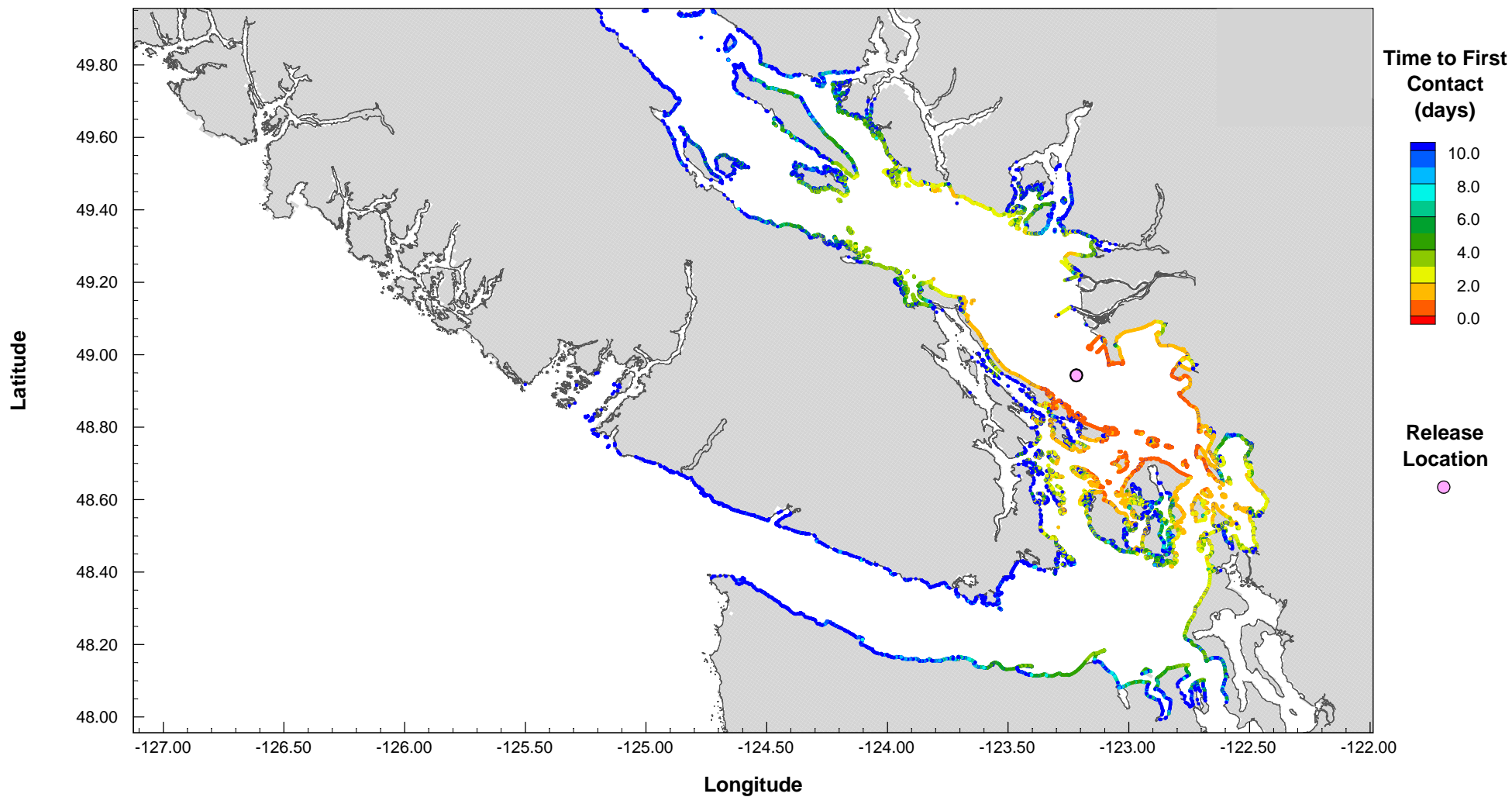


TRANS MOUNTAIN OIL SPILL STUDY

Stochastic Simulation Summer 2011, Site D (16,500 m³) Shoreline Oiled Probability

PROJECT NO. V13203022	DWN AH	CKD JAS	APVD -	REV 0
OFFICE EBA-VANC	DATE October 4, 2013			

Figure D.3-3



NOTES

- Statistical results based on independent spills occurring every 6 hours from July 01 00:00 to September 30 23:00.
- Time to first contact is the minimum time, over all simulations, for oil to reach a given shore segment.
- Tracking time for each spill was 15 days.

STATUS
ISSUED FOR USE

CLIENT

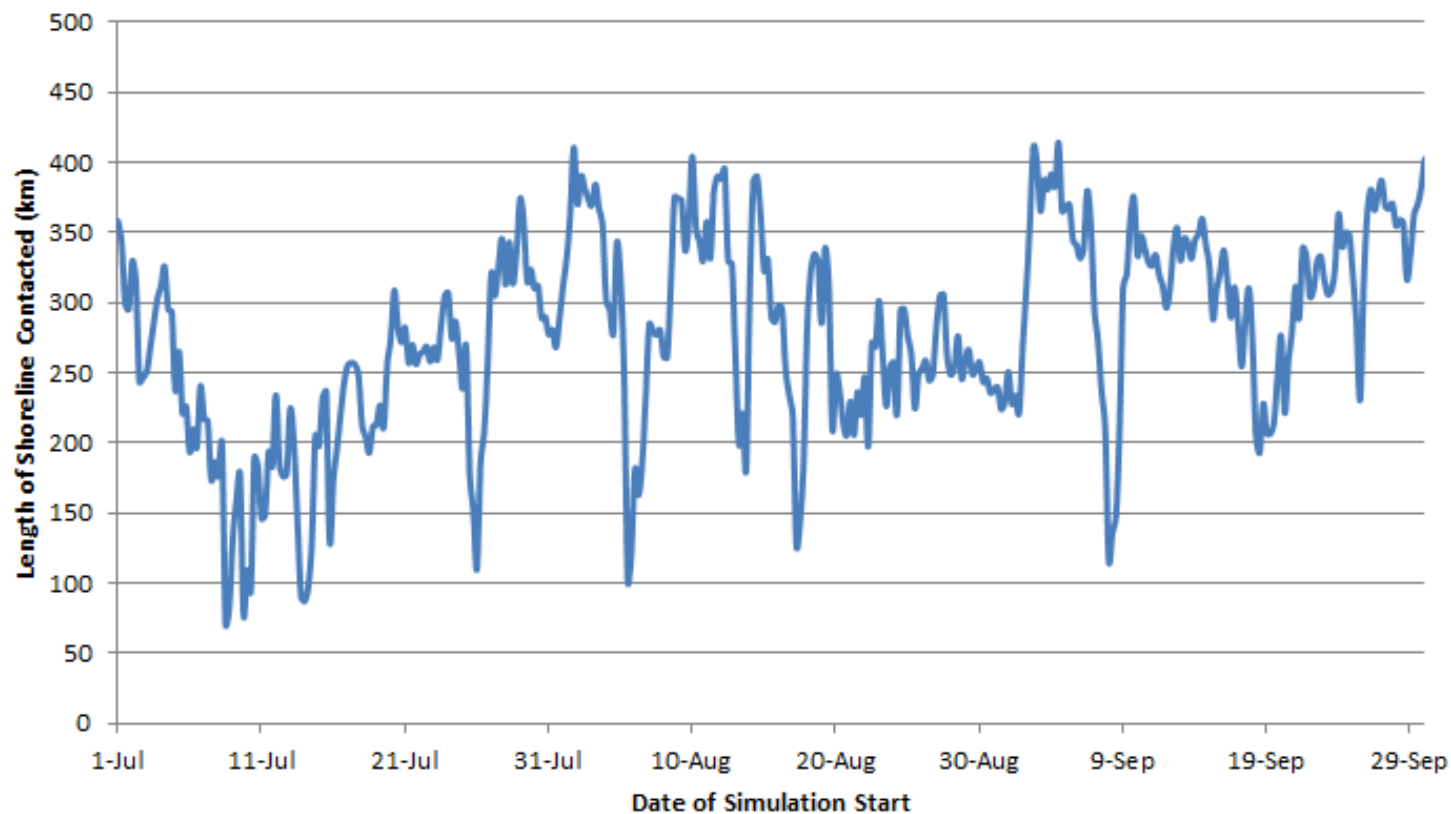


TRANS MOUNTAIN OIL SPILL STUDY

Stochastic Simulation Summer 2011, Site D (16,500 m³) Shoreline Time to First Contact

PROJECT NO. V13203022	DWN AH	CKD JAS	APVD -	REV 0
OFFICE EBA-VANC	DATE October 4, 2013			

Figure D.3-4



NOTES

- Statistical results based on independent spills occurring every 6 hours from July 01 00:00 to September 30 23:00, for a total of 368 independent spills.
- Tracking time for each spill was 15 days.

STATUS
ISSUED FOR USE

CLIENT



TRANS MOUNTAIN OIL SPILL STUDY

Stochastic Simulation Summer 2012, Site D (16,500 m³) Length of Shoreline Contacted

PROJECT NO.
V13203022

OFFICE
EBA-VANC

DWN
AH

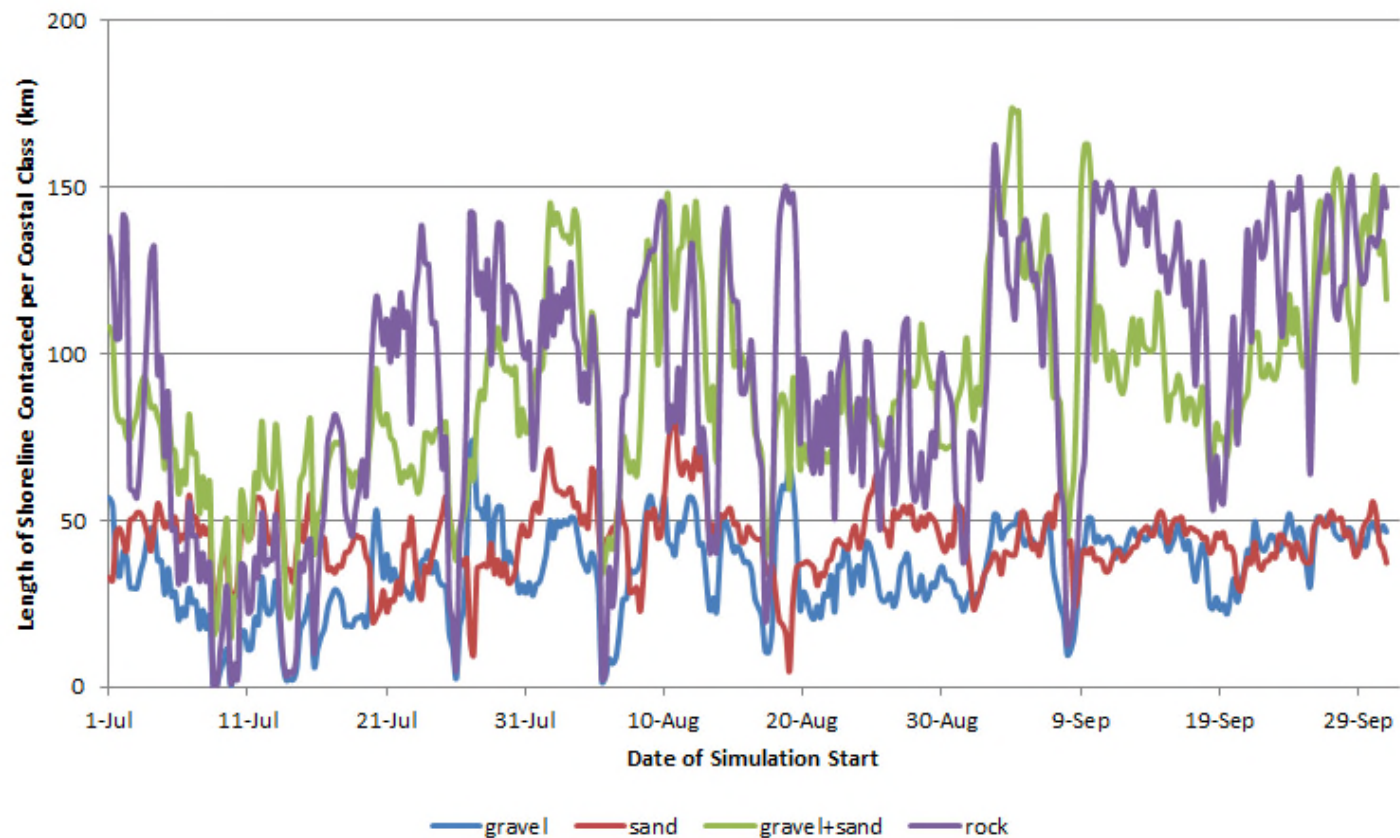
CKD
JAS

APVD
-

REV
0

DATE
October 15, 2013

Figure D.3-5



NOTES

- Statistical results based on independent spills occurring every 6 hours from July 01 00:00 to September 30 23:00, for a total of 368 independent spills.
- Tracking time for each spill was 15 days.

STATUS
ISSUED FOR USE

CLIENT

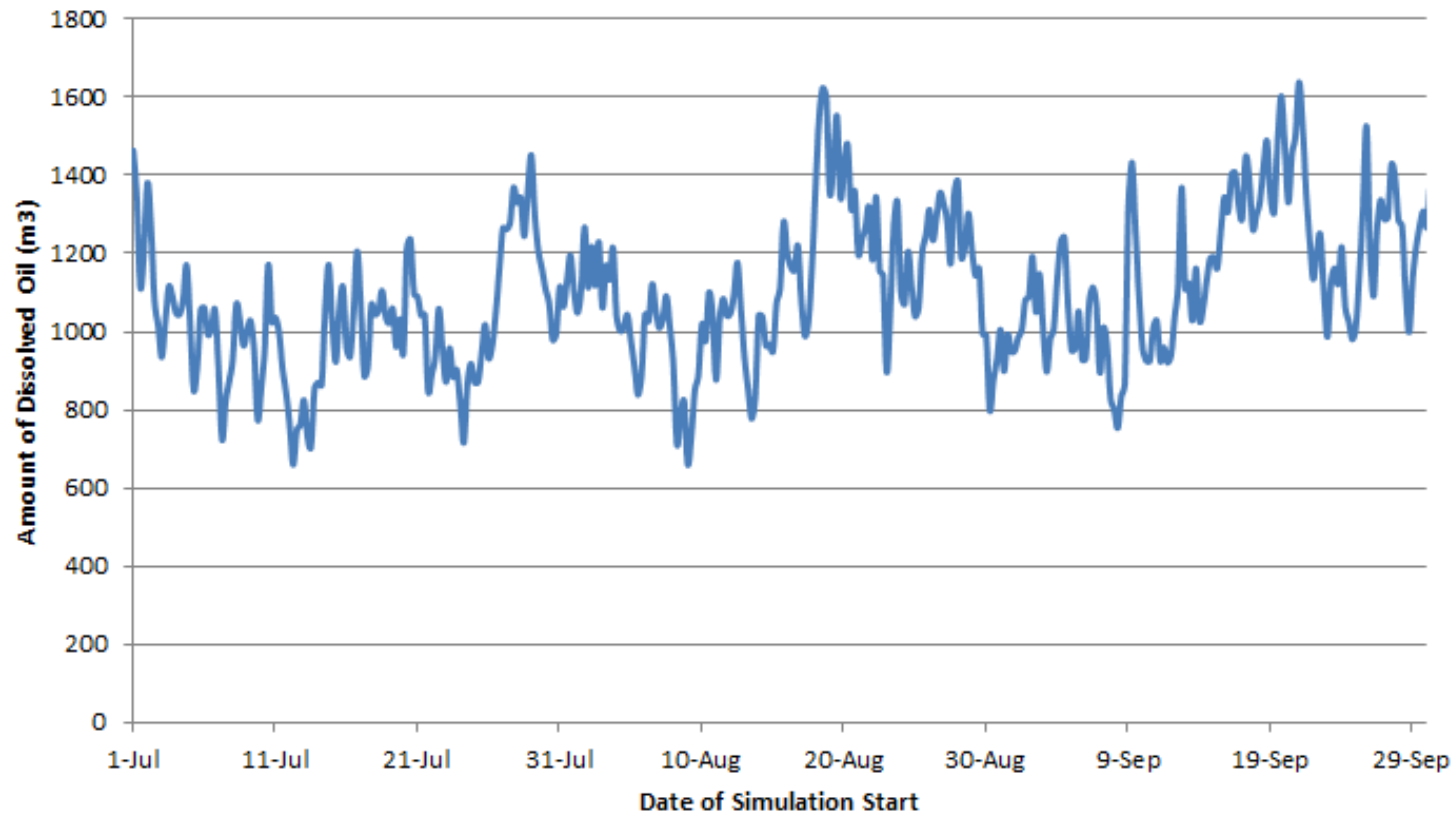


TRANS MOUNTAIN OIL SPILL STUDY

Stochastic Simulation - Summer 2012 Site D (16,500 m³): Length of Shoreline Contacted Per Coastal Class

PROJECT NO. V13203022	DWN AH	CKD JAS	APVD -	REV 0
OFFICE EBA-VANC	DATE October 15, 2013			

Figure D.3-6



NOTES

- Statistical results based on independent spills occurring every 6 hours from July 01 00:00 to September 30 23:00, for a total of 368 independant spills.
- Tracking time for each spill was 15 days.

STATUS
ISSUED FOR USE

CLIENT

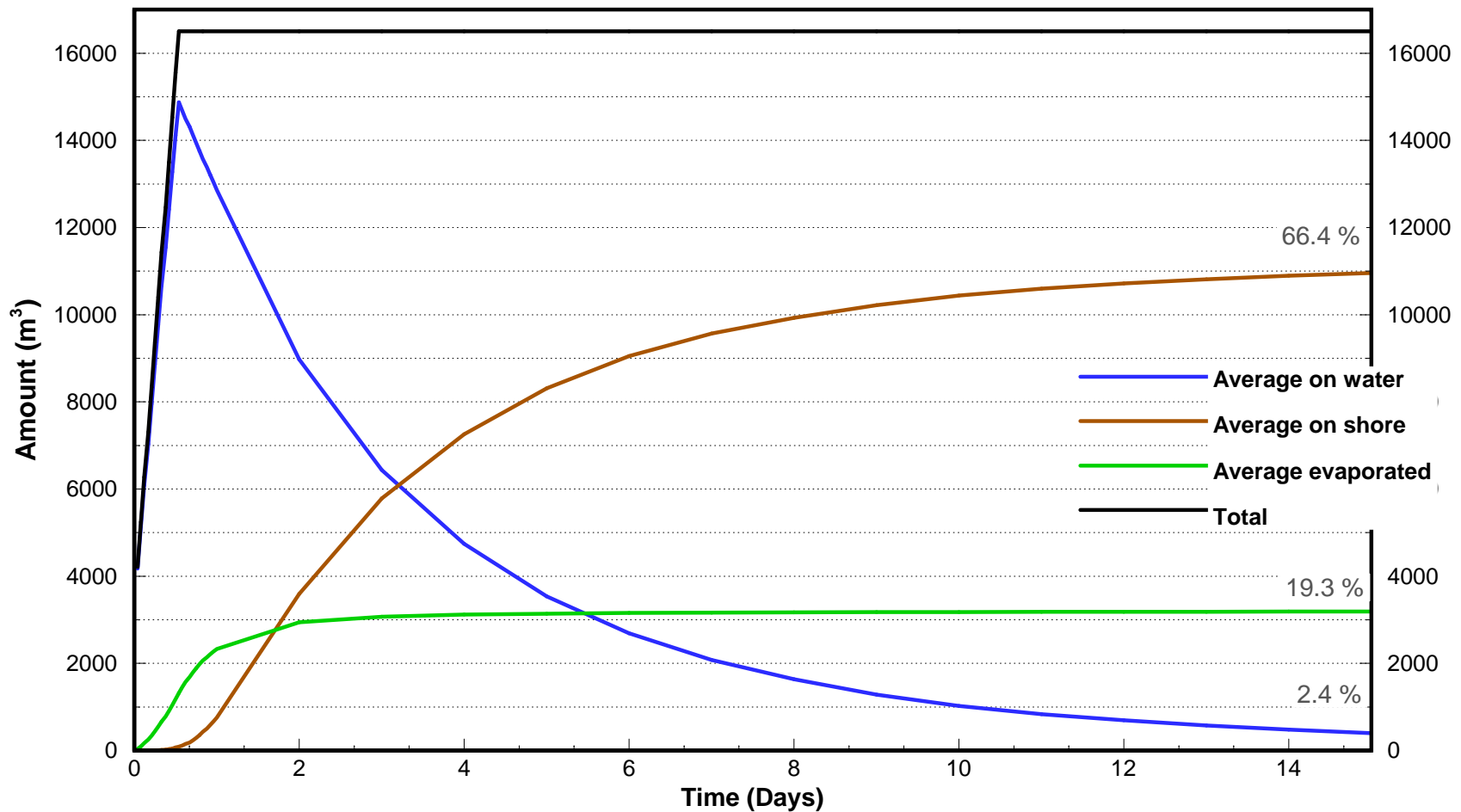


TRANS MOUNTAIN OIL SPILL STUDY

Stochastic Simulation Summer 2012, Site D (16,500 m³) Amount of Dissolved Oil

PROJECT NO. V13203022	DWN AH	CKD JAS	APVD -	REV 0
OFFICE EBA-VANC	DATE October 15, 2013			

Figure D.3-7



NOTES

- Statistical results based on independent spills occurring every 6 hours from July 01 00:00 to September 30 23:00.
- Tracking time for each spill was 15 days.
- The major components of the mass balance are shown above.

STATUS
ISSUED FOR USE

CLIENT

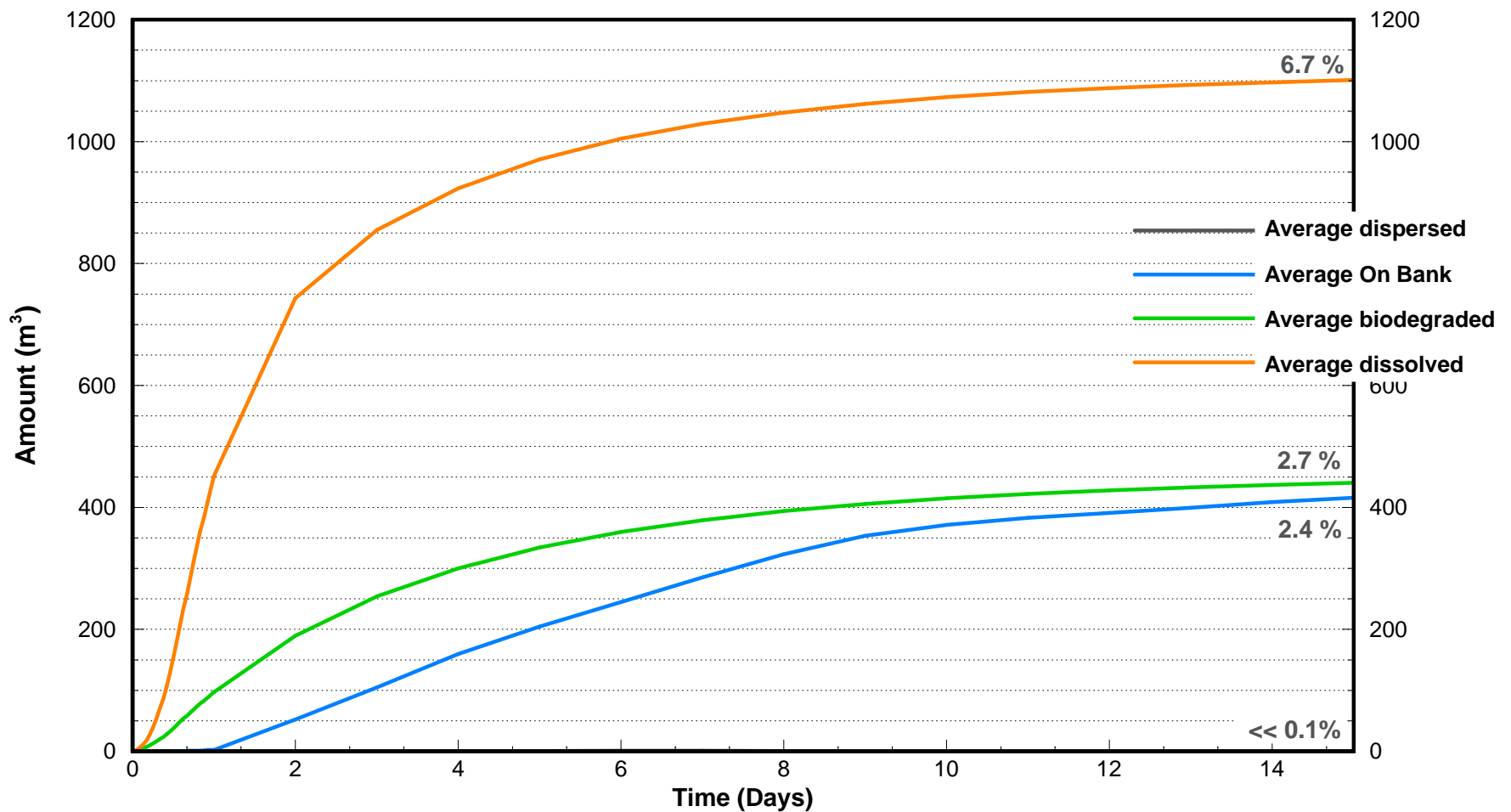


TRANS MOUNTAIN OIL SPILL STUDY

Stochastic Simulation Summer 2011, Site D (16,500 m³) Major Components of the Mass Balance

PROJECT NO. V13203022	DWN AH	CKD JAS	APVD -	REV 0
OFFICE EBA-VANC	DATE October 4, 2013			

Figure D.3-8



NOTES

- Statistical results based on independent spills occurring every 6 hours from July 01 00:00 to September 30 23:00.
- Tracking time for each spill was 15 days.
- The minor components of the mass balance are shown above.

STATUS
ISSUED FOR USE

CLIENT

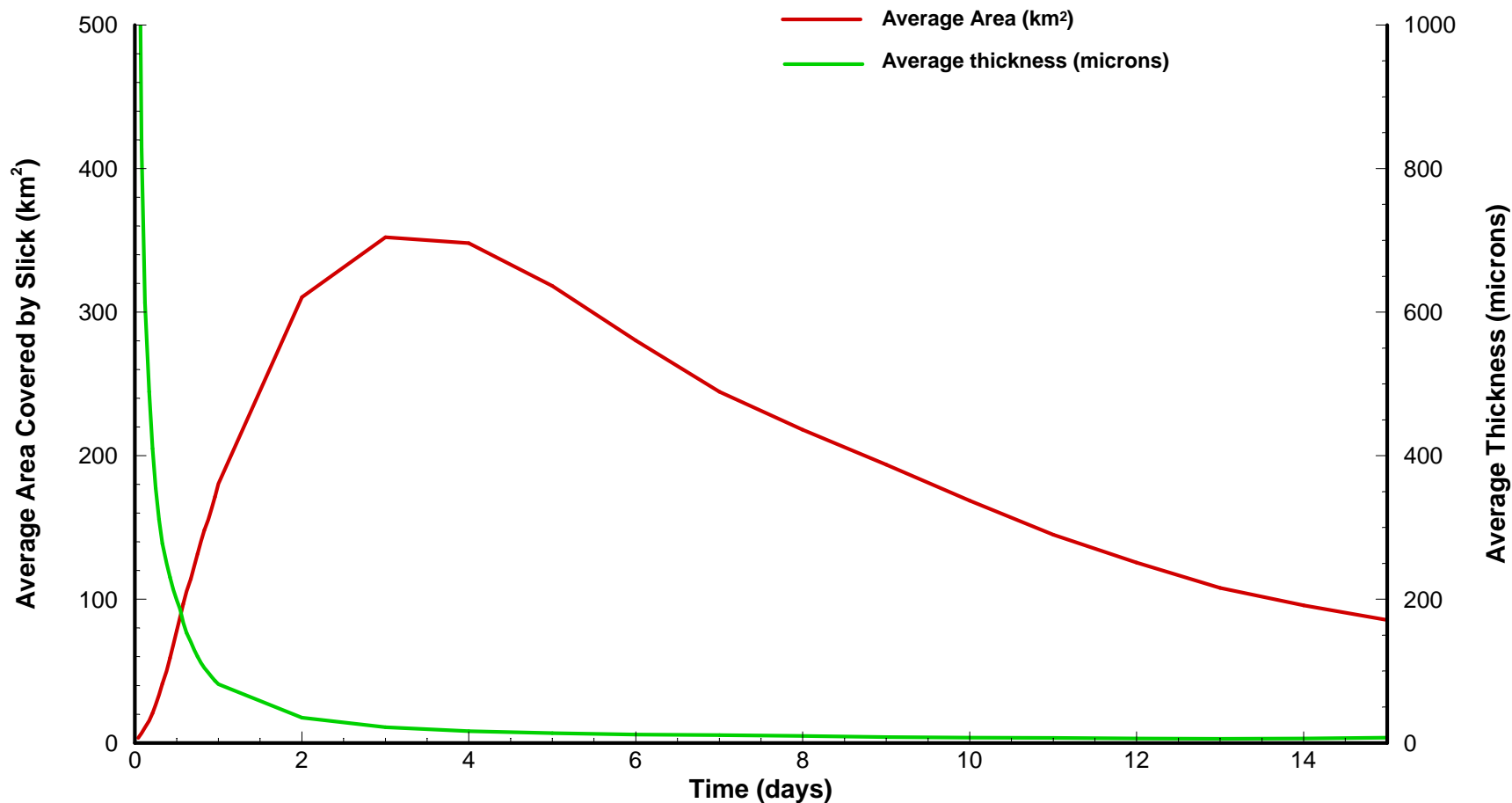


TRANS MOUNTAIN OIL SPILL STUDY

Stochastic Simulation Summer 2011, Site D (16,500 m³) Minor Components of the Mass Balance

PROJECT NO. V13203022	DWN AH	CKD JAS	APVD -	REV 0
OFFICE EBA-VANC	DATE October 4, 2013			

Figure D.3-9



NOTES

- Statistical results based on independent spills occurring every 6 hours from July 01 00:00 to September 30 23:00.
- The average thickness is based on a full coverage of each grid cell that contains oil.

STATUS
ISSUED FOR USE

CLIENT

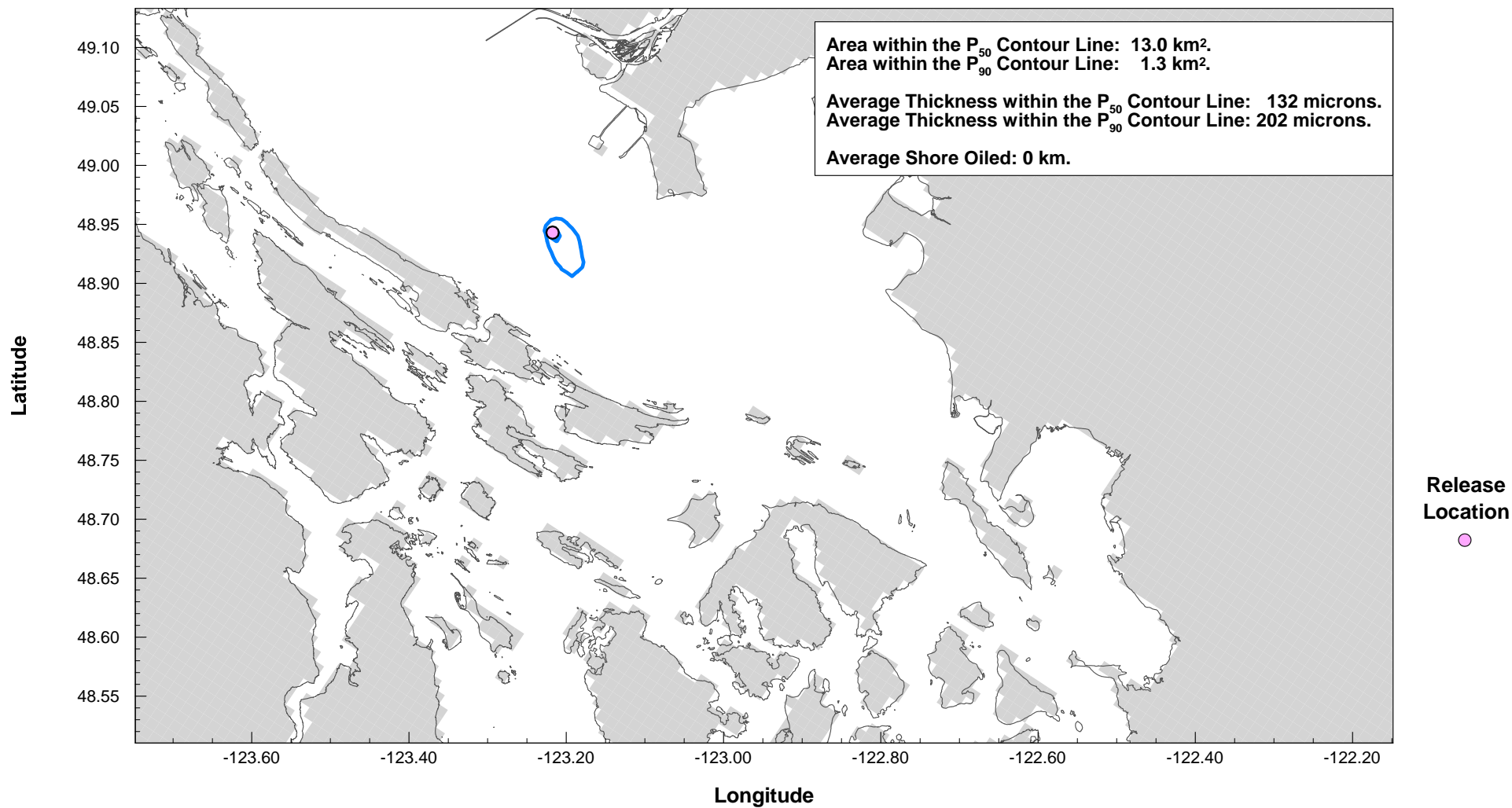


TRANS MOUNTAIN OIL SPILL STUDY

Stochastic Simulation Summer 2011, Site D (16,500 m³) Statistics on Area and Thickness

PROJECT NO. V13203022	DWN AH	CKD JAS	APVD -	REV 0
OFFICE EBA-VANC	DATE October 4, 2013			

Figure D.3-10



NOTES

- Statistical results based on independent spills occurring every 6 hours from July 01 00:00 to September 30 23:00.

Probability of oil presence is the percentage of simulations in which oil was present at a given location.

P_{50} : after 6 hours, there is a 50% probability for the area within the P_{50} contour line to have been contacted.

P_{90} : after 6 hours, there is a 90% probability for the area within the P_{90} contour line to have been contacted.

- Tracking time for each spill was 6 hours.

- The average thickness is based on a full coverage of each grid cell that contains oil and within the contour line.

STATUS
ISSUED FOR USE

CLIENT

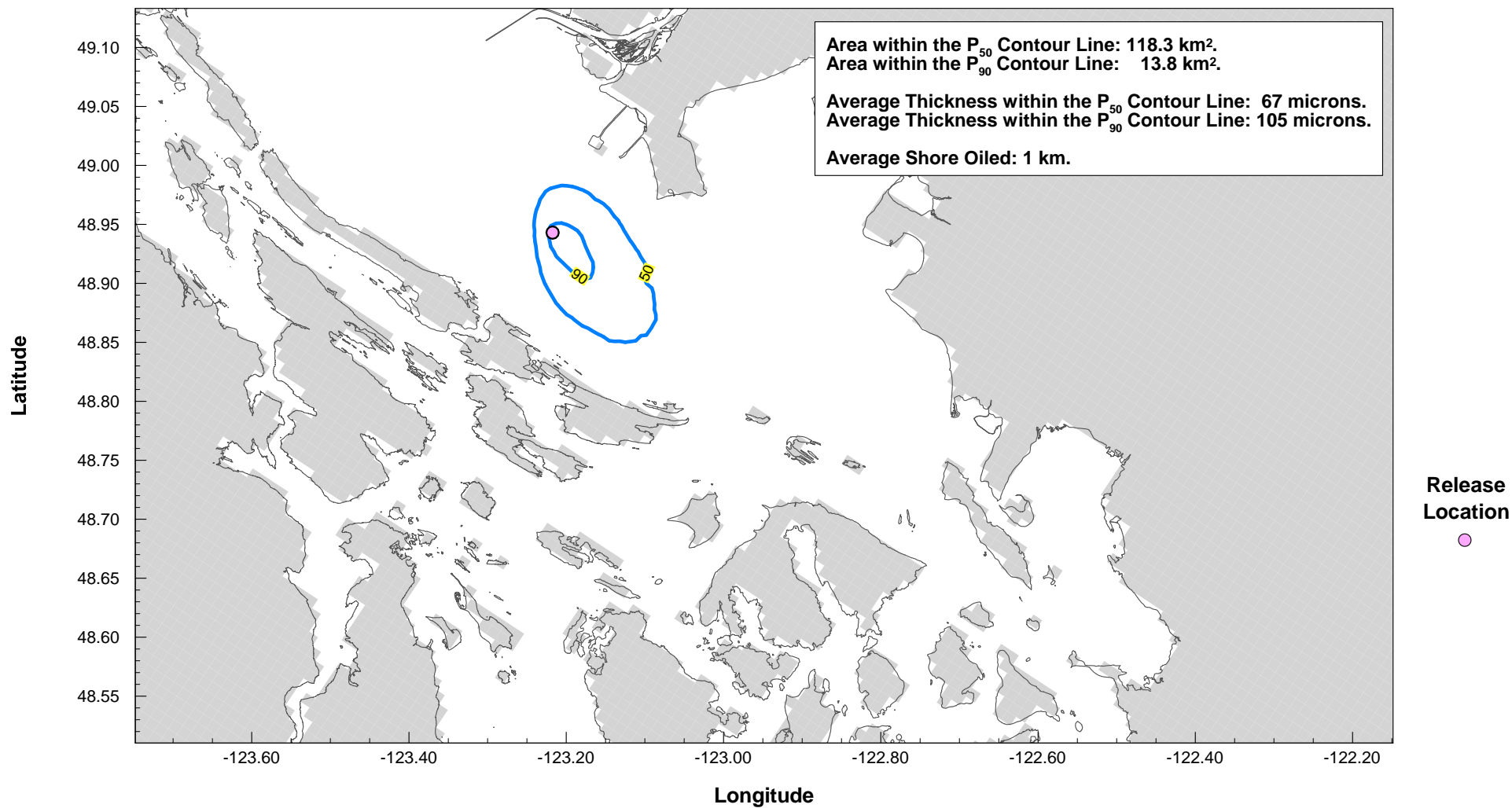


TRANS MOUNTAIN OIL SPILL STUDY

Stochastic Simulation
Summer 2011, Site D (16,500 m³)
 P_{50} and P_{90} after 6 Hours

PROJECT NO. V13203022	DWN AH	CKD JAS	APVD -	REV 0
OFFICE EBA-VANC	DATE October 4, 2013			

Figure D.3-11



NOTES

- Statistical results based on independent spills occurring every 6 hours from July 01 00:00 to September 30 23:00.

Probability of oil presence is the percentage of simulations in which oil was present at a given location.

P_{50} : after 12 hours, there is a 50% probability for the area within the P_{50} contour line to have been contacted.

P_{90} : after 12 hours, there is a 90% probability for the area within the P_{90} contour line to have been contacted.

- Tracking time for each spill was 12 hours.

- The average thickness is based on a full coverage of each grid cell that contains oil and within the contour line.

STATUS
ISSUED FOR USE

CLIENT



TRANS MOUNTAIN OIL SPILL STUDY

Stochastic Simulation
Summer 2011, Site D (16,500 m³)
 P_{50} and P_{90} after 12 Hours

PROJECT NO.
V13203022

DWN
AH

CKD
JAS

APVD
-

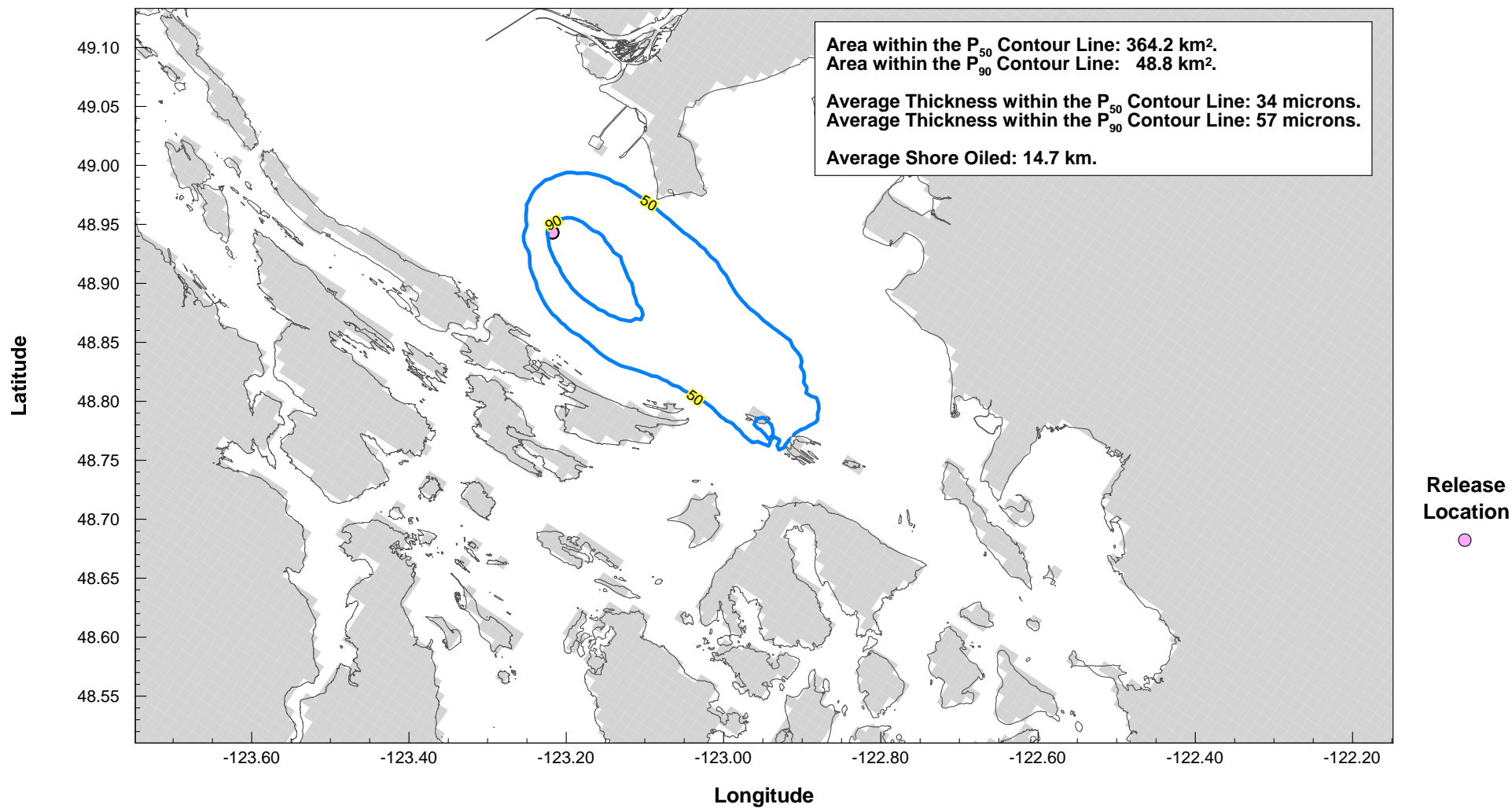
REV
0

Figure D.3-12

OFFICE
EBA-VANC

DATE
October 4, 2013





NOTES

- Statistical results based on independent spills occurring every 6 hours from July 01 00:00 to September 30 23:00.

Probability of oil presence is the percentage of simulations in which oil was present at a given location.

P_{50} : after 24 hours, there is a 50% probability for the area within the P_{50} contour line to have been contacted.

P_{90} : after 24 hours, there is a 90% probability for the area within the P_{90} contour line to have been contacted.

- Tracking time for each spill was 24 hours.

- The average thickness is based on a full coverage of each grid cell that contains oil and within the contour line.

STATUS
ISSUED FOR USE

CLIENT



TRANS MOUNTAIN OIL SPILL STUDY

Stochastic Simulation
Summer 2011, Site D (16,500 m³)
 P_{50} and P_{90} after 24 Hours

PROJECT NO.

V13203022

OFFICE

EBA-VANC

DWN

AH

CKD

JAS

APVD

-

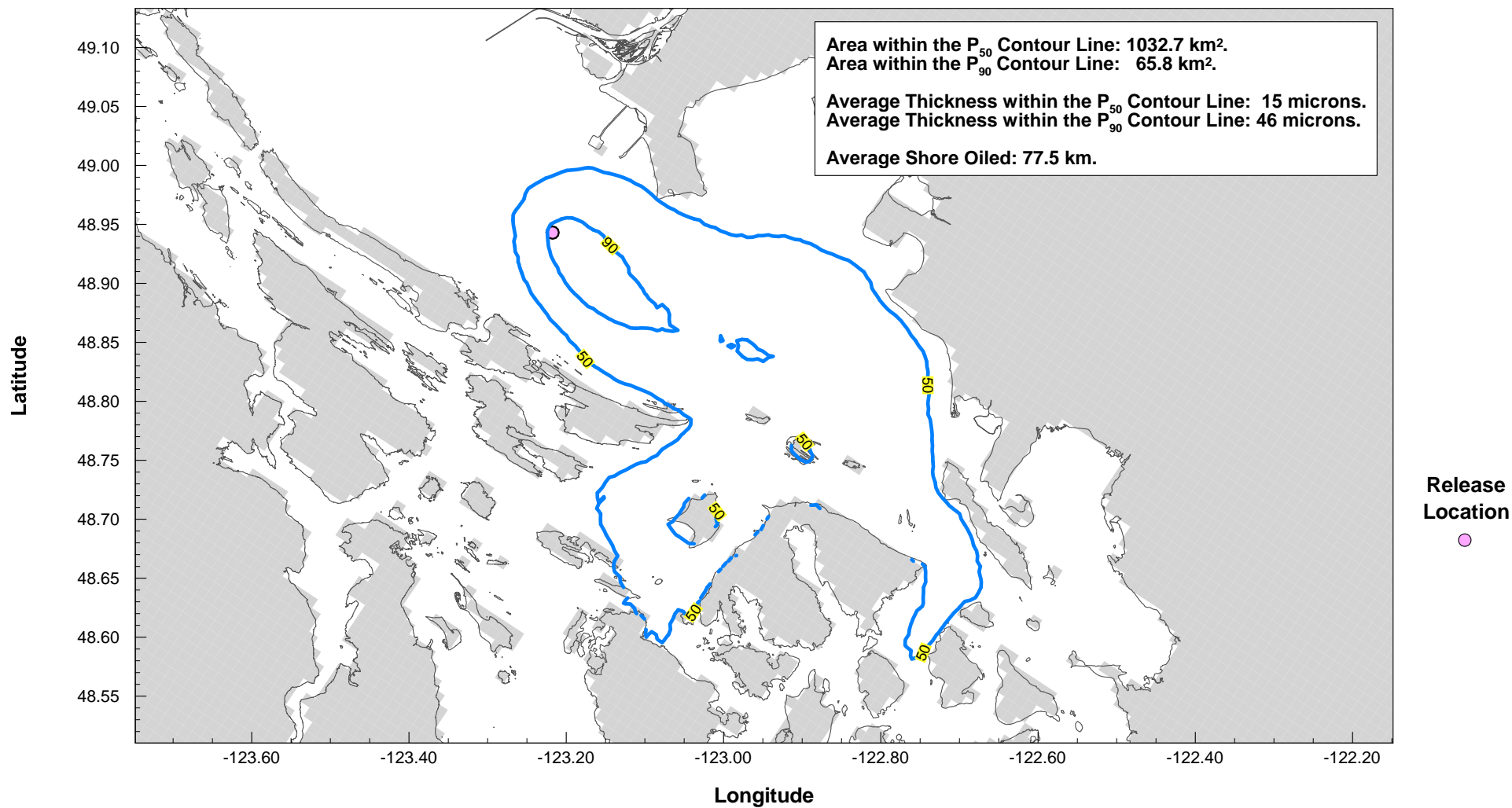
REV

0

DATE

October 4, 2013

Figure D.3-13



NOTES

- Statistical results based on independent spills occurring every 6 hours from July 01 00:00 to September 30 23:00.

Probability of oil presence is the percentage of simulations in which oil was present at a given location.

P_{50} : after 48 hours, there is a 50% probability for the area within the P_{50} contour line to have been contacted.

P_{90} : after 48 hours, there is a 90% probability for the area within the P_{90} contour line to have been contacted.

- Tracking time for each spill was 48 hours.

- The average thickness is based on a full coverage of each grid cell that contains oil and within the contour line.

STATUS
ISSUED FOR USE

CLIENT

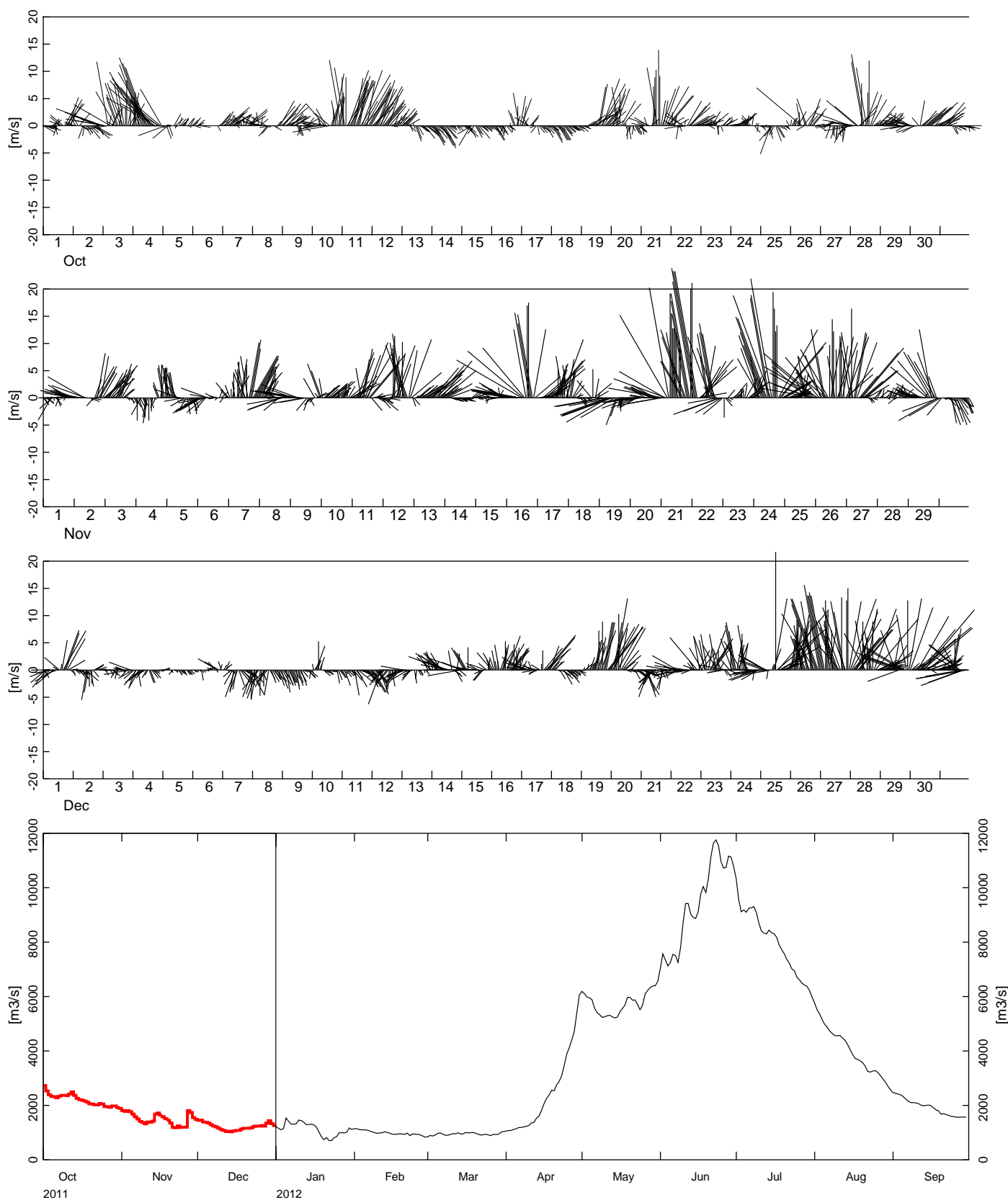


TRANS MOUNTAIN OIL SPILL STUDY

Stochastic Simulation
Summer 2011, Site D (16,500 m³)
 P_{50} and P_{90} after 48 Hours

PROJECT NO. V13203022	DWN AH	CKD JAS	APVD -	REV 0
OFFICE EBA-VANC	DATE October 4, 2013			

Figure D.3-14



NOTES

- The wind stick represent winds at Saturna Island.
- The bottom graph represents the Fraser River discharge at Hope.

STATUS
ISSUED FOR USE

CLIENT

TRANS MOUNTAIN



TRANS MOUNTAIN OIL SPILL STUDY

Environmental Conditions: Fall 2011 Site D
Stochastic Modelling

PROJECT NO.
V13203022

OFFICE
EBA-VANC

DWN
AH

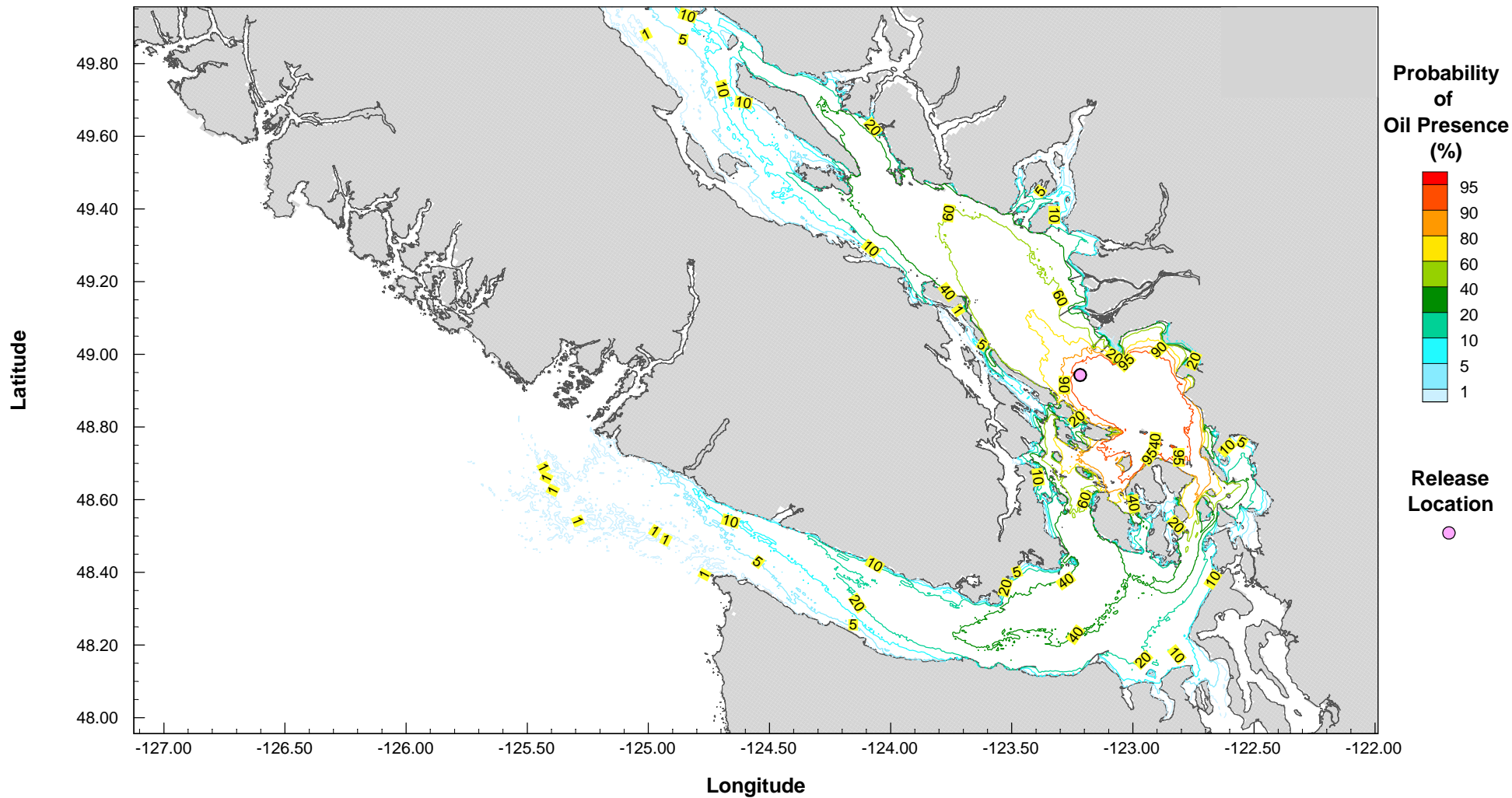
DATE
October 2013

CHK
JAS

APVD
JAS

REV
0

Figure D.4-1



NOTES

- Statistical results based on independent spills occurring every 6 hours from October 01 00:00 to December 31 23:00, for a total of 368 independant spills.
- Probability of oil presence is the percentage of simulations in which oil was present at a given location.
- Tracking time for each spill was 15 days.

STATUS
ISSUED FOR USE

CLIENT



TRANS MOUNTAIN OIL SPILL STUDY

**Stochastic Simulation
Fall 2011, Site D (16,500 m³)
Probability of Oil Presence**

PROJECT NO.
V13203022

OFFICE
EBA-VANC

DWN
AH

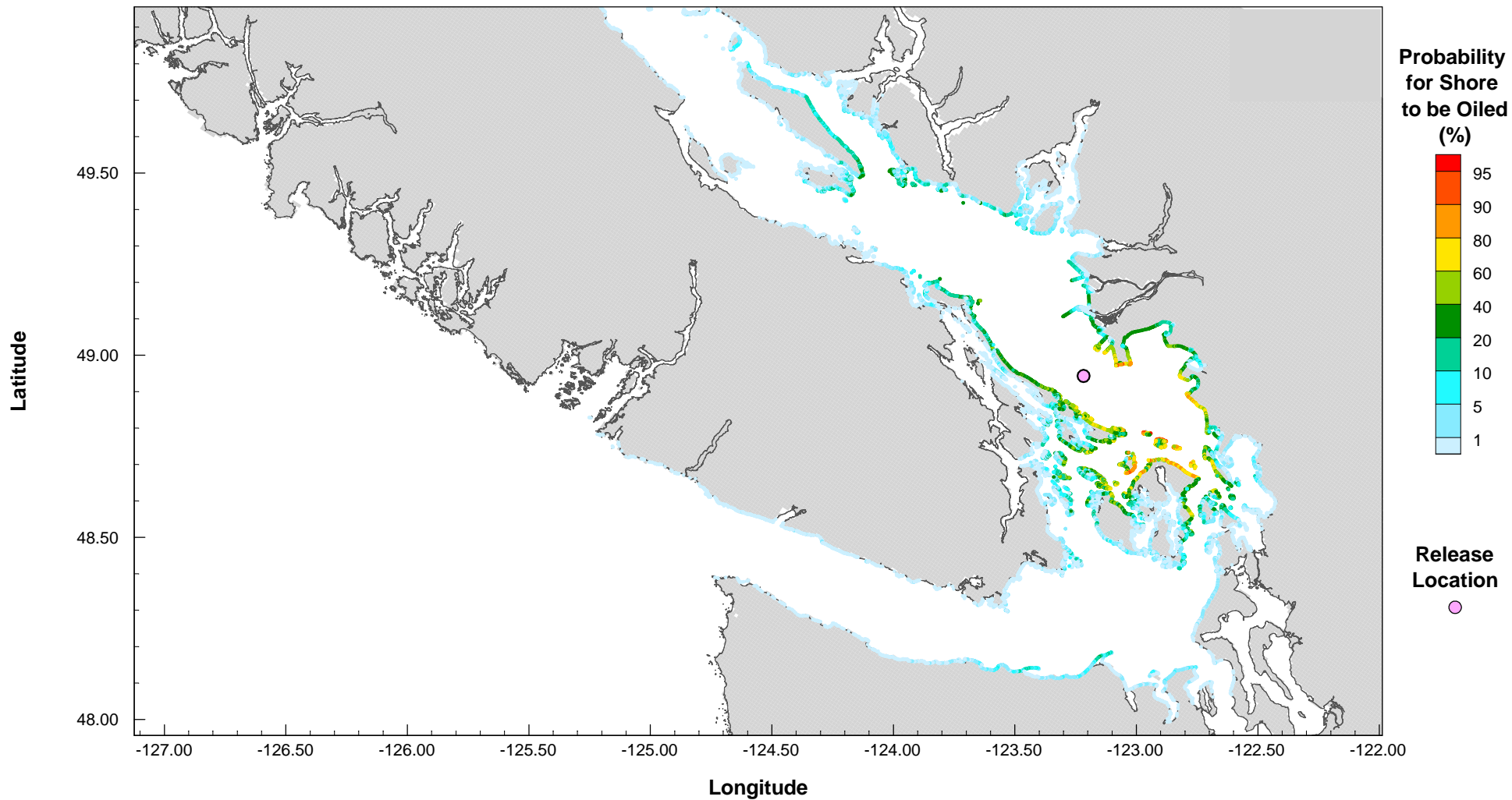
CKD
JAS

APVD
-

REV
0

DATE
October 4, 2013

Figure D.4-2



NOTES

- Statistical results based on independent spills occurring every 6 hours from October 01 00:00 to December 31 23:00, for a total of 368 independent spills.
- Probability of oil presence is the percentage of simulations in which oil was present at a given location.
- Tracking time for each spill was 15 days.

STATUS
ISSUED FOR USE

CLIENT

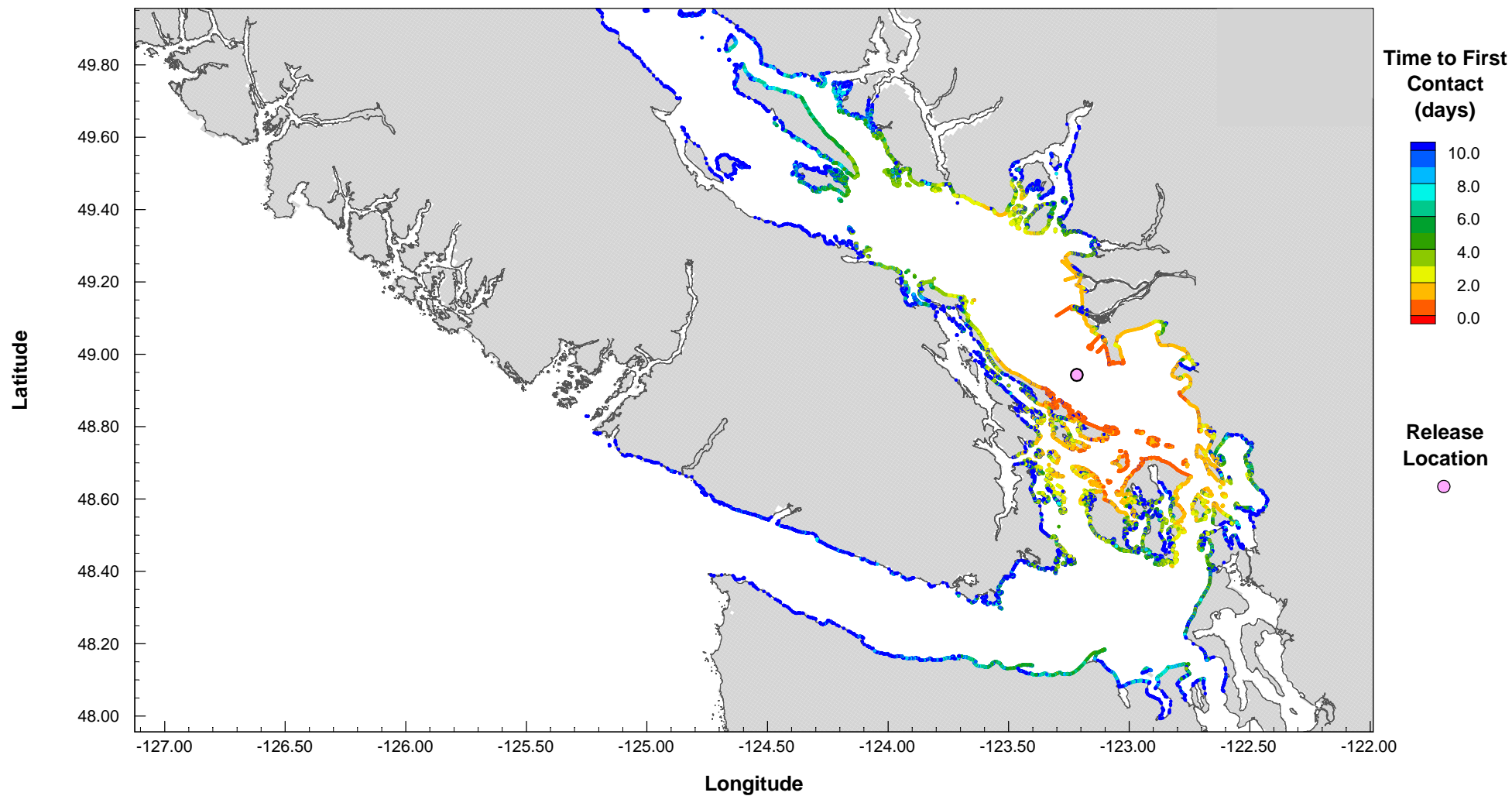


TRANS MOUNTAIN OIL SPILL STUDY

Stochastic Simulation
Fall 2011, Site D (16,500 m³)
Shoreline Oiled Probability

PROJECT NO. V13203022	DWN AH	CKD JAS	APVD -	REV 0
OFFICE EBA-VANC	DATE October 4, 2013			

Figure D.4-3



NOTES

- Statistical results based on independent spills occurring every 6 hours from October 01 00:00 to December 31 23:00, for a total of 368 independant spills.
- Time to first contact is the minimum time, over all simulations, for oil to reach a given shore segment.
- Tracking time for each spill was 15 days.

STATUS
ISSUED FOR USE

CLIENT

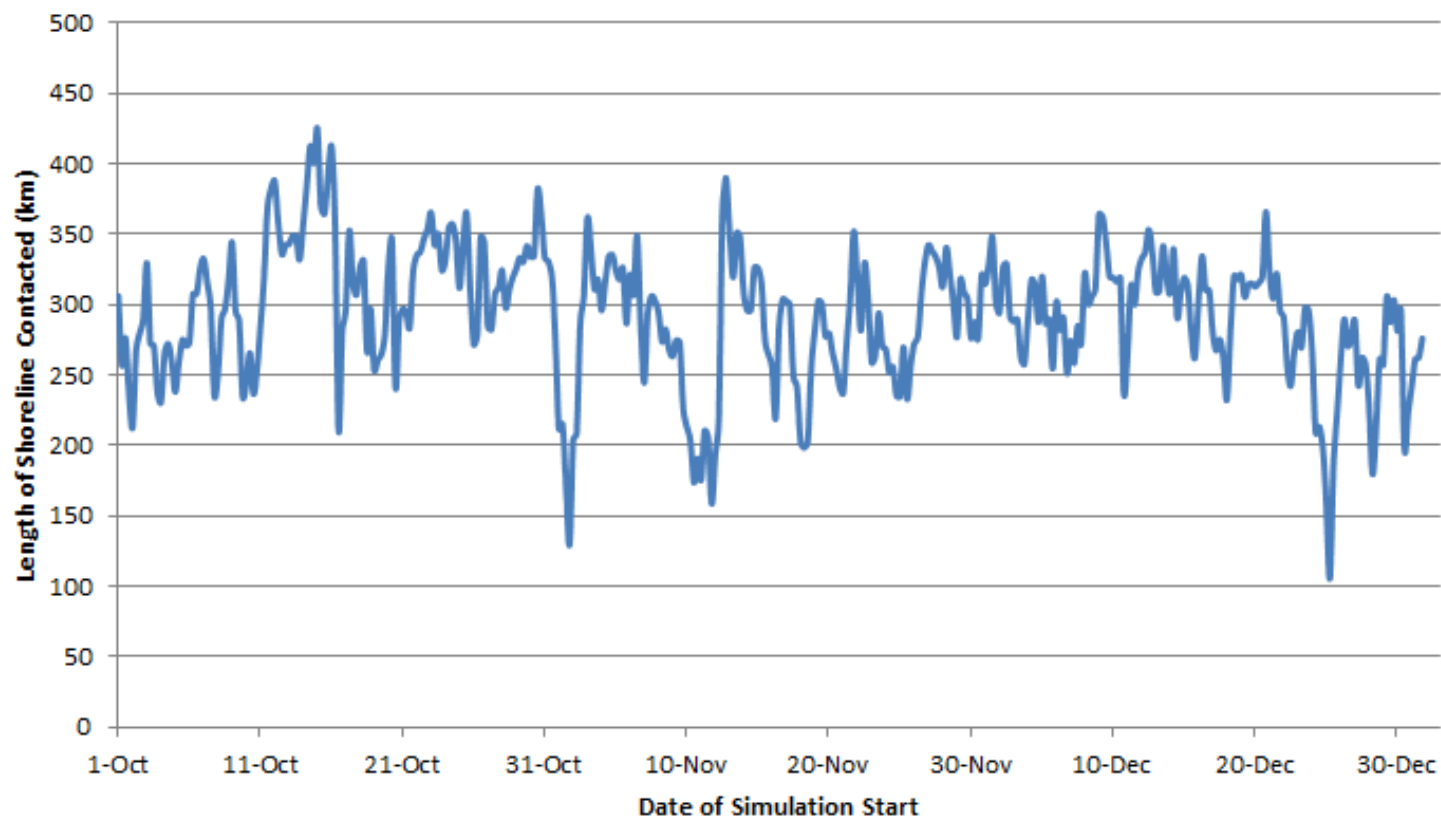


TRANS MOUNTAIN OIL SPILL STUDY

Stochastic Simulation
Fall 2011, Site D (16,500 m³)
Shoreline Time to First Contact

PROJECT NO.	DWN	CKD	APVD	REV
V13203022	AH	JAS	-	0
OFFICE	DATE			
EBA-VANC	October 4, 2013			

Figure D.4-4



NOTES

- Statistical results based on independent spills occurring every 6 hours from October 01 00:00 to December 31 23:00, for a total of 368 independant spills.
- Tracking time for each spill was 15 days.

STATUS
ISSUED FOR USE

CLIENT



TRANS MOUNTAIN OIL SPILL STUDY

**Stochastic Simulation
Fall 2011, Site D (16,500 m³)
Length of Shoreline Contacted**

PROJECT NO.
V13203022

DWN
AH

CKD
JAS

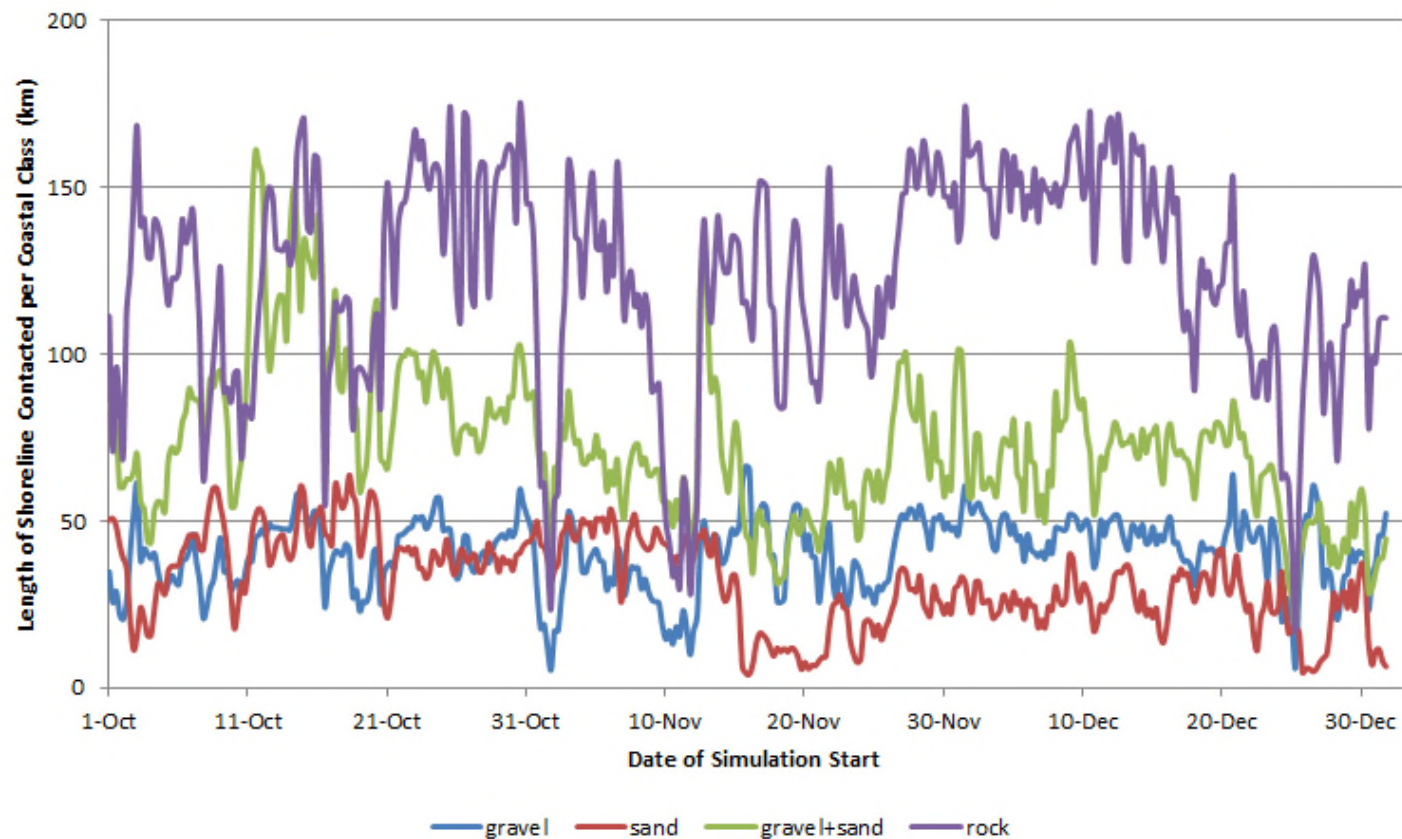
APVD
-

REV
0

OFFICE
EBA-VANC

DATE
October 4, 2013

Figure D.4-5



NOTES

- Statistical results based on independent spills occurring every 6 hours from October 01 00:00 to December 31 23:00, for a total of 368 independant spills.
- Tracking time for each spill was 15 days.

STATUS
ISSUED FOR USE

CLIENT

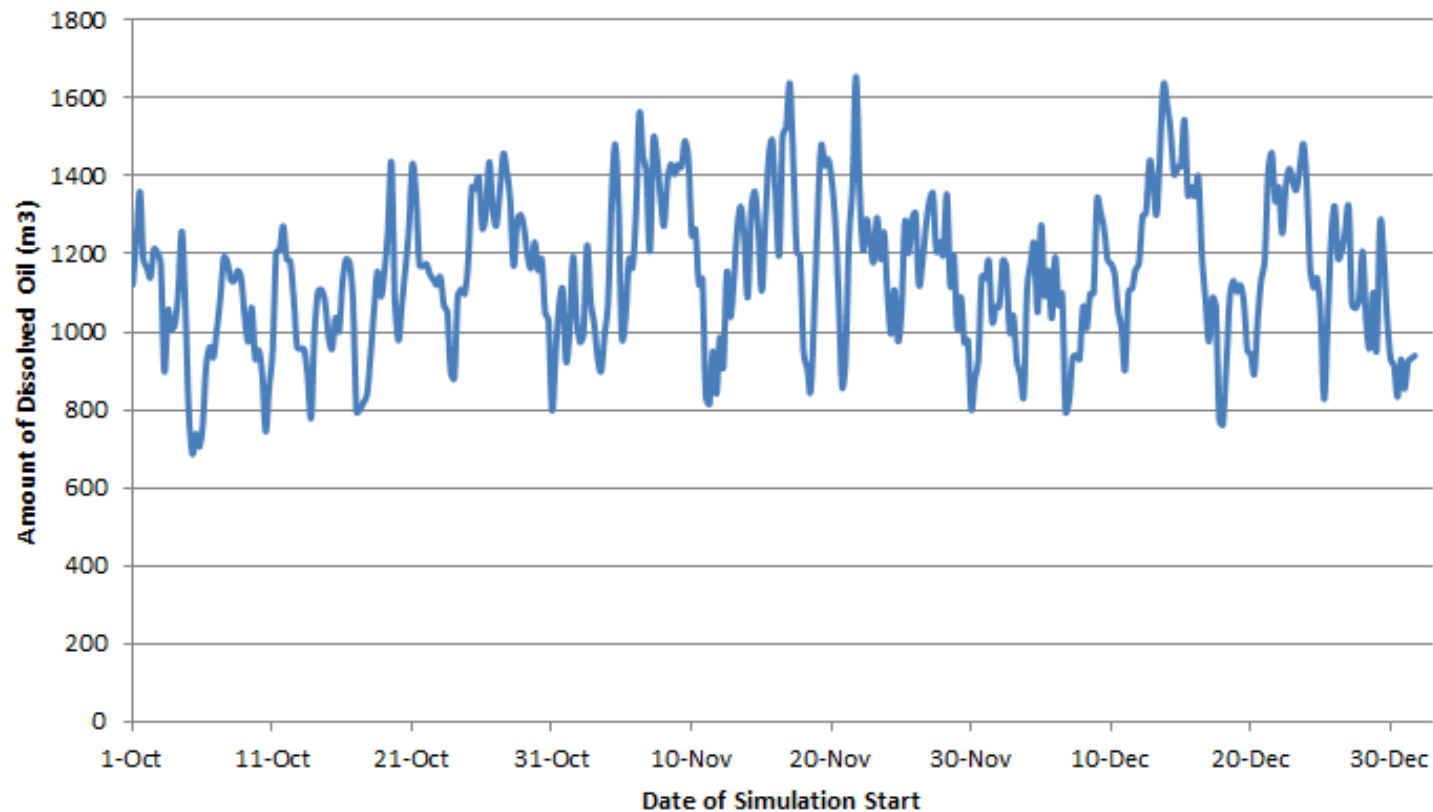


TRANS MOUNTAIN OIL SPILL STUDY

Stochastic Simulation - Fall 2011 Site D (16,500 m³): Length of Shoreline Contacted Per Coastal Class

PROJECT NO. V13203022	DWN AH	CKD JAS	APVD -	REV 0
OFFICE EBA-VANC	DATE October 4, 2013			

Figure D.4-6



NOTES

- Statistical results based on independent spills occurring every 6 hours from October 01 00:00 to December 31 23:00, for a total of 368 independant spills.
- Tracking time for each spill was 15 days.

STATUS
ISSUED FOR USE

CLIENT



TRANS MOUNTAIN OIL SPILL STUDY

Stochastic Simulation Fall 2011, Site D (16,500 m³) Amount of Dissolved Oil

PROJECT NO.
V13203022

DWN
AH

CKD
JAS

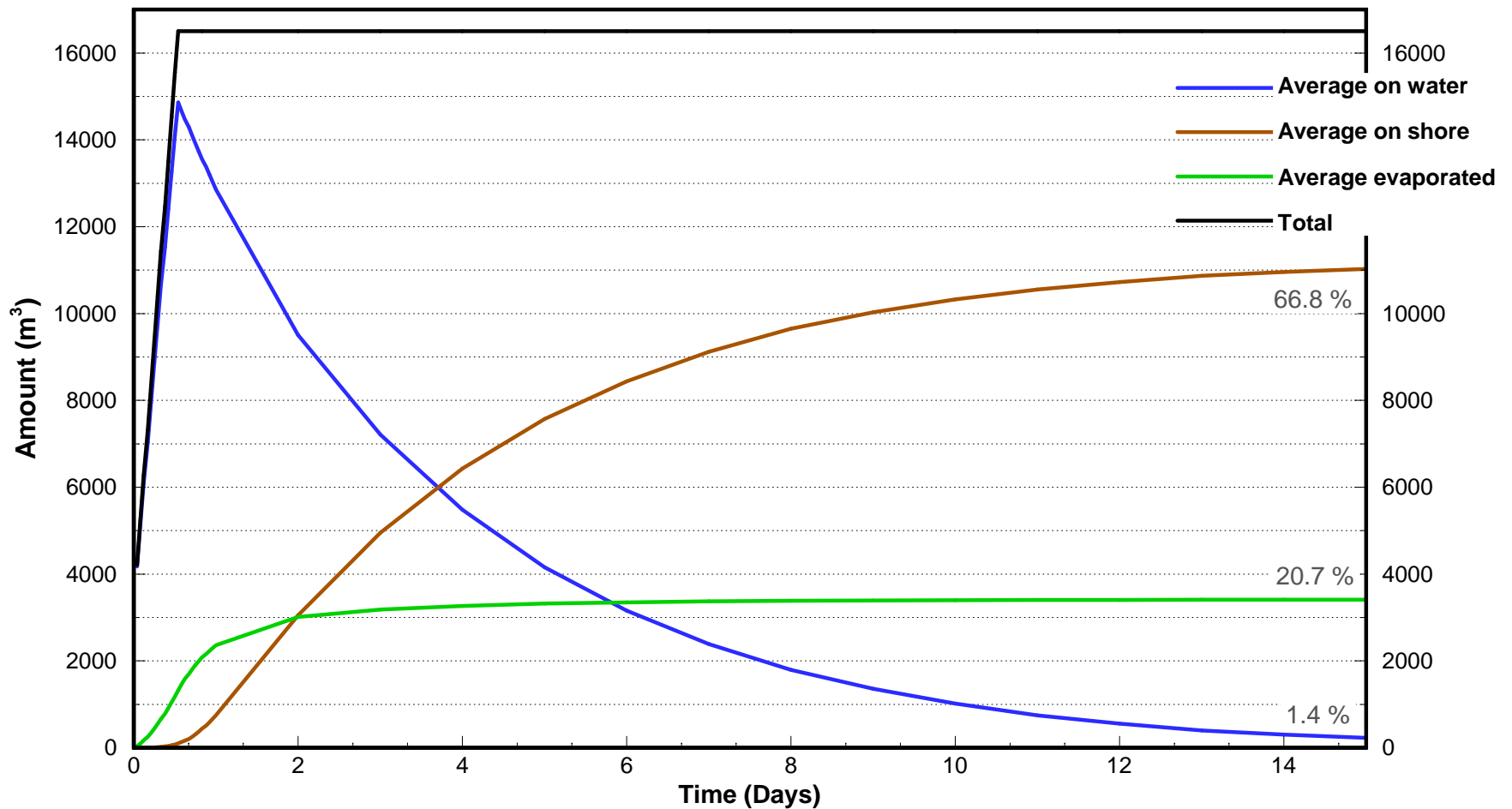
APVD
-

REV
0

OFFICE
EBA-VANC

DATE
October 4, 2013

Figure D.4-7



NOTES

- Statistical results based on independent spills occurring every 6 hours from October 01 00:00 to December 31 23:00, for a total of 368 independant spills.
- Tracking time for each spill was 15 days.
- The major components of the mass balance are shown above.

STATUS
ISSUED FOR USE

CLIENT

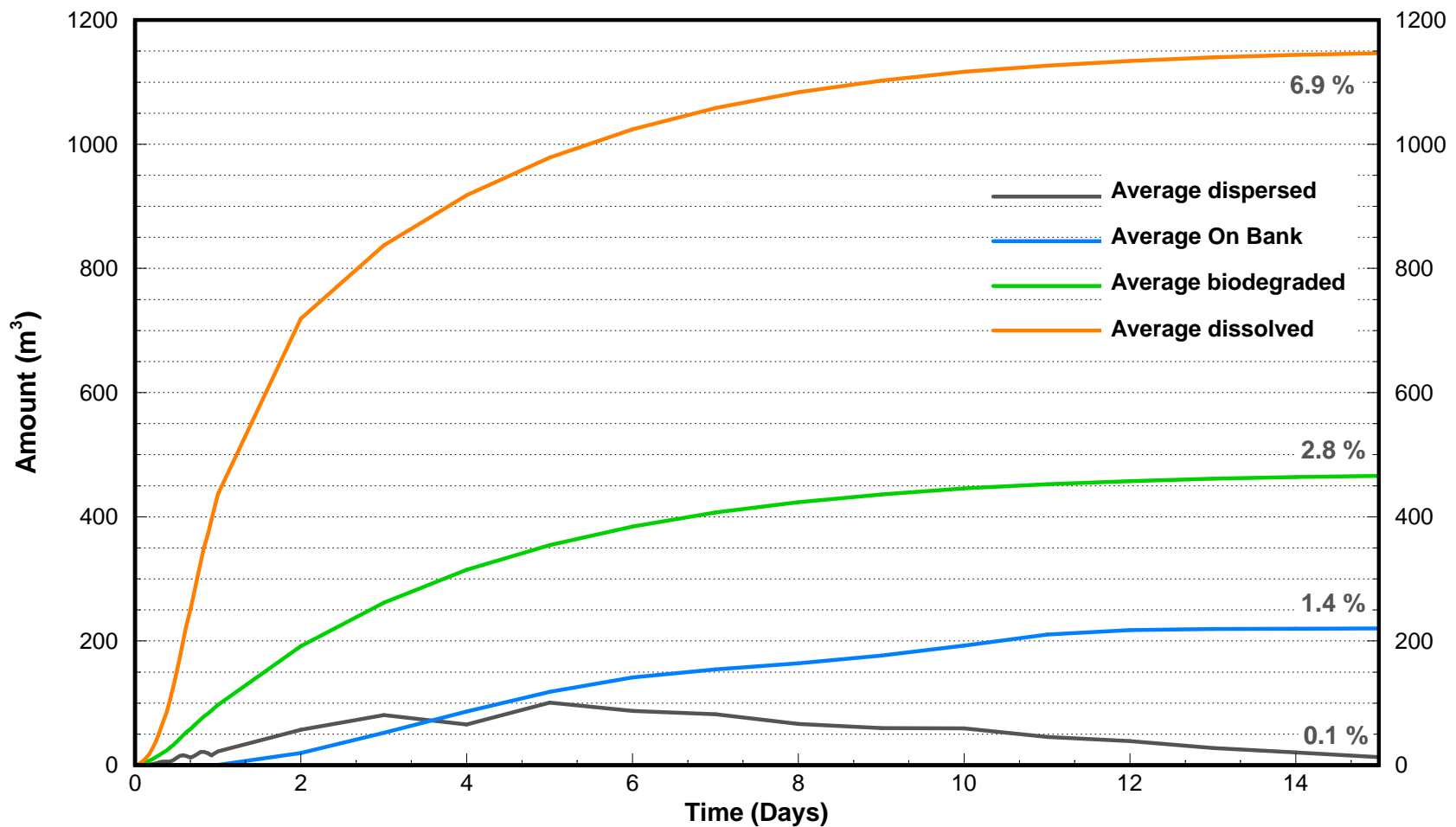


TRANS MOUNTAIN OIL SPILL STUDY

Stochastic Simulation
Fall 2011, Site D (16,500 m³)
Major Components of the Mass Balance

PROJECT NO. V13203022	DWN AH	CKD JAS	APVD -	REV 0
OFFICE EBA-VANC	DATE October 4, 2013			

Figure D.4-8



NOTES

- Statistical results based on independent spills occurring every 6 hours from October 01 00:00 to December 31 23:00, for a total of 368 independant spills.
- Tracking time for each spill was 15 days.
- The minor components of the mass balance are shown above.

STATUS
ISSUED FOR USE

CLIENT

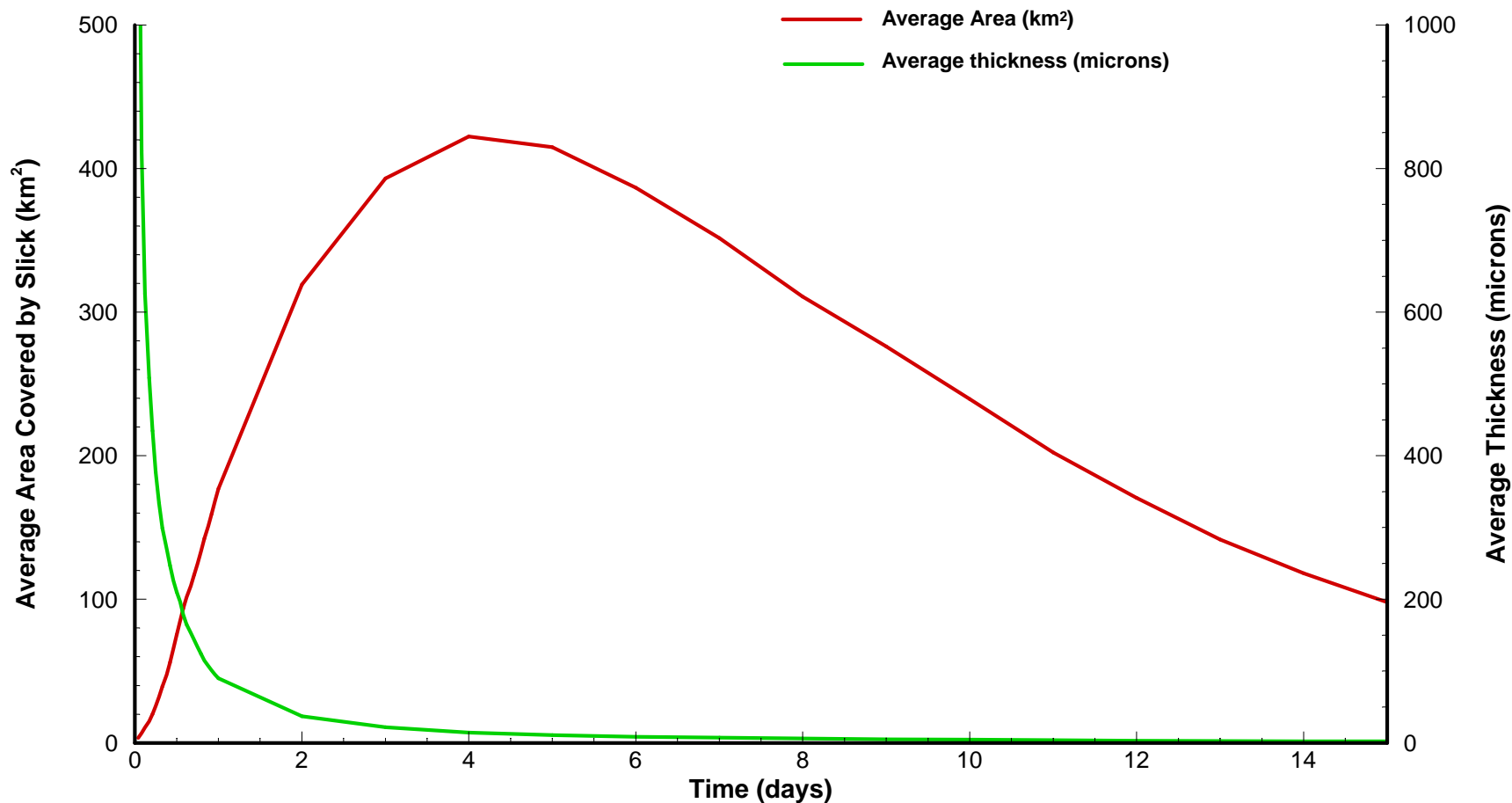


TRANS MOUNTAIN OIL SPILL STUDY

Stochastic Simulation Fall 2011, Site D (16,500 m³) Minor Components of the Mass Balance

PROJECT NO. V13203022	DWN AH	CKD JAS	APVD -	REV 0
OFFICE EBA-VANC	DATE October 4, 2013			

Figure D.4-9



NOTES

- Statistical results based on independent spills occurring every 6 hours from October 01 00:00 to December 31 23:00.
- The average thickness is based on a full coverage of each grid cell that contains oil.

STATUS
ISSUED FOR USE

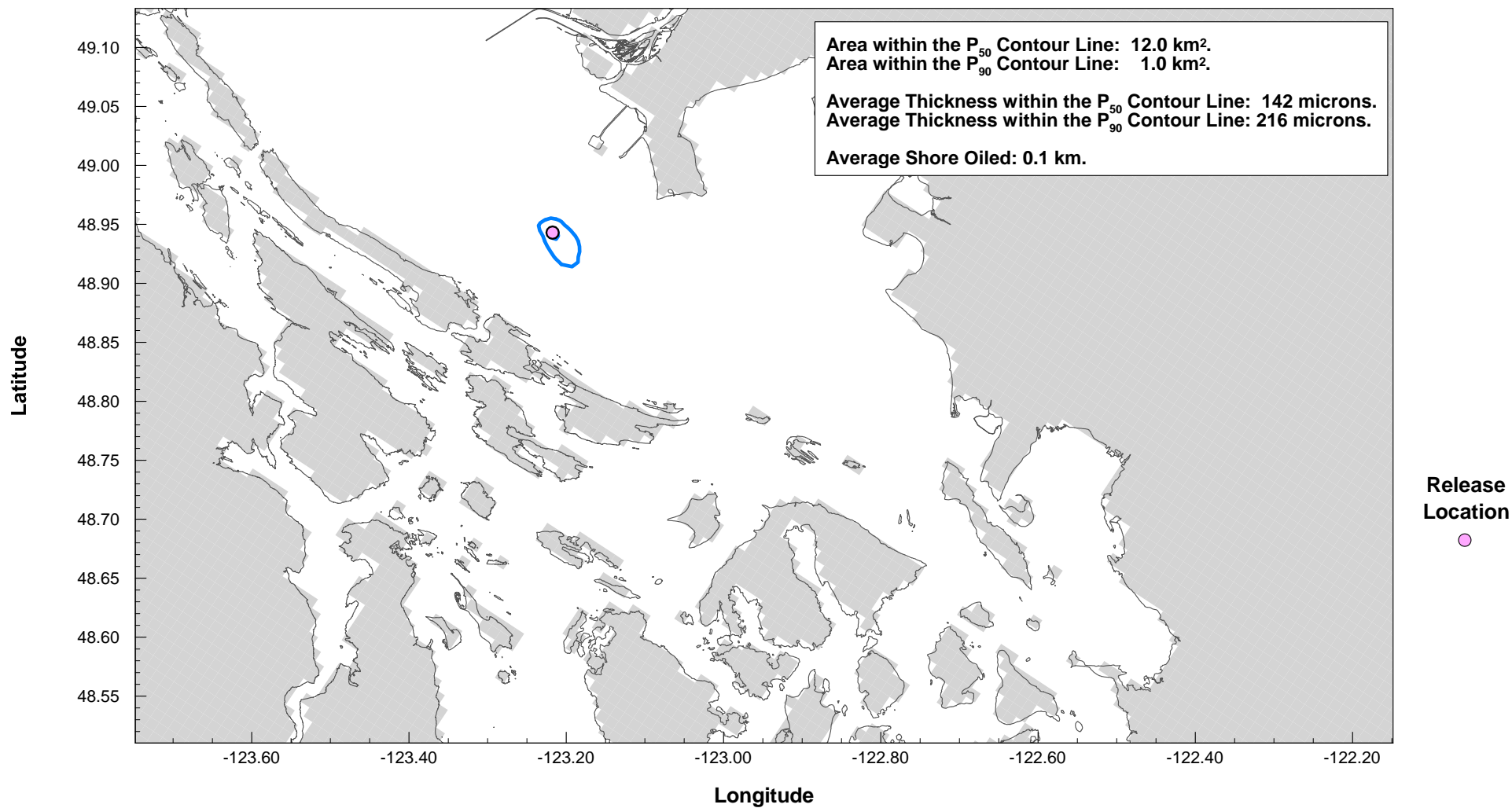
CLIENT



TRANS MOUNTAIN OIL SPILL STUDY

Stochastic Simulation Fall 2011, Site D (16,500 m³) Statistics on Area and Thickness

PROJECT NO. V13203022	DWN AH	CKD JAS	APVD -	REV 0	Figure D.4-10
OFFICE EBA-VANC	DATE October 4, 2013				



NOTES

- Statistical results based on independent spills occurring every 6 hours from October 01 00:00 to December 31 23:00, for a total of 368 independant spills.

Probability of oil presence is the percentage of simulations in which oil was present at a given location.

P_{50} : after 6 hours, there is a 50% probability for the area within the P_{50} contour line to have been contacted.

P_{90} : after 6 hours, there is a 90% probability for the area within the P_{90} contour line to have been contacted.

- Tracking time for each spill was 6 hours.

- The average thickness is based on a full coverage of each grid cell that contains oil and within the contour line.

STATUS
ISSUED FOR USE

CLIENT

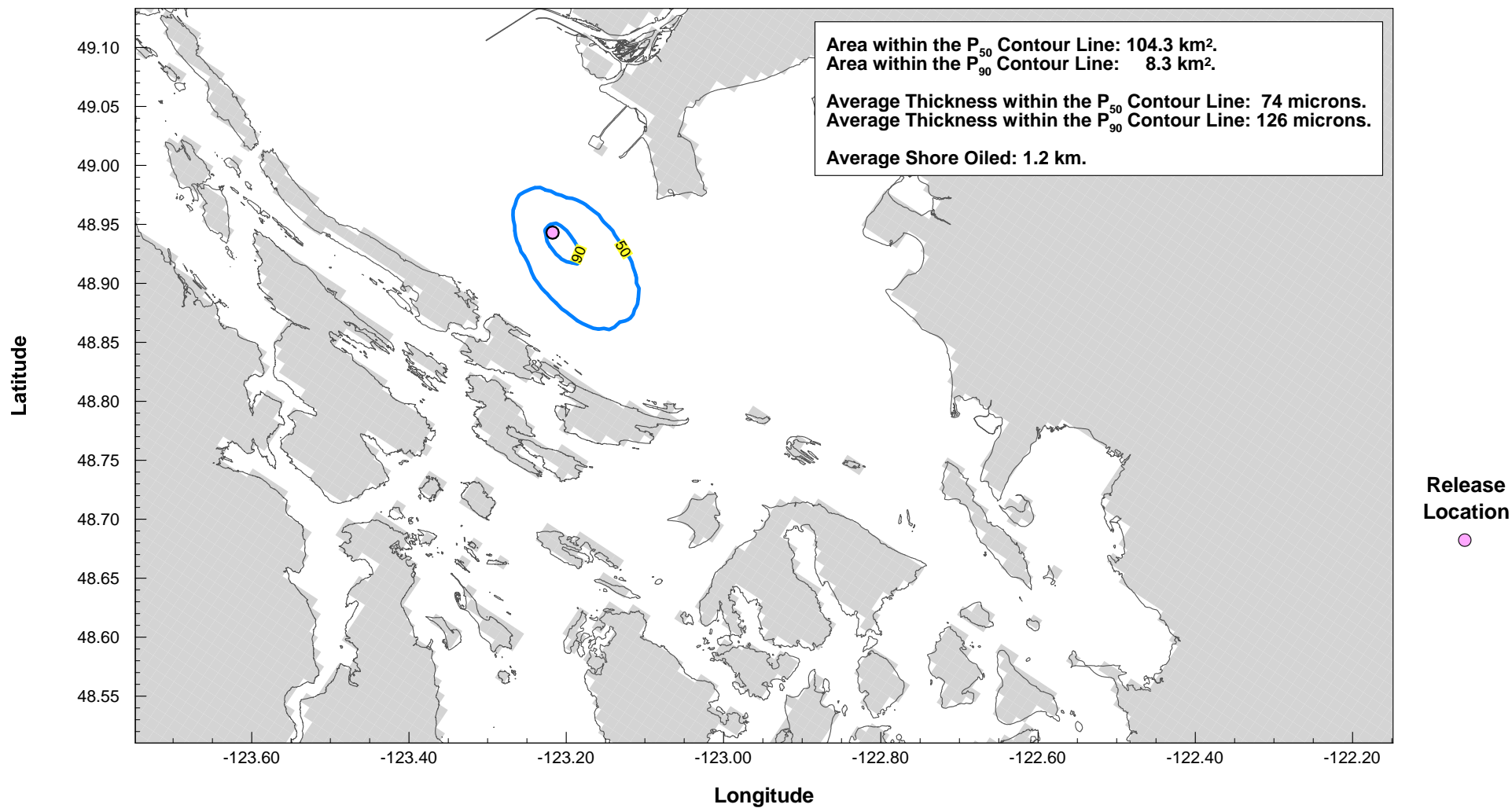


TRANS MOUNTAIN OIL SPILL STUDY

Stochastic Simulation
Fall 2011, Site D (16,500 m³)
 P_{50} and P_{90} after 6 Hours

PROJECT NO. V13203022	DWN AH	CKD JAS	APVD -	REV 0
OFFICE EBA-VANC	DATE October 4, 2013			

Figure D.4-11



NOTES

- Statistical results based on independent spills occurring every 6 hours from October 01 00:00 to December 31 23:00, for a total of 368 independent spills.

Probability of oil presence is the percentage of simulations in which oil was present at a given location.

P_{50} : after 12 hours, there is a 50% probability for the area within the P_{50} contour line to have been contacted.

P_{90} : after 12 hours, there is a 90% probability for the area within the P_{90} contour line to have been contacted.

- Tracking time for each spill was 12 hours.

- The average thickness is based on a full coverage of each grid cell that contains oil and within the contour line.

STATUS
ISSUED FOR USE

CLIENT

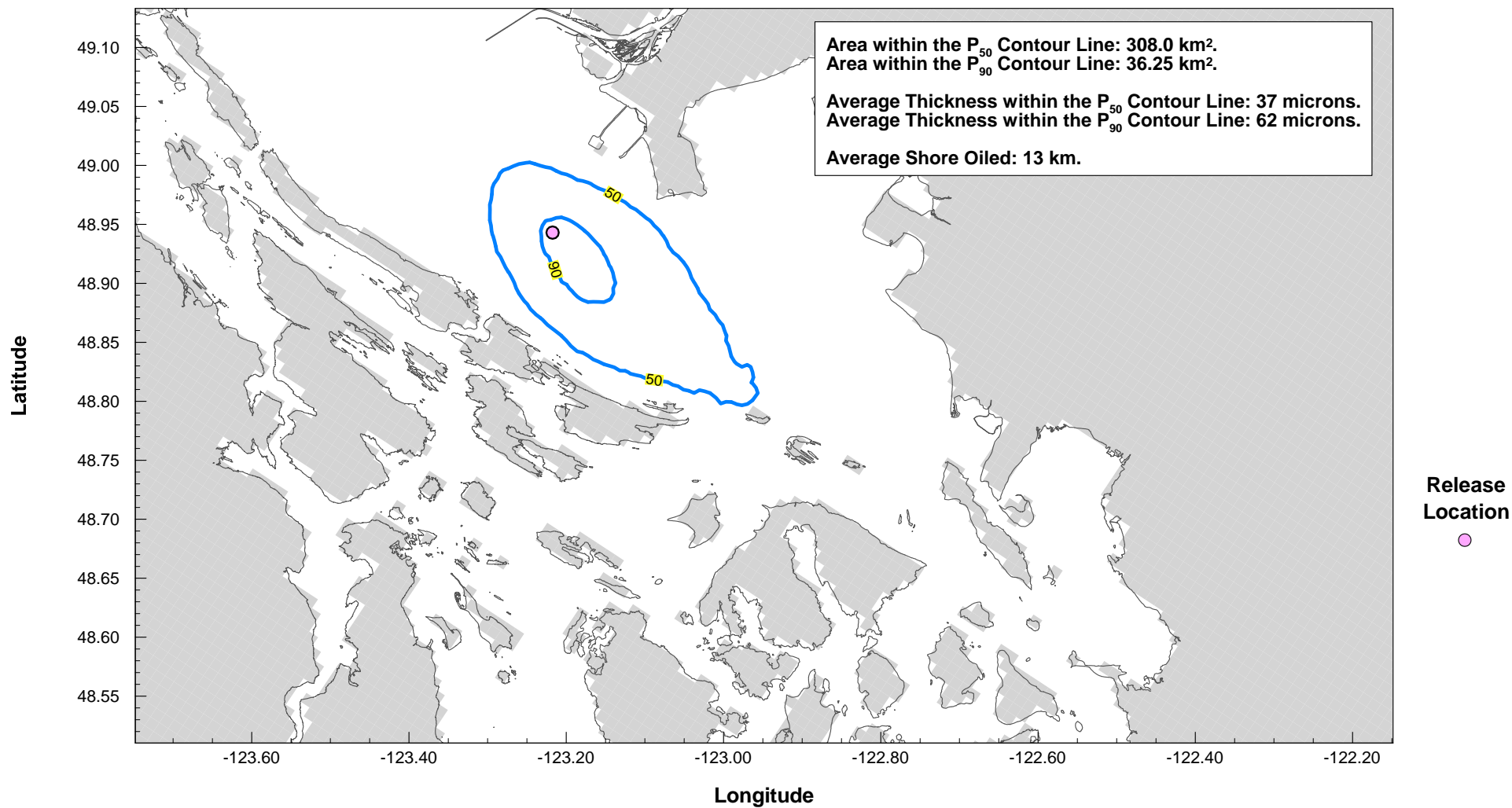


TRANS MOUNTAIN OIL SPILL STUDY

Stochastic Simulation
Fall 2011, Site D (16,500 m³)
 P_{50} and P_{90} after 12 Hours

PROJECT NO. V13203022	DWN AH	CKD JAS	APVD -	REV 0
OFFICE EBA-VANC	DATE October 4, 2013			

Figure D.4-12



NOTES

- Statistical results based on independent spills occurring every 6 hours from October 01 00:00 to December 31 23:00, for a total of 368 independent spills.

Probability of oil presence is the percentage of simulations in which oil was present at a given location.

P_{50} : after 24 hours, there is a 50% probability for the area within the P_{50} contour line to have been contacted.

P_{90} : after 24 hours, there is a 90% probability for the area within the P_{90} contour line to have been contacted.

- Tracking time for each spill was 24 hours.

- The average thickness is based on a full coverage of each grid cell that contains oil and within the contour line.

STATUS
ISSUED FOR USE

CLIENT

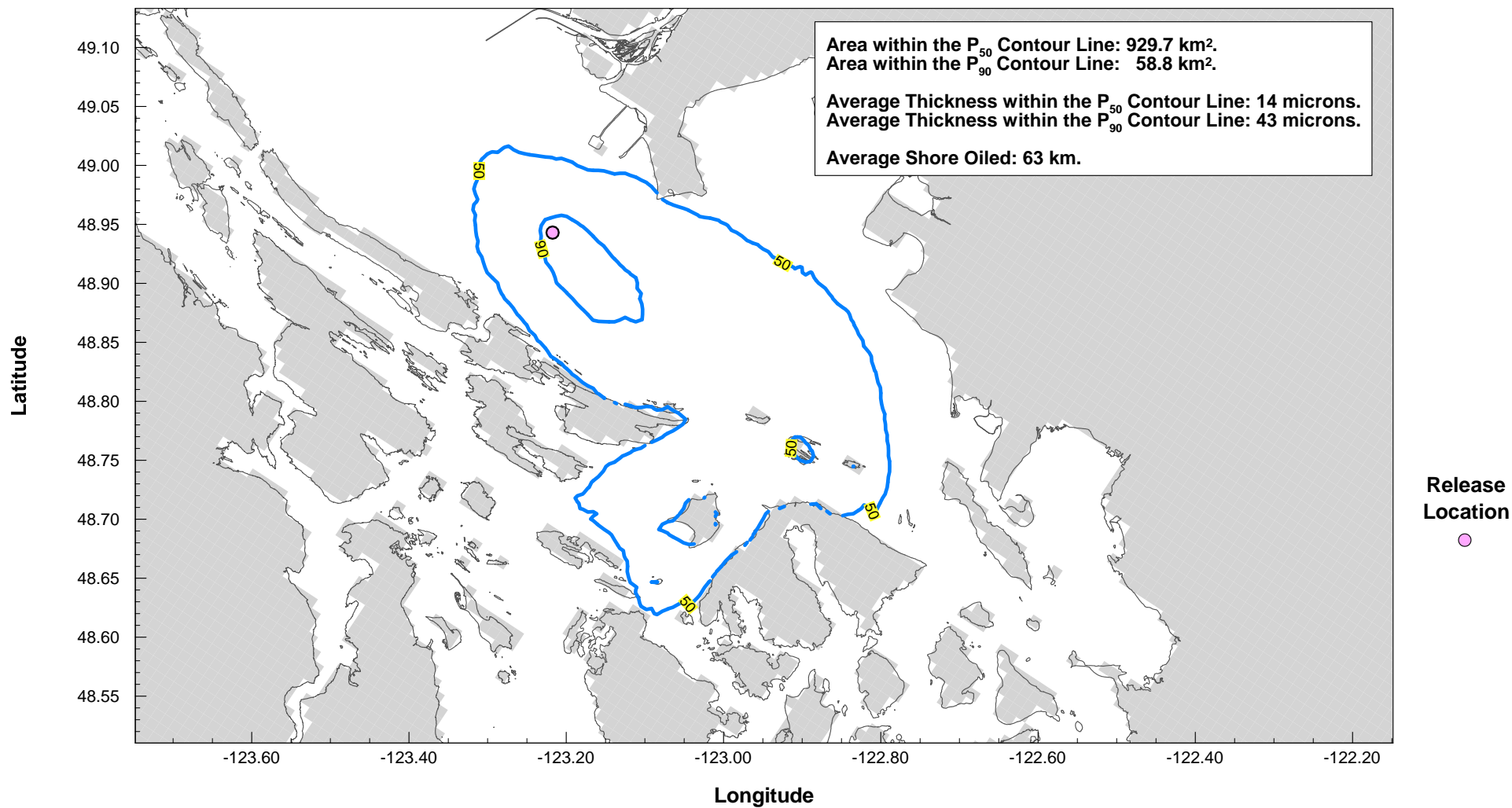


TRANS MOUNTAIN OIL SPILL STUDY

Stochastic Simulation
Fall 2011, Site D (16,500 m³)
 P_{50} and P_{90} after 24 Hours

PROJECT NO. V13203022	DWN AH	CKD JAS	APVD -	REV 0
OFFICE EBA-VANC	DATE October 4, 2013			

Figure D.4-13



NOTES

- Statistical results based on independent spills occurring every 6 hours from October 01 00:00 to December 31 23:00, for a total of 368 independent spills.

Probability of oil presence is the percentage of simulations in which oil was present at a given location.

P_{50} : after 48 hours, there is a 50% probability for the area within the P_{50} contour line to have been contacted.

P_{90} : after 48 hours, there is a 90% probability for the area within the P_{90} contour line to have been contacted.

- Tracking time for each spill was 48 hours.

- The average thickness is based on a full coverage of each grid cell that contains oil and within the contour line.

STATUS
ISSUED FOR USE

CLIENT



TRANS MOUNTAIN OIL SPILL STUDY

Stochastic Simulation
Fall 2011, Site D (16,500 m³)
 P_{50} and P_{90} after 48 Hours

PROJECT NO.

V13203022

OFFICE

EBA-VANC

DWN

AH

CKD

JAS

APVD

-

REV

0

DATE

October 4, 2013

Figure D.4-14