

Fred Bullen
Western Pacific Marine Ltd.
7721 Upper Balfour Rd
Balfour, BC. V0G 1C0

April 21, 2017

Re: Balfour Osprey 2000 Gear Oil Spill – Water Quality Update - April 21, 2017

Water quality samples were taken at nine sites between April 16 – 19, 2017 to document baseline and follow up conditions following the gear oil spill from the Balfour Osprey 2000 that occurred on April 15, 2017 (Table 1, Figure 1, Photos 1 - 9). Analytical services were provided by Caro Analytical in Richmond, BC. Samples were taken from the top 10 – 20 cm of the water column and included surface water. Samples were analyzed for light extractable petroleum hydrocarbons, heavy extractable petroleum hydrocarbons and polycyclic aromatic hydrocarbons. Results are presented in Attachment 1.

The sample taken at Site 4 on April 17 tested positive for heavy extractable hydrocarbons (474 ug/L). Site 4 is 2 m from shore immediately downstream from the first marina dock where oil film was observed on an area of quiet water during both sampling events at this site (April 17th and 19th). For all other samples analyzed all parameters were below detection limits (Attachment 1).

Table 1. Water quality sampling sites.

Site	Location	UTM (11 U)	April 16	April 17	April 19	Comment
1	Balfour Beach Hotel Marina dock	503300 5496802		X	X	350 m upstream of ferry terminal. Sample taken 2 m from shore on d/s side of boat launch dock.
2	Dock 'n' Duck Dock	502962 5496842		X	X	At Dock n' Duck pub dock within terminal bay. Sampled on u/s side of dock 2 m from shore. Oil film present.
3	First Marina End	502711 5496703	X	X	X	200 m d/s. At the end of first marina dock. Oil film present on April 16 th and 17 th .
4	First Marina Beach	502697 5496768		X	X	2 m from shore immediately d/s from first marina dock. Oil film present.
5	Balfour Wharf Government Dock End	502534 5496670		X	X	450 m d/s. Balfour Wharf at end of government dock on u/s corner.
6	Balfour Wharf Government Beach	502515 5496714		X	X	450 m d/s. Balfour Wharf 2 m from shore on u/s side of government dock.
7	Black Angus Farm	501065 5496461		X	X	1.8 km d/s of terminal on private land at West Arm pinch point.
8	Harrop Ferry	496091 5495383	X			Not shown on map. ~7 km downstream. 2 m from shore on upstream side of Harrop Ferry Ramp.
9	Orange Bridge	479447 5484403	X			Not shown on map. ~30 km downstream at orange bridge located in City of Nelson.

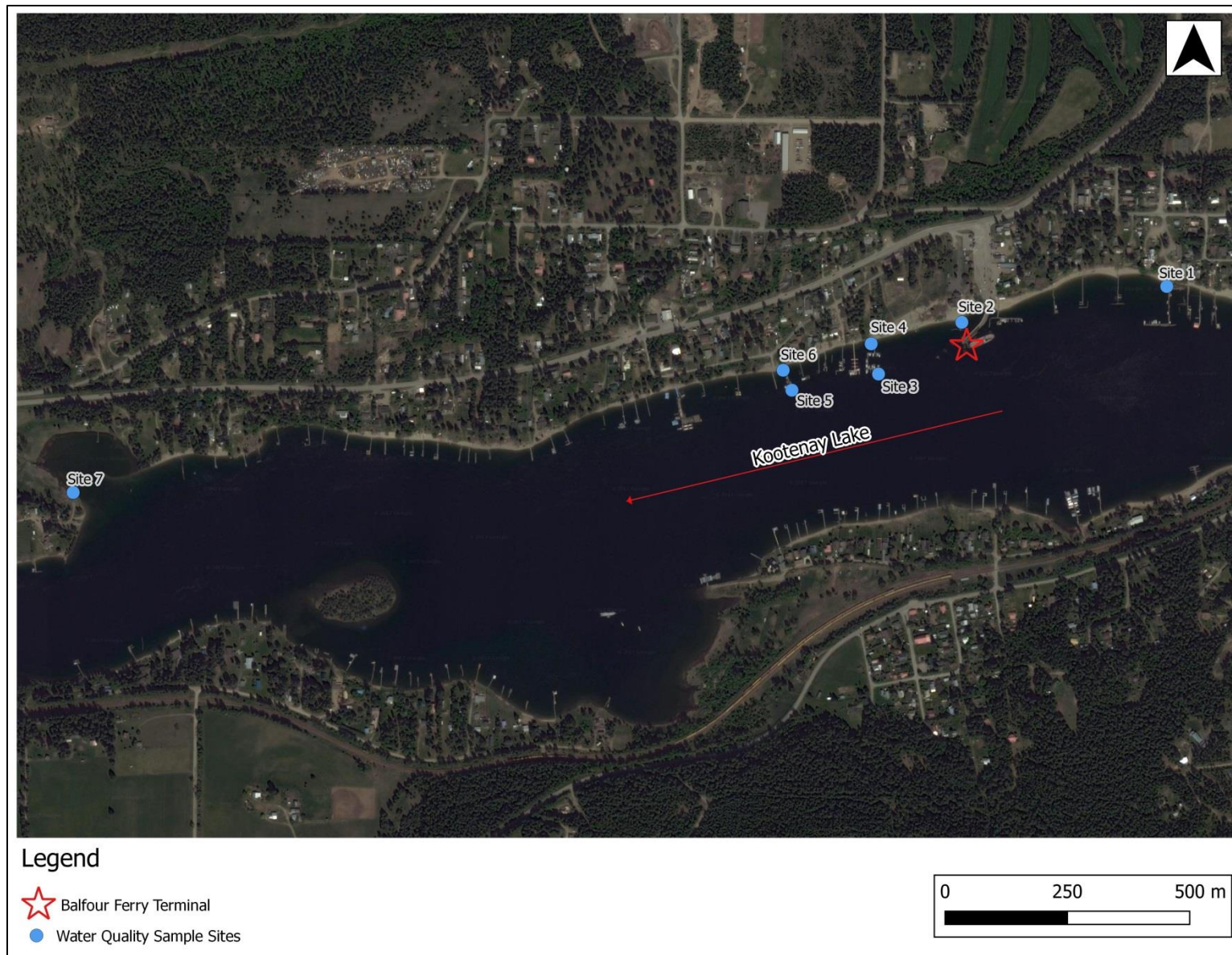


Figure 1. Water quality sites.



Photo 1. Site 1 - Balfour Beach Hotel Marina dock.



Photo 2. Site 2 - Dock 'n' Duck Dock.



Photo 3. Site 3 - First Marina End.



Photo 4. Site 4 - First Marina Beach



Photo 5. Site 5 - Balfour Wharf Government Dock End.



Photo 6. Site 6 - Balfour Wharf Government Beach



Photo 7. Site 7 - Black Angus Farm.



Photo 8. Site 8 - Harrop Ferry - ~7 km downstream of Balfour Ferry terminal.



Photo 9. Site 9 - Orange bridge in City of Nelson - ~30 km downstream of Balfour Ferry terminal.

If you have any questions or comments please feel free to contact us.

Sincerely,

Al Irvine, RPBio

Masse Environmental Consultants

E: al@masse-env.com

Attachment 1
Raw Water Quality Data

Balfour Gear Oil Spill - Water Quality Update - April 21, 2017

Site ID		Site 4	Site 8	Site 9	Site 1	Site 2	Site 3	Site 4	Site 5	Site 6	Site 7
LAB ID		7041176-02	7041176-03	7041176-01	7041176-07	7041176-04	7041176-05	7041176-06	7041176-09	7041176-08	7041176-10
CLIENT ID		Moore 1 End	Harrop Ferry	Orange Bridge	BBI	Rec Beach	Moore 1 End	Moore 1 Beach	Gov Dock End	Gov Dock Beach	Black Angus
DATE SAMPLED		2017-04-16	2017-04-16	2017-04-16	2017-04-17	2017-04-17	2017-04-17	2017-04-17	2017-04-17	2017-04-17	2017-04-17
DATE RECEIVED		2017-04-19	2017-04-19	2017-04-19	2017-04-19	2017-04-19	2017-04-19	2017-04-19	2017-04-19	2017-04-19	2017-04-19
Analyte	Units	RDL									
EPHw10-19	ug/L	250	<250	<250	<250	<250	<250	<250	<250	<250	<250
EPHw19-32	ug/L	250	<250	<250	<250	<250	<250	474	<250	<250	<250
LEPHw	ug/L	250	<250	<250	<250	<250	<250	<250	<250	<250	<250
HEPHw	ug/L	250	<250	<250	<250	<250	<250	474	<250	<250	<250
Acenaphthene	ug/L	0.05	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Acenaphthylene	ug/L	0.2	<0.200	<0.200	<0.200	<0.200	<0.200	<0.200	<0.200	<0.200	<0.200
Acridine	ug/L	0.05	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Anthracene	ug/L	0.01	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Benz(a)anthracene	ug/L	0.01	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Benzo(a)pyrene	ug/L	0.01	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Benzo(b)fluoranthene	ug/L	0.05	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Benzo(b+j)fluoranthene	ug/L	0.1	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100
Benzo(g,h,i)perylene	ug/L	0.05	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Benzo(k)fluoranthene	ug/L	0.05	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Chrysene	ug/L	0.05	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Dibenz(a,h)anthracene	ug/L	0.05	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Fluoranthene	ug/L	0.03	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030
Fluorene	ug/L	0.05	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Indeno(1,2,3-cd)pyrene	ug/L	0.05	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Naphthalene	ug/L	0.2	<0.200	<0.200	<0.200	<0.200	<0.200	<0.200	<0.200	<0.200	<0.200
Phenanthrene	ug/L	0.1	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100
Pyrene	ug/L	0.02	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
Quinoline	ug/L	0.05	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050

Balfour Gear Oil Spill - Water Quality Update - April 21, 2017

Site ID			Site 1	Site 2	Site 3	Site 4	Site 5	Site 6	Site 7
LAB ID			7041371-03	7041371-02	7041371-04	7041371-05	7041371-07	7041371-06	7041371-01
DATE SAMPLED			2017-04-19	2017-04-19	2017-04-19	2017-04-19	2017-04-19	2017-04-19	2017-04-19
DATE RECEIVED			2017-04-20	2017-04-20	2017-04-20	2017-04-20	2017-04-20	2017-04-20	2017-04-20
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Acenaphthene	ug/L	0.05	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
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Benz(a)anthracene	ug/L	0.01	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Benzo(a)pyrene	ug/L	0.01	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Benzo(b)fluoranthene	ug/L	0.05	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Benzo(b+j)fluoranthene	ug/L	0.1	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100
Benzo(g,h,i)perylene	ug/L	0.05	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Benzo(k)fluoranthene	ug/L	0.05	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
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Dibenz(a,h)anthracene	ug/L	0.05	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Fluoranthene	ug/L	0.03	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030
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Phenanthrene	ug/L	0.1	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100
Pyrene	ug/L	0.02	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
Quinoline	ug/L	0.05	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050