

**Table 4-2.** Phytoplankton density (cells/L) and richness by major taxa group, Whale Tail Pit Baseline, 2014.

| Lake            | Sample   | date     | Richness<br>(# of species) | Density in cells/L (percent of total in parentheses) |             |              |              |              |                 | Total Density |
|-----------------|----------|----------|----------------------------|------------------------------------------------------|-------------|--------------|--------------|--------------|-----------------|---------------|
|                 |          |          |                            | Cyanophyte                                           | Chlorophyte | Chrysophyte  | Diatoms      | Cryptophytes | Dinoflagellates |               |
| Whale Tail Lake | WHAL - 1 | 5/Sep/14 | 35                         | 14768 (1)                                            | 417272 (17) | 1840104 (73) | 215920 (8.6) | 15768 (0.6)  | 15168 (0.6)     | 2,519,000     |
|                 | WHAL - 3 | 5/Sep/14 | 38                         | 57472 (2)                                            | 352016 (13) | 1883208 (69) | 356016 (13)  | 68856 (3)    | 16568 (0.6)     | 2,734,136     |
|                 | WHAL - 5 | 5/Sep/14 | 38                         | 50488 (2)                                            | 337848 (11) | 2357352 (74) | 324680 (10)  | 98792 (3)    | 800 (0.03)      | 3,169,960     |
| Mammoth Lake    | LAK3 - 1 | 4/Sep/14 | 35                         | 0 (0)                                                | 302128 (8)  | 2474296 (67) | 820176 (22)  | 74440 (2)    | 3600 (0.1)      | 3,674,640     |
|                 | LAK3 - 3 | 4/Sep/14 | 34                         | 400 (0.01)                                           | 466960 (14) | 2245608 (66) | 654344 (19)  | 38320 (1)    | 8984 (0.3)      | 3,414,616     |
|                 | LAK3 - 5 | 4/Sep/14 | 35                         | 600 (0.02)                                           | 524632 (14) | 2554920 (69) | 619624 (17)  | 23752 (1)    | 4800 (0.1)      | 3,728,328     |
| Nemo Lake       | NEMO - 1 | 6/Sep/14 | 35                         | 1200 (0.05)                                          | 182000 (7)  | 1710792 (67) | 605056 (24)  | 36920 (1)    | 600 (0.02)      | 2,536,568     |
|                 | NEMO - 3 | 6/Sep/14 | 35                         | 200 (0.01)                                           | 216920 (9)  | 1596248 (68) | 476744 (20)  | 44904 (2)    | 7984 (0.3)      | 2,343,000     |
|                 | NEMO - 5 | 6/Sep/14 | 34                         | 50488 (3)                                            | 396320 (22) | 898600 (50)  | 453992 (25)  | 14568 (1)    | 800 (0.04)      | 1,814,768     |

**Notes:**

Data presented here was adapted from Portt and Associates (2015a).

Species richness calculated at the lowest practical level (LPL) of identification.

Density shown by major taxa group.



**Table 4-3.** Phytoplankton biomass (mg/m<sup>3</sup>) by major taxa group, Whale Tail Pit Baseline, 2015.

| Station | Sample   | date      | Biomass in mg/m <sup>3</sup> (percent of total in parentheses) |             |             |             |              |                 | Total Biomass |
|---------|----------|-----------|----------------------------------------------------------------|-------------|-------------|-------------|--------------|-----------------|---------------|
|         |          |           | Cyanophyte                                                     | Chlorophyte | Chrysophyte | Diatoms     | Cryptophytes | Dinoflagellates |               |
| WTN     | WTN1-S   | 17/Jul/15 | 0 (0)                                                          | 1.2 (0.3)   | 344 (95)    | 2.2 (0.6)   | 6.7 (1.8)    | 9.8 (2.7)       | 364           |
|         | WTN2-S   | 17/Jul/15 | 0 (0)                                                          | 1 (0.4)     | 234 (86)    | 3.6 (1.3)   | 6.8 (2.5)    | 25 (9)          | 270           |
|         | WTN3-S   | 20/Aug/15 | 0.1 (0.1)                                                      | 4.5 (2.5)   | 140 (76)    | 7.3 (4)     | 7.8 (4.2)    | 24 (13)         | 184           |
|         | WTN4-S   | 20/Aug/15 | 0 (0)                                                          | 3.7 (2.4)   | 104 (68)    | 11 (7.2)    | 4.7 (3)      | 30 (20)         | 154           |
|         | WTN5-S   | 18/Sep/15 | 0.2 (0.1)                                                      | 6 (2.5)     | 191 (79)    | 25 (10.4)   | 4.3 (1.8)    | 15.3 (6.3)      | 242           |
|         | WTN6-S   | 18/Sep/15 | 0.3 (0.1)                                                      | 1.9 (0.8)   | 189 (83)    | 15 (6.6)    | 4.4 (1.9)    | 16.3 (7.2)      | 226           |
| WTS     | WTS1-S   | 17/Jul/15 | 0 (0)                                                          | 1 (0.3)     | 284 (83)    | 6 (1.7)     | 20 (5.8)     | 30 (8.8)        | 340           |
|         | WTS2-S   | 17/Jul/15 | 0 (0)                                                          | 1.3 (0.5)   | 211 (80)    | 5.4 (2)     | 12.8 (4.8)   | 35 (13)         | 265           |
|         | WTS3-S   | 21/Aug/15 | 3.5 (2)                                                        | 11.1 (6.4)  | 122 (71)    | 8.4 (4.9)   | 2.9 (1.7)    | 24 (14)         | 173           |
|         | WTS4-S   | 21/Aug/15 | 2.7 (2)                                                        | 5.9 (4.4)   | 112 (84)    | 5 (3.7)     | 2.1 (1.5)    | 6.3 (4.7)       | 134           |
|         | WTS5-S   | 18/Sep/15 | 0.9 (0.5)                                                      | 1.6 (0.8)   | 158 (81)    | 20 (10)     | 4.5 (2.3)    | 10.1 (5.2)      | 195           |
|         | WTS6-S   | 18/Sep/15 | 0.1 (0)                                                        | 13.6 (4.6)  | 248 (85)    | 17 (6)      | 8.8 (3)      | 4.5 (1.5)       | 293           |
| MAM     | MAM1-S   | 18/Jul/15 | 0 (0)                                                          | 1.2 (0.4)   | 236 (85)    | 17.4 (6.3)  | 11 (4)       | 11.6 (4.2)      | 277           |
|         | MAM2-S   | 18/Jul/15 | 0 (0)                                                          | 0.9 (0.5)   | 179 (92)    | 5.8 (3)     | 3.7 (1.9)    | 4.5 (2.3)       | 194           |
|         | MAM3-S   | 24/Aug/15 | 0.2 (0.1)                                                      | 10.3 (6.5)  | 113 (71)    | 11.4 (7.2)  | 4.8 (3.1)    | 18.6 (11.8)     | 158           |
|         | MAM4-S   | 24/Aug/15 | 0 (0)                                                          | 6.5 (4.8)   | 108 (79)    | 7.1 (5.2)   | 4.8 (3.5)    | 10.1 (7.4)      | 137           |
|         | MAM5-S   | 19/Sep/15 | 0.1 (0)                                                        | 2.7 (1.2)   | 198 (87)    | 11.4 (5)    | 5.2 (2.3)    | 11.2 (4.9)      | 228           |
|         | MAM6-S   | 19/Sep/15 | 3.1 (1.5)                                                      | 5.3 (2.5)   | 173 (81)    | 13.3 (6.2)  | 5.6 (2.6)    | 13.4 (6.2)      | 214           |
| NEM     | NEM1-S   | 18/Jul/15 | 0 (0)                                                          | 1.8 (1.1)   | 121 (73)    | 13.4 (8.1)  | 12.3 (7.4)   | 17.1 (10.4)     | 165           |
|         | NEM2-S   | 18/Jul/15 | 0 (0)                                                          | 3.3 (1.3)   | 205 (80)    | 13.9 (5.4)  | 12.9 (5)     | 21.6 (8.4)      | 257           |
|         | NEM3-S   | 23/Aug/15 | 0 (0)                                                          | 20.9 (18.8) | 59 (53)     | 23 (21)     | 2.1 (1.9)    | 6.3 (5.7)       | 111           |
|         | NEM4-S   | 23/Aug/15 | 0 (0)                                                          | 15.7 (14.7) | 70 (65)     | 19.1 (18)   | 0.3 (0.3)    | 1.8 (1.7)       | 107           |
|         | NEM5-S   | 19/Sep/15 | 0.7 (0.5)                                                      | 6.7 (4.5)   | 115 (78)    | 17.9 (12)   | 0.6 (0.4)    | 6.5 (4.4)       | 147           |
|         | NEM6-S   | 19/Sep/15 | 0.6 (0.4)                                                      | 5.2 (3.4)   | 133 (87)    | 7.9 (5.2)   | 1.9 (1.2)    | 4.1 (2.7)       | 152           |
| INUG    | INUG-70S | 27/Jul/15 | 0 (0)                                                          | 2.4 (0.6)   | 369 (89)    | 13.1 (3.2)  | 15 (3.6)     | 13.6 (3.3)      | 413           |
|         | INUG-71S | 27/Jul/15 | 0 (0)                                                          | 2.1 (0.5)   | 399 (91)    | 6.3 (1.4)   | 12.2 (2.8)   | 20.8 (4.7)      | 440           |
|         | INUG72S  | 27/Aug/15 | 0.1 (0.1)                                                      | 5.8 (3.2)   | 157 (87)    | 13.3 (7.4)  | 1 (0.6)      | 2.3 (1.3)       | 179           |
|         | INUG73S  | 27/Aug/15 | 0.6 (0.3)                                                      | 6.4 (3.2)   | 167 (83)    | 11.6 (5.8)  | 5.8 (2.9)    | 10 (5)          | 202           |
|         | INUG74S  | 1/Oct/15  | 3.4 (1.7)                                                      | 6 (3)       | 156 (77)    | 21 (10)     | 9.7 (4.7)    | 8.1 (4)         | 204           |
|         | INUG75S  | 1/Oct/15  | 2 (1)                                                          | 8.3 (4.3)   | 148 (77)    | 18 (9.4)    | 7 (3.7)      | 7.9 (4.2)       | 191           |
| PDL     | PDL37S   | 28/Jul/15 | 0 (0)                                                          | 0.6 (0.3)   | 199 (87)    | 13.7 (6)    | 7.8 (3.4)    | 6.6 (2.9)       | 227           |
|         | PDL38S   | 28/Jul/15 | 0 (0)                                                          | 0.1 (0)     | 230 (88)    | 10.2 (3.9)  | 6.3 (2.4)    | 15.1 (5.8)      | 262           |
|         | PDL39S   | 26/Aug/15 | 0.8 (0.5)                                                      | 7.8 (5)     | 127 (81)    | 16.6 (10.6) | 2.5 (1.6)    | 2.3 (1.5)       | 158           |
|         | PDL40S   | 26/Aug/15 | 0.9 (0.6)                                                      | 5.3 (3.3)   | 135 (83)    | 16.3 (10.1) | 2.2 (1.4)    | 2.1 (1.3)       | 162           |
|         | PDL41S   | 4/Oct/15  | 2.5 (1.8)                                                      | 9 (6.5)     | 97 (71)     | 11.4 (8.3)  | 4 (2.9)      | 13.3 (9.7)      | 137           |

**Notes:**

Biomass (wet weight) shown by major taxa group.



**Table 4-4.** Phytoplankton density (cells/L) and richness by major taxa group, Whale Tail Pit Baseline, 2015.

| Station | Sample   | date      | Richness       | Density in cells/L (percent of total in parentheses) |             |              |             |              |                 | Total Density |
|---------|----------|-----------|----------------|------------------------------------------------------|-------------|--------------|-------------|--------------|-----------------|---------------|
|         |          |           | (# of species) | Cyanophyte                                           | Chlorophyte | Chrysophyte  | Diatoms     | Cryptophytes | Dinoflagellates |               |
| WTN     | WTN1-S   | 17/Jul/15 | 30             | 0 (0)                                                | 35920 (0.7) | 4638096 (96) | 65056 (1.3) | 95592 (2)    | 1600 (0.03)     | 4,836,264     |
|         | WTN2-S   | 17/Jul/15 | 30             | 0 (0)                                                | 36120 (0.9) | 3971584 (96) | 67856 (1.6) | 68656 (2)    | 10384 (0.2)     | 4,154,600     |
|         | WTN3-S   | 20/Aug/15 | 33             | 800 (0.04)                                           | 165432 (8)  | 1567312 (76) | 131512 (6)  | 165232 (8)   | 23552 (1.1)     | 2,053,840     |
|         | WTN4-S   | 20/Aug/15 | 35             | 400 (0.02)                                           | 158248 (10) | 1201128 (73) | 146480 (9)  | 100576 (6)   | 44704 (2.7)     | 1,651,536     |
|         | WTN5-S   | 18/Sep/15 | 37             | 600 (0.02)                                           | 237472 (9)  | 2011736 (75) | 362216 (13) | 52088 (2)    | 22752 (0.8)     | 2,686,864     |
|         | WTN6-S   | 18/Sep/15 | 38             | 1800 (0.07)                                          | 143680 (6)  | 2094344 (83) | 228520 (9)  | 65456 (3)    | 2200 (0.09)     | 2,536,000     |
| WTS     | WTS1-S   | 17/Jul/15 | 29             | 0 (0)                                                | 50288 (1.1) | 3985568 (89) | 97592 (2)   | 299144 (7)   | 23952 (0.5)     | 4,456,544     |
|         | WTS2-S   | 17/Jul/15 | 35             | 0 (0)                                                | 72040 (2.3) | 2880616 (92) | 54488 (2)   | 113360 (4)   | 4000 (0.1)      | 3,124,504     |
|         | WTS3-S   | 21/Aug/15 | 40             | 72840 (3)                                            | 366984 (15) | 1703008 (72) | 177016 (7)  | 50288 (2)    | 3600 (0.2)      | 2,373,736     |
|         | WTS4-S   | 21/Aug/15 | 35             | 57472 (3)                                            | 323880 (17) | 1315472 (70) | 133312 (7)  | 35920 (2)    | 8184 (0.4)      | 1,874,240     |
|         | WTS5-S   | 18/Sep/15 | 33             | 29936 (1)                                            | 122128 (5)  | 1851888 (77) | 298960 (13) | 72640 (3)    | 15768 (0.7)     | 2,391,320     |
|         | WTS6-S   | 18/Sep/15 | 37             | 600 (0.02)                                           | 173616 (5)  | 2737520 (81) | 323512 (10) | 144880 (4)   | 7584 (0.2)      | 3,387,712     |
| MAM     | MAM1-S   | 18/Jul/15 | 32             | 0 (0)                                                | 71840 (2)   | 3346560 (91) | 157864 (4)  | 99392 (3)    | 13384 (0.4)     | 3,689,040     |
|         | MAM2-S   | 18/Jul/15 | 26             | 0 (0)                                                | 57472 (2)   | 2900952 (94) | 87608 (3)   | 37720 (1)    | 1200 (0.04)     | 3,084,952     |
|         | MAM3-S   | 24/Aug/15 | 38             | 1000 (0.05)                                          | 424056 (21) | 1323256 (65) | 187200 (9)  | 72840 (4)    | 23752 (1.2)     | 2,032,104     |
|         | MAM4-S   | 24/Aug/15 | 37             | 400 (0.02)                                           | 359600 (16) | 1604632 (73) | 151080 (7)  | 73040 (3)    | 9184 (0.4)      | 2,197,936     |
|         | MAM5-S   | 19/Sep/15 | 36             | 600 (0.02)                                           | 316696 (11) | 2149432 (78) | 223368 (8)  | 79624 (3)    | 1200 (0.04)     | 2,770,920     |
|         | MAM6-S   | 19/Sep/15 | 37             | 57472 (2.1)                                          | 359400 (13) | 2023120 (72) | 265688 (10) | 87008 (3)    | 1600 (0.1)      | 2,794,288     |
| NEM     | NEM1-S   | 18/Jul/15 | 28             | 0 (0)                                                | 36120 (2)   | 1975816 (85) | 245488 (11) | 69256 (3)    | 2000 (0.09)     | 2,328,680     |
|         | NEM2-S   | 18/Jul/15 | 31             | 0 (0)                                                | 65056 (2)   | 2694616 (86) | 259272 (8)  | 104576 (3)   | 9384 (0.3)      | 3,132,904     |
|         | NEM3-S   | 23/Aug/15 | 30             | 0 (0)                                                | 424456 (27) | 900400 (57)  | 218120 (14) | 43104 (3)    | 7384 (0.5)      | 1,593,464     |
|         | NEM4-S   | 23/Aug/15 | 29             | 400 (0.03)                                           | 395720 (30) | 636792 (49)  | 266408 (20) | 7184 (1)     | 200 (0.02)      | 1,306,704     |
|         | NEM5-S   | 19/Sep/15 | 30             | 15368 (0.99)                                         | 266408 (17) | 974256 (62)  | 288760 (19) | 7384 (0)     | 7584 (0.5)      | 1,559,760     |
|         | NEM6-S   | 19/Sep/15 | 35             | 14968 (0.84)                                         | 208936 (12) | 1320688 (74) | 209136 (12) | 29336 (2)    | 400 (0.02)      | 1,783,464     |
| INUG    | INUG-70S | 27/Jul/15 | 30             | 0 (0)                                                | 172616 (6)  | 2061504 (77) | 296744 (11) | 140096 (5)   | 800 (0.03)      | 2,671,760     |
|         | INUG-71S | 27/Jul/15 | 33             | 0 (0)                                                | 129712 (5)  | 2190616 (87) | 117144 (5)  | 57688 (2)    | 8784 (0.35)     | 2,503,944     |
|         | INUG72S  | 27/Aug/15 | 35             | 400 (0.02)                                           | 196768 (11) | 1419448 (77) | 210336 (11) | 14768 (1)    | 7184 (0.39)     | 1,848,904     |
|         | INUG73S  | 27/Aug/15 | 37             | 7584 (0.33)                                          | 211536 (9)  | 1671288 (73) | 260424 (11) | 114944 (5)   | 8384 (0.4)      | 2,274,160     |
|         | INUG74S  | 1/Oct/15  | 40             | 66056 (2.67)                                         | 274992 (11) | 1734744 (70) | 305544 (12) | 72640 (3)    | 21752 (0.88)    | 2,475,728     |
|         | INUG75S  | 1/Oct/15  | 39             | 14968 (0.62)                                         | 209736 (9)  | 1734144 (72) | 356232 (15) | 79424 (3)    | 21552 (0.9)     | 2,416,056     |
| PDL     | PDL37S   | 28/Jul/15 | 28             | 0 (0)                                                | 36320 (2)   | 1790048 (85) | 225112 (11) | 59872 (3)    | 1400 (0.07)     | 2,112,752     |
|         | PDL38S   | 28/Jul/15 | 23             | 0 (0)                                                | 14368 (1)   | 1986416 (88) | 207552 (9)  | 38920 (2)    | 10584 (0.5)     | 2,257,840     |
|         | PDL39S   | 26/Aug/15 | 32             | 9184 (0.49)                                          | 244456 (13) | 1361176 (72) | 219520 (12) | 43504 (2)    | 600 (0.03)      | 1,878,440     |
|         | PDL40S   | 26/Aug/15 | 32             | 3800 (0.22)                                          | 123328 (7)  | 1370160 (79) | 213536 (12) | 22952 (1)    | 400 (0.02)      | 1,734,176     |
|         | PDL41S   | 4/Oct/15  | 30             | 7400 (0.47)                                          | 359200 (23) | 939920 (60)  | 219520 (14) | 22152 (1)    | 14968 (1)       | 1,563,160     |

**Notes:**

Species richness calculated at the lowest practical level (LPL) of identification.

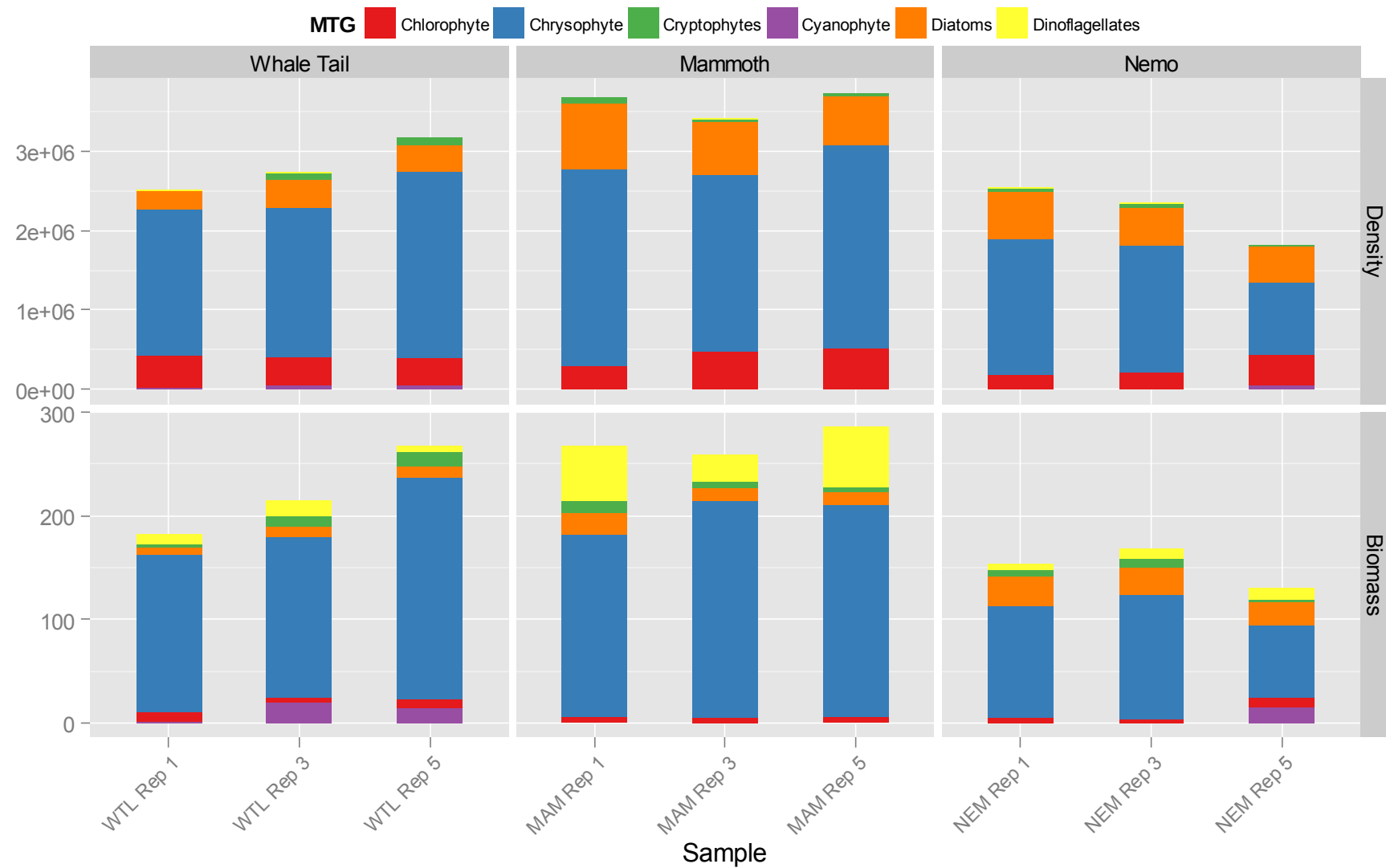
Density shown by major taxa group.



*Whale Tail Pit Core Receiving Environment Monitoring Program (CREMP):  
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**Figure 4i1.** Phytoplankton density (cells/L) and biomass (mg/m<sup>3</sup>) by major taxa group, Whale Tail Pit Baseline, 2014.

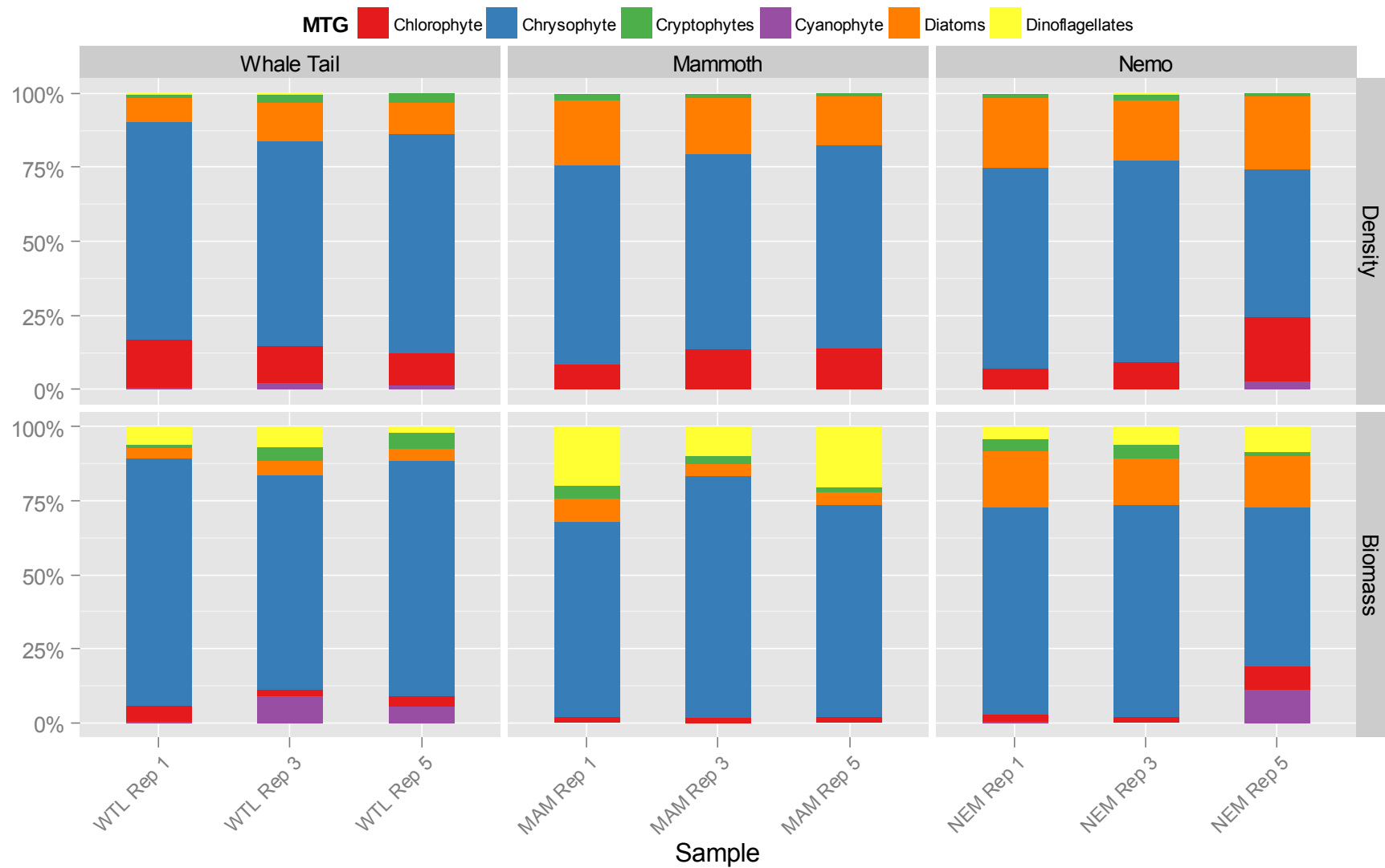
Notes: See text for information on the major taxa groups (MTG). Samples were collected in early September 2014.



*Whale Tail Pit Core Receiving Environment Monitoring Program (CREMP):  
2014 - 2015 Baseline Studies*

**Figure 4i2.** Percent phytoplankton density and biomass by major taxa group, Whale Tail Pit Baseline, 2014.

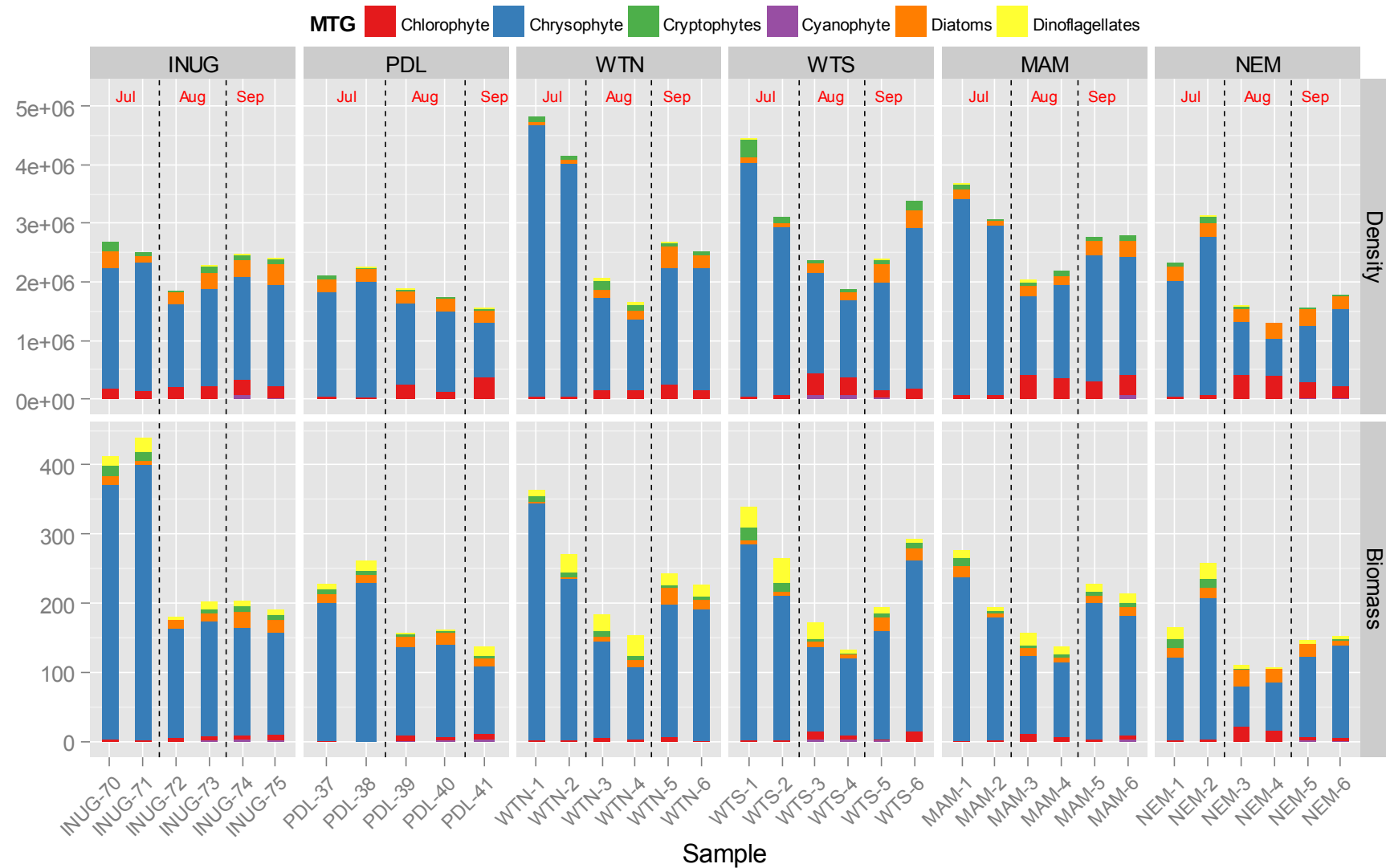
Notes: See text for information on the major taxa groups (MTG). Samples were collected in early September 2014.



*Whale Tail Pit Core Receiving Environment Monitoring Program (CREMP):  
2014 - 2015 Baseline Studies*

**Figure 4i3.** Phytoplankton density (cells/L) and biomass (mg/m<sup>3</sup>) by major taxa group, Whale Tail Pit Baseline, 2015.

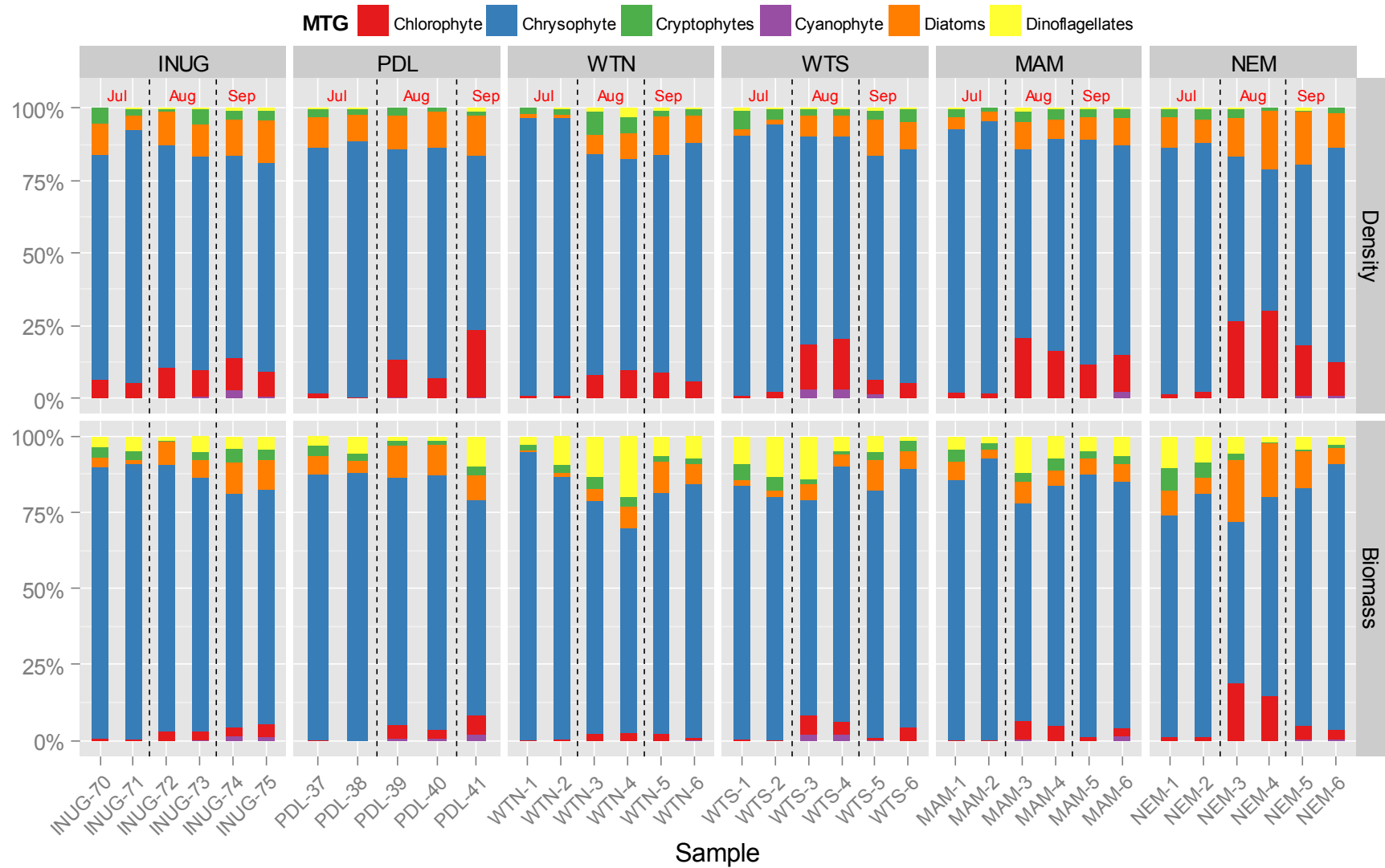
Notes: See text for information on the major taxa groups (MTG). Vertical dashed lines separate the samples by sampling event (i.e., July, August, and September).



*Whale Tail Pit Core Receiving Environment Monitoring Program (CREMP):  
2014 - 2015 Baseline Studies*

**Figure 4i4.** Percent phytoplankton density and biomass by major taxa group, Whale Tail Pit Baseline, 2015.

Notes: See text for information on the major taxa groups (MTG). Vertical dashed lines separate the samples by sampling event (i.e., July, August, and September).



## 5. BENTHIC INVERTEBRATES

### 5.1. Methods Overview

#### 5.1.1. Sample Collection

Benthic invertebrate samples were collected according to methods outlined in the Meadowbank CREMP SOP (Azimuth 2015b) for the 2014 and 2015 baseline programs. Samples were collected using a Petite Ponar grab (0.023 m<sup>2</sup>) and a 500-µm sieve at the same time and locations as sediment chemistry samples. For the 2014 baseline program, five locations were established throughout each lake at the target depth to assess variability in the benthic invertebrate community at the spatial scale of the entire lake. The 2015 baseline program was designed according to the Meadowbank CREMP with five replicates established over a smaller spatial area (~ 100 m radius) to assess the spatial variability in the benthic invertebrate community at the level of the basin, consistent with the approach used in the Meadowbank CREMP. At each replicate station, two independent grabs were composited to form a single sample. Benthic invertebrate samples were preserved in the field using neutral buffered formalin to final concentration of approximately 10% formalin. Each sample had enough water and formalin to completely cover any debris in the sample. Lastly, an internal water-proof label was added to each replicate sample, and the lids were sealed with electrical tape.

#### 5.1.2. Laboratory Methods

Different taxonomists were used for sample identification in 2014 and 2015, but the taxonomic identification methods were similar between years. Taxonomic analysis of the 2014 samples was completed William Morton and Dr. G.L. Mackie at the LPL of taxonomic resolution. A detailed description of the laboratory methods used in 2014 is presented in Portt and Associates (2015a).

Samples collected in 2015 were sent to Zaranko Environmental Assessment Services (ZEAS; Nobleton, ON), the same lab used for the Meadowbank CREMP, for taxonomic identification and analysis. Upon arrival at ZEAS, samples were logged and inspected upon arrival to ensure adequate preservation to a minimum concentration of 10% buffered formalin. Samples were sorted at a magnification of between 7 and 10-times with the use of a stereomicroscope. To expedite sorting prior to processing, all samples were stained with a protein dye that is absorbed by aquatic organisms but not by organic material, such as detritus and algae. Prior to sorting, samples were washed free of formalin in a 500-µm sieve. Benthic invertebrates were enumerated and sorted into major taxonomic groups, (i.e., order and family), placed in glass bottles and re-preserved in 80% ethanol for more detailed taxonomic analysis by senior staff. Each bottle was labeled internally with the survey name, date, area and replicate number.

Abundance of organisms/m<sup>2</sup> was determined from the total number of organisms enumerated. Nematods (phylum *Nemata*) and ostracods were not reported, nor were they included in abundance and richness calculations consistent with taxonomic methods outlined by Environment Canada (2012). Organisms at pupal stage of development were excluded from the species richness totals in each sample unless they were the only stage identified in the sample.

#### 5.1.3. Data Handling and Analysis

The benthic invertebrate results (abundance and richness) were grouped by major taxa, specifically oligochaetes (phyla *Annelida*), insects (class *Insecta*), molluscs (phylum *Mollusca*), and other taxa (phylum *Arthropoda* and phylum *Platyhelminthes*). Data were tabulated in Microsoft Excel and plotted using R software.





## 5.2. Quality Assurance / Quality Control

### 5.2.1. QA/QC Methods

No information was provided on the QA/QC method used by William Morton and Dr. G.L. Mackie in their taxonomic identifications. ZEAS incorporates the following set of QA/QC procedures in all benthic projects undertaken by the company to ensure the generation of high quality and reliable data:

- Samples are logged upon arrival, inspected, and enumerated;
- Samples are checked for proper preservation;
- Samples are stained to facilitate sorting;
- Taxonomic identifications are based on the most updated and widely used keys;
- 10% of the samples are re-sorted, and re-counted, targeting >90% recovery;
- Precision and accuracy estimates are calculated;
- A voucher collection is compiled;
- Sorted sediments and debris are re-preserved in 10% formalin and are retained for up to three months. For samples subject to subsampling, sorted and unsorted fractions are re-preserved separately.

### 5.2.2. QA/QC Results

Results of the QA/QC assessment for the 2015 benthic invertebrate data are presented in [Appendix A2](#). Samples were sorted in their entirety due to low overall abundance. Three samples were resorted, and the lowest percent recovery was 93%, with an average percent recovery of 95% ([Table A2 Ĩ3](#)).

## 5.3. Results

Abundance and richness of benthic invertebrates from the 2014 baseline program are presented in [Table 5 Ĩ1](#) and shown in [Figure 5 Ĩ1](#) (abundance and richness [per m<sup>2</sup>]) and [Figure 5 Ĩ2](#) (percent abundance and richness). The tabulated data presented here were adapted from the original laboratory data presented in the 2014 baseline report (Portt and Associates 2015a).

Results of the 2015 baseline benthic invertebrate community assessment are presented in [Table 5 Ĩ2](#) and shown in [Figure 5 Ĩ3](#) (abundance and richness [per m<sup>2</sup>]) and [Figure 5 Ĩ4](#) (percent abundance and richness). Raw benthic invertebrate data from ZEAS are included as [Appendix F](#).

Overall abundance and richness was low at most locations sampled in 2014 and 2015, characteristic of depositional areas in northern lakes with low productivity and nutrient cycling. Insects, primarily chironomids in the subfamilies *Chironominae* and *Tanypodinae*, and fingernail clams (*Sphaeriidae*) were the dominant benthic invertebrate taxa in the Whale Tail Pit Study Area Lakes (2014 and 2015) and CREMP reference areas (2015). Abundance and richness in the reference areas was approximately 1,700 organisms/m<sup>2</sup> and 13 taxa at INUG and 1,200 organisms/m<sup>2</sup> and 9 taxa at PDL. Average taxa richness in the 2014 baseline study was 11 at Whale Tail Lake, 9 at Nemo Lake, and 12 at Mammoth Lake ([Table 5 Ĩ1](#)). The 2014 baseline study shows there is considerable within-lake variability in the benthic invertebrate community abundance despite similar water depths ([Figure 5 Ĩ1](#)). In 2015, taxa richness ranged between 11 (WTN) and 16 (WTN-Ex) ([Table 5 Ĩ2](#)). Overall, the abundance and richness at the reference areas in 2015 were within the historical range reported for these areas (Azimuth 2015b). With the exception of WTN, abundance was generally higher at the Lake stations in 2015 compared to the reference areas. The highest abundance (over 8,000 mg/m<sup>2</sup>) was reported in a sample from Mammoth



Lake, which was also the area with the highest spatial variability in abundance of the lakes/basins sampled in 2015. On average, however, the highest abundance was observed at WTN-Ex (5,300 organisms/m<sup>2</sup>). The higher abundance was due primarily to increased abundance of chironomids in the genus *Corynocera* and fingernail clams *Cyclocalyx* / *Neopisidium*. At WTN, the lower overall abundance was due primarily to a reduction in the number of chironomid larvae.

The abundance and species composition of benthic invertebrates are strongly affected by water depth, substrate size and organic carbon. Other physical factors, such as water temperature, influence larval development rates and ultimately timing of hatching for insect larvae.



**Table 5-1.** Benthic invertebrate abundance (#/m<sup>2</sup>) and richness (# taxa) by major taxa group, Whale Tail Pit Baseline, 2014.

| Lake & Replicate | Depth (m) | Abundance (#/m <sup>2</sup> ) |         |          |            | Total Abundance | Richness (# taxa) |         |          |            | Total Richness |
|------------------|-----------|-------------------------------|---------|----------|------------|-----------------|-------------------|---------|----------|------------|----------------|
|                  |           | Oligochaetes                  | Insects | Molluscs | Other Taxa |                 | Oligochaetes      | Insects | Molluscs | Other Taxa |                |
| Whale Tail Lake  |           |                               |         |          |            |                 |                   |         |          |            |                |
| Rep 1            | 8.5       | 0                             | 9217    | 870      | 0          | 10087           | 0                 | 8       | 2        | 0          | 10             |
| Rep 2            | 7.8       | 22                            | 2130    | 261      | 65         | 2478            | 1                 | 9       | 1        | 2          | 13             |
| Rep 3            | 8.0       | 22                            | 1435    | 217      | 0          | 1674            | 1                 | 6       | 1        | 0          | 8              |
| Rep 4            | 7.8       | 65                            | 1261    | 174      | 0          | 1500            | 1                 | 8       | 2        | 0          | 11             |
| Rep 5            | 8.0       | 22                            | 1783    | 326      | 0          | 2130            | 1                 | 8       | 2        | 0          | 11             |
| Lake Mean        |           | 26                            | 3165    | 370      | 13         | 3574            | 1                 | 8       | 2        | 0          | 11             |
| Nemo Lake        |           |                               |         |          |            |                 |                   |         |          |            |                |
| Rep 1            | 7.6       | 0                             | 3043    | 261      | 0          | 3304            | 0                 | 7       | 1        | 0          | 8              |
| Rep 2            | 7.4       | 65                            | 1435    | 348      | 0          | 1848            | 1                 | 8       | 1        | 0          | 10             |
| Rep 3            | 8.3       | 22                            | 478     | 370      | 0          | 870             | 1                 | 7       | 2        | 0          | 10             |
| Rep 4            | 8.5       | 22                            | 435     | 65       | 22         | 543             | 1                 | 5       | 2        | 1          | 9              |
| Rep 5            | 8.7       | 43                            | 500     | 65       | 22         | 630             | 1                 | 7       | 1        | 1          | 10             |
| Area Mean        |           | 30                            | 1178    | 222      | 9          | 1439            | 1                 | 7       | 1        | 0          | 9              |
| Mammoth Lake     |           |                               |         |          |            |                 |                   |         |          |            |                |
| Rep 1            | 8.1       | 196                           | 1391    | 283      | 22         | 1891            | 2                 | 9       | 2        | 1          | 14             |
| Rep 2            | 7.3       | 22                            | 891     | 478      | 22         | 1413            | 1                 | 9       | 1        | 1          | 12             |
| Rep 3            | 8.3       | 22                            | 1739    | 326      | 0          | 2087            | 1                 | 9       | 1        | 0          | 11             |
| Rep 4            | 7.4       | 43                            | 5478    | 239      | 0          | 5761            | 1                 | 8       | 2        | 0          | 11             |
| Rep 5            | 7.3       | 22                            | 4696    | 326      | 22         | 5065            | 1                 | 7       | 2        | 1          | 11             |
| Area Mean        |           | 61                            | 2839    | 330      | 13         | 3243            | 1                 | 8       | 2        | 1          | 12             |

**Notes:**

Data presented here were adapted from Portt and Associates (2015a).

<sup>1</sup> Other taxa: (Hygrobatiidae, Lebertiidae, and Platyhelminthes).



**Table 5-2.** Benthic invertebrate abundance (#/m<sup>2</sup>) and richness (# taxa) by major taxa group, Whale Tail Pit Baseline, 2015.

| Area-Replicate                   | Depth (m) | Abundance (#/m <sup>2</sup> ) |         |          |            | Total<br>Abundance | Richness (# taxa) |         |          |            | Total<br>Richness |
|----------------------------------|-----------|-------------------------------|---------|----------|------------|--------------------|-------------------|---------|----------|------------|-------------------|
|                                  |           | Oligochaetes                  | Insects | Molluscs | Other Taxa |                    | Oligochaetes      | Insects | Molluscs | Other Taxa |                   |
| Inuggugayualik Lake              |           |                               |         |          |            |                    |                   |         |          |            |                   |
| INUG-1                           | 7.0       | 22                            | 565     | 348      | 0          | 935                | 1                 | 7       | 2        | 0          | 10                |
| INUG-2                           | 6.5       | 43                            | 1696    | 630      | 0          | 2370               | 1                 | 13      | 3        | 0          | 17                |
| INUG-3                           | 7.4       | 130                           | 1609    | 457      | 65         | 2261               | 1                 | 10      | 3        | 2          | 16                |
| INUG-4                           | 8.5       | 22                            | 1304    | 391      | 0          | 1717               | 1                 | 9       | 2        | 0          | 12                |
| INUG-5                           | 8.5       | 43                            | 935     | 435      | 0          | 1413               | 1                 | 6       | 2        | 0          | 9                 |
| Area Mean                        |           | 52                            | 1222    | 452      | 13         | 1739               | 1                 | 9       | 2        | 0          | 13                |
| Pipedream Lake                   |           |                               |         |          |            |                    |                   |         |          |            |                   |
| PDL-1                            | 6.5       | 0                             | 1239    | 196      | 0          | 1435               | 0                 | 9       | 2        | 0          | 11                |
| PDL-2                            | 6.7       | 87                            | 957     | 304      | 22         | 1370               | 2                 | 7       | 1        | 1          | 11                |
| PDL-3                            | 8.5       | 0                             | 891     | 435      | 43         | 1370               | 0                 | 6       | 1        | 2          | 9                 |
| PDL-4                            | 8.5       | 43                            | 370     | 196      | 0          | 609                | 1                 | 4       | 1        | 0          | 6                 |
| PDL-5                            | 6.8       | 0                             | 783     | 283      | 43         | 1109               | 0                 | 6       | 1        | 1          | 8                 |
| Area Mean                        |           | 26                            | 848     | 283      | 22         | 1178               | 1                 | 6       | 1        | 1          | 9                 |
| Whale Tail North Basin           |           |                               |         |          |            |                    |                   |         |          |            |                   |
| WTN-1                            | 8.0       | 0                             | 717     | 174      | 109        | 1000               | 0                 | 6       | 2        | 2          | 10                |
| WTN-2                            | 8.4       | 0                             | 565     | 22       | 22         | 609                | 0                 | 4       | 1        | 1          | 6                 |
| WTN-3                            | 7.9       | 0                             | 413     | 457      | 87         | 957                | 0                 | 8       | 3        | 3          | 14                |
| WTN-4                            | 9.1       | 87                            | 435     | 348      | 65         | 935                | 2                 | 5       | 2        | 2          | 11                |
| WTN-5                            | 7.5       | 43                            | 1326    | 261      | 65         | 1696               | 1                 | 8       | 2        | 2          | 13                |
| Area Mean                        |           | 26                            | 691     | 252      | 70         | 1039               | 1                 | 6       | 2        | 2          | 11                |
| Whale Tail North Basin (shallow) |           |                               |         |          |            |                    |                   |         |          |            |                   |
| WTN-Ex-1                         | 5.0       | 22                            | 4217    | 1543     | 130        | 5913               | 1                 | 9       | 3        | 3          | 16                |
| WTN-Ex-2                         | 5.4       | 0                             | 1152    | 913      | 152        | 2217               | 0                 | 11      | 3        | 3          | 17                |
| WTN-Ex-3                         | 5.7       | 174                           | 4891    | 1087     | 239        | 6391               | 2                 | 9       | 3        | 3          | 17                |
| WTN-Ex-4                         | 6.1       | 109                           | 4043    | 1326     | 217        | 5696               | 2                 | 8       | 3        | 4          | 17                |
| WTN-Ex-5                         | 5.4       | 43                            | 4891    | 1435     | 174        | 6543               | 2                 | 9       | 2        | 2          | 15                |
| Area Mean                        |           | 70                            | 3839    | 1261     | 183        | 5352               | 1                 | 9       | 3        | 3          | 16                |
| Whale Tail South Basin           |           |                               |         |          |            |                    |                   |         |          |            |                   |
| WTS-1                            | 7.2       | 0                             | 696     | 457      | 22         | 1174               | 0                 | 9       | 3        | 1          | 13                |
| WTS-2                            | 7.1       | 0                             | 717     | 457      | 65         | 1239               | 0                 | 8       | 3        | 1          | 12                |
| WTS-3                            | 7.8       | 22                            | 2304    | 674      | 152        | 3152               | 1                 | 10      | 3        | 4          | 18                |
| WTS-4                            | 7.4       | 0                             | 1957    | 522      | 109        | 2587               | 0                 | 10      | 3        | 2          | 15                |
| WTS-5                            | 7.8       | 0                             | 652     | 413      | 43         | 1109               | 0                 | 9       | 3        | 2          | 14                |
| Area Mean                        |           | 4                             | 1265    | 504      | 78         | 1852               | 0                 | 9       | 3        | 2          | 14                |



**Table 5-2.** Benthic invertebrate abundance (#/m<sup>2</sup>) and richness (# taxa) by major taxa group, Whale Tail Pit Baseline, 2015.

| Area-Replicate | Depth (m) | Abundance (#/m <sup>2</sup> ) |         |          |            | Total<br>Abundance | Richness (# taxa) |         |          |            | Total<br>Richness |
|----------------|-----------|-------------------------------|---------|----------|------------|--------------------|-------------------|---------|----------|------------|-------------------|
|                |           | Oligochaetes                  | Insects | Molluscs | Other Taxa |                    | Oligochaetes      | Insects | Molluscs | Other Taxa |                   |
| Nemo Lake      |           |                               |         |          |            |                    |                   |         |          |            |                   |
| NEM-1          | 8.0       | 43                            | 1870    | 761      | 65         | 2739               | 1                 | 5       | 2        | 2          | 10                |
| NEM-2          | 9.0       | 43                            | 2413    | 696      | 174        | 3326               | 1                 | 6       | 3        | 4          | 14                |
| NEM-3          | 8.9       | 0                             | 2370    | 500      | 87         | 2957               | 0                 | 6       | 2        | 3          | 11                |
| NEM-4          | 8.0       | 43                            | 1978    | 652      | 109        | 2783               | 1                 | 7       | 2        | 2          | 12                |
| NEM-5          | 8.5       | 65                            | 2217    | 348      | 87         | 2717               | 1                 | 7       | 2        | 1          | 11                |
| Area Mean      |           | 39                            | 2170    | 591      | 104        | 2904               | 1                 | 6       | 2        | 2          | 12                |
| Mammoth Lake   |           |                               |         |          |            |                    |                   |         |          |            |                   |
| MAM-1          | 8.0       | 109                           | 2978    | 717      | 87         | 3891               | 2                 | 8       | 2        | 2          | 14                |
| MAM-2          | 8.1       | 174                           | 1804    | 674      | 109        | 2761               | 2                 | 8       | 3        | 2          | 15                |
| MAM-3          | 7.5       | 43                            | 1283    | 565      | 87         | 1978               | 1                 | 8       | 2        | 2          | 13                |
| MAM-4          | 8.1       | 22                            | 7109    | 1065     | 109        | 8304               | 1                 | 7       | 3        | 3          | 14                |
| MAM-5          | 8.8       | 65                            | 5130    | 370      | 43         | 5609               | 1                 | 6       | 3        | 2          | 12                |
| Area Mean      |           | 83                            | 3661    | 678      | 87         | 4509               | 1                 | 7       | 3        | 2          | 14                |

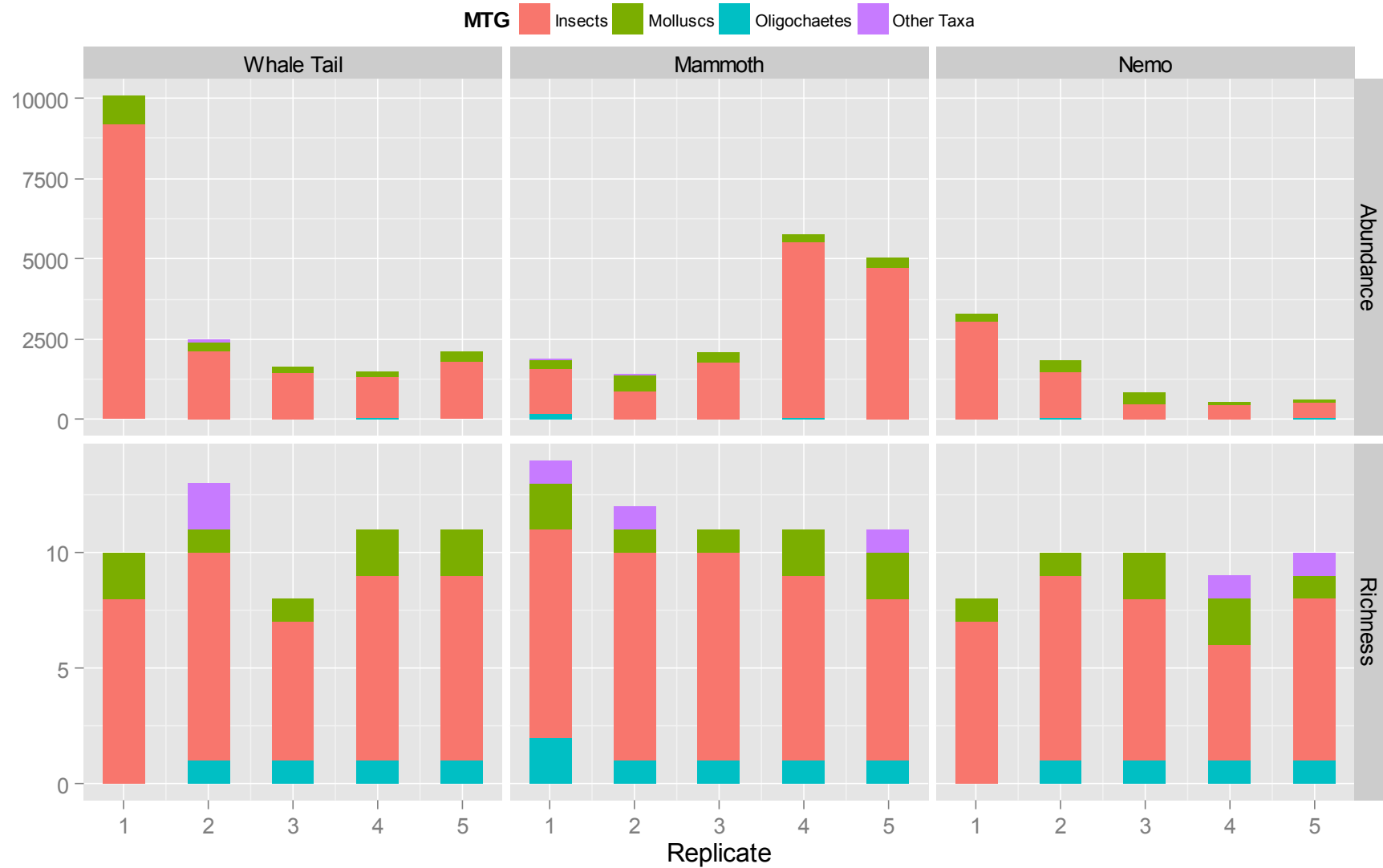
**Notes:**

<sup>1</sup> Other taxa: (Turbellaria, Acalyptonotidae, Hygrobatidae, Lebertiidae, Oxidae, and Notostraca).



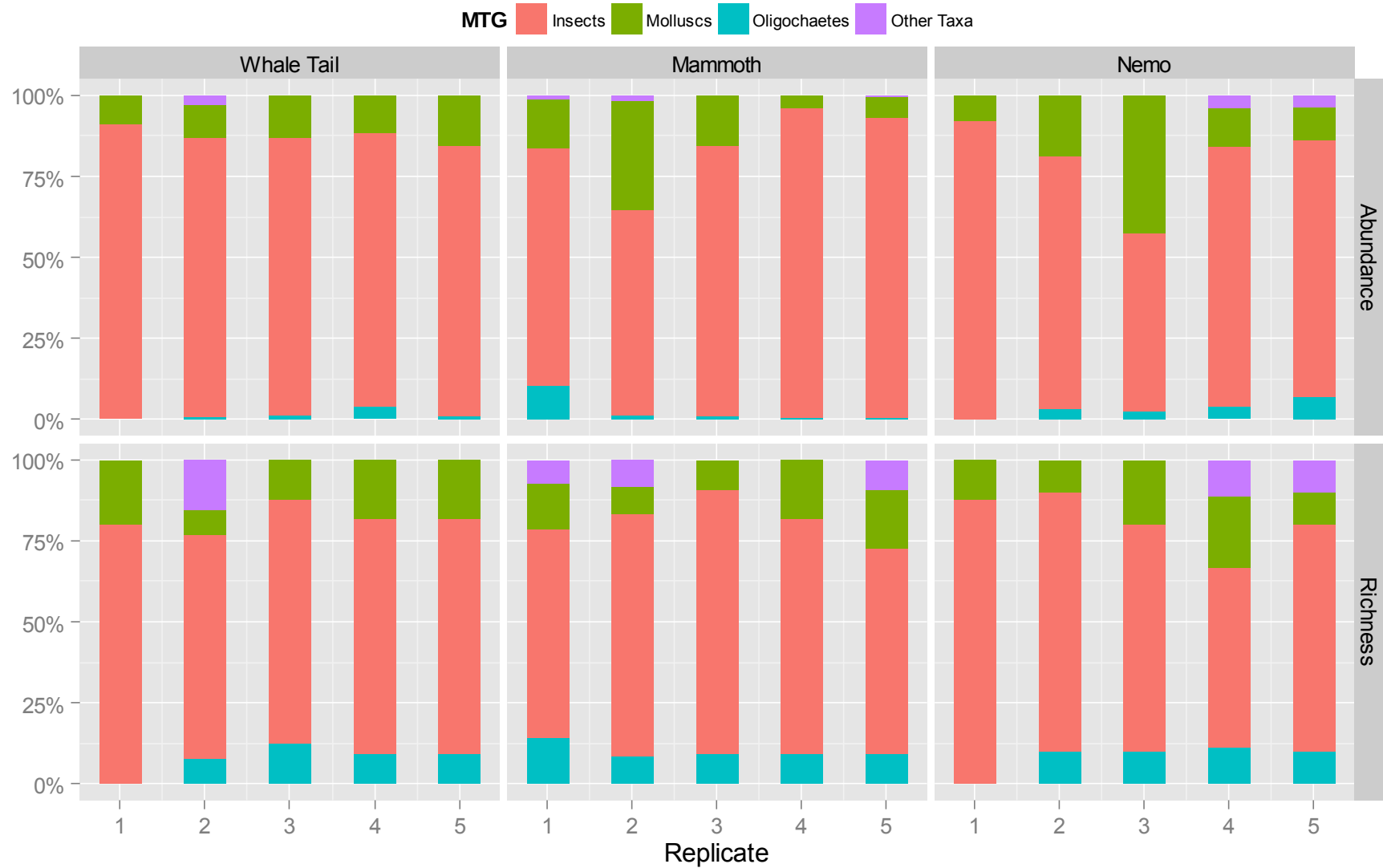
**Figure 5i1.** Benthic invertebrate abundance (organisms/m<sup>2</sup>) and richness by major taxa group, Whale Tail Pit Baseline, 2014.

Notes: See text for information on the major taxa groups (MTG) and locations of the replicates in each lake.



**Figure 5İ2.** Percent benthic invertebrate abundance and richness by major taxa group, Whale Tail Pit Baseline, 2014.

Notes: See text for information on the major taxa groups (MTG) and locations of the replicates in each lake.



**Figure 5İ3.** Benthic invertebrate abundance (organisms/m<sup>2</sup>) and richness by major taxa group, Whale Tail Pit Baseline, 2015.

Notes: See text for information on the major taxa groups (MTG).

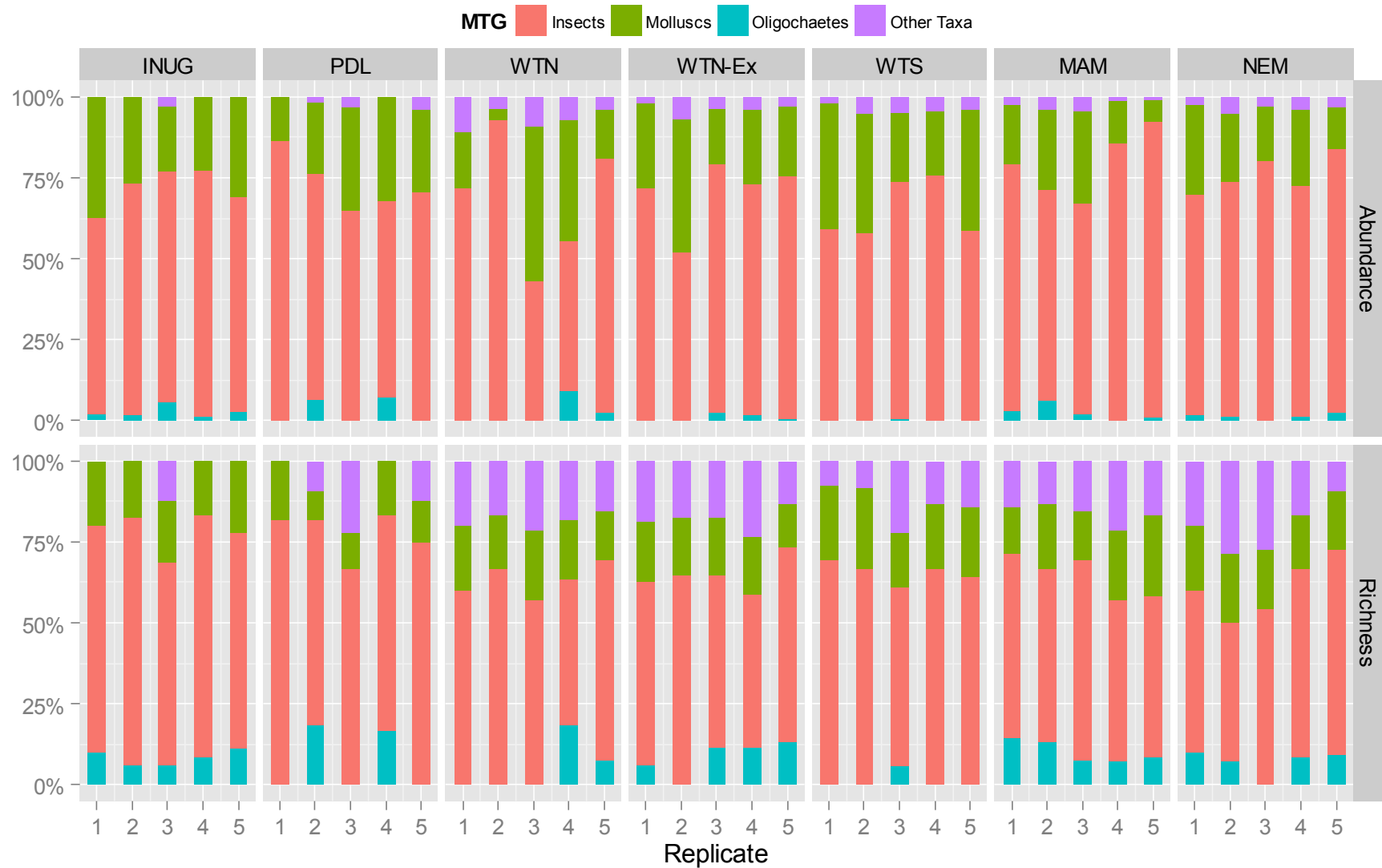




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**Figure 5.14.** Percent benthic invertebrate abundance and richness by major taxa group, Whale Tail Pit Baseline, 2015.

Notes: See text for information on the major taxa groups (MTG).



## **6. ZOOPLANKTON**

### **6.1. Methods**

#### **6.1.1. Sample Collection**

Zooplankton samples were collected synoptically from limnology/water chemistry sampling stations from the Whale Tail Pit Study Area Lakes during each 2015 event in support of the EIA. The samples were collected according to an SOP provided to Azimuth by Golder (pers. comm.). Zooplankton was not collected as part of the 2014 baseline program. Location information (UTM coordinates), station depth, haul depth (vertical length of water towed), and number of tows per sample were recorded for each station. The information is presented in **Table 6.1.1**.

Samples were collected after taking the limnology measurement and collecting water samples for chemistry at each station. The boat was not anchored unless wind conditions necessitated. The zooplankton net measured 2.4 m in length, 30 cm in diameter (at the opening), and had a mesh size of 80 µm (74 µm mesh size on the cod end). To collect the sample, the net was lowered to depth where the cod end (bottom of the net) was within 1 m of the sediment surface. Station depth was determined using a portable depth sounder. A weight was also tied to the bottom of the net at 1 m below the cod end to confirm when the cod end was 1 m above the sediment. The net was deployed slowly and held at the appropriate depth for approximately 30 seconds. The net was retrieved at a rate of approximately 0.5 m/second. Once at the surface, the net was pulled into the boat while simultaneously rinsing the net with a squirt bottle by spraying the outside of the net. After checking the net for any adhered zooplankton, the contents of the cod end was rinsed into a 500 mL wide-mouth plastic jar. Samples were preserved by first adding half a tablet of Alka-Seltzer® to immobilize the zooplankton, followed by fixation with buffered formalin to a final concentration of approximately 5% (v/v). One field duplicate zooplankton sample was collected during each sampling event.

#### **6.1.2. Laboratory Methods**

Zooplankton samples were submitted to Biologica Environmental Services Ltd. (Victoria, BC) for abundance, biomass, and biovolume measurements. Zooplankton was subsampled using a Hensen-Stempel® pipette. Care was taken to mix the sample in a random fashion before pipetting to avoid bias due to sinking of heavier organisms. The contents of the smallest subsample were identified to the lowest taxon and life-stage possible (typically genus or species) and enumerated. The larger subsamples were then re-examined for species that occur in numbers less than 10 individuals. The largest and rarest organisms were counted in their entirety, whereas the numbers of the smallest and most common organisms were extrapolated from the subsample. Micro-zooplankton (i.e., rotifers) were identified at magnification between 20-times and 100-times, suitable to observe characteristic morphological features required for identification. Once identified, organisms were enumerated in a counting tray. Subsamples were processed until the targeted range of 200 to 400 organisms per sample (except for rotifers and copepod nauplii) was counted. A Sedgwick-Rafter® counting cell or Utermöhl® counting chamber was used to enumerate rotifers and copepod nauplii using 100-times magnification. Copepod nauplii of calanoid and cyclopoid copepod species were enumerated separately from adults; juveniles of these species are enumerated together due to the lack of distinguishing characteristics.

Biovolume (based on length measurements) are taken for the first 20 individuals of each zooplankton species identified from each taxonomic group using a calibrated eyepiece reticule. An initial comparison of the lengths of dominant taxa between sampling regions will determine if there is any among-site variability in per-taxon size estimates that should be accounted for. Individual lengths are then used to



calculate body mass for each zooplankton species measured using length-weight relationships developed for each species by McCauley (1984). Taxa-specific biomeasurements and conversions are presented in [Appendix G1](#). Biomass (in mg [ww and dw]) was calculated by multiplying the number of individuals of a given species in a given sample by the average individual weight for that species.

### 6.1.3. Data Handling and Analysis

Taxa abundance and biomass results were tabulated in Microsoft Excel. Zooplankton abundance and biomass were converted to density measures by dividing the abundance and biomass by the volume of water filtered through the zooplankton net ( $V = \pi r^2 h$ ). Three major groups of zooplankton typically dominate the plankton community in freshwater lakes. These are rotifers, and two subclasses of the *Crustacea*, *Cladocera* and *Copepoda* (within which there are two major orders, calanoid and cyclopoid copepods) (Wetzel, 1983). Rotifers are a large and diverse group that are predominantly sessile and associated with littoral substrates, although planktonic species can form a significant component of the zooplankton community. Copepod nauplii were grouped together as a major taxa group in the data analysis because of difficult distinguishing between the juvenile stages.

## 6.2. Quality Assurance / Quality Control

### 6.2.1. QA/QC Methods

#### **Laboratory Duplicates**

The laboratory QA/QC program for zooplankton is made up of two components:

- Subsampling accuracy – determined on approximately 10% of the samples (one per sampling event). Samples are chosen randomly for evaluation of the precision of the subsampling procedure (i.e., consistency of duplicate processing). The difference between two sample fractions is used as an indicator of subsampling consistency and quantified using RPD. Guidance on precision between subsamples is lacking for zooplankton, so guidance from Environment Canada (2002) on subsampling precision for benthic invertebrates is applied. Estimates of organism abundance in each group of samples should be within 20% of each other. If the error between subsamples abundance exceeds 20%, the laboratory will be consulted to determine the potential cause of the error.
- Accuracy of taxonomic identification – comparing the number of disagreements in unique taxa (at the lowest practical level of identification) between two taxonomists.

#### **Field Duplicates**

A field duplicate was collected during each sampling event to assess sampling variability and sample homogeneity. Total biomass and abundance between the duplicate and original sample were compared, but no formal DQO was applied because zooplankton communities can be highly variable within the water column within a small spatial area.

### 6.2.2. QA/QC Results

Subsampling precision and taxonomic accuracy results are presented in [Table A2 Ĩ 4](#). The mean subsampling precision was 10.6% with a maximum subsampling error of 15.3%, well within the DQO of 20%. There were no disagreements between taxonomists in the identification of unique taxa in the three QA samples ([Table A2 Ĩ 4](#)).



The RPD results of the field duplicate samples are presented in [Table A2 Ĩ5](#). There was considerable variability in both biomass and abundance for individual major taxa groups as well as for total estimates of abundance and biomass. The differences are considered representative of the high degree of variability in the zooplankton community within the stations.

### 6.3. Results

Zooplankton density (organisms/m<sup>3</sup>) and richness (number of taxa) are presented in [Table 6 Ĩ2](#). Biomass results are presented in [Table 6 Ĩ3](#). Density and biomass are shown in [Figure 6 Ĩ1](#) (per m<sup>3</sup>) and [Figure 6 Ĩ2](#) (percent). The raw zooplankton data from Biolgoica are presented in [Appendix G1](#). Historical zooplankton biomass and taxonomy results from Inuggugayualik Lake and Pipedream Lake are included in [Appendix G2](#) and [Appendix G3](#) for 2010 and 2011, respectively. The data are included for context purposes, but caution should be applied when comparing the historical data from Inuggugayualik Lake and Pipedream Lake to the 2015 baseline results from the Whale Tail Pit Study Area Lakes because of differences in field collection methods<sup>8</sup>, different taxonomic methods<sup>9</sup>, and the absence of paired reference data for 2015 to compare with the historical reference data. For more information on the historical zooplankton data, refer to Azimuth 2011 and 2012b Meadowbank CREMP reports.

Twenty different taxa (6 cladoceran, 3 calanoid copepods, 3 cyclopoid copepods, and 8 rotifers) were identified at the LPL from the samples submitted in 2015. Taxa richness ranged from a high of ten at WTN-1 in July to a low of three at NEM-3 in August ([Table 6 Ĩ2](#)). Overall, rotifers were the most abundant major taxa group, with more than 50% of the total zooplankton density comprised of rotifers ([Figure 6 Ĩ2](#)). Nemo Lake was the exception, where copepods (nauplii and adult cyclopods) were the most abundant zooplankton taxa during all three sampling events. The other major taxa group, the cladocerans, were a relatively small portion of the zooplankton community during the summer months (<1% to 7%). Cladocerans, primarily *Holopedium gibberum*, *Daphnia* sp., and *Bosmina* sp. occurred in their highest abundance in July, with fewer individuals observed during the August and September sampling events ([Figure 6 Ĩ2](#)). Zooplankton sampling for the Meadowbank CREMP noted similarly low overall abundance of cladocerans in 2010 and 2011 from all of the Meadowbank project lakes (Azimuth 2012a).

Some spatial variability in zooplankton density was observed at most locations during each month, but most notably seen in samples collected at Mammoth Lake during the July and August sampling events. The sample collected from MAM-2 in July had nearly 150,000 organisms/m<sup>2</sup> compared with MAM-1 where zooplankton density was less than 20,000 organisms/m<sup>2</sup> ([Figure 6 Ĩ1](#), [Table 6 Ĩ2](#)). Sample abundance was comprised mainly of rotifers at 83%, the highest reported abundance of this major taxonomic group of all the samples collected in 2015. MAM-2 was located in a relatively shallow location in Mammoth Lake compared to MAM-1 ([Figure 1 Ĩ5](#)), which is important because rotifers are predominantly sessile and associated with littoral substrates.

Zooplankton biomass was generally between 50 mg/m<sup>3</sup> and 100 mg/m<sup>3</sup> with the exception of Mammoth Lake where highly variable biomass was reported for the replicate samples in the July and August sampling events ([Figure 6 Ĩ1](#)). The two July replicate samples collected from Mammoth Lake had total biomass measurements of 11 mg/m<sup>3</sup> and 183 mg/m<sup>3</sup>. Similarly variable results were reported in the two August replicate samples: 304 mg/m<sup>3</sup> and 59 mg/m<sup>3</sup> ([Table 6 Ĩ3](#)). Despite the variability in total

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<sup>8</sup> Zooplankton samples were collected in 2010 and 2011 from a depth of 8 m depth to surface. Each sample was a composite of 2 tows.

<sup>9</sup> Rotifers, which were prevalent in the 2015 samples, were not identified in the 2010 and 2011 samples.



biomass, the percent composition of taxa contributing to the total biomass was similar between replicates for each event (**Figure 6i2**). Temporally, the July and September samples had higher proportions of the biomass comprised of Cyclopoid copepods, whereas the August samples had more of the total zooplankton biomass comprised of Calanoid copepods. Whale Tail Lake (WTN and WTS) had increased biomass from rotifers in August, coinciding with reduced biomass from the Cyclopoid copepods. This pattern was not observed in Mammoth Lake and Nemo Lake.

In summary, zooplankton abundance and biomass can vary considerably within lakes and between lakes depending on a range of environmental factors (nutrients, phytoplankton community and abundance, turbidity, wind speed, direction, water depth, etc.).



**Table 6-1.** Zooplankton station information, Whale Tail Pit Baseline, 2015.

| Sampling Event | Sampling Area | Date      | UTM Coordinates |         |          | Depth<br>(m) | Haul Depth <sup>1</sup><br>(m) | DUP | Number of<br>Tows | Number of<br>Jars |
|----------------|---------------|-----------|-----------------|---------|----------|--------------|--------------------------------|-----|-------------------|-------------------|
|                |               |           | Zone            | Easting | Northing |              |                                |     |                   |                   |
| July           | WTN-1         | 17-Jul-15 | 14W             | 607207  | 7254975  | 7.4          | 6.0                            | No  | 1                 | 1                 |
|                | WTN-2         | 17-Jul-15 | 14W             | 607252  | 7254613  | 6.4          | 5.0                            | No  | 1                 | 1                 |
|                | WTS-1         | 17-Jul-15 | 14W             | 607450  | 7253884  | 9.5          | 8.0                            | No  | 1                 | 1                 |
|                | WTS-2         | 17-Jul-15 | 14W             | 607621  | 7254253  | 5.1          | 4.0                            | Yes | 1                 | 1                 |
|                | NEM-1         | 18-Jul-15 | 14W             | 606604  | 7254415  | 10.5         | 9.0                            | No  | 1                 | 1                 |
|                | NEM-2         | 18-Jul-15 | 14W             | 606454  | 7257135  | 11.9         | 11.0                           | No  | 1                 | 1                 |
|                | MAM-1         | 18-Jul-15 | 14W             | 604145  | 7254415  | 7.8          | 7.5                            | No  | 1                 | 1                 |
|                | MAM-2         | 18-Jul-15 | 14W             | 604278  | 7254163  | 5.1          | 4.0                            | No  | 1                 | 1                 |
| August         | WTN-3         | 22-Aug-15 | 14W             | 607393  | 7254558  | 8.6          | 7.6                            | No  | 1                 | 1                 |
|                | WTN-4         | 22-Aug-15 | 14W             | 607221  | 7254988  | 6.4          | 5.4                            | No  | 1                 | 1                 |
|                | WTS-3         | 22-Aug-15 | 14W             | 607155  | 7253550  | 7.8          | 6.8                            | Yes | 1                 | 1                 |
|                | WTS-4         | 21-Aug-15 | 14W             | 607571  | 7254138  | 7.5          | 6.5                            | No  | 1                 | 1                 |
|                | NEM-3         | 23-Aug-15 | 14W             | 606553  | 7257360  | 8            | 7.0                            | No  | 1                 | 1                 |
|                | NEM-4         | 23-Aug-15 | 14W             | 606370  | 7257235  | 10.2         | 9.2                            | No  | 1                 | 1                 |
|                | MAM-3         | 24-Aug-15 | 14W             | 604273  | 7254244  | 7.4          | 6.4                            | No  | 1                 | 1                 |
|                | MAM-4         | 24-Aug-15 | 14W             | 604239  | 7253860  | 7.8          | 6.8                            | No  | 1                 | 1                 |
| September      | WTN-5         | 18-Sep-15 | 14W             | 607244  | 7255025  | 6.7          | 5.7                            | No  | 1                 | 1                 |
|                | WTN-6         | 18-Sep-15 | 14W             | 607329  | 7254542  | 10.9         | 9.9                            | No  | 1                 | 1                 |
|                | WTS-5         | 18-Sep-15 | 14W             | 607612  | 7253907  | 6.5          | 5.5                            | Yes | 1                 | 1                 |
|                | WTS-6         | 18-Sep-15 | 14W             | 607568  | 7254259  | 7.8          | 6.8                            | No  | 1                 | 1                 |
|                | NEM-5         | 19-Sep-15 | 14W             | 606289  | 7257418  | 10.5         | 10.0                           | No  | 1                 | 1                 |
|                | NEM-6         | 19-Sep-15 | 14W             | 606611  | 7257938  | 15.2         | 10.0                           | No  | 1                 | 1                 |
|                | MAM-5         | 19-Sep-15 | 14W             | 604357  | 7254348  | 8.9          | 8.0                            | No  | 1                 | 1                 |
|                | MAM-6         | 19-Sep-15 | 14W             | 604228  | 7253834  | 6.4          | 6.0                            | No  | 1                 | 1                 |

**Notes:**

Haul depth start is the depth measured from the surface to the bottom of the cod end on the zooplankton net.



**Table 6-2.** Zooplankton richness and density (organisms/m<sup>3</sup>) by major taxa group, Whale Tail Pit Baseline, 2015.

| Area-Replicate              | Haul Length <sup>1</sup><br>(m) | Total Richness <sup>2</sup> | Density <sup>3</sup> (organisms/m <sup>3</sup> ) |            |             |                 |             | Total Density |
|-----------------------------|---------------------------------|-----------------------------|--------------------------------------------------|------------|-------------|-----------------|-------------|---------------|
|                             |                                 |                             | Cladocera                                        | Calanoida  | Cyclopoida  | Copepod Nauplii | Rotifera    |               |
| Whale Tail Lake North Basin |                                 |                             |                                                  |            |             |                 |             |               |
| WTN-1                       | 3.6                             | 10                          | 1140 (2.2)                                       | 825 (1.6)  | 10296 (20)  | 9169 (18)       | 30914 (59)  | 52344         |
| WTN-2                       | 2.6                             | 5                           | 3374 (7.6)                                       | 653 (1.5)  | 8651 (19)   | 13422 (30)      | 18500 (41)  | 44600         |
| WTN-3                       | 5.1                             | 7                           | 166 (0.4)                                        | 860 (2)    | 2136 (5)    | 9616 (23)       | 29174 (70)  | 41951         |
| WTN-4                       | 3.0                             | 8                           | 47 (0.07)                                        | 723 (1.1)  | 2326 (3.7)  | 20278 (32)      | 39769 (63)  | 63143         |
| WTN-5                       | 3.3                             | 5                           | 17 (0.05)                                        | 111 (0.3)  | 2255 (7)    | 5859 (18)       | 24079 (74)  | 32321         |
| WTN-6                       | 7.5                             | 7                           | 19 (0.04)                                        | 1103 (2.1) | 5187 (10)   | 10249 (20)      | 35085 (68)  | 51643         |
| Whale Tail Lake South Basin |                                 |                             |                                                  |            |             |                 |             |               |
| WTS-1                       | 5.6                             | 9                           | 1011 (3.2)                                       | 126 (0.4)  | 6871 (22)   | 7831 (25)       | 16084 (50)  | 31924         |
| WTS-2                       | 1.6                             | 6                           | 725 (1.3)                                        | 265 (0.5)  | 18391 (32)  | 9431 (17)       | 28294 (50)  | 57107         |
| WTS-3                       | 4.4                             | 5                           | 0 (0)                                            | 1109 (2)   | 2508 (4.6)  | 10289 (19)      | 40727 (75)  | 54632         |
| WTS-4                       | 4.1                             | 6                           | 17 (0.04)                                        | 1070 (2.4) | 2519 (5.6)  | 8971 (20)       | 32780 (72)  | 45357         |
| WTS-5                       | 3.1                             | 7                           | 68 (0.2)                                         | 479 (1.5)  | 4723 (15)   | 9736 (30)       | 17189 (53)  | 32196         |
| WTS-6                       | 4.4                             | 5                           | 32 (0.1)                                         | 322 (1.4)  | 3237 (14.1) | 4609 (20)       | 14790 (64)  | 22989         |
| Nemo Lake                   |                                 |                             |                                                  |            |             |                 |             |               |
| NEM-1                       | 6.6                             | 8                           | 227 (0.8)                                        | 4116 (15)  | 4223 (16)   | 9146 (34)       | 9360 (35)   | 27071         |
| NEM-2                       | 8.6                             | 8                           | 191 (0.7)                                        | 2884 (11)  | 4228 (16)   | 12009 (45)      | 7457 (28)   | 26768         |
| NEM-3                       | 4.6                             | 4                           | 123 (0.3)                                        | 6858 (17)  | 5382 (13.4) | 14762 (37)      | 12917 (32)  | 40042         |
| NEM-4                       | 6.8                             | 3                           | 0 (0)                                            | 3537 (13)  | 3495 (12.9) | 12067 (45)      | 7906 (29)   | 27004         |
| NEM-5                       | 7.6                             | 8                           | 9 (0.04)                                         | 3109 (13)  | 2383 (10.3) | 10859 (47)      | 6794 (29)   | 23153         |
| NEM-6                       | 7.6                             | 5                           | 19 (0.09)                                        | 1861 (9.3) | 1173 (5.9)  | 8811 (44)       | 8066 (40)   | 19930         |
| Mammoth Lake                |                                 |                             |                                                  |            |             |                 |             |               |
| MAM-1                       | 5.1                             | 6                           | 89 (0.5)                                         | 202 (1.1)  | 255 (1.3)   | 5733 (30)       | 12760 (67)  | 19039         |
| MAM-2                       | 1.6                             | 8                           | 3625 (2.5)                                       | 1238 (0.9) | 12556 (9)   | 6985 (5)        | 120545 (83) | 144949        |
| MAM-3                       | 4.0                             | 9                           | 354 (0.51)                                       | 13322 (19) | 16151 (23)  | 10257 (15)      | 29591 (42)  | 69674         |
| MAM-4                       | 4.4                             | 8                           | 3 (0.01)                                         | 498 (1.8)  | 569 (2)     | 9324 (33)       | 18005 (63)  | 28400         |
| MAM-5                       | 5.6                             | 6                           | 17 (0.09)                                        | 472 (2.5)  | 1684 (9.1)  | 6231 (34)       | 10105 (55)  | 18509         |
| MAM-6                       | 3.6                             | 7                           | 24 (0.11)                                        | 495 (2.3)  | 1619 (7)    | 7336 (33)       | 12444 (57)  | 21918         |

**Notes:**

<sup>1</sup> Haul length = the vertical length of the water towed (i.e., length of the water column from the surface to the opening of the zooplankton net).

<sup>2</sup> Taxonomic richness measured at the lowest practical level (LPL) of taxonomic identification.

<sup>3</sup> Density reported as number of organisms/m<sup>3</sup> calculated based on the length of the haul (percent of total shown in parentheses). Volume of water (cubic meters) towed was calculated using the following equation:  $V = \pi r^2 h$ ; where  $r$  = the radius of the net (0.15 m) and  $h$  = the haul length.



**Table 6-3.** Zooplankton biomass (mg/m<sup>3</sup>) by major taxa group, Whale Tail Pit Baseline, 2015.

| Area-Replicate              | Haul Length <sup>1</sup><br>(m) | Zooplankton Biomass <sup>2</sup> (mg/m <sup>3</sup> ) |           |            |                 |           | Total Biomass |
|-----------------------------|---------------------------------|-------------------------------------------------------|-----------|------------|-----------------|-----------|---------------|
|                             |                                 | Cladocera                                             | Calanoida | Cyclopoida | Copepod Nauplii | Rotifera  |               |
| Whale Tail Lake North Basin |                                 |                                                       |           |            |                 |           |               |
| WTN-1                       | 3.6                             | 7 (9.4)                                               | 4 (6)     | 41 (58)    | 2 (2.1)         | 18 (25)   | 72            |
| WTN-2                       | 2.6                             | 14 (21)                                               | 3 (5)     | 36 (54)    | 2 (3.4)         | 11 (16)   | 66            |
| WTN-3                       | 5.1                             | 1 (3)                                                 | 18 (38)   | 7 (13.6)   | 0 (0.5)         | 22 (45)   | 48            |
| WTN-4                       | 3.0                             | 0 (0.7)                                               | 17 (29)   | 6 (11.1)   | 1 (0.9)         | 34 (58)   | 58            |
| WTN-5                       | 3.3                             | 0 (0.2)                                               | 2 (6)     | 8 (26)     | 0 (0.9)         | 20 (67)   | 30            |
| WTN-6                       | 7.5                             | 0 (0.1)                                               | 29 (34)   | 21 (25)    | 0 (0.5)         | 34 (40)   | 85            |
| Whale Tail Lake South Basin |                                 |                                                       |           |            |                 |           |               |
| WTS-1                       | 5.6                             | 3 (6.7)                                               | 1 (1)     | 26 (59)    | 1 (2.9)         | 13 (30)   | 43            |
| WTS-2                       | 1.6                             | 2 (2)                                                 | 1 (1)     | 63 (58)    | 1 (1.1)         | 41 (38)   | 109           |
| WTS-3                       | 4.4                             | 0 (0)                                                 | 24 (34)   | 7 (9.9)    | 0 (0.4)         | 40 (56)   | 71            |
| WTS-4                       | 4.1                             | 0 (0.6)                                               | 22 (37)   | 6 (10.2)   | 1 (1.1)         | 31 (51)   | 61            |
| WTS-5                       | 3.1                             | 1 (2)                                                 | 12 (24)   | 20 (37)    | 1 (1.5)         | 19 (36)   | 53            |
| WTS-6                       | 4.4                             | 1 (1.9)                                               | 6 (15)    | 14 (38)    | 0 (1.1)         | 16 (44)   | 37            |
| Nemo Lake                   |                                 |                                                       |           |            |                 |           |               |
| NEM-1                       | 6.6                             | 2 (4.2)                                               | 20 (41)   | 17 (35)    | 0.88 (1.8)      | 8.5 (18)  | 48            |
| NEM-2                       | 8.6                             | 1 (2)                                                 | 14 (41)   | 11 (33)    | 0.65 (1.9)      | 7.4 (22)  | 34            |
| NEM-3                       | 4.6                             | 2 (2.1)                                               | 78 (75)   | 10 (9.4)   | 0.36 (0.3)      | 13.3 (13) | 104           |
| NEM-4                       | 6.8                             | 0 (0)                                                 | 42 (74)   | 6 (10.8)   | 0.27 (0.5)      | 8.4 (15)  | 56            |
| NEM-5                       | 7.6                             | 0.14 (0.2)                                            | 47 (79)   | 4 (7)      | 0.34 (0.6)      | 7.8 (13)  | 60            |
| NEM-6                       | 7.6                             | 0.17 (0.4)                                            | 29 (70)   | 3 (6)      | 0.37 (0.9)      | 9.6 (23)  | 42            |
| Mammoth Lake                |                                 |                                                       |           |            |                 |           |               |
| MAM-1                       | 5.1                             | 0 (4)                                                 | 1.2 (10)  | 1 (12)     | 0.84 (7.4)      | 8 (66)    | 11            |
| MAM-2                       | 1.6                             | 22 (11.8)                                             | 7.5 (4)   | 70 (38)    | 1.17 (0.6)      | 83 (45)   | 183           |
| MAM-3                       | 4.0                             | 6 (2)                                                 | 235 (78)  | 37 (12.2)  | 0.69 (0.2)      | 24 (8)    | 304           |
| MAM-4                       | 4.4                             | 0.07 (0.1)                                            | 42 (70)   | 1 (2.1)    | 0.41 (0.7)      | 16 (27)   | 59            |
| MAM-5                       | 5.6                             | 0.11 (0.4)                                            | 10 (38)   | 6 (19.8)   | 0.27 (1)        | 11 (41)   | 28            |
| MAM-6                       | 3.6                             | 0.23 (0.8)                                            | 9 (33)    | 5 (18.5)   | 0.61 (2.1)      | 13 (46)   | 28            |

**Notes:**

<sup>1</sup> Haul length = the vertical length of the water towed (i.e., length of the water column from the surface to the opening of the zooplankton net).

<sup>2</sup> Biomass reported as grams dry weight/m<sup>3</sup> calculated based on the length of the haul (percent of total shown in parentheses). Volume of water (cubic meters) towed was calculated using the following equation:  $V = \pi r^2 h$ ; where  $r$  = the radius of the net (0.15 m) and  $h$  = the haul length.

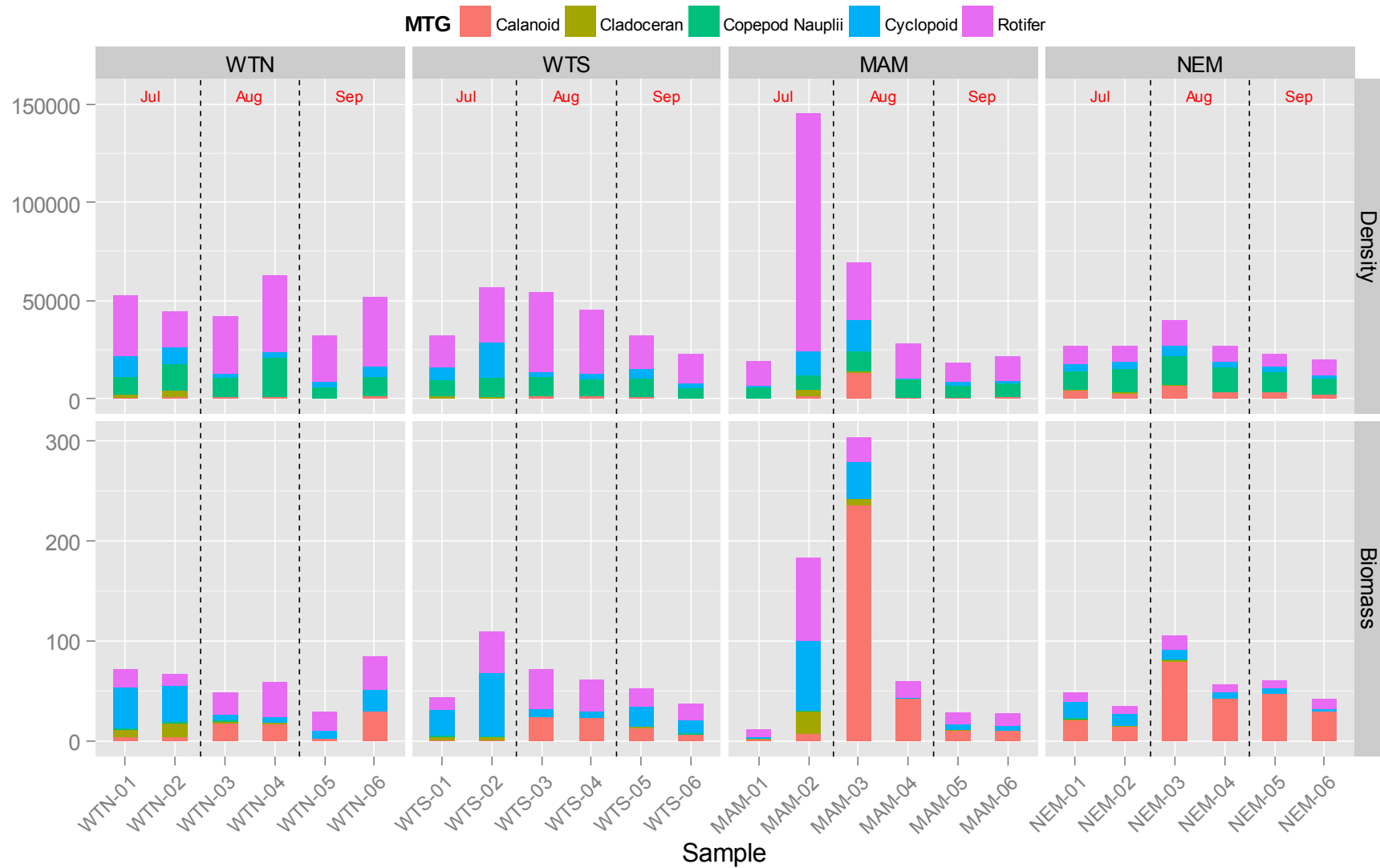




*Whale Tail Pit Core Receiving Environment Monitoring Program (CREMP):  
2014 - 2015 Baseline Studies*

**Figure 6 i 1.** Zooplankton density (organisms/m<sup>3</sup>) and biomass (mg/m<sup>3</sup> dry weight) by major taxa group, Whale Tail Pit Baseline, 2015.

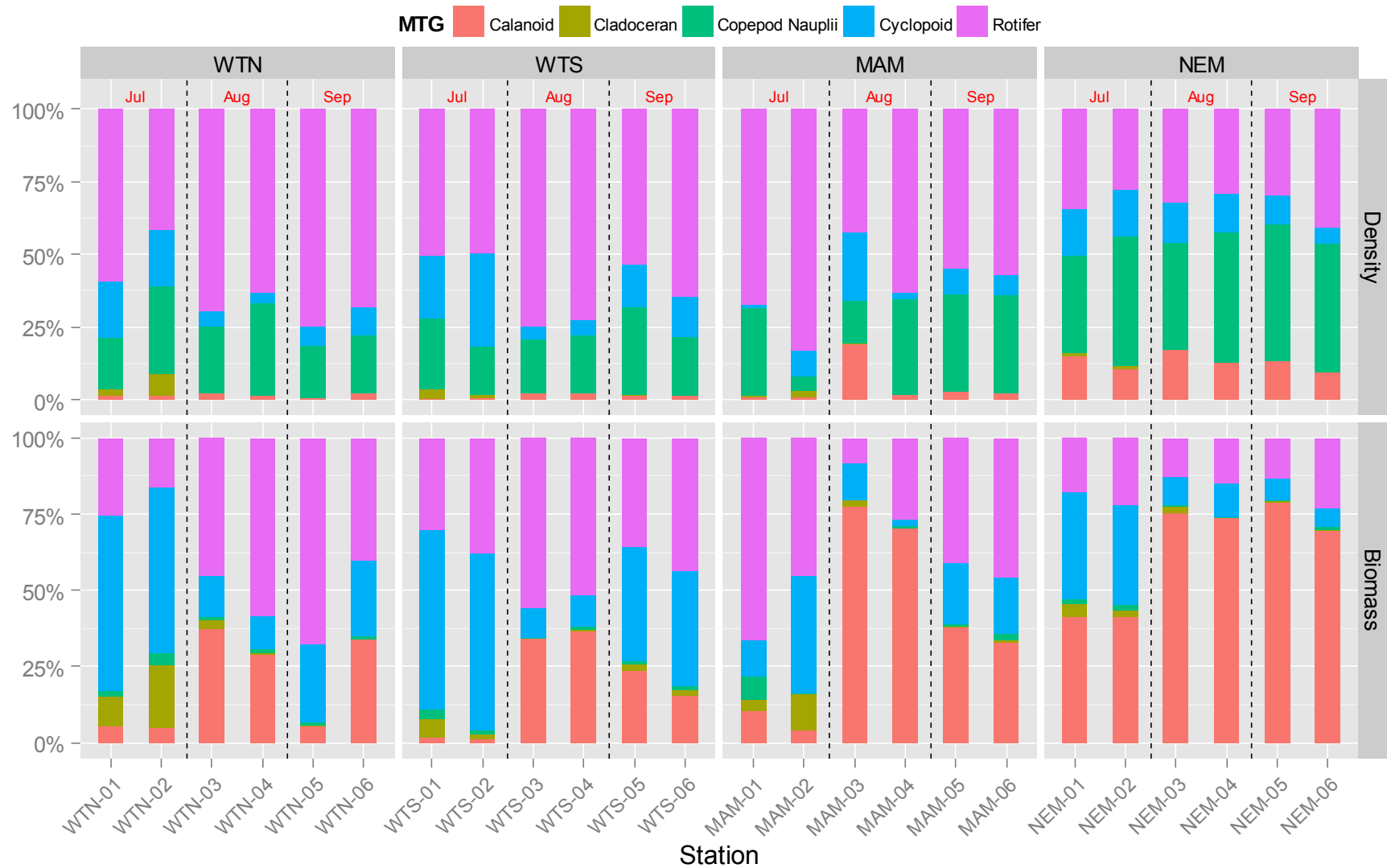
Notes: See text for information on the major taxa groups (MTG). Vertical dashed lines separate the samples by sampling event (i.e., July, August, and September).



*Whale Tail Pit Core Receiving Environment Monitoring Program (CREMP):  
2014 - 2015 Baseline Studies*

**Figure 6ï2.** Percent zooplankton density and biomass by major taxa group, Whale Tail Pit Baseline, 2015.

Notes: See text for information on the major taxa groups (MTG). Vertical dashed lines separate the samples by sampling event (i.e., July, August, and September).



## **7. PERIPHYTON**

### **7.1. Qualitative Survey Methods**

Periphyton surveys were completed during each 2015 sampling event to provide a qualitative assessment of the abundance and distribution of periphyton in the study area; no periphyton assessment was conducted in 2014. Data collection was carried out according to methods provided by Golder (Golder 2015b) and included the following:

- GPS coordinates,
- Photographs of the microhabitat of the sampling area as well as the macrohabitat surrounding the area,
- Visual estimate of the percent periphyton cover at the micro and macrohabitat scales,
- Substrate types present and their proportions, and
- A description of the periphyton community, including colour, thickness, and texture.

Results were recorded on waterproof paper using the field datasheet template provided by Golder. Field observations, coordinates, and photographs were submitted to Golder at the end of each sampling event for use in the EIA. Tabulated results are presented in [Appendix H](#).

### **7.2. Results**

Location of the periphyton surveys in Whale Tail, Nemo, and Mammoth Lakes are shown on [Figure 1i3](#) to [Figure 1i5](#). The July and September surveys were completed in the same general location in each lake. Periphyton growth in the July survey was considered sparse to moderate at most locations. Sparse growth was evident in areas where ice scour was noticeable on the rock substrate. Periphyton cover was more noticeable at deeper depths (as an example, see notes for WTN-2 in [Appendix H](#)). Below 20 cm, periphyton cover was generally rated as moderate (25-75% cover). Periphyton growth was considered low to moderate at most stations in the August survey. Green filamentous algae was observed at most locations and the periphyton was firmly attached to the substrate with a thickness between 1 mm and 5 mm. Lake levels in the September survey were noticeably lower at several locations. Exposed rocks had dried periphyton visible along the shoreline, but below 10 cm growth was rated as moderate to high (>75%).

Periphyton surveys were completed at the Sentinel stations during each event ([Figure 1i1](#)). Periphyton cover was spatially heterogeneous at the Sentinel stations during each of the sampling events. Areas of low flow and adequate depth had dense mats of periphyton growth (>75% cover). Lower water levels were noted in September relative to July, but in areas where the rocks were submerged, dense periphyton growth was noted (see the survey for C2 on September 20<sup>th</sup> as an example).

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## APPENDICES

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## **APPENDIX A**

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### **Quality Assurance / Quality Control Results**

## **APPENDIX A1**

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### **Water and Sediment Chemistry QA/QC Results**



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## **A1-1. WATER CHEMISTRY QA/QC RESULTS**

### **A1-1.1. Lake Stations (2014)**

A full review of the QA/QC results for the 2014 surface water samples collected by Portt and Associates was not done in this report. The QA/QC assessment presented here is limited to results from the equipment blank and duplicate samples submitted with the 2014 Lake samples. [Table A1 i 1](#) presents the DLs, equipment blank concentrations, and field duplicate RPDs.

- Equipment Blanks – A few metals were detected above the MDL in the equipment blank collected by Portt and Associates in September 2014, specifically total and dissolved barium, total and dissolved lead, total and dissolved manganese, dissolved aluminum, and dissolved organic carbon (DOC). Each of these parameters was reviewed in detail to evaluate the implications of the possible cross-contamination identified in the equipment blanks.
  - o Barium – Barium was detected in the total and dissolved fractions of each sample submitted in 2014. The barium concentration in the total and dissolved blanks represented less than 5% of the concentrations reported in the Lake samples. The effects of cross-contamination (i.e., <5%) are well within laboratory variability, so the barium results for the 2014 Lake samples were considered reliable for this project.
  - o Lead – Total lead was measured at the DL (0.00005 mg/L) in the equipment blank and dissolved lead was measured at nearly 10-times the DL (0.00047 mg/L). Dissolved lead was lower than the DL in all of the 2014 Lake samples, and only two samples had measured concentrations of total lead. One seemingly anomalous total lead concentration of 0.0069 mg/L in sample Rep-1 from Whale Tail Lake in 2014 exceeded the CCME aquatic life criteria as well as the trigger and threshold values developed for the Meadowbank project lakes ([Table 2 i 1](#)). Rep-1 was collected from the North Basin in 2014 (Location 1, [Figure 1 i 3](#)). The other two replicates were below the DL for total lead of (0.00005 mg/L), and based on these data, the total lead concentration from replicate 1 is considered unreliable. The other sample with detected total lead was at Location 3 in Mammoth Lake, and was considered unreliable because the reported concentration was less than 5-times the concentration in the equipment blank.
  - o Manganese – Manganese, like barium, was detected in the total and dissolved fractions of each sample submitted in 2014, but in each case, the reported concentration was greater than 5-times the concentration in the equipment blank. The effect of cross-contamination from the equipment blank was minor, representing less than 6% for total manganese and 11% for dissolved manganese in the Lake samples. A cautionary flag is applied to the dissolved manganese results.
  - o Dissolved aluminum – The DL for dissolved aluminum is 0.001 mg/L and the concentration measured in the equipment blank was 0.0018 mg/L ([Table A1 i 1](#)). Seven of the nine Lake samples collected in 2014 had dissolved aluminum concentrations within 5-times the concentration in the equipment blank; consequently, a cautionary flag is applied to these results.
  - o DOC – The equipment blank result for DOC was 0.83 mg/L, marginally above the DL of 0.5 mg/L. A cautionary flag is applied to all of the DOC results because the measured concentration in the Lake samples is less than 5-times the concentration in the equipment blank.



- Field Duplicates – All field duplicate parameters were less than the DQO of 50% RPD between the duplicate samples.
- Other Considerations – Replicate 3 from Whale Tail Lake had concentrations of ammonia and total phosphorus that were over an order of magnitude higher than the other two replicate samples collected from Whale Tail Lake during the same sampling event in September 2014 ([Table 2 Ĩ1](#)). In the case of phosphorus, replicate 1 and 5 were below the DL, while replicate 3 was 40-fold higher at 0.083 mg/L. The magnitude of the difference in ammonia between replicate 3 and replicates 1 and 5 is low (~5 to 20-fold). Surface water tends to be well mixed and homogenous throughout the Lakes, as evidenced by the similarity in *in-situ* field-measured water quality parameters ([Table B1 Ĩ1](#)); as such, order of magnitude differences in ammonia and total phosphorus observed at Whale Tail Lake would not be expected. For this reason, the results for ammonia and total phosphorus at Whale Tail Lake are flagged as unreliable.

### A1-1.2. Lake and Sentinel Stations (2015)

One duplicate water sample and one equipment blank were collected during each of the three lake and sentinel station sampling events in July, August, and September. Travel blanks were submitted for the July and August events, but the September water samples were submitted without a travel blank, as one was not available on site. QA/QC results are presented in [Table A1 Ĩ2](#) (MDLs, equipment blanks, and travel blanks), [Table A1 Ĩ3](#) (laboratory duplicates), and [Table A1 Ĩ4](#) (field duplicates). Results of the QA/QC analyses are discussed below.

- Laboratory QC
  - o There were no instances of laboratory duplicate samples failing the DQOs.
  - o Matrix spike samples and CRM analyses were within the laboratory DQOs.
  - o There were occasional exceedances of the MB DQO for total alkalinity (< 1.0 mg/L), calcium (<0.05 mg/L). In all cases the results were considered reliable (i.e., concentrations were at least 5-times greater than the blank levels).
  - o Dissolved vs Total Concentrations – While lower MDLs are reported for dissolved aluminum, copper, and zinc compared to the total analyses, there were no unexpected patterns of higher dissolved concentrations relative to total.
- Travel Blanks – All analyses were below the MDLs in the travel blanks submitted in July and August.
- Equipment Blanks – The majority of the total and dissolved parameters were below the MDLs for the equipment blanks submitted in July, August, and September. A few metals were detected above the MDL in each event:
  - o July – total lead and dissolved aluminum
  - o August – total aluminum, barium, cadmium, and lead
  - o September – total and dissolved lead

Each metal parameter was reviewed in detail to evaluate the implications of the possible cross-contamination identified in the equipment blanks:

- o Total aluminum – The concentration in the August equipment blank was 0.0035 mg/L (MDL = 0.003 mg/L). Aluminum was detected in all of the August Lake and Sentinel station samples, but the concentrations were less than 10-times the MDL. For this



reason, even low levels of cross-contamination in the equipment blank have the potential to affect the results. In total, 12 Lake samples and 4 Sentinel station samples were less 5-times the concentration reported in the August equipment blank. Despite the potential influence of cross-contamination, the total aluminum data are only given a cautionary flagging for the following reasons: 1) the August total aluminum concentrations were generally less than the July and September results, and 2) dissolved aluminum was detected in all August samples.

- o Total barium – The concentration in the August equipment blank was 0.00009 mg/L. Barium was detected in every water sample (see [Table 2i2](#)). The minimum concentration reported for the August event (Lake and Sentinel stations) was 0.0018 mg/L, or 20-fold higher than the equipment blank. Consequently, the effects of cross-contamination (i.e., <5%) are well within laboratory variability, so the barium results for August meet the overall DQOs for this project.
- o Total cadmium – The cadmium concentration in the August equipment blank was 0.0000089 mg/L. The single August field sample (collected from NEM-3) with measured concentrations was less than 5-times the equipment blank concentration, so is considered unreliable.
- o Total lead – Detected in each event's equipment blank, ranging in concentration from 0.00006 to 0.00071 mg/L. While most of the actual Lake and Sentinel station samples were less than MDL (0.00005 mg/L), total lead concentrations for MAM-06 (September) and PDL-39 (August) were flagged as unreliable, as well as 5 detected values from the Sentinel stations.
- o Dissolved aluminum – Dissolved aluminum was detected in the July equipment blank near the MDL (0.001 mg/L). A cautionary flag was applied to the dissolved aluminum results at NEM-01, NEM-02, C2-JUL, and C20-July because the concentration was below 5-times the concentration in the equipment blank (0.005 mg/L).
- o Dissolved lead – Detected in the September equipment blank (0.000069 mg/L). Results from four Lake samples (WTS-05, NEM-05, NEM-06, MAM-05) and one Sentinel station sample (C20-SEPT) were flagged as unreliable for two reasons: 1) the total lead concentrations were less than the MDL in each sample, and 2) the dissolved concentrations in these samples were less than 5-times the concentration detected in the equipment blank.
- Field Duplicates – All field duplicate parameters were less than the DQO of 50% RPD between the duplicate samples.
- Field Measurements – Anomalous water quality measurements were noted in several field-parameters collected by AEM technicians from the reference areas in 2015. At INUG-74, specific conductivity was greater than 121  $\mu\text{S}/\text{cm}$  at all depth profiles down to 10 m. By comparison, the specific conductivity at INUG-75 was between 43 and 26  $\mu\text{S}/\text{cm}$ , which is consistent with long-term conditions at INUG. The anomalous results are likely due to issues with the conductivity probe. Similarly, there were two instances of low pH (at or below pH 6.5) at PDL that are also likely reflective of water quality meter issues.
- Other Considerations – TSS was detected in the September sample from C41, which also had elevated concentrations of iron and total phosphorus relative to previous sampling events. The elevated TSS is likely a sampling artifact due to low flow at the time of sample collection; the total iron result for this station is flagged as unreliable.



### **A1-1.3. Tributary Stations (2015)**

A duplicate water sample was collected during each of the August and September sampling events. A travel blank was submitted for the August event but not for September as one was not available at the time of sampling. Equipment blanks were not prepared as the samples were collected directly into the bottles. QA/QC results for the tributary samples are presented in [Table A1 i 5](#) (MDLs, equipment blanks, and travel blanks), [Table A1 i 6](#) (laboratory duplicates), and [Table A1 i 7](#) (field duplicates). Results of the QA/QC analyses are discussed below.

- Travel Blanks – No parameters were above the MDL in the August travel blank.
- Laboratory Duplicates – There were no instances of laboratory duplicate samples failing the DQO.
- Field Duplicates – All field duplicate parameters were less than the DQO of 50% RPD between the duplicate samples.
- Dissolved vs Total Concentrations – There were two instances of dissolved organic carbon (DOC) concentration being reported higher than the total organic carbon (TOC) concentration in tributary samples collected in September (A16-A14 and A13-A12). The results were verified by repeat analysis, suggesting the DOC and TOC samples were labelled incorrectly in the field. No other issues were identified.
- Other Considerations – TSS was detected in a few of the samples. The highest concentration was observed in A55-A17 in September, and resulted in exceedances of the screening criteria of a few parameters. The elevated TSS is likely a sampling artifact due to low flow at the time of sample collection; the total iron result for this station is flagged as unreliable. Further discussion of the exceedance is presented in [Section 2.3.3](#) of the Main Report.

## **A1-2. SEDIMENT CHEMISTRY QA/QC RESULTS**

[Table A1 i 8](#) presents the QA/QC assessment of the metal analyses and includes results of the laboratory duplicate RPDs, the field duplicate RPDs, and results from the equipment swipes. [Table A1 i 9](#) shows the field duplicate RPD results for the hydrocarbon and PAH analyses. No laboratory duplicate or equipment swipe analyses were completed for hydrocarbons or PAHs.

### **A1-2.1. Laboratory Duplicates**

There were no exceedance of the laboratory DQOs for the laboratory duplicates ([Table A1 i 8](#)), indicating acceptable precision in the analytical method.

### **A1-2.2. Equipment Swipes**

Four equipment swipes were submitted with the sediment samples, corresponding to approximately 10% of the samples that were collected. There were a few parameters that were detected on at least one of the swipe samples: aluminum, barium, chromium, iron, magnesium, manganese, nickel, tin, titanium, and zinc ([Table A1 i 8](#)). Of these parameters, only iron was greater than 10-times the MDL (reported in mg metal per swipe). Because of the number of parameters that were detected, two “blank” swipes were submitted in October. Fewer analytes were detected in the blank swipes, but iron, magnesium, and zinc were detected at less than 10-times the MDL. Despite detectable metals on the swipes, the concentrations contributed less than 0.1% of the total metals concentration in the sediment samples in all cases, indicating that any residual metals present on the equipment would not influence the overall sediment chemistry.



### **A1-2.3. Field Duplicates**

Four duplicate sediment samples were collected for metals analysis, one from each of the areas sampled in August. There were no exceedances of the DQO (50% RPD) for metals in the field duplicate samples ([Table A1 i 8](#)). The range of reported RPDs was between -22% and 29%. One duplicate sample had RPDs that exceeded 50% for sand and clay content, likely an artifact of small-scale spatial heterogeneity in particle size at the location (MAM-2).

PAHs and hydrocarbons were below the MDL for the composite sample and duplicate collected from Mammoth Lake in August ([Table A1 i 9](#)). Mineral oil and grease had an RPD of 64% in the field duplicates, but the concentrations were less than 10-times the MDL.

**Table A1-1.** Equipment blanks and field duplicate results for water parameters, Whale Tail Pit Baseline, 2014.

| Analyte                                         | Detection Limits | Equipment Blank <sup>1</sup> | Field Duplicate<br>(Mammoth Lake Rep 5) |           |                  |
|-------------------------------------------------|------------------|------------------------------|-----------------------------------------|-----------|------------------|
|                                                 |                  |                              | Rep 5                                   | Duplicate | RPD <sup>2</sup> |
|                                                 |                  |                              |                                         |           |                  |
| Physical Tests                                  |                  |                              |                                         |           |                  |
| Conductivity (µS/cm)                            | 2                | <2.0                         | 20.40                                   | 20.8      | -1.9             |
| Hardness (mg/L)                                 | 0.5              | <0.50                        | 08.0                                    | 07.8      | 2.3              |
| pH (Laboratory)                                 | 0.1              | 5.58                         | 7.14                                    | 6.76      | 5.5              |
| Total Suspended Solids (mg/L)                   | 1                | <1.0                         | <1.0                                    | <1.0      |                  |
| Total Dissolved Solids (mg/L)                   | 3                | <10                          | 17.0                                    | 20.0      | -16.2            |
| Turbidity (NTU)                                 | 0.1              | <0.10                        | 0.42                                    | 0.39      | 7                |
| Anions and Nutrients (mg/L)                     |                  |                              |                                         |           |                  |
| Alkalinity, Bicarbonate (as CaCO <sub>3</sub> ) | 1                | <1.0                         | 5.70                                    | 4.00      | 35               |
| Alkalinity, Carbonate (as CaCO <sub>3</sub> )   | 1                | <1.0                         | <1.0                                    | <1.0      |                  |
| Alkalinity, Hydroxide (as CaCO <sub>3</sub> )   | 1                | <1.0                         | <1.0                                    | <1.0      |                  |
| Alkalinity, Total (as CaCO <sub>3</sub> )       | 1                | <1.0                         | 5.70                                    | 4.00      | 35               |
| Ammonia, Total (as N)                           | 0.005            | <0.0050                      | 0.03                                    | 0.02      | 45               |
| Bromide (Br)                                    | 0.05             | <0.050                       | <0.050                                  | <0.050    |                  |
| Chloride (Cl)                                   | 0.1              | <0.10                        | 0.69                                    | 0.69      | 0                |
| Fluoride (F)                                    | 0.02             | <0.020                       | 0.03                                    | 0.03      | 6.5              |
| Nitrate (as N)                                  | 0.005            | <0.0050                      | <0.0050                                 | <0.0050   |                  |
| Nitrite (as N)                                  | 0.001            | <0.0010                      | <0.0010                                 | <0.0010   |                  |
| Total Kjeldahl Nitrogen                         | 0.05             |                              |                                         |           |                  |
| Orthophosphate-Dissolved (as P)                 | 0.001            | <0.0010                      | <0.0010                                 | <0.0010   |                  |
| Phosphorus (P)-Total Dissolved                  | 0.002            | <0.0020                      | 0.0021                                  | <0.0020   |                  |
| Phosphorus (P)-Total                            | 0.002            | <0.0020                      | <0.0020                                 | <0.0020   |                  |
| Silicate (as SiO <sub>2</sub> )                 | 0.5              | <0.50                        | 0.51                                    | 0.57      | -11.1            |
| Sulfate (SO <sub>4</sub> )                      | 0.3              | <0.50                        | 2.83                                    | 2.80      | 1                |
| Cyanides (mg/L)                                 |                  |                              |                                         |           |                  |
| Total Cyanide                                   | 0.001            | <0.0050                      | <0.0050                                 | <0.0050   |                  |
| Free Cyanide                                    | 0.001            | <0.0050                      | <0.0050                                 | <0.0050   |                  |
| Organic / Inorganic Carbon (mg/L)               |                  |                              |                                         |           |                  |
| Dissolved Organic Carbon                        | 0.5              | 0.83                         | 2.19                                    | 2.25      | -3               |
| Total Organic Carbon                            | 0.5              | <0.50                        | 1.93                                    | 1.87      | 3.2              |
| Plant Pigments (µg/L)                           |                  |                              |                                         |           |                  |
| Chlorophyll-a                                   | 0.01             | -                            | 0.34                                    | 0.37      | -10              |
| Total Metals (mg/L)                             |                  |                              |                                         |           |                  |
| Aluminum                                        | 0.003            | <0.0030                      | 0.01                                    | 0.01      | -10              |
| Antimony                                        | 0.0001           | <0.00010                     | <0.00010                                | <0.00010  |                  |
| Arsenic                                         | 0.0001           | <0.00010                     | 0.00043                                 | 0.00043   | 0                |
| Barium                                          | 0.00005          | 0.00006                      | 0.0035                                  | 0.0035    | 1.2              |
| Beryllium                                       | 0.0001           | <0.00010                     | <0.00010                                | <0.00010  |                  |
| Bismuth                                         | 0.0005           | <0.00050                     | <0.00050                                | <0.00050  |                  |
| Boron                                           | 0.01             | <0.010                       | <0.010                                  | <0.010    |                  |
| Cadmium                                         | 0.00001          | <0.000010                    | <0.000010                               | <0.000010 |                  |
| Calcium                                         | 0.05             | <0.050                       | 1.91                                    | 1.89      | 1.1              |
| Chromium                                        | 0.0001           | <0.00010                     | 0.00013                                 | 0.00      | 17               |
| Cobalt                                          | 0.0001           | <0.00010                     | <0.00010                                | <0.00010  |                  |
| Copper                                          | 0.0005           | <0.00050                     | <0.00050                                | <0.00050  |                  |
| Iron                                            | 0.01             | <0.010                       | 0.021                                   | 0.021     | 0.0              |
| Lead                                            | 0.00005          | 0.00005                      | <0.000050                               | <0.000050 |                  |
| Lithium                                         | 0.0005           | <0.00050                     | <0.00050                                | <0.00050  |                  |
| Magnesium                                       | 0.1              | <0.10                        | 0.74                                    | 0.74      | 0.0              |
| Manganese                                       | 0.00005          | 0.00008                      | 0.0014                                  | 0.0014    | 1.4              |
| Mercury                                         | 0.00001          | <0.000010                    | <0.000010                               | <0.000010 |                  |
| Molybdenum                                      | 0.00005          | <0.000050                    | <0.000050                               | <0.000050 |                  |
| Nickel                                          | 0.0005           | <0.00050                     | 0.00052                                 | 0.00050   | 3.9              |
| Phosphorus                                      | 0.05             | <0.050                       | <0.050                                  | <0.050    |                  |
| Potassium                                       | 0.1              | <0.10                        | 0.53                                    | 0.55      | -4               |
| Selenium                                        | 0.0001           | <0.00010                     | <0.00010                                | <0.00010  |                  |
| Silicon                                         | 0.05             | <0.050                       | 0.32                                    | 0.33      | -1.5             |
| Silver                                          | 0.00001          | <0.000010                    | <0.000010                               | <0.000010 |                  |
| Sodium                                          | 0.05             | <0.050                       | 0.50                                    | 0.50      | -1.0             |
| Strontium                                       | 0.0002           | <0.00020                     | 0.008                                   | 0.008     | 0                |
| Sulfur                                          | 0.5              | <0.50                        | 0.96                                    | 0.93      | 3                |
| Thallium                                        | 0.00001          | <0.000010                    | <0.000010                               | <0.000010 |                  |
| Tin                                             | 0.0001           | <0.00010                     | <0.00010                                | <0.00010  |                  |
| Titanium                                        | 0.01             | <0.010                       | <0.010                                  | <0.010    |                  |
| Uranium                                         | 0.00001          | <0.000010                    | 0.000024                                | 0.000021  | 13.3             |
| Vanadium                                        | 0.001            | <0.0010                      | <0.0010                                 | <0.0010   |                  |
| Zinc                                            | 0.003            | <0.0030                      | <0.0030                                 | <0.0030   |                  |





**Table A1-1.** Equipment blanks and field duplicate results for water parameters, Whale Tail Pit Baseline, 2014.

| Analyte                 | Detection Limits | Equipment Blank <sup>1</sup> | Field Duplicate<br>(Mammoth Lake Rep 5) |           |                  |
|-------------------------|------------------|------------------------------|-----------------------------------------|-----------|------------------|
|                         |                  |                              | Rep 5                                   | Duplicate | RPD <sup>2</sup> |
| Dissolved Metals (mg/L) |                  |                              |                                         |           |                  |
| Aluminum                | 0.001            | 0.0018                       | 0.0060                                  | 0.0066    | -10              |
| Antimony                | 0.0001           | <0.00010                     | <0.00010                                | <0.00010  |                  |
| Arsenic                 | 0.0001           | <0.00010                     | 0.0004                                  | 0.00040   | -2.5             |
| Barium                  | 0.00005          | 0.000099                     | 0.0035                                  | 0.0035    | 1.4              |
| Beryllium               | 0.0001           | <0.00010                     | <0.00010                                | <0.00010  |                  |
| Bismuth                 | 0.0005           | <0.00050                     | <0.00050                                | <0.00050  |                  |
| Boron                   | 0.01             | <0.010                       | <0.010                                  | <0.010    |                  |
| Cadmium                 | 0.00001          | <0.000010                    | <0.000010                               | <0.000010 |                  |
| Calcium                 | 0.05             | <0.050                       | 1.94                                    | 1.91      | 1.6              |
| Chromium                | 0.0001           | <0.00010                     | <0.00010                                | <0.00010  |                  |
| Cobalt                  | 0.0001           | <0.00010                     | <0.00010                                | <0.00010  |                  |
| Copper                  | 0.0002           | <0.00020                     | 0.00039                                 | 0.00038   | 2.6              |
| Iron                    | 0.01             | <0.010                       | 0.01                                    | 0.01      | 10               |
| Lead                    | 0.00005          | 0.00047                      | <0.000050                               | <0.000050 |                  |
| Lithium                 | 0.0005           | <0.00050                     | <0.00050                                | <0.00050  |                  |
| Magnesium               | 0.1              | <0.10                        | 0.76                                    | 0.73      | 4.0              |
| Manganese               | 0.00005          | 0.000114                     | 0.0010                                  | 0.0009    | 7                |
| Mercury                 | 0.00001          | <0.000010                    | <0.000010                               | <0.000010 |                  |
| Molybdenum              | 0.00005          | <0.000050                    | <0.000050                               | <0.000050 |                  |
| Nickel                  | 0.0005           | <0.00050                     | <0.00050                                | <0.00050  |                  |
| Phosphorus              | 0.05             | <0.050                       | <0.050                                  | <0.050    |                  |
| Potassium               | 0.1              | <0.10                        | 0.53                                    | 0.53      | 0.0              |
| Selenium                | 0.0001           | <0.00010                     | <0.00010                                | <0.00010  |                  |
| Silicon                 | 0.05             | <0.050                       | 0.33                                    | 0.32      | 4.3              |
| Silver                  | 0.00001          | <0.000010                    | <0.000010                               | <0.000010 |                  |
| Sodium                  | 0.05             | <0.050                       | 0.50                                    | 0.50      | -0.8             |
| Strontium               | 0.0002           | <0.00020                     | 0.008                                   | 0.008     | 0.0              |
| Sulfur                  | 0.5              | <0.50                        | 0.93                                    | 0.98      | -5               |
| Thallium                | 0.00001          | <0.000010                    | <0.000010                               | <0.000010 |                  |
| Tin                     | 0.0001           | <0.00010                     | <0.00010                                | <0.00010  |                  |
| Titanium                | 0.01             | <0.010                       | <0.010                                  | <0.010    |                  |
| Uranium                 | 0.00001          | <0.000010                    | 0.000020                                | 0.000022  | -9.5             |
| Vanadium                | 0.001            | <0.0010                      | <0.0010                                 | <0.0010   |                  |
| Zinc                    | 0.001            | <0.0010                      | <0.0010                                 | <0.0010   |                  |

**Notes:**  
Data presented here were adapted from Portt and Associates (2015a).

<sup>1</sup> **Bolded Equipment Blank values** concentrations exceeds laboratory MDLs but < 10 x MDL.  
**Shaded Equipment Blank values** concentrations is > 10 x MDL.

<sup>2</sup> RPD = Relative Percent Difference (%) = ((original - duplicate) / (original + duplicate)/2) x 100.  
RPDs have not been calculated for cases where one of the samples is below detection and the other is not and in cases where both are below detection. RPD has been left blank.  
The data quality objective (DQO) for field duplicates is an RPD < 50%.  
**Bolded RPDs** RPD values exceed 50% but < 10 x MDL.  
**Shaded RPD** RPD values exceed 50% and > 10 x MDL.  
*Italicized numbers are below detection limits.*



**Table A1-2.** Detection limits, equipment blanks, and travel blanks for water parameters in Lake and Sentinel station samples, Whale Tail Pit Baseline, 2015.

| Analyte                                         | Month | Detection Limits |          |           | Equipment Blanks |           |           | Travel Blanks <sup>1</sup> |            |
|-------------------------------------------------|-------|------------------|----------|-----------|------------------|-----------|-----------|----------------------------|------------|
|                                                 |       | July             | August   | September | JUL EB-1         | AUG EB-1  | SEPT EB-1 | JUL TRAV-1                 | AUG TRAV-2 |
|                                                 |       | Min              | Min      | Min       |                  |           |           |                            |            |
| Physical Tests                                  |       |                  |          |           |                  |           |           |                            |            |
| Conductivity (µS/cm)                            |       | 2                | 2        | 2         | <2.0             | <2.0      | <2.0      | <2.0                       | <2.0       |
| Hardness (mg/L)                                 |       | 0.5              | 0.5      | 0.5       | <0.5             | <0.5      | <0.5      | <0.5                       | <0.5       |
| pH (Laboratory)                                 |       | 0.1              | 0.1      | 0.1       | 5.45             | 5.4       | 5.54      | 5.8                        | 5.34       |
| Total Suspended Solids (mg/L)                   |       | 1                | 1        | 1         | <1.0             | <1.0      | <1.0      | -                          | <1.0       |
| Total Dissolved Solids (mg/L)                   |       | 3                | 3        | 3         | <3.0             | <3.0      | <3.0      | -                          | <3.0       |
| Turbidity (NTU)                                 |       | 0.1              | 0.1      | 0.1       | <0.1             | <0.1      | <0.1      | <0.1                       | <0.1       |
| Anions and Nutrients (mg/L)                     |       |                  |          |           |                  |           |           |                            |            |
| Alkalinity, Bicarbonate (as CaCO <sub>3</sub> ) |       | 1                | 1        | 1         | <1.0             | <1.0      | <1.0      | <2.0                       | <1.0       |
| Alkalinity, Carbonate (as CaCO <sub>3</sub> )   |       | 1                | 1        | 1         | <1.0             | <1.0      | <1.0      | <2.0                       | <1.0       |
| Alkalinity, Hydroxide (as CaCO <sub>3</sub> )   |       | 1                | 1        | 1         | <1.0             | <1.0      | <1.0      | <2.0                       | <1.0       |
| Alkalinity, Total (as CaCO <sub>3</sub> )       |       | 1                | 1        | 1         | <1.0             | <1.0      | <1.0      | <2.0                       | <1.0       |
| Ammonia, Total (as N)                           |       | 0.005            | 0.005    | 0.005     | <0.005           | <0.005    | <0.005    | <0.005                     | <0.005     |
| Bromide (Br)                                    |       | 0.05             | 0.05     | 0.05      | <0.05            | <0.05     | <0.05     | <0.05                      | <0.05      |
| Chloride (Cl)                                   |       | 0.1              | 0.1      | 0.1       | <0.1             | <0.1      | <0.1      | <0.1                       | <0.1       |
| Fluoride (F)                                    |       | 0.02             | 0.02     | 0.02      | <0.02            | <0.02     | <0.02     | <0.02                      | <0.02      |
| Nitrate (as N)                                  |       | 0.005            | 0.005    | 0.005     | <0.005           | <0.005    | <0.005    | <0.005                     | <0.005     |
| Nitrite (as N)                                  |       | 0.001            | 0.001    | 0.001     | <0.001           | <0.001    | <0.001    | <0.001                     | <0.001     |
| Total Kjeldahl Nitrogen                         |       | 0.05             | 0.05     | 0.05      | <0.05            | <0.05     | <0.05     | <0.05                      | <0.05      |
| Orthophosphate-Dissolved (as P)                 |       | 0.001            | 0.001    | 0.001     | <0.001           | <0.001    | <0.001    | <0.001                     | <0.001     |
| Phosphorus (P)-Total Dissolved                  |       | 0.002            | 0.002    | 0.002     | <0.002           | <0.002    | <0.002    | <0.002                     | <0.002     |
| Phosphorus (P)-Total                            |       | 0.002            | 0.002    | 0.002     | <0.002           | <0.002    | <0.002    | <0.002                     | <0.002     |
| Silicate (as SiO <sub>2</sub> )                 |       | 0.5              | 0.5      | 0.5       | <0.5             | <0.5      | <0.5      | <0.002                     | <0.5       |
| Sulfate (SO <sub>4</sub> )                      |       | 0.3              | 0.3      | 0.3       | <0.30            | <0.30     | <0.30     | <0.5                       | <0.30      |
| Cyanides (mg/L)                                 |       |                  |          |           |                  |           |           |                            |            |
| Total Cyanide                                   |       | 0.001            | 0.001    | 0.001     | <0.001           | <0.001    | <0.001    | <0.001                     | <0.001     |
| Free Cyanide                                    |       | 0.001            | 0.001    | 0.001     | <0.001           | <0.001    | <0.001    | <0.001                     | <0.001     |
| Organic / Inorganic Carbon (mg/L)               |       |                  |          |           |                  |           |           |                            |            |
| Dissolved Organic Carbon                        |       | 0.5              | 0.5      | 0.5       | <0.5             | <0.5      | <0.5      | -                          | -          |
| Total Organic Carbon                            |       | 0.5              | 0.5      | 0.5       | <0.5             | <0.5      | <0.5      | <0.5                       | <0.5       |
| Plant Pigments (µg/L)                           |       |                  |          |           |                  |           |           |                            |            |
| Chlorophyll-a                                   |       | 0.01             | 0.01     | 0.01      |                  |           |           |                            |            |
| Total Metals (mg/L)                             |       |                  |          |           |                  |           |           |                            |            |
| Aluminum                                        |       | 0.003            | 0.003    | 0.003     | <0.003           | 0.0035    | <0.003    | <0.003                     | <0.003     |
| Antimony                                        |       | 0.0001           | 0.0001   | 0.0001    | <0.0001          | <0.0001   | <0.0001   | <0.0001                    | <0.0001    |
| Arsenic                                         |       | 0.0001           | 0.0001   | 0.0001    | <0.0001          | <0.0001   | <0.0001   | <0.0001                    | <0.0001    |
| Barium                                          |       | 0.00005          | 0.00005  | 0.00005   | <0.00005         | 0.00009   | <0.00005  | <0.00005                   | <0.00005   |
| Beryllium                                       |       | 0.00002          | 0.00002  | 0.00002   | <0.00002         | <0.00002  | <0.00002  | <0.00002                   | <0.00002   |
| Bismuth                                         |       | 0.00005          | 0.00005  | 0.00005   | <0.00005         | <0.00005  | <0.00005  | <0.00005                   | <0.00005   |
| Boron                                           |       | 0.01             | 0.01     | 0.01      | <0.01            | <0.01     | <0.01     | <0.01                      | <0.01      |
| Cadmium                                         |       | 0.000005         | 0.000005 | 0.000005  | <0.000005        | 0.0000087 | <0.000005 | <0.000005                  | <0.000005  |
| Calcium                                         |       | 0.05             | 0.05     | 0.05      | <0.05            | <0.05     | <0.05     | <0.05                      | <0.05      |
| Chromium                                        |       | 0.0001           | 0.0001   | 0.0001    | <0.0001          | <0.0001   | <0.0001   | <0.0001                    | <0.0001    |
| Cobalt                                          |       | 0.0001           | 0.0001   | 0.0001    | <0.0001          | <0.0001   | <0.0001   | <0.0001                    | <0.0001    |
| Copper                                          |       | 0.0005           | 0.0005   | 0.0005    | <0.0005          | <0.0005   | <0.0005   | <0.0005                    | <0.0005    |
| Iron                                            |       | 0.01             | 0.01     | 0.01      | <0.01            | <0.01     | <0.01     | <0.01                      | <0.01      |
| Lead                                            |       | 0.00005          | 0.00005  | 0.00005   | 0.00006          | 0.00071   | 0.00019   | <0.00005                   | <0.00005   |
| Lithium                                         |       | 0.001            | 0.001    | 0.001     | <0.001           | <0.001    | <0.001    | <0.001                     | <0.001     |
| Magnesium                                       |       | 0.1              | 0.1      | 0.1       | <0.1             | <0.1      | <0.1      | <0.1                       | <0.1       |
| Manganese                                       |       | 0.0001           | 0.0001   | 0.0001    | <0.0001          | <0.0001   | <0.0001   | <0.0001                    | <0.0001    |
| Mercury                                         |       | 0.000005         | 0.000005 | 0.000005  | <0.000005        | <0.000005 | <0.000005 | <0.000005                  | <0.000005  |
| Molybdenum                                      |       | 0.00005          | 0.00005  | 0.00005   | <0.00005         | <0.00005  | <0.00005  | <0.00005                   | <0.00005   |
| Nickel                                          |       | 0.0005           | 0.0005   | 0.0005    | <0.0005          | <0.0005   | <0.0005   | <0.0005                    | <0.0005    |
| Phosphorus                                      |       | 0.05             | 0.05     | 0.05      | <0.05            | <0.05     | <0.05     | <0.05                      | <0.05      |
| Potassium                                       |       | 0.1              | 0.1      | 0.1       | <0.1             | <0.1      | <0.1      | <0.1                       | <0.1       |
| Selenium                                        |       | 0.00005          | 0.00005  | 0.00005   | <0.00005         | <0.00005  | <0.00005  | <0.00005                   | <0.00005   |
| Silicon                                         |       | 0.05             | 0.05     | 0.05      | <0.05            | <0.05     | <0.05     | <0.05                      | <0.05      |
| Silver                                          |       | 0.00001          | 0.00001  | 0.00001   | <0.00001         | <0.00001  | <0.00001  | <0.00001                   | <0.00001   |
| Sodium                                          |       | 0.05             | 0.05     | 0.05      | <0.05            | <0.05     | <0.05     | <0.05                      | <0.05      |
| Strontium                                       |       | 0.0002           | 0.0002   | 0.0002    | <0.0002          | <0.0002   | <0.0002   | <0.0002                    | <0.0002    |
| Sulfur                                          |       | 0.5              | 0.5      | 0.5       | <0.5             | <0.5      | <0.5      | <0.5                       | <0.5       |
| Thallium                                        |       | 0.00001          | 0.00001  | 0.00001   | <0.00001         | <0.00001  | <0.00001  | <0.00001                   | <0.00001   |
| Tin                                             |       | 0.0001           | 0.0001   | 0.0001    | <0.0001          | <0.0001   | <0.0001   | <0.0001                    | <0.0001    |
| Titanium                                        |       | 0.0003           | 0.0003   | 0.0003    | <0.0003          | <0.0003   | <0.0003   | <0.0003                    | <0.0003    |
| Uranium                                         |       | 0.00001          | 0.00001  | 0.00001   | <0.00001         | <0.00001  | <0.00001  | <0.00001                   | <0.00001   |
| Vanadium                                        |       | 0.0005           | 0.0005   | 0.0005    | <0.0005          | <0.0005   | <0.0005   | <0.0005                    | <0.0005    |
| Zinc                                            |       | 0.003            | 0.003    | 0.003     | <0.003           | <0.003    | <0.003    | <0.003                     | <0.003     |
| Zirconium                                       |       | 0.0003           | 0.0003   | 0.0003    | <0.0003          | <0.0003   | <0.0003   | <0.0003                    | <0.0003    |
| Dissolved Metals (mg/L)                         |       |                  |          |           |                  |           |           |                            |            |
|                                                 |       | 0                |          |           |                  |           |           |                            |            |
| Aluminum                                        |       | 0.001            | 0.001    | 0.001     | 0.001            | <0.001    | <0.001    |                            |            |
| Antimony                                        |       | 0.0001           | 0.0001   | 0.0001    | <0.0001          | <0.0001   | <0.0001   |                            |            |
| Arsenic                                         |       | 0.0001           | 0.0001   | 0.0001    | <0.0001          | <0.0001   | <0.0001   |                            |            |
| Barium                                          |       | 0.00005          | 0.00005  | 0.00005   | <0.00005         | <0.00005  | <0.00005  |                            |            |
| Beryllium                                       |       | 0.00002          | 0.00002  | 0.00002   | <0.00002         | <0.00002  | <0.00002  |                            |            |
| Bismuth                                         |       | 0.00005          | 0.00005  | 0.00005   | <0.00005         | <0.00005  | <0.00005  |                            |            |
| Boron                                           |       | 0.01             | 0.01     | 0.01      | <0.01            | <0.01     | <0.01     |                            |            |
| Cadmium                                         |       | 0.000005         | 0.000005 | 0.000005  | <0.000005        | <0.000005 | <0.000005 |                            |            |
| Calcium                                         |       | 0.05             | 0.05     | 0.05      | <0.05            | <0.05     | <0.05     |                            |            |
| Chromium                                        |       | 0.0001           | 0.0001   | 0.0001    | <0.0001          | <0.0001   | <0.0001   |                            |            |
| Cobalt                                          |       | 0.0001           | 0.0001   | 0.0001    | <0.0001          | <0.0001   | <0.0001   |                            |            |



**Table A1-2.** Detection limits, equipment blanks, and travel blanks for water parameters in Lake and Sentinel station samples, Whale Tail Pit Baseline, 2015.

| Analyte    | Month | Detection Limits |          |           | Equipment Blanks |           |           | Travel Blanks <sup>1</sup> |            |
|------------|-------|------------------|----------|-----------|------------------|-----------|-----------|----------------------------|------------|
|            |       | July             | August   | September | JUL EB-1         | AUG EB-1  | SEPT EB-1 | JUL TRAV-1                 | AUG TRAV-2 |
|            |       | Min              | Min      | Min       |                  |           |           |                            |            |
| Copper     |       | 0.0002           | 0.0002   | 0.0002    | <0.0002          | <0.0002   | <0.0002   |                            |            |
| Iron       |       | 0.01             | 0.01     | 0.01      | <0.01            | <0.01     | <0.01     |                            |            |
| Lead       |       | 0.00005          | 0.00005  | 0.00005   | <0.00005         | <0.00005  | 0.00007   |                            |            |
| Lithium    |       | 0.001            | 0.001    | 0.001     | <0.001           | <0.001    | <0.001    |                            |            |
| Magnesium  |       | 0.1              | 0.1      | 0.1       | <0.1             | <0.1      | <0.1      |                            |            |
| Manganese  |       | 0.0001           | 0.0001   | 0.0001    | <0.0001          | <0.0001   | <0.0001   |                            |            |
| Mercury    |       | 0.000005         | 0.000005 | 0.000005  | <0.000005        | <0.000005 | <0.000005 |                            |            |
| Molybdenum |       | 0.00005          | 0.00005  | 0.00005   | <0.00005         | <0.00005  | <0.00005  |                            |            |
| Nickel     |       | 0.0005           | 0.0005   | 0.0005    | <0.0005          | <0.0005   | <0.0005   |                            |            |
| Phosphorus |       | 0.05             | 0.05     | 0.05      | <0.05            | <0.05     | <0.05     |                            |            |
| Potassium  |       | 0.1              | 0.1      | 0.1       | <0.1             | <0.1      | <0.1      |                            |            |
| Selenium   |       | 0.00005          | 0.00005  | 0.00005   | <0.00005         | <0.00005  | <0.00005  |                            |            |
| Silicon    |       | 0.05             | 0.05     | 0.05      | <0.05            | <0.05     | <0.05     |                            |            |
| Silver     |       | 0.00001          | 0.00001  | 0.00001   | <0.00001         | <0.00001  | <0.00001  |                            |            |
| Sodium     |       | 0.05             | 0.05     | 0.05      | <0.05            | <0.05     | <0.05     |                            |            |
| Strontium  |       | 0.0002           | 0.0002   | 0.0002    | <0.0002          | <0.0002   | <0.0002   |                            |            |
| Sulfur     |       | 0.5              | 0.5      | 0.5       | <0.5             | <0.5      | <0.5      |                            |            |
| Thallium   |       | 0.00001          | 0.00001  | 0.00001   | <0.00001         | <0.00001  | <0.00001  |                            |            |
| Tin        |       | 0.0001           | 0.0001   | 0.0001    | <0.0001          | <0.0001   | <0.0001   |                            |            |
| Titanium   |       | 0.0003           | 0.0003   | 0.0003    | <0.0003          | <0.0003   | <0.0003   |                            |            |
| Uranium    |       | 0.00001          | 0.00001  | 0.00001   | <0.00001         | <0.00001  | <0.00001  |                            |            |
| Vanadium   |       | 0.0005           | 0.0005   | 0.0005    | <0.0005          | <0.0005   | <0.0005   |                            |            |
| Zinc       |       | 0.001            | 0.001    | 0.0010    | <0.001           | <0.001    | <0.001    |                            |            |
| Zirconium  |       | 0.0003           | 0.0003   | 0.0003    | <0.0003          | <0.0003   | <0.0003   |                            |            |

**Notes:**

<sup>1</sup> A travel blank was not available for submission with the September samples.

**Bolded Equipment or Travel Blank values** concentrations exceeds laboratory MDLs but < 10 x MDL.

**Shaded Equipment or Travel Blank values** concentrations is > 10 x MDL.

*Italicized numbers are below detection limits.*

Table A1-3. Laboratory QA/QC results for water parameters in Lake and Sentinel station samples, Whale Tail Pit Baseline, 2015.

| Analyte                                         | ALS Report Number | Month<br>Laboratory<br>DQOs <sup>1</sup> | July      |                     |           | August MDLs | August                              |           |           | September<br>MDLs | September                           |           |           |                                     |
|-------------------------------------------------|-------------------|------------------------------------------|-----------|---------------------|-----------|-------------|-------------------------------------|-----------|-----------|-------------------|-------------------------------------|-----------|-----------|-------------------------------------|
|                                                 |                   |                                          | July MDLs | L1648210 & L1649931 |           |             | L1665542 & L1667195                 |           |           |                   | L1679751 & L1681194                 |           |           |                                     |
|                                                 |                   |                                          |           | Original            | Lab Dup   |             | RPD <sup>2</sup> /Diff <sup>3</sup> | Original  | Lab Dup   |                   | RPD <sup>2</sup> /Diff <sup>3</sup> | Original  | Lab Dup   | RPD <sup>2</sup> /Diff <sup>3</sup> |
| Physical Tests                                  |                   |                                          |           |                     |           |             |                                     |           |           |                   |                                     |           |           |                                     |
| Conductivity (µS/cm)                            |                   | 10                                       | 2         |                     |           | 2           |                                     |           |           | 2                 |                                     |           |           |                                     |
| Hardness (mg/L)                                 |                   | 25                                       | 0.5       |                     |           | 0.5         |                                     |           |           | 0.5               |                                     |           |           |                                     |
| pH (Laboratory)                                 |                   | 0.3                                      | 0.1       |                     |           | 0.1         |                                     |           |           | 0.1               |                                     |           |           |                                     |
| Total Suspended Solids (mg/L)                   |                   | 20                                       | 1         |                     |           | 1           |                                     |           |           | 1                 |                                     |           |           |                                     |
| Total Dissolved Solids (mg/L)                   |                   | 20                                       | 3         | 16                  | 14.9      | 7.1         | 3                                   |           |           | 3                 |                                     |           |           |                                     |
| Turbidity (NTU)                                 |                   | 15                                       | 0.1       | 0.39                | 0.39      | 0           | 0.1                                 | 0.23      | 0.26      | -12               | 0.1                                 |           |           |                                     |
| Anions and Nutrients (mg/L)                     |                   |                                          |           |                     |           |             |                                     |           |           |                   |                                     |           |           |                                     |
| Alkalinity, Bicarbonate (as CaCO <sub>3</sub> ) | 20                |                                          | 1         |                     |           |             | 1                                   |           |           |                   | 1                                   |           |           |                                     |
| Alkalinity, Carbonate (as CaCO <sub>3</sub> )   | 20                |                                          | 1         |                     |           |             | 1                                   |           |           |                   | 1                                   |           |           |                                     |
| Alkalinity, Hydroxide (as CaCO <sub>3</sub> )   | 20                |                                          | 1         |                     |           |             | 1                                   |           |           |                   | 1                                   |           |           |                                     |
| Alkalinity, Total (as CaCO <sub>3</sub> )       | 20                |                                          | 1         |                     |           |             | 1                                   |           |           |                   | 1                                   |           |           |                                     |
| Ammonia, Total (as N)                           | 20                |                                          | 0.005     |                     |           |             | 0.005                               | <0.005    | <0.005    |                   | 0.005                               | <0.005    | <0.005    |                                     |
| Bromide (Br)                                    | 20                |                                          | 0.05      |                     |           |             | 0.05                                | <0.05     | <0.05     |                   | 0.05                                |           |           |                                     |
| Chloride (Cl)                                   | 20                |                                          | 0.1       |                     |           |             | 0.1                                 | 1.57      | 1.57      | 0                 | 0.1                                 |           |           |                                     |
| Fluoride (F)                                    | 20                |                                          | 0.02      |                     |           |             | 0.02                                | 0.025     | 0.025     | 0                 | 0.02                                |           |           |                                     |
| Nitrate (as N)                                  | 20                |                                          | 0.005     |                     |           |             | 0.005                               | <0.005    | <0.005    |                   | 0.005                               |           |           |                                     |
| Nitrite (as N)                                  | 20                |                                          | 0.001     |                     |           |             | 0.001                               | <0.001    | <0.001    |                   | 0.001                               |           |           |                                     |
| Total Kjeldahl Nitrogen                         | 20                |                                          | 0.05      | 0.171               | 0.164     | 4.2         | 0.05                                | 0.107     | 0.108     | -0.9              | 0.05                                | 0.129     | 0.127     | 1.6                                 |
| Orthophosphate (as P)                           | 20                |                                          | 0.001     | <0.001              | <0.001    |             | 0.001                               | <0.001    | <0.001    |                   | 0.001                               |           |           |                                     |
| Phosphorus (P)-Total Diss.                      | 20                |                                          | 0.002     |                     |           |             | 0.002                               | 0.0023    | 0.003     | 0.0007            | 0.002                               |           |           |                                     |
| Phosphorus (P)-Total                            | 20                |                                          | 0.002     |                     |           |             | 0.002                               | <0.002    | <0.002    |                   | 0.002                               | <0.002    | <0.002    |                                     |
| Silicate (as SiO <sub>2</sub> )                 | 20                |                                          | 0.5       |                     |           |             | 0.5                                 |           |           |                   | 0.5                                 |           |           |                                     |
| Sulfate (SO <sub>4</sub> )                      | 20                |                                          | 0.3       |                     |           |             | 0.3                                 | 1.31      | 1.31      | 0                 | 0.3                                 |           |           |                                     |
| Cyanides (mg/L)                                 |                   |                                          |           |                     |           |             |                                     |           |           |                   |                                     |           |           |                                     |
| Total Cyanide                                   | 20                |                                          | 0.001     | <0.001              | <0.001    |             | 0.001                               | <0.001    | <0.001    |                   | 0.001                               | <0.001    | <0.001    |                                     |
| Free Cyanide                                    | 20                |                                          | 0.001     | <0.001              | <0.001    |             | 0.001                               | <0.001    | <0.001    |                   | 0.001                               | <0.001    | <0.001    |                                     |
| Organic / Inorganic Carbon (mg/L)               |                   |                                          |           |                     |           |             |                                     |           |           |                   |                                     |           |           |                                     |
| Dissolved Organic Carbon                        | 20                |                                          | 0.5       | 2.15                | 2.07      | 3.8         | 0.5                                 | 1.85      | 1.77      | 4.4               | 0.5                                 | 1.22      | 1.31      | -7.1                                |
| Total Organic Carbon                            | 20                |                                          | 0.5       | 2.29                | 2.46      | -7.2        | 0.5                                 | 1.72      | 1.8       | -4.5              | 0.5                                 | 1.55      | 1.45      | 6.7                                 |
| Plant Pigments (µg/L)                           |                   |                                          |           |                     |           |             |                                     |           |           |                   |                                     |           |           |                                     |
| Chlorophyll-a                                   | 35                |                                          | 0.01      |                     |           |             | 0.01                                |           |           |                   | 0.01                                |           |           |                                     |
| Total Metals (mg/L)                             |                   |                                          |           |                     |           |             |                                     |           |           |                   |                                     |           |           |                                     |
| Aluminum                                        | 20                |                                          | 0.003     |                     |           |             | 0.003                               |           |           |                   | 0.003                               | 0.0116    | 0.0127    | -9.1                                |
| Antimony                                        | 20                |                                          | 0.0001    |                     |           |             | 0.0001                              |           |           |                   | 0.0001                              | <0.0001   | <0.0001   |                                     |
| Arsenic                                         | 20                |                                          | 0.0001    |                     |           |             | 0.0001                              |           |           |                   | 0.0001                              | 0.00019   | 0.00019   | 0                                   |
| Barium                                          | 20                |                                          | 0.00005   |                     |           |             | 0.00005                             |           |           |                   | 0.00005                             | 0.0041    | 0.00411   | -0.2                                |
| Beryllium                                       | 20                |                                          | 0.00002   |                     |           |             | 0.00002                             |           |           |                   | 0.00002                             | <0.00002  | <0.00002  |                                     |
| Bismuth                                         | 20                |                                          | 0.00005   |                     |           |             | 0.00005                             |           |           |                   | 0.00005                             | <0.00005  | <0.00005  |                                     |
| Boron                                           | 20                |                                          | 0.01      |                     |           |             | 0.01                                |           |           |                   | 0.01                                | <0.01     | <0.01     |                                     |
| Cadmium                                         | 20                |                                          | 0.000005  |                     |           |             | 0.000005                            |           |           |                   | 0.000005                            | <0.000005 | <0.000005 |                                     |
| Calcium                                         | 20                |                                          | 0.05      |                     |           |             | 0.05                                |           |           |                   | 0.05                                | 2.15      | 2.11      | 1.9                                 |
| Chromium                                        | 20                |                                          | 0.0001    |                     |           |             | 0.0001                              |           |           |                   | 0.0001                              | 0.00014   | 0.00016   | -13                                 |
| Cobalt                                          | 20                |                                          | 0.0001    |                     |           |             | 0.0001                              |           |           |                   | 0.0001                              | <0.0001   | <0.0001   |                                     |
| Copper                                          | 20                |                                          | 0.0005    |                     |           |             | 0.0005                              |           |           |                   | 0.0005                              | <0.0005   | <0.0005   |                                     |
| Iron                                            | 20                |                                          | 0.01      |                     |           |             | 0.01                                |           |           |                   | 0.01                                | 0.021     | 0.028     | 0.007                               |
| Lead                                            | 20                |                                          | 0.00005   |                     |           |             | 0.00005                             |           |           |                   | 0.00005                             | <0.00005  | <0.00005  |                                     |
| Lithium                                         | 20                |                                          | 0.001     |                     |           |             | 0.001                               |           |           |                   | 0.001                               | <0.001    | <0.001    |                                     |
| Magnesium                                       | 20                |                                          | 0.1       |                     |           |             | 0.1                                 |           |           |                   | 0.1                                 | 0.71      | 0.7       | 1.4                                 |
| Manganese                                       | 20                |                                          | 0.0001    |                     |           |             | 0.0001                              |           |           |                   | 0.0001                              | 0.00365   | 0.00359   | 1.7                                 |
| Mercury                                         | 20                |                                          | 0.000005  | <0.000005           | <0.000005 |             | 0.000005                            |           |           |                   | 0.000005                            |           |           |                                     |
| Molybdenum                                      | 20                |                                          | 0.00005   |                     |           |             | 0.00005                             |           |           |                   | 0.00005                             | <0.00005  | <0.00005  |                                     |
| Nickel                                          | 20                |                                          | 0.0005    |                     |           |             | 0.0005                              |           |           |                   | 0.0005                              | 0.0006    | 0.00063   | -4.9                                |
| Phosphorus                                      | 20                |                                          | 0.05      |                     |           |             | 0.05                                |           |           |                   | 0.05                                | <0.05     | <0.05     |                                     |
| Potassium                                       | 20                |                                          | 0.1       |                     |           |             | 0.1                                 |           |           |                   | 0.1                                 | 0.39      | 0.38      | 2.6                                 |
| Selenium                                        | 20                |                                          | 0.00005   |                     |           |             | 0.00005                             |           |           |                   | 0.00005                             | <0.00005  | <0.00005  |                                     |
| Silicon                                         | 20                |                                          | 0.05      |                     |           |             | 0.05                                |           |           |                   | 0.05                                | 0.247     | 0.246     | 0.4                                 |
| Silver                                          | 20                |                                          | 0.00001   |                     |           |             | 0.00001                             |           |           |                   | 0.00001                             | <0.00001  | <0.00001  |                                     |
| Sodium                                          | 20                |                                          | 0.05      |                     |           |             | 0.05                                |           |           |                   | 0.05                                | 0.526     | 0.52      | 1.1                                 |
| Strontium                                       | 20                |                                          | 0.0002    |                     |           |             | 0.0002                              |           |           |                   | 0.0002                              | 0.0145    | 0.0143    | 1.4                                 |
| Sulfur                                          | 20                |                                          | 0.5       |                     |           |             | 0.5                                 |           |           |                   | 0.5                                 | 0.54      | 0.52      | 3.8                                 |
| Thallium                                        | 20                |                                          | 0.00001   |                     |           |             | 0.00001                             |           |           |                   | 0.00001                             | <0.00001  | <0.00001  |                                     |
| Tin                                             | 20                |                                          | 0.0001    |                     |           |             | 0.0001                              |           |           |                   | 0.0001                              | <0.0001   | <0.0001   |                                     |
| Titanium                                        | 20                |                                          | 0.0003    |                     |           |             | 0.0003                              |           |           |                   | 0.0003                              | <0.0003   | <0.0003   |                                     |
| Uranium                                         | 20                |                                          | 0.00001   |                     |           |             | 0.00001                             |           |           |                   | 0.00001                             | 0.000032  | 0.000032  | 0                                   |
| Vanadium                                        | 20                |                                          | 0.0005    |                     |           |             | 0.0005                              |           |           |                   | 0.0005                              | <0.0005   | <0.0005   |                                     |
| Zinc                                            | 20                |                                          | 0.003     |                     |           |             | 0.003                               |           |           |                   | 0.003                               | <0.003    | <0.003    |                                     |
| Zirconium                                       | 20                |                                          | 0.0003    |                     |           |             | 0.0003                              |           |           |                   | 0.0003                              | <0.0003   | <0.0003   |                                     |
| Dissolved Metals (mg/L)                         |                   |                                          |           |                     |           |             |                                     |           |           |                   |                                     |           |           |                                     |
| Aluminum                                        | 20                |                                          | 0.001     |                     |           |             | 0.001                               | 0.0053    | 0.0055    | -3.7              | 0.001                               |           |           |                                     |
| Antimony                                        | 20                |                                          | 0.0001    |                     |           |             | 0.0001                              | <0.0001   | <0.0001   |                   | 0.0001                              |           |           |                                     |
| Arsenic                                         | 20                |                                          | 0.0001    |                     |           |             | 0.0001                              | 0.00016   | 0.00017   | -6.1              | 0.0001                              |           |           |                                     |
| Barium                                          | 20                |                                          | 0.00005   |                     |           |             | 0.00005                             | 0.00329   | 0.00326   | 0.9               | 0.00005                             |           |           |                                     |
| Beryllium                                       | 20                |                                          | 0.00002   |                     |           |             | 0.00002                             | <0.00002  | <0.00002  |                   | 0.00002                             |           |           |                                     |
| Bismuth                                         | 20                |                                          | 0.00005   |                     |           |             | 0.00005                             | <0.00005  | <0.00005  |                   | 0.00005                             |           |           |                                     |
| Boron                                           | 20                |                                          | 0.01      |                     |           |             | 0.01                                | <0.01     | <0.01     |                   | 0.01                                |           |           |                                     |
| Cadmium                                         | 20                |                                          | 0.000005  |                     |           |             | 0.000005                            | <0.000005 | <0.000005 |                   | 0.000005                            |           |           |                                     |
| Calcium                                         | 20                |                                          | 0.05      |                     |           |             | 0.05                                | 1.63      | 1.65      | -1.2              | 0.05                                |           |           |                                     |
| Chromium                                        | 20                |                                          | 0.0001    |                     |           |             | 0.0001                              | <0.0001   | <0.0001   |                   | 0.0001                              |           |           |                                     |
| Cobalt                                          | 20                |                                          | 0.0001    |                     |           |             | 0.0001                              | <0.0001   | <0.0001   |                   | 0.0001                              |           |           |                                     |
| Copper                                          | 20                |                                          | 0.0002    |                     |           |             | 0.0002                              | 0.00034   | 0.00036   | -5.7              | 0.0002                              |           |           |                                     |
| Iron                                            | 20                |                                          | 0.01      |                     |           |             | 0.01                                | 0.011     | 0.011     | 0                 | 0.01                                |           |           |                                     |
| Lead                                            | 20                |                                          | 0.00005   |                     |           |             | 0.00005                             | <0.00005  | <0.00005  |                   | 0.00005                             |           |           |                                     |
| Lithium                                         | 20                |                                          | 0.001     |                     |           |             | 0.001                               | <0.001    | <0.001    |                   | 0.001                               |           |           |                                     |
| Magnesium                                       | 20                |                                          | 0.1       |                     |           |             | 0.1                                 | 0.63      | 0.64      | -1.6              | 0.1                                 |           |           |                                     |
| Manganese                                       | 20                |                                          | 0.0001    |                     |           |             | 0.0001                              | 0.00136   | 0.00134   | 1.5               | 0.0001                              |           |           |                                     |
| Mercury                                         | 20                |                                          | 0.000005  | <0.000005           | <0.000005 |             | 0.000005                            |           |           |                   | 0.000005                            |           |           |                                     |
| Molybdenum                                      | 20                |                                          | 0.00005   |                     |           |             | 0.00005                             | <0.00005  | <0.00005  |                   | 0.00005                             |           |           |                                     |
| Nickel                                          | 20                |                                          | 0.0005    |                     |           |             | 0.0005                              | 0.0005    | 0.0005    | 0                 | 0.0005                              |           |           |                                     |
| Phosphorus                                      | 20                |                                          | 0.05      |                     |           |             | 0.05                                | <0.05     | <0.05     |                   | 0.05                                |           |           |                                     |
| Potassium                                       | 20                |                                          | 0.1       |                     |           |             | 0.1                                 | 0.36      | 0.35      | 2.8               | 0.1                                 |           |           |                                     |
| Selenium                                        | 20                |                                          | 0.00005   |                     |           |             | 0.00005                             | <0.00005  | <0.00005  |                   | 0.00005                             |           |           |                                     |
| Silicon                                         | 20                |                                          | 0.05      |                     |           |             | 0.05                                | 0.25      | 0.253     | -1.2              | 0.05                                |           |           |                                     |
| Silver                                          | 20                |                                          | 0.00001   |                     |           |             | 0.00001                             | <0.00001  | <0.00001  |                   | 0.00001                             |           |           |                                     |
| Sodium                                          | 20                |                                          | 0.05      |                     |           |             | 0.05                                | 0.502     | 0.506     | -0.8              | 0.05                                |           |           |                                     |
| Strontium                                       | 20                |                                          | 0.00      |                     |           |             |                                     |           |           |                   |                                     |           |           |                                     |

Notes:

<sup>1</sup> DQO = Data quality objectives (i.e., RPD limits) for laboratory duplicate samples. DQOs shown as percentages except for pH (units).

<sup>2</sup> RPD = Relative Percent Difference (%) = ((original - duplicate) / (original + duplicate)/2) x 100.

RPDs have not been calculated for cases where one of the samples is below detection and the other is not and in cases where both are below detection. RPD has been left blank.

<sup>3</sup> Diff = The difference between the replicate values in concentration units. Used in cases where the concentration is <10x the MDL.

For low level results, the DQO is a concentration difference between the two measurements of < 2x the MDL (unless the RPD is met).

|                    |                                                  |
|--------------------|--------------------------------------------------|
| <b>Bolded RPDs</b> | RPD values exceed laboratory DQO but < 10 x MDL. |
| <b>Shaded RPD</b>  | RPD values exceed laboratory DQO and > 10 x MDL. |

Blank cells indicate no laboratory duplicate analysis was conducted.

*Italicized numbers are below detection limits.*



Table A1-4. Field duplicate QA/QC results from the Lake and Sentinel station water sampling program, Whale Tail Pit Baseline, 2015.

| Analyte                                         | Month<br>Station | July      |                               |           |      | August<br>MDLs | August    |                               |      | September<br>MDLs | September |                               |      |
|-------------------------------------------------|------------------|-----------|-------------------------------|-----------|------|----------------|-----------|-------------------------------|------|-------------------|-----------|-------------------------------|------|
|                                                 |                  | July MDLs | Whale Tail Lake (South Basin) |           |      |                | WTN-04-S  | Whale Tail Lake (North Basin) |      |                   | WTN-06-S  | Whale Tail Lake (North Basin) |      |
|                                                 |                  |           | WTS-02-S                      | JUL DUP-1 | RPD  |                |           | AUG DUP-1                     | RPD  |                   |           | SEP DUP-1                     | RPD  |
| Physical Tests                                  |                  |           |                               |           |      |                |           |                               |      |                   |           |                               |      |
| Conductivity (µS/cm)                            |                  | 2         | 15.9                          | 15.4      | 3.2  | 2              | 19.80     | 19.5                          | 1.5  | 2                 | 21.80     | 21.4                          | 1.9  |
| Hardness (mg/L)                                 |                  | 0.5       | 5.8                           | 5.9       | -1.7 | 0.5            | 07.2      | 07.1                          | 0.6  | 0.5               | 07.8      | 8.09                          | -4.2 |
| pH (Laboratory)                                 |                  | 0.1       | 6.78                          | 6.76      | 0.3  | 0.1            | 6.82      | 6.70                          | 1.8  | 0.1               | 6.75      | 6.76                          | -0.1 |
| Total Suspended Solids (mg/L)                   |                  | 1         | <1.0                          | <1.0      |      | 1              | <1.0      | <1.0                          |      | 1                 | <1.0      | <1.0                          |      |
| Total Dissolved Solids (mg/L)                   |                  | 3         | 13.8                          | 13.3      | 3.7  | 3              | 13.2      | 14.2                          | -7.3 | 3                 | 17.7      | 17.0                          | 4.0  |
| Turbidity (NTU)                                 |                  | 0.1       | 0.35                          | 0.37      | -5.6 | 0.1            | 0.28      | 0.24                          | 15   | 0.1               | 0.35      | 0.32                          | 9.0  |
| Anions and Nutrients (mg/L)                     |                  |           |                               |           |      |                |           |                               |      |                   |           |                               |      |
| Alkalinity, Bicarbonate (as CaCO <sub>3</sub> ) |                  | 1         | 4.20                          | 3.90      | 7.4  | 1              | 3.90      | 4.30                          | -10  | 1                 | 5         | 4                             | 6.7  |
| Alkalinity, Carbonate (as CaCO <sub>3</sub> )   |                  | 1         | <1.0                          | <1.0      |      | 1              | <1.0      | <1.0                          |      | 1                 | <1.0      | <1.0                          |      |
| Alkalinity, Hydroxide (as CaCO3)                |                  | 1         | <1.0                          | <1.0      |      | 1              | <1.0      | <1.0                          |      | 1                 | <1.0      | <1.0                          |      |
| Alkalinity, Total (as CaCO <sub>3</sub> )       |                  | 1         | 4.20                          | 3.90      | 7.4  | 1              | 3.90      | 4.30                          | -10  | 1                 | 5         | 4                             | 6.7  |
| Ammonia, Total (as N)                           |                  | 0.005     | <0.005                        | <0.005    |      | 0.005          | <0.005    | 0.01                          |      | 0.005             | <0.005    | <0.005                        |      |
| Bromide (Br)                                    |                  | 0.05      | <0.05                         | <0.05     |      | 0.05           | <0.05     | <0.05                         |      | 0.05              | <0.05     | <0.05                         |      |
| Chloride (Cl)                                   |                  | 0.1       | 1.06                          | 1.05      | 0.9  | 0.1            | 1.84      | 1.84                          | 0    | 0.1               | 2.38      | 2.36                          | 0.8  |
| Fluoride (F)                                    |                  | 0.02      | 0.03                          | 0.02      | 4.1  | 0.02           | 0.03      | 0.03                          | -3.9 | 0.02              | 0.026     | 0.026                         | 0    |
| Nitrate (as N)                                  |                  | 0.005     | <0.005                        | <0.005    |      | 0.005          | <0.005    | <0.005                        |      | 0.005             | <0.005    | <0.005                        |      |
| Nitrite (as N)                                  |                  | 0.001     | <0.001                        | <0.001    |      | 0.001          | <0.001    | <0.001                        |      | 0.001             | <0.001    | <0.001                        |      |
| Total Kjeldahl Nitrogen                         |                  | 0.05      | 0.14                          | 0.16      | -13  | 0.05           | 0.11      | 0.15                          | -35  | 0.05              | 0.12      | 0.12                          | -2.5 |
| Orthophosphate-Dissolved (as P)                 |                  | 0.001     | <0.001                        | <0.001    |      | 0.001          | <0.001    | <0.001                        |      | 0.001             | <0.001    | <0.001                        |      |
| Phosphorus (P)-Total Dissolved                  |                  | 0.002     | 0.002                         | <0.002    |      | 0.002          | 0.0028    | 0.0025                        | 11   | 0.002             | <0.002    | <0.002                        |      |
| Phosphorus (P)-Total                            |                  | 0.002     | 0.002                         | 0.005     | -67  | 0.002          | 0.002     | 0.004                         | -44  | 0.002             | 0.0031    | <0.002                        |      |
| Silicate (as SiO <sub>2</sub> )                 |                  | 0.5       | 0.54                          | 0.54      | 0    | 0.5            | 0.57      | 0.56                          | 1.8  | 0.5               | 0.67      | 0.67                          | 0    |
| Sulfate (SO <sub>4</sub> )                      |                  | 0.3       | 1.22                          | 1.21      | 0.8  | 0.3            | 1.37      | 1.37                          | 0    | 0.3               | 1.37      | 1.37                          | 0    |
| Cyanides (mg/L)                                 |                  |           |                               |           |      |                |           |                               |      |                   |           |                               |      |
| Total Cyanide                                   |                  | 0.001     | <0.001                        | <0.001    |      | 0.001          | <0.001    | <0.001                        |      | 0.001             | <0.001    | <0.001                        |      |
| Free Cyanide                                    |                  | 0.001     | <0.001                        | <0.001    |      | 0.001          | <0.001    | <0.001                        |      | 0.001             | <0.001    | <0.001                        |      |
| Organic / Inorganic Carbon (mg/L)               |                  |           |                               |           |      |                |           |                               |      |                   |           |                               |      |
| Dissolved Organic Carbon                        |                  | 0.5       | 1.98                          | 2.04      | -3.0 | 0.5            | 2.09      | 1.79                          | 15   | 0.5               | 1.74      | 1.79                          | -2.8 |
| Total Organic Carbon                            |                  | 0.5       | 2.02                          | 1.96      | 3.0  | 0.5            | 1.78      | 1.80                          | -1.1 | 0.5               | 1.77      | 1.87                          | -5.5 |
| Plant Pigments (µg/L)                           |                  |           |                               |           |      |                |           |                               |      |                   |           |                               |      |
| Chlorophyll-a                                   |                  | 0.01      | 0.28                          | 0.21      | 29   | 0.01           | 0.70      | 0.80                          | -14  | 0.01              | 0.934     | 0.85                          | 10   |
| Total Metals (mg/L)                             |                  |           |                               |           |      |                |           |                               |      |                   |           |                               |      |
| Aluminum                                        |                  | 0.003     | 0.02                          | 0.02      | -2.9 | 0.003          | 0.01      | 0.01                          | 18   | 0.003             | 0.012     | 0.0112                        | 6.9  |
| Antimony                                        |                  | 0.0001    | <0.0001                       | <0.0001   |      | 0.0001         | <0.0001   | <0.0001                       |      | 0.0001            | <0.0001   | <0.0001                       |      |
| Arsenic                                         |                  | 0.0001    | 0.00013                       | 0.00013   | 0    | 0.0001         | 0.00018   | 0.00021                       | -15  | 0.0001            | 0.00018   | 0.00018                       | 0    |
| Barium                                          |                  | 0.00005   | 0.0033                        | 0.0034    | -3.3 | 0.00005        | 0.0035    | 0.0036                        | -2.9 | 0.00005           | 0.00372   | 0.00374                       | -0.5 |
| Beryllium                                       |                  | 0.00002   | <0.00002                      | <0.00002  |      | 0.00002        | <0.00002  | <0.00002                      |      | 0.00002           | <0.00002  | <0.00002                      |      |
| Bismuth                                         |                  | 0.00005   | <0.00005                      | <0.00005  |      | 0.00005        | <0.00005  | <0.00005                      |      | 0.00005           | <0.00005  | <0.00005                      |      |
| Boron                                           |                  | 0.01      | <0.01                         | <0.01     |      | 0.01           | <0.01     | <0.01                         |      | 0.01              | <0.01     | <0.01                         |      |
| Cadmium                                         |                  | 0.000005  | <0.000005                     | <0.000005 |      | 0.000005       | <0.000005 | <0.000005                     |      | 0.000005          | <0.000005 | <0.000005                     |      |
| Calcium                                         |                  | 0.05      | 1.37                          | 1.36      | 0.7  | 0.05           | 1.77      | 1.74                          | 1.7  | 0.05              | 1.95      | 1.93                          | 1.0  |
| Chromium                                        |                  | 0.0001    | <0.0001                       | 0.00012   |      | 0.0001         | 0.00010   | <0.0001                       |      | 0.0001            | 0.00011   | 0.00017                       | -43  |
| Cobalt                                          |                  | 0.0001    | <0.0001                       | <0.0001   |      | 0.0001         | <0.0001   | <0.0001                       |      | 0.0001            | <0.0001   | <0.0001                       |      |
| Copper                                          |                  | 0.0005    | <0.0005                       | <0.0005   |      | 0.0005         | <0.0005   | <0.0005                       |      | 0.0005            | <0.0005   | <0.0005                       |      |
| Iron                                            |                  | 0.01      | 0.037                         | 0.037     | 0    | 0.01           | 0.019     | 0.018                         | 5.4  | 0.01              | 0.024     | 0.021                         | 13   |
| Lead                                            |                  | 0.00005   | <0.00005                      | <0.00005  |      | 0.00005        | <0.00005  | <0.00005                      |      | 0.00005           | <0.00005  | <0.00005                      |      |
| Lithium                                         |                  | 0.001     | <0.001                        | <0.001    |      | 0.001          | <0.001    | <0.001                        |      | 0.001             | <0.001    | <0.001                        |      |
| Magnesium                                       |                  | 0.1       | 0.56                          | 0.55      | 1.8  | 0.1            | 0.65      | 0.64                          | 1.6  | 0.1               | 0.70      | 0.70                          | 0    |
| Manganese                                       |                  | 0.0001    | 0.0052                        | 0.0051    | 0.8  | 0.0001         | 0.0026    | 0.0027                        | -4.6 | 0.0001            | 0.00294   | 0.00262                       | 12   |
| Mercury                                         |                  | 0.000005  | <0.000005                     | <0.000005 |      | 0.000005       | <0.000005 | <0.000005                     |      | 0.000005          | <0.000005 | <0.000005                     |      |
| Molybdenum                                      |                  | 0.00005   | <0.00005                      | <0.00005  |      | 0.00005        | <0.00005  | <0.00005                      |      | 0.00005           | 0.000059  | <0.00005                      |      |
| Nickel                                          |                  | 0.0005    | 0.00067                       | 0.00067   | 0    | 0.0005         | 0.00059   | 0.00061                       | -3.3 | 0.0005            | 0.00061   | 0.00057                       | 6.8  |
| Phosphorus                                      |                  | 0.05      | <0.05                         | <0.05     |      | 0.05           | <0.05     | <0.05                         |      | 0.05              | <0.05     | <0.05                         |      |
| Potassium                                       |                  | 0.1       | 0.33                          | 0.33      | 0    | 0.1            | 0.37      | 0.37                          | 0    | 0.1               | 0.38      | 0.36                          | 5.4  |
| Selenium                                        |                  | 0.00005   | <0.00005                      | <0.00005  |      | 0.00005        | <0.00005  | <0.00005                      |      | 0.00005           | <0.00005  | <0.00005                      |      |
| Silicon                                         |                  | 0.05      | 0.31                          | 0.30      | 3.0  | 0.05           | 0.27      | 0.25                          | 5.0  | 0.05              | 0.263     | 0.259                         | 1.5  |
| Silver                                          |                  | 0.00001   | <0.00001                      | <0.00001  |      | 0.00001        | <0.00001  | <0.00001                      |      | 0.00001           | <0.00001  | <0.00001                      |      |
| Sodium                                          |                  | 0.05      | 0.47                          | 0.48      | -0.4 | 0.05           | 0.49      | 0.52                          | -4.6 | 0.05              | 0.55      | 0.52                          | 4.5  |
| Strontium                                       |                  | 0.0002    | 0.008                         | 0.008     | 0    | 0.0002         | 0.011     | 0.011                         | 0    | 0.0002            | 0.0128    | 0.0126                        | 1.6  |
| Sulfur                                          |                  | 0.5       | <0.5                          | <0.5      |      | 0.5            | <0.5      | 0.52                          |      | 0.5               | 0.53      | <0.5                          |      |
| Thallium                                        |                  | 0.00001   | <0.00001                      | <0.00001  |      | 0.00001        | <0.00001  | <0.00001                      |      | 0.00001           | <0.00001  | <0.00001                      |      |
| Tin                                             |                  | 0.0001    | <0.0001                       | <0.0001   |      | 0.0001         | <0.0001   | <0.0001                       |      | 0.0001            | <0.0001   | <0.0001                       |      |
| Titanium                                        |                  | 0.0003    | <0.0003                       | <0.0003   |      | 0.0003         | <0.0003   | <0.0003                       |      | 0.0003            | <0.0003   | <0.0003                       |      |
| Uranium                                         |                  | 0.00001   | 0.000043                      | 0.000042  | 2.4  | 0.00001        | 0.000035  | 0.000034                      | 2.9  | 0.00001           | 0.000035  | 0.000035                      | 0    |
| Vanadium                                        |                  | 0.0005    | <0.0005                       | <0.0005   |      | 0.0005         | <0.0005   | <0.0005                       |      | 0.0005            | <0.0005   | <0.0005                       |      |
| Zinc                                            |                  | 0.003     | <0.003                        | <0.003    |      | 0.003          | <0.003    | <0.003                        |      | 0.003             | <0.003    | <0.003                        |      |
| Zirconium                                       |                  | 0.0003    | <0.0003                       | <0.0003   |      | 0.0003         | <0.0003   | <0.0003                       |      | 0.0003            | <0.0003   | <0.0003                       |      |
| Dissolved Metals (mg/L)                         |                  |           |                               |           |      |                |           |                               |      |                   |           |                               |      |
| Aluminum                                        |                  | 0.001     | 0.012                         | 0.013     | -10  | 0.001          | 0.0048    | 0.0048                        | 0    | 0.001             | 0.0038    | 0.0037                        | 2.7  |
| Antimony                                        |                  | 0.0001    | <0.0001                       | <0.0001   |      | 0.0001         | <0.0001   | <0.0001                       |      | 0.0001            | <0.0001   | <0.0001                       |      |
| Arsenic                                         |                  | 0.0001    | 0.00012                       | 0.00011   | 8.7  | 0.0001         | 0.00      | 0.00020                       | -5.1 | 0.0001            | 0.00017   | 0.00017                       | 0    |
| Barium                                          |                  | 0.00005   | 0.0033                        | 0.0032    | 3.1  | 0.00005        | 0.00      | 0.0036                        | -2.9 | 0.00005           | 0.00373   | 0.00380                       | -1.9 |
| Beryllium                                       |                  | 0.00002   | 0.00                          | <0.00002  |      | 0.00002        | <0.00002  | <0.00002                      |      | 0.00002           | <0.00002  | <0.00002                      |      |
| Bismuth                                         |                  | 0.00005   | <0.00005                      | <0.00005  |      | 0.00005        | <0.00005  | <0.00005                      |      | 0.00005           | <0.00005  | <0.00005                      |      |
| Boron                                           |                  | 0.01      | <0.01                         |           |      |                |           |                               |      |                   |           |                               |      |

**Table A1-5.** Detection limits and travel blanks for water parameters from the Tributary sampling program, Whale Tail Pit Baseline, 2015.

| Analyte                                         | Month | Detection Limits |           | Travel Blanks <sup>1</sup> |
|-------------------------------------------------|-------|------------------|-----------|----------------------------|
|                                                 |       | August           | September | AUG TRAV-2                 |
|                                                 |       | Min              | Min       |                            |
| Physical Tests                                  |       |                  |           |                            |
| Conductivity (µS/cm)                            |       | 2                | 2         |                            |
| Hardness (mg/L)                                 |       | 0.5              | 0.5       | <0.5                       |
| pH (Laboratory)                                 |       | 0.1              | 0.1       |                            |
| Total Suspended Solids (mg/L)                   |       | 1                | 1         |                            |
| Total Dissolved Solids (mg/L)                   |       | 3                | 3         |                            |
| Turbidity (NTU)                                 |       | 0.1              | 0.1       |                            |
| Anions and Nutrients (mg/L)                     |       |                  |           |                            |
| Alkalinity, Bicarbonate (as CaCO <sub>3</sub> ) |       | 1                | 1         |                            |
| Alkalinity, Carbonate (as CaCO <sub>3</sub> )   |       | 1                | 1         |                            |
| Alkalinity, Hydroxide (as CaCO <sub>3</sub> )   |       | 1                | 1         |                            |
| Alkalinity, Total (as CaCO <sub>3</sub> )       |       | 1                | 1         |                            |
| Ammonia, Total (as N)                           |       | 0.005            | 0.005     | <0.005                     |
| Bromide (Br)                                    |       | 0.05             | 0.05      |                            |
| Chloride (Cl)                                   |       | 0.1              | 0.1       |                            |
| Fluoride (F)                                    |       | 0.02             | 0.02      |                            |
| Nitrate (as N)                                  |       | 0.005            | 0.005     |                            |
| Nitrite (as N)                                  |       | 0.001            | 0.001     |                            |
| Total Kjeldahl Nitrogen                         |       | 0.05             | 0.05      | <0.05                      |
| Orthophosphate-Dissolved (as P)                 |       | 0.001            | 0.001     |                            |
| Phosphorus (P)-Total Dissolved                  |       | 0.002            | 0.002     |                            |
| Phosphorus (P)-Total                            |       | 0.002            | -         | <0.002                     |
| Silicate (as SiO <sub>2</sub> )                 |       | 0.5              | 0.5       |                            |
| Sulfate (SO <sub>4</sub> )                      |       | 0.3              | 0.3       |                            |
| Cyanides (mg/L)                                 |       |                  |           |                            |
| Total Cyanide                                   |       | 0.001            | 0.001     | <0.001                     |
| Free Cyanide                                    |       | 0.001            | 0.001     | <0.001                     |
| Organic / Inorganic Carbon (mg/L)               |       |                  |           |                            |
| Dissolved Organic Carbon                        |       | 0.5              | 0.5       |                            |
| Total Organic Carbon                            |       | 0.5              | 0.5       | <0.5                       |
| Plant Pigments (µg/L)                           |       |                  |           |                            |
| Chlorophyll-a                                   |       |                  |           |                            |
| Total Metals (mg/L)                             |       |                  |           |                            |
| Aluminum                                        |       | 0.003            | 0.003     | <0.003                     |
| Antimony                                        |       | 0.0001           | 0.0001    | <0.0001                    |
| Arsenic                                         |       | 0.0001           | 0.0001    | <0.0001                    |
| Barium                                          |       | 0.00005          | 0.00005   | <0.00005                   |
| Beryllium                                       |       | 0.00002          | 0.00002   | <0.00002                   |
| Bismuth                                         |       | 0.00005          | 0.00005   | <0.00005                   |
| Boron                                           |       | 0.01             | 0.01      | <0.01                      |
| Cadmium                                         |       | 0.000005         | 0.000005  | <0.000005                  |
| Calcium                                         |       | 0.05             | 0.05      | <0.05                      |
| Chromium                                        |       | 0.0001           | 0.0001    | <0.0001                    |
| Cobalt                                          |       | 0.0001           | 0.0001    | <0.0001                    |
| Copper                                          |       | 0.0005           | 0.0005    | <0.0005                    |
| Iron                                            |       | 0.01             | 0.01      | <0.01                      |
| Lead                                            |       | 0.00005          | 0.00005   | <0.00005                   |
| Lithium                                         |       | 0.001            | 0.001     | <0.001                     |
| Magnesium                                       |       | 0.1              | 0.1       | <0.1                       |
| Manganese                                       |       | 0.0001           | 0.0001    | <0.0001                    |
| Mercury                                         |       | 0.000005         | 0.000005  | <0.000005                  |
| Molybdenum                                      |       | 0.00005          | 0.00005   | <0.00005                   |
| Nickel                                          |       | 0.0005           | 0.0005    | <0.0005                    |
| Phosphorus                                      |       | 0.05             | 0.05      | <0.05                      |
| Potassium                                       |       | 0.1              | 0.1       | <0.1                       |
| Selenium                                        |       | 0.00005          | 0.00005   | <0.00005                   |
| Silicon                                         |       | 0.05             | 0.05      | <0.05                      |
| Silver                                          |       | 0.00001          | 0.00001   | <0.00001                   |
| Sodium                                          |       | 0.05             | 0.05      | <0.05                      |
| Strontium                                       |       | 0.0002           | 0.0002    | <0.0002                    |
| Sulfur                                          |       | 0.5              | 0.5       | <0.5                       |
| Thallium                                        |       | 0.00001          | 0.00001   | <0.00001                   |
| Tin                                             |       | 0.0001           | 0.0001    | <0.0001                    |
| Titanium                                        |       | 0.0003           | 0.0003    | <0.0003                    |
| Uranium                                         |       | 0.00001          | 0.00001   | <0.00001                   |
| Vanadium                                        |       | 0.0005           | 0.0005    | <0.0005                    |
| Zinc                                            |       | 0.003            | 0.003     | <0.003                     |
| Zirconium                                       |       | 0.0003           | 0.0003    | <0.0003                    |



**Table A1-5.** Detection limits and travel blanks for water parameters from the Tributary sampling program, Whale Tail Pit Baseline, 2015.

| Analyte                 | Month | Detection Limits |           | Travel Blanks <sup>1</sup> |
|-------------------------|-------|------------------|-----------|----------------------------|
|                         |       | August           | September | AUG TRAV-2                 |
|                         |       | Min              | Min       |                            |
| Dissolved Metals (mg/L) |       |                  |           |                            |
| Aluminum                |       | 0.001            | 0.001     |                            |
| Antimony                |       | 0.0001           | 0.0001    |                            |
| Arsenic                 |       | 0.0001           | 0.0001    |                            |
| Barium                  |       | 0.00005          | 0.00005   |                            |
| Beryllium               |       | 0.00002          | 0.00002   |                            |
| Bismuth                 |       | 0.00005          | 0.00005   |                            |
| Boron                   |       | 0.01             | 0.01      |                            |
| Cadmium                 |       | 0.000005         | 0.000005  |                            |
| Calcium                 |       | 0.05             | 0.05      |                            |
| Chromium                |       | 0.0001           | 0.0001    |                            |
| Cobalt                  |       | 0.0001           | 0.0001    |                            |
| Copper                  |       | 0.0002           | 0.0002    |                            |
| Iron                    |       | 0.01             | 0.01      |                            |
| Lead                    |       | 0.00005          | 0.00005   |                            |
| Lithium                 |       | 0.001            | 0.001     |                            |
| Magnesium               |       | 0.1              | 0.1       |                            |
| Manganese               |       | 0.0001           | 0.0001    |                            |
| Mercury                 |       | 0.000005         | 0.000005  |                            |
| Molybdenum              |       | 0.00005          | 0.00005   |                            |
| Nickel                  |       | 0.0005           | 0.0005    |                            |
| Phosphorus              |       | 0.05             | 0.05      |                            |
| Potassium               |       | 0.1              | 0.1       |                            |
| Selenium                |       | 0.00005          | 0.00005   |                            |
| Silicon                 |       | 0.05             | 0.05      |                            |
| Silver                  |       | 0.00001          | 0.00001   |                            |
| Sodium                  |       | 0.05             | 0.05      |                            |
| Strontium               |       | 0.0002           | 0.0002    |                            |
| Sulfur                  |       | 0.5              | 0.5       |                            |
| Thallium                |       | 0.00001          | 0.00001   |                            |
| Tin                     |       | 0.0001           | 0.0001    |                            |
| Titanium                |       | 0.0003           | 0.0003    |                            |
| Uranium                 |       | 0.00001          | 0.00001   |                            |
| Vanadium                |       | 0.0005           | 0.0005    |                            |
| Zinc                    |       | 0.001            | 0.0010    |                            |
| Zirconium               |       | 0.0003           | 0.0003    |                            |

**Notes:**

<sup>1</sup> A travel blank was not submitted with the September samples.

**Bolded Equipment or Travel Blank values** concentrations exceeds laboratory MDLs but < 10 x MDL.

**Shaded Equipment or Travel Blank values** concentrations is > 10 x MDL.

*Italicized numbers are below detection limits.*





Table A1-6. Laboratory QA/QC results for water parameters from the Tributary sampling program, Whale Tail Pit Baseline, 2015.

| Month                                           |                   | August      |                                         |           |                                     | September      |                     |           |                                     |
|-------------------------------------------------|-------------------|-------------|-----------------------------------------|-----------|-------------------------------------|----------------|---------------------|-----------|-------------------------------------|
| ALS Report Numbers                              | Laboratory        | August MDLs | L1655097, L1658117, L1659270 & L1659279 |           |                                     | September MDLs | L1679754 & L1681194 |           |                                     |
|                                                 |                   |             | Original                                | Lab Dup   | RPD <sup>2</sup> /Diff <sup>3</sup> |                | Original            | Lab Dup   | RPD <sup>2</sup> /Diff <sup>3</sup> |
| Analyte                                         | DQOs <sup>1</sup> |             |                                         |           |                                     |                |                     |           |                                     |
| Physical Tests                                  |                   |             |                                         |           |                                     |                |                     |           |                                     |
| Conductivity (µS/cm)                            | 10                | 2           | 12.6                                    | 12.6      | 0.0                                 | 2              |                     |           |                                     |
| Hardness (mg/L)                                 | 25                | 0.5         |                                         |           |                                     | 0.5            |                     |           |                                     |
| pH (Laboratory)                                 | 0.3               | 0.1         | 6.74                                    | 6.75      | -0.01                               | 0.1            |                     |           |                                     |
| Total Suspended Solids (mg/L)                   | 20                | 1           |                                         |           |                                     | 1              |                     |           |                                     |
| Total Dissolved Solids (mg/L)                   | 20                | 3           |                                         |           |                                     | 3              |                     |           |                                     |
| Turbidity (NTU)                                 | 15                | 0.1         | 0.22                                    | 0.2       | 9.5                                 | 0.1            |                     |           |                                     |
| Anions and Nutrients (mg/L)                     |                   |             |                                         |           |                                     |                |                     |           |                                     |
| Alkalinity, Bicarbonate (as CaCO <sub>3</sub> ) | 20                | 1           |                                         |           |                                     | 1              |                     |           |                                     |
| Alkalinity, Carbonate (as CaCO <sub>3</sub> )   | 20                | 1           |                                         |           |                                     | 1              |                     |           |                                     |
| Alkalinity, Hydroxide (as CaCO <sub>3</sub> )   | 20                | 1           |                                         |           |                                     | 1              |                     |           |                                     |
| Alkalinity, Total (as CaCO <sub>3</sub> )       | 20                | 1           |                                         |           |                                     | 1              | 5.8                 | 5.3       | 9.0                                 |
| Ammonia, Total (as N)                           | 20                | 0.005       |                                         |           |                                     | 0.005          |                     |           |                                     |
| Bromide (Br)                                    | 20                | 0.05        | <0.05                                   | <0.05     |                                     | 0.05           | <0.05               | <0.05     |                                     |
| Chloride (Cl)                                   | 20                | 0.1         | 1.73                                    | 1.73      | 0.0                                 | 0.1            | 0.73                | 0.73      | 0.0                                 |
| Fluoride (F)                                    | 20                | 0.02        | 0.025                                   | 0.025     | 0.0                                 | 0.02           | 0.032               | 0.032     | 0.0                                 |
| Nitrate (as N)                                  | 20                | 0.005       | 0.0065                                  | 0.0061    | 6.3                                 | 0.005          | 0.0068              | 0.0067    | 1.5                                 |
| Nitrite (as N)                                  | 20                | 0.001       | <0.001                                  | <0.001    |                                     | 0.001          | <0.001              | <0.001    |                                     |
| Total Kjeldahl Nitrogen                         | 20                | 0.05        |                                         |           |                                     | 0.05           |                     |           |                                     |
| Orthophosphate (as P)                           | 20                | 0.001       |                                         |           |                                     | 0.001          |                     |           |                                     |
| Phosphorus (P)-Total Diss.                      | 20                | 0.002       | <0.002                                  | <0.002    |                                     | 0.002          |                     |           |                                     |
| Phosphorus (P)-Total                            | 20                | 0.002       | 0.0026                                  | 0.0021    | 0.0005                              | -              |                     |           |                                     |
| Silicate (as SiO <sub>2</sub> )                 | 20                | 0.5         | 0.88                                    | 0.87      | 1.14                                | 0.5            | 0.89                | 0.93      | -4.4                                |
| Sulfate (SO <sub>4</sub> )                      | 20                | 0.3         | 2.57                                    | 2.57      | 0.0                                 | 0.3            | 1.06                | 1.05      | 0.9                                 |
| Cyanides (mg/L)                                 |                   |             |                                         |           |                                     |                |                     |           |                                     |
| Total Cyanide                                   | 20                | 0.001       | <0.001                                  | <0.001    |                                     | 0.001          | <0.001              | <0.001    |                                     |
| Free Cyanide                                    | 20                | 0.001       | <0.001                                  | <0.001    |                                     | 0.001          | 0.001               | 0.001     | 0.0                                 |
| Organic / Inorganic Carbon (mg/L)               |                   |             |                                         |           |                                     |                |                     |           |                                     |
| Dissolved Organic Carbon                        | 20                | 0.5         | 1.92                                    | 1.77      | 8.1                                 | 0.5            | 2.76                | 2.62      | 5.2                                 |
| Total Organic Carbon                            | 20                | 0.5         | 1.9                                     | 1.66      | 13.5                                | 0.5            | 2.76                | 2.46      | 11.5                                |
| Plant Pigments (µg/L)                           |                   |             |                                         |           |                                     |                |                     |           |                                     |
| Chlorophyll-a                                   | 35                |             |                                         |           |                                     |                |                     |           |                                     |
| Total Metals (mg/L)                             |                   |             |                                         |           |                                     |                |                     |           |                                     |
| Aluminum                                        | 20                | 0.003       |                                         |           |                                     | 0.003          | 0.0087              | 0.0088    | -1.1                                |
| Antimony                                        | 20                | 0.0001      |                                         |           |                                     | 0.0001         | <0.0001             | <0.0001   |                                     |
| Arsenic                                         | 20                | 0.0001      |                                         |           |                                     | 0.0001         | 0.00027             | 0.00027   | 0.0                                 |
| Barium                                          | 20                | 0.00005     |                                         |           |                                     | 0.00005        | 0.00508             | 0.00518   | -1.9                                |
| Beryllium                                       | 20                | 0.00002     |                                         |           |                                     | 0.00002        | <0.00002            | <0.00002  |                                     |
| Bismuth                                         | 20                | 0.00005     |                                         |           |                                     | 0.00005        | <0.00005            | <0.00005  |                                     |
| Boron                                           | 20                | 0.01        |                                         |           |                                     | 0.01           | <0.01               | <0.01     |                                     |
| Cadmium                                         | 20                | 0.000005    |                                         |           |                                     | 0.000005       | <0.000005           | <0.000005 |                                     |
| Calcium                                         | 20                | 0.05        |                                         |           |                                     | 0.05           | 3.07                | 3.08      | -0.3                                |
| Chromium                                        | 20                | 0.0001      |                                         |           |                                     | 0.0001         | 0.00014             | 0.00012   | 15.4                                |
| Cobalt                                          | 20                | 0.0001      |                                         |           |                                     | 0.0001         | <0.0001             | <0.0001   |                                     |
| Copper                                          | 20                | 0.0005      |                                         |           |                                     | 0.0005         | <0.0005             | <0.0005   |                                     |
| Iron                                            | 20                | 0.01        |                                         |           |                                     | 0.01           | 0.02                | 0.021     | -4.9                                |
| Lead                                            | 20                | 0.00005     |                                         |           |                                     | 0.00005        | <0.00005            | <0.00005  |                                     |
| Lithium                                         | 20                | 0.001       |                                         |           |                                     | 0.001          | <0.001              | <0.001    |                                     |
| Magnesium                                       | 20                | 0.1         |                                         |           |                                     | 0.1            | 0.92                | 0.93      | -1.1                                |
| Manganese                                       | 20                | 0.0001      |                                         |           |                                     | 0.0001         | 0.00313             | 0.00323   | -3.1                                |
| Mercury                                         | 20                | 0.000005    | <0.000005                               | <0.000005 |                                     | 0.000005       |                     |           |                                     |
| Molybdenum                                      | 20                | 0.00005     |                                         |           |                                     | 0.00005        | <0.00005            | <0.00005  |                                     |
| Nickel                                          | 20                | 0.0005      |                                         |           |                                     | 0.0005         | 0.00103             | 0.00101   | 2.0                                 |
| Phosphorus                                      | 20                | 0.05        |                                         |           |                                     | 0.05           | <0.05               | <0.05     |                                     |
| Potassium                                       | 20                | 0.1         |                                         |           |                                     | 0.1            | 0.4                 | 0.4       | 0.0                                 |
| Selenium                                        | 20                | 0.00005     |                                         |           |                                     | 0.00005        | <0.00005            | <0.00005  |                                     |
| Silicon                                         | 20                | 0.05        |                                         |           |                                     | 0.05           | 0.266               | 0.273     | -2.6                                |
| Silver                                          | 20                | 0.00001     |                                         |           |                                     | 0.00001        | <0.00001            | <0.00001  |                                     |
| Sodium                                          | 20                | 0.05        |                                         |           |                                     | 0.05           | 0.574               | 0.571     | 0.5                                 |
| Strontium                                       | 20                | 0.0002      |                                         |           |                                     | 0.0002         | 0.0223              | 0.0221    | 0.9                                 |
| Sulfur                                          | 20                | 0.5         |                                         |           |                                     | 0.5            | 0.61                | 0.59      | 3.3                                 |
| Thallium                                        | 20                | 0.00001     |                                         |           |                                     | 0.00001        | <0.00001            | <0.00001  |                                     |
| Tin                                             | 20                | 0.0001      |                                         |           |                                     | 0.0001         | <0.0001             | <0.0001   |                                     |
| Titanium                                        | 20                | 0.0003      |                                         |           |                                     | 0.0003         | <0.0003             | <0.0003   |                                     |
| Uranium                                         | 20                | 0.00001     |                                         |           |                                     | 0.00001        | 0.000027            | 0.000026  | 3.8                                 |
| Vanadium                                        | 20                | 0.0005      |                                         |           |                                     | 0.0005         | <0.0005             | <0.0005   |                                     |
| Zinc                                            | 20                | 0.003       |                                         |           |                                     | 0.003          | <0.003              | <0.003    |                                     |
| Zirconium                                       | 20                | 0.0003      |                                         |           |                                     | 0.0003         | <0.0003             | <0.0003   |                                     |
| Dissolved Metals (mg/L)                         |                   |             |                                         |           |                                     |                |                     |           |                                     |
| Aluminum                                        | 20                | 0.001       | 0.0033                                  | 0.0025    | 0.0008                              | 0.001          |                     |           |                                     |
| Antimony                                        | 20                | 0.0001      | <0.0001                                 | <0.0001   |                                     | 0.0001         |                     |           |                                     |
| Arsenic                                         | 20                | 0.0001      | 0.0002                                  | 0.00019   | 5.1                                 | 0.0001         |                     |           |                                     |
| Barium                                          | 20                | 0.00005     | 0.00802                                 | 0.00809   | -0.9                                | 0.00005        |                     |           |                                     |
| Beryllium                                       | 20                | 0.00002     | <0.00002                                | <0.00002  |                                     | 0.00002        |                     |           |                                     |
| Bismuth                                         | 20                | 0.00005     | <0.00005                                | <0.00005  |                                     | 0.00005        |                     |           |                                     |
| Boron                                           | 20                | 0.01        | <0.01                                   | <0.01     |                                     | 0.01           |                     |           |                                     |
| Cadmium                                         | 20                | 0.000005    | <0.000005                               | <0.000005 |                                     | 0.000005       |                     |           |                                     |
| Calcium                                         | 20                | 0.05        | 2.15                                    | 2.14      | 0.5                                 | 0.05           |                     |           |                                     |
| Chromium                                        | 20                | 0.0001      | <0.0001                                 | <0.0001   |                                     | 0.0001         |                     |           |                                     |
| Cobalt                                          | 20                | 0.0001      | <0.0001                                 | <0.0001   |                                     | 0.0001         |                     |           |                                     |
| Copper                                          | 20                | 0.0002      | 0.00059                                 | 0.00059   | 0.0                                 | 0.0002         |                     |           |                                     |
| Iron                                            | 20                | 0.01        | <0.01                                   | <0.01     |                                     | 0.01           |                     |           |                                     |
| Lead                                            | 20                | 0.00005     | <0.00005                                | <0.00005  |                                     | 0.00005        |                     |           |                                     |
| Lithium                                         | 20                | 0.001       | <0.001                                  | <0.001    |                                     | 0.001          |                     |           |                                     |
| Magnesium                                       | 20                | 0.1         | 0.74                                    | 0.72      | 2.7                                 | 0.1            |                     |           |                                     |
| Manganese                                       | 20                | 0.0001      | 0.00094                                 | 0.00094   | 0.0                                 | 0.0001         |                     |           |                                     |
| Mercury                                         | 20                | 0.000005    | <0.000005                               | <0.000005 |                                     | 0.000005       | <0.000005           | <0.000005 |                                     |
| Molybdenum                                      | 20                | 0.00005     | <0.00005                                | <0.00005  |                                     | 0.00005        |                     |           |                                     |
| Nickel                                          | 20                | 0.0005      | 0.00052                                 | <0.0005   |                                     | 0.0005         |                     |           |                                     |
| Phosphorus                                      | 20                | 0.05        | <0.05                                   | <0.05     |                                     | 0.05           |                     |           |                                     |
| Potassium                                       | 20                | 0.1         | 0.55                                    | 0.54      | 1.8                                 | 0.1            |                     |           |                                     |
| Selenium                                        | 20                | 0.00005     | <0.00005                                | <0.00005  |                                     | 0.00005        |                     |           |                                     |
| Silicon                                         | 20                | 0.05        | 0.39                                    | 0.387     | 0.8                                 | 0.05           |                     |           |                                     |
| Silver                                          | 20                | 0.00001     | <0.00001                                | <0.00001  |                                     | 0.00001        |                     |           |                                     |
| Sodium                                          | 20                | 0.05        | 0.658                                   | 0.662     | -0.6                                | 0.05           |                     |           |                                     |
| Strontium                                       | 20                | 0.0002      | 0.00868                                 | 0.00864   | 0.5                                 | 0.0002         |                     |           |                                     |
| Sulfur                                          | 20                | 0.5         | 0.89                                    | 0.9       | -1.1                                | 0.5            |                     |           |                                     |
| Thallium                                        | 20                | 0.00001     | <0.00001                                | <0.00001  |                                     | 0.00001        |                     |           |                                     |
| Tin                                             | 20                | 0.0001      | 0.00013                                 | 0.00012   | 8.0                                 | 0.0001         |                     |           |                                     |
| Titanium                                        | 20                | 0.0003      | <0.0003                                 | <0.0003   |                                     | 0.0003         |                     |           |                                     |
| Uranium                                         | 20                | 0.00001     | 0.000018                                | 0.000017  | 5.7                                 | 0.00001        |                     |           |                                     |
| Vanadium                                        | 20                | 0.0005      | <0.0005                                 | <0.0005   |                                     | 0.0005         |                     |           |                                     |
| Zinc                                            | 20                | 0.001       | <0.001                                  | <0.001    |                                     | 0.001          |                     |           |                                     |
| Zirconium                                       | 20                | 0.0003      | <0.0003                                 | <0.0003   |                                     | 0.0003         |                     |           |                                     |

Notes:

<sup>1</sup> DQO = Data quality objectives (i.e., RPD limits) for laboratory duplicate samples. DQOs shown as percentages except for pH (units).

<sup>2</sup> RPD = Relative Percent Difference (%) = ((original - duplicate) / (original + duplicate)/2) x 100.

RPDs have not been calculated for cases where one of the samples is below detection and the other is not and in cases where both are below detection. RPD has been left blank.

<sup>3</sup> Diff = The difference between the replicate values in concentration units. Used in cases where the concentration is <10x the MDL.

For low level results, the DQO is a concentration difference between the two measurements of < 2x the MDL (unless the RPD is met).

|                    |                                                  |
|--------------------|--------------------------------------------------|
| <b>Bolded RPDs</b> | RPD values exceed laboratory DQO but < 10 x MDL. |
| <b>Shaded RPD</b>  | RPD values exceed laboratory DQO and > 10 x MDL. |

Blank cells indicate no laboratory duplicate analysis was conducted.

*Italicized numbers are below detection limits.*



Table A1-7. Field duplicate QA/QC results from the Tributary water sampling program, Whale Tail Pit Baseline, 2015.

| Analyte                                         | Month<br>Station | August         |           |             | September         |          |             |           |       |
|-------------------------------------------------|------------------|----------------|-----------|-------------|-------------------|----------|-------------|-----------|-------|
|                                                 |                  | August<br>MDLs | A8-A7     |             | September<br>MDLs | A1-DS1   |             |           |       |
|                                                 |                  |                | Original  | E3-E2 (Dup) |                   | Original | E5-E4 (Dup) | RPD       |       |
| Physical Tests                                  |                  |                |           |             |                   |          |             |           |       |
| Conductivity (µS/cm)                            |                  | 2              | 23        | 23          | 0.9               | 2        | 21          | 21        | 1.9   |
| Hardness (mg/L)                                 |                  | 0.5            | 8.2       | 8.4         | -2.2              | 0.5      | 7.3         | 7.4       | -0.4  |
| pH (Laboratory)                                 |                  | 0.1            | 7.0       | 7.0         | -0.3              | 0.1      | 6.9         | 6.9       | -0.3  |
| Total Suspended Solids (mg/L)                   |                  | 1              | <1.0      | <1.0        |                   | 1        | <1.0        | 1.1       |       |
| Total Dissolved Solids (mg/L)                   |                  | 3              | 19        | 20          | -2.1              | 3        | 14          | 16        | -10.2 |
| Turbidity (NTU)                                 |                  | 0.1            | 0.24      | 0.27        | -11.8             | 0.1      | 0.81        | 0.77      | 5     |
| Anions and Nutrients (mg/L)                     |                  |                |           |             |                   |          |             |           |       |
| Alkalinity, Bicarbonate (as CaCO <sub>3</sub> ) |                  | 1              | 6.4       | 6.3         | 1.6               | 1        | 6.3         | 5.8       | 8.3   |
| Alkalinity, Carbonate (as CaCO <sub>3</sub> )   |                  | 1              | <1.0      | <1.0        |                   | 1        | <1.0        | <1.0      |       |
| Alkalinity, Hydroxide (as CaCO3)                |                  | 1              | <1.0      | <1.0        |                   | 1        | <1.0        | <1.0      |       |
| Alkalinity, Total (as CaCO <sub>3</sub> )       |                  | 1              | 6.4       | 6.3         | 1.6               | 1        | 6.3         | 5.8       | 8.3   |
| Ammonia, Total (as N)                           |                  | 0.005          | <0.005    | 0.0061      |                   | 0.005    | <0.005      | <0.005    |       |
| Bromide (Br)                                    |                  | 0.05           | <0.05     | <0.05       |                   | 0.05     | <0.05       | <0.05     |       |
| Chloride (Cl)                                   |                  | 0.1            | 0.94      | 0.94        | 0.0               | 0.1      | 0.95        | 0.96      | -1.0  |
| Fluoride (F)                                    |                  | 0.02           | 0.025     | 0.025       | 0.0               | 0.02     | 0.028       | 0.027     | 3.6   |
| Nitrate (as N)                                  |                  | 0.005          | <0.005    | <0.005      |                   | 0.005    | 0.011       | 0.011     | -4.6  |
| Nitrite (as N)                                  |                  | 0.001          | <0.001    | <0.001      |                   | 0.001    | <0.001      | <0.001    |       |
| Total Kjeldahl Nitrogen                         |                  | 0.05           | 0.15      | 0.13        | 12.8              | 0.05     | 0.18        | 0.12      | 43.5  |
| Orthophosphate-Dissolved (as P)                 |                  | 0.001          | <0.001    | <0.001      |                   | 0.001    | 0.0011      | <0.001    |       |
| Phosphorus (P)-Total Dissolved                  |                  | 0.002          | <0.002    | <0.002      |                   | 0.002    | 0.0026      | <0.002    |       |
| Phosphorus (P)-Total                            |                  | 0.002          | <0.002    | 0.0048      |                   | -        |             |           |       |
| Silicate (as SiO <sub>2</sub> )                 |                  | 0.5            | 0.87      | 0.88        | -1.1              | 0.5      | 1.0         | 0.89      | 12.6  |
| Sulfate (SO <sub>4</sub> )                      |                  | 0.3            | 2.6       | 2.6         | 0.0               | 0.3      | 2.0         | 2.1       | -2.0  |
| Cyanides (mg/L)                                 |                  |                |           |             |                   |          |             |           |       |
| Total Cyanide                                   |                  | 0.001          | <0.001    | <0.001      |                   | 0.001    | <0.001      | <0.001    |       |
| Free Cyanide                                    |                  | 0.001          | <0.001    | <0.001      |                   | 0.001    | <0.001      | <0.001    |       |
| Organic / Inorganic Carbon (mg/L)               |                  |                |           |             |                   |          |             |           |       |
| Dissolved Organic Carbon                        |                  | 0.5            | 1.7       | 1.9         | -6.7              | 0.5      | 1.9         | 2.2       | -13.9 |
| Total Organic Carbon                            |                  | 0.5            | 1.6       | 1.5         | 11.0              | 0.5      | 1.8         | 1.9       | -4.4  |
| Plant Pigments (µg/L)                           |                  |                |           |             |                   |          |             |           |       |
| Chlorophyll-a                                   |                  | 0              |           |             |                   | 0        |             |           |       |
| Total Metals (mg/L)                             |                  |                |           |             |                   |          |             |           |       |
| Aluminum                                        |                  | 0.003          | 0.0064    | 0.0060      | 6.5               | 0.003    | 0.030       | 0.024     | 24.4  |
| Antimony                                        |                  | 0.0001         | <0.0001   | <0.0001     |                   | 0.0001   | <0.0001     | <0.0001   |       |
| Arsenic                                         |                  | 0.0001         | 0.00023   | 0.00023     | 0.0               | 0.0001   | 0.00011     | 0.00011   | 0.0   |
| Barium                                          |                  | 0.00005        | 0.0047    | 0.0048      | -0.4              | 0.00005  | 0.0038      | 0.0036    | 3.5   |
| Beryllium                                       |                  | 0.00002        | <0.00002  | <0.00002    |                   | 0.00002  | <0.00002    | <0.00002  |       |
| Bismuth                                         |                  | 0.00005        | <0.00005  | <0.00005    |                   | 0.00005  | <0.00005    | <0.00005  |       |
| Boron                                           |                  | 0.01           | <0.01     | <0.01       |                   | 0.01     | <0.01       | <0.01     |       |
| Cadmium                                         |                  | 0.000005       | <0.000005 | <0.000005   |                   | 0.000005 | <0.000005   | <0.000005 |       |
| Calcium                                         |                  | 0.05           | 2.1       | 2.2         | -5.6              | 0.05     | 1.9         | 1.9       | -0.5  |
| Chromium                                        |                  | 0.0001         | <0.0001   | <0.0001     |                   | 0.0001   | 0.00014     | 0.00011   | 24.0  |
| Cobalt                                          |                  | 0.0001         | <0.0001   | <0.0001     |                   | 0.0001   | <0.0001     | <0.0001   |       |
| Copper                                          |                  | 0.0005         | <0.0005   | <0.0005     |                   | 0.0005   | <0.0005     | <0.0005   |       |
| Iron                                            |                  | 0.01           | 0.017     | 0.016       | 6.1               | 0.01     | 0.070       | 0.062     | 12.1  |
| Lead                                            |                  | 0.00005        | <0.00005  | <0.00005    |                   | 0.00005  | <0.00005    | 0.00006   |       |
| Lithium                                         |                  | 0.001          | <0.001    | <0.001      |                   | 0.001    | <0.001      | <0.001    |       |
| Magnesium                                       |                  | 0.1            | 0.72      | 0.80        | -10.5             | 0.1      | 0.59        | 0.61      | -3.3  |
| Manganese                                       |                  | 0.0001         | 0.0023    | 0.0018      | 22.8              | 0.0001   | 0.0015      | 0.0013    | 20.8  |
| Mercury                                         |                  | 0.000005       | <0.000005 | <0.000005   |                   | 0.000005 | <0.000005   | <0.000005 |       |
| Molybdenum                                      |                  | 0.00005        | <0.00005  | <0.00005    |                   | 0.00005  | <0.00005    | <0.00005  |       |
| Nickel                                          |                  | 0.0005         | 0.00054   | 0.00052     | 3.8               | 0.0005   | <0.0005     | <0.0005   |       |
| Phosphorus                                      |                  | 0.05           | <0.05     | <0.05       |                   | 0.05     | <0.05       | <0.05     |       |
| Potassium                                       |                  | 0.1            | 0.53      | 0.61        | -14.0             | 0.1      | 0.45        | 0.47      | -4.3  |
| Selenium                                        |                  | 0.00005        | <0.00005  | <0.00005    |                   | 0.00005  | <0.00005    | <0.00005  |       |
| Silicon                                         |                  | 0.05           | 0.37      | 0.40        | -7.5              | 0.05     | 0.49        | 0.47      | 2.7   |
| Silver                                          |                  | 0.00001        | <0.00001  | <0.00001    |                   | 0.00001  | <0.00001    | <0.00001  |       |
| Sodium                                          |                  | 0.05           | 0.54      | 0.54        | 0.7               | 0.05     | 0.61        | 0.66      | -8.7  |
| Strontium                                       |                  | 0.0002         | 0.0090    | 0.0090      | -0.4              | 0.0002   | 0.0081      | 0.0081    | 0.5   |
| Sulfur                                          |                  | 0.5            | 0.91      | 1.0         | -9.4              | 0.5      | 0.67        | 0.68      | -1.5  |
| Thallium                                        |                  | 0.00001        | <0.00001  | <0.00001    |                   | 0.00001  | <0.00001    | <0.00001  |       |
| Tin                                             |                  | 0.0001         | <0.0001   | <0.0001     |                   | 0.0001   | <0.0001     | <0.0001   |       |
| Titanium                                        |                  | 0.0003         | <0.0003   | <0.0003     |                   | 0.0003   | 0.00081     | 0.00068   | 17.4  |
| Uranium                                         |                  | 0.00001        | 0.00002   | 0.00002     | 0.0               | 0.00001  | 0.00003     | 0.00003   | 12.9  |
| Vanadium                                        |                  | 0.0005         | <0.0005   | <0.0005     |                   | 0.0005   | <0.0005     | <0.0005   |       |
| Zinc                                            |                  | 0.003          | <0.003    | <0.003      |                   | 0.003    | <0.003      | <0.003    |       |
| Zirconium                                       |                  | 0.0003         | <0.0003   | <0.0003     |                   | 0.0003   | <0.0003     | <0.0003   |       |
| Dissolved Metals (mg/L)                         |                  |                |           |             |                   |          |             |           |       |
| Aluminum                                        |                  | 0.001          | 0.0027    | 0.0033      | -20.0             | 0.001    | 0.0072      | 0.0076    | -5    |
| Antimony                                        |                  | 0.0001         | <0.0001   | <0.0001     |                   | 0.0001   | <0.0001     | <0.0001   |       |
| Arsenic                                         |                  | 0.0001         | 0.00020   | 0.00020     | 0.0               | 0.0001   | 0.00010     | <0.0001   |       |
| Barium                                          |                  | 0.00005        | 0.0075    | 0.0080      | -7.0              | 0.00005  | 0.0058      | 0.0044    | 27.8  |
| Beryllium                                       |                  | 0.00002        | <0.00002  | <0.00002    |                   | 0.00002  | <0.00002    | <0.00002  |       |
| Bismuth                                         |                  | 0.00005        | <0.00005  | <0.00005    |                   | 0.00005  | <0.00005    | <0.00005  |       |
| Boron                                           |                  | 0.01           | <0.01     | <0.01       |                   | 0.01     | <0.01       | <0.01     |       |
| Cadmium                                         |                  | 0.000005       | <0.000005 | <0.000005   |                   | 0.000005 | <0.000005   | <0.000005 |       |
| Calcium                                         |                  | 0.05           | 2.1       | 2.2         | -1.9              | 0.05     | 1.9         | 1.9       | 0.0   |
| Chromium                                        |                  | 0.0001         | <0.0001   | <0.0001     |                   | 0.0001   | <0.0001     | <0.0001   |       |
| Cobalt                                          |                  | 0.0001         | <0.0001   | <0.0001     |                   | 0.0001   | <0.0001     | <0.0001   |       |
| Copper                                          |                  | 0.0002         | 0.00063   | 0.00059     | 6.6               | 0.0002   | 0.00056     | 0.00048   | 15.4  |
| Iron                                            |                  | 0.01           | <0.01     | <0.01       |                   | 0.01     | 0.021       | 0.021     | 0.0   |
| Lead                                            |                  | 0.00005        | <0.00005  | <0.00005    |                   | 0.00005  | <0.00005    | <0.00005  |       |
| Lithium                                         |                  | 0.001          | <0.001    | <0.001      |                   | 0.001    | <0.001      | <0.001    |       |
| Magnesium                                       |                  | 0.1            | 0.72      | 0.74        | -2.7              | 0.1      | 0.62        | 0.62      | 0.0   |
| Manganese                                       |                  | 0.0001         | 0.00096   | 0.00094     | 2.1               | 0.0001   | 0.00083     | 0.00088   | -5.8  |
| Mercury                                         |                  | 0.000005       | <0.000005 | <0.000005   |                   | 0.000005 | <0.000005   | <0.000005 |       |
| Molybdenum                                      |                  | 0.00005        | <0.00005  | <0.00005    |                   | 0.00005  | <0.00005    | <0.00005  |       |
| Nickel                                          |                  | 0.0005         | 0.00052   | 0.00052     | 0.0               | 0.0005   | <0.0005     | <0.0005   |       |
| Phosphorus                                      |                  | 0.05           | <0.05     | <0.05       |                   | 0.05     | <0.05       | <0.05     |       |
| Potassium                                       |                  | 0.1            | 0.54      | 0.55        | -1.8              | 0.1      | 0.45        | 0.48      | -6    |
| Selenium                                        |                  | 0.00005        | <0.00005  | <0.00005    |                   | 0.00005  | <0.00005    | <0.00005  |       |
| Silicon                                         |                  | 0.05           | 0.37      | 0.39        | -5.5              | 0.05     | 0.46        | 0.46      | 0.2   |





**Table A1-7.** Field duplicate QA/QC results from the Tributary water sampling program, Whale Tail Pit Baseline, 2015.

| Analyte   | Month<br>Station | August  |          |             | September |          |             |      |
|-----------|------------------|---------|----------|-------------|-----------|----------|-------------|------|
|           |                  | August  | A8-A7    |             | September | A1-DS1   |             |      |
|           |                  | MDLs    | Original | E3-E2 (Dup) | MDLs      | Original | E5-E4 (Dup) | RPD  |
| Silver    |                  | 0.00001 | <0.00001 | <0.00001    | 0.00001   | <0.00001 | <0.00001    |      |
| Sodium    |                  | 0.05    | 0.63     | 0.66        | 0.05      | 0.74     | 0.75        | -1.6 |
| Strontium |                  | 0.0002  | 0.0087   | 0.0087      | 0.0002    | 0.0080   | 0.0081      | 0    |
| Sulfur    |                  | 0.5     | 0.89     | 0.89        | 0.5       | 0.71     | 0.69        | 3    |
| Thallium  |                  | 0.00001 | <0.00001 | <0.00001    | 0.00001   | <0.00001 | <0.00001    |      |
| Tin       |                  | 0.0001  | 0.00012  | 0.00013     | 0.0001    | <0.0001  | <0.0001     |      |
| Titanium  |                  | 0.0003  | <0.0003  | <0.0003     | 0.0003    | <0.0003  | <0.0003     |      |
| Uranium   |                  | 0.00001 | 0.00002  | 0.00002     | 0.00001   | 0.00002  | 0.00002     | 4    |
| Vanadium  |                  | 0.0005  | <0.0005  | <0.0005     | 0.0005    | <0.0005  | <0.0005     |      |
| Zinc      |                  | 0.001   | <0.001   | <0.001      | 0.001     | 0.0012   | <0.001      |      |
| Zirconium |                  | 0.0003  | <0.0003  | <0.0003     | 0.0003    | <0.0003  | <0.0003     |      |

**Notes:**

RPD = Relative Percent Difference (%) = ((original - duplicate) / (original + duplicate)/2) x 100.

RPDs have not been calculated for cases where one of the samples is below detection and the other is not and in cases where both are below detection. RPD has been left blank.

The data quality objective (DQO) for field duplicates is an RPD < 50%.

|                    |                                       |
|--------------------|---------------------------------------|
| <b>Bolded RPDs</b> | RPD values exceed 50% but < 10 x MDL. |
| <b>Shaded RPD</b>  | RPD values exceed 50% and > 10 x MDL. |

*Italicized numbers are below detection limits.*



Table A1-8. QA/QC data for sediment metals analyses, Whale Tail Baseline, 2015.

| Analyte                       | Laboratory<br>DQOs <sup>1,2</sup> | MDLs  | Field Duplicates |             |                  |                 |             |                  |           |             |                  | Laboratory Duplicates |             |                  |                    |                         |            |                    |                         |            |                     |                         |            |  |
|-------------------------------|-----------------------------------|-------|------------------|-------------|------------------|-----------------|-------------|------------------|-----------|-------------|------------------|-----------------------|-------------|------------------|--------------------|-------------------------|------------|--------------------|-------------------------|------------|---------------------|-------------------------|------------|--|
|                               |                                   |       | Whale Tail Lake  |             |                  | Whale Tail Lake |             |                  | Nemo Lake |             |                  | Mammoth Lake          |             |                  | WTN-1 (L1669874-6) |                         |            | WTN-4 (L1669874-9) |                         |            | MAM-5 (L1669874-22) |                         |            |  |
|                               |                                   |       | WTN-3            | Field DUP-1 | RPD <sup>3</sup> | WTS-1           | Field DUP-2 | RPD <sup>3</sup> | NEM-3     | Field DUP-3 | RPD <sup>3</sup> | MAM-2                 | Field DUP-4 | RPD <sup>3</sup> | Original           | Laboratory<br>Duplicate | RPD<br>(%) | Original           | Laboratory<br>Duplicate | RPD<br>(%) | Original            | Laboratory<br>Duplicate | RPD<br>(%) |  |
|                               |                                   |       | 22-Aug-15        | 21-Aug-15   | (%)              | 21-Aug-05       | 21-Aug-05   | (%)              | 23-Aug-15 | 23-Aug-15   | (%)              | 24-Aug-15             | 24-Aug-15   | (%)              |                    |                         |            |                    |                         |            |                     |                         |            |  |
| Physical & Organic Parameters |                                   |       |                  |             |                  |                 |             |                  |           |             |                  |                       |             |                  |                    |                         |            |                    |                         |            |                     |                         |            |  |
| Moisture (%)                  | 20                                | 0.25  | 80.9             | 84.3        | -4.1             | 85.5            | 85.6        | -0.1             | 90.9      | 91.3        | -0.4             | 90.7                  | 90.4        | 0.3              |                    |                         |            |                    |                         |            |                     |                         |            |  |
| pH                            | 0.30                              | 0.10  | 5.71             | 5.47        | 4.3              | 5.48            | 5.83        | -6.2             | 6.32      | 6.37        | -0.8             | 5.98                  | 6.27        | -4.7             | 6.29               | 6.36                    | 0.07       |                    |                         |            | 5.4                 | 5.55                    | 0.15       |  |
| Total Organic Carbon (% dw)   | 30                                | 0.10  | 4.65             | 4.61        | 0.9              | 5.29            | 5.33        | -0.8             | 11.10     | 9.18        | 19               | 11.70                 | 11.70       | 0.0              |                    |                         |            | 5.72               | 5.73                    | -0.2       |                     |                         |            |  |
| Particle Size                 |                                   |       |                  |             |                  |                 |             |                  |           |             |                  |                       |             |                  |                    |                         |            |                    |                         |            |                     |                         |            |  |
| % Gravel (>2mm)               | 5                                 | 0.10  | <0.10            | 0.34        |                  | <0.10           | <0.10       |                  | <0.10     | <0.10       |                  | <0.10                 | <0.10       |                  |                    |                         |            | <0.10              | <0.10                   |            |                     |                         |            |  |
| % Sand (2.00mm - 0.063mm)     | 5                                 | 0.10  | 4.68             | 4.54        | 3.0              | 5.4             | 5.1         | 5.5              | 19.2      | 17.2        | 11.0             | 2.5                   | 0.5         | 132.2            |                    |                         |            | 3.18               | 2.89                    | 0.3        |                     |                         |            |  |
| % Silt (0.063mm - 4µm)        | 5                                 | 0.10  | 82.6             | 82.8        | -0.2             | 82.0            | 82.8        | -1.0             | 76.4      | 78.7        | -3.0             | 92.4                  | 86.1        | 7.1              |                    |                         |            | 84.6               | 89                      | 4.4        |                     |                         |            |  |
| % Clay (<4µm)                 | 5                                 | 0.10  | 12.6             | 12.3        | 2.4              | 12.6            | 12.0        | 4.9              | 4.4       | 4.2         | 5.6              | 5.1                   | 13.4        | -89.3            |                    |                         |            | 12.2               | 8.08                    | 4.1        |                     |                         |            |  |
| Total Metals (mg/kg dw)       |                                   |       |                  |             |                  |                 |             |                  |           |             |                  |                       |             |                  |                    |                         |            |                    |                         |            |                     |                         |            |  |
| Aluminum                      | 40                                | 50    | 14800            | 14300       | 3.4              | 14700           | 14500       | 1.4              | 10800     | 10300       | 4.7              | 18600                 | 17200       | 7.8              | 13900              | 13500                   | 2.9        |                    |                         |            | 18400               | 19500                   | -5.8       |  |
| Antimony                      | 30                                | 0.10  | 0.25             | 0.22        | 12.8             | 0.23            | 0.21        | 9.1              | 0.35      | 0.38        | -8.2             | 0.32                  | 0.33        | -3.1             | 0.25               | 0.33                    | -27.6      |                    |                         |            | 0.26                | 0.27                    | -3.8       |  |
| Arsenic                       | 30                                | 0.100 | 568.0            | 557.0       | 2.0              | 102.0           | 96.7        | 5.3              | 46.4      | 47.2        | -1.7             | 143.0                 | 138.0       | 3.6              | 897                | 859                     | 4.3        |                    |                         |            | 70                  | 71.2                    | -1.7       |  |
| Barium                        | 40                                | 0.50  | 97               | 92          | 5.5              | 113             | 112         | 0.9              | 91        | 92          | -1.0             | 142                   | 138         | 2.9              | 212                | 214                     | -0.9       |                    |                         |            | 136                 | 140                     | -2.9       |  |
| Beryllium                     | 30                                | 0.10  | 1.27             | 1.09        | 15.3             | 1.35            | 1.26        | 6.9              | 0.59      | 0.68        | -14              | 1.29                  | 1.34        | -3.8             | 1.22               | 1.17                    | 4.2        |                    |                         |            | 1.2                 | 1.25                    | -4.1       |  |
| Bismuth                       | 30                                | 0.20  | 0.47             | 0.40        | 16.1             | 0.52            | 0.49        | 5.9              | 0.21      | 0.25        | -17              | 0.45                  | 0.45        | 0.0              | 0.45               | 0.44                    | 2.2        |                    |                         |            | 0.43                | 0.42                    | 2.4        |  |
| Cadmium                       | 30                                | 5.0   | 0.151            | 0.137       | 9.7              | 0.410           | 0.383       | 6.8              | 0.221     | 0.273       | -21              | 0.255                 | 0.258       | -1.2             | 0.315              | 0.319                   | -1.3       |                    |                         |            | 0.296               | 0.278                   | 6.3        |  |
| Calcium                       | 30                                | 50    | 2050             | 1720        | 17.5             | 2300            | 2270        | 1.3              | 3690      | 3620        | 1.9              | 3370                  | 3370        | 0.0              | 1950               | 2010                    | -3.0       |                    |                         |            | 2780                | 2920                    | -4.9       |  |
| Chromium                      | 30                                | 0.50  | 94.5             | 92.4        | 2.2              | 63              | 63          | 1.3              | 110.0     | 113.0       | -2.7             | 162.0                 | 158.0       | 2.5              | 84.4               | 82.6                    | 2.2        |                    |                         |            | 158                 | 162                     | -2.5       |  |
| Cobalt                        | 30                                | 0.10  | 20.5             | 19.7        | 4.0              | 16.1            | 15.8        | 1.9              | 8.0       | 8.1         | -1.2             | 11.5                  | 11.4        | 0.9              | 24                 | 23.9                    | 0.4        |                    |                         |            | 13.3                | 13.4                    | -0.7       |  |
| Copper                        | 30                                | 0.50  | 35.5             | 33.6        | 5.5              | 37.9            | 36.5        | 3.8              | 36.4      | 39.7        | -8.7             | 63.9                  | 63.1        | 1.3              | 37.3               | 36.4                    | 2.4        |                    |                         |            | 60.5                | 60.5                    | 0.0        |  |
| Iron                          | 30                                | 50    | 127000           | 122000      | 4.0              | 69000           | 64300       | 7.1              | 23800     | 24500       | -2.9             | 43400                 | 43800       | -1               | 151000             | 143000                  | 5.4        |                    |                         |            | 33000               | 34700                   | -5.0       |  |
| Lead                          | 40                                | 0.5   | 11.7             | 10.4        | 11.8             | 13.7            | 13.3        | 3.0              | 8.4       | 9.4         | -12              | 16.5                  | 16.2        | 1.8              | 10.9               | 10.8                    | 0.9        |                    |                         |            | 16.8                | 16.6                    | 1.2        |  |
| Lithium                       | 30                                | 2.0   | 14.0             | 10.5        | 28.6             | 13.1            | 11.2        | 16               | 10.0      | 12.4        | -21              | 17.1                  | 18.0        | -5               | 13.4               | 12.9                    | 3.8        |                    |                         |            | 15.1                | 15.8                    | -4.5       |  |
| Magnesium                     | 30                                | 20    | 6300             | 6000        | 4.9              | 5690            | 5620        | 1.2              | 6590      | 6610        | -0.3             | 9010                  | 8570        | 5.0              | 5800               | 5640                    | 2.8        |                    |                         |            | 8900                | 9190                    | -3.2       |  |
| Manganese                     | 30                                | 1.0   | 2200             | 1960        | 11.5             | 2010            | 1850        | 8.3              | 302       | 304         | -0.7             | 414                   | 389         | 6                | 6660               | 6950                    | -4.3       |                    |                         |            | 408                 | 417                     | -2.2       |  |
| Mercury                       | 40                                | 0.005 | 0.0612           | 0.0542      | 12.1             | 0.0764          | 0.0746      | 2.4              | 0.0289    | 0.0304      | -5               | 0.0991                | 0.0874      | 13               | 0.0742             | 0.0704                  | 5.3        |                    |                         |            | 0.0955              | 0.0965                  | -1.0       |  |
| Molybdenum                    | 40                                | 0.10  | 5.33             | 4.88        | 8.8              | 3.26            | 3.21        | 1.5              | 2.50      | 2.70        | -7.7             | 3.73                  | 3.64        | 2.4              | 6.27               | 6.21                    | 1.0        |                    |                         |            | 2.89                | 3                       | -3.7       |  |
| Nickel                        | 30                                | 0.5   | 59.9             | 57.8        | 3.6              | 73.9            | 71.5        | 3.3              | 78.4      | 83.7        | -6.5             | 102.0                 | 99.80       | 2.2              | 92                 | 93.6                    | -1.7       |                    |                         |            | 107                 | 108                     | -0.9       |  |
| Phosphorus                    | 30                                | 50    | 1770             | 1680        | 5.2              | 1680            | 1560        | 7.4              | 664       | 656         | 1.2              | 911                   | 876         | 3.9              | 1830               | 1690                    | 8.0        |                    |                         |            | 796                 | 810                     | -1.7       |  |
| Potassium                     | 40                                | 100   | 2150             | 1950        | 9.8              | 2170            | 2100        | 3.3              | 1460      | 1440        | 1.4              | 2950                  | 2780        | 6                | 2040               | 2010                    | 1.5        |                    |                         |            | 2990                | 3200                    | -6.8       |  |
| Selenium                      | 30                                | 0.20  | 0.75             | 0.71        | 5.5              | 0.67            | 0.67        | 0.0              | 0.51      | 0.57        | -11              | 0.63                  | 0.66        | -4.7             | 0.78               | 0.76                    | 2.6        |                    |                         |            | 0.67                | 0.65                    | 3.0        |  |
| Silver                        | 40                                | 0.1   | 0.23             | 0.20        | 14.0             | 0.26            | 0.24        | 8.0              | 0.16      | 0.20        | -22              | 0.42                  | 0.42        | 0.0              | 0.26               | 0.25                    | 3.9        |                    |                         |            | 0.44                | 0.47                    | -6.6       |  |
| Sodium                        | 40                                | 50    | 257              | 222         | 14.6             | 282             | 284         | -0.7             | 555       | 503         | 9.8              | 442                   | 342         | 26               | 292                | 269                     | 8.2        |                    |                         |            | 338                 | 351                     | -3.8       |  |
| Strontium                     | 40                                | 0.5   | 21.6             | 18.1        | 17.6             | 22.1            | 22.1        | 0.0              | 26.7      | 27.1        | -1.5             | 24.3                  | 23.7        | 2.5              | 22                 | 22.5                    | -2.2       |                    |                         |            | 20.6                | 22.3                    | -7.9       |  |
| Thallium                      | 30                                | 0.05  | 0.154            | 0.130       | 16.9             | 0.195           | 0.190       | 2.6              | 0.079     | 0.090       | -13              | 0.223                 | 0.215       | 4                | 0.219              | 0.226                   | -3.1       |                    |                         |            | 0.249               | 0.252                   | -1.2       |  |
| Tin                           | 40                                | 2.0   | <2.0             | <2.0        |                  | <2.0            | <2.0        |                  | <2.0      | <2.0        |                  | <2.0                  | <2.0        |                  | <2.0               | <2.0                    |            |                    |                         |            | <2.0                | <2.0                    |            |  |
| Titanium                      | 40                                | 1.0   | 413              | 363         | 12.9             | 407             | 403         | 1.0              | 258       | 247         | 4.4              | 510                   | 457         | 11               | 379                | 366                     | 3.5        |                    |                         |            | 481                 | 586                     | -19.7      |  |
| Uranium                       | 30                                | 0.05  | 9.2              | 8.1         | 13.4             | 9.5             | 9.3         | 2.3              | 3.6       | 4.2         | -15              | 11.8                  | 11.9        | -0.8             | 8.78               | 8.67                    | 1.3        |                    |                         |            | 11.1                | 10.8                    | 2.7        |  |
| Vanadium                      | 30                                | 0.2   | 25.9             | 24.7        | 4.7              | 24.3            | 23.6        | 2.9              | 23.1      | 23.4        | -1.3             | 39.6                  | 38.6        | 2.6              | 23.7               | 23                      | 3.0        |                    |                         |            | 38.4                | 39.9                    | -3.8       |  |
| Zinc                          | 30                                | 2.0   | 79.1             | 75.2        | 5.1              | 86.7            | 82.7        | 4.7              | 54.2      | 57.7        | -6.3             | 109.0                 | 106.0       | 2.8              | 88.1               | 85.9                    | 2.5        |                    |                         |            | 110                 | 111                     | -0.9       |  |

**Notes:**

<sup>1</sup> Laboratory data quality objectives (DQOs) for moisture, TOC, and metals are expressed as the relative percent difference (RPD).

<sup>2</sup> The laboratory DQOs for pH and particle size are the absolute difference between the original sample and laboratory duplicate.

<sup>3</sup> The DQO for field duplicates is an RPD of < 50%.  
RPD (%) = ((original - duplicate) / (original + duplicate)/2) x 100.

RPDs have not been calculated for cases where one of the samples is below detection and the other is not and in cases where both are below detection. RPD has been left blank.

|                            |                                                            |
|----------------------------|------------------------------------------------------------|
| <b>Bold RPDs</b>           | values exceed the DQOs, but concentrations are < 10 x MDL. |
| <b>Shaded RPDs</b>         | values exceed the DQOs, and concentrations are > 10 x MDL. |
| <b>Bold Filter Swipe</b>   | value is > MDL, but < 10 x MDL.                            |
| <b>Shaded Filter Swipe</b> | value > 10x MDL.                                           |

Field Dup' samples are homogenization duplicates - the original and duplicate samples were split from the same homogenized bowl of sediment.

*Italicized numbers are below detection limits.*



Table A1-8. QA/QC data for sediment metals analyses, Whale Tail Baseline, 2015.

| Analyte                       | Laboratory<br>DQOs <sup>1,2</sup> | MDLs  | Laboratory Duplicates     |                         |            |                           |                         |            |                           |                         |            | Equipment Swipes |           |           |           |            |            |
|-------------------------------|-----------------------------------|-------|---------------------------|-------------------------|------------|---------------------------|-------------------------|------------|---------------------------|-------------------------|------------|------------------|-----------|-----------|-----------|------------|------------|
|                               |                                   |       | Field DUP-1 (L1669874-30) |                         |            | Field DUP-3 (L1669874-32) |                         |            | Field DUP-4 (L1669874-33) |                         |            | SWIPE-1          | SWIPE-2   | SWIPE-3   | SWIPE-4   | SWIPE-QA-1 | SWIPE-QA-2 |
|                               |                                   |       | Original                  | Laboratory<br>Duplicate | RPD<br>(%) | Original                  | Laboratory<br>Duplicate | RPD<br>(%) | Original                  | Laboratory<br>Duplicate | RPD<br>(%) | FILTER           | FILTER    | FILTER    | FILTER    | FILTER     | FILTER     |
|                               |                                   |       |                           |                         |            |                           |                         |            |                           |                         |            | 22-Aug-15        | 21-Aug-15 | 24-Aug-15 | 24-Aug-15 | 8-Oct-15   | 8-Oct-15   |
| Physical & Organic Parameters |                                   |       |                           |                         |            |                           |                         |            |                           |                         |            |                  |           |           |           |            |            |
| Moisture (%)                  | 20                                | 0.25  |                           |                         |            | 91.3                      | 91.2                    | 0.1        |                           |                         |            |                  |           |           |           |            |            |
| pH                            | 0.30                              | 0.10  |                           |                         |            |                           |                         |            |                           |                         |            |                  |           |           |           |            |            |
| Total Organic Carbon (% dw)   | 30                                | 0.10  |                           |                         |            | 9.18                      | 9.28                    | -1.1       |                           |                         |            |                  |           |           |           |            |            |
| Particle Size                 |                                   |       |                           |                         |            |                           |                         |            |                           |                         |            |                  |           |           |           |            |            |
| % Gravel (>2mm)               | 5                                 | 0.10  | 0.34                      | 0.34                    | 0.0        |                           |                         |            |                           |                         |            |                  |           |           |           |            |            |
| % Sand (2.00mm - 0.063mm)     | 5                                 | 0.10  | 4.54                      | 4.14                    | 0.4        |                           |                         |            |                           |                         |            |                  |           |           |           |            |            |
| % Silt (0.063mm - 4µm)        | 5                                 | 0.10  | 82.8                      | 83.4                    | 0.6        |                           |                         |            |                           |                         |            |                  |           |           |           |            |            |
| % Clay (<4µm)                 | 5                                 | 0.10  | 12.3                      | 12.2                    | 0.1        |                           |                         |            |                           |                         |            |                  |           |           |           |            |            |
| Total Metals (mg/kg dw)       |                                   |       |                           |                         |            |                           |                         |            |                           |                         |            |                  |           |           |           |            |            |
| Aluminum                      | 40                                | 50    |                           |                         |            |                           |                         |            | 17200                     | 17400                   | -1.2       | 0.010            | 0.011     | 0.018     | 0.015     | <0.010     | <0.010     |
| Antimony                      | 30                                | 0.10  |                           |                         |            |                           |                         |            | 0.33                      | 0.33                    | 0.0        | 0.010            | <0.010    | <0.010    | <0.010    | <0.010     | <0.010     |
| Arsenic                       | 30                                | 0.100 |                           |                         |            |                           |                         |            | 138                       | 138                     | 0.0        | 0.010            | <0.010    | <0.010    | <0.010    | <0.010     | <0.010     |
| Barium                        | 40                                | 0.50  |                           |                         |            |                           |                         |            | 138                       | 140                     | -1.4       | 0.00050          | 0.00135   | 0.00147   | 0.00084   | <0.00050   | <0.00050   |
| Beryllium                     | 30                                | 0.10  |                           |                         |            |                           |                         |            | 1.34                      | 1.35                    | -0.7       | 0.00030          | <0.00030  | <0.00030  | <0.00030  | <0.00030   | <0.00030   |
| Bismuth                       | 30                                | 0.20  |                           |                         |            |                           |                         |            | 0.45                      | 0.47                    | -4.3       | 0.010            | <0.010    | <0.010    | <0.010    | <0.010     | <0.010     |
| Cadmium                       | 30                                | 5.0   |                           |                         |            |                           |                         |            | 0.258                     | 0.258                   | 0.0        | 0.00050          | <0.00050  | <0.00050  | <0.00050  | <0.00050   | <0.00050   |
| Calcium                       | 30                                | 50    |                           |                         |            |                           |                         |            | 3370                      | 4140                    | -20.5      | 0.050            | <0.050    | <0.050    | <0.050    | <0.050     | <0.050     |
| Chromium                      | 30                                | 0.50  |                           |                         |            |                           |                         |            | 158                       | 158                     | 0.0        | 0.0010           | 0.0021    | 0.0083    | 0.0042    | 0.0054     | <0.0010    |
| Cobalt                        | 30                                | 0.10  |                           |                         |            |                           |                         |            | 11.4                      | 11.7                    | -2.6       | 0.00050          | <0.00050  | <0.00050  | <0.00050  | <0.00050   | <0.00050   |
| Copper                        | 30                                | 0.50  |                           |                         |            |                           |                         |            | 63.1                      | 64.8                    | -2.7       | 0.00050          | <0.00050  | <0.00050  | <0.00050  | <0.00050   | <0.00050   |
| Iron                          | 30                                | 50    |                           |                         |            |                           |                         |            | 43800                     | 44300                   | -1.1       | 0.0020           | 0.0312    | 0.0696    | 0.0452    | 0.0395     | 0.0074     |
| Lead                          | 40                                | 0.5   |                           |                         |            |                           |                         |            | 16.2                      | 16.2                    | 0.0        | 0.0030           | <0.0030   | 0.0038    | <0.0030   | <0.0030    | <0.0030    |
| Lithium                       | 30                                | 2.0   |                           |                         |            |                           |                         |            | 18                        | 18.1                    | -0.6       | 0.00050          | <0.00050  | <0.00050  | <0.00050  | <0.00050   | <0.00050   |
| Magnesium                     | 30                                | 20    |                           |                         |            |                           |                         |            | 8570                      | 8740                    | -2.0       | 0.0050           | 0.0084    | 0.0170    | 0.0154    | 0.0094     | 0.0090     |
| Manganese                     | 30                                | 1.0   |                           |                         |            |                           |                         |            | 389                       | 395                     | -1.5       | 0.00030          | 0.00147   | 0.00107   | 0.00077   | 0.00060    | <0.00030   |
| Mercury                       | 40                                | 0.005 |                           |                         |            |                           |                         |            | 0.0874                    | 0.0855                  | 2.2        |                  |           |           |           |            |            |
| Molybdenum                    | 40                                | 0.10  |                           |                         |            |                           |                         |            | 3.64                      | 3.66                    | -0.5       | 0.0020           | <0.0020   | <0.0020   | <0.0020   | <0.0020    | <0.0020    |
| Nickel                        | 30                                | 0.5   |                           |                         |            |                           |                         |            | 99.8                      | 102                     | -2.2       | 0.0030           | <0.0030   | 0.0038    | <0.0030   | <0.0030    | <0.0030    |
| Phosphorus                    | 30                                | 50    |                           |                         |            |                           |                         |            | 876                       | 899                     | -2.6       | 0.020            | <0.020    | <0.020    | <0.020    | <0.020     | <0.020     |
| Potassium                     | 40                                | 100   |                           |                         |            |                           |                         |            | 2780                      | 2790                    | -0.4       | 0.10             | <0.10     | <0.10     | <0.10     | <0.10      | <0.10      |
| Selenium                      | 30                                | 0.20  |                           |                         |            |                           |                         |            | 0.66                      | 0.71                    | -7.3       | 0.010            | <0.010    | <0.010    | <0.010    | <0.010     | <0.010     |
| Silver                        | 40                                | 0.1   |                           |                         |            |                           |                         |            | 0.42                      | 0.43                    | -2.4       | 0.00050          | <0.00050  | <0.00050  | <0.00050  | <0.00050   | <0.00050   |
| Sodium                        | 40                                | 50    |                           |                         |            |                           |                         |            | 342                       | 355                     | -3.7       | 0.10             | 0.10      | <0.10     | <0.10     | <0.10      | <0.10      |
| Strontium                     | 40                                | 0.5   |                           |                         |            |                           |                         |            | 23.7                      | 24.4                    | -2.9       | 0.00030          | <0.00030  | <0.00030  | <0.00030  | <0.00030   | <0.00030   |
| Thallium                      | 30                                | 0.05  |                           |                         |            |                           |                         |            | 0.215                     | 0.218                   | -1.4       | 0.010            | <0.010    | <0.010    | <0.010    | <0.010     | <0.010     |
| Tin                           | 40                                | 2.0   |                           |                         |            |                           |                         |            | <2.0                      | <2.0                    |            | 0.0020           | <0.0020   | 0.0023    | <0.0020   | <0.0020    | <0.0020    |
| Titanium                      | 40                                | 1.0   |                           |                         |            |                           |                         |            | 457                       | 453                     | 0.9        | 0.00050          | 0.00059   | 0.00089   | 0.00055   | <0.00050   | <0.00050   |
| Uranium                       | 30                                | 0.05  |                           |                         |            |                           |                         |            | 11.9                      | 11.9                    | 0.0        |                  |           |           |           |            |            |
| Vanadium                      | 30                                | 0.2   |                           |                         |            |                           |                         |            | 38.6                      | 39.3                    | -1.8       | 0.0020           | <0.0020   | <0.0020   | <0.0020   | <0.0020    | <0.0020    |
| Zinc                          | 30                                | 2.0   |                           |                         |            |                           |                         |            | 106                       | 107                     | -0.9       | 0.00030          | 0.00031   | 0.00113   | 0.00095   | 0.00047    | 0.00042    |

**Notes:**

<sup>1</sup> Laboratory data quality objectives (DQOs) for moisture, TOC, and metals are expressed as the relative percent difference (RPD).

<sup>2</sup> The laboratory DQOs for pH and particle size are the absolute difference between the original sample and laboratory duplicate.

<sup>3</sup> The DQO for field duplicates is an RPD of < 50%.  
RPD (%) = ((original - duplicate) / (original + duplicate)/2) x 100.  
RPDs have not been calculated for cases where one of the samples is below detection and the other is not and in cases where both are below detection. RPD has been left blank.

|                            |                                                            |
|----------------------------|------------------------------------------------------------|
| <b>Bold RPDs</b>           | values exceed the DQOs, but concentrations are < 10 x MDL. |
| <b>Shaded RPDs</b>         | values exceed the DQOs, and concentrations are > 10 x MDL. |
| <b>Bold Filter Swipe</b>   | value is > MDL, but < 10 x MDL.                            |
| <b>Shaded Filter Swipe</b> | value > 10x MDL.                                           |

Field Dup' samples are homogenization duplicates - the original and duplicate samples were split from the same homogenized bowl of sediment.

*Italicized numbers are below detection limits.*



**Table A1-9.** QA/QC data for sediment hydrocarbon and PAH analyses, Whale Tail Baseline, 2015.

| Analyte                                  | MDLs   | Mammoth Lake |            |         |
|------------------------------------------|--------|--------------|------------|---------|
|                                          |        | MAM-COMP     | COMP DUP-1 | RPD (%) |
| Physical Parameters                      |        |              |            |         |
| Moisture (%)                             | 0.25   | 90.9         | 91.2       | -0.3    |
| Aggregate Organics (mg/kg)               |        |              |            |         |
| Mineral Oil and Grease                   | 500    | 1960         | 1010       | 64.0    |
| Hydrocarbons (mg/kg)                     |        |              |            |         |
| EPH10-19                                 | 680    | <1100        | <1000      |         |
| EPH19-32                                 | 680    | <1100        | <1000      |         |
| LEPH                                     | 680    | <1100        | <1000      |         |
| HEPH                                     | 680    | <1100        | <1000      |         |
| Polycyclic Aromatic Hydrocarbons (mg/kg) |        |              |            |         |
| Acenaphthene                             | 0.0050 | <0.015       | <0.015     |         |
| Acenaphthylene                           | 0.0050 | <0.015       | <0.015     |         |
| Anthracene                               | 0.0040 | <0.012       | <0.012     |         |
| Benzo(a)anthracene                       | 0.010  | <0.030       | <0.030     |         |
| Benzo(a)pyrene                           | 0.010  | <0.030       | <0.030     |         |
| Benzo(b)fluoranthene                     | 0.010  | <0.030       | <0.030     |         |
| Benzo(b+j+k)fluoranthene                 | 0.015  | <0.042       | <0.042     |         |
| Benzo(g,h,i)perylene                     | 0.010  | <0.030       | <0.030     |         |
| Benzo(k)fluoranthene                     | 0.010  | <0.030       | <0.030     |         |
| Chrysene                                 | 0.010  | <0.030       | <0.030     |         |
| Dibenz(a,h)anthracene                    | 0.0050 | <0.015       | <0.015     |         |
| Fluoranthene                             | 0.010  | <0.030       | <0.030     |         |
| Fluorene                                 | 0.010  | <0.030       | <0.030     |         |
| Indeno(1,2,3-c,d)pyrene                  | 0.010  | <0.030       | <0.030     |         |
| 2-Methylnaphthalene                      | 0.010  | <0.030       | <0.030     |         |
| Naphthalene                              | 0.010  | <0.030       | <0.030     |         |
| Phenanthrene                             | 0.010  | <0.030       | <0.030     |         |
| Pyrene                                   | 0.010  | <0.030       | <0.030     |         |
| d10-Acenaphthene (%)                     |        | 87.7         | 90.8       | -3.5    |
| d12-Chrysene (%)                         |        | 115.7        | 115.6      | 0.1     |
| d8-Naphthalene (%)                       |        | 78.1         | 85.0       | -8.5    |
| d10-Phenanthrene (%)                     |        | 108.1        | 108.4      | -0.3    |
| B(a)P Total Potency Equivalent           | 0.020  | <0.029       | <0.029     |         |
| IACR (CCME)                              | 0.15   | <0.32        | <0.32      |         |

**Notes:**

RPD = Relative Percent Difference (%) = ((original - duplicate) / (original + duplicate)/2) x 100.

RPDs have not been calculated for cases where one of the samples is below detection and the other is not and in cases where both are below detection. RPD has been left blank.

**Bold RPDs** values exceed the DQOs, but concentrations are < 10 x MDL.

**Shaded RPDs** values exceed the DQOs, and concentrations are > 10 x MDL.

COMP DUP samples are homogenization duplicates - the original and duplicate samples were split from the same homogenized bowl of sediment.

"-" = no measurement

*Italicized numbers are below detection limits.*



## **APPENDIX A2**

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### **Phytoplankton, Benthic Invertebrate, and Zooplankton QA/QC Results**

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**Table A2-1.** QA/QC results for the laboratory duplicate phytoplankton samples, Whale Tail Pit Baseline, 2014 and 2015.

| <b>2014 Baseline Program</b>       |                                |                       |                        |
|------------------------------------|--------------------------------|-----------------------|------------------------|
| Sample<br>date                     | <b>September Lab Duplicate</b> |                       |                        |
|                                    | LAK3 - 1<br>04/09/14           | LAK3 - 1R<br>04/09/14 | <b>RPD<sup>1</sup></b> |
| Total biomass (mg/m <sup>3</sup> ) | 268                            | 253                   | 5.7                    |
| Total Density (cells/L)            | 3,674,640                      | 3,573,464             | 2.8                    |

**Notes:**

2014 baseline data was adapted from Portt and Associates (2015a).

<sup>1</sup> The DQO for laboratory duplicates is an RPD of < 25% for total biomass and total density.

RPD (%) = ((original - duplicate) / (original + duplicate)/2) x 100.

| <b>2015 Baseline Program</b>       |                             |                     |                        |                                    |                     |                        |                                  |                     |                        |
|------------------------------------|-----------------------------|---------------------|------------------------|------------------------------------|---------------------|------------------------|----------------------------------|---------------------|------------------------|
| Sample<br>date                     | <b>July Field Duplicate</b> |                     |                        | <b>August Laboratory Duplicate</b> |                     |                        | <b>September Field Duplicate</b> |                     |                        |
|                                    | NEM2-S<br>18/07/15          | NEM2-SR<br>18/07/15 | <b>RPD<sup>1</sup></b> | WTN3-S<br>20/08/15                 | WTN3-SR<br>20/08/15 | <b>RPD<sup>1</sup></b> | NEM6-S<br>19/09/15               | NEM6-SR<br>19/09/15 | <b>RPD<sup>1</sup></b> |
| Total biomass (mg/m <sup>3</sup> ) | 257                         | 245                 | 4.8                    | 184                                | 198                 | -7.4                   | 152                              | 153                 | -0.8                   |
| Total Density (cells/L)            | 3,132,904                   | 3,103,968           | 0.9                    | 2,053,840                          | 2,062,424           | -0.4                   | 1,783,464                        | 1,692,472           | 5.2                    |

**Notes:**

<sup>1</sup> The DQO for laboratory duplicates is an RPD of < 25% for total biomass and total density.

RPD (%) = ((original - duplicate) / (original + duplicate)/2) x 100.



**Table A2-2.** QA/QC results for the field duplicate phytoplankton samples, Whale Tail Pit Baseline, 2014 and 2015.

| 2014 Baseline Program              |                         |                     |                  |
|------------------------------------|-------------------------|---------------------|------------------|
| Sample<br>date                     | September Lab Duplicate |                     |                  |
|                                    | LAK3 - 5<br>04/09/14    | DUP - 1<br>04/09/14 | RPD <sup>1</sup> |
| Total biomass (mg/m <sup>3</sup> ) | 286                     | 246                 | 14.9             |
| Total Density (cells/L)            | 3,728,328               | 3,824,704           | -2.6             |

**Notes:**

2014 baseline data was adapted from Portt and Associates (2015a).

<sup>1</sup> The DQO for field duplicates is an RPD of < 50% for total biomass and total density.

RPD (%) = ((original - duplicate) / (original + duplicate)/2) x 100.

| 2015 Baseline Program              |                      |                  |                  |                        |                  |                  |                           |                  |                  |
|------------------------------------|----------------------|------------------|------------------|------------------------|------------------|------------------|---------------------------|------------------|------------------|
| Sample<br>date                     | July Field Duplicate |                  |                  | August Field Duplicate |                  |                  | September Field Duplicate |                  |                  |
|                                    | WTS2-S<br>17/07/15   | DUP1<br>01/07/15 | RPD <sup>1</sup> | WTN4-S<br>20/08/15     | DUP1<br>01/08/15 | RPD <sup>1</sup> | WTN6-S<br>18/09/15        | DUP1<br>01/09/15 | RPD <sup>1</sup> |
| Total Biomass (mg/m <sup>3</sup> ) | 265                  | 321              | -19.1            | 154                    | 211              | -31.4            | 226                       | 205              | 10.1             |
| Total Density (cells/L)            | 4,154,600            | 4,115,096        | 1.0              | 1,651,536              | 2,808,760        | -51.9            | 2,536,000                 | 2,629,192        | -3.6             |

**Notes:**

<sup>1</sup> The DQO for field duplicates is an RPD of < 50% for total biomass and total density.

RPD (%) = ((original - duplicate) / (original + duplicate)/2) x 100.





**Table A2-3.** QA/QC summary of the benthic invertebrate taxonomy, 2015 baseline program.

| Area-Replicate            | Number of Organisms |        | Percent Recovery |
|---------------------------|---------------------|--------|------------------|
|                           | Initial Count       | Resort |                  |
| MAM-2                     | 135                 | 142    | 95.1%            |
| NEM-1                     | 143                 | 147    | 97.3%            |
| WTN-3                     | 53                  | 57     | 93.0%            |
| <i>Average % Recovery</i> |                     |        | 95.1%            |

**Notes:**

All samples were sorted in their entirety.



**Table A2-4.** Laboratory QA/QC results from the zooplankton taxonomic identification, Whale Tail Pit Baseline, 2015.

| <b>Subsampling Accuracy</b>       |                                               |                                         |                                              |
|-----------------------------------|-----------------------------------------------|-----------------------------------------|----------------------------------------------|
| <b>QA Sample</b>                  | <b>Abundance<br/>(Original Replicate) (A)</b> | <b>Abundance<br/>(QA Replicate) (B)</b> | <b>Accuracy<br/><math>1-(A/B)*100</math></b> |
| MAM-02-S                          | 16393                                         | 18903                                   | 15.3                                         |
| WTS-05-S                          | 7055                                          | 7852                                    | 10.2                                         |
| MAM-05-S                          | 7327                                          | 7833                                    | 6.5                                          |
| <b>Mean Subsampling Error (%)</b> |                                               |                                         | <b>10.6</b>                                  |

| <b>Taxonomic Accuracy - Internal</b>        |                                  |                                    |                                                |
|---------------------------------------------|----------------------------------|------------------------------------|------------------------------------------------|
| <b>QA Sample</b>                            | <b>Number of Unique Taxa (B)</b> | <b>Number of disagreements (A)</b> | <b>% Accuracy<br/><math>1-(A/B)*100</math></b> |
| MAM-02-S                                    | 7                                | 0                                  | 100.0                                          |
| WTS-05-S                                    | 7                                | 0                                  | 100.0                                          |
| MAM-05-S                                    | 6                                | 0                                  | 100.0                                          |
| <b>Mean Internal Taxonomic Accuracy (%)</b> |                                  |                                    | <b>100.0</b>                                   |



**Table A2-5.** QA/QC results for the field duplicate zooplankton samples, Whale Tail Pit Baseline, 2015.

| July Field Duplicate (WTS-2) |                     |            |                   |                              |              |                   |
|------------------------------|---------------------|------------|-------------------|------------------------------|--------------|-------------------|
| Major Taxa Group             | Biomass (ww/sample) |            |                   | Abundance (organisms/sample) |              |                   |
|                              | Original            | Duplicate  | RPDs <sup>1</sup> | Original                     | Duplicate    | RPDs <sup>1</sup> |
| Cladocera                    | 1.1                 | 2.7        | -82               | 82                           | 186          | -78               |
| Calanoida                    | 3.7                 | 49         | -172              | 30                           | 400          | -172              |
| Cyclopoida                   | 36                  | 81         | -78               | 2080                         | 5440         | -89               |
| Copepod Nauplii              | 0.69                | 1.0        | -40               | 1067                         | 1433         | -29               |
| Rotifera                     | 47                  | 61         | -27               | 3200                         | 4833         | -41               |
| <b>Total Zooplankton</b>     | <b>88</b>           | <b>195</b> | <b>-76</b>        | <b>6459</b>                  | <b>12293</b> | <b>-62</b>        |

| August Field Duplicate (WTS-3) |                     |            |                   |                              |             |                   |
|--------------------------------|---------------------|------------|-------------------|------------------------------|-------------|-------------------|
| Major Taxa Group               | Biomass (ww/sample) |            |                   | Abundance (organisms/sample) |             |                   |
|                                | Original            | Duplicate  | RPDs <sup>1</sup> | Original                     | Duplicate   | RPDs <sup>1</sup> |
| Cladocera                      | 0.00                | 0.62       | -200              | 0                            | 23          | -200              |
| Calanoida                      | 155                 | 113        | 31                | 345                          | 243         | 35                |
| Cyclopoida                     | 11                  | 7.1        | 42                | 780                          | 650         | 18                |
| Copepod Nauplii                | 0.40                | 0.31       | 25                | 3200                         | 2300        | 33                |
| Rotifera                       | 123                 | 39         | 104               | 12667                        | 5300        | 82                |
| <b>Total Zooplankton</b>       | <b>289</b>          | <b>160</b> | <b>57</b>         | <b>16992</b>                 | <b>8516</b> | <b>66</b>         |

| September Field Duplicate (WTS-5) |                     |            |                   |                              |             |                   |
|-----------------------------------|---------------------|------------|-------------------|------------------------------|-------------|-------------------|
| Major Taxa Group                  | Biomass (ww/sample) |            |                   | Abundance (organisms/sample) |             |                   |
|                                   | Original            | Duplicate  | RPDs <sup>1</sup> | Original                     | Duplicate   | RPDs <sup>1</sup> |
| Cladocera                         | 1.16                | 0.48       | 84                | 15                           | 10          | 40                |
| Calanoida                         | 49                  | 57         | -15               | 105                          | 123         | -15               |
| Cyclopoida                        | 21                  | 15         | 33                | 1035                         | 688         | 40                |
| Copepod Nauplii                   | 0.84                | 0.30       | 94                | 2133                         | 667         | 105               |
| Rotifera                          | 41                  | 40         | 2.3               | 3767                         | 3900        | -3.5              |
| <b>Total Zooplankton</b>          | <b>113</b>          | <b>113</b> | <b>0.1</b>        | <b>7055</b>                  | <b>5387</b> | <b>27</b>         |

**Notes:**

<sup>1</sup> RPD = Relative Percent Difference (%) = ((original - duplicate) / (original + duplicate)/2) x 100.



## **APPENDIX B**

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### ***In-situ* Water Quality Results, Whale Tail Pit Baseline, 2014 and 2015**

## **APPENDIX B1**

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### **2014 *In-situ* Water Quality Results: Lake Stations**

**Table B1-1.** *In-situ* water quality results from the Lake stations, Whale Tail Pit Baseline, 2014.

| Lake            | Date      | Location | UTM Coordinates |         |          | Water Depth (m) | Secchi Depth (m) | Profile Depth (m) | pH   | Temp. (°C) | Specific Conductivity (µS/cm) | Dissolved Oxygen (mg/L) | Turbidity (NTU) |
|-----------------|-----------|----------|-----------------|---------|----------|-----------------|------------------|-------------------|------|------------|-------------------------------|-------------------------|-----------------|
|                 |           |          | Zone            | Easting | Northing |                 |                  |                   |      |            |                               |                         |                 |
| Whale Tail Lake | 05-Sep-14 | 1*       | 14W             | 607005  | 7255983  | 8.5             | 8.5              | 0                 | 7.30 | 9.3        | 21.8                          | 11.6                    | 0.06            |
|                 |           |          |                 |         |          |                 |                  | 1                 | 7.30 | 9.3        | 21.8                          | 11.5                    | 0.05            |
|                 |           |          |                 |         |          |                 |                  | 2                 | 7.24 | 9.3        | 21.7                          | 11.4                    | 0.06            |
|                 |           |          |                 |         |          |                 |                  | 3                 | 7.21 | 9.3        | 21.8                          | 11.2                    | 0.09            |
|                 |           |          |                 |         |          |                 |                  | 4                 | 7.06 | 9.3        | 21.7                          | 11.1                    | 0.09            |
|                 |           |          |                 |         |          |                 |                  | 5                 | 7.05 | 9.3        | 21.7                          | 10.8                    | 0.09            |
|                 |           |          |                 |         |          |                 |                  | 6                 | 7.14 | 9.3        | 21.8                          | 11.0                    | 0.10            |
|                 |           |          |                 |         |          |                 |                  | 7                 | 7.03 | 9.3        | 21.7                          | 11.2                    | 0.10            |
|                 |           |          |                 |         |          |                 |                  | 8                 | 7.05 | 9.3        | 21.7                          | 11.2                    | 0.11            |
|                 |           | 2        | 14W             | 607431  | 7255251  | 7.8             | 6.4              | 0                 | 6.77 | 9.4        | 18.5                          | 11.6                    | 0.10            |
|                 |           |          |                 |         |          |                 |                  | 1                 | 6.97 | 9.4        | 18.5                          | 11.5                    | 0.09            |
|                 |           |          |                 |         |          |                 |                  | 2                 | 6.83 | 9.4        | 18.5                          | 11.6                    | 0.10            |
|                 |           |          |                 |         |          |                 |                  | 3                 | 6.79 | 9.4        | 18.5                          | 11.6                    | 0.09            |
|                 |           |          |                 |         |          |                 |                  | 4                 | 6.76 | 9.4        | 18.5                          | 11.7                    | 0.10            |
|                 |           |          |                 |         |          |                 |                  | 5                 | 6.80 | 9.4        | 18.5                          | 11.8                    | 0.10            |
|                 |           |          |                 |         |          |                 |                  | 6                 | 6.80 | 9.4        | 18.5                          | 11.7                    | 0.11            |
|                 |           |          |                 |         |          |                 |                  | 7                 | 6.85 | 9.4        | 18.5                          | 11.8                    | 0.10            |
|                 |           | 3*       | 14W             | 607538  | 7254596  | 8               | 7                | 0                 | 7.02 | 9.4        | 17.3                          | 11.5                    | 0.10            |
|                 |           |          |                 |         |          |                 |                  | 1                 | 6.93 | 9.5        | 17.4                          | 11.5                    | 0.11            |
|                 |           |          |                 |         |          |                 |                  | 2                 | 6.87 | 9.5        | 17.4                          | 11.5                    | 0.13            |
|                 |           |          |                 |         |          |                 |                  | 3                 | 6.83 | 9.4        | 17.4                          | 11.6                    | 0.13            |
|                 |           |          |                 |         |          |                 |                  | 4                 | 6.92 | 9.4        | 17.4                          | 11.6                    | 0.13            |
|                 |           |          |                 |         |          |                 |                  | 5                 | 6.99 | 9.4        | 17.3                          | 11.6                    | 0.13            |
|                 |           |          |                 |         |          |                 |                  | 6                 | 6.95 | 9.4        | 17.4                          | 11.7                    | 0.14            |
|                 |           |          |                 |         |          |                 |                  | 7                 | 6.95 | 9.4        | 17.3                          | 11.7                    | 0.14            |
|                 |           | 4        | 14W             | 607230  | 7253781  | 7.8             | 6.5              | 0                 | 7.07 | 9.3        | 17.3                          | 11.4                    | 0.09            |
|                 |           |          |                 |         |          |                 |                  | 1                 | 7.01 | 9.3        | 17.3                          | 11.5                    | 0.12            |
|                 |           |          |                 |         |          |                 |                  | 2                 | 6.97 | 9.3        | 17.3                          | 11.4                    | 0.14            |
|                 |           |          |                 |         |          |                 |                  | 3                 | 7.01 | 9.3        | 17.3                          | 11.5                    | 0.13            |
|                 |           |          |                 |         |          |                 |                  | 4                 | 6.90 | 9.3        | 17.3                          | 11.5                    | 0.14            |
|                 |           |          |                 |         |          |                 |                  | 5                 | 6.90 | 9.3        | 17.3                          | 11.6                    | 0.15            |
|                 |           |          |                 |         |          |                 |                  | 6                 | 6.91 | 9.3        | 17.3                          | 11.6                    | 0.12            |
|                 |           |          |                 |         |          |                 |                  | 7                 | 6.88 | 9.3        | 17.3                          | 11.6                    | 0.13            |
|                 |           | 5*       | 14W             | 607120  | 7253603  | 8               | 7                | 0                 | 7.12 | 9.2        | 17.4                          | 11.4                    | 0.15            |
|                 |           |          |                 |         |          |                 |                  | 1                 | 7.14 | 9.2        | 17.3                          | 11.4                    | 0.15            |
|                 |           |          |                 |         |          |                 |                  | 2                 | 6.95 | 9.3        | 17.4                          | 11.3                    | 0.15            |
|                 |           |          |                 |         |          |                 |                  | 3                 | 6.89 | 9.2        | 17.4                          | 11.5                    | 0.15            |
|                 |           |          |                 |         |          |                 |                  | 4                 | 6.99 | 9.2        | 17.3                          | 11.5                    | 0.15            |
|                 |           |          |                 |         |          |                 |                  | 5                 | 7.03 | 9.3        | 17.3                          | 11.5                    | 0.15            |
|                 |           |          |                 |         |          |                 |                  | 6                 | 6.87 | 9.3        | 17.3                          | 11.5                    | 0.15            |
|                 |           |          |                 |         |          |                 |                  | 7                 | 6.95 | 9.3        | 17.3                          | 11.6                    | 0.15            |
| Nemo Lake       | 06-Sep-14 | 1*       | 14W             | 606358  | 7257042  | 7.6             | >7.6             | 0                 | 7.32 | 9.2        | 25.1                          | 11.51                   | 0.00            |
|                 |           |          |                 |         |          |                 |                  | 1                 | 7.23 | 9.2        | 25.1                          | 11.50                   | 0.00            |
|                 |           |          |                 |         |          |                 |                  | 2                 | 7.28 | 9.2        | 25.1                          | 11.52                   | 0.00            |
|                 |           |          |                 |         |          |                 |                  | 3                 | 7.23 | 9.1        | 25.1                          | 11.58                   | 0.00            |
|                 |           |          |                 |         |          |                 |                  | 4                 | 7.28 | 9.1        | 25.1                          | 11.62                   | 0.00            |
|                 |           |          |                 |         |          |                 |                  | 5                 | 7.28 | 9.1        | 25.1                          | 11.59                   | 0.00            |
|                 |           |          |                 |         |          |                 |                  | 6                 | 7.28 | 9.1        | 25.1                          | 11.58                   | 0.00            |
|                 |           |          |                 |         |          |                 |                  | 7                 | 7.29 | 9.1        | 25.1                          | 11.62                   | 0.00            |
|                 |           | 2        | 14W             | 606040  | 7257418  | 7.4             | >7.4             | 0                 | 7.34 | 9.5        | 25.1                          | 11.47                   | 0.00            |
|                 |           |          |                 |         |          |                 |                  | 1                 | 7.19 | 9.3        | 25.1                          | 11.45                   | 0.00            |
|                 |           |          |                 |         |          |                 |                  | 2                 | 7.28 | 9.3        | 25.1                          | 11.45                   | 0.00            |
|                 |           |          |                 |         |          |                 |                  | 3                 | 7.14 | 9.3        | 25.1                          | 11.49                   | 0.00            |
|                 |           |          |                 |         |          |                 |                  | 4                 | 7.26 | 9.3        | 25.1                          | 11.51                   | 0.00            |
|                 |           |          |                 |         |          |                 |                  | 5                 | 7.20 | 9.3        | 25.1                          | 11.54                   | 0.00            |
|                 |           |          |                 |         |          |                 |                  | 6                 | 7.22 | 9.3        | 25.1                          | 11.57                   | 0.00            |
|                 |           |          |                 |         |          |                 |                  | 7                 | 7.11 | 9.3        | 25.1                          | 11.56                   | 0.00            |
|                 |           | 3*       | 14W             | 606048  | 7257571  | 8.3             | >8.3             | 0                 | 7.09 | 9.3        | 25.1                          | 11.39                   | 0.00            |
|                 |           |          |                 |         |          |                 |                  | 1                 | 7.17 | 9.3        | 25.1                          | 11.34                   | 0.00            |
|                 |           |          |                 |         |          |                 |                  | 2                 | 7.20 | 9.3        | 25.1                          | 11.26                   | 0.00            |
|                 |           |          |                 |         |          |                 |                  | 3                 | 7.15 | 9.3        | 25.0                          | 11.00                   | 0.00            |
|                 |           |          |                 |         |          |                 |                  | 4                 | 7.19 | 9.3        | 25.0                          | 10.76                   | 0.00            |
|                 |           |          |                 |         |          |                 |                  | 5                 | 7.23 | 9.2        | 25.1                          | 10.67                   | 0.00            |
|                 |           |          |                 |         |          |                 |                  | 6                 | 7.07 | 9.2        | 25.0                          | 10.66                   | 0.00            |
|                 |           |          |                 |         |          |                 |                  | 7                 | 7.11 | 9.2        | 25.0                          | 10.62                   | 0.00            |



**Table B1-1.** *In-situ* water quality results from the Lake stations, Whale Tail Pit Baseline, 2014.

| Lake         | Date      | Location | UTM Coordinates |         |          | Water Depth (m) | Secchi Depth (m) | Profile Depth (m) | pH   | Temp. (°C) | Specific Conductivity (µS/cm) | Dissolved Oxygen (mg/L) | Turbidity (NTU) |
|--------------|-----------|----------|-----------------|---------|----------|-----------------|------------------|-------------------|------|------------|-------------------------------|-------------------------|-----------------|
|              |           |          | Zone            | Easting | Northing |                 |                  |                   |      |            |                               |                         |                 |
| Nemo Lake    | 6-Sep-14  | 4        | 14W             | 606963  | 7257756  | 8.5             | >8.5             | 0                 | 7.31 | 9.4        | 25.0                          | 11.30                   | 0.00            |
|              |           |          |                 |         |          |                 |                  | 1                 | 7.20 | 9.4        | 25.0                          | 11.27                   | 0.00            |
|              |           |          |                 |         |          |                 |                  | 2                 | 7.28 | 9.4        | 25.0                          | 11.18                   | 0.00            |
|              |           |          |                 |         |          |                 |                  | 3                 | 7.29 | 9.4        | 25.0                          | 11.14                   | 0.00            |
|              |           |          |                 |         |          |                 |                  | 4                 | 7.22 | 9.4        | 25.0                          | 11.05                   | 0.00            |
|              |           |          |                 |         |          |                 |                  | 5                 | 7.28 | 9.4        | 25.0                          | 10.97                   | 0.00            |
|              |           |          |                 |         |          |                 |                  | 6                 | 7.28 | 9.4        | 25.0                          | 11.04                   | 0.00            |
|              |           |          |                 |         |          |                 |                  | 7                 | 7.27 | 9.4        | 25.0                          | 11.00                   | 0.00            |
|              |           | 5*       | 14W             | 606740  | 7257566  | 8.7             | 8.3              | 8                 | 7.21 | 9.4        | 25.0                          | 11.14                   | 0.00            |
|              |           |          |                 |         |          |                 |                  | 0                 | 7.29 | 9.4        | 25.0                          | 11.35                   | 0.00            |
|              |           |          |                 |         |          |                 |                  | 1                 | 7.31 | 9.4        | 25.0                          | 11.29                   | 0.00            |
|              |           |          |                 |         |          |                 |                  | 2                 | 7.29 | 9.4        | 25.0                          | 11.17                   | 0.00            |
|              |           |          |                 |         |          |                 |                  | 3                 | 7.25 | 9.4        | 25.0                          | 10.98                   | 0.00            |
|              |           |          |                 |         |          |                 |                  | 4                 | 7.18 | 9.4        | 25.0                          | 10.84                   | 0.00            |
|              |           |          |                 |         |          |                 |                  | 5                 | 7.25 | 9.4        | 25.0                          | 10.81                   | 0.00            |
|              |           |          |                 |         |          |                 |                  | 6                 | 7.27 | 9.4        | 25.0                          | 10.79                   | 0.00            |
| Mammoth Lake | 04-Sep-14 | 1*       | 14W             | 605074  | 7254893  | 8.1             | 6.5              | 7                 | 7.15 | 9.4        | 25.0                          | 10.79                   | 0.00            |
|              |           |          |                 |         |          |                 |                  | 8                 | 7.24 | 9.4        | 25.0                          | 10.85                   | 0.00            |
|              |           |          |                 |         |          |                 |                  | 0                 | 7.59 | 9.8        | 21.6                          | 11.5                    | 0.29            |
|              |           |          |                 |         |          |                 |                  | 1                 | 7.53 | 9.8        | 21.6                          | 11.5                    | 0.29            |
|              |           |          |                 |         |          |                 |                  | 2                 | 7.59 | 9.8        | 21.6                          | 11.3                    | 0.32            |
|              |           |          |                 |         |          |                 |                  | 3                 | 7.54 | 9.8        | 21.6                          | 11.6                    | 0.31            |
|              |           |          |                 |         |          |                 |                  | 4                 | 7.46 | 9.3        | 22.1                          | 11.9                    | 0.31            |
|              |           |          |                 |         |          |                 |                  | 5                 | 7.30 | 9.8        | 21.7                          | 12.4                    | 0.31            |
|              |           | 2        | 14W             | 604486  | 7254566  | 7.3             | 7.2              | 6                 | 7.30 | 9.7        | 21.9                          | 11.9                    | 0.28            |
|              |           |          |                 |         |          |                 |                  | 7                 | 7.37 | 9.6        | 21.9                          | 11.8                    | 0.33            |
|              |           |          |                 |         |          |                 |                  | 8                 | 7.24 | 9.5        | 22.1                          | 11.6                    |                 |
|              |           |          |                 |         |          |                 |                  | 0                 | 7.23 | 10.0       | 21.0                          | 11.5                    | 0.14            |
|              |           |          |                 |         |          |                 |                  | 1                 | 7.30 | 10.0       | 20.9                          | 11.5                    | 0.16            |
|              |           |          |                 |         |          |                 |                  | 2                 | 7.24 | 10.0       | 20.9                          | 11.2                    | 0.16            |
|              |           |          |                 |         |          |                 |                  | 3                 | 7.24 | 10.0       | 21.0                          | 11.1                    | 0.17            |
|              |           |          |                 |         |          |                 |                  | 4                 | 7.28 | 10.0       | 21.0                          | 11.1                    | 0.17            |
|              |           | 3*       | 14W             | 604398  | 7254336  | 8.3             | 7.5              | 5                 | 7.20 | 10.0       | 21.0                          | 11.2                    | 0.16            |
|              |           |          |                 |         |          |                 |                  | 6                 | 7.19 | 10.0       | 21.0                          | 11.2                    | 0.16            |
|              |           |          |                 |         |          |                 |                  | 7                 | 7.24 | 9.7        | 20.9                          | 11.2                    | 0.17            |
|              |           |          |                 |         |          |                 |                  | 8                 | 7.00 | 10.0       | 20.9                          | 11.7                    | 0.14            |
|              |           |          |                 |         |          |                 |                  | 1                 | 7.07 | 9.9        | 20.9                          | 11.7                    | 0.14            |
|              |           |          |                 |         |          |                 |                  | 2                 | 6.99 | 9.9        | 20.9                          | 11.5                    | 0.15            |
|              |           |          |                 |         |          |                 |                  | 3                 | 7.04 | 9.9        | 20.9                          | 11.2                    | 0.16            |
|              |           |          |                 |         |          |                 |                  | 4                 | 6.96 | 9.9        | 20.9                          | 11.1                    | 0.16            |
|              |           | 4        | 14W             | 603925  | 7254200  | 7.4             | 7.0              | 5                 | 7.00 | 9.9        | 20.9                          | 11.0                    | 0.16            |
|              |           |          |                 |         |          |                 |                  | 6                 | 7.11 | 9.9        | 21.0                          | 10.9                    | 0.16            |
|              |           |          |                 |         |          |                 |                  | 7                 | 7.15 | 9.5        | 21.0                          | 11.0                    | 0.17            |
|              |           |          |                 |         |          |                 |                  | 8                 | 7.02 | 9.4        | 21.0                          | 11.0                    | 0.16            |
|              |           |          |                 |         |          |                 |                  | 0                 | 7.00 | 9.9        | 20.9                          | 11.8                    | 0.17            |
|              |           |          |                 |         |          |                 |                  | 1                 | 7.00 | 9.8        | 20.9                          | 11.7                    | 0.16            |
|              |           |          |                 |         |          |                 |                  | 2                 | 6.94 | 9.8        | 20.9                          | 11.5                    | 0.17            |
|              |           |          |                 |         |          |                 |                  | 3                 | 7.02 | 9.8        | 20.9                          | 11.3                    | 0.17            |
|              |           | 5*       | 14W             | 604191  | 7253847  | 7.3             | 7.3              | 4                 | 6.98 | 9.8        | 20.9                          | 11.2                    | 0.17            |
|              |           |          |                 |         |          |                 |                  | 5                 | 7.00 | 9.8        | 20.9                          | 11.1                    | 0.17            |
|              |           |          |                 |         |          |                 |                  | 6                 | 7.03 | 9.7        | 20.9                          | 10.9                    | 0.17            |
|              |           |          |                 |         |          |                 |                  | 7                 | 7.06 | 9.7        | 20.8                          | 11.0                    | 0.18            |
|              |           |          |                 |         |          |                 |                  | 0                 | 7.04 | 10.1       | 20.8                          | 11.2                    | 0.11            |
|              |           |          |                 |         |          |                 |                  | 1                 | 7.10 | 10.1       | 20.8                          | 11.3                    | 0.13            |
|              |           |          |                 |         |          |                 |                  | 2                 | 7.07 | 10.1       | 20.9                          | 11.0                    | 0.14            |
|              |           |          |                 |         |          |                 |                  | 3                 | 7.08 | 10.0       | 20.9                          | 11.0                    | 0.13            |
|              |           |          |                 |         |          |                 |                  | 4                 | 7.14 | 9.9        | 20.8                          | 11.4                    | 0.15            |
|              |           |          |                 |         |          |                 |                  | 5                 | 6.94 | 9.9        | 20.8                          | 11.5                    | 0.17            |
|              |           |          |                 |         |          |                 |                  | 6                 | 7.05 | 9.6        | 20.8                          | 11.6                    | 0.17            |
|              |           |          |                 |         |          |                 |                  | 7                 | 7.11 | 9.6        | 20.9                          | 11.4                    | 0.17            |

**Notes:**

Data presented here were adapted from Portt and Associates (2015a).

\* = water, phytoplankton, and sediment were submitted for analysis from these locations.



## **APPENDIX B2**

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### **2015 *In-situ* Water Quality Results: Lakes Stations**



**Table B2-1.** *In-situ* water quality results from the Lake stations, Whale Tail Pit Baseline, 2015.

| Area-Replicate | Date      | UTM Coordinates |         |          | Water Depth (m) | Secchi Depth (m) | Profile Depth (m) | pH   | Temp. (°C) | Specific Conductivity (µS/cm) | Dissolved Oxygen (mg/L) |
|----------------|-----------|-----------------|---------|----------|-----------------|------------------|-------------------|------|------------|-------------------------------|-------------------------|
|                |           | Zone            | Easting | Northing |                 |                  |                   |      |            |                               |                         |
| WTN-1          | 17-Jul-15 | 14W             | 607207  | 7254975  | 7.4             | 4.3              | 0                 | 6.81 | 10.1       | 19.2                          | 11.3                    |
|                |           |                 |         |          |                 |                  | 1                 | 6.77 | 10.1       | 19.2                          | 11.4                    |
|                |           |                 |         |          |                 |                  | 2                 | 6.76 | 10.1       | 19.2                          | 11.2                    |
|                |           |                 |         |          |                 |                  | 3                 | 6.77 | 8.1        | 19.2                          | 11.8                    |
|                |           |                 |         |          |                 |                  | 4                 | 6.71 | 7.8        | 19.7                          | 11.7                    |
|                |           |                 |         |          |                 |                  | 5                 | 6.71 | 7.1        | 20.3                          | 12.1                    |
|                |           |                 |         |          |                 |                  | 6                 | 6.68 | 6.8        | 20.4                          | 12.2                    |
| WTN-2          | 17-Jul-15 | 14W             | 607252  | 7254613  | 6.7             | 4.7              | 7                 | 6.70 | 6.6        | 20.7                          | 12.5                    |
|                |           |                 |         |          |                 |                  | 0                 | 6.85 | 9.2        | 15.8                          | 11.4                    |
|                |           |                 |         |          |                 |                  | 1                 | 6.84 | 9.1        | 15.8                          | 11.5                    |
|                |           |                 |         |          |                 |                  | 2                 | 6.85 | 9.1        | 15.8                          | 11.3                    |
|                |           |                 |         |          |                 |                  | 3                 | 6.77 | 9.1        | 15.9                          | 11.2                    |
|                |           |                 |         |          |                 |                  | 4                 | 6.79 | 7.9        | 15.7                          | 11.6                    |
|                |           |                 |         |          |                 |                  | 5                 | 6.79 | 6.4        | 15.2                          | 12.0                    |
| WTN-3          | 20-Aug-15 | 14W             | 607387  | 7254563  | 6.8             | 6.1              | 0                 | 7.03 | 11.4       | 17.1                          | 10.5                    |
|                |           |                 |         |          |                 |                  | 1                 | 7.00 | 11.4       | 17.1                          | 10.3                    |
|                |           |                 |         |          |                 |                  | 2                 | 6.99 | 11.4       | 17.1                          | 10.2                    |
|                |           |                 |         |          |                 |                  | 3                 | 6.99 | 11.4       | 17.1                          | 10.2                    |
|                |           |                 |         |          |                 |                  | 4                 | 6.99 | 11.4       | 17.1                          | 10.1                    |
|                |           |                 |         |          |                 |                  | 5                 | 6.99 | 11.4       | 17.1                          | 10.1                    |
|                |           |                 |         |          |                 |                  | 6                 | 6.99 | 11.4       | 17.1                          | 10.1                    |
| WTN-4          | 20-Aug-15 | 14W             | 607221  | 7254980  | 7.9             | 5.4              | 0                 | 6.99 | 11.3       | 18.2                          | 10.1                    |
|                |           |                 |         |          |                 |                  | 1                 | 6.97 | 11.3       | 18.3                          | 10.0                    |
|                |           |                 |         |          |                 |                  | 2                 | 6.97 | 11.3       | 18.2                          | 10.0                    |
|                |           |                 |         |          |                 |                  | 3                 | 6.98 | 11.3       | 18.2                          | 10.0                    |
|                |           |                 |         |          |                 |                  | 4                 | 6.96 | 11.4       | 18.3                          | 9.9                     |
|                |           |                 |         |          |                 |                  | 5                 | 6.97 | 11.4       | 18.1                          | 9.9                     |
|                |           |                 |         |          |                 |                  | 6                 | 6.96 | 11.4       | 18.2                          | 9.9                     |
| WTN-5          | 18-Sep-15 | 14W             | 607244  | 7255025  | 6.7             | 4.0              | 7                 | 6.95 | 11.4       | 18.6                          | 9.8                     |
|                |           |                 |         |          |                 |                  | 0                 | 6.81 | 4.8        | 23.5                          | 12.2                    |
|                |           |                 |         |          |                 |                  | 1                 | 6.82 | 4.8        | 23.4                          | 11.8                    |
|                |           |                 |         |          |                 |                  | 2                 | 6.80 | 4.8        | 23.5                          | 11.8                    |
|                |           |                 |         |          |                 |                  | 3                 | 6.79 | 4.8        | 23.4                          | 11.8                    |
|                |           |                 |         |          |                 |                  | 4                 | 6.79 | 4.8        | 23.4                          | 11.7                    |
|                |           |                 |         |          |                 |                  | 5                 | 6.76 | 4.8        | 23.4                          | 11.8                    |
| WTN-6          | 18-Sep-15 | 14W             | 607329  | 7254542  | 10.9            | 5.6              | 6                 | 6.78 | 4.8        | 23.3                          | 11.9                    |
|                |           |                 |         |          |                 |                  | 0                 | 6.82 | 4.9        | 20.4                          | 11.2                    |
|                |           |                 |         |          |                 |                  | 1                 | 6.81 | 4.9        | 20.4                          | 11.1                    |
|                |           |                 |         |          |                 |                  | 2                 | 6.82 | 4.9        | 20.4                          | 11.2                    |
|                |           |                 |         |          |                 |                  | 3                 | 6.79 | 5.0        | 20.6                          | 11.2                    |
|                |           |                 |         |          |                 |                  | 4                 | 6.78 | 5.0        | 20.8                          | 11.1                    |
|                |           |                 |         |          |                 |                  | 5                 | 6.78 | 4.9        | 21.0                          | 11.1                    |
| WTS-1          | 17-Jul-15 | 14W             | 607450  | 7253884  | 9.5             | 3.7              | 6                 | 6.78 | 5.0        | 21.1                          | 11.1                    |
|                |           |                 |         |          |                 |                  | 7                 | 6.74 | 5.0        | 21.2                          | 11.1                    |
|                |           |                 |         |          |                 |                  | 8                 | 6.71 | 5.0        | 21.2                          | 11.1                    |
|                |           |                 |         |          |                 |                  | 9                 | 6.72 | 5.0        | 21.1                          | 11.2                    |
|                |           |                 |         |          |                 |                  | 10                | 6.72 | 4.9        | 21.1                          | 11.3                    |
|                |           |                 |         |          |                 |                  | 0                 | 6.85 | 9.1        | 15.3                          | 11.4                    |
|                |           |                 |         |          |                 |                  | 1                 | 6.80 | 9.1        | 15.3                          | 11.1                    |
| WTS-2          | 17-Jul-15 | 14W             | 607621  | 7254253  | 5.1             | 3.5              | 2                 | 6.79 | 9.0        | 15.2                          | 11.3                    |
|                |           |                 |         |          |                 |                  | 3                 | 6.80 | 9.0        | 15.1                          | 11.1                    |
|                |           |                 |         |          |                 |                  | 4                 | 6.78 | 8.7        | 15.0                          | 11.2                    |
|                |           |                 |         |          |                 |                  | 5                 | 6.80 | 7.9        | 15.0                          | 11.2                    |
|                |           |                 |         |          |                 |                  | 6                 | 6.75 | 5.7        | 14.9                          | 12.0                    |
|                |           |                 |         |          |                 |                  | 7                 | 6.70 | 5.6        | 15.0                          | 12.0                    |
|                |           |                 |         |          |                 |                  | 8                 | 6.73 | 5.4        | 14.9                          | 12.0                    |
| WTS-3          | 21-Aug-15 | 14W             | 607173  | 7253550  | 8.5             | 5.5              | 0                 | 6.79 | 7.7        | 15.2                          | 11.7                    |
|                |           |                 |         |          |                 |                  | 1                 | 6.78 | 7.7        | 15.2                          | 11.8                    |
|                |           |                 |         |          |                 |                  | 2                 | 6.79 | 7.7        | 15.1                          | 11.6                    |
|                |           |                 |         |          |                 |                  | 3                 | 6.77 | 7.6        | 15.1                          | 11.6                    |
|                |           |                 |         |          |                 |                  | 4                 | 6.78 | 7.6        | 15.5                          | 11.9                    |
|                |           |                 |         |          |                 |                  | 0                 | 6.77 | 10.8       | 17.0                          | 10.3                    |
|                |           |                 |         |          |                 |                  | 1                 | 6.81 | 10.8       | 17.0                          | 10.1                    |



**Table B2-1.** *In-situ* water quality results from the Lake stations, Whale Tail Pit Baseline, 2015.

| Area-Replicate | Date      | UTM Coordinates |         |          | Water Depth (m) | Secchi Depth (m) | Profile Depth (m) | pH   | Temp. (°C) | Specific Conductivity (µS/cm) | Dissolved Oxygen (mg/L) |
|----------------|-----------|-----------------|---------|----------|-----------------|------------------|-------------------|------|------------|-------------------------------|-------------------------|
|                |           | Zone            | Easting | Northing |                 |                  |                   |      |            |                               |                         |
| WTS-3 (con't)  |           |                 |         |          |                 |                  | 2                 | 6.84 | 10.8       | 17.0                          | 10.0                    |
|                |           |                 |         |          |                 |                  | 3                 | 6.90 | 10.8       | 17.0                          | 10.1                    |
|                |           |                 |         |          |                 |                  | 4                 | 6.90 | 10.8       | 17.0                          | 10.0                    |
|                |           |                 |         |          |                 |                  | 5                 | 6.90 | 10.8       | 17.0                          | 10.1                    |
|                |           |                 |         |          |                 |                  | 6                 | 6.91 | 10.8       | 17.0                          | 10.0                    |
|                |           |                 |         |          |                 |                  | 7                 | 6.91 | 10.8       | 17.0                          | 9.9                     |
|                |           |                 |         |          |                 |                  | 8                 | 6.90 | 10.8       | 17.0                          | 10.0                    |
| WTS-4          | 21-Aug-15 | 14W             | 607571  | 7254138  | 7.5             | 6.5              | 0                 | 6.84 | 10.8       | 17.1                          | 10.3                    |
|                |           |                 |         |          |                 |                  | 1                 | 6.86 | 10.8       | 17.1                          | 10.3                    |
|                |           |                 |         |          |                 |                  | 2                 | 6.86 | 10.8       | 17.1                          | 10.2                    |
|                |           |                 |         |          |                 |                  | 3                 | 6.85 | 10.8       | 17.1                          | 10.2                    |
|                |           |                 |         |          |                 |                  | 4                 | 6.86 | 10.8       | 17.1                          | 10.2                    |
|                |           |                 |         |          |                 |                  | 5                 | 6.87 | 10.8       | 17.1                          | 10.0                    |
|                |           |                 |         |          |                 |                  | 6                 | 6.87 | 10.8       | 17.1                          | 10.1                    |
| WTS-5          | 18-Sep-15 | 14W             | 607612  | 7253907  | 6.5             | 5.1              | 0                 | 6.59 | 4.9        | 19.8                          | 13.1                    |
|                |           |                 |         |          |                 |                  | 1                 | 6.60 | 4.9        | 19.8                          | 13.1                    |
|                |           |                 |         |          |                 |                  | 2                 | 6.57 | 4.9        | 19.8                          | 13.1                    |
|                |           |                 |         |          |                 |                  | 3                 | 6.49 | 4.9        | 19.8                          | 13.1                    |
|                |           |                 |         |          |                 |                  | 4                 | 6.47 | 4.9        | 19.8                          | 13.1                    |
|                |           |                 |         |          |                 |                  | 5                 | 6.38 | 4.9        | 19.8                          | 13.4                    |
|                |           |                 |         |          |                 |                  |                   |      |            |                               |                         |
| WTS-6          | 18-Sep-15 | 14W             | 607568  | 725459   | 7.8             | 5.0              | 0                 | 6.76 | 4.9        | 19.8                          | 12.1                    |
|                |           |                 |         |          |                 |                  | 1                 | 6.75 | 4.9        | 19.8                          | 12.0                    |
|                |           |                 |         |          |                 |                  | 2                 | 6.73 | 4.9        | 19.8                          | 12.0                    |
|                |           |                 |         |          |                 |                  | 3                 | 6.76 | 4.9        | 19.7                          | 12.0                    |
|                |           |                 |         |          |                 |                  | 4                 | 6.74 | 4.9        | 19.8                          | 12.0                    |
|                |           |                 |         |          |                 |                  | 5                 | 6.68 | 4.9        | 19.8                          | 12.1                    |
|                |           |                 |         |          |                 |                  | 6                 | 6.69 | 4.9        | 19.8                          | 12.1                    |
| NEM-1          | 18-Jul-15 | 14W             | 606604  | 7257508  | 10.5            | 8.0              | 7                 | 6.66 | 4.9        | 19.8                          | 12.3                    |
|                |           |                 |         |          |                 |                  | 0                 | 7.06 | 6.2        | 24.1                          | 14.8                    |
|                |           |                 |         |          |                 |                  | 1                 | 7.08 | 6.2        | 24.2                          | 14.8                    |
|                |           |                 |         |          |                 |                  | 2                 | 7.07 | 6.3        | 24.1                          | 14.5                    |
|                |           |                 |         |          |                 |                  | 3                 | 7.08 | 6.2        | 24.2                          | 14.6                    |
|                |           |                 |         |          |                 |                  | 4                 | 7.10 | 6.2        | 24.1                          | 14.5                    |
|                |           |                 |         |          |                 |                  | 5                 | 7.09 | 6.2        | 24.2                          | 14.3                    |
|                |           |                 |         |          |                 |                  | 6                 | 7.10 | 6.1        | 24.1                          | 14.4                    |
|                |           |                 |         |          |                 |                  | 7                 | 7.11 | 6.1        | 24.1                          | 14.4                    |
| NEM-2          | 18-Jul-15 | 14W             | 606454  | 7257135  | 11.1            | 7.0              | 8                 | 7.12 | 6.1        | 24.1                          | 14.3                    |
|                |           |                 |         |          |                 |                  | 9                 | 7.15 | 6.1        | 24.1                          | 14.2                    |
|                |           |                 |         |          |                 |                  | 0                 | 7.01 | 6.4        | 24.1                          | 15.3                    |
|                |           |                 |         |          |                 |                  | 1                 | 7.01 | 6.4        | 24.2                          | 15.2                    |
|                |           |                 |         |          |                 |                  | 2                 | 7.01 | 6.4        | 24.1                          | 15.2                    |
|                |           |                 |         |          |                 |                  | 3                 | 7.03 | 6.1        | 24.1                          | 15.0                    |
|                |           |                 |         |          |                 |                  | 4                 | 7.03 | 6.1        | 24.2                          | 15.1                    |
|                |           |                 |         |          |                 |                  | 5                 | 7.04 | 6.0        | 24.2                          | 15.3                    |
|                |           |                 |         |          |                 |                  | 6                 | 7.05 | 6.0        | 24.2                          | 15.1                    |
|                |           |                 |         |          |                 |                  | 7                 | 7.07 | 5.9        | 24.3                          | 15.4                    |
| NEM-3          | 23-Aug-15 | 14W             | 606553  | 7257360  | 8               | 7.6              | 8                 | 7.09 | 5.9        | 24.2                          | 15.2                    |
|                |           |                 |         |          |                 |                  | 9                 | 7.13 | 5.9        | 24.2                          | 15.2                    |
|                |           |                 |         |          |                 |                  | 10                | 7.22 | 6.1        | 24.1                          | 15.2                    |
|                |           |                 |         |          |                 |                  | 0                 | 7.25 | 11.3       | 21.7                          | 11.7                    |
|                |           |                 |         |          |                 |                  | 1                 | 7.25 | 11.2       | 21.7                          | 11.6                    |
|                |           |                 |         |          |                 |                  | 2                 | 7.27 | 11.2       | 21.7                          | 11.1                    |
|                |           |                 |         |          |                 |                  | 3                 | 7.26 | 11.2       | 21.7                          | 11.2                    |
|                |           |                 |         |          |                 |                  | 4                 | 7.26 | 11.1       | 21.7                          | 11.3                    |
| NEM-4          | 23-Aug-15 | 14W             | 606378  | 7257257  | 11.8            | 8.4              | 5                 | 7.26 | 11.1       | 21.7                          | 11.0                    |
|                |           |                 |         |          |                 |                  | 6                 | 7.26 | 11.1       | 21.7                          | 10.7                    |
|                |           |                 |         |          |                 |                  | 7                 | 7.26 | 11.1       | 21.7                          | 11.0                    |
|                |           |                 |         |          |                 |                  | 0                 | 7.08 | 11.1       | 21.7                          | 12.9                    |
|                |           |                 |         |          |                 |                  | 1                 | 7.12 | 11.1       | 21.7                          | 12.6                    |
|                |           |                 |         |          |                 |                  | 2                 | 7.14 | 11.1       | 21.7                          | 12.6                    |
|                |           |                 |         |          |                 |                  | 3                 | 7.14 | 11.1       | 21.7                          | 12.7                    |
|                |           |                 |         |          |                 |                  | 4                 | 7.16 | 11.1       | 21.7                          | 12.7                    |



**Table B2-1.** *In-situ* water quality results from the Lake stations, Whale Tail Pit Baseline, 2015.

| Area-Replicate | Date      | UTM Coordinates |         |          | Water Depth (m) | Secchi Depth (m) | Profile Depth (m) | pH   | Temp. (°C) | Specific Conductivity (µS/cm) | Dissolved Oxygen (mg/L) |
|----------------|-----------|-----------------|---------|----------|-----------------|------------------|-------------------|------|------------|-------------------------------|-------------------------|
|                |           | Zone            | Easting | Northing |                 |                  |                   |      |            |                               |                         |
| NEM-4 (con't)  |           |                 |         |          |                 |                  | 5                 | 7.16 | 11.1       | 21.7                          | 12.2                    |
|                |           |                 |         |          |                 |                  | 6                 | 7.17 | 11.1       | 21.7                          | 12.4                    |
|                |           |                 |         |          |                 |                  | 7                 | 7.17 | 11.0       | 21.7                          | 12.5                    |
|                |           |                 |         |          |                 |                  | 8                 | 7.18 | 11.0       | 21.7                          | 12.0                    |
|                |           |                 |         |          |                 |                  | 9                 | 7.18 | 11.0       | 21.7                          | 12.2                    |
|                |           |                 |         |          |                 |                  | 10                | 7.18 | 11.0       | 21.7                          | 12.0                    |
|                |           |                 |         |          |                 |                  | 11                | 7.19 | 11.0       | 21.7                          | 12.1                    |
| NEM-5          | 19-Sep-15 | 14W             | 606288  | 7257418  | 10.5            | 7.5              | 0                 | 7.17 | 5.5        | 23.4                          | 14.1                    |
|                |           |                 |         |          |                 |                  | 1                 | 7.15 | 5.5        | 23.4                          | 13.9                    |
|                |           |                 |         |          |                 |                  | 2                 | 7.12 | 5.5        | 23.4                          | 14.0                    |
|                |           |                 |         |          |                 |                  | 3                 | 7.18 | 5.5        | 23.4                          | 14.0                    |
|                |           |                 |         |          |                 |                  | 4                 | 7.19 | 5.5        | 23.4                          | 14.0                    |
|                |           |                 |         |          |                 |                  | 5                 | 7.14 | 5.5        | 23.4                          | 14.0                    |
|                |           |                 |         |          |                 |                  | 6                 | 7.16 | 5.5        | 23.4                          | 14.2                    |
|                |           |                 |         |          |                 |                  | 7                 | 7.14 | 5.5        | 23.4                          | 14.2                    |
|                |           |                 |         |          |                 |                  | 8                 | 7.20 | 5.5        | 23.4                          | 14.3                    |
| NEM-6          | 19-Sep-15 | 14W             | 606611  | 7257938  | 15.2            | 8.5              | 9                 | 7.24 | 5.5        | 23.4                          | 14.7                    |
|                |           |                 |         |          |                 |                  | 0                 | 7.20 | 5.8        | 23.4                          | 14.3                    |
|                |           |                 |         |          |                 |                  | 1                 | 7.17 | 5.8        | 23.4                          | 14.1                    |
|                |           |                 |         |          |                 |                  | 2                 | 7.18 | 5.8        | 23.4                          | 14.0                    |
|                |           |                 |         |          |                 |                  | 3                 | 7.19 | 5.8        | 23.4                          | 13.9                    |
|                |           |                 |         |          |                 |                  | 4                 | 7.18 | 5.8        | 23.4                          | 13.9                    |
|                |           |                 |         |          |                 |                  | 5                 | 7.17 | 5.8        | 23.4                          | 14.0                    |
|                |           |                 |         |          |                 |                  | 6                 | 7.15 | 5.8        | 23.4                          | 13.9                    |
|                |           |                 |         |          |                 |                  | 7                 | 7.19 | 5.8        | 23.4                          | 13.8                    |
|                |           |                 |         |          |                 |                  | 8                 | 7.21 | 5.8        | 23.4                          | 13.8                    |
|                |           |                 |         |          |                 |                  | 9                 | 7.19 | 5.8        | 23.4                          | 13.9                    |
|                |           |                 |         |          |                 |                  | 10                | 7.19 | 5.8        | 23.4                          | 14.0                    |
|                |           |                 |         |          |                 |                  | 11                | 7.17 | 5.8        | 23.4                          | 14.1                    |
|                |           |                 |         |          |                 |                  | 12                | 7.18 | 5.8        | 23.4                          | 13.9                    |
|                |           |                 |         |          |                 |                  | 13                | 7.17 | 5.8        | 23.4                          | 14.2                    |
| MAM-1          | 18-Jul-15 | 14W             | 604278  | 7254163  | 5.1             | 5.1              | 14                | 7.12 | 5.8        | 23.4                          | 14.3                    |
|                |           |                 |         |          |                 |                  | 0                 | 7.09 | 10.6       | 22.1                          | 12.5                    |
|                |           |                 |         |          |                 |                  | 1                 | 7.08 | 10.5       | 22.1                          | 12.4                    |
|                |           |                 |         |          |                 |                  | 2                 | 7.09 | 10.5       | 22.1                          | 12.2                    |
|                |           |                 |         |          |                 |                  | 3                 | 7.08 | 10.4       | 22.1                          | 12.2                    |
| MAM-2          | 18-Jul-15 | 14W             | 604145  | 7254415  | 7.8             | 6.5              | 4                 | 7.08 | 10.4       | 22.1                          | 12.2                    |
|                |           |                 |         |          |                 |                  | 0                 | 7.09 | 10.2       | 22.1                          | 12.5                    |
|                |           |                 |         |          |                 |                  | 1                 | 7.10 | 10.1       | 22.1                          | 12.5                    |
|                |           |                 |         |          |                 |                  | 2                 | 7.08 | 10.0       | 22.1                          | 12.4                    |
|                |           |                 |         |          |                 |                  | 3                 | 7.07 | 10.0       | 22.1                          | 12.1                    |
|                |           |                 |         |          |                 |                  | 4                 | 7.05 | 9.9        | 22.1                          | 12.1                    |
|                |           |                 |         |          |                 |                  | 5                 | 7.04 | 8.8        | 21.8                          | 12.2                    |
| MAM-3          | 24-Aug-15 | 14W             | 604273  | 7254244  | 7.2             | 6.6              | 6                 | 7.07 | 7.7        | 21.4                          | 13.3                    |
|                |           |                 |         |          |                 |                  | 7                 | 7.09 | 6.9        | 21.3                          | 13.8                    |
|                |           |                 |         |          |                 |                  | 0                 | 6.96 | 11.0       | 21.3                          | 11.1                    |
|                |           |                 |         |          |                 |                  | 1                 | 6.96 | 11.0       | 21.3                          | 11.0                    |
|                |           |                 |         |          |                 |                  | 2                 | 6.95 | 11.0       | 21.3                          | 10.9                    |
|                |           |                 |         |          |                 |                  | 3                 | 6.95 | 10.9       | 21.3                          | 11.0                    |
|                |           |                 |         |          |                 |                  | 4                 | 6.96 | 10.9       | 21.3                          | 10.8                    |
| MAM-4          | 24-Aug-15 | 14W             | 604239  | 7253860  | 7.8             | 6.5              | 5                 | 6.95 | 10.9       | 21.3                          | 10.8                    |
|                |           |                 |         |          |                 |                  | 6                 | 6.96 | 10.9       | 21.3                          | 10.6                    |
|                |           |                 |         |          |                 |                  | 7                 | 6.95 | 10.9       | 21.3                          | 10.5                    |
|                |           |                 |         |          |                 |                  | 0                 | 7.11 | 11.0       | 21.3                          | 12.6                    |
|                |           |                 |         |          |                 |                  | 1                 | 7.10 | 11.0       | 21.3                          | 12.2                    |
|                |           |                 |         |          |                 |                  | 2                 | 7.08 | 11.0       | 21.3                          | 12.4                    |
|                |           |                 |         |          |                 |                  | 3                 | 7.08 | 11.0       | 21.3                          | 12.3                    |
| MAM-5          | 19-Sep-15 | 14W             | 604357  | 7254348  | 8.9             | 6.0              | 4                 | 7.08 | 11.0       | 21.3                          | 12.0                    |
|                |           |                 |         |          |                 |                  | 5                 | 7.08 | 11.0       | 21.3                          | 11.8                    |
|                |           |                 |         |          |                 |                  | 6                 | 7.07 | 11.0       | 21.3                          | 12.0                    |
|                |           |                 |         |          |                 |                  | 7                 | 7.07 | 11.0       | 21.3                          | 12.0                    |
|                |           |                 |         |          |                 |                  | 0                 | 7.04 | 4.5        | 24.0                          | 14.5                    |
|                |           |                 |         |          |                 |                  | 1                 | 7.06 | 4.5        | 24.0                          | 14.4                    |



**Table B2-1.** *In-situ* water quality results from the Lake stations, Whale Tail Pit Baseline, 2015.

| Area-Replicate | Date      | UTM Coordinates |         |          | Water Depth (m) | Secchi Depth (m) | Profile Depth (m) | pH   | Temp. (°C) | Specific Conductivity (µS/cm) | Dissolved Oxygen (mg/L) |
|----------------|-----------|-----------------|---------|----------|-----------------|------------------|-------------------|------|------------|-------------------------------|-------------------------|
|                |           | Zone            | Easting | Northing |                 |                  |                   |      |            |                               |                         |
| MAM-5 (con't)  |           |                 |         |          |                 |                  | 2                 | 7.06 | 4.5        | 24.0                          | 14.4                    |
|                |           |                 |         |          |                 |                  | 3                 | 7.07 | 4.5        | 24.0                          | 14.3                    |
|                |           |                 |         |          |                 |                  | 4                 | 7.11 | 4.5        | 24.0                          | 14.3                    |
|                |           |                 |         |          |                 |                  | 5                 | 7.08 | 4.5        | 24.0                          | 14.4                    |
|                |           |                 |         |          |                 |                  | 6                 | 7.09 | 4.5        | 24.0                          | 14.4                    |
|                |           |                 |         |          |                 |                  | 7                 | 7.08 | 4.5        | 24.0                          | 14.5                    |
|                |           |                 |         |          |                 |                  | 8                 | 7.15 | 4.5        | 24.0                          | 14.5                    |
| MAM-6          | 19-Sep-15 | 14W             | 604228  | 7253834  | 6.4             | 5.9              | 0                 | 6.97 | 4.5        | 23.8                          | 15.2                    |
|                |           |                 |         |          |                 |                  | 1                 | 7.00 | 4.5        | 23.8                          | 15.1                    |
|                |           |                 |         |          |                 |                  | 2                 | 7.00 | 4.5        | 23.8                          | 15.0                    |
|                |           |                 |         |          |                 |                  | 3                 | 7.00 | 4.5        | 23.8                          | 15.1                    |
|                |           |                 |         |          |                 |                  | 4                 | 6.97 | 4.5        | 23.8                          | 14.9                    |
| PDL-37         | 28-Jul-15 | 14W             | 631323  | 7224998  | 28              |                  | 0                 | 6.55 |            |                               |                         |
|                |           |                 |         |          |                 |                  | 1                 |      | 7.9        | 15.0                          | 11.6                    |
|                |           |                 |         |          |                 |                  | 2                 |      | 7.0        | 18.0                          | 11.6                    |
|                |           |                 |         |          |                 |                  | 3                 |      | 6.8        | 19.0                          | 11.2                    |
|                |           |                 |         |          |                 |                  | 4                 |      | 6.7        | 19.0                          | 10.9                    |
|                |           |                 |         |          |                 |                  | 5                 |      | 6.1        | 20.0                          | 10.7                    |
|                |           |                 |         |          |                 |                  | 6                 |      | 5.5        | 21.0                          | 11.1                    |
|                |           |                 |         |          |                 |                  | 7                 |      | 5.3        | 21.0                          | 11.2                    |
|                |           |                 |         |          |                 |                  | 8                 |      | 5.2        | 24.0                          | 11.1                    |
|                |           |                 |         |          |                 |                  | 9                 |      | 5.1        | 18.0                          | 11.0                    |
|                |           |                 |         |          |                 |                  | 10                |      | 5.1        | 18.0                          | 10.9                    |
|                |           |                 |         |          |                 |                  | 11                |      | 5.0        | 18.0                          | 10.7                    |
|                |           |                 |         |          |                 |                  | 12                |      | 5.0        | 18.0                          | 10.4                    |
|                |           |                 |         |          |                 |                  | 13                |      | 4.9        | 17.0                          | 10.7                    |
|                |           |                 |         |          |                 |                  | 14                |      | 4.9        | 17.0                          | 10.7                    |
|                |           |                 |         |          |                 |                  | 15                |      | 4.8        | 17.0                          | 10.8                    |
| PDL-38†        | 28-Jul-15 | 14W             | 632161  | 7225256  | 27              | 10.0             | 0                 | 6.20 |            |                               |                         |
|                |           |                 |         |          |                 |                  | 1                 |      | 6.3        | 18.0                          | 10.7                    |
|                |           |                 |         |          |                 |                  | 2                 |      | 5.9        | 20.0                          | 10.3                    |
|                |           |                 |         |          |                 |                  | 3                 |      | 5.7        | 21.0                          | 10.3                    |
|                |           |                 |         |          |                 |                  | 4                 |      | 5.3        | 21.0                          | 9.4                     |
|                |           |                 |         |          |                 |                  | 5                 |      | 5.2        | 21.0                          | 9.6                     |
|                |           |                 |         |          |                 |                  | 6                 |      | 4.9        | 21.0                          | 10.1                    |
|                |           |                 |         |          |                 |                  | 7                 |      | 4.8        | 20.0                          | 9.8                     |
|                |           |                 |         |          |                 |                  | 8                 |      | 4.8        | 18.0                          | 9.9                     |
|                |           |                 |         |          |                 |                  | 9                 |      | 4.8        | 17.0                          | 10.0                    |
|                |           |                 |         |          |                 |                  | 10                |      | 4.7        | 17.0                          | 10.1                    |
|                |           |                 |         |          |                 |                  | 11                |      | 4.7        | 16.0                          | 10.0                    |
|                |           |                 |         |          |                 |                  | 12                |      | 4.6        | 15.0                          | 10.0                    |
|                |           |                 |         |          |                 |                  | 13                |      | 4.6        | 14.0                          | 9.2                     |
|                |           |                 |         |          |                 |                  | 14                |      | 4.5        | 16.0                          | 9.6                     |
|                |           |                 |         |          |                 |                  | 15                |      | 4.5        | 16.0                          | 9.4                     |
| PDL-39         | 26-Aug-15 | 14W             | 631743  | 7224224  | 23.4            | 9.9              | 0                 | 7.16 | 10.6       | 18.7                          | 12.2                    |
|                |           |                 |         |          |                 |                  | 1                 | 7.15 | 10.4       | 18.7                          | 12.3                    |
|                |           |                 |         |          |                 |                  | 2                 | 7.15 | 10.4       | 18.7                          | 12.4                    |
|                |           |                 |         |          |                 |                  | 3                 | 7.16 | 10.3       | 18.7                          | 12.3                    |
|                |           |                 |         |          |                 |                  | 4                 | 7.15 | 10.3       | 18.7                          | 12.3                    |
|                |           |                 |         |          |                 |                  | 5                 | 7.15 | 10.2       | 18.7                          | 12.2                    |
|                |           |                 |         |          |                 |                  | 6                 | 7.15 | 10.2       | 18.7                          | 12.2                    |
|                |           |                 |         |          |                 |                  | 7                 | 7.14 | 10.2       | 18.7                          | 12.0                    |
|                |           |                 |         |          |                 |                  | 8                 | 7.15 | 10.2       | 18.7                          | 12.2                    |
|                |           |                 |         |          |                 |                  | 9                 | 7.15 | 10.2       | 18.7                          | 12.1                    |
|                |           |                 |         |          |                 |                  | 10                | 7.15 | 10.2       | 18.7                          | 12.2                    |
|                |           |                 |         |          |                 |                  | 11                | 7.15 | 10.2       | 18.7                          | 12.1                    |
|                |           |                 |         |          |                 |                  | 12                | 7.15 | 10.2       | 18.7                          | 12.1                    |
|                |           |                 |         |          |                 |                  | 13                | 7.16 | 10.2       | 18.7                          | 12.2                    |
|                |           |                 |         |          |                 |                  | 14                | 7.14 | 10.1       | 18.7                          | 12.0                    |
|                |           |                 |         |          |                 |                  | 15                | 7.16 | 10.1       | 18.7                          | 12.0                    |
|                |           |                 |         |          |                 |                  | 16                | 7.14 | 10.1       | 18.7                          | 12.1                    |
|                |           |                 |         |          |                 |                  | 17                | 7.15 | 10.1       | 18.7                          | 11.9                    |
|                |           |                 |         |          |                 |                  | 18                | 7.15 | 10.1       | 18.7                          | 11.9                    |



**Table B2-1.** *In-situ* water quality results from the Lake stations, Whale Tail Pit Baseline, 2015.

| Area-Replicate | Date      | UTM Coordinates |         |          | Water Depth (m) | Secchi Depth (m) | Profile Depth (m) | pH   | Temp. (°C) | Specific Conductivity (µS/cm) | Dissolved Oxygen (mg/L) |
|----------------|-----------|-----------------|---------|----------|-----------------|------------------|-------------------|------|------------|-------------------------------|-------------------------|
|                |           | Zone            | Easting | Northing |                 |                  |                   |      |            |                               |                         |
| PDL-39 (con't) |           |                 |         |          |                 |                  | 19                | 7.15 | 10.1       | 18.7                          | 12.0                    |
|                |           |                 |         |          |                 |                  | 20                | 7.15 | 10.1       | 18.7                          | 12.0                    |
| PDL-40         | 26-Aug-15 | 14W             | 632623  | 7223870  | 26.9            | 11.6             | 0                 | 7.27 | 10.6       | 18.7                          | 13.0                    |
|                |           |                 |         |          |                 |                  | 1                 | 7.27 | 10.3       | 18.7                          | 13.0                    |
|                |           |                 |         |          |                 |                  | 2                 | 7.27 | 10.3       | 18.6                          | 13.0                    |
|                |           |                 |         |          |                 |                  | 3                 | 7.26 | 10.1       | 18.7                          | 12.1                    |
|                |           |                 |         |          |                 |                  | 4                 | 7.26 | 10.1       | 18.7                          | 12.2                    |
|                |           |                 |         |          |                 |                  | 5                 | 7.25 | 10.1       | 18.7                          | 12.1                    |
|                |           |                 |         |          |                 |                  | 6                 | 7.25 | 10.1       | 18.7                          | 12.0                    |
|                |           |                 |         |          |                 |                  | 7                 | 7.25 | 10.1       | 18.7                          | 12.0                    |
|                |           |                 |         |          |                 |                  | 8                 | 7.25 | 10.1       | 18.7                          | 12.1                    |
|                |           |                 |         |          |                 |                  | 9                 | 7.24 | 10.1       | 18.7                          | 12.0                    |
|                |           |                 |         |          |                 |                  | 10                | 7.25 | 10.1       | 18.7                          | 12.1                    |
|                |           |                 |         |          |                 |                  | 11                | 7.24 | 10.1       | 18.7                          | 12.1                    |
|                |           |                 |         |          |                 |                  | 12                | 7.24 | 10.1       | 18.7                          | 11.9                    |
|                |           |                 |         |          |                 |                  | 13                | 7.24 | 10.1       | 18.7                          | 12.0                    |
|                |           |                 |         |          |                 |                  | 14                | 7.24 | 10.1       | 18.7                          | 12.1                    |
|                |           |                 |         |          |                 |                  | 15                | 7.24 | 10.0       | 18.7                          | 12.1                    |
|                |           |                 |         |          |                 |                  | 16                | 7.24 | 10.0       | 18.7                          | 12.0                    |
|                |           |                 |         |          |                 |                  | 17                | 7.23 | 10.0       | 18.7                          | 12.0                    |
|                |           |                 |         |          |                 |                  | 18                | 7.23 | 9.9        | 18.7                          | 11.9                    |
|                |           |                 |         |          |                 |                  | 19                | 7.21 | 9.8        | 18.7                          | 12.0                    |
|                |           |                 |         |          |                 |                  | 20                | 7.20 | 9.8        | 18.7                          | 11.9                    |
| PDL-41†        | 4-Oct-15  | 14W             | 630089  | 7223596  | 13.5            |                  | 0                 | 6.43 |            |                               |                         |
|                |           |                 |         |          |                 |                  | 1                 |      | 3.0        | 37.0                          | 10.6                    |
|                |           |                 |         |          |                 |                  | 2                 |      | 3.0        | 26.0                          | 10.5                    |
|                |           |                 |         |          |                 |                  | 3                 |      | 3.1        | 26.0                          | 10.4                    |
|                |           |                 |         |          |                 |                  | 4                 |      | 3.1        | 26.0                          | 10.2                    |
|                |           |                 |         |          |                 |                  | 5                 |      | 3.1        | 25.0                          | 10.2                    |
|                |           |                 |         |          |                 |                  | 6                 |      | 3.1        | 25.0                          | 10.2                    |
|                |           |                 |         |          |                 |                  | 7                 |      | 3.1        | 25.0                          | 10.2                    |
|                |           |                 |         |          |                 |                  | 8                 |      | 3.1        | 25.0                          | 10.1                    |
|                |           |                 |         |          |                 |                  | 9                 |      | 3.1        | 25.0                          | 10.1                    |
|                |           |                 |         |          |                 |                  | 10                |      | 3.1        | 25.0                          | 10.1                    |
|                |           |                 |         |          |                 |                  | 11                |      | 3.1        | 26.0                          | 10.1                    |
|                |           |                 |         |          |                 |                  | 12                |      | 3.1        | 26.0                          | 10.1                    |
|                |           |                 |         |          |                 |                  | 13                |      | 3.1        | 26.0                          | 10.1                    |
| INUG-70        | 27-Jul-15 | 14W             | 622965  | 7216215  | 4.5             |                  | 0                 | 7.04 |            |                               |                         |
|                |           |                 |         |          |                 |                  | 1                 |      | 10.7       | 12.0                          | 10.0                    |
|                |           |                 |         |          |                 |                  | 2                 |      | 10.5       | 12.0                          | 9.8                     |
|                |           |                 |         |          |                 |                  | 3                 |      | 10.2       | 12.0                          | 9.9                     |
|                |           |                 |         |          |                 |                  | 4                 |      | 10.1       | 12.0                          | 9.8                     |
| INUG-71        | 27-Jul-15 | 14W             | 622256  | 7214295  | 8.5             | 8.5              | 0                 | 7.12 |            |                               |                         |
|                |           |                 |         |          |                 |                  | 1                 |      | 10.7       | 12.0                          | 10.0                    |
|                |           |                 |         |          |                 |                  | 2                 |      | 10.4       | 12.0                          | 10.3                    |
|                |           |                 |         |          |                 |                  | 3                 |      | 10.1       | 12.0                          | 9.8                     |
|                |           |                 |         |          |                 |                  | 4                 |      | 10.1       | 12.0                          | 10.0                    |
|                |           |                 |         |          |                 |                  | 5                 |      | 9.9        | 13.0                          | 10.1                    |
|                |           |                 |         |          |                 |                  | 6                 |      | 9.5        | 13.0                          | 10.1                    |
|                |           |                 |         |          |                 |                  | 7                 |      | 9.2        | 13.0                          | 10.1                    |
| INUG-72        | 27-Aug-15 | 14W             | 621832  | 7215439  | 9.8             | 9.4              | 0                 | 7.31 | 11.5       | 13.3                          | 10.0                    |
|                |           |                 |         |          |                 |                  | 1                 | 7.27 | 11.6       | 13.3                          | 9.9                     |
|                |           |                 |         |          |                 |                  | 2                 | 7.26 | 11.5       | 13.3                          | 10.1                    |
|                |           |                 |         |          |                 |                  | 3                 | 7.24 | 11.5       | 13.3                          | 9.9                     |
|                |           |                 |         |          |                 |                  | 4                 | 7.22 | 11.5       | 13.3                          | 9.9                     |
|                |           |                 |         |          |                 |                  | 5                 | 7.18 | 11.5       | 13.3                          | 9.8                     |
|                |           |                 |         |          |                 |                  | 6                 | 7.18 | 11.5       | 13.3                          | 9.8                     |
|                |           |                 |         |          |                 |                  | 7                 | 7.16 | 11.5       | 13.3                          | 9.6                     |
|                |           |                 |         |          |                 |                  | 8                 | 7.16 | 11.5       | 13.3                          | 9.7                     |
|                |           |                 |         |          |                 |                  | 9                 | 7.12 | 11.4       | 13.3                          | 9.9                     |
| INUG-73        | 27-Aug-15 | 14W             | 622718  | 7214853  | 9.3             | 8.6              | 0                 | 6.94 | 11.5       | 13.2                          | 10.1                    |
|                |           |                 |         |          |                 |                  | 1                 | 6.95 | 11.5       | 13.2                          | 9.8                     |
|                |           |                 |         |          |                 |                  | 2                 | 6.94 | 11.5       | 13.2                          | 9.9                     |



**Table B2-1.** *In-situ* water quality results from the Lake stations, Whale Tail Pit Baseline, 2015.

| Area-Replicate  | Date     | UTM Coordinates |         |          | Water Depth (m) | Secchi Depth (m) | Profile Depth (m) | pH   | Temp. (°C) | Specific Conductivity (µS/cm) | Dissolved Oxygen (mg/L) |
|-----------------|----------|-----------------|---------|----------|-----------------|------------------|-------------------|------|------------|-------------------------------|-------------------------|
|                 |          | Zone            | Easting | Northing |                 |                  |                   |      |            |                               |                         |
| INUG-73 (con't) |          |                 |         |          |                 |                  | 3                 | 6.94 | 11.5       | 13.2                          | 10.0                    |
|                 |          |                 |         |          |                 |                  | 4                 | 6.94 | 11.5       | 13.3                          | 10.0                    |
|                 |          |                 |         |          |                 |                  | 5                 | 6.94 | 11.5       | 13.2                          | 9.9                     |
|                 |          |                 |         |          |                 |                  | 6                 | 6.94 | 11.4       | 13.2                          | 9.8                     |
|                 |          |                 |         |          |                 |                  | 7                 | 6.94 | 11.4       | 13.3                          | 9.9                     |
|                 |          |                 |         |          |                 |                  | 8                 | 6.94 | 11.4       | 13.3                          | 9.8                     |
|                 |          |                 |         |          |                 |                  | 9                 | 6.94 | 11.4       | 13.3                          | 9.7                     |
| INUG-74*        | 1-Oct-15 | 14W             | 622518  | 7214715  | 11              |                  | 0                 | 6.74 | 2.5        | 157                           | 10.4                    |
|                 |          |                 |         |          |                 |                  | 1                 |      | 2.5        | 154                           | 10.3                    |
|                 |          |                 |         |          |                 |                  | 2                 |      | 2.4        | 153                           | 10.3                    |
|                 |          |                 |         |          |                 |                  | 3                 |      | 2.4        | 140                           | 10.2                    |
|                 |          |                 |         |          |                 |                  | 4                 |      | 2.4        | 140                           | 10.1                    |
|                 |          |                 |         |          |                 |                  | 5                 |      | 2.4        | 138                           | 10.1                    |
|                 |          |                 |         |          |                 |                  | 6                 |      | 2.4        | 132                           | 10.1                    |
|                 |          |                 |         |          |                 |                  | 7                 |      | 2.4        | 129                           | 10.2                    |
|                 |          |                 |         |          |                 |                  | 8                 |      | 2.4        | 126                           | 10.1                    |
|                 |          |                 |         |          |                 |                  | 9                 |      | 2.4        | 122                           | 10.1                    |
|                 |          |                 |         |          |                 |                  | 10                |      | 2.4        | 121                           | 10.1                    |
| INUG-75         | 1-Oct-15 | 14W             | 622756  | 7215766  | 13              |                  | 0                 | 7.00 | 2.4        | 43.0                          | 10.3                    |
|                 |          |                 |         |          |                 |                  | 1                 |      | 2.4        | 27.0                          | 10.4                    |
|                 |          |                 |         |          |                 |                  | 2                 |      | 2.4        | 27.0                          | 10.3                    |
|                 |          |                 |         |          |                 |                  | 3                 |      | 2.4        | 26.0                          | 10.3                    |
|                 |          |                 |         |          |                 |                  | 4                 |      | 2.4        | 26.0                          | 10.2                    |
|                 |          |                 |         |          |                 |                  | 5                 |      | 2.4        | 27.0                          | 10.2                    |
|                 |          |                 |         |          |                 |                  | 6                 |      | 2.4        | 27.0                          | 10.3                    |
|                 |          |                 |         |          |                 |                  | 7                 |      | 2.4        | 27.0                          | 10.3                    |
|                 |          |                 |         |          |                 |                  | 8                 |      | 2.4        | 27.0                          | 10.2                    |
|                 |          |                 |         |          |                 |                  | 9                 |      | 2.4        | 28.0                          | 10.2                    |
|                 |          |                 |         |          |                 |                  | 10                |      | 2.4        | 29.0                          | 10.2                    |
|                 |          |                 |         |          |                 |                  | 11                |      | 2.4        | 29.0                          | 10.2                    |
|                 |          |                 |         |          |                 |                  | 12                |      | 2.4        | 29.0                          | 10.2                    |

**Notes:**

pH profiles were not recorded by AEM staff at PDL and INUG during the July and September/October sampling events.

Specific conductivity measurements for INUG-74 are considered anomalous relative to the measurements recorded at INUG-75 and long-term specific conductivity at INUG.

† pH measurements at PDL-38 and PDL-41 were considered anomalous relative to the other pH measurement taken during the sampling event.



## **APPENDIX B3**

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### **2015 *In-situ* Water Quality Results: Sentinel Stations**

**Table B3-1. *In-situ* water quality results from the Sentinel stations, Whale Tail Pit Baseline, 2015.**

| Area-Replicate | Date      | UTM Coordinates |         |          | pH   | Temp.<br>(°C) | Specific Conductivity<br>(µS/cm) | Dissolved Oxygen<br>(mg/L) |
|----------------|-----------|-----------------|---------|----------|------|---------------|----------------------------------|----------------------------|
|                |           | Zone            | Easting | Northing |      |               |                                  |                            |
| C2             | 19-Jul-15 | 14W             | 638199  | 7221598  | -    | 10.3          | 22.7                             | 11.98                      |
|                | 25-Aug-15 | 14W             | 638217  | 7221627  | 7.22 | 9.6           | 16.9                             | 11.34                      |
|                | 20-Sep-15 | 14W             | 638328  | 7221902  | 7.02 | 2.7           | 22.6                             | 13.71                      |
| C14            | 19-Jul-15 | 14W             | 632916  | 7232202  | 7.03 | 9.4           | 24.8                             | 13.03                      |
|                | 25-Aug-15 | 14W             | 632890  | 7232182  | 7.36 | 10.9          | 20.4                             | 10.97                      |
|                | 20-Sep-15 | 14W             | 632916  | 7232202  | 6.98 | 4.0           | 22.7                             | 13.3                       |
| C17            | 19-Jul-15 | 14W             | 630583  | 7234684  | 7.03 | 10.0          | 23.4                             | 12.5                       |
|                | 25-Aug-15 | 14W             | 630557  | 7234667  | 6.78 | 10.1          | 14.1                             | 11.2                       |
|                | 20-Sep-15 | 14W             | 630583  | 7234684  | 6.98 | 3.2           | 21.3                             | 13.5                       |
| C20            | 19-Jul-15 | 14W             | 627265  | 7236464  | 7.05 | 8.2           | 23.4                             | 13.8                       |
|                | 25-Aug-15 | 14W             | 627186  | 7236475  | 7.36 | 10.6          | 18.6                             | 10.7                       |
|                | 20-Sep-15 | 14W             | 627265  | 7236464  | 6.92 | 3.6           | 20.3                             | 13.6                       |
| C41            | 19-Jul-15 | 14W             | 620607  | 7244690  | 7.10 | 10.7          | 17.2                             | 11.7                       |
|                | 25-Aug-15 | 14W             | 620637  | 7244668  | 7.22 | 9.6           | 16.9                             | 11.3                       |
|                | 20-Sep-15 | 14W             | 620607  | 7244690  | 6.90 | 2.5           | 23.3                             | 15.0                       |

**Notes:**

No pH for C2 in July.





## **APPENDIX C**

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### **ALS Certificates of Analysis, Whale Tail Pit Baseline, 2015**