Table S1. Mean sockeye salmon-mediated phosphorus flux estimates (in kg) for Alturas, Pettit, and Redfish lakes by migration year including associated 90% upper (UCI) and lower (LCI) confidence intervals. Phosphorus flux was estimated with smolt exports and adult imports including both captive and anadromous fish combined and only anadromous fish.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **Alturas** | | | | |  | **Pettit** | | | | |  | **Redfish** | | | | |  |
|  | **Captive and Anadromous** | | | **Anadromous Only** | | | **Captive and Anadromous** | | | **Anadromous Only** | | | **Captive and Anadromous** | | | **Anadromous Only** | | |
| **Year** | **Mean** | **LCI** | **UCI** | **Mean** | **LCI** | **UCI** | **Mean** | **LCI** | **UCI** | **Mean** | **LCI** | **UCI** | **Mean** | **LCI** | **UCI** | **Mean** | **LCI** | **UCI** |
| 1998 | - | - | - | - | - | - | - | - | - | - | - | - | 4.15 | 4.01 | 4.29 | -0.11 | -0.11 | -0.10 |
| 1999 | 0.08 | -0.04 | 0.18 | -0.05 | -0.09 | 0.00† | - | - | - | - | - | - | 0.20 | 0.08 | 0.31 | -0.09 | -0.11 | -0.07 |
| 2000 | 0.70 | 0.63 | 0.77 | 0.11 | 0.06 | 0.16 | - | - | - | - | - | - | 2.97 | 2.93 | 3.01 | 0.65 | 0.65 | 0.66 |
| 2001 | 0.39 | 0.33 | 0.45 | -0.06 | -0.10 | -0.02 | 0.41 | 0.41 | 0.41 | -0.01† | -0.01† | 0.00 | 7.35 | 7.28 | 7.42 | 0.09 | 0.08 | 0.09 |
| 2002 | -0.05 | -0.12 | 0.03 | -0.20 | -0.65 | 0.24 | 1.28 | 1.28 | 1.29 | -0.14 | -0.14 | -0.14 | 5.39 | 5.18 | 5.59 | -0.32 | -0.35 | -0.28 |
| 2003 | 0.01 | -0.08 | 0.09 | -0.02 | -0.10 | 0.05 | -1.16 | -1.43 | -0.89 | -0.01† | -0.01† | -0.01† | 3.52 | 3.39 | 3.66 | -0.31 | -0.33 | -0.30 |
| 2004 | 0.86 | 0.83 | 0.89 | -0.01† | -0.03 | 0.02 | 1.00 | 0.98 | 1.02 | -0.01 | -0.01 | -0.01 | 4.62 | 4.51 | 4.72 | -0.18 | -0.20 | -0.17 |
| 2005 | -0.54 | -0.71 | -0.37 | -0.28 | -0.53 | -0.02 | -1.17 | -1.23 | -1.12 | -0.47 | -0.48 | -0.45 | 0.71 | 0.52 | 0.89 | -0.32 | -0.34 | -0.29 |
| 2006 | -0.01 | -0.13 | 0.11 | -0.54 | -0.64 | -0.44 | -2.69 | -2.87 | -2.52 | -2.51 | -2.65 | -2.37 | 4.13 | 4.04 | 4.22 | -0.20 | -0.24 | -0.16 |
| 2007 | -0.05 | -0.12 | 0.02 | -0.20 | -0.26 | -0.14 | -0.20 | -0.22 | -0.17 | -0.14 | -0.14 | -0.13 | 3.72 | 3.62 | 3.82 | -0.22 | -0.25 | -0.18 |
| 2008 | -0.23 | -0.33 | -0.12 | -0.45 | -0.62 | -0.27 | -0.29 | -0.35 | -0.24 | -0.01 | -0.01 | -0.01 | 4.98 | 4.87 | 5.09 | 1.67 | 1.63 | 1.71 |
| 2009 | -0.05 | -0.13 | 0.02 | -0.15 | -0.23 | -0.08 | -0.03 | -0.05 | -0.02 | -0.17 | -0.17 | -0.16 | 7.30 | 7.20 | 7.40 | 3.29 | 3.26 | 3.31 |
| 2010 | 0.76 | 0.72 | 0.80 | -0.01† | -0.04 | 0.03 | -0.23 | -0.24 | -0.22 | -0.22 | -0.23 | -0.22 | 8.42 | 8.32 | 8.52 | 6.61 | 6.55 | 6.66 |
| 2011 | -0.06 | -0.11 | -0.01† | -0.01† | -0.01† | 0.00 | -0.97 | -1.01 | -0.93 | -0.79 | -0.82 | -0.75 | 9.47 | 9.41 | 9.52 | 5.41 | 5.38 | 5.43 |
| 2012 | -0.01† | -0.03 | 0.03 | -0.01† | -0.03 | 0.03 | -0.07 | -0.08 | -0.07 | -0.06 | -0.06 | -0.05 | 3.08 | 2.93 | 3.24 | -0.27 | -0.48 | -0.06 |
| 2013 | -0.01† | -0.01† | -0.01† | -0.01† | -0.01† | 0.00† | -0.07 | -0.07 | -0.06 | -0.07 | -0.07 | -0.06 | 0.02 | -0.14 | 0.18 | -0.62 | -0.75 | -0.49 |
| 2014 | -0.01† | -0.02 | 0.02 | -0.01† | -0.02 | 0.02 | 0.33 | 0.33 | 0.33 | -0.04 | -0.04 | -0.04 | 8.10 | 8.09 | 8.11 | 4.23 | 4.22 | 4.24 |
| 2015 | -0.15 | -0.21 | -0.08 | -0.15 | -0.21 | -0.08 | 0.43 | 0.43 | 0.43 | 0.03 | 0.03 | 0.03 | 1.36 | 1.34 | 1.38 | -0.37 | -0.39 | -0.35 |
| 2016 | - | - | - | - | - | - | 0.41 | 0.41 | 0.41 | -0.03 | -0.03 | -0.03 | 4.26 | 4.22 | 4.31 | 0.92 | 0.88 | 0.96 |
| 2017 | -0.03 | -0.04 | -0.02 | -0.03 | -0.04 | -0.02 | 0.51 | 0.51 | 0.51 | -0.05 | -0.05 | -0.05 | 16.38 | 16.37 | 16.39 | -0.13 | -0.15 | -0.11 |
| *Notes:*  (-) denotes where data deficiencies precluded estimated nutrient flux  † denotes values greater than -0.01 but less than zero. | | | | | | | | | | | | | | | | | | |

Table S2. Mean sockeye salmon-mediated nitrogen (N) flux estimates (in kg) for Alturas, Pettit, and Redfish lakes by migration year including associated 90% upper (UCI) and lower (LCI) confidence intervals. Nitrogen flux was estimated with smolt exports and adult imports including both captive and anadromous fish combined and only anadromous fish.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **Alturas** | | | | |  | **Pettit** | | | | |  | **Redfish** | | | | |  |
|  | **Captive and Anadromous** | | | **Anadromous Only** | | | **Captive and Anadromous** | | | **Anadromous Only** | | | **Captive and Anadromous** | | | **Anadromous Only** | | |
| **Year** | **Mean** | **LCI** | **UCI** | **Mean** | **LCI** | **UCI** | **Mean** | **LCI** | **UCI** | **Mean** | **LCI** | **UCI** | **Mean** | **LCI** | **UCI** | **Mean** | **LCI** | **UCI** |
| 1998 | - | - | - | - | - | - | - | - | - | - | - | - | 24.05 | 23.25 | 24.85 | -0.61 | -0.66 | -0.57 |
| 1999 | 0.44 | -0.21 | 1.07 | -0.27 | -0.54 | -0.01 | - | - | - | - | - | - | 1.46 | 0.76 | 2.14 | -0.48 | -0.59 | -0.38 |
| 2000 | 5.22 | 4.83 | 5.61 | 1.28 | 0.98 | 1.58 | - | - | - | - | - | - | 19.65 | 19.42 | 19.89 | 5.27 | 5.25 | 5.29 |
| 2001 | 2.26 | 1.92 | 2.58 | -0.34 | -0.57 | -0.10 | 2.38 | 2.36 | 2.40 | -0.01† | -0.01† | 0.00 | 44.07 | 43.65 | 44.48 | 0.70 | 0.68 | 0.73 |
| 2002 | -0.27 | -0.71 | 0.17 | -1.18 | -3.75 | 1.37 | 7.44 | 7.41 | 7.47 | -0.80 | -0.81 | -0.79 | 33.57 | 32.39 | 34.76 | -1.67 | -1.87 | -1.48 |
| 2003 | 0.05 | -0.45 | 0.50 | -0.12 | -0.56 | 0.30 | -6.70 | -8.31 | -5.14 | -0.02 | -0.03 | -0.02 | 24.45 | 23.66 | 25.25 | -1.81 | -1.90 | -1.71 |
| 2004 | 4.97 | 4.78 | 5.15 | -0.01 | -0.17 | 0.14 | 5.80 | 5.69 | 5.90 | -0.04 | -0.04 | -0.04 | 30.79 | 30.18 | 31.40 | -1.07 | -1.15 | -0.98 |
| 2005 | -3.12 | -4.10 | -2.15 | -1.59 | -3.07 | -0.13 | -6.79 | -7.11 | -6.49 | -2.71 | -2.81 | -2.62 | 6.53 | 5.46 | 7.57 | -1.83 | -1.96 | -1.71 |
| 2006 | -0.06 | -0.78 | 0.65 | -3.11 | -3.68 | -2.55 | -15.59 | -16.61 | -14.58 | -14.53 | -15.34 | -13.75 | 31.07 | 30.53 | 31.60 | -1.14 | -1.36 | -0.92 |
| 2007 | -0.30 | -0.70 | 0.11 | -1.17 | -1.49 | -0.84 | -1.14 | -1.27 | -1.01 | -0.79 | -0.82 | -0.75 | 27.58 | 27.01 | 28.14 | -1.25 | -1.46 | -1.04 |
| 2008 | -1.31 | -1.93 | -0.69 | -2.58 | -3.59 | -1.57 | -1.68 | -2.01 | -1.40 | -0.05 | -0.06 | -0.05 | 39.07 | 38.43 | 39.71 | 13.90 | 13.64 | 14.15 |
| 2009 | -0.31 | -0.75 | 0.11 | -0.89 | -1.34 | -0.45 | -0.19 | -0.29 | -0.11 | -0.97 | -1.00 | -0.94 | 58.29 | 57.69 | 58.87 | 26.73 | 26.61 | 26.85 |
| 2010 | 4.42 | 4.19 | 4.66 | -0.01 | -0.22 | 0.20 | -1.34 | -1.40 | -1.29 | -1.29 | -1.32 | -1.27 | 68.33 | 67.73 | 68.91 | 54.13 | 53.81 | 54.45 |
| 2011 | -0.32 | -0.63 | -0.02 | -0.01 | -0.02 | 0.01 | -5.61 | -5.86 | -5.37 | -4.56 | -4.76 | -4.36 | 73.27 | 72.94 | 73.60 | 43.85 | 43.69 | 44.01 |
| 2012 | -0.01† | -0.16 | 0.15 | -0.01† | -0.16 | 0.15 | -0.42 | -0.44 | -0.41 | -0.32 | -0.33 | -0.31 | 26.66 | 25.75 | 27.56 | 0.39 | -0.84 | 1.62 |
| 2013 | -0.01 | -0.01 | -0.01 | -0.01 | -0.01 | -0.01 | -0.39 | -0.41 | -0.37 | -0.39 | -0.41 | -0.37 | 3.09 | 2.14 | 4.02 | -2.04 | -2.81 | -1.28 |
| 2014 | -0.01† | -0.10 | 0.09 | -0.01† | -0.10 | 0.09 | 2.76 | 2.75 | 2.76 | -0.24 | -0.25 | -0.24 | 65.15 | 65.09 | 65.20 | 34.16 | 34.10 | 34.21 |
| 2015 | -0.84 | -1.20 | -0.49 | -0.84 | -1.20 | -0.48 | 3.43 | 3.43 | 3.43 | 0.23 | 0.23 | 0.23 | 11.69 | 11.57 | 11.81 | -2.16 | -2.28 | -2.04 |
| 2016 | - | - | - | - | - | - | 3.25 | 3.25 | 3.25 | -0.20 | -0.20 | -0.20 | 35.55 | 35.30 | 35.79 | 8.79 | 8.56 | 9.03 |
| 2017 | -0.18 | -0.24 | -0.13 | -0.18 | -0.24 | -0.13 | 4.06 | 4.06 | 4.06 | -0.26 | -0.27 | -0.25 | 108.35 | 108.29 | 108.42 | -0.75 | -0.85 | -0.66 |
| *Notes:*  (-) denotes where data deficiencies precluded estimated nutrient flux  † denotes values greater than -0.01 but less than zero. | | | | | | | | | | | | | | | | | | |