**URBEMIS Emission Factor (Grams/bhp)**

**2008**

| Chairlift | Horsepower | ROG | NOX | CO | SOX | PM | $CO_2$ |
|---|---|---|---|---|---|---|---|
| Ellis | 300 | 0.365 | 4.491 | 1.111 | 0.005 | 0.137 | 420.920 |
| Quail | 130 | 0.835 | 5.331 | 2.771 | 0.005 | 0.412 | 420.920 |
| Quad (2) | 99 | 0.835 | 5.331 | 2.771 | 0.005 | 0.412 | 420.920 |
| | 400 | 0.328 | 4.113 | 1.287 | 0.004 | 0.127 | 420.920 |
| Madden | 150 | 0.545 | 4.782 | 2.230 | 0.005 | 0.227 | 420.920 |

**2011**

| Chairlift | Horsepower | ROG | NOX | CO | SOX | PM | $CO_2$ |
|---|---|---|---|---|---|---|---|
| Ellis | 300 | 0.290 | 3.796 | 0.925 | 0.005 | 0.109 | 420.920 |
| Quail | 130 | 0.694 | 4.611 | 2.697 | 0.005 | 0.365 | 420.920 |
| Quad (2) | 99 | 0.694 | 4.611 | 2.697 | 0.005 | 0.365 | 420.920 |
| | 400 | 0.260 | 3.448 | 1.008 | 0.004 | 0.102 | 420.920 |
| Madden | 150 | 0.459 | 4.106 | 2.203 | 0.005 | 0.203 | 420.920 |

**2012**

| Chairlift | Horsepower | ROG | NOX | CO | SOX | PM | $CO_2$ |
|---|---|---|---|---|---|---|---|
| Ellis | 300 | 0.268 | 3.533 | 0.887 | 0.005 | 0.099 | 420.920 |
| Quail | 130 | 0.641 | 4.332 | 2.669 | 0.005 | 0.341 | 420.920 |
| Quad (2) | 99 | 0.641 | 4.332 | 2.669 | 0.005 | 0.341 | 420.920 |
| | 400 | 0.240 | 3.196 | 0.944 | 0.004 | 0.093 | 420.920 |
| Madden | 150 | 0.426 | 3.851 | 2.195 | 0.005 | 0.189 | 420.920 |

**2013**

| Chairlift | Horsepower | ROG | NOX | CO | SOX | PM | $CO_2$ |
|---|---|---|---|---|---|---|---|
| Ellis | 300 | 0.249 | 3.280 | 0.860 | 0.005 | 0.091 | 420.920 |
| Quail | 130 | 0.587 | 4.058 | 2.642 | 0.005 | 0.314 | 420.920 |
| Quad (2) | 99 | 0.587 | 4.058 | 2.642 | 0.005 | 0.314 | 420.920 |
| | 400 | 0.224 | 2.955 | 0.897 | 0.004 | 0.085 | 420.920 |
| Madden | 150 | 0.393 | 3.610 | 2.187 | 0.005 | 0.173 | 420.920 |

**2014**

| Chairlift | Horsepower | ROG | NOX | CO | SOX | PM | $CO_2$ |
|---|---|---|---|---|---|---|---|
| Ellis | 300 | 0.231 | 2.981 | 0.837 | 0.005 | 0.082 | 420.920 |
| Quail | 130 | 0.535 | 3.813 | 2.616 | 0.005 | 0.286 | 420.920 |
| Quad (2) | 99 | 0.535 | 3.813 | 2.616 | 0.005 | 0.286 | 420.920 |
| | 400 | 0.207 | 2.669 | 0.857 | 0.004 | 0.077 | 420.920 |
| Madden | 150 | 0.360 | 3.382 | 2.181 | 0.005 | 0.157 | 420.920 |

**2015**

| Chairlift | Horsepower | ROG | NOX | CO | SOX | PM | $CO_2$ |
|---|---|---|---|---|---|---|---|
| Ellis | 300 | 0.213 | 2.691 | 0.818 | 0.005 | 0.074 | 420.920 |
| Quail | 130 | 0.482 | 3.532 | 2.592 | 0.005 | 0.257 | 420.920 |
| Quad (2) | 99 | 0.482 | 3.532 | 2.592 | 0.005 | 0.257 | 420.920 |
| | 400 | 0.192 | 2.394 | 0.825 | 0.004 | 0.070 | 420.920 |
| Madden | 150 | 0.326 | 3.065 | 2.177 | 0.005 | 0.142 | 420.920 |

**2016**

| Chairlift | Horsepower | ROG | NOX | CO | SOX | PM | $CO_2$ |
|---|---|---|---|---|---|---|---|
| Ellis | 300 | 0.196 | 2.414 | 0.801 | 0.005 | 0.067 | 420.920 |
| Quail | 130 | 0.432 | 3.267 | 2.570 | 0.005 | 0.230 | 420.920 |
| Quad (2) | 99 | 0.432 | 3.267 | 2.570 | 0.005 | 0.230 | 420.920 |
| | 400 | 0.178 | 2.135 | 0.798 | 0.004 | 0.063 | 420.920 |
| Madden | 150 | 0.294 | 2.763 | 2.173 | 0.005 | 0.127 | 420.920 |

**2017**

| Chairlift | Horsepower | ROG | NOX | CO | SOX | PM | $CO_2$ |
|---|---|---|---|---|---|---|---|
| Ellis | 300 | 0.182 | 2.155 | 0.788 | 0.005 | 0.060 | 420.920 |
| Quail | 130 | 0.386 | 3.017 | 2.550 | 0.005 | 0.203 | 420.920 |
| Quad (2) | 99 | 0.386 | 3.017 | 2.550 | 0.005 | 0.203 | 420.920 |
| | 400 | 0.166 | 1.911 | 0.777 | 0.004 | 0.057 | 420.920 |
| Madden | 150 | 0.264 | 2.480 | 2.171 | 0.005 | 0.112 | 420.920 |

**2018**

| Chairlift | Horsepower | ROG | NOX | CO | SOX | PM | $CO_2$ |
|---|---|---|---|---|---|---|---|
| Ellis | 300 | 0.168 | 1.912 | 0.777 | 0.005 | 0.054 | 420.920 |
| Quail | 130 | 0.342 | 2.779 | 2.532 | 0.005 | 0.178 | 420.920 |
| Quad (2) | 99 | 0.342 | 2.779 | 2.532 | 0.005 | 0.178 | 420.920 |
| | 400 | 0.157 | 1.711 | 0.762 | 0.004 | 0.051 | 420.920 |
| Madden | 150 | 0.237 | 2.214 | 2.170 | 0.005 | 0.099 | 420.920 |

**2019**

| Chairlift | Horsepower | ROG | NOX | CO | SOX | PM | $CO_2$ |
|---|---|---|---|---|---|---|---|
| Ellis | 300 | 0.157 | 1.693 | 0.768 | 0.005 | 0.048 | 420.920 |
| Quail | 130 | 0.301 | 2.553 | 2.516 | 0.005 | 0.153 | 420.920 |
| Quad (2) | 99 | 0.301 | 2.553 | 2.516 | 0.005 | 0.153 | 420.920 |
| | 400 | 0.148 | 1.523 | 0.752 | 0.004 | 0.046 | 420.920 |
| Madden | 150 | 0.215 | 1.977 | 2.170 | 0.005 | 0.088 | 420.920 |

**2020**

| Chairlift | Horsepower | ROG | NOX | CO | SOX | PM | $CO_2$ |
|---|---|---|---|---|---|---|---|
| Ellis | 300 | 0.147 | 1.493 | 0.760 | 0.005 | 0.043 | 420.920 |
| Quail | 130 | 0.270 | 2.351 | 2.504 | 0.005 | 0.133 | 420.920 |
| Quad (2) | 99 | 0.270 | 2.351 | 2.504 | 0.005 | 0.133 | 420.920 |
| | 400 | 0.140 | 1.346 | 0.745 | 0.004 | 0.041 | 420.920 |
| Madden | 150 | 0.198 | 1.763 | 2.170 | 0.005 | 0.078 | 420.920 |

Source: Tirman pers comm. (D); URBEMIS 2007

*ons = (emission factor) X (Hp) X (Hours/day) X (Load Factor)*

Where

Emission Factor = efault summarized above

Hp = epower summarized above

Hours/day = urs per year/8760 hours)

Load Factor = ; URBEMIS default

| Emissions (pounds/day) | | | | | | | |
|---|---|---|---|---|---|---|---|
| **2008** | | | | | | | |
| **Chairlift** | **ROG** | **NOX** | **CO** | **SOX** | **PM10[1]** | **PM2.5[2]** | **$CO_2$[3]** |
| Ellis | 0.001 | 0.012 | 0.003 | 0.000 | 0.000 | 0.000 | 4.485 |
| Quail | 0.002 | 0.014 | 0.007 | 0.000 | 0.001 | 0.001 | 1.944 |
| Quad | 0.002 | 0.014 | 0.007 | 0.000 | 0.001 | 0.001 | 1.480 |
| Quad | 0.001 | 0.011 | 0.003 | 0.000 | 0.000 | 0.000 | 5.980 |
| Madden | 0.001 | 0.013 | 0.006 | 0.000 | 0.001 | 0.001 | 2.243 |
| **Total** | 0.008 | 0.064 | 0.027 | 0.000 | 0.004 | 0.003 | 16.132 |

| **2011** | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Chairlift** | **ROG** | **NOX** | **CO** | **SOX** | **PM10[1]** | **PM2.5[2]** | **$CO_2$[3]** |
| Ellis | 0.001 | 0.010 | 0.002 | 0.000 | 0.000 | 0.000 | 4.485 |
| Quail | 0.002 | 0.012 | 0.007 | 0.000 | 0.001 | 0.001 | 1.944 |
| Quad | 0.002 | 0.012 | 0.007 | 0.000 | 0.001 | 0.001 | 1.480 |
| Quad | 0.001 | 0.009 | 0.003 | 0.000 | 0.000 | 0.000 | 5.980 |
| Madden | 0.001 | 0.011 | 0.006 | 0.000 | 0.001 | 0.001 | 2.243 |
| **Total** | 0.006 | 0.055 | 0.026 | 0.000 | 0.003 | 0.003 | 16.132 |

| **2012** | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Chairlift** | **ROG** | **NOX** | **CO** | **SOX** | **PM10[1]** | **PM2.5[2]** | **$CO_2$[3]** |
| Ellis | 0.001 | 0.009 | 0.002 | 0.000 | 0.000 | 0.000 | 4.485 |
| Quail | 0.002 | 0.012 | 0.007 | 0.000 | 0.001 | 0.001 | 1.944 |
| Quad | 0.002 | 0.012 | 0.007 | 0.000 | 0.001 | 0.001 | 1.480 |
| Quad | 0.001 | 0.009 | 0.003 | 0.000 | 0.000 | 0.000 | 5.980 |
| Madden | 0.001 | 0.010 | 0.006 | 0.000 | 0.001 | 0.000 | 2.243 |
| **Total** | 0.006 | 0.052 | 0.025 | 0.000 | 0.003 | 0.003 | 16.132 |

| **2013** | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Chairlift** | **ROG** | **NOX** | **CO** | **SOX** | **PM10[1]** | **PM2.5[2]** | **$CO_2$[3]** |
| Ellis | 0.001 | 0.009 | 0.002 | 0.000 | 0.000 | 0.000 | 4.485 |
| Quail | 0.002 | 0.011 | 0.007 | 0.000 | 0.001 | 0.001 | 1.944 |
| Quad | 0.002 | 0.011 | 0.007 | 0.000 | 0.001 | 0.001 | 1.480 |
| Quad | 0.001 | 0.008 | 0.002 | 0.000 | 0.000 | 0.000 | 5.980 |
| Madden | 0.001 | 0.010 | 0.006 | 0.000 | 0.000 | 0.000 | 2.243 |
| **Total** | 0.005 | 0.048 | 0.025 | 0.000 | 0.003 | 0.002 | 16.132 |

| **2014** | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Chairlift** | **ROG** | **NOX** | **CO** | **SOX** | **PM10[1]** | **PM2.5[2]** | **$CO_2$[3]** |
| Ellis | 0.001 | 0.008 | 0.002 | 0.000 | 0.000 | 0.000 | 4.485 |
| Quail | 0.001 | 0.010 | 0.007 | 0.000 | 0.001 | 0.001 | 1.944 |
| Quad | 0.001 | 0.010 | 0.007 | 0.000 | 0.001 | 0.001 | 1.480 |
| Quad | 0.001 | 0.007 | 0.002 | 0.000 | 0.000 | 0.000 | 5.980 |
| Madden | 0.001 | 0.009 | 0.006 | 0.000 | 0.000 | 0.000 | 2.243 |
| **Total** | 0.005 | 0.045 | 0.024 | 0.000 | 0.002 | 0.002 | 16.132 |

**2015**

| Chairlift | ROG | NOX | CO | SOX | PM10[1] | PM2.5[2] | $CO_2$[3] |
|---|---|---|---|---|---|---|---|
| Ellis | 0.001 | 0.007 | 0.002 | 0.000 | 0.000 | 0.000 | 4.485 |
| Quail | 0.001 | 0.009 | 0.007 | 0.000 | 0.001 | 0.001 | 1.944 |
| Quad | 0.001 | 0.009 | 0.007 | 0.000 | 0.001 | 0.001 | 1.480 |
| Quad | 0.001 | 0.006 | 0.002 | 0.000 | 0.000 | 0.000 | 5.980 |
| Madden | 0.001 | 0.008 | 0.006 | 0.000 | 0.000 | 0.000 | 2.243 |
| **Total** | 0.005 | 0.041 | 0.024 | 0.000 | 0.002 | 0.002 | 16.132 |

**2016**

| Chairlift | ROG | NOX | CO | SOX | PM10[1] | PM2.5[2] | $CO_2$[3] |
|---|---|---|---|---|---|---|---|
| Ellis | 0.001 | 0.006 | 0.002 | 0.000 | 0.000 | 0.000 | 4.485 |
| Quail | 0.001 | 0.009 | 0.007 | 0.000 | 0.001 | 0.001 | 1.944 |
| Quad | 0.001 | 0.009 | 0.007 | 0.000 | 0.001 | 0.001 | 1.480 |
| Quad | 0.000 | 0.006 | 0.002 | 0.000 | 0.000 | 0.000 | 5.980 |
| Madden | 0.001 | 0.007 | 0.006 | 0.000 | 0.000 | 0.000 | 2.243 |
| **Total** | 0.004 | 0.037 | 0.024 | 0.000 | 0.002 | 0.002 | 16.132 |

**2017**

| Chairlift | ROG | NOX | CO | SOX | PM10[1] | PM2.5[2] | $CO_2$[3] |
|---|---|---|---|---|---|---|---|
| Ellis | 0.000 | 0.006 | 0.002 | 0.000 | 0.000 | 0.000 | 4.485 |
| Quail | 0.001 | 0.008 | 0.007 | 0.000 | 0.001 | 0.001 | 1.944 |
| Quad | 0.001 | 0.008 | 0.007 | 0.000 | 0.001 | 0.001 | 1.480 |
| Quad | 0.000 | 0.005 | 0.002 | 0.000 | 0.000 | 0.000 | 5.980 |
| Madden | 0.001 | 0.007 | 0.006 | 0.000 | 0.000 | 0.000 | 2.243 |
| **Total** | 0.004 | 0.034 | 0.024 | 0.000 | 0.002 | 0.002 | 16.132 |

**2018**

| Chairlift | ROG | NOX | CO | SOX | PM10[1] | PM2.5[2] | $CO_2$[3] |
|---|---|---|---|---|---|---|---|
| Ellis | 0.000 | 0.005 | 0.002 | 0.000 | 0.000 | 0.000 | 4.485 |
| Quail | 0.001 | 0.007 | 0.007 | 0.000 | 0.000 | 0.000 | 1.944 |
| Quad | 0.001 | 0.007 | 0.007 | 0.000 | 0.000 | 0.000 | 1.480 |
| Quad | 0.000 | 0.005 | 0.002 | 0.000 | 0.000 | 0.000 | 5.980 |
| Madden | 0.001 | 0.006 | 0.006 | 0.000 | 0.000 | 0.000 | 2.243 |
| **Total** | 0.003 | 0.031 | 0.024 | 0.000 | 0.002 | 0.001 | 16.132 |

**2019**

| Chairlift | ROG | NOX | CO | SOX | PM10[1] | PM2.5[2] | $CO_2$[3] |
|---|---|---|---|---|---|---|---|
| Ellis | 0.000 | 0.005 | 0.002 | 0.000 | 0.000 | 0.000 | 4.485 |
| Quail | 0.001 | 0.007 | 0.007 | 0.000 | 0.000 | 0.000 | 1.944 |
| Quad | 0.001 | 0.007 | 0.007 | 0.000 | 0.000 | 0.000 | 1.480 |
| Quad | 0.000 | 0.004 | 0.002 | 0.000 | 0.000 | 0.000 | 5.980 |
| Madden | 0.001 | 0.005 | 0.006 | 0.000 | 0.000 | 0.000 | 2.243 |
| **Total** | 0.003 | 0.028 | 0.023 | 0.000 | 0.001 | 0.001 | 16.132 |

| | 2020 | | | | | | |
|---|---|---|---|---|---|---|---|
| **Chairlift** | **ROG** | **NOX** | **CO** | **SOX** | **PM10[1]** | **PM2.5[2]** | **$CO_2$[3]** |
| Ellis | 0.000 | 0.004 | 0.002 | 0.000 | 0.000 | 0.000 | 4.485 |
| Quail | 0.001 | 0.006 | 0.007 | 0.000 | 0.000 | 0.000 | 1.944 |
| Quad | 0.001 | 0.006 | 0.007 | 0.000 | 0.000 | 0.000 | 1.480 |
| Quad | 0.000 | 0.004 | 0.002 | 0.000 | 0.000 | 0.000 | 5.980 |
| Madden | 0.001 | 0.005 | 0.006 | 0.000 | 0.000 | 0.000 | 2.243 |
| **Total** | **0.003** | **0.025** | **0.023** | **0.000** | **0.001** | **0.001** | **16.132** |

Notes

[1] PM10 assumed to be 100% of total PM

[2] PM2.5 assumed to be 92% of total PM

[3] Presented in metric tons per year (48 hours of operation per year)