

Table 1. Summary of SW ODMDS utilization and dispersive properties of site.

| YEAR | VOLUME PLACED IN SW ODMDS | SPECIFICIED PLACEMENT METHOD ^<br>C=contractor<br>G=government | MAXIMUM MOUND HEIGHT @ END OF DREDGING SEASON * | EFFECTIVENESS OF USING ENTIRE SW SITE TO DISPERSE DREDGED MATERIAL | TRANSPORT DURING DREDGING SEASON (CY) ** | TRANSPORT DURING WINTER (CY) ** | NET ANNUAL TRANSPORT OF SEDIMENT OUT OF SW SITE (CY) ** |
|------|---------------------------|--|---|--|--|---------------------------------|---|
| 1997 | 1.0 MCY                   | None (C)   | 2-3 ft<br>peak = 5 ft                           | 20% of the Site Was Used   | -400,000<br>(40%)                        | +614,000<br>(60%)               | +214,000<br>(20% accumulated)                           |
| 1998 | 3.5 MCY                   | Grid Cells (C)<br>Uniformly (G)                                | 5-6 ft<br>peak = 6 ft                           | 70% of the Site Was Used   | -2,100,000<br>(60%)                      | -1,216,000<br>(35%)             | -3,315,000<br>(95% eroded)                              |
| 1999 | 3.8 MCY                   | Grid Cells(C)<br>Uniformly(G)                                  | 6-7 ft<br>Peak = 7 ft                           | 80% of the Site Was Used   | -1,520,000<br>(40%)                      | -1,091,000<br>(30%)             | -2,611,000<br>(70% eroded)                              |
| 2000 | 2.9 MCY                   | Grid Cells(C)<br>Uniformly(G)                                  | 6-8 ft<br>Peak = 8 ft                           | 60% of the Site Was Used   | -1,160,000<br>(40%)                      | -739,000<br>(25%)               | -1,899,000<br>(65% eroded)                              |
| 2001 | 2.2 MCY                   | Disposal Lanes(C)<br>Uniformly(G)                              | 6-7 ft<br>Peak = 9 ft                           | 70% of the Site Was Used   | -1,200,000<br>(50%)                      | -1,752,000<br>(73%)             | -2,952,000<br>(123% eroded)                             |
| 2002 | 1.5 MCY                   | Disposal Lanes(C)  | 6-7 ft<br>Peak = 8 ft                           | 50% of the Site Was Used   | -300,000<br>(20%)                        | not available                   | not available   |
|      | 2.8 MCY                   | <b>AVERAGE VALUES</b>  | 6-7 ft<br>Peak = 8 ft                           | 70%  | 45%                                      | 40%                             | 90%   |

^ = method used to distribute dredged material within SW ODMDS during seasonal placement. Grid cells enhance the uniform distribution of dredged material placed through out the site; the release point of each dump is assigned to a given grid cell, the end point of the dump lies 500-1,500 ft away from the release point. Each grid cell is assigned a finite number of dumps. Disposal lanes thru the ODMD are assigned a limiting elevation, above which accumulation of placed dredged material is restricted. Use of Grid cells to minimize the vertical accumulation of dredged material placed with an ODMDS are superior to disposal lanes.

\* = peak value for maximum vertical accumulation of dredged material (mound height) may have occurred before the end of the dredgeing season.

\*\* = percentage of dredged material transported (out of SW ODMDS) is based on the volume “placed” during a given year. Transport greater than 100% indicates that the SW ODMDS experienced net erosion. Values for 2002 have not been determined.

Table 2. Summary statistics of the wave data used to model the transformation of wind-generated waves at the mouth of the Columbia River, using STWAVE. Detailed descriptions (wave spectra) of the data are given in figures S1-S11.

| <b>WAVE SCENARIO NUMBER</b> | <b>DATE TIME</b>   | <b>WAVE CONDITION</b> | <b>WAVE HEIGHT (M)</b> | <b>WAVE PERIOD (SEC)</b> | <b>WAVE DIRECTION (DEG)</b> | <b>SUMMER % occurrence</b> | <b>WINTER % occurrence</b> | <b>ANNUAL % occurrence</b> |
|-----------------------------|--------------------|-----------------------|------------------------|--------------------------|-----------------------------|----------------------------|----------------------------|----------------------------|
| 1<br>S-W                    | 2 JAN 02<br>21:00  | Winter Storm          | 6.48                   | 12.5                     | 225                         | 0.00                       | 2.57                       | 1.48                       |
| 2<br>S-W                    | 7 JAN 02<br>22:00  | Winter Storm          | 8.34                   | 16.7                     | 260                         | 0.00                       | 0.64                       | 0.37                       |
| 3<br>S-W                    | 15 NOV 01<br>14:00 | Winter Storm          | 6.78                   | 10.5                     | 210                         | 0.00                       | 2.70                       | 1.55                       |
| 4<br>S-W                    | 22 AUG 01<br>7:00  | Summer Storm          | 3.56                   | 7.7                      | 200                         | 1.95                       | 4.09                       | 3.18                       |
| 5<br>S-W                    | 27 JUN 01<br>20:00 | Summer Storm          | 3.51                   | 10.5                     | 175                         | 0.28                       | 1.62                       | 1.05                       |
| 6<br>NW-SW                  | 7 AUG 01<br>8:00   | Summer Swell          | 1.79                   | 11                       | 275                         | 25.53                      | 22.95                      | 24.05                      |
| 7<br>NW-SW                  | 8 DEC 01<br>10:00  | Winter Swell          | 2.85                   | 16.7                     | 280                         | 3.48                       | 19.61                      | 12.73                      |
| 8<br>NW-SW                  | 15 JUL 01<br>10:00 | Summer Swell          | 1.29                   | 16.7                     | 225                         | 5.66                       | 1.42                       | 2.66                       |
| 9<br>NW-SW                  | 19 NOV 01<br>8:00  | Winter Swell          | 3.75                   | 16.7                     | 275                         | 1.97                       | 19.09                      | 11.78                      |
| 10<br>NW-SW                 | 22 JAN 02<br>17:00 | Winter Storm          | 6.55                   | 14                       | 310                         | 0.09                       | 1.57                       | 0.94                       |
| 11<br>NW-SW                 | 19 SEP 02<br>16:00 | Summer Swell          | 1.77                   | 8.3                      | 305                         | 40.1                       | 8.09                       | 21.75                      |
| <b>SUM</b>                  |                    |                       |                        |                          |                             | <b>79.06</b>               | <b>83.99</b>               | <b>81.54</b>               |

Table 3. Summary of STWAVE results for assessing nearshore wind-wave change at MCR due to nearshore bathymetry change. Column (A) indicates maximum wave amplification predicted within SWS, based on comparing STWAVE results for the 1997 and 2002 bathymetry conditions. Column (B) indicates the degree of change in wave breaking in or near the SWS, based on comparing STWAVE results for the 1997 and 2002 bathymetry conditions.

| Wave Case                 |              | Offshore Wave Height (m) | Offshore Wave Period (sec) | Offshore Wave Direction (deg) | Annual Occurrence % | Wave Height in SWS 1997 (m) | Wave Height in SWS 2002 (m) | 1997 vs. 2002 Wave Amplification at SWS | Wave Breaking Change at SWS |
|---------------------------|--------------|--------------------------|----------------------------|-------------------------------|---------------------|-----------------------------|-----------------------------|---|-----------------------------|
| <b>1</b><br><b>S-W</b>    | Winter Storm | 6.48                     | 12.5                       | 225                           | 1.48%               | <b>6.4</b>                  | <b>6.8</b>                  | <b>6%</b>                               | <b>See fig B8</b>           |
| <b>2</b><br><b>S-W</b>    | Winter Storm | 8.34                     | 16.7                       | 260                           | 0.37%               | <b>8.1</b>                  | <b>8.7</b>                  | <b>7%</b>                               | <b>See fig B12</b>          |
| <b>3</b><br><b>S-W</b>    | Winter Storm | 6.78                     | 10.5                       | 210                           | 1.55%               | <b>5.2</b>                  | <b>5.4</b>                  | <b>3%</b>                               | <b>See fig B16</b>          |
| <b>4</b><br><b>S-W</b>    | Summer Storm | 3.56                     | 7.7                        | 200                           | 3.18%               | <b>2.8</b>                  | <b>2.9</b>                  | <b>4%</b>                               | No Breaking                 |
| <b>5</b><br><b>S-W</b>    | Summer Storm | 3.51                     | 10.5                       | 175                           | 1.05%               | <b>2.8</b>                  | <b>2.9</b>                  | <b>5%</b>                               | No Breaking                 |
| <b>6</b><br><b>NW-SW</b>  | Summer Swell | 1.79                     | 11                         | 275                           | 24.05%              | <b>2.0</b>                  | <b>2.1</b>                  | <b>7%</b>                               | No Breaking                 |
| <b>7</b><br><b>NW-SW</b>  | Winter Swell | 2.85                     | 16.7                       | 280                           | 12.73%              | <b>2.9</b>                  | <b>3.2</b>                  | <b>11%</b>                              | <b>See fig B32</b>          |
| <b>8</b><br><b>NW-SW</b>  | Summer Swell | 1.29                     | 16.7                       | 225                           | 2.66%               | <b>1.4</b>                  | <b>1.5</b>                  | <b>7%</b>                               | No Breaking                 |
| <b>9</b><br><b>NW-SW</b>  | Winter Swell | 3.75                     | 16.7                       | 275                           | 11.78%              | <b>3.9</b>                  | <b>4.4</b>                  | <b>12%</b>                              | <b>See fig B40</b>          |
| <b>10</b><br><b>NW-SW</b> | Winter Storm | 6.55                     | 14                         | 310                           | 0.94%               | <b>6.6</b>                  | <b>7.1</b>                  | <b>8%</b>                               | <b>See fig B44</b>          |

(A)

(B)

Table 6. Summary of STWAVE results for assessing nearshore wind-wave change at MCR due to simulated dredged material disposal within the SWS for 2 MCY, 4 MCY, and 6 MCY. Column (A) indicates maximum wave amplification predicted within SWS due to simulated dredged material disposal as compared to 1997. Column (B) indicates the degree of change in wave breaking in or near the SWS, due to simulated dredged material disposal as compared to 1997.

| Wave Case       |              | Dredged Material Placement Scenario (MCY) | Offshore Wave Height (m) | Offshore Wave Period (sec) | Offshore Wave Direction (deg) | Annual Occrnc % | Wave Height in SWS 1997 (m) | Wave Height in SWS Post Placmnt (m) | 1997 vs. "Placement" Wave Amplification at SWS % | Wave Breaking at SWS |
|-----------------|--------------|---|--------------------------|----------------------------|-------------------------------|-----------------|-----------------------------|-------------------------------------|--|----------------------|
| <b>1 S-W</b>    | Winter Storm | <b>2</b>                                  | 6.48                     | 12.5                       | 225                           | 1.48%           | <b>6.4</b>                  | <b>6.6</b>                          | <b>3%</b>  | See fig M3           |
| 1 S-W           | Winter Storm | <b>4</b>                                  |                          |                            |                               |                 |                             | <b>6.8</b>                          | <b>6%</b>  | See fig M29          |
| 1 S-W           | Winter Storm | <b>6</b>                                  |                          |                            |                               |                 |                             | <b>7.0</b>                          | <b>10%</b>                                       | See Fig M55          |
| <b>2 S-W</b>    | Winter Storm | <b>2</b>                                  | 8.34                     | 16.7                       | 260                           | 0.37%           | <b>8.1</b>                  | <b>8.4</b>                          | <b>4%</b>  | See fig M6           |
| 2 S-W           | Winter Storm | <b>4</b>                                  |                          |                            |                               |                 |                             | <b>8.4</b>                          | <b>4%</b>  | See Fig M32          |
| 2 S-W           | Winter Storm | <b>6</b>                                  |                          |                            |                               |                 |                             | <b>8.2</b>                          | <b>2%</b>  | See Fig M58          |
| <b>3 S-W</b>    | Winter Storm | <b>2</b>                                  | 6.78                     | 10.5                       | 210                           | 1.55%           | <b>5.2</b>                  | <b>5.3</b>                          | <b>2%</b>  | See figu M9          |
| 3 S-W           | Winter Storm | <b>4</b>                                  |                          |                            |                               |                 |                             | <b>5.5</b>                          | <b>5%</b>  | See Fig M35          |
| 3 S-W           | Winter Storm | <b>6</b>                                  |                          |                            |                               |                 |                             | <b>5.6</b>                          | <b>7%</b>  | See Fig M61          |
| <b>4 S-W</b>    | Summer Storm | <b>2</b>                                  | 3.56                     | 7.7                        | 200                           | 3.18%           | <b>2.8</b>                  | <b>2.8</b>                          | <b>1%</b>  | No Breaking          |
| 4 S-W           | Summer Storm | <b>4</b>                                  |                          |                            |                               |                 |                             | <b>2.9</b>                          | <b>2%</b>  | No Breaking          |
| 4 S-W           | Summer Storm | <b>6</b>                                  |                          |                            |                               |                 |                             | <b>2.9</b>                          | <b>4%</b>  | No Breaking          |
| <b>5 S-W</b>    | Summer Storm | <b>2</b>                                  | 3.51                     | 10.5                       | 175                           | 1.05%           | <b>2.8</b>                  | <b>2.9</b>                          | <b>3%</b>  | No Breaking          |
| 5 S-W           | Summer Storm | <b>4</b>                                  |                          |                            |                               |                 |                             | <b>2.9</b>                          | <b>3%</b>  | No Breaking          |
| 5 S-W           | Summer Storm | <b>6</b>                                  |                          |                            |                               |                 |                             | <b>3.0</b>                          | <b>6%</b>  | No Breaking          |
| <b>6 NW-SW</b>  | Summer Swell | <b>2</b>                                  | 1.79                     | 11                         | 275                           | 24.05%          | <b>2.0</b>                  | <b>2.1</b>                          | <b>4%</b>  | No Breaking          |
| 6 NW-SW         | Summer Swell | <b>4</b>                                  |                          |                            |                               |                 |                             | <b>2.1</b>                          | <b>6%</b>  | No Breaking          |
| 6 NW-SW         | Summer Swell | <b>6</b>                                  |                          |                            |                               |                 |                             | <b>2.2</b>                          | <b>11%</b>                                       | No Breaking          |
| <b>7 NW-SW</b>  | Winter Swell | <b>2</b>                                  | 2.85                     | 16.7                       | 280                           | 12.73%          | <b>2.9</b>                  | <b>3.0</b>                          | <b>5%</b>  | See Fig M18          |
| 7 NW-SW         | Winter Swell | <b>4</b>                                  |                          |                            |                               |                 |                             | <b>3.1</b>                          | <b>7%</b>  | See Fig M44          |
| 7 NW-SW         | Winter Swell | <b>6</b>                                  |                          |                            |                               |                 |                             | <b>3.3</b>                          | <b>13%</b>                                       | See Fig M70          |
| <b>8 NW-SW</b>  | Summer Swell | <b>2</b>                                  | 1.29                     | 16.7                       | 225                           | 2.66%           | <b>1.4</b>                  | <b>1.4</b>                          | <b>3%</b>  | No Breaking          |
| 8 NW-SW         | Summer Swell | <b>4</b>                                  |                          |                            |                               |                 |                             | <b>1.5</b>                          | <b>6%</b>  | No Breaking          |
| 8 NW-SW         | Summer Swell | <b>6</b>                                  |                          |                            |                               |                 |                             | <b>1.5</b>                          | <b>7%</b>  | No Breaking          |
| <b>9 NW-SW</b>  | Winter Swell | <b>2</b>                                  | 3.75                     | 16.7                       | 275                           | 11.78%          | <b>3.9</b>                  | <b>4.1</b>                          | <b>5%</b>  | See Fig M23          |
| 9 NW-SW         | Winter Swell | <b>4</b>                                  |                          |                            |                               |                 |                             | <b>4.3</b>                          | <b>9%</b>  | See Fig M49          |
| 9 NW-SW         | Winter Swell | <b>6</b>                                  |                          |                            |                               |                 |                             | <b>4.5</b>                          | <b>15%</b>                                       | See Fig M75          |
| <b>10 NW-SW</b> | Winter Storm | <b>2</b>                                  | 6.55                     | 14                         | 310                           | 0.94%           | <b>6.6</b>                  | <b>6.8</b>                          | <b>3%</b>  | See Fig M26          |
| 10 NW-SW        | Winter Storm | <b>4</b>                                  |                          |                            |                               |                 |                             | <b>7.0</b>                          | <b>6%</b>  | See Fig M52          |
| 10 NW-SW        | Winter Storm | <b>6</b>                                  |                          |                            |                               |                 |                             | <b>7.1</b>                          | <b>8%</b>  | See Fig M78          |
| <b>11 NW-SW</b> | Winter Storm | <b>2</b>                                  | 1.77                     | 8.3                        | 305                           | 21.80%          | <b>1.7</b>                  | <b>1.7</b>                          | <b>2%</b>  | No Breaking          |
| 11 NW-SW        | Winter Storm | <b>4</b>                                  |                          |                            |                               |                 |                             | <b>1.8</b>                          | <b>4%</b>  | No Breaking          |
| 11 NW-SW        | Winter Storm | <b>6</b>                                  |                          |                            |                               |                 |                             | <b>1.8</b>                          | <b>6%</b>  | No Breaking          |

(A)

(B)

Table 7. **Summary of STWAVE results for assessing nearshore wind-wave change at MCR due to 4 million cy placement scenario. *The effect of Ebb Current for a spring tide has been included.*** Column (A) indicates maximum wave amplification predicted within SWS, based on comparing STWAVE results for the 1997 and Post-4 MCY placement conditions. Column (B) indicates the degree of change in wave breaking in or near the SWS, based on comparing STWAVE results for the 1997 and Post-4 MCY placement conditions.

| Wave Case   |              | Offshore Wave Height (m) | Offshore Wave Period (sec) | Offshore Wave Direction (deg) | Annual Occurrence % | Wave Height in SWS 1997 (m) | Wave Height in SWS post 4 MCY (m) | 1997 vs. 4 MCY Wave Amplification at SWS | Wave Breaking at SWS |
|-------------|--------------|--------------------------|----------------------------|-------------------------------|---------------------|-----------------------------|-----------------------------------|--|----------------------|
| 6<br>NW-SW  | Summer Swell | 1.79                     | 11                         | 275                           | 24.05%              | 2.8                         | 2.9                               | 5%                                       | No Breaking          |
| 7<br>NW-SW  | Winter Swell | 2.85                     | 16.7                       | 280                           | 12.73%              | 4.3                         | 4.6                               | 8%                                       | See fig C7           |
| 8<br>NW-SW  | Summer Swell | 1.29                     | 16.7                       | 225                           | 2.66%               | 1 (1.4)                     | 1.5 (1.6)                         | 50% (15%)                                | See fig C10          |
| 9<br>NW-SW  | Winter Swell | 3.75                     | 16.7                       | 275                           | 11.78%              | 4.9                         | 5.3                               | 9%                                       | See fig C13          |
| 10<br>NW-SW | Winter Storm | 6.55                     | 14                         | 310                           | 0.94%               | 7.6                         | 8.0                               | 5%                                       | See fig C16          |
| 11<br>NW-SW | Winter Storm | 1.77                     | 8.3                        | 305                           | 21.80%              | 2.2                         | 2.3                               | 5%                                       | No Breaking          |

(A)

(B)