

TABLE 12

VARIATION 2:  
STAFF ESTIMATE OF HYDROPOWER-RELATED LOSSES  
USING CURRENT RUN SIZE AS A BASIS<sup>1</sup>

Fish Distribution (Percentage)

| Area of Production     | Spring Chinook | Summer Chinook | Fall Chinook |         | Coho  | Steelhead | Sockeye |
|------------------------|----------------|----------------|--------------|---------|-------|-----------|---------|
|                        |                |                | Hatchery     | Natural |       |           |         |
| Between 1 & 2 Dams     | 0.027          | 0.000          | 0.260        | 0.175   | 0.176 | 0.047     | 0.000   |
| Between 2 & 3 Dams     | 0.128          | 0.000          | 0.000        | 0.234   | 0.109 | 0.054     | 0.000   |
| Between 3 & 4 Dams     | 0.000          | 0.000          | 0.150        | 0.000   | 0.031 | 0.107     | 0.000   |
| Between 4 & 5 Dams     | 0.084          | 0.047          | 0.510        | 0.508   | 0.244 | 0.095     | 0.000   |
| Between 5 & 6 Dams     | 0.000          | 0.000          | 0.000        | 0.000   | 0.000 | 0.000     | 0.000   |
| Between 6 & 7 Dams     | 0.021          | 0.000          | 0.050        | 0.000   | 0.000 | 0.023     | 0.000   |
| Between 7 & 8 Dams     | 0.033          | 0.019          | 0.000        | 0.020   | 0.040 | 0.022     | 0.210   |
| Between 8 & 9 Dams     | 0.654          | 0.870          | 0.020        | 0.063   | 0.359 | 0.614     | 0.296   |
| Between 9 & 10 Dams    | 0.053          | 0.064          | 0.000        | 0.000   | 0.046 | 0.038     | 0.493   |
| Above Chief Joseph Dam | 0.000          | 0.000          | 0.000        | 0.000   | 0.000 | 0.000     | 0.000   |
| Above Hells Canyon Dam | 0.000          | 0.000          | 0.000        | 0.000   | 0.000 | 0.000     | 0.000   |

<sup>1</sup> Variation assumes that the percentage of production above and below blocked areas is the same proportion now as prior to 1850.

**TABLE 12 (cont.)**

**Calculation Parameters**

|   | <u>Spring<br/>Chinook</u> | <u>Summer<br/>Chinook</u> | <u>Fall Chinook</u> |                | <u>Coho</u> | <u>Steelhead</u> | <u>Sockeye</u> |
|---|---------------------------|---------------------------|---------------------|----------------|-------------|------------------|----------------|
|   |                           |                           | <u>Hatchery</u>     | <u>Natural</u> |             |                  |                |
| Total Adult<br>Production<br>(thousands)              | 92                        | 77                        | 334                 | 360            | 179         | 143              | 58             |
| Ocean Survival  | 0.02                      | 0.04                      | 0.04                | 0.04           | 0.08        | 0.10             | 0.10           |
| Juvenile Down-<br>stream Survival<br>(per dam passed) | 0.80                      | 0.80                      | 0.80                | 0.80           | 0.80        | 0.80             | 0.80           |
| Adult Down-<br>stream Survival<br>(per dam passed)    | 0.95                      | 0.95                      | 0.95                | 0.95           | 0.95        | 0.95             | 0.95           |

**CALCULATIONS**

**Number of Adults at River Mouth with Dams (Thousands)**

| <u>Spring<br/>Chinook</u> | <u>Summer<br/>Chinook</u> | <u>Fall Chinook</u> |                | <u>Coho</u> | <u>Steelhead</u> | <u>Sockeye</u> |
|---------------------------|---------------------------|---------------------|----------------|-------------|------------------|----------------|
|                           |                           | <u>Hatchery</u>     | <u>Natural</u> |             |                  |                |
| 92                        | 77                        | 334                 | 360            | 179         | 143              | 58             |

**Number of Smolts at River Mouth with Dams (Thousands)**

| <u>Spring<br/>Chinook</u> | <u>Summer<br/>Chinook</u> | <u>Fall Chinook</u> |                | <u>Coho</u> | <u>Steelhead</u> | <u>Sockeye</u> |
|---------------------------|---------------------------|---------------------|----------------|-------------|------------------|----------------|
|                           |                           | <u>Hatchery</u>     | <u>Natural</u> |             |                  |                |
| 4,600                     | 1,925                     | 8,350               | 9,000          | 2,238       | 1,430            | 580            |

TABLE 12 (cont.)

Number of Smolts Produced (Thousands)

| <u>Area of Production</u> | <u>Spring Chinook</u> | <u>Summer Chinook</u> | <u>Fall Chinook</u> | <u>Coho</u>  | <u>Steelhead</u> | <u>Sockeye</u> |
|---------------------------|-----------------------|-----------------------|---------------------|--------------|------------------|----------------|
| Between 1 & 2 Dams        | 155                   | 0                     | 4,683               | 492          | 84               | 0              |
| Between 2 & 3 Dams        | 920                   | 0                     | 3,291               | 381          | 121              | 0              |
| Between 3 & 4 Dams        | 0                     | 0                     | 2,446               | 135          | 299              | 0              |
| Between 4 & 5 Dams        | 943                   | 221                   | 21,559              | 1,333        | 332              | 0              |
| Between 5 & 6 Dams        | 0                     | 0                     | 0                   | 0            | 0                | 0              |
| Between 6 & 7 Dams        | 368                   | 0                     | 1,593               | 0            | 125              | 0              |
| Between 7 & 8 Dams        | 724                   | 174                   | 858                 | 427          | 150              | 581            |
| Between 8 & 9 Dams        | 17,931                | 9,982                 | 4,375               | 4,788        | 5,233            | 1,023          |
| Between 9 & 10 Dams       | 1,816                 | 918                   | 0                   | 767          | 405              | 2,130          |
| Above Chief Joseph Dam    | 0                     | 0                     | 0                   | 0            | 0                | 0              |
| Above Hells Canyon Dam    | 0                     | 0                     | 0                   | 0            | 0                | 0              |
| <b>Totals:</b>            | <b>22,859</b>         | <b>11,295</b>         | <b>38,804</b>       | <b>8,323</b> | <b>6,749</b>     | <b>3,734</b>   |

**TABLE 12 (cont.)**

**Number of Smolts at River Mouth Without Dams (Thousands)**

| <u>Area of Production</u> | <u>Spring Chinook</u> | <u>Summer Chinook</u> | <u>Fall Chinook</u> | <u>Coho</u>  | <u>Steelhead</u> | <u>Sockeye</u> |
|---------------------------|-----------------------|-----------------------|---------------------|--------------|------------------|----------------|
| Between 1 & 2 Dams        | 155                   | 0                     | 4,683               | 492          | 84               | 0              |
| Between 2 & 3 Dams        | 920                   | 0                     | 3,291               | 381          | 121              | 0              |
| Between 3 & 4 Dams        | 0                     | 0                     | 2,446               | 135          | 299              | 0              |
| Between 4 & 5 Dams        | 943                   | 221                   | 21,559              | 1,333        | 332              | 0              |
| Between 5 & 6 Dams        | 0                     | 0                     | 0                   | 0            | 0                | 0              |
| Between 6 & 7 Dams        | 368                   | 0                     | 1,593               | 0            | 125              | 0              |
| Between 7 & 8 Dams        | 724                   | 174                   | 858                 | 427          | 150              | 581            |
| Between 8 & 9 Dams        | 17,931                | 9,982                 | 4,375               | 4,788        | 5,233            | 1,023          |
| Between 9 & 10 Dams       | 1,816                 | 918                   | 0                   | 767          | 405              | 2,130          |
| Above Chief Joseph Dam    | 0                     | 0                     | 0                   | 0            | 0                | 0              |
| Above Hells Canyon Dam    | 0                     | 0                     | 0                   | 0            | 0                | 0              |
| <b>Totals:</b>            | <b>22,859</b>         | <b>11,295</b>         | <b>38,804</b>       | <b>8,323</b> | <b>6,749</b>     | <b>3,734</b>   |

**TABLE 12 (cont.)**

**Number of Adults at River Mouth Without Dams (Thousands)**

| <u>Area of Production</u> | <u>Spring Chinook</u> | <u>Summer Chinook</u> | <u>Fall Chinook</u> | <u>Coho</u> | <u>Steelhead</u> | <u>Sockeye</u> |
|---------------------------|-----------------------|-----------------------|---------------------|-------------|------------------|----------------|
| Between 1 & 2 Dams        | 3                     | 0                     | 187                 | 39          | 8                | 0              |
| Between 2 & 3 Dams        | 18                    | 0                     | 132                 | 30          | 12               | 0              |
| Between 3 & 4 Dams        | 0                     | 0                     | 98                  | 11          | 30               | 0              |
| Between 4 & 5 Dams        | 19                    | 9                     | 862                 | 107         | 33               | 0              |
| Between 5 & 6 Dams        | 0                     | 0                     | 0                   | 0           | 0                | 0              |
| Between 6 & 7 Dams        | 7                     | 0                     | 64                  | 0           | 13               | 0              |
| Between 7 & 8 Dams        | 14                    | 7                     | 34                  | 34          | 15               | 58             |
| Between 8 & 9 Dams        | 359                   | 399                   | 175                 | 383         | 523              | 102            |
| Between 9 & 10 Dams       | 36                    | 37                    | 0                   | 61          | 40               | 213            |
| Above Chief Joseph Dam    | 0                     | 0                     | 0                   | 0           | 0                | 0              |
| Above Hells Canyon Dam    | 0                     | 0                     | 0                   | 0           | 0                | 0              |
| <b>Totals:</b>            | <b>456</b>            | <b>452</b>            | <b>1,552</b>        | <b>665</b>  | <b>674</b>       | <b>373</b>     |

TABLE 12 (cont.)

Number of Adults at Spawning Grounds Without Dams (Thousands)

| <u>Area of Production</u> | <u>Spring Chinook</u> | <u>Summer Chinook</u> | <u>Fall Chinook</u> | <u>Coho</u> | <u>Steelhead</u> | <u>Sockeye</u> |
|---------------------------|-----------------------|-----------------------|---------------------|-------------|------------------|----------------|
| Between 1 & 2 Dams        | 3                     | 0                     | 187                 | 39          | 8                | 0              |
| Between 2 & 3 Dams        | 18                    | 0                     | 132                 | 30          | 12               | 0              |
| Between 3 & 4 Dams        | 0                     | 0                     | 98                  | 11          | 30               | 0              |
| Between 4 & 5 Dams        | 19                    | 9                     | 862                 | 107         | 33               | 0              |
| Between 5 & 6 Dams        | 0                     | 0                     | 0                   | 0           | 0                | 0              |
| Between 6 & 7 Dams        | 7                     | 0                     | 64                  | 0           | 13               | 0              |
| Between 7 & 8 Dams        | 14                    | 7                     | 34                  | 34          | 15               | 58             |
| Between 8 & 9 Dams        | 359                   | 399                   | 175                 | 383         | 523              | 102            |
| Between 9 & 10 Dams       | 36                    | 37                    | 0                   | 61          | 40               | 213            |
| Above Chief Joseph Dam    | 96                    | 152                   | 377                 | 139         | 95               | 694            |
| Above Hells Canyon Dam    | 100                   | 314                   | 765                 | 0           | 132              | 5              |
| <hr/>                     |                       |                       |                     |             |                  |                |
| Totals:                   | 653                   | 918                   | 2,695               | 805         | 901              | 1,073          |

All Species Total: 7,046,000

**TABLE 12 (cont.)**

**Number of Adults at Spawning Grounds With Dams (Thousands)**

| <u>Area of Production</u> | <u>Spring Chinook</u> | <u>Summer Chinook</u> | <u>Fall Chinook</u> | <u>Coho</u> | <u>Steelhead</u> | <u>Sockeye</u> |
|---------------------------|-----------------------|-----------------------|---------------------|-------------|------------------|----------------|
| Between 1 & 2 Dams        | 2                     | 0                     | 142                 | 30          | 6                | 0              |
| Between 2 & 3 Dams        | 11                    | 0                     | 76                  | 18          | 7                | 0              |
| Between 3 & 4 Dams        | 0                     | 0                     | 43                  | 5           | 13               | 0              |
| Between 4 & 5 Dams        | 6                     | 3                     | 288                 | 36          | 11               | 0              |
| Between 5 & 6 Dams        | 0                     | 0                     | 0                   | 0           | 0                | 0              |
| Between 6 & 7 Dams        | 1                     | 0                     | 12                  | 0           | 2                | 0              |
| Between 7 & 8 Dams        | 2                     | 1                     | 5                   | 5           | 2                | 9              |
| Between 8 & 9 Dams        | 40                    | 44                    | 19                  | 43          | 58               | 11             |
| Between 9 & 10 Dams       | 3                     | 3                     | 0                   | 5           | 3                | 18             |
| Above Chief Joseph Dam    | 0                     | 0                     | 0                   | 0           | 0                | 0              |
| Above Hells Canyon Dam    | 0                     | 0                     | 0                   | 0           | 0                | 0              |
| <b>Totals:</b>            | <b>66</b>             | <b>52</b>             | <b>586</b>          | <b>141</b>  | <b>104</b>       | <b>38</b>      |

All Species Total: 986,000

TABLE 12 (cont.)

Dam Produced Salmon and Steelhead Loss (Thousands)

| <u>Area of Production</u>    | <u>Spring Chinook</u> | <u>Summer Chinook</u> | <u>Fall Chinook</u> | <u>Coho</u> | <u>Steelhead</u> | <u>Sockeye</u> |
|------------------------------|-----------------------|-----------------------|---------------------|-------------|------------------|----------------|
| Between 1 & 2 Dams           | 1                     | 0                     | 45                  | 9           | 2                | 0              |
| Between 2 & 3 Dams           | 8                     | 0                     | 56                  | 13          | 5                | 0              |
| Between 3 & 4 Dams           | 0                     | 0                     | 55                  | 6           | 17               | 0              |
| Between 4 & 5 Dams           | 13                    | 6                     | 575                 | 71          | 22               | 0              |
| Between 5 & 6 Dams           | 0                     | 0                     | 0                   | 0           | 0                | 0              |
| Between 6 & 7 Dams           | 6                     | 0                     | 51                  | 0           | 10               | 0              |
| Between 7 & 8 Dams           | 12                    | 6                     | 29                  | 29          | 13               | 50             |
| Between 8 & 9 Dams           | 319                   | 355                   | 156                 | 340         | 465              | 91             |
| Between 9 & 10 Dams          | 33                    | 34                    | 0                   | 56          | 37               | 195            |
| Above Chief Joseph Dam       | 96                    | 152                   | 377                 | 139         | 95               | 694            |
| Above Hells Canyon Dam       | 100                   | 314                   | 765                 | 0           | 132              | 5              |
| <hr/>                        |                       |                       |                     |             |                  |                |
| Totals:                      | 587                   | 867                   | 2,109               | 664         | 797              | 1,035          |
| All Species Total: 6,060,000 |                       |                       |                     |             |                  |                |

**TABLE 12 (cont.)**

**Hydropower-Related Salmon and Steelhead Loss (Thousands)**

| <u>Area of Production</u> | <u>Spring Chinook</u> | <u>Summer Chinook</u> | <u>Fall Chinook</u> | <u>Coho</u> | <u>Steelhead</u> | <u>Sockeye</u> |
|---------------------------|-----------------------|-----------------------|---------------------|-------------|------------------|----------------|
| Between 1 & 2 Dams        | 1                     | 0                     | 40                  | 8           | 2                | 0              |
| Between 2 & 3 Dams        | 7                     | 0                     | 49                  | 11          | 5                | 0              |
| Between 3 & 4 Dams        | 0                     | 0                     | 49                  | 5           | 15               | 0              |
| Between 4 & 5 Dams        | 11                    | 5                     | 511                 | 63          | 20               | 0              |
| Between 5 & 6 Dams        | 0                     | 0                     | 0                   | 0           | 0                | 0              |
| Between 6 & 7 Dams        | 5                     | 0                     | 46                  | 0           | 9                | 0              |
| Between 7 & 8 Dams        | 11                    | 5                     | 26                  | 26          | 11               | 44             |
| Between 8 & 9 Dams        | 284                   | 316                   | 138                 | 303         | 414              | 81             |
| Between 9 & 10 Dams       | 30                    | 30                    | 0                   | 50          | 33               | 174            |
| Above Chief Joseph Dam    | 88                    | 140                   | 347                 | 128         | 87               | 639            |
| Above Hells Canyon Dam    | 50                    | 157                   | 383                 | 0           | 66               | 3              |
| <b>Totals:</b>            | <b>487</b>            | <b>654</b>            | <b>1,590</b>        | <b>596</b>  | <b>661</b>       | <b>940</b>     |

All Species Total: 4,927,000

TABLE 13

**VARIATION 2:  
STAFF ESTIMATE OF HYDROPOWER-RELATED LOSSES  
USING CURRENT POTENTIAL RUN SIZE AS A BASIS<sup>1</sup>**

**(Numbers of Smolts Produced by Area)**

| Areas of Production                     | Spring Chinook  |                | Summer Chinook  |                | Fall Chinook    |                | Coho            |                | Steelhead       |                | Sockeye         |                |
|---|-----------------|----------------|-----------------|----------------|-----------------|----------------|-----------------|----------------|-----------------|----------------|-----------------|----------------|
|   | <u>Hatchery</u> | <u>Natural</u> |
| Between 1 & 2 Dams                      | 4,917,000       | 864,000        | ---             | ---            | 4,431,000       | ---            | 1,750,000       | 269,000        | 160,000         | 197,000        | ---             | ---            |
| Between 2 & 3 Dams                      | 765,000         | 1,407,000      | ---             | ---            | ---             | 2,057,000      | ---             | 331,000        | 130,000         | 105,000        | ---             | ---            |
| Between 3 & 4 Dams                      | ---             | 4,273,000      | ---             | ---            | 2,580,000       | 2,025,000      | ---             | ---            | 48,000          | 458,000        | ---             | ---            |
| Between 4 & 5 Dams                      | 514,000         | 3,112,000      | ---             | ---            | 8,520,000       | 21,938,000     | ---             | ---            | 359,000         | 355,000        | ---             | ---            |
| Between 5 & 6 Dams                      | ---             | ---            | ---             | ---            | ---             | ---            | ---             | ---            | ---             | ---            | ---             | ---            |
| Between 6 & 7 Dams                      | ---             | ---            | ---             | ---            | 840,000         | ---            | ---             | ---            | 220,000         | 1,000          | ---             | ---            |
| Between 7 & 8 Dams                      | 1,640,000       | 887,000        | ---             | 556,000        | ---             | ---            | ---             | ---            | ---             | 94,000         | ---             | 316,000        |
| Between 8 & 9 Dams                      | 6,251,000       | 16,905,000     | 1,364,000       | 14,159,000     | 360,000         | 24,000         | 320,000         | 232,000        | 4,472,000       | 1,885,000      | ---             | 460,000        |
| Above Wells and Below Chief Joseph dams | 800,000         | 1,266,000      | 1,344,000       | 1,295,000      | ---             | ---            | ---             | ---            | 368,000         | 78,000         | ---             | 748,000        |

<sup>1</sup> Variation assumes that the percentage of production above and below blocked areas is the same proportion now as prior to 1850

**TABLE 13 (cont.)**

**Calculation Parameters**

|   | <u>Spring<br/>Chinook</u> | <u>Summer<br/>Chinook</u> | <u>Fall<br/>Chinook</u> | <u>Coho</u> | <u>Steelhead</u> | <u>Sockeye</u> |
|---|---------------------------|---------------------------|-------------------------|-------------|------------------|----------------|
| Ocean Survival  | 0.02                      | 0.04                      | 0.04                    | 0.08        | 0.10             | 0.10           |
| Juvenile Down-<br>stream Survival<br>(per dam passed) | 0.80                      | 0.80                      | 0.80                    | 0.80        | 0.80             | 0.80           |
| Adult Down-<br>stream Survival<br>(per dam passed)    | 0.95                      | 0.95                      | 0.95                    | 0.95        | 0.95             | 0.95           |
| % Hydropower Loss                                     |                           |                           |                         |             |                  |                |
| Operational   | 0.89                      | 0.89                      | 0.89                    | 0.89        | 0.89             | 0.89           |
| Above Chief Joseph                                    | 0.92                      | 0.92                      | 0.92                    | 0.92        | 0.92             | 0.92           |
| Above Hells Canyon                                    | 0.50                      | 0.50                      | 0.50                    | 0.50        | 0.50             | 0.50           |

**Proportion of Salmon and Steelhead in Blocked Areas in Predevelopment Times**

|                           |       |       |       |       |       |       |
|---------------------------|-------|-------|-------|-------|-------|-------|
| Above<br>Chief Joseph Dam | 0.147 | 0.166 | 0.140 | 0.173 | 0.105 | 0.647 |
| Above<br>Hells Canyon Dam | 0.153 | 0.342 | 0.284 | 0.000 | 0.146 | 0.005 |

**TABLE 13 (cont.)**

**Number of Smolts Produced (Thousands)**

| <u>Area of Production</u>          | <u>Spring Chinook</u> | <u>Summer Chinook</u> | <u>Fall Chinook</u> | <u>Coho</u>  | <u>Steelhead</u> | <u>Sockeye</u> |
|------------------------------------|-----------------------|-----------------------|---------------------|--------------|------------------|----------------|
| Between 1 & 2 Dams                 | 5,781                 | 0                     | 4,431               | 2,019        | 357              | 0              |
| Between 2 & 3 Dams                 | 2,172                 | 0                     | 2,057               | 331          | 235              | 0              |
| Between 3 & 4 Dams                 | 4,273                 | 0                     | 4,605               | 0            | 506              | 0              |
| Between 4 & 5 Dams                 | 3,626                 | 0                     | 30,458              | 0            | 714              | 0              |
| Between 5 & 6 Dams                 | 0                     | 0                     | 0                   | 0            | 0                | 0              |
| Between 6 & 7 Dams                 | 0                     | 0                     | 840                 | 0            | 221              | 0              |
| Between 7 & 8 Dams                 | 2,527                 | 556                   | 0                   | 0            | 94               | 316            |
| Between 8 & 9 Dams                 | 23,156                | 15,523                | 384                 | 552          | 6,357            | 460            |
| Above Wells and Below Chief Joseph | 2,066                 | 2,639                 | 0                   | 0            | 446              | 748            |
| Above Chief Joseph Dam             | 0                     | 0                     | 0                   | 0            | 0                | 0              |
| Above Hells Canyon Dam             | 0                     | 0                     | 0                   | 0            | 0                | 0              |
| <b>Totals:</b>                     | <b>43,601</b>         | <b>18,718</b>         | <b>42,775</b>       | <b>2,902</b> | <b>8,930</b>     | <b>1,524</b>   |

All Species Total: 118,450,000

TABLE 13 (cont.)

Smolts to River Mouth With Dams (Thousands)

| <u>Area of Production</u>          | <u>Spring Chinook</u> | <u>Summer Chinook</u> | <u>Fall Chinook</u> | <u>Coho</u> | <u>Steelhead</u> | <u>Sockeye</u> |
|------------------------------------|-----------------------|-----------------------|---------------------|-------------|------------------|----------------|
| Between 1 & 2 Dams                 | 4.625                 | 0                     | 3.545               | 1.615       | 286              | 0              |
| Between 2 & 3 Dams                 | 1.390                 | 0                     | 1,316               | 212         | 150              | 0              |
| Between 3 & 4 Dams                 | 2.188                 | 0                     | 2,358               | 0           | 259              | 0              |
| Between 4 & 5 Dams                 | 1.485                 | 0                     | 12,476              | 0           | 292              | 0              |
| Between 5 & 6 Dams                 | 0                     | 0                     | 0                   | 0           | 0                | 0              |
| Between 6 & 7 Dams                 | 0                     | 0                     | 220                 | 0           | 58               | 0              |
| Between 7 & 8 Dams                 | 530                   | 117                   | 0                   | 0           | 20               | 66             |
| Between 8 & 9 Dams                 | 3,885                 | 2,604                 | 64                  | 93          | 1,067            | 77             |
| Above Wells and Below Chief Joseph | 277                   | 354                   | 0                   | 0           | 60               | 100            |
| Above Chief Joseph Dam             | 0                     | 0                     | 0                   | 0           | 0                | 0              |
| Above Hells Canyon Dam             | 0                     | 0                     | 0                   | 0           | 0                | 0              |
| Totals:                            | 14,380                | 3,075                 | 19,979              | 1,920       | 2,192            | 244            |

All Species Total: 41,789,000

TABLE 13 (cont.)

Number of Adults at River Mouth With Dams (Thousands)

| <u>Area of Production</u>          | <u>Spring Chinook</u> | <u>Summer Chinook</u> | <u>Fall Chinook</u> | <u>Coho</u> | <u>Steelhead</u> | <u>Sockeye</u> |
|------------------------------------|-----------------------|-----------------------|---------------------|-------------|------------------|----------------|
| Between 1 & 2 Dams                 | 92                    | 0                     | 142                 | 129         | 29               | 0              |
| Between 2 & 3 Dams                 | 28                    | 0                     | 53                  | 17          | 15               | 0              |
| Between 3 & 4 Dams                 | 44                    | 0                     | 94                  | 0           | 26               | 0              |
| Between 4 & 5 Dams                 | 30                    | 0                     | 499                 | 0           | 29               | 0              |
| Between 5 & 6 Dams                 | 0                     | 0                     | 0                   | 0           | 0                | 0              |
| Between 6 & 7 Dams                 | 0                     | 0                     | 9                   | 0           | 6                | 0              |
| Between 7 & 8 Dams                 | 11                    | 5                     | 0                   | 0           | 2                | 7              |
| Between 8 & 9 Dams                 | 78                    | 104                   | 3                   | 7           | 107              | 8              |
| Above Wells and Below Chief Joseph | 6                     | 14                    | 0                   | 0           | 6                | 10             |
| Above Chief Joseph Dam             | 0                     | 0                     | 0                   | 0           | 0                | 0              |
| Above Hells Canyon Dam             | 0                     | 0                     | 0                   | 0           | 0                | 0              |
| Totals:                            | 288                   | 123                   | 799                 | 154         | 219              | 24             |

All Species Total: 1,607,000

TABLE 13 (cont.)

Number of Adults at Spawning Grounds With Dams (Thousands)

| <u>Area of Production</u>          | <u>Spring Chinook</u> | <u>Summer Chinook</u> | <u>Fall Chinook</u> | <u>Coho</u> | <u>Steelhead</u> | <u>Sockeye</u> |
|------------------------------------|-----------------------|-----------------------|---------------------|-------------|------------------|----------------|
| Between 1 & 2 Dams                 | 88                    | 0                     | 135                 | 123         | 27               | 0              |
| Between 2 & 3 Dams                 | 25                    | 0                     | 48                  | 15          | 14               | 0              |
| Between 3 & 4 Dams                 | 38                    | 0                     | 81                  | 0           | 22               | 0              |
| Between 4 & 5 Dams                 | 24                    | 0                     | 406                 | 0           | 24               | 0              |
| Between 5 & 6 Dams                 | 0                     | 0                     | 0                   | 0           | 0                | 0              |
| Between 6 & 7 Dams                 | 0                     | 0                     | 6                   | 0           | 4                | 0              |
| Between 7 & 8 Dams                 | 7                     | 3                     | 0                   | 0           | 1                | 5              |
| Between 8 & 9 Dams                 | 52                    | 69                    | 2                   | 5           | 71               | 5              |
| Above Wells and Below Chief Joseph | 3                     | 9                     | 0                   | 0           | 4                | 6              |
| Above Chief Joseph Dam             | 0                     | 0                     | 0                   | 0           | 0                | 0              |
| Above Hells Canyon Dam             | 0                     | 0                     | 0                   | 0           | 0                | 0              |
| <b>Totals:</b>                     | <b>237</b>            | <b>81</b>             | <b>678</b>          | <b>143</b>  | <b>167</b>       | <b>16</b>      |

All Species Total: 1,322,000

**TABLE 13 (cont.)**

**Number of Adults at Spawning Grounds Without Dams (Thousands)**

| <u>Area of Production</u>          | <u>Spring Chinook</u> | <u>Summer Chinook</u> | <u>Fall Chinook</u> | <u>Coho</u> | <u>Steelhead</u> | <u>Sockeye</u> |
|------------------------------------|-----------------------|-----------------------|---------------------|-------------|------------------|----------------|
| Between 1 & 2 Dams                 | 116                   | 0                     | 177                 | 162         | 36               | 0              |
| Between 2 & 3 Dams                 | 43                    | 0                     | 82                  | 26          | 24               | 0              |
| Between 3 & 4 Dams                 | 85                    | 0                     | 184                 | 0           | 51               | 0              |
| Between 4 & 5 Dams                 | 73                    | 0                     | 1,218               | 0           | 71               | 0              |
| Between 5 & 6 Dams                 | 0                     | 0                     | 0                   | 0           | 0                | 0              |
| Between 6 & 7 Dams                 | 0                     | 0                     | 34                  | 0           | 22               | 0              |
| Between 7 & 8 Dams                 | 51                    | 22                    | 0                   | 0           | 9                | 32             |
| Between 8 & 9 Dams                 | 463                   | 621                   | 15                  | 44          | 636              | 46             |
| Above Wells and Below Chief Joseph | 41                    | 106                   | 0                   | 0           | 45               | 75             |
| Above Chief Joseph Dam             | 183                   | 253                   | 416                 | 49          | 125              | 283            |
| Above Hells Canyon Dam             | 191                   | 520                   | 844                 | 0           | 174              | 2              |
| <b>Totals:</b>                     | <b>1,246</b>          | <b>1,522</b>          | <b>2,970</b>        | <b>281</b>  | <b>1,192</b>     | <b>438</b>     |

All Species Total: 7,649,000

**TABLE 13 (cont.)**

**Dam Produced Salmon and Steelhead Loss (Thousands)**

| <u>Area of Production</u>          | <u>Spring Chinook</u> | <u>Summer Chinook</u> | <u>Fall Chinook</u> | <u>Coho</u> | <u>Steelhead</u> | <u>Sockeye</u> |
|------------------------------------|-----------------------|-----------------------|---------------------|-------------|------------------|----------------|
| Between 1 & 2 Dams                 | 28                    | 0                     | 43                  | 39          | 9                | 0              |
| Between 2 & 3 Dams                 | 18                    | 0                     | 35                  | 11          | 10               | 0              |
| Between 3 & 4 Dams                 | 48                    | 0                     | 103                 | 0           | 28               | 0              |
| Between 4 & 5 Dams                 | 48                    | 0                     | 812                 | 0           | 48               | 0              |
| Between 5 & 6 Dams                 | 0                     | 0                     | 0                   | 0           | 0                | 0              |
| Between 6 & 7 Dams                 | 0                     | 0                     | 27                  | 0           | 18               | 0              |
| Between 7 & 8 Dams                 | 43                    | 19                    | 0                   | 0           | 8                | 27             |
| Between 8 & 9 Dams                 | 412                   | 552                   | 14                  | 39          | 565              | 41             |
| Above Wells and Below Chief Joseph | 38                    | 97                    | 0                   | 0           | 41               | 68             |
| Above Chief Joseph Dam             | 183                   | 253                   | 416                 | 49          | 125              | 283            |
| Above Hells Canyon Dam             | 191                   | 520                   | 844                 | 0           | 174              | 2              |
| <b>Totals:</b>                     | <b>1,009</b>          | <b>1,440</b>          | <b>2,293</b>        | <b>138</b>  | <b>1,025</b>     | <b>422</b>     |

All Species Total: 6,327,000

**TABLE 13 (cont.)**

**Hydropower-Related Salmon and Steelhead Loss (Thousands)**

| <u>Area of Production</u>          | <u>Spring Chinook</u> | <u>Summer Chinook</u> | <u>Fall Chinook</u> | <u>Coho</u> | <u>Steelhead</u> | <u>Sockeye</u> |
|------------------------------------|-----------------------|-----------------------|---------------------|-------------|------------------|----------------|
| Between 1 & 2 Dams                 | 25                    | 0                     | 38                  | 35          | 8                | 0              |
| Between 2 & 3 Dams                 | 16                    | 0                     | 31                  | 10          | 9                | 0              |
| Between 3 & 4 Dams                 | 43                    | 0                     | 92                  | 0           | 25               | 0              |
| Between 4 & 5 Dams                 | 43                    | 0                     | 723                 | 0           | 42               | 0              |
| Between 5 & 6 Dams                 | 0                     | 0                     | 0                   | 0           | 0                | 0              |
| Between 6 & 7 Dams                 | 0                     | 0                     | 24                  | 0           | 16               | 0              |
| Between 7 & 8 Dams                 | 38                    | 17                    | 0                   | 0           | 7                | 24             |
| Between 8 & 9 Dams                 | 366                   | 491                   | 12                  | 35          | 503              | 36             |
| Above Wells and Below Chief Joseph | 34                    | 86                    | 0                   | 0           | 36               | 61             |
| Above Chief Joseph Dam             | 168                   | 232                   | 383                 | 45          | 115              | 261            |
| Above Hells Canyon Dam             | 95                    | 260                   | 422                 | 0           | 87               | 1              |
| <b>Totals:</b>                     | <b>829</b>            | <b>1,087</b>          | <b>1,724</b>        | <b>124</b>  | <b>848</b>       | <b>383</b>     |

All Species Total: 4,995,000

TABLE 14

VARIATION 3:  
 STAFF ESTIMATE OF HYDROPOWER-RELATED LOSSES  
 USING PRE-1850 RUN SIZE AS A BASIS<sup>1</sup>

Fish Distribution (Percentage)

| <u>Area of Production</u> | <u>Spring Chinook</u> | <u>Summer Chinook</u> | <u>Fall Chinook</u> | <u>Coho</u> | <u>Steelhead</u> | <u>Sockeye</u> |
|---------------------------|-----------------------|-----------------------|---------------------|-------------|------------------|----------------|
| Below Bonneville          | 0.151                 | 0.000                 | 0.248               | 0.437       | 0.171            | 0.000          |
| Between 1 & 2 Dams        | 0.009                 | 0.000                 | 0.010               | 0.049       | 0.022            | 0.000          |
| Between 2 & 3 Dams        | 0.033                 | 0.000                 | 0.004               | 0.000       | 0.041            | 0.001          |
| Between 3 & 4 Dams        | 0.045                 | 0.000                 | 0.004               | 0.000       | 0.052            | 0.000          |
| Between 4 & 5 Dams        | 0.061                 | 0.018                 | 0.029               | 0.135       | 0.061            | 0.021          |
| Between 5 & 6 Dams        | 0.000                 | 0.000                 | 0.022               | 0.000       | 0.000            | 0.000          |
| Between 6 & 7 Dams        | 0.007                 | 0.000                 | 0.064               | 0.021       | 0.011            | 0.000          |
| Between 7 & 8 Dams        | 0.026                 | 0.012                 | 0.022               | 0.027       | 0.011            | 0.008          |
| Between 8 & 9 Dams        | 0.325                 | 0.420                 | 0.174               | 0.139       | 0.359            | 0.016          |
| Between 9 & 10 Dams       | 0.042                 | 0.041                 | 0.000               | 0.020       | 0.020            | 0.303          |
| Above Chief Joseph Dam    | 0.147                 | 0.166                 | 0.140               | 0.173       | 0.105            | 0.647          |
| Above Hells Canyon Dam    | 0.153                 | 0.342                 | 0.284               | 0.000       | 0.146            | 0.005          |

<sup>1</sup> Percent hydropower loss is computed using benefits allocation instead of repayment allocation.

**TABLE 14 (cont.)**

**Calculation Parameters**

|   | <u>Spring<br/>Chinook</u> | <u>Summer<br/>Chinook</u> | <u>Fall<br/>Chinook</u> | <u>Coho</u> | <u>Steelhead</u> | <u>Sockeye</u> |
|---|---------------------------|---------------------------|-------------------------|-------------|------------------|----------------|
| Total Adult<br>Production<br>(thousands)              | 1,449                     | 3,569                     | 1,971                   | 1,342       | 959              | 2,722          |
| Ocean Survival  | 0.02                      | 0.04                      | 0.04                    | 0.08        | 0.10             | 0.10           |
| Juvenile Down-<br>stream Survival<br>(per dam passed) | 0.80                      | 0.80                      | 0.80                    | 0.80        | 0.80             | 0.80           |
| Adult Down-<br>stream Survival<br>(per dam passed)    | 0.95                      | 0.95                      | 0.95                    | 0.95        | 0.95             | 0.95           |

**CALCULATIONS**

**Number of Adults Without Dams (Thousands)**

| <u>Spring<br/>Chinook</u> | <u>Summer<br/>Chinook</u> | <u>Fall<br/>Chinook</u> | <u>Coho</u> | <u>Steelhead</u> | <u>Sockeye</u> |
|---------------------------|---------------------------|-------------------------|-------------|------------------|----------------|
| 1,449                     | 3,569                     | 1,971                   | 1,342       | 959              | 2,722          |

**Number of Smolts Without Dams (Thousands)**

| <u>Spring<br/>Chinook</u> | <u>Summer<br/>Chinook</u> | <u>Fall<br/>Chinook</u> | <u>Coho</u> | <u>Steelhead</u> | <u>Sockeye</u> |
|---------------------------|---------------------------|-------------------------|-------------|------------------|----------------|
| 72,450                    | 89,225                    | 49,275                  | 16,775      | 9,590            | 27,220         |

TABLE 14 (cont.)

Numerical Distribution of Smolts Produced Without Dams (Thousands)

| <u>Area of Production</u> | <u>Spring Chinook</u> | <u>Summer Chinook</u> | <u>Fall Chinook</u> | <u>Coho</u> | <u>Steelhead</u> | <u>Sockeye</u> |
|---------------------------|-----------------------|-----------------------|---------------------|-------------|------------------|----------------|
| Below Bonneville          | 10,940                | 0                     | 12,220              | 7,331       | 1,640            | 0              |
| Between 1 & 2 Dams        | 652                   | 0                     | 493                 | 822         | 211              | 0              |
| Between 2 & 3 Dams        | 2,391                 | 0                     | 197                 | 0           | 393              | 27             |
| Between 3 & 4 Dams        | 3,260                 | 0                     | 197                 | 0           | 499              | 0              |
| Between 4 & 5 Dams        | 4,419                 | 1,606                 | 1,429               | 2,265       | 585              | 572            |
| Between 5 & 6 Dams        | 0                     | 0                     | 1,084               | 0           | 0                | 0              |
| Between 6 & 7 Dams        | 507                   | 0                     | 3,154               | 352         | 105              | 0              |
| Between 7 & 8 Dams        | 1,884                 | 1,071                 | 1,084               | 453         | 105              | 218            |
| Between 8 & 9 Dams        | 23,546                | 37,475                | 8,574               | 2,332       | 3,443            | 436            |
| Between 9 & 10 Dams       | 3,043                 | 3,658                 | 0                   | 336         | 192              | 8,248          |
| Above Chief Joseph Dam    | 10,650                | 14,811                | 6,899               | 2,902       | 1,007            | 17,611         |
| Above Hells Canyon Dam    | 11,085                | 30,515                | 13,994              | 0           | 1,400            | 136            |
| Totals:                   | 72,378                | 89,136                | 49,324              | 16,792      | 9,580            | 27,247         |

TABLE 14 (cont.)

Number of Smolts at River Mouth With Dams (Thousands)

| <u>Area of Production</u> | <u>Spring Chinook</u> | <u>Summer Chinook</u> | <u>Fall Chinook</u> | <u>Coho</u> | <u>Steelhead</u> | <u>Sockeye</u> |
|---------------------------|-----------------------|-----------------------|---------------------|-------------|------------------|----------------|
| Below Bonneville          | 10,940                | 0                     | 12,220              | 7,331       | 1,640            | 0              |
| Between 1 & 2 Dams        | 522                   | 0                     | 394                 | 658         | 169              | 0              |
| Between 2 & 3 Dams        | 1,530                 | 0                     | 126                 | 0           | 252              | 17             |
| Between 3 & 4 Dams        | 1,669                 | 0                     | 101                 | 0           | 255              | 0              |
| Between 4 & 5 Dams        | 1,810                 | 658                   | 585                 | 928         | 240              | 234            |
| Between 5 & 6 Dams        | 0                     | 0                     | 355                 | 0           | 0                | 0              |
| Between 6 & 7 Dams        | 133                   | 0                     | 827                 | 92          | 28               | 0              |
| Between 7 & 8 Dams        | 395                   | 225                   | 227                 | 95          | 22               | 46             |
| Between 8 & 9 Dams        | 3,950                 | 6,287                 | 1,438               | 391         | 578              | 73             |
| Between 9 & 10 Dams       | 408                   | 491                   | 0                   | 45          | 26               | 1,107          |
| Above Chief Joseph Dam    | 0                     | 0                     | 0                   | 0           | 0                | 0              |
| Above Hells Canyon Dam    | 0                     | 0                     | 0                   | 0           | 0                | 0              |
| Totals:                   | 21,358                | 7,661                 | 16,274              | 9,539       | 3,208            | 1,477          |

TABLE 14 (cont.)

Number of Adults at River Mouth With Dams (Thousands)

| <u>Area of Production</u> | <u>Spring Chinook</u> | <u>Summer Chinook</u> | <u>Fall Chinook</u> | <u>Coho</u> | <u>Steelhead</u> | <u>Sockeye</u> |
|---------------------------|-----------------------|-----------------------|---------------------|-------------|------------------|----------------|
| Below<br>Bonneville       | 219                   | 0                     | 489                 | 586         | 164              | 0              |
| Between 1<br>& 2 Dams     | 10                    | 0                     | 16                  | 53          | 17               | 0              |
| Between 2<br>& 3 Dams     | 31                    | 0                     | 5                   | 0           | 25               | 2              |
| Between 3<br>& 4 Dams     | 33                    | 0                     | 4                   | 0           | 26               | 0              |
| Between 4<br>& 5 Dams     | 36                    | 26                    | 23                  | 74          | 24               | 23             |
| Between 5<br>& 6 Dams     | 0                     | 0                     | 14                  | 0           | 0                | 0              |
| Between 6<br>& 7 Dams     | 3                     | 0                     | 33                  | 7           | 3                | 0              |
| Between 7<br>& 8 Dams     | 8                     | 9                     | 9                   | 8           | 2                | 5              |
| Between 8<br>& 9 Dams     | 79                    | 251                   | 58                  | 31          | 58               | 7              |
| Between 9<br>& 10 Dams    | 8                     | 20                    | 0                   | 4           | 3                | 111            |
| Above Chief<br>Joseph Dam | 0                     | 0                     | 0                   | 0           | 0                | 0              |
| Above Hells<br>Canyon Dam | 0                     | 0                     | 0                   | 0           | 0                | 0              |
| Totals:                   | 427                   | 306                   | 651                 | 763         | 321              | 148            |

TABLE 14 (cont.)

## Number of Adults at Spawning Grounds With Dams (Thousands)

| <u>Area of<br/>Production</u> | <u>Spring<br/>Chinook</u> | <u>Summer<br/>Chinook</u> | <u>Fall<br/>Chinook</u> | <u>Coho</u> | <u>Steelhead</u> | <u>Sockeye</u> |
|-------------------------------|---------------------------|---------------------------|-------------------------|-------------|------------------|----------------|
| Below<br>Bonneville           | 219                       | 0                         | 489                     | 586         | 164              | 0              |
| Between 1<br>& 2 Dams         | 10                        | 0                         | 15                      | 50          | 16               | 0              |
| Between 2<br>& 3 Dams         | 28                        | 0                         | 5                       | 0           | 23               | 2              |
| Between 3<br>& 4 Dams         | 29                        | 0                         | 3                       | 0           | 22               | 0              |
| Between 4<br>& 5 Dams         | 29                        | 21                        | 19                      | 60          | 20               | 19             |
| Between 5<br>& 6 Dams         | 0                         | 0                         | 11                      | 0           | 0                | 0              |
| Between 6<br>& 7 Dams         | 2                         | 0                         | 24                      | 5           | 2                | 0              |
| Between 7<br>& 8 Dams         | 6                         | 6                         | 6                       | 5           | 2                | 3              |
| Between 8<br>& 9 Dams         | 52                        | 167                       | 38                      | 21          | 38               | 5              |
| Between 9<br>& 10 Dams        | 5                         | 12                        | 0                       | 2           | 2                | 70             |
| Above Chief<br>Joseph Dam     | 0                         | 0                         | 0                       | 0           | 0                | 0              |
| Above Hells<br>Canyon Dam     | 0                         | 0                         | 0                       | 0           | 0                | 0              |
| <b>Totals:</b>                | <b>379</b>                | <b>207</b>                | <b>611</b>              | <b>731</b>  | <b>288</b>       | <b>98</b>      |

All Species Total: 2,314,000

TABLE 14 (cont.)

Number of Adults at Spawning Grounds Without Dams (Thousands)

| <u>Area of Production</u> | <u>Spring Chinook</u> | <u>Summer Chinook</u> | <u>Fall Chinook</u> | <u>Coho</u>  | <u>Steelhead</u> | <u>Sockeye</u> |
|---------------------------|-----------------------|-----------------------|---------------------|--------------|------------------|----------------|
| Below Bonneville          | 219                   | 0                     | 489                 | 586          | 164              | 0              |
| Between 1 & 2 Dams        | 13                    | 0                     | 20                  | 66           | 21               | 0              |
| Between 2 & 3 Dams        | 48                    | 0                     | 8                   | 0            | 39               | 3              |
| Between 3 & 4 Dams        | 65                    | 0                     | 8                   | 0            | 50               | 0              |
| Between 4 & 5 Dams        | 88                    | 64                    | 57                  | 181          | 58               | 57             |
| Between 5 & 6 Dams        | 0                     | 0                     | 43                  | 0            | 0                | 0              |
| Between 6 & 7 Dams        | 10                    | 0                     | 126                 | 28           | 11               | 0              |
| Between 7 & 8 Dams        | 38                    | 43                    | 43                  | 36           | 11               | 22             |
| Between 8 & 9 Dams        | 471                   | 1,499                 | 343                 | 187          | 344              | 44             |
| Between 9 & 10 Dams       | 61                    | 146                   | 0                   | 27           | 19               | 825            |
| Above Chief Joseph Dam    | 213                   | 592                   | 276                 | 232          | 101              | 1,761          |
| Above Hells Canyon Dam    | 222                   | 1,221                 | 560                 | 0            | 140              | 14             |
| <b>Totals:</b>            | <b>1,448</b>          | <b>3,565</b>          | <b>1,973</b>        | <b>1,343</b> | <b>958</b>       | <b>2,725</b>   |

All Species Total: 12,012,000

TABLE 14 (cont.)

## Dam Produced Salmon and Steelhead Loss (Thousands)

| <u>Area of Production</u> | <u>Spring Chinook</u> | <u>Summer Chinook</u> | <u>Fall Chinook</u> | <u>Cono</u> | <u>Steelhead</u> | <u>Sockeye</u> |
|---------------------------|-----------------------|-----------------------|---------------------|-------------|------------------|----------------|
| Below Bonneville          | 0                     | 0                     | 0                   | 0           | 0                | 0              |
| Between 1 & 2 Dams        | 3                     | 0                     | 5                   | 16          | 5                | 0              |
| Between 2 & 3 Dams        | 20                    | 0                     | 3                   | 0           | 17               | 1              |
| Between 3 & 4 Dams        | 37                    | 0                     | 4                   | 0           | 28               | 0              |
| Between 4 & 5 Dams        | 59                    | 43                    | 38                  | 121         | 39               | 38             |
| Between 5 & 6 Dams        | 0                     | 0                     | 32                  | 0           | 0                | 0              |
| Between 6 & 7 Dams        | 8                     | 0                     | 102                 | 23          | 9                | 0              |
| Between 7 & 8 Dams        | 32                    | 37                    | 37                  | 31          | 9                | 19             |
| Between 8 & 9 Dams        | 419                   | 1,332                 | 305                 | 166         | 306              | 39             |
| Between 9 & 10 Dams       | 56                    | 134                   | 0                   | 25          | 18               | 755            |
| Above Chief Joseph Dam    | 213                   | 592                   | 276                 | 232         | 101              | 1,761          |
| Above Hells Canyon Dam    | 222                   | 1,221                 | 560                 | 0           | 140              | 14             |
| <b>Totals:</b>            | <b>1,068</b>          | <b>3,359</b>          | <b>1,362</b>        | <b>613</b>  | <b>670</b>       | <b>2,626</b>   |

All Species Total: 9,698,000

TABLE 14 (cont.)

Hydropower-Related Salmon and Steelhead Loss (Thousands)

| <u>Area of Production</u> | <u>Spring Chinook</u> | <u>Summer Chinook</u> | <u>Fall Chinook</u> | <u>Coho</u> | <u>Steelhead</u> | <u>Sockeye</u> |
|---------------------------|-----------------------|-----------------------|---------------------|-------------|------------------|----------------|
| Below Bonneville          | 0                     | 0                     | 0                   | 0           | 0                | 0              |
| Between 1 & 2 Dams        | 3                     | 0                     | 4                   | 15          | 5                | 0              |
| Between 2 & 3 Dams        | 19                    | 0                     | 3                   | 0           | 16               | 1              |
| Between 3 & 4 Dams        | 34                    | 0                     | 4                   | 0           | 26               | 0              |
| Between 4 & 5 Dams        | 55                    | 40                    | 36                  | 113         | 37               | 36             |
| Between 5 & 6 Dams        | 0                     | 0                     | 30                  | 0           | 0                | 0              |
| Between 6 & 7 Dams        | 8                     | 0                     | 96                  | 21          | 8                | 0              |
| Between 7 & 8 Dams        | 30                    | 34                    | 35                  | 29          | 8                | 17             |
| Between 8 & 9 Dams        | 393                   | 1,252                 | 286                 | 156         | 288              | 36             |
| Between 9 & 10 Dams       | 52                    | 126                   | 0                   | 23          | 17               | 710            |
| Above Chief Joseph Dam    | 145                   | 403                   | 188                 | 158         | 68               | 1,198          |
| Above Hells Canyon Dam    | 111                   | 610                   | 280                 | 0           | 70               | 7              |
| <b>Totals:</b>            | <b>851</b>            | <b>2,466</b>          | <b>962</b>          | <b>516</b>  | <b>542</b>       | <b>2,005</b>   |

All Species Total: 7,342,000

TABLE 15

VARIATION 3:  
 STAFF ESTIMATE OF HYDROPOWER-RELATED LOSSES  
 USING CURRENT RUN SIZE AS A BASIS<sup>1</sup>

Fish Distribution (Percentage)

| Area of<br>Production     | Spring<br>Chinook | Summer<br>Chinook | Fall Chinook |         | Coho  | Steelhead | Sockeye |
|---------------------------|-------------------|-------------------|--------------|---------|-------|-----------|---------|
|                           |                   |                   | Hatchery     | Natural |       |           |         |
| Between 1<br>& 2 Dams     | 0.027             | 0.000             | 0.260        | 0.175   | 0.176 | 0.047     | 0.000   |
| Between 2<br>& 3 Dams     | 0.128             | 0.000             | 0.000        | 0.234   | 0.109 | 0.054     | 0.000   |
| Between 3<br>& 4 Dams     | 0.000             | 0.000             | 0.150        | 0.000   | 0.031 | 0.107     | 0.000   |
| Between 4<br>& 5 Dams     | 0.084             | 0.047             | 0.510        | 0.508   | 0.244 | 0.095     | 0.000   |
| Between 5<br>& 6 Dams     | 0.000             | 0.000             | 0.000        | 0.000   | 0.000 | 0.000     | 0.000   |
| Between 6<br>& 7 Dams     | 0.021             | 0.000             | 0.050        | 0.000   | 0.000 | 0.023     | 0.000   |
| Between 7<br>& 8 Dams     | 0.033             | 0.019             | 0.000        | 0.020   | 0.040 | 0.022     | 0.210   |
| Between 8<br>& 9 Dams     | 0.654             | 0.870             | 0.020        | 0.063   | 0.359 | 0.614     | 0.296   |
| Between 9<br>& 10 Dams    | 0.053             | 0.064             | 0.000        | 0.000   | 0.046 | 0.038     | 0.493   |
| Above Chief<br>Joseph Dam | 0.000             | 0.000             | 0.000        | 0.000   | 0.000 | 0.000     | 0.000   |
| Above Hells<br>Canyon Dam | 0.000             | 0.000             | 0.000        | 0.000   | 0.000 | 0.000     | 0.000   |

<sup>1</sup> Percent hydropower loss is computed using benefits allocation instead of repayment allocation.

TABLE 15 (cont.)

## Calculation Parameters

|   | <u>Spring<br/>Chinook</u> | <u>Summer<br/>Chinook</u> | <u>Fall Chinook</u> |                | <u>Coho</u> | <u>Steelhead</u> | <u>Sockeye</u> |
|---|---------------------------|---------------------------|---------------------|----------------|-------------|------------------|----------------|
|   |                           |                           | <u>Hatchery</u>     | <u>Natural</u> |             |                  |                |
| Total Adult<br>Production<br>(thousands)              | 92                        | 77                        | 334                 | 360            | 179         | 143              | 58             |
| Ocean Survival  | 0.02                      | 0.04                      | 0.04                | 0.04           | 0.08        | 0.10             | 0.10           |
| Juvenile Down-<br>stream Survival<br>(per dam passed) | 0.80                      | 0.80                      | 0.80                | 0.80           | 0.80        | 0.80             | 0.80           |
| Adult Down-<br>stream Survival<br>(per dam passed)    | 0.95                      | 0.95                      | 0.95                | 0.95           | 0.95        | 0.95             | 0.95           |

## CALCULATIONS

## Number of Adults at River Mouth with Dams (Thousands)

| <u>Spring<br/>Chinook</u> | <u>Summer<br/>Chinook</u> | <u>Fall Chinook</u> |                | <u>Coho</u> | <u>Steelhead</u> | <u>Sockeye</u> |
|---------------------------|---------------------------|---------------------|----------------|-------------|------------------|----------------|
|                           |                           | <u>Hatchery</u>     | <u>Natural</u> |             |                  |                |
| 92                        | 77                        | 334                 | 360            | 179         | 143              | 58             |

## Number of Smolts at River Mouth with Dams (Thousands)

| <u>Spring<br/>Chinook</u> | <u>Summer<br/>Chinook</u> | <u>Fall Chinook</u> |                | <u>Coho</u> | <u>Steelhead</u> | <u>Sockeye</u> |
|---------------------------|---------------------------|---------------------|----------------|-------------|------------------|----------------|
|                           |                           | <u>Hatchery</u>     | <u>Natural</u> |             |                  |                |
| 4,600                     | 1,925                     | 8,350               | 9,000          | 2,238       | 1,430            | 580            |

TABLE 15 (cont.)

## Number of Smolts Produced (Thousands)

| <u>Area of Production</u> | <u>Spring Chinook</u> | <u>Summer Chinook</u> | <u>Fall Chinook</u> | <u>Coho</u> | <u>Steelhead</u> | <u>Sockeye</u> |
|---------------------------|-----------------------|-----------------------|---------------------|-------------|------------------|----------------|
| Between 1 & 2 Dams        | 155                   | 0                     | 4,683               | 492         | 84               | 0              |
| Between 2 & 3 Dams        | 920                   | 0                     | 3,291               | 381         | 121              | 0              |
| Between 3 & 4 Dams        | 0                     | 0                     | 2,446               | 135         | 299              | 0              |
| Between 4 & 5 Dams        | 943                   | 221                   | 21,559              | 1,333       | 332              | 0              |
| Between 5 & 6 Dams        | 0                     | 0                     | 0                   | 0           | 0                | 0              |
| Between 6 & 7 Dams        | 368                   | 0                     | 1,593               | 0           | 125              | 0              |
| Between 7 & 8 Dams        | 724                   | 174                   | 858                 | 427         | 150              | 581            |
| Between 8 & 9 Dams        | 17,931                | 9,982                 | 4,375               | 4,788       | 5,233            | 1,023          |
| Between 9 & 10 Dams       | 1,816                 | 918                   | 0                   | 767         | 405              | 2,130          |
| Above Chief Joseph Dam    | 0                     | 0                     | 0                   | 0           | 0                | 0              |
| Above Hells Canyon Dam    | 0                     | 0                     | 0                   | 0           | 0                | 0              |
| Totals:                   | 22,859                | 11,295                | 38,804              | 8,323       | 6,749            | 3,734          |

TABLE 15 (cont.)

## Number of Smolts at River Mouth Without Dams (Thousands)

| <u>Area of Production</u> | <u>Spring Chinook</u> | <u>Summer Chinook</u> | <u>Fall Chinook</u> | <u>Coho</u>  | <u>Steelhead</u> | <u>Sockeye</u> |
|---------------------------|-----------------------|-----------------------|---------------------|--------------|------------------|----------------|
| Between 1 & 2 Dams        | 155                   | 0                     | 4,683               | 492          | 84               | 0              |
| Between 2 & 3 Dams        | 920                   | 0                     | 3,291               | 381          | 121              | 0              |
| Between 3 & 4 Dams        | 0                     | 0                     | 2,446               | 135          | 299              | 0              |
| Between 4 & 5 Dams        | 943                   | 221                   | 21,559              | 1,333        | 332              | 0              |
| Between 5 & 6 Dams        | 0                     | 0                     | 0                   | 0            | 0                | 0              |
| Between 6 & 7 Dams        | 368                   | 0                     | 1,593               | 0            | 125              | 0              |
| Between 7 & 8 Dams        | 724                   | 174                   | 858                 | 427          | 150              | 581            |
| Between 8 & 9 Dams        | 17,931                | 9,982                 | 4,375               | 4,788        | 5,233            | 1,023          |
| Between 9 & 10 Dams       | 1,816                 | 918                   | 0                   | 767          | 405              | 2,130          |
| Above Chief Joseph Dam    | 0                     | 0                     | 0                   | 0            | 0                | 0              |
| Above Hells Canyon Dam    | 0                     | 0                     | 0                   | 0            | 0                | 0              |
| <b>Totals:</b>            | <b>22,859</b>         | <b>11,295</b>         | <b>38,804</b>       | <b>8,323</b> | <b>6,749</b>     | <b>3,734</b>   |

TABLE 15 (cont.)

## Number of Adults at River Mouth Without Dams (Thousands)

| <u>Area of Production</u> | <u>Spring Chinook</u> | <u>Summer Chinook</u> | <u>Fall Chinook</u> | <u>Cono</u> | <u>Steelhead</u> | <u>Sockeye</u> |
|---------------------------|-----------------------|-----------------------|---------------------|-------------|------------------|----------------|
| Between 1 & 2 Dams        | 3                     | 0                     | 187                 | 39          | 8                | 0              |
| Between 2 & 3 Dams        | 18                    | 0                     | 132                 | 30          | 12               | 0              |
| Between 3 & 4 Dams        | 0                     | 0                     | 98                  | 11          | 30               | 0              |
| Between 4 & 5 Dams        | 19                    | 9                     | 862                 | 107         | 33               | 0              |
| Between 5 & 6 Dams        | 0                     | 0                     | 0                   | 0           | 0                | 0              |
| Between 6 & 7 Dams        | 7                     | 0                     | 64                  | 0           | 13               | 0              |
| Between 7 & 8 Dams        | 14                    | 7                     | 34                  | 34          | 15               | 58             |
| Between 8 & 9 Dams        | 359                   | 399                   | 175                 | 383         | 523              | 102            |
| Between 9 & 10 Dams       | 36                    | 37                    | 0                   | 61          | 40               | 213            |
| Above Chief Joseph Dam    | 213                   | 592                   | 276                 | 232         | 101              | 1,761          |
| Above Hells Canyon Dam    | 222                   | 1,221                 | 560                 | 0           | 140              | 14             |
| <b>Totals:</b>            | <b>892</b>            | <b>2,265</b>          | <b>2,388</b>        | <b>898</b>  | <b>916</b>       | <b>2,148</b>   |

TABLE 15 (cont.)

## Number of Adults at Spawning Grounds Without Dams (Thousands)

| <u>Area of Production</u> | <u>Spring Chinook</u> | <u>Summer Chinook</u> | <u>Fall Chinook</u> | <u>Coho</u> | <u>Steelhead</u> | <u>Sockeye</u> |
|---------------------------|-----------------------|-----------------------|---------------------|-------------|------------------|----------------|
| Between 1 & 2 Dams        | 3                     | 0                     | 187                 | 39          | 8                | 0              |
| Between 2 & 3 Dams        | 18                    | 0                     | 132                 | 30          | 12               | 0              |
| Between 3 & 4 Dams        | 0                     | 0                     | 98                  | 11          | 30               | 0              |
| Between 4 & 5 Dams        | 19                    | 9                     | 862                 | 107         | 33               | 0              |
| Between 5 & 6 Dams        | 0                     | 0                     | 0                   | 0           | 0                | 0              |
| Between 6 & 7 Dams        | 7                     | 0                     | 64                  | 0           | 13               | 0              |
| Between 7 & 8 Dams        | 14                    | 7                     | 34                  | 34          | 15               | 58             |
| Between 8 & 9 Dams        | 359                   | 399                   | 175                 | 383         | 523              | 102            |
| Between 9 & 10 Dams       | 36                    | 37                    | 0                   | 61          | 40               | 213            |
| Above Chief Joseph Dam    | 213                   | 592                   | 276                 | 232         | 101              | 1,761          |
| Above Hells Canyon Dam    | 222                   | 1,221                 | 560                 | 0           | 140              | 14             |
| <b>Totals:</b>            | <b>892</b>            | <b>2,265</b>          | <b>2,388</b>        | <b>898</b>  | <b>916</b>       | <b>2,148</b>   |

All Species Total: 9,507,000

TABLE 15 (cont.)

Number of Adults at Spawning Grounds With Dams (Thousands)

| <u>Area of Production</u> | <u>Spring Chinook</u> | <u>Summer Chinook</u> | <u>Fall Chinook</u> | <u>Coho</u> | <u>Steelhead</u> | <u>Sockeye</u> |
|---------------------------|-----------------------|-----------------------|---------------------|-------------|------------------|----------------|
| Between 1 & 2 Dams        | 2                     | 0                     | 142                 | 30          | 6                | 0              |
| Between 2 & 3 Dams        | 11                    | 0                     | 76                  | 18          | 7                | 0              |
| Between 3 & 4 Dams        | 0                     | 0                     | 43                  | 5           | 13               | 0              |
| Between 4 & 5 Dams        | 6                     | 3                     | 288                 | 36          | 11               | 0              |
| Between 5 & 6 Dams        | 0                     | 0                     | 0                   | 0           | 0                | 0              |
| Between 6 & 7 Dams        | 1                     | 0                     | 12                  | 0           | 2                | 0              |
| Between 7 & 8 Dams        | 2                     | 1                     | 5                   | 5           | 2                | 9              |
| Between 8 & 9 Dams        | 40                    | 44                    | 19                  | 43          | 58               | 11             |
| Between 9 & 10 Dams       | 3                     | 3                     | 0                   | 5           | 3                | 18             |
| Above Chief Joseph Dam    | 0                     | 0                     | 0                   | 0           | 0                | 0              |
| Above Hells Canyon Dam    | 0                     | 0                     | 0                   | 0           | 0                | 0              |
| <b>Totals:</b>            | <b>66</b>             | <b>52</b>             | <b>586</b>          | <b>141</b>  | <b>104</b>       | <b>38</b>      |

All Species Total: 986,000

TABLE 15 (cont.)

## Dam Produced Salmon and Steelhead Loss (Thousands)

| <u>Area of Production</u> | <u>Spring Chinook</u> | <u>Summer Chinook</u> | <u>Fall Chinook</u> | <u>Coho</u> | <u>Steelhead</u> | <u>Sockeye</u> |
|---------------------------|-----------------------|-----------------------|---------------------|-------------|------------------|----------------|
| Between 1<br>& 2 Dams     | 1                     | 0                     | 45                  | 9           | 2                | 0              |
| Between 2<br>& 3 Dams     | 8                     | 0                     | 56                  | 13          | 5                | 0              |
| Between 3<br>& 4 Dams     | 0                     | 0                     | 55                  | 6           | 17               | 0              |
| Between 4<br>& 5 Dams     | 13                    | 6                     | 575                 | 71          | 22               | 0              |
| Between 5<br>& 6 Dams     | 0                     | 0                     | 0                   | 0           | 0                | 0              |
| Between 6<br>& 7 Dams     | 6                     | 0                     | 51                  | 0           | 10               | 0              |
| Between 7<br>& 8 Dams     | 12                    | 6                     | 29                  | 29          | 13               | 50             |
| Between 8<br>& 9 Dams     | 319                   | 355                   | 156                 | 340         | 465              | 91             |
| Between 9<br>& 10 Dams    | 33                    | 34                    | 0                   | 56          | 37               | 195            |
| Above Chief<br>Joseph Dam | 213                   | 592                   | 276                 | 232         | 101              | 1,761          |
| Above Hells<br>Canyon Dam | 222                   | 1,221                 | 560                 | 0           | 140              | 14             |
| <b>Totals:</b>            | <b>826</b>            | <b>2,213</b>          | <b>1,802</b>        | <b>757</b>  | <b>812</b>       | <b>2,111</b>   |

All Species Total: 8,522,000

TABLE 15 (cont.)

## Hydropower-Related Salmon and Steelhead Loss (Thousands)

| <u>Area of Production</u> | <u>Spring Chinook</u> | <u>Summer Chinook</u> | <u>Fall Chinook</u> | <u>Coho</u> | <u>Steelhead</u> | <u>Sockeye</u> |
|---------------------------|-----------------------|-----------------------|---------------------|-------------|------------------|----------------|
| Between 1 & 2 Dams        | 1                     | 0                     | 42                  | 9           | 2                | 0              |
| Between 2 & 3 Dams        | 7                     | 0                     | 52                  | 12          | 5                | 0              |
| Between 3 & 4 Dams        | 0                     | 0                     | 52                  | 6           | 16               | 0              |
| Between 4 & 5 Dams        | 12                    | 6                     | 540                 | 67          | 21               | 0              |
| Between 5 & 6 Dams        | 0                     | 0                     | 0                   | 0           | 0                | 0              |
| Between 6 & 7 Dams        | 6                     | 0                     | 48                  | 0           | 10               | 0              |
| Between 7 & 8 Dams        | 12                    | 6                     | 28                  | 27          | 12               | 47             |
| Between 8 & 9 Dams        | 300                   | 334                   | 146                 | 320         | 437              | 85             |
| Between 9 & 10 Dams       | 31                    | 32                    | 0                   | 53          | 35               | 183            |
| Above Chief Joseph Dam    | 145                   | 403                   | 188                 | 158         | 69               | 1,197          |
| Above Hells Canyon Dam    | 111                   | 611                   | 280                 | 0           | 70               | 7              |
| <b>Totals:</b>            | <b>624</b>            | <b>1,389</b>          | <b>1,376</b>        | <b>651</b>  | <b>675</b>       | <b>1,520</b>   |

All Species Total: 6,236,000