2015 PRESEASON FORECAST PACKET
FOR HOOD CANAL
SALMON RUNS'

PRESEASON FORECAST PACKET PREPARED BY:

SKOKOMISH TRIBE

SALMON FORECASTS AGREED TO BY:

LOWER ELWHA TRIBE
PNPTC (FOR JAMESTOWN & PORT GAMBLE)
SKOKOMISH TRIBE
WDFW

FINAL 30JAN15
### SUMMARY OF 2015 HOOD CANAL FORECASTS
and Forecasting Methods

<table>
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<tr>
<th>Species (Ref.#)</th>
<th>Origin</th>
<th>Type</th>
<th>Number</th>
<th>Mass Marked</th>
<th>Number Type</th>
<th>Model Designation</th>
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<td>Chinook (A-1)</td>
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<td>Primary</td>
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<td>Hatchery</td>
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<td>Summer Chum (A-2)</td>
<td>Natural (supplemented)</td>
<td>Secondary</td>
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<td>Total Recruits</td>
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<tr>
<td></td>
<td>Natural</td>
<td>Primary</td>
<td>81,938</td>
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<td>Total DA2(^1) Recruits</td>
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<td>Natural</td>
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<td></td>
<td>Hatchery</td>
<td>Secondary</td>
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<td>126,699</td>
<td>Total DA2(^1) Recruits</td>
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\(^1\) See overleaf for Coho FRAM model inputs (DA2 = December Age 2; JA3 = January Age 3).

NOTES: Summer Chum salmon, although classified as “secondary”, are under rehabilitation.
Forecasts for individual Hood Canal Management Units (MU) are:

- Mainstem Hood Canal MU: 11,410
- SE Hood Canal MU: 2,076
- Quilcene MU: 9,040

Natural Chinook salmon, although classified as “secondary”, are under rehabilitation.
Forecasts for individual Hood Canal Management Units (MU) are:

- Mid Hood Canal MU: 299
- Skokomish MU (Natural): 2,775
  (Hatchery): 36,995
- Hoodsport MU: 21,989
- Miscell.: 76
### Coho FRAM Model Inputs:

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<tr>
<th>Stock Name</th>
<th>DA2</th>
<th>nuFRAM Stock</th>
<th>nuFRAM JA3 = DA2*(1.232/1.333)</th>
<th>Marked nuFRAM</th>
<th>Marked %</th>
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<tr>
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<tr>
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<td>qlcnbh</td>
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<td>Quilcene Hatchery</td>
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<td>qlcenh</td>
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<td>hoodsh</td>
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<tr>
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<td>George Adams Hatchery</td>
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<td>gadamh</td>
<td>31,029</td>
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<td>80.00%</td>
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<td>Skokomish River Natural</td>
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<td>skokrw</td>
<td>7,764</td>
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A. Pre-season Forecasting Methods

A-1. Summer/Fall Chinook Salmon

The 2015 forecasted terminal run size of summer-run Hood Canal Chinook salmon is the product of brood 2011 fingerling lbs released from WDFW facilities in 2012, multiplied by the average of post-season estimated terminal area return rates (total terminal run / hatchery fingerling lbs released 5 yrs previous) for the last five return years (2010-2014), (Table A-1-a). The data series used this year was intended to estimate a terminal return to net fisheries, freshwater sport and escapements. It does not include other run components or contributions. The historical data series was recently reconciled from the 2010 through 2012 return years (2014 remains preliminary), to include this information for 2015 forecasting purposes (Tables A-1-a and A-1-b). The resulting terminal area run forecast is 62,134 Chinook salmon. The forecast was apportioned to 58,984 chinook expected to return to hatcheries and 3,150 fish expected to return to natural spawning areas (Table A-1-d), based on the Hood Canal terminal runs' relative contribution of the individual Hood Canal management units in the most recent brood cycle, comprised of the 2010-2014 return years (Table A-1-c). These estimates will be used as inputs to generate ocean recruit forecasts during pre-season simulation modeling.
Table A-1-a. Hood Canal Summer/Fall Chinook Releases at WDFW Hatcheries and Run Sizes.

<table>
<thead>
<tr>
<th>Return Year (RY)</th>
<th>0+ Lbs. Released in RY-3</th>
<th>Return/Lb</th>
<th>Terminal Run</th>
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<td>0.42295</td>
<td>16,593</td>
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<td>1985</td>
<td>40,098</td>
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<tr>
<td>1986</td>
<td>55,499</td>
<td>0.39329</td>
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<tr>
<td>1987</td>
<td>50,811</td>
<td>0.51412</td>
<td>26,123</td>
</tr>
<tr>
<td>1988</td>
<td>55,967</td>
<td>0.50753</td>
<td>28,405</td>
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<tr>
<td>1989</td>
<td>65,510</td>
<td>0.38222</td>
<td>25,039</td>
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<tr>
<td>1990</td>
<td>54,674</td>
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<td>12,728</td>
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<tr>
<td>1991</td>
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<td>1993</td>
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<tr>
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<td>82,895</td>
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<td>1997</td>
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<td>7,805</td>
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<tr>
<td>1998</td>
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<td>0.27658</td>
<td>16,222</td>
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<td>89,149</td>
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<tr>
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(*) 2013-14 return data are preliminary and subject to revision, following reconciliation of records.
### Table A-1-b. Hood Canal Summer/Fall Chinook Terminal Runs

<table>
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<tr>
<th>Year</th>
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<th>12C</th>
<th>12D</th>
<th>Skokomish</th>
<th>G.A. Hatchery</th>
<th>Hoodsport Hatchery</th>
<th>Total</th>
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*Note: Values for years prior to 1998 DO NOT include freshwater recreational catch and the 2014 run reconstruction is preliminary and subject to revision.
### Table A-1-c. Proportional Distribution of Hood Canal Summer/Fall Chinook Returns

<table>
<thead>
<tr>
<th>Year</th>
<th>12A</th>
<th>12B</th>
<th>12C</th>
<th>12D</th>
<th>Skokomish</th>
<th>G.Adam</th>
<th>Hoodsport</th>
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<td>2010</td>
<td>0.00000</td>
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<td>0.00004</td>
<td>0.00222</td>
<td>0.05535</td>
<td>0.53905</td>
<td>0.39838</td>
</tr>
<tr>
<td>2010-14 Mean</td>
<td>0.00001</td>
<td>0.00480</td>
<td>0.00038</td>
<td>0.00084</td>
<td>0.04466</td>
<td>0.59541</td>
<td>0.35390</td>
</tr>
</tbody>
</table>

### Table A-1-d. Apportionment of the Hood Canal Summer/Fall Chinook Forecast

<table>
<thead>
<tr>
<th>Hood Canal Production Unit</th>
<th>Terminal Run Forecast</th>
<th>Proportion</th>
</tr>
</thead>
<tbody>
<tr>
<td>12A</td>
<td>0.49</td>
<td>0.00001</td>
</tr>
<tr>
<td>12B</td>
<td>298</td>
<td>0.00480</td>
</tr>
<tr>
<td>12C</td>
<td>24</td>
<td>0.00038</td>
</tr>
<tr>
<td>12D</td>
<td>52</td>
<td>0.00084</td>
</tr>
<tr>
<td>Skokomish</td>
<td>2,775</td>
<td>0.04466</td>
</tr>
<tr>
<td>Natural Subtotal</td>
<td>3,150</td>
<td>0.05069</td>
</tr>
<tr>
<td>George Adams</td>
<td>36,995</td>
<td>0.59541</td>
</tr>
<tr>
<td>Hoodsport</td>
<td>21,989</td>
<td>0.35390</td>
</tr>
<tr>
<td>Hatchery Subtotal</td>
<td>58,984</td>
<td>0.94931</td>
</tr>
<tr>
<td>Total</td>
<td>62,134</td>
<td>1.0</td>
</tr>
</tbody>
</table>

Note: The forecasted proportions are derived from the 2010-2014 mean distribution.
A-2. **Summer Chum Salmon**

**A-2.1 Natural Summer Chum Runs**

The 2015 pre-season forecast of the Hood Canal summer chum salmon returns was forecast as total recruitment to all fisheries and escapements for the Mainstem Hood Canal, Quilcene/Dabob, and SE Hood Canal Management Units (MUs).

Abundance for each MU was forecast as the mean of the 2011 through 2014 returns.

Estimates of the number of natural-origin recruits and supplementation-origin recruits returning to each MU each year from 2007 through 2014 and associated forecasts for 2015 are shown in Table A-2-a.

The 2015 forecasted returns are 11,410 summer chum to the Mainstem Hood Canal MU, 9,040 summer chum to the Quilcene/Dabob Bays MU, and 2,076 summer chum to the SE Hood Canal MU. The total forecasted return is 22,525 summer chum to Hood Canal in 2015 (Table A-2-a).

Supplementation and reintroduction projects were implemented in the Big Quilcene River from 1992 through 2003 (Quilcene/Dabob MU); in the Union River from 2000 through 2003 and in the Tahuya River from 2003 through the present (SE Hood Canal MU). In the Mainstem Hood Canal MU, supplementation and reintroduction projects were implemented in Lilliwaup Creek from 1992 through the present, in Big Beef Creek from 1996 through 2004 and in the Hamma Hamma River from 1997 through 2008. Summer chum fry from each project were marked and natural-origin recruits (NORs) can be distinguished from supplementation-origin recruits (SORs) upon return as adults. Fry released from each project have contributed substantially to the summer chum adult recruitment and escapements.

The supplementation projects in Lilliwaup Creek and the Tahuya River are each expected to contribute supplementation-origin recruits (SORs) during 2015. The projects in the Quilcene River, Big Beef Creek, and the Union River were terminated and no SORs are expected to return from those projects in 2015.

The *Summer Chum Salmon Conservation Initiative* (SCSCI) defines interim Critical and Recovery abundance thresholds for each MU. The interim abundance thresholds are 1,260 (Critical) and 4,570 (Recovery) for the Quilcene/Dabob MU, 2,980 (Critical) and 15,740 (Recovery) for the Mainstem Hood Canal MU, and 340 (Critical) and 550 (Recovery) for the SE Hood Canal MU.

The 2015 forecasted returns of summer chum exceed the interim Critical threshold for each Hood Canal Management Unit and exceed the interim Recovery threshold for the Quilcene/Dabob MU and SE Hood Canal MU.
Table A-2-a. Hood Canal Summer Chum Salmon Natural and Supplementation Origin Recruits.

<table>
<thead>
<tr>
<th>Year</th>
<th>Mainstem Hood Canal</th>
<th>Quilcene / Dabob</th>
<th>SE Hood Canal</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>NOR</td>
<td>SOR</td>
<td>NOR</td>
</tr>
<tr>
<td>2007</td>
<td>5,939</td>
<td>3,802</td>
<td>75</td>
</tr>
<tr>
<td>2008</td>
<td>9,835</td>
<td>5,866</td>
<td>0</td>
</tr>
<tr>
<td>2009</td>
<td>4,953</td>
<td>2,498</td>
<td>0</td>
</tr>
<tr>
<td>2010</td>
<td>8,625</td>
<td>2,101</td>
<td>9</td>
</tr>
<tr>
<td>2011</td>
<td>3,700</td>
<td>2,736</td>
<td>627</td>
</tr>
<tr>
<td>2012</td>
<td>14,315</td>
<td>12,501</td>
<td>3,762</td>
</tr>
<tr>
<td>2013</td>
<td>11,336</td>
<td>8,723</td>
<td>2,906</td>
</tr>
<tr>
<td>2014</td>
<td>16,288</td>
<td>12,199</td>
<td>1,008</td>
</tr>
<tr>
<td>2015 Forecast a/</td>
<td>11,410</td>
<td>9,040</td>
<td>2,076</td>
</tr>
<tr>
<td>2015 Total Hood Canal Forecast</td>
<td></td>
<td></td>
<td>22,525</td>
</tr>
</tbody>
</table>

a/ 2011-14 mean return

The Co-managers have agreed to monitor the incidental harvest of summer chum in all scheduled fisheries and to monitor the in-season abundance of summer chum in the Quilcene / Dabob Bays MU. As in 2010 - 2014, the Co-managers agree that no gillnet fisheries will occur in 2015 until spawner escapement exceeds 1,500 summer chum in the Big and Little Quilcene rivers.

The Co-managers will conduct annual post-season abundance assessments comparing the forecasts to actual returns for each MU. All of the above actions are consistent with the requirements and provisions of the SCSCI.
A-3. Coho Salmon

A-3.1 Coho Salmon Natural Runs

The forecasted recruitment of 2015 Hood Canal natural coho salmon runs was based on a linear regression model that related the return of tagged natural jack coho at Big Beef Creek (BBC) to Hood Canal December Age 2 (DA2) recruits in the subsequent run year. This model used recruit data from brood years 1983-1998 and 2002-2010 (Table A-3-a). Recruit data from brood years 1999-2001 were excluded because of their unusually high recruit per tagged jack ratio, which is not expected to occur this year. The final form of the regression is shown below:

\[
\text{Hood Canal Recruitment} = 33714.819 + (394.280 \times (\text{BBC Tagged Jacks}))
\]

Relevant statistics of the model used to derive the 2015 forecast are shown below.

<table>
<thead>
<tr>
<th>Using Brood Years</th>
<th>1983-1998, 2002-2010</th>
</tr>
</thead>
<tbody>
<tr>
<td>Multiple R</td>
<td>0.79040</td>
</tr>
<tr>
<td>R²</td>
<td>0.62473</td>
</tr>
<tr>
<td>Adj. R²</td>
<td>0.60841</td>
</tr>
<tr>
<td>Std Error of Estimate</td>
<td>35746.879</td>
</tr>
<tr>
<td>N</td>
<td>25</td>
</tr>
<tr>
<td>Intercept</td>
<td>33714.819</td>
</tr>
<tr>
<td>Slope</td>
<td>394.280</td>
</tr>
<tr>
<td>2014 Jacks (X)</td>
<td>127</td>
</tr>
<tr>
<td>2015 Forecast (Y)</td>
<td>83,788</td>
</tr>
</tbody>
</table>

The forecasted recruits were subsequently apportioned to primary and secondary units on the basis of the distribution of their parent brood escapement. The total forecast of 83,788 natural DA2 recruits was thus apportioned into 81,938 from primary and 1,850 from secondary units, on the basis of their parent brood spawner distribution (Table A-3-b).
<table>
<thead>
<tr>
<th>Brood Year</th>
<th>Big Beef Creek Total Smolts</th>
<th>Big Beef Total Natural Jacks</th>
<th>Big Beef Tagged Natural Jacks</th>
<th>Hood Canal Total Dec Age-2 Recruits</th>
</tr>
</thead>
<tbody>
<tr>
<td>1975</td>
<td>35,025</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1976</td>
<td>17,619</td>
<td>36</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1977</td>
<td>45,634</td>
<td>452</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1978</td>
<td>20,715</td>
<td>265</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1979</td>
<td>41,054</td>
<td>398</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1980</td>
<td>25,225</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1981</td>
<td>25,333</td>
<td>210</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1982</td>
<td>36,636</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1983</td>
<td>26,062</td>
<td>427</td>
<td>346</td>
<td>211,127</td>
</tr>
<tr>
<td>1984</td>
<td>23,994</td>
<td>445</td>
<td>350</td>
<td>232,860</td>
</tr>
<tr>
<td>1985</td>
<td>11,510</td>
<td>201</td>
<td>121</td>
<td>40,236</td>
</tr>
<tr>
<td>1986</td>
<td>26,534</td>
<td>314</td>
<td>208</td>
<td>117,460</td>
</tr>
<tr>
<td>1987</td>
<td>17,594</td>
<td>336</td>
<td>234</td>
<td>118,316</td>
</tr>
<tr>
<td>1988</td>
<td>19,739</td>
<td>173</td>
<td>122</td>
<td>81,147</td>
</tr>
<tr>
<td>1989</td>
<td>23,646</td>
<td>167</td>
<td>144</td>
<td>66,306</td>
</tr>
<tr>
<td>1990</td>
<td>18,677</td>
<td>273</td>
<td>202</td>
<td>67,729</td>
</tr>
<tr>
<td>1991</td>
<td>13,071</td>
<td>206</td>
<td>149</td>
<td>140,612</td>
</tr>
<tr>
<td>1992</td>
<td>18,431</td>
<td>188</td>
<td>157</td>
<td>95,144</td>
</tr>
<tr>
<td>1993</td>
<td>16,574</td>
<td>224</td>
<td>185</td>
<td>73,734</td>
</tr>
<tr>
<td>1994</td>
<td>25,820</td>
<td>410</td>
<td>298</td>
<td>149,823</td>
</tr>
<tr>
<td>1995</td>
<td>40,828</td>
<td>610</td>
<td>510</td>
<td>180,517</td>
</tr>
<tr>
<td>1996</td>
<td>22,222</td>
<td>60</td>
<td>45</td>
<td>23,437</td>
</tr>
<tr>
<td>1997</td>
<td>20,967</td>
<td>96</td>
<td>85</td>
<td>55,909</td>
</tr>
<tr>
<td>1998</td>
<td>47,088</td>
<td>189</td>
<td>179</td>
<td>165,500</td>
</tr>
<tr>
<td>1999</td>
<td>21,803</td>
<td>120</td>
<td>111</td>
<td>107,024</td>
</tr>
<tr>
<td>2000</td>
<td>24,352</td>
<td>80</td>
<td>70</td>
<td>268,753</td>
</tr>
<tr>
<td>2001</td>
<td>36,060</td>
<td>339</td>
<td>254</td>
<td>298,347</td>
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<tr>
<td>2002</td>
<td>25,060</td>
<td>294</td>
<td>235</td>
<td>76,798</td>
</tr>
<tr>
<td>2003</td>
<td>32,949</td>
<td>61</td>
<td>33</td>
<td>57,206</td>
</tr>
<tr>
<td>2004</td>
<td>38,579</td>
<td>161</td>
<td>86</td>
<td>111,437</td>
</tr>
<tr>
<td>2005</td>
<td>29,911</td>
<td>47</td>
<td>39</td>
<td>39,674</td>
</tr>
<tr>
<td>2006</td>
<td>27,416</td>
<td>111</td>
<td>95</td>
<td>96,089</td>
</tr>
<tr>
<td>2007</td>
<td>45,399</td>
<td>32</td>
<td>26</td>
<td>18,994</td>
</tr>
<tr>
<td>2008</td>
<td>24,396</td>
<td>197</td>
<td>177</td>
<td>102,243</td>
</tr>
<tr>
<td>2009</td>
<td>51,932</td>
<td>212</td>
<td>178</td>
<td>154,318</td>
</tr>
<tr>
<td>2010</td>
<td>21,243</td>
<td>90</td>
<td>70</td>
<td>53,523</td>
</tr>
<tr>
<td>2011</td>
<td>27,246</td>
<td>124</td>
<td>84</td>
<td></td>
</tr>
<tr>
<td>2012</td>
<td>58,136</td>
<td>172</td>
<td>127</td>
<td></td>
</tr>
</tbody>
</table>

*Data italicized denotes methodology currently under review and agreed to for forecasting purposes only.
<table>
<thead>
<tr>
<th>Area</th>
<th>Escapement Capacity</th>
<th>Escapement BY 2012</th>
<th>Management Unit Type</th>
<th>Proportion of Brood Escapement</th>
<th>December Age-2 Recruits</th>
</tr>
</thead>
<tbody>
<tr>
<td>12 / 12B</td>
<td>28.88%</td>
<td>19,611</td>
<td>Primary</td>
<td>41.76%</td>
<td>34,992</td>
</tr>
<tr>
<td>12C / 12D</td>
<td>31.66%</td>
<td>21,601</td>
<td>Primary</td>
<td>46.00%</td>
<td>38,543</td>
</tr>
<tr>
<td>Skokomish</td>
<td>29.01%</td>
<td>4,709</td>
<td>Primary</td>
<td>10.03%</td>
<td>8,402</td>
</tr>
<tr>
<td>9A</td>
<td>1.25%</td>
<td>256</td>
<td>Secondary</td>
<td>0.55%</td>
<td>457</td>
</tr>
<tr>
<td>12A</td>
<td>9.20%</td>
<td>781</td>
<td>Secondary</td>
<td>1.66%</td>
<td>1,394</td>
</tr>
<tr>
<td><strong>Primary Subtotal</strong></td>
<td><strong>89.55%</strong></td>
<td><strong>45,921</strong></td>
<td></td>
<td><strong>97.79%</strong></td>
<td><strong>81,938</strong></td>
</tr>
<tr>
<td><strong>Secondary Subtotal</strong></td>
<td><strong>10.45%</strong></td>
<td><strong>1,037</strong></td>
<td></td>
<td><strong>2.21%</strong></td>
<td><strong>1,850</strong></td>
</tr>
<tr>
<td><strong>Grand Total</strong></td>
<td><strong>100.00%</strong></td>
<td><strong>46,958</strong></td>
<td></td>
<td><strong>100.00%</strong></td>
<td><strong>83,788</strong></td>
</tr>
</tbody>
</table>
Table A-3-c. Escapement of Coho Salmon to Primary Natural Spawning Areas of Hood Canal

<table>
<thead>
<tr>
<th>Year</th>
<th>North (12-12B)</th>
<th>South (12C-12D)</th>
<th>Skokomish</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1986</td>
<td>17,865</td>
<td>19,679</td>
<td>3,432</td>
<td>40,976</td>
</tr>
<tr>
<td>1987</td>
<td>7,286</td>
<td>8,026</td>
<td>3,510</td>
<td>18,822</td>
</tr>
<tr>
<td>1988</td>
<td>4,523</td>
<td>4,983</td>
<td>1,948</td>
<td>11,454</td>
</tr>
<tr>
<td>1989</td>
<td>6,488</td>
<td>7,148</td>
<td>934</td>
<td>14,570</td>
</tr>
<tr>
<td>1990</td>
<td>2,518</td>
<td>2,774</td>
<td>1,281</td>
<td>6,573</td>
</tr>
<tr>
<td>1991</td>
<td>5,118</td>
<td>5,638</td>
<td>1,541</td>
<td>12,297</td>
</tr>
<tr>
<td>1992</td>
<td>8,026</td>
<td>8,842</td>
<td>2,179</td>
<td>19,047</td>
</tr>
<tr>
<td>1993</td>
<td>9,800</td>
<td>10,795</td>
<td>1,327</td>
<td>21,922</td>
</tr>
<tr>
<td>1994</td>
<td>20,847</td>
<td>22,965</td>
<td>12,128</td>
<td>55,940</td>
</tr>
<tr>
<td>1995</td>
<td>16,340</td>
<td>18,000</td>
<td>5,560</td>
<td>39,900</td>
</tr>
<tr>
<td>1996</td>
<td>18,428</td>
<td>20,300</td>
<td>4,008</td>
<td>42,736</td>
</tr>
<tr>
<td>1997</td>
<td>37,016</td>
<td>40,777</td>
<td>17,568</td>
<td>95,361</td>
</tr>
<tr>
<td>1998</td>
<td>40,323</td>
<td>44,420</td>
<td>14,957</td>
<td>99,700</td>
</tr>
<tr>
<td>1999</td>
<td>6,854</td>
<td>7,550</td>
<td>1,847</td>
<td>16,251</td>
</tr>
<tr>
<td>2000</td>
<td>8,724</td>
<td>9,610</td>
<td>8,288</td>
<td>26,622</td>
</tr>
<tr>
<td>2001</td>
<td>35,134</td>
<td>38,703</td>
<td>20,601</td>
<td>94,438</td>
</tr>
<tr>
<td>2002</td>
<td>26,170</td>
<td>28,829</td>
<td>13,647</td>
<td>68,646</td>
</tr>
<tr>
<td>2003</td>
<td>60,546</td>
<td>66,697</td>
<td>44,757</td>
<td>172,000</td>
</tr>
<tr>
<td>2004</td>
<td>39,439</td>
<td>43,445</td>
<td>62,995</td>
<td>145,879</td>
</tr>
<tr>
<td>2005</td>
<td>14,854</td>
<td>16,363</td>
<td>6,286</td>
<td>37,503</td>
</tr>
<tr>
<td>2006</td>
<td>5,554</td>
<td>6,118</td>
<td>1,597</td>
<td>13,269</td>
</tr>
<tr>
<td>2007</td>
<td>19,017</td>
<td>20,949</td>
<td>6,381</td>
<td>46,347</td>
</tr>
<tr>
<td>2008</td>
<td>5,082</td>
<td>5,598</td>
<td>836</td>
<td>11,516</td>
</tr>
<tr>
<td>2009</td>
<td>12,330</td>
<td>13,583</td>
<td>1,048</td>
<td>26,961</td>
</tr>
<tr>
<td>2010</td>
<td>1,906</td>
<td>2,099</td>
<td>192</td>
<td>4,197</td>
</tr>
<tr>
<td>2011</td>
<td>9,106</td>
<td>10,030</td>
<td>5,252</td>
<td>24,388</td>
</tr>
<tr>
<td>2012</td>
<td>19,611</td>
<td>21,601</td>
<td>4,709</td>
<td>45,921</td>
</tr>
<tr>
<td>2013</td>
<td>6,779</td>
<td>7,467</td>
<td>1,798</td>
<td>16,044</td>
</tr>
</tbody>
</table>
The 2015 forecast utilized survival rates for two brood cycles, or six brood years (Table A-3-d). Historic marine survival rates were estimated from CWT-based cohort reconstruction of December Age-2 recruits, as were those of natural coho. Because there are several enhancement facilities in Hood Canal, and tag data were not available for all facilities for all years, marine survival rates were estimated from reconstructed cohorts, using the assumption that untagged releases contributed to preterminal fisheries in a way that maintained the same ratio to tagged releases, as estimated by RRTERM to have entered the Hood Canal terminal area (Table A-3-d).

The 2015 forecast of 142,692 hatchery reared December Age-2 coho recruits (Table A-3-d) was predicted from the brood year 2012 smolt releases multiplied by the average estimated marine survival rate for smolts from the six most recent available brood years for all facilities except Quilcene Bay Net Pens which applied brood year 2011. (Table A-3-d). In the winter of 2012-2013 a storm damaged the Quilcene Bay Net Pens, as a result BY12 fish destined for the net pens were held and released on station at the Quilcene National Fish Hatchery.
## Table A-3-d. Hood Canal Hatchery and Net Pen Smolt to Dec-2 Recruit Survival

<table>
<thead>
<tr>
<th>Year</th>
<th>George Adams Hatchery</th>
<th>Port Gamble Net Pens</th>
<th>Quilcene NFH</th>
<th>Quilcene Bay Net Pens</th>
</tr>
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<td>2011</td>
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<tr>
<td>2012</td>
<td>337,700</td>
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<td>0.09745</td>
<td>38,397</td>
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<tr>
<td>Average (2005-10)</td>
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<td>0.04894</td>
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<td>33,581</td>
<td>20,260</td>
<td>82,825</td>
<td>6,026</td>
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</table>

Note: Values in italics indicate values agreed to for preseason forecasting only. Values in boldface were excluded from the analysis.
A-4. Fall Chum Salmon

The 2015 forecast of the Hood Canal fall chum salmon run was estimated separately for natural production units, off-station augmented production in natural rearing areas, and individual hatchery production units. The following descriptions of methods and source data are intended to provide documentation of the methods and approaches used.

A-4.1.1 Natural Run Forecasts (Tribal)

The 2015 return of Hood Canal natural fall-timed chum salmon of each returning age group (3, 4, and 5 year olds) was forecast using the available mean return-per-spawner-at-age rates for the brood years 2001-08. The mean recruit-per-spawner return rates were 0.66197, 1.25324, and 0.17952, for 3, 4, and 5 year-olds respectively (Table A-4-a). These adjusted rates of return were multiplied with the 2012, 2011, and 2010 brood escapements (40,493, 48,446, and 17,223; respectively) to estimate the total 2015 forecast of 90,611 Hood Canal natural fall chum returning to Puget Sound, before the addition of anticipated returns from in-stream supplementation projects. The Hood Canal natural run forecast was further apportioned to individual production units (Tables A-4-d and A-4-e), on the basis of relative proportion attributable to each production unit's spawners (brood year escapements), for each returning age group.

The grand total return of 90,725 to each natural production unit was estimated by adding the estimated 114 return from in-stream enhancement and supplementation efforts. The forecast of this latter component is described under "Hatchery runs" (Section A-4.2).

A-4.1.2 Natural Run Forecasts (WDFW)

Natural fall chum forecasts were calculated using the Puget Sound-wide recruit/spawner (R/S) method, with the regional (Hood Canal) forecast, and terminal forecasts within Hood Canal, allocated according to parent escapement and terminal forecasts allocated by escapement goal.

The WDFW natural fall chum salmon forecast was estimated for Puget Sound using the recruit/spawner method. Escapement of parent broods of 2010, 2011, and 2012 and age composition were used to estimate 2015 returns of Age 3, Age 4, and Age 5 natural fall chum. The 2015 forecast of natural fall chum to Puget Sound is 31,734 Age 3; 597,661 Age 4; and 122,136 Age 5 fish for a total run size of 751,532 (Table A-4b).

The apportionment of 751,532 Puget Sound natural fall chum to Hood Canal was determined by applying the Hood Canal parent escapement proportion to each age class. The Hood Canal forecast by age is 17,605 Age 3; 81,374 Age 4; and 1,997 Age 5 fish for a total Hood Canal forecast of 100,975 natural fall chum (Table A-4c).

The Hood Canal natural run forecast was further apportioned to individual production units (Tables A-4-d and A-4-e), on the basis of relative proportion attributable to each production unit's spawners (brood year escapements), for each returning age group. The forecasted return of each age group to Puget Sound was apportioned to Hood Canal using the proportions of the parent escapement of each brood (Table A-4-f).

A-4.1.3 Joint 2015 Hood Canal Natural Fall Chum Salmon Forecast

For preliminary preseason planning, we agreed to use a forecast of 95,907 natural fall chum, the average of the Tribal and WDFW results. The total forecast was then apportioned to individual production units on the basis of the age specific brood escapement distribution (Table A-4-g).
<table>
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<th>Brood Year</th>
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<th>4's</th>
<th>5's</th>
<th>Total</th>
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<tr>
<td>2012</td>
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<td>1.25324</td>
<td>0.17952</td>
<td>2.09473</td>
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2015 Tribal Forecast* 26,805 60,714 3,092 90,611
### Table A-4-b. 2015 WDFW Puget Sound Natural Fall Chum Salmon Forecast

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<tr>
<th>Parent Brood</th>
<th>Age</th>
<th>Parent Escapement</th>
<th>Mean R/S</th>
<th>Adjusted R/S</th>
<th>Estimated R/S (all ages)</th>
<th>Mean Age Composition</th>
<th>Natural Forecast</th>
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<td>2010</td>
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<td>2.31</td>
<td>2.31</td>
<td>631,593</td>
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<td>353,305</td>
<td>2.99</td>
<td>2.99</td>
<td>1,055,642</td>
<td>0.5660000</td>
<td>597,661</td>
</tr>
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<td>2012</td>
<td>3</td>
<td>280,933</td>
<td>2.31</td>
<td>2.31</td>
<td>648,472</td>
<td>0.1880000</td>
<td>122,136</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td><strong>751,532</strong></td>
</tr>
</tbody>
</table>

Note: Uses odd or even brood year average, depending on brood year

### Table A-4-c. 2015 WDFW Hood Canal Natural Fall Chum Salmon Forecasts

<table>
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<th>Puget Sound Forecast</th>
<th>HC Parent Escapement Proportion</th>
<th>HC Forecast by Age</th>
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<tr>
<td>Age 3 (2012 Brood) Forecast</td>
<td>122,136</td>
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<td>Age 4 (2011 Brood) Forecast</td>
<td>597,661</td>
<td>0.1360000</td>
</tr>
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<td>Age 5 (2010 Brood) Forecast</td>
<td>31,734</td>
<td>0.0630000</td>
</tr>
<tr>
<td><strong>Total WDFW Forecast</strong></td>
<td><strong>751,531</strong></td>
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### Table A-4-d. 2015 Hood Canal Natural Fall Chum Salmon Parent Brood Escapement Distribution

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<thead>
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<th>Area</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
</tr>
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<tbody>
<tr>
<td>9A</td>
<td>0.00%</td>
<td>0.00%</td>
<td>0.00%</td>
</tr>
<tr>
<td>12</td>
<td>6.28%</td>
<td>4.67%</td>
<td>4.25%</td>
</tr>
<tr>
<td>12A</td>
<td>0.79%</td>
<td>4.34%</td>
<td>1.51%</td>
</tr>
<tr>
<td>12B</td>
<td>27.88%</td>
<td>47.46%</td>
<td>43.31%</td>
</tr>
<tr>
<td>12C</td>
<td>36.19%</td>
<td>15.35%</td>
<td>11.09%</td>
</tr>
<tr>
<td>82G</td>
<td>12.22%</td>
<td>23.12%</td>
<td>23.85%</td>
</tr>
<tr>
<td>12D</td>
<td>16.66%</td>
<td>5.06%</td>
<td>15.99%</td>
</tr>
</tbody>
</table>
Table A-4-e. Apportionment of the 2015 Tribal Hood Canal Natural Fall Chum Salmon Forecast

<table>
<thead>
<tr>
<th>Area</th>
<th>3's</th>
<th>4's</th>
<th>5's</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>9A</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>12</td>
<td>1,139</td>
<td>2,835</td>
<td>194</td>
<td>4,169</td>
</tr>
<tr>
<td>12A</td>
<td>405</td>
<td>2,635</td>
<td>24</td>
<td>3,064</td>
</tr>
<tr>
<td>12B</td>
<td>11,609</td>
<td>28,815</td>
<td>862</td>
<td>41,286</td>
</tr>
<tr>
<td>12C</td>
<td>2,973</td>
<td>9,320</td>
<td>1,119</td>
<td>13,411</td>
</tr>
<tr>
<td>82G</td>
<td>6,393</td>
<td>14,037</td>
<td>378</td>
<td>20,808</td>
</tr>
<tr>
<td>12D</td>
<td>4,286</td>
<td>3,072</td>
<td>515</td>
<td>7,873</td>
</tr>
<tr>
<td>Total</td>
<td>26,805</td>
<td>60,714</td>
<td>3,092</td>
<td>90,611</td>
</tr>
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Table A-4-f. Apportionment of the 2015 WDFW Hood Canal Natural Fall Chum Salmon Forecast

<table>
<thead>
<tr>
<th>Area</th>
<th>3's</th>
<th>4's</th>
<th>5's</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>9A</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>12</td>
<td>749</td>
<td>3,798</td>
<td>125</td>
<td>4,672</td>
</tr>
<tr>
<td>12A</td>
<td>266</td>
<td>3,531</td>
<td>16</td>
<td>3,812</td>
</tr>
<tr>
<td>12B</td>
<td>7,624</td>
<td>38,622</td>
<td>557</td>
<td>46,803</td>
</tr>
<tr>
<td>12C</td>
<td>1,952</td>
<td>12,493</td>
<td>723</td>
<td>15,168</td>
</tr>
<tr>
<td>82G</td>
<td>4,199</td>
<td>18,815</td>
<td>244</td>
<td>23,259</td>
</tr>
<tr>
<td>12D</td>
<td>2,814</td>
<td>4,114</td>
<td>333</td>
<td>7,262</td>
</tr>
<tr>
<td>Total</td>
<td>17,605</td>
<td>81,374</td>
<td>1,997</td>
<td>100,975</td>
</tr>
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</table>

Table A-4-g. Apportionment of the 2015 Joint Hood Canal Natural Fall Chum Salmon Forecast

<table>
<thead>
<tr>
<th>Area</th>
<th>Tribal Forecast</th>
<th>WDFW Forecast</th>
<th>Joint Forecast</th>
</tr>
</thead>
<tbody>
<tr>
<td>9A</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>12</td>
<td>4,169</td>
<td>4,672</td>
<td>4,420</td>
</tr>
<tr>
<td>12A</td>
<td>3,064</td>
<td>3,812</td>
<td>3,438</td>
</tr>
<tr>
<td>12B</td>
<td>41,286</td>
<td>46,803</td>
<td>44,045</td>
</tr>
<tr>
<td>12C</td>
<td>13,411</td>
<td>15,168</td>
<td>14,290</td>
</tr>
<tr>
<td>82G (Skokomish)</td>
<td>20,808</td>
<td>23,259</td>
<td>22,035</td>
</tr>
<tr>
<td>12D</td>
<td>7,873</td>
<td>7,262</td>
<td>7,566</td>
</tr>
<tr>
<td>12D Off-Station</td>
<td>114</td>
<td></td>
<td>114</td>
</tr>
<tr>
<td>Total</td>
<td>90,725</td>
<td>100,975</td>
<td>95,907</td>
</tr>
</tbody>
</table>
A-4.2  Hatchery Runs (Tribal)

The 2015 hatchery-origin returns of fall-timed chum salmon were generally forecasted using average returns-at-age-per-pound of fingerlings released, to Puget Sound net fisheries and escapements, using historical run sizes from the fall chum database, historical releases from each facility, and applying them to releases from brood years 2010, 2011, and 2012. In estimating the returns, the following information was used for each facility. The problems with recent years’ terminal area run reconstruction, may have introduced significant positive bias to the estimates of Skokomish River hatchery runs, introducing a negative bias to Hoodsport hatchery runs. Off-station production, resulting from instream augmentation programs was estimated separately and was then added to the forecasted return to natural spawning areas.

The effects of changes to the Hood Canal hatchery chum programs will continue to be seen in 2015, including the return of Area 12A production unit to natural production, since the last release from the Quilcene National Fish Hatchery occurred with the 2002 brood. Also, the 2004 brood was the first year of reduced production at the Hoodsport and George Adams / McKernan facilities, which first affected age-5 returns in 2009 and subsequent years.

A-4.2.1 Forecasts of Instream Augmentation (Tribal)

Egg box and fry-augmented runs to streams of areas 12, 12B, 12C, 12D, 82G: The Tribal forecast applied one half of the mean return rates of age 3, age 4, and age 5 fish per pound planted at Hoodsport Hatchery (2001-2008 broods) (Tables A-4-h and A-4-i). The resulting forecast for 2015 is 114 fish. This forecast was apportioned to each area, according to the volume released from each brood year and the resulting estimates were added to the corresponding natural run components.

<table>
<thead>
<tr>
<th>Area</th>
<th>BY 2012</th>
<th>BY 2011</th>
<th>BY 2010</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Lbs</td>
<td>Lbs</td>
<td>Lbs</td>
</tr>
<tr>
<td>9A</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>12</td>
<td>16.67</td>
<td>13.20</td>
<td>26.66</td>
</tr>
<tr>
<td>12B</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>12A</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>12C</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Skokomish</td>
<td>0.49</td>
<td>145.20</td>
<td>158.40</td>
</tr>
<tr>
<td>12D</td>
<td>0.68</td>
<td>30.40</td>
<td>87.01</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>18</strong></td>
<td><strong>189</strong></td>
<td><strong>272</strong></td>
</tr>
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</table>
Table A-4-i. Apportionment of the 2015 Tribal Hood Canal Fall Chum Off-Station Forecast

<table>
<thead>
<tr>
<th>Area</th>
<th>3's</th>
<th>4's</th>
<th>5's</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>9A</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0</td>
</tr>
<tr>
<td>12</td>
<td>5.33</td>
<td>6.90</td>
<td>0.89</td>
<td>13</td>
</tr>
<tr>
<td>12B</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0</td>
</tr>
<tr>
<td>12A</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0</td>
</tr>
<tr>
<td>12C</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0</td>
</tr>
<tr>
<td>82G</td>
<td>0.38</td>
<td>75.94</td>
<td>5.28</td>
<td>82</td>
</tr>
<tr>
<td>12D</td>
<td>0.22</td>
<td>15.90</td>
<td>2.90</td>
<td>19</td>
</tr>
<tr>
<td>Total</td>
<td>6</td>
<td>99</td>
<td>9</td>
<td>114</td>
</tr>
</tbody>
</table>

A-4.2.2 Fall Chum Hatchery On-Station Forecasts (Tribal)

Hoodsport Hatchery: Mean return rate of age 3, 4, and 5 fish per pound planted at Finch Creek (2001-2008 broods) (Table A-4-j). The resulting forecast for 2015 is 53,363. Run reconstruction problems have biased this run low.

George Adams/McKernan Hatcheries: Mean return rate of age 3, age 4, and age 5 fish per pound released (2001-2008 broods), BY 2000 (age 4) includes a release of 4,119 pounds from Rick’s Pond. The resulting forecast for 2015 is 224,299 (Table A-4-k).

Little Boston Hatchery: Mean return rate of age 3, age 4 and age 5 fish per pound planted at Hoodsport Hatchery (2001-2008 broods) (Table A-4-j). The resulting forecast for 2015 is based on the fingerling releases of 1,713 lbs. (BY12), 866 lbs. (BY2011), and 1,324 lbs (BY 2010), which were used to estimate the return of 3, 4, and 5-year olds respectively, for a total return of 2,090 (Table A-4-n).

Enetai Hatchery: Mean return rates of age 3, age 4 and age 5 fish per pound planted (2001-2008 broods). (Table A-4-l). The resulting forecast for 2015 is based on the fingerling releases of 9,637 lbs. (BY12), 6,879 lbs. (BY2011), and 5,531 lbs. (BY 2010), which were used to estimate the return of 3, 4, and 5-year olds respectively, for a total return of 39,901.

The Tribal forecasts of hatchery returns are summarized in Table A-4-n and indicate a total forecast of on-station hatchery-origin fall chum of 319,653.

A-4.2.3 Fall Chum Hatchery Forecasts (WDFW)

The 2015 return of hatchery-origin fall chum was forecast by multiplying pounds released from each facility by long-term, even/odd brood year specific average return rates for that facility. For example, 3-year old returns were forecast by multiplying pounds released of 2012 brood year chum by the long-term, even-year brood age 3 return rate for that hatchery. Age 4 and age 5 returns were forecast by the same method. For off-station releases (volunteer/cooperative projects), return rates were based on rates for a corresponding hatchery, reduced by a factor of 2 or 4 to compensate for smaller size at release. A summary of the WDFW forecasts by age are shown for Hood Canal hatcheries in Table A-4-m. The 2015 WDFW Hood Canal hatchery fall chum forecast is 293,145 on-station and 126 off-station for a total forecast of 293,271.
For preliminary preseason planning, we agreed to use a forecast of 306,462 hatchery fall chum, the average of the Tribal and WDFW forecasting methods’ results, apportioned to individual hatchery facilities (Table A-4-o).
Table A-4-j. Fall Chum Returns-per-Pound, by Age at Return from Hoodsport Hatchery Releases

<table>
<thead>
<tr>
<th>Brood Year</th>
<th>Release Lbs.</th>
<th>3's</th>
<th>4's</th>
<th>5's</th>
<th>Total</th>
</tr>
</thead>
<tbody>
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<td>1965</td>
<td>888</td>
<td>0.80208</td>
<td>2.35750</td>
<td>0.01558</td>
<td>3.17516</td>
</tr>
<tr>
<td>1966</td>
<td>1,771</td>
<td>0.92010</td>
<td>2.66721</td>
<td>0.02299</td>
<td>3.61030</td>
</tr>
<tr>
<td>1967</td>
<td>2,301</td>
<td>0.93776</td>
<td>1.15006</td>
<td>0.11132</td>
<td>2.19914</td>
</tr>
<tr>
<td>1968</td>
<td>4,373</td>
<td>0.54928</td>
<td>1.56195</td>
<td>0.19686</td>
<td>2.30809</td>
</tr>
<tr>
<td>1969</td>
<td>2,424</td>
<td>0.59879</td>
<td>2.69040</td>
<td>0.26275</td>
<td>3.55194</td>
</tr>
<tr>
<td>1970</td>
<td>3,036</td>
<td>1.45276</td>
<td>4.96486</td>
<td>0.00000</td>
<td>6.41762</td>
</tr>
<tr>
<td>1971</td>
<td>3,794</td>
<td>1.45488</td>
<td>1.48756</td>
<td>0.02969</td>
<td>2.97213</td>
</tr>
<tr>
<td>1972</td>
<td>4,126</td>
<td>0.55870</td>
<td>7.49948</td>
<td>0.82970</td>
<td>8.88788</td>
</tr>
<tr>
<td>1973</td>
<td>9,202</td>
<td>0.70599</td>
<td>3.60727</td>
<td>0.16357</td>
<td>4.47683</td>
</tr>
<tr>
<td>1974</td>
<td>27,368</td>
<td>0.89570</td>
<td>5.68814</td>
<td>0.03343</td>
<td>6.61727</td>
</tr>
<tr>
<td>1975</td>
<td>22,776</td>
<td>2.54895</td>
<td>2.78624</td>
<td>0.05244</td>
<td>5.38763</td>
</tr>
<tr>
<td>1976</td>
<td>24,490</td>
<td>0.76752</td>
<td>1.80998</td>
<td>0.04155</td>
<td>2.61905</td>
</tr>
<tr>
<td>1977</td>
<td>21,883</td>
<td>3.98451</td>
<td>2.02120</td>
<td>0.02757</td>
<td>6.03328</td>
</tr>
<tr>
<td>1978</td>
<td>33,256</td>
<td>1.00278</td>
<td>2.34466</td>
<td>0.24428</td>
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<tr>
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<td>24,238</td>
<td>2.98678</td>
<td>2.89652</td>
<td>0.21504</td>
<td>6.09834</td>
</tr>
<tr>
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<td>44,336</td>
<td>0.48636</td>
<td>2.23768</td>
<td>0.04039</td>
<td>2.76443</td>
</tr>
<tr>
<td>1981</td>
<td>23,589</td>
<td>3.18480</td>
<td>4.51989</td>
<td>0.36118</td>
<td>8.06587</td>
</tr>
<tr>
<td>1982</td>
<td>32,058</td>
<td>1.69592</td>
<td>4.43338</td>
<td>0.15862</td>
<td>6.28792</td>
</tr>
<tr>
<td>1983</td>
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<td>1.23151</td>
<td>4.91046</td>
<td>0.44689</td>
<td>6.58886</td>
</tr>
<tr>
<td>1984</td>
<td>60,763</td>
<td>1.76204</td>
<td>2.85909</td>
<td>0.09411</td>
<td>4.71524</td>
</tr>
</tbody>
</table>

Continued ...
<table>
<thead>
<tr>
<th>Year</th>
<th>Returns</th>
<th>Fall Chum</th>
<th>Fall Chum</th>
<th>Fall Chum</th>
<th>Fall Chum</th>
</tr>
</thead>
<tbody>
<tr>
<td>1985</td>
<td>39,279</td>
<td>2.92389</td>
<td>5.00571</td>
<td>0.20595</td>
<td>8.13555</td>
</tr>
<tr>
<td>1986</td>
<td>33,036</td>
<td>0.53259</td>
<td>2.21872</td>
<td>0.20579</td>
<td>2.95710</td>
</tr>
<tr>
<td>1987</td>
<td>40,323</td>
<td>0.42814</td>
<td>3.70929</td>
<td>0.14736</td>
<td>4.28479</td>
</tr>
<tr>
<td>1988</td>
<td>36,877</td>
<td>3.13411</td>
<td>7.17034</td>
<td>0.29712</td>
<td>10.60157</td>
</tr>
<tr>
<td>1989</td>
<td>35,149</td>
<td>0.71847</td>
<td>1.79583</td>
<td>0.50845</td>
<td>3.02275</td>
</tr>
<tr>
<td>1990</td>
<td>38,422</td>
<td>4.27142</td>
<td>7.01940</td>
<td>0.37401</td>
<td>11.66483</td>
</tr>
<tr>
<td>1991</td>
<td>39,379</td>
<td>3.01183</td>
<td>1.98098</td>
<td>0.07460</td>
<td>5.06741</td>
</tr>
<tr>
<td>1992</td>
<td>33,678</td>
<td>2.33155</td>
<td>3.93700</td>
<td>0.12497</td>
<td>6.39352</td>
</tr>
<tr>
<td>1993</td>
<td>33,920</td>
<td>1.77835</td>
<td>4.03487</td>
<td>0.17676</td>
<td>5.98998</td>
</tr>
<tr>
<td>1994</td>
<td>37,075</td>
<td>0.73558</td>
<td>1.96470</td>
<td>0.03943</td>
<td>2.73971</td>
</tr>
<tr>
<td>1995</td>
<td>37,583</td>
<td>1.29662</td>
<td>0.93342</td>
<td>0.01997</td>
<td>2.25001</td>
</tr>
<tr>
<td>1996</td>
<td>25,374</td>
<td>0.35104</td>
<td>1.66305</td>
<td>0.05572</td>
<td>2.06981</td>
</tr>
<tr>
<td>1997</td>
<td>30,276</td>
<td>0.34889</td>
<td>2.52394</td>
<td>0.09089</td>
<td>2.96372</td>
</tr>
<tr>
<td>1998</td>
<td>37,534</td>
<td>2.62754</td>
<td>3.21934</td>
<td>0.03818</td>
<td>5.88506</td>
</tr>
<tr>
<td>1999</td>
<td>33,196</td>
<td>3.81337</td>
<td>2.85193</td>
<td>0.30443</td>
<td>6.96973</td>
</tr>
<tr>
<td>2000</td>
<td>34,067</td>
<td>0.18327</td>
<td>1.12001</td>
<td>0.06995</td>
<td>1.37323</td>
</tr>
<tr>
<td>2001</td>
<td>35,033</td>
<td>1.16696</td>
<td>0.88571</td>
<td>0.04609</td>
<td>2.09876</td>
</tr>
<tr>
<td>2002</td>
<td>35,574</td>
<td>0.48600</td>
<td>0.98579</td>
<td>0.00808</td>
<td>1.47987</td>
</tr>
<tr>
<td>2003</td>
<td>33,231</td>
<td>0.83763</td>
<td>0.63987</td>
<td>0.04794</td>
<td>1.52544</td>
</tr>
<tr>
<td>2004</td>
<td>31,410</td>
<td>0.33036</td>
<td>0.56328</td>
<td>0.01959</td>
<td>0.91323</td>
</tr>
<tr>
<td>2005</td>
<td>29,031</td>
<td>0.77693</td>
<td>1.52074</td>
<td>0.16253</td>
<td>2.46020</td>
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<tr>
<td>2006</td>
<td>29,958</td>
<td>0.08529</td>
<td>1.31603</td>
<td>0.02103</td>
<td>1.42236</td>
</tr>
<tr>
<td>2007</td>
<td>25,523</td>
<td>1.40372</td>
<td>2.16346</td>
<td>0.21276</td>
<td>3.77993</td>
</tr>
<tr>
<td>2008</td>
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Table A-4-l. Fall Chum Returns-per-Pound, by Age at Return for Enetai Hatchery Releases

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<th>Total</th>
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Average (Brood Years 1976-08).

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Note: Because of incomplete reconstruction, and lack of rack sampling, return rates after 2005 were not available.
### Table A-4-m. Summary of 2015 WDFW Hood Canal Hatchery Fall Chum Forecasts

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### Table A-4-n. Summary of 2015 Tribal Hood Canal Hatchery Fall Chum Forecasts

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<th>Age 4</th>
<th>Age 5</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Little Boston Hatchery</td>
<td>1,096</td>
<td>906</td>
<td>88</td>
<td>2,090</td>
</tr>
<tr>
<td>Hoodsport Hatchery</td>
<td>19,985</td>
<td>31,561</td>
<td>1,817</td>
<td>53,363</td>
</tr>
<tr>
<td>G. Adams / McKernan Hatchery</td>
<td>88,478</td>
<td>129,484</td>
<td>6,336</td>
<td>224,298</td>
</tr>
<tr>
<td>Enetai Hatchery</td>
<td>22,090</td>
<td>17,152</td>
<td>659</td>
<td>39,901</td>
</tr>
<tr>
<td>Total</td>
<td>131,649</td>
<td>179,102</td>
<td>8,901</td>
<td>319,652</td>
</tr>
</tbody>
</table>

### Table A-4-o. Apportionment of the 2015 Joint Hood Canal Hatchery Fall Chum Salmon Forecasts

<table>
<thead>
<tr>
<th>Facility</th>
<th>Tribal Forecast</th>
<th>WDFW Forecast</th>
<th>Joint Forecast</th>
</tr>
</thead>
<tbody>
<tr>
<td>Little Boston Hatchery</td>
<td>2,090</td>
<td>3,432</td>
<td>2,761</td>
</tr>
<tr>
<td>Hoodsport Hatchery</td>
<td>53,363</td>
<td>121,422</td>
<td>87,392</td>
</tr>
<tr>
<td>G. Adams / McKernan Hatchery</td>
<td>224,298</td>
<td>136,763</td>
<td>180,531</td>
</tr>
<tr>
<td>Enetai Hatchery</td>
<td>39,901</td>
<td>31,528</td>
<td>35,715</td>
</tr>
<tr>
<td>12D Streams - Augmentation</td>
<td></td>
<td></td>
<td>126</td>
</tr>
<tr>
<td>Total</td>
<td>319,652</td>
<td>293,271</td>
<td>306,462</td>
</tr>
</tbody>
</table>
A-5. Pink Salmon.

A-5.1 Pink Salmon Natural Runs

Tribal Forecast:

The 2015 return of naturally reared Hood Canal pink salmon was forecast as recruitment to all fisheries (Canadian and domestic) and escapement, using the product of the 2013 brood year estimated escapement (191,976) (Table A-5-a) multiplied by the long-term recruit per spawner average estimated “Cycle 1” return rate of (1.584276) for a forecast of 303,668 natural pink salmon total recruits (Table A-5-b).

Table A-5-a. Pink Salmon Natural Run Reconstruction for Hood Canal

<table>
<thead>
<tr>
<th>Return Year (RY)</th>
<th>Brood Year (BY)</th>
<th>Hood Canal Parent (BY) Natural Escapement</th>
<th>Hood Canal Natural 4B Run (RY)</th>
<th>Hood Canal Total Natural Recruits (RY) (4B+CDN)</th>
<th>Hoodsport Hatchery Recruits (RY)</th>
<th>Hood Canal Total Recruits (RY)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1961</td>
<td>1959</td>
<td>30,600</td>
<td>37,863</td>
<td>44,388</td>
<td>3,560</td>
<td>47,948</td>
</tr>
<tr>
<td>1963</td>
<td>1961</td>
<td>36,900</td>
<td>629,272</td>
<td>901,536</td>
<td>11,893</td>
<td>913,429</td>
</tr>
<tr>
<td>1965</td>
<td>1963</td>
<td>503,200</td>
<td>167,326</td>
<td>217,872</td>
<td>586</td>
<td>218,458</td>
</tr>
<tr>
<td>1969</td>
<td>1967</td>
<td>269,400</td>
<td>42,957</td>
<td>58,604</td>
<td>3,146</td>
<td>61,750</td>
</tr>
<tr>
<td>1973</td>
<td>1971</td>
<td>104,100</td>
<td>48,991</td>
<td>70,592</td>
<td>2,291</td>
<td>72,883</td>
</tr>
<tr>
<td>1975</td>
<td>1973</td>
<td>47,100</td>
<td>13,194</td>
<td>18,402</td>
<td>3,457</td>
<td>21,859</td>
</tr>
<tr>
<td>1977</td>
<td>1975</td>
<td>12,600</td>
<td>45,643</td>
<td>79,795</td>
<td>10,530</td>
<td>90,325</td>
</tr>
<tr>
<td>1979</td>
<td>1977</td>
<td>44,300</td>
<td>42,243</td>
<td>74,371</td>
<td>8,710</td>
<td>83,081</td>
</tr>
<tr>
<td>1981</td>
<td>1979</td>
<td>37,300</td>
<td>7,652</td>
<td>12,013</td>
<td>3,044</td>
<td>15,057</td>
</tr>
<tr>
<td>1983</td>
<td>1981</td>
<td>6,550</td>
<td>25,803</td>
<td>29,222</td>
<td>626</td>
<td>29,848</td>
</tr>
<tr>
<td>1985</td>
<td>1983</td>
<td>25,200</td>
<td>66,602</td>
<td>91,738</td>
<td>2,196</td>
<td>93,934</td>
</tr>
<tr>
<td>1987</td>
<td>1985</td>
<td>64,100</td>
<td>68,988</td>
<td>77,341</td>
<td>11,117</td>
<td>88,458</td>
</tr>
<tr>
<td>1989</td>
<td>1987</td>
<td>62,200</td>
<td>87,472</td>
<td>114,943</td>
<td>4,047</td>
<td>118,990</td>
</tr>
<tr>
<td>1991</td>
<td>1989</td>
<td>60,970</td>
<td>131,677</td>
<td>166,259</td>
<td>4,683</td>
<td>170,942</td>
</tr>
<tr>
<td>1993</td>
<td>1991</td>
<td>118,450</td>
<td>37,225</td>
<td>38,695</td>
<td>12,599</td>
<td>51,294</td>
</tr>
<tr>
<td>1997</td>
<td>1995</td>
<td>31,306</td>
<td>9,202</td>
<td>9,477</td>
<td>23,969</td>
<td>33,446</td>
</tr>
<tr>
<td>1999</td>
<td>1997</td>
<td>8,363</td>
<td>12,673</td>
<td>12,673</td>
<td>7,635</td>
<td>20,308</td>
</tr>
<tr>
<td>2001</td>
<td>1999</td>
<td>12,667</td>
<td>98,962</td>
<td>99,061</td>
<td>71,539</td>
<td>170,600</td>
</tr>
<tr>
<td>2005</td>
<td>2003</td>
<td>37,531</td>
<td>17,585</td>
<td>17,603</td>
<td>14,107</td>
<td>31,710</td>
</tr>
<tr>
<td>2007</td>
<td>2005</td>
<td>17,481</td>
<td>29,505</td>
<td>29,564</td>
<td>4,406</td>
<td>33,970</td>
</tr>
<tr>
<td>2009</td>
<td>2007</td>
<td>29,001</td>
<td>11,501</td>
<td>11,501</td>
<td>22,455</td>
<td>33,956</td>
</tr>
<tr>
<td>2011</td>
<td>2009</td>
<td>11,063</td>
<td>15,256</td>
<td>15,256</td>
<td>17,791</td>
<td>33,047</td>
</tr>
<tr>
<td>2013</td>
<td>2011</td>
<td>14,974</td>
<td>202,798</td>
<td>203,204</td>
<td>4,903</td>
<td>208,107</td>
</tr>
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</table>
Table A-5-b. Hood Canal Natural Pink Salmon Returns per Spawner

<table>
<thead>
<tr>
<th>Cycle 1 BY</th>
<th>Cycle 1 R/S</th>
<th>Cycle 2 BY</th>
<th>Cycle 2 R/S</th>
<th>Cycle 3 BY</th>
<th>Cycle 3 R/S</th>
</tr>
</thead>
<tbody>
<tr>
<td>1959</td>
<td>1.455</td>
<td>1961</td>
<td>24.498</td>
<td>1963</td>
<td>0.433</td>
</tr>
<tr>
<td>1965</td>
<td>2.909</td>
<td>1967</td>
<td>0.218</td>
<td>1969</td>
<td>3.302</td>
</tr>
<tr>
<td>1971</td>
<td>0.679</td>
<td>1973</td>
<td>0.396</td>
<td>1975</td>
<td>6.384</td>
</tr>
<tr>
<td>1977</td>
<td>1.690</td>
<td>1979</td>
<td>0.324</td>
<td>1981</td>
<td>4.531</td>
</tr>
<tr>
<td>1989</td>
<td>2.735</td>
<td>1991</td>
<td>0.327</td>
<td>1993</td>
<td>1.023</td>
</tr>
<tr>
<td>1995</td>
<td>0.303</td>
<td>1997</td>
<td>1.527</td>
<td>1999</td>
<td>7.823</td>
</tr>
<tr>
<td>2001</td>
<td>0.389</td>
<td>2003</td>
<td>0.470</td>
<td>2005</td>
<td>1.695</td>
</tr>
<tr>
<td>2007</td>
<td>0.397</td>
<td>2009</td>
<td>0.639</td>
<td>2011</td>
<td>3.131</td>
</tr>
<tr>
<td>2013</td>
<td>1.616</td>
<td>2015</td>
<td>2017</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Average:</td>
<td>1.584</td>
<td></td>
<td>0.639</td>
<td></td>
<td>3.717</td>
</tr>
<tr>
<td>Std. Dev.</td>
<td>1.190</td>
<td></td>
<td>0.475</td>
<td></td>
<td>2.390</td>
</tr>
</tbody>
</table>

2015 Tribal Forecast: 303,668
2015 WDFW Forecast: 314,665
2015 Joint Forecast: 309,166

**WDFW Forecast:**
The WDFW provided a separate forecast for naturally reared Hood Canal pink salmon at 314,665 recruits, using SaSI stock escapement values, multiplied by a Cycle 1 return rate of 1.616381 recruits per spawner. The difference in State and Tribal forecasts arises from the treatment of various outliers in the dataset.

**Joint 2015 Hood Canal Natural Pink Salmon Forecast:**
Given the relatively small difference between methodology, the agreed to forecast for 2015 is 309,166 natural pink salmon recruits, the mean of the Tribal and WDFW forecasts.

**A-5.2 Pink Salmon Hatchery Runs.**

**Tribal Forecast:**
The 2015 return of hatchery reared Hood Canal pink salmon was forecast as recruitment to all fisheries and escapement, using the product of the 2013 brood year fingerling pounds released from the Hoodsport Hatchery (1,372), multiplied by the long term average recruits per pound rate estimated for the Hoodsport Hatchery (2.5513). The resulting recruit forecast is 3,501 pink salmon recruits (Table A-5-c).

**WDFW Forecast:**
For hatchery returns, the WDFW provided a separate forecast of 3,318 hatchery recruits using the same SaSI stock escapement values, multiplied by a Cycle 1 average return rate of 3.655 recruits per spawner, excluding the 1999 outlier. The difference in State and Tribal forecasts is based on the different averaging methods.

**Joint 2015 Hood Canal Hatchery Pink Salmon Forecast:**
For 2015, again given the relatively small difference between methodology the agreed to forecast is 3,410 hatchery pink salmon recruits, the mean of the Tribal and WDFW forecasts (Table A-5-c).
## Table A-5-c. Hoodsport Hatchery Pink Salmon Return Rates.

<table>
<thead>
<tr>
<th>Brood Year</th>
<th>Lbs. Released</th>
<th>Total Recruits</th>
<th>Recruits/Lb</th>
</tr>
</thead>
<tbody>
<tr>
<td>1959</td>
<td>2,515</td>
<td>3,560</td>
<td>1.4155</td>
</tr>
<tr>
<td>1961</td>
<td>492</td>
<td>11,893</td>
<td><strong>24.1728</strong></td>
</tr>
<tr>
<td>1963</td>
<td>1,209</td>
<td>586</td>
<td>0.4847</td>
</tr>
<tr>
<td>1965</td>
<td>1,283</td>
<td>3,869</td>
<td>3.0156</td>
</tr>
<tr>
<td>1967</td>
<td>1,416</td>
<td>3,146</td>
<td>2.2218</td>
</tr>
<tr>
<td>1969</td>
<td>2,399</td>
<td>3,188</td>
<td>1.3289</td>
</tr>
<tr>
<td>1971</td>
<td>3,071</td>
<td>2,291</td>
<td>0.7460</td>
</tr>
<tr>
<td>1973</td>
<td>2,104</td>
<td>3,457</td>
<td>1.6431</td>
</tr>
<tr>
<td>1975</td>
<td>3,477</td>
<td>10,530</td>
<td>3.0285</td>
</tr>
<tr>
<td>1977</td>
<td>3,496</td>
<td>8,710</td>
<td>2.4914</td>
</tr>
<tr>
<td>1979</td>
<td>2,253</td>
<td>3,044</td>
<td>1.3511</td>
</tr>
<tr>
<td>1981</td>
<td>1,748</td>
<td>626</td>
<td>0.3581</td>
</tr>
<tr>
<td>1983</td>
<td>655</td>
<td>2,196</td>
<td>3.3527</td>
</tr>
<tr>
<td>1985</td>
<td>2,152</td>
<td>11,117</td>
<td>5.1659</td>
</tr>
<tr>
<td>1987</td>
<td>5,625</td>
<td>4,047</td>
<td>0.7195</td>
</tr>
<tr>
<td>1989</td>
<td>1,913</td>
<td>4,683</td>
<td>2.4480</td>
</tr>
<tr>
<td>1991</td>
<td>4,453</td>
<td>12,599</td>
<td>2.8293</td>
</tr>
<tr>
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<td>6,532</td>
<td>29,373</td>
<td>4.4968</td>
</tr>
<tr>
<td>1995</td>
<td>7,623</td>
<td>23,969</td>
<td>3.1443</td>
</tr>
<tr>
<td>1997</td>
<td>7,851</td>
<td>7,635</td>
<td>0.9725</td>
</tr>
<tr>
<td>1999</td>
<td>3,117</td>
<td>71,539</td>
<td><strong>22.9512</strong></td>
</tr>
<tr>
<td>2001</td>
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<td>25,217</td>
<td>7.7734</td>
</tr>
<tr>
<td>2003</td>
<td>3,563</td>
<td>14,107</td>
<td>3.9593</td>
</tr>
<tr>
<td>2005</td>
<td>1,670</td>
<td>4,406</td>
<td>2.6383</td>
</tr>
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<td>1,267</td>
<td>22,455</td>
<td><strong>17.7230</strong></td>
</tr>
<tr>
<td>2009</td>
<td>1,600</td>
<td>17,791</td>
<td><strong>11.1194</strong></td>
</tr>
<tr>
<td>2011</td>
<td>1,584</td>
<td>4,903</td>
<td>3.0953</td>
</tr>
<tr>
<td>2013</td>
<td>1,372</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>BY 1959-011 Average</strong></td>
<td></td>
<td></td>
<td><strong>2.5513</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>TRIBAL 2015 Forecast</th>
<th>3,501</th>
</tr>
</thead>
<tbody>
<tr>
<td>WDFW 2015 Forecast</td>
<td>3,318</td>
</tr>
<tr>
<td>2015 Joint Forecast</td>
<td>3,410</td>
</tr>
</tbody>
</table>

Note: Values in boldface were excluded from both forecast methods.