Agriculture Preparation/Adaptation
Working Group

Initial Group Conference Call
June 26, 2007
Agriculture Preparation/Adaptation Working Group

Review Tasks and Goals of Agriculture PAWG
Agriculture Preparation/Adaptation Working Group

- Review the climate impacts baseline and identify the key issues/vulnerabilities for the agriculture sector and reach agreement on what it means to be vulnerable to climate change, and to adapt and prepare.

- Develop a set of limited, but fundamental issues/vulnerabilities in the agriculture sector for further examination, and where possible, identify a vulnerability threshold.
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- Identify specific adaptation approaches and expectations for each of these fundamental issues / vulnerabilities

- Identify opportunity areas and additional preparation/adaptation strategies WA should pursue

- Identify any critical research needs and propose recommendations for the state to move its understanding of adapting to expected climate change forward by filling information gaps or case-study opportunities in agriculture sector
Participate with ECY/CTED and Climate Impacts Group in a cross-sector dialog to identify additional strategies that are broad and cross-cutting.

Prepare a draft final report of findings with suggested recommendations for consideration by the Directors of CTED and Ecology.
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Baseline Climate Assumptions
Changes in PNW climate from ten climate models for the 2020’s and 2040’s. All changes are benchmarked to average temperature and precipitation for 1970-1999.

### 2020’s Temperature Change (CIG 2005 projections)

<table>
<thead>
<tr>
<th></th>
<th>Annual</th>
<th>Oct-Mar</th>
<th>Apr-Sept</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low</td>
<td>+0.7°F (0.4°C)</td>
<td>+0.4°F (0.2°C)</td>
<td>+0.8°F (0.5°C)</td>
</tr>
<tr>
<td>Average</td>
<td>+1.9°F (1.1°C)</td>
<td>+1.7°F (0.9°C)</td>
<td>+2.1°F (1.2°C)</td>
</tr>
<tr>
<td>High</td>
<td>+3.2°F (1.8°C)</td>
<td>+2.6°F (1.5°C)</td>
<td>+3.8°F (2.1°C)</td>
</tr>
</tbody>
</table>

### 2020’s Precipitation Change (CIG 2005 projections)

<table>
<thead>
<tr>
<th></th>
<th>Annual</th>
<th>Oct-Mar</th>
<th>Apr-Sept</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low</td>
<td>- 4%</td>
<td>- 3%</td>
<td>- 12%</td>
</tr>
<tr>
<td>Average</td>
<td>+ 2%</td>
<td>+ 4%</td>
<td>- 2%</td>
</tr>
<tr>
<td>High</td>
<td>+ 7%</td>
<td>+ 12%</td>
<td>+ 5%</td>
</tr>
</tbody>
</table>
Changes in PNW climate from ten climate models for the 2020’s and 2040’s. All changes are benchmarked to average temperature and precipitation for 1970-1999.

### 2040’s Temperature Change (ClG 2005 projections)

<table>
<thead>
<tr>
<th></th>
<th>Annual</th>
<th>Oct-Mar</th>
<th>Apr-Sept</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Low</strong></td>
<td>+1.4°F (0.8°C)</td>
<td>+1.1°F (0.6°C)</td>
<td>+1.4°F (0.8°C)</td>
</tr>
<tr>
<td><strong>Average</strong></td>
<td>+2.9°F (1.6°C)</td>
<td>+2.5°F (1.4°C)</td>
<td>+3.3°F (1.8°C)</td>
</tr>
<tr>
<td><strong>High</strong></td>
<td>+4.6°F (2.6°C)</td>
<td>+4.1°F (2.3°C)</td>
<td>+5.4°F (3.0°C)</td>
</tr>
</tbody>
</table>

### 2040’s Precipitation Change (ClG 2005 projections)

<table>
<thead>
<tr>
<th></th>
<th>Annual</th>
<th>Oct-Mar</th>
<th>Apr-Sept</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Low</strong></td>
<td>- 4%</td>
<td>- 1%</td>
<td>- 14%</td>
</tr>
<tr>
<td><strong>Average</strong></td>
<td>+ 2%</td>
<td>+ 5%</td>
<td>- 4%</td>
</tr>
<tr>
<td><strong>High</strong></td>
<td>+ 9%</td>
<td>+ 17%</td>
<td>+ 6%</td>
</tr>
</tbody>
</table>
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Source: Climate Impacts Group, University of Washington
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Comparison Heat Units based on NWS temperature data (1961-1990 dk blue) and (1971-2000 pink)

Accumulated Heat Units - Vancouver, WA

Accumulated Heat Units - Yakima, WA

Accumulated Heat Units - Port Angeles, WA

Accumulated Heat Units - Omak, WA

WSDA - 2006
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Predicted Changes in Temperature for Pacific Northwest (August)
PNW Climate Prediction Summary

- Temperature to increase approximately 0.5 °F per decade
- Increase in precipitation during fall and winter (4-5%)
- Decrease in precipitation during spring and summer (2-3%)
- Onset of warmer temperatures arriving earlier (2-3 days per decade)
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Agricultural Statistics
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2006 Washington State Crop Locations
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Western Washington:
58,434 acres

Eastern Washington:
1,678,568 acres

Irrigated Acreage Washington State - 2006

As mapped by WSDA-NRAS
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### Major Crops Grown in Washington State 2006 est.

<table>
<thead>
<tr>
<th>Crop</th>
<th>WSDA Acres</th>
<th>Confidence Level</th>
<th>NASS/FSA Acres</th>
</tr>
</thead>
<tbody>
<tr>
<td>Orchard</td>
<td>250,286</td>
<td>95%</td>
<td>267,186</td>
</tr>
<tr>
<td>Vineyard</td>
<td>63,452</td>
<td>95%</td>
<td>56,989</td>
</tr>
<tr>
<td>Potato</td>
<td>166,165</td>
<td>95%</td>
<td>160,000</td>
</tr>
<tr>
<td>Dryland</td>
<td>5,290,432</td>
<td>50%</td>
<td>N/A</td>
</tr>
</tbody>
</table>
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## Market Value of Washington’s Agricultural Products

<table>
<thead>
<tr>
<th>Item</th>
<th>Value ($1,000)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fruit, tree nuts, berries</td>
<td>1,354,238</td>
</tr>
<tr>
<td>Vegetables, melons, potatoes</td>
<td>805,567</td>
</tr>
<tr>
<td>Grains, oilseeds, dry beans &amp; peas</td>
<td>581,991</td>
</tr>
<tr>
<td>Other crops and hay</td>
<td>422,822</td>
</tr>
<tr>
<td>Nursery and greenhouse</td>
<td>391,930</td>
</tr>
<tr>
<td>Animals and animal products</td>
<td>1,592,255</td>
</tr>
</tbody>
</table>

USDA-NASS (2002)
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Previously Identified Areas of Concern/Change
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- Reduction in available water for irrigation
  - Negative impact on high value crops
  - Increased or improved irrigation technology
  - Potential impacts on biofuel feedstocks
  - Reduction in soil moisture (dryland areas)
  - Impacts to water quality

- New and/or increased pest pressures
  - Reduction or elimination of winter “die off”
  - Introduction of exotic/non-native pests
  - Changing or increased use of pesticides
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- **Impacts to animal/animal product industry**
  - Shifts from W WA to E WA or out of state
  - Competition for feed stocks diverted to biofuels
  - Relationship of climate change to disease outbreaks

- **Commodity transportation issues**
  - Columbia barge activity and river levels
  - Increased costs of overland transportation

- **Shifting crop patterns**
  - New crops replacing traditional
  - Changes in crop/pest/pesticide relations (pro and con)
  - Impacts to food processing industry
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PAWG membership discussion of issues