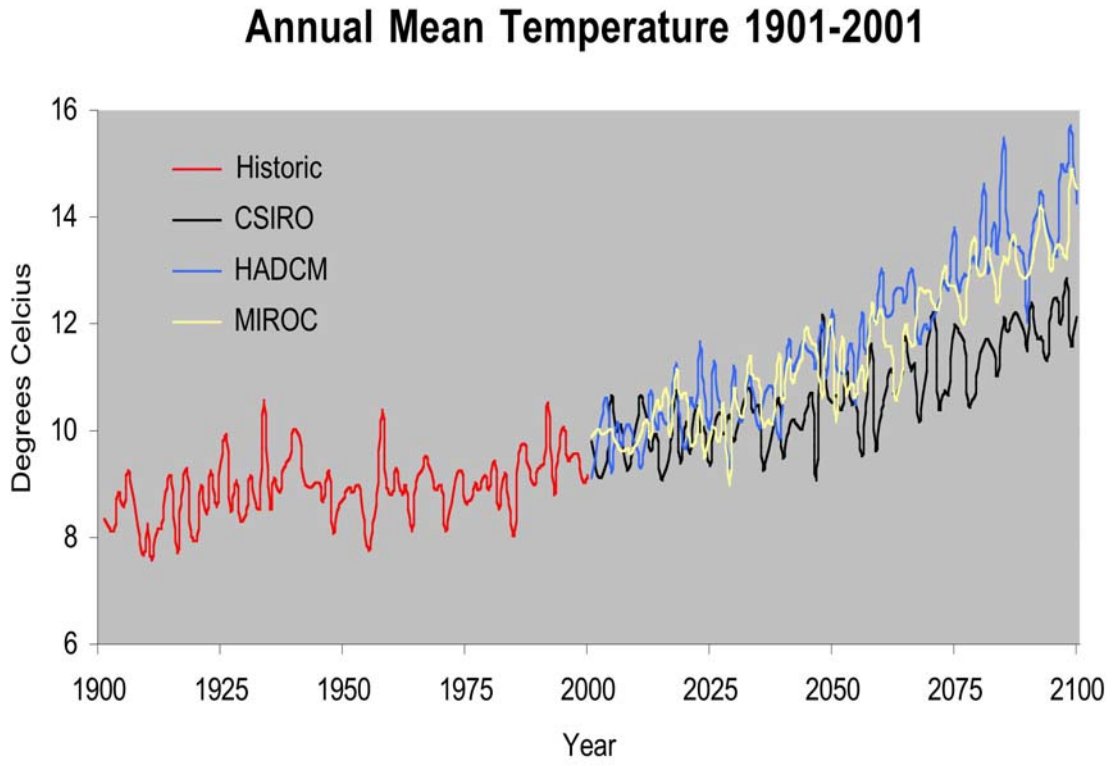


**Appendix C. Maps and graphs displaying climate change projections for the Upper Willamette River Basin.**

- C-1. Annual average temperature across the Upper Willamette River Basin 1900-2100.
- C-2. Average monthly temperature across the Upper Willamette River Basin: 2035-2045 (top) and 2075-2085 (bottom) versus baseline (1961-90).
- C-3. Annual sum precipitation across the Upper Willamette River Basin 1900 - 2100.
- C-4. Average monthly precipitation across the Upper Willamette River Basin: 2035-2045 (top) and 2075-2085 (bottom) versus baseline (1961-1990).
- C-5. Distributional map of fall precipitation in the Upper Willamette River Basin historically (1961-1990) and projected with 3 climate models for 2035-2046 and 2075-2085.
- C-6. Distributional map of winter precipitation in the Upper Willamette River Basin historically (1961-1990) and projected with 3 climate models for 2035-2046 and 2075-2085.
- C-7. Distributional map of spring precipitation in the Upper Willamette River Basin historically (1961-1990) and projected with 3 climate models for 2035-2046 and 2075-2085.
- C-8. Distributional map of summer precipitation in the Upper Willamette River Basin historically (1961-1990) and projected with 3 climate models for 2035-2046 and 2075-2085.
- C-9. Changes in vegetation type within the Upper Willamette River Basin, based on baseline (1961-1990) vegetation types and projections for future vegetation types in 2035-45 and 2075-85, from projections using the MC1 vegetation model and three different Global Climate Models.
- C-10. Proportion of area burned in the Upper Willamette River Basin, for the baseline time period (1961-1990) and the change in percent burned as projected by three Global Climate Models for two future time periods: 2035-2045 and 2075-2085.

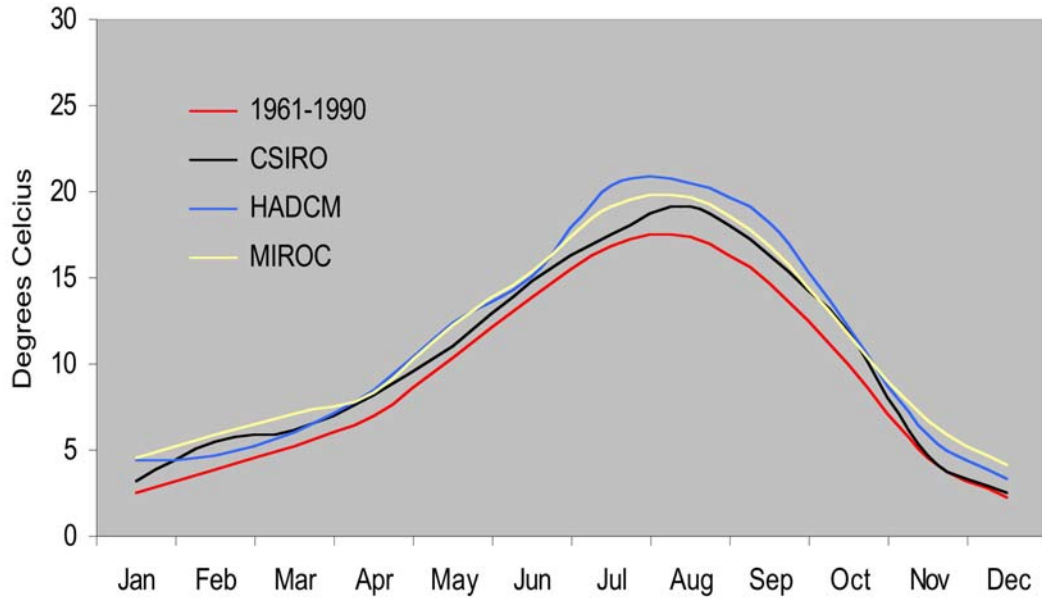
- C-11. Areas of the Pacific Northwest with at-risk snow from 2° C (3.6° F) warming compared to historical average winter temperatures (1971-2000).
- C-12. Percent change in snowpack from 1999 to 2095 in the western U.S., based on a ten-year moving average and calculated using a snowpack model and the Canadian Centre for Climate Modeling and Analysis (CCC) Global Climate Model (McCabe and Wolock 1999).

Appendix C-1. Annual average temperature across the Upper Willamette River Basin 1900-2100.

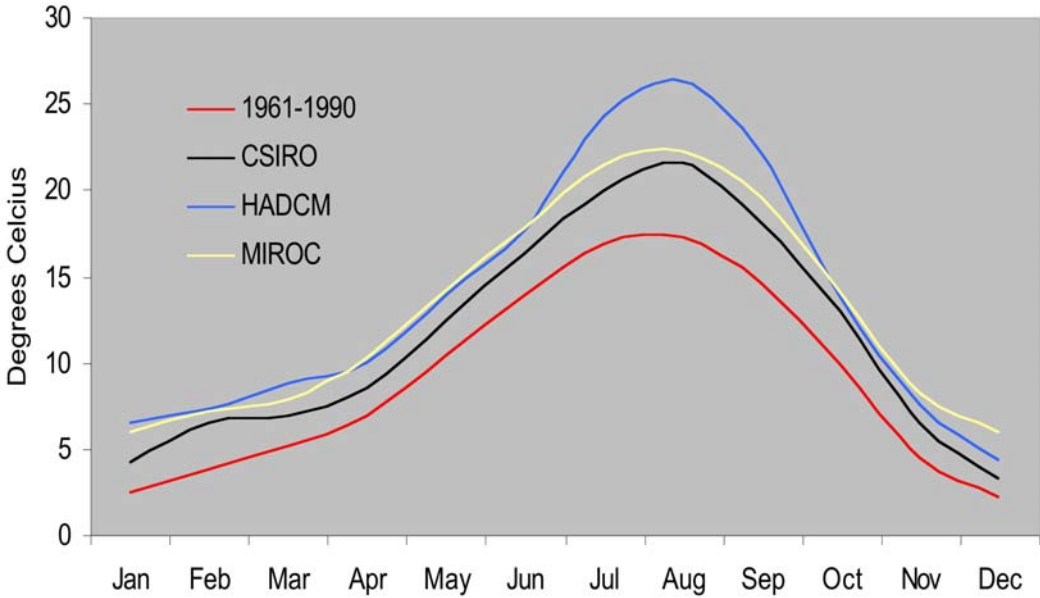


Appendix C-2. Average monthly temperature across the Upper Willamette River Basin: 2035-2045 (top) and 2075-2085 (bottom) versus baseline (1961-90).

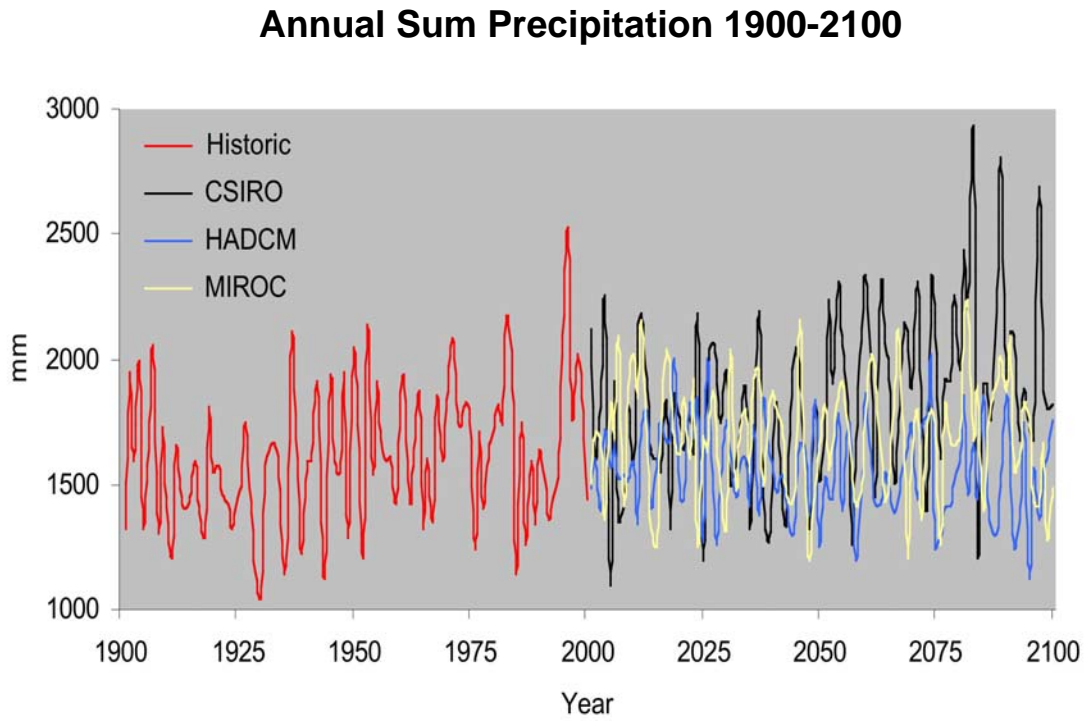
### Mean Monthly Temperature 2035-2045



# Mean Monthly Temperature 2075-2085

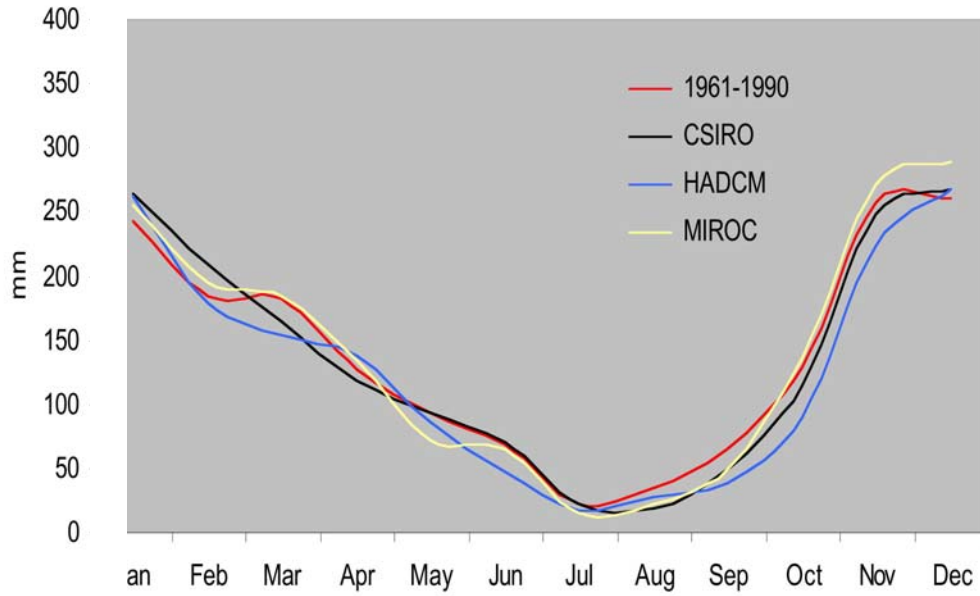


Appendix C-3. Annual sum precipitation across the Upper Willamette River Basin 1900 - 2100.

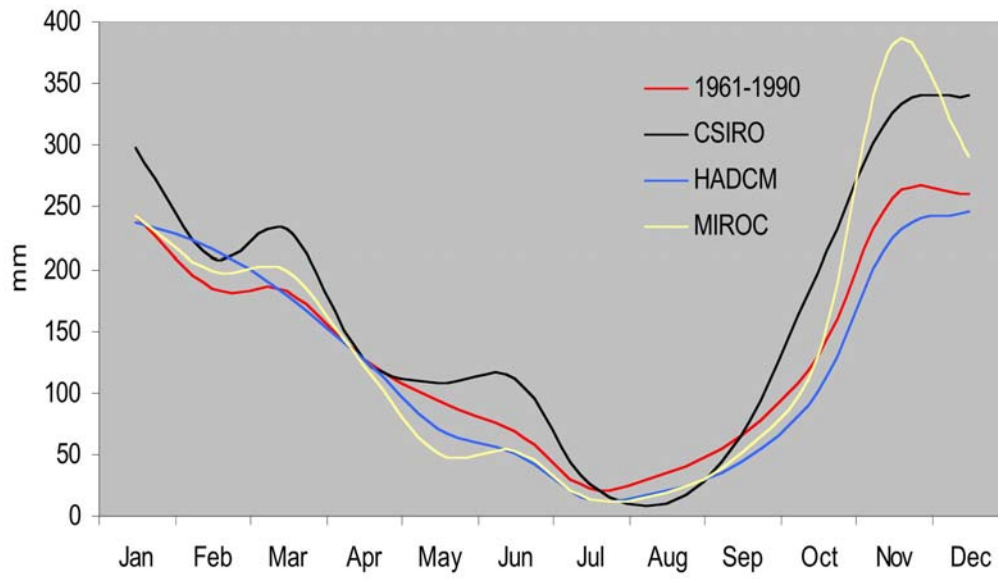


Appendix C-4. Average monthly precipitation across the Upper Willamette River Basin: 2035-2045 (top) and 2075-2085 (bottom) versus baseline (1961-1990).

### Average Monthly Precipitation 2035-2045

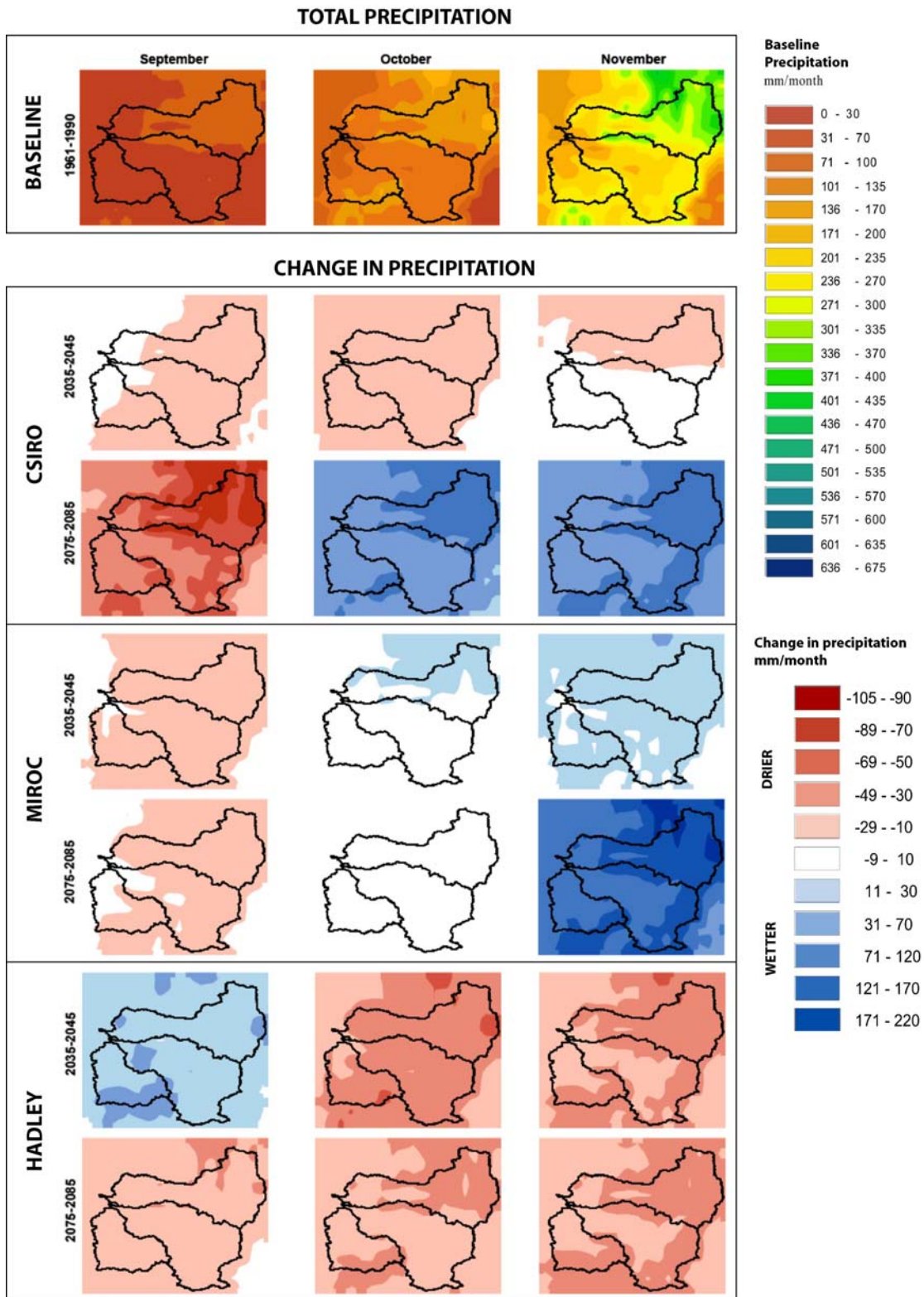


## Average Monthly Precipitation 2075-2085



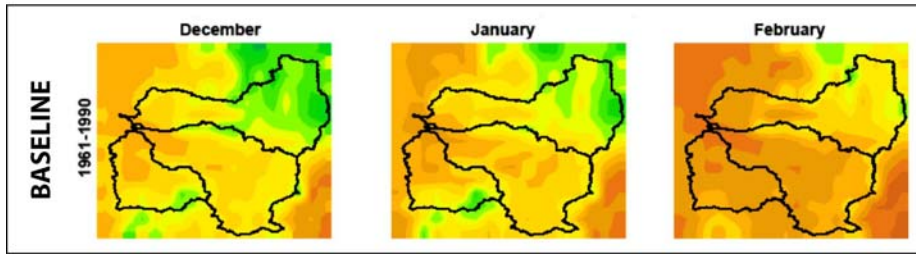


Appendix C-5: Distributional map of fall precipitation in the Upper Willamette River Basin historically (1961-1990) and projected with 3 climate models for 2035-2046 and 2075-2085.



Appendix C-6. Distributional map of winter precipitation in the Upper Willamette River Basin historically (1961-1990) and projected with 3 climate models for 2035-2046 and 2075-2085.

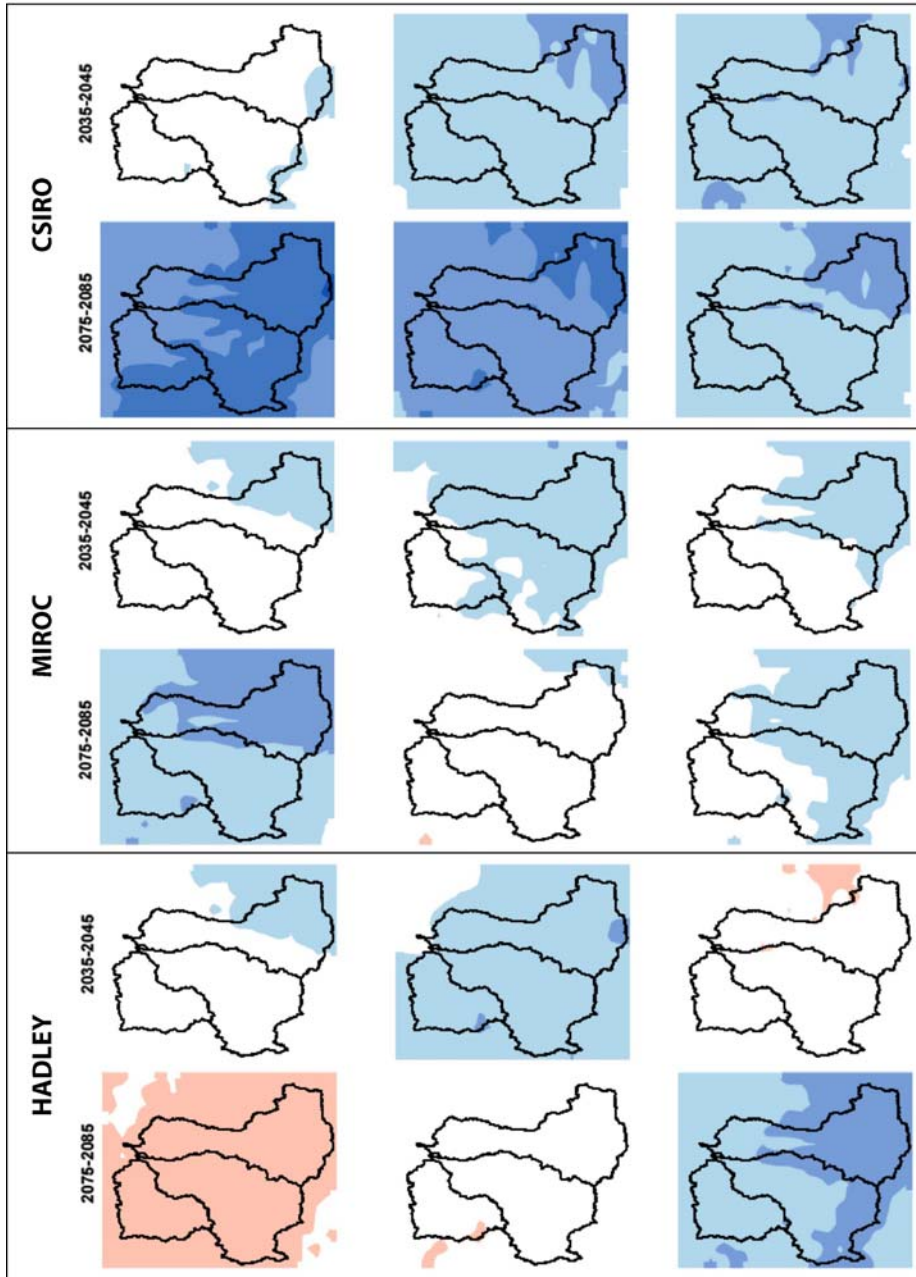
## TOTAL PRECIPITATION



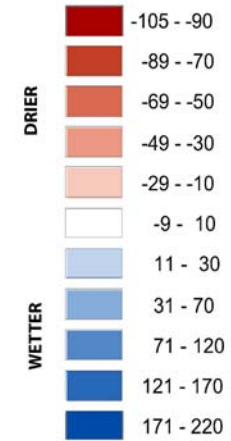
**Baseline  
Precipitation**  
mm/month



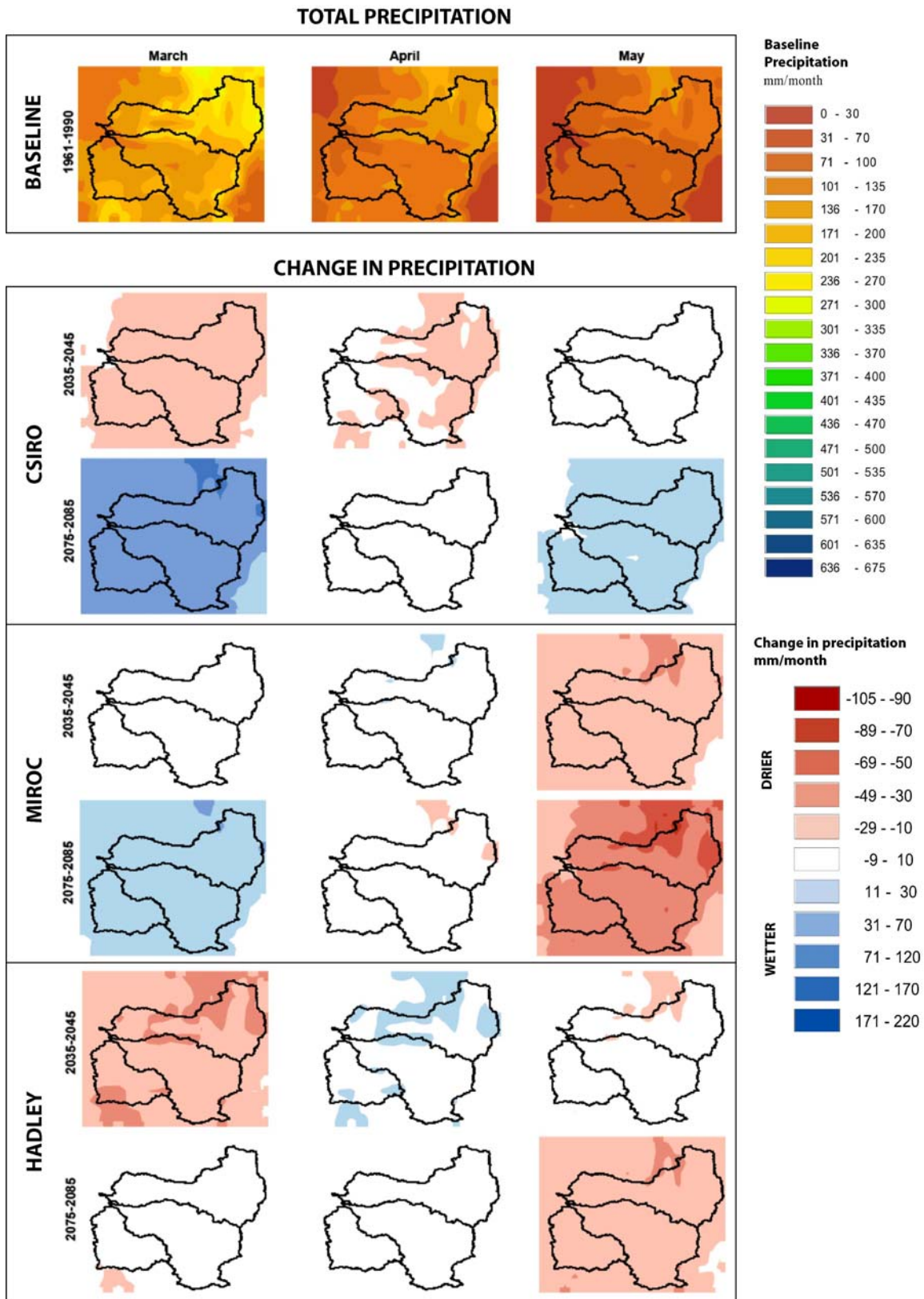
## CHANGE IN PRECIPITATION



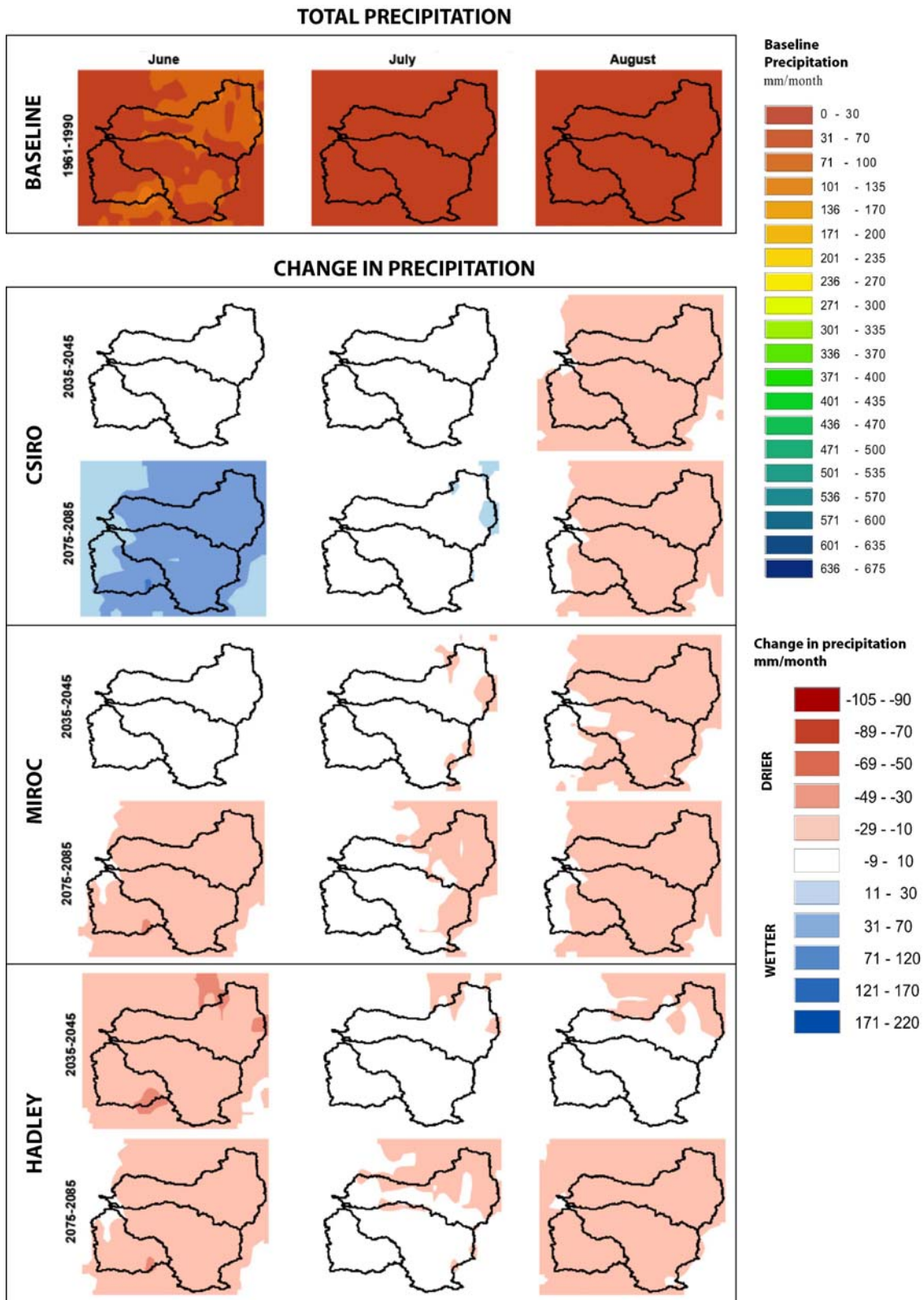
**Change in precipitation**  
mm/month



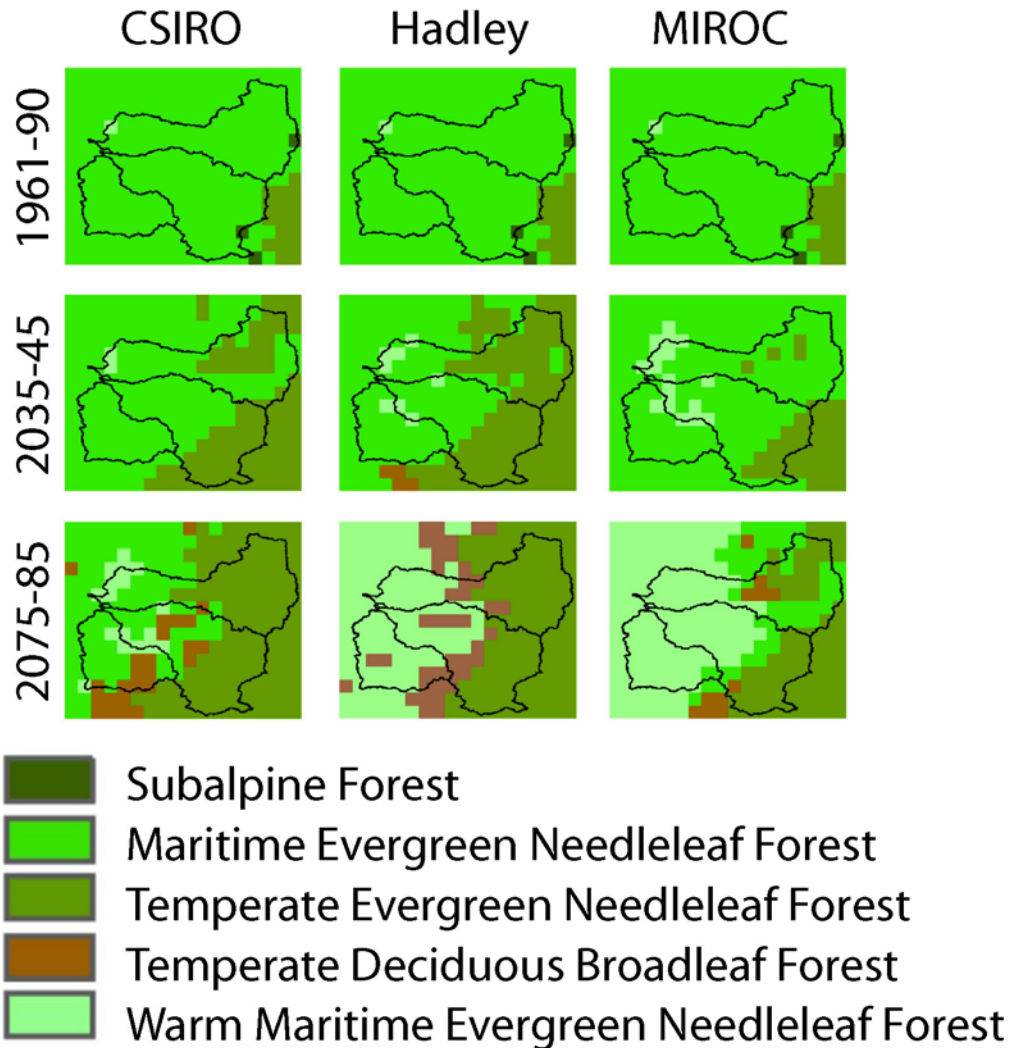
Appendix C-7. Distributional map of spring precipitation in the Upper Willamette River Basin historically (1961-1990) and projected with 3 climate models for 2035-2046 and 2075-2085.



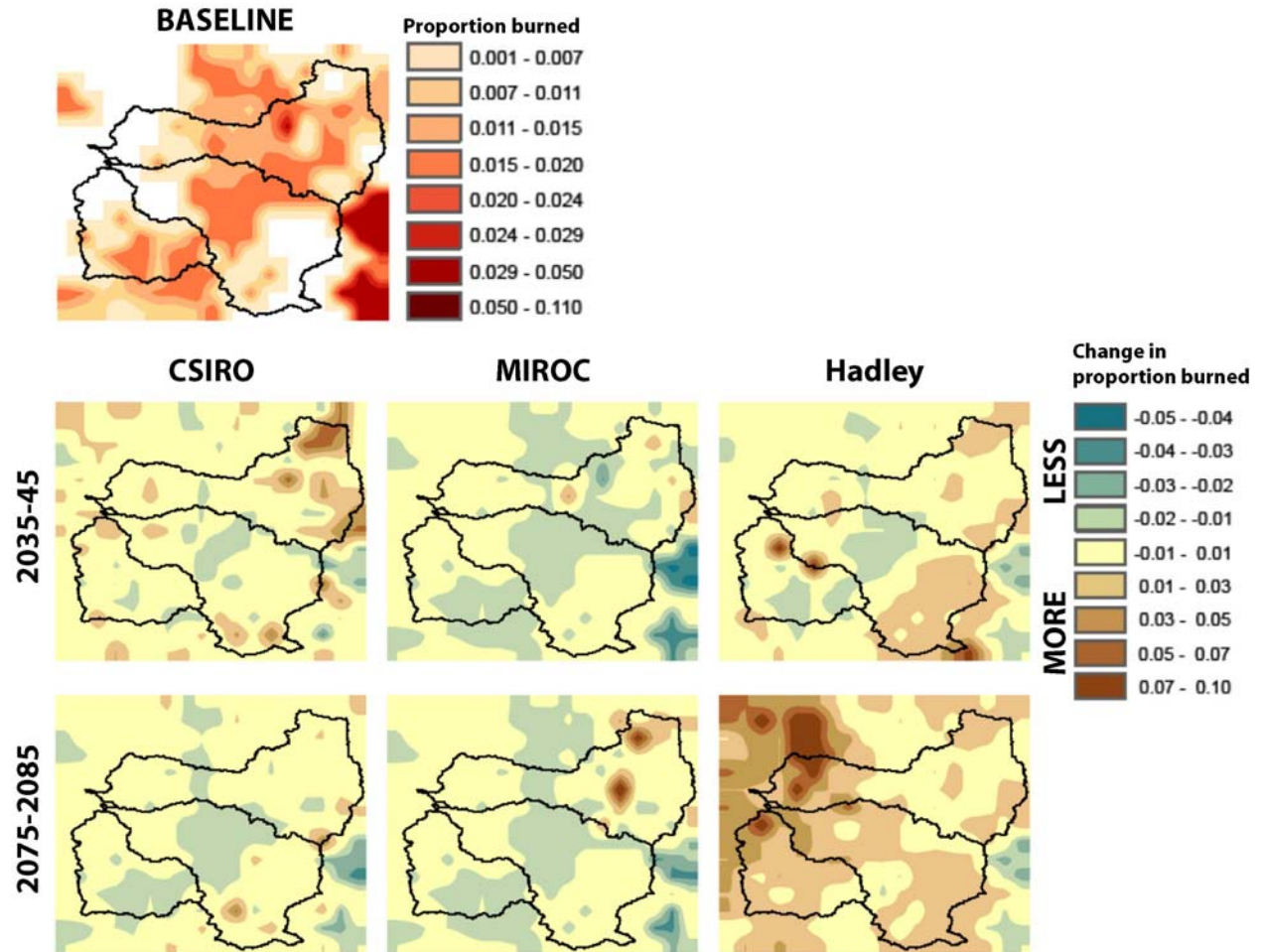
Appendix C-8. Distributional map of summer precipitation in the Upper Willamette River Basin historically (1961-1990) and projected with 3 climate models for 2035-2046 and 2075-2085.



Appendix C-9. Changes in vegetation type within the Upper Willamette River Basin, based on baseline (1961-1990) vegetation types and projections for future vegetation types in 2035-45 and 2075-85, from projections using the MCI vegetation model and three different Global Climate Models.



Appendix C-10. Proportion of area burned in the Upper Willamette River Basin, for the baseline time period (1961-1990) and the change in percent burned as projected by three Global Climate Models for two future time periods: 2035-2045 and 2075-2085.



Appendix C-11. Areas of the Pacific Northwest with at-risk snow from 2° C (3.6° F) warming compared to historical average winter temperatures (1971-2000). Snow was considered at-risk if average temperatures were below freezing historically yet projected to be above freezing based on a 2° C warming scenario (Nolin and Daly 2006). The southern Cascade range was especially prone to shifting from snow to rain.

### Snow Classification

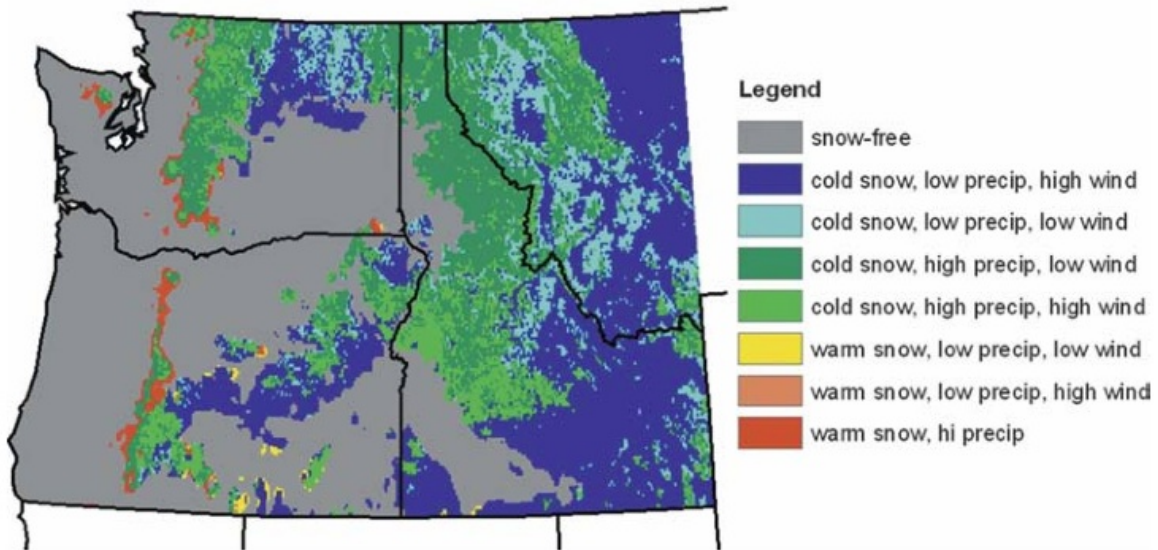
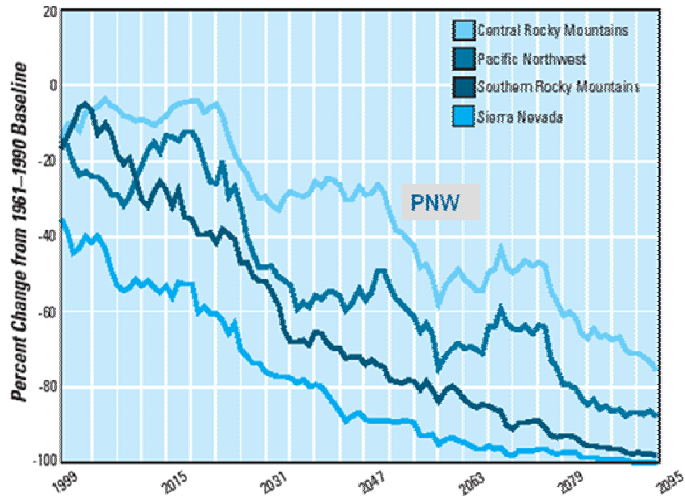


FIG. 3. Snow cover classification using a rain-snow threshold of 0°C. At-risk snow is shown in red.



Appendix C-12. Percent change in snowpack from 1999 to 2095 in the western U.S., based on a ten-year moving average and calculated using a snowpack model and the Canadian Centre for Climate Modeling and Analysis (CCC) Global Climate Model (McCabe and Wolock 1999).



## **Literature Cited**

Nolin, A. W. and C. Daly. 2006. Mapping "at risk" snow in the Pacific Northwest. *Journal of Hydrometeorology* 7:1164-1171.

McCabe, G. J. and D. M. Wolock. 1999. General-circulation-model simulations of future snowpack in the western United States. *J. American Water Resources Assn.* 35:1473-1484.