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.

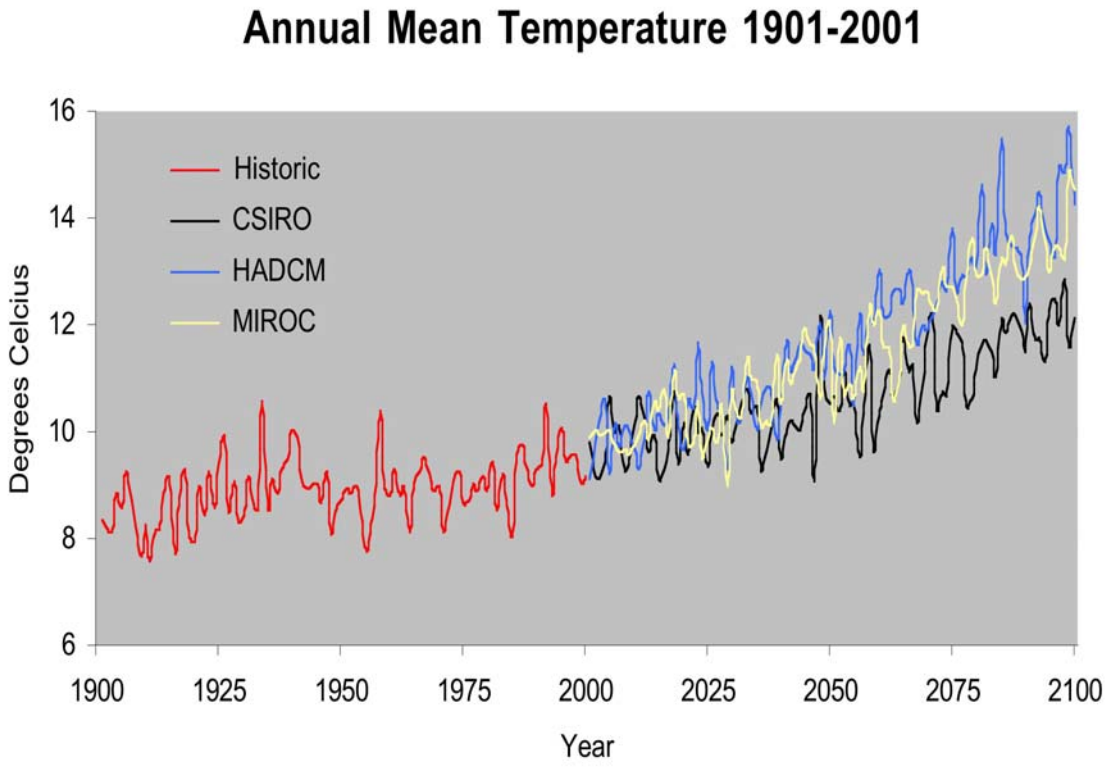
C-9. Changes in vegetation type within the Upper Willamette River Basin, based on baseline (1961-1990) vegetation types and projections for future vegetation types in 2035-45 and 2075-85, from projections using the MC1 vegetation model and three different Global Climate Models.

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.

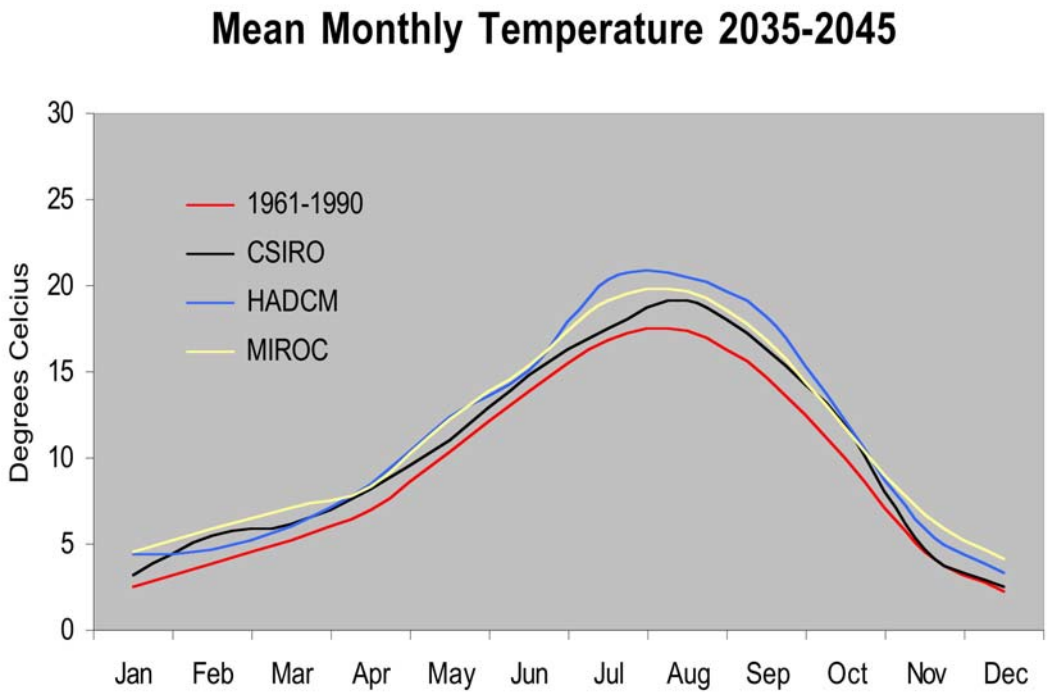
C-11. Areas of the Pacific Northwest with at-risk snow from 2˚ C (3.6˚ F) warming compared to historical average winter temperatures (1971-2000).

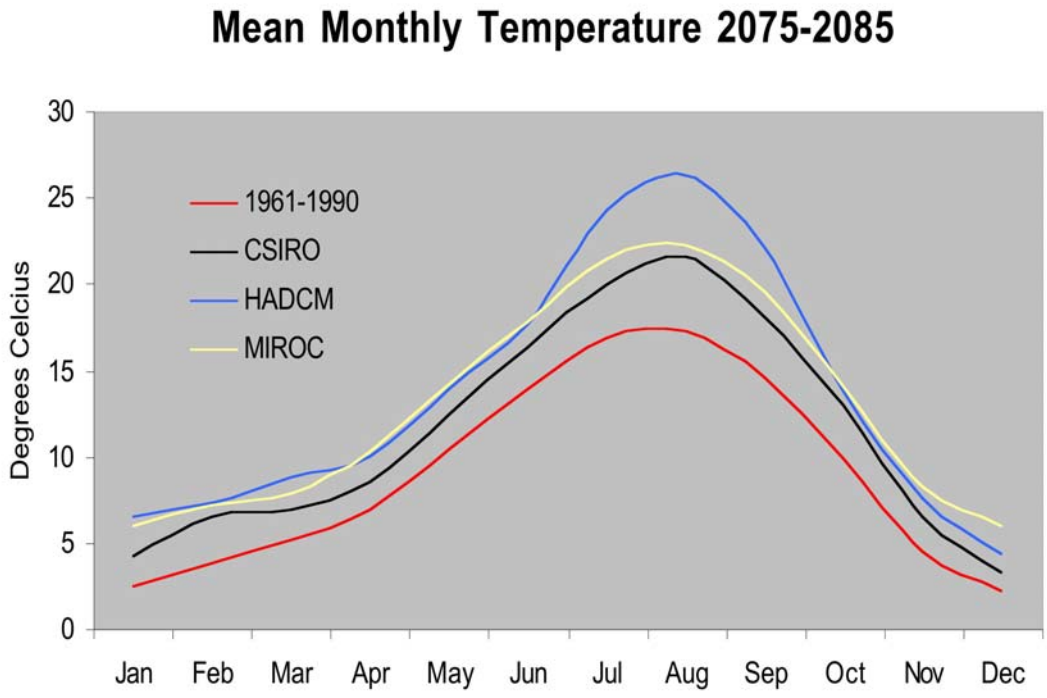
C-12. Percent change in snowpack from 1999 to 2095 in the western U.S., based on a ten-year moving average and calculated using a snowpack model and the Canadian Centre for Climate Modeling and Analysis (CCC) Global Climate Model (McCabe and Wolock 1999).

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

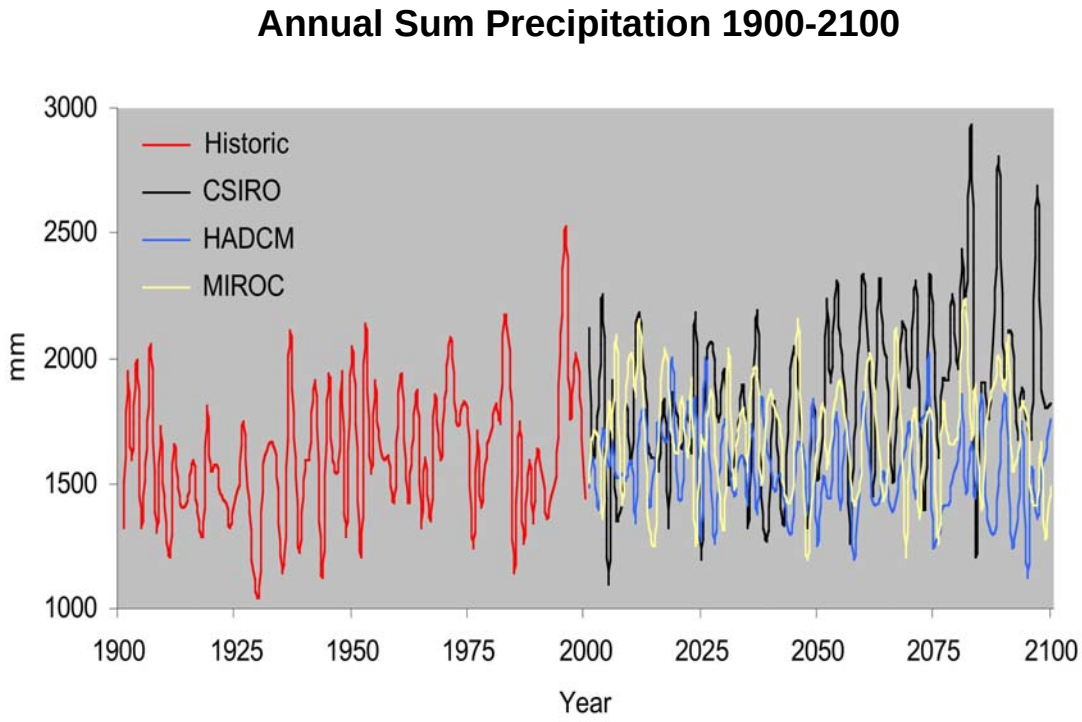


Appendix C-2. Average monthly temperature across the Upper Willamette River Basin: 2035-2045 (top) and 2075-2085 (bottom) versus baseline (1961-90).

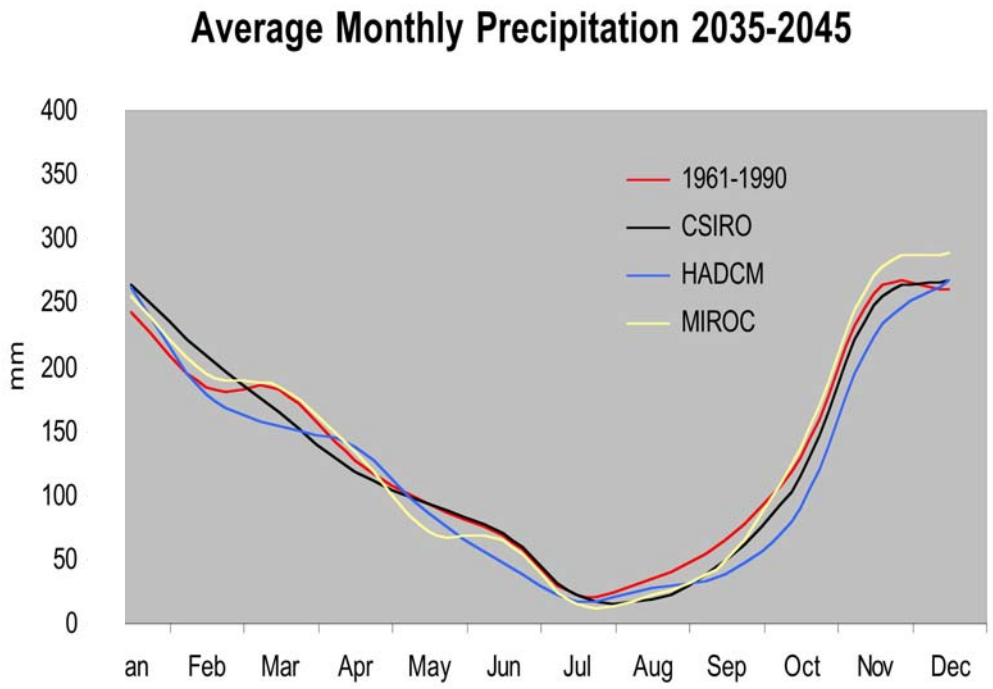


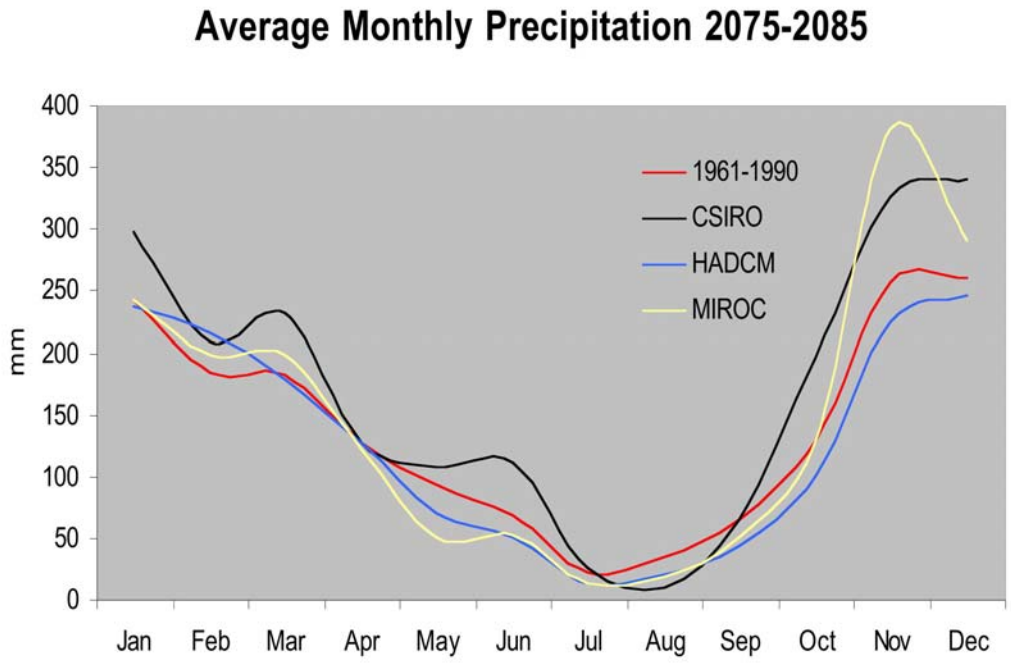

Mean Monthly Temperature 2075-2085
Degrees Celcius
30
25
20
15
10
5
0
1961-1990
CSIRO
HADCM
MIROC
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec

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

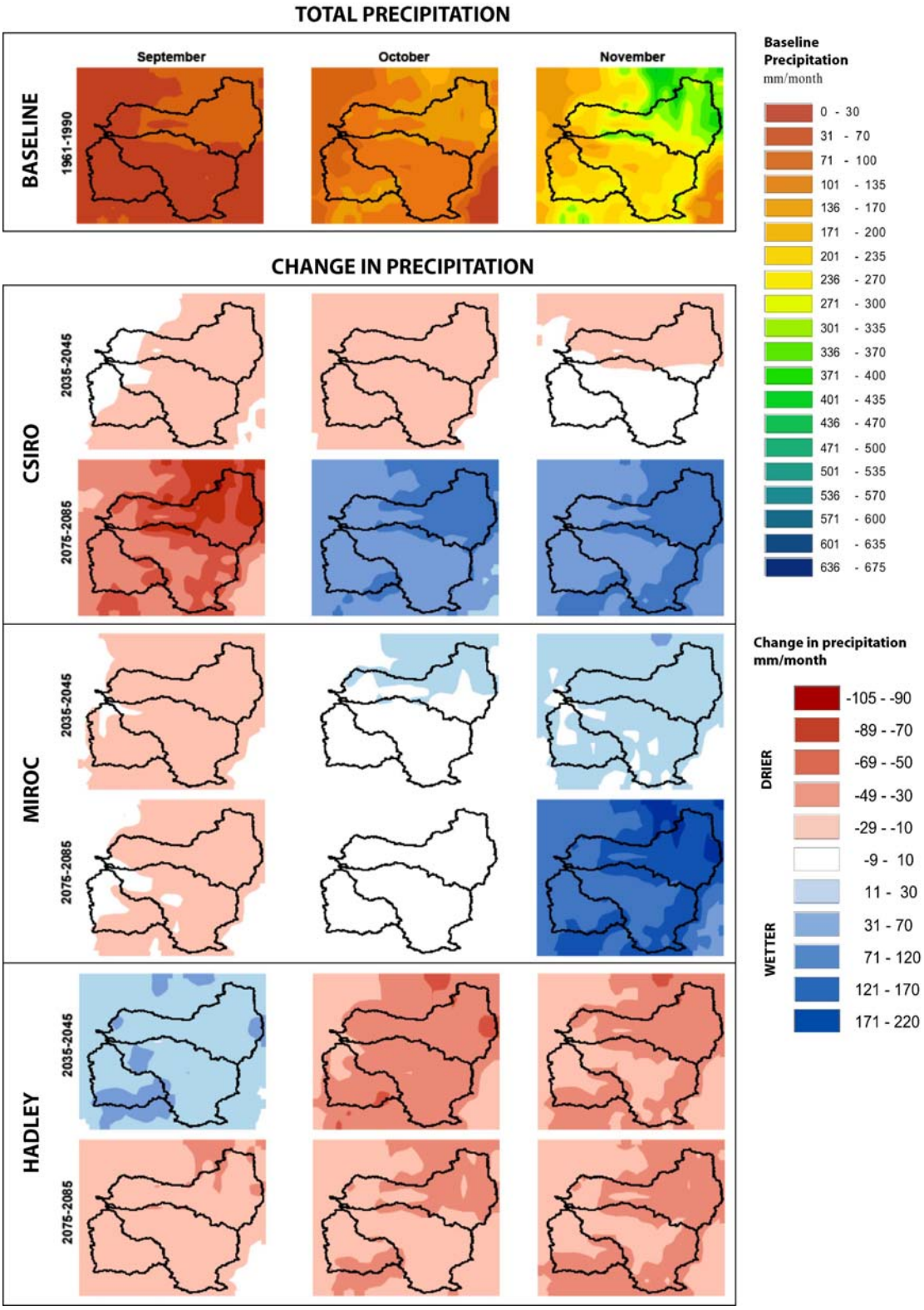


Appendix C-4. Average monthly precipitation across the Upper Willamette River Basin: 2035-2045 (top) and 2075-2085 (bottom) versus baseline (1961-1990).

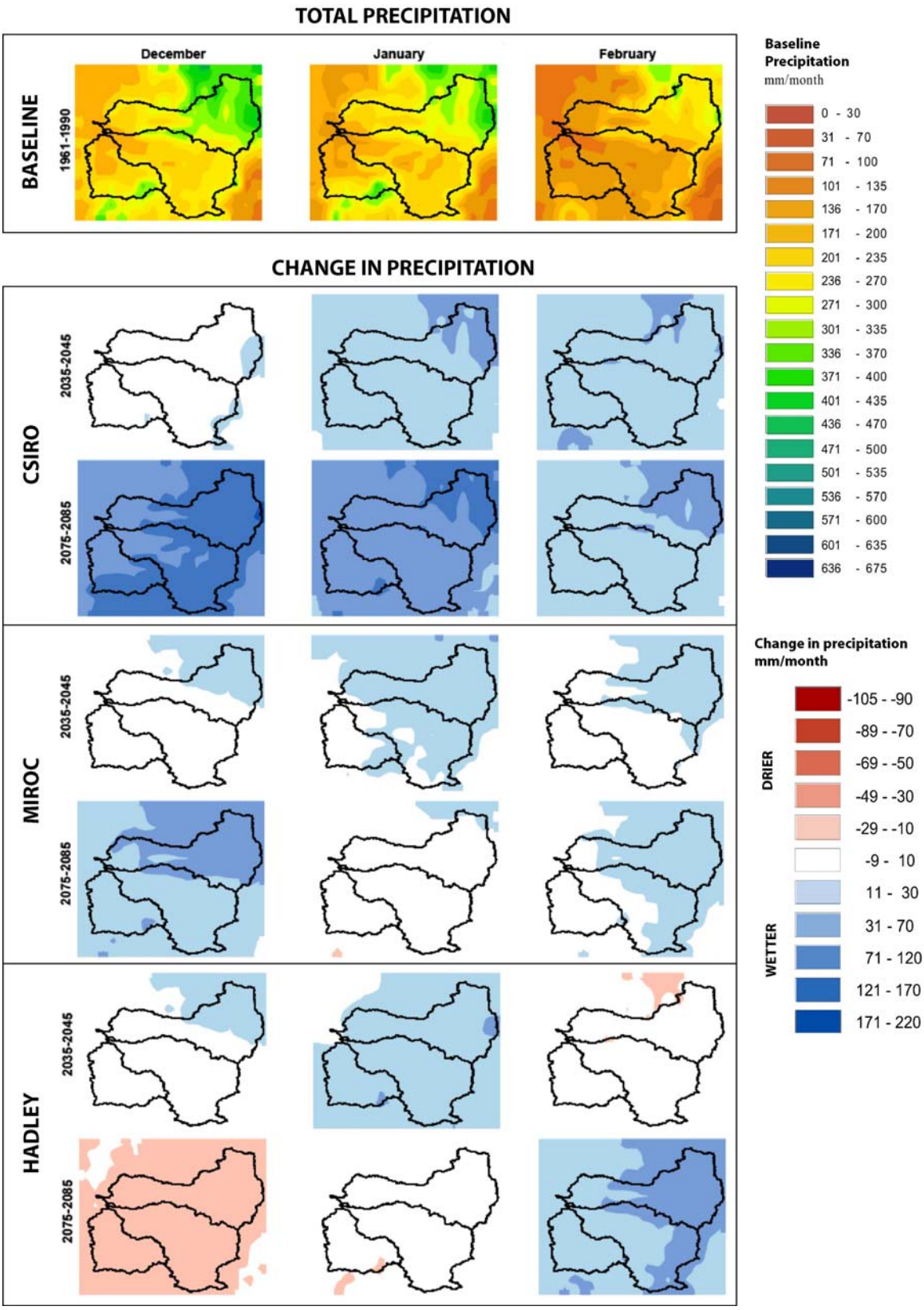



Average Monthly Precipitation 2075-2085
400
350
300
250
200
150
100
50
0
mm
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
1961-1990
CSIRO
HADCM
MIROC

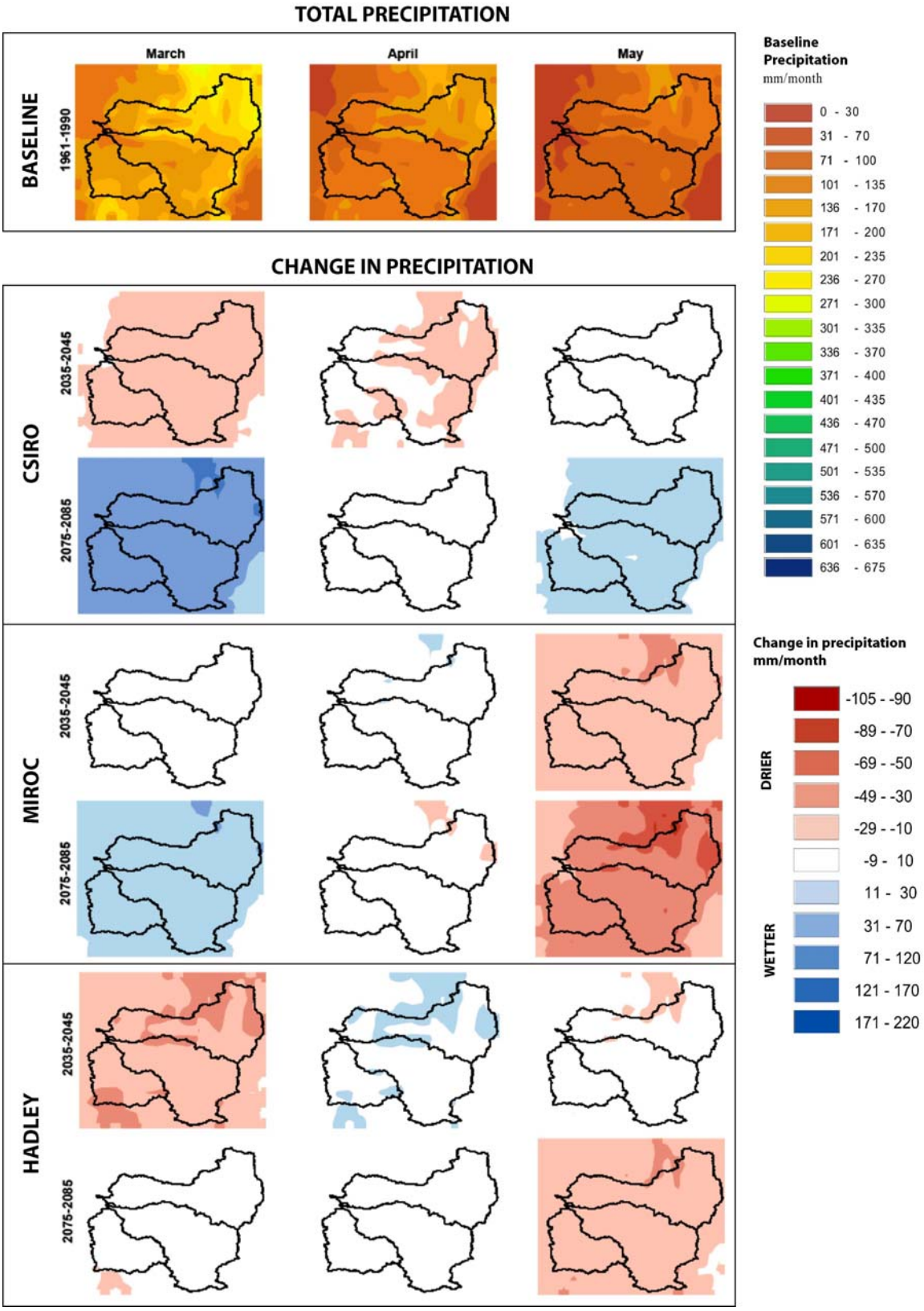
Appendix C-5: Distributional map of fall precipitation in the Upper Willamette River Basin historically (1961-1990) and projected with 3 climate models for 2035-2046 and 2075-2085.



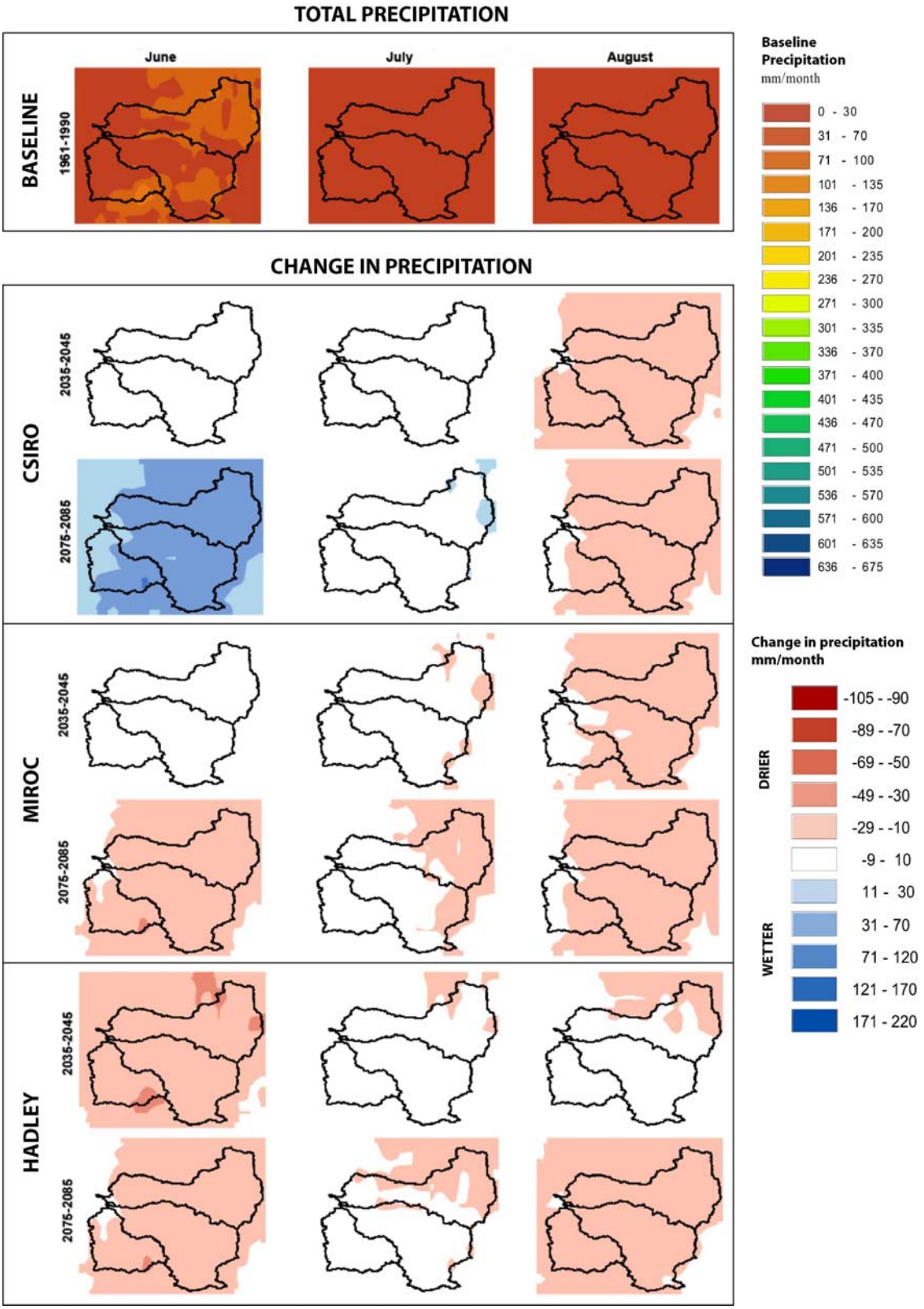
Appendix C-6. Distributional map of winter precipitation in the Upper Willamette River Basin historically (1961-1990) and projected with 3 climate models for 2035-2046 and 2075-2085.


TOTAL PRECIPITATION
December
January
February
BASELINE
1961-1990
CHANGE IN PRECIPITATION
CSIRO
2035-2045
2075-2085
MIROC
2035-2045
2075-2085
HADLEY
2035-2045
2075-2085
Baseline Precipitation
mm/month
0 - 30
31 - 70
71 - 100
101 - 135
136 - 170
171 - 200
201 - 235
236 - 270
271 - 300
301 - 335
336 - 370
371 - 400
401 - 435
436 - 470
471 - 500
501 - 535
536 - 570
571 - 600
601 - 635
636 - 675
Change in precipitation mm/month
DRIER
-105 - -90
-89 - -70
-69 - -50
-49 - -30
-29 - -10
-9 - 10
WETTER
11 - 30
31 - 70
71 - 120
121 - 170
171 - 220

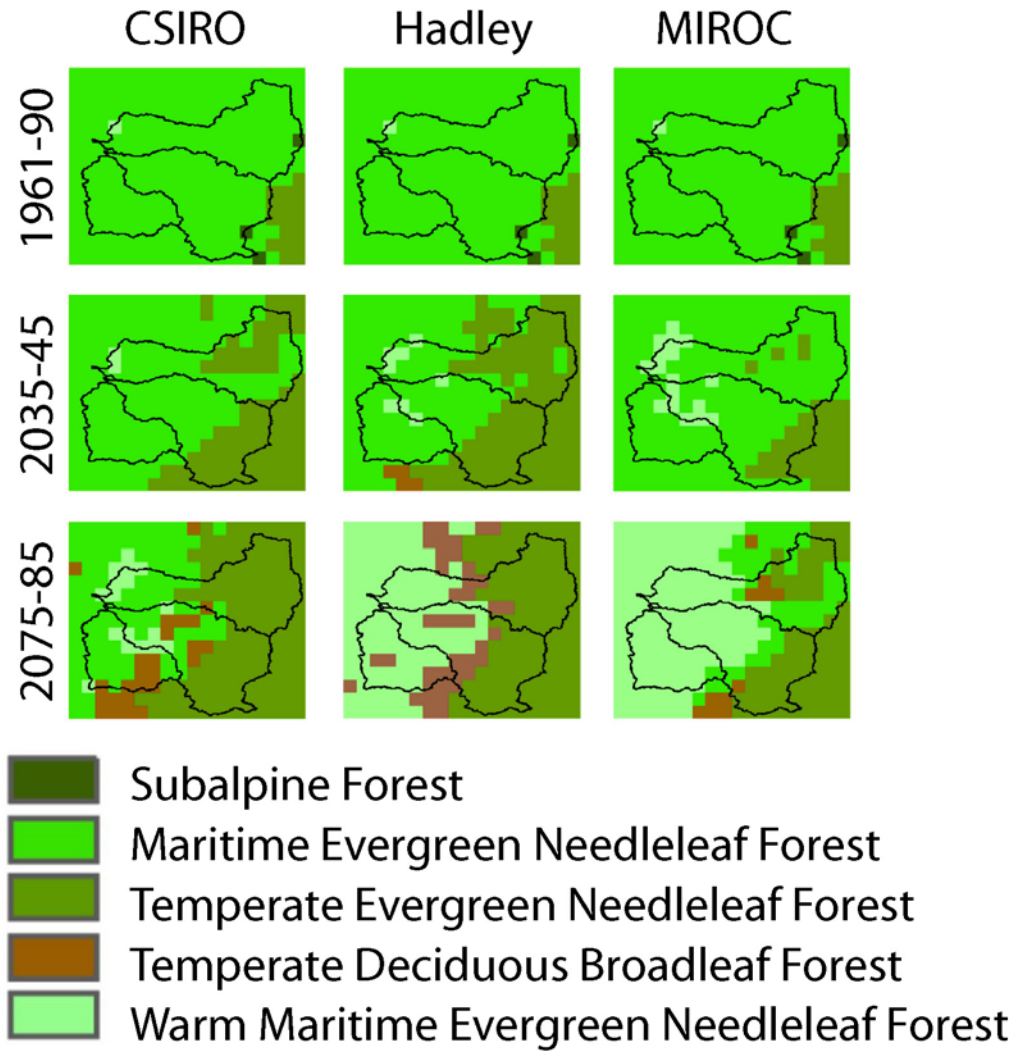
Appendix C-7. Distributional map of spring precipitation in the Upper Willamette River Basin historically (1961-1990) and projected with 3 climate models for 2035-2046 and 2075-2085.



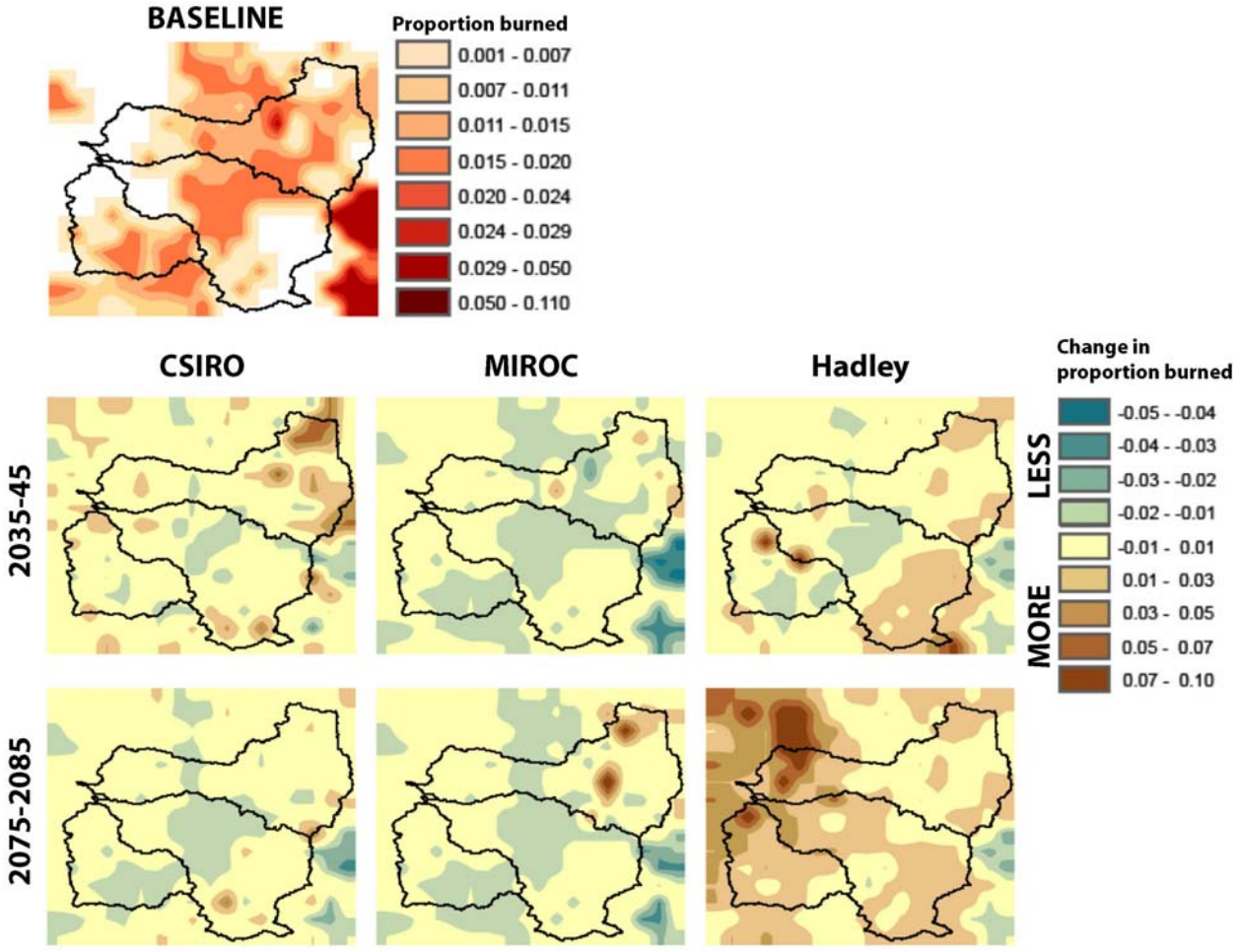
Appendix C-8. Distributional map of summer precipitation in the Upper Willamette River Basin historically (1961-1990) and projected with 3 climate models for 2035-2046 and 2075-2085.



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 MC1 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.

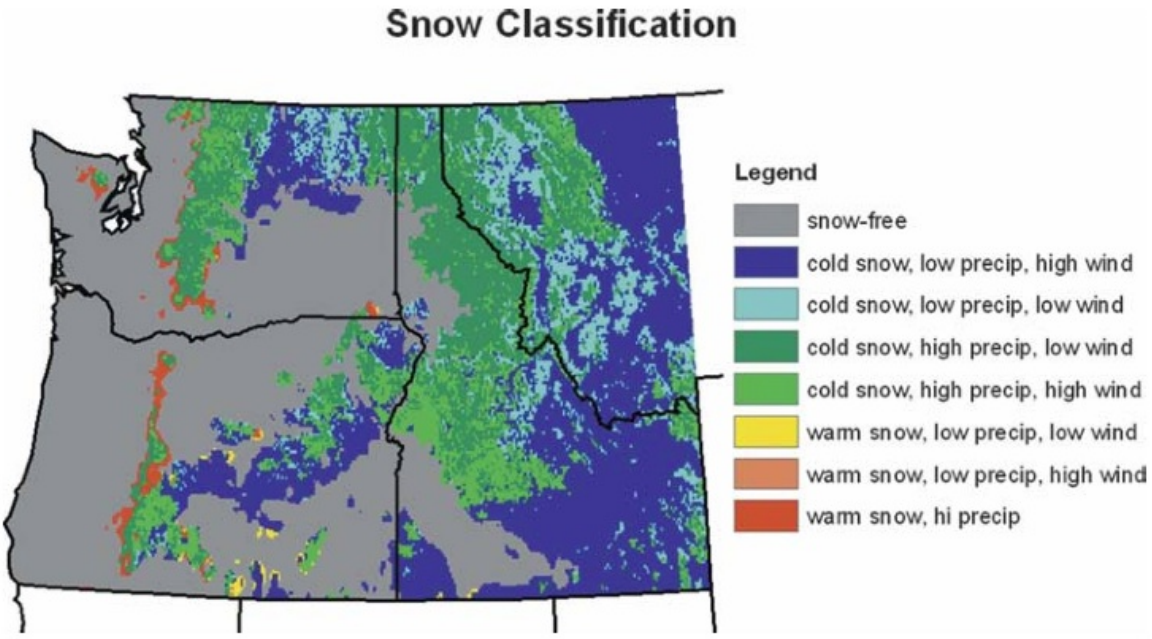
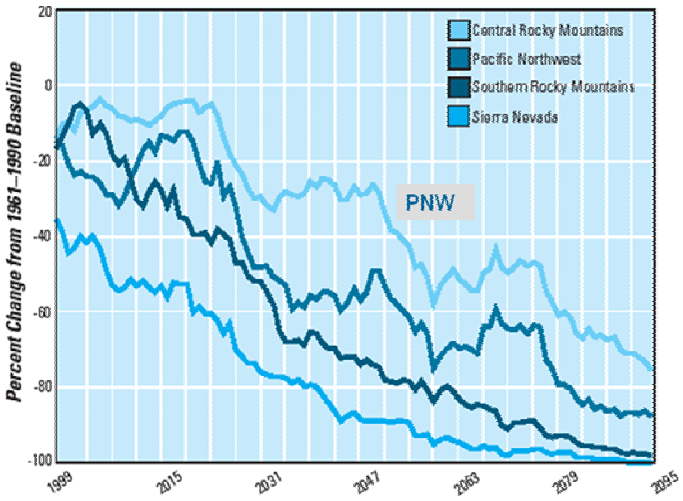


FIG. 3. Snow cover classification using a rain–snow threshold of 0°C. At-risk snow is shown in red.

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.