

Handout for Intertribal Climate Adaptation Summit

Prepared by Pepperwood – Dodge and Micheli – November 2016

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Table 3.3. Climate vulnerability metrics and ecological impacts of change

Climate Indicator (and Trend)	Ecological Impacts and Concerns
Minimum temperatures (increasing)	Reduced freeze days; shifts in phenology (seed set, leaf-out, migration patterns, or emergence of overwintering of insects); shifts in growth period and or duration; shifts in disease dynamics and susceptibility
Maximum temperatures (increasing in magnitude and frequency)	Heat stress; water limitation; increases in wildlife and plant disease susceptibility; impacts on phenology; increased water temperature and related impacts on microorganisms; reduced dissolved oxygen
Precipitation (greater variability)	More frequent drought; species with high tolerance to extremes favored; impact on specialist species reliant on wetland habitat; episodic erosion and turbidity events
CWD (increasing)	Increased drought stress to plants; water stress to animals; decreased food availability; increased fire frequency; faster drying of wetlands, streams, and ponds; shifts in fungal communities, symbionts, and pathogens
Runoff and recharge (greater variability)	Greater proportions of runoff relative to recharge; changes in water availability for plants and wildlife
Actual evapotranspiration (AET) (greater variability)	High AET (correlated with plant productivity) indicates periods of high carbon sequestration and fuel loading
Seasonality changes (potentially longer Summers and shorter winters)	Phenology shifts; asynchronicity of coevolved processes; food web impacts
Cumulative effects (increasing)	Reduced reproductive output and success; impacts on vulnerable life stages and reduced recruitment; population declines; reduced food sources, species level abundance, gene flow and genetic diversity; trophic changes; habitat loss as a result of species shifts

From *An Adaptive Management Plan for Pepperwood Preserve*, Gillogly et al 2016

<http://www.pepperwoodpreserve.org/wp-content/uploads/2016/08/Adaptive-Management-Plan-for-Pepperwood-Preserve-REVIEW-DRAFT-June-2016.pdf>

Climate and Hydrology History (1950-2010) and Projections (2010-2099) for the McDowell Creek Watershed

Table 2.1 -2.3 Basin Characterization Model outputs

McDowell Creek	Historical and Recent Values			
	1950-1981	SL	1981-2010	SL
CWD (in)	29.0	0.5	29.3	0.7
DJF (I)	37.1	6.2	37.9	6.2
JJA (F)	87.7	6.7	86.9	6.1
PPT (in)	41.2	2.1	41.5	2.6
RCH (in)	14.9	1.1	14.3	1.1
RUN (in)	9.5	1.2	10.3	1.4
AEI (in)	16.2	0.5	16.5	0.6

McDowell Creek	Warm, Moderate Rainfall						Warm, High Rainfall					
	2010-2039		2040-2069		2070-2099		2010-2039		2040-2069		2070-2099	
	SE	SE	SE	SE	SE	SE	SE	SE	SE	SE	SE	
CWD (in)	30.1	0.5	31.7	0.5	32.7	0.5	28.9	0.6	30.4	0.6	32.0	0.5
DJF (I)	39.7	5.3	40.3	6.4	43.1	6.4	39.8	6.7	41.7	6.3	44.1	6.3
JJA (F)	88.9	5.2	90.7	6.1	93.2	6.2	89.1	6.2	92.2	6.2	94.4	6.2
PPT (in)	42.2	2.5	40.9	2.2	43.7	3.3	53.1	2.3	52.6	3.3	55.7	3.3
RCH (in)	14.7	1.1	14.8	1.1	14.7	1.1	17.2	0.9	17.2	1.1	17.5	1.0
RUN (in)	10.8	1.5	9.8	1.2	12.6	2.2	18.0	1.9	18.0	2.3	21.9	2.4
AET (in)	16.3	0.4	16.1	0.5	16.4	0.5	17.7	0.6	17.0	0.6	16.9	0.4

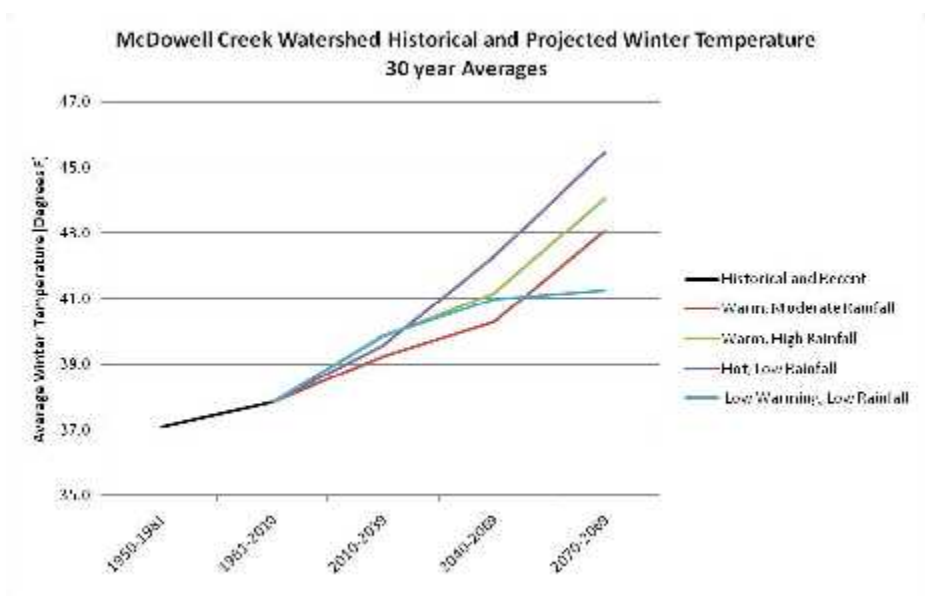
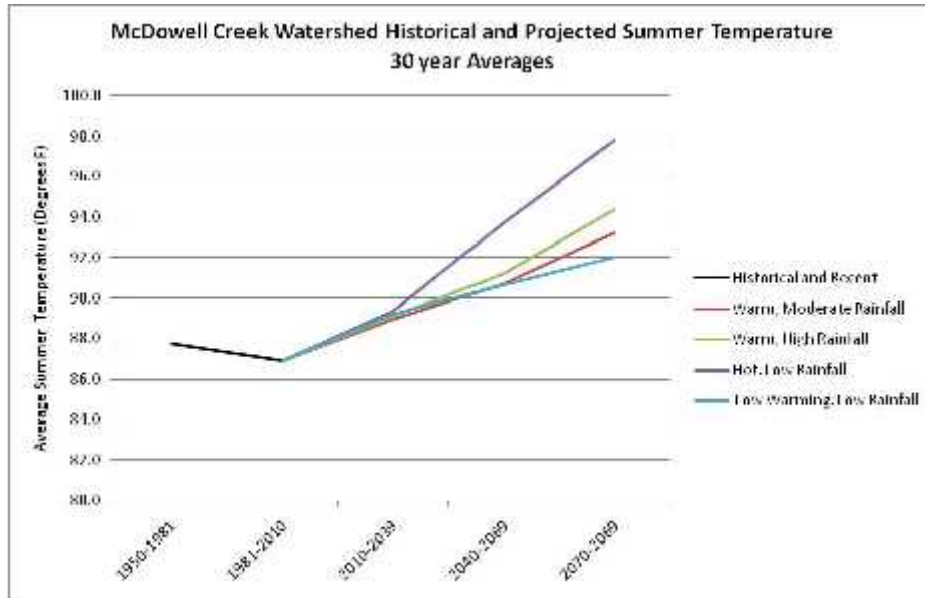
McDowell Creek	Hot, Low Rainfall						High Warming, Low Rainfall					
	2010-2039		2040-2069		2070-2099		2010-2039		2040-2069		2070-2099	
	SE	SE	SE	SE	SE	SE	SE	SE	SE	SE	SE	
CWD (in)	30.0	0.4	32.3	0.5	35.0	0.5	30.8	0.5	30.2	0.5	31.6	0.4
DJF (I)	39.6	6.4	42.3	6.3	45.5	6.3	39.9	6.3	41.0	6.3	41.3	6.3
JJA (F)	89.3	6.3	93.7	6.3	97.8	6.7	89.7	6.1	90.7	6.7	92.0	6.7
PP (in)	40.0	1.2	34.3	1.9	33.8	1.7	42.6	3.7	40.7	2.3	34.3	2.3
RCH (in)	14.3	0.8	11.7	1.1	12.4	0.9	13.0	1.3	13.9	1.0	10.7	1.1
RUN (in)	8.7	0.8	6.6	1.0	6.3	0.9	12.6	2.2	9.5	1.3	7.4	1.3
AET (in)	16.0	0.4	16.0	0.4	15.1	0.4	15.8	0.6	17.0	0.4	16.1	0.4

Table 3 Basin Characterization Model – Change from historic (1981-2010) conditions

McDowell Creek	1981-2010	Warm, Moderate Rainfall			Warm, High Rainfall			Hot, Low Rainfall			High warming, low rainfall		
		2010-2039	2040-2069	2070-2099	2010-2039	2040-2069	2070-2099	2010-2039	2040-2069	2070-2099	2010-2039	2040-2069	2070-2099
		Pct Change CWD	1.2	4.8	7.1	11.0	4.3	4.9	10.3	3.7	11.5	20.6	6.7
Delta DJF (I)	0.8	2.1	3.2	6.0	2.7	4.1	7.0	2.5	5.2	6.4	2.8	3.0	4.2
Delta JJA (F)	-0.4	1.7	3.0	5.5	1.4	3.5	6.7	1.6	6.0	10.1	7.5	-3.0	4.3
Pct Change PPT	0.6	2.4	-0.7	6.1	23.0	27.5	35.1	-3.0	-15.5	-10.1	3.4	-1.1	-15.5
Pct Change RCH	-0.7	-1.6	-0.6	-1.7	1.5	1.5	1.7	-1.0	-0.4	-1.7	-6.5	-0.6	-24.1
Pct Change RUN	8.1	14.3	3.3	33.2	69.5	90.2	125.2	-8.1	-30.0	-33.8	32.7	1.6	-21.0
Pct Change AEI	1.8	1.1	-0.6	1.3	9.4	5.5	4.4	7.7	-0.9	-6.6	-7.7	5.4	-0.4

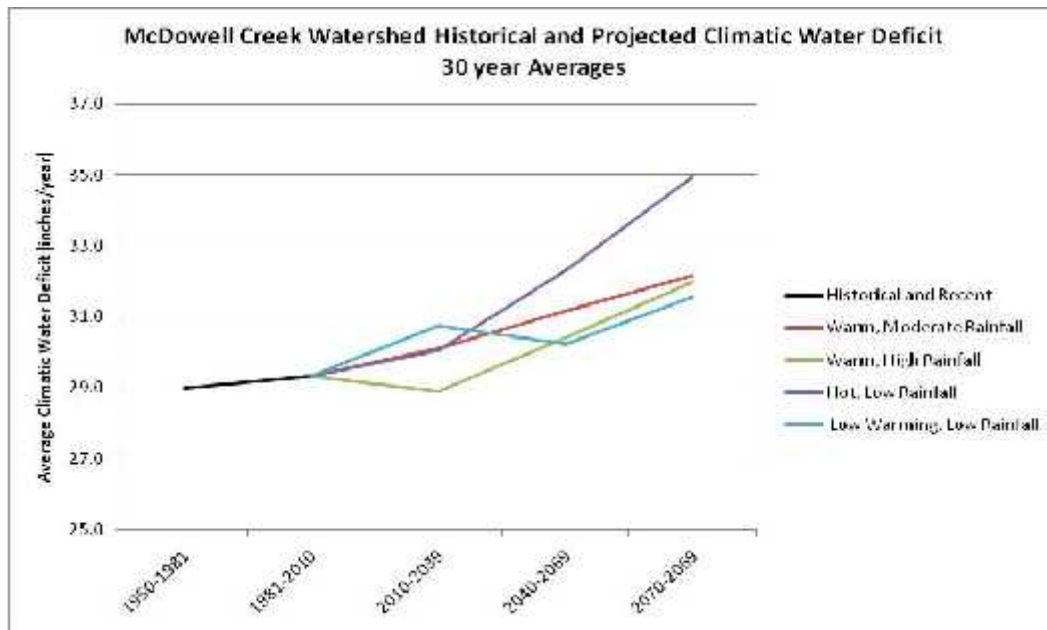
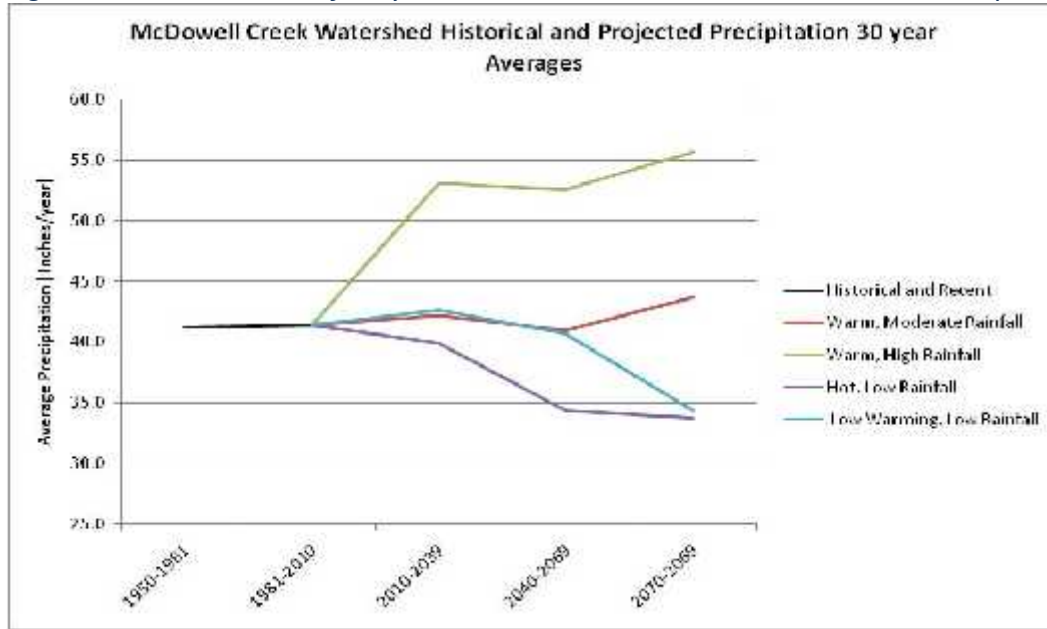
Climate Projections for the McDowell Creek Watershed Cont'd

Figure 1.1 - 1.2 Charts of 30-year trends - Basin Characterization Model outputs (derived from monthly values)

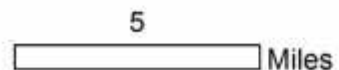
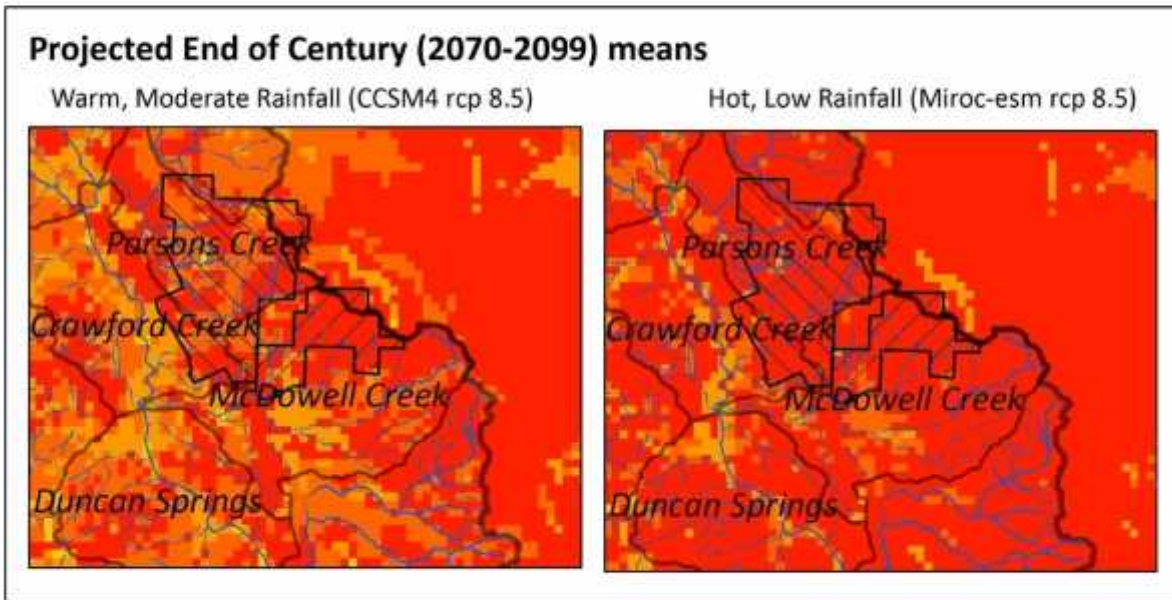
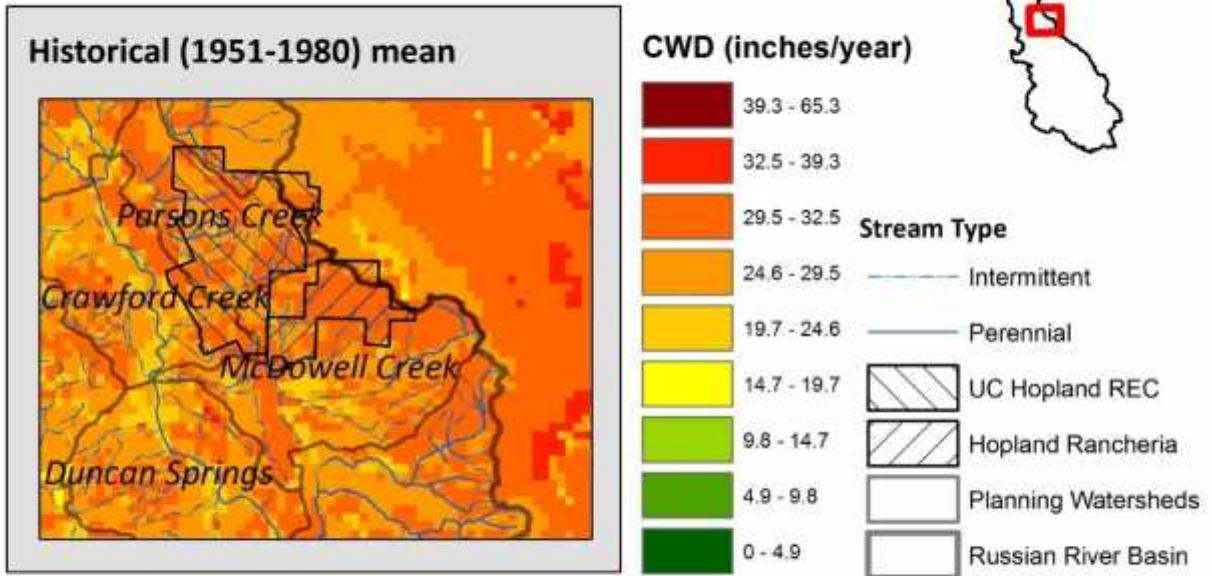


Climate Projections for the McDowell Creek Watershed Cont'd

Figures 1.3 - 1.4 Charts of 30-year trends - Basin Characterization Model outputs



Intertribal Climate Adaptation Summit - Climatic Water Deficit (CWD)
 Historical and Projected 30-Year Averages



Intertribal Climate Adaptation Summit - Water Supply

Historical and Projected 30-Year Averages

