Northwest Power and Conservation Council

Pilot Capacity Standard for the NW

Resource Adequacy Forum

Technical Committee

August 23, 2006

Northwest Power and Conservation Council

Objectives

1. Decide on the form for the capacity metric.
2. Decide on initial capacity targets for winter and summer.
3. Decide on the language in the pilot capacity standard document.
4. Agree to forward this proposal to the Steering Committee.

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Capacity Metric

- Surplus sustained-peaking capacity in units of percent
  - Over the 10 peak-load hours of the day for a 5-day period, calculated for each month
  - Assuming 3,000 MW of available out-of-region capacity per hour in winter and 0 MW in summer
  - Using a base load derived from the monthly average temperature over all days and all years
  - Using hydro generation based on critical hydro (’37 water)

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Getting to a Capacity Target

Temperature Statistics

Regional Daily-Average* Temperatures

	Dec	Diff	Jan	Diff	Feb	Diff
Avg*	36.9		35.2		39.0	
95%	14.3	-22.6	10.2	-25.0	14.5	-24.5
90%	24.1	-12.8	11.8	-23.4	17.3	-21.7

	Jul	Diff	Aug	Diff
Avg*	67.8		67.4	
95%	80.1	12.3	79.6	12.2
90%	79.4	11.6	78.3	10.9

Regional Daily-average temperature = average of the day's high and low temperatures, weighted by population.
Avg = average over all days and all years for each month.

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Temperature – Load Relationship

(Weekdays, 1995-2002 NW data)

Month	Min	**Avg**	Max
December	-247	**-336**	-426
January	-206	**-226**	-246
February	-197	**-277**	-358
July	158	**178**	197
August	123	**149**	174

Units are daily-average megawatts per degree (Fahrenheit) change in daily-average temperature

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Temperature – Load Relationship

(1995-2002 data vs. HELM data)

Month	**1995-2005**	**HELM**
December	-336	-246
January	-226	-246
February	-277	-246
July	178	162
August	149	162

Units are daily-average megawatts per degree (Fahrenheit) change in daily-average temperature

Load Deviations

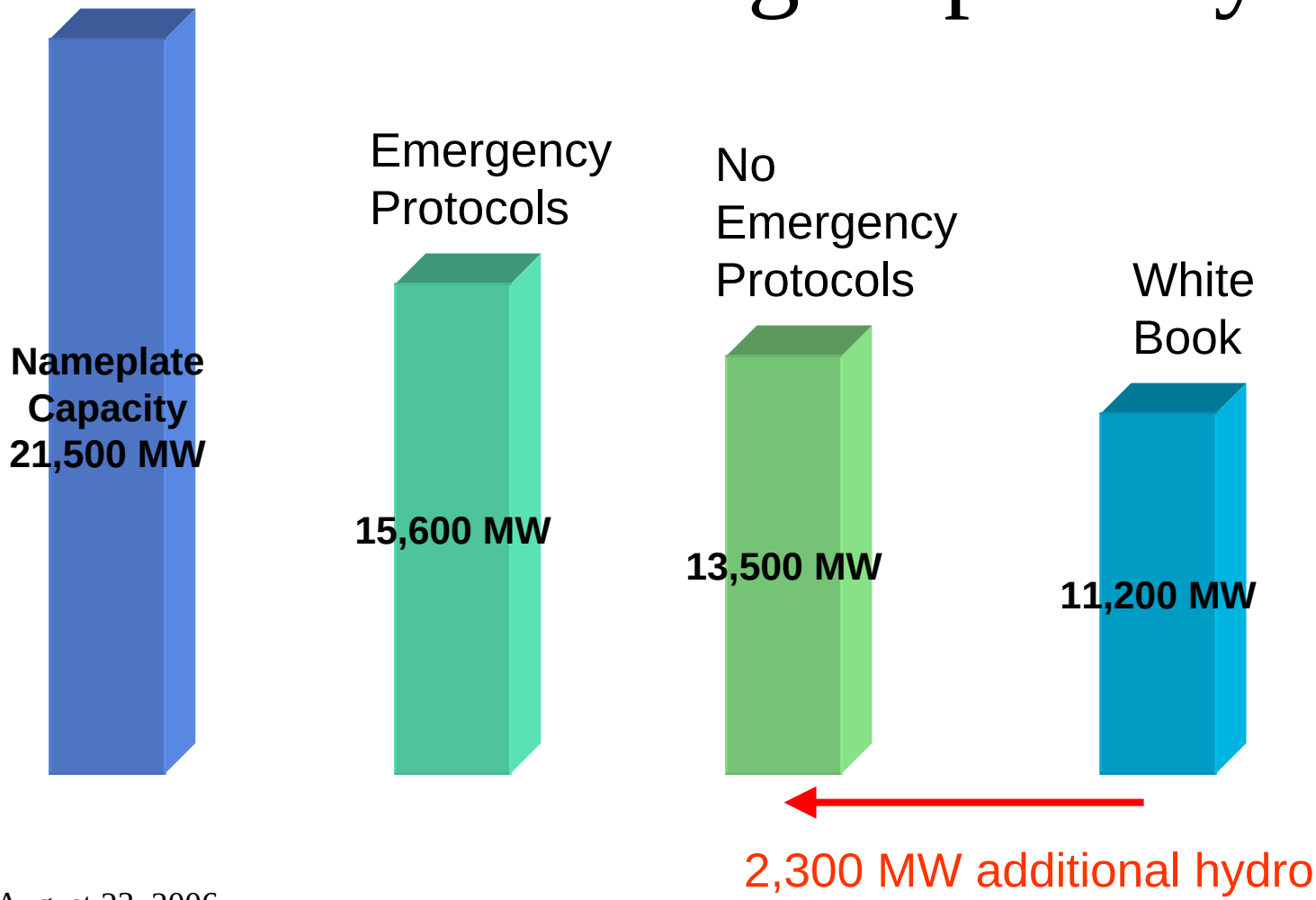
(From Weekday Daily-Average* Regional Load)

	Dec	Add	Jan	Add	Feb	Add
Load	22,591		24,422		24,262	
95%		7,593		5,650		6,787
90%		4,300		5,288		6,011

	Jul	Add	Aug	Add
Load	20,617		20,634	
95%		2,189		1,818
90%		2,065		1,624

*Based on average-daily temperature.
Units are in megawatt-days.

FCRPS Peaking Capability



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Sustained Peaking Planning Adjustment

- Planning for a 1-in-20 year extreme temperature event combined with a 1-in-75 year water condition event is too conservative
- During emergencies, up to 4,400 MW of additional hydro generation is available
- Even without emergency protocols 2,300 MW of additional hydro is available
- To be safe, assume that an additional 1,000 MW of hydro can be relied upon

Sustained Peaking Planning Adjustment (cont'd)

- We have also assumed that 3,000 MW of out-of-region surplus capacity is available for import over winter months
- Adding these two yields a planning adjustment of 4,000 MW for winter
- The planning adjustment for summer is 1,000 MW

Reserve Margin for an Extreme Temperature Event

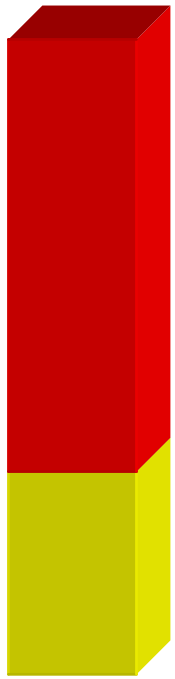
Including a Planning Adjustment

	Dec	Jan	Feb	Jul	Aug
Avg Load	22,591	24,422	24,262	20,617	20,634
TLD	7,593	5,650	6,787	2,189	1,818
PA	4,000	4,000	4,000	1,000	1,000
ALD	3,593	1,650	2,787	1,189	818
RM	16%	7%	11%	6%	4%

TLD = temperature load deviation PA = planning adjustment
ALD = adjusted load deviation RM = Reserve margin = ALD/Avg Load

Proposed Capacity Target

Target:
22% Dec
12% Jul
for the Sustained Peaking Capacity Reserve Margin



Components

16% (December)
6% (July) for Adverse Temperature

6% for Contingency and Supplemental Reserves (7% for Thermal and 5% for Hydro)

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10-Hour Sustained Peak Capacity Reserve Margin

2007 10-hour peak	**December (Current)**	**December (LOLP 5%)**	**July (Current)**	**July (LOLP 5%)**
Hydro ('37)	20,500	20,500	22,400	22,400
Non-hydro	14,355	10,355	14,034	10,034
Firm Exports*	-920	-920	-1,124	-1,124
Spot Imports	0	0	0	0
Total Resource	33,935	29,935	35,310	31,310
Load (Avg)	22,591	22,591	20,617	20,617
Balance	11,344	7,344	14,693	10,693
Reserve	**50%**	**33%**	**71%**	**52%**

*Firm exports from BPA's 2004 White Book

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Pilot Capacity Standard

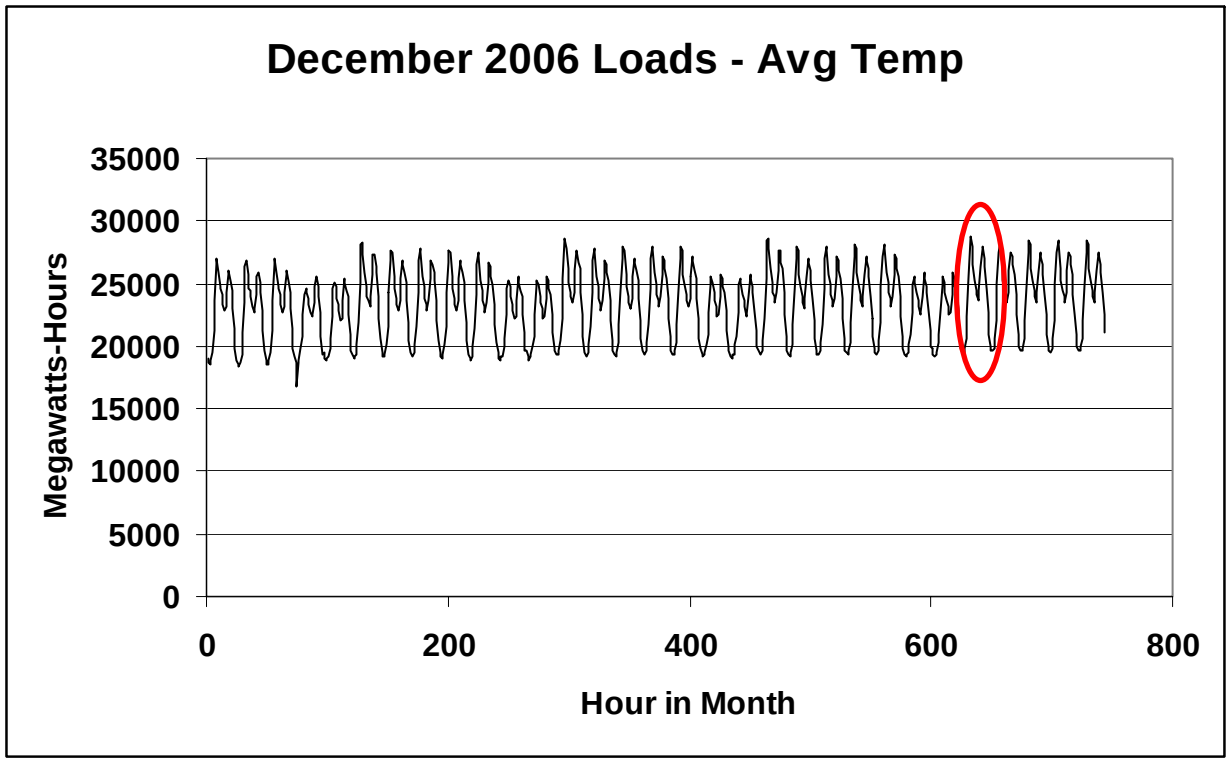
- Metric – Surplus sustained-peaking capacity (%)
  - Over the 10 peak-load hours of the day for a 5-day period, calculated for each month
  - Assuming 3,000 MW of available out-of-region capacity per hour in winter and 0 MW in summer
  - Using a base load derived from the monthly average temperature over all days and all years
  - Using hydro generation based on critical hydro ('37 water)

- Target – 22 percent for Winter (December)
  12 percent for Summer (July)

Hourly Load Shapes

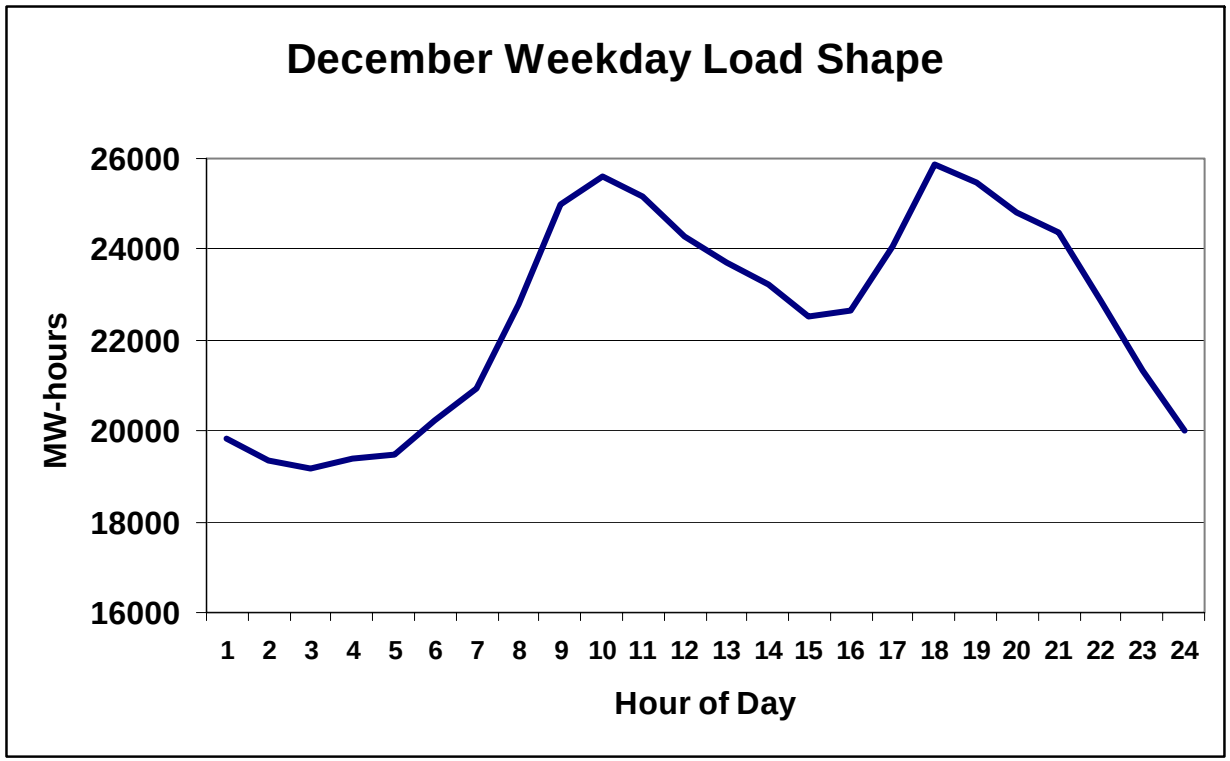
Load Shapes - December

HELM data – Average Temperatures



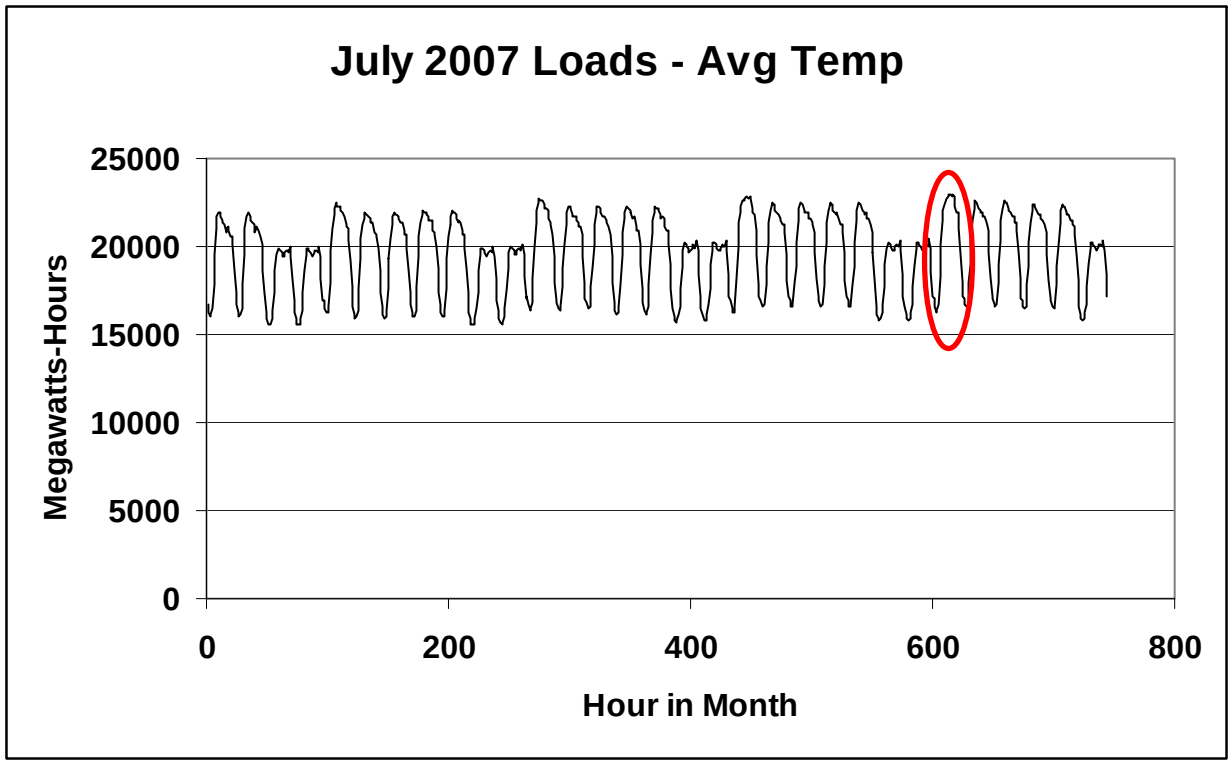
Load Shapes - December

HELM data – Average Temperatures



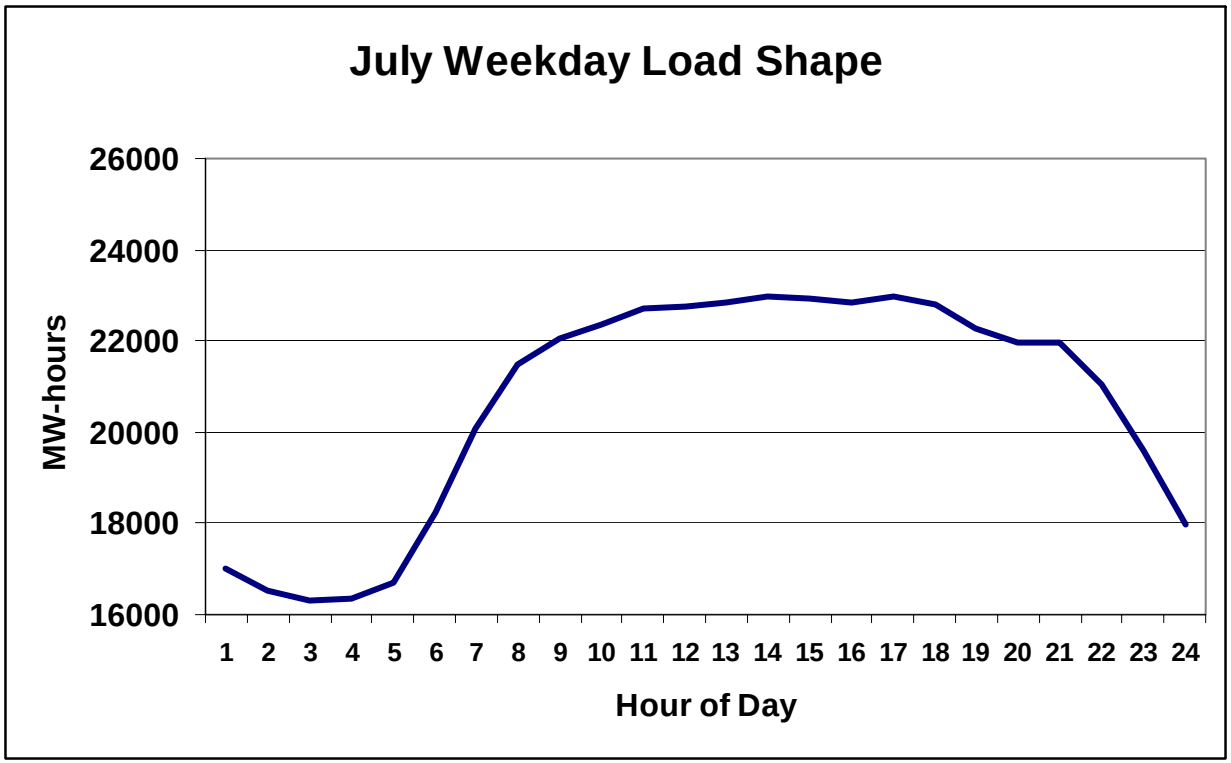
Load Shapes - July

HELM data – Average Temperatures



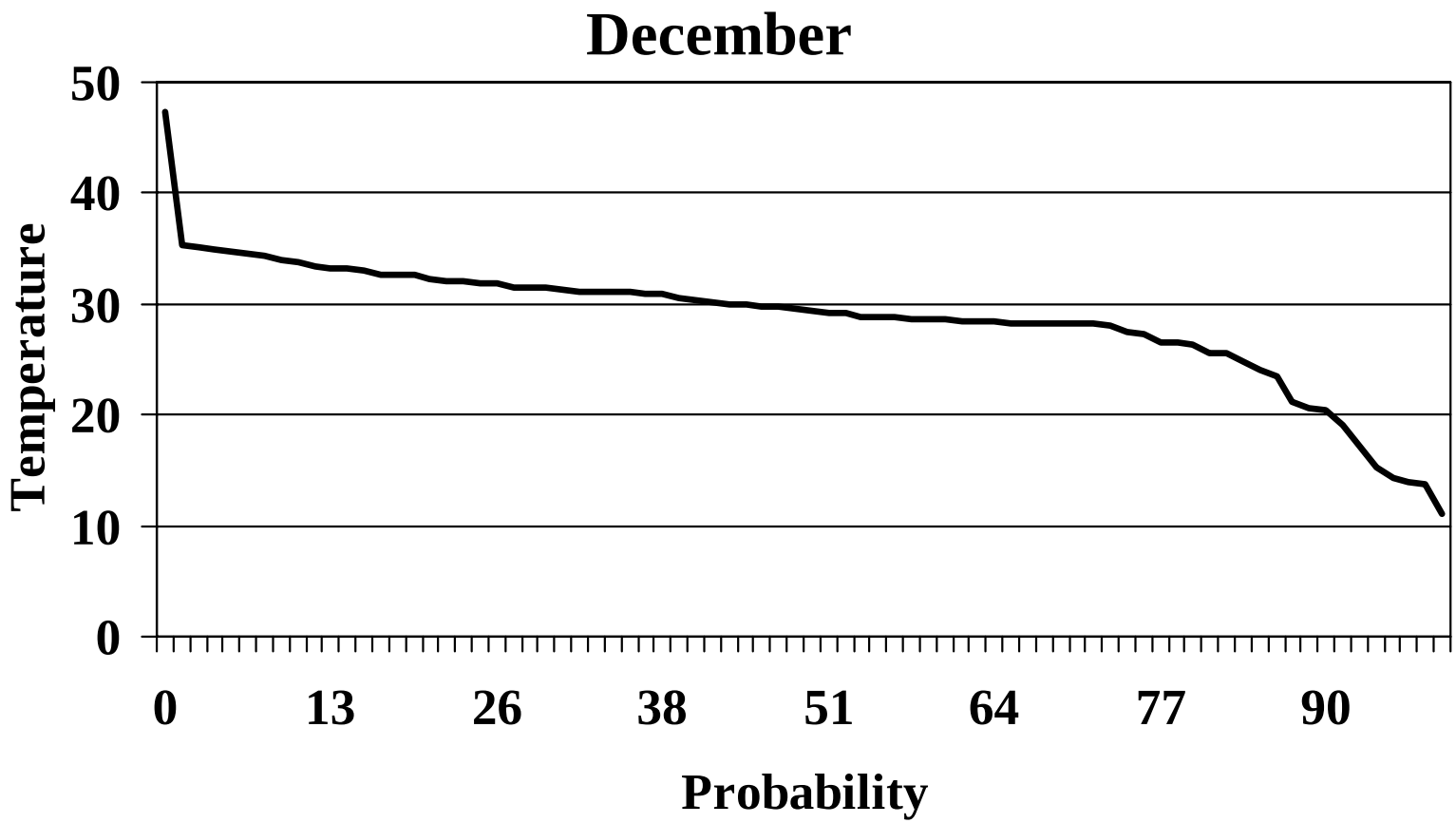
Load Shapes - July

HELM data – Average Temperatures

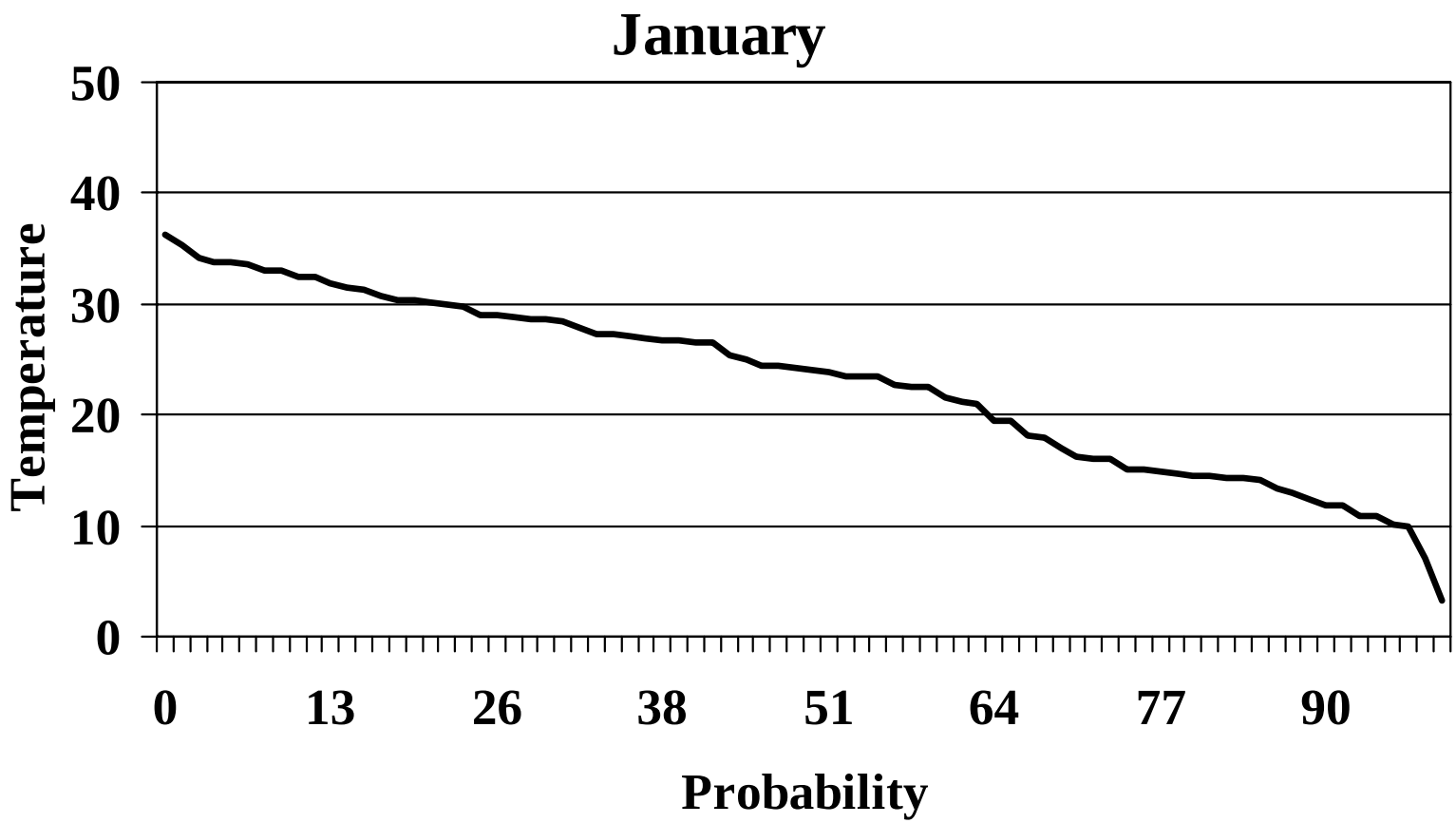


Temperature Duration Curves

Coldest Day Duration Curve



Coldest Day Duration Curve



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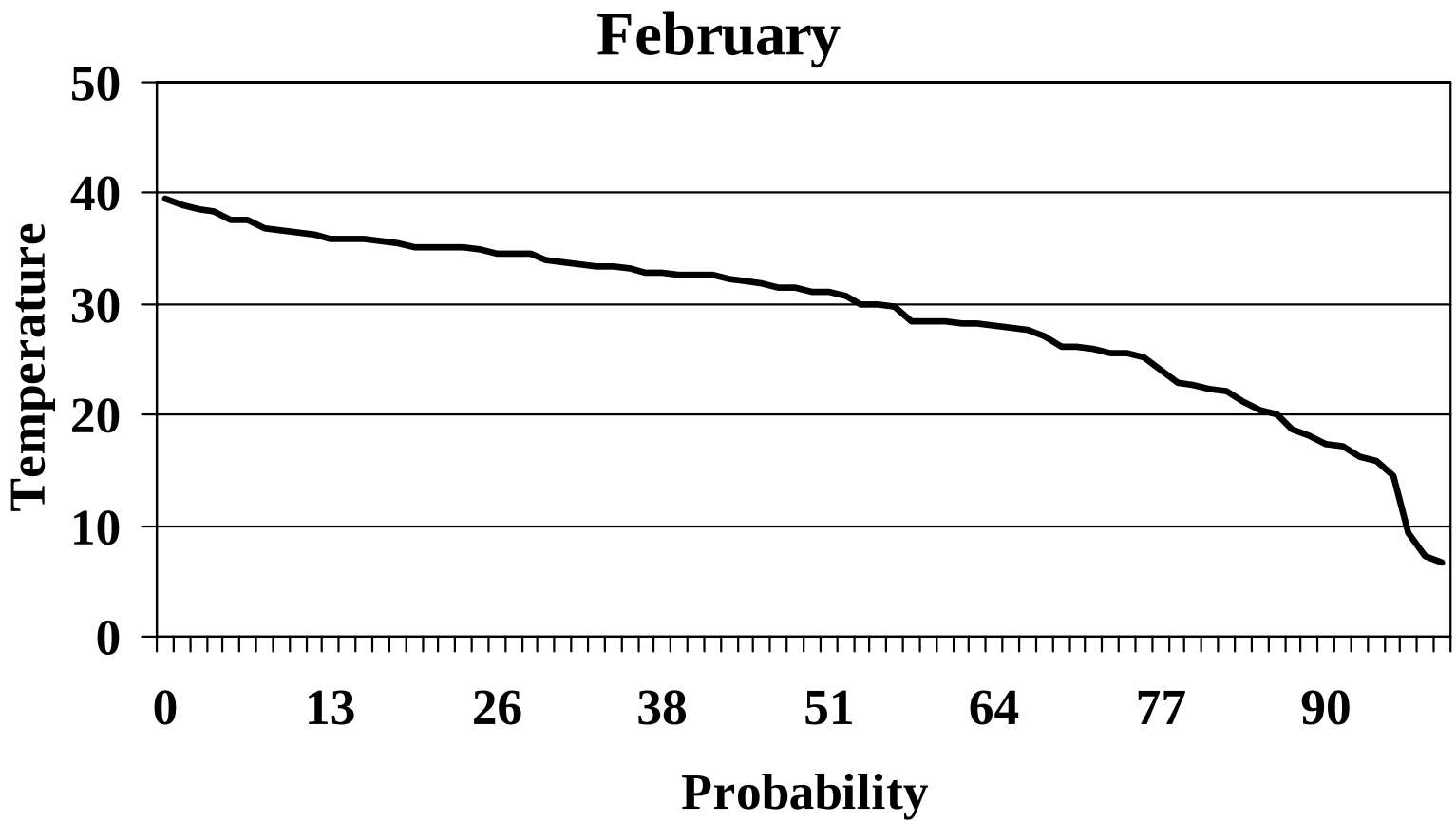
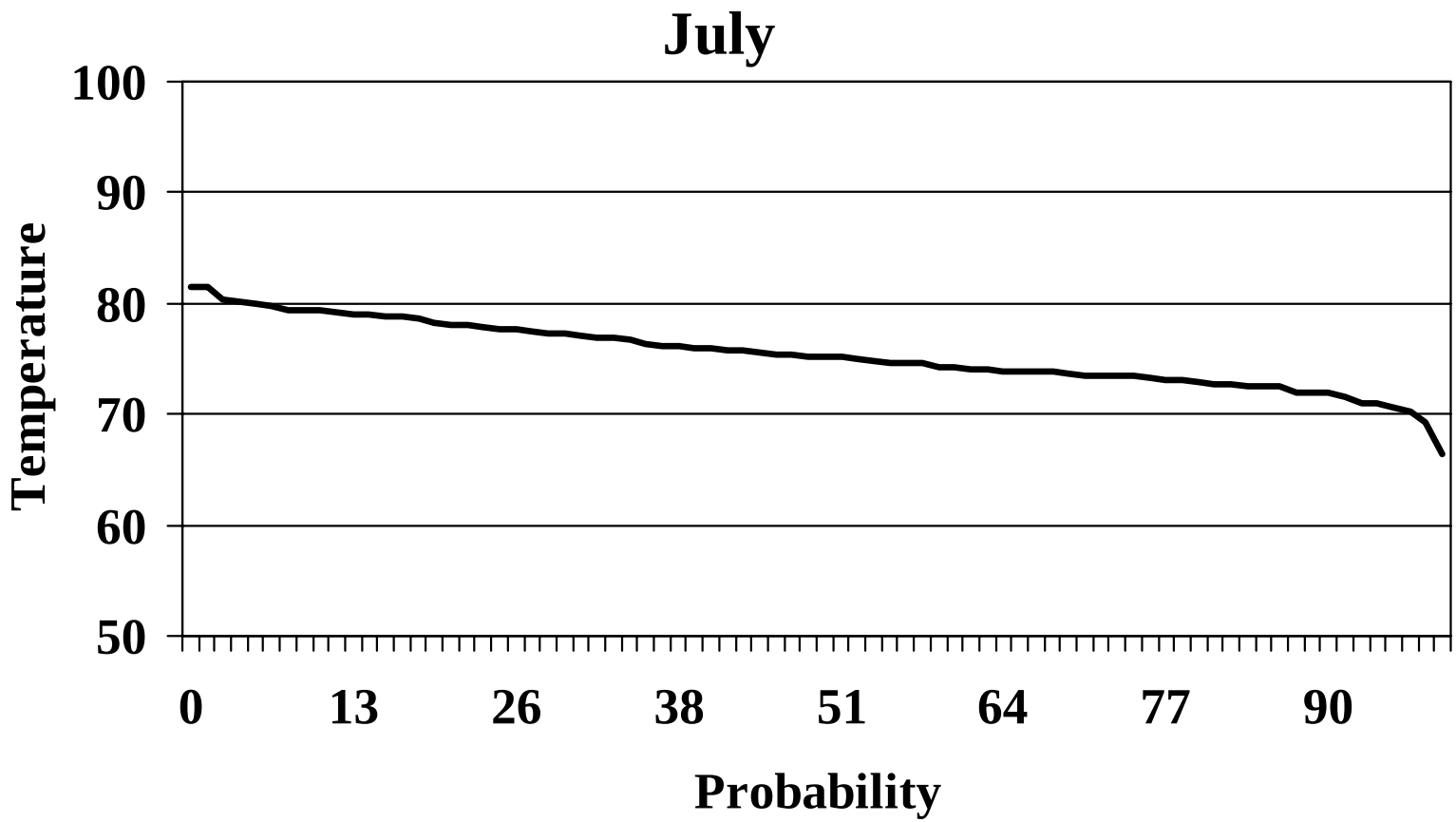
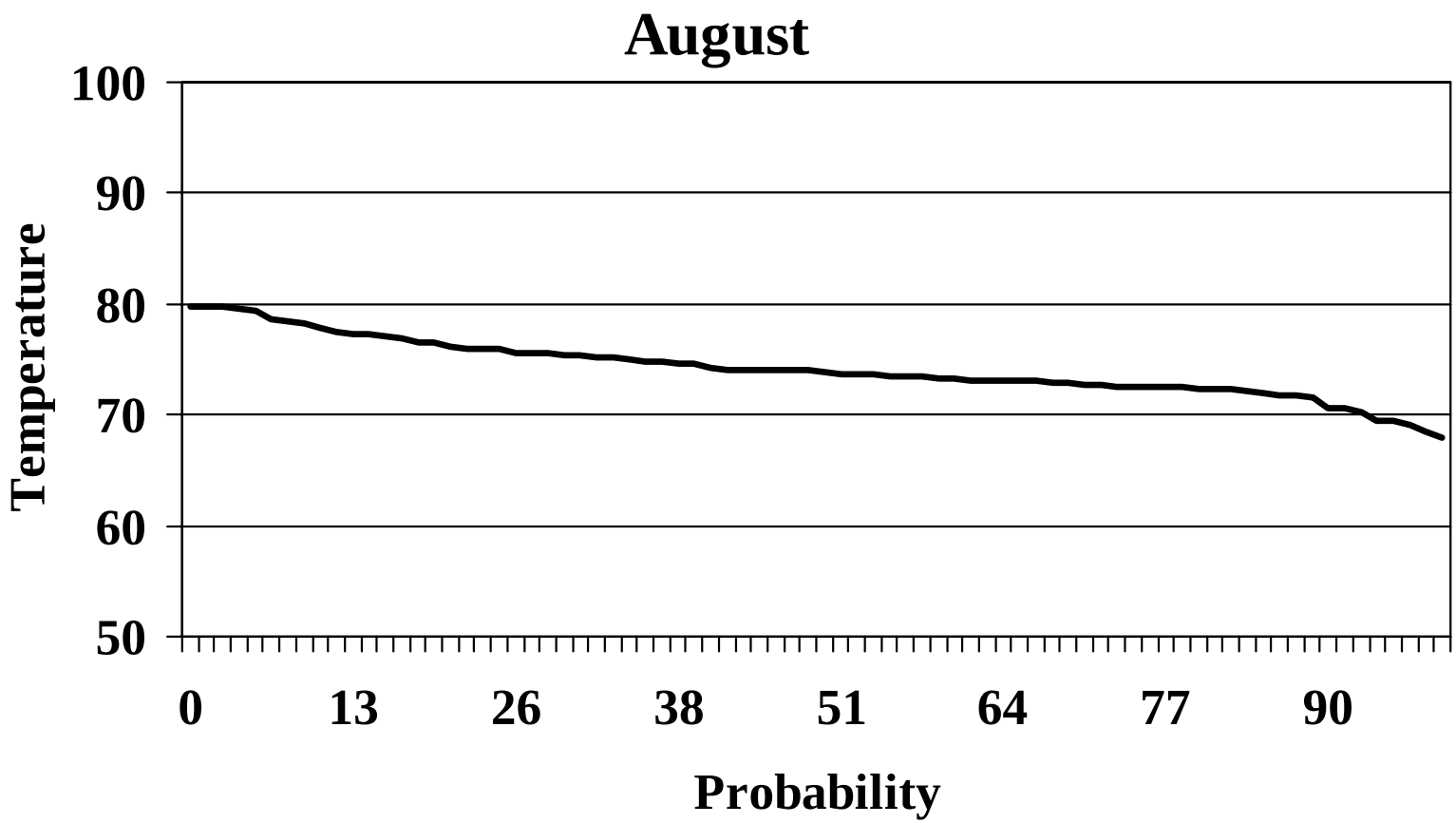


Hottest Day Duration Curve



Hottest Day Duration Curve