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to Nelson from Chapman

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Seattle 4, Washington

U. S. Department of Agriculture
Soil Conservation Service
840 Bon Marche Building
Spokane 1, Washington

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EVAPOTRANSPIRATION MAPS FOR THE STATE OF WASHINGTON

Evapotranspiration computations have been made for all locations in the State of Washington where Weather Bureau normals of precipitation and temperature are available. The method used was that developed by Thornthwaite (1948) and later simplified by Palmer and Havens (1958). These results have been mapped to show the general variations of evapotranspiration data over the agricultural and forested areas of the State. A series of nine maps have been prepared.

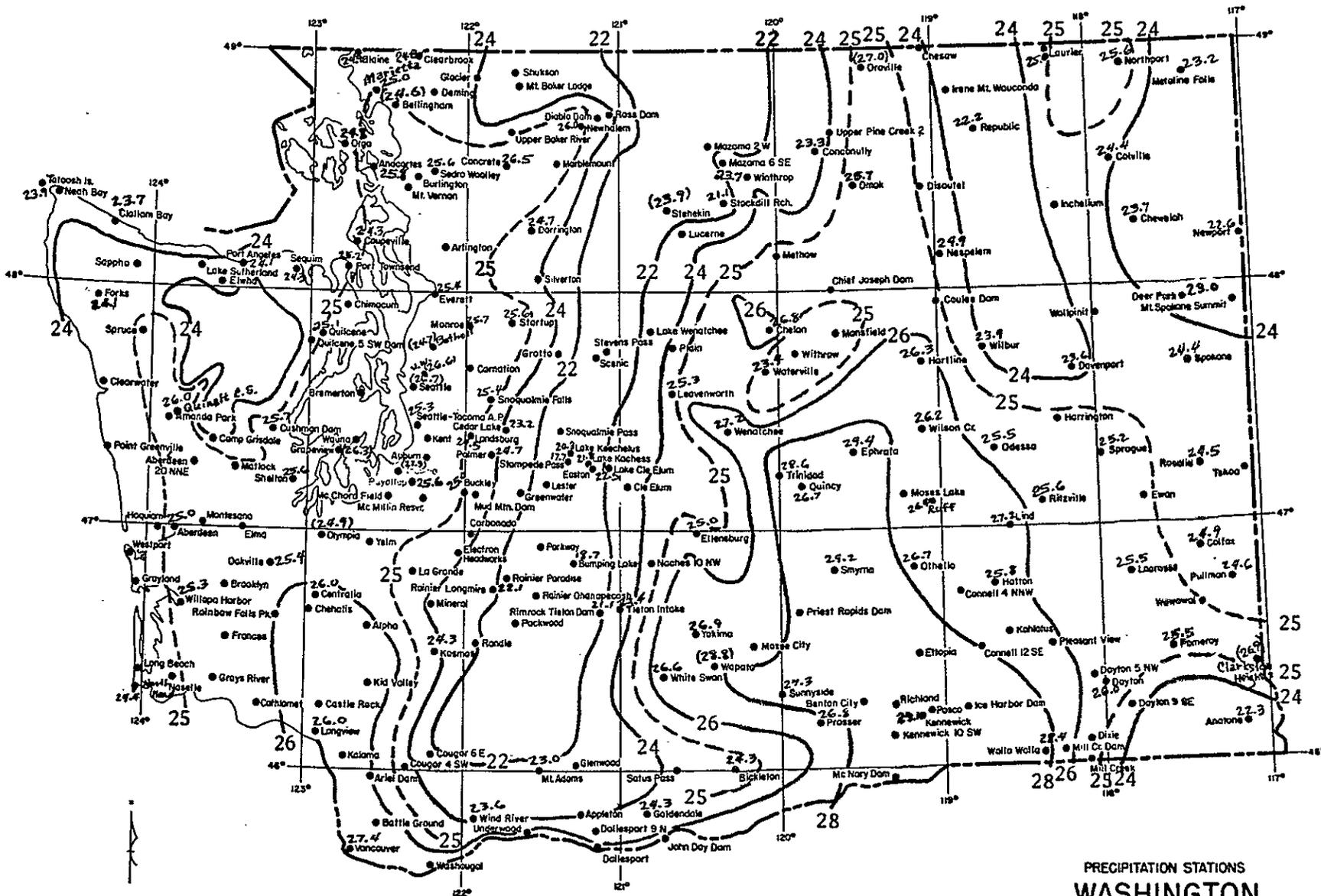
Maps 1 through 3 give the distribution of potential (or maximum) evapotranspiration. This concept of potential evapotranspiration may be defined as the maximum water loss from a vegetative-covered surface. This concept also assumes that a moisture stress never exists and that there is sufficient water in the soil at all times for plant use. Maximum or potential evapotranspiration can occur with a given crop cover under ideal irrigation practices. Potential evapotranspiration is principally determined by climatic conditions. Map 1 shows the general state-wide patterns of potential evapotranspiration on an annual basis. Map 2 gives the same information except the time period is limited to the length of the 32°F growing season at each location. Map 3 similarly relates the patterns for the 28°F growing season. All of these patterns are based on normal conditions.

Maps 4 through 9 relate to actual evapotranspiration as computed from standardized formulas. This is the water loss that actually occurs in a given location under actual temperature and precipitation conditions. This quantity approaches the potential amount in rainy climates; whereas, in arid climates, the quantity is only a fraction of the potential amount. When precipitation and subsequent soil moisture is lacking, evapotranspiration is also reduced. Following Thornthwaite's procedures, it has been assumed that evapotranspiration decreases linearly as soil moisture is reduced. To make computations for actual evapotranspiration, it is necessary to assume that a given soil profile will hold or can store a given quantity of moisture. For this, we have set up two conditions; first, it is assumed that 2 inches of moisture can be stored and be made available to plants and secondly, that 6 inches are available. This quantity, 2 or 6 inches, is called the available water capacity. It is possible to compute or interpolate actual evapotranspiration values for other available water capacities, say 4 or 8 inches.

*11 recd.
12 Swickson
13 Wilson
& in file (in your desk)*

6
5
4
3
2
1
0

Map 1 - MEAN POTENTIAL EVAPOTRANSPIRATION, PET, INCHES
Annual



PRECIPITATION STATIONS
WASHINGTON
 MARCH 1962

0 10 20 30 40
 SCALE IN MILES

• W.B. Precipitation Stations

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Maps 4 through 6 give actual evapotranspiration values under normal conditions when it is assumed that the available water capacity is 2 inches. These values can best be related to shallow rooted crops and/or soil that has limited water holding capacity. Map 4 relates to actual evapotranspiration values on an annual basis; Map 5, for the 32°F growing season; and Map 6, for the 28°F growing season.

Maps 7 through 9 give actual evapotranspiration values under normal conditions for a 6 inch assumed available water capacity. As before, Map 7 relates to these patterns on an annual basis; Map 8, for the 32°F growing season; and Map 9, for the 28°F growing season.

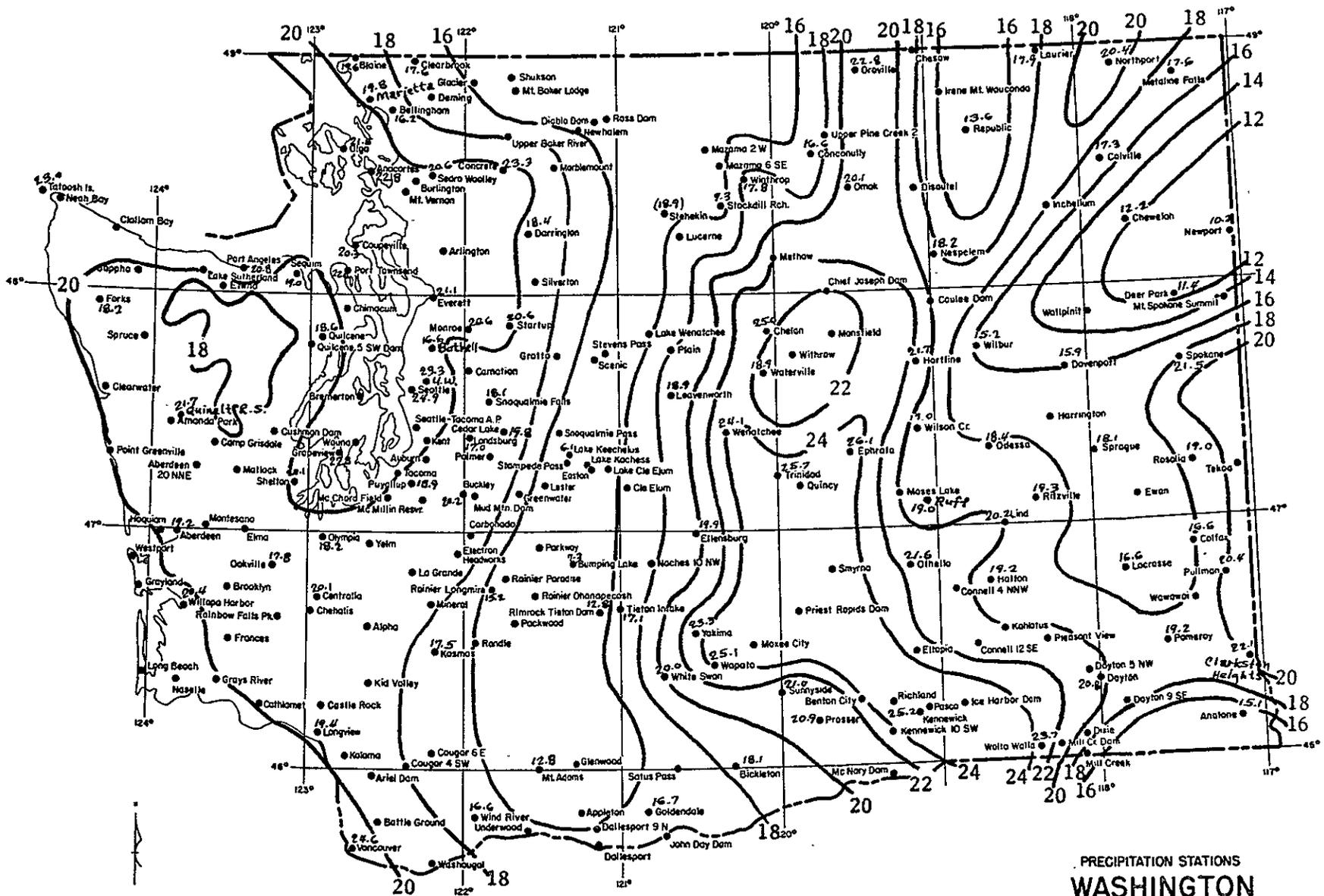
All of this computed data on evapotranspiration were published in mimeod tables during February 1961 and are available through either the Weather Bureau or the Soil Conservation Service.

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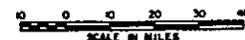
9 1 1 2 5 0 1 5 0 9

Map 2 - MEAN POTENTIAL EVAPOTRANSPIRATION, PET, INCHES
32° Growing Season



PRECIPITATION STATIONS
WASHINGTON

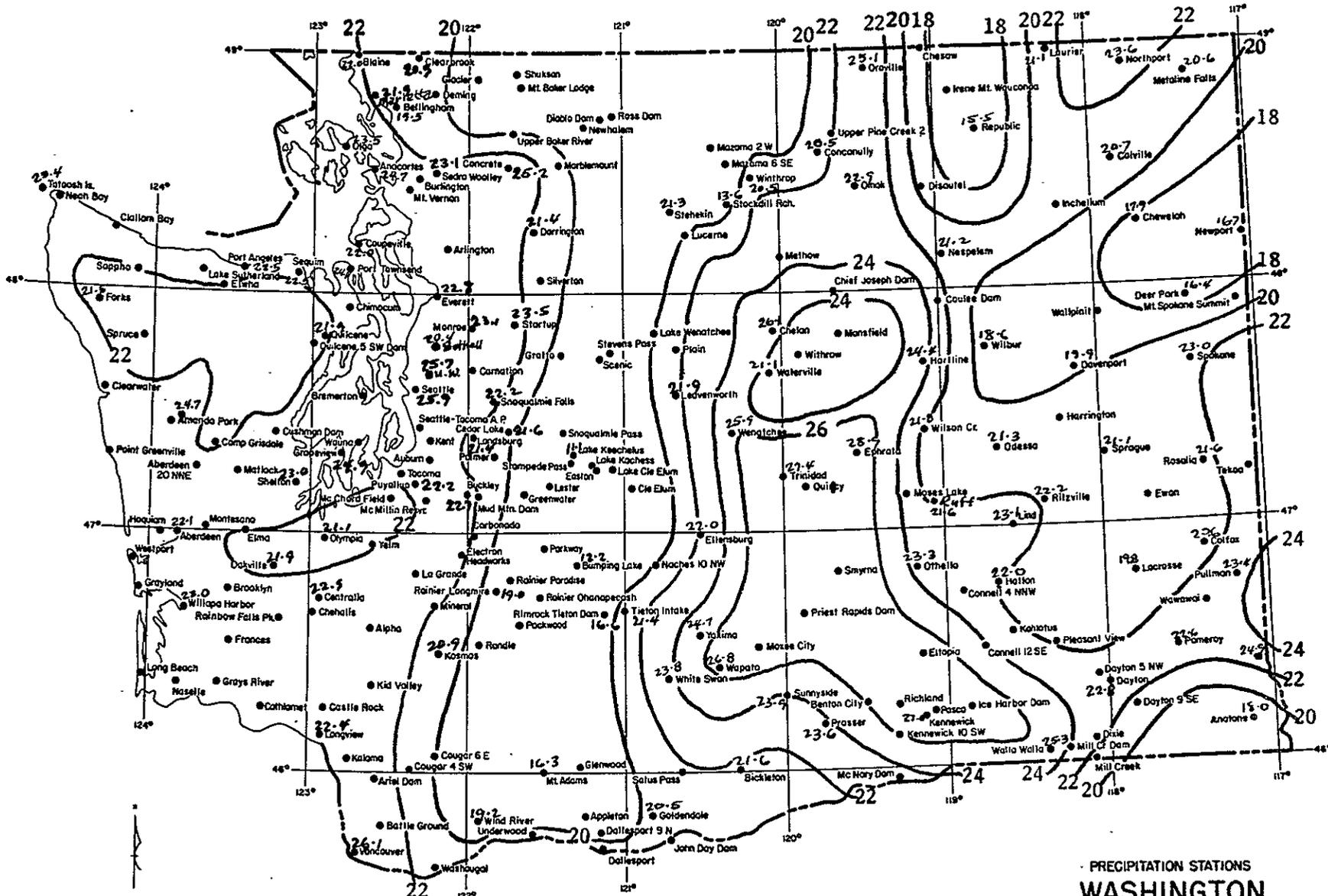
MARCH 1962



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Map 3 - MEAN POTENTIAL EVAPOTRANSPIRATION, PET, INCHES
28° Growing Season

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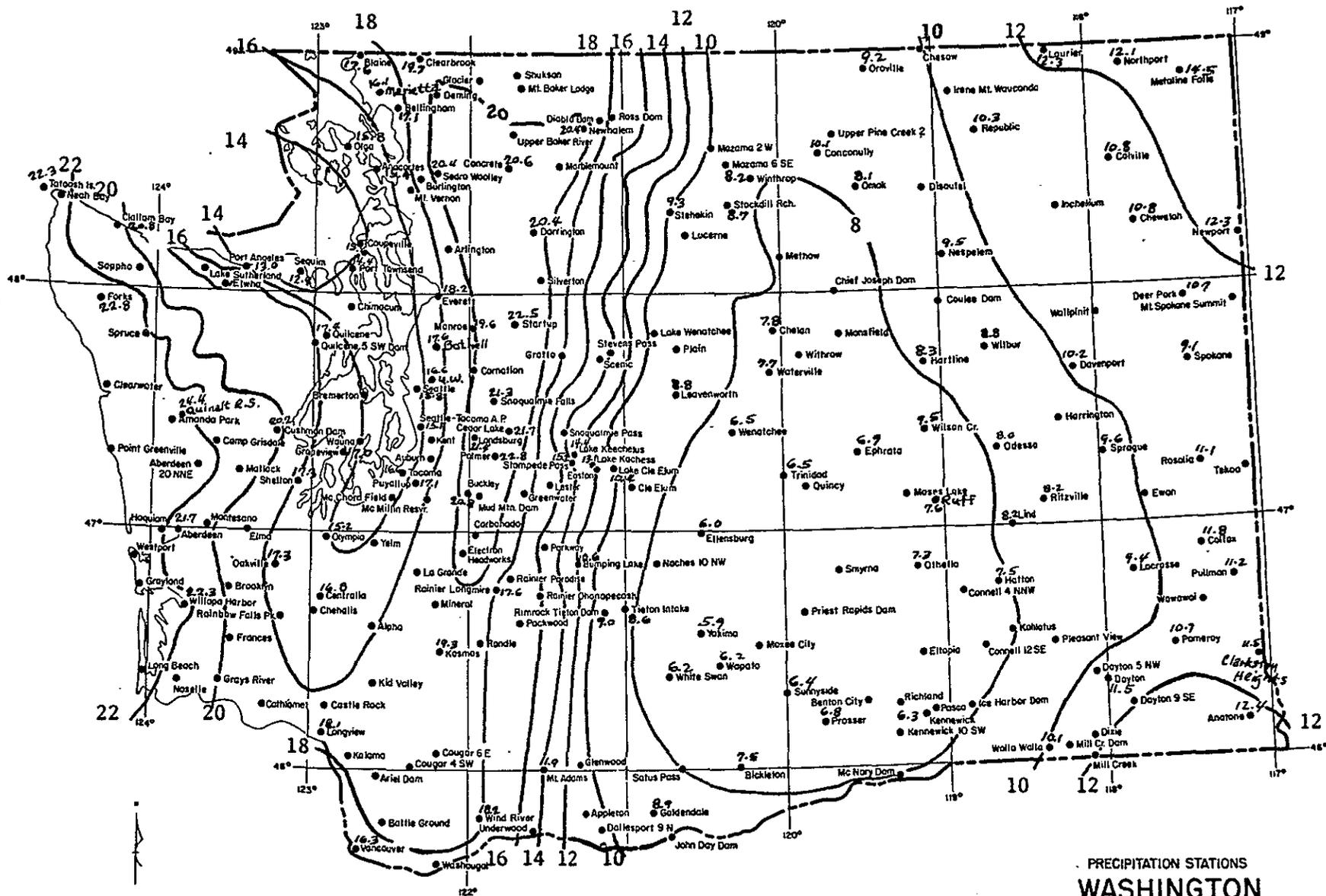
• W. B. Precipitation Stations

PRECIPITATION STATIONS
WASHINGTON
MARCH 1962
SCALE IN MILES
0 10 20 30 40

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Map 4 - MEAN ACTUAL EVAPOTRANSPIRATION, $E_a(2)$, INCHES
Annual

[For 2 inches, available water capacity]



PRECIPITATION STATIONS
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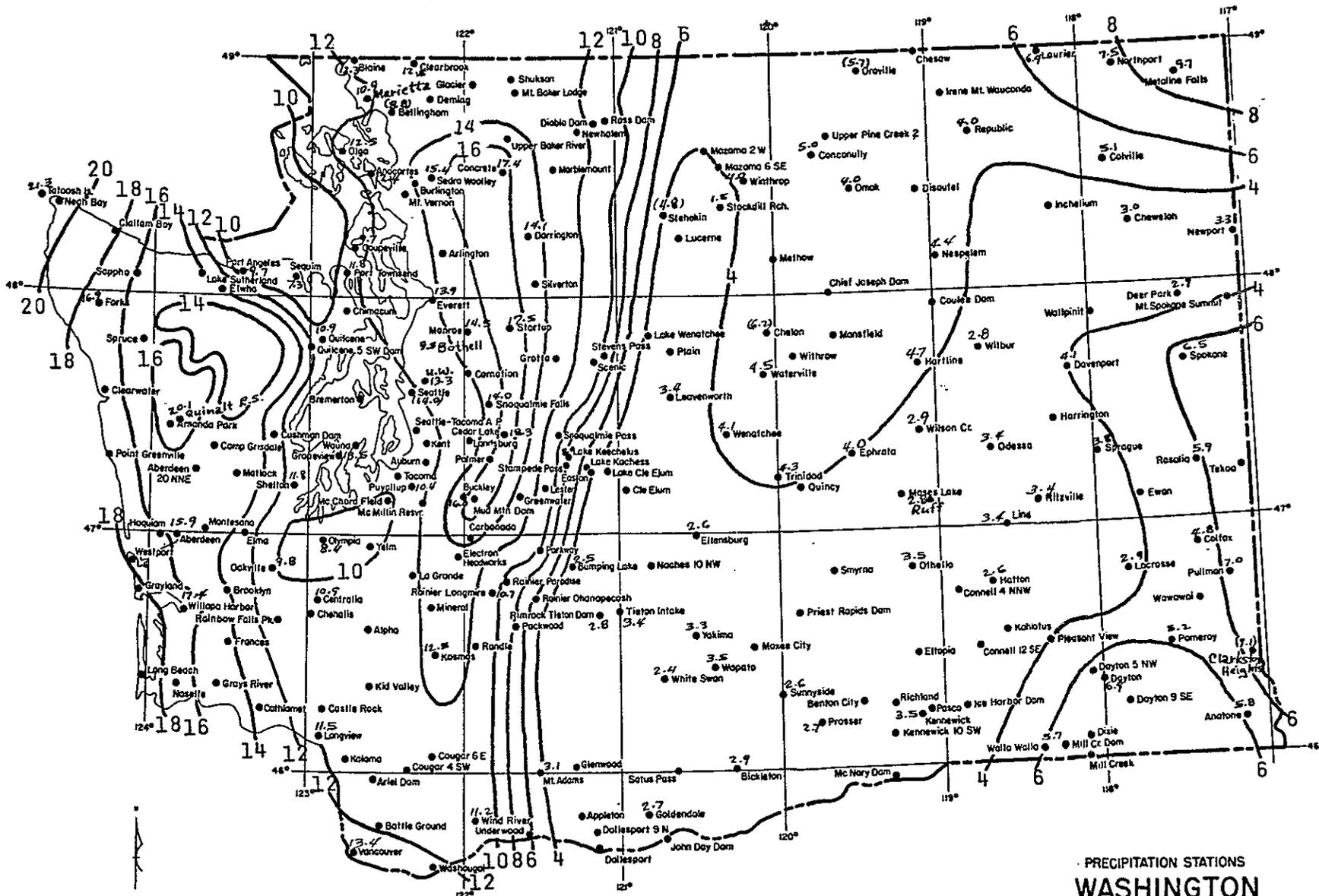
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9 1 1 2 7 5 0 1 5 7 2

Map 5 - MEAN ACTUAL EVAPOTRANSPIRATION, $E_a(2)$, INCHES 32° Growing Season

[For 2 inches, available water capacity]



PRECIPITATION STATIONS
WASHINGTON
 MARCH 1962
 0 10 20 30 40
 SCALE IN MILES

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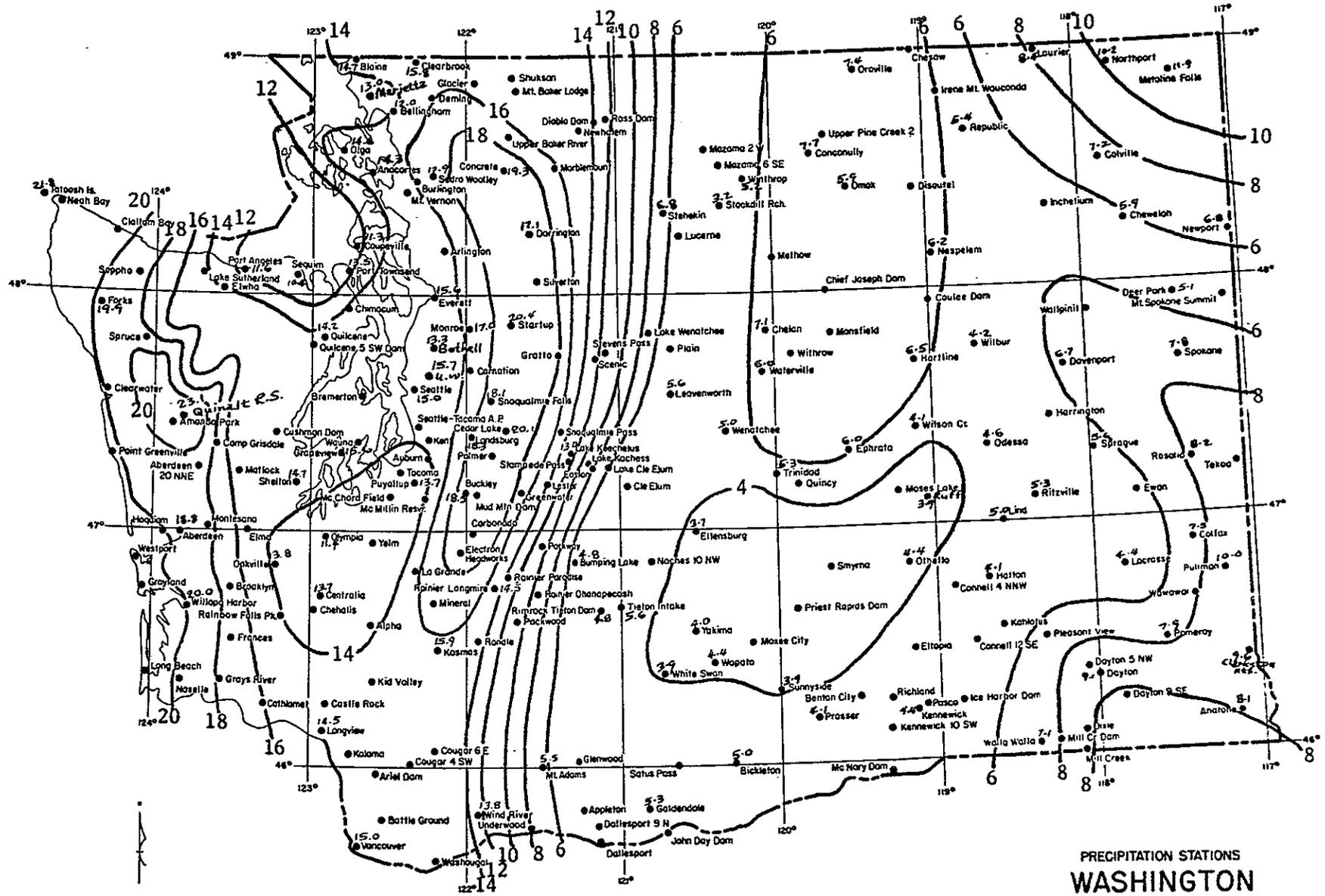
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9 1 1 2 7 5 7 1 5 7 3

Map 6 - MEAN ACTUAL EVAPOTRANSPIRATION, $E_a(2)$, INCHES 28° Growing Season

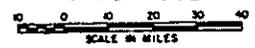
[For 2 inches, available water capacity]



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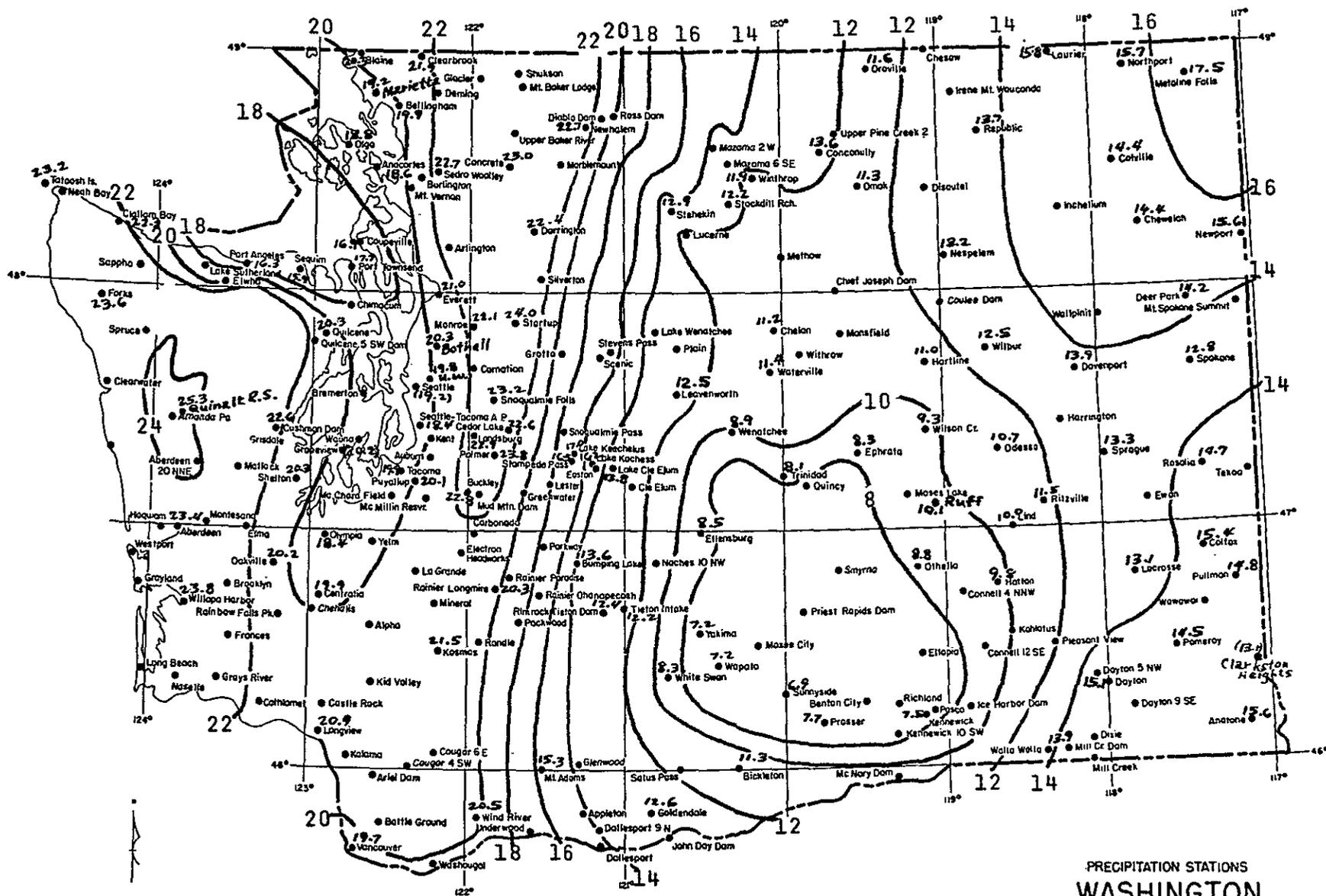


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Map 7 - MEAN ACTUAL EVAPOTRANSPIRATION, $E_a(6)$, INCHES
Annual

[For 6 inches, available water capacity]



PRECIPITATION STATIONS
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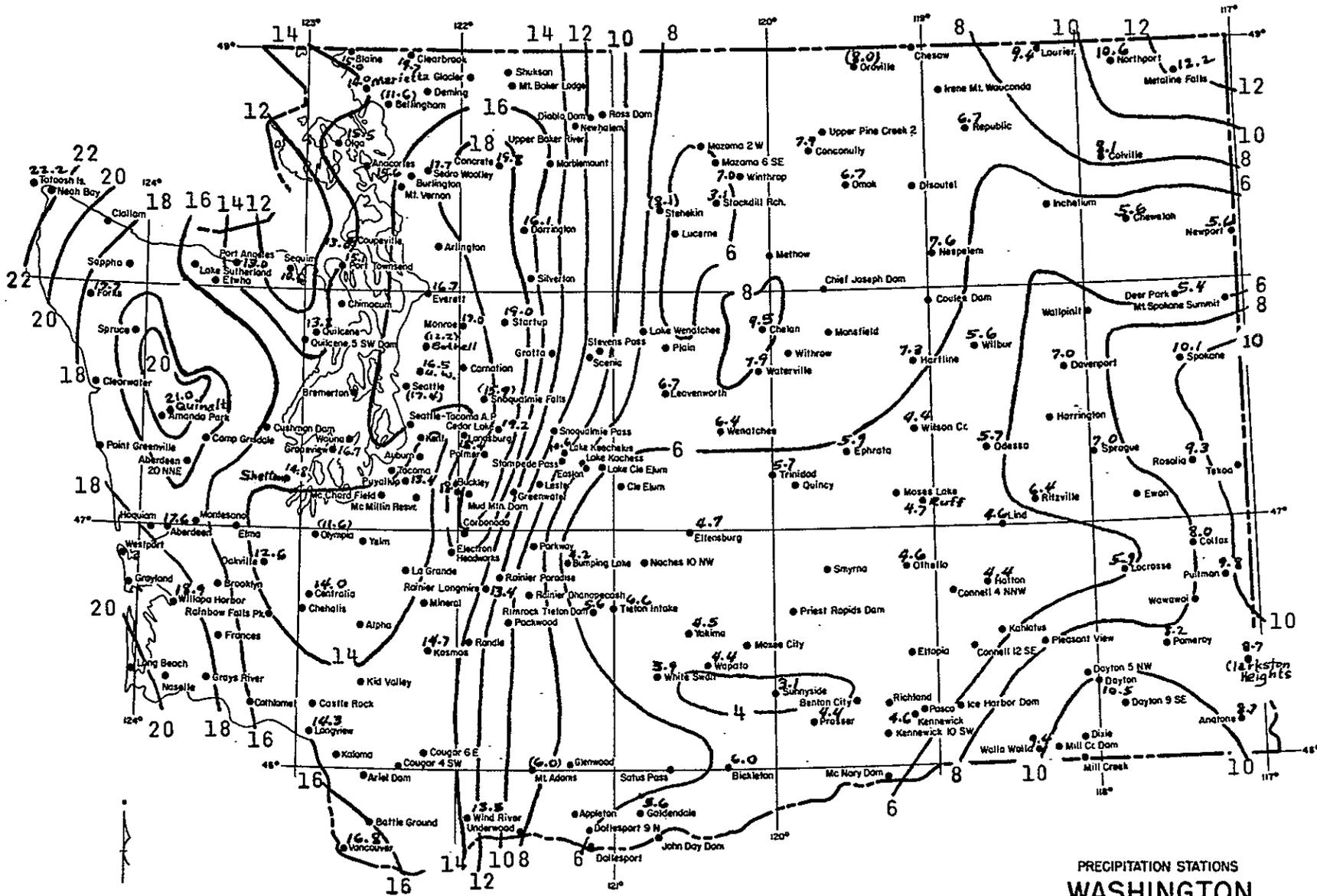


• W. B. Precipitation Stations

9 1 1 2 3 5 7 1 5 7 5

Map 8 - MEAN ACTUAL EVAPOTRANSPIRATION, $E_a(6)$, INCHES 32° Growing Season

[For 6 inches, available water capacity]



PRECIPITATION STATIONS
WASHINGTON

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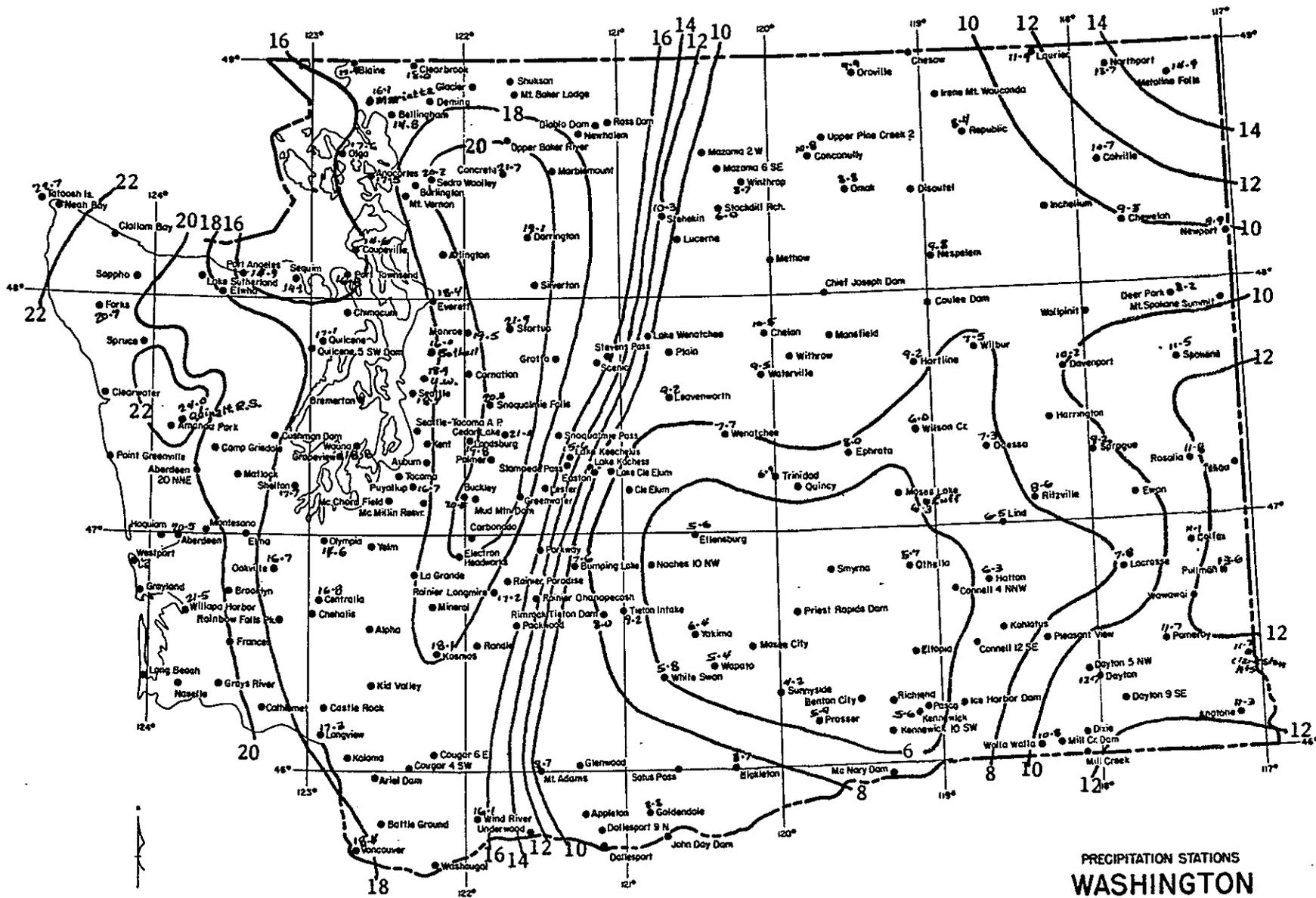


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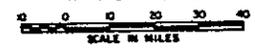
Map 9 - MEAN ACTUAL EVAPOTRANSPIRATION, $E_a(6)$, INCHES
28° Growing Season

[For 6 inches, available water capacity]



PRECIPITATION STATIONS
WASHINGTON

MARCH 1962



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