Name: _____ **Earth Science**
Lab 25: The Local Water Budget **Date: _____**

Introduction: Every region has a local water cycle of income from precipitation, outgo through Evapotranspiration, variations in soil water storage, and runoff.

A local water budget is a mathematical model of the water cycle for a region. It shows how the income, outgo and storage of water vary over the course of an average year. The local water budget may show periods of water DEFICIT, when the total supply is less than the total demand, and it may show SURPLUS, when there is more water available than can be used or stored.

The water budget is a model that is used to analyze the changes that occur within an area. The model is an approximation for a general area and does not always represent specific conditions at all points with the region. This model helps predict when water conservation efforts must be maximized and llamas must be given extra care and watering.

Objective: Given data on precipitation and Evapotranspiration for an area you should be able to calculate a water budget and draw its graph. From this information you will be able to identify climate types, months of water usage, months of water recharge, months of potential flooding, and months when irrigation is desirable.

Vocabulary:

P - _____ **St -** _____

E_p - _____ **E_a -** _____

$P-E_p$ - _____ **D -** _____

ΔSt - _____ **S -** _____

Procedures:

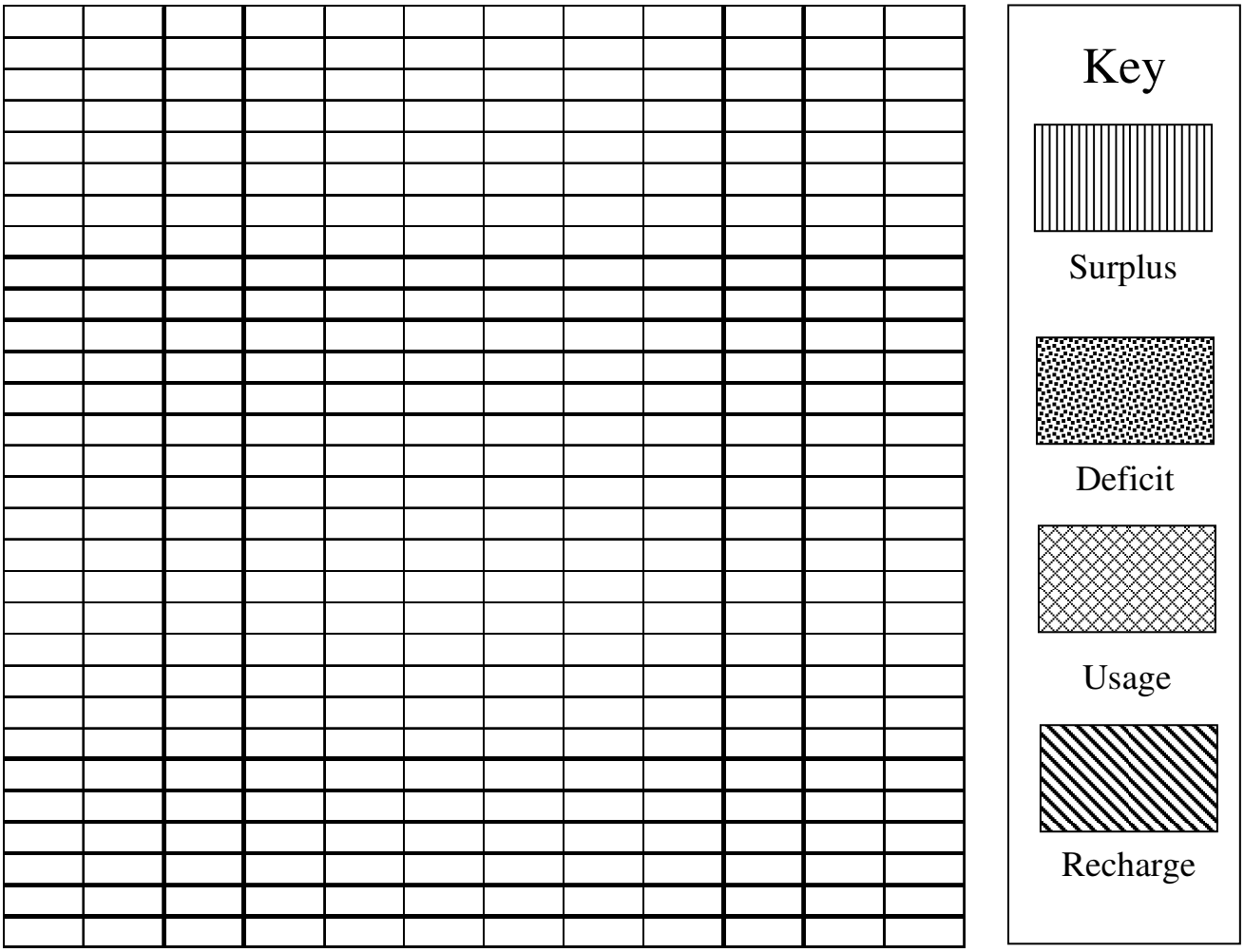
1. Using the Appendix and the information provided by your instructor, compute the water budgets for Syracuse, New York; Alexandria, Louisiana; and El Paso, Texas on the report sheet.

2. After you have computed these water budgets, draw a graph on the grid provided on each report sheet. Include all parts to your graph.

    a. Only data for P, E_p, E_a are to be plotted.
    b. Use a line of different color for each factor.
    c. The areas between the plotted lines show surpluses, deficits, usage, and recharge. Label these areas, and shade them as shown by the key on each report sheet. Note that the size of the area between the lines is a measure of the amount of surplus, deficit, usage, and recharge.

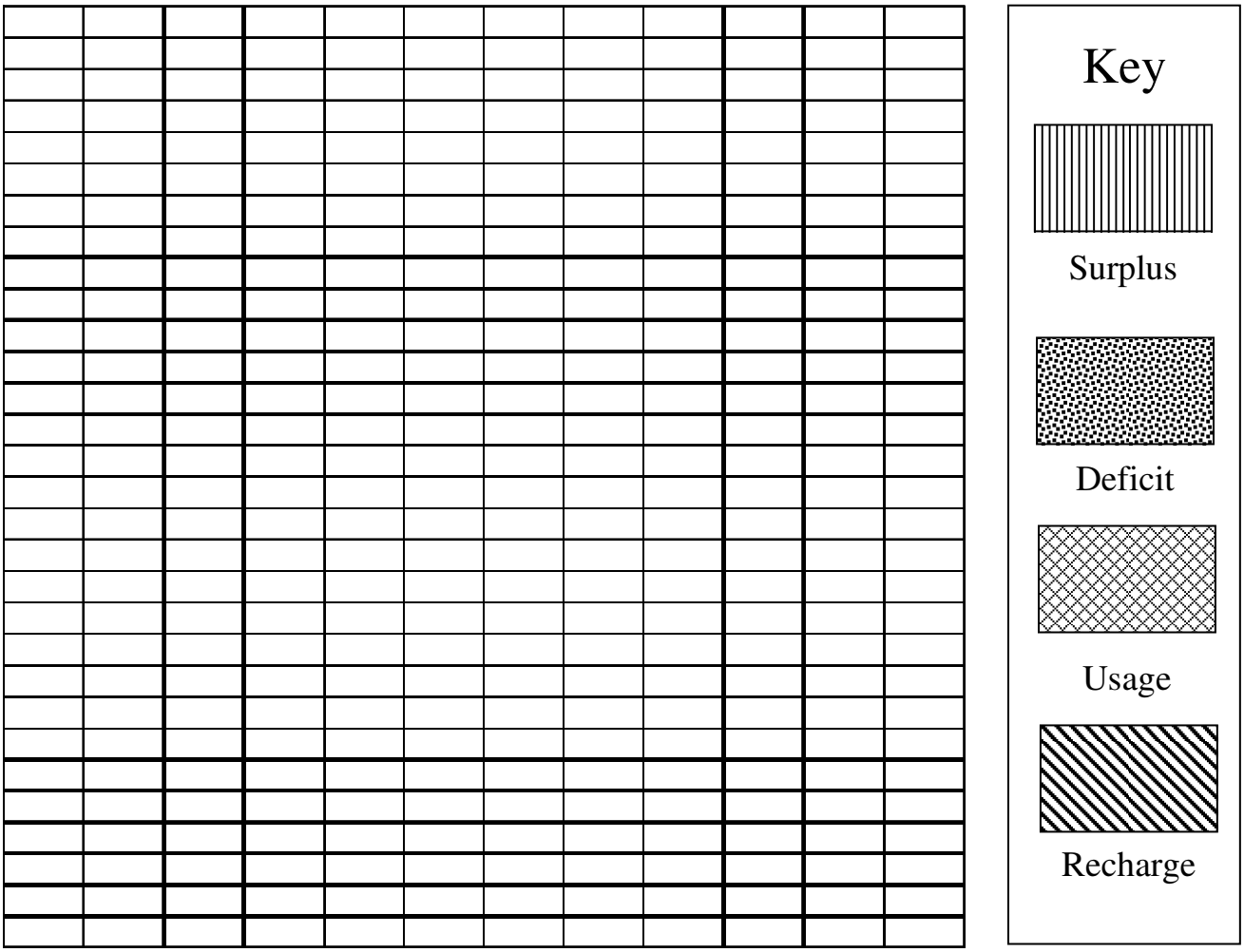
Report Sheet for Syracuse, New York

Month	J	F	M	A	M	J	J	A	S	O	N	D	Totals
P	72	68	81	75	74	87	84	82	72	76	68	72	
E_p	0	0	3	34	83	115	134	122	84	46	15	0	
$P-E_p$													
Ch. St													
St			100										
E_a													
D													
S													



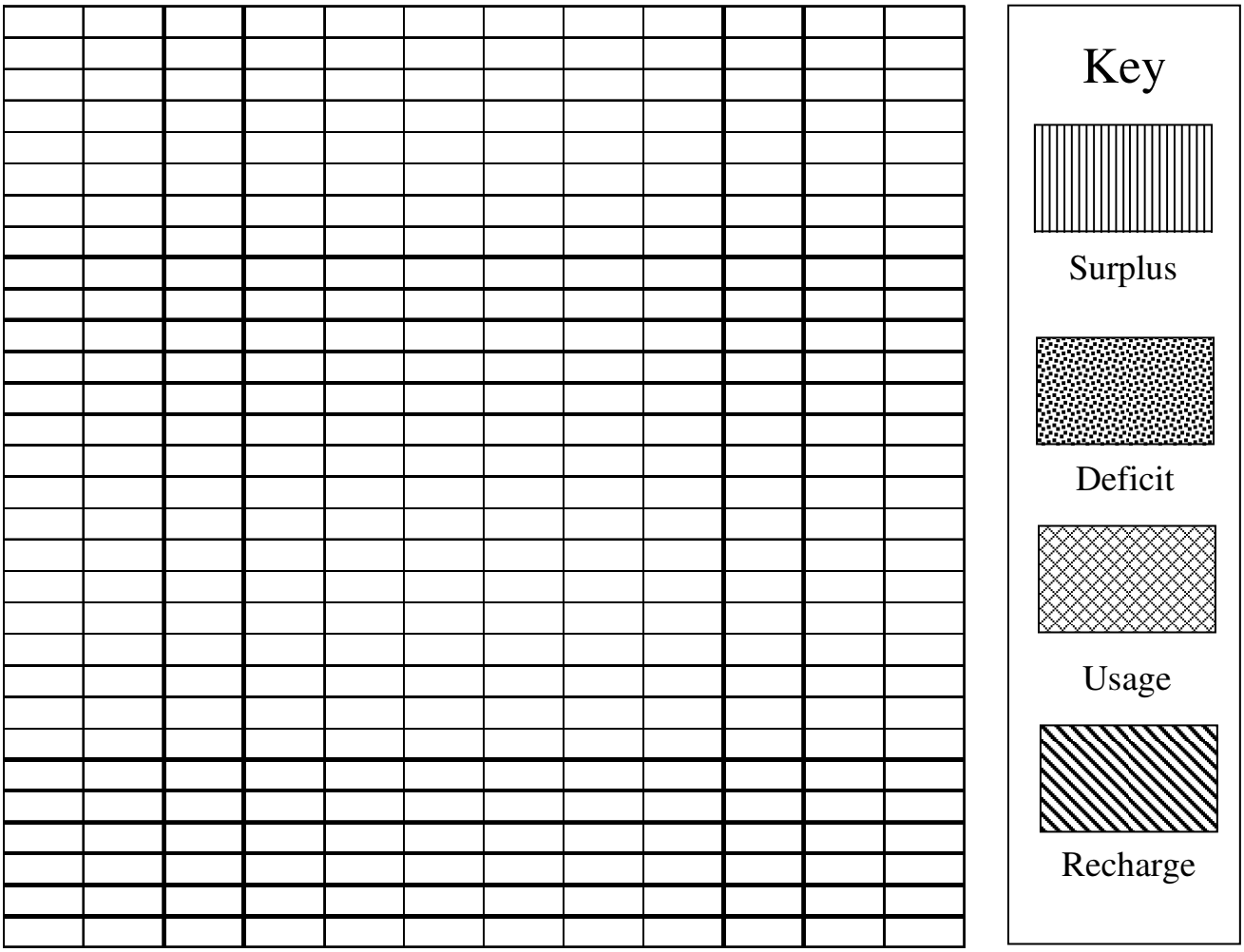
Report Sheet for Alexandria, Louisiana

Month	J	F	M	A	M	J	J	A	S	O	N	D	Totals
P	127	133	142	134	119	115	136	106	73	85	111	152	
E_p	15	18	45	75	122	164	179	170	129	69	31	15	
$P-E_p$													
Ch. St													
St			100										
E_a													
D													
S													



Report Sheet for El Paso, Texas

Month	J	F	M	A	M	J	J	A	S	O	N	D	Totals
P	10	11	8	7	8	18	40	41	33	17	13	12	
E_p	11	18	37	75	117	163	171	152	111	62	24	10	
$P-E_p$													
Ch. St													
St							0						
E_a													
D													
S													



Discussion Questions:

1. What are the two sources of moisture for a water budget? _____

2. What causes the potential evapotranspiration to vary from month to month? _____

   _____

3. When precipitation is less than potential evapotranspiration, what is likely to happen to soil moisture storage? _____

4. When does a moisture deficit exist? _____

5. When precipitation is more than potential evapotranspiration, what will happen to soil moisture storage?

   _____

6. What are the conditions under which surplus may exist? _____

7. Which of the three calculated water budgets is most desert-like? _____

   Explain using your graphs. _____

   _____

8. What causes the El Paso and Alexandria E_p curves to be similar to each other but the Syracuse curve to be different? _____

   _____

9. In which city would a wild herd of llamas most likely be found and why? _____

   _____

10. What would be the effect on the water budget if the ground were frozen during the winter months? _____

    _____

11. How are water budgets helpful for planning the land use of an area? _____

    _____