**Appendix 1. WEAP Lab Exercise Questions**

*WEAP Resources, Installation, and Sample River Basins*

*3.a. How many headflows, reach gains, reservoirs, and aquifers are in the sample model?*

|  |  |
| --- | --- |
| Headflows | 3 |
| Reach Gains | 2 (weaping river) |
| Reservoirs | 2 |
| Aquifers | 2 |

*3.b. What is the data source for feadflows for each river*

|  |  |
| --- | --- |
| Weaping River | .csv |
| Blue River | Monthly time series wizard |
| Green River | Monthly time series wizard |

*3.c. What menu options did you select to view water supplied to a demand site and shortages at a demand site (i.e., the difference between the actual delivery and the delivery target)?*

From the results tab I selected the following in the top drop down:

Demand -> Supply delivered

Demand -> Unmet demand

*The Lower Bear River Basin*

*Model Schematic*

*6.a. What reservoirs, demand sites, and other elements need to be added in WEAP?*

* Demand site Cache Valley New
* 2 transmission lines
* 1 return flow

*Data Entry*

*11.a. What Rivers has headflow data already been specified*

* QX41 - Blacksmith Fork
* QX61 - Malad River
* QX46 - Little Bear River
* QX77 - Weber Surplus

*11.a.2. What headflows need to be added to the WEAP model?*

* QX1 – Bear River

*11.a.3. Why? (not all rivers in the WEAP model will have head flows)*

Because some streams start from return flows that become local or tributary inflows that flow into a river

*12. To which reaches are the gains assigned*

Both are assigned to the Bear River reach

*15. What does a setting of 100% return flow routing mean?*

It indicates that 100% of the demand site outflow will return to the river.

*16.b.1. What type of operation (that you examined in ILO-4) does a buffer coefficient value of 1 represent?*

It represents a SLOP operation. If the buffer coefficient were closer to 0 it would reflect hedging operation.

*16.b.2. What was your reason for entering the Top of Inactive, Buffer, and Conservation Pool?*

The values chosen for these parameters were based on the hedging resulting in ILO-4. Top of Conservation was set up by the given reservoir capacity and flood pool season. The Top of Buffer was set to 15,000 ac-ft as this was the optimal storage solution for shortage costs. The Top of Inactive was set to 2000 ac-ft believing that an outlet level of 5ft above the bottom is reasonable.

*Model Results*

*20.a. Which demand site(s) have unmet demand (i.e., experience shortage(s))?*

Bear River Canal Company, Bird Refuge, Box Elder County MandI, Cache Valley Agriculture, Cache Valley New, New Box Elder County Agriculture, Wasatch Front, Weber Basin Project

*20.b. What is the reliability of annual deliveries to the Bear River Canal Company and*

*New Urban Users in Cache County? What is the reliability of annual deliveries to*

*the stakeholder your group is studying for the group project (if the stakeholder is*

*already included in the Lower Bear River model)?*

Bear River Canal Company: 97.76

Cache Valley New: 89.63

Bear River Migratory Bird Refuge: 77.03

*22.b. What data did you change?*

I changed the monthly demand of Box Elder County MandI, Weber Basin Project, South Cache Existing, and Cache Valley New. This was done by using expression builder and multiplying each series by 0.9.

*22.c.1 What are the answers to questions 20a,b*

*Which demand site(s) have unmet demand (i.e., experience shortage(s))?*

Bear River Canal Company, Bird Refuge, Box Elder County MandI, Cache Valley Agriculture, Cache Valley New, New Box Elder County Agriculture, Wasatch Front, Weber Basin Project

*What is the reliability of annual deliveries to the Bear River Canal Company and*

*New Urban Users in Cache County? What is the reliability of annual deliveries to*

*the stakeholder your group is studying for the group project (if the stakeholder is*

*already included in the Lower Bear River model)?*

Bear River Canal Company: 97.76

Cache Valley New: 78.09

Bear River Migratory Bird Refuge: 77.24

*22.c.2 How do results for this scenario change from the base case scenario?*

*23.1 What data did you change?*

I changed the Above Cutler reservoir capacity to 51,342 ac-ft. I added operation rules as described in question *16.b.2.*

*What are the answers to questions 20a,b above?*

*Which demand site(s) have unmet demand (i.e., experience shortage(s))?*

Bear River Canal Company, Bird Refuge, Box Elder County MandI, Cache Valley Agriculture, Cache Valley New, New Box Elder County Agriculture, Wasatch Front, Weber Basin Project

*What is the reliability of annual deliveries to the Bear River Canal Company and*

*New Urban Users in Cache County? What is the reliability of annual deliveries to*

*the stakeholder your group is studying for the group project (if the stakeholder is*

*already included in the Lower Bear River model)?*

Bear River Canal Company: 97.67

Cache Valley New: 83.54

Bear River Migratory Bird Refuge: 83.74

*24. What changes will you need to make to the WEAP model for the Lower Bear River basin to represent the stakeholder you are studying for your semester group project?*