Responses to Reviewer #2

Point #1

General comment This manuscript used SWAT and RiverWare models to study the impacts of management activities such as reservoir operation and irrigation on streamflow. Human impacts on hydrology are important and interesting, and study of them is also very challenging due to the randomness and uncertainty of human activities. Thus, the study could be a good contribution to this field and the methods are reasonable.

However, there are some issues that need to be addressed.

Response: Thank you for your valuable comments. We have revised the manuscript according to each of the comments.

Point #2

Specific comments 1. L20-21: may not be necessary

Response: We removed this sentence from the Abstract

Point #3

The last paragraph of Introduction

needs to be rephrased. L83-85: you may want to delete this as it is better to see it after you described your results. L81: 'this study aimed to : : :' and 'Objective (1)' are nearly the same, you may want to delete one. L87-90: it is unexpected to see SWAT and RiverWare as the authors did not mention how and what method they used before.

Response: Thank you for the suggestions. We agree with the reviewer that this part is a bit redundant. As a result, we removed the sentence in lines 83-85. We improved the sentence in line 81 to avoid repetition:

In addition, we move the introduction of the SWAT and RiverWare model to Conclusion.

Here is the revised paragraph:

"In recognition of the challenges in modeling hydrology in heavily managed watersheds, this study investigated impacts of water management on streamflow modeling in the YRB. Using the YRB as a testbed, we evaluated streamflow simulations with different model representations of management activities. Objectives of this study are to (1) examine how different representations of reservoir operations influence watershed streamflow simulations, and (2) assess impacts of cropland irrigation on watershed hydrology. Methods and findings derived from this study hold the promise to provide valuable information for improving hydrologic modeling in intensively managed basins across the globe."

Point #4

L209: What are Ens and r? What are R in Figures?

Response: Thank you for the suggestions. Ens and R are Nash–Sutcliffe efficiency coefficient and correlation coefficient, respectively. We introduce these two metrics in the last sentence section 2.3 (line 173-175) as follows:

"We used Nash–Sutcliffe efficiency coefficient (*Ens*) (Nash and Sutcliffe, 1970) and correlation coefficient (*R*) (Legates and McCabe, 1999) as the metrics to evaluate model performance."

Point #5

3.1 and 3.2 are results about sensitivity and performance. They should describe the results with numbers. Similarly, 3.3 and 3.4 lack numbers to support their statement. I would suggest use a few important numbers when necessary.

Response: Thank you for the valuable suggestions, we added more quantitative information about our findings in sections 3.1, 3.2, 3.3, and 3.4. Specifically, we added the T and P values of the selected parameters in the sensitivity analysis.

Table S2 Parameter sensitivity under various scenarios.

Parameters	Description	***T and P* values for parameter sensitivity**[1,2]				
		R0	R1	R2	R2S1	R2S2
SFTMP	Snowfall temperature (°C)	-8.06 (0.00)	-15.08 (0.00)	-12.18 (0.00)	-1.03 (0.31)	-9.32 (0.00)
CN2	Initial SCS runoff curve number for moisture condition	-10.75 (0.00)	-17.76 (0.00)	-15.25 (0.00)	-22.50 (0.00)	-11.22 (0.00)
SMFMX	Maximum melt rate for snow during year (occurs	-4.89 (0.00)	-6.72 (0.00)	-2.54 (0.01)	-0.32 (0.75)	-3.47 (0.00)

	on summer solstice) (mm H_2O/°C/day)					
SMTMP	Snow melt base temperature (°C)	4.28 (0.00)	11.45 (0.00)	7.91 (0.00)	0.76 (0.45)	4.43 (0.00)
CH_N2	Manning's "n" value for the main channel	3.22 (0.00)	1.69 (0.09)	2.70 (0.01)	-0.73 (0.47)	1.16 (0.25)
SMFMN	Minimum melt rate for snow during the year (occurs on winter solstice) (mm H_2O/°C/day)	-1.19 (0.23)	-1.97 (0.05)	-0.10 (0.92)	-0.87 (0.38)	-0.77 (0.44)
SLSUBBSN	Average slope length (m)	5.04 (0.00)	5.54 (0.00)	3.32 (0.00)	8.65 (0.00)	4.85 (0.00)
CH_N1	Manning's "n" value for the tributary channels	-0.18 (0.86)	0.44 (0.66)	0.72 (0.47)	-0.45 (0.65)	-0.06 (0.95)
SOL_K	Saturated hydraulic conductivity (mm/hr)	-2.63 (0.01)	-1.98 (0.05)	-2.49 (0.01)	-8.57 (0.00)	-2.57 (0.01)
GW_REVAP	Groundwater "revap" coefficient	-1.21 (0.23)	-1.19 (0.23)	1.34 (0.18)	1.34 (0.18)	-0.80 (0.43)
CANMX	Maximum canopy storage (mm H_2O)	0.05 (0.96)	-0.31 (0.75)	0.69 (0.49)	-0.06 (0.95)	-0.01 (0.99)
HRU_SLP	Average slope steepness (m/m)	-0.87 (0.38)	-2.17 (0.03)	-0.25 (0.80)	-4.60 (0.00)	-0.46 (0.65)
RES_K	Hydraulic conductivity of the reservoir bottom (mm/hr)	-1.46 (0.14)	2.14 (0.03)	0.11 (0.91)	5.33 (0.00)	0.15 (0.88)
GW_DELAY	Groundwater delay (days)	-1.45 (0.15)	-0.51 (0.61)	0.71 (0.47)	-0.25 (0.81)	-1.60 (0.11)
EVRSV	Lake evaporation coefficient	-0.60 (0.55)	3.36 (0.00)	0.66 (0.51)	1.37 (0.17)	-0.49 (0.63)
TIMP	Snow pack temperature lag factor	-0.02 (0.98)	-0.04 (0.97)	-0.73 (0.46)	-0.06 (0.95)	-0.10 (0.92)
ESCO	Soil evaporation compensation coefficient	-0.11 (0.91)	-1.82 (0.07)	-0.13 (0.90)	-0.95 (0.34)	0.11 (0.91)
GWQMN	Threshold water level in the shallow aquifer for the base flow (mm)	0.26 (0.79)	0.47 (0.64)	-0.82 (0.41)	-0.89 (0.38)	0.02 (0.99)
PLAPS	Precipitation lapse rate (mm H_2O/km)	-0.33 (0.74)	-5.01 (0.00)	-2.70 (0.01)	-2.54 (0.01)	-0.89 (0.38)
OV_N	Manning's "n" value for overland flow	-2.51 (0.01)	0.42 (0.67)	0.44 (0.66)	1.53 (0.13)	-2.11 (0.04)
REVAPMN	Threshold depth of water in the shallow aquifer for "revap" to occur (mm)	0.08 (0.94)	-0.23 (0.81)	0.57 (0.57)	0.56 (0.58)	-0.03 (0.98)

SOL_AWC	Available water capacity of the soil layer (mm H_2O/mm soil)	0.00 (1.00)	-1.89 (0.06)	-0.10 (0.92)	-0.35 (0.72)	0.63 (0.53)
NDTARGR	Number of days to reach target storage from current reservoir storage	-1.27 (0.21)	0.44 (0.66)	1.48 (0.14)	2.48 (0.01)	-0.46 (0.65)
ALPHA_BF	Baseflow alpha factor (1/day)	0.37 (0.71)	-0.47 (0.64)	1.10 (0.27)	1.70 (0.09)	0.59 (0.55)
SOL_Z	Depth from soil surface to the bottom of the layer (mm)	3.89 (0.00)	2.43 (0.01)	2.40 (0.02)	4.75 (0.00)	3.87 (0.00)
TLAPS	Temperature lapse rate (°C/km)	-0.44 (0.66)	8.91 (0.00)	1.25 (0.21)	3.02 (0.00)	0.21 (0.83)
SURLAG	Surface runoff lag coefficient	-0.53 (0.60)	-0.03 (0.98)	0.11 (0.91)	0.18 (0.85)	-1.35 (0.18)
EPCO	Plant uptake compensation factor	1.56 (0.12)	1.34 (0.18)	-2.29 (0.02)	0.66 (0.51)	1.14 (0.25)

[1], Format the T and P values is: T (P)

[2], For *P* values less than 0.01, we use "0.00" in the above table.

In section 3.2, we added a table to summary all evaluation metrics for the four selected subbasins.

Table S1. SWAT performances in the five scenarios during the calibration and validation period

Scenarios \ Metrics		Calibration		validation	
		Ens	*R*	*Ens*	*R*
R0	Site 67	0.204	0.532	-0.480	0.297
	Site 99	0.377	0.620	-0.093	0.452
	Site 160	0.229	0.479	0.013	0.498
	Site 171	0.216	0.469	0.519	0.590
R1	Site 67	0.249	0.501	0.288	0.538
	Site 99	0.281	0.557	0.276	0.543
	Site 160	0.440	0.671	0.245	0.503
	Site 171	0.427	0.666	0.326	0.578
R2	Site 67	0.311	0.560	0.312	0.589
	Site 99	0.298	0.585	0.322	0.575
	Site 160	0.404	0.648	0.246	0.511
	Site 171	0.360	0.653	0.318	0.575
R2S1	Site 67	0.372	0.631	0.221	0.531
	Site 99	0.423	0.664	0.228	0.506
	Site 160	0.282	0.534	0.213	0.512
	Site 171	0.280	0.536	0.291	0.576

R2S2	Site 67	0.094	0.362	-0.451	0.595
	Site 99	0.074	0.388	-0.874	0.429
	Site 160	0.343	0.613	-0.883	0.252
	Site 171	0.364	0.618	-0.148	0.368

Ens and *R* are Nash–Sutcliffe efficiency coefficient and correlation coefficient, respectively

In sections 3.3 and 3.4, we compared averages in water fluxes (ET and streamflow) to show differences among the scenarios.

Point #6

The quality of Figures 6 and 7 can be improved.

Response: We improved the two figures by changing the dashed lines of model simulations to solid lines:

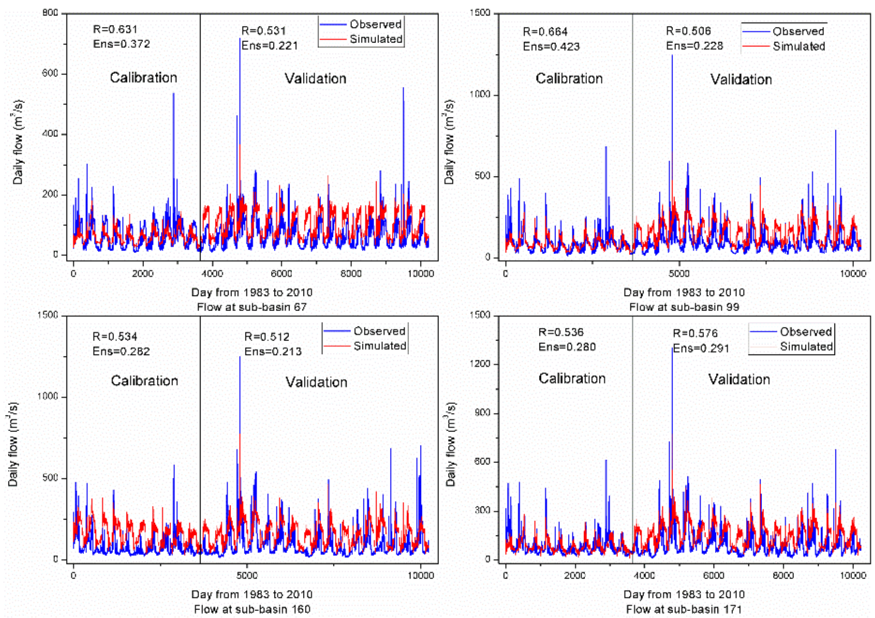

Figure 6

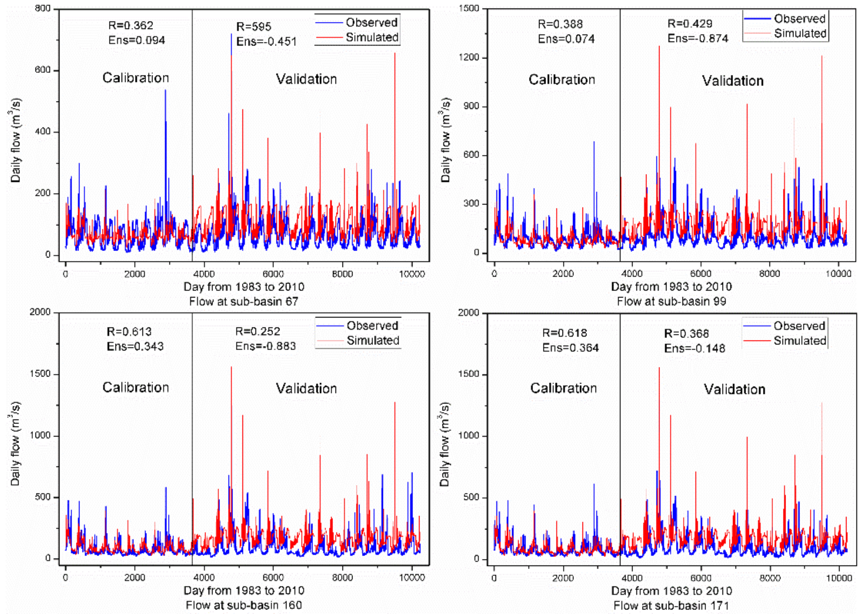

Figure 7

Point #7

There is a grammar issue for Caption of Figure 5.

Response: we improved the caption as follows:

“Figure 5 Monthly and annual ET simulated under reservoir operation only scenarios (R0, R1, and R2). “