

Appendix K

Site-Specific Validation for Watershed Flow Evaluation Tool

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Site Specific Validation for Watershed Flow Evaluation Tool



By: William J. Miller
Miller Ecological Consultants, Inc.
2111 S. College Ave, Unit D
Fort Collins, CO 80525

May 23, 2011

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Introduction

This report documents the comparison of the site specific habitat results with the Watershed Flow Evaluation Tool (WFET) (Wilding and Poff 2008) at several locations in the Colorado River between Kremmling and Dotsero, Colorado. The site specific data was obtained using a Two dimensional habitat model (2D model) applied at three locations (Miller and Swaim 2011).

The river from Kremmling to Dotsero was divided into three river reach, each representing different riverine characteristics. The three reaches were represented by one site in each reach (Table 1).

Table 1. Colorado River Reaches and Sites from Miller and Swaim (2011).

Reach	Site
Blue River confluence to Radium	Pumphouse
Radium to Rancho del Rio	Rancho del Rio
Rancho del Rio to Dotsero	Lyons Gulch

The objective of this validation was to determine if the amount of habitat for trout and warmwater fish were comparable to the risk levels predicted by the WFET.

Methods

The comparison used data from the Weighted Usable Area (WUA) function for adult and juvenile rainbow and brown trout, and adult flannemouth sucker at the sites listed above and hydrology at several locations for several discharge levels. CDM provided the hydrology for each location and risk level (Table 2) from StateMod. The discharges used were the upper value for each risk level. In addition to the comparison at the risk level flows, WUA values for Natural (i.e. undepleted flows) and Current (existing flows with diversions) flows. Figure 1 provides an example of a WUA function. The WFET metrics and the rationale for each metric is provided in Poff and Wilding (2008).

The comparison for trout was completed as follows. The hydrology for each flow level was converted to habitat area using the WUA function for each species and life stage. The habitat area for each specific flow was then compared to the maximum habitat area at the site for the specific species and life stage to calculate the percent of maximum WUA. The value for each percent maximum WUA was compared to the WFET Risk level.

The comparison for flannelmouth sucker was completed using the same approach as for trout. The hydrology for each flow level was converted to habitat area using the WUA function for each species and life stage. The habitat area for each specific flow was then compared to the maximum habitat area at the site for the specific species and life stage to calculate the percent of maximum WUA. The value for each percent maximum WUA was compared to the WFET Risk level. The warmwater fish metric is a biomass estimate for each risk level. The biomass for the medium and low risk levels was compared to the percent maximum WUA.

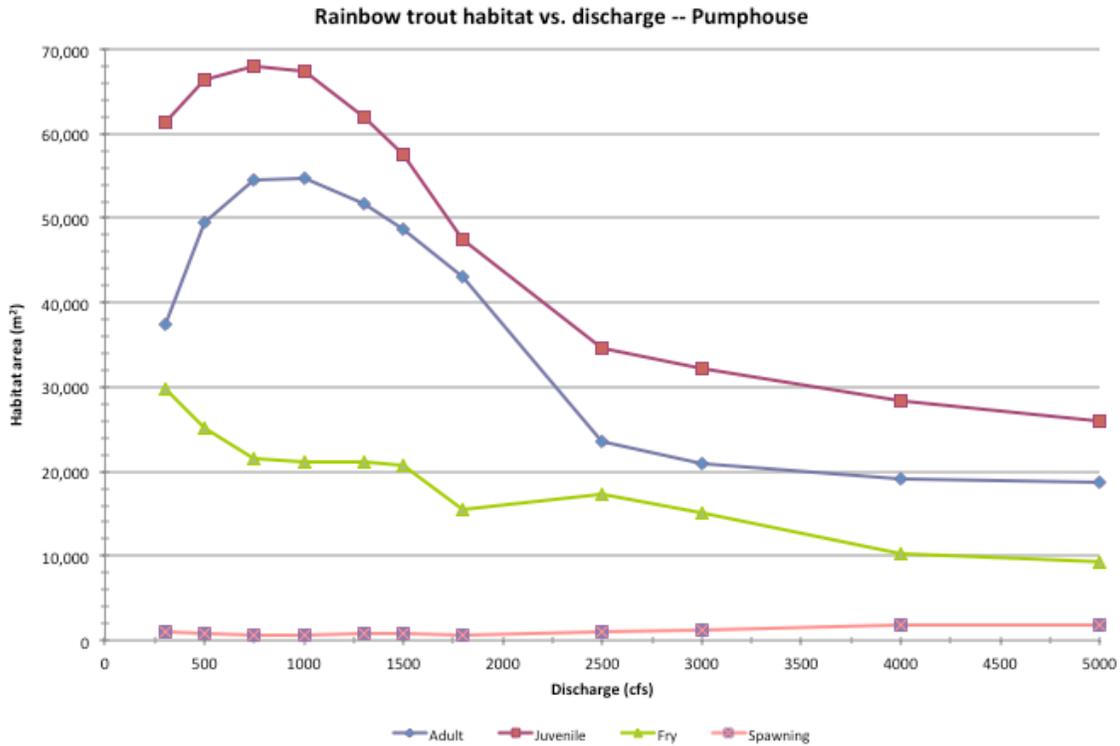


Figure 1. Pumphouse site example – rainbow trout habitat as a function of discharge.

Table 2. Location and description of hydrology node locations.

Locations	Description
09058000	COLO R NR KREMMLING
CONFL_40	CONFLUENCE OF COLORADO RIVER AND SHEEPHORN CREEK
CONFL_45	CONFLUENCE OF COLORADO RIVER AND ROCK CREEK
CONFL_48	CONFLUENCE OF COLORADO RIVER AND DERBY CREEK
CONFL_51	CONFLUENCE OF COLORADO RIVER AND SWEETWATER CREEK
CONFL_61	CONFLUENCE OF COLORADO RIVER AND EAGLE RIVER

Results

There were six hydrology locations of interest for the Colorado River between Kremmling, Colorado and the Eagle River confluence. These hydrology locations were paired with the appropriate 2D Model site (Table 3).

Table 3. Hydrology node location and corresponding 2D Model site.

Hydrology Location	2D Model Site
09058000	Pumphouse
CONFL_40	Rancho del Rio
CONFL_45	Lyons Gulch
CONFL_48	Lyons Gulch
CONFL_51	Lyons Gulch
CONFL_61	Lyons Gulch

Trout

Location 09058000

Current August flows for gage 09058000 is 1144 cfs. The current September flow is 734 cfs. Natural August flow is 1209 cfs and natural September flow is 689 cfs. The moderate risk August flow is 422 cfs and the moderate risk September flow is 253 cfs.

The high risk August flow is 252 cfs and the high risk September flow is 169 cfs (Table 4).

Table 4. Hydrology for trout comparison at gage 09058000.

Hydrology 09058000				
WFET Risk Level	Current August Flow	Current September Flow	Natural August Flow	Natural September Flow
Very Low	1144	734	1209	689
Moderate	422	253		
High	252	169		

The current August and September flows are rated as very low risk by the WFET. The current August and September flows provide 93% or more of the maximum habitat area for adult trout and 81% or more of the maximum habitat area for juvenile trout (Table 5, Table 6). The flows reported as moderate risk by WFET produce 80% and 87% of maximum habitat in August and 57% and 67% of maximum habitat in September for adult rainbow and brown trout. The flows reported as moderate risk by WFET produce 95% and 97% of maximum habitat in August and 76% and 78% of maximum habitat in September for juvenile rainbow and brown trout. The flows reported as high risk by WFET produce 56% and 67% of maximum habitat in August and 38% and 45% of maximum habitat in September for adult rainbow and brown trout. The flows reported as high risk by WFET produce 76% and 78% of maximum habitat in August and 51% and 52% of maximum habitat in September for juvenile rainbow and brown trout.

In general, the WFET risk values are supported by the site specific habitat values. The adult trout values have a better correspondence than the juvenile values.

Table 5. Percent Maximum WUA for rainbow trout compared to gage 00958000.

Percent of Maximum WUA compared to WFET Risk Level at gage 00958000									
Adult rainbow trout					Juvenile Rainbow trout				
WFET Risk Level	Percent at Current August Flow	Percent at Current September Flow	Percent at Natural August Flow	Percent at Natural September Flow	WFET Risk Level	Percent at Current August Flow	Percent at Current September Flow	Percent at Natural August Flow	Percent at Natural September Flow
Very Low	99%	97%	96%	95%	Very Low	95%	100%	93%	99%
Moderate	80%	57%			Mid	95%	76%		
High	56%	38%			High	76%	51%		

Table 6. Percent Maximum WUA for brown trout compared to gage 00958000.

Percent of Maximum WUA compared to WFET Risk Level at gage 00958000									
Adult brown trout					Juvenile brown trout				
WFET Risk Level	Percent at Current August Flow	Percent at Current September Flow	Percent at Natural August Flow	Percent at Natural September Flow	WFET Risk Level	Percent at Current August Flow	Percent at Current September Flow	Percent at Natural August Flow	Percent at Natural September Flow
Very Low	93%	99%	91%	98%	Very Low	81%	99%	78%	99%
Moderate	87%	67%			Mid	97%	78%		
High	67%	45%			High	78%	52%		

Location Confl_40

Current August flows for Confl_40 is 1204 cfs. The current September flow is 744 cfs. Natural August flow is 1215 cfs and natural September flow is 695 cfs. The moderate risk August flow is 427 cfs and the moderate risk September flow is 256 cfs. The high risk August flow is 255 cfs and the high risk September flow is 171 cfs (Table 7).

Table 7. Hydrology for trout comparison at Confl_40.

Hydrology Confl_40				
WFET Risk Level	Current August Flow	Current September Flow	Natural August Flow	Natural September Flow
Very Low	1202	744	1215	695
Moderate	427	256		
High	255	171		

The current August and September flows are rated as very low risk by the WFET. The current August and September flows provide 85% or more of the maximum habitat area for adult trout and 96% or more of the maximum habitat area for juvenile trout (Table 8, Table 9). The flows reported as moderate risk by WFET produce 71% and 82% of maximum habitat in August and 52% and 63% of maximum habitat in September for adult rainbow and brown trout. The flows reported as moderate risk by WFET produce 90% and 98% of maximum habitat in August and 73% and 80% of maximum habitat in September for juvenile rainbow and brown trout. The flows reported as high risk by WFET produce 52% and 63% of maximum habitat in August and 35% and 42% of maximum habitat in September for adult rainbow and brown trout. The flows reported as high risk by WFET produce 73% and 80% of maximum habitat in August and 49% and 53% of maximum habitat in September for juvenile rainbow and brown trout.

In general, the WFET risk values are supported by the adult site specific habitat values. The juvenile risk values for September correspond better than the August values.

Table 8. Percent Maximum WUA for rainbow trout compared to Confl_40.

Percent of Maximum WUA compared to WFET Risk Level at Confl_40									
Adult rainbow trout					Juvenile Rainbow trout				
WFET Risk Level	Percent at Current August Flow	Percent at Current September Flow	Percent at Natural August Flow	Percent at Natural September Flow	WFET Risk Level	Percent at Current August Flow	Percent at Current September Flow	Percent at Natural August Flow	Percent at Natural September Flow
Very Low	99%	92%	99%	89%	Very Low	99%	96%	99%	95%
Moderate	71%	52%			Mid	90%	73%		
High	52%	35%			High	73%	49%		

Table 9. Percent Maximum WUA for brown trout compared to Confl_40.

Percent of Maximum WUA compared to WFET Risk Level at Confl_40									
Adult brown trout					Juvenile brown trout				
WFET Risk Level	Percent at Current August Flow	Percent at Current September Flow	Percent at Natural August Flow	Percent at Natural September Flow	WFET Risk Level	Percent at Current August Flow	Percent at Current September Flow	Percent at Natural August Flow	Percent at Natural September Flow
Very Low	85%	89%	85%	88%	Very Low	96%	98%	96%	99%
Moderate	82%	63%			Mid	98%	80%		
High	63%	42%			High	80%	53%		

Location Confl_45

Current August flows for Confl_45 is 1110 cfs. The current September flow is 714 cfs. Natural August flow is 1243 cfs and natural September flow is 717 cfs. The moderate risk August flow is 440 cfs and the moderate risk September flow is 264 cfs. The high risk August flow is 263 cfs and the high risk September flow is 176 cfs (Table 10).

Table 10. Hydrology for trout comparison at Confl_45

Hydrology Confl_45				
WFET Risk Level	Current August Flow	Current September Flow	Natural August Flow	Natural September Flow
Low	1110	714	1243	717
Moderate	440	264		
High	263	176		

The current August and September flows are rated as low risk by the WFET. The current August and September flows provide 94% or more of the maximum habitat area for adult trout and 97% or more of the maximum habitat area for juvenile trout (Table 11, Table 12). The flows reported as moderate risk by WFET produce 82% and 72% of maximum habitat in August and 60% and 50% of maximum habitat in September for adult rainbow and brown trout. The flows reported as moderate risk by WFET produce 97% and 97% of maximum habitat in August and 79% and 79% of maximum habitat in September for juvenile rainbow and brown trout. The flows reported as high risk by WFET produce 60% and 50% of maximum habitat in August and 40% and 34% of maximum habitat in September for adult rainbow and brown trout. The flows reported as high risk by WFET produce 79% and 78% of maximum habitat in August and 53% and 52% of maximum habitat in September for juvenile rainbow and brown trout.

In general, the WFET risk values are supported by the site specific habitat values. The adult trout values have a better correspondence than the juvenile values. The September values for juveniles correspond better than the August values.

Table 11. Percent Maximum WUA for rainbow trout compared to Confl_45.

Percent of Maximum WUA compared to WFET Risk Level at Confl_45									
Adult rainbow trout					Juvenile Rainbow trout				
WFET Risk Level	Percent at Current August Flow	Percent at Current September Flow	Percent at Natural August Flow	Percent at Natural September Flow	WFET Risk Level	Percent at Current August Flow	Percent at Current September Flow	Percent at Natural August Flow	Percent at Natural September Flow
Low	99%	97%	92%	97%	Very Low	99%	99%	93%	99%
Moderate	82%	60%			Mid	97%	79%		
High	60%	40%			High	79%	53%		

Table 12. Percent Maximum WUA for brown trout compared to Confl_45.

Percent of Maximum WUA compared to WFET Risk Level at Confl_45									
Adult brown trout					Juvenile brown trout				
WFET Risk Level	Percent at Current August Flow	Percent at Current September Flow	Percent at Natural August Flow	Percent at Natural September Flow	WFET Risk Level	Percent at Current August Flow	Percent at Current September Flow	Percent at Natural August Flow	Percent at Natural September Flow
Low	99%	94%	93%	94%	Very Low	97%	99%	92%	99%
Moderate	72%	50%			Mid	97%	79%		
High	50%	34%			High	78%	52%		

Location Confl_48

Current August flows for Confl_48 is 1213 cfs. The current September flow is 798 cfs. Natural August flow is 1364 cfs and natural September flow is 818 cfs. The moderate risk August flow is 481 cfs and the moderate September flow is 288 cfs. The high risk August flow is 287 cfs and the high September flow is 192 cfs (Table 13).

Table 13. Hydrology for trout comparison at Confl_48.

Hydrology Confl_48				
WFET Risk Level	Current August Flow	Current September Flow	Natural August Flow	Natural September Flow
Low	1213	798	1364	818
Moderate	481	288		
High	287	192		

The current August and September flows are rated as low risk by the WFET. The current August and September flows provide 94% or more of the maximum habitat area for adult trout and 93% or more of the maximum habitat area for juvenile trout (Table 14, Table 15). The flows reported as moderate risk by WFET produce 86% and 76% of maximum habitat in August and 66% and 55% of maximum habitat in September for adult rainbow and brown trout. The flows reported as moderate risk by WFET produce 99% and 99% of maximum habitat in August and 87% and 86% of maximum habitat in September for juvenile rainbow and brown trout. The flows reported as high risk by WFET produce 65% and 55% of maximum habitat in August and 44% and 37% of maximum habitat in September for adult rainbow and brown trout. The flows reported as high risk by WFET produce 86% and 86% of maximum habitat in August and 58% and 57% of maximum habitat in September for juvenile rainbow and brown trout.

In general, the WFET risk values are supported by the site specific habitat values. The adult trout values have a better correspondence than the juvenile values. The trout WFET risk levels do not reflect the changes in habitat predicted by the site specific study.

Table 14. Percent Maximum WUA for rainbow trout compared to Confl_48.

Percent of Maximum WUA compared to WFET Risk Level at Confl_48									
Adult rainbow trout					Juvenile Rainbow trout				
WFET Risk Level	Percent at Current August Flow	Percent at Current September Flow	Percent at Natural August Flow	Percent at Natural September Flow	WFET Risk Level	Percent at Current August Flow	Percent at Current September Flow	Percent at Natural August Flow	Percent at Natural September Flow
Low	94%	98%	87%	99%	Very Low	94%	99%	89%	99%
Moderate	86%	66%			Mid	99%	87%		
High	65%	44%			High	86%	58%		

Table 15. Percent Maximum WUA for brown trout compared to Confl_48.

Percent of Maximum WUA compared to WFET Risk Level at Confl_48									
Adult brown trout					Juvenile brown trout				
WFET Risk Level	Percent at Current August Flow	Percent at Current September Flow	Percent at Natural August Flow	Percent at Natural September Flow	WFET Risk Level	Percent at Current August Flow	Percent at Current September Flow	Percent at Natural August Flow	Percent at Natural September Flow
Low	94%	97%	90%	97%	Very Low	93%	99%	89%	99%
Moderate	76%	55%			Mid	99%	86%		
High	55%	37%			High	86%	57%		

Location Confl_51

Current August flows for Confl_51 is 1200 cfs. The current September flow is 789 cfs. Natural August flow is 1371 cfs and natural September flow is 825 cfs. The moderate risk August flow is 487 cfs and the moderate risk September flow is 292 cfs. The high risk August flow is 291 cfs and the high risk September flow is 195 cfs (Table 16).

Table 16. Hydrology for trout comparison at Confl_51.

Hydrology Confl_51				
WFET Risk Level	Current August Flow	Current September Flow	Natural August Flow	Natural September Flow
Low	1200	789	1371	825
Moderate	487	292		
High	291	195		

The current August and September flows are rated as low risk by the WFET. The current August and September flows provide 94% or more of the maximum habitat area for adult trout and 94% or more of the maximum habitat area for juvenile trout (Table 17, Table 18). The flows reported as moderate risk by WFET produce 87% and 77% of maximum habitat in August and 67% and 56% of maximum habitat in September for adult rainbow and brown trout. The flows reported as moderate risk by WFET produce 99% and 99% of maximum habitat in August and 88% and 87% of maximum habitat in September for juvenile rainbow and brown trout. The flows reported as high risk by WFET produce 66% and 55% of maximum habitat in August and 44% and 37% of maximum habitat in September for adult rainbow and brown trout. The flows reported as high risk by WFET produce 87% and 87% of maximum habitat in August and 59% and 58% of maximum habitat in September for juvenile rainbow and brown trout.

In general, the WFET risk values are supported by the site specific habitat values. The adult trout values have a better correspondence than the juvenile values. The trout WFET risk levels do not reflect the changes in habitat predicted by the site specific study.

Table 17. Percent Maximum WUA for rainbow trout compared to Confl_51.

Percent of Maximum WUA compared to WFET Risk Level at Confl_51									
Adult rainbow trout					Juvenile Rainbow trout				
WFET Risk Level	Percent at Current August Flow	Percent at Current September Flow	Percent at Natural August Flow	Percent at Natural September Flow	WFET Risk Level	Percent at Current August Flow	Percent at Current September Flow	Percent at Natural August Flow	Percent at Natural September Flow
Low	94%	98%	87%	99%	Very Low	95%	99%	89%	99%
Moderate	87%	67%			Mid	99%	88%		
High	66%	44%			High	87%	59%		

Table 18. Percent Maximum WUA for brown trout compared to Confl_51.

Percent of Maximum WUA compared to WFET Risk Level at Confl_51									
Adult brown trout					Juvenile brown trout				
WFET Risk Level	Percent at Current August Flow	Percent at Current September Flow	Percent at Natural August Flow	Percent at Natural September Flow	WFET Risk Level	Percent at Current August Flow	Percent at Current September Flow	Percent at Natural August Flow	Percent at Natural September Flow
Low	95%	97%	90%	97%	Very Low	94%	99%	89%	98%
Moderate	77%	56%			Mid	99%	87%		
High	55%	37%			High	87%	58%		

Location Confl_61

Current August flows for Confl_61 is 1563 cfs. The current September flow is 1040 cfs. Natural August flow is 1864 cfs and natural September flow is 1148 cfs. The moderate risk August flow is 649 cfs and the moderate risk September flow is 390 cfs. The high risk August flow is 389 cfs and the high risk September flow is 260 cfs (Table 19).

Table 19. Hydrology for trout comparison at Confl_61.

Hydrology Confl_61				
WFET Risk Level	Current August Flow	Current September Flow	Natural August Flow	Natural September Flow
Low	1563	1040	1864	1,148
Moderate	649	390		
High	389	260		

The current August and September flows are rated as low risk by the WFET. The current August and September flows provide 77% or more of the maximum habitat area for adult trout and 83% or more of the maximum habitat area for juvenile trout (Table 20, Table 21). The flows reported as moderate risk by WFET produce 94% and 89% of maximum habitat in August and 77% and 67% of maximum habitat in September for adult rainbow and brown trout. The flows reported as moderate risk by WFET produce 99% and 99% of maximum habitat in August and 94% and 94% of maximum habitat in September for juvenile rainbow and brown trout. The flows reported as high risk by WFET produce 77% and 67% of maximum habitat in August and 59% and 50% of maximum habitat in September for adult rainbow and brown trout. The flows reported as high risk by WFET produce 94% and 94% of maximum habitat in August and 78% and 77% of maximum habitat in September for juvenile rainbow and brown trout.

The WFET risk values for adult trout in September are supported by the site specific habitat values. The August values do not correspond well with the WFET ratings. The trout WFET risk levels do not reflect the changes in juvenile trout habitat predicted by the site specific study.

Table 20. Percent Maximum WUA for rainbow trout compared to Confl_61.

Percent of Maximum WUA compared to WFET Risk Level at Confl_61									
Adult rainbow trout					Juvenile Rainbow trout				
WFET Risk Level	Percent at Current August Flow	Percent at Current September Flow	Percent at Natural August Flow	Percent at Natural September Flow	WFET Risk Level	Percent at Current August Flow	Percent at Current September Flow	Percent at Natural August Flow	Percent at Natural September Flow
Low	77%	94%	75%	97%	Very Low	83%	96%	78%	97%
Moderate	94%	77%			Mid	99%	94%		
High	77%	59%			High	94%	78%		

Table 21. Percent Maximum WUA for brown trout compared to Confl_61.

Percent of Maximum WUA compared to WFET Risk Level at Confl_61									
Adult brown trout					Juvenile brown trout				
WFET Risk Level	Percent at Current August Flow	Percent at Current September Flow	Percent at Natural August Flow	Percent at Natural September Flow	WFET Risk Level	Percent at Current August Flow	Percent at Current September Flow	Percent at Natural August Flow	Percent at Natural September Flow
Low	84%	92%	81%	97%	Very Low	84%	96%	74%	95%
Moderate	89%	67%			Mid	99%	94%		
High	67%	50%			High	94%	77%		

Warmwater

Location Confl_40

Current 30-day minimum flow for Confl_40 is 534 cfs. The natural 30-day minimum flow is 400 cfs. The moderate risk flow is 154 cfs. The high risk flow is 40 cfs (Table 22).

Table 22. Hydrology for warmwater comparison at Confl_40.

Hydrology Confl_40		
WFET Risk Level	30-Day Minimum Flow Current	30 Day Minimum Flow Natural
Low	534	400
Moderate	154	
High	40	

The WFET rates the current 30-day minimum flow risk value as low. The current 30-day minimum flow provides 63% of the maximum habitat area. The WFET moderate risk flow provides 19% of the maximum habitat area. The WFET high risk 30-day minimum flow provides 5% of the maximum habitat area (Table 23).

The WFET ratings correspond with the habitat predicted by the site specific model. The percent biomass reduction based on the WFET also corresponds with the site specific model.

Table 23. Percent maximum WUA for flannemouth sucker at Confl_40.

Location Confl_45

Current 30-day minimum flow for Confl_45 is 533 cfs. The natural 30-day minimum flow is 417 cfs. The moderate risk flow is 161 cfs. The high risk flow is 42 cfs (Table 24).

Table 24. Hydrology for warmwater comparison at Confl_45.

Hydrology Confl_45		
WFET Risk Level	30-Day Minimum Flow Current	30 Day Minimum Flow Natural
Low	533	417
Moderate	161	
High	42	

The WFET rates the current 30-day minimum flow risk value as low. The current 30-day minimum flow provides 71% of the maximum habitat area. The WFET moderate risk flow provides 22% of the maximum habitat area. The WFET high risk 30-day minimum flow provides 6% of the maximum habitat area (Table 25).

The trend for the WFET rating corresponds with the habitat trend predicted by the site specific model. The percent biomass reduction based on the WFET also corresponds with the site specific model.

Table 25. Percent maximum WUA for flannelmouth sucker at Confl_45.

Percent of Maximum WUA compared to WFET Risk Level at Confl_45						
Adult flannelmouth sucker						
WFET Risk Level	Percent at 30-Day Minimum Flow Current	Percent at 30 Day Minimum Flow Natural	Biomass Current	Biomass Natural	% Reduction in Biomas	% Reduction from Maximum WUA
Very Low	70%	56%	68%	63%	9%	-30%
Mid	22%		47%	63%	-25%	-78%
High	6%		31%	63%	-50%	-94%

Location Confl_48

Current 30-day minimum flow for Confl_48 is 604 cfs. The natural 30-day minimum flow is 484 cfs. The moderate risk flow is 187 cfs. The high risk flow is 49 cfs (Table 26).

Table 26. Hydrology for warmwater comparison at Confl_48.

Hydrology Confl_48		
WFET Risk Level	30-Day Minimum Flow Current	30 Day Minimum Flow Natural
Low	604	484
Moderate	187	
High	49	

The WFET rates the current 30-day minimum flow risk value as low. The current 30-day minimum flow provides 77% of the maximum habitat area. The WFET moderate risk flow provides 26% of the maximum habitat area. The WFET high risk 30-day minimum flow provides 7% of the maximum habitat area (Table 27).

The trend for the WFET ratings correspond with the habitat trend predicted by the site specific model. The percent biomass reduction based on the WFET also corresponds with the site specific model.

Table 27. Percent maximum WUA for flannelmouth sucker at Confl_48.

Percent of Maximum WUA compared to WFET Risk Level at Confl_48						
Adult flannelmouth sucker						
WFET Risk Level	Percent at 30-Day Minimum Flow Current	Percent at 30 Day Minimum Flow Natural	Biomass Current	Biomass Natural	% Reduction in Biomas	% Reduction from Maximum WUA
Very Low	75%	65%	68%	63%	9%	-25%
Mid	26%		47%	63%	-25%	-74%
High	7%		31%	63%	-50%	-93%

Location Confl_51

Current 30-day minimum flow for Confl_51 is 599 cfs. The natural 30-day minimum flow is 489 cfs. The moderate risk flow is 189 cfs. The high risk flow is 49 cfs (Table 28).

Table 28. Hydrology for warmwater comparison at Confl_51.

Hydrology Confl_51		
WFET Risk Level	30-Day Minimum Flow Current	30 Day Minimum Flow Natural
Low	599	489
Moderate	189	
High	49	

The WFET rates the current 30-day minimum flow risk value as low. The current 30-day minimum flow provides 77% of the maximum habitat area. The WFET moderate risk flow provides 26% of the maximum habitat area. The WFET high risk 30-day minimum flow provides 7% of the maximum habitat area (Table 29).

The trend for the WFET rating corresponds with the habitat trend predicted by the site specific model. The percent biomass reduction based on the WFET also corresponds with the site specific model.

Table 29. Percent maximum WUA for flannelmouth sucker at Confl_51.

Percent of Maximum WUA compared to WFET Risk Level at Confl_51						
Adult flannelmouth sucker						
WFET Risk Level	Percent at 30-Day Minimum Flow Current	Percent at 30 Day Minimum Flow Natural	Biomass Current	Biomass Natural	% Reduction in Biomas	% Reduction from Maximum WUA
Very Low	75%	66%	68%	63%	9%	-25%
Mid	26%		47%	63%	-25%	-74%
High	7%		31%	63%	-50%	-93%

Location Confl_61

Current 30-day minimum flow for Confl_61 is 830 cfs. The natural 30-day minimum flow is 692 cfs. The moderate risk flow is 267 cfs. The high risk flow is 70 cfs (Table 30).

Table 30. Hydrology for warmwater comparison at Confl_61.

Hydrology Confl_61		
WFET Risk Level	30-Day Minimum Flow Current	30 Day Minimum Flow Natural
Low	830	692
Moderate	267	
High	70	

The WFET rates the current 30-day minimum flow risk value as low. The current 30-day minimum flow provides 92% of the maximum habitat area. The WFET moderate risk flow provides 37% of the maximum habitat area. The WFET high risk 30-day minimum flow provides 10% of the maximum habitat area (Table 31).

The trend for the WFET rating corresponds with the habitat trend predicted by the site specific model. The percent biomass reduction based on the WFET also corresponds with the site specific model.

Table 31. Percent maximum WUA for flannelmouth sucker at Confl_61.

Percent of Maximum WUA compared to WFET Risk Level at Confl_61						
Adult flannelmouth sucker						
WFET Risk Level	Percent at 30-Day Minimum Flow Current	Percent at 30 Day Minimum Flow Natural	Biomass Current	Biomass Natural	% Reduction in Biomas	% Reduction from Maximum WUA
Very Low	90%	82%	68%	63%	9%	-10%
Mid	36%		47%	63%	-25%	-64%
High	10%		31%	63%	-50%	-90%

Conclusions

- In general, the WFET trout model corresponds with the adult trout habitat predicted by the site specific model
- The juvenile habitat predicted by the site specific model does not correspond with the WFET risk values.
- The warmwater WFET model corresponds with the habitat area predicted by the flannelmouth sucker site specific values. The better correspondence is in the downstream sections of the river.

Literature Cited

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