Hydrology: Additional information for Emerald Creek

INFISH interim Riparian Management Objectives (RMOs) includes a stream width/depth ratio value of less than 10. Fisheries technicians collected stream width and mean depth information during habitat inventories on Cat Spur, E. Fk. Emerald, Keeler and W. Fk. Merry Creeks. This data was collected over varying stream reach lengths on each creek. The following table presents the width/depth ratio calculated by dividing each measured width with the mean depth for that transect then averaged for each creek (see project file).

Watershed	Average Width/Depth Ratio
Cat Spur Creek	11
E. Fk. Emerald Creek	17
Keeler Creek	9
W. Fk. Merry Creek	24

Henderson, et al., (2002) compiled data in their Annual Summary Report, 1991-2001, from various stream reaches on the Idaho Panhandle N.F., for monitoring conditions in the upper Columbia River basin and "specifically livestock grazing". Five stream reaches were sampled on the St. Joe Ranger District. Two sampled reaches are within grazing allotments, E. Fk. Emerald and Charlie Creeks. Collected data monitors existing conditions compared to INFISH riparian Management Objectives (RMO). Methodology for the various parameters is presented in the Annual Summary Report (Henderson, et al., 2002). The following table presents some of the Summary Report findings.

Watershed	Bankfull Width/Depth Ratio	Pools/mile	Riparian Effective Cover	Large Woody debris
Bechtel Cr.	3	251	100	*
Charlie Cr.	23	68	99	0
E. Fk. Emerald	23	53	96	27
Foehl Cr.	29	39	100	61
L. N. Fk. Clearwater	42	29	99	29

*The reach sampled on Bechtel Creek is in a meadow – no woody debris present

Watersheds were stratified based on management activities; "managed" watersheds had livestock grazing, "unmanaged" had no grazing in the past 30 years and minimal timber harvest, mining or roading activities, and "other", if they are managed but not grazed (Henderson, et al., 2002). Of particular interest are the values found in the Foehl Creek data. Foehl Creek is designated as unmanaged, the other basins are considered managed (Henderson, et al., 2002).

Both Charlie Creek and E. Fk. Emerald Creek ("managed watersheds") had lower width/depth ratios and higher numbers of pools/mile than the "unmanaged" Foehl Creek. The effective cover in riparian areas is essentially the same for these three creeks. Values for in-stream large woody debris were markedly higher in Foehl Creek than the other creeks.

Pool frequency meets RMOs for all creeks except E. Fk. Emerald, which had 53 pools/mile compared to the RMO of 56 or 95% of the recommended number of pools/mile. The percent of the RMO for pool frequency follows.

Watershed	Pool Frequency as Percent of RMO
Bechtel Cr.	260%
Charlie Cr.	121%
E. Fk. Emerald	95%
Foehl Cr.	150%
L. N. Fk. Clearwater	112%

The overall number of pools/mile is higher in Charlie and E. Fk Emerald compared to Foehl Creek, but this RMO is based on wetted width. Pool frequency as percent of RMO allows a better comparison between the managed and unmanaged streams.

The wetted width/depth ratio is not met in any of the monitored streams. Comparison of the following values for wetted width/depth ratio as percent of the RMO show that for creeks with grazing, the values in "managed" streams compare relatively closely to the "unmanaged" conditions in Foehl Creek (no grazing occurs on the St. Joe RD portion of the L. N. Fk. Clearwater). The values displayed are all about 5 times greater than the objective of less than 10 for w/d ratio, except the LNFK Clearwater, which is considerably higher than data measured at the other locations.

Watershed	Wetted width/depth ratio as Percent of RMO
Bechtel Cr.	490%
Charlie Cr.	557%
E. Fk. Emerald	530%
Foehl Cr.	519%
L. N. Fk. Clearwater	762%

Large woody debris is met in all drainages except Charlie Creek. Comparison of values as percent of RMO for LWD follows. The high value for Foehl Creek may be indicative of the remote un-roaded nature of this drainage and because of this nature, it may not have been part of the misguided LWD removal of the 1960's or 1970's.

Watershed	Large Woody Debris as Percent of RMO
Bechtel Cr.	*
Charlie Cr.	0%
E. Fk. Emerald	135%
Foehl Cr.	305%
L. N. Fk. Clearwater	145%

*meadow reach

Interpretation of the results of this monitoring suggests that width/depth conditions (both bankfull w/d and wetted w/d) are about equal in the "managed" streams compared to the "unmanaged" stream sampled, except for the L. N. Fk. Clearwater. The lack of LWD in Charlie Creek is of some concern, but given the high pool/mile value it does not seem to be a limiting condition for aquatic health. For RMO pool frequency, the unmanaged Foehl Cr. had higher levels than the grazed watersheds.

Discussion

Parameters that do meet RMO's (except as noted below): woody debris, pool frequency, and riparian cover. Pool frequency meets RMO's for all St. Joe RD streams sampled (except EFK Emerald which is 5% below).

Parameters that do not meet RMO's: width/depth (w/d) ratios for all monitored streams, pool frequency in E. Fk Emerald Creek, and woody debris in Charlie Creek.

Width /depth ratios sampled by fisheries technicians met RMO's in Keeler Creek and was only 10% higher (11) than RMO for Cat Spur Creek. Both wetted and bankfull width/depth ratios in managed streams are comparable to unmanaged conditions.

Overall, data collected for the monitored streams indicate that managed streams and unmanaged streams share very similar habitat conditions at least in the reaches monitored. And that for the most part INFISH RMO's are met at the sampled reaches. Because w/d ratios consistently do not meet RMO's perhaps the RMO is unattainable in the present climate and geographic scope. Perhaps the largest deviation from RMO's is the lack of woody debris in Charlie Creek, but upon further investigation of the data tables presented in the Summary Report (Henderson, et al., 2002, p. 34) there were 7 LWD found in Charlie Creek but these were not carried through the table. There were also 7 LWD found in EFK Emerald Creek and this met RMO, so I am suggesting that Charlie Creek also meets the RMO for LWD. The pool frequency for EFK Emerald is 5% shy of meeting the RMO and would need 3 more pools per mile to meet the RMO.