PROCEDURES FOR PRELIMINARY ASSESSMENT OF WATER AVAILABILITY FOR INSTREAM FLOW RECOMMENDATION

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OBJECTIVES

Present hydrologic analysis methods which could be applied by Wyoming Game and Fish Department personnel to preliminarily assess the availability of recommended instream flows for fisheries on Wyoming stream reaches.

ASSUMPTIONS

1. Methods presented will be used for preliminary water availability analysis.
2. Available flow records are from locations at or very near the lower end of the Instream Flow Reach.
3. Only one instream flow recommendation is to be considered for the each.
4. The instream flow recommendation is already quantified or estimated (suggest 33 percent of average discharge be used).
5. Flow duration analysis adequately reflects historic water use through the Instream Flow Reach.
6. Where necessary. Game and Fish personnel will obtain water right information from the State Engineer's Office (SEO) and apply the water use criteria developed by the Water Development Commission (WDC) staff as reported in the Clarkes Fork Feasibility Analysis study.
7. No major tributaries enter the Instream Flow Reach which are not accounted for.
8. Game and Fish Department personnel are familiar with the Water Resources Data System (WRDS) of the Wyoming Water Research Center and the flow estimation techniques published by Lowham (1976). Brief descriptions of each are attached at the end of this report.

CASES CONSIDERED

Case #1

A currently active streamgage is located within the Instream Flow Reach and has a perlod-of-record (p-o-r) $\geq$ 10 years.

Case #2

A streamgage was operated within the Instream Flow Reach, but is no longer active. The p-o-r is at least 10 years.

Case #3

A currently active streamgage is located within the Instream Flow Reach but has a p-o-r of less than 10 years.

Case #4

No streamgage station is or has been operational within the Instream Flow Reach. However, discharge records are available from other locations on the study stream or elsewhere in the drainage basin.

Procedures for Preliminary Assessment of Water Availability For Instream Flow

Step No.	Case #1	Case #2
1	Obtain daily flow duration analysis for July-Sept. for p-o-r and for past 10 yrs.	Obtain daily flow duration analysis for July-Sept. for p-o-r.
2	Compare to determine any obvious changes in water use.	Consult SEO records to determine "new" water rights from the end of p-o-r to present.
3	Determine % exceedence of recommended instream flow (Q_{IF}) from appropriate duration curve.	Apply WDC criteria to estimate "new" daily water use for July-Sept. period.
4	Apply criterion of at least 50% exceedence.	Adjust Y-axis of July-Sept. duration curve to reflect "new" water use.
5		Determine % exceedence of Q_{IF} from adjusted duration curve.
6		Apply criterion of at least 50%, exceedence.

Step No.	Case #3	Case #4
1	Run DATESW to determine location and p-o-r of streamgages in basin.	Apply Lowham's (1976) hydraulic geometry equation or basin characteristics equation to determine average discharge through study reach. Determine which equation to use by comparing results with published A.D. values for nearby gages.
2	Select appropriate gage with p-o-r $\geq$ 10 years which encompasses p-o-r of study reach gage.	Calculate $Q_{IF}/Q_{A.D.}$ to determine % average discharge.
3	Run DAYAVE for p-o-r for both short- and long-term gages for July-Sept. period.	Run DATESW to determine location and p-o-r of gages in basin.
4	Correlate DAYAVE Q values between the 2 stations (92 data pairs)	Select appropriate gage with p-o-r $\geq$ 10 yrs. which is most similar to study stream based upon elevation, drainage area, and land/water use.
5	If correlation is statistically significant, use the equation developed to calculate Q at the long-term gage which corresponds to Q_{IF}.	Run DURCUR, July-Sept., for selected gage using cubic ft/sec divided by mean daily flow (cmd)
6	Run DURCUR, July-Sept., for the long-term station	Using % A.D. (cmd), enter duration curve and apply 50% exceedence criterion.
7	Using Q which corresponds to Q_{IF}, apply 50% exceedence criterion.	