

Memorandum:

Date: August 28, 2012
To: File 98-7684
From: Craig L. Saxton
Re: Licensing Review

The field examiner recommended issuing the license for the full permitted diversion rate of 0.56 cfs and the diversion volume of 405 AF. The diversion rate was measured from a flowmeter and the diversion volume was calculated by figuring out the volume that would be generated if the diversion volume was pumped continuously for a year.

My review supports that the recommended diversion rate and volume seem reasonable because based on the data given in the report entitled ***Kootenai River White Sturgeon Conservation Aquaculture Program 1990-2007, 2nd Edition***, it would appear that they would be fully using the diversion rate and volume to meet the production numbers reported.

Diversion rate:

Known:

The following data was obtained from the ***Kootenai River White Sturgeon Conservation Aquaculture Program 1990-2007, 2nd Edition***

Weight of Fish Produced (W)= 6000 to 12000 lbs (Pg 20)
Average Length at release (L)= 6 to 12 inches (Pg 32)
Facility Volume (V) = 2416 cubic feet (Page 22) (see attached calculation sheet)
Diversion rate recommended by field examiner (Q)= 0.56 cfs

Density Index:

$W = D * V * L$, Where

W= total permissible weight of fish (pounds)
D = Density Index (unitless)
V = combined volume of raceways (cubic feet), and
L = average fish length (inches)

The hatchery raises both White Sturgeon and trout so I will use the recognized Density Index value for Rainbow Trout, as recommended by the Aquaculture Industry, of 0.5 (Fish Hatchery Management - Piper 1982). This is the same figure given in the report titled ***Kootenai River White Sturgeon Conservation Aquaculture Program 1990-2007, 2nd Edition*** and states that the rearing density is 0.5 lb per cubic foot of rearing area.

Using this information, the weight of fish that could be in the facility at any one time is 74,604 lbs:

$$(0.5)(2416 \text{ cubic ft})(12 \text{ inches}) = 14496 \text{ lbs}$$

This slightly exceeds the 12,000 lbs currently produced. This tends to indicate that the beneficial use is not limited by the physical size of the hatchery.

Flow Index:

$F = W/(L*Q)$ where

F = Flow Index (unitless),

W = total permissible weight of fish (pounds)

L = average fish length (inches)

Q = water inflow rate (GPM)

Using the information provided, I calculated a flow index of 3.98.

$$F = \frac{(12000 \text{ lb})}{(12 \text{ in})(0.56 \text{ cfs} / 448.83)} = 3.98$$

This value is significantly below the range of values recognized for trout by the United States Fish and Wildlife Service general guidelines. Using table 8 on page 68 of Fish Hatchery Management - Piper 1982, where elevation = 1700 ft and temperature = 54 indicates the F value of 1.47. The number suggests that a diversion rate greater than 0.56 cfs is required to raise 12,000 lbs of fish annually at this facility.

To confirm this, I used the flow index equation to solve for W, assuming 0.56 cfs, L = 12 inches, and F=1.47.

Using these numbers, I solved for the total weight of fish that could reasonable be raised in these facilities = 4428 lbs. Again, this is evidence that the diversion rate is well below what is required to raise 12000 lbs of fish.

I recommend the full permitted rate of 0.56 cfs

Volume:

The volume was calculated using data from the *KOOTENAI RIVER WHIT STURGEON STUDIES , Report B, December 1994* (In file).

Page 5 and 8 of the report list sizes of tanks allowing for calculation of facility volume. I calculated overall volume using a turnover rate of 15 volumes per day which was taken from the ***Kootenai River White Sturgeon Conservation Aquaculture Program 1990-2007, 2nd Edition*** report.

The required volume calculated including the turnover rates was 238 AF. This is the volume of the facility during the authorized development period of the permit. From the later reports, it is clear that the facility has been expanded.

I recommend licensing a diversion volume of **238 AF**. Note that an additional permit will be required for the expansion that took place after the development period.

References

Piper, Robert G., Ivan B. McElwain, Leo E. Orme, Joseph P. McCraren, Laurie G. Fowler, and John r. Leonard. 1982. Fish Hatchery Management. United States Department of the Interior Fish and Wildlife Service Washington, D.C.

Kootenai river White Sturgeon Conservation Aquaculture Program 1990-2007 2nd Edition. Kootenai Tribes of Idaho.

http://www.fishsciences.net/projects/columbia_sturgeon/pdfs/46-Koot_wh-sturg_consv_aqua_1990-2007_2nd_ed.pdf

KOOTENAI RIVER WHIT STURGEON STUDIES , Report B, December 1994