# Quarterly Progress Report
## October 1 – December 31, 2006
## BOR Agreement 1425-05-FG-10-1188

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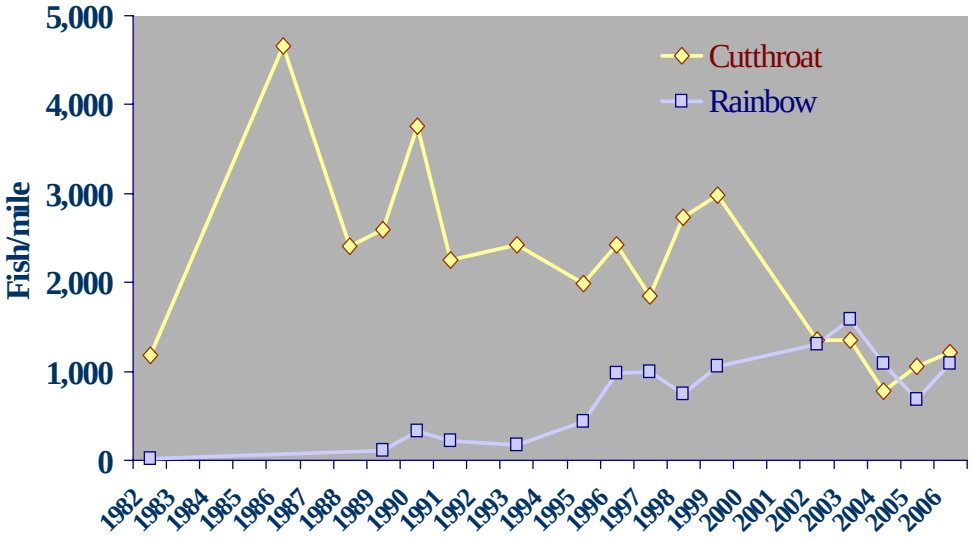
Bureau of Reclamation implemented Ecologically Based System Operations (EBSM) in the South Fork Snake River during winter 2003-2004. To evaluate these innovative flow operations, IDFG began biological monitoring of Yellowstone cutthroat trout during the same time period. This quarterly progress report summarizes activities conducted during the fourth quarter of 2006, which is the fifth quarter of this modified grant agreement. This agreement runs through September 2007.

The 2005 annual progress report was finalized and copies were sent to BOR. Data from 2006 are being entered and analyzed, and that annual report is in preparation. In addition, a peer-reviewed manuscript describing the effects of hydrologic regime and its alteration on trout populations in the South Fork was returned and is being revised. The manuscript was prepared by Dr. Rob Van Kirk and Sarra Moller, Idaho State University, and myself.

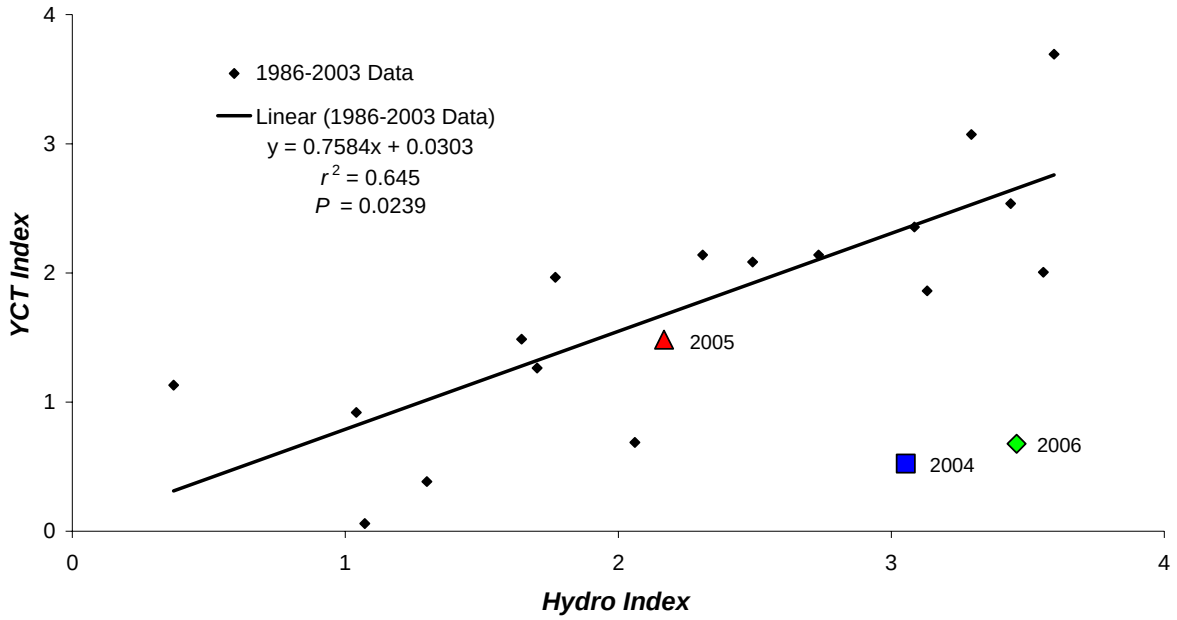
Because of damage caused by high runoff last spring, all the fish weirs will require significant repairs. That work is ongoing. Assessment of the overall weir program began this quarter in light of the poor trapping results from last spring. These results were presented in the last two quarterly reports and will be discussed in the annual report. The rotary-drum fish screens in Palisades and Burns creeks – two major cutthroat trout spawning tributaries – were shut down in November after being successfully operated throughout the irrigation season.

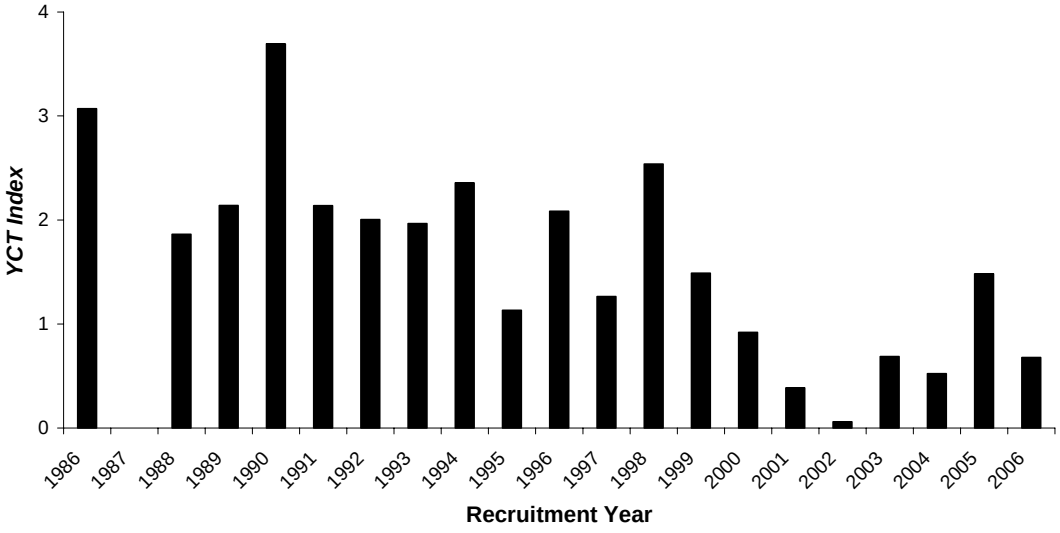
As mentioned last quarter, moderate improvements in cutthroat trout densities were observed at both upper and lower river electrofishing sections last fall, 2006. Unfortunately, there was also an increase in rainbow trout density in the upper river at Conant. Both density estimates at Conant, which are for age 1 and older fish, are within the range of the last five years for cutthroat trout and ten years for rainbow trout. But note that the last five years have been at the low end of the 20-year trend for cutthroat trout, and the last ten years have been at the high end of the 20-year trend for rainbow trout. In sum, cutthroat trout are still quite depressed throughout the river – about half their long-term average and at their early 1980's level before special regulations were enacted – despite good tributary flows the last couple of years. And rainbow trout rebounded slightly after declining for two years – despite improved main river flow conditions provided by BOR and increased harvest over the last three years. The following graph illustrates these results at Conant:



A major objective this quarter was to evaluate the 2005 freshet (14,900 cfs on June 15) and the 2006 freshet (19,500 cfs on June 16) in terms of fish recruitment to the South Fork. The first freshet was provided in 2004 (19,000 cfs on May 23). Two indices have been developed by Dr. Rob Van Kirk, Idaho State University, to better present results (see 2005 annual report). The *YCT Index* uses rainbow and cutthroat trout recruitment parameters measured at the Conant electrofishing reach. The *Hydro Index* uses a set of five variables describing hydrologic conditions as measured at the Heise gage. Graphical depiction of both indices for recruitment years through 2006 are shown below. The 2006 recruit class (i.e. yearlings measured in the fall 2006, but produced in the spring and summer 2005) experienced very favorable hydrologic conditions, and the *Hydro Index* was 3.459. This value is within the top three index values over the last 20 years. However, cutthroat trout recruitment was below average, and rainbow trout recruitment was very high – the fourth-highest recorded, exceeded only by recruitment years 1997, 2002, and 2003. This gave a *YCT Index* of 0.677 when a value of 2.654 is predicted. The 2006 *YCT Index* is within the bottom five index values observed over the last 20 years, all of which have occurred since 2001. The value for 2005 is an exception, but it may be suspect as a different method was used to estimate recruitment that year (cohort analysis, but also used six other years; see 2005 annual report).

Dr. Van Kirk and I will be discussing these results in the near future. The last three water years have been much different than the ones used to develop the indices, i.e. there has been less snow recently but more rain in the fall and spring. It is also possible that the maximum to minimum flow ratio, which is a binary variable, may outweigh the other variables (alteration of first spring spawning, second spring, and summer discharge) in the hydraulic model. Finally, it is possible that the fish populations have passed a threshold beyond which the species composition will never turn around, no matter what is done. To address this last concern, Dr. Van Kirk and I will be doing some population dynamics modeling.




YCT Index
0
1
2
3
4
1986
1987
1988
1989
1990
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1994
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1996
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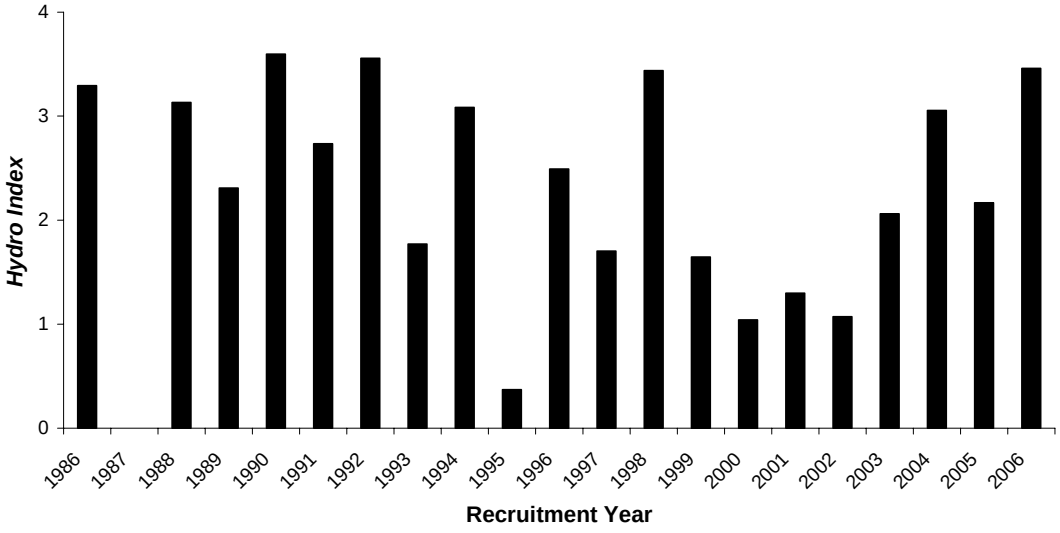
1998
1999
2000
2001
2002
2003
2004
2005
2006
Recruitment Year


Hydro Index
0
1
2
3
4
1986
1987
1988
1989
1990
1991
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1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
Recruitment Year