

BOW RIVER TROUT DECLINES-WHAT DOES IT MEAN.

Introduction:

The Bow River has been a world-renowned trout sports fishery that is under pressure from the human population growth in the region, the ever-increasing demand for outdoor recreational pursuits, environmental changes, and degradation of aquatic and riparian habitat. Fishery managers have monitored the Bow River for more than 30 years, and in this time, and, it has been demonstrated that up until 2003 the fishery was sustainable with proper regulatory constraints ⁽¹⁾.

More recently though we have seen dramatic changes to the Bow River with devastating floods, low river flows in the warmest seasons, higher summer temperatures, increased angling effort, and the possible impact of Whirling Disease.

A recent report ⁽²⁾ indicated that the Bow River Rainbow Trout population has declined by as much as 50% over ten years from 2003 to 2013. This report takes the historical fish population data as a baseline and projects what the trout populations may well be in 2021 and what it could be in the future if fishery management change is not made.

Summary of Bow River Trout Population Estimates 1980 to 2005

Trout population data was collected from the same 4 Km reach of the Bow River downstream of Policeman's Flats in each of the survey years.

Table 1 documents trout populations from 1980 to 2005. The variations in yearly trout population in the Bow River are more than likely due to a combination of sampling techniques, river flow rates, and spawning success in previous years ⁽¹⁾. This is most noticeable with spring spawning rainbow trout where they may be subject to the impact of spring runoff in the Highwood River drainage. Conversely, Brown Trout spawn in the fall of the year when there are more consistent river flows.

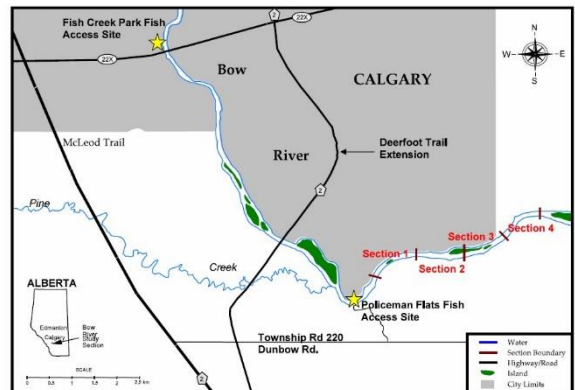
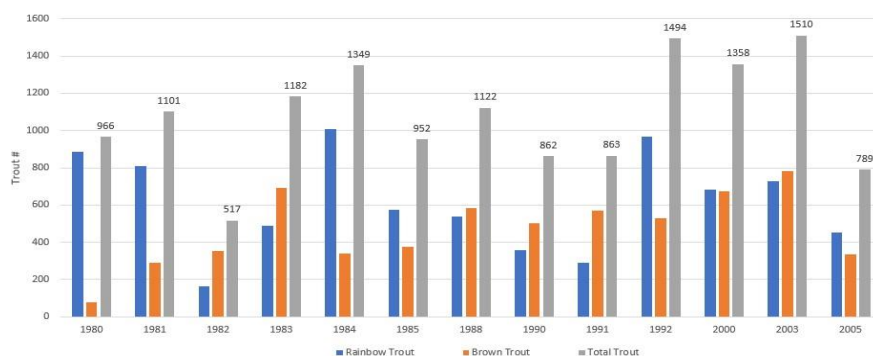


Figure 1. Map of the 4-km study area on the Bow River surveyed in 2003 and 2005.

Table 1
BOW RIVER TOTAL TROUT POPULATION ESTIMATES 1980 - 2005



Source: Courtney, R.F., et.al. 1980 -1992; Council, T., et.al. 2000 - 2005

For these analyses, only fish population data from the 2000 to 2005 Bow River trout populations surveys was used, as it represents the highest trout populations recorded on the Bow River ⁽³⁾. In addition, only data for mature rainbow and brown trout with a fork length of > 250mm (10") were used as the baseline data as it represents the most catchable size of trout.

Although Rocky Mountain Whitefish did represent a significant proportion of sports fish in the Bow River, they were not included in the data set as little is known of their population decline in subsequent years. Total trout and whitefish populations in all size classes were 2512/Km and 2521 /Km for 2000 and 2003 respectively, dropping to 1022 /KM in 2005 following the flood in that year. Additional fish population data was collected in 2007 ⁽⁴⁾ that indicated trout populations had returned to historical norms following the 2005 flood.

Unfortunately, surveys were not continued regularly leaving the fishing community speculating in recent years on Bow River trout populations.

Alberta Environment & Parks did conduct sporadic fish population surveys from 2007 onwards. But did not use the same methodology that had been used in previous years. An assumption was made that the original study area was representative of the Calgary to Carseland stretch of the Bow River, but there are significant differences in fish habitat and population across this reach of Bow River. Furthermore, the 2013 Bow River flood had a dramatic impact on the Bow River hydrology, fish habitat and showed a perceived drop in the trout population. The anecdotal evidence has been that the rainbow trout population was the most affected by the flood. Therefore, expanding the survey areas to the lower sections of the river would give a more comprehensive assessment of fish populations. A comprehensive survey was conducted in 2018, 2019, and 2020 but to date, the analysis is not complete.

Bow River Trout Population Decline.

Alberta Environment & Parks working cooperatively with the Department of Biological Sciences, University of Calgary analyzed rainbow trout capture-recapture survey data collected from 2003-2013⁽²⁾. The analyses showed a rather alarming population decline during this timeframe:

- An analysis of 2003 – 2008 data indicated that there was a **5.6% annual decline in rainbow trout populations – or a 43% decline over the 10 years of 2003 to 2013.**
- An analysis of 2003 – 2013 data indicated that there was a **6.8% annual decline in rainbow trout populations - or a 50% decline over the 10 years of 2003 to 2013.**

The more conservative 5.6% annual decline in Rainbow Trout populations was used to give a projection of mature trout population declines since 2003 due to unknown fish population recovery following the 2013 flood event . The summary from Table 2 for 2000-2005 for trout of > 250mm was used as the baseline date in Figure 1: Total trout populations declined by 40% from 2003 to 2013 and possibly further in recent years.

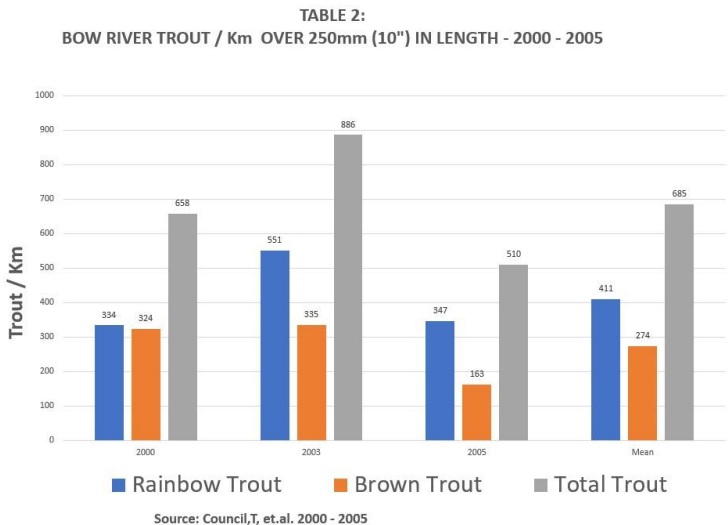


Figure 1:

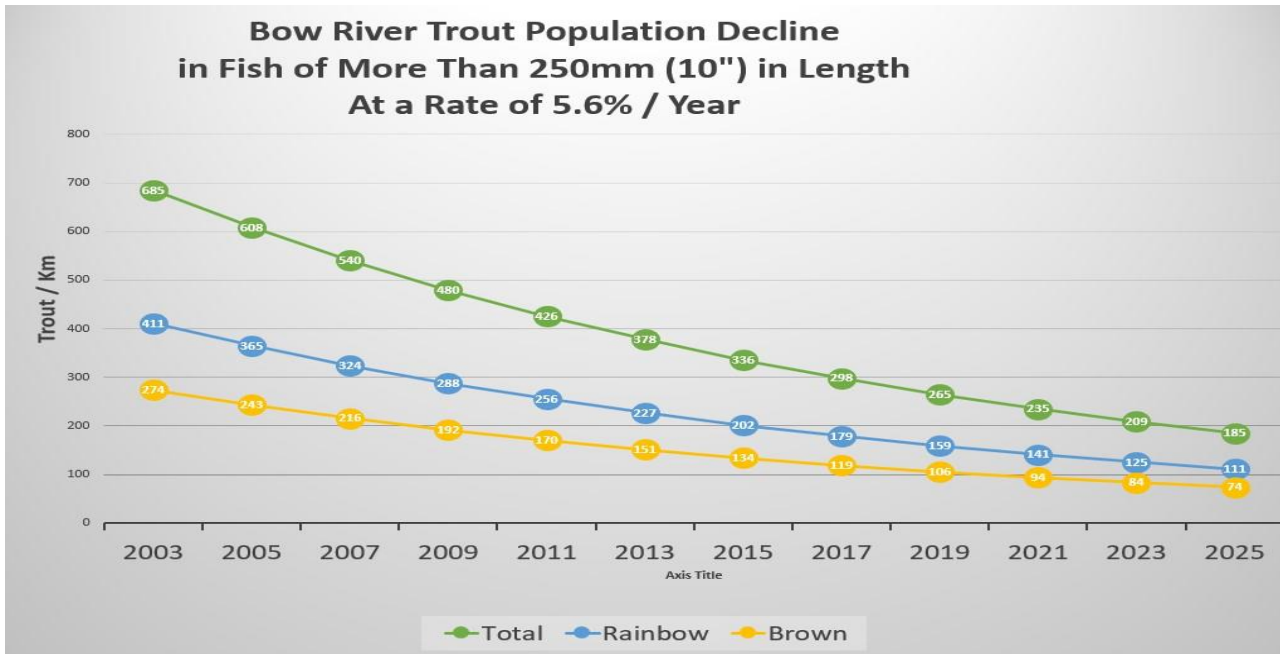
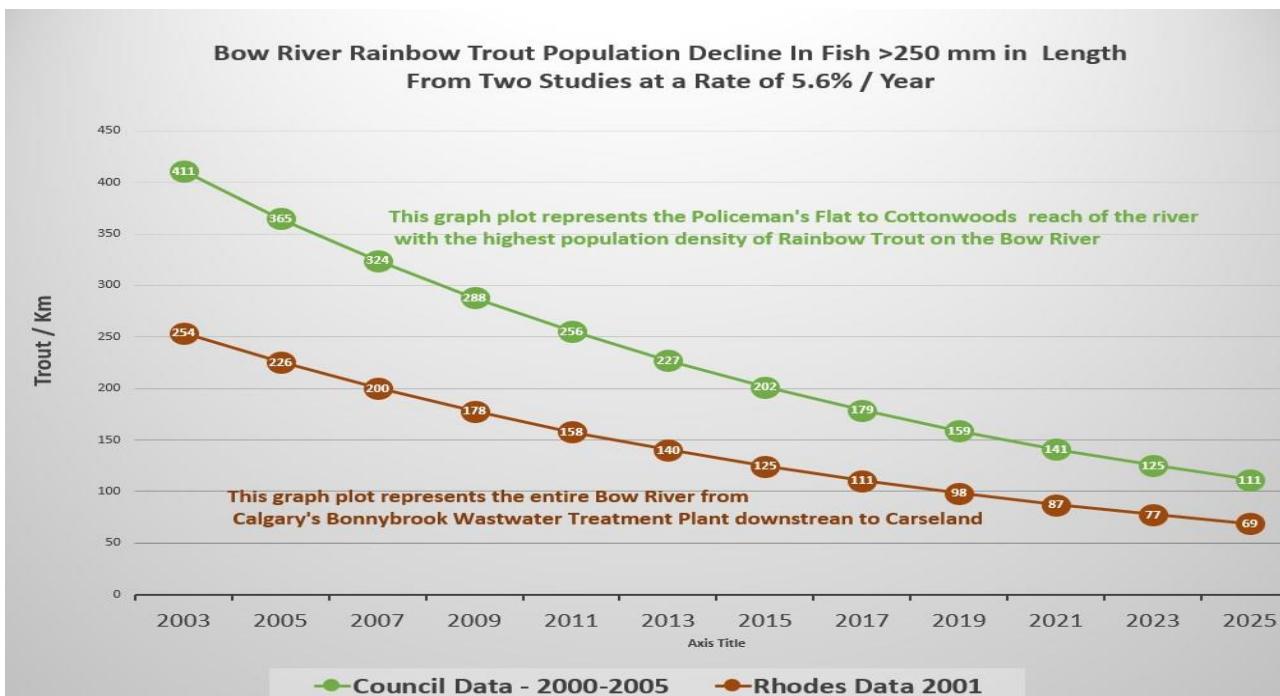


Figure 2 shows further analysis of a 2001 Bow River Rainbow Trout population survey covering the entire Bow River from the Bonnybrook Wastewater Treatment Plant to Carseland⁽⁵⁾, which was compared to the higher baseline data for the reach of the river below Policeman’s Flats. The substantially lower Rainbow Trout population decline reported in the 2001 survey is more indicative of the entire lower Bow River trout fishery below Calgary.

Figure 2:



Discussion.

There is a need to be cautious with the interpretation of these data:

- Year-to-year variables in river flows, changing hydrology and fish habitat of the river, sampling techniques and site selection will have impacted consistency of data collection, its comparative analysis, and interpretation of results.
- Two flood events in 2005 and again in 2013 would have had the greatest impact on spring-spawning rainbow trout, and less of an impact on fall-spawning brown trout. Although recovery of the rainbow trout population was evident following the 2005 flood ⁽⁴⁾, there is no data currently available to support a similar recovery following the 2013 flood event.
- The projected decline in trout population beyond 2013 is speculative. But once the 2018-2020 fish population survey data analysis become available a more accurate projection of the trout population can be made.

Nevertheless, there is an indication that the Bow River fishery is in serious decline and headed in a dangerous direction. Fishery managers need to take immediate action to stop this decline.

The Calgary River Users' Alliance, together with our member organizations is positioned to advocate and support the Bow River fishery. We are committed to support government and academia or take a lead role in research and policy development for the enhancement of the fishery. The dynamics of a sustainable fish population as well as monitoring fish populations needs to be supported with sound fishery management policy, research initiatives to sustain a world-class fishery, and timely intervention in management protocols to enhance the fishery.

References:

1. Bow River trout populations could well be in decline - A need for a change in fishery management. 2018. Bow River Trout Foundation
2. Cahill, C., Mogensen, S.M. Wilson, K.L. Cantin, A. Sinnatamby, N. Post J.R. 2018. Multiple challenges confront a high-effort recreational fishery in decline. Bow River Basin Council Science Forum, May 2, 2018
3. Council, T., and T.D. Ripley. 2006. Bow River sport fish population monitoring, 2003 and 2005. Data Report, D-2007-006, produced by the Alberta Conservation Association, Lethbridge, Alberta, Canada, and Alberta Fish and Wildlife, Calgary, Alberta, Canada. 34 pp. + App
4. Blackburn, J., Council, T., Hurkett, B. 2008. Bow River Fish Population Monitoring. Project Summary produced by the Alberta Conservation Association, Lethbridge, Alberta, Canada, and Alberta Fish and Wildlife, Calgary, Alberta, Canada.
5. Rhodes, T.R, The Immediate and Short-term Angling on Migration and Catch-and-Release on Migration and Pre-spawning Condition of Rainbow Trout in the Bow River, Alberta. 2005. A Masters Thesis, Department of Biological Sciences, University of Calgary.

Peter Crowe-Swords,
Calgary River Users Alliance
June 01, 2021