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# Angler Survey of Experimental Recreational Bull Trout Fishery for Lake Koocanusa, Montana 2011 - 2012.

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## SUMMARY

In 2004, the U.S. Fish and Wildlife Service authorized limited sport fishing for bull trout *Salvelinus confluentus* at Hungry Horse Reservoir, South Fork Flathead River and Lake Koocanusa as requested by Montana Fish, Wildlife & Parks after those fisheries were deemed to have reached recovery goals. A portion of the permit conditions called for a bull trout permit and catch card system, angler survey and development of educational information pertaining to these new fisheries. In 2011, Montana Fish Wildlife & Parks decreased bull trout harvest from two to one for three main reasons: 1) decreasing mean lengths of bull trout caught and harvested; 2) a decreasing trend of redd numbers in the Wigwam River (the major spawning tributary in the BC portion Lake Koocanusa bull trout) and Grave Creek (the major spawning tributary in the US portion of Lake Koocanusa); 3) unknown impacts to the bull trout population caused by anglers in the mainstem and tributaries of the BC portion of Koocanusa and the Kootenai drainage.

This was the eighth year of the surveys. Of anglers who obtained permit/catch cards, 780 chose to be validated for Lake Koocanusa. By July 1, 2012 we had received a total of 598 responses (76.7% return) for both mailings and returned catch cards. We issued the fewest permits for Koocanusa for all years and also noted a decrease in both the number and percent of anglers that said they actually fished at Koocanusa for the second consecutive season. The decrease could be due to decreasing the harvest to one bull trout in the year. The number of days anglers fished at Koocanusa (3.2) was still high compared to previous seasons.

We estimated that 107 bull trout were harvested from Lake Koocanusa during the 2011 - 2012 season. This was lowest since the fishery began and continued to be much lower than the allowed harvest (1,140) from USFWS Sub-permit TE-077533. Anglers released more than 91 percent of the bull trout they caught at Lake Koocanusa. Once again, harvest increased in the last months of the season, likely due to lake conditions and angler's desire to harvest healthier post-spawn bull trout. Anglers that used two poles 90 percent of the time or more accounted for higher percent of the harvested (56.1) and released (62.2) bull trout in fewer angler-days (892 and 960 for two lines vs. one line, respectively) than those that used one line. During the 2011 season, anglers captured fewer bull trout during the four seasons since the two-line regulation was enacted by the Montana Legislature and made effective for the 2007-2008 season. The most obvious reason is that there were nearly 40 percent fewer anglers that said they fished in 2011 compared to 2010.

The mean length of harvested bull trout exceeded the mean length of released bull trout for the 2011 - 2012 season. This was similar to other years and likely because anglers target "healthier bigger" bull trout. The mean length of both harvested and released bull trout was the lowest on record and the difference between mean lengths of harvested versus released bull trout (4.9") was the highest on record. There has been a significant downward trend for mean lengths of bull trout caught since 2008. This trend is commensurate with the decreasing trend for redds during the same time period. We believe enough bull trout were cropped from the population both in Montana and British Columbia that fewer large bull trout were available to be caught. Violations were similar to the previous year and no serious violations were noted for Lake Koocanusa.

## INTRODUCTION

In 2012, Montana Fish, Wildlife & Parks (MFWP) personnel conducted the eighth annual angler mail survey for the recreational bull trout (***Salvelinus confluentus***) fishery on Lake Koocanusa initiated in 2004. Because bull trout were listed as a "threatened species" under the Endangered Species Act in 1998, this fishery was authorized under special permit by the U.S. Fish and Wildlife Service (USFWS). In 2011, Montana Fish Wildlife & Parks decreased bull trout harvest from two to one per angler per year for several reasons: 1) decreasing mean lengths of bull trout caught and harvested; 2) a decreasing trend of redd numbers in the Wigwam River (the major spawning tributary in the BC portion Lake Koocanusa bull trout) and Grave Creek (the major spawning tributary in the US portion of Lake Koocanusa); 3) unknown amount of angler harvest in the mainstem and tributaries of the BC portion of Lake Koocanusa. We believed this to be the prudent course of action even though the USFWS permit stipulations allowed for more harvest.

## BACKGROUND

Bull trout were listed as "threatened" under the Endangered Species Act in 1998. At the time of listing, sportfishing for bull trout had already been discontinued in Montana and was under review, except in Swan Lake which was considered to have a stable population.

The USFWS authorized an experimental sport fishery for bull trout at Lake Koocanusa because this fishery was deemed to have reached recovery levels. This activity was intended to benefit the species by researching the effects of restoring recreational fishing. In addition, allowing angling for bull trout likely increases public support for management of stable bull trout populations in the identified water bodies. We also believe the action will continue to garner additional support for restoration of bull trout habitats and other management activities that will improve bull trout populations throughout the state.

## METHODS

Conditions of the USFWS special permit (TE-077533) for a new bull trout fisheries contained specific items agreed upon by both USFWS and MFWP (Hensler and Benson 2005). One condition called for the development and use of a harvest catch card. Also required was a formal survey of anglers participating in these experimental bull trout fisheries. Educational materials were also developed to explain catch card use, bull trout identification, seasons, limits, and regulations pertinent to each fishery and bull trout conservation measures.

The first step in developing a catch card harvest authorization involved creating an application for anglers interested in angling for bull trout. We made the form available through the Region 1 MFWP office and over MFWP's web site. The application required the angler's name, address, automated licensing system (ALS) number and permit area (waters) where they chose to fish. Anglers were not given duplicate catch cards during the season if the original was lost. To ensure consistent, high-quality information to and from participating anglers, we required that all applications be submitted to the Region One FWP office in Kalispell. There continued to be no charge for the permit/catch card.

After a completed application was processed, a permit and numbered catch card was issued to each angler. The catch cards provided general instructions for anglers fishing for bull trout on Lake Koocanusa and the request to keep the card until a survey was sent. The cards requested entry of the catch zone, fish length, month and day of catch for each fish harvested from Lake Koocanusa. Additionally, we requested supplemental information: total number of days fished for bull trout, total number of bull trout caught and released, and a catch and release log that included zone, length, month, and day. We also asked the percent of time each angler fished with two lines.

As was previously described, anglers were allowed to harvest only one bull trout during the 2011 season. Upon landing a bull trout, anglers were required to immediately release the fish or harvest it. If a bull trout was harvested from Lake Koocanusa, the angler was required to record the information in ballpoint pen and notch out a triangle on the edge of the catch card; much like what is required for most big game licenses.

We offered to provide bull trout anglers a copy of the current bull trout fishing regulations and an informational pamphlet with each catch card issued. Pamphlets specifically outlined seasons, limits, restrictions, catch card use, catch-and-release fishing techniques and bull trout identification for all waters open to bull trout fishing. Special license procedures, regulations and conservation measures for bull trout were also itemized in the 2011 and 2012 Montana Fishing Regulations booklets.

Completed catch cards helped to provide information on bull trout harvest, catch date, size and location for the 2011 - 2012 season. We still do not charge a fee for catch cards or assess a penalty for failure to return cards as specified. We requested that anglers retain their catch card until surveyed and return the 2011-2012 catch card with the survey to improve the reliability of information.

To obtain the best and most thorough and accurate estimates of angling effort, harvest, and catch rates, MFWP also conducted a mail survey of all anglers. The survey asked for the same information as requested on the catch cards. Surveys were initially mailed to anglers on March 1, 2012. A follow up mailing was conducted on March 30, 2012 to anglers who had not returned surveys. Anglers were also reminded to return their catch cards with the surveys.

For this report, we were primarily concerned with estimates of bull trout catch and harvest for Lake Koocanusa. We used the survey in combination with catch card returns to estimate the total number of bull trout harvested. All estimates and graphs were generated in Microsoft Excel. Level of significance was at 0.05 unless otherwise noted.

## FINDINGS

### Bull Trout Catch Card Returns

Catch card instructions requested that anglers return the catch cards after their license expired with the survey. Anglers were no longer required to present the prior year's catch card or sign an affidavit attesting to information on a lost catch card before receiving a catch card for the current season. Some anglers did return catch cards but not surveys; some returned both; some returned only surveys. By July 1, 2012, we received 11 catch cards (1.4%) from anglers that did not return surveys.

### Bull Trout Angler Mail Survey

On March 1, 2012, we mailed the initial survey to 780 Koocanusa anglers. The results of the initial mail survey achieved a 71.2% return rate (n=555 and 37 undeliverable) by March 30, 2012. We conducted a second mailing to non-respondents to increase our level of returns. By July 1, 2012 we had received a total of 598 responses (76.7%) for both mailings and returned catch cards and ended the survey due to declining returns. Returned surveys were processed by July 10, 2012.

### Angler Preferred Waters

Since 2009, anglers could get a catch card for Lake Koocanusa or South Fork Flathead (including Hungry Horse Reservoir) but not both. We received 780 bull trout permit applications for which anglers declared Lake Koocanusa as the water they intended to fish for bull trout during the 2011 - 2012 season. Total catch cards issued Lake Koocanusa (780) was down from the previous year (1,072) and lower than any other season (Table 1). In fact, the number of cards issued for Lake Koocanusa has decreased every season since the system was first instituted in 2004. We presume the lower number of issued cards was because anglers were required to choose only one water, they allowed to harvest only one bull trout and possibly due to higher cost of recreational angling.

### Angler Demographics

The vast majority of permitted bull trout anglers that fished at Lake Koocanusa were Montana residents (86.8%). This was similar to most other years. Anglers from 13 other states and provinces (13 in 2010, 13 in 2009, and 22 in 2008) were issued a catch card for Lake Koocanusa. Non-resident anglers were primarily from the states of Idaho (5.8%), Alberta (2.3%) and Washington (1.9%).

Table 1. Bull trout waters selected by anglers through the 2011 - 2012 season.

| Waters Selected | Number Selected 2004 | Percent of total 2004 | Number Selected 2005 | Percent of total 2005 | Number Selected 2006 | Percent of total 2006 | Number Selected 2007 | Percent of total 2007 | Number Selected 2008 | Percent of Total 2008 | Number Selected 2009[2] | Percent of Total 2009[2] | Number Selected 2010 | Percent of Total 2010 | Number Selected 2010 | Percent of Total 2010 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| (HHR, SFF, LK)[1] | 1,200 | 42 | 1,034 | 41 | 846 | 39 | 917 | 39 | 801 | 33 | -- | -- | -- | -- | -- | -- |
| LK Only | 1,040 | 37 | 911 | 36 | 768 | 35 | 817 | 35 | 901 | 38 | -- | -- | -- | -- | -- | -- |
| Total Cards Issued | 2,858 | 100 | 2,522 | 100 | 2,209 | 100 | 2,336 | 100 | 2,404 | 100 | 2,224 | 100 | 2,080 | 100 | 1,657 | 100 |
| Total cards that included LK | **2,423** | 84.8 | **2,110** | 83.3 | **1,809** | 81.9 | **1,734** | 74.2 | **1,702** | 70.8 | **1,181** | 53.2 | **1,072** | 51.5 | **780** | 47.1 |

[1] HHR = Hungry Horse Reservoir, SFF = South Fork Flathead River, LK = Lake Koocanusa.
[2] Anglers were required to choose either LK or SFF/HHR beginning 2009.

**Fishing Pressure Estimates**

After the season, 598 (76.7%) of the 780 bull trout anglers that received a catch card for Lake Koocanusa either returned catch cards or responded to the mail survey. We found that 312 of the respondents (52.2%) indicated that they did fish for bull trout. This was the second consecutive season that both number and percentage of anglers that fished for bull trout decreased (Figure 1).

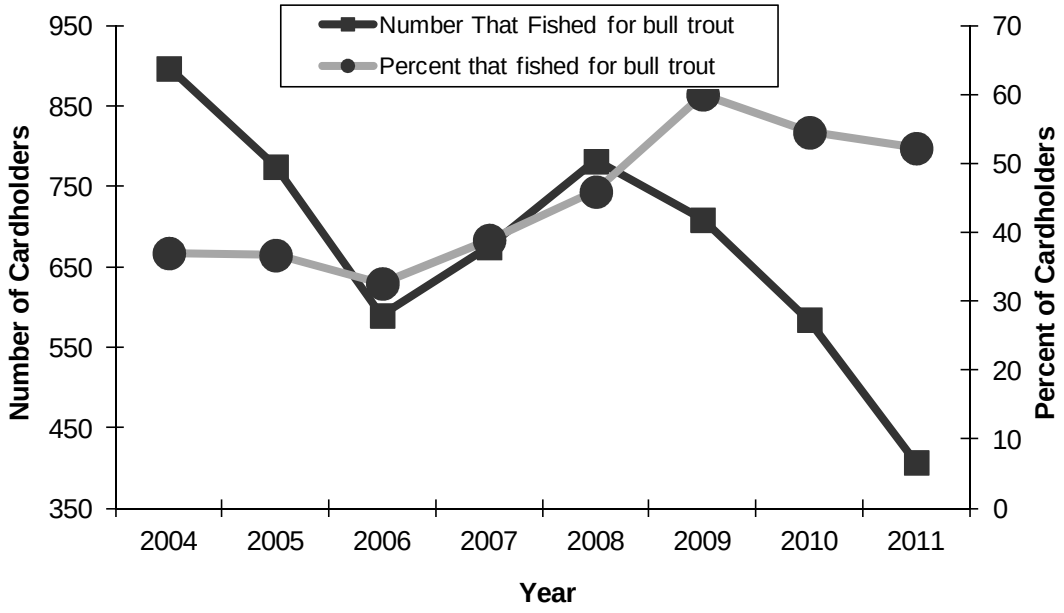


Figure 1. Estimated number of catch card holders and percent of total catch card holders that fished for bull trout at Lake Koocanusa, through the 2011 - 2012 season.

To estimate total number of angler-days of pressure on bull trout, we used the number of days anglers reported from catch cards and survey respondents who fished for bull trout. We assumed anglers not responding to the survey fished for bull trout with the same effort. Though the estimated total angler-days was lowest recorded, estimated days per angler (3.2) during the 2011 - 2012 season were still relative high compared to other years (Table 2). It again showed that anglers who chose Lake Koocanusa were more serious about fishing for bull trout and therefore more likely to spend more days fishing.

Table 2. Bull trout season angling pressure estimates calculated from catch card and survey results for Lake Koocanusa through the 2011 - 2012 season.

| Number Angler-Days Fishing Pressure | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Season | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 |
| Number of Respondents | 897 | 774 | 590 | 569 | 609 | 691 | 497 | 312 |
| Angler-Days from survey | 1,685 | 3,285 | 2,639 | 2,963 | 3,917 | 3,686 | 3,154 | 1,933 |
| Estimated Angler-Days | 3,483 | 4,874 | 3,390 | 3,595 | 4,607 | 4,537 | 3,720 | 2,521 |
| Estimated days per angler | 1.4 | 2.3 | 1.9 | 2.1 | 2.7 | 3.8 | 3.5 | 3.2 |

**Harvest and Catch Estimates**

To estimate total harvest of bull trout for Lake Koocanusa for the 2010 - 2011 season, we calculated the mean harvest rate from survey and catch card returns (0.137; n=598) and expanded it to harvest for all anglers who acquired a catch card for Lake Koocanusa. We assumed that anglers who did not return catch cards or surveys continued to fish for and harvest bull trout at the same rate as those that returned their catch card and/or survey. The request to return catch cards in combination with surveys continued to produce high quality results. The harvest estimate for Lake Koocanusa bull trout during the 2011 - 2012 season (107) was substantially lower than the previous year (163) and the lowest since harvest opened in 2004 (Table 3). It is possible that the decrease of harvest from two bull trout to one could have caused this decline, although adverse weather conditions (extreme drawdown in spring due to high snowpack; poor ice conditions in January/February) also likely affected angler participation during some of the year.

Table 3. Estimated bull trout harvest (known harvest) and catch (known catch) for Lake Koocanusa through the 2011-2012 season.

| Season | Bull Trout Harvested | Lower Bound | Upper Bound | Bull Trout Caught | Lower Bound | Upper Bound | Percent Released |
|---|---|---|---|---|---|---|---|
| 2004 - 2005 | 650 (259) | 259 | 652 | 2,399(698) | * | * | 72.1 |
| 2005 - 2006 | 371 (216) | 216 | 373 | 3,595 (2,171) | 2,171 | 3,611 | 89.7 |
| 2006 - 2007 | 180 (140) | 140 | 181 | 1349 (909) | 909 | 1,353 | 86.6 |
| 2007 - 2008 | 267 (220) | 220 | 268 | 1,484 (997) | 997 | 1,488 | 82.0 |
| 2008 - 2009 | 295 (249) | 249 | 296 | 1,897 (1,358) | 1,358 | 1,900 | 84.4 |
| 2009 - 2010 | 256(206) | 206 | 257 | 1,810 (1,247) | 1,247 | 1,815 | 85.8 |
| 2010 - 2011 | 163(138) | 138 | 164 | 1,568(1,328) | 1,328 | 1,573 | 89.6 |
| 2011 - 2012 | 107(82) | 82 | 108 | 1,318(925) | 925 | 1,323 | 91.9 |

*Point estimate expanded from caught vs. released bull trout from catch cards with no variance calculated

To estimate total catch at Lake Koocanusa for the 2011 - 2012 season, we calculated the mean catch rate (1.55) for anglers who returned catch cards and surveys (n = 598). The estimated total catch calculated from all catch card recipients was 1,318 bull trout (Table 3). We combined catch information with the harvest information and we estimated that anglers released 91.9 percent of the bull trout they caught; the highest release rate of all survey years.

We asked anglers to estimate the percent of time they fished with two lines to assess the potential impact of that legislated regulation change to bull trout catch and harvest. During the 2011 - 2012 season, 46.1 percent of anglers said they fished with two lines all the time, 60.1 percent responded that they fished with two lines at least some of the time (Table 4).

Table 4. Percent of anglers that used two lines to fish for bull trout in Lake Koocanusa through the 2011 - 2012 season.

| Season | Total Number of Respondents | Percent That Fished with Two Lines at Least Some of The Time | Percent That Fished with Two Lines all of the Time | Known bull trout caught by all methods |
|---|---|---|---|---|
| 2006 | One line | 0 | 0 | 909 |
| 2007 | None* | -- | -- | 997 |
| 2008 | 430 | 59.1 | 33.7 | 1,358 |
| 2009 | 511 | 64.0 | 38.0 | 1,247 |
| 2010 | 469 | 65.8 | 41.2 | 1,328 |
| 2011 | 295 | 60.1 | 46.1 | 925 |

*The regulation was put into effect after the start of the 2007 season

We analyzed catch and harvest for anglers using two lines for 2011 - 2012. The respondents that acknowledged the number of lines they used accounted for an estimated 1,928 angler-days, 80 bull trout harvested and 839 bull trout released. Anglers that used two poles 90 percent of the time or more accounted for higher percent of the harvested (56.1) and released (62.2) bull trout in fewer angler-days (892 and 960 for two lines vs. one line, respectively). During the 2011 season, anglers captured the fewest bull trout since the two-line regulation was enacted by the Montana Legislature and made effective for the 2007-2008 season. The most obvious reason was there were nearly 40 percent fewer anglers that said they fished in 2011 compared to 2010.

We also asked anglers to record lengths of bull trout harvested and released by water and zone. The following figures (Figures 2 and 3) show the length categories of bull trout harvested and released by anglers since 2004. As was typical for all years, anglers caught and released bull trout from all of the size classes but were more likely to keep larger fish. For the 2011 - 2012 season, the mean length of harvested bull trout (25.4”; range 13.0”- 33.0”) was longer than the mean length of released bull trout (20.5”; range 5.0”- 34.5”). For the 2011-2012 season, the mean lengths of harvested and released bull trout were the lowest on record and significantly lower ($P<.05$) than all years since 2008; the difference between mean lengths of harvested versus released bull trout (4.9”) was the highest on record.

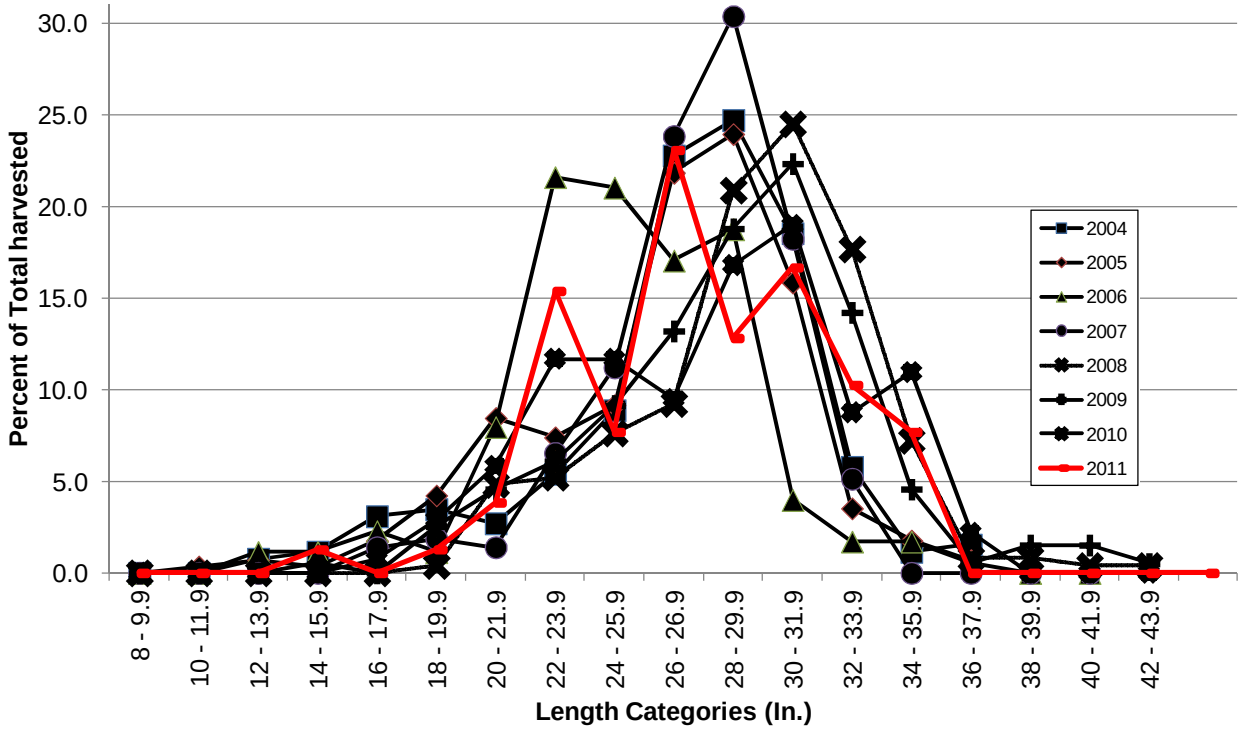


Figure 2. Lengths of bull trout harvested through the 2011 - 2012 season from Lake Koocanusa, Montana.

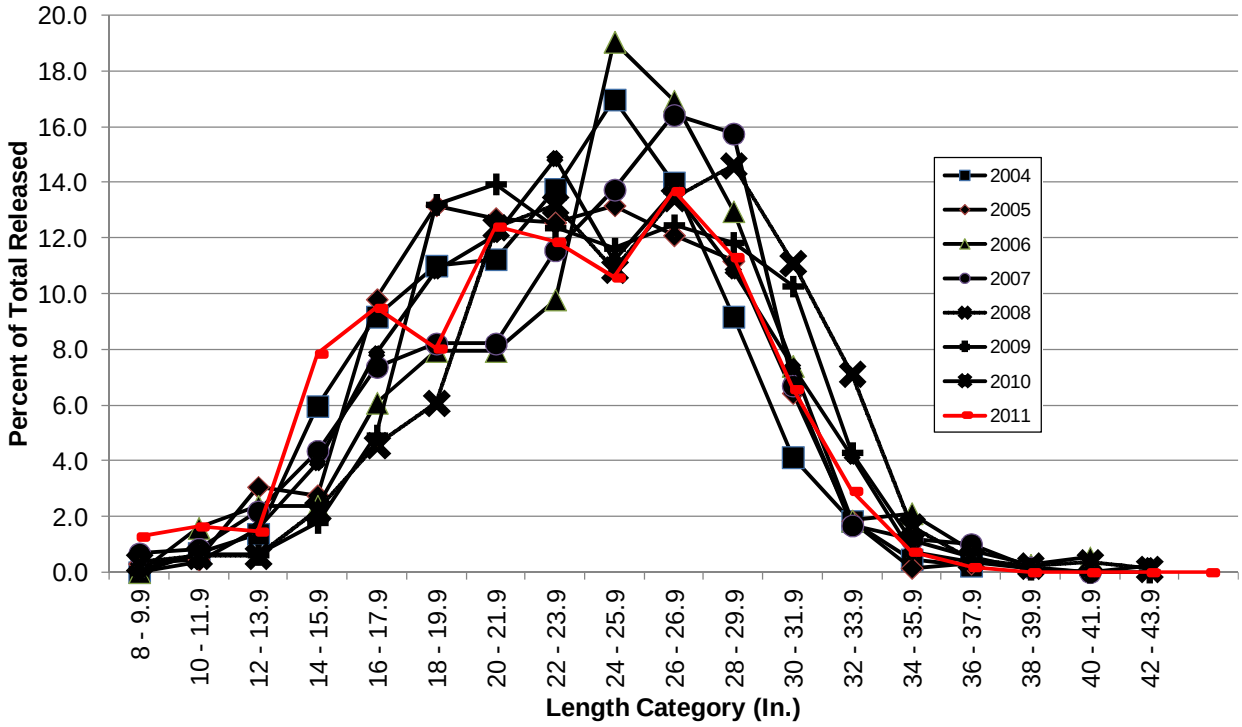


Figure 3. Lengths of bull trout caught and released through the 2011 - 2012 season from Lake Koocanusa, Montana.

There has been a significant downward trend for mean length of all fish caught since 2007. This trend followed the decreasing trend for redd counts for the Wigwam River during the same time period (Figure 4). We believe enough bull trout have been cropped from the population both in Montana and British Columbia that fewer large bull trout were available to be caught.

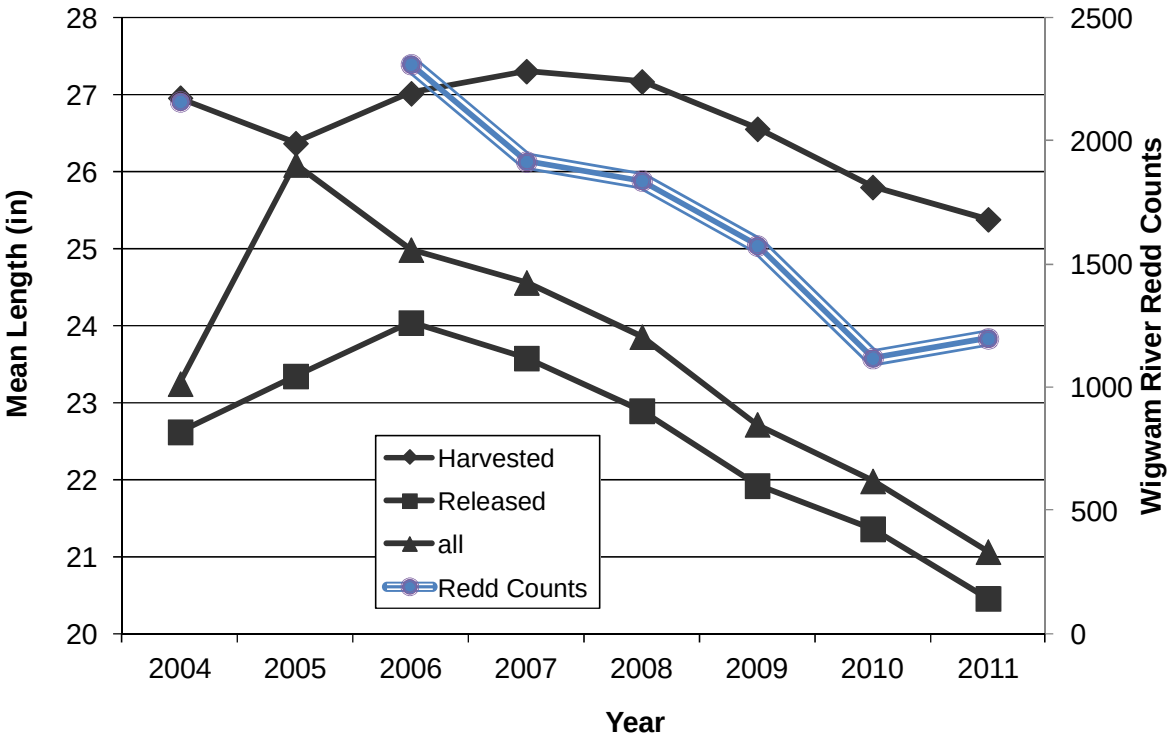


Figure 4. Mean lengths of bull trout caught and released through the 2011 - 2012 season from Lake Koocanusa, Montana and redd counts from Wigwam River B.C. Note: The 2005 released bull trout represented only 10 percent of the total catch so the mean for all fish was skewed toward the harvested mean

We also analyzed harvest by month for bull trout taken from Lake Koocanusa (Figure 5). The trends were similar for all six seasons. We found that, as expected, the catch rate was low during summer months and through spawning in September. Harvest on adult bull trout increased substantially as they returned to the reservoir from spawning streams. Harvest spiked in December for the first time since 2005. The percent of harvest in February for the 2011 - 2012 season was similar to the previous season which was the lowest on record.

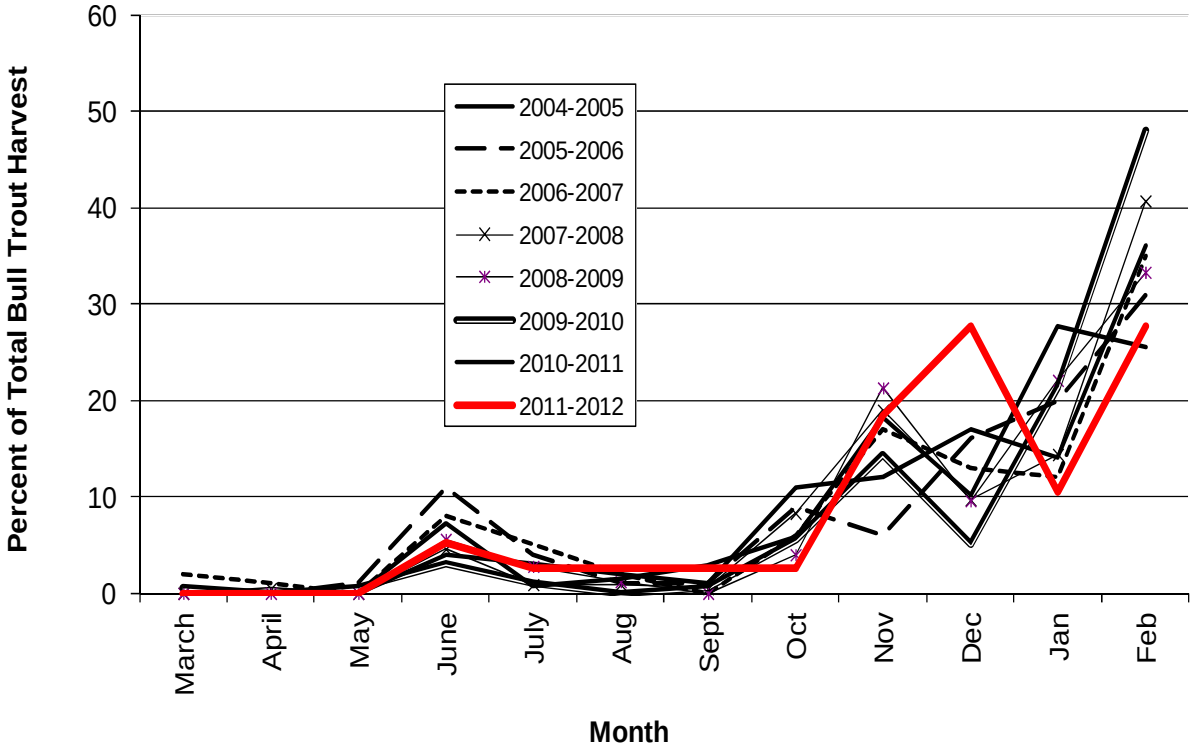


Figure 5. Percent of total harvest of bull trout by month from Lake Koocanusa through the 2011 - 2012 season.

Bull trout anglers also reported harvest by zone. During the 2011 - 2012 season, zonal harvest continued to follow a similar pattern to the previous years (Figure 6). The increased harvest in November and December likely coincides with increased fall fishing for trophy rainbow trout, hunting season nearing its end and the return of spawning adult bull trout and their partial recovery to better fitness. Harvest was greater in the northern zone from November through January but the south and middle portion of the reservoir had increased harvest during February likely because there fewer days of quality ice formed north of the Koocanusa Bridge after January that would have allowed for a relatively safe ice fishery.

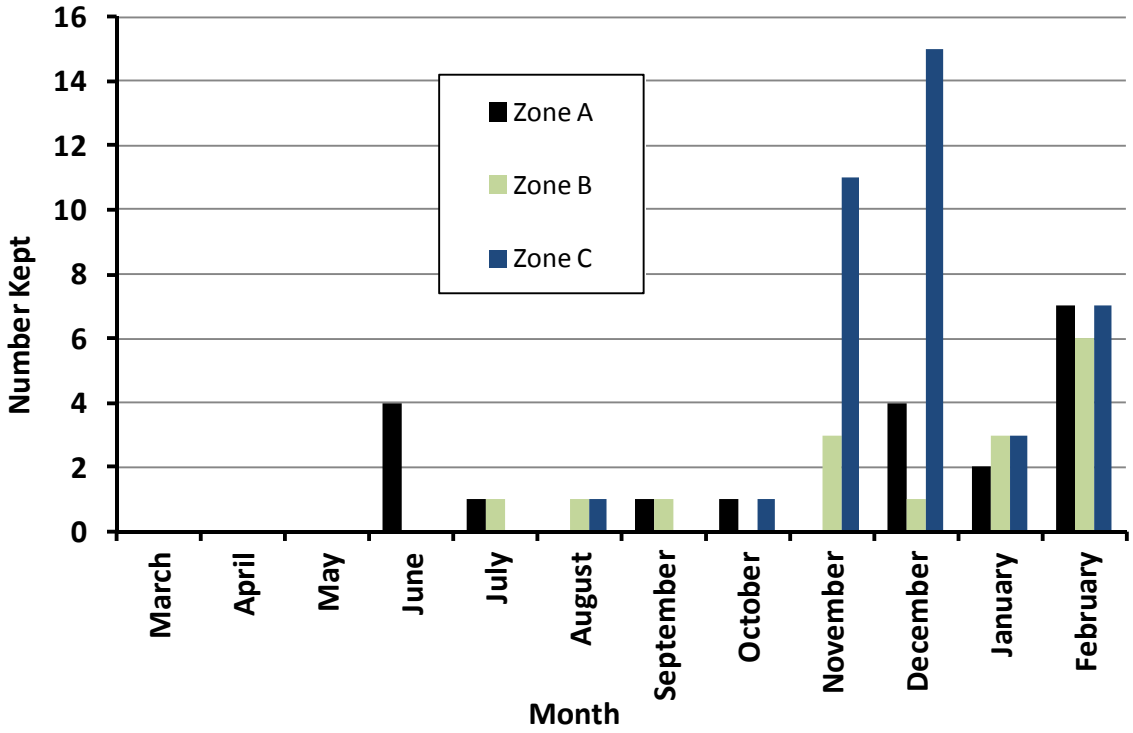


Figure 6. Bull trout harvest by zone (Zone A = Libby Dam to Tenmile Creek; Zone B = Tenmile Creek to Koocanusa Bridge; Zone C = Koocanusa Bridge to Canadian Border) from Lake Koocanusa during the 2011 - 2012 season.

**Catch Card Violations**

By July 1, 2012 we received 399 catch cards for the 780 cards issued for the Koocanusa bull trout fishery. We found technical violations on 65 cards (16.3%). This was another increase over the previous year but showed that most anglers understood the procedure and correctly filled out the catch card. All of the violations were combinations of not notching card for harvested bull trout (48%), not signing the catch card (37%) or both (15%). All violations were submitted to Region One enforcement division for follow-up.

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