# Fisheries Division
# Federal Aid Job Progress Report

Montana Statewide Fisheries Management

Federal Aid Project Number: F-113-R-6

July 1, 2021 – June 30, 2022

Project Title: Montana Statewide Fisheries Management

Job Title: Havre Area Coldwater Fisheries Management

Abstract:

The coldwater fisheries in Hill, Blaine, and Phillips Counties experienced low summer flows and receding water levels in 2020/2021. Severe drought conditions plagued the area and continued to persist into 2022. Partial fish kills were observed during the late summer and continued through the winter. Kills were observed at North Faber, Choteau and Snag Retention. Several severe algal blooms were observed at multiple reservoirs by August and September, a trend that continues to become more common than rare. Rainbow trout survival in Beaver Creek Reservoir has been poor the past few years and correlates with lower trout densities, likely due to predation by walleye and pike shortly after stocking. Rainbow trout densities and growth in Bearpaw Lake have been stable but white sucker densities continue to remain high. Beaver Creek Reservoir, Bearpaw Lake and select ponds and reservoirs in Hill, Blaine, and Phillips Counties were monitored in 2021 and results and management recommendations for all these waters are presented.

## OBJECTIVES AND DEGREE OF ATTAINMENT

*Survey and Inventory:* Objective is to survey and monitor the characteristics and trends of fish populations, angler harvest and preference, and to assess habitat conditions in selected waters. Objective accomplished, data presented.

*Fish Population Management:* Objective is to implement fish stocking programs and/or fish eradication actions to maintain fish populations at levels consistent with habitat conditions and other limiting factors. Objective accomplished, data presented.

*Technical Guidance:* To review projects by federal, state and local government agencies and private parties that has the potential to affect fisheries resources, and to provide technical advice or decisions to mitigate impacts on these resources. Provide landowners and other private parties with technical advice and information to sustain and enhance fisheries resources. Objective accomplished: (2) 310 and (13) 124 projects were reviewed along with one wastewater review with local agencies; attended two walleye unlimited meetings, one Chinook Road and Gun Club meeting, and helped with two school programs and fishing events related to the “Hooked on Fishing” program.

## METHODS

Floating and sinking multi-filament experimental gill nets 125 feet in length and 6 feet deep consisting of 25-foot panels of ¾", 1", 1 ¼", 1 ½", and 2 ½" mesh were set to acquire information on adult fish populations in ponds and reservoirs. Whenever possible, fish were measured for total length (TL: inches (in.)) and weighed to the nearest 0.01 pound (lbs.).

## RESULTS AND DISCUSSION

### Beaver Creek Reservoir

Beaver Creek Reservoir, located south of Havre, is a 185-acre reservoir with a maximum depth of 70 feet. Its proximity to the city of Havre makes this reservoir a valuable local resource and it has been managed intensively for a variety of species. The statewide fishing pressure survey for 2019/2020 indicated it received 930 (± 562) angler days (MTFWP Fisheries Bureau 2020). The decrease in pressure observed in 2019 may be due to annual drawdowns in the reservoir by more than 15 feet and recent harmful algal blooms in August/September.

This reservoir was initially managed as a rainbow trout fishery in the 1970's. However, the illegal introductions of northern pike (1980s) and yellow perch (1980s) created a variable rainbow trout fishery. As a result, the fisheries management goal was expanded to include other warm water species, which were legally introduced to control white suckers and enhance the fishing opportunity within the reservoir. Currently this reservoir receives annual plants of 40,000 catchable size Arlee and Arlee x Erwin rainbow trout, as well as 10,000 fingerling and 5,000 advanced fingerling walleye.

#### Population Status of Adult Fishes

Water levels in September 2021 were down approximately 10 feet during our sampling effort, with a moderate algal bloom occurring. Water levels continued to decrease throughout the fall. Gill netting was conducted overnight with three sinking and three floating experimental gill nets. Prior to 1986, adult fish populations were monitored inconsistently resulting in limited useful trend data on sport fish population size or composition. As a result, these data were excluded from analysis and are only included within the tables for reference to the illegal introduction of northern pike and yellow perch.

#### *Rainbow Trout*

Historically, rainbow trout densities have exhibited high annual variation. This variability can be attributed to rainbow trout stocking densities, predation by northern pike and walleye, and flushing during high water events.

In 2006, stocking densities of rainbow trout reflected historical densities (70,000 RB/year) and relative abundance increased to target levels (10 trout/net) in 2007 and 2008 (Tables 1 and 2). Rainbow trout relative abundance fell below target levels in 2009, 2010, 2011 and 2013 (Table 1), major flood events occurred in three of the four years. In 2014, rainbow trout relative abundance increased to its highest level in 11 years (14 fish/net) and dropped slightly in 2015 to 11.83 fish/net ($\bar{x}$ length=12.78), remaining above historic abundances (Table 1).

In 2017 and 2019, sampling took place at the same time as the fall rainbow trout plant. This was unintentional and resulted in inflated rainbow trout relative abundance and reduced average length (Table 1). Rainbow relative abundance observed in 2020 was the lowest ever documented at 0.17 trout/net and slightly increased in 2021 (Table 1). Since 2008, rainbow trout stocking densities into Beaver Creek Reservoir were decreased due to budget cuts and hatchery space. Stocking densities increased in 2020 and larger trout were stocked in 2021 (Table 2). Walleye densities remain high and

recent stomach analysis on walleye and pike indicate increasing predation on stocked rainbow trout as well (Table 1).

Table 1. Summary of relative abundance (catch per unit effort (CPUE)), average total length, and relative weights of fishes collected in fall gillnetting surveys in Beaver Creek Reservoir, 1974-2021.

| | | | Rainbow Trout | | | Yellow Perch | | | Northern Pike | | | Smallmouth bass | | | Walleye | | | Longnose sucker | | White sucker | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Date | | Nets | Rel. Ab (fish/net) | Ave TL (in.) | Rel Wt | Rel. Ab (fish/net) | Ave TL (in.) | Rel Wt | Rel. Ab (fish/net) | Ave TL (in.) | Rel Wt | Rel. Ab (fish/net) | Ave TL (in.) | Rel Wt | Rel. Ab (fish/net) | Ave TL (in.) | Rel Wt | Rel. Ab (fish/net) | Ave TL (in.) | Rel. Ab (fish/net) | Ave TL (in.) |
| Sep-74 | 1974 | 3 | 24.00 | 10.91 | 111.26 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | 7.33 | 10.49 | 82.33 | 10.23 |
| Nov-77 | 1977 | 3 | 35.00 | 10.05 | 86.31 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | 2.33 | 9.66 | 113.00 | 9.75 |
| Sep-80 | 1980 | 3 | 23.33 | 10.12 | 81.04 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | 1.33 | 6.33 | 156.00 | 8.86 |
| Sep-81 | 1981 | 3 | 7.33 | 10.88 | 82.77 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | 6.67 | 8.78 | 165.33 | 8.70 |
| Oct-82 | 1982 | 3 | 8.33 | 11.78 | 99.67 | -- | -- | -- | 2.33 | 15.79 | 109.67 | -- | -- | -- | -- | -- | -- | 3.33 | 9.66 | 109.67 | 9.69 |
| Oct-83 | 1983 | 3 | 3.33 | 11.79 | 94.66 | -- | -- | -- | 3.67 | 25.10 | 117.07 | -- | -- | -- | -- | -- | -- | 1.33 | -- | 98.33 | -- |
| Sep-84 | 1984 | 3 | 3.00 | 11.26 | 95.43 | -- | -- | -- | 3.67 | 26.64 | 111.21 | -- | -- | -- | -- | -- | -- | 0.67 | 11.00 | 58.33 | 10.50 |
| Sep-86 | 1986 | 6 | 15.00 | 11.50 | 98.90 | -- | -- | -- | 4.17 | 16.68 | 109.86 | -- | -- | -- | -- | -- | -- | 0.00 | -- | 42.00 | -- |
| Sep-87 | 1987 | 6 | 11.33 | 13.61 | 92.06 | 0.33 | 6.30 | -- | 5.17 | 22.43 | 91.71 | -- | -- | -- | 0.00 | -- | -- | 0.00 | -- | 18.00 | -- |
| Sep-88 | 1988 | 6 | 9.67 | 14.74 | 90.40 | 8.17 | 5.93 | 105.50 | 3.00 | 27.55 | 123.61 | -- | -- | -- | 0.67 | 10.58 | 86.48 | 4.00 | -- | 14.00 | -- |
| Sep-89 | 1989 | 6 | 10.67 | 13.15 | 93.45 | 9.17 | 7.59 | 96.04 | 1.17 | 30.31 | 94.56 | -- | -- | -- | 0.00 | -- | -- | 2.50 | -- | 14.33 | 4.13 |
| Sep-90 | 1990 | 6 | 18.50 | 11.96 | 88.66 | 4.00 | 8.51 | 95.13 | 0.67 | 20.95 | 100.49 | -- | -- | -- | 2.67 | 13.69 | 81.72 | 9.17 | 8.04 | 9.67 | 14.12 |
| Sep-91 | 1991 | 6 | 15.50 | 12.78 | 93.26 | 12.00 | 7.39 | 103.98 | 2.33 | 16.57 | 95.37 | -- | -- | -- | 5.67 | 13.98 | 90.24 | 2.83 | -- | 8.17 | -- |
| Sep-92 | 1992 | 6 | 13.67 | 13.74 | 93.42 | 6.00 | 6.37 | 91.54 | 3.33 | 25.64 | 113.39 | -- | -- | -- | 2.33 | 17.84 | 94.80 | 1.33 | -- | 7.67 | -- |
| Sep-93 | 1993 | 6 | 3.17 | 16.43 | 94.48 | 12.33 | 7.20 | 109.06 | 2.00 | 27.49 | 100.01 | -- | -- | -- | 3.33 | 16.75 | 95.36 | 0.00 | -- | 8.67 | -- |
| Sep-94 | 1994 | 6 | 27.67 | 11.73 | 99.87 | 23.83 | 7.65 | 101.80 | 2.83 | 25.52 | 114.54 | -- | -- | -- | 1.67 | 17.39 | 103.33 | 0.00 | -- | 6.00 | -- |
| Sep-95 | 1995 | 6 | 20.17 | 13.42 | 96.73 | 20.00 | 7.71 | 102.97 | 3.50 | 21.66 | 96.62 | -- | -- | -- | 2.50 | 17.96 | 90.90 | 0.00 | -- | 12.83 | -- |
| Sep-96 | 1996 | 6 | 7.83 | 12.56 | 96.59 | 38.00 | 7.58 | 105.79 | 2.83 | 24.86 | 103.02 | 0.17 | 10.10 | 119.26 | 3.33 | 16.68 | 96.53 | 0.00 | -- | 11.00 | 3.75 |
| Sep-97 | 1997 | 6 | 6.83 | 13.00 | 91.31 | 39.50 | 7.22 | 94.54 | 4.17 | 21.70 | 99.11 | 0.00 | -- | -- | 2.17 | 17.65 | 96.90 | 0.00 | -- | 6.17 | -- |
| Sep-98 | 1998 | 6 | 4.50 | 15.53 | 86.75 | 47.17 | 7.55 | 93.84 | 4.83 | 24.43 | 94.79 | 0.33 | 11.65 | 114.91 | 4.33 | 18.04 | 96.05 | 0.00 | -- | 10.17 | 13.74 |
| Sep-99 | 1999 | 5 | 4.20 | 12.26 | 104.04 | 40.60 | 8.39 | 93.18 | 2.20 | 24.17 | 105.00 | 0.80 | 8.95 | 119.90 | 4.40 | 15.24 | 95.74 | 0.20 | 17.30 | 4.60 | 13.39 |
| Sep-00 | 2000 | 6 | 1.00 | 15.07 | 93.40 | 25.00 | 7.52 | 96.67 | 2.50 | 25.33 | 99.20 | 0.50 | 7.80 | 104.56 | 4.67 | 16.66 | 96.31 | 0.00 | -- | 4.17 | 0.00 |
| Sep-01 | 2001 | 6 | 14.50 | 12.09 | 92.76 | 30.67 | 7.39 | 100.86 | 1.00 | 27.73 | 96.81 | 0.17 | 10.40 | 108.60 | 4.50 | 13.93 | 93.62 | 0.17 | 17.10 | 8.67 | 14.72 |
| Sep-02 | 2002 | 6 | 3.33 | 11.98 | 96.85 | 21.67 | 7.98 | 100.11 | 1.17 | 25.76 | 96.31 | 0.50 | 9.43 | 99.04 | 7.67 | 14.90 | 89.57 | 0.17 | -- | 5.33 | -- |
| Sep-03 | 2003 | 5 | 15.80 | 11.46 | 102.26 | 12.20 | 7.94 | 125.10 | 2.00 | 13.90 | 108.18 | 0.20 | 10.40 | 96.53 | 3.60 | 14.74 | 101.16 | 0.00 | -- | 2.60 | -- |
| Sep-04 | 2004 | 6 | 12.83 | 11.62 | 93.09 | 16.17 | 8.34 | 99.43 | 0.67 | 23.90 | 103.89 | 0.33 | 8.20 | 103.42 | 2.50 | 15.32 | 68.68 | 0.17 | 19.20 | 5.17 | 15.99 |
| Sep-05 | 2005 | 6 | 5.50 | 13.63 | 97.00 | 12.33 | 8.35 | 102.88 | 0.50 | 29.23 | 104.05 | 0.00 | -- | -- | 3.33 | 15.29 | 96.82 | 0.00 | -- | 6.00 | 16.57 |
| Sep-06 | 2006 | 6 | 3.00 | 13.38 | 143.90 | 23.00 | 7.71 | 101.30 | 1.50 | 26.94 | 97.10 | 0.00 | -- | -- | 3.00 | 15.08 | 98.10 | 0.00 | -- | 3.00 | 16.89 |
| Sep-07 | 2007 | 6 | 9.00 | 11.80 | 95.70 | 29.33 | 7.90 | 107.00 | 1.67 | 27.50 | 101.50 | 0.17 | 9.20 | 107.20 | 5.17 | 12.80 | 103.80 | 0.00 | -- | 17.00 | 17.20 |
| Sep-08 | 2008 | 6 | 10.00 | 12.05 | 104.30 | 26.50 | 8.01 | 102.48 | 1.00 | 28.10 | 97.53 | 0.17 | 14.00 | 113.20 | 2.67 | 19.80 | 94.20 | 0.00 | -- | 1.83 | 16.89 |
| Sep-09 | 2009 | 6 | 4.00 | 11.80 | 100.90 | 20.00 | 8.20 | 100.40 | 2.33 | 26.40 | 95.16 | 0.17 | 15.70 | 124.59 | 3.67 | 18.26 | 104.72 | 0.00 | -- | 0.83 | 16.90 |
| Sep-10 | 2010 | 6 | 3.67 | 12.12 | 110.10 | 19.20 | 7.35 | 106.30 | 0.83 | 24.32 | 92.23 | 0.17 | 10.20 | 113.73 | 1.33 | 14.48 | 87.10 | 0.00 | -- | 1.17 | 16.59 |
| Aug-11 | 2011 | 4 | 3.75 | 12.93 | 98.08 | 26.50 | 7.76 | 92.06 | 1.75 | 18.10 | 83.31 | 0.25 | 8.20 | 76.40 | 0.75 | 13.63 | 81.05 | 0.00 | -- | 6.00 | 16.07 |
| Sep-12 | 2012 | 6 | 12.33 | 11.75 | 105.68 | 36.33 | 8.53 | 157.05 | 1.00 | 24.07 | 106.95 | 0.33 | 9.40 | 111.89 | 3.83 | 11.76 | 99.32 | 0.00 | -- | 3.20 | 15.14 |
| Sep-13 | 2013 | 6 | 5.33 | 11.56 | 104.79 | 26.00 | 8.81 | 104.64 | 0.33 | 22.05 | 92.04 | -- | -- | -- | 2.50 | 10.18 | 87.06 | 0.00 | -- | 5.33 | 16.28 |
| Sep-14 | 2014 | 6 | 14.00 | 12.22 | 98.22 | 8.50 | 8.34 | 92.12 | 1.50 | 25.46 | 100.97 | 0.33 | 13.50 | 104.83 | 1.83 | 15.25 | 83.76 | 0.00 | -- | 2.66 | 16.31 |
| Sep-15 | 2015 | 6 | 11.83 | 12.78 | 96.40 | 12.33 | 8.79 | 95.82 | 2.00 | 24.95 | 101.28 | 0.66 | 11.75 | 108.10 | 4.66 | 12.72 | 94.03 | 0.00 | -- | 1.83 | 16.84 |
| Sep-16 | 2016 | 6 | 4.33 | 13.57 | 95.91 | 5.00 | 8.24 | 98.79 | 1.16 | 23.23 | 95.79 | 0.83 | 13.50 | 103.27 | 8.33 | 13.82 | 89.11 | 0.00 | -- | 2.50 | 17.64 |
| Sep-17 | 2017 | 4 | 23.25 | 9.21 | 110.26 | 7.50 | 7.64 | 92.54 | 1.50 | 24.62 | 100.71 | -- | -- | -- | 8.50 | 14.04 | 87.75 | 0.00 | -- | 1.00 | 16.60 |
| Sep-18 | 2018 | 6 | 0.67 | 17.45 | 107.56 | 4.67 | 7.87 | 98.67 | 1.67 | 24.65 | 103.82 | 0.33 | 11.50 | 105.35 | 8.67 | 14.01 | 89.26 | 0.00 | -- | 1.67 | 17.64 |
| Sep-19 | 2019 | 6 | 13.17 | 8.09 | 106.75 | 20.67 | 5.95 | 94.81 | 2.17 | 21.95 | 103.71 | 0.17 | 14.60 | 99.95 | 13.17 | 14.68 | 85.71 | 0.00 | -- | 0.67 | 18.80 |
| Sep-20 | 2020 | 6 | 0.17 | 14.90 | 92.58 | 20.33 | 6.48 | 94.23 | 3.50 | 28.61 | 101.54 | -- | -- | -- | 6.50 | 16.31 | 84.57 | 0.00 | -- | 1.17 | 17.91 |
| Sep-21 | 2021 | 6 | 1.17 | 12.57 | 108.24 | 20.83 | 7.56 | 100.89 | 0.83 | 25.56 | 103.09 | -- | -- | -- | 5.33 | 17.53 | 84.16 | 0.00 | -- | 0.17 | 13.80 |

Table 2. Rainbow trout historic stocking rates as it relates to numbers stocked, strain, length and month on Beaver Creek Reservoir, 1997-2021. Strains include A-Arlee I- Eagle Lake T- Erwin N- Arlee x Eagle Lake R- Arlee x Erwin G- Gerrard.

| Year | # Stocked | Strain | Length (Inches) | Month Stocked |
|---|---|---|---|---|
| 1997 | 19,990 | T | 6.7-7.3 | April |
| 1997 | 52,722 | A | 3.6 | May |
| 1997 | 19,219 | I | 5.9 | June |
| 1998 | 11,358 | T | 6.8 | April |
| 1998 | 5,200 | T | 7.3 | May |
| 1998 | 40,086 | A | 4.0 | June |
| 1998 | 19,992 | I | 5.6 | June |
| 1999 | 17,010 | T | 7.0 | April |
| 1999 | 10,413 | A | 6.8 | April |
| 1999 | 4,858 | T | 8.7 | June |
| 1999 | 18,691 | A | 5.8 | July |
| 1999 | 6,975 | I | 3.0 | August |
| 2000 | 10,557 | A | 6.0 | April |
| 2000 | 25,010 | T | 6.7 | April |
| 2000 | 18,955 | I | 4.2 | July |
| 2000 | 36,758 | A | 6.8 | September |
| 2001 | 21,151 | T | 6.2 | April |
| 2001 | 6,012 | N | 4.2 | June |
| 2001 | 52,578 | A | 6.5 | September |
| 2001 | 15,433 | I | 4.6 | September |
| 2002 | 20,010 | T | 6.5 | April |
| 2002 | 4,992 | A | 3.2 | April |
| 2002 | 47,721 | A | 6.7-7.3 | September |
| 2002 | 2,992 | T | 9.0 | September |
| 2003 | 20,705 | T | 6.2 | April |
| 2003 | 48,563 | A | 5.6-7.2 | September |
| 2003 | 15,175 | N | 6.4 | September |
| 2004 | 20,040 | T | 5.9 | April |
| 2004 | 7,000 | I | 4.1 | August |
| 2004 | 17,149 | I | 4.4 | September |
| 2004 | 45,663 | A | 6.3-7.0 | September |
| 2004 | 9,998 | I | 3.8 | October |
| 2005 | 10,440 | T | 6.6 | April |
| 2005 | 30,976 | A | 7.7 | September |
| 2006 | 20,045 | T | 6.7 | April |
| 2006 | 19,125 | A | 3.2 | May |
| 2006 | 54,854 | A | 6.7-7.9 | September |
| 2007 | 19,121 | I | 8.0 | April |
| 2007 | 52,058 | A | 6.5-7.6 | September |
| 2007 | 24,823 | I | 4.3 | September |
| 2008 | 20,168 | R | 6.9 | April |
| 2008 | 50,222 | A | 6.1-7.5 | September |
| 2009 | 10,005 | R | 7.2 | April |
| 2009 | 8,364 | I | 8.6 | May |
| 2009 | 49,210 | A | 7.8-8.4 | September |
| 2010 | 19,995 | R | 6.9 | April |
| 2011 | 10,120 | R | 6.6 | April |
| 2011 | 24,486 | A | 7.7 | August |
| 2012 | 30,124 | A | 8.6 | September |
| 2013 | 20,120 | AxI | 7.2 | April |
| 2013 | 30,000 | A | 6.2 | September |
| 2014 | 50,362 | A, R | 5.9 | April/September |
| 2015 | 36,160 | A, R | 7-8.2 | April/September |
| 2016 | 20,137 | R | 6.0-7.0 | April |
| 2017 | 41,424 | A, R | 7.0-8.5 | April/September |
| 2018 | 24,020 | A, R | 7.1 | May/September |
| 2019 | 22,483 | A, R | 7.5 | April/September |
| 2020 | 20,740 | G | 5.3 | October |
| 2020 | 82,709 | A, R | 3.7 | July |
| 2020 | 20,500 | R | 6.8 | April |
| 2021 | 40,134 | A, R | 7.4-8.1 | May/October |

## Bearpaw Lake

Bearpaw Lake is a very popular 45 surface-acre reservoir located on Beaver Creek in the Bearpaw Mountains and received 9,390 (± 2,986) angler days in 2019/2020 (MTFWP Fisheries Bureau 2020). Bearpaw Lake has been managed as a trout fishery since 1960 and is currently maintained with annual plants of 15,000 catchable Arlee, 10,000 Gerrard and 5,000 Eagle Lake rainbow trout. Stocking of cutthroats was discontinued in 2010 due to poor growth rates and overall condition of these fish in Bearpaw Lake. Wild brook trout migrating out of Beaver Creek are also found in the reservoir.

Bearpaw Lake and Beaver Creek also sustain a very robust population of white suckers, which negatively impacts the rainbow trout fishery (Leslie 2007). To limit white sucker abundance, FWP introduced smallmouth bass and they have been naturally reproducing within the reservoir since 1998. Walleye were illegally introduced in the 1990s and were then used as a control measure for white suckers with periodic stockings from 1992 to 1997. In 2006, a supplemental plant of 5,000 advanced fingerlings occurred to replenish the aging walleye population. Following a chemical rehabilitation of Bearpaw Lake conducted in 1983, a manual sucker control program was initiated in 1989 to reduce food competition between trout and white suckers and improve growth and survival of rainbow trout (Figure 1).

### Population Status of Adult Fishes

Adult fish populations were monitored at three fixed experimental gillnetting sites, established in 1984. Gill netting was conducted over-night utilizing one sinking experimental gill net and two floating experimental gill nets. The sinking and floating experimental gill nets were 125 feet in length and 6 feet deep consisting of 25-foot panels of ¾", 1", 1 ¼", 1 ½", and 2 ½" mesh. Fish were measured for total length (TL: inches) and weighted to the nearest 0.01 pound (lb).

From 1989-2015, manual removal efforts of white suckers were attempted annually. Removal efforts involved setting five or more trap nets for one to two weeks during their peak spawning period (April/May). Traps were checked daily, and white suckers were killed and returned to the lake or dumped at a landfill. Limited trap netting has occurred from 2016-2021 to remove adult white suckers.

#### *Rainbow Trout*

Rainbow trout have been stocked in Bearpaw Lake since the 1960s and have been stocked at a rate of 30,000 catchables annually (Table 4). Stocking densities were reduced in 2018 and 2019 due to reduced hatchery budgets but increased in 2020 (Table 4).

The relative abundance of rainbow trout has varied greatly since their introduction (Table 3). The primary reasons for these fluctuations are stocking densities, fishing pressure, stream flows (entrainment) over spillway, and competition with white suckers. In 2015, relative abundance of rainbow trout increased to their highest level since chemical rehabilitation occurred in 1983 (55.7 fish/net), this was the second consecutive year record rainbow trout relative abundance was documented (Table 3). Rainbow trout relative abundance decreased by 60% to 22.3 rainbow trout/net in 2016 and fell to their lowest level since 2009 in 2019 (11.67 fish/net; Table 3). Rainbow relative abundance increased to 31.3 fish/net in 2020 and remained close to average in 2021 (Table 3).

Rainbow and brook trout have had relatively poor growth rates due to competition with white suckers for food. However, since the initiation of manual control effort of white suckers and the introductions of smallmouth bass (1992) and walleye (legally in 1995; Table 5), the average length of trout has increased from lengths recorded in the late 1990s (Figure 1; Table 3).

#### *White Sucker*

The white sucker population has been significantly reduced since control efforts were initiated in 1984 (Figure 1; Table 3). Chemical rehabilitation was attempted in 1983 however white suckers quickly re-populated the lake from upstream sources in Beaver Creek. In 1989, a manual removal program was initiated. From 1989 to 2021, 151,422 white suckers have been removed using trap and gill nets (Table 5).

In 2016, white sucker relative abundance increased by 38% to 53 white sucker/net (Table 3). White suckers accounted for 80% of the total catch during fall surveys and densities have increased since 2011 (Table 3). Results from 2017-2021 show the white sucker population continues to increase (> 60 white sucker/net; Table 3). Removal efforts may have been able to slightly reduce the adult population of suckers from 2016-2021; however, in recent years (2008-2012), when significant declines in white sucker relative abundance occurred (Table 3), significant outflows from Bearpaw Lake were recorded. It appears flushing of suckers during high water events may have a greater influence on white sucker abundance than manual removal efforts. No significant water events have occurred on Bearpaw Lake since 2013.

***Smallmouth Bass***

Smallmouth bass were introduced legally in 1992 to assist with the control of YOY white suckers. Since 1998, smallmouth bass have been successfully reproducing and recruiting into the population. In addition to providing control of white suckers, smallmouth bass have become an important addition to the fishery. Anglers continue to report catching many smallmouth bass throughout the reservoir during the summer months.

***Walleye***

Walleye were illegally introduced into Bearpaw Lake in the early 1990s. They were first documented in the lake in 1992. From 1992 to 1997, walleye fry and fingerlings were stocked to help control adult white sucker populations. Walleye were last stocked in 2006 with 5,000 advanced fingerlings to replenish the aging walleye population. Since their legal introduction, walleye have exhibited slow growth and their densities continue to decline and are likely extirpated from Bearpaw Lake (no walleye captured during last eight fall surveys: Table 3).

Figure 1. - Comparison of white sucker relative abundance during fall gill netting surveys and average length of rainbow trout sampled in Bearpaw Lake (1984-2021).

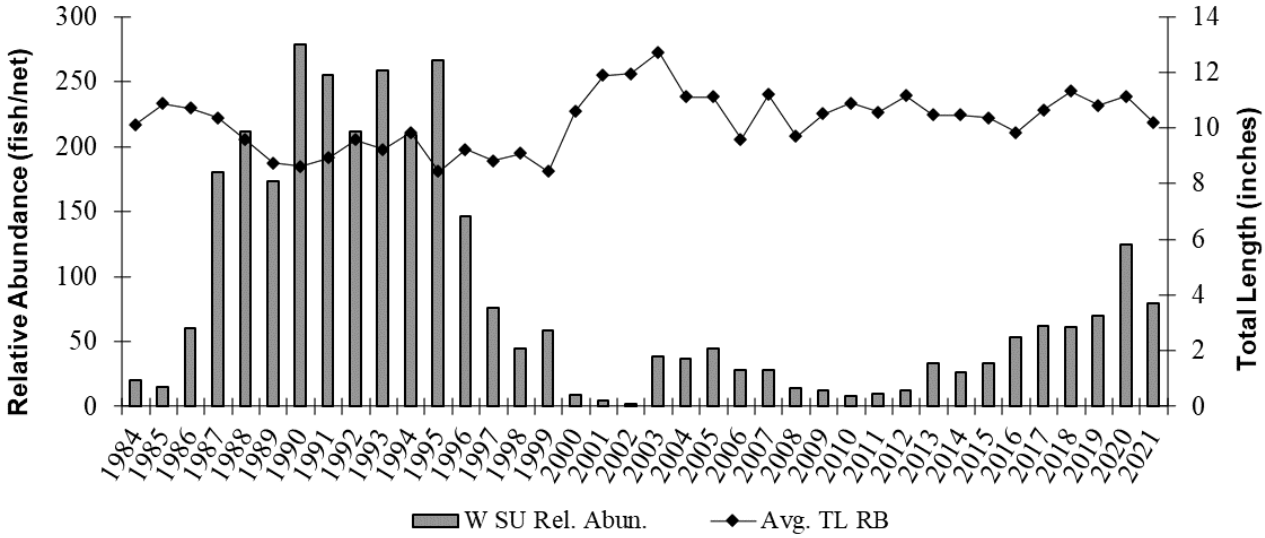


Table 3.- Summary of relative abundance (catch per unit effort (CPUE)), total length (TL), and relative weights of fishes collected in fall gillnetting surveys in Bear Paw Lake since chemical rehabilitation in 1983.

| | | | Rainbow Trout | | | Brook Trout | | | Yellowstone Cutthoat Trout | | | White Sucker | | | Smallmouth Bass | | | Walleye | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Date | | Nets | CPUE (fish/net) | Ave TL (in.) | Rel Wt | CPUE (fish/net) | Ave TL (in.) | Rel Wt | CPUE (fish/net) | Ave TL (in.) | Rel Wt | CPUE (fish/net) | Ave TL (in.) | Rel Wt | CPUE (fish/net) | Ave TL (in.) | Rel Wt | CPUE (fish/net) | Ave TL (in.) | Rel Wt |
| Sep-84 | 1984 | 2 | 0.00 | -- | -- | 0.00 | -- | -- | 15.50 | 10.13 | 86.34 | 13.50 | 8.00 | -- | -- | -- | -- | -- | -- | -- |
| Sep-85 | 1985 | 3 | 1.33 | 12.03 | 97.49 | 1.00 | 9.05 | 109.72 | 27.33 | 11.50 | 86.83 | 6.33 | -- | -- | -- | -- | -- | -- | -- | -- |
| Sep-86 | 1986 | 3 | 0.00 | -- | -- | 3.33 | 10.41 | 106.78 | 16.67 | 11.01 | 86.45 | 94.33 | 6.40 | -- | -- | -- | -- | -- | -- | -- |
| Sep-87 | 1987 | 3 | 17.00 | 11.27 | 93.31 | 3.00 | 10.31 | 103.48 | 25.67 | 9.52 | 86.21 | 192.67 | 7.00 | -- | -- | -- | -- | -- | -- | -- |
| Aug-88 | 1988 | 3 | 9.33 | 10.66 | 83.05 | 1.33 | 10.48 | 100.24 | 9.00 | 7.60 | 90.08 | 210.33 | 11.67 | 93.74 | -- | -- | -- | -- | -- | -- |
| Sep-89 | 1989 | 3 | 15.33 | 8.64 | 88.09 | 0.67 | 9.50 | 106.91 | 19.33 | 8.08 | 85.50 | 173.67 | 8.00 | -- | -- | -- | -- | -- | -- | -- |
| Aug-90 | 1990 | 3 | 9.00 | 9.95 | 81.94 | 0.33 | 7.20 | 86.56 | 22.33 | 8.71 | 77.85 | 277.67 | 8.00 | -- | -- | -- | -- | -- | -- | -- |
| Aug-91 | 1991 | 3 | 4.00 | 10.23 | 88.55 | 0.67 | 7.45 | 104.75 | 15.00 | 9.12 | 85.36 | 255.33 | 8.00 | -- | -- | -- | -- | -- | -- | -- |
| Sep-92 | 1992 | 3 | 17.00 | 9.83 | 90.97 | 0.33 | 10.10 | 90.14 | 58.67 | 8.79 | 77.22 | 212.00 | 8.00 | -- | -- | -- | -- | 0.33 | 13.90 | 97.61 |
| Sep-93 | 1993 | 3 | 0.00 | -- | -- | 0.33 | 9.30 | 105.94 | 6.00 | 9.15 | 81.65 | 258.33 | 8.00 | -- | 0.00 | -- | -- | 0.00 | -- | -- |
| Sep-94 | 1994 | 3 | 6.33 | 10.59 | 101.87 | 0.00 | -- | -- | 13.67 | 9.09 | 79.87 | 208.67 | 8.00 | -- | 0.00 | -- | -- | 0.00 | -- | -- |
| Sep-95 | 1995 | 2 | 21.50 | 9.07 | 92.20 | 0.00 | -- | -- | 89.50 | 7.82 | 81.30 | 399.00 | 8.00 | -- | 1.00 | 5.80 | 111.70 | 0.00 | -- | -- |
| Sep-96 | 1996 | 3 | 1.67 | 10.36 | 102.97 | 0.33 | 8.40 | 90.25 | 60.67 | 8.94 | 85.64 | 146.00 | 8.80 | -- | 0.67 | 6.80 | 96.44 | 1.33 | 8.73 | 81.46 |
| Sep-97 | 1997 | 3 | 24.67 | 9.16 | 93.58 | 0.00 | -- | -- | 26.00 | 8.47 | 80.26 | 76.00 | 10.00 | -- | 0.67 | 9.90 | 103.82 | 1.00 | 7.73 | 72.03 |
| Sep-98 | 1998 | 3 | 10.00 | 9.34 | 86.71 | 0.00 | -- | -- | 3.67 | 8.84 | 72.68 | 44.33 | 12.02 | 84.89 | 0.33 | 6.00 | 90.19 | 1.33 | 8.43 | 80.59 |
| Sep-99 | 1999 | 3 | 43.33 | 8.31 | 97.60 | 0.00 | -- | -- | 19.33 | 8.54 | 79.14 | 57.33 | 12.00 | -- | 0.00 | -- | -- | 1.33 | 10.43 | 83.95 |
| Sep-00 | 2000 | 2 | 46.00 | 11.36 | 97.54 | 1.50 | 9.67 | 98.77 | 20.00 | 10.81 | 80.53 | 14.00 | 12.00 | -- | 6.00 | 9.76 | 103.09 | 3.50 | 11.30 | 88.39 |
| Sep-01 | 2001 | 2 | 11.00 | 13.39 | 98.99 | 6.50 | 11.36 | 101.16 | 15.00 | 10.91 | 81.14 | 6.00 | 8.00 | -- | 2.00 | 10.83 | 102.66 | 0.00 | -- | -- |
| Sep-02 | 2002 | 2 | 19.50 | 12.58 | 98.57 | 0.00 | -- | -- | 6.50 | 11.31 | 83.45 | 3.00 | 13.52 | 99.67 | 0.00 | -- | -- | 2.00 | 19.50 | 82.57 |
| Sep-03 | 2003 | 3 | 16.33 | 12.72 | 94.32 | 0.00 | -- | -- | 0.00 | -- | -- | 37.67 | 8.00 | -- | 5.67 | 12.21 | 112.80 | 1.00 | 19.60 | 101.96 |
| Sep-04 | 2004 | 3 | 13.33 | 11.11 | -- | 0.00 | -- | -- | 0.00 | -- | -- | 36.67 | 12.60 | -- | 0.33 | 14.50 | -- | 0.67 | 20.45 | -- |
| Sep-05 | 2005 | 3 | 24.67 | 11.12 | 92.19 | 0.00 | -- | -- | 0.33 | -- | -- | 44.67 | 13.14 | 99.05 | 5.67 | 9.07 | 112.75 | 1.33 | 20.53 | 101.17 |
| Sep-06 | 2006 | 3 | 32.00 | 10.62 | 98.00 | 0.00 | -- | -- | 0.67 | 9.35 | 96.10 | 28.00 | 15.31 | 108.20 | 9.00 | 9.84 | 109.80 | 0.33 | 15.40 | 104.20 |
| Sep-07 | 2007 | 3 | 13.33 | 11.20 | 96.30 | 0.00 | -- | -- | 2.33 | 9.20 | 80.90 | 28.00 | 13.40 | 102.30 | 9.00 | 9.00 | 115.70 | 4.33 | 7.60 | 96.10 |
| Sep-08 | 2008 | 3 | 30.33 | 9.73 | 94.58 | 0.00 | -- | -- | 7.67 | 9.03 | 84.95 | 14.00 | 14.12 | 108.86 | 5.67 | 10.94 | 147.97 | 5.00 | 8.07 | 97.96 |
| Sep-09 | 2009 | 3 | 9.66 | 10.50 | 73.45 | 0.33 | 10.00 | 100.88 | 9.00 | 9.33 | 62.37 | 12.33 | 14.58 | 95.00 | 7.66 | 11.31 | 104.73 | 2.66 | 10.25 | 80.07 |
| Sep-10 | 2010 | 3 | 14.33 | 10.90 | 104.35 | 0.33 | 10.00 | 111.49 | 0.00 | -- | -- | 7.67 | 13.80 | 104.10 | 1.67 | 8.94 | 117.20 | 6.00 | 10.62 | 98.00 |
| Aug-11 | 2011 | 3 | 26.33 | 10.56 | 98.91 | 0.33 | 10.60 | 106.02 | 0.00 | -- | -- | 10.00 | 14.28 | 102.92 | 0.00 | -- | -- | 0.67 | 12.40 | 103.88 |
| Sep-12 | 2012 | 3 | 34.67 | 11.15 | 99.37 | 1.33 | 9.73 | 99.80 | 0.00 | -- | -- | 12.00 | 12.26 | 103.03 | 0.66 | 10.80 | 106.63 | 1.66 | 14.90 | 102.83 |
| Sep-13 | 2013 | 3 | 24.00 | 10.47 | 146.81 | 0.66 | 8.55 | 98.05 | 0.00 | -- | -- | 33.33 | 12.79 | 106.65 | 1.66 | 12.20 | 104.72 | 0.33 | 17.10 | 109.51 |
| Sep-14 | 2014 | 3 | 52.30 | 10.46 | 97.25 | 4.00 | 10.05 | 90.72 | 0.00 | -- | -- | 25.70 | 13.01 | 98.94 | 0.33 | 12.90 | 106.22 | 0.00 | -- | -- |
| Sep-15 | 2015 | 3 | 55.67 | 10.36 | 91.26 | 0.00 | -- | -- | 0.00 | -- | -- | 33.00 | 12.18 | 94.10 | 0.33 | 12.90 | 107.95 | 0.00 | -- | -- |
| Sep-16 | 2016 | 3 | 22.30 | 9.83 | 90.11 | 0.00 | -- | -- | 0.00 | -- | -- | 53.00 | 14.00 | 95.10 | 0.00 | -- | -- | 0.00 | -- | -- |
| Sep-17 | 2017 | 3 | 27.00 | 10.64 | 93.51 | 0.00 | -- | -- | 0.00 | -- | -- | 61.70 | 14.43 | 97.30 | 2.33 | 10.77 | 95.77 | 0.00 | -- | -- |
| Sep-18 | 2018 | 3 | 28.00 | 11.31 | 88.00 | 0.33 | 10.30 | 82.45 | 0.00 | -- | -- | 60.70 | 11.97 | 93.55 | 2.67 | 14.49 | 108.22 | 0.00 | -- | -- |
| Sep-19 | 2019 | 3 | 11.67 | 10.82 | 93.93 | 0.00 | -- | -- | 0.00 | -- | -- | 69.70 | 11.97 | 89.95 | 0.33 | 8.40 | 92.02 | 0.00 | -- | -- |
| Sep-20 | 2020 | 3 | 31.33 | 11.13 | 98.87 | 0.00 | -- | -- | 0.00 | -- | -- | 124.00 | 12.32 | 92.75 | 4.33 | 12.28 | 103.43 | 0.00 | -- | -- |
| Sep-21 | 2021 | 3 | 21.67 | 10.18 | 87.13 | 0.00 | -- | -- | 0.00 | -- | -- | 79.33 | 12.26 | 88.14 | 0.67 | 9.60 | 87.58 | 0.00 | -- | -- |

Table 4. Stocking summary of rainbow trout, Yellowstone cutthroat trout, smallmouth bass, and walleye in Bearpaw Lake, 1984-2021. Strains include A-Arlee I- Eagle Lake D- Lake DeSmet M- McBride Lake G- Goose Lake (YCT) /Gerrard (RB).

| | Rainbow Trout | | | | Yellowstone Cutthoat Trout | | | Smallmouth Bass | | Walleye | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Date | # Stocked | Strain | Month | Size (inches) | # Stocked | Strain | Month | # Stocked | Month | # Stocked | Month |
| 1984 | -- | -- | -- | -- | 21,234 | M | April/Sept. | -- | -- | -- | -- |
| 1985 | -- | -- | -- | -- | 8,120 | M | May/Aug. | -- | -- | -- | -- |
| 1986 | -- | -- | -- | -- | 12,727 | M | June/Sept. | -- | -- | -- | -- |
| 1987 | 13,008 | D and I | April/Sept. | 6.9 | 19,248 | M | April/Sept. | -- | -- | -- | -- |
| 1988 | 8,018 | I | Sept. | 5.2 | 28,904 | M | April/Sept. | -- | -- | -- | -- |
| 1989 | 500 | | May | 6 | 6,000 | M | May | -- | -- | -- | -- |
| 1990 | -- | -- | -- | -- | 5,025 | M | May | -- | -- | -- | -- |
| 1991 | 9,965 | A | Sept. | 6.8 | 7,574 | M | May | -- | -- | -- | -- |
| 1992 | 6,879 | A | Sept. | 8.8 | 8,023 | M | May | 25,000 | Aug. | -- | -- |
| 1993 | 11,040 | A | Sept. | 7.1 | 5,058 | M | May | 41,250 | July/Aug. | -- | -- |
| 1994 | 9,394 | A | Sept. | 7.4 | 5,040 | M | May | 23,995 | July/Aug. | -- | -- |
| 1995 | -- | -- | -- | -- | 10,064 | M | May | -- | -- | 5,000 | June |
| 1996 | 11,398 | A | Sept. | 7.2 | 9,997 | M | May | 20,000 | July | 4,000 | June |
| 1997 | 13,448 | A | Sept. | 6.8 | 8,924 | M | May | 5,000 | Aug. | 6,000 | June |
| 1998 | 13,904 | A | Sept. | 6.8 | 5,047 | M | May | 5,000 | July | -- | -- |
| 1999 | 17,160 | A | June | 5 | 4,048 | M | May | -- | -- | -- | -- |
| 2000 | 4,995 | A | Sept. | 6.5 | 3,973 | M | May | -- | -- | -- | -- |
| 2001 | 10,000 | A | Sept. | 6.4 | 3,991 | M | May | -- | -- | -- | -- |
| 2002 | 10,700 | A | Sept. | 7.3 | 4,320 | M | May | -- | -- | -- | -- |
| 2003 | 15,215 | A | Sept. | 6.5 | 4,200 | M | May | -- | -- | -- | -- |
| 2004 | 12,549 | A | Sept. | 6.5 | 4,384 | M | May | -- | -- | -- | -- |
| 2005 | 14,520 | A | Sept. | 7.7 | 5,600 | M | May | -- | -- | -- | -- |
| 2006 | 12,628 | A | Sept. | 6.7 | 6,214 | M | April/May | -- | -- | 5,112 | Sept. |
| 2007 | 20,000 | A and I | Sept. | 6 | 8,127 | M | May | -- | -- | -- | -- |
| 2008 | 15,000 | A | Sept. | 7.3 | 7,293 | G | May | -- | -- | -- | -- |
| 2009 | 15,000 | A | Sept. | 8 | 5,024 | G | May | -- | -- | -- | -- |
| 2010 | 5,000 | I | June | 7.6 | -- | -- | -- | -- | -- | -- | -- |
| 2011 | 5,104 | I | June | 7.7 | -- | -- | -- | -- | -- | -- | -- |
| 2012 | 15,828 | A | Sept./Nov. | 8.7 | -- | -- | -- | -- | -- | -- | -- |
| 2013 | 20,000 | A | Sept./Nov. | 6.9 | -- | -- | -- | -- | -- | -- | -- |
| 2014 | 20,536 | A | June/Sept. | 6.7 | -- | -- | -- | -- | -- | -- | -- |
| 2015 | 20,328 | A and I | May/Sept. | 7.5 | -- | -- | -- | -- | -- | -- | -- |
| 2016 | 19,777 | A and I | May/Sept. | 6.4 | -- | -- | -- | -- | -- | -- | -- |
| 2017 | 17,725 | A and I | Sept./Oct. | 8 | -- | -- | -- | -- | -- | -- | -- |
| 2018 | 12,757 | A and I | Sept./Oct. | 7 | -- | -- | -- | -- | -- | -- | -- |
| 2019 | 12,715 | A and I | Sept./Oct. | 7.3 | -- | -- | -- | -- | -- | -- | -- |
| 2020 | 30,214 | A and I | July/Sept. | 3.3-7.3 | -- | -- | -- | -- | -- | -- | -- |
| 2021 | 30,049 | A, I and G | Oct. | 5.0-8.0 | -- | -- | -- | -- | -- | -- | -- |

Table 5. - Number of white suckers removed from Bearpaw Lake by trap netting and fall gill netting, 1989-2021.

| Year | Number Trap Netting | Number Gill netting | Total Number | Total Pounds |
|---|---|---|---|---|
| 1989 | 12,545 | 521 | 13,066 | 9,359.19 |
| 1990 | 44,622 | 833 | 45,455 | 10,396.52 |
| 1991 | 18,140 | 766 | 18,906 | 4,932.86 |
| 1992 | 4,133 | 636 | 4,769 | 955.42 |
| 1993 | 5,239 | 775 | 6,014 | 1,205.33 |
| 1994 | 6,995 | 626 | 7,621 | 882.49 |
| 1995 | 5,653 | 798 | 6,451 | 2,396.44 |
| 1996 | 1,991 | 438 | 2,429 | 817.39 |
| 1997 | 13,485 | 228 | 13,713 | 8,227.80 |
| 1998 | 6,708 | 133 | 6,841 | 5,309.22 |
| 1999 | 8,239 | 172 | 8,411 | 7,614.72 |
| 2000 | 2,225 | 28 | 2,253 | 2,591.20 |
| 2001 | 331 | 12 | 343 | 562.69 |
| 2002 | 17 | 6 | 23 | 21.65 |
| 2003 | 1,564 | 113 | 1,677 | 2,362.17 |
| 2004 | 222 | 110 | 332 | 418.32 |
| 2005 | 1,895 | 134 | 2,029 | 2,311.74 |
| 2006 | 1,893 | 84 | 1,977 | 2,491.02 |
| 2007 | 1,705 | 84 | 1,789 | 2,111.02 |
| 2008 | 560 | 42 | 602 | 818.72 |
| 2009 | 175 | 37 | 212 | 290.44 |
| 2010 | 104 | 23 | 127 | 173.99 |
| 2011 | 310 | 30 | 340 | 418.20 |
| 2012 | 409 | 36 | 445 | 547.35 |
| 2013 | 641 | 100 | 741 | 911.43 |
| 2014 | 1,560 | 77 | 1,637 | 2,013.51 |
| 2015 | 1,392 | 99 | 1,491 | 1,491.00 |
| 2016 | -- | 159 | 159 | 196.00 |
| 2017 | -- | 185 | 185 | 263.00 |
| 2018 | -- | 182 | 182 | 263.00 |
| 2019 | -- | 209 | 209 | 192.00 |
| 2020 | 383 | 372 | 755 | 385.05 |
| 2021 | -- | 238 | 238 | 216.58 |
| Totals | 143,136 | 8,286 | 151,422 | 73,147 |

**Blaine County Ponds**

Ponds throughout Blaine County were sampled using gill and trap nets to assess species composition, relative abundance, and size distribution of fish or the voluntary creel boxes were maintained.

***Anderson Reservoir***

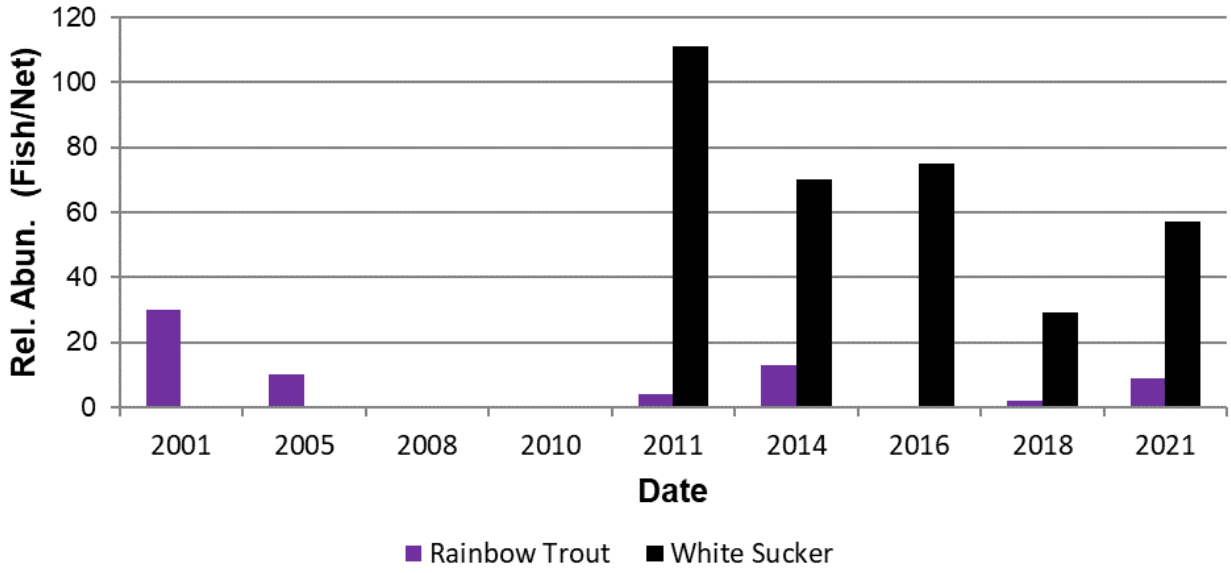
Anderson reservoir is a privately-owned reservoir, which has been managed as a rainbow trout fishery since 2001. This reservoir is maintained with annual plants of 2,000 two to three-inch Arlee rainbow trout.

Initially, the trout exhibited excellent growth and survival in Anderson reservoir. However, winterkills occurred in 2008 and 2010, which limited the abundance and size of fish (Figure 2).

In 2011, fish health samples were collected for trap and transport of fathead minnows, one gill net and two trap nets were set overnight and captured 10 rainbow trout, 783 white sucker, 8,500 fathead minnows, 236 brassy minnow, 3 creek chubs, 3 northern redbelly dace, 1 brook stickleback, and 1 mountain sucker. The rainbow trout stocked in 2010 showed excellent growth and exceeded 15 inches in total length. The high diversity of species found in Anderson Reservoir during the 2011 sampling effort was most likely caused by a high spring runoff event that had many creeks running out of their banks and small dams either breaching or running water over spillways. Rainbow trout relative abundance has been variable since 2011 and averaged 12.4 inches in 2021 (Figure 2). In 2021, one trap net captured three rainbow trout that averaged 13.1 inches and contained white suckers, fathead minnows and brassy minnows.

The reservoir continues to support a high white sucker population (Figure 2) and their presence at current densities is most likely impacting the rainbow trout population. Gerrard strain rainbow trout were planted in the fall of 2021 to increase predation on the minnow and sucker populations. Additional sampling will occur to identify how well this strain of rainbow trout does in this waterbody.

Figure 2. - Relative abundance of rainbow trout and white suckers in Anderson Reservoir based on gill netting surveys from 2001 to 2021.



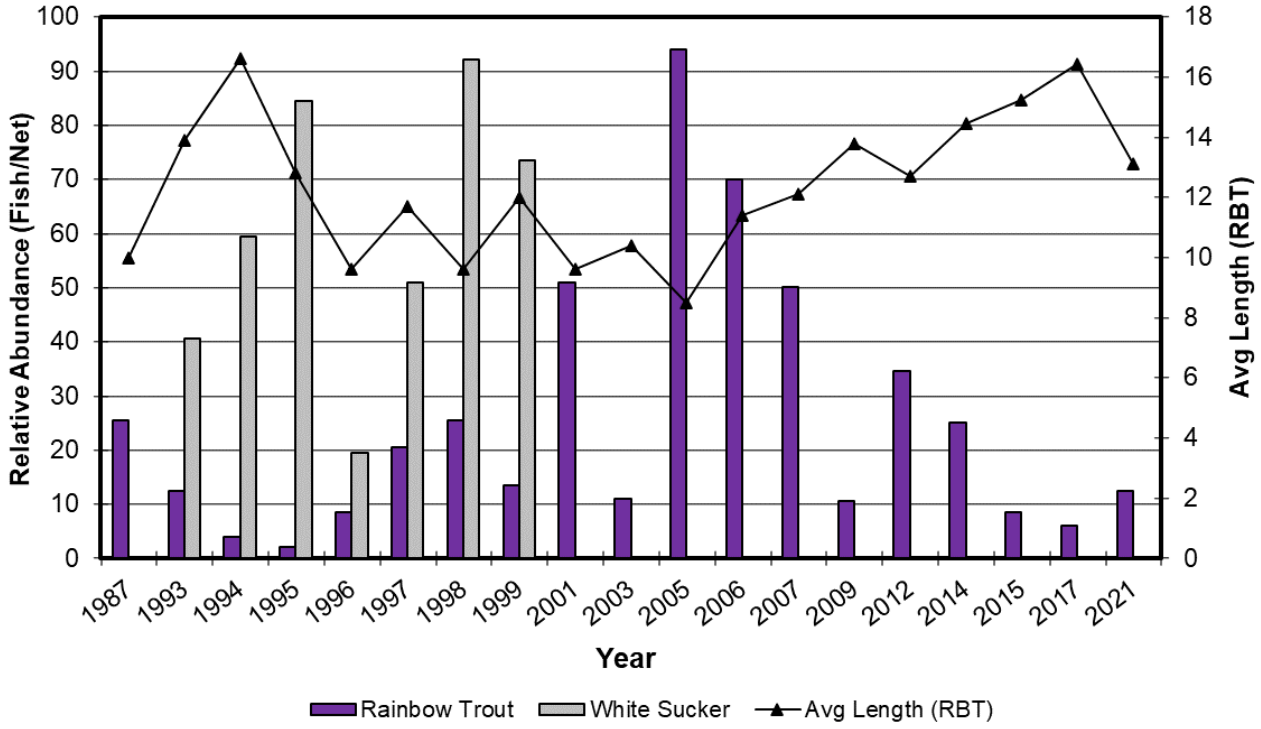
***Faber Reservoir***

Faber Reservoir, a 25 surface-acre reservoir located 30 miles south of Chinook near Cleveland is a very popular fishing access site in north central Montana. This reservoir became a fishing access site in 1986 and the contract was renewed in 2006 for another 20 years. Faber reservoir ranked 20th in the region for fishing pressure in 2019/2020, with a total of 722 (± 448) angler days. Faber has been a consistent producer of quality rainbow trout for three decades.

This reservoir was successfully rehabilitated in 2000 due to the illegal introduction of largemouth bass and white suckers. Fingerling Arlee rainbow trout were re-stocked in the spring of 2001 and approximately 10,000 fingerling trout are stocked annually.

Since the rehabilitation in 2000, rainbow trout densities have been good (Figure 3). Surveys conducted in 2021 show rainbow trout relative abundance has slightly increased (Figure 3). The average length of rainbow trout remains good ( $\bar{x}$ TL=13.11; Figure 3).

Figure 3. - Relative abundance of rainbow trout and white sucker, and average length of rainbow trout in Faber Reservoir based on gill netting surveys from 1987 to 2021.




***Grasshopper Reservoir***

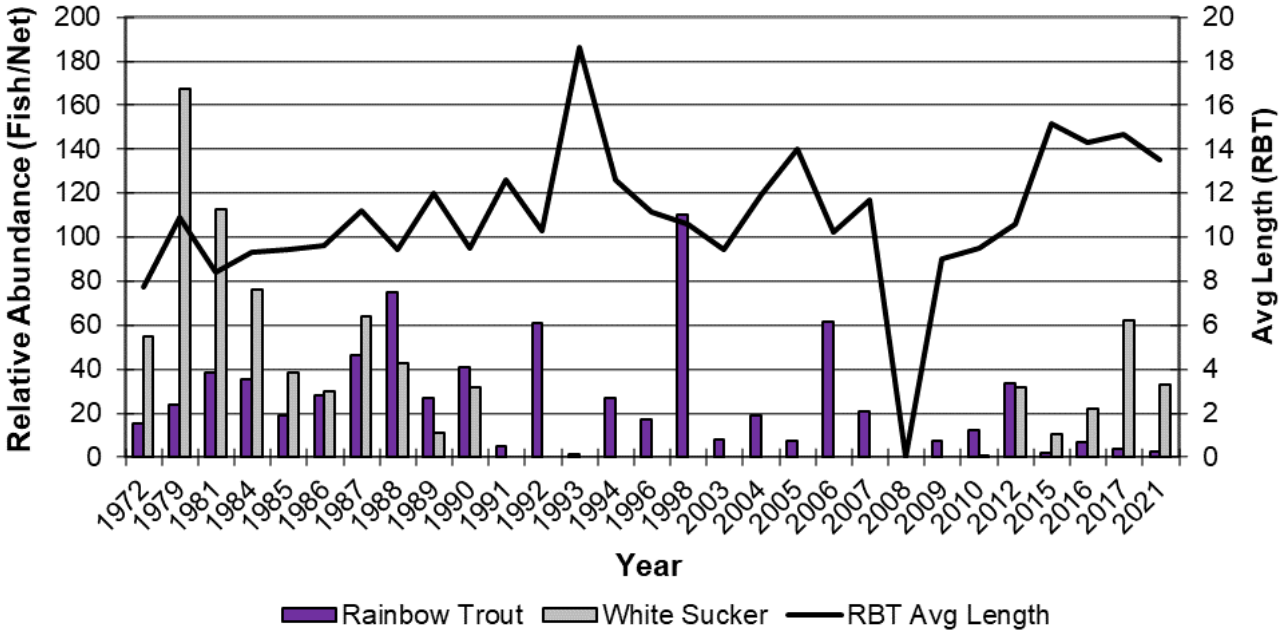
Grasshopper Reservoir is a privately owned 19 surface-acre reservoir located approximately 12 miles south of Chinook and received 509 (± 311) angler days in 2019/2020 (MTFWP Fisheries Bureau 2020). Grasshopper Reservoir was first stocked with rainbow trout in 1947 and trout have exhibited good growth and survival rates in this reservoir. Grasshopper is currently maintained with annual plants of 2,500 fingerling Arlee rainbow trout and biennial plants of 3,000 advanced fingerling Eagle Lake rainbow trout.

White suckers were chemically removed in 1991 and were undetected in netting surveys until 2010, when one white sucker (TL=7.4; WT=0.16 lbs.) was captured. White suckers have since established themselves within the reservoir and are successfully reproducing (Figure 4). Tiger muskies were stocked in 2013 as a biological control on the white sucker population, their impact is undetermined at this time,

and three tiger muskie were observed during our 2021 surveys ($\bar{x}$ TL=23.0 in.). Pearl dace, a species of special concern is present in this reservoir, which makes a chemical rehabilitation effort very difficult. The landowner has also expressed disinterest in use of chemicals to remove white sucker.

In 2021 rainbow trout relative abundance remained low at 2.5 fish/net with an average length of 13.48 inches (Figure 4). White sucker relative abundance remains high at 32.5 white suckers/net and the population has remained stable. In addition to the standardized sampling FWP personnel collected genetic samples from pearl dace in Grasshopper Reservoir.

Figure 4. - Relative abundance of rainbow trout and white suckers and average total length of rainbow trout in Grasshopper reservoir based on gill netting surveys from 1972 to 2021.




**Phillips County Ponds**

Ponds throughout Phillips County were sampled using gill and trap nets to assess species composition, relative abundance, and size distribution of fish or the voluntary creel boxes were maintained.

***Current Reservoir***

Current Reservoir is a 10-acre pond located on BLM land in south Phillips County. This reservoir has been popular since the 1970s because of its ability to produce quality trout. Water levels have been good in recent years but were down approximately five feet or more in 2021. In addition to fishing pressure, this reservoir also receives a fair amount of grazing pressure, which has been blamed in recent years for a reduction in the aquatic vegetation and the riparian quality surrounding the reservoir.

This reservoir has been monitored periodically since the 1970s, however the relative abundance and size of fish present had been consistent (Table 6). Severe drought reduced reservoir elevations from 2006-2008 and netting surveys suggest the reservoir may have winter-killed in 2007 and 2010 (based on average lengths; Table 6)

In 2013, rainbow trout relative abundance remained low but at least three different age classes were sampled, which suggests reservoir pools levels had stabilized enough for the rainbow trout to overwinter and grow to desirable sizes (Table 6). No rainbow trout were observed in 2019 but 2021

surveys captured seven, with two distinct year-classes observed (Table 6). The trap net captured fathead and brassy minnows.

Table 6. Relative abundance, average length, and average weight of rainbow trout collected during periodic gill net surveys on Current Reservoir from 1982-2021.

| | Rainbow Trout | | |
|---|---|---|---|
| Date | Rel. Abun. | Avg. Length | Avg. Weight |
| 8/18/1982 | 14 | 13.71 | 1.57 |
| 8/25/1999 | 58 | 16.00 | 1.25 |
| 7/20/2005 | 11 | 15.81 | 1.80 |
| 7/9/2008 | 8 | 6.32 | 0.14 |
| 7/11/2013 | 7 | 12.7 | 0.86 |
| 7/17/2019 | 0 | -- | -- |
| 7/14/2021 | 7 | 15.24 | 1.68 |

***King Reservoir***

King Reservoir is a 9.8-acre pond located on BLM land in south Phillips County. This reservoir has been managed as a rainbow trout fishery since the 1960s. King is maintained with annual plants of 1,500 fingerling Arlee rainbow trout. This reservoir has a windmill aeration system and is fenced to exclude livestock.

King Reservoir has been a very consistent rainbow trout fishery in south Phillips County, with good relative abundance and age structure observed during most sampling events (Table 7). In 2021, one gill and one trap net were set overnight. The gill net contained 21 rainbow trout with an average length of 14.11 inches and four different year-classes. The trap net contained five rainbow trout and 600 fathead minnows.

Table 7. Relative abundance, average length, and average weight of rainbow and brown trout sampled during periodic gill net surveys in King Reservoir from 2005-2021.

| | Rainbow Trout | | |
|---|---|---|---|
| Date | CPUE | Avg. Length | Avg. Weight |
| 7/21/2005 | 26 | 10.6 | 0.80 |
| 7/16/2009 | 2 | 19.10 | 3.07 |
| 7/11/2013 | 0 | -- | -- |
| 6/27/2017 | 12 | 17.36 | 2.58 |
| 7/13/2021 | 21 | 14.11 | 1.37 |

***Plutz Reservoir***

Plutz is located on BLM land in south Phillips County and has been managed as a fishery since 1994. This reservoir receives annual plants of 1,000 fingerling rainbow trout and brown trout plants occurred in 2000 and 2001. There is currently no plan to continue stocking brown trout.

Rainbow and brown trout exhibited good growth and survival within Plutz, however not as high as some of the neighboring ponds. In 2011, approximately 1,700 adult fathead minnows were trapped from Compton Reservoir and transferred to Plutz to establish an alternate forage base to increase trout growth. In 2013, one gill net and one trap net were set overnight. The gill net contained one rainbow trout

(Table 8). The trap net contained one rainbow trout (18.3 inches) and 534 fathead minnows. The presence of fathead minnows confirms the introduction of this species was successful.

Since 2017, no rainbow trout have been observed in either the gill or trap nets (Table 8). Fathead minnows are still being observed and both white suckers and western silvery minnows were captured in the trap net in 2019, suggesting these fish were somehow planted and have established within the reservoir.

Water quality issues have been thought to be a limiting factor at Plutz, even though max depths approach 20 feet. In July 2021 fisheries personnel took dissolved oxygen readings at Plutz. Water temps were in the mid to upper 60's and dissolved oxygen levels became very low from mid to bottom depths (10-14 feet D.O. ranged from 3.86-0.30 ppm). Continued water quality data will be collected throughout the year to determine the next steps needed to restore the fishery value at Plutz.

Table 8. Relative abundance, average length, and average weight of rainbow and brown trout sampled during periodic gill net surveys in Plutz Reservoir from 2002-2021.

| | Rainbow Trout | | | Brown Trout | |
|---|---|---|---|---|---|
| Date | CPUE | Avg. Length | Avg. Weight | CPUE | Avg. Length |
| 4/18/2002 | 5 | 8.5 | 0.25 | 3 | 9.6 |
| 7/19/2005 | 17 | 9.70 | 0.41 | 7 | 13.40 |
| 7/22/2009 | 49 | 7.10 | 0.17 | 0 | 0.00 |
| 7/16/2013 | 1 | 17.70 | 2.48 | 0 | 0.00 |
| 7/6/2017 | -- | -- | -- | -- | -- |
| 7/17/2019 | -- | -- | -- | -- | -- |
| 7/14/2021 | -- | -- | -- | -- | -- |

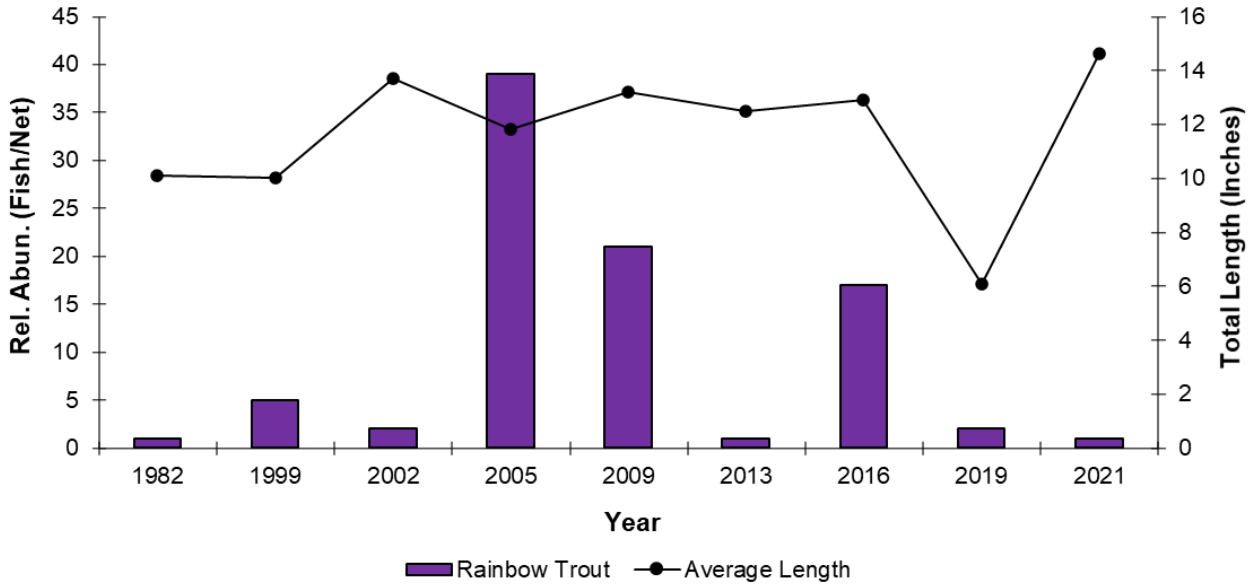
***Sentinel Reservoir***

Sentinel is located on BLM land in south Phillips County and received 333 (± 274) angler days in 2017/2018 (MTFWP Fisheries Bureau 2018). This reservoir has been managed as a rainbow trout fishery since 1970. Sentinel receives annual plants of 6,000 fingerling rainbow trout.

Rainbow trout relative abundance has been variable over the years, with little variability in the average length of rainbow trout collected prior to 2019 (Figure 5). Rainbow trout relative abundance decreased to 2 trout/net in 2019 ($\bar{x}$ TL=6.2, $\bar{x}$ Wt. = 0.10 lbs.; Figure 5). The trap net captured 11 rainbow trout and 109 fathead minnows. Two size classes of rainbow trout were observed, 2019 plants and older age 4 fish that exceeded 20 inches. It was also evident that a significant amount of water flowed through the reservoir and out the spillway. It's possible high densities of rainbow trout were entrained downstream during this rain event.

Netting surveys in 2021 captured three rainbow trout that ranged from 4.0-17.0 inches. The trap net also contained fathead minnows and one white sucker (TL=6.9 in.) was observed in the gill net.

Figure 5. - Relative abundance and average total length of rainbow trout in Sentinel reservoir based on gill netting surveys from 1982 to 2021.




## RECOMMENDATIONS

***Beaver Creek Reservoir:*** Continue annual stocking of up to 30,000 catchable size Arlee rainbow trout. Continue to monitor fishery annually with the use of seining and gill netting at fixed sites. Continue to monitor the impacts to the fishery during extreme water years and impacts of entrainment over the spillway.

***Bearpaw Lake:*** Continue annual stocking of 10,000 catchable size Arlee and 5,000 Eagle Lake rainbow trout. Continue manual removal of adult suckers by trapping and/or electrofishing in the spring, and gill netting in the fall. Continue to monitor fishery annually with the use of fall gill netting at fixed stations.

***Blaine County Ponds:*** Monitor ponds every two to three years to assess survival and growth of stocked fish. Continue public education program alerting the public to the problems associated with the use of live bait (where illegal) and illegal dumping of fish into Montana waters. Continue to look for other ponds with suitable habitats to create new fisheries, work with area wardens and landowners to help identify potential ponds.

***Phillips County Ponds:*** Monitor ponds every two to three years to assess survival and growth of stocked fish. Continue to look for other ponds with suitable habitats to create new fisheries, work with area wardens and landowners to help identify potential ponds. Include pond updates in periodic Region 6 Pond Fishing Guide.

**Key Words or Fish Species:**
Region 6; ponds; Hill County; Blaine County; Phillips County; Havre; Chinook; Malta; Arlee; Eagle Lake; Erwin; rainbow trout, brown trout; brook trout; mottled sculpin; longnose dace; mountain sucker; fathead minnow; lake chub; white sucker; white sucker control; smallmouth bass; walleye; northern pike; largemouth bass; yellow perch; Beaver Creek Reservoir; Bearpaw Lake

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**Appendix 1.** Arlee rainbow trout stocking from 2001-2021 on select ponds and reservoirs in Blaine and Phillips Counties. Table highlights year and month, as well as number and size of fish stocked. Note-Brookie Pond did receive several brook trout (EB) plants during the period of reference.

| YEAR | Brookie Pond | Current Reservoir | Plutz Reservoir | Rebate Reservoir | Rotator Cup Reservoir | Sentinel Reservoir | Shallow Reservoir | Spanky Reservoir |
|---|---|---|---|---|---|---|---|---|
| 2001 (April) | -- | 2,415 (2.8") | 1,610 (2.8") | 805 (2.8") | -- | 5,175 (2.8") | -- | 805 (2.8") |
| 2002 (April) | -- | 3,000 (3") | 1,004 (3") | -- | 1,000 (4") | 5,000 (3") | -- | -- |
| 2003 (April) | -- | 2,971 (3.1") | -- | -- | -- | 6,022 (3.1") | 1,003 (3.1") | 1,000 (3.1") |
| 2004 (April) | -- | 3,045 (2.6") | 2,030 (2.6") | 1,015 (2.6") | 1,015 (2.6") | 6,090 (2.6") | -- | -- |
| 2005 (April) | -- | 3,035 (2.9") | -- | -- | -- | 6,016 (2.9") | 1,030 (2.9) | 1,030 (2.9") |
| 2006 (April) | -- | 3,300 (3.1") | 2,200 (3.1") | -- | 1,100 (3.1") | 6,601 (3.1") | -- | -- |
| 2007 (April) | EB-3,000 (4") | 3,020 (3.2") | -- | 982 (3.2") | -- | 6,040 (3.2") | 982 (3.2") | 982 (3.2") |
| 2008 (April) | EB-2,000 (4.7") | 3,047 (3.3") | -- | -- | -- | 6,022 (3.3") | -- | -- |
| 2009 (May) | -- | 2,993 (4") | 2,010 (4") | -- | -- | 5,986 (4") | 1,026 (4") | 1,026 (4") |
| 2010 (May) | -- | 3,000 (3.6") | -- | -- | -- | 6,000 (3.6") | -- | -- |
| 2011 (June) | EB-1,500 (3.9") | 3,000 (3.6") | 2,000 (3.6") | -- | -- | 6,000 (3.6") | 1,000 (3.6") | 1,000 (3.6") |
| 2012 (May) | EB-1,500 (4.3") | 3,000 (2.7") | -- | -- | -- | 6,000 (2.7") | -- | -- |
| 2013 (June) | EB-1,500 (4.5") | 3,000 (3.2") | 2,000 (3.4") | 1,000 (3.4") | -- | 6,000 (3.2") | 1,000 (3.4") | 1,000 (3.4") |
| 2014 (April) | -- | 3,000 (2.1") | -- | -- | -- | 6,000 (2.1") | -- | -- |
| 2015 (April) | EB-1,500 (4.9") | 3,000 (1.9") | 2,000 (1.9") | -- | -- | 6,000 (1.9") | 1,000 (1.9") | 1,000 (1.9") |
| 2016 (April) | -- | 3,000 (2.1") | -- | 1,000 (2.1") | 1,000 (2.6") | 6,000 (2.1") | -- | -- |
| 2017 (April) | 1,000 (2") | 3,000 (2") | 2,000 (2") | -- | -- | 6,000 (2.6") | 1,000 (2") | 1,000 (2") |
| 2018 (June) | 1,000 (2.5") | 3,000 (3.1") | 1,000 (1.9") | 1,000 (1.9") | 1,000 (1.9") | 6,000 (2.5") | 1,000 (1.9") | -- |
| 2019 (May) | 1,000 (2.7") | 3,000 (2.7") | 2,000 (2.7") | 1,000 (2.7") | -- | 6,000 (2.7") | 1,000 (2.7") | 1,000 (2.7") |
| 2020 (May) | 500 (3.21") | 3,000 (3.21") | 1,000 (3.21") | 250 (3.21") | 1,000 (3.21") | 6,105 (3.08") | 250 (3.21") | 250 (3.21") |
| 2021 (May) | 500 (3.1") | 3,000 (3.12") | 1,000 (3.12") | 250 (3.12") | -- | 6,000 (3.12") | 250 (3.12") | 250 (3.12") |