Mainstem Flathead River Angler Survey 2015-2016

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Executive Summary

Angler surveys are a valuable tool for connecting resource users and managers while gathering biological and social information to support sound fisheries management. However, conducting these studies is often labor, time, and cost-intensive, limiting their frequency, scale, and scope. Within the upper Flathead River system, large-scale angler surveys were performed during 1981 (Fredenberg and Graham 1983), 1992-1993 (Hanzel 1995), 2002-2003 (Deleray 2004), and 2015-2016. These studies documented the fish community changes associated with the establishment of *Mysis* shrimp in Flathead Lake, which dramatically impacted native and nonnative species and the fisheries they support. This most recent angler survey focused on the Mainstem Flathead River upstream of Flathead Lake during 2015-2016 and described fishing pressure, catch rates, harvest rates, harvest, and additional user characteristics. In this large and diffusely-accessed drainage, a roving creel design was used across five river sections (a.k.a., "strata") using eight access points along with aerial counts to provide both angler interview data and instantaneous user counts.

Angling pressure increased in the Mainstem Flathead River by 80% since 2002-2003, with nearly 1,400 anglers interviewed and 189 aerial surveys conducted over the 12-month survey period. The observed increase in fishing pressure was comparable to increases in public use of other local outdoor resources (e.g., Glacier National Park). Notably, the lower-river sloughs received the greatest angling pressure across all seasons during 2015-2016 as compared to ranking 4th among 5 river sections during 2002-2003. An estimated 5,031 fish were harvested from the Flathead River during the survey period. While catch rates, harvest rates, and harvest varied by species, increases were observed for Yellow Perch while declines were seen in Lake Trout, Mountain Whitefish, and Lake Whitefish rates.

The greatest drop in each metric was observed for Lake Whitefish during that autumn fishery. One potential cause includes natural variation in year-class strength, which can fluctuate the number of adults migrating upstream from Flathead Lake during their spawning run. Additionally, a lower proportion of anglers targeted the species during 2015-2016. In the section of Flathead River from Pressentine Fishing Access Site (FAS) downstream to the Stillwater River confluence (Section 2), 72% of anglers targeted Lake Whitefish during 2002-2003 as compared to 36% in 2015-2016. An 84% decline in the number of commercial harvest permit applications received by Montana Fish, Wildlife and Parks (FWP) was also observed following the closure of Mountain Lake Fisheries, LLC in 2011, which purchased commercially-harvested Lake Whitefish from local anglers. However, while fewer anglers targeted, caught, and harvested the species during 2015-2016, there is insufficient evidence to suggest that this reflects a true population decline.

Anglers were also asked which fish species, if any, they targeted during 2015-2016. As in 2002-2003, most anglers did not specify a target species. However, 24% of all anglers focused on catching Westslope Cutthroat Trout during 2015-2016, ranking higher across all river sections than during 2002-2003. While gear use remained comparable over time, differences included increased cast-fishing in all river sections and fly-fishing in all but the most-upstream river section (Blankenship Bridge downstream to Teakettle FAS). Jigging use declined the most, corresponding to fewer anglers targeting Lake Whitefish during that autumn fishery.

The overall use of guided fishing services decreased on the Flathead River between Blankenship Bridge and Pressentine FAS (sections 3 and 4) since 2002-2003. However, guided fishing pressure (angler hours) still increased in the lower half of this river stretch (Section 3) because of the magnitude of increased angling overall during 2015-2016. In other words, greater overall angling pressure translated to more guided angling in Section 3 – even while the percentage of guided angling declined in that section. When it came to angler residency status, a higher proportion of Flathead River anglers identified as non-Montana residents during 2015-2016 as compared to 2002-2003, except in the most upstream river section. While the proportions of anglers who identified as non-Montana residents and reported the use of guided fishing services were very similar during 2002-2003, this was not strongly observed during 2015-2016. While not reported during 2002-2003, 41% of non-Montana resident anglers used a fishing guide during 2015-2016. Most (53%) flotation-based river users were observed fishing throughout year, except during June and July.

In this increasingly-popular river system offering seasonally-diverse and unique angling opportunities, the ability to track changes over time provides valuable information for the public and resource managers alike. For example, a regulation change limiting angling to the use of single-point hooks upstream of Teakettle FAS was implemented for the 2020 fishing season, protecting native fish species (e.g., Westslope Cutthroat Trout and Bull Trout) from increased handling associated with multi-point (e.g., treble) hook use. Such actions rely on the most recent biological and social data available to support sound management actions.

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Acknowledgements

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Introduction

The Flathead River system offers seasonally-diverse angling opportunities, including for Westslope Cutthroat Trout, Rainbow Trout, Lake Whitefish, Mountain Whitefish, Northern Pike, among other native and nonnative species. Hungry Horse Dam inundation and operation has historically impacted productivity downstream (Hauer et al. 1994; Muhlfeld et al. 2011), and angler surveys have been conducted to evaluate corresponding changes in angler pressure, catch rates, harvest rates, and other metrics (Fredenberg and Graham 1983; Hanzel 1995; Deleray 2004). A creel, otherwise known as an angler survey, provides information that complements ongoing research, monitoring, and mitigation activities focused in the Mainstem Flathead River while providing interaction with resource users and opportunities for outreach and education. An angler survey was conducted on the Mainstem Flathead River during March 2015 through February 2016 to quantify fishing pressure, angler catch rates, harvest rates, target species, angler demographics, and gear use.

Methods

Survey methods were comparable to those used by Hanzel (1995) and Deleray (2004), including study area designation and stratification (Figure 1). The Mainstem Flathead River was stratified into five sections, with Section 5 being the lower river sloughs. Within the study area, eight angler access points were targeted using a roving creel design with stratified simple random sampling, combined with instantaneous counts collected using aerial flights (Malvestuto 1993; Pollock et al. 1994). Stratification was performed by river reach, month, day type (weekend and holiday versus weekday), day period (morning and afternoon) and angler type (boat or shore angler). Ice anglers were lumped with shore anglers for reporting purposes.

Data were extrapolated to the month scale to accommodate sufficient sample sizes without extending into periods with dissimilar fishery characteristics. Days were the primary sample units, with nine holidays grouped with weekend days (when they fell on a weekday). Daily fishing hours were defined as one half hour before sunrise and one-half hour after sunset, assuming no fishing occurred at night (Table 1).

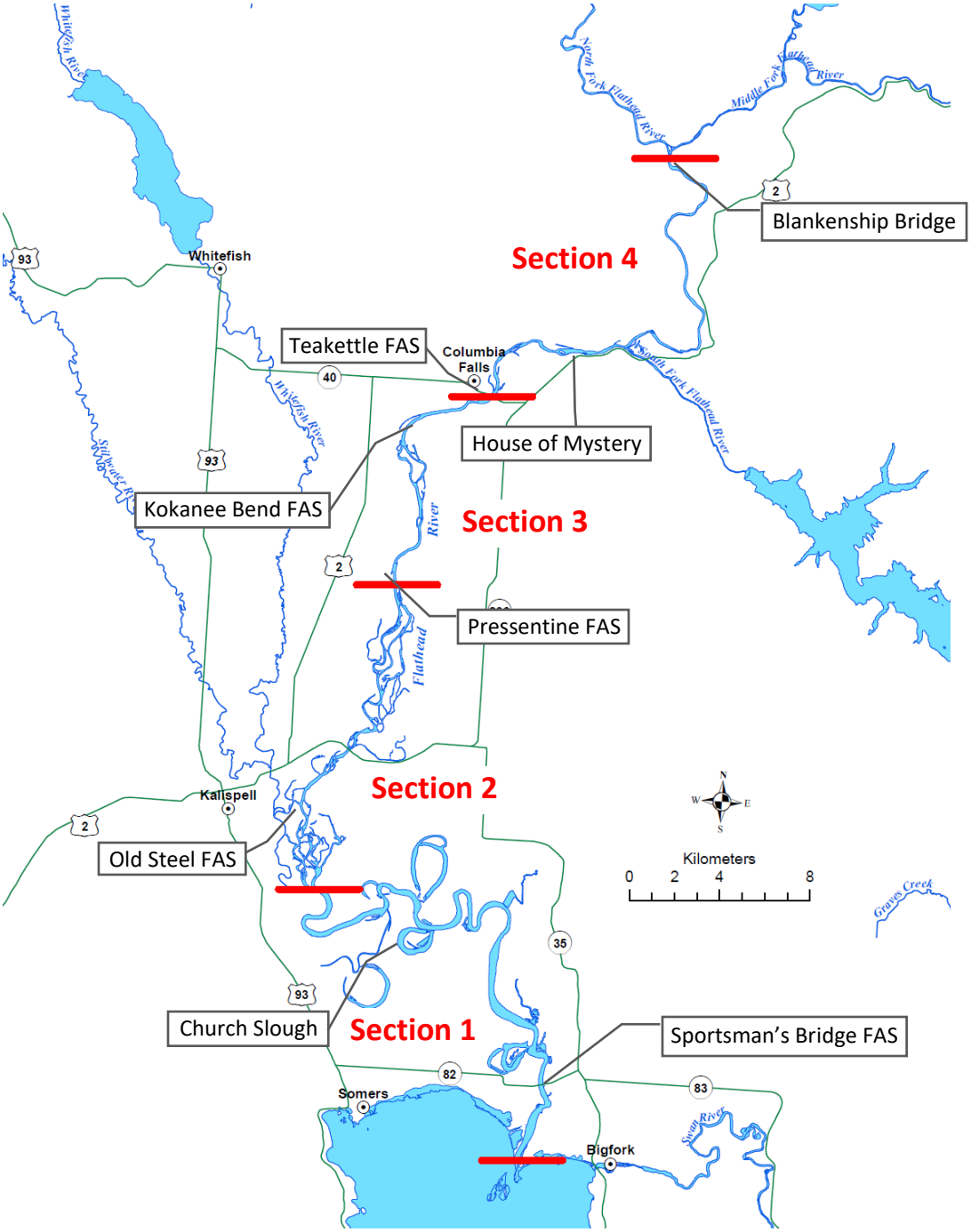


Figure 1.—Study area of the Flathead River system targeted by a creel (angler) survey conducted from March 2015 through February 2016. An additional Section 5 included the lower Flathead River sloughs, as in Deleray (2004). Angler access points used by creel clerks are shown by name and location, where FAS = Fishing Access Site.

Table 1.— Daily fishing hours used to estimate angling pressure during March 2015 through February 2016. The average number of daylight hours per month was used to inform sunrise and sunset times for each month.

Month	Sunrise	Sunset	Hrs	Hrs + 1 hr
Jan	8:23	17:11	8.8	9.8
Feb	7:44	18:00	10.3	11.3
Mar	6:51	18:43	11.9	12.9
Apr	6:48	20:29	13.7	14.7
May	5:58	21:11	15.2	16.2
Jun	5:37	21:40	16.1	17.1
Jul	5:53	21:34	15.7	16.7
Aug	6:32	20:51	14.3	15.3
Sep	7:15	19:50	12.6	13.6
Oct	7:57	18:49	10.9	11.9
Nov	7:45	16:59	9.2	10.2
Dec	8:22	16:44	8.4	9.4

Both fishery and angler data were collected through creel clerk interviews at access points, employing a roving creel approach due to the drainage size and the dispersed nature of angling (Malvestuto 1993; Pollock et al. 1994). Clerks followed a schedule which used random selection and proportional allocation to dedicate interview time (monthly) to access points based on information collected from Deleray (2004). Clerks were stationed at access points and moved between them to collect completed trip information (Table 2). A template data sheet with additional data fields can be found in Appendix A. Two clerks collected angler interview data from June through October and one surveyed the remaining months of the year-long survey. Surveys were conducted during most days from April through November, and three to five days per week during the remaining months.

Table 2.—Examples of data collected by creel clerks at access points in the Flathead River system during 2015 and 2016. A comprehensive list of information collected can be found in Appendix A.

Data collected
Hours fished
Angler type (Shore* or Boat)
Method (Troll, Jib, Cast, Fly)
Lure type (Bait, Artificial, Barbless)
Guided/Non-guided
MT resident/Non-resident
Primary target species
Number and species of fish caught
Number and species of fish harvested

*Ice anglers were combined with shore anglers for reporting purposes.

Gear method and lure type were among the questions posed to anglers interviewed and included trolling, jigging, casting, and fly-fishing. Trolling involves pulling a lure behind a moving watercraft. Jigging involves vertically moving a lure. Jigging is typically done from a stationary position, often from a boat or while ice fishing. Casting uses spin fishing or bait casting gear to either cast out and retrieve a lure or cast out and allow bait to rest. Fly-fishing includes using a fly rod and line to cast a lure. Fly anglers were also asked if they were using barbless hooks. Lure type was designated as bait or artificial.

In addition to angler interviews, flights were conducted over the study area during the entire creel period to estimate fishing pressure using instantaneous angler counts. Counts were conducted from a fixed-wing airplane using a template map and legend to describe user types and numbers observed (Figure 2). Boat, shore, and ice anglers were counted separately in each section. Flight survey data were subsequently entered into a GIS format for analyses and visualization. Flight survey days and times were randomly selected during each month, stratifying weekends (including holidays) and weekdays to proportionally allocate effort to adequately characterize higher use periods as well as slower times (Table 3). We strived to sample at least 60% of all weekends and holidays and 40% of all weekdays.

Table 3.—Proportions of weekend days (including holidays) and weekdays surveyed using aerial flights for angler use during March 2015 through February 2016. Weather limitations restricted flights during some months.

Day type	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Weekend	0.82	0.89	0.44	0.63	0.64	0.75	0.88	0.80	0.78	0.78	0.70	0.44
Weekday	0.65	0.60	0.50	0.45	0.40	0.43	0.43	0.38	0.43	0.41	0.43	0.45

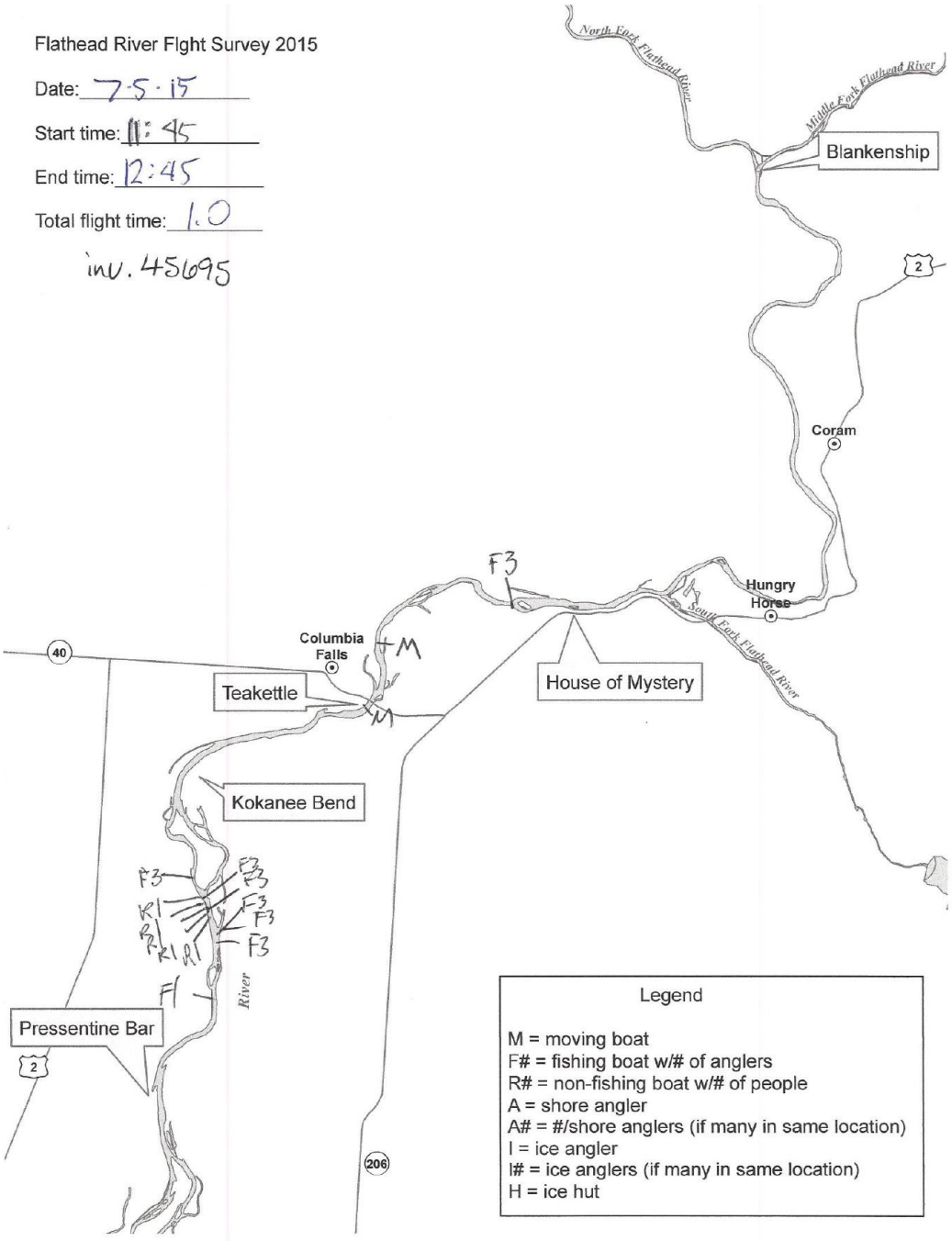


Figure 2.—Example of a completed aerial angler survey (northern half of study area) conducted in 2015 on the Flathead River.

If no anglers were aerially observed in a stratum during a month when anglers were interviewed, values were adjusted to avoid underestimating pressure. For example, flight observations of “0” anglers were replaced with a value of “1” if at least one angler was interviewed during the same day type in a month. A comparable approach was used by Deleray (2004). While this method likely still underestimates pressure in low-use periods and strata, it is

a more accurate reflection of pressure. Angler pressure, catch rates, harvest rates, and harvest were estimated from instantaneous aerial counts and angler interview data using a FWP creel census software program (McFarland and Roache 1987).

Results and Conclusions

Angler Fishing Pressure

Anglers fished an estimated 84,864 hours (95% confidence interval = 84,329 - 85,399 hours) from March 2015 through February 2016 in the Flathead River from Blankenship Bridge downstream to the confluence with Flathead Lake (Figure 1 and Table 4). This reflects an 80% increase in angler hours since 2002-2003 (Deleray 2004) and a 61% increase since 1992-1993 (Hanzel 1995).

The total number of angler days also increased since Deleray (2004) by 49% (14,992 days to 22,284 days), where one day is defined as one fisherman fishing one body of water for any amount of time on a given day. A comparable increase in Flathead River fishing pressure (46%) was reflected in statewide mail-in creel surveys over a similar timeframe (FWP 2004; FWP 2016). The average length of a fishing day for shore anglers throughout the survey period was 1.7 hours as compared to 2.3 hours during 2002-2003. The average duration of fishing days for boat anglers, however, was 4.6 hours versus 4.1 hours during the prior creel. Nearly 1,400 interviews were conducted with anglers during the study period as compared to 925 interviews during 2002-2003 (Appendix C).

Increased fishing pressure on the Flathead River is consistent with growth observed in related local and statewide outdoor recreation, including visitation at regional State Parks and Glacier National Park (GNP) (D. Landstrom, FWP, unpublished data; FWP 2016; NPS 2019). For example, regional State Park visitation in the Flathead drainage more than doubled from 2003 through 2016 (D. Landstrom, FWP, unpublished data; FWP 2016). Visitation to GNP increased by 55% between 2002 and 2016 (NPS 2019). More broadly, Montana ranked second nationwide behind Hawaii in a 2012-2017 U.S. Department of Commerce report detailing the percent of state gross domestic product derived from outdoor recreation (BEA 2019).

Table 4.—Estimates of angler fishing pressure (hours) in the Flathead River, by section, during 2015-2016. River sections are listed from upstream down and are defined in Figure 1.

	Section					
Month	4	3	2	1	5 (Sloughs)	Totals
Jan	17.2	56.1	180.8	120.1	6,353.1	6,727.2
Feb	101.7	173.7	216.6	289.3	1,372.9	2,154.3
Mar	103.2	503.1	464.4	580.5	903.0	2,554.2
Apr	409.2	773.2	543.9	449.8	2,222.6	4,398.7
May	473.5	211.2	580.5	279.5	3,442.5	4,987.1
Jun	3,512.3	3,180.6	1,491.1	678.3	5,280.5	14,142.8
Jul	5,061.8	4,524.7	3,811.9	889.9	4,457.5	18,745.7
Aug	3,921.9	2,333.3	2,689.2	919.5	4,273.8	14,137.7
Sep	1,649.5	835.4	1,095.8	702.0	2,477.1	6,759.8
Oct	614.5	788.3	1,602.5	367.3	945.9	4,318.6
Nov	145.7	291.4	840.3	17.0	264.7	1,559.1
Dec	57.3	65.8	231.9	0.0	4,023.2	4,378.2
Totals	16,067.7	13,736.8	13,748.8	5,293.1	36,016.9	84,863.5
Angler Days	5,208.5	4,316.8	4,185.6	1,452.6	7,120.5	22,284.2

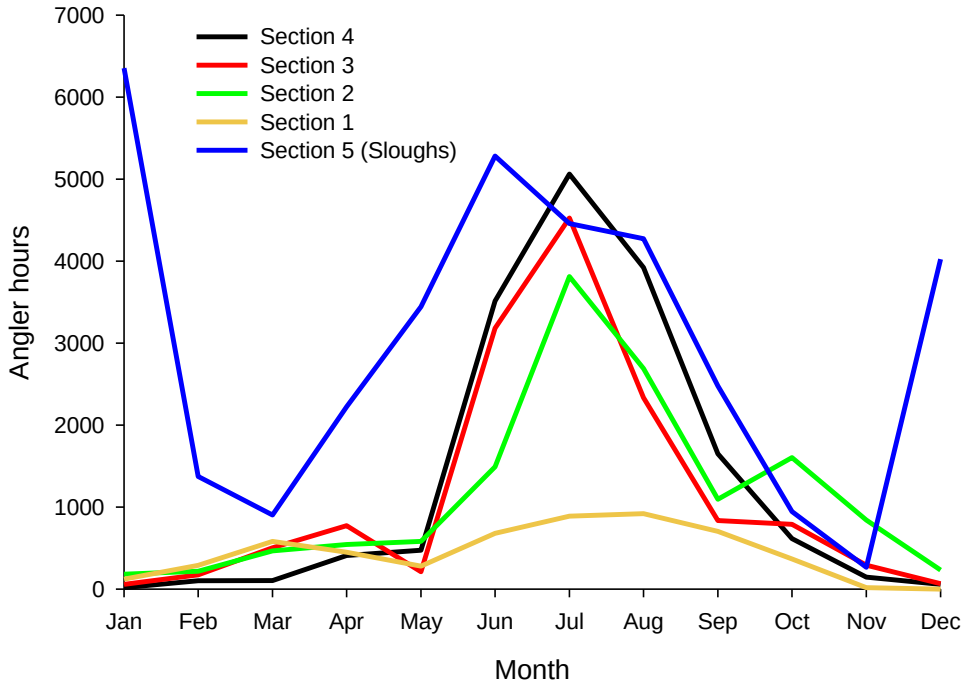


Figure 3.—Estimates of angler fishing pressure (hours) in the Flathead River, by section, during 2015-2016. River sections are listed from upstream down and are defined in Figure 1.

As observed during 2002-2003, the highest-use season for all sections was summer (June-August) (Figure 3, Tables 4 and 5). However, Section 5 (sloughs) received the greatest use year-round, including some heavy periods during winter (December-February). In fact, the highest use across all river sections for the entire creel period occurred during January 2016 in the sloughs. For example, during one flight on January 10, 2016, 73 anglers were estimated to be present during a mid-day count. The average daily number of anglers estimated from instantaneous flight observations during that month in the sloughs was 23, ranging from 4 to 73. This represented a 424% increase in use during January from the 2002-2003 estimate. The distribution of fishing pressure across day types was comparable to that of past creel surveys, with 43% of angling occurring during weekends and holidays as compared to 40% for Deleray (2004) and 48% for Hanzel (1995).

Table 5.—Estimates of angler fishing pressure (hours) in the Flathead River, by section and season during 2015-2016. Winter = December through February, Spring = March through May, Summer = June through August, and Autumn = September through November. River sections are listed from upstream down and are defined in Figure 1.

	Section						
Season	4	3	2	1	5 (Sloughs)	Totals	Percent of use
Winter	176.1	295.6	629.3	409.3	11,749.3	13,259.6	16%
Spring	985.9	1,487.5	1,588.8	1,309.8	6,568.1	11,940.0	14%
Summer	12,496.0	10,038.6	7,992.2	2,487.7	14,011.7	47,026.3	55%
Fall	2,409.7	1,915.2	3,538.6	1,086.3	3,687.8	12,637.6	15%
Totals	16,067.7	13,736.8	13,748.8	5,293.1	36,016.9	84,863.5	100%

Deleray (2004) observed that fishing pressure varied across seasons and river sections largely as a function of fish migrations, their seasonal availability, and environmental conditions (e.g., run-off). While sloughs received the most annual angling pressure during 2015-2016, this was bolstered by opportunities for ice fishing during winter months in this section. The influence of fish movements on angling pressure is most apparent in the uppermost river sections 4, 3, and 2 (Blankenship Bridge downstream to the Stillwater River confluence) (Figure 3).

Section 4 (Blankenship Bridge downstream to the Teakettle Fishing Access Site)

Section 4 received the second-highest angling pressure of all river reaches during 2015-2016 (Figure 3, Tables 4 and 5). This most upstream section was dominated by the summer Westslope Cutthroat Trout and Rainbow Trout fisheries, with fish movements and angling conditions driving pressure. While Deleray (2004) observed the highest pressure in this section during July, August, and September (> 80%), most use occurred during summer (June-August) in 2015-2016 (78%). Low levels of winter, early-spring, and late-autumn pressure were likely due to the seasonal movement of both trout species as well as seasonal access challenges associated with weather and river conditions. The majority (84%) of anglers using Section 4

year-round were boat-based, with shore anglers dominating during November, December, and January (71%) (Appendix B).

Section 3 (Teakettle Fishing Access Site downstream to Pressentine Fishing Access Site)

Section 3 demonstrated a similar seasonality in use by anglers as did Section 4, with 73% of its annual pressure occurring during summer. As in Section 4, angling pressure in this river reach is largely driven by the Westslope Cutthroat Trout and Rainbow Trout fisheries. However, the autumn Lake Whitefish fishery likely contributed to the slightly higher pressure observed during that season (as compared to Section 4) – particularly in lower portions of the reach. As in Section 4, most (86%) anglers were boat-based throughout 2015-2016.

Section 2 (Pressentine Fishing Access Site downstream to the Stillwater River confluence)

Similar to the 2002-2003 estimate, the angling pressure in Section 2 was seasonally distributed between the summer trout and the autumn Lake Whitefish fisheries. However, this section received the most annual angling pressure during both 1992-1993 and 2002-2003, whereas it ranked 3rd during 2015-2016. While most angling occurred during summer in this river reach (58%), it received more pressure during autumn (26%) than was observed in upstream reaches (Figure 3 and Table 5). Notably, the third-highest angling pressure of the year in Section 2 occurred during October 2015. However, Hanzel (1995) and Deleray (2004) observed a greater proportion of use during autumn than was evident in this survey. Likely causes of observed differences are discussed later in "Fish Harvest, Harvest Rates, and Catch Rates". Boat anglers were more prevalent (72%) throughout 2015-2016 in Section 2, but shore anglers dominated angling pressure during winter (83%) (Appendix B).

Section 1 (Stillwater River confluence downstream to Flathead Lake)

Deleray (2004) noted that Section 1 is heavily impacted by the operation of Seli'š Ksanka Qlispe' Dam (SKQ, formerly Kerr) at the outlet of Flathead Lake. Although Flathead Lake is a naturally-occurring waterbody, SKQ dam operation unnaturally raises the lake elevation by 10 feet during summer months. This artificially-higher lake level impacts the Flathead River upstream of Flathead Lake to the Stillwater River confluence, influencing the fishery characteristics and angler use in Section 1. As a result, this section is dominated by lower velocity and lower gradient habitat than typically observed in upstream reaches. Section 1 received the least angling pressure of all river reaches during both 2002-2003 (Deleray 2004) and 2015-2016, with pressure more evenly distributed throughout the year than observed in other reaches (Figure 3, Tables 4 and 5). Similarly, boat angling was more prevalent throughout the year than shore-based angling (85%, Appendix B).

Section 5 (Lower Flathead River sloughs adjacent to Section 1)

Section 5 received the greatest angling pressure during 2015-2016 (Figure 3, Tables 4 and 5), in contrast to ranking 4th during 2002-2003. Unlike all upstream reaches, autumn was the quietest

period of the year in Section 5. As observed by Deleray (2004), boat anglers were more prevalent during most seasons (spring-autumn), but shore (ice) angling comprised the vast majority (99%) of angling pressure during winter (Appendix B). This is due to the limited boat access during winter resulting from iced-over sloughs, creating popular ice angling opportunities.

Fish Harvest, Harvest Rates, and Catch Rates

Anglers harvested an estimated 5,031 fish throughout the Flathead River study area during 2015-2016 (Table 6). This represents an 80% decline in harvest, largely in Lake Whitefish, from 2002-2003 (Deleray 2004). While still representing the highest proportion of fish harvested (36%), the Lake Whitefish fishery in the Flathead River appeared much less productive during 2015-2016 than in past years. Although annual gill net monitoring data do not indicate any clear trend in Lake Whitefish numbers since the early 1990s (Figure 4), both the catch-per-unit effort and the proportion of total catch comprised of Lake Whitefish were significantly lower than the long-term average during spring 2015 (Devore and Peck 2005).

Additional factors may have contributed to a lower Lake Whitefish harvest during 2015-2016. For example, a Flathead Valley-based commercial fish processing facility (Mountain Lake Fisheries, LLC) closed operation in 2011, eliminating the opportunity for anglers to legally sell their Lake Whitefish catch for human consumption. Additionally, the number of annual commercial harvest permits issued by FWP (no cost), allowing anglers to sell Lake Whitefish they catch, declined by 84% between 2003 and 2015 (FWP, unpublished data). However, the abundance and availability of Lake Whitefish can vary substantially year-to-year, which likely contributes to the observed differences in catch and harvest rates across years. Factors influencing Lake Whitefish year-class strength can include adult population abundance, predation during early life stages, and environmental conditions (Henderson et al. 1983; Brown et al. 1993; Claramunt et al. 2010). Thus, the lower harvest and catch rates observed during this most recent angler survey may not indicate an overall population decline.

As with angling pressure, the harvest rates, harvest, and catch rates observed during 2015-2016 reflected the range and seasonal nature of fisheries across the study area (Figure 5 and Tables 6-12). For example, the harvest of Lake Whitefish was exclusive to sections 2-4 during autumn and winter when adults migrate upstream from Flathead Lake to spawn in the river system (Table 12). Alternatively, Yellow Perch were only harvested from the lower river system (sections 1 and 5), reflecting their existing range and suitable habitat. Westslope Cutthroat Trout catch rates were highest in sections 4 and 3, demonstrating the dominant seasonal trout fishery of the upper river system. Additionally, while harvest is no longer permitted for Westslope Cutthroat Trout in the Flathead River, it was legal during our study period for Section 5 only. However, the only reported harvest of cutthroat came from Section 2. Thus, these fish were either misidentified, harvested from a slough, or illegally kept. No Bull Trout were harvested in compliance with angling regulations.

Additionally, catch rates for some species increased since 2002-2003 while others decreased (Figure 5). For example, catch rates declined significantly for Lake Trout, Lake Whitefish (discussed earlier), and Mountain Whitefish. However, catch rates significantly increased for Yellow Perch, with minimal variation observed for remaining species.

Table 6.—Mean angler harvest rates (fish harvested per hour), harvest, and catch rates (fish caught per hour) for all river sections combined in the Flathead River during 2015-2016.

Species	Harvest rate	Variance	Number harvested	Variance	Catch rate	Variance
Lake Trout	0.0027	1.15E-06	123	1.11E+04	0.01	7.70E-06
Lake Whitefish	0.0581	3.46E-05	1,819	1.31E+05	0.07	4.29E-05
Yellow Perch	0.0050	2.36E-06	427	2.54E+04	0.30	5.30E-04
W. Cutthroat Trout	0.0007	1.13E-07	63*	1.02E+03	0.19	4.75E-05
Rainbow Trout	0.0004	2.13E-08	37	2.87E+02	0.03	2.63E-06
Bull Trout	0.0000	0.0000	0	0.00E+00	0.01	2.31E-06
Northern Pike	0.0098	1.32E-06	1,071	2.50E+04	0.04	7.02E-06
Largemouth Bass	0.0007	4.39E-08	83	1.06E+03	0.03	6.12E-06
Mountain Whitefish	0.0041	1.10E-06	166	3.34E+03	0.02	5.57E-06
Other	0.0111	5.74E-06	1,242	1.67E+05	0.04	3.04E-05
Total	0.0929	4.99E-05	5,031	3.65E+05	0.73	6.82E-04

*Although Westslope Cutthroat Trout could be legally harvested from Section 5 (sloughs) during the creel period, harvest was only observed in Section 2. Thus, these fish were either misidentified, harvested from a slough, or illegally harvested.

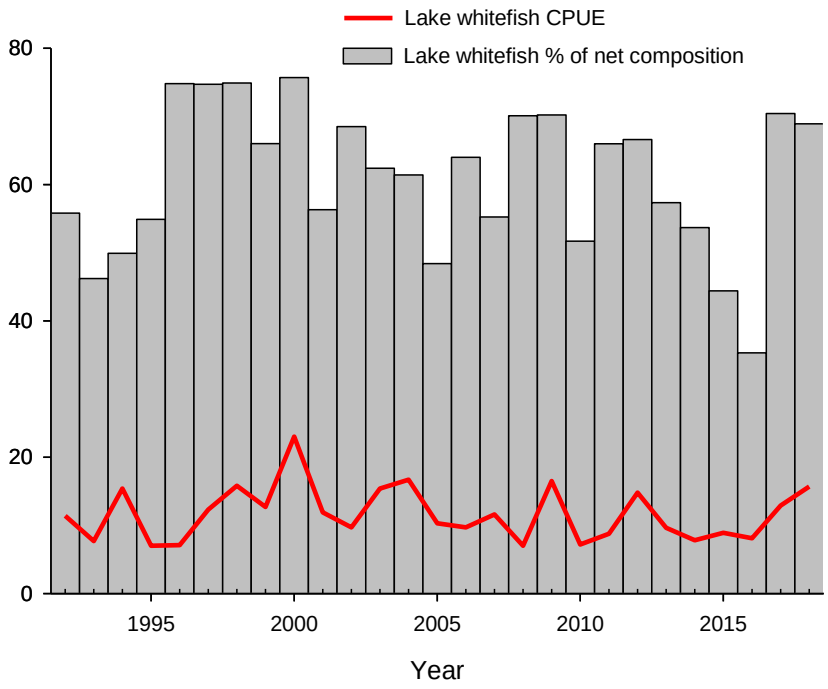


Figure 4.—Lake Whitefish catch-per-unit effort (CPUE) and percent composition per sinking net (relative to other species caught) for annual spring gill net monitoring in Flathead Lake. (Source: K. Breidinger, Montana Fish, Wildlife & Parks, unpublished data).

Table 7.—Mean angler harvest rates (fish harvested per hour), harvest, and catch rates (fish caught per hour) for Section 4 in the Flathead River during 2015-2016. River sections are listed from upstream down and are defined in Figure 1.

Species	Harvest rate	Variance	Number harvested	Variance	Catch rate	Variance
Lake Trout	0.000	0.00E+00	0	0.00E+00	0.01	1.66E-05
Lake Whitefish	0.033	4.14E-05	336	4.09E+04	0.03	4.42E-05
Yellow Perch	0.000	0.00E+00	0	0.00E+00	0.00	0.00E+00
W. Cutthroat Trout	0.000	0.00E+00	0	0.00E+00	0.38	4.40E-04
Rainbow Trout	0.001	3.21E-07	23	1.62E+02	0.04	2.36E-05
Bull Trout	0.000	0.0000	0	0.00E+00	0.02	3.62E-05
Northern Pike	0.000	0.00E+00	0	0.00E+00	0.00	0.00E+00
Largemouth Bass	0.000	0.00E+00	0	0.00E+00	0.00	0.00E+00
Mountain Whitefish	0.009	1.71E-05	83	2.02E+03	0.05	8.95E-05
Other	0.002	2.27E-06	20	2.83E+02	0.02	1.92E-05
Total	0.045	6.11E-05	461	4.34E+04	0.55	6.69E-04

Table 8.—Mean angler harvest rates (fish harvested per hour), harvest, and catch rates (fish caught per hour) for Section 3 in the Flathead River during 2015-2016. River sections are listed from upstream down and are defined in Figure 1.

Species	Harvest rate	Variance	Number harvested	Variance	Catch rate	Variance
Lake Trout	0.000	0.00E+00	0	0.00E+00	0.00	0.00E+00
Lake Whitefish	0.084	2.40E-04	613	5.35E+04	0.09	2.71E-04
Yellow Perch	0.000	0.00E+00	0	0.00E+00	0.00	0.00E+00
W. Cutthroat Trout	0.000	0.00E+00	0	0.00E+00	0.36	4.49E-04
Rainbow Trout	0.000	0.00E+00	0	0.00E+00	0.07	4.12E-05
Bull Trout	0.000	0.0000	0	0.00E+00	0.00	4.11E-07
Northern Pike	0.000	0.00E+00	0	0.00E+00	0.00	3.19E-07
Largemouth Bass	0.000	0.00E+00	0	0.00E+00	0.00	0.00E+00
Mountain Whitefish	0.000	0.00E+00	0	0.00E+00	0.01	4.02E-06
Other	0.000	0.00E+00	0	0.00E+00	0.01	7.66E-06
Total	0.084	2.40E-04	613	5.35E+04	0.53	7.74E-04

Table 9.—Mean angler harvest rates (fish harvested per hour), harvest, and catch rates (fish caught per hour) for Section 2 in the Flathead River during 2015-2016. River sections are listed from upstream down and are defined in Figure 1.

Species	Harvest rate	Variance	Number harvested	Variance	Catch rate	Variance
Lake Trout	0.012	2.27E-05	123	1.11E+04	0.04	1.34E-04
Lake Whitefish	0.178	5.63E-04	870	3.61E+04	0.20	5.95E-04
Yellow Perch	0.000	0.00E+00	0	0.00E+00	0.00	0.00E+00
W. Cutthroat Trout	0.003	2.22E-06	63*	1.02E+03	0.27	3.38E-04
Rainbow Trout	0.000	1.03E-07	14	1.25E+02	0.04	1.51E-05
Bull Trout	0.000	0.0000	0	0.00E+00	0.01	9.42E-06
Northern Pike	0.000	2.15E-07	14	2.32E+02	0.00	2.15E-07
Largemouth Bass	0.000	0.00E+00	0	0.00E+00	0.00	0.00E+00
Mountain Whitefish	0.009	4.81E-06	83	1.32E+03	0.04	1.91E-05
Other	0.001	9.54E-07	13	2.53E+02	0.03	2.77E-05
Total	0.205	0	1,181	5.02E+04	0.63	1.14E-03

*Although Westslope Cutthroat Trout could be legally harvested from Section 5 (sloughs) during the creel period, harvest was only observed in Section 2. Thus, these fish were either misidentified, harvested from a slough, or illegally harvested.

Table 10.—Mean angler harvest rates (fish harvested per hour), harvest, and catch rates (fish caught per hour) for Section 1 in the Flathead River during 2015-2016. River sections are listed from upstream down and are defined in Figure 1.

Species	Harvest rate	Variance	Number harvested	Variance	Catch rate	Variance
Lake Trout	0.000	0.00E+00	0	0.00E+00	0.01	3.26E-05
Lake Whitefish	0.000	0.00E+00	0	0.00E+00	0.00	0.00E+00
Yellow Perch	0.003	2.64E-06	18	2.07E+02	0.05	8.84E-04
W. Cutthroat Trout	0.003	0.00E+00	0	0.00E+00	0.00	0.00E+00
Rainbow Trout	0.000	0.00E+00	0	0.00E+00	0.00	0.00E+00
Bull Trout	0.000	0.0000	0	0.00E+00	0.00	0.00E+00
Northern Pike	0.017	1.48E-05	176	2.85E+03	0.05	8.73E-05
Largemouth Bass	0.000	0.00E+00	0	0.00E+00	0.01	3.26E-05
Mountain Whitefish	0.000	0.00E+00	0	0.00E+00	0.00	0.00E+00
Other	0.000	0.00E+00	0	0.00E+00	0.00	0.00E+00
Total	0.024	0	194	3.06E+03	0.11	1.04E-03

Table 11.—Mean angler harvest rates (fish harvested per hour), harvest, and catch rates (fish caught per hour) for Section 5 in the Flathead River during 2015-2016. River sections are listed from upstream down and are defined in Figure 1.

Species	Harvest rate	Variance	Number harvested	Variance	Catch rate	Variance
Lake Trout	0.000	0.00E+00	0	0.00E+00	0.00	0.00E+00
Lake Whitefish	0.000	0.00E+00	0	0.00E+00	0.01	4.19E-05
Yellow Perch	0.013	1.61E-05	410	2.52E+04	0.78	3.61E-03
W. Cutthroat Trout	0.000	0.00E+00	0	0.00E+00	0.00	6.43E-06
Rainbow Trout	0.000	0.00E+00	0	0.00E+00	0.00	5.86E-08
Bull Trout	0.000	0.0000	0	0.00E+00	0.00	5.53E-08
Northern Pike	0.024	8.81E-06	880	2.19E+04	0.09	4.70E-05
Largemouth Bass	0.002	3.01E-07	83	1.06E+03	0.07	4.15E-05
Mountain Whitefish	0.000	0.00E+00	0	0.00E+00	0.00	2.93E-07
Other	0.027	3.82E-05	1,209	1.67E+05	0.07	1.91E-04
Total	0.065	0	2,582	2.15E+05	1.03	3.94E-03

Table 12.—Lake Whitefish harvest by Flathead River section during 2015-2016. River sections are listed from upstream down and are defined in Figure 1.

Month	Section 4	Section 3	Section 2	Section 1	Section 5	Total
Jan	0	190	215	0	0	405
Feb	0	0	9	0	0	9
Mar	0	0	0	0	0	0
Apr	0	0	0	0	0	0
May	0	0	0	0	0	0
Jun	0	0	0	0	0	0
Jul	0	0	0	0	0	0
Aug	0	0	0	0	0	0
Sep	0	0	15	0	0	15
Oct	16	273	180	0	0	469
Nov	313	133	416	0	0	863
Dec	7	16	36	0	0	59
Total	336	613	870	0	0	1,819

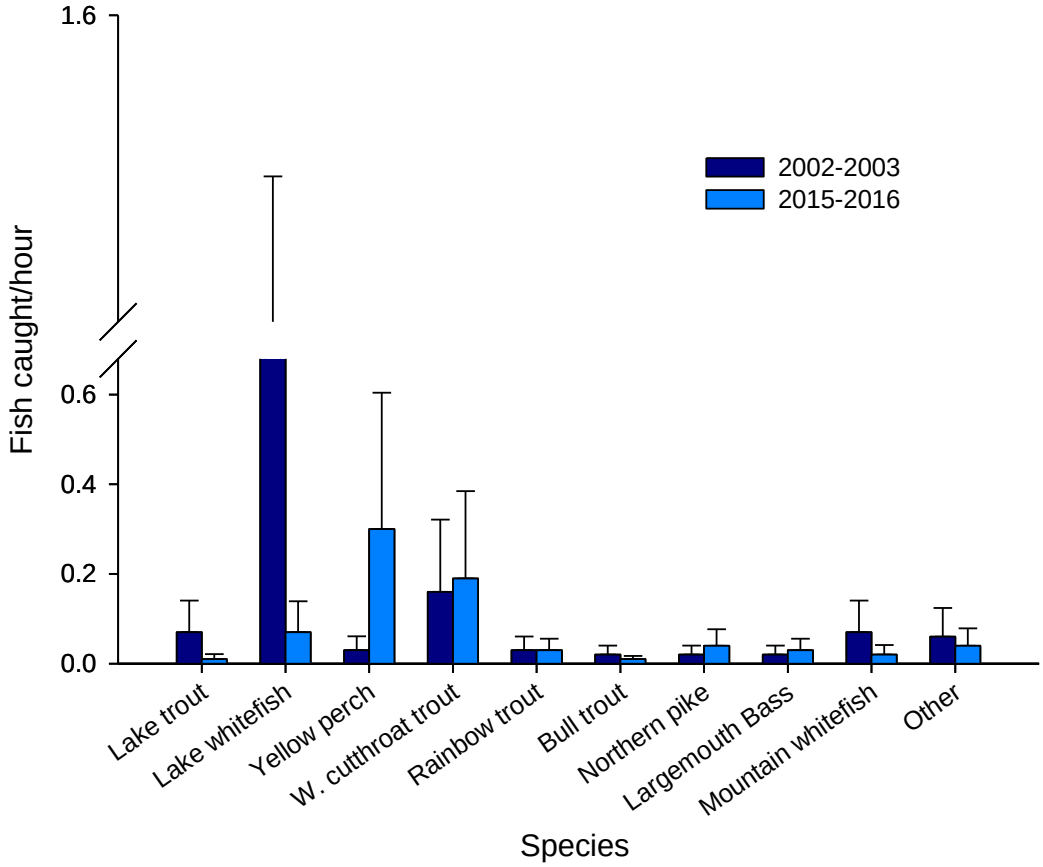


Figure 5.—Angler catch rates and associated 95% confidence intervals for fish species in the Mainstem Flathead River system during 2002-2003 and 2015-2016.

River User Characteristics

Information about anglers and non-angling river users was collected during 2015-2016 from interviews and flight surveys. While most user information was gathered in-person, flights allowed us to estimate the proportion of floaters observed angling throughout the study period and area. Further, all user characteristics were typically stratified by river section and season to avoid biased characterizations.

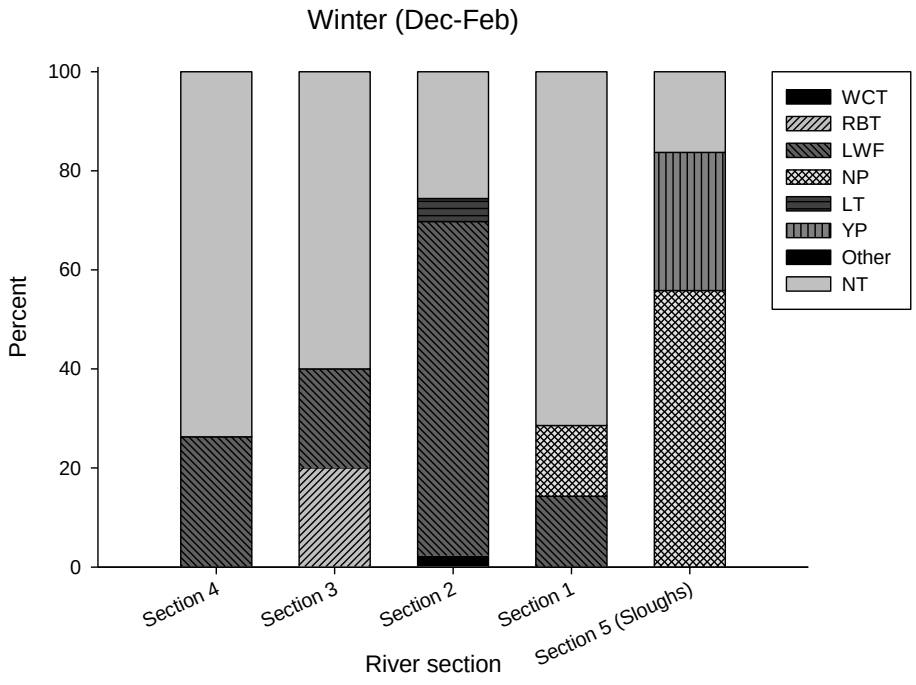
Target Species

During interviews, anglers were asked to identify which species (if any) they were attempting to catch. These "target species" are reported by river section and season (Figure 6 and Table 13), reflecting angler preference as well as the life histories and seasonal distributions of fisheries in the Mainstem Flathead River. When no specific target species was identified, the category "no target" was used. Similarly, "other" describes targeted fish characterized as "non-game" or

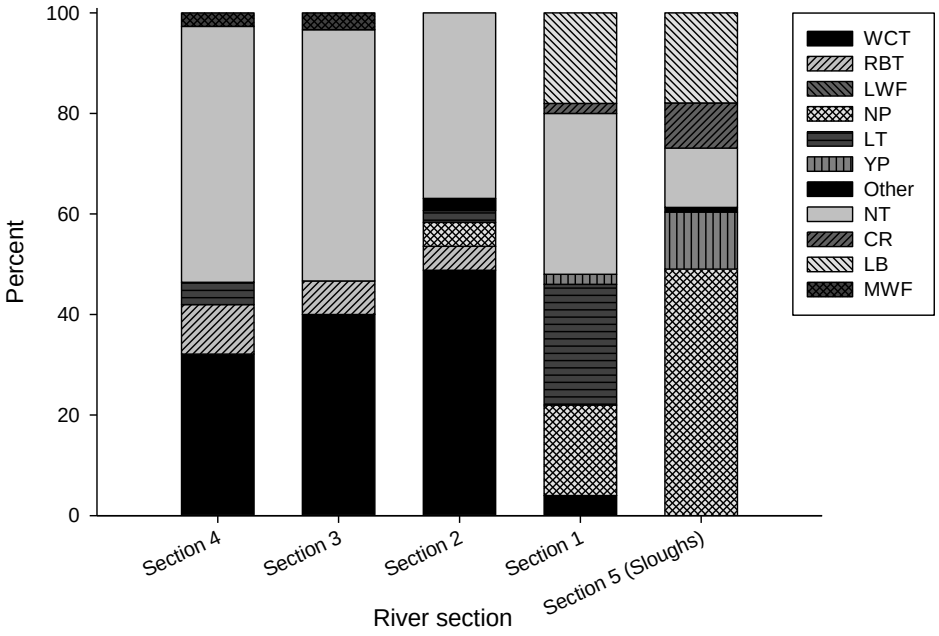
otherwise caught for use as bait and typically include Northern Pikeminnow, Peamouth, and sucker species.

As with fishing pressure, harvest, harvest rates, and catch rates, reported target species varied over seasons and river sections (Figure 6 and Table 13). While the highest proportion of anglers (36% overall) did not report targeting any particular species, Westslope Cutthroat Trout were identified as the most-sought fish (24%). Further, Westslope Cutthroat Trout were more heavily-targeted during 2015-2016 than during 2002-2003 in all river sections.

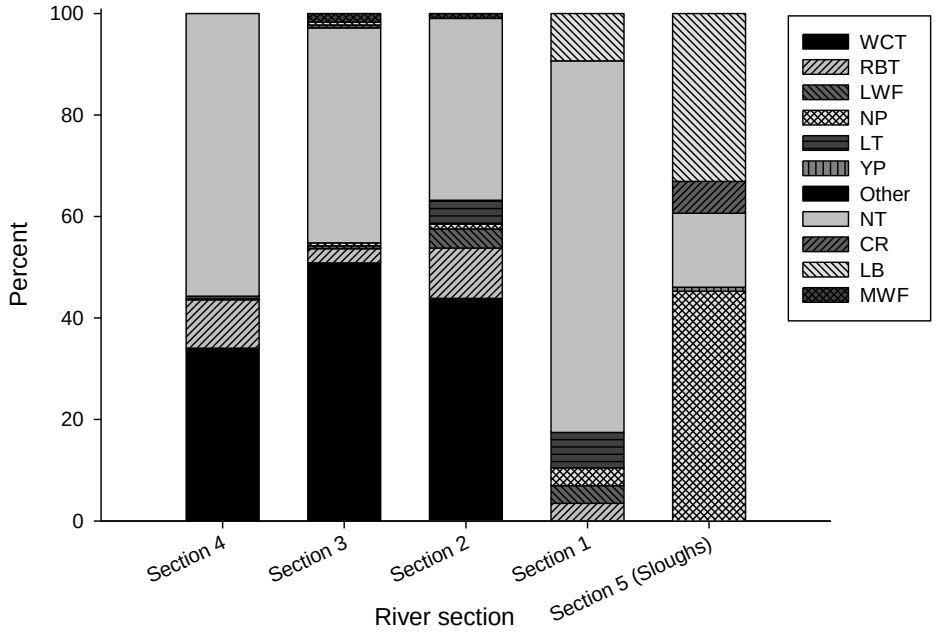
In the most upstream river section (4), 53% of anglers reported no target species, followed by Westslope Cutthroat Trout (34%) and Rainbow Trout (8%). This represents a 12% increase in the proportion of anglers targeting a specific species (predominantly trout) since 2002-2003. Moving downstream to Section 3, the trout fishery was still preferred by most anglers (53%), whereas 39% reported no target species and 5% focused on Lake Whitefish. As in 2002-2003, anglers preferred Lake Whitefish (36%) and non-target anglers (26%) in Section 2, though more equally (73% Lake Whitefish, 21% non-target). Anglers in Section 1 reported comparable species target rates over time, with 63% of anglers stating no preference, followed by Largemouth Bass (10%), Lake Trout (10%), and Northern Pike (9%). While most slough (Section 5) anglers focused on Northern Pike (47%) during 2015-2016, this represented a decline from the 70% target rate of 2002-2003. More than double the proportion of slough anglers focused on Largemouth Bass during 2015-2016 (22%) than during 2002-2003 (7%), with the remainder reporting targeting no particular species (17%), Yellow Perch (7%), or Black Crappie (6%).



Spring (Mar-May)



Summer (Jun-Aug)



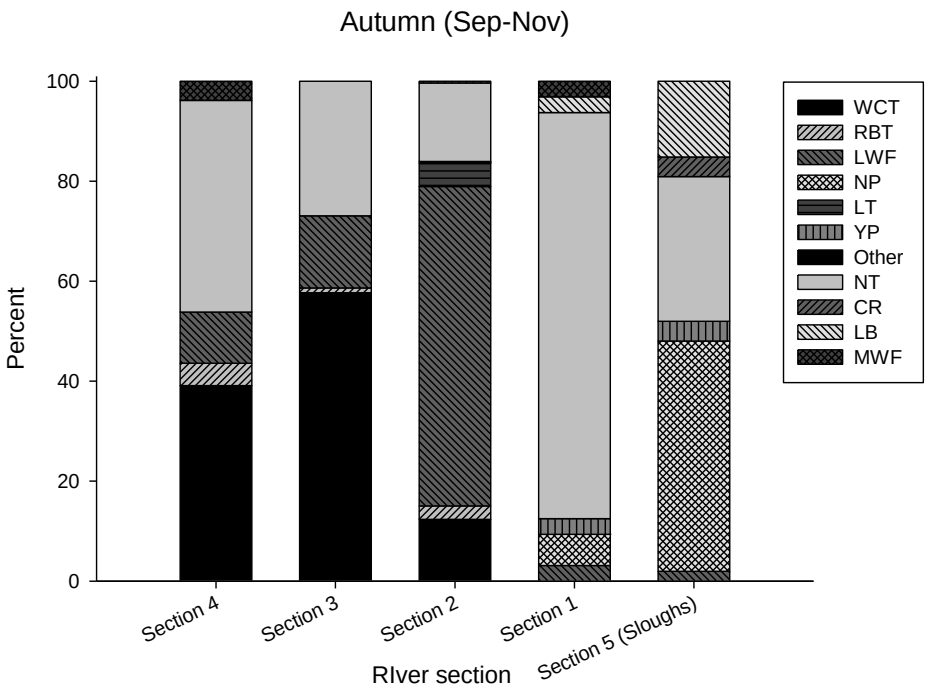


Figure 6.—Percentages of anglers who reported targeting specific species, by season and river section, during 2015-2016 in the Flathead River system. WCT = Westslope Cutthroat Trout, RBT = Rainbow Trout, LT = Lake Trout, LWF = Lake Whitefish, NP = Northern Pike, YP = Yellow Perch, Other = non-game and bait species (e.g., sucker species, Northern Pikeminnow, Peamouth), NT = no specific target species, CR = Black Crappie, LB = Largemouth Bass, and MWF = Mountain Whitefish. River sections are listed from upstream down and are defined in Figure 1.

Table 13.—Percentages of anglers who reported targeting specific species during 2015-2016 in the Flathead River system, by river section. WCT = Westslope Cutthroat Trout, RBT = Rainbow Trout, LT = Lake Trout, LWF = Lake Whitefish, NP = Northern Pike, YP = Yellow Perch, Other = non-game and bait species (e.g., longnose sucker, Northern Pikeminnow, Peamouth chub), NT = no specific target species, CR = Black Crappie, LB = Largemouth Bass, and MWF = Mountain Whitefish. River sections are listed from upstream down and are defined in Figure 1.

Section	WCT	RBT	LWF	NP	LT	YP	Other	No Target	CR	LB	MWF
4	34%	8%	3%	0%	1%	0%	0%	53%	0%	0%	1%
3	50%	3%	5%	0%	0%	0%	0%	39%	0%	0%	1%
2	27%	5%	36%	1%	4%	0%	0%	26%	0%	0%	0%
1	1%	2%	3%	9%	10%	1%	0%	63%	1%	10%	1%
5	0%	0%	0%	47%	0%	7%	0%	17%	6%	22%	0%
Weighted mean*	24%	4%	10%	13%	2%	2%	0%	36%	2%	6%	1%

*Using the weighted mean accounts for the differing number of anglers interviewed over time and across river sections, avoiding bias in estimated percentages.

Gear Use and Lure Type

Angling gear use and lure types varied among seasons and across river sections, reflecting the changes in fishing opportunities and angler preference throughout the year (Table 14). Reported gear use also changed over time, with greater differences observed in some sections than others (Figure 7). For example, fly-fishing became increasingly popular in most river sections since the early 2000s, except for the most upstream portion of the survey area where it remained comparable (64% during 2002-2003 versus 59% during 2015-2016) (Section 4). Further, more anglers used casting methods in all sections during 2015-2016. Jigging saw the greatest overall decline in use, except in Section 4 which showed a nominal increase from 0% to 3% between the two survey periods (Deleray 2004).

Table 14.—Percent of anglers interviewed using various gear types and lures, by season, in the Flathead River from March 2015 through February 2016. Both boat and shore-based anglers were combined for summary purposes. River sections are listed from upstream down and are defined in Figure 1. N = number of anglers interviewed, by section. Note that the percentage of anglers reporting barbless hook use applies only to fly-fishers.

	Year-round								
	Cast		Jig		Troll		Fly		
River section	Artificial	Bait	Artificial	Bait	Artificial	Bait	Artificial	*Barbless*	N
4	29%	8%	2%	1%	0%	0%	59%	*57%*	680
3	24%	3%	2%	1%	0%	0%	70%	*49%*	289
2	39%	17%	13%	3%	0%	0%	29%	*40%*	603
1	39%	25%	11%	8%	7%	1%	9%	*33%*	100
5 (Sloughs)	56%	13%	9%	18%	3%	0%	1%	*0%*	577
Total									2,249

	Winter: *December-February*								
	Cast		Jig		Troll		Fly		
River section	Artificial	Bait	Artificial	Bait	Artificial	Bait	Artificial	*Barbless*	N
4	100%	0%	0%	0%	0%	0%	0%	*0%*	1
3	0%	0%	50%	0%	0%	0%	50%	*0%*	2
2	10%	10%	71%	5%	0%	0%	5%	*0%*	21
1	33%	0%	67%	0%	0%	0%	0%	*0%*	6
5 (Sloughs)	0%	0%	32%	68%	0%	0%	0%	*0%*	37
Total									67

Spring: *March-May*

	Cast		Jig		Troll		Fly		
River section	Artificial	Bait	Artificial	Bait	Artificial	Bait	Artificial	*Barbless*	N
4	32%	3%	3%	7%	0%	0%	56%	53%	72
3	33%	3%	0%	0%	0%	0%	64%	48%	36
2	37%	11%	3%	3%	0%	0%	46%	19%	70
1	26%	5%	21%	21%	16%	0%	11%	50%	19
5 (Sloughs)	40%	14%	13%	29%	2%	0%	2%	0%	244
Total									441

Summer: *June-August*

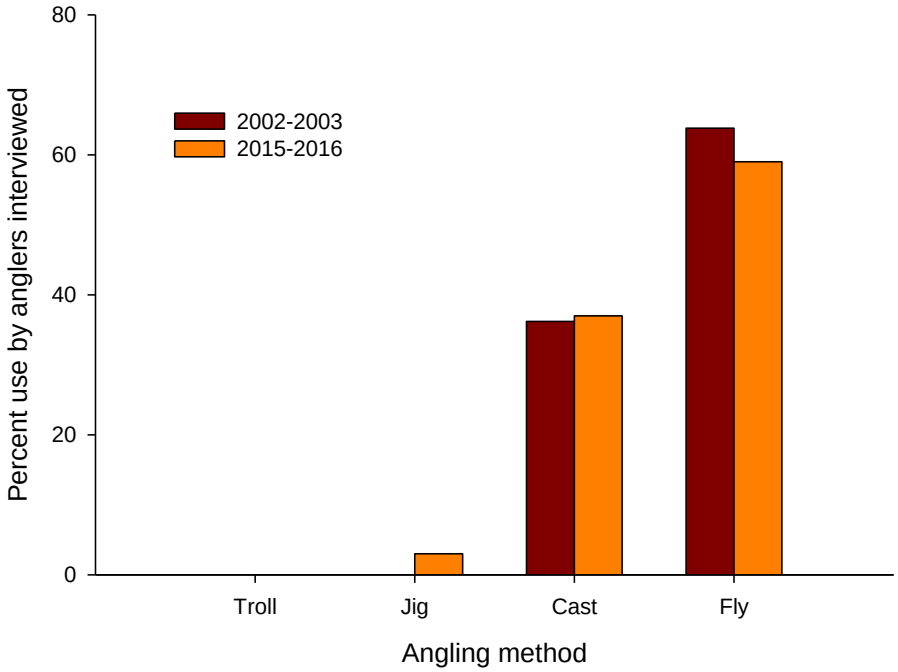
	Cast		Jig		Troll		Fly		
River section	Artificial	Bait	Artificial	Bait	Artificial	Bait	Artificial	*Barbless*	N
4	32%	9%	0%	0%	0%	0%	59%	57%	494
3	25%	4%	1%	1%	0%	0%	70%	46%	167
2	29%	21%	1%	1%	0%	0%	46%	53%	205
1	42%	34%	5%	6%	3%	2%	8%	20%	64
5 (Sloughs)	77%	15%	2%	1%	4%	0%	0%	0%	202
Total									1,132

Autumn: *September-November*

	Cast		Jig		Troll		Fly		
River section	Artificial	Bait	Artificial	Bait	Artificial	Bait	Artificial	*Barbless*	N
4	18%	7%	12%	2%	0%	0%	62%	63%	113
3	19%	1%	5%	1%	0%	0%	74%	55%	84
2	48%	15%	18%	4%	0%	0%	15%	28%	307
1	45%	18%	0%	0%	18%	0%	18%	50%	11
5 (Sloughs)	77%	11%	2%	5%	1%	1%	3%	0%	94
Total									609

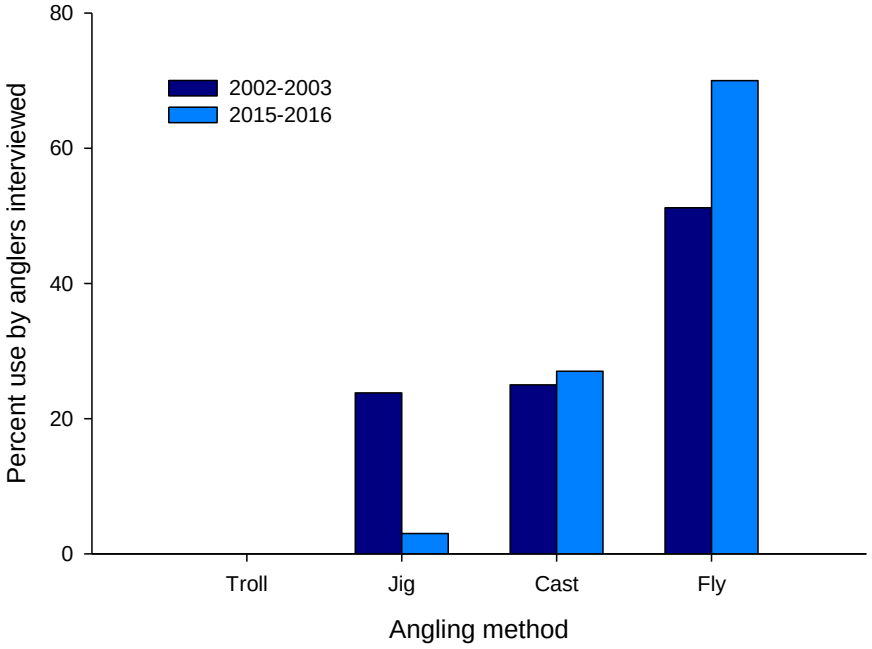
Section 4

Blankenship Bridge downstream to Teakettle FAS



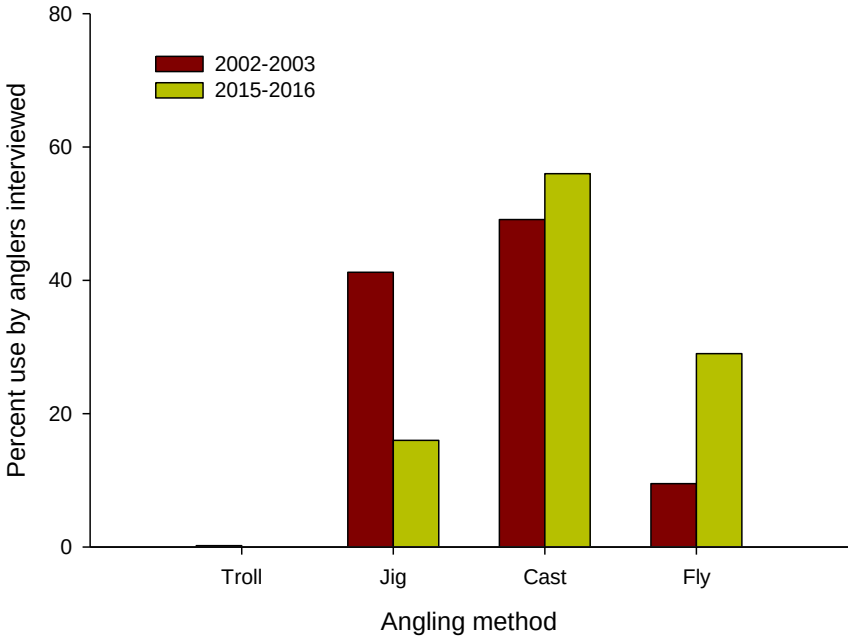
Section 3

Teakettle FAS downstream to Pressentine Bar FAS



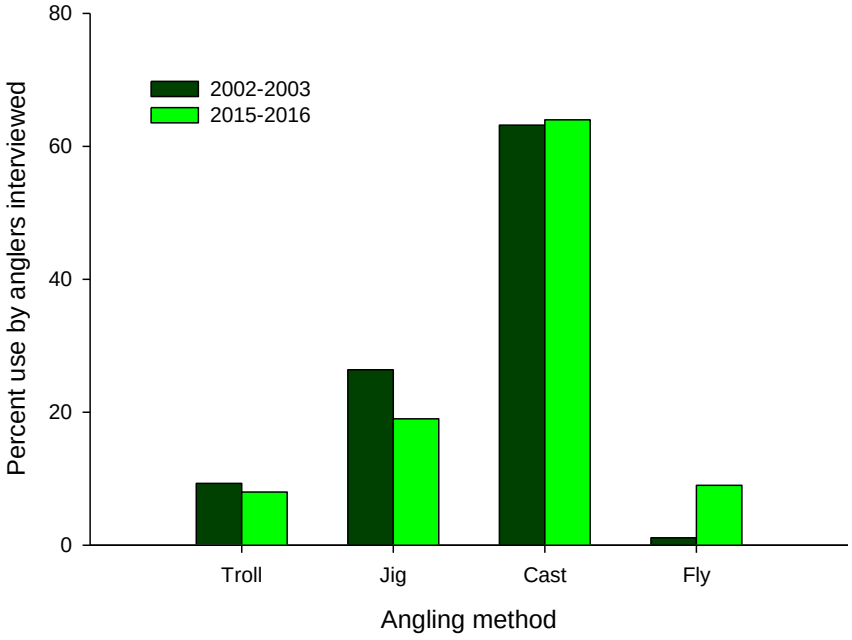
Section 2

Pressentine Bar FAS downstream to Stillwater River confluence



Section 1

Stillwater River confluence downstream to Flathead Lake



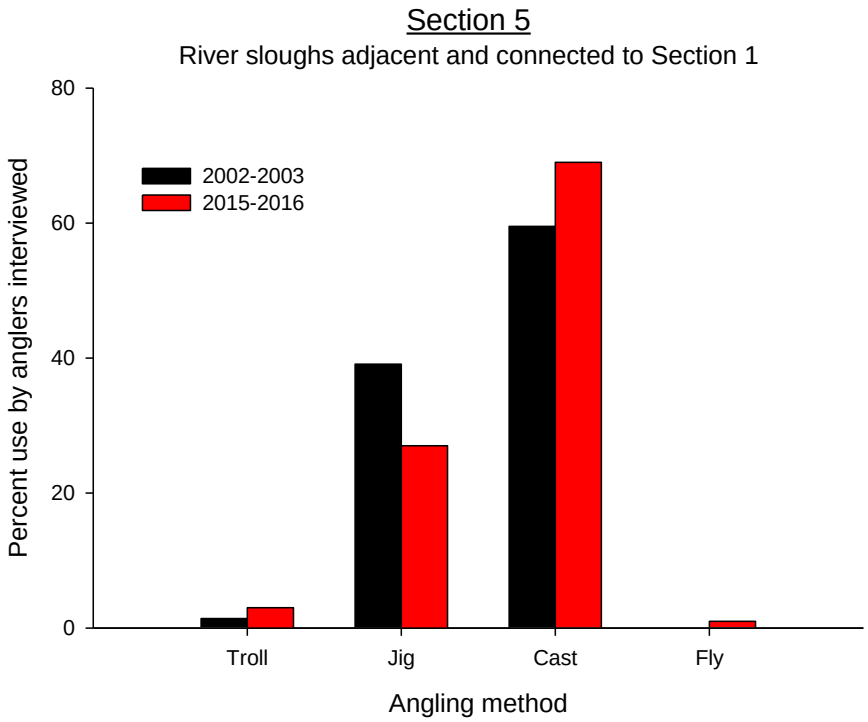


Figure 7.—Percent of anglers interviewed using various gear types, by season, in the Flathead River from June 2002 through May 2003 and March 2015 through February 2016, respectively. Both boat and shore-based anglers were combined for summary purposes. River sections are shown from upstream down and are defined in Figure 1.

Guided and Unguided Anglers

The proportion of anglers using guided fishing services during 2015-2016 was comparable to those reported in Deleray (2004) in most but not all areas, demonstrating variation in use among survey sections (Figure 8). Specifically, guided use declined to varying degrees since 2002-2003 in the most upstream survey areas (sections 3 and 4). For example, the percent of anglers reporting fishing with a guide over the entire survey period declined from 42% to 10% in Section 4 (Blankenship to Teakettle FAS), and from 30% to 22% in Section 3 (Teakettle FAS downstream to Pressentine FAS). While these data demonstrate a drop in the proportion of anglers using guided fishing services in the upper Flathead River during peak months, it did not always result in a reduction in the total number of guided trips since overall pressure has increased since 2002-2003 (Figure 8).

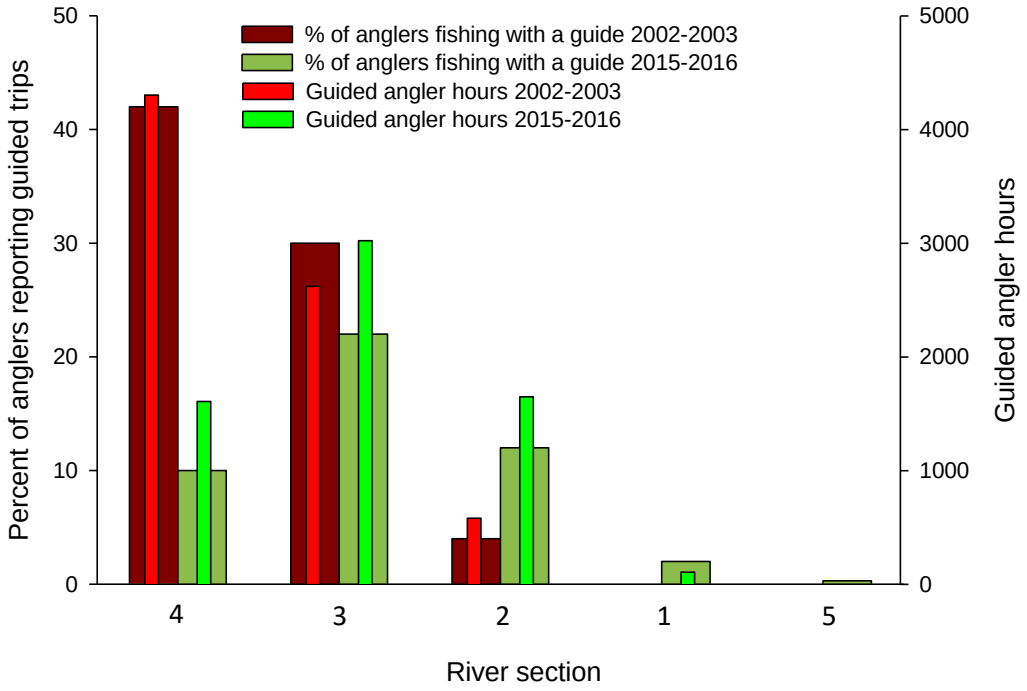


Figure 8.—Percentages of anglers interviewed who reported participating in professionally-guided fishing trips during 2002-2003 and 2015-2016 in the Flathead River (wide bars), compared with the corresponding fishing pressure of guided anglers during the two survey periods (narrow bars). River sections are shown from upstream down and are defined in Figure 1.

Seasonal volume of guided service use was comparable to Deleray (2004), with most guided trips taking place during summer months (June-August) (Figure 9). However, the distribution of guided service use across river sections varied between 2002-2003 and 2015-2016. For example, while overall angling pressure was greatest during summer in Section 4, a higher percentage of autumn anglers reported using guided fishing services. This was also the case for Section 3, where although more total anglers were observed during summer, a higher proportion of autumn anglers fished with a guide. Additionally, Section 5 (sloughs) had little to no angler-reported guide use, with the highest proportion observed during spring. Refer to the following section for comparisons of guide use and residency status (Montanan versus non-Montanan).

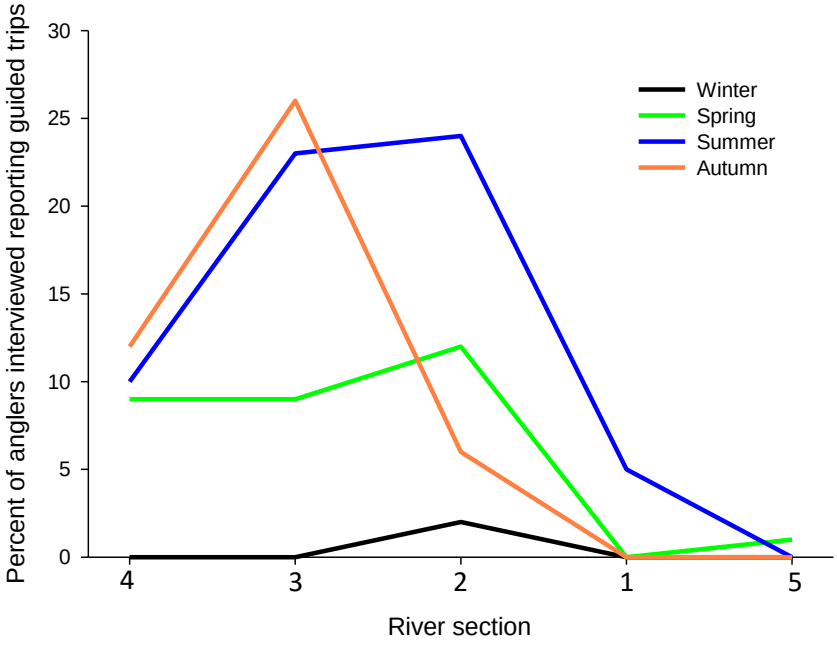


Figure 9.—Percentages of anglers interviewed who reported participating in professionally-guided fishing trips during 2015-2016 in the Flathead River, by season. Winter = December through February, Spring = March through May, Summer = June through August, and Autumn = September through November. River sections are shown from upstream down and are defined in Figure 1.

Resident and Nonresident Anglers

While Deleray (2004) observed that the reported residency status of anglers (Montana versus non-Montana resident) was very similar, by river section, to the proportion of anglers using guided angling services, this trend appeared to shift during 2015-2016 (Table 15). Specifically, a smaller proportion of non-resident anglers reported using guided services during 2015-2016 than during prior years. The greatest proportions of non-resident and guided angling use were observed in Section 3, followed by sections 4 and 2. Conversely, most anglers interviewed in sections 1 and 5 (the lower Flathead River and sloughs) did not use a fishing guide and were Montana residents.

Table 15.—Percentages of anglers interviewed during 2002-2003 and 2015-2016 who reported participating in professionally-guided fishing trips compared to reported residency status. River sections are shown from upstream down and are defined in Figure 1.

	Guided		Non-MT resident	
River section	2002-2003	2015-2016	2002-2003	2015-2016
4	42%	10%	41%	33%
3	30%	22%	30%	35%
2	4%	12%	7%	18%
1	0%	2%	10%	17%
5 (Sloughs)	0%	< 1%	1%	5%

The seasonality of angler residency status generally tracked fishing pressure trends among river sections (Figures 3 and 10), with the greatest proportion of non-resident anglers encountered during summer and autumn months. One exception to this trend was observed in the Flathead River sloughs (Section 5), where the percentage of non-resident anglers was slightly higher during spring. A higher proportion of non-residents were also observed angling during spring in Section 2 (Pressentine FAS downstream to the Stillwater River confluence). Very few non-residents were encountered during winter in any river section.

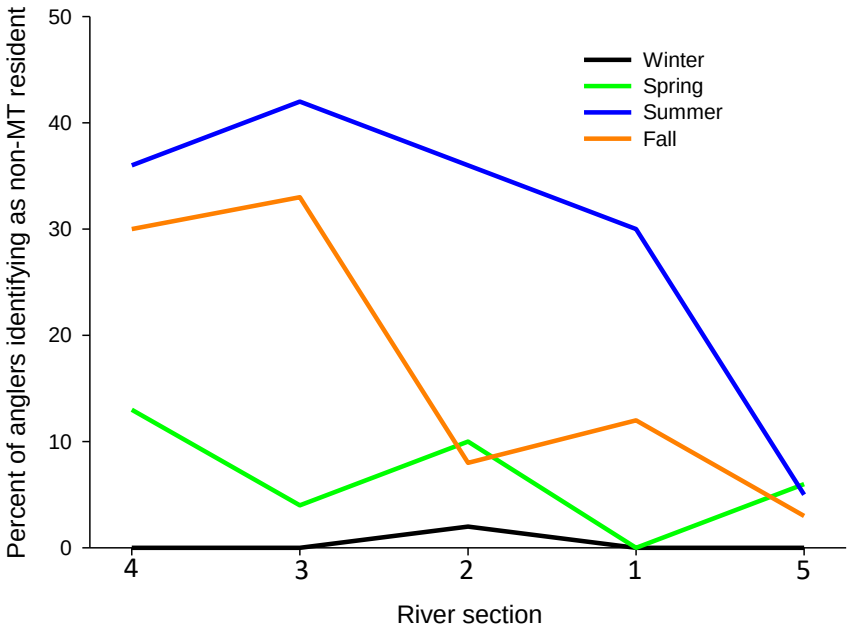


Figure 10.—Percentages of anglers interviewed who identified as non-Montana residents during 2015-2016 in the Flathead River, by season. Spring = March through May, Summer = June through August, Autumn = September through November, and Winter = December through February. River sections are shown from upstream down and are defined in Figure 1.

Anglers and Non-Anglers

A total of 189 aerial flights were conducted between March 2015 and February 2016, capturing instantaneous counts of Flathead River users (Table 16). While flight data indicated that non-angling floaters represented a large proportion of users during summer (June-August), most flotation-based users (53%) observed throughout the year were fishing (Table 17). However, non-angling floaters dominated instantaneous flight observations during June and July (Figure 11).

Table 16.—Number of aerial counts conducted on the Flathead River from March 2015 through February 2016 to estimate instantaneous angling pressure and river use.

Month	Conducted flights
Jan	21
Feb	17
Mar	11
Apr	16
May	15
Jun	14
Jul	17
Aug	16
Sep	16
Oct	14
Nov	17
Dec	15
Total	189

Table 17.—Observations of angling use from instantaneous aerial counts of the Mainstem Flathead River from Blankenship Bridge downstream to Flathead Lake during March 2015 through February 2016.

Month	Boat anglers	Non-angling boaters	Total	Percent angling
Jan	9	3	12	75%
Feb	39	6	45	87%
Mar	45	18	63	71%
Apr	136	25	161	84%
May	156	73	229	68%
Jun	365	624	989	37%
Jul	566	614	1,180	48%
Aug	333	317	650	51%
Sep	253	106	359	70%
Oct	123	39	162	76%
Nov	33	14	47	70%
Dec	32	19	51	63%
Total	2,090	1,858	3,948	53%

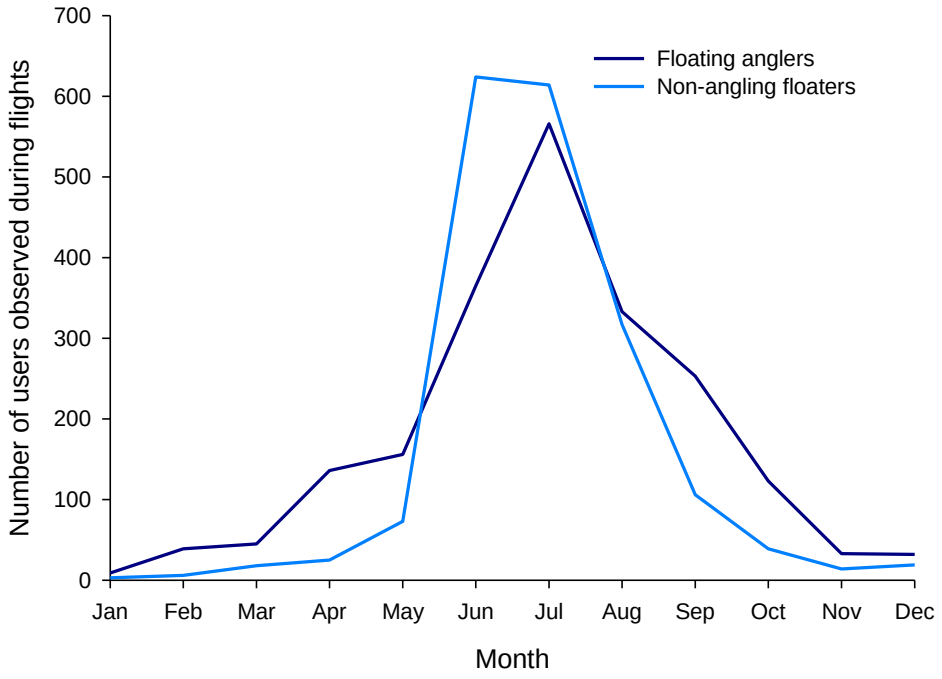


Figure 11.—Instantaneous flight observations of flotation-based use in the Flathead River from Blankenship Bridge to Sportsman's Bridge during March 2015-February 2016.

Literature cited

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Appendix A

Front of angler interview form:

FLATHEAD RIVER AND SLOUGHS CREEL SURVEY 2015 Weather (1-5, see key):

Date: / / Interviewer: Interview location: Page of

Weekend/Weekday (circle one): Time start/end: /

Interview Number	1		2		3		4		5		6		7		8		9		10	
Group or Individual (circle one)	G	I	G	I	G	I	G	I	G	I	G	I	G	I	G	I	G	I	G	I
Launch site (use codes)																				
Fished sloughs or river? (S, R, or Both)																				
Time of interview																				
Time fishing started																				
Hours fished																				
Angler type: 1 = Shore; 2 = Boat																				
Method: 1 = Troll; 2 = Jig; 3 = Cast; 4 = Fly																				
Lure type: 1 = Bait; 2 = Artificial; 3 = Barbless																				
Launch Location: 1 = Public; 2 = Private																				
Guided trip: 1 = Yes; 2 = No																				
Number of anglers in group																				
# MT resident/Non-resident																				
Trip: 1 = Complete; 2 = Incomplete																				
Primary target species (9 = No target):																				
1 = Lake trout C/H																				
2 = Lake whitefish C/H																				
3 = Perch C/H																				
4 = Cutthroat C/H																				
5 = Rainbow C/H																				
6 = Hybrid trout C/H																				
7 = Bull trout C/H																				
8 = Pike C/H																				
10 = Bass C/H																				
11 = Mountain whitefish C/H																				
12 = Crappy C/H																				
13 = Other C/H																				

Comments:

Back of angler interview form:

FISH LENGTHS (mm)											
Int. # = Interview #											
Fish #	Int.#	Species	Length	Fish #	Int.#	Species	Length	Fish #	Int. #	Species	Length
1				32				63			
2				33				64			
3				34				65			
4				35				66			
5				36				67			
6				37				68			
7				38				69			
8				39				70			
9				40				71			
10				41				72			
11				42				73			
12				43				74			
13				44				75			
14				45				76			
15				46				77			
16				47				78			
17				48				79			
18				49				80			
19				50				81			
20				51				82			
21				52				83			
22				53				84			
23				54				85			
24				55				86			
25				56				87			
26				57				88			
27				58				89			
28				59				90			
29				60				91			
30				61				92			
31				62				93			

Appendix A—continued

Access point codes

SPB = Sportsmans Bridge
CHS = Church Slough
OSB = Old Steel Bridge
KOK = Kokanee Bend
PRB = Pressentine
TEA = Teakettle
HOM = House of Mystery
SFF= South Fork Flathead (not to be surveyed but people may launch here)
BLK = Blankenship

Weather codes (generalized)

1 = Sunny, warm, calm to no wind (perfect day)
2 = Sunny, warm, some amount of wind
3 = Some sun, not very warm, some wind
4 = Part to full cloud cover (perhaps some precipitation), cool to cold, some wind
5 = Precipitation, cold, wind (terrible day)

Appendix B

Table B1.—Detailed angler fishing pressure estimates for the Flathead River during 2015-2016. River sections are listed from upstream down and are defined in Figure 1.

		Section 4		Section 3		Section 2		Section 1		Section 5		Totals		
Month	Day type	Shore	Boat	Shore	Boat	Shore	Boat	Shore	Boat	Shore	Boat	Shore	Boat	Combined
Jan	Weekday	17.2	0.0	0.0	34.3	137.2	0.0	17.2	102.9	2,846.9	0.0	3,018.4	137.2	3,155.6
	Weekend	0.0	0.0	10.9	10.9	21.8	21.8	0.0	0.0	3,506.2	0.0	3,538.9	32.7	3,571.6
	Combined	17.2	0.0	10.9	45.2	159.0	21.8	17.2	102.9	6,353.1	0.0	6,557.3	169.9	6,727.2
Feb	Weekday	0.0	0.0	42.9	0.0	85.9	0.0	21.5	64.4	901.7	64.4	1,052.0	128.8	1,180.9
	Weekend	29.1	72.6	43.6	87.2	43.6	87.2	14.5	188.9	348.7	58.1	479.4	494.0	973.4
	Combined	29.1	72.6	86.5	87.2	129.5	87.2	36.0	253.3	1,250.4	122.5	1,531.5	622.8	2,154.3
Mar	Weekday	0.0	38.7	77.4	38.7	38.7	38.7	77.4	116.1	116.1	77.4	309.6	309.6	619.2
	Weekend	64.5	0.0	96.8	290.3	290.3	96.8	0.0	387.0	580.5	129.0	1,032.0	903.0	1,935.0
	Combined	64.5	38.7	174.2	329.0	329.0	135.5	77.4	503.1	696.6	206.4	1,341.6	1,212.6	2,554.2
Apr	Weekday	102.9	240.1	171.5	548.8	68.6	343.0	123.5	216.1	0.0	1,296.5	466.5	2,644.5	3,111.0
	Weekend	0.0	66.2	52.9	0.0	26.5	105.8	0.0	110.3	0.0	926.1	79.4	1,208.3	1,287.7
	Combined	102.9	306.3	224.4	548.8	95.1	448.8	123.5	326.3	0.0	2,222.6	545.9	3,852.9	4,398.7
May	Weekday	152.7	0.0	0.0	44.6	133.7	311.9	0.0	133.7	0.0	1,692.9	286.4	2,183.0	2,469.3
	Weekend	116.6	204.1	41.7	125.0	104.1	30.8	0.0	145.8	0.0	1,749.6	262.4	2,255.3	2,517.8
	Combined	269.4	204.1	41.7	169.5	237.8	342.7	0.0	279.5	0.0	3,442.5	548.8	4,438.3	4,987.1
Jun	Weekday	188.1	1,655.3	301.0	2,031.5	489.1	865.3	150.5	413.8	0.0	2,407.7	1,128.6	7,373.5	8,502.1
	Weekend	191.5	1,477.4	0.0	848.2	0.0	136.8	0.0	114.0	0.0	2,872.8	191.5	5,449.2	5,640.7
	Combined	379.6	3,132.7	301.0	2,879.6	489.1	1,002.1	150.5	527.8	0.0	5,280.5	1,320.1	12,822.7	14,142.8
Jul	Weekday	661.3	2,571.8	330.7	2,755.5	330.7	1,763.5	100.2	167.0	73.5	2,902.5	1,496.3	10,160.3	11,656.6
	Weekend	250.5	1,578.2	128.8	1,309.8	150.3	1,567.4	64.4	558.3	0.0	1,481.5	594.0	6,495.1	7,089.1
	Combined	911.8	4,150.0	459.5	4,065.3	481.0	3,330.9	164.6	725.3	73.5	4,384.0	2,090.4	16,655.4	18,745.7
Aug	Weekday	91.8	2,708.1	241.0	1,365.5	107.1	1,749.3	128.5	546.2	35.7	2,463.3	604.1	8,832.4	9,436.5
	Weekend	102.0	1,020.0	0.0	726.8	153.0	679.8	0.0	244.8	0.0	1,774.8	255.0	4,446.2	4,701.2
	Combined	193.8	3,728.1	241.0	2,092.3	260.1	2,429.1	128.5	791.0	35.7	4,238.1	859.1	13,278.6	14,137.7
Sep	Weekday	126.9	1,015.5	63.5	317.3	63.5	507.7	0.0	317.3	126.9	1,301.1	380.8	3,458.9	3,839.7
	Weekend	104.9	402.2	17.5	437.1	174.9	349.7	69.9	314.7	17.5	1,031.7	384.7	2,535.4	2,920.1
	Combined	231.8	1,417.6	81.0	754.5	238.3	857.4	69.9	632.1	144.4	2,332.7	765.5	5,994.4	6,759.8
Oct	Weekday	174.5	145.4	87.3	465.4	320.0	640.0	29.1	145.4	87.3	494.5	698.1	1,890.8	2,588.9
	Weekend	53.6	241.0	42.8	192.8	342.7	299.9	0.0	192.8	0.0	364.1	439.1	1,290.6	1,729.7
	Combined	228.1	386.4	130.1	658.2	662.7	939.8	29.1	338.2	87.3	858.7	1,137.2	3,181.3	4,318.6
Nov	Weekday	145.7	58.3	87.4	204.0	349.7	116.6	0.0	0.0	29.1	116.6	612.0	437.1	1,049.1
	Weekend	0.0	0.0	0.0	0.0	136.0	238.0	17.0	0.0	85.0	34.0	238.0	272.0	510.0
	Combined	145.7	0.0	87.4	204.0	485.7	354.6	17.0	0.0	114.1	150.6	850.0	709.1	1,559.1
Dec	Weekday	21.9	21.9	43.9	21.9	153.5	0.0	0.0	0.0	2,237.2	0.0	2,456.5	43.9	2,500.4
	Weekend	13.4	0.0	0.0	0.0	78.3	0.0	0.0	0.0	1,786.0	0.0	1,877.8	0.0	1,877.8
	Combined	35.4	21.9	43.9	21.9	231.9	0.0	0.0	0.0	4,023.2	0.0	4,334.3	43.9	4,378.2
	Totals	2,609.2	13,458.5	1,881.4	11,855.4	3,799.0	9,949.9	813.7	4,479.5	12,778.4	23,238.6	21,881.7	62,981.8	84,863.5

Appendix C

Table C1.—Number of angler interviews completed on the Flathead River between Blankenship Bridge and Flathead Lake during 2015-2016. Ice anglers were included with shore anglers, where applicable.

	Section 4		Section 3		Section 2		Section 1		Section 5 (Sloughs)		Combined	
Month	Shore	Boat	Shore	Boat	Shore	Boat	Shore	Boat	Shore	Boat	Shore	Boat
Jan	1	0	0	1	15	1	1	1	14	0	31	3
Feb	0	0	1	0	4	0	2	3	2	0	9	3
Mar	1	8	5	10	11	9	3	11	12	6	32	44
Apr	5	4	11	4	5	15	0	10	4	55	25	88
May	11	25	19	5	23	6	2	22	18	99	73	157
Jun	12	63	21	69	60	27	14	36	11	136	118	331
Jul	51	123	22	55	18	44	12	4	4	36	107	262
Aug	60	93	46	50	28	28	9	12	6	43	149	226
Sep	25	43	14	29	41	25	4	11	9	47	93	155
Oct	17	4	12	39	123	15	2	7	6	49	160	114
Nov	5	0	1	8	87	5	1	0	0	2	94	15
Dec	5	0	0	0	20	1	0	0	21	0	46	1
Totals	193	363	152	270	435	176	50	117	107	473	937	1,399