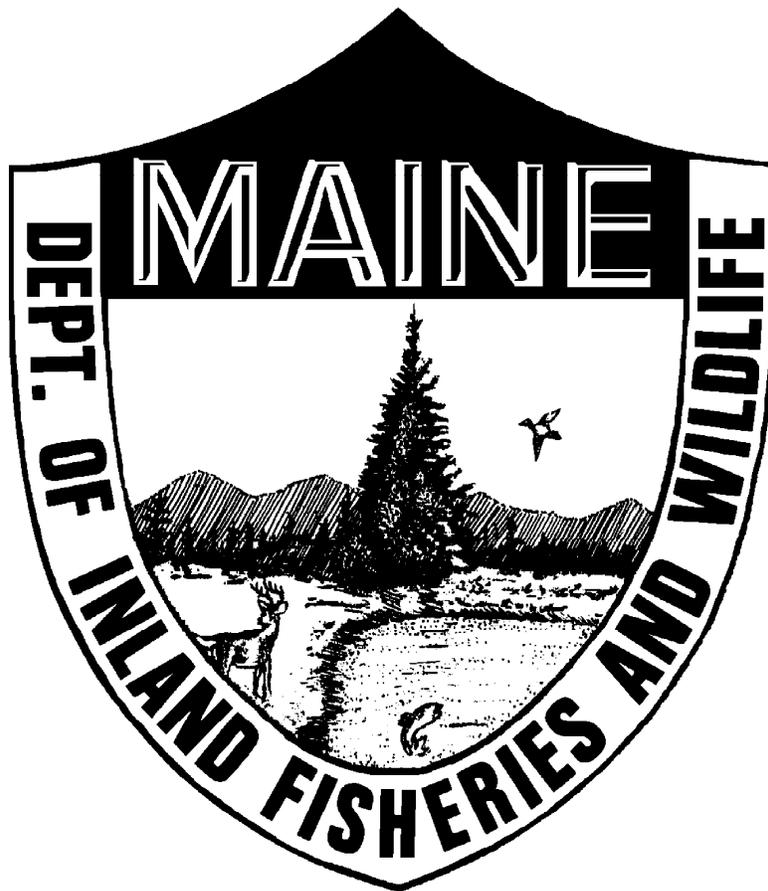


Fishery Interim Summary Report Series No. 17-5

Upper Dam Pool Fishery Management

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Rangeley Lakes Region



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Maine Department of
Inland Fisheries & Wildlife
Fisheries and Hatcheries Division

Job F-014
Upper Dam Pool Fishery Management
Interim Summary Report No. 10 (2017)

SUMMARY

- Upper Dam Pool is located between Upper Dam (Figure 1), which controls water levels in Mooselookmeguntic Lake, and the Richardson Lakes. The outlet stream, which is the major inlet to the Richardson Lakes, is approximately 0.46 miles long, but the fishery is concentrated in the large tailwater pool below the dam. The fishery is comprised of wild salmon that drop down from Mooselookmeguntic Lake and hatchery salmon stocked in the Richardson Lakes. Brook trout are of wild origin from both lakes and from stockings made into the Richardson Lakes. Lake trout are present from historic stockings made into the Richardson Lakes and a small wild population still exists. The Upper Dam tailrace is a spawning tributary for rainbow smelt, an important prey species of salmonids in the Richardson Lakes.
- A reconstruction of Upper Dam began in 2012 and was completed in 2016. The new dam is designed to withstand and pass 36,000 CFS during the probable maximum precipitation/ probable maximum flood as required by the Federal Energy Regulatory Commission. The new service spillway is comprised of approximately 6,000 cubic yards of concrete with flow managed through two 10-ft wide split leaf gates and one 24-ft wide radial gate and approximately 480 linear feet of labyrinth spillway. Embankment slopes were re-shaped from the existing 1:1 slopes and flattened to 2:1. These embankments were then armored with stone rip-rap which was salvaged from the excavation area for the new structure. Fishing access on both the north and south sides of the river were delineated and improved to assure safe angler access to the river.
- From 1996 to 2006, fishing regulations for Upper Dam Pool included fly fishing only, minimum length limits of 18 inches for salmon and 12 inches (14 inches in 2007) for brook trout, and a total daily bag limit of one fish. In 2008, a catch-and-release rule was implemented for brook trout, and the length limit on salmon was reduced to 16 inches. The smelt-spawning run was closed to recreational dipping in 1996. October fishing (catch-and-release only) has been permitted since 1998. Season-long angler creel surveys were conducted in 1998–1999, 2002–2004, 2007, 2010, 2013, and 2016 to evaluate and monitor the fishery.
- Annual fishing pressure at Upper Dam Pool had been increasing steadily during recent surveys, with an estimated 2,985 to 4,591 anglers fishing the pool in 2013 (Table 2). Only an estimated 1,735 to 2,407 anglers fished it in 2016, a drop attributed to the construction project of the new dam. Fishing in October comprised about 27% of the 2016 season's total fishing effort with 24% and 16% of the season's legal salmon and brook trout catch occurring, respectively (Table 5).

- Catch rates for both legal-sized salmon and brook trout decreased in 2016 compared to the 2013 survey, but stayed at levels near or above other recent surveys (Tables 2 & 3). The catch rate for legal-size salmon in 2016 was 0.42 fish/trip and a total catch of 876 ± 142 fish. Similarly, 2016 statistics for brook trout over 12 inches were 0.43 fish/trip and 893 ± 145 fish of that size were caught. These values are higher than those measured during many other recent surveys. This reflects the high abundance of salmon and brook trout in both Mooselookmeguntic Lake and the Richardson Lakes.
- Data provided by volunteers over the last 10 years indicates the salmon fishery continues to be dominated by fish in the 14 to 16-inch size range (Figure 4). This data also showed an increase in the size proportion of salmon overall, but a slight decline in the proportion of salmon over 20 inches.
- The brook trout fishery was comprised of larger fish from 2007 to 2016, with 42% of the reported catch being 12 inches or greater (Figure 3). This proportion of larger brook trout has increased from the 27% in 1996 to 2006.
- Upper Dam Pool provides high quality salmon and brook trout fisheries that attract large numbers of anglers. Restrictive regulations and high rates of voluntary release should maintain the integrity of this important resource. However, the Upper Dam Pool fishery may still be affected by recent changes in fishery management in Mooselookmeguntic Lake and the Richardson Lakes. We will continue to monitor this fishery with a season-long creel survey scheduled for the 2019 and 2022 fishing seasons and through voluntary angler log books.

KEY WORDS: BKT, LLS, SMB, ANGLER EFFORT, ANGLER SURVEY, REGULATIONS, FORAGE, CLERK SURVEY, MEAN SIZE

INTRODUCTION AND STUDY AREA

Upper Dam Pool is located between Upper Dam, which controls water levels in Mooselookmeguntic Lake, and Richardson Lake (Figure 1). The outlet stream, which is the major inlet to the Richardson Lakes, is approximately 0.46 miles long, but the fishery is concentrated in the large tailwater pool below the dam. During typical July flows, the pool where salmonids congregate and most of the angling occurs has a surface area of about 3 acres and mean and maximum depths of 12 feet and 20 feet, respectively. Salmonids that congregate in the pool include landlocked salmon (*Salmo salar*), brook trout (*Salvelinus fontinalis*), and lake trout (*Salvelinus namaycush*). The fishery is comprised of wild salmon that drop down from Mooselookmeguntic Lake and hatchery salmon stocked in the Richardson Lakes. Brook trout are of wild origin from both lakes and from stockings made in the Richardson Lakes. Small numbers of lake trout are present in Upper Dam Pool. The lake trout fishery is comprised of a small number of wild fish that are descendants from historical stockings into the Richardson Lakes. The Upper Dam tailrace is an important spawning tributary for rainbow smelt (*Osmerus mordax*), the principal prey species of predator fish in the Richardson Lakes. Upper Dam Pool does not provide a significant amount of suitable spawning habitat for salmon, brook trout, or lake trout.

A reconstruction of Upper Dam began in 2012 and was completed in 2016. The new dam is designed to withstand and pass 36,000 CFS during the probable maximum precipitation/probable maximum flood as required by the Federal Energy Regulatory Commission. The new service spillway is comprised of approximately 6,000 cubic yards of concrete with flow managed through two 10-foot wide split leaf gates and one 24-foot wide radial gate and approximately 480 linear feet of labyrinth spillway. Embankment slopes were reshaped from the existing 1:1 slopes and flattened to 2:1. These embankments were then armored with stone rip-rap which was salvaged from the excavation area for the new structure. Fishing access on both the north and south sides of the river were delineated and improved to assure safe angler access to the river.

Fishing regulations for Upper Dam Pool are highly restrictive. A catch-and-release rule was adopted for brook trout in 2008 at the request of anglers, with support from the Department. While harvest of brook trout caught in Upper Dam Pool was historically low, the small numbers killed were often large, older-age fish that are highly valued by anglers. Also in 2008, the minimum legal length limit for salmon was reduced from 18 to 16 inches to conform to new statewide regulation categories. In 1998, Upper Dam Pool was opened to catch-and-release fishing during October after electrofishing, trapnetting, and Scuba surveys showed that natural reproduction of salmonids in the stream was minimal, and that biological problems associated with handling stress were not likely to impact fisheries in either Upper Dam Pool or the adjoining lakes (Bonney 1997). Smelt dipping is also prohibited in Upper Dam Pool, which is consistent with all other tributaries to the Richardson Lakes. Upper Dam Pool is restricted to fly fishing only.

There is vehicular access to within one mile of Upper Dam Pool. The pool can also be accessed by boat from Mooselookmeguntic Lake and the Richardson Lakes.

Season-long angler creel surveys were conducted in 1998–1999, 2002–2004, 2007, 2010, 2013, and 2016. The surveys, funded and staffed by FPL Energy Maine Hydro (FPLE) and Brookfield Renewable Energy Partners (BREP), were designed to evaluate the fishery following changes in water level and flow management regimes from Upper Dam. The 2016 survey is the subject of this report. Results of the previous surveys, reported by Boucher (1999a, 1999b, 2003, 2005, and 2007), Seiders (2011), and Howatt and Seiders (2013), are included here for comparison.

METHODS

Creel clerks counted anglers and conducted interviews on one weekend day and two weekdays per week from May 16 to October 31, 2016 (Table 1). Angler counts were made on each survey day during the period of peak daily fishing activity based on the records of voluntary anglers from 2005 to 2015 (Figure 2). Computation of use estimates followed the method described by Havey (1984). The Upper Dam Pool fishery was also evaluated from data provided by several voluntary anglers.

SUMMARY OF FINDINGS

Angler use for the entire 2016 season (May 1 to October 31) was estimated at 2,071 trips (Table 2). Anglers caught a total of 876 ± 142 legal salmon (≥ 16 inches) and 893 ± 145 brook trout (≥ 12 inches). Catch rates for legal-size salmon in 2016 were lower than 2013 (0.42 fish/trip and 0.71 fish/trip, respectively). Catch rates for brook trout decreased from 1.17 fish/trip in 2013, to 0.43 fish/trip in 2016 (Table 3). Salmon of all sizes, including sublegal fish, were caught at a rate of 1.59 fish/trip, while the catch rate for brook trout of all sizes was 2.59 fish/trip (Table 2). The release rate for legal-size salmon was 98% and similar to all surveys since 1999. The release rate for legal-size brook trout was 100% due to catch-and-release regulations.

As in previous years, high release rates and stringent length restrictions precluded the creel clerk's efforts to collect size frequency or age and growth data. However, data provided by volunteers from 2007 to 2016 indicate the salmon fishery is comprised primarily of fish in the 14 to 16-inch size range (Figure 4). From 1996 to 2006, about 15% of the salmon catch exceeded 16 inches. This ratio increased slightly to 16% from 2007 to 2016. The proportion of larger salmon (≥ 20 in) declined to about 4% of the catch from 1996 to 2006, and to only 2% of the total catch from 2007 to 2016.

The brook trout fishery was comprised of larger fish from 2007 to 2016, with 42% of the reported catch being 12 inches or greater (Figure 3). The proportion of brook trout exceeding 14 inches increased from 13% during 1996 to 2006, to 20% during the period from 2007 to 2016. The proportion of large brook trout, over 16 inches, represented about 3% of the catch from 2007 to 2016.

The October fishing season use was 27% of total 2016 angler use or 564 ± 202 angler trips (Table 4). Angler use during the October season increased steadily from 2002 to 2010, then decreased sharply in 2013, only to rebound in 2016. The 2013 drop in angler use can be attributed to the construction of the new dam which deterred anglers from fishing the pool that year. Only 5% of the 2013 season's catch of legal size salmon and brook trout occurred in October (Table 5). In 2016, 24% and 16%, respectively, of the season's total catch of salmon and brook trout occurred during this fall season.

DISCUSSION

Angler use during the entire 2016 season (May-October) was estimated at $2,071 \pm 336$ trips, which is lower than the estimate of $3,783 \pm 798$ anglers in 2013, but similar to the estimates obtained in 1999, and 2003–2004. Angler use estimates for Upper Dam Pool have indicated a long-term upward trend (Figure 5). The 2016 October angler use was back to levels observed prior to the dam reconstruction project that began in 2012. The October fishery remains popular, with an overall increasing trend from 2002 (Table 4). We do not anticipate negative impacts from the October fishery, because this area does not provide suitable spawning and nursery habitat for salmonids. Rather, Upper Dam Pool provides a unique opportunity for Western Maine anglers to participate in fall fishing for wild salmonids with limited potential impacts. This information can be used to formulate a rational basis for predicting levels of use, handling, and potential mortalities where extended seasons for salmonids are proposed in the future, either by the public or by the Department.

The catch rate for legal-size salmon decreased from 0.71 fish/trip in 2013 to 0.42 in 2016 (Table 2). This lower average was still higher than all other survey years prior to 2013. The total catch of salmon (all size groups) was also down in 2016 at $3,290 \pm 534$ fish, reflecting the lower angler use rate. Salmon growth has been poor in both lakes since approximately 2001 as forage (smelts) populations declined due to large salmon populations. Consistent with the salmon growth data for the Richardson Lakes, the proportion of the salmon catch greater than 16 inches remains low at Upper Dam Pool. This coincides with 2016 data from the Rapid River that showed anglers were catching mostly small salmon (Howatt 2017). The salmon fisheries in these two areas (Upper Dam Pool and the Rapid River) rely heavily upon fish contributed from the Richardson Lakes. The decreased salmon size in both areas suggests that some portion of the Richardson Lakes' salmon population is experiencing poor growth, despite the data collected directly from the Richardson Lakes. Efforts to improve salmon size quality in Mooselookmeguntic Lake and the Richardson Lakes will continue. Salmon harvest rules have been liberalized considerably at Mooselookmeguntic Lake in an effort to remove these predatory fish and increase the forage base. Reductions in salmon stocking in the Richardson Lakes began in 1994. Stocking was suspended in 2006 then resumed at a reduced rate in 2007. Lake trout stockings were terminated and the lake and tributaries were closed to taking of smelts in 2007 (Bonney 2008).

Catch rates for legal and sublegal brook trout also decreased in 2016 (Table 3). The catch rate for all sized trout decreased from 3.66 fish/trip in 2013 to 2.59 in 2016. This is again reflects the lower angler use rate as a result of the dam reconstruction project. In recent years, the relative stability of trout numbers in Upper Dam Pool, and their improved size quality, suggests that water level regimes currently employed for Mooselookmeguntic Lake and the Upper Dam tailrace are appropriate for this species under the current fishing regulations. In addition, tributaries to Mooselookmeguntic and the Richardson Lakes are inspected annually by BREP staff to assure a zone of passage is maintained for spawning salmonids and smelts. This may have played a role in assuring stable recruitment and consistent catch rates for brook trout in Upper Dam Pool. Brook trout stockings of spring-yearling sized fish in the Richardson Lakes occur annually, possibly contributing to the pool's fishery.

Upper Dam Pool supports high quality fisheries for landlocked salmon and brook trout that attract large numbers of anglers. Restrictive harvest regulations and high rates of voluntary release practiced by anglers should maintain the integrity of this important resource. However, the Upper Dam Pool fishery will be affected by changes in fishery management for Mooselookmeguntic Lake and the Richardson Lakes. Continued monitoring will be necessary to fully evaluate these changes.

RECOMMENDATIONS

1. Conduct season-long creel surveys in 2019 and 2022, including the October extended fishery.
2. Continue and expand the use of voluntary anglers to monitor the Upper Dam Pool fishery on an annual basis.
3. Continue to evaluate and monitor fishery conditions in Mooselookmeguntic Lake and the Richardson Lakes, insofar as these waters influence the Upper Dam Pool fishery.

ACKNOWLEDGMENTS

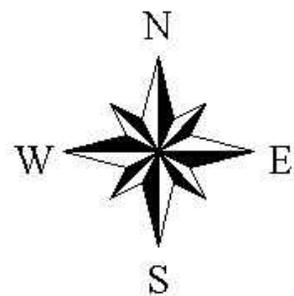
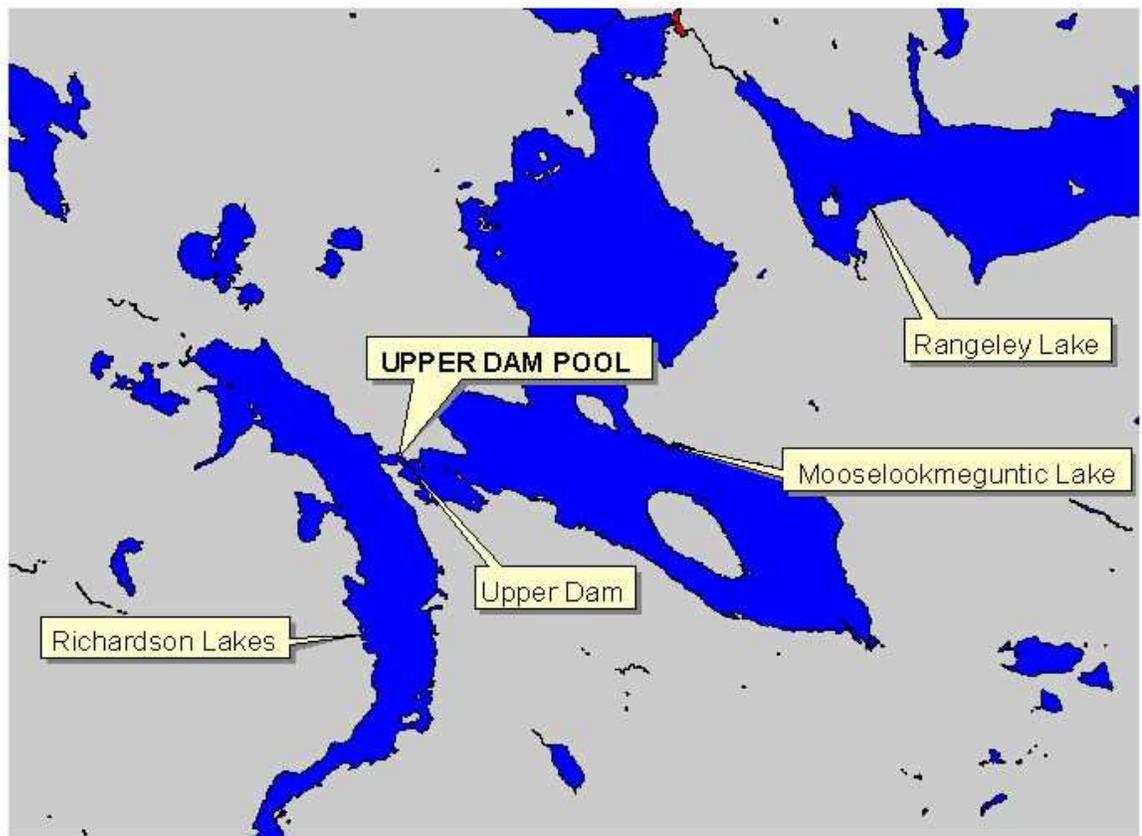
Brookfield Renewable Energy Partners provided staff and funding for the creel survey and angler counts as a condition of their operating license for Upper and Middle Dams. Cassidy Bigos and Jeff Smith conducted the creel survey in 2016. Elizabeth Thorndike assisted in the coordination of the survey, data enter/analysis, and report formatting. Kyle Murphy of BREP provided information about the new dam and its construction. Fishery Biologists Matt Lubejko and Robert Van Riper reviewed this report and offered several helpful suggestions. Sincere thanks are due to the following anglers who have participated in the voluntary angler log program at Upper Dam Pool from 2007 to 2016: Mike Anctil, Bill Booker, Bob Bourassa, Lyndall Hewey, Ralph Johnson, Charlie LePage, Wayne MacDougall, Peter Mills, Don Palmer, Greg Swenson, and Harry Vernesoni.

Prepared by:
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Figure 1. Site location map for Upper Dam Pool.



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Augusta, Maine

Table 1. Description of Upper Dam Pool angler creel surveys, 1999-2016.

Year	Date	No. days surveyed	No. days in season
1999	May 14 to October 31	36	214
2002	May 4 to October 31	53	214
2003	May 16 to October 31	57	214
2004	May 12 to October 31	55	214
2007	May 2 to October 31	58	214
2010	May 3 to October 31	59	214
2013	May 1 to October 31	51	214
2016	May 16 to October 31	66	214

Figure 2. Daily angler activity curve for Upper Dam Pool as reported by voluntary anglers. (268 angler trips surveyed from 2005 to 2016).

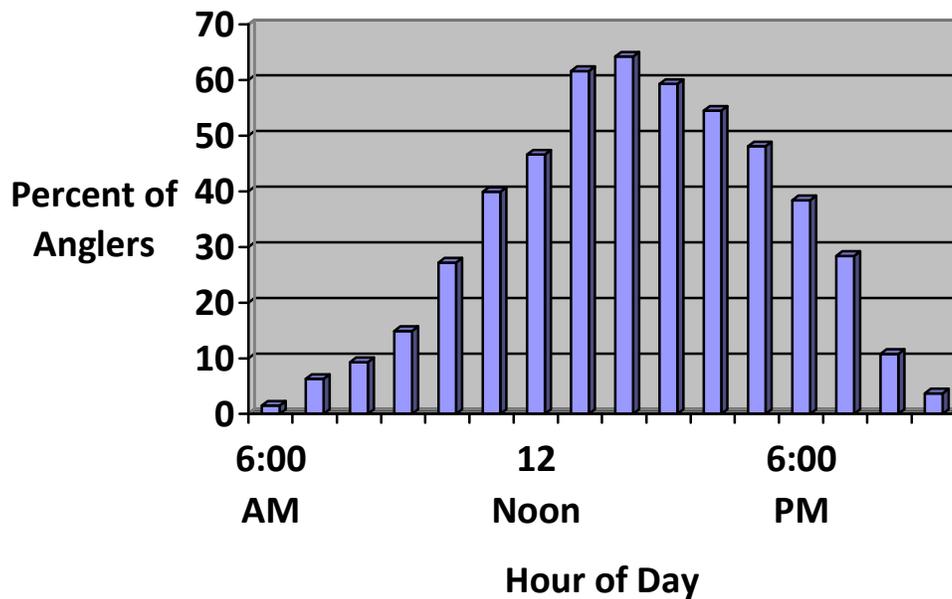


Table 2. Summary statistics for Upper Dam Pool salmon from clerk creel surveys, 1999-2016. Confidence limits (\pm) were computed at the 0.05 probability level.

Parameter	Species and year of survey							
	Salmon							
	1999	2002	2003	2004	2007	2010	2013	2016
No. anglers surveyed:	287	323	468	530	475	437	318	350
No. angler hours surveyed:	732	895	1,317	1,643	1,377	1,415	1,018	1032
No. (%) successful anglers:	23 (8)	28 (9)	47 (10)	38 (7)	78 (16)	70 (16)	92 (29)	84 (24)
No. legals caught: ¹	34	46	65	55	142	122	226	148
No. (%) legals released:	33 (97)	46 (100)	65 (100)	53 (96)	141 (99)	121 (99)	224 (99)	145 (98)
No. (%) sublegals released:	324 (91)	481 (91)	631 (91)	1,078 (95)	493 (78)	511 (81)	503 (69)	408 (73)
No. legals caught/angler-trip:	0.12	0.14	0.14	0.10	0.30	0.28	0.71	0.42
No. legals kept/angler-trip:	<0.01	0	0	<0.01	<0.01	<0.01	<0.01	<0.01
Hours/legal caught:	21.5	19.4	20.3	29.9	9.7	11.6	4.5	7.0
All sizes caught/angler-trip:	1.25	1.63	1.49	2.14	1.34	1.45	2.29	1.59
Estimated total catch of legals \pm CI:	309 \pm 79	174 \pm 41	390 \pm 62	209 \pm 41	977 \pm 156	968 \pm 179	2,689 \pm 567	876 \pm 142
Estimated total harvest of legals \pm CI:	8 \pm 2	0	0	8 \pm 2	7 \pm 1	7 \pm 1	23 \pm 5	18 \pm 3
Estimated total catch, all sizes \pm CI	3,273 \pm 833	1,985 \pm 471	4,177 \pm 659	4,477 \pm 882	4,364 \pm 698	3,896 \pm 721	8,672 \pm 1,829	3,290 \pm 534
Estimated total angler days \pm CI	2,618 \pm 666	1,218 \pm 289	2,809 \pm 442	2,092 \pm 412	3,257 \pm 521	3,509 \pm 650	3,783 \pm 798	2,071 \pm 336

¹ Minimum legal length limit for salmon was 18 inches from 1998 to 2006. In 2007, the minimum legal length for salmon was reduced to 16 inches.

Table 3. Summary statistics for Upper Dam Pool brook trout from clerk creel surveys, 1999-2016. Confidence limits (\pm) were computed at the 0.05 probability level.

Parameter	Species and year of survey							
	Brook trout							
	1999	2002	2003	2004	2007	2010	2013	2016
No. anglers surveyed:	287	323	468	530	475	437	318	350
No. angler hours surveyed:	732	895	1,317	1,643	1,377	1,415	1,018	1032
No. (%) successful anglers:	18 (6)	27 (8)	36 (8)	48 (9)	45 (9)	105 (24)	112 (35)	98 (28)
No. legals caught: ²	27	60	42	78	59	192	373	151
No. (%) legals released:	26 (96)	60 (100)	42 (100)	76 (97)	59 (100)	192 (100)	373 (100)	151 (100)
No. (%) sublegals released:	137 (84)	174 (74)	124 (75)	264 (77)	216 (78)	619 (76)	791 (68)	755 (83)
No. legals caught/angler-trip:	0.09	0.19	0.09	0.15	0.12	0.44	1.17	0.43
No. legals kept/angler-trip:	<0.01	0	0	<0.01	0	-	-	-
Hours/legal caught:	27.1	14.9	31.4	21.1	23.3	7.4	2.7	6.8
All sizes caught/angler-trip:	0.57	0.73	0.36	0.65	0.58	1.86	3.66	2.59
Estimated total catch of legals \pm CI:	246 \pm 63	226 \pm 54	252 \pm 40	314 \pm 62	405 \pm 65	1,553 \pm 287	4,437 \pm 936	893 \pm 145
Estimated total harvest of legals \pm CI:	8 \pm 2	0	0	8 \pm 2	0	-	-	-
Estimated total catch, all sizes \pm CI	1,496 \pm 381	882 \pm 209	1,011 \pm 159	1,360 \pm 268	1,886 \pm 302	6,495 \pm 1,202	13,847 \pm 2,921	5,361 \pm 870

² Minimum legal length limit for brook trout was 12 inches from 1998 to 2006. Starting in 2007, brook trout fishing changed to catch and release only. For the purpose of this summary, legal-size brook trout from 2007 forward were considered to be 12 inches and greater in length.

Table 4. Angler use ($\pm 95\%$ CI) of Upper Dam Pool fishery during the special October extended season, 1999-2016.

Year of survey	Estimated use (days) for entire season	Estimated use (days) in October only	Percent of annual use in October
1999	2,618 \pm 666	362 \pm 128	14
2002	1,218 \pm 289	160 \pm 60	13
2003	2,809 \pm 442	478 \pm 128	17
2004	2,092 \pm 412	595 \pm 168	28
2007	3,257 \pm 521	630 \pm 180	19
2010	3,509 \pm 650	657 \pm 205	19
2013	3,783 \pm 798	233 \pm 139	6
2016	2,071 \pm 336	564 \pm 202	27

Table 5. Catch of legal¹ salmon and brook trout ($\pm 95\%$ CI) during the special October extended season, Upper Dam Pool, 1999-2016.

Year of survey	Estimated catch, entire season		Estimated catch in October		Percent of annual catch in October	
	Salmon	Brook trout	Salmon	Brook trout	Salmon	Brook trout
1999	309 \pm 79	246 \pm 63	116\pm41	51\pm18	38	21
2002	174 \pm 41	226 \pm 54	68\pm25	30\pm11	39	13
2003	390 \pm 62	252 \pm 40	225\pm60	81\pm22	58	32
2004	209 \pm 41	314 \pm 62	149\pm42	131\pm37	71	42
2007	977 \pm 176	405 \pm 65	404\pm65	75\pm12	41	19
2010	968 \pm 179	1,553 \pm 287	247\pm46	410\pm76	26	26
2013	2,686 \pm 567	4,426 \pm 933	130\pm78	205\pm122	5	5
2016	876 \pm 142	893 \pm 145	211\pm76	147\pm53	24	16

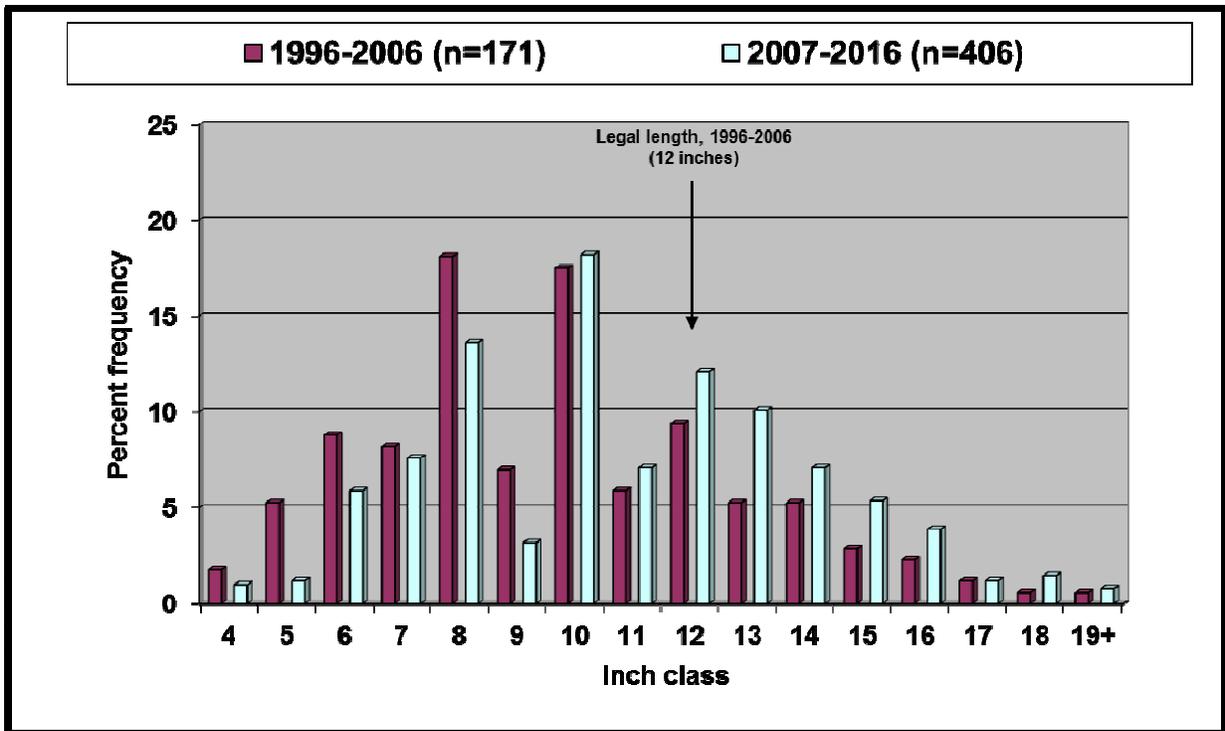


Figure 3. Length frequency distribution of brook trout reported by voluntary anglers, Upper Dam Pool, 1996-2016. Arrow indicates minimum legal length limit.

Minimum legal length limits for brook trout were 12 inches from 1996 to 2006. In 2007, the minimum legal length for brook trout was increased to 14 inches. Beginning in 2008, brook trout fishing was catch and release only.

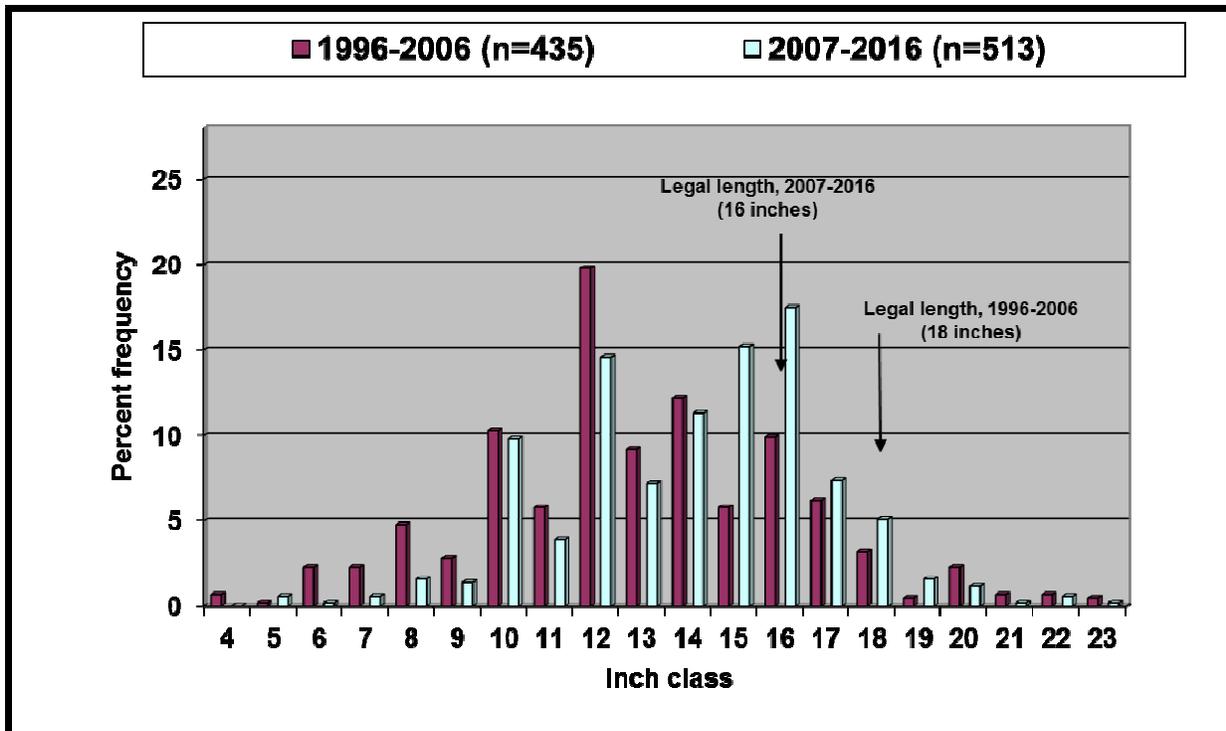
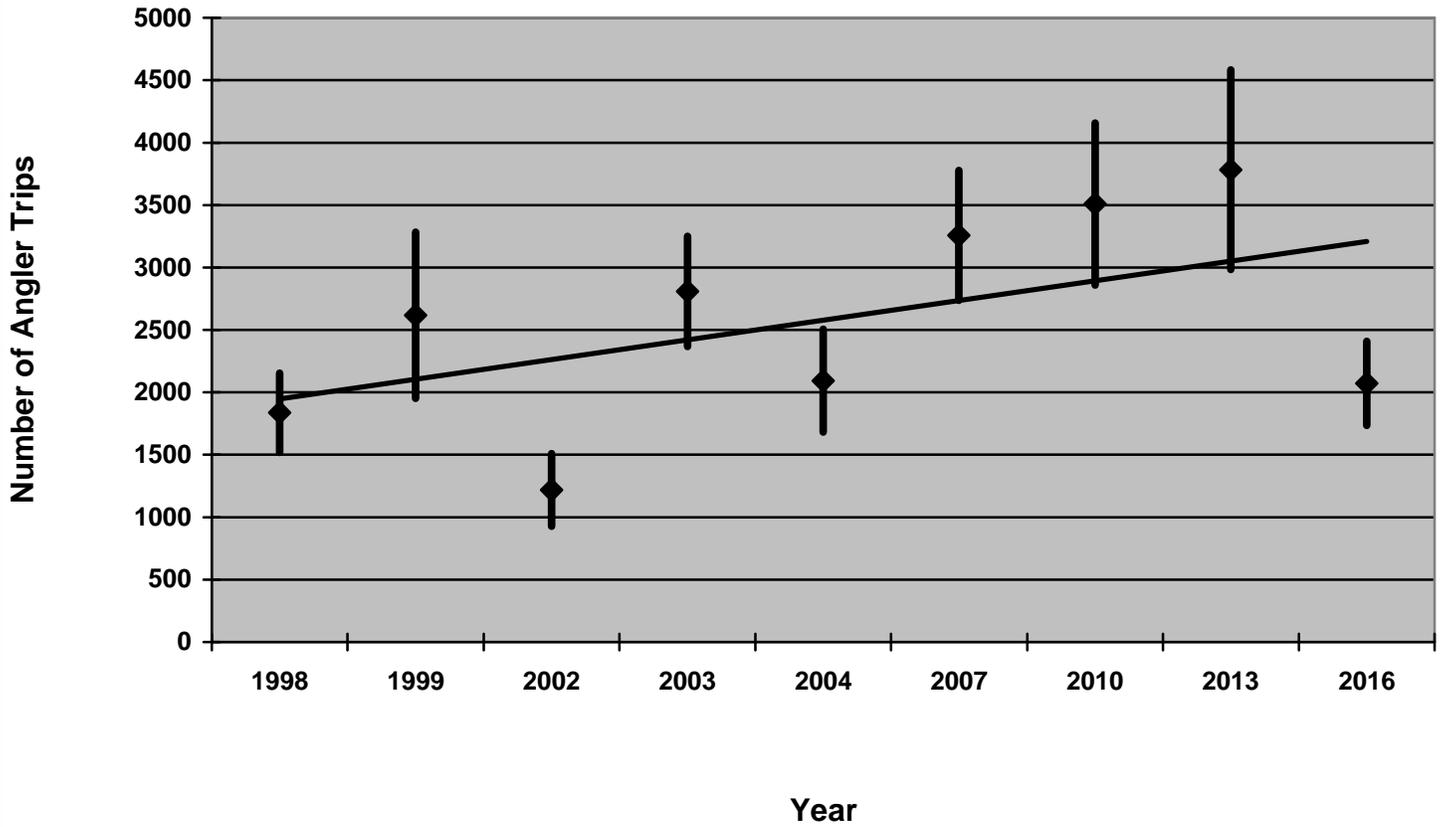


Figure 4. Length frequency distribution of salmon reported by voluntary anglers, Upper Dam Pool, 1996-2016. Arrow indicates minimum legal length limit.

Minimum legal length limits for salmon were 18 inches from 1996 to 2006. In 2007, the minimum legal length for salmon was reduced to 16 inches.

**Figure 5. Upper Dam Pool angler use estimates by year
(vertical bars represent confidence limits of 95%).**



COOPERATIVE

STATE



FEDERAL

PROJECT

This report has been funded in part by the Federal Aid in Sport Fish Restoration Program. This is a cooperative effort involving federal and state government agencies. The program is designed to increase sport fishing and boating opportunities through the wise investment of angler's and boater's tax dollars in state sport fishery projects. This program which was founded in 1950 was named the Dingell-Johnson Act in recognition of the congressmen who spearheaded this effort. In 1984 this act was amended through the Wallop Breaux Amendment (also named for the congressional sponsors) and provided a threefold increase in Federal monies for sportfish restoration, aquatic education and motorboat access.

The program is an outstanding example of a "user pays-user benefits" or "user fee" program. In this case, anglers and boaters are the users. Briefly, anglers and boaters are responsible for payment of fishing tackle, excise taxes, motorboat fuel taxes, and import duties on tackle and boats. These monies are collected by the sport fishing industry, deposited in the Department of Treasury, and are allocated the year following collection to state fishery agencies for sport fisheries and boating access projects. Generally, each project must be evaluated and approved by the U.S. Fish and Wildlife Service (USFWS). The benefits provided by these projects to users complete the cycle between "user pays – user benefits."



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