
**FISHERY INTERIM SUMMARY REPORT SERIES NO. 14-6
UPPER DAM POOL FISHERY MANAGEMENT**

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Job F-014
Upper Dam Pool Fishery Management
Interim Summary Report No. 9 (2013)

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 an important spawning tributary for rainbow smelt, the principal prey species of predator fish in the Richardson Lakes.
- 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, and 2013 to evaluate and monitor the fishery.
- Annual fishing pressure at Upper Dam Pool has increased steadily during recent surveys, with an estimated 2,985 to 4,591 anglers fishing the pool in 2013 (Table 2). Despite these record high numbers, the use during the month of October decreased for the first time since 2002 (Table 4). Fishing in October comprised only about 6 percent of the 2013 season's total fishing effort. In 2010, 26 percent of the season's catch of both salmon and brook trout occurred in October, while only 5 percent for both was handled in 2013 (Table 5). Fall fishing at the pool had been gaining in popularity, but with construction of the new dam beginning, angling pressure has clearly dropped off.
- Catch rates for both legal-sized salmon and brook trout increased dramatically in 2013 to levels not seen before in previous surveys (Tables 2 & 3). The catch rate for legal-size salmon in 2013 climbed to 0.71 fish/angler and a total catch of approximately 2,700 fish. Similarly, high 2013 statistics for brook trout are 1.17 fish over 12 inches/angler and approximately 4,450 fish of that size caught. These values are about two times higher than those measured during other recent surveys. This indicates continued very high abundance of salmon and brook trout in both Mooselookmeguntic Lake and the Richardson Lakes.

- Data provided by volunteers showed that the salmon fishery continued to be dominated by fish in the 10 to 12-inch and 14 to 16-inch size groups (Figure 3). Volunteer angler data also showed an increase in the proportion of salmon exceeding 18 inches, but a slight decline in the proportion of salmon over 20 inches.
- The brook trout fishery was comprised of larger fish from 2011 to 2013, with 83 percent of the reported catch being 10 inches or greater (Figure 4). The proportion of brook trout 12 inches and greater has increased steadily from 37 percent in 2001 to 2007, to 51 percent in 2008 to 2010, and to 55 percent from 2011 to 2013.
- 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 2016 and 2019 fishing seasons and through voluntary angler log books.

KEY WORDS: BKT, LLS, 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. Salmonines 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.

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 insignificant, 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 both Mooselookmeguntic Lake and the Richardson Lakes.

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

METHODS

Creel clerks counted anglers and conducted interviews on one weekend day and one weekday per week from May 1 to October 31, 2013 (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 2000 to 2013 (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 2013 season (May 1 to October 31) was estimated at 3,783 trips (Table 2). Anglers caught a total of about 2,689 legal salmon (≥ 16 inches) and about 4,437 brook trout (≥ 12 inches). Catch rates for legal-size salmon in 2013 were much higher than 2007 (0.71 fish/trip and 0.38 fish/trip, respectively). Catch rates for brook trout increased dramatically from 0.44 fish/trip in 2007, to 1.17 fish/trip in 2013 (Table 3). Salmon of all sizes, including sublegal fish, were caught at a rate of 2.29 fish/trip, while the catch rate for brook trout of all sizes was 3.66 fish/trip. The release rate for legal-size salmon was 96 percent; similar to all surveys since 1999. The release rate for legal-size brook trout was 100 percent due to catch-and-release regulations.

As in previous years, high release rates and stringent length restrictions precluded creel clerk's efforts to collect size frequency or age and growth data. However, data provided by volunteers from 2001 to 2013 show the salmon fishery to be comprised primarily of fish in the 10 to 12-inch and 14 to 16-inch size groups (Figure 3). From 2001 to 2007, about 29 percent of the salmon catch exceeded 16 inches. This ratio increased slightly to 32 percent from 2008 to 2010, and to 41 percent from 2011 to 2013. The proportion of large salmon (>20 in) declined to about three percent of the catch from 2001 to 2007, and to one percent of the total catch from 2008 to 2013. The brook trout fishery was comprised of larger fish from 2011 to 2013, with 83 percent of the reported catch being 12 inches or greater (Figure 4). The proportion of brook trout exceeding 14 inches or greater increased from 13 percent during 2001 to 2007, to 35 and 34 percent during the periods from 2008 to 2010 and 2011 to 2013, respectively. The proportion of large brook trout, over 16 inches, represented about 7 percent of the catch from 2011 to 2013.

About 233 trips, or 6 percent of total angler use, in 2013 were made during the special October fishing season (Table 4). Use during the October season had been steady increasing; however, it decreased sharply in 2013. It is presumed that the construction of the new dam deterred anglers from fishing the pool. Five percent of the 2013 season's catch of legal size salmon and brook trout occurred in October. These estimates are below those made from earlier surveys.

DISCUSSION

Angler use during the entire 2013 season (May-October) was estimated at 3,783 trips, which is similar to the estimate obtained in 2010. Angler use estimates for Upper Dam Pool have indicated a long-term upward trend (Figure 5). The 2013 October angler use was down, likely due to the ongoing dam reconstruction. The October fishery still remains popular, with use steadily increasing from 2002 through 2010 (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 dramatically increased in 2013 (Table 2). The total catch of salmon (all size groups) was very high at about 8,675 fish, indicating their continued high abundance in both Mooselookmeguntic Lake and the Richardson Lakes. Salmon growth has been poor in both lakes since approximately 2001 as forage (smelts) populations declined due to their large salmon populations. Consistent with the salmon growth data for the Richardson Lakes, the proportion of the salmon catch >16 inches remains poor at Upper Dam Pool. This coincides with recent data from the Rapid River that show anglers continuing to catch small salmon (MDIFW unpublished data). 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 predatory fish and increase the forage base. Salmon stocking in the Richardson Lakes was temporarily suspended in 2006 then resumed at a reduced rate, 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 increased dramatically in 2013 (Table 3). The proportion of brook trout exceeding 12 inches continued to increase. This is consistent with our observations of brook trout growth in Mooselookmeguntic Lake, which has stabilized or improved in recent years (Boucher 2008). 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. In addition, tributaries to Mooselookmeguntic and the Richardson Lakes are inspected annually to assure a zone of passage is maintained for spawning salmonids; 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 have occurred regularly in recent years, possibly contributing to increased angler success.

Upper Dam Pool supports high quality fisheries for landlocked salmon and brook trout that attract large numbers of anglers, despite relatively inconvenient access. 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 2016 and 2019. Continue to include October in the surveys to monitor development of this 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

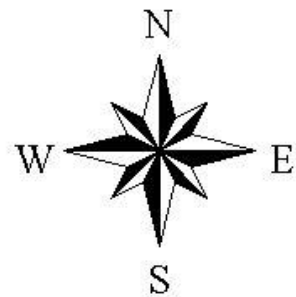
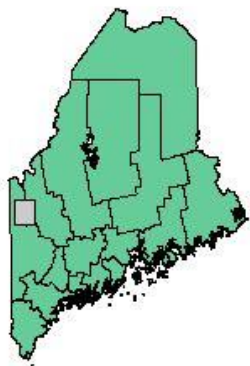
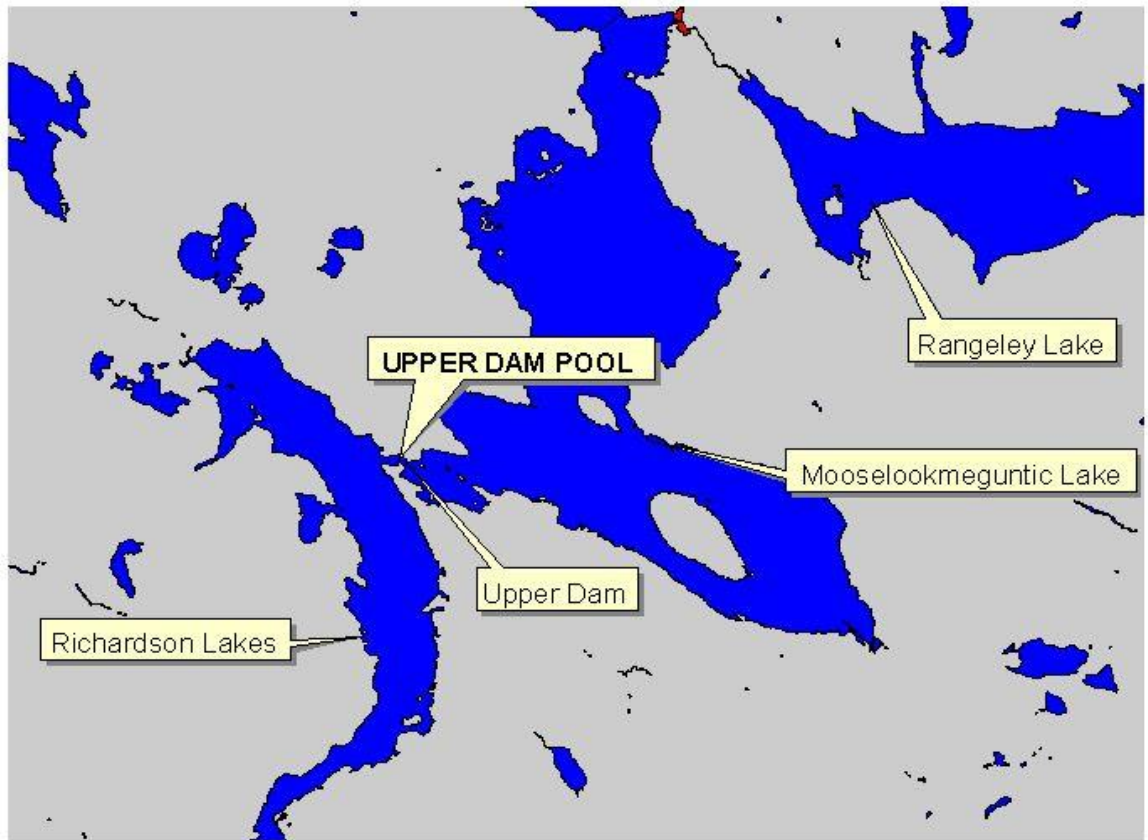
Brookfield Renewable Energy Partners provided staff and funding for the creel survey and angler counts as a condition of their operating license for Upper and Middle Dams. Harry Vernesoni and other Brookfield staff conducted the creel survey in 2013. Fishery Biologists Dave Boucher, Robert Van Riper, and Elizabeth Thorndike reviewed this report and offered several helpful suggestions. Sincere thanks are due to the following anglers who have participated in the voluntary angler diary program at Upper Dam Pool from 2007 to 2013: Mike Anctil, Bill Booker, Bob Bourassa, Lyndall Hewey, Ralph Johnson, Charlie LePage, Wayne MacDougall, Don Palmer, Greg Swenson, and Harry Vernesoni.

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Figure 1. Site location map for Upper Dam Pool.



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Table 1. Description of Upper Dam Pool angler creel surveys, 1998-2013.

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

Figure 2. Daily angler activity curve for Upper Dam Pool as reported by voluntary anglers. (372 angler trips surveyed from 2000 to 2013).

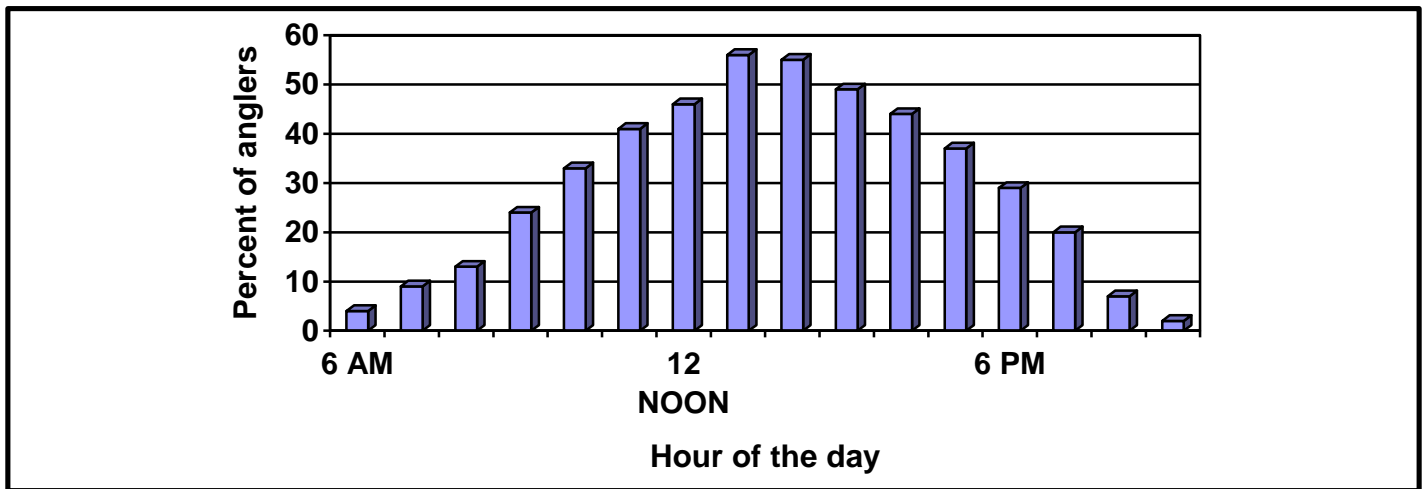


Table 2. Summary statistics for Upper Dam Pool salmon from clerk creel surveys, 1999-2013. Confidence limits (\pm) were computed at the 0.05 probability level.

Parameter	Species and year of survey						
	Salmon						
	1999	2002	2003	2004	2007	2010	2013
No. anglers surveyed:	287	323	468	530	475	437	318
No. angler hours surveyed:	732	895	1,317	1,643	1,377	1,415	1,018
No. (%) successful anglers:	23 (8)	28 (9)	47 (10)	38 (7)	78 (16)	70 (16)	92 (29)
No. legals caught: ¹	34	46	65	55	142	122	226
No. (%) legals released:	33 (97)	46 (100)	65 (100)	53 (96)	141 (99)	121 (99)	224 (99)
No. (%) sublegals released:	324 (91)	481 (91)	631 (91)	1,078 (95)	493 (78)	511 (81)	503 (69)
No. legals caught/angler-trip:	0.12	0.14	0.14	0.10	0.30	0.28	0.71
No. legals kept/angler-trip:	<0.01	0	0	<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
All sizes caught/angler-trip:	1.25	1.63	1.49	2.14	1.34	1.45	2.29
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
Estimated total harvest of legals \pm CI:	8 \pm 2	0	0	8 \pm 2	7 \pm 1	7 \pm 1	23 \pm 5
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
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

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, 1999-2013. 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
No. anglers surveyed:	287	323	468	530	475	437	318
No. angler hours surveyed:	732	895	1,317	1,643	1,377	1,415	1,018
No. (%) successful anglers:	18 (6)	27 (8)	36 (8)	48 (9)	45 (9)	105 (24)	112 (35)
No. legals caught: ²	27	60	42	78	59	192	373
No. (%) legals released:	26 (96)	60 (100)	42 (100)	76 (97)	59 (100)	192 (100)	373 (100)
No. (%) sublegals released:	137 (84)	174 (74)	124 (75)	264 (77)	216 (78)	619 (76)	791 (68)
No. legals caught/angler-trip:	0.09	0.19	0.09	0.15	0.12	0.44	1.17
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
All sizes caught/angler-trip:	0.57	0.73	0.36	0.65	0.58	1.86	3.66
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
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

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, 1999-2013.

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

Table 5. Catch of legal¹ salmon and brook trout ($\pm 95\%$ CI) during the special October extended season, Upper Dam Pool, 1999-2013.

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

¹ Minimum legal length limits for salmon and brook trout were 18 inches and 12 inches, respectively, from 1999 to 2004. In 2007, the minimum legal length for salmon was reduced to 16 inches and for brook trout was increased to 14 inches. Beginning in 2008, brook trout fishing was 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.

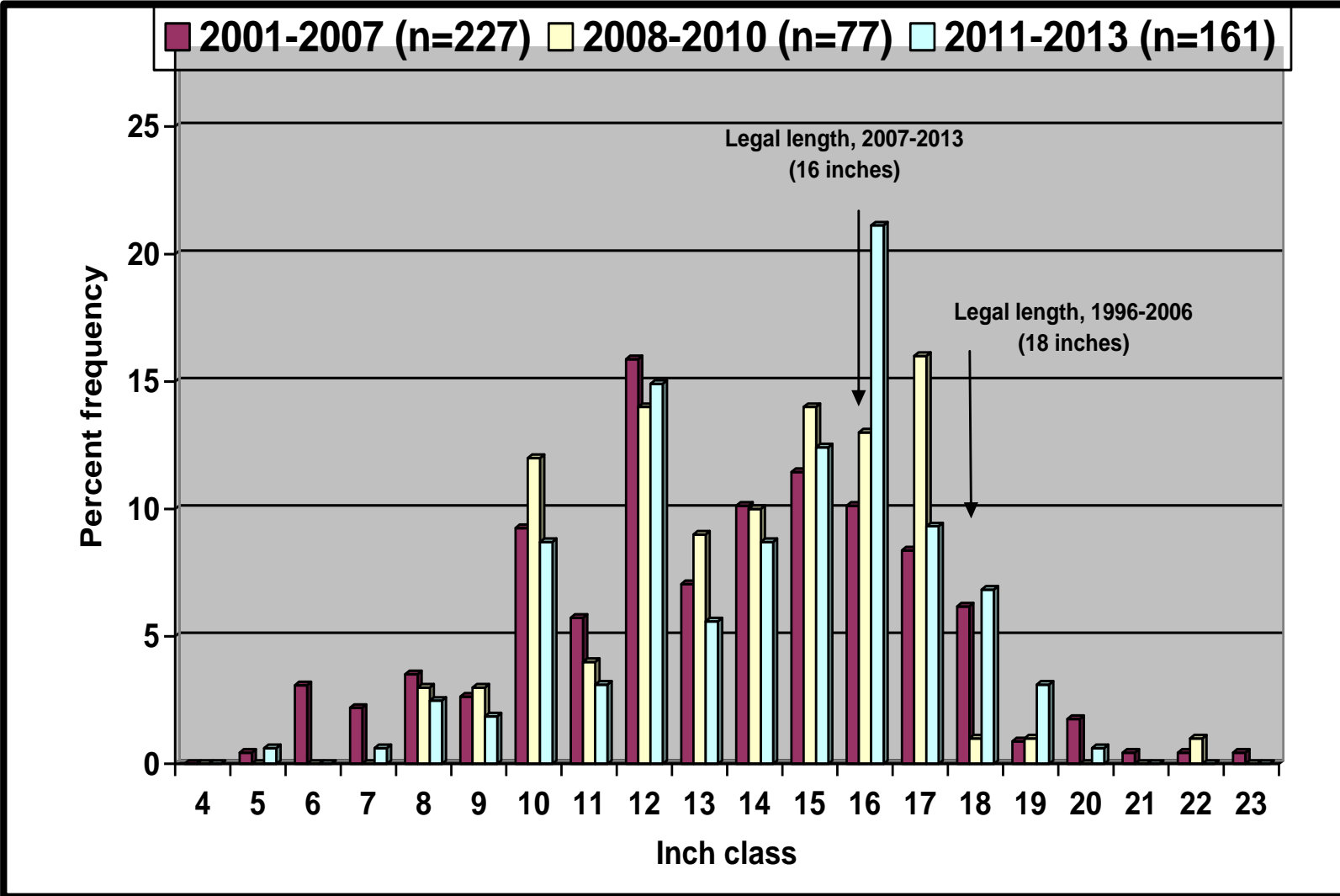


Figure 3. Length frequency distribution of salmon reported by voluntary anglers, Upper Dam Pool, 2001-2013. Arrow indicates minimum legal length limit.

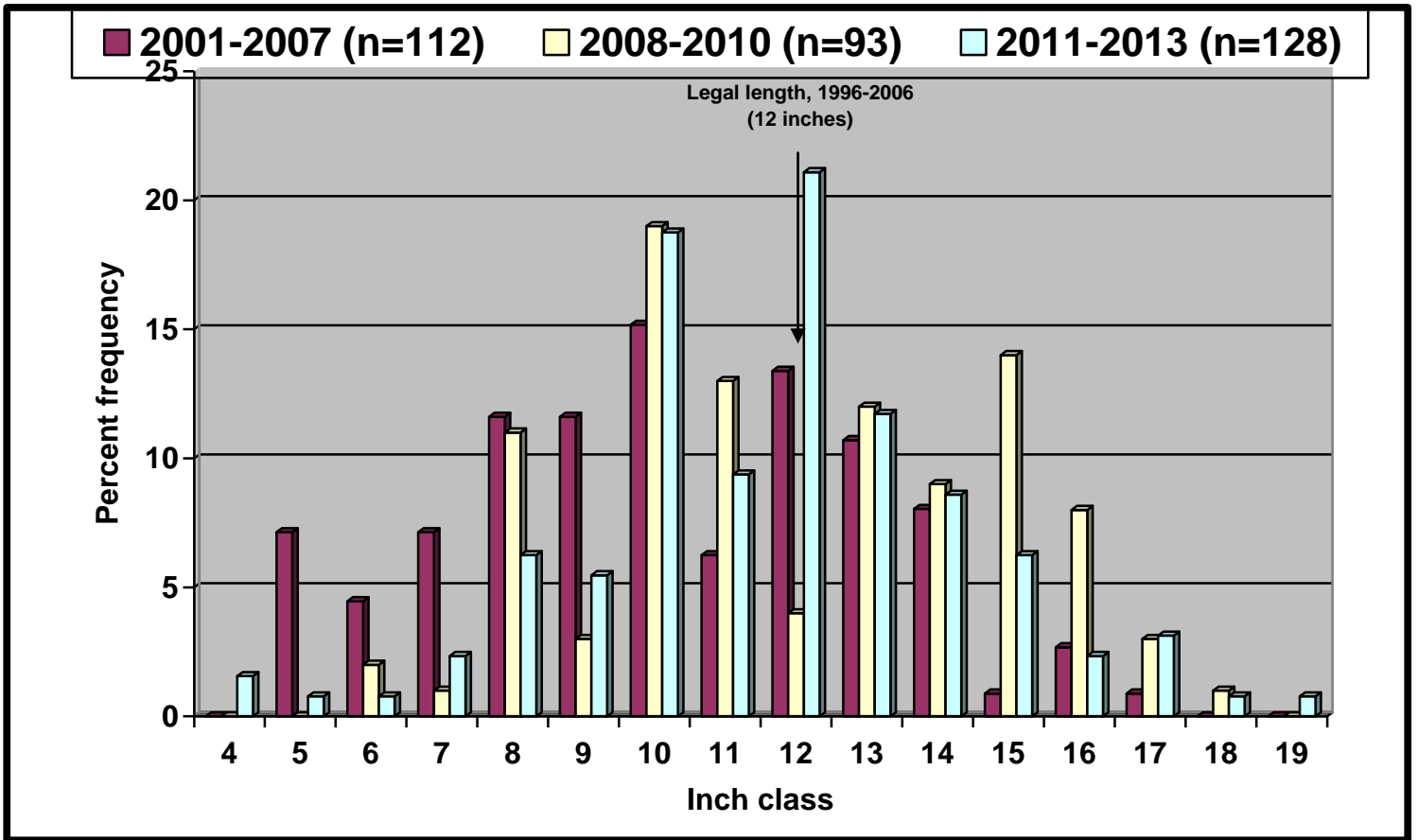


Figure 4. Length frequency distribution of brook trout reported by voluntary anglers, Upper Dam Pool, 1998-2013. Arrow indicates minimum legal length limit.

Figure 5. Upper Dam Pool angler use estimates, 1998-2013.

