

Abundance and Run Timing of Dolly Varden in the Middle Fork Goodnews River, 2003 – 2006.

Alaska Fisheries Data Series Report Number 2007-8



**Togiak National Wildlife Refuge Office
Dillingham, Alaska
May 2007**



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Mark J. Lisac

Abstract

During the summers of 2003 through 2006 we estimated the annual passage of mature, prespawning Dolly Varden in the Middle Fork Goodnews River. An average of 2,353 fish was counted annually passing a salmon counting weir. We captured from 12.7% to 33.2% of the daily passage during July to mid-August of each year to collect biological data and determine maturity. Sample sizes were adequate to determine the proportion of mature fish in two of the four years. Prespawners accounted for 49.3% and 68.5% of the sample from 2003 and 2004, respectively. During these years an estimated 927 and 2,291 prespawning Dolly Varden passed upstream of the weir.

Introduction

Dolly Varden are an important component to the subsistence fishery harvest, the sport fishery and the ecosystem in southwest Alaska. Quantitative information concerning the subsistence harvest of Dolly Varden in the Goodnews River is nonexistent, but they are likely harvested in such quantities to match or exceed the harvest of salmon by weight (Wolfe et al.1984). Between 2001 and 2005 the sport fishing effort averaged 2,955 angler days and resulted in an average catch of 15,189 char (Dolly Varden and Arctic char combined) in the entire Goodnews River (Chythlook 2006). This catch ranks second behind the Kanektok River among all estimated sport fisheries in the Kuskokwim region. The sport harvest of these fish is usually small when compared to the catch and has averaged 542 (3.6%) over the same time period.

To provide more information for developing management strategies, the Togiak National Wildlife Refuge (Refuge) initiated research to learn more about Dolly Varden life history and habitat use throughout the Refuge (Lisac and Moran 1999, Lisac and Nelle 2000, Reynolds 2000, Lisac and Buchholtz 2001, Crane et al 2003, and Lisac 2004 and 2006). Previously, radio telemetry and visual marking were used successfully to document aspects of anadromous Dolly Varden life history, and identifying important spawning and overwintering areas in the Middle Fork Goodnews River (MFGR) drainage (Lisac 2004).

A salmon escapement monitoring weir has been operated by the Alaska Department of Fish and Game (Department) on the MFGR since 1990 (Estensen 2001). Since 1996 a more efficient weir design has allowed the weir to be operated for a longer season and to provide an estimate of the daily and seasonal Dolly Varden passage. The weir has provided estimates of Dolly Varden daily passage for various durations (41 to 83 days) during 1996 to 2002 seasons (Appendix 1). Seasonal passage has ranged from approximately 1,800 fish in 1996 and 1999 to 6,616 in 2000.

Using the annual returns of Dolly Varden to most systems in Alaska as the basis for monitoring population health and abundance is difficult because these runs are generally composed of stocks of mixed origin and maturity (DeCicco 1985, Whalen 1992, Larson 1997, Lisac and Nelle 2000, and Lisac 2006). The proportion of mature fish, as well as the size of fish, has been documented to decline over time. This is generally due to the increase of immature and nonspawning fish, which enter the river for feeding and overwintering during the later half of the run.

Other studies have dealt with the problem of providing a meaningful estimate of Dolly Varden abundance in a variety of ways (Whalen 1992 and Larson 1997). Whalen (1992) concluded that monitoring annual spawner abundance of Dolly Varden would be more useful for understanding long-term population trends. This has been accomplished by apportioning the total estimated Dolly Varden daily counts by maturity index. Based on previous studies (Lisac and Moran 1999; Estensen 2001; Lisac 2004 and 2006) the most important time to estimate Dolly Varden spawner abundance is during early July to mid-August. In 2001, the Refuge attempted to qualify the Dolly Varden run to estimate the number of prespawning fish based on maturity index proportions of fish caught in the weir live trap (Lisac 2004). Of the 1,708 fish counted between 15 July and 6 August 2001 an estimated 40.3% ($n = 703$; $SE = 79.54$) mature Dolly Varden passed upstream of the weir.

The purpose of this report is to compile the available data on annual returns and provide an estimate of the annual spawner abundance for Dolly Varden returning to the MFGR for the years 2003 to 2006. The objectives addressed in this report are to: 1) determine the annual run timing of Dolly Varden passing upstream of the MFGR weir; 2) estimate the number of prespawning Dolly Varden passing the MFGR weir during July to mid-August; and, 3) collect length, sex and maturity data from Dolly Varden immigrating past the MFGR weir.

Study Area

The Goodnews River drainage occurs within the 19,021 km² Togiak National Wildlife Refuge in southwest Alaska. The drainage consists of three river channels which drain approximately 2,600 km² in the Ahklun Mountains (USFWS 1990, Figure 1). The MFGR is approximately 68 km long. It parallels the North Fork Goodnews River (75 km) branch which diverges from the MFGR approximately 6.5 km upstream of Goodnews Bay. Two branches flow from the Middle Fork Lakes for approximately 10 km and join to form the main MFGR. Kukaktlik River is the only named tributary to the MFGR and flows southwest from Kukaktlim Lake for approximately 33 km to join the MFGR approximately 55 km upstream of the confluence with the North Fork Goodnews River. The salmon weir is located approximately 13 km upstream of Goodnews Bay on the MFGR.

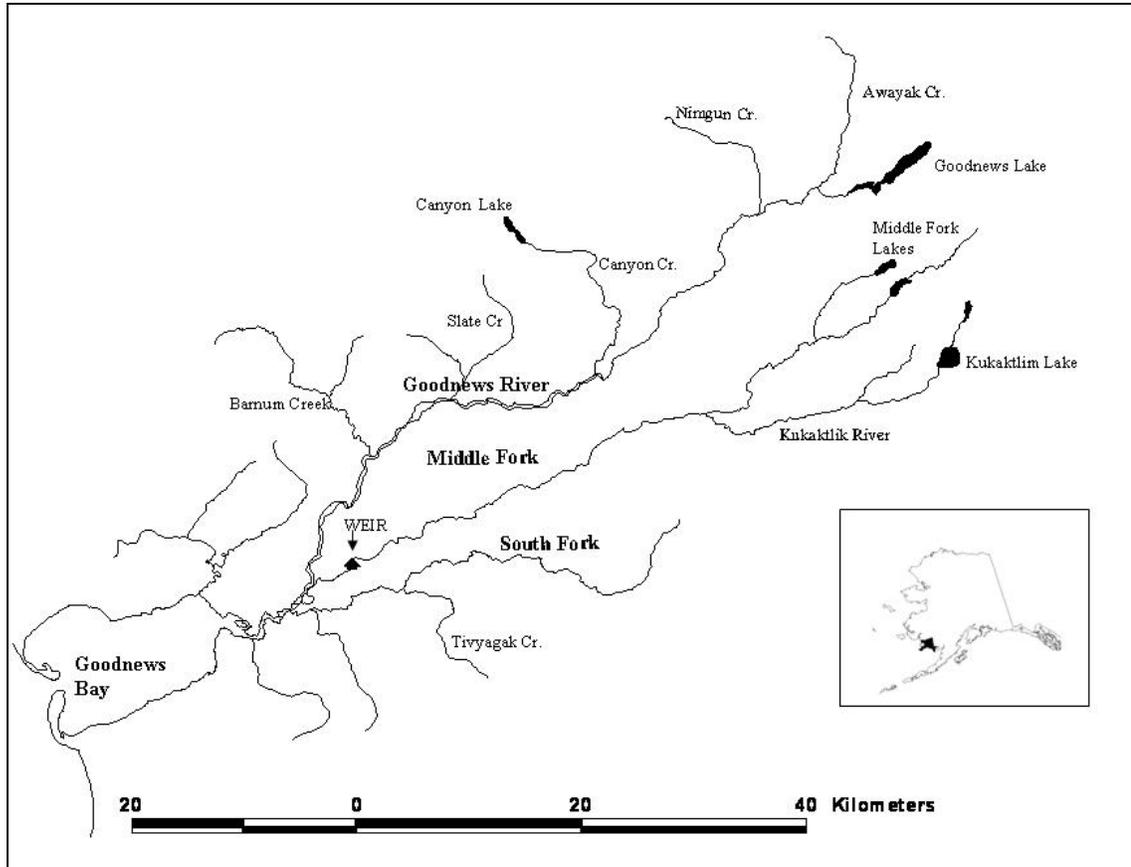


FIGURE 1. — Goodnews River drainage.

Methods

Dolly Varden migrating upstream in the MFGR are counted at the weir. Estensen (2001) provided a detailed description of how this weir is configured and operated. Dolly Varden were captured using a live trap attached to the upstream side of the weir. Capture and sampling efforts concentrated on the early portion of the run between early July and mid-August when the proportion of prespawning Dolly Varden is higher. After 2003 the operation of the weir live trap was modified in two ways. The inside of the trap was lined with a 25mm square mesh material to decrease the gap between the trap pickets to prevent smaller Dolly Varden (< 400 mm) from escaping the trap. The trap was also baited using roe obtained from female salmon carcasses that washed downstream onto the weir.

Dolly Varden were measured for fork length to the nearest 1.0 mm. Length frequency distributions in 10 mm increments were calculated for prespawning and all Dolly Varden from each annual sample. Dolly Varden greater than 250 mm were marked with an individually numbered “T”-bar anchor tag. Sex, color code and maturity were recorded for each fish.

A maturity index (Lisac 2006) was used to classify fish as immature, nonspawner, prespawner, or unknown. Photographic keys were used to train field personnel to identify sex and maturity of

fish using external characteristics. The primary external characteristics used were the coloration of the body, head, jaw and fins. Fish were characterized as being either 1) silver or showing no color; 2) showing signs of color change (darkening opercle, head and jaws, reddening of fins with white leading edge); or 3) full spawning colors. Head shape, kype formation, a swollen ovipositor or abdomen were used as sex determinant characteristics. Dolly Varden were periodically photographed and sacrificed to confirm maturity index and sex based on gonad development.

The annual sample period was divided into 3 time strata: prior to 21 July, 21 to 31 July, and after 31 July. The number of prespawning fish was estimated by multiplying the total Dolly Varden weir count for each time strata by the proportions of prespawners in the sample for that time strata (Larson 1997 and Lisac 2006). The proportion of Dolly Varden in each maturity index were determined by time strata. The total number and the variance of Dolly Varden prespawners passing through the weir were estimated by summing the estimate and variance of each time strata. Fish counted by Department staff prior to our arrival were apportioned by extrapolation using the proportion of prespawners observed in the first time strata sample.

Results

The MFGR weir operated by the third week of June until mid-September each year from 2003 to 2006 (Table 1). During this time period the annual Dolly Varden run past the MFGR weir averaged 2,353 fish. The earliest the run was documented to begin was 20 June (in 2003) (Figure 2 and 3; Appendix 1). The average mid-point of the run occurred on 21 July, and ranged between 13 July (2005) and 26 July (2006). The average 50% peak of the run occurred during a 17-day period between 14 and 30 July for all years.

Dolly Varden capture efforts began between 17 June and 3 July, and continued until between 14 and 28 August for the four years (Table 1). The number of fish captured during the four years ranged between 271 (2005) and 805 (2004) (Table 1 and Figure 2). Of the 2,057 fish captured over four years, 2,048 were measured for fork length and 1,346 were assigned a prespawner maturity index. The majority (97%) of the 1,346 fish assigned a prespawning maturity index were sampled in 2 of the 4 years (2003 and 2004). Overall mean fork-length ranged from 409.4 mm (SD = 71.90; 2004) to 464.7 mm (SD = 40.08; 2006) (Table 2 and Figure 3). The smallest fish sampled was 159 mm (2004), while the largest was 660 mm (2002). Prespawning Dolly Varden ranged in size from 271 mm (2003) to 643 mm (2004). Mean fork length of prespawners ranged from 441.8 mm (SD = 47.41; 2004) to 492.5 mm (SD = 40.18; 2005).

Prespawner abundance could not be estimated for two of the four years (2005 and 2006) because inexperienced technicians were unable to consistently determine maturity indices. Captured fish accounted for 32.2% (2003) and 21.2% (2004) of the cumulative daily weir counts during the annual sample periods (Table 3 and Figure 5). Prespawners comprised 49.3% and 68.5% of the sample in 2003 and 2004, respectively. During these two years an estimated 927 (SE = 103.4; 2003), and 2,291 (SE = 148.9; 2004) prespawning Dolly Varden passed upstream of the weir.

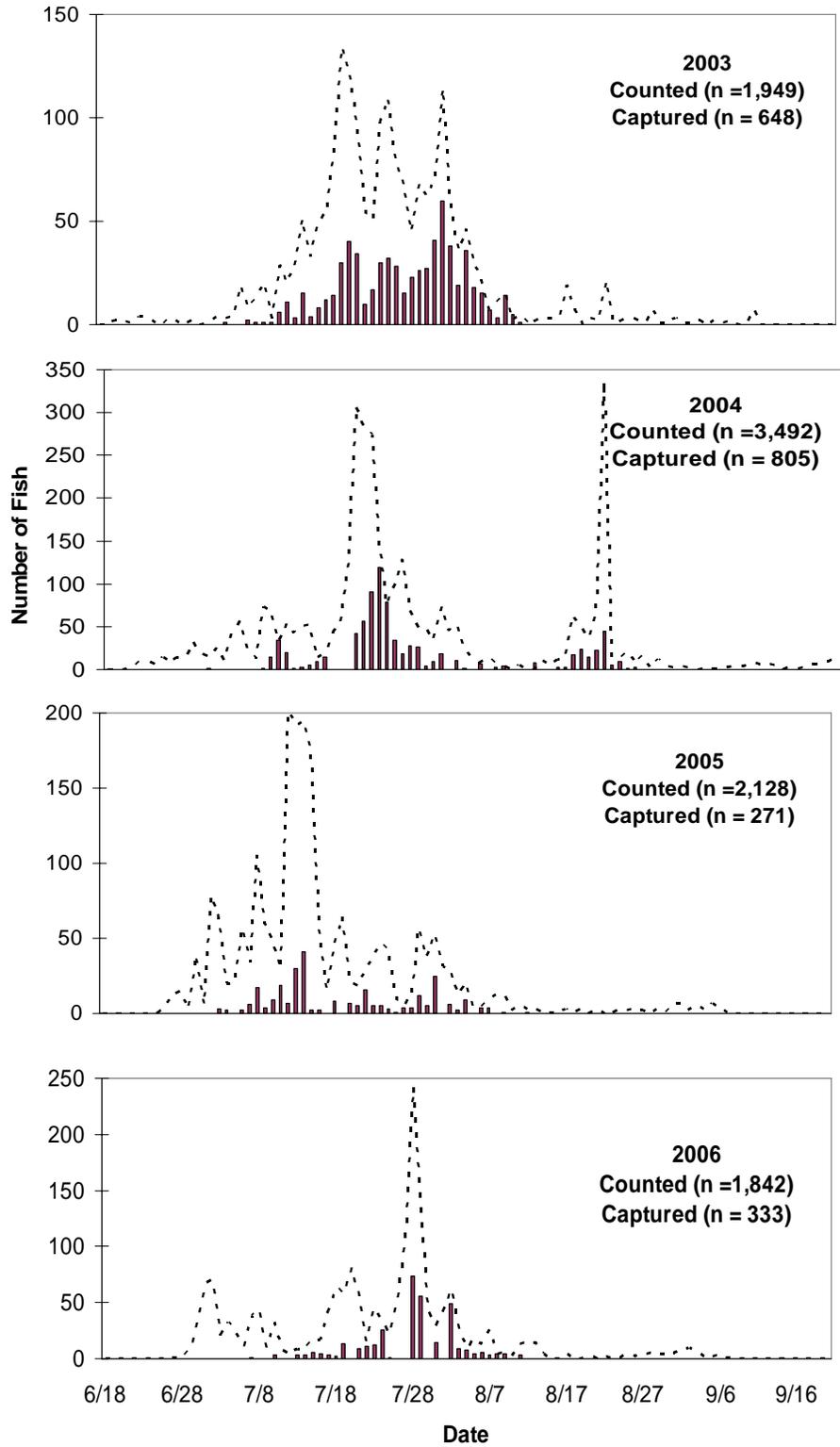


FIGURE 2. —Number of Dolly Varden counted (line) and captured (bar) at the MFGR weir, 2003 to 2006

TABLE 1. —Total run, sample size and estimated prespawning Dolly Varden at the MFGR weir, 2003 to 2006.

	2003	2004	2005	2006
Dates of weir operation	6/18 – 9/18	6/21 – 9/20	6/26 – 9/12	6/26 – 9/07
Total run	1,949	3,492	2,128	1,842
Sample period dates	7/03 – 8/28	6/17 – 8/26	6/26 – 8/14	6/28 – 8/28
Number of fish captured	648	805	271	333
Fork length sample size	644	803	271	330
Number of fish used for apportioning weir counts ¹	594	712	18	22
Percent prespawners	49.3%	68.5%	6.6%	6.6%
Apportioned dates	6/20 – 8/10	6/21 – 8/24	NA	NA
Apportioned weir count	1,842	3,353		
Estimate prespawners	927	2,292		
SE	103.4	146.53		

¹ Only days with complete capture information and reliable maturity index assignments were used.

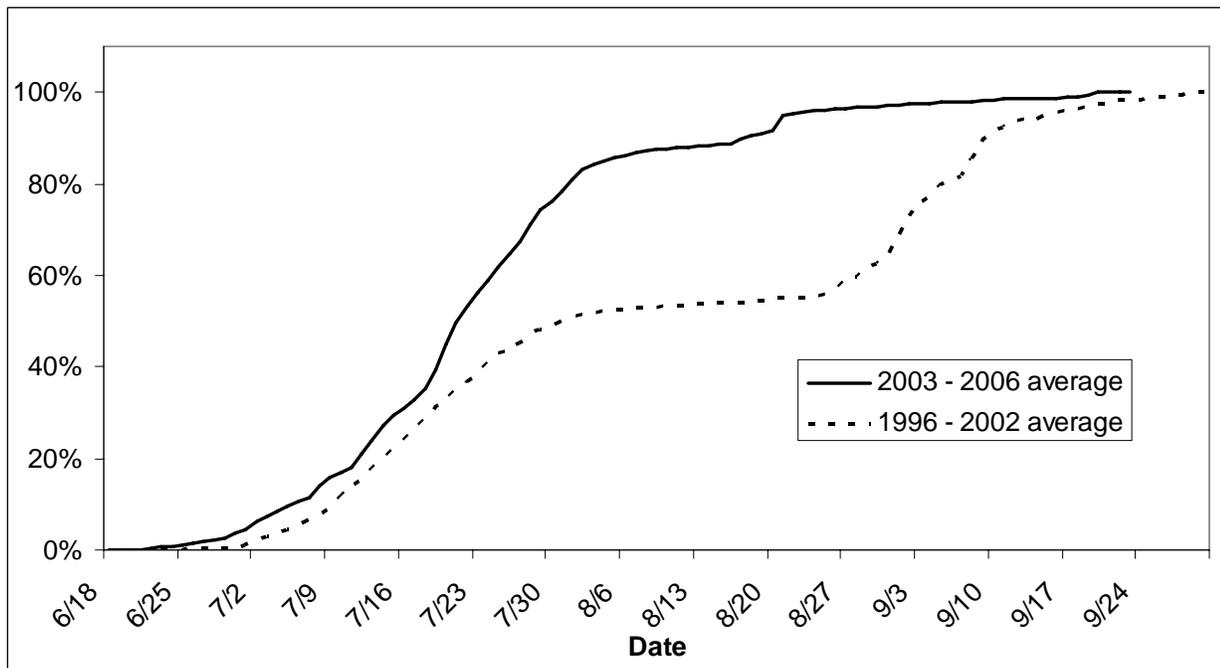


FIGURE 3. —Recent and historical average cumulative counts of Dolly Varden, by day, at the MFGRW.

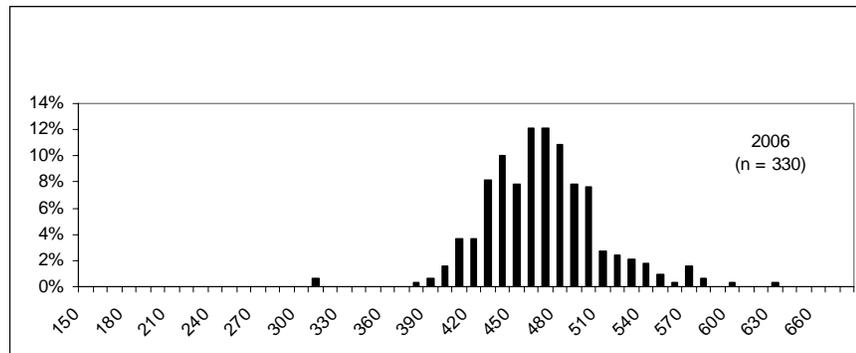
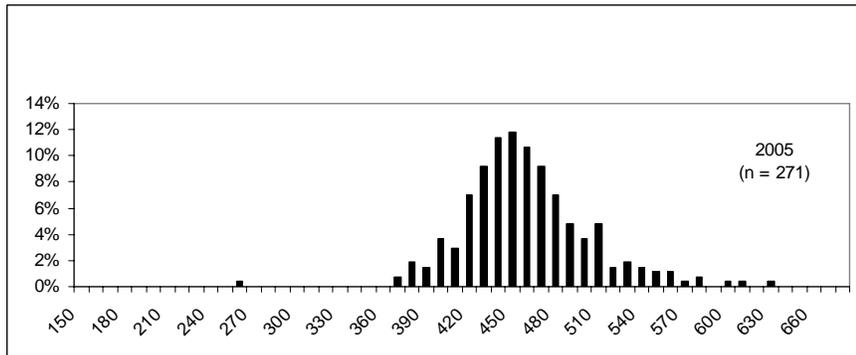
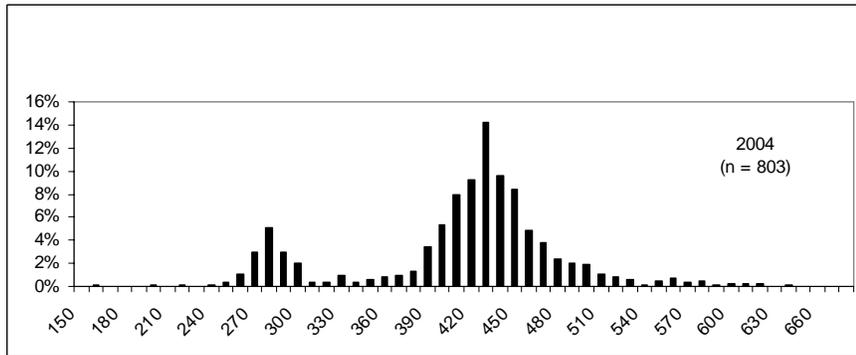
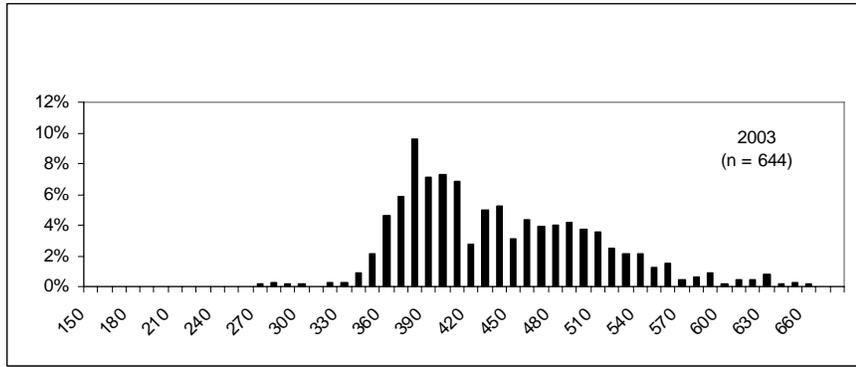


FIGURE 4.—Fork length frequency distribution (mm) for Dolly Varden caught in the MFGR, 2003 - 2006.

TABLE 2. —Mean fork length and size range for all and prespawning Dolly Varden caught at the Middle Fork Goodnews River weir, 2003 - 2006.

	2003	2004	2005	2006
<u>All</u>				
Mean FL	436.0	409.4	456.5	464.7
SD	67.79	71.90	44.38	40.08
Minimum	268	159	255	310
Maximum	660	643	625	625
<i>n</i>	644	803	271	330
<u>Prespawners</u>				
Mean FL	455.7	441.8	484.6	492.5
S.D.	70.35	47.41	43.63	40.18
Minimum	271	324	418	419
Maximum	641	643	607	565
<i>n</i>	294	489	18	22

TABLE 3. —Weir count, sample size and the estimated number of prespawners (PR) of Dolly Varden from the MFGR, 2003 - 2004, by time strata.

2003	Time strata	Weir count	Number sampled	Percent sampled	Number prespawners	Percent		Estimated PR	SE
						PR in sample			
	1	701	106	15.1%	48	45.3%		317	87.1
	2	801	283	35.3%	173	61.1%		490	46.7
	3	340	205	60.3%	72	35.1%		119	30.3
	Total	1,842	594	32.2%	293	49.3%		927	103.4
2004	Time strata	Weir count	Number sampled	Percent sampled	Number prespawners	Percent		Estimated PR	SE
						PR in sample			
	1	1,258	144	11.4%	135	93.8%		1,179	44.1
	2	1,282	485	37.8%	328	67.6%		867	50.7
	3	813	83	10.2%	25	30.1%		245	132.9
	Total	3,353	712	21.2%	488	68.5%		2,291	148.9

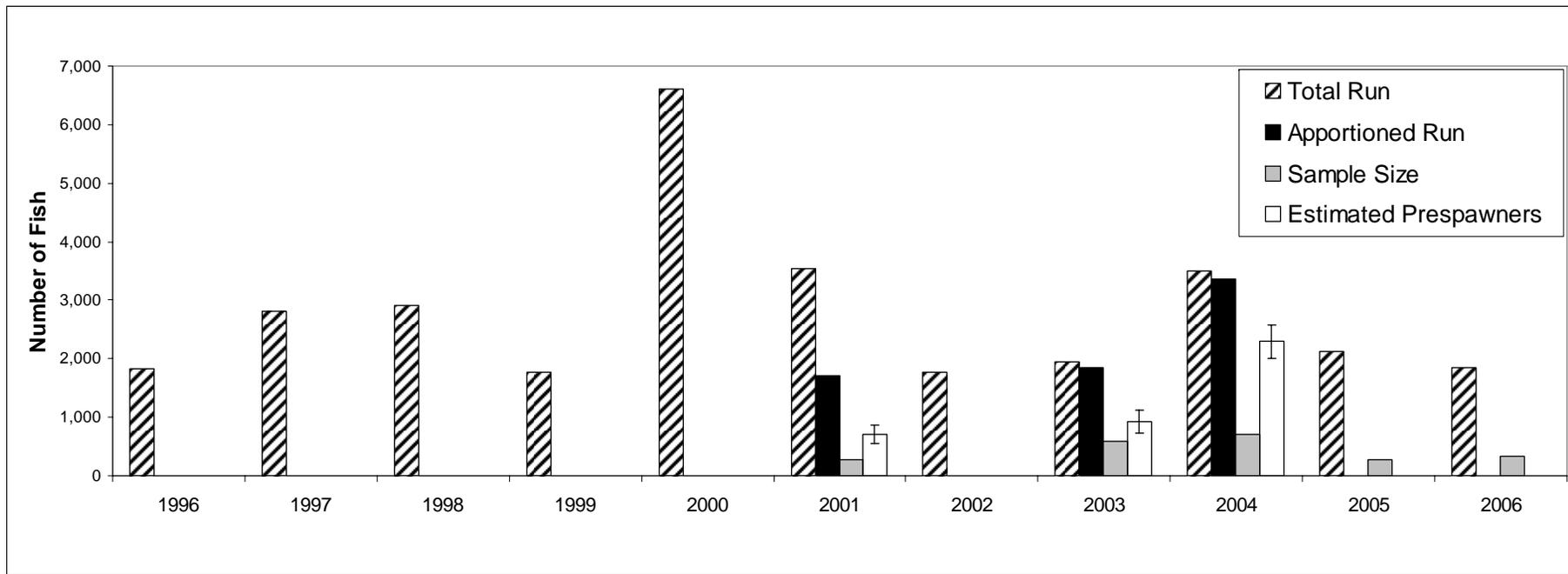


FIGURE 5. —Historical number of Dolly Varden counted for the season (total run), counted during study period (apportioned run), the number sampled, and estimated prespawner abundance with 95% confidence intervals for years when available, MFGR weir, 1996 - 2006.

Discussion

For most years the bulk of the run has passed the MFGR weir by the first week of August. The annual returns of Dolly Varden to this system have averaged 2,353 fish between 2003 and 2006. This is approximately 22% lower than the 1996 to 2002 average of 3,033 fish (Figure 3 and Appendix 1). The total Dolly Varden run in the MFGR was near or above 3,000 fish for only four of the eleven years the run was monitored. During those four years there was a larger component of fish arriving during August and September. It is likely that these fish are primarily immature and nonspawning fish comprised of fish of mixed stock origin that entered the MFGR to spend the winter. In 2000 large schools of small, immature Dolly Varden were observed in the weir area. These fish may have actually been migrating up and downstream, through the pickets of the weir and may have caused the annual count to be inflated (Rob Stewart, ADFG, personal communication).

The objective of estimating the abundance of prespawning Dolly Varden in the MFGR has proven to be more difficult to accomplish than that of documenting run timing and biological characteristics. Representing the composition of the run is difficult due to the location and design of the weir, and the consistency of determining sexual maturity using non-lethal observations of external characteristics. Determining sex and maturity requires specialized training and periodic comparison of fish's gonad development with external characteristics. This is especially true when examining female Dolly Varden which do not exhibit the striking coloration of male prespawners, but are more subtle in their development and color. In 2003 and 2004 the prespawner proportion was approximately 49% to 69%. The much lower proportion of prespawners observed in 2005 and 2006 could be the result of an inexperienced crew who were not as well trained in determining sexual maturity and did not compare gonad development to external characteristics. This problem is compounded by the location of the weir, as it is located only 18 km (11 river miles) upstream of Goodnews Bay. Determining maturity based on external factors is more reliable after the fish have resided in freshwater for a greater period of time and are closer to spawning time and locations. Thus, Dolly Varden passing the MFGR weir may not have spent sufficient time in freshwater to develop external features characteristic of prespawning char.

The estimates of total prespawning Dolly Varden for 2003 ($n = 927$; SE 103.4) and 2004 ($n = 2,291$; SE = 148.9) appear to be reasonable compared to that estimated in 2001 ($n = 703$; SE = 79.54) (Lisac 2004) given the high variability in Dolly Varden migration patterns. Although the 2001 run was the largest ($n = 3,535$) of these three years, the proportion of prespawners in the July sample was only about 40%. Also in 2001, a majority (57%) of Dolly Varden were counted past the weir after 1 August when immature and nonspawning fish usually dominate the run. In 2003 and 2004 only 27% and 23% of the run occurred after August 1st, respectively.

This study approach has provided a low cost means of understanding the Dolly Varden run in the MFGR. Other than in 2001 when a crew was on site and dedicated to capturing Dolly Varden for a telemetry study, the work in all other years has been conducted with the cooperation of ADFG personnel and additional staffing provided by the Bristol Bay Economic Development Corporation. Continued modifications to the weir live trap and the use of bait has improved the success of this method to capture Dolly Varden in greater numbers and size ranges. Improving the accuracy of maturity indexing and developing a more rigorous sampling design will be necessary to determine if this program truly represents the number of prespawning Dolly Varden returning to the MFGR.

Acknowledgements

Funding and support for this project were provided by the U.S. Fish and Wildlife Service Togiak National Wildlife Refuge, Office of Subsistence Management, the Bristol Bay Economic Development Corporation, and the Alaska Department of Fish and Game Commercial Fisheries Management Division. Additional support was provided by Kuitsarik, Inc. (the Goodnews Bay village corporation), which owns the land on which the weir is built. Field data collection was accomplished by Gene Horning, Denise Coopchiak, Courtenay Peirce, Troy Jaecks, David Epstein and Seth Beaudreault. The assistance of the Department's crew of Chris Bach, Tyler Dann, Naomi Brodersen, Patrick Jones, Simeon Prennace, Brent Latham, John Linderman, and Jeff Estensen is greatly appreciated. This report was greatly improved by the review and edits provided by Patrick Walsh, Rod Simmons and M. James LaWonn.

References

- Chythlook, J. 2006. Fishery Management Report for Sport Fisheries in the Kuskokwim Management Area for 2003 - 2005. Alaska Department of Fish and Game, Fishery Management Report Series No. 06-65, Anchorage.
- Crane, P., M.J. Lisac, B. Spearman, E. Kretschmer, C. Lewis, S. Miller and J. Wenburg. 2003. Microsatellite marker development and use in population and mixed-stock analysis for Dolly Varden in the Togiak River Drainage. Final Report for Fishery Information Services Division Project FIS 00-011. Conservation Genetics Lab. Anchorage, Alaska.
- DeCicco, A.L. 1985. Inventory and cataloging of sport fish and sport fish waters of western Alaska with emphasis on Arctic char life history studies. Alaska Department of Fish and Game Sport Fish Division. Annual Performance Report, Vol. 26, Study G-I.
- Estensen, J. L. 2001. Middle Fork Goodnews River fisheries studies, 2000 - 2001. Alaska Department of Fish and Game, Commercial Fisheries Division. Regional Information Report No. 3A02-31.
- Larson, L. L. 1997. Lower Kenai Peninsula Dolly Varden studies during 1995. Alaska Department of Fish and Game, Fishery Data Series Number 97-2, Anchorage, Alaska.
- Lisac, M.J. 2004. Run timing, seasonal distribution and biological characteristics of Dolly Varden *Salvelinus malma* in the Middle Fork Goodnews River, Togiak National Wildlife Refuge, 2001. Final Report. U.S. Fish and Wildlife Service, Dillingham, Alaska.
- Lisac, M.J. 2006. Run timing, seasonal distribution and biological characteristics of Dolly Varden in the Kanektok River, Togiak National Wildlife Refuge, 2002 - 2003. U.S. Fish and Wildlife Service Alaska Fisheries Technical Report Number 94. Dillingham, Alaska.
- Lisac, M.J. and W. Buchholtz. 2001. Spawning grounds surveys and genetic tissue collections of Dolly Varden in the Togiak River drainage, Togiak National Wildlife Refuge. Dillingham, Alaska.
- Lisac, M.J. and J.R. Moran. 1999. Migratory behavior and seasonal distribution of Dolly Varden *Salvelinus malma* in the Togiak River watershed, 1998, Togiak National Wildlife Refuge. Progress Report. U.S. Fish and Wildlife Service. Dillingham, Alaska.

Lisac, M.J. and R.D. Nelle. 2000. Migratory behavior and seasonal distribution of Dolly Varden *Salvelinus malma* in the Togiak River watershed, Togiak National Wildlife Refuge. Final Report. U.S. Fish and Wildlife Service. Dillingham, Alaska.

Reynolds, J.B. 2000. Life history analysis of Togiak River char through otolith microchemistry. Final Report. Unit Cooperative Agreement 1434-HQ-97-RU-01582. Research Work Order 91. University of Alaska, Alaska Cooperative Fish and Wildlife Research Unit, Fairbanks, Alaska.

U. S. Fish and Wildlife Service. 1990. Fishery management plan, Togiak National Wildlife Refuge. U.S. Department of the Interior, Fish and Wildlife Service, Alaska.

Whalen, M.E. 1992. Stock assessment of Dolly Varden in the Buskin River, Kodiak, 1991. Alaska Department of Fish and Game, Fishery Data Series Number 92-29, Anchorage, Alaska.

Wolfe, R. J., J.J. Gross, G.J. Langdon, J.M. Wright, G.K. Sherrod, L.J. Ellanna, V. Sumida, and P.J. Usher. 1984. Subsistence-based economies in coastal Communities of Southwest Alaska, Technical Paper No. 89. Alaska Department of Fish and Game, Subsistence Division. Anchorage, Alaska.

APPENDIX 1. —Historical daily Dolly Varden passage at Middle Fork Goodnews River weir showing the mid-point (box), and peak (50%) of the run (shaded area), 1996 - 2006.

Date	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
6/18								0			
6/19								0			
6/20								2			
6/21								2	1		
6/22								1	9		
6/23	0	0						4	11		
6/24	5	4						4	7		
6/25	1	0					4	1	14		
6/26	10	0				0	0	0	9	4	
6/27		2				0	1	4	14	13	1
6/28		16				0	2	1	14	15	1
6/29		2				0	1	1	32	3	8
6/30		9				0	1	2	19	39	39
7/01	65	30				5	2	0	14	6	67
7/02	40	120			3	0	7	1	25	78	70
7/03	51	118			0	3	7	4	10	64	21
7/04	63	117	1	2	6	3	7	3	44	20	32
7/05	84	110	3	3	6	0	0	4	56	21	22
7/06	108	217	7	1	7	11	8	19	23	57	11
7/07	88	172	7	0	3	4	25	8	13	34	38
7/08	39	189	13	0	27	8	26	13	74	105	45
7/09	83	207	42	1	36	0	63	20	68	60	10
7/10	193	332	45	2	59	3	100	3	33	48	32
7/11	28	230	37	5	34	6	239	29	54	30	8
7/12	65	104	97	6	35	18	112	20	42	201	5
7/13		71	113	7	44	26	278	29	51	192	9
7/14		138	167	12	16	29	261	51	52	195	9
7/15		74	148	22	98	15	74	33	13	174	17
7/16		103	105	60	47	60	125	49	20	58	17
7/17		43	192	25	49	53	132	55	43	16	42
7/18		101	283	33	47	50	102	83	56	47	64
7/19		78	231	20	143	117	24	134	130	64	58
7/20	17	64	170	60	145	30	25	121	307	21	81
7/21	87	16	300	48	72	46	22	95	283	19	55
7/22	73	26	204	90	75	60	28	54	274	28	16
7/23	60	15	172	138	22	47	12	51	150	38	46
7/24	160	11	89	267	53	82	8	98	76	47	32
7/25	163	9	126	92	25	124	3	109	101	42	22
7/26	72	6	29	50	10	120	4	80	128	9	52
7/27	75	4	25	108	5	194	0	68	69	5	111
7/28	60		8	108	22	181	2	45	47	14	242
7/29			4	168	11	93	5	68	47	57	150
7/30			23	31	12	54	1	62	34	37	45
7/31		2	29	122	7	86	9	71	73	53	29
8/01		7	17	43	6	112	0	114	45	31	43
8/02		5	23	104	1	42	5	57	53	28	63
8/03		1	21	54	0	12	9	36	24	13	27
8/04		1	11		0	55	2	46	12	20	9
8/05		2	12		0	38	2	31	8	5	18
8/06		8	11		0	37	0	21	15	4	13
8/07		2	7		0	25	0	7	6	9	26

APPENDIX 1. —Historical daily Dolly Varden passage at Middle Fork Goodnews River weir showing the mid-point (box), and peak (50%) of the run (shaded area), 1996 - 2006. (continued)

Date	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
8/08	3	0	3		0	1	0	11	4	13	5
8/09	0	0	9		0	19	2	15	0	12	6
8/10	4	0	16		3	10	1	2	5	2	3
8/11	15		18		2	8	0	5	1	6	13
8/12	10		3		1	6	1	0	0	3	15
8/13	18	16	1		3	7	0	2	10	3	15
8/14	7	4	2	0	3	5	1	3	5	1	5
8/15	6	1	1	5	3	16	1	3	12	1	0
8/16	8	8	12	2	7	13	0	4	14	1	0
8/17	11	3	5	4	13	6	0	19	63	3	5
8/18	11	0	4	11	10	3	3	7	49	1	0
8/19	12	1	1	6	35	12	0	0	37	3	0
8/20	8	1		4	38	12	0	3	65	0	3
8/21	14	0	8	4	36	1	0	2	337	3	0
8/22	9	0	3	6	13	1	0	21	15	0	2
8/23	3	0	3	5	28	1	1	1	12	1	0
8/24		6	8	4	36	0	0	2	21	3	1
8/25		0	9	1	48	13	1	4	7	2	5
8/26		2	1	4	188	17	1	2	16	3	2
8/27		0	10	6	452	7	0	1	1	2	4
8/28		0	5	3	225	9	0	7	12	0	6
8/29			1	3	378	20	0	1	5	3	4
8/30			4	7	154	41	0	1	3	1	4
8/31			1	4	219	60	0	3	4	7	6
9/01		0	1		751	107	0	1	2	7	7
9/02			1		676	62	1	1	0	2	10
9/03			7		385	99	0	2	1	6	7
9/04			0		89	142	1	0	1	3	2
9/05			3		198	180	1	2	1	7	2
9/06			1		66	142	5	1	2	4	3
9/07			2		13	71	3	2	5	1	1
9/08					414	32	6	0	4	0	
9/09					404	122	0	0	10	0	
9/10					184	21	1	7	7	0	
9/11					57	81	0	0	6	0	
9/12					64	69	2	0	5	0	
9/13					24	47	0	0	0		
9/14					7	1	0	0	4		
9/15					47	36	0	0	1		
9/16					62	32	0	0	4		
9/17					57	33	0	0	7		
9/18					3	2	0	0	6		
9/19					31	4			9		
9/20					34	5			16		
9/21					13	6					
9/22					16	36					
9/23						0					
9/24						3					
9/25						16					
9/26						4					
9/27						10					
9/28						3					
9/29						30					
9/30						2					
Total	1,829	2,808	2,915	1,761	6,616	3,535	1,770	1,949	3,492	2,128	1,842