CHIGNIK LAKES SCALE PATTERN ANALYSIS, RUN APPORTIONMENT, AND SOCKEYE SALMON CATCH SAMPLING RESULTS, 2002

By

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ABSTRACT

Two distinct sockeye salmon *Oncorhynchus nerka* runs enter the Chignik River system and temporally overlap during late June and July. The overlap creates a need to differentiate between the runs to effectively manage the commercial salmon fishery. Scale pattern analysis was performed and applied to a discriminant analysis model to separate the early and late runs. A common logistic function was used to smooth the model output which was then applied to the escapement estimates to determine if each run's escapement goals were met. The run apportionment is used both inseason for commercial fisheries management purposes and postseason for run reconstruction and run forecasting. Scale samples were collected from commercial catches in the Chignik Lagoon to estimate the age composition of the catch and subsequent run apportionment. The analysis indicated a slightly earlier than average transition timing from the early to late runs.

INTRODUCTION

The Chignik Management Area (CMA) is located on the south side of the Alaska Peninsula between Kilokak Rocks to the north, Kupreanof Point to the south, and supports a large sockeye salmon *Oncorhynchus nerka* commercial fishery (Figure 1). The Chignik River system is the major sockeye salmon producer in the CMA and supports two distinct runs (Templin et al. 1999). The Chignik River system is composed of Black Lake in the upper portion of the watershed which empties into the Black River and then into Chignik Lake (Figure 2). Chignik Lake discharges into Chignik Lagoon and the ocean via Chignik River. During June and July, the majority of the "early run" ascends to spawn in Black Lake and the upper watershed via Black River. The majority of the "late run" ascends to Chignik Lake during July and August. There is substantial temporal overlap of the two runs each year during late June and July as fish pass the Alaska Department of Fish and Game (ADF&G) counting weir in the Chignik River below Chignik Lake (Figure 2).

These runs are essential to the CMA commercial salmon fishery, which includes the four villages of Chignik Bay, Chignik Lagoon, Chignik Lake, and Perryville (Figure 1). A number of fishery management plans in the CMA, Kodiak Management Area (KMA), and Alaska Peninsula Salmon Management Area (Area M) are impacted by the apportionment of the two runs. The local manager's ability to effectively apportion sockeye salmon escapement between the Black Lake and Chignik Lake spawning stocks depends upon the ability to distinguish the two runs of fish inseason.

Estimating the catch and escapement's contribution to each of the runs has been accomplished in the past through several methods. Tagging studies conducted in the late 1960s, in which tags were applied at the weir and then recovered on the spawning grounds, were used to estimate each run's contribution to the total escapement (Lechner 1965; Dahlberg 1968; Phinney and Lechner 1969). Average time of entry curves (ATOE) were developed based on several of the tagging studies to apportion the runs into early and late components during years in which tagging did not occur. The ATOE curves are still used in cases when the current method proves to be unreliable.

Differentiating salmon stocks by their scale pattern using various discriminant function analyses is referred to as SPA. Currently, SPA is utilized to provide estimates of individual run strength at Chignik. The analysis is performed inseason to ensure that early and late-run escapement goals are met and any surplus can be harvested. Postseason SPA is performed to more accurately apportion the escapement and catches as well as reconstruct the run.

METHODS

Model Overview

The run strength estimates are derived from a discriminant analysis model based on the studies of Conrad (1983 and 1984) and Swanton (1992). The model is based on measurements of freshwater scale growth characteristics (i.e., focus to each circulus of freshwater growth). This modeling is conducted both inseason (generally using age 2.3 fish) and postseason (using age 1.3 and age 2.3 fish)

because the Black Lake and Chignik Lake sockeye salmon stocks are typically dominated by age 1.3 and age 2.3 sockeye salmon respectively.

The formation of each model requires two initial data sets, one to represent each of the two runs involved. These data sets are established with attempts to provide "pure" data from each stock of origin and are referred to as *standards*, or *knowns*. The known data files are age class specific and are composed of measurements of freshwater growth characteristics with a target sample size of 200 individuals from each of the two runs. For the inseason models, scales for the early run knowns generally come from age 2.3 fish captured at the outlet of Black Lake in late June. Because late run fish are not available for inseason analysis, the late run known generally comes from age 2.2 fish of the prior year's catch during early August to early September in the Chignik Bay District commercial fishery.

The use of the late season catch as a Chignik Lake known is based on Conrad's studies that used post July 24 (Conrad 1983) and July 27 (Conrad 1984) Chignik Lagoon catch samples as their source, based on the assumption that the Black Lake run has passed Chignik Lagoon by late July. Currently, post July 31 Chignik Lagoon catch samples are considered to be 100% Chignik Lake stock. The Chignik Lake late run model is also based on the assumption that age 2.2 fish during year y and age 2.3 fish during year $y+1$ have similar freshwater growth patterns.

For postseason run reconstruction, scales for the early run known come from the Black Lake escapement sample as described above. Scales for the late run known come from fish collected in August from the current season's catch. Once the model is established, it is then applied to mixed stock, or unknown data sets collected from Chignik Lagoon commercial harvest samples.

There are several types of variables used in the models. The first variable is the total number of freshwater circuli from the scale measurements. This variable usually describes most of the variation between the knowns. Another variable is the distance from the scale focus to the outside edge of each freshwater circulus (e.g., focus to 1st circulus); there are generally several of these variables. The measurement from the focus to last freshwater circulus is also used. The other variables used depend upon the specific characteristics of the known scales. For instance, this year, there was a marked difference observed in the distance between the first four circuli between the knowns, so the average of these distances was used successfully as an additional variable. While a particular scale may have many focus-to-circuli measurements, the model uses the same number of variables for analyzing each sample, so the scale measurement with the least number of circuli is used to set the maximum number of variables in the analysis.

After the variables are established, the discriminant analysis model is developed using the SAS ™ statistical software package. The model is essentially based on a combination of observed variables which maximizes the variation between groups relative to the variation within groups (Fisher 1936). This model is then used to classify scales collected from the Chignik Lagoon catch to either the early or late run.

Each unknown data file consists of age class specific measurements of 100 individuals randomly sampled (but of sufficient quality to measure) from the Chignik Lagoon commercial catch. Sampling

frequency varies, ranging from once every two to three days during the period of transition between the two runs (i.e., June 26 to July 9), to once each week at the end of the season. These mixed run fishery files are analyzed throughout the season. Results provide estimates of percent composition of the Black Lake early run and the Chignik Lake late run. Estimates of run contribution are established and maintained as the season progresses.

To account for the misclassification inherent in the model, a correction factor, developed by Cook and Lord (1978), is applied to the model output. Using a polynomial discriminant method, classification errors for known samples from each stock are considered and the correction factor is applied. The correction factor basically utilizes the error structure, produced when the knowns are applied to the model, to adjust the model estimates. A DOS based computer program automates the correction factor procedure.

2002 Season

Scale Sample Collection

Sockeye salmon catches were sampled for scales during the 2002 season by the Chignik weir crew approximately every three days during the transition period (June 26 through July 15 since the transition seemed to be late) and once per week after the Chignik Lake stock dominated the samples. When catch samples were available, samples were taken at one of the two processing plants in Chignik Bay (Figure 2). All catch sampling was representative and random. There was no pre-selection of fish for length, sex, condition, or any other factor. The targeted size per catch sample was 600 fish, which assumes a conservative estimate of at least 88.5% readable scales. This generally results in an adequate number of age 1.3 and/or 2.3 scales of sufficient quality to achieve the goal of measuring 100 per age class.

In an effort to improve the age 1.2 and 2.2 samples for the inseason baseline samples for the 2003 season, size selective samples were also taken late in the season. Sockeye salmon falling within the typical size frequency of age 2.2 and 1.2 class fish were selected and sampled by the catch sampling crew. The samples were taken during mid to late August to ensure that they were from the late run. These samples were taken during the 2001 season as well.

Inseason Model

Age compositions from the escapement samples collected from Black Lake during late June revealed that there was an adequate proportion of age 2.3 sockeye salmon (Table 1) with numbers just above the early run known goal size of 200 scales. Conversely, age 1.2 sockeye salmon from the Chignik Lake stock were in very low proportions during the late 2001 season, thereby making an inseason age 1.3 model impossible to develop. Similar proportions of age 2.3 fish were also found in catch samples from the Chignik Lagoon during mid June (Table 2). Sufficient numbers of age 2.3 sockeye salmon were present in the catch samples providing enough resolution to justify conducting the inseason SPA with age 2.3 sockeye salmon.

Examination of both random and size selective scale samples from catches after July 31 during 2001 (Tables 3 and 4) revealed that over 200 age 2.2 sockeye salmon were readable and of sufficient quality to perform SPA. Size selective sampling was implemented post July 31, 2001 to increase the probability of acquiring age 1.2 and 2.2 Chignik Lake sockeye salmon scales.

Discriminant analysis models were developed using Chignik Lagoon age 2.2 catch samples from the 2001 season and Black Lake age 2.3 sockeye salmon escapement samples from the 2002 season as knowns. Both linear and quadratic discriminant models were evaluated using the SAS™ statistical software package. After the model parameters were developed, the known scale sample measurements were applied back into the model and a "resubstitution" or "classification" accuracy was determined by the amount of known samples that were apportioned to the correct stock. The model with the highest classification accuracy was used. Both backward and forward stepwise analysis were performed on the model to determine if classification accuracy of the model could be improved if one or more variables were removed. The established model was applied to the unknown samples (with a sample size goal of 100 per event) to determine the proportions of Black and Chignik Lakes stocks. The estimated proportion of Black and Chignik Lake stocks from each unknown sample was then applied to the Cook and Lord correction factor (Cook and Lord 1978).

Logistic Function Smoothing

Because there was significant variability in the run composition within any particular sample as well as between samples, a smoothing mechanism was necessary to interpret the transition from the early run to the late run.

In past years, the model's stock composition estimate of each sample was smoothed with a moving average of three data points. The stock composition on May 23 was assumed to be 0% Chignik Lake fish. The first sample was averaged using (0 + first value + second value) ÷ 3. The second and following samples were a simple moving average of three data points; however, the last sample was averaged with the assumption that on July 31, 100% of the fish were attributable to Chignik Lake. The stock composition for a specific day was then estimated by interpolation between the previously averaged values. An application consisting of an R:Base™ database and a C++™ program was used to estimate inseason escapement proportions.

During 2002, to estimate the proportion of the total escapement assigned to the Chignik and Black Lake stocks, the stock proportion data were fit to the common logistic function (Quinn and Deriso 1999). A nonlinear weighted (by sample size) least squares optimizing scheme was used to fit the model to the Chignik stock proportion data (weighting the data toward 100% Chignik run by 31 July, similar to past seasons). Stock proportion data were fit to the logistic function and the resultant curve was used to estimate the actual daily stock proportions. As incoming data were analyzed (via SPA and the model) the logistic curve was refit to the entire data set and a new logistic curve was utilized to estimate the daily stock proportions between the date of the previous and most current samples (Figure 3). Using this method, previous escapement estimates that were released to the public remained unchanged, yet the entire logistic curve was refit to incorporate incoming data and only the new portion of the refit curve was used to apportion the run.

The logistic curve smoothing method was developed in 2001 so that each escapement proportion data point was estimated using the entire data set, which likely resulted in inherently more accurate results than the previously utilized three point smoothing method.

The smoothed daily proportion of Chignik and Black Lake stocks was applied to the daily escapement and the total escapement for each stock was estimated. Since a Fisheries Biologist position was dedicated to SPA beginning in the 2002 season, pressing, aging, measuring, and analyzing samples were able to be completed more quickly, generally making escapement proportions available the day after a sample was taken.

The apportioned escapement information was then used by commercial salmon fishery managers to regulate the commercial fishery to ensure achievement of escapement goals for both runs and harvest surplus fish.

Postseason 1.3 Model

After all of the scale samples were collected from commercial harvests for the season, the postseason models were developed. The postseason age 1.3 Chignik Lake stock known data set was developed from the scale samples of age 1.3 sockeye salmon sampled from the commercial salmon fishery in Chignik Lagoon after July 31. The postseason age 1.3 Black Lake known data set -was developed from the age 1.3 sockeye salmon sampled from the Black Lake escapement. Linear and quadratic discriminant postseason models were then developed using SAS™ and backward and forward stepwise analysis was performed to evaluate discriminating power of each variable and to determine if classification accuracy could be increased by the removal of any variables. The model and variables with the highest classification accuracy were used. Each sample from the commercial fishery was then run through the model and stock proportions of age 1.3 sockeye salmon were estimated for each sample and corrected using the Cook and Lord correction factor. The logistic function was then used to smooth the data and apportion daily estimates of age 1.3 sockeye salmon to stock of origin.

Postseason 2.3 Model

Concurrent to the development of the age 1.3 postseason model, the age 2.3 postseason model was developed. The age 2.3 Chignik Lake data set was developed from the scale samples of age 2.3 sockeye salmon taken from the commercial salmon catch in Chignik Lagoon after July 31. The age 2.3 Black Lake known was taken from the same sockeye salmon samples as the inseason Black Lake known. Similar stepwise analyses were performed and the model and variables with the highest classification accuracy was used. Unknown fishery samples were then run through to the model to estimate age 2.3 stock composition of each sample, each sample was corrected using the Cook and Lord Correction factor, and the logistic function was used to smooth the output.

Catch and Escapement Apportionment

A Microsoft™ Excel spreadsheet application was developed to automate the apportionment of catches and escapement to each stock. Catches from all outside districts, the Cape Igvak Section in the KMA,

the Southeastern District Mainland (SEDM) in Area M, and escapement from the Chignik weir were standardized to account for different travel times that they would have passed through the Chignik Lagoon fishery. The estimated travel time to the Chignik Lagoon for each area is summarized in Table 5 (Conrad 1983).

The stock apportionment output from the logistic function curve for age 1.3 sockeye salmon was applied to assign the age 1.3 fish from the harvests and escapement to each stock. The procedure was repeated for the age 2.3 logistic function curve and catch and escapement numbers. Age 1.2 sockeye salmon were apportioned to Black and Chignik Lake stocks in the same proportions as the age 1.3 fish, while the age 2.2 sockeye salmon were apportioned the same as the age 2.3 fish. All other age classes were apportioned to the Black and Chignik Lakes stocks using an average of the age 1.3 and 2.3 proportions. The resultant output consisted of daily estimates of the catch, escapement, and total run apportioned to Chignik and Black Lakes by day.

RESULTS

Scale Sampling

The baseline scale sampling for the Black Lake stock was conducted on June 22 through June 25 by Chignik weir staff (n=1,743; Table 1). Catches from the commercial fishery and commercial test fisheries in the Chignik Lagoon were sampled for scales on 19 occasions during the 2002 season (n=9,599; Table 2).

The Chignik Lagoon samples indicated a dominance of age 1.3 sockeye salmon in the early part of the run with a transition to a dominance of age 2.3 fish in mid to late July (Table 2). The Black Lake scale samples had a similar age composition to that of the early portion of the Chignik Lagoon samples (Tables 1 and 2).

Inseason Model

When the scale measurements used to develop the age 2.3 inseason models were resubstituted into the linear and quadratic discriminant models, the resultant classification accuracy indicated that the quadratic model performed better than the linear model in correctly apportioning more of the knowns to the correct stock. The classification accuracy of the quadratic model was estimated at 82.3% for the Black Lake stock and 84.5% for the Chignik Lake stock (Table 6). Stepwise analysis further indicated that the model classification accuracy was highest when all 13 variables were used. The variables used were the maximum freshwater growth (one variable), the average distance between the first four circuli (one variable), the number of freshwater circuli (one variable), and the focus-to-circuli measurements to the first 10 circuli (10 variables).

The model output indicated an initial Chignik Lake stock composition of between 11% and 28% during early June, increasing to a level of 16% to 42% during late June and early July (Table 7). The July 18 sample indicated a Chignik Lake stock composition of approximately 55% and a slow transition into the second run occurred in the subsequent samples.

The results of the smoothing from the inseason logistic function curve estimated the 50% stock composition date on approximately July 15 and the same relatively slow transition period (Table 8; Figure 3) as the unsmoothed estimate. The Chignik Lake stock was estimated to compose 100% of the run on August 4.

Postseason 2.3 Model

The age 2.3 postseason model using the quadratic function with all of the 12 possible variables exhibited the highest classification accuracy. The variables used were the number of freshwater circuli (one variable), the average distance between the first four circuli (one variable), the maximum freshwater growth (one variable), and the focus-to-circuli measurements for the first nine circuli (nine variables). The classification accuracy was 83.7% for the Black Lake stock and 89.0% for the Chignik Lake stock (Table 6).

The model output for the age 2.3 postseason model exhibited a more abrupt transition trend than the inseason model; however, early June point estimates of the Chignik Lake stock were higher, ranging from 16% to 36% of the entire run during June (Table 9) and the transition was estimated to occur earlier. After the model data was fit to a logistic curve, the Chignik Lake stock was estimated to reach 50% on July 7 (Table 8; Figure 4).

Postseason 1.3 Model

The age 1.3 postseason model was similar to the inseason model in that the highest classification accuracy was attained using all possible variables with a quadratic model. The variables used were the maximum freshwater growth (one variable), the average of the distances between the first four circuli (one variable), the number of freshwater circuli (one variable), and the focus-to-circuli measurements to the first eight circuli (eight variables). The age 1.3 postseason model utilized 11 variables instead of 13 used inseason, and had a slightly higher classification accuracy. When the scale measurements used to create the model were resubstituted back into the model, the classification accuracy was 89.0% for Black Lake and 78.8% for Chignik Lake (Table 6).

The age 1.3 postseason model estimated that the transition from the Black Lake to Chignik Lake runs was relatively gradual, beginning on June 9 at a proportion of 6% (Table 10). After the data was smoothed with the logistic curve, Chignik Lake was estimated to compose 50% of the total run on July 10 (Table 8; Figure 5).

Catch and Escapement Apportionment

The results of the postseason run apportionment (Tables 11 and 12) indicated that the transition between the Black Lake and Chignik Lake stock occurred earlier than was indicated by the inseason model (Table 8). The date at which the two runs were at equal proportions (the 50/50 date) was estimated as approximately July 8 (Table 13), a full seven days earlier than the inseason estimate. The resultant change in transition timing resulted in an overall Black Lake escapement of 380,701 sockeye salmon and an overall catch of 684,715 sockeye salmon (Table 11). The Chignik Lake escapement

was estimated at 344,519 sockeye salmon and catch was estimated at 565,351 sockeye salmon (Table 12).

The estimated age composition of the Black Lake escapement was characterized by a high proportion of age 1.3 sockeye salmon during the early portion of the season with a decreasing proportion as the season progressed (Table 14). The estimated age composition of the Black Lake catch exhibited a similar trend (Table 15). Age 1.2 fish also composed an unusually high proportion during the early portion of the Black Lake catch and escapement. The Chignik Lake escapements had a high proportion of age 1.3 sockeye salmon early in the run, however the dominating age class switched to age 2.3 fish by July 5 (Table 16). The Chignik Lake catch age compositions are the same as the escapement and summarized in Table 17.

DISCUSSION

The 2002 season was characterized by a slightly earlier than average transition timing from the Black Lake early run to the Chignik Lake late run, according to the postseason analysis (Table 13). The Black Lake escapement fell in the middle portion of the escapement goal range of 350,000 to 400,000 fish. The total catch from the Chignik Area, the Cape Igvak Section of the KMA, and the SEDM of Area M attributed to the Black Lake run was approximately 684,715 sockeye salmon (Table 11) which was 55% of the total catch from both runs combined (Table 18).

The late run escapement to Chignik Lake was estimated at 344,519 sockeye salmon (Tables 12 and 16). The total catch attributed to the Chignik Lake run from the Chignik Area, the Cape Igvak Section of the KMA, and the SEDM of Area M was approximately 565,351 sockeye salmon. This harvest accounted for approximately 45% of the total Chignik River system harvest (Table 18).

The transition timing was estimated inseason, to be later than usual with the 50/50 date estimated to be July 15. When the postseason models were employed, the 50/50 date was estimated at July 7 by the age 2.3 model and at July 10 for the age 1.3 model. Since age 2.3 sockeye salmon was a higher proportion of the catch and escapement during the transition, the overall 50/50 date was weighted toward the results of the age 2.3 model. The overall 50/50 date for both models when applied to the catch and escapements was estimated on approximately July 8 (Table 13).

The assumption that Chignik Lake age 2.2 sockeye salmon from 2001 have similar scale growth patterns to age 2.3 scale growth patterns from 2002 is the basis enabling us to estimate the transition inseason. This assumption has been tested in the past (Witteveen 2002) and while the age 2.2 fish are more similar to the age 2.3 fish from the next year than to the other knowns in the analysis, there are still significant differences. These differences certainly affect the level of difference between the inseason and postseason estimates. Unfortunately, there are no other known alternatives to make inseason SPA possible, so there will likely always be some degree of difference between the inseason and postseason estimates.

Another possible reason that the inseason model estimated the run transition to be later than the postseason models estimations may be due to the selection of the inseason Chignik Lake known

measurements (late 2001 Chignik Lagoon age 2.2 samples). Most of the scales selected for the known were from late August since that is when they were available. A genetic analysis of Chignik sockeye indicated that there is a distinct difference between the late run sockeye salmon that arrive earlier versus the late sockeye salmon that arrive later (Templin et al. 1999). In other words, some spawning areas within the Chignik watershed exhibit a late run and a "very late" run. Later spawn timing can lead to later emergence timing of fry (Brannon 1984; Nickelson et al. 1986), and therefore, the progeny from the earlier timed sockeye salmon may be rearing at a different time than the progeny of the later timed sockeye salmon. This could result in differential growth and consequent differential scale patterns despite the fact that the adults spawn in the same location. If the late season knowns were derived from the "very late" portion of the Chignik escapement, the model would estimate a run transition between the early run and a later portion of the late run and would therefore shift the estimated transition to be later.

In the postseason analysis, the Chignik Lake known was constructed from samples evenly spread throughout the late run. Perhaps since the entire Chignik Lake run was evenly represented by the known (as opposed to only the later portion), the transition was estimated to occur earlier. To prevent this inseason scenario from occurring again, increased effort was directed toward size selective sampling so that a sufficient number of age .2 fish could be measured from throughout August (Table 19). Preliminary investigation of the random (Table 2) and size selective samples (Table 19) taken during August 2002 indicate that there should be enough age 2.2 sockeye salmon available to construct a evenly distributed known for the inseason 2003 analysis. Despite this effort, there are still relatively low numbers of age 1.2 fish available for 2003 analysis.

Size selective samples were taken during the 2001 season as well and resulted in a higher number of age .2 fish being available for inseason analysis during the 2002 season. This aided in inseason model estimates being closer to the postseason estimates than they had been in past years. During the 2001 analysis (with late season knowns from the 2000 season), there were an insufficient number of age 2.2 Chignik Lake knowns so an inseason age 1.3 model had to be constructed in place of the age 2.3 model.

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Table 1. Age composition of Black Lake sockeye salmon escapement samples, 2002.

		Ages											
Date		0.2	0.3	1.1	1.2	1.3	1.4	2.2	2.3	2.4	3.2	3.3	Total
22-Jun	Numbers	1	0	0	60	145	4	28	40	0	0	0	250
	Percent	0	0	0	24	58	2	8	16	0	0	0	
23-Jun	Numbers	7	1	2	313	373	11	12	124	0	1	0	844
	Percent	1	0	0	37	44	1	1	15	0	0	0	
24-Jun	Numbers	4	2	0	89	148	3	2	47	1	0	0	296
	Percent	1	1	0	30	50	1	1	16	0	0	0	
25-Jun	Numbers	3	1	0	123	154	5	14	52	0	0	1	353
	Percent	1	0	0	35	44	1	4	15	0	0	0	
Total	Numbers	14	4	2	585	820	23	28	263	2	1	1	1,743
	Percent	1	0	0	34	47	1	2	15	0	0	0	

Table 2. Age composition of Chignik Lagoon sockeye salmon commercial catch and test fishery samples by day, 2002.

		Ages														
Period		0.2	0.3	0.4	1.1	1.2	1.3	1.4	1.5	2.1	2.2	2.3	2.4	3.2	3.3	Total
9-Jun	Numbers	2	1	0	0	136	309	4	1	0	0	67	0	0	0	520
	Percent	0	0	0	0	26	59	1	0	0	0	13	0	0	0	
13-Jun	Numbers	3	2	0	0	84	336	12	0	0	6	71	0	0	0	514
	Percent	1	0	0	0	16	65	2	0	0	1	14	0	0	0	
17-Jun	Numbers	0	2	0	0	163	195	11	0	0	32	88	0	0	1	492
	Percent	0	0	0	0	33	40	2	0	0	7	18	0	0	0	
20-Jun	Numbers	1	1	0	0	129	230	3	0	0	22	152	0	0	0	538
	Percent	0	0	0	0	24	43	1	0	0	4	28	0	0	0	
25-Jun	Numbers	0	2	0	0	79	244	5	0	0	20	171	0	0	1	522
	Percent	0	0	0	0	15	47	1	0	0	4	33	0	0	0	
28-Jun	Numbers	0	1	0	0	119	236	1	0	0	37	133	2	1	0	530
	Percent	0	0	0	0	22	45	0	0	0	7	25	0	0	0	
1-Jul	Numbers	0	1	0	0	60	260	4	0	0	18	194	0	0	0	537
	Percent	0	0	0	0	11	48	1	0	0	3	36	0	0	0	
3-Jul	Numbers	1	2	0	0	68	229	4	0	0	9	213	0	1	1	528
	Percent	0	0	0	0	13	43	1	0	0	2	40	0	0	0	
6-Jul	Numbers	1	1	0	1	78	174	4	0	0	51	193	3	2	0	508
	Percent	0	0	0	0	15	34	1	0	0	10	38	1	0	0	
9-Jul	Numbers	3	0	0	0	39	188	8	0	0	27	268	3	2	2	540
	Percent	1	0	0	0	7	35	1	0	0	5	50	1	0	0	
12-Jul	Numbers	0	3	0	0	41	165	8	0	0	47	247	3	0	0	514
	Percent	0	1	0	0	8	32	2	0	0	9	48	1	0	0	
15-Jul	Numbers	1	1	1	0	21	143	9	0	0	47	308	9	3	2	545
	Percent	0	0	0	0	4	26	2	0	0	9	57	2	1	0	

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Table 2. (page 2 of 2)

Period		Ages														Total
		0.2	0.3	0.4	1.1	1.2	1.3	1.4	1.5	2.1	2.2	2.3	2.4	3.2	3.3	
18-Jul	Numbers	0	4	1	0	20	130	5	0	0	50	325	7	1	4	547
	Percent	0	1	0	0	4	24	1	0	0	9	59	1	0	1	
23-Jul	Numbers	0	0	0	0	13	128	5	0	0	53	333	2	3	8	545
	Percent	0	0	0	0	2	23	1	0	0	10	61	0	1	1	
30-Jul	Numbers	0	2	0	0	18	70	4	0	0	72	336	5	1	16	524
	Percent	0	0	0	0	3	13	1	0	0	14	64	1	0	3	
6-Aug	Numbers	0	0	1	0	18	60	2	0	0	81	361	13	2	18	556
	Percent	0	0	0	0	3	11	0	0	0	15	65	2	0	3	
13-Aug	Numbers	1	0	0	0	5	22	2	0	0	72	386	14	3	8	513
	Percent	0	0	0	0	1	4	0	0	0	14	75	3	1	2	
20-Aug	Numbers	0	0	0	0	8	25	2	0	1	44	279	4	2	3	368
	Percent	0	0	0	0	2	7	1	0	0	12	76	1	1	1	
31-Aug	Numbers	0	1	0	0	7	16	0	0	0	47	168	8	3	8	258
	Percent	0	0	0	0	3	6	0	0	0	18	65	3	1	3	
Total	Numbers	13	24	3	1	1,106	3,160	93	1	1	735	4,293	73	24	72	9,599
	Percent	0	0	0	0	12	33	1	0	0	8	45	1	0	1	

Table 3. Age composition of Chignik Lagoon catch samples by day, post July 31, 2001.

		Ages													
Date		0.2	0.3	0.4	1.1	1.2	1.3	1.4	2.1	2.2	2.3	2.4	3.2	3.3	Total
6-Aug	Numbers	0	0	0	1	5	102	0	1	20	295	2	1	0	427
	Percent	0	0	0	0	1	24	0	0	5	69	0	0	0	
13-Aug	Numbers	0	1	0	0	2	78	1	0	8	391	0	0	0	481
	Percent	0	0	0	0	0	16	0	0	2	81	0	0	0	
21-Aug	Numbers	0	1	0	1	0	39	0	1	6	409	0	2	3	462
	Percent	0	0	0	0	0	8	0	0	1	89	0	0	1	
24-Aug	Numbers	0	1	0	0	0	31	0	1	3	424	2	3	1	466
	Percent	0	0	0	0	0	7	0	0	1	91	0	1	0	
30-Aug	Numbers	0	0	0	0	1	37	0	0	24	405	1	8	0	476
	Percent	0	0	0	0	0	8	0	0	5	85	0	2	0	
Total	Numbers	0	3	0	2	8	287	1	3	61	1,924	5	14	4	2,312
	Percent	0%	0%	0%	0%	0%	12%	0%	0%	3%	83%	0%	1%	0%	100%

Table 4. Age composition of size selected Chignik Lagoon sockeye salmon commercial catch samples by day, 2001.

		Ages													
Period		0.3	1.2	1.3	1.4	2.1	2.2	2.3	2.4	3.1	3.2	3.3	4.1	4.2	Total
17-Aug	Numbers	0	5	5	0	2	63	97	0	0	5	0	0	3	180
	Percent	0	3	3	0	1	35	54	0	0	3	0	0	2	
21-Aug	Numbers	1	6	13	0	0	83	166	0	0	5	0	0	1	275
	Percent	0	2	5	0	0	30	60	0	0	2	0	0	0	
24-Aug	Numbers	0	6	10	1	3	151	283	2	2	27	1	0	1	487
	Percent	0	1	2	0	1	31	58	0	0	6	0	0	0	
27-Aug	Numbers	0	3	19	0	1	231	667	6	1	80	0	1	5	1,014
	Percent	0	0	2	0	0	23	66	1	0	8	0	0	0	
30-Aug	Numbers	0	2	5	0	2	96	200	1	0	32	2	0	1	341
	Percent	0	1	1	0	1	28	59	0	0	9	1	0	0	
Total	Numbers	1	22	52	1	8	624	1,413	9	3	149	3	1	11	2,297
	Percent	0	1	2	0	0	27	62	0	0	6	0	0	0	

Table 5. Estimated delay time for sockeye salmon traveling to Chignik Lagoon.

Location	Delay Days	Statistical Areas	Time Period
Weir Count	-1		Entire Season
Chignik Lagoon	0	27110	Entire Season
Outer Chignik Bay/Kujulik Sections	1	27220-27250	Entire Season
Cape Kumlik Section	2	27262-27264	Entire Season
Eastern District	3	27260, 27270-27296	Entire Season
Cape Igvak (Kodiak)	5	26275-26295	Through July 25
Western District	2	27370-27394	Entire Season
Perryville District	3	27540-27560	Entire Season
SEDM (Area M)	5	21815-28190	Through June 30
SEDM (Area M)	5	28115-28130, 28170-28190	June 30 through July 25

Table 6. Classification accuracy for Chignik and Black Lake inseason and postseason run apportionment scale pattern analysis models.

	Model Classification Accuracy					
	Age 2.3 Inseason		Age 1.3 Postseason		Age 2.3 Postseason	
Actual Destination	Black Lake	Chignik Lake	Black Lake	Chignik Lake	Black Lake	Chignik Lake
Black Lake	82.3%	17.2%	89.0%	11.0%	83.7%	16.3%
Chignik Lake	15.5%	84.5%	21.2%	78.8%	11.0%	89.0%

Table 7. Results from the Chignik River system age 2.3 sockeye salmon inseason SPA model.

					Second Order Estimate[a] - Cook and Lord					
		Unknown	Model Results		Black Lake			Chignik Lake		
Sample #	Catch Date	Sample Size	Black L	Chignik L	Low	Point	High	Low	Point	High
1	9-Jun	61	0.639	0.361	0.516	0.724	0.932	0.073	0.280	0.486
2	13-Jun	64	0.625	0.357	0.503	0.706	0.910	0.080	0.282	0.483
3	17-Jun	61	0.738	0.246	0.680	0.874	1.069	-0.077	0.113	0.304
4	20-Jun	89	0.708	0.281	0.659	0.829	0.999	-0.004	0.164	0.332
5	25-Jun	99	0.667	0.303	0.607	0.772	0.937	0.040	0.202	0.363
6	28-Jun	90	0.722	0.278	0.679	0.848	1.016	-0.011	0.157	0.324
7	1-Jul	99	0.626	0.364	0.538	0.707	0.875	0.120	0.287	0.453
8	3-Jul	104	0.548	0.452	0.420	0.588	0.756	0.248	0.415	0.582
9	6-Jul	101	0.614	0.386	0.518	0.686	0.854	0.150	0.317	0.484
10	9-Jul	105	0.648	0.352	0.573	0.736	0.900	0.104	0.267	0.430
11	12-Jul	100	0.530	0.460	0.393	0.563	0.734	0.260	0.429	0.599
12	15-Jul	103	0.641	0.350	0.563	0.728	0.893	0.102	0.265	0.429
13	18-Jul	104	0.433	0.538	0.257	0.423	0.588	0.386	0.551	0.715
14	23-Jul	100	0.480	0.520	0.316	0.486	0.657	0.346	0.516	0.686
15	30-Jul	100	0.480	0.520	0.316	0.486	0.657	0.346	0.516	0.686
16	6-Aug	105	0.343	0.638	0.126	0.286	0.447	0.535	0.696	0.856
17	13-Aug	102	0.392	0.598	0.192	0.358	0.524	0.469	0.634	0.800
18	20-Aug	100	0.300	0.700	0.057	0.218	0.379	0.623	0.783	0.943
19	31-Aug	105	0.286	0.705	0.043	0.199	0.355	0.636	0.792	0.948

[a] The second order point estimate for the Chignik Lake stock is used to calculate the logistic curve and estimate the stock composition.

Table 8. Estimated daily proportion of Chignik River sockeye salmon to Chignik Lake smoothed by the common logistic function, using age 2.3 scales inseason and age 1.3 and 2.3 scales postseason.

	Model		
Date	2.3 inseason %	1.3 postseason %	2.3 postseason %
25-May	7.10	1.95	4.79
26-May	7.39	2.12	5.12
27-May	7.69	2.30	5.47
28-May	7.99	2.50	5.84
29-May	8.32	2.72	6.23
30-May	8.65	2.96	6.65
31-May	9.00	3.21	7.09
1-Jun	9.36	3.49	7.56
2-Jun	9.74	3.79	8.06
3-Jun	10.13	4.11	8.59
4-Jun	10.53	4.46	9.16
5-Jun	10.96	4.84	9.75
6-Jun	11.40	5.25	10.38
7-Jun	11.86	5.69	11.04
8-Jun	12.33	6.16	11.74
9-Jun	12.83	6.68	12.48
10-Jun	13.34	7.23	13.26
11-Jun	13.88	7.82	14.08
12-Jun	14.44	8.46	14.94
13-Jun	15.02	9.15	15.85
14-Jun	15.62	9.88	16.80
15-Jun	16.25	10.67	17.79
16-Jun	16.90	11.51	18.83
17-Jun	17.58	12.41	19.92
18-Jun	18.28	13.36	21.06
19-Jun	19.02	14.38	22.24
20-Jun	19.78	15.47	23.47
21-Jun	20.58	16.62	24.74
22-Jun	21.40	17.83	26.06
23-Jun	22.26	19.12	27.43
24-Jun	23.16	20.47	28.84
25-Jun	24.09	21.90	30.30
26-Jun	25.06	23.39	31.79
27-Jun	26.06	24.96	33.33
28-Jun	27.11	26.59	34.90
29-Jun	28.20	28.29	36.51
30-Jun	29.33	30.05	38.15
1-Jul	30.51	31.88	39.82
2-Jul	31.74	33.76	41.51
3-Jul	33.01	35.69	43.23
4-Jul	34.34	37.68	44.96
5-Jul	35.72	39.70	46.71
6-Jul	37.15	41.76	48.47
7-Jul	38.64	43.85	50.24

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	Model		
Date	2.3 inseason %	1.3 postseason %	2.3 postseason %
8-Jul	39.04	45.96	52.00
9-Jul	40.65	48.09	53.77
10-Jul	42.32	50.22	55.53
11-Jul	41.60	52.35	57.28
12-Jul	43.40	54.48	59.01
13-Jul	45.28	56.58	60.72
14-Jul	47.00	58.67	62.41
15-Jul	49.04	60.72	64.08
16-Jul	51.17	62.74	65.72
17-Jul	49.95	64.71	67.32
18-Jul	52.19	66.63	68.89
19-Jul	54.53	68.51	70.42
20-Jul	57.48	70.32	71.91
21-Jul	60.05	72.07	73.36
22-Jul	62.75	73.75	74.77
23-Jul	65.56	75.37	76.13
24-Jul	68.50	76.92	77.45
25-Jul	67.69	78.40	78.72
26-Jul	70.58	79.81	79.94
27-Jul	73.60	81.15	81.12
28-Jul	76.75	82.42	82.25
29-Jul	80.03	83.63	83.33
30-Jul	83.45	84.76	84.37
31-Jul	87.01	85.83	85.36
1-Aug	90.73	86.84	86.30
2-Aug	94.61	87.78	87.20
3-Aug	98.65	88.67	88.06
4-Aug	100.00	89.50	88.88
5-Aug		90.28	89.65
6-Aug		91.00	90.39
7-Aug		91.67	91.08
8-Aug		92.30	91.74
9-Aug		92.89	92.37
10-Aug		93.43	92.96
11-Aug		93.94	93.52
12-Aug		94.41	94.04
13-Aug		94.84	94.54
14-Aug		95.24	95.01
15-Aug		95.61	95.45
16-Aug		95.96	95.86
17-Aug		96.28	96.25
18-Aug		96.57	96.62
19-Aug		96.84	96.97
20-Aug		97.09	97.29
21-Aug		97.32	97.60
22-Aug		97.54	97.88

-Continued-

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	Model		
Date	2.3 inseason %	1.3 postseason %	2.3 postseason %
23-Aug		97.74	98.15
24-Aug		97.92	98.40
25-Aug		98.08	98.64
26-Aug		98.24	98.86
27-Aug		98.38	99.07
28-Aug		98.51	99.26
29-Aug		98.63	99.44
30-Aug		98.74	99.61
31-Aug		98.84	99.77

Table 9. Results from the Chignik River system age 2.3 sockeye salmon postseason SPA model.

					Second Order Estimate[a] - Cook and Lord					
Sample		Unknown	Model Results		Black Lake			Chignik Lake		
Number	Catch Date	Sample Size	Black L	Chignik L	Low	Point	High	Low	Point	High
1	9-Jun	61	0.574	0.426	0.488	0.637	0.786	0.214	0.363	0.512
2	13-Jun	64	0.609	0.391	0.541	0.686	0.830	0.170	0.314	0.459
3	17-Jun	61	0.656	0.344	0.605	0.750	0.894	0.106	0.250	0.395
4	20-Jun	89	0.719	0.281	0.718	0.836	0.955	0.045	0.164	0.282
5	25-Jun	99	0.657	0.343	0.633	0.751	0.868	0.132	0.249	0.367
6	28-Jun	90	0.578	0.422	0.518	0.643	0.767	0.233	0.357	0.482
7	1-Jul	99	0.596	0.404	0.548	0.668	0.787	0.213	0.332	0.452
8	3-Jul	104	0.490	0.510	0.405	0.523	0.640	0.360	0.477	0.595
9	6-Jul	101	0.406	0.594	0.290	0.407	0.524	0.476	0.593	0.710
10	9-Jul	105	0.514	0.486	0.438	0.555	0.673	0.327	0.445	0.562
11	12-Jul	100	0.330	0.670	0.189	0.303	0.416	0.584	0.697	0.811
12	15-Jul	103	0.456	0.544	0.359	0.476	0.593	0.407	0.524	0.641
13	18-Jul	104	0.327	0.673	0.187	0.298	0.410	0.590	0.702	0.813
14	23-Jul	100	0.280	0.720	0.125	0.234	0.343	0.657	0.766	0.875
15	30-Jul	100	0.190	0.810	0.011	0.111	0.210	0.790	0.889	0.989
16	6-Aug	105	0.095	0.905	-0.102	-0.019	0.063	0.937	1.019	1.102
17	13-Aug	102	0.206	0.794	0.032	0.132	0.233	0.767	0.868	0.968
18	20-Aug	100	0.150	0.850	-0.038	0.056	0.149	0.851	0.944	1.038
19	31-Aug	105	0.152	0.848	-0.033	0.059	0.151	0.849	0.941	1.033

[a] The second order point estimate for the Chignik Lake stock is used to calculate the logistic curve and estimate the stock composition.

Table 10. Results from the Chignik River system age 1.3 sockeye salmon postseason SPA model.

					Second Order Estimate[a] - Cook and Lord					
Sample		Unknown	Model Results		Black Lake			Chignik Lake		
Number	Catch Date	Sample Size	Black L	Chignik L	Low	Point	High	Low	Point	High
1	9-Jun	106	0.849	0.151	0.840	0.939	1.037	-0.037	0.061	0.160
2	13-Jun	101	0.891	0.109	0.908	1.001	1.093	-0.093	-0.001	0.092
3	17-Jun	101	0.782	0.218	0.730	0.841	0.951	0.049	0.159	0.270
4	20-Jun	102	0.755	0.245	0.687	0.801	0.914	0.086	0.199	0.313
5	25-Jun	102	0.804	0.196	0.766	0.873	0.979	0.021	0.127	0.234
6	28-Jun	103	0.689	0.311	0.584	0.704	0.824	0.176	0.296	0.416
7	1-Jul	101	0.624	0.376	0.481	0.608	0.735	0.265	0.392	0.519
8	3-Jul	102	0.686	0.314	0.579	0.700	0.821	0.179	0.300	0.421
9	6-Jul	103	0.592	0.408	0.434	0.562	0.689	0.311	0.438	0.566
10	9-Jul	102	0.539	0.461	0.353	0.484	0.615	0.385	0.516	0.647
11	12-Jul	102	0.363	0.637	0.089	0.225	0.361	0.639	0.775	0.639
12	15-Jul	101	0.396	0.604	0.137	0.274	0.410	0.590	0.726	0.863
13	18-Jul	102	0.490	0.510	0.278	0.412	0.545	0.455	0.588	0.722
14	23-Jul	101	0.495	0.505	0.285	0.419	0.553	0.447	0.581	0.715
15	30-Jul	68	0.441	0.559	0.181	0.340	0.499	0.501	0.660	0.819
16	6-Aug	55	0.236	0.764	-0.125	0.039	0.204	0.796	0.961	1.125
17	13-Aug	22	0.364	0.636	-0.033	0.226	0.485	0.515	0.774	1.033
18	20-Aug	25	0.080	0.920	-0.362	-0.191	-0.019	1.019	1.191	1.362
19	31-Aug	16	0.250	0.750	-0.217	0.059	0.335	0.665	0.941	1.217

[a] The second order point estimate for the Chignik Lake stock is used to calculate the logistic curve and estimate the stock composition.

Table 11. Daily and cumulative sockeye salmon catch and escapement as determined by postseason scale pattern analysis for the Black Lake system stock, adjusted to Lagoon date, 2002.

Date	Escapement Counts	Catch	Daily Total	Cumulative Catch and Escapement	Cumulative Percent	Daily Proportion of Entire Run
24-May	0	0	0	0	0.0	0.0
25-May	0	0	0	0	0.0	0.0
26-May	0	0	0	0	0.0	0.0
27-May	0	0	0	0	0.0	0.0
28-May	0	0	0	0	0.0	0.0
29-May	0	0	0	0	0.0	0.0
30-May	0	0	0	0	0.0	0.0
31-May	0	0	0	0	0.0	0.0
1-Jun	322	0	322	322	0.0	0.0
2-Jun	411	0	411	733	0.1	0.0
3-Jun	1,583	0	1,583	2,316	0.2	0.1
4-Jun	1,143	0	1,143	3,459	0.3	0.1
5-Jun	2,322	302	2,625	6,083	0.6	0.2
6-Jun	959	0	959	7,042	0.7	0.1
7-Jun	21,194	0	21,194	28,236	2.7	2.0
8-Jun	12,272	0	12,272	40,508	3.8	1.2
9-Jun	16,536	972	17,508	58,016	5.4	1.6
10-Jun	12,830	14,844	27,674	85,690	8.0	2.6
11-Jun	7,315	24,578	31,893	117,583	11.0	3.0
12-Jun	4,667	28,162	32,829	150,411	14.1	3.1
13-Jun	6,598	31,073	37,670	188,082	17.7	3.5
14-Jun	10,118	32,562	42,679	230,761	21.7	4.0
15-Jun	8,577	44,062	52,639	283,400	26.6	4.9
16-Jun	7,014	34,431	41,445	324,845	30.5	3.9
17-Jun	6,579	26,484	33,062	357,907	33.6	3.1
18-Jun	9,346	29,965	39,312	397,219	37.3	3.7
19-Jun	18,963	20,378	39,342	436,561	41.0	3.7
20-Jun	22,440	4,712	27,152	463,713	43.5	2.5
21-Jun	24,816	7,479	32,295	496,007	46.6	3.0
22-Jun	7,086	2,529	9,615	505,623	47.5	0.9
23-Jun	17,249	9,056	26,306	531,928	49.9	2.5
24-Jun	9,678	1,856	11,534	543,462	51.0	1.1
25-Jun	11,977	33,941	45,918	589,380	55.3	4.3
26-Jun	20,047	17,193	37,240	626,620	58.8	3.5
27-Jun	12,358	23,479	35,837	662,457	62.2	3.4
28-Jun	11,896	49,437	61,333	723,790	67.9	5.8
29-Jun	8,642	6,743	15,384	739,174	69.4	1.4
30-Jun	9,099	16,138	25,237	764,412	71.7	2.4
1-Jul	6,244	8,466	14,710	779,122	73.1	1.4
2-Jul	4,291	10,802	15,093	794,215	74.5	1.4
3-Jul	2,916	12,132	15,047	809,262	76.0	1.4
4-Jul	2,740	14,878	17,617	826,880	77.6	1.7

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Table 11. (page 2 of 3)

Date	Escapement Counts	Catch	Daily Total	Cumulative Catch and Escapement	Cumulative Percent	Daily Proportion of Entire Run
5-Jul	1,240	12,285	13,525	840,405	78.9	1.3
6-Jul	1,098	11,202	12,300	852,705	80.0	1.2
7-Jul	1,814	14,094	15,909	868,613	81.5	1.5
8-Jul	1,486	8,463	9,949	878,563	82.5	0.9
9-Jul	2,866	7,516	10,382	888,944	83.4	1.0
10-Jul	3,348	6,157	9,505	898,449	84.3	0.9
11-Jul	3,560	8,427	11,987	910,437	85.5	1.1
12-Jul	1,840	6,974	8,814	919,251	86.3	0.8
13-Jul	3,224	7,916	11,140	930,391	87.3	1.0
14-Jul	4,144	6,166	10,310	940,701	88.3	1.0
15-Jul	2,140	11,612	13,752	954,453	89.6	1.3
16-Jul	3,192	12,064	15,257	969,710	91.0	1.4
17-Jul	2,678	7,377	10,056	979,765	92.0	0.9
18-Jul	2,302	6,148	8,450	988,216	92.8	0.8
19-Jul	946	8,618	9,564	997,780	93.7	0.9
20-Jul	1,039	5,023	6,062	1,003,842	94.2	0.6
21-Jul	1,527	5,228	6,755	1,010,597	94.9	0.6
22-Jul	2,497	3,838	6,335	1,016,932	95.4	0.6
23-Jul	5,385	1,293	6,678	1,023,610	96.1	0.6
24-Jul	2,451	2,990	5,441	1,029,050	96.6	0.5
25-Jul	2,820	1,444	4,264	1,033,314	97.0	0.4
26-Jul	1,011	3,445	4,455	1,037,769	97.4	0.4
27-Jul	1,291	3,584	4,875	1,042,645	97.9	0.5
28-Jul	850	3,225	4,074	1,046,719	98.2	0.4
29-Jul	615	1,713	2,328	1,049,048	98.5	0.2
30-Jul	521	1,486	2,008	1,051,055	98.7	0.2
31-Jul	547	1,147	1,695	1,052,750	98.8	0.2
1-Aug	438	942	1,381	1,054,131	98.9	0.1
2-Aug	172	878	1,050	1,055,180	99.0	0.1
3-Aug	212	731	943	1,056,123	99.1	0.1
4-Aug	321	1,121	1,442	1,057,565	99.3	0.1
5-Aug	156	1,032	1,188	1,058,753	99.4	0.1
6-Aug	179	521	700	1,059,453	99.4	0.1
7-Aug	270	437	707	1,060,160	99.5	0.1
8-Aug	411	307	718	1,060,878	99.6	0.1
9-Aug	224	274	498	1,061,376	99.6	0.0
10-Aug	281	324	605	1,061,981	99.7	0.1
11-Aug	168	173	341	1,062,322	99.7	0.0
12-Aug	174	248	422	1,062,744	99.7	0.0
13-Aug	50	280	330	1,063,075	99.8	0.0
14-Aug	111	231	342	1,063,416	99.8	0.0
15-Aug	100	174	274	1,063,690	99.8	0.0
16-Aug	102	146	248	1,063,938	99.9	0.0
17-Aug	115	99	214	1,064,152	99.9	0.0
18-Aug	77	104	181	1,064,333	99.9	0.0
19-Aug	68	150	218	1,064,550	99.9	0.0

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Table 11. (page 3 of 3)

Date	Escapement Counts	Catch	Daily Total	Cumulative Catch and Escapement	Cumulative Percent	Daily Proportion of Entire Run
20-Aug	49	84	132	1,064,683	99.9	0.0
21-Aug	58	100	157	1,064,840	99.9	0.0
22-Aug	48	74	122	1,064,962	100.0	0.0
23-Aug	37	66	103	1,065,065	100.0	0.0
24-Aug	55	23	77	1,065,142	100.0	0.0
25-Aug	37	19	56	1,065,198	100.0	0.0
26-Aug	37	21	58	1,065,256	100.0	0.0
27-Aug	22	16	38	1,065,295	100.0	0.0
28-Aug	21	15	36	1,065,331	100.0	0.0
29-Aug	18	15	32	1,065,363	100.0	0.0
30-Aug	16	13	29	1,065,392	100.0	0.0
31-Aug	14	10	24	1,065,416	100.0	0.0
1-Sep	0	0	0	1,065,416	100.0	0.0
2-Sep	0	0	0	1,065,416	100.0	0.0
3-Sep	0	0	0	1,065,416	100.0	0.0
4-Sep	0	0	0	1,065,416	100.0	0.0
5-Sep	0	0	0	1,065,416	100.0	0.0
6-Sep	0	0	0	1,065,416	100.0	0.0
7-Sep	0	0	0	1,065,416	100.0	0.0
8-Sep	0	0	0	1,065,416	100.0	0.0
9-Sep	0	0	0	1,065,416	100.0	0.0
10-Sep	0	0	0	1,065,416	100.0	0.0
11-Sep	0	0	0	1,065,416	100.0	0.0
12-Sep	0	0	0	1,065,416	100.0	0.0
13-Sep	0	0	0	1,065,416	100.0	0.0
14-Sep	0	0	0	1,065,416	100.0	0.0
15-Sep	0	0	0	1,065,416	100.0	0.0
			0			
Total	380,701	684,715	1,065,416			

Table 12. Daily and cumulative sockeye salmon catch and escapement as determined by postseason scale pattern analysis for the Chignik Lake system stock, adjusted to Lagoon date, 2002.

Date	Escapement Counts	Catch	Daily Total	Cumulative Catch and Escapement	Cumulative Percent	Daily Proportion of Entire Run
24-May	0	0	0	0	0.0	0.0
25-May	0	0	0	0	0.0	0.0
26-May	0	0	0	0	0.0	0.0
27-May	0	0	0	0	0.0	0.0
28-May	0	0	0	0	0.0	0.0
29-May	0	0	0	0	0.0	0.0
30-May	0	0	0	0	0.0	0.0
31-May	0	0	0	0	0.0	0.0
1-Jun	13	0	13	13	0.0	0.0
2-Jun	19	0	19	32	0.0	0.0
3-Jun	78	0	78	110	0.0	0.0
4-Jun	61	0	61	171	0.0	0.0
5-Jun	135	18	152	324	0.0	0.0
6-Jun	60	0	60	384	0.0	0.0
7-Jun	1,448	0	1,448	1,832	0.2	0.2
8-Jun	909	0	909	2,741	0.3	0.1
9-Jun	1,329	78	1,407	4,148	0.5	0.2
10-Jun	1,125	1,301	2,426	6,574	0.7	0.3
11-Jun	699	2,348	3,047	9,621	1.1	0.3
12-Jun	486	2,932	3,418	13,040	1.4	0.4
13-Jun	748	3,525	4,274	17,313	1.9	0.5
14-Jun	1,266	4,075	5,342	22,655	2.5	0.6
15-Jun	1,183	6,077	7,260	29,915	3.3	0.8
16-Jun	1,065	5,227	6,292	36,207	4.0	0.7
17-Jun	1,098	4,421	5,520	41,727	4.6	0.6
18-Jun	1,715	5,498	7,212	48,939	5.4	0.8
19-Jun	3,819	4,104	7,922	56,861	6.2	0.9
20-Jun	4,954	1,040	5,994	62,855	6.9	0.7
21-Jun	5,953	1,794	7,747	70,603	7.8	0.9
22-Jun	1,847	659	2,506	73,108	8.0	0.3
23-Jun	4,883	2,564	7,446	80,555	8.9	0.8
24-Jun	2,975	570	3,545	84,100	9.2	0.4
25-Jun	3,998	11,328	15,326	99,426	10.9	1.7
26-Jun	7,185	6,162	13,347	112,773	12.4	1.5
27-Jun	4,760	9,042	13,802	126,575	13.9	1.5
28-Jun	4,926	20,472	25,398	151,973	16.7	2.8
29-Jun	3,911	3,052	6,963	158,936	17.5	0.8
30-Jun	4,498	7,977	12,475	171,412	18.8	1.4
1-Jul	3,369	4,567	7,936	179,348	19.7	0.9
2-Jul	2,517	6,334	8,851	188,199	20.7	1.0
3-Jul	1,858	7,731	9,590	197,788	21.7	1.1
4-Jul	1,900	10,319	12,220	210,008	23.1	1.3

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Table 12. (page 2 of 3)

Date	Escapement Counts	Catch	Daily Total	Cumulative Catch and Escapement	Cumulative Percent	Daily Proportion of Entire Run
5-Jul	935	9,270	10,205	220,213	24.2	1.1
6-Jul	901	9,190	10,091	230,304	25.3	1.1
7-Jul	1,619	12,576	14,194	244,498	26.9	1.6
8-Jul	1,441	8,208	9,649	254,147	27.9	1.1
9-Jul	3,019	7,918	10,937	265,084	29.1	1.2
10-Jul	3,816	7,016	10,832	275,916	30.3	1.2
11-Jul	4,389	10,389	14,778	290,694	31.9	1.6
12-Jul	2,453	9,299	11,752	302,446	33.2	1.3
13-Jul	4,669	11,462	16,131	318,576	35.0	1.8
14-Jul	6,512	9,689	16,200	334,777	36.8	1.8
15-Jul	3,647	19,789	23,436	358,212	39.4	2.6
16-Jul	5,879	22,215	28,093	386,306	42.5	3.1
17-Jul	5,329	14,677	20,005	406,311	44.7	2.2
18-Jul	4,949	13,213	18,162	424,473	46.7	2.0
19-Jul	2,194	19,996	22,190	446,663	49.1	2.4
20-Jul	2,603	12,583	15,186	461,849	50.8	1.7
21-Jul	4,129	14,142	18,271	480,120	52.8	2.0
22-Jul	7,292	11,211	18,503	498,623	54.8	2.0
23-Jul	16,988	4,077	21,065	519,688	57.1	2.3
24-Jul	8,353	10,190	18,543	538,231	59.2	2.0
25-Jul	10,382	5,318	15,701	553,931	60.9	1.7
26-Jul	4,020	13,705	17,726	571,657	62.8	1.9
27-Jul	5,550	15,408	20,957	592,614	65.1	2.3
28-Jul	3,946	14,979	18,926	611,540	67.2	2.1
29-Jul	3,090	8,598	11,688	623,228	68.5	1.3
30-Jul	2,829	8,064	10,892	634,120	69.7	1.2
31-Jul	3,213	6,733	9,945	644,065	70.8	1.1
1-Aug	2,782	5,984	8,765	652,831	71.7	1.0
2-Aug	1,179	6,035	7,214	660,045	72.5	0.8
3-Aug	1,579	5,444	7,023	667,068	73.3	0.8
4-Aug	2,587	9,048	11,635	678,703	74.6	1.3
5-Aug	1,363	9,038	10,401	689,104	75.7	1.1
6-Aug	1,697	4,950	6,647	695,751	76.5	0.7
7-Aug	2,780	4,514	7,294	703,045	77.3	0.8
8-Aug	4,607	3,442	8,049	711,095	78.2	0.9
9-Aug	2,735	3,344	6,079	717,173	78.8	0.7
10-Aug	3,742	4,306	8,048	725,221	79.7	0.9
11-Aug	2,443	2,504	4,947	730,168	80.2	0.5
12-Aug	2,756	3,935	6,691	736,859	81.0	0.7
13-Aug	876	4,860	5,736	742,595	81.6	0.6
14-Aug	2,114	4,405	6,519	749,114	82.3	0.7
15-Aug	2,106	3,652	5,758	754,872	83.0	0.6
16-Aug	2,361	3,394	5,755	760,627	83.6	0.6
17-Aug	2,966	2,533	5,499	766,126	84.2	0.6
18-Aug	2,185	2,977	5,162	771,289	84.8	0.6
19-Aug	2,176	4,766	6,942	778,231	85.5	0.8

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Table 12. (page 3 of 3)

Date	Escapement Counts	Catch	Daily Total	Cumulative Catch and Escapement	Cumulative Percent	Daily Proportion of Entire Run
20-Aug	1,742	2,983	4,726	782,956	86.1	0.5
21-Aug	2,318	4,009	6,328	789,284	86.7	0.7
22-Aug	2,187	3,359	5,546	794,830	87.4	0.6
23-Aug	1,898	3,442	5,340	800,170	87.9	0.6
24-Aug	3,267	1,373	4,641	804,811	88.5	0.5
25-Aug	2,568	1,322	3,890	808,701	88.9	0.4
26-Aug	3,076	1,726	4,802	813,503	89.4	0.5
27-Aug	2,190	1,622	3,812	817,314	89.8	0.4
28-Aug	2,603	1,778	4,381	821,696	90.3	0.5
29-Aug	2,794	2,293	5,088	826,783	90.9	0.6
30-Aug	3,394	2,792	6,186	832,969	91.5	0.7
31-Aug	4,366	3,142	7,508	840,477	92.4	0.8
1-Sep	4,879	1,151	6,030	846,507	93.0	0.7
2-Sep	4,763	758	5,521	852,028	93.6	0.6
3-Sep	903	300	1,203	853,231	93.8	0.1
4-Sep	0	759	759	853,990	93.9	0.1
5-Sep	0	280	280	854,270	93.9	0.0
6-Sep	0	0	0	854,270	93.9	0.0
7-Sep	0	0	0	854,270	93.9	0.0
8-Sep	0	0	0	854,270	93.9	0.0
9-Sep	0	0	0	854,270	93.9	0.0
10-Sep	0	0	0	854,270	93.9	0.0
11-Sep	0	0	0	854,270	93.9	0.0
12-Sep	0	0	0	854,270	93.9	0.0
13-Sep	0	0	0	854,270	93.9	0.0
14-Sep	0	0	0	854,270	93.9	0.0
Post Season Estimate 9/4-9/30	55,600	0	55,600	909,870	100.0	6.1
Total	344,519	565,351	909,870			

Table 13. Individual and total run size and estimated 50/50 date, 1983-2002.

Year	Total Black Lake Run	Total Chignik Lake Run	Total Run Size	Estimated 50/50 Date
1983	1,282,459	1,694,542	2,977,001	2-Jul
1984	3,517,697	880,936	4,398,633	20-Jul
1985	1,027,796	815,241	1,843,037	unknown
1986	1,922,067	803,108	2,725,175	23-Jul
1987	2,536,237	634,436	3,170,674	20-Jul
1988	692,654	809,481	1,502,136	8-Jul
1989	618,238	1,486,709	2,104,947	3-Jul
1990	1,017,070	2,083,295	3,100,365	7-Jul
1991	2,374,343	1,038,463	3,412,806	13-Jul
1992	1,107,022	1,181,066	2,288,088	5-Jul
1993	1,291,154	1,532,166	2,823,319	5-Jul
1994	2,364,641	613,821	2,978,462	28-Jul
1995	1,033,295	1,689,287	2,722,582	8-Jul
1996	2,152,972	990,046	3,143,018	20-Jul
1997	631,160	914,141	1,545,301	9-Jul
1998	723,686	1,107,320	1,831,006	5-Jul
1999	2,479,777	1,982,458	4,462,235	9-Jul
2000	2,111,996	844,681	2,956,677	14-Jul
2001	1,307,089	1,607,308	2,914,397	6-Jul
2002	1,065,416	909,870	1,975,286	8-Jul
10-year Average 1992-2001	1,520,279	1,246,229	2,766,508	10-Jul

Table 14. Estimated age composition of Black Lake sockeye salmon escapement by week using postseason scale pattern analysis, 2002.

		Ages														
Stat Week		0.2	1.1	0.3	1.2	2.1	0.4	1.3	2.2	1.4	2.3	3.2	3.3	1.5	2.4	Total
23	Percent	0.4%	0.0%	0.2%	26.3%	0.0%	0.0%	59.8%	0.0%	0.8%	12.3%	0.0%	0.0%	0.2%	0.0%	100.0%
5/31-6/06	Number	26	0	13	1,774	0	0	4,031	0	52	831	0	0	13	0	6,739
24	Percent	0.4%	0.0%	0.2%	24.3%	0.0%	0.0%	61.2%	0.2%	1.1%	12.4%	0.0%	0.0%	0.2%	0.0%	100.0%
6/7-6/13	Number	346	0	189	19,795	0	0	49,817	186	890	10,065	0	0	124	0	81,412
25	Percent	0.2%	0.0%	0.3%	26.8%	0.0%	0.0%	46.4%	4.2%	1.5%	20.5%	0.0%	0.1%	0.0%	0.0%	100.0%
6/14-6/20	Number	150	0	250	22,267	0	0	38,516	3,506	1,224	17,062	0	63	0	0	83,037
26	Percent	0.1%	0.0%	0.3%	19.7%	0.0%	0.0%	46.9%	4.1%	0.7%	28.1%	0.0%	0.1%	0.0%	0.1%	100.0%
6/21-6/27	Number	61	0	300	20,367	0	0	48,377	4,190	738	28,990	28	105	0	56	103,212
27	Percent	0.0%	0.0%	0.2%	17.3%	0.0%	0.0%	47.7%	4.5%	0.5%	29.4%	0.1%	0.0%	0.0%	0.2%	100.0%
6/28-7/4	Number	15	2	99	7,941	0	0	21,844	2,063	227	13,486	55	13	0	83	45,828
28	Percent	0.3%	0.0%	0.2%	10.1%	0.0%	0.0%	36.5%	6.7%	1.3%	43.9%	0.3%	0.2%	0.0%	0.6%	100.0%
7/5-7/11	Number	52	7	29	1,550	0	0	5,622	1,027	202	6,763	44	30	0	85	15,412
29	Percent	0.1%	0.0%	0.4%	5.2%	0.0%	0.1%	28.8%	8.6%	1.4%	53.3%	0.3%	0.4%	0.0%	1.3%	100.0%
7/12-7/18	Number	17	0	86	1,022	0	26	5,627	1,685	279	10,405	59	71	0	246	19,522
30	Percent	0.0%	0.0%	0.1%	2.7%	0.0%	0.0%	23.4%	9.8%	0.9%	60.5%	0.5%	1.5%	0.0%	0.5%	100.0%
7/19-7/25	Number	0	0	23	452	0	5	3,899	1,638	151	10,083	78	245	0	91	16,664
31	Percent	0.0%	0.0%	0.3%	3.1%	0.0%	0.0%	15.9%	12.7%	0.8%	63.5%	0.3%	2.6%	0.0%	0.8%	100.0%
7/26-8/1	Number	0	0	14	164	0	0	840	669	42	3,346	16	138	0	45	5,274
32	Percent	0.0%	0.0%	0.1%	2.9%	0.0%	0.1%	10.1%	14.5%	0.4%	66.3%	0.4%	3.1%	0.0%	2.1%	100.0%
8/1-8/8	Number	0	0	1	50	0	2	174	249	7	1,140	6	52	0	37	1,719

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Stat Week		Ages														Total
		0.2	1.1	0.3	1.2	2.1	0.4	1.3	2.2	1.4	2.3	3.2	3.3	1.5	2.4	
33	Percent	0.1%	0.0%	0.0%	1.6%	0.0%	0.1%	5.9%	14.2%	0.4%	72.7%	0.5%	2.0%	0.0%	2.6%	100.0%
8/9-8/15	Number	1	0	0	18	0	1	66	157	4	806	6	22	0	28	1,109
34	Percent	0.1%	0.0%	0.0%	1.9%	0.2%	0.0%	6.3%	12.6%	0.5%	75.1%	0.6%	1.1%	0.0%	1.6%	100.0%
8/16-8/22	Number	0	0	0	10	1	0	33	65	3	388	3	6	0	8	516
35	Percent	0.0%	0.0%	0.2%	3.6%	0.1%	0.0%	9.5%	14.3%	0.3%	67.2%	0.8%	1.9%	0.0%	2.1%	100.0%
8/23-8/29	Number	0	0	0	8	0	0	21	32	1	152	2	4	0	5	226
36	Percent	0.0%	0.0%	0.3%	8.5%	0.0%	0.0%	19.7%	13.7%	0.0%	51.2%	1.1%	2.8%	0.0%	2.8%	100.0%
8/30-9/5	Number	0	0	0	3	0	0	6	4	0	15	0	1	0	1	30
Total	Percent	0.2%	0.0%	0.3%	19.8%	0.0%	0.0%	47.0%	4.1%	1.0%	27.2%	0.1%	0.2%	0.0%	0.2%	100.0%
	Number	668	9	1,003	75,421	1	34	178,873	15,472	3,819	103,532	298	751	137	684	380,701

Table 15. Estimated age composition of Black Lake sockeye salmon catch by week using postseason scale pattern analysis, 2002.

		Ages														
Stat Week		0.2	1.1	0.3	1.2	2.1	0.4	1.3	2.2	1.4	2.3	3.2	3.3	1.5	2.4	Total
23	Percent	0.4%	0.0%	0.2%	26.3%	0.0%	0.0%	59.8%	0.0%	0.8%	12.3%	0.0%	0.0%	0.2%	0.0%	100.0%
5/31-6/06	Number	1	0	1	80	0	0	181	0	2	37	0	0	1	0	302
24	Percent	0.5%	0.0%	0.3%	19.6%	0.0%	0.0%	64.2%	0.8%	1.8%	12.7%	0.0%	0.0%	0.1%	0.0%	100.0%
6/7-6/13	Number	518	0	325	19,567	0	0	63,923	747	1,831	12,657	0	0	60	0	99,628
25	Percent	0.2%	0.0%	0.4%	27.5%	0.0%	0.0%	48.4%	4.3%	2.0%	17.1%	0.0%	0.1%	0.0%	0.0%	100.0%
6/14-6/20	Number	373	0	708	53,056	0	0	93,189	8,325	3,872	32,849	0	221	0	0	192,593
26	Percent	0.0%	0.0%	0.3%	18.5%	0.0%	0.0%	47.6%	4.2%	0.7%	28.3%	0.0%	0.1%	0.0%	0.1%	100.0%
6/21-6/27	Number	21	0	300	17,713	0	0	45,463	4,047	701	27,047	40	119	0	80	95,532
27	Percent	0.1%	0.0%	0.2%	18.1%	0.0%	0.0%	46.7%	4.7%	0.5%	29.3%	0.2%	0.0%	0.0%	0.2%	100.0%
6/28-7/4	Number	61	10	274	21,509	0	0	55,401	5,547	556	34,750	183	52	0	252	118,594
28	Percent	0.3%	0.1%	0.2%	12.1%	0.0%	0.0%	36.9%	7.2%	1.1%	41.1%	0.3%	0.1%	0.0%	0.5%	100.0%
7/5-7/11	Number	207	62	122	8,262	0	0	25,164	4,888	764	27,987	223	99	0	368	68,145
29	Percent	0.1%	0.0%	0.4%	5.1%	0.0%	0.1%	28.7%	8.6%	1.4%	53.6%	0.3%	0.4%	0.0%	1.3%	100.0%
7/12-7/18	Number	53	0	247	2,974	0	81	16,693	5,020	837	31,197	186	216	0	753	58,257
30	Percent	0.0%	0.0%	0.3%	3.1%	0.0%	0.1%	24.1%	9.5%	0.9%	59.6%	0.4%	1.2%	0.0%	0.8%	100.0%
7/19-7/25	Number	0	0	97	880	0	23	6,861	2,689	259	16,956	107	337	0	226	28,435
31	Percent	0.0%	0.0%	0.3%	3.1%	0.0%	0.0%	16.2%	12.6%	0.8%	63.4%	0.3%	2.6%	0.0%	0.8%	100.0%
7/26-8/1	Number	0	0	40	480	0	1	2,521	1,956	124	9,847	47	401	0	127	15,543
32	Percent	0.0%	0.0%	0.1%	3.1%	0.0%	0.1%	10.7%	14.5%	0.5%	65.6%	0.3%	3.1%	0.0%	2.0%	100.0%
8/1-8/8	Number	0	0	5	154	0	6	539	727	23	3,298	16	158	0	100	5,028
33	Percent	0.1%	0.0%	0.0%	1.5%	0.0%	0.0%	5.5%	14.1%	0.4%	73.3%	0.5%	1.9%	0.0%	2.6%	100.0%
8/9-8/15	Number	2	0	0	25	0	1	94	240	7	1,249	9	32	0	44	1,703

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Stat Week		Ages														Total
		0.2	1.1	0.3	1.2	2.1	0.4	1.3	2.2	1.4	2.3	3.2	3.3	1.5	2.4	
34	Percent	0.0%	0.0%	0.0%	2.0%	0.2%	0.0%	6.5%	12.6%	0.5%	75.1%	0.6%	1.1%	0.0%	1.5%	100.0%
8/16-8/22	Number	0	0	0	15	2	0	49	95	4	567	4	8	0	12	756
35	Percent	0.0%	0.0%	0.2%	3.5%	0.1%	0.0%	9.3%	14.1%	0.3%	67.8%	0.8%	1.8%	0.0%	2.0%	100.0%
8/23-8/29	Number	0	0	0	6	0	0	16	25	1	118	1	3	0	3	174
36	Percent	0.0%	0.0%	0.3%	8.4%	0.0%	0.0%	19.5%	13.7%	0.0%	51.4%	1.1%	2.8%	0.0%	2.8%	100.0%
8/30-9/5	Number	0	0	0	2	0	0	4	3	0	12	0	1	0	1	23
Total	Percent	0.2%	0.0%	0.3%	18.2%	0.0%	0.0%	45.3%	5.0%	1.3%	29.0%	0.1%	0.2%	0.0%	0.3%	100.0%
	Number	1,238	72	2,119	124,721	2	112	310,099	34,308	8,981	198,572	817	1,648	61	1,966	684,715

Table 16. Estimated age composition of Chignik Lake sockeye salmon escapement by week using postseason scale pattern analysis, 2002.

		Ages														
Stat Week		0.2	1.1	0.3	1.2	2.1	0.4	1.3	2.2	1.4	2.3	3.2	3.3	1.5	2.4	Total
23	Percent	0.4%	0.0%	0.2%	23.0%	0.0%	0.0%	52.3%	0.0%	0.8%	23.1%	0.0%	0.0%	0.2%	0.0%	100.0%
5/31-6/06	Number	1	0	1	84	0	0	192	0	3	85	0	0	1	0	367
24	Percent	0.4%	0.0%	0.3%	21.1%	0.0%	0.0%	54.6%	0.5%	1.2%	21.8%	0.0%	0.0%	0.1%	0.0%	100.0%
6/7-6/13	Number	30	0	17	1,425	0	0	3,680	32	81	1,468	0	0	10	0	6,744
25	Percent	0.2%	0.0%	0.3%	22.6%	0.0%	0.0%	38.4%	6.2%	1.4%	30.9%	0.0%	0.1%	0.0%	0.0%	100.0%
6/14-6/20	Number	26	0	44	3,419	0	0	5,795	936	209	4,659	0	11	0	0	15,100
26	Percent	0.1%	0.0%	0.3%	16.4%	0.0%	0.0%	39.7%	5.5%	0.7%	37.1%	0.0%	0.1%	0.0%	0.1%	100.0%
6/21-6/27	Number	16	0	95	5,193	0	0	12,533	1,727	230	11,739	11	34	0	21	31,600
27	Percent	0.0%	0.0%	0.2%	14.6%	0.0%	0.0%	41.5%	5.4%	0.5%	37.4%	0.1%	0.0%	0.0%	0.2%	100.0%
6/28-7/4	Number	10	1	52	3,356	0	0	9,527	1,239	123	8,596	28	8	0	38	22,979
28	Percent	0.3%	0.0%	0.2%	8.5%	0.0%	0.0%	32.1%	7.3%	1.4%	49.1%	0.3%	0.2%	0.0%	0.6%	100.0%
7/5-7/11	Number	54	6	32	1,372	0	0	5,171	1,182	219	7,916	44	32	0	90	16,120
29	Percent	0.1%	0.0%	0.4%	4.6%	0.0%	0.1%	25.9%	9.1%	1.4%	56.4%	0.3%	0.4%	0.0%	1.3%	100.0%
7/12-7/18	Number	28	0	150	1,529	0	47	8,650	3,031	468	18,868	103	132	0	431	33,436
30	Percent	0.0%	0.0%	0.1%	2.6%	0.0%	0.0%	22.5%	10.0%	0.9%	61.3%	0.5%	1.5%	0.0%	0.5%	100.0%
7/19-7/25	Number	0	0	63	1,353	0	12	11,701	5,195	470	31,846	247	781	0	274	51,942
31	Percent	0.0%	0.0%	0.3%	3.2%	0.0%	0.0%	15.7%	12.8%	0.8%	63.4%	0.3%	2.7%	0.0%	0.9%	100.0%
7/26-8/1	Number	0	0	68	807	0	2	4,004	3,252	199	16,120	73	680	0	223	25,429
32	Percent	0.0%	0.0%	0.1%	3.0%	0.0%	0.1%	10.5%	14.4%	0.4%	65.9%	0.4%	3.0%	0.0%	2.2%	100.0%
8/1-8/8	Number	3	0	9	480	0	21	1,661	2,271	67	10,403	57	478	0	344	15,794
33	Percent	0.1%	0.0%	0.0%	1.6%	0.0%	0.0%	6.1%	14.1%	0.4%	72.6%	0.5%	1.9%	0.0%	2.5%	100.0%
8/9-8/15	Number	23	0	0	272	2	8	1,023	2,357	65	12,181	88	326	0	426	16,771

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		Ages														
Stat Week		0.2	1.1	0.3	1.2	2.1	0.4	1.3	2.2	1.4	2.3	3.2	3.3	1.5	2.4	Total
34	Percent	0.0%	0.0%	0.0%	1.9%	0.2%	0.0%	6.2%	12.7%	0.5%	75.3%	0.6%	1.1%	0.0%	1.5%	100.0%
8/16-8/22	Number	7	0	2	307	32	0	989	2,018	78	11,997	92	170	0	244	15,936
35	Percent	0.0%	0.0%	0.2%	2.5%	0.1%	0.0%	6.4%	15.4%	0.2%	70.0%	0.9%	2.1%	0.0%	2.2%	100.0%
8/23-8/29	Number	0	0	39	452	22	0	1,183	2,835	45	12,872	163	381	0	404	18,397
36	Percent	0.0%	0.0%	0.4%	2.7%	0.0%	0.0%	6.2%	18.0%	0.0%	65.6%	1.1%	3.0%	0.0%	3.0%	100.0%
8/30-9/5	Number	0	0	68	491	2	0	1,135	3,292	4	12,000	208	551	0	553	18,305
Post Weir	Percent	0.0%	0.0%	0.4%	2.7%	0.0%	0.0%	6.2%	18.2%	0.0%	65.1%	1.2%	3.1%	0.0%	3.1%	100.0%
Estimate	Number	0	0	216	1,509	0	0	3,448	10,129	0	36,205	647	1,724	0	1,724	55,600
Total	Percent	0.1%	0.0%	0.2%	6.4%	0.0%	0.0%	20.5%	11.5%	0.7%	57.2%	0.5%	1.5%	0.0%	1.4%	100.0%
	Number	199	7	856	22,049	59	90	70,693	39,497	2,260	196,954	1,761	5,311	11	4,773	344,519

Table 17. Estimated age composition of Chignik Lake sockeye salmon catch by week using postseason scale pattern analysis, 2002.

		Ages														
Stat Week		0.2	1.1	0.3	1.2	2.1	0.4	1.3	2.2	1.4	2.3	3.2	3.3	1.5	2.4	Total
23	Percent	0.4%	0.0%	0.2%	23.1%	0.0%	0.0%	52.4%	0.0%	0.8%	22.9%	0.0%	0.0%	0.2%	0.0%	100.0%
5/31-6/06	Number	0	0	0	4	0	0	9	0	0	4	0	0	0	0	18
24	Percent	0.5%	0.0%	0.3%	17.2%	0.0%	0.0%	57.1%	1.3%	1.9%	21.5%	0.0%	0.0%	0.1%	0.0%	100.0%
6/7-6/13	Number	55	0	34	1,754	0	0	5,816	133	195	2,192	0	0	6	0	10,185
25	Percent	0.2%	0.0%	0.4%	23.8%	0.0%	0.0%	40.5%	6.7%	2.0%	26.3%	0.0%	0.1%	0.0%	0.0%	100.0%
6/14-6/20	Number	55	0	113	7,248	0	0	12,340	2,030	608	8,013	0	36	0	0	30,443
26	Percent	0.0%	0.0%	0.3%	15.7%	0.0%	0.0%	40.4%	5.6%	0.7%	36.9%	0.0%	0.1%	0.0%	0.1%	100.0%
6/21-6/27	Number	6	0	103	5,042	0	0	12,976	1,809	237	11,860	15	41	0	31	32,120
27	Percent	0.1%	0.0%	0.2%	15.1%	0.0%	0.0%	40.6%	5.5%	0.5%	37.5%	0.2%	0.1%	0.0%	0.2%	100.0%
6/28-7/4	Number	41	7	149	9,148	0	0	24,532	3,337	317	22,677	96	34	0	116	60,454
28	Percent	0.3%	0.1%	0.2%	10.2%	0.0%	0.0%	32.3%	8.0%	1.2%	46.7%	0.3%	0.2%	0.0%	0.5%	100.0%
7/5-7/11	Number	202	52	118	6,582	0	0	20,867	5,141	760	30,182	206	101	0	355	64,566
29	Percent	0.1%	0.0%	0.4%	4.5%	0.0%	0.1%	25.7%	9.0%	1.4%	56.6%	0.3%	0.4%	0.0%	1.3%	100.0%
7/12-7/18	Number	91	0	431	4,469	0	147	25,818	9,072	1,414	56,837	330	405	0	1,329	100,343
30	Percent	0.0%	0.0%	0.3%	2.9%	0.0%	0.1%	22.9%	9.7%	0.9%	60.8%	0.4%	1.2%	0.0%	0.8%	100.0%
7/19-7/25	Number	0	0	241	2,249	0	57	17,760	7,510	705	47,151	300	953	0	589	77,517
31	Percent	0.0%	0.0%	0.3%	3.1%	0.0%	0.0%	16.0%	12.7%	0.8%	63.3%	0.3%	2.6%	0.0%	0.8%	100.0%
7/26-8/1	Number	0	0	194	2,314	0	5	11,783	9,313	581	46,512	216	1,932	0	621	73,470
32	Percent	0.0%	0.0%	0.1%	3.2%	0.0%	0.1%	11.2%	14.3%	0.5%	65.1%	0.3%	3.1%	0.0%	2.0%	100.0%
8/1-8/8	Number	3	0	37	1,365	0	56	4,752	6,092	192	27,636	140	1,330	0	866	42,470
33	Percent	0.1%	0.0%	0.0%	1.5%	0.0%	0.0%	5.7%	14.0%	0.4%	73.3%	0.5%	1.8%	0.0%	2.6%	100.0%
8/9-8/15	Number	40	0	0	399	5	9	1,533	3,781	106	19,805	146	493	0	690	27,007

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Stat Week		Ages														Total
		0.2	1.1	0.3	1.2	2.1	0.4	1.3	2.2	1.4	2.3	3.2	3.3	1.5	2.4	
34	Percent	0.0%	0.0%	0.0%	2.0%	0.2%	0.0%	6.3%	12.6%	0.5%	75.3%	0.6%	1.0%	0.0%	1.5%	100.0%
8/16-8/22	Number	9	0	4	472	50	0	1,510	3,028	118	18,084	138	252	0	356	24,022
35	Percent	0.0%	0.0%	0.2%	2.4%	0.1%	0.0%	6.4%	15.3%	0.3%	70.2%	0.9%	2.0%	0.0%	2.2%	100.0%
8/23-8/29	Number	0	0	28	332	17	0	874	2,072	35	9,515	118	275	0	292	13,557
36	Percent	0.0%	0.0%	0.4%	2.7%	0.0%	0.0%	6.2%	17.9%	0.0%	65.8%	1.1%	3.0%	0.0%	3.0%	100.0%
8/30-9/5	Number	0	0	33	245	1	0	570	1,640	3	6,040	103	272	0	274	9,182
Total	Percent	0.1%	0.0%	0.3%	7.4%	0.0%	0.0%	25.0%	9.7%	0.9%	54.2%	0.3%	1.1%	0.0%	1.0%	100.0%
	Number	500	59	1,486	41,622	74	274	141,140	54,958	5,271	306,509	1,810	6,125	6	5,517	565,351

Table 18. Chignik sockeye salmon daily escapement, catch by area, and total run adjusted to Chignik Lagoon date, 2002.

		Catch									
Date	Escapement	Chignik Lagoon	Outer Chignik Bay/Kujulik Sections	Cape Kumlik Section	Eastern District	Cape Igvak (Kodiak)	Western District	Perryville District	SEDM (Area M)	Total Catch	Daily Run Total
24-May	0	0	0	0	0	0	0	0	0	0	0
25-May	0	0	0	0	0	0	0	0	0	0	0
26-May	0	0	0	0	0	0	0	0	0	0	0
27-May	0	0	0	0	0	0	0	0	0	0	0
28-May	0	0	0	0	0	0	0	0	0	0	0
29-May	0	0	0	0	0	0	0	0	0	0	0
30-May	0	0	0	0	0	0	0	0	0	0	0
31-May	0	0	0	0	0	0	0	0	0	0	0
1-Jun	335	0	0	0	0	0	0	0	0	0	335
2-Jun	430	0	0	0	0	0	0	0	0	0	430
3-Jun	1,661	0	0	0	0	0	0	0	0	0	1,661
4-Jun	1,204	0	0	0	0	0	0	0	0	0	1,204
5-Jun	2,457	320	0	0	0	0	0	0	0	320	2,777
6-Jun	1,019	0	0	0	0	0	0	0	0	0	1,019
7-Jun	22,642	0	0	0	0	0	0	0	0	0	22,642
8-Jun	13,181	0	0	0	0	0	0	0	0	0	13,181
9-Jun	17,865	1,050	0	0	0	0	0	0	0	1,050	18,915
10-Jun	13,955	16,145	0	0	0	0	0	0	0	16,145	30,100
11-Jun	8,014	26,926	0	0	0	0	0	0	0	26,926	34,940
12-Jun	5,153	28,123	2,971	0	0	0	0	0	0	31,094	36,247
13-Jun	7,346	33,687	911	0	0	0	0	0	0	34,598	41,944
14-Jun	11,384	36,637	0	0	0	0	0	0	0	36,637	48,021
15-Jun	9,760	50,139	0	0	0	0	0	0	0	50,139	59,899
16-Jun	8,079	39,658	0	0	0	0	0	0	0	39,658	47,737
17-Jun	7,677	30,905	0	0	0	0	0	0	0	30,905	38,582
18-Jun	11,061	30,959	4,504	0	0	0	0	0	0	35,463	46,524
19-Jun	22,782	19,689	4,793	0	0	0	0	0	0	24,482	47,264
20-Jun	27,394	4,215	1,537	0	0	0	0	0	0	5,752	33,146
21-Jun	30,769	6,438	0	0	2,835	0	0	0	0	9,273	40,042
22-Jun	8,933	3,188	0	0	0	0	0	0	0	3,188	12,121
23-Jun	22,132	11,620	0	0	0	0	0	0	0	11,620	33,752
24-Jun	12,653	2,426	0	0	0	0	0	0	0	2,426	15,079
25-Jun	15,975	10,252	0	0	0	35,017	0	0	0	45,269	61,244
26-Jun	27,232	1,993	0	0	0	15,577	0	0	5,785	23,355	50,587
27-Jun	17,118	1,000	0	0	0	25,367	0	0	6,154	32,521	49,639
28-Jun	16,822	10,009	0	0	0	53,576	0	0	6,324	69,909	86,731
29-Jun	12,553	4,629	0	0	0	0	0	0	5,166	9,795	22,348
30-Jun	13,597	18,350	0	0	0	0	0	0	5,766	24,116	37,713
1-Jul	9,613	13,033	0	0	0	0	0	0	0	13,033	22,646
2-Jul	6,808	17,136	0	0	0	0	0	0	0	17,136	23,944
3-Jul	4,774	19,863	0	0	0	0	0	0	0	19,863	24,637
4-Jul	4,640	25,197	0	0	0	0	0	0	0	25,197	29,837
5-Jul	2,175	21,555	0	0	0	0	0	0	0	21,555	23,730
6-Jul	1,999	17,045	3,347	0	0	0	0	0	0	20,392	22,391
7-Jul	3,433	22,184	4,486	0	0	0	0	0	0	26,670	30,103
8-Jul	2,927	14,828	1,843	0	0	0	0	0	0	16,671	19,598

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Table 18. (page 2 of 3)

		Catch									
Date	Escapement	Chignik Lagoon	Outer Chignik Bay/Kujulik Sections	Cape Kumlik Section	Eastern District	Cape Igvak (Kodiak)	Western District	Perryville District	SEDM (Area M)	Total Catch	Daily Run Total
9-Jul	5,885	14,824	0	610	0	0	0	0	0	15,434	21,319
10-Jul	7,164	13,173	0	0	0	0	0	0	0	13,173	20,337
11-Jul	7,949	18,816	0	0	0	0	0	0	0	18,816	26,765
12-Jul	4,293	16,273	0	0	0	0	0	0	0	16,273	20,566
13-Jul	7,893	19,378	0	0	0	0	0	0	0	19,378	27,271
14-Jul	10,656	13,266	0	0	0	0	1,326	0	1,262	15,854	26,510
15-Jul	5,787	21,090	0	0	0	0	1,847	0	8,464	31,401	37,188
16-Jul	9,071	22,839	0	0	0	0	3,334	0	8,106	34,279	43,350
17-Jul	8,007	22,054	0	0	0	0	0	0	0	22,054	30,061
18-Jul	7,251	19,361	0	0	0	0	0	0	0	19,361	26,612
19-Jul	3,140	28,614	0	0	0	0	0	0	0	28,614	31,754
20-Jul	3,642	16,466	1,140	0	0	0	0	0	0	17,606	21,248
21-Jul	5,656	16,728	2,642	0	0	0	0	0	0	19,370	25,026
22-Jul	9,789	14,075	974	0	0	0	0	0	0	15,049	24,838
23-Jul	22,373	5,370	0	0	0	0	0	0	0	5,370	27,743
24-Jul	10,804	8,498	0	0	0	4,682	0	0	0	13,180	23,984
25-Jul	13,202	5,722	0	0	0	1,040	0	0	0	6,762	19,964
26-Jul	5,031	15,711	0	0	0	1,229	0	0	210	17,150	22,181
27-Jul	6,841	9,687	0	0	0	0	0	0	9,305	18,992	25,833
28-Jul	4,796	10,972	0	0	0	0	748	0	6,484	18,204	23,000
29-Jul	3,705	9,557	0	0	0	0	754	0	0	10,311	14,016
30-Jul	3,350	9,129	0	0	0	0	421	0	0	9,550	12,900
31-Jul	3,760	7,880	0	0	0	0	0	0	0	7,880	11,640
1-Aug	3,220	6,757	0	0	0	0	0	169	0	6,926	10,146
2-Aug	1,351	6,913	0	0	0	0	0	0	0	6,913	8,264
3-Aug	1,791	4,771	1,404	0	0	0	0	0	0	6,175	7,966
4-Aug	2,908	6,740	3,429	0	0	0	0	0	0	10,169	13,077
5-Aug	1,519	6,236	2,028	1,806	0	0	0	0	0	10,070	11,589
6-Aug	1,876	5,118	353	0	0	0	0	0	0	5,471	7,347
7-Aug	3,050	4,951	0	0	0	0	0	0	0	4,951	8,001
8-Aug	5,018	3,749	0	0	0	0	0	0	0	3,749	8,767
9-Aug	2,959	3,618	0	0	0	0	0	0	0	3,618	6,577
10-Aug	4,023	4,630	0	0	0	0	0	0	0	4,630	8,653
11-Aug	2,611	2,677	0	0	0	0	0	0	0	2,677	5,288
12-Aug	2,930	4,183	0	0	0	0	0	0	0	4,183	7,113
13-Aug	926	5,140	0	0	0	0	0	0	0	5,140	6,066
14-Aug	2,225	4,636	0	0	0	0	0	0	0	4,636	6,861
15-Aug	2,206	3,826	0	0	0	0	0	0	0	3,826	6,032
16-Aug	2,463	3,540	0	0	0	0	0	0	0	3,540	6,003
17-Aug	3,081	2,632	0	0	0	0	0	0	0	2,632	5,713
18-Aug	2,262	2,860	0	0	0	0	221	0	0	3,081	5,343
19-Aug	2,244	4,217	0	0	0	0	699	0	0	4,916	7,160
20-Aug	1,791	2,388	604	0	0	0	75	0	0	3,067	4,858
21-Aug	2,376	2,502	1,362	245	0	0	0	0	0	4,109	6,485
22-Aug	2,235	1,471	1,857	105	0	0	0	0	0	3,433	5,668
23-Aug	1,935	2,113	1,395	0	0	0	0	0	0	3,508	5,443
24-Aug	3,322	1,374	22	0	0	0	0	0	0	1,396	4,718

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Table 18. (page 3 of 3)

		Catch									
Date	Escapement	Chignik Lagoon	Outer Chignik Bay/Kujulik Sections	Cape Kumlik Section	Eastern District	Cape Igvak (Kodiak)	Western District	Perryville District	SEDM (Area M)	Total Catch	Daily Run Total
25-Aug	2,605	1,341	0	0	0	0	0	0	0	1,341	3,946
26-Aug	3,113	1,747	0	0	0	0	0	0	0	1,747	4,860
27-Aug	2,212	1,638	0	0	0	0	0	0	0	1,638	3,850
28-Aug	2,624	1,793	0	0	0	0	0	0	0	1,793	4,417
29-Aug	2,812	2,308	0	0	0	0	0	0	0	2,308	5,120
30-Aug	3,410	2,805	0	0	0	0	0	0	0	2,805	6,215
31-Aug	4,380	3,152	0	0	0	0	0	0	0	3,152	7,532
1-Sep	4,879	1,151	0	0	0	0	0	0	0	1,151	6,030
2-Sep	4,763	758	0	0	0	0	0	0	0	758	5,521
3-Sep	903	300	0	0	0	0	0	0	0	300	1,203
4-Sep	0	759	0	0	0	0	0	0	0	759	759
5-Sep	0	280	0	0	0	0	0	0	0	280	280
6-Sep	0	0	0	0	0	0	0	0	0	0	0
7-Sep	0	0	0	0	0	0	0	0	0	0	0
8-Sep	0	0	0	0	0	0	0	0	0	0	0
9-Sep	0	0	0	0	0	0	0	0	0	0	0
10-Sep	0	0	0	0	0	0	0	0	0	0	0
11-Sep	0	0	0	0	0	0	0	0	0	0	0
12-Sep	0	0	0	0	0	0	0	0	0	0	0
13-Sep	0	0	0	0	0	0	0	0	0	0	0
14-Sep	0	0	0	0	0	0	0	0	0	0	0
Post Weir Estimate 9/4-9/30	55,600	0	0	0	0	0	0	0	0	0	55,600
Total	725,220	993,756	41,602	2,766	2,835	136,488	9,425	169	63,026	1,250,066	1,975,286

Table 19. Age composition of size selected Chignik Lagoon sockeye salmon commercial catch samples by day, 2002.

		Ages											
Date		0.2	1.2	1.3	1.4	2.1	2.2	2.3	2.4	3.1	3.2	3.3	Total
6-Aug	Numbers	0	23	4	1	0	184	48	0	0	3	3	266
	Percent	0	9	2	0	0	69	18	0	0	1	1	
13-Aug	Numbers	0	15	2	0	1	116	17	1	0	4	0	156
	Percent	0	10	1	0	1	74	11	1	0	3	0	
20-Aug	Numbers	1	6	1	0	1	52	17	0	0	1	0	79
	Percent	1	8	1	0	1	66	22	0	0	1	0	
27-Aug	Numbers	1	16	2	1	0	140	34	0	1	5	0	200
	Percent	1	8	1	1	0	70	17	0	1	3	0	
31-Aug	Numbers	0	1	0	0	0	10	0	0	0	0	0	11
	Percent	0	9	0	0	0	91	0	0	0	0	0	
Total	Numbers	2	61	9	2	2	502	116	1	1	13	3	712
	Percent	0	9	1	0	0	71	16	0	0	2	0	

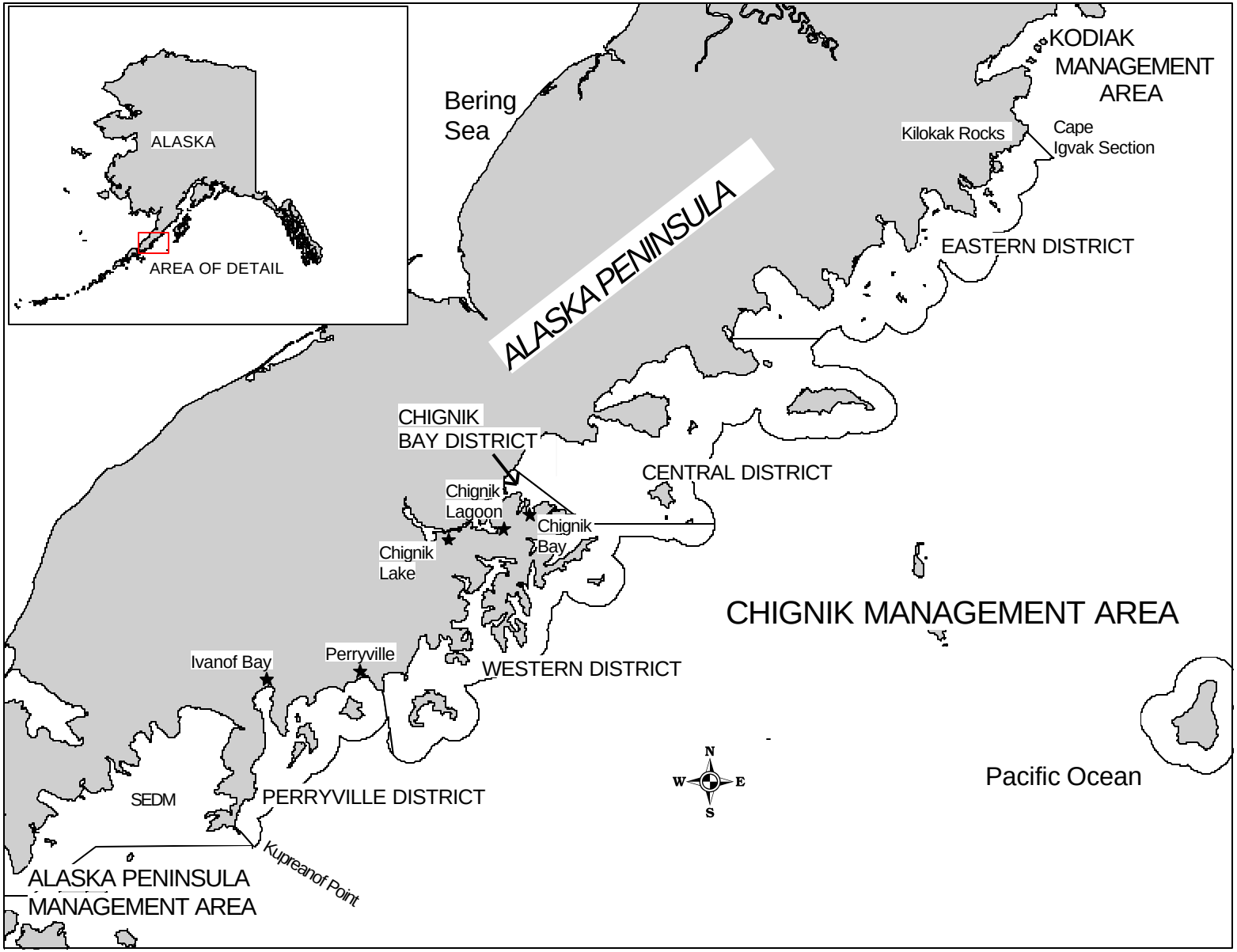

Figure 1. Map of the Chignik Management Area.

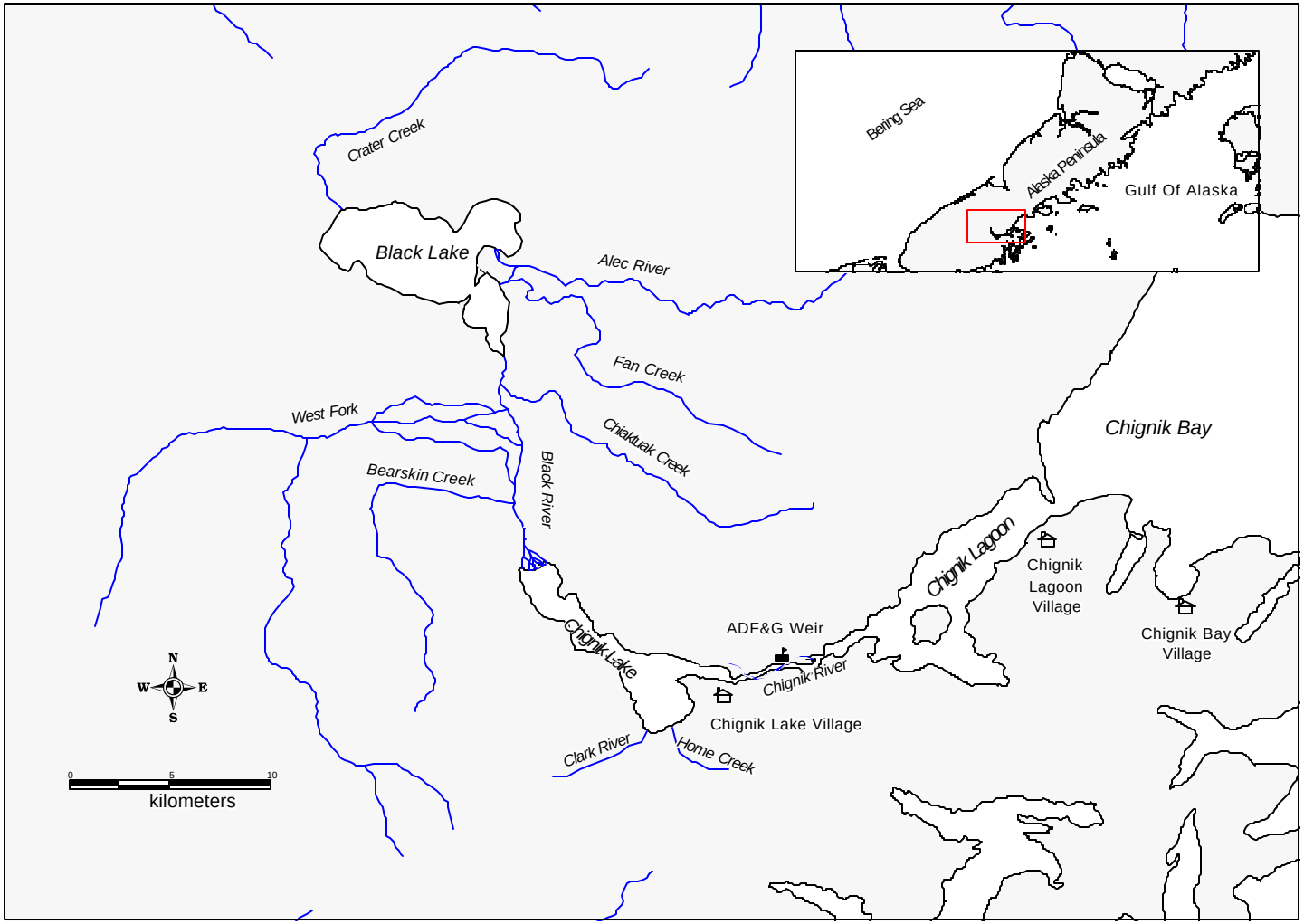

Figure 2. Map of the Chignik watershed including Black and Chignik Lakes.

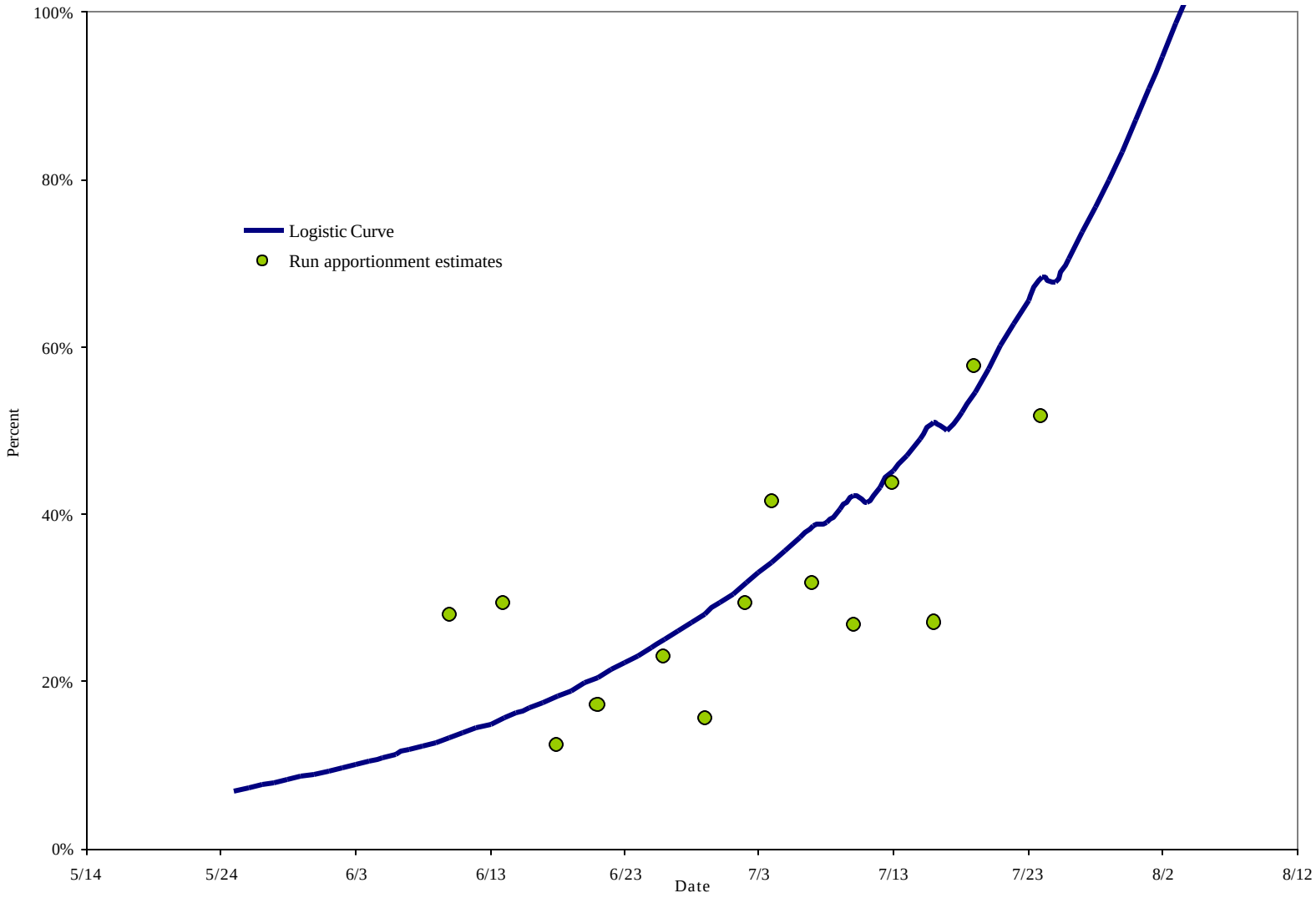

Figure 3. Estimated proportion of Chignik Lake sockeye salmon in the Chignik River system by day using a weighted logistic function fit to the age 2.3 model output data and refit for each sample inseason.

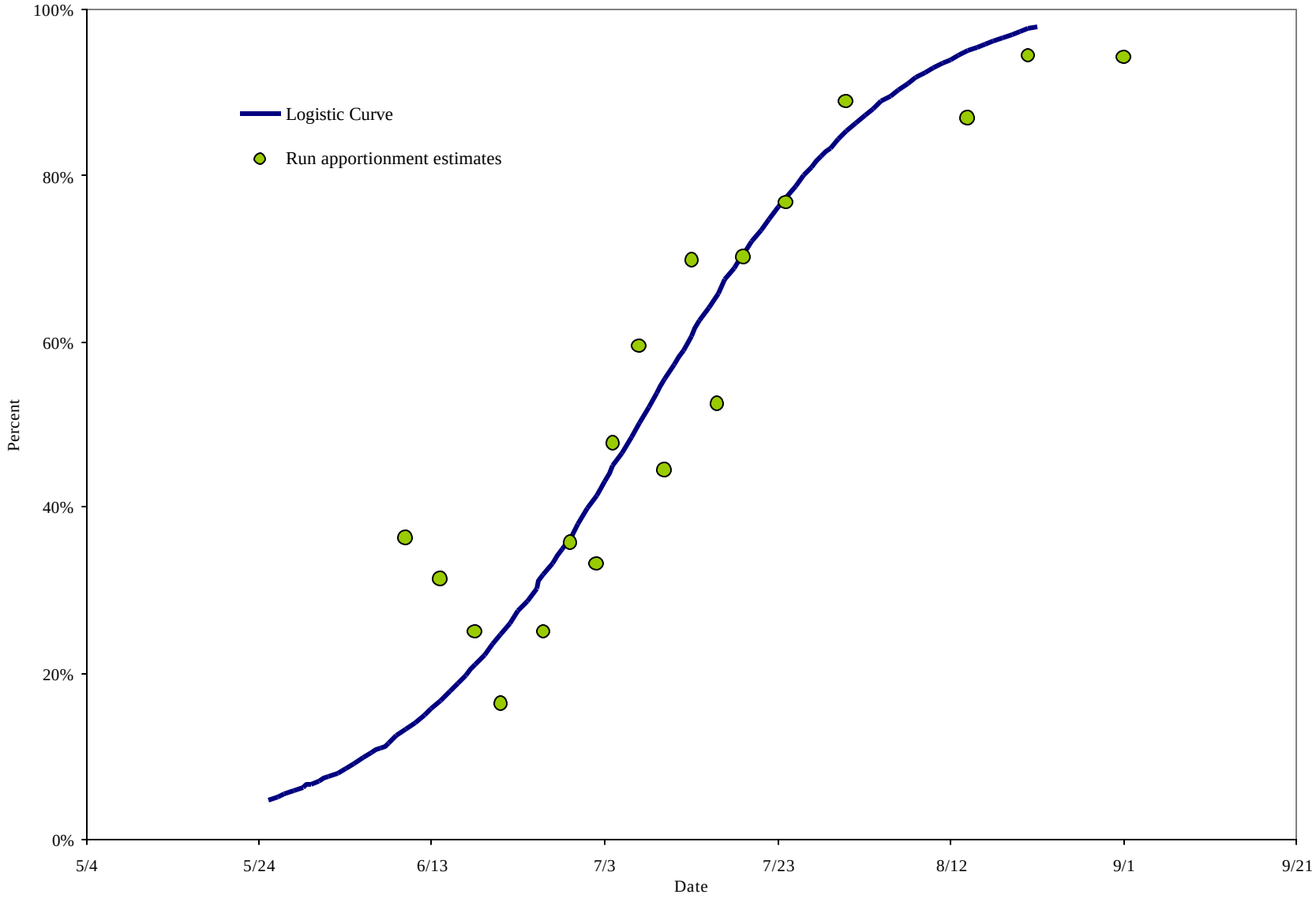

Figure 4. Estimated proportion of Chignik Lake sockeye in Chignik River system by day using a weighted logistic function fit to the age 2.3 SPA model estimated run apportionment, postseason.

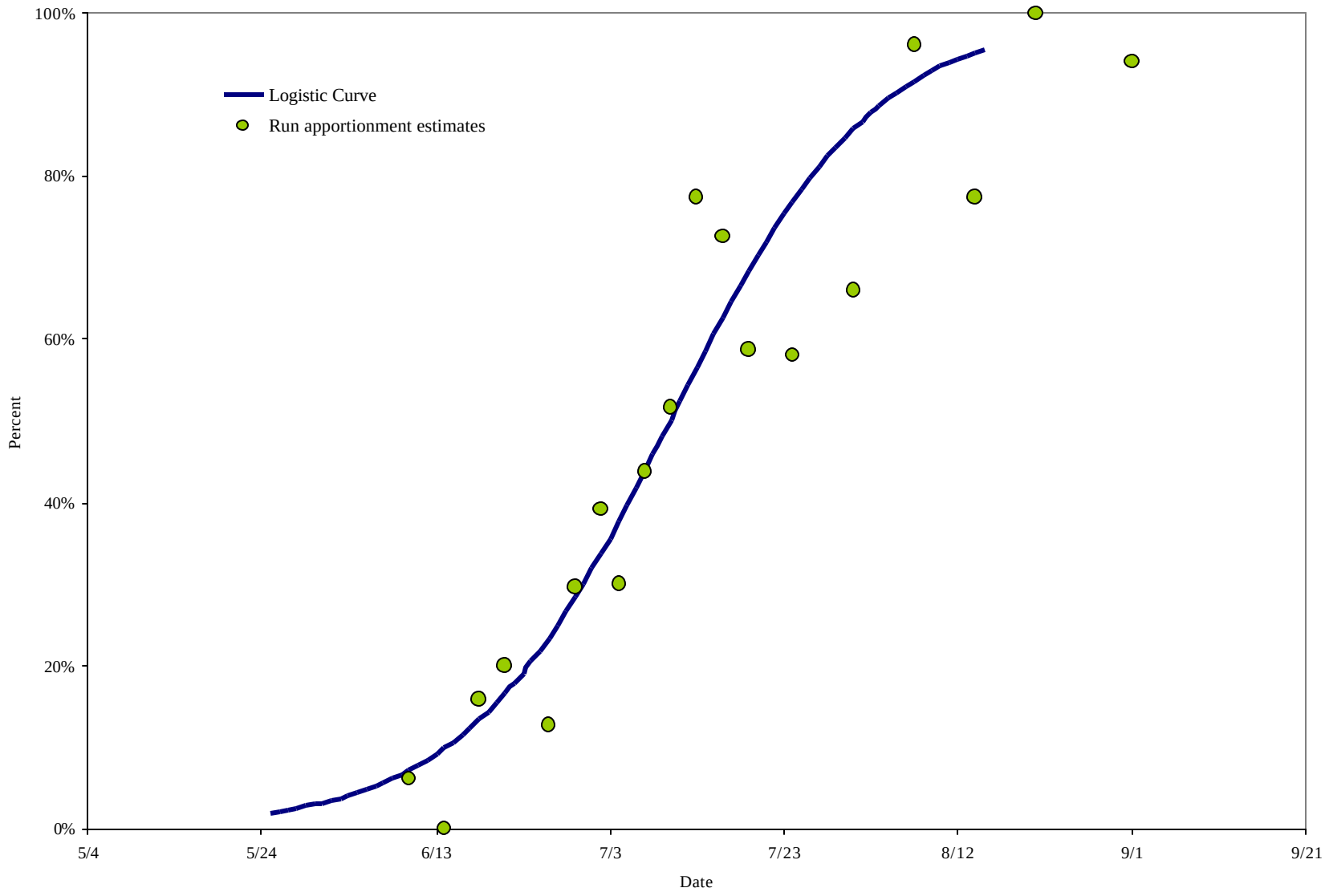

Figure 5. Estimated proportion of Chignik Lake sockeye in Chignik River system by day using a weighted logistic function fit to the age 1.3 SPA model estimated run apportionment, postseason.

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