

Estimated numbers and weights of 1SW- 4SW salmon, previous spawners and escaped salmon in the official catch statistics in Norway the years 2011 and 2012 for the Kolarctic salmon project area in Northern Norway; results from the converting of SSB catch data into sea-age groups

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This report has been produced with the assistance of the European Union, but the contents can in no way be taken to reflect the views of the European Union.

Abstract

This report is responding to the specific item mentioned in the Kolarctic project: "Task 3. Combine genetic, biological and environmental information into a salmon migration model that will allow for a more precise and sustainable management. Moment 3.4. Describe the salmon catch composition in time and space based on available catch statistics and own data". There are many life histories in wild salmon caught at sea and in addition salmon which have escaped from cage farming facilities. Wild salmon with the sea-ages from 1SW (one sea-winter) to 4SW and previous spawners are making throughout almost the entire official fishing season mixture of diverse life history combinations in the catches. Official salmon catch statistics offer numbers and weights of three size groups of salmon and here we present data where those numbers converted into sea-ages of wild salmon or into the numbers of escaped salmon. After converting SSB data into real sea-ages work the weekly numbers of wild salmon can be used further when analyzing their river of origin using the genetic assignment data. The proportion of 1SW salmon exceeded the proportions of all other groups in both of the years in Troms and Finnmark counties. The proportions of 2SW, 3SW and 4SW salmon stayed almost the same in both of the years in Finnmark but the proportion of escaped salmon declined from 8% in 2011 to 4% in 2012 in the official reported catches. In the official salmon catches in Nordland County the proportion of 1SW salmon increased from very low abundance of 5% in 2011 to 30% in 2012. Great surprise was that escaped salmon were as high as close to 45% in Nordland of all the catches measured in terms of numbers and 41-47% from the catches in terms of weight. Multi sea-winter salmon (MSW) makes high proportion in the total reported salmon catches in terms of weight in Finnmark also in the years when MSW salmon stocks are lowest like in the years 2011 and 2012. We also present here the daily and weekly catches in municipalities from the Kolarctic salmon research fishery, which clearly demonstrates the timing of salmon migrations for various sea-ages and escaped salmon during the time period from June 1st to August 4th. This data gives now for the first time in Northern Norway exact information of the migratory patterns of all the sea-age groups of wild salmon and also escaped salmon within the area from Lofoten in Nordland to Sør-Varanger close to Russian border.

1. Introduction

SSB (Statistics Norway) collects annual catch data from all sea salmon fishermen. Fishermen have to fulfill the daily logbooks and report their salmon catches. Salmon catches are reported in terms of numbers and weights separately for fish that weight less than 3 kilos, from 3 to 7 kilos and over 7 kilos. During the official fishing time between June 1st and August 4th fishermen are asked to report salmon and trout catches without any information if salmon is wild or escaped fish. The reported salmon catches include therefore both wild as well as escaped salmon.

To describe salmon ecology, to evaluate the reported salmon catch composition in relation to time and space and to describe the stock specific migration patterns in the Kolarctic salmon project collection of the basic information of the salmon catches like scales for age determination, lengths and weights, sex and number of salmon lice was arranged. The normal SSB salmon catch data in which catch is divided into three size groups masks the ecological detailed data (sea-ages, wild or escaped salmon) behind each size groups of salmon. To better understand the diversity of salmon catches and the timing of the migrations of various sea-ages of salmon belonging into different salmon stocks it was necessary to convert the officially collected salmon catch data into the numbers and weights of salmon in 1SW (one sea-winter salmon), 2SW, 3SW, 4SW, previous spawners and in escaped salmon. These specific numbers of salmon in different sea-ages combined to the genetic information are the tools for the recommendations for a new adaptive, knowledge based management regime to minimize mixed stock fishery where needed to preserve declining and vulnerable stocks. The use of locally (here in each municipality or combination of municipalities) obtained catch samples were used to convert the official catch data into sea-age groups of wild salmon and escaped salmon and then by using modern genetic analyses to identify which stock each salmon belong to it is possible to construct migration patterns for each salmon from different rivers and regions reported in the official catches.

This report is responding into the specific item mentioned in the Kolarctic project "Task 3. Combine genetic, biological and environmental information into a salmon migration model that will allow for a more precise and sustainable management. Moment 3.4. Describe the salmon catch composition in time and space based on available catch statistics and own data".

2. Material and methods

Kolarctic salmon project arranged careful sampling from the salmon fishery in Northern Norway in the years 2011 and 2012. Detailed information on the results covering sea-ages, origin of salmon (wild or escaped salmon) and timing of the catches of various sea-ages etc. are presented in separate reports (Kolarctic salmon report I, data from the sampling in 2011; report II, data from the sampling in 2012; report III, summary report from the samplings in 2011 and 2012).

SSB (Statistics Norway) provided daily catch data for the years 2011 and 2012. In this daily catch data there is information on the numbers and weights of salmon for the size groups of <3 kg, 3-7 kg and >7 kg salmon. Daily catch data is combined in this report for weekly catch data for each size group of salmon. In the case of unclear (unknown) information on the fishing time the catch data is not included in the analyses when converting official catch data into the catches of 1SW, 2SW, 3SW, 4SW, previous spawner and escaped salmon. The number of salmon with unclear catch date was rather low.

Catches are for the following areas in this report: Nordland (salmon districts Helgeland, Lofoten, Salten are combined), South Troms (municipalities Harstad, Tromsø, Kvæfjord, Skånland, Bjarkøy, Ibestad, Gratangen, Lavangen, Salangen, Målselv, Sørreisa, Dyrøy, Tranøy, Torsken, Berg, Lenvik, Balsfjord are combined), North Troms (municipalities Karlsøy, Lyngen, Storfjord, Kåfjord, Skjervøy, Nordreisa, Kvænangen are combined), Loppa-Hasvik (combined), Alta, Hammerfest-Nordkapp-Kvalsund-Måsøy (combined), Porsanger, Lebesby, Tana, Gamvik-Båtsfjord-Berlevåg-Vardø (combined), Vadsø-Nesseby (combined), Sør-Varanger. Catches in some municipalities had to be combined to the neighboring municipality due to too few fishermen in one municipality.

There are many sea-ages of wild salmon and escaped salmon present in the same size group in each week and that is true especially in the size groups of 3-7 kg salmon and >7 kg salmon. Therefore it is impossible to use size groups to correspond different sea-ages of salmon. For example 2SW salmon and escaped salmon occurred in all the three size groups of salmon. When we converted the official weekly catch data into sea-ages and escaped salmon for the years 2011 and 2012 we used separate sea-age distributions within the three size groups for each municipality or groups of municipalities instead of using some general or combined sea-age distribution model. Reason to use these smaller units was that the weekly sea-age distributions were not equal for different areas. In one case, in Porsanger municipality, the material is biased in the year 2011 for some weeks in July in our own scale collection for salmon larger than 7 kg. In the SSB catch data there was reasonable high number of salmon larger than 7 kg in the weeks 26, 27, 28 and 29 which is supposed to be 3-4SW salmon and previous spawners but in our own scale sampling there was no 3-4SW salmon in those weeks in that size category. Therefore those fishes in SSB catches for larger than 7 kg for weeks 27, 28 and 29 have been estimated to be previous spawners based on the sea-age distributions from the week 26.

3. Results

3.1 Numbers and weights of salmon for 1-4SW salmon, previous spawners and escaped salmon in there counties in Northern Norway in the reported catches

As a summary from all the converting work of the official catch data into various sea-ages and wild or escaped salmon it appeared that the proportion of 1SW salmon exceeded the proportions of other groups in both of the years in Troms and Finnmark counties. Year 2012 was supposed to be a good grilse (1SW salmon) year in northern rivers and at sea due to the higher numbers of 1SW salmon in the catches and in spawning stocks six years earlier in the year 2006. Therefore it was no surprise to have higher proportion of these small sizes salmon in the catches (Figure 1, Table 1) in the year 2012 than in the year 2011. The proportions of 2SW, 3SW and 4SW salmon stayed almost the same in both of the years in Finnmark but the proportion of escaped salmon declined from 8 % in 2011 to 4 % in 2012.

In the official salmon catches in Nordland County the proportion of 1SW salmon increased from very low abundance of 5% in 2011 to 30% in 2012. The official salmon fishing time is nowadays limited to July and fishing is allowed only a couple of weeks in order to allow large female salmon to ascend rivers earlier in the summer. Great surprise was that escaped salmon made as much as close to 45% of all the catches measured in terms of numbers and 41-47% of the catches in terms of weight.

In Troms County the proportion of escaped salmon was also higher than expected in the total salmon catches making 15-18% from the reported numbers of salmon. From the weight of salmon catches escaped fish formed 20-22%. Figure 1 indicates that multi sea-winter salmon (MSW) makes a high proportion in the total reported salmon catches in terms of weight in Finnmark also in the years when MSW salmon stocks are lowest.

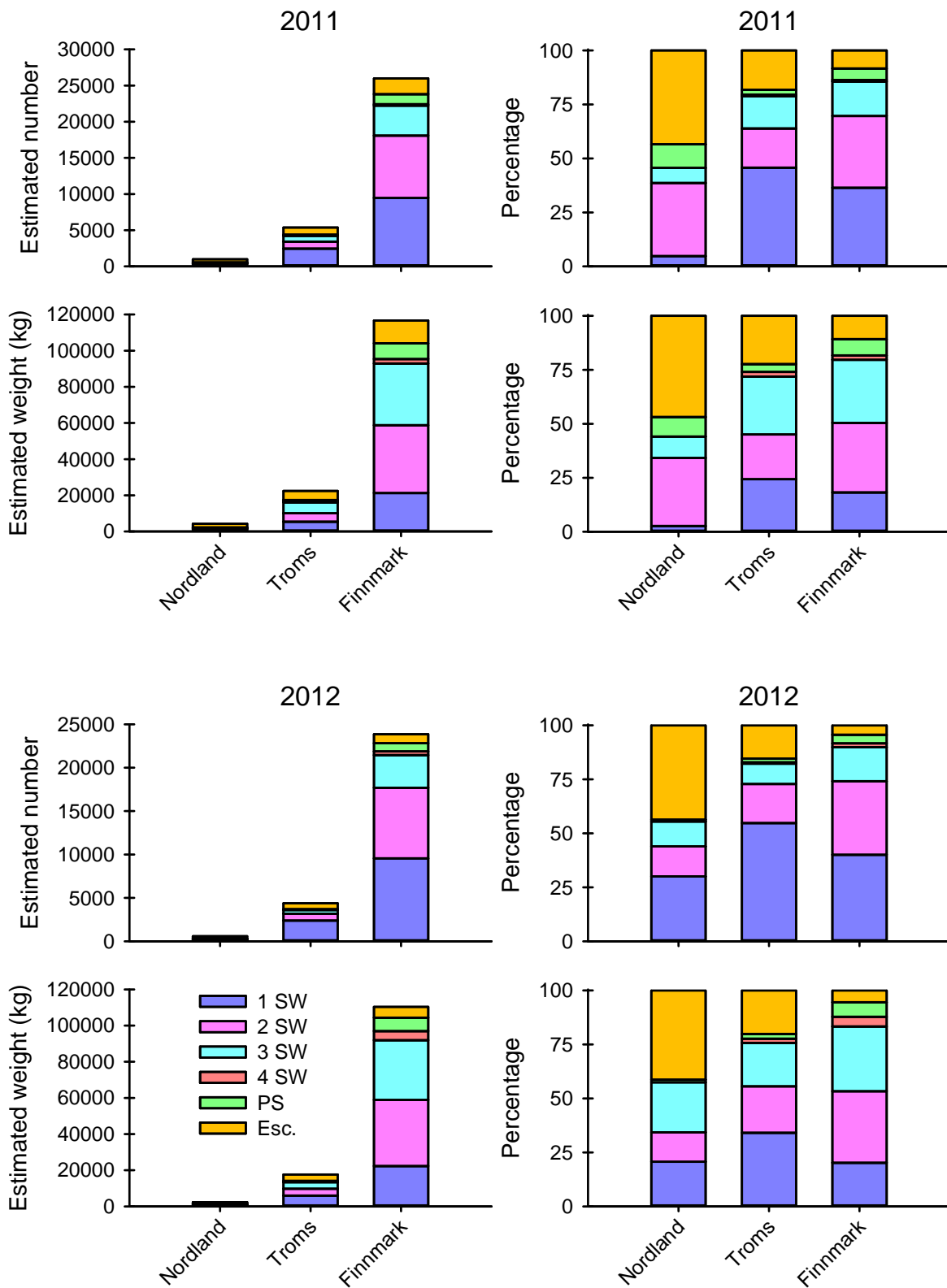


Figure 1. Estimated numbers and weights of wild 1-4SW salmon, previous spawners and escaped salmon converted from the reported official catches (SSB, Statistics Norway) in Kolarctic area in 2011 and 2012.

Table I. Numbers and percentages (in parenthesis) of wild 1-4SW salmon, previous spawners and escaped salmon caught during the ordinary fishing time within each county in Kolarctic salmon project area in the years 2011 and 2012. Numbers of salmon are converted from the official catch information (SSB, Statistics Norway) into sea-age groups of salmon based on the scale sampling data.

Year 2011	1SW	2SW	3SW	4SW	Previous spawner	Escaped salmon
Finnmark	9460 (36)	8637 (33)	4137 (16)	191 (<1)	1387 (5)	2161 (8)
Troms	2457 (46)	976 (18)	804 (15)	35 (<1)	123 (2)	977 (18)
Nordland	48 (5)	336 (34)	69 (7)		108 (11)	431 (43)
Year 2012						
Finnmark	9558 (40)	8123 (34)	3769 (16)	422 (2)	940 (4)	1038 (4)
Troms	2394 (55)	793 (18)	410 (9)	27 (<1)	73 (2)	674 (15)
Nordland	175 (30)	81 (14)	67 (12)		4 (<1)	255 (44)

Table II. Weights and percentages (in parentheses) of wild 1-4SW salmon, previous spawners and escaped salmon caught during the ordinary fishing time within each county in Kolarctic salmon project area in the years 2011 and 2012. Numbers of salmon are converted from the official catch information (SSB, Statistics Norway) into sea-age groups of salmon.

Year 2011	1SW	2SW	3SW	4SW	Previous spawner	Escaped salmon
Finnmark	21292 (18)	37553 (32)	34110 (29)	2404 (2)	8788 (8)	12552 (11)
Troms	5458 (24)	4645 (21)	6024 (27)	483 (2)	813 (4)	5006 (22)
Nordland	117 (3)	1357 (31)	424 (10)		319 (9)	2017 (47)
Year 2012						
Finnmark	22312 (20)	36545 (33)	33096 (31)	4957 (4)	7473 (7)	5964 (5)
Troms	6019 (34)	3788 (22)	3553 (20)	338 (2)	388 (2)	3546 (20)
Nordland	480 (21)	318 (14)	538 (23)		30 (1)	960 (41)

3.2 Numbers and weights of salmon for 1-4SW salmon, previous spawners and escaped salmon in the municipalities or group of municipalities in Northern Norway in the reported catches

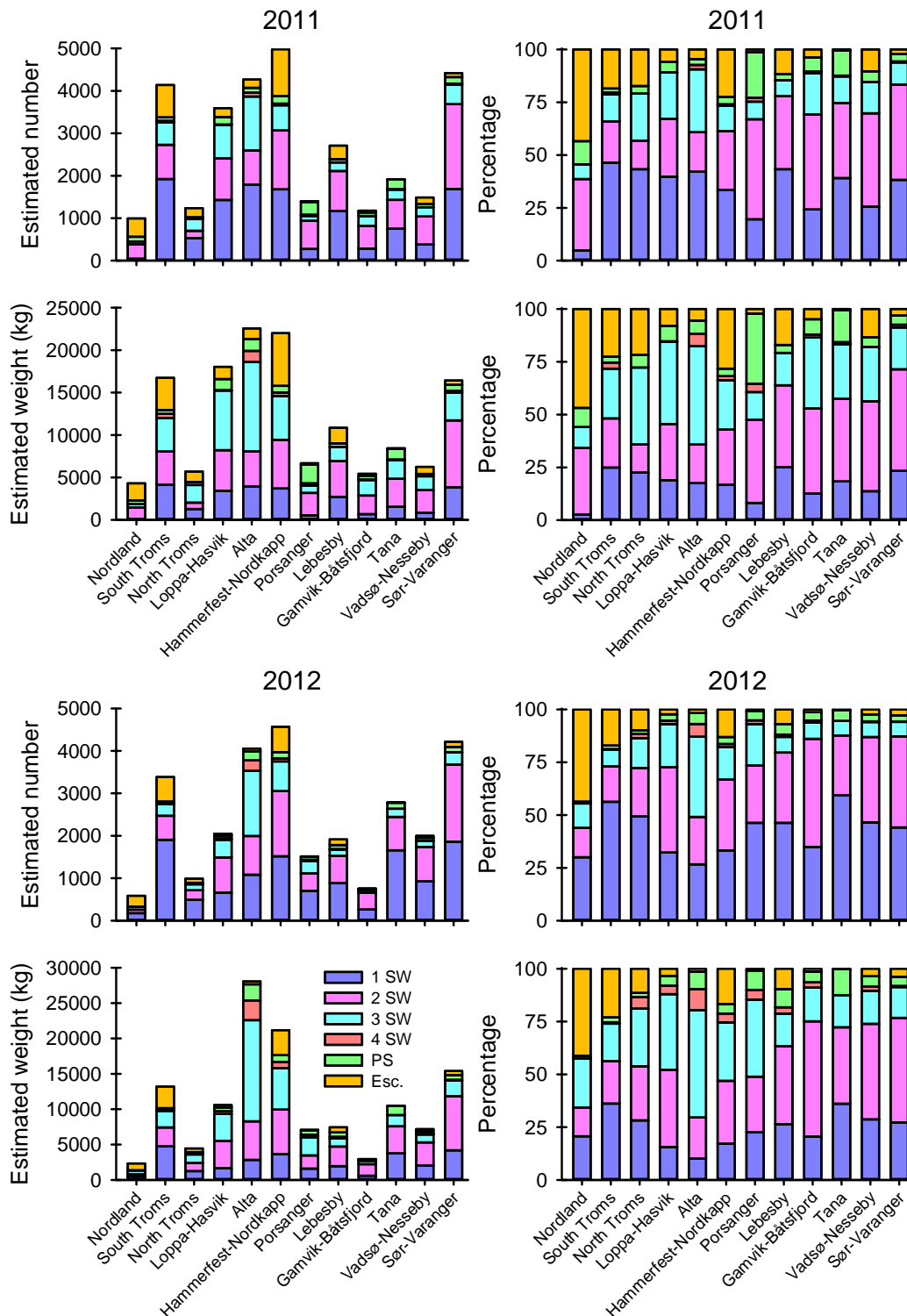


Figure 2. Estimated numbers and weights of wild 1-4SW salmon, previous spawners and escaped salmon in the reported official catches (SSB, Statistics Norway) in Kolarctic area (counties and municipalities) in 2011 and 2012.

In the figure 2 and in the tables III-VI the numbers and weights of salmon of various sea-ages and wild or escaped salmon caught during the official fishing time which is valid in each of the municipalities are presented. Salmon catches vary a lot between municipalities or groups of municipalities. Also the sea-age distributions vary between municipalities. There are two or three areas in Finnmark where the salmon catches are clearly higher than in other areas. Those areas are the municipalities of Alta, Sør-Varanger and large area where municipalities Hammerfest, Kvalsund, Måsøy and Nordkapp are combined. Especially in Alta municipality the number and weight of 3SW salmon in the reported catches is important reflecting high MSW salmon production from the large river Alta.

Table III. Numbers and percentages (in parentheses) of wild 1-4SW salmon, previous spawners and escaped salmon caught within each municipality in Finnmark and in North Troms, South Troms and Nordland in Kolarctic salmon project area in the year 2011 during the ordinary fishing time. Numbers of salmon are converted from the official catch information (SSB, Statistics Norway) into sea-age groups of salmon.

Year 2011	1SW	2SW	3SW	4SW	Previous spawner	Escaped salmon
Sør-Varanger	1690 (39)	1995 (45)	463 (10)	18 (<1)	154 (3)	96 (2)
Vadsø-Nesseby	380 (26)	658 (45)	221 (14)		75 (5)	153 (10)
Tana	750 (39)	681 (36)	241 (12)	7 (<1)	227 (11)	8 (<1)
Gamvik, Berlevåg	285 (25)	530 (45)	230 (20)	8 (<1)	79 (6)	44 (3)
Lebesby	1173 (44)	937 (35)	203 (8)		80 (2)	314 (11)
Porsanger	274 (19)	664 (48)	116 (9)	27 (2)	301 (21)	17 (1)
Hammerfest et al.	1679 (34)	1388 (28)	594 (12)	37 (<1)	177 (3)	1119 (23)
Alta	1796 (42)	799 (19)	1272 (30)	89 (3)	115 (2)	195 (4)
Loppa-Hasvik	1429 (39)	982 (28)	793 (23)	2 (<1)	175 (4)	210 (5)
North Troms	534 (44)	168 (13)	275 (22)		43 (3)	213 (18)
South Troms	1922 (47)	808 (20)	528 (12)	35 (<1)	80 (1)	763 (19)
Nordland	47 (5)	336 (34)	69 (7)		108 (11)	431 (43)

Table IV. Numbers and percentages (in parentheses) of wild 1-4SW salmon, previous spawners and escaped salmon caught within each municipality in Finnmark and in North Troms, South Troms and Nordland in Kolarctic salmon project area in the year 2012 during the ordinary fishing time. Numbers of salmon are converted from the official catch information (SSB, Statistics Norway) into sea-age groups of salmon.

Year 2012	1SW	2SW	3SW	4SW	Previous spawner	Escaped salmon
Sør-Varanger	1861 (45)	1815 (43)	287 (6)	7 (<1)	121 (2)	119 (3)
Vadsø-Nesseby	930 (47)	807 (40)	141 (7)	7 (<1)	64 (3)	47 (2)
Tana	1657 (60)	786 (28)	192 (6)		142 (5)	7 (<1)
Gamvik, Berlevåg	264 (35)	388 (52)	58 (8)	7 (<1)	29 (3)	9 (1)
Lebesby	886 (47)	637 (34)	141 (7)	20 (1)	95 (4)	132 (7)
Porsanger	701 (46)	411 (27)	295 (20)	27 (2)	65 (4)	12 (<1)
Hammerfest et al.	1517 (33)	1534 (34)	699 (15)	70 (1)	150 (3)	594 (14)
Alta	1080 (26)	912 (23)	1536 (38)	246 (6)	208 (5)	68 (2)
Loppa-Hasvik	660 (32)	829 (41)	416 (20)	33 (2)	61 (3)	46 (2)
North Troms	488 (49)	227 (23)	139 (14)	19 (2)	17 (1)	97 (11)
South Troms	1905 (57)	565 (16)	270 (7)	8 (<1)	56 (1)	577 (18)
Nordland	175 (30)	81 (14)	67 (12)		4 (<1)	255 (44)

Table V. Weights and percentages (in parentheses) of wild 1-4SW salmon, previous spawners and escaped salmon caught within each municipality in Finnmark and in North Troms, South Troms and Nordland in Kolarctic salmon project area in the year 2011 during the ordinary fishing time. Numbers of salmon are converted from the official catch information (SSB, Statistics Norway) into sea-age groups of salmon.

Year 2011	1SW	2SW	3SW	4SW	Previous spawner	Escaped salmon
Sør-Varanger	3834 (23)	7898 (49)	3266 (20)	208 (1)	708 (4)	512 (3)
Vadsø-Nesseby	857 (13)	2668 (43)	1615 (26)		285 (5)	836 (13)
Tana	1550 (18)	3302 (40)	2176 (25)	85 (1)	1278 (15)	48 (<1)
Gamvik, Berlevåg	688 (12)	2187 (41)	1825 (34)	79 (1)	391 (7)	265 (5)
Lebesby	2736 (25)	4201 (39)	1667 (15)		411 (4)	1842 (17)
Porsanger	547 (8)	2626 (39)	877 (14)	264 (4)	2216 (33)	145 (2)
Hammerfest et al.	3702 (16)	5739 (27)	5138 (23)	422 (2)	787 (4)	6204 (28)
Alta	3957 (17)	4125 (18)	10522 (47)	1302 (6)	1399 (6)	1246 (6)
Loppa-Hasvik	3417 (18)	4802 (27)	7020 (39)	41 (<1)	1309 (7)	1451 (8)
North Troms	1283 (23)	759 (13)	2075 (36)		342 (6)	1235 (22)
South Troms	4174 (24)	3885 (24)	3948 (23)	483 (3)	470 (3)	3771 (23)
Nordland	117 (3)	1357 (31)	424 (10)		391 (9)	2017 (47)

Table VI. Weights and percentages of wild 1-4SW salmon, previous spawners and escaped salmon caught within each municipality in Finnmark and in North Troms, South Troms and Nordland in Kolarctic salmon project area in the year 2012 during the ordinary fishing time. Numbers of salmon are converted from the official catch information (SSB, Statistics Norway) into sea-age groups of salmon.

Year 2012	1SW	2SW	3SW	4SW	Previous spawner	Escaped salmon
Sør-Varanger	4191 (27)	7629 (49)	2240 (15)	83 (<1)	664 (4)	588 (4)
Vadsø-Nesseby	2056 (28)	3250 (46)	1125 (15)	142 (2)	348 (5)	255 (4)
Tana	3784 (36)	3787 (36)	1603 (15)		1283 (12)	19 (<1)
Gamvik, Berlevåg	605 (20)	1617 (55)	470 (16)	73 (2)	151 (6)	40 (1)
Lebesby	1956 (26)	2751 (37)	1145 (15)	226 (3)	638 (9)	716 (10)
Porsanger	1600 (22)	1864 (26)	2576 (37)	333 (5)	644 (9)	60 (<1)
Hammerfest et al.	3626 (17)	6312 (30)	5856 (27)	882 (4)	962 (5)	3527 (17)
Alta	2832 (10)	5460 (19)	14280 (51)	2799 (11)	2286 (8)	397 (1)
Loppa-Hasvik	1657 (15)	3871 (37)	3798 (36)	415 (4)	494 (5)	359 (3)
North Troms	1251 (28)	1136 (26)	1212 (27)	247 (6)	82 (2)	507 (11)
South Troms	4767 (37)	2651 (20)	2340 (17)	90 (<1)	306 (2)	3038 (23)
Nordland	480 (21)	318 (14)	538 (23)		30 (1)	960 (41)

In the following figures 3, 6, 9, 12, 15, 18, 21, 24, 27, 30, 33 and 36 weekly official reported catch data (SSB) divided into three size groups in terms of numbers and weights during the ordinary fishing time for each municipality or groups of municipalities is presented. In those figures we also present the corresponding converted weekly numbers of 1SW, 2SW, 3SW, 4SW salmon, previous spawners and escaped salmon.

Results from the Kolarctic project research fishing in each municipality or groups of municipalities can be seen in the figures 4, 7, 10, 13, 16, 19, 22, 25, 28, 31, 34, and 37. Figures include catch data for the time period from June 1st to August 4th. Catch data is presented for each fishing date and also for weekly total catches. The main output from these figures is to observe;

- how precisely Kolarctic sampling is covering the period of official fishing period
- the timing of 1SW, 2SW, 3SW, 4SW salmon, previous spawners and escaped salmon in the catches during June, July and early August
- how sea-age distributions are changing during the summer
- figures demonstrate clearly migratory patterns indicating the period when each sea-age group of salmon is available for fishery in each municipality

Figures 5, 8, 11, 14, 17, 20, 23, 26, 29, 32, 35, and 38 illustrate weekly proportions of five sea-age groups of wild salmon and escaped salmon within each size groups. Although 1SW salmon is dominating in the size group of salmon below 3 kilos, 2SW salmon is dominating in salmon between 3 and 7 kilos and 3SW salmon is dominating in salmon above 7 kilos there is large weekly overlapping within each sea-age groups. The proportions of 1SW salmon increased in the size group of 3-7 kg salmon towards the end of the season in all areas. That indicates late migration for those salmon which have spent a longer time during their second year at sea and they have therefore exceeded the weight of 3 kilos. Some of the first 2SW salmon caught at sea early in June were weight less than 3 kilos but some weeks later in June almost all 2SW salmon had reached the size of 3 kilos and therefore the second size group from 3 to 7 kilos. Some 2SW salmon ascended into the coastal areas later in the summer and after having some additional growth during their third summer at sea they exceeded the weight of 7 kilos. The basic weekly percentage data presented in the figures 5, 8, 11, 14, 17, 20, 23, 26, 29, 32, 35, and 38 was used when converting the weekly SSB data to real numbers and weights of 1SW, 2SW, 3SW, 4SW salmon, previous spawners and escaped salmon.

3.2.1 Sør-Varanger municipality

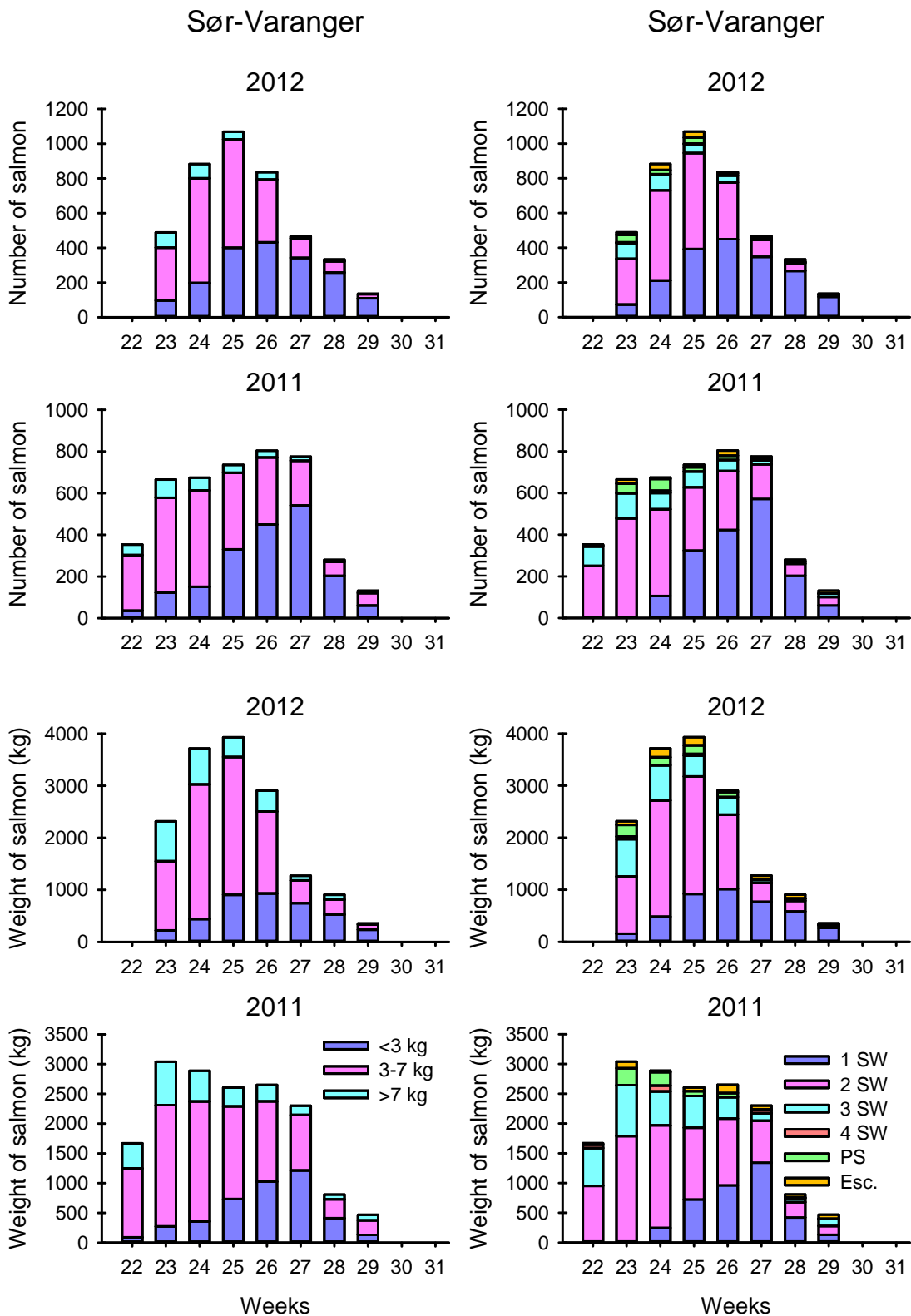


Figure 3. SSB catch data (SSB, Statistics Norway) and size groups on the left and catch data converted into sea-age groups of salmon on the right only for the official fishing time in Sør-Varanger municipality in 2011 and 2012.

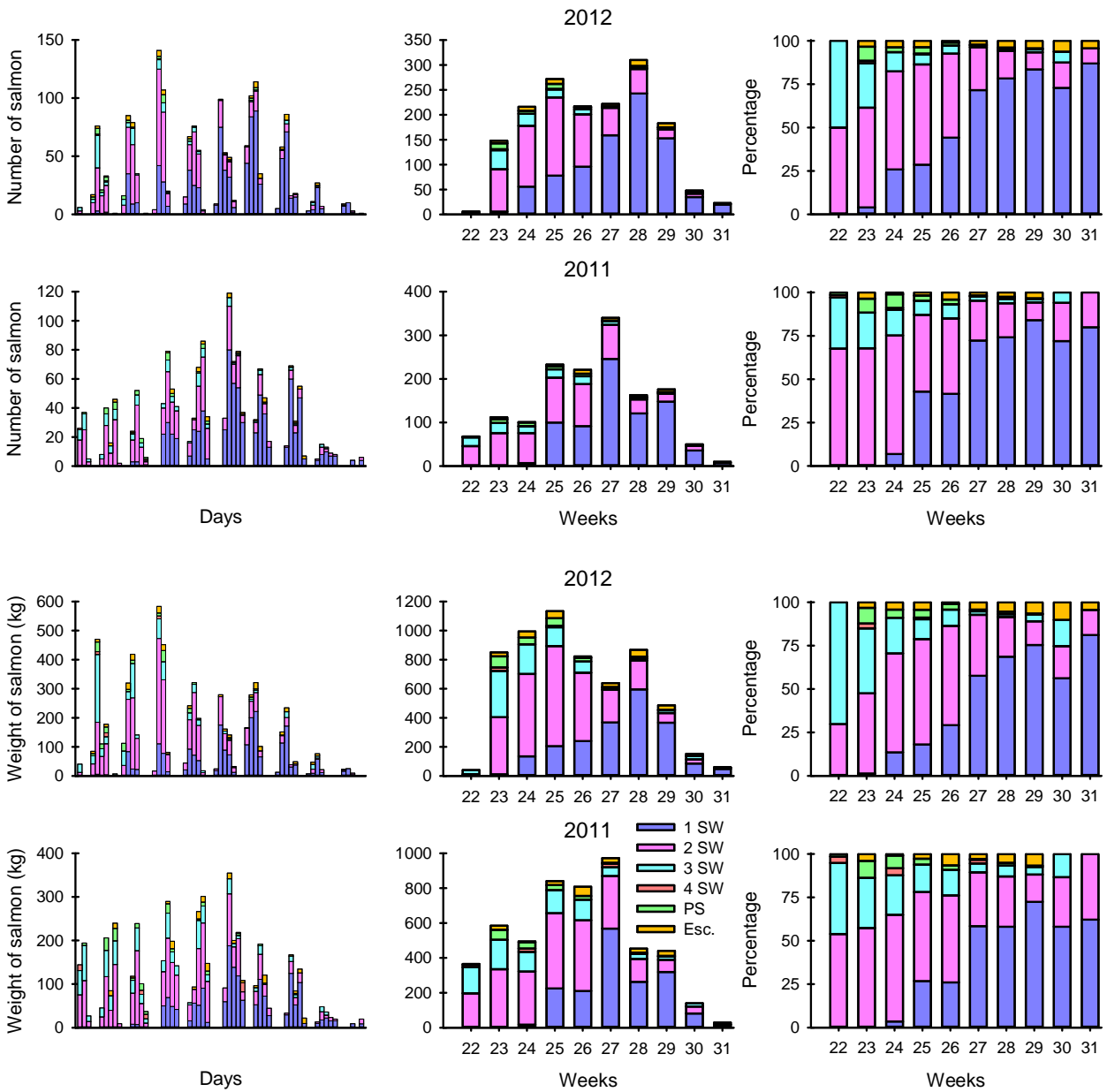


Figure 4. Numbers and weights of daily (figure on the left) and weekly (figure in the middle) scale samples of different sea-age groups of salmon in the catches for Sør-Varanger fishermen. Figure on the right illustrates weekly changes in the sea-age distribution from the beginning of June to August 4.

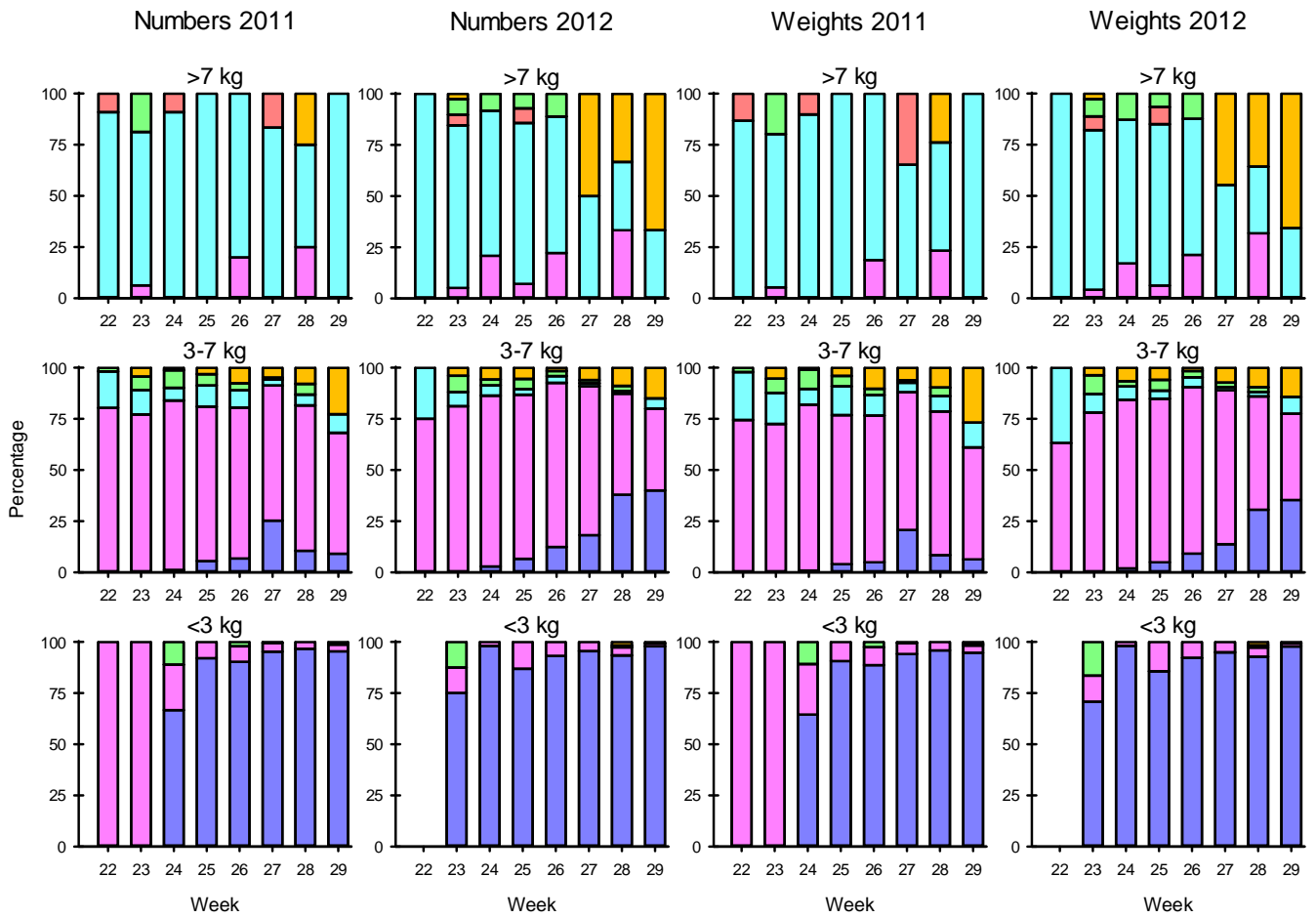


Figure 5. Sea-age distributions throughout the summer in three size groups of salmon in terms of numbers and weights in the catches for Sør-Varanger fishermen in the years 2011 and 2012.

3.2.2 Vadsø and Nesseby municipalities

Vadsø and Nesseby

Vadsø and Nesseby

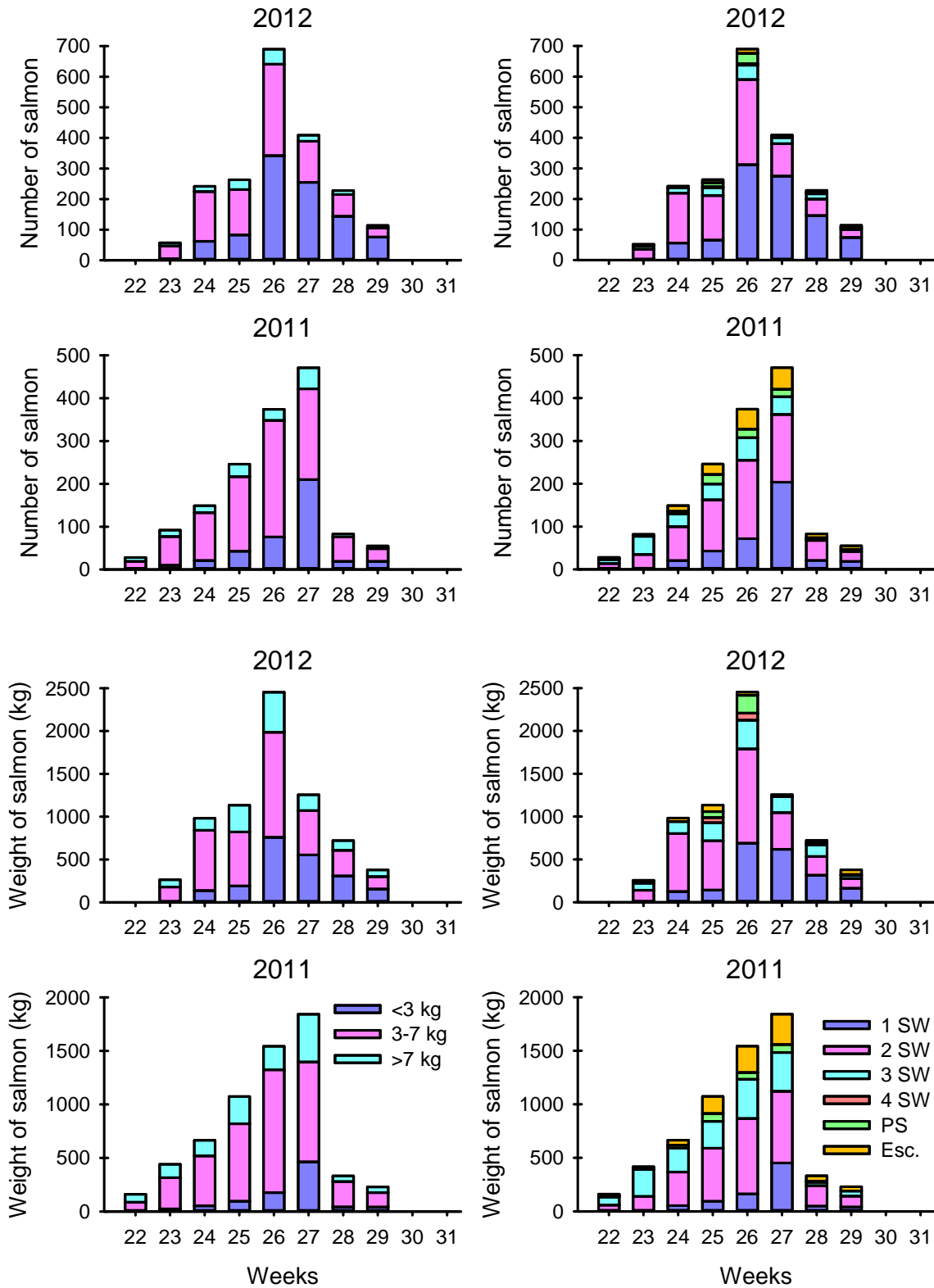


Figure 6. SSB catch data and size groups on the left and catch data converted into sea-age groups of salmon on the right only for the official fishing time in Vadsø and Nesseby municipalities in 2011 and 2012.

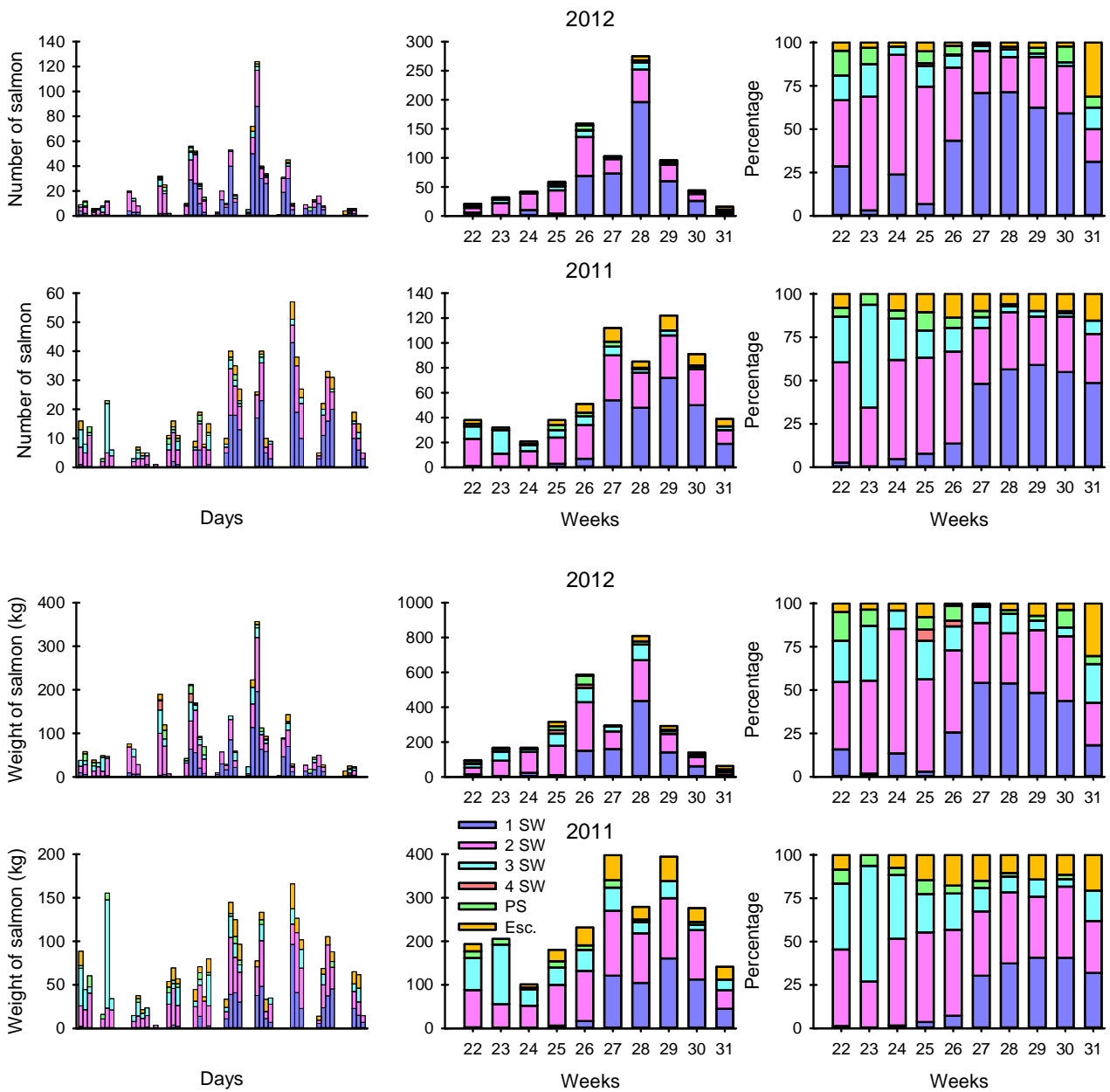


Figure 7. Numbers and weights of daily (figure on the left) and weekly (figure in the middle) scale samples of different sea-age groups of salmon in the catches for Vadsø and Nesseby fishermen. Figure on the right illustrates weekly changes in the sea-age distribution from the beginning of June to August 4th.

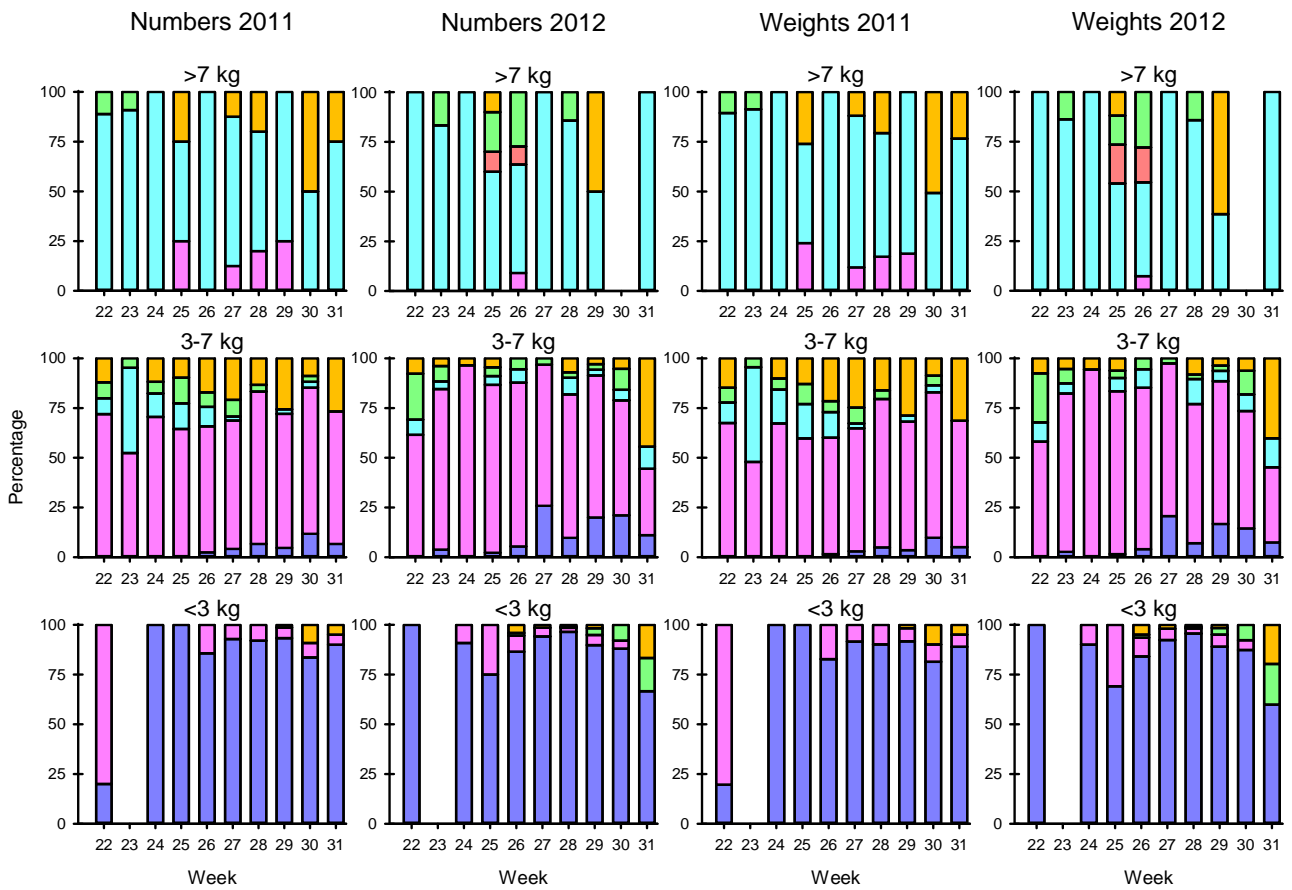


Figure 8. Sea-age distributions through the summer in three size groups of salmon in terms of numbers and weights in the catches for Vadsø and Nesseby fishermen in the years 2011 and 2012.

3.2.3 Gamvik, Berlevåg, Båtsfjord and Vardø municipalities

Gamvik, Berlevåg and Båtsfjord

Gamvik, Berlevåg and Båtsfjord

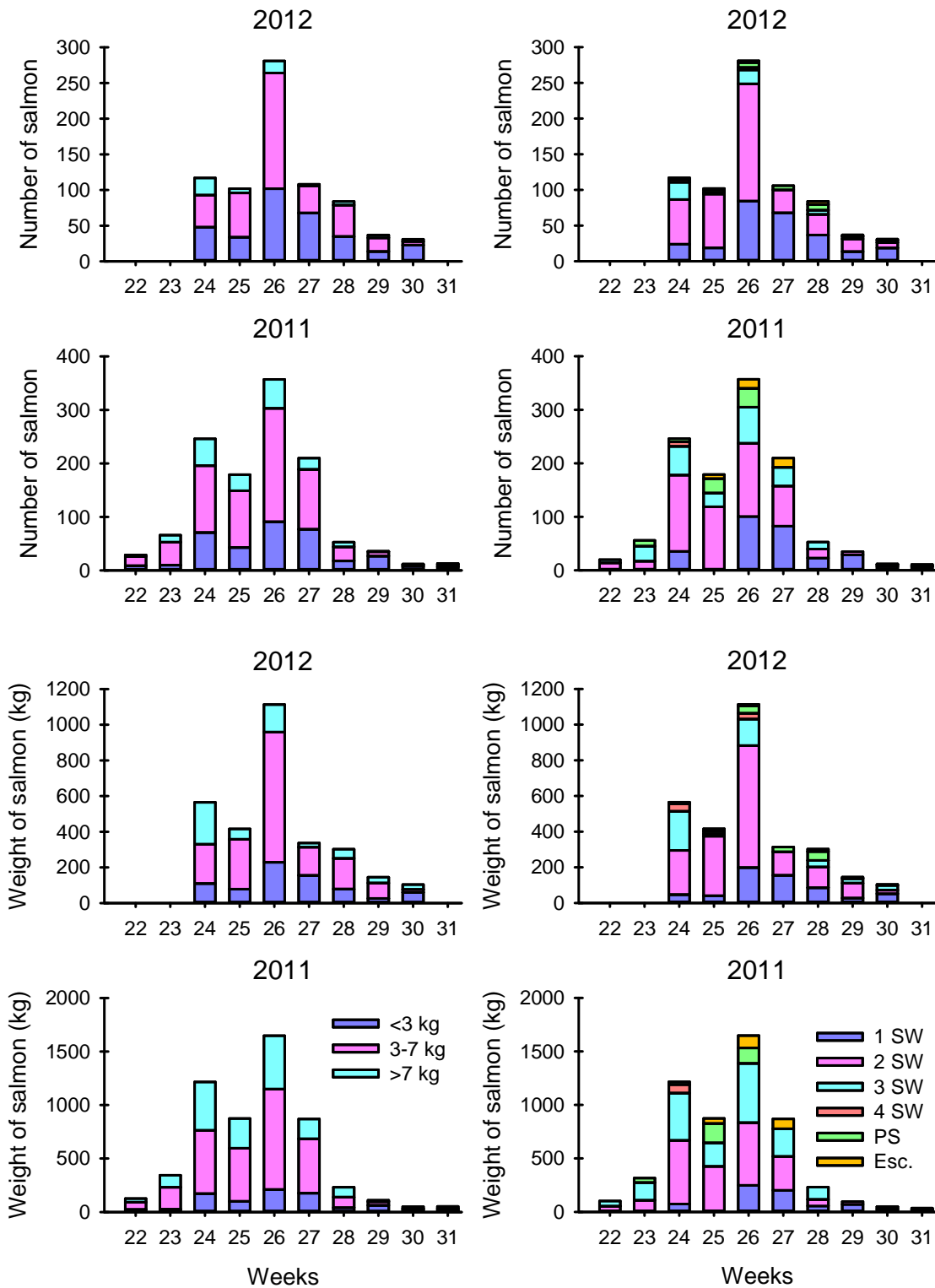


Figure 9. SSB catch data and size groups on the left and catch data converted into sea-age groups of salmon on the right only for the official fishing time in Gamvik, Berlevåg, Båtsfjord and Vardø municipalities in 2011 and 2012.

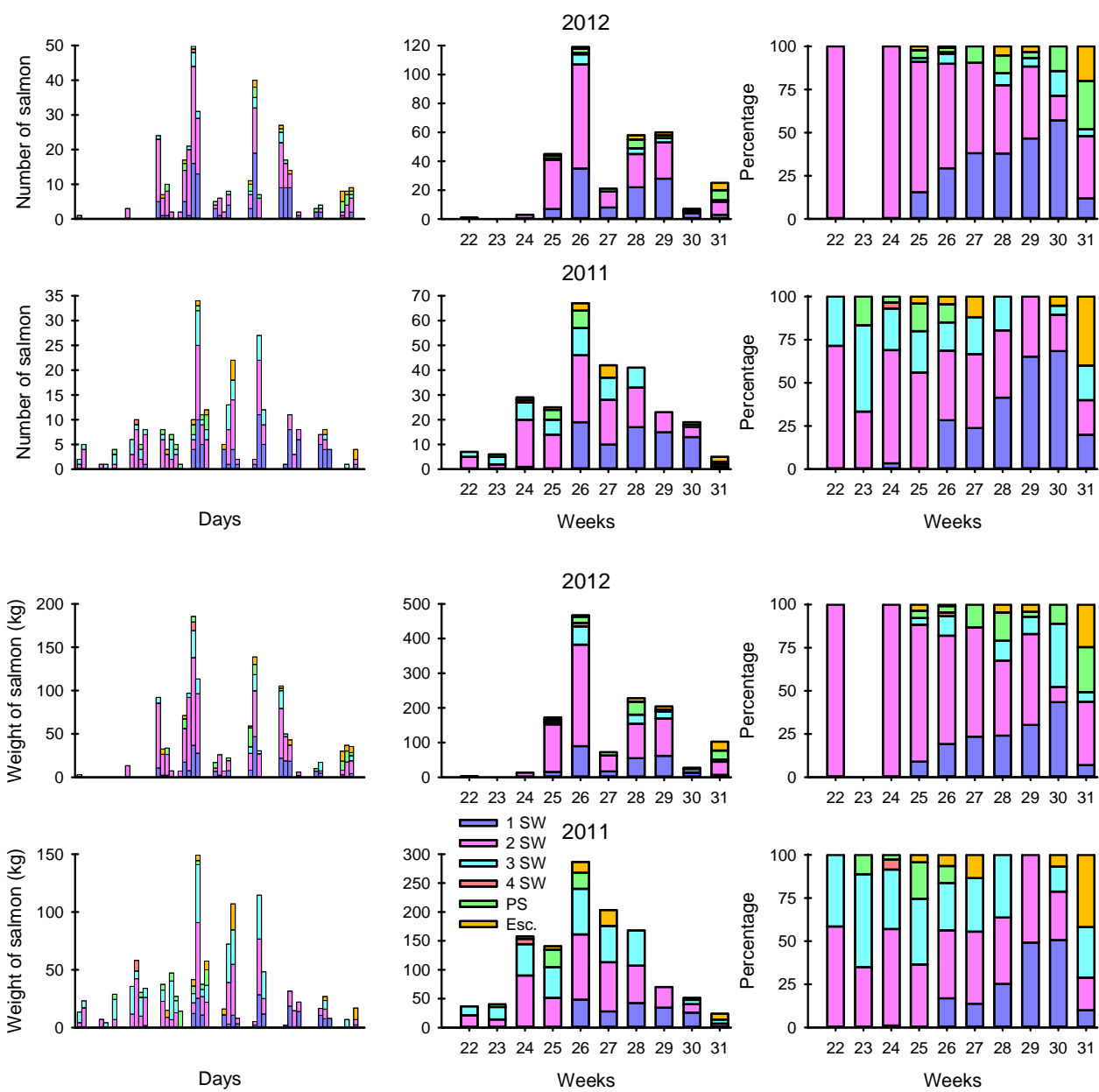


Figure 10. Numbers and weights of daily (figure on the left) and weekly (figure in the middle) scale samples of different sea-age groups of salmon in the catches for Gamvik, Berlevåg, Båtsfjord and Vardø fishermen. Figure on the right illustrates weekly changes in the sea-age distribution from the beginning of June to August 4th.

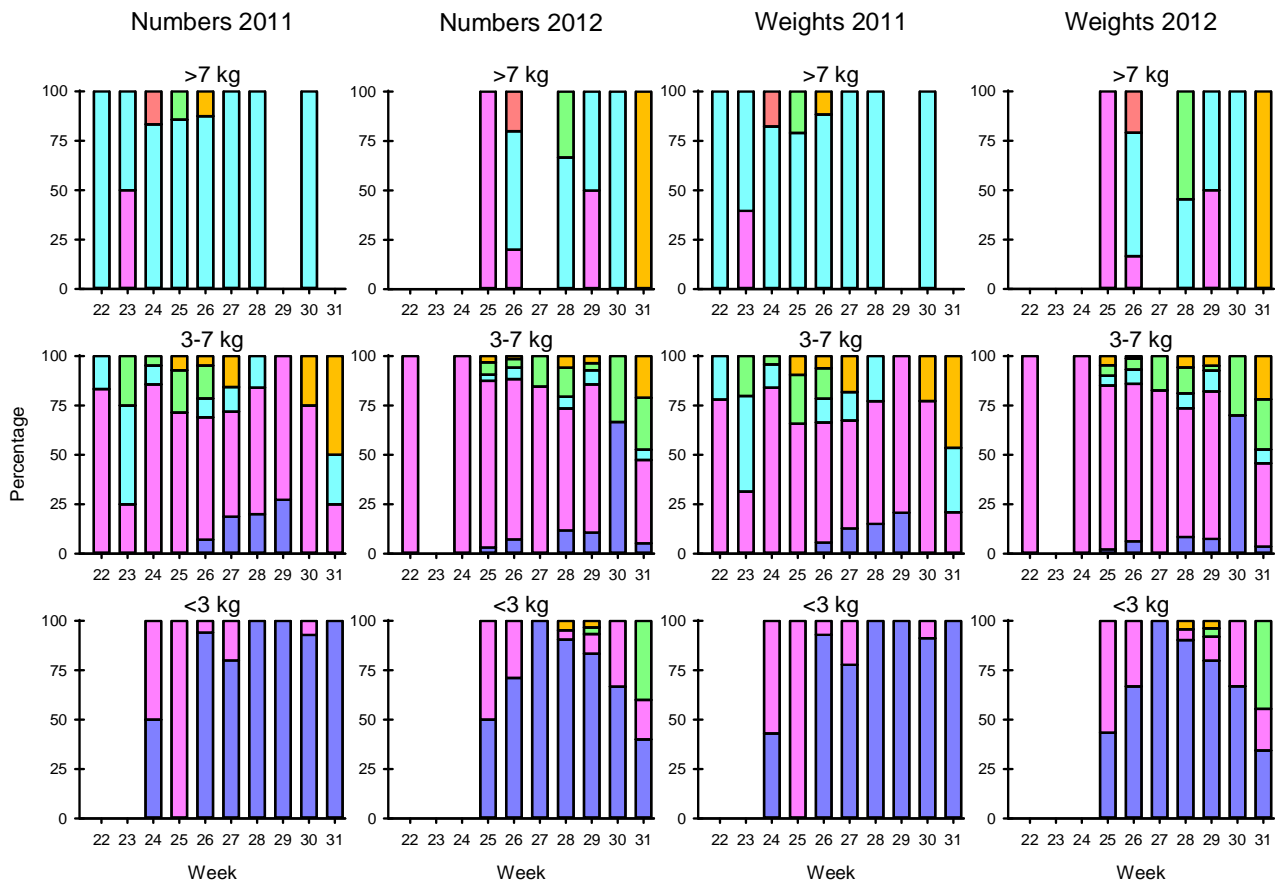


Figure 11. Sea-age distributions through the summer in three size groups of salmon in terms of numbers and weights in the catches for Gamvik, Berlevåg, Båtsfjord and Vardø fishermen in the years 2011 and 2012.

3.2.4 Tana municipality

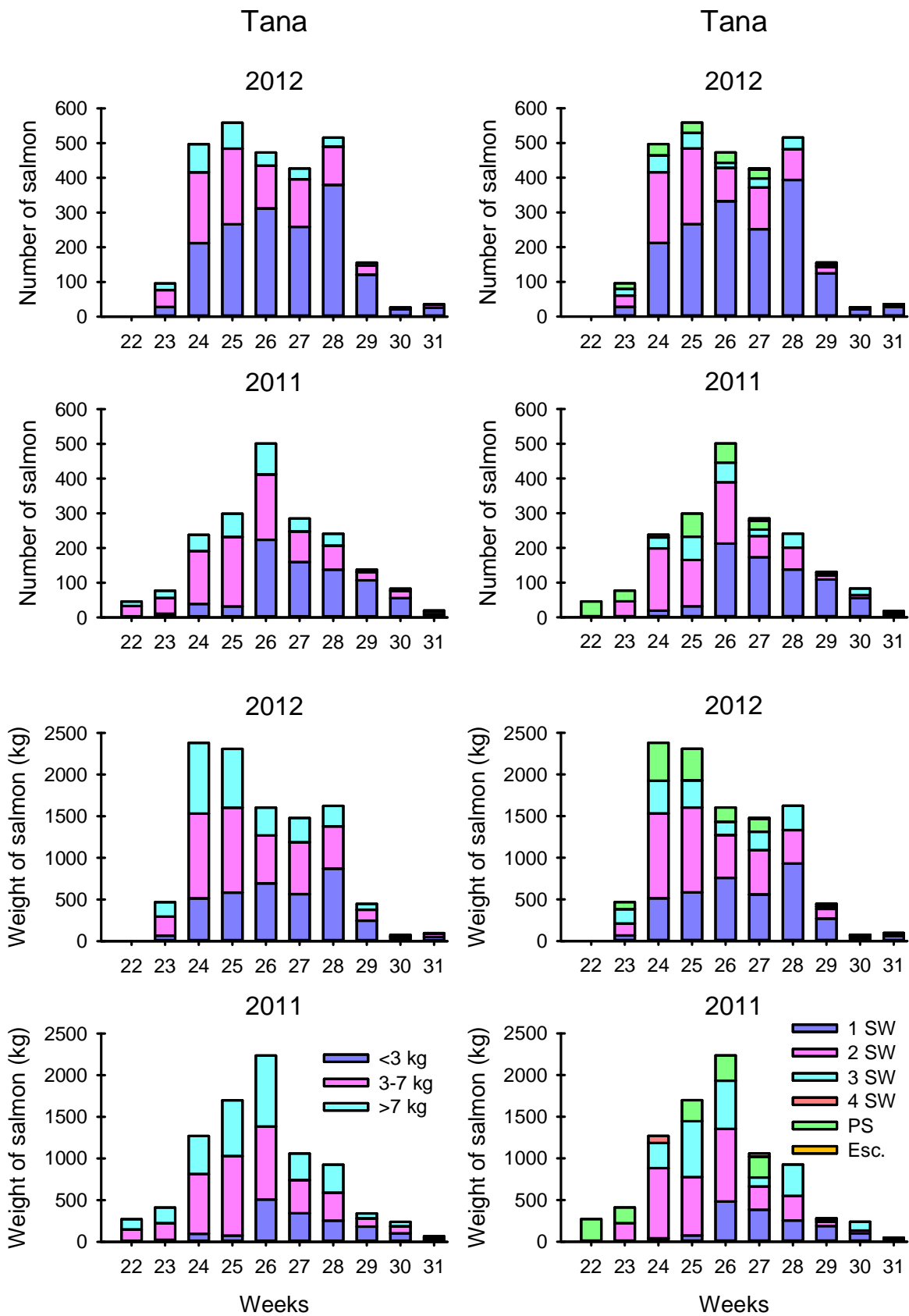


Figure 12. SSB catch data and size groups on the left and catch data converted into sea-age groups of salmon on the right only for the official fishing time in Tana municipality in 2011 and 2012.

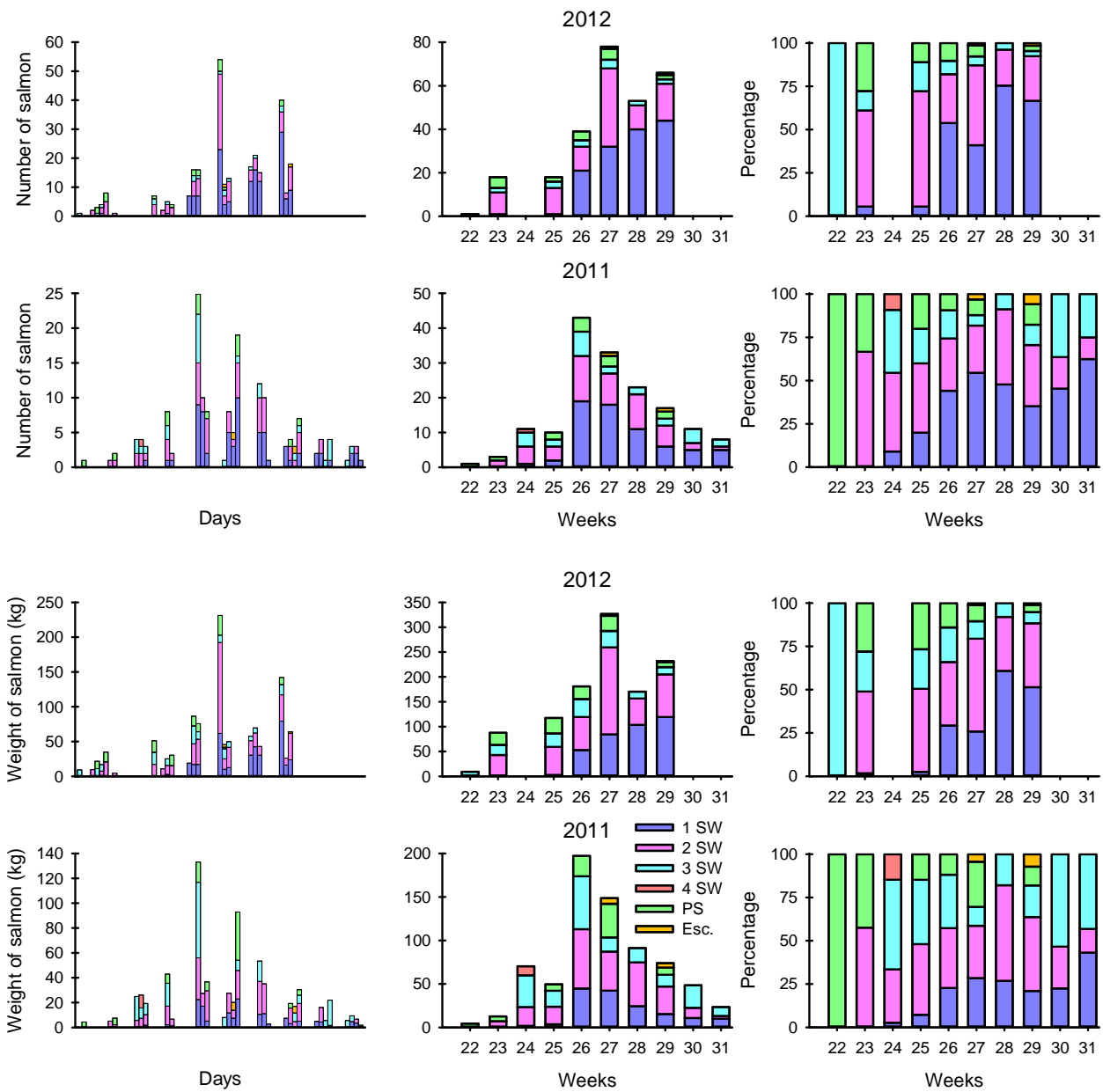


Figure 13. Numbers and weights of daily (figure on the left) and weekly (figure in the middle) scale samples of different sea-age groups of salmon in the catches for Tana fishermen. Figure on the right illustrates weekly changes in the sea-age distribution from the beginning of June to August 4th.

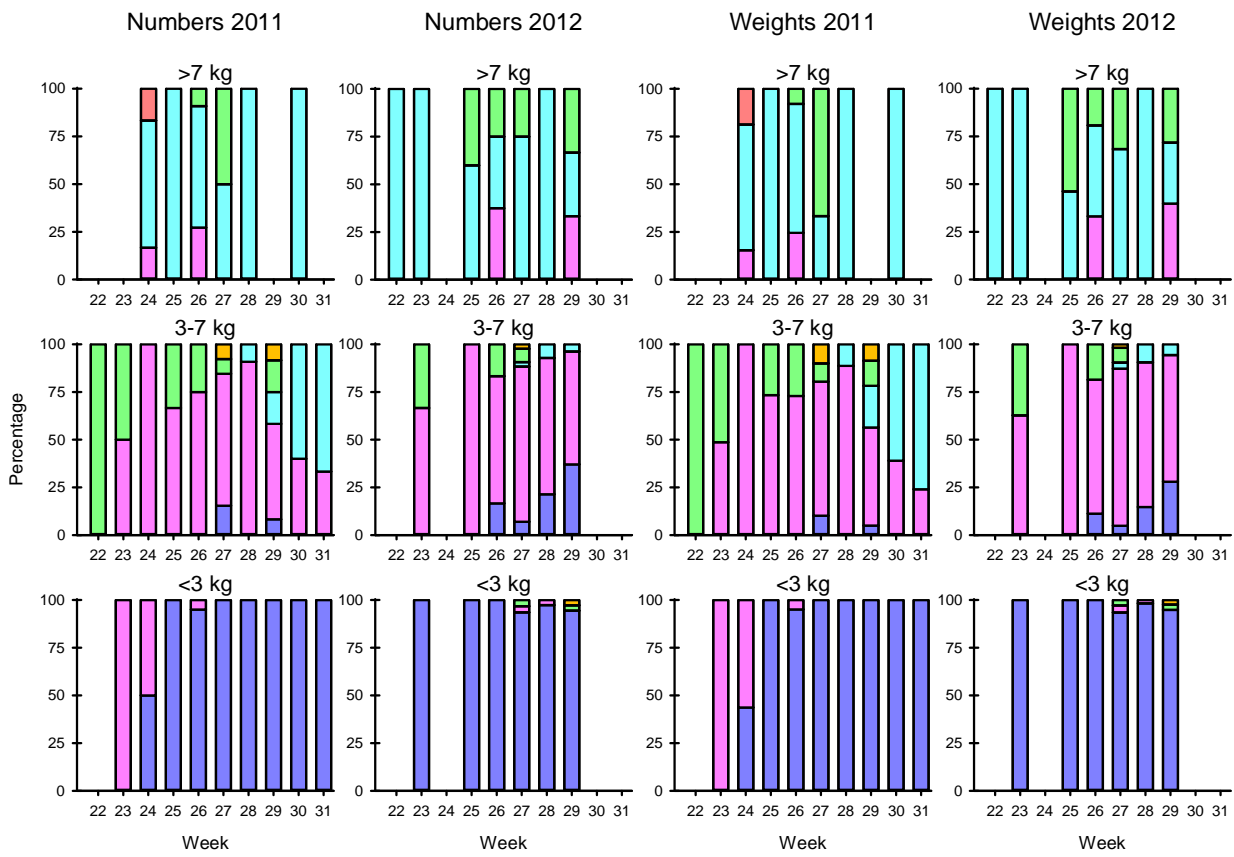


Figure 14. Sea-age distributions through the summer in three size groups of salmon in terms of numbers and weights in the catches for Tana fishermen in the years 2011 and 2012.

3.2.5 Lebesby municipality

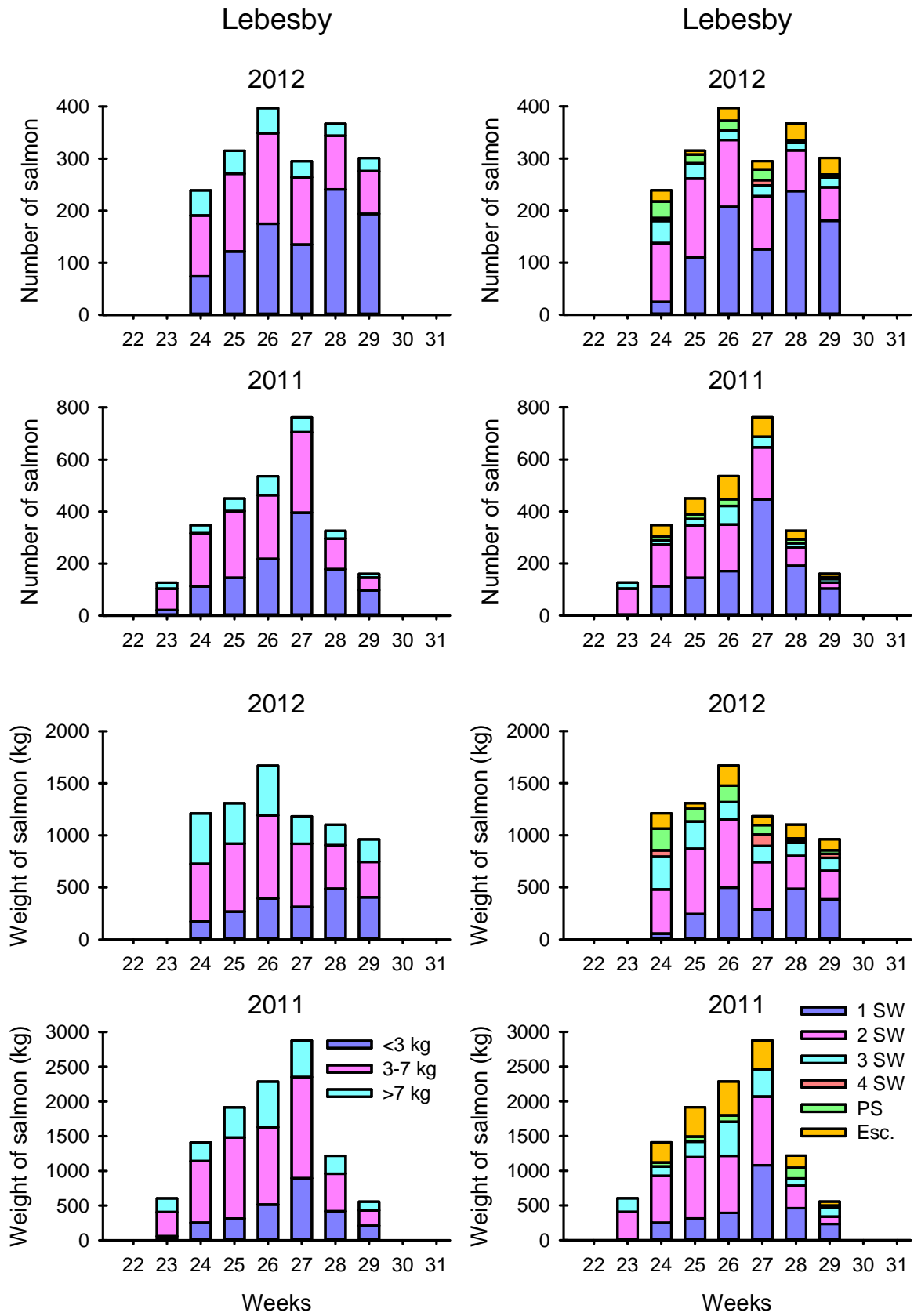


Figure 15. SSB catch data and size groups on the left and catch data converted into sea-age groups of salmon on the right only for the official fishing time in Lebesby municipality in 2011 and 2012.

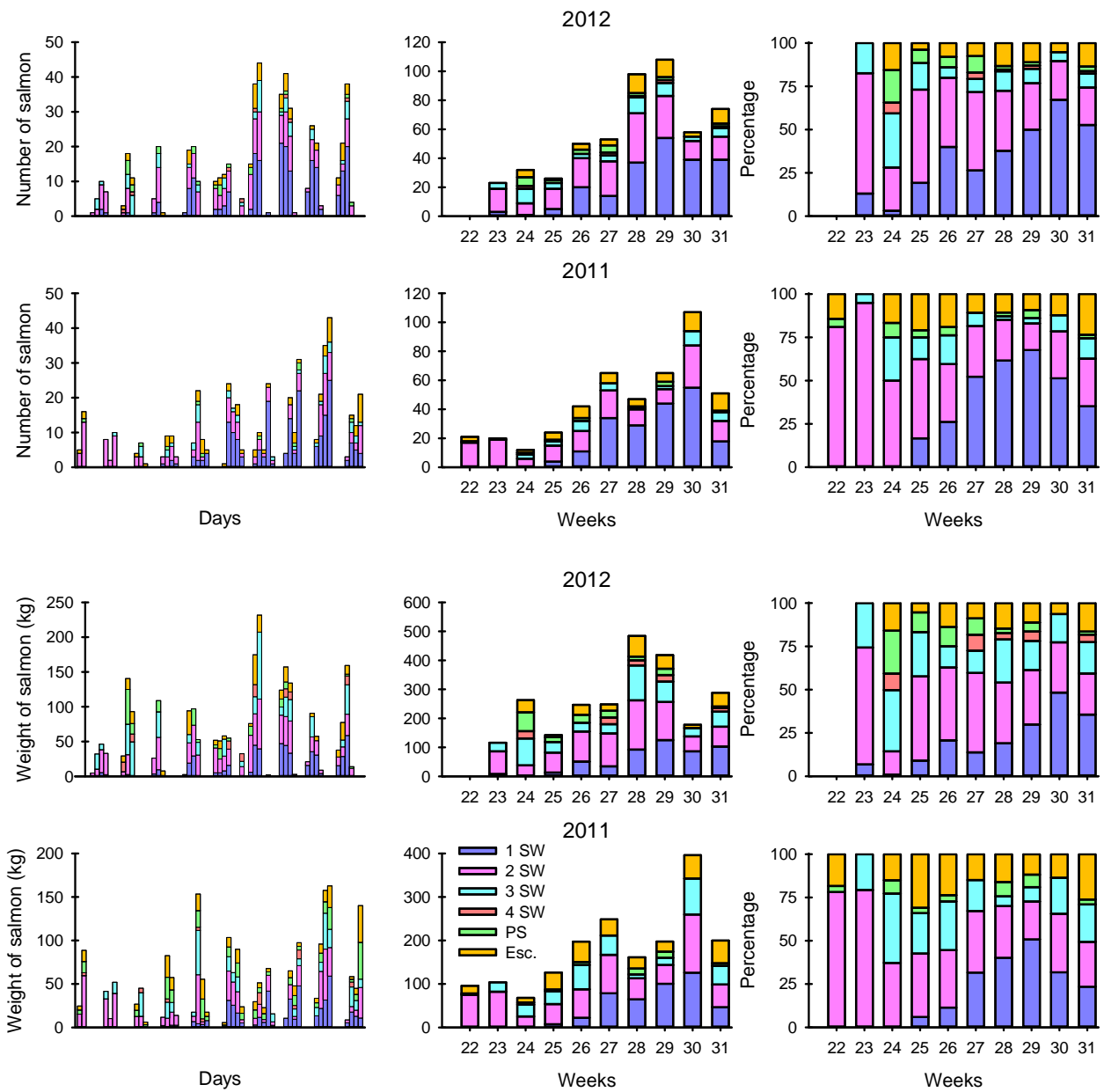


Figure 16. Numbers and weights of daily (figure on the left) and weekly (figure in the middle) scale samples of different sea-age groups of salmon in the catches for Lebesby fishermen. Figure on the right illustrates weekly changes in the sea-age distribution from the beginning of June to August 4th.

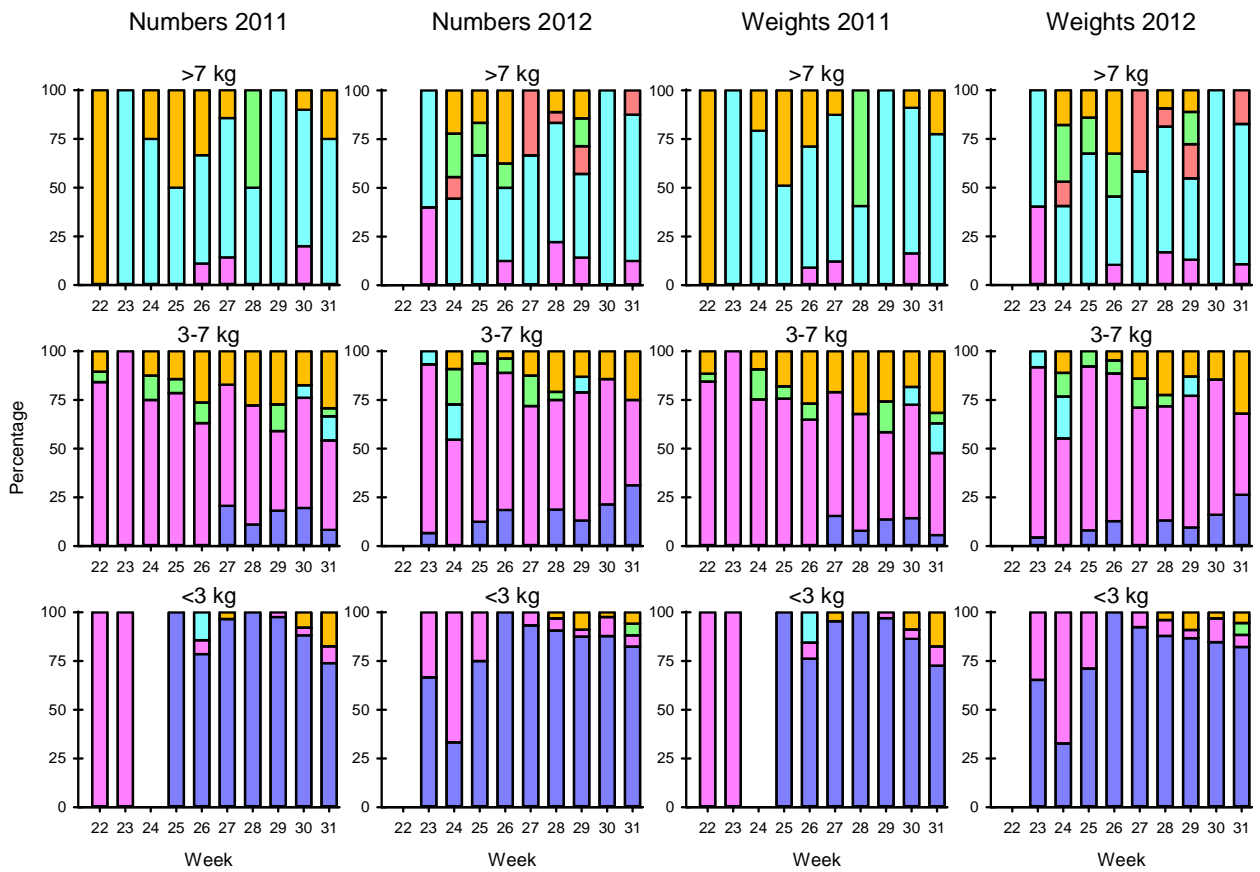


Figure 17. Sea-age distributions through the summer in three size groups of salmon in terms of numbers and weights in the catches for Lebesby fishermen in the years 2011 and 2012.

3.2.6 Porsanger municipality

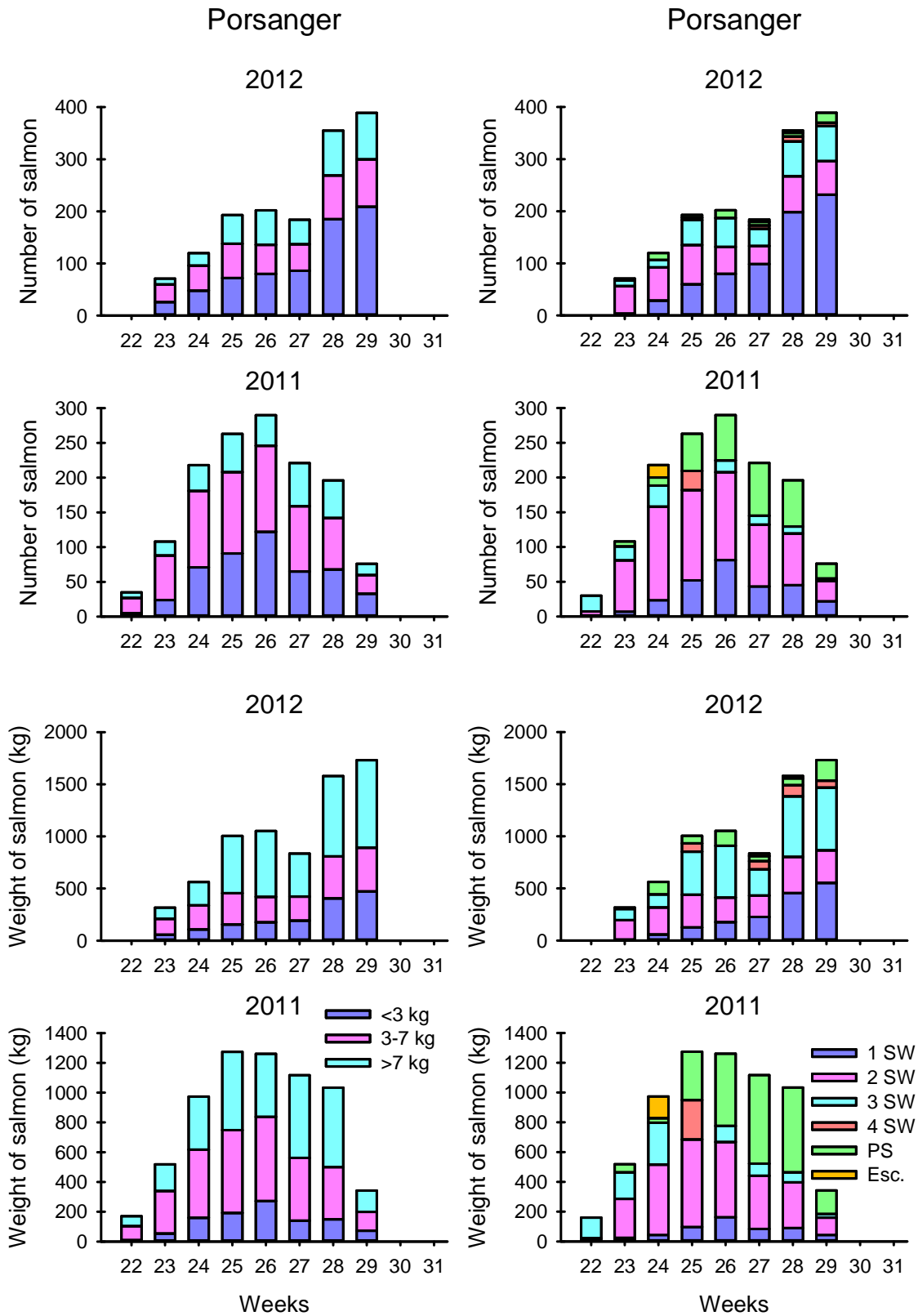


Figure 18. SSB catch data and size groups on the left and catch data converted into sea-age groups of salmon on the right only for the official fishing time in Porsanger municipality in 2011 and 2012.

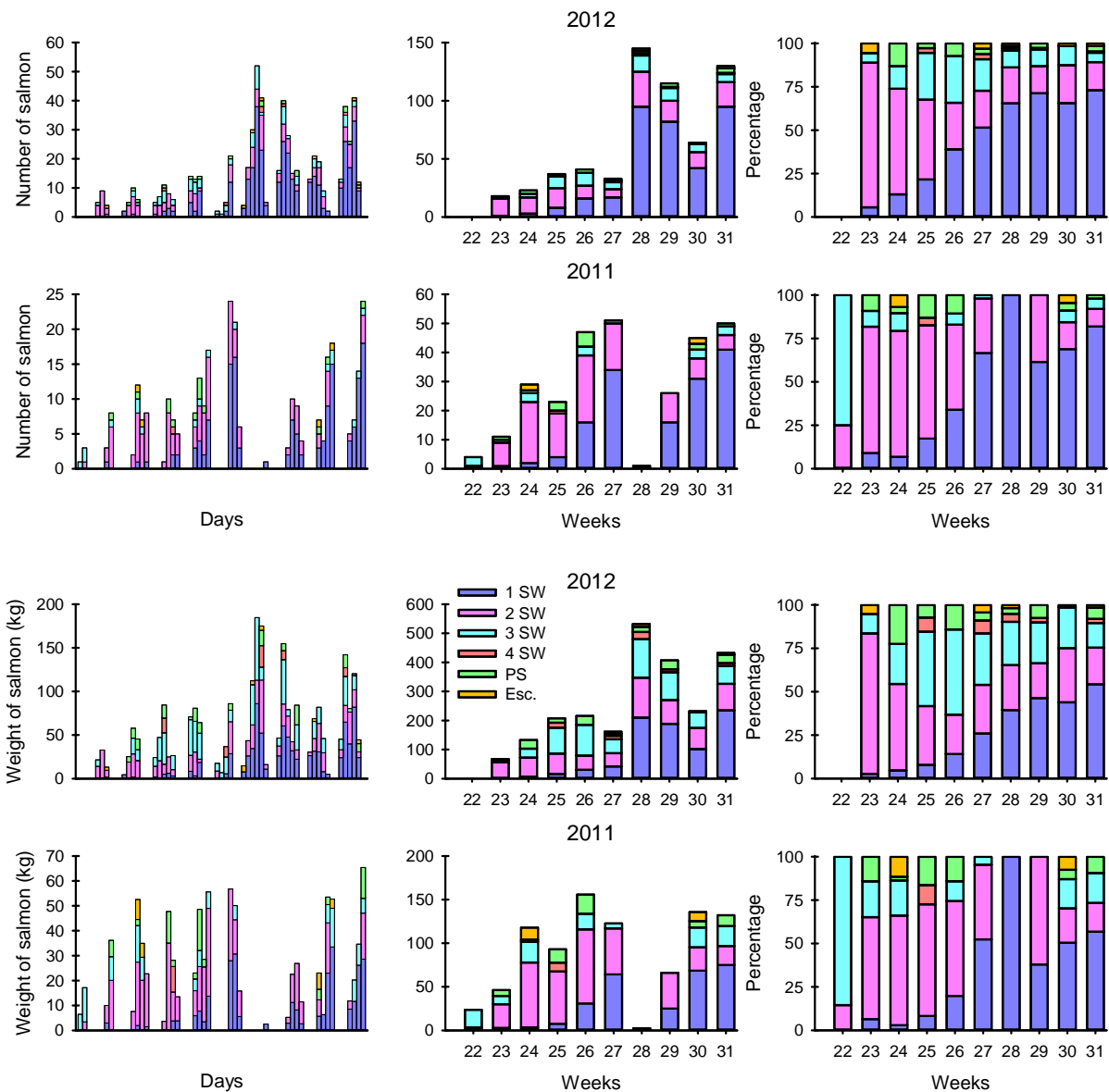


Figure 19. Numbers and weights of daily (figure on the left) and weekly (figure in the middle) scale samples of different sea-age groups of salmon in the catches for Porsanger fishermen. Figure on the right illustrates weekly changes in the sea-age distribution from the beginning of June to August 4th.

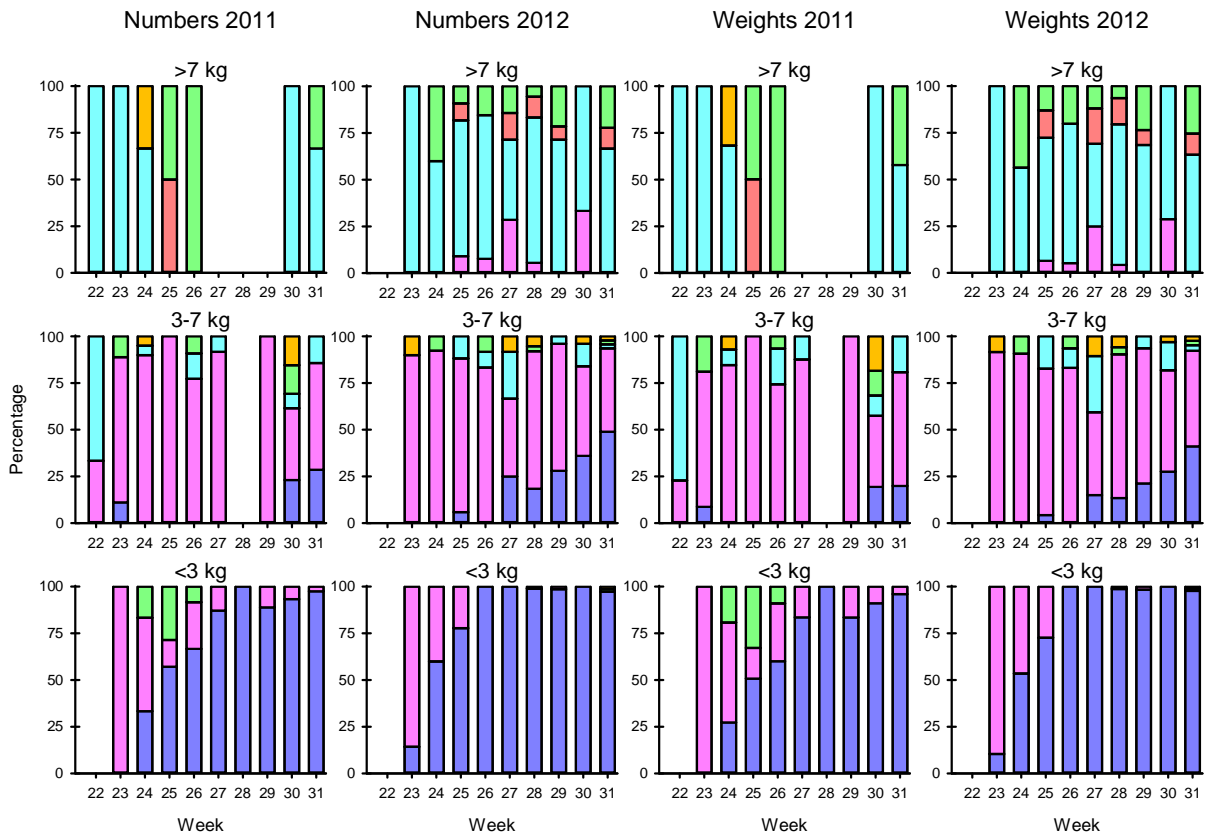


Figure 20. Sea-age distributions through the summer in three size groups of salmon in terms of numbers and weights in the catches for Porsanger fishermen in the years 2011 and 2012.

3.2.7 Nordkapp, Kvalsund, Måsøy and Hammerfest municipalities

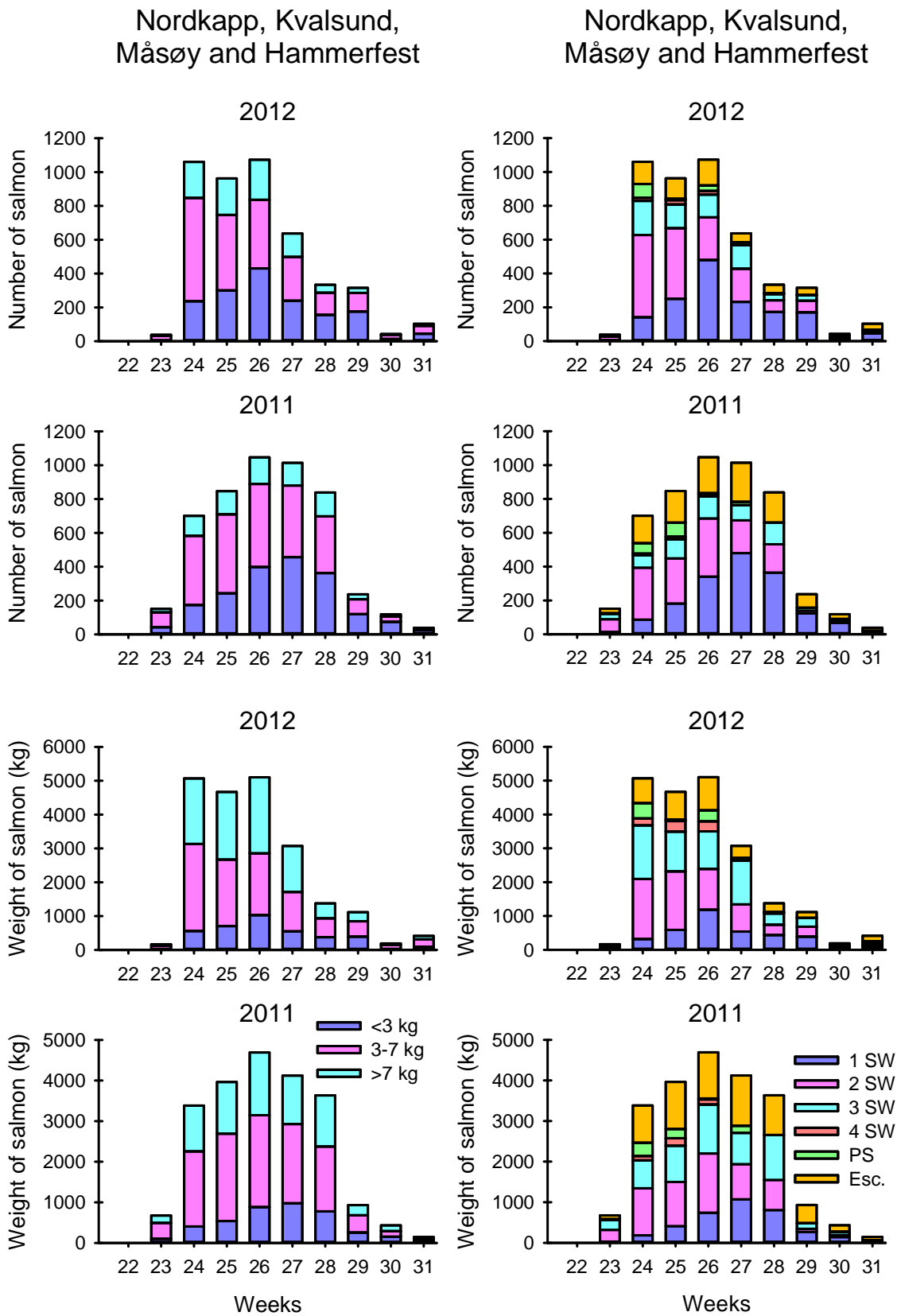


Figure 21. SSB catch data and size groups on the left and catch data converted into sea-age groups of salmon on the right only for the official fishing time in Nordkapp, Kvalsund, Måsøy and Hammerfest municipalities in 2011 and

2012.

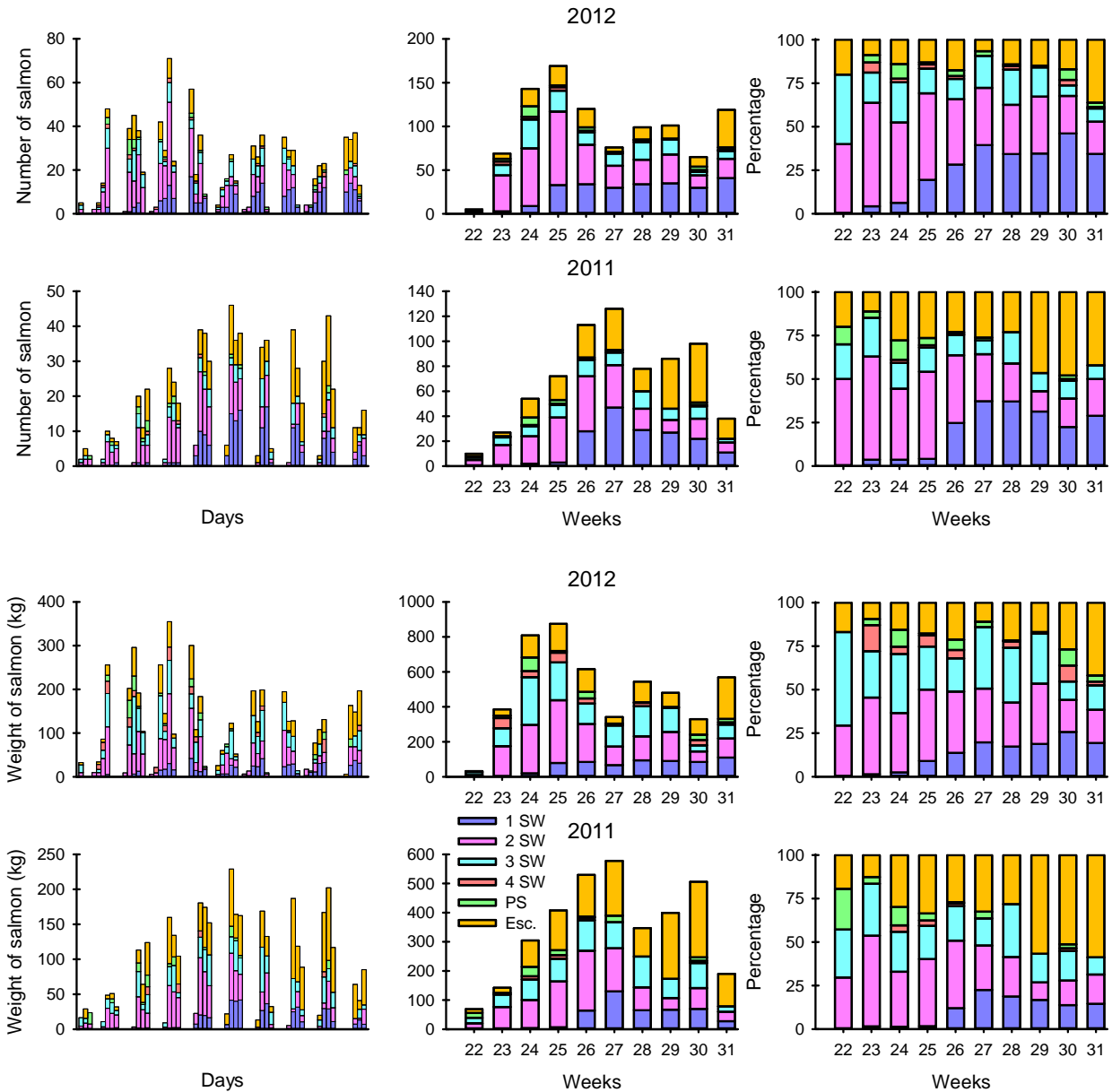


Figure 22. Numbers and weights of daily (figure on the left) and weekly (figure in the middle) scale samples of different sea-age groups of salmon in the catches for Nordkapp, Kvalsund, Måsøy and Hammerfest fishermen. Figure on the right illustrates weekly changes in the sea-age distribution from the beginning of June to August 4th.

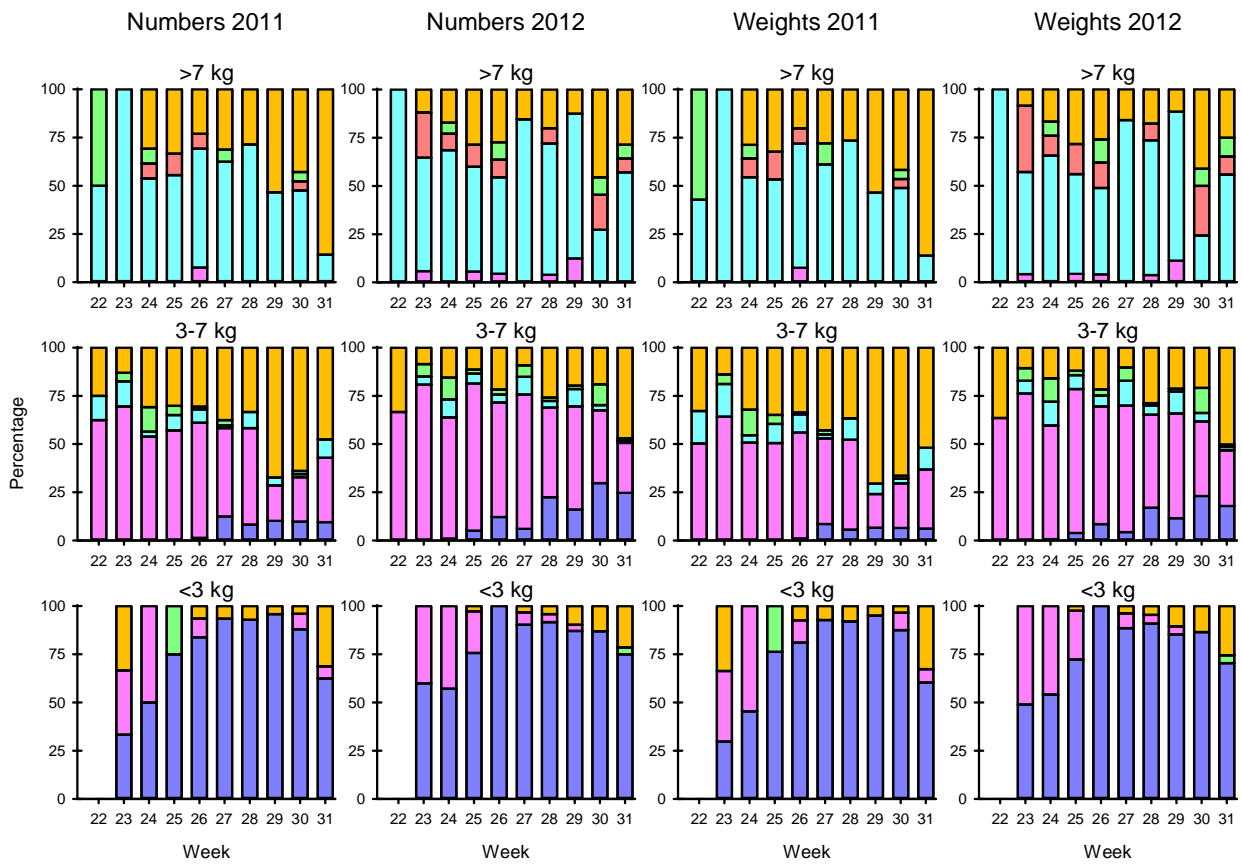


Figure 23. Sea-age distributions through the summer in three size groups of salmon in terms of numbers and weights in the catches for Nordkapp, Kvalsund, Måsøy and Hammerfest fishermen in the years 2011 and 2012.

3.2.8 Alta municipality

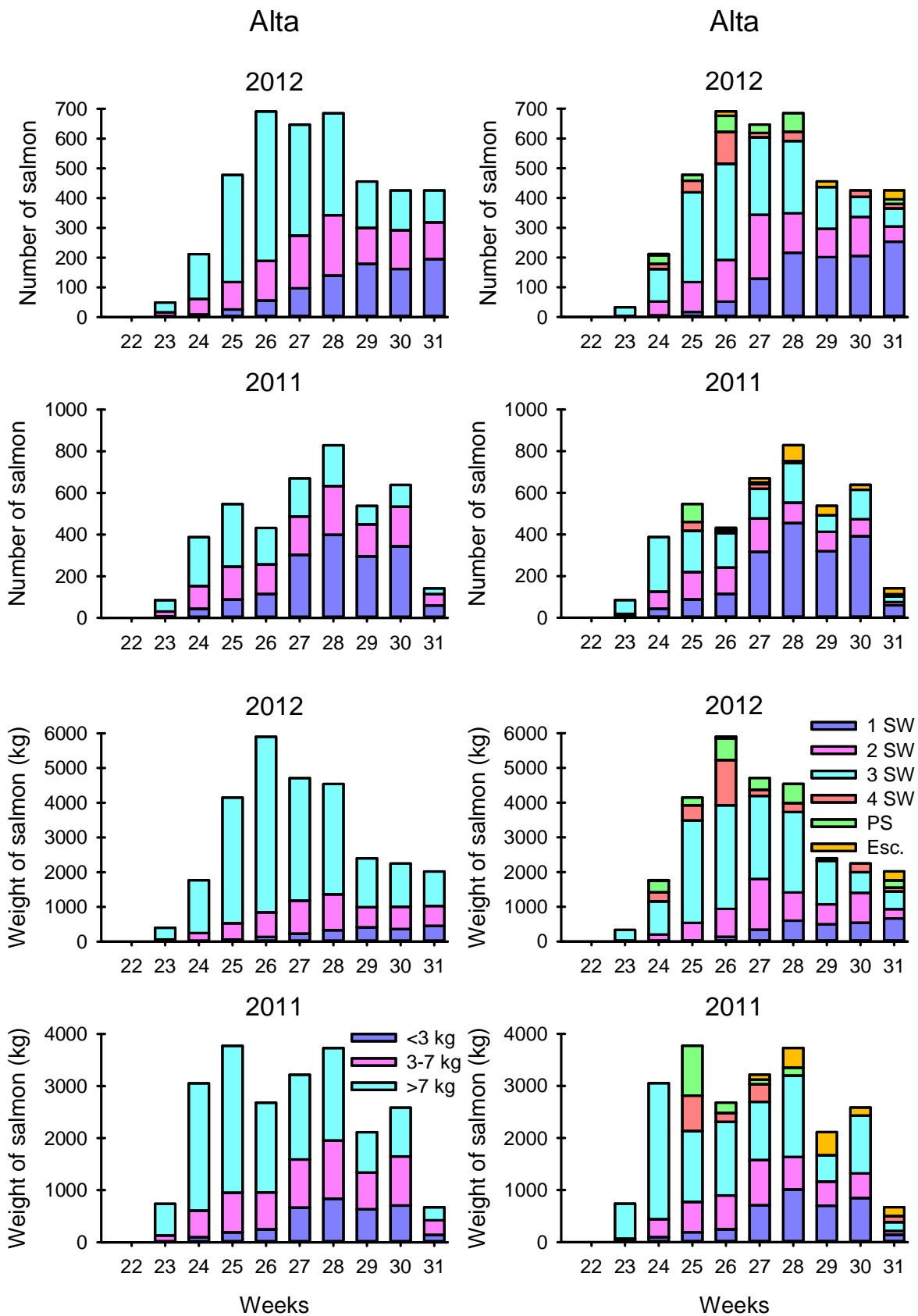


Figure 24. SSB catch data and size groups on the left and catch data converted into sea-age groups of salmon on the right only for the official fishing time in Alta municipality in 2011 and 2012.

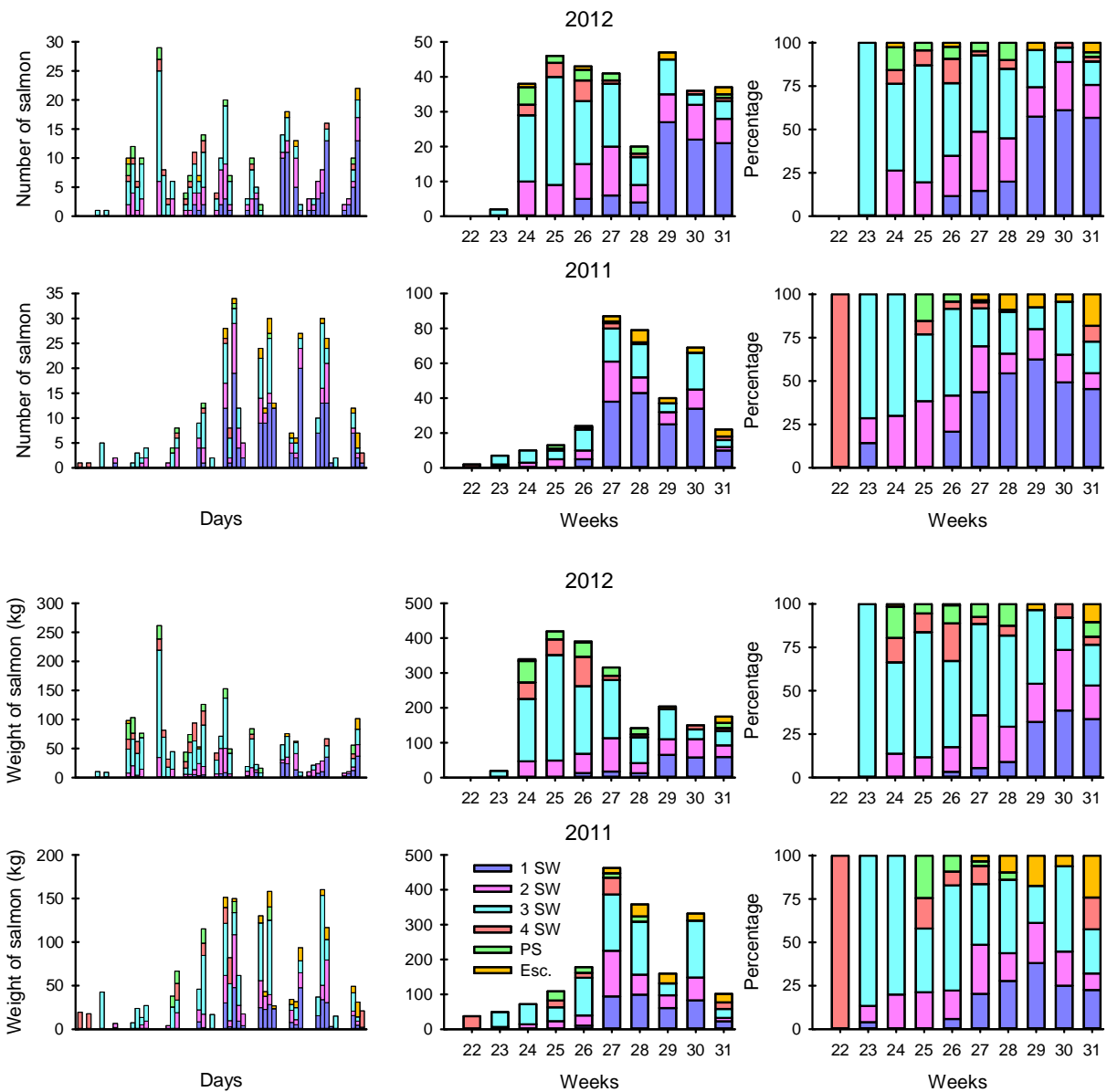


Figure 25. Numbers and weights of daily (figure on the left) and weekly (figure in the middle) scale samples of different sea-age groups of salmon in the catches for Alta fishermen. Figure on the right illustrates weekly changes in the sea-age distribution from the beginning of June to August 4th.

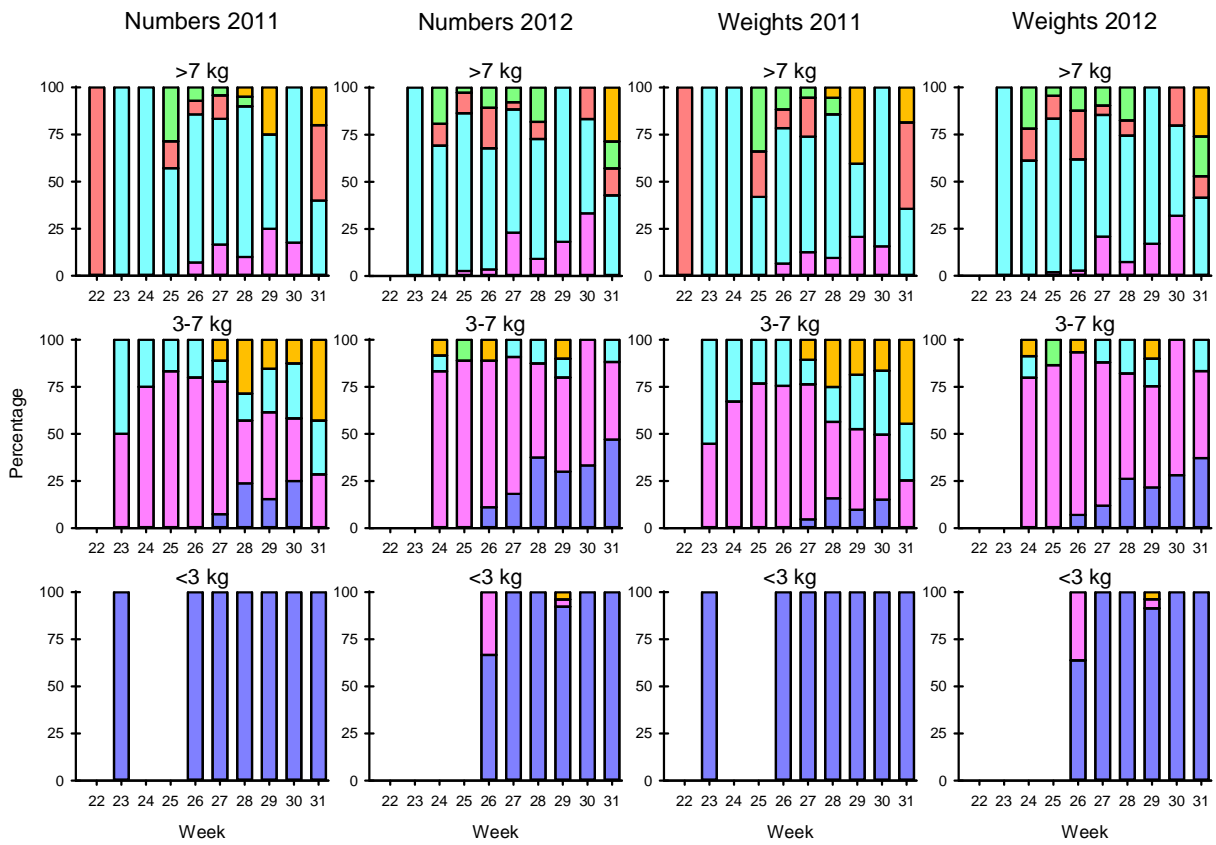


Figure 26. Sea-age distributions through the summer in three size groups of salmon in terms of numbers and weights in the catches for Alta fishermen in the years 2011 and 2012.

3.2.9 Loppa and Hasvik municipalities

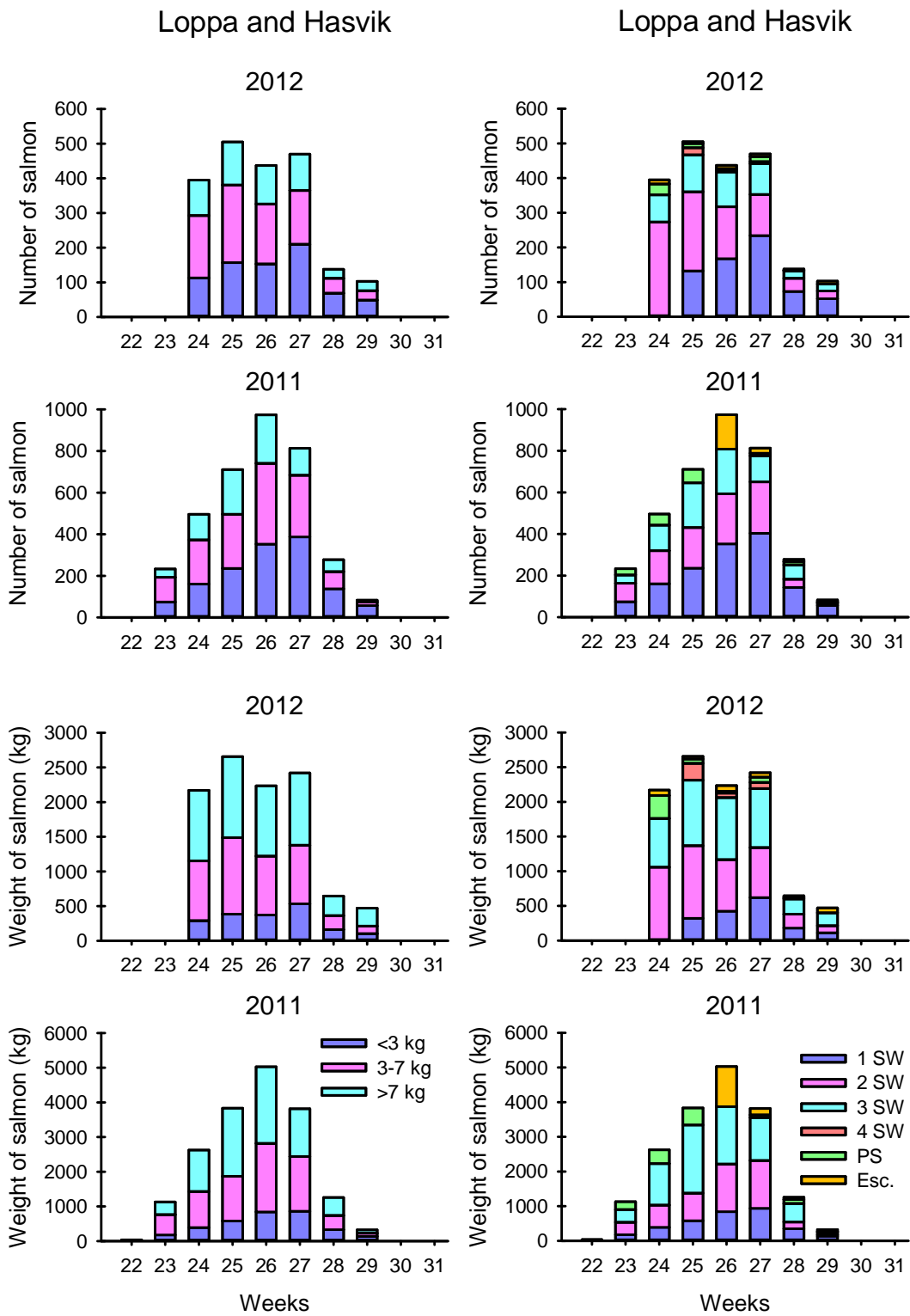


Figure 27. SSB catch data and size groups on the left and catch data converted into sea-age groups of salmon on the right only for the official fishing time in Loppa and Hasvik municipalities in 2011 and

2012.

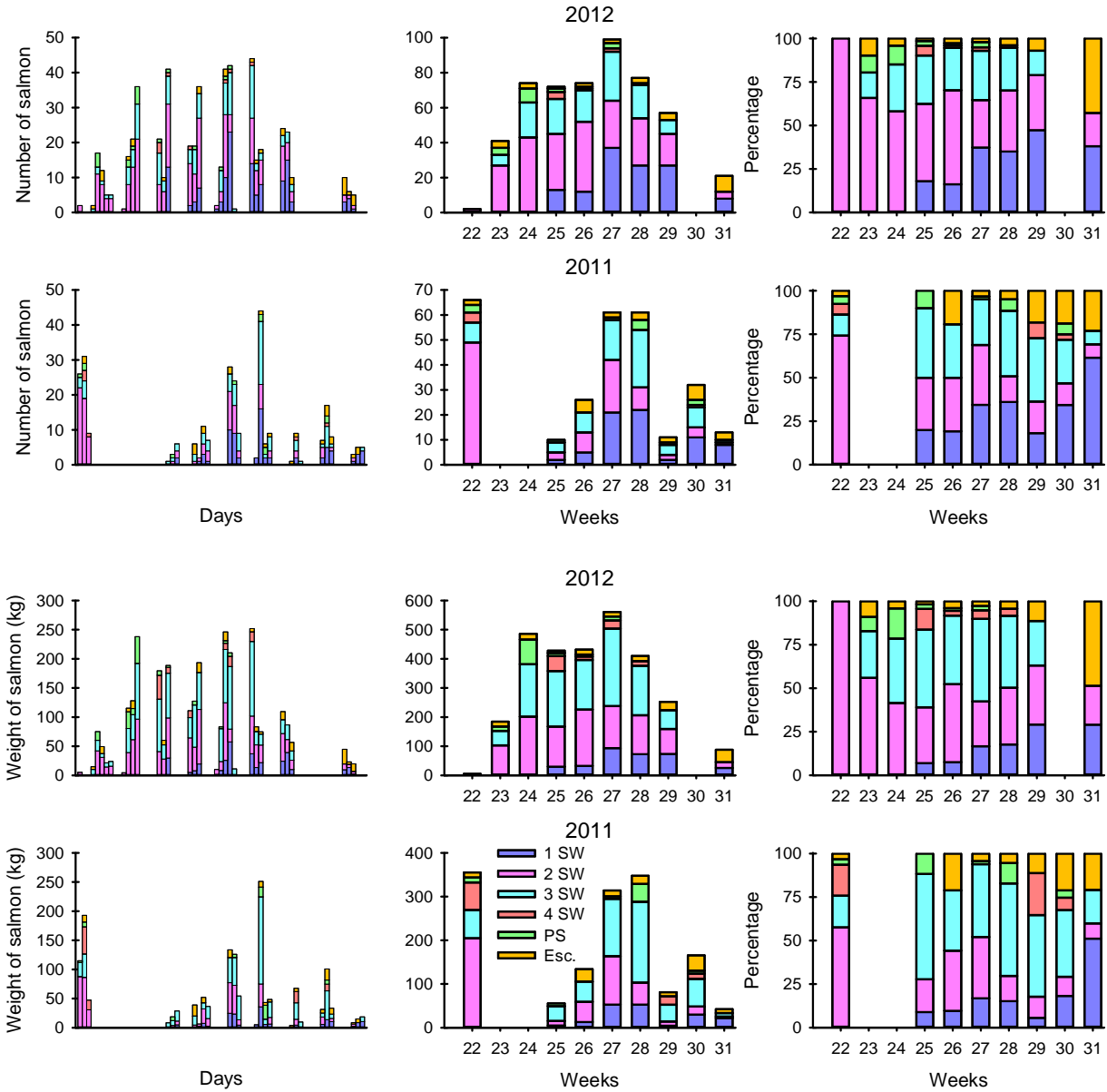


Figure 28. Numbers and weights of daily (figure on the left) and weekly (figure in the middle) scale samples of different sea-age groups of salmon in the catches for Loppa and Hasvik fishermen. Figure on the right illustrates weekly changes in the sea-age distribution from the beginning of June to August 4th.

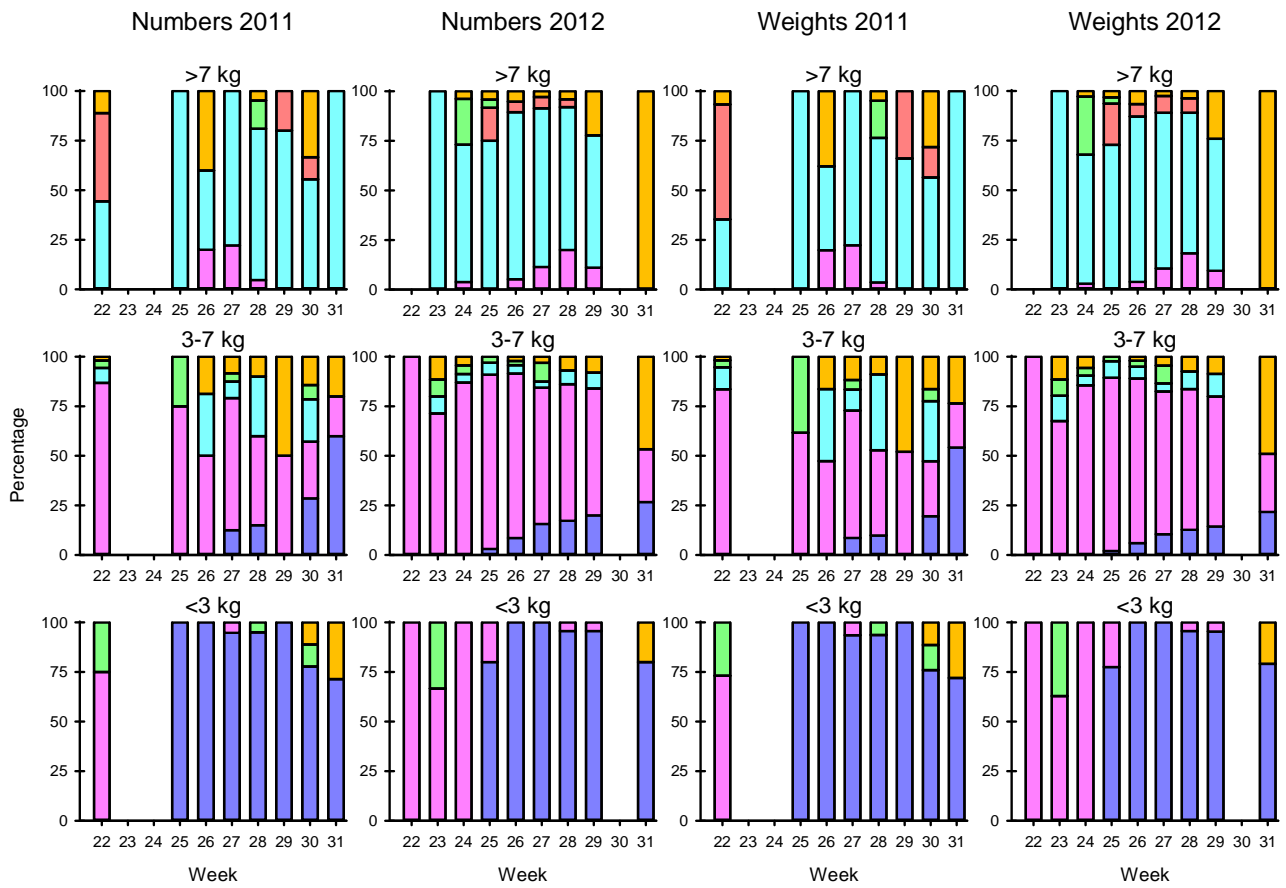


Figure 29. Sea-age distributions through the summer in three size groups of salmon in terms of numbers and weights in the catches for Loppa and Hasvik fishermen in the years 2011 and 2012.

3.2.10 Northern Troms County

North Troms

North Troms

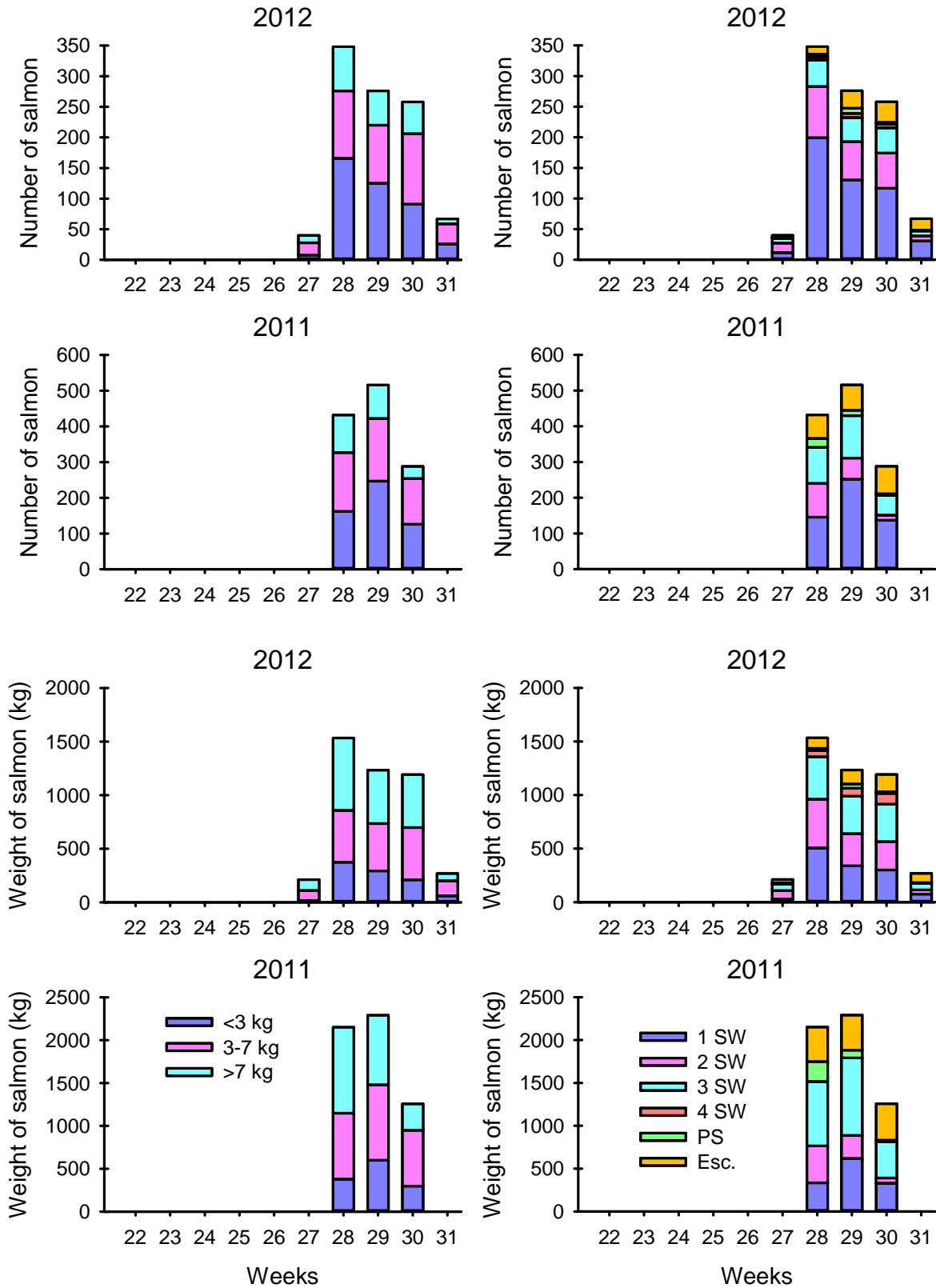


Figure 30. SSB catch data and size groups on the left and catch data converted into sea-age groups of salmon on the right only for the official fishing time in North Troms in 2011 and 2012.

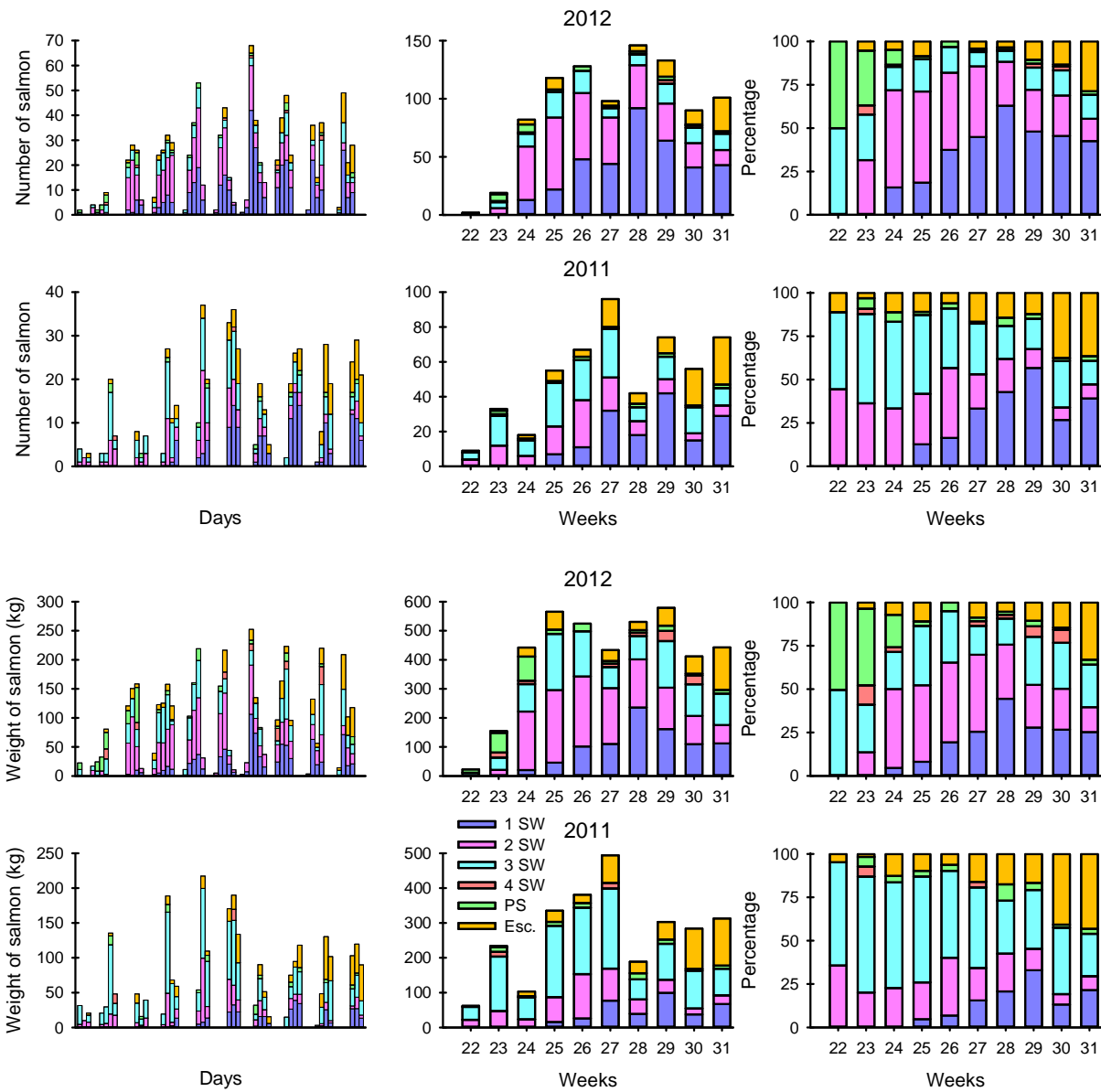


Figure 31. Numbers and weights of daily (figure on the left) and weekly (figure in the middle) scale samples of different sea-age groups of salmon in the catches for North Troms fishermen. Figure on the right illustrates weekly changes in the sea-age distribution from the beginning of June to August 4th.

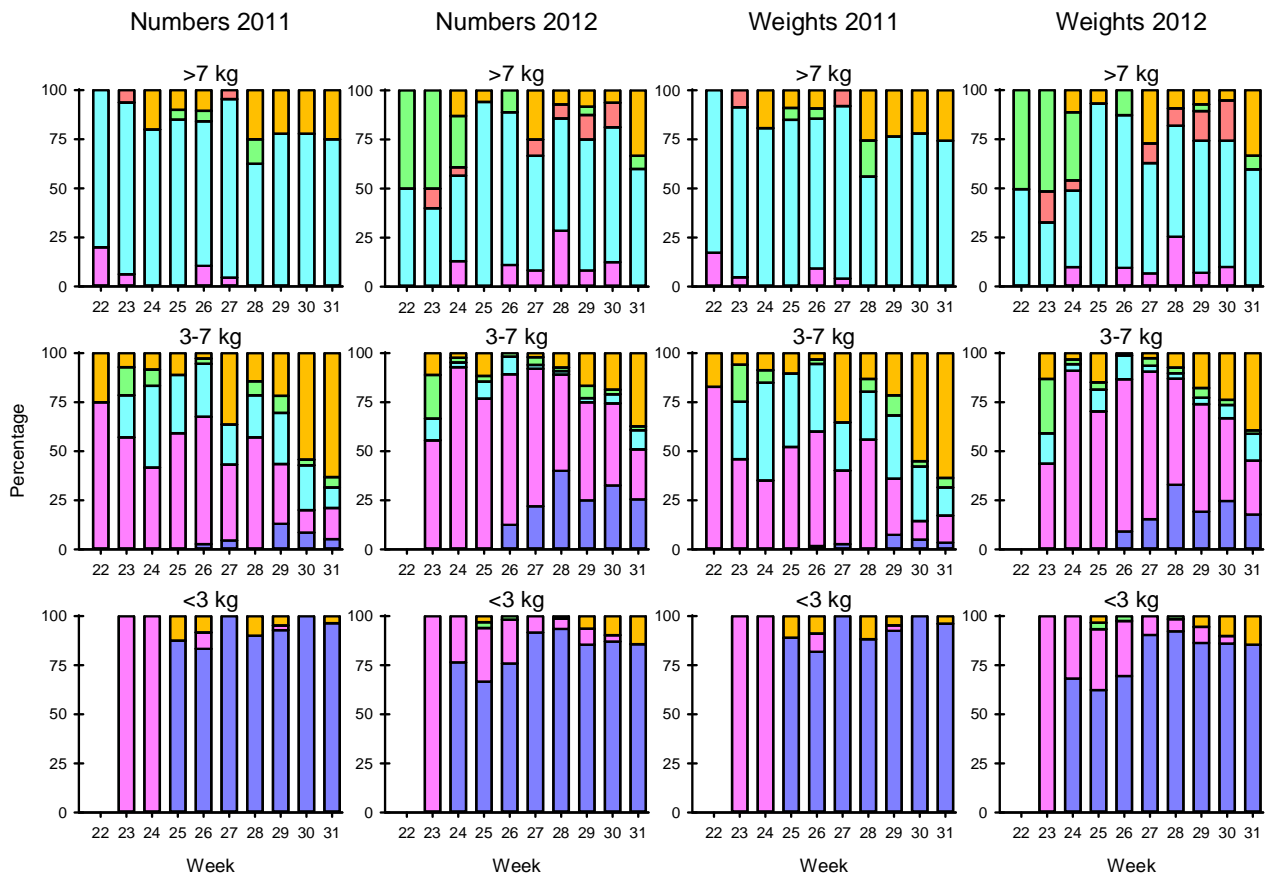


Figure 32. Sea-age distributions through the summer in three size groups of salmon in terms of numbers and weights in the catches for North Troms fishermen in the years 2011 and 2012.

3.2.11 Southern Tros County

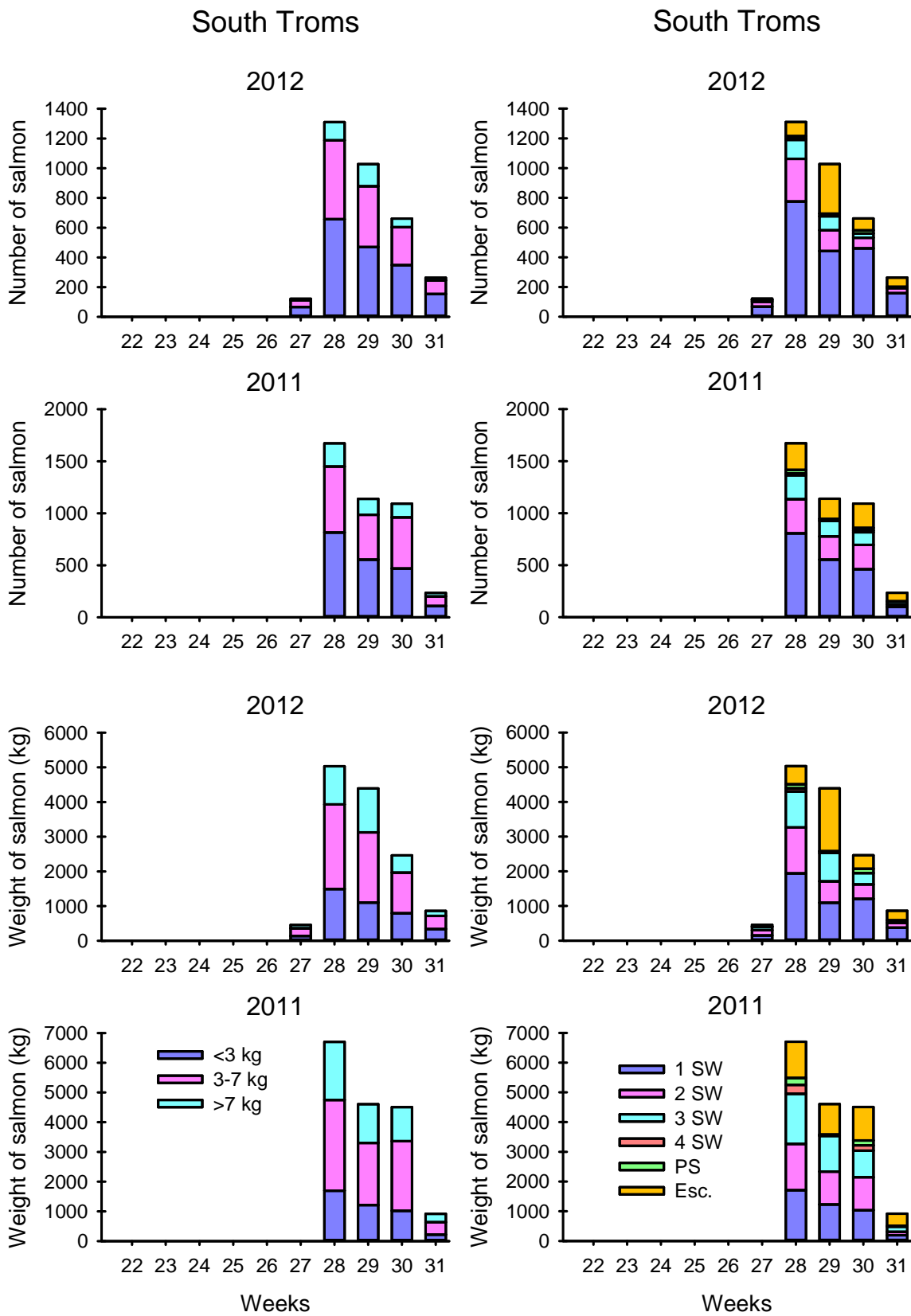


Figure 33. SSB catch data and size groups on the left and catch data converted into sea-age groups of salmon on the right only for the official fishing time in South Tros in 2011 and

2012.

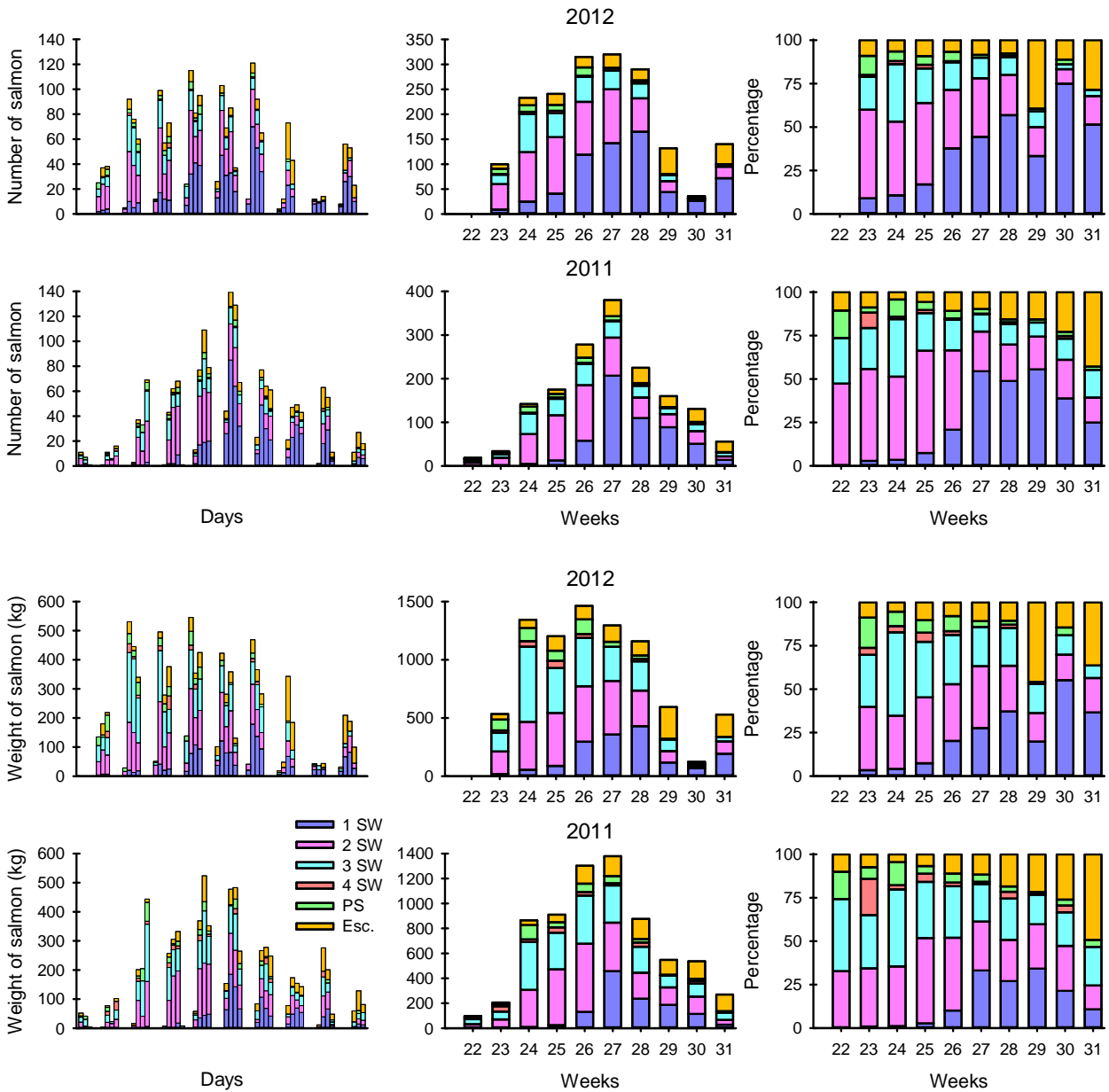


Figure 34. Number of daily (figure on the left) and weekly (figure in the middle) scale samples of different sea-age groups of salmon in the catches for fishermen in South Troms. Figure on the right illustrates weekly changes in the sea-age distribution from the beginning of June to August 4th.

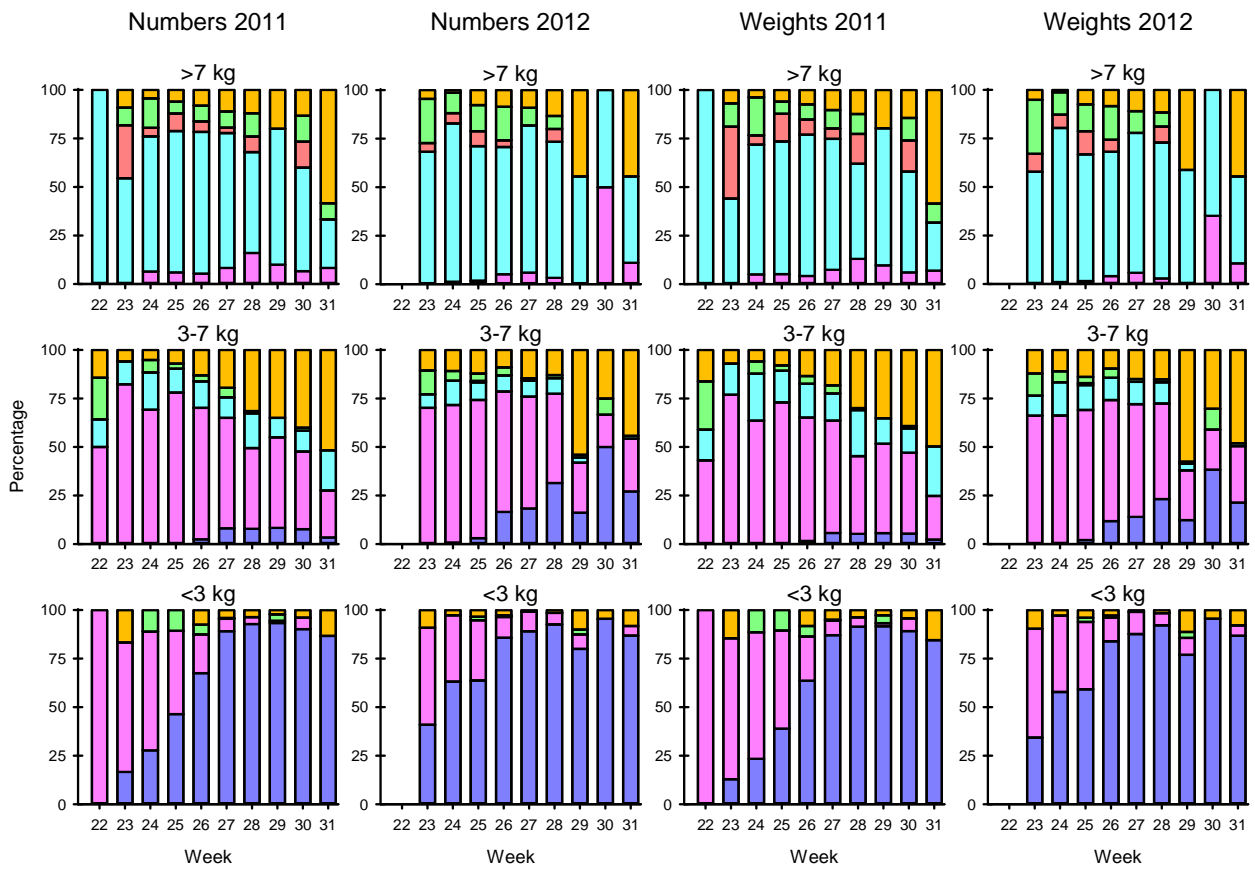


Figure 35. Sea-age distributions through the summer in three size groups of salmon in terms of numbers and weights in the catches for South Troms fishermen in the years 2011 and 2012.

3.2.12 Nordland County

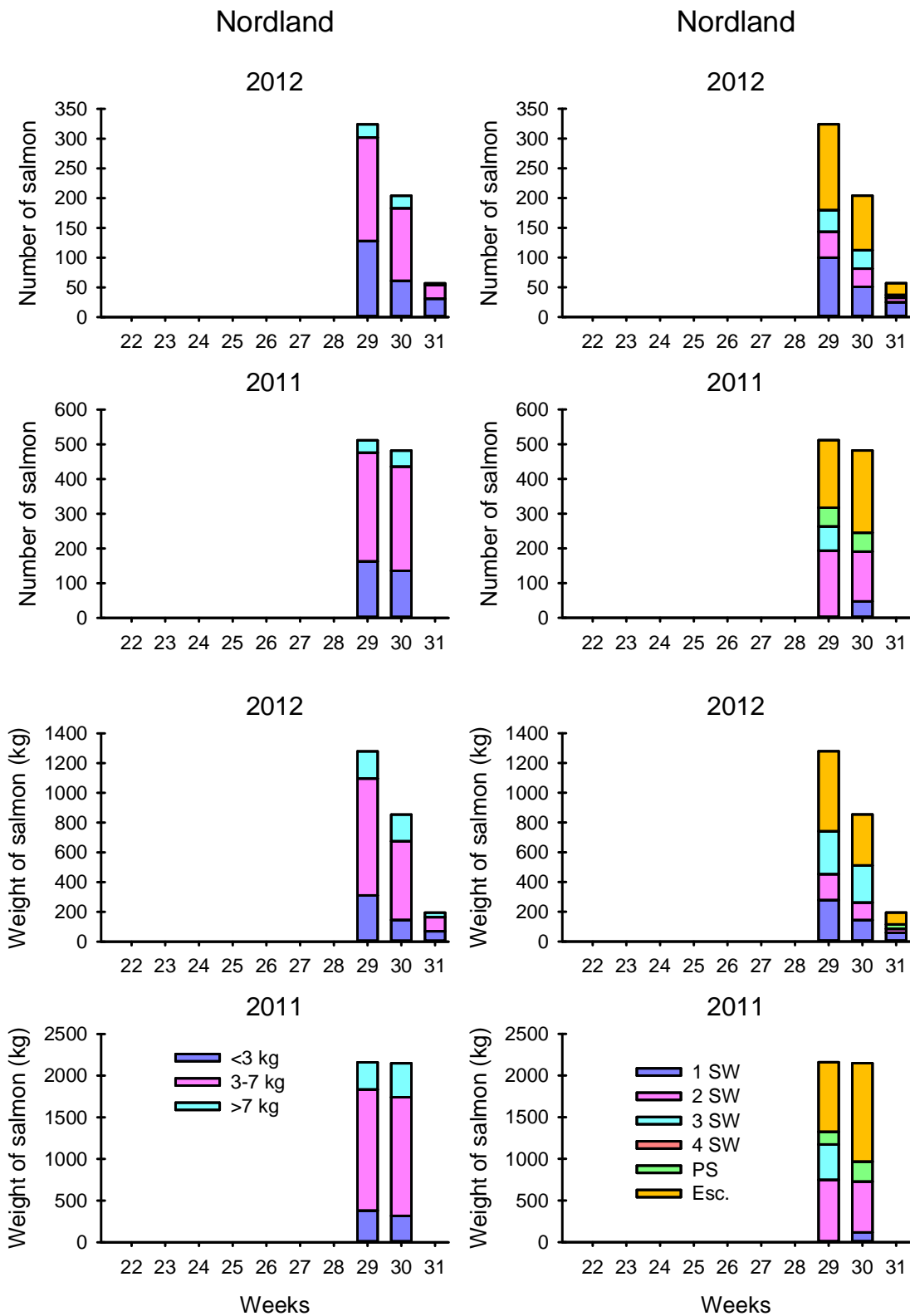


Figure 36. SSB catch data and size groups on the left and catch data converted into sea-age groups of salmon on the right only for the official fishing time in Nordland in 2011 and

2012.

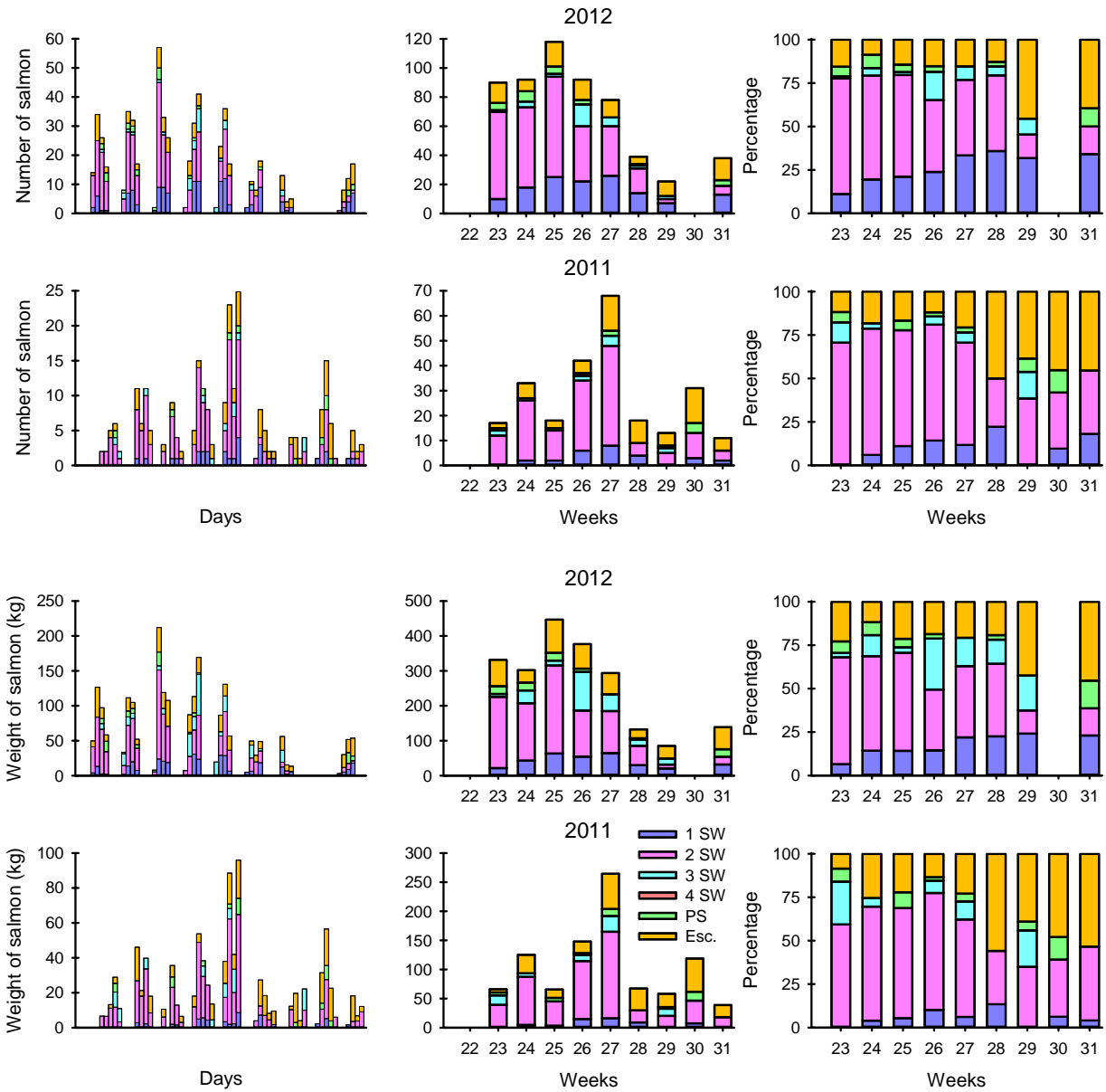


Figure 37. Number of daily (figure on the left) and weekly (figure in the middle) scale samples of different sea-age groups of salmon in the catches for fishermen in Nordland. Figure on the right illustrates weekly changes in the sea-age distribution from the beginning of June to August 4th.

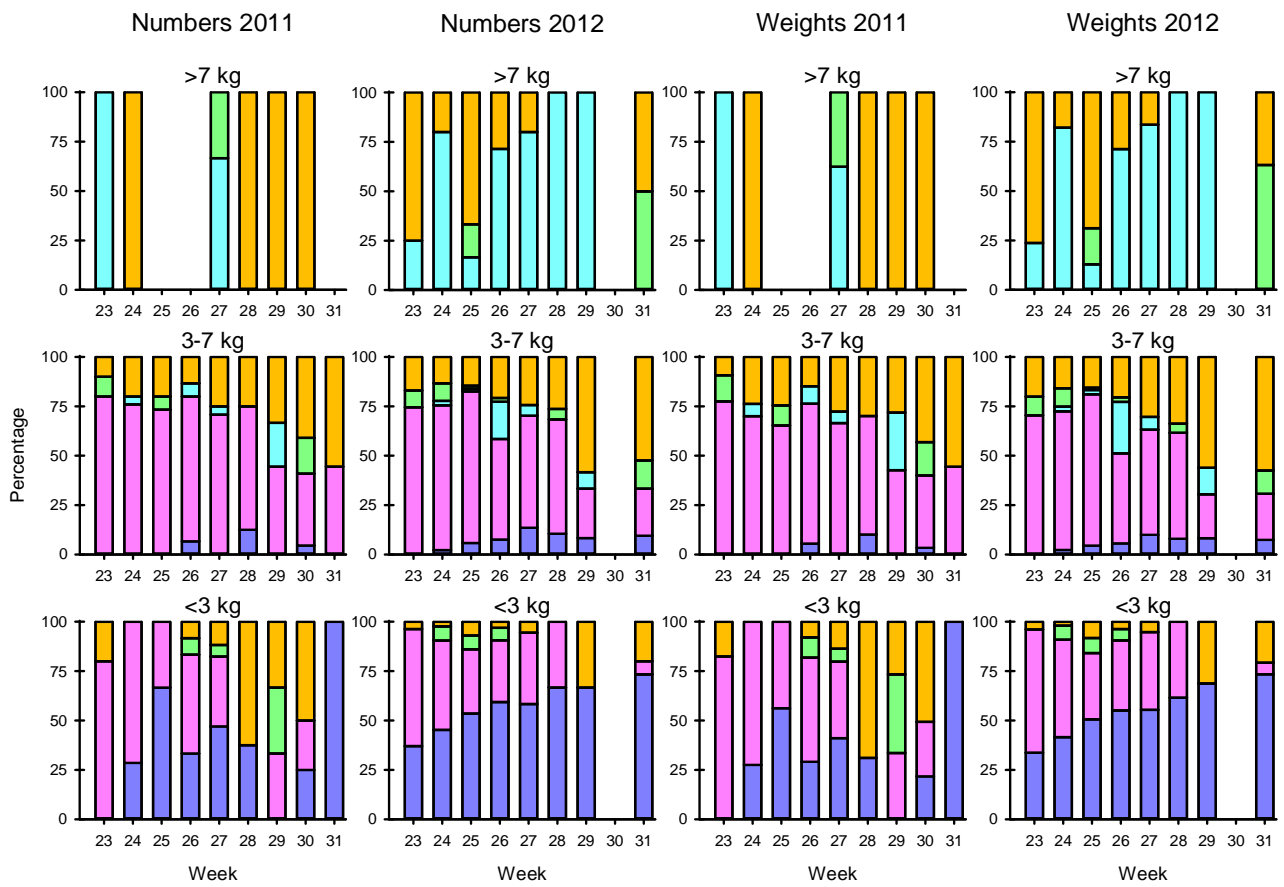


Figure 38. Sea-age distributions through the summer in three size groups of salmon in terms of numbers and weights in the catches for Nordland fishermen in the years 2011 and 2012.

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This study was funded by the European Union, Kolarctic ENPI CBC project – *Trilateral cooperation on our common resource; the Atlantic salmon in the Barents region - "Kolarctic salmon"* (KO197) and national sources in each participating country. The Lead partner of the project is the Office of the Finnmark County Governor (FMFI). Partners in Finland: University of Turku (UTU) and Finnish Game and Fisheries Research Institute (FGFRI). Partners in Norway: Institute of Marine Research (IMR) and Norwegian Institute of Nature Research (NINA). Partner in Russia: Knipovich Polar Research Institute of Marine Fisheries and Oceanography (PINRO).

Responsibilities in this report: FGFRI conducted the work concerning the salmon scales collected in Nordland, Troms and Finnmark: establishing the basic scale information file, making impressions from the scales, ageing salmon, designing and producing the graphs and writing the text. FGFRI gathered the catch data from the yearly salmon catch reports, converted the catch information to sea-age groups of salmon, produced graphs and drafted the text. FMFI organised together with FGFRI the scale collection and sampling arrangements including: information to fishermen, scale sampling manual drafting, design and purchase of scale bags, handling incoming samples and payments to fishermen. FMFI organized the basic catch data covering the years 2011-2012 from SSB (Statistics Norway).

NINA applied for the special research permission from the Norwegian Directorate of Nature Management for fishing outside the ordinary fishing season and had contact with fishermen in Nordland and Troms.

Lead Partner and partners of the Kolarctic ENPI CBC EU Kolarctic salmon project KO197 will thank warmly SSB (Statistics Norway/Anne Turi Baklien) and all the fishermen for their cooperation during the sampling period. Without the help of professional fishermen we could not have collected the marvellous biological material from the salmon catches in this project area. We are thankful also to the sea salmon fishing organizations in Finnmark and Troms. We also want to say thanks to all the people who helped us process the salmon scale material.

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