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Size-specific dynamics of Pacific halibut: A key to reduce bycatch in the groundfish fisheries

by

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INTRODUCTION

Bycatch mortality of Pacific halibut (*Hippoglossus stenolepis*) in the Bering Sea (Figure 1) and in the Gulf of Alaska causes losses both in groundfish fisheries and in the halibut setline fishery. The North Pacific Fishery Management Council (NPFMC) and the National Marine Fisheries Service (NMFS) impose halibut mortality limits for groundfish fisheries in Alaskan waters in an effort to control bycatch mortality. Management regulations for bycatch in the region specify mortality quotas (in metric tons) for this prohibited species in various groundfish fisheries and also require prompt discard of the bycatch to sea. It is not uncommon that bycatch quotas are reached before groundfish quotas are taken, causing fishery closures before harvest of the allowable catch. Among others, groundfish harvest in the Pacific cod (*Gadus macrocephalus*), rock sole (*Pleuronectes bilineata*), and yellowfin sole (*Pleuronectes aspera*) fisheries results in high halibut bycatch rates.

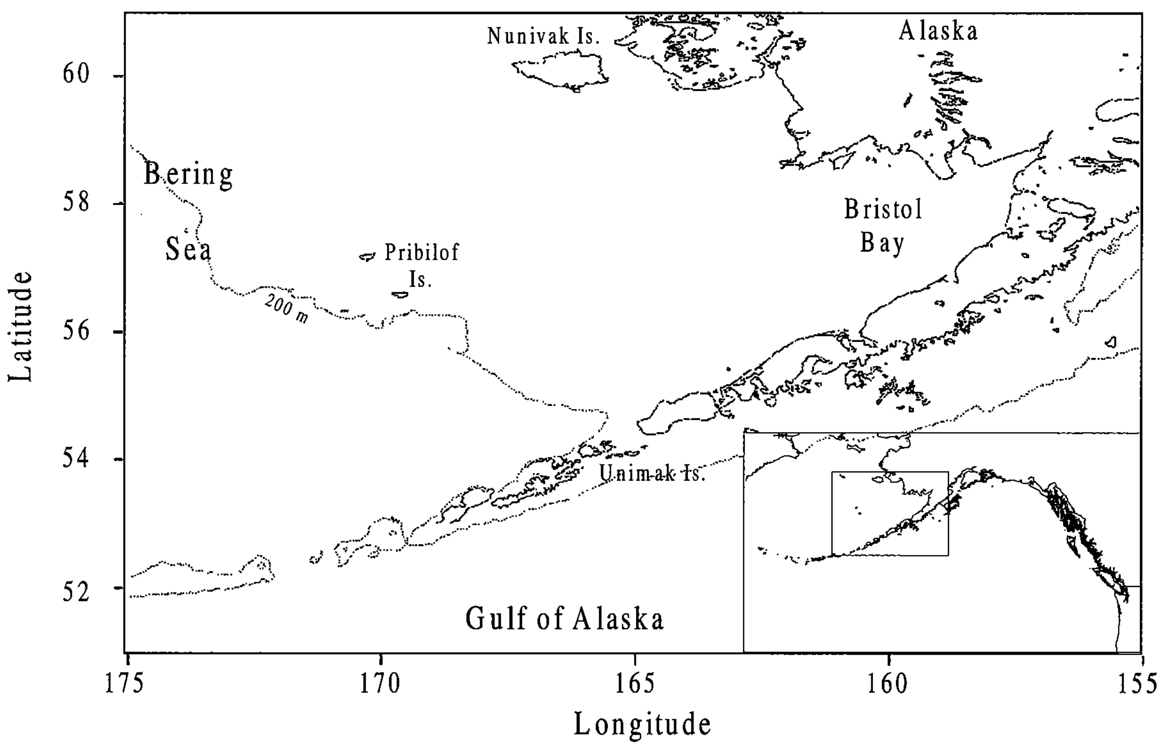

Figure 1. The Bering Sea showing geographical landmarks referenced in this report.

Bycatch occurs when non-selective fishing gears operate in areas where the distributions of groundfish populations and halibut, mainly juveniles, overlap. The spatial-temporal dynamics of fish populations in the Bering Sea are determined by severe seasonal environmental variations that have resulted in complex migratory patterns. Thus, within a year the distribution of halibut and the target species in the region changes seasonally. Further, halibut are segregated by size and their migratory patterns are size specific. Since the distribution of the halibut cohorts changes seasonally, the size composition and the bycatch length distribution of the halibut population in a particular area varies, depending on where the various groundfish fisheries operate. Further, fluctuation of halibut year-class strength causes variation in the population size structure resulting in inter-annual changes of the size composition of the bycatch. As a result, halibut bycatch rates vary annually with the seasonal movements of the cohorts and also inter-annually with fluctuations of cohort strength. The most recent successful year class was spawned in 1987, causing high bycatch rates in trawl groundfish fisheries particularly in 1991. Changes in groundfish abundance and distribution, in groundfish fishing effort, and in efforts by the fleets to prevent bycatch will also affect halibut bycatch rates.

Understanding of the size-specific spatial-temporal dynamics of the halibut population and its influence on bycatch is incomplete. Some studies have described the dynamics of the halibut population on a broad scale (Best 1977, 1981) but do not provide information that can be used for managing bycatch. Adlerstein (1994) analyzed the spatial, seasonal and inter-annual halibut bycatch variation within the Pacific cod fisheries in which bycatch is made up of juveniles and adults. Results showed that bycatch rates in the 1990, 1991 and 1992 Pacific cod trawl and longline fisheries varied significantly between areas and months, as well as across areas between years. Nevertheless, most of the recent bycatch studies have ignored analyzing the inter-annual nature of bycatch seasonal variation and have relied on information of halibut bycatch rates by target species in particular years as a predictor for bycatch rates in the future (Norris et al. 1991, Smoker 1993, NRC and B. Amjoun 1991). Those studies have limited predictive values because they do not consider the spatial dynamics of the halibut population. While they accurately portray conditions at the time data were collected, they cannot easily deal with variations in cohort strength beyond the range of the observations. Ultimately, the key to reducing bycatch is knowing the meso-scale dynamics of the population and its biological basis, and understanding the interface of these dynamics with the fishing gear selectivity. This basic information is needed to ground further studies including economic aspects of bycatch management. Accordingly, the objective of this study is to provide maps of halibut monthly size-specific distribution for the eastern Bering Sea that can be used to improve prediction of bycatch distributions, given the length distribution of the halibut population in a particular year.

MATERIALS AND METHODS

Maps of size-specific distributions of Pacific halibut based on indices of relative abundance from bycatch were produced by month for January to November. Halibut size intervals for the analysis are: 15-24 cm, 25-34 cm, 35-44 cm, 45-54 cm, 55-64 cm, 65-74 cm and over 74 cm which correspond approximately to halibut ages 2 to 8+, respectively. The basic data for constructing the maps consist of numbers of bycaught halibut and halibut length frequency distribution from records of individual bottom trawl hauls in the 1990 to 1993 Pacific cod, rock sole, and yellowfin sole fisheries. Because of the small (10 cm) size categories, maps based on halibut numbers correspond directly to halibut weight by applying an average weight of individuals for each interval. Records contain information on fishing location and duration of the fishing operation. Data were provided by the NMFS North Pacific Observer Program and are from the NORPAC database.

Halibut length frequency data were used to calculate the halibut proportion in the corresponding size intervals in designated areas for each groundfish fishery. Halibut catch data were used to calculate the number of halibut bycaught per unit time in the same areas. Estimates are obtained by month. Relative catch per unit effort (CPUE) values were calculated as the product of halibut proportions (in numbers) in each size category by the number bycaught by unit time (minutes). The CPUE values are an index of abundance that, strictly speaking, apply only to times and areas where groundfish fishing occurred. Gear selectivity has an effect on the distribution of size classes in the bycatch of any groundfish fishery. Designated areas are fishery-specific and were designed to capture the seasonal movements of the different size segments of the halibut population (Figure 2). These areas were defined by comparing available halibut length data by groundfish fishery throughout the Bering Sea from adjacent squares of 1-degree longitude by 0.5-degree latitude. All 1-degree by 0.5-degree cells with less than five observations for each month-size cell were pooled with adjacent squares. Each fishery occurred within different seasons and areas (Table 1). Data from the three fisheries amounted to several hundred to over 10,000 catch or length records for each fishery (Table 1).

First, sets of maps were produced for each fishery *f*, year *y*, halibut size interval *s*, and month *m* (3 target fisheries, 4 years, 7 size classes and 11 months). Indices of relative abundance (CPUE) by size class were calculated as the product of the total number of halibut bycaught by unit time in minutes in each designed area *a* and the halibut proportions (in numbers) in each size category in that area.

$$CPUE_{f,y,m,a,s} = CPUE_{f,y,m,a} \frac{n_{f,y,m,a,s}}{\sum_{s=1}^{7} n_{f,y,m,a,s}} \tag{1}$$

These over 400 maps constitute an intermediate step in the analysis and are not presented because of practical reasons. Next, to integrate this information in one map for each halibut size interval and month, the Bering sea was divided into rectangles of 1-degree longitude by 0.5-degree latitude and CPUE averages over fisheries and years were calculated for rectangles *r* for which information was available.

$$CPUE_{m,r,s} = \frac{1}{A} \sum_{f=1}^{F} \sum_{y=1}^{Y} CPUE_{f,y,m,r,s} \tag{2}$$

where *A* is the number of fishery-year combinations in the data. The CPUE averages for each rectangle in an area correspond to the average CPUE in that area:

$$CPUE_{f,y,m,r,s} = CPUE_{f,y,m,a,s}$$

A second index was estimated as an average of scaled CPUEs (0 to 1). Scaling was relative to the highest CPUE in each size interval-fishery-month-year combination.

Pacific cod Areas

Yellowfin sole Areas

Rock sole Areas

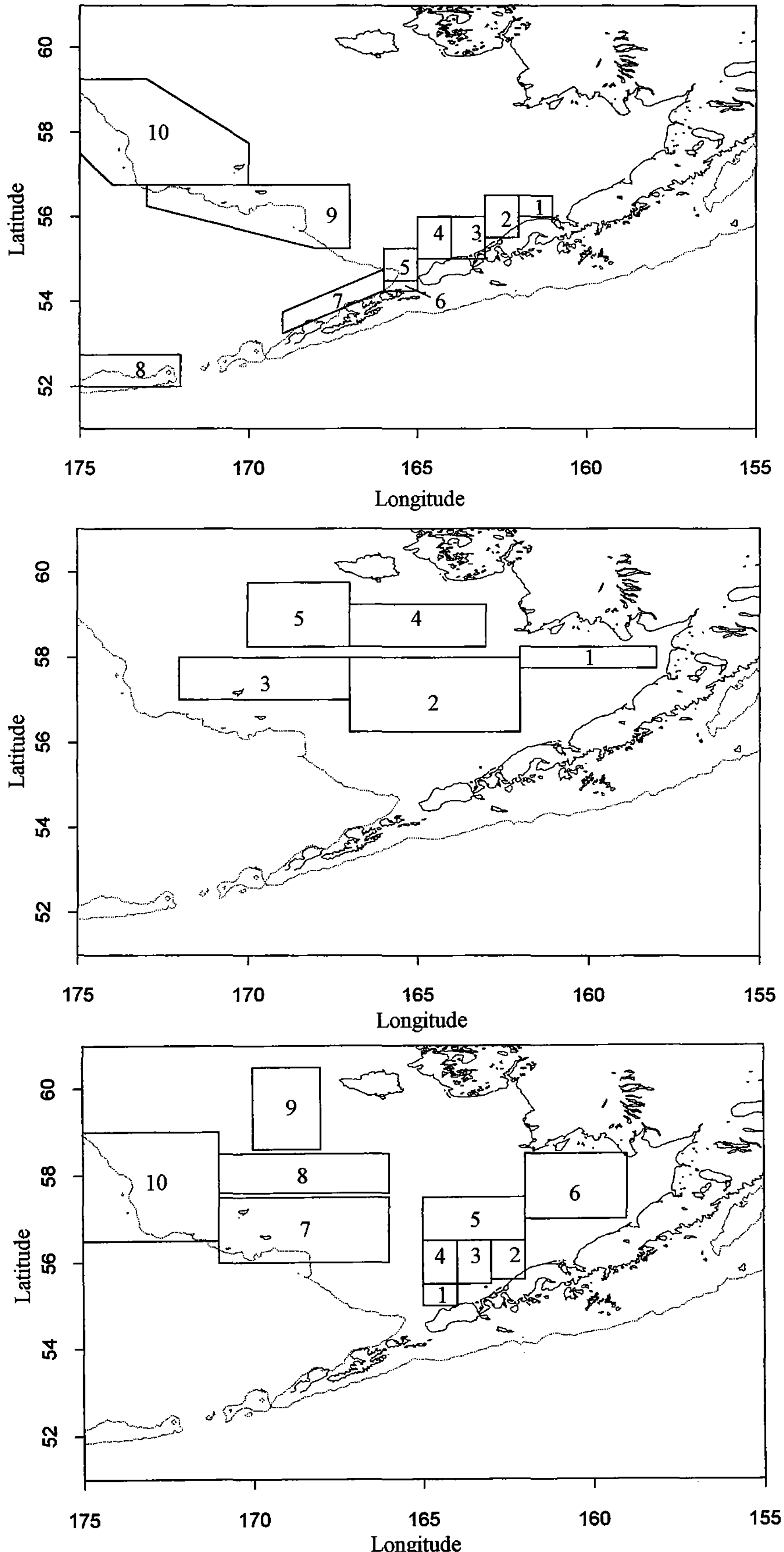

Figure 2. **Fishery-specific areas used to analyze seasonal patterns of halibut distribution by size category.**

Table 1. **Months and areas (from Figure 2) of data used for assessing the Pacific cod, yellowfin sole, and rock sole fisheries.**

1990 Fisheries **Area**	**Pacific Cod**	**Yellowfin Sole**	**Rock Sole**
1	May	August	Jan-Mar
2	Jan-May	Aug, Nov	Jan-Feb
3	Jan-May	Oct-Nov	Jan-Feb
4	Jan-May	Oct-Nov	Jan-Mar
5	Feb-May	Aug-Nov	----
6	May-Dec		----
7	Feb-May		Jan, Mar, Nov
8	Apr-June		Aug-Nov
9	----		Oct
10	May		----
Catch records	2,376	536	747
Length Records	10,977	2,744	5,789

1991 Fisheries **Area**	**Pacific Cod**	**Yellowfin Sole**	**Rock Sole**
1	----	May-Sept	Jan-Apr
2	----	June	Feb-Mar, June
3	Jan, Apr	May, July-Sept	Jan-Feb
4	Jan-Feb, Apr	May	Jan-Mar
5	Jan-Apr	May	May
6	Jan-May		May
7	Jan-May		Jan-June
8	Feb, Apr, July		May-June
9	Feb-Apr		May-July, Sept
10	Mar-May		----
Catch records	2,407	3,263	2,334
Length records	13,483	4,242	8,996

1992 Fisheries **Area**	**Pacific Cod**	**Yellowfin Sole**	**Rock Sole**
1	----	May-Sept	Jan-Feb
2	----	June-Oct	Jan-Feb
3	Feb	June-July, Sept	Jan-Feb
4	Jan-Feb	May-June, Oct-Dec	Jan-Feb
5	Jan-May	May-June, Aug-Sept	Jan, May
6	Mar-May		May
7	Mar-Apr		Jan, Apr, Aug
8	Mar-May		Aug-Oct
9	Mar-Apr		----
10	Mar-Apr		----
Catch records	2,387	5,191	2,941
Length records	11,908	3,375	7,465

Table 1. (continued)

1993 Fisheries Area	Pacific Cod	Yellowfin Sole	Rock Sole
1	----	May-June	Jan-Apr
2	----	May-June, Aug	Jan-Feb
3	Mar-Apr	----	Jan-Feb
4	Mar-Apr	May-June, Sept-Dec	Jan-Feb
5	Jan-Apr	June, Aug-Nov	----
6	----		----
7	Mar		Jan, Apr-May
8	Mar-Apr		July-Aug, Oct
9	Mar-Apr		----
10	May		----
Catch records	2,025	3,644	2,567
Length records	9,570	3,497	5,399

Scaled CPUEs (ScCPUE) by rectangle were calculated before averaging over fisheries and years for each halibut size class for which the maximum CPUE was not zero, for each fishery, month, and year:

$$ScCPUE_{f,y,m,r,s} = \frac{CPUE_{f,y,m,r,s}}{\max(CPUE_{f,y,m,r,s})} \tag{3}$$

The final size-specific halibut distribution by month is presented in a series of 77 maps. Mapping used the average bycatch CPUE and the scaled index as indices of relative abundance as indicated above. These maps were constructed using S-Plus programming environment routines. The maps based on average CPUE were constructed by interpolating the data from the rectangles with available information. Maps based on the scaled index are not interpolated and present information only for rectangles for which data were available. The gray scale for each CPUE map was set such that black corresponds to the maximum CPUE value that is documented in each case. Unfortunately, extreme ranges of CPUE values did not allow for a consistent gray scale across months or ages.

RESULTS

A total of 77 map sets were obtained which represent the size-specific distribution of halibut for the months of January through November in seven 10-cm length intervals, corresponding approximately to halibut age 2 to 8 (Appendix).

Halibut 15-24 cm

Fish were found concentrated along the Unimak Island coast during January to April, with highest CPUE levels in January (0.01) towards the south of the Island, while in March they were found aggregated to the north. During May, fish were absent from the Unimak Island coast and were found around the Pribilof Islands and towards

Bristol Bay. CPUE levels during this month were higher than at the beginning of the year probably because data from January to April are from the Pacific cod fishery while May data are from the rock sole fishery. This fishery operates in shallower water than the cod fisheries. From May to July the distribution shifts north and east of the Pribilofs. During these months fish were also found in Bristol Bay, but highest concentrations in this area were only found from July to September. By the end of the year levels were almost negligible in the areas for which information was available, and suggest that fish are moving south and towards the Alaskan Peninsula coast.

Halibut 25-34 cm

Fish in this size category have a similar distribution to that of 15-24 cm fish but CPUE levels are much higher (up to 0.6), indicating higher availability and gear selectivity for these larger fish. January to April highest concentration were found along the coast of Unimak Island with densities progressively increasing along the outer continental shelf in March and April. CPUE levels observed along the edge of the continental shelf up to the Pribilof Islands were relatively higher than levels found for smaller fish. During May and June fish were found around the Pribilof Islands and in Bristol Bay. In July fish were south from Nunivak Island up to Bristol Bay, and later in the year concentrations occurred south from Nunivak Island and in Bristol Bay. Data for October and November are very limited but suggest that fish were moving back to winter locations.

Halibut 35-44 cm

CPUE levels were the highest (up to 0.8) among all size intervals. Fish in this size interval were found concentrated along the coast of Unimak Island and the edge of the continental shelf from January to April. The distribution was more uniform than the distribution of smaller fish and CPUE levels along the coast of the Alaska Peninsula were fairly similar to those on the edge of the continental shelf. During May and June, fish were found dispersed throughout the Bering Sea with reduced CPUE levels along the Alaskan Peninsula coast and the continental shelf edge. From July to September fish were found south of Nunivak Island and in Bristol Bay, and during October and November towards the Pribilofs.

Halibut 45-54 cm

CPUE levels were relatively high (up to 0.6), but slightly lower than levels for 35-44 cm fish. During January and February, fish in this size interval were found concentrated north of Unimak Island, but further from the coast than fish of smaller size. During March and April, CPUE levels were higher along the continental shelf edge up to the Pribilofs than along the coast of the Alaska Peninsula. In May and June fish were evenly dispersed, and during July and August they were found concentrated south of Nunivak Island and in Bristol Bay. In September fish were mostly south of Nunivak Island and had moved out of Bristol Bay. During October and November fish were found between Nunivak Island and the Pribilof Islands.

Halibut 55-64 cm

Distribution of fish in this size category follows closely with that of 45-54 cm category fish except during June when concentrations were found in the central Bering Sea southeast of Nunivak Island.

Halibut 65-74 cm

Distribution of these larger fish is rather different from that of smaller size categories. While smaller halibut aggregate in highest densities in winter along the Bering Sea edge, larger halibut are virtually absent. When smaller halibut begin to disperse to the continental shelf in the spring, the larger halibut reach highest densities on the shelf break. By summer, all sizes are found in low densities on the Bering Sea flats. During January and February CPUE levels were lower (up to 0.04) than in March, April, and May (up to 0.15), suggesting that larger fish were not present where the fisheries operated during the winter. High levels were found in March around the Pribilof Islands. During April, CPUEs were evenly distributed along the edge of the continental shelf and the Alaska Peninsula south of Unimak Pass along the Alaska Peninsula. CPUE was highest in April close to Unimak Island. During May, high levels occurred north of Unimak Pass, and in June around the Pribilofs. From July to October fish were found between Nunivak Island and Bristol Bay, and in November towards the Pribilofs.

Halibut 75 cm+

Distribution of the largest fish category is similar to that of 65-74 cm fish. Low, fairly evenly distributed CPUE levels were found from January to April. The highest level (0.06) was in May along the continental shelf edge east from the Pribilofs towards Unimak Pass. Areas of concentration shifted northward in July, and to the east and west during August. September and October levels were highest south of Nunivak Island. In November levels were highest around the Pribilofs.

CONCLUSIONS AND DISCUSSION

The presented maps show some clear patterns in the halibut population distribution and provide useful information for bycatch management. In general, small halibut (<65 cm) concentrate during winter along Unimak Island and the edge of the continental shelf (Figure 3). Highest concentrations are found in these areas in January and February. In March, April, and May, small halibut tend to aggregate at lower densities than in winter along the outer shelf southeast from the Pribilof Islands. From June, these fish move onto the shallow flats towards Bristol Bay and Nunivak Island and concentrations decrease relative to winter and spring. Larger fish (>65 cm) are virtually absent from the shelf and upper slope in winter, with minor presence along Unimak Island and the edge of the shelf. Densities of larger halibut reached maximum levels east of the Pribilofs along the shelf edge and north of Unimak Pass from March to May. Summer densities decline relative to spring all along the Bering Sea flats. As a consequence of the shift in distribution, bycatch rates, in halibut weight rather than in numbers, increase in March, April, and May along the coast of Unimak

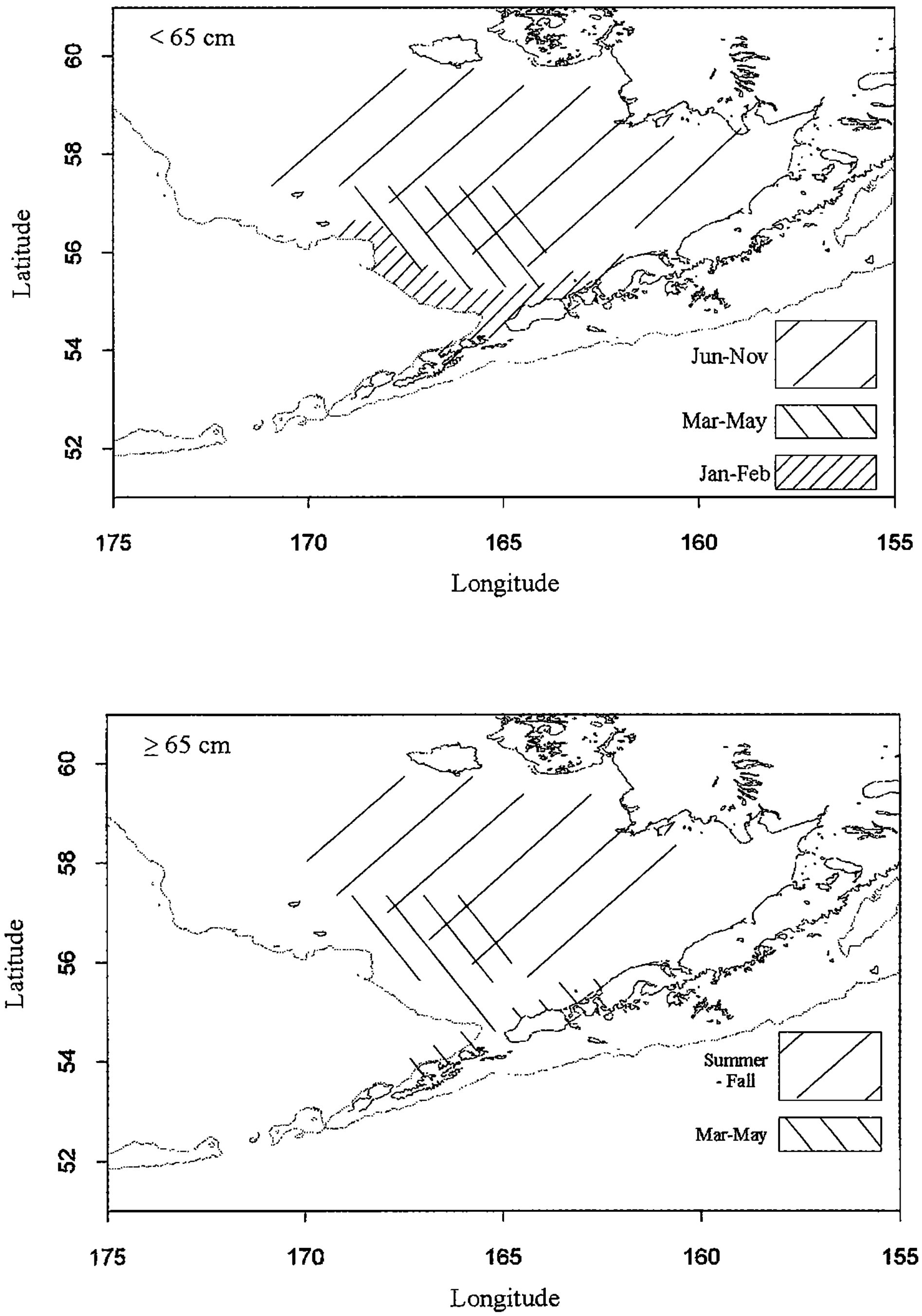

Figure 3. **Schematic distribution of Pacific halibut in the Bering Sea by size and season.**

Island northwest toward the Pribilofs due to the presence of large, heavy fish. The halibut numbers lost as bycatch, nevertheless, are higher in January and February when small fish are densely aggregated near Unimak Pass, and in March to May northwest toward the Pribilofs. The spatial-temporal difference in bycatch rates should vary among years according to the cohort strength. This overall picture indicates that management based on time-area closures established solely to avoid areas of high bycatch rates would not protect all size categories equally. Nevertheless, if the aim is to reduce mortality of juvenile halibut, avoiding fishing in specific time and areas would be effective.

The presentation of over 400 size-specific maps from the individual fisheries by year (integrated in average CPUE maps) to demonstrate annual variation is impractical. The summary maps presented here represent intra-annual variability that is consistent from year to year, modified by inter-annual changes in halibut cohort strength. However, conclusions of annual variability of the size-specific halibut distribution can be derived from the summary maps, using annual Bering Sea survey data such as presented by Clark and Walters (1997). Halibut of a particular size were found every year in the areas where the presented final maps indicate highest density. In years of high cohort abundance, the area of distribution of these particular size fish expands around the high concentration areas.

Although useful insight about the halibut population distribution was obtained from this analysis, bycatch data from groundfish fisheries are far from ideal as a source of information for spatial-temporal distribution studies. The main problem arises from data patchiness which not only provides a limited picture of the halibut distribution in the area but also complicates integration of the available information. The analysis combines bycatch data from three groundfish fisheries, but no source of information allows one to actually determine the relative catchability of these fisheries for halibut, because in most instances the fisheries operate in different areas and months. For instance, the Pacific cod fishery operates mainly from January to May while the yellowfin sole fishery operates later in the year. Thus, when looking at the maps it should be kept in mind that differences in average CPUE within months from particular halibut size interval may be the result of the fishery from which the data were obtained rather than representing major changes in halibut density. It should also be kept in mind that CPUE indices in the context of this study are useful in indicating the halibut distribution within a particular size category but are not strictly indices of abundance because of the gear selectivity. This is obvious from the trend of increasing CPUEs with halibut size between fish 15 to 45 cm.

From looking at the presented maps it becomes clear that the complexity of the spatial-temporal dynamics of the halibut population distribution in the Bering Sea precludes using area-specific data from one particular year as a predictor for bycatch the next year. Predictions need to be based on integrated information that allows one to determine where aggregations of different size fish would be and when. The maps presented here, complemented with information on halibut year class strength, can be used to forecast qualitative halibut aggregations and distribution of relatively high and low bycatch areas. This exercise can be performed every year using the same maps and an updated estimate of halibut year class strength. Year class strength information is made available through estimates of abundance of halibut by length from NMFS summer trawl surveys in the Bering Sea (Clark and Walters 1997). Predicting quantitative distribution of bycatch rates is impracticable because it requires forecast of abundance estimates of the spatial distribution of halibut and estimates of actual groundfish abundance and fishing patterns.

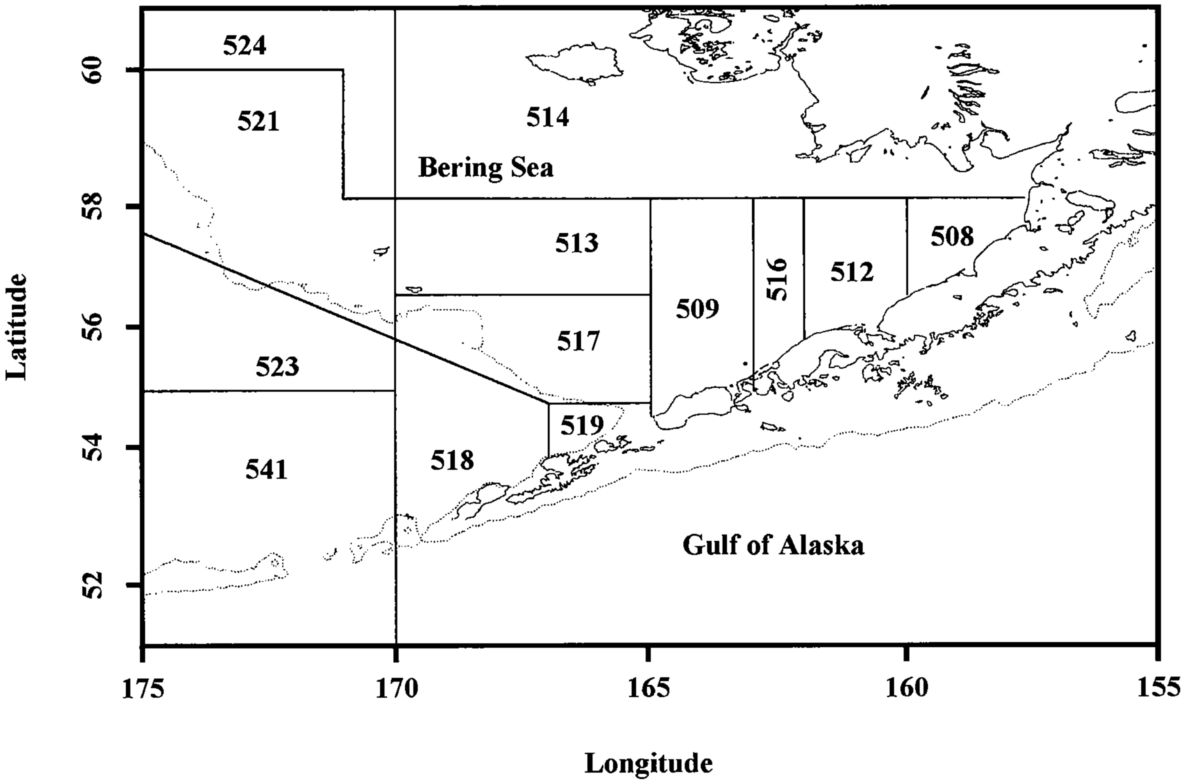

Figure 4. Federal regulatory areas for the Bering Sea-Aleutian Islands.

Spatial-temporal patterns of halibut bycatch are qualitatively predictable in the Bering Sea for the size groups we presented (Figure 3), using the information contained in the derived maps and trawl survey results such as provided by Clark and Walters (1997). This information cannot be translated into management regulations using the federal regulatory areas of the Bering Sea directly (Figure 4). Areas of halibut concentration occur in only parts of a management area, or parts of several areas. Halibut shorter than 64 cm concentrate north of Unimak Pass (the southern half of Area 509) in January and February. While the two smallest groups stayed near Unimak Pass through April, 45 to 64 cm groups spread out along the continental shelf (southwest Area 513 and northwest Area 517) in March and April. Halibut 65 cm and larger move throughout the Bering Sea flats after becoming abundant along the continental shelf in March, and areas of concentration are wide spread and often change month by month.

Given the interannual variation of seasonal and spatial distribution of halibut abundance and the static nature of management, we conclude that the best application of the results of this study is voluntary use by fishermen to guide their fishing patterns to harvest groundfish with a minimum of halibut bycatch. Similar conclusions emerged from an analysis by Adlerstein and Trumble (1998) that demonstrated consistency of halibut bycatch patterns, but high inter-annual variation, in the Bering Sea Pacific cod fisheries. Voluntary action is most likely under a management program, as yet undeveloped in Alaska, incorporating individual responsibility for bycatch reductions. Rigid time-area management would inevitably have some closures occurring where halibut are in relatively low abundance, while allowing fishing in areas of high halibut concentration.

ACKNOWLEDGEMENTS

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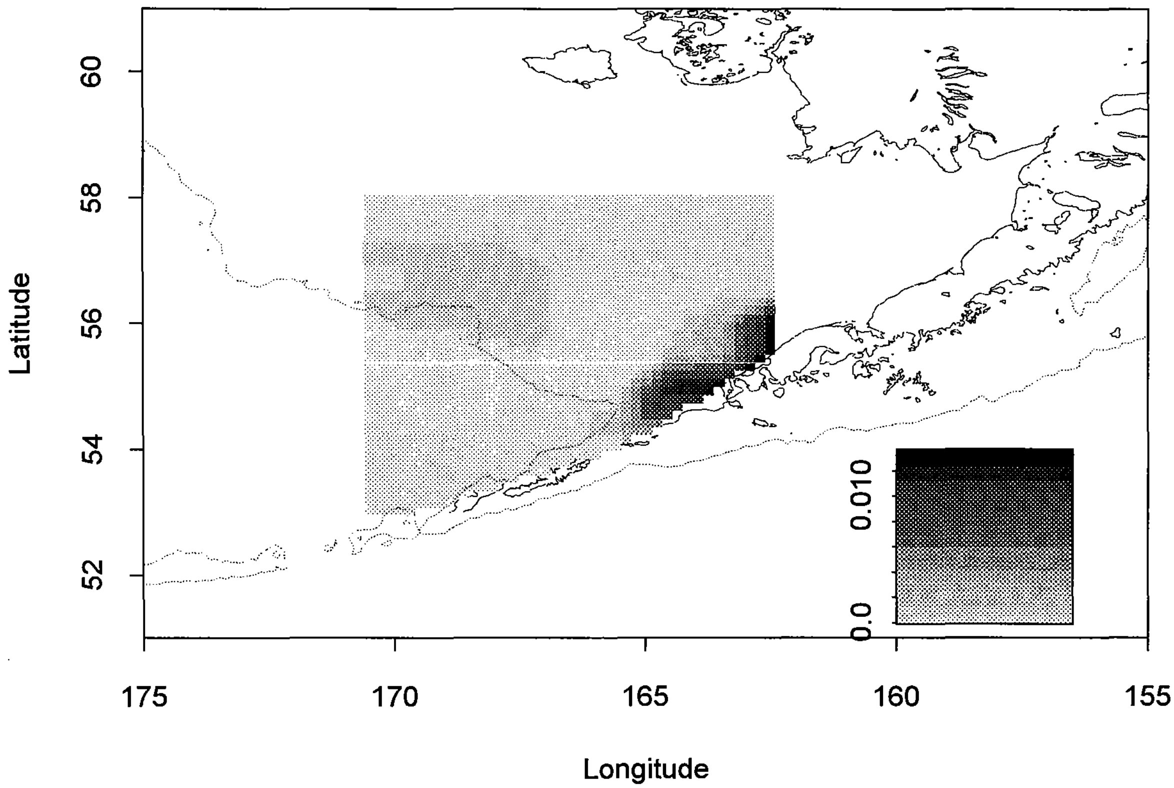
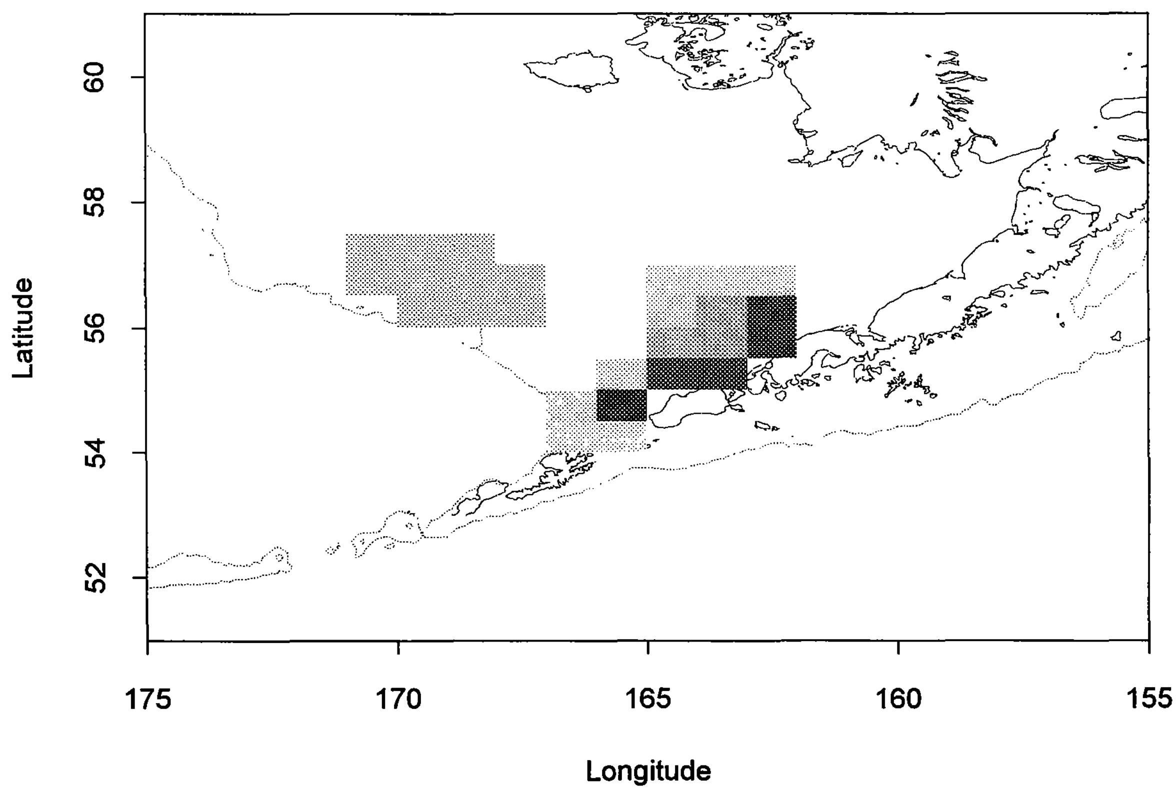
APPENDIX

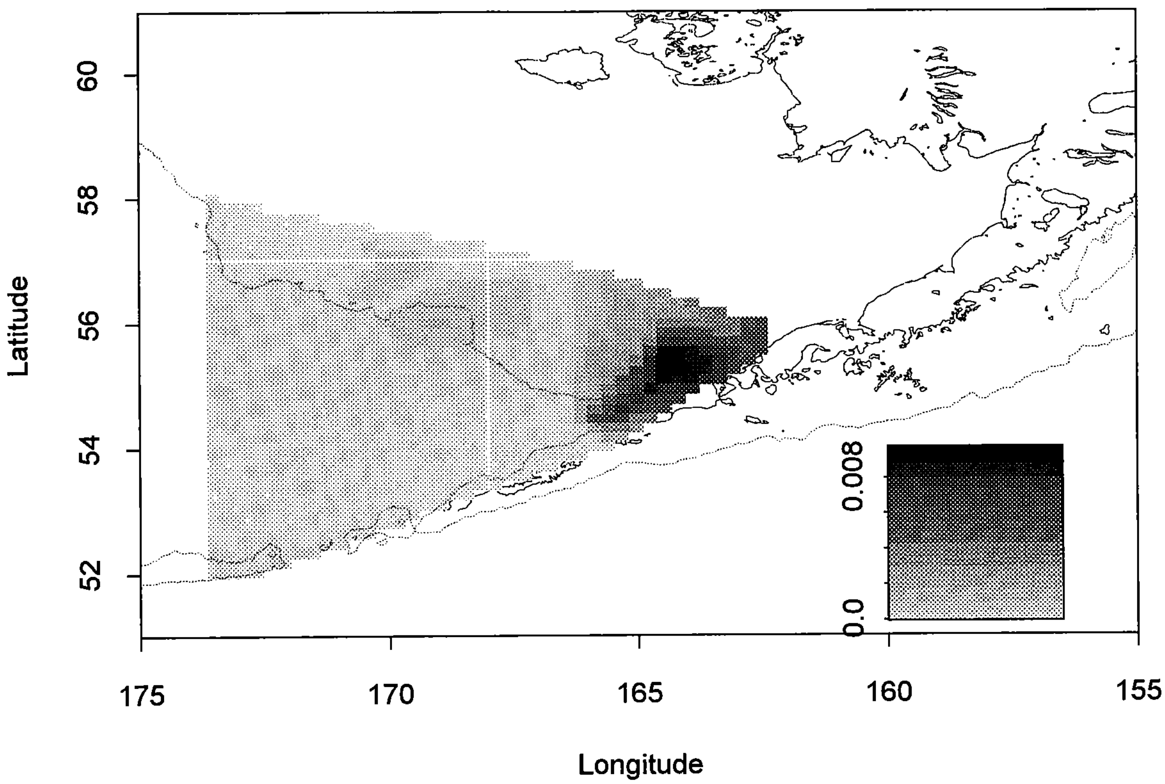
Maps of size-specific halibut distribution in Bering Sea trawl bycatch.

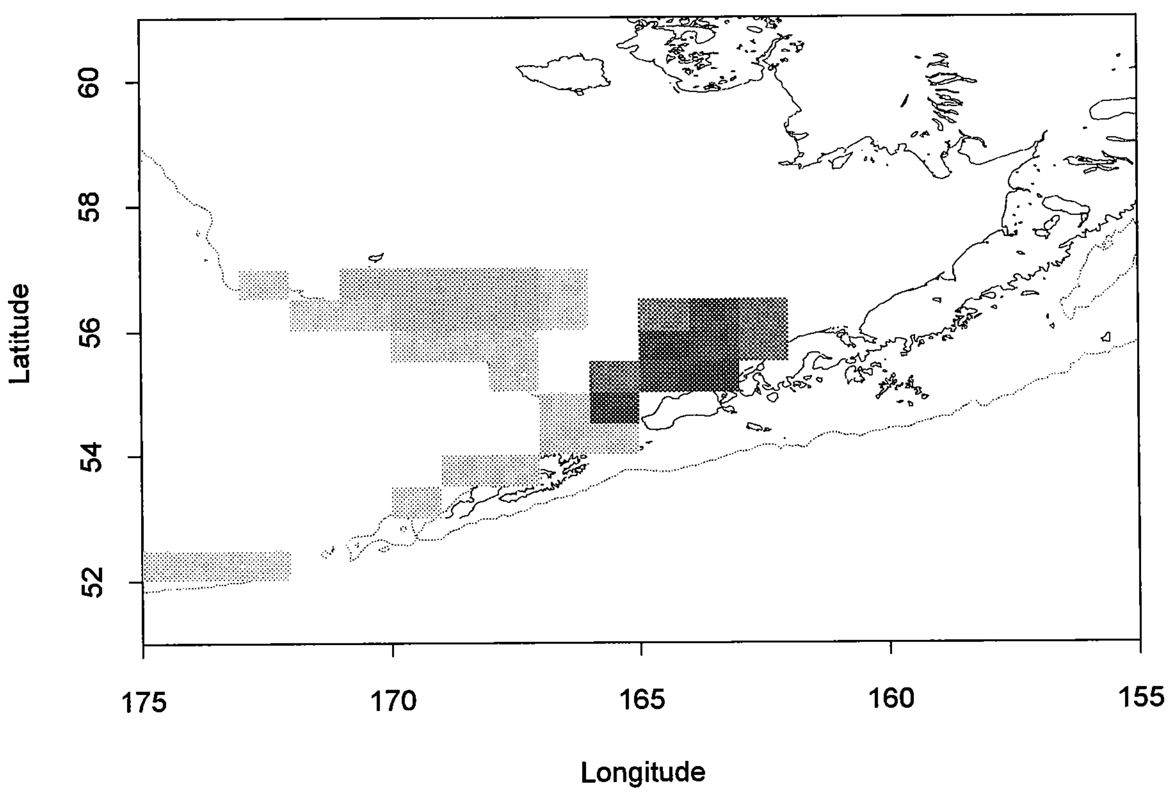
Halibut 15-24cm: January



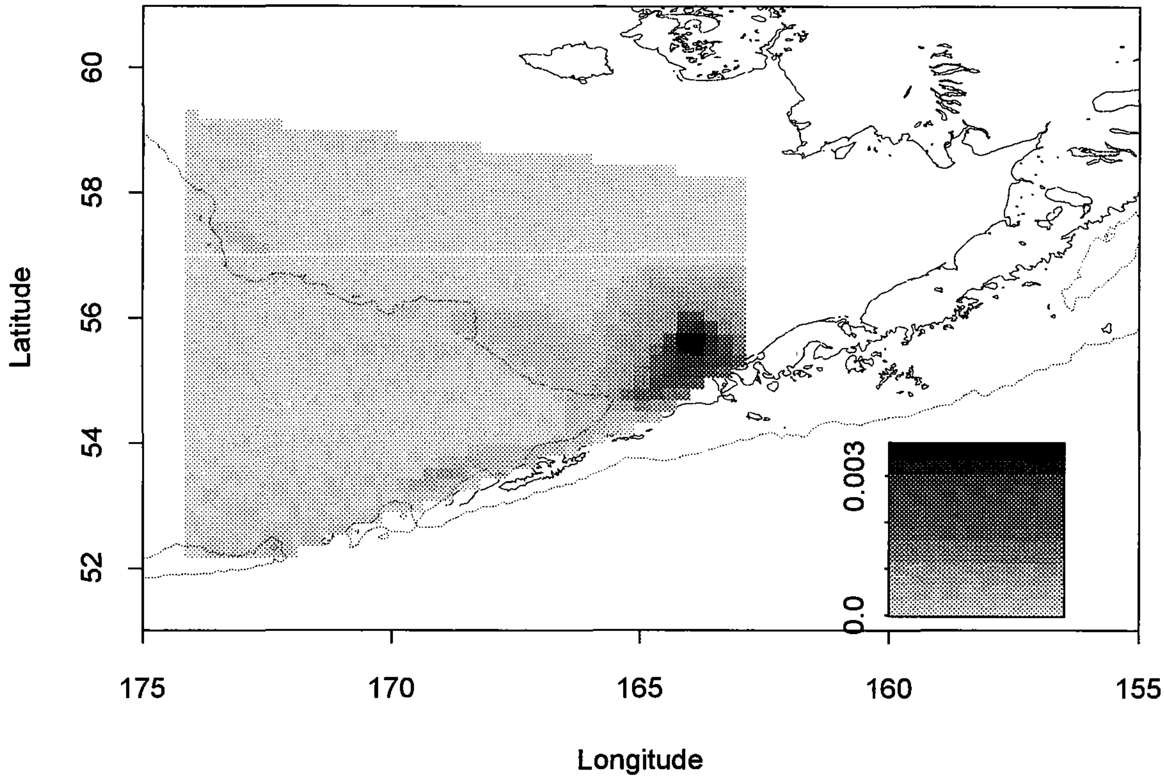


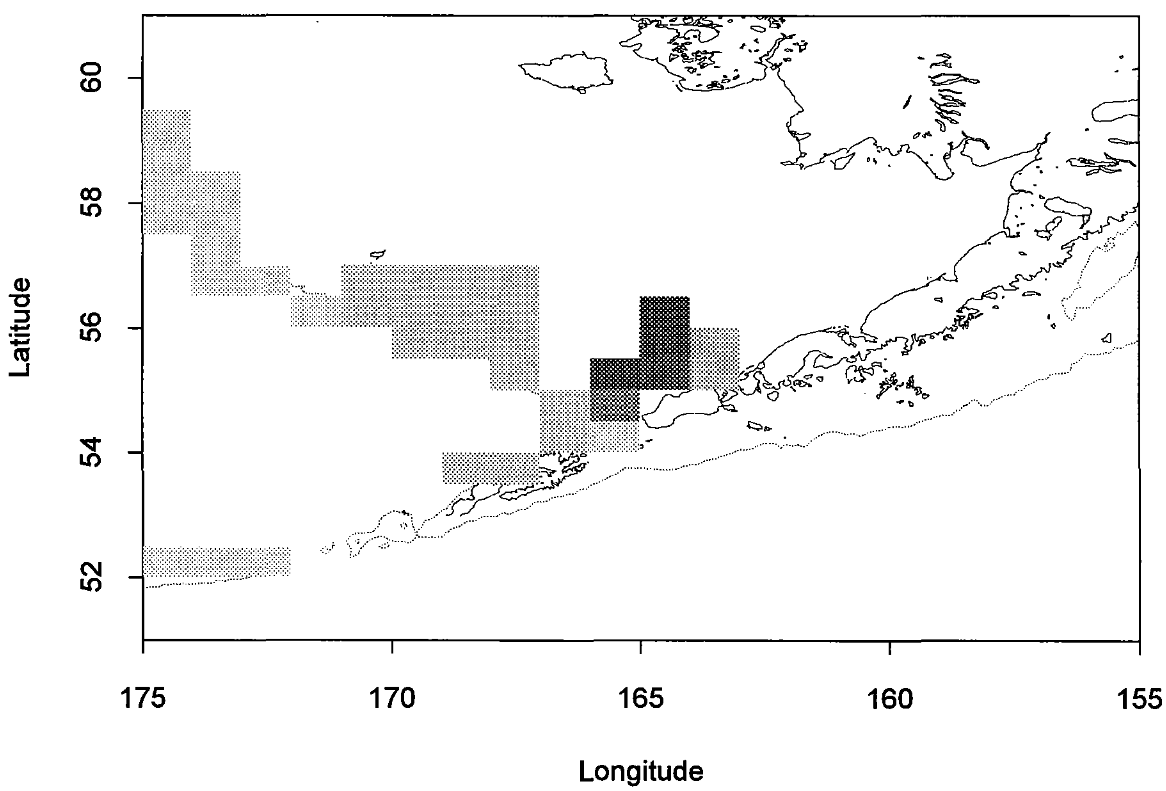
Halibut 15-24cm: February



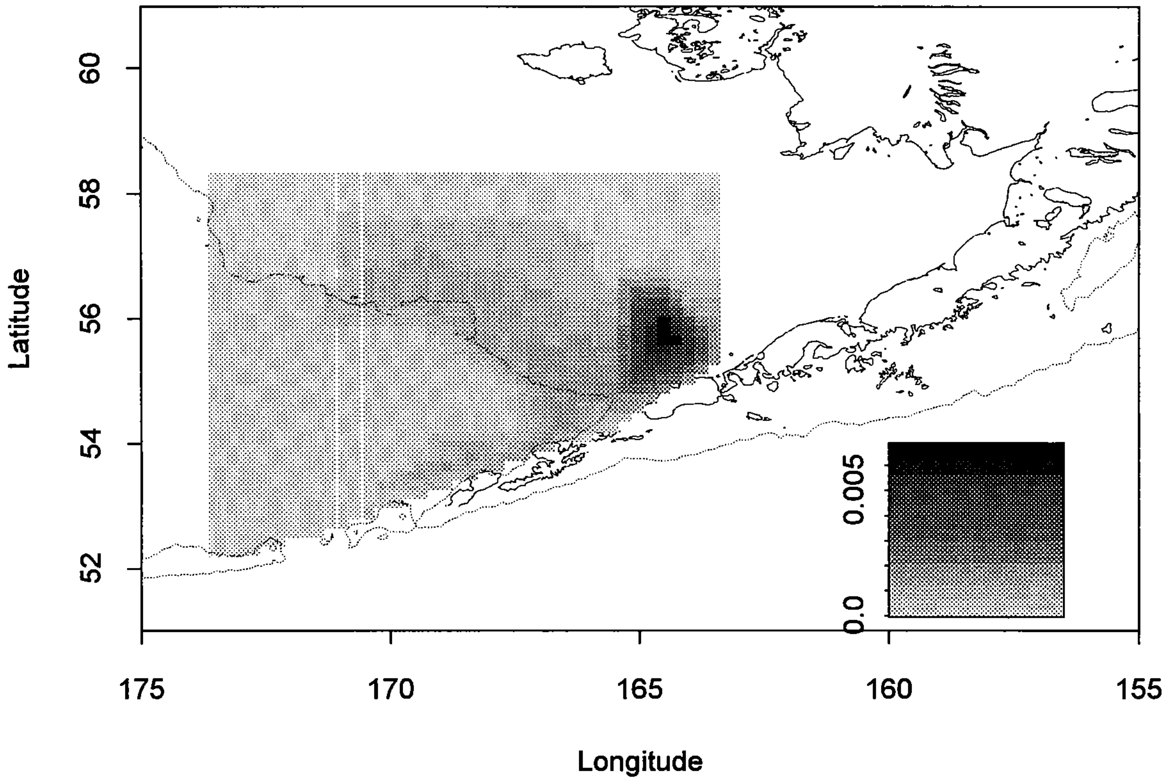


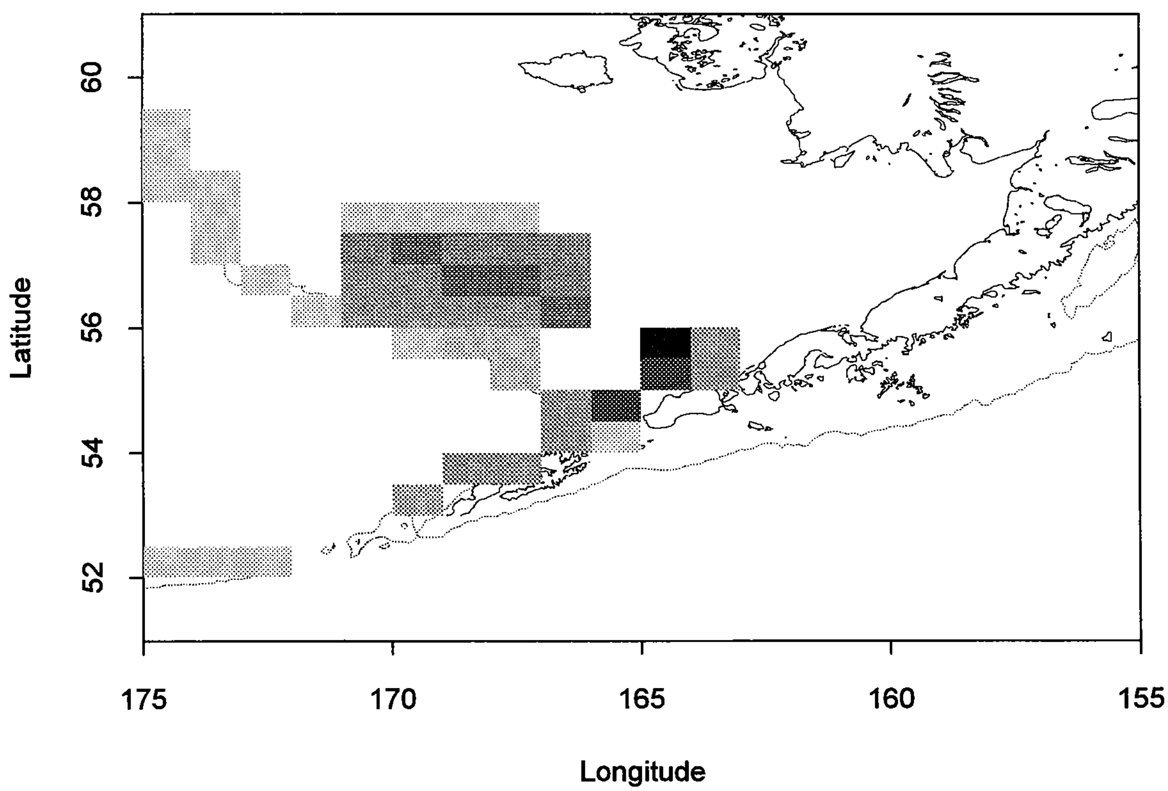
Halibut 15-24cm: March



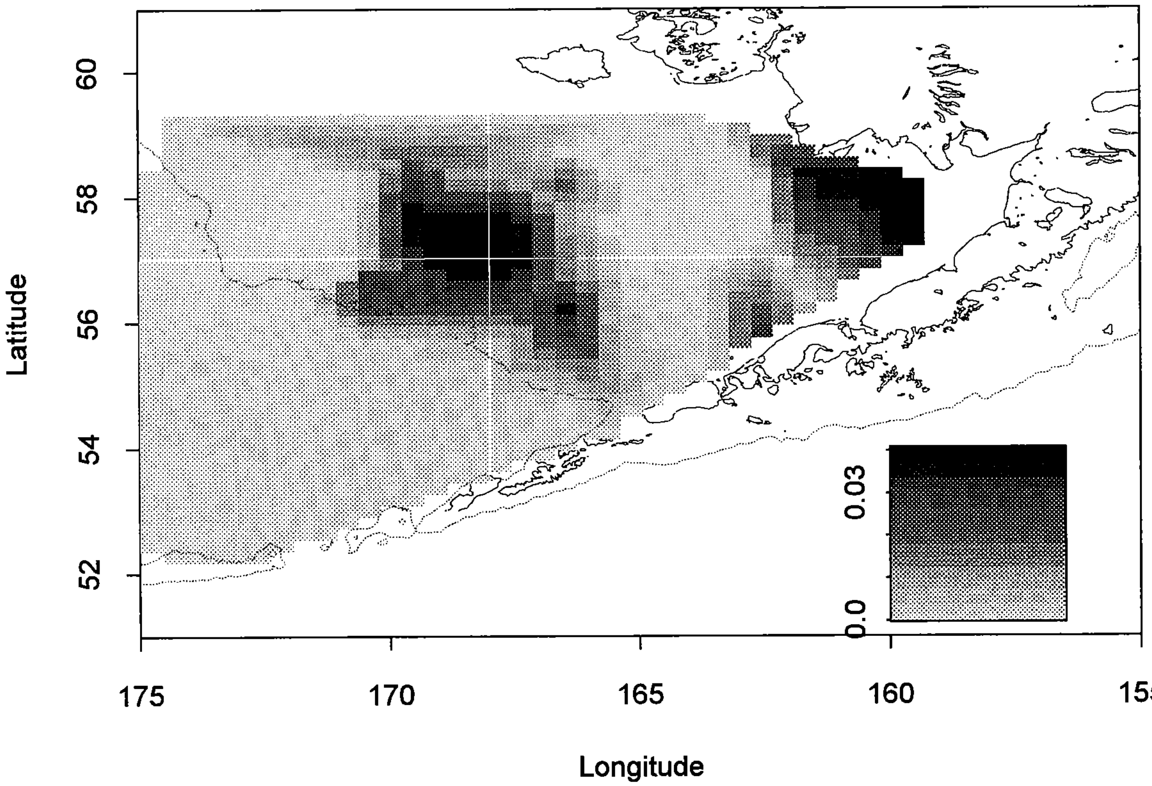


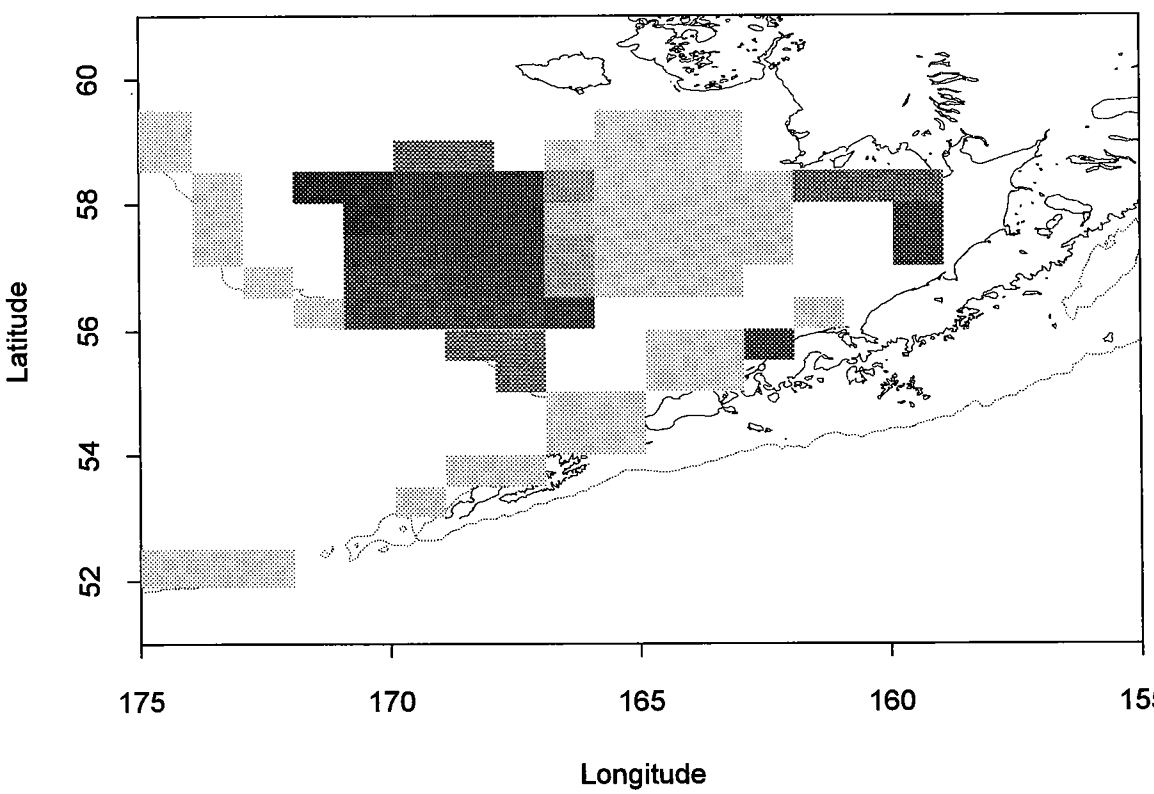
Halibut 15-24cm: April



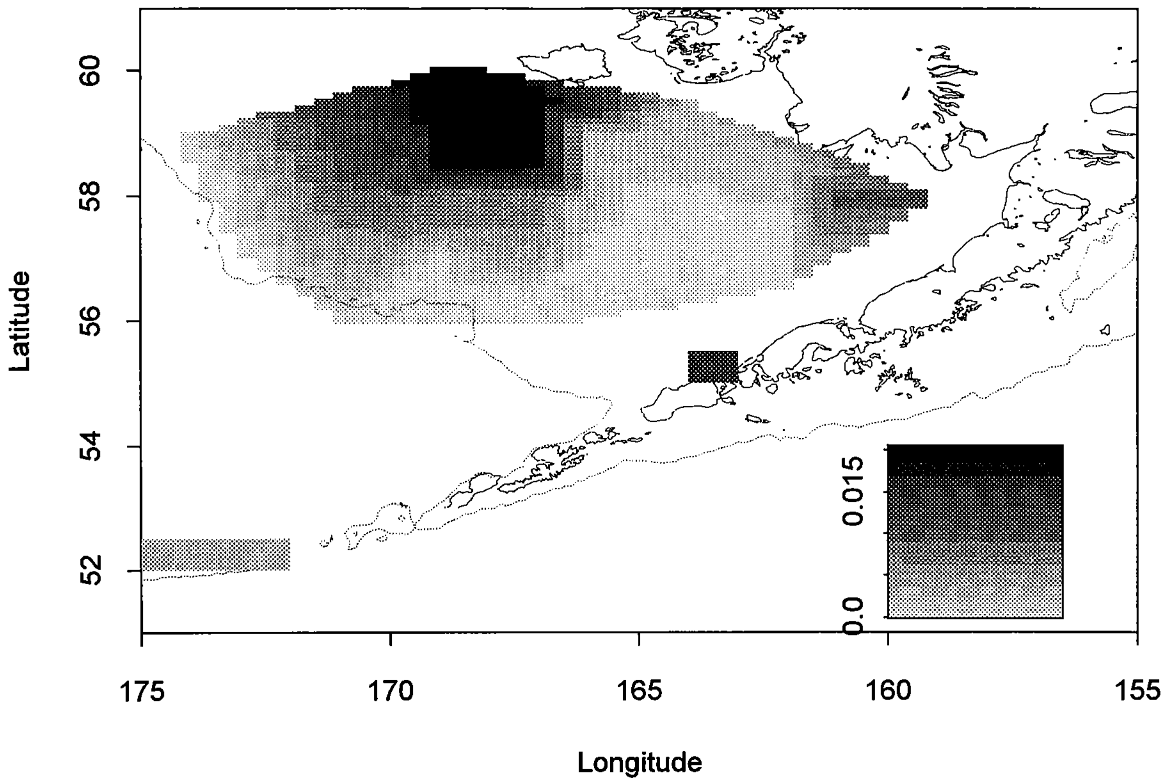


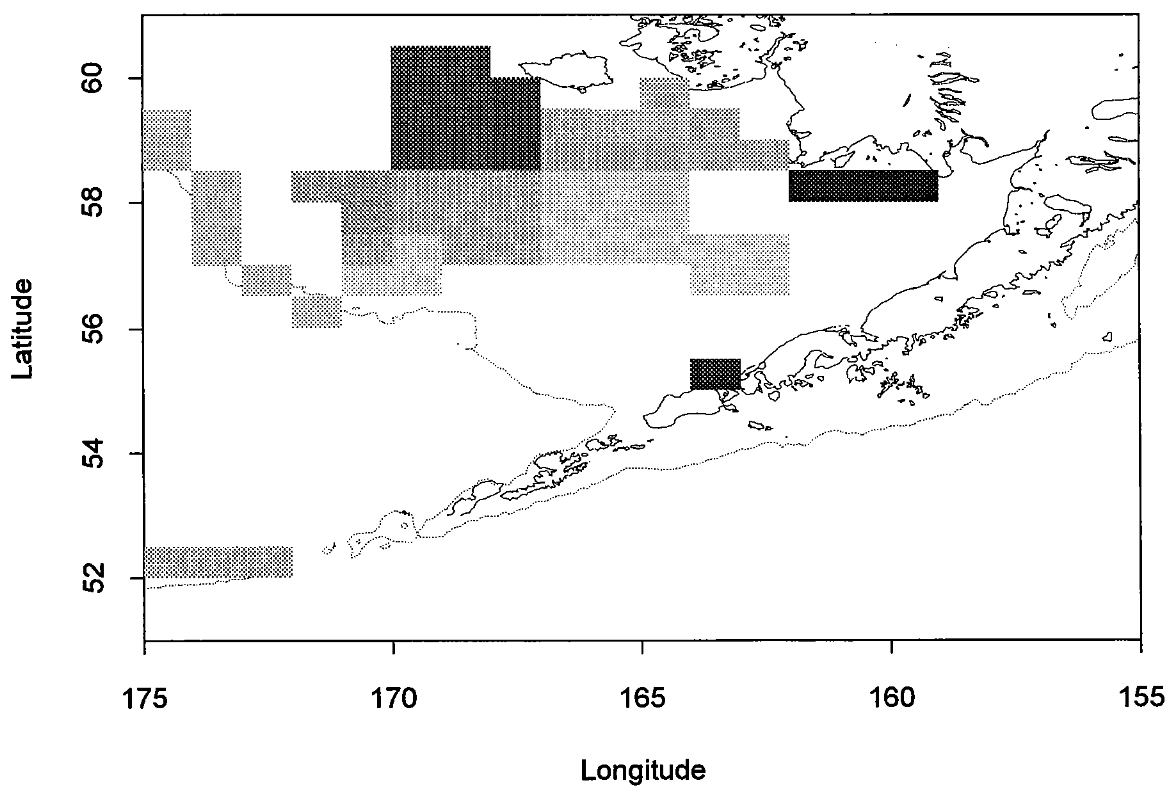
Halibut 15-24cm: May



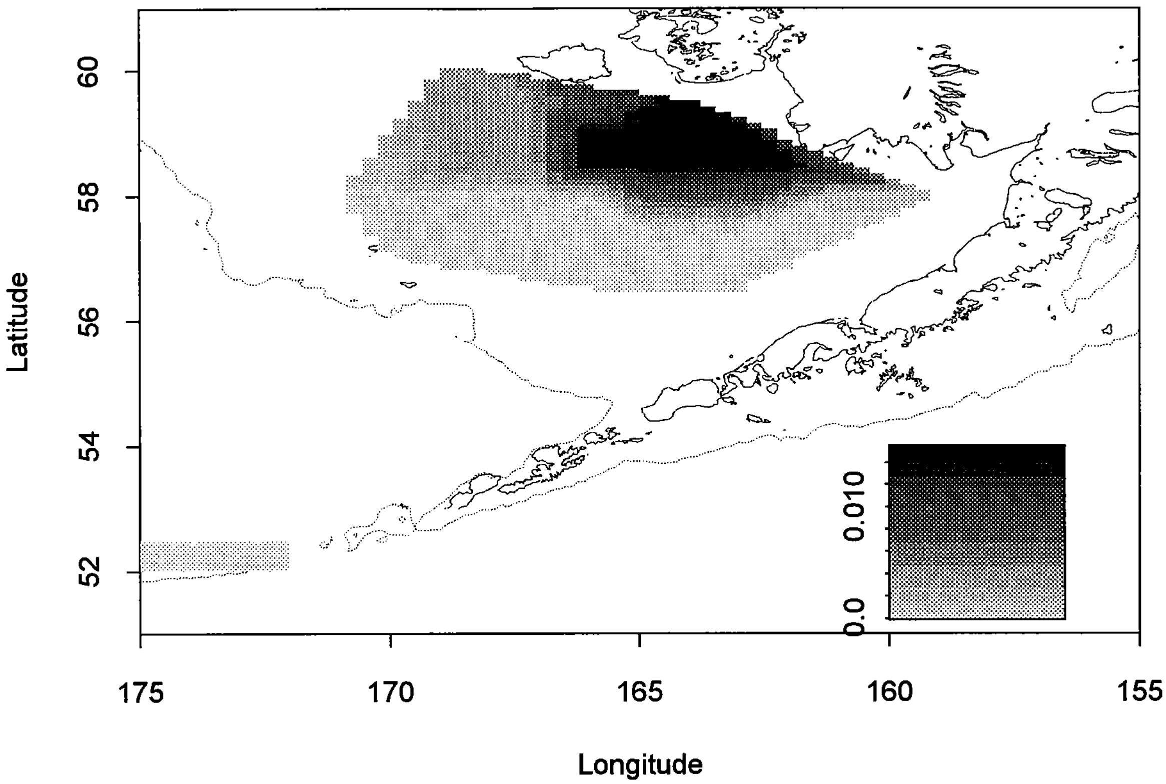


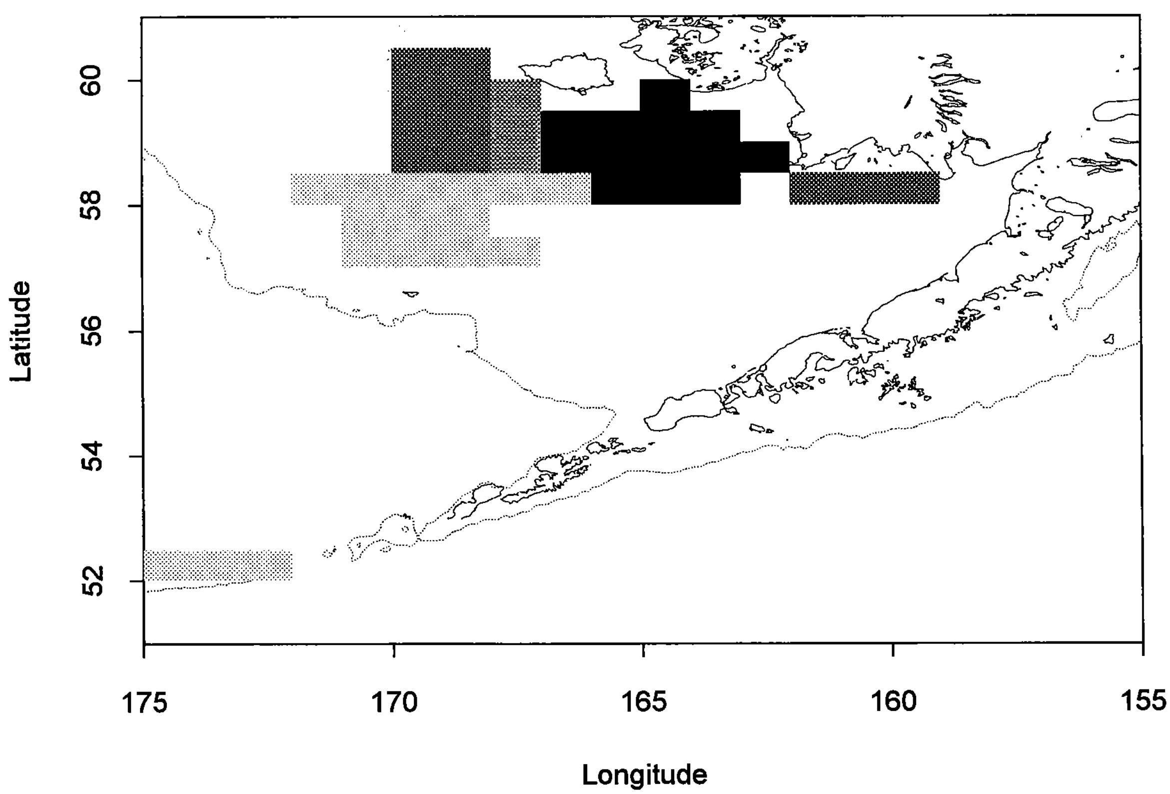
Halibut 15-24cm: June



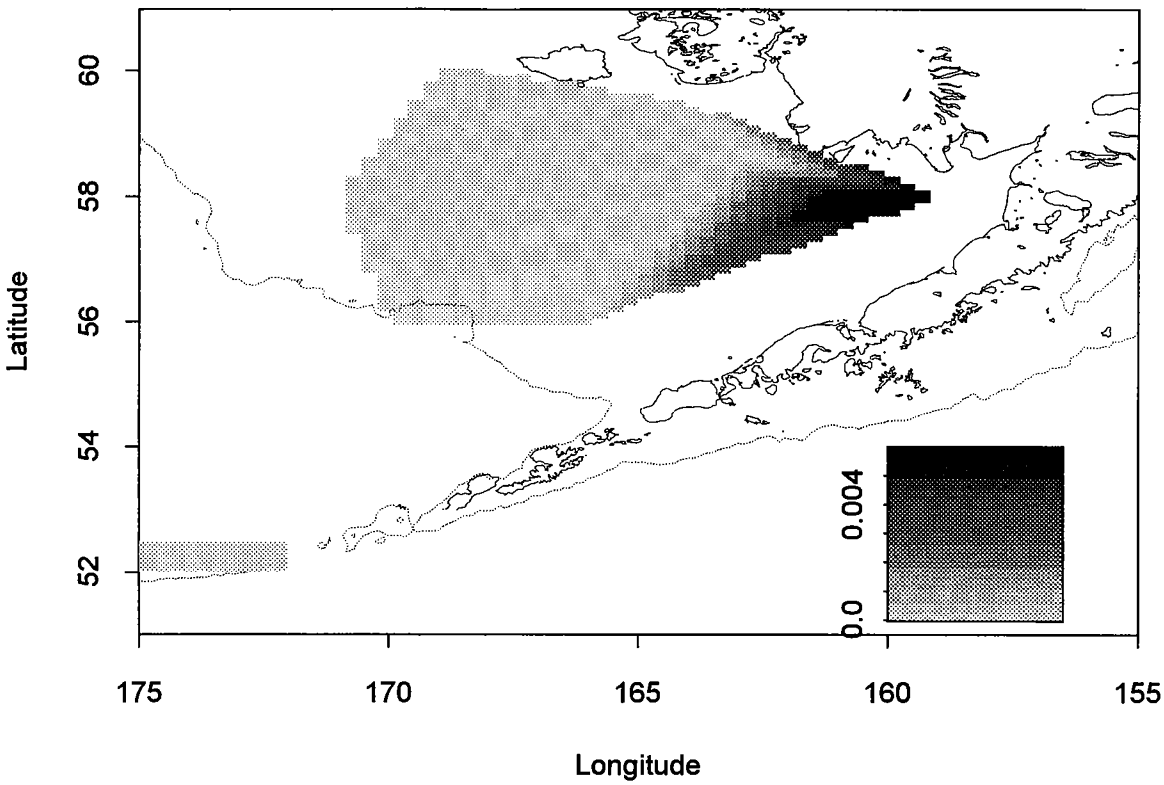


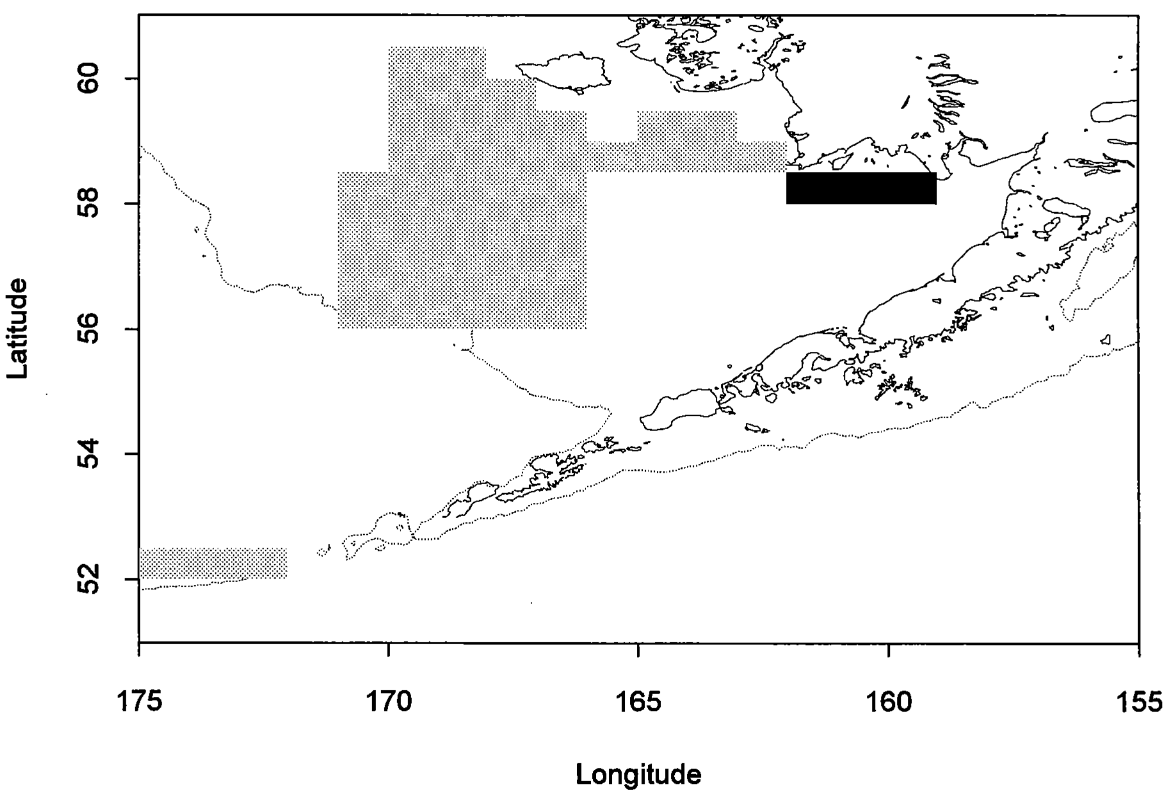
Halibut 15-24cm: July



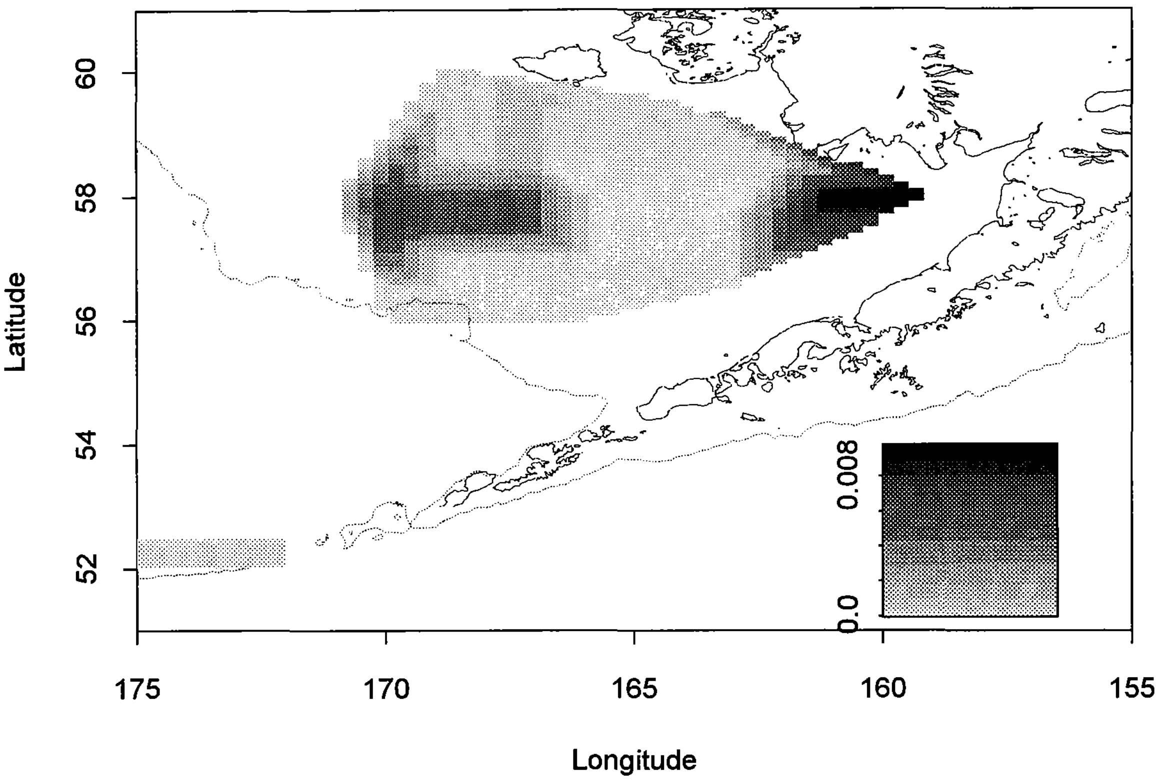


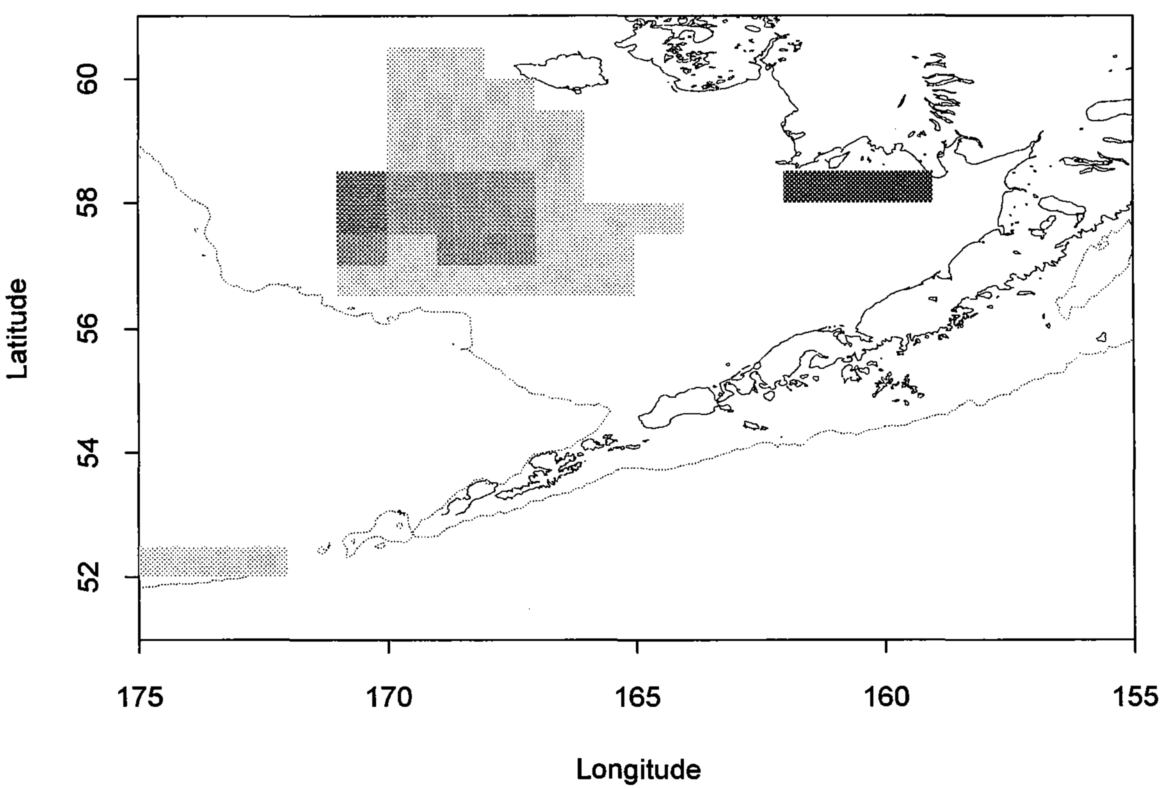
Halibut 15-24cm: August



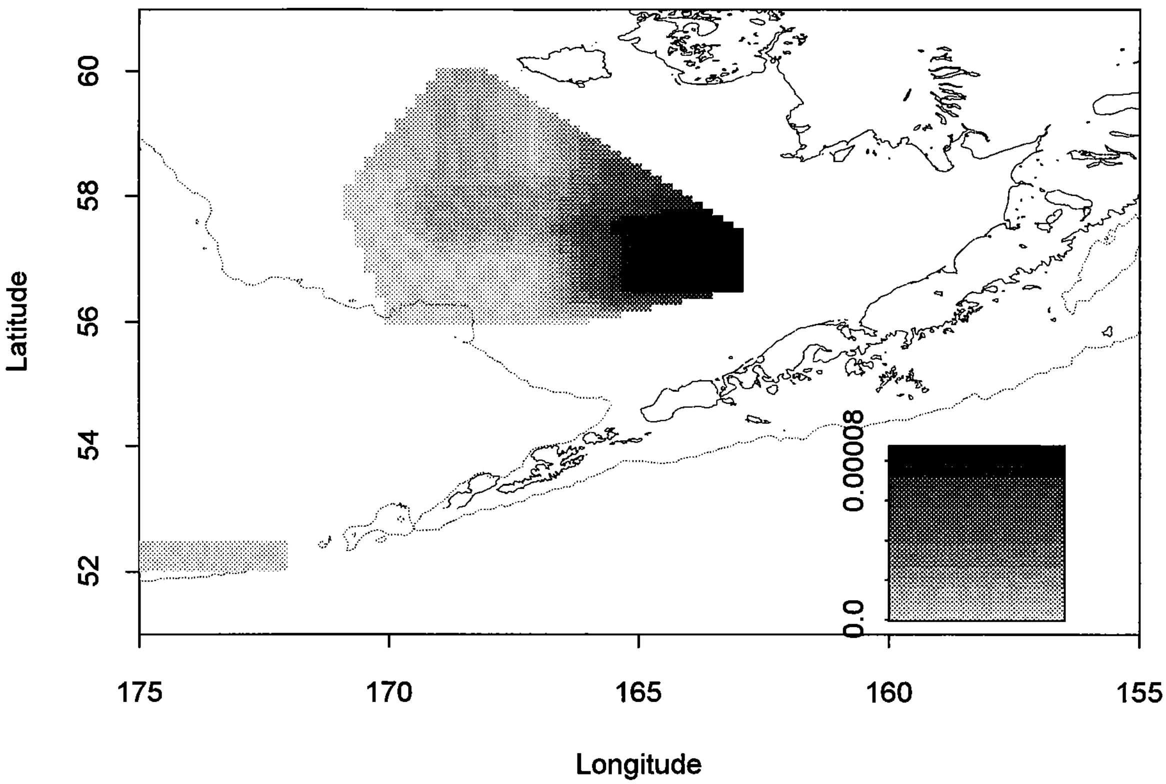


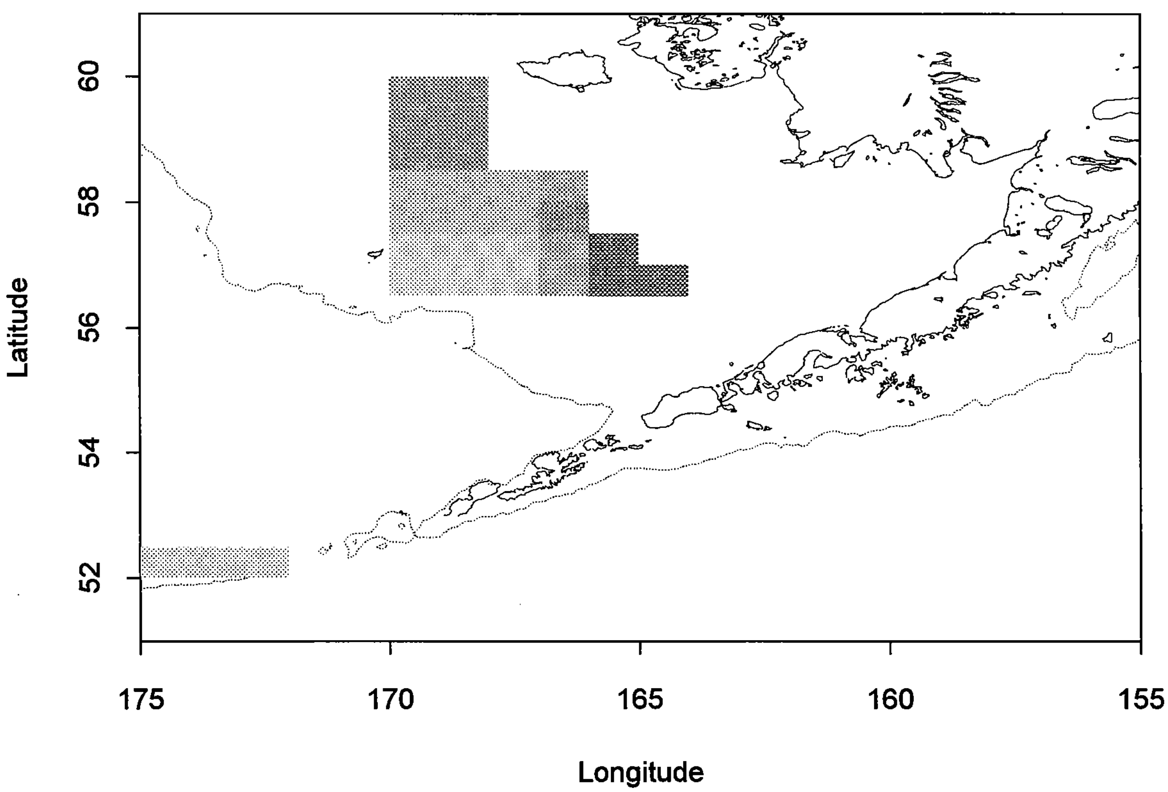
Halibut 15-24cm: September



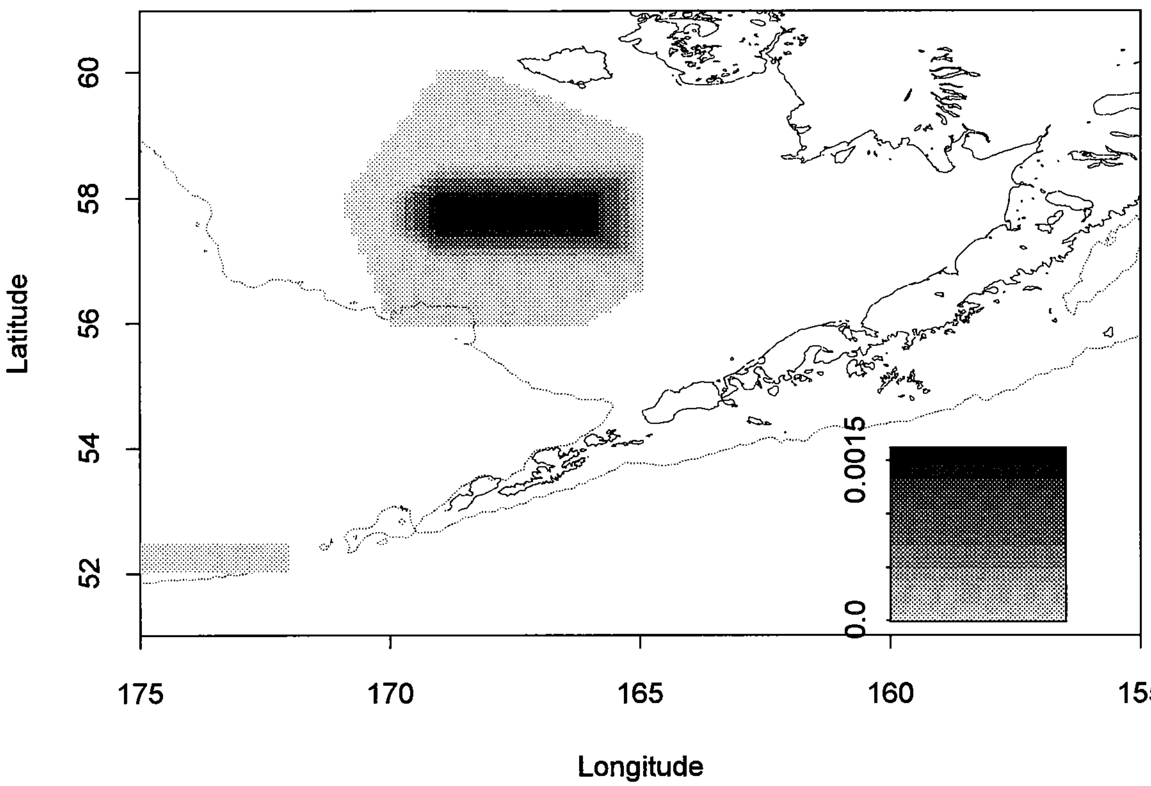


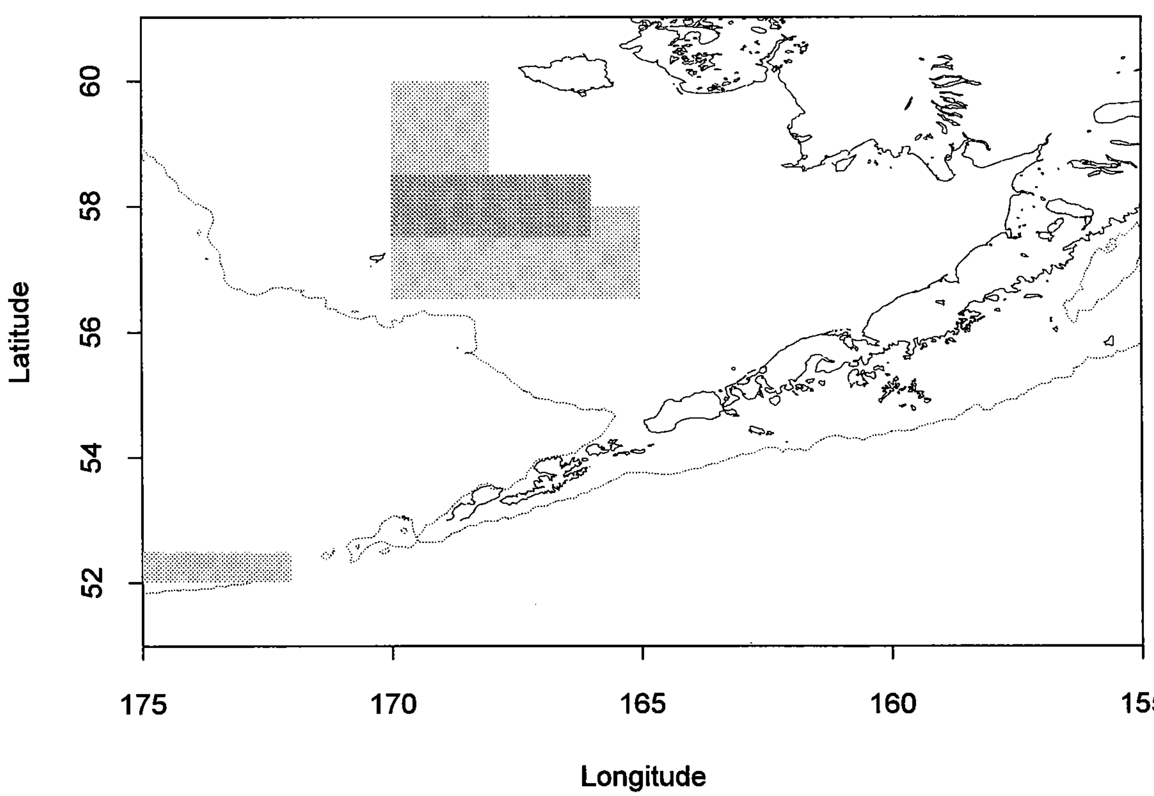
Halibut 15-24cm: October



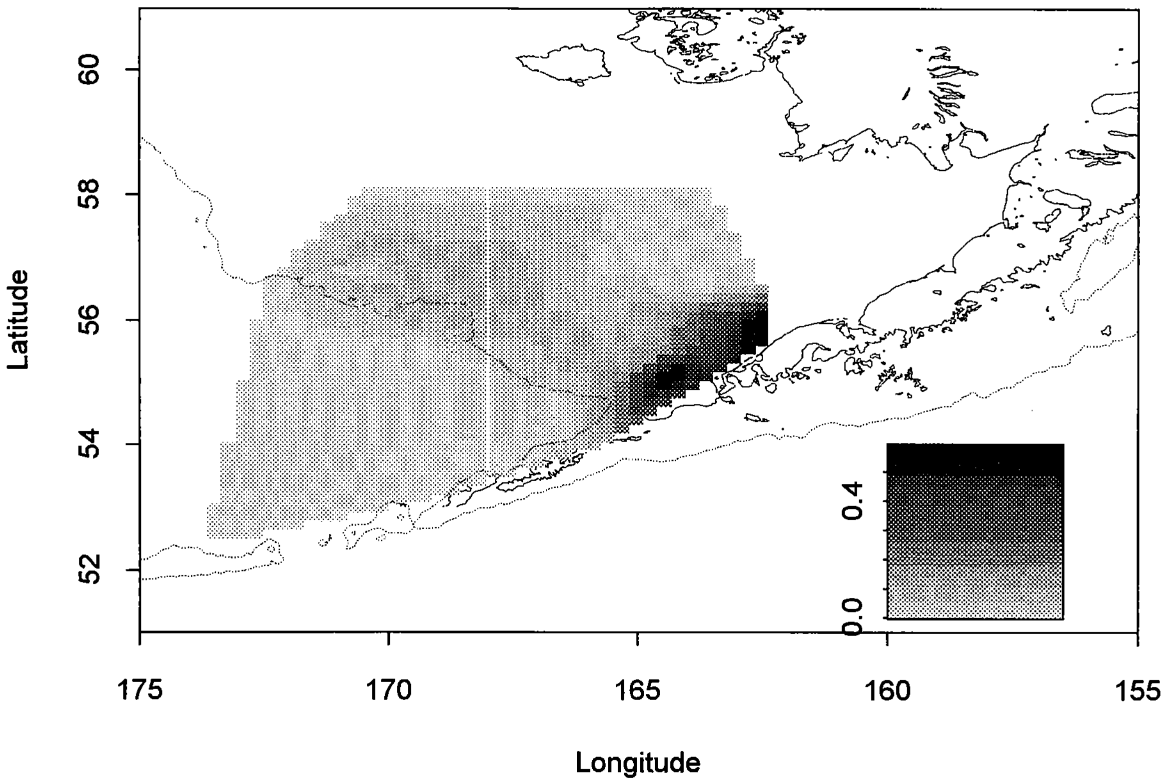


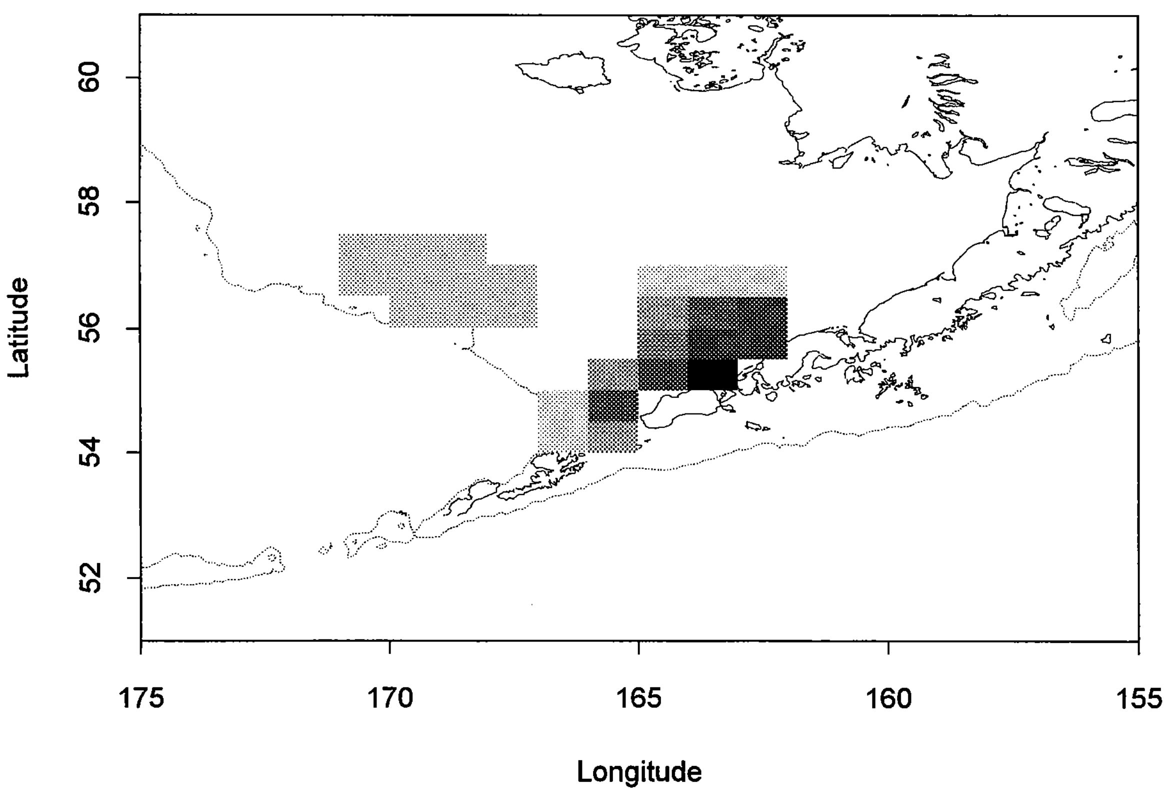
Halibut 15-24cm: November



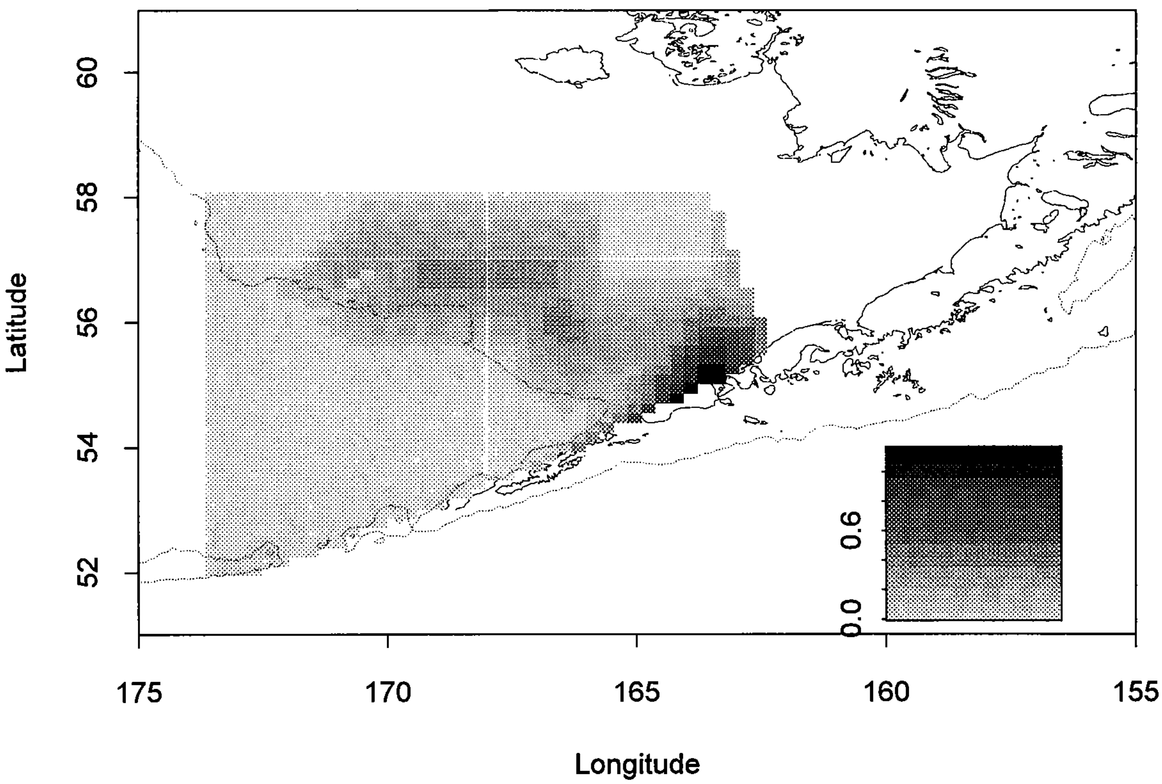


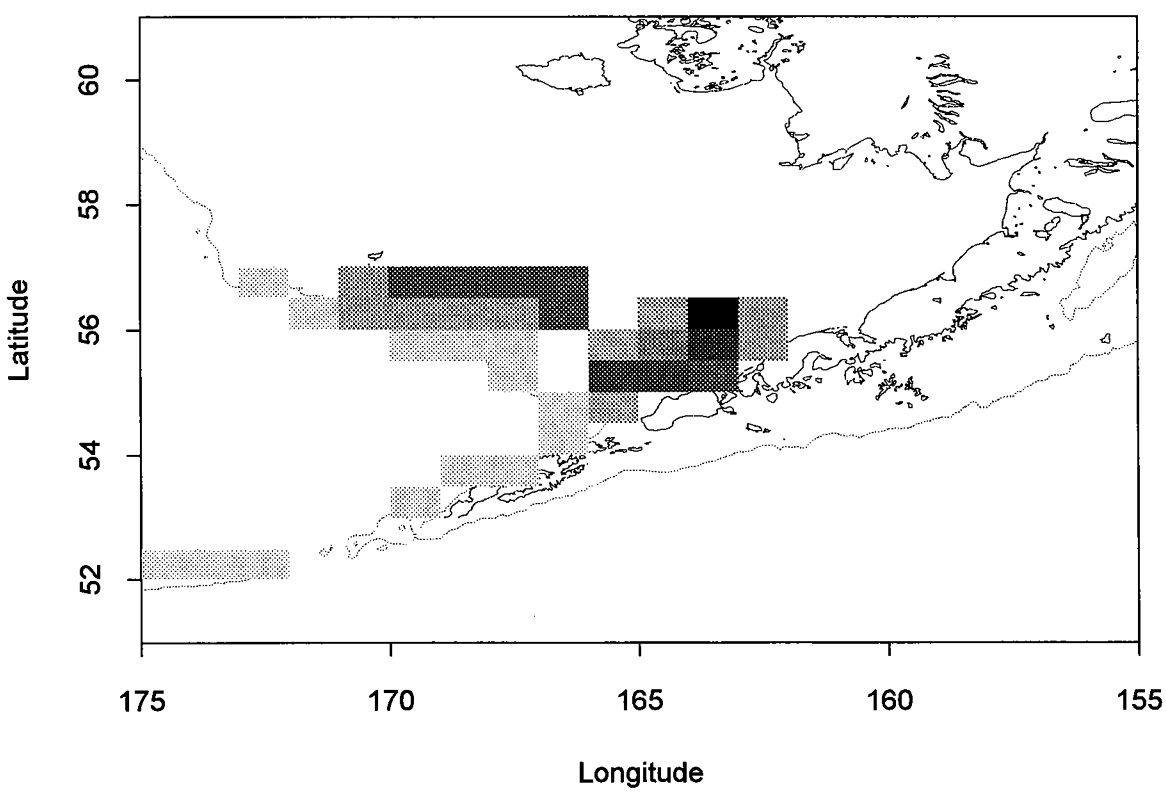
Halibut 25-34cm: January



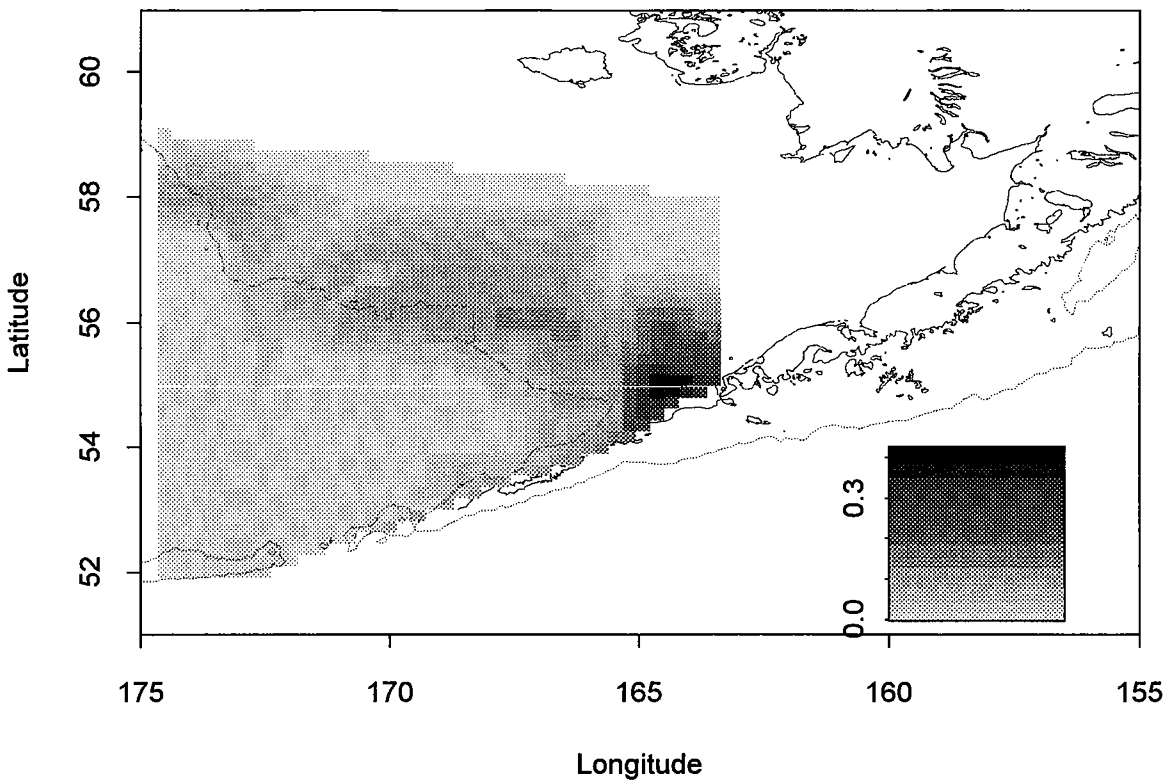


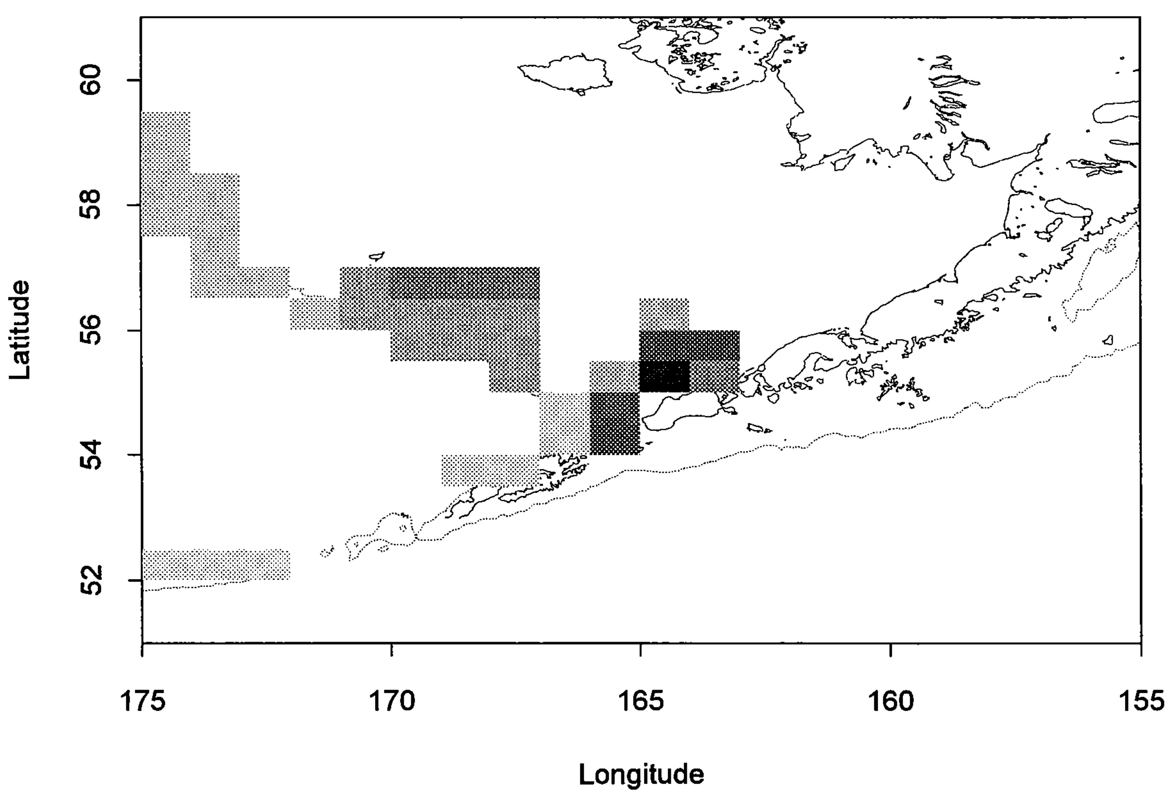
Halibut 25-34cm: February



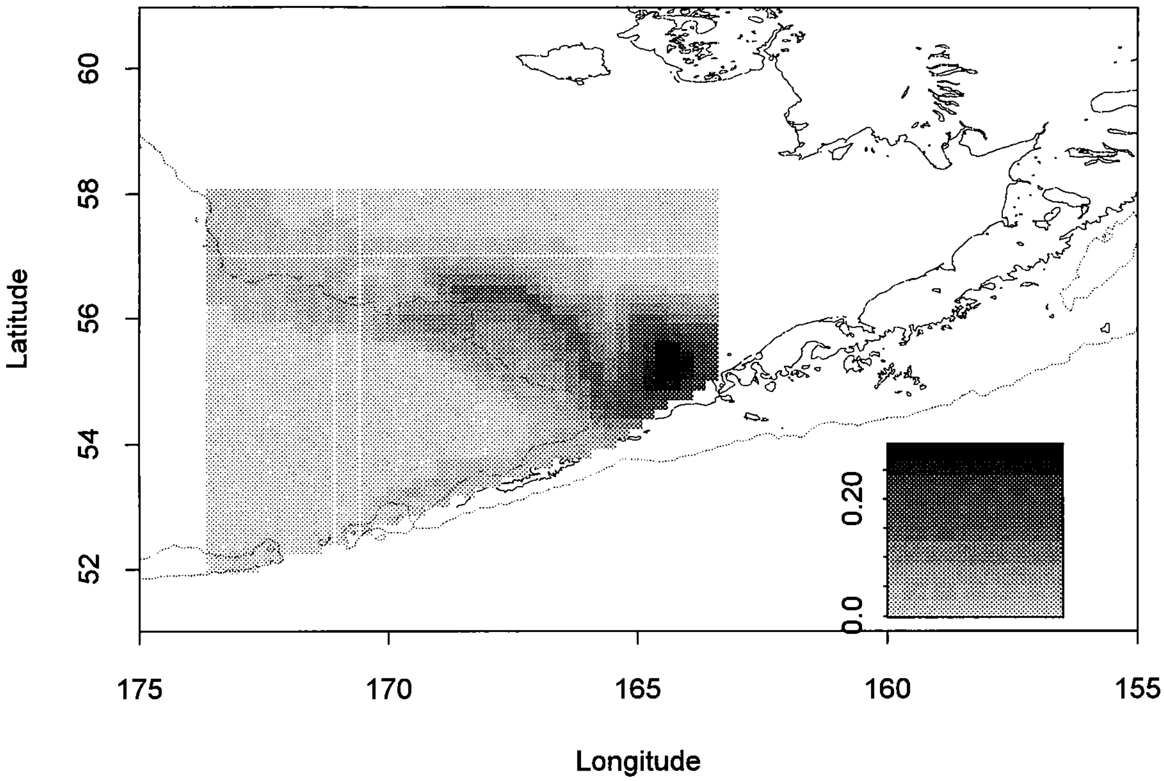


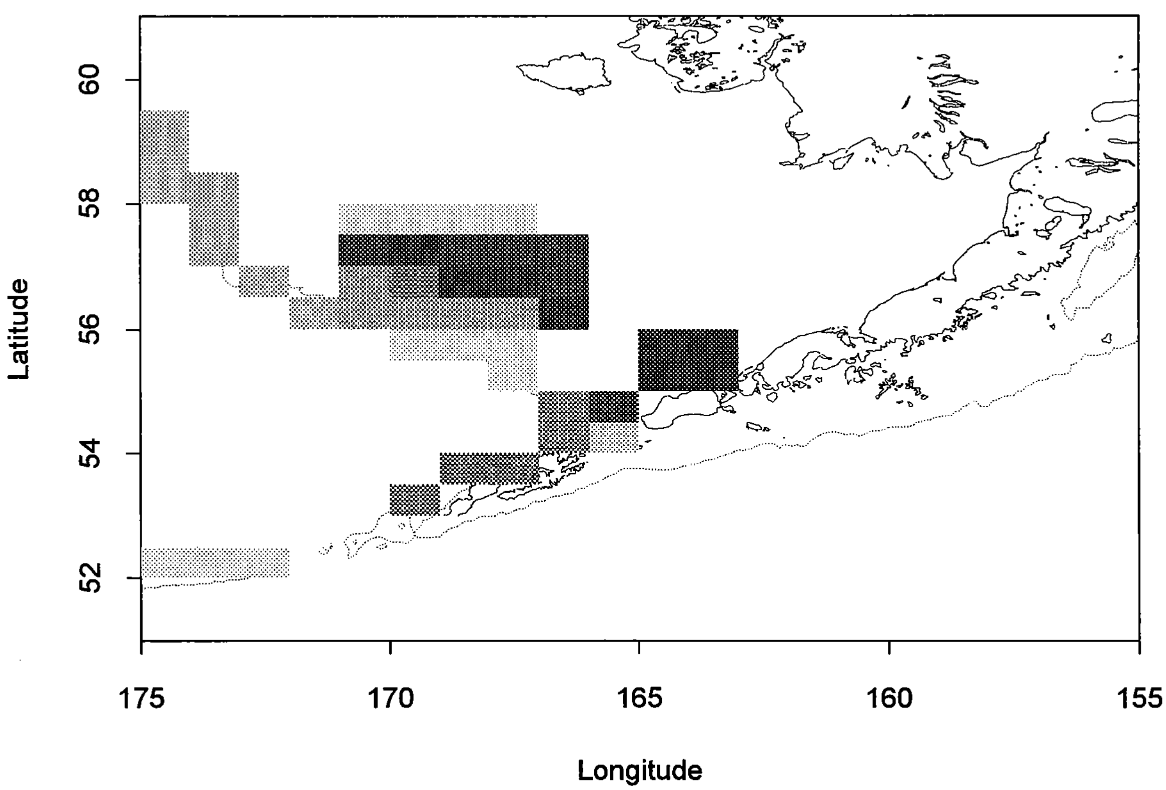
Halibut 25-34cm: March



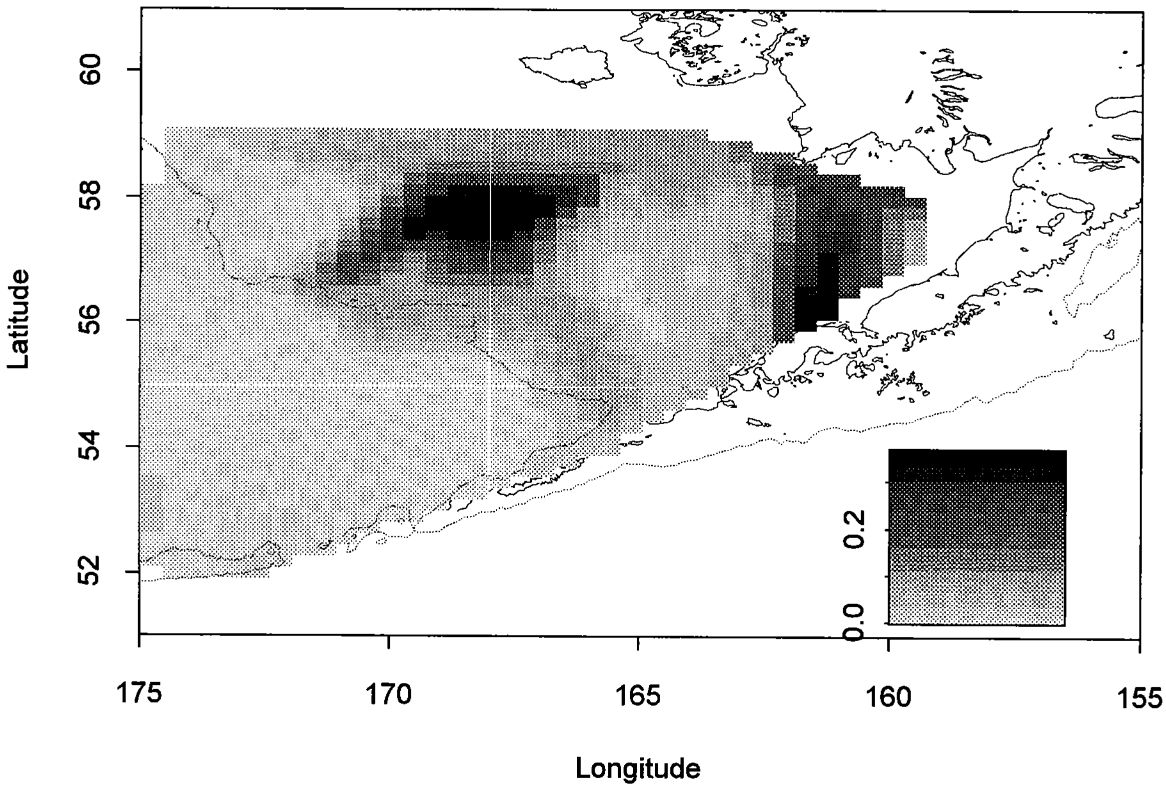


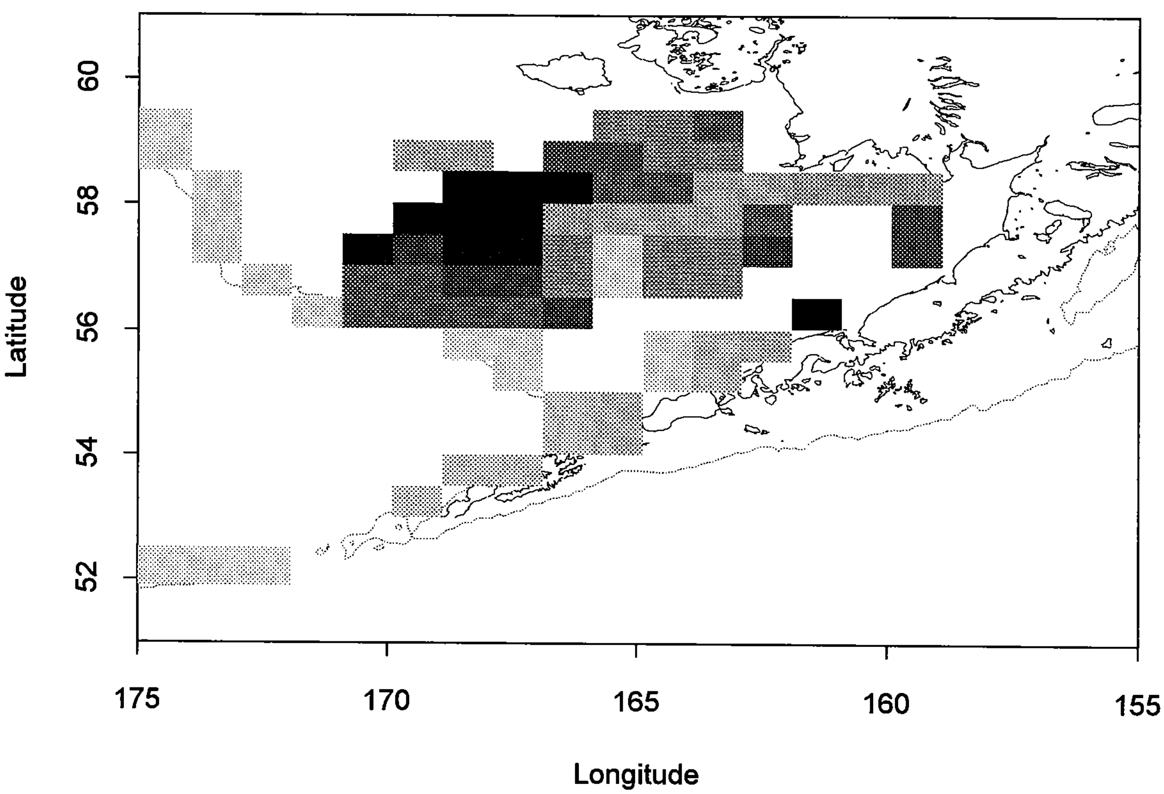
Halibut 25-34cm: April



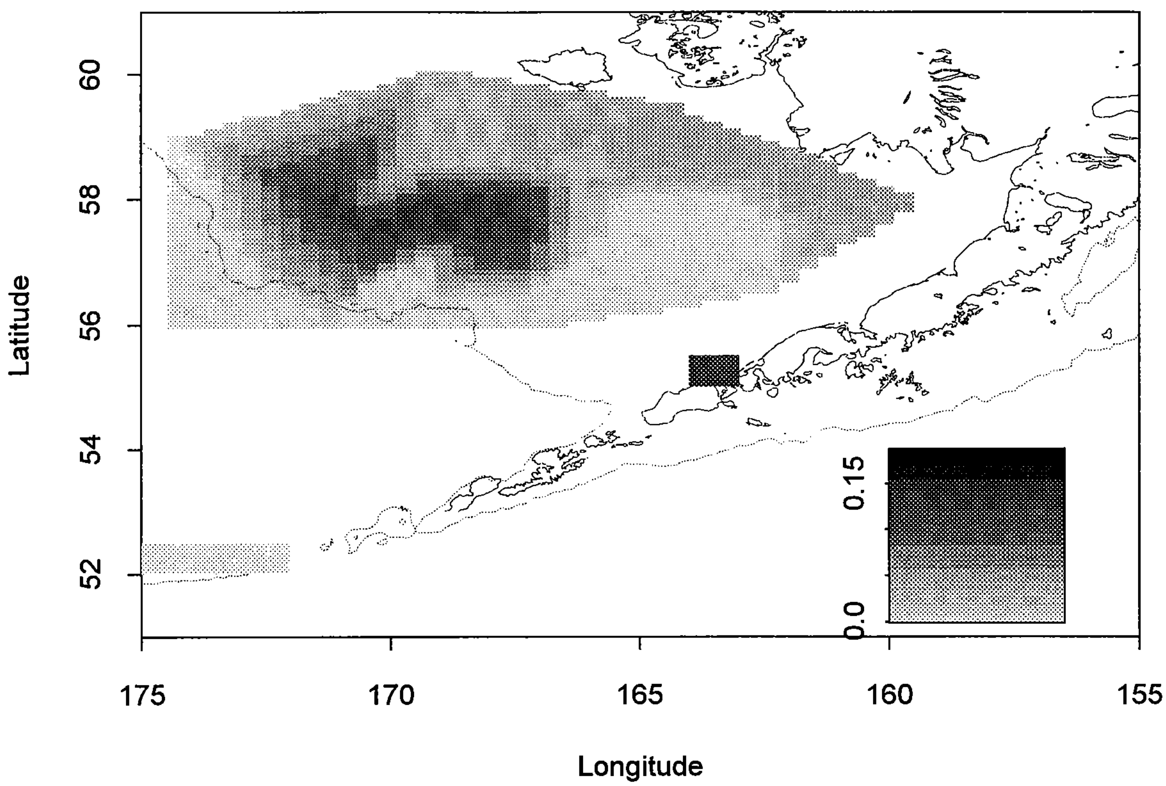


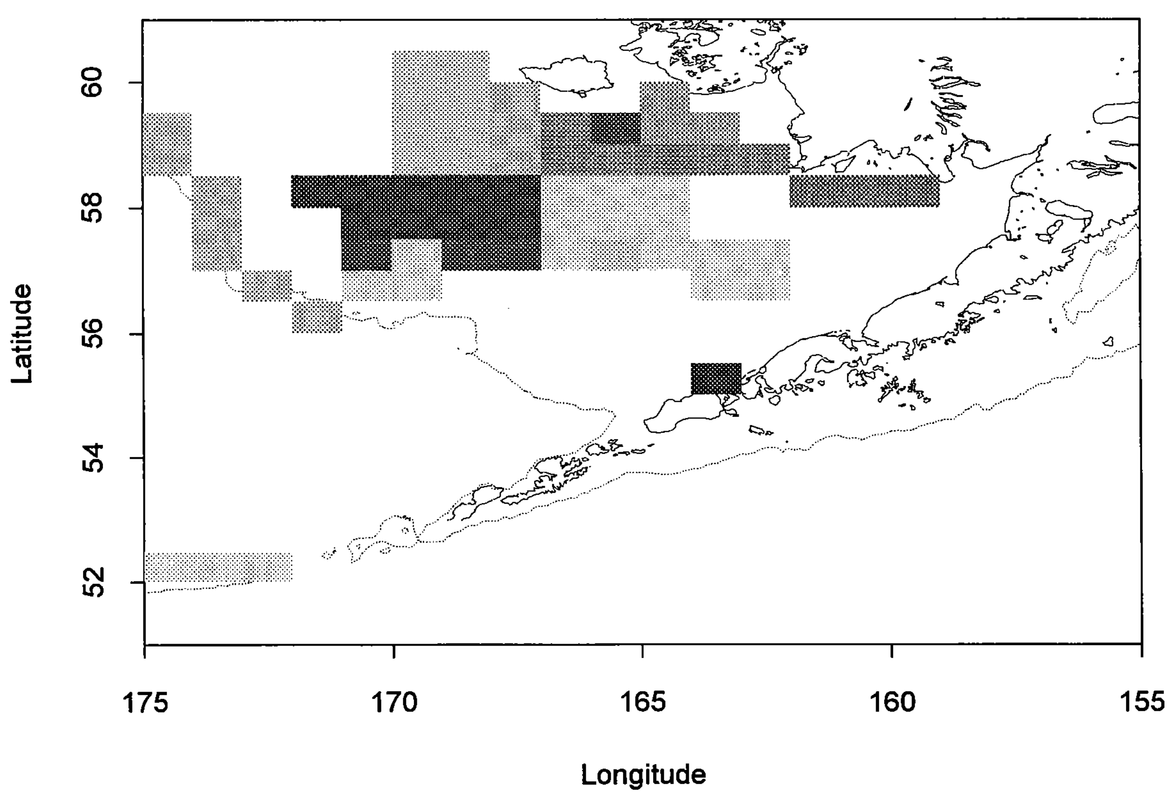
Halibut 25-34cm: May



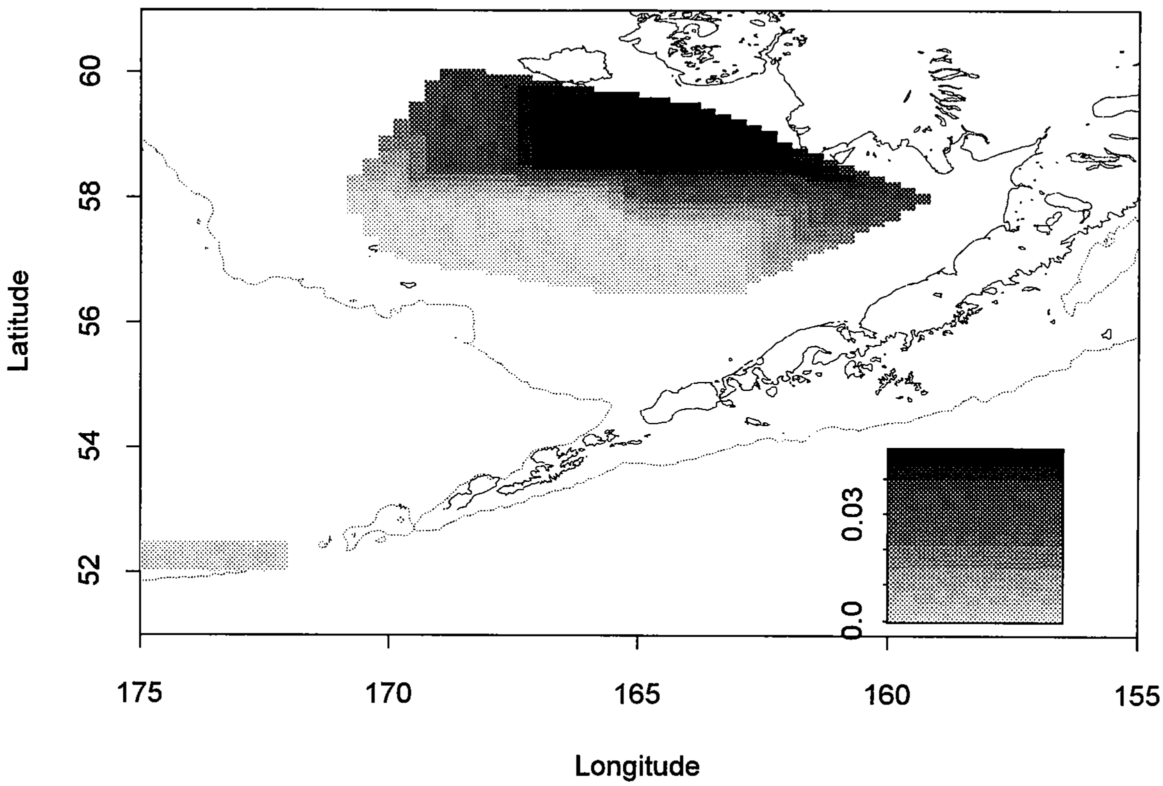


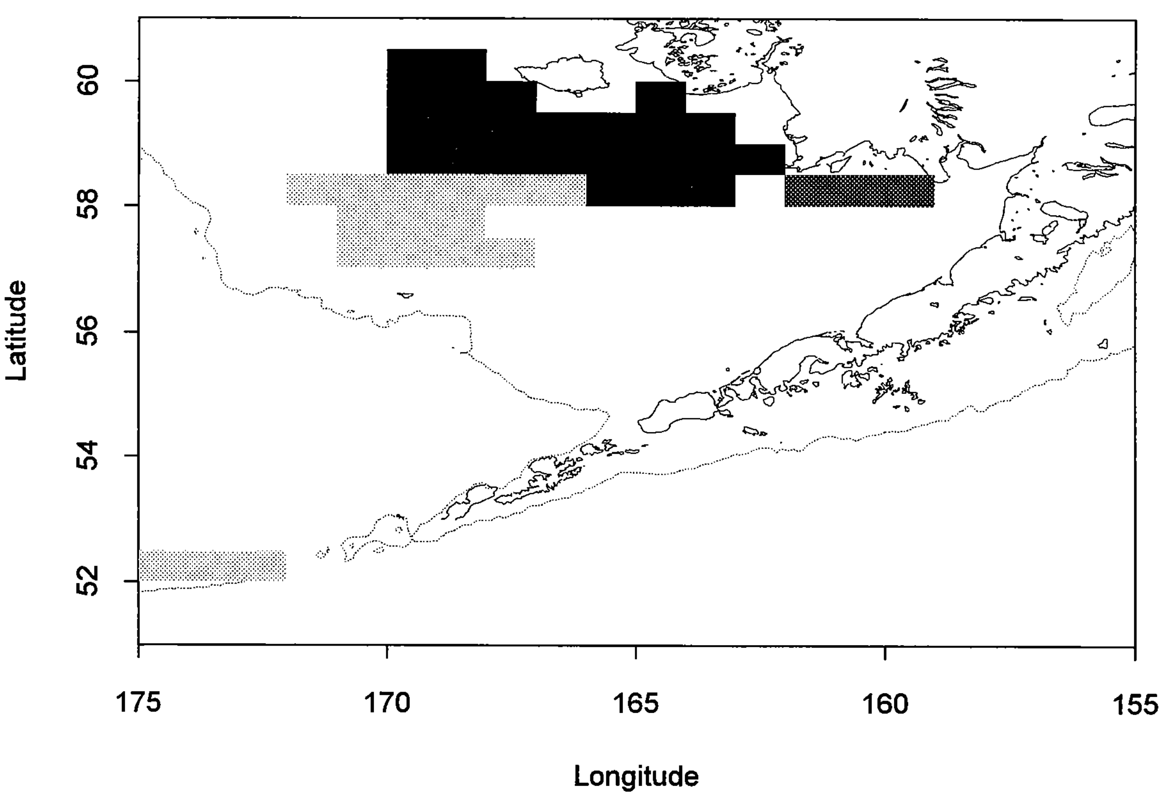
Halibut 25-34cm: June



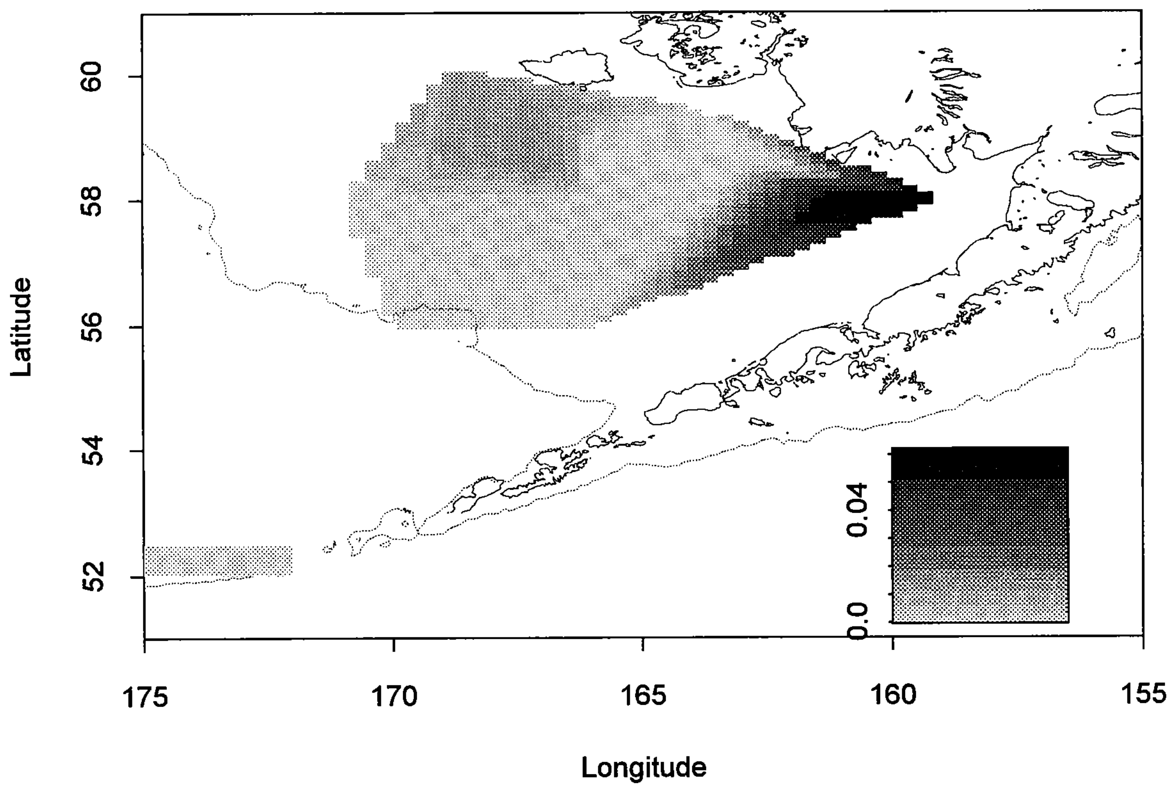


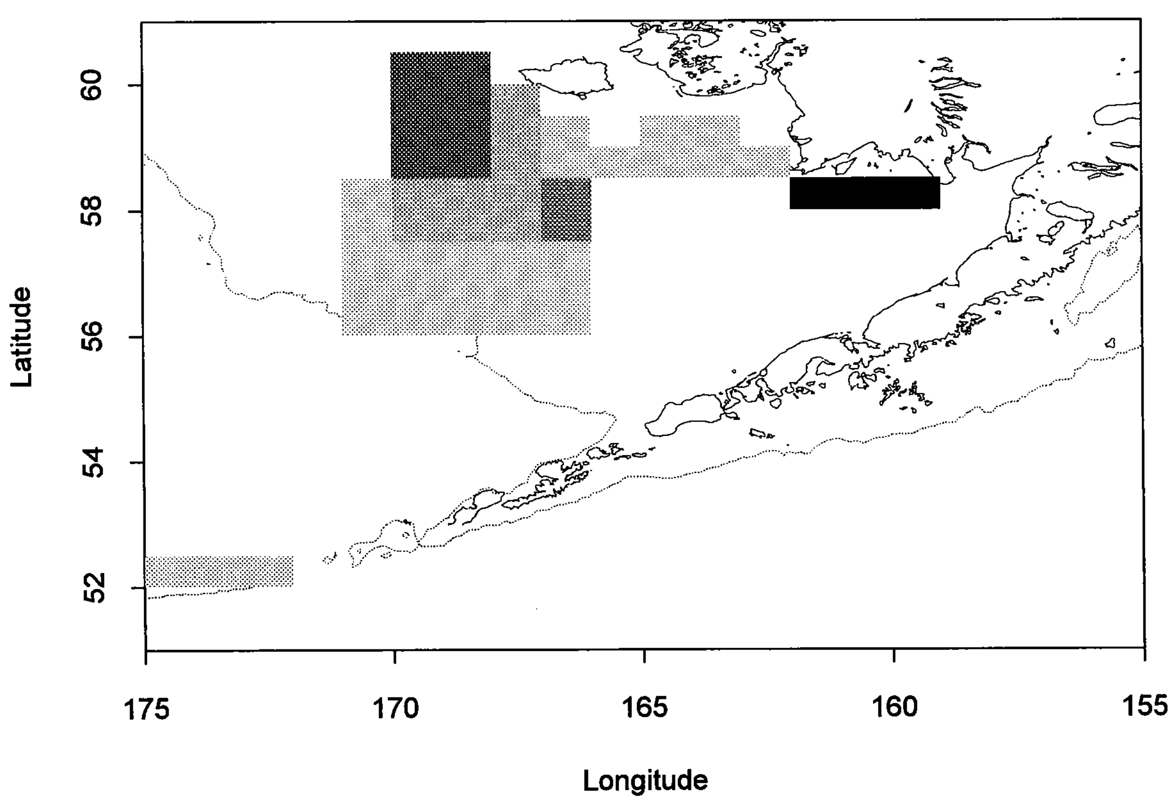
Halibut 25-34cm: July



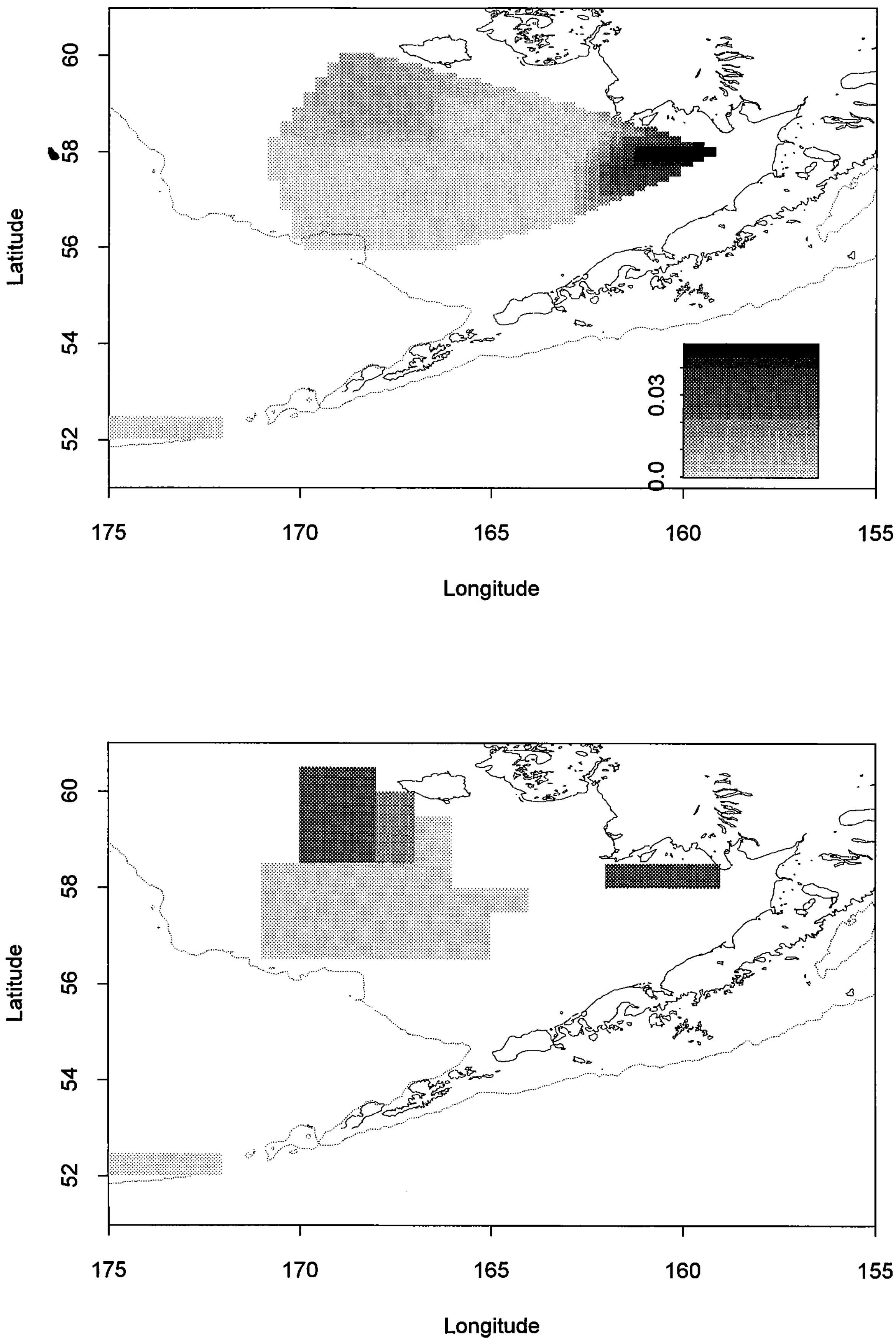


Halibut 25-34cm: August

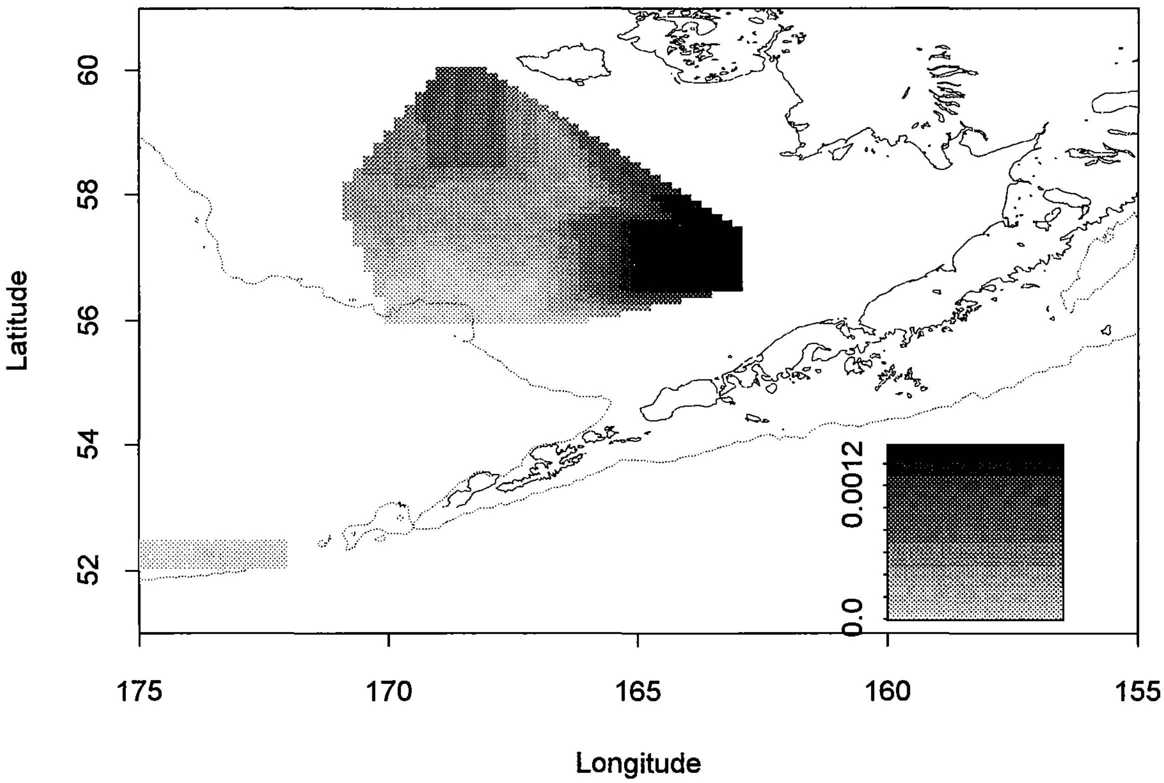


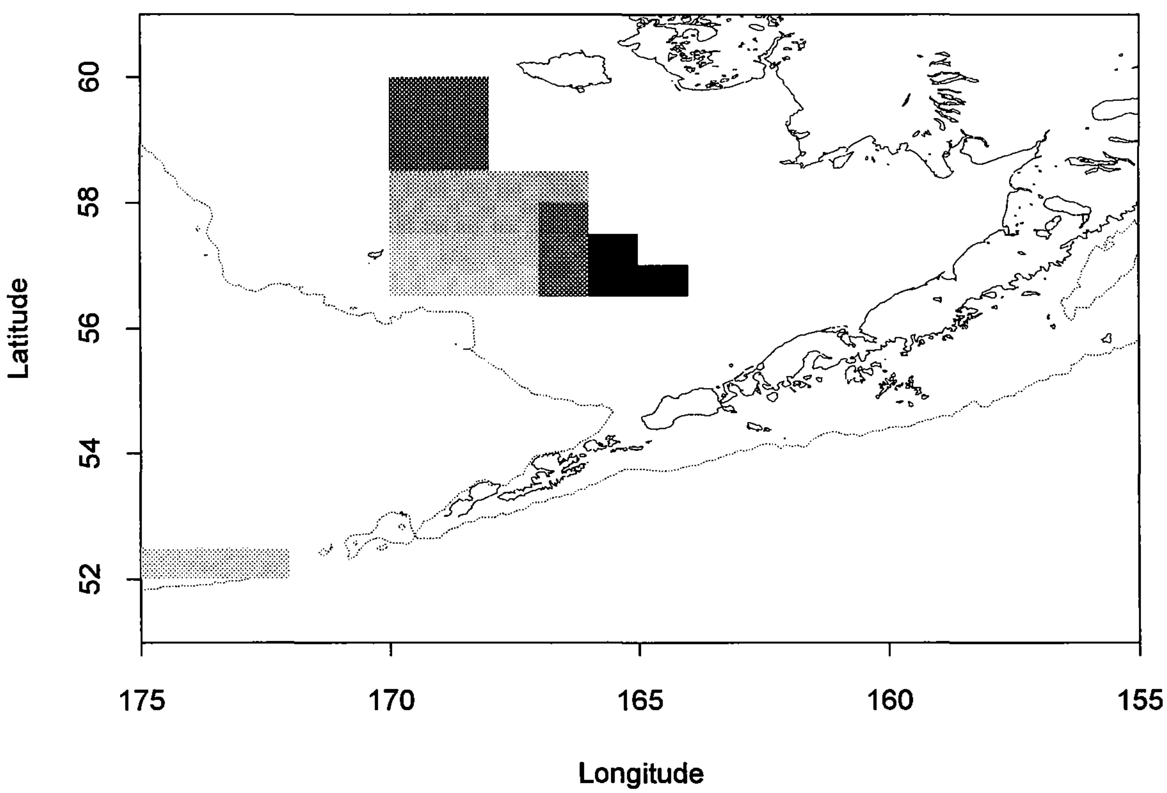


Halibut 25-34cm: September

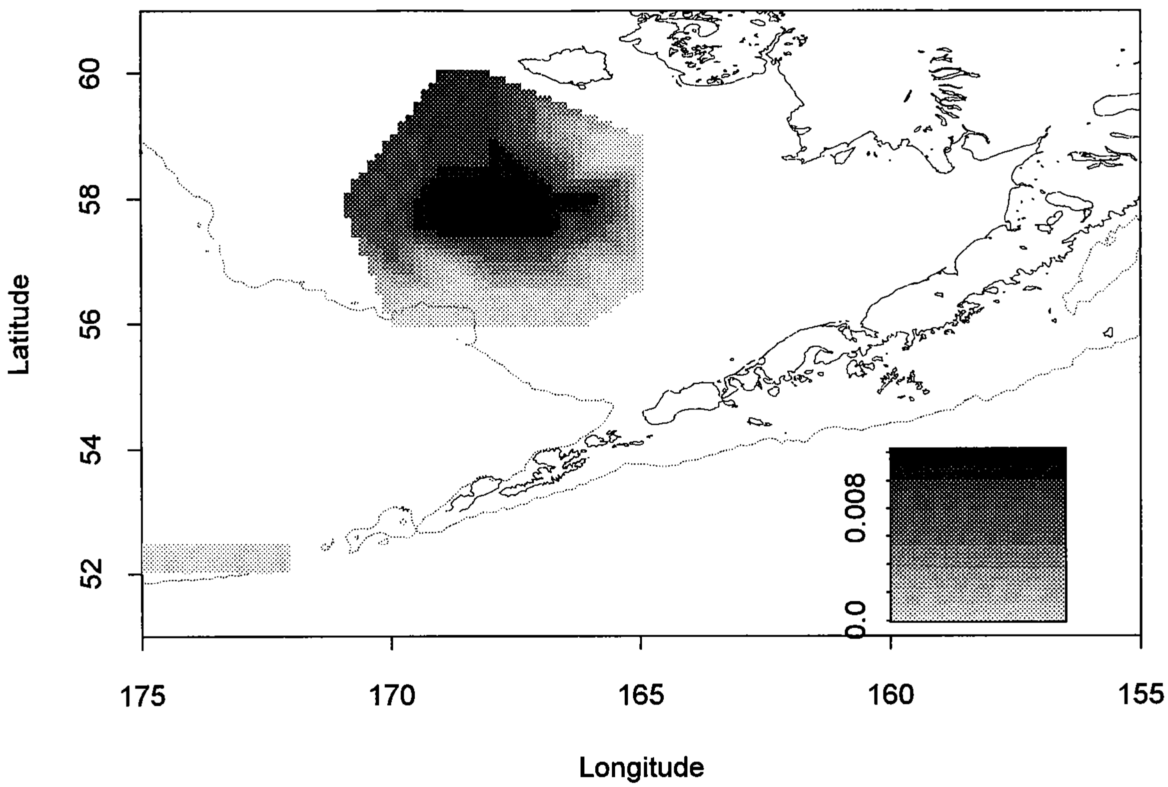


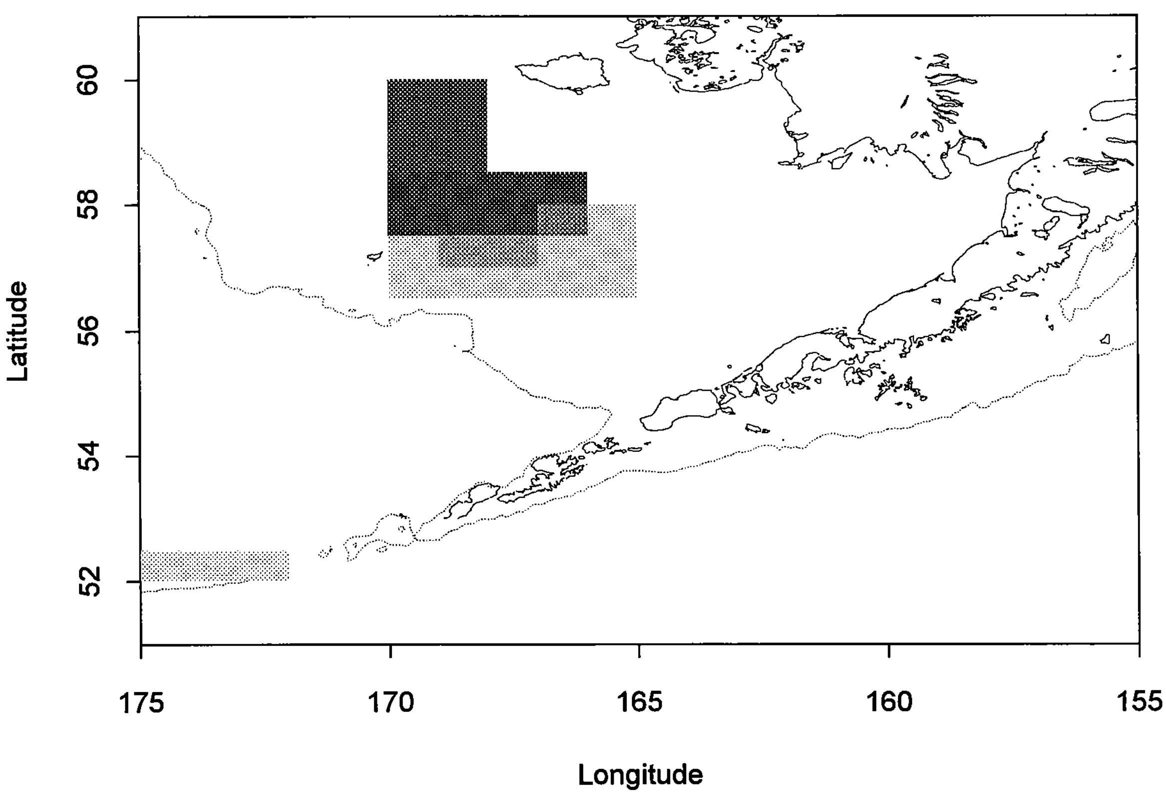
Halibut 25-34cm: October



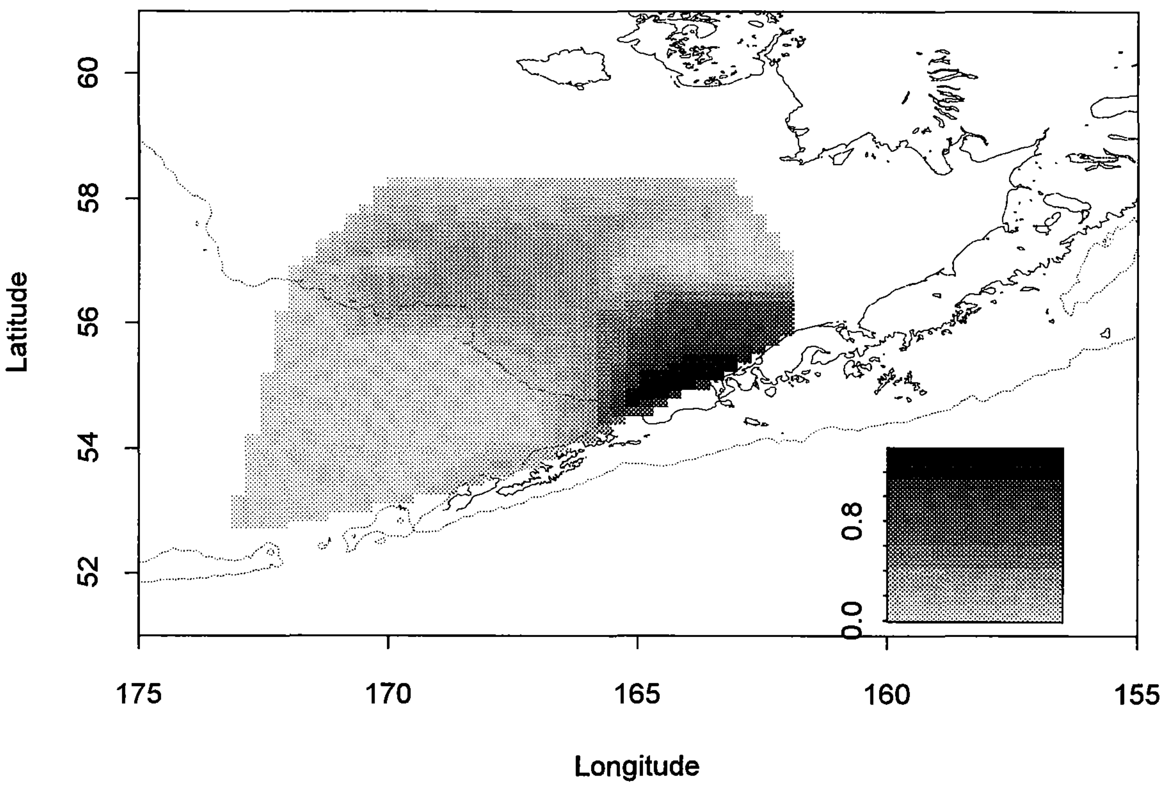


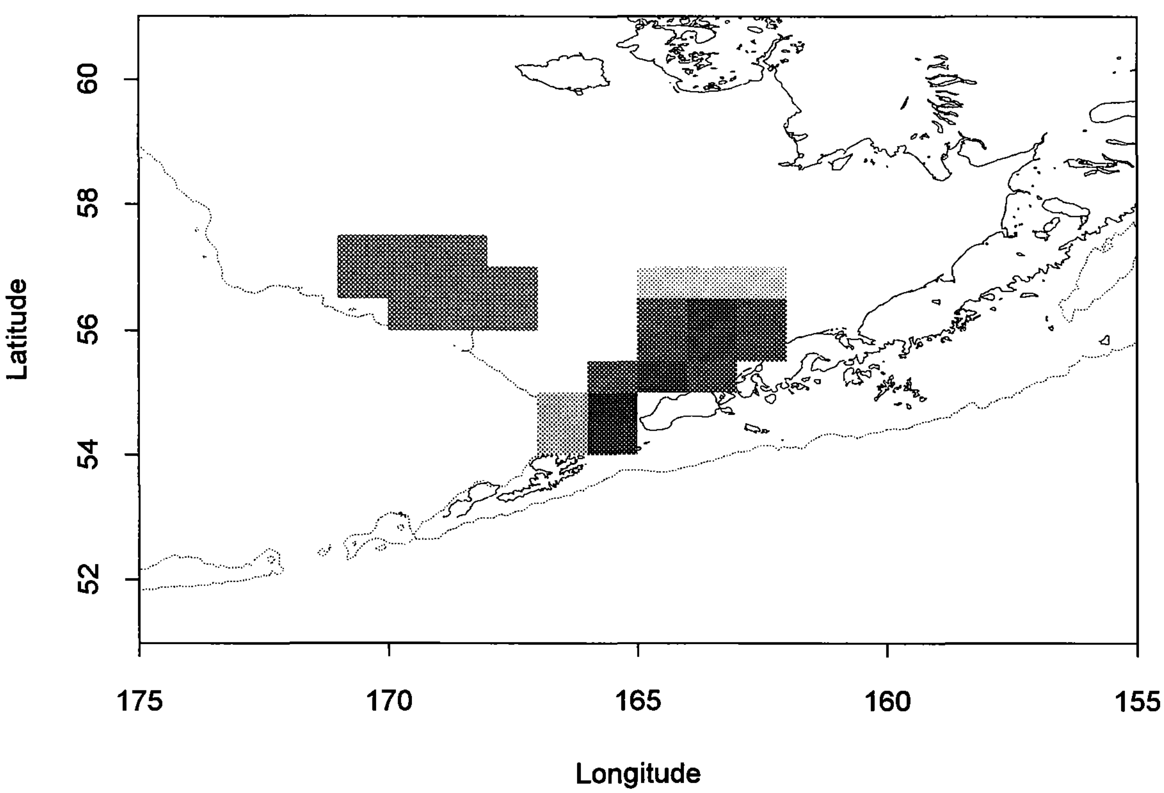
Halibut 25-34cm: November



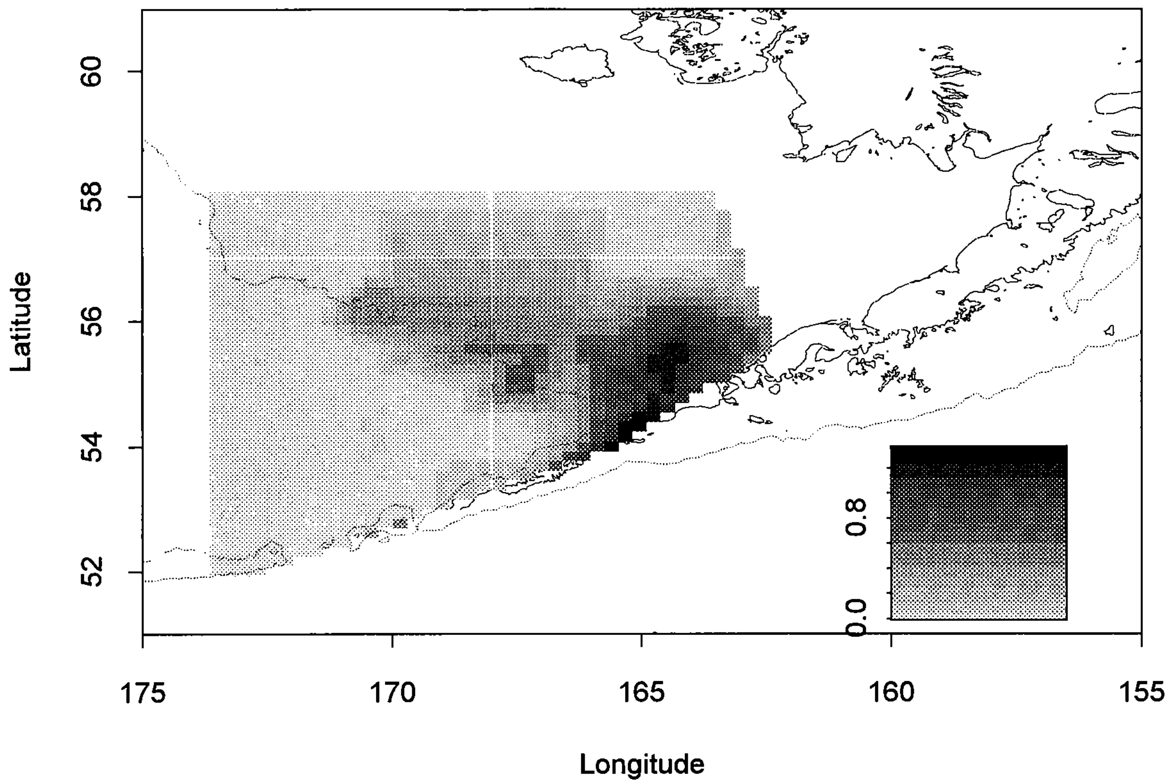


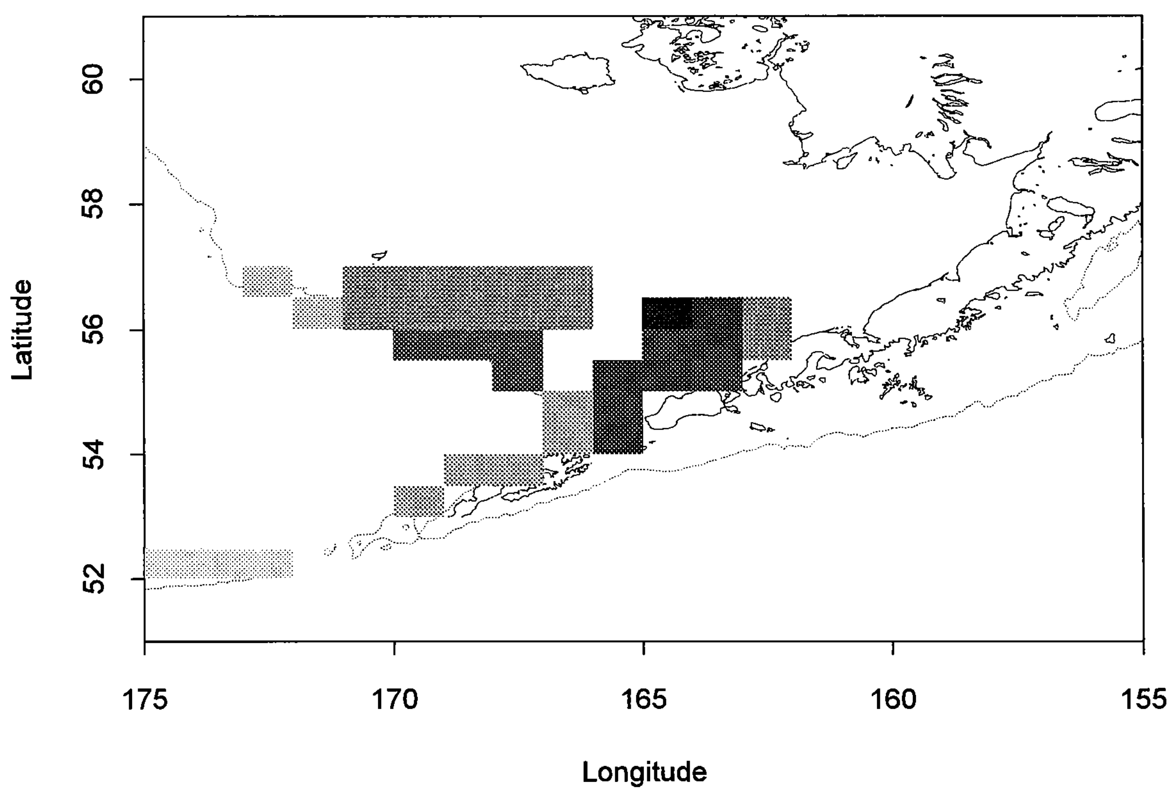
Halibut 35-44cm: January



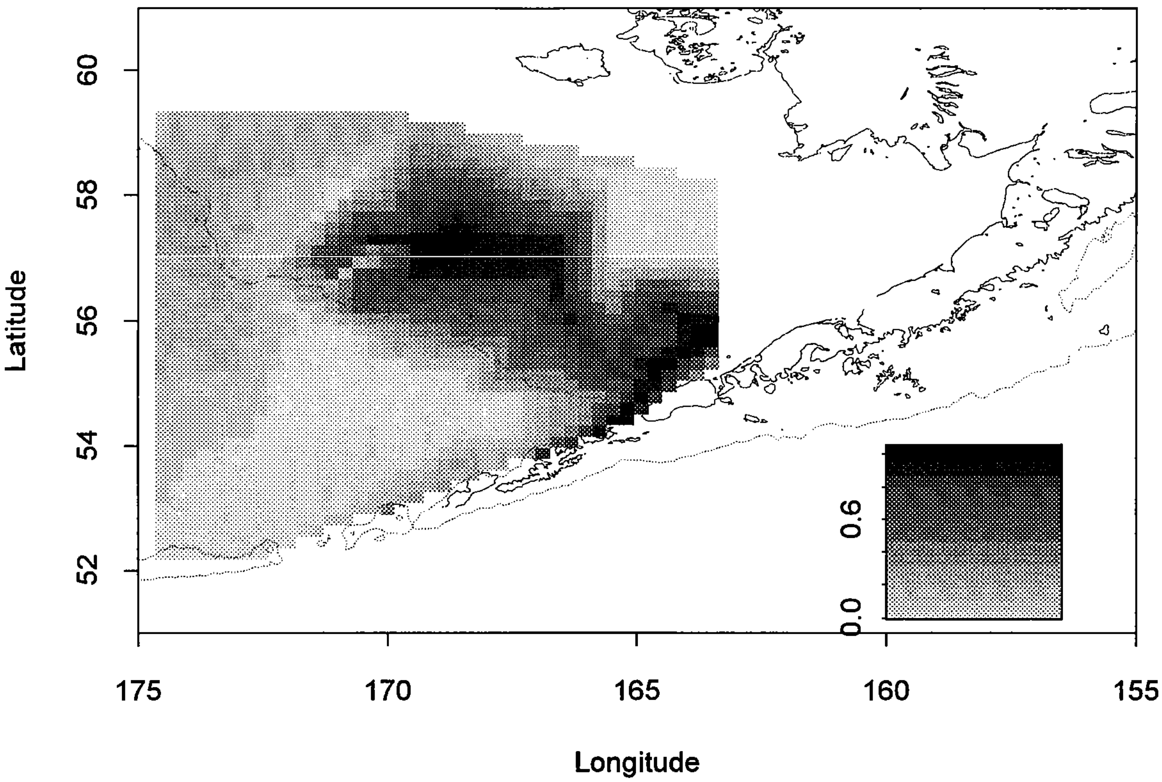


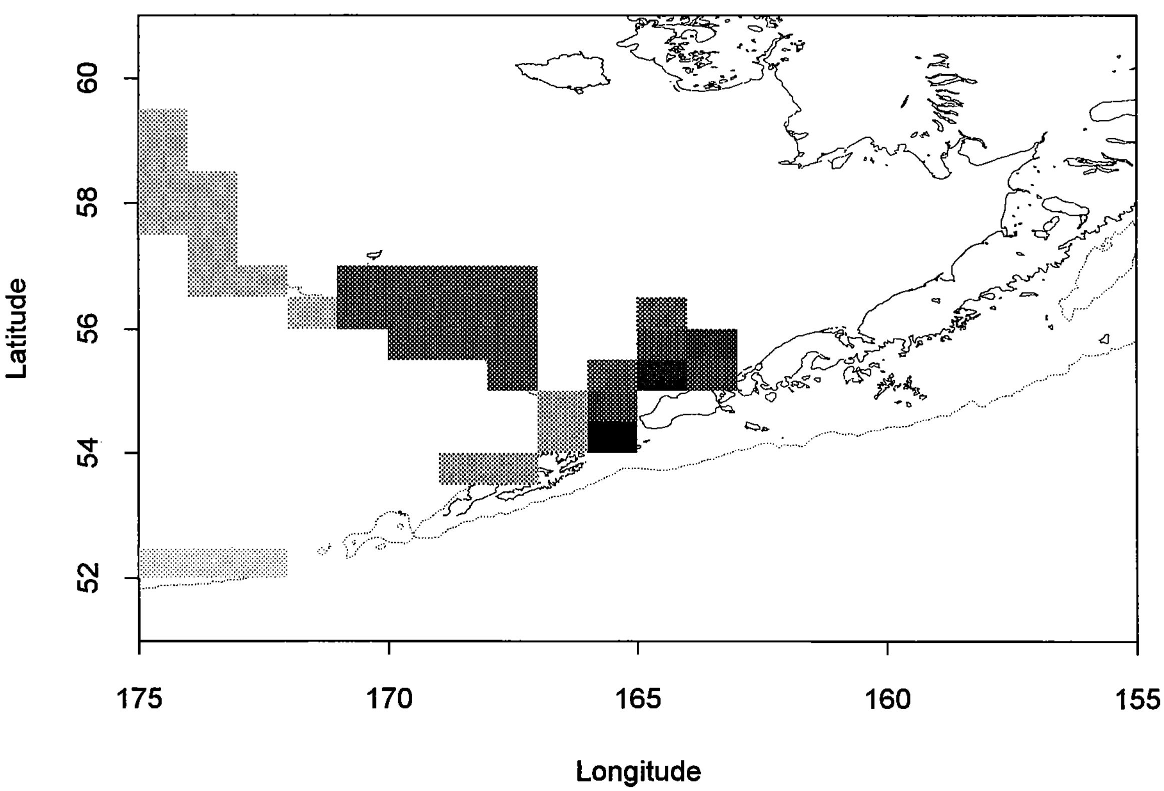
Halibut 35-44cm: February



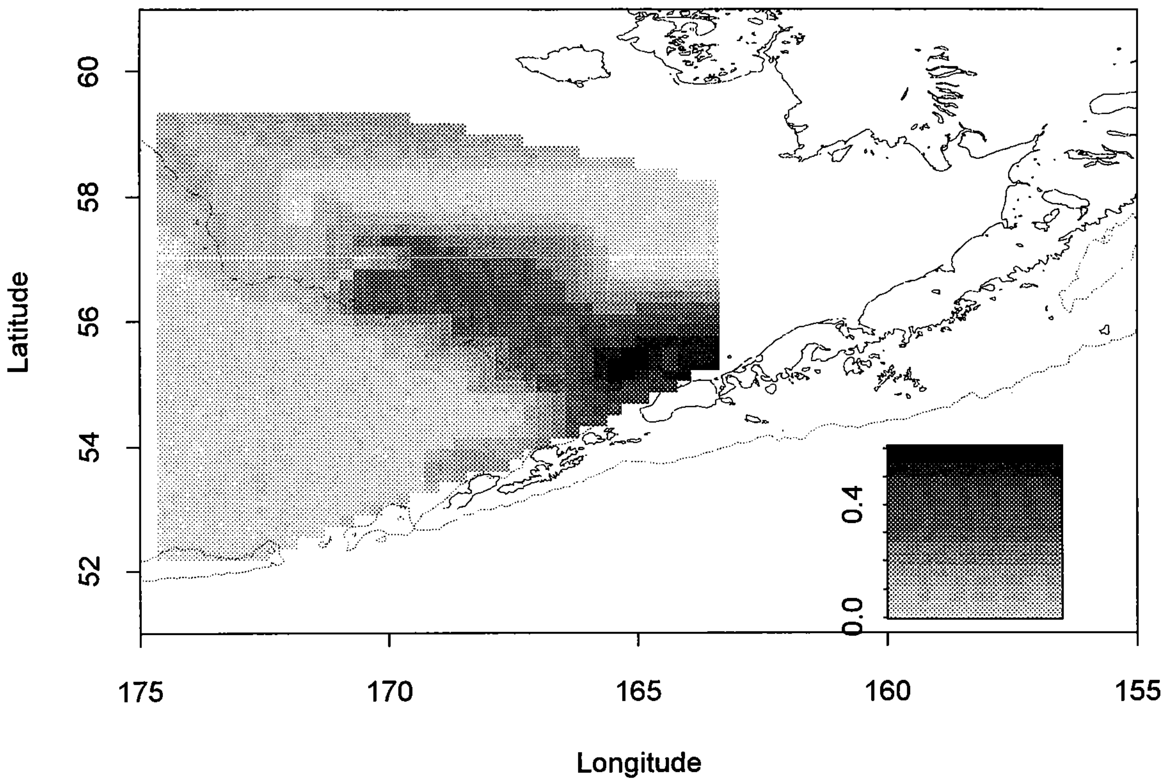


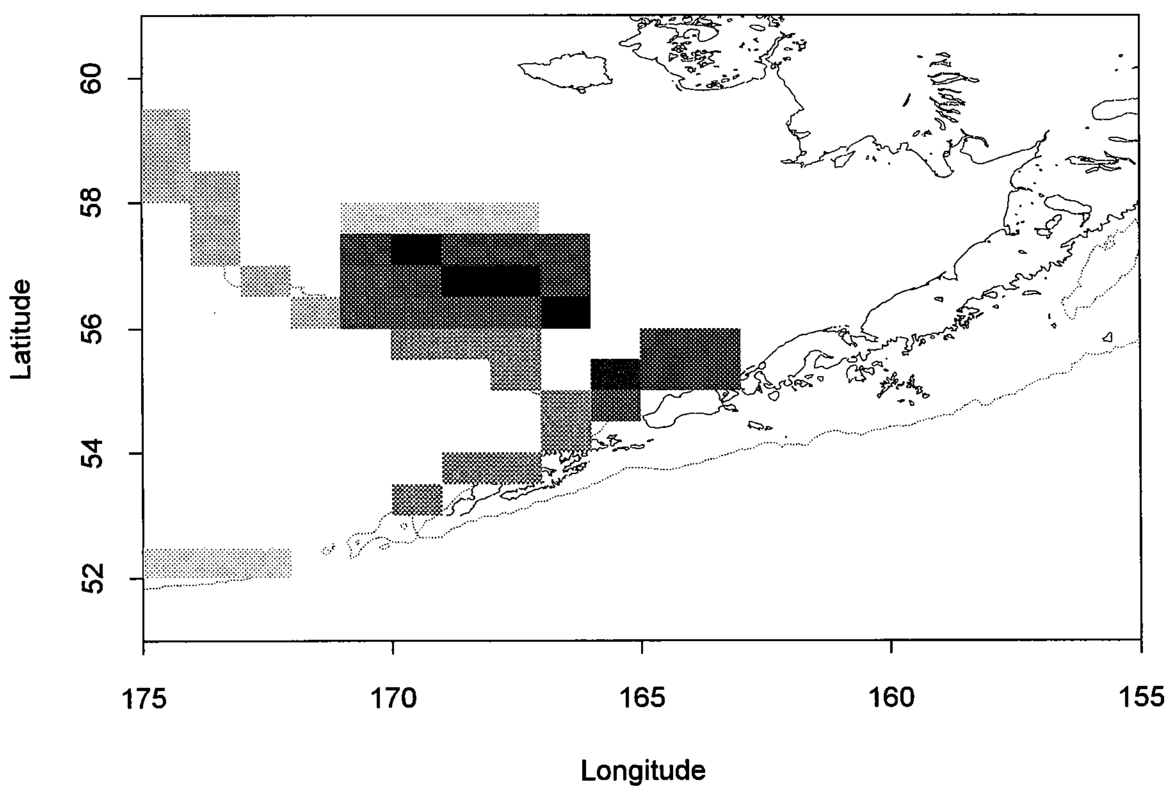
Halibut 35-44cm: March



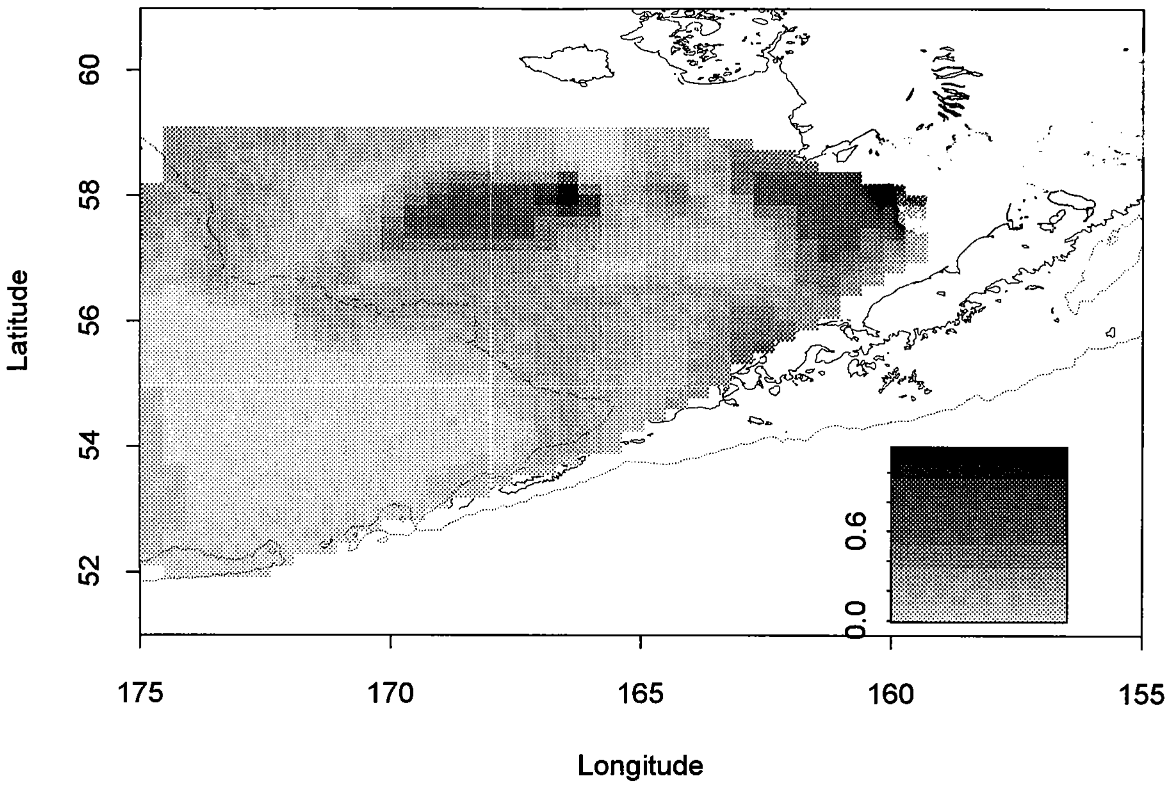


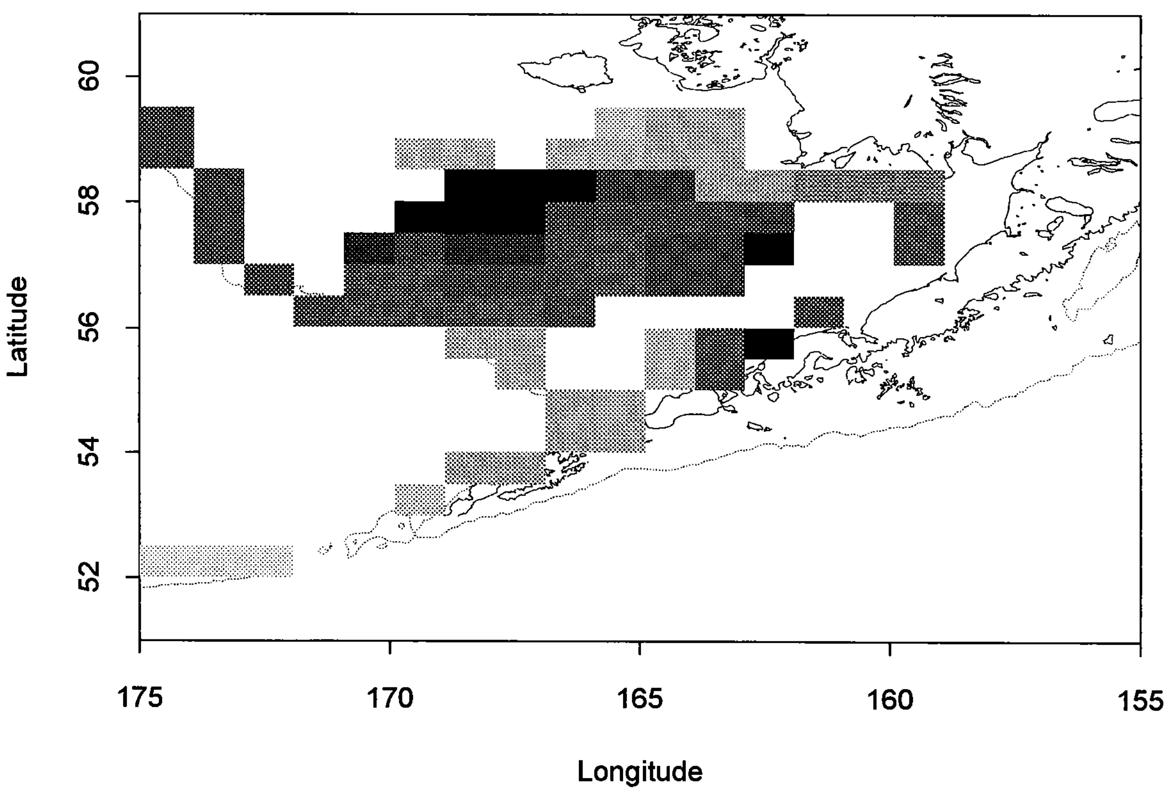
Halibut 35-44cm: April



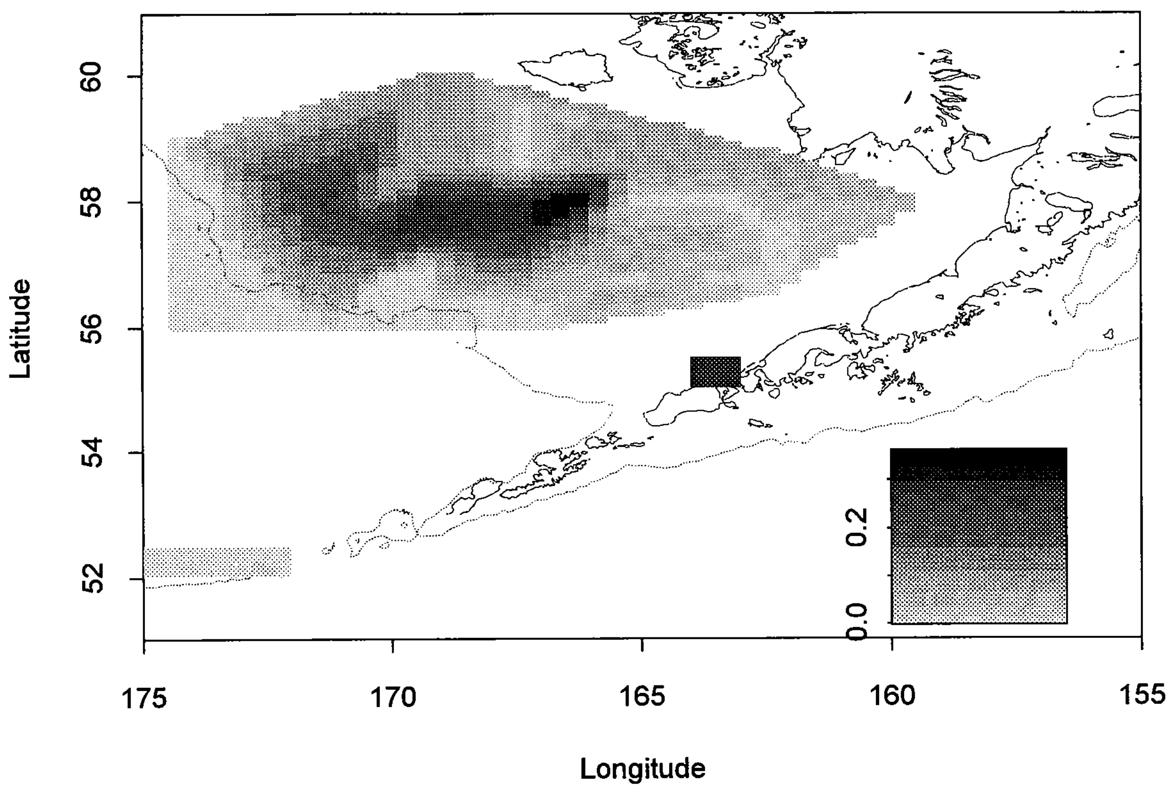


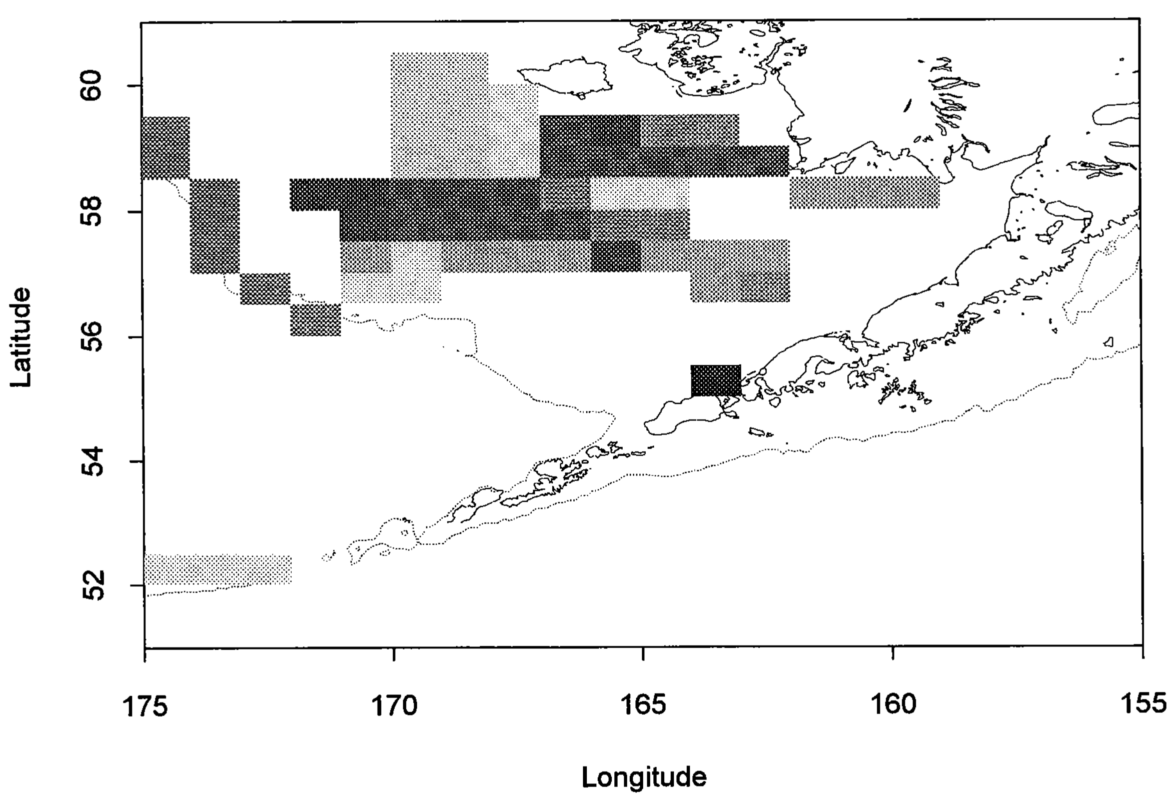
Halibut 35-44cm: May



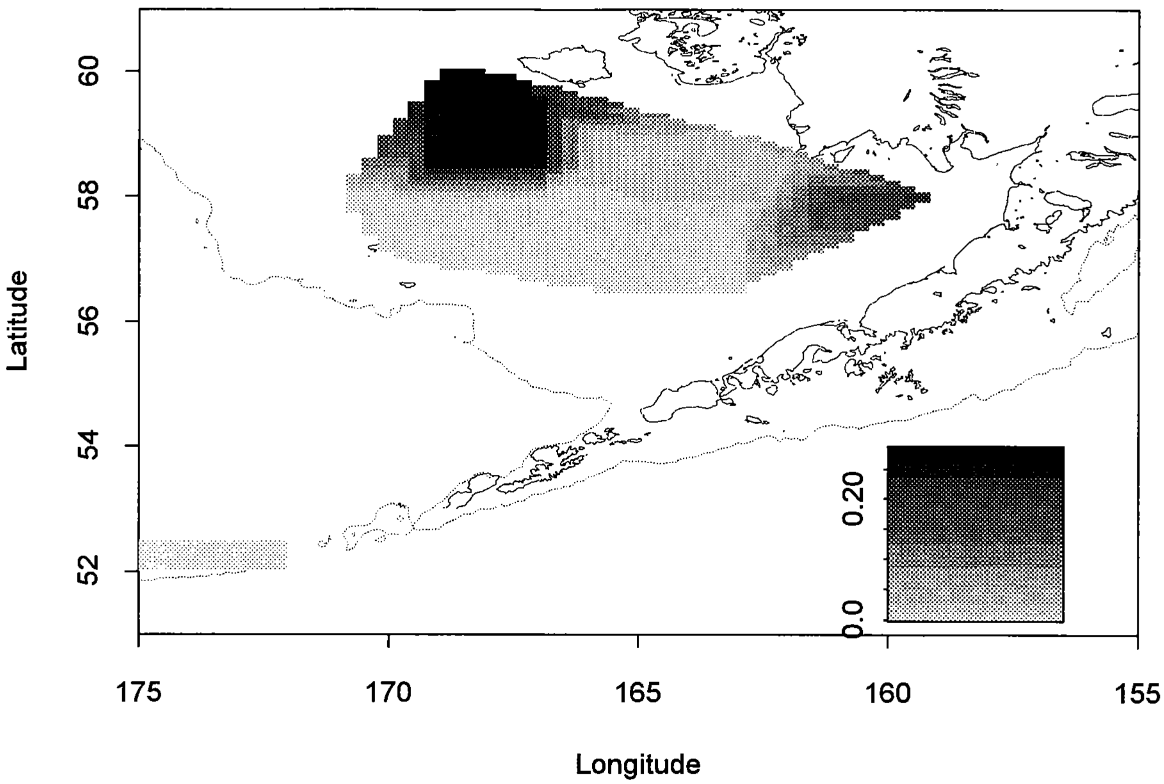


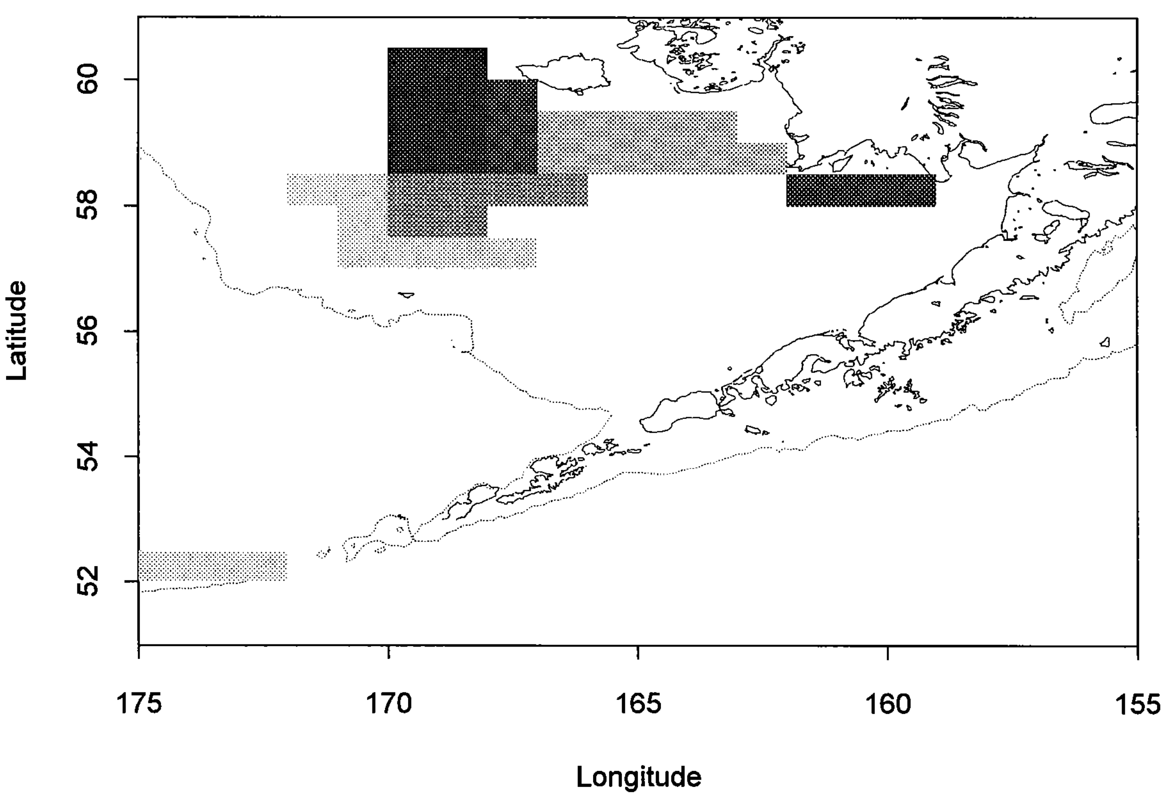
Halibut 35-44cm: June



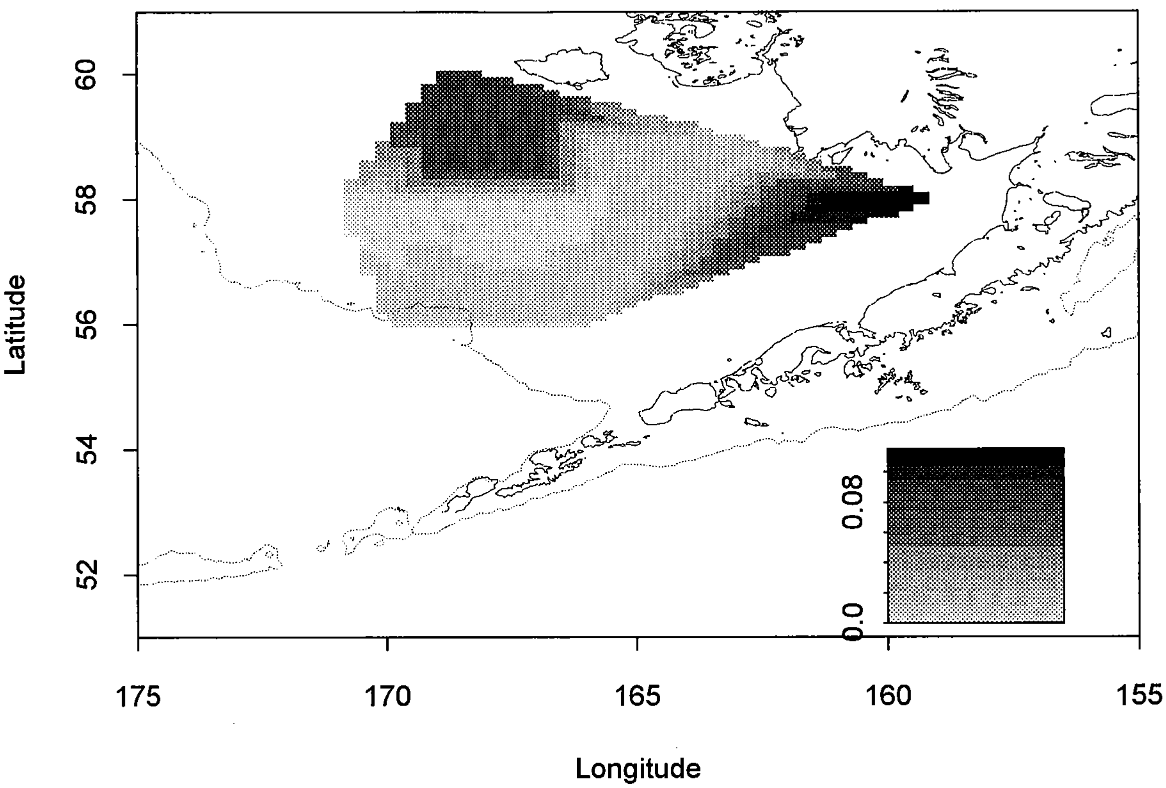


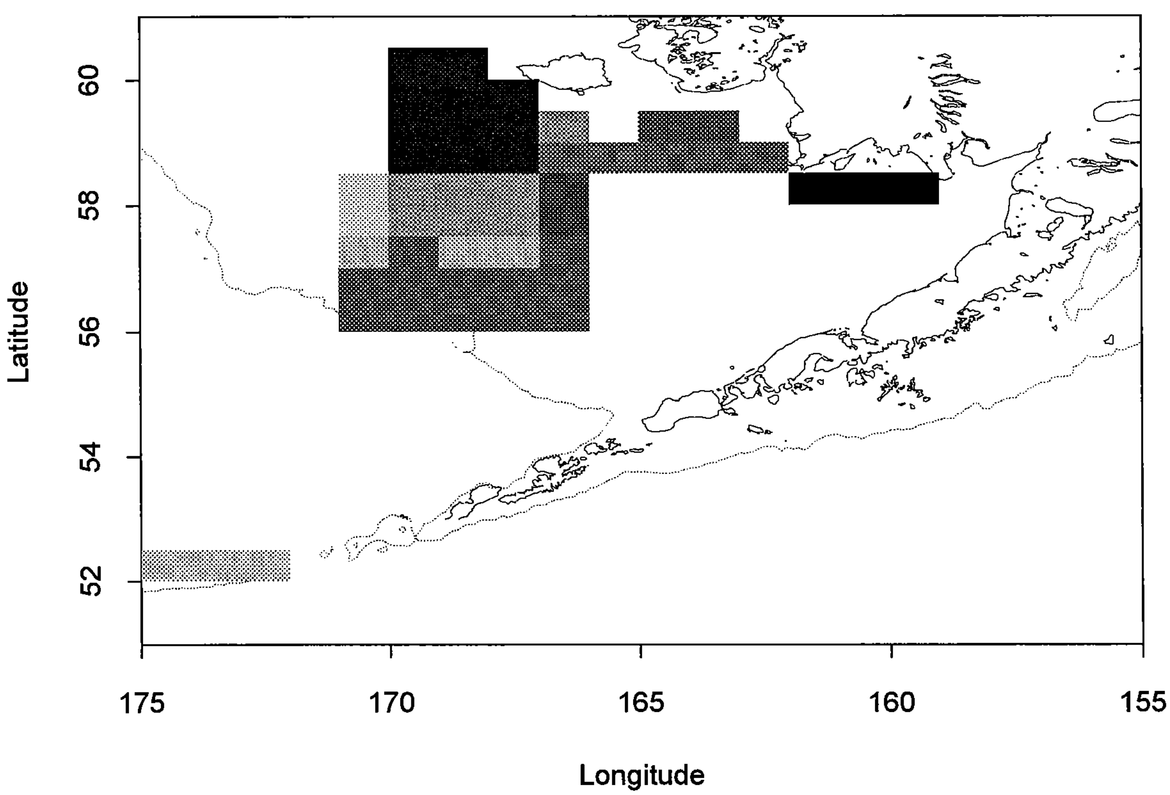
Halibut 35-44cm: July



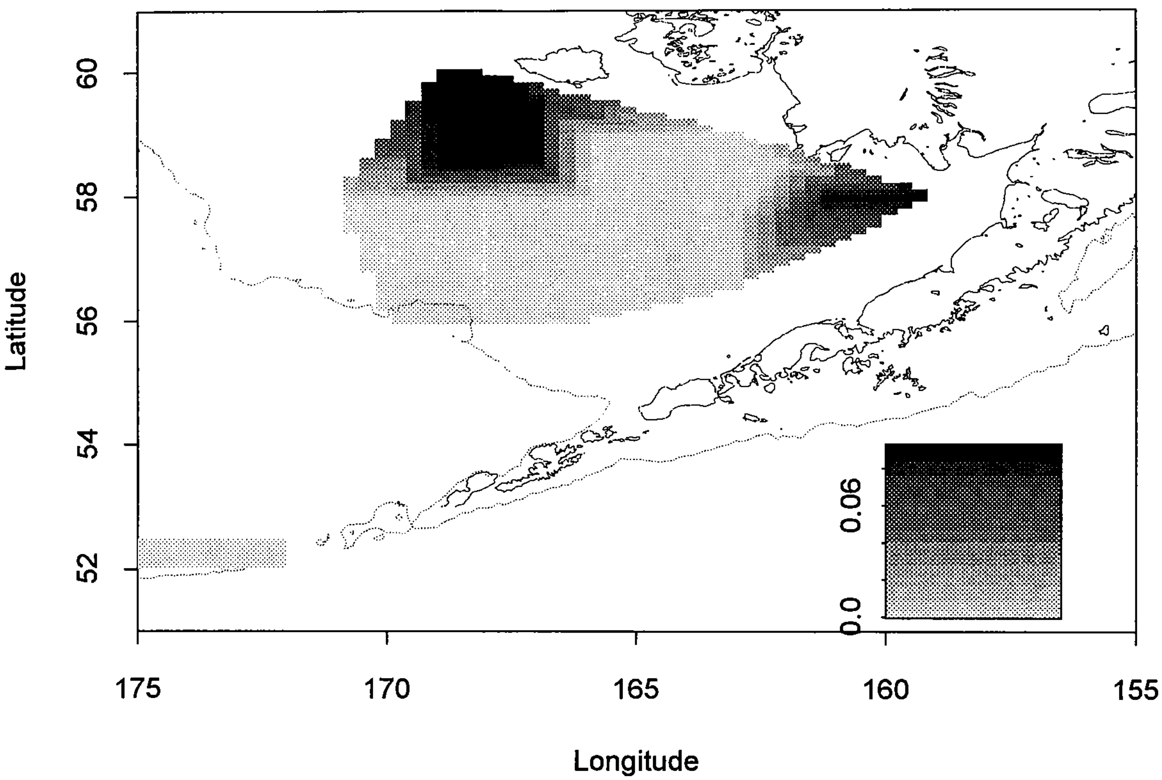


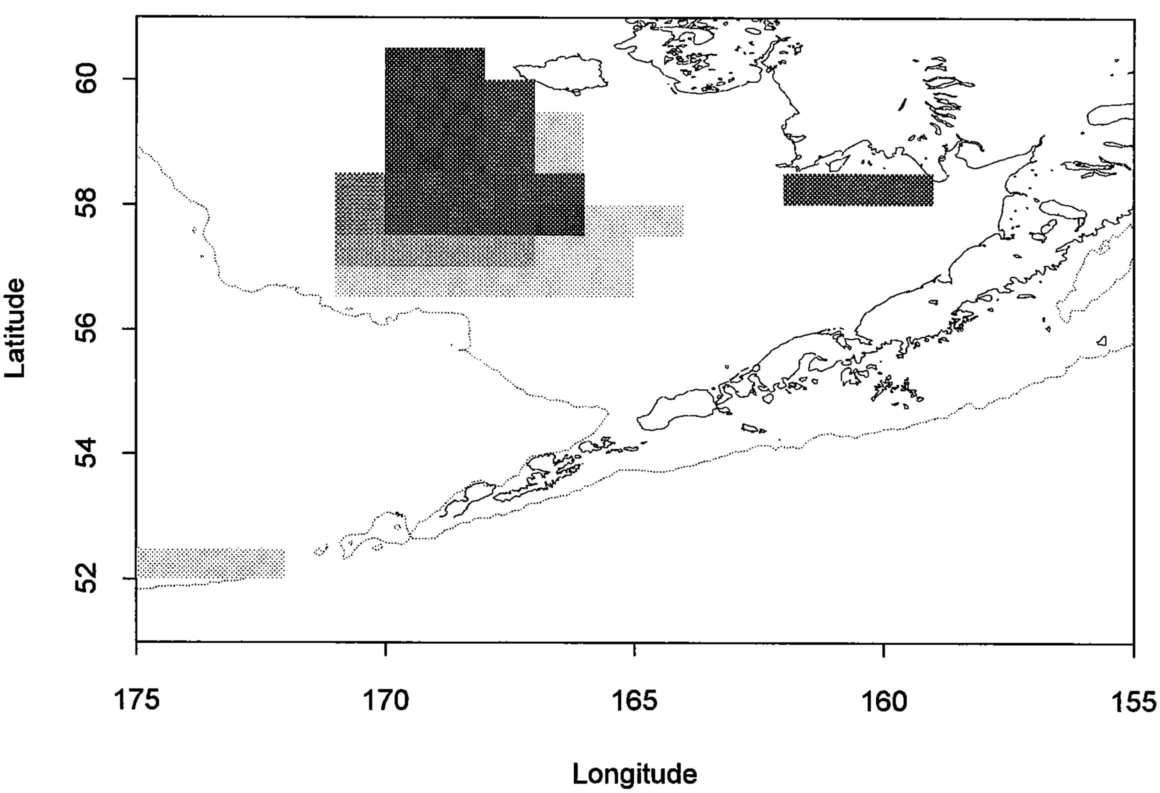
Halibut 35-44cm: August



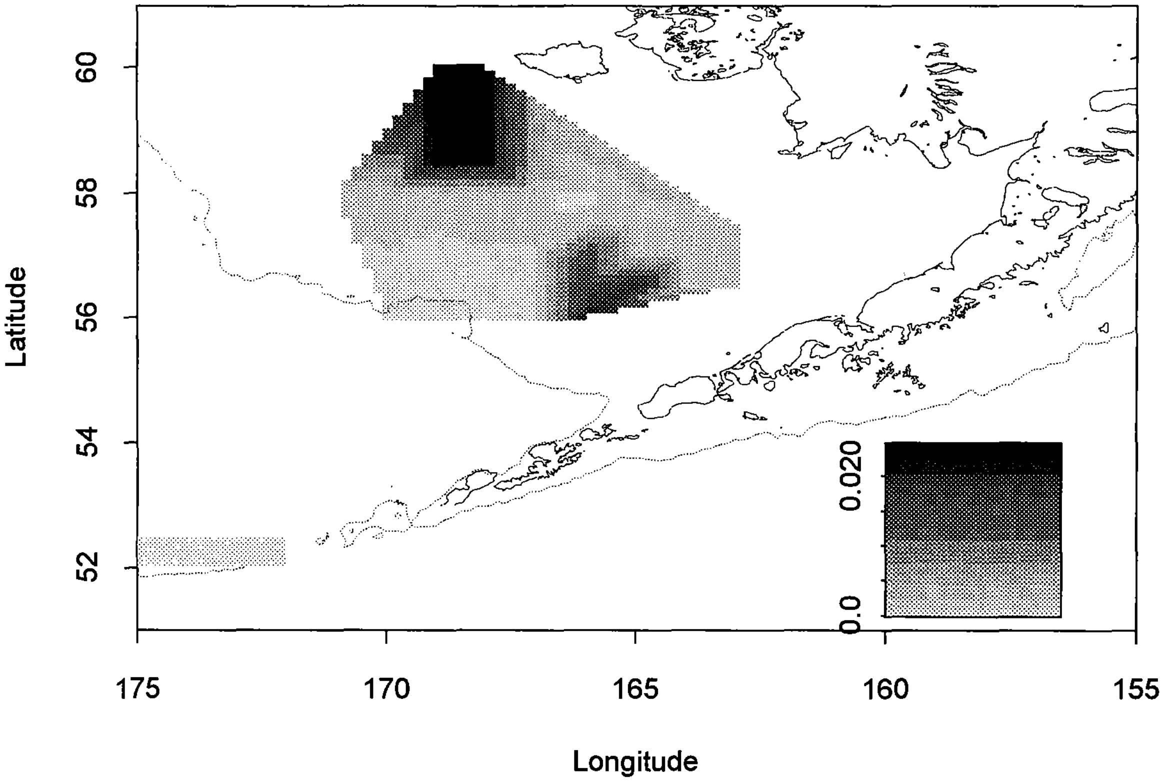


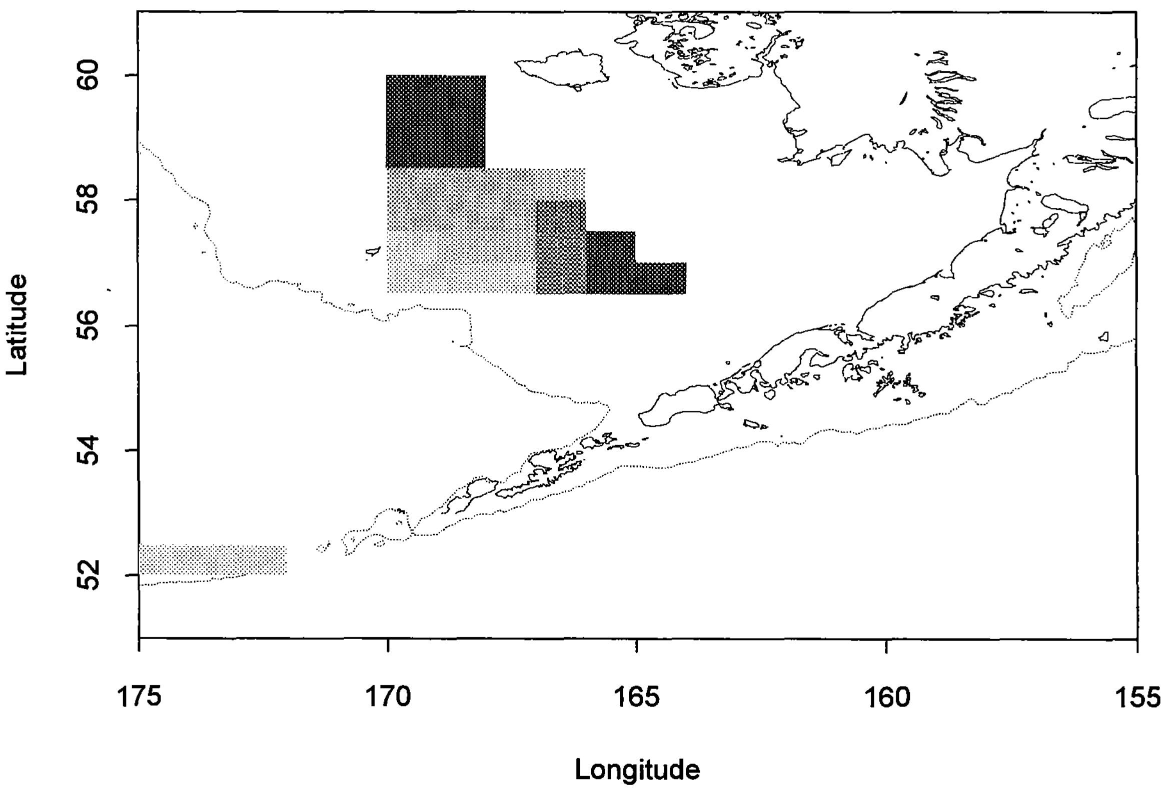
Halibut 35-44cm: September



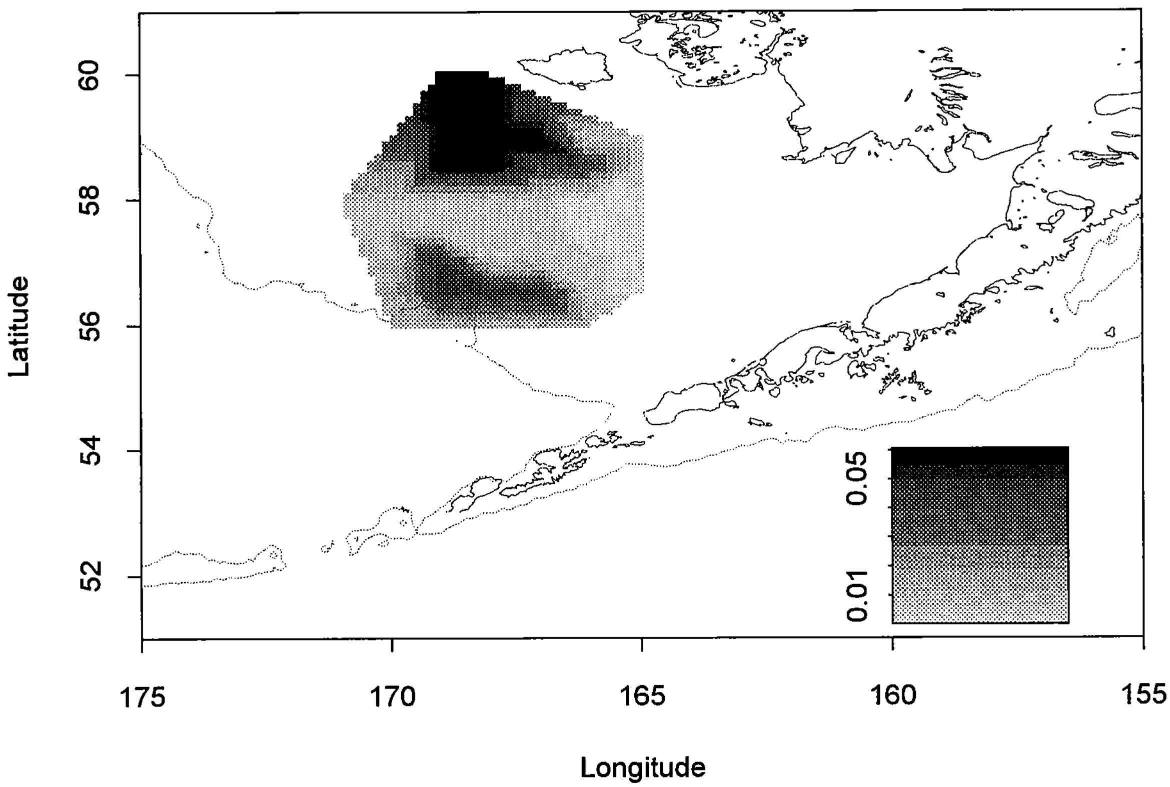


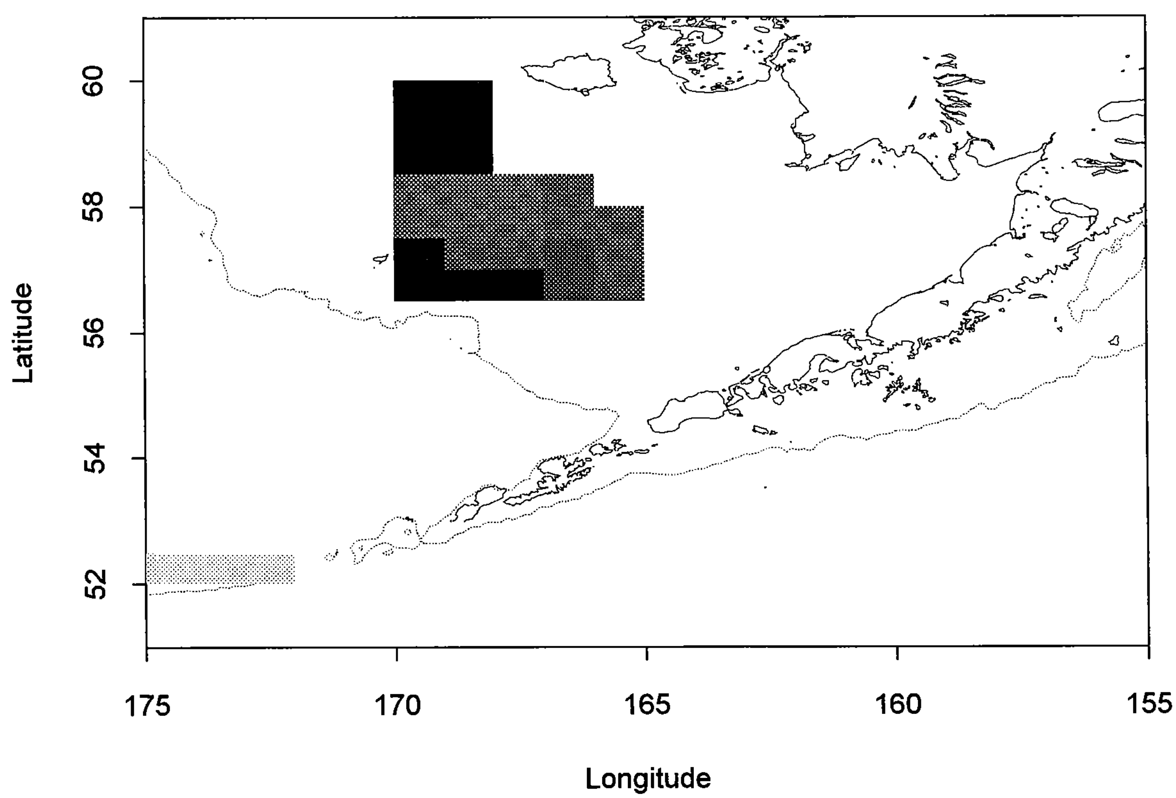
Halibut 35-44cm: October



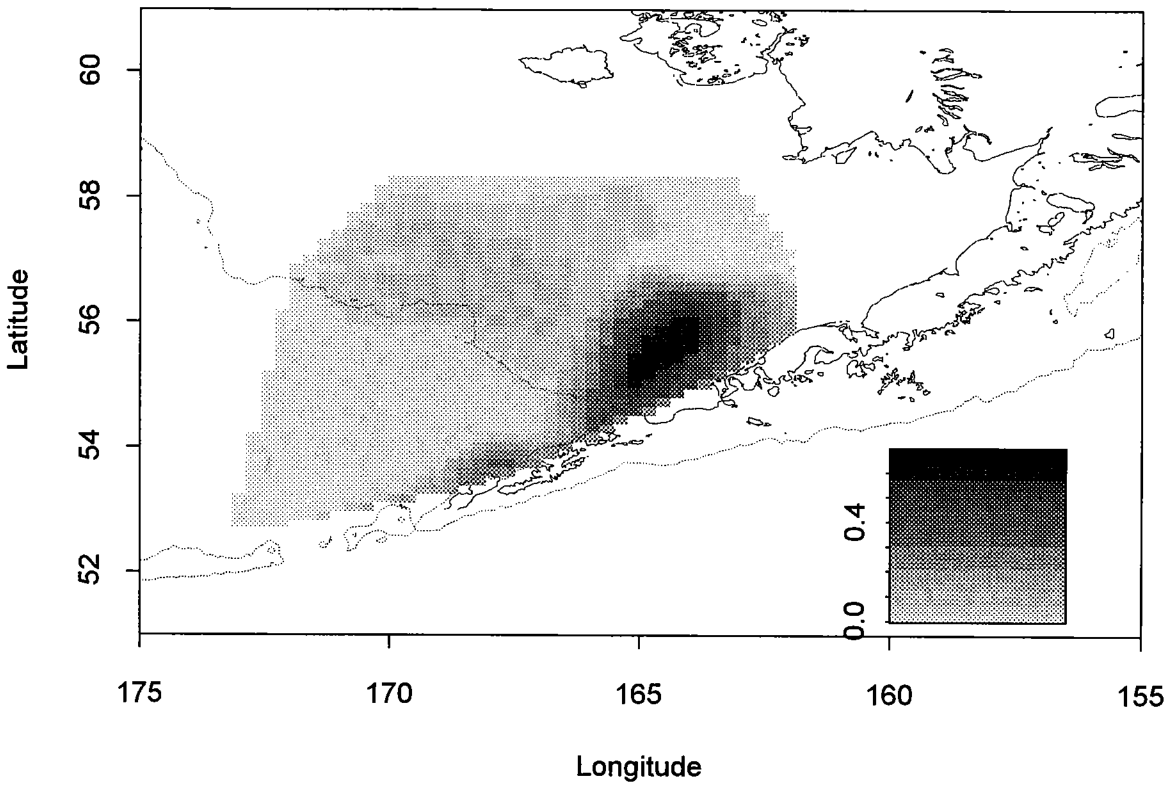


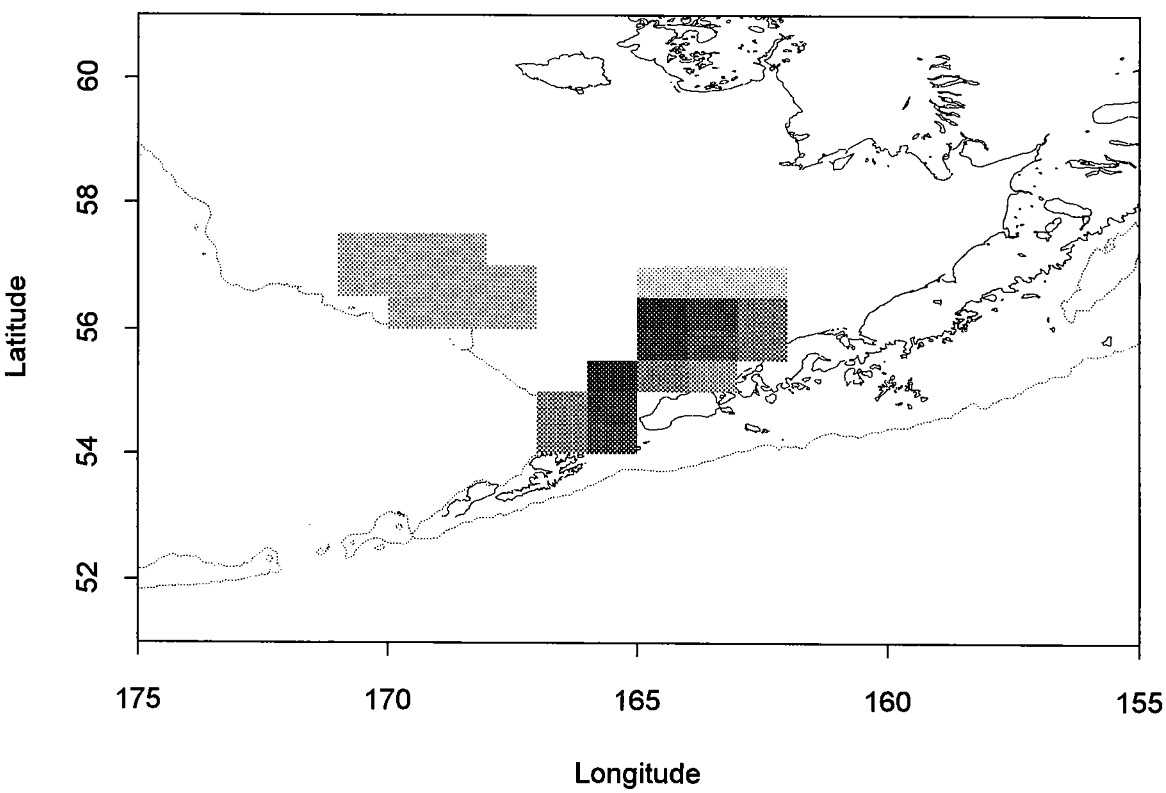
Halibut 35-44cm: November



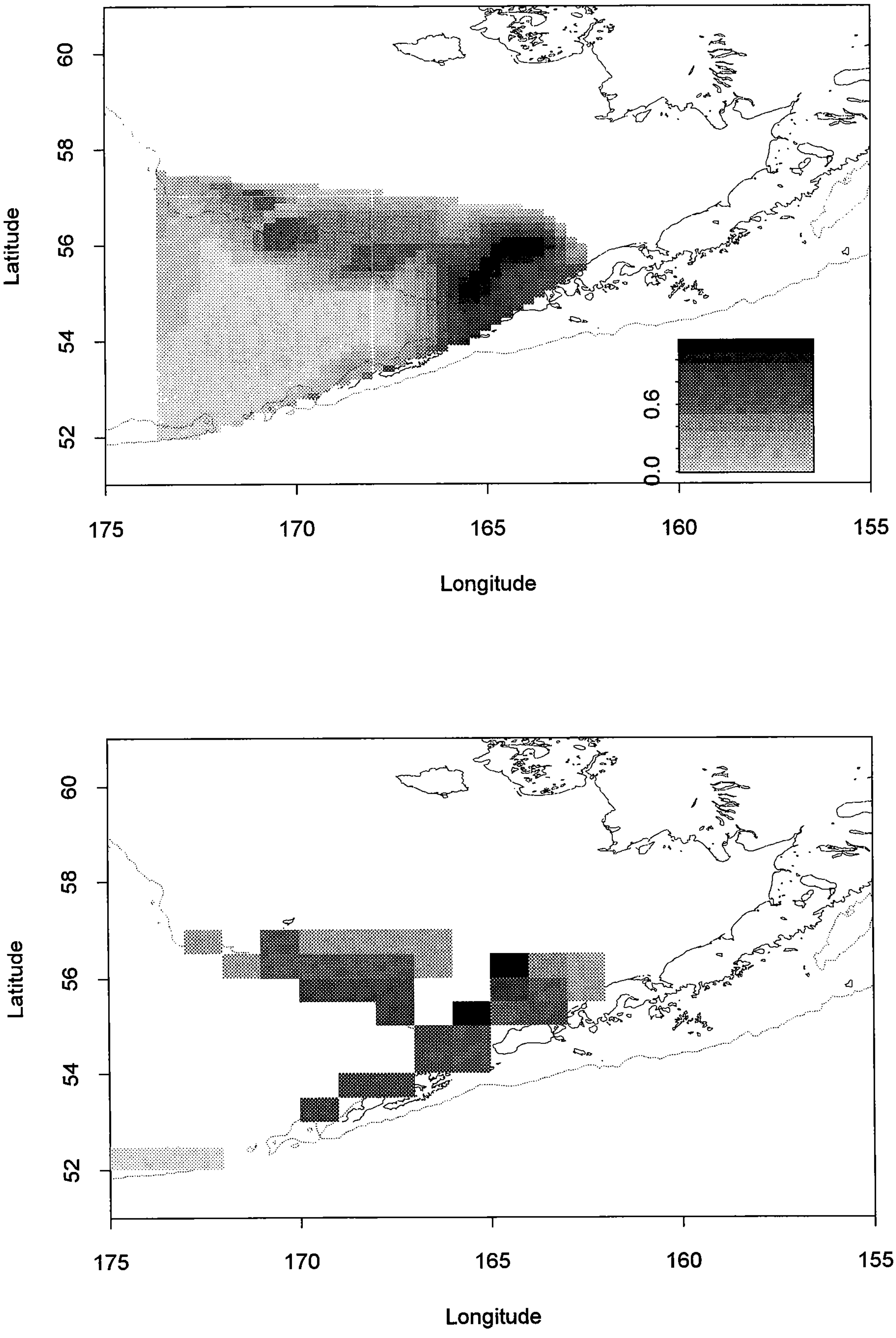


Halibut 45-54cm: January

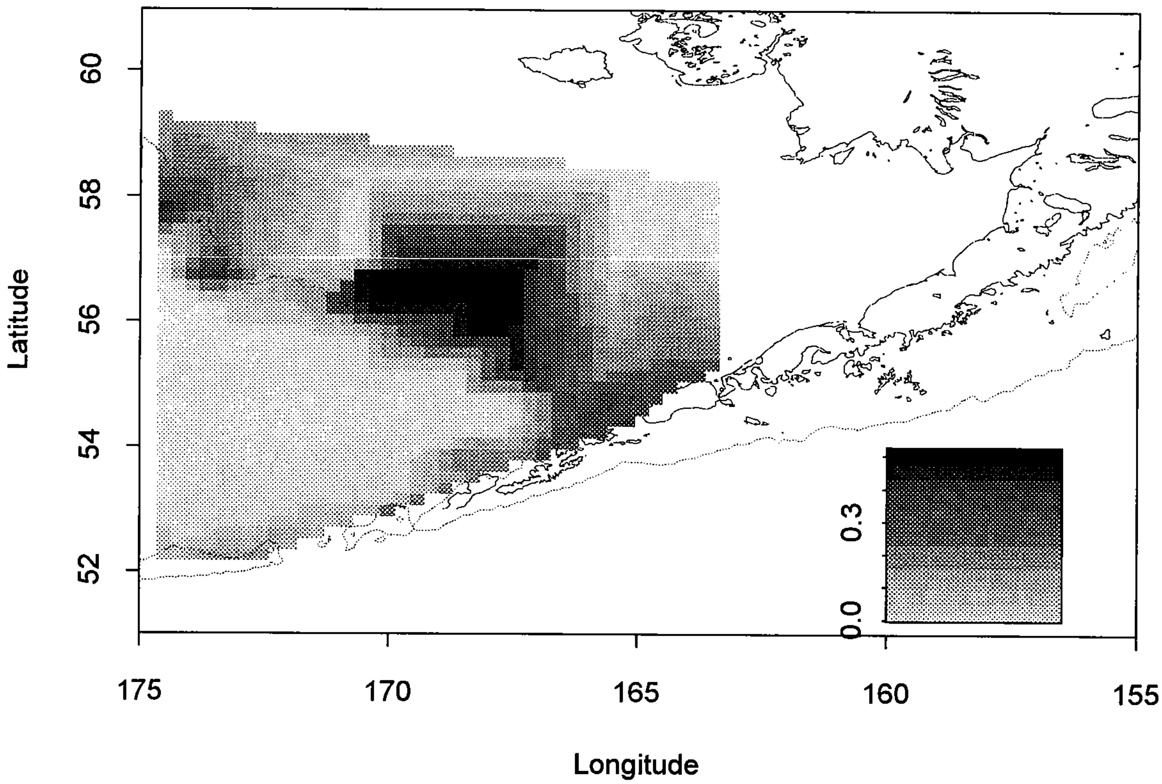


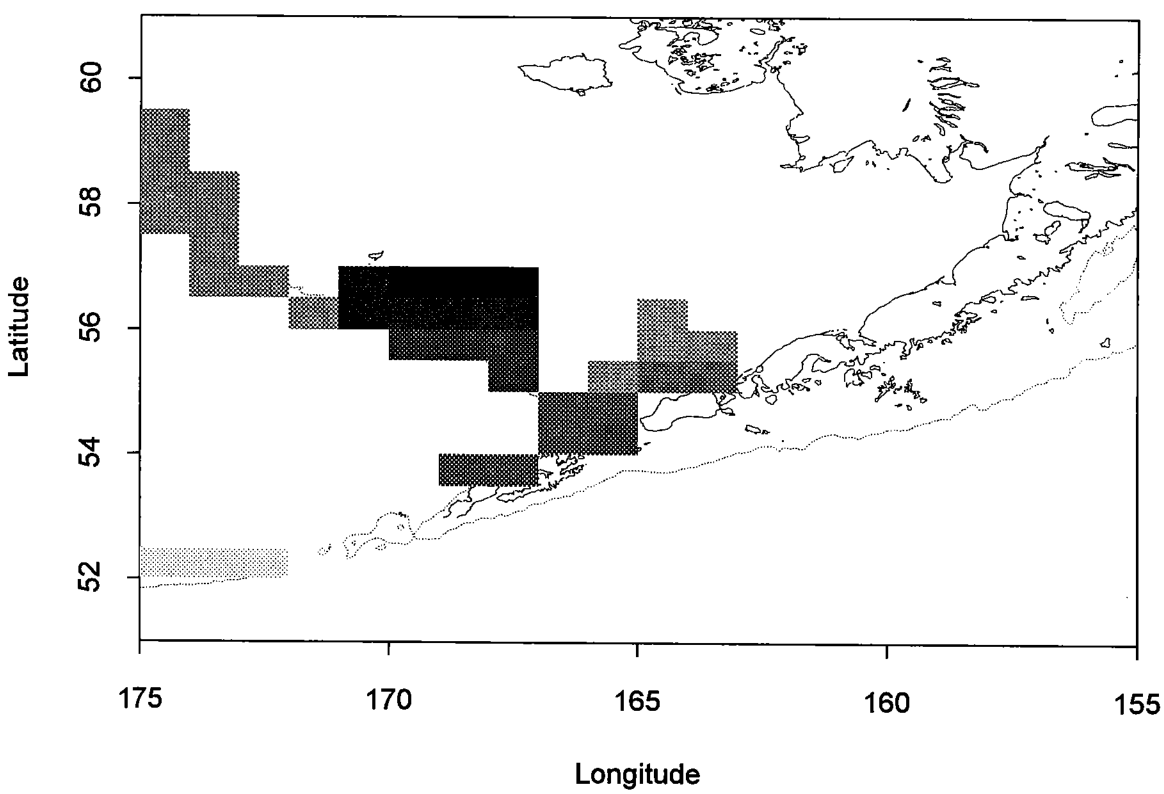


Halibut 45-54cm: February

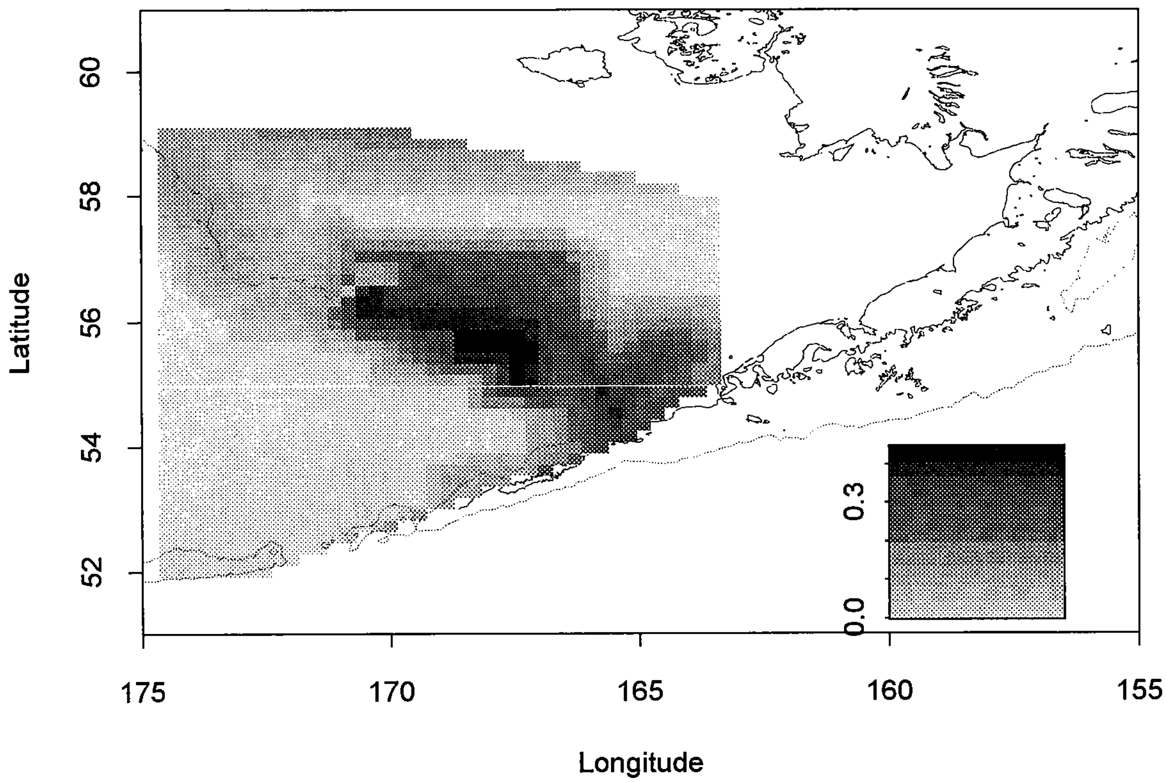


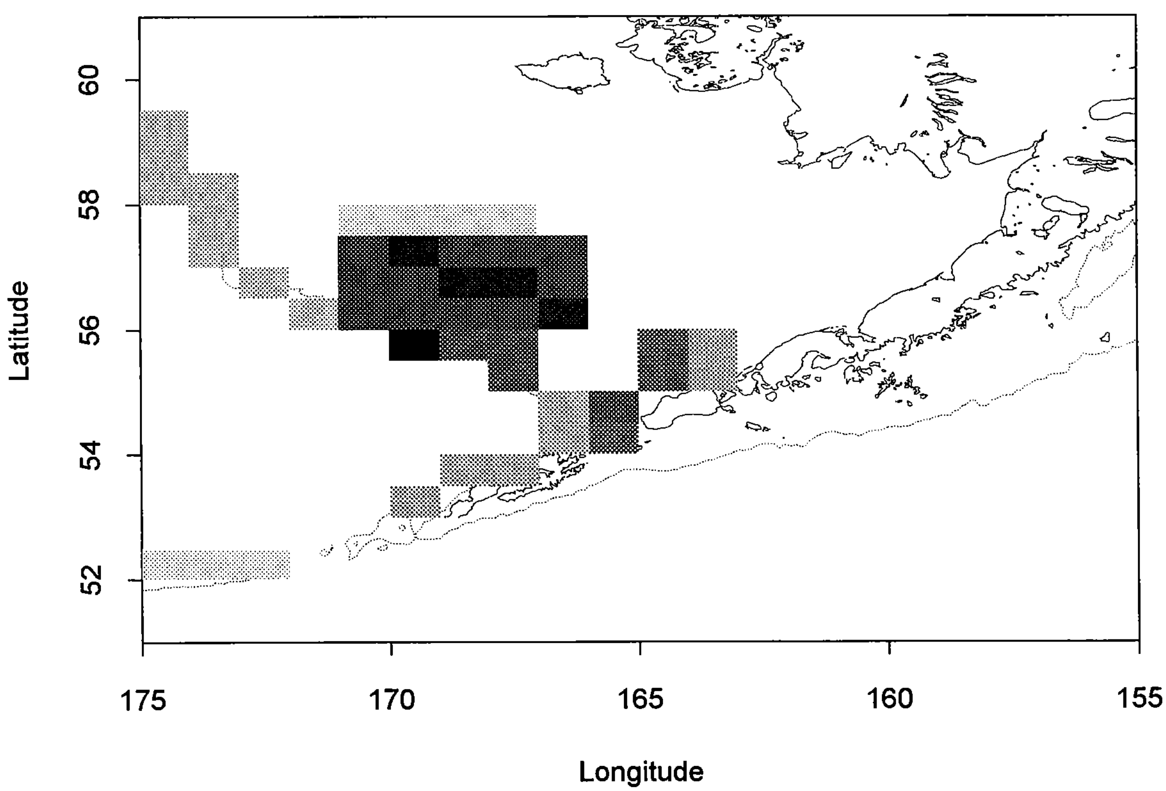
Halibut 45-54cm: March



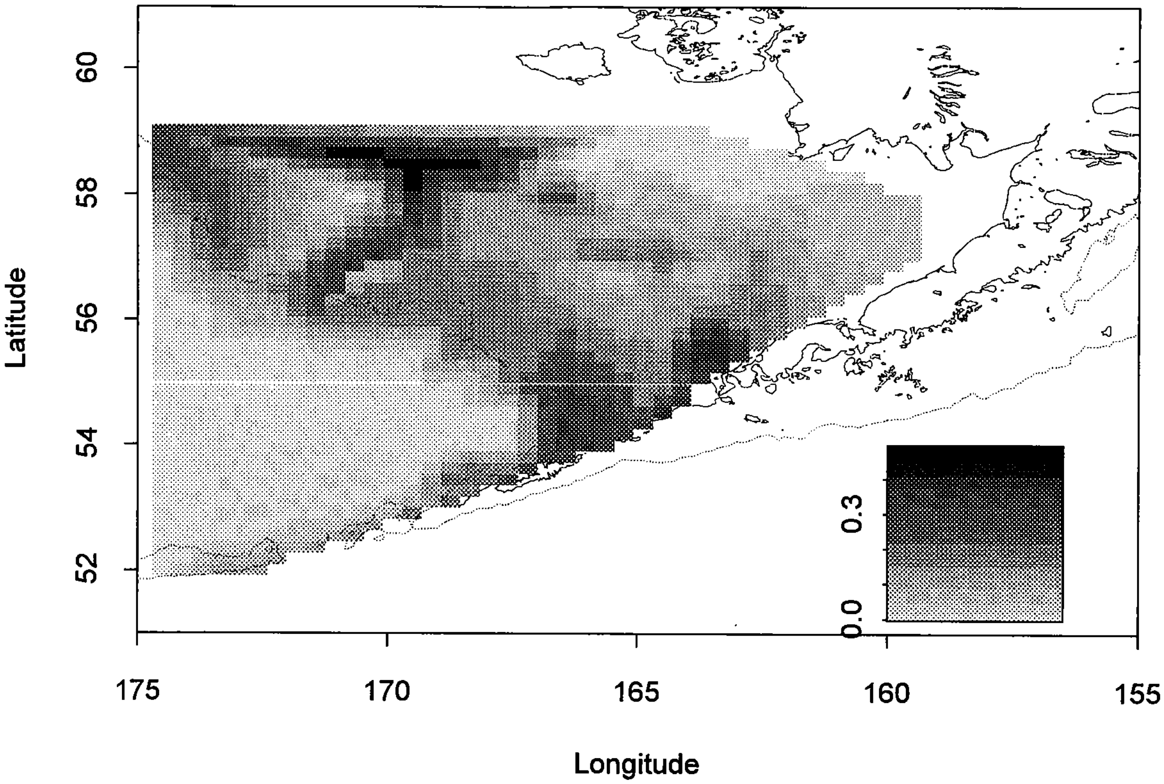


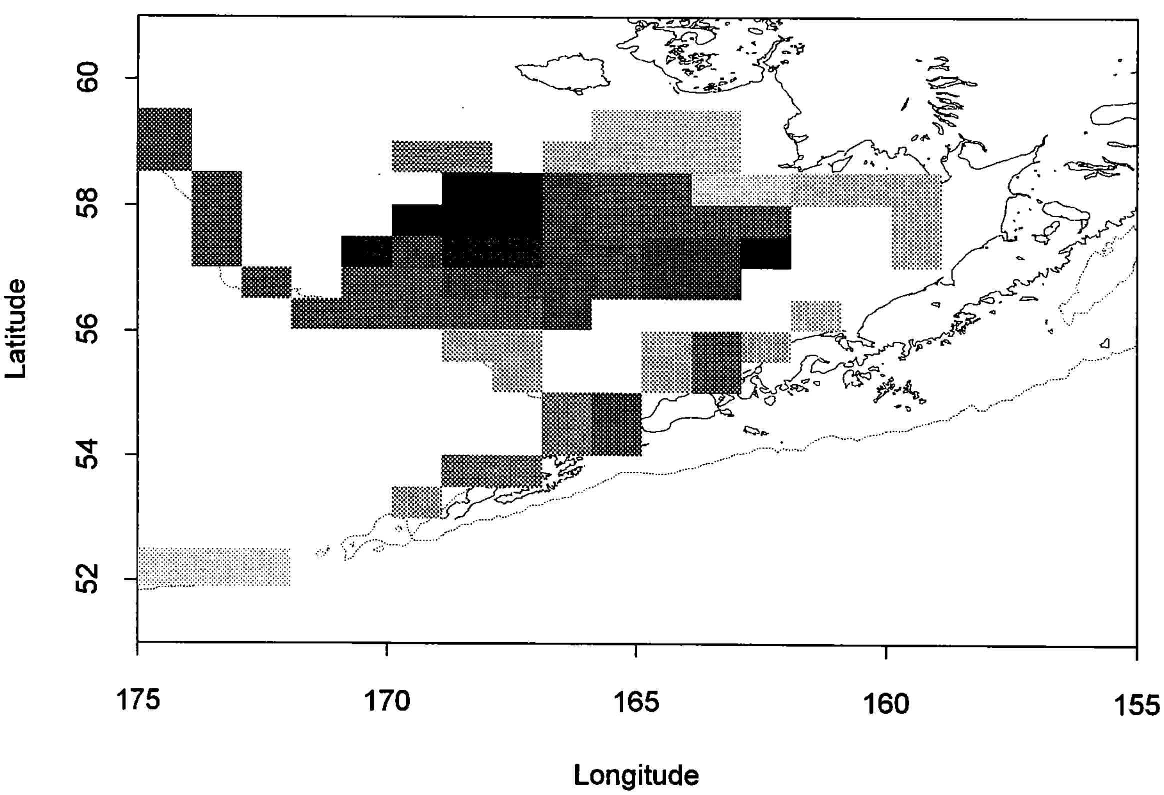
Halibut 45-54cm: April



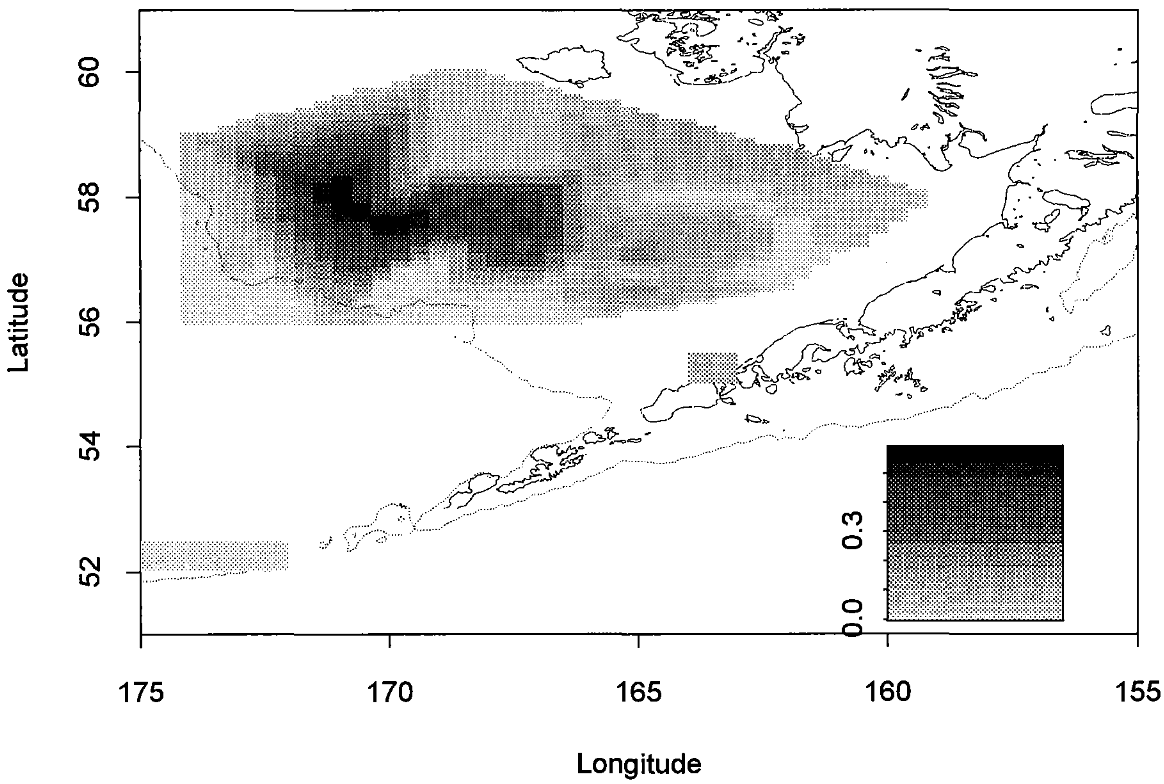


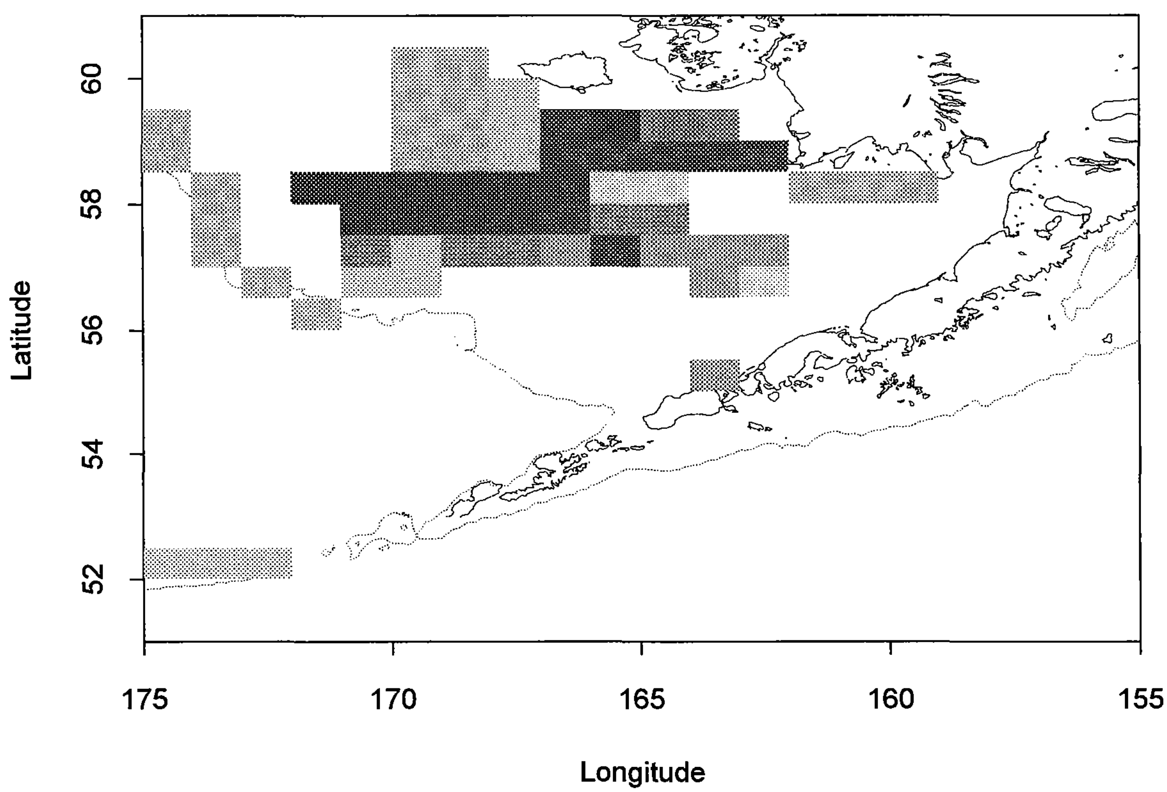
Halibut 45-54cm: May



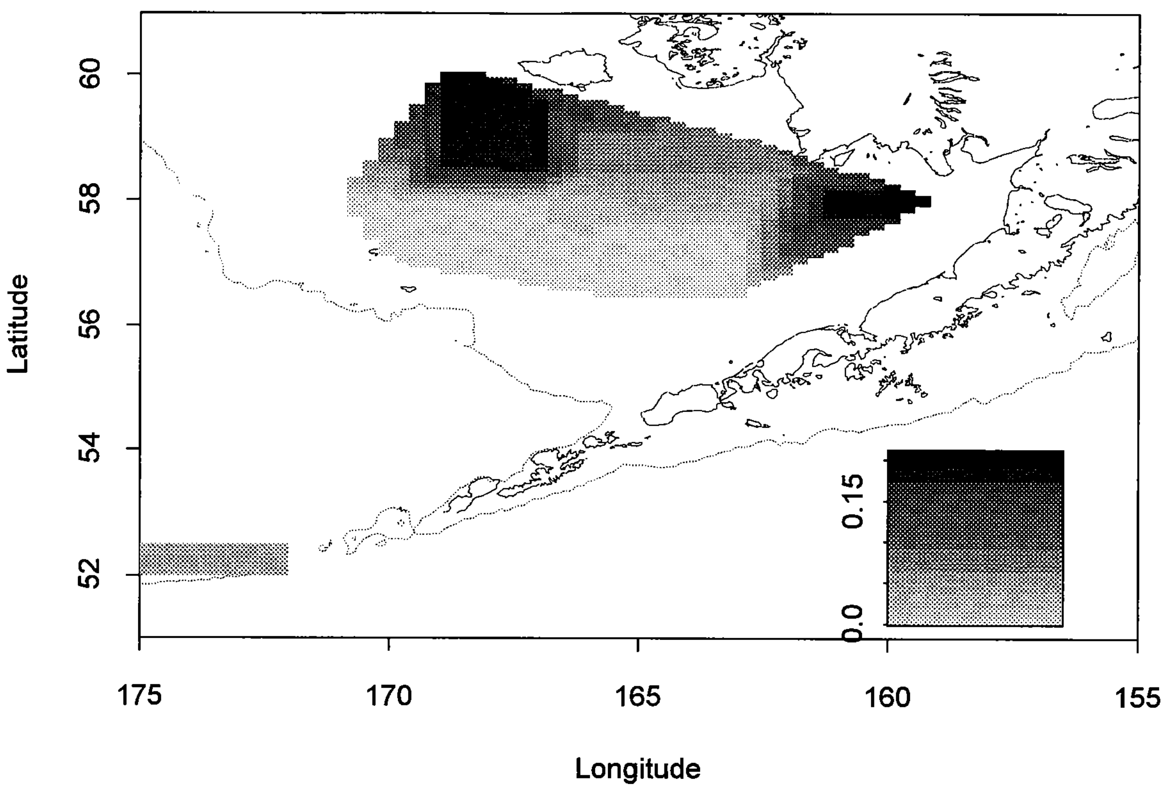


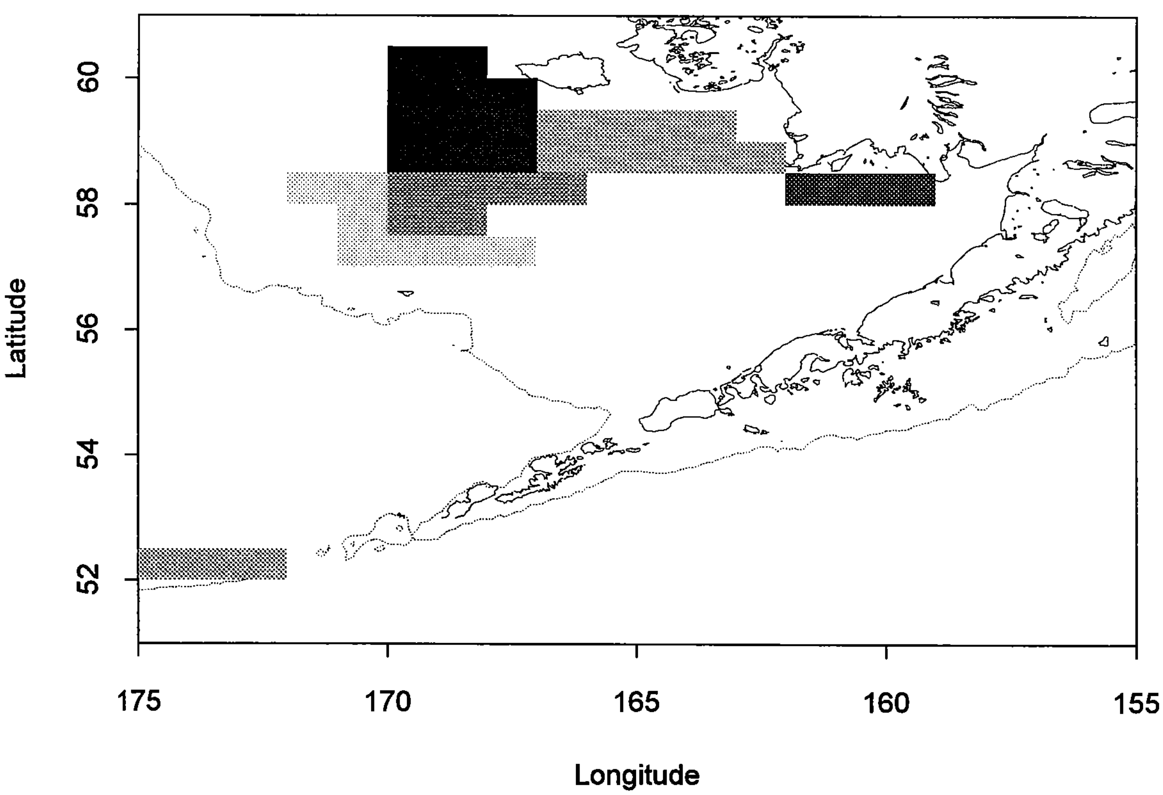
Halibut 45-54cm: June



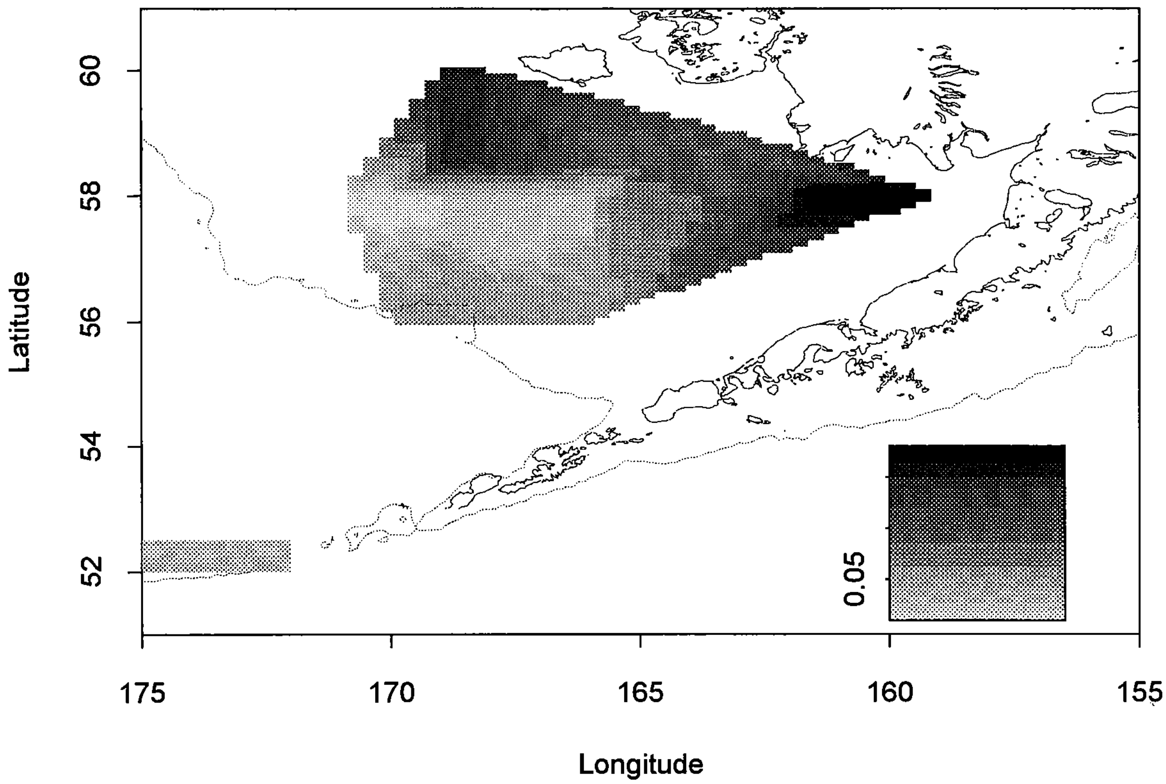


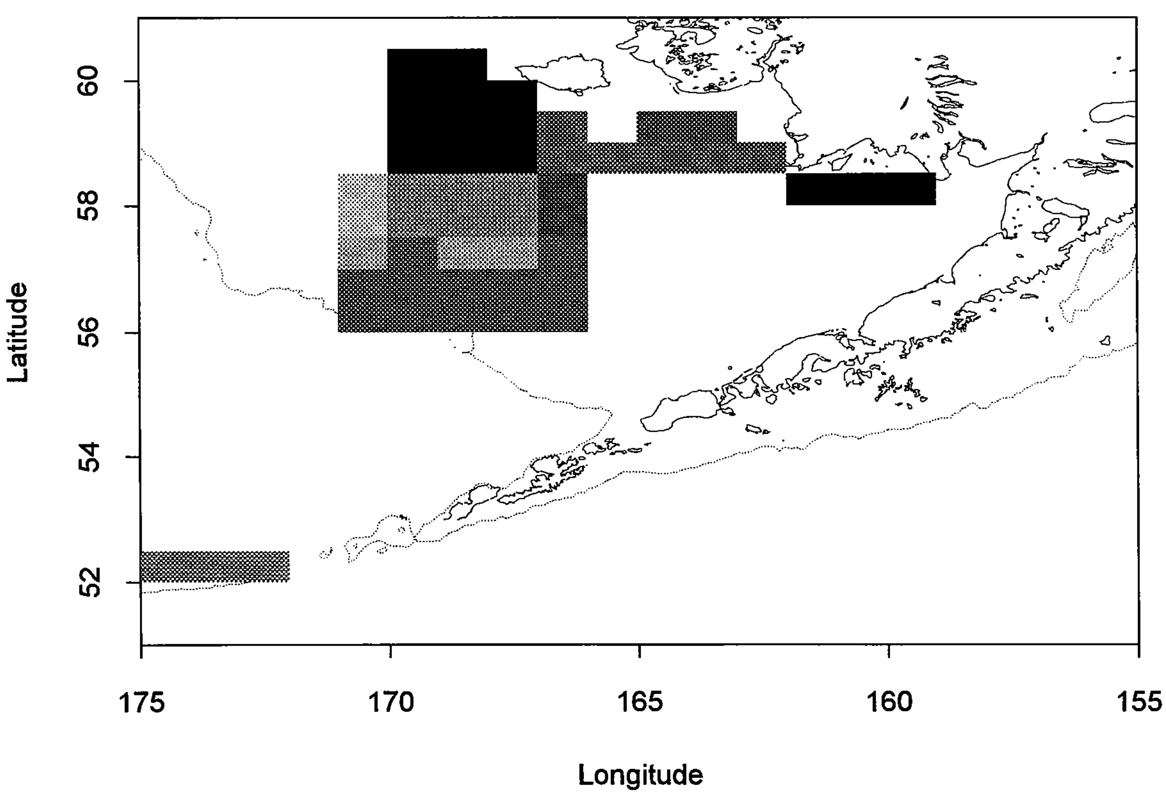
Halibut 45-54cm: July



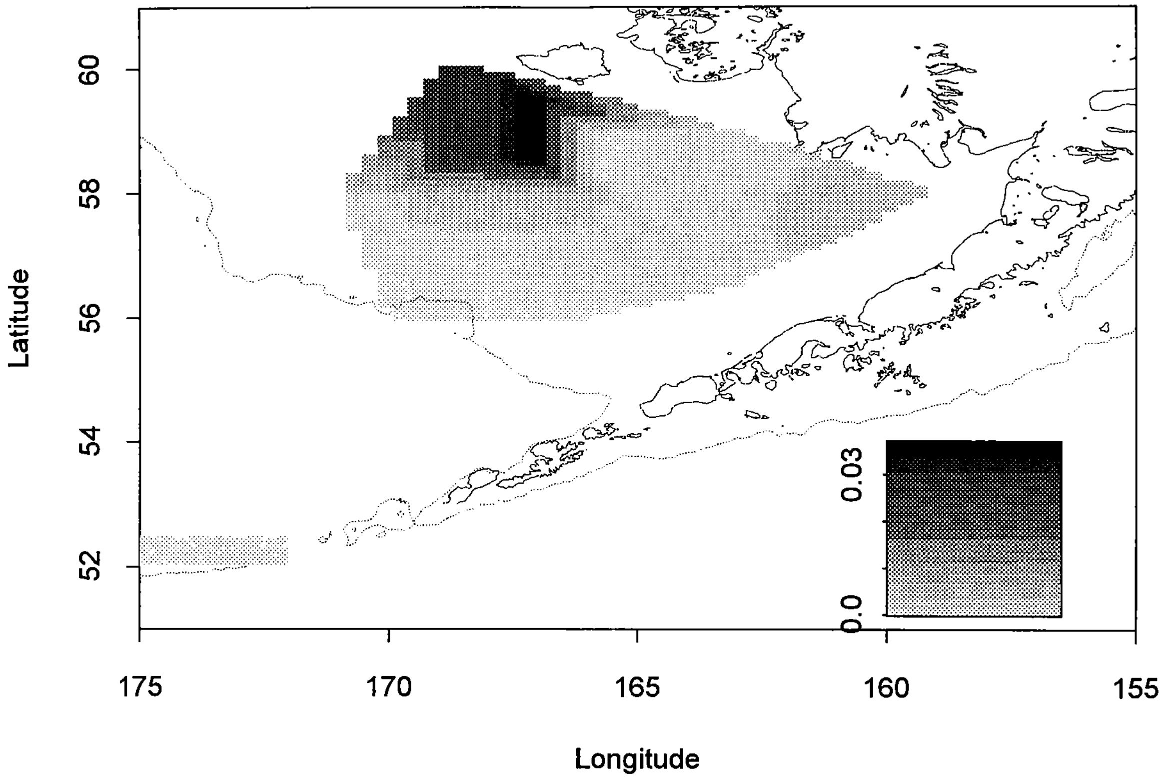


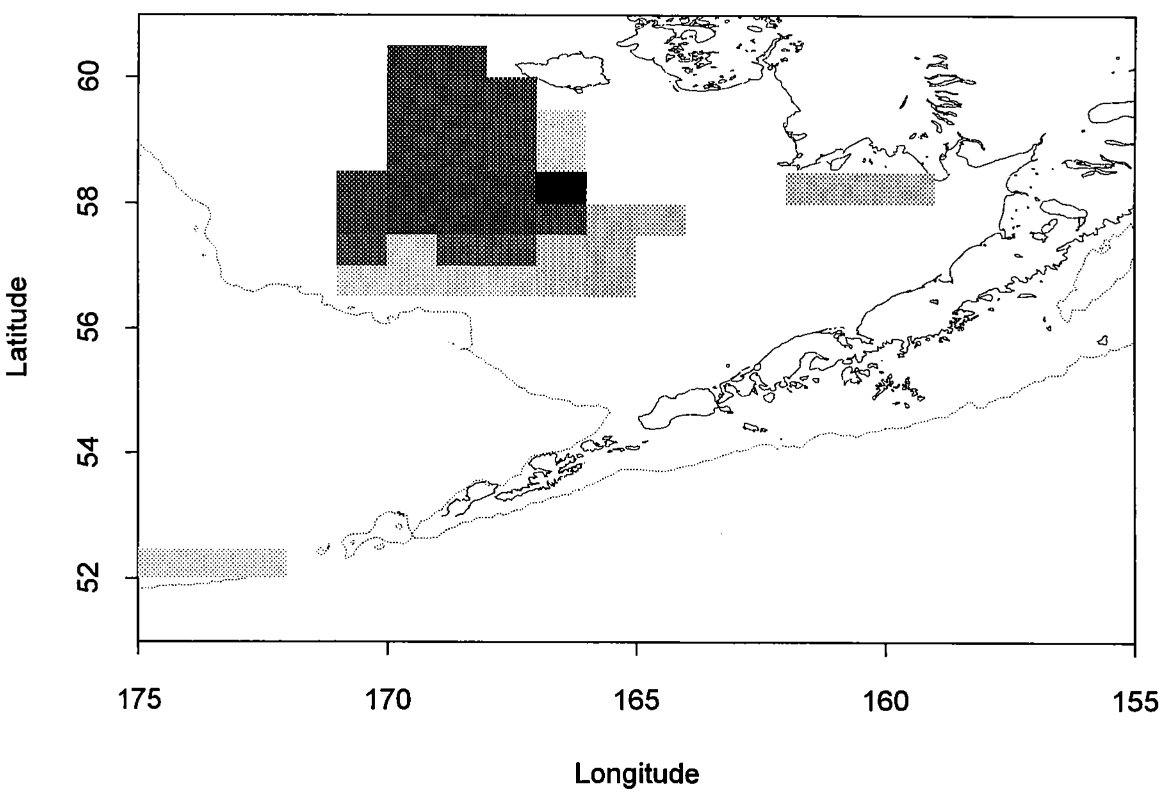
Halibut 45-54cm: August



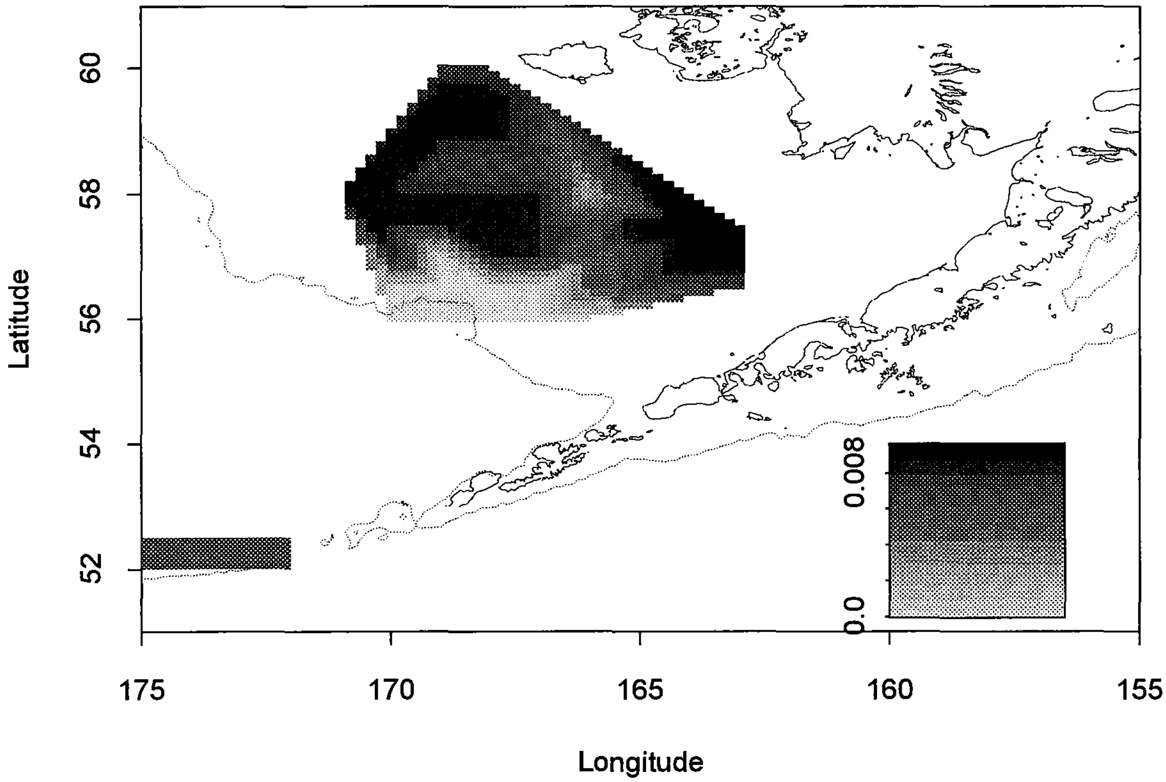


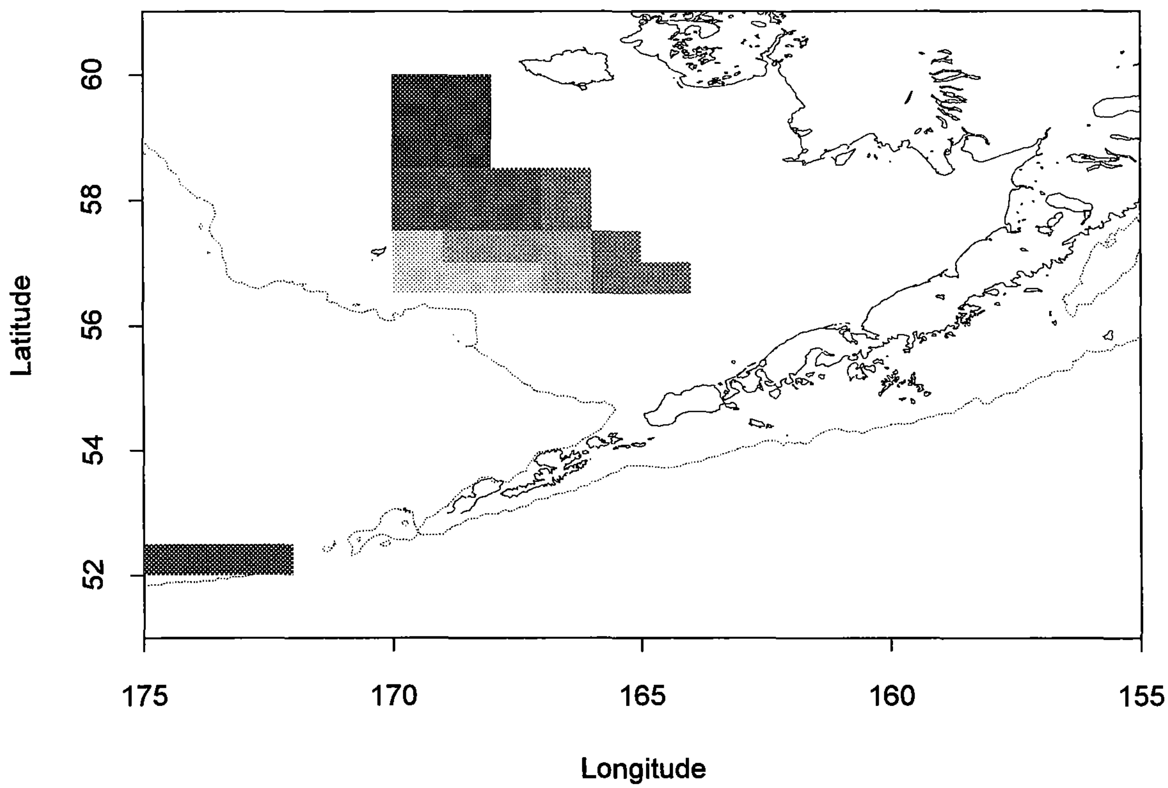
Halibut 45-54cm: September



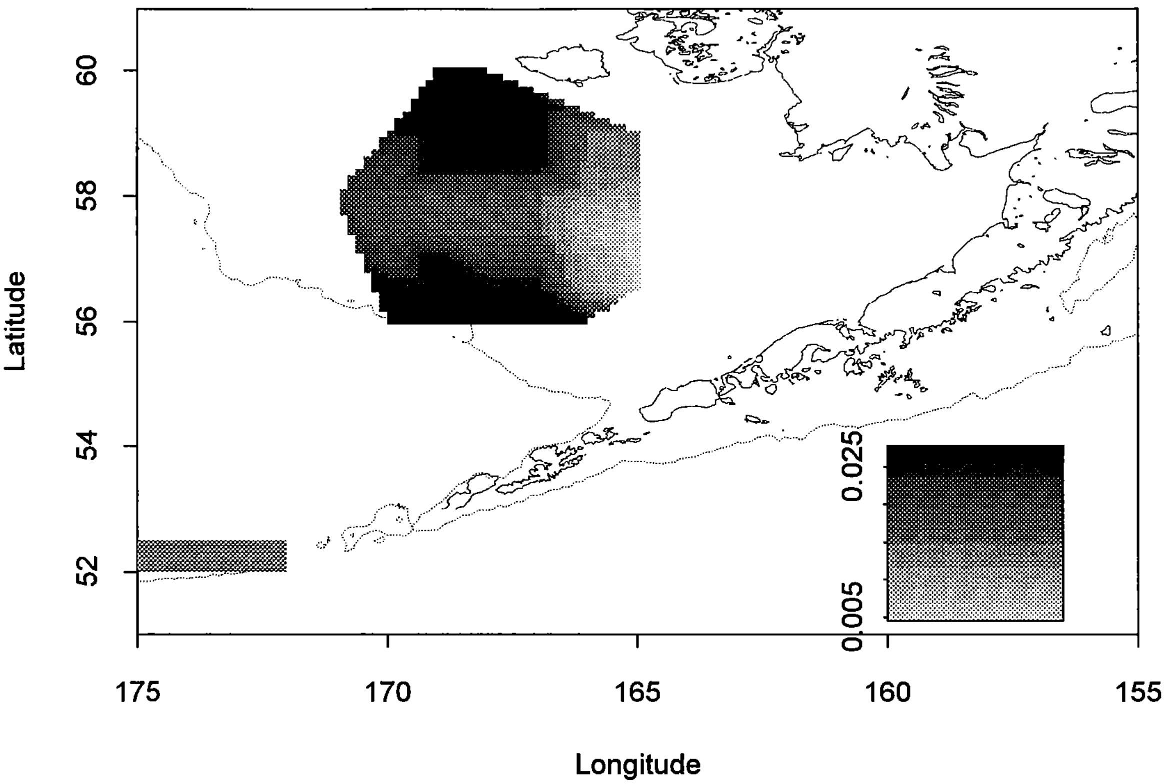


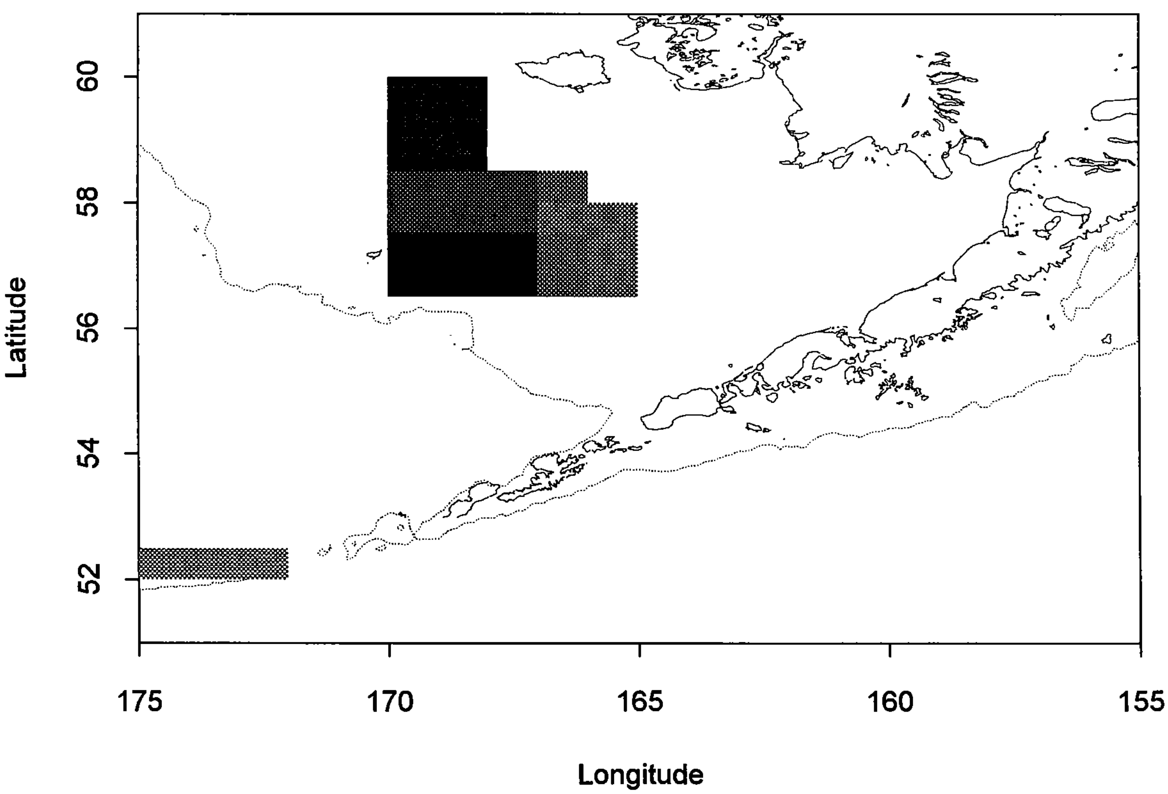
Halibut 45-54cm: October



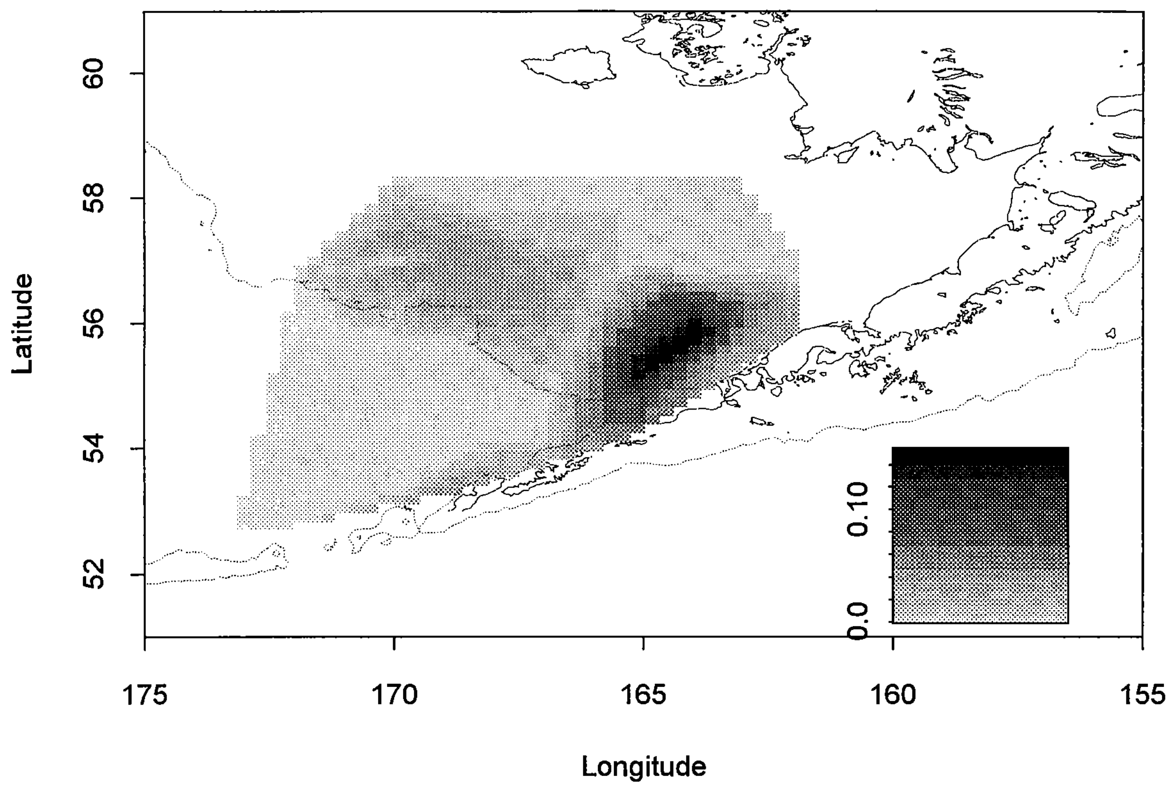


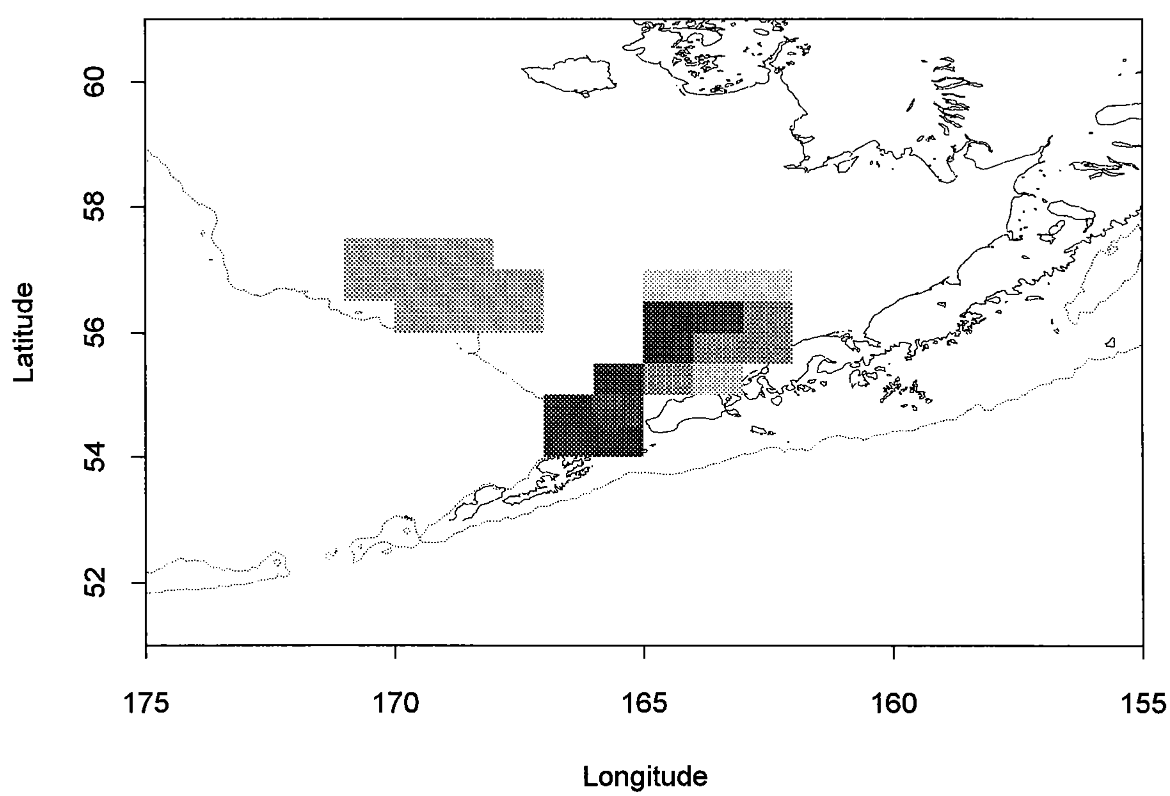
Halibut 45-54cm: November



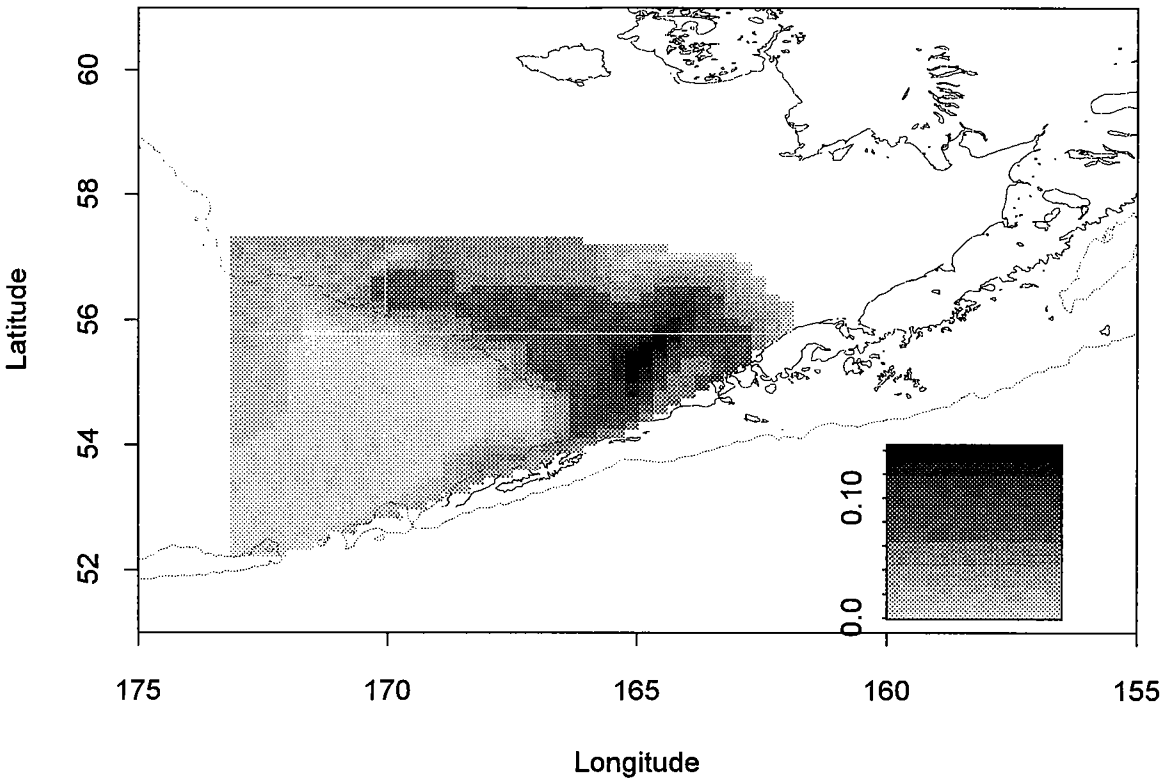


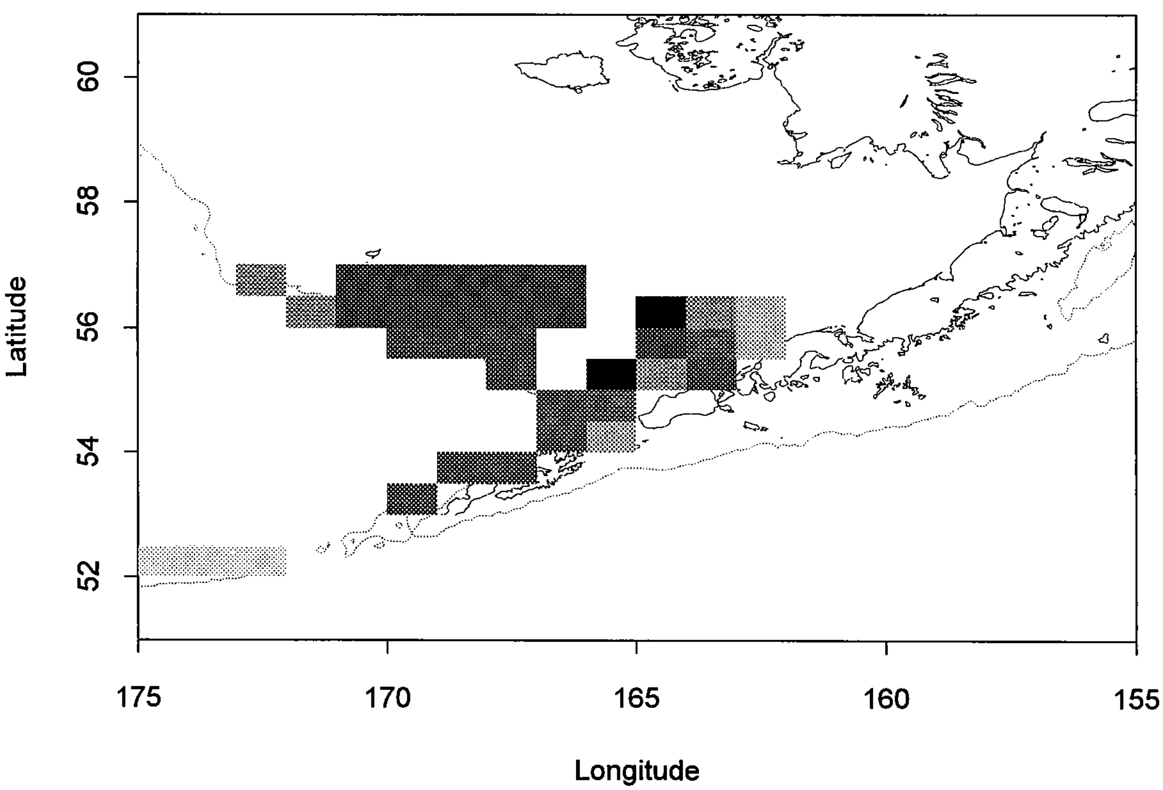
Halibut 55-64cm: January



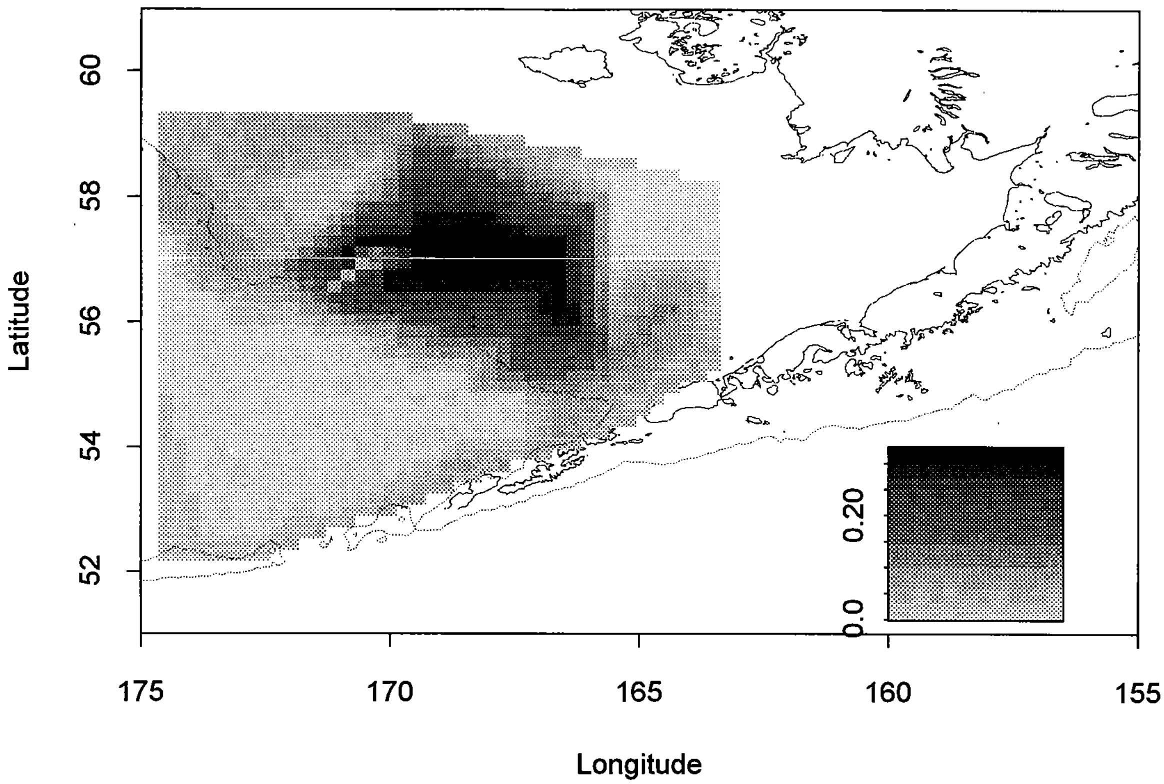


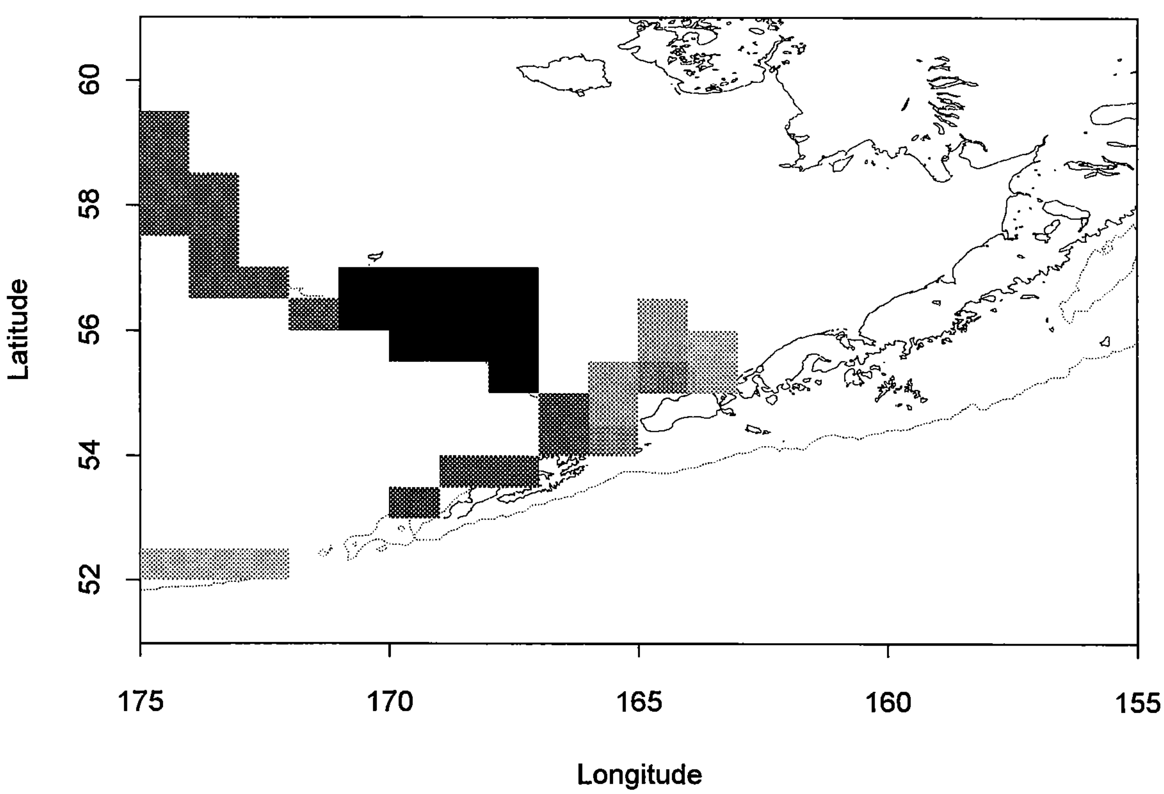
Halibut 55-64cm: February



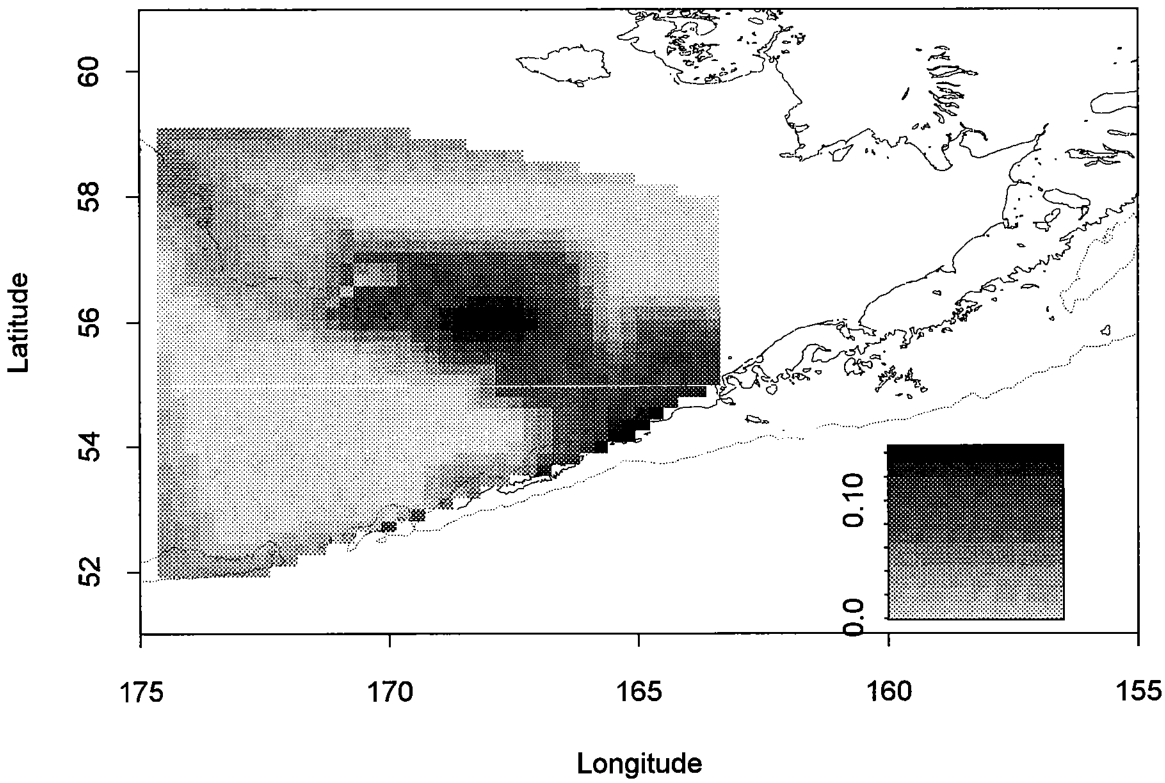


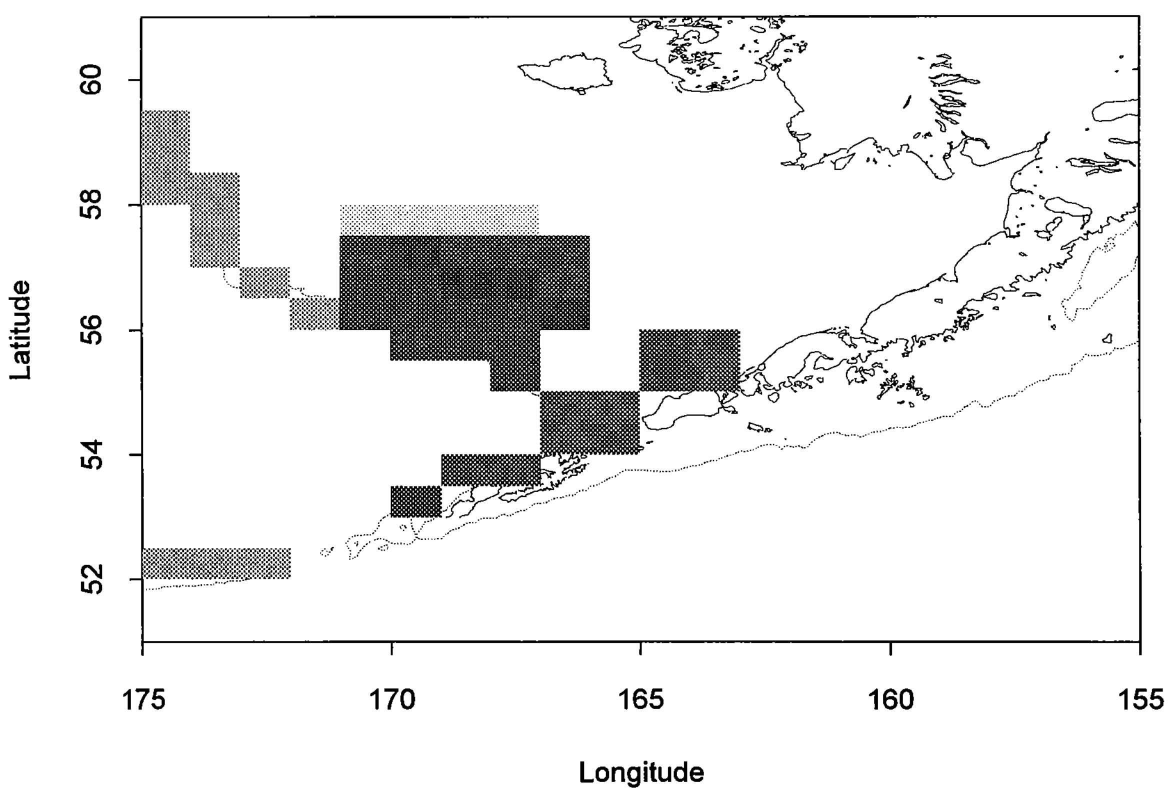
Halibut 55-64cm: March



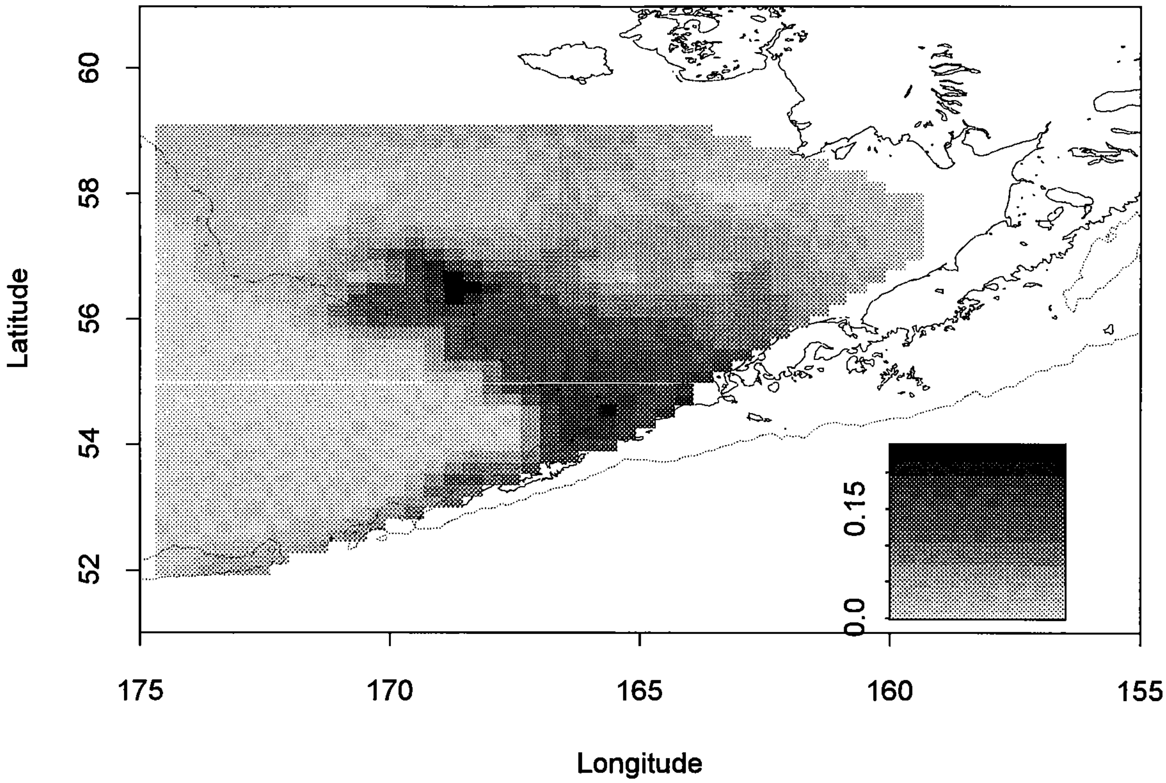


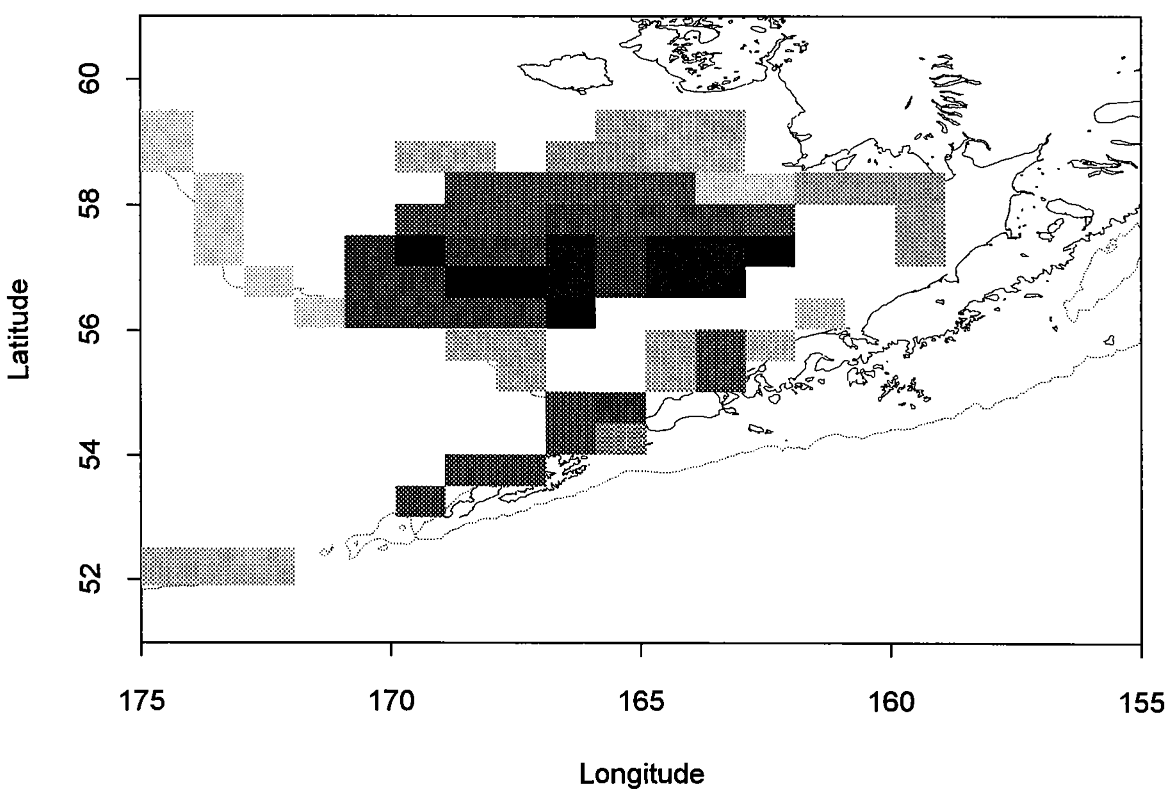
Halibut 55-64cm: April



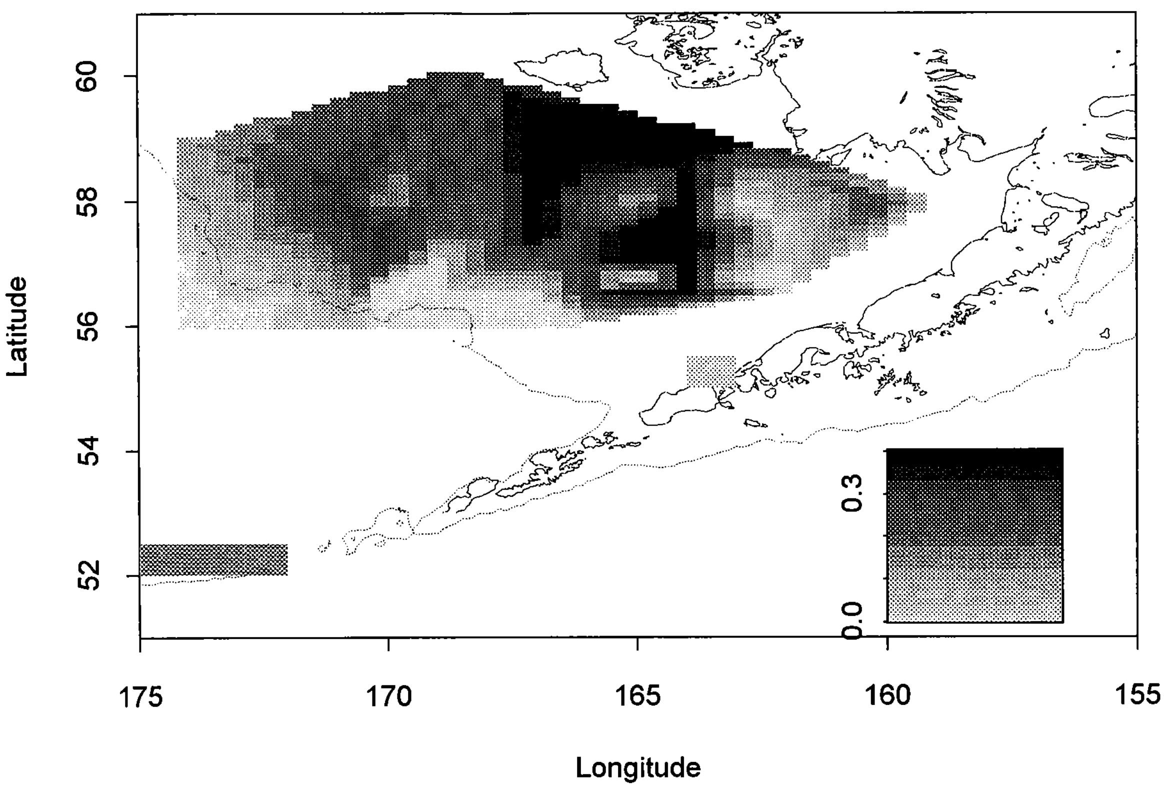


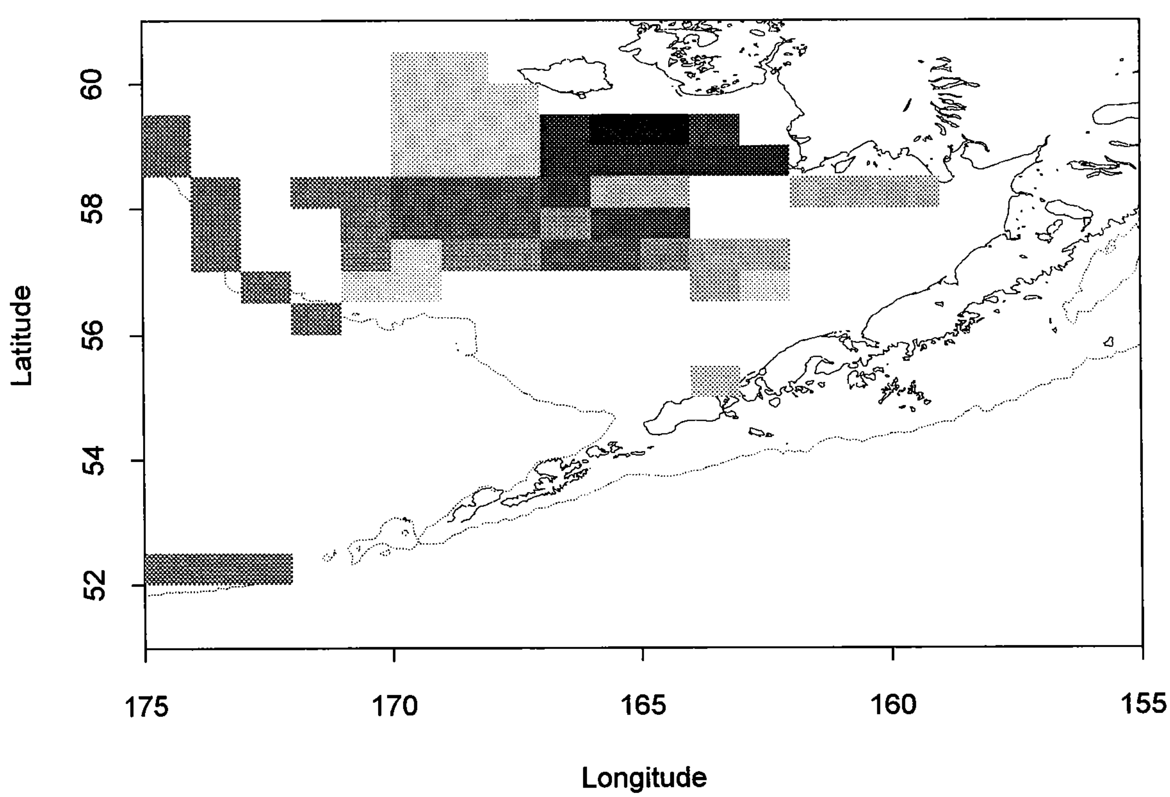
Halibut 55-64cm: May



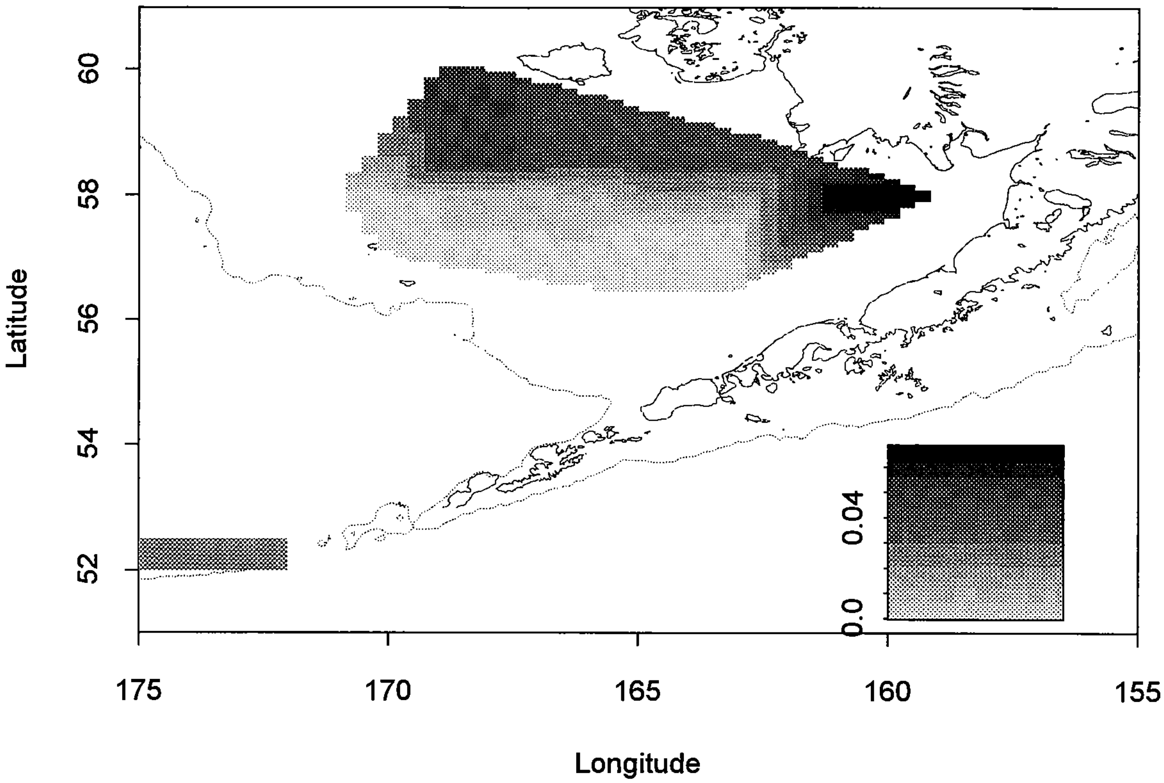


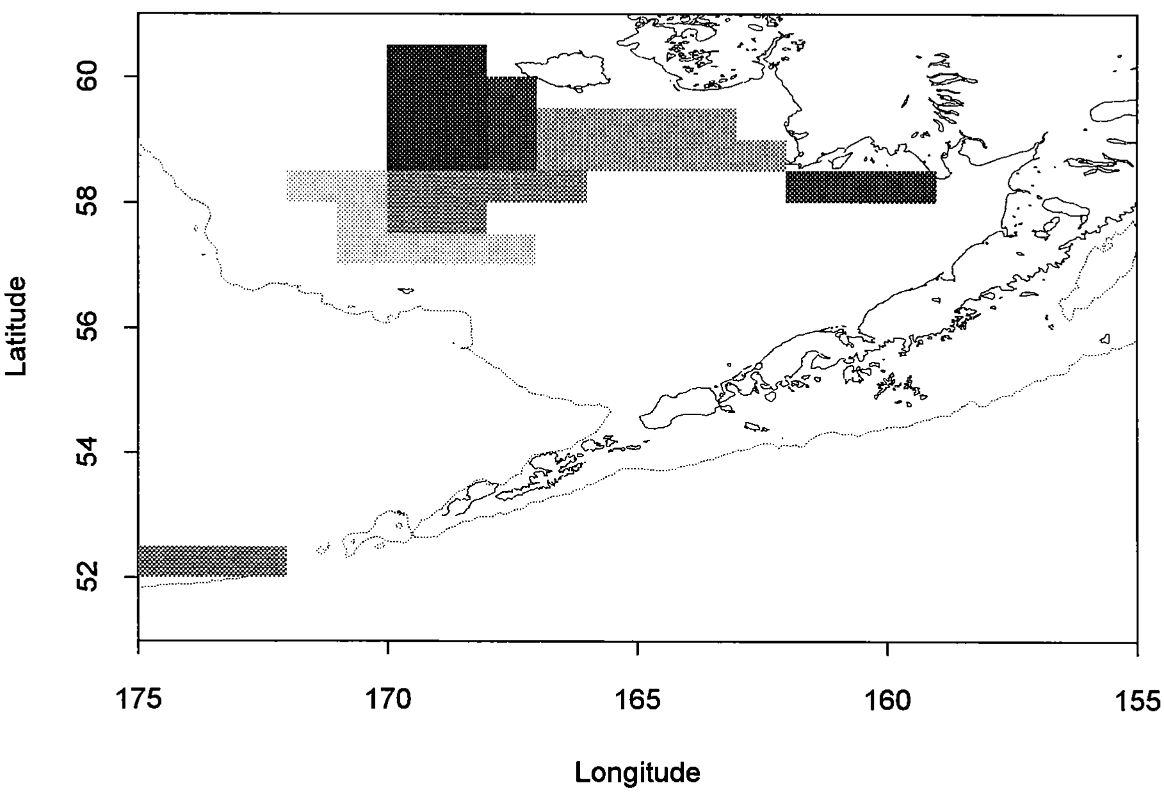
Halibut 55-64cm: June



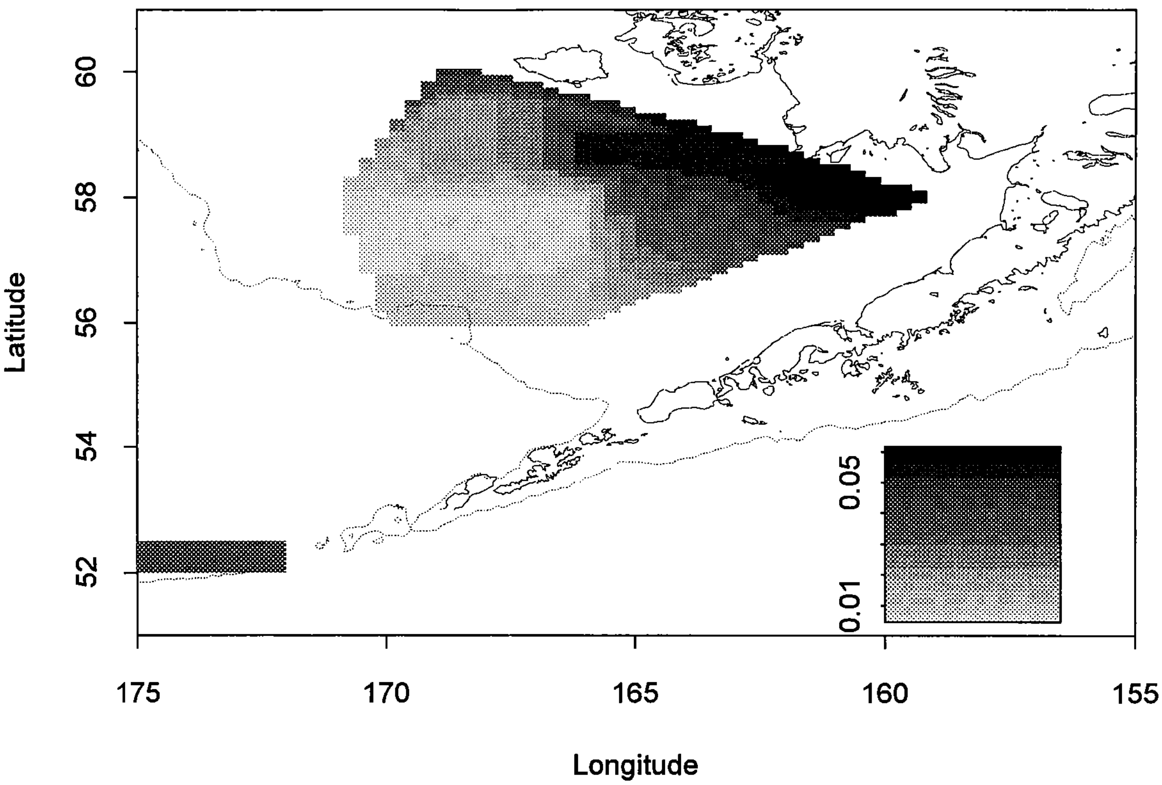


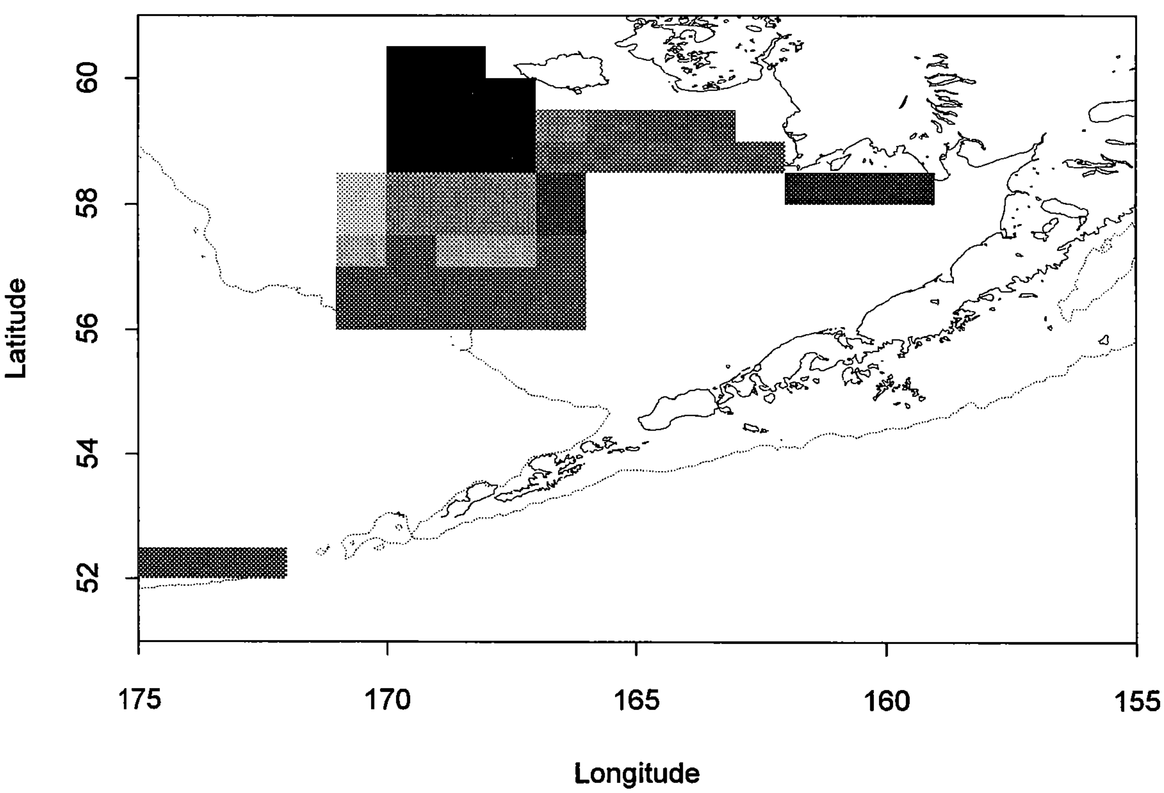
Halibut 55-64cm: July



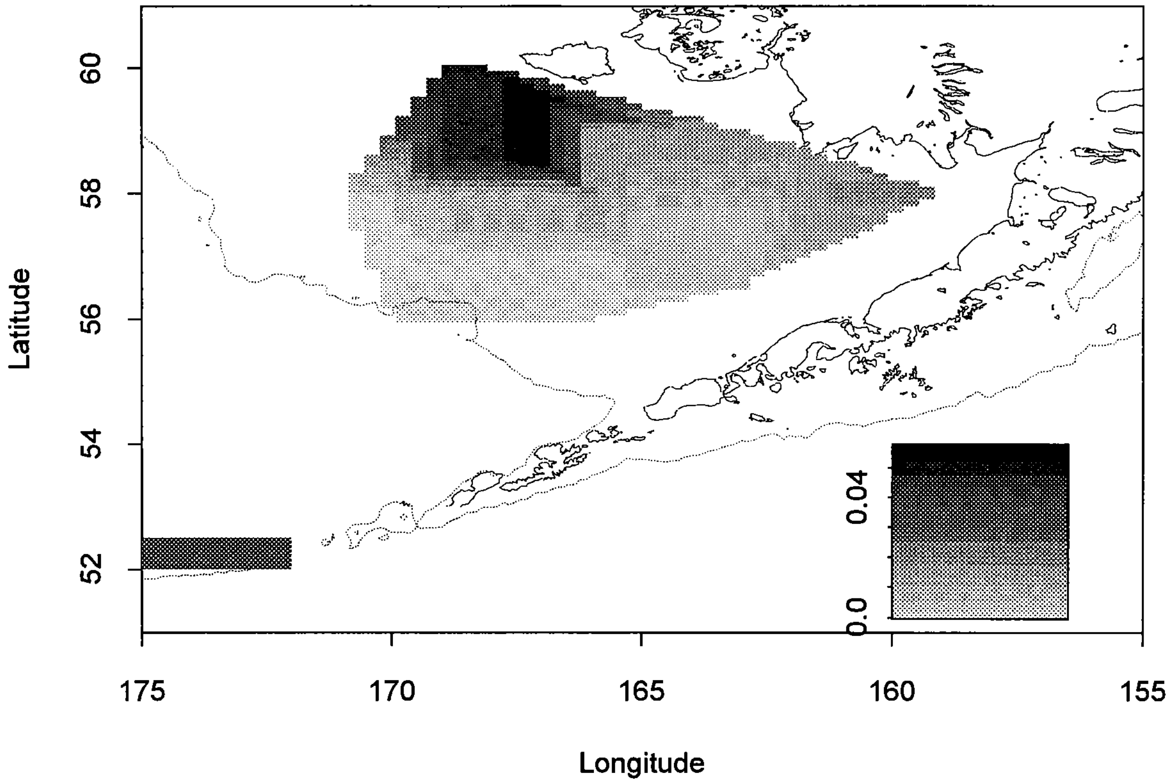


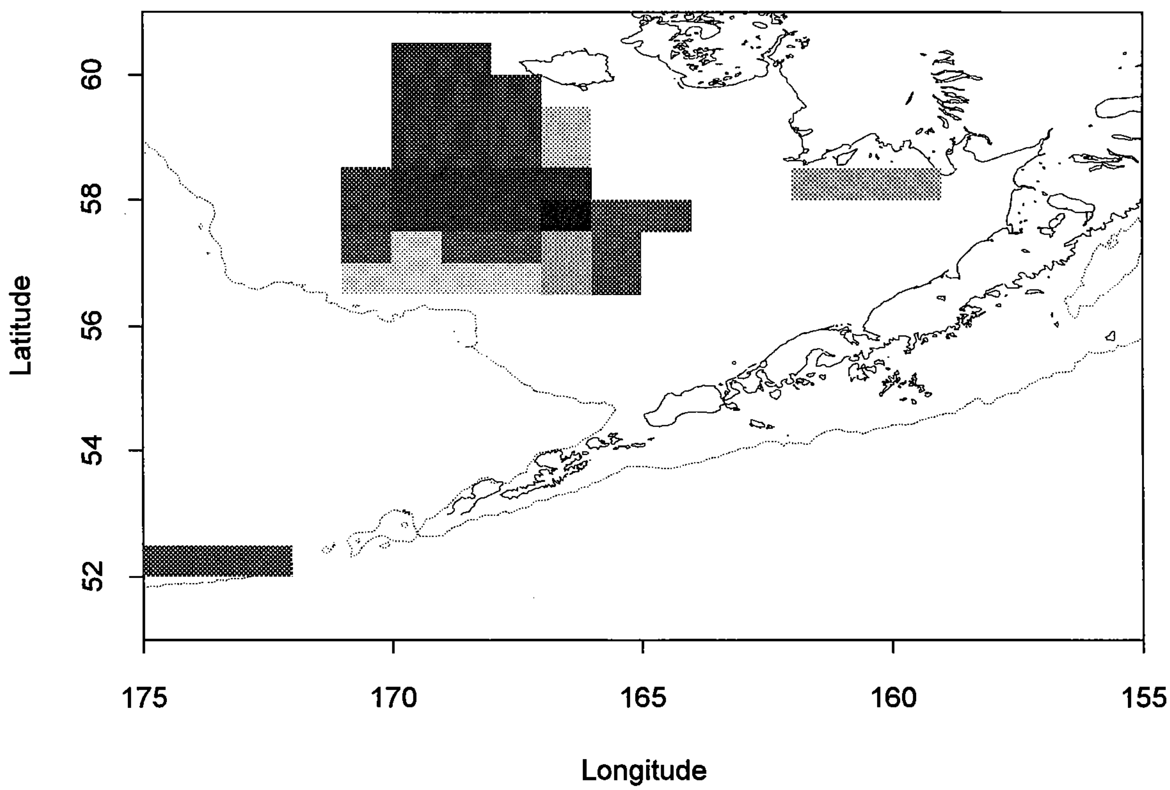
Halibut 55-64cm: August



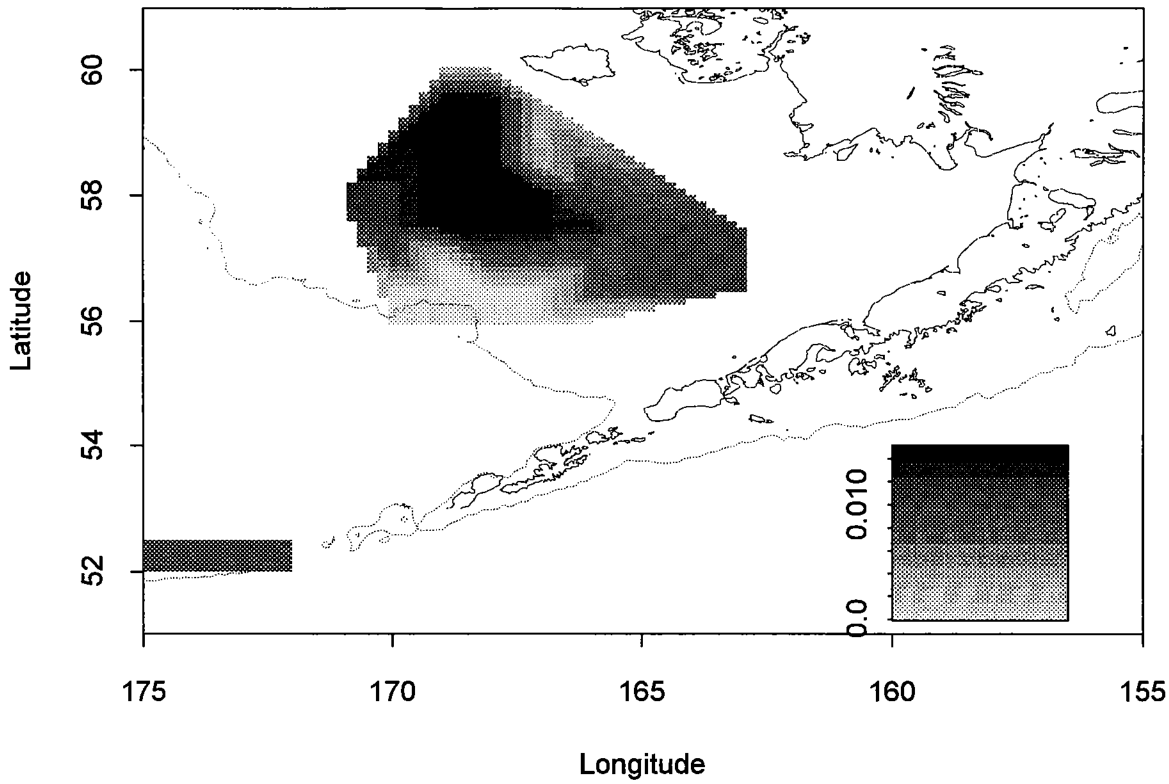


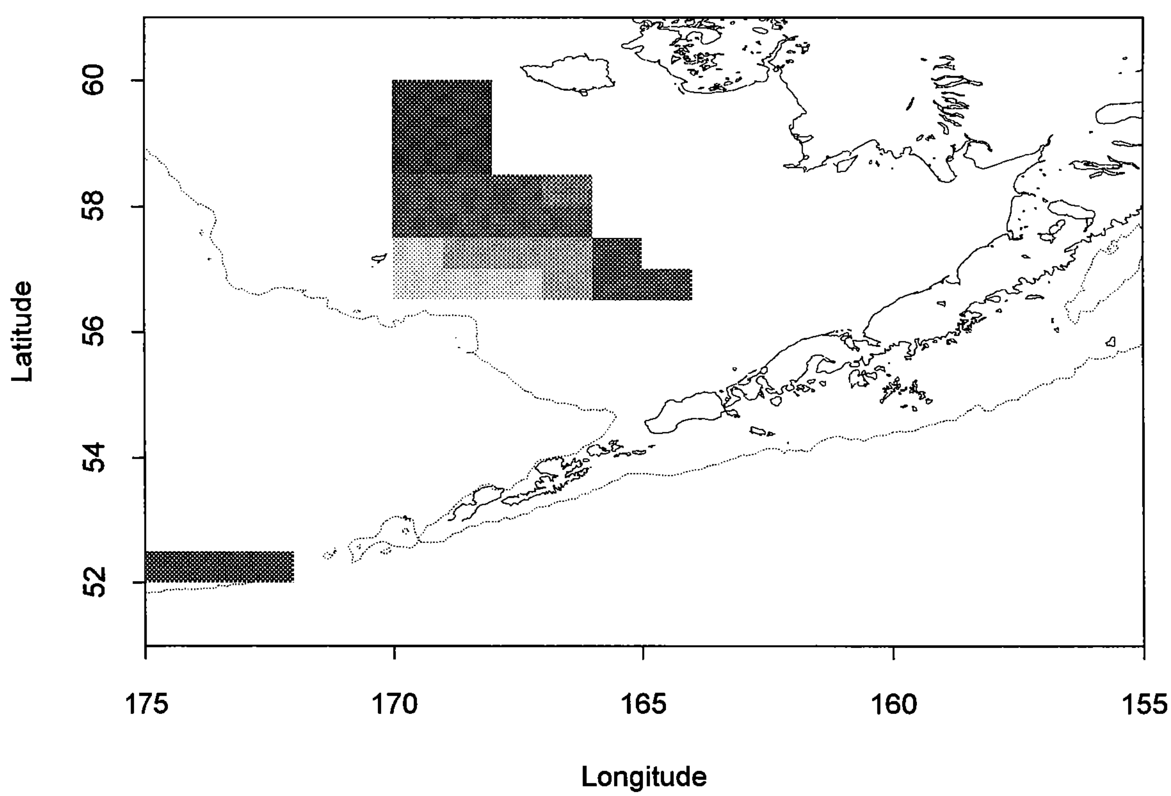
Halibut 55-64cm: September



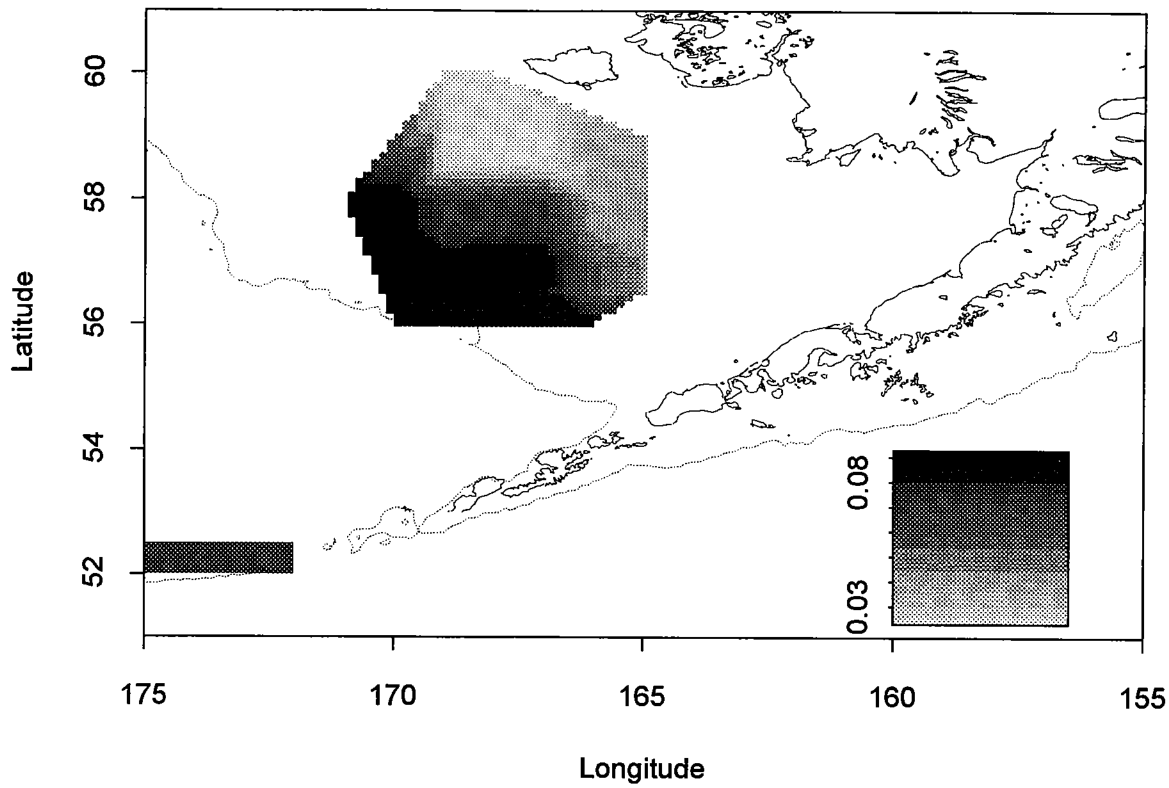


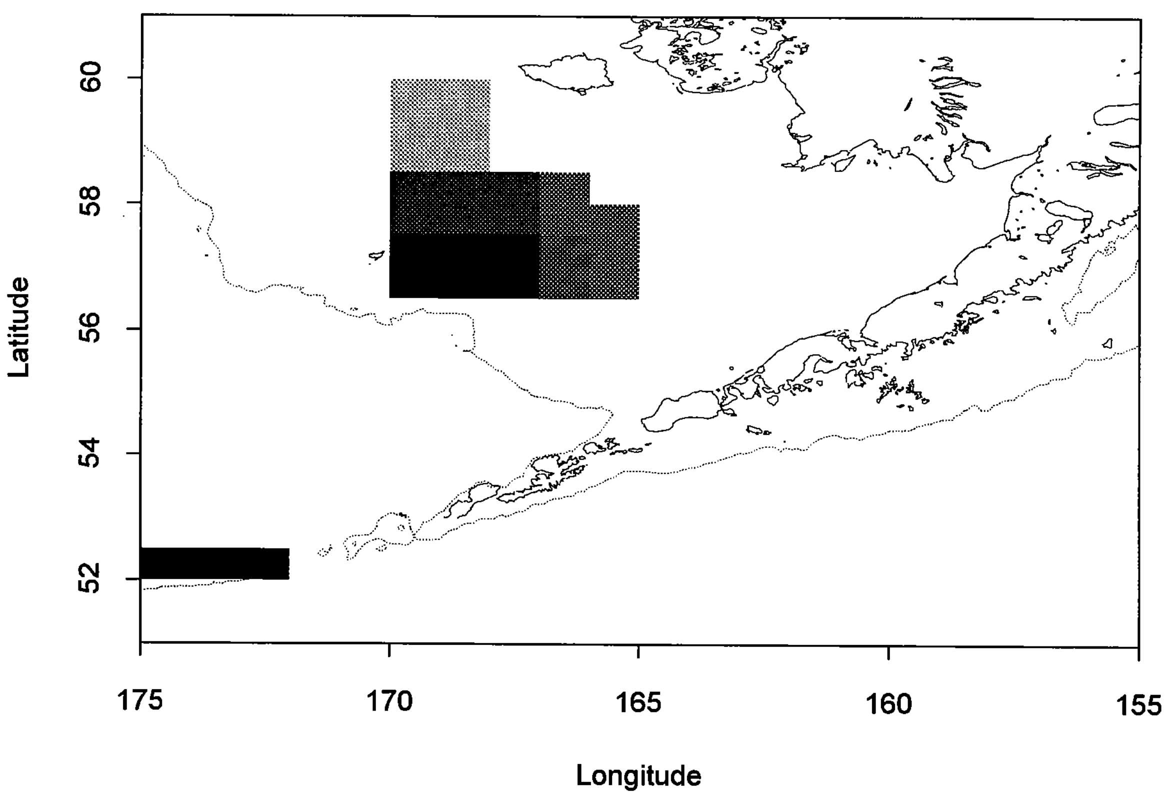
Halibut 55-64cm: October



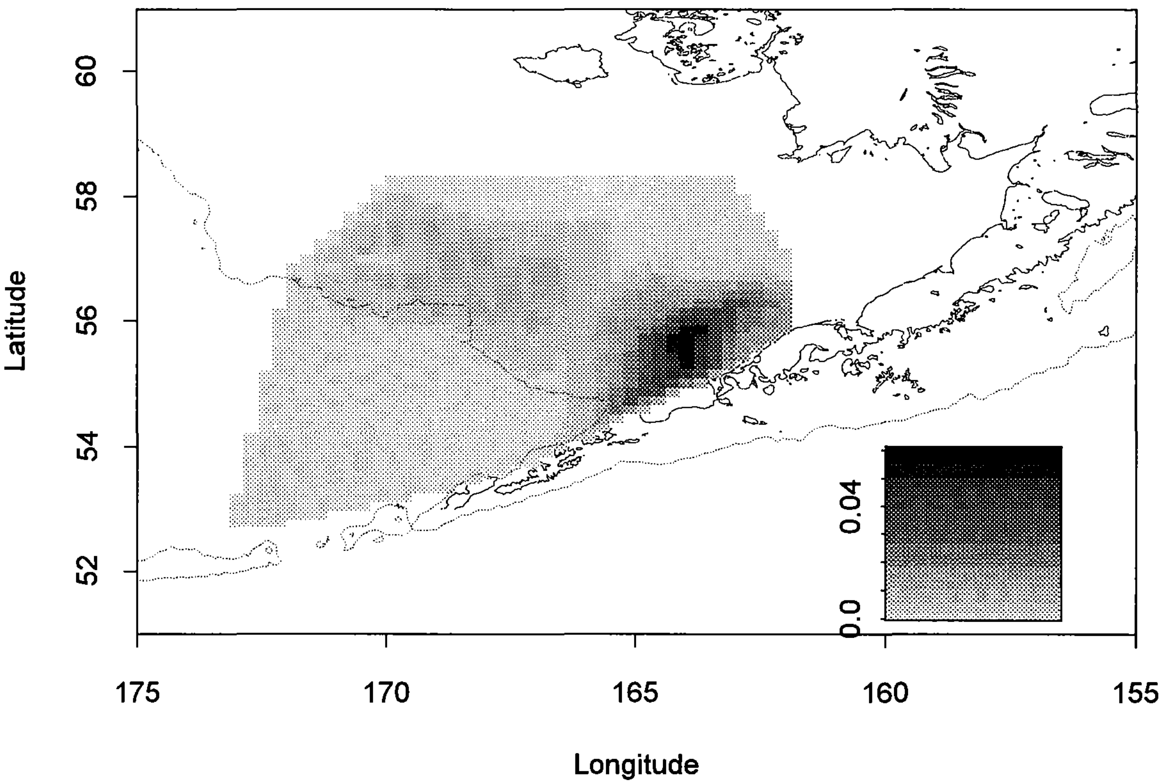


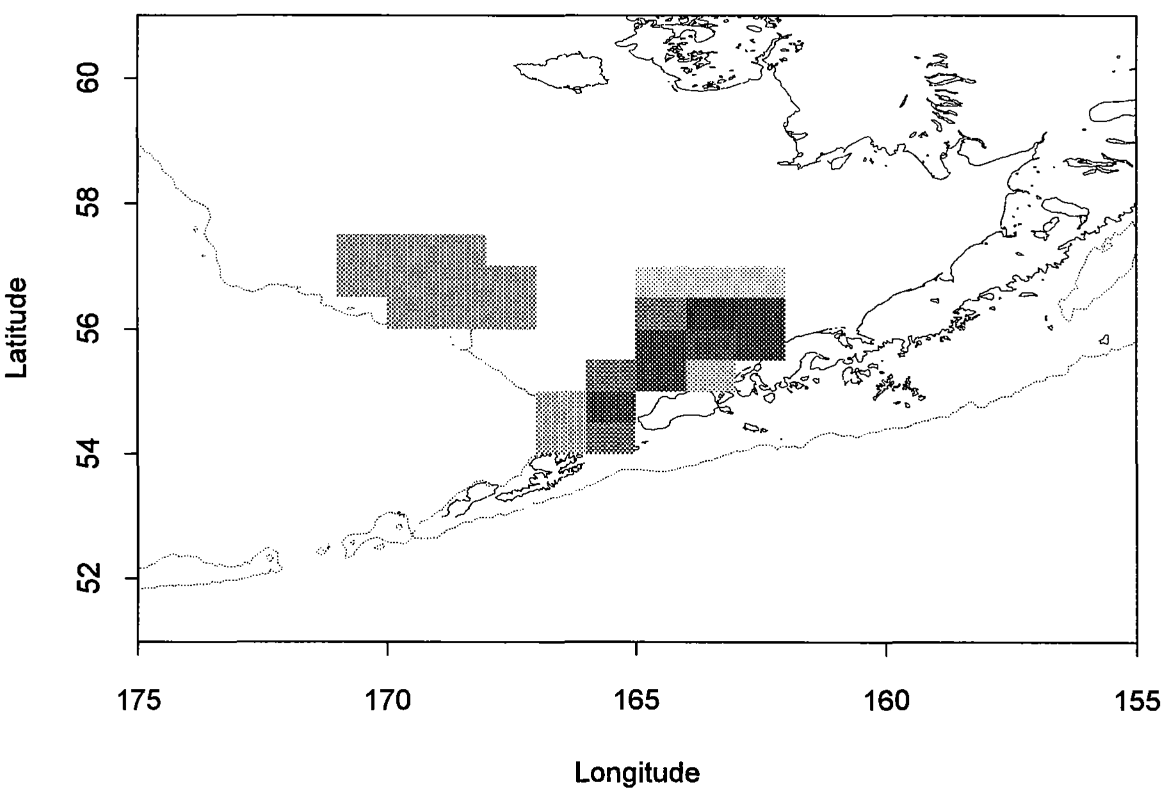
Halibut 55-64cm: November



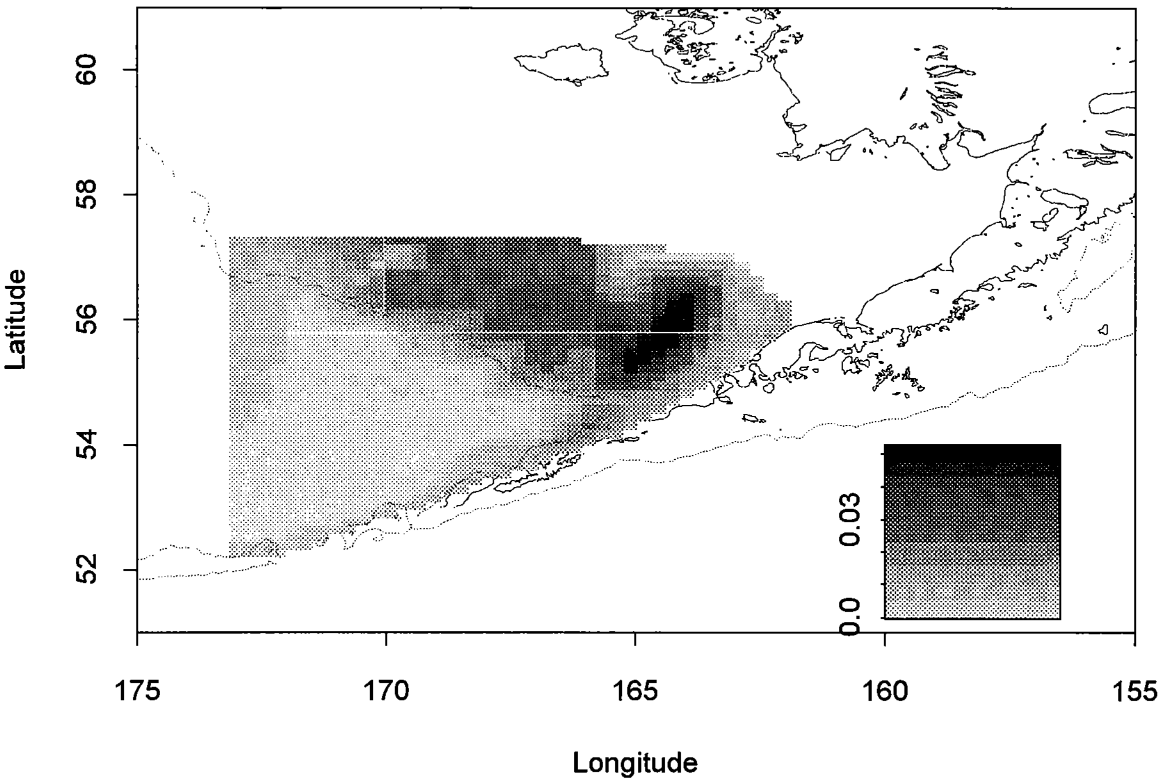


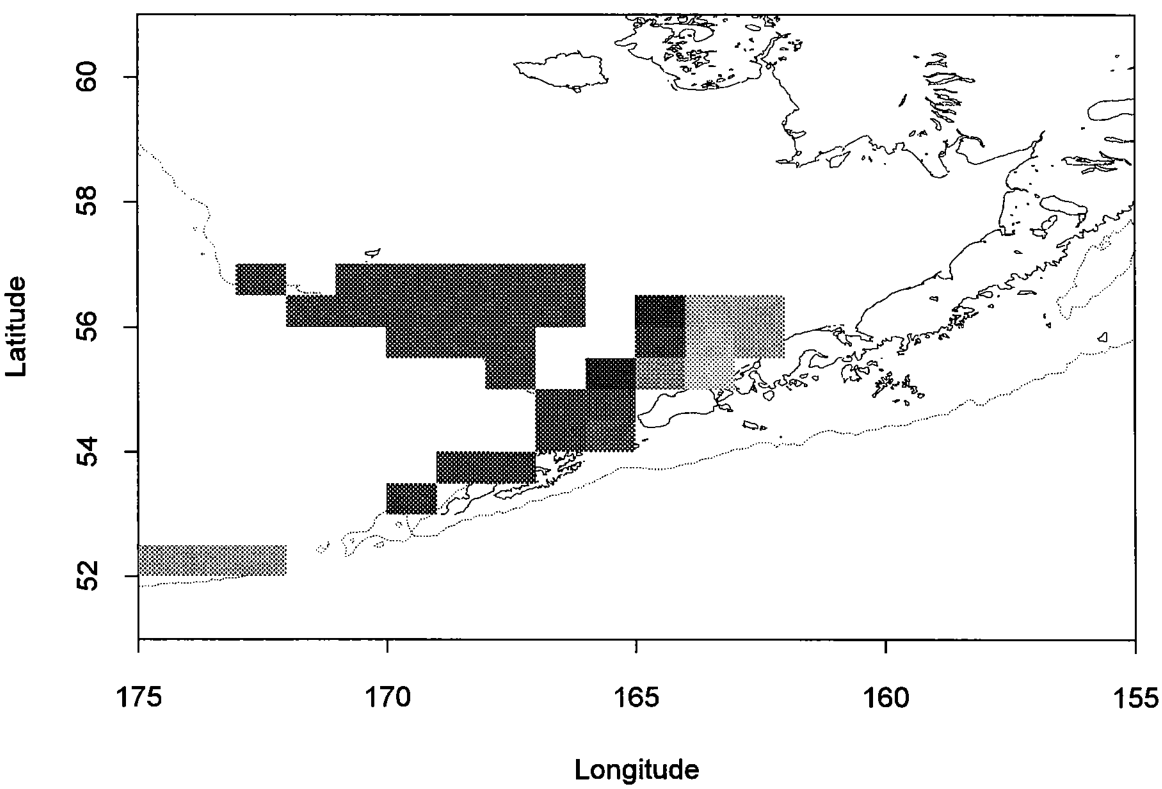
Halibut 65-74cm: January



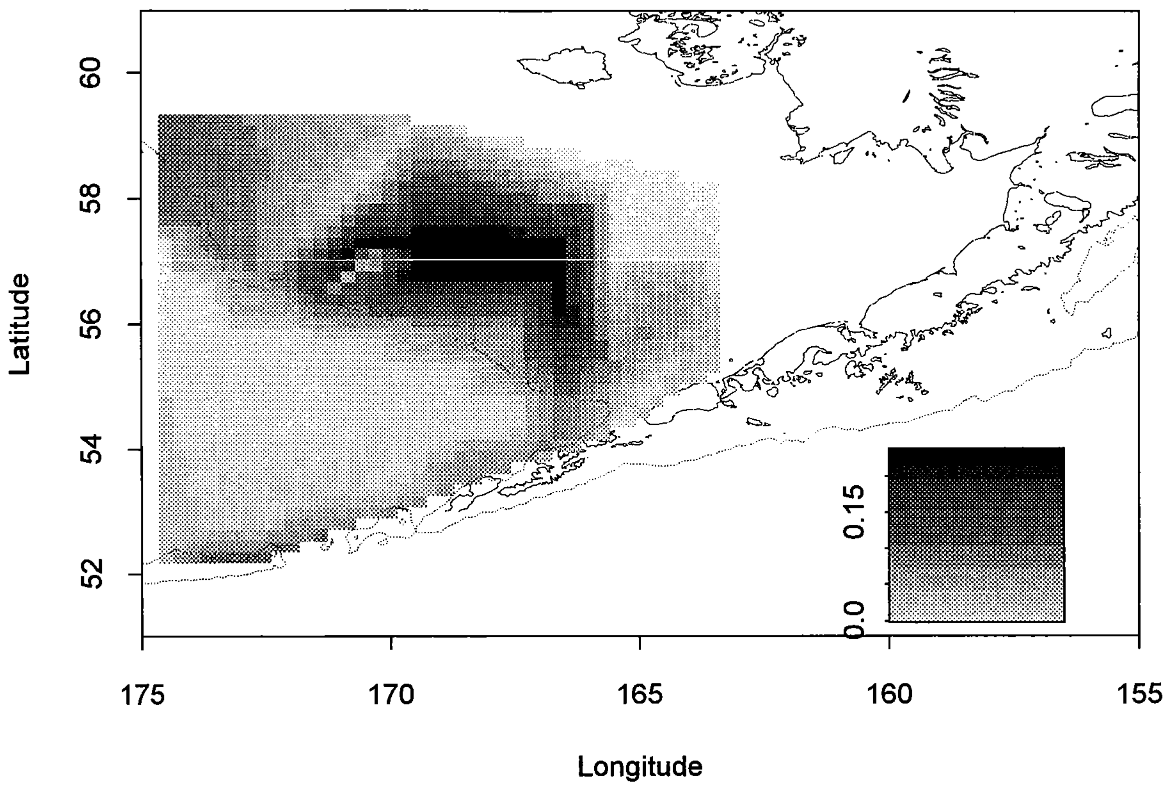


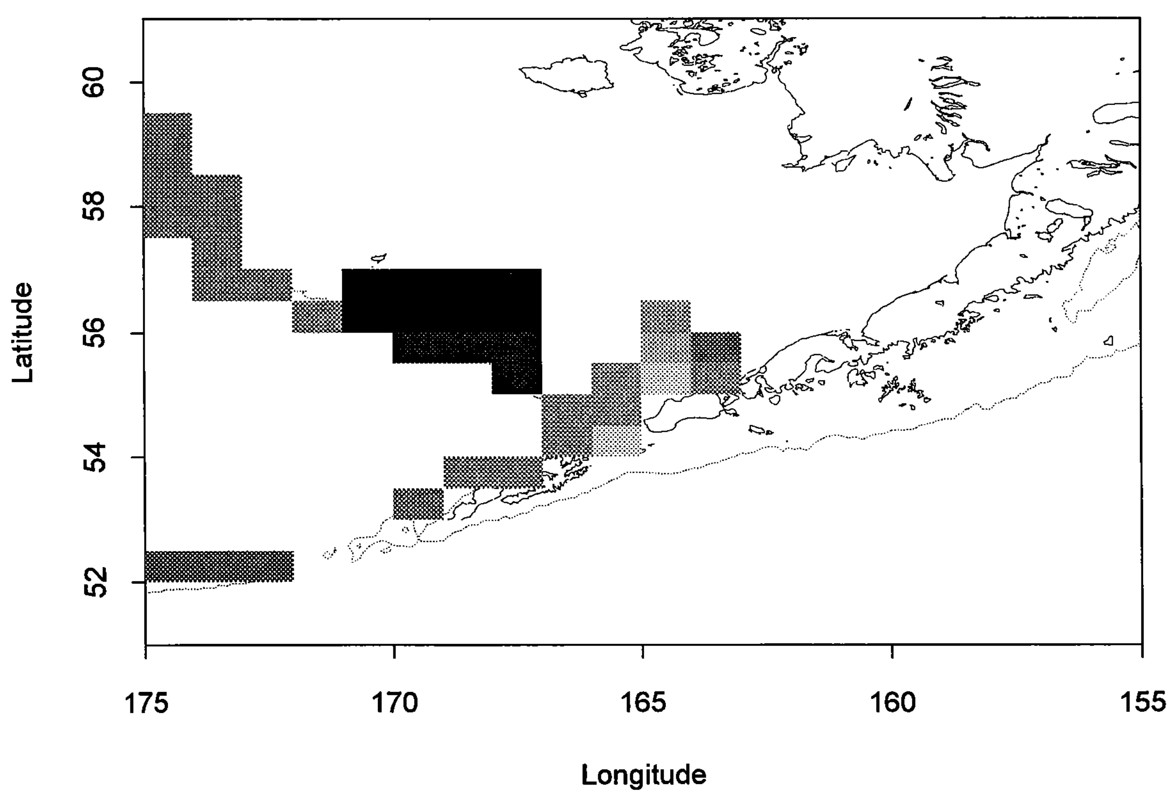
Halibut 65-74cm: February



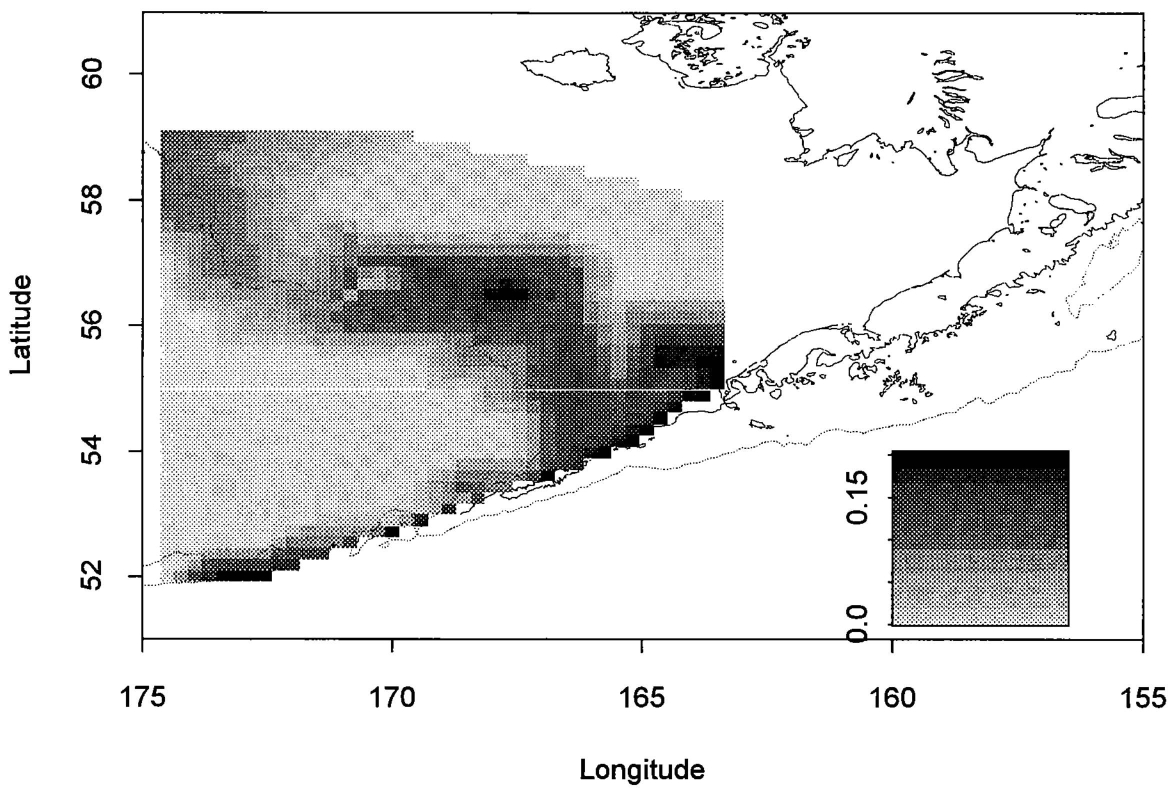


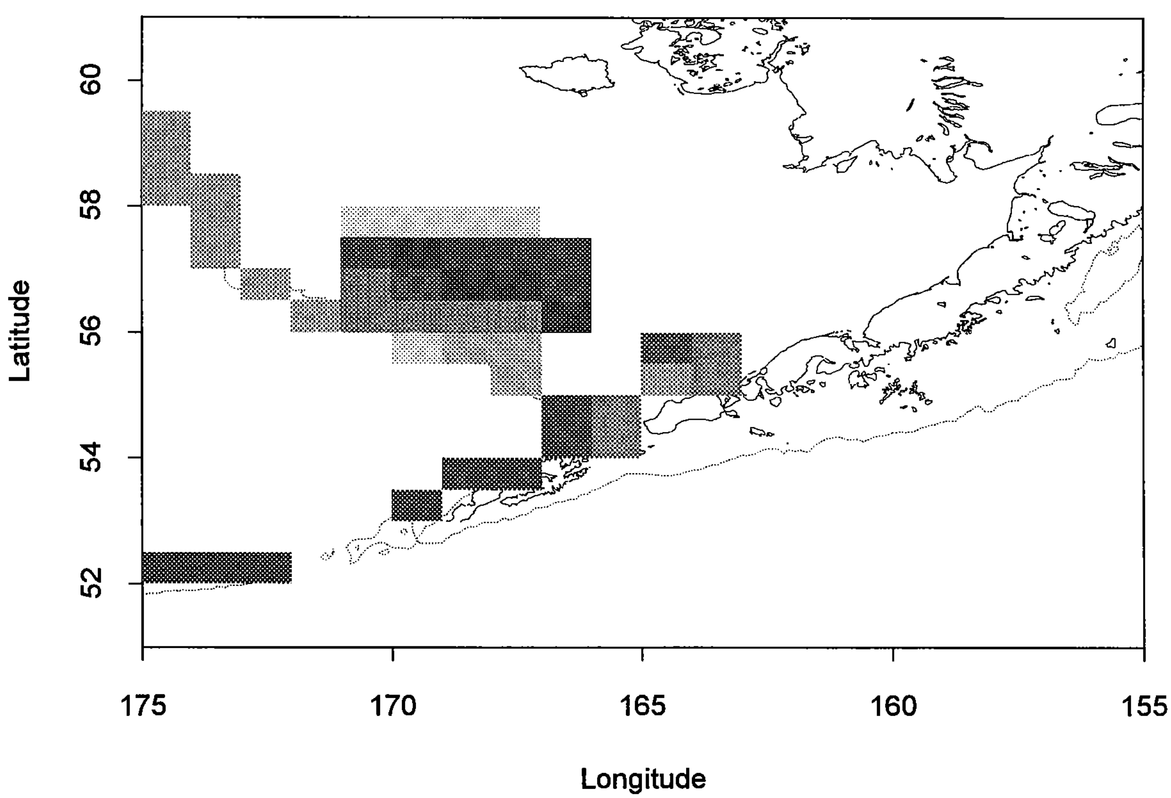
Halibut 65-74cm: March



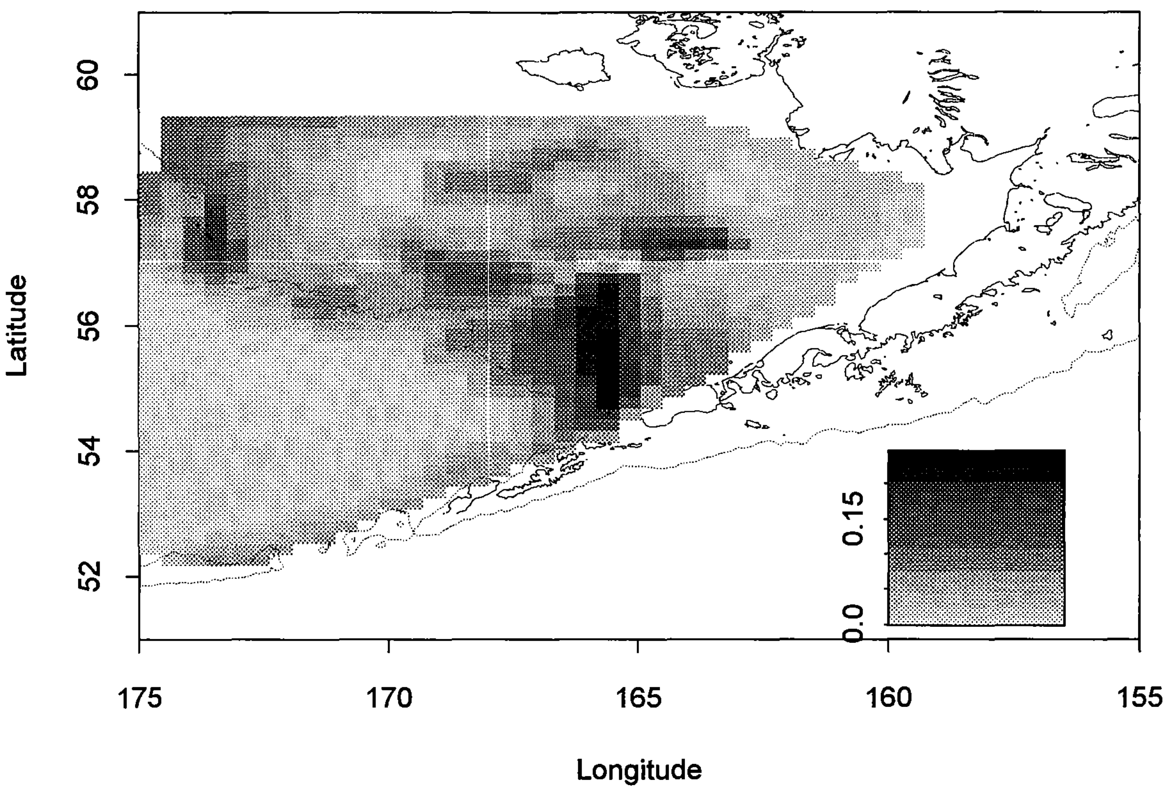


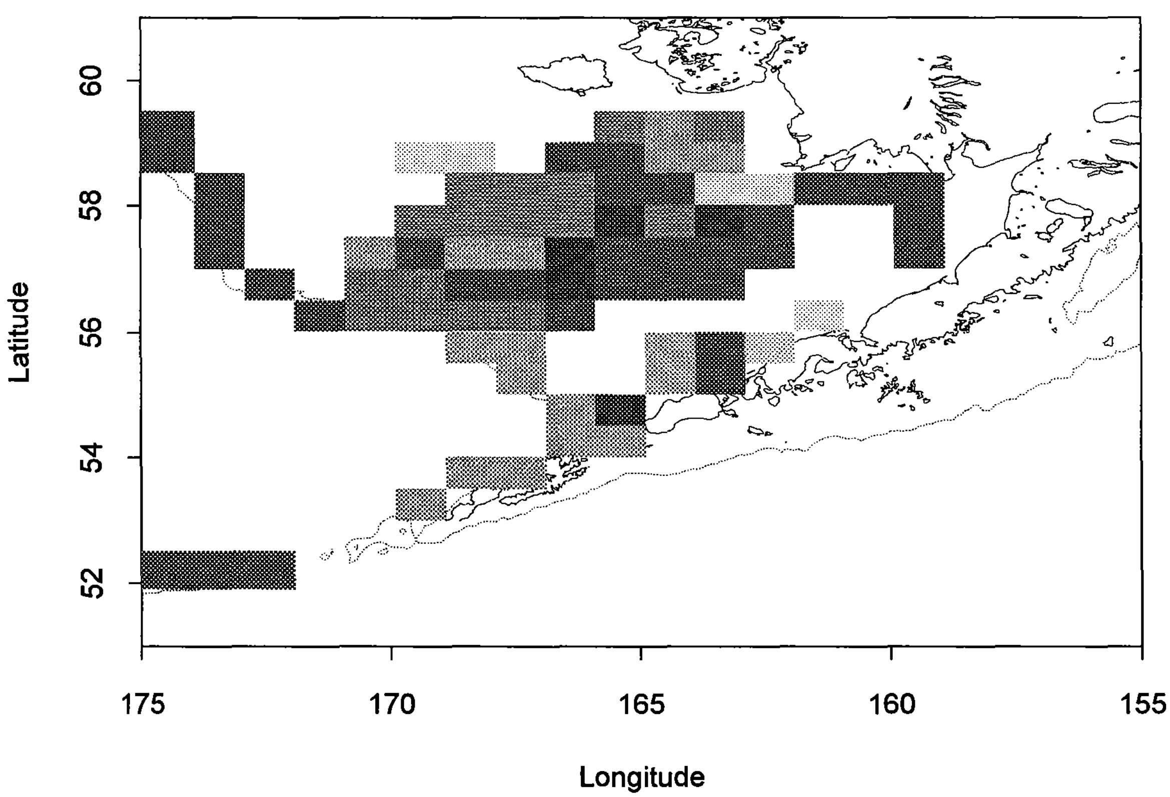
Halibut 65-74cm: April



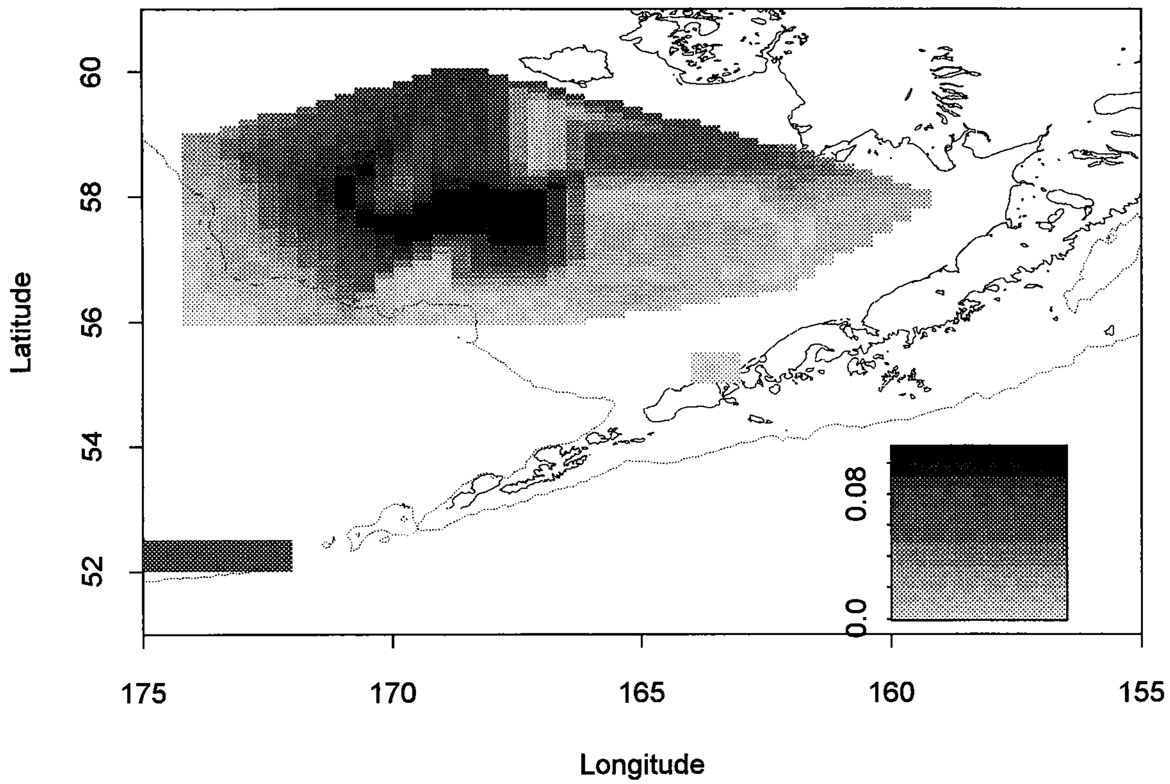


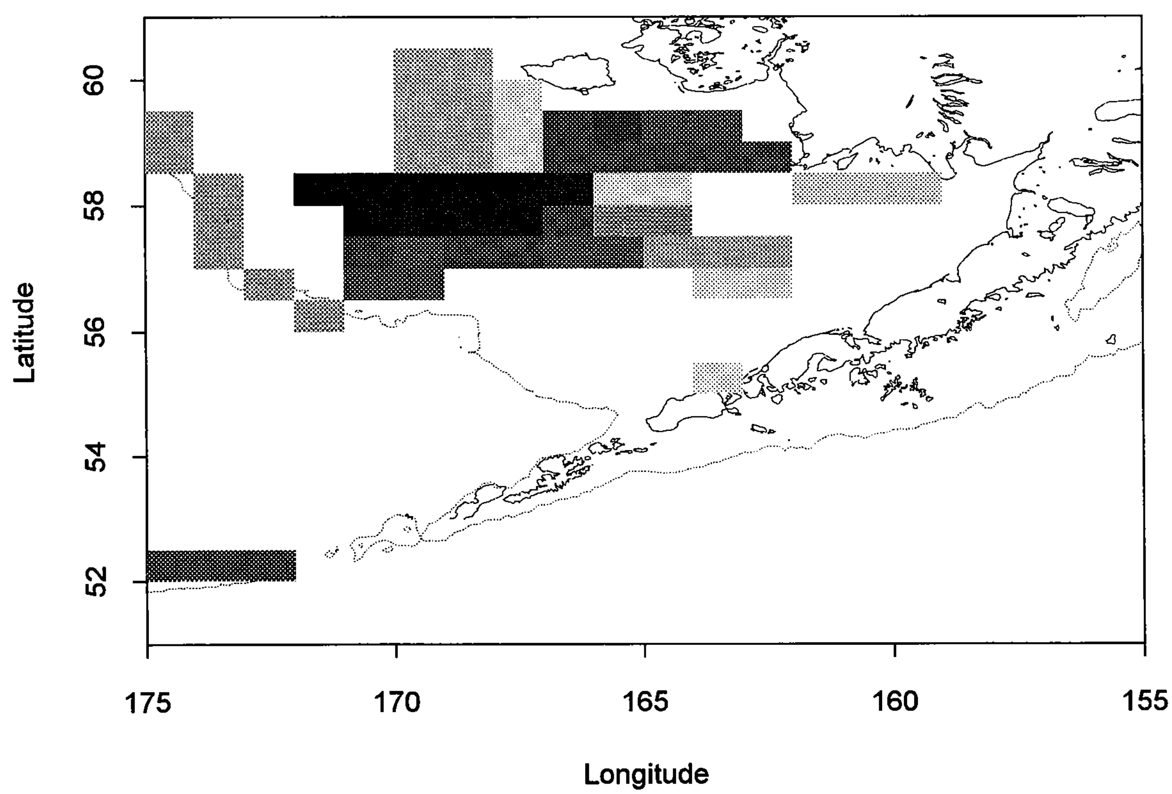
Halibut 65-74cm: May



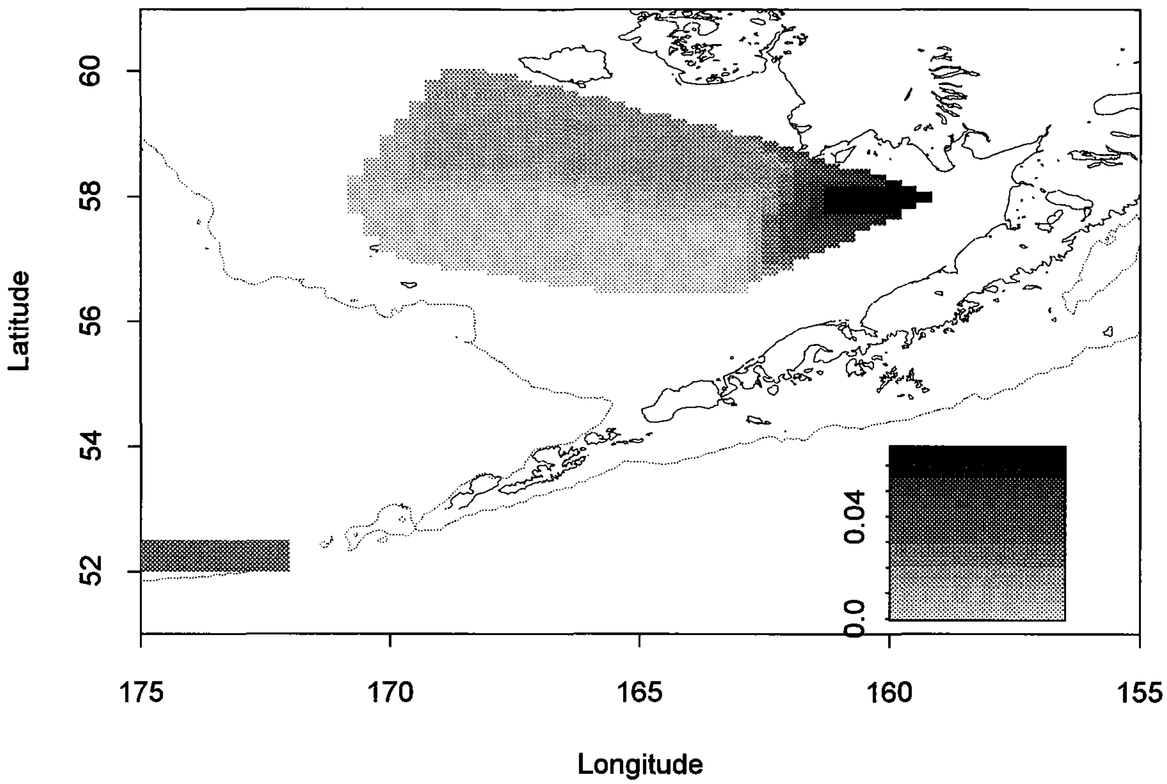


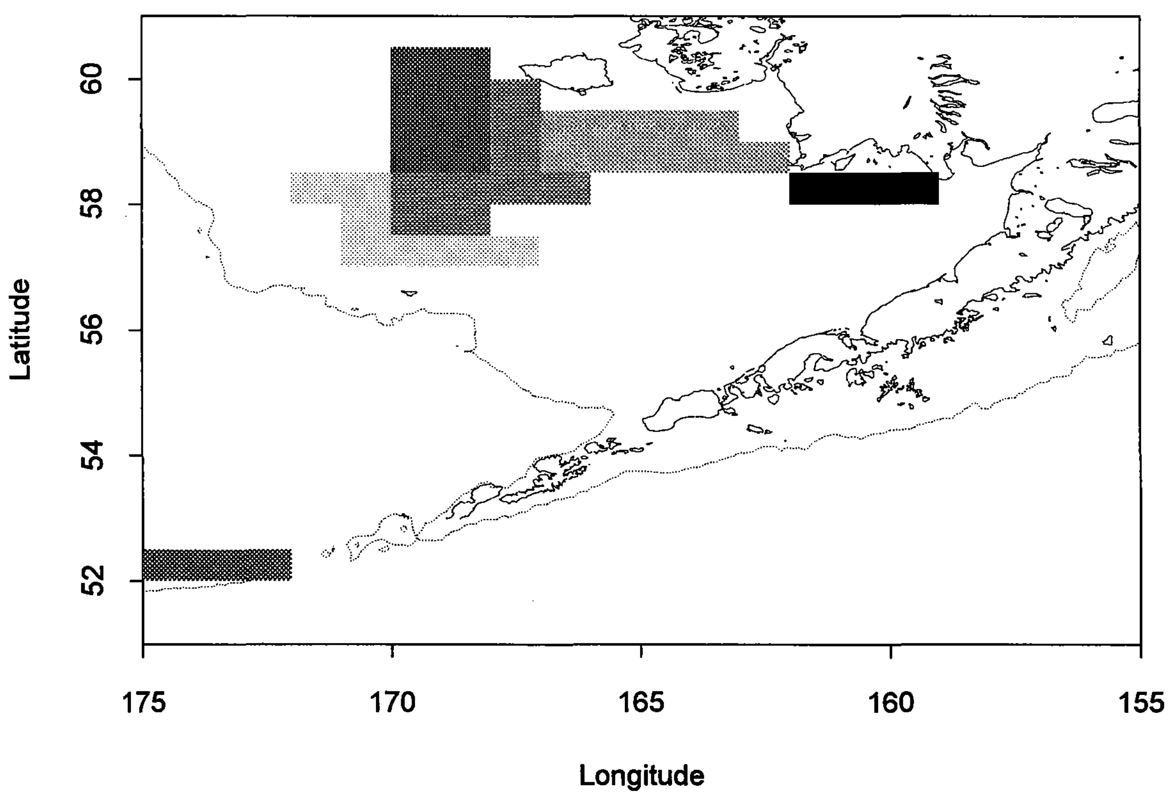
Halibut 65-74cm: June



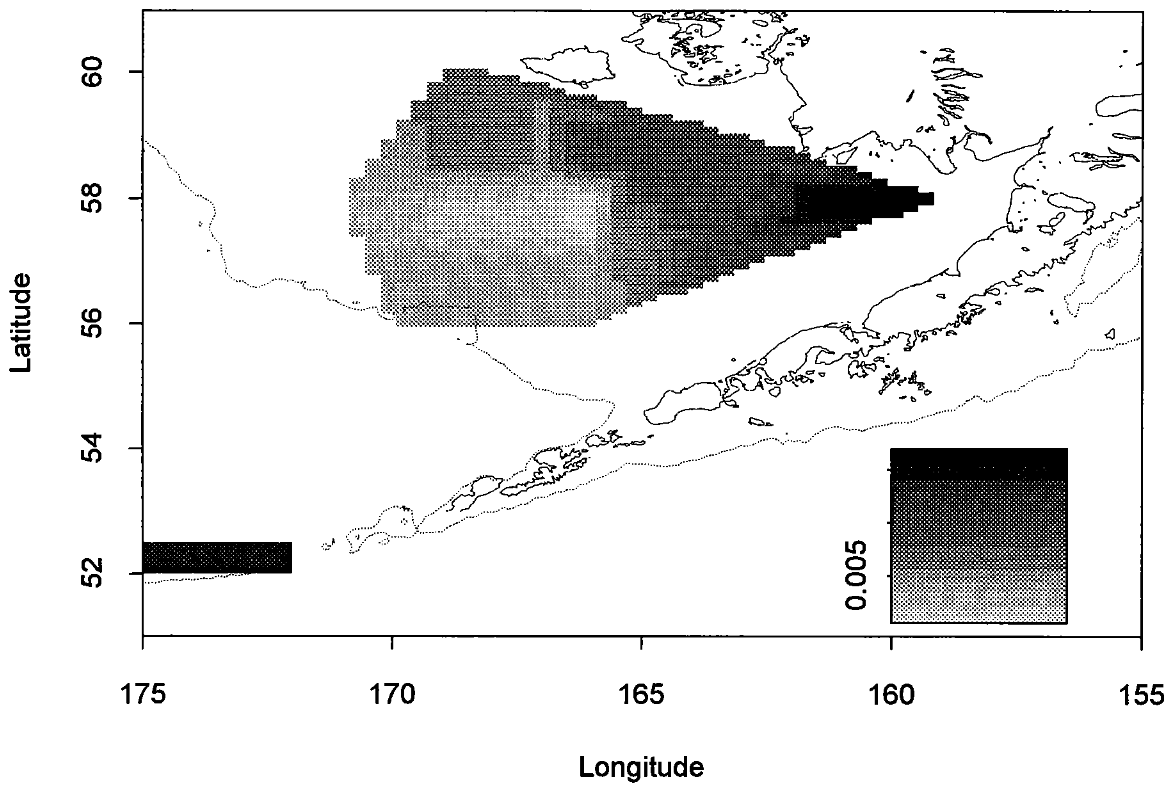


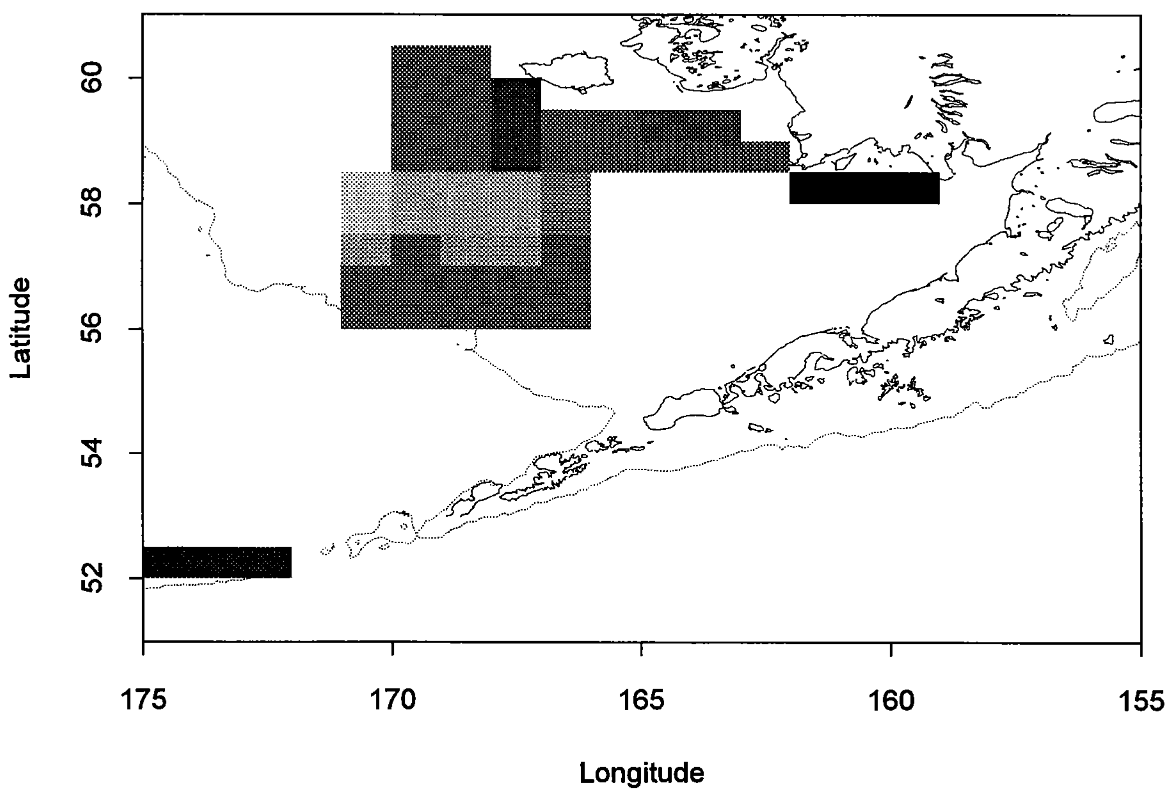
Halibut 65-74cm: July



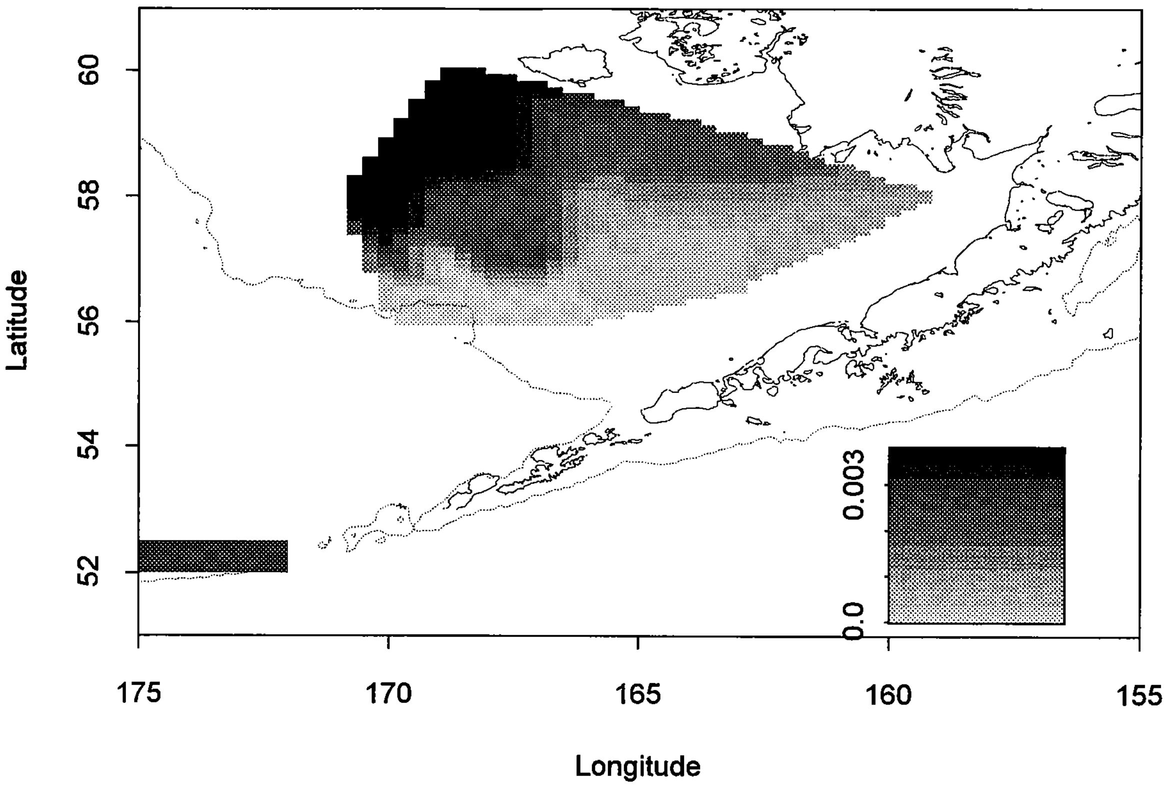


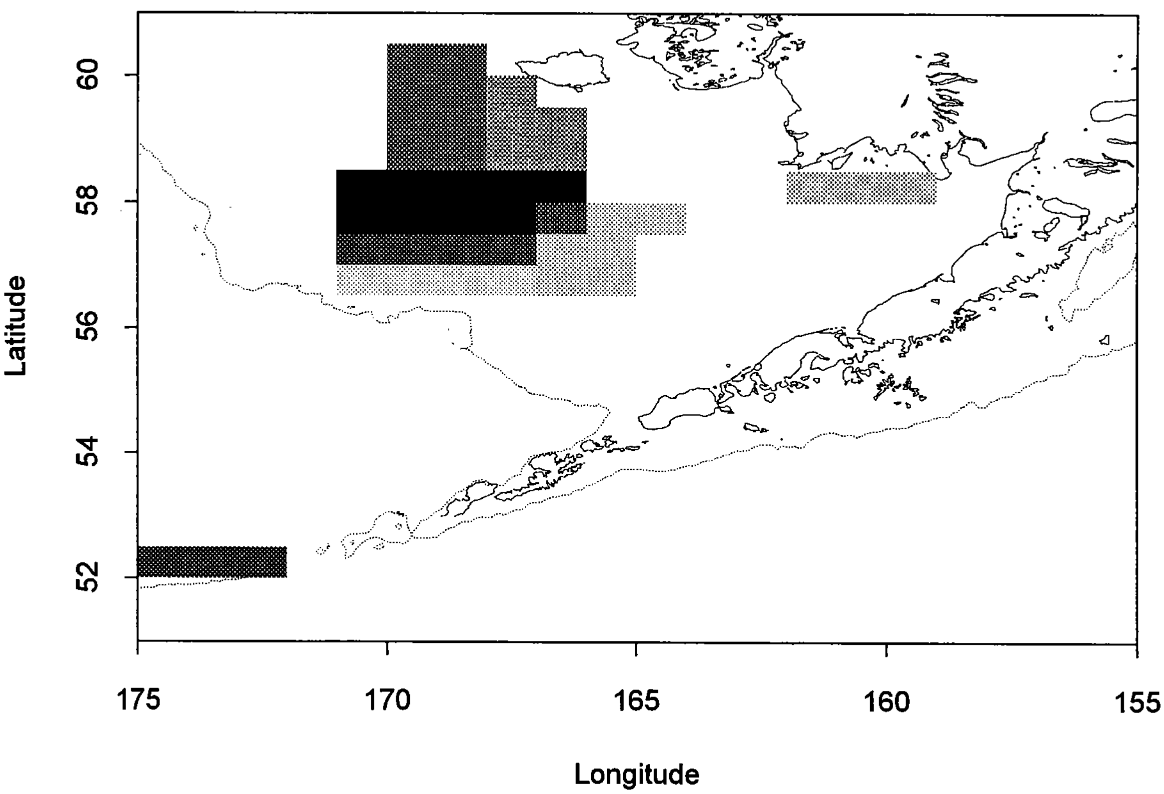
Halibut 65-74cm: August



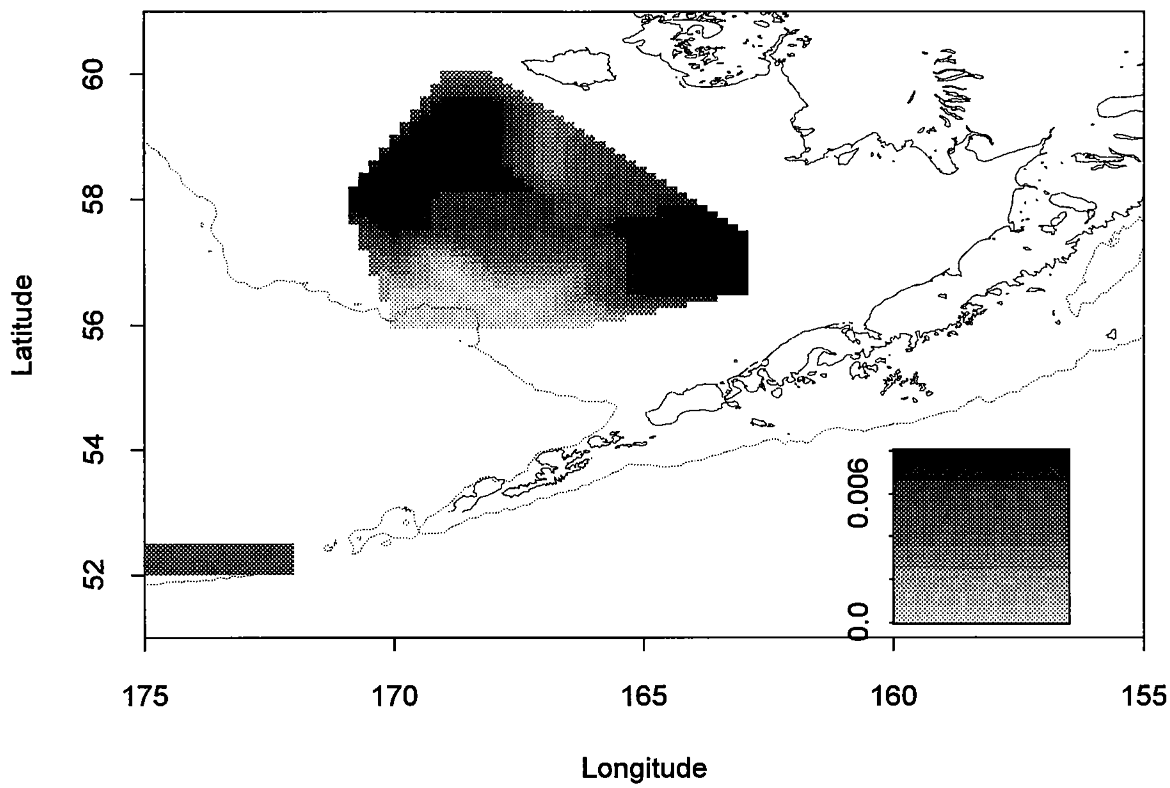


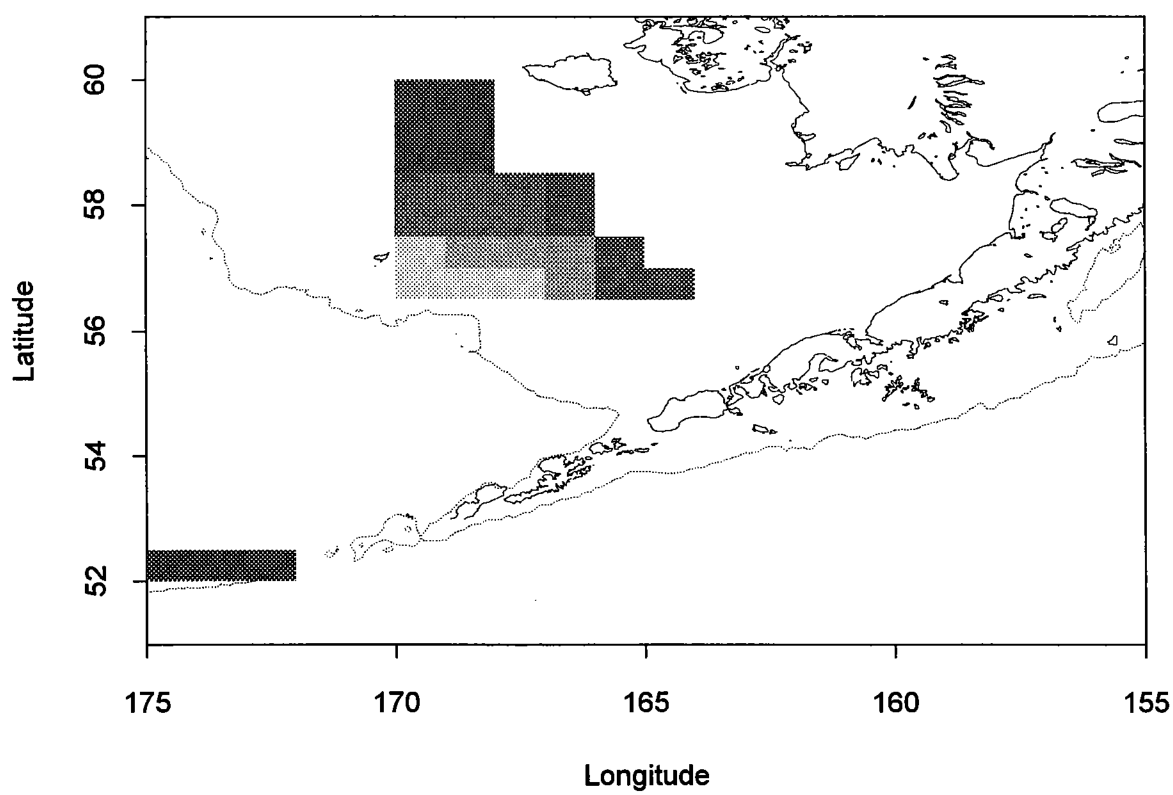
Halibut 65-74cm: September



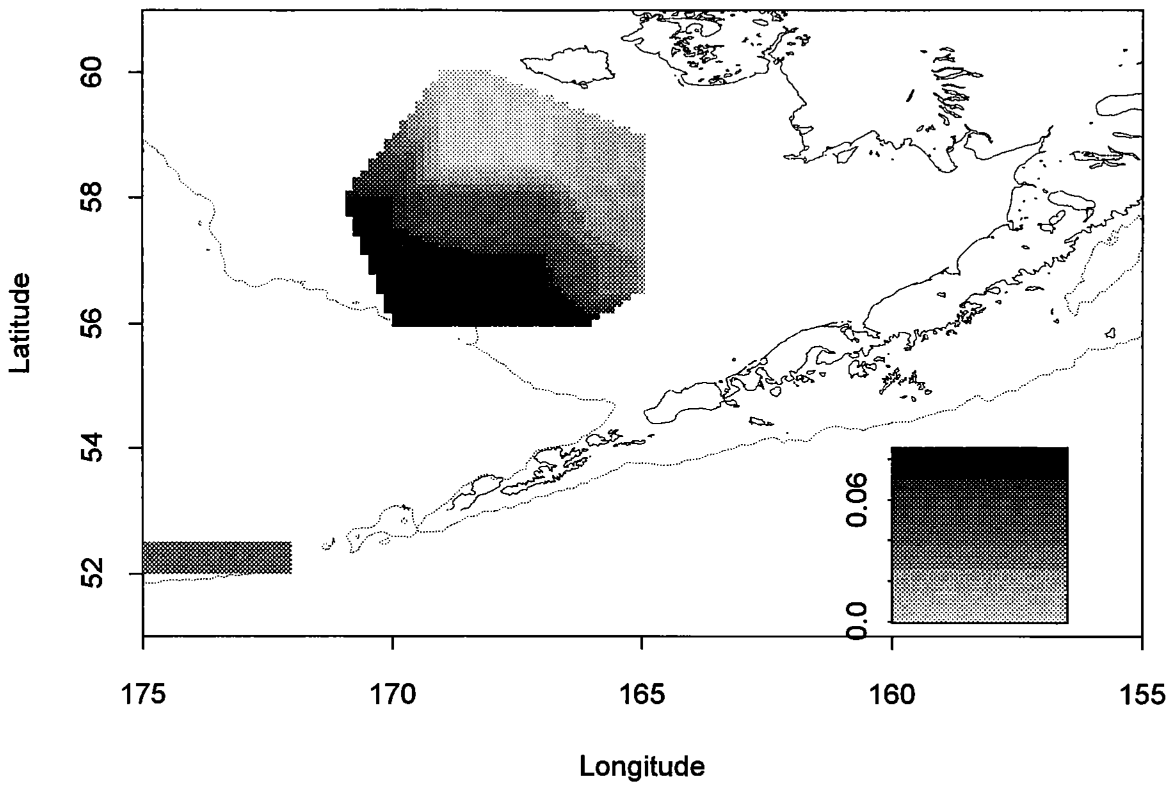


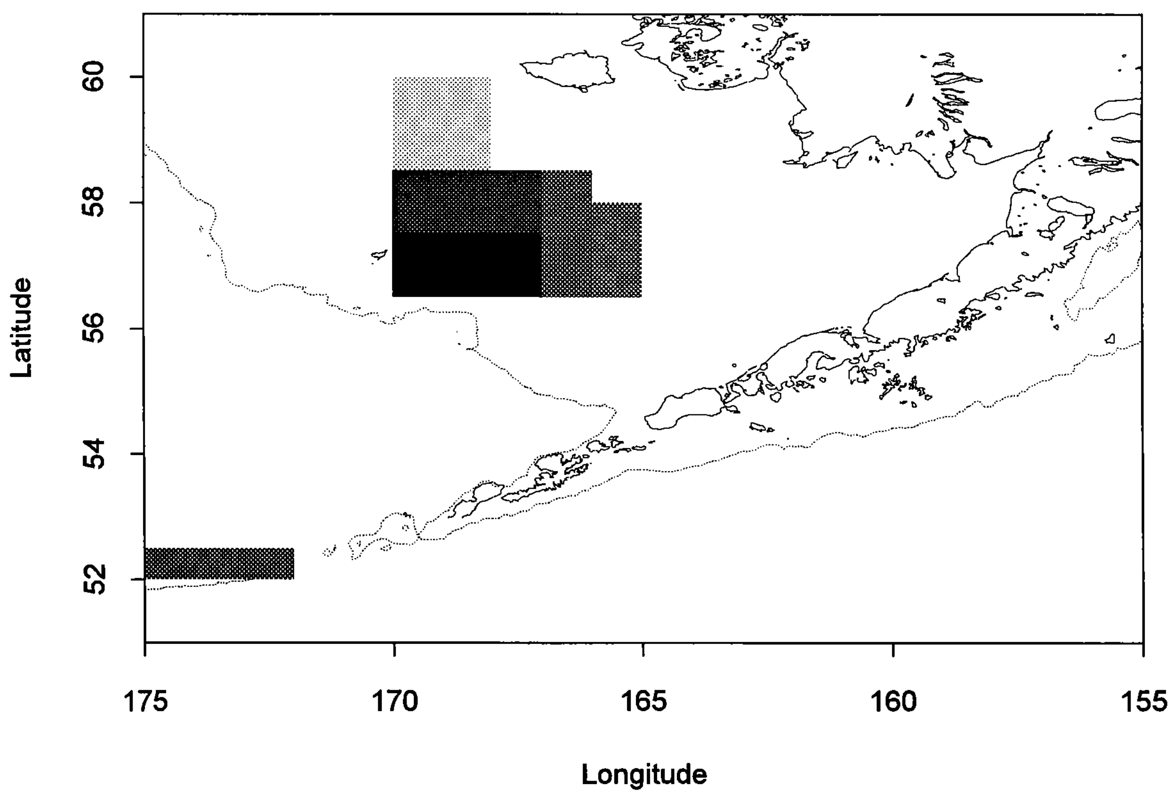
Halibut 65-74cm: October



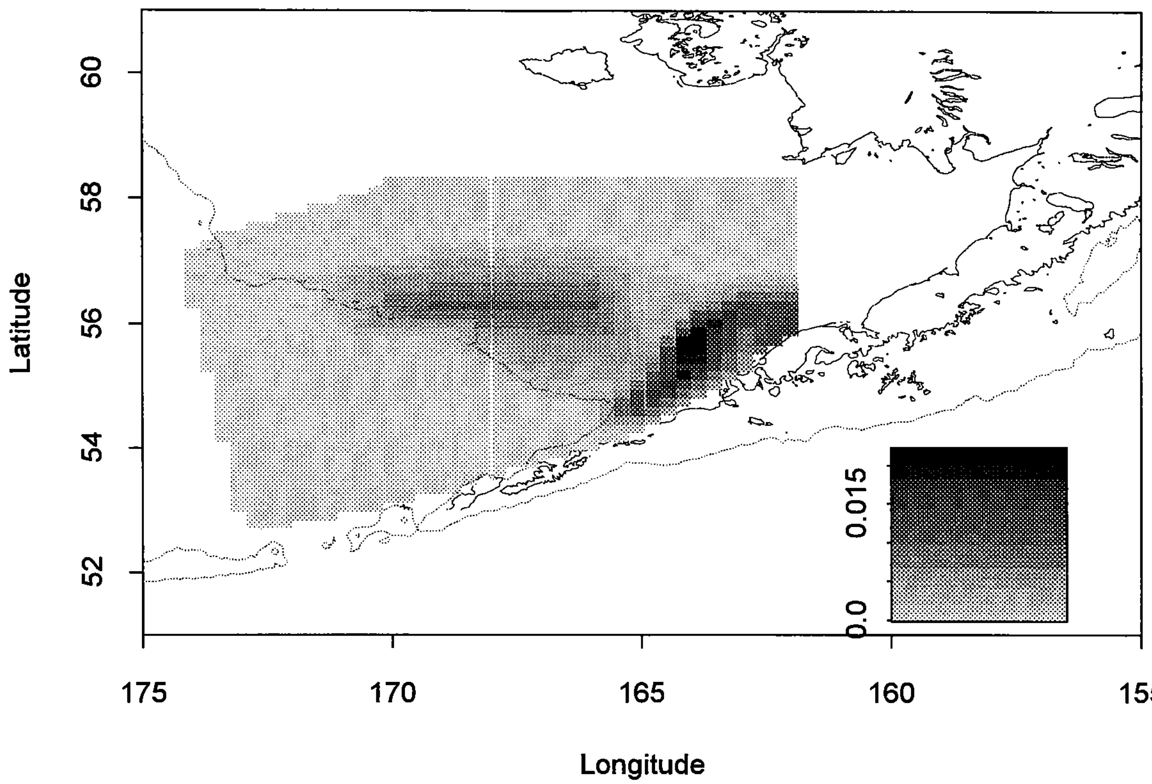


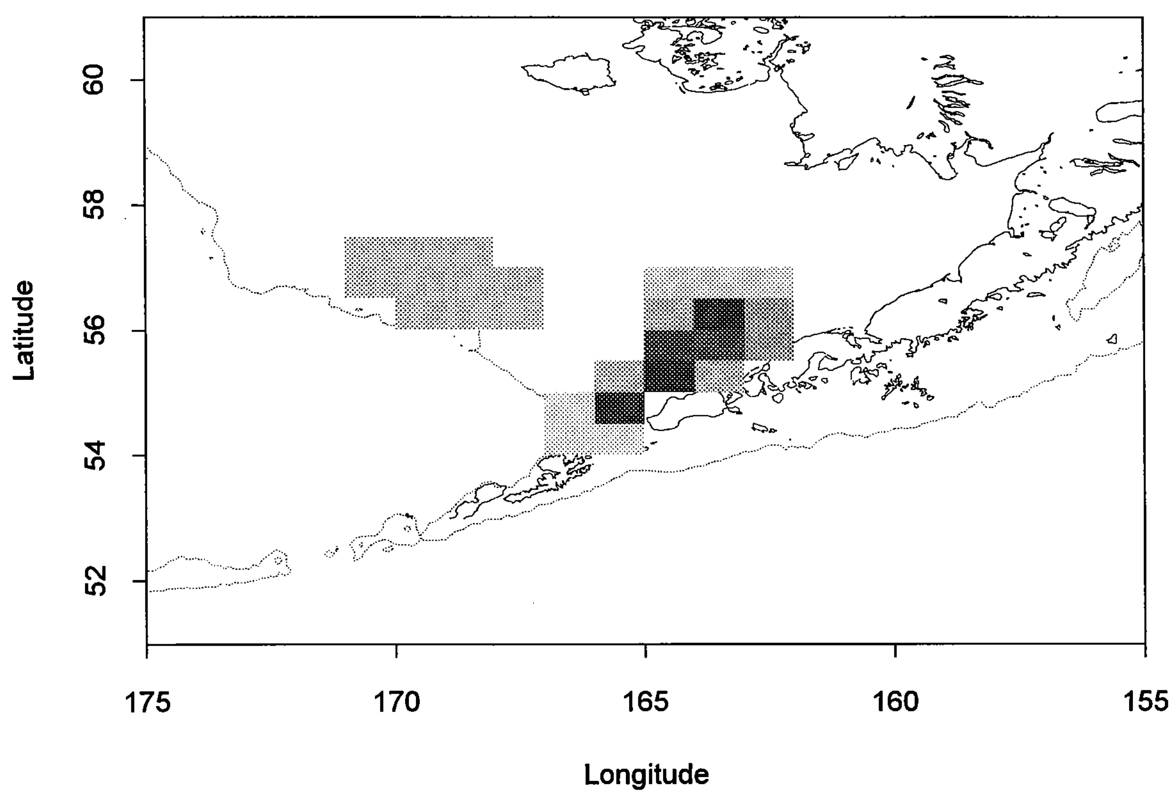
Halibut 65-74cm: November



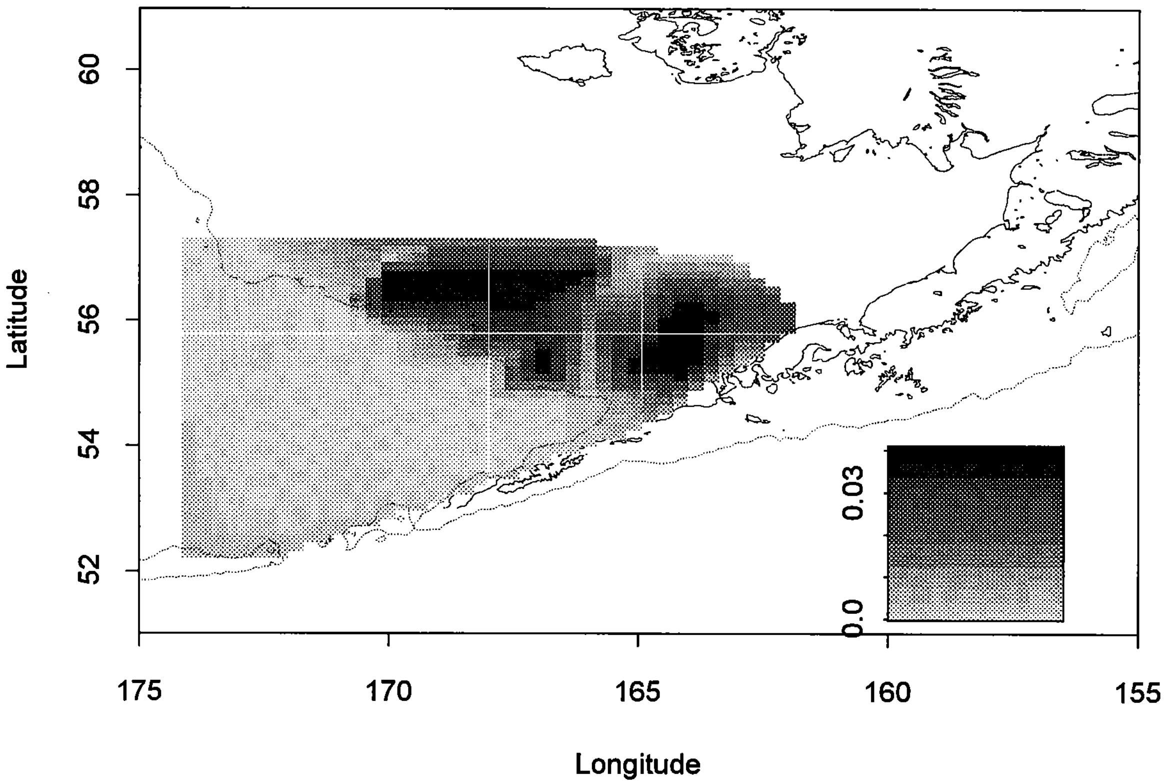


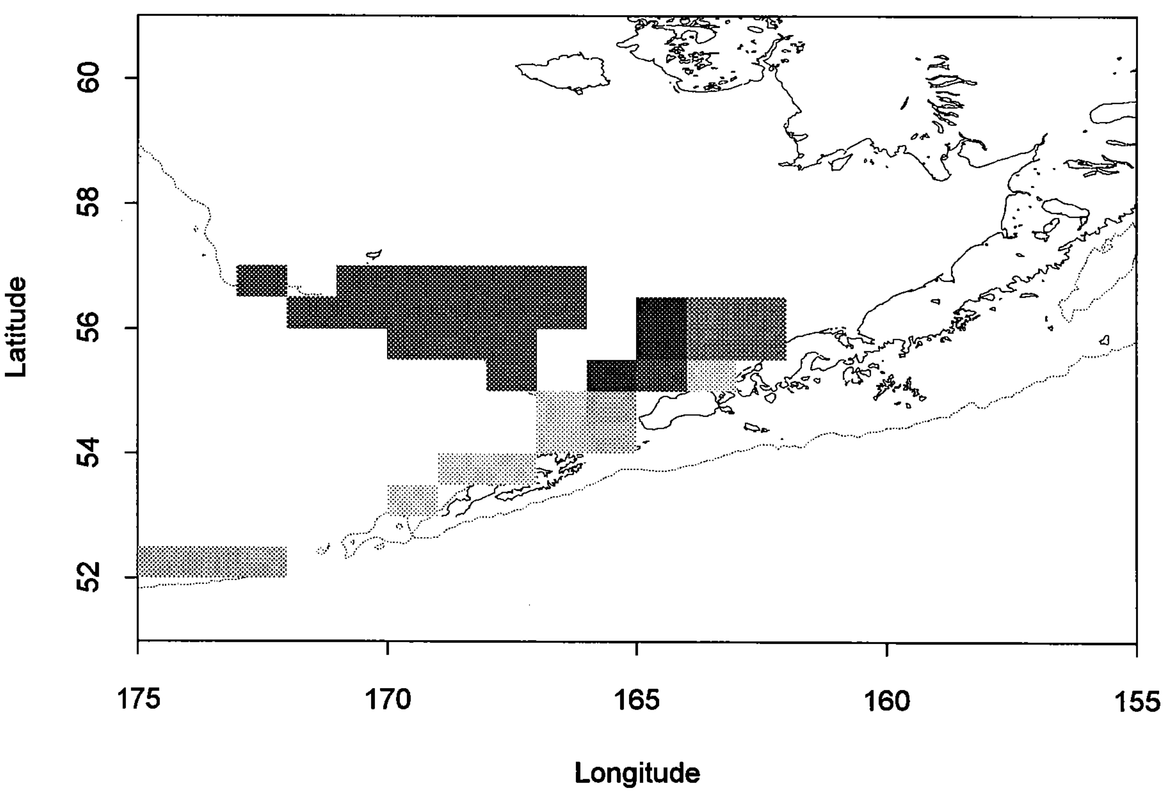
Halibut 75+cm: January



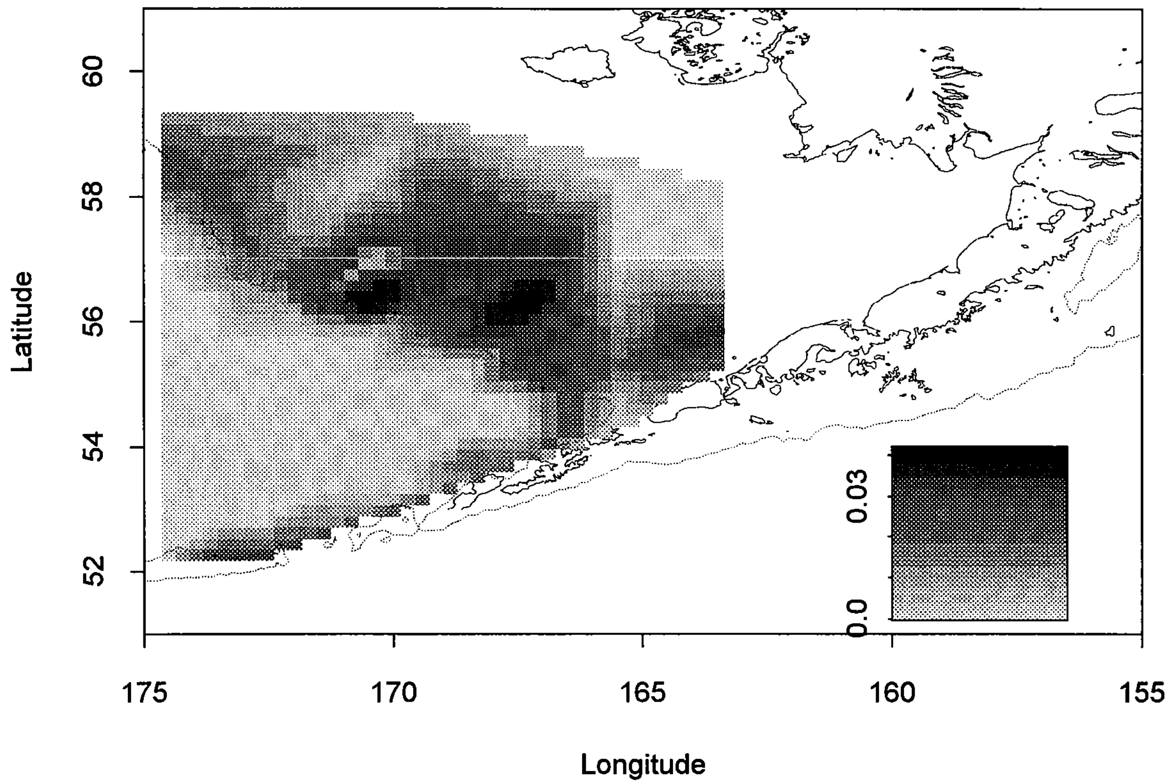


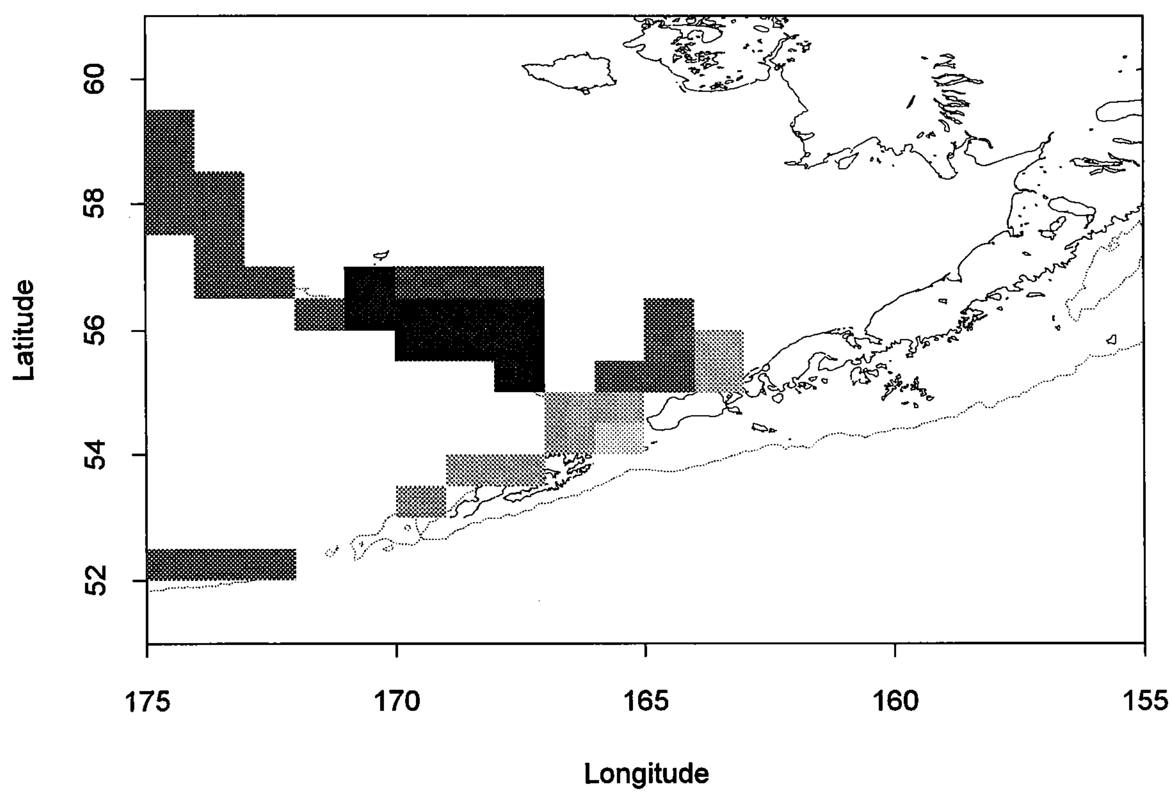
Halibut 75+cm: February



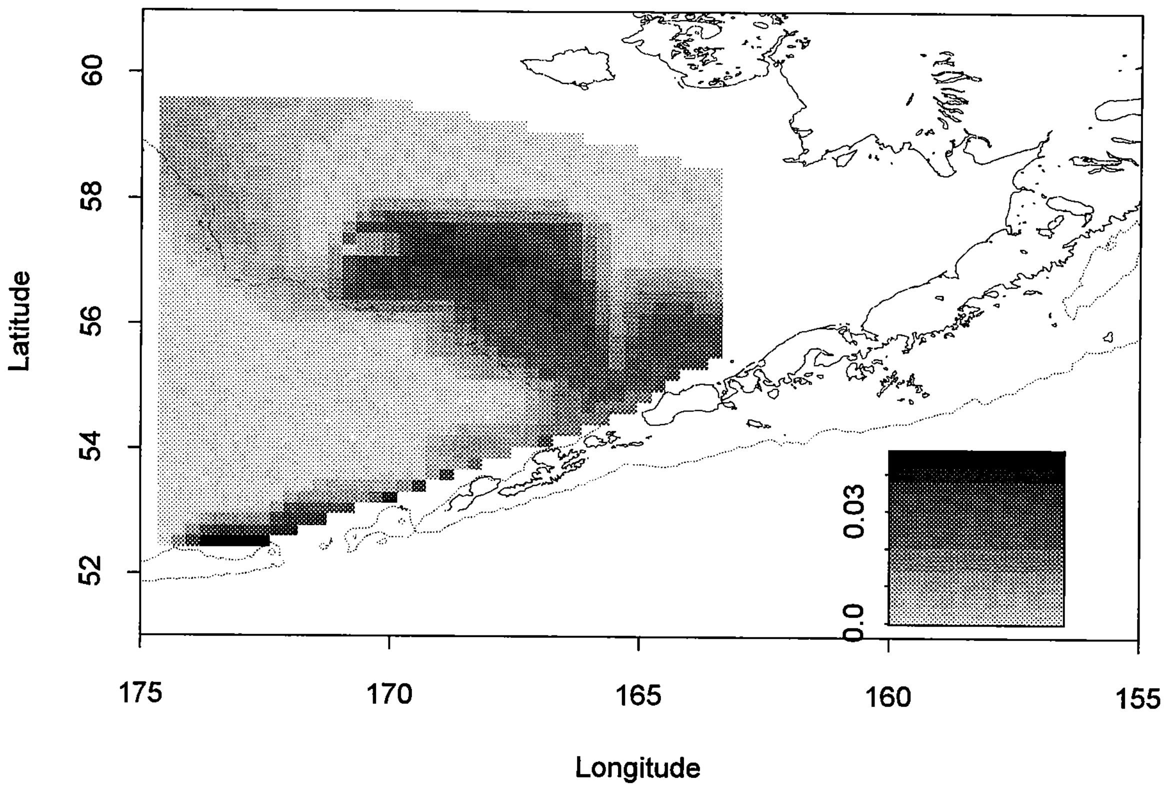


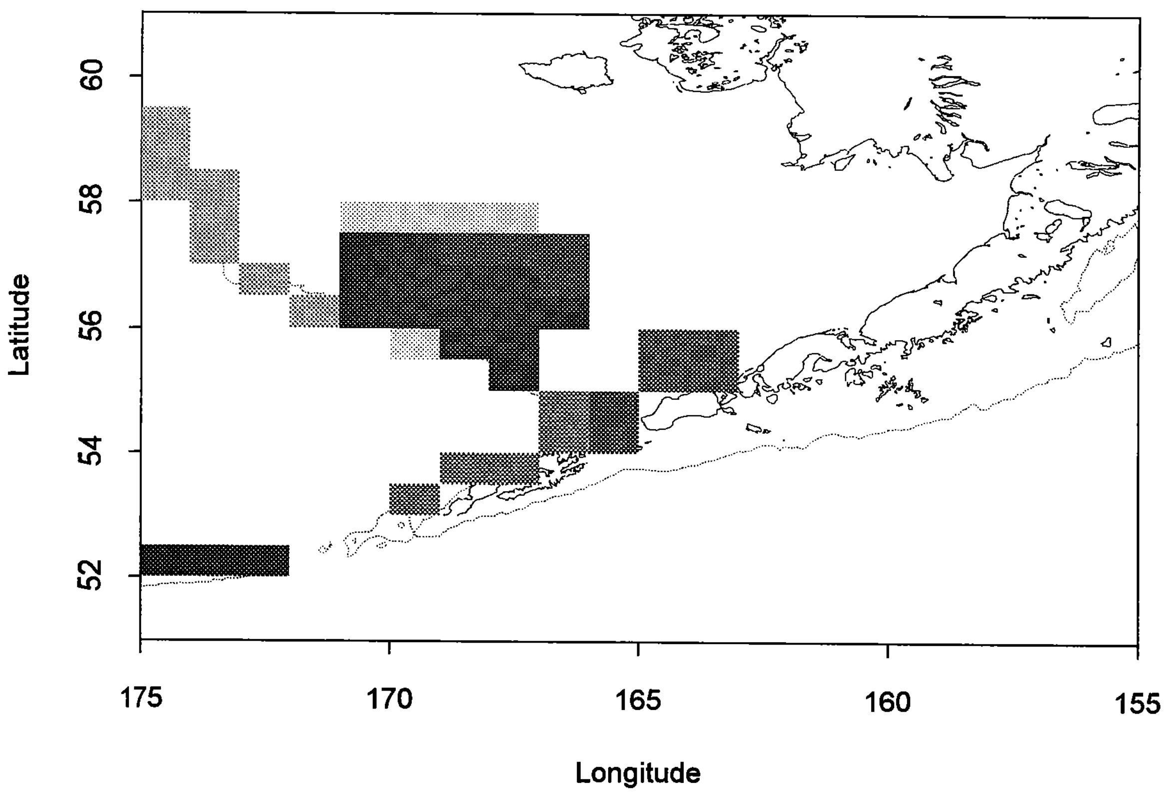
Halibut 75+cm: March



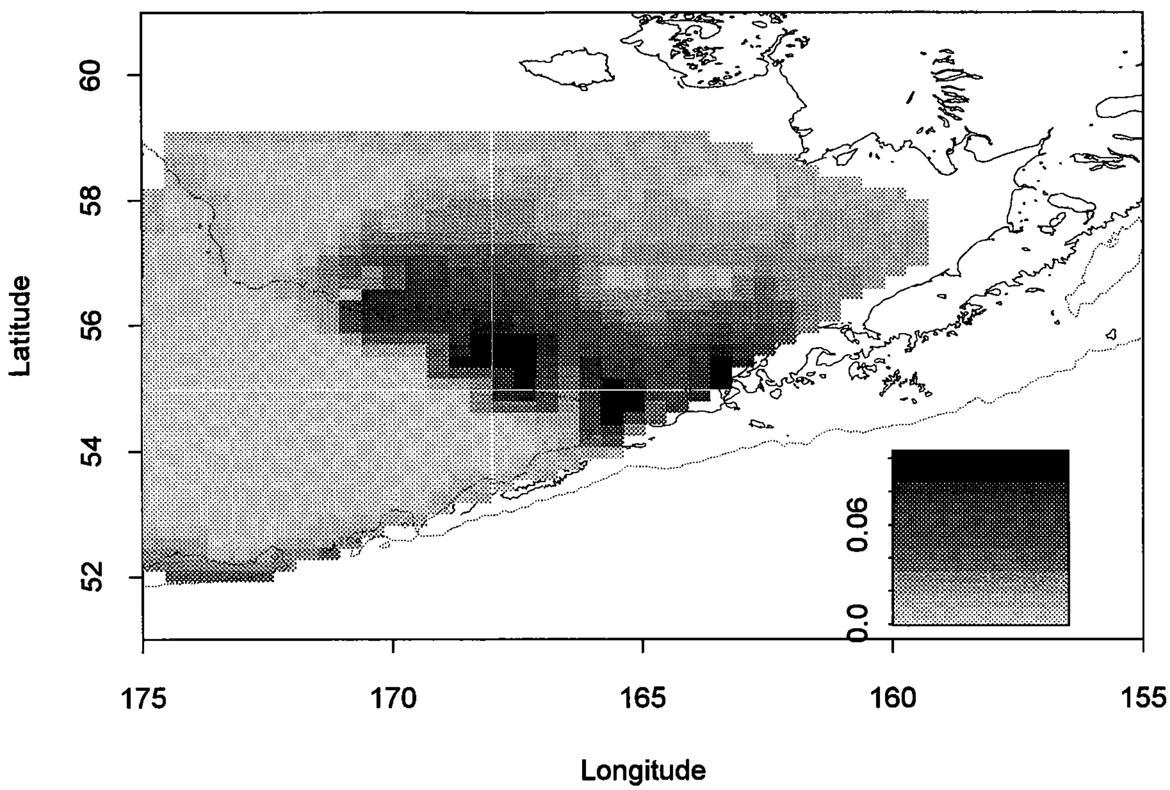


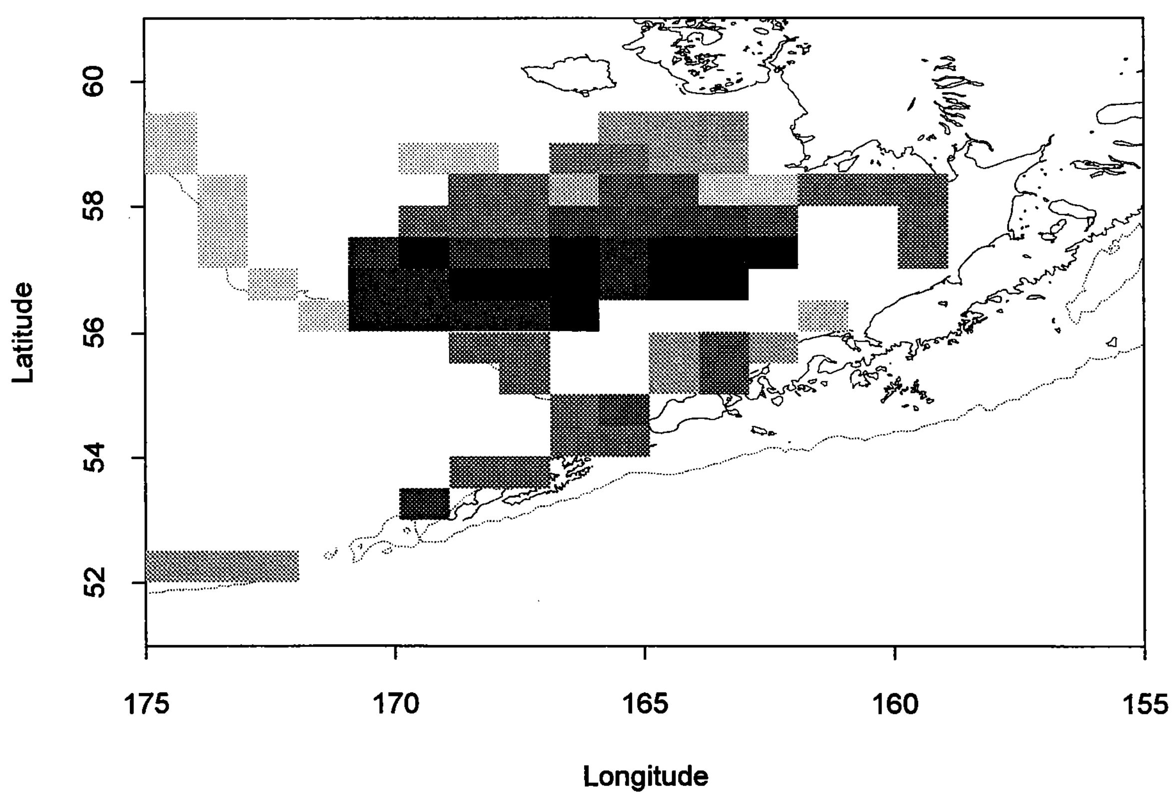
Halibut 75+cm: April



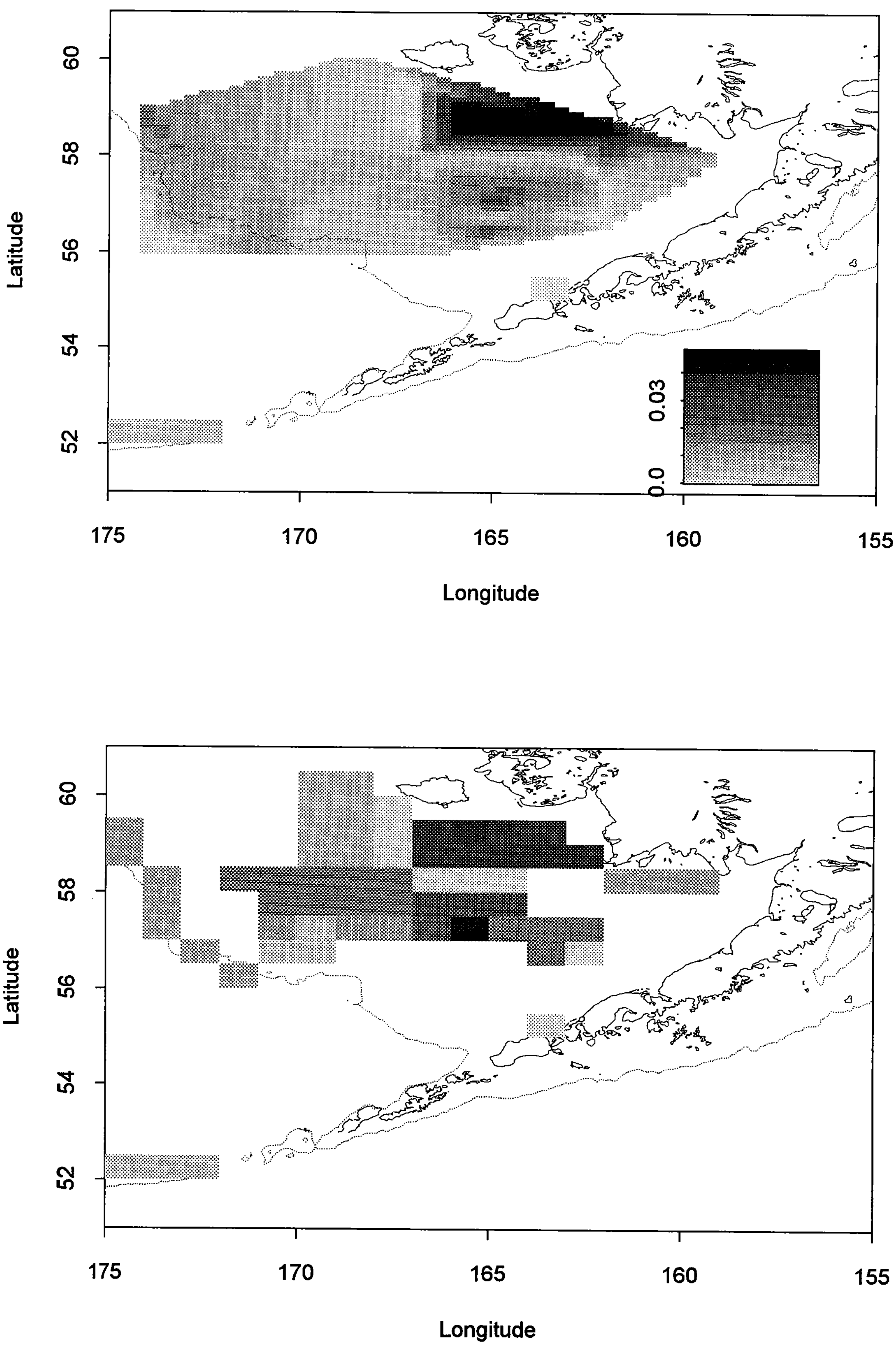


Halibut 75+cm: May

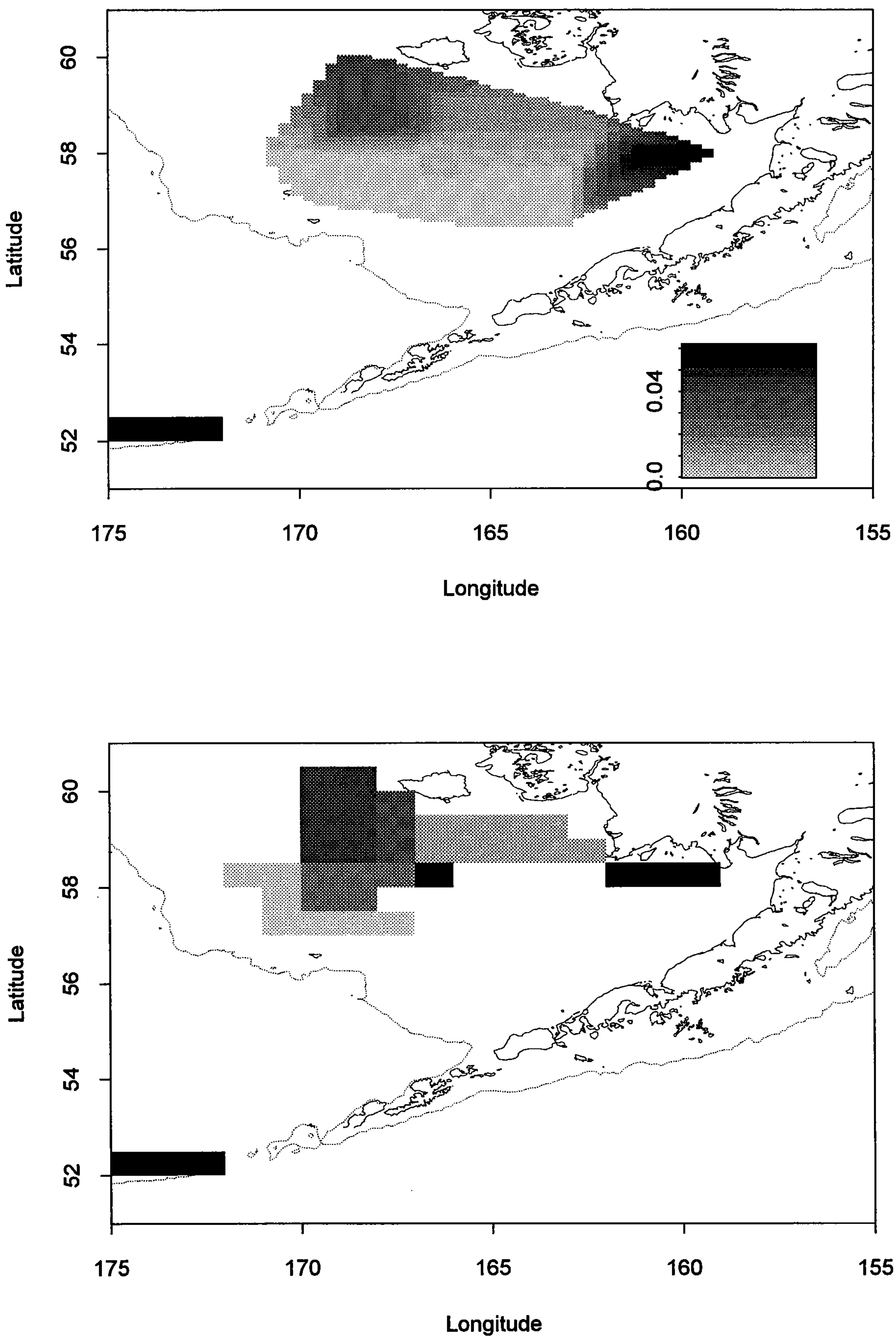




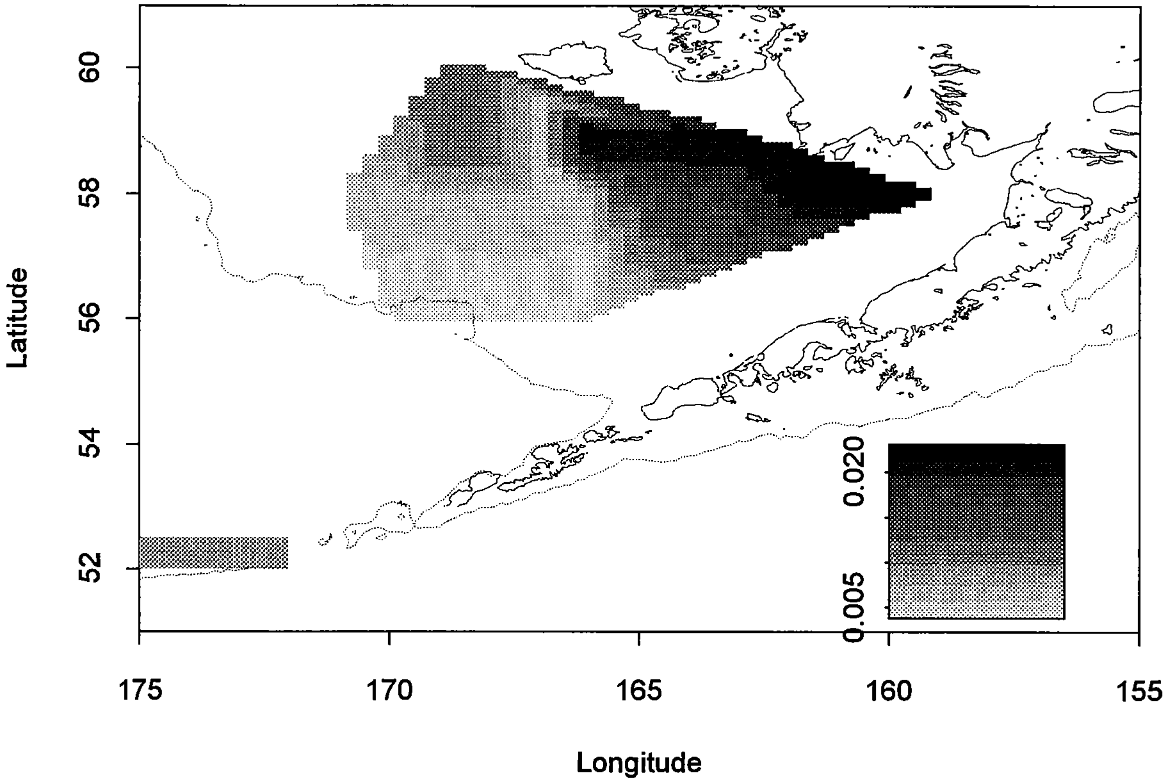
Halibut 75+cm: June

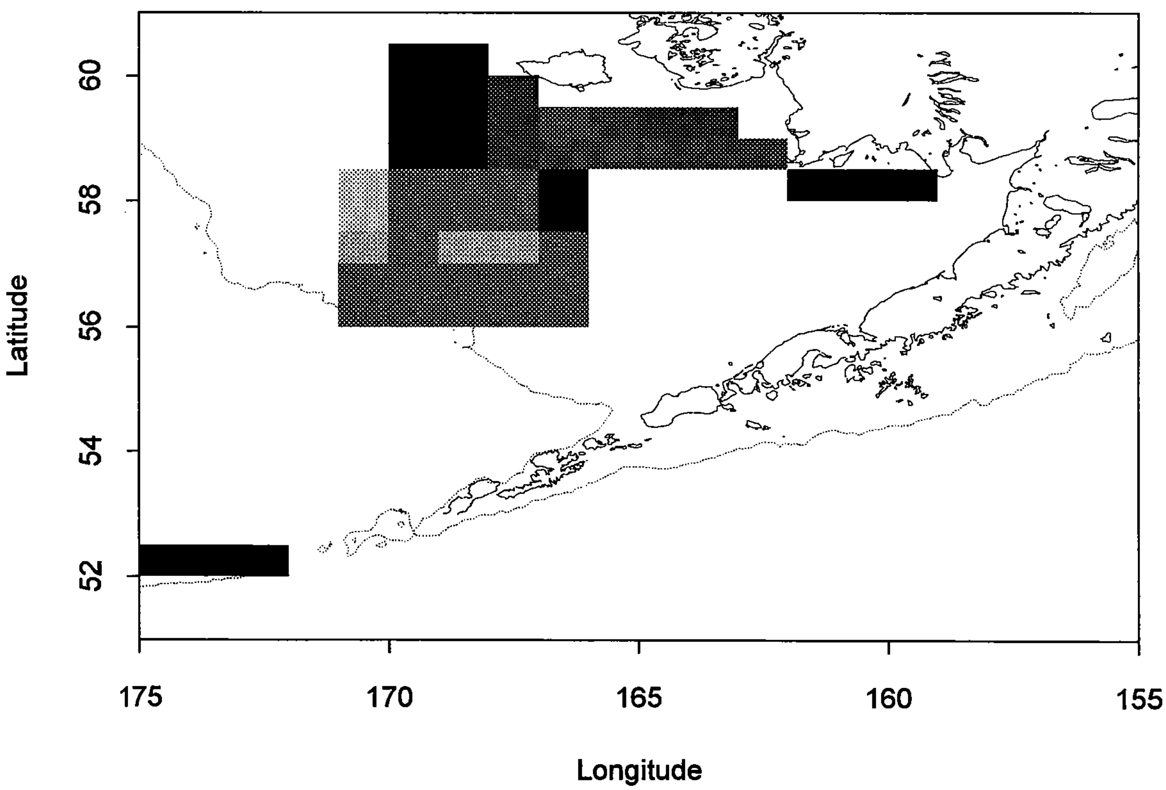


Halibut 75+cm: July

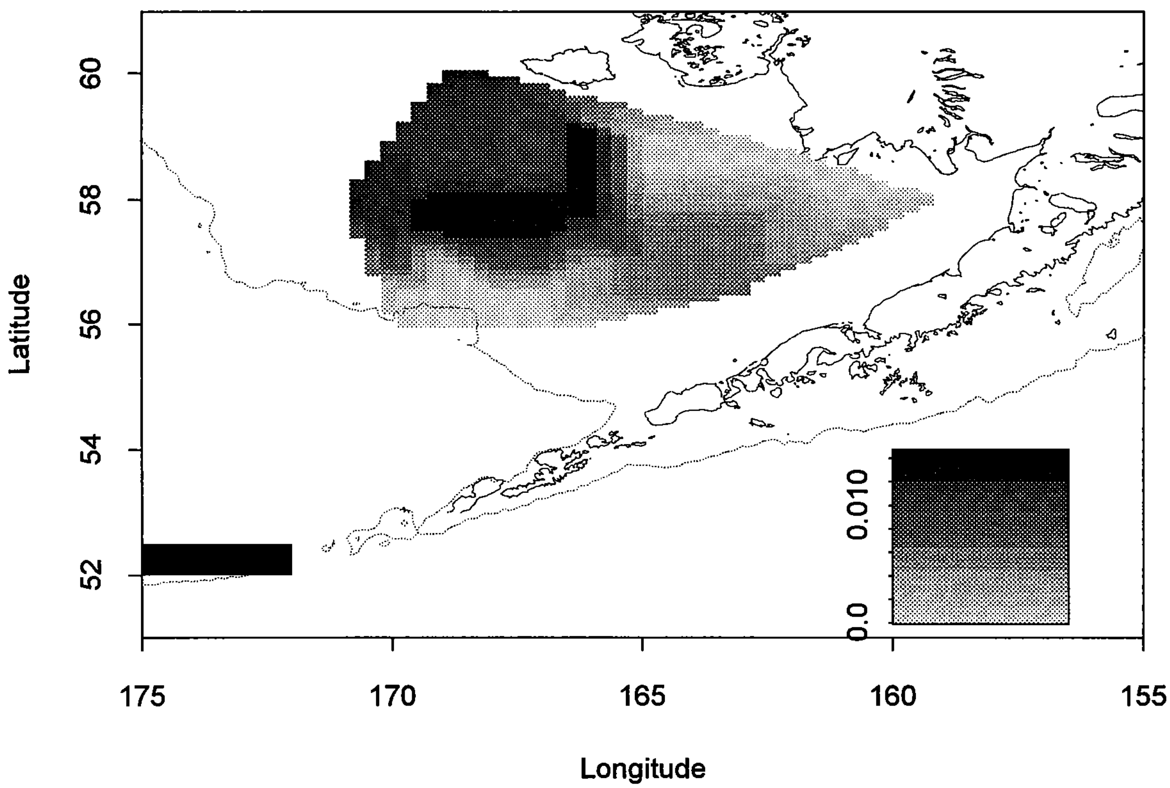


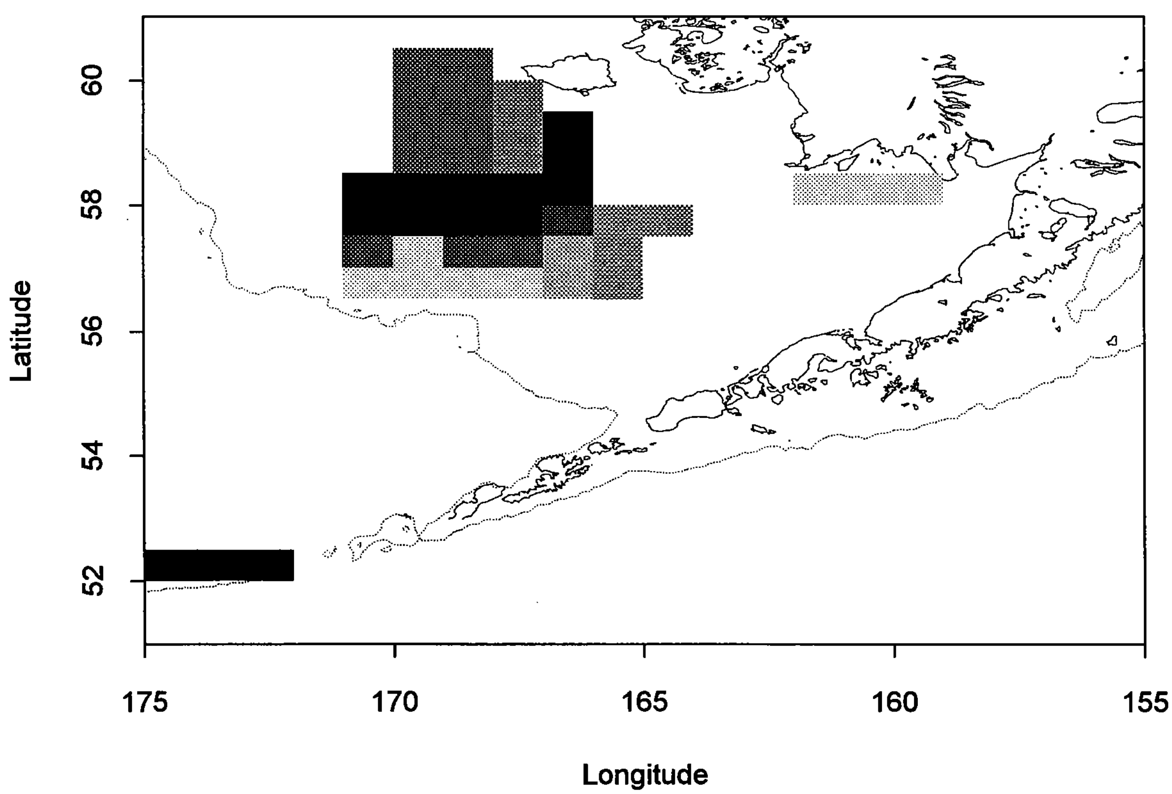
Halibut 75+cm: August



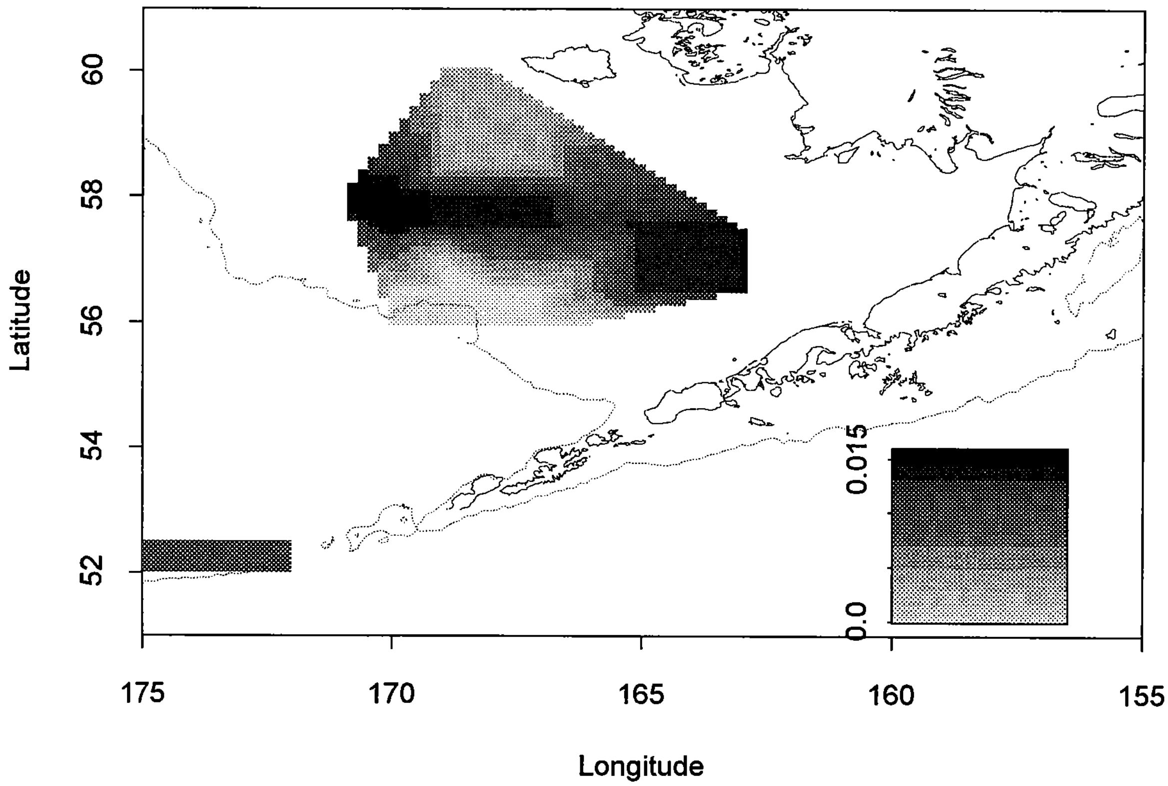


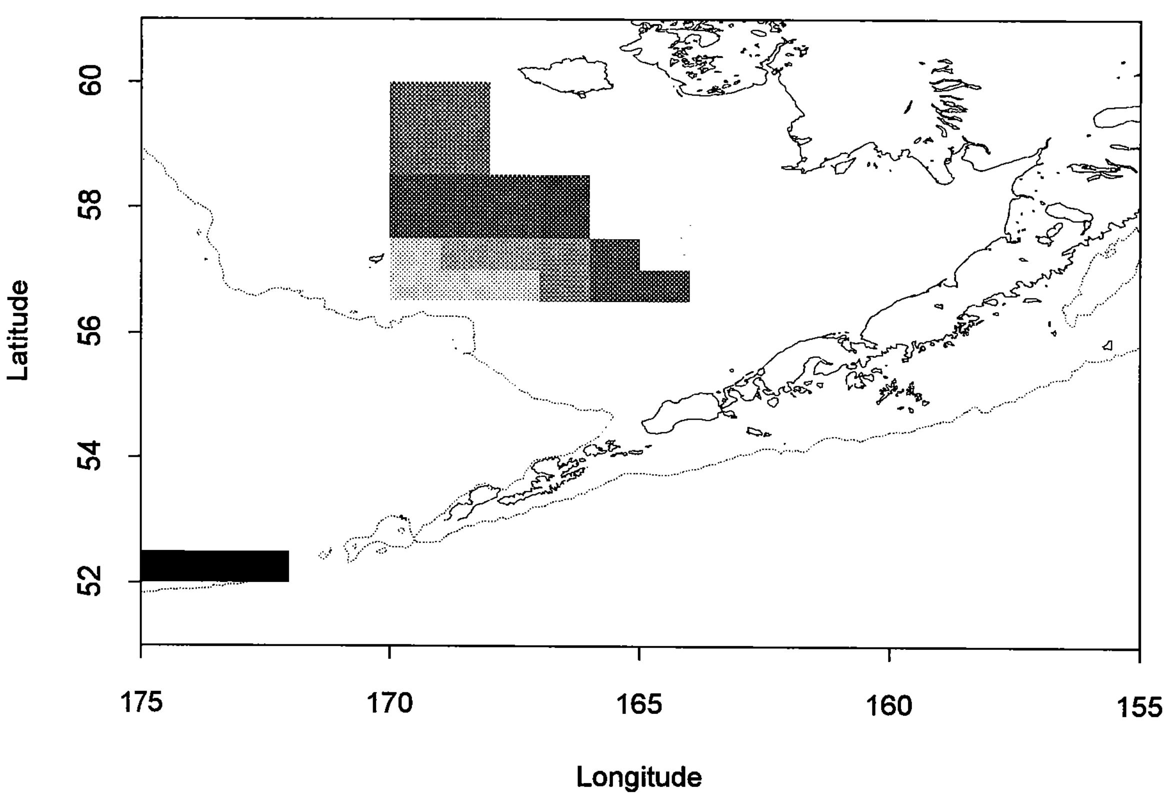
Halibut 75+cm: September





Halibut 75+cm: October





Halibut 75+cm: November