SOUTHWEST FISHERIES SCIENCE CENTER

NATIONAL MARINE FISHERIES SERVICE SOUTHWEST FISHERIES SCIENCE CENTER P.O. BOX 271 LA JOLLA, CA 92038

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REPORT ON THE 1992 COOPERATIVE NORTH PACIFIC ALBACORE OBSERVER PROJECT

By

Norm Bartoo and David Holts

ADMINISTRATIVE REPORT LJ-93-04

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Norm Bartoo and David Holts
Southwest Fisheries Science Center
National Marine Fisheries Service, NOAA
La Jolla, California 92038-0271

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In 1992, the Southwest Fisheries Science Center (SWFSC) in cooperation with the Western Fishboat Owners Association (WFOA) continued the Cooperative North Pacific Albacore Project begun in 1990 (Bartoo et al. 1991, 1992) by placing observers on cooperating vessels fishing in the north Pacific. This effort was part of a comprehensive impact assessment program on the effects of the high-seas drift net fisheries on the north Pacific albacore (*Thunnus alalunga*) stocks and other fisheries. Albacore that encounter drift nets and escape often bear some external marks that can subsequently identify it (to a greater or lesser extent) in the troll catch. In this report, the results of the 1992 observer project are described.

BACKGROUND

Catches and catch-per-effort from the U. S. albacore troll and Japanese pole-and-line fisheries in the north Pacific declined continuously from the mid-1970's, reaching record low levels in the late 1980s and early 1990s (Tsuji et al. 1992; Rensink and Miller, 1992; Coan et al. 1991, Kleiber and Perrin 1991). In addition to these surface fisheries, Japan and Taiwan each have a longline fleet catching albacore in the north Pacific, and their total catch appears to have remained constant over time. Drift net fleets from Japan, Taiwan and the Republic of Korea (ROK) operated in the north Pacific since the late 1970's and were active in 1992.

The small mesh drift net fleets include more than 600 vessels from Japan, Taiwan and the Republic of Korea. The Japanese and Taiwan fleets fish for flying squid (*Ommastrephes bartrami*) using small (90 to 120 mm stretch mesh) nets in the North Pacific Transition Zone (NPTZ) from about May through December. The ROK operates in the same area with the gear, but on a year-round basis. The reported landings of albacore from these drift net fisheries are greater than 10,000 mt per year.

The large mesh drift net fleet is composed of approximately 160 vessels from Japan and Taiwan. These fleets use nets with stretch mesh sizes of 170 to 185 mm (Bartoo and Holts 1991). The Japanese fleet is restricted by domestic regulations to waters east of 170° E. Taiwan has no east-west regulations. Both Japan and Taiwan have imposed internal regulations limiting fishing effort in higher latitudes west of 170° E longitude to minimize interceptions of high seas salmon.

Accurate large mesh drift net landings of albacore are not yet available. Current best reported estimates put the minimum aggregate annual catch in recent years for all drift net fisheries (both large and small mesh) in the north Pacific near 30,000 mt with the possibility of another 20,000 mt in unreported or under-reported catches.

In accordance with the United Nations moratorium against high seas drift netting, Japan, Taiwan and ROK have agreed to end all drift netting in the north Pacific at the end of 1992.

1992 OBSERVER PROJECT

In 1992, SWFSC Biological Technicians observed 3 fishing trips aboard 3 different U. S. troll vessels fishing the north Pacific. Vessels were selected to provide maximum spatial and time coverage of the fishery. Observers documented daily catches and profiled drift net inflected damage on albacore caught during trolling operations over a wide area of the north Pacific.

The project goal for 1992 was to provide a minimum estimate of the magnitude of direct interactions between high-seas drift net and U. S. troll fisheries in 1992. Specific objectives are as follows:

A. Describe the types of gill net damage on troll-caught albacore.
B. Estimate the relative frequency of undamaged albacore and damaged albacore.
C. Estimate the size-frequency of undamaged albacore and damaged albacore.

METHODS

The methods used in 1992 were the same as those used in 1990 and 1991 (Bartoo et al. 1991, 1992) to reduce the chance of introducing bias into the results. Observers were provided common instruction for executing duties, and were interviewed post-cruise when data collected were checked for errors and omissions.

The marks left on a fish after an encounter with a drift net are most visible just after being caught and boated during troll operations. Many marks cannot be seen once the fish is frozen. Observers were instructed to examine each boated fish and note marks on the fish which could be identified as net scares or marks. Observers were provided reference photographs for each damage code. If the particular classification of a fish was in doubt, the observers photographed the damage and it was coded during the post-cruise interview. The codes used were:

Code	Damage Description
0	No gill net damage to fish.

1 Minor damage along sides of fish, pattern of stripes due to minor scale loss where fish forces its way through or along net.

2 Minor damage to head, chiefly forwards of pectoral fins, brush like pattern of scale loss.

3 Severe damage with bruising or scraping away of parts of the skin, primarily in area of greatest girth.

4 Old gill net damage of any degree that is partially or completely healed.

In addition to damage code, observers collected information on fork lengths, maximum girth, and weights for as many fish as possible. Fishing operations usually continued all day from first light to just after dark. Photographs of fish with various damage codes were taken randomly.

RESULTS

A total of 228 observed sea days were completed on 3 fishing vessels between July 2 and September 23, 1992. The distribution of effort for the entire fishery shows the fishery concentrated in the waters off Oregon, Washington, Vancouver and the Queen Charlotte Islands, Canada and generally west of about 130° W. There were also good catches further offshore in the NPTZ. The observed cruises cover the fishery distribution reasonably well (Figure 1).

A total of 15,219 albacore were examined from 1992 observed cruises for drift net related injuries or marks and were measured for fork length. An aggregate average catch-per-observed days fishing of 66.7 fish was measured. Of the 15,219 fish examined for damage 95.4% showed no visible damage caused by encounters with high-seas gill nets (Table 1). The total of new and old damage was 4.6% of the sample. Of these damaged fish, new damage (Codes 1, 2 and 3) was reported in 4.3% of the sample, most of which was the minor damage category Code 1. Only 0.3% of the sample showed healed or partially healed damage (Code 4) from earlier net encounters.

The quantity of damage varied slightly by area (Table 1) with both new and old damage marks most prevalent west of 140° W. Less total damage was observed north of 50° N and east of 140° W as was observed in prior years.

The overall length frequency of all fish sampled shows one distinct size mode at 60 to 65 cm representing age 3 fish with a small proportion of age 2 fish in the 51 to 55 cm range (Figure 2). All areas showed a high proportion of fish in the single size mode representing 3 year old albacore. Length frequencies sampled east of 140° W were similar in each 5° latitudinal band (Figure 3). The northern portion of the fishery, north of 50° N, showed a slightly higher proportion of fish over 68 cm as did the area west of 140° W although large albacore in the 68 to 78 cm range accounted for a small proportion of the sample. Along the coast, south of 50° N and east of 140° W, smaller fish in the 51 to 55 cm range were more prevalent, particularly in the 35° to 40° N latitude band.

This is considerably different than seen in 1990 and 1991 (Bartoo et al. 1991, 1992) three size modes were well represented in the sample. While these length frequencies varied considerably from year to year, they were consistent with the length frequencies measured by port samplers in each respective year (Rensink and Miller 1992; Coan et al. 1991).

The length frequencies of undamaged fish by latitude band (Figure 4) is not different from the total length frequency for damaged fish in the same bands. The length frequencies by area for all recently damaged fish (Figure 5) show that most of the damage is in the same proportion to the undamaged fish. Except that those recently damaged fish sampled south of 40° N (both west and east of 140° W) tended to be a little larger than undamaged fish in the sample. Fish with old damage appeared proportional to the undamaged fish area by area although our sample size was very small in some areas (Figure 6).

Marine mammal sightings were routinely documented using standard observation forms. A summary of such sightings includes:

Species	Sightings
Pacific white sided dolphin	259
Northern right whale dolphin	10
Common dolphin	513
Dalls porpoise	137
Killer whale	1
Short-finned pilot whale	1
Unidentified dolphin	117
Unidentified whale	16

CONCLUSIONS

In 1992, a relatively large sample of albacore from the U.S. troll catch were examined for evidence of previous encounters with drift nets in the north Pacific. The proportion of fish sampled with new and old damage (4.6%) was slightly higher than observed in 1991, but still much less than the 12.4% observed in 1990. Recently marked fish were most frequent west of 140° W (8.4% overall) and least frequent north of 50° N (1.9%). This is the same trend observed in 1990 and 1991. Of the recently damaged fish, 93% had minor (Code 1) markings. Old marks were seen on only 0.3% of the total sample, down significantly from previous years (Figure 7).

The 1992 sample indicated essentially a uni-modal size distribution throughout the fishery. Larger, age 4, albacore observed in 1990 and 1991 were not available to the troll fishery in 1992. Age 2 albacore, although weakly represented throughout the fishery were most common south of 40° S. There was no damage observed on fish caught south of 40° N. Roughly 77% of the fish showing old damage were observed west of 140° W.

The gradient of higher proportions of new and old damage west of 140° W seen in 1990 and 1991, was repeated in 1992. No explanation for the observed gradient is given at this time. However, as seen in Figure 8, the fishing effort of the monitored portion of the Japanese squid drift net fleet in 1990 was concentrated in the area west of 146° W. If this pattern was repeated in 1992, the gradient could be caused by the albacore moving eastward through the small mesh net fishery and into the U. S. troll fishery. Mortality and diffusion or mixing with albacore not passing the net fishery could create the gradient.

It is not known to what extent the United Nations moratorium on high seas drift netting will have on the fishing success of the U. S. albacore troll fishery or the north Pacific albacore stock(s).

ACKNOWLEDGEMENT

We thank the owners and skippers of albacore troll vessels who participated in this study, and the Western Fishboat Owners Association. We thank the observers, Jeff Nelson, Greg Spencer and John Childers who examined and measured over 15,000 albacore and documented the data presented. Karen Handschuh formatted the manuscript and figures.

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Table 1. Percentage of albacore caught by U.S. troll vessels that were determined to be damaged from encounters with high-seas drift nets.

DAMAGE TYPE	1992 FISHING AREA				
	WEST OF 160° W	160° W TO 140° W	EAST OF 140° W NORTH OF 50° N	EAST OF 140° W SOUTH OF 50° N	ALL AREAS
NO DAMAGE	88.4	95.7	98.1	97.3	95.4
NEW DAMAGE					
CODE 1	9.4	3.7	1.7	2.6	4.0
CODE 2	0.9	0.4	0.0	0.0	0.2
CODE 3	0.3	0.1	0.0	0.0	0.1
TOTAL NEW DAMAGE	10.6	4.2	1.7	2.6	4.3
OLD DAMAGE	1.0	0.1	0.2	0.1	0.3
TOTAL ALL DAMAGE	11.6	4.3	1.9	2.7	4.6
SAMPLE SIZE, n	3190	1690	2539	7800	15219

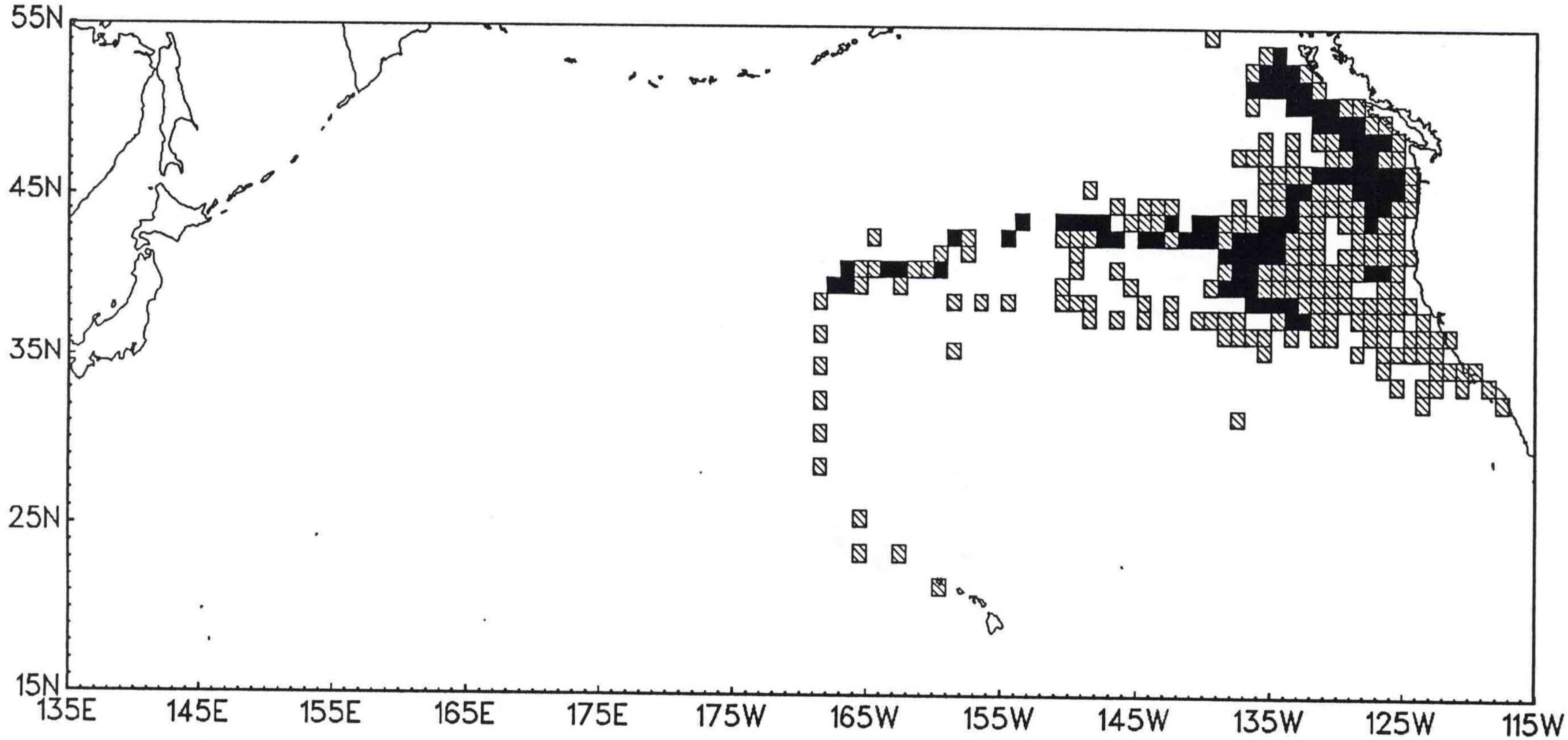

Figure 1. U.S. troll effort (shaded) and fishing areas (black) for three trips by U.S. albacore troll vessels with government observers aboard. Two vessels departed Honolulu and one departed from U.S. West Coast.

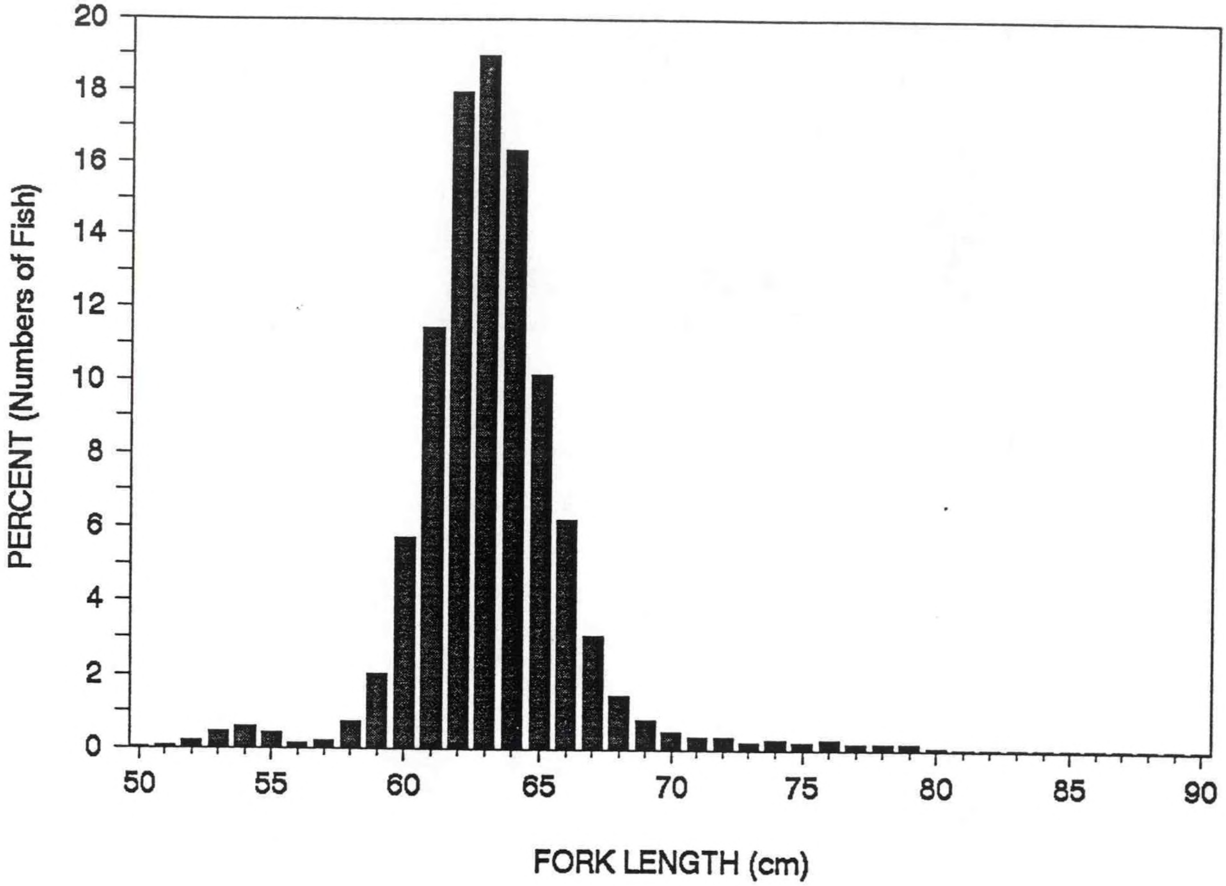

Figure 2. Length-frequency distribution of 15,219 albacore measured during the albacore observer program in 1992.

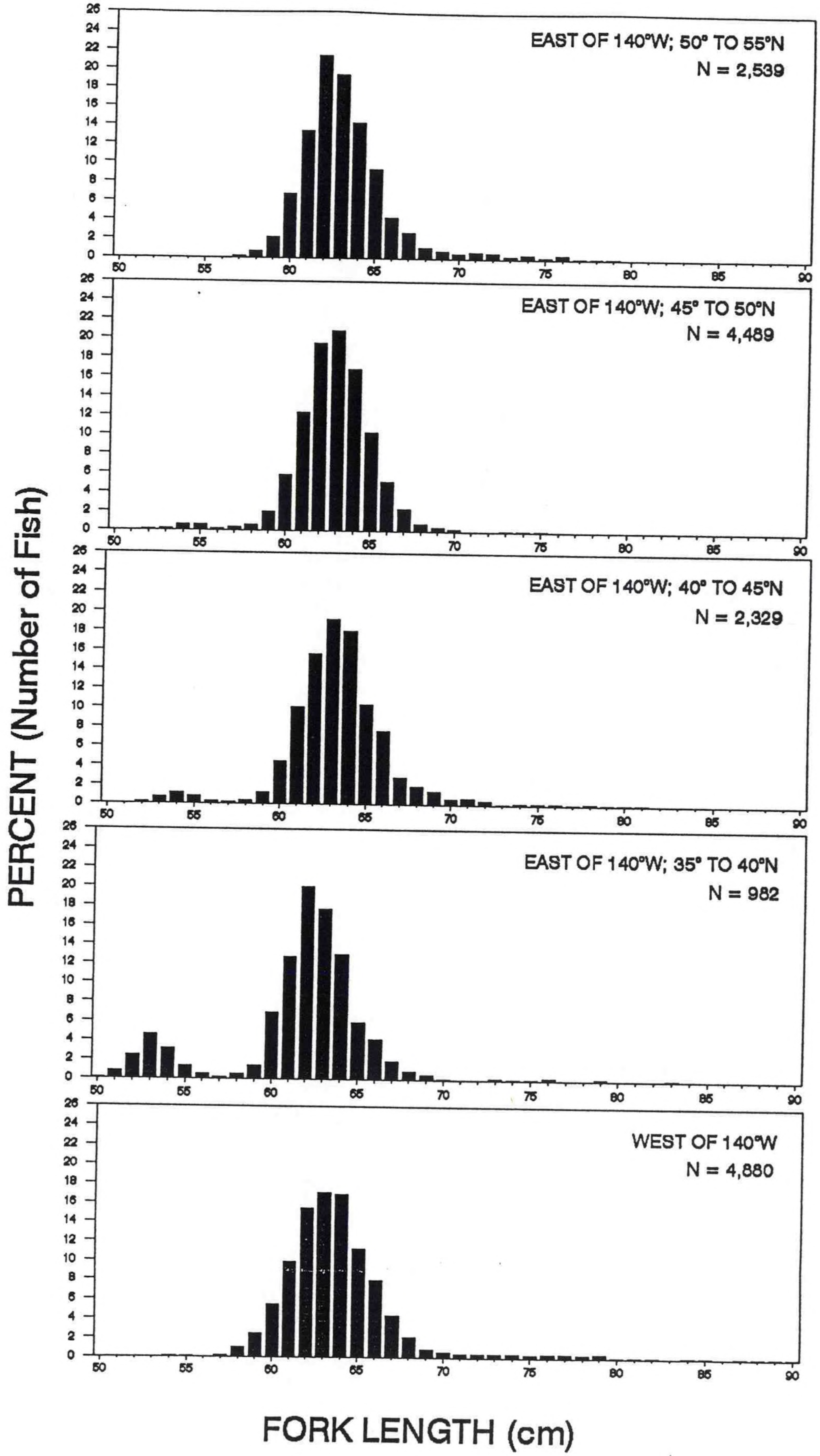

Figure 3. Length-frequency distributions of albacore by fishing area in the north Pacific, 1992. (N = sample size).

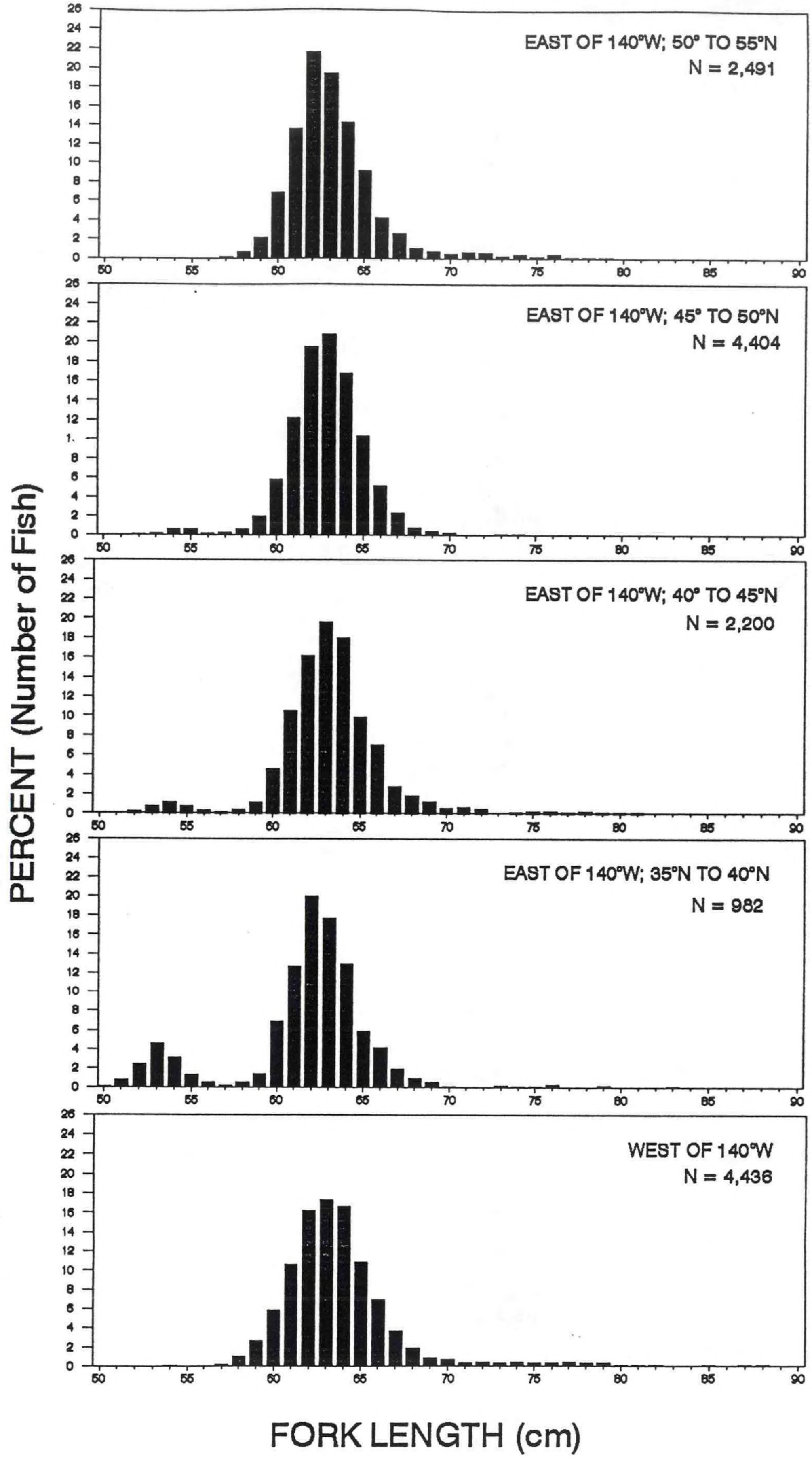

Figure 4. Length-frequency distributions of undamaged albacore (Code 0) by fishing area in the north Pacific, 1992. (N = sample size).

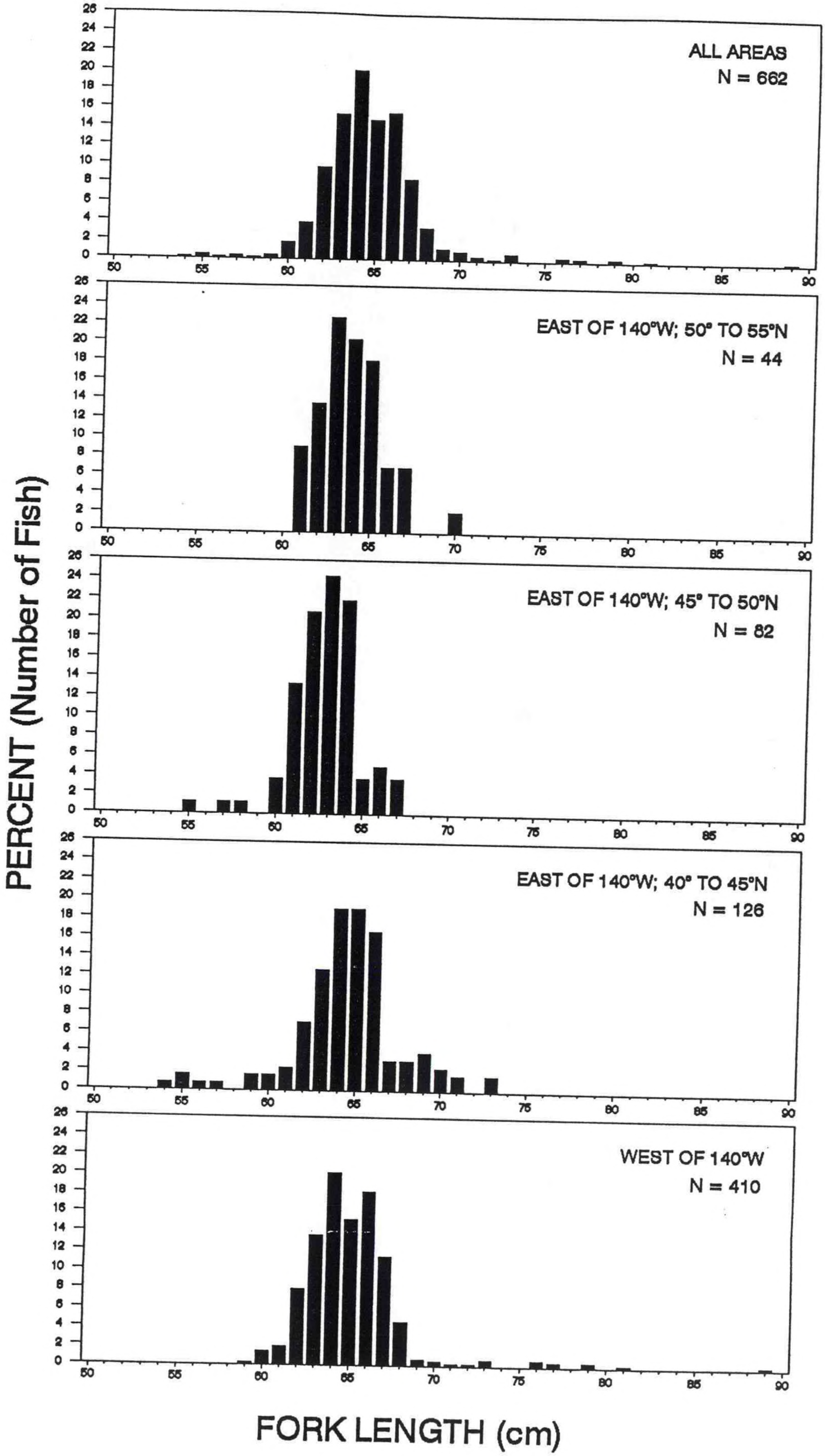

Figure 5. Length-frequency distributions of recently damaged albacore (Codes 1, 2, and 3) by fishing area in the north Pacific, 1992. (N = sample size).

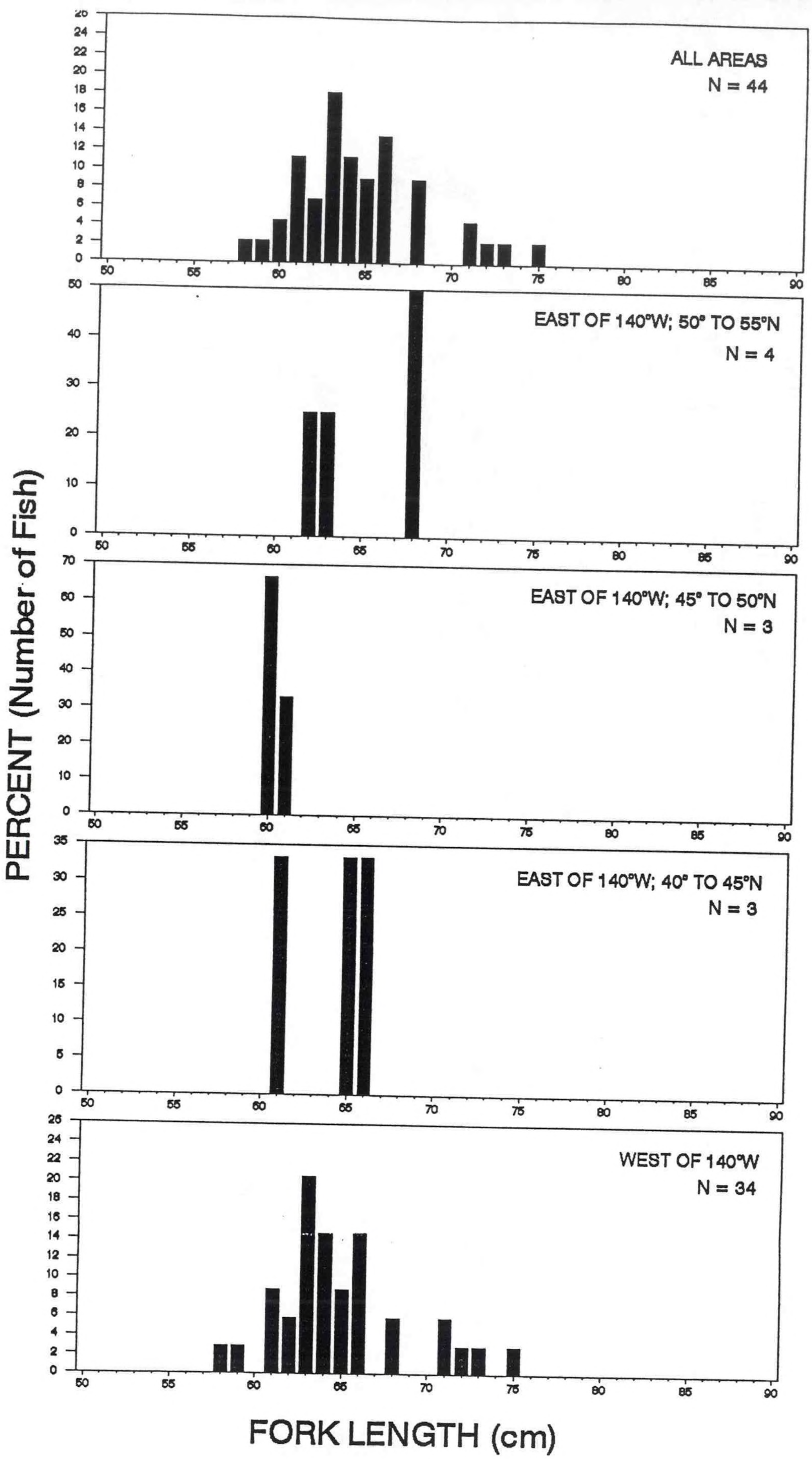

Figure 6. Length-frequency of albacore with old damage (Code 4) by fishing area in the north Pacific, 1992. (N = sample size).

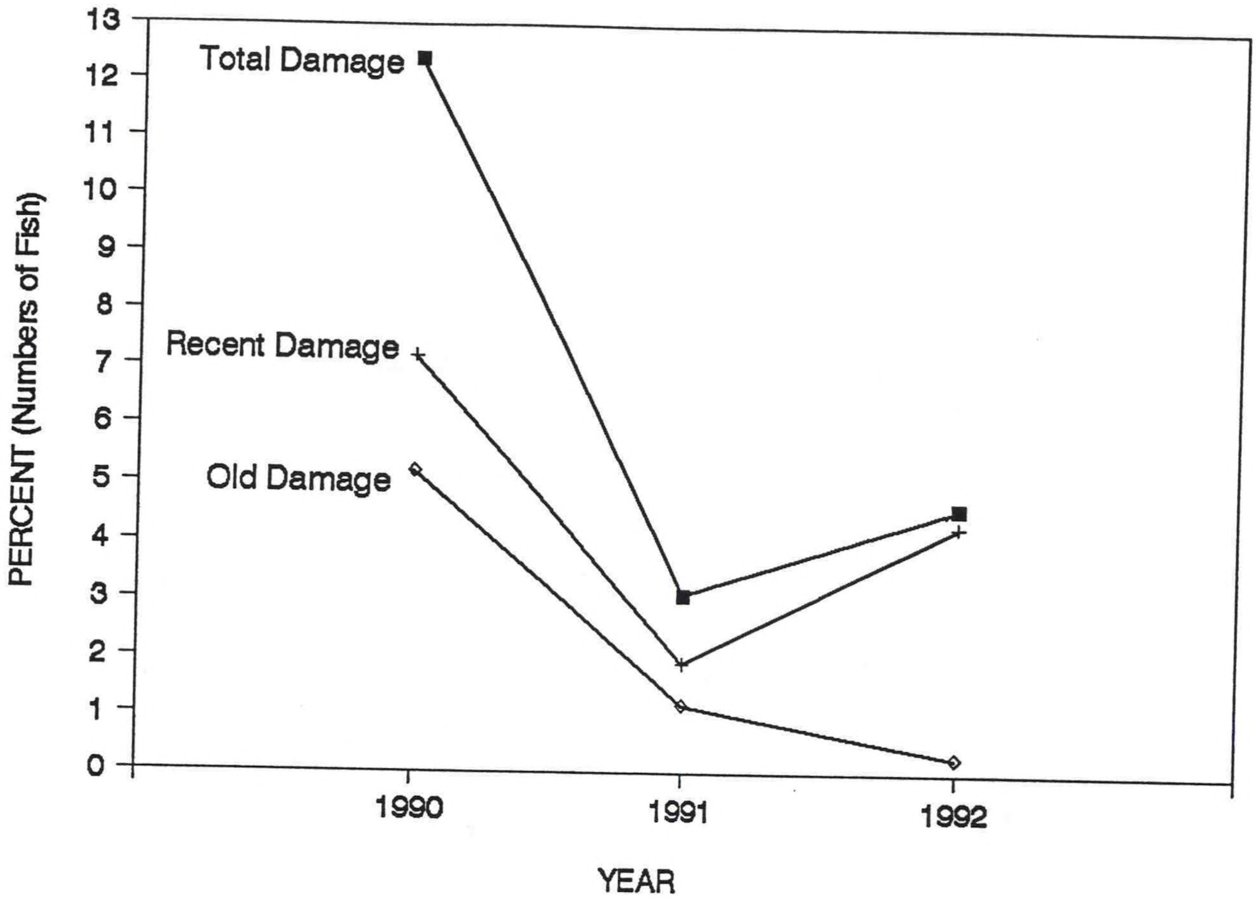

Figure 7. Percent of damaged albacore by damage type for 1990, 1991 and 1992.

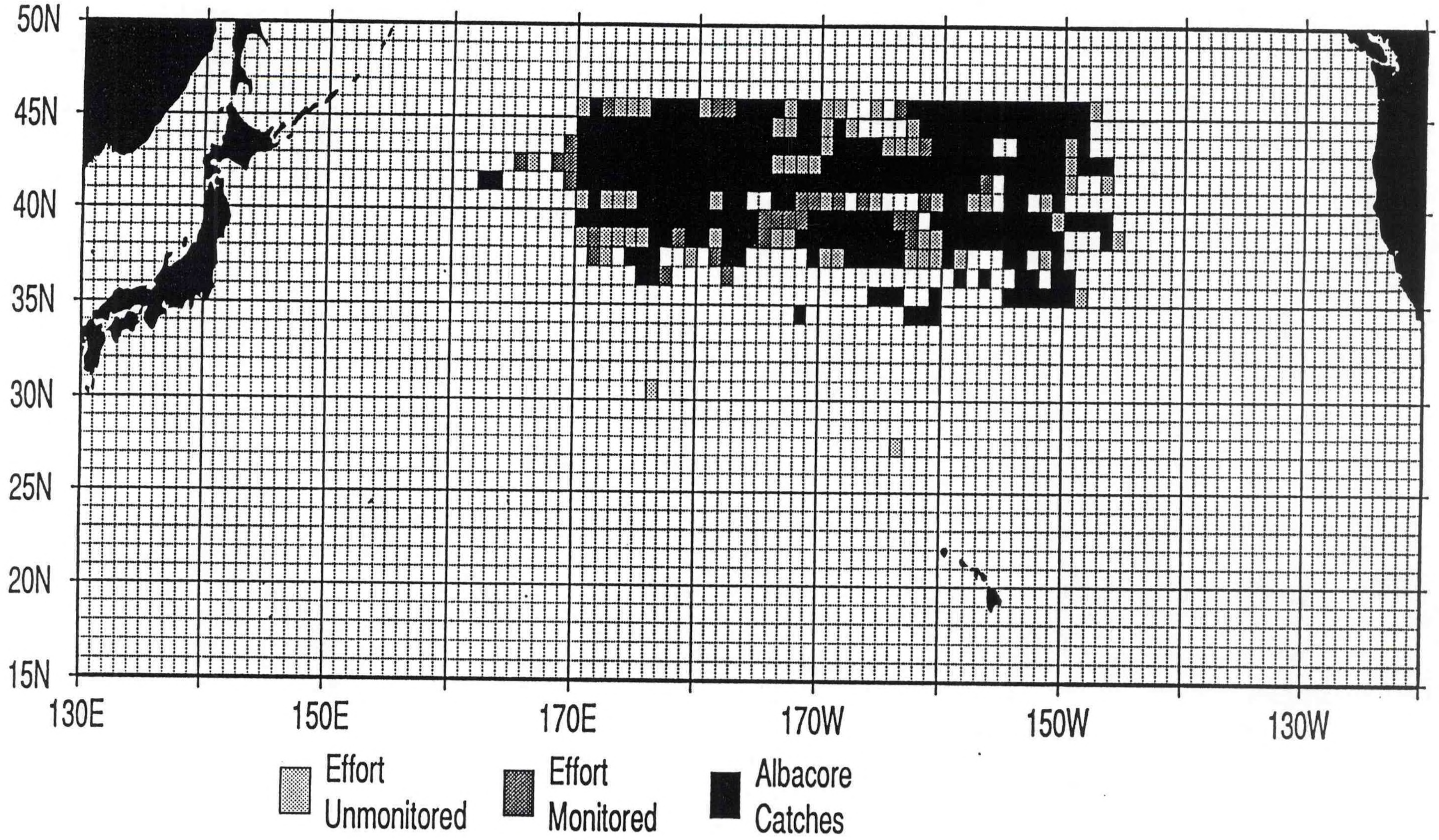

Figure 8. Location of Japanese squid drift net fishing effort and albacore catch in the north Pacific for 1990. Monitored effort is effort observed by onboard observers. (Personal communication, J. Wetherall, NMFS, Honolulu Laboratory).