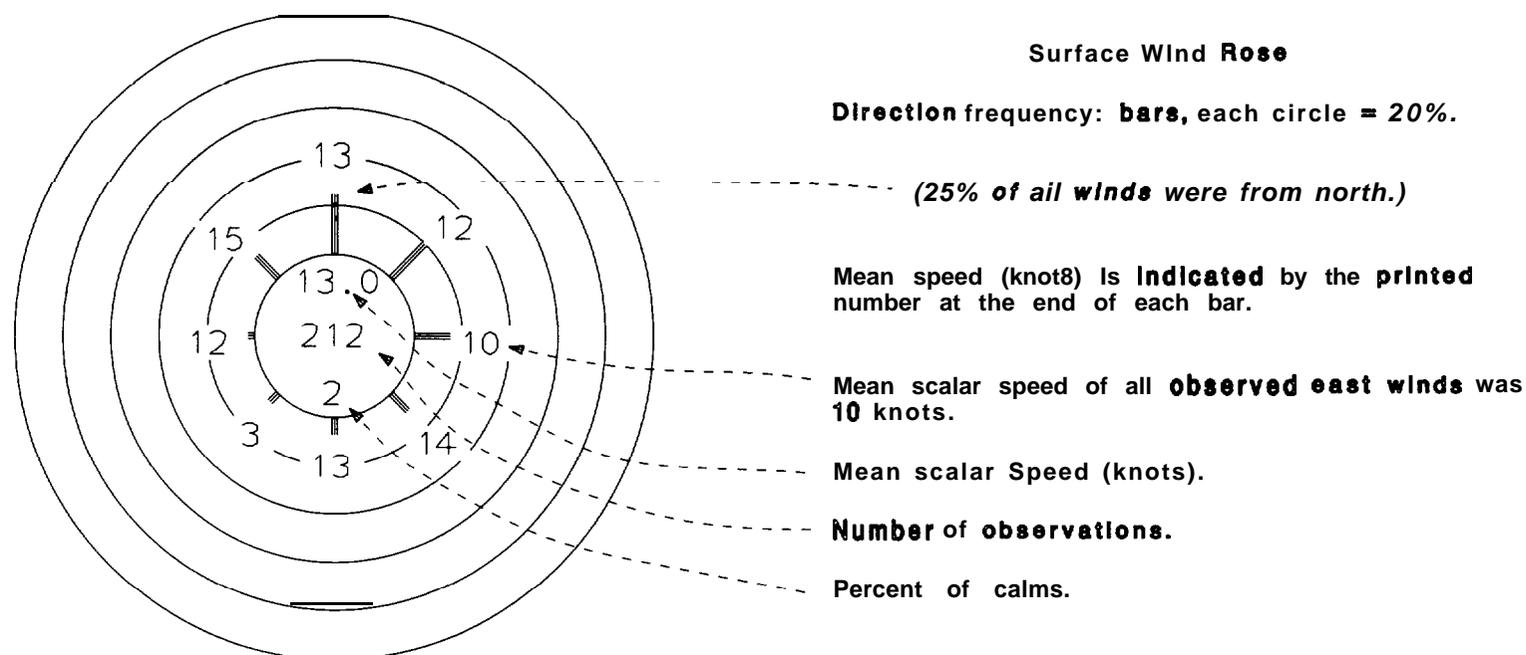


## Map 14. Wind speed and direction

ROSE – Percent frequency of wind observations by direction (8-points).

Albers Equal-Area Conic Projection



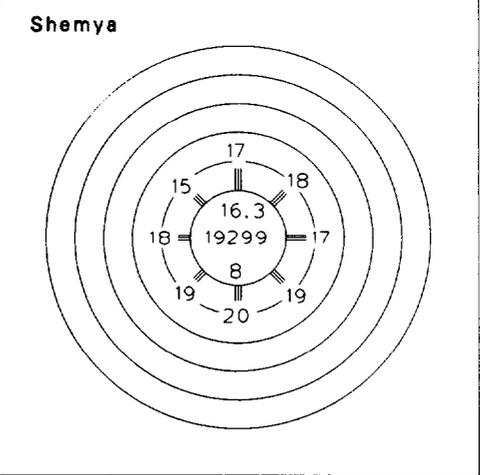
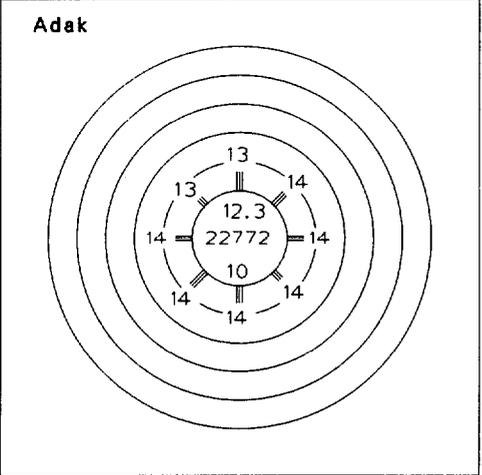
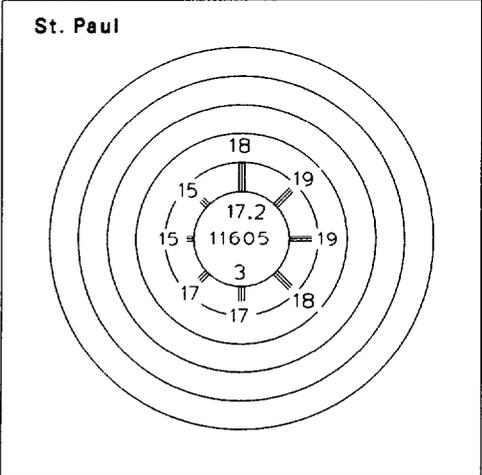
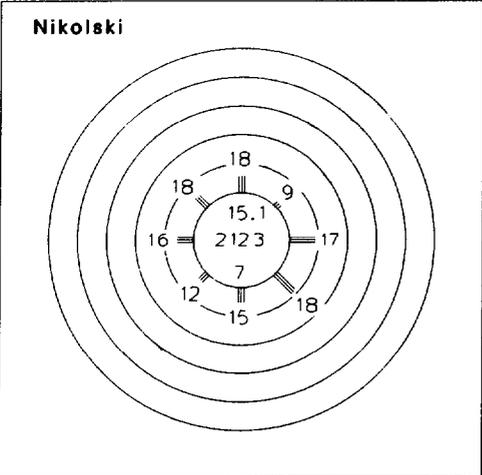
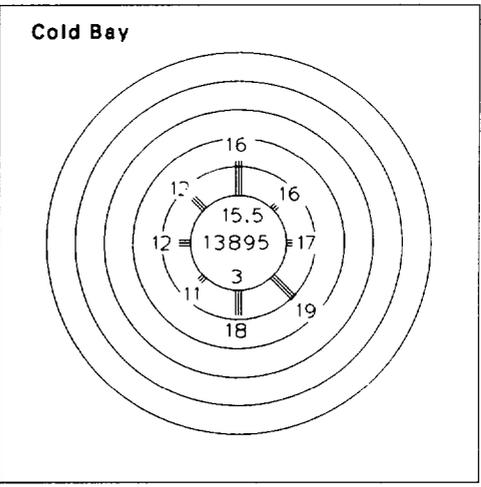
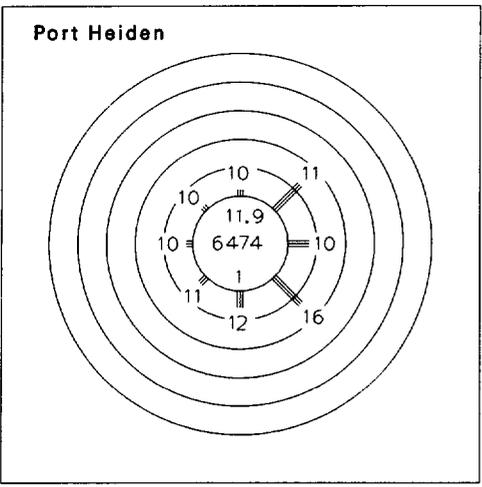
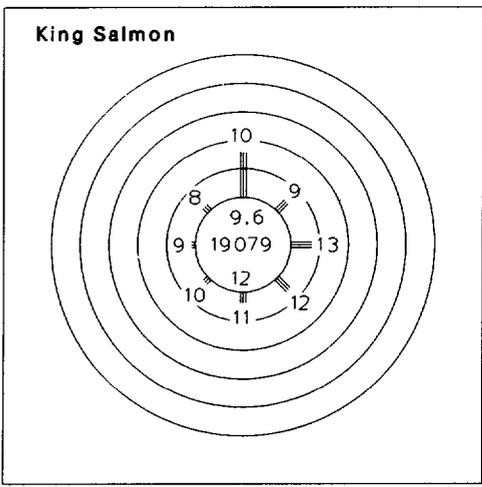
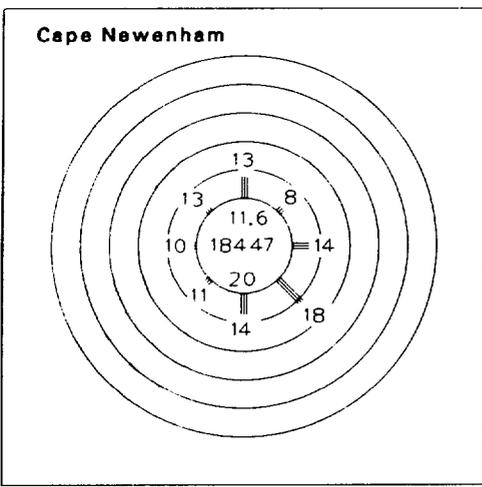
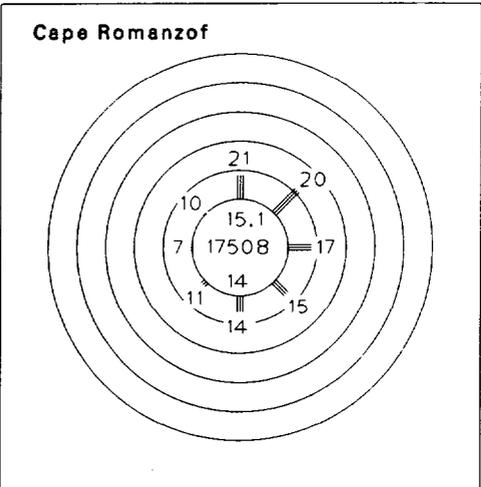
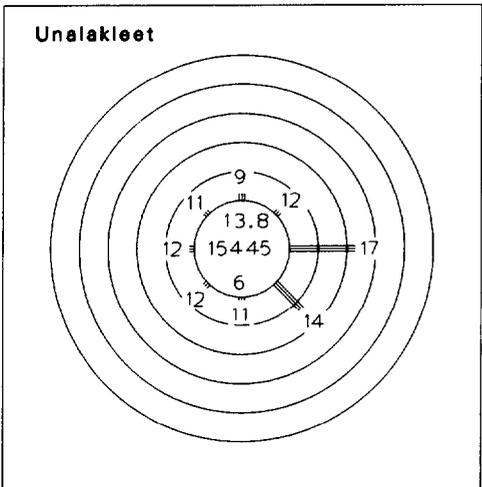
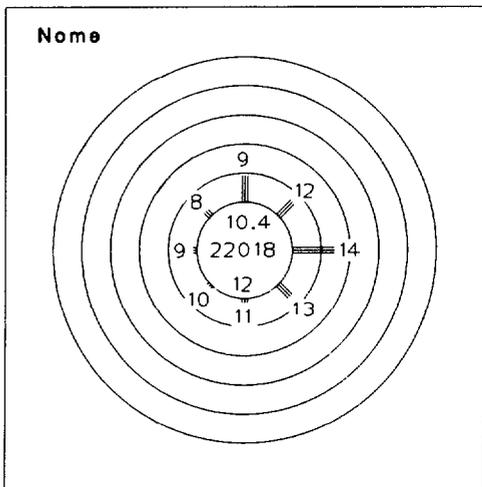
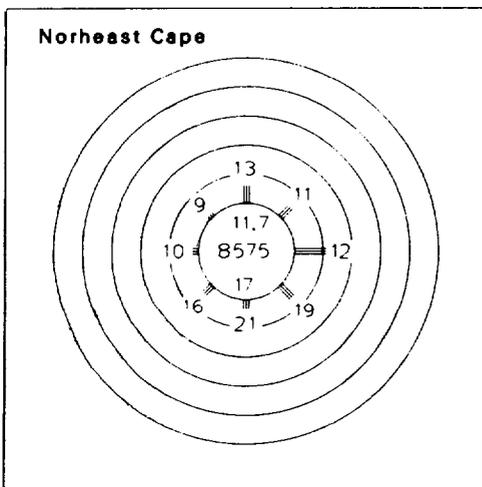
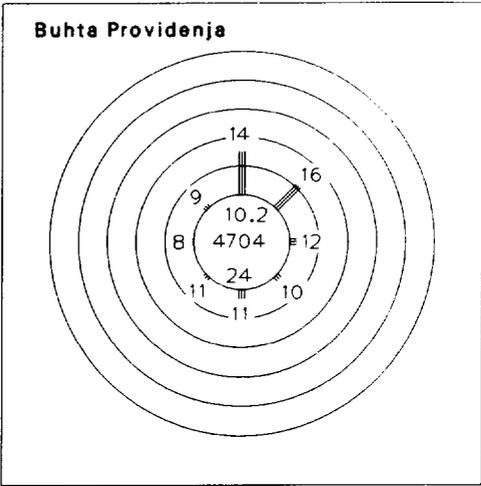
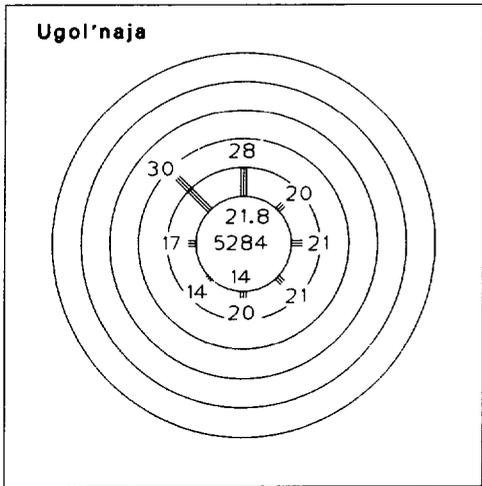
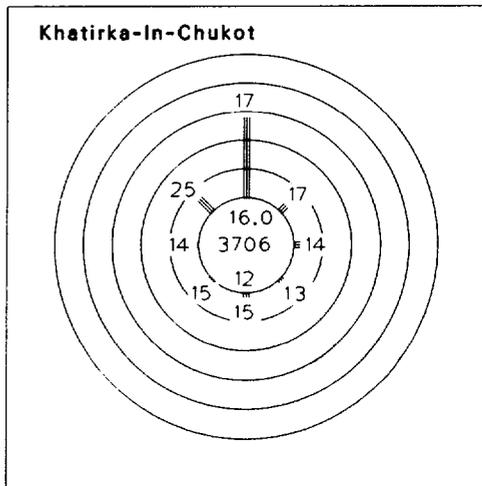
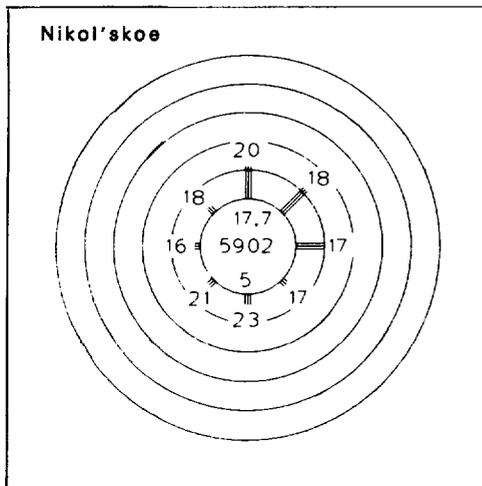
Wind is measured in terms of velocity, a vector that gives both wind speed and direction. **True wind** is the wind that is experienced by an observer standing still. When the ship is moving, an observer experiences what is termed an **apparent wind**. The speed and course of the ship must be eliminated from the apparent wind to obtain the true wind, which is needed for meteorological purposes. Wind estimated from the appearance of the sea surface is a true wind, while wind determined by the appearance of the ship's rigging or by a shipboard anemometer is an apparent wind. True wind direction may be estimated by observing the direction from which ripples, small waves, and sea spray are coming, since they run with the wind. The direction from which the waves are coming is most easily found by sighting along the wave crests and then turning 90° to face the advancing waves. The observer is then facing the direction from which the waves are coming. The direction is determined to the nearest 10° with respect to true north. The true wind speed is the average speed of the wind blowing near the sea surface. Information in the following table is used to estimate the true wind speed based upon the condition of the sea surface. Refer to the text in Set 11 for additional descriptive information on winds.

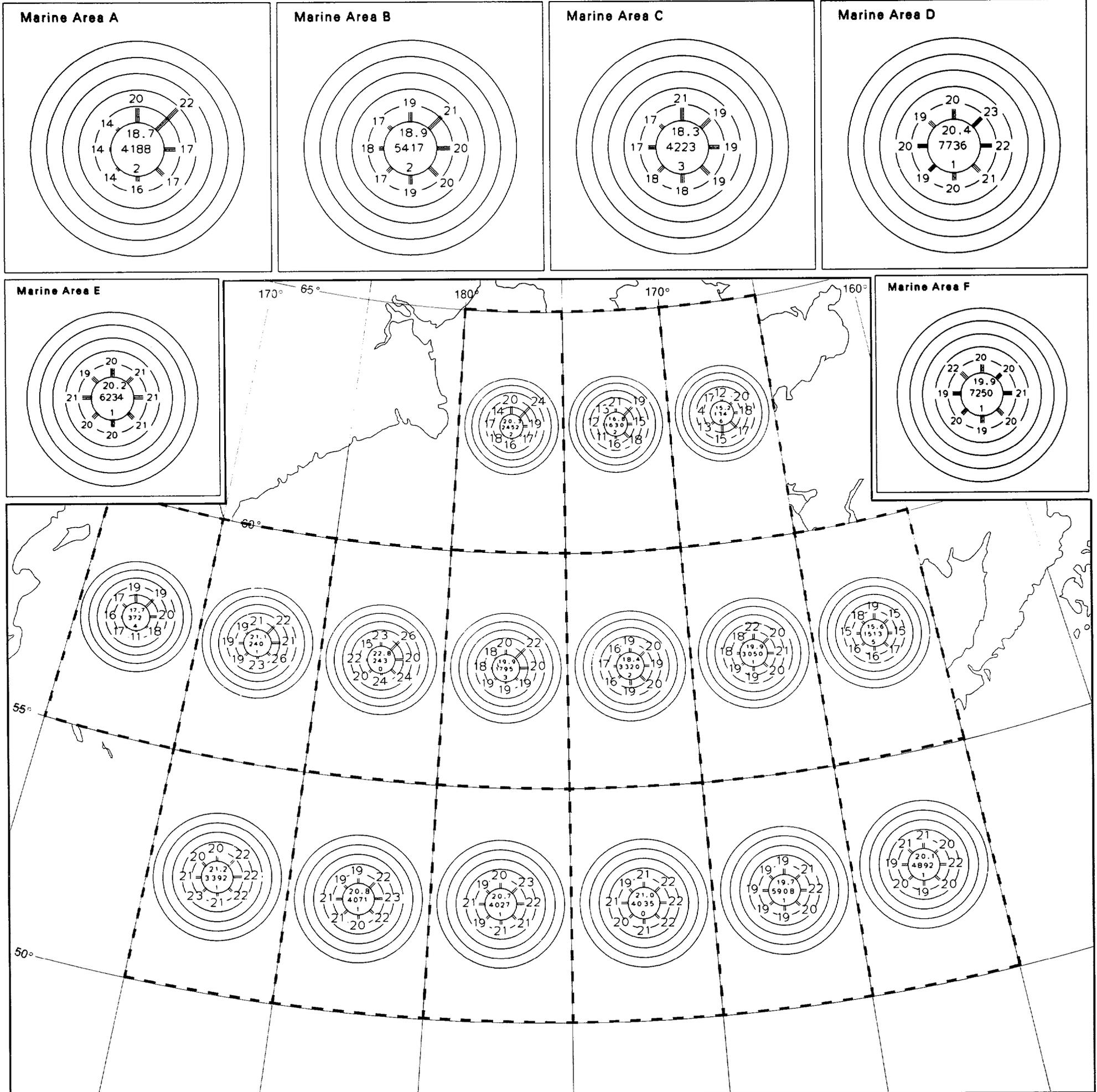
### WIND SPEED IN KNOTS (WMO Code, 1982)

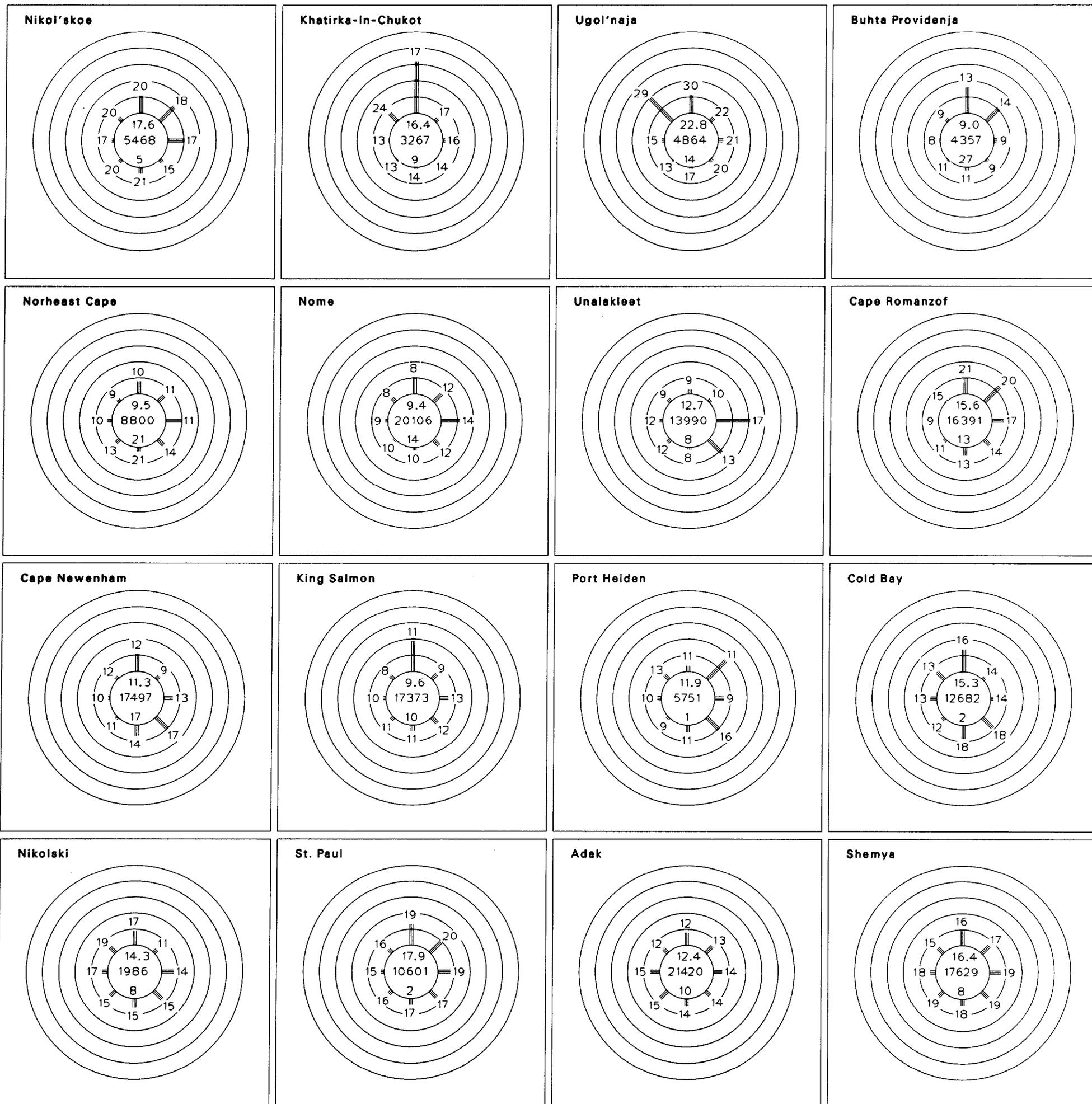
This table is based on sea conditions over deep water with a fully developed sea. There will be frequent cases where the sea will not be fully developed because the wind has not blown long enough over a sufficient distance (fetch). Other factors such as currents and water depth will also affect the look of the sea.

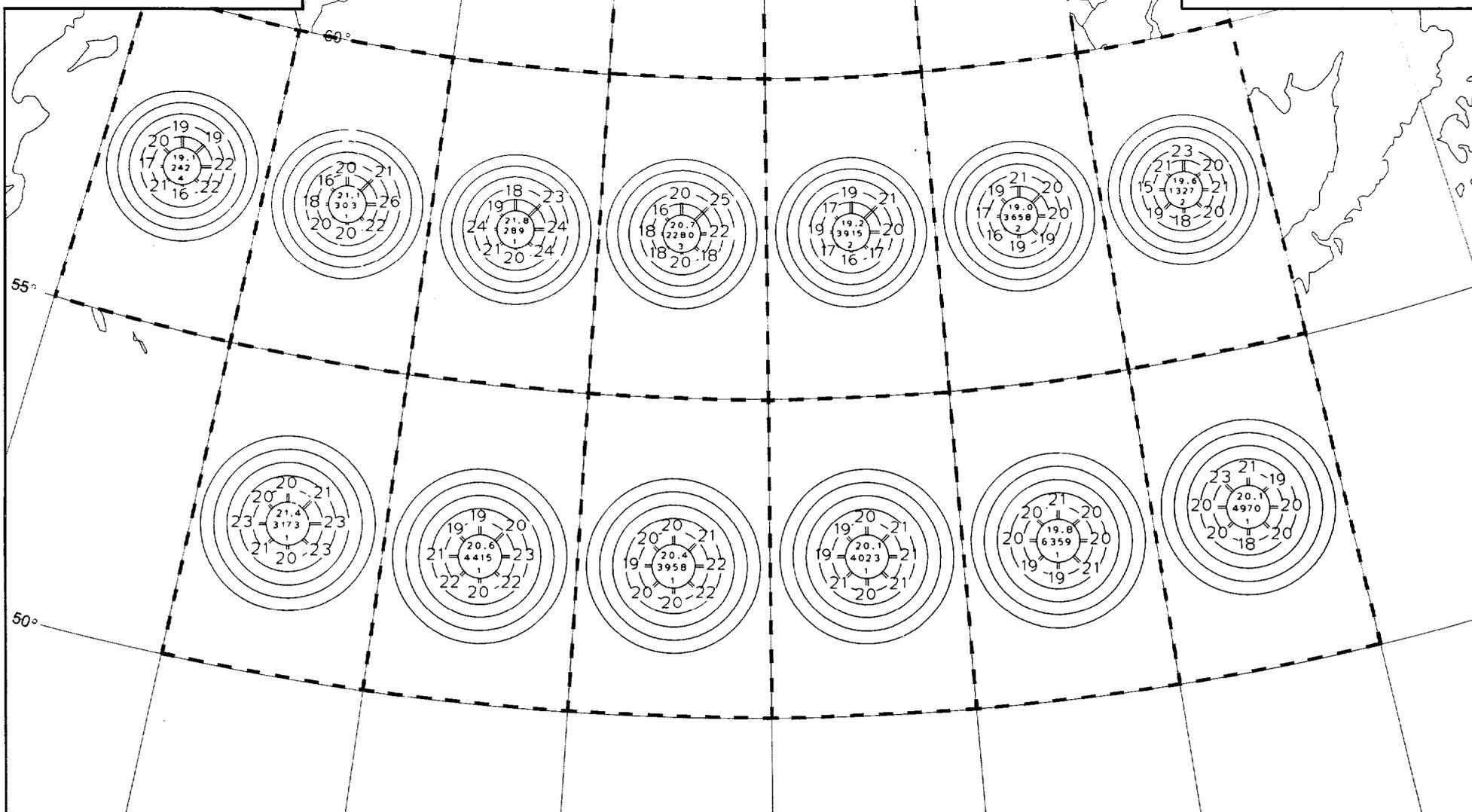
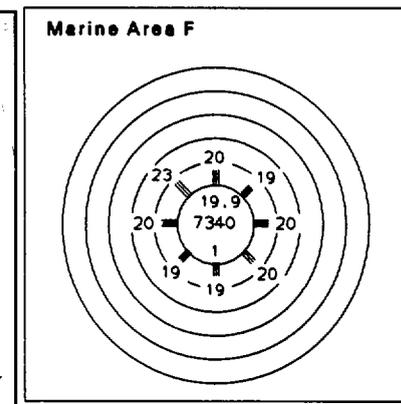
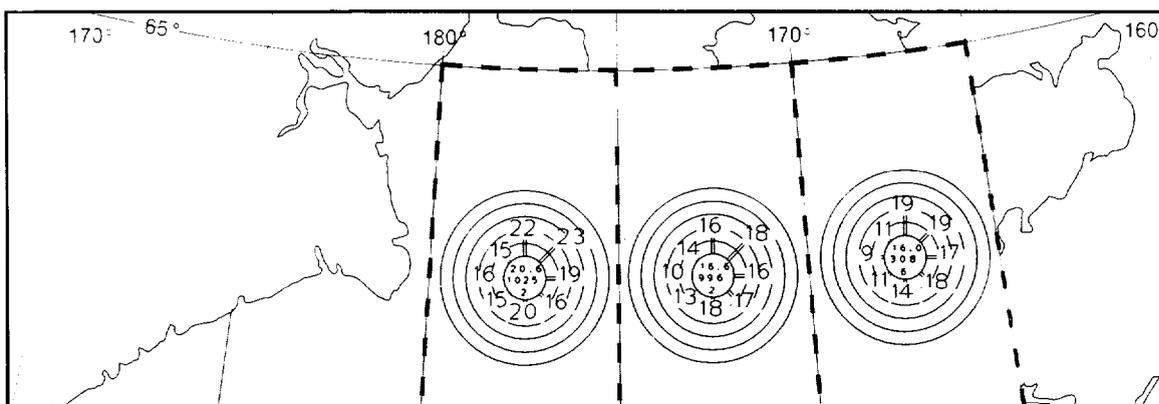
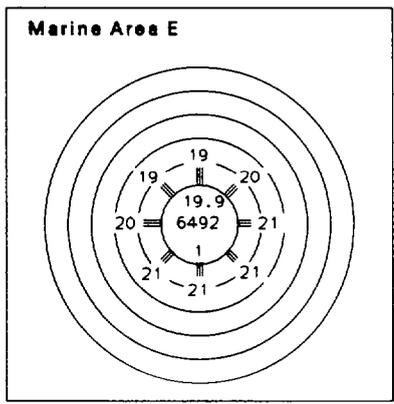
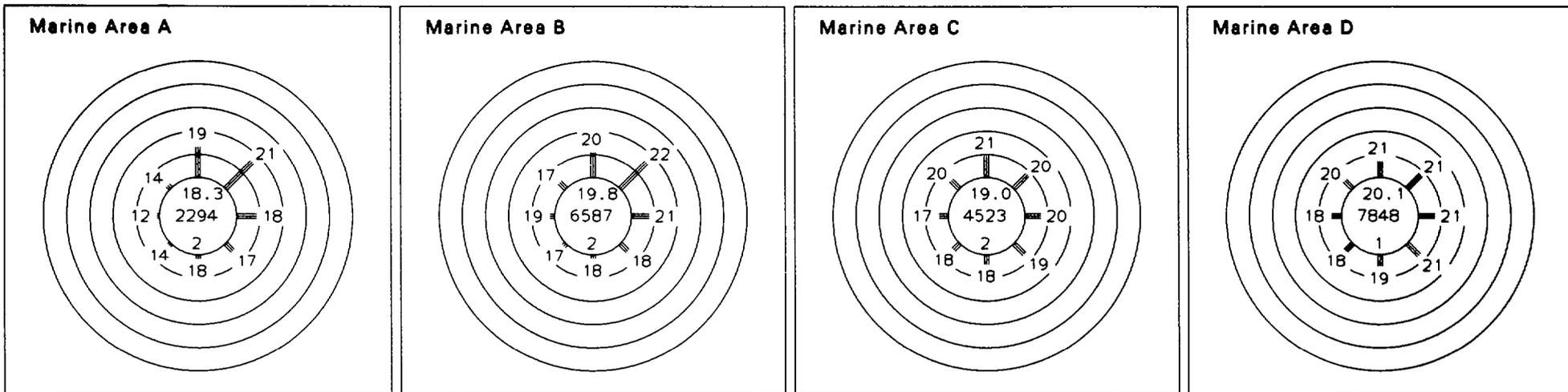
Code figs. (Knots)	Beaufort	Description	Sea criterion when sea <b>fully</b> developed	Probable ht. of waves in m (ft)	
				Average	Maximum
00	0	Calm	S e a l i k e a m i r r o r	-	-
01-03	1	Light air	Ripples with the appearance of scales are formed, but without foam crests . . .	0.1	(1/4) 0.1 (1/4)
04-06	2	Light breeze	Small wavelets, still short but more pronounced, crests have glassy appearance and do not break . . . . .	0.2	(1/2) 0.3 (1)
07-10	3	Gentle breeze	Large wavelets; crests begin to break; foam of glassy appearance; perhaps scattered white horses.	0.6	(2) 1 (3)
11-16	4	Moderate breeze	Small waves, becoming longer; fairly frequent white horses . . . . .	1	(3%) 1.5 (5)
17-21	5	Fresh breeze	Moderate waves, taking a more pronounced long form; many white horses are formed (chance of some spray)	2	(6) 2.5 (8 1/2)
22-27	6	Strong breeze	Large waves begin to form; white foam crests are more extensive everywhere (probably some spray)	3	(9 1/2) 4 (13)
28-33	7	Near gale	Sea heaps up and white foam from breaking waves begins to be blown in streaks along the direction of the wind . . . . .	4	(13%) 5.5 (19)
34-40	8	Gale	Moderately high waves of greater length; edges of crests begin to break into the spindrift; the foam is blown in well-marked streaks along the direction of the wind . . . . .	5.5	(18) 7.5 (25)
41-47		Strong gale	High waves; dense streaks of foam along the direction of the wind; crests of waves begin to topple, tumble and roll over; spray may affect visibility	7	(23) 10 (32)
48-55	10	Storm	Very high waves with long overhanging crests; the resulting foam, in great patches, is blown in dense white streaks along the direction of the wind; on the whole, the surface of the sea takes on a white appearance; tumbling of the sea becomes heavy and shock-like; visibility affected . . . . .	9	(29) 12.5 (41)
58-63	11	Violent Storm	Exceptionally high waves (small and medium-sized ships might be for a time lost to view behind the waves); the sea is completely covered with long white patches of foam lying along the direction of the wind; everywhere the edges of the wave crests are blown into froth; v i s i b i l i t y a f f e c t e d	11.5	(37) 16 (52)
64 and over	12	Hurricane	The air is filled with foam and spray; sea completely white with driving spray; visibility very seriously affected	14	(45) x x

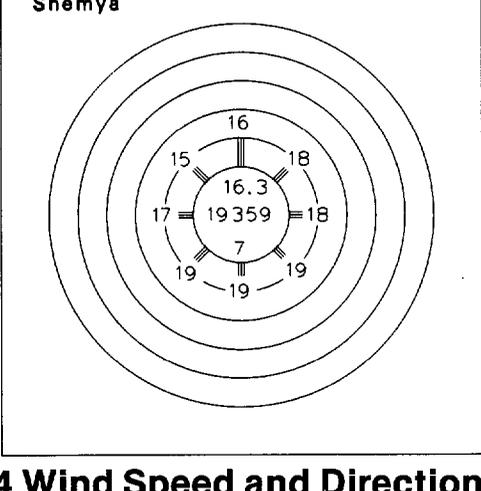
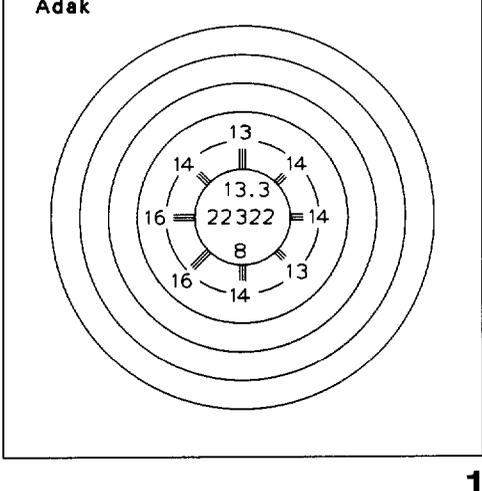
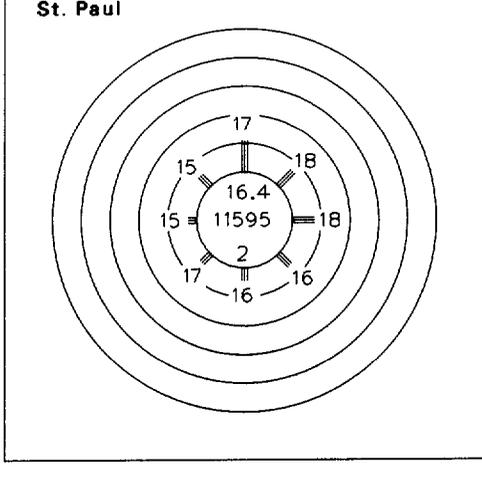
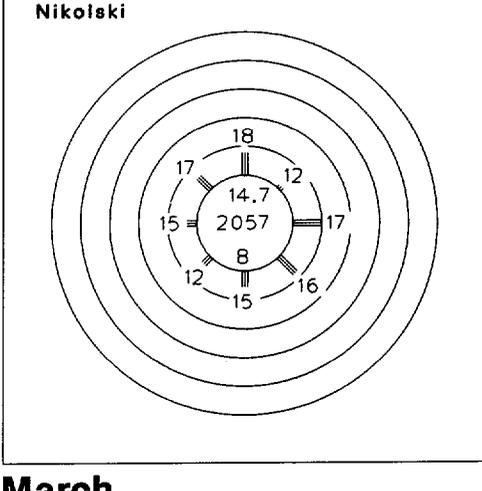
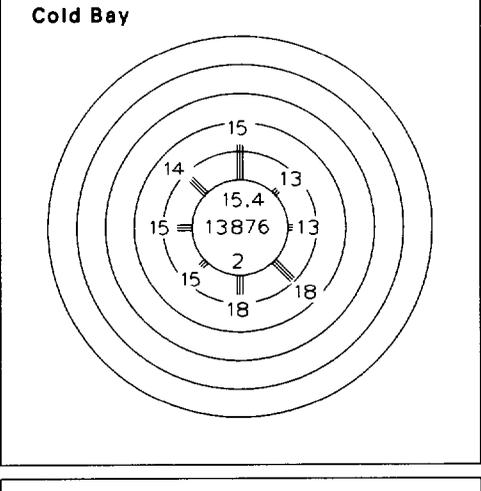
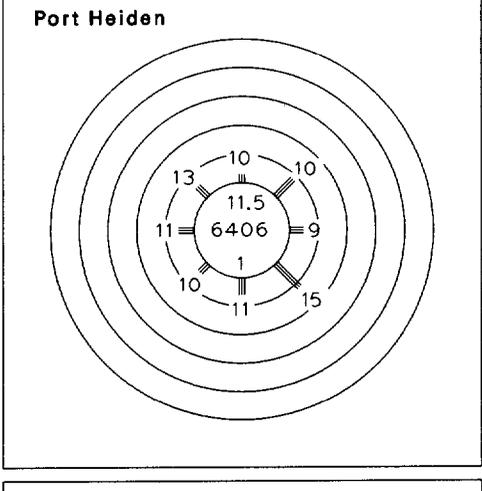
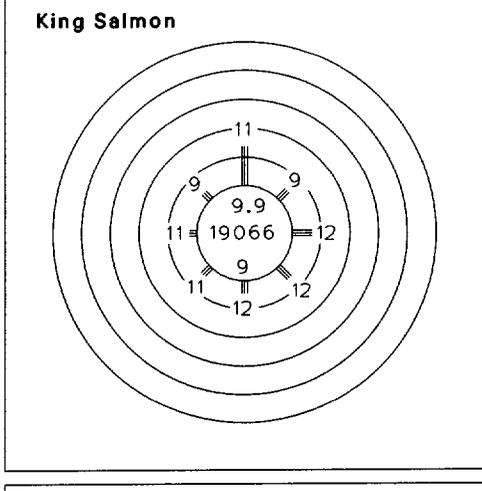
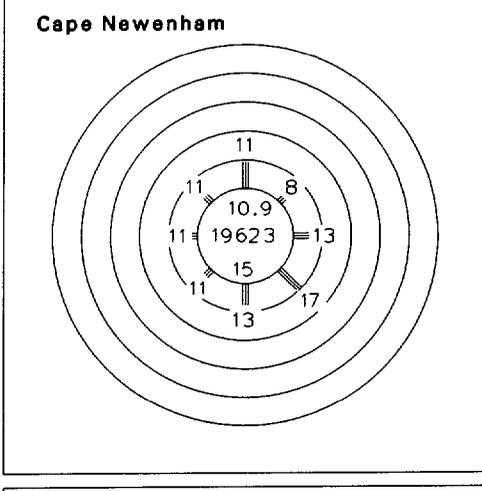
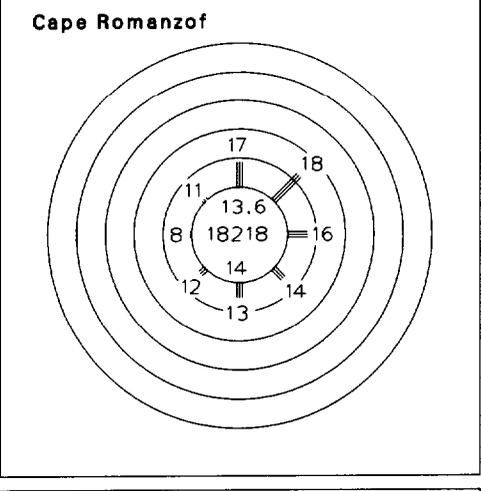
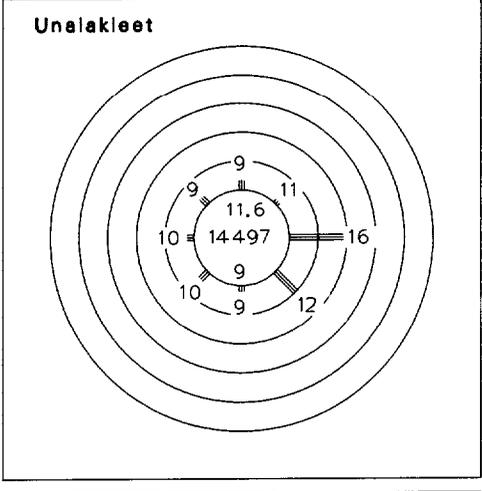
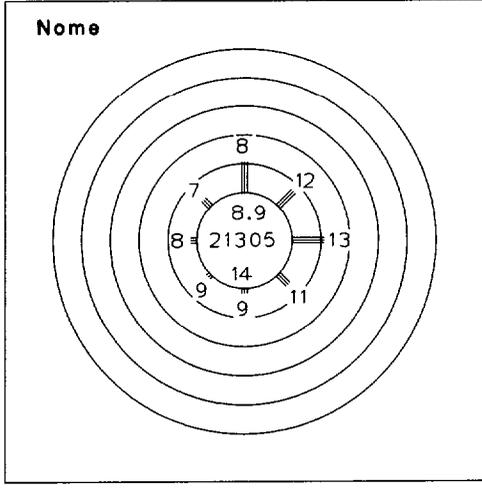
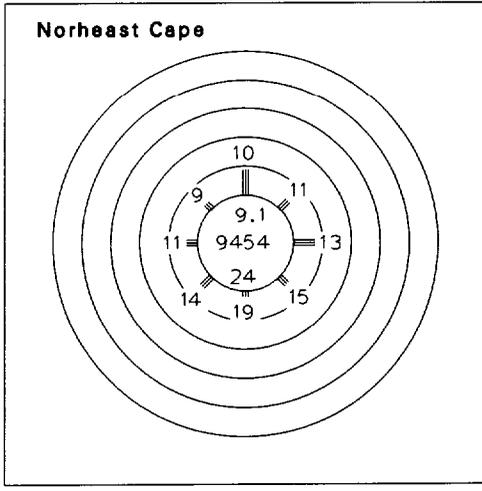
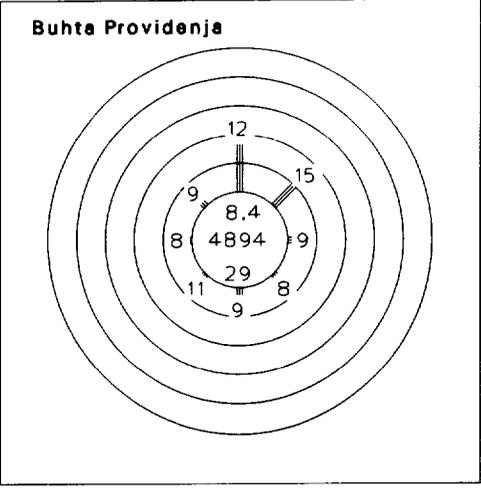
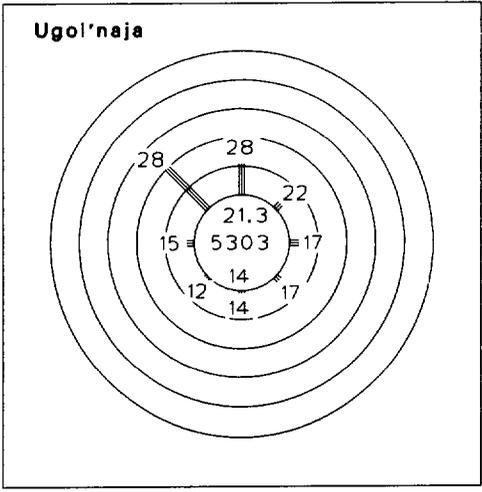
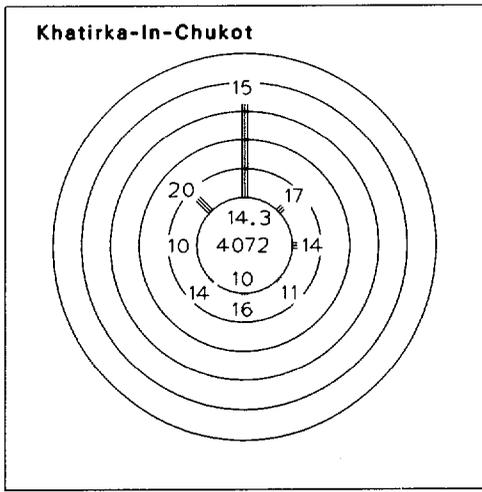
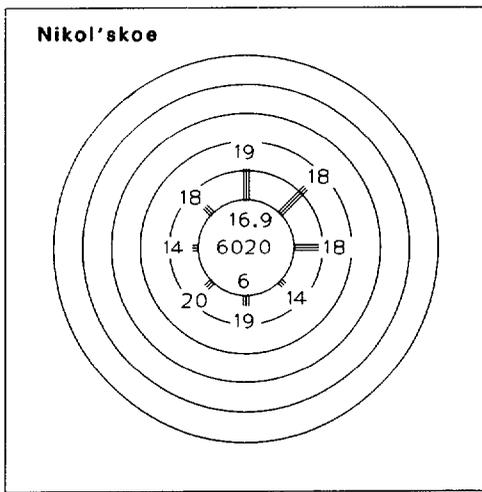
Note: For winds over 99 knots, add 50 to dd (direction) and enter the tens and units digits of the wind speed for ff; e.g. for a wind from 100° true at 125 knots, dd = 60, and ff = 25.

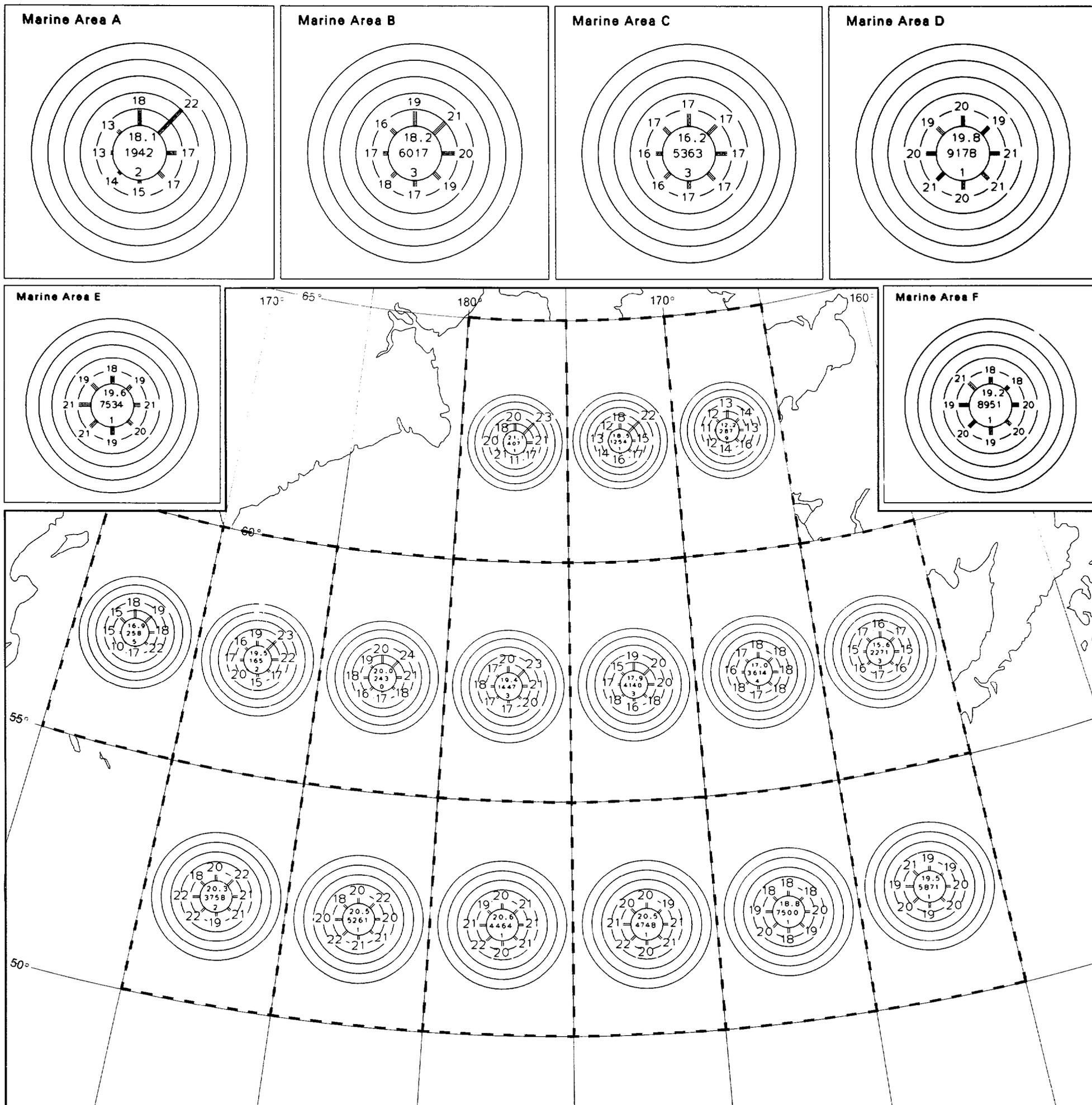


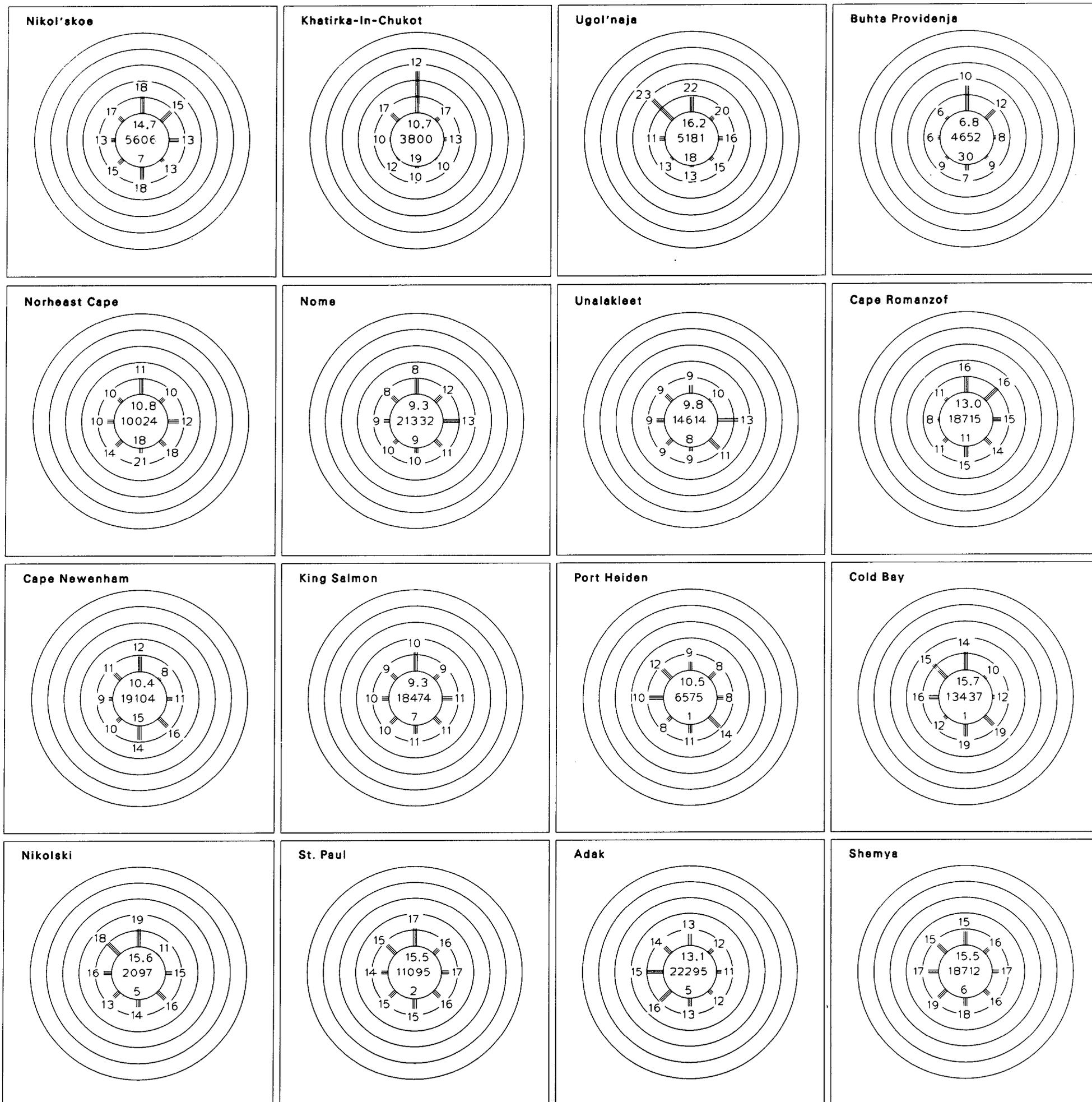


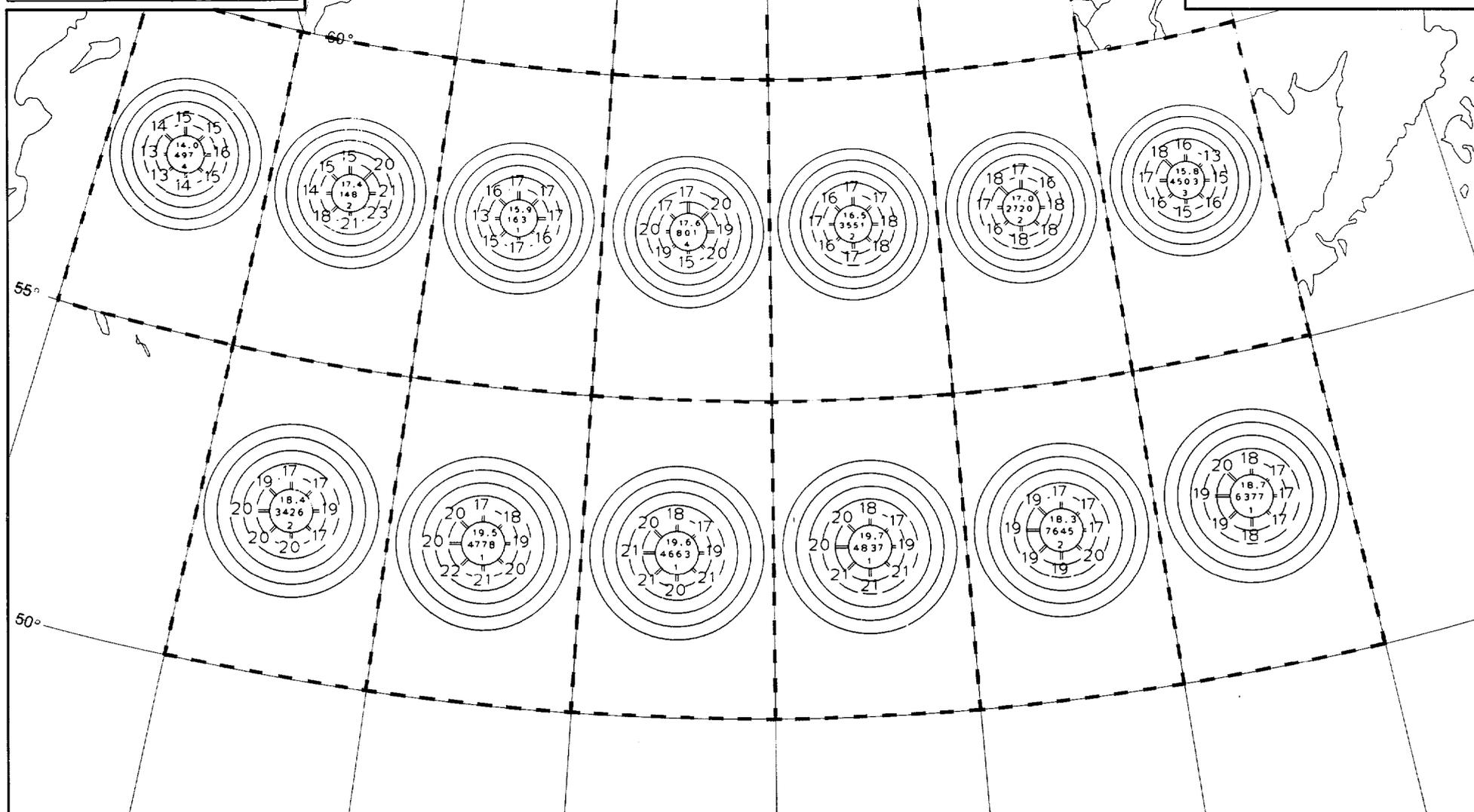
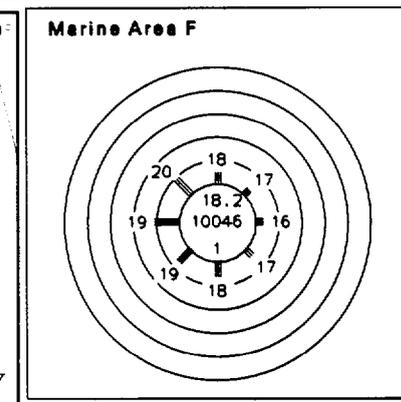
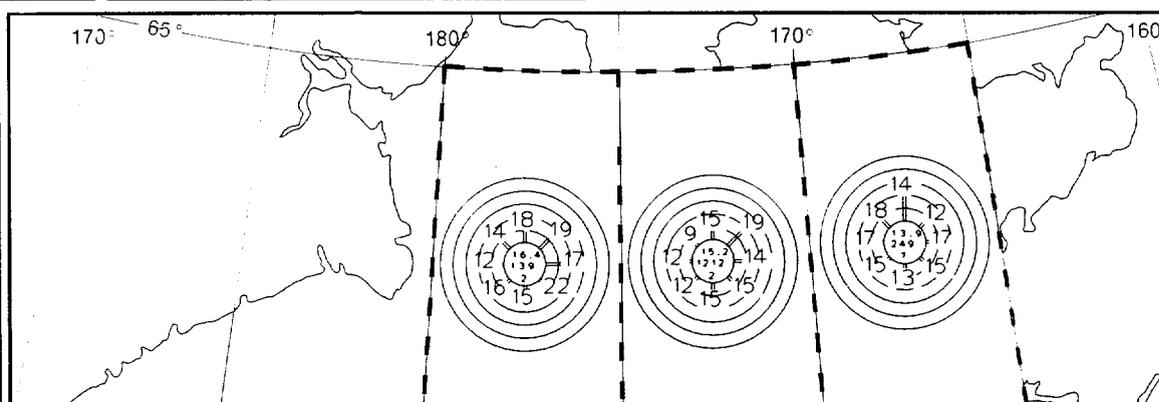
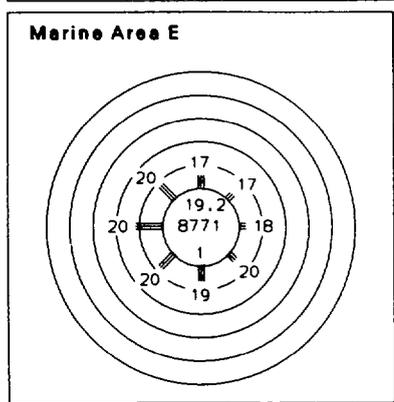
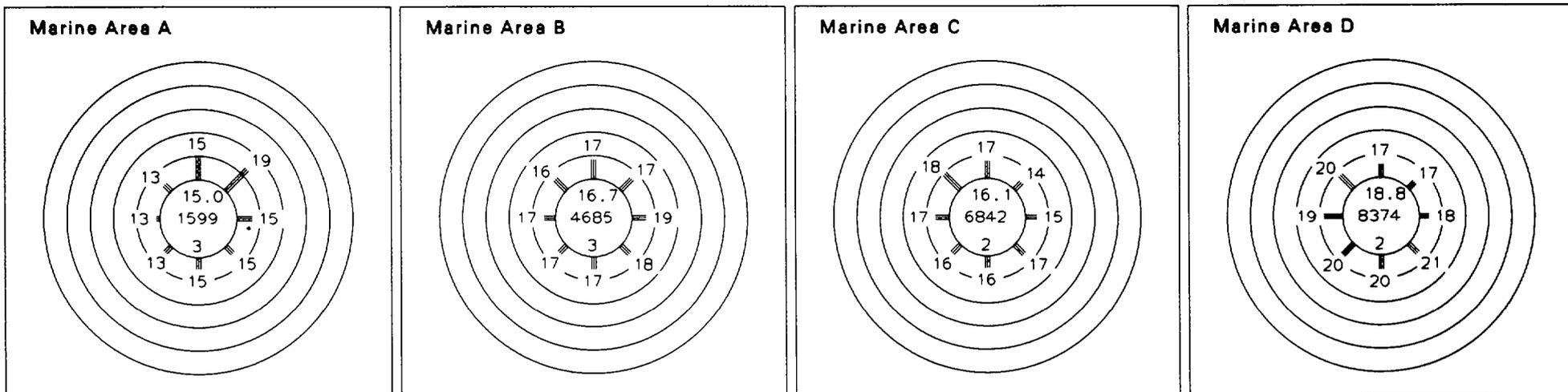


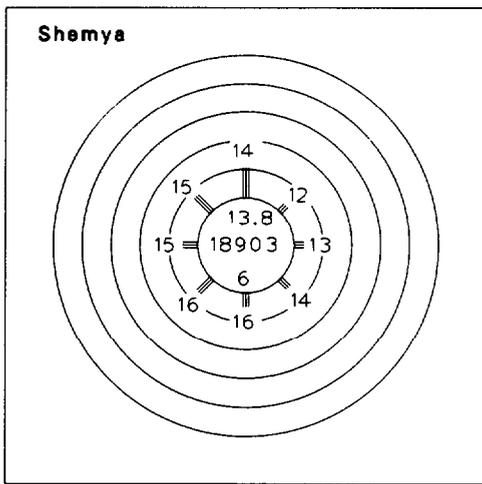
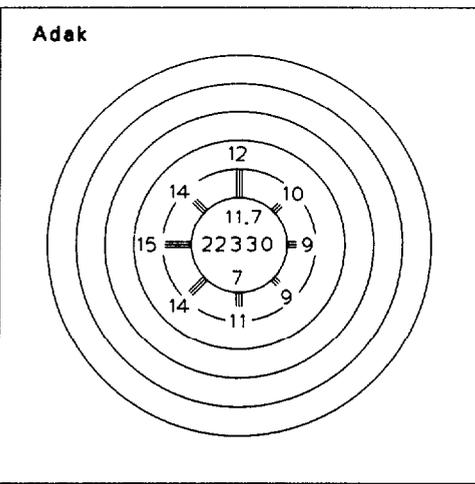
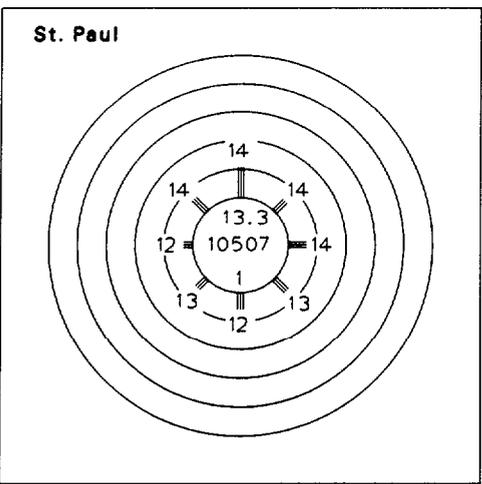
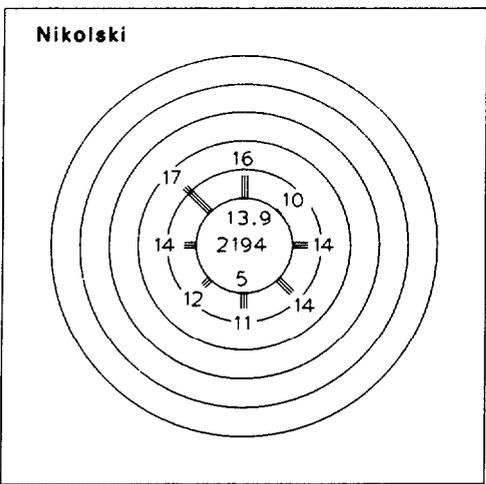
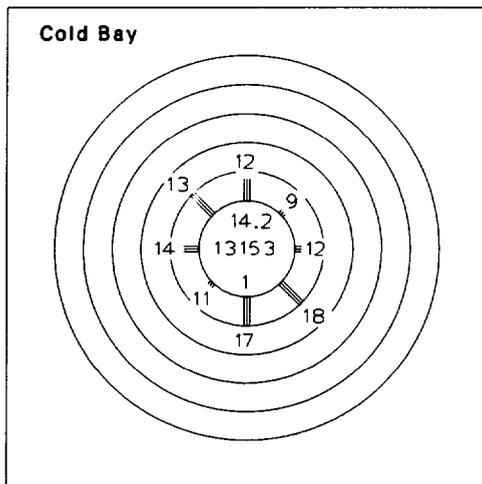
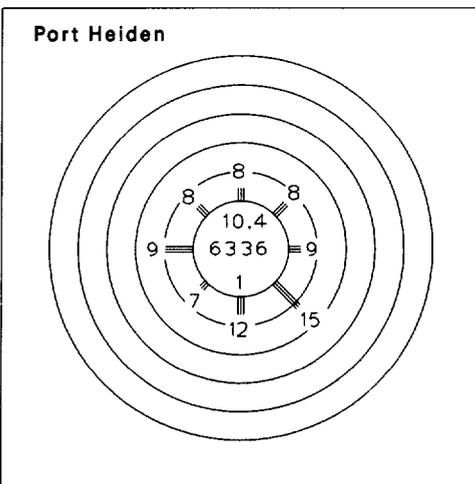
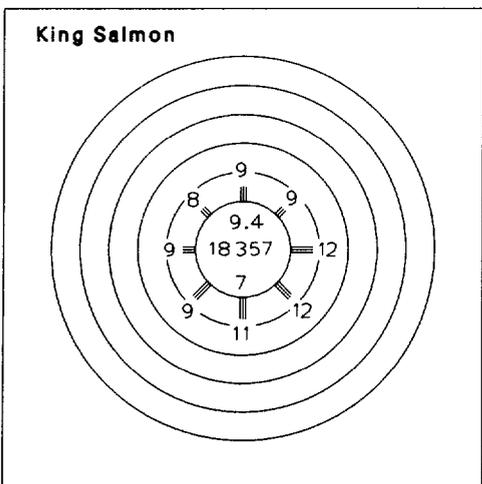
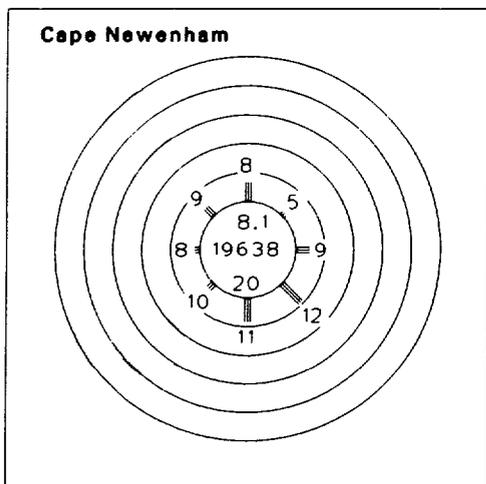
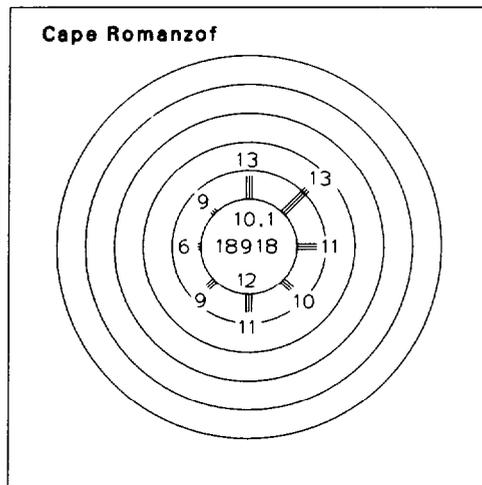
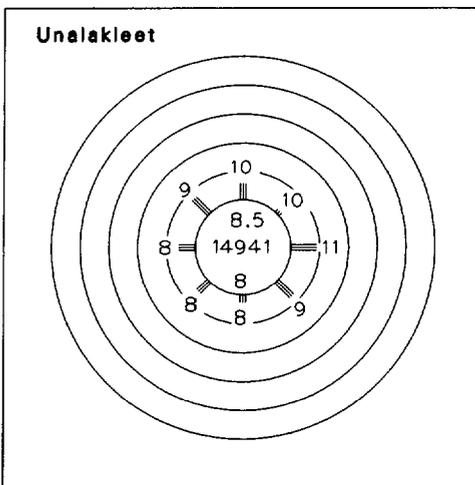
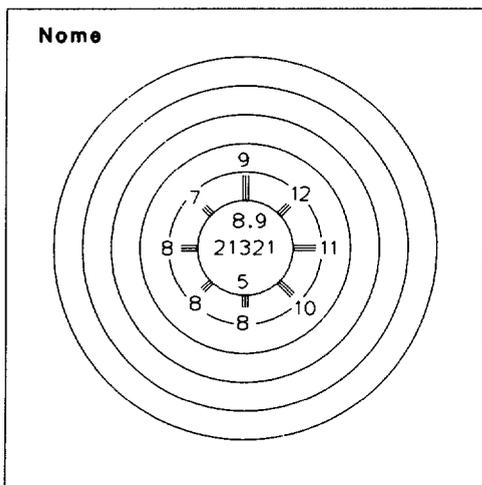
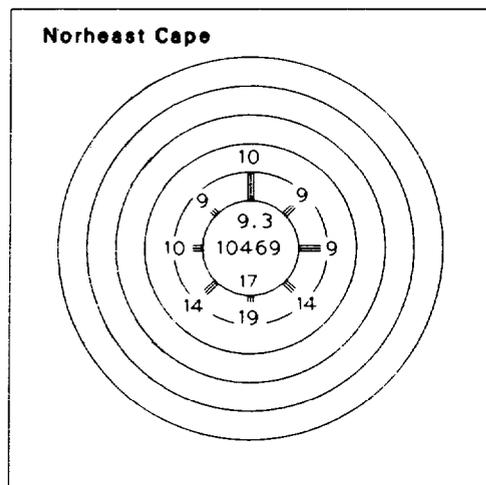
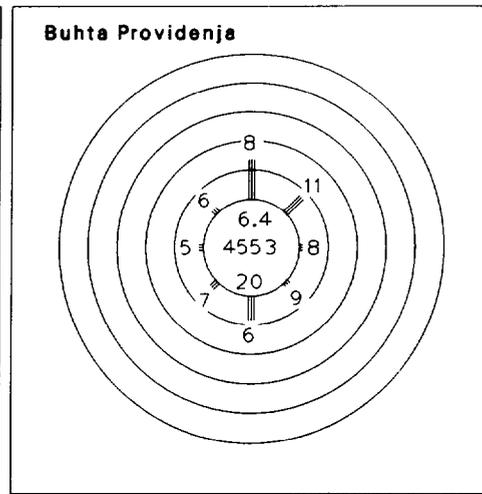
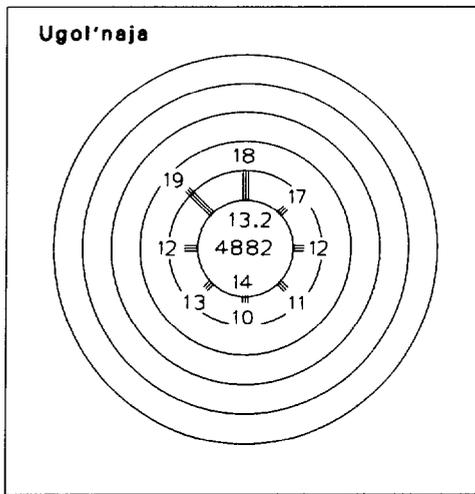
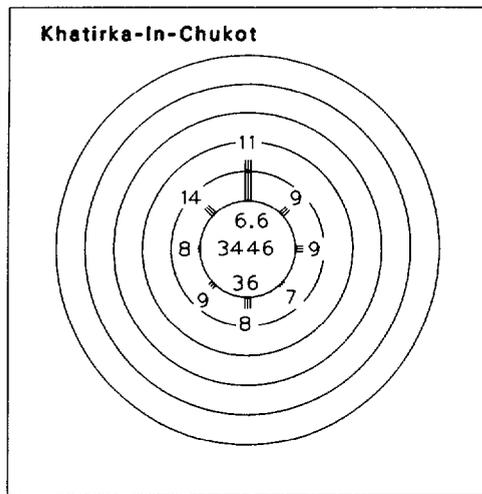
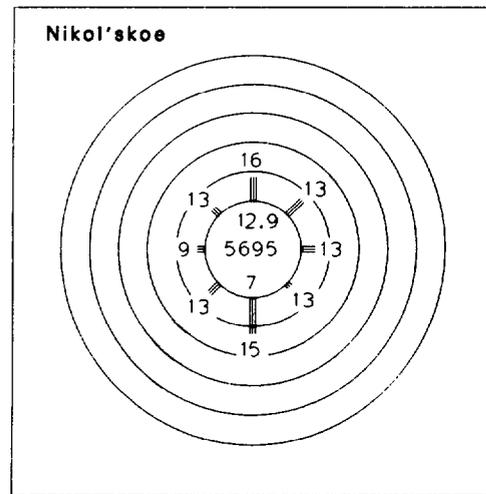


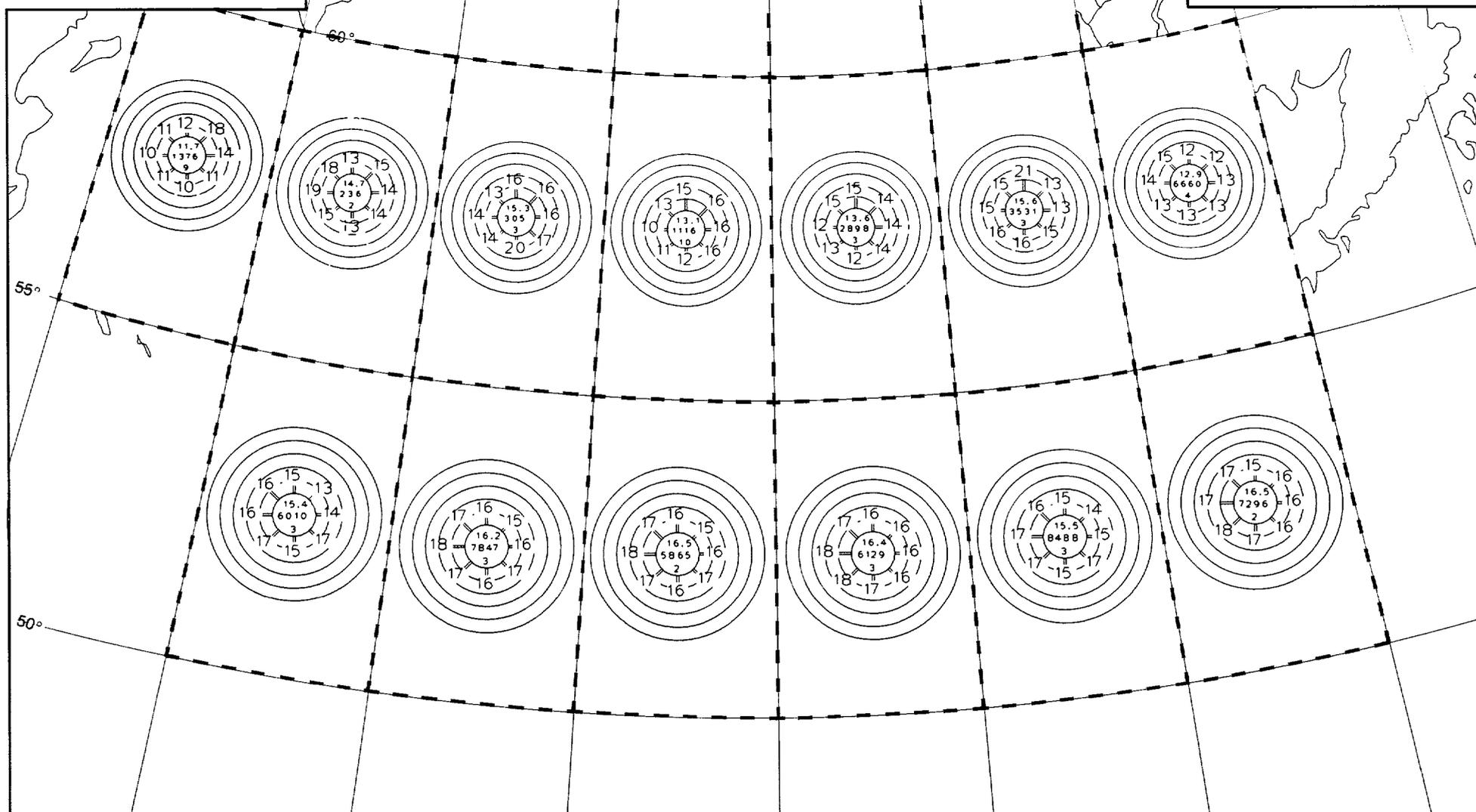
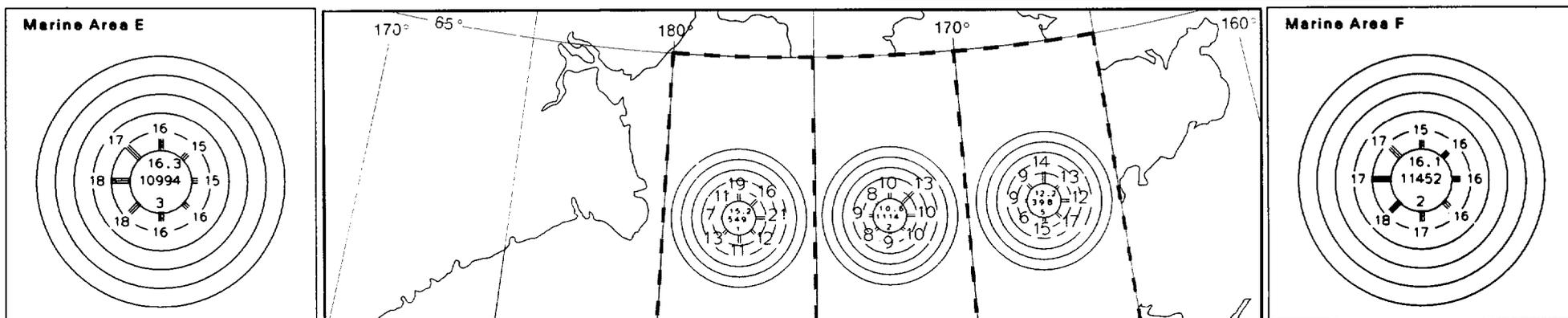
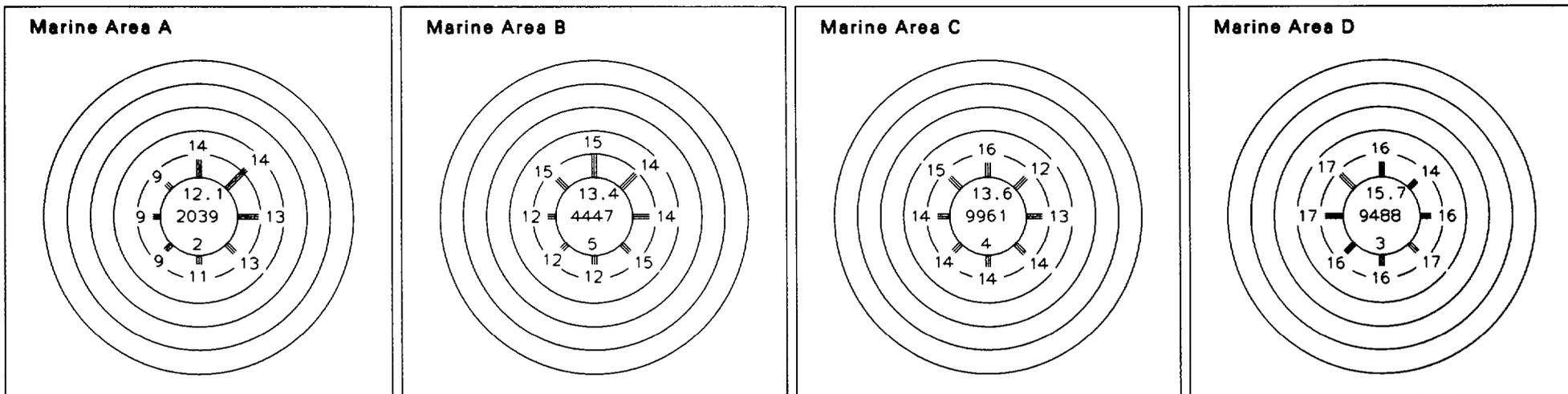




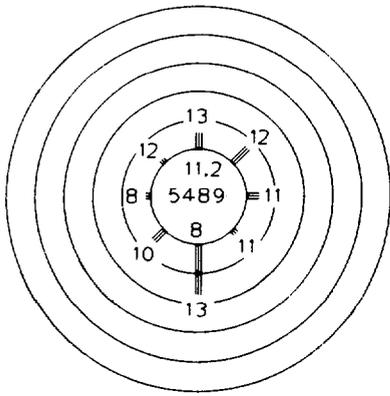




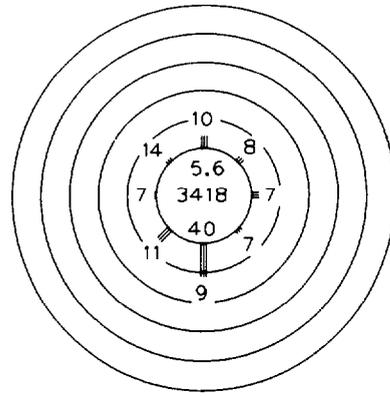




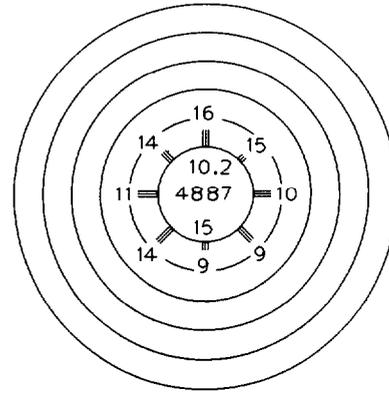
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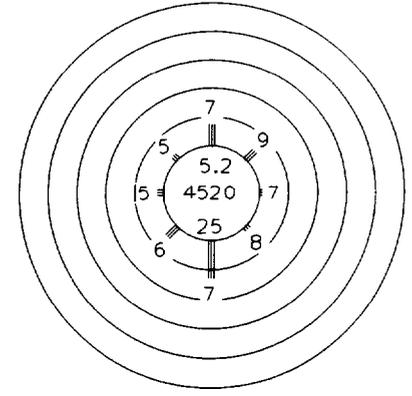
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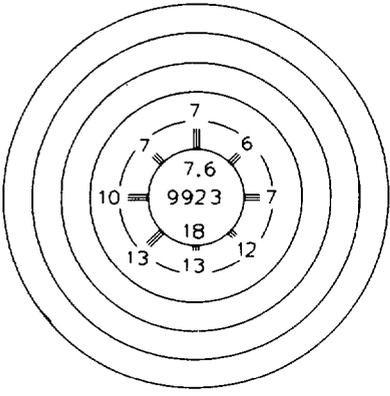
Ugol'naja



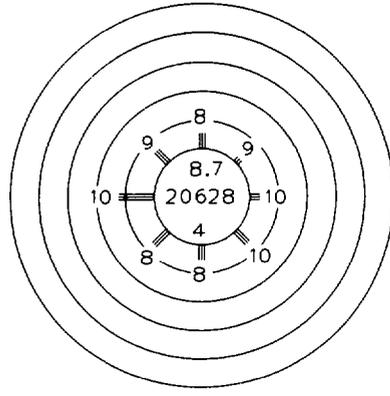
Buhta Providenja



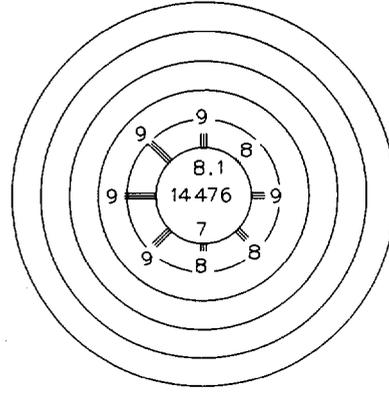
Northeast Cape



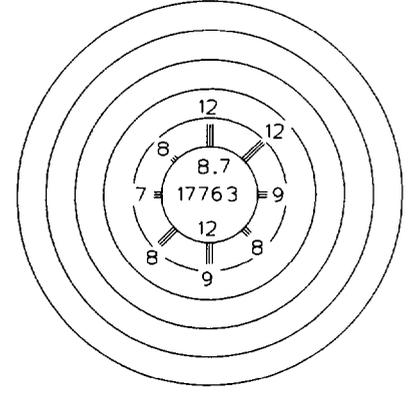
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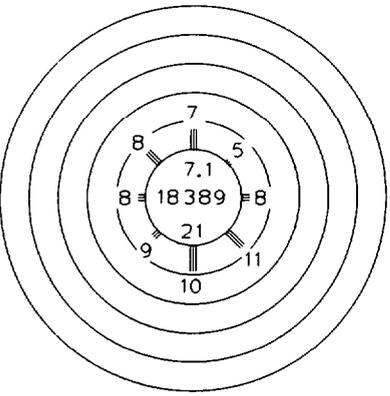
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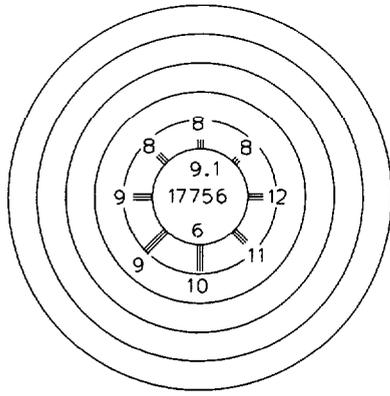
Cape Romanzof



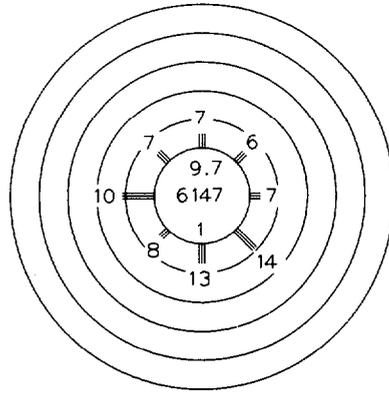
Cape Newenham



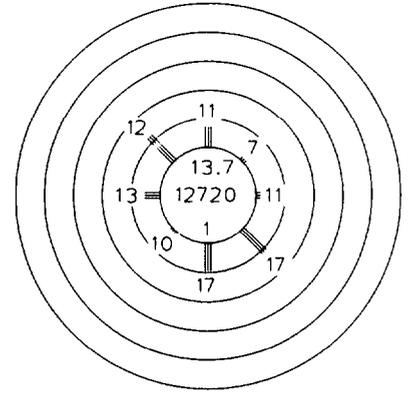
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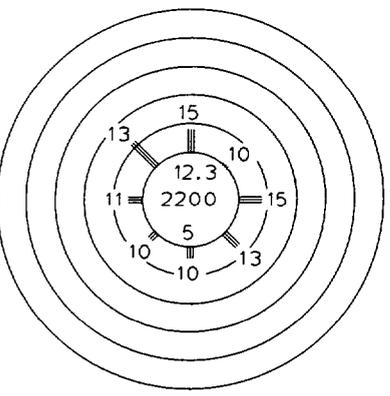
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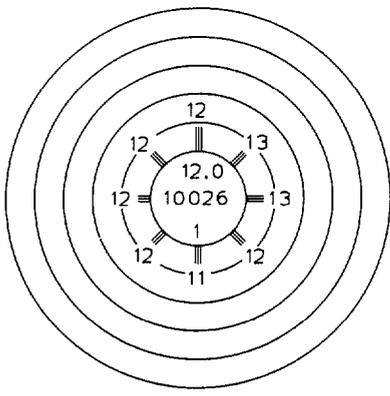
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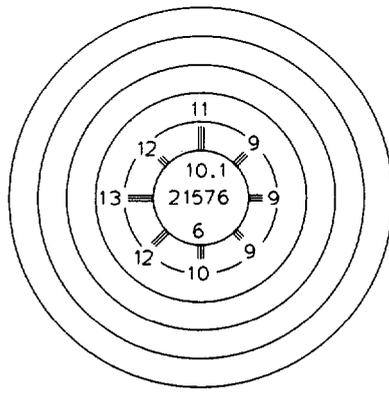
Nikolski



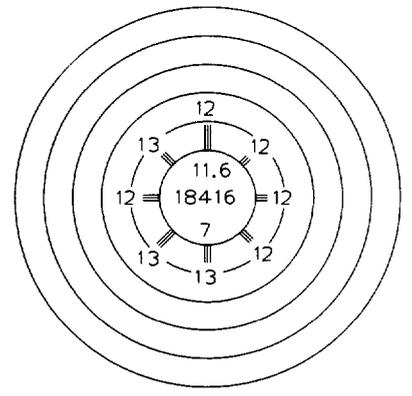
St. Paul

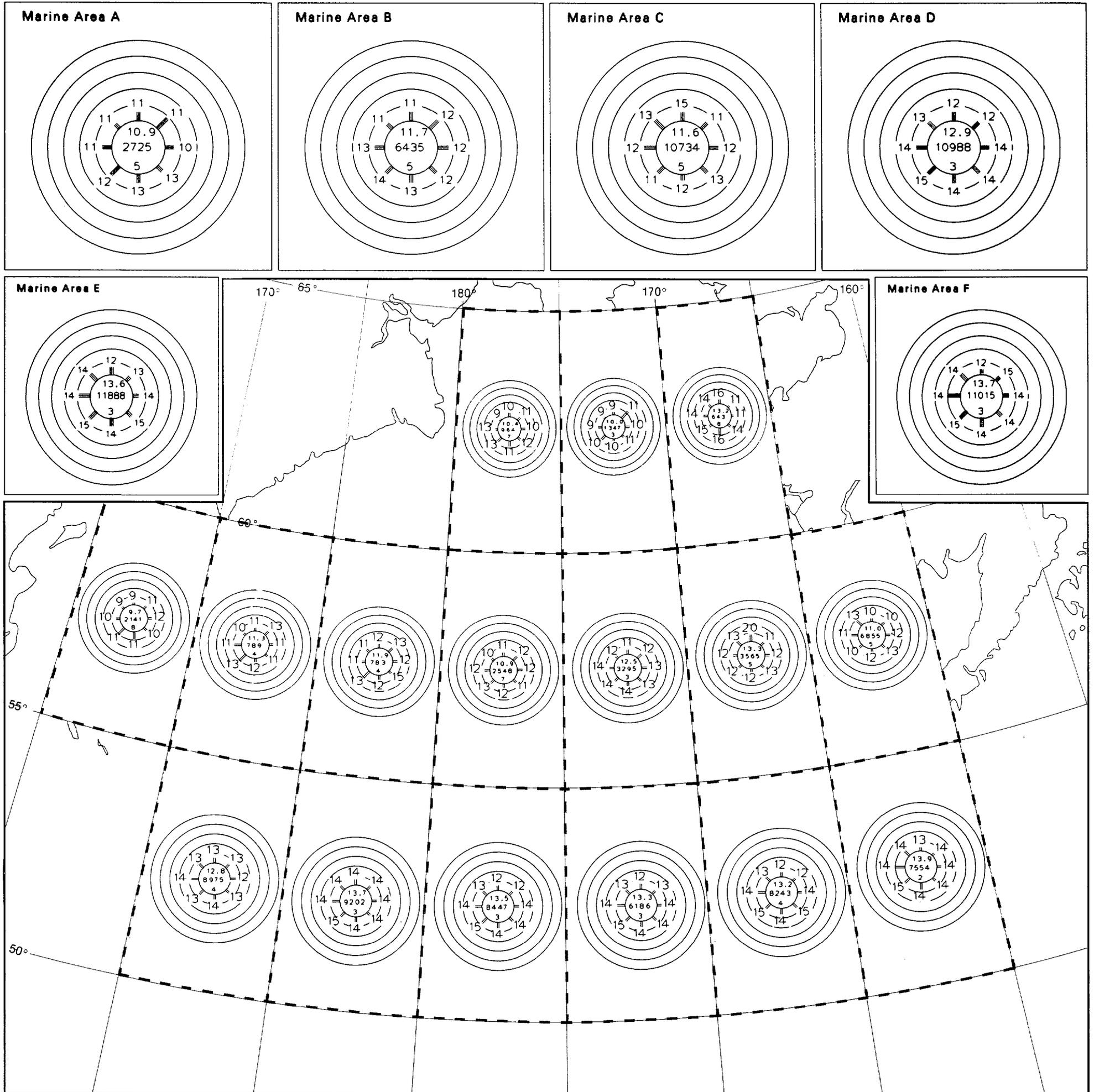


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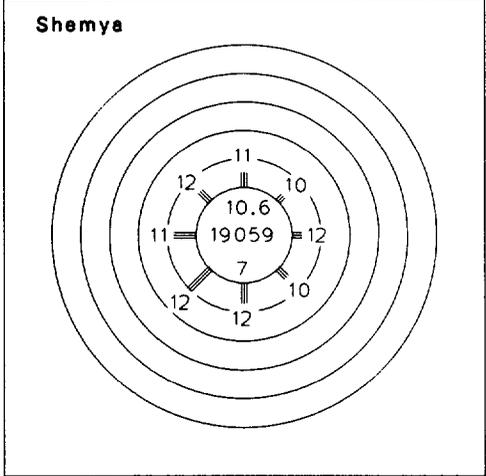
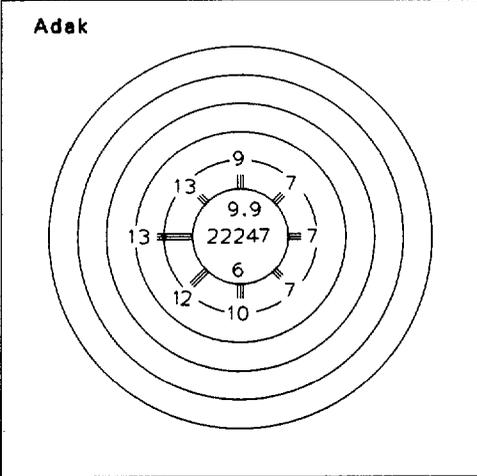
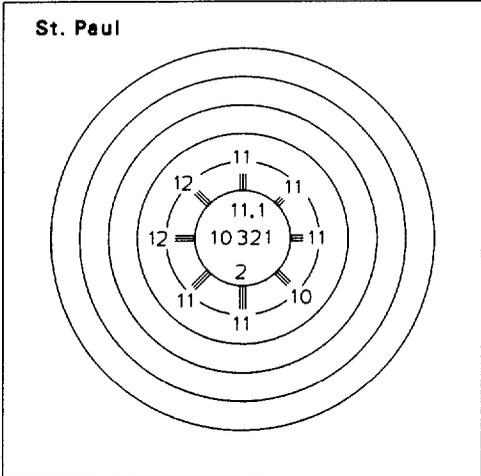
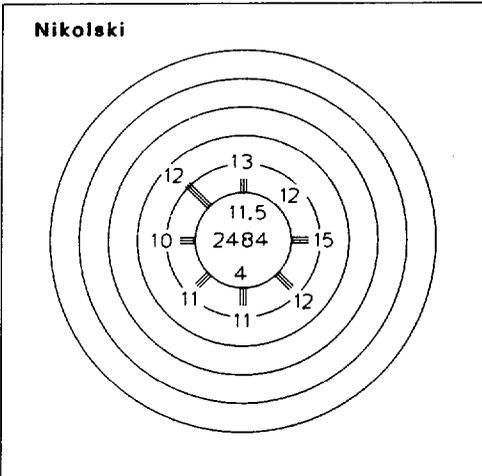
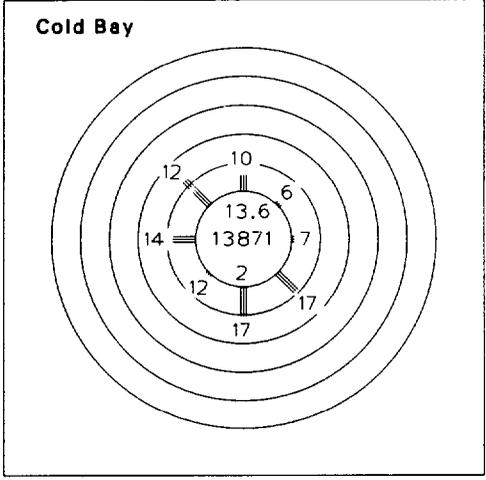
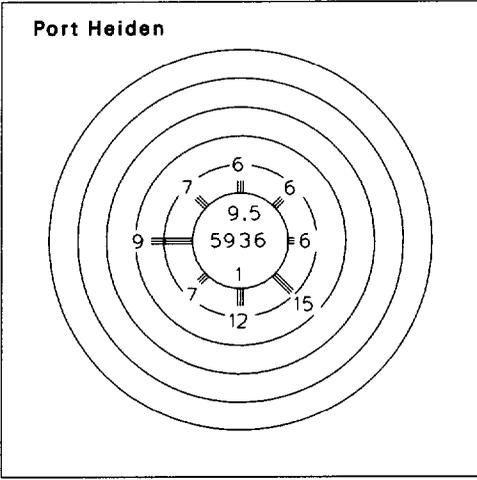
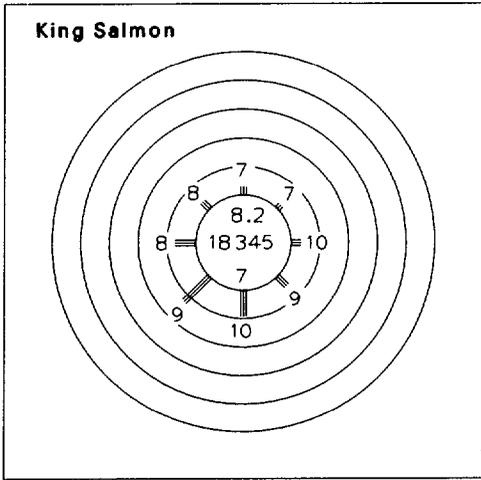
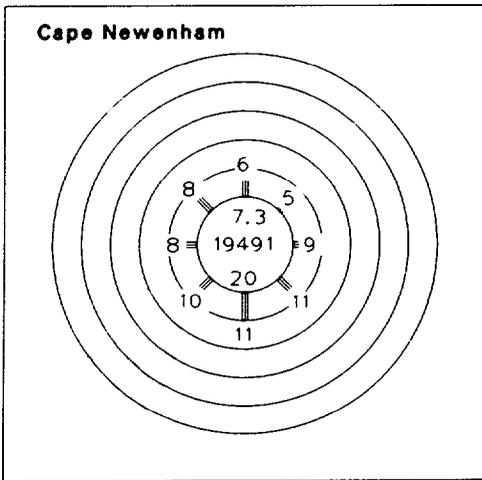
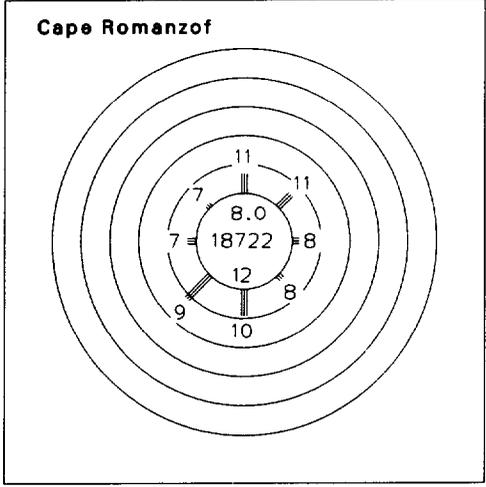
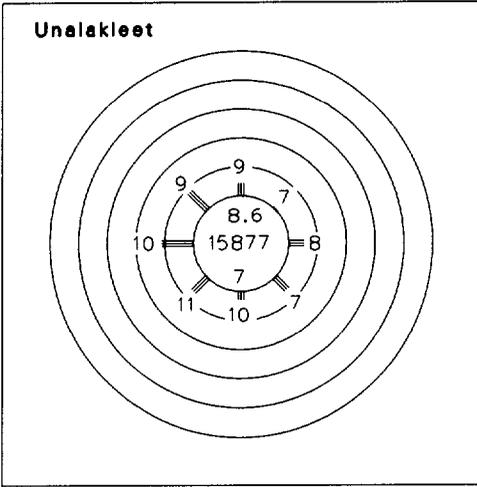
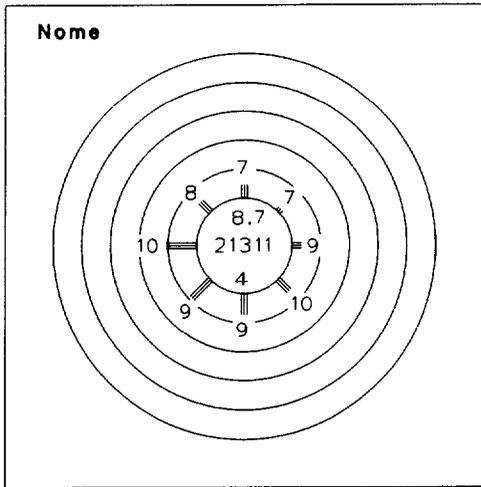
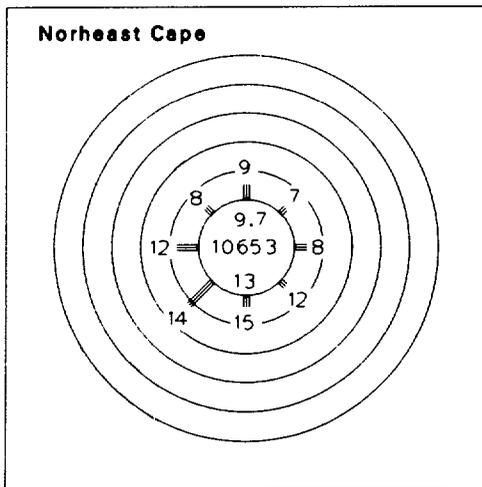
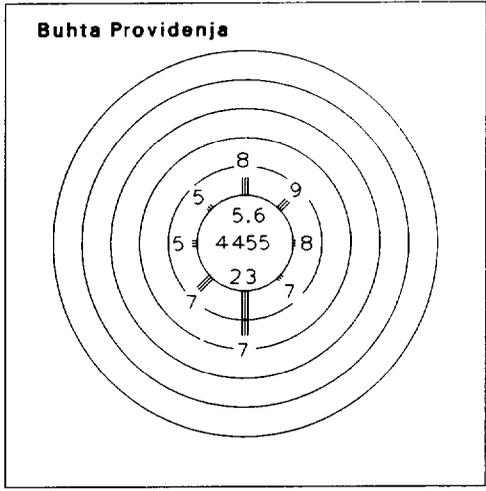
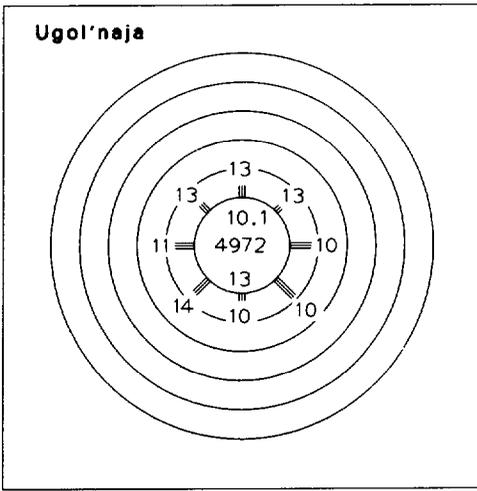
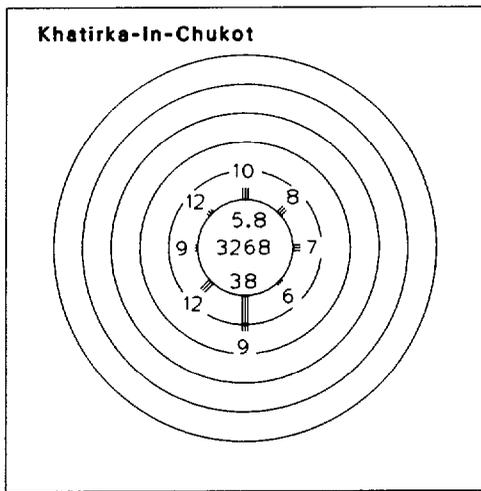
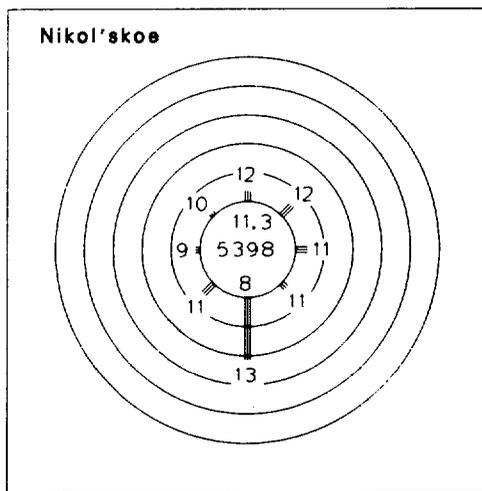


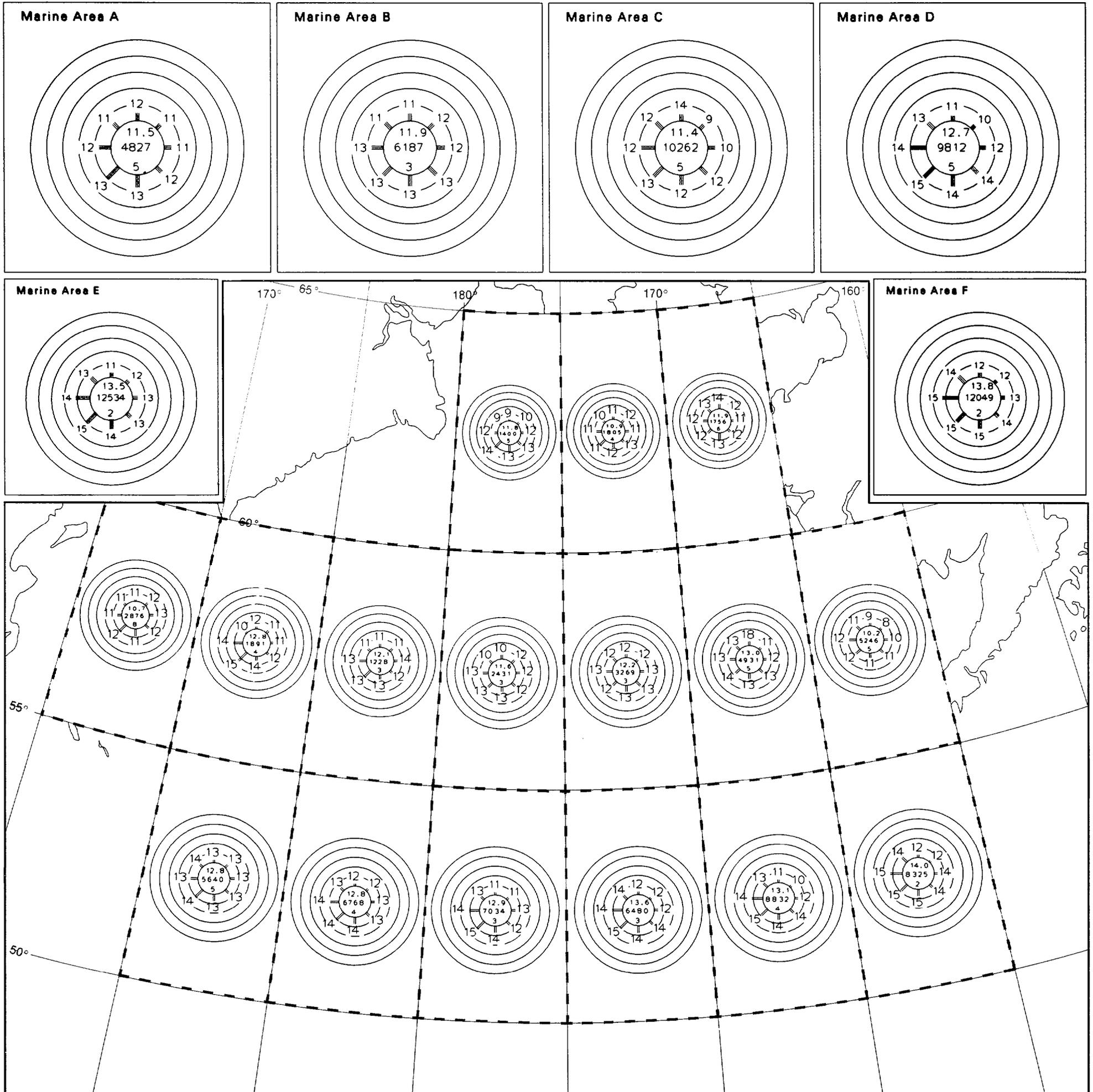
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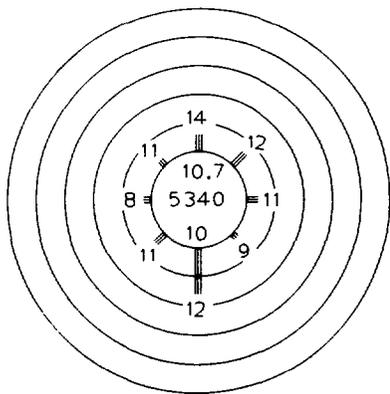
14 Wind Speed and Direction



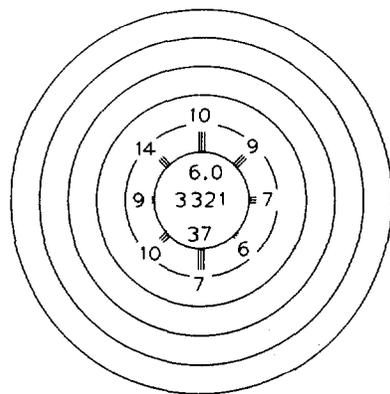


14 Wind Speed and Direction

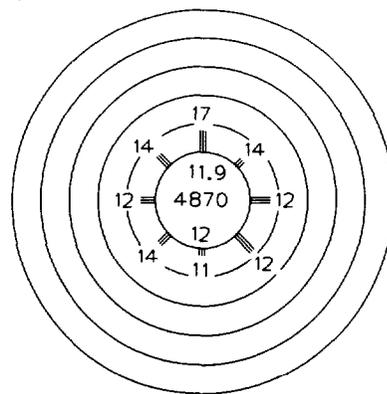
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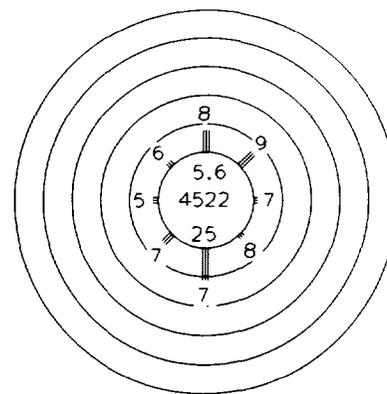
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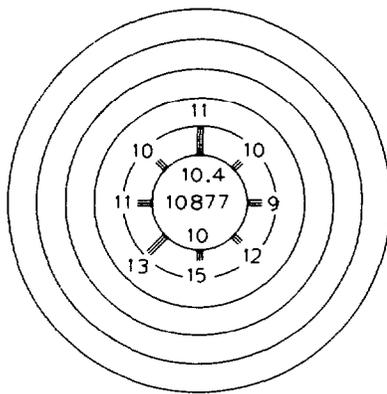
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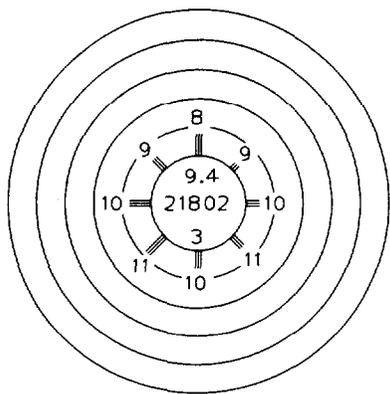
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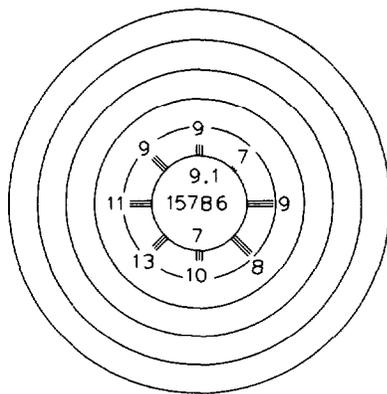
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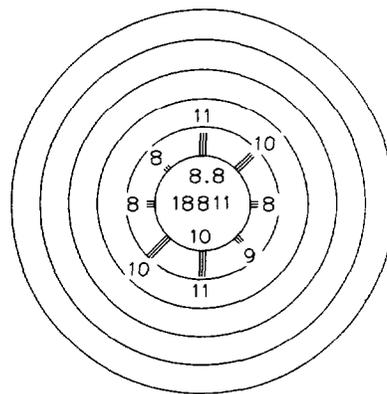
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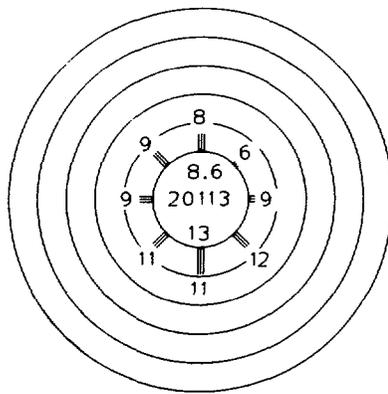
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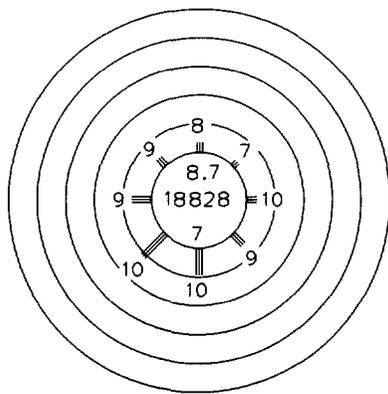
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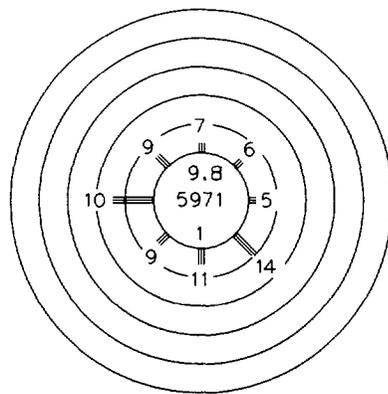
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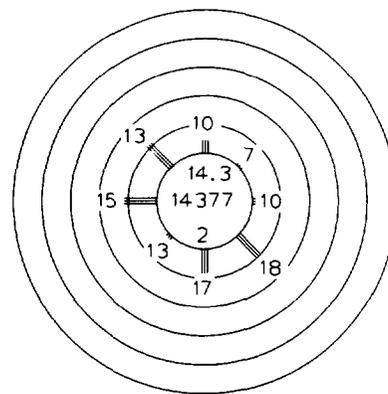
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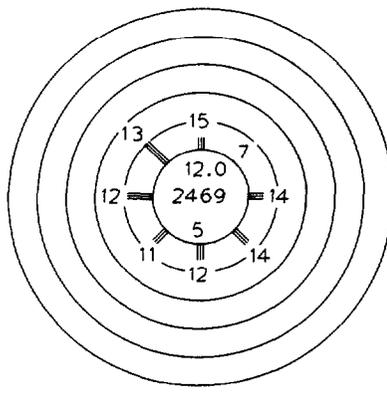
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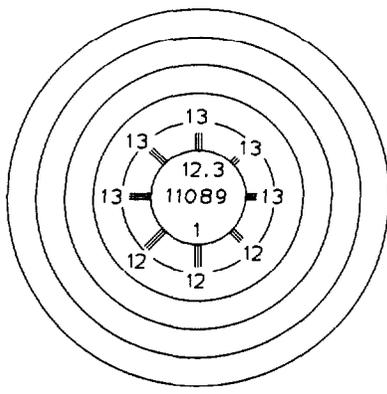
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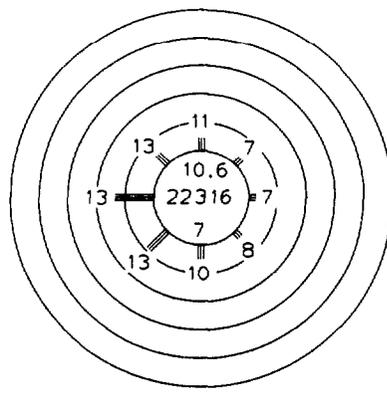
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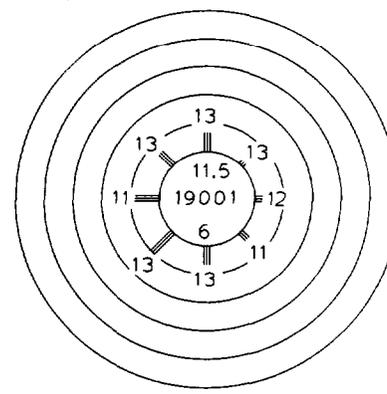
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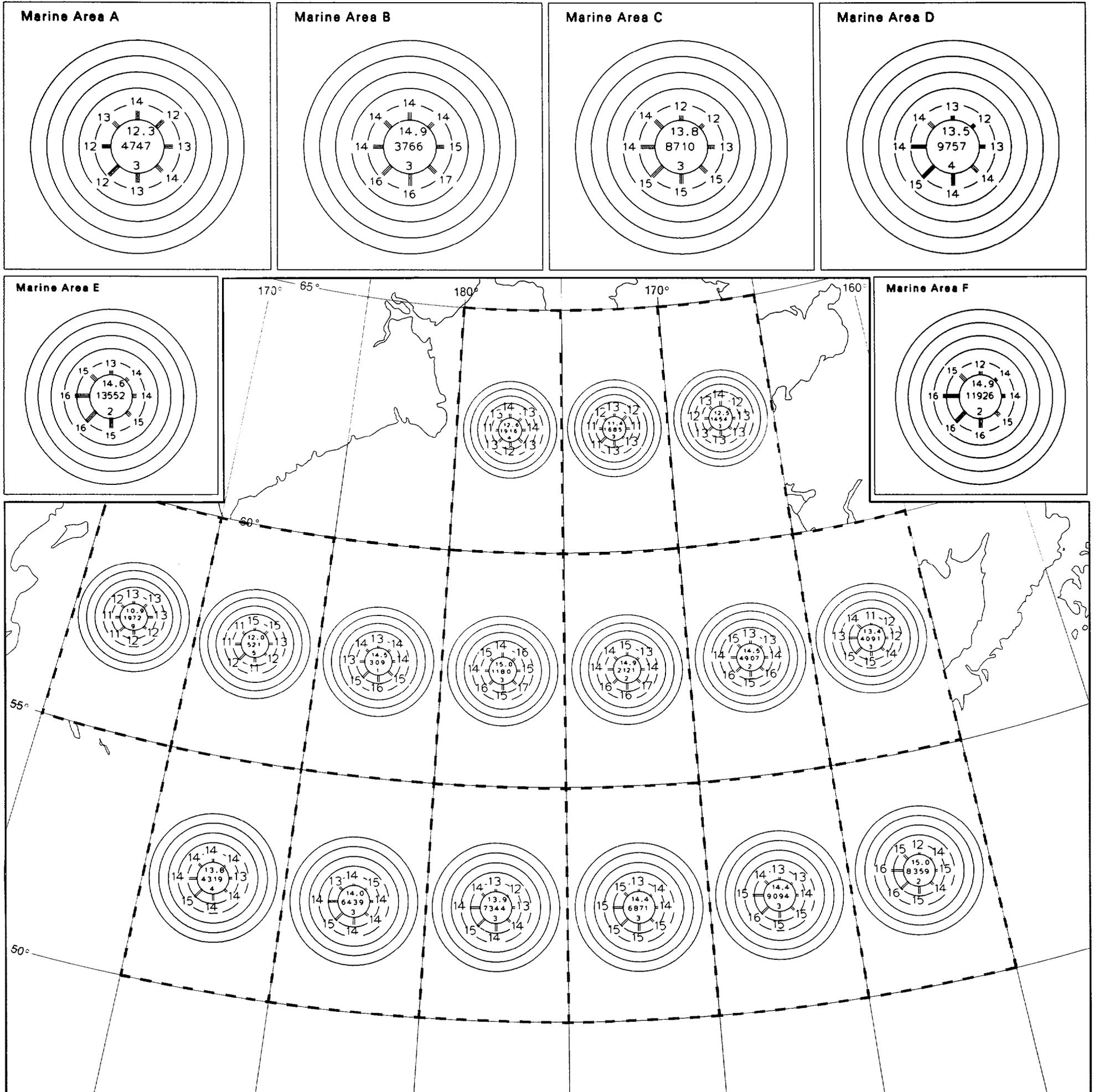


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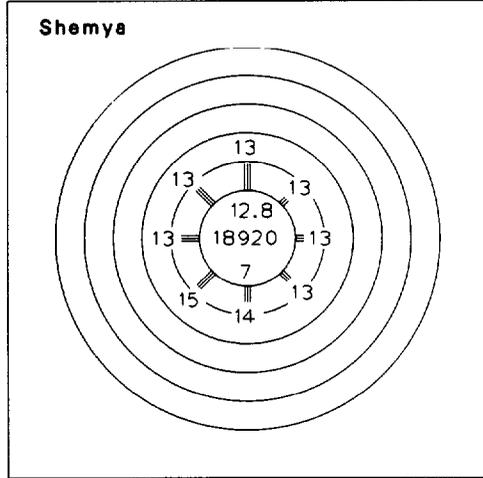
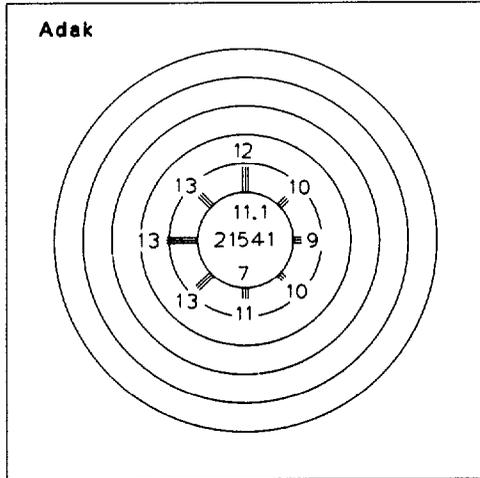
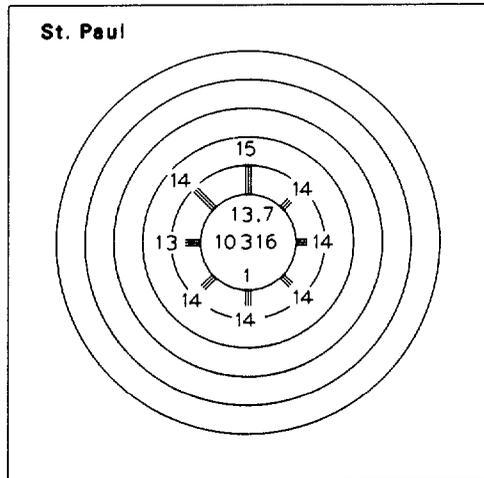
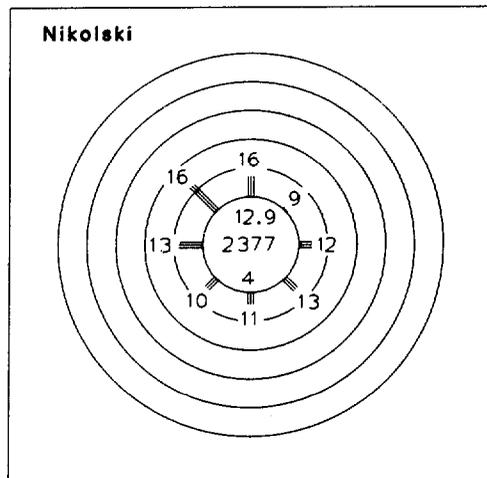
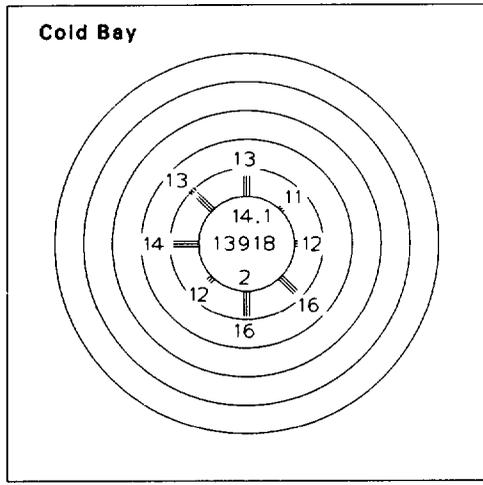
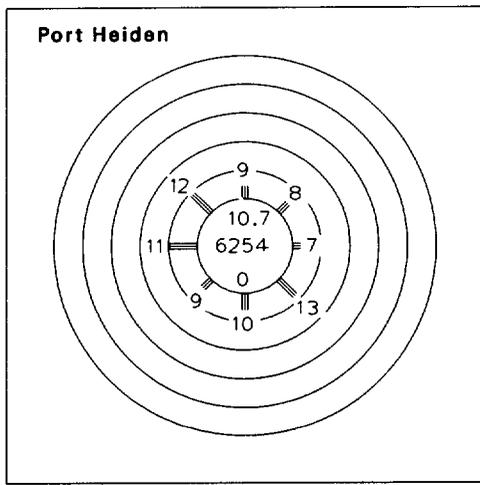
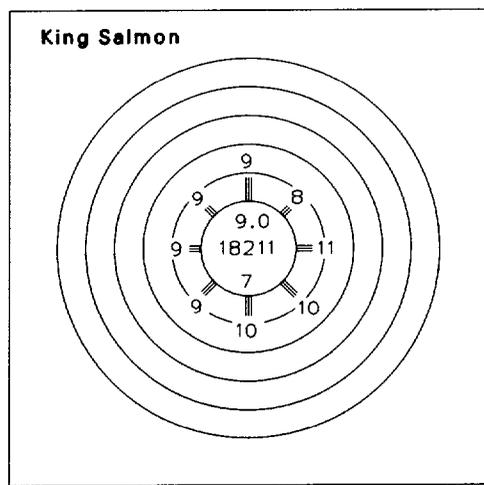
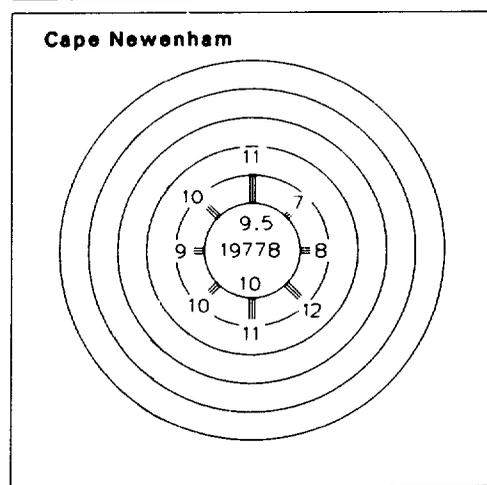
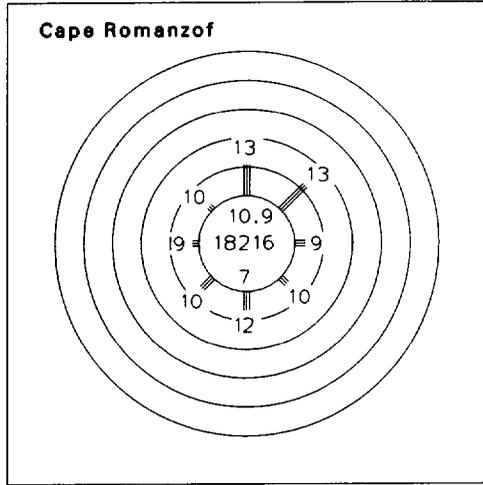
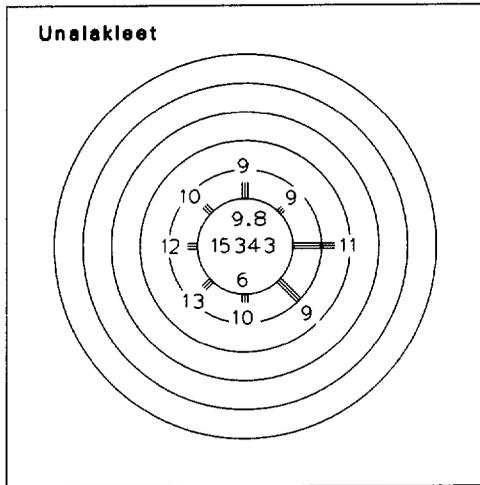
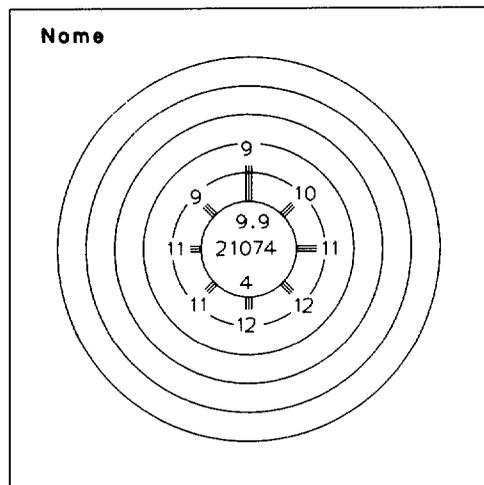
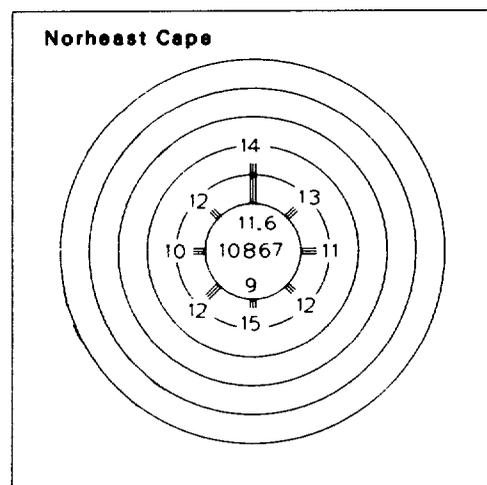
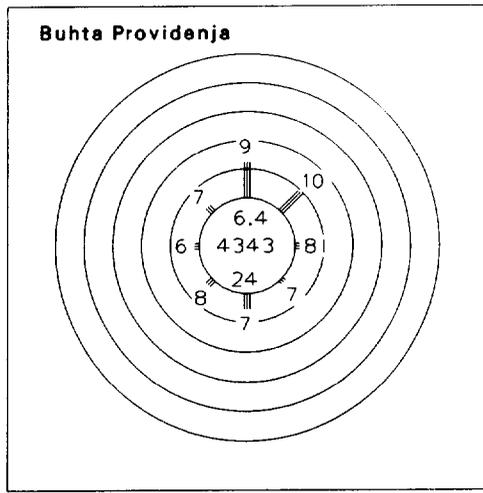
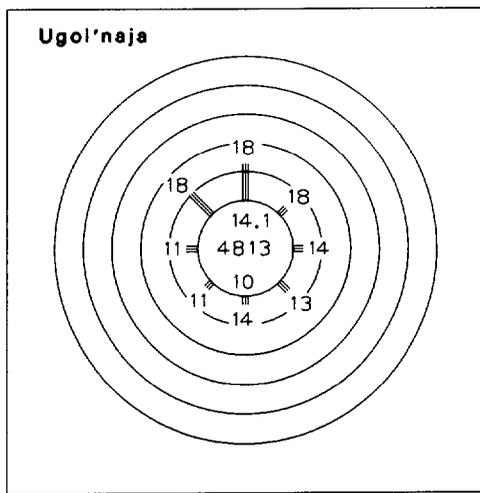
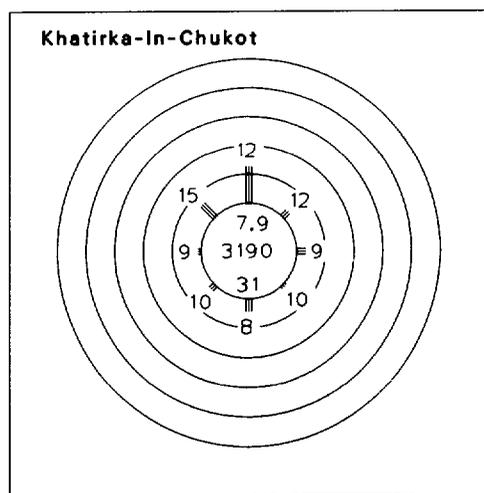
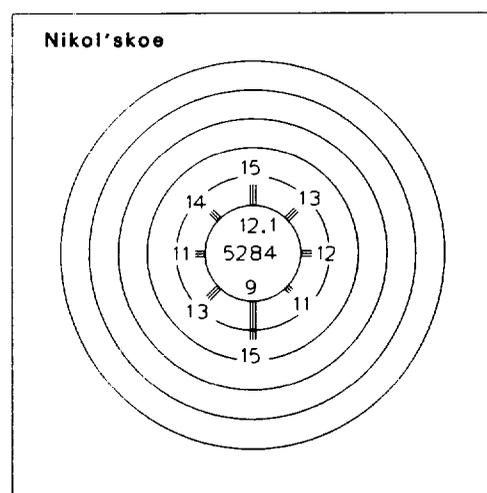
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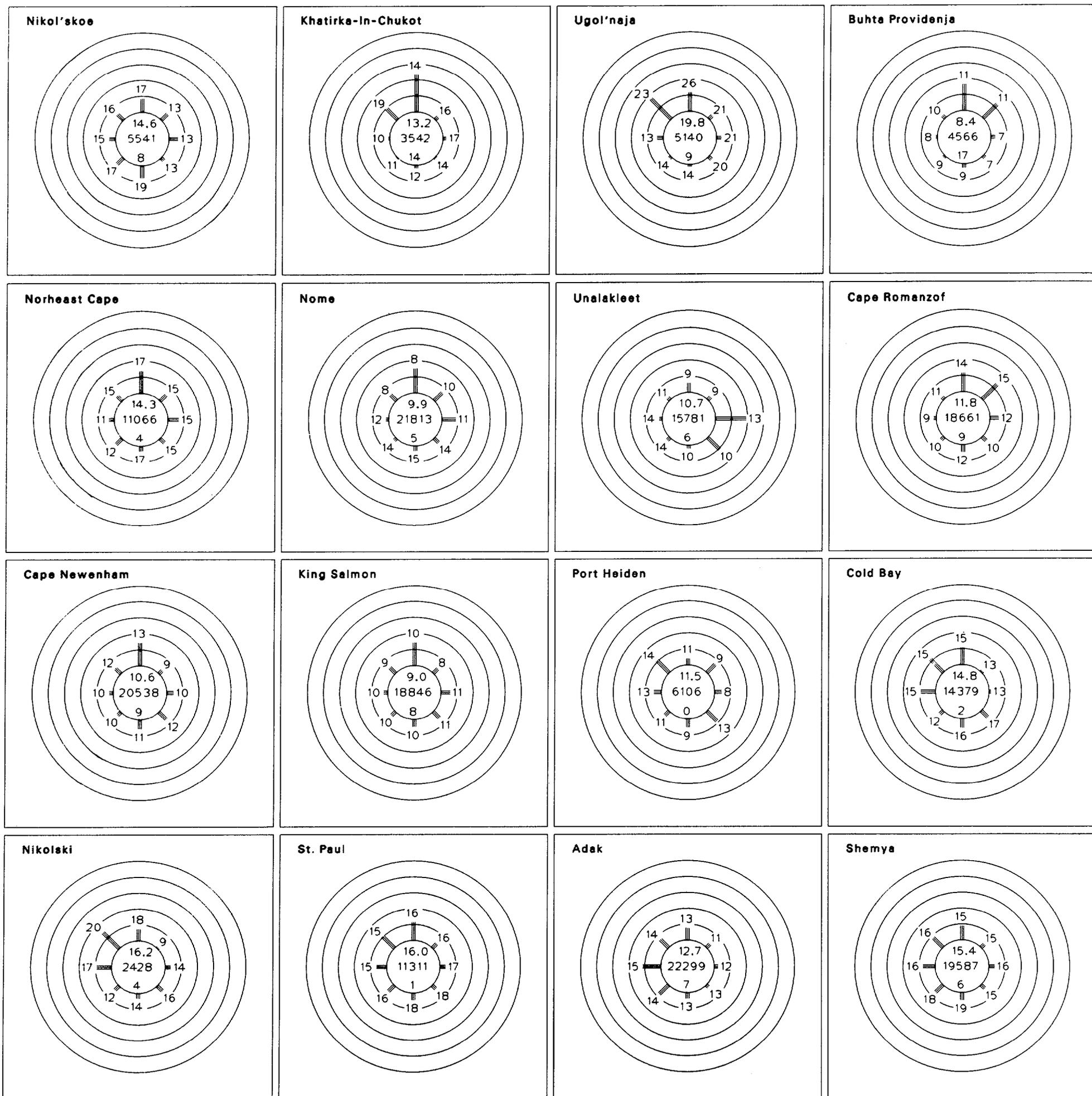


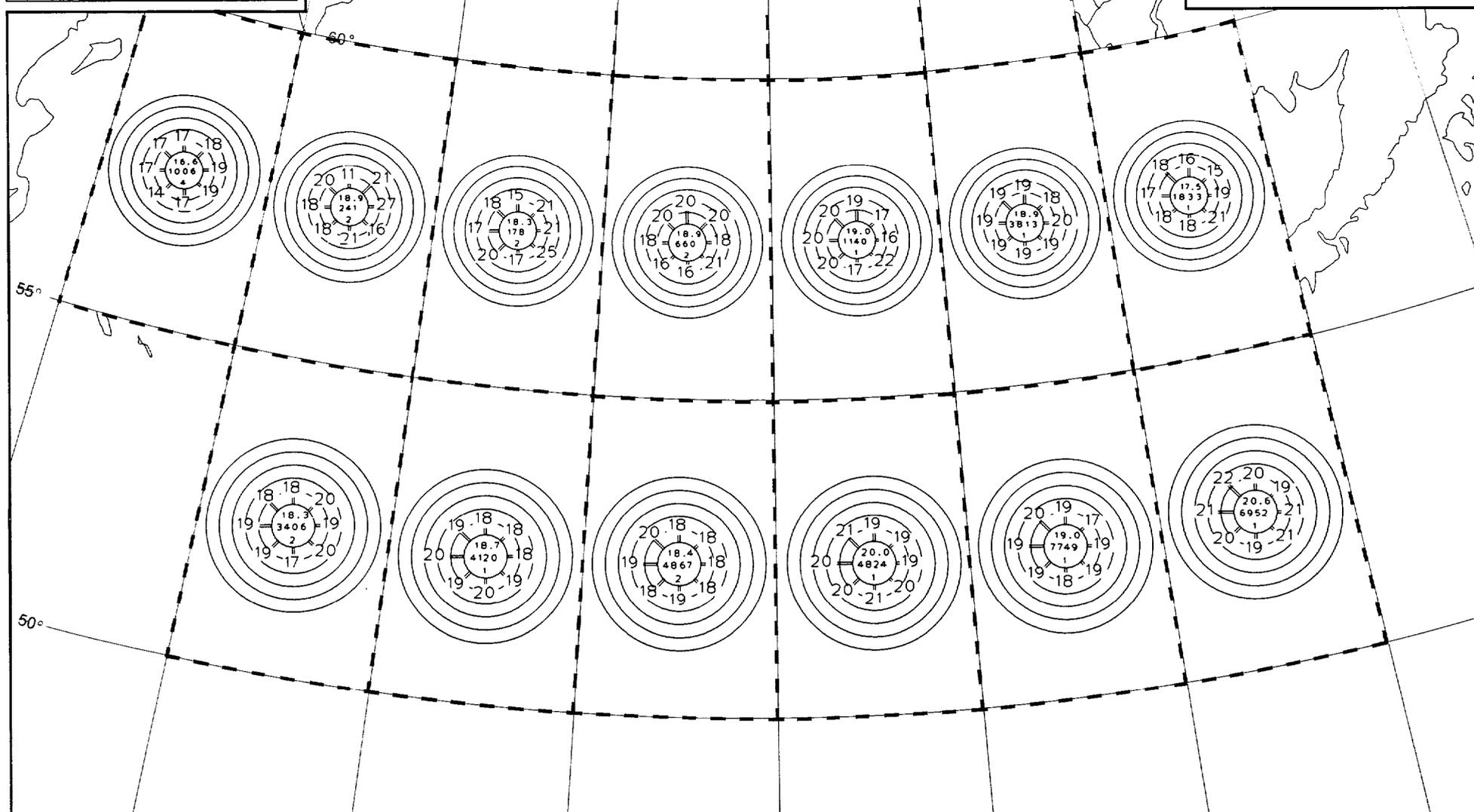
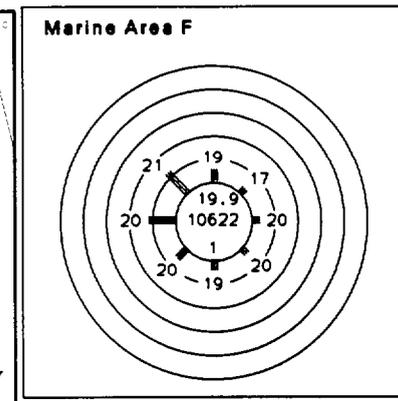
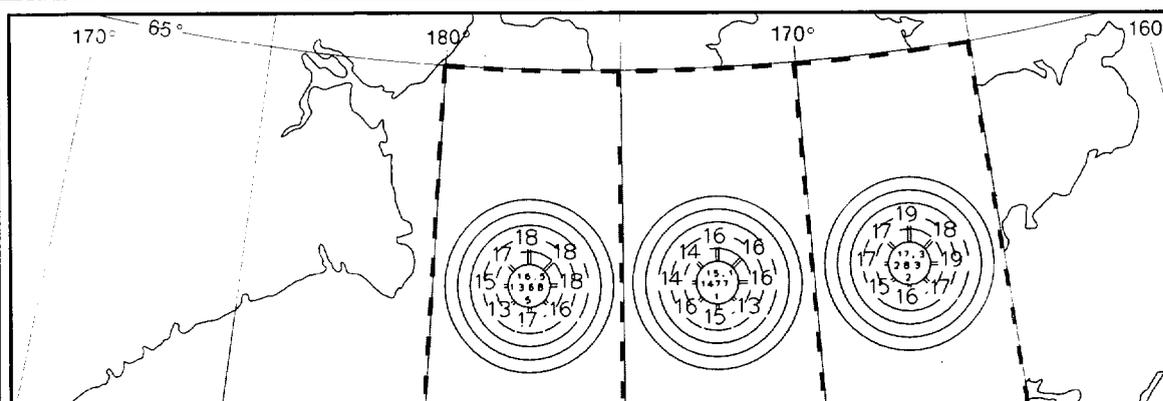
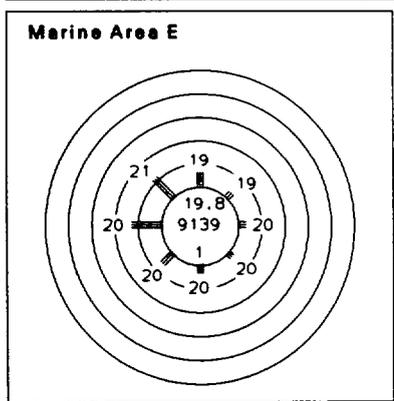
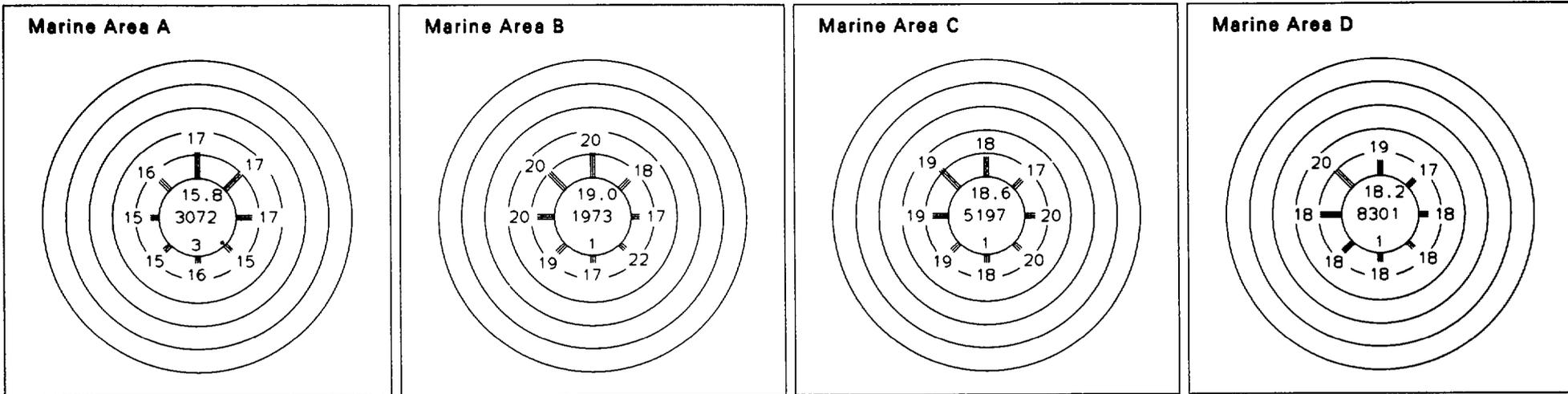
14 Wind Speed and Direction

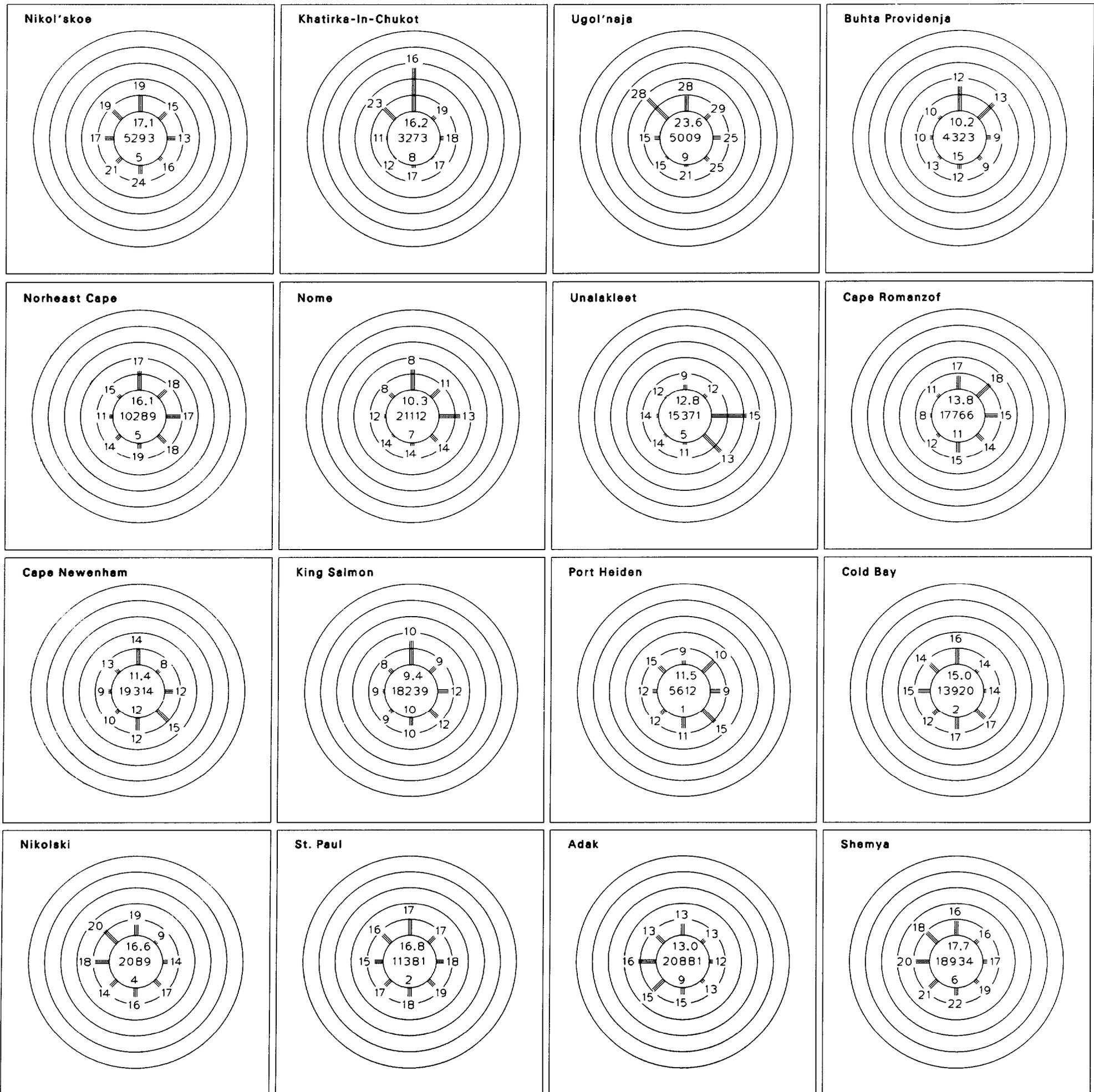
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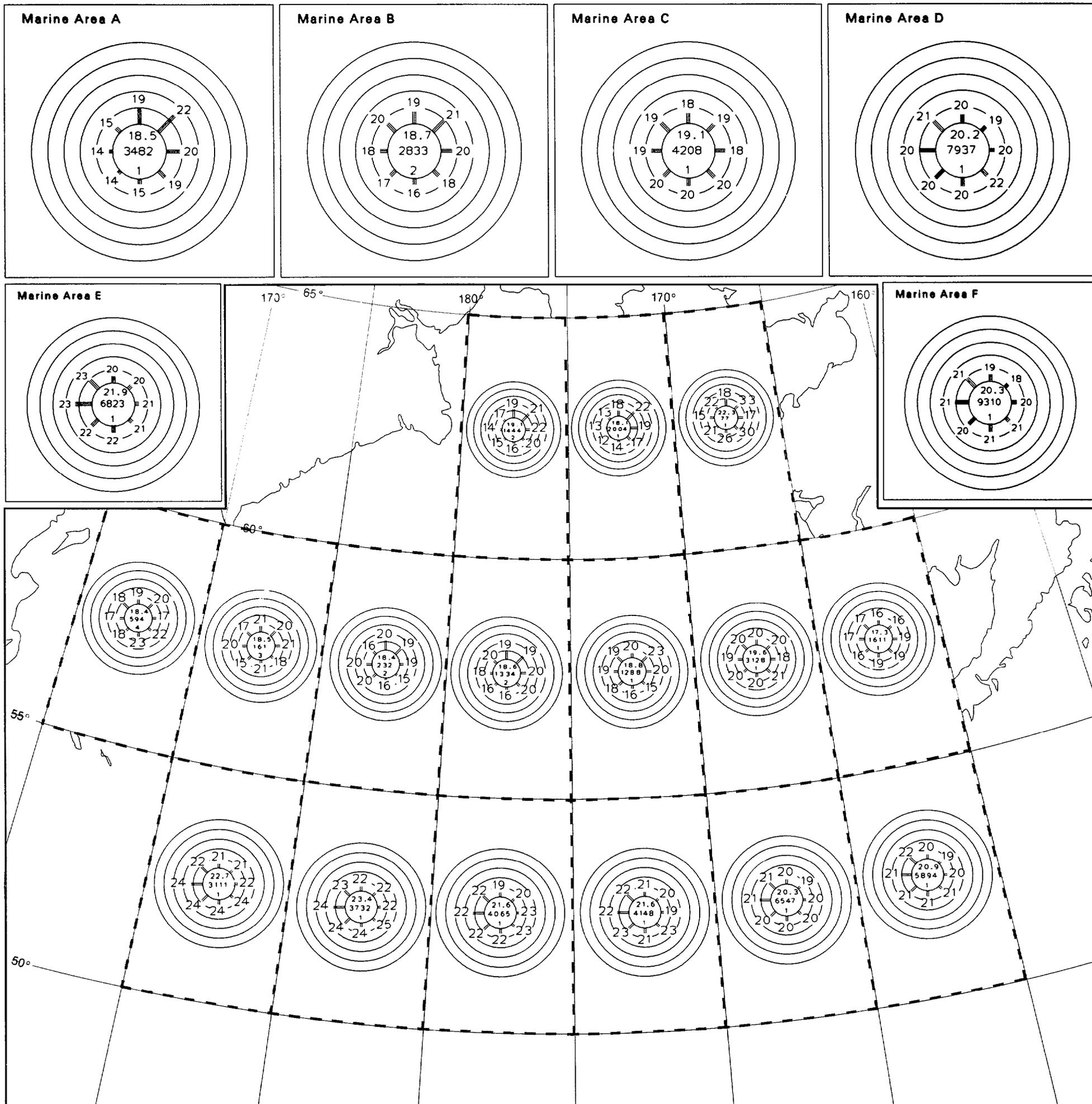












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November

