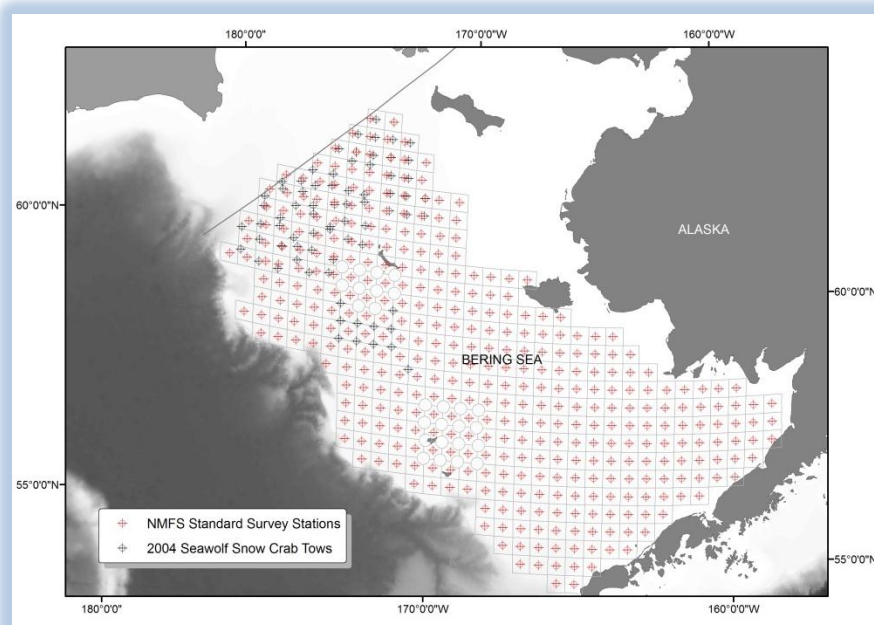


## **2004 Bering Sea Snow Crab Cooperative Survey**

This survey was intended to directly address the concerns that the standard NMFS survey trawl did not tend bottom adequately to capture snow crab in the path of the trawl resulting in low estimates of abundance with poor precision. This was the first field research undertaken by the Bering Sea Fisheries Research Foundation and was conducted under an MOU signed with NMFS. NMFS RACE division scientists directed the research, collected all crab data, and provided summaries to the NPFMC Crab Plan Team, ADF&G and BSFRF. Researchers from both NMFS and ADF&G were onboard during the research as part of the scientific survey party. Final reporting of the project was limited and was only reported briefly in the 2004 Report to Industry (Rugolo et al. 2006). There were three main objectives for this cooperative research:

- 1) Sample additional stations within the standard annual Bering Sea bottom trawl survey area where the highest densities of mature male and female snow crab have been found in previous AFSC surveys for the purpose of determining the level of improvement in the estimation of snow crab abundance provided by additional sampling stations and to assess the spatial structure of snow crab in the area for future geostatistical analysis.
- 2) Sample additional stations outside of the standard survey area and increase sampling inside the northwest standard survey area to assess the distribution and abundance of mature male and female snow crab in these areas and improve bias and precision of the survey.
- 3) Use the modified tickler chain trawl for one vessel day to compare its catches to the standard survey net catches in alternating areas of the high density snow crab area.

A 20-day charter was signed between NMFS and the owners of the F/V *Seawolf*, a 145' Bering Sea catcher vessel stern trawler, to conduct a supplemental survey for snow crab in the summer of 2004. The vessel was outfitted with a standard 83-112 Northeastern trawl (the standard NMFS survey trawl) and additional gear where the footrope of the standard trawl could be fitted with a heavier tickler chain that would precede the footrope, staying in contact with or digging into the seabed to dislodge snow crabs to be caught by the trawl. The modified footrope was to be used on a limited number of tows. The tickler chain was designed to prevent any snow crabs that lay in the path of the modified trawl from passing underneath the footrope and not being captured. The chart at right shows 74 stations in the northeast Bering Sea snow crab survey area where the F/V *Seawolf* surveyed according to standard NMFS survey protocols (30 minute duration, 3 knots towing speed, etc.) (Stauffer 2004). At each station, a tow was completed and all snow crab measured for carapace width and counted by sex and shell condition. These data were summarized into area swept snow crab densities for use in estimating abundance. The research was concurrent to the 2004 NMFS survey where the F/V *Arcturus* and F/V *Aldebaran* would be conducting their survey tows as part of the standard NMFS trawl in the same time and area as the F/V *Seawolf*.



The results of this cooperative experiment for snow crab survey showed modest improvement in the precision of the estimates of abundance when additional stations were added with the third vessel. The abundance estimates within the standard survey area were higher (+9%) based on data collected during this experiment. As noted in the NMFS Report to Industry, there was no testing of fishing power between vessels conducted during the research so the combined densities of the F/V *Seawolf* and the F/V *Arcturus* in the same time and area were averaged. The tickler chain modified trawl was only used for one tow and compared to a single other tow completed in the same area showing almost 4 times as many snow crab caught with the tickler chain on the footrope. The final use of the data was for the development of a semivariogram for geostatistical analysis of snow crab distribution in the area sampled (Conan 1988).