

## Background

The Chukchi Sea Environmental Studies Program (CESP) completed interdisciplinary surveys in the northeastern Chukchi Sea from 2008-2011. The 2011 survey area encompassed the primary study areas and extended north to include Hanna Shoal. It was divided into four sampling strata for analyses.

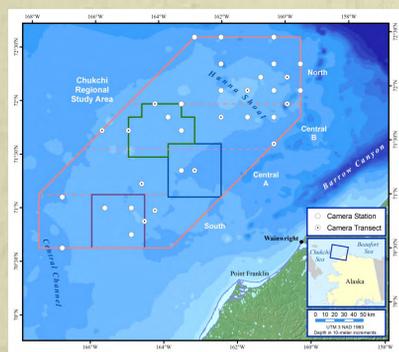


Figure 1. CESP study areas with 2011 video survey stations.

Benthic sampling was carried out using van Veen grabs for sediment dwelling organisms (infauna) and bottom trawls for organisms living on or near the sediment surface (epifauna). In 2011, epifaunal sampling was conducted through video surveys. Results from 33 stations, including two or more 1 kilometer transects in each stratum, are presented.

## Benthic Communities

Benthic community composition, both epifaunal and near surface infaunal organisms, corresponded with sediment characteristics. More upright, suspension feeding organisms were present on the rocky areas found in the South stratum; deposit feeders such as brittle stars dominated the muddy Central A and B strata; the sandy North stratum supported few organisms.

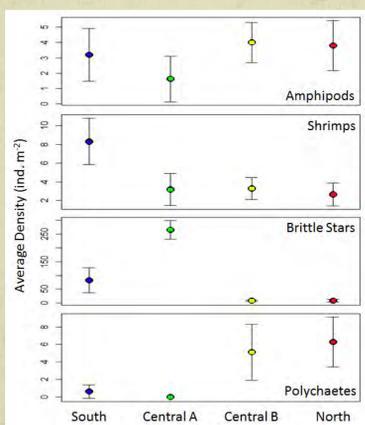


Figure 2. Distribution of common taxa across all strata.

A few taxa were present across the entire regional study area. High brittle star densities corresponded with low amphipod and shrimp densities. High polychaete densities were found with low brittle stars densities.

## Habitat Heterogeneity

Substrate type varied on both large and small spatial scales. Variation within a transect was similar to variation within its respective stratum. The Central strata were muddy while more diverse substrates were found in the South and North strata.

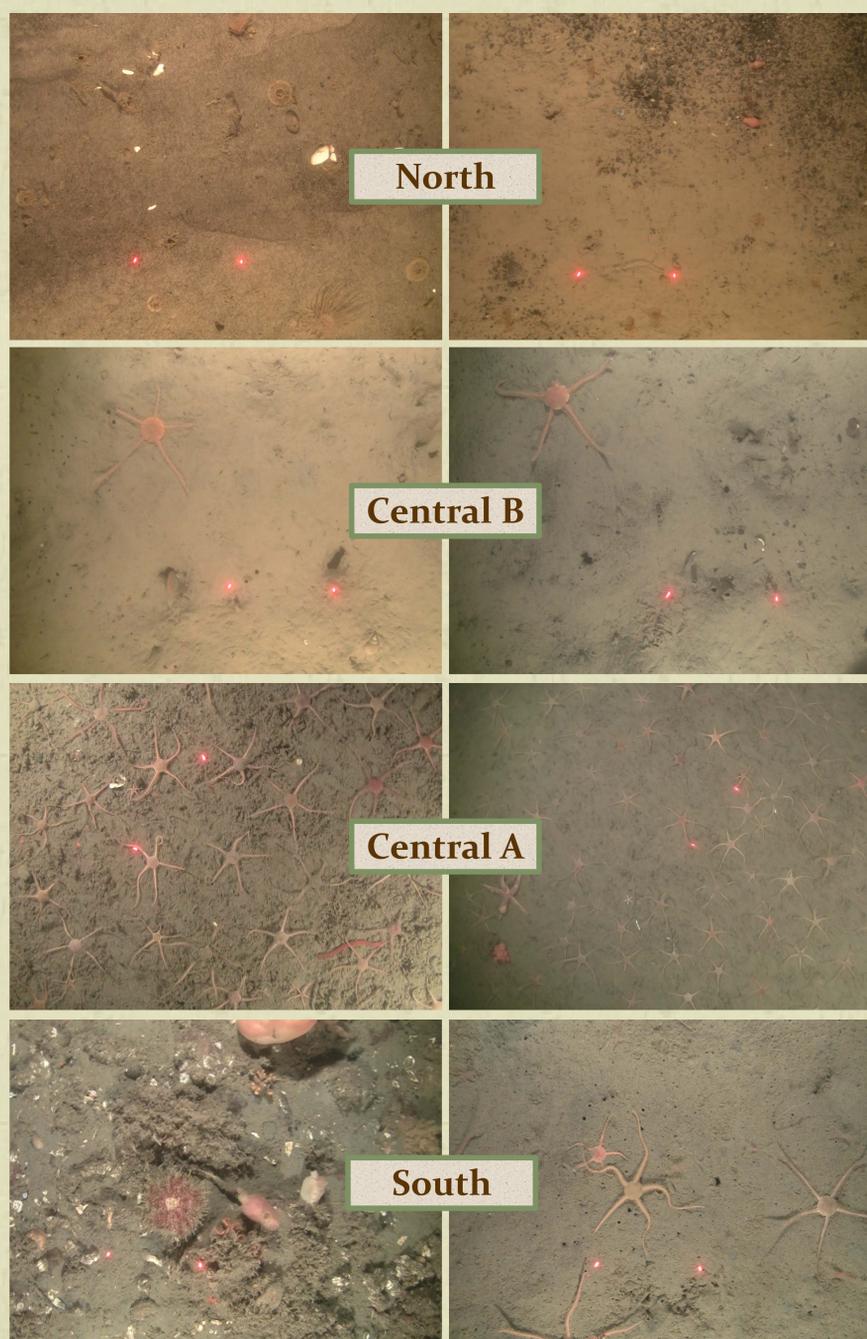


Figure 3. Representative habitats and benthic communities in the northeastern Chukchi Sea from 2011 CESP video surveys.

Table 1. Summary of habitat and benthic community characteristics by stratum. Values in parentheses are standard deviations.

% Frequency Substrate Types	South	Central A	Central B	North	Overall
Mud	83	100	96	61	83
Sand	0	0	0	25	8
Gravel	1	0	0	1	1
Sand/Mud	0	0	4	4	3
Gravel/Mud	11	0	0	8	4
Rock/Mud	5	0	0	1	1
Ave. Depth (m)	39.0 (3.6)	43.1 (0.6)	40.2 (3.7)	37.6 (7.3)	39.4 (5.1)
Ave. Density (ind. m <sup>-2</sup> )	159.8 (206.4)	342.6 (154.5)	30.3 (29.9)	46.3 (33.8)	84.2 (144.3)
# Taxa	42	17	32	22	54

## Gear Efficiency

Three types of gear were used to sample benthic communities during the 2008-2011 CESP: van Veen grabs, bottom trawls, and video surveys. Each targeted different components of the benthic community and sampling scales differed, but overlap occurred in what organisms were actually sampled.

A comparison of data from the Klondike, Burger, and Statoil prospect areas for each sampling method was made.

Table 2. Density (scaled to ind. m<sup>-2</sup>) of common benthic taxa sampled by each method.

Epifaunal Group	Van Veen Grab	Bottom Trawl	Video Survey
<b>Klondike</b>			
Brittle Stars	55.0	17.0	5.9
Crabs	0.9	0.4	0.9
Hermit Crabs	5.5	0.0	0.9
Shrimps	0.3	2.1	9.0
Snails	3.2	0.4	0.4
<b>Burger</b>			
Brittle Stars	285.8	86.1	313.2
Crabs	0.6	0.5	0.0
Hermit Crabs	0.4	0.0	0.0
Shrimps	0.6	1.9	1.0
Snails	2.6	3.5	0.0
<b>Statoil</b>			
Brittle Stars	34.4	12.4	1.8
Crabs	0.5	0.2	0.1
Hermit Crabs	0.3	0.0	0.3
Shrimps	1.1	0.9	1.1
Snails	1.4	0.7	0.0

Where brittle stars are abundant, bottom trawls seem to underestimate their density, likely due to breakage of individuals and small individuals passing through the mesh holes. Van Veen grabs appear to collect fairly representative samples.

## Conclusions

- Habitat, and consequently benthic community structure, demonstrates significant heterogeneity on large and small spatial scales in the northeastern Chukchi Sea.
- Sampling gear utilized for benthic surveys could be re-evaluated based on targeted taxa and lead to less invasive techniques.

## Acknowledgments

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