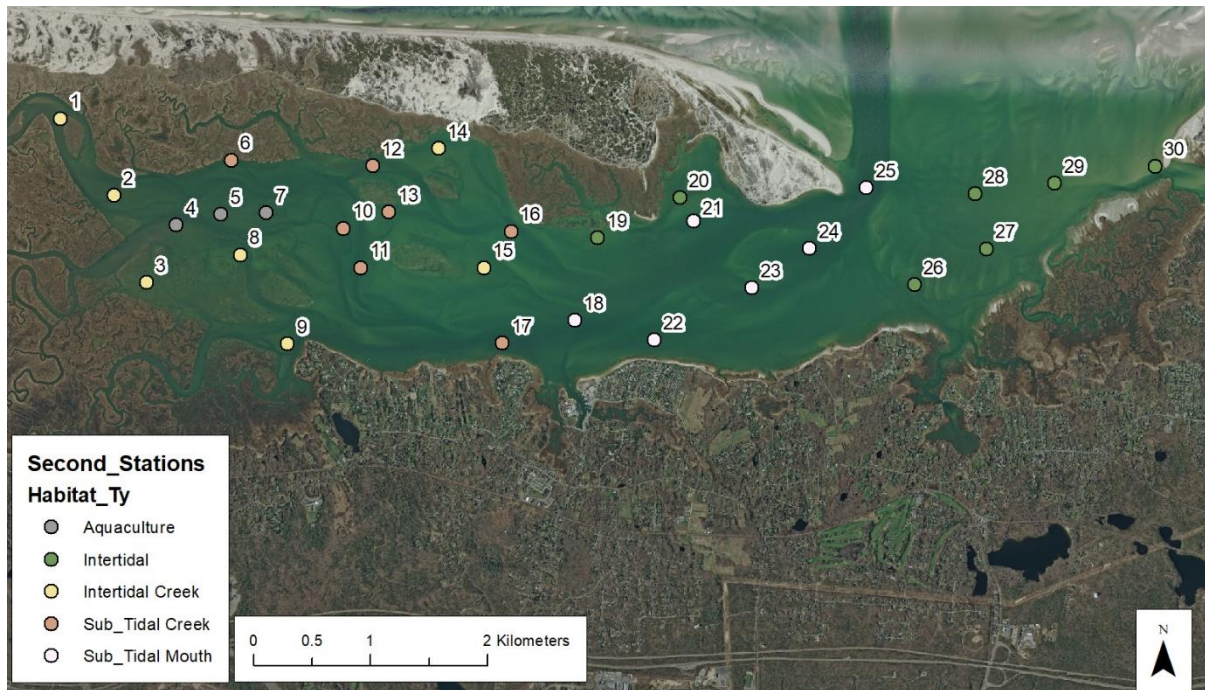


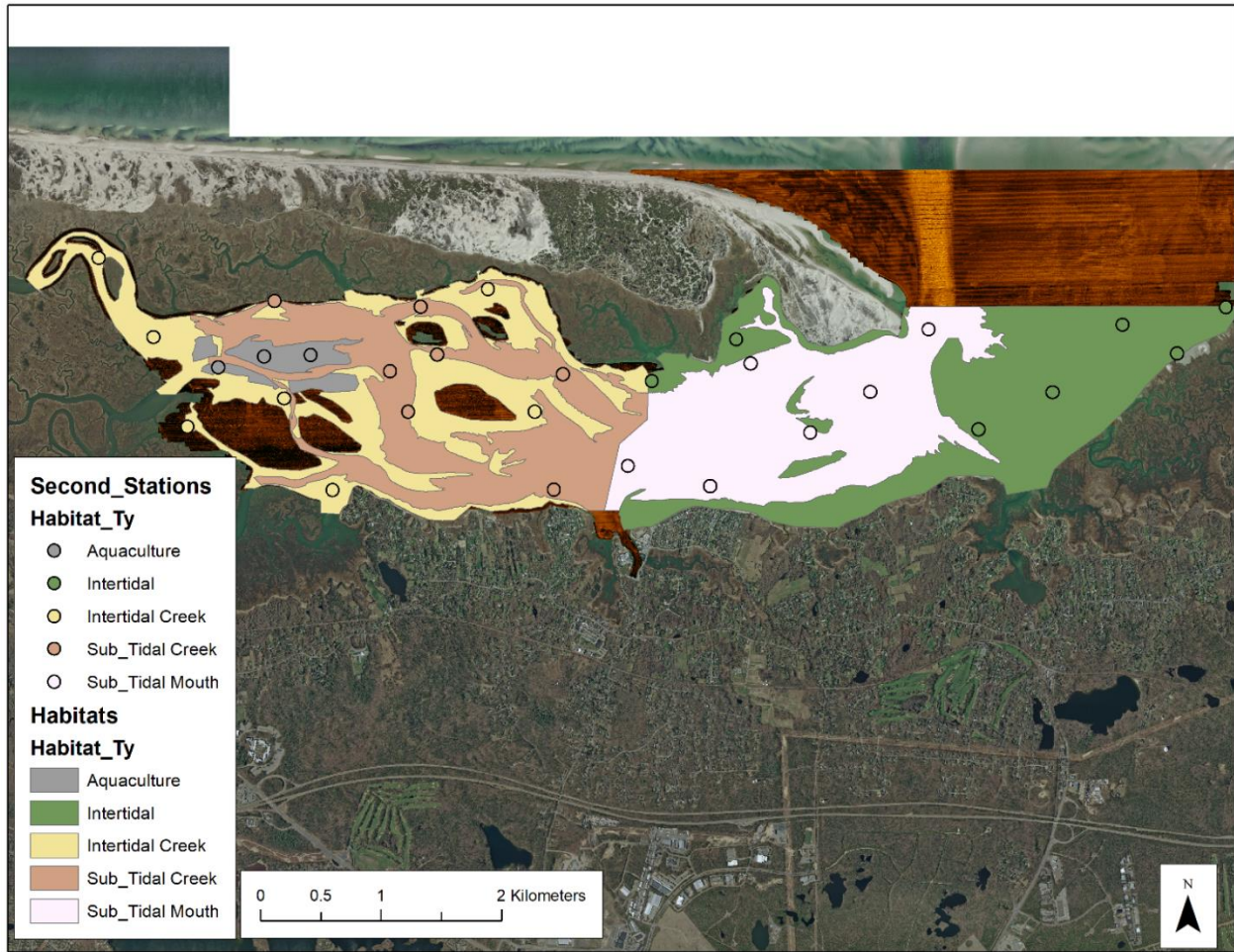
Barnstable Harbor

CCS collected faunal and sediment samples at 31 stations throughout Barnstable Harbor on 10/1, 10/2, and 10/4 of 2018. Sampling stations were randomly stratified to include intertidal areas (n= 7), areas of aquaculture (n= 3) intertidal and subtidal creeks, areas of aquaculture and intertidal (n=7) and subtidal (n=7) creeks, subtidal mouths of creeks (n=6) as well as one station in the marina. All samples were collected with a Young modified Van Veen grab.



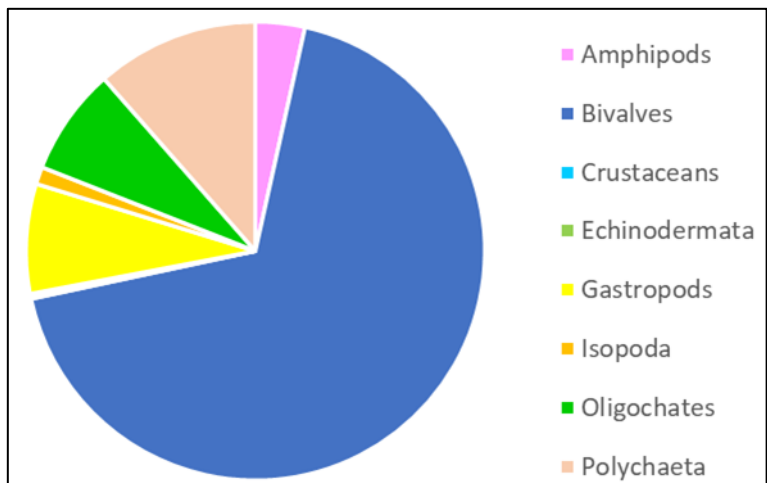
Sediment samples were transferred into small whirl paks for transportation to the lab. Faunal samples were collected in triplicate (total n= 93) and stored in 1 gallon buckets for transportation to the lab. Sediment samples were then dried before further processing according to recent studies, which includes drying 20-30 grams of sediment at 105°C for 24 hours before being placed in the muffle furnaces at 550°C for four hours. Grain size was then determined with a Horbia Camsizer (for coarser samples) and a Beckman-Coulter laser diffraction particle size analyzer (for finer samples).

Faunal samples were sieved at 1mm and transferred into large glass jars for storage. 90% ethanol was added for fixation and Rose Bengal was added to facilitate sorting of organic tissue. On August 12th 2019 sorting of benthic invertebrates started. This process is still ongoing. As of 11/26/19 77 samples of 26 stations have been sorted by 28 volunteers investing 350 hours. Animals are sorted into broad categories such as: worms, clams, sea cucumbers, snails etc. Identification of animals is conducted to species level whenever possible and genus or family level when appropriate. On 11/26/19 69 samples have been identified, counting 14056 individual invertebrates belonging to 74 different species.



***UPDATE

Most invertebrates identified to date are bivalves, with the Amethyst gem clam (*Gemma gemma*) being the most abundant species in Barnstable Harbor with (26,596 individuals), particularly at stations 2, 26 and 28. While bivalves are the most abundant type of invertebrates, polychaete worms are the most divers. 30 species of polychaets have been identified, followed by 17 species of amphipods or side swimmers and 25 species molluscs (grouping bivalves and gastropods).



As of today, station 17 was the most diverse station with 30 species, the least diverse station is station 31 with 0 species. The least abundant station were 0 (0 individuals), followed by station 30 (15 individuals), the most abundant station is station 28 (9161 individuals).

We added station 31 out of curiosity. It is located withing the marina, just off the dock.

Overall, 91 species were identified and 40,267 individuals were counted. Based on this, an average of 433 individuals and 0.9 species per grab can be calculated. Compared to other study sites, this puts Barnstable Harbor at number 5 of 7 for abundance and number 3 of 4 for diversity.

Location	Individuals/grab	Species/grab
Herring Cove	47231	2.9
Shimmo Creek	944	0.7
Nauset Marsh	512	0.9
Pleasant Bay	466	0.9
Barnstable Harbor	433	0.9
Provincetown	427	1
Wellfleet Harbor	106	0.9

With the data we have so far (sediment grain size, water quality) we can explain 62% of species distribution with Median, Sorting, Salinity and %Mud as the most important variables. Including geoforms and video analysis will likely change that number.

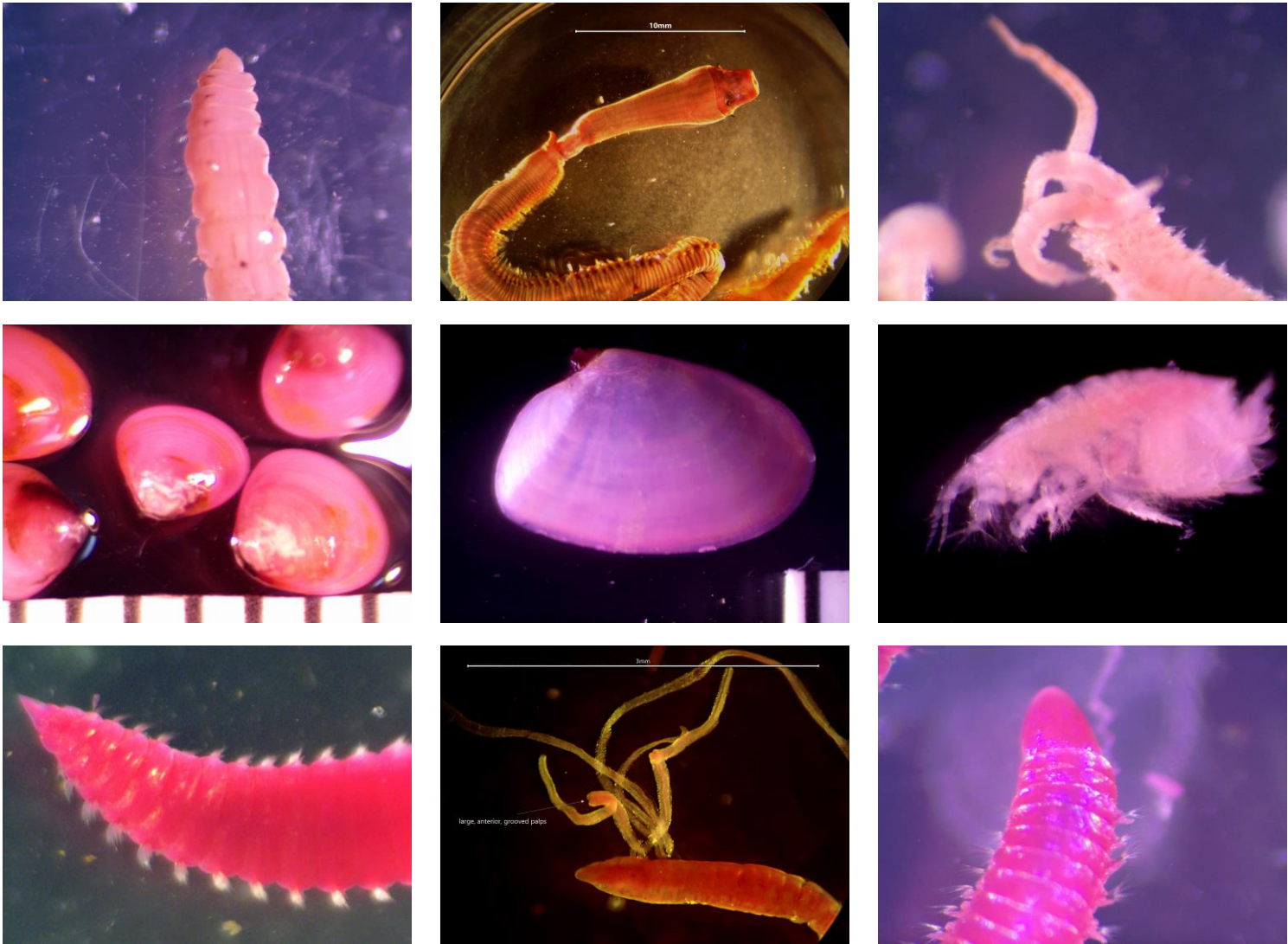
CMECS Substrate component: all stations are of geologic substrate origin and are fine unconsolidated substrate

Station	Substrate Group	Substrate Subgroup	Station ID	Substrate Group	Substrate Subgroup
BH01	Sand	Medium Sand	BH17	Slightly Gravelly	Slightly Gravelly Muddy Sand
BH02	Muddy Sand	Silty Sand	BH18	Slightly Gravelly	Slightly Gravelly Sand
BH03	Muddy Sand	Silty Sand	BH19	Slightly Gravelly	Slightly Gravelly Sand
BH04	Muddy Sand	Silty Sand	BH20	Sand	Fine Sand
BH05	Muddy Sand	Silty Sand	BH21	Slightly Gravelly	Slightly Gravelly Sand
BH06	Muddy Sand	Silty Sand	BH22	Slightly Gravelly	Slightly Gravelly Sand
BH07	Slightly Gravelly	Slightly Gravelly Sand	BH23	Sand	Medium Sand
BH08	Sand	Fine Sand	BH24	Slightly Gravelly	Slightly Gravelly Sand
BH09	Slightly Gravelly	Slightly Gravelly Sand	BH25	Slightly Gravelly	Slightly Gravelly Sand
BH10	Sand	Medium Sand	BH26	Slightly Gravelly	Slightly Gravelly Muddy Sand
BH11	Sand	Medium Sand	BH27	Slightly Gravelly	Slightly Gravelly Sand
BH12	Sand	Coarse Sand	BH28	Slightly Gravelly	Slightly Gravelly Sand
BH13	Sand	Coarse Sand	BH29	Slightly Gravelly	Slightly Gravelly Muddy Sand
BH14	Slightly Gravelly	Slightly Gravelly Sand	BH30	Slightly Gravelly	Slightly Gravelly Sand
BH15	Slightly Gravelly	Slightly Gravelly Sand	BH31	Mud	Silt
BH16	Slightly Gravelly	Slightly Gravelly Sand			

CMECS Biotic Component

The table below shows 9 different biotic communities, 3 of which do not appear in the CMECS catalog. In the table header S stands for number of species, N for number of individuals, and H' describes Shannon diversity. *Capitella* sp., *Glycera americana* and *Streblospio benedictii* are polychaete or bristle worms. *Gemma gemma* and *Tellina agilis* (now *Ameritella agilis*) are small clam species, *Haustoriidae* sp. are Amphipods or side swimmers. The uncatalogued *Phylo ornatus*, *Dodecaceria* sp., and *Arabella iricolor* are polychaeta species. Since no invertebrates were found at station 31, it could not be classified.

Not all species ID and counts have undergone QA/QC procedures and are subject to change.



Top row (left to right): *Capitella* sp., *Glycera* sp., *Streblospio benedictii*
Second row (left to right): *Gemma gemma*, *Tellina agilis*, *Haustoriidae* sp.
Third row (left to right): *Phylo ornatus*, *Dodecaceria* sp, *Arabella iricolor*

Station	Biotic Subclass	Biotic group	Biotic community	most abundant species	S	N	H'
BH01		Not in CMECS catalog		Phylo ornatus	7	92	1.03
BH02	Soft sediment fauna	Clam bed	Gemma bed	Gemma gemma	20	2131	0.7381
BH03	Soft sediment fauna	Small surface-burrowing fauna	Capitellid bed	Capitella sp	27	244	1.658
BH04	Soft sediment fauna	Small surface-burrowing fauna	Capitellid bed	Capitella sp	18	168	1.799
BH05	Soft sediment fauna	Small tube- building fauna	Streblospio bed	Streblospio benedictii	17	360	1.657
BH06	Soft sediment fauna	Small surface-burrowing fauna	Capitellid bed	Capitella sp	27	325	1.859
BH07	Soft sediment fauna	Clam bed	Gemma bed	Gemma gemma	21	560	0.221
BH08	Soft sediment fauna	Small surface-burrowing fauna	Capitellid bed	Capitella sp	24	52	2.275
BH09	Soft sediment fauna	Clam bed	Gemma bed	Gemma gemma	21	337	0.8445
BH10	Soft sediment fauna	Small surface-burrowing fauna	Capitellid bed	Capitella sp	20	38	2.268
BH11	Soft sediment fauna	Small surface-burrowing fauna	Tellina bed	Tellina agilis	10	27	1.746
BH12	Soft sediment fauna	Small surface-burrowing fauna	Tellina bed	Tellina agilis	11	26	1.724
BH13	Soft sediment fauna	Clam bed	Gemma bed	Gemma gemma	11	388	0.47
BH14		Not in CMECS catalog		Dodecaceria sp.	23	32	2.709
BH15	Soft sediment fauna	Clam bed	Gemma bed	Gemma gemma	10	137	0.9281
BH16	Soft sediment fauna	Mobile crustaceans on soft sediment	Haustoriid bed	Haustoriidae sp	9	124	1.244
BH17	Soft Sediment Fauna	Small Surface-Burrowing Fauna	Oligochaete Bed	Oligochaets	30	51	2.948
BH18	Soft sediment fauna	Mobile crustaceans on soft sediment	Haustoriid bed	Haustoriidae sp	9	27	1.131
BH19	Soft Sediment Fauna	Larger Deep-Burrowing Fauna	Glycera bed	Glycera americana	9	27	1.225
BH20		Not in CMECS catalog		Arabella iricolor	17	69	2.334
BH21	Soft sediment fauna	Small surface-burrowing fauna	Tellina bed	Tellina agilis	22	33	2.442
BH22	Soft sediment fauna	Mobile crustaceans on soft sediment	Haustoriid bed	Haustoriidae sp	11	68	1.274
BH23	Soft sediment fauna	Mobile crustaceans on soft sediment	Haustoriid bed	Haustoriidae sp	10	90	0.8005
BH24	Soft Sediment Fauna	Small Surface-Burrowing Fauna	Oligochaete Bed	Oligochaets	7	113	0.6286
BH25	Soft sediment fauna	Mobile crustaceans on soft sediment	Haustoriid bed	Haustoriidae sp	7	56	0.3465
BH26	Soft sediment fauna	Clam bed	Gemma bed	Gemma gemma	28	2580	0.4259
BH27	Soft sediment fauna	Clam bed	Gemma bed	Gemma gemma	28	1653	0.7395
BH28	Soft sediment fauna	Clam bed	Gemma bed	Gemma gemma	26	3054	1.219
BH29	Soft Sediment Fauna	Small Surface-Burrowing Fauna	Oligochaete Bed	Oligochaets	13	555	0.5872
BH30	Soft sediment fauna	Clam bed	Gemma bed	Gemma gemma	3	5	0.8522
BH31					0	0	0