Comments From	COMMENT	RESPONSE
Henry O. Briceno	Page 1: What this sampling program means is that you will have only two samples per season. That is not enough samples to assess a robust seasonal statistic. From what we know from previous work, temporal variability is significant, especially in canal waters.

Page 2: That is not correct. According to most recent water quality report from FIU-WQPP (http://serc.fiu.edu/wqmnetwork/) nitrogen and phosphorous have declined slightly and salinity has remained constant the last 23 years Keys-wide. Inside the Halo, data since 2011 indicates that nitrogen, salinity or phosphorous have not increased either

 Previous results from the Water Quality Monitoring Project and Canal Monitoring Project indicate that there is significant temporal and spatial variability in canal and halo waters. I think that a two-year project, when only 2 sampling per season will be analyzed, cannot account for seasonal variability, let alone diurnal and/or tidal variability.

Page 4 BLOCK DESIGN: This is a valid statement to begin, but it does not mean that we totally obviate the alternate situation. This is to arbitrarily say that spatial closeness is synonym of similarity in biogeochemical makeup (benthic and WQ). In fact the experiment needs to have resources to test this arbitrary initial design. Unfortunately, with the restricted number of samples this is not possible. The first zone has 8 blocks, and if all of them are sampled twice, then data will include, as maximum, only two seasons. So, data from individual blocks do not account for seasonal variability. For zones 2 and 3, with 8 blocks each the uncertainty is even larger.

Page 5 BLOCK DESIGN This is so only if you sample all the blocks every quarter. See previous comment

Page 6: According to your MDL for NOx of 0.004 mg/l, it is one order of magnitude higher than the minimum NOx concentration in the halo (0.0004). Consequently, you'd have about 34% of Non-Detects in Halo samples. Likewise, mean CHLa is 0,5 | HB also commented on Task 1, this overview is just for clarification, we did not design this study, and are implementing the requirements of the Florida Keys RAD.
The revised plan collects more samples at fewer sites; Each canal site will have 15 water quality stations sampled each quarter. There is also the potential for an extra extreme event sampling each year. The initial question will not examine seasonality but rather observed patterns of nutrient concentrations from the mouth to 500 m off shore.

This is very recent history – we are looking at a recovery phase, and this study is aimed at understanding the distribution on nutrients in the "gap" from the halo to the 500 m point. The sampling will be undertaken with the following constraints to account for variability
- only on out-going tides
- only during the day
- only is water 0.5 meters or greater in depth
- taken quarterly

The revised plan has expanded the number of samples per site to address this issue.

See revisions in the parameters Table |

	ug/l and your MDL is 1 ug/l. Then, most of your CHLa measurements will be non-detect. TP and TKN MDLs are adequate	
	It seems that only surface water samples will be collected. What will be the sampling depth? Waters in the halo zone are usually well mixed, except perhaps in areas with dense seagrass beds, so in general a surface sample is OK Canal waters, on the other hand, are very stratified and generally deeper waters are of worse quality, mostly for depth larger than 6 ft. What will you sample in the canals? Surface?... how deep?... if budget for only one sample, why not a depth-integrated sample? The ideal situation would be if we know how deep (thick) is the exchanging water mass during tidal cycles, then you could integrate to that sampling depth. Shallow surface water (e.g. 1 ft) may not be representative of the exchanging mass.	Sampling depth as per DEP SOPs is 30 cm
	Page 8: STATISTICAL ANALYSIS Proposed statistical test are too ambiguous and incomplete. AO It would be good to be more specific about the questions you are attempting to answer with this study. My understanding, based on the tasks described, is that you can answer at least three important questions: 1. Is there a difference in water quality between nearshore waters adjacent to canals, and nearshore waters not adjacent to canals, and does the distance from shore (zone) have an effect? 2. Is there a difference in the number and coverage of marine habitat types between canal and non-canal nearshore waters, and does the distance from shore (zone) have an effect? 3. Is there a difference in the epifaunal community composition and diversity between canal and non-canal nearshore waters, does the distance from shore matter, and how does the epifaunal composition and diversity	See revisions in the task that describes statistical approach These questions then become the focus of hypotheses to be tested in task design

	4. compare to a reference expectation? (if a reference condition or existing index, even in the literature, is available for comparison). KB: This breakdown was very helpful. While these assessments might be able to identify a difference in canal and non-canal community composition and diversity, it's not clear to me how those differences can be tied to canal WQ. As a very simple example, what about boat traffic in and out of canals? That's bound to have an impact on the benthos and might overshadow and WQ signal. Page 9: STATISTICAL ANALYSIS The proposal lacks description of the (statistical) analytical approach to assess water quality and linkage to benthic communities. For example, how will TP, TN, NOx be analyzed to determine effects on benthic diversity/cover? Quarterly measures of physical parameters on a single day do not capture the temporal variability of those parameters. How does the sampling integrate the effect of the other 360 days?	
ANDY BRUCKNER	I think this will provide really valuable data on potential nutrient pollution associated with run-off, sewage and other land-based sources. It offers a large spatial scale of sampling, includes sampling in both canal and adjacent nearshore habitats, has a temporal component and accounts for unusual events (heavy rainfall). I only have one question/concern: The focus is on nitrogen and phosphorus - this is really important as these nutrients can fuel algal blooms and may result in hypoxic events. However, the one water quality monitoring component that has been very limited is marine contaminants including personal care product chemicals (e.g. sunscreen, lotions), pharmaceuticals, antibiotics, pesticides and anti-foulant chemicals. We know that chemicals in personal care products can be passed from sewage into the water and these can be transferred to the food chain. Some of these are very persistent and some are known endocrine disrupters. We also know that these likely have a large impact on	This might be costed out as a separate task that could be presented to the Monroe BOCC? These issues have been of interest to the Water Quality Protection Program.

	reproductive behavior of molluscs - including conch, and it probably affects a lot of the other marine invertebrates found in sea grass beds. Would it be possible to select one or two chemicals (e.g. oxybenzone, oral contraceptives) to add to the list of monitored parameters? This would be a first step to identify if there was a particular area, a canal etc. where the contaminant load is higher than background and then there could be follow up work to look for these in invertebrates close to the source and characterize the impacts on those organisms. The other issue pertains to disease causing pathogens. It would be really useful to screen some of the samples for microorganisms. About 25 years ago there was a study that identified a strain of Serratia (a human gut bacteria, also found in other organisms) from canal water that was also linked to a coral disease killing elkhorn coral. We have an ongoing coral disease outbreak that has marched through the Keys (and is now off Key West), presumed to be bacterial, but we have no idea of the cause or potential source of a pathogen. If we at least were able to create libraries of bacteria found in canal water and surrounding seagrass beds, we would possibly be able to link this with ongoing or future disease events. I'm not sure if it would be possible to preserve water samples for these analysis in the event that the funding to analyze them is outside the range of the available funding - thus we at least have the samples and could seek alternate ways for analysis.	
Ashley O'Neal	Better image of Figure 1, unclear and hard to read This covers just the WQ correct? There would also be 294 biological samples to add to this? (147 stations X 2 times a year?) Page 5: This benthic classification system should be identified, and a reference should be provided It will be important to consider questions of scale and patchiness when comparing what the existing benthic community maps indicate "should" be there, and what is discovered with the fine scale Braun Blanquet surveys.	Note, this reference is also available online Biological samples are taken outside the canal in the block design Classification is CMECS –Federal data standard for Marine and Estuarine Community Classification ** Make a note talk to DEP Coastal Office about cross- walk to State classification.

	Page 7: Again, important to consider questions of scale and methods in comparing results of previous surveys KB added: Agreed. Need to consider variability between ocean vs. bayside. Be sure to get more specific about the questions that you are asking – and that there is enough spatial and temporal variability. Be as specific as possible. Need to be explicit about the approach to quantify benthos and document what the expectations for biodiversity in the different habitats.	Agreed – the sampling will improve and produce a higher resolution benthic community map for the small areas around the canal mouth. Using CMECS is dynamic – and communities will change over time, especially biotopes The benefit of using CMECS as our classification is that there are many components, and it is very contextual, so Oceanside and bayside sea grass communities can't be the same biotopes. (See https://iocm.noaa.gov/cmecs/)
Julie Epsy	There's no mention of QA/QC. You may want to mention that a QAPP would be part of this task or use language from the contract which talks about adhering to DEP SOPs for water quality sampling and analysis.	Noted, and this is in the deliverables, Task 2 will have a QAPP and comply with DEP SOP.
Karen Bohnsack	Page 3: Terminology is inconsistent which is confusing. Here each canal/non-canal area is referred to a "station" but below the sampling points at each canal/non canal area are referred to as stations. HB To avoid confusion I'd suggest to use the term "site" for canals or non-canal study areas and to call "stations" the seven places where samples are actually collected at each site I made it consistent in the Task Overview, but the inconsistencies are present throughout the project scope of work. HB To avoid confusion I'd suggest to use the term "site" for canals or non-canal study areas and to call "stations" the seven places where samples are actually collected at each site Page 4: This statement seems to put the cart before the horse – isn't it the goal of this project to determine if this is the case? *Do canals in the Florida Keys contribute to nearshore water quality degradation?* *Requesting further information on statement:* Any changes in island hydrology have immediate repercussions for these back reef habitats as they have been the most acutely impacted by eutrophication with the extirpation of invertebrate species and dramatic changes in the ecological community composition.	Noted, and will be corrected. Will use HB's suggestion to have "Sites" be the canal or non-canal locations, and "Stations" be the actual water sampling points. See these comments addressed in the revisions.

	HB References???... This has not been proved in the Florida Keys	
	Block Design – Improvement over transect but what about statistics?	
Christopher Kavanagh	Page 1: This review asks: does the experimental method and analysis of results answer this question in a 2 year study?	Yes
	Page 6: Suggest the "list" be inclusive of all genera present with the 5 most common species identified for rank order abundance.	Agreed
	Page 6: Spot checks of these parameters will tell us very little of substance.	I agree, the intention is to leave the HOBOs in place for two weeks at a time, and then rotate locations, so that the HOBOS would be in two weeks at each site twice a year, not ideal, but better than "spot checks".
	Page 7 Great for visualization, but not a conclusive link between benthic community and canal water quality data.	Agree, this will only establish a relationship, we will need to set up an experiment system to test the causal links
	Conclusion of question 3 is strongly dependent upon how well the canal water quality can be linked to the benthic communities and to the canal physical attributes. Analysis of canal "types" will not carry much statistical power.	Agreed – this
	Page 11: Standard analytical methods should be referenced.	Agreed – this section will be expanded and referenced.
	COMMENTS – bring in explicit analytical approach will help to define the degradation.	
	Have the RAD TN TP been taken back to some baseline information? What is going to be used as the background?	
Gus Rios	DEP has determined that 500 m is the limit for coastal input – WBIDs This is a loading limit, not a numerical nutrient standards in the Halo (less than 500m). This has never been resolved as to how the water really moves from in the canals to near shore water.	
	There are complicating factors that make it difficult to determine if nutrients came from a specific canals - hydrogeologists have used conservative tracer to look at the movement of the water – movement of water from injection wells, can be detected in Very small concentration.	