

Dear US Military,

This portion of the DEIS review pertains directly to **Volume 4: Aircraft Carrier Berthing**. My detailed comments are enclosed.

For this project, the Navy proposes to construct a new deep-draft wharf with shore-side infrastructure improvements in Apra Harbor, Guam to provide for transient nuclear powered aircraft carrier visits of both the USS Nimitz Class (CVN 68) as well as the Gerald R. Ford Class (CVN 78) in 2015. Alternative 1 (Polaris Point, reduced clearance, dock parallel to shore) is the Navy's preferred alternative. Using the U.S. Environmental Protection Agency rating definitions and based on my review, I am rating the Preferred Alternative 1 as Environmental Objections – Inadequate (EO-3). I have major concerns regarding the cumulative environmental impacts of the construction, use and maintenance of the Inner Harbor channel. I also have concerns regarding the validity of estimates of ecological equivalence and importance of adjacent marine shoals and protected areas, a lack of carrying forward of the beneficial use of dredged materials, and the introduction of additional contaminations to marine ecosystems currently contaminated by military activities. Dredging encourages the spread of marine invasive species by removing competitive interactions with the surrounding ecosystems, and sediment plumes further exacerbate this problem by reducing the fitness of adjacent ecosystems.

I recommend the Navy select an alternative, and associated mitigation measures, that maximize pollution, habitat degradation and invasive species prevention opportunities in Apra Harbor, Guam. Site investigations revealed that contaminants currently exist within marine sediments, which will migrate off-site if resuspended by dredging operations. While contaminant levels at SRF (and other undisclosed sites within the study) are not yet high enough to warrant GEPA regulatory action, they do present the Navy with a valuable opportunity to slow the incremental contamination that will occur if they proceed with ACC berthing Alternatives 1 or 2.

Toward this end, I recommend that reevaluation of the Kilo Wharf as the aircraft berthing location and a subsequent relocation of smaller vessel munitions operations within Inner Apra harbor. Reprogramming in this way meets the stated QDR goal of an increased aircraft carrier presence in the Western Pacific. I am aware that a waiver is required from DDESB and Naval Ordnance Safety and Security Activity for ships carrying ammunition to berth in Inner Apra Harbor; however, there is no significant difference between a waiver for smaller vessels and a waiver for nuclear aircraft carriers. If the Preferred Alternative 1 is selected, I insist that this alternative be modified by dredging a channel path that avoids the Shoals within Inner Apra Harbor (Western, Jade, Eastern, etc.). Delays (due to nearly reaching EPA water quality limits) to construction of the expansion at Kilo Wharf clearly demonstrate that the SOP for suspended sediment containment is not effective. *It is important to note that although the organisms within the Inner Apra Harbor Shoal system are "suited" to the existing turbidity levels, they are only there because their "tolerance" for turbidity is greater than other marine organisms (i.e., they are there because they are better at surviving in this extreme environment). This does not, in any way, ensure that they will thrive under the impending turbidity regime.* Moreover, I argue that the turbidity will increase over time because the finest sediments (i.e., those that stay suspended the longest) will become concentrated by dredging, rather than removed in equal portions during the dredging process, *because they will take the longest to sink to the bottom again* and thus, over time, dredging operations will increase the resuspension of these sediments. Similar habitats can not be found anywhere else within the Mariana Islands, not even within the Marianas Trench National

Monument. Moreover, given the Navy's opinion on the current state of environmental quality around Guam, it is likely that no amount of compensatory mitigation will be able to restore this ecological function of this unique system.

I also recommend that the Navy removes artificial reef projects from their potential compensatory mitigation plans. Most exotic marine species with the capacity to become invasive in Apra Harbor have been discovered on artificial structures, including the hulls of sunken vessels and concrete pilings. Dredging will provide a tabula rasa for invasive species to gain a foothold before they encounter competition from native organisms; construction of artificial reefs would provide additional substrate for these nuisance organisms, adding insult to injury. Instead, I suggest the Navy consider supporting feral animal (dogs, cats, pigs, etc.) eradication programs, which could complement the watershed rehabilitation mitigation efforts.

I would like to commend the Navy for a comprehensive, well-organized and well-researched document. However, I feel it is my professional and civic duty to challenge the validity of Volume 4: Section 11.1.1: Navy Coral Assessment Methodology, which could possibly be plagiarizing (p. 11-3) the conclusion section of Veihman *et al.* (2009) as a means to support the creation of a new Habitat Equivalency quantification method, which grossly underestimates the rugosity of the Inner Apra Harbor Shoal system and the age classes of corals within them, and does not account for rare and endangered animals that are not directly observed at the time of assessment (Minton *et al.* 2009: Volume 9, Appendix J, *Comparison of a Photographic and an In Situ Method to Assess the Coral Reef Benthic Community in Apra Harbor, Guam*). Even if one just simplified all of the ecological equivalency calculations to what we know about the history of Inner Apra Harbor (e.g., in Alternative 2, all 44 acres where dredged 60 years ago, and it has taken the coral all 60 years to reach the stage that they are now), then the expected result in a loss of approx. 2,460 DSAYs of coral habitat due to direct impacts alone, which is over double that estimated within this DEIS.

I appreciate the opportunity to comment on this DEIS. UOGML and UOG Sea Grant encourages the Navy to take a long-term stewardship approach to site management at Apra Harbor to reduce future cleanup costs and benefit the residents of Guam. By modifying the Alternatives carried forward to reduce environmental impacts of dredging operations, removing contamination hotspots at SRF, and controlling run-off from Wharf activity, the Navy will be embracing the pollution prevention pillar of its environmental strategy. The UOGML is available to provide assistance to the Navy regarding prevention of marine habitat degradation and related topics. If you have questions, please contact me or Angie Duenas, our secretary. Angie can be reached at (671) 735-2176 or aduenas@uguam.uog.edu. Please also send one copy of the Final EIS to the address below once it is released for public review.

Enclosed:
detailed comments

DETAILED COMMENTS ON THE VISITING AIRCRAFT CARRIER BERTHING DRAFT ENVIRONMENTAL IMPACT STATEMENT, NOV. 2009

Alternatives and Opportunities to Prevent Environmental Destruction

Project alternatives

Note: All information included as Arial 10pt font in italics is copied directly from the DEIS. Important portions within these excerpts are delineated by bold-faced type.

REFERENCE: (Volume 4, Section 1.1.3.6 Transient Berthing Capability and Operation in Guam, page 1-9).

*On average, ammunition operations occur at Kilo Wharf 275 days per year. Beginning in 2014, the munitions operations are projected to increase from 275 to 315 days per year at Kilo Wharf to support the programmed Navy, Marine Corps and Air Force missions (Commander Navy Installations Command 2006). Kilo Wharf is unavailable during unfavorable weather (tropical storms) or high seas, which occur an estimated 40 to 50 non-consecutive days per year. In addition to the days the wharf is unavailable due to munitions operations (275 days) and ocean or weather conditions (average 45 days, **for a total estimated 325 days when it is unavailable**), there are an estimated 40 to 45 days per year that the wharf is unavailable for use by the aircraft carrier due to maintenance work aboard cargo munitions ships that are docked at Kilo Wharf. Unscheduled repairs to these ships while loaded are restricted to Kilo Wharf because of the explosive safety considerations. If they require maintenance and are carrying munitions, Kilo Wharf is the only wharf in Apra Harbor that has a DDESB approval for large quantities of munitions. A waiver is required from DDESB and Naval Ordnance Safety and Security Activity for ships carrying ammunition to berth in Inner Apra Harbor. These waivers are not readily granted because the large quantities of explosives berthed at a wharf that is unauthorized for large net explosive weights would represent an increased safety risk to nearby populations (NMC-DET Guam 2009).*

ISSUE: Scoping efforts clearly demonstrate that the loss of the Inner Apra Harbor Shoal system is culturally, economically, socially, and environmentally unacceptable to the people of Guam, and yet, both alternatives brought forth within this DEIS not only threaten the viability of these systems, but also downplay the extent of these threats AND the ecological significance of these resources.

DISCUSSION:

- The Kilo Wharf usage estimates are high. 275 days use leaves 90 days, albeit possibly weather-hindered. If “The aircraft carrier visits are managed through scheduling, but are disruptive to munitions operations and limit flexibility in carrier scheduling,” this does not preclude this Wharf from being used.

- Won't the carriers be carrying large enough amounts of explosives to require a waiver as well? The carrier has a nuclear reactor and many more features that might be better suited by being stationed at Outer Apra Harbor, including rapid deployments in response to enemy threats.
- Re-evaluation of the Kilo Wharf as the aircraft berthing location and a subsequent relocation of smaller vessel munitions operations within Inner Apra Harbor is warranted. Reprogramming operations in this way meets the stated QDR goal of an increased aircraft carrier presence in the Western Pacific.
- A waiver is required from DDESB and Naval Ordnance Safety and Security Activity for ships carrying ammunition to berth in Inner Apra Harbor, regardless of its size. Therefore, there should not be a significant difference between a waiver for smaller vessels and a waiver for nuclear aircraft carriers.

RECOMMENDATION: *Re-evaluation of the Kilo Wharf as the aircraft berthing location and a subsequent relocation of smaller vessel munitions operations within Inner Apra Harbor is warranted. Reprogramming operations in this way meets the stated QDR goal of an increased aircraft carrier presence in the Western Pacific.*

REFERENCE: (Volume 4, Section 2.3.5 Dredging, p. 2-23).

"The standard best management practices associated with in-water work (including dredging), such as silt curtains, would be implemented (see Volume 7)."

ISSUE: Delays (due to nearly reaching EPA water quality limits) to construction of the expansion at Kilo Wharf clearly demonstrate that the SOP for suspended sediment containment is not effective.

DISCUSSION:

- Dredging is an extremely destructive practice that is exacerbated by the presence of fine sediments within the dredged material.
- The finest sediments (i.e., those that stay suspended in the water column the longest) will become concentrated by dredging operations, rather than removed in equal portions during the dredging process, because they will take the longest to sink to the bottom again and thus, over time, increases in turbidity should be anticipated.
- Although the organisms within the Inner Apra Harbor Shoal system are "suited" to the existing turbidity levels, they only exist there because their "tolerance" for turbidity is greater than other marine organisms (i.e., they are there because they are better at surviving in this extreme environment). This does not, in any way, ensure that they will thrive under the impending turbidity regime.

RECOMMENDATION: Re-evaluation of the Kilo Wharf as the aircraft berthing location and a subsequent relocation of smaller vessel munitions operations within Inner Apra Harbor is warranted. Reprogramming operations in this way meets the stated QDR goal of an increased aircraft carrier presence in the Western Pacific.

REFERENCE: (Volume 4, Section 2.3.5 Dredging, "Dredged Material Disposal" p. 2-23).

This EIS/OEIS assumes four scenarios for the placement of dredged material: 100% disposal in a proposed ocean dredged material disposal site (ODMDS), 100% disposal upland, 100% beneficial reuse, and 20-25% beneficial reuse/75-80% ocean disposal.

"The 100% ODMDS and 100% upland disposal options are analyzed as the environmentally most adverse scenarios, because placing all dredged material in either location would limit the capacity of either the ODMDS or upland site(s) and does not account for some of the sediment being used for a beneficial purpose."

(p. 2-26)Between 1 and 1.1 million cubic yards (cy) (764,555 million cubic meters [m³]) of dredged material would be excavated from the Inner and Outer Apra Harbor for the proposed Navy and Marine Corps actions...

...Beneficial use of portions of this total volume would be possible and several local projects have been identified. These local projects include:

- Support shoreline stabilization below Aircraft Carrier Wharf*
- Fill of berms and backstops at proposed military firing ranges on Guam*
- Port Authority of Guam (PAG) expansion program*

ISSUE: This DEIS suggests that there is no concrete plan for beneficial reuse of any of the dredged material.

DISCUSSION:

- Local construction companies are currently investigating alternate sources of aggregate material.*
- Although it is stated in the DEIS that upland disposal and use of the dredged material is "being explored," it then says that no upland site for treatment or remediation is anticipated, and I quote: **"There have been no Navy dredging projects on Guam that have required designation of an upland site for the treatment or remediation of sediment. None is anticipated for this project."** (Last sentence Vol. 4, p. 2-24)*

RECOMMENDATION: The projected usage statistics for the resulting dredge material should be clarified more with careful consideration as to how these materials will be beneficially used; i.e., an action plan for providing these companies and the public with dredged material free of charge should be developed and implemented. At least 50% of all dredged material should be beneficially reused.

REFERENCE: (Volume 4, Section 2.3.5 Dredging, “Sediment Sampling/Testing” p. 2-23).

Sediment samples near the proposed dredging areas are being analyzed according to testing criteria (40 Code of Federal Regulations [CFR] Parts 225 and 227). If the sediment meets the criteria, it can be beneficially reused, placed on land, or disposed of in an ODMDS. If the material does not meet the criteria for ocean disposal, it would not be placed in the ODMDS but potentially can still be beneficially reused, placed on land in an upland placement site or a confined disposal facility for treatment or remediation. Preliminary sediment characterization data (NAVFAC Pacific 2006) suggest most, if not all, of the material would meet the testing criteria and be suitable for disposal/dewatering on land or ODMDS disposal (NAVFAC Pacific 2006).

Previous testing for Alpha/Bravo wharf construction and maintenance dredging of Inner Apra Harbor and the approach to the inner harbor has indicated minimal contamination in the nearshore substrate.

DISCUSSION: When were these tests conducted? It could be that these data are so out of date as to be deemed “less than accurate.”

REFERENCE: (Volume 4, Section 2.3.5 Dredging, “Sediment Sampling/Testing” p. 2-24).

The results of the physical testing indicated that, with the exception of the Composite 3 area adjacent to Charlie Wharf, the sediments were coarse-grained and comprised predominantly of gravelly sand. In the Composite 3 area and all of the Inner Apra Harbor areas, the sediment samples were predominantly finer-grained, silty clay material.

Chemical analyses were conducted according to USEPA and American Society for Testing and Materials standards. “Sediment core samples were selected from multiple locations within the dredging footprints for the three dredge areas (Figure 2.3-6)...”

“...The number of samples and the compositing of samples were consistent with common practice for USACE dredging permit applications for Hawaii and Guam dredging projects.”

Within nine geographic areas, the core samples were composited and analyzed:

- *Composite 1 (six sample locations) and Composite 2 (three sample locations) were representative of the proposed dredging for the turning basin and aircraft carrier berthing at the Former SRF location.*
- *Composite 1 and Composite 3 (five sample locations) were representative of the area to be dredged for the proposed turning basin and berthing at Polaris Point (see Figure 2.3-6).*

With respect to chemical analyses and as noted in detail in Chapter 4, Volume 2, in general, sediment contaminant concentrations were low throughout all the areas sampled. This included results for total organic carbon, heavy metals, ammonia, sulfides, total petroleum aromatic hydrocarbons, PCBs, chlorinated pesticides, organotins, and phthalates.

Of all the composite sample chemical test results, only one result in Composite 3 (Polaris Point area) exceeded the ER-L concentration and that was for nickel (NAVFAC Pacific 2006). The ER-L concentration is 20.9 and the test result was slightly higher than the ER-L with a value of 21.50.

The results from this study would suggest that the materials to be dredged would not require special handling and would be suitable for upland placement for beneficial

reuse or ocean disposal, although the ocean disposal permitting process would require separate analysis and toxicity testing.

ISSUE: The validity of the findings from the sediment samples is questionable, and alarming results are not addressed at all within this DEIS.

DISCUSSION:

- Sediment samples were collected from within the harbor at multiple locations along the path that they are expecting to dredge.
- In Figure 2.3-6. Sediment Sample Locations, there are points on the map with numbers and letters (i.e., 1A through 4J), but in Table 4.1-3. Sediment Sampling Summary Table there are "composites" numbered 1-9. It is my guess that they took A-X samples in a location number (1) and COMBINED them into a single sample.
 - **If one is looking at threshold levels of acceptability, combining samples (i.e., composites) increases the probability of "DILUTING" any one hotspot down to acceptable levels.**
 - **This is not an acceptable way to analyze sediments**
- **In the reporting table there are NINE numbers.**
 - **There are no indications of where sample Composites 5-9 were collected? Composites 8 & 9 have higher than EC-L values for ARSENIC.**
- **Sampling Area 2 (SRF Carrier docking site) shows 22.2 (no units given) of a substance known as "Arochlor 1260," which is a Monsanto trade name for PCBs that were marketed in the 30s-70s (http://en.wikipedia.org/wiki/Polychlorinated_biphenyl). This is a clear indicator of a potential 2ndary impact of a military dock and a threat to the environment from dredging that has not been satisfactorily addressed.**

RECOMMENDATION: The sites where these aforementioned samples were taken provide an opportunity for the Navy to take a long-term stewardship approach to site management at Apra Harbor to reduce future cleanup costs and benefit the residents of Guam.

REFERENCE: *Volume 4, Section 2.5 ALTERNATIVE 1: POLARIS POINT -PREFERRED ALTERNATIVE, BIOSECURITY p. 2-30)*

Brown tree snake (BTS) control plans and other invasive species controls would include a quarantine and inspection area and security fencing designed for both humans/vehicles inspection and BTS control...

ISSUE: *None of this addresses biosecurity related to an Aircraft Carrier Berthing*

DISCUSSION:

- **The majority of biosecurity threats from this aspect of the military build-up (i.e., maritime travel) come from ballast water and biofouling of the ship's hull.**
- **Neither a quarantine and inspection area nor security fencing will mitigate these types of biological threats.**
- **One secondary impact left unaddressed is that dredging will provide a *tabula rasa* for invasive species**
 - ***“Invading” species will not be restricted by competitive interactions.***
- **CUMULATIVE IMPACT: The Sasa Bay MPA and three of the most unique coral reef ecosystems in Guam will be outcompeted by invasive species.**

RECOMMENDATION: *A marine biosecurity plan will not prevent invasive marine species in dredged areas. Re-evaluation of the Kilo Wharf as the aircraft berthing location and a subsequent relocation of smaller vessel munitions operations within Inner Apra Harbor is warranted. Reprogramming operations in this way meets the stated QDR goal of an increased aircraft carrier presence in the Western Pacific.*

REFERENCE: *Volume 4, Section 2.5.2.2 Utilities, Potable Water, p 2-39*

The potable water supply would be connected to the southern Navy water system, which receives its surface water supply from Fena Reservoir. Potable water demand for the aircraft carrier would have no impact on the Northern Guam Lens Aquifer. According to and following the applicable UFC documents and guidance provided in the review draft Navy Facility Planning Criteria for aircraft carriers, the daily average potable water requirements, with air wing or troops aboard, for a CVN 68 is 185,000 gpd (700,301 lpd) and for a CVN 78 is 235,000 gpd (889,572 lpd). Therefore, the existing potable water system requirements are based on the necessity to supply a minimum flow rate at the berthing location of 1,000 gpm (3,785 lpm) at 40 psi and satisfy an average daily demand of 235,000 gpd (889,572 lpd).

ISSUE: The DEIS is asking for too much water.

DISCUSSION:

- ***1,000 gpm is 1,440,000 gallons per day, which is 6 times the “average daily demand” required for these vessels!***

RECOMMENDATION: A comprehensive water usage regime needs to be developed.

REFERENCE: *Volume 4, Section 2.5.2.2 Utilities, Stormwater, p 2-40*

*Alternative 1 provides for approximately 5.8 ac (2.3 ha) of staging area adjacent to the back of the wharf. The maximum surface area of the pier would be approximately 2.7 ac (1.1 ha). Additionally, the MWR area would be situated on a 2.4 ac (0.97 ha) lot adjacent to the pier. Surface flow would be directed toward the west and south perimeters of the staging area and would be intercepted by a concrete swale. The layout of the staging area intercepts surface flow from the southeast. Therefore, a catch basin is planned to intercept this flow (however, more refined topographical and planimetric information may demonstrate that this catch basin may be eliminated and the total design flow reduced accordingly). The storm drain path would be along the same alignment as the swale, southward and then westward. **A cyclonic separator would be located in the southwest corner of the staging area and the outfall located on the east end of the channel between the Apra Inner and Outer Harbors.** Armor rock would be installed from the back of the wharf to about 250 ft (76 m) southward along the channel. However, additional rock cover is planned on the east side of the staging area at the west end of Griffin Beach, to protect the concrete cut-off wall return from undercutting action by waves. Chapter 4 of this Volume contains more information on potential impacts from stormwater.*

ISSUE: This statement, in essence, is stating that storm water will be channeled directly into Apra Harbor without measures to prevent anything that has been spilled onto this 10.9 acre area.

DISCUSSION:

- **There is no way to anticipate the introduction of petroleum products or other hazardous materials into the surface water within this 10.9 acre area.**
- **Cyclonic separation is a method of removing particulate matter (e.g., sediment, debris, and metal objects) from a water stream, without the use of filters, through the use of centrifugal force as the primary means of separation. This technology can only be used to separate mixtures of solids and fluids, NOT liquids (e.g., petroleum products and chemicals) nor anything that is less dense than water (i.e., floating things).**

RECOMMENDATION: All surface flow water should be collected and TREATED as potentially hazardous waste.

REFERENCE: *Volume 4, Chapter 17 – HAZARDOUS MATERIALS & WASTE, p 17-2*

Due to the projected increase in the volume of hazardous materials, Alternative 1 Polaris Point (referred to as Alternative 1) could result in an impact (i.e., to soils, surface water,

groundwater, air, or biota). However, the increase in hazardous materials would be handled and disposed of per applicable regulations and best management practices (BMPs) (see Volume 7); therefore, the increase in volume would not result in significant impacts.

ISSUE: There is precedence for the US Military to cover up accidents on Guam.

DISCUSSION:

- There is nothing said about notifying the public of spills of any kind.
- This is not acceptable considering that an earlier radioactive spill was not reported until 6 months after the incident occurred.

RECOMMENDATION: **The public should be notified of spills of any kind within 24 hrs.**

The following section relates directly to my professional and civic duty to challenge the validity of Volume 4: Section 11.1.1: Navy Coral Assessment Methodology, which could possibly be plagiarizing (p. 11-3) the conclusion section of Veihman *et al.* (2009) as a means to support the creation of a new Habitat Equivalency quantification method, which grossly underestimates the rugosity of the Inner Apra Harbor Shoal system and the age classes of corals within them, and does not account for rare and endangered animals that are not directly observed at the time of assessment (Minton *et al.* 2009: Volume 9, Appendix J, *Comparison of a Photographic and an In Situ Method to Assess the Coral Reef Benthic Community in Apra Harbor, Guam*). I have changed the format of these issues as they are all related. Excerpts from the DEIS are in *italic* font. A single recommendation follows this entire section.

Chapter 11 – Marine Biological Resources:

- 11.1 AFFECTED ENVIRONMENT
 - Vol. 4, p. 11-1. “*This chapter describes the potentially affected environment for marine biological resources in Outer Apra Harbor, where the proposed aircraft carrier berthing would occur.*”

ISSUE: This statement is entirely inconsistent with all of the proposed Action Alternatives. The only alternative within ‘Outer Apra Harbor’ discussed in this DEIS is that of Kilo Wharf, which is discussed within “Section 2.2: Alternatives Considered and Dismissed.”

- **Figure 11.1-1** (*Bathymetric Map of the Study Area and Proposed Alternatives*)
 - *Figure 11.1-1 shows a bathymetric map of the project area and the proposed aircraft carrier berthing alternatives (Alternative 1 Polaris Point and Alternative 2 Former Ship Repair Facility [SRF]).*

ISSUE: The figure also depicts Sasa Bay Marine Preserve as “Sea Turtle and EFH MUS High Concentration Area.” This is a sea-locked & land-locked area. Sea Turtles are “sea-faring” animals. It is logical to assume that the turtles must pass through the project areas proposed.

- Vol. 4, p. 11-1. *The proposed channel and turning basins are bordered by several large “patch reefs” or “shoal areas” that consist of shallow, flat-topped, and steep-sided features. The largest three of these reefs are Jade Shoals, Western Shoals, and Big Blue Reef (shoal areas). These reefs all consist of relatively flat and shallow upper surfaces that are covered primarily with muddy sand and rubble. The western facing slopes of Western Shoals and Big Blue Reef are almost completely covered with living corals to a depth of approximately 50 to 60 feet (ft) (15 to 18 meters [m]), where the slopes intersect the channel floor. **Coral cover on the eastern slopes of these two reefs is much less compared to the western slopes.***

ISSUE: The major slope of Western Shoals that will be affected (by proximity association alone) is the **NORTHERN SLOPE**, which is also almost completely covered with living corals to a depth of approximately 50 to 60 feet (ft) (15 to 18 meters [m]).

- Vol. 4, p. 11-1. *Construction of the aircraft carrier wharf would involve placing fill material in approximately 3.6 acres (ac) (1.5 hectares [ha]) of nearshore and intertidal waters for either alternative.*

ISSUE: 3.6 acres of nearshore and intertidal waters will be buried to construct this wharf.

- Vol. 4, p. 11-1. *As described by Smith (2007), a substantial percentage of the coral at all depth contours off Polaris Point was growing on metallic and/or concrete debris, was of marginal quality, and showed the greatest signs of stress. This stress appeared to be due in part to high levels of total suspended solids (TSS) coming from Inner Apra Harbor.*

ISSUE: The study conducted by Smith et al., 2007, suggests that suspended solids coming from Inner Apra Harbor (i.e., the military portion of the harbor which is routinely maintained by dredging) stresses corals in ways that reduce their quality tremendously. Dredging conducted during the construction and maintenance phases of this action will increase the levels of TSS in the waters surrounding ALL of these Shoals. Similar habitats can not be found ANYWHERE else on Guam. As coral and coral habitat are extremely important resources, ALL potential threats should be avoided entirely.

- 11.1.1 Navy Coral Assessment Methodology

Coral reef restoration is currently an evolving field with new research methods continuously being developed. Few, if any, injuries to coral have been followed from impact to complete recovery as part of the NRDA process. Consequently, expert estimates about whether a site will recover in 30, 50, or 300 years, or not at all, are necessarily imperfect, but bear the responsibility of being the best available information at present. Almost all of the approaches detailed in Viehman (2009) rely heavily on expert opinion, which is unlikely to be universally accepted, and consequently, contributes to the adversarial nature of determining the extent and costs of restoration. Thus, the Viehman (2009) paper also provides encouragement for coral reef NRDA to become a process that is objective (quantitative) rather than the current, often subjective process. As more informative data emerge from research, restoration monitoring, and HEA, the application should advance the NRDA process in conjunction with coral reef restoration science.

In its simplest form, the objective of coral reef restoration conducted through the NRDA process is to restore the services lost from the injuries caused by the responsible party. It is often difficult to know whether the trustee actions are sufficient to reach this objective given the current state of reef restoration science and NRDA practice. While the practical and measurable goals of restoration are to rapidly recreate the structure and functions of an injury habitat, the approaches for realizing this goal are continually evolving. There is a delicate balance between broad, general operating principles and site specificity. Careful selection of the theoretical NRDA approach (HEA-based using two-dimensional coral cover or composite metrics, or REA-based using size-frequency distributions) and metrics appropriate to both the degree and extent of injury and of habitat type will serve as a vital link between the damage assessment, recovery modeling, compensatory calculations, and recovery monitoring. An immense amount of information is necessary to fully understand the type and magnitude of ecological services provided by the injured coral reef in its baseline condition, the manner in which those ecological services will recover following the injury, and the relationship of those services with those provided via compensatory restoration projects. A nearly complete understanding of coral reef ecological services is required to objectively determine whether selected compensatory restoration projects adequately restore lost services for a given injury (Viehman 2009).

ISSUE: These are Paragraphs taken directly from Viehman, 2009. Text that is taken verbatim from Viehman 2009 is highlighted in green. Text taken but changed in order is underlined. Therefore, the second and third paragraphs of section 11.1.1 are taken almost VERBATIM from Viehman (2009)'s Conclusions Section. THIS IS PLAIGARISM and is also proof that the validity of this entire section should be in question.

RECOMMENDATION: *The US Navy should either proceed with the NO ACTION ALTERNATIVE, or consider very carefully a re-evaluation of the Kilo Wharf as the aircraft berthing location and a subsequent relocation of smaller vessel munitions operations within Inner Apra Harbor is warranted. REPROGRAMMING OPERATIONS IN THIS WAY MEETS THE STATED QDR GOAL OF AN INCREASED AIRCRAFT CARRIER PRESENCE IN THE WESTERN PACIFIC AND IS HIGHLY RECOMMENDED GIVEN THE QUESTIONABLE VALIDITY OF VOLUME 4.*