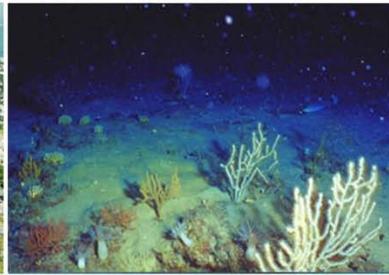




# Key West Harbor



## Reconnaissance Report

November 2010

U.S. Army Corps of Engineers

Jacksonville District

Interviews with knowledgeable stakeholders revealed no anecdotal history of groundings, collisions or other damaging events-at-sea in or near the Key West channel. Increases in safety and navigation technology combined with the increased economic costs of a potential grounding have resulted in a phenomenal safety record in Key West channel. In fact, some of the cruise vessels constrained from calling at Key West might be able to call there under ideal, no wind or wave conditions, but due to the average weather conditions of 12.4 knot winds and moderate to strong and variable cross currents, cruise ship companies have opted not to assume the increased risk of a delayed or cancelled port call on top of potentially grounding their vessels. The cruise ship companies require a consistent, fixed schedule for itinerary planning purposes and therefore require a large margin of safety so that they can continue to meet their schedule even under unfavorable conditions. Key West does not currently offer an adequate margin of safety for these newer, larger cruise ships to consistently call there.

#### ENVIRONMENTAL CONSIDERATIONS

The following is information taken from the *Environmental Assessment for Fleet Support and Infrastructure Improvements; Naval Air Station Key West*, U.S. Navy, 2003, and describes the available hardbottom information as documented in this report. While none of the species observed in 2003 were threatened or endangered, during the 2006 dredging event, the threatened staghorn coral (*Acropora cervicornis*) was seen within 1,500 feet of the channel.

“Biological resources surveys were conducted by Continental Shelf Associates, Inc. (CSA 2002) to characterize the benthic habitat and communities within the vicinity of the project area. Side-scan sonar data, diver observations, towed and diver held video camera data and still photographs were collected to assist in describing the project area. Data were collected from Truman Annex Harbor, the adjacent turning basin (Cut C), and the Key West Ship Channel (Cuts B and A, and the Main Ship Channel are illustrated in **Figures 3** and **4**). Also surveyed were areas adjacent to the Ship Channel extending out 1,000 feet on each side, and a 1,000-foot wide potential dredge pipeline route along the north side of Hawk Channel extending from Cut B east to Boca Chica Channel.

The vertical walls along the channel edges at the northern end of Cut B range in height from approximately two to three feet up to eight feet. The walls are colonized by hydroids; several species of tunicates; encrusting, branching and massive sponges; and occasional small scleractinian corals. Faunal abundance is highest near the upper edges of the wall with very low biotal cover near the bottom. Tunicates species include *Eudistoma* sp. and *Didemnum* sp. and other unidentified encrusting species. Sponges

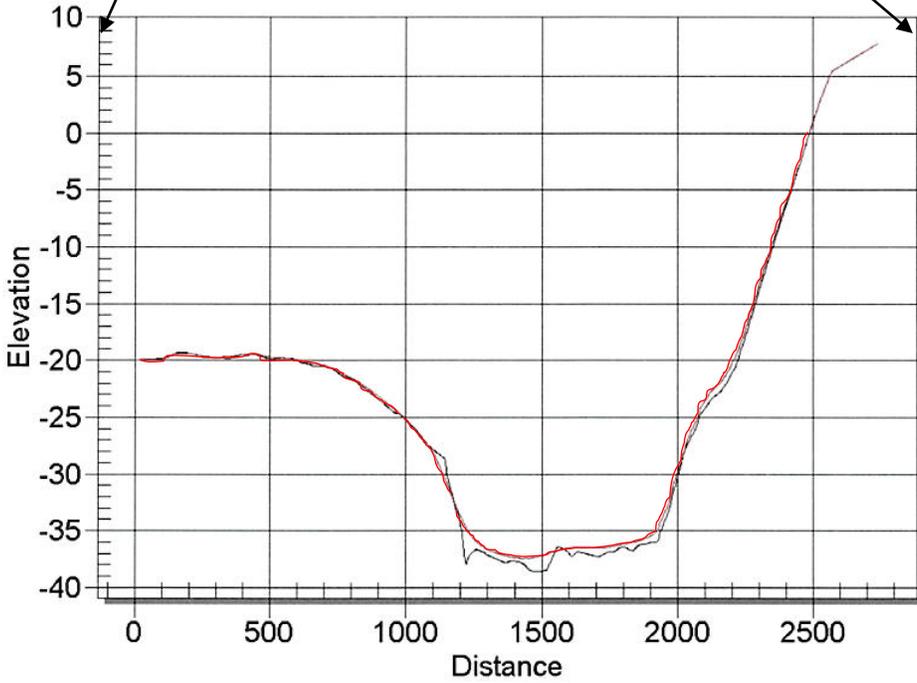
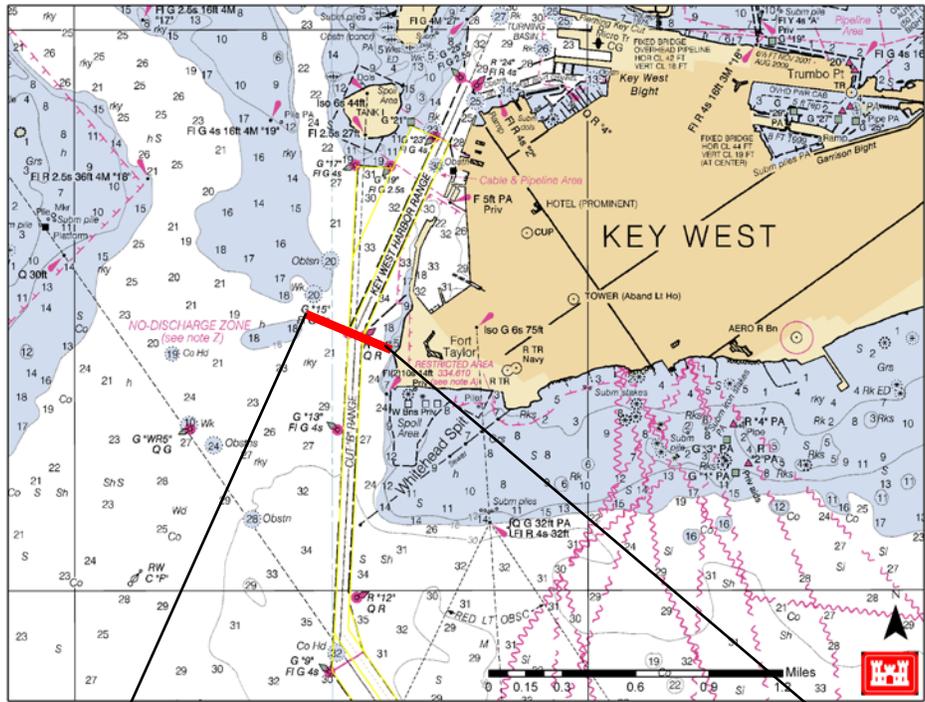
include *Amphimedon compressa*, *Aplysina* sp., *Callyspongia vaginalis*, *Cinachyra* sp., *Lotrochota birotulata*, *I. Strobilina*, *S. vesparium*, and several unidentified species. Scleractinian corals are not abundant on the walls, with small colonies of the branching coral *O. diffusa* and occasional small *S. radians* and *S. siderea* recruits. Most of the scleractinian corals have diameters of less than 10 centimeters (cm). The fouling soft coral *Carejoa riisei* is relatively abundant along the upper sections of the wall on the western side of the channel. Other epifauna include long-spine urchins (*D. antillarum*), pencil urchins (*Eucidaris tribuloides*), and small spiny lobsters (*P. argus*).

The rock surface extending from the top of the walls away from the channel is more heavily colonized with sponges, scleractinian corals, tunicates, and macroalgae. Sponge and tunicate species are similar to those observed on the vertical rock face. Scleractinian corals include *M. annularis*, *M. cavernosa*, *O. diffusa*, *Porites astreoides*, *S. radians*, *S. siderea*, and *Solenastrea bournoni*.

At the midpoint of Cut B, the ridge and groove features observed in the rock bottom in the turning basin were highly visible running across the channel, with red algae attached to the ridges. Epibiota increased at the southern end of the cut, with the dominant cover an unidentified species of red turf-like algae, along with increasing numbers of sponges and small octocorals (*Eunicea* sp.). Overall, this section of the channel seemed to be highly disturbed by ship traffic, with a predominantly rubble-covered bottom.

An area of low-relief hard bottom was observed immediately to the west of the channel in Cut B. It was colonized by macroalgae, sponges, octocorals, and stony corals, with a species composition similar to the area west of the turning basin. Further to the west and southwest of the channel, sediments graded into sand with macroalgae and the seagrass *H. decipiens*. To the east of the Cut B channel, the bottom ranged from low-relief hard bottom (with algae, small sponges, and octocorals) to sand bottom.”

These identified hardbottom areas pose a high risk for vessel groundings immediately outside of the channel. Under crabbed conditions, this risk increases proportionally to the increasing effective beam of the vessel. As shown in **Figure 8**, the natural steep slopes of the Key West Harbor Channel diminish the margin of flexibility with which the vessel can drift outside the channel limits safely.



**Figure 8: Cross Section of Key West Channel at Cut B/Cut C Channel Line from a 2005 Survey of Pre (black line) and Post (red line) Hurricane Rita**

## 2) Future Without Project Conditions

Without a Federal channel widening project it is anticipated that no channel widening will occur. It is also anticipated that cruise ship size proportions will continue to increase as the cruise industry continues to grow and cruise companies continue to capitalize on economies of scale in the Caribbean market. This trend is expected to continue well into the future, further details can be found in **Appendix A**. Show past history for trend for regional fleet and those specifically calling on Key West on a recurring basis.

Royal Caribbean Cruises Ltd. (RCCL) and Carnival Corporation (CCL) represent the largest number of cruise lines that visit Key West. Over 90% of ships that visit Key West are from these two cruise ship companies.<sup>3</sup> Royal Caribbean made some of its fleet statistics available for use in this study. Their data, in conjunction with interviews, supports the assumption that older, smaller passenger ship vessels will continue to be phased out of operation in the Caribbean market, and that the shift of vessel type will continue to be to the larger, wider, and potentially deeper drafting vessels similar to the dimensions of the Royal Caribbean Freedom Class, which cannot currently call at Key West due to channel configuration, (**Figures 5 and 7**). It is anticipated that these vessels will go to other ports of call that can accommodate the larger dimensioned vessels. This trend is anticipated to further limit the number of active vessels that are able to call at Key West Harbor. This limitation is due to the existing channel configuration and is set per pilot regulation that results from a threshold of the combined draft, beam, and length of a vessel.

## 3) Future With Project Conditions

Widening Key West Harbor in Cut B, one of the narrowest portions of the channel, would allow a greater number of the newer, larger cruise ships to transit the channel and dock at Key West Harbor. This would immediately benefit the local economy of the City of Key West due to profits generated by the tourism industry. Benefits of navigation improvements affecting cruise ships arise from more efficient ship operations and increased tourism or enhanced tourism experience. It is assumed that all benefits generated by the newer, larger cruise ship vessel are included as NED benefits, not Regional Economic Development (RED) benefits because Key West is a port of call competing with other international ports as opposed to regional U.S. ports. A further

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<sup>3</sup> Murray et al, *The Impacts of the Cruise Ship Industry on the Quality of Life in Key West, 2005*

detailed analysis and quantification of these national economic benefits is included in the economics **Appendix A** of this report.

#### D. PLANNING OBJECTIVES

The objective of NED is a general statement and not specific enough for direct use in plan formulation. The water and related land resource problems and opportunities identified in this study are stated as specific planning objectives to provide focus for the formulation of alternatives. These planning objectives reflect the problems and opportunities and represent desired positive changes in the without project conditions. The planning objectives are specified as follows:

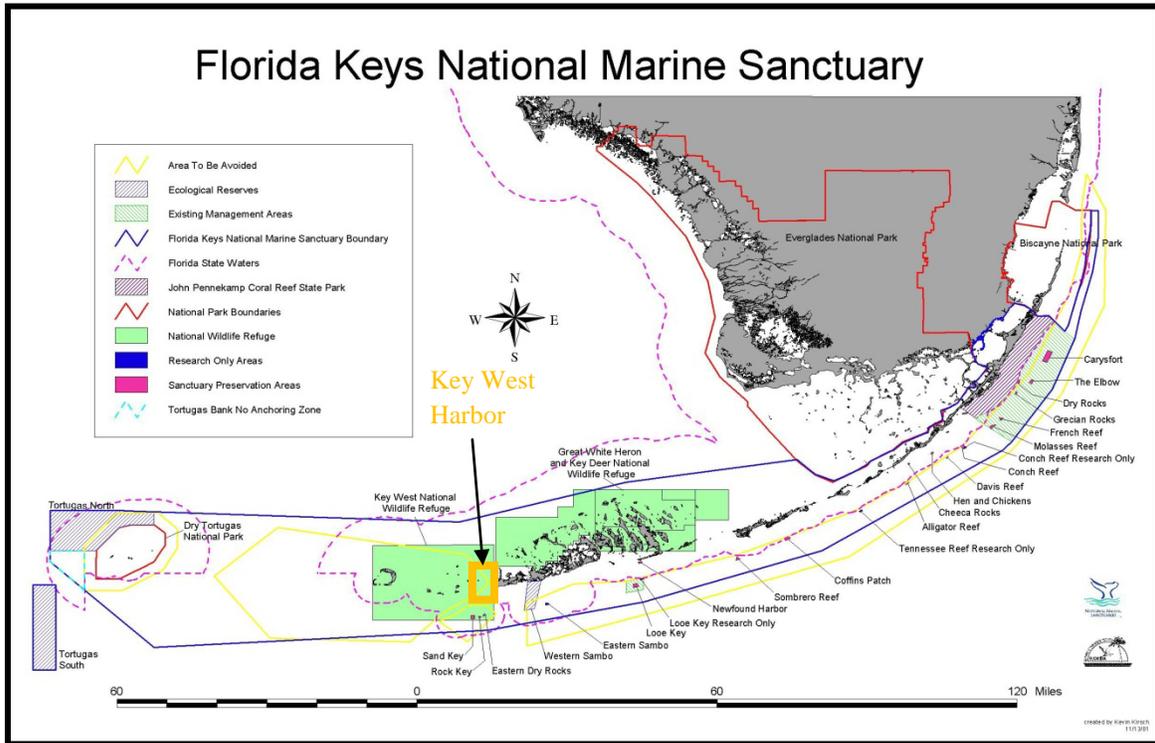
- 1) Maximize NED benefits at Key West Harbor
- 2) Minimize navigational, environmental, and life safety risks associated with transiting the Key West Harbor navigation channels.

#### E. PLANNING CONSTRAINTS

Unlike planning objectives that represent desired positive changes, planning constraints represent restrictions that should not be violated. The planning constraints identified in this study are as follows:

1) Compliance with the Florida Keys National Marine Sanctuary and Protection Act (FKNMSPA) – Key West Harbor is currently located within the FKNMSPA designation boundaries (**Figure 9**). Project implementation would ultimately require relief from regulations implemented under Public Law 101-605 which prohibits “...drilling into, dredging or otherwise altering the seabed of the Sanctuary (Florida Keys National Marine Sanctuary)” 33 CFR 922.163(a)(3). Operation and Maintenance dredging to existing channel depth is however allowed, as these depths were authorized prior to the Sanctuary Designation in 1998. Under Existing Conditions and Future Without Project Conditions, the environmental resources that exist along the channel boundaries remain at risk to groundings under certain wind and current conditions. It is assumed that the resources that do exist in the bordering habitat are already degraded due to infrequent but damaging ship interactions. Proposed channel modifications which include widening, would have direct and indirect impacts to these documented environmental resources, but help provide the necessary buffer to preserve the healthy habitat existing outside of the zone of influence of current ship traffic.

2) Under the Endangered Species Act (ESA) of 1973; the threatened coral *Acropora cervicornis* (staghorn coral) and *Acropora palmata* (elkhorn coral) could be located adjacent to the channel in the areas proposed for expansion (**Figure 2**) as this area is designated as critical habitat for these species. While it is possible to relocate the actual colonies of coral, the critical habitat would be permanently removed. It is highly likely that the removal of several acres of occupied designated critical habitat (habitat where the species has been shown to be able to flourish under baseline conditions) could be considered an adverse modification of critical habitat under Section 7 of the ESA. This would be Jacksonville District’s first adverse modification of critical habitat determination in the last 15 years. It is also unknown what reasonable and prudent alternatives and measures National Marine Fisheries Service (NMFS) would include in a biological opinion to avoid the project adversely modifying designated critical habitat, as required under Section 7 of the Act. It is expected that resource agencies would oppose any channel modifications outside the existing footprint.



**Figure 9: Florida Keys National Marine Sanctuary Map**