

DEPARTMENT OF THE ARMY
U.S. Army Corps of Engineers
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CECW-PF

Circular
No. 1105-2-186

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EXPIRES 30 JUNE 1990
Planning
GUIDANCE ON THE INCORPORATION
OF SEA LEVEL RISE
POSSIBILITIES
IN FEASIBILITY STUDIES

1. Purpose. This circular provides guidance for incorporating the effects of possible changes in relative sea level in Corps of Engineers feasibility studies.

2. Applicability. This circular is applicable to all HQUSACE elements and all field operating activities (FOA) having Civil Works responsibilities.

3. References.

a. Dean, R. G., et. al., Committee on Engineering Implications of Changes in Relative Mean Sea Level, National Research Council, Responding to Changes in Sea Level: Engineering Implications, National Academy Press, Washington, DC, 1987.

b. DAEN-CWH-D letter dated 21 March 1986, subject: "Relative Sea Level Change."

c. Revelle, R., "Probable future changes in sea level resulting from increasing atmospheric carbon dioxide," Changing Climate, National Academy Press, Washington, DC, 1983.

d. EC 1105-2-179, Risk and Uncertainty Analysis.

4. Definitions.

a. Eustatic sea level change - a global change of the oceanic water level (positive in the upward direction).

b. Local land change - a local change in the elevation of the land mass, e.g. glacial rebound or subsidence (positive in the upward direction).

c. Relative sea level change - the sum of the eustatic sea level change and any local land elevation change.

5. Background.

a. The National Research Council (NRC) study (reference 3a) is a practical and rational review of data on relative sea level changes and the resulting engineering implications. The study should be used by the Corps for technical guidance for determining the estimated relative sea level change rates for a given region.

b. The NRC study recommended that: "Feasibility studies for coastal projects (e.g., shore protection projects of the U.S. Army Corps of Engineers and storm surge studies of the Federal Emergency Management Agency) should consider the high probability of accelerated sea level rise. It may be some time before precise estimates of future sea level rise are possible. In the meantime, the risks associated with a substantial rise should not be disregarded. Instead, feasibility studies should consider which designs are most appropriate for a range of possible future rates of rise. Strategies that would be appropriate for the entire range of uncertainty should receive preference over those that would be optimal for a particular rate of rise but unsuccessful for other possible outcomes."

6. Procedure.

a. Potential relative sea level change should be considered in every feasibility study undertaken within the coastal zone and the estuarine zone as far inland as the new head of tide. This would include all project types, including navigation, hurricane and storm damage reduction, and flood control. Areas which are already experiencing a fall in sea level or where eustatic sea level rise increases are predicted should consider sea level rise impacts as part of the study. Plans should be formulated using currently accepted design criteria, i.e. the historical rate of relative sea level change, as established in reference 3b.

b. It will be at least twenty-five years before sufficient data is collected to estimate with reasonable certainty the rate of increase or even to reach some consensus on which of the various sea level rise scenarios is most likely. For now, planning should consider what impact a higher relative sea level rise rate scenario would have on the design based on the historical rate. A sensitivity analysis (as outlined in reference 3d) should be conducted to determine what effect (if any) changes in sea level rise rate would have on the plan evaluation and selection process. A risk analysis may not be possible because the

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probability of occurrence of any of the scenarios cannot be established, however, this uncertainty must be discussed. The FOA and the non-Federal study sponsor must agree on which scenarios should be used for the risk analysis. It should be noted that the National Academy of Science (reference 3c) study considered curve II in reference 3a as the most probable and curve III as most likely the high envelope.

c. If the plan selected is sensitive to sea level rise, then the FOA and the local sponsor can determine what steps to take to accommodate a possible higher rate of rise. In light of the requirement on WRDA 86 for the non-Federal sponsor to operate, maintain, and replace projects, it is imperative that we at least make them aware of possible future changes in design conditions, which would affect their future responsibilities. It may be appropriate to consider plans that are designed for today's conditions (i.e., the historical rate), but that can incorporate features to facilitate future changes, or that would be appropriate for a greater range of uncertainty. Justification for any resulting deviation from the NED plan is still required and use of any sea level change rate other than the historical rate must be based on compelling and unambiguous evidence.

d. The environmental impact assessment should give appropriate consideration to the impact of the project selected, and a possible higher rate of rise upon that project.

FOR THE COMMANDER:



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