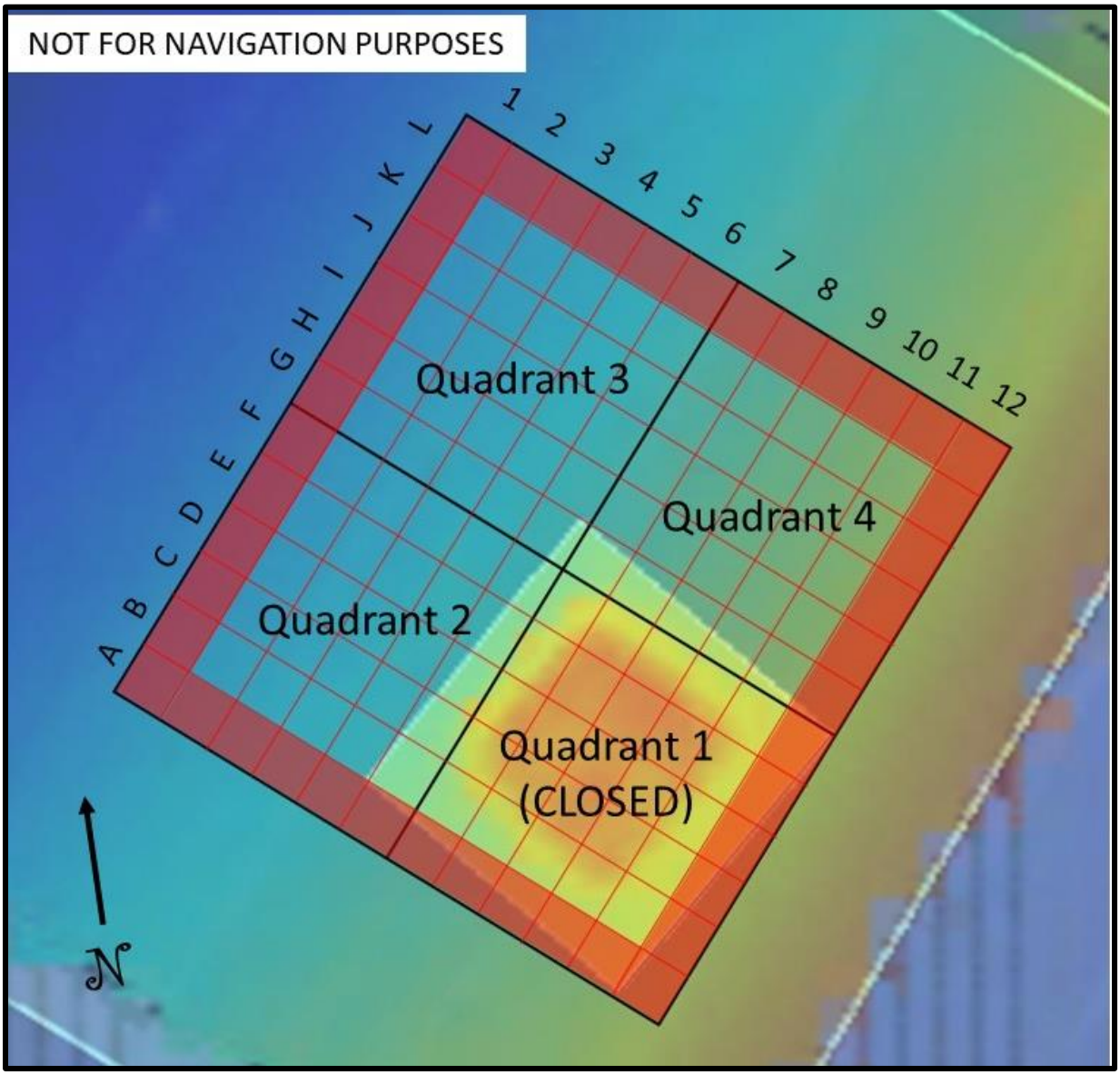
DRAFT SMMP

Site Management and Monitoring Plan for the Expanded Humboldt Open Ocean Disposal Site (HOODS)



Prepared by US EPA Region 9
in coordination with the
San Francisco District, USACE

April 23, 2020

EPA is accepting written comments on this draft SMMP. Comments should be emailed to ross.brian@epa.gov, and reference "HOODS Expansion SMMP" in the subject line. If you are unable to access email, please contact Brian Ross at 415-972-3475 and he will assist you in determining how to best to submit your comments.

DRAFT

Site Management and Monitoring Plan for the Expanded Humboldt Open Ocean Disposal Site (HOODS)

I. INTRODUCTION

This proposed updated Site Management and Monitoring Plan (SMMP) was developed jointly by Region 9 of the US Environmental Protection Agency (EPA) and the San Francisco District of the US Army Corps of Engineers (USACE). It describes proposed management and monitoring of the expanded HOODS beginning in 2021. The SMMP is designed to ensure that disposal operations continue to comply with established site use conditions, and to confirm that adverse environmental conditions do not occur either within or outside the site boundary. It describes the kinds of periodic site monitoring surveys that EPA and USACE will conduct as needed, as well as a range of potential management actions that EPA may take depending on the results of the periodic monitoring.

The Marine Protection, Research and Sanctuaries Act (MPRSA) of 1972 (33 USC Section 1401 *et seq*.) is the primary legislative authority regulating the disposal of dredged material into ocean waters. The MPRSA prohibits disposal activities that would unreasonably degrade or endanger human health or the marine environment. Under the act, the EPA and the USACE have joint authority for regulating ocean disposal of dredged material and for managing ocean disposal sites. Management of an ocean disposal site consists of: (a) regulating the quantities, times, rates, and methods of disposing dredged material; (b) implementation of an effective monitoring program for the site; (c) considering changes to site use practices or the designation itself if warranted based on the results from periodic site monitoring; and (d) enforcement of permit conditions.

Section 506 of the Water Resources Development Act (WRDA) amended Section 102(c) of the MPRSA to require, in part, that a site management plan be developed for each designated ocean disposal site, before the final designation takes effect. Site management plans must include:

- An assessment of baseline (pre-disposal) conditions at the site;
- a program for monitoring the site;
- special management practices necessary for protection of the site;
- consideration of the quantity and contaminant levels of material to be disposed at the site;
- consideration of the lifespan of the site and any management requirements after closure; and
- a schedule for review and revision of the site management plan.

Ocean disposal sites are intended to be monitored at least every 10 years (subject to available funding), and SMMPs are updated and revised based on the results of the site monitoring. The issues that Section 102(c) of the MPRSA requires be included in SMMPs mean that the document should be iterative and adaptive over time, responsive to the results of monitoring and changing conditions. As such, SMMPs are generally not themselves rules but do nonetheless identify conditions and practices that may be incorporated as enforceable project-specific requirements via EPA concurrence letters (either for USACE permits or for USACE authorizations of its Federal dredging projects involving the transportation and disposal of dredged materials).

In the case of the Humboldt Open Ocean Disposal Site (HOODS) (Figure 1), the original designation action took effect on October 30, 1995, and an initial Site Management and Monitoring Plan (SMMP) was put in place at the same time. Baseline conditions for the original site were assessed in the site designation EIS (EPA 1995). Since its designation, HOODS has received an average of approximately one million cubic yards (cy) of dredged material each year, almost all of it sand from dredging of the Federal navigation channels in Humboldt Bay. Site monitoring during the first 10 years of site use consisted of annual bathymetric surveys conducted by USACE. Based on that monitoring, which documented the growth of the sand mound inside the site boundaries, EPA took two key management actions. First, EPA published an updated SMMP for HOODS in 2006, which included site use conditions for all permitted users of HOODS, to more closely manage the mounding. EPA also initiated plans to conduct more intensive site monitoring in 2008. That site monitoring confirmed that no significant adverse environmental impacts were occurring at HOODS. But it also confirmed that mounding was effectively filling the site such that expansion would be necessary within a few years in order for HOODS to continue to provide capacity for ongoing ocean disposal. EPA therefore initiated planning to conduct even more comprehensive monitoring, as well as additional baseline surveys throughout a larger site expansion study area. These surveys were conducted in 2014. The results of the 2008 and 2014 surveys of HOODS and the surrounding area are available at: https://www.epa.gov/ocean-dumping/humboldt-open-ocean-disposal-site-hoods-documents.

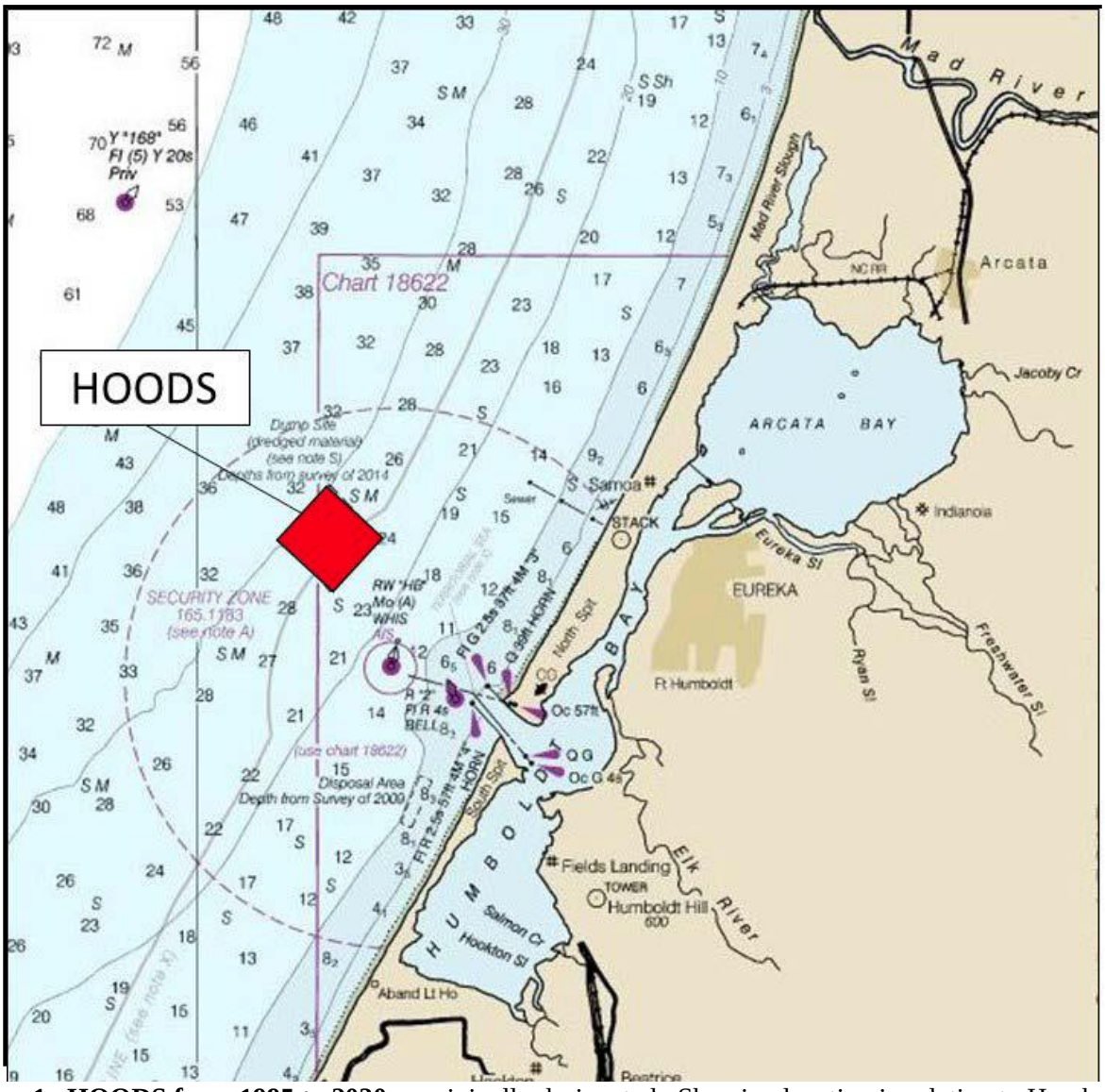


Figure 1. HOODS from 1995 to 2020 as originally designated. Showing location in relation to Humboldt Bay and the City of Eureka, CA.

Since the 2014 surveys, EPA has effectively updated the 2006 SMMP annually by placing additional project-specific conditions on each dredging project using the site. These conditions were designed to manage ongoing mounding within the existing site boundary, while preparation of an Environmental Assessment and a rulemaking to expand the site were under way. The annual site use condition updates ensured that disposal only occurred on portions of the site that had not yet mounded to 130 feet deep (relative to mean lower low water, mllw). The criterion that mounding at HOODS should not occur much shallower than about 130 feet deep is based on the original (1995) site designation EIS. The EIS estimated that at shallower depths the largest seasonal waves passing over the site could begin to interact with the bottom substrate, and potentially start to re-focus or redirect them. A change in wave behavior near the Humboldt Harbor entrance channel could in turn potentially affect navigation safety.

Expanding HOODS will allow EPA and USACE to continue managing the site so that mounding shallower than 130 feet will not occur. EPA is therefore conducting a rulemaking to formally expand the existing HOODS boundaries by 1 nautical mile (nmi) to the north, and 1 nmi to the west. The proposed rulemaking is expected to be published in the Federal Register in May 2020 for public comment, and the expanded boundaries would be effective by the end of the year. The Environmental Assessment (EA) supporting the expansion proposed rule is available at: https://www.epa.gov/ocean-dumping/humboldt-open-ocean-disposal-site-hoods-documents. As proposed, it is expected that the expanded HOODS will continue to receive an average of approximately one million cy of material each year, dredged primarily from the navigation channels in Humboldt Bay and the surrounding area. Most of this material will likely continue to be fine sand, while a small proportion may be silty material dredged from marinas, commercial docks, and other maritime facilities. Only material meeting the suitability requirements for ocean dumping will be disposed.

Relation to a potential future Nearshore Sand Placement Site (NSPS). This updated SMMP presently does NOT address any activities in the potential NSPS described in the EA for expanding HOODS. Similarly, it does not address activities related to any monitored demonstration sand placement project that USACE may undertake. If the NSPS is formally established in the future following such a demonstration project, this SMMP will be updated again to reflect how disposal at HOODS (regulated under MPRSA) inter-relates with beneficial use placement of sand at the NSPS (regulated under CWA). For example, it is expected that fine-grained dredged material (which is not suitable for placement in the NSPS) would continue to be disposed at HOODS and be subject to the HOODS SMMP. Disposal of at least some sand would also continue at HOODS, and be subject to the HOODS SMMP, if/when weather or wave conditions are unsafe for placement at the NSPS, or when the NSPS is otherwise unavailable for use.

II. DESCRIPTION OF ORIGINAL vs. EXPANDED HOODS

Original HOODS. The original HOODS was a square site, extending from 3-4 nmi offshore and covering 1 square nmi (Figure 1). It was divided into quadrants and cells (Figure 2) to facilitate management of individual disposal events so that mounding would not substantially exceed the target depth of 130 feet mllw. The outermost cells constituted a no-disposal buffer zone, to help ensure that most of the dredged material discharged would settle on the seafloor within the site boundaries.

Because the majority of sediment disposed at HOODS since 1995 has been sand that stays in place after disposal in these water depths, this approach resulted in a symmetrical mound, with a surface elevation averaging approximately 130 feet deep, covering all of the internal cells (Figure 3).

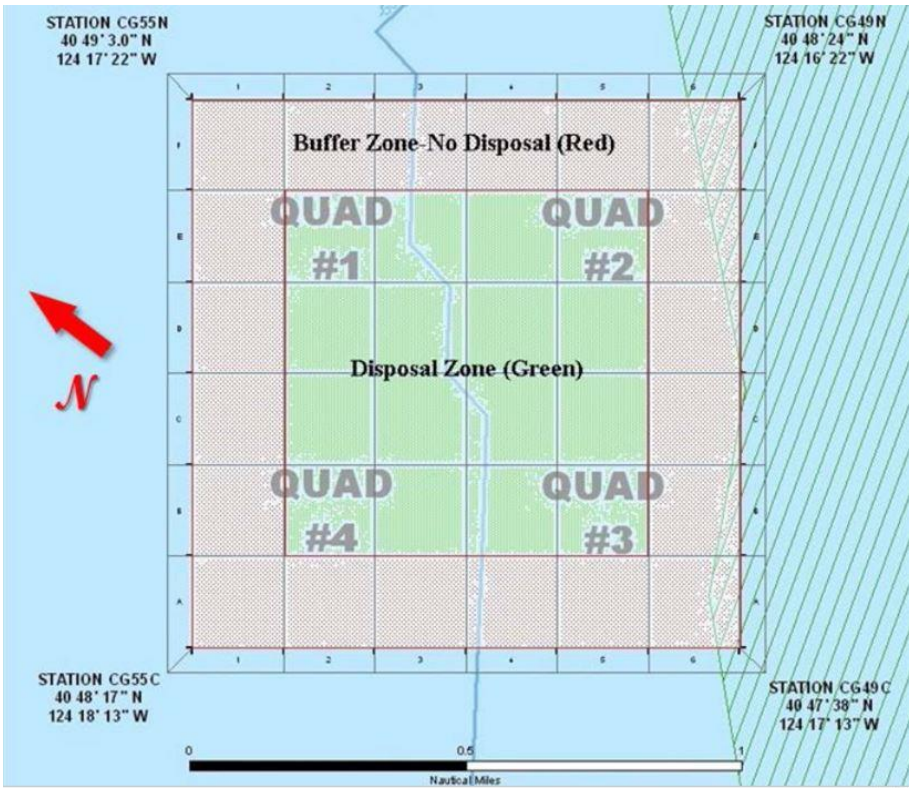


Figure 2. Layout of HOODS as originally designated, showing division into quadrants and cells. Disposal was allowed only in interior cells, while outer cells were a no-disposal buffer zone.

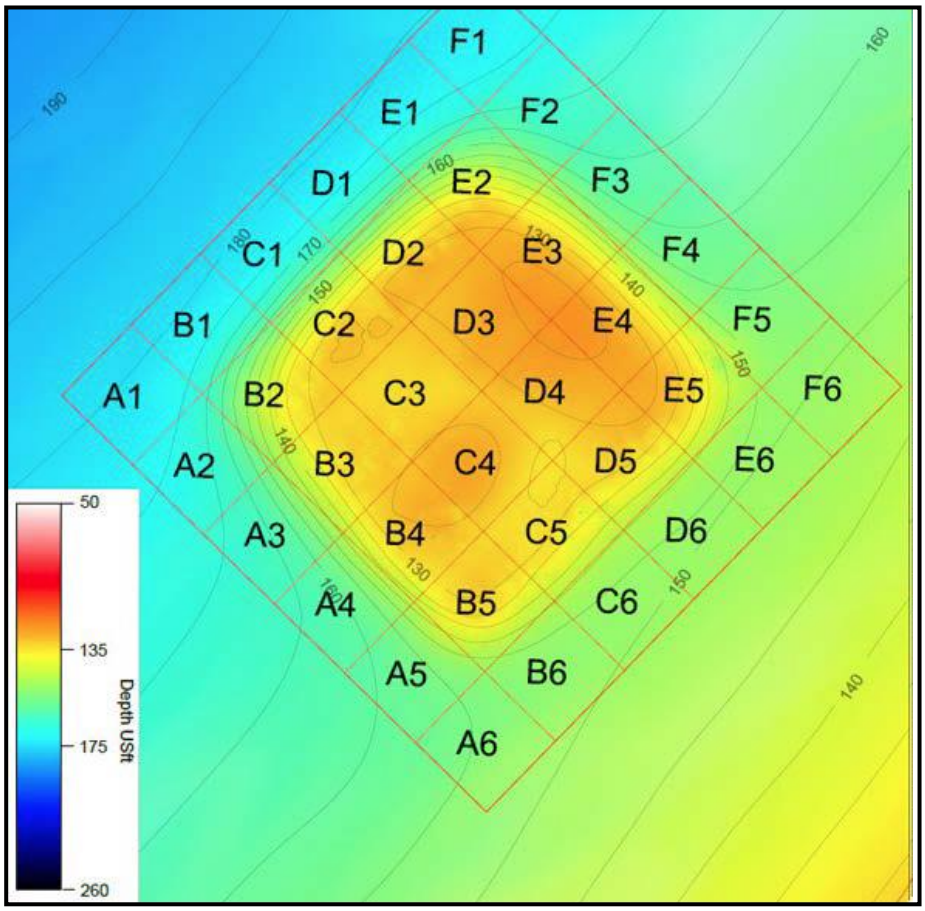


Figure 3. Map of HOODS disposal cells overlain on bathymetry from August 2014. Depths are in feet MLLW. (Reproduced from eTrac, 2014.)

As interior disposal cells reached (and in some cases slightly exceeded) the 130-foot depth target over time, EPA closed those cells to further disposal and restricted ongoing disposal to fewer and fewer cells. By 2020, disposal was only allowed in the inner portions of the buffer zone cells on the north and west sides of the site, along the slopes of the mound (Figure 4). This ensured that incremental growth of the mound would only occur in the directions that EPA proposed expanding the site footprint. Buffer zone cells on the south and east sides of the site remained off-limits for disposal because EPA did not anticipate allowing disposal to the south (closer to the Humboldt Bay entrance channel) or to the east (inside the 3-mile limit, which are also State waters).

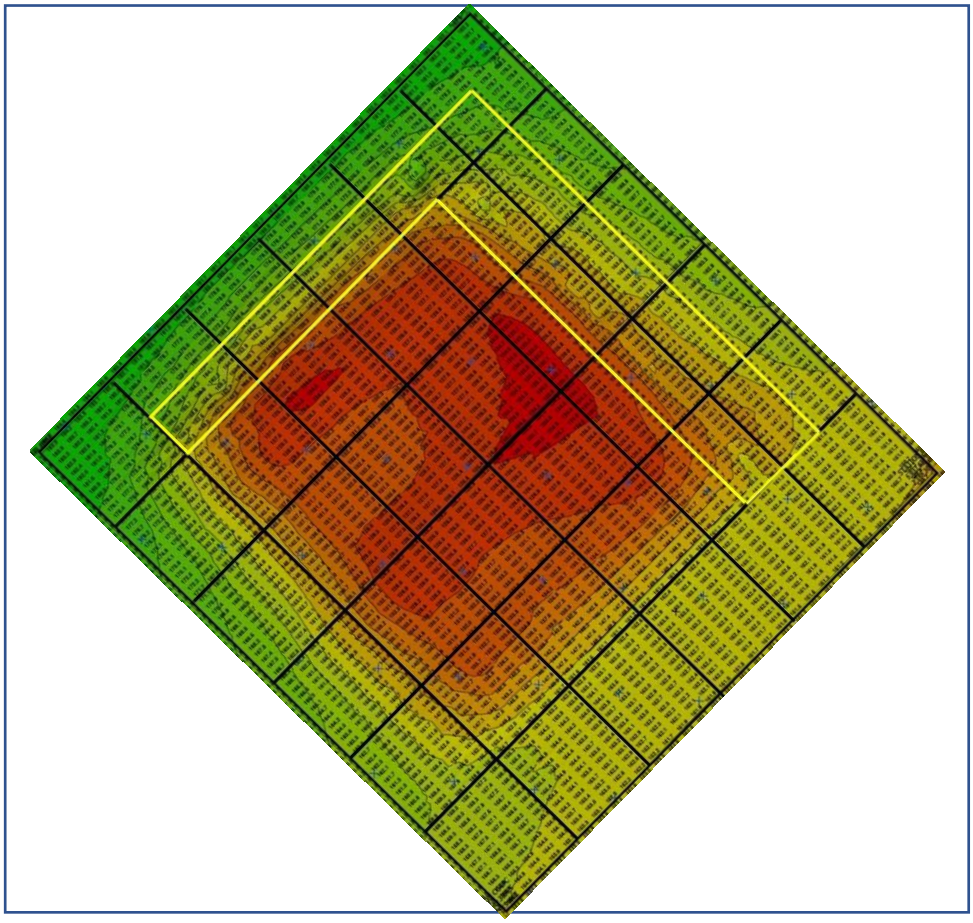


Figure 4: Open disposal cells at HOODS for 2020 are outlined by the bright yellow box. Black grid depicts the same disposal cells as shown on Figure 3. Here, disposal cell boundaries are overlain on the most recent (2019) bathymetry with green and yellow shading being deeper areas, and orange and red shading being shallower.

Expanded HOODS. As proposed, the expanded HOODS overlaps with the original site, and extends an additional 1 nmi to the north and west (Figure 5). It covers 4 square nmi and is in water depths ranging from approximately 150 to 210 feet. Table 1 provides the outer corner coordinates of the expanded site. The effective total capacity of the site will increase from the original 25 million cy to over 100 million cy (i.e., allowing for 75 million cy of additional disposal to occur), before mounding to -130 feet could again occur across the entire site. So, if today's disposal practices were to continue unchanged (i.e., if on average 1 million cy of dredged sand per year were to continue being placed at HOODS indefinitely), the site would reach capacity again in about 75 years. However, the effective life of the expanded site could be much longer than 75 years if nearshore placement of sand for beach or littoral system support were to begin at some point in the future (as discussed in the EA). In that event, disposal of finer sediment would continue in the expanded HOODS footprint, but it could be managed in such a way that little or no additional long-term mounding would occur at all.

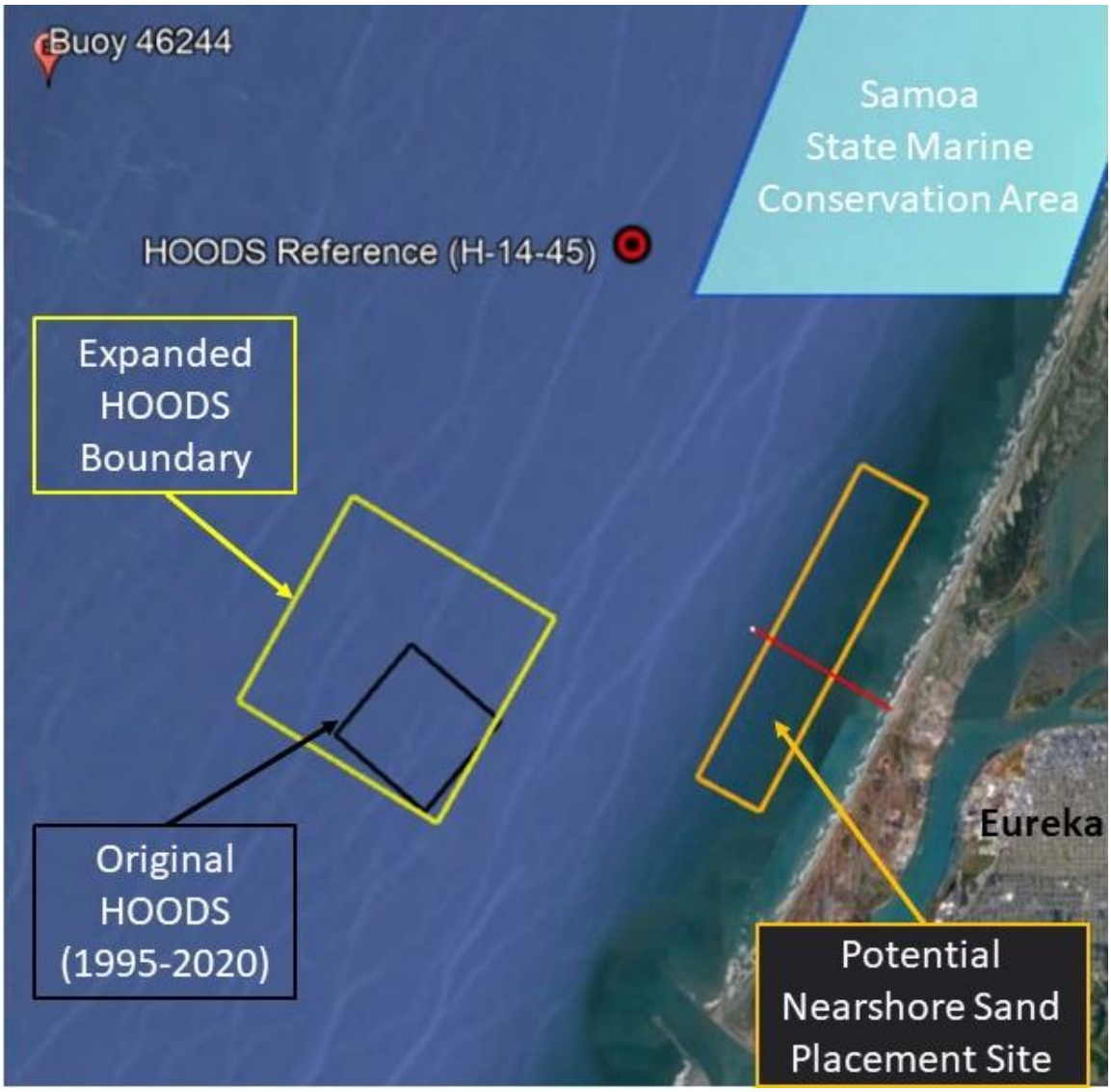


Figure 5. Expanded HOODS, beginning 2021. Showing location in relation to the original HOODS, the new HOODS reference site, the Samoa State Marine Conservation Area, the potential future Nearshore Sand Placement Site (NSPS), and the city of Eureka, California.

Table 1. Expanded HOODS corner coordinates and centroid (NAD 83).

Alternative 1 (Proposed): Expand by 1 nmi to North and West				
Corner	Latitude	Longitude	Centroid Lat.	Centroid Long.
North	40° 50' 18" N	124° 18' 01" W	40° 48' 56" N	124° 17' 32" W
East	40° 49' 16" N	124° 15' 46" W		
South	40° 47' 33" N	124° 17' 05" W		
West	40° 48' 34" N	124° 19' 18" W		

The expanded HOODS is also divided into quadrants and cells (Figure 6). Each quadrant is 1 square nmi (the size of the original HOODS) and is divided into 36 square cells that are each approximately 1,000 feet by 1,000 feet in size. (Coordinates of each cell are provided in the Appendix.) The mound in the original HOODS occupies Quadrant 1 of the expanded site and will remain closed to ongoing disposal. The outermost cells of the expanded site will also continue to serve as a buffer zone closed to disposal. Otherwise the 75 remaining cells in Quadrants 2, 3, and 4 are available for ongoing disposal. Allowable disposal cells for individual projects will be specified in EPA ocean disposal concurrences for the individual projects.

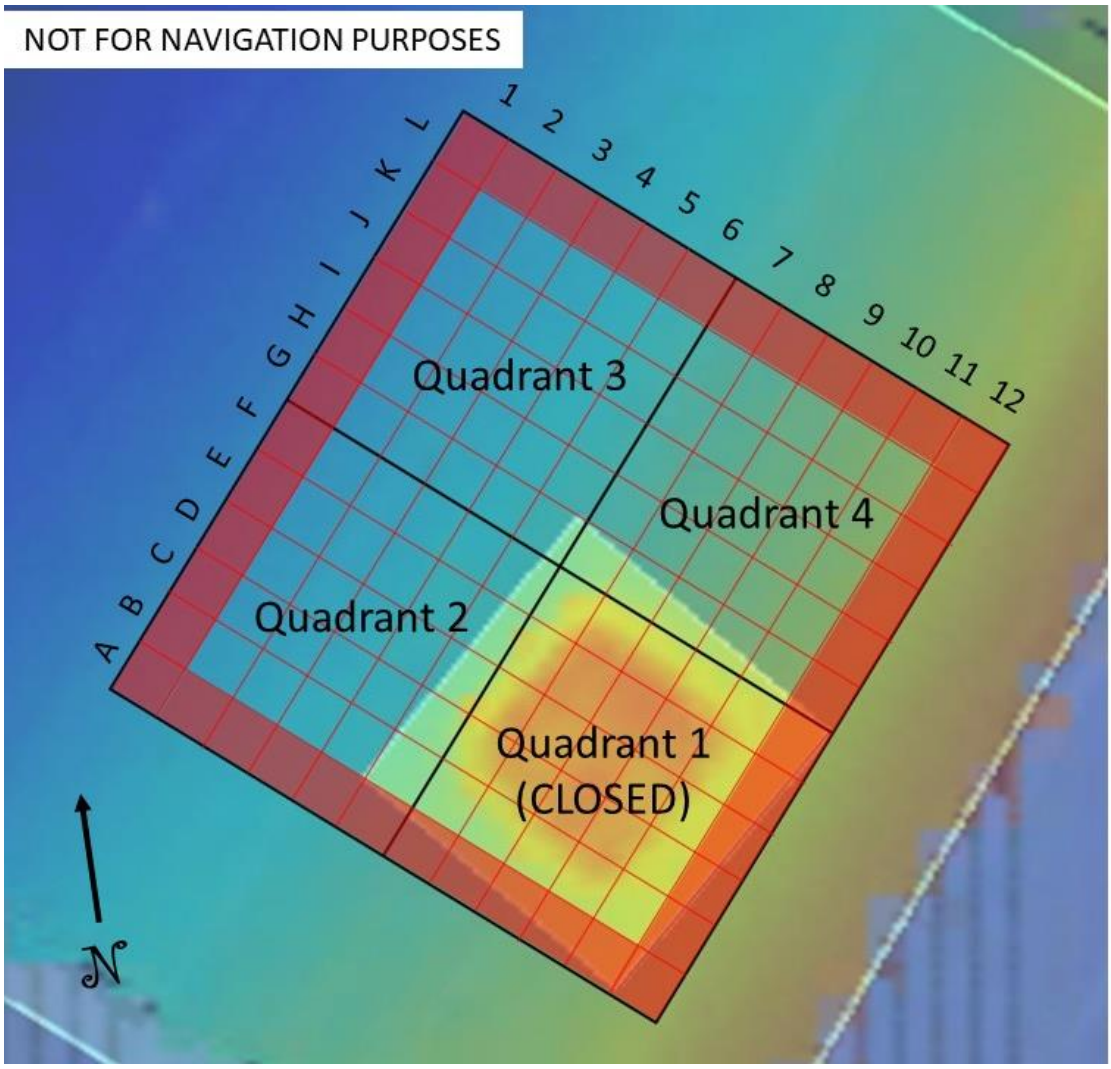


Figure 6. Map showing the layout of quadrants and disposal cells in the expanded HOODS, beginning in 2021. Quadrant 1 includes the original HOODS, which is closed to further disposal. The outermost cells of the expanded site (red shading) comprise a buffer zone that is also closed to disposal. Allowable disposal cells will be specified on a project-specific basis.

III. MANAGEMENT PLAN

Ocean disposal site management consists of three main activities jointly undertaken by EPA Region 9 and the USACE' San Francisco District. These activities include:

- Application of specific ocean dumping site use requirements as outlined in this SMMP and implemented by any EPA conditions applied to individual permitted projects or to authorizations for USACE project involving ocean dumping;
- Periodic site monitoring; and
- Consideration of permit compliance and site monitoring results to determine whether disposal site use changes may be needed.

The overall goal for management of the expanded HOODS is to ensure that only physical effects occur within the site boundaries, and that no adverse physical, chemical or biological effects occur outside the site. The objectives for meeting this overall goal, including the manner in which disposal of dredged material will be managed within the expanded site, are described in this Section III. Section IV describes the periodic site monitoring program for HOODS, and Section V lists the potential management actions EPA and USACE may take if needed based on site monitoring results.

Management Objectives for the Expanded HOODS

The following overall objectives apply to the expanded HOODS. Specific enforceable conditions for achieving these goals are outlined below.

- No disposal may occur at HOODS unless USACE has issued a permit (or authorization for a Federal project involving ocean dumping) pursuant to Section 103 of the MPRSA, the related ocean dumping regulations published at 40 CFR Parts 220-228, and USACE permitting regulations at 33 CFR Parts 320-330 and 335-338.
- USACE may not issue a permit or other authorization for ocean disposal unless EPA has concurred in writing that the sediment to be disposed is suitable for ocean disposal (is non-toxic and otherwise meets the requirements described in 40 CFR Part 227 and the testing program outlined in the joint EPA-USACE national Ocean Testing Manual, or OTM).
- EPA and USACE will continue to review and approve in advance Sampling and Analysis Plans (SAPs) for dredging projects to ensure suitability determinations are based on adequate, representative sampling.
- EPA encourages the beneficial use of dredged sediment whenever feasible. EPA will not concur on ocean disposal, even for otherwise suitable material, if a "need for ocean disposal" has not been demonstrated – i.e., if an alternative to ocean disposal is practicable.
- Approved disposal actions at HOODS must occur only where and as specified in the site use conditions described in this SMMP and specified by EPA in project-specific concurrence letters on the MPRSA permit or authorization. USACE must include EPA's required conditions in the MPRSA permit or authorization.
- Disposal at HOODS will continue to be managed to avoid creation of a mound with a seafloor shallower than approximately 130 feet mllw.
- Automated GPS-based tracking and recording of transport to and disposal at HOODS will continue to be required for each dump.
- Periodic site monitoring at HOODS as outlined in Section IV will continue to occur.
- Management options as described in Section V will be considered if any significant environmental impacts are identified via periodic site monitoring.
- This SMMP will be updated if a NSPS as described in the EA is formally established.

New Reference Site for the Expanded HOODS

Reference sediment test results are an important point of comparison for determining suitability of a dredging project's sediments for disposal at the particular ocean disposal site. The OTM defines Reference Sediment as follows:

> *A sediment, substantially free of contaminants, that is as similar as practicable to the grain size of the dredged material and the sediment at the disposal site, and that reflects the conditions that would exist in the vicinity of the disposal site had no dredged-material disposal ever taken place, but had all other influences on sediment condition taken place. These conditions have to be met to the maximum extent possible. If it is not possible to fully meet these conditions, tests should use organisms that are not sensitive to the grain-size differences among the reference sediment, control sediment, and dredged material. The reference sediment serves as a point of comparison to identify potential effects of contaminants in the dredged material.*

The original reference site for HOODS was to the north of the site, in water approximately 170 feet deep, at 40 deg 50.021 min N and 124 deg 15.372 min W. This location met the OTM definition and was used by EPA and USACE for project reviews from 1995 through 2014. However, the original

HOODS reference site was within the proposed footprint of the expanded HOODS. As such, disposal in the future could take place at the site and it would no longer qualify as an appropriate reference for HOODS.

EPA therefore identified a new location that will continue to meet the OTM definition of an appropriate reference site, even after the HOODS boundary is expanded. The new site was identified in the 2014 monitoring survey as station H-14-45 (see the HOODS monitoring synthesis report at: https://www.epa.gov/ocean-dumping/humboldt-open-ocean-disposal-site-hoods-documents). This new reference site, which EPA has required to be used since 2015, is offshore of the southwest corner of the Samoa State Marine Conservation Area. It is in water approximately 180 feet deep (similar to HOODS) but is farther to the north and outside of the direct influence of any future disposal activity in the expanded HOODS. The coordinates for the new HOODS reference site are: **40 deg 52.450 min N and 124 deg 14.870 min W** (NAD 83).

Site Use Conditions to be Required for the Expanded HOODS

Enforceable conditions for dredged material disposal operations at the HOODS are included in USACE-issued permits and authorizations for Federal projects, based on EPA's and USACE's identification of necessary conditions under 103(a) or through EPA's concurrence under 103(c) of the MPRSA, and the ocean dumping regulations at 40 CFR Parts 220-228. The following provisions of this SMMP are intended to be applicable both to dredging projects permitted by USACE, and to USACE-authorized Federal dredging projects (whether using Government owned and operated dredging equipment such as the hopper dredges *Essayons* and *Yaquina*, or using contracted equipment such as under USACE's West Coast Hopper Contract).

Conditions and reporting requirements become enforceable when and as specified or confirmed by EPA in its ocean disposal concurrence letters for individual projects and would be in addition to any other conditions USACE may include it its MPRSA Section 103 permits or authorizations. In the event of any conflict or inconsistency between the conditions in EPA's project-specific concurrence letter and the most recent SMMP, the former establishes the enforceable obligations. EPA may determine not to include one or more of the conditions identified below, or to require additional conditions, on a project-specific basis. Otherwise, EPA intends to apply each of the following conditions (along with any supplemental conditions included in EPA concurrence letters) for all projects involving transportation and disposal of dredged material at HOODS. Violations of the MPRSA (including conditions established in an MPRSA permit or Federal project authorization) by a permittee or dredging contractor are subject to compliance action including possible assessment of substantial administrative, civil, or criminal penalties.

Definitions:

A. ***"Permit"*** and ***"permittee"*** as used here mean USACE ocean dumping permits issued to others under Section 103 of the MPRSA, and authorizations that USACE issues to itself or its contractors for USACE dredging projects (see MPRSA section 103(e) and 40 CFR 220.2).

B. ***"Disposal vessel"*** is any barge, scow, or self-propelled vessel (such as a hopper dredge) that carries dredged material during transit and from which the dredged material is discharged, typically by opening doors in the bottom of the hull or by splitting the hull.

C. ***"Towing vessel"*** is any self-propelled tug or other marine vessel used to transport (tow or push) the "disposal vessel" for any portion of the transit to HOODS.

D. ***"Transit"*** or ***"transport"*** to the disposal site begins as soon as dredged material loading into the disposal vessel is completed and the disposal vessel begins moving to the disposal site (either under its own power or with the aid of a towing vessel).

E. ***"Buffer cells"*** are the outermost cells of the overall disposal site, adjacent to the site boundaries. NO DISPOSAL is allowed in the buffer cells unless specified by EPA on a project-by-project basis.

F. ***"Closed cells"*** are specified cells in the interior of the overall disposal site that EPA has identified as having mounded to a degree that DISPOSAL IS NO LONGER ALLOWED. Closed cells at a minimum include the interior cells of the original HOODS.

G. ***"Allowable Disposal Cells"*** are specified cells in the interior of the overall disposal site within which the disposal vessel must discharge all of the dredged material.

H. ***"Substantial leakage/spillage"*** or other loss is an apparent loss of draft of one foot or more between the time that the disposal vessel begins transport to the HOODS and the time of actual disposal.

Conditions to be Required for all Projects Using the Expanded HOODS:

In addition to any project-specific conditions provided in EPA's concurrence for a project, the following model conditions are expected to be included in USACE ocean dumping permits, and authorizations for Federal projects involving the transportation and disposal of dredged material at the HOODS.

1. All disposal operations at the HOODS shall be conducted in accordance with the version of the Site Management and Monitoring Plan (SMMP) (available at: https://www.epa.gov/ocean-dumping/humboldt-open-ocean-disposal-site-hoods-documents), that exists as of the date of EPA's concurrence for a project.

2. Dredged material shall not leak or spill from disposal vessels during transit to the HOODS. Transportation of dredged material to the HOODS shall only be allowed when weather and sea state conditions will not interfere with safe transportation and will not create risk of spillage, leak or other loss of dredged material in transit to the HOODS. No disposal vessel trips shall be initiated when the National Weather Service has issued a gale warning for local waters during the time period necessary to complete dumping operations, or when wave heights are 16 feet or greater.

3. No more than one disposal vessel may be present within the HOODS at any time.

4. NO DISPOSAL cells: Disposal may not occur in buffer cells or closed cells, including interior cells of the original HOODS or other cells in which mounding has resulted in a seafloor depth of 130 feet or less, mllw. Closed cells will be identified in project-specific concurrence letters from EPA or in updates to this SMMP as the case may be.

5. Allowable disposal cells: Disposal events shall occur only in designated cells, and where depths exceed 130 feet MLLW. Specific allowable cells for individual projects will be identified in EPA concurrence letters. In general EPA will specify allowable cells over the western and northern slopes of the existing mound, to minimize the area of new disturbance of seafloor habitat at any time. To manage mounding, dredged material from sequential trips shall not be disposed in the same cell; rather, to the maximum extent practicable consistent with safe vessel operation, disposal events shall progress to all specified allowable disposal cells before returning to a previously used cell. (Note, this does not mean disposal must happen in order from one cell to the next. Nor does it mean that single disposal events cannot cross a cell's boundary and discharge material in multiple authorized cells.)

6. The disposal vessel must have an automated disposal tracking system, and the system must be operational before any individual disposal trip to HOODS is initiated. Throughout

transit to the disposal site, during disposal, and for at least 10 minutes after disposal is complete, the disposal tracking system must automatically indicate and record the position, speed and draft of the disposal vessel. These data must be generated at a maximum 1-minute interval while en route to the HOODS, and at a maximum 15-second interval while within 1/4 mile of and inside the HOODS boundary. The tracking system must also indicate and record the time and location of the beginning and end of each disposal event (e.g., opening and closing of scow hull or hopper doors).

7. "E-mail alerts" regarding any degree of apparent dumping outside the HOODS boundary, and/or regarding any apparent substantial leakage/spillage or other loss of material en route to the HOODS must be sent within 24 hours of the permittee becoming aware of the apparent issue, to Brian Ross (ross.brian@epa.gov) and Allan Ota (ota.allan@epa.gov) at EPA Region 9, the San Francisco District USACE project manager, and Mark Delaplaine at the California Coastal Commission (mdelaplaine@coastal.ca.gov).

8. In addition to any alerts pursuant to Condition 7 above, data recorded from the disposal tracking system must be provided to EPA Region 9, the San Francisco District USACE, and the California Coastal Commission at a minimum on a monthly basis during disposal operations (due by the 15th day of the following month). For each disposal trip the records must include disposal trip number and date, estimated bin volume of material disposed, and a visual display of the beginning and ending locations of the disposal event relative to the HOODS boundaries and internal cells. The reports shall include a cover letter describing any problems complying with these Ocean Disposal Special Conditions, the cause(s) of the problems, any steps taken to rectify the problems, and whether the problems occurred on subsequent disposal trips.

9. A post-disposal bathymetric survey of the HOODS, extending at least 1,000 feet outside the boundaries of the project's allowable disposal cells in all directions, shall be conducted within 60 days of completion of disposal operations, and provided to EPA Region 9 and USACE within 30 days of completion. (Note that EPA may waive this requirement for individual smaller-volume projects, in lieu of USACE continuing to conduct annual bathymetric surveys of the entire expanded HOODS.)

IV. SITE MONITORING PLAN

Site monitoring plans evaluate whether the disposal site's management goals and objectives are being met, and whether any unanticipated environmental impacts are occurring. Periodic ocean disposal site monitoring is intended to occur at least every 10 years. SMMPs are then re-evaluated based on the site monitoring results and updated if needed (with opportunity for public input).

This site monitoring plan for the expanded HOODS is designed to address the following management questions:

1. Is the physical presence of disposed dredged material primarily restricted to the disposal site itself (retained within the site boundaries)?
2. Is the sand mound being successfully managed so that it does not substantially exceed the 130-foot depth target?
3. Are there indications that adverse chemical-related?
4. Are there indications that any adverse environmental impacts may be occurring beyond the site boundaries, related to dredged material disposal

To do this, periodic site monitoring activities have physical, chemical, and biological components, including:

- Physical - identify the extent of the dredged material "footprint" within and outside HOODS, including the height of dredged material mound(s);
- Chemical - confirm that chemical concentrations in disposed sediment are as expected based on pre-dredge testing, and that chemical concentrations are not elevated to levels of concern off site as a result of dredged material disposal; and
- Biological – qualitatively and/or quantitatively identify the status of the benthic community within and outside the site.

Depending on results from the site monitoring surveys, EPA and USACE may consider taking site management actions as described in Section V. These management actions can include additional or more intensive site monitoring activities if necessary.

Physical Monitoring - Disposal Footprint Mapping

At HOODS, mapping the physical extent of disposed material on the seafloor (the disposal footprint), including the size and height of the disposal mound, will happen in two primary ways.

Bathymetric Surveys

Acoustic bathymetric surveys of the seafloor are appropriate for mapping the height and extent of mounded dredged material within HOODS. Such surveys have been conducted in and just beyond the HOODS boundaries by USACE at least once per year in the past. It is expected that USACE will continue to conduct at least annual surveys of the entire expanded HOODS and extending at least 500 feet beyond the site boundary in all directions. The acoustic bathymetric survey method used must be capable of identifying seafloor depths with a (tidally corrected) accuracy of at least 0.2 feet. Bathymetric surveys are a site use condition applicable to all approved users of HOODS (see site use Condition 9 above). However, in years when USACE provides a high-resolution survey of the entire site, EPA may waive this requirement for other individual disposal projects. Also, if adequate high-resolution bathymetric survey data are available from recent (within one year) annual monitoring, EPA may decide not to conduct an additional bathymetric survey during periodic (every 10 year) site monitoring surveys.

Sediment Profile Imaging

The Sediment Profile Imaging-Plan View camera system (SPI/PV) is a dual-camera instrument that is lowered to the seafloor. The SPI camera is inserted into the sediment to capture a high-resolution image of a cross-section of the upper sediment column (up to 20 cm depending on density of the sediment). Several replicate images are captured around each station. This method is capable of discerning dredged material deposits of as little as a few millimeters from underlying native sediment. Thus, the SPI system can document thin dredged material deposits on the bottom that would not be detectable in a bathymetric survey. In conjunction with bathymetric surveys, SPI helps provide a comprehensive footprint mapping result. In addition to footprint mapping, the SPI system in conjunction with its PV component also provides valuable biological and habitat information, as discussed later in this section. Figure 7 presents a schematic of the SPI system in use.

Chemical Monitoring – Sediment Collection and Analysis

A major purpose of periodic chemical monitoring is to confirm that dredged material disposed at HOODS is not substantially different, in terms of contaminant levels, compared to the pre-dredge sediment testing on which the approval to dispose of the material was based. In other words,

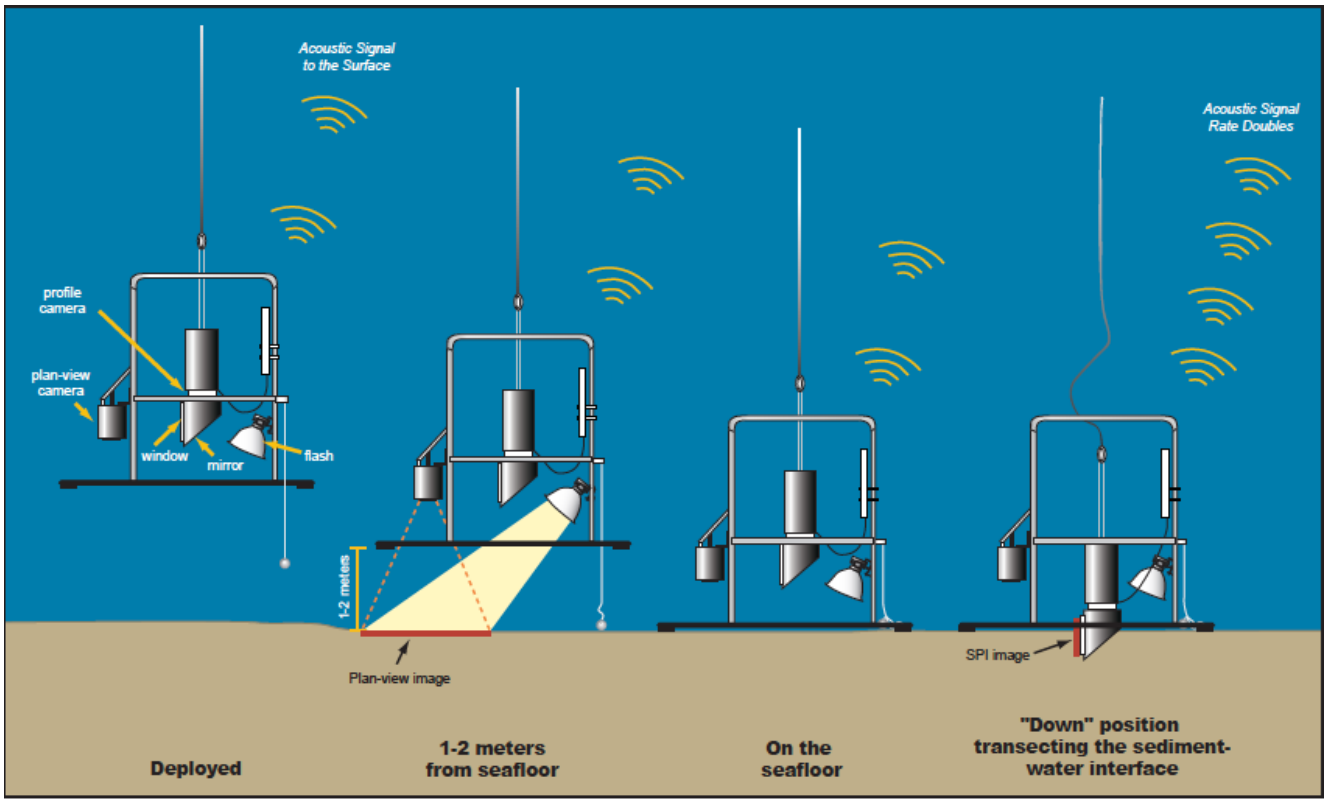


Figure 7. Schematic of deployment and collection of sediment profile images and plan view photographs. (Reproduced from Germano & Assoc., 2014).

analyzing the chemistry of material disposed at the site is important confirmation that the pre-dredge sampling and testing that EPA and USACE require is appropriately representative, and that significantly contaminated sediment is not being missed by the testing and being disposed at HOODS. Another major purpose of chemical monitoring is to compare disposed sediment with undisturbed off-site sediment, to confirm that contaminants are not being transported off site and causing any significant adverse biological impacts outside of the HOODS.

Sediment may be appropriately retrieved from the seafloor in and around HOODS by a variety of sampling methods. Since this site is relatively shallow compared to many of the ocean disposal sites in EPA Region 9, more complicated and expensive equipment such as large box core samplers are generally not needed. Instead, to date EPA has utilized simpler double Van Veen samplers. But any equipment capable of retrieving undisturbed samples of the upper 5-10 cm of the sediment column could be employed.

Once collected, sediment samples are processed, preserved, and shipped to the lab for analysis of a variety of chemicals. Chemical analysis is typically performed for the same extensive suite of parameters and potential contaminants as for pre-dredge testing, such as those shown in Table 2.

Biological Monitoring

Trawl sampling for fish and macroinvertebrates was conducted during baseline surveys prior to the original designation of HOODS in 1995. The location of HOODS was chosen in part based on those surveys (and other existing information) that indicted fish and macroinvertebrates were generally much more abundant in shallower water closer to shore in this area. Subsequent site monitoring at HOODS has therefore not included further trawl surveys, and instead has focused on monitoring the benthic (sediment-dwelling) community in other qualitative and quantitative ways, as follows.

Table 2. Typical chemical parameters to be analyzed in periodic site monitoring surveys for the expanded HOODS. (Note that EPA may modify this list, based on emerging contaminants of concern, dredging project testing, special management and monitoring needs, etc.)

Parameter	Analysis Method	Reporting Limit (RL)
Conventional		
Total Solids (percent)	EPA 2450-G	+0.1
Total Organic Carbon (percent)	EPA 5310B mod or EPA 9060	+0.1
Grain Size (percent)	Plumb 1991[2]	+0.1
Metals (mg/kg)		
Antimony	EPA 6010/6020	0.5
Arsenic*	EPA 6010/6020	1.0
Barium	EPA 6010/6020	2.0
Beryllium	EPA 6010/6020	1.0
Cadmium*	EPA 6010/6020	0.5
Chromium*	EPA 6010/6020	2.0
Cobalt	EPA 6010/6020	3.0
Copper*	EPA 6010/6020	3.0
Lead*	EPA 6010/6020	3.0
Mercury*	EPA 7471	0.05
Molybdenum	EPA 6010/6020	--
Nickel*	EPA 6010/6020	5.0
Selenium*	EPA 7740	0.1
Silver*	EPA 6010/6020	0.5
Thallium	EPA 6010/6020	--
Vanadium	EPA 6010/6020	3.0
Zinc*	EPA 6010/6020	3.0
Polynuclear Aromatic Hydrocarbons (µg/kg)		
1-Methylnaphthalene	EPA 8270	20
1-Methylphenanthrene	EPA 8270	20
2,3,5- Trimethylnaphthalene	EPA 8270	20
2,6-Dimenthylnaphthalene	EPA 8270	20
2-Methylnaphthalene	EPA 8270	20
Acenaphthalene	EPA 8270	20
Acenaphthylene	EPA 8270	20
Anthracene	EPA 8270	20
Biphenyl	EPA 8270	20
Benzo(a)anthracene	EPA 8270	20
Benzo(a)pyrene	EPA 8270	20
Benzo(b)fluoranthene	EPA 8270	20
Benzo(e)pyrene	EPA 8270	20
Benzo(g,h,i)perylene	EPA 8270	20
Benzo(k)fluoranthene	EPA 8270	20
Chrysene	EPA 8270	20
Dibenzo(a,h)anthracene	EPA 8270	20
Dibenzothiophene	EPA 8270	20
Fluorene	EPA 8270	20
Fluouranthene	EPA 8270	20
Indeno(1,2,3-c,d)pyrene	EPA 8270	20
Naphthalene	EPA 8270	20
Perylene	EPA 8270	20
Phenanthrene	EPA 8270	20
Pyrene	EPA 8270	20
Total PAHs*	EPA 8270	--
Pesticides (µg/kg)		
Aldrin	EPA 8081A	2
Alpha-BHC	EPA 8081A	2
Beta-BHC	EPA 8081A	2
Delta-BHC	EPA 8081A	2

Table 2, continued.

Parameter	Analysis Method	Reporting Limit (RL)
Gamma-BHC	EPA 8081A	2
Total BHCs*	EPA 8081A	--
Chlordane	EPA 8081A	20
Total Chlordanes*	EPA 8081A	20
Dieldrin*	EPA 8081A	2
Trans-nonachlor	EPA 8081A	2
2,4'-DDD	EPA 8081A	2
2,4'-DDE	EPA 8081A	2
2,4'-DDT	EPA 8081A	2
4,4'-DDD	EPA 8081A	2
4,4'-DDE	EPA 8081A	2
4,4'-DDT	EPA 8081A	2
Total DDTs*	EPA 8081A	--
Endosulfan I	EPA 8081A	2
Endosulfan II	EPA 8081A	2
Endosulfan sulfate	EPA 8081A	2
Endrin	EPA 8081A	2
Endrin aldehyde	EPA 8081A	2
Endrin Ketone	EPA 8081A	2
Heptachlor	EPA 8081A	2
Heptachlor Epoxide	EPA 8081A	2
Methoxychlor	EPA 8081A	2
Toxaphene	EPA 8081A	20
Alpha Chlordane	EPA 8081A	2
Gamma Chlordane	EPA 8081A	2
Cis-nonachlor	EPA 8081A	2
Polychlorinated Biphenyls (µg/kg)		
PCB008	EPA 8082 GC/ECD	0.5
PCB018	EPA 8082 GC/ECD	0.5
PCB028	EPA 8082 GC/ECD	0.5
PCB031	EPA 8082 GC/ECD	0.5
PCB033	EPA 8082 GC/ECD	0.5
PCB044	EPA 8082 GC/ECD	0.5
PCB049	EPA 8082 GC/ECD	0.5
PCB052	EPA 8082 GC/ECD	0.5
PCB056	EPA 8082 GC/ECD	0.5
PCB060	EPA 8082 GC/ECD	0.5
PCB066	EPA 8082 GC/ECD	0.5
PCB070	EPA 8082 GC/ECD	0.5
PCB074	EPA 8082 GC/ECD	0.5
PCB087	EPA 8082 GC/ECD	0.5
PCB095	EPA 8082 GC/ECD	0.5
PCB097	EPA 8082 GC/ECD	0.5
PCB099	EPA 8082 GC/ECD	0.5
PCB101	EPA 8082 GC/ECD	0.5
PCB105	EPA 8082 GC/ECD	0.5
PCB110	EPA 8082 GC/ECD	0.5
PCB118	EPA 8082 GC/ECD	0.5
PCB128	EPA 8082 GC/ECD	0.5
PCB132	EPA 8082 GC/ECD	0.5
PCB138/158	EPA 8082 GC/ECD	0.5
PCB141	EPA 8082 GC/ECD	0.5
PCB149	EPA 8082 GC/ECD	0.5
PCB151	EPA 8082 GC/ECD	0.5
PCB153	EPA 8082 GC/ECD	0.5
PCB156	EPA 8082 GC/ECD	0.5

Table 2, continued.

Parameter	Analysis Method	Reporting Limit (RL)
PCB170	EPA 8082 GC/ECD	0.5
PCB174	EPA 8082 GC/ECD	0.5
PCB177	EPA 8082 GC/ECD	0.5
PCB180	EPA 8082 GC/ECD	0.5
PCB183	EPA 8082 GC/ECD	0.5
PCB187	EPA 8082 GC/ECD	0.5
PCB194	EPA 8082 GC/ECD	0.5
PCB195	EPA 8082 GC/ECD	0.5
PCB201	EPA 8082 GC/ECD	0.5
PCB203	EPA 8082 GC/ECD	0.5
Total PCBs*	EPA 8082 GC/ECD	--
Butyltins (µg/kg)		
Tetrabutyltin	Krone (1989)	10
Tributyltin	Krone (1989)	10
Dibutyltin	Krone (1989)	10
Monobutyltin	Krone (1989)	10
Total Butyltins	Krone (1989)	--
Dioxins (pg/g)		
Dioxin (TCDD TEQ), total	EPA 8290	2.0

1 RLs are based on dry sample weight assuming no interferences; site-specific method modifications may be required to achieve these RLs in some cases.
2 Plumb, RH, Jr 1981
* Required analyte for beneficial reuse of dredged material

Seafloor imagery using the SPI-PV dual camera system provides visual information on benthic community structure and health, including key aspects of benthic habitat structure and recolonization following disturbance. In addition to vertical profile images captured by the SPI camera, a plan view (PV) camera captures images from several feet above the seafloor (see Figure 7). Each replicate PV image documents the general benthic habitat type (including the presence of any surface features), as well as fish and macroinvertebrates (such as crab or shrimp) in an approximately 3-4 square meter downward-oriented view. The SPI/PV system allows information to be collected quickly and efficiently from a large number of sites, and for the results to be used in near real time for modifying other site surveys (i.e., selecting the stations from which sediment should be retrieved for chemical analysis), and even for making important site management decisions. But this approach does not identify all species in the community to a low taxonomic level or quantify the numbers of species, or individuals in each species, that may be present.

In contrast, sediment collected from a subset of sampling stations (taken at the same time and with the same equipment as the chemistry samples) is processed to screen out and preserve all of the organisms (greater than 0.5 mm in size) living in the surface sediment. These samples are then sent to taxonomy laboratories for identification of the organisms (to the species level where possible), and quantification of benthic community parameters such as abundance, density, diversity, and other indices. Although this approach yields an abundance of quantitative data, it is very expensive to collect, process, and analyze, so it can only be done for a limited number of stations compared to using SPI-PV imagery. In addition, it can take more than a year for results for be available. Finally, this approach does not directly show the structure of the benthic community in the sediment column. The results from past biological monitoring at HOODS are presented in EPA's 2016 site monitoring synthesis report.[1]

[1] Available at: https://www.epa.gov/sites/production/files/2016-09/documents/humboldt_open_ocean_disposal_site_hoods_2008-2014_monitoring_synthesis_report.pdf

The synthesis report documents that no significant effects on the benthic community, aside from the presence of the sand mound itself, have resulted from the past 25 years of disposal at HOODS. EPA expects the lack of impacts to the benthic community to continue, as long as the majority of sediment disposed at HOODS continues to be sand, and as long as the site continues to be managed (as proposed) to slowly enlarge the mound by disposing over its side slopes as opposed to spreading sediment throughout the site each year. EPA may therefore opt to continue monitoring benthic community status qualitatively using the SPI-PV system, and not to regularly include quantitative benthic community sampling unless a need for it is otherwise indicated.

HOODS Periodic Site Monitoring – Typical Sampling Approach

Physical, chemical, and biological samples are collected from an array of stations that include representative locations from both within and outside the disposal site boundaries, as well as from locations both with and without the presence of disposed dredged material. Figure 8 shows a typical sampling array, in this case with 30 stations including the new HOODS reference site. SPI-PV images would initially be collected at all 30 stations, with 3-5 replicate images at each. (Additional SPI-PV stations may be needed if the dredged material deposit boundary is not adequately defined.) Sediment samples for chemistry (and possibly biology) would be collected at a subset of 1/3 to 1/2 of the stations.

The final determination of the subset of stations from which to retrieve sediment samples for chemical and/or biological evaluation in the laboratory is generally made in the field following evaluation of the most recent physical (bathymetric) survey, and preliminary analysis of the SPI-PV imagery. Sediment collection stations are selected to ensure that, overall, the collected sediment is representative of the seafloor:

- within the expanded site boundaries;
- outside the expanded site boundaries;
- on the mound within the original HOODS boundary;
- with disposed dredged material present;
- without disposed dredged material (i.e., native seafloor); and
- at the reference site.

Additional stations may be added or dropped, and/or planned stations moved, depending on the preliminary review of the SPI-PV imagery in the field. Similarly, weather and sea state conditions may also affect the field activities and limit the number of planned stations that can be sampled.

EPA develops a specific monitoring plan, including a detailed Quality Assurance Project Plan (QAPP), in advance of each periodic site monitoring event. These plans detail such things as field operations, sample collection and handling methods, and laboratory analytic requirements. Once results from all of the completed surveys are available (which typically takes 3-6 months, to well over a year if quantitative benthic community analysis is included), EPA will make the results reports (or a monitoring synthesis report if available) publicly available.

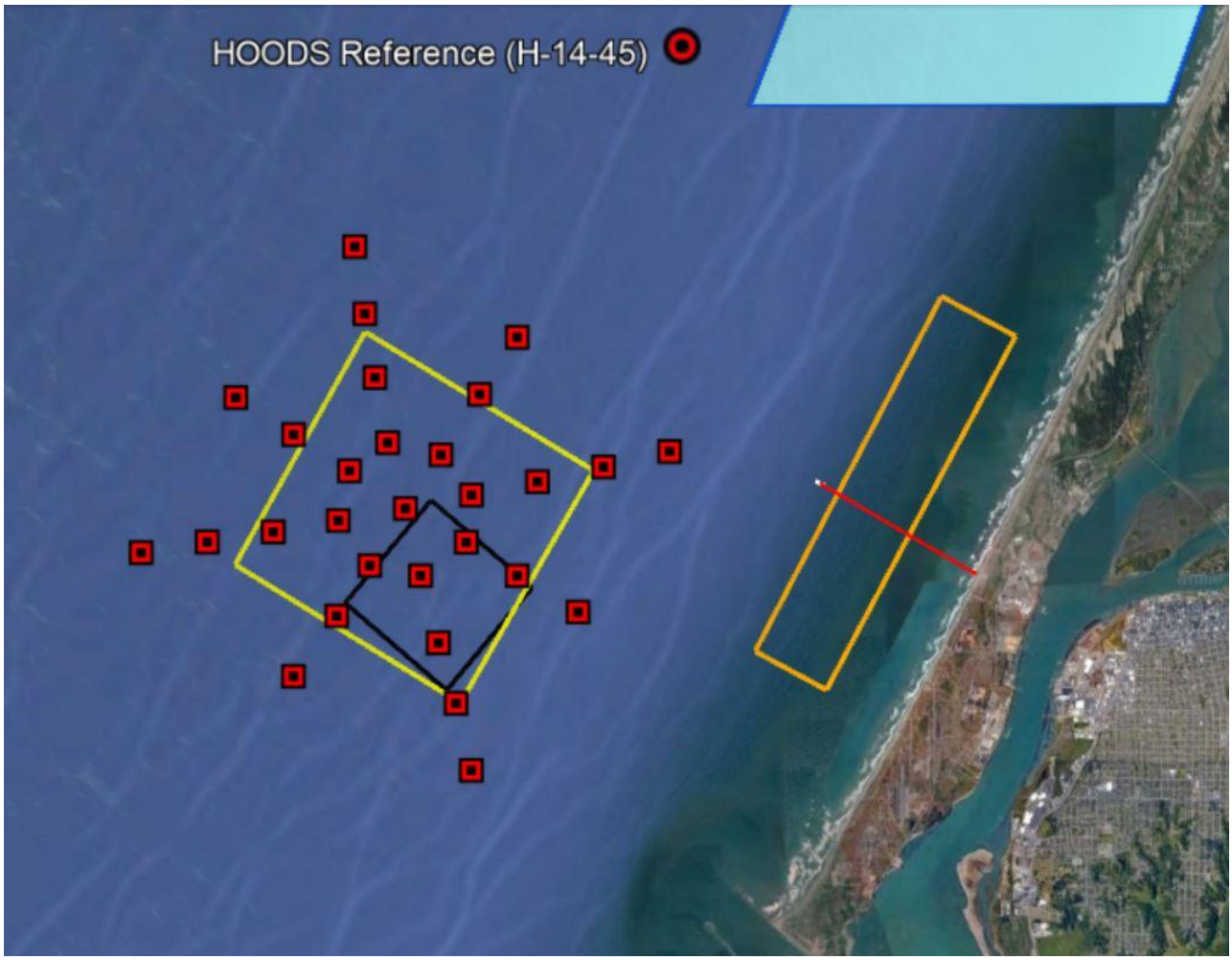


Figure 8. Typical sediment sampling station array for periodic site monitoring at HOODS. The expanded HOODS is outlined in yellow, the original HOODS (now closed) is outlined in black, and the potential future Nearshore Sand Placement Site is outlined in orange. The new HOODS reference site is also shown.

V. SITE MANAGEMENT OPTIONS

Based on the results of site monitoring (whether the annual bathymetric surveys or the more comprehensive periodic monitoring studies), EPA and the USACE will determine whether changes to the SMMP may be needed in order to ensure that any impacts are addressed and that the site remains in compliance with the MPRSA.

This SMMP does not specify particular responses to any identified or potential adverse impact indicated from monitoring. However, EPA and the USACE will consider the following range of example management actions (listed in order of increasing severity) as appropriate:

1. No Action. Monitoring results do not indicate unanticipated adverse impacts; site use may continue under the current SMMP requirements.
2. Minor modification to current disposal practices. If a potential issue is identified that can be addressed in the immediate term without collecting additional monitoring data, for example by temporarily avoiding disposal in a specific portion of the expanded HOODS, such changes can be made without modifying the SMMP or accelerating site monitoring plans.

3. Collect additional data **during** the next periodic monitoring survey. If a potential issue is identified that warrants closer evaluation, but that is not so serious that site management changes need to be made right away (or that can be avoided in the interim), special focus during the next scheduled (e.g., 10-year) periodic site monitoring survey may be appropriate. Additional data collection could include additional imagery, addition of more stations for sediment collection (for chemistry and/or biology), or completely different kinds of surveys (such as evaluation of tissue chemistry in on-site vs off-site marine organisms).
4. Collect additional data **before** the next periodic monitoring survey. If a potential impact is identified that could be serious enough to warrant site management changes, but that is uncertain or cannot be avoided in the interim, collection of additional data sooner than the next scheduled (e.g., 10-year) periodic site monitoring survey may be appropriate.
5. Revise site use practices. A variety of changes to site use requirements could be made to address impacts identified as a result of site monitoring. These may include, but are not limited to:
    a. revise the number, size, or location of closed vs allowable disposal cells;
    b. require specific dredging practices (e.g., use of a grizzly to exclude large debris);
    c. limit the volume or timing of disposal at the site;
    d. reconfigure the disposal site boundaries (enlargement requires rulemaking).
6. De-designate (close) the disposal site entirely. Closing the expanded HOODS could be appropriate if monitoring indicates that disposal at HOODS has caused unacceptable environmental impacts within or beyond the site boundary, and that other corrective actions are or would be ineffective in preventing or correcting them. Closing the disposal site may have to be preceded by identification of an acceptable alternative ocean disposal site. Monitoring of the closed site may need to continue, to ensure that adverse effects do not worsen and to allow any necessary remedial actions to proceed in a timely manner.

VI. UPDATING THE SMMP

SMMP updates are required to be considered at least every 10 years, based on the results of periodic site monitoring. This draft SMMP is expected to be in effect for ocean disposal activity at HOODS beginning in 2021, following completion of the rulemaking process to expand HOODS. Therefore, absent any modifications or updates in the interim, this SMMP could be in place through 2031 before it would need to be updated again. EPA will provide another opportunity for public input before the next SMMP update. In particular, any proposed substantive changes to the provisions of this SMMP (such as some of the management actions listed in Section V) would be highlighted, and the need for them specifically discussed.

APPENDIX

COORDINATES OF INDIVIDUAL DISPOSAL CELLS IN THE EXPANDED HOODS

[ALLAN – need table inserted here!]