DQM: ROLES AND RESPONSIBILITIES

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National Dredging Quality Management Program
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National Dredging Quality Management Program
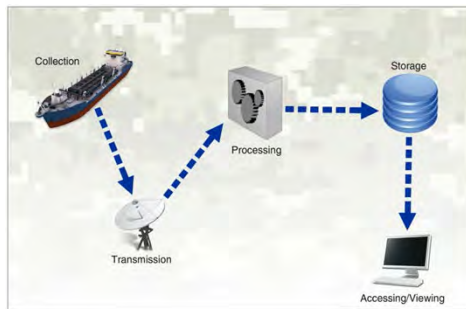
The National Dredging Quality Management (DQM) Program is a Corps-Dredging Industry partnership for automated monitoring of dredge activities to provide quality near-real-time data for Corps dredging projects. On-board sensors continually monitor dredge activities and the data is routed to the DQM Center for processing, storage and publishing. The DQM web-based tools can be utilized to view project operations, produce disposal plots, and export dredge data for better understanding and oversight of dredge operations.

The National Dredging Quality Management (DQM) Program is a partnership between the US Army Corps of Engineers (USACE) and the dredging industry for automated monitoring of dredge activities. DQM's goals are to provide quality near-real-time data that allows for rapid response to emerging situations, improve business practices, ensure environmental compliance, and increase our understanding of dredging science and technology.

The current DQM Program was originally developed as a research project called Silent Inspector (SI) at the US Army Engineer Research and Development Center (ERDC). With the release of the CECW-CO Memorandum "Implementation of Automated Dredging Quality Assurance Monitoring" (17 April 2006), SI was migrated into a nationwide operational program under the Operations Division's Spatial Data Branch (CESAM-OP-J) at the USACE Mobile District. Initially, the program was to monitor all Civil Works dredging projects using hopper dredges and/or scows, but over time this mandate has been amended to add guidance for monitoring projects requiring DQM permits and for monitoring pipeline dredges.

Sensor data collected by DQM can be evaluated to answer the following questions about dredging activities:
• What is the location of dredging and material placement?
• How is the dredge operating at any particular time?
• Is the project progressing at the anticipated rate?
• Are operations in compliance with requirements?

One of the major benefits of mandating the DQM Program has been the standardized collection of dredging data so that as a plant moves from District to District, or contract to contract, it does not have to install/uninstall instrumentation to meet local requirements. Since everyone is collecting the same information, better comparisons can be made of dredge operations across the country. The DQM Center provides specifications; a central storage repository for all dredging data, which makes it easily accessible to a variety of interested parties); and tools to view and analyze the data. The DQM system, consisting of both hardware and USACE-developed software, provides USACE with timely data access, multiple reporting formats, and full technical support (including dredge certifications, data quality control, and database management).

The Operations and Dredging Endangered Species System (ODESS) was developed by the USACE Mobile District's Spatial Data Branch/DQM in 2017 with the following goals:

- To automate data collection and provide an interactive decision-making tool that measures the impact of hopper dredging activities on threatened and endangered species (TES)

- To assist other agencies in the evaluation of this data

ODESS provides a platform to centralize and archive TES data from dredging activities for long-term continuity and evaluation across regions and under the various negotiated Biological Opinions. ODESS is a dynamic program that is continually being populated and updated.

ODESS can be divided into three components based on the type of user:

- **Data collection**—Stores electronically gathered load and incident records from on-site observers

- **USACE-only intranet site**—Provides a location for USACE District personnel to review and evaluate information received from the field

- **Public website**—Displays current information regarding reported incidents and status with respect to the various regional biological opinions

DQM CENTER PERSONNEL

Rhonda Lenoir—DQM Program Manager, Systems Manager

- **Brenda Allen—**Specifications, Certifications, Data Acquisition and Analysis
- **Anne Baumhower—**Data QA, Report Coordination
- **Jesse Hall—**Dredge Plant Support, Data Acquisition and QA, Special Analyses
- **Jacob Lambert—**Operational and Customer Support (Project Tracking, Viewer), Financial Management
- **Michael Sessions—**ODESS Program Manager

* Field QA Team, Contractor Development Teams (Mobile/Seattle)

| Overview | Data Oversight | Data Usage |

The DQM and ODESS teams are comprised of Government and contractor personnel based in the USACE Mobile District office and are also located remotely on the East and West Coasts (Charleston and Seattle, respectively).

Part of the Operations Division's Spatial Data Branch, the DQM Center is anchored by five USACE engineers led by Program Manager Rhonda Lenoir. Duties are spread out over several functional areas, including Dredge Support, Operational/ Customer Support, Data Oversight, and Innovation and Integration. Further support for field evaluations, software development, and database management is provided by contractor personnel.
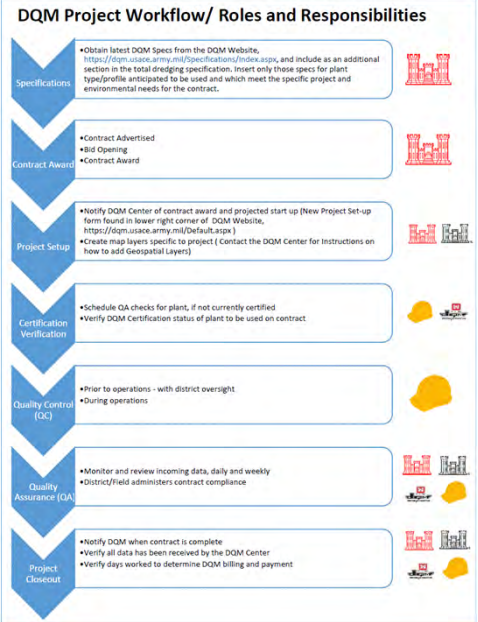
To understand what part you might play throughout the course of a dredging contract, DQM has attempted to lay out where each entity (Local District, Field Office, DQM Center, or Contractor) is involved and their responsibilities during the phases of a dredging contract.

Contract phases are defined as follows:

- **Specifications**—Prepare the dredging requirements

- **Contract Award**—Activate the dredging contract process

- **Project Setup**—Prepare for the start of dredging

- **Certification Verification**—Verify that all plant and personnel are qualified to dredge

- **Quality Control (QC)**—Oversee maintenance of the dredge plant and processes

- **Quality Assurance (QA)**—Monitor and review incoming data and contract compliance

- **Project Closeout**—Verify that the project is complete

ACCESS
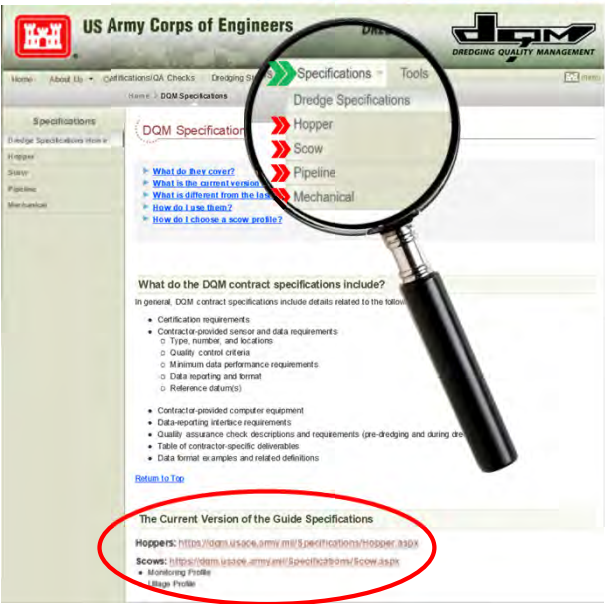
- Latest specifications are on the DQM Website
- Include Endangered Species Monitoring Guidance (ODESS)

Available in 3 formats for each plant type:

Civil Works — Word (.doc)

Civil Works — SpecsIntact (.sec)

Regulatory — Word (.doc)

Note: Pipeline monitoring is mandated only for Unrestricted (Full and Open Competition) contracts.

https://dqm.usace.army.mil/Specifications/Index.aspx

The process of conducting a dredging contract begins with preparation of the contract package (putting together the specifications) at the local USACE District. The DQM Center has prepared specifications for each dredge plant type—hoppers, scows, and pipelines. Because specifications are considered living documents and are continually revised to clarify requirements or to incorporate new policy or technology, specification writers should verify that they have the most recent version of the specifications to include in their packages. Specifications can be found on the DQM website at https://dqm.usace.army.mil/Specifications/Index.aspx. Either select the appropriate plant type from the Specifications drop-down menu (as magnified in the slide above) or click one of the links under "The Current Version of the Guide Specifications" heading. Three format options are available for each plant type or profile: Word and SpecsIntact versions for Civil Works contracts and a Word version for regulatory permits.

The DQM specification section is entitled 35 20 23.23. Include only the specifications for the plant types you expect to use on the contract. For example, if you are advertising for a hopper contract, you do not need to include the scow and pipeline sections, nor do you need to include both options for scows, just the one you want to use. We recommend the monitoring profile for scows as the basic profile since the relatively minor addition of draft sensors allows a better indication of dredging/disposing as well as tracking the potential for leakage. Scow ullage profiles are often required on high-profile contracts where EPA monitoring is performed. The scow tracking profile has been eliminated since it did not provide enough information to effectively determine dredge state.

Use of DQM monitoring has been mandated for all hopper and scow Civil Works projects and for regulatory projects requiring a USACE permit. Although DQM monitoring of pipeline dredges is now mandated for Civil Works contracts, it is currently required only for Unrestricted contracts. This does not mean that you cannot include the specs for a Restricted (small business set aside or sole source) contract for high-visibility projects or projects with stringent environmental concerns. In these cases, DQM monitoring might be required if deemed expedient, or a clause can be added that if the dredge used has a valid DQM system already installed, then the data should be submitted as per a regular contract. Pipeline monitoring guidelines for Regulatory projects are being reviewed.

WHAT TO EXPECT

Specifications
Contract Award
Project Setup
Certification Verification
Quality Control (QC)
Quality Assurance (QA)
Project Closeout

- Performance-based
  - Required Parameters
  - Collection/transmission frequency
  - Data format

- Allow 48 hours to address an issue once identified

- Enforced through retainage by the local USACE District; not meant to shut down operations

DQM specifications are performance based and provide the following:

- The data required for a given profile and the required accuracy and resolution of the data collected. Instead of listing specific sensors to be included in the instrumentation package, listing accuracy and resolution requirements allows individual contractors to choose the brand or model they deem the most cost effective.

- A description of the required frequency of data collection/transmission to provide a complete dataset. Generally, data should be collected every 6-12 seconds. This rate is relaxed for scows during transit or when stationary (to save power on the data logger/modem).

- Guidance for the format of the data transmitted to the DQM Center. Hopper data is provided in XML format and is sent as individual data strings containing all parameters for each date/time datapoint. Pipeline and scow data are also provided as individual data strings, but in JSON format.

- Hopper and pipeline data are transmitted to a dedicated web service as they are collected whereas scow data is transmitted via other mechanisms. Provisions are also described for providing data backups if the Internet connection is poor or lost.

If issues with the sensor data are discovered during the QA process (such as missing data or static values), the contractor is given 48 hours after the issue has been brought to their attention to correct the problem or provide a plan to correct the problem if extenuating circumstances prevent an immediate solution (for example, qualified personnel cannot get on site in a timely manner or a part needs to be specially manufactured). Although DQM can apprise the local USACE District of potential issues, they do not have the authority to enforce this provision. The intent of DQM monitoring is not to shut down operations for non-compliance issues; therefore, the specifications indicate that if the specifications are not upheld, the local District shall use the mechanism of retainage to enforce compliance.

ODESS

Specifications

Contract Award

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- Contracts in areas with biological opinions (SARBO, GARBO, individual project BO)

- Include in Section 01.57.20 "Environmental Protection"

- Mandates use of the ODESS automated system by contractor observers
  - Collect load observer reports via tablet
  - Document endangered species incidents

ODESS

Operations and Dredging Endangered Species System (ODESS) Guidance

This guidance should be incorporated into Section 01 57 20, "Environmental Protection," of the dredging specification based on the specific contract requirements and the discretion of USACE personnel. It is designed for both the dredging Contractor and the Endangered Species Observers responsible for monitoring the potential presence of sea turtles, sturgeon, and large whales.

MONITORING ENDANGERED SPECIES

Maintenance of US waterways for navigation is essential for national and international trade, job creation, and national security as well as for hydropower, flood protection, municipal water supply, agricultural irrigation, recreation, and regional development.

Typically, cutterhead pipeline, hopper, and mechanical dredges are used to maintain navigation depths in these channels and to construct new waterways. However, hopper dredging in the southeastern US potentially impacts five species of threatened or endangered sea turtles (Kemp's ridley, leatherback, loggerhead, green, hawksbill) and three species of sturgeon (shortnose, gulf, and atlantic).

To monitor these impacts and assist in the evaluation of these data, the US Army Corps of Engineers (USACE) Engineer Research and Development Center (ERDC) created the Sea Turtle Data Warehouse (STDW) in 1992. The database was designed as a central repository for current and historical data on impacted sea turtles.

In 2014 the US Army Corps of Engineers, National Dredging Quality Management Program (DQM), at the request of USACE Headquarters (HQUSACE), partnered with ERDC, the US Army Corps of Engineers, Mobile District, Spatial Data Branch (CESAM-OP-J) and Bowhead to develop a new and enhanced STDW database and website. This new Program is referred to as the Operations & Dredging Endangered Species System (ODESS) Program. The use of ODESS will facilitate enhanced monitoring and data collection, enable faster transmittal of information, and meet threatened and endangered species reporting requirements to the National Marine Fisheries Service (NMFS).

Guidance for use of ODESS monitoring is also available from the DQM Center for inclusion in the specification package. All projects covered under either a regional biological opinion (SARBO or GARBO) or an individual project biological opinion (BO) shall include this guidance in Section 01.57.20 "Environmental Protection." This document requires the use of ODESS by contractor observers and includes instructions in how to use the automated system to record observer reports and to document endangered species incidents.
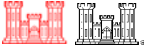
CONTRACTING

- Contract Advertised on FBO
- Bid Opening
- Contract Award

Once the contract package is complete, it will be advertised in Fed Biz Ops and entered into the Dredging Information System (DIS) by local USACE District contracting personnel, eventually leading to the award of the contract.
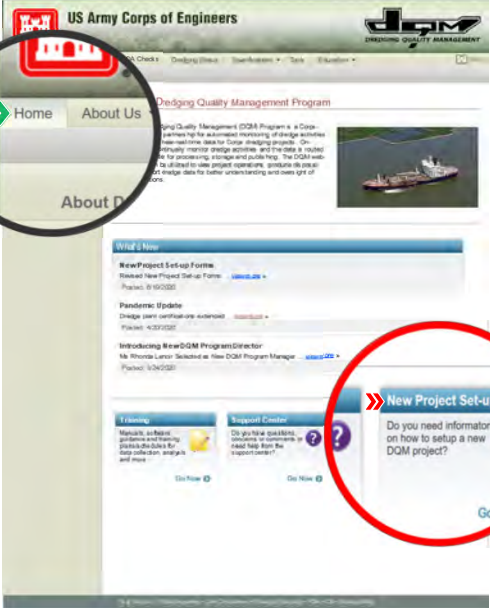
SET UP YOUR PROJECT

- Complete New Project Setup form on DQM Website
- Load custom map layers

https://dqm.usace.army.mil/Default.aspx

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Some preliminary work must be done in order to be ready to track a project from the start of dredging, including sharing basic contract information, contacts, and contract-specific information that needs to be tracked. The local USACE District must notify DQM about upcoming projects by submitting a New Project Request Form.

The New Project Request Form is available on the DQM Home page (https://dqm.usace.army.mil/Default.aspx) in the lower-right corner. When you click New Project Set-up, a PDF file is downloaded to your computer.

After filling out the New Project Request Form as completely as possible, click Submit in the bottom-right corner to send it to the DQM Center.
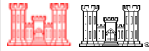
VALUE FROM YOUR DATA

- General contract information
- Project Area information
- Contacts and Reporting Requirement

The New Project Request Form asks for some basic information regarding the dredging contract, including the correct contract/permit number, project area, type of contract, and plant to be used. This information will be used to track and categorize the data for the local USACE District and upper management. The form also includes space to include contacts for various reports to be generated and distributed during the course of the contract. As much as possible, the fields allow for checking a box or selecting a choice from a drop-down menu; however, some fields require the entry of short text or descriptors specific to the contract. After filling out the New Project Request Form as completely as possible click the Submit button in the bottom-right corner to send the form directly to the DQM Center.

We recently revised the New Project Request Form to collect more complete information that will be used for data organization and analysis. In addition to the standard fields that allow the data to be displayed correctly within the DQM database and the DQM Online Data Viewer, new fields have been added that allow for system improvements and deeper levels of data analysis. This new information will enable increased automation in our processes, and collecting this information will allow us to better tune our algorithms and include historical data when putting that automation into production. And we still managed to keep it all to a single page!

The data collected in the New Project Request Form is used to fulfill at least one of several different goals within DQM. These goals include the following:

- **To aid in data organization and navigation within the DQM Online Data Viewer**—This data, generally found in the upper third of the form, is primarily contract related. The ability to attach drawings or information about dredging or placement areas also falls in this category. These fields include **USACE District**, **Contract/Permit Number**, **Contract Name, Contractor, Plant names, Profile Type, Project Area, State Plane**, and **Time Zone.**

- **To assist in report generation and automation**—Currently, reports are manually compiled and distributed (generally on a District-by-District basis). We hope to automate this process in the near future to send data about only a specific contract to those who specifically request that data. Many of the above fields are also necessary to automate the report-building process while keeping the existing formatting. These fields include information on District contacts and the types of reports they want to receive as well as fields which would help categorize the data for upper-level reporting.

- **To improve existing processes or to support future automation**—Certain fields were added or expanded to allow the creation of alerts or to assist in improving production calculations and tracking. For example:
    1. Individual dredging and placement areas and their related information will enable the creation of alerts when events occur outside of the designated areas.
    2. New Project Request Forms received well in advance of a project start will enable the detection of when dredges move between contracts by monitoring where dredging and placement occur.
    3. Information on estimated volumes will enable better tracking of contract progress and estimate how much longer to expect a dredge to be at a given location. This can be utilized by HQUSACE to better inform weekly dredge schedules.
    4. Collecting information about the in-situ water and material densities allows for more accurate volume and production calculations.
    5. Other fields such as disposal method and dredging depth also allow for alerts to be created. More importantly, however, they allow for better automated QA processes.

ADDING A MAP LAYER
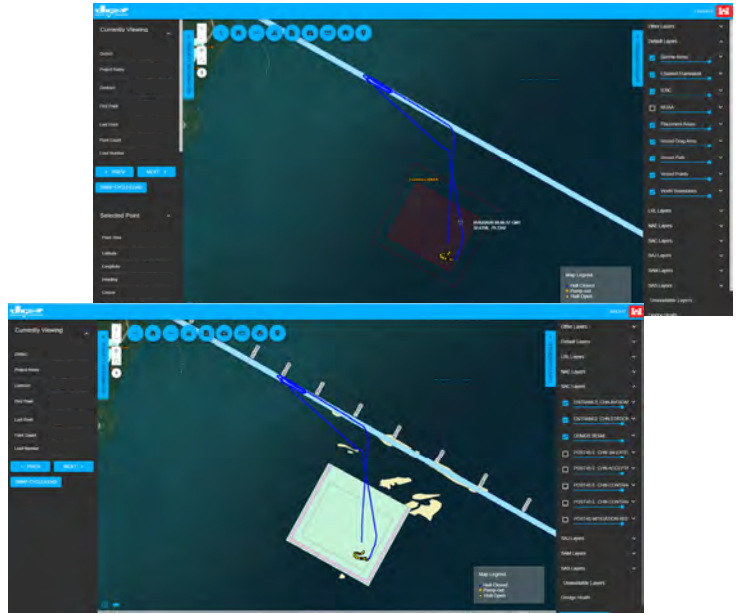
In addition to the general world basemap, over which the dredge track is plotted, additional features can be overlaid on the view as "layers." If these features are generally standardized across USACE and remain constant over a period of years (for example, placement areas, borrow areas, the Navigation Channel Framework, and Inland Electronic Navigation Charts), then these layers are automatically visible as one of the "default" layers found on the Layer Control tab on the right side of the DQM Online Data Viewer screen. Additional layers such as AIS data, NOAA weather conditions, and the latest eHydro surveys may be added to these default choices later.

Often, however, there are additional features which are applicable only to a certain area/District or a particular year or contract, such as individual dredge cuts, temporary dredging/placement area modifications, avoidance zones, or specific sub-cells within placement areas. These layers can be added by the local District via a REST service on the USACE Geospatial Platform and made available to the Viewer. These "short-term" or "custom" layers can be activated from the District Layers options under the Layer Control tab.

Although any of these layers available from the USACE Geospatial Platform can be shown as map overlays on the Viewer, they cannot be downloaded from there for use in other applications. However, if the layers are activated in the Viewer, they display on any screenshots or reports generated from the Viewer.
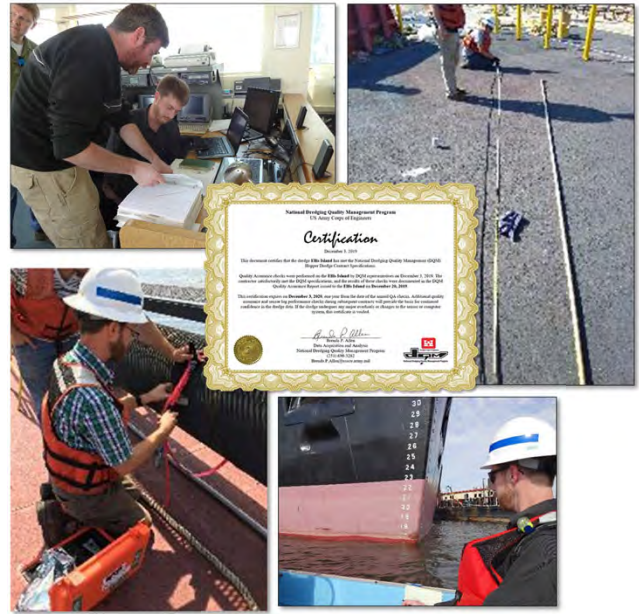
Upon request, the DQM Center can provide a guidance document to walk the local District through setting up the REST service to display these custom layers. If you have any additional questions about the process, do not hesitate to contact the DQM Center.

THE ROOT OF GOOD DATA

- Schedule/Conduct QA Checks
- Verify Certification Status of Plants to be Used
- Certify Observers

Specifications
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Project Closeout

Another aspect of getting ready to start up a contract is to verify that everything is in place to obtain the best possible data. The DQM Data Acquisition Team performs annual on-site checks of each contractor's instrumentation system to verify that it is capable of meeting the minimum requirements set forth in the specifications. It is the responsibility of the contractor to schedule these annual checks. Local USACE personnel are welcome to attend the visits. During the on-site visits, team members check manual vs electronic readings, documentation of the equipment, and the calculations made on the data. Depending on the type of plant, checks can include position checks, draft sensor checks, ullage sounding checks, and draghead or cutterhead depth checks. Additionally, a velocity or dye test is performed on pipeline dredges. Guidance documents describing the procedures for conducting the annual checks are available from the DQM website.

Preliminary results are reported to both the contractor and the local USACE District either verbally or by email. Within two weeks, the team issues a trip report, summarizing the results of the visit. After a review of that report, certification letters are issued by the DQM Center. Copies of the trip report and letter of certification are transmitted to the contractor, and certification is updated on the DQM website. Certification *does not* mean that the plant will continually meet requirements, only that it is capable of doing so. Continuing QC by the contractor and QA by USACE is necessary to ensure that good quality data is collected.

CERTIFICATION STATUS

Interested parties can verify the certification status of a particular plant by going to the DQM website and clicking the Dredging Status tab. A listing of all plants, whether each plant is currently fully or conditionally certified, and the date of the last QA check can be downloaded from the Dredging Status page. A listing of all active projects/plants is also available from this page.

COVID-19 RESPONSE PLAN

Specifications

Contract Award

Project Setup

Certification Verification

Quality Control (QC)

Quality Assurance (QA)

Project Closeout

- Response Plan for DQM Certification Checks

- Pre-Site Visit Survey

Until QA checks are back to their normal annual routine, plants which may be denied on-site visits due to a negative risk analysis shall be extended until conditions improve.

New plants shall automatically be issued a conditional certification after submission of a Dredge Plant Instrumentation Plan (DPIP) and documentation of installation, including receipt of an acceptable data string.

All QA field checks have currently been suspended due to the pandemic. As important as data acquisition is to overseeing improvements to our National infrastructure, the safety of both our staff and the dredge crews remains our highest concern. To address that need, the DQM Center has created a plan to evaluate risk and provide guidance on which projects/dredge plants can be visited again. The plan adopted by the DQM Program seeks to balance Individual Risks (testing, health monitoring, and PPE requirements), Site Risks (destination area, travel mode, accommodations, and dredge plant access), Exposure Risks (limiting personnel and duration of exposure), and Procedure Modifications (increased communications, pre-visit preparations, and modifications to the dredging cycle to reduce exposure).

Prior to accepting a request for on-site checks, the DQM Center will ask contractors/system providers to complete a questionnaire describing their pandemic precautions. The questionnaire will be evaluated in our risk analysis process to decide whether to proceed with the appointment. Until QA checks are back to their normal annual routine, plants which may be denied on-site visits due to a negative risk analysis shall be extended until conditions improve. New plants shall automatically be issued a conditional certification after submission of a Dredge Plant Instrumentation Plan (DPIP) and documentation of installation, including receipt of an acceptable data string.
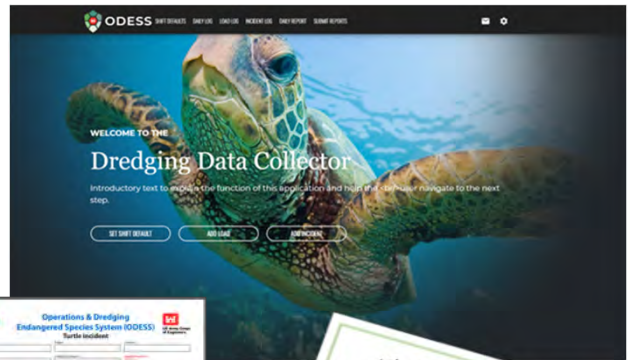
For Operations & Dredging Endangered Species System (ODESS) projects, observer companies must supply a tablet with Internet capability and coordinate with the ODESS Center to ensure that the Field Data Collection Toolkit (FC) software has been remotely installed by ODESS Support. The FC, a stand-alone tool that can be run from a computer/tablet in the field to collect Listed Species Observation data, replicates the old paper observer reports in a digital format. If, for some reason, the electronic version is not available, we have paper versions available on the dredge plants as well for later entry into the electronic forms. ODESS Support conducts online and in-person training for observers on how to use the FC to collect data regarding TES monitoring on the dredge and to report incidents or "takes." Successful completion of this training results in ODESS system certification for the observer.
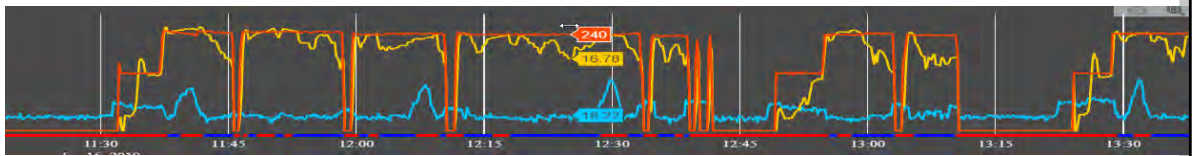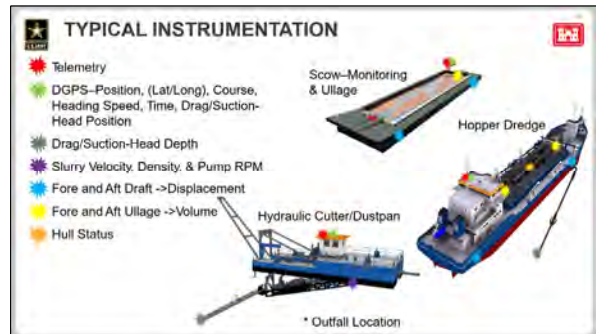
Upon project setup, which includes the initiation of contract and plant information and registration of individual observers, links are made with the DQM database to automatically fill in some of the basic report information for subsequent entries. Observers enter data for each dredging load, including general information on site conditions (such as weather and sea conditions) as well as a description of cage contents. This data is correlated with DQM data regarding dredging locations and slurry quantities for the corresponding load. In the case of an incident, additional data is entered, and the tablet can be used to take photographs to attach to the report. These reports are transmitted via the Internet after completion or when telemetry is available.

DATA QUALITY MAINTENANCE

Specifications
Contract Award
Project Setup
Certification Verification
Quality Control (QC)
Quality Assurance (QA)
Project Closeout

- Contractors ensure data continues to meet DQM minimum specifications

- Prior to and during operations

TYPICAL INSTRUMENTATION

- Telemetry
- DGPS–Position, (Lat/Long), Course, Heading Speed, Time, Drag/Suction-Head Position
- Drag/Suction-Head Depth
- Slurry Velocity, Density, & Pump RPM
- Fore and Aft Draft ->Displacement
- Fore and Aft Ullage ->Volume
- Hull Status

Scow–Monitoring & Ullage

Hopper Dredge

Hydraulic Cutter/Dustpan

* Outfall Location

QC is performed by the contractor's dredge crews and shoreside personnel according to their QC plan, which must be approved as part of the contracting process. In the case of DQM, the contractor ensures that all sensors necessary to provide the required data parameters are properly installed and calibrated, and that they will be monitored and maintained over the course of the contract. They are also required to provide documentation through the Resident Management System (RMS) and other reports throughout the project. To be noted, the type of daily reports that are sent to RMS are different and separate from DQM, but we are working toward linking the two databases to reduce the need for duplicate data entries in the future.
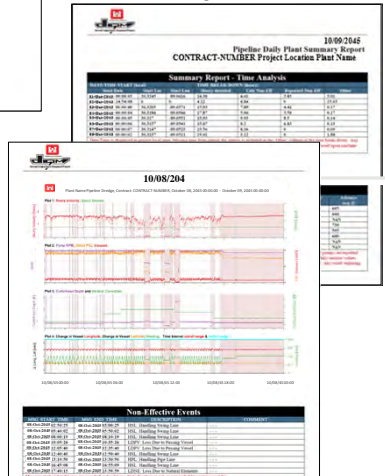
DATA QUALITY OVERSIGHT

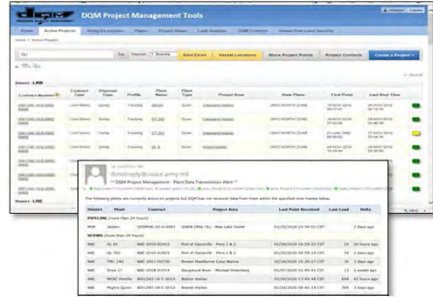- Monitor and review incoming data: daily and weekly
- Enforce contract compliance

DQM Email Alerts

Pipeline

DQM Project Administration Tools

For the DQM Center, continued quality assurance consists of monitoring that the data is being received daily and that the sensors are reporting as expected. To assist in this endeavor, DQM has developed automated reports and alerts to track incoming data to ensure that it is being delivered in a timely fashion. Active projects are monitored by the DQM in-house Project Administration tool—color-coded icons highlight the extent of time that has elapsed since the last data point was received for a given plant. (We want to see all green!) Email alerts listing plant for which no data has been received within the last 24-hour period are generated each morning and sent to the DQM Support Team for followup with the system providers/contractors.
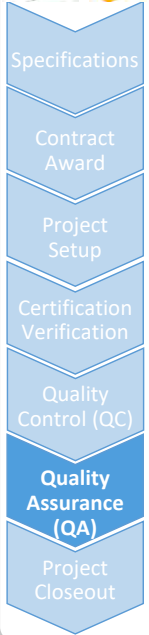
The DQM Center is in the process of automating QA checks on incoming data in order to flag "bad" sensors and identify data gaps. However, this "sensor health check," which is used to prepare weekly reports for the dredging contractors to inform them of any problems, is currently being truthed by visual inspection of time series graphs of the collected parameters. The email notices list any data gaps noted and provide guidance on the perceived severity of any sensor irregularities.

Each week, generally on Thursday or Friday, the DQM Center emails the local District contacts identified on the New Project Request Form a list of all dredge plants in their District that have data quality issues identified during a review of the previous weeks' data. Comments are classified as "Investigate Further" (issues we would like to have resolves along with an explanation of the issue or a plan of action for resolving the issue), "Advisory Items" (items that we noticed but that we do not feel are significant enough to warrant immediate action; such as one-off incidents or minor issues with "lower-importance" sensors which generally do not affect our ability to make dredge state determinations or perform data analysis), and "Acknowledged" (issues that have been previously identified and for which a plan of action or explanation has been provided by the contractor; these are listed until they are resolved or the planned timeframe for repair has elapsed, at which time they are moved back to "Investigate Further").

Additionally, because much of the "state" data received from pipeline dredges is not available on the DQM Online Data Viewer, weekly summary reports of this data are generated and sent out to the local Districts to verify receipt of the information and to provide an easy way to view this data.

DQM-GENERATED REPORTS

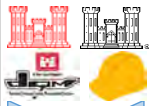- Load Summary Reports
- Turtle Incident Reports
- EPA and BOEMRE Reports

Specifications
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Quality Control (QC)
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Project Closeout

Load Summary

Turtle Incident

Turtle Take Hourly Plot

BOEMRE

VESSEL TRANSIT SUMMARY REPORT

EPA

EPA Vessel Monitoring Data

Weekly load summary reports are automatically generated and forwarded to involved parties at the conclusion of a contract/work instance. These reports have been customized to reflect the unique requirements of various USACE Districts (for example, CENAE's DAMOS Load Summary reports and CESAM's Transit Summary reports).

The Turtle Incident reports generated from the MATLAB program have been used quite often, especially in the Jacksonville District as part of its risk assessment process. The DQM Center is receiving very positive feedback on the usefulness of this data to better understand dredge conditions during the time when a turtle is taken, resulting in more understanding and confidence in continuing dredging operations in lieu of shutting down operations.

Although similar information can be gleaned from DQM Online Data Viewer graphs, the PDF hour-by-hour and load summary plots generated by the Turtle Incident report make this assessment easier. The report must now be requested directly from the DQM Center, but we plan to make an "easy button" for the field to run it from either the DQM Online Data Viewer or the ODESS website. The report itself is an export of dragarm parameters during the load in question, but color codes vulnerable periods for a potential take according to filters based on material type and threshold values. The graphs can be reviewed to evaluate whether the dragheads maintained contact with the bottom or whether velocities indicated that the dragarm was sucking mainly water, increasing the potential to take a turtle. A presentation on how to evaluate Turtle Incident reports will be available soon from the DQM Center.

USACE has a joint effort with EPA Regions 4 and Region 6 to standardize the EPA dredging data reporting requirements within the USACE South Atlantic Division. This has reduced the burden on the Districts and contractors to develop this information individually and has helped standardize the process, allowing for better controls of sensitive information. The two dredge monitoring systems, although significantly different in design, complement each other, helping both agencies meet specific needs and uses. In addition to assisting Districts for environmental compliance, USACE can use the data to improve performance-monitoring business practices and provide dredging information and data to support the National Dredging Mission. The local district is currently responsible for detecting and addressing compliance issues such as material leak detection and

environmental and/or operational constraints. The DQM Center has considered creating automated alerts for the local district to help identify issues more rapidly and is interested in getting feedback about the level of need for this analysis from the dredging community. Examples of alerts for events of interest might be, 1) when a vessel exceeds the 10 kt speed limit in designated slow zones, 2) loss of material during transit (leakage), 3) entry into no-go zones, 4) reporting hull open status outside of a disposal area, 5) others? The development of alerts would help to quickly attract the attention of the districts during their daily review of project data, with the intention of addressing issues quickly and reducing unintentional violations. We are hoping to have further conversations to work out the details about the possibilities for these types of alerts.

The DQM Center can also produce a specialized BOEMRE report, which filters and formats the data to reflect operations in the borrow area. An interagency agreement assists in the development of an algorithm to use these reports to evaluate borrow area usage.

DQM VIEWER 3.0

- Nation-wide 24/7 dredge monitoring

- Displays hoppers, scows, and pipelines

- Data can be exported (PDF reports, CSV files)

- Works best in Google Chrome

The DQM interactive web-based Online Data Viewer web application allows users to select dredging projects, graph load or daily data, manage and request placement information, and export data. We are continually adding security measures, providing additional report options, and including utilization of more spatial features to enhance the user experience.

- It is completely web-based and is available 24 hours a day, 7 days a week.

- The data available is near-real-time, typically within approximately 10 minutes of the time it was collected.

- Hopper, scow, and pipeline dredge data can be visualized.

- Data can be exported in other formats (for example, PDF reports and CSV files).

- Development of new features and improvements is ongoing.

- It works best in Google Chrome!

All USACE personnel are able to access all portions of the DQM Viewer, but they must first register their CAC by going to the Viewer and then waiting for email notification that access has been granted. Non-USACE users (contract/system provider technical personnel) may be granted I-PASS access to specific plant or contract data. Directions on how to log in to the Viewer are available from the DQM Center on request. Because it contains some proprietary information, access to the program's tools (such as the web-based Online Data Viewer shown here) is available only to USACE personnel and the designated contractor personnel during the active project period. Dredging data can be requested through the FOIA process, however certain parameters are proprietary and therefore may not be available for release.
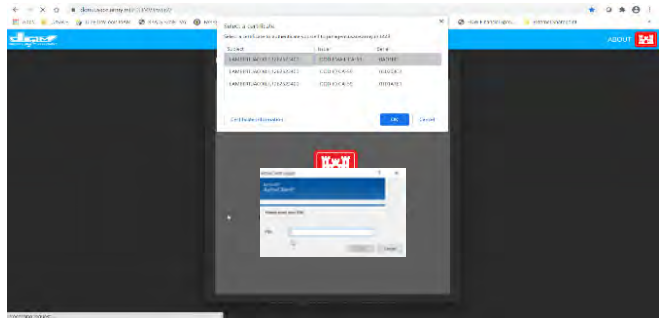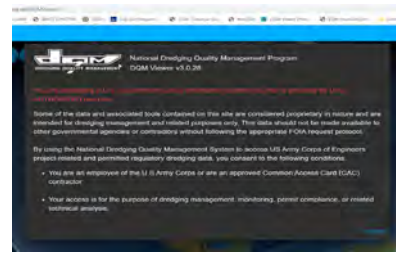
DQM VIEWER TRAINING

Specifications
Contract Award
Project Setup
Certification Verification
Quality Control (QC)
Quality Assurance (QA)
Project Closeout

https://dqm.usace.army.mil/DQMViewer2/

- CAC Log-in

Disclaimer:

- Proprietary dredging data is protected by law
- For internal official USACE use only
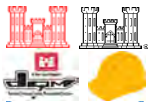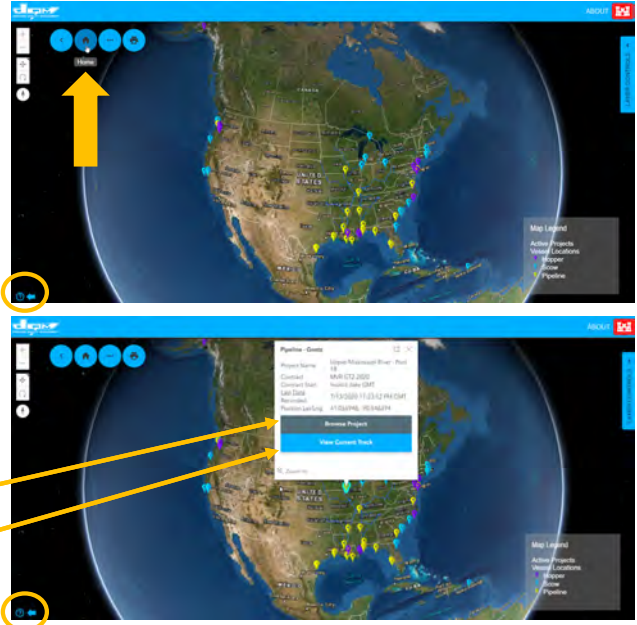- Do not share data with outside Government Agencies

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The DQM Viewer can be accessed here: https://dqm.usace.army.mil/dqmviewer2/

Use your CAC to log in to the system.

Once you log in, you will see a disclaimer, stating that the data that you are viewing is proprietary, protected by law, and cannot be made available to other Governmental agencies or contractors without following the appropriate FOIA request protocol.

When a project requires reports to be sent to the EPA or BOEMRE, customized reports are generated by DQM that specifically do not include proprietary information.

DQM VIEWER BASICS

Specifications

Contract Award

Project Setup

Certification Verification

Quality Control (QC)

Quality Assurance (QA)

Project Closeout

- Home Screen

- Selecting a Project

- Plotting Vessel Tracks & Graphing Dredge Data

- Requesting Reports

- Requesting Exports

These topics are covered in this high-level demonstration of the DQM Online Data Viewer.

More in-depth training on the DQM Online Data Viewer can be requested, and the DQM Center will work with you to arrange a time for a live demonstration.

HOME SCREEN

Home Screen

- All currently active dredging projects
- Click 'Home' button to return to this screen at any time

Push-Pins

- **PURPLE** = Hopper Dredge
- **BLUE** = Scow / Barge
- **YELLOW** = Pipeline Dredge
- Click on a push-pin for project info
- **Browse Project** = plot a specific load or a specific day
- **View Current Track** = plot the vessel's current load or current day.

The DQM Online Data Viewer landing page, or Home screen, indicates the locations of active projects and allows the user to select and zoom to an individual project.

- Clicking the question mark in the lower-left corner displays a looping video tutorial on the various features available on this page.

- The Home button can be used at any time return to the Home screen and start over.

- The pushpins show the locations of active dredging projects and are color-coded by dredge plant type.

- Clicking a pushpin opens a window (lower image in the slide above) with project visualization options.

  - Clicking Browse Project in this window takes you to the Selectron for the contract and project, allowing you to plot a specific load or day.

  - Clicking View Current Track takes you straight to the data for that contract and project, displaying the current vessel track as well as an information panel.
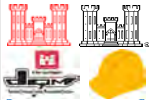
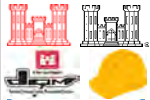**SELECTING A PROJECT**

Two Ways to Find Your Project:

1) Select Data button

2) Browse Project button from a push-pin
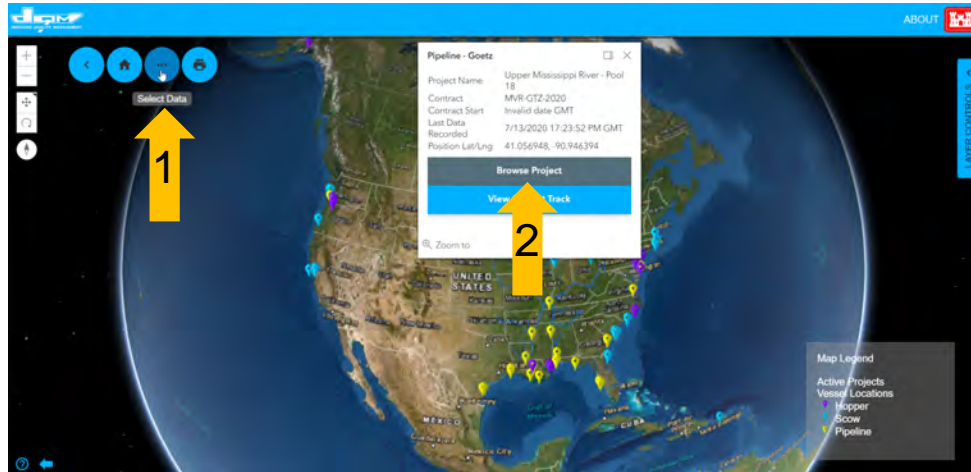
There are two ways find project data for current and historical contracts:

• Click the Select Data button in the top-left corner of the screen.

• Click a pushpin and then click the Browse Project button in the window that opens (this way was briefly mentioned on the previous slide.
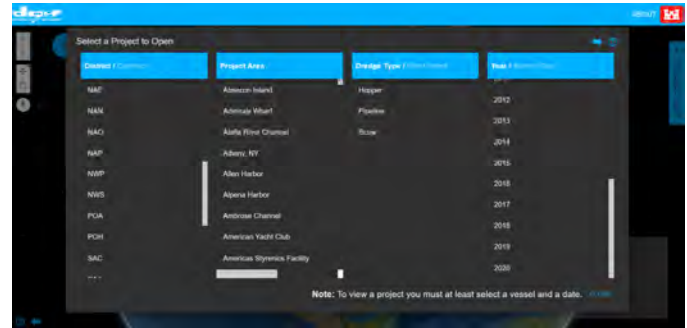
SELECTING A PROJECT (1)

Work from left to right on the menu.

Note: Click-and-Drag the top of each column to rearrange the column order

1. Select the District acronym of where the project is located.
2. Select the contract number.
3. Select the project area
4. Select either hopper, scow or pipeline, then the name of the vessel
5. Select the desired date

Note on plotting the vessel tracks:
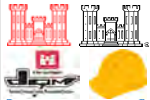- Hopper/Scow: double-click a load # or cycle #
- Pipeline: double-click a specific day

Sidebar menu: Specifications | Contract Award | Project Setup | Certification Verification | Quality Control (QC) | **Quality Assurance (QA)** | Project Closeout

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Using the Select Data Button

When you click the Select Data button, a window like the one shown above displays. You can view a specific project by selecting the associated identifiers under each of the column headings, working from left to right. The columns can be rearranged by clicking and dragging the blue column header.

Note: Hopper dredges and scows operate by loads/trips/loading cycle, so when you select a hopper or scow, a fifth column displays to the right, listing the load or cycle numbers that took place within the criteria selected in the first four columns. Since pipelines don't operate by loads, you drill down to the desired day instead of load number.

Example: Search for a Project in a Given District and Year

1. Click the Year header and drag it to the second position from the left on the screen.
   This causes the Project Area and Dredge Type columns to slide to the right.

2. Select a District.
   A list of contract numbers displays.

3. Select a contract number.
   The columns to the right are filtered to display information only for dredge projects that happened in the selected District under the selected contract number.

4. In the second column, select a year.
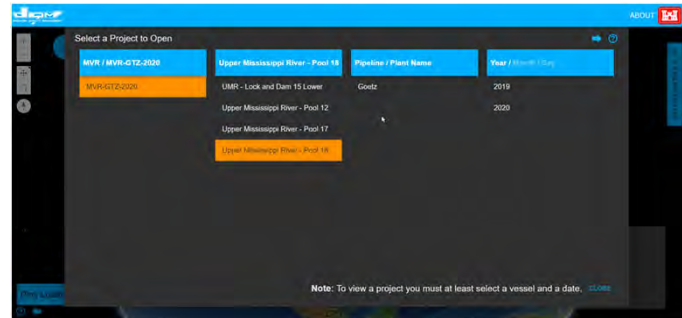   The data in the columns to the right are further filtered, and so on.

SELECTING A PROJECT (2)

Using the 'Browse Project' button from Push-Pin....

- Project Data pre-populated
- Now, click the Dredge name
- Double-click either a load # for Hopper/Scow, or a specific day if Pipeline

Specifications

Contract Award

Project Setup

Certification Verification

**Quality Control (QC)**

Quality Assurance (QA)

Project Closeout

Using the Browse Project Button

1. Click a pushpin.

2. In the window that displays, click the Browse Project button from a pushpin.
   Since it already has the Contract Number and Project Area, which pre-filters the data, you are taken you straight to the project.

3. Select the dredge plant you want to view.

4. Select the year.

5. Double-click the day.
   Note: If the selected dredge plant is a hopper dredge or a scow, you would double-click a load number or cycle number instead of the day.
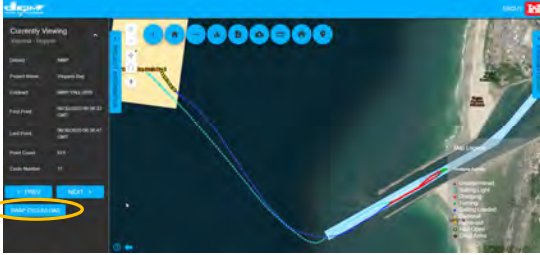
PLOTTING TRACKS/GRAPHING

Hopper / Scow

Calculated Cycle Number	Reported Load Number
Color-codes each Dredge State	As Received from contractor
Red = Dredging, **Blue** = Sailing Loaded,	Blue = Hull Closed, Yellow = Hull Open
Yellow = Disposal, **Light Blue** = Sailing Light	

After plotting a Load or Cycle…
- Use mouse or on-screen Map Controls to zoom in/out, pan, rotate, etc.
- Click on a point to see more details about a specific point (lower left corner)
- Layer Controls tab located on right side
  › Turn layers on/off, adjust opacity, etc.

Sidebar navigation: Specifications, Contract Award, Project Setup, Certification Verification, Quality Control (QC), **Quality Assurance (QA)**, Project Closeout

Once you have selected your project, the Viewer displays a single track:

- For pipelines, it displays a single day of data (described on the next slide).

- For hoppers and scows, it displays a single Calculated Cycle Number or Reported Load Number (as shown in the slide above), based on what is selected.

  The Load Number is shown exactly as it is received from the dredge/contractor. The contractor is responsible for incrementing the Load Numbers, which are shown in the Viewer in the order they are received and as labeled by the contractor. The Calculated Cycle Number is based on an algorithm that uses the data from the reported sensor data to determine the activities of the dredge plant.

Use the Map Controls to zoom in/out, pan, rotate, and adjust the settings for viewing the data. Data points can be selected to see the information associated with that point in the left panel. Also in the left panel are **<PREV** and **NEXT>** buttons, which allow you to scroll backward and forward in the Cycle/Load Numbers being viewed. A more in-depth training is available from the DQM Center upon request.

*Note: You can swap between viewing the data by Reported Load Number or by Calculated Cycle Number by using the Swap Cycle/Load button (highlighted in the slide above), located under the **<PREV** and **NEXT>** buttons in the left panel.
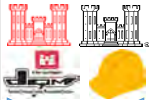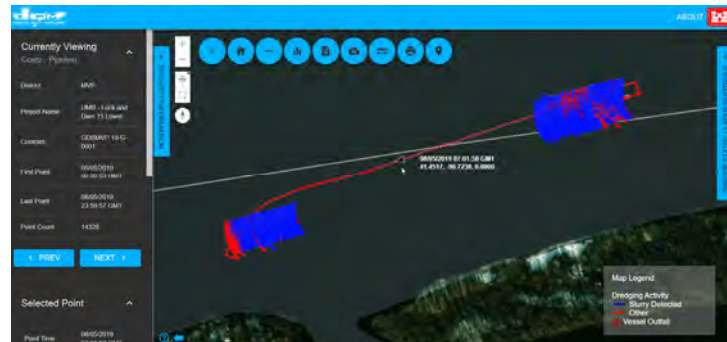
PLOTTING TRACKS/GRAPHING

Pipeline

Blue = Slurry Detected (Dredging)

Red = Other

✚ = Outfall Location

After plotting a Pipeline Day….
- Use mouse or on-screen Map Controls to zoom in/out, pan, rotate, etc.
- Click on a point to see more details about a specific point (lower left corner)
- Dredge Status & Layer Controls located on right side
    - See daily advance, Pipe Length, etc.
    - Turn layers On/Off, Adjust Opacity, etc.

As mentioned in the previous slide, pipelines are plotted by day, and therefore show all the data collected for the selected 24-hour period. The Advance is entered by the contractor.

The Map Controls can be used to zoom in/out, pan, rotate, and adjust the settings for viewing the data. Data points can be selected to see the information associated with that point in the left panel. Also in the left panel are **<PREV** and **NEXT>** buttons, which allow you to scroll backward and forward within the Date being viewed. A more in-depth training is available from the DQM Center upon request.
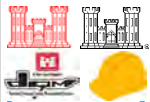
PLOTTING TRACKS/GRAPHING
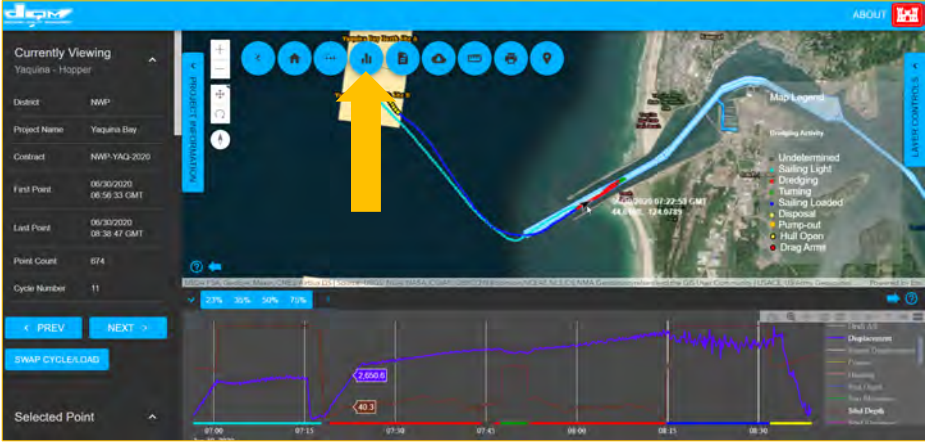
Click the 'Graphs' button at the top to graph dredging data
- Graph various dredging parameters by selecting from the list on the bottom right corner
- Turn off by selecting again
- Graphs Controls are in the grey box (Ex: Zoom, Pan, Reset, etc.)

Click the Graphs button at the top of the graph to expand the window at the bottom to show timeseries plots of the data along the trackline. All of the available parameters to be plotted are listed at the right of the line plots, so you may need to scroll to access the entire list. Click a parameter to add it to the line plot and click it again to remove it from the plot. You can add as many parameters as you want, but the plot gets hard to read if too many are plotted at the same time. Similar to the map above, the graph window has a set of controls in the upper-right corner to zoom in/out, pan, and perform other functions.

Note: The calculated Dredge State is plotted along the bottom of the x-axis of the Graphs plot. Red indicates Dredging, dark blue indicates Sailing Loaded, yellow indicates Disposing, and light blue indicates Sailing Light.

This view is especially valuable when taking a close look at your data. For example, if there is a sudden decrease in vessel depth, you can hover the pointer over the data points of interest to simultaneously see where the dredge plant is located and what the dredge is doing at the time. Looking at the calculated Dredge State at the time of the event of interest can also help inform if the loss of draft correlates to a disposal event or if it is occurring during transit.

PLOTTING TRACKS/GRAPHING

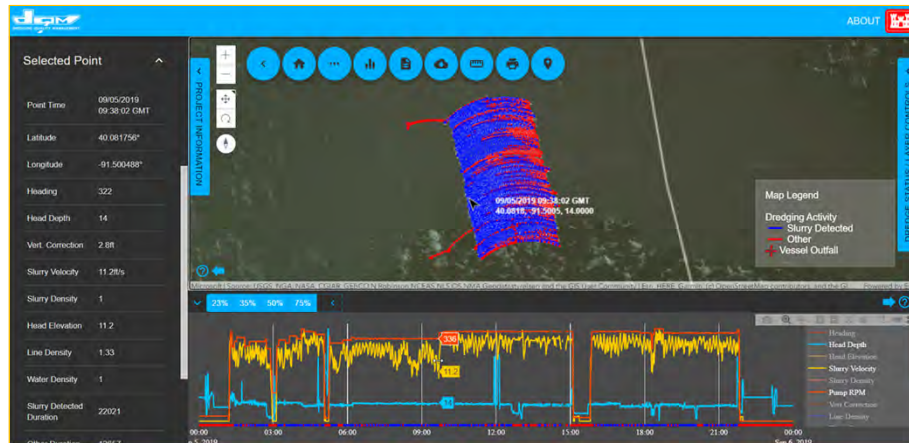- Adjust the window size of the graphs by changing the window percentage
- Values displayed on graphs and in Selected Point window
- Sliding cursor along the graphs also syncs with the vessel location in the map

The size of the graphing window can be adjusted by selecting a percentage in the upper-left corner of the window. (For example, if you select 50%, the graphs and the map each take half of the screen.)

If you move the cursor over the graphs, the data at any point is shown at your cursor and in the left panel, and a pointer tracks along the trackline in the map above, showing the location that corresponds to the data under your cursor. Likewise, if you move your cursor over the trackline, a pointer tracks along the graphed data below, showing the data that corresponds to the location under your cursor.
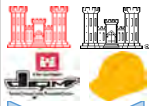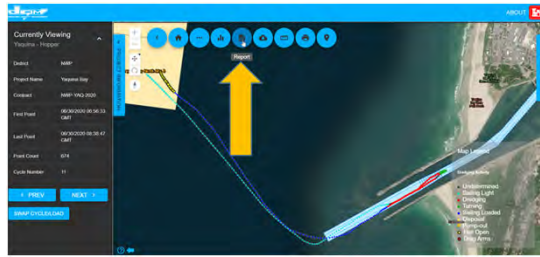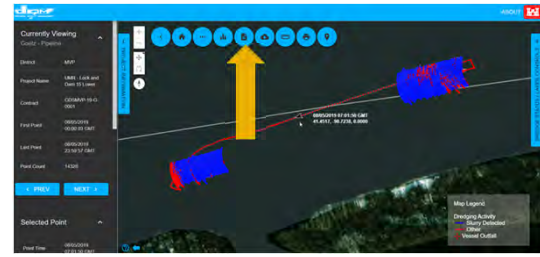
The next button over from Graphs on the Viewer is Reports. The DQM Center offers standard project reports (listed in the slide above), which differ, depending on the dredge plant type. Hopper and scow reports summarize data by Load or Cycle Numbers (single or multiple), and pipeline reports summarize data by Day (single or multiple).

REQUESTING REPORTS
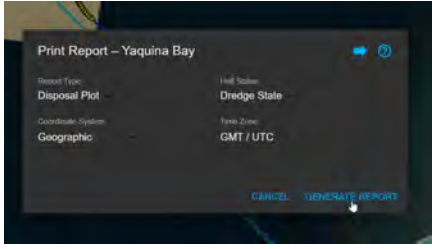
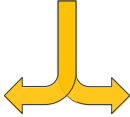For Hoppers & Scows
- Choose the 'Report Type' from the drop-down menu
  - Disposal Plot
  - Cumulative Disposal Plot
  - Dredge Plot
  - Cumulative Dredge Plot
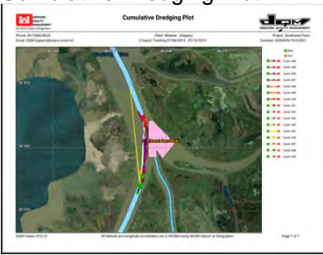- Choose Coordinate system, Time zone, etc.
- Click 'Generate Report'

Disposal Plot

Cumulative Dredging Plot

When you click the Reports button, a window displays, allowing you to select the type of report you want to generate as well as the coordinate system and time zone. When you click the Generate Report button, you can select where you want to save the generated PDF file.

Sample reports shown above:

- **Disposal Plot**—The top of the Disposal Plot is a summary of the load information and a plot of the full track while the bottom map shows a zoomed-in view of the disposal event. The Disposal Plot is useful when examining data points more closely when the doors open and close.

- **Cumulative Dredging Plot**—The Cumulative Dredging Plot shows all of the dredging tracks for a selected number of loads. This is a great way to quickly view multiple loads on one plot, and see where they are dredging (for example, are they hitting that toe?).
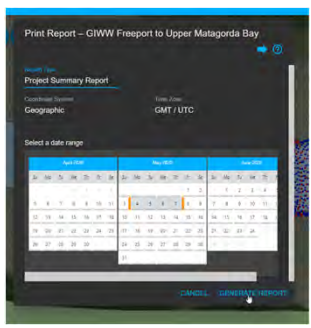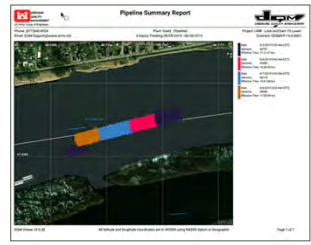
REQUESTING REPORTS

For Pipelines
- From the calendar, select the date range needed
- Choose Coordinate system, Time zone
- Click 'Generate Report'

Project Summary Report:
- Color coded by day
- Advance
- Effective Time

The Pipeline Summary Report shows the trackline, color-coded by day, Advance, and Effective Time.

When requesting a report for a pipeline dredge, a window displays, allowing you to select the time frame from a calendar as well as the coordinate system and time zone you want. The maximum amount of time you can request in one report is seven days, so if you need information on more than seven days, you must break the request up into 7-day parts.

When you click the Generate Report button, you are given the option of where you would like to save the generated PDF file.
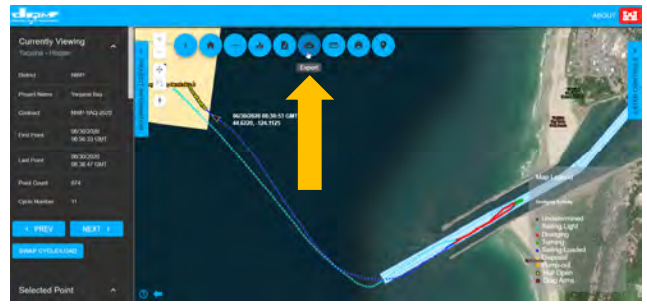
REQUESTING EXPORTS

Specifications

Contract Award

Project Setup

Certification Verification

Quality Control (QC)

Quality Assurance (QA)

Project Closeout

After plotting a Load/Cycle or Pipeline day…
- Click the 'Export' button to export dredging data

Data Export, a .csv imported into Excel

The next button in the toolbar is the Export button, which enables you to export the data from the DQM Online Data Viewer.
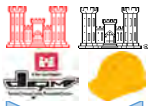
REQUESTING EXPORTS
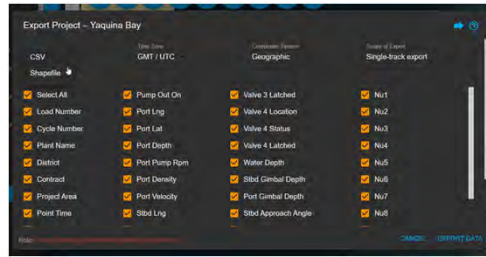
Hopper / Scow
- Choose the format of your export:
    - CSV Spreadsheet
    - Shapefile
- 'Select All' dredging parameters

    OR
- Only select the few parameters that you want
- Click 'Export Data' (lower right corner)

Pipeline
- CSV (Spreadsheet) only
- 'Select All' dredging parameters

    OR
- Only select the few parameters that you want
- Click 'Export Data' (lower right corner)

For hopper dredges and scows, data can be exported in CSV/spreadsheet format or in a shapefile.

For pipelines, the data can be exported in CSV/spreadsheet format only.

For all dredge plant types, select the parameters you want either individually or by using the Select All option, which selects all available parameters.

Note: If the Dredge State ID is selected as an export parameter, then the exported data can later be filtered by Dredge State (for example, using Excel) to analyze it by a particular state (such as disposing or dredging) for use in other applications.

There are a number of other available buttons and controls on the DQM Online Data Viewer, but this was a very high-level run-through of the Viewer's components. Contact the DQM Center if you are interested in a more in-depth training and live demonstration.

Operations & Dredging Endangered Species System (ODESS)
Data Workflow and Support Model
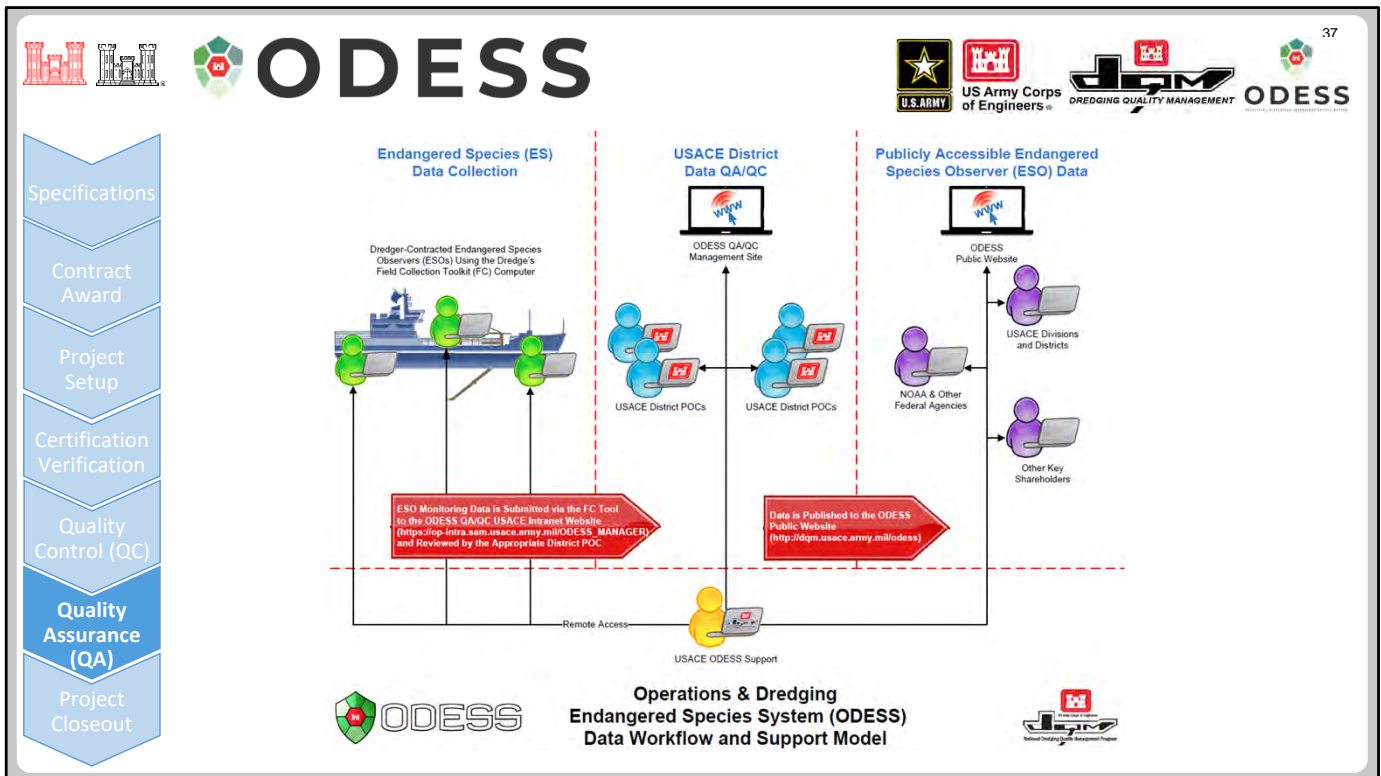
ODESS data flows from the field to the ODESS database and ultimately to the public website through three functional areas:

- An observer collects data on the vessel/dredge plant where ODESS is implemented and submits it electronically through a computer system (tablet, laptop or desktop computer).

  The hardware is supplied by the dredging contractor, and the ODESS software is supplied by USACE.

- A USACE-designated POC reviews electronic records submitted by the observer and publishes these records to the ODESS database, where it is made available on the ODESS public website.

- Data submitted by the observer and published by the USACE ODESS POC is available publicly to anyone with Internet access at http://dqm.usace.army.mil/odess.

Assuming that the dredging project is set up correctly within DQM before the initial data is submitted by the observer, designated ODESS USACE POCs receive an email notification, letting them know that the observer supporting their dredging project has submitted the first batch of ODESS electronic records. The designated POC then goes to the ODESS intranet site and "project initializes" the project. Once the required fields are entered and the project is saved, the electronic data records are then made available to the ODESS public website.

If the project is *not* set up within DQM for whatever reason, the ODESS Support team receives an email notification, making them aware that observer electronic records have been submitted but do not have an associated project.

The only email notification that the USACE-designated ODESS POC should receive after the initial batch of data is submitted is if the observer submits an incident electronic record. The POC then reviews the data record and decides if the incident is legitimate and should go against the associated Biological Opinion. Once this review is complete, the USACE POC publishes the incident record to the ODESS database, and it is made available on the public website. After the initial data submission, load data records are pushed to the ODESS database without notification to minimize excessive emails.

Observers enter data for each dredging load, including general information on site conditions (such as weather and sea conditions) as well as a description of cage contents. This data is correlated with DQM data regarding dredging locations and slurry quantities for the corresponding load. In the case of an incident, additional data is entered, and the tablet can be used to take photographs to attach to the report. These reports are transmitted via the Internet after completion or when telemetry is available.

ODESS has also been developing and testing a mobile app for use on trawlers assisting with relocating endangered species in the vicinity of a dredging operation to mitigate actual takes. Trawlers can download the app onto their smartphone and utilize some of the phone's GPS features to provide tracking for each transit through the dredge area. For each tow, the data collector can enter the number and species of encountered and relocated creatures.

ODESS – INTRANET

Attachments

1. This is the ODESS V1 intranet web application, the version that is currently available and that the ODESS-designated POCs access. This intranet web application is available only on the USACE network; it is not available to the public. ODESS USACE POCs review and publish observer-submitted incident data and are responsible for making it available on the public website.

   The ODESS V2 intranet web application, which is currently in development, will allow USACE-designated POCs to edit ODESS database fields that routinely require modification because of errors/omissions from the observer electronic data records. The ODESS V2 interface, which looks different from the V1 interface, is shown later in the presentation.

2. Once the incident record is published and designated as a lethal or non-lethal incident, the associated biological opinion take allowance is adjusted to reflect the decision.

3. When incidents are published, attachments can be added to the report. It should be noted, once a report is published, the information cannot be changed, so be sure the information is accurate before publishing. In ODESS V2, the user will have additional controls to allow modifications throughout the reporting process.
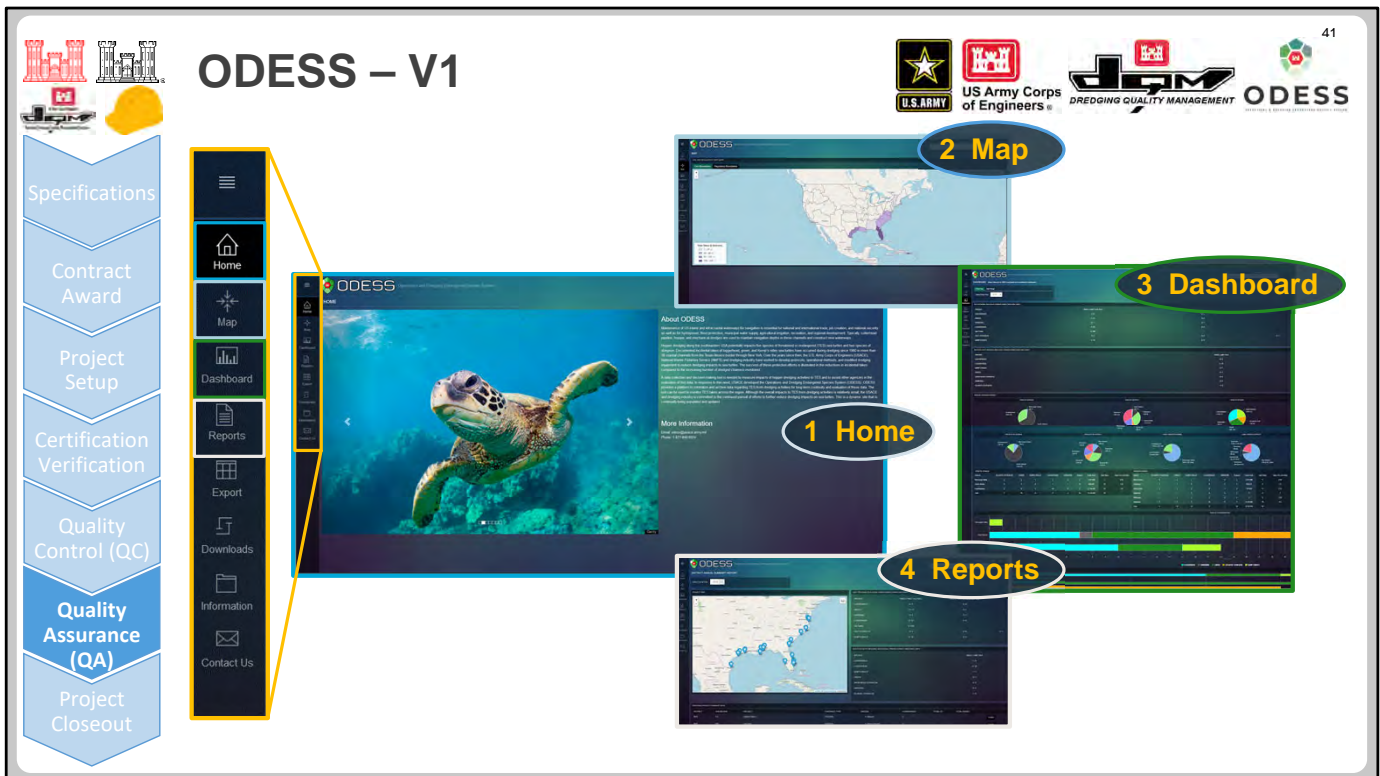
1. **Home Page**—This is the ODESS V1 public web application Home page.

   Tabs along the left panel enable users to display the Map, Dashboard, and Reports pages (described below) as well as export data, download information, and contact ODESS Support.

2. **Map**—On the Maps page, Civil and Regulatory heat maps display the Total Takes (with the number of USACE Districts represented within each category).

3. **Dashboard**—Using the Dashboard, viewers can see data correlated by USACE Division, District, species, biological opinion, or quantity of material, either in tabular or graphical format.

4. **Reports**—In the Reports section, District Annual Summary Reports can be generated by District. These reports present a map overview of reported takes as well as additional tabular information concerning the takes. Other reports available from the Reports tab are the Biological Opinion Tracking Report and the Historical District Annual Reports.

1. **Home Page**—This is the ODESS V2 public web application Home page, currently under development. You are presented with the navigational items, with an emphasis on the Search functionality for finding what you need quickly and seamlessly.

   For example, if you have been assigned to a project and you want to see how that project has been performing, or if you are the observer, you might want to check to see if the reports that you submitted were uploaded successfully.

2. **Dashboard**—The Dashboard shows the status of current ODESS operations and incident data.

3. **Status**—Current active dredging projects with the ODESS requirement are listed.

4. **Project Details**—Project details display when you click a project name link in the Status list.

5. **Biological Opinions**—ODESS V2 supports project-specific Biological Opinions (BOs).

CLOSE OUT YOUR PROJECT

- Specifications
- Contract Award
- Project Setup
- Certification Verification
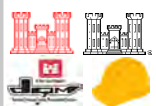- Quality Control (QC)
- Quality Assurance (QA)
- **Project Closeout**

- Notify DQM Center when Project is Complete

- Verify all data has been received by the DQM Center

- Verify days worked to determine DQM billing and payment

- End of project statistics?

Cumulative Load Summary Report

Upon completion of a dredging project, when final surveys have been approved and the equipment has been released to demobilize, the District POC and/or contractor shall notify the DQM Center via email that the project is complete. The DQM Center then closes out the project in the database, so that they can assign the plant to a new contract/location. They also coordinate with the contractor/system provider to verify that all data for the retiring project has been received and archived.

DQM reviews the data to determine the number of days worked on the project and notifies the District POC regarding appropriate billing amounts. Upon request from the District POC, DQM provides the project Cumulative Load Summary Report. At the present time, this report is limited to statistics regarding disposal events, but the DQM Center is currently working on a report which will calculate and display statistical information on a load-by-load basis. Similar statistical summary reports on a daily basis are being developed for pipeline dredge contracts.

Thank you.

Survey and PDF of the presentation will follow via email.

Please contact DQM with any questions:

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