FINDING THE SILVER LINING IN COVID-19 IMPACTS ON NATIONAL DREDGING QUALITY MANAGEMENT PROGRAM (DQM) QA PRACTICES.

U.S.ARMY

US Army Corps of Engineers®

DREDGING QUALITY MANAGEMENT

DQM CERTIFICATIONS

- DQM currently receives data from 362 dredge plants.
- Annual onsite Quality Assurance (QA) Checks to ensure consistent data quality

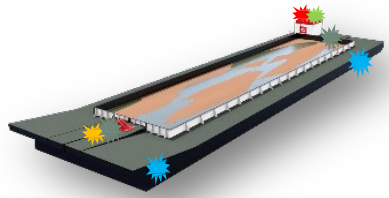
20 Hopper Dredges

Typical Instrumentation

- Telemetry
- GPS—Position (Lat/Long), Course, Heading Speed, Time, Drag/Suction-Head position
- Drag/Suction—Head Depth
- Slurry Velocity, Density, and Pump RPM
- Fore and Aft Draft→Displacement
- Fore and Aft Ullage→Volume
- Hull Status

57 Hydraulic Cutter/Dustpan

285 Scows — Monitoring, Ullage



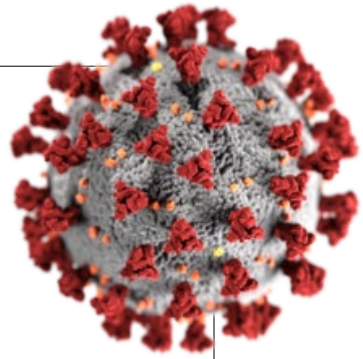
FIELD TECHNIQUE ADVANCEMENT

1 Simulated draft sensor check:
Pressure sensor testing and calibration inside a temporary test well.

2 Draghead and cutterhead depth sensor checks:
Depth check of a cutterhead using a portable pressure sensor for data validation.

SUSPENSION OF QA CHECKS

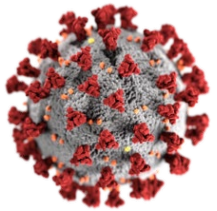
- In March 2020, The US Department of Defense (DoD) suspended travel due to the increasing spread of COVID-19.
- QA Checks were suspended.
- DQM Center extended certifications.



PANDEMIC RESPONSE PLAN

In June 2020 the DQM team developed a response plan:

- Evaluated risk.
- Provided guidance.
- Strategy sought to balance individual risks, site risks, exposure risks, and procedure modifications.



Response Plan

National Dredging Quality Management Program
(DQM)

COVID-19 RESPONSE PLAN FOR DQM CERTIFICATION CHECKS

As travel restrictions are loosened, the DQM Center is committed to return to performing on-site QA reviews of contractors' DQM installations to ensure that the highest quality dredge monitoring data is collected.

However, 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 plant can be visited again.

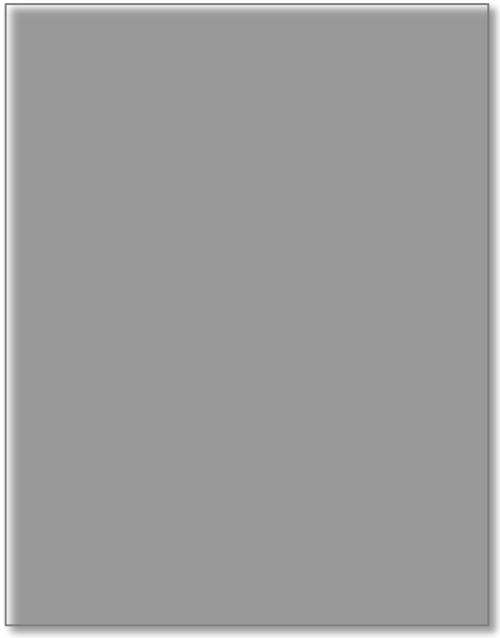
Individual Risks—We recognize that, as visitors, we pose a risk to dredge crews who have, for the most part, been isolated on the dredge plant/worksite. To mitigate that risk, we propose the following protective measures:

- **Testing**—Field personnel will be tested for COVID-19 before being cleared to join a DQM QA team.
- **Health Monitoring**—Temperatures will be checked and self-evaluations conducted daily. No one who has a fever or feels unwell will be able to participate in the scheduled checks.
- **PPE**—Cloth or surgical-type face coverings will be used in addition to the usual PPE—flotation device, gloves, eye protection, and steel-toe shoes. Absence of any one of these items will result in restricted access to the site.

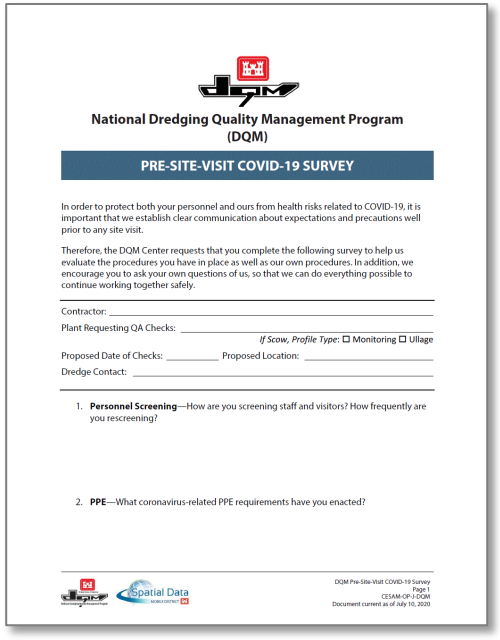
Site Risks—These considerations include regional conditions as well as the condition of the worksite itself.

- **Destination**—Per USACE Office of Personnel Management (OPM) guidelines, destination sites must have experienced a downward trend in documented COVID-19 cases for the 14 days prior to the scheduled visit, or the travel will be denied.

Risk Assessment



Pre-Site-Visit Survey



National Dredging Quality Management Program
(DQM)

PRE-SITE-VISIT COVID-19 SURVEY

In order to protect both your personnel and ours from health risks related to COVID-19, it is important that we establish clear communication about expectations and precautions well prior to any site visit.

Therefore, the DQM Center requests that you complete the following survey to help us evaluate the procedures you have in place as well as our own procedures. In addition, we encourage you to ask your own questions of us, so that we can do everything possible to continue working together safely.

Contractor: _____

Plant Requesting QA Checks: _____

If Scow, Profile Type: ☐ Monitoring ☐ Ullage

Proposed Date of Checks: _____ Proposed Location: _____

Dredge Contact: _____

1. **Personnel Screening**—How are you screening staff and visitors? How frequently are you rescreening?

2. **PPE**—What coronavirus-related PPE requirements have you enacted?

REMOTE MONITORING

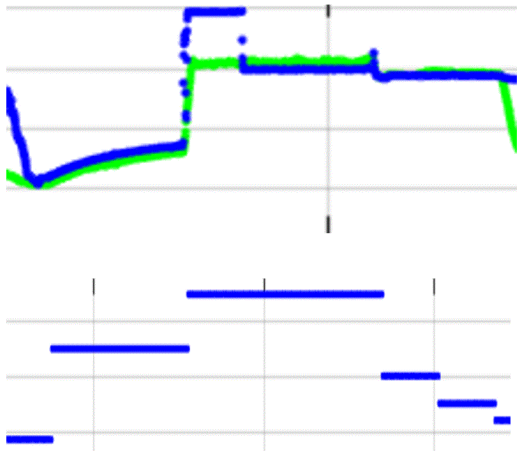
- Remote monitoring was especially important during COVID-19, as personnel were no longer on-site.
- To facilitate increased remote monitoring for USACE staff:
  - DQM established online trainings: DQM support services and tools
  - Increased individual and small group tutorials

ENSURING QUALITY DATA

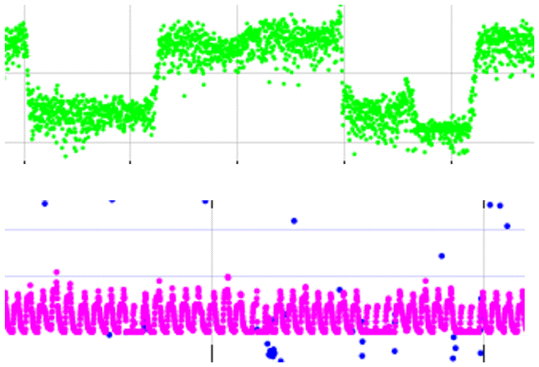
With QA Checks suspended, increased focus on automated data analysis and machine learning tools for continuous sensor health checks.

- Detecting sensor issues, bad data, & data gaps
- Part of weekly QC reporting

a) Disjointed



b) Noisy



c) Static

d) Invalid Values

ENSURING QUALITY DATA

Summary reports for pipeline data.

- Pipeline dredges increasingly being added to the DQM Program.
- Pipeline “state” data is not yet available on the DQM Viewer.

10/09/2045

Pipeline Daily Plant Summary Report

CONTRACT-NUMBER Project Location Plant Name

Summary Report - Time Analysis

DATE/TIME START (local)			TIME BREAK-DOWN (hours)			
Start Date	Start Lat	Start Lon	Slurry detected	Calc Non-Eff	Reported Non-Eff	Other
01-Oct-2045 00:00:03	30.3245	-89.0616	14.38	4.61	3.83	5.01
02-Oct-2045 14:54:08	0	0	4.12	4.84	0	15.03
03-Oct-2045 00:00:00	30.3205	-89.0571	15.93	7.89	4.41	0.17
04-Oct-2045 00:00:04	30.3186	-89.0566	17.87	5.96	3.58	0.17
05-Oct-2045 00:00:05	30.317	-89.0551	13.93	9.93	8.5	0.14
06-Oct-2045 00:00:06	30.3157	-89.0541	15.67	8.2	6.83	0.13
07-Oct-2045 00:00:07	30.3147	-89.0523	15.56	8.36	0	0.09
08-Oct-2045 00:00:02	30.3137	-89.0511	19.01	3.12	0	1.88

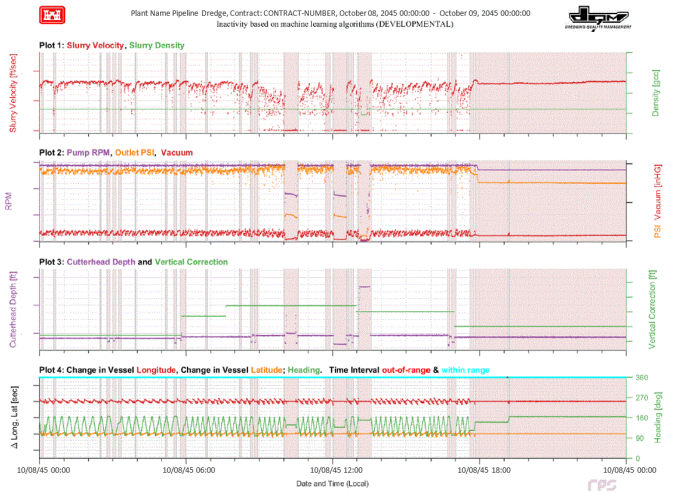
Date/Time is displayed in project local time. Missing time from partial day entries is included in the ‘Other’ column of the time break-down. Any result requiring further scrutiny can be referenced in the DQM viewer (GMT time). As of September 8th, 2020, inactivity is based upon machine learning algorithms, and may differ from results seen in DQM viewer v3.0.28.

Summary Report - Daily Statistics

Start Date (local)	CH Depth (avg ft)	Vert. Cor. (avg ft)	Placement (loc)	Pipe Length (total ft)	Num. Pump (max)	Advance (avg ft)
01-Oct-2045 00:00:03	40.9644	-0.43	Open Water	8580	0	605
02-Oct-2045 14:54:08	42.0819	-1.58	Open Water	4740	0	660
03-Oct-2045 00:00:00	40.943	-0.3	Open Water	4740	0	NaN
04-Oct-2045 00:00:04	41.6962	-1.05	Open Water	8380	NaN	730
05-Oct-2045 00:00:05	42.4385	-1.55	Open Water	7280	NaN	595
06-Oct-2045 00:00:06	42.1076	-1.18	Open Water	7280	NaN	600
07-Oct-2045 00:00:07	42.0859	-1.21	Open Water	NaN	NaN	NaN
08-Oct-2045 00:00:02	41.1011	-0.53	Open Water	NaN	NaN	NaN

CH Depth is averaged only during effective dredging periods. Advance, outfall placement, pipe length, and number of booster pumps are reported from the system provider in state event messages. NaNs imply information was not submitted for a given time period. Other daily statistic values calculated by a DQM automated routine are optimized to work across all types of data sets submitted by each system provider. Any result requiring further scrutiny can be referenced in the DQM viewer (GMT time).

10/08/2045



Non-Effective Events

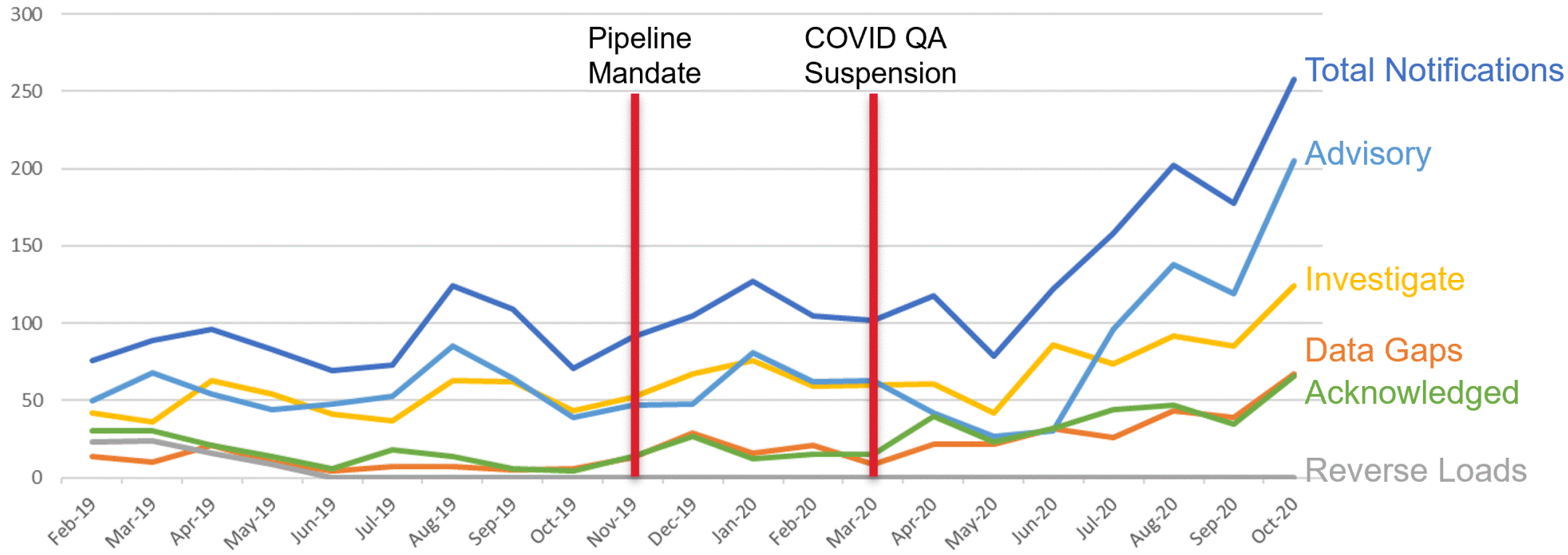
MSG_START_TIME	MSG_END_TIME	DESCRIPTION	COMMENT
08-Oct-2045 02:50:25	08-Oct-2045 03:00:25	HSL: Handling Swing Line	- - -
08-Oct-2045 05:40:02	08-Oct-2045 05:50:02	HSL: Handling Swing Line	- - -
08-Oct-2045 08:00:19	08-Oct-2045 08:10:19	HSL: Handling Swing Line	- - -
08-Oct-2045 10:05:26	08-Oct-2045 10:35:26	LDPV: Loss Due to Passing Vessel	- - -
08-Oct-2045 12:05:40	08-Oct-2045 12:35:40	LDPV: Loss Due to Passing Vessel	- - -
08-Oct-2045 12:40:40	08-Oct-2045 12:50:40	HSL: Handling Swing Line	- - -
08-Oct-2045 13:10:50	08-Oct-2045 13:30:50	HPL: Handling Pipe Line	- - -
08-Oct-2045 16:45:08	08-Oct-2045 16:55:09	HSL: Handling Swing Line	- - -
08-Oct-2045 17:40:15	08-Oct-2045 23:59:59	LDNE: Loss Due to Natural Elements	- - -

Message start and end times are reported in local time. State function events are provided by system provider.

HISTORICAL RECORDS

The “extra” time available from suspended field visits was used for data and trend analysis.

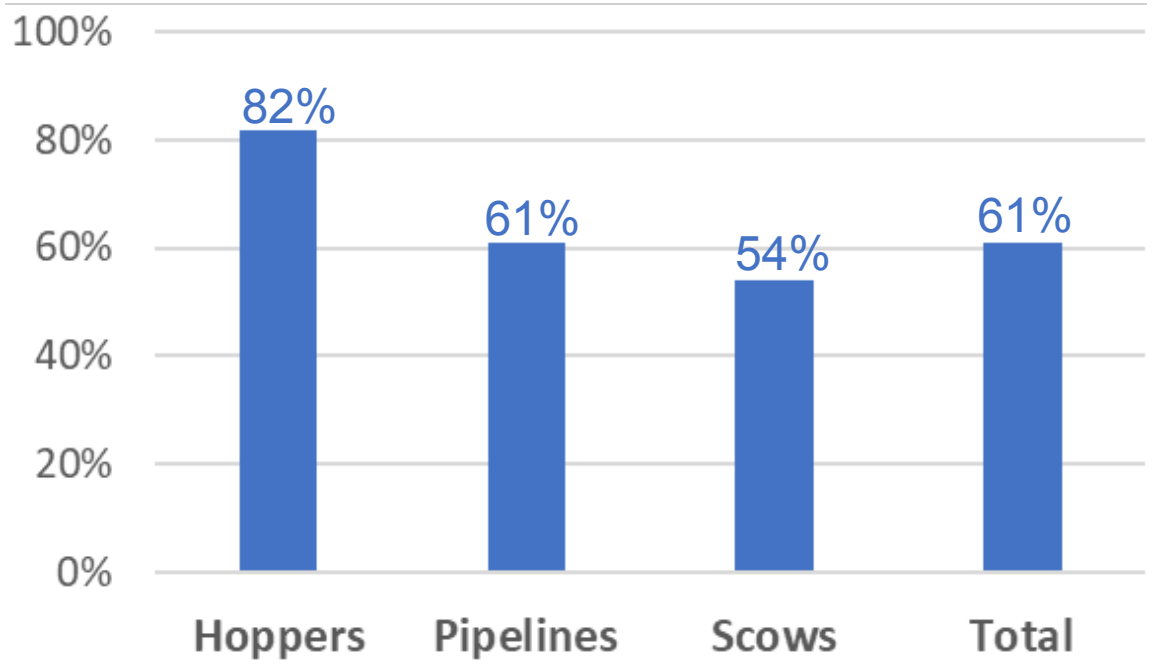
- The Database of QA notifications showed:
  - Historically, sensor performance declined in lead-up to annual DQM Check.
  - Increases in June 2020 may reflect addition of pipeline dredges and/or the suspension of the annual and start-up on-site QA Checks.



HISTORICAL RECORDS

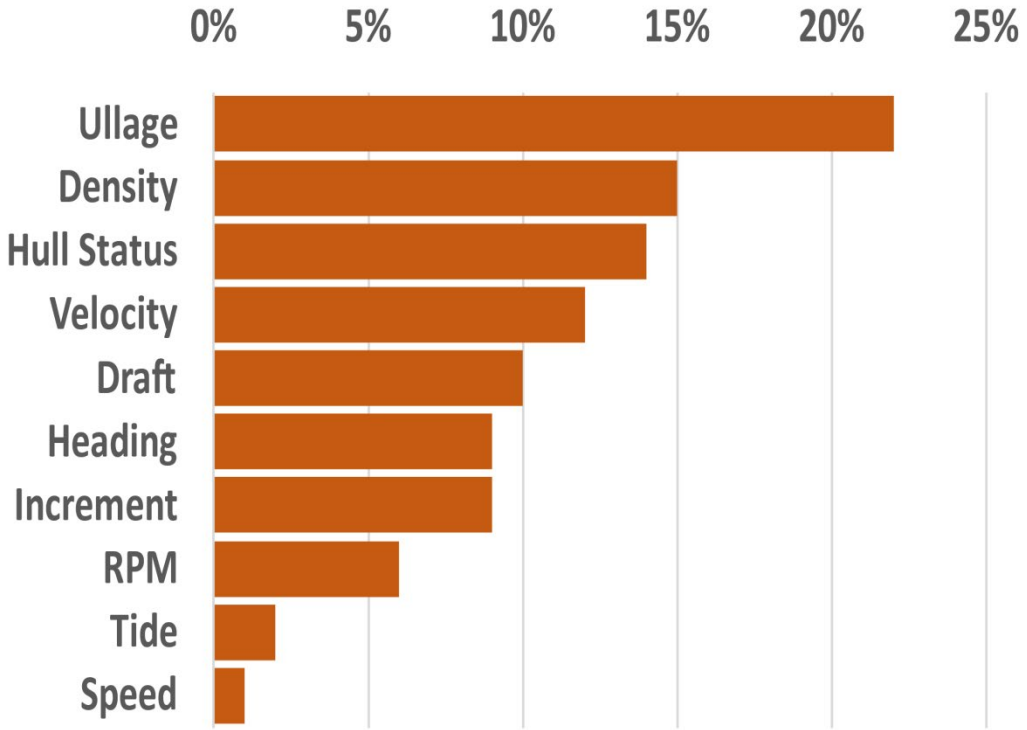
FY 2020

Percent of Active Plants Displaying Issues



More issues are noted as the complexity of the system increases.

Issue frequency for commonly cited parameters



Breakdown of "Investigate Further" issues.

EVALUATION OF FIELD DATA

Digitization of DPIP information for more efficient plant evaluation and comparisons.

Pipeline Dredge Goetz Instrumentation Plan

United States Army
Corps of Engineers

Dredge William L. Goetz

December 2016

Pipeline Dredge Goetz Instrumentation Plan

Table of Dredge Characteristics

Dredging Method	Cutterhead	
Dredge Length	200 ft	
Dredge Width	39 ft	
Dredge Hull Depth	8 ft	
Average Draft	5 ft	
Ladder Length	40 ft	
Minimum & Maximum Dredging Depths	0	25
Maximum Cut Width	250 ft	
Number & Type of Pumps	1 Main Pump	
Minimum & Maximum Pump RPM	0	526
Minimum & Maximum Slurry Velocity	0	19.2
Inner Diameter of Suction/Discharge Pipes	22 in	20 in
Dredge Advance Mechanism	Spud Carriage	
Cutter Spin Direction	Clockwise	

UNITED STATES ARMY
CORPS OF ENGINEERS

Dredge Yaquina

April 2017

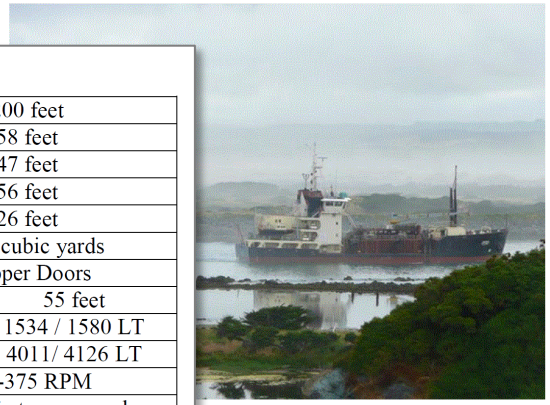


Table of Dredge Characteristics

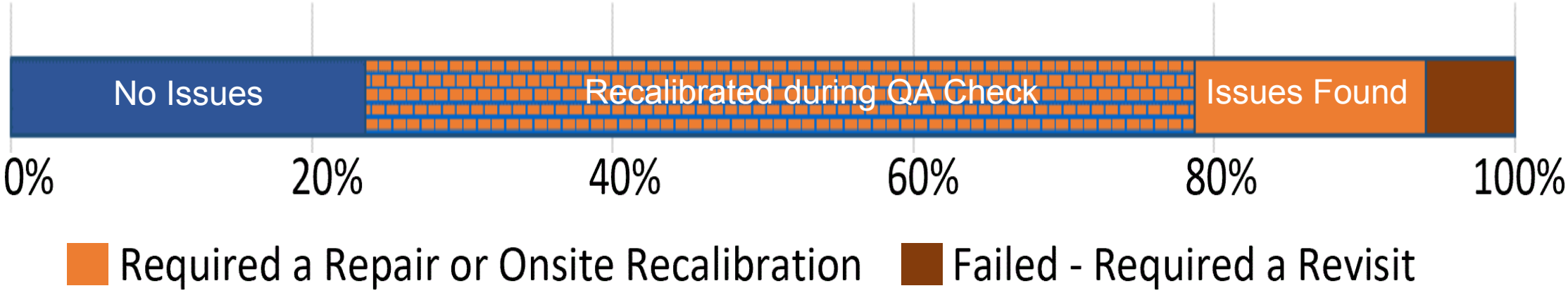
Dredge Length	200 feet	
Dredge Width	58 feet	
Hopper Length	47 feet	
Hopper Width	56 feet	
Hopper Depth	26 feet	
Hopper Capacity	1043 cubic yards	
Disposal Methods	Hopper Doors	
Minimum & Maximum Dredging Depth	16 feet	55 feet
Minimum Draft & Displacement (FW/SW)	7 feet	1534 / 1580 LT
Maximum Draft & Displacement (FW/SW)	16 feet	4011/ 4126 LT
Minimum & Maximum Pump Speed	183-375 RPM	
Minimum & Maximum Slurry Velocity	7.5-14 feet per second	
Inner Diameter of Suction Pipe	20 inches	
Inner Diameter of Discharge Pipe	20 inches	

EVALUATION OF FIELD DATA

Analysis of issues found during QA Checks.

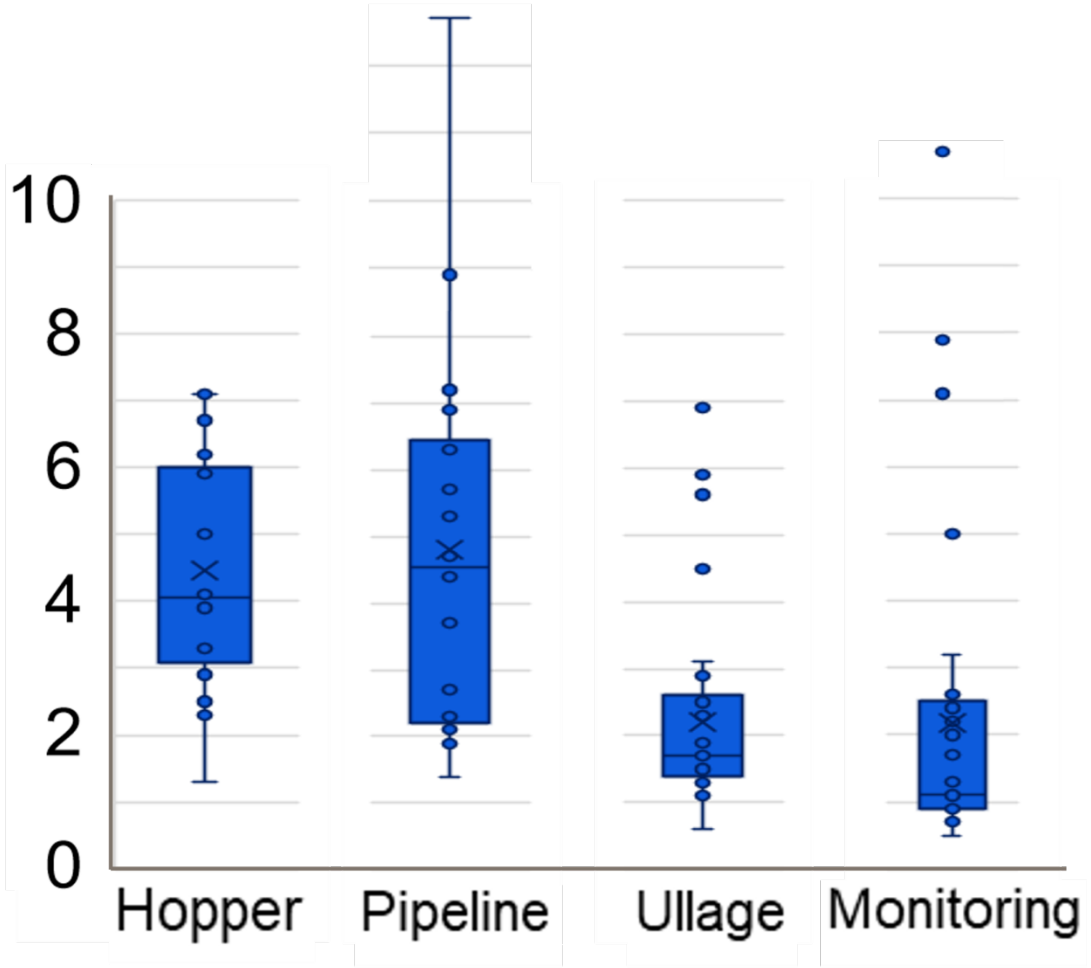
Of 136 QA Checks 1/2019–2/2020:

32 no issues, 75 recalibrated as part of the QA Check, 29 required repairs



EVALUATION OF FIELD DATA

Analysis of time on site of QA Checks by dredge plant type: New QA procedures reduce durations.



CONCLUSIONS

QUESTIONS