

NATIONAL DREDGING QUALITY MANAGEMENT (DQM) PROGRAM

GULF WEDA CHAPTER MEETING
NOVEMBER 2016

VERN GWIN, PROGRAM DIRECTOR
NATIONAL DQM CENTER



PRESENTATION OUTLINE

- 2016 ACCOMPLISHMENTS
- SPECIAL ANALYSES
- PLANS FOR 2017



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2016

- Pipeline Pipeline Pipeline
 - ▶ HQ's Coordination
 - ▶ Industry Meetings
 - ▶ District Coordination
 - ▶ Government plant Implementation
 - ▶ Major Dev Effort
 - OBS/Database/Viewer
 - ▶ Spec Version Changes
 - ▶ DPIP's



More 2016

- ODDES Dev, Pilot
- Website changes
- Data to ERDC
- Cycle Logic/ACS redo
- Pipeline Special Analysis
- Dredge Fundamentals Course
- Dredging Short Course



Pipeline Implementation

- Industry/Corps Meeting in ATL
- Hashed out final Data Parameters
 - ▶ Reduced from 35 to 10
- Comments/Responses
- Mobile District Initial Implementation
 - ▶ SAD will follow
- Final Specs on Website



New DQM Pipeline Viewer

The screenshot displays the DQM Pipeline Viewer interface. At the top left is the DQM logo (Dredging Quality Management). The top right features an 'ABOUT' link with a Swiss flag icon. The main area is a globe showing North America with several black and blue location pins. On the left, a sidebar contains sections: 'Currently Viewing' (No project or day loaded...), 'Select a project day by opening the selection above or by clicking on a push pin on the map...' (with an 'OPEN SELECTION' button), 'Selected Point', and 'Select a point on the graph below...' (with a 'SHOW/HIDE GRAPH' button). A central toolbar includes icons for home, menu, bar chart, list, document, and print, along with zoom controls. On the right, a vertical sidebar contains 'DREDGE STATUS / LAYER CONTROLS'. The bottom of the screen has a 'pins' label and a footer with source information and 'Powered by Esri'.



ABOUT

Currently Viewing
No project or day loaded...

Select a project day by opening the selection above or by clicking on a push pin on the map...

OPEN SELECTION

Selected Point

Select a point on the graph below...

SHOW/HIDE GRAPH

PROJECT / INFORMATION



DREDGE STATUS / LAYER CONTROLS

pins

Government Plant Implementation Lessons Learned

- Government plants were mostly fully instrumented.
- Driver for standard dredging software needed to be developed.
- Interface between PLC and dredge computer was a challenge due to all dredges having unique systems.
- Better than expected coverage using cell for data transmission from dredge.



National Dredging Quality Management Program (DQM)

Pipeline Data Flow Sensor-Based Parameters (per Compliance Specification)



Pump Sensors

- Pump Vac
- Pump Press
- Density
- Velocity

Position Sensors

- Position
- Heading
- Vert Correction (Tide)
- CH Depth

Discharge Sensors

- (radio link)
- Discharge Position
- Discharge Elevation
- Discharge Heading

Notes

*Dredge Positioning Computer—Data is compiled and converted to JSON format

**DQM Onboard Computer—Minimum Specifications

CPU: Intel/AMD processor; 3 GHz (non-overclocked) clock speed

Hard Disk: 250 GB; internal

RAM: 2 GB

Ethernet Adapter: 10/100 Mbps internal network card; RJ-45 connector

Video Adapter: Supports 1024x768 resolution at 16-bit color depth

Monitor: 17" viewable display; supports 1024x768 resolution at 16-bit color depth

Keyboard: Standard 101-key

Mouse: Standard 2-button

CD-ROM Drive: 16X read speed/8X write speed

Ports: 2 free serial ports (standard 9-pin connectors); 1 free USB port

Cables: Cat-5 cable; standard RJ-45 plugs connecting the network adapter to the network hub; 1 spare cable

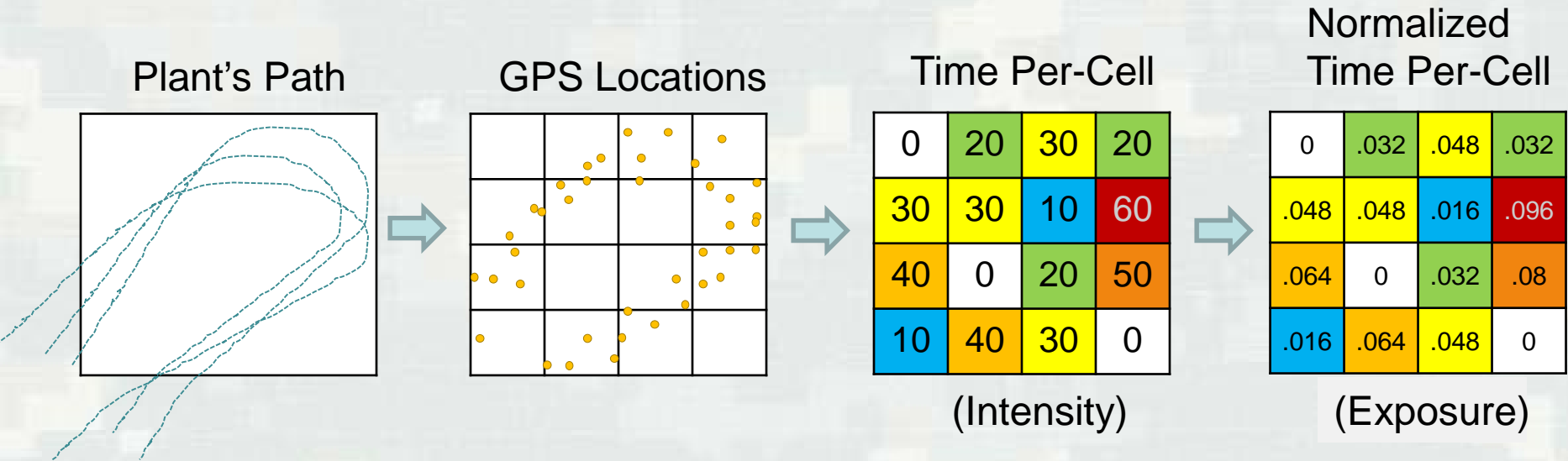
Software: Windows 7 Professional (fully licensed); any necessary manufacturer-provided drivers for the installed hardware

Dredge Intensity Model

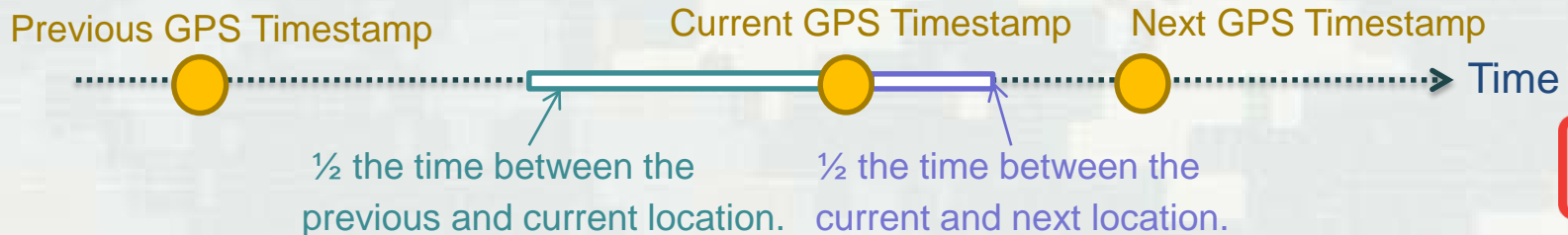
- ✓ Software tool which takes the results of the mathematical model and creates products compatible with prominent GIS applications
- ✓ Vessel transit tracks delineating areas of high traffic use
- ✓ Generation of relevant geospatial metadata for the product including processing history sections



Data Transformation



- Time spent at each location is calculated
- GPS locations are converted to UTM, and a grid is constructed
- Time per-location is accumulated within cells of a grid
- Values are normalized based on the cell size, final units are seconds per meter squared.



Flexible Gridding Parameters

- Select any number of DQM database export files
- Choice of grid cell size
 - ▶ 100 m
 - ▶ 50 m
 - ▶ 25 m
 - ▶ 10 m
- Interpolation on/off
- Define timeframe
- Filter to only use
 - ▶ Transit
 - ▶ Active dredging by drag arms
 - ▶ Or no filter
- Define a domain
 - ▶ By extent
 - ▶ With a shape file
- Grid origin



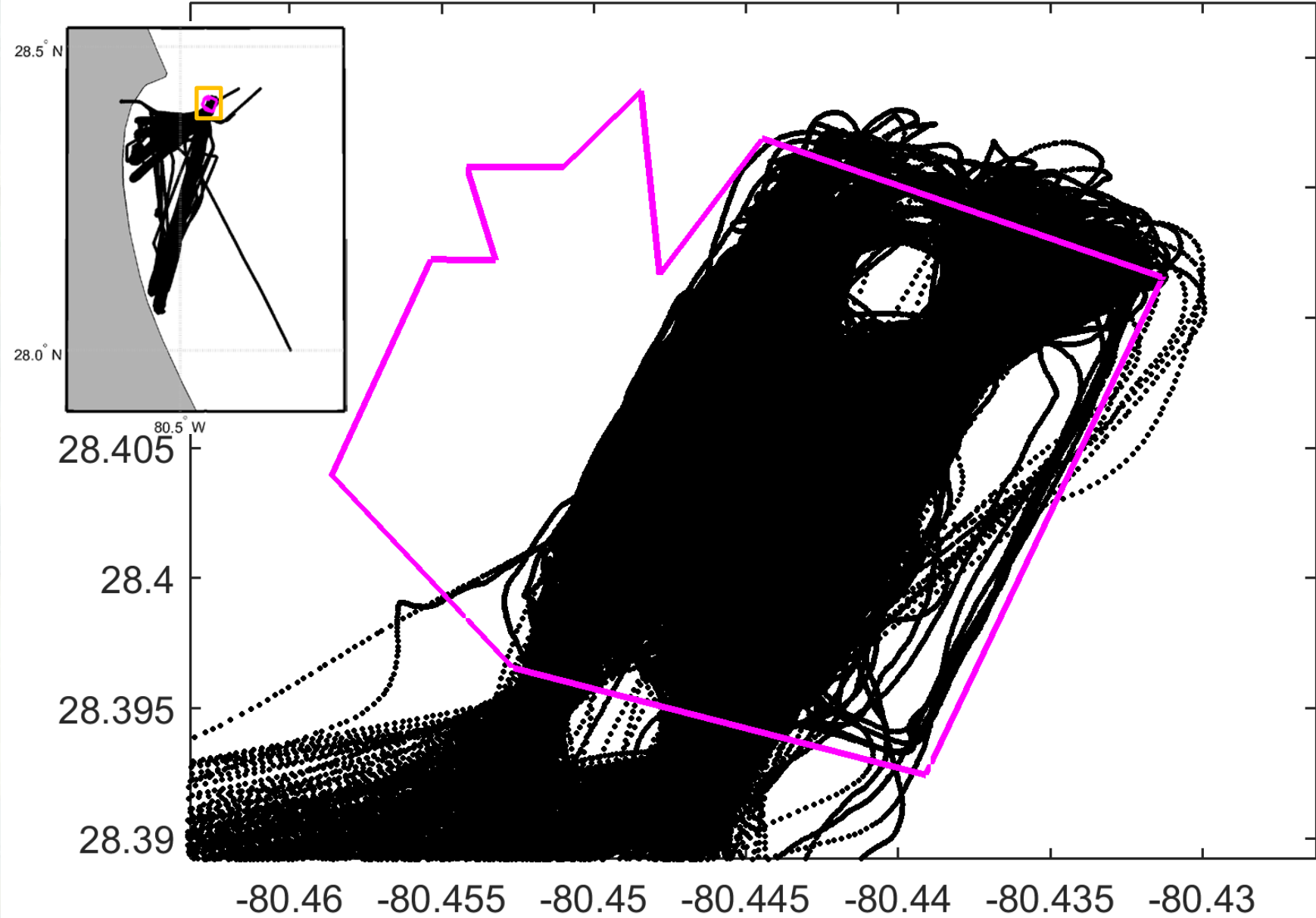
Example with Borrow Area

- The example project was in 2013 - 2014
- Do not filter by dredge state (use all points)
- Define the borrow area domain with a shapefile
- Test each of the 4 grid cell sizes:
100 m, 50 m, 25 m, 10 m



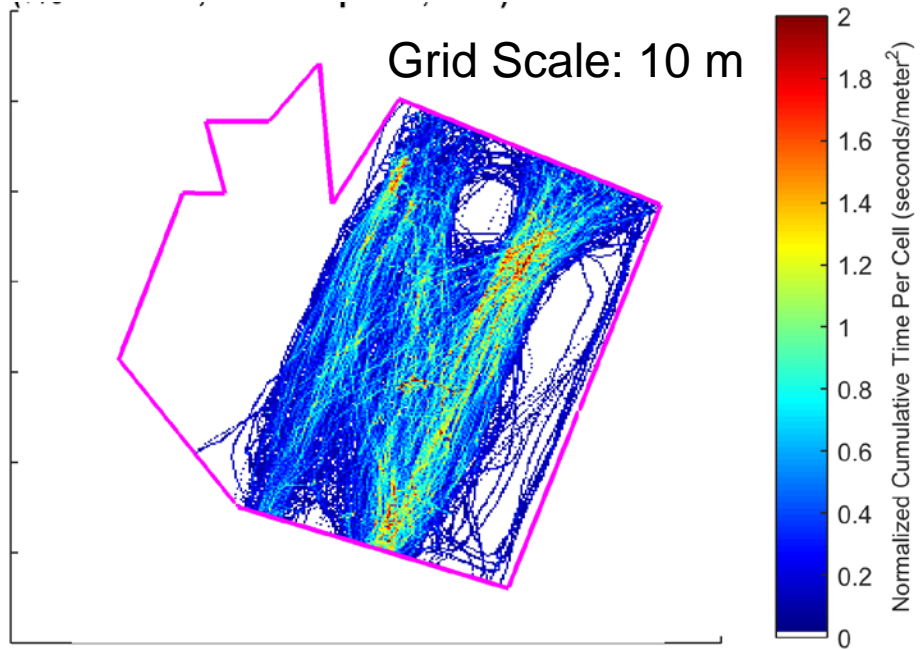
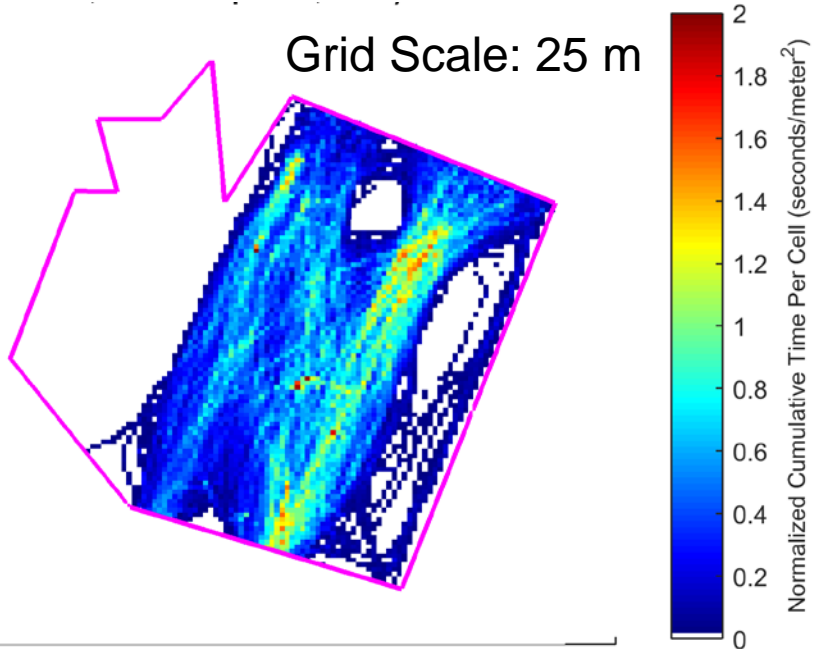
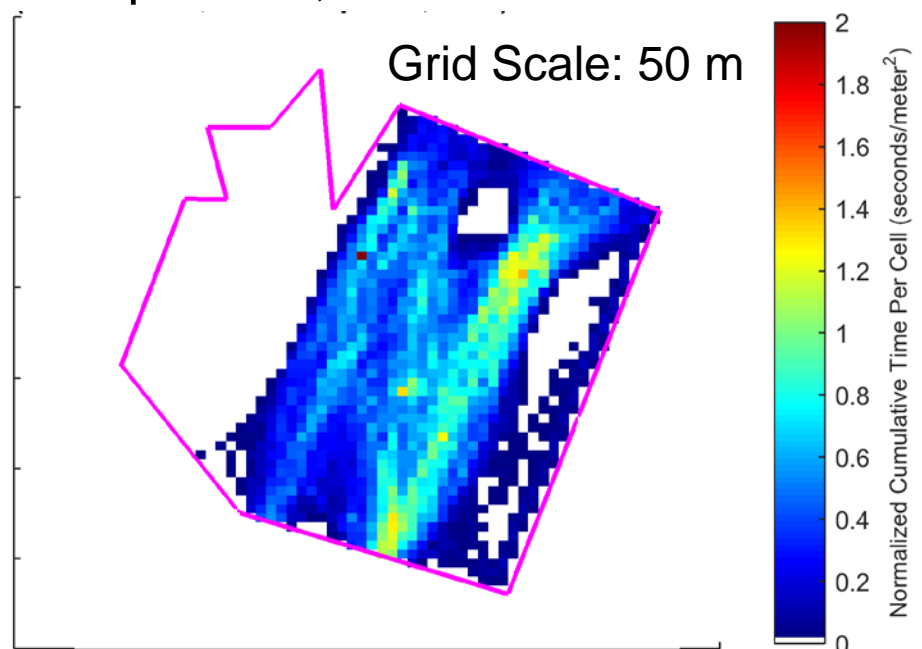
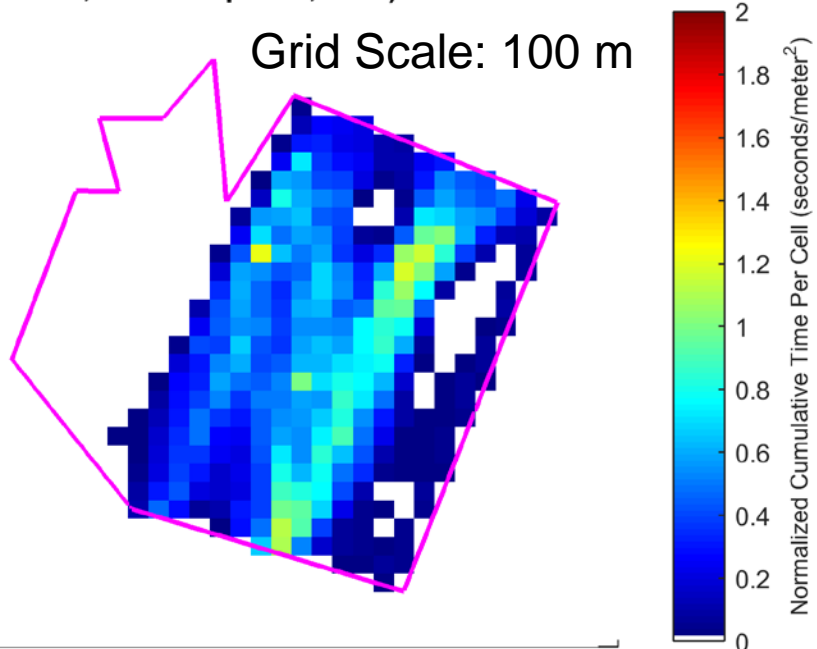
Brevard County, FL

All GPS Data from November 27, 2013 to April 22 2014

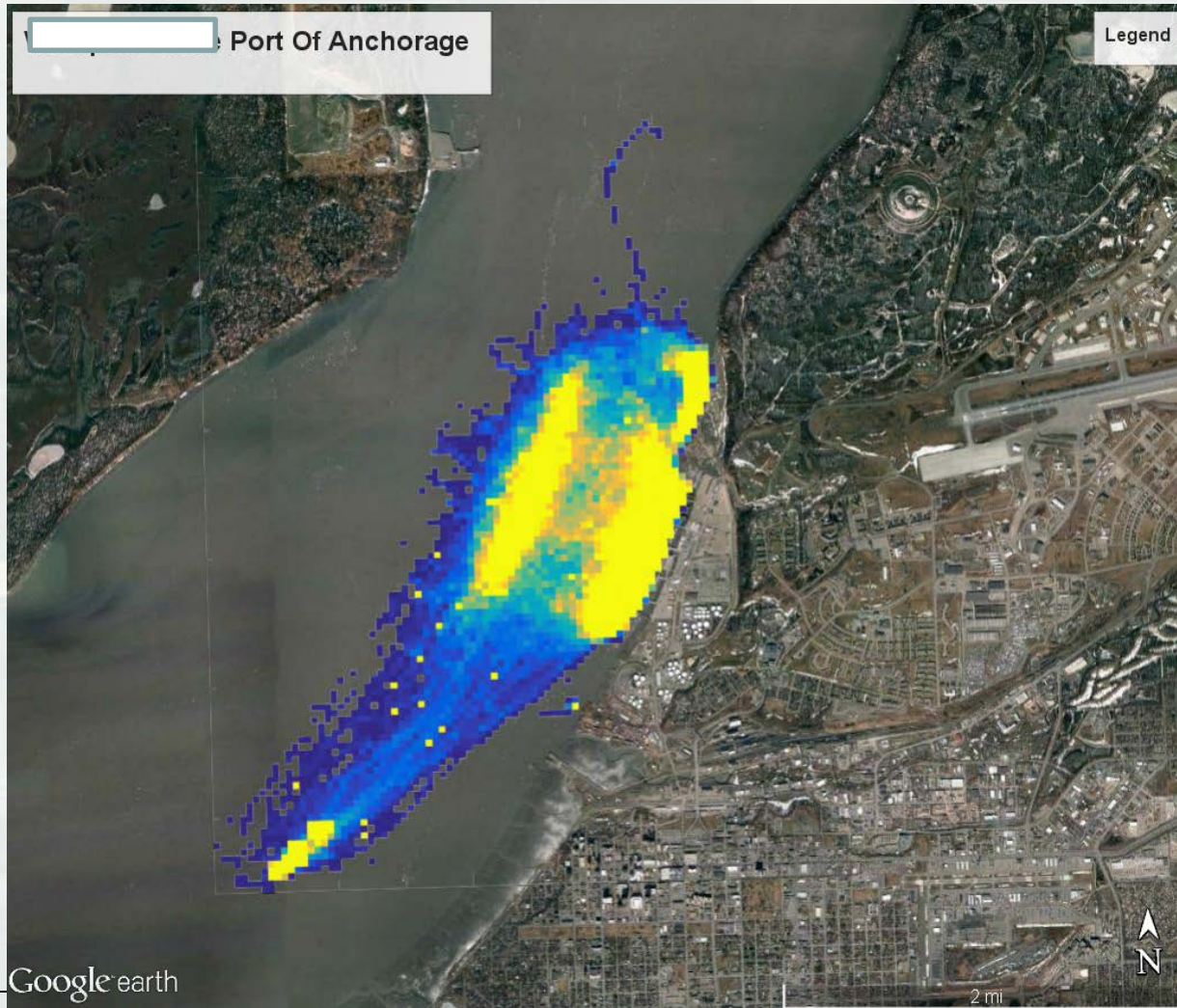


Vessel location at Brevard County, FL

November 27th 2013 to April 22nd, 2014



Port of Anchorage Dredging Intensity Analysis



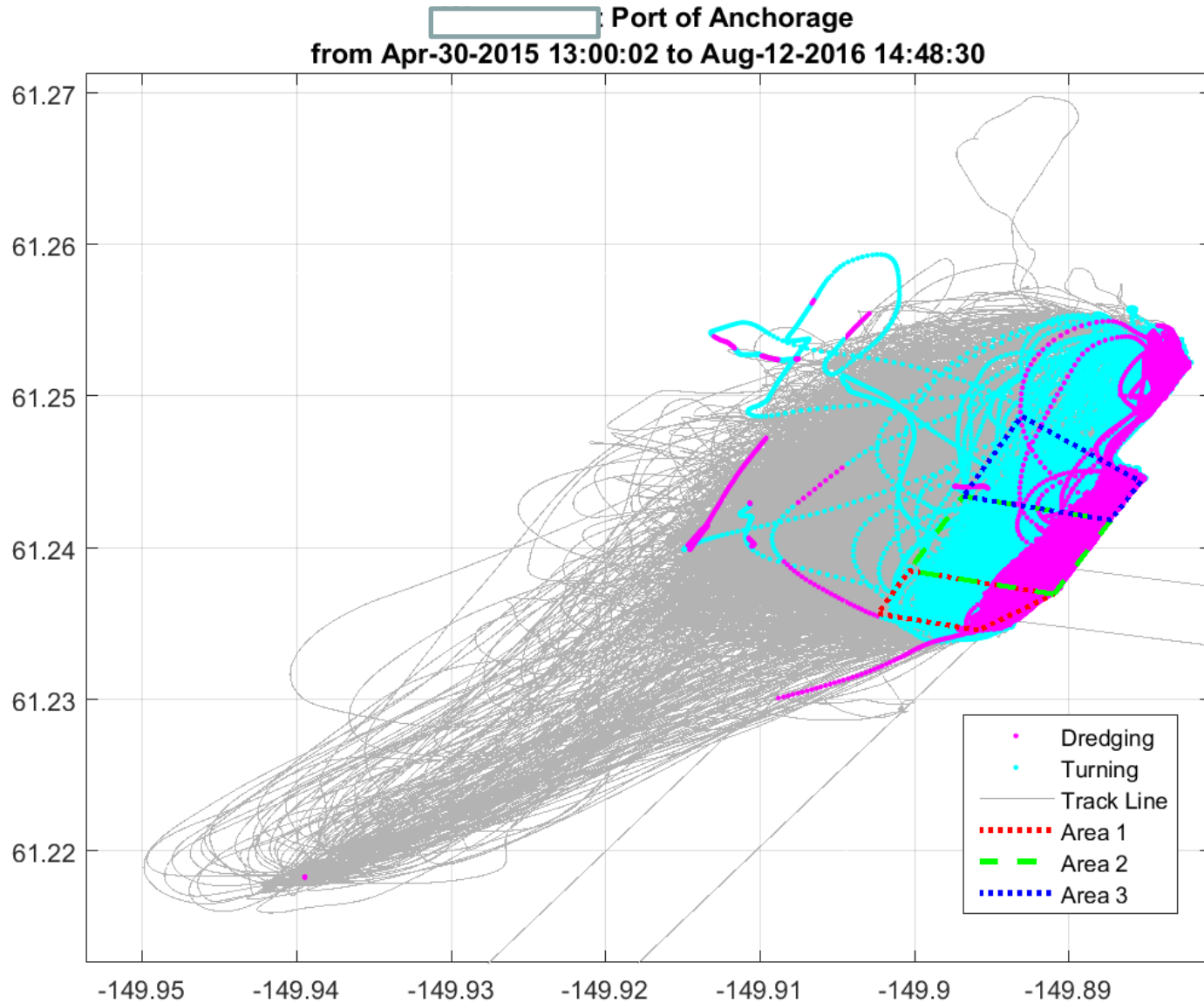
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Purpose/Objectives

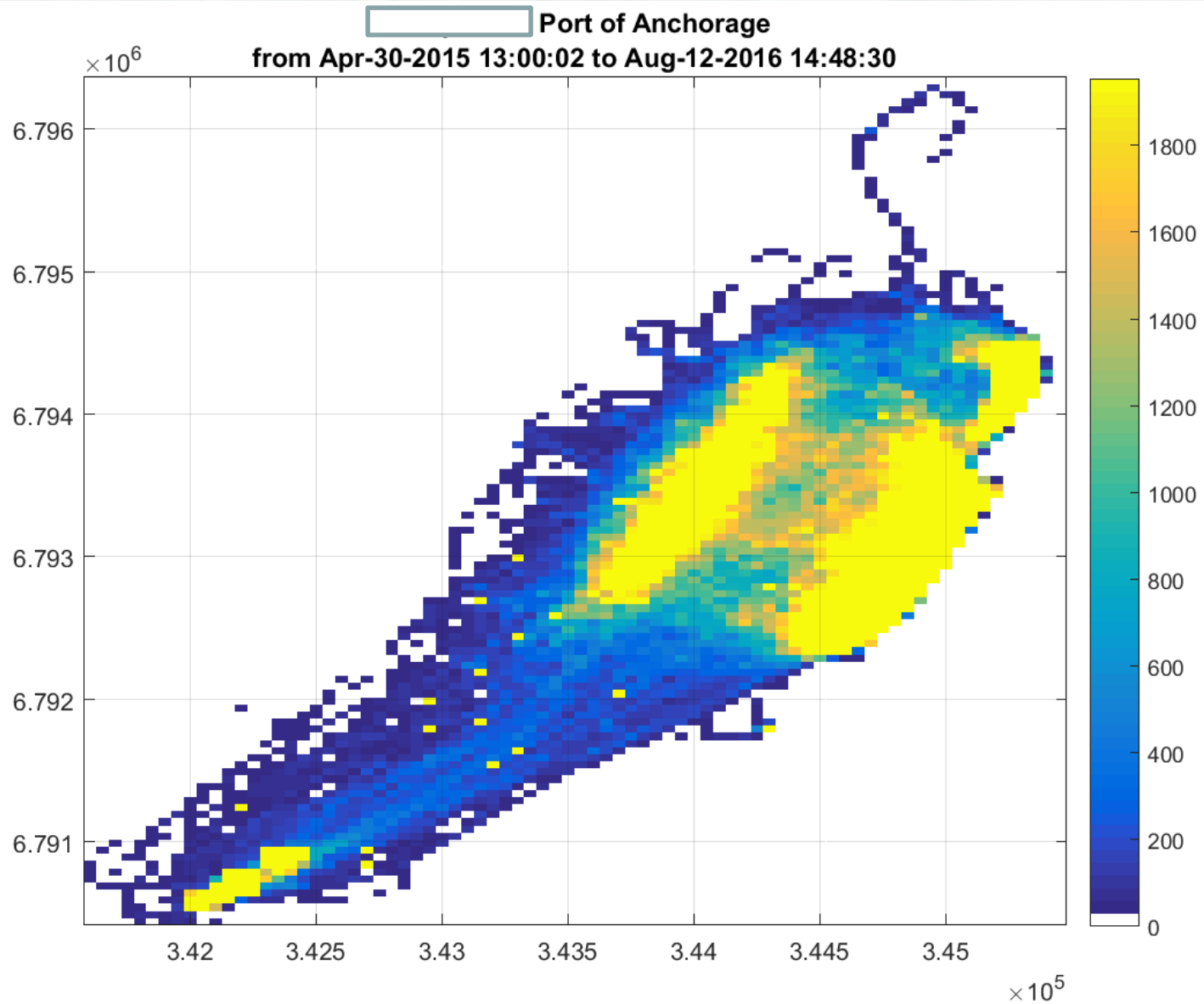
- Purpose: To review the last five years of dredging to determine the dredging tendencies along the Port of Anchorage adjacent to the port docking areas.
- Objectives: Determine impacts to normal operations if a phased construction of new port bulkhead work is performed.



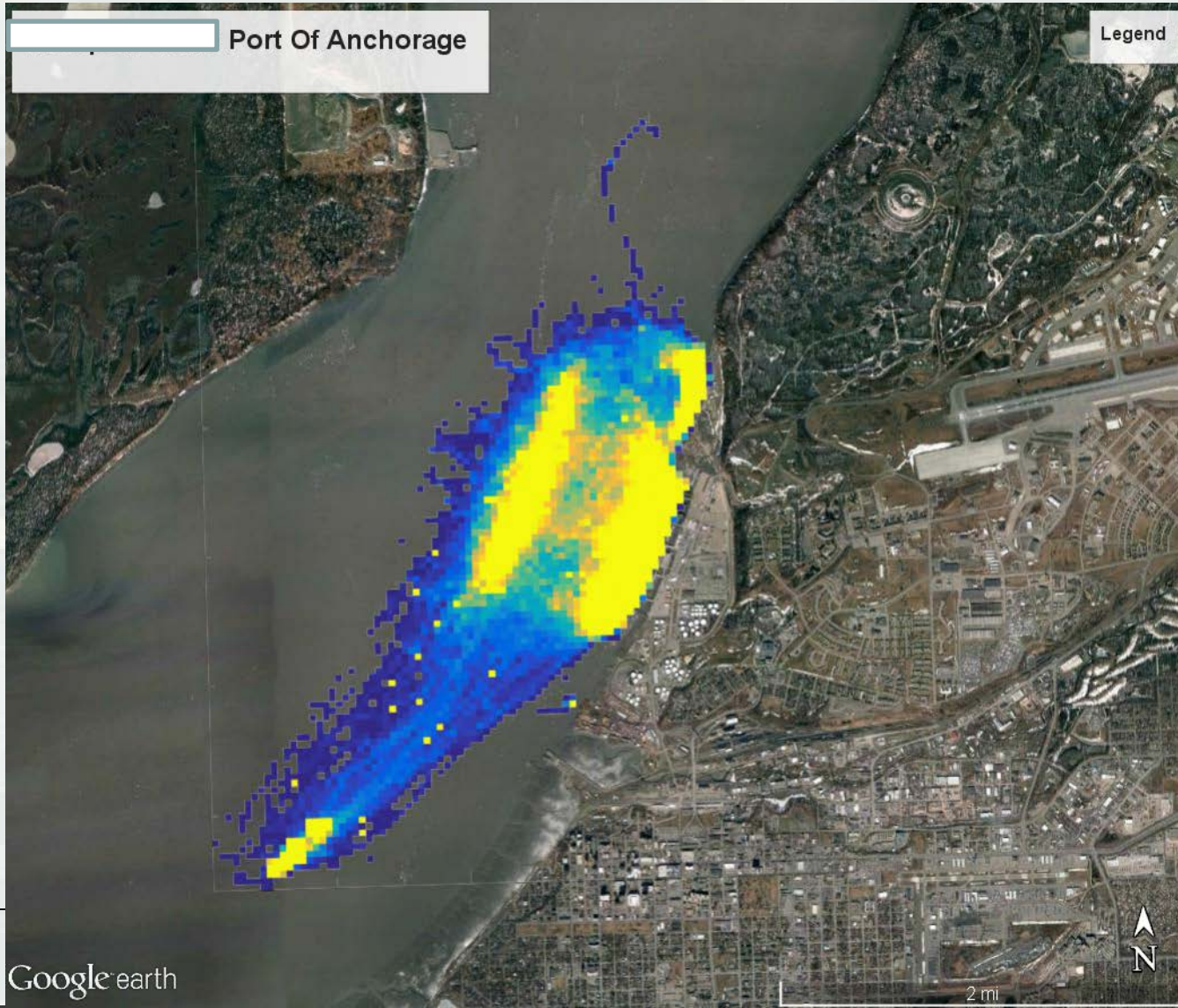
Tracks & Dredging



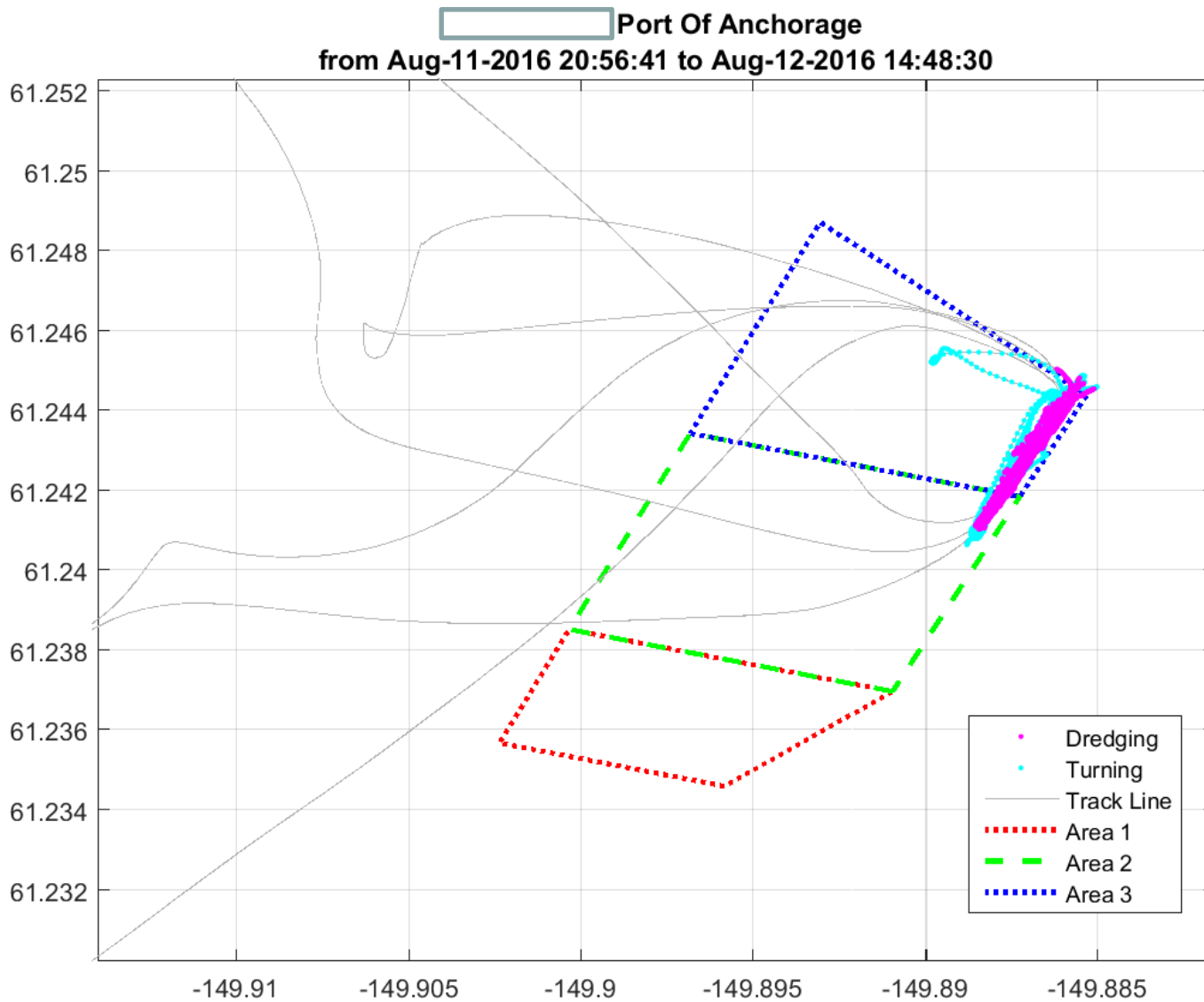
Heat Map



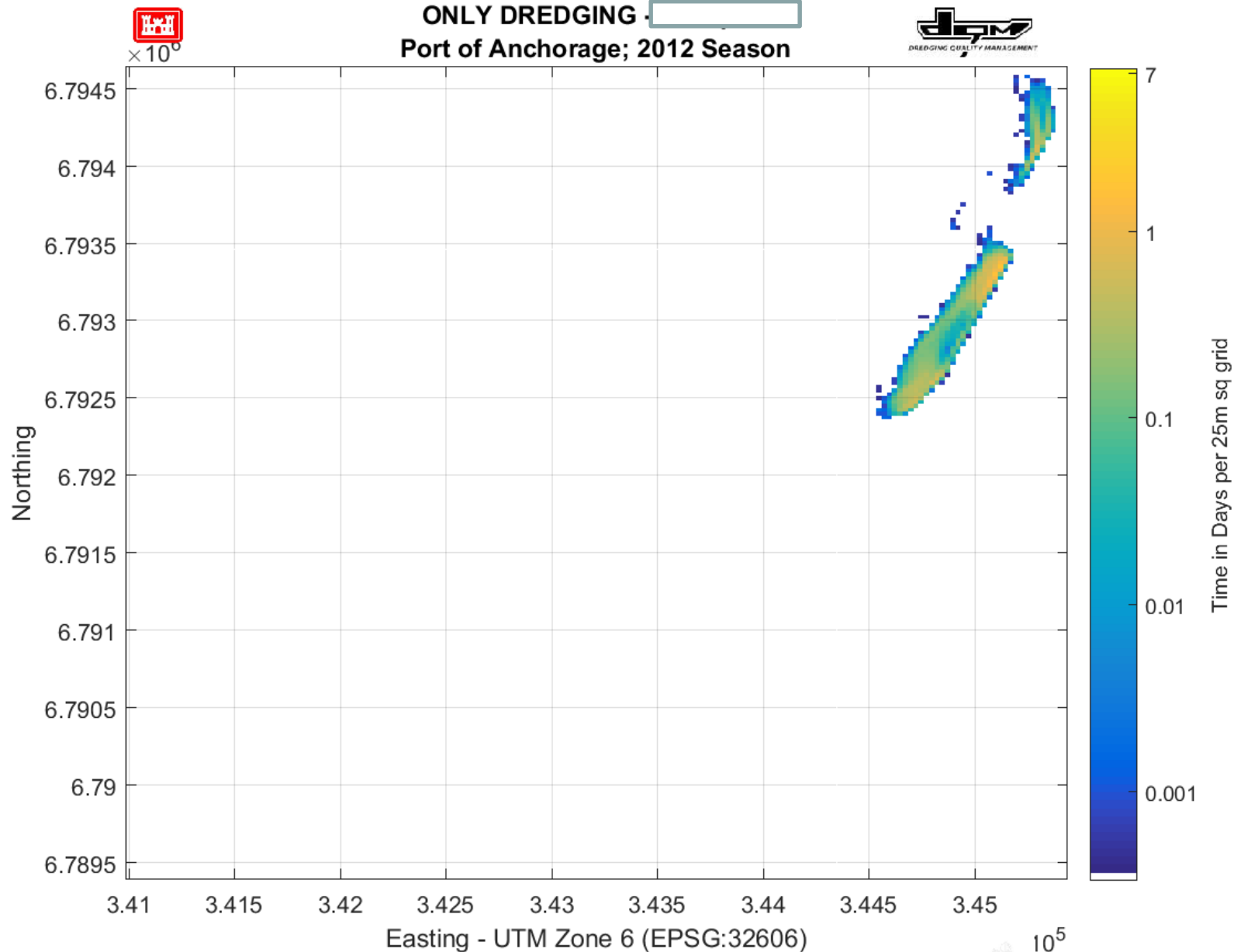
Google Earth Overlay



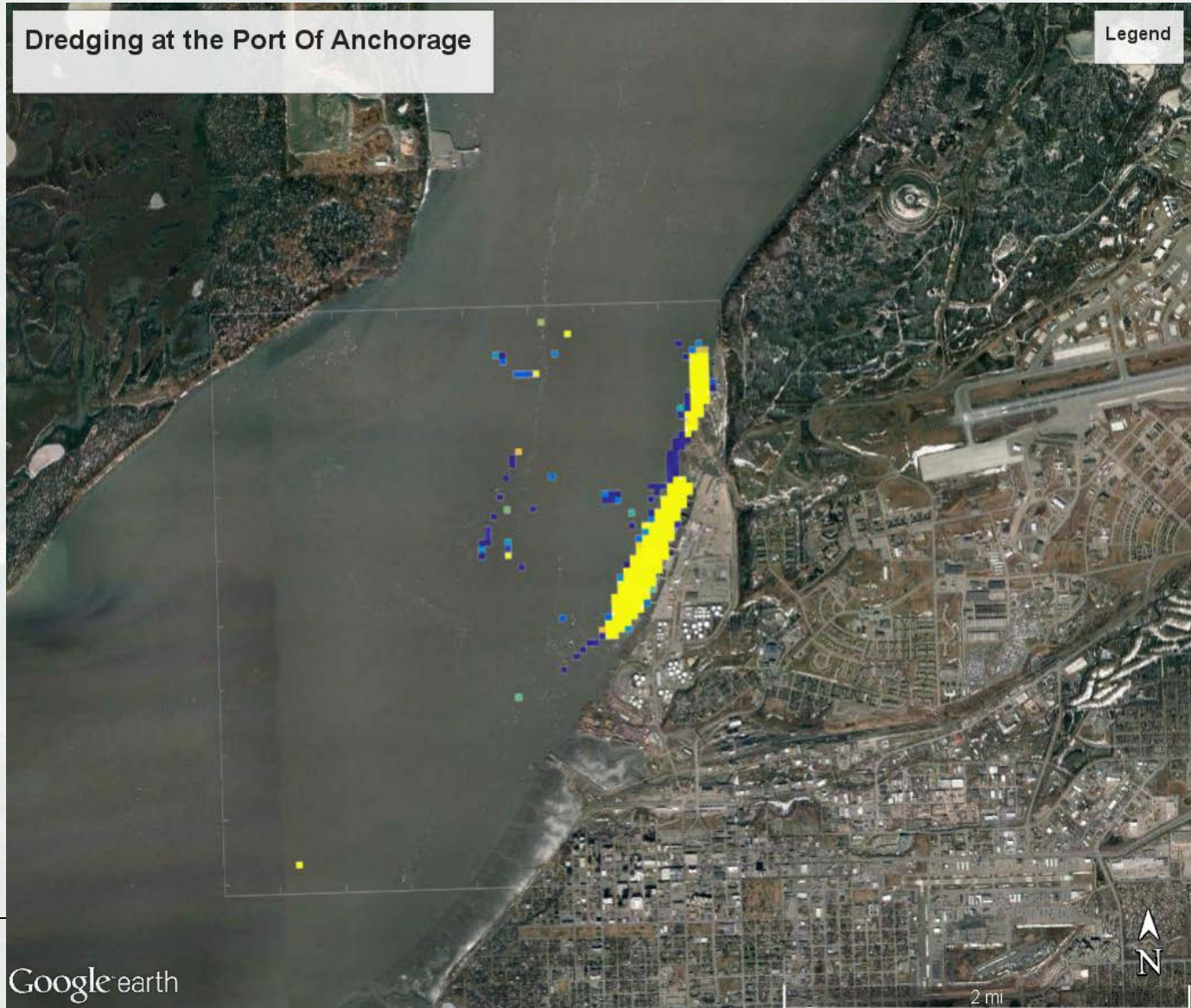
Area 1, 2, and 3



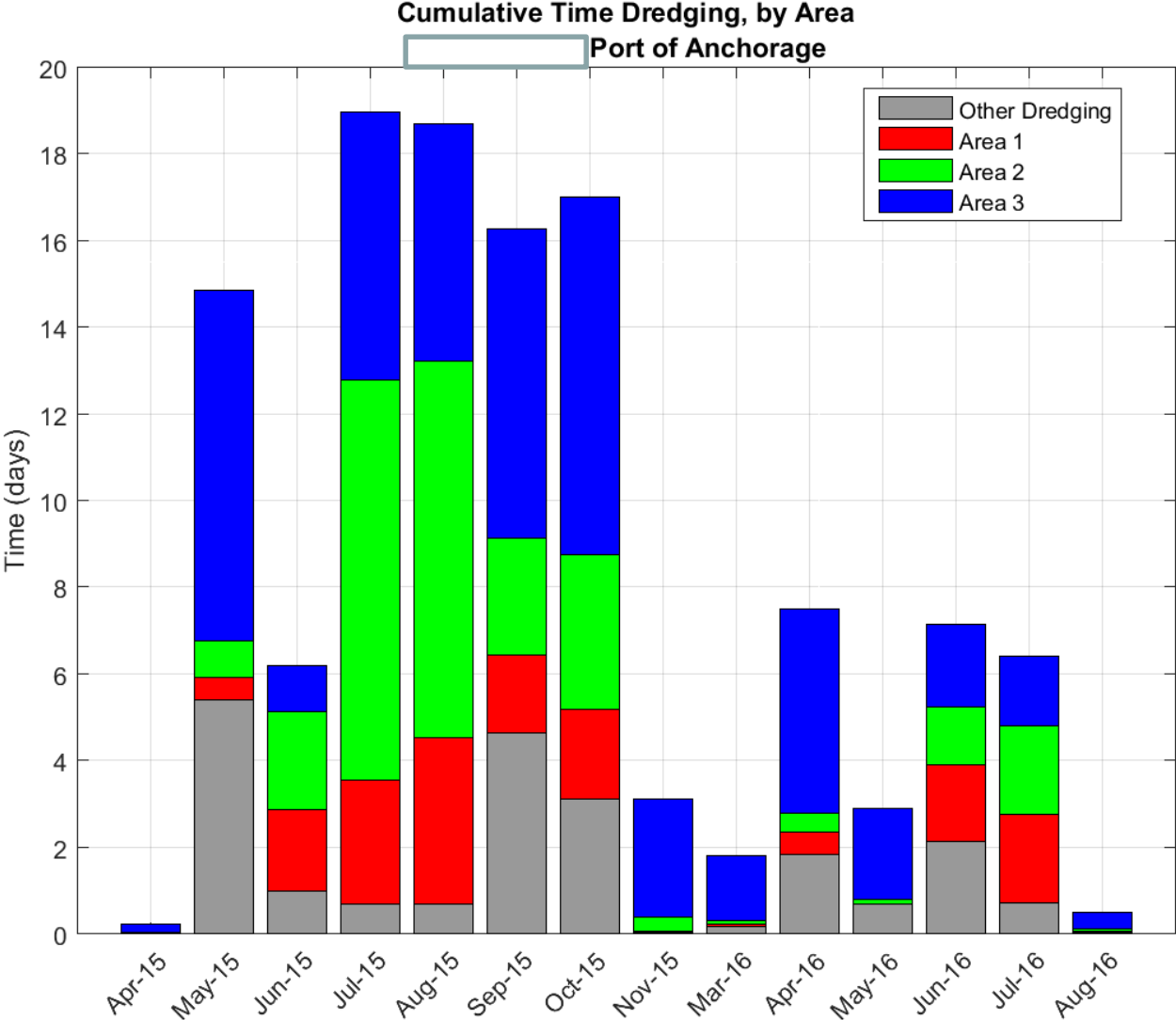
Filtering out all but Dredging



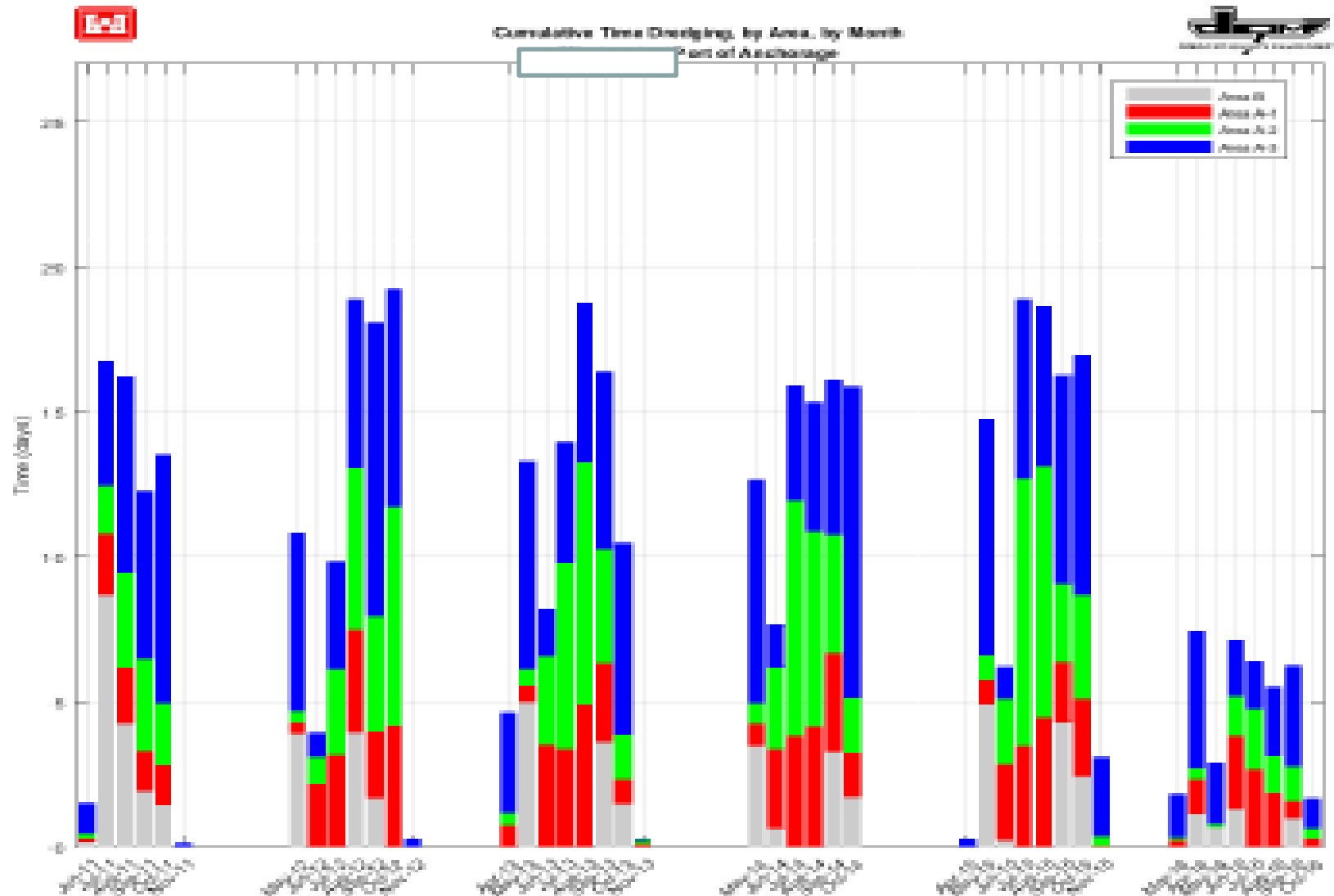
Where actual dredging occurred



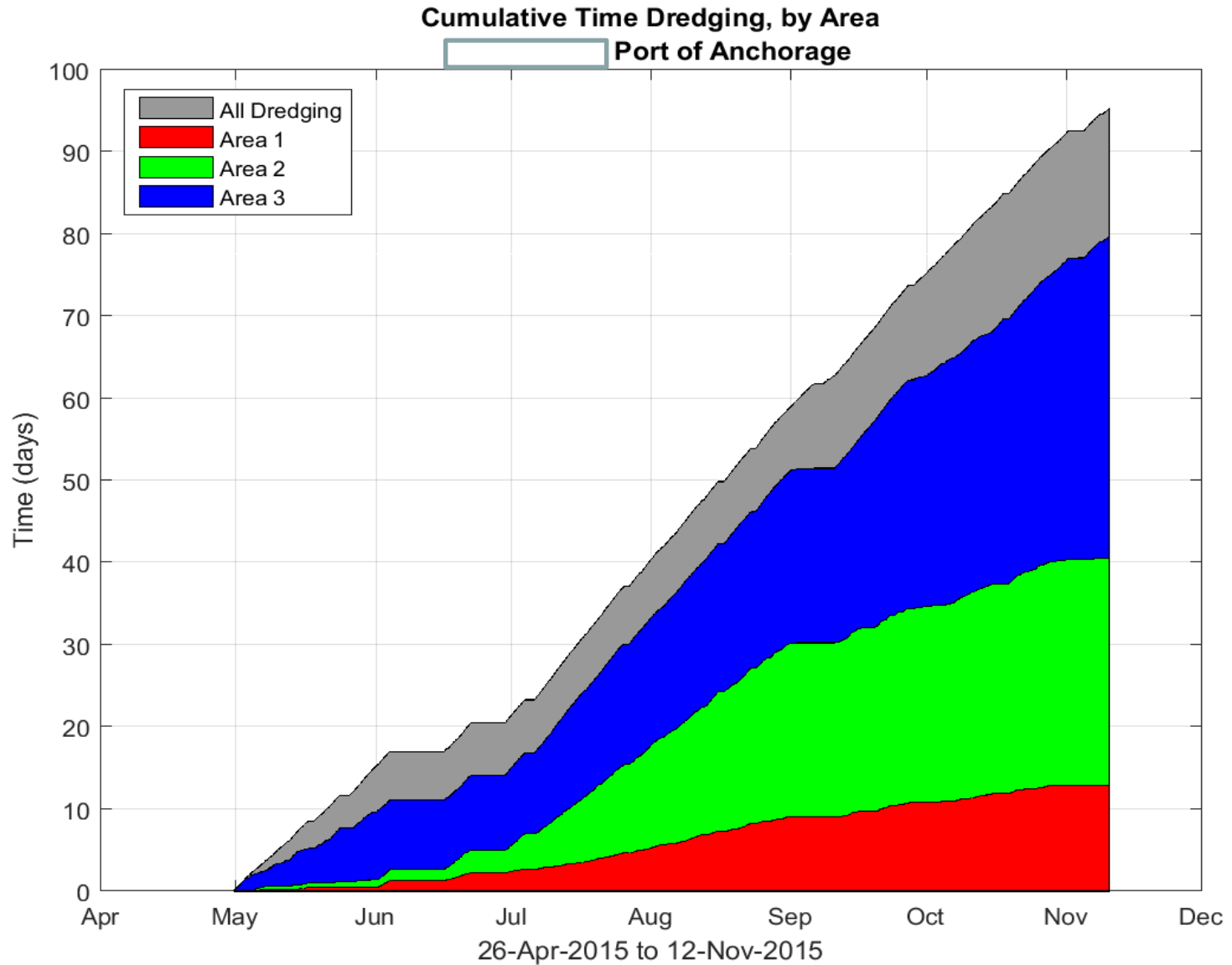
Dredging by area, by Month



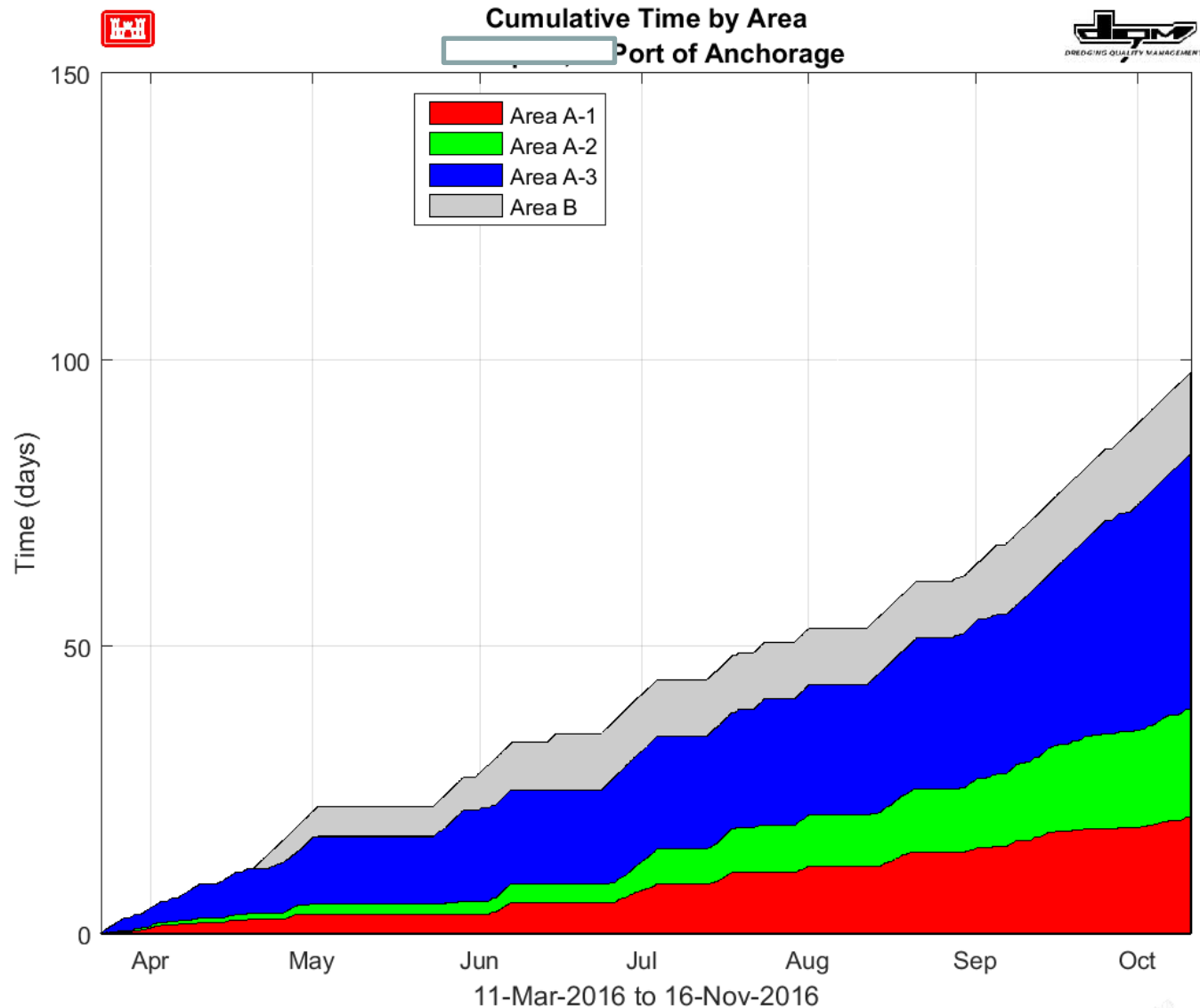
Cumulative Annual Dredging



FY15 Cumulative



Cumulative Monthly by Area



2017

- Private Pipeline Monitoring
- New Customers/More Customer Service
- ODESS Implementation
- Dev
 - ▶ V2.9, V3.0, Portal, ACS, Desktop tools, Management Tools, Enhance Dredge Intensity Model



More 2017

- Technical Advancements
 - ▶ Cloud, Machine Learning, OSIssoft
- Personnel Changes
- Alaska Analysis
- DQM, DIS and RMS
- Training on New DQM Tools



NEW **DQM** PORTAL



Search for Application



Certifications/QA



Administration



Reports



Plots



Export



DQM Viewer



Dashboard



Payments



Tools



DQM Public Website



Training





THE NATIONAL DREDGING QUALITY MANAGEMENT PROGRAM

The DQM Program is a partnership between the Corps and the dredging industry for automated monitoring of dredge activities.

Onboard sensors provide near-real-time data that allows for immediate response to emerging situations.

Districts can use the web-based DQM software to view, analyze, report on, and export dredging data.

The data can be used to improve business practice, ensure environmental compliance, and increase our understanding of dredging science and technology.



Question/Comments?



NATIONAL DREDGING QUALITY MANAGEMENT
DQPM



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