

ENSTAR's Periodic Atmospheric Corrosion Application using ArcGIS Field Maps and Survey123

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ENSTAR NATURAL GAS COMPANY



About ENSTAR

A TriSummit Utilities Company

Serving south-central Alaska since 1960

Service territory:
>2,800 sq. Mi

Population in service area:
>440,000

Customers:
>150,000

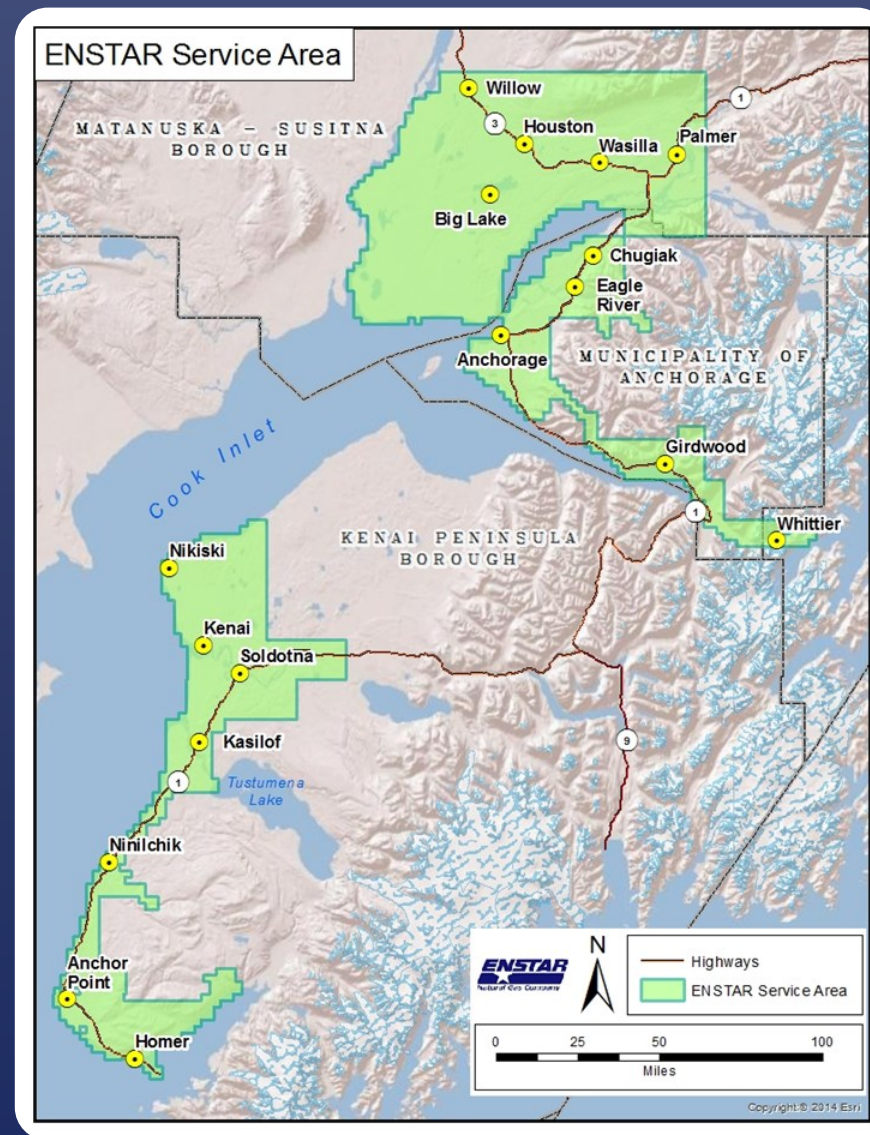
Transmission pipeline:
>380 mi

HP distribution pipeline:
>80 mi

Distribution Mains:
>3,200 mi

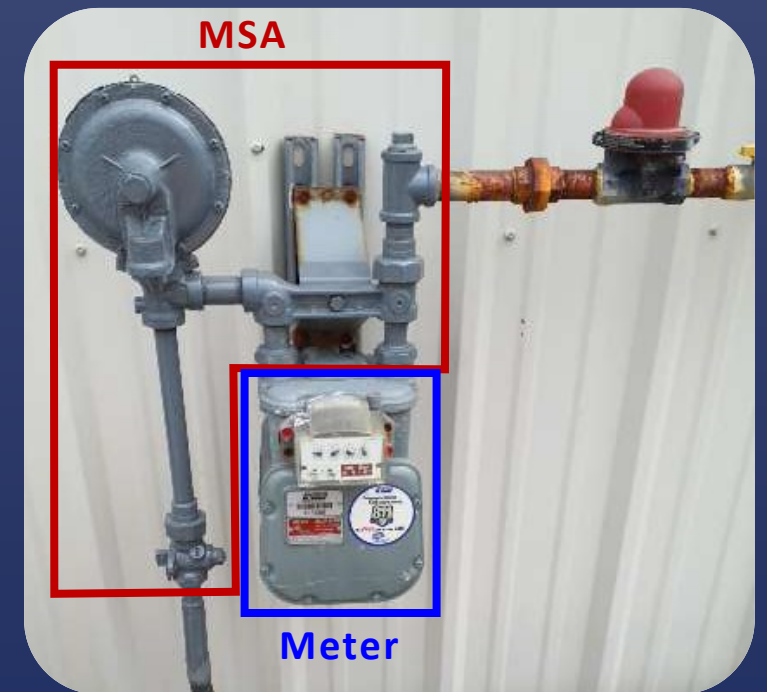
Service lines:
>136,000

Maintains >30 miles of main and >800 service lines for Doyon Utilities JBER



Atmospheric Corrosion Regulation

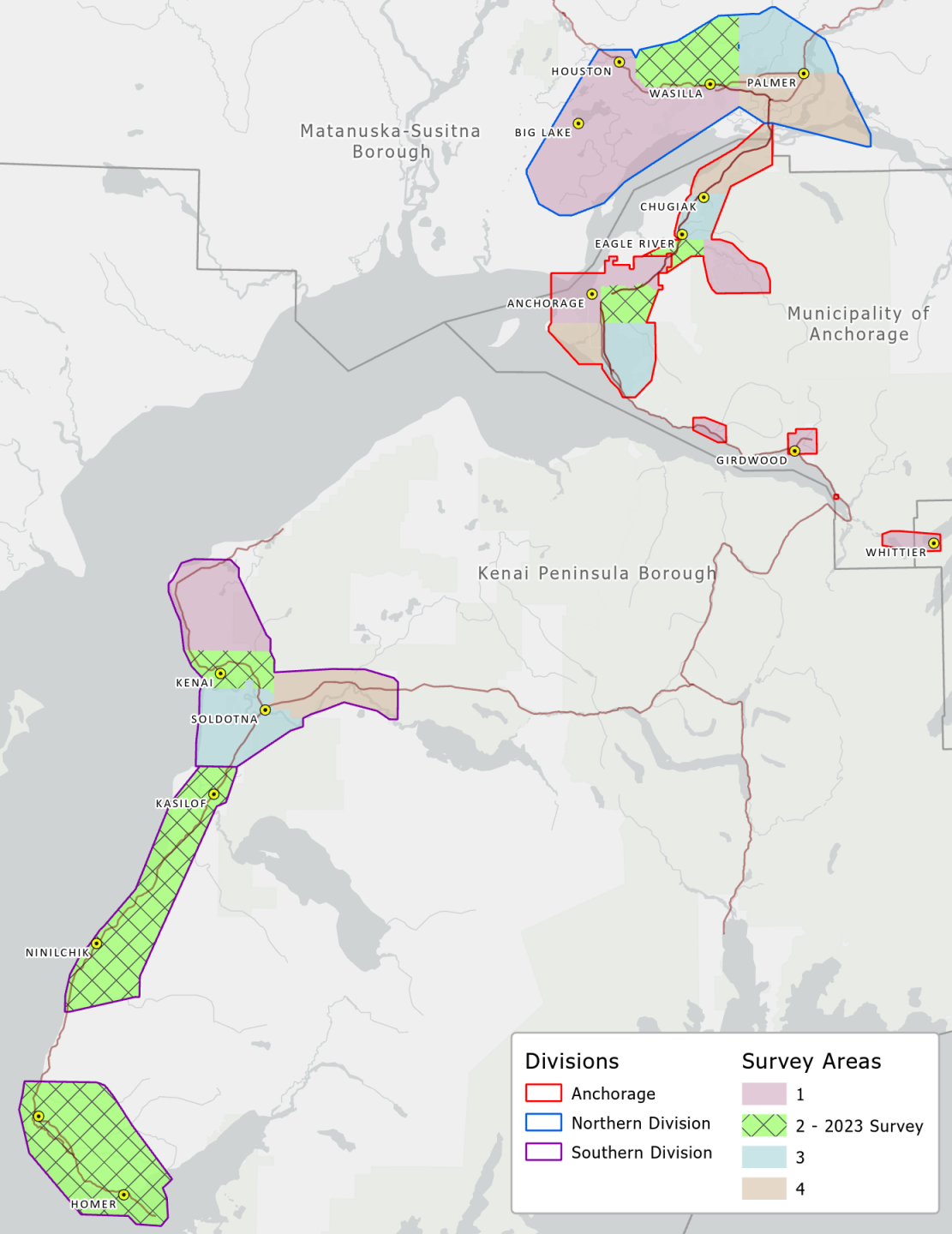
- USDOT – Pipeline and Hazardous Materials Safety Administration (PHMSA)
- 49 CFR 192.479 and 49 CFR 192.481
 - Inspect and evaluate each pipeline* or portion of the pipeline that is exposed to the atmosphere for evidence of atmospheric corrosion at least once every 5 calendar years.
 - If atmospheric corrosion is found, clean and coat each pipeline that is exposed to the atmosphere.
- ENSTAR's Periodic Atmospheric Corrosion (AC) Inspection Process
 - Survey and Maintain all above ground distribution piping every 4 years (every year in Whittier and on the Homer Spit).
 - Meter Set Assembly's (MSAs) and Meters



* A service line ends at the outlet of the customer meter or at the connection to a customer's piping, whichever is further downstream.

Division & Survey Areas

- Service area divided into 3 divisions
 - Anchorage
 - Northern
 - Southern
- Each division is further divided into 4 survey areas
 - Used in leak survey and atmospheric corrosion
 - Each area is surveyed by either leak survey or atmospheric corrosion every 2 years
- 2023 Periodic Atmospheric Corrosion
 - Conducted in survey area 2
 - 38,000+ work orders (MSAs)



Atmospheric Corrosion Requirements

- Replace custom ArcGIS Mobile SDK application
 - ENSTAR Mobile Maps
 - Running on ArcGIS Server 10.3.1 (ESRI Retired 12/2020)
- Compatible with ArcGIS Enterprise 10.9.x
- Compatible with Windows 10/11 or Android
- Change work orders from meters to MSAs
- Add/edit work orders, including meters and infractions
- Capture pictures
- Offline capable
- Easy-to-use and manage
- Synchronize with production database



MSA - 2 Meters



MSA Location

Atmospheric Corrosion Solution

- Development Started Oct 2022 -> Released May 2023
- Samsung Galaxy Tab Active3
 - Rugged Cases with shoulder and hand strap
- ArcGIS Survey123
 - Built using ArcGIS Survey123 Connect
 - Hosted Feature Service on ArcGIS Portal
- ArcGIS Field Maps
 - Offline Areas and Smart Forms
- 2 Web Applications
 - Work Order Assignment Tool
 - Atmospheric Corrosion Status
- Production Synchronization (in development)



Galaxy Tab Active3 8.0"

AT&T Sim Card

4GB RAM,
128GB Storage

13.0 MP Rear
Camera

GPS, Glonass,
Beidou, Galileo



Workflow

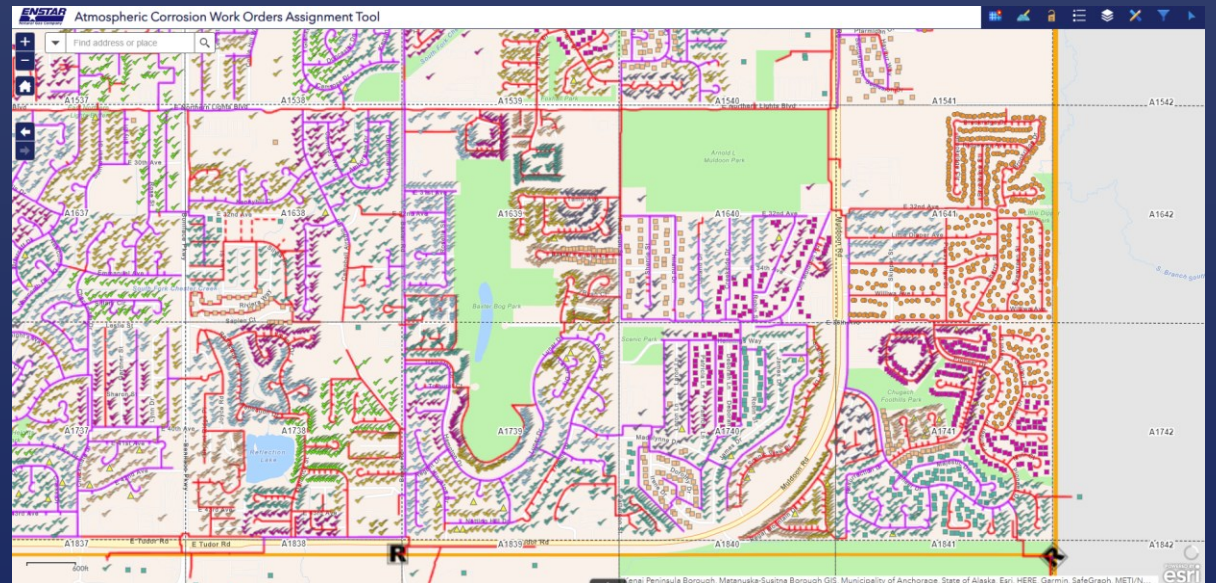
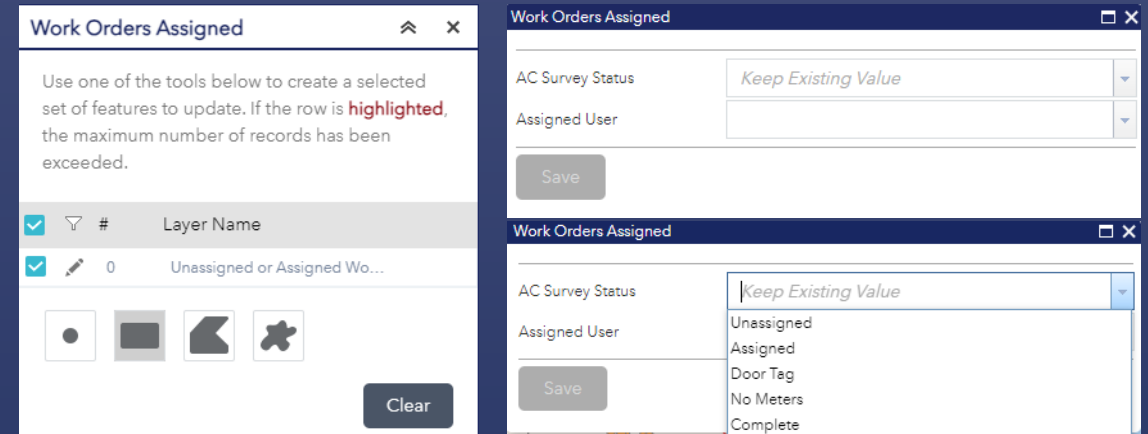
Assign

Survey

Track

AC Work Order Assignments Tool

- ESRI Application Builder and out-of-the-box widgets
 - Smart Editor, Filter, and Batch Attribute Editor
- Work orders are MSAs
- Managers assign work orders
- Work orders assigned by Username
 - Assigned/Unassign by grid, extent, polygon, etc.
- Manage “Door Tags”
- Create New Orders
 - Auto-filled data from other feature services
- Edits immediately available to field crews



Field Collection: Survey123 & Field Maps

ArcGIS Survey123

- Tile package (tpkx)
 - Non-editable data
 - Increases performance and usability
- Download assigned work
 - Assigned by username
 - Assigned work orders or door tags
- Survey123 functions
 - Linked Content - Web Map (Online)
 - Autofill data
 - Existing MSA and/or meter attributes
 - Field tech name & number
 - Data validation and rules
 - Add/Update MSA & meter(s)
 - Update 'Survey Status'
 - Capture 2 pictures
 - Add infractions
 - Gas leak, noisy meter, meter support, etc.

ArcGIS Field Maps

- Tile package (tpkx)
- Offline Area
 - Create/Download/Sync
- Field Maps functions
 - View completed work
 - Self-assign work orders
 - Add/Update addresses
- Customer Caution Alerts
 - Field worker safety



Atmospheric Corrosion Survey

Work Order Location
 61.300°N 149.499°W

Atmospheric Corrosion Survey

AC Survey Status *
 If set to 'Door Tag', infractions are hidden. Change to 'No Meters' or 'Complete' to show infraction(s) and meter(s).
 Door Tag No Meters Complete

Meter Setting Status *
 Stub Meter Set Assembly
 Abandoned Riser Only, no MSA

Employee Name *
 Justin Crowther

Employee Number *
 6 1

Number of Rows *
 1

Number of Columns *
 1

Number of Meters *
 1

Comment(s)

Comment Date
 Date

Inbox

Search

WO - SW156 - 20566 DRIFTWOOD BAY DR - Assigned ...
 Modified 8/14/23

WO - SW156 - 20588 DRIFTWOOD BAY DR - Assigned ...
 Modified 8/14/23

WO - SW156 - 20602 DRIFTWOOD BAY DR - Assigned ...
 Modified 8/14/23

WO - SW156 - 20620 DRIFTWOOD BAY DR - Assigned ...
 Modified 8/14/23

WO - SW156 - 20638 DRIFTWOOD BAY DR - Assigned ...
 Modified 8/14/23

WO - SW156 - 20656 DRIFTWOOD BAY DR - Assigned ...
 Modified 8/14/23

WO - SW156 - 20674 DRIFTWOOD BAY DR - Assigned ...
 Modified 8/14/23

Picture of the Meter Setting *
 Make sure to capture entire meter setting and all meters.

Picture of the Meter Installation on the Exterior of the Building *
 Take from a distance. Try to capture the general location of the meter setting and the location it's installed

Meter(s) *

Meter Information

Meter Number *
 1 87

ERT Number *
 2 508

Meter Row *
 0

Meter Column *
 0

Comment for Meter #: 1 87

1 of 1

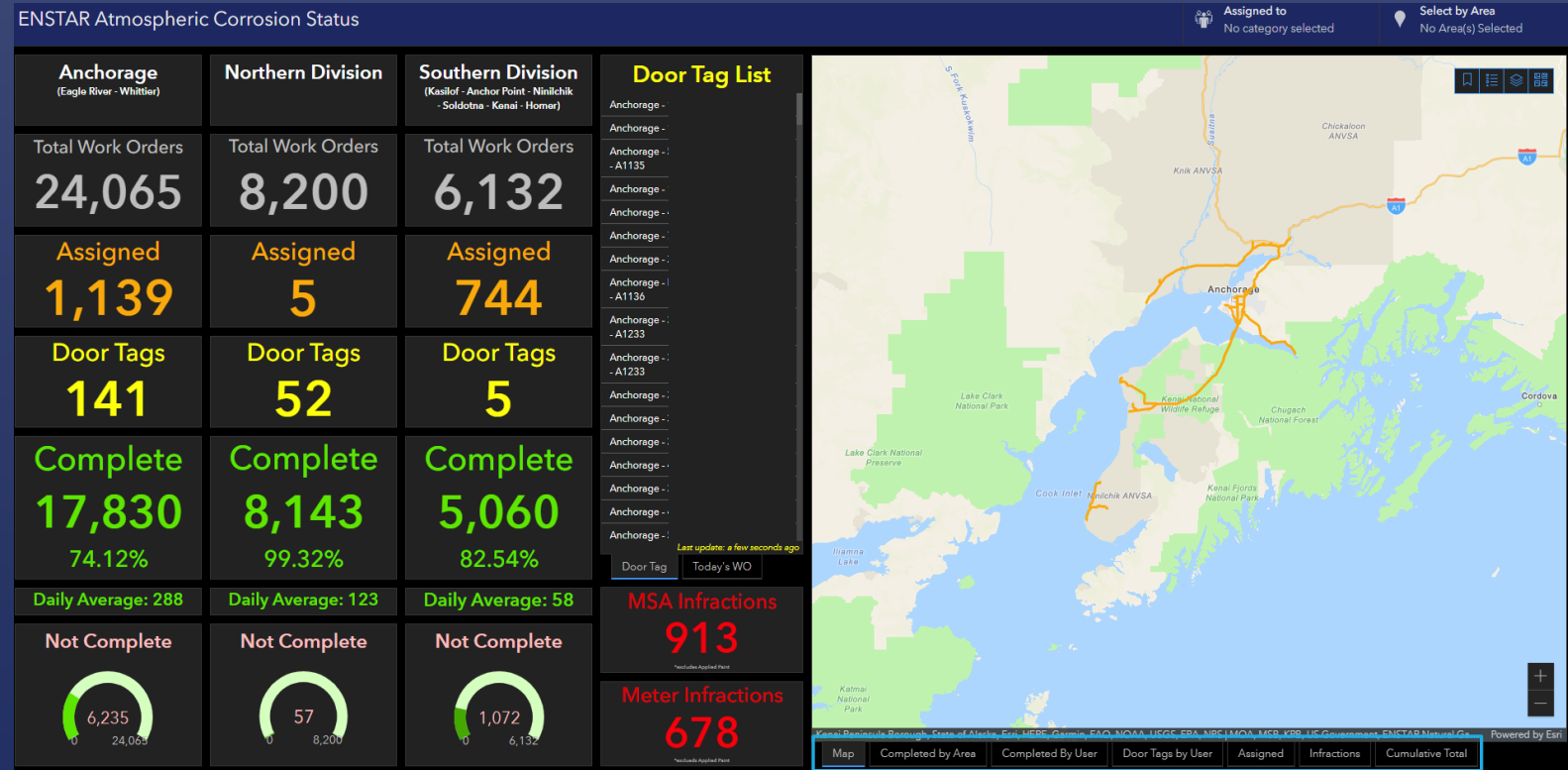
Infractions *

Is corrosion or other infraction present? *
 Yes
 No

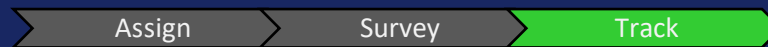
1 of 1

ENSTAR Atmospheric Corrosion Status

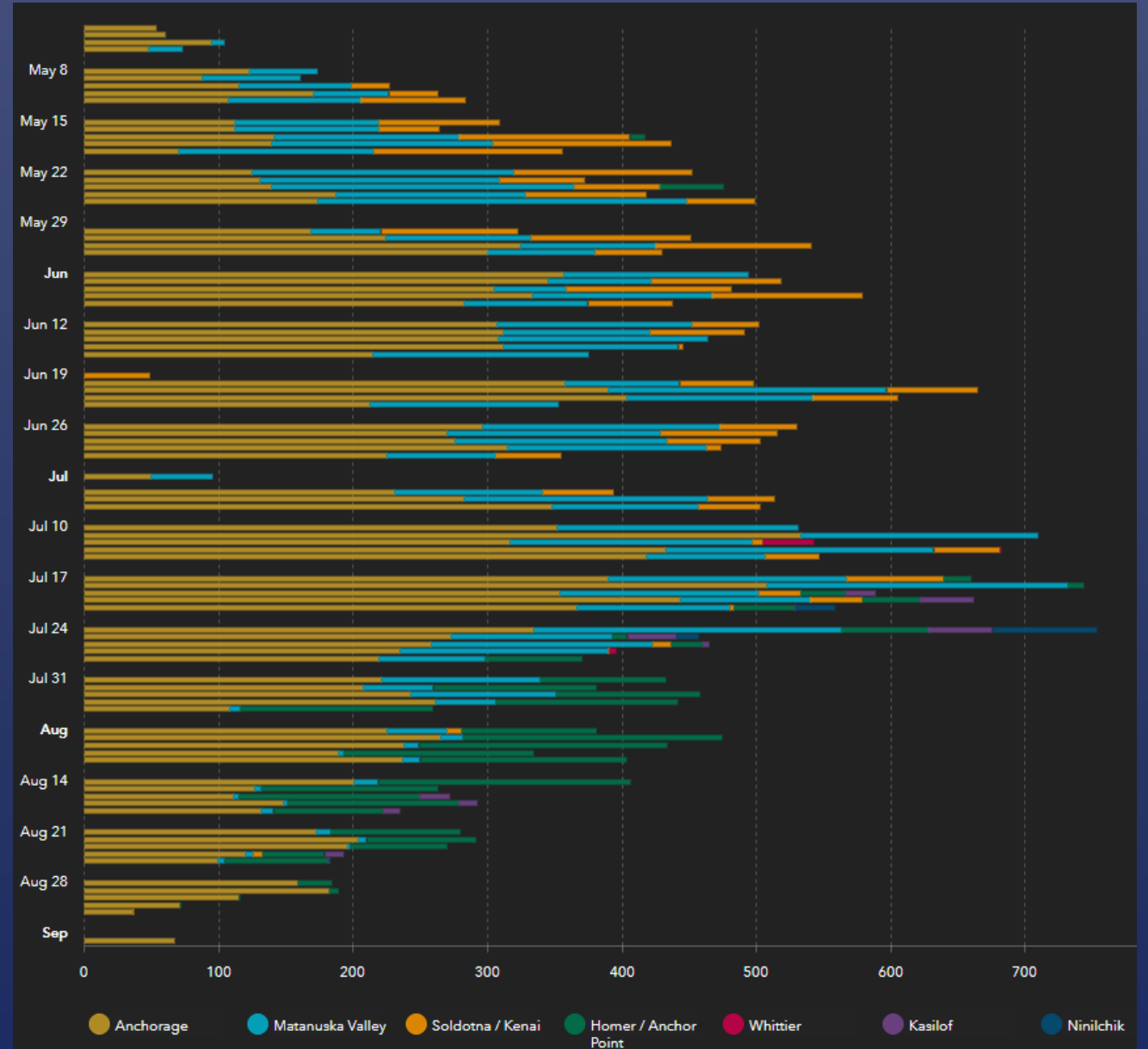
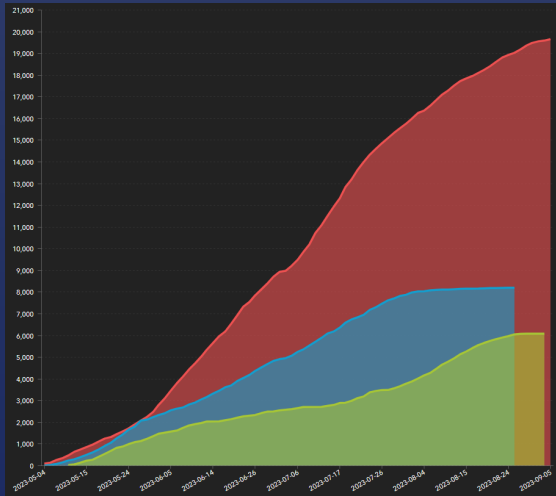
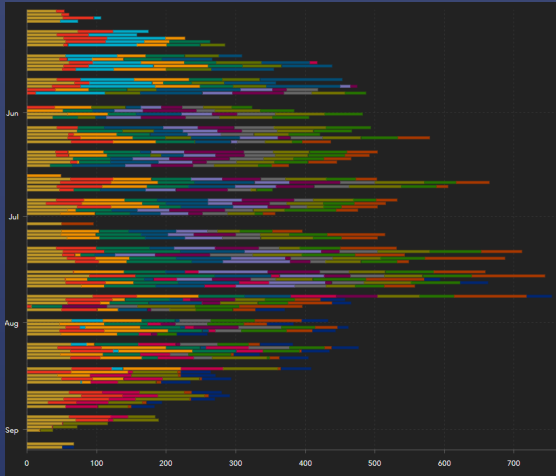
- ArcGIS Dashboard
- Overview of the AC surveys
- Filterable by User and Area
- Multiple trackers by division
- Multiple graphs for managers
- ArcGIS Arcade to transform data
 - Daily Average and Cumulative Total



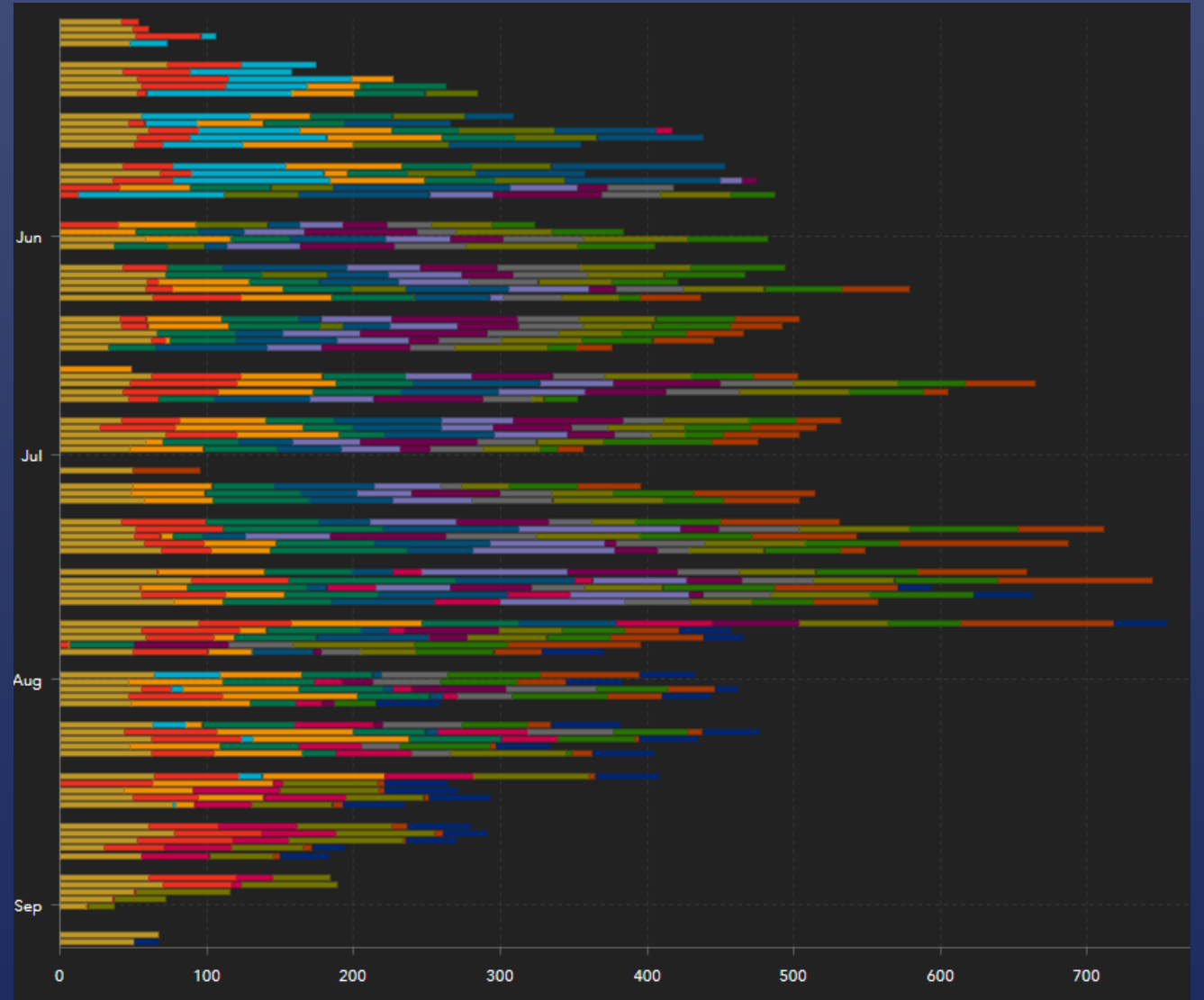
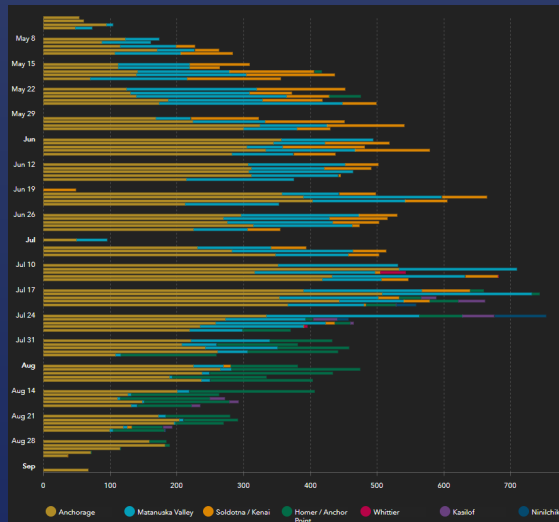
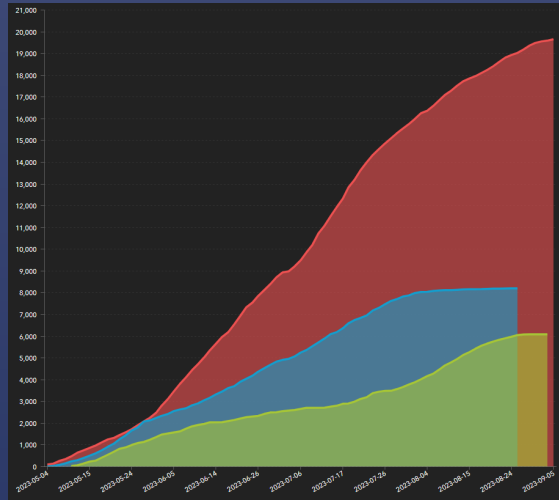
- Map
- Completed by Area
- Completed By User
- Door Tags
- Assigned
- Infractions
- Cumulative Total



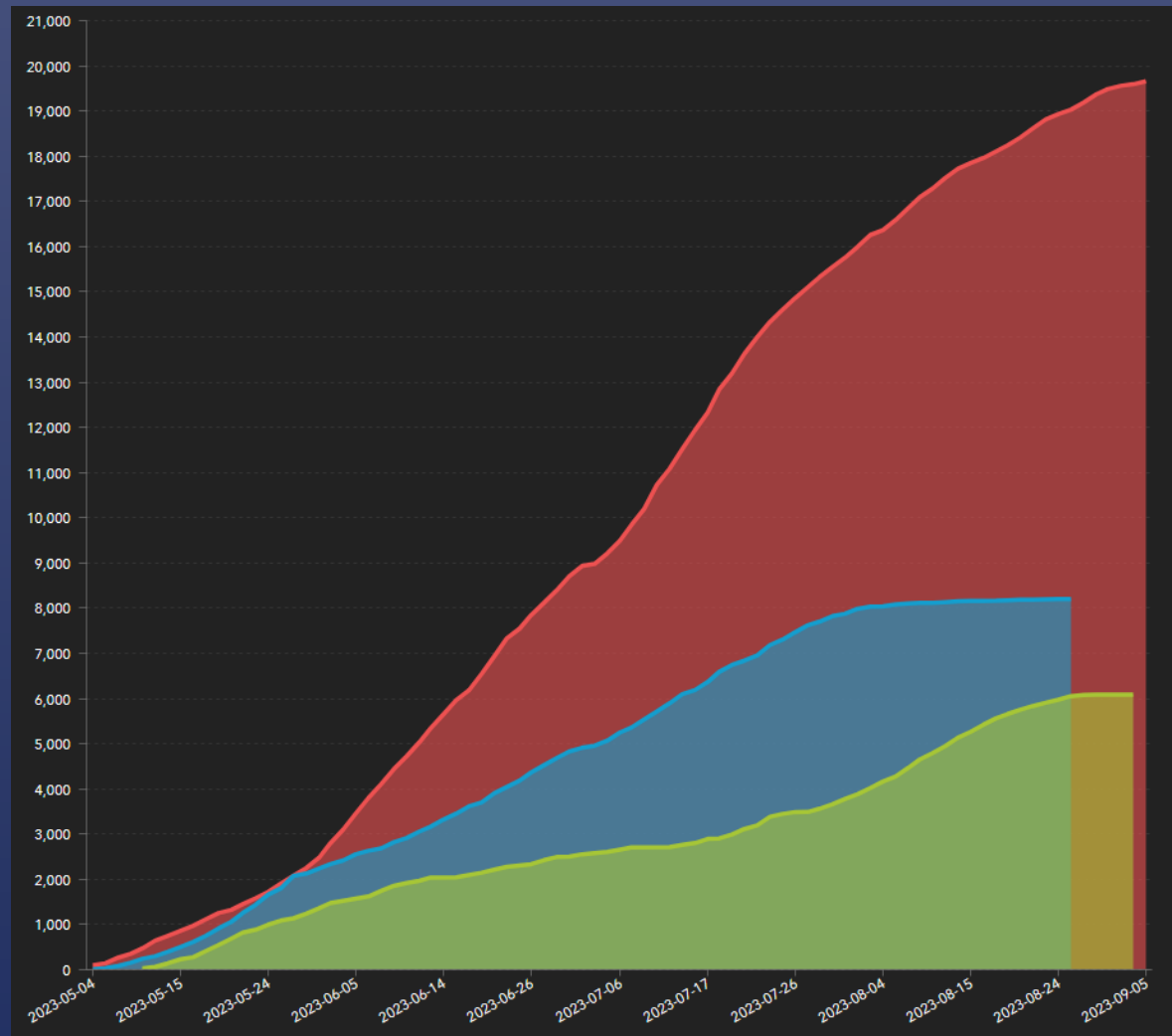
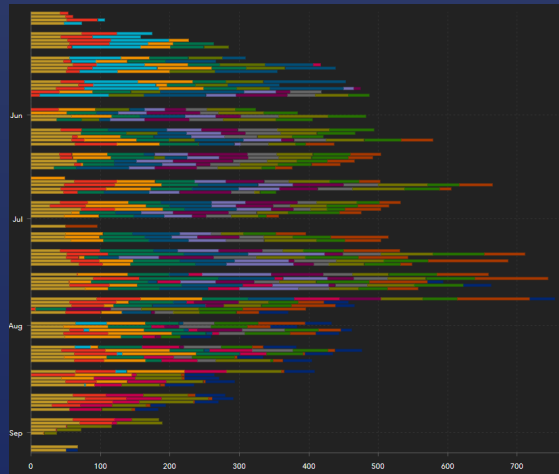
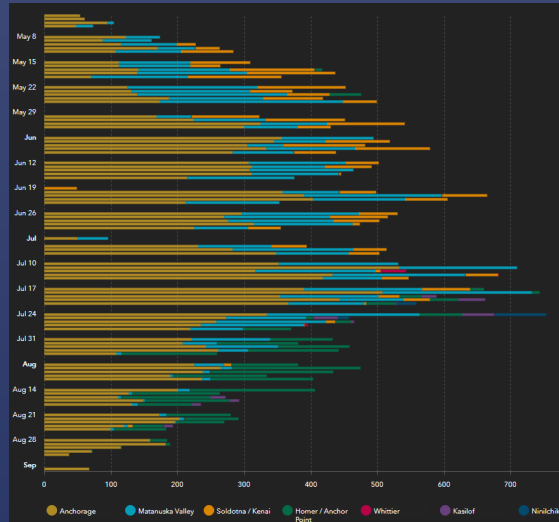
Completed By Area



Completed By User



Cumulative Total



```
for (var feature in selfS) {
    feat = {
        'attributes': {
            'editdate': Text(feature['editdate'], 'YYYY-MM-DD'),
            'local': feature['local'],
        }
    }
    Push(features, feat);
};

var dowDict = {
    'fields': [
        {'name': 'editdate', 'type': 'esriFieldTypeString'},
        {'name': 'local', 'type': 'esriFieldTypeString'},
        {'name': 'running_sum1', 'type': 'esriFieldTypeDouble'}
    ],
    'geometryType': '',
    'features': features
};
```

Benefits & Value

- Managers better informed
 - Real-time data
 - Less downtime and more flexibility
 - Easy-to-use for field crews and managers
 - Increased efficiency
 - Easily configured and modified
- 2019 vs 2023
 - Beginning of Season to July 27th
 - Same number of technicians
 - Same Area
 - 2019 work orders = Meters
 - 2023 work orders = MSAs

≈45% more surveys collected

	Year (Area)		Change
	2019 (2)	2023 (2)	
# Days	66	61	▼ -5
# Meters	24,203	32,739	▲ 8,536
# MSAs	19,450	25,707	▲ 6,257
Meters/Day	367	537	▲ 170
MSAs/Day	295	421	▲ 126

Thank You

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