Using ArcGIS Online to Manage Snow Operations

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Outline of Today’s Presentation

➤ Brief Overview of ArcGIS Online
  ➤ How to store data and publish maps
  ➤ Examples of snow management

➤ The Beginning of Our Snow Map
  ➤ Last year had a lot of snow to keep track of

➤ Improvements to the Snow Map
  ➤ Taking lessons learned from last year and implementing

➤ Live Demo of Snow Map

➤ Future Plans of the Snow Map
ArcGIS Online (AGOL) Overview

- Online uses a subscription account that is included with your ArcGIS Desktop license.
- Number of basemaps, such as imagery, street, and political boundary maps, are available.
- Online uses a multitude of data types, created from feature classes and shapefiles.
- Online maps are sharable, either by embedding into websites or creating URLs.
Getting Data Online

- 2 main ways to publish and manage data into the AGOL world
- ‘My Hosted Services’ site – ArcGIS Organizational Account
  - This is where I store Greenwood’s online data
- ArcGIS Server
- two difference
  - Online vs On Premises data storage
  - How get the data into the hands of workers/citizens
Greenwood AGOL Public Maps

- Boundary Map
- Building Permits – Active
- Johnson County Historical Markers
- Parks and Trails
- Common Council
- Legal Drains
- Road Ownership
- Trash Service
- Letters of Map Amendment
- Library Districts
- Utility Coverage Map
- Zoning Map
Solutions for Smart Snow Fighting

Esri Snow Management
Boston tracks snowplows with GIS-based SnowCOP to keep roads clear

- “Over the course of a storm, we have 500 to 600 plows pinging once each minute for 18 hours or longer”
- “The system tracks almost 30,000 street segments in the city”
- “display the locations of Boston’s snow-fighting workers with real-time 311 information from residents”
Esri Snow Management Case Studies

Managing GIS Operations for Snow Removal for the City of Columbus OH

- “Displaying real-time vehicle location data provided by Network Fleet (15-second intervals)”
- “Allowing users to search historical vehicle activity by a location on the map or by information, such as brass tag, street centerline, or street maintenance zone”
- “Providing standard reports for route completion, customer service requests, and truck activity summary”
Esri's Severe Weather Public Information Map
The Beginning of Our Snow Map

- Last year after a couple of snow events my boss approached me
- He was curious if there was a way to make a map to track snow plow activities
- This map would need to be able to show
  - Subdivisions plowed
  - Roads plowed
  - Which roads to plow/not plow
- I said that I could and got started working
The GIS of the Snow Map

- Started with Roads
  - Determined which were public/private/state
- Moved onto Subdivisions
  - Began by removing any ‘Commercial’ subdivision
  - Then removed subdivisions that didn’t have roads or had only private roads
- I then created new GIS Feature Classes and added new fields to track snow data
  - Status – Needs Plowing, Done Plowing
  - Drivers – 254 character limit, plenty of room to enter names
  - Notes – 254 character limit
  - Start Time
  - End Time
The AGOL of the Snow Map

- Uploaded the GIS data to AGOL and created a map like this
The AGOL of the Snow Map

- After each snow event I asked for input from whomever was updating/using map
  - What did you like/dislike
  - What do we need to do to make it easier/more user friendly
- Hardest part of all this was that no one had iPads yet
- Only able to update on desktop (even though map was mobile friendly)
- Meant coming up with system of phone calls to get the map updated
  - Crew calls crew leader who calls person updating map
  - Not ideal but effective for the initial stages
- Able to use the map for the rest of that season with the plan to update it for the next year
Snow Map Updates

- Getting ready for the current snow season we started talking about how to improve the map
- One advantage was that more people had iPads
  - Allowed for easier and more timely updates
- Some improvements to the map
  - Combining of Subdivisions/Plow Areas
    - Consulted with Street Dept. Supervisors to determine best way to do this
    - Some subdivisions are tiny
      - Mainly in our downtown area
    - Others have large areas that drivers plow, encompassing multiple subdivisions
  - Major roads were split into appropriate areas of coverage
    - Main St (EW road thru town) was split at Madison Ave
  - Fine tuned drop down options
    - Removed some options (Partial) deemed not needed
- Combining subdivisions/plow areas
- Easier to update map
- Less areas to click
AGOL Snow Event data

- Updating the map during an event
  - Street Dept. Supervisors utilize iPads and desktop computers
  - Receive phone calls/texts from crews when they finish an area
  - Since the supervisors are also plowing while updating they generally wait until they receive 3-4 updates before adding that to the map
  - Go over map after event on desktop
    - Double check and add any final changes

- Once an event is done
  - I create a shapefile, that is dated per the event, and download it to my desktop
  - I then can track each event
  - Able to make maps showing who plowed where
Snow Map produced from AGOL data
Updating online snow subdivision feature class

- Once an event is over and I’ve downloaded the data it’s time to overwrite the map and make it ready for the next event
  - I go to my desktop GIS and open my snow map
  - I take the ‘clean’ snow subdivision feature class (empty schema) and overwrite the online feature class
  - This ‘resets’ the map back to the beginning
  - All subdivisions/plow areas are red (Needs Plowing)

- Now the online map is ready for the next Snow Event
- Lets have a quick Live Demo of the Snow Map
Future of the Snow Map

- Continue working with all departments to ensure the map is working effectively
- Hope to have iPads in all Snow Plow trucks by next winter
  - Will allow for easier updating and more information
  - Drivers to easily identify when they are starting/stopping to plow an area
    - Currently not worrying about time
    - Too much information for supervisors to add to the map during a snow event
  - Even quicker turn around for supervisors to determine areas in need or already completed
- Would ultimately even allow for a ‘live’ snow map which could be made public
Future of the Snow Map

- By next year we are hopeful to have Cityworks up and running for the street department
  - Cityworks is an asset management/work order software
- Snow Events will be handled through Cityworks
  - Drivers will be assigned work order for their route
  - Will update their progress and completion in Cityworks
- Superintendent and supervisors will go to Cityworks dashboard to gain insight on a snow event
  - Different manner of assessing drivers/areas during event with the same results
- Historical snow data
- Usage statistics
  - Salt, gas, overtime, truck mileage, etc.
Benefits of the Snow Map

- The success and usefulness of this map has been noticed by the Street Dept Superintendent
- He recently asked for more online maps that will allow them to track
  - Street Sweeping
  - Potholes
- This has also been a useful tool in getting people ready for Cityworks
- Will have different style map and data entry points
- Helps users prepare for moving from paper to digital
QUESTIONs??

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