Outline

- Background
- History
- Goals
- Approach
- Next Steps
- Takeaways
City of Colorado Springs incorporated 1886

2\textsuperscript{nd} most populous city in Colorado but largest by area – 195 mi\textsuperscript{2}

Semi-arid – 16 in/yr

Mobile streambeds

Floodplains – 160-mi

Fountain Creek Watershed – 460 mi\textsuperscript{2}
1990 – Southern Delivery System (SDS) Planning Begins
1997 – 1st Colorado Springs MS4 permit
2005 – Stormwater Enterprise Approved
2009 – Stormwater Enterprise Ended by City Council
2012 Waldo Canyon Fire    2014 Black Forest Fire
2014 – Drainage Criteria Manual Adopted
2015 – EPA MS4 permit notice of violation
2016 – Pueblo County Inter-Governmental Agreement (IGA)
2016 – SDS begins operation
2017 – Stormwater fee re-established
Problems
Project Goals

- GIS-based web application for CIP planning
- Existing infrastructure gaps
- CIP prioritization and budgeting tool
- Create a Stormwater Channel Assessment Program framework
- BMP tracking system
Colorado Springs Utilities
Operations & Maintenance
Development Review
Fountain Creek Watershed Flood Control & Greenway District
CIP Delivery
Parks & Open Space
GIS and IT
Benchmarking

- City of Aurora
- City & County of Denver
- Urban Drainage & Flood Control District

- Project Definitions
- Sub-Projects
- Prioritization
- Querying
- Cut Sheets
- Work Flow
- Cost Index
- Editability
- Accessibility
Data Collection – Field Review

- Over 258 mi of open channel
  - 37 major drainage basins
  - 63 mi improved/195 unimproved
  - 1,260 grade control structures
  - 800+ existing BMPs

- GIS data
  - Tablet data collection
  - Geolocated photos
Data Collection – Field Review

Parameters collected

- Location - GPS
- Improvement type
- Condition
  - Tier 1
  - Tier 2
- Height
- Vegetation
Tier 1 – Infrastructure Condition
- Health/safety/flooding
- Channel stability
- Utility risks
- Road/bridge/structure risk
- Criteria – headcuts, unstable banks, severe floodplain disconnect, undermined drop structures

Tier 2 – Corridor Function
- Recreation
- Habitat/riparian function
- Aesthetics
- Criteria – geomorphic floodplain connection, vegetation quality and connection, bedrock
Field Assessment

Tier 1 – Infrastructure Condition: Examples

- Good (green) – healthy stream corridor; sustainable [35%]
- Fair (yellow) – some instability but no adjacent risks; at risk in large flood; maintenance [50%]
- Poor (orange) – instability with adjacent risks; could need a CIP [10%]
- Critical (red) – needs immediate attention; imminent risk [<5%]
Tier 2 – Corridor Value: Examples

- **Good (green)** – healthy stream corridor; high aesthetic and habitat value [30%]
- **Fair (yellow)** – some impaired habitat but mostly functioning [45%]
- **Poor (orange)** – disconnected floodplain, sparse vegetation [20%]
- **Critical (red)** – minimal habitat value[<5%]
Field Assessment

Examples

- Tier 1 – Good
- Tier 2 - Poor
Over 400 documents
- Plans/Reports
- IGA Projects
- Needs Assessment
- Databases
- Spreadsheets
- Hand written notes
- Individual staff knowledge

GIS data
## PROJECT ORGANIZATION: INVENTORY SPREADSHEET

<table>
<thead>
<tr>
<th>No.</th>
<th>ID</th>
<th>Cost Table (SIMP ID) (NEW)</th>
<th>Attribute Only (SIMP ID) (New)</th>
<th>Improvement Name</th>
<th>Location (Street Names)</th>
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<th>Description</th>
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### Legend:
- **Summary of costs by document.**
- Project Improvements identified in the reviewed document.
- Steps in inventory spreadsheet to define project organization.
Prioritization

Planning
- Drainage Basin Planning Studies
- Existing Infrastructure Needs Assessment

Condition

Capacity
## Planning Prioritization

### Table: Planning Prioritization

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<thead>
<tr>
<th>Drainage Basin</th>
<th>DBPS Published Date</th>
<th>Age of DBPS</th>
<th>Design Standard</th>
<th>Degree of Future Development</th>
<th>Existing Regional Detention</th>
<th>Future Regional Detention</th>
<th>Potential Natural Stream Preservation/Restoration Opportunities</th>
<th>Closed Basin</th>
<th>City-Input (based on economic, social and political climate at the time of ranking)</th>
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LEVEL 1/ LEVEL 2 – LANDOWNER SCALE
Prioritize Highest Need Drainage Basins

Parcelscale
(mid-to-upper watershed)

- Acres untreated by BMPs (BMP layers)
- Bank condition weighted by miles of open channel (Field inspection)
- Unplatted acres (DBPS scoring)
- Percent imperviousness (City layers -LU)
- Closed basins (City list)
- Social issues (City layers)
  - Low/Moderate Income Areas (LMI)
  - Affordable Housing Units
  - Economic Opportunity Zones
- 303(d) listings by impairment (CDPHE)

Reach-scale
(lower watershed)

- Erosion potential
  - Bank height (Field inspection)
  - Bank cover (Field inspection)
  - Soil type/ K-value (NRCS)
- No. of utilities within a buffer (City layers)
- Other at risk infrastructure (City layers)
  - Building footprint
  - Highway buffer layer
  - Schools, hospitals, and other institutions
  - Trails
- Project identification (SIMP Database)

LEVEL 2 – PARCEL & REACH SCALES
Prioritize Highest Risk Locations Within Drainage Basins

- Parcel ownership – Public vs. Private (City layers)
- Zoning – Residential vs. Industrial Uses (City layers)
- Hydrologic Soil Group – A & B vs. C/D (NRCS)
- Project identification weighted by source & date (SIMP Database)

LEVEL 3 - PROJECT SCALE
Prioritize Solutions by Project Type

- Pollutant removal
- Project cost

- DETENTION (OFF-LINE)
- STORM/ OTHER
- GRADE CONTROL
- CHANNELS
- BRIDGES/ CULVERTS
- DETENTION (ONLINE)

Colorado Springs Stormwater Infrastructure Master Plan
Next Steps

- Project Identification
- Project Prioritization
- Develop Web Application
Evolution is painful
Deferred maintenance is not the sum of its parts
Leverage existing data
Listen to users
Communicate
City Project Manager – Tim Biolchini
Engineering Stormwater Division Manager – Richard Mulledy
Stormwater Capital Programs Manager – Brian Kelley