CEATI INTERNATIONAL **Vegetation Management Conference 2018**

Integrating Utility Vegetation Management and Urban Forestry
A Municipal Utility Perspective

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Topics

- Background
- Utility Vegetation Management and Urban Forestry: A Recap
- Vegetation Management at the City of Palo Alto
- Integrating UVM and UF:
  - What we (can) do today
  - Obstacles
  - Overcoming the obstacles: Essential Requirements
  - Enabling technologies and tools
  - New possibilities
- Technology overview and implementation issues

CITY OF PALO ALTO URBAN FORESTRY

Background

- City's UF Department has historically managed both utility and street trees
- Experience dealing with tree/line conflicts
- Currently addressing these issues in piece meal ways
- Constrained by data and tools for what we can do
- Decided to explore new approaches with Tree Asset Manager
- Successfully implemented the first phase
- But not without its challenges

CITY OF PALO ALTO URBAN FORESTRY

Utility Vegetation Management

UVM Objectives - Treat, trim, and remove vegetation to

- Maintain power system reliability
- Mitigate wildfire threats
- Reduce liability exposure
- Promote safety
- Lower costs
  - trees on private property are the among the highest maintenance expense

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Urban Forestry Management

UF Objectives – Plant, treat, trim, and remove vegetation to

- Grow and maintain a healthy urban forest
- Increase canopy cover percentage in all areas of the city
- Increase the environmental, economic and social benefits of urban trees
- Minimize infrastructure conflicts
- Educate and involve community in advocating for the urban forest

Vegetation Management at the City of Palo Alto

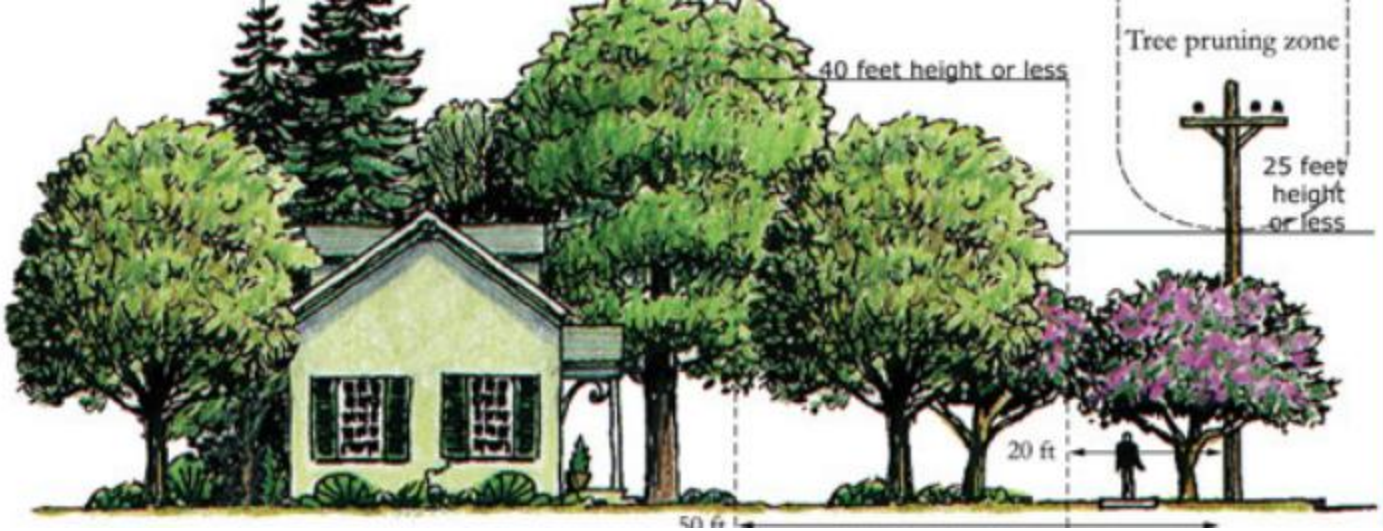
- Staff of 10 with separate responsibilities for UVM and urban forestry
- A current inventory of all trees. Separate tables for utility, street, and park trees
- Separate contractors and work management for utility and UF trees
- Primary UVM strategy: Cyclical (routine) line clearance by geographical zones
- Completely different zone definitions for utility and street trees
- Different line clearance or maintenance cycles for utility trees and UF trees
- Powerline/tree conflicts handled in piece meal ways
- High priority on community involvement
- UFMP: References to UVM disproportionate to its costs and risks

CITY OF PALO ALTO URBAN FORESTRY

Utility / Tree Conflicts

Generally accepted approaches to managing tree/powerline conflicts

- Changes in local ordinances, regulation & legislation
- Right management and maintenance strategies
- Changes in consumer perceptions and behavior



CITY OF PALO ALTO URBAN FORESTRY

Integrating UVM and UF: What we (can) do today

The RIGHT TREE In The RIGHT PLACE CITY OF PALO ALTO

- Elements of the RTRP program:
  - Appropriate species mix for street trees
  - Potential to distribute free shade trees to residential consumers
  - Encourage/subsidize replacement of large trees with smaller trees near power lines
- Free removal and reimbursement for partial cost of stump grinding and replacement tree purchase to property owners for trees conflicting with powerlines

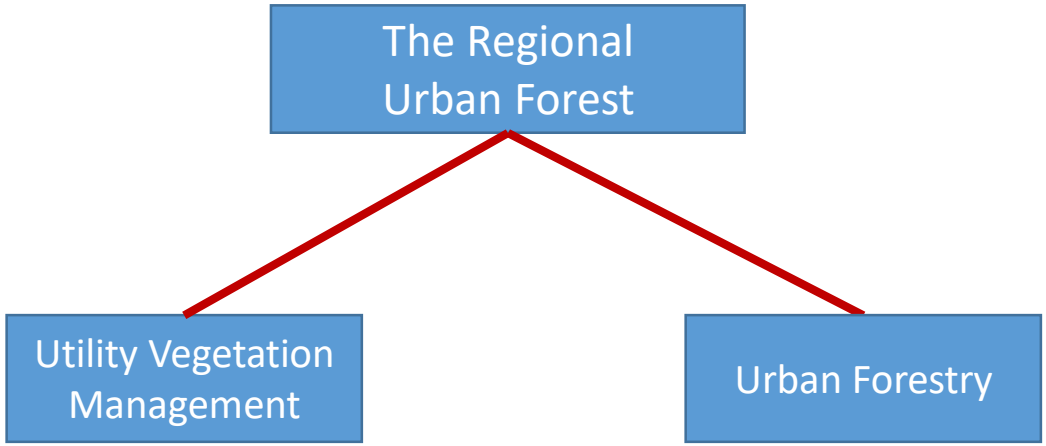
Integrating UVM & UF: Obstacles

Utility Vegetation Management

Urban Forestry

- UVM and UF are treated as two separate vegetation management programs
- Manual, paper-based activities
- Lack of appropriate analytical and decision support tools

Integrating UVM & UF: Overcoming the obstacles



Essential requirements

- Create a holistic (systemic) view of the regional urban forest by "bringing together"
  - All data, e.g., utility and street trees inventory, maintenance history
  - All processes and workflows, e.g., work management, zones
- Reduce/eliminate manual handling of data and people interactions
- Need both management and analytical/modeling capabilities
  - Improve on current utility and street trees maintenance practices
  - Generate economically acceptable (bankable) forecasts of tree benefits, e.g., energy savings, peak reduction, canopy cover

Integrating UVM and UF: Implementation
Tree Asset Manager (TreeAM)

Successfully implemented Phase 1: Create and prove-in the software infrastructure to achieve UVM/UF integration

- Data integration
  - Standardized and cleaned-up data from existing WMS to create a "unified" (integrated) database
  - Includes utility and street trees inventory, maintenance activities, history, contractors, zones, sites, other
  - Ability to add new data sets as needed , e.g., heritage trees, weather, soils, sidewalk conditions
- Redefined workflows to reduce/eliminate manual work and people interactions
  - Perform any system task on any selection of utility trees only, street trees only, or any selected mix, e.g., data updates, Work Package management, hot-spotting, routine maintenance outside of standard cycles
  - Easily create custom workflows
- Apply analytical, modeling, and decision support tools to any inventory mix:
  - Simple and complex data and map based querying
  - Risk assessment and tree appraisal
  - Latest USFS tree growth and biomass models (SEQ-CO2)
  - KWHr savings and peak reduction from shade trees on residential buildings
  - Stormwater interception
  - Custom or third party models
- A versatile mobile app platform to support diverse applications in the field

Phase 2: Extend platform capabilities to further integrate UVM and UF for planning, maintenance, and ecosystem benefits.

New strategies enabled by UVM and UF integration

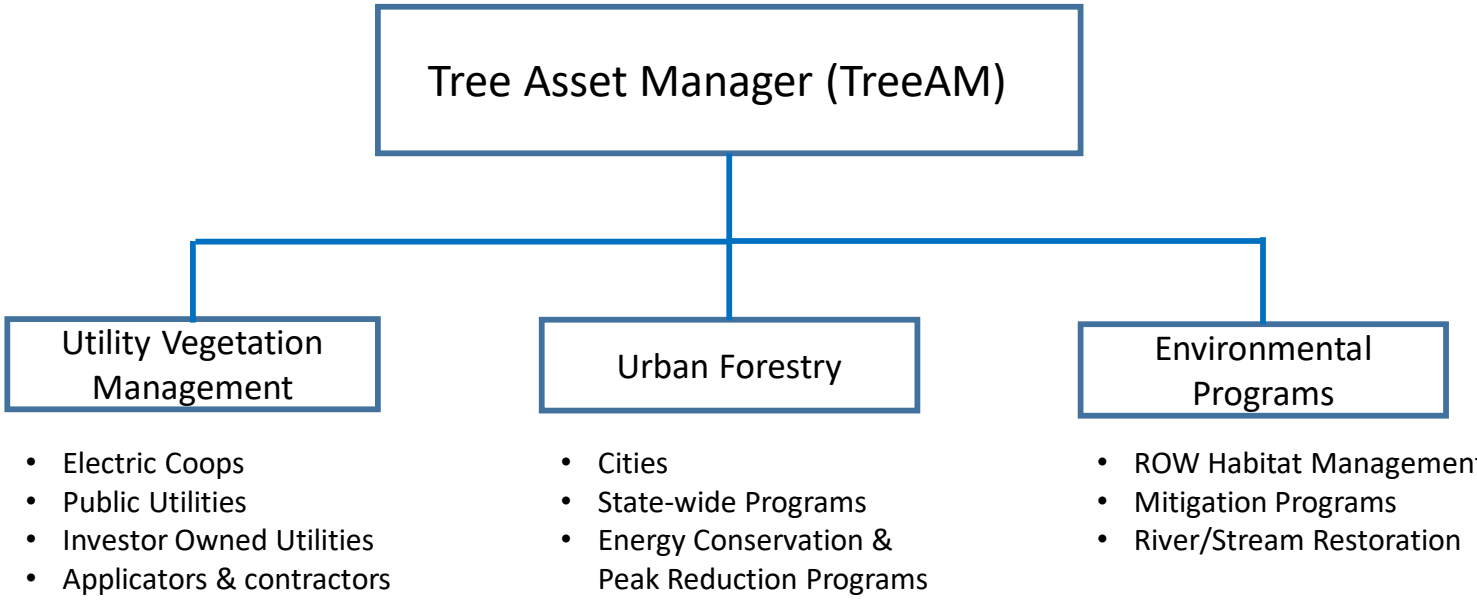
Benefits UVM and the regional forest

- Combine results of different approaches for early identification of danger trees
  - Apply analytics/modeling based on tree inventories, maintenance history, and environmental factors
  - On the ground observation by contractors, staff, home owners, NGO volunteers
  - Allow for different forms of data submission based on user competence
  - Future: Measurement through remote sensing data

- Gradually shift from cyclical maintenance to proactive, condition based maintenance
- Improve customer engagement to enable more aggressive trimming and replacement on their properties
  - A dedicated vegetation-centric web portal
  - Extend customer relationship beyond KWHrs and dollars to vegetation
  - Online interactions to justify and coordinate tree work on property
  - Increase participation in tree shade and replacement programs
  - Map-based tools to guide user with proper planting locations
- Implement more comprehensive RTRP programs
- Manage tree replacements and plantings at regional level
  - Combine trees on streets and private properties
  - Achieve a better species mix
  - Increase ecosystem benefits
- Manage systemic issues at the regional level, e.g., diseases, wildfire risks and canopy cover

Technology overview: Tree Asset Manager (TreeAM)

A versatile software platform for managing environmental assets



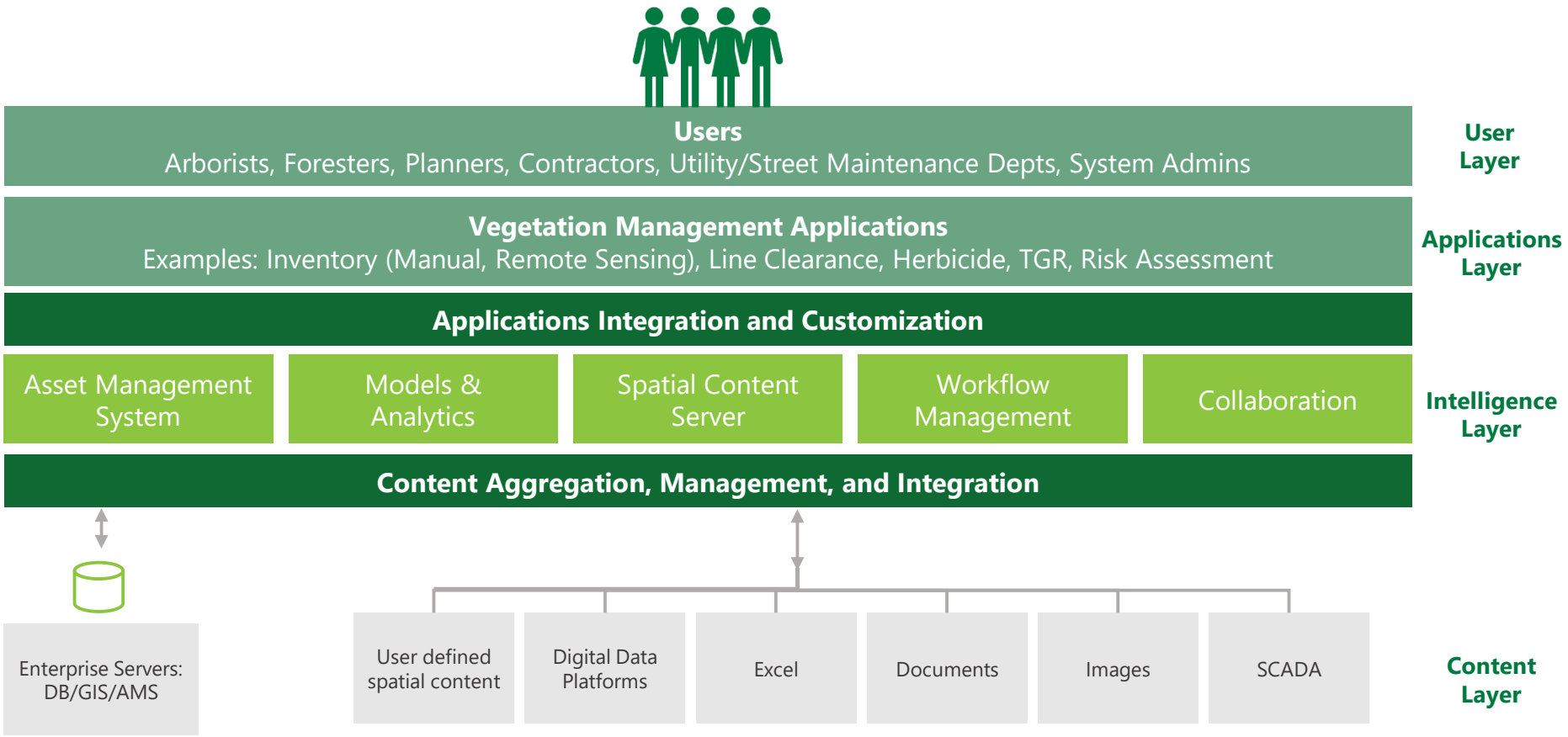
Field proven

- Demonstrated over 40 projects . . . .
- . . . . For a range of environmental assets: Vegetation, land, soils, and water
- Customers include utilities, arborists, contractors, regulatory agencies, cities, USFS, others
- Diverse scales: Residential landscapes, local and regional scales

TreeAM for environmental asset management

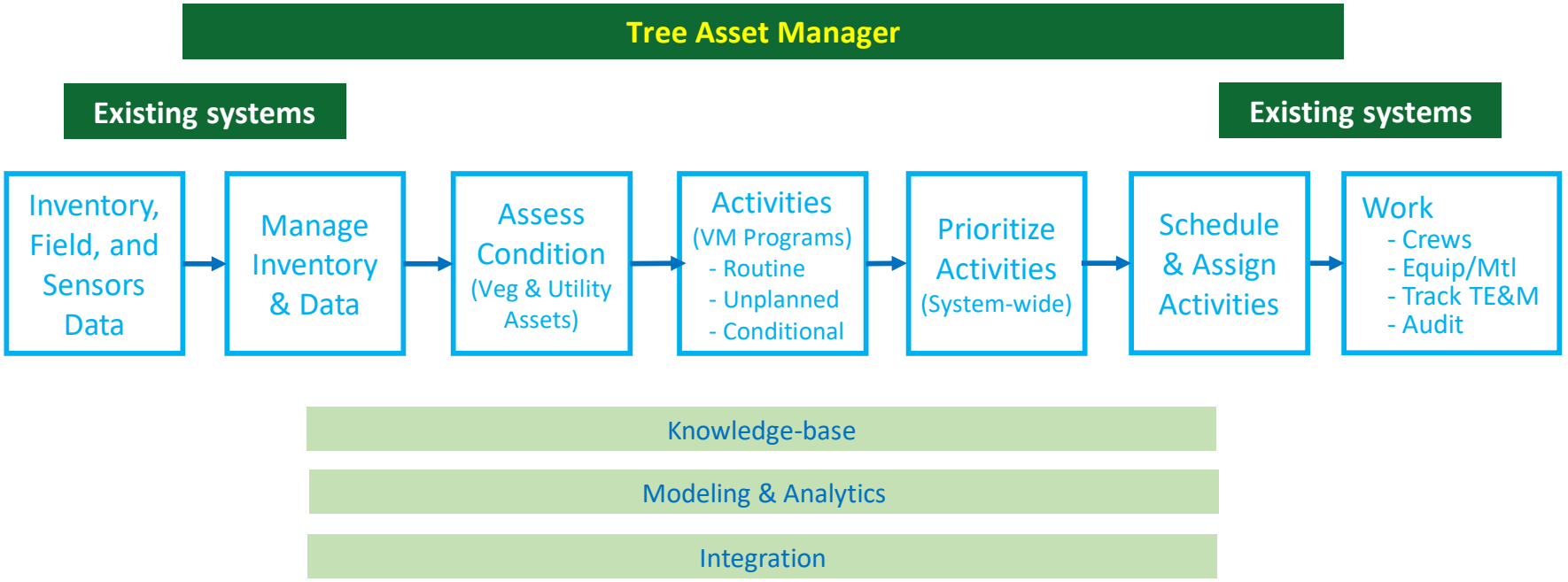
- Treats vegetation as “environmental assets, very different from “built assets”
- Software designed to mirror the characteristics of environmental assets, e.g.,
  - Exist as part of a complex system that is constantly changing
  - Asset condition and performance (e.g., growth, failure) depend on many current and historical factors
  - Lack design and performance standards or specifications
  - Large scale
  - Managed outcomes influenced by several stakeholders, not just the asset owner
- Key capabilities
  - Integration (systems)
  - Modeling and analytics
  - Collaboration
  - Adaptability
  - Customization
  - Modularity

TreeAM software platform for environmental asset management



TreeAM℠ Redefining Vegetation Management

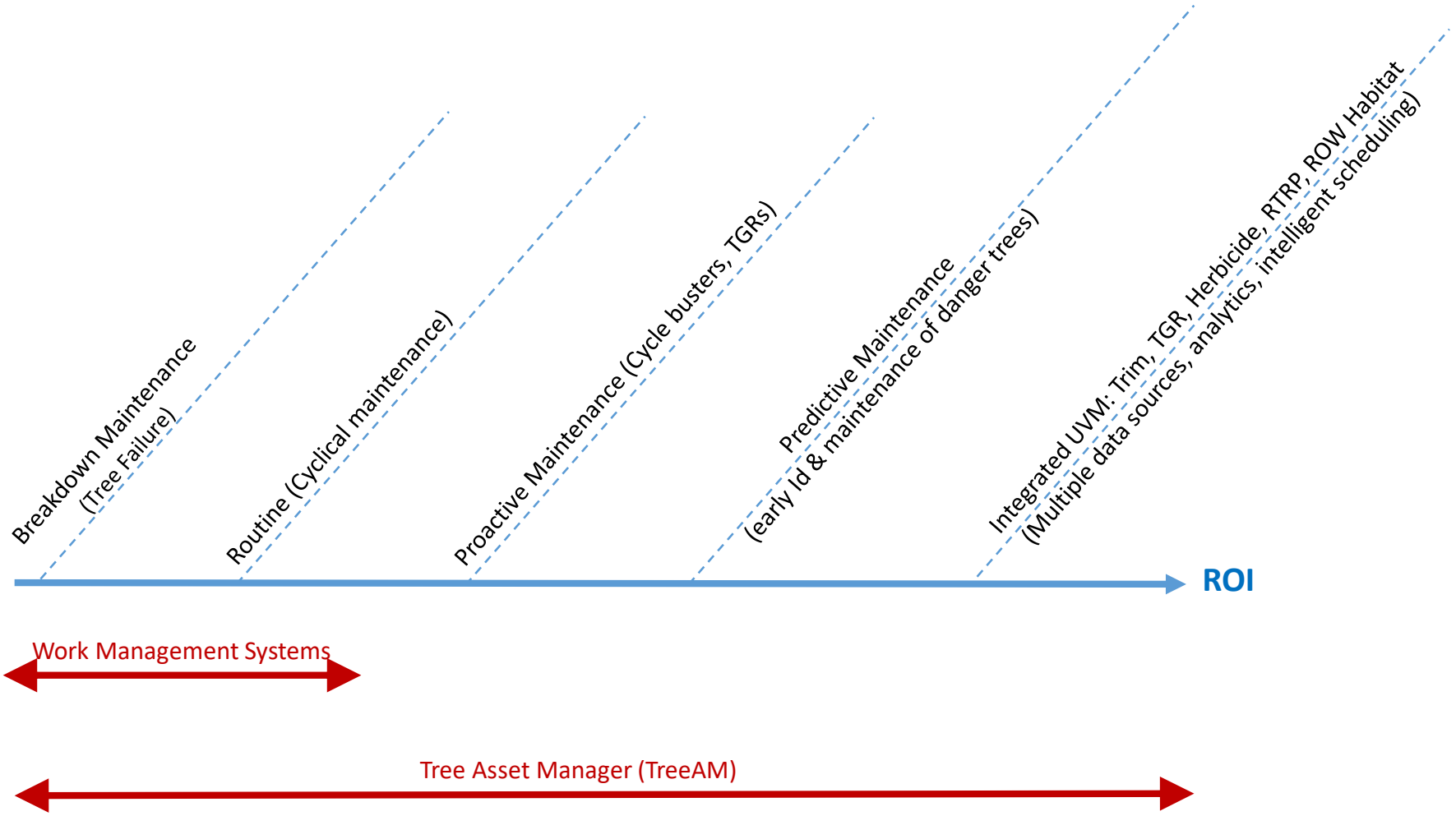
Technology integration: Working with existing systems



TreeAM for “Next Gen” Utility Vegetation Management

- Digital data acquisition and management
  - Integrate digital data collection from multiple sensors and platforms from different vendors
  - Gracefully migrate manual data collection and workflows to an increasingly digital environment
  - Simplify and improve manual field data collections
- Codify staff or industry expert knowledge into software
- Improved analytics, modeling, and decision support tools
  - Integrate data from multiple sensors and sources to run custom analytics and models
  - Earlier identification of danger trees
  - Prioritize maintenance activities by utility defined criteria
- Increased situational awareness and assessment
- Develop more systemic (holistic) UVM strategies by including, for example
  - Utility asset conditions and network impact of tree failure
  - Mitigation of tree failure consequences using tools for the smart grid (distribution automation)
  - Current and historical wind, soil, and precipitation data
  - Fire ignition and propagation models
- **Do UVM right**
  - Shift from cyclical (routine) maintenance with its low ROI (all trees equally likely to fail)
  - Condition-based and predictive maintenance strategies: Prevent trees from becoming danger trees
  - Integrate UVM with urban forestry
  - Other….

TreeAM: Right strategies ---> Desired outcomes



Thank you!