Mapping Fruit Trees: An Efficient Web Map Data Entry System

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Esri UC 2015

Background

- Agricultural Commissioner mandated by State to trap and detect against invasive insects
- Traps are distributed geographically and rotated
- ACWM secured internal County grant to convert paper system to geodatabase
- eGIS advised on best practices and suggested using Geocortex for high-accuracy placement

Insect Traps

A Jackson trap uses a pheromone, which attracts the male of the fruit fly species, and it contains a minute amount of pesticide to stun the insect and cause it to fall to the sticky insert. For Oriental Fruit Flies, the pesticide content is 0.1% of Dibrom. For Melon Fly, it is 0.5% of Dibrom. It only works through ingestion of the pesticide by the pest.

A McPhail trap lures insects with yeast dissolved in water. Insects fly in and can't fly out.

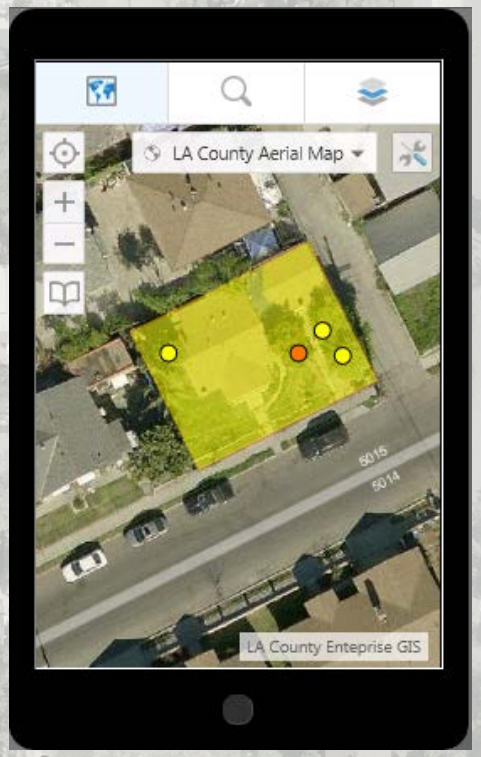
A Japanese Beetle trap has a rose scented insert and a pheromone. No toxic pesticides are used in this trap.

Gypsy Moth Trap on a Tree

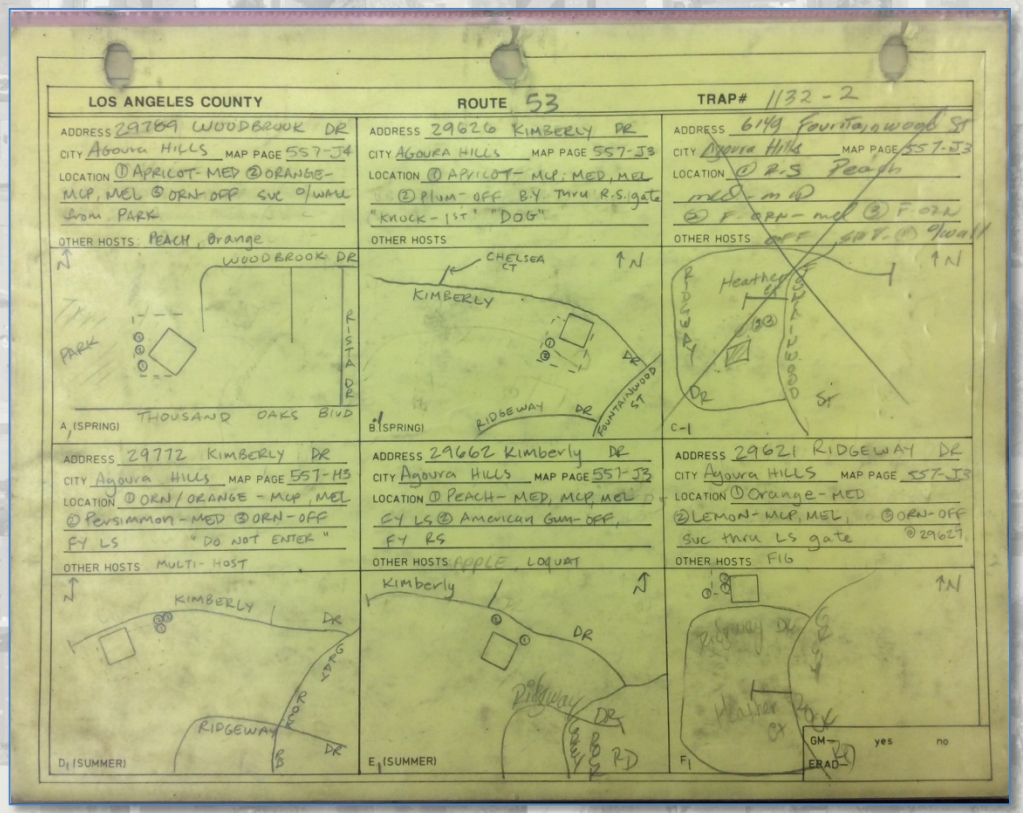
A Gypsy Moth trap has a pheromone with the inside coated in glue. No toxic pesticides are used in this trap.

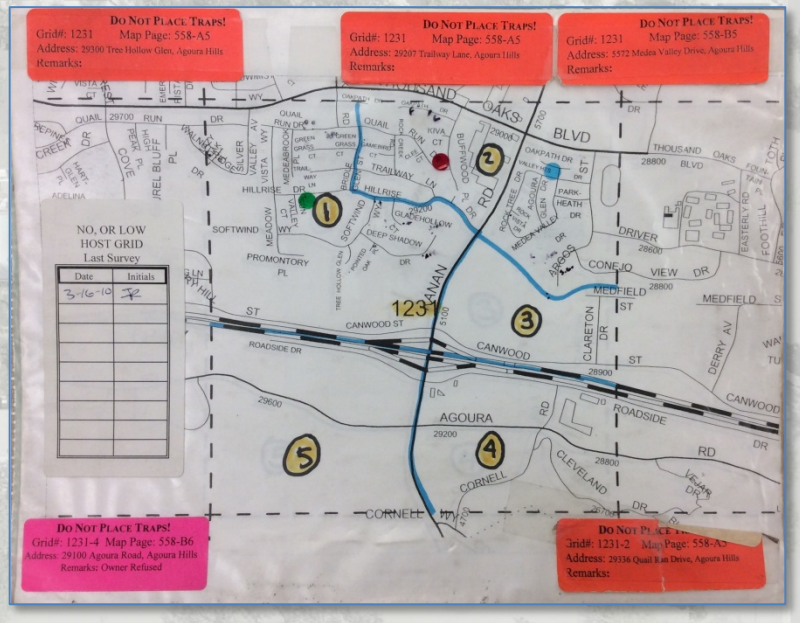
Goals and Objectives

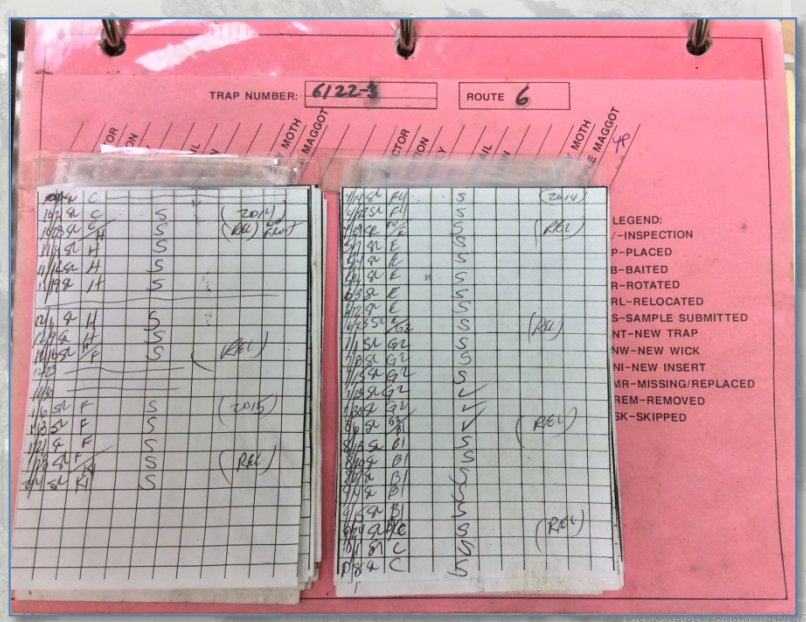
- **Convert paper files into GIS database**
- **Create cost-effective mapping application**
- **Foundation to seamlessly evolve into future field data collection and inspections**
  - ✓ Mobile-Friendly
  - ✓ Simple Interface
  - ✓ Low Costs
  - ✓ Fully Customizable



Paper-based System





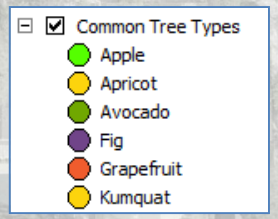


Personnel

- **Hired temporary workers to enter tree locations and descriptions of lots**
  - Major data conversion project:
    - 5 field offices
    - 56 routes
    - 448 binders
    - 220,000 sites
    - 660,000 fruit trees
  - Access points
  - Presence of dogs
- **ACWM inspectors verify and correct some addresses**

Infrastructure and Software

- **Esri ArcGIS Desktop**
  - Creates symbology for tree types and parcels
- **Esri ArcGIS for Server**
  - Serves map services online so applications can consume them
- **Microsoft SQL Server 2012**
  - Esri ArcSDE Geodatabase
  - Hosts and organizes data
  - Provides built-in SQL spatial analysis



Folder: ACWM

Current Version: 10.22

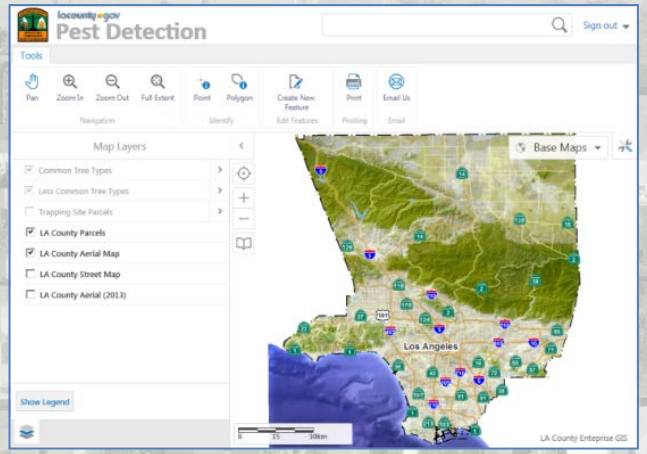
View Footprints In: ArcGIS.com Map

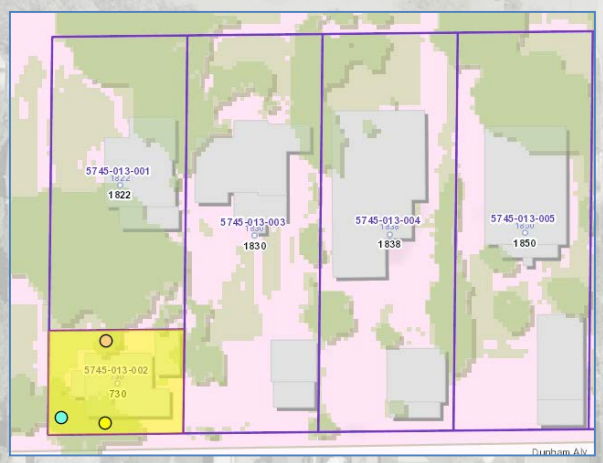
Services:

- ACWM/PRD (MapServer)
- ACWM/Quarantine (MapServer)
- ACWM/TreeParcels_AdvancedEditing (FeatureServer)
- ACWM/TreeParcels_AdvancedEditing (MapServer)
- ACWM/TreeParcels_ForEditing (FeatureServer)
- ACWM/TreeParcels_ForEditing (MapServer)
- ACWM/TreeParcels_ForTrapping (FeatureServer)
- ACWM/TreeParcels_ForTrapping (MapServer)
- ACWM/TreeSites_ForEditing (FeatureServer)
- ACWM/TreeSites_ForEditing (MapServer)
- ACWM/TreeSites (MapServer)
- ACWM/WeedAbatementParcels (MapServer)
- ACWM/ZAPUR (MapServer)

Infrastructure and Software (continued)

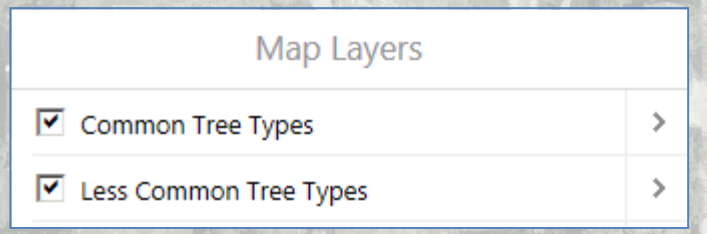
- **OOTB Latitude Geographics Geocortex Products**
  - Provides simple and easy-to-use interface
  - Functions include finding an address or parcel, adding and editing information
  - Can switch between several base maps



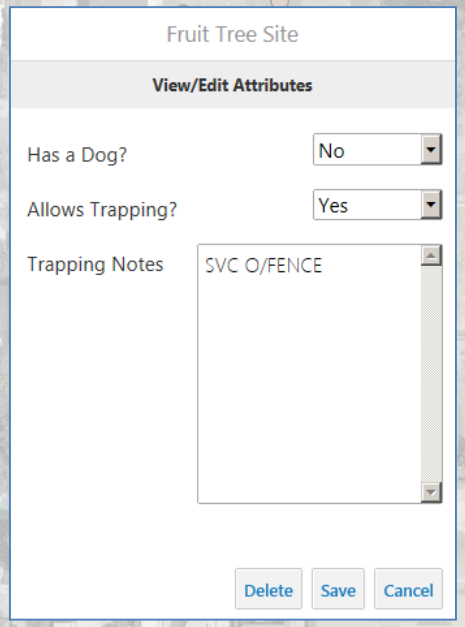


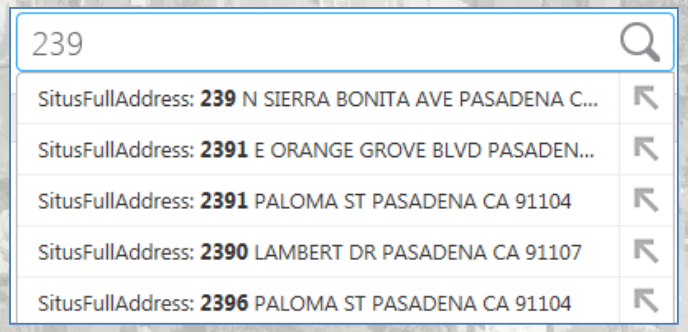
Data Conversion Workflow

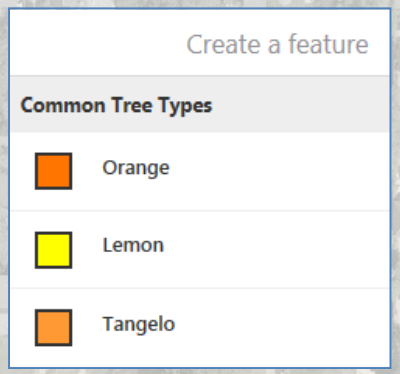
- **Tree type domain**
  - List of choices to add to map



- **Consideration for simplicity**
  1. Find location by address.
     - With an auto-complete index
  2. Select tree type → Add to map
  3. Spatial Triggers eliminate key entry.
  4. Add trapping notes to site







Data Conversion Workflow *(Desktop View)*

Search for location by Address or APN

↓

Select Tree Type from List

↓

Click Map at Precise Location

↓

System Adds Grid, Parcel/Address Info and Site Shape

↓

User enters trapping restrictions, dog, access comments

Plum

Site Added!

Multi-Site Parcel – Digitizing Workflow

Search for location by Address or APN

↓

Add Tree at Location and Digitize Site

↓

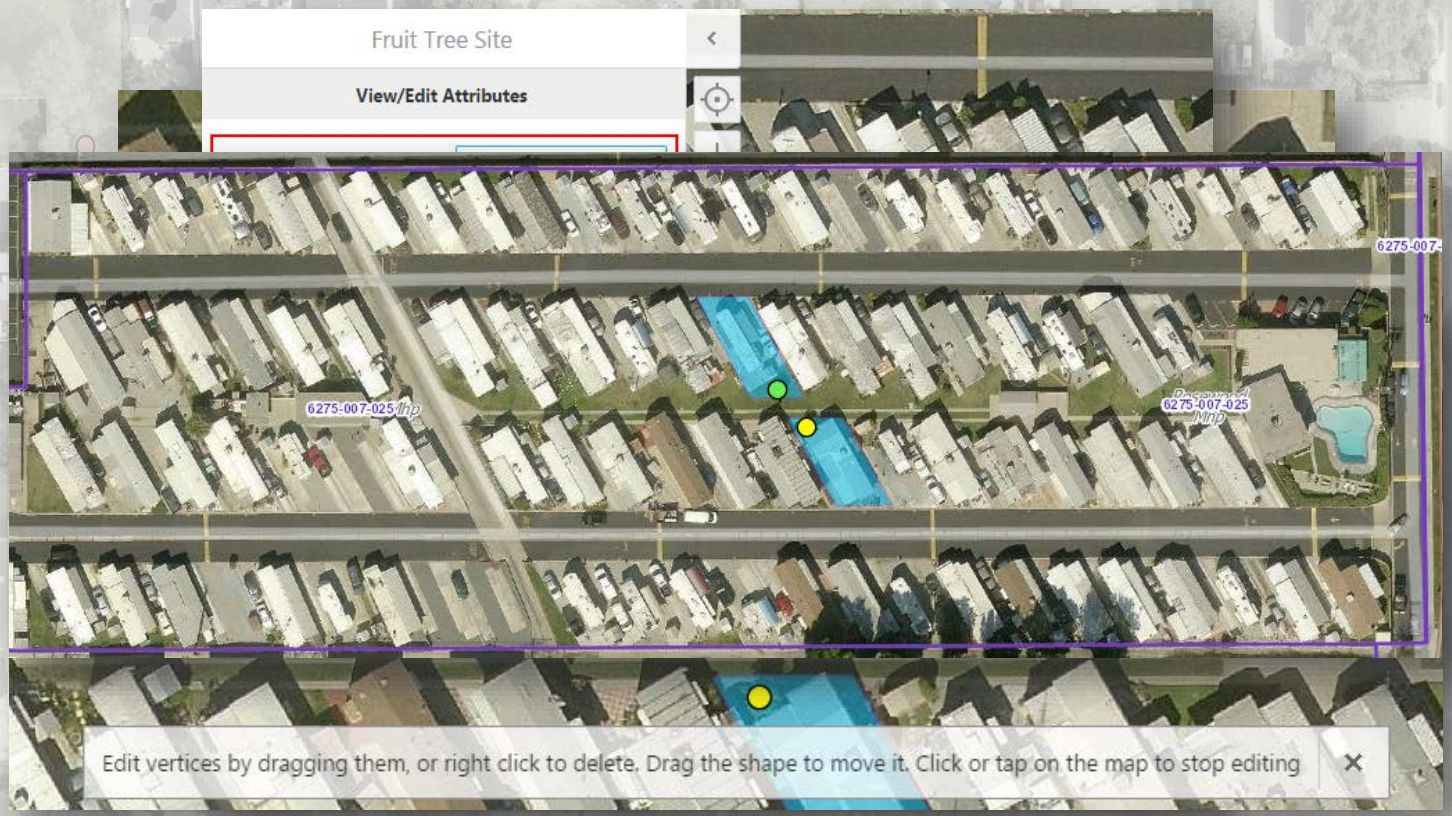
User Manually Enters Address/Unit

↓

Ability to refine shape by vertex

↓

Sites created within a Large, Multi-Unit Parcel



Trap Placement Workflow *(Mobile Phone View)*

Search for location by GPS, Address, Grid or SiteID

↓

Select Site on Map

↓

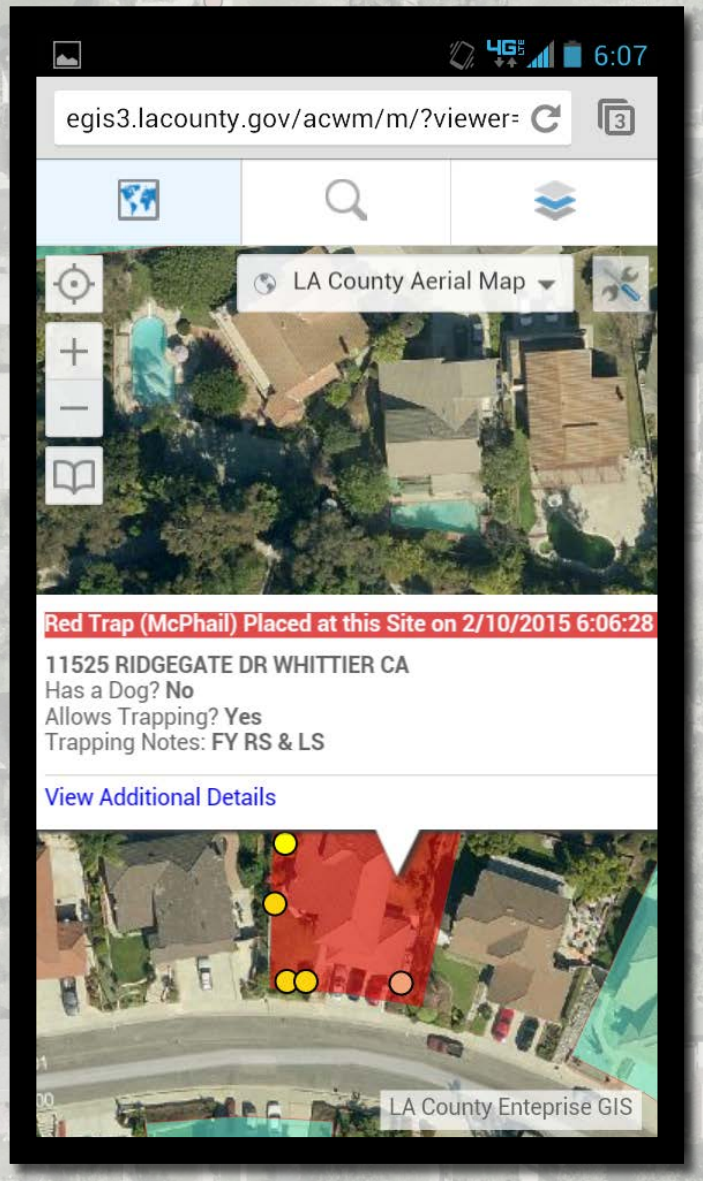
Place Trap by Type

↓

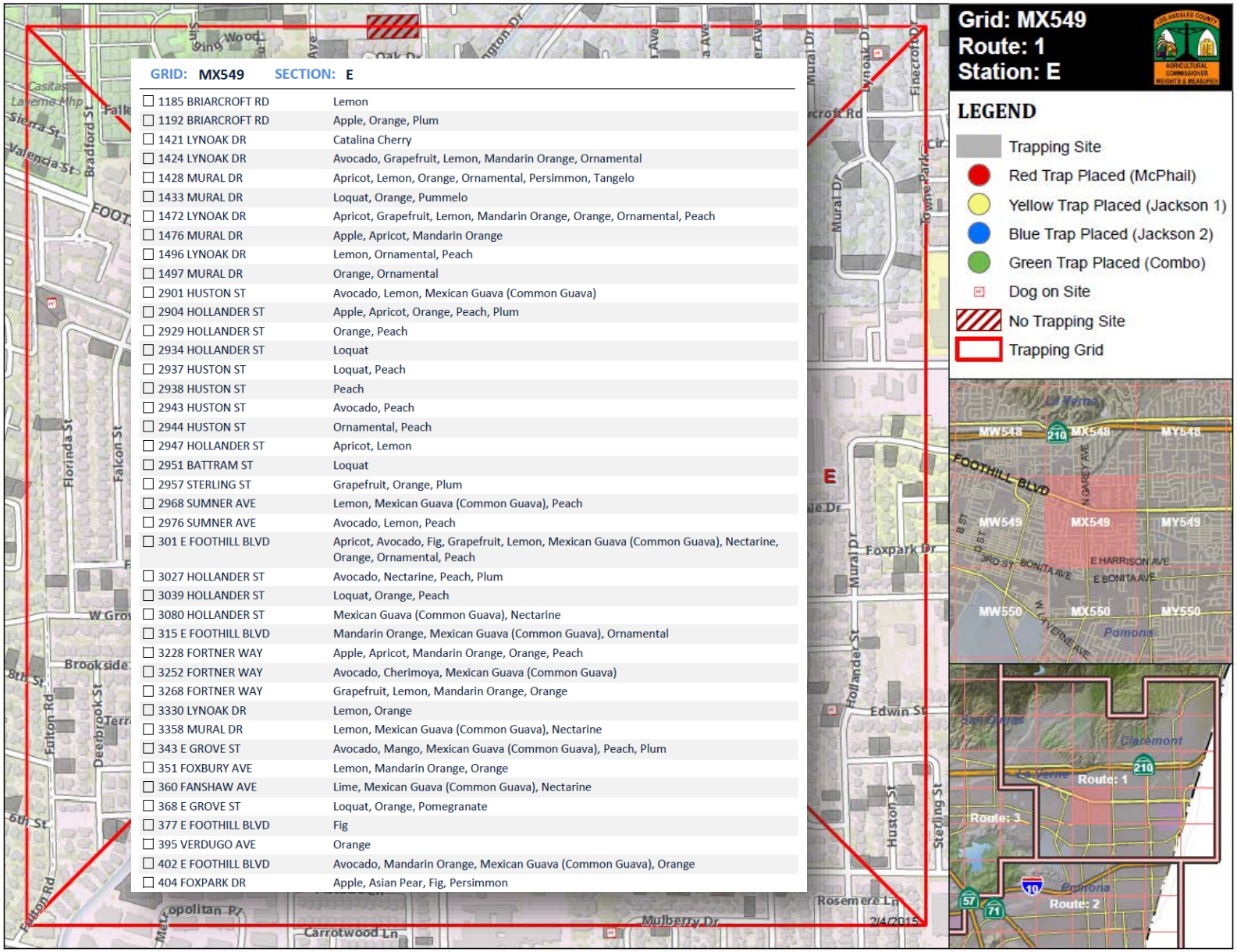
System Adds Date Stamp and Colors Site Shape

↓

When Removed, Dates and Info are Logged into History



Data-Driven Maps and Reports



GRID: MX549 SECTION: E

☐ 1185 BRIARCROFT RD	Lemon
☐ 1192 BRIARCROFT RD	Apple, Orange, Plum
☐ 1421 LYNOAK DR	Catalina Cherry
☐ 1424 LYNOAK DR	Avocado, Grapefruit, Lemon, Mandarin Orange, Ornamental
☐ 1428 MURAL DR	Apricot, Lemon, Orange, Ornamental, Persimmon, Tangelo
☐ 1433 MURAL DR	Loquat, Orange, Pummelo
☐ 1472 LYNOAK DR	Apricot, Grapefruit, Lemon, Mandarin Orange, Orange, Ornamental, Peach
☐ 1476 MURAL DR	Apple, Apricot, Mandarin Orange
☐ 1496 LYNOAK DR	Lemon, Ornamental, Peach
☐ 1497 MURAL DR	Orange, Ornamental
☐ 2901 HUSTON ST	Avocado, Lemon, Mexican Guava (Common Guava)
☐ 2904 HOLLANDER ST	Apple, Apricot, Orange, Peach, Plum
☐ 2929 HOLLANDER ST	Orange, Peach
☐ 2934 HOLLANDER ST	Loquat
☐ 2937 HUSTON ST	Loquat, Peach
☐ 2938 HUSTON ST	Peach
☐ 2943 HUSTON ST	Avocado, Peach
☐ 2944 HUSTON ST	Ornamental, Peach
☐ 2947 HOLLANDER ST	Apricot, Lemon
☐ 2951 BATTRAM ST	Loquat
☐ 2957 STERLING ST	Grapefruit, Orange, Plum
☐ 2968 SUMNER AVE	Lemon, Mexican Guava (Common Guava), Peach
☐ 2976 SUMNER AVE	Avocado, Lemon, Peach
☐ 301 E FOOTHILL BLVD	Apricot, Avocado, Fig, Grapefruit, Lemon, Mexican Guava (Common Guava), Nectarine, Orange, Ornamental, Peach
☐ 3027 HOLLANDER ST	Avocado, Nectarine, Peach, Plum
☐ 3039 HOLLANDER ST	Loquat, Orange, Peach
☐ 3080 HOLLANDER ST	Mexican Guava (Common Guava), Nectarine
☐ 315 E FOOTHILL BLVD	Mandarin Orange, Mexican Guava (Common Guava), Ornamental
☐ 3228 FORTNER WAY	Apple, Apricot, Mandarin Orange, Orange, Peach
☐ 3252 FORTNER WAY	Avocado, Cherimoya, Mexican Guava (Common Guava)
☐ 3268 FORTNER WAY	Grapefruit, Lemon, Mandarin Orange, Orange
☐ 3330 LYNOAK DR	Lemon, Orange
☐ 3358 MURAL DR	Lemon, Mexican Guava (Common Guava), Nectarine
☐ 343 E GROVE ST	Avocado, Mango, Mexican Guava (Common Guava), Peach, Plum
☐ 351 FOXBURY AVE	Lemon, Mandarin Orange, Orange
☐ 360 FANSHAW AVE	Lime, Mexican Guava (Common Guava), Nectarine
☐ 368 E GROVE ST	Loquat, Orange, Pomegranate
☐ 377 E FOOTHILL BLVD	Fig
☐ 395 VERDUGO AVE	Orange
☐ 402 E FOOTHILL BLVD	Avocado, Mandarin Orange, Mexican Guava (Common Guava), Orange
☐ 404 FOXPARK DR	Apple, Asian Pear, Fig, Persimmon

Conclusions

- **Created a cost-effective and efficient web mapping application**
  - Implements current technology
  - Contains digital inventory of fruit trees, trapping notes, etc.
  - Allows editing
  - Adaptable to user experience
  - Extendable to mobile devices
- **Future direction**
  - Disconnected editing
  - Routing capabilities
  - User profiles for Area of Interests
  - Attach photos

Thank You

http://acwm.lacounty.gov

http://gis.lacounty.gov

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Demo