Mapping Fruit Trees: An Efficient Web Map Data Entry System

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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.

**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. 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
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

1. Search for location by Address or APN
2. Select Tree Type from List
3. Click Map at Precise Location
4. System Adds Grid, Parcel/Address Info and Site Shape
5. User enters trapping restrictions, dog, access comments

Site Added!
**Multi-Site Parcel – Digitizing Workflow**

1. Search for location by Address or APN
2. Add Tree at Location and Digitize Site
3. User Manually Enters Address/Unit
4. Ability to refine shape by vertex
5. Sites created within a Large, Multi-Unit Parcel

*Edit vertices by dragging them, or right click to delete. Drag the shape to move it. Click or tap on the map to stop editing.*
Trap Placement Workflow (Mobile Phone View)

1. Search for location by GPS, Address, Grid or SiteID
2. Select Site on Map
3. Place Trap by Type
4. System Adds Date Stamp and Colors Site Shape
5. When Removed, Dates and Info are Logged into History
Data-Driven Maps and Reports
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

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Demo