

# Workforce Mobilization via Integrated GIS Solutions

Jacob Mundt and Ryan Pierson

Ada County (Idaho) Weed, Pest, and Mosquito Abatement; Meridian, ID

Electronic Data Solutions; Jerome, ID

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Weed, Pest, and Mosquito Abatement



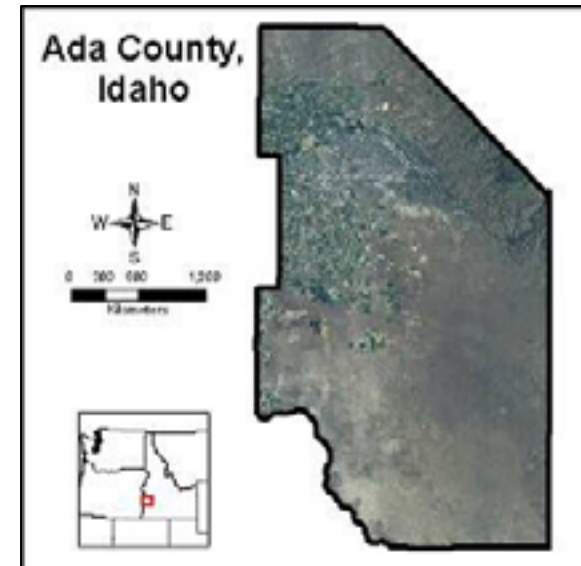
# Abstract

Ada County Mosquito, Weed, and Pest Control in Boise, ID is utilizing mobile GIS technology to enhance its mosquito abatement program. Field crews are outfitted with rugged field computers enabled with a customized ArcPad interface that records all abatement activity, replacing the previous system (constituted of tracking thousands of paper maps and duplicate data entry). The ArcPad application provides a simplistic functionality for personnel with little or no GIS training, and enables automated work order prioritization. Custom tools have been developed to provide immediate access to inspection histories, respond to customer complaints in the field, and catalog newly discovered mosquito breeding sites. Additional enterprise tools seamlessly integrate data from multiple field users into geodatabase applications, and concurrently update the County's Work Order, Accounting, and Billing database. This presentation will discuss how this technology was developed and successfully deployed within Ada County, ID.

Weed, Pest, and Mosquito Abatement

# Overview

- Location: Southwest Idaho (Boise)
- Population: 383,000
- Climate: Semiarid
- Mosquito Abatement District
  - Abatement District covers 406 Square Miles
  - > 2,000 discrete breeding sites
  - Crew: 10 abatement personnell, 1 surveillance technician
  - 1,549 Miles of adulticide transects in 2006
  - Aerial application (Naled) over ~85,000 acres in 2006



# Mosquito Larvaciding

## The Old Way

- Manually sorted through hundreds of paper maps.
- Navigated to each site manually
- Recorded inspections / treatments on paper
- Data entered manually by office staff
- Thousands of maps produced yearly



# Mosquito Larvaciding

## The New Way

- Uses GPS to record the locations of mosquito breeding sites.
- Uses GPS to navigate to the sites repeatedly.
- Records mosquito inspections and treatments.
- Fully implemented
- Used to track cost, track success of treatments



# Mosquito Larvaciding



Sections to visit



Roads



Sites – red/blue



Site Numbers

# Mosquito Larvaciding



Last Visit



Inspection 1



Inspection 2



Treatment





# Return on Investment - Larvacide

- For a Staff of 5 larvaciders (2 year round), with one part time administrative assistant, and one office support person:
  - A relatively large implementation cost is quickly offset by yearly cost savings.
  - Values of data integrity and product control are large, but not considered in this equation.

Costs Before			
Item	Hrs/Yr	Unit Cost	Total
Loss of applicator hours	1540.4	\$10.00	\$15,404.17
Extra administrative hours	273.0	\$9.00	\$2,457.00
Annual Summary	1.0	\$2,000.00	\$2,000.00
Photocopies	7800	\$0.05	\$390.00
<b>Total</b>			<b>\$20,251.17</b>
Costs After			
Item	Quantity / yr	Unit Cost	Total
Loss of field time hours	438.8	\$10.00	\$4,387.50
Extra administrative hours	0.0	\$9.00	\$0.00
Annual Summary	0.0	\$0.00	\$0.00
Photocopies	100	\$0.05	\$5.00
Programming	1	\$1,000.00	\$1,000.00
Equipment / Software	1	\$5,000.00	\$5,000.00
<b>Total</b>			<b>\$10,392.50</b>
Implementation Costs			
Development	1	\$12,000.00	\$12,000.00
Hardware - Field PC / GPS	5	\$2,000.00	\$10,000.00
Software - Office PC	1	\$3,000.00	\$3,000.00
Software - Field PC	5	\$400.00	\$2,000.00
<b>Total</b>			<b>\$27,000.00</b>
Summary			
Yearly Cost Savings:		\$9,858.67	
Break Event Point (years)		3.79	



# Mosquito Adulticiding

## The Old Way

- Hundreds of paper maps
- Two color highlighter system
- Hundreds of individual maps produced yearly
- Manually estimate area sprayed and product used



# Mosquito Adulticiding

## The New Way

- Uses GPS to record the locations of airborne pesticide applications
- Records a line attributed with ~15 values
- New application, developed, implementation this year.
- Used to track applications for cost and spatial analysis
- Accuracy < 5 meter





# Mosquito Adultciding



Open



Area



Background



Interface

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# Mosquito Adultciding

Identify Results

Layers: <Top-most layer>

[-] Applications

[ ] [Redacted]

Location: (2450348,983982)

Field	Value
FID	4162
Shape	Polyline
SUPER	[Redacted]
USER	21
WNDDIR	Nw
WNDSPD	2
TEMP	84
PROD	AquaControl
APPRATE	7
WONUM	A220619513314
DIST	11074.9066
AREA	81.7837
TIMESTART	8:20:35 PM
TIMESTOP	8:33:31 PM
SPEED	10.4337
GIS_KEY	177254491
PDOP	2.600000
DIFCOR	1
sDate	8/14/2006
acres	81.615028



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# Return on Investment – Adulticide

- For a Staff of 3 adulticides (1 year round), with one part time administrative assistant:
  - A relatively large implementation cost is quickly offset by yearly cost savings.
  - Values of data integrity and product control are large, but not considered in this equation.

Costs Before			
Item	Hrs/Yr	Unit Cost	Total
Loss of applicator hours	455.0	\$10.00	\$4,550.00
Extra administrative hours	390.0	\$9.00	\$3,510.00
Extra coordination hours	595.8	\$12.00	\$7,150.00
End of Year Summary	1	\$1,000.00	\$1,000.00
Photocopies	3900	\$0.05	\$195.00
<b>Total</b>			<b>\$16,405.00</b>
Costs After			
Item	Hrs/Yr	Unit Cost	Total
Loss of applicator hours	0.0	\$10.00	\$0.00
Extra administrative hours	195.0	\$9.00	\$1,755.00
Extra coordination hours	379.2	\$12.00	\$4,550.00
End of year summary	50.0	\$0.00	\$0.00
Photocopies	3900	\$0.05	\$195.00
Programming	1	\$500.00	\$500.00
Equipment / Software	1	\$1,500.00	\$1,500.00
<b>Total</b>			<b>\$8,500.00</b>
Implementation Costs			
Development	1	\$2,000.00	\$2,000.00
Hardware - Field PC / GPS	3	\$2,000.00	\$6,000.00
Software - Office PC	1	\$0.00	\$0.00
Software - Field PC	3	\$400.00	\$1,200.00
<b>Total</b>			<b>\$9,200.00</b>
Summary			
Yearly Cost Savings:	\$7,905.00		
Break Event Point (years)	2.24		

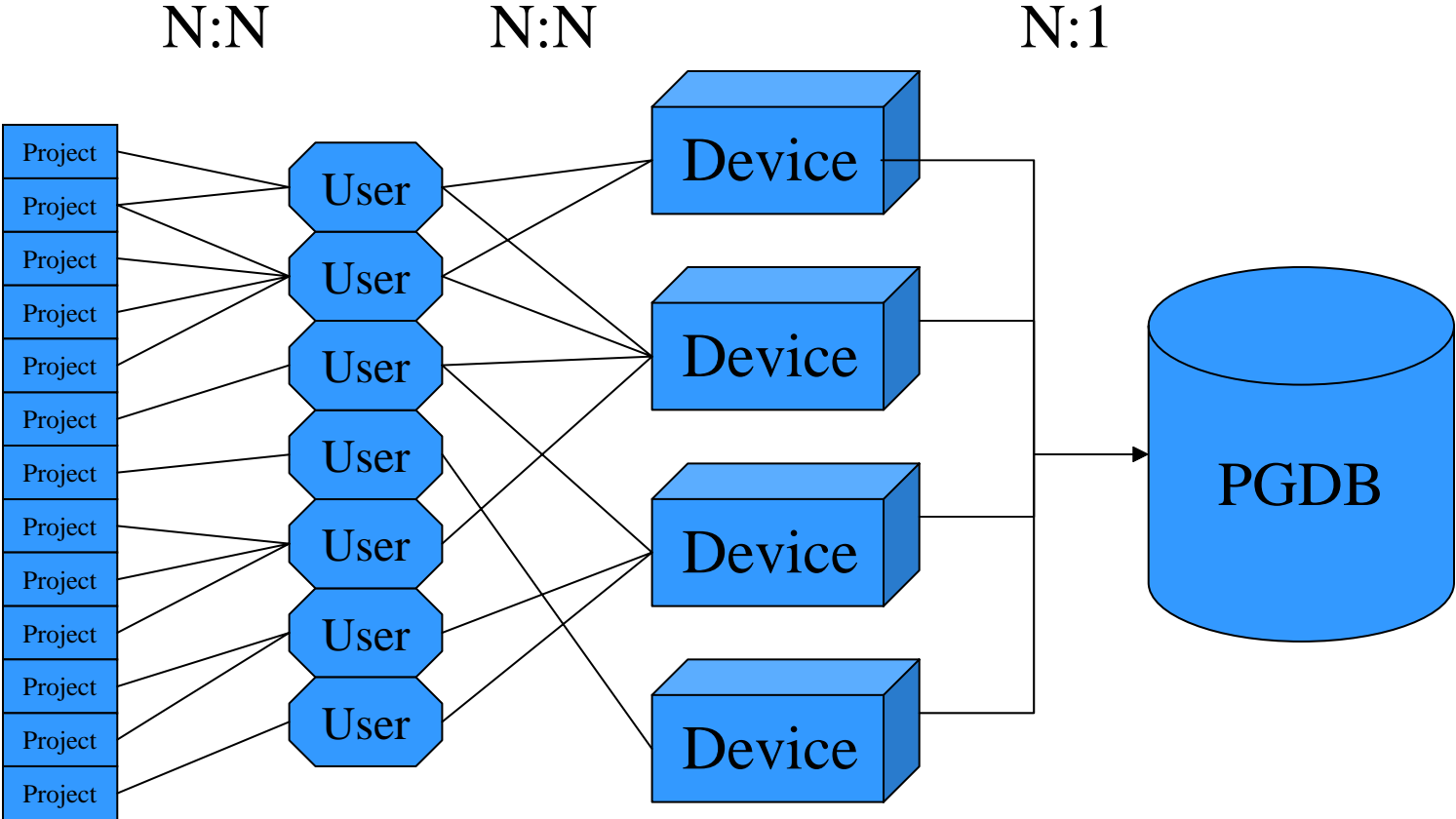
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# Integrated Data Management

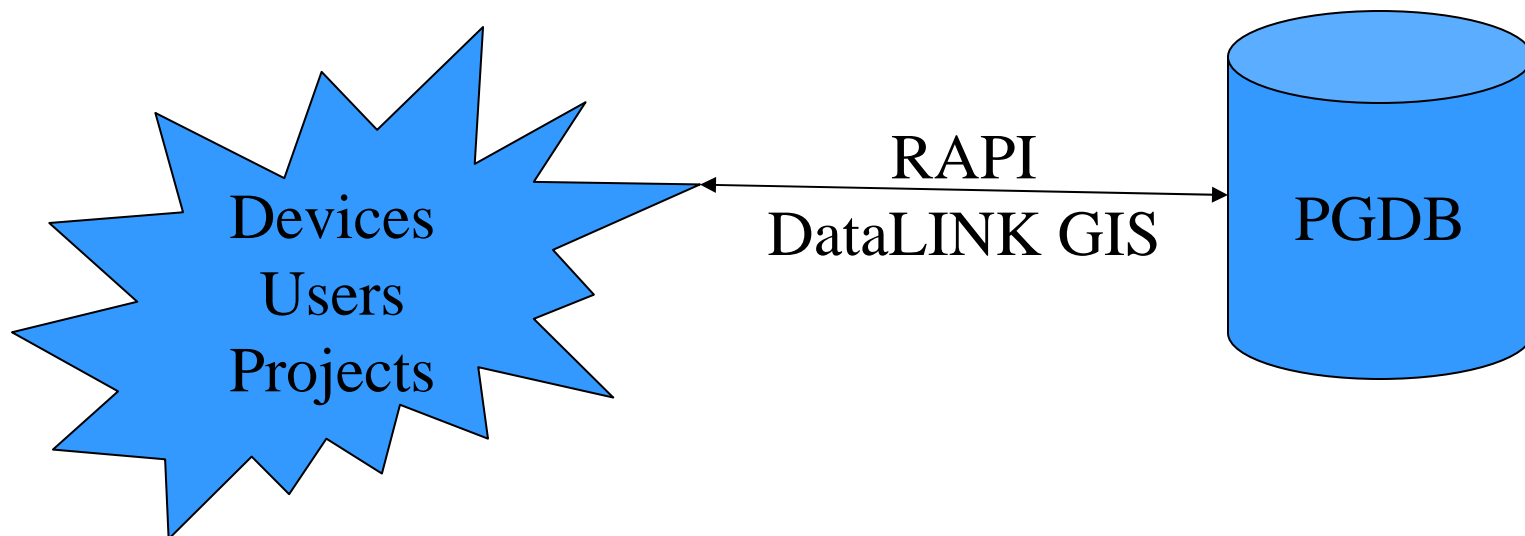
## Mobile Device Management



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# Integrated Data Management

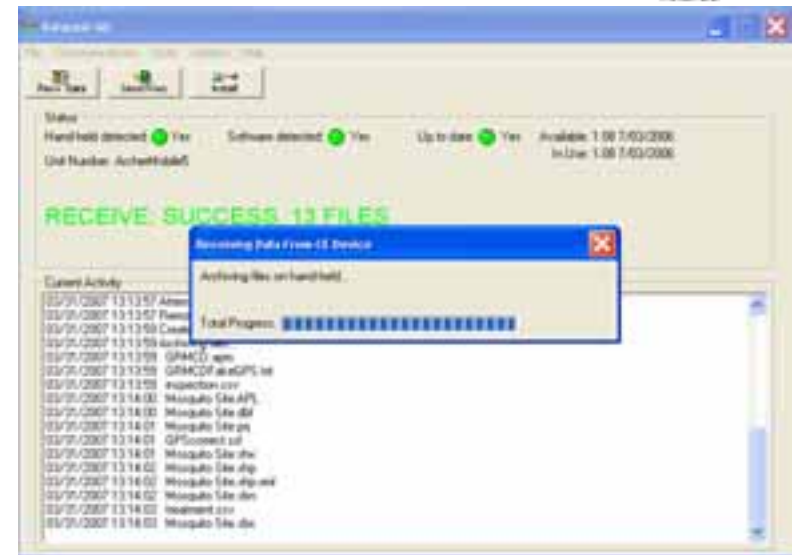
- RAPI (Remote Application Program Interface).
- RAPI allows a desktop PC to communicate with Windows CE using an Active Sync Connection
- This allows the automation of file organization on mobile Devices





# DataLINK GIS

- MS ActiveSync Middleware That
  - supports any mobile device
  - supports unlimited users
  - automatically merges ESRI data
    - shapefile, PGDB
  - is compatible with any mobile sw
  - synchronizes ArcPAD data



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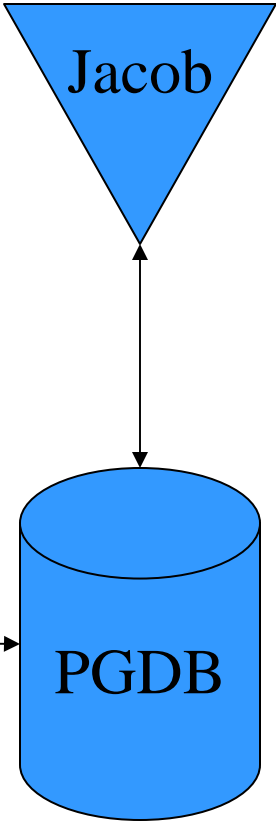
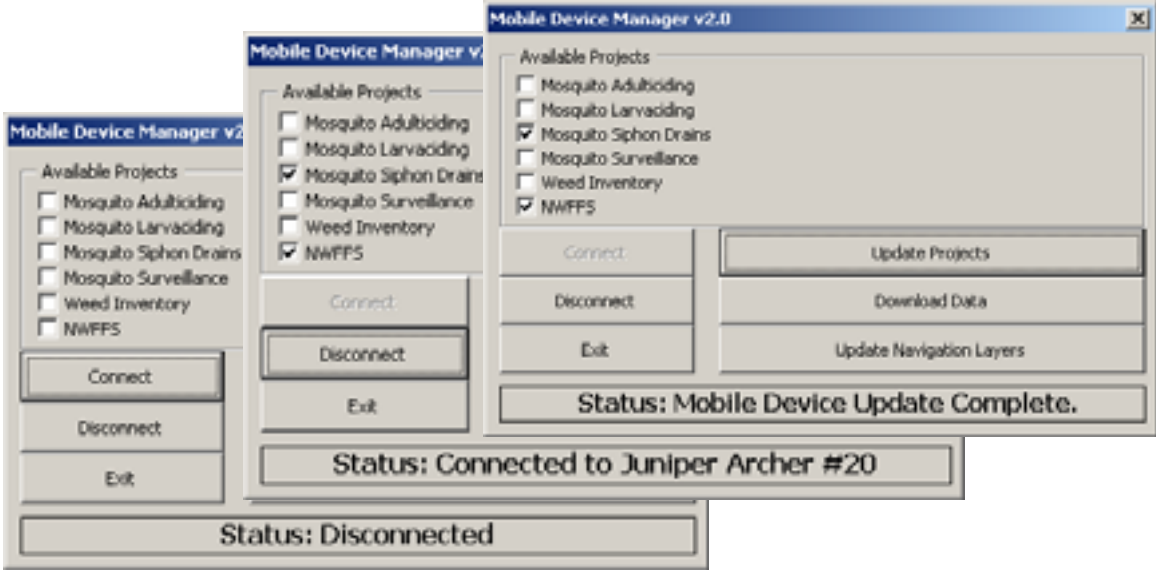
# DataLINK GIS

- MS ActiveSync Middleware That
  - automates data transactions
    - receive data from all devices
    - merge & process data
      - differential correction too
    - send new data to all devices
  - keeps all mobile devices current
  - is easily configured and modified
    - reflects business workflow
    - allows batch processing

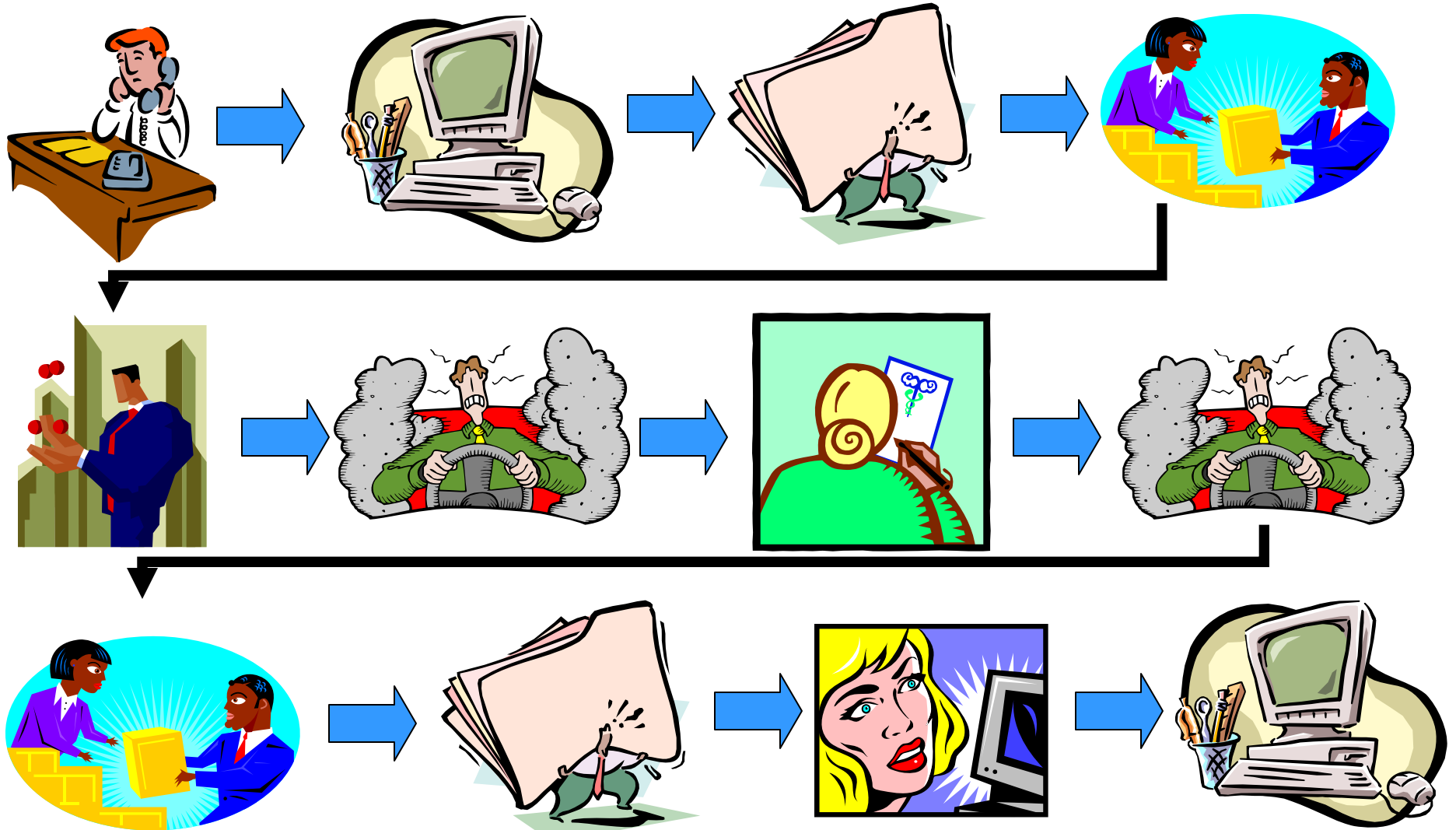


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# Integrated Data Management

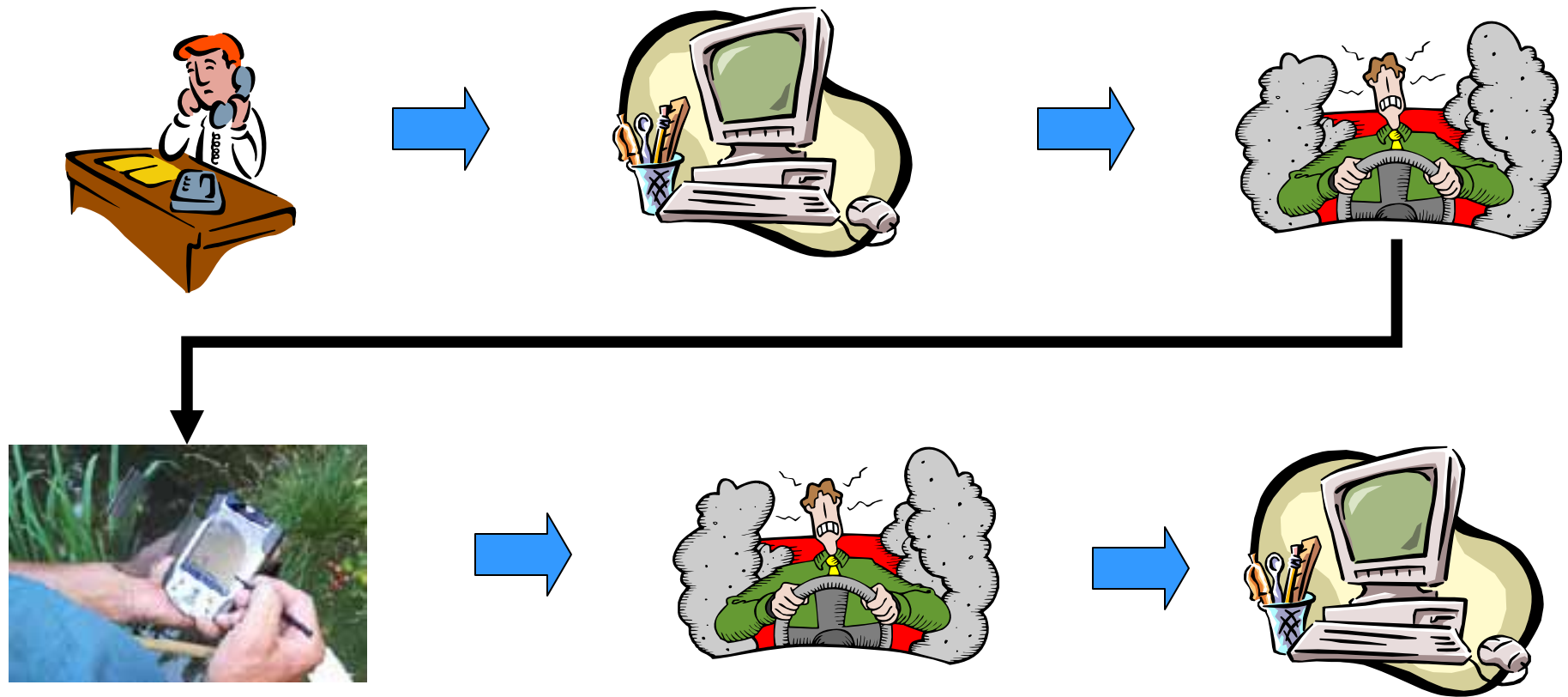


# Simplified Project Management



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# Simplified Project Management



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# Acknowledgements

**Ada County Board of County Commissioners, Electronic Data Solutions (Jerome, ID). The ESRI Developer Network (EDN) and the development forums.**

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# Author Information



## Jacob Mundt

GIS / Mapping Coordinator

Ada County Weed, Pest, and Mosquito Abatement

975 E Pine Avenue; Meridian, ID 83726

208-577-4646; [jmundt@adaweb.net](mailto:jmundt@adaweb.net)

## Ryan Pierson

GPS/GIS Sales Coordinator

Electronic Data Solutions

P.O. Box 31; Jerome, ID 83338

208-324-8006; [ryan@elecdata.com](mailto:ryan@elecdata.com)