




Best GIS Practices for Trails

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Roadmap

1. Trails, Maps & GIS - Overview
2. Whoa, Nellie – a word about GIS!
3. BARTC – Evolution of GIS Use
4. GIS Opportunities and Practices
5. Emerging Capacities on the Web
6. Conclusion and Q&A

GreenInfo Network

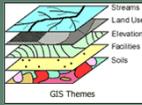
- www.GreenInfo.org
- www.MapsPortal.org (interactive solutions)
- Non-profit, founded 1996
- Consultant to public interest groups, agencies, 10 staff
- Wide range of technology – GIS, maps, data, web, communications



Wait, What IS GIS?

Vectors
&
Rasters
= GIS Layers

GIS Data	Data About GIS Data
Points	A school: 444 Main St., 386 students
Lines	A road: +1, +1 - +2, +2 May 15
Polygons	A park: 500 acres Active rec.
Images	A scene: (pixel values)




Attributes (database)

Systems of Maps

Area of Operation	Land Ownerships	Property/Project	Easement Monitoring	Conservation Assessment	Accomplishments
[Map 1]	[Map 1]	[Map 1]	[Map 1]	[Map 1]	[Map 1]
[Map 2]	[Map 2]	[Map 2]	[Map 2]	[Map 2]	[Map 2]
[Map 3]	[Map 3]	[Map 3]	[Map 3]	[Map 3]	[Map 3]
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Trails and Mapping

Don

San Jose PMS

Closing the Gaps

Using GIS for Trails

MEANS >>	TO DO WHAT?
<ul style="list-style-type: none"> • Paper map • GPS • Image/PDF/GeoPDF • Online map/mashup • Simple web GIS • Desktop GIS - basic • Desktop GIS – advanced • Web map applications 	<ul style="list-style-type: none"> • Display • Inventory • Analyze • Communicate • Persuade • Prioritize • Collaborate • and more...

A Quick Survey

- Where are you on GIS spectrum?

Not much A little Frequently A lot

Paper map Simple, browser ArcGIS Full GIS

The Ridge Trail and the Council

- Bay Area Ridge Trail
- Bay Area Ridge Trail Council

The basics:

- Founded 1990 (Independent non-profit)
- 550 miles, 332 dedicated (completion rates vary)
- 6.5 staff, ~3,500 members, 100s of volunteers
- 25 member board



Geographic Drivers at BARTC

- Trail runs along ridgelines
- Builds upon & connects historic public access
- Element in State & regional trail network
 - Links people to nearby open space
 - Links to other trails
- Multi-use (hike, bike, ride)
- Trail is catalyst for open space & habitat preservation



Starting With Mapping

- Strategy - ID existing trails, parks & open spaces, then trail connection options between
- Challenge of connecting all!
- Volunteer driven mapping, pre-GIS
- "Overlays" – McHarg, layers approach
- Paper maps, hand drawing



Building a GIS Strategy

- 2003 assessment by GreenInfo
- Purposes:
 - GIS – track the trail (capture details for each section of trail & area summaries)
 - Project management – track the work of creating, maintaining the trail, integrate with GIS
 - Create wide range of planning & display maps
- → AIM: robust project management database connected to robust GIS framework



Where We're Going

- GIS – the database and creating products
- Ridge Trail GIS use and impact
- Key topics: GPS, protected areas data, PDF, etc.
- The Web – what's being done, what's coming up



Trail GIS - Database

- Alignment (general)
- Route (specific)
- Status (open/closed)
- Use basis (hike, bike, etc.)



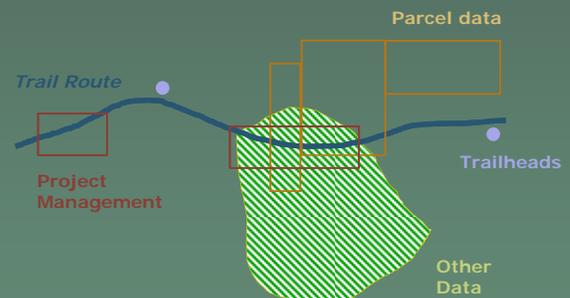
Trail GIS - Database

- Using advanced GIS to build the trail database



Distance (mi)	4.75	3.25	.5	.2	1	1.75	2.1
Status	Proposed	Dedicated	D	D	D	P	P
Use	None	Multi	M	Hike Only	HO	None	None
Project	None	2.1	N	N	2.3	2.3	N

Trail GIS – Related Data



Trail GIS – Data/Maps

Bay Area Ridge Trail

Dedicated Multi Use
— Hiker, Biker, Equestrian Accessible

Dedicated Not Multi Use
— Hiker Accessible
— Hiker and Biker Accessible
— Hiker and Equestrian Accessible

Proposed
— Not Accessible
— Trail End Points

Map created with data from CPAD www.cpad.org, the East Bay Regional Park District, Bay Area Ridge Trail Council, and Bay Area Open Space Council.

Bay Area Ridge Trail Council
 1001 Central Expressway, Suite 300 San Francisco, California 94133

Public & Privately Owned Land

■ Fee Ownership
■ Conservation Easement / Private
■ Urban Area
— County Boundary

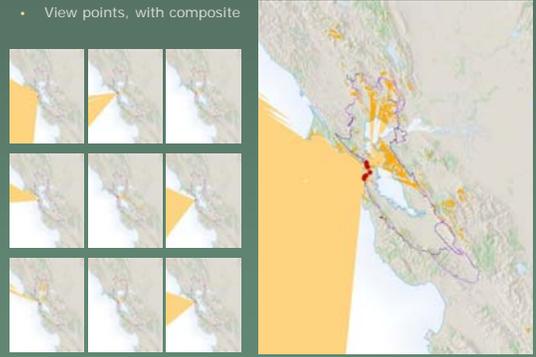
THIS MAP IS NOT A TRAIL GUI

This map is a planning tool. Many of the routes or staging areas identified on the map are simply proposed and not open to the public for any purpose. This map does not convey any right to the public to use any trail routes shown on this drawing, nor does this map exempt any person from trespassing charges.



Trail GIS - Viewshed Analysis

- View points, with composite



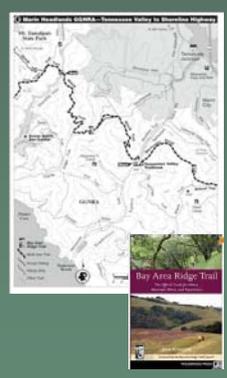
Trail GIS – Mapping

- Print – page, tabloid, poster, large poster
- Print - Atlas
- Purposes:
 - Internal planning/analysis (staff and volunteers)
 - Public display
 - Handouts and guides



Trail GIS – Mapping

- Print – publication printing
 - GIS > offset printing issues
 - Black & white, color
- Tools:
 - Integrate with GIS (MapPublisher)
 - Use GIS for some source data, but work in Illustration software



Volunteer Links GIS, Guidebook, & Google Earth

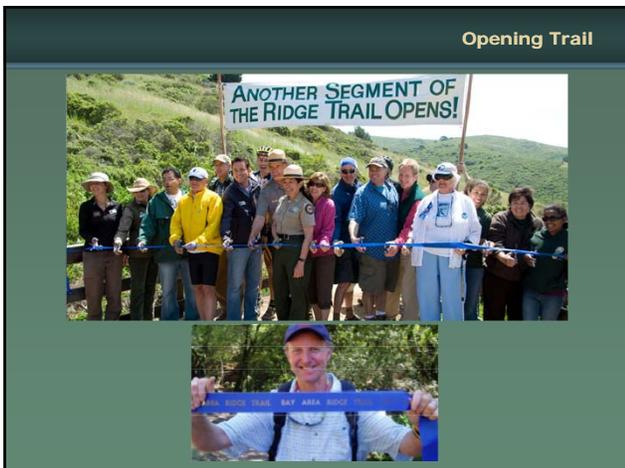
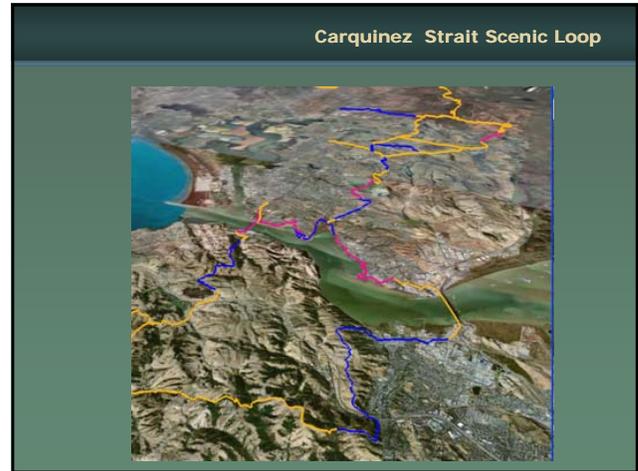
Trail GIS – Project Management Links

- Trail segment (+ Gaps)
- Staffer
- Project

Project Management

- Track development stage: acquisition, planning, design, construction
- Maintain info – site characteristics, ownership, trail features (surface, width, slope), access (any restrictions)
- Track activity: site visits, meetings, phone contacts, permitting, environmental review, etc.

Trail GIS - Reporting in Action



What's Next

- What we'd like to do now:
 - Advocacy
 - Funding/ development
 - Outreach - new audiences
 - Plan outings
 - Share info & experiences
 - Special projects - Geocaching




Summary - Value Created

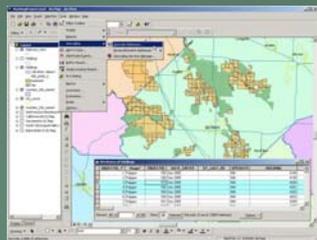
GIS + Project Management:

- Planning & analysis tool
- Change over time
- Information integration
- Clarify advocacy options & strategies
- Create summary reports for stakeholders
- Maps – are worth a thousand words

Key Topics for Trails & GIS

Key Topics – GIS Software

- ArcGIS – ArcView - \$ (\$1,200, or grant*) – www.esri.com
- ArcGIS – ArcInfo - \$\$\$ (grant?)
- Open source
- Web tools
- *ecpgrant@esri.com

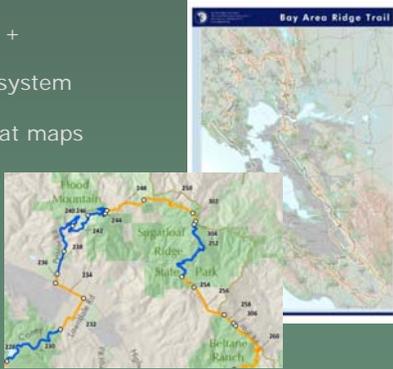


Key Topics – GIS Data

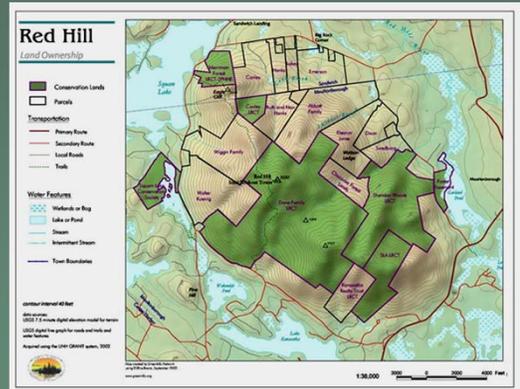
- Cal-Atlas – atlas.ca.gov
- Data Basin - www.databasin.org
- GeoData.gov (U.S.) – www.geodata.gov
- CPAD – www.CALands.org
- USGS – www.usgs.gov, gapanalysis.usgs.gov
- Parcels . . .
- Much data now online, consumed over net link

Key Topics – Map Design Matters

- Great data +
- Great GIS system
- NEEDS great maps



Key Topics – Why Map Design Matters



Key Topics – Create a Map Atlas

- Create atlas in ArcGIS using MapBook extension
- Print, publish as PDF



Key Topics - Protected Areas Data

- CPAD - 49 million acres, 51,000 holdings, 900 agencies
- GIS database, online at www.CALands.org
- GreenInfo Network is publisher



CPAD – Why It Matters



Key Topics - GIS and GPS Cameras

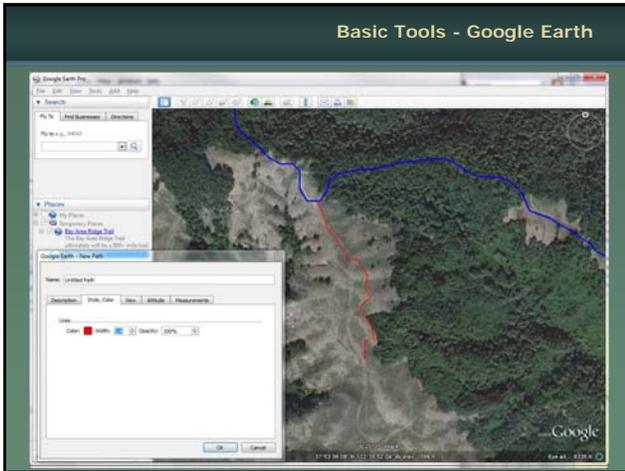
- GPS cameras
 - Sony HX5V - \$250
 - Ricoh Caplio - \$1200+



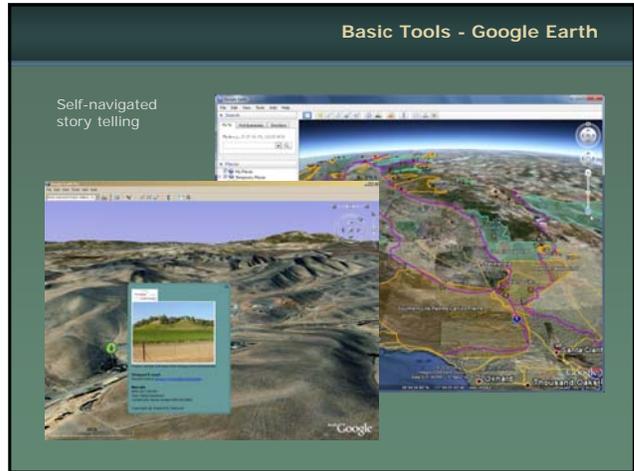
Web Mapping for Trails



Basic Tools - Google Earth

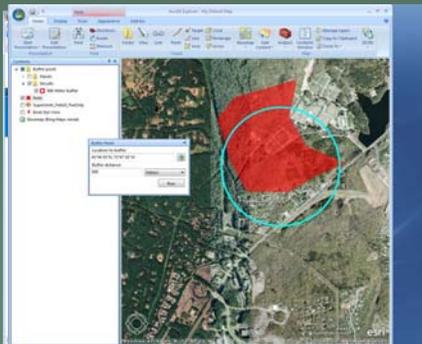


Basic Tools - Google Earth

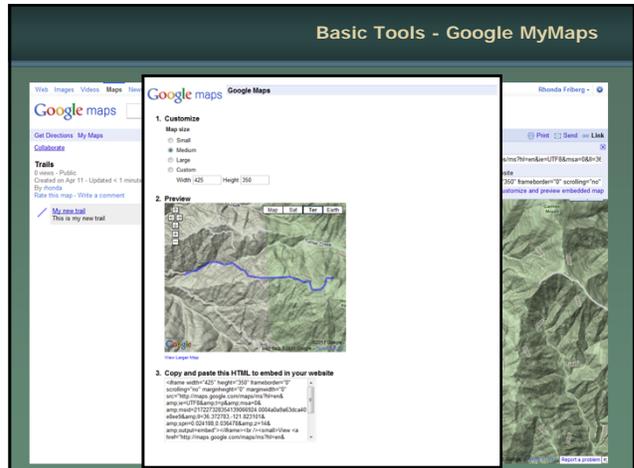


Basic Tools – ESRI ArcExplorer

Free desktop download from ESRI:



Basic Tools - Google MyMaps



Basic Tools - Google MyMaps

Basic Tools – Google Maps API

Basic Tools – Google Maps API

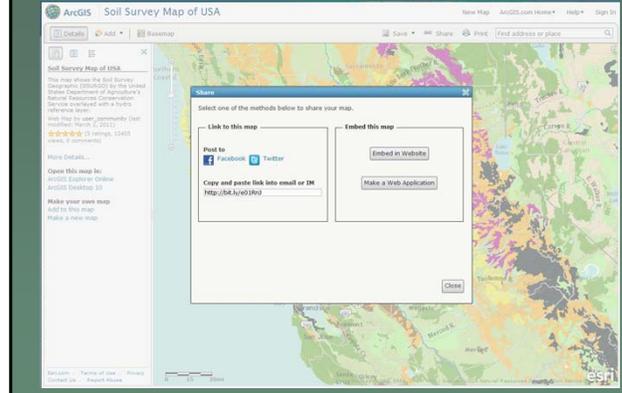
Basic Tools – Google Maps API

Basic Tools – ESRI ArcGIS Online

1. Choose base maps
2. Search for data
3. Create presentations



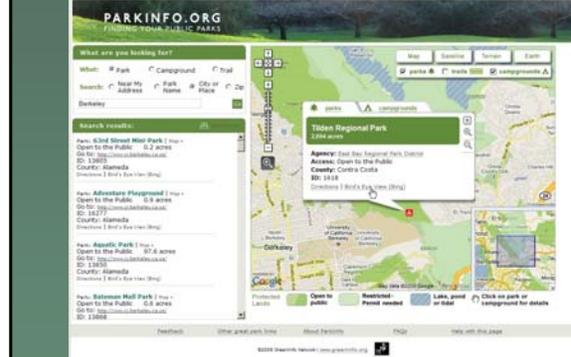
Basic Tools – ESRI ArcGIS Online



Web Applications – Custom, Flash



Web Applications – Custom Maps/Interface



Web Applications – Hiking Sites

Welcome | Register | Login

Share This Trip
Flash map with photos for websites & blogs
Ch2vca hzet="http://www.everytrail.

Transit & Trails

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Web Mapping - Mobile Applications

- Wide range of applications, more on way

iPod 16:24

Assiniboine From Nub Peak

Web/Mobile - ESRI ArcGIS

- Free map browser

World Imagery Map

Web/Mobile - Virtual Reality

- AVR – Augmented Virtual Reality

Wrap Up

- Trail and GIS are a great fit
- Integrate with planning, management, volunteers, outreach
- Simple tools to start, takes more to do well
- Web will continue to grow as place for outreach, maybe also data



Contacts



MapLines newsletter at www.GreenInfo.org
also: www.MapsPortal.org
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Rhonda Friberg, Interactive Solutions Manager,
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Mobile

Mobile

- Item

