California Reality and Nova Scotia Dreaming

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The geospatial world

- Remote sensing
- Geographic information systems
- Automated cartography
- Global Positioning System
CANCER MORTALITY, 1950-69, BY COUNTY
TRACHEA, BRONCHUS & LUNG
WHITE MALES

1. Google Earth image
2. 1843 map of London from David Rumsey collection
3. Pump and death locations from my own web site
2000 Presidential Election in Florida by County
Blue — Gore
Pink — Bush
Why is a spatial perspective different?

- Focus on relationships, joint rather than marginal characteristics
Enabling communities

• California
  – high density
  – rich infrastructure
  – large geospatial industry

• Annapolis Valley
  – low density
  – uneven infrastructure
  – NSCC/COGS
Isla Vista

• Adjacent to the UCSB campus
• Populated by UCSB students
  – and recent-immigrant service workers
• High-speed Internet
• Technically sophisticated
http://www.uweb.ucsb.edu/~matthew_dursum/
Top-down or bottom-up?

• National mapping agencies
  – highly capitalized
  – staffed by experts
  – producing low-cost mapping products
National Spatial Data Infrastructure

- Breakdown of the authoritative system
  - government reluctance to fund
  - increasing demand
  - empowerment of smaller agencies and individuals
  - collapse of initial costs
  - abundance of data sources
    - reversal of top-down flow

- 1992 National Academy report
  - a patchwork approach
  - Executive Order 12906 in 1994
  - facilitated by standards
  - Federal Geographic Data Committee
  - Open Geospatial Consortium, ISO
Community mapping

• Volunteer effort
• Emphasis on topics that may never have been mapped in the past
  – cultural
  – social networks
  – alternative perspectives
  – Public Participation GIS
  – GIS/2
Four scans of original redlined maps of the greater Los Angeles area in 1939
The Highest concentrations of TRI sites tend to be nearest to redlined areas, with some blue outliers. Santa Monica has a few TRI sites now, but in the thirties was thought of as a “grungy port town” and was fairly significantly redlined. This too would not have countered our predictive model as Santa Monica does not fit the criteria of our retroactive prediction model.
Cyberscape: Placemarks in post-Katrina
New Orleans

Flooding Reports (via Scipionus) in New Orleans, Sept. 2005

Who was able to or interested in using this new technology?

Which places were they interested in?

Crutcher and Zook. 2009. GeoForum
Jesus and Allah

BLUE = (more Jesus than Allah); RED = (more Allah than Jesus).
Size of the bubble show the magnitude of the difference.
Crandall et al. 2009. Mapping the world’s photos.
Authority and assertion

- Authority
  - inaccuracies are guaranteed
  - formal testing programs
  - metadata
- Assertion
  - inaccuracies are undocumented
  - no metadata
  - data about popular places tend to be more accurate
  - inaccuracies often less than legacy authoritative data
Emphasis on the easy stuff

• Placenames, streets, pictures
  – georeferencing
  – well-defined reference systems and objects
• Free production by citizens replacing authoritative production
• Do other types of geographic information require experts?
  – a catalog of types
The FGDC framework layers

- **Transportation**
  - basic network
    - rapid updates
  - citizens as probes
    - real-time congestion
  - air quality
- **Hydrography**
  - water quality
- **Elevation**
  - adequate authoritative sources
- **Orthoimagery**
  - cost of entry
- **Cadastral**
  - legal issues
- **Administrative units**
  - legal issues
- **Geodetic control**
  - expertise in geodesy
Thematic layers

- **Weather and climate**
  - tradition of amateur observers
  - GLOBE

- **Biota**
  - Christmas Bird Count
  - e-flora
  - phenology

- **Soils**
  - Natural Resource Conservation Service
  - mapping for agricultural advice
The soil map

• An area-class map
  – irregular areas denoting uniform soil type
  – lengthy descriptions of types
  – made by highly trained experts
  – sample points
  – interpolation from ground observation and aerial photography
  – every point assigned to a single class
  – expressed in a unique mapping $c = f(x)$

• What is the nature of the expertise?
Analysis of sample soils

Application/use case

Aerial photography

Application/use case

Historical records of crop performance

Application/use case

Expert knowledge

Application/use case

Covariates, e.g. elevation, climate, parent material

Application/use case

Scale and accuracy issues

Application/use case

Application knowledge

Application/use case
Forms of expertise

• Measurement
  – GPS
  – precision agriculture

• Cartography
  – distributed software

• Subject matter
  – application-specific
  – application-generic

• Local area
Summary

• Advanced expertise was needed to make soil maps
• The generic soil map was the result of severe economies of scale
• The costs of entry have fallen almost to zero
• Geographic information on soils can now be purpose-specific
  – using purpose-specific expertise
    • the farmer
    • the gardener
Simulations

- 1.8 vehicles per driveway
- Driver behavior influenced by:
  - lane width
  - slope
  - view distances
  - traffic control mechanisms
  - information feedback
  - driver aggressiveness
- 770 homes
  - clearing times > 30 minutes
Policy implications

- Addition of new outlets
- Better deployment of traffic control resources
- Understanding the risk
- Reduce cars used per household
- Problems of shut-ins, elderly, latch-key kids
Luck, readiness pay off in Santa Barbara's Mission Canyon

Smoke from the Jesusita fire darkens the sky along Holly Road above Mission Canyon near Santa Barbara today.

Hundreds of homes are set in a narrow canyon downwind from brush-covered wildlands, but evacuation drills, brush clearance and reverse 911 calls all help avert a major disaster.

By Bettina Boxall and Catherine Saillant
May 9, 2009

Reporting from Santa Barbara -- Everyone in Mission Canyon knew these days of flame and smoke would come. It was just a matter of when and how bad it would get.

They had staged evacuation drills, set up phone trees and put herds of brush-munching goats to work. They had cut down clusters of eucalyptus and bought metal shutters to protect against flying embers.