Using Voice of the customer data to Improve Emergency Management Systems

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Classical vs. post-‘911’ disaster risk analysis

- Most probable vs. worst-case scenario
- Hazard vs. vulnerability, exposure, elements
- Hazard profiles: magnitude, duration, seasonality, speed of onset, frequency
- Elements include property, infrastructure, people
- Vulnerability: susceptibility of elements to damage or injury

Classical vs. post-‘911’ disaster risk analysis

- Capacity: elements ability to resist a hazard’s harmful effects and/or recover easily

  -- factors that increase/decrease an element’s capacity
- Risk= hazard + vulnerability + capacity
- Single hazard vs. multi-hazard approach

Challenges

- Location not chosen beforehand
- Spatial distribution of population different pre and post disaster
- Research design must be done quickly without having all knowledge of the situation

Operational Considerations

Preparation of research personnel for disaster field setting

- Health and Safety
- Incident Command System
- Self-sufficiency

Preparation of research personnel for data collected at partner institutions

Importance of COOP/BCP planning

- Care for local researchers and back-up systems
- Mutual aid agreements between nearby universities and emergency management agencies and organizations
- CISD for academic/research institutions

Operational Considerations

- GIS-oriented software packages
- CAMEO (Computer Aided Management of Emergency Operations) package (EPA)
- HAZUS-MH (FEMA)
- Interoperability with SAS, SPSS and other commonly used statistical analysis software

Who is the “customer”?

- Recipients of disaster assistance
- First responders
- Government contractors e.g. Shaw
- Volunteers

EM customer characteristics

- Some of these customers don’t pay for service and so customer profit may not be directly measurable.
- Service provider may be the only choice; little competition.
- Difficulty in doing market research due to rare use of services.
- Customer difficulty in rating services/products due to lack of experience.

EM processes

- Getting a FEMA trailer
- Providing medicine to critical patients after a disaster Cipro vs. antihypertensives.

  -market segmentation e.g. different meds and protocols for patients, highly specific.
- Responding to a large fire
- Getting a paycheck after a disaster (involves COOP planning)

Possible Metrics

- Time from requesting FEMA trailer to living in FEMA trailer
- Patient customer satisfaction and health outcome survey
- Full-scale exercise evaluation
- Employee satisfaction survey over time

  e.g. pre and post-disaster

Possible Metrics

- Time to response
- Mental health status of victims and responders
- Risk analysis=Exposure+hazard+vulnerability+ capacity+recoverability
- PT test for SAR workers
- Failure rates of communication equipment and networks

EM Best practices

- Determined less by monetary competition and more by regulatory guidelines established by government agencies.

  -OSHA, FEMA, EPA, NRC
- Myth of EM practices as doctrine.

  -OSHA vs. ACGIH
- Making best practices better

  -academia and VOC

NSF Katrina Study

Background

Hurricane Katrina

- Third strongest land falling U.S. hurricane recorded
- Second Katrina landfall hit Southeast Louisiana as a Category 3 hurricane
- 81.2 billion US dollars in damages
- 1580 confirmed deaths in Louisiana (direct and indirect)
- Hundreds of Louisiana residents still classified as missing

NSF Katrina Background

Pre-Katrina U.S. Census Bureau data

- Louisiana (2000) 4,468,976 White-64.1% Black-33.0% (2004)
- Orleans Parish (2000) 484,674 White-28.6% Black-67.8% (2004)

Post-Katrina Rapid Population Estimate Project data

(City of New Orleans)

- Orleans Parish (January 2006) 181,400
- Estimated that N.O. West Bank and unflooded area populations decreased only 2,000 to 5,000 each, but that flooded Orleans areas had a population decrease of 296,000.

Purpose/Aims

- Hurricane evacuation modeling
- Quantify impacted population reaction to hurricane response
- Social network analysis

Data Collected

- Demographic
- Spatial
- Expectations and preparations
- Past experience
- Chronology
- Post-event reaction to response
- Suggested improvements
- Phased approach

Sampling Strategy

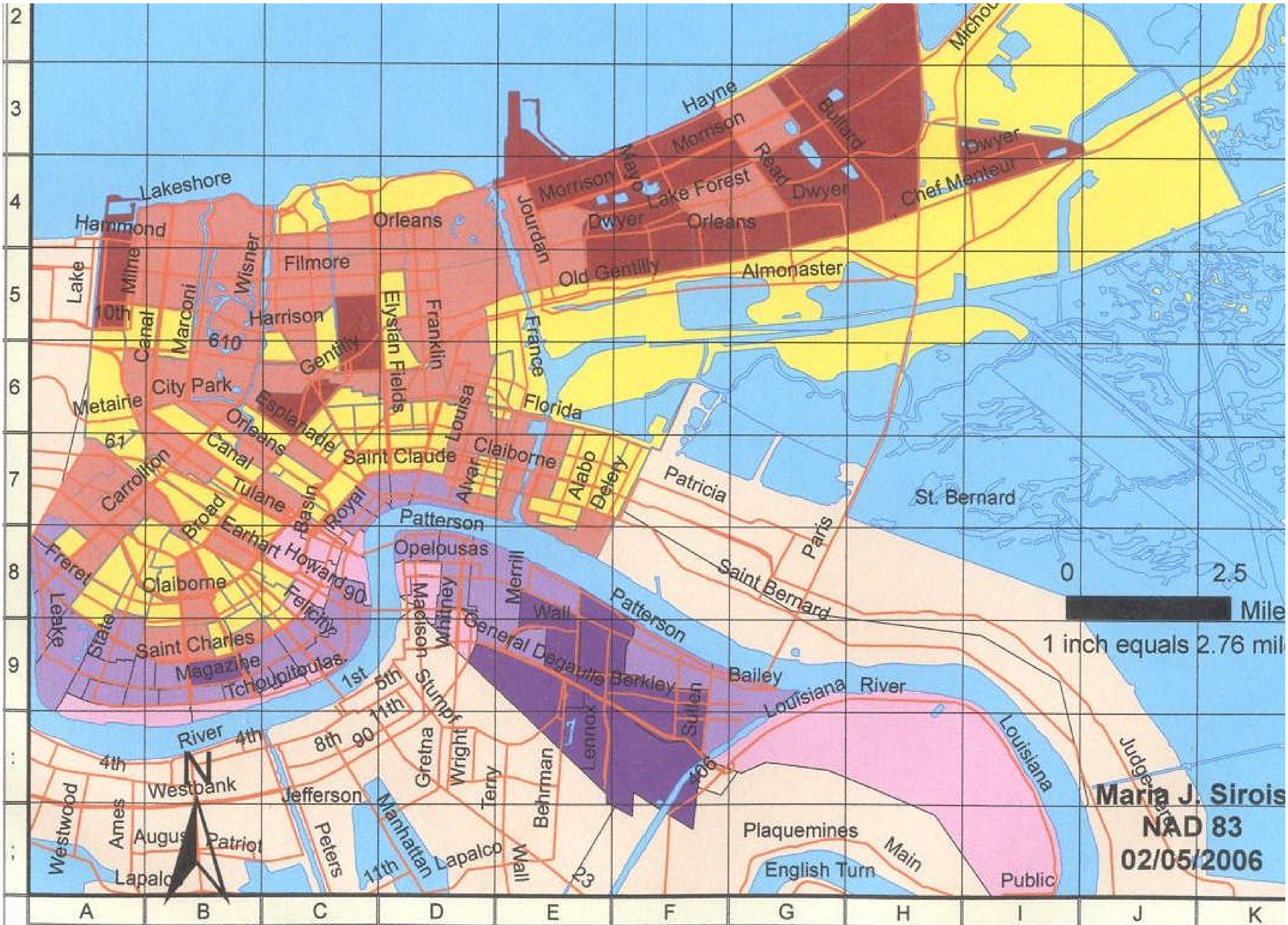
Overall sample size goal was 500

Method 1:Face-to-face interviews in the New Orleans area conducted by project staff.

- Map of generally flooded and non-flooded areas, as well as housing density.
- Crude estimate of flooded area---75%
- Overlay grid for Orleans parish

Sampling strategy (continued)

- Grid square size: Manageable size for 1 person or 2 person team/day
- Want to randomly pick 380 points in flooded areas & 120 in non-flooded areas.
- Areas with higher housing density get more points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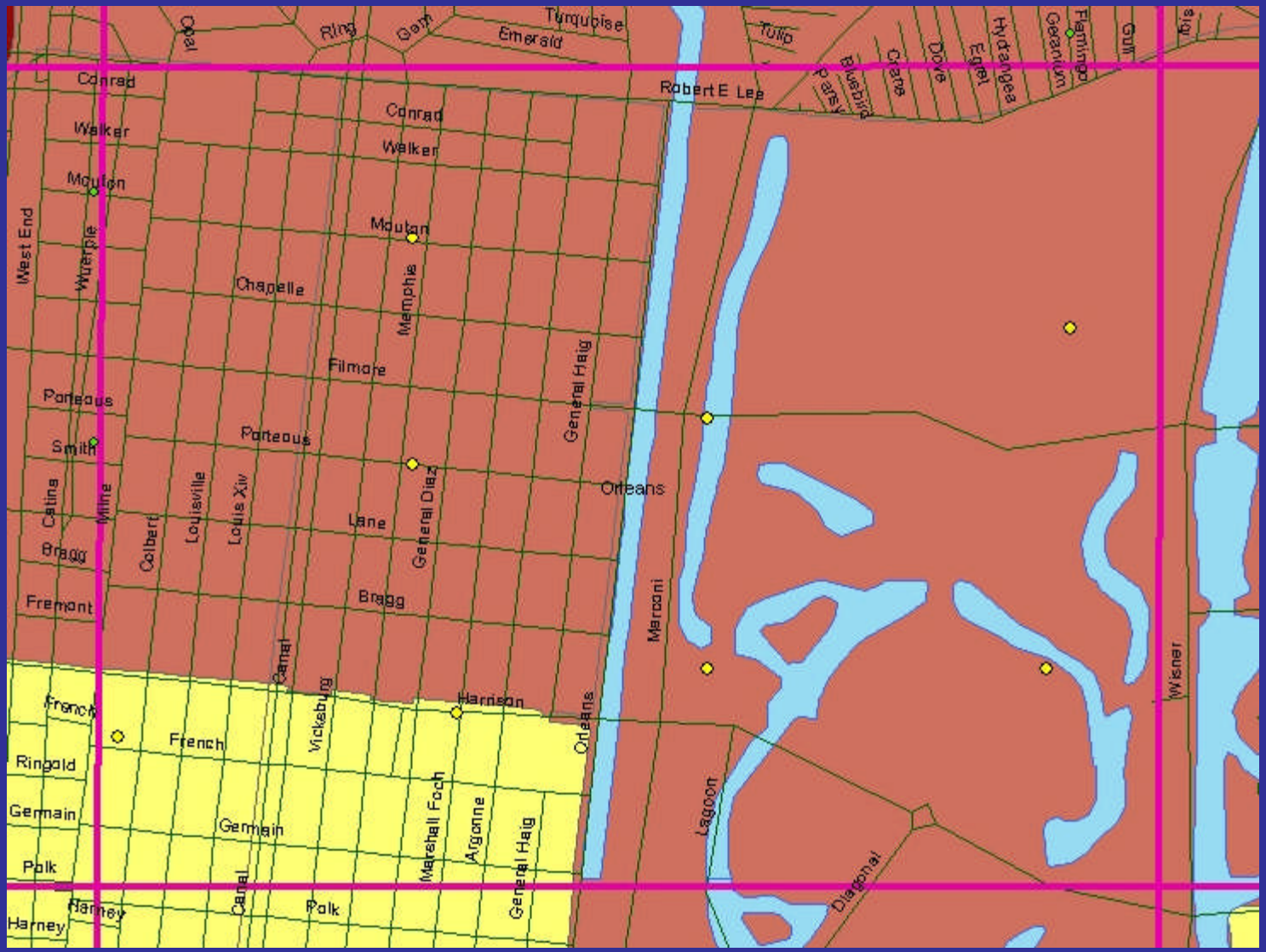
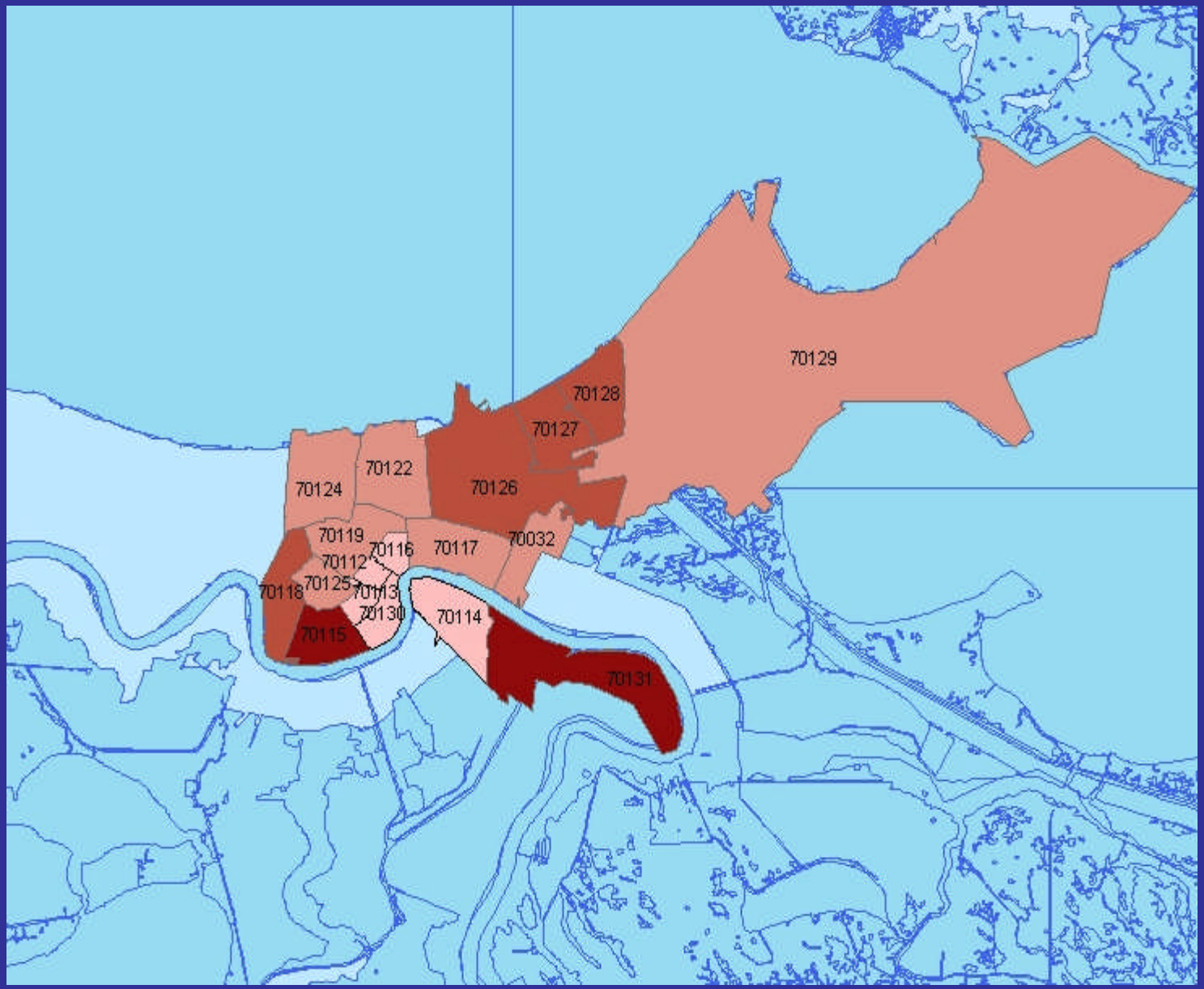
Maria J. Sirois
NAD 83
02/05/2006

Street Map of Grid Square B5



Interview concentration by zipcode-In person surveys



Sampling Strategy (continued)

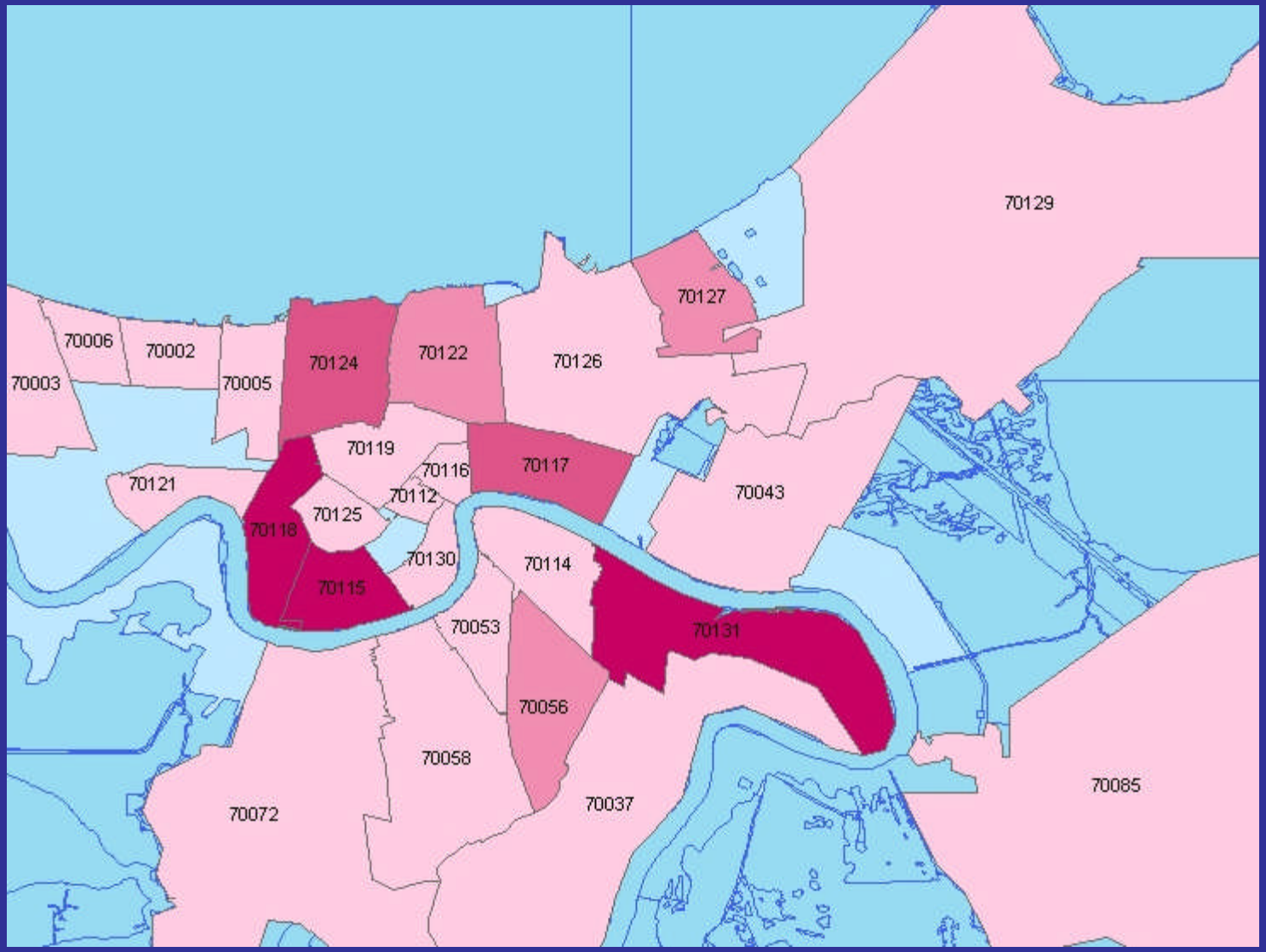
- Methods 2 & 3

  -used random digit dialing of 504 area code landline or cellular telephone numbers

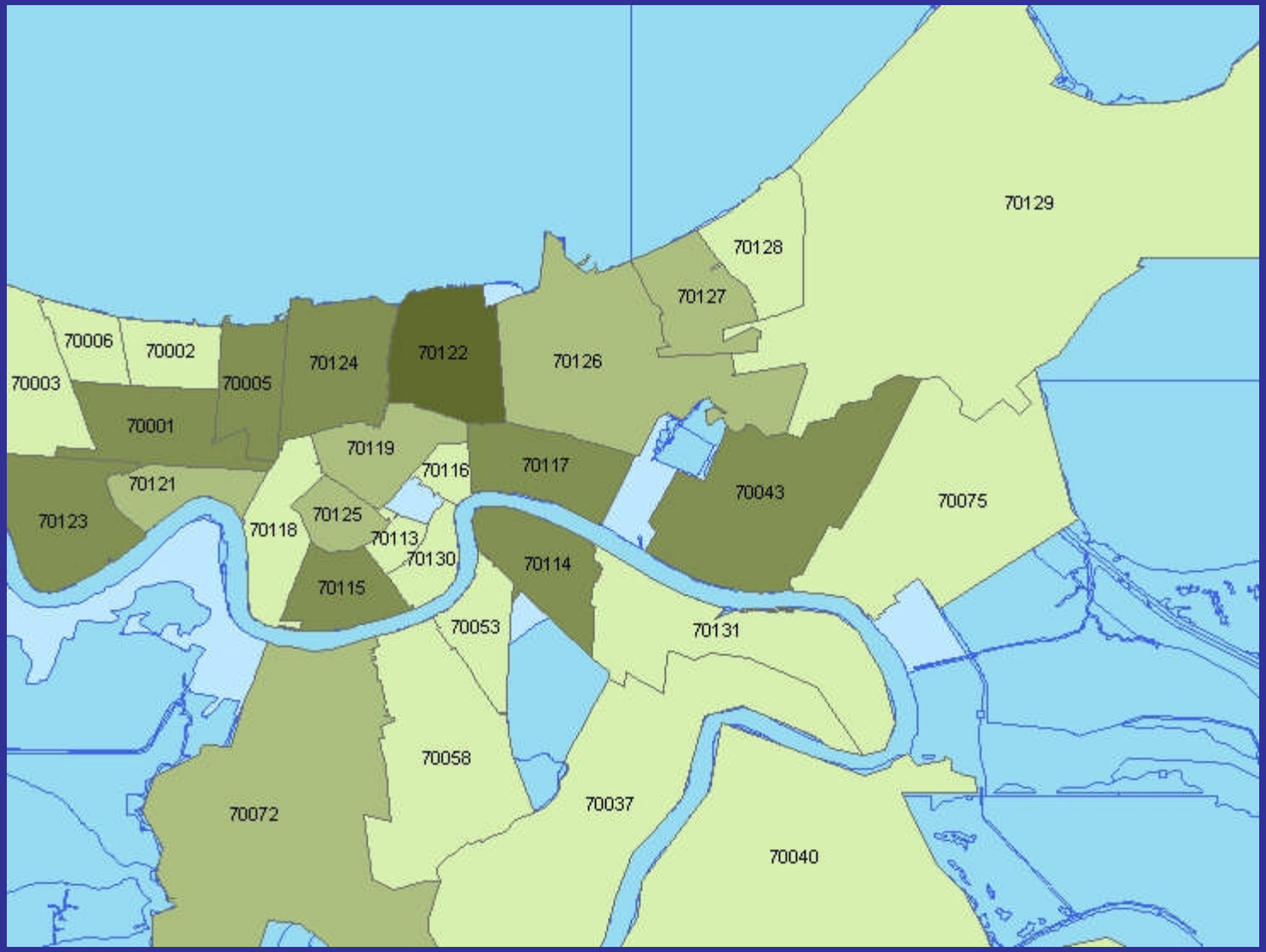
  -CATI (Computer Assisted Telephone Interviews) system

  -offsite

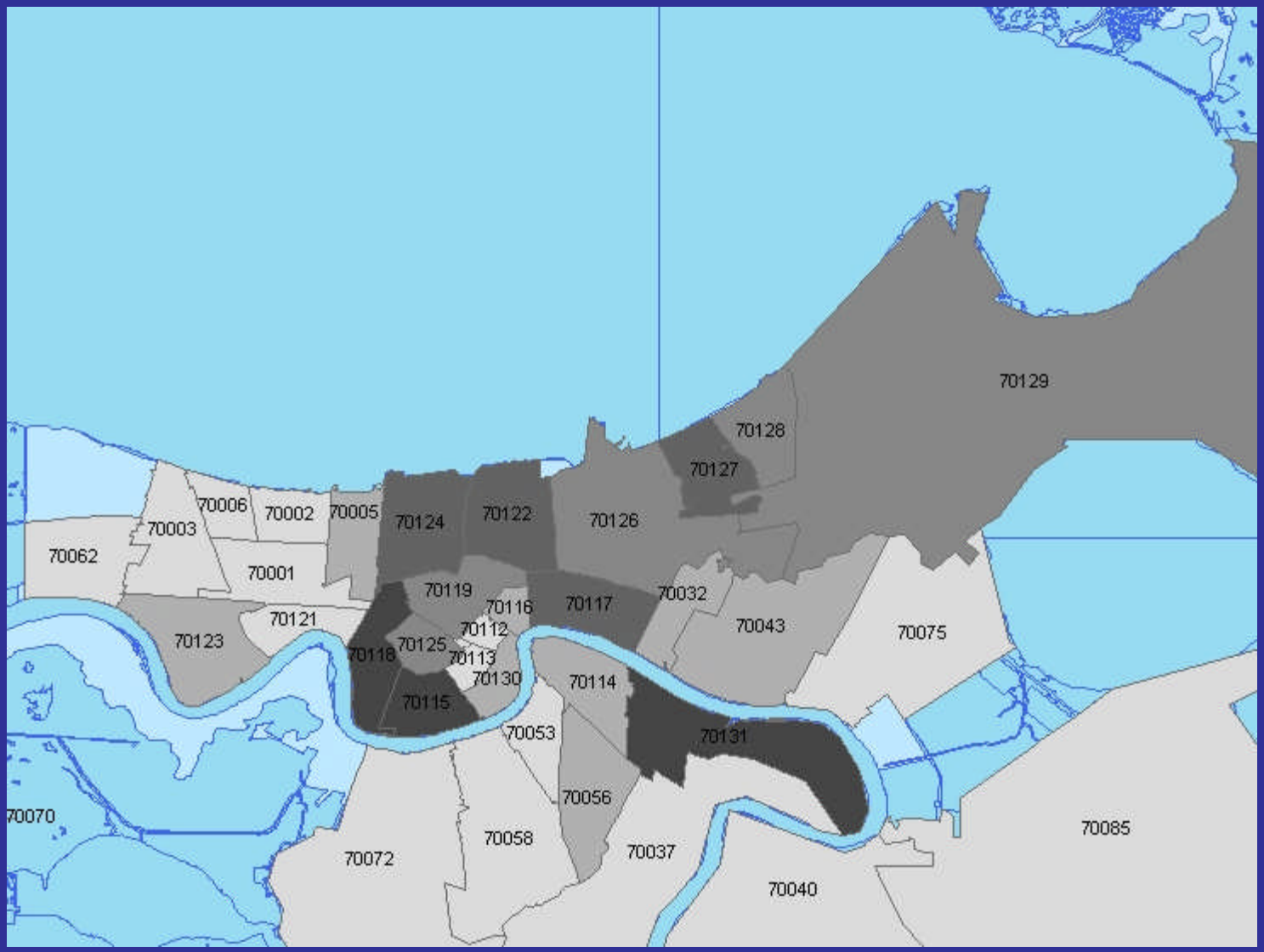
Interview concentration by zipcode-UNCC landline interviews



Interview concentration by zipcode-UNCC cellular interviews



Interview concentration by zipcode-all interviews



Sampling Strategy (Continued)

Pros

Increased interview coverage in severely devastated post-disaster setting

Increased safety of project staff

Cons

Not accepted by many telephone survey organizations or groups yet

Respondent compensation for cellular airtime usage

Application to quality improvement

- Most and least helpful agencies or organizations during three phases of the disaster-1 week prior to Katrina, relief period, and recovery period.

  -Use this data to generate a list of organizations and agencies that could be rated for response efficacy during different phases of the disaster.

-List of agencies or organizations with high ratings used for benchmarking best practices in delivering disaster relief services or supplies.

-churches, American Red Cross.

-EM phase is an important factor e.g. FEMA SBA loans vs. temporary housing trailers.

- Improvements that could have reduced loss of life and property.
- System failures that resulted in loss of life and property.
- Open-ended question naming person, agency or situation and failure of the entity.
- Use this data to choose and help prioritize processes to improve.

- Problem: timely delivery of FEMA trailers.
- Challenge is defining the process; very complicated and dependent on location.

- Problem: SAR not dropping food and water early enough to people stranded.

2006 Health and Population Survey (website: popest.org)- Orleans Supplement

- Complex survey strategy with assistance of U.S. Census Bureau and Centers for Disease Control.
- Multiple stages of sampling, including census block groups and households.
- Stratification by level of property damage, owner-occupied percent, urban vs. rural, and race.

- Supplement given only to Orleans parish subjects.
- Used to assess efficacy of media campaigns on disaster-related topics, including trailer safety and city-assisted evacuation.
- Questions about the product itself e.g. billboards, radio announcements.
- Demographic comparisons for preparedness awareness.

- Use this data improve campaign efficacy and decrease vulnerability of populations with lower awareness.
- Incorporate demographic characteristics into media design e.g. language
- Change mode of media distribution to reach populations that have lower awareness.

Conclusions

- Should use quality improvement concepts to establish needs and initiatives.
- Unresolved dividing line between disaster recovery and sustainable development-both amenable to quality improvement methods.
- Using VOC involves the “customer” and

  -increases EM process awareness and innovation

  -may increase self-sufficiency of stakeholders.

Any questions?