





# Michigan Section American Water Works Association

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Michigan Water Security Summit  
Best Western-Midway Hotel  
Wednesday, June 4, 2008



# Kudos

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- Thank You Michigan Section, American Water Works Association
- Thank You people of Michigan for supporting a safe and adequate water system
- Thank you for being here



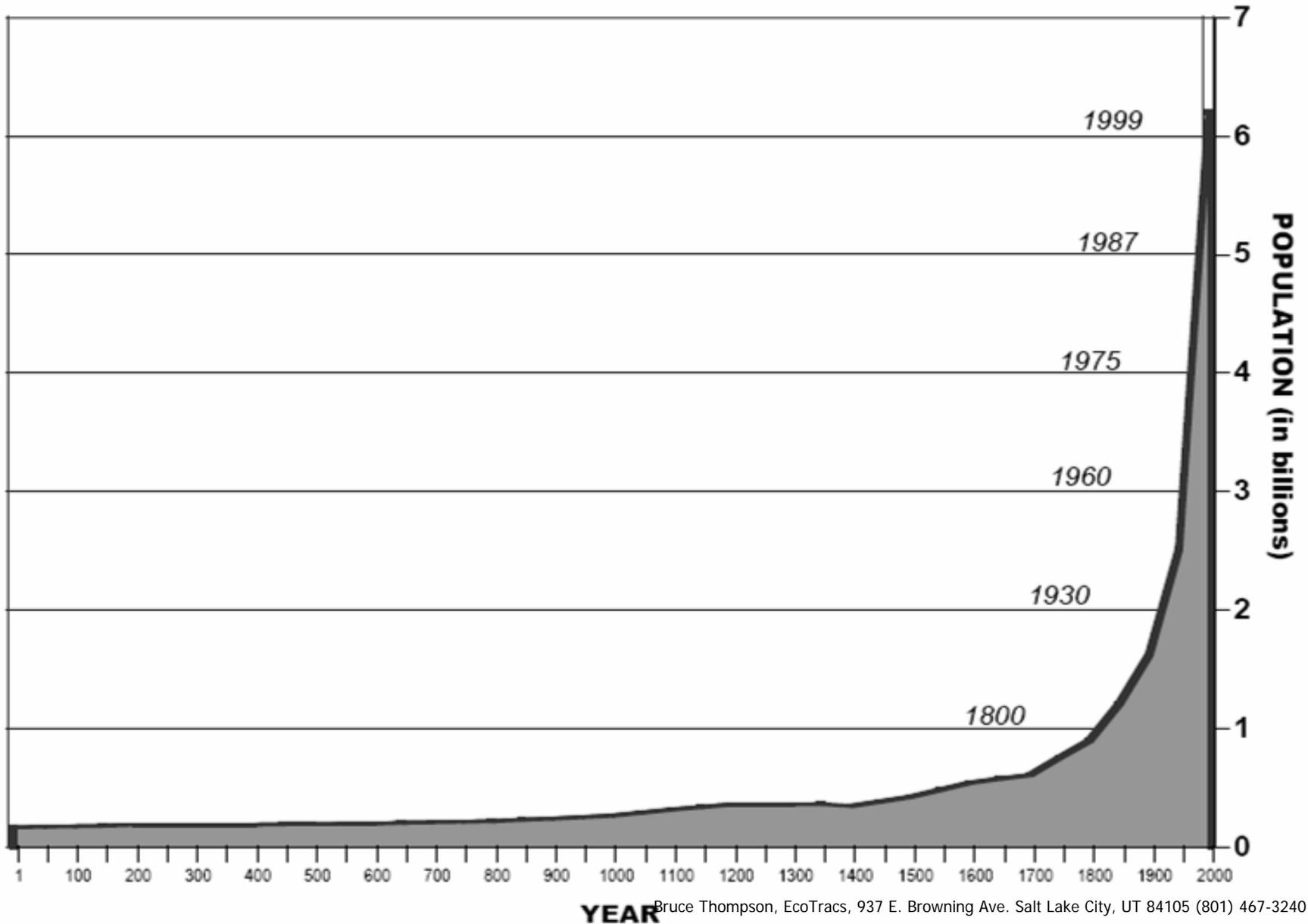
## Handouts: 3

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- Evaluation form
- Michigan WARN brochure
- Michigan Department of Agriculture yellow Emergency Action Plans for Retail Food Establishments
  - Interruption of service
  - Contaminated water supply



# Human Population Growth Since 1 A.D.



# Contamination of the Distribution System...the 800 pound gorilla

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# Contamination of the distribution System

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- The “800 pound gorilla”
- Protection of the many miles and locations of the distribution system is one of our big challenges



# Morning Session

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- MDEQ Water Sector Security Update: Bob Babcock
- Message mapping: Scott Minamyer
- Hydrant tampering: Jim Van De Wege
- Threat Evaluation and Sensors: Robert Janke
- Contaminant Warning System case history: Sumedh Bahl



# Afternoon Session

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- Contaminant Warning Systems and Consequence Management Plans: Brian Pickard
- Gas Chlorine Reduction: Tom Smith
- MDEQ Laboratory and Real-Time Monitoring Parameters: Bob Avery
- Security Improvements and LEPC funding case history: Paul Reinsch
- WARN/MI WARN: Bob Babcock



# MDEQ Water Sector Security Update

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○ “Let’s  
Roll”



# MDEQ Water Security Update

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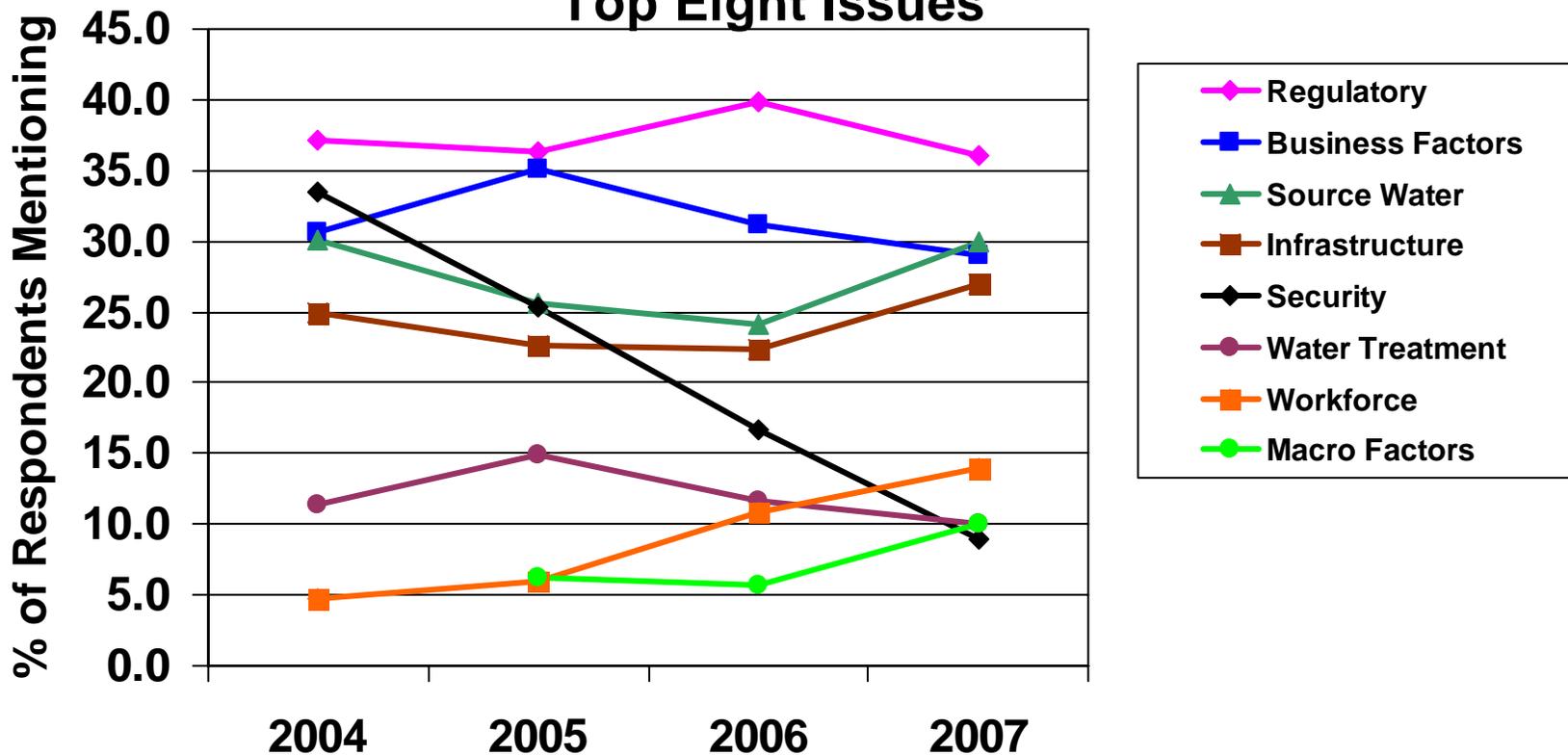
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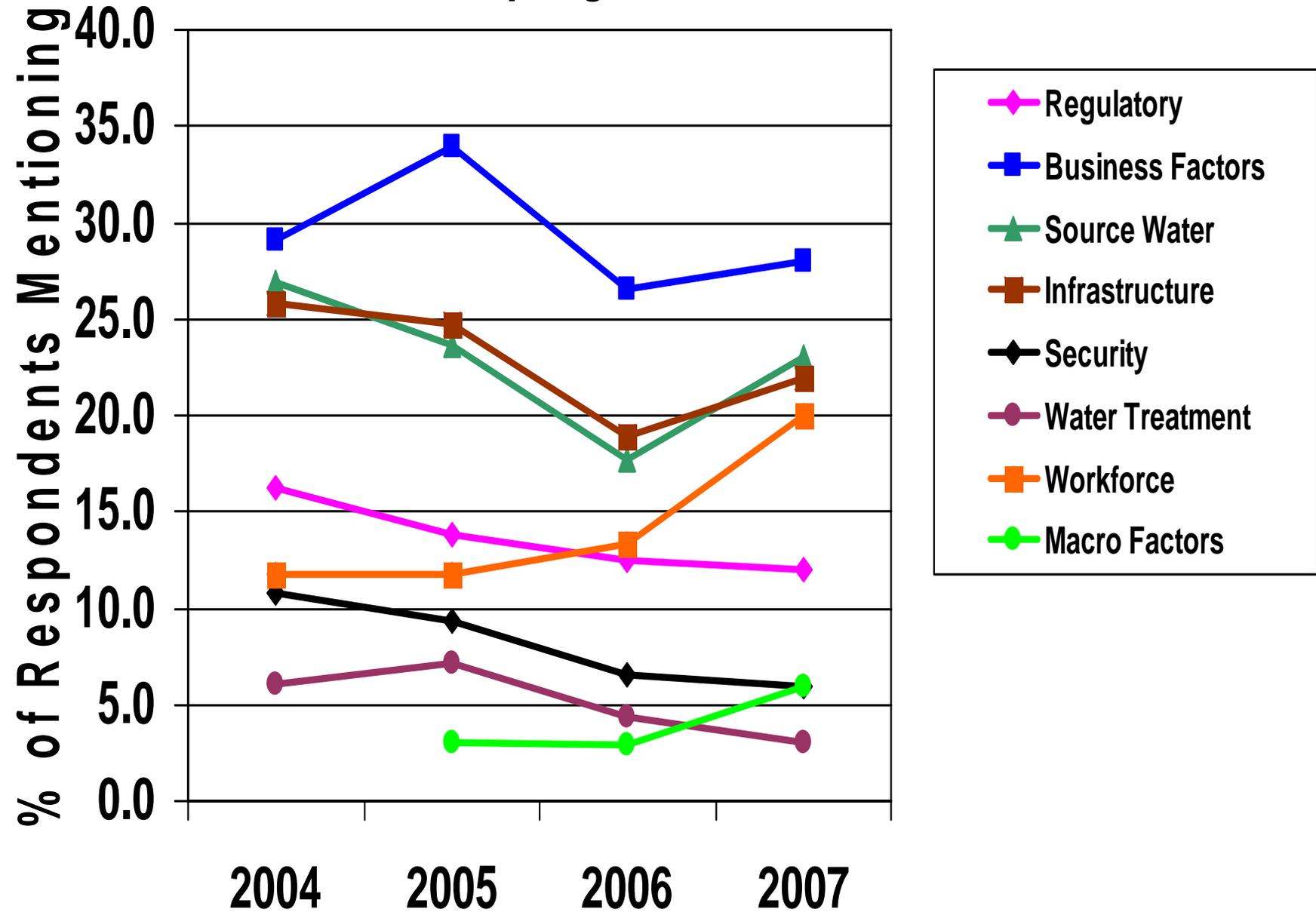
environmental activism) grew, while Security issues continued their steady decline.

### US Water Current Issues (1-2 yr) Trend Top Eight Issues



# US Water Inadequately Addressed Issues Trend

## Top Eight Issues



# Summary: MDEQ Currents

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## ○A. MDEQ stuff

-VA CIP

-TTX

-gas CL2

-WARN

-TANS

# National Comments

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- B. Country Wide Synoptic Comments
  - New Orleans, LA ASDWA conference: January 23-25, 2008
  - Cincinnati, OH AWWA Water Security Congress: April 6-8, 2008:
    - Cincinnati, Raleigh, Dallas, Glendale, Charlotte, New York City



## VA CIP Follow-up

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- Vulnerability Assessment (VA) Capital Improvement Plan (CIP) follow-up
- CDM Michigan Inc. contractor



## VA-CIP Project Goals

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- Assess status of capital projects identified in Utility Vulnerability Assessments
- Identify remaining project needs

# VA-CIP Survey

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- Completed by utility – interview, fax, mail or phone;
- Survey Questions:
  - VA projects ID'd/VA projects done
  - Timeline for completion of remaining projects
  - Projects identified post-VA
  - Projects completed post-VA
  - Changes in policies & procedures
  - Changes in emergency response plans

# VA CIP

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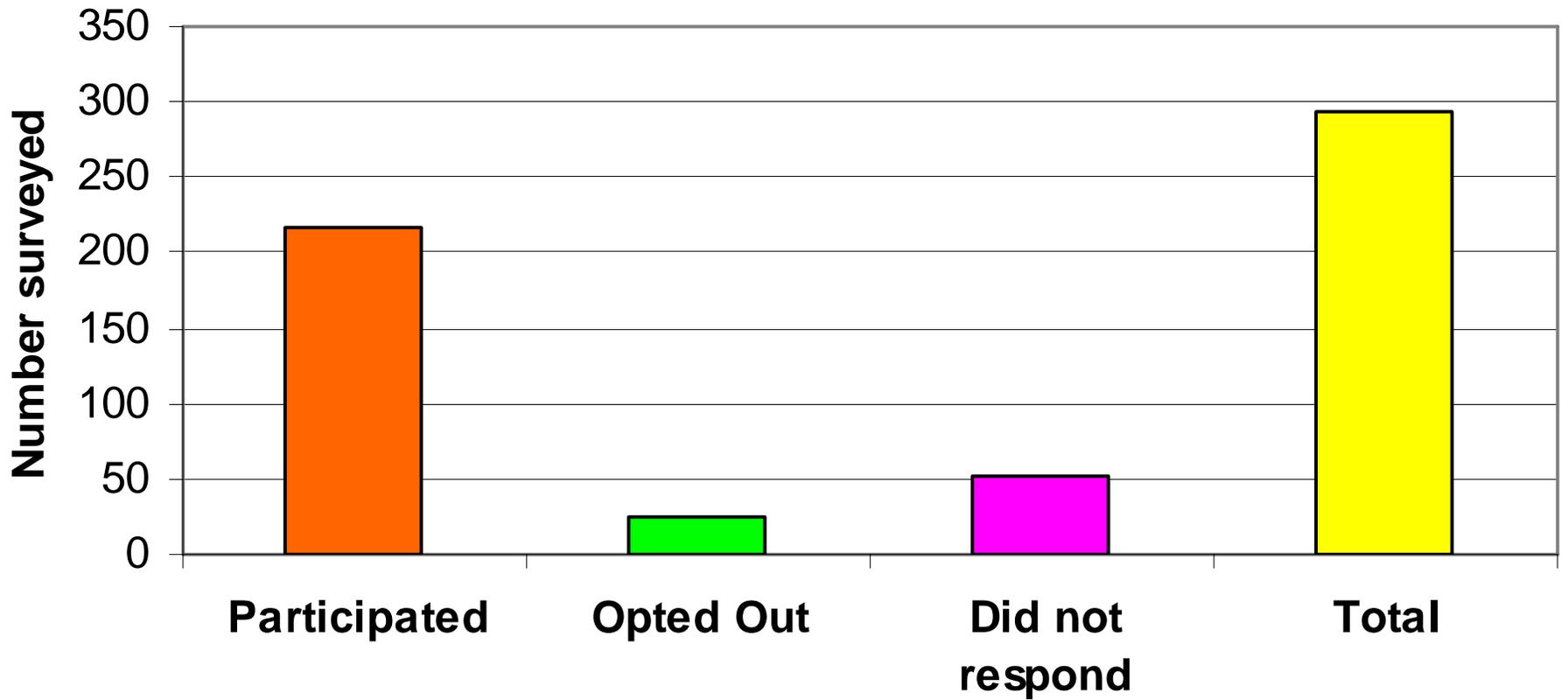
- 2 phases
  - Phase I: evaluate the Vulnerability Assessment capital improvements identified and completion efforts
  - Phase II: subsequent survey to determine new security related capital improvements



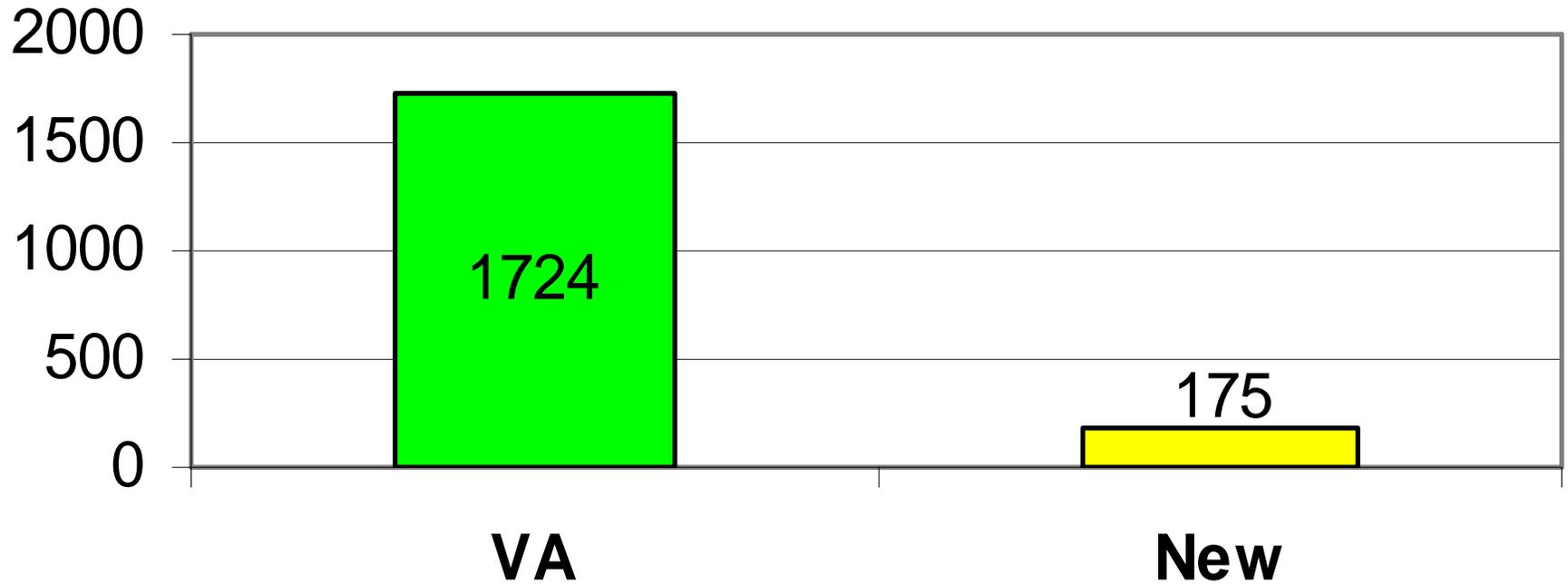
# VA CIP Phase I

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## Number of Utilities Surveyed

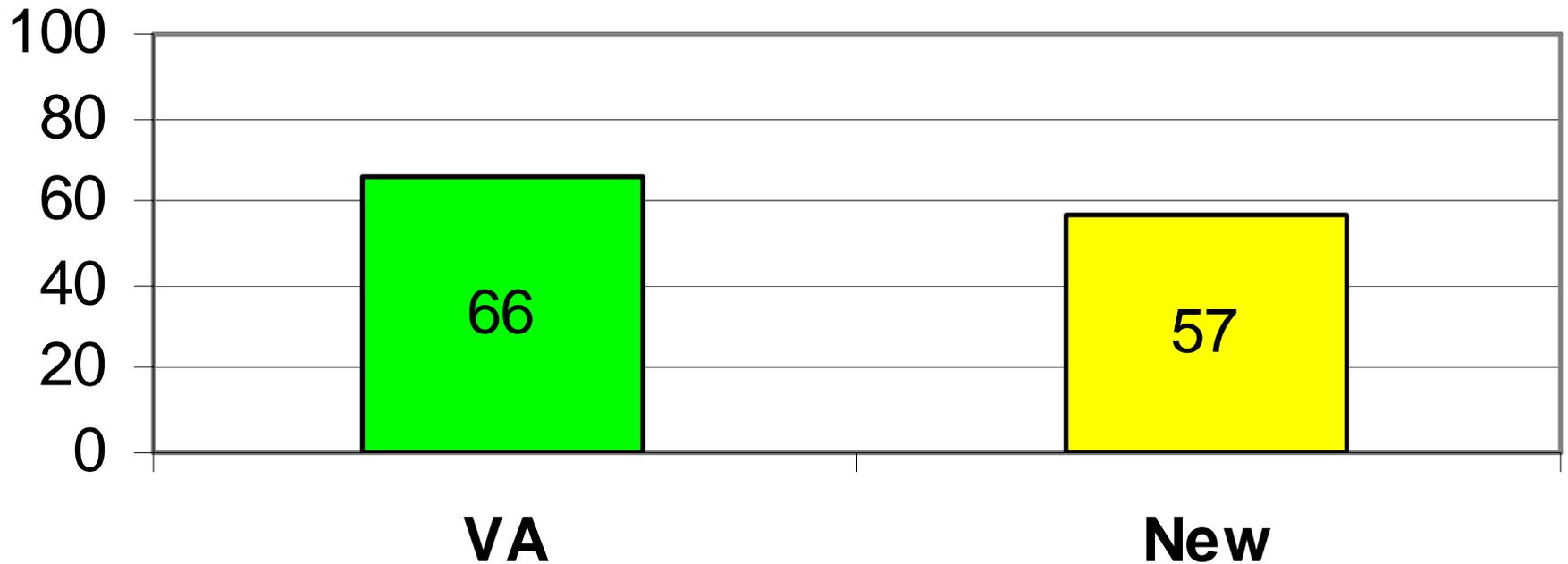


# Number of Projects Identified

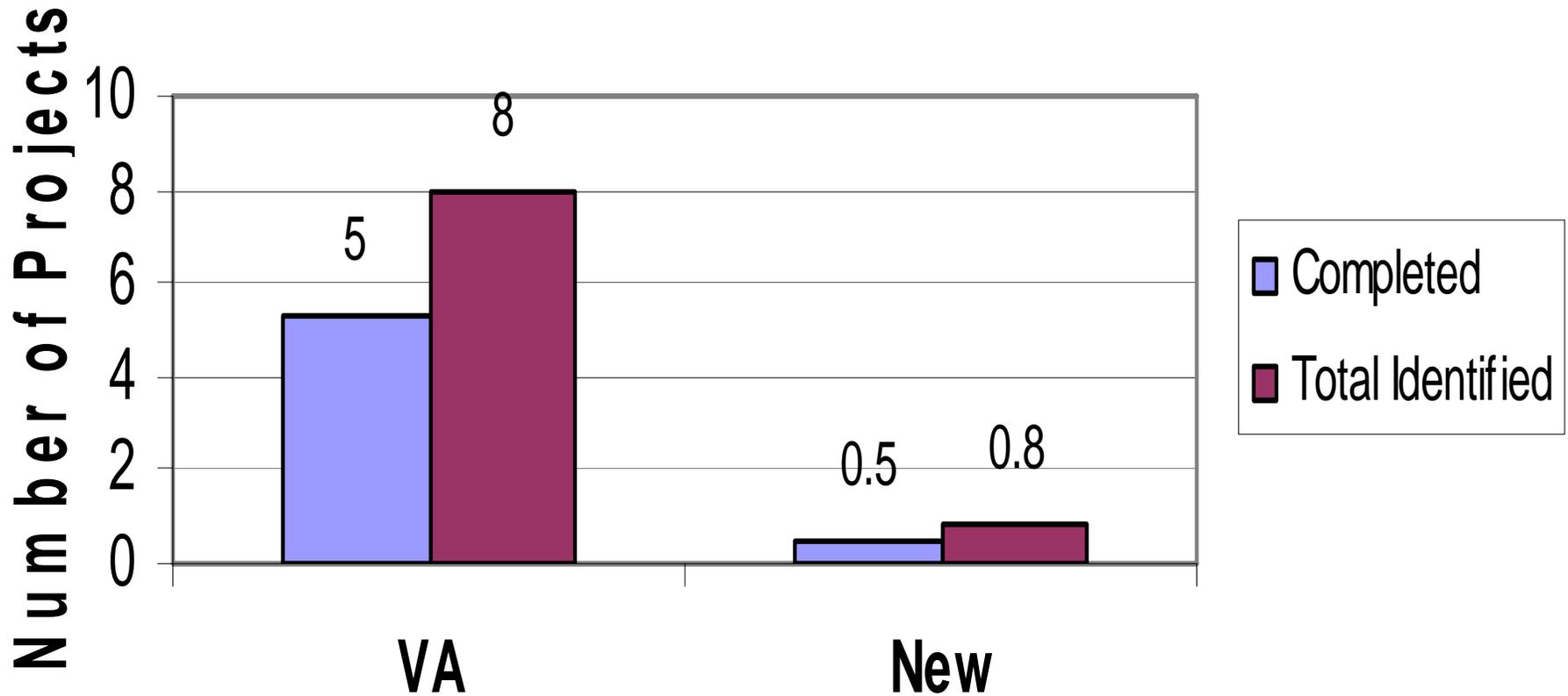


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## Percent of Projects Completed



# Average Projects per Utility





# CIP Project Costs

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- > \$25M total
- Range
  - Min \$100 new locks
  - Max \$5M new backup generators

# Typical Projects

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- Locks
- Fences
- Cameras
- Card key access
- Generator



# Policy & Procedures

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- Almost all utilities modified policies and procedures





## VA CIP Phase 2

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- Assess continuing progress by drinking water utilities in implementation of security projects
- Assess awareness and interest in Michigan WARN program



# VA-CIP Phase 2 Survey

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- Completed by utility – email, fax, snail mail or phone;
- Survey Questions:
  - Projects completed in 2007 - type and cost
  - Projects planned for future - type and cost
  - Interest in WARN



# Utility Participation

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- 196 contacted throughout Michigan (all participants in phase 1)
- 119 participated as of May 21
- 1 refused
- 76 no response/still attempting to contact
- 61% response rate

# Security Projects Related Expenses in 2007

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- \$9 Million spent by drinking water utilities in 2007 in Michigan
  - Approximately half of utilities performing security projects were able to provide expenditure estimate
- \$310,000 per utility
- Range
  - Min \$50 new locks
  - Max \$6M new backup generators



# Anticipated Financial Needs

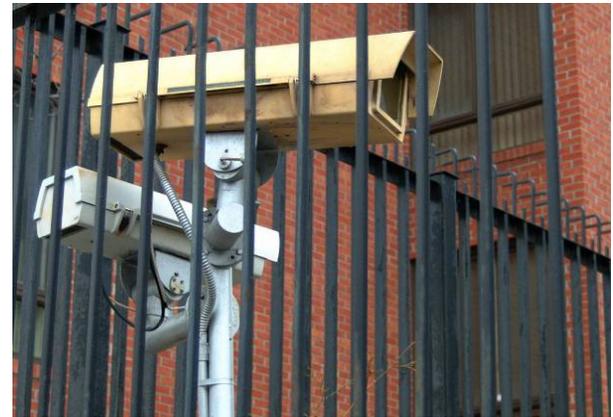
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- \$10,700,000 total
  - Approximately half of utilities planning security projects were able to provide budget estimate
- \$346,000 per utility

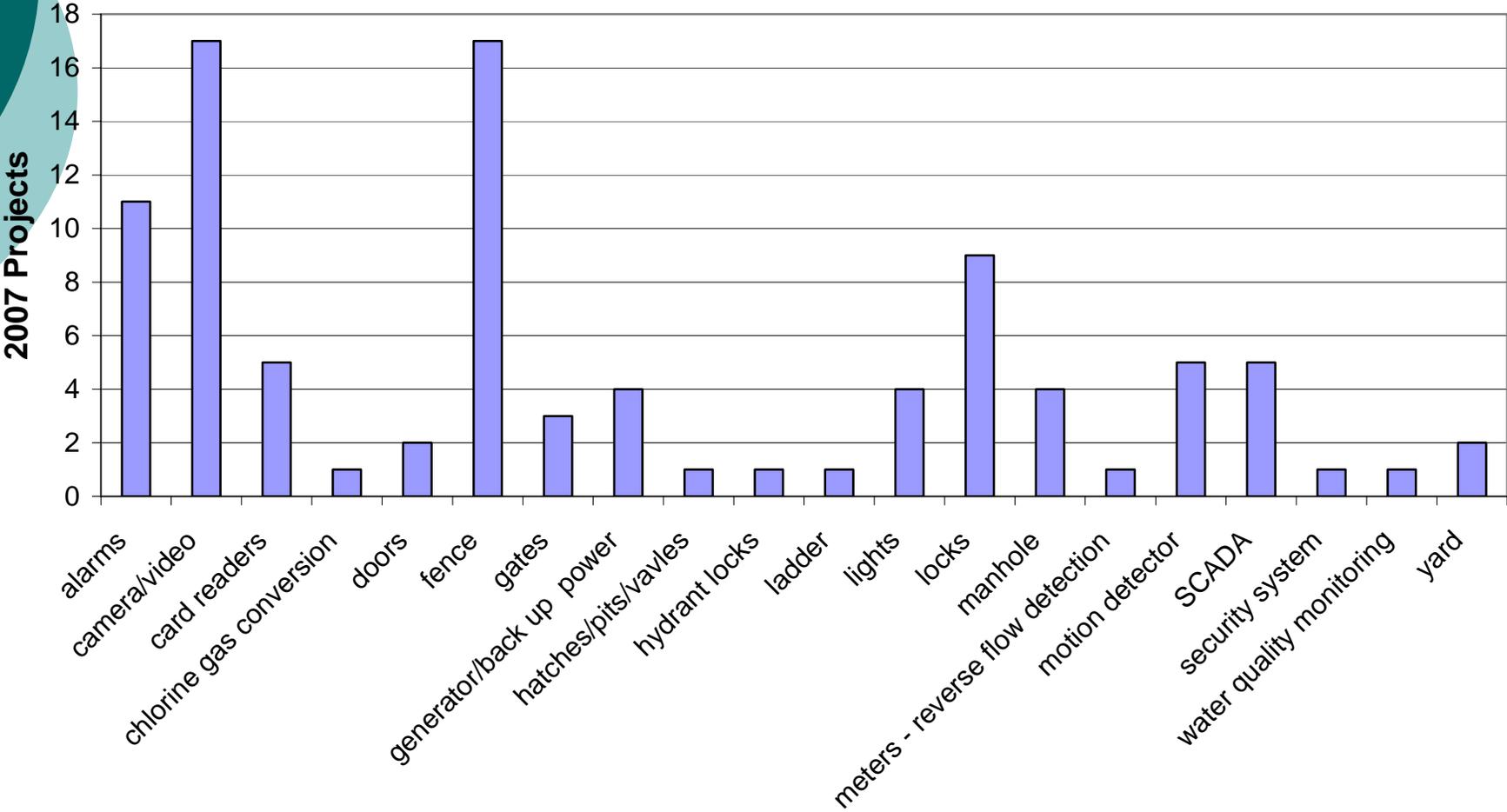
# Typical Projects

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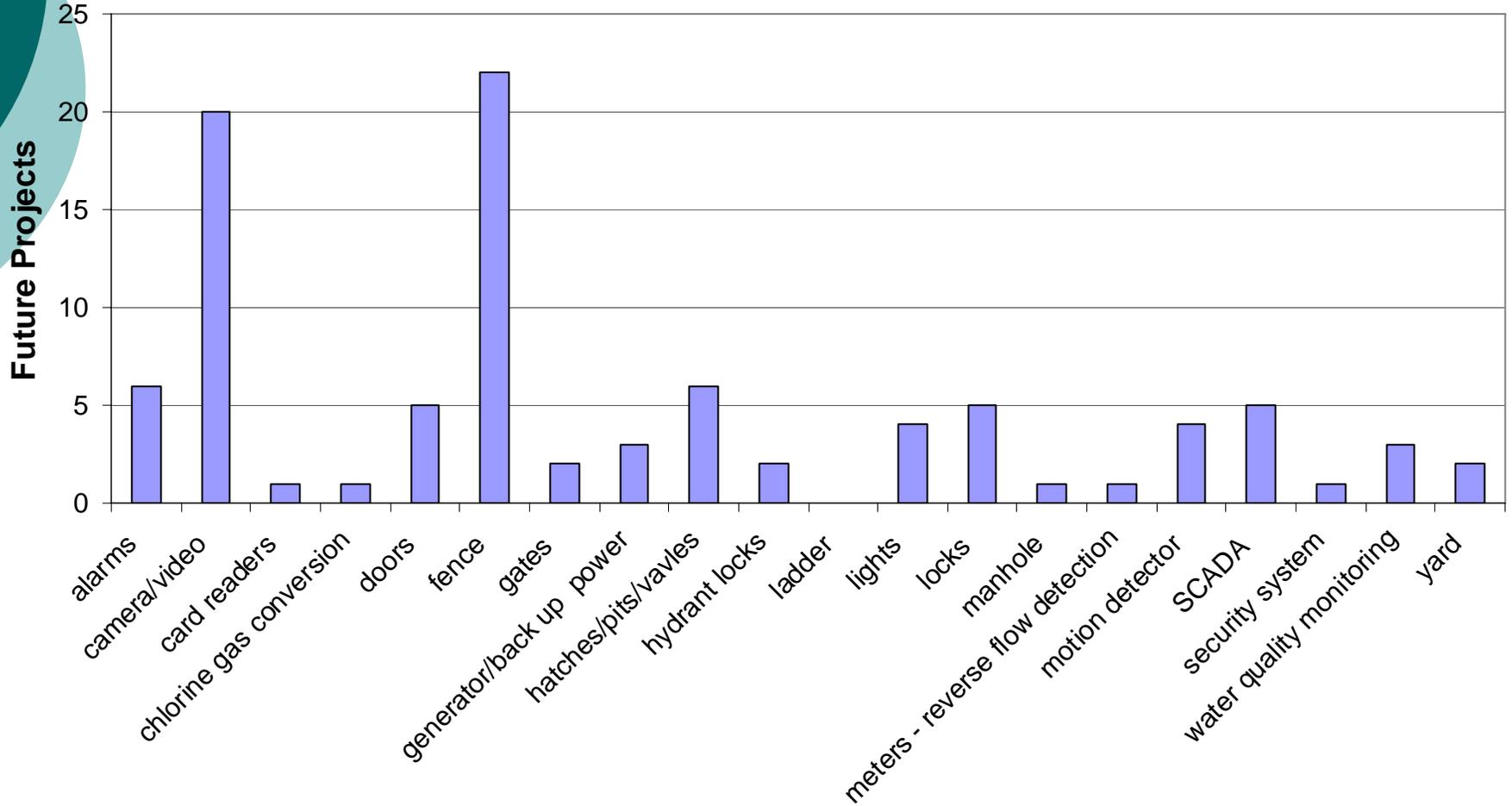
- Locks
- Fences
- Cameras  
s/videos
- Alarms
- Card  
readers



# Frequency of Security Project Type Michigan Water Utilities Completed in 2007



# Frequency of Future Security Project Type Michigan Water Utilities Future Plans





## Best Quote

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“Security projects are just a routine part of the utility budget, like chemicals and electricity”

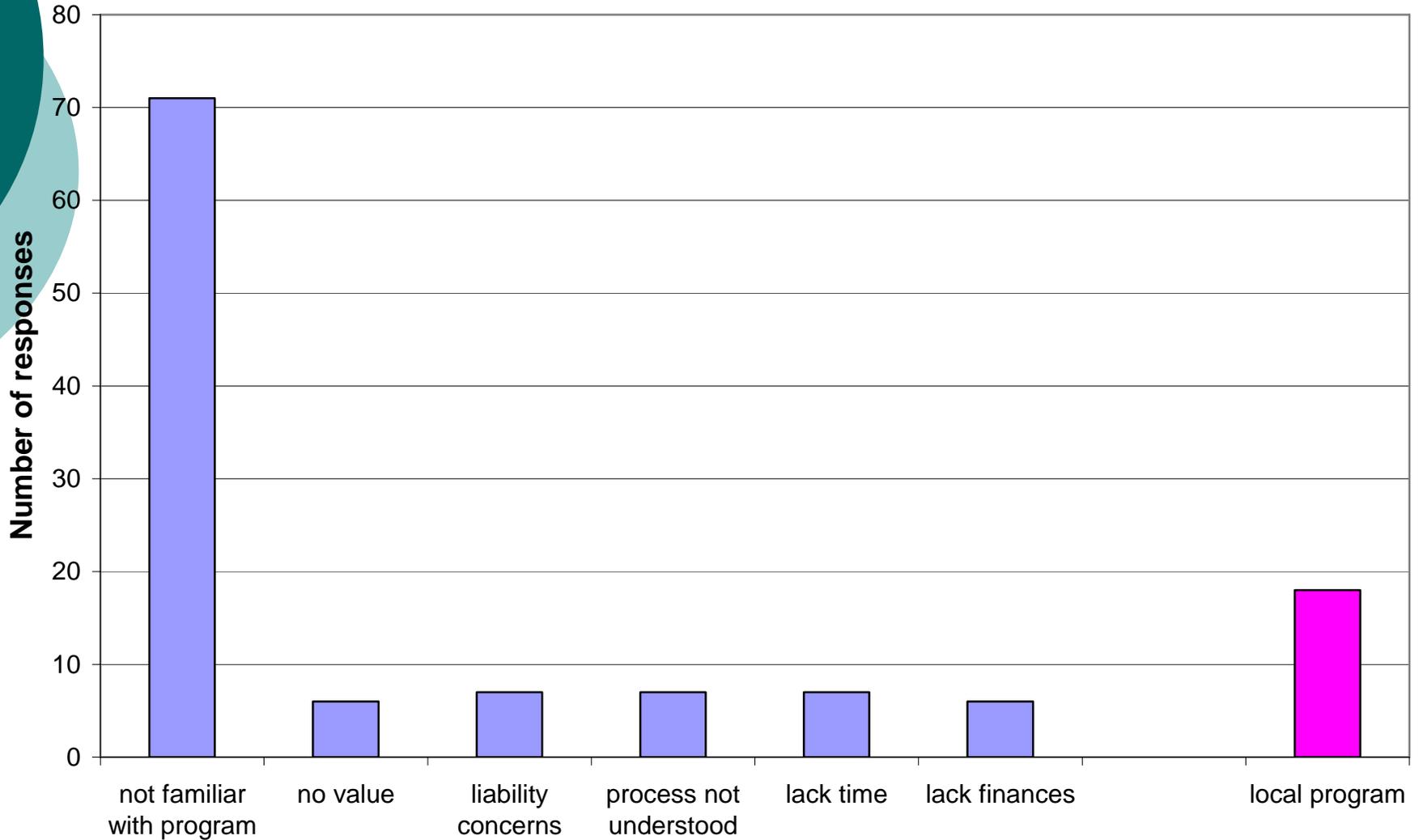


# WARN Participation

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- 36 utilities already plan to participate
- 79 utilities unfamiliar with the program
- But most are interested
- Many have some form of local assistance already
- At least one region has formal agreements

## Frequency of Reasons for Non-Participation in WARN





You can still participate!

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## Table Top Exercises

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- Over the last 4 years, MDEQ has performed approximately 100 at our largest water and wastewater treatment plants



# Tabletop Exercises

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- Purpose: increase the understanding of:
  - the importance of the water system to the community, and,
  - the vulnerability of the water system



## Table Top Exercises (TTX)

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- Perform annually
  - You play like you practice  
...train, train,  
train



TTX

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- Will assist in all hazards emergency management, relationships, and response

# TTX

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- Have injects that deal with the 6 modes of terrorism: CBRNE and cyber
  - Chemical, biological, radiological, nuclear, and explosive and cyber



## Table Top Exercises

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- Most difficult issues to deal with:
  - Emergency lab availability
  - Alternate water source

# TANS

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- TANS = threat advisory notice system
- TANS index on MDEQ web site
- Have numerous staff w/ emails on TANS



## Gas Chlorine

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o the most dangerous material the city has?



# Gas Chlorine

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○ If it ain't  
broke, don't  
fix it!



# Gas Chlorine

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- Paradigm shift:
- Cost-effective vs risk-benefit



# Gas Chlorine

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- In today's environment, the risks need to be considered even if the alternative is more costly



# New Orleans ASDWA Conference

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- ASDWA = Ass'n of State Drinking Water Administrators
- Attendees: 8 US EPA regions
- First conference of 43 state water security coordinators
- January 23-25, 2008

# New Orleans ASDWA II

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- “utilities fell thru the cracks in planning” ...New Orleans EM
- 85 % of Critical Infrastructure is private
- 15 % of Critical Infrastructure is public
- All hazards
- DHS PSA's (protective security advisors) perform SAV's (site assessment visits)



## New Orleans ASDWA III

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- Water security program is voluntary
- Prevention/Detection
- Response
- Recovery/decontamination



# New Orleans ASDWA IV

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- Contaminant Warning System:
  - Spatial and temporal coverage
  - Broad spectrum of contaminants
  - Sustainability
- 5 triggers:
  - Water quality monitoring, real-time monitoring, public health surveillance, police intelligence, consumer complaints

# New Orleans ASDWA V

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- Incident Command System and National Incident Management System training
- US Corps of Engineers
  - Engineering Support Function # 3: public works and Engineering
  - Repair water and wastewater systems
- Ingrain security like safety – routine & part of operations

# New Orleans ASDWA VI

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- Get Emergency Response Plans (ERP's) on the same page...water, hospital, industry
- Top 3 Sectors of the 17 Sectors in the National Response Framework
  - Water, power, and communications
- WARN
  - Water and Wastewater Agency Response Network
  - Resource typing, e.g., type/size of truck, type I team – most robust vs type II team – least

# New Orleans ASDWA VII

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- WARN (cont'd)
  - “the problem of communication is the perception that it has been achieved”  
Ben Franklin
  - “plans are useless but planning is essential” Dwight Eisenhower
  - Water needs to partner with emergency management
  - Put State & Regional labs in WARN



# New Orleans ASDWA VIII

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- Crisis mental noise reduces cognitive abilities up to 80 %
- graphics help communicate
- may want to communicate 3 advisories (boiled water, do not drink, do not use) on your utility bill or the CCR (consumer confidence report)...ie, don't wait for incident
- reverse 911

# New Orleans ASDWA IX

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- Roll MANG Civil Support Team (CST) to get them familiar w/ your system
- RRT's important: regional response teams – hazmat folks w/ Level A PPE (personal protective equipment) should be at TTX's

# New Orleans ASDWA X

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- PWS need to strengthen link with law enforcement
- Need timely and accurate information on water supplies to the public in a time of crisis
- Pandemic plan: plan staff food, berthing for extended stay at water treatment system due to need for **social distancing**



## Cincinnati AWWA

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- Water Security Congress:  
April 6-8, 2008
- Water security is not about regulations but about partnerships
- CD available from conference attendees



# Cincinnati AWWA II

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- Cincinnati PWS is strongly IT based
  - pH, TOC, chlorine residual, ORP, turbidity, and conductivity at 17 locations in 6 pressure districts
  - Sustainability and dual use is key to the Contaminant Warning System

# Cincinnati AWWA III

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- Cincinnati:
  - Millions of permutations in simulating contamination: contaminant, amount, location, time of day
  - Detection level vs LD 50 is sometimes problematic
  - Benefits of CWS: quick, eg, w/in 15 minutes, where contaminant is going and sampling plan initiated

# Cincinnati AWWA IV

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- Event detection ASAP
- Event response ASAP
- Digital 'sandbox' to provide real-time response...? Automated valves/pumps ?
  - Algorithms key, i.e., management response set points
  - Baselines thresholds must be defined
- Risk: probability times consequences



## Cincinnati AWWA V

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- Emergency Management and Tabletop Exercises
  - Improved partnerships & relationships are not expensive

# Cincinnati AWWA VI

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- Cyber: increased connectivity increases security risks
  - Need cyber as a part of the security program
  - Biometric: be wary...German official thumb print stolen...permanently lost...never to be used again
  - Water behind gas and electric w/ IT security issues
  - IT and SCADA has to be together

# Cincinnati AWWA VII

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- WARN participation keeps utility operating without lengthy outages & reduces revenue loss
- Cost to WARN membership is low
- Detroit, OR: 50 inches of wet snow w/ road not plowable and propane running low...got neighboring Salem to use backhoes to get road open for propane
- Alamora, CO: salmonella outbreak & got emergency chlorination delivered by WARN
- WARN membership could improve bond rating and decrease insurance cost

# Cincinnati AWWA VIII

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- City of Raleigh
  - Hydraulic modeling software: watermax, pipelinenet, EPAnet, H2Omap, infowater
  - Emergency response zones w/ isolation valves ID'd



## Cincinnati AWWA IX

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- Dallas

- Dual use CWS:  
water quality and  
contamination  
sensing

# Cincinnati AWWA X

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- Glendale, AZ
  - Operational enhancements result from CWS and protects infrastructure
    - GAC a function of TOC
    - Iron oxide from ductile iron pipe a function of infrastructure need...responded by increasing caustic feed to reduce aggressive corrosion
    - Could not detect iron until used SCAN spectroanalyzer and two year old ductile iron pipe's iron and increased the pipe's longevity
  - Web based comms allow for real-time comms

# Cincinnati AWWA XI

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- Charlotte, NC
  - drought reduces revenue
  - large banking center supportive of EM
  - strong emergency preparedness
  - conducted successful field training exercise (FTX) using level B PPE
  - tampering with a public water system...20 year penalty
  - documentation important...video useful with date/time group

# Cincinnati AWWA XII

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- Charlotte, NC (cont'd)
  - Contamination response plan
  - Hot wash (immediate verbal) vs cold wash (later written report)
  - Food, hydration, rotate staff, rest rooms, comms w/ back up battery, turn off trucks when sampling
  - Insurance department put water FTX on their list of required training
  - HAZMAT RRT's at TTX and FTX

## Cincinnati AWWA XIII

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- Charlotte, NC (cont'd)
  - Should have a plan to respond to any trigger
  - No single detection device can give whole story

# Cincinnati AWWA XIV

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- US EPA demo
- Field deployable ultrafiltration device
  - To concentrate microorganisms because detection limit is too high
  - 3 gallons concentrated to 1 quart sample

# Cincinnati AWWA XV

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- New York City high rise buildings study
  - Gravity roof tanks generally not secure; Gravity tank can't exceed 370 feet; Office buildings peak use during day
  - Basement booster pumps take psi's from 30 to 200; Contamination flows toward use

# Cincinnati AWWA XVI

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- Decon strategy: US EPA
  - Alamora, CO: salmonella contamination treated with portable high chlorination
  - Fate and transport huge issues
  - Risk balance flush vs containment
  - Capital improvement plan needs to deal with decon
  - Assets available list including emergency lab and alternative water source



# Epilogue

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- An elderly gentleman I met at an international AWWA Water Security Congress mentioned that the book of Genesis cautions to not allow your enemy to poison your well.
- Apparently drinking water security has been around a while, not here today and gone tomorrow.



## Epilogue II

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- If water system security is here today and gone tomorrow, the point of water system security is missed. Keep doing what you do so well . . . meeting the mission of your water utility.
- The culture of water supply systems includes security—it always has, and, it always will.