SAND2012-6680C

WARRP Systems Study

Dave Franco, Wayne Einfeld, Donna Edwards, Paula Krauter,
Julie Fruetel, Mark Tucker, and Mark Kinnan

Sandia National Laboratories

WARRP Capstone
September 13-14, 2012

Homeland Security
Science and Technology

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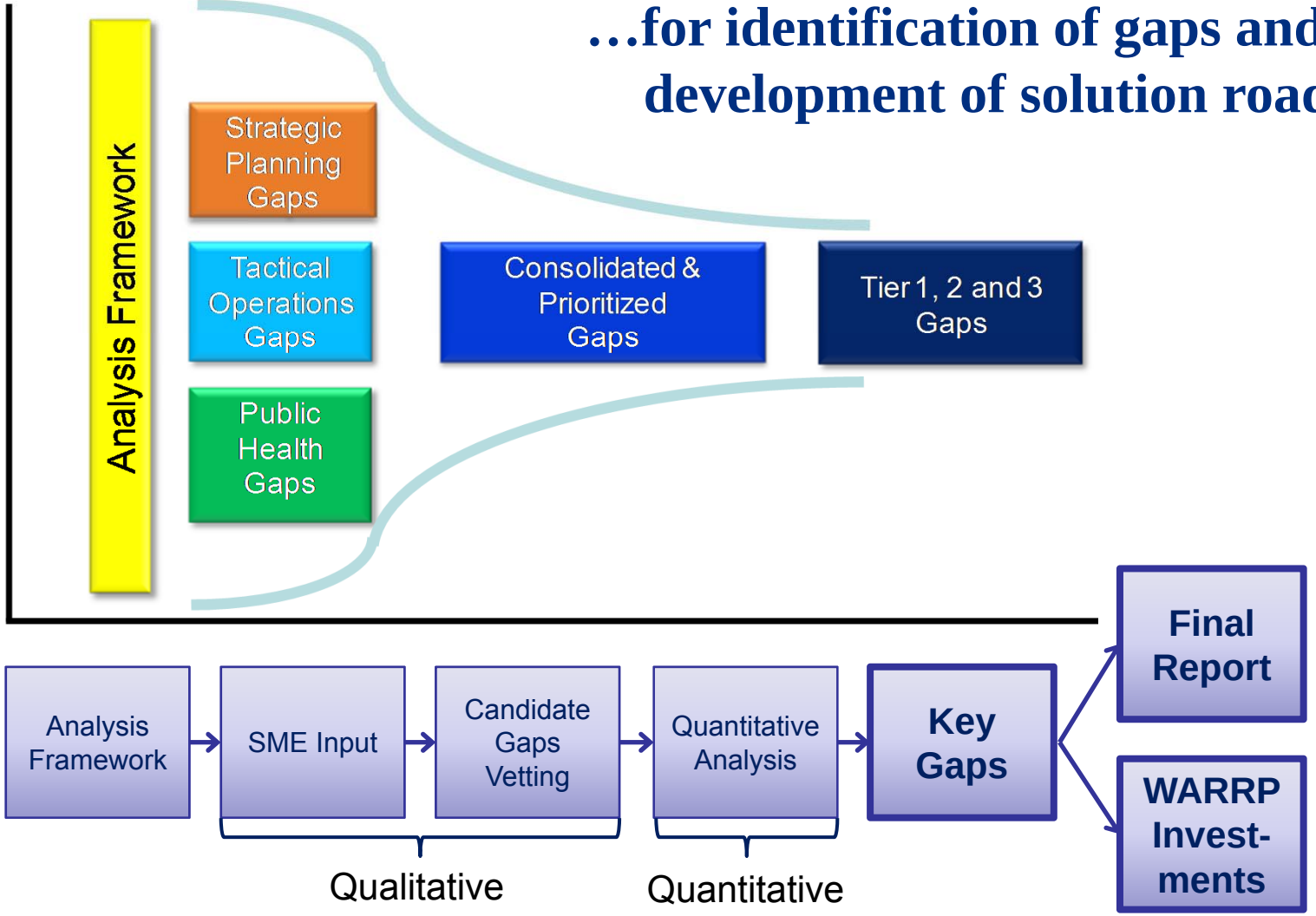
System Study Objectives

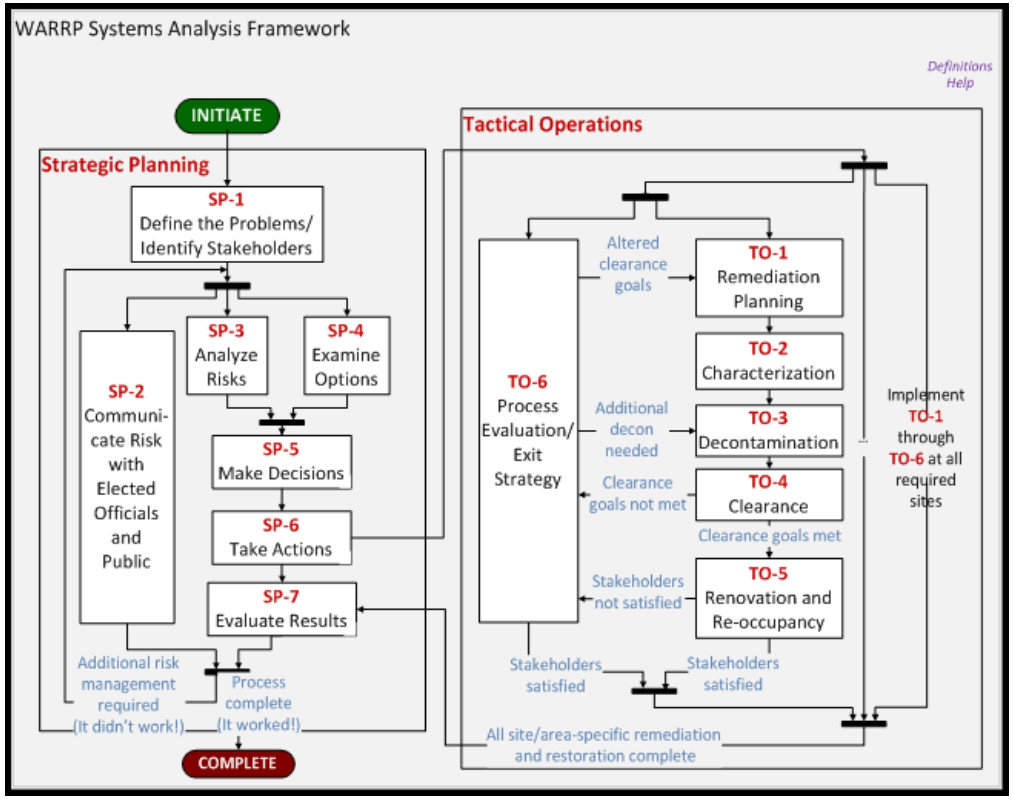
- **Recovery Process Definition**
  - obtaining a clearer understanding of the recovery process
- **Gap Identification**
  - systematic determination of where recovery process gaps exist
- **Gap Solution Identification**
  - assessment of potential solutions in terms of time frame and complexity
- **Clarification of Next Steps**
  - an actionable plan for development of gap solutions at local and federal levels

A systematic analysis of wide-area recovery processes…

…for identification of gaps and development of solution roadmap



A high-level recovery framework…



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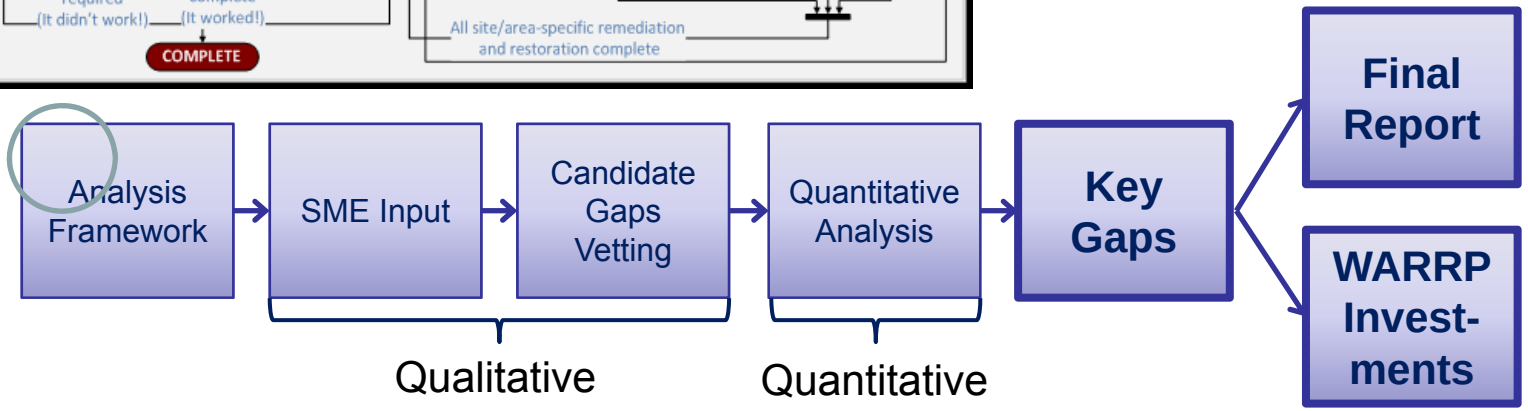
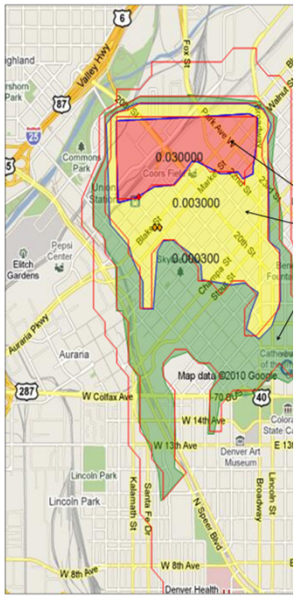
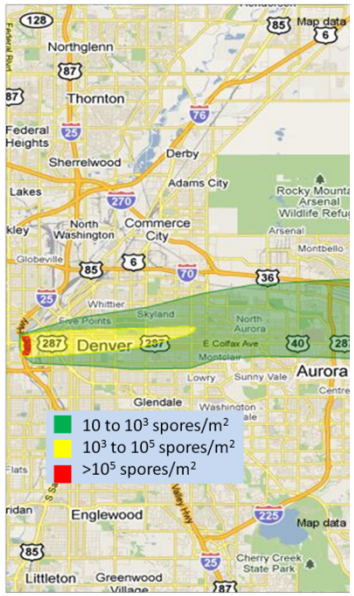


WARRP Scenarios…

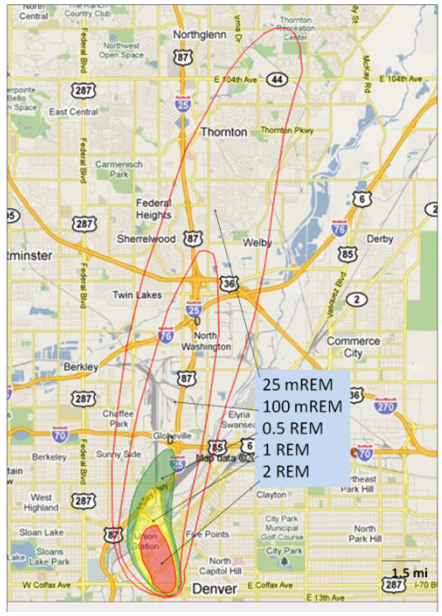
Coors Field Chem Scenario



Downtown Bio Scenario



Downtown RDD Scenario



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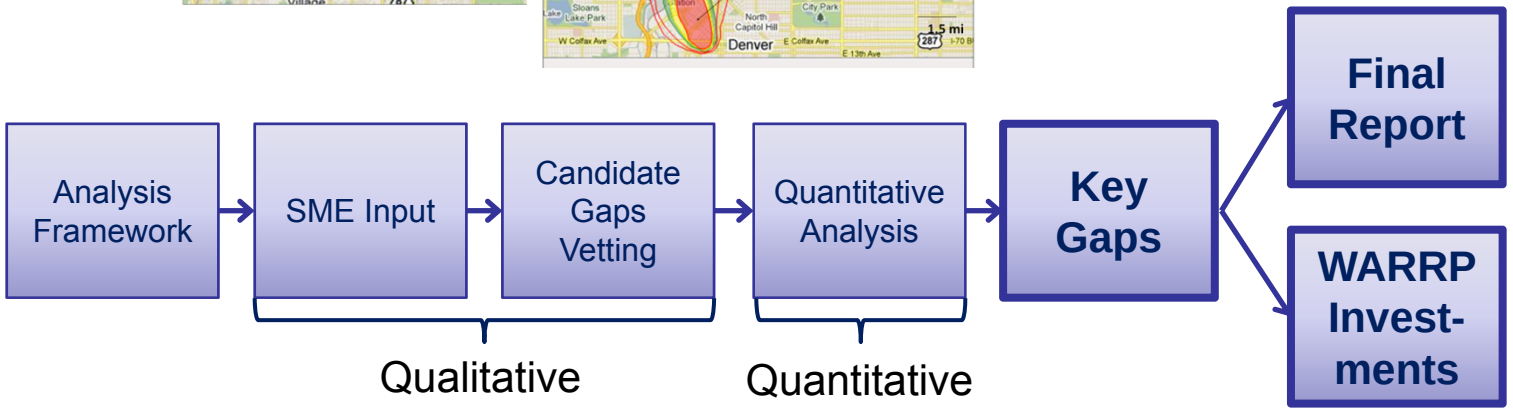

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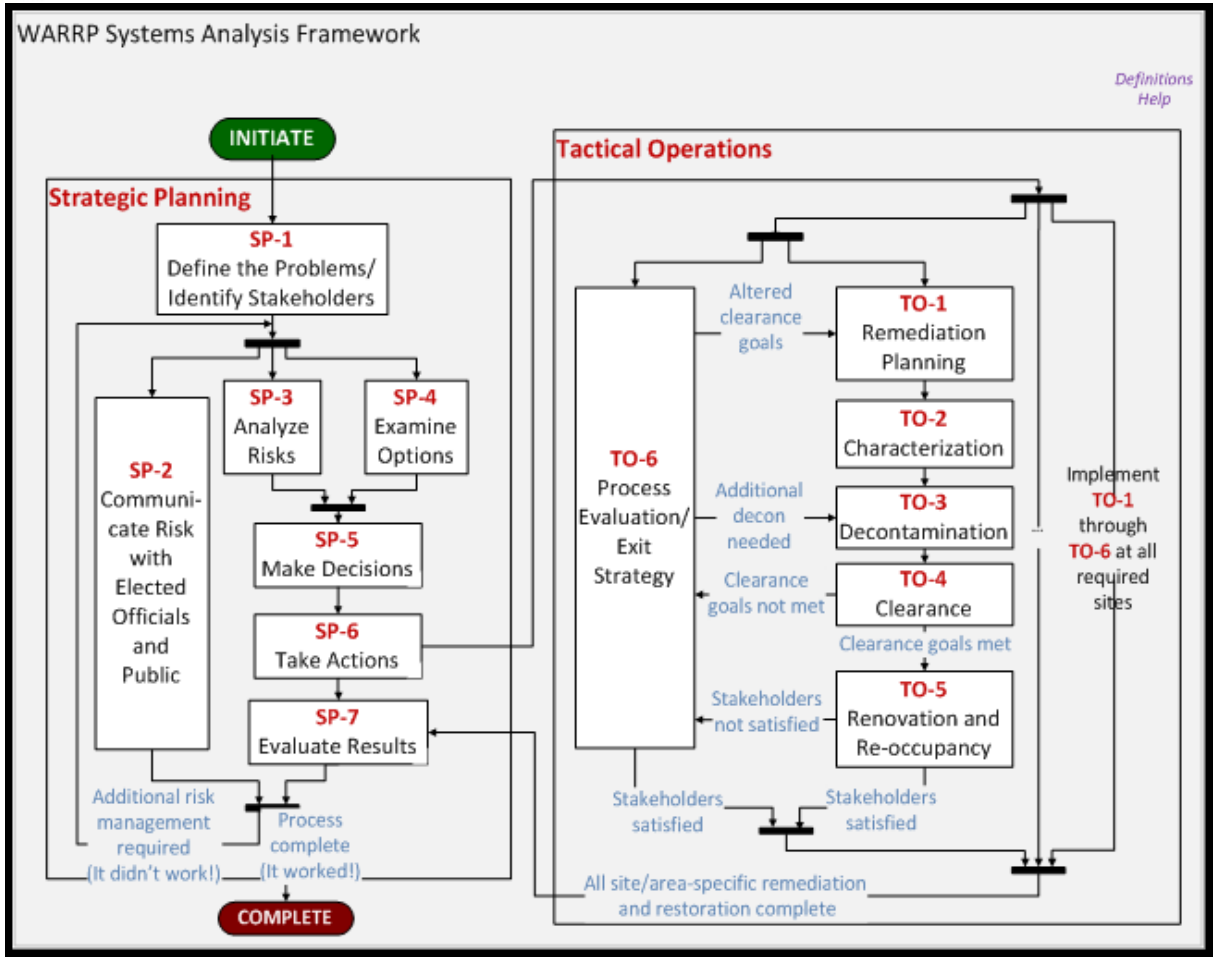

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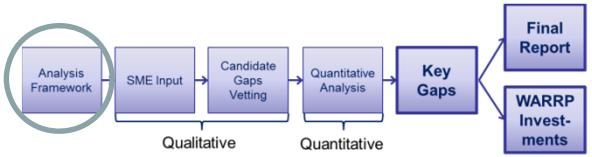

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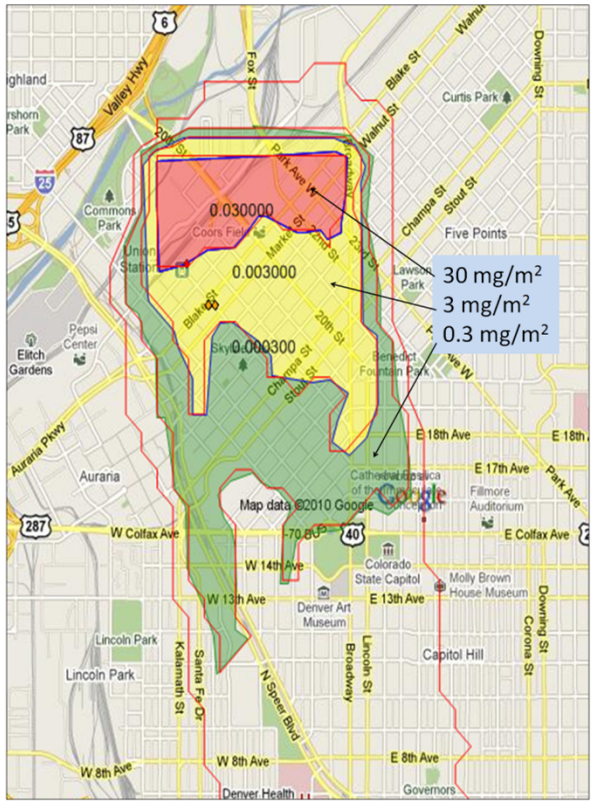

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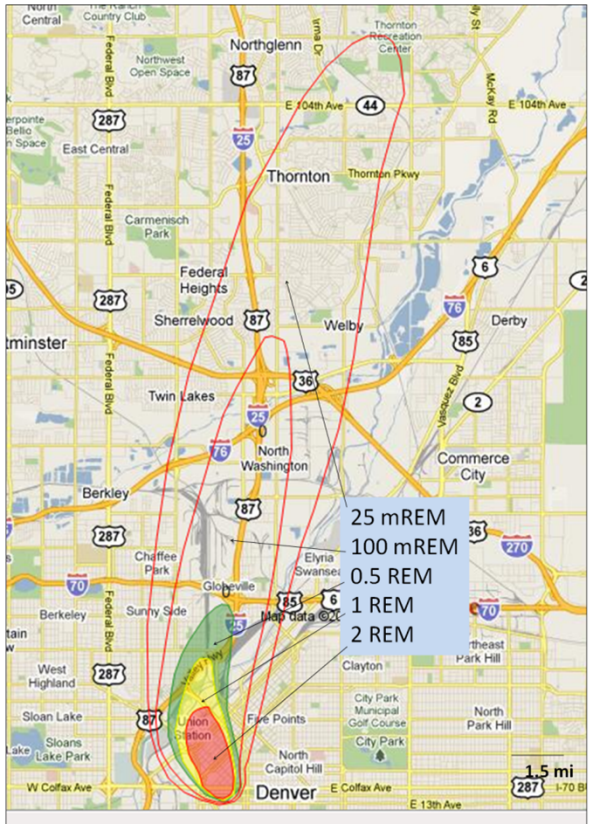
Downtown RDD Scenario



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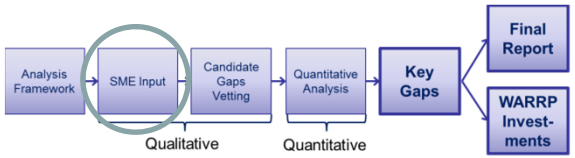


Workshops identified gaps in various phases of recovery…

Denver UASI Workshop - Recovery Strategy

- Local and state recovery stakeholders
- Identified strategic gaps in the overall recovery process
- Example strategies include: area prioritization, recovery objectives (e.g. rapid economic restoration, minimize public health risk)

U.S. EPA Workshop - Remediation Tactics

- Technical subject matter experts in recovery
- Identified tactical operations gaps – how to actually do recovery
- Example tactics: best decon practices, waste management approaches, efficient characterization methods

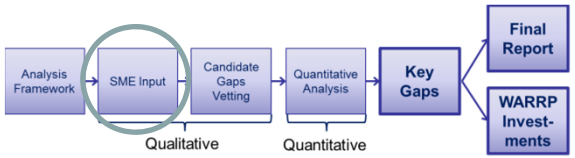
WARRP Tactical Operations Workshop
July 11, 2011

Agenda

Time	Session Title	Presenter/Facilitator
9:00 – 9:10	Welcome and Introduction	Erica Canzler/Chris Russell
9:10 – 9:30	System Study Objectives Scenario Overviews Framework Overview	Wayne Einfeld Dave Franco
9:30 – 10:30	Gaps Assessment: Remediation Planning	Dave Franco
10:30 – 10:45	Break	
10:45 – 12:00	Gaps Assessment: Characterization	Wayne Einfeld
12:00 – 1:00	Lunch	
1:00 – 3:00	Gaps Assessment: Decontamination, Clearance, Renovation and Re-occupancy	Mark Tucker Wayne Einfeld
3:00 – 3:15	Wrap up	Wayne Einfeld

Public Health Workshop

- General population and recovery workers included
- Identified public, mental, and behavioral health issues in long-term recovery phase
- Culmination of ongoing Public Health Working Group discussions within the WARRP program



A fourth workshop vetted and prioritized gaps and brainstormed solutions…

Federal Workshop - Vetting and Prioritization

- Discussed, vetted, refined prospective gaps across strategic planning and tactical operations
- Categorized gaps as strategic, tactical, or public health
- Prioritized gaps
- Brainstormed solutions to the most important gaps

Tier 1

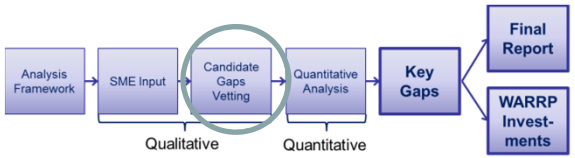
- Strongly impacts recovery efficiency (overall timeline/cost, public health, economic recovery, etc.)
- Multiple stakeholders indicated the gap is high priority
- No gap solution currently exists

Tier 2

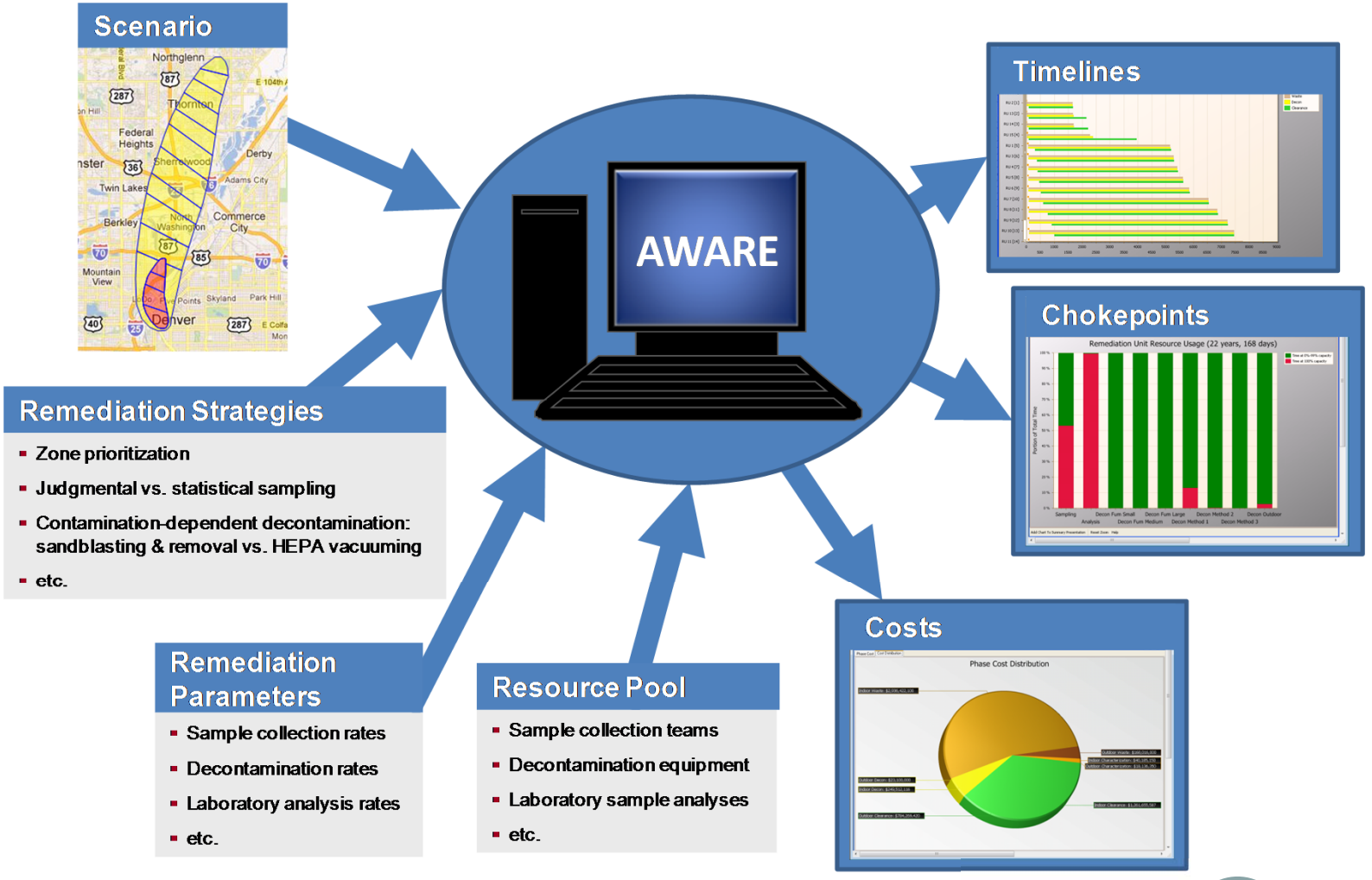
- Impacts recovery efficiency and/or public trust
- One or more stakeholders indicated the gap is highest priority
- Options exist to solve the gap, but are not optimal or scalable

Tier 3

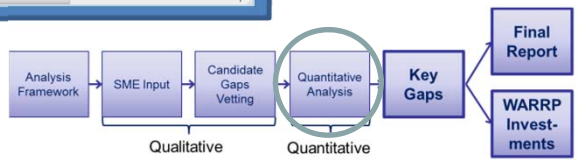
- Impacts limited/targeted aspects of recovery
- One or more stakeholders indicated the gap is high priority
- Options exist to solve the problem with some improvement in overall recovery



Quantitative analysis corroborated and further refined gaps…

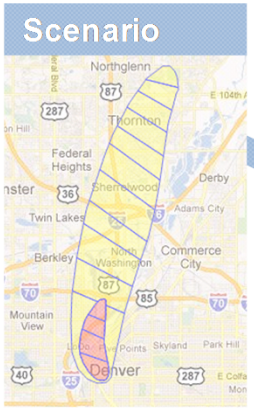


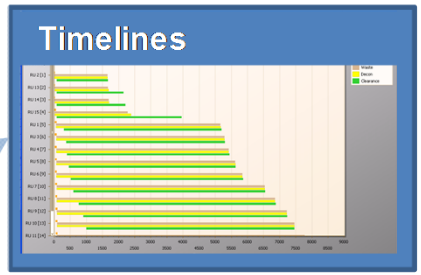
Elements of the AWARE tool used in the quantitative analysis.

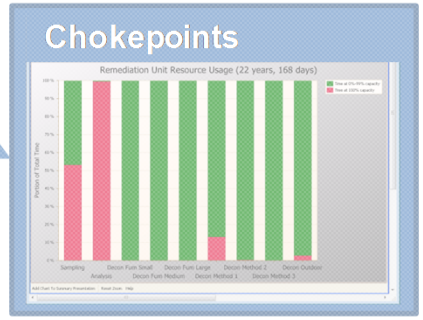


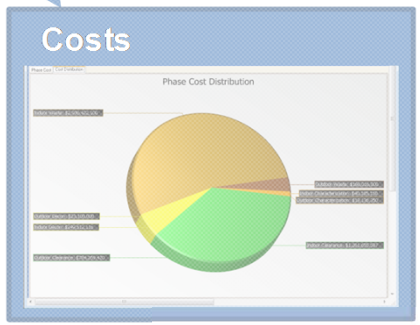
Quantitative analysis corroborated and further refined gaps…

Timelines were corroborated.









Remediation Strategies

- Zone prioritization
- Judgmental vs. statistical sampling
- Contamination-dependent decontamination: sandblasting & removal vs. HEPA vacuuming
- etc.

Remediation Parameters

- Sample collection rates
- Decontamination rates
- Laboratory analysis rates
- etc.

Resource Pool

- Sample collection teams
- Decontamination equipment
- Laboratory sample analyses
- etc.

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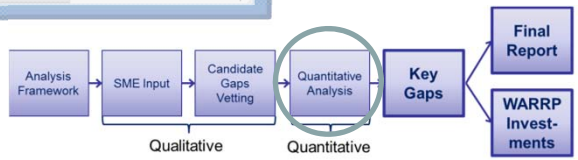

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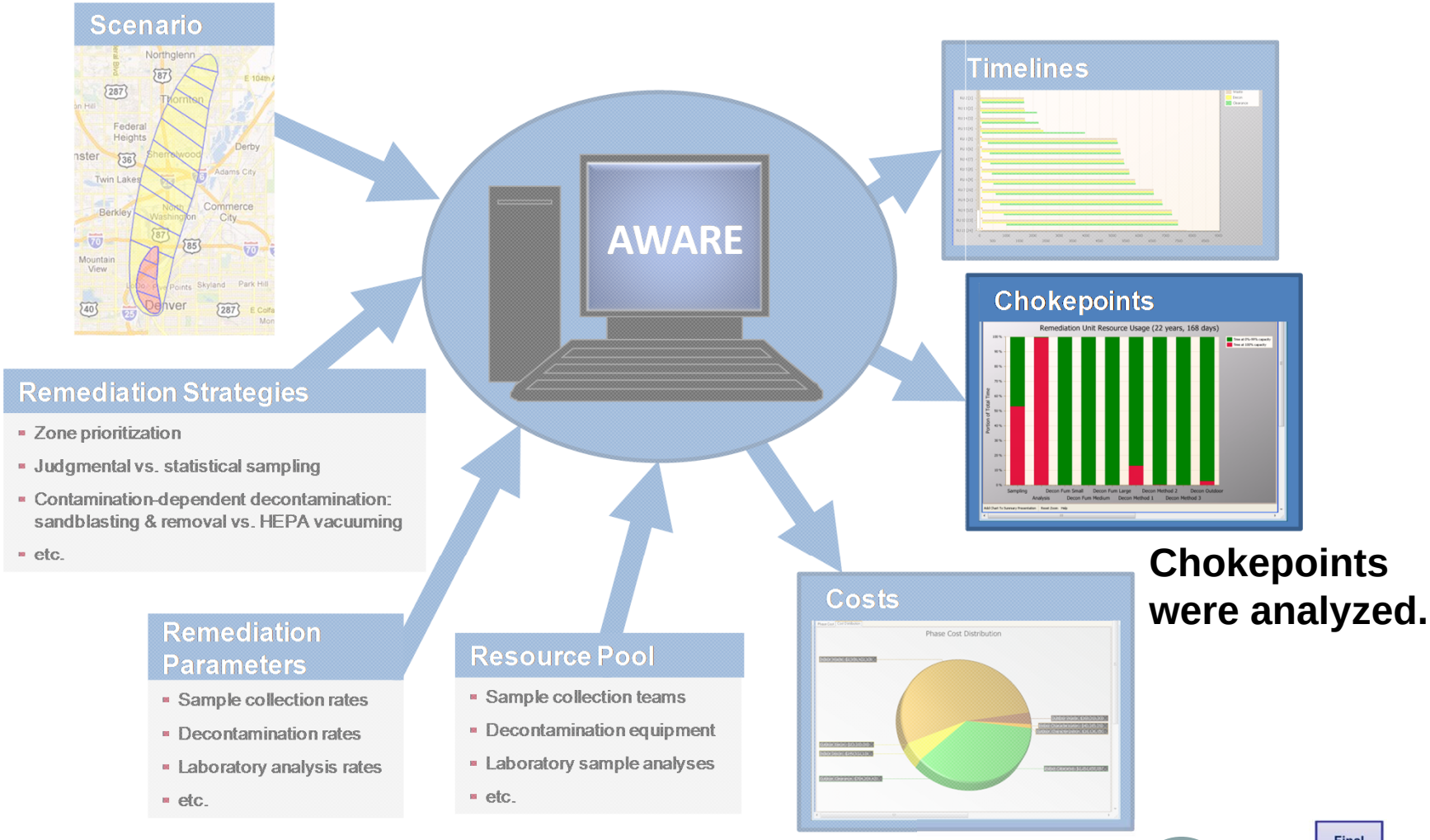

Chokepoints were analyzed.

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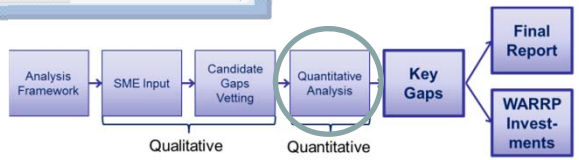
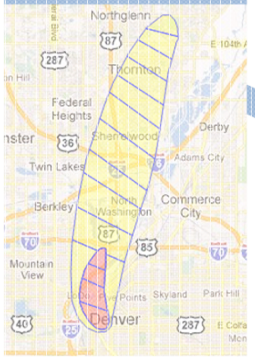


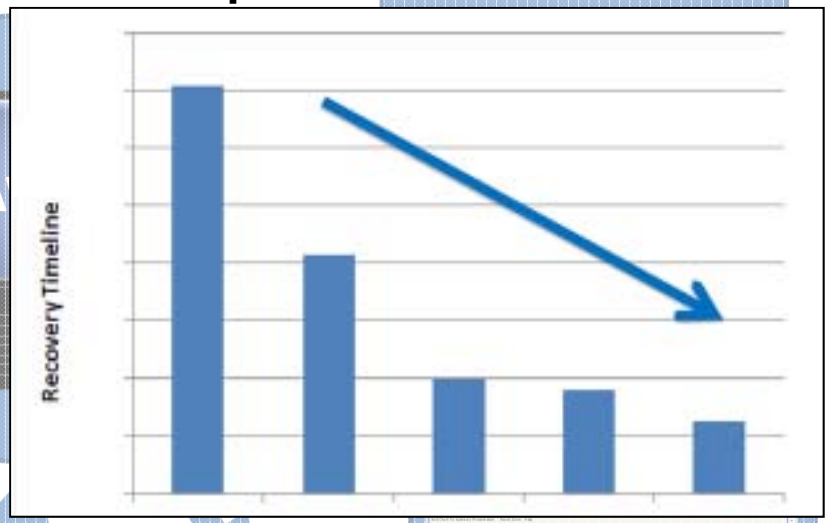
Quantitative analysis corroborated and further refined gaps…

Recovery strategies were compared.

Scenario



Timelines



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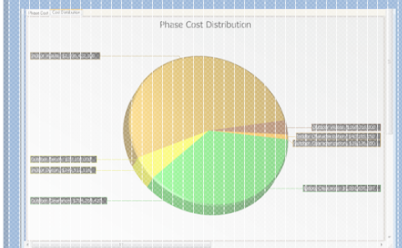
Costs



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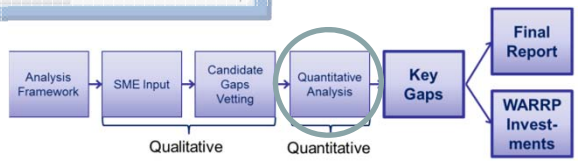
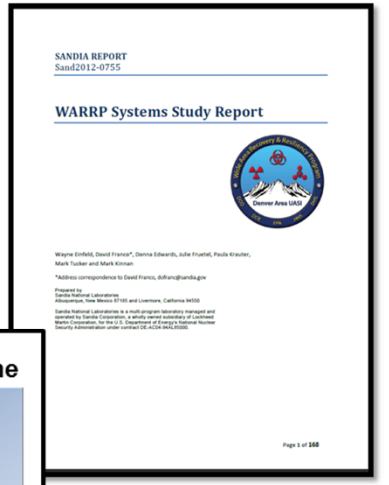
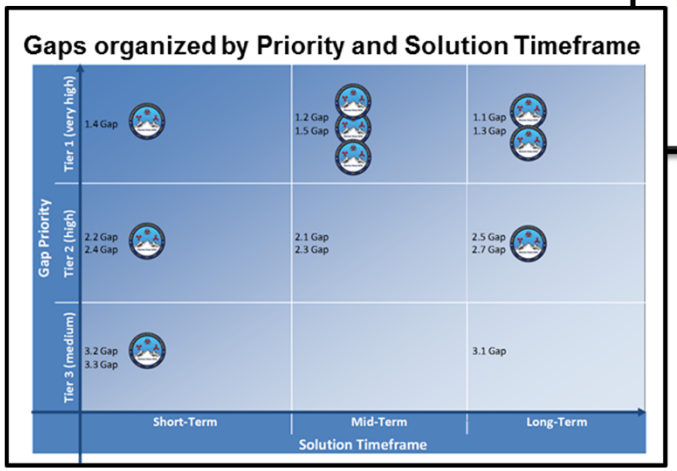


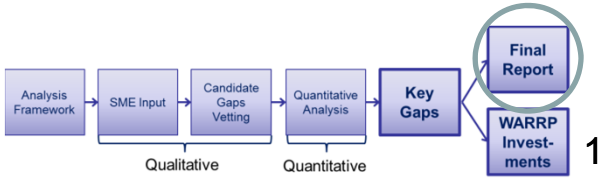
Completed Report

- **Drafted report** and received feedback including 200+ comments
- Reviewed and **addressed all comments**
- Published WARRP System Study **Final Report**


SANDIA REPORT
Sand2012-0755

WARRP Systems Study Report

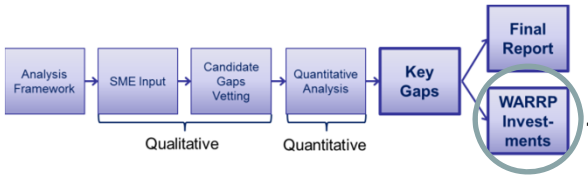




WARRP System Study Recommendations

Key Recommendation:

Develop and implement a multi-pronged strategy to improve wide-area CBR recovery preparedness.



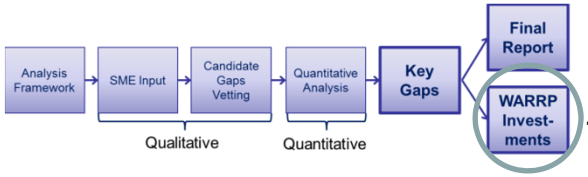
WARRP System Study Recommendations

Key Recommendation:

Develop and implement a multi-pronged strategy to improve wide-area CBR recovery preparedness.

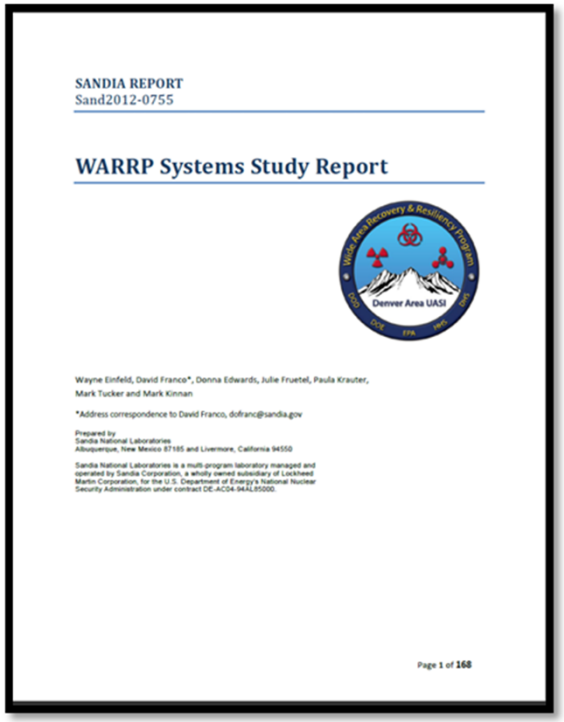
In addition, the following recommendations are provided:

- **Additional programs focused on the recovery and remediation of wide areas** should be implemented, as many gaps persist that will severely limit a region's ability to recover from a CBR incident.
- These programs must **engage a broad set of stakeholders**, including the public and private sector, and **encompass the full scope of recovery**, including public health, social, and economic aspects.
- Investments focused on **improving interagency coordination should be pursued immediately**. This will increase awareness of available resources, clarify existing policies and processes, and identify shortfalls.
- Investments in **scientific studies, methods development, and technology specific to CBR remediation should be made** to address critical gaps in these areas.



Summary

- Successfully completed 9 month study to identify and prioritize key performance gaps and potential solutions within wide-area CBR recovery planning and operations.
- Through a series of workshops and analysis activities, twenty-five high-level gaps across regional risk management, site-specific remediation, and long-term public heath were identified.
- Final report provides comprehensive documentation and reference for wide-area CBR recovery preparedness.



SANDIA REPORT
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WARRP Systems Study Report

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*Address correspondence to David Franco, dofranc@sandia.gov

Prepared by
Sandia National Laboratories
Albuquerque, New Mexico 87185 and Livermore, California 94550

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System study results used to inform WARRP program activities, as well as the national research agenda for improving long-term recovery from domestic chemical, biological, and radiological events