Contaminants of Emerging Concern:
Linking Science to Effective Action

CONTAMINANTS OF
EMERGING CONCERN

RMSAWWA/RMWEA

2009 Joint Annual Conference

September 14, 2009

Carol E. Lyons, Sara A. Klingenstein, Sarah B. Lade, Kristin Brubaker, Institute for Environmental Solutions

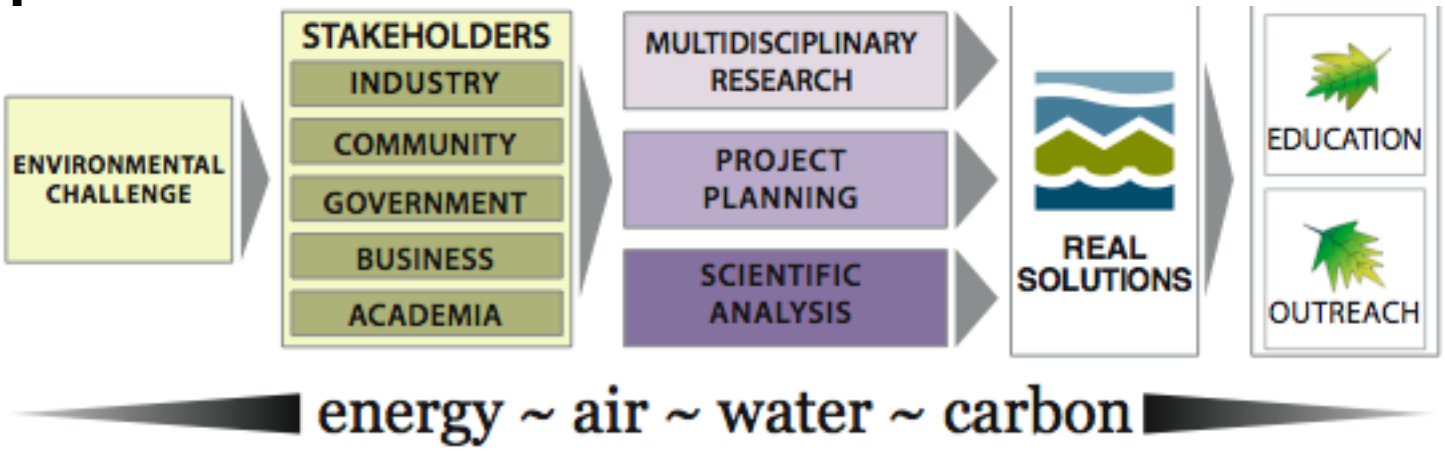
© 2009 Institute for Environmental Solutions. All rights reserved.

INSTITUTE FOR ENVIRONMENTAL SOLUTIONS

Mission

Engage stakeholders to deliver proactive, technically sound solutions to complex environmental and natural resource problems that avoid unwanted side effects.

Approach



Solutions to the CEC Problem

1) Traditional: End of pipe treatment
   - Reactive
   - Difficult, expensive, variable effectiveness
2) Regulation: Control
   - Reactive
   - Expensive, ineffective, time consuming
3) **Source reduction: Prevention**
   - **Proactive**
   - **Cheap, safe, quick**

CEC Source Reduction

- CEC Source: Consumer activity
- Reduction approach: education
- Cultivates informed consumer base
  - Advances regulation through public demand
  - Promotes R&D through citizen and consumer values, and reduces need for new technology

The CEC Project: CEC Source Reduction

- Pilot project in the City of Golden, Colo.
- Reduce CECs through public education
- Identify easy but consequential recommendations
- Two evaluative measures

The CEC Project

Stakeholders

Background Research

"Before" Sampling

"Before" Surveys

Education

"After" Sampling

"After" Surveys

Evaluations

Recommendations

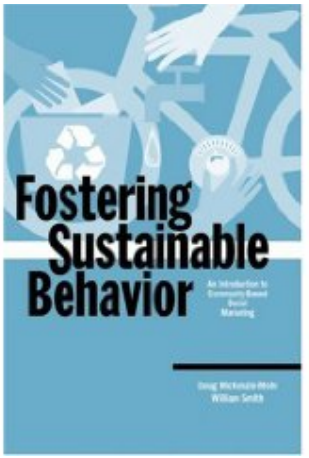
Replication

The CEC Project: Education and Outreach

- Information alone often has little effect on behavior
  - Households that received and read an in-depth handbook on water efficiency made no changes to water consumption
- Economic self-interest fails to motivate
  - California utilities spend $200 million annually on media advertising how energy conservation saves money; little effect on energy use

The CEC Project:
Community-Based Social Marketing

- A proven framework for designing active, targeted education and outreach campaigns to foster sustainable behavior
- Carried out at community level
  - Direct involvement
- CBSM provides a set of tools



McKenzie-Mohr, Doug, and William Smith. **Fostering Sustainable Behavior**. Gabriola Island, BC: New Society, 1999.

www.cbsm.com

The CEC Project:
Designing effective education and outreach

- Make no assumptions
  - Focus groups and surveys
- Literature review

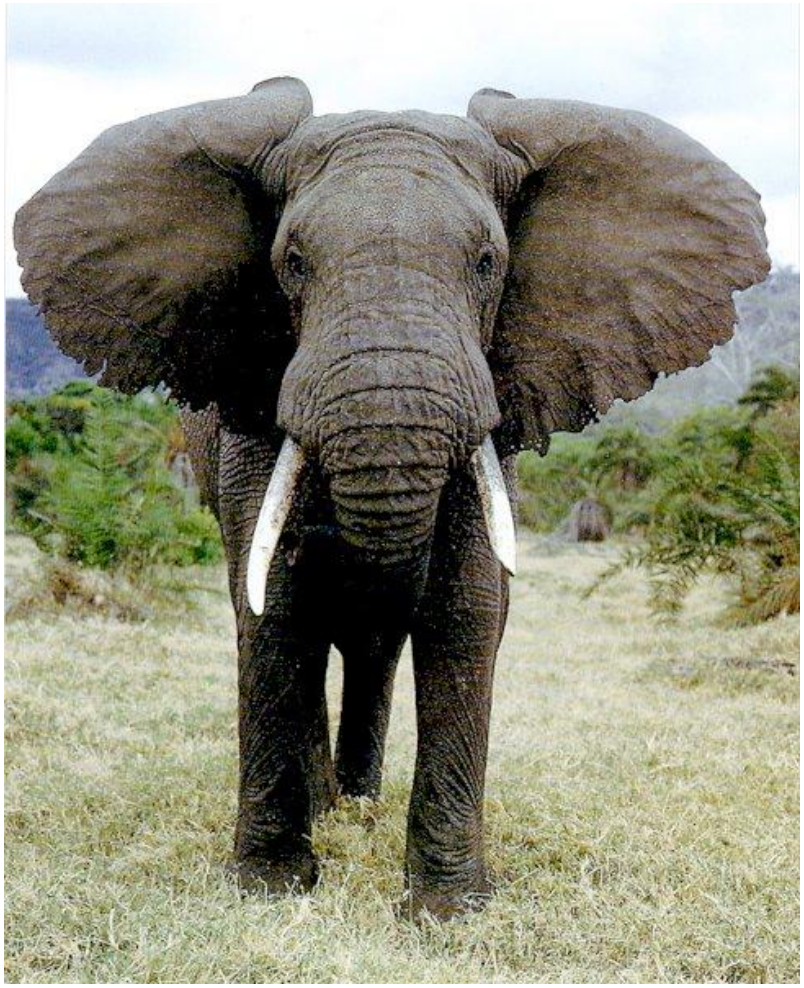
The CEC Project:
Tools for fostering sustainable behavior

Gathering commitment – from intention to action, recruiting *intention* from people.

–Proven in the past: Making a commitment increases likelihood of change

–For CEC Project: Ask people to sign a pledge to reduce use of certain products

The CEC Project:
Tools for fostering sustainable behavior, ctd.



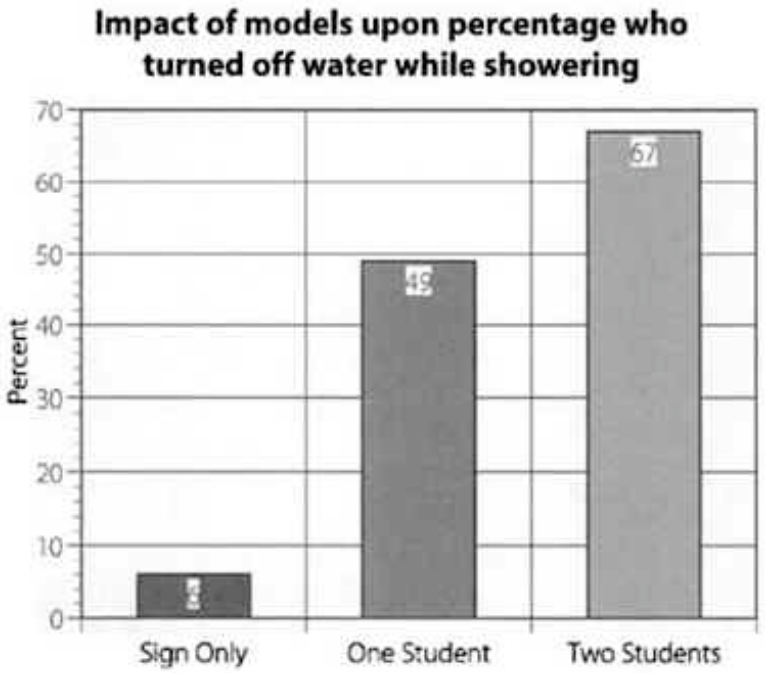
Prompts – remembering to act sustainably, a reminder present with people when making relevant decisions.

- Proven in the past:
  - Recycling reminders over bins
  - Littering reduction
- For CEC Project: grocery pads with pre-printed info, wallet cards.

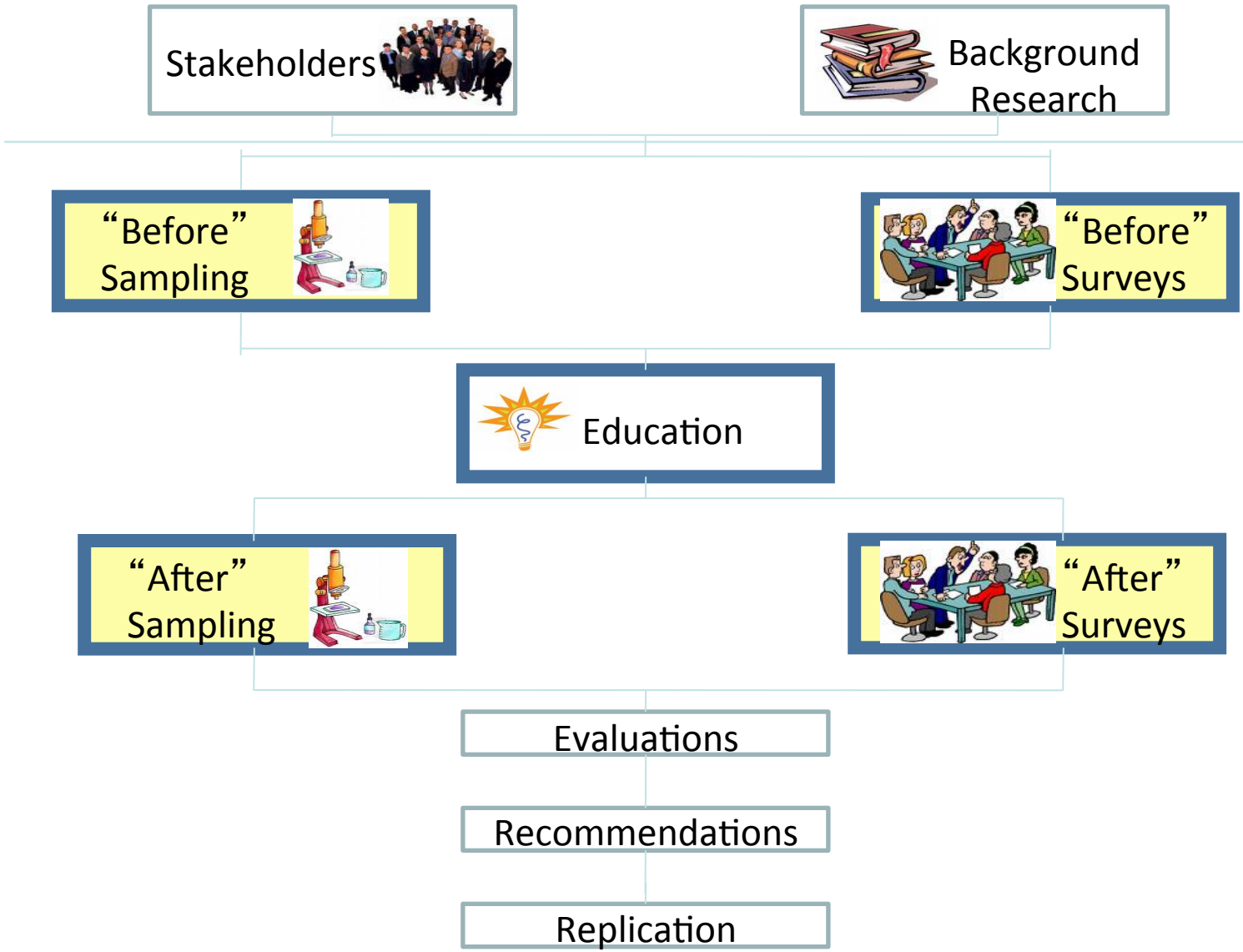
The CEC Project:
Tools for fostering sustainable behavior, ctd.

Norms – building community support

- Proven in the past:
  - Water conservation in showers
- For CEC Project:
  - Challenge groups with mothers
  - School curriculum



The CEC Project: Evaluative Measures



The CEC Project:
Evaluation measures

Chemical Analysis of Wastewater Samples

Robert Young and Thomas Borch, Colorado State University:
Liquid chromatography-tandem mass spectrometry (LC-MS/MS) using electrospray ionization

Mark A. Murphy, U.S. EPA Region 8 Lab, Golden, CO:
Direct inject method for PPCPs in water

Partial List of Compounds
Atrazine
Benzophenone
Butylated hydroxyanisole (BHA)
BPA (bisphenol A)
Caffeine
Methylparaben
Musk ketone
Nonylphenol
Octylphenol
Triclosan

The CEC Project:
Evaluation measures, ctd.

Community surveys

- 300 - 500 surveys, before and after education campaign
- Determine changes in awareness and reported behavior
- "After" survey asks whether respondent was affected by campaign

The CEC Project:
Project Analysis

- First phase of pilot project
  - Limited funds
  - Limited time
- Non-quantifiable results
  - Community educates us on how to be better community educators in the future

Future Plans/Recommendations

- ChemicalFootprint.org
- Pharmaceutical compounds: used vs. unused
- Unused pharmaceutical disposal – scientific/economic analysis of alternatives
- Collaboration
- Comments and suggestions

Conclusions

- Important to compare virtues of chemical compounds with their eventual environmental and health costs
- Important to have realistic approach on how to use limited resources to produce greatest environmental benefits
- Cheaper and easier to keep CECs from ever entering waterways than to treat later, and problem is still young

www.i4es.org/emerging.html

INSTITUTE FOR ENVIRONMENTAL SOLUTIONS

CONTAMINANTS OF EMERGING CONCERN

IES
761 Newport Street
Denver, CO 80220
303-388-5211
Solutions@i4es.org

Carol Lyons
Executive Director
Carol@i4es.org

Sara Klingenstein
Research Associate
Sara@i4es.org

Carol E. Lyons, Sara A. Klingenstein, Sarah B. Lade, Kristin Brubaker, Institute for Environmental Solutions

© 2009 Institute for Environmental Solutions. All rights reserved.