Tackling Contaminants of Emerging Concern Through Youth Education and Community Prevention

Institute for Environmental Solutions

The Institute for Environmental Solutions (IES) is an independent non-profit organization that engages stakeholders to deliver technically sound solutions to complex environmental and health problems – without unwanted side effects.

Common CECs

Community Based Social Marketing (CBSM)

- Reduce and prevent water pollution at the household level
- Promote water stewardship through existing social networks
- Establish an environmental ethic
- Hands on education on how to reduce your chemical footprint
- Relevant to every day life

IES CEC Project Team Members:
Carol Lyons, Alani Parmet, Bruce Lundgren, Zach Eidhuns

Contact:
www.i4es.org
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Carol Lyons, Executive Director

IES Contaminants of Emerging Concern Project

Mission: Reduce CEC concentrations entering wastewater and reduce human exposure to these contaminants.

CECs: The Challenge

- New and relatively unknown toxins
- Conventional focus on imminent
  - Expensive
  - Limited effectiveness
- New chemicals:
  - Unknown toxicity / impact
  - Lack of screening effectiveness
- Problem: Without a hook, don't see direct effects
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- Gap between scientific research results and public understanding

CECs: What to Do?

CECs: an important challenge to our health and environment

- Community knowledge about CECs and potential harm is very low
- Traditional education / outreach is not effective
- People are willing to change their behavior in response to community-based one-on-one education and outreach
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CEHA Annual Education Conference

September 24, 2014 - Steamboat Springs, Colorado

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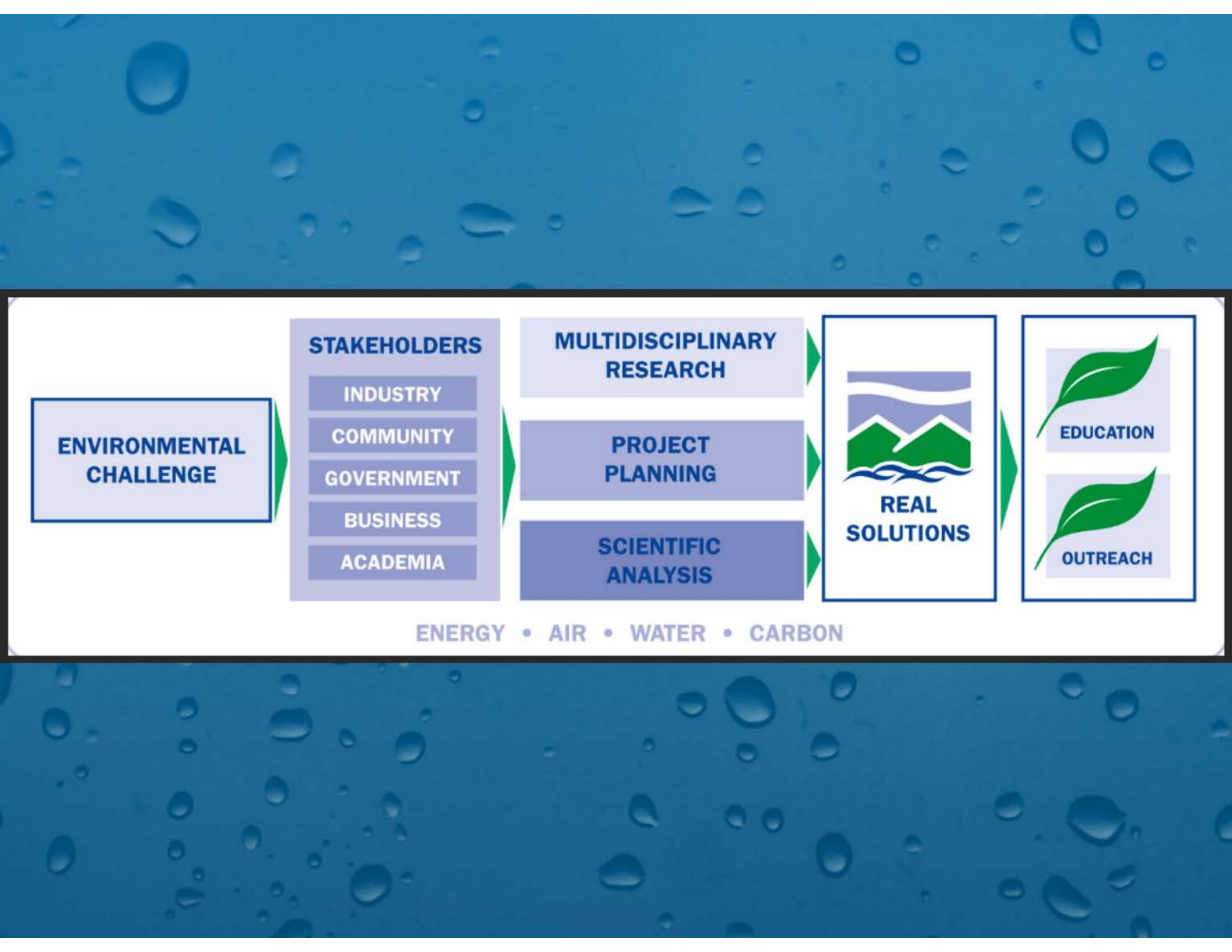
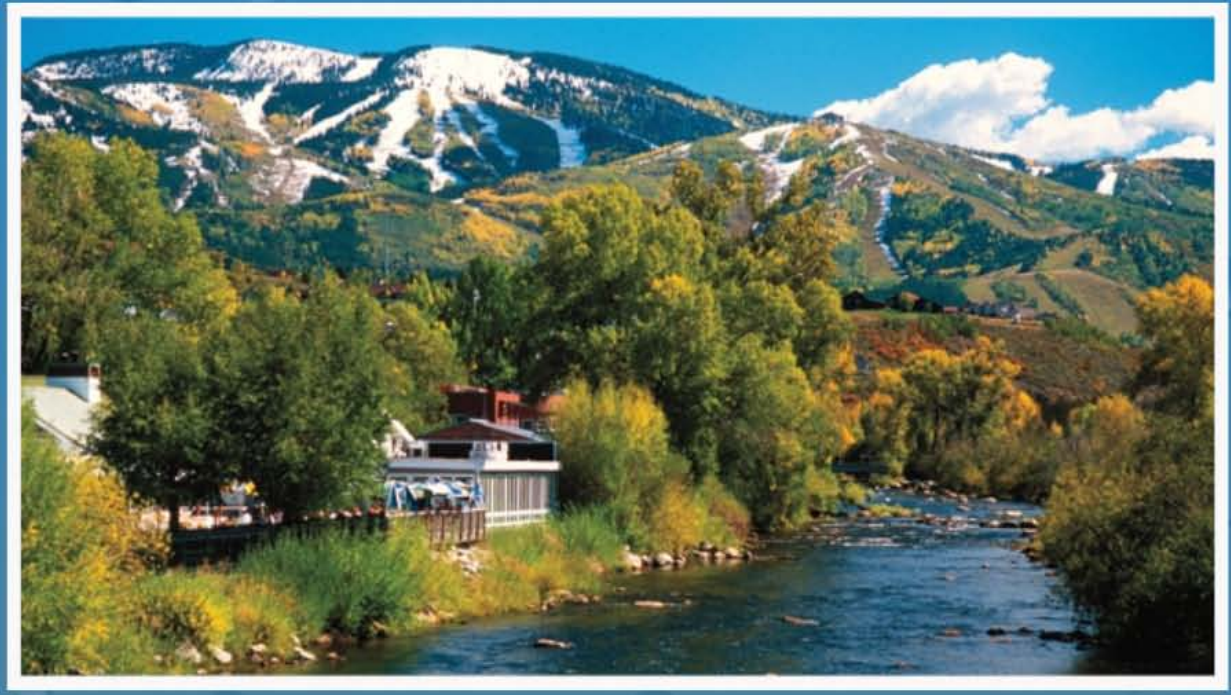

ENVIRONMENTAL CHALLENGE
STAKEHOLDERS
INDUSTRY
COMMUNITY
GOVERNMENT
BUSINESS
ACADEMIA
MULTIDISCIPLINARY RESEARCH
PROJECT PLANNING
SCIENTIFIC ANALYSIS
REAL SOLUTIONS
EDUCATION
OUTREACH
ENERGY • AIR • WATER • CARBON

Goals of our presentation

1. Bring attention to the issue of Contaminants of Emerging Concern
2. Solicit ideas and seek community collaborators



IES
Contaminants of Emerging Concern Project

Mission: Reduce CEC concentrations entering wastewater and reduce human exposure to these contaminants.

Contaminants of Emerging Concern (CECs): New analytical capabilities have allowed scientists to identify chemicals in the environment in extremely small concentrations. CECs are those chemicals that recently have been shown to occur widely in water resources and identified as being a potential environmental or public health risk, and yet adequate data do not exist to determine their risk.

(Drewes and Shore 2001, Younos, 2005)

Scope: Harmful contaminants in personal care, cleaning and household, both indoor and outdoor products (not pharmaceuticals)

IES CEC Project Goals:

- Demonstrate that prevention is better and cheaper than treatment.
- Show kids and adults how to reduce CEC water pollution
- Foster commitment to reduce use of products containing CECs.

What Are CECs?

Chemicals in everyday household products:

- Personal care products
- Cleaning products
- Packaging and food preservatives
- Pesticides
- Flame retardants

Common CECs

CEC	Where it is found	Potential Effects
Triclosan Antibacterial agent		Fish can't reproduce
Nonylphenol Soaps and detergents		
DEET Insect repellant		Increased cancer risk
Synthetic Fragrances Artificial scent		
BPA Plastics		Breathing problems for humans
Oxybenzone Sunscreen		
BHA Food preservative		Development problems in children

Potential Health Risks

- Interfere with endocrine system
- Interfere with development
- Suspected toxins and carcinogens

Where did the boys go?

"Reproductive Disruption in Fish Downstream from an Estrogenic Wastewater Effluent"
2003-2004 Boulder Creek
Sucker fish upstream and downstream of wastewater treatment plant

Downstream:

- 20% both sex organs
- 50% fewer males
- Decrease in size of gonads
- Endocrine-active chemicals

Health impact study results examples

Triclosan and triclocarban
Aquatic animals - reproductive and endocrine disorders
Bacterial resistance in humans

Surfactants
Toxic to aquatic life
Harm reproductive organs in fish

BPA
Endocrine disruptor
Effects in fish, aquatic invertebrates, amphibians, and reptiles
Human studies: possible impact on hormonal changes

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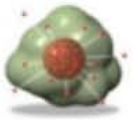
DEET Insect repellant		 Increased cancer risk
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Research limitations

- Chemicals tested on animals and not humans
- Use of dose-response curves to extrapolate
- Few long-term studies
- U.S. government says studies merit further research, not regulation

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CECs: The Challenge *continued*

- Not regulated
- Conventional wastewater treatment does not target or effectively remove
- Stormwater runoff doesn't go through treatment
- NPS pollution
- Low-dose, long-term exposure
- Often the alternatives to harmful contaminants are just as bad

CECs: What to Do?

Drinking Water and Wastewater Treatment

- Expensive
- Limited effectiveness
- Unknown / too many chemicals and degradation products

Thousands of synthetic chemicals – unknown toxicity; too many to screen

Regulation

Add to existing or create new regulations

- Existing system stretched thin
- Lack of scientific certainty
- Lack of political will

Prevention

- Effective
- Low- or no-cost
- Reduce / eliminate harm to human health and the environment
- Individual actions of people can make a difference

Community Based Social Marketing (CBSM)

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- Related to every day life

IES Blue Crew Water Stewards

Mission: Educate 6th graders about CECs and engage them in CEC reduction to prevent water pollution

- Experimentation
- CEC-free product creation
- Use of props
- Foster sustainable behavioral change

Fostering sustainable behavior,

Doug McKenzie-Mohr, www.cbsm.com

- Education alone has little or no effect on sustainable behavior
- Little or no relationship between attitudes or knowledge, and behavior.

Pilot 3-Workshop Series

- BPA – voluntary commitment to reduce chemical footprint
- DEET – aquatic life in Clear Creek (the water supply); make your own DEET-free bug repellent
- BHA – create your own contaminant-free snack

Challenges

- Vocabulary associated with CECs can be complex – the science behind it and the biological effects make it complicated
- Teaching in context: Why should 6th grade students care about CECs?

Solutions

- 9-11 year olds the target age for water and environmental education
- Contaminants that relate directly to students' life
- Coordinated with local and state curriculum

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Community Involvement

Building on Blue Crew

- Scientific information alone is insufficient
- Community members need to know how change will benefit them
- Stakeholder collaboration is the bridge to community support

Case Study: Bismarck, North Dakota

- Nonylphenol contamination
  - Toxic to fish
  - Environmental persistence
  - Endocrine disruptor
  - WWT not effective
- Pretreatment approach – working with local businesses and industry

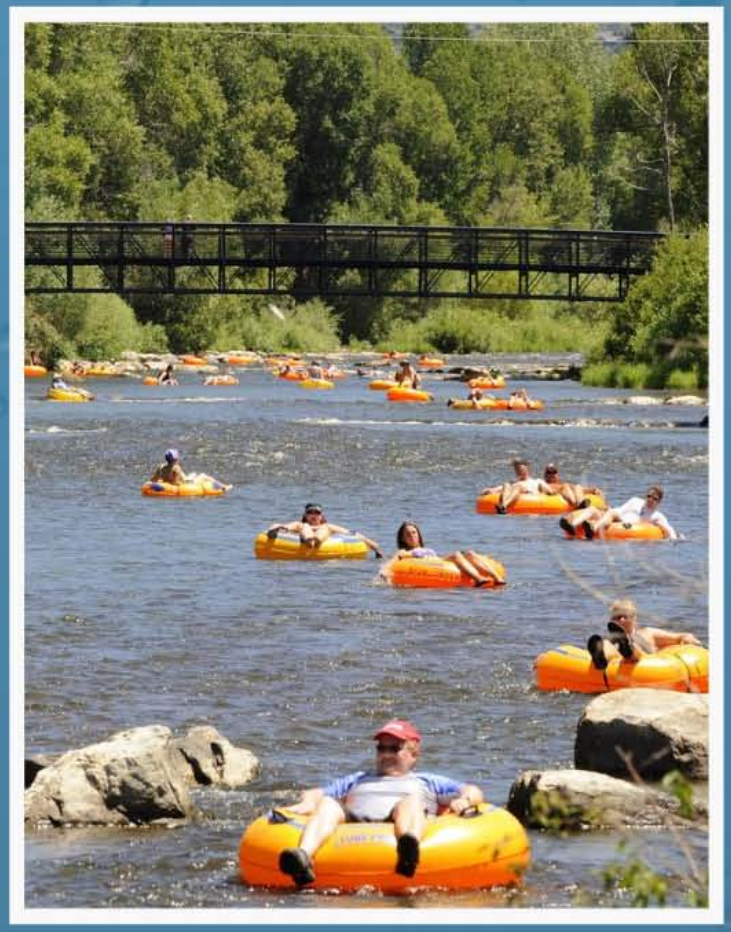
Incorporate CBSM

- Social and community benefits of switching to NP-free detergents
- Not mandatory
- 90% ongoing success

Next Steps

Community partners to collaborate with

Demonstrate prevention is the best option to save our water



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