

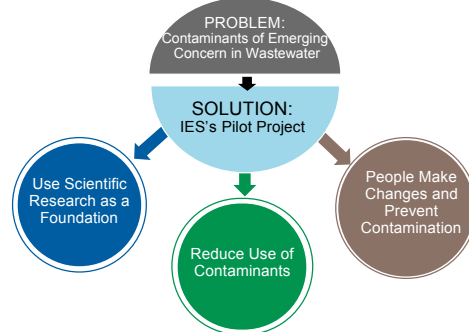


## Eliminating Contaminants of Emerging Concern Upstream: Education and Prevention

Carol E. Lyons, Sarah Horn, Zoe Keve, and Susan Sherrod



## Presentation Overview



## IES's Pilot Project Contaminants of Emerging Concern

Use education and community-based social marketing to mitigate and prevent household and personal care contaminants in the downstream water supply.



## Voluntary Upstream Prevention of Contaminants Provides Numerous Consumer Benefits

### Benefits:

- Is cheap
- Saves consumer money
- Reduces immediate human exposure and potential health impacts
- Reduces wildlife and environmental impact
- Can achieve 100% contaminant reduction
- Has no negative side effects



## Contaminants of Emerging Concern (CECs) Pilot Project Scope

**1. Background Research**

**2. Education**

**3. Water Analysis**

**4. Community Interviews**

## Pilot Project Focused on CECs in Personal Care and Household Products



**Why?**  
Breadth of compounds covers most personal and household sources, pathways, and chemical properties.

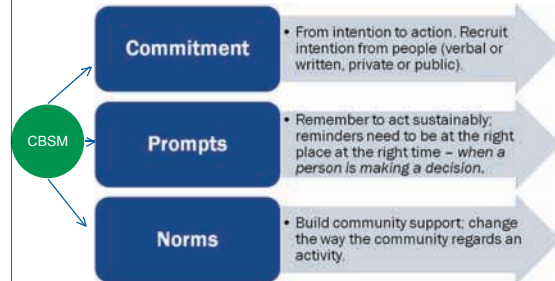
| Target Compounds               |   |
|--------------------------------|---|
| Benzophenone                   | UV blocker  |
| Butylated hydroxyanisole (BHA) | Food preservative   |
| Bisphenol A (BPA)              | Plasticizer (hard, clear plastics; epoxy can linings)           |
| Caffeine                       | Stimulant   |
| Methylparaben                  | Antifungal, used as preservative in personal care products and  |
| Musk ketone                    | Artificial fragrance  |
| Nonylphenol, octylphenol       | Surfactant degradate (in detergents, cosmetics, other products) |
| Triclosan                      | Antimicrobial agent (soap, toothpaste, deodorant, clothing)     |

## Reduce Use of Contaminants Through Community-Based Social Marketing (CBSM)



SOURCE:  
www.CBSM.com

## CBSM's Impact on Behavior Changes



## CEC Education Program

Develop and find CEC-free products and practices  
Products

- Commercial
- Recipes for make-it-yourself

Practices

- Ten Easy Ways to Reduce Your Chemical Footprint



## CEC Education Program

Community workshops

- Where does your water come from?

CECs

- Why do we care?
- Where are they?
- Make your own non-toxic personal care and household products



## CEC Education Program

Provide educational materials

- Wallet cards
- Window posters
- Library and store displays
- Reading list
- Shopping guide

Outreach

- Library
- Stores
- Schools



## CEC Education Program was Successful

CBSM successful

Interactive, hands-on education

- Make your own products
- Free samples

Easy-to-understand and readily-accessible information

- Wallet cards, refrigerator magnets, shopping guide

Make changes in easy, small steps



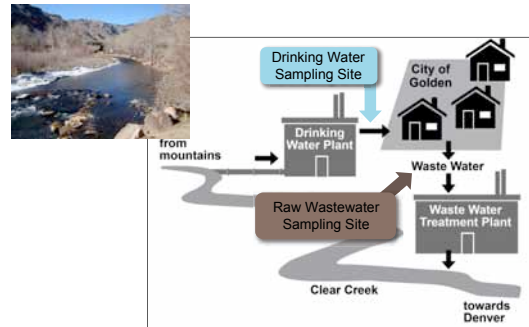
## CEC Education Program Challenges and Limitations

- Workshop scheduling, organization, attendance
- Local store, library, and organization cultivation



13

## Water Analysis



Institute for Environmental Solutions | www.ies.org | Denver, Colorado USA | 01.303.388.5211

14

## Results of Water Analysis

- Detectable levels of contaminants found in wastewater
- No CECs in drinking water except for caffeine
- In this study, the local community is the source of CECs in wastewater
- Analytical methods to analyze raw wastewater still under development

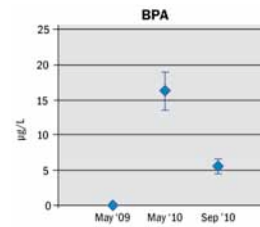


Institute for Environmental Solutions | www.ies.org | Denver, Colorado USA | 01.303.388.5211

15

## Results of Water Analysis

LCMS

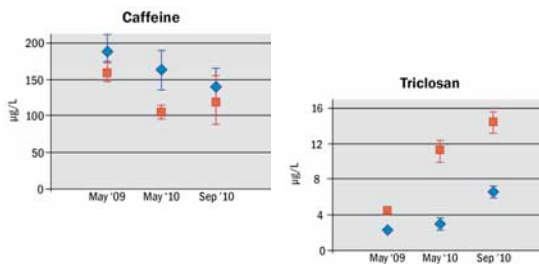


| Sampling Period | Sample number (n) | Preservative (NaN <sub>2</sub> ) used? | Holding time |
|-----------------|-------------------|--|--------------|
| Spring 2009     | 14                | Yes                                    | 13.5 months  |
| Spring 2010     | 4                 | Yes                                    | 3 months     |
| Fall 2010       | 13                | No                                     | 3.5 days     |

16

## Results of Water Analysis

LCMS  
GCMS



17

## Community Surveys and Interviews

- One-to-one in-person surveys:

- 338 surveys conducted in Summer-Fall 2009
- 287 in Summer-Fall 2010
- 625 Total

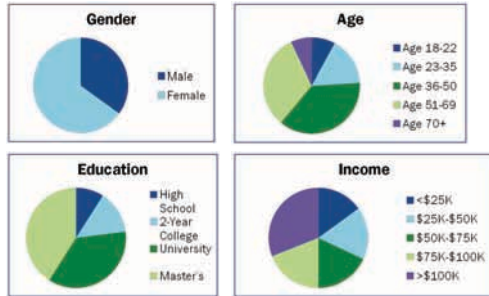


- Initial design to evaluate change in behavior before and after education program
- Scope of survey and scope of education program both too small to provide statistically detectable changes
- Valuable characterization of personal and household habits related to products that contain CECs

Institute for Environmental Solutions | www.ies.org | Denver, Colorado USA | 01.303.388.5211

18

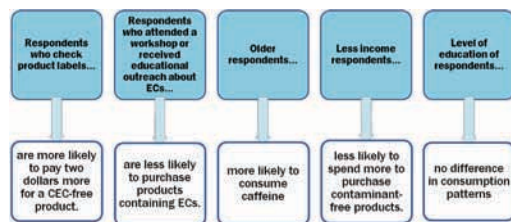
## Key Findings – Survey Respondents



## Key Findings – Personal Habits



## Key Findings - Correlations



## Community Survey - Conclusions

- Community knowledge about CECs and potential harm is very low
- People are willing to change their behavior in response to community-based one-to-one education and outreach
- Survey population probably not representative of the community
- Surveys valuable for a snapshot of the community and some insights



## Pilot Program Conclusions



### LIMITATIONS:

Pilot: very small scale (limited scope) and short term

Difficult to obtain quantitative analytical comparison (water analysis and surveys)

Need better way to measure CBSM effectiveness / behavior changes

- CEC research is critical to support action to reduce pollution
- CEC pollution prevention from personal care and household products is feasible
- IES's CBSM-based outreach and education leads to better water quality and better health

## Pilot Program Conclusions

*"The Institute for Environmental Solutions did a fabulous job. I feel like I am much better equipped now. I have an understanding of what to avoid when purchasing cleaning products and also know how to make my own!"*

-Amy Alcorn, IES Workshop Participant

- People can and will change their habits to reduce and prevent pollution
- Traditional education / outreach is not effective
- CBSM strategies are effective
- Cheaper and easier to keep CECs from entering waterways than to treat downstream

## Making CEC Pollution Prevention Sustainable

### Sustaining Education Program

- How to design, build, and establish an ongoing self-sustaining education program?
  - Build on established groups and programs that want input
  - Who is most likely to benefit and be interested?
  - Children, youth, students
  - Social media, YouTube
  - Examine motivations for adopting sustainable behavior
  - Target topics to interest of audience



## Making CEC Pollution Prevention Sustainable

### Blue Crew Water Stewards

- Promote water stewardship through existing social networks
- Establish an environmental ethic
- Develop a taskforce of local leaders to educate about ECs
- Reduce and prevent water pollution at the household level
- Neighborhood leaders trained to lead "Blue Crews"



## Making CEC Pollution Prevention Sustainable

### [www.ChemicalFootprint.org](http://www.ChemicalFootprint.org)

- Online interactive application – series of questions about everyday household product use
- Identify CECs found in products currently used, safe product alternatives, and educational tips to reduce your chemical footprint
- Receive your "chemical footprint" score based on how much CECs used and exposed to
- Help you make better purchasing decisions in the future



### Thanks

Co-authors: Sarah Horn, Zoe Keve, Susan Sherrod

### Funding:

City of Golden Public Works, Clean Water Network, Colorado Environmental Partnership, Colorado Healthy Rivers Fund, Elizabeth McGeachin McKee Foundation, Metro Wastewater Reclamation District, New Belgium Brewing Company, RBC Blue Water Fund, River Network – Miller Coors, Roche Colorado Corporation, Sea Crest Group

Team members: Patrick DePriest, Meghan Fox, Tony Konowal, Amy Laughlin, Duncan Mole, Heather Schneider, Ariel Scott, Brandon Singletary, Janice Ward



[www.i4es.org](http://www.i4es.org)  
Solutions@i4es.org  
Carol Lyons, Executive Director  
303-388-5211

For You  
Quarterly e-newsletter: [Newsletter@i4es.org](mailto:Newsletter@i4es.org)

Samples: Wallet cards, Top ten list, Bumper stickers

IES 2010 Annual Report

