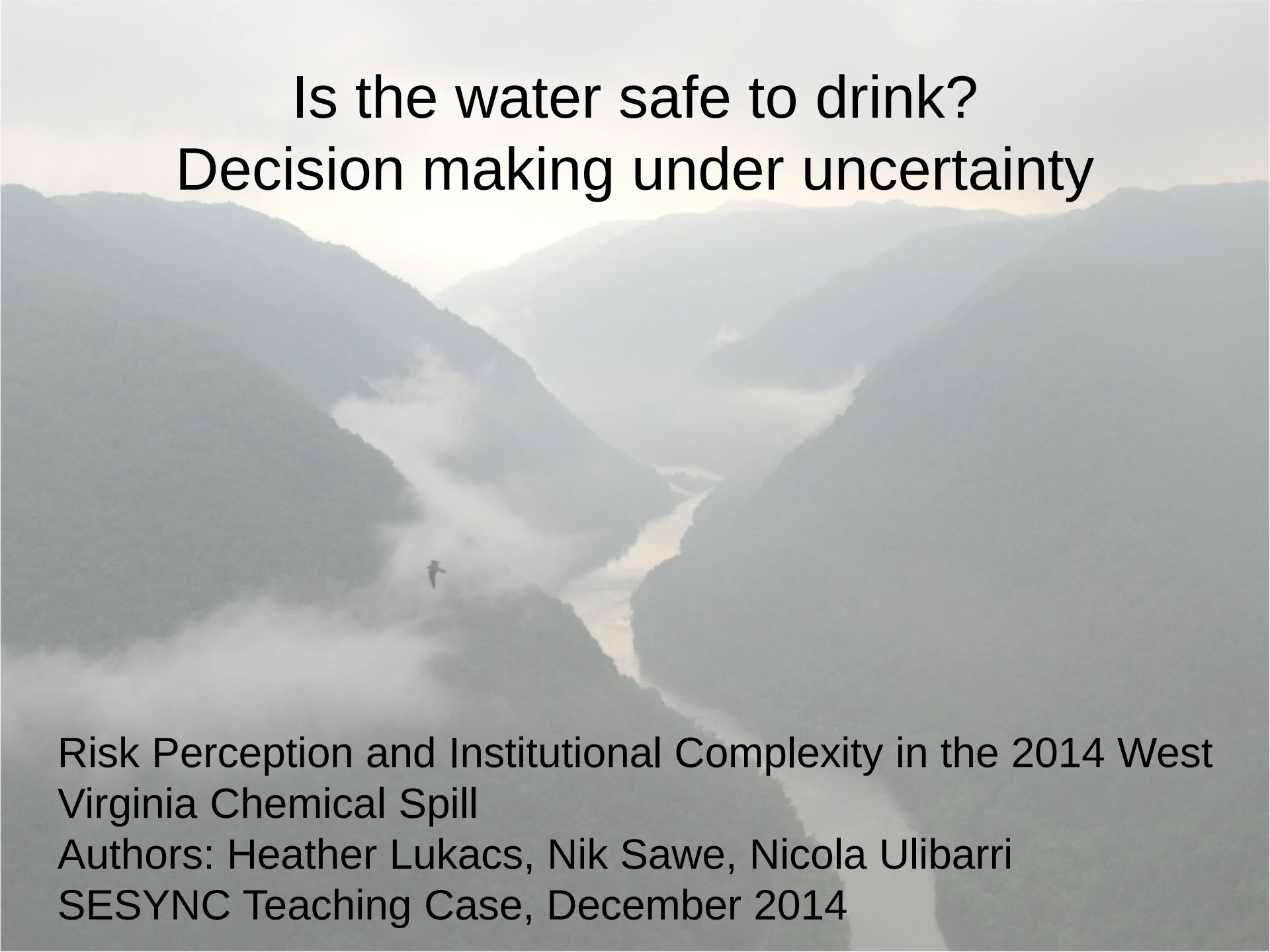


Is the water safe to drink?
Decision making under uncertainty

Risk Perception and Institutional Complexity in the 2014 West Virginia Chemical Spill

Authors: Heather Lukacs, Nik Sawe, Nicola Ulibarri

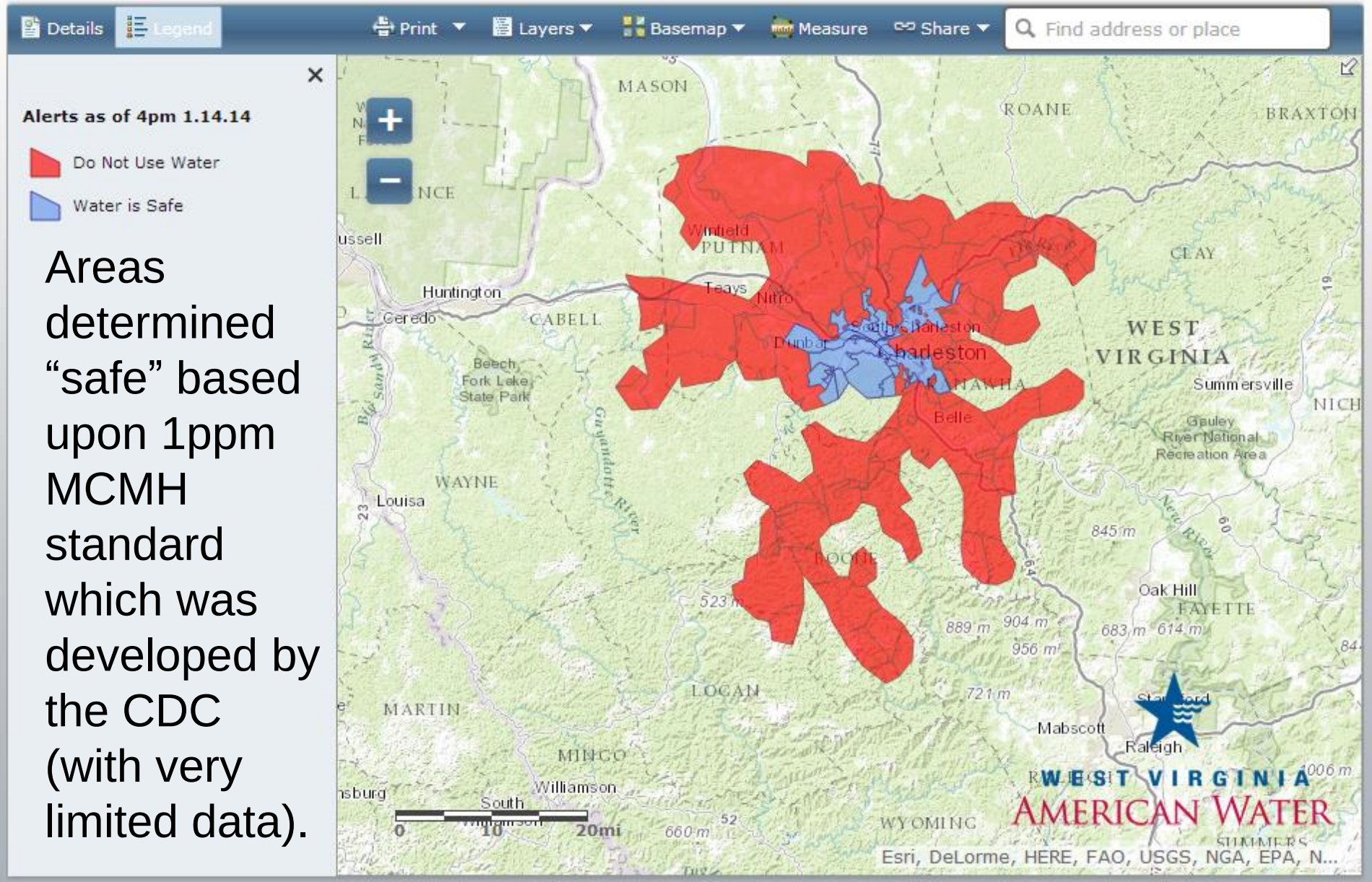
SESYNC Teaching Case, December 2014

Chemical Spill, January 9, 2014

4-Methylcyclohexanemethanol (MCHM)

January 14, 2014

Kanawha Valley Water Safety Status Map



Areas determined “safe” based upon 1ppm MCMH standard which was developed by the CDC (with very limited data).

January 16, 2014

Due to limited availability of data, and out of an abundance of caution, pregnant women may wish to consider an alternative drinking water source until the chemical is at non-detectable levels in the water distribution system. For mothers with babies, there is no research that suggests consuming water with these low levels of MCHM poses any health risk to their baby. However, if you have any concerns, please **consult your doctor**.

http://emergency.cdc.gov/chemical/MCHM/westvirginia2014/

January 20, 2014 Press Conference

“Should we be drinking the water?”

“It’s your decision. If you do not feel comfortable drinking or cooking with this water then use bottled water. I’m not going to say absolutely, 100 percent that everything is safe. But what I can say is if you do not feel comfortable, don’t use it.”

– West Virginia Governor Tomblin

February 17, Recent School Closure(s)

1. Congressional Hearing In Charleston, West Virginia (1:34)
February 10, 2014
Congresswoman Capito: Is the water safe?
WV American Water
https://www.youtube.com/watch?v=OadFXDi62b8&feature=player_embedded

2. February 6, 2014
West Virginia elementary school cook
Listen from 1:45-3:08
http://youtu.be/AXeYdBWdrAo?t=1m45s

3. Is It Really Safe? Testing West Virginia's Water (5:03)
http://wvpublic.org/post/it-really-safe-testing-west-virginias-water

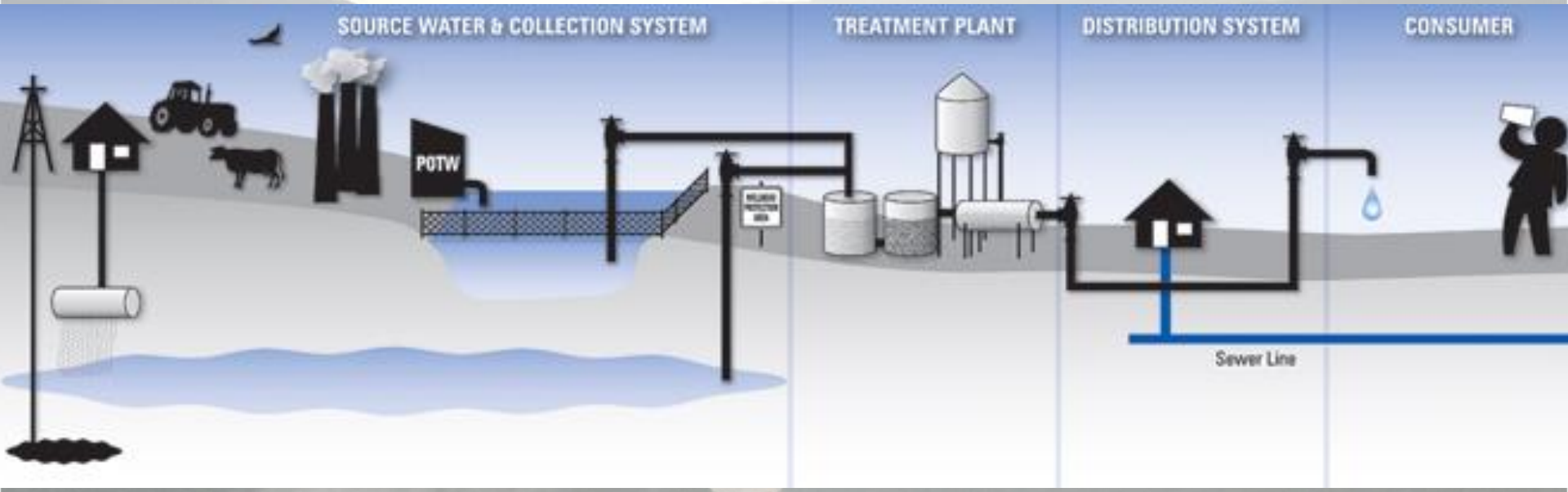
Think/pair/share:

Why were schools closed when no MCHM was detected in the water in the schools?

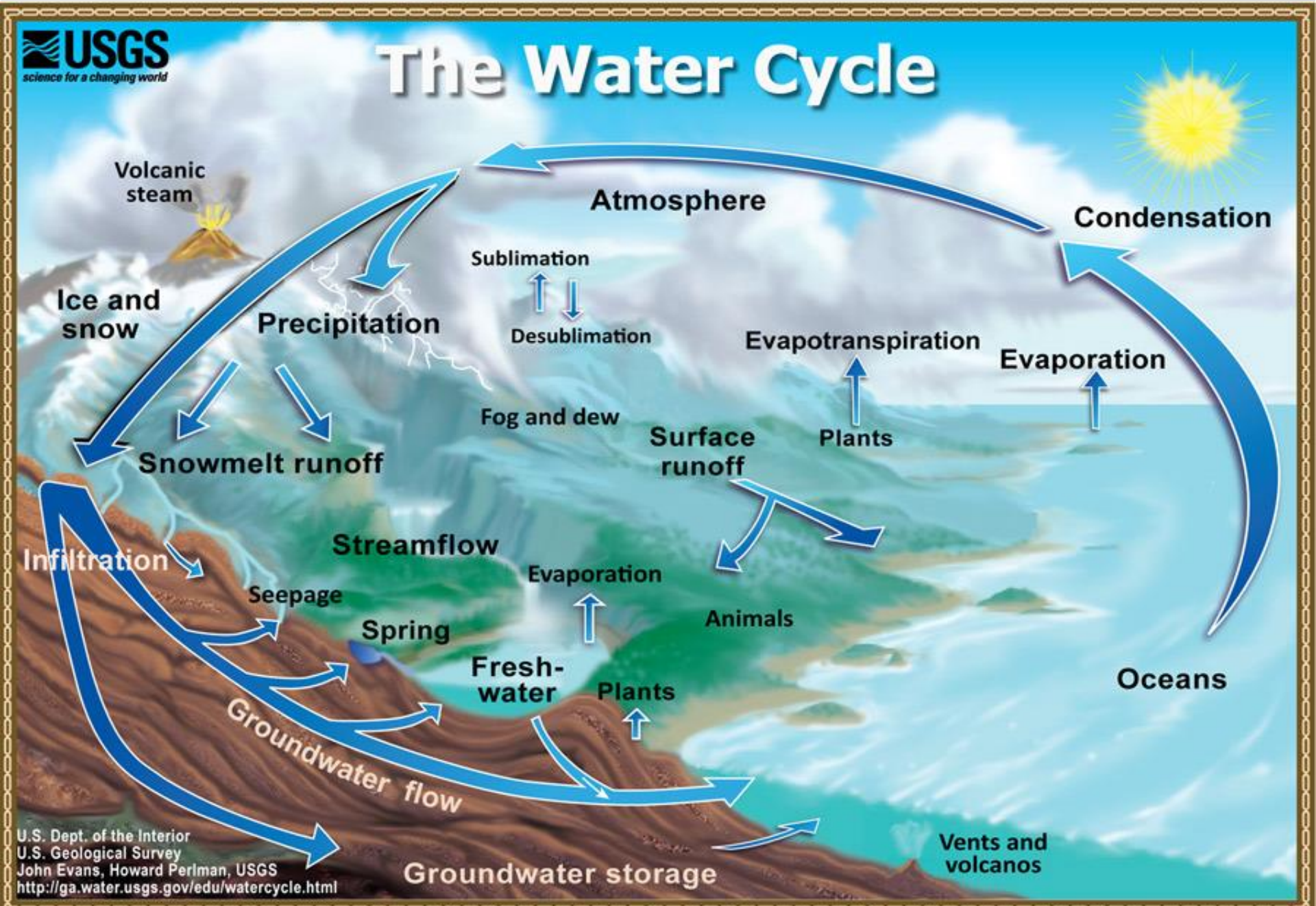
What did you find surprising or confusing about the data you downloaded for the Water Quality Homework?

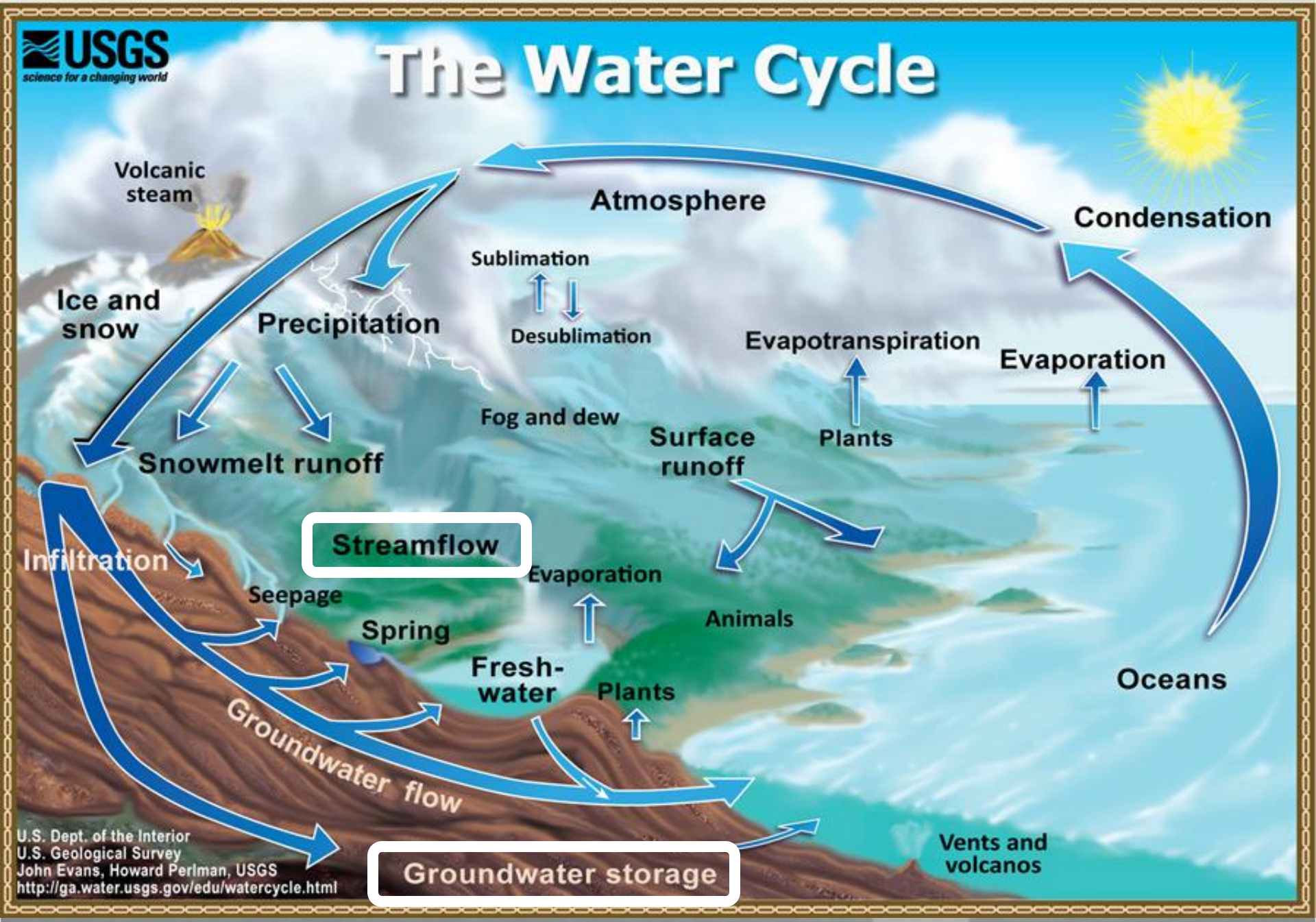
Group Discussion: Would you drink the water? What would you need to know about the system to determine if the water is safe?

Ensuring Safe Drinking Water Through the Multiple-Barrier Approach



Source: EPA (2002) Consider the Source: A Pocket Guide to Protecting Your Drinking Water. http://www.epa.gov/safewater/sourcewater/pubs/guide_swppocket_2002.pdf


USGS
science for a changing world
The Water Cycle
Volcanic steam
Atmosphere
Condensation
Sublimation
Desublimation
Ice and snow
Precipitation
Evapotranspiration
Evaporation
Fog and dew
Surface runoff
Plants
Snowmelt runoff
Streamflow
Infiltration
Evaporation
Seepage
Animals
Spring
Fresh-water
Plants
Oceans
Groundwater flow
Vents and volcanos
Groundwater storage
U.S. Dept. of the Interior
U.S. Geological Survey
John Evans, Howard Perlman, USGS
http://ga.water.usgs.gov/edu/watercycle.html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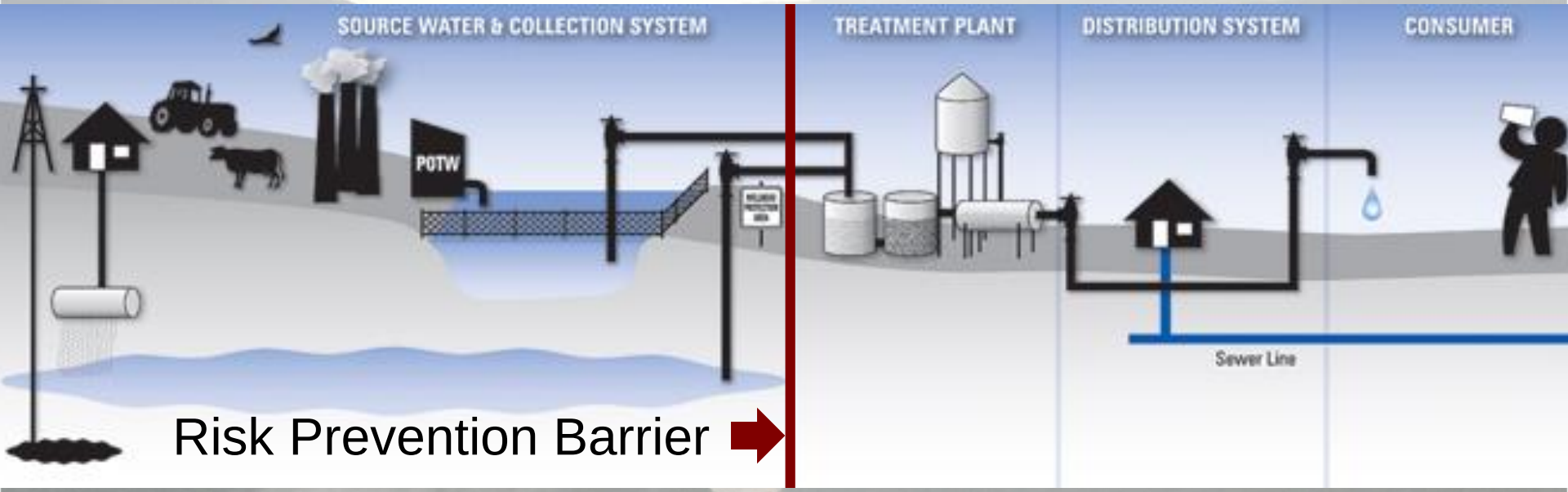
Ensuring Safe Drinking Water Through the Multiple-Barrier Approach



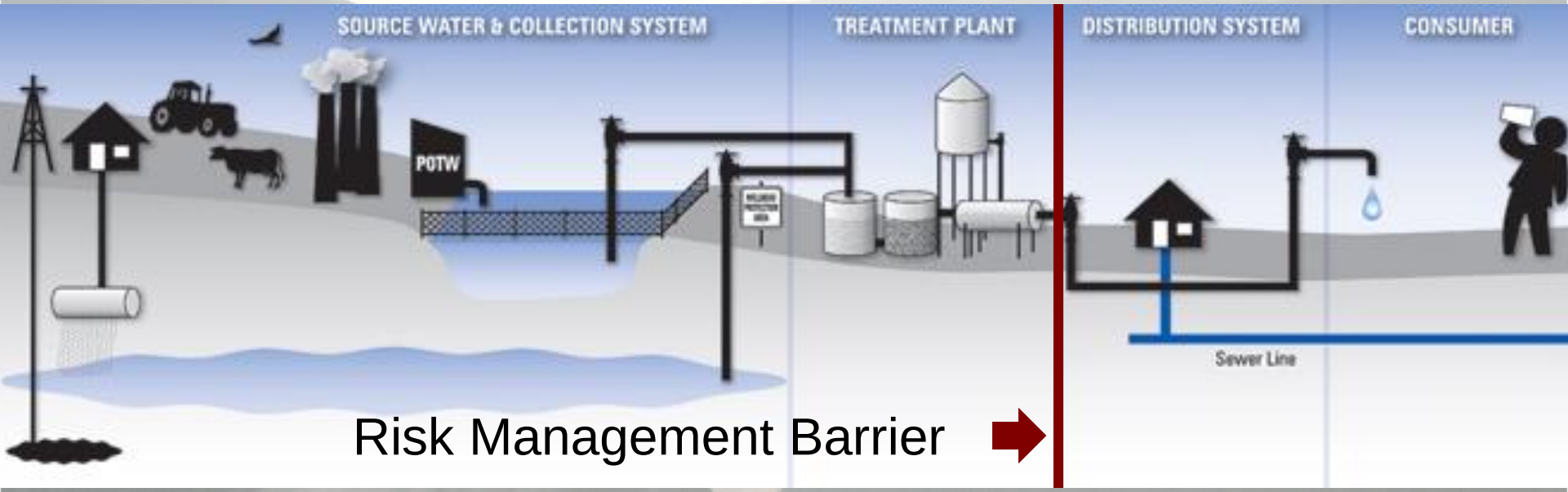
Source: EPA (2002) Consider the Source: A Pocket Guide to Protecting Your Drinking Water. http://www.epa.gov/safewater/sourcewater/pubs/guide_swppocket_2002.pdf

Steps for Source Water Protection

1. DELINEATE your drinking water source protection area
2. INVENTORY known and potential sources of contamination within these areas
3. DETERMINE THE SUCEPTIBILITY of your water supply system to these contaminants
4. NOTIFY AND INVOLVE THE PUBLIC about threats identified in the contaminant source inventory and what they mean to their PWS.
5. IMPLEMENT MANAGEMENT MEASURES to prevent, reduce or eliminate threats
6. DEVELOP CONTINGENCY PLANNING STRATEGIES to deal with water supply contamination or service interruption emergencies

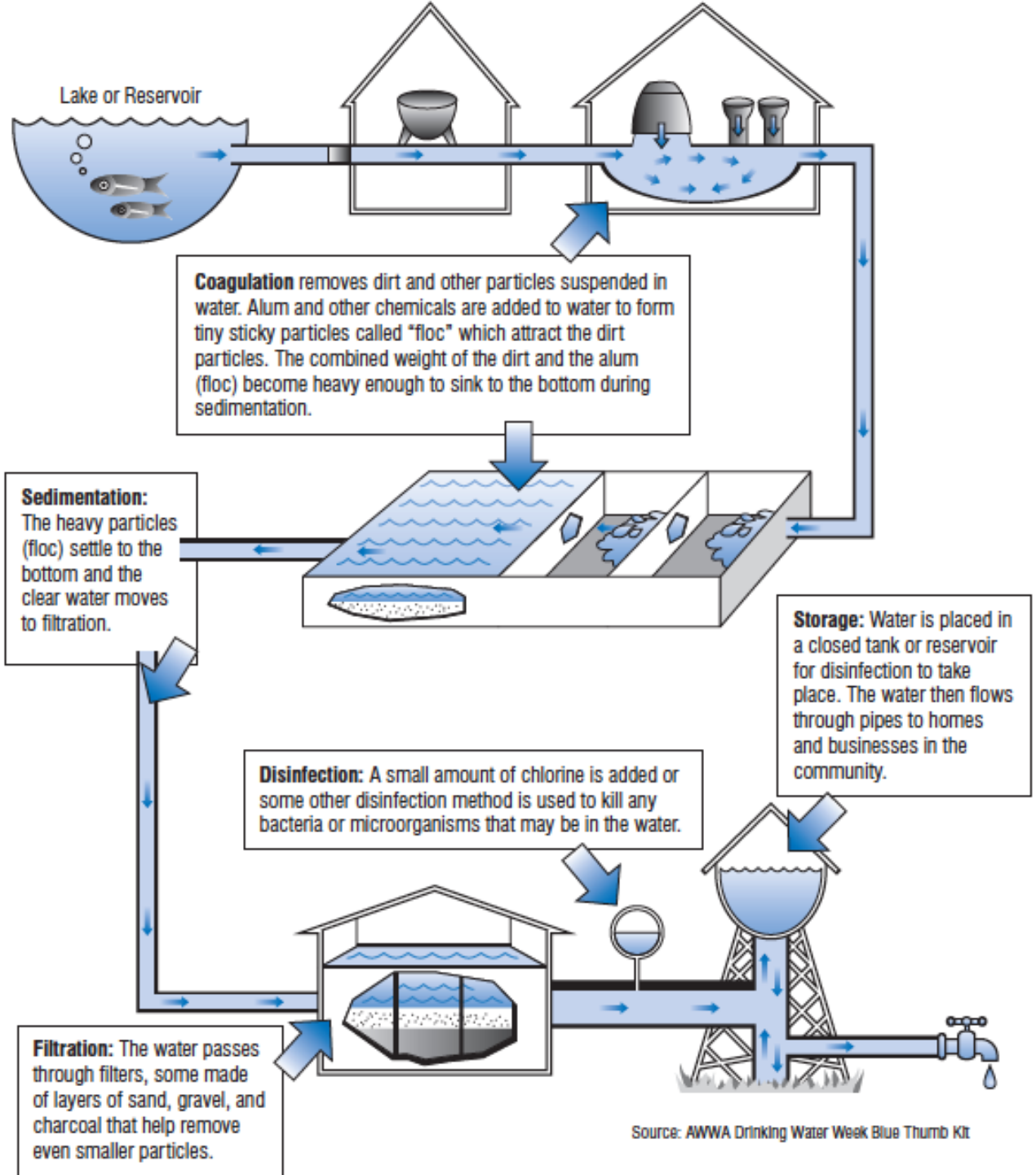
Source: EPA (2002) Consider the Source: A Pocket Guide to Protecting Your Drinking Water. http://www.epa.gov/safewater/sourcewater/pubs/guide_swppocket_2002.pdf

Ensuring Safe Drinking Water Through the Multiple-Barrier Approach



Source: EPA (2002) Consider the Source: A Pocket Guide to Protecting Your Drinking Water. http://www.epa.gov/safewater/sourcewater/pubs/guide_swppocket_2002.pdf

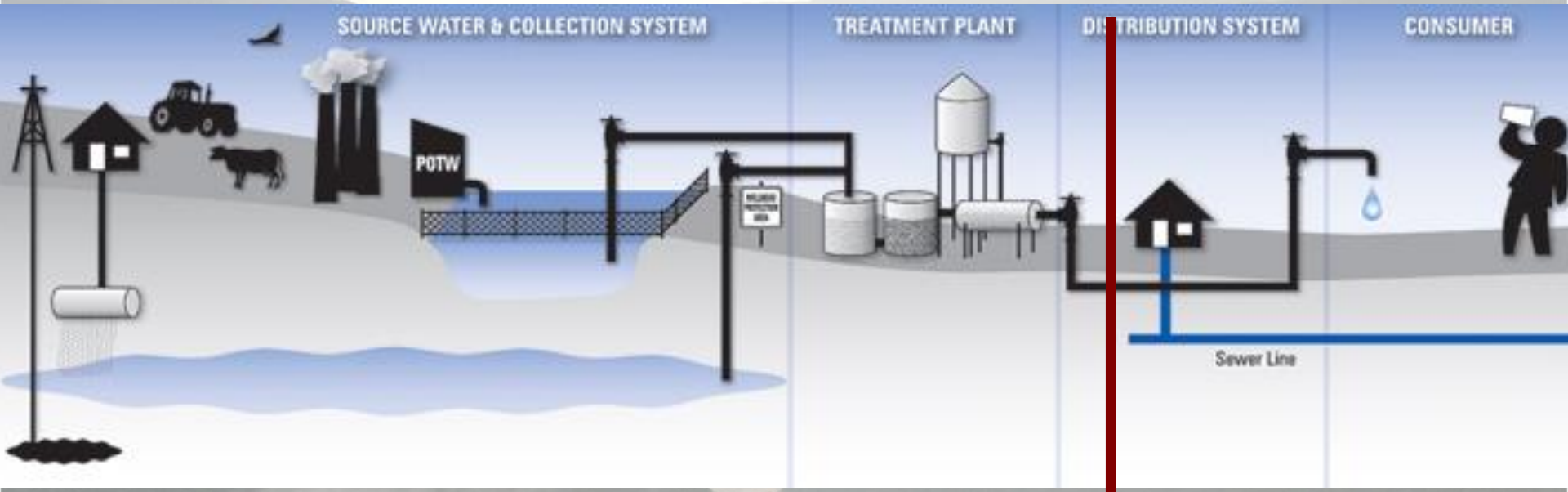
Water Treatment Plant



Source: EPA (2009) Water on Tap: What you need to know

http://www.epa.gov/ogwdw/wot/pdfs/book_waterontap_full.pdf

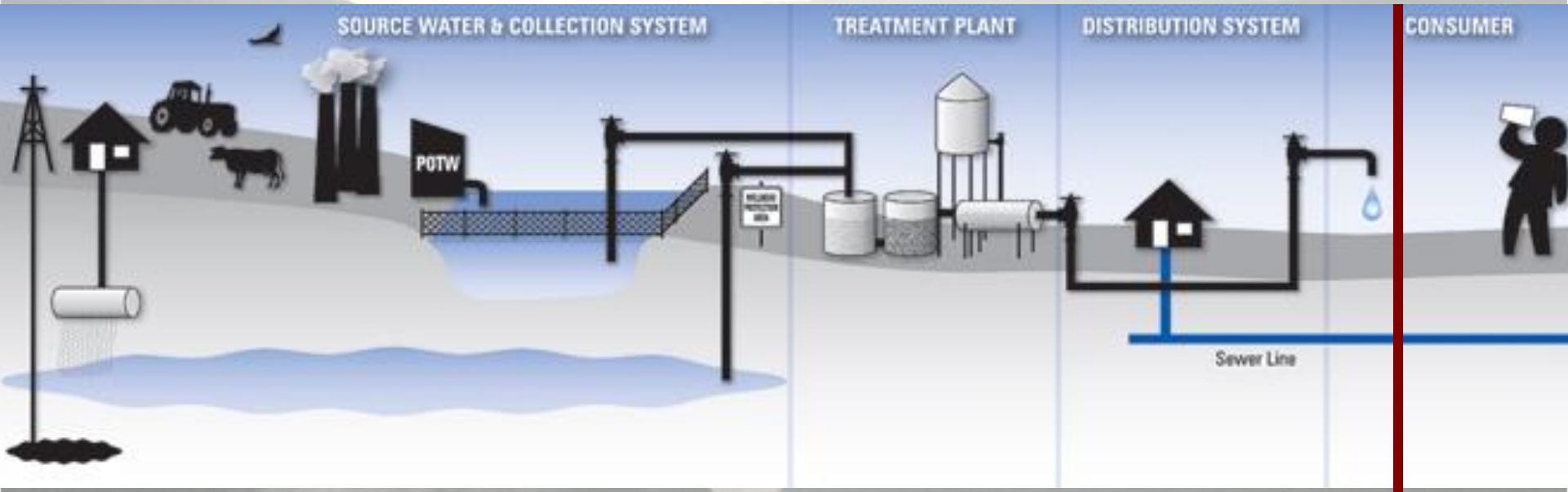
Ensuring Safe Drinking Water Through the Multiple-Barrier Approach



Risk Monitoring and Compliance Barrier

Source: EPA (2002) Consider the Source: A Pocket Guide to Protecting Your Drinking Water. http://www.epa.gov/safewater/sourcewater/pubs/guide_swppocket_2002.pdf

Ensuring Safe Drinking Water Through the Multiple-Barrier Approach



Individual Action Barrier

Source: EPA (2002) Consider the Source: A Pocket Guide to Protecting Your Drinking Water. http://www.epa.gov/safewater/sourcewater/pubs/guide_swppocket_2002.pdf

- Small group exercise: Please develop an argument for or against three potential sources of MCHM in the system:
  - Source Water: The Elk River
  - Treatment Plant: Filters releasing MCHM
  - Distribution System: MCHM reservoirs (e.g. storage tanks)

- Draw on information from this news article: *Trace amounts' of MCHM found in Elk plant water*. (2014, March 25 Charleston Gazette)


All humanly used resources are embedded in complex, ***social-ecological systems.*** ***– Ostrom (2009)***
Morris Dr
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