EPA
United States
Environmental Protection
Agency

Study of the the Potential Impacts of Hydraulic Fracturing on Drinking Water Resources: Overview for Roundtable Meetings

U.S. Environmental Protection Agency
Office of Research and Development
November 2012

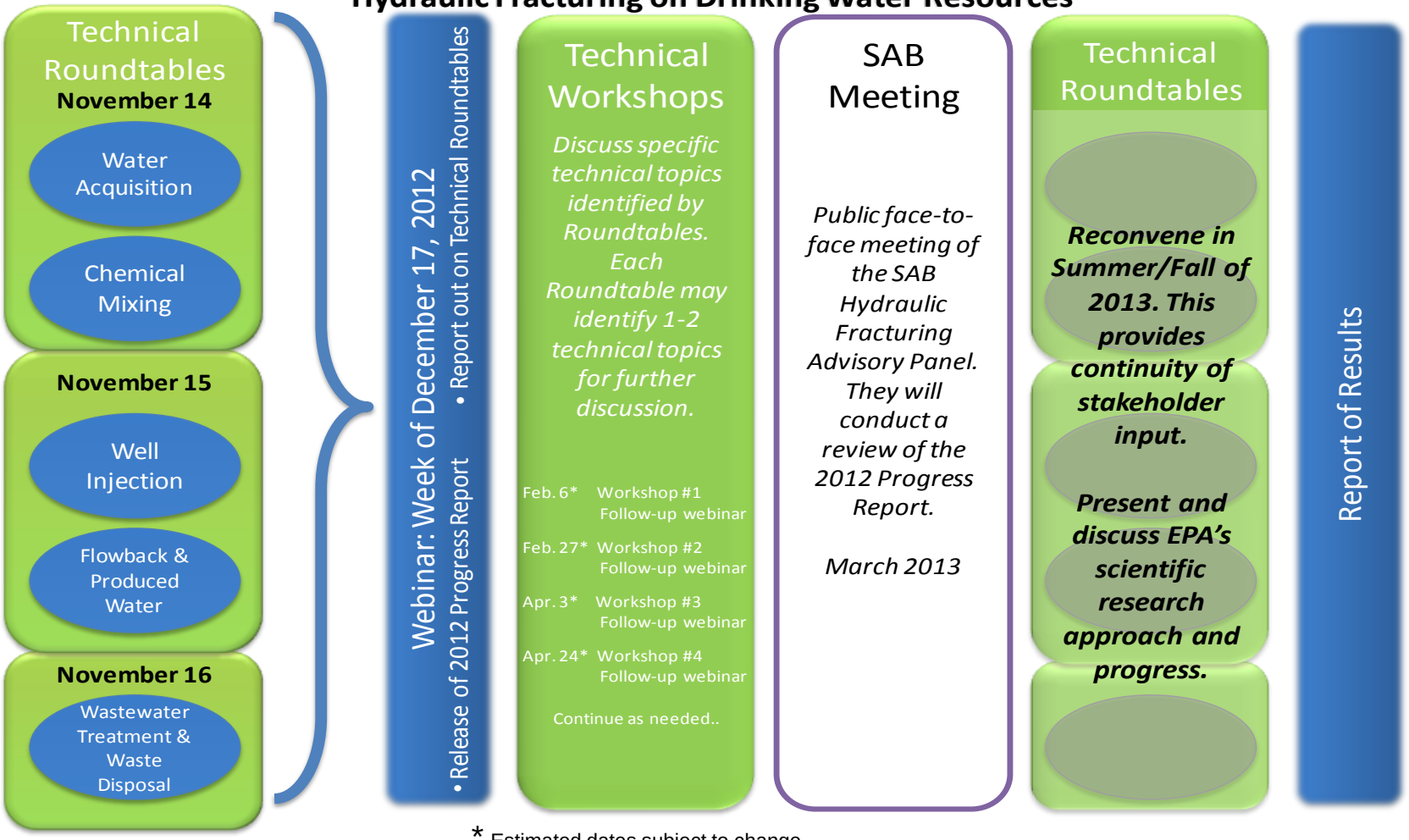


Webinar Outline

- Context for roundtable meetings
- Logistics and what to expect at the roundtable meetings
- Background and organization of EPA study
- Questions?

United States Environmental Protection Agency

Technical Stakeholder Engagement for EPA's Study of the Potential Impacts of Hydraulic Fracturing on Drinking Water Resources



* Estimated dates subject to change.

Peer Review Ongoing

EVENT	DATE	PURPOSE
Webinar	10/31	Introduce roundtable participants to the HF study and the roundtable meetings
Five Roundtables: each focusing on a stage of the water cycle	11/14 - 11/16	EPA to present information regarding the work underway on the HF water study. Seek a broad and balanced range of expertise and data from stakeholders Nominate topics for technical workshops
Technical Workshops	TBD	Technical experts from a cross-section of stakeholder groups discuss topics stemming from the roundtable discussions

Roundtable Logistics

Roundtable	Date and Time
Water Acquisition	Wednesday, November 14 8:00 am – 12:00 pm
Chemical Mixing	Wednesday, November 14 1:30 pm – 5:30 pm
Well Injection	Thursday, November 15 8:00 am – 12:00 pm
Flowback and Produced Water	Thursday, November 15 1:30 pm – 5:30 pm
Wastewater Treatment	Friday, November 16 8:00 am – 1:00 pm

Roundtable Meetings

- EPA will present more detailed information regarding the work underway
- Discussion will help to ensure that EPA has access to a broad and balanced range of expertise and data
- Participants may nominate specific topics for technical workshops

Roundtable Agenda

8:00 am or 1:30 pm	**Welcome and Purpose of Meeting** Robert Sussman, Senior Policy Counsel
8:10 am or 1:40pm	**Introductions** (all participants led by facilitator) » *Name and Affiliation* » *Ground Rules*
8:25 am or 1:55 pm	**EPA's Study of the Potential Impacts of Hydraulic Fracturing on Drinking Water Resources** Ramona Trovato, Associate Assistant Administrator, Office of Research and Development
8:35 am or 2:05 pm	**ORD Presentation on EPA's Research Related to Water Cycle Stage**
9:20 am or 2:50 pm	**Break**
9:30 am or 3:00 pm	**Discussion and Identification of Specific Technical Topics for Possible Follow-on Workshop** *(Roundtable participants and EPA, facilitated)* *Questions to stimulate discussion*
11:50 am or 5:20 pm	**Closing** Glenn Paulson, Science Advisor
12:00 pm or 5:30 pm	**Adjourn**

During the Meeting

- Meeting is not a FACA
  - Primary purpose is exchange of information/facts
  - Seeking individual opinions, not consensus advice
  - No voting or recommendations from the group as a whole
- In-person meeting
- No substitutes

After the Meeting

- EPA will host a webinar for the public to inform them of the content and results of the roundtable meeting
- Materials shared at the meeting will be posted on EPA's website
- EPA will identify and set up workshops on key topics

Schedule

2012

- Stakeholder Roundtable Meeting
- Federal Register notice to solicit data and published papers
- Progress Report
- Stakeholder Webinars

2013

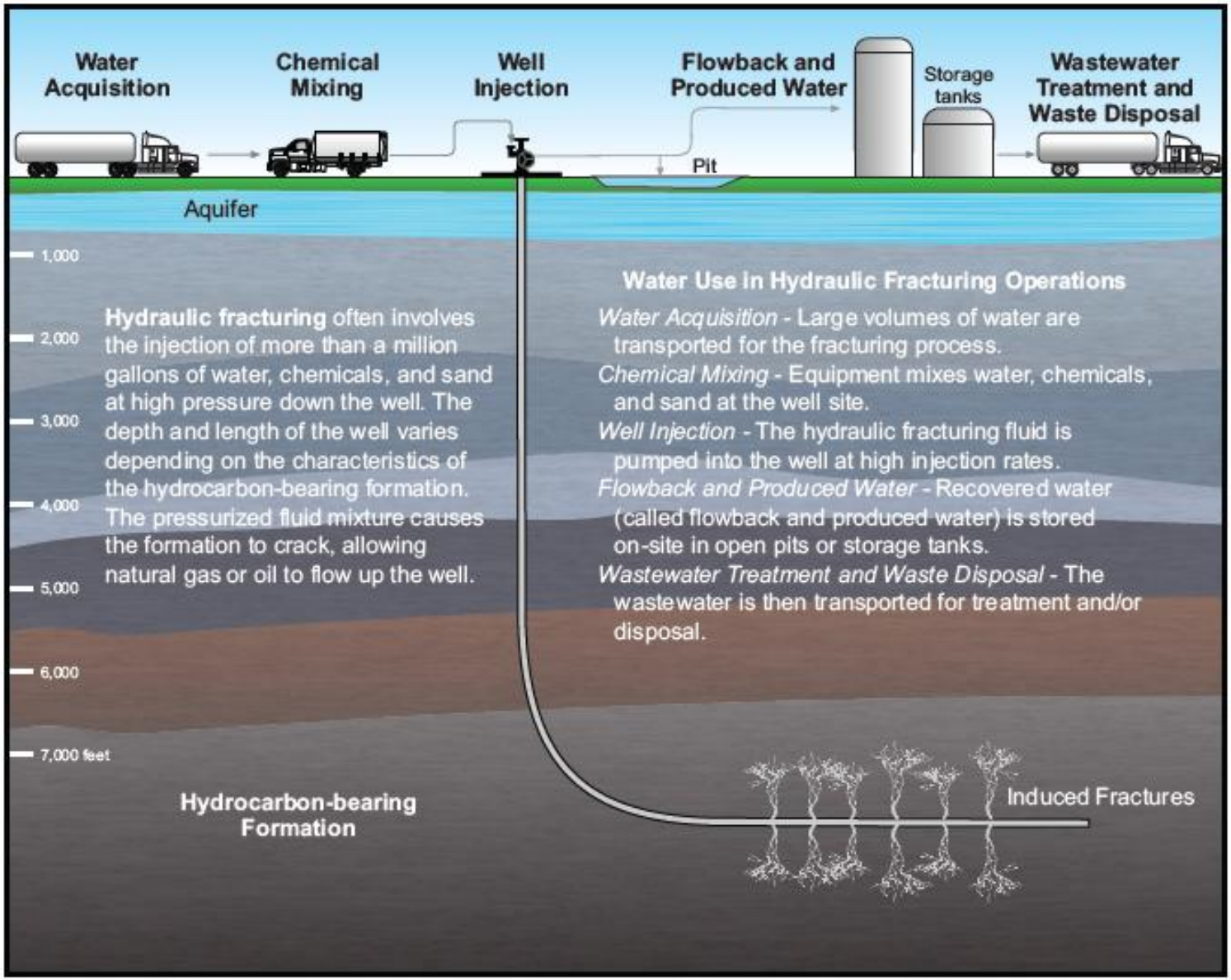
- Technical Workshops
- SAB review of Progress Report
- Follow up Stakeholder Roundtable meeting

2014

- Draft Report of Results

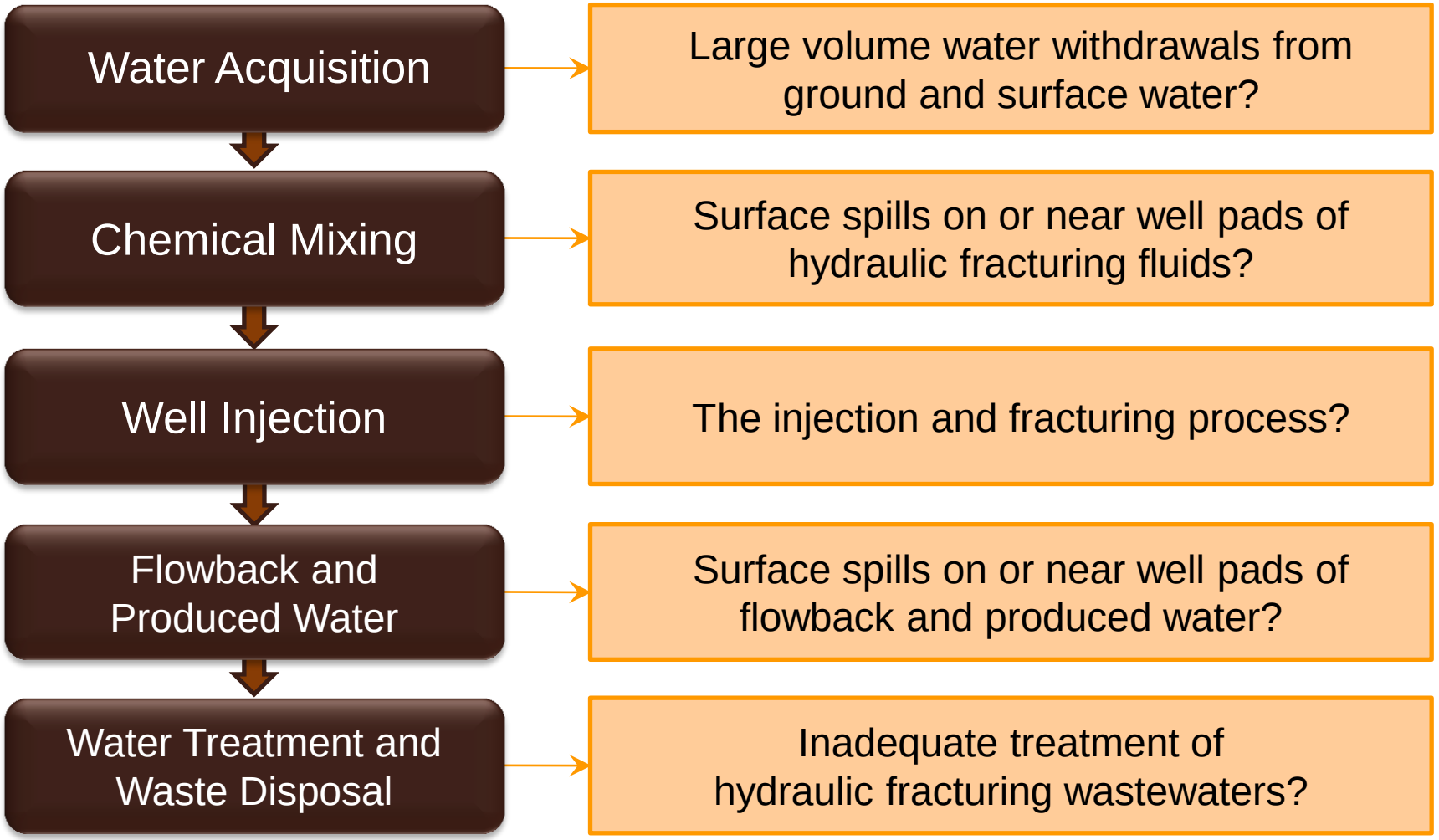
Information in Preparation for Roundtable Meetings

Water Cycle

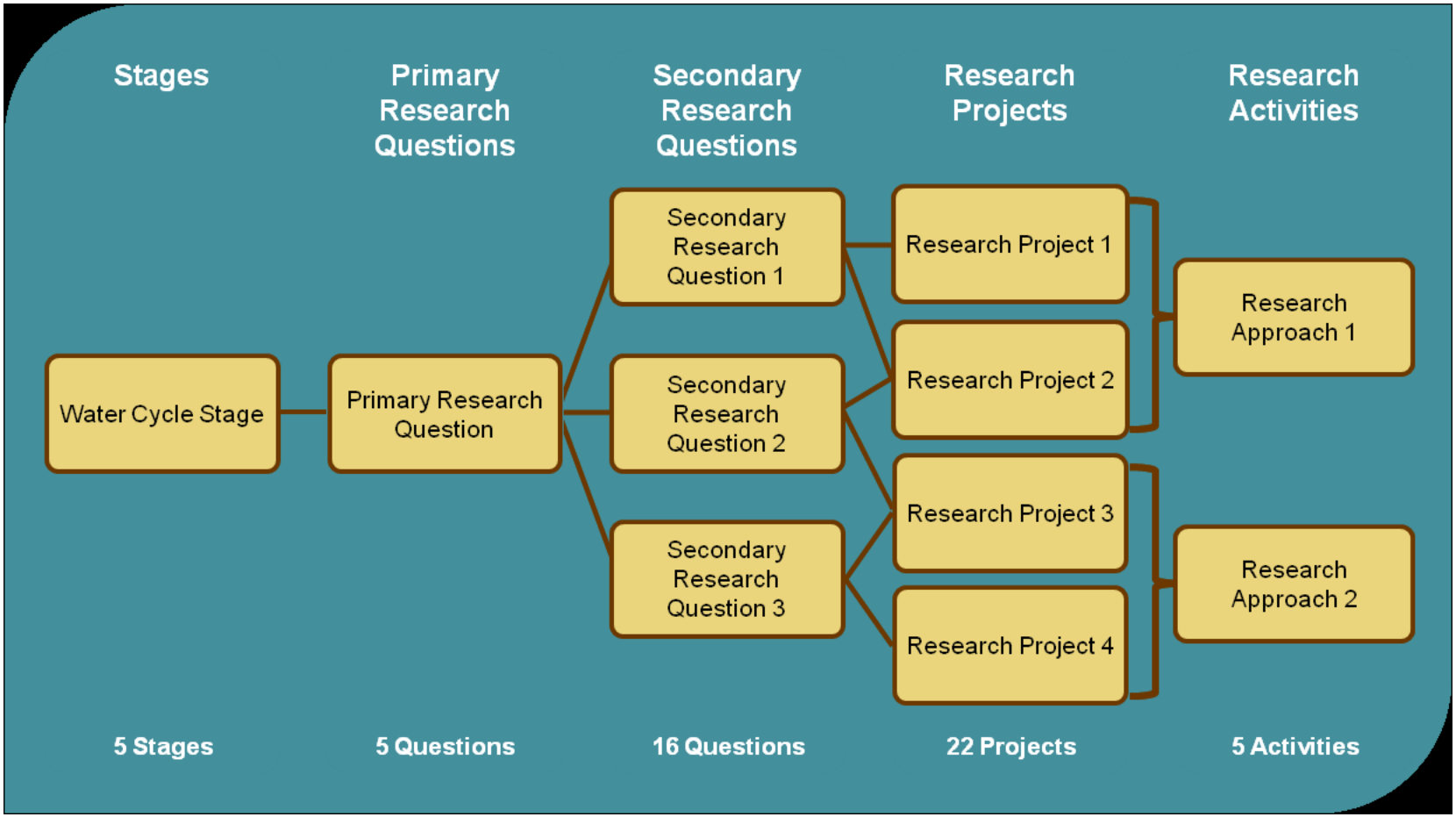

Water Acquisition
Chemical Mixing
Well Injection
Flowback and Produced Water
Storage tanks
Wastewater Treatment and Waste Disposal
Pit
Aquifer
1,000
2,000
3,000
4,000
5,000
6,000
7,000 feet
Hydraulic fracturing often involves the injection of more than a million gallons of water, chemicals, and sand at high pressure down the well. The depth and length of the well varies depending on the characteristics of the hydrocarbon-bearing formation. The pressurized fluid mixture causes the formation to crack, allowing natural gas or oil to flow up the well.
Water Use in Hydraulic Fracturing Operations
Water Acquisition - Large volumes of water are transported for the fracturing process.
Chemical Mixing - Equipment mixes water, chemicals, and sand at the well site.
Well Injection - The hydraulic fracturing fluid is pumped into the well at high injection rates.
Flowback and Produced Water - Recovered water (called flowback and produced water) is stored on-site in open pits or storage tanks.
Wastewater Treatment and Waste Disposal - The wastewater is then transported for treatment and/or disposal.
Hydrocarbon-bearing Formation
Induced Fractures

Research Questions

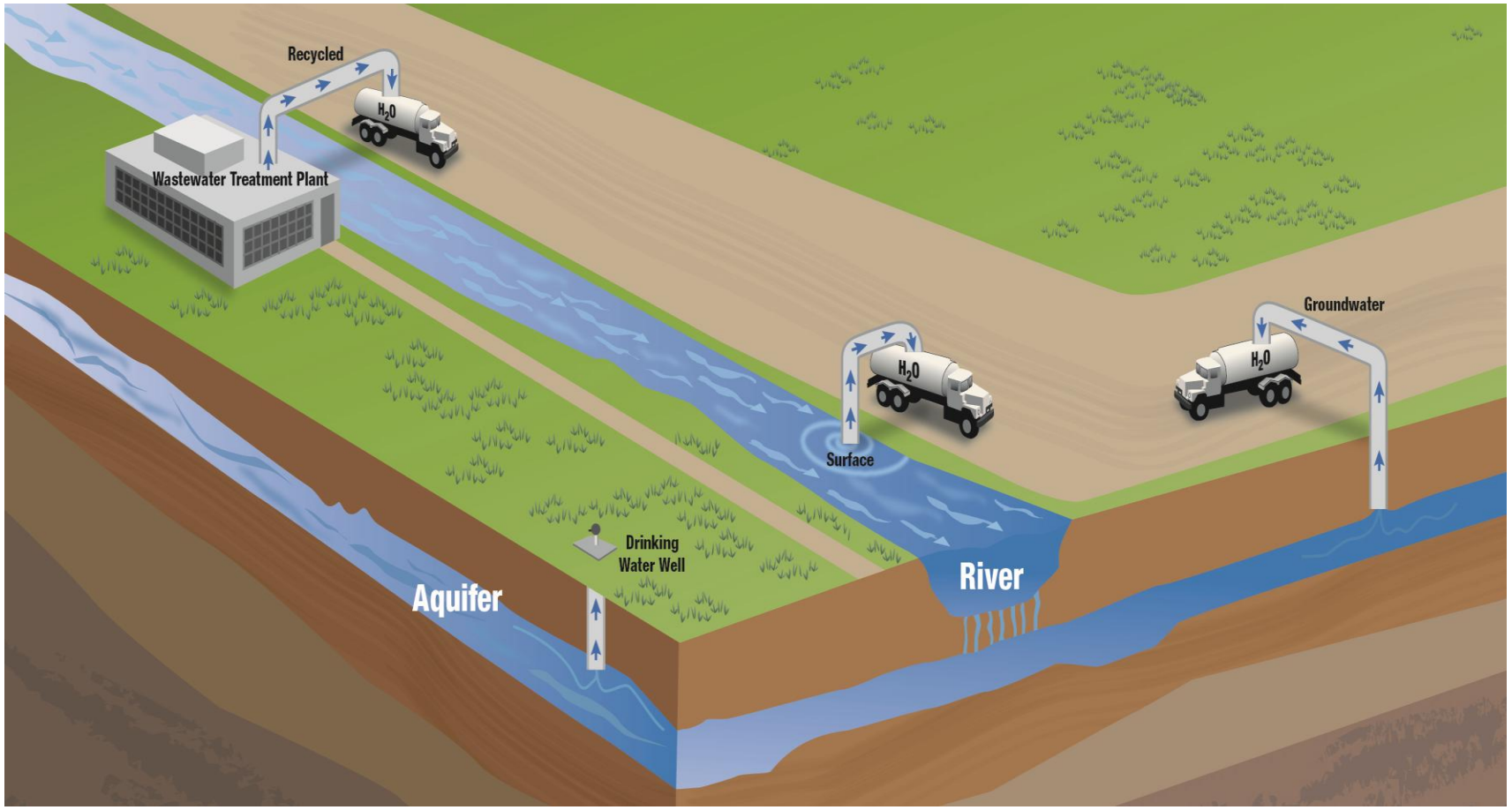
What are the potential impacts on drinking water resources of:



Roundtable Meetings



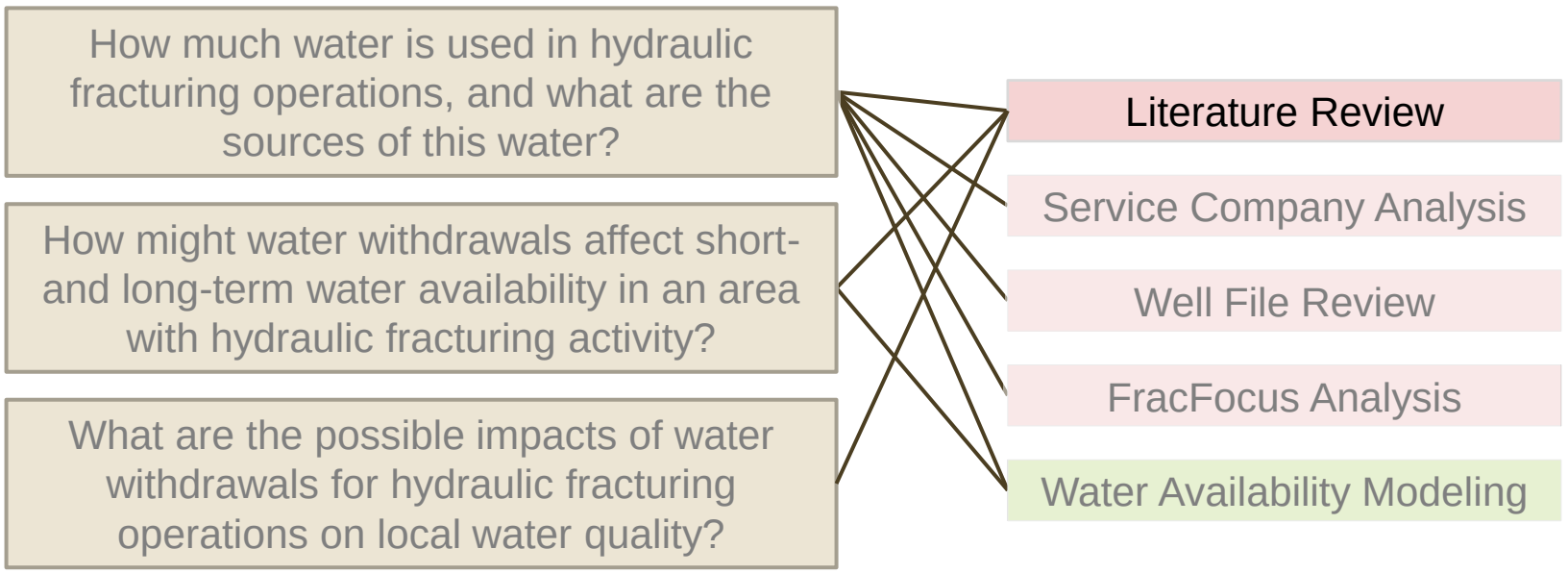
Water Acquisition



What are the potential impacts of large volume water withdrawals from ground and surface waters on drinking water resources?

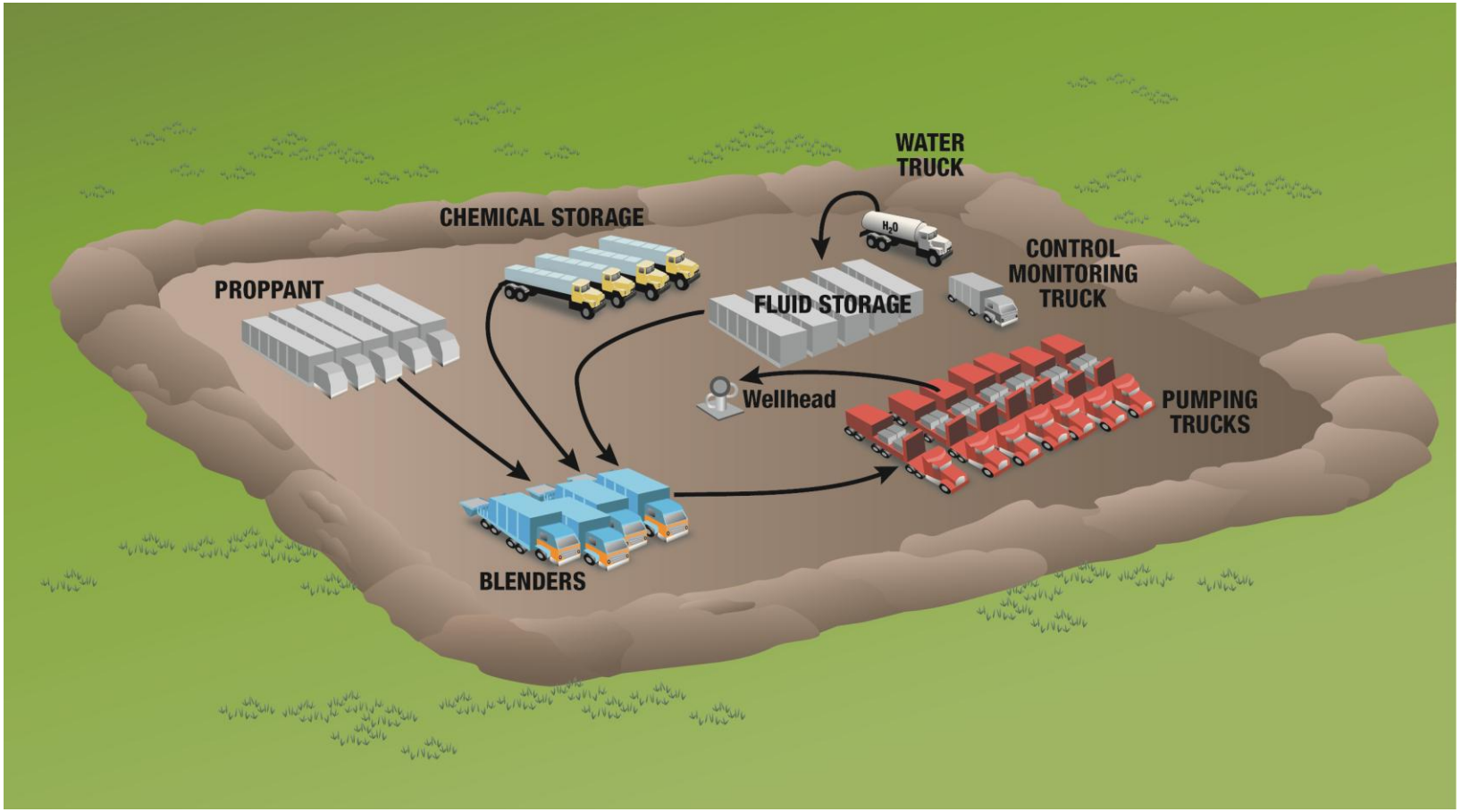
Water Acquisition

What are the possible impacts of surface spills on or near well pads of hydraulic fracturing fluids on drinking water resources?



Analysis of Existing Data | Laboratory Studies | Toxicity Assessment | Scenario Evaluations | Case Studies

Chemical Mixing



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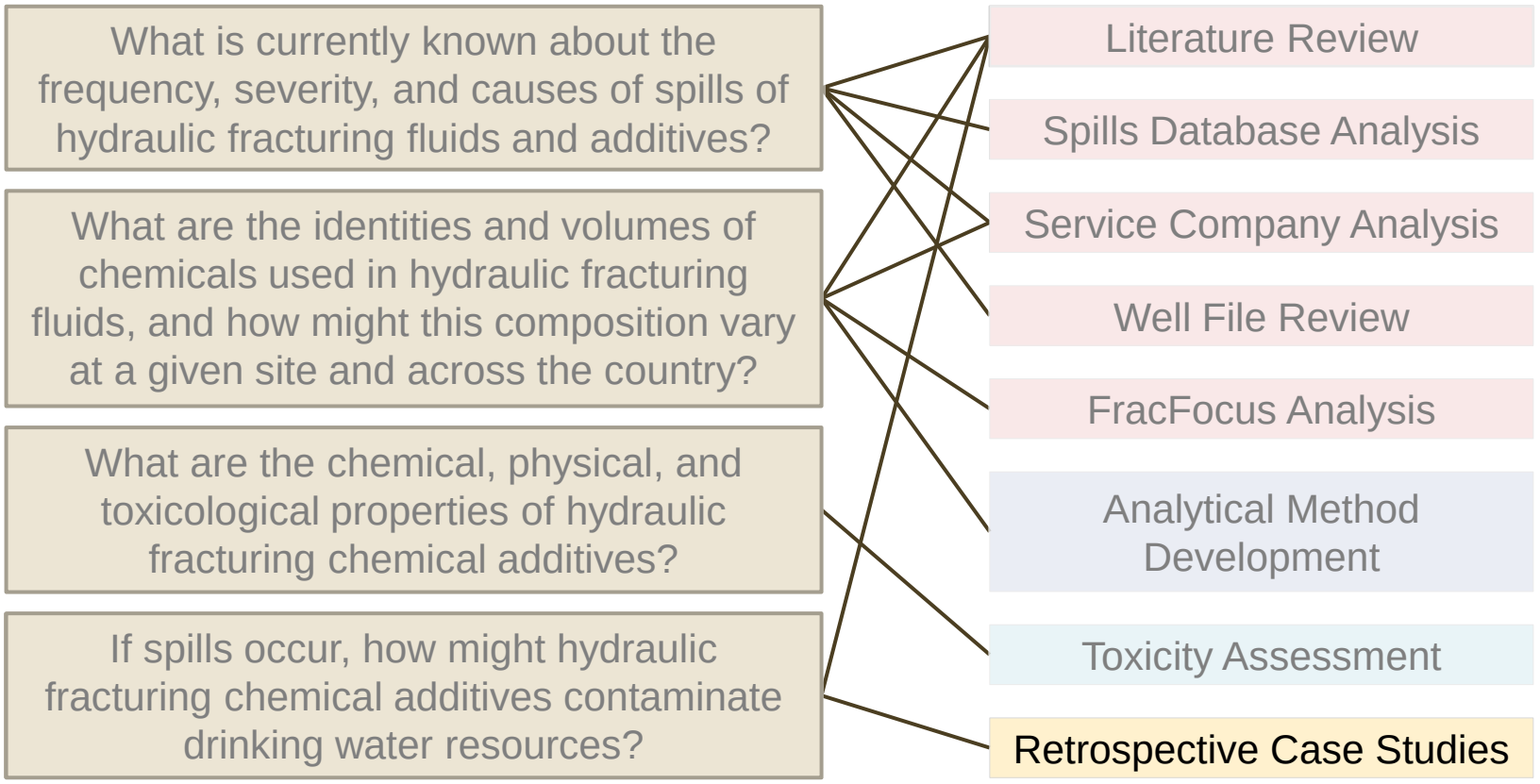

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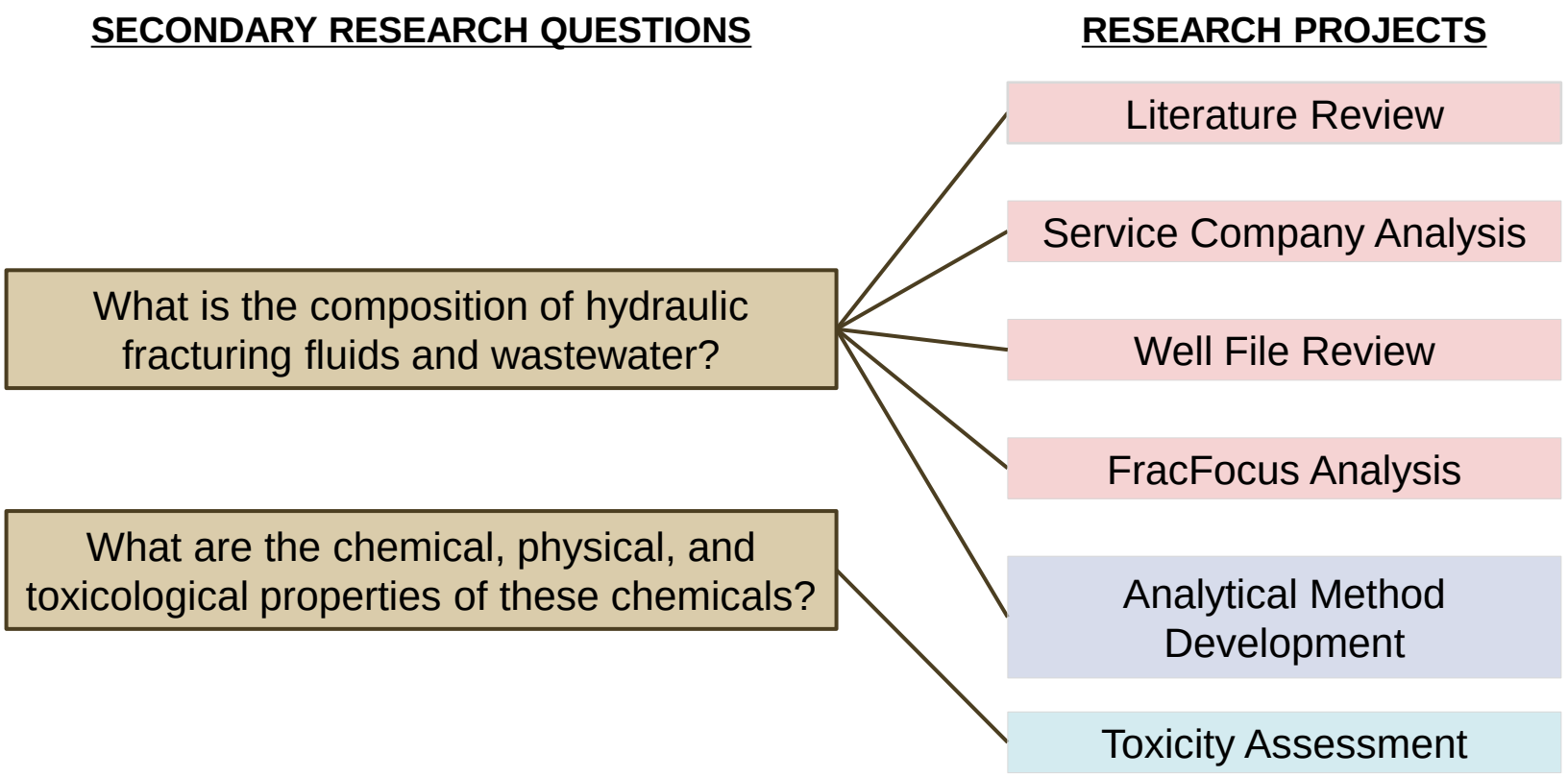
Chemical Mixing

What are the possible impacts of surface spills on or near well pads of hydraulic fracturing fluids and wastewater on drinking water resources?



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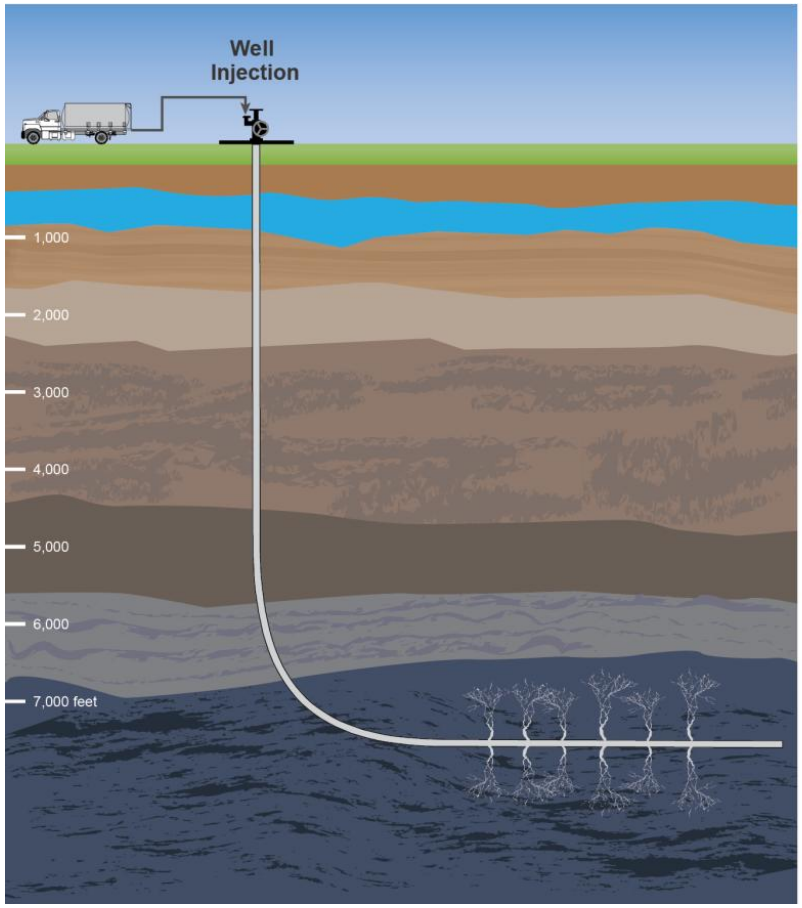
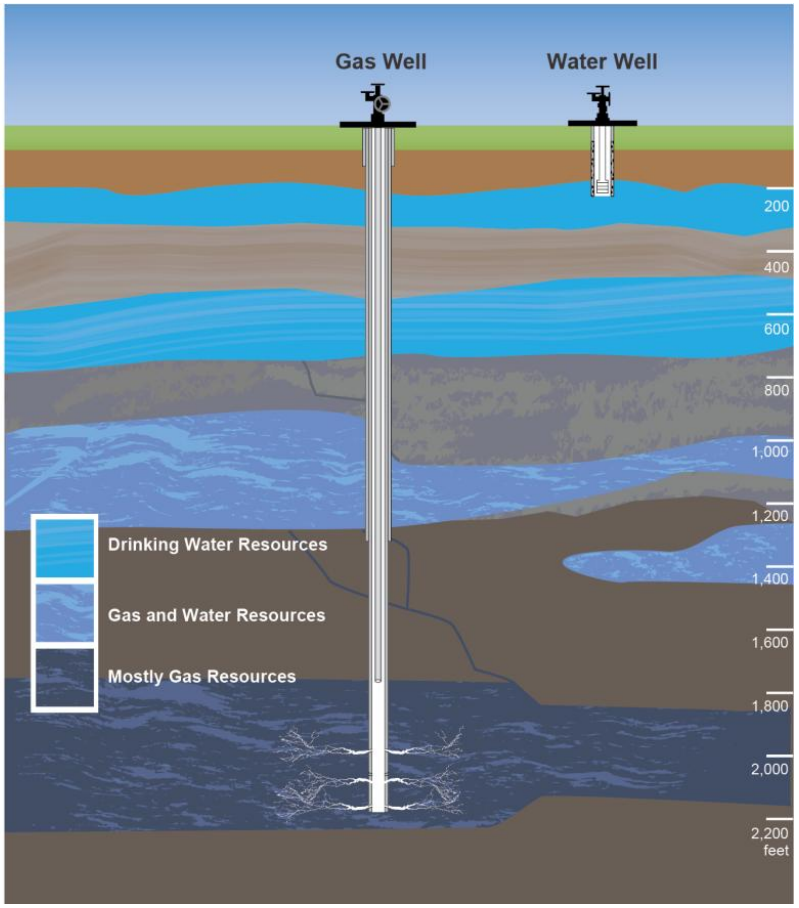
Well Injection





What are the possible impacts of the injection and fracturing process on drinking water resources?

Well Injection

What are the possible impacts of surface spills on or near well pads of hydraulic fracturing fluids on drinking water resources?

SECONDARY RESEARCH QUESTIONS

What is currently known about the frequency, severity, and causes of spills of hydraulic fracturing fluids and additives?

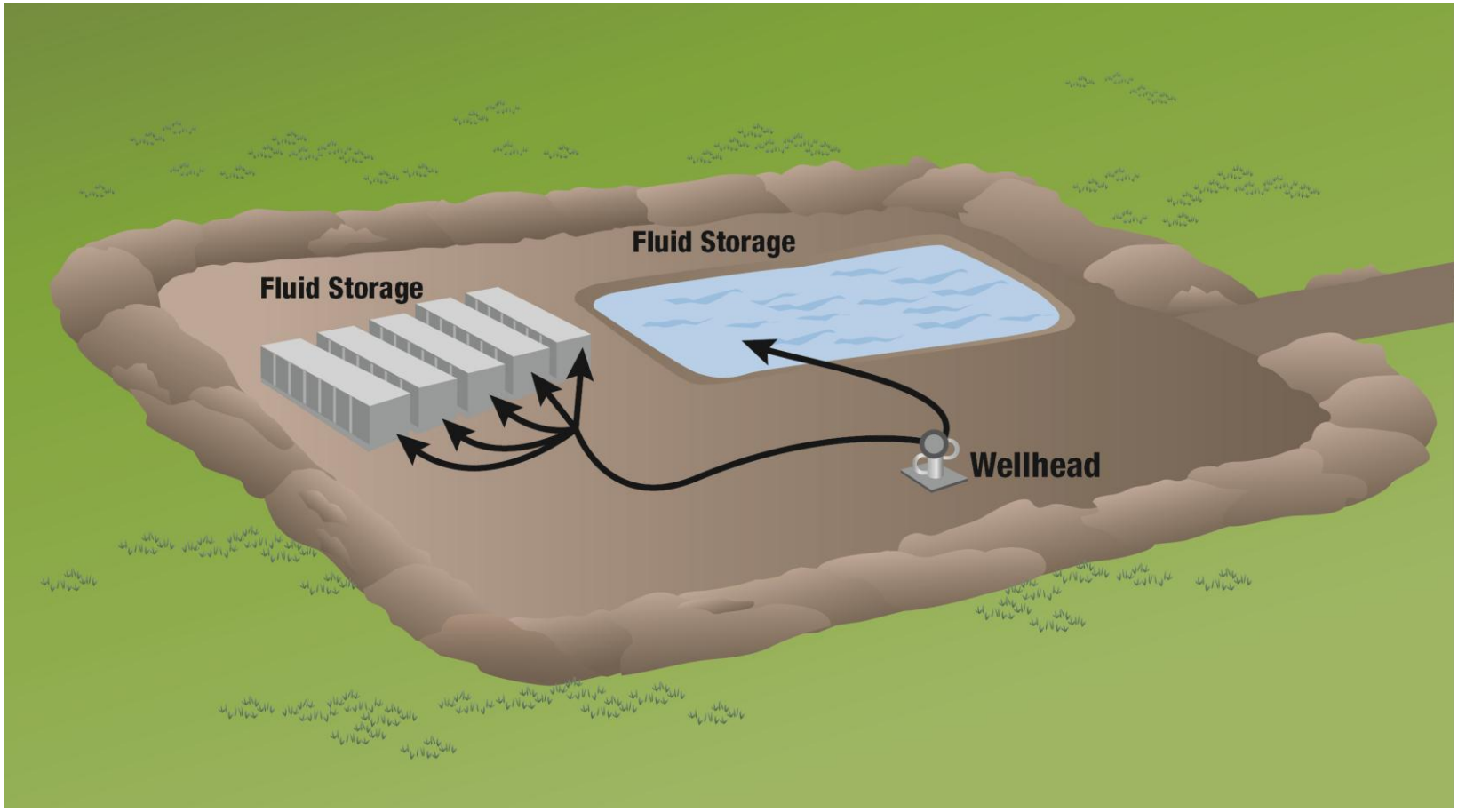
What are the identities and volumes of chemicals used in hydraulic fracturing fluids, and how might this composition vary at a given site and across the country?

RESEARCH PROJECTS

- Literature Review
- Service Company Analysis
- Well File Review
- Subsurface Migration Modeling
- Retrospective Case Studies

Analysis of Existing Data | Laboratory Studies | Toxicity Assessment | Scenario Evaluations | Case Studies

Flowback & Produced Water



What are the possible impacts of surface spills on or near well pads of flowback and produced water on drinking water resources?

Flowback & Produced Water

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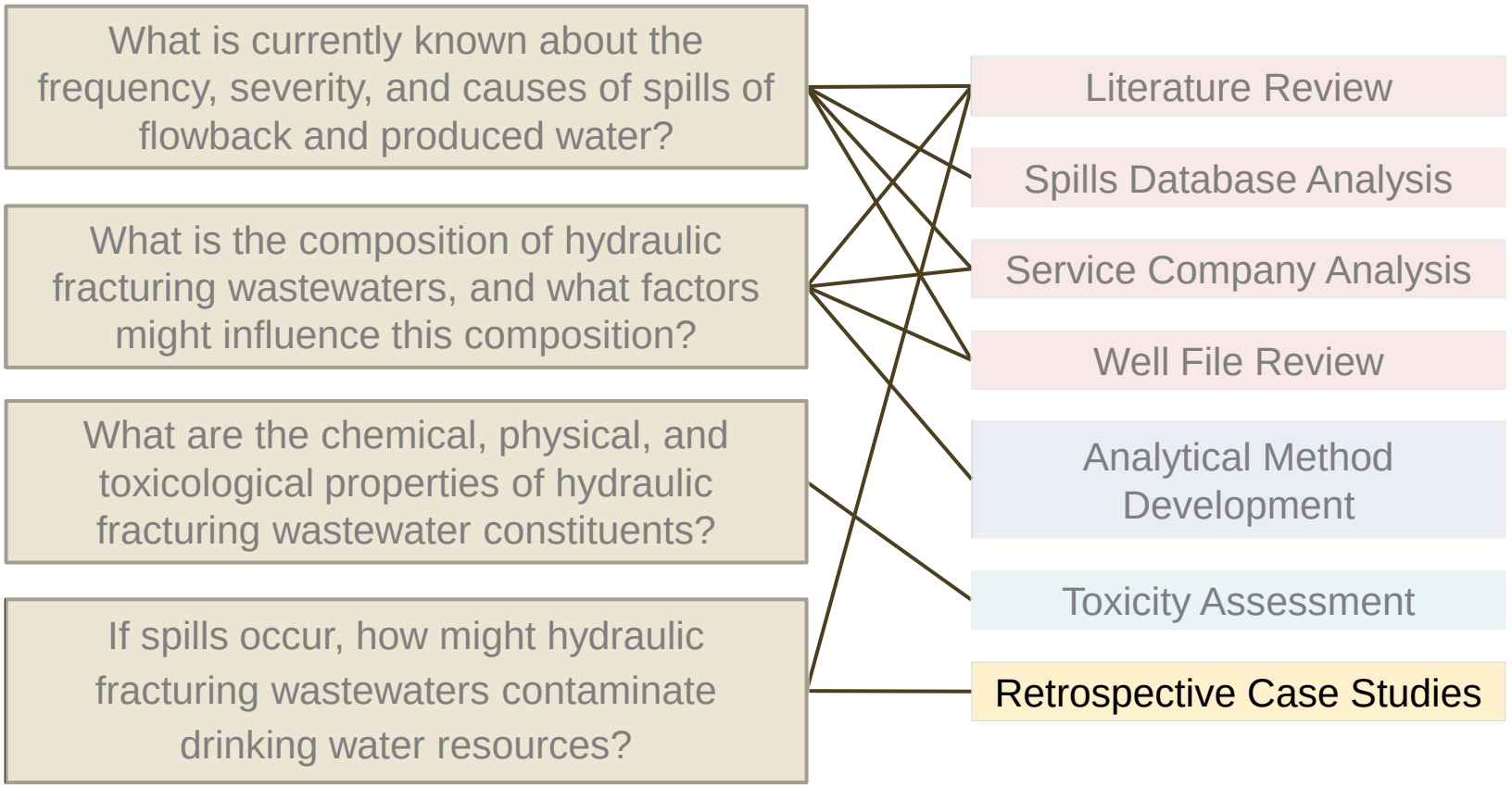

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Flowback & Produced Water

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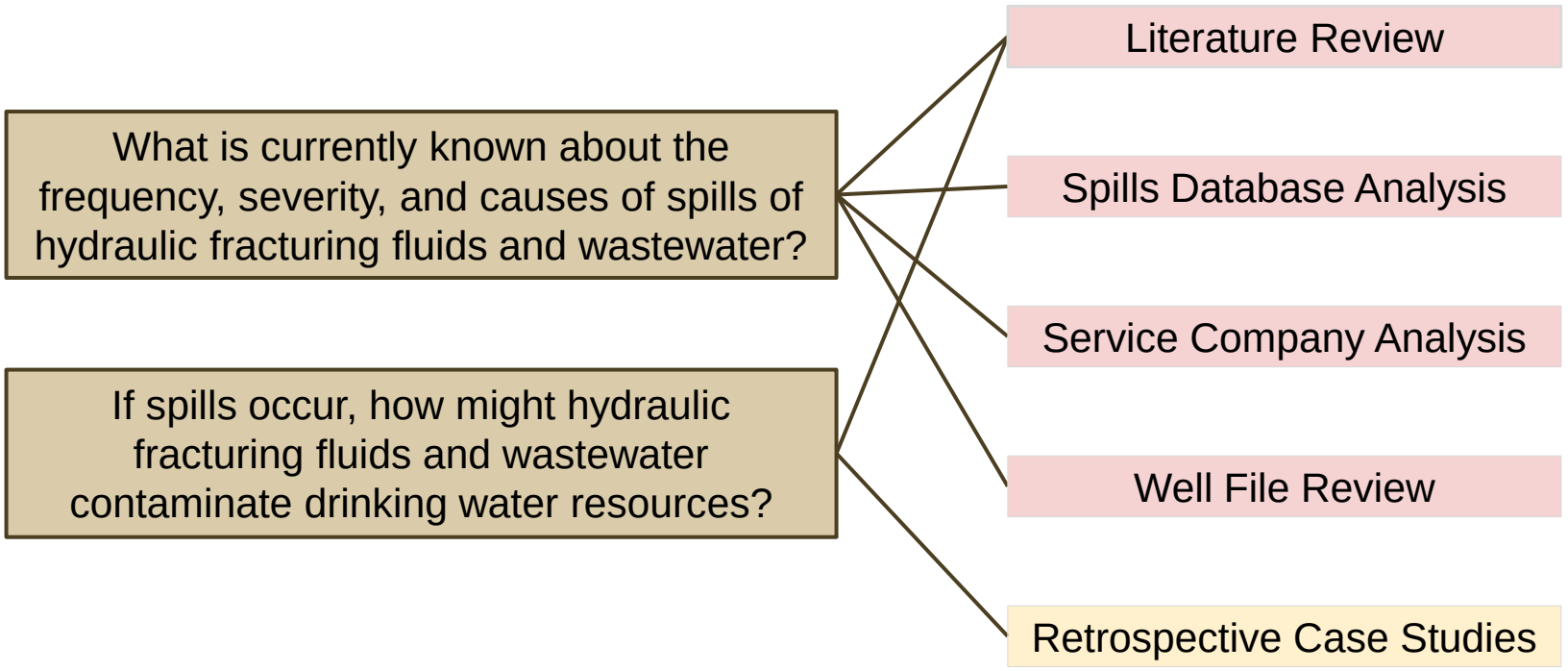

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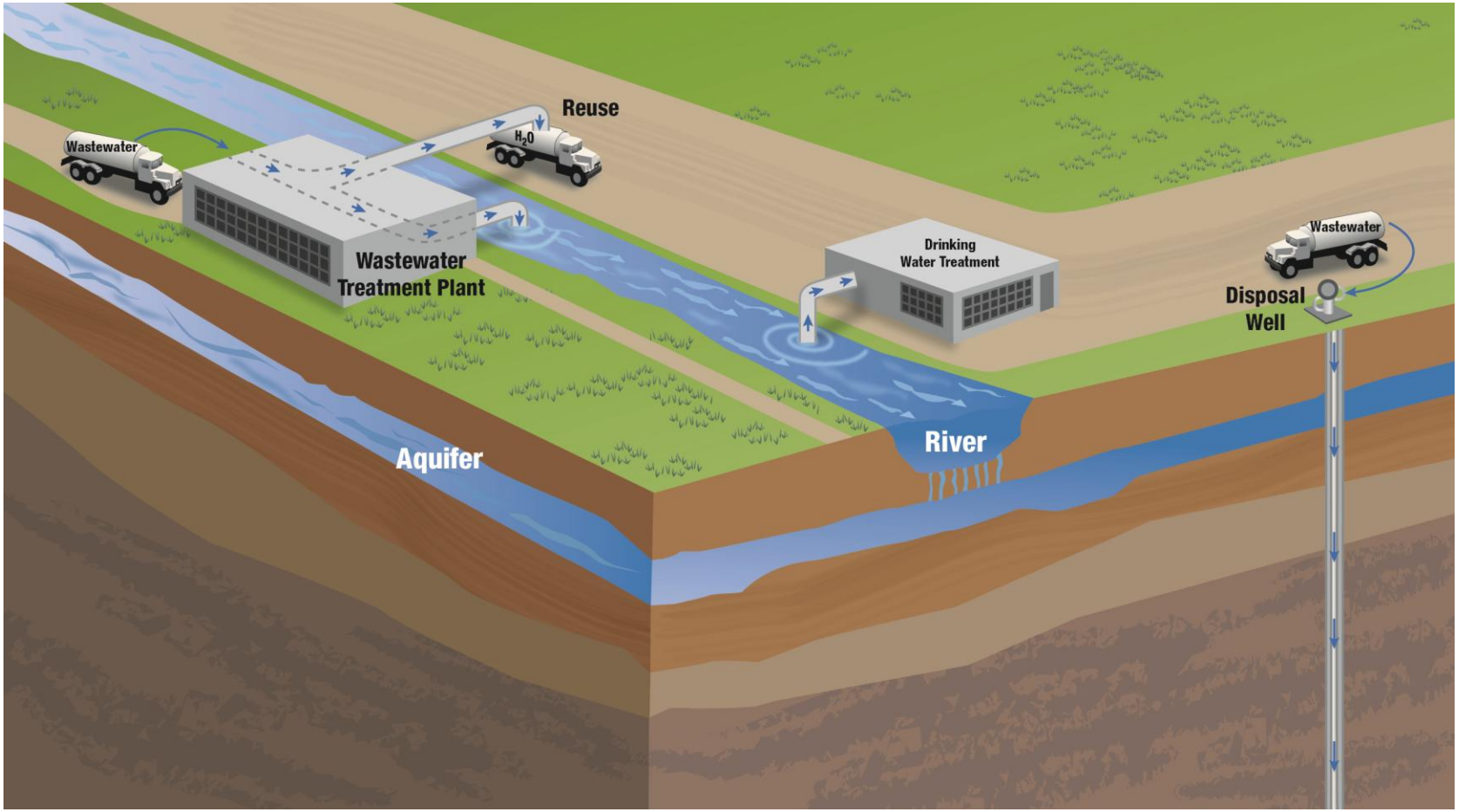
Wastewater Treatment and Waste Disposal



What are the possible impacts of inadequate treatment of hydraulic fracturing wastewaters on drinking water resources?

Wastewater Treatment and Waste Disposal

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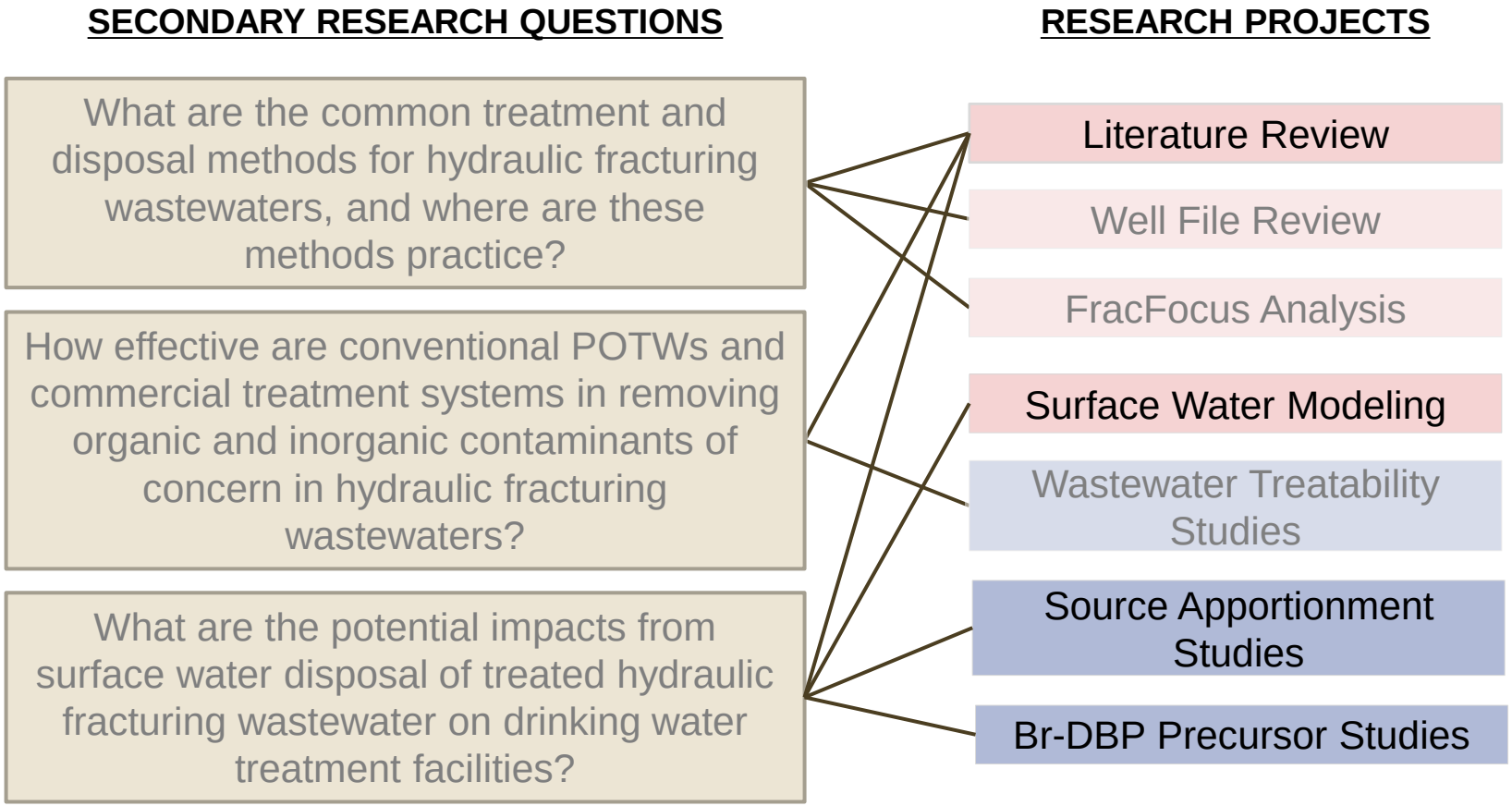

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Questions?

For More Information

www.epa.gov/hfstudy

Contact Lisa Matthews

Matthews.lisa@epa.gov

Background Information

Purpose of EPA's Study

- To assess whether hydraulic fracturing can impact drinking water resources

- To identify driving factors that affect the severity and frequency of any impacts

EPA's study plan focuses on the water cycle in hydraulic fracturing.

United States Environmental Protection Agency

EPA is committed to using:

- ✓*Best available science*
- ✓*Transparent, peer-reviewed process*
- ✓*Quality assurance principles*
- ✓*Independent sources of information*
- ✓*Consultation with others*

Science Advisory Board Peer Review

- SAB found study plan to be “appropriate and comprehensive”
- Response to SAB recommendations:
  - Core research questions and general approach are unchanged
  - More focused research questions
  - More detail about how questions will be addressed

Overview of Research Projects

- Analysis of Existing Data
- Scenario Evaluations
- Laboratory Studies
- Toxicity Assessments
- Case Studies

Analysis of Existing Data

Project	Description
Literature Review	Review and assessment of existing papers and reports, focusing on peer-reviewed literature
Spills Database Analysis	Analysis of selected federal and state databases for information on spills of hydraulic fracturing fluids and wastewaters
Service Company Analysis	Analysis of data and information provided by nine hydraulic fracturing service companies in response to a September 2010 information request on hydraulic fracturing operations
Well File Review	Analysis of data and information provided by nine oil and gas operators in response to an August 2011 information request for 350 well files
FracFocus Analysis	Analysis of data compiled from FracFocus

Scenario Evaluations

Project	Description
Subsurface Migration Modeling	Numerical modeling of five subsurface fluid migration scenarios that explore the potential for fluids to move from the fractured zone to drinking water aquifers
Surface Water Modeling	Modeling of concentrations of selected chemicals at public water supplies located downstream from wastewater treatment facilities discharging treated hydraulic fracturing wastewater to surface waters
Water Availability Modeling	Assessment and modeling of current and future scenarios exploring the impact of water usage for hydraulic fracturing on drinking water availability in the Upper Colorado River Basin and the Susquehanna River Basin

Laboratory Studies

Project	Description
Source Apportionment Studies	Identification and quantification of the source of high bromide and chloride concentrations at public water supply intakes downstream from wastewater treatment facilities
Wastewater Treatability Studies	Assessment of the efficacy of common wastewater treatment processes on removing selected chemicals found in hydraulic fracturing wastewater
Br-DBP Precursor Studies	Assessment of the ability of bromide and brominated compounds present in hydraulic fracturing wastewater to form brominated disinfection byproducts (Br-DBPs) during drinking water treatment processes
Analytical Method Development	Development of analytical methods for selected analytes found in hydraulic fracturing fluids or wastewater

Toxicity Assessments

Project	Description
Toxicity Assessment	Toxicity assessment of chemicals used in hydraulic fracturing fluids or found in hydraulic fracturing wastewater

Case Studies

Project	Description
Prospective Studies	Investigation of potential impacts of hydraulic fracturing through collection of samples from a site before, during and after well pad construction and hydraulic fracturing
Retrospective Studies	Investigations of whether reported drinking water impacts may be associated with or caused by hydraulic fracturing activities