



Smoke in the Ozark Highlands



Name:	Class/Period:	Date:
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During the slideshow presentation, complete Part A and Part B.

Part A: Background Information

1) What is smoke?

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2) Table 1: The Four Stages of Combustion

Stage	Characteristic(s)
Pre-ignition	
Flaming	
Smoldering	
Glowing	

3) What are two environmental hazards associated with smoke?

1)	2)
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4) What are the 6 criteria pollutants that are included in the NAAQS?

1)	4)
2)	5)
3)	6)

5) In number 4), ~~cross out~~ the criteria pollutant that isn't present in smoke from burning vegetation.

6) In number 4), circle the two criteria pollutants that are of greatest health concern.

What are some examples of health impacts these two pollutants can have?

7) What are the steps of risk analysis?

1)
2)
3)

8) Table 2: Accepted Levels of Risk for “Smoke in the Ozark Highlands”

Environmental Hazard	Acceptable Level of Risk
Reduced Visibility	
Pollutant Exposure	

Part B: VSmoke-Web Simulation Preparation

9) What are the two simplest ways to manage smoke impacts?

1)
2)

10) What are examples of “points of concern” that must be identified to assist with smoke management decisions?

1)
2)
3)
4)

5)
6)
7)

Part C: Case Study Information

Using the [“Smoke in the Ozark Highlands” case study map](#), choose a case study to simulate and determine “points of concern” near the burn site.

- Available case studies are marked with orange “fire” icons.
- Use the map to “visit” the case study locations to determine which one will be simulated.
 - Zoom in on the locations until a “yellow area” is visible.
 - The “yellow area” is where the prescribed burn will be conducted, the burn unit.

11) Case Study to be simulated:

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- Once a case study has been chosen, use the map in “Step 3” to analyze the burn unit’s surrounding area for “points of concern.”
 - Remember, depending upon the size of the burn, smoke could have impacts many miles away.
 - Examine the “closer” surroundings of the burn unit to begin.
 - Then, zoom out until features can be seen 20-30 miles away.
 - Refer to **10)** from **Part B** as a reminder of “points of concern.”
- Write down “points of concern” in the table below:

Table 3: “Points of Concern” for the Case Study:_____

Description	Direction from Burn Unit	Distance from Burn Unit	Environmental Hazard(s) of Concern

12) Find the "Fire & Weather Info" table for the selected case study (provided either as links or on paper). Record the case study information in the table below:

Table 4: Case Study “Fire & Weather Info” to be Used with VSmoke-Web

	Case Study:	Season of Burn Growing or Dormant
1)	Latitude	
	Longitude	
2)	Acres	

	Duration (hours)	
	Ignition Method	Backing/Spot
3)	Ozark Highlands Category*	*
	Fuel Type	
4)	Fuel Moisture	
	% Consumed	
6)	Transport Wind	
	Transport Wind	

*Not a simulation parameter for VSmoke-Web.

To “run” the simulation, click on “Run Model” beneath parameter “7. *Update Map*.”

Part D: The Simulation

Go to the “[VSmoke-Web](#)” online simulation ([demonstration video](#)).

- Enter the parameters for the chosen case study
- Run the model (click on “Run Model” beneath parameter “7. *Update Map*”)
- Switch the map to “Satellite” view
- Scale and adjust the map as necessary
- Insert a screen print/shot of the map in the indicated location below or have the instructor check the map on a device
- Respond to the prompts (the AQI information in “Step 6” of the JenksFERST activity could help)

13) Insert a screenshot of the resulting VSmoke-Web map. Be sure to scale and adjust the map as necessary to show the AQI impact plume and surrounding points of concern.

Insert map here or have the instructor check the map on a device.

14) Estimate the length of the predicted AQI impact plume resulting from the case study's prescribed burn.

15) On the resulting map, what is the most severe "reduced visibility" impact resulting from the burn?

16) Describe an appropriate immediate response to the reduced visibility impact in 15).

17) On the resulting map, what is the most severe "pollutant exposure" impact resulting from the burn?

18) Describe an appropriate immediate response to the pollutant exposure impact in 17). (The AQI table provided in the slideshow or in "Step 6" on JenksFERST could be helpful.)

19) According to the AQI impact plume predicted with VSmoke-Web, should the case study's prescribed burn be conducted? Explain.

20) Describe a smoke management plan for the case study that could eliminate or reduce smoke impacts predicted on the map from occurring on future burns.

Part E: Wilson's Creek National Battlefield Smoke Management Plan

- Go to the [“Smoke in the Ozark Highlands - Wilson's Creek National Battlefield” map](#).
- Read this background information:

Wilson's Creek was the first major Civil War battle fought west of the Mississippi River, and where the first Union general was killed in action. The costly Southern victory on August 10, 1861, focused national attention on the war in Missouri. Wilson's Creek National Battlefield commemorates and interprets the battle within the context of the war west of the Mississippi. Wilson's Creek is currently involved in a long-term program aimed at restoring the historic landscape within the park through periodic prescribed burns. At the time of the 1861 battle, much of the vegetation was an upland savanna. Both historically and naturally, fire played an important role in maintaining this savanna landscape. With its prescribed fire program, the National Park Service is reintroducing fire as an effective management tool to assist with the restoration of this important historic scene.

Important goals of the prescribed fire management plan at Wilson's Creek National Battlefield:

- Restore historic vegetation patterns
- Reduce invasive plant species
- Enhance native prairie grasses and wildlife habitat
- Mitigate wildfire risk through fuel reduction
- Preserve cultural and historic landscape integrity

The proposed burn unit in the map has an area of 30 (thirty) acres.

- Investigate the area surrounding the “Wilson's Creek National Battlefield” using this map, [“Smoke in the Ozark Highlands - Wilson's Creek National Battlefield” map](#).
- Respond to the prompt below.

21) Describe a smoke management plan that could allow the U.S. National Park Service to conduct prescribed burns at the Wilson's Creek National Battlefield.

Part F: Submission of Work - Submit your completed “Smoke in the Ozark Highlands” activity according to the procedure provided by the instructor.