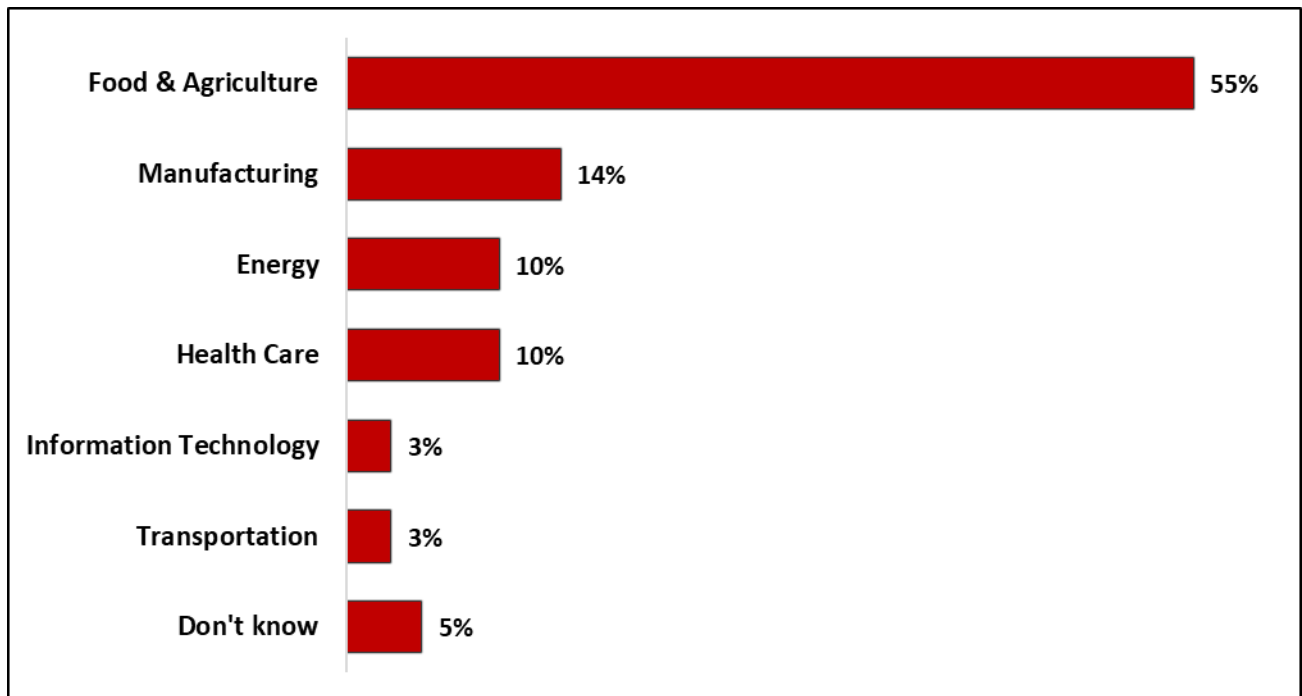# APM Survey:

What do Americans think about water use and pollution?

APM Research Lab on behalf of the Water Main
March 26, 2019

Which consumes the most water? Most Americans correctly believe that Food & Agriculture consumes more water than any other industrial sector asked about.

Question: "Of the following industries or sectors, which one do you think USES the most water?"
Source: APM Survey (January 22-27, 2019). Nationally representative sample, half sample A (n=500). Margin of error for the sample is +/-5.4 percentage points at the 95 percent confidence level.

What does science tell us about industrial impacts on water?

by [Dan Ackerman](), Fellow with the Water Main

Which industrial sector uses the most water?

In this nationally representative survey, a majority of American adults thought Food and Agriculture was the industrial sector that uses the most water. Which sector is actually the thirstiest? The answer depends on how you define "water use."

Some water use is consumptive, meaning water is withdrawn from the environment (like a lake, stream, or underground aquifer) and not returned to its source. Agriculture is a prime example of consumptive use—irrigation water gets soaked up by crops or evaporates into the atmosphere. In fact, agriculture is the largest consumptive water user of any sector, matching most of the survey respondents' intuition. Agriculture swallows 118 billion gallons of water each day—as much as New York City uses in four months. All this irrigation water allows farmers to grow crops in parts of the country that would otherwise be too dry.

Non-consumptive use of water cycles water back to its source. Perhaps the clearest example of non-consumptive use is a hydropower dam—water held in a reservoir passes through the dam then continues its journey down-river. But the biggest non-consumptive water user is a different kind of electricity generation: thermoelectric power. In thermoelectric plants, fossil fuels or biomass are burned to boil water. The energetic steam spins a turbine to generate electricity. Then the water used in the process is usually cooled and routed back into a nearby lake or stream. Overall, very little water is lost from the surface water system. Non-consumptive water use in thermoelectric power has declined since 2005, though it still accounts for 133 billion gallons daily.

So, while energy *uses* more water than any other sector, agriculture *consumes* the most water, depleting it from lakes, streams, and underground aquifers.

-Source: [U.S. Geological Survey]()

Which industrial sector pollutes water the most?

Agriculture is the chief source of water pollution in the United States. When rainwater hits farm fields, it soaks up fertilizers and pesticides and carries them into downstream waterways. These contaminants harm fish and other aquatic creatures and can endanger drinking water sources. Agricultural pollutants have impaired over 135,000 miles of rivers and streams—enough to span over half the distance between Earth and the moon. Manufacturing was a much greater source of water pollution before it became regulated under the 1972 Clean Water Act.

Source: [U.S. Environmental Protection Agency]()

Introduction

Water touches many aspects of our lives, and indeed all life depends on it. However, Americans have a varied amount of knowledge about industrial impacts on our water resources. Are Americans' opinions aligned with the facts? Effective water policy should be informed by public opinion, so we fielded a nationally representative survey to find out what Americans know. Our study sought to gain insight on how informed the public is about two major aspects of industrial water use—how much water is used by industrial sectors relative to one another, and how much water pollution results from each of these sectors.

Key findings concerning water usage by sector

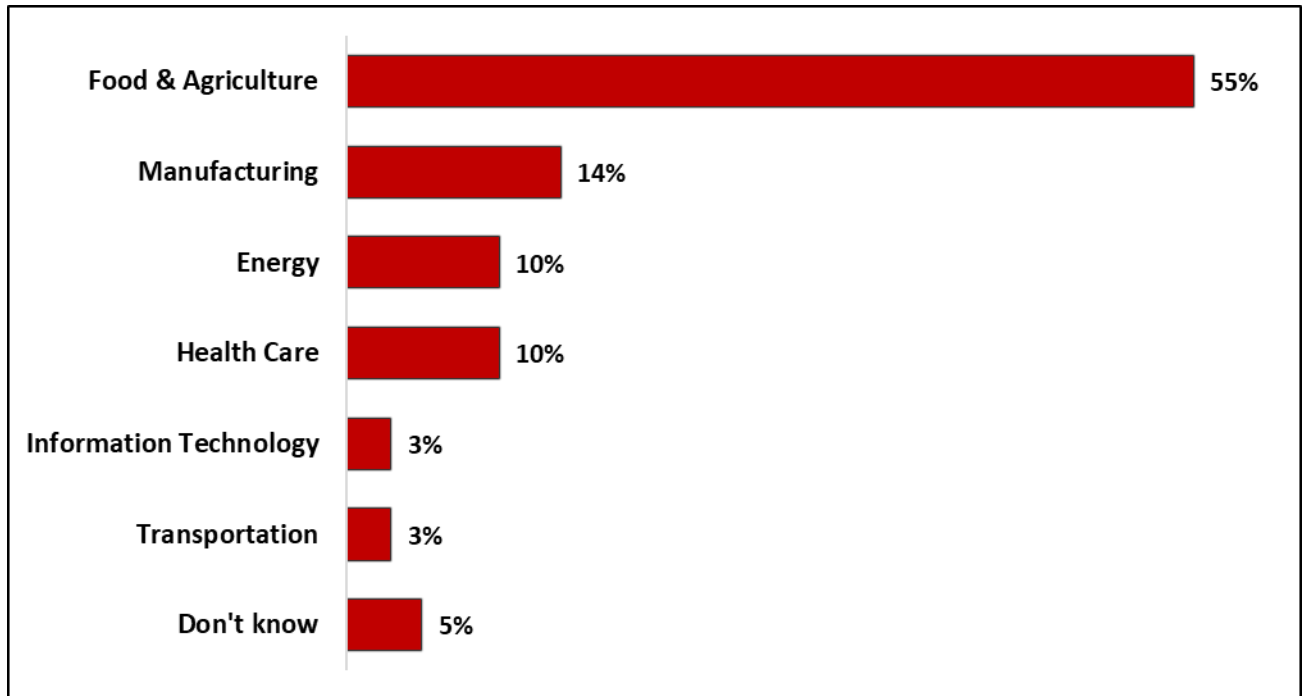We asked a nationally representative survey of American adults the following question:

"Of the following industries or sectors, which one do you think USES the most water?"

The survey respondents were asked to choose between these six industrial sectors provided in response: Food & Agriculture, Manufacturing, Energy, Health Care, Information Technology, and Transportation.

The results revealed:

- **Americans overwhelmingly believe (55%), correctly, that the Food & Agriculture sector consumes more water than any other sector.**
    - This belief is consistent with reality, as the Food & Agriculture sector consumes more water than any other sector.[1]
- **When Food & Agriculture was removed as an option, more Americans chose Manufacturing (40%) and Energy (28%) as consuming the most water.**

Which consumes the most water? Most Americans correctly believe that Food & Agriculture consumes more water than any other industrial sector asked about.

Sector	Percentage
Food & Agriculture	55%
Manufacturing	14%
Energy	10%
Health Care	10%
Information Technology	3%
Transportation	3%
Don't know	5%

Question: "Of the following industries or sectors, which one do you think USES the most water?"
Source: APM Survey (January 22-27, 2019). Nationally representative sample, half sample A (n=500). Margin of error for the sample is +/-5.4 percentage points at the 95 percent confidence level.

Key findings concerning consumption

Most respondents answered this question correctly—in terms of total consumptive water use, Food & Agriculture is at the top. The next three response categories (Manufacturing, Energy, and Health Care) are statistically tied. It is also important to note the difference between *consumptive* water use and *non-consumptive* use (see the sidebar on page 2). For instance, Energy technically uses the highest volume of water in daily operations such as in hydroelectric power generation, but most of the water remains in the surface water supply.

Demographic differences around perceptions of water usage by sector

- Sixty-nine percent of respondents living in states in the West[2] chose Food & Agriculture, a significantly higher share than those who said among those who live in other regions of the country.
- Fifty-seven percent of respondents living in metropolitan areas chose Food & Agriculture, a statistically higher proportion than non-metro respondents (39%).
  - While agricultural operations are primarily located in nonmetropolitan areas of the country, residents of those areas were less likely to see Food & Agriculture as the highest-consuming sector.
- A statistically higher percentage of those with a college degree or more (29%) correctly said Food & Agriculture pollutes water the most than those with only some college or an associate's degree (15%).

When Food & Agriculture was not offered as a response category, most Americans believe Manufacturing is the sector that consumes the most water, followed by Energy and Health Care.

Question: "Of the following industries or sectors, which one do you think USES the most water?
Source: APM Survey (January 22-27, 2019). Nationally representative sample, half sample B (n=504). Margin of error for s is +/-5.4 percentage points at the 95 percent confidence level. Due to rounding, percentages do not add up to 100%.
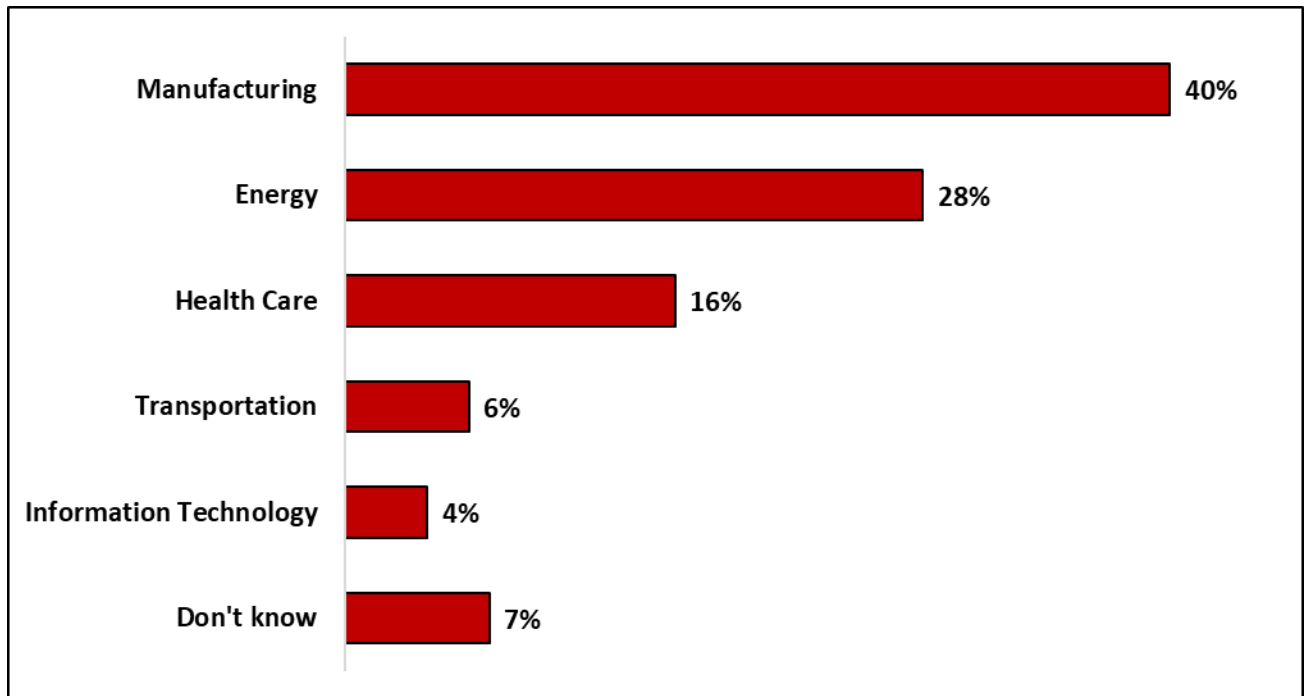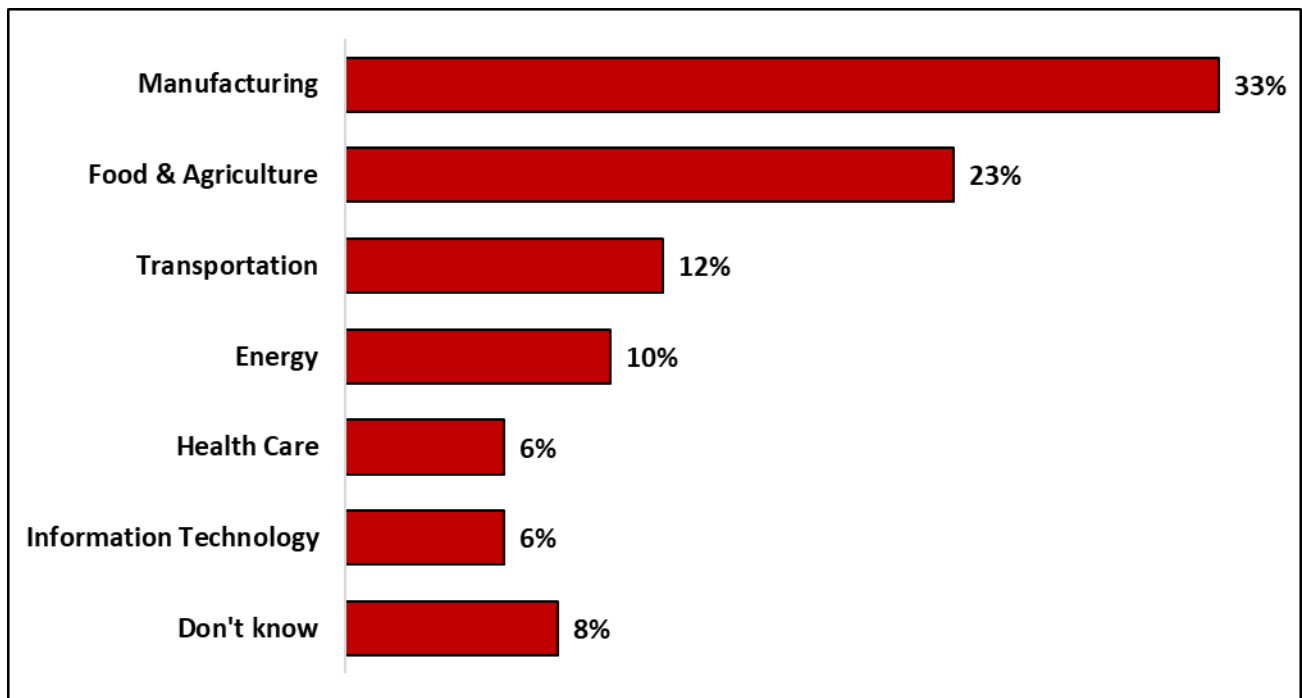
Key Findings concerning water pollution by sector

- **A plurality of Americans (33%) believe that Manufacturing pollutes water the most. In fact, Food & Agriculture is the greatest polluter of water.**
  - The next largest category of respondents (23%) correctly chose Food & Agriculture.
- When Food & Agriculture was removed in half sample B, Manufacturing remained the most popular category (39%).

Only 23 percent of Americans correctly identify Food & Agriculture as the sector that pollutes water the most.

Sector	Percentage
Manufacturing	33%
Food & Agriculture	23%
Transportation	12%
Energy	10%
Health Care	6%
Information Technology	6%
Don't know	8%

Question: "Of the following industries or sectors, which one do you think POLLUTES water the most?
Source: APM Survey (January 22-27, 2019). Nationally representative sample, half sample A (n=500). Margin of error for the sample is +/-5.4 percentage points at the 95 percent confidence level. Due to rounding, percentages do not add up to 100%.

When Food & Agriculture is not offered as a response, a plurality of Americans believe that Manufacturing pollutes water the most, followed by Energy and Transportation.
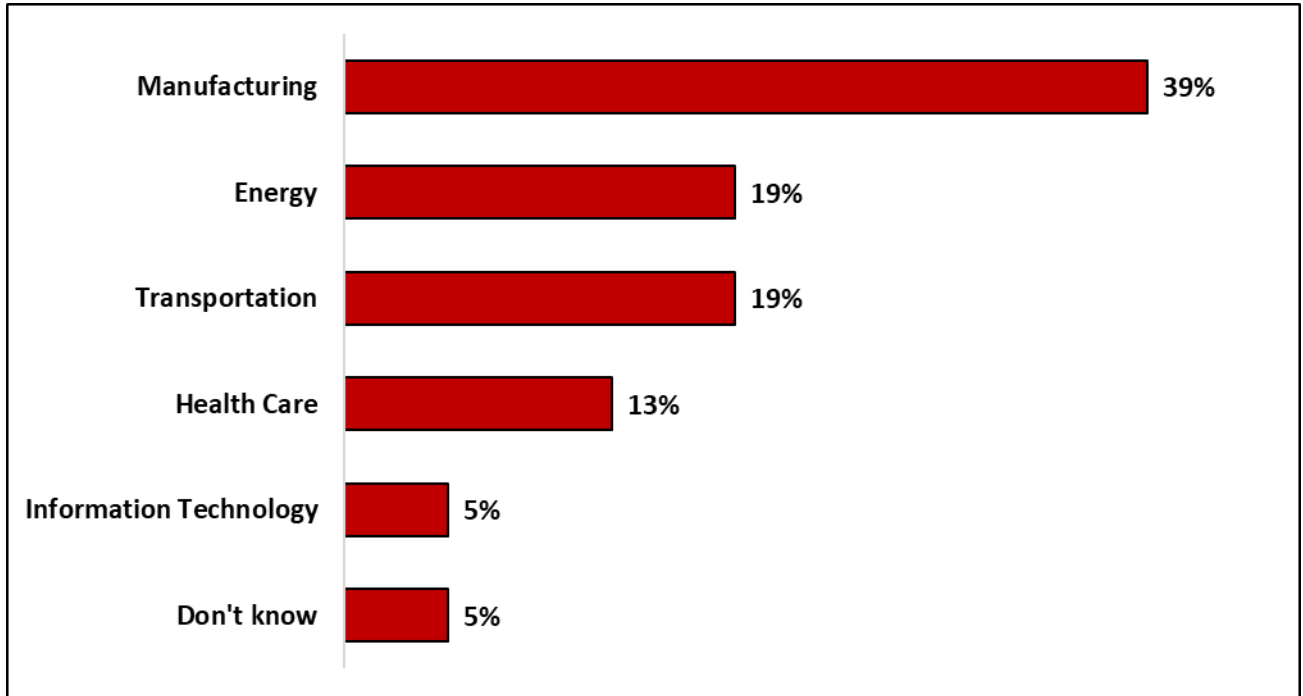
Sector	Percentage
Manufacturing	39%
Energy	19%
Transportation	19%
Health Care	13%
Information Technology	5%
Don't know	5%

Question: "Of the following industries or sectors, which one do you think POLLUTES water the most?
Source: APM Survey (January 22-27, 2019). Nationally representative sample, half sample B (n=504). Margin of error for the sample is +/-5.4 percentage points at the 95 percent confidence level.

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Appendix A: Full Survey Results

Question 1, Half Sample A: "Of the following industries or sectors, which one do you think USES the most water?"

	Number of respondents	F & A	M	HC	E	IT	T	DK
ALL	500	277	68	50	50	16	14	25
SEX								
Male	289	54%	15%	6%	12%	5%	3%	6%
Female	211	57%	12%	15%	8%	2%	3%	3%
AGE GROUP								
18-34	90	56%	14%	6%	12%	6%	2%	4%
35-44	61	73%	10%	5%	6%	1%	3%	3%
45-54	80	53%	12%	13%	11%	1%	2%	7%
55-64	72	61%	16%	7%	8%	2%	2%	4%
65+	191	38%	15%	19%	12%	5%	5%	6%
HOUSEHOLD INCOME								
Under $25,000	77	42%	16%	11%	17%	3%	6%	5%
$25,000-$49,999	121	51%	14%	15%	9%	3%	3%	5%
$50,000-$74,999	56	68%	12%	9%	10%	2%	0%	0%
$75,000 or more	159	58%	15%	6%	9%	4%	2%	5%
REGION								
North East	95	49%	19%	12%	9%	2%	5%	5%
North Central	93	46%	17%	15%	6%	6%	4%	5%
South	184	53%	13%	11%	14%	2%	1%	4%
West	128	69%	7%	4%	8%	4%	3%	6%
EDUCATIONAL ATTAINMENT								
High School or less	174	46%	15%	12%	14%	3%	3%	7%
Some college/associate's degree	102	63%	10%	10%	6%	6%	2%	4%
4-year degree +	218	64%	15%	7%	8%	2%	3%	1%
RACE								
White non-Hispanic	340	58%	14%	9%	10%	1%	2%	5%
Black non-Hispanic	43	50%	7%	17%	14%	3%	4%	5%
Hispanic or Latino	65	52%	16%	12%	7%	6%	2%	4%
METRO STATUS								
Metro	322	57%	13%	11%	9%	3%	3%	3%
Non-metro	104	39%	15%	13%	15%	6%	4%	7%

Question: "Of the following industries or sectors, which one do you think USES the most water?"
Source: APM Survey (January 22-27, 2019). Nationally representative sample, half sample A (n=500). Margin of error for the sample is +/-5.4 percentage points at the 95 percent confidence level.

Key:

F&A	= Food & Agriculture	E	= Energy
M	= Manufacturing	IT	= Information Technology
HC	= Health Care	T	= Transportation
		DK	= Don't know

Question 1, Half Sample B: "Of the following industries or sectors, which one do you think USES the most water?"

	Number of respondents	M	E	HC	T	IT	DK
ALL	504	199	139	81	28	19	35
SEX							
Male	260	42%	31%	11%	5%	5%	6%
Female	244	38%	25%	20%	6%	3%	8%
AGE GROUP							
18-34	88	41%	32%	18%	3%	3%	3%
35-44	62	42%	31%	19%	4%	0%	4%
45-54	61	50%	24%	5%	4%	7%	10%
55-64	89	34%	28%	13%	8%	5%	12%
65+	198	33%	22%	21%	9%	6%	9%
HOUSEHOLD INCOME							
Under $25,000	97	26%	28%	30%	5%	2%	8%
$25,000-$49,999	119	42%	27%	13%	5%	7%	6%
$50,000-$74,999	56	51%	22%	20%	0%	2%	5%
$75,000 or more	145	51%	26%	17%	2%	2%	3%
REGION							
North East	72	51%	26%	17%	2%	2%	4%
North Central	126	39%	23%	19%	7%	5%	7%
South	183	36%	30%	15%	7%	2%	10%
West	123	39%	30%	15%	5%	8%	3%
EDUCATIONAL ATTAINMENT							
High School or less	147	31%	26%	22%	9%	3%	8%
Some college/associate's degree	132	44%	28%	13%	5%	2%	8%
4-year degree +	219	45%	28%	14%	3%	7%	4%
RACE							
White non-Hispanic	340	44%	26%	15%	5%	5%	5%
Black non-Hispanic	41	26%	31%	10%	15%	0%	19%
Hispanic or Latino	67	20%	39%	30%	5%	2%	4%
METRO STATUS							
Metro	335	40%	29%	14%	5%	4%	8%
Non-metro	109	40%	25%	19%	7%	2%	7%

Question: "Of the following industries or sectors, which one do you think USES the most water?
Source: APM Survey (January 22-27, 2019). Nationally representative sample, half sample B (n=504). Margin of
error for the sample is +/-5.4 percentage points at the 95 percent confidence level. Due to rounding, percentages may not sum to 100%.

Key:

M	= Manufacturing		T	= Transportation
E	= Energy		IT	= Information Technology
HC	= Health Care		DK	= Don't know

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Question 2, Half Sample A: "Of the following industries or sectors, which one do you think POLLUTES water the most?"

	Number of respondents	M	F & A	T	E	HC	IT	DK
ALL	500	165	116	61	49	28	28	42
SEX								
Male	289	29%	23%	12%	13%	5%	6%	9%
Female	211	37%	23%	12%	6%	6%	5%	8%
AGE GROUP								
18-34	90	39%	19%	17%	7%	3%	4%	8%
35-44	61	37%	22%	9%	10%	1%	4%	18%
45-54	80	29%	30%	14%	5%	1%	9%	9%
55-64	72	40%	26%	6%	15%	9%	4%	1%
65+	191	23%	20%	12%	16%	14%	6%	6%
HOUSEHOLD INCOME								
Under $25,000	77	20%	25%	11%	11%	10%	6%	11%
$25,000-$49,999	121	35%	28%	16%	7%	8%	3%	3%
$50,000-$74,999	56	44%	16%	15%	6%	0%	5%	13%
$75,000 or more	159	34%	25%	10%	13%	5%	7%	5%
REGION								
North East	95	39%	18%	17%	12%	2%	4%	5%
North Central	93	32%	25%	10%	8%	10%	3%	6%
South	184	28%	26%	10%	10%	7%	8%	8%
West	128	35%	23%	12%	8%	6%	5%	13%
EDUCATIONAL ATTAINMENT								
High School or less	174	32%	23%	12%	8%	6%	5%	11%
Some college/associate's degree	102	34%	15%	14%	10%	8%	6%	10%
4-year degree +	218	34%	29%	11%	12%	5%	5%	2%
RACE								
White non-Hispanic	340	34%	25%	10%	12%	5%	5%	7%
Black non-Hispanic	43	37%	20%	14%	7%	7%	3%	10%
Hispanic or Latino	65	30%	16%	17%	8%	5%	5%	14%
METRO STATUS								
Metro	322	32%	23%	12%	10%	6%	6%	9%
Non-metro	104	37%	18%	14%	9%	7%	5%	7%

Question: "Of the following industries or sectors, which one do you think POLLUTES water the most?
Source: APM Survey (January 22-27, 2019). Nationally representative sample, half sample A (n=500). Margin of
error for total respondents is +/-5.4 percentage points at the 95 percent confidence level. Due to rounding, percentages may not sum to 100%.

Key:

M	= Manufacturing	HC	= Health Care
F&A	= Food & Agriculture	IT	= Information Technology
T	= Transportation	DK	= Don't know
E	= Energy		

Question 2, Half Sample B: "Of the following industries or sectors, which one do you think POLLUTES water the most?"

	Number of respondents	M	T	E	HC	IT	DK
ALL	504	195	95	94	63	27	23
SEX							
Male	260	40%	16%	23%	12%	5%	4%
Female	244	38%	21%	15%	13%	6%	5%
AGE GROUP							
18-34	88	35%	30%	21%	11%	3%	1%
35-44	62	33%	26%	17%	14%	5%	3%
45-54	61	52%	14%	22%	4%	4%	3%
55-64	89	44%	10%	23%	13%	5%	4%
65+	198	36%	10%	11%	19%	11%	12%
HOUSEHOLD INCOME							
Under $25,000	97	30%	22%	17%	21%	5%	5%
$25,000-$49,999	119	42%	22%	12%	13%	8%	1%
$50,000-$74,999	56	41%	13%	22%	15%	6%	2%
$75,000 or more	145	46%	16%	21%	6%	6%	3%
REGION							
North East	72	44%	12%	15%	14%	7%	6%
North Central	126	39%	17%	22%	8%	6%	7%
South	183	40%	22%	14%	15%	4%	4%
West	123	34%	20%	25%	13%	6%	2%
EDUCATIONAL ATTAINMENT							
High School or less	147	29%	21%	22%	13%	9%	6%
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RACE							
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Black non-Hispanic	41	35%	25%	13%	9%	7%	12%
Hispanic or Latino	67	30%	23%	20%	16%	7%	3%
METRO STATUS							
Metro	335	37%	21%	20%	12%	6%	4%
Non-metro	109	47%	13%	15%	15%	2%	7%

Question: "Of the following industries or sectors, which one do you think POLLUTES water the most?
Source: APM Survey (January 22-27, 2019). Nationally representative sample, half sample B (n=504). Margin of
error for total respondents is +/-5.4 percentage points at the 95 percent confidence level. Due to rounding, percentages may not sum to 100%.

Key:

M	= Manufacturing	HC	= Health Care
T	= Transportation	IT	= Information Technology
E	= Energy	DK	= Don't know

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Appendix B: About the Survey

This survey is the result of an ongoing collaboration between the Water Main and the APM Research Lab, with data collection paid for by the Water Main. The survey was conducted by SSRS between January 22-27, 2019 on its Omnibus survey platform.

Interviews were conducted by telephone among a sample of 1,004 respondents in English (967) and Spanish (37). The surveys were conducted via landline (401) and cell phone (603). Because of the split half sample design of this survey, the margin of error for each sample is +/-5.4 percentage points at the 95 percent confidence level. All data are weighted to reflect a nationally representative target population.

For additional details about survey methodology, please see: https://www.americanpublicmedia.org/wp-content/uploads/2019/02/SSRS_2019_Feb_5-10_OmnibusSurvey_Methods.docx

The survey used a split sample design, with Half Sample A receiving the full array of response options, and Half Sample B receiving the same array minus the Food & Agriculture option. Survey designers anticipated a high number of respondents choosing "Food & Agriculture," so the sample was split to measure more variation among the remaining response categories.

The verbatim questions asked of participants in Half Sample A were:

1. Of the following industries or sectors, which one do you think USES the most water?
   A. Food and Agriculture
   B. Manufacturing
   C. Health Care
   D. Energy
   E. Information Technology
   F. Transportation
   G. Don't know/refuse

2. Of the following industries or sectors, which one do you think POLLUTES water the most?
   A. Food and Agriculture
   B. Manufacturing
   C. Health Care
   D. Energy
   E. Information Technology
   F. Transportation
   G. Don't know/refuse

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The specific questions asked of participants in Half Sample B were:

1. Of the following industries or sectors, which one do you think USES the most water?
   A. Manufacturing
   B. Health Care
   C. Energy
   D. Information Technology
   E. Transportation
   F. Don't know/refuse

2. Of the following industries or sectors, which one do you think POLLUTES water the most?
   A. Manufacturing
   B. Health Care
   C. Energy
   D. Information Technology
   E. Transportation
   F. Don't know/refuse

Acknowledgments

This report was authored by Josh Quinn of the APM Research Lab, with contributions by Dan Ackerman of the Water Main.

End Notes

_____

[1] Defined as "consumptive use" as opposed to "non-consumptive use" in areas such as energy where water is used for power generation and then deposited back into the environment.

[2] Regions are defined as: **North Central**: Iowa, Illinois, Indiana, Kansas, Michigan, Minnesota, Missouri, North Dakota, Nebraska, Ohio, South Dakota, Wisconsin. **North East**: Connecticut, Maine, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, Vermont. **South**: Alabama, Arkansas, Washington DC, Delaware, Florida, Georgia, Kentucky, Louisiana, Maryland, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, Virginia, West Virginia. **West**: Alaska, Arizona, California, Colorado, Hawaii, Idaho, Montana, New Mexico, Nevada, Oregon, Utah, Washington, Wyoming.

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The Water Main builds public will in support of clean, abundant, accessible water. We do this as a hub that brings people together, informs and expands perspectives, catalyzes new thinking and action, and collaborates with stakeholders. By doing this, we will serve more people and strengthen American Public Media's public service.

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