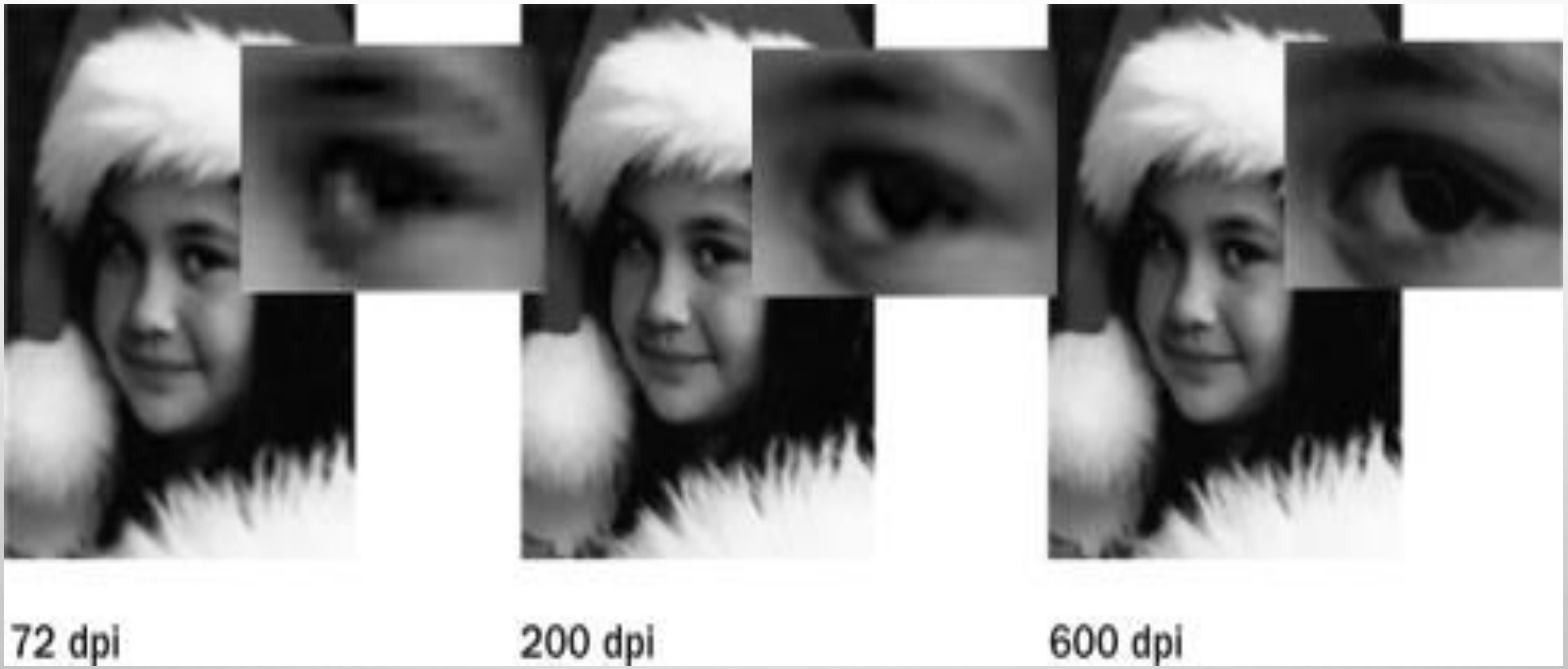
DEALING WITH DATA

ALL ABOUT THE DATA…

WHICH PHONE DATA PLAN DO YOU PREFER—

1 GIGABYTE OR 8 GIGABYTES?

HOW DO YOU KNOW WHEN YOU HAVE ENOUGH DATA?"



https://www.sciencedirect.com/topics/computer-science/resolution-image

DATA DEFINED

- WHAT ARE DATA?
- WHY IS THE AMOUNT OF DATA IMPORTANT?
- THINK OF ONE OR MORE EVERYDAY CIRCUMSTANCES IN WHICH INCREASING AMOUNTS OF DATA HELP YOU UNDERSTAND SOMETHING BETTER. DESCRIBE THESE CIRCUMSTANCES.

DATA IS EVERYWHERE

CAN YOU PROVIDE AN EXAMPLE OF TWO THINGS THAT MIGHT BE RELATED TO ONE ANOTHER IN EVERYDAY LIFE AND THE INFLUENCE THEY HAVE ON EACH OTHER?

HOW MANY TEXT MESSAGES DO YOU SEND EACH DAY?

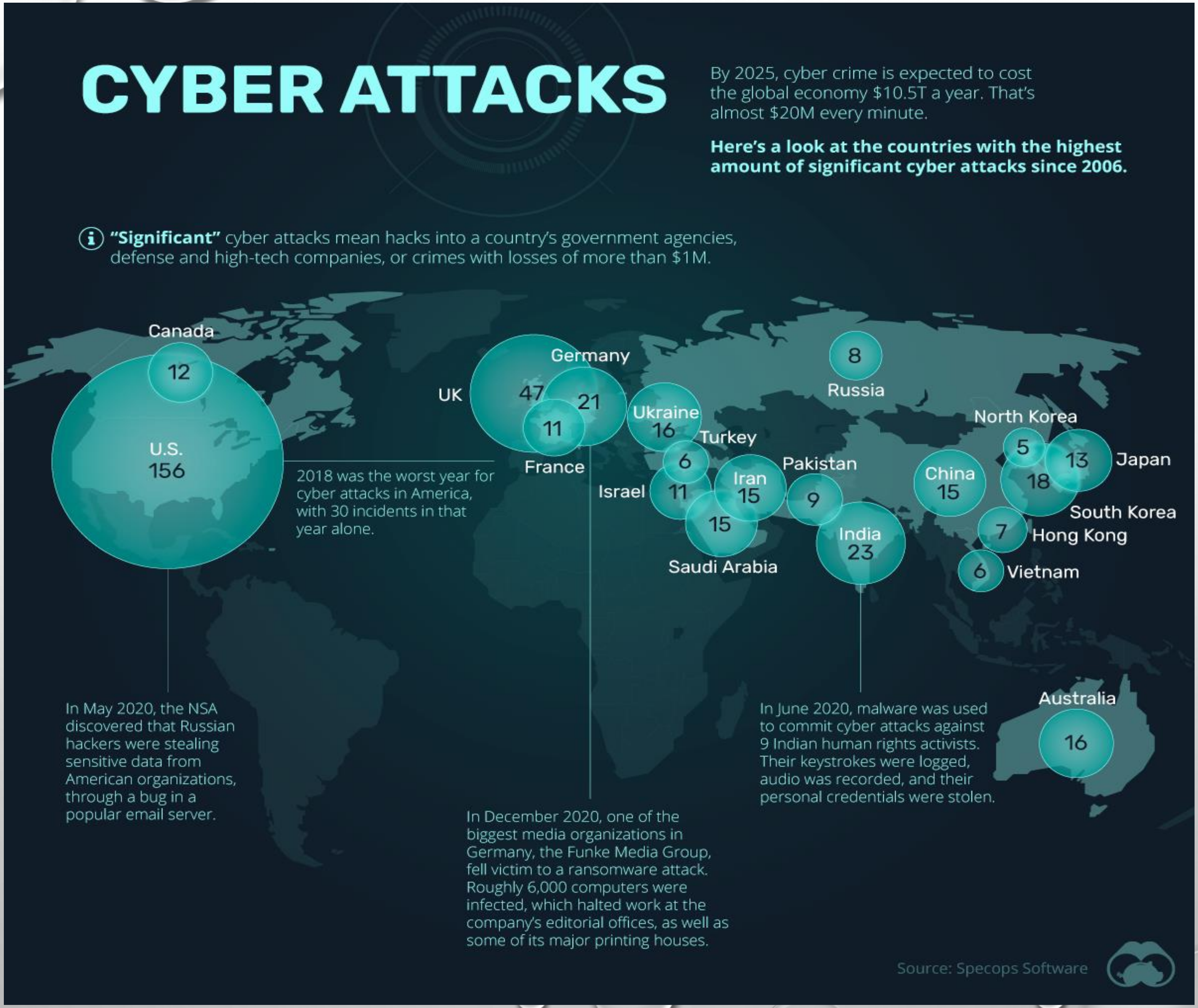
HOW FAST DOES YOUR PHONE BATTERY LIFE DECREASE AS A RESULT OF THE NUMBER OF MESSAGES?

USES OF BIG DATA

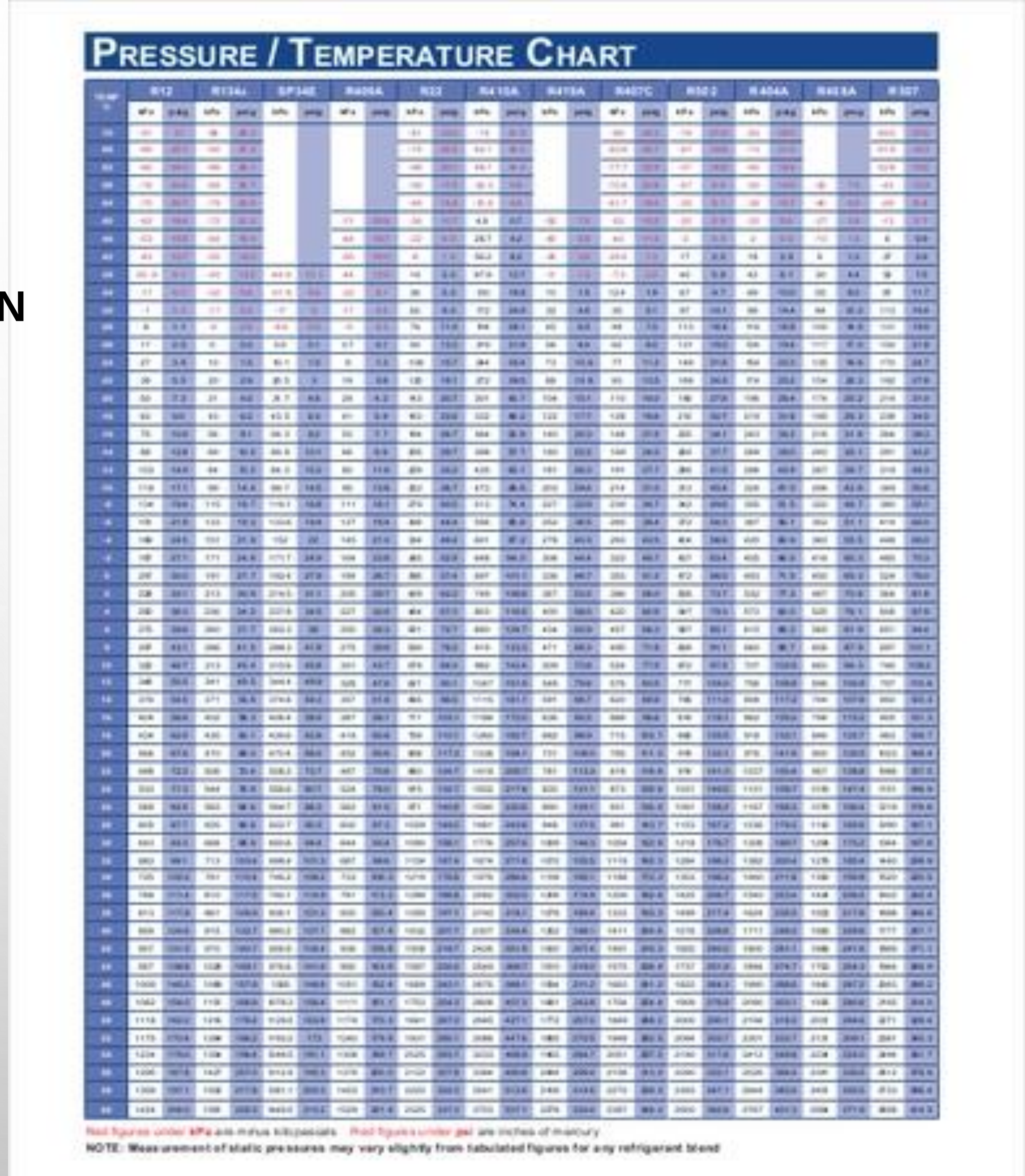
- GENERATE A LIST OF WAYS IN WHICH BIG DATA MIGHT BE HELPFUL FOR SCIENTISTS OR ENGINEERS.

- HOW MIGHT SCIENTISTS OR ENGINEERS COLLECT THIS KIND OF DATA?

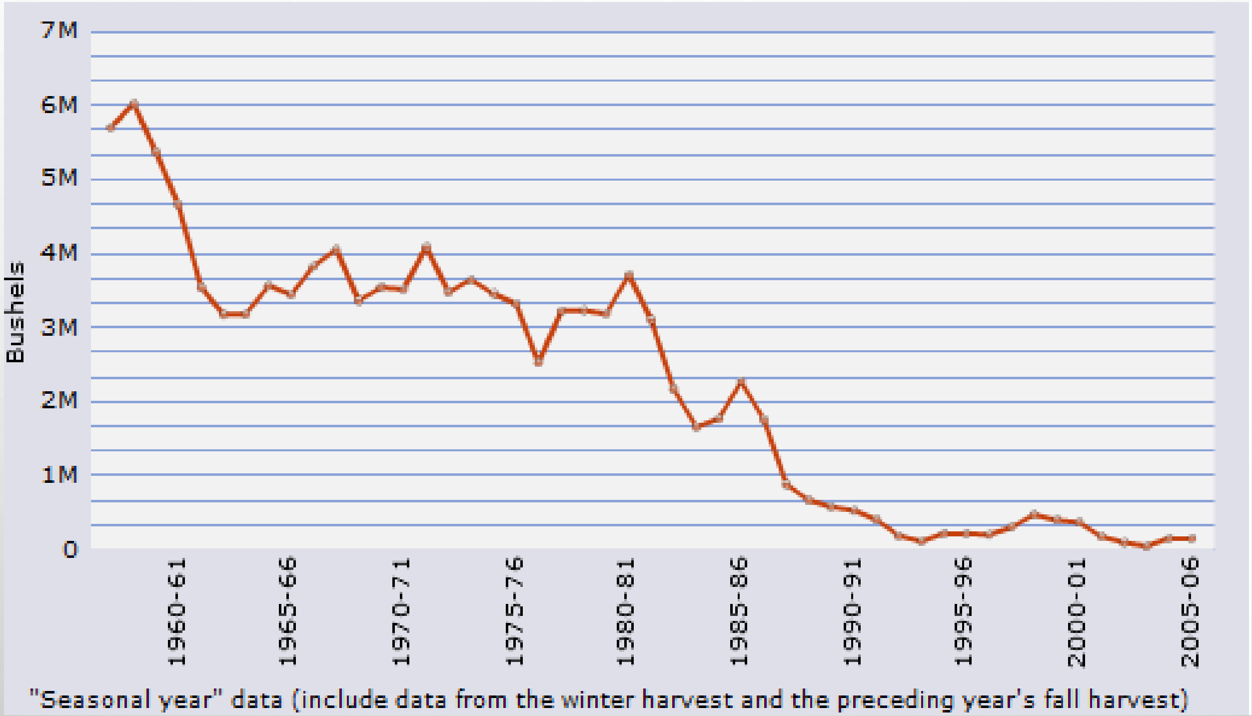
FROM OBSERVATION/REPORTING



FROM EXPERIMENTATION



Trends in Oyster Populations in Chesapeake Bay



Graph: US Fish and Wildlife Service; Data source: EPA Chesapeake Bay Program

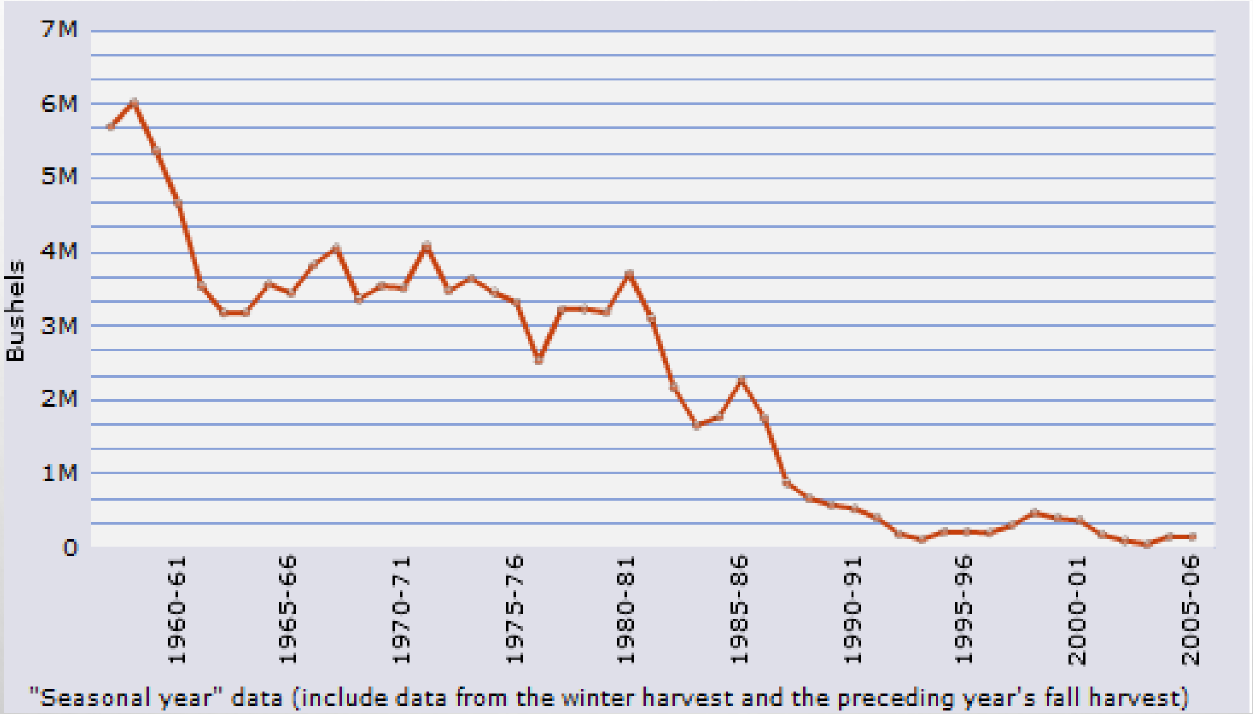
UNDERSTANDING DATA

- LOOK AT VISUALIZING TRENDS AND DIFFERENCES
  - WHAT DO YOU THINK? IS THERE A TREND OR DIFFERENCE?
  - HOW DO YOU KNOW?

INQUIRY VIA SCIENTIFIC QUESTIONS

- WHAT IS THE RELATIONSHIP BETWEEN VARIABLES?
- FOR A GIVEN DEPENDENT VARIABLE, IS THERE A DIFFERENCE BETWEEN TWO GROUPS?

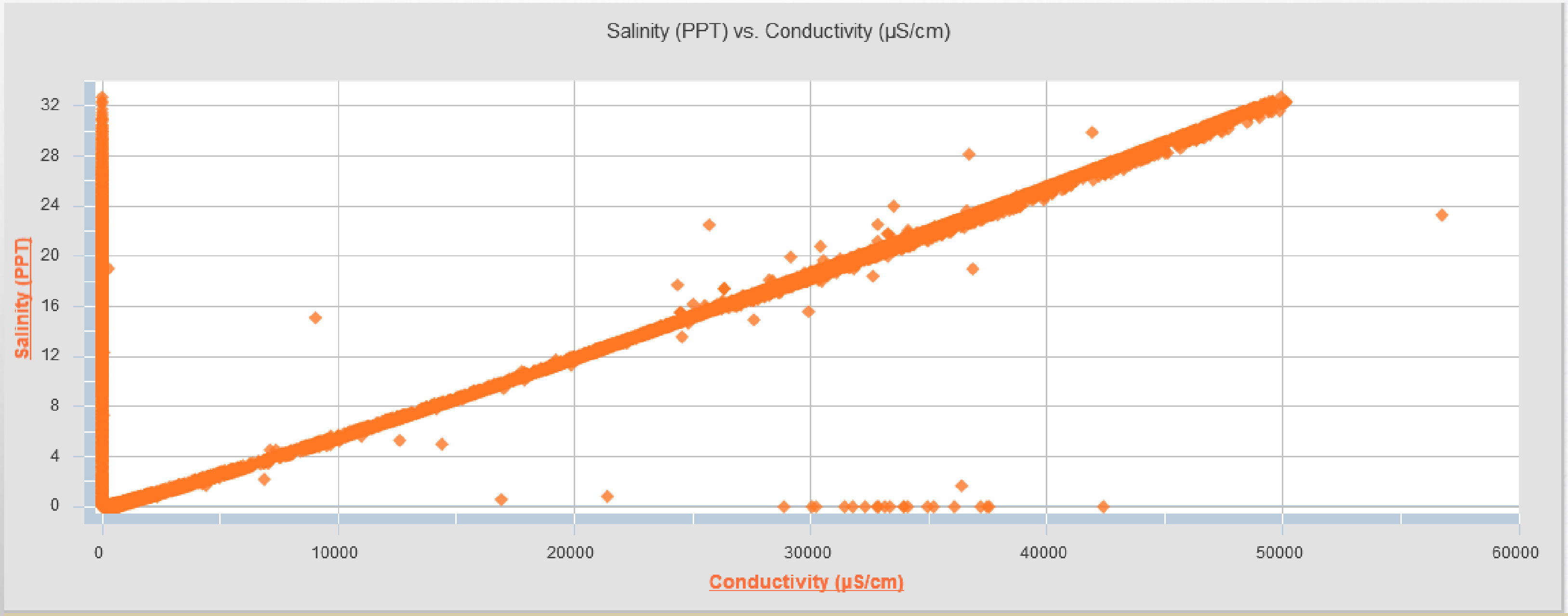
Trends in Oyster Populations in Chesapeake Bay, BREAKING DOWN THE FACTORS



Graph: US Fish and Wildlife Service; Data source: EPA Chesapeake Bay Program

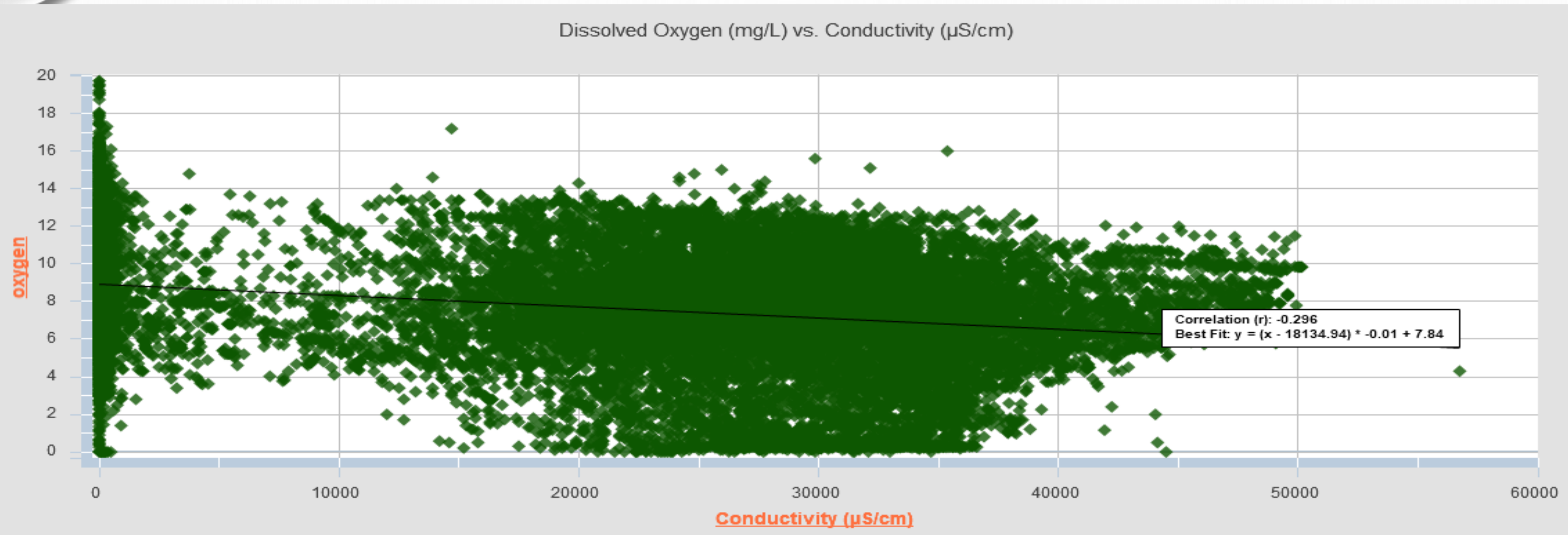
Graph 1: Salinity versus Conductivity

Conductivity measures how easily electricity flows through water. Typical values for conductivity are rain water: 2 to 100 µS/cm, ground water: 50 to 50,000 µS/cm, ocean: 50,000 µS/cm, drainage from landfill: 10,000 µS/cm.

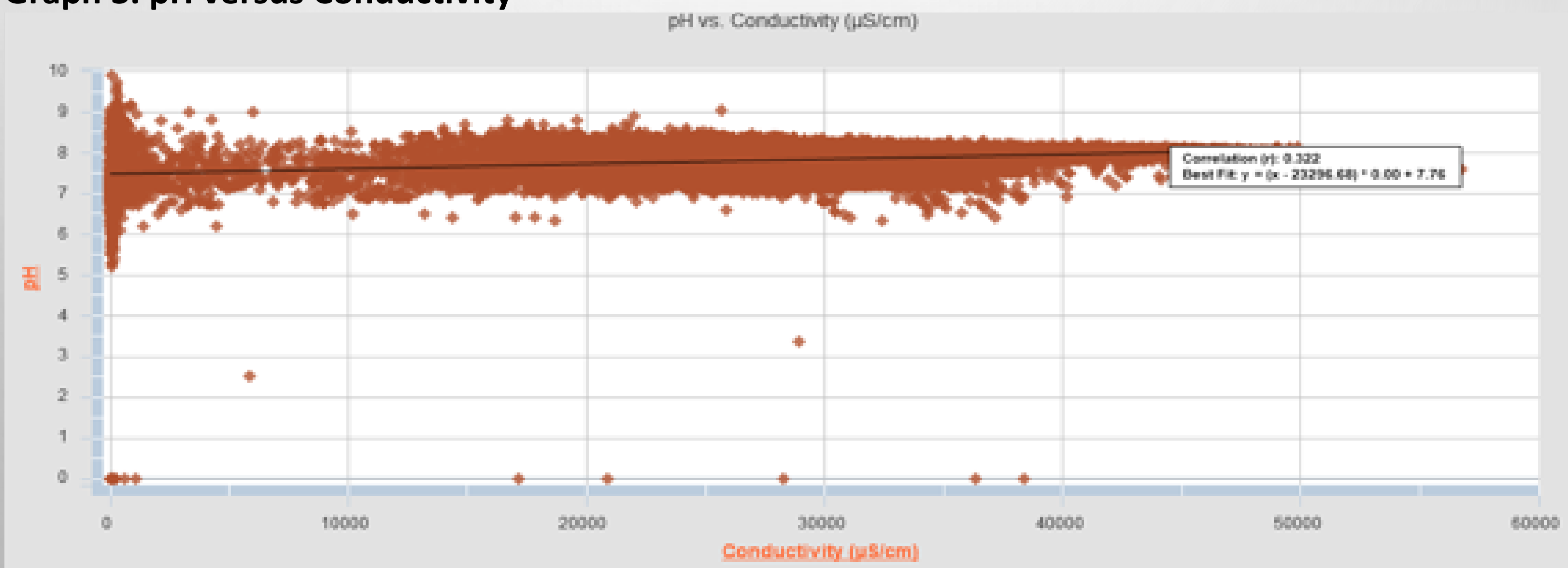


CHESAPEAKE BAY WATER QUALITY DATA

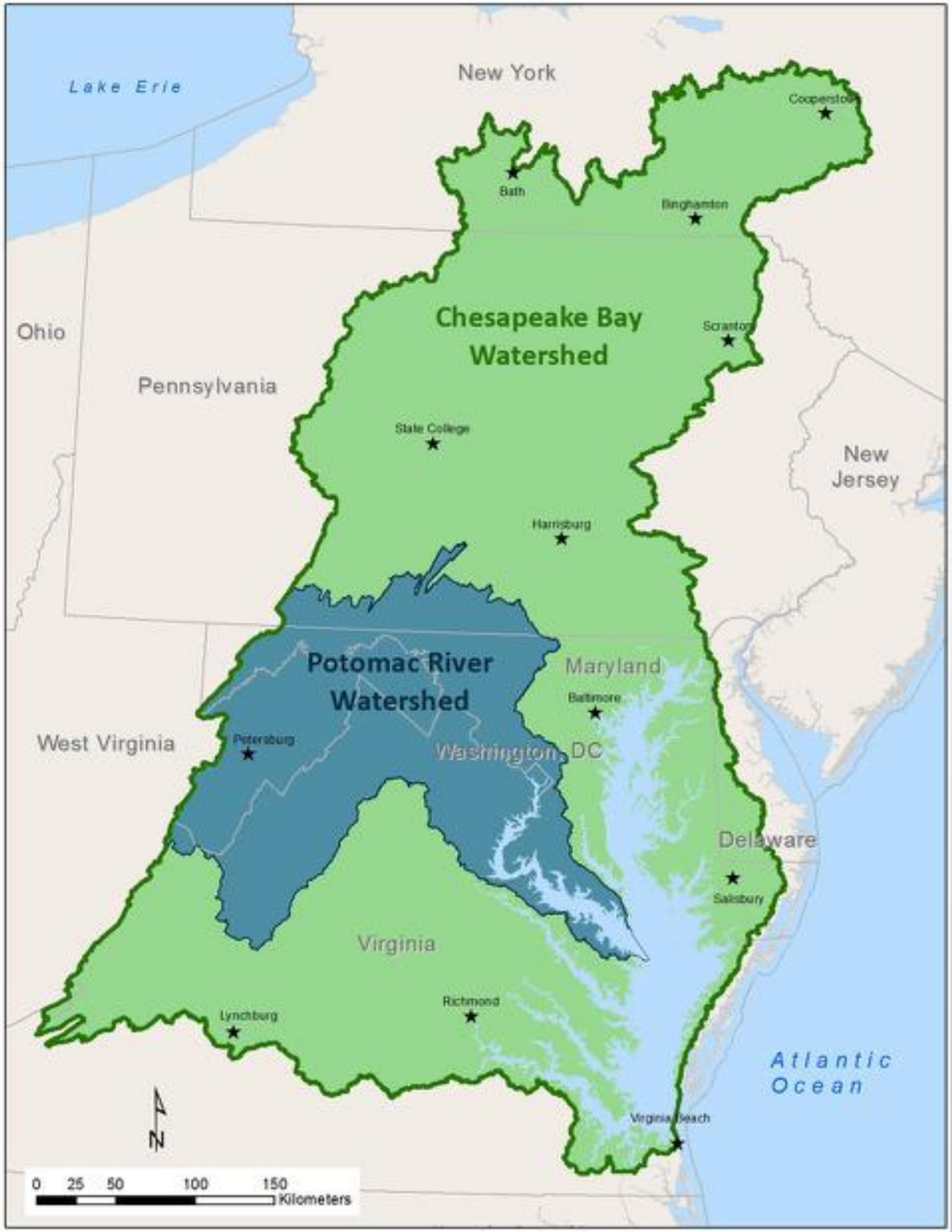
Graph 2. Dissolved Oxygen and Conductivity



Graph 3. pH versus Conductivity

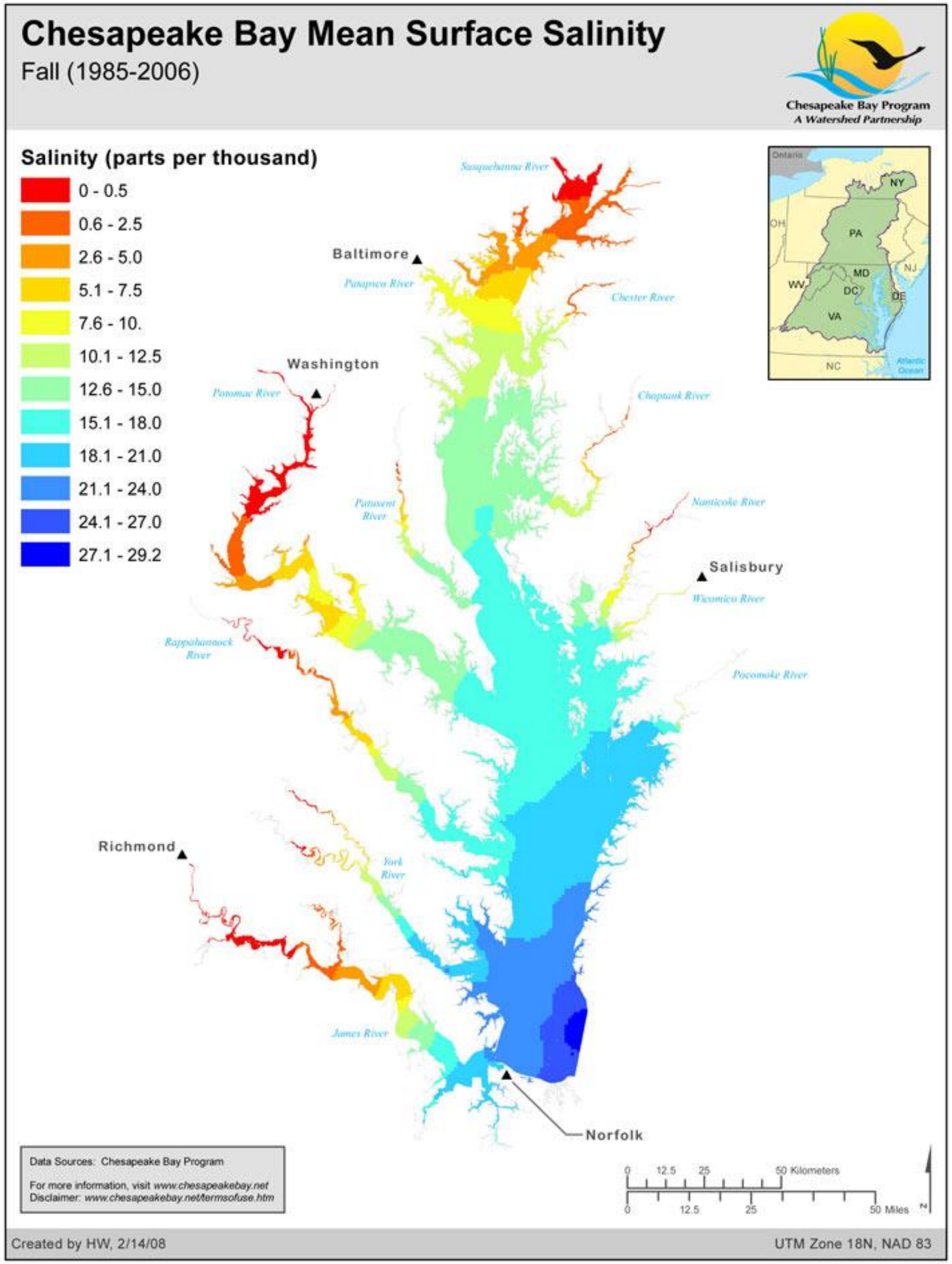


Geography of large watersheds draining into Chesapeake Bay

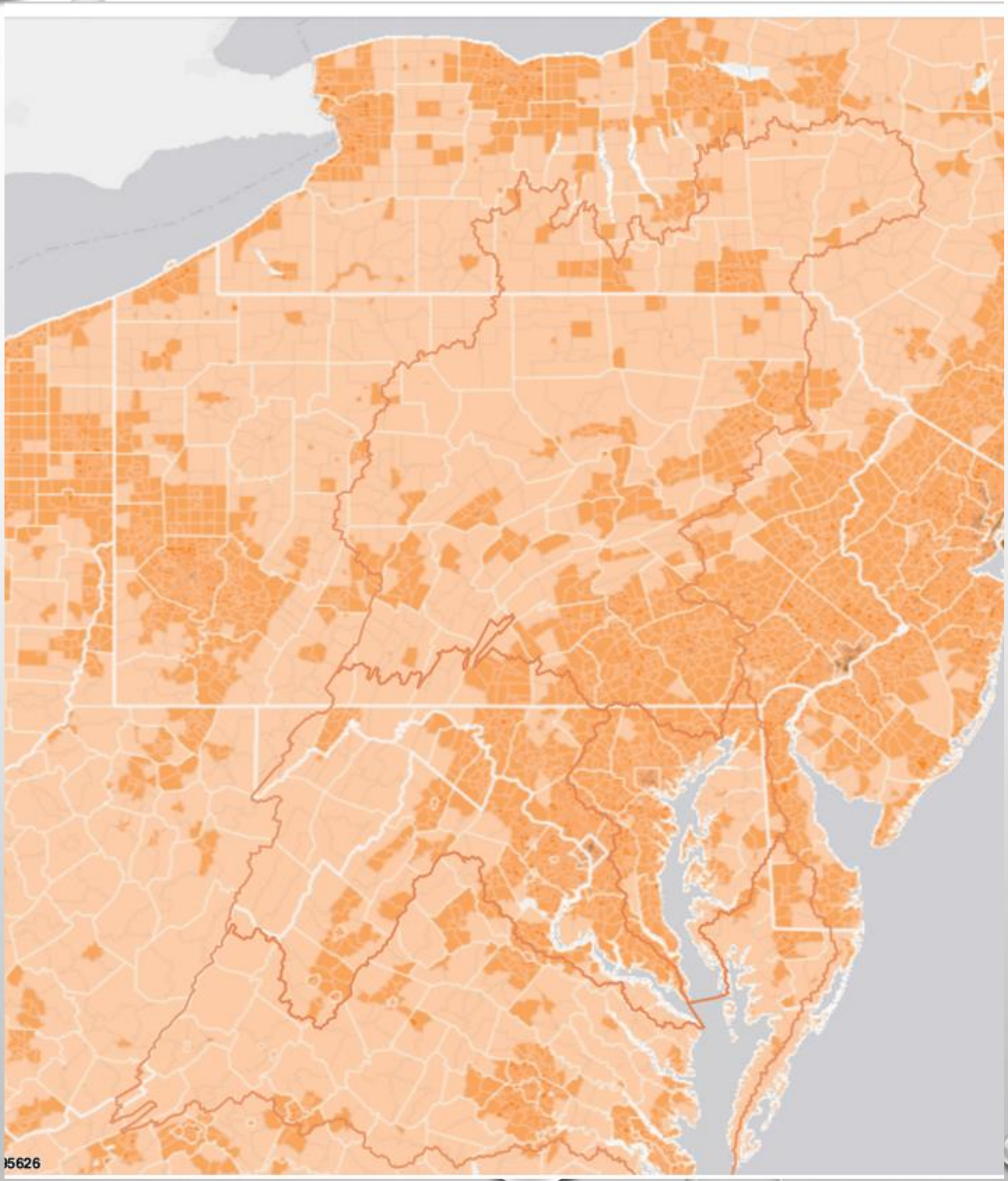


Interstate Commission on the Potomac River Basin

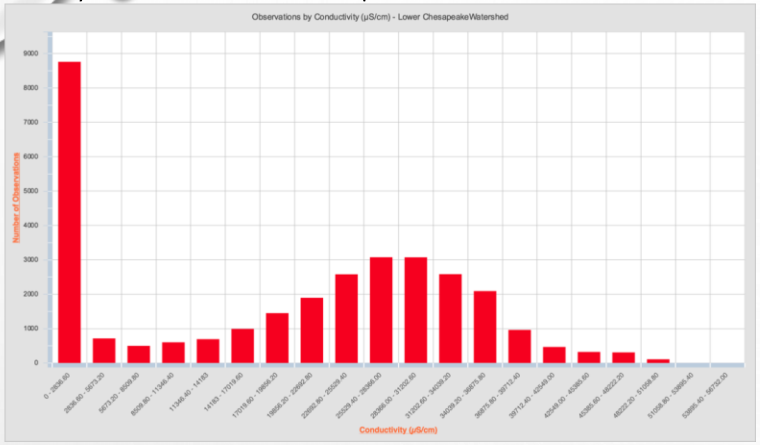
Salinity in River Outlets



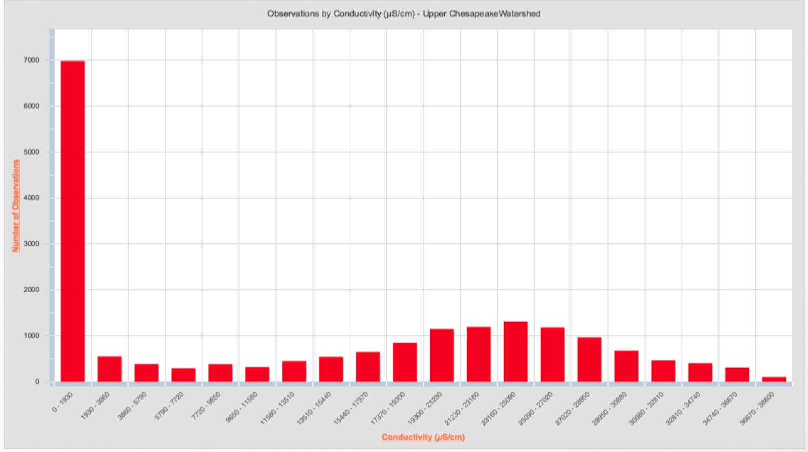
Population Density of the Chesapeake Bay Watershed



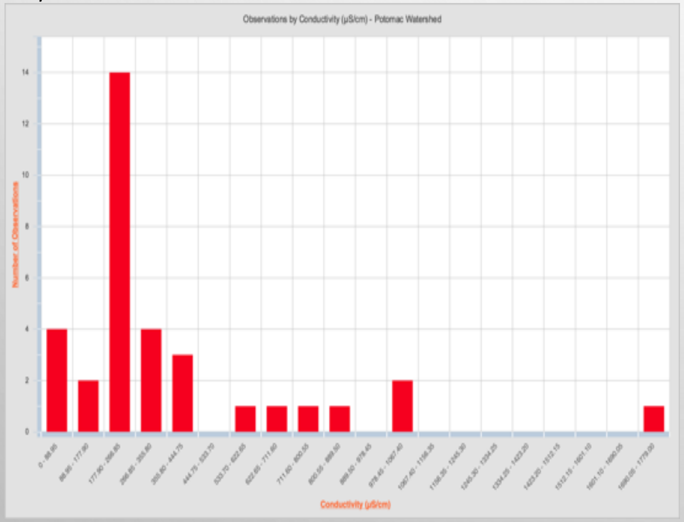
1. Conductivity Levels in the Lower Chesapeake



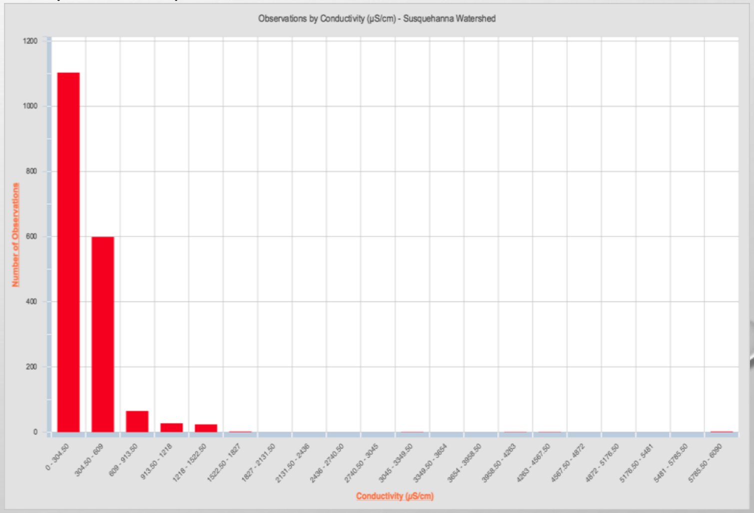
3. Conductivity in the Upper Chesapeake Watershed



2. Conductivity in the Potomac Watershed



4. Conductivity in the Susquehanna Watershed



FORMING A SCIENTIFIC QUESTION

- WHAT KINDS OF SCIENTIFIC QUESTIONS COULD WE ASK THAT WOULD HELP US UNDERSTAND TRENDS BETWEEN TWO VARIABLES?
- WHAT KIND OF SCIENTIFIC QUESTIONS COULD WE ASK THAT WOULD HELP US UNDERSTAND DIFFERENCES IN POPULATIONS?

DEVELOPING AN ARGUMENT

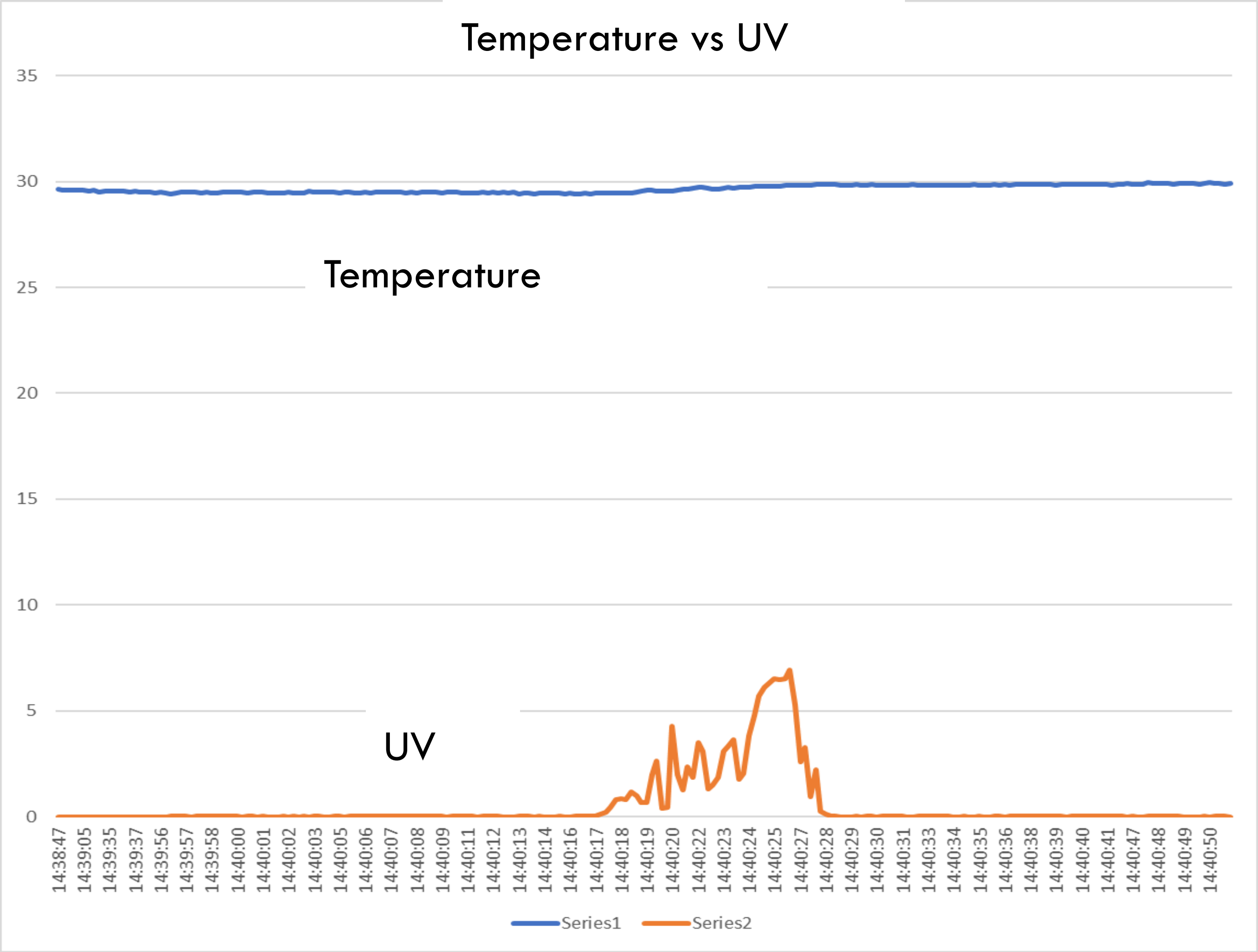
- DEVELOP EXPLANATIONS RELATED TO THE DECLINE OF THE OYSTER POPULATIONS. YOU MAY ARGUE FOR EITHER A: URBANIZATION HAS CAUSED OYSTER DECLINE, OR B: URBANIZATION HAS NOT CAUSED OYSTER DECLINE.
- USE THE DATA SOURCES AND MAPS TO FULLY DEVELOP THEIR EXPLANATIONS OF WHAT THEY THINK IS HAPPENING.
- IN PARTICULAR, PAY CLOSE ATTENTION TO THE RELATIONSHIPS BETWEEN SALINITY AND URBAN AREAS WITHIN THE BAY.
- DESIGN AND CONSTRUCT A VISUAL AID, A MAP OR GRAPH WITH A SUMMARY OR CAPTION. THE SUMMARY CAN BE IN EITHER PARAGRAPH OR BULLET POINT FORMAT.

HOW TO MANAGE THE DATA

LET'S VISIT EXCEL!

Date	Time	Air Temp °C:	Humidity %rH:	Gas Ohms:	Gas PPM:	Lux:	UV Index:
11/13/2021	14:38:47	29.63	22.14	34.92	48.33	633.6	0
11/13/2021	14:38:51	29.61	22.1	21.02	192.08	630.4	0
11/13/2021	14:38:54	29.6	21.88	20.89	189.27	632.8	0
11/13/2021	14:38:58	29.61	21.6	21.27	178.16	628	0
11/13/2021	14:39:01	29.58	21.6	21.16	195.32	624	0
11/13/2021	14:39:05	29.58	21.51	21.08	178.35	630.4	0
11/13/2021	14:39:08	29.54	21.97	21.61	169.65	630.4	0
11/13/2021	14:39:12	29.58	21.91	21.55	174.19	626.4	0
11/13/2021	14:39:35	29.52	21.67	21.65	159.83	628.8	0
11/13/2021	14:39:35	29.53	21.69	21.76	170.4	628.8	0
11/13/2021	14:39:35	29.53	21.67	21.51	168.6	628.8	0
11/13/2021	14:39:36	29.54	21.67	21.64	165.87	629.6	0
11/13/2021	14:39:36	29.54	21.68	21.72	166.76	629.6	0
11/13/2021	14:39:36	29.53	21.67	21.89	168.15	629.6	0
11/13/2021	14:39:36	29.5	21.66	21.65	166.01	629.6	0
11/13/2021	14:39:37	29.54	21.66	21.91	166.78	629.6	0
11/13/2021	14:39:37	29.51	21.67	21.93	169.12	629.6	0
11/13/2021	14:39:37	29.52	21.67	21.91	161.55	629.6	0
11/13/2021	14:40:50	29.91	23.09	21.09	188.42	279.2	0.04
11/13/2021	14:40:50	29.96	23.13	21.04	184.7	129.6	0
11/13/2021	14:40:50	29.93	23.15	21.05	179.4	216.8	0.04
11/13/2021	14:40:51	29.91	23.22	21.18	184.28	380	0.04
11/13/2021	14:40:51	29.89	23.28	21.28	186.28	403.2	0.04
11/13/2021	14:40:51	29.9	23.36	21.2	187.68	653.6	0
	max	29.96	29.77	34.92	229.97	52428	6.93
	min	29.41	21.51	19.43	48.33	129.6	0
	average	29.65	23.46	21.79	171.33	7209.91	0.55

HOW TO QUESTION THE DATA



HOW TO QUESTION THE DATA