# WHY CAN'T WE GET TO THE POINT?

## NON-POINT SOURCE WATER POLLUTION IN LAKE HURON

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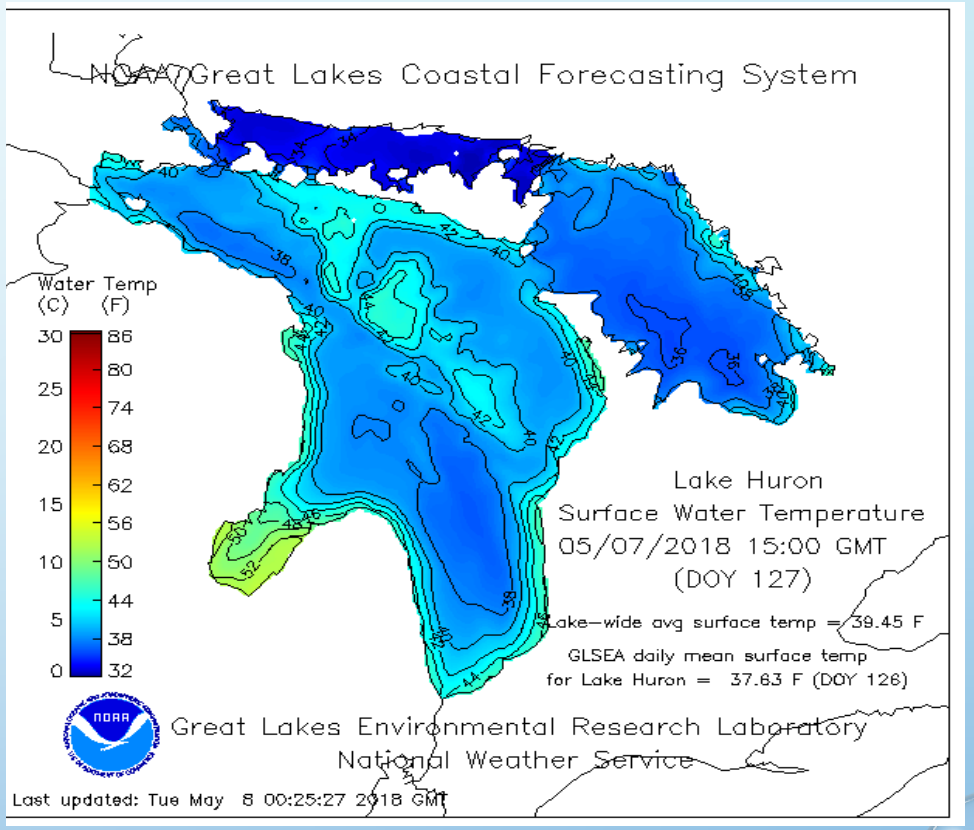
# LAKE HURON

- LAKE TYPE: GLACIAL
- LAKE HURON, LOCATED BETWEEN MICHIGAN AND ONTARIO, IS THE FIFTH LARGEST FRESH WATER LAKE IN THE WORLD
- TWO IMPORTANT ECOSYSTEMS: ALVARS AND PINERY PROVINCIAL PARK
- HYDROLOGICALLY ATTACHED TO LAKE MICHIGAN- JOINED BY THE STRAITS OF MACKINAC
- MAJOR INDUSTRIES ALONG SHORELINE: IRON/ STEEL MILLS, PAPER MILLS, METAL WORKING, SLAT MINING AND SHIP BUILDING

# WATER FACTS

- PH LEVEL: 8.3 (2013)
- 250 SPECIES OF FISHES
- 2,200 PLANT, 70 TREE AND 400 BIRD SPECIES
- SINCE 1900, TOTAL ANNUAL PRECIPITATION HAS INCREASED BY 11% IN THE U.S. GREAT LAKES REGION.
- AVERAGE DEPTH: 59 M
- SURFACE AREA: 59,565 KM2



# WHAT IS NON-POINT SOURCE WATER POLLUTION?

ACCORDING TO THE EPA:

> " NONPOINT SOURCE (NPS) POLLUTION GENERALLY RESULTS FROM LAND RUNOFF, PRECIPITATION, ATMOSPHERIC DEPOSITION, DRAINAGE, SEEPAGE OR HYDROLOGIC MODIFICATION."

UNLIKE POLLUTION THAT CAN BE TRACKED BACK TO ONE SPECIFIC LOCATION, NPS POLLUTION COMES FROM MANY DIFFUSE SOURCES

# PROPERTIES OF POLLUTANTS

- THE LEVEL OF IMPACT FROM A POLLUTANT IS DEPENDENT ON SEVERAL PROPERTIES OF THE PARTICULAR POLLUTANT:
  1. LEVEL OF TOXICITY
     - THE HIGHER THE TOXICITY LEVEL THE GREATER DANGER THEY POSE.
  2. AMOUNT OF POLLUTANT IN THE ENVIRONMENT
     - ALTHOUGH A POLLUTANT MAY ONLY BE MILDLY TOXIC IF IT IS FOUND IN THE ENVIRONMENT IN SUFFICIENT QUANTITIES IT CAN BE VERY HARMFUL
  3. LONGEVITY OF THE POLLUTANT
     - SOME POLLUTANTS BREAKDOWN QUICKLY AND DISSOLVE. OTHERS ARE HIGHLY RESISTANT AND CAN REMAIN FOR DECADES AFTER THEIR RELEASE. DDT AND PCB`S ARE PARTICULARLY RESISTANT. STUDIES FROM THE GREAT LAKES HAVE SHOWN THAT WHILE THE RELEASE OF THESE TOXIC POLLUTANTS HAS DECREASED THEIR LEVELS IN FISH HAVE INCREASED. MANY OF THESE POLLUTANTS CAN BE PASSED THROUGH THE FOOD CHAIN, ACCUMULATING AT THE TOP OF THE CHAIN.

# CAUSES OF NON-SOURCE POLLUTANTS

ACCORDING TO THE EPA:

> "NONPOINT SOURCE POLLUTION GENERALLY RESULTS FROM LAND RUNOFF, PRECIPITATION, ATMOSPHERIC DEPOSITION, DRAINAGE, SEEPAGE OR HYDROLOGIC MODIFICATION."

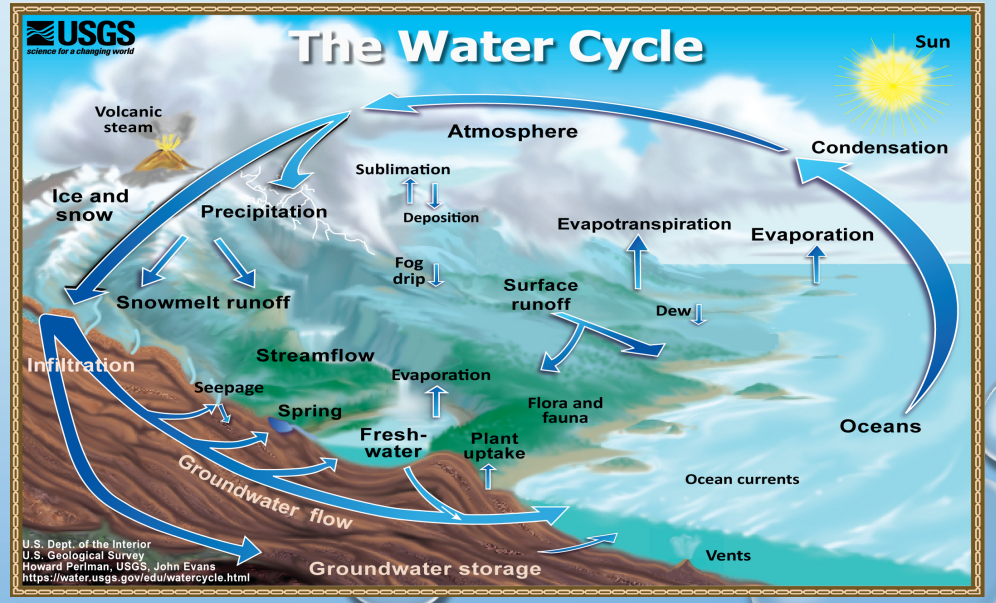
1. NUTRIENTS ARE COMPOUNDS THAT STIMULATE PLANT GROWTH, LIKE NITROGEN AND PHOSPHOROUS THAT EMANATE FROM AGRICULTURAL FERTILIZERS, SEPTIC SYSTEMS, HOME LAWN CARE PRODUCTS, AND YARD AND ANIMAL WASTES
2. PATHOGENS ARE DISEASE CAUSING BACTERIA AND VIRUSES THAT COME FROM THE FECAL WASTE OF ANIMALS AND HUMANS
3. TOXIC CONTAMINATES ARE CREATED BY A WIDE VARIETY OF HUMAN PRACTICES AND PRODUCTS LIKE HEAVY METALS, PESTICIDES AND ROAD SALTS

# CAUSE : NUTRIENT RUNOFF

- ABOUT 80% OF THE PHOSPHORUS IN THE HURON RIVER STEMS FROM HUMAN ACTIVITY
- PHOSPHORUS IS A NATURALLY OCCURRING POWERFUL NUTRIENT - ONE POUND OF PHOSPHORUS CAN PRODUCE 500 POUNDS OF ALGAE
- DECOMPOSING ALGAE DEPLETES OXYGEN LEVELS WITHIN THE WATER SUFFOCATING INDIGENOUS AQUATIC INHABITANTS
- THE 2014 TOXIC ALGAE BLOOM FOULED WATER SUPPLY FOR RESIDENTS OF OHIO AND MICHIGAN, DRAWING NATIONAL ATTENTION AND CULMINATING IN A $188 FUNDING PACKAGE TO REDUCE FUTURE RISKS

# A HYDROLOGIST`S PERSPECTIVE

- IN THE HURON RIVER WATERSHED, 50% OF THE POLLUTANTS ENTERING THE RIVER COME FROM DAY-TO-DAY HUMAN ACTIVITIES
- LESS SNOWFALL, HEAVIER RAINFALLS IN THE SPRING AND GENERALLY RISING TEMPERATURES PROVIDE CONDITIONS CONDUCIVE TO ALGAE GROWTH
- RUNOFF – A PRIMARY TRANSPORT FOR NON-SOURCE WATER POLLUTANTS IS PARTICULARLY DIFFICULT TO REGULATE
- REGULATIONS HELP ADDRESS LARGE COMMERCIAL OPERATIONS BUT THERE IS LITTLE REGULATION AROUND SMALL OPERATIONS, LAWNS, GOLF COURSES AND OTHER SMALL SOURCES OF RUNOFF



# IMPACTS

- WHEN WE USE CHEMICALS FOR OUR LAWNS AND ALSO OUR AGRICULTURE PESTICIDES SEEP INTO THE GROUNDWATER WHICH CAUSES HIGH LEVELS OF NITRATES AND PHOSPHATES. THIS INCREASES HARMFUL AGILE GROWTH WHICH IS NOT ONLY UGLY TO LOOK AT BUT IS ALSO HARMFUL TO AQUATIC AND HUMAN LIFE.
- TOXIC CONTAMINATES THAT OFTEN DERIVE FROM INDUSTRIAL RUNOFF SUCH AS LEAD AND MERCURY FREQUENTLY FIND THEIR WAY INTO THE FOOD CHAIN CAUSING DEATH OR ILLNESS TO THE ANIMAL LIFE AND THOSE WHO CONSUME IT. IT CAN ALSO AFFECT THE DRINKING WATER. HIGH LEVELS OF LEAD IN THE WATERS ARE WHAT CAUSED THE SICKNESS ASSOCIATED WITH THE FLINT DRINKING WATER.
- THE HEALTH OF GREAT LAKES SPECIES SUCH AS THE GREAT BLUE HERON (ARDEA HERODIAS) IS THREATENED BY THE PRESENCE OF TOXIC POLLUTANTS IN THE ECOSYSTEM.

# SOLUTIONS

- THE BEST WAY TO ADDRESS NON-SOURCE POLLUTED RUN-OFF AND KEEP OUR DRINKING WATER AND BIOLOGICAL LAKE LIFE SAFE, IS TO **AVOID PUTTING ANYTHING UNNATURAL INTO THE WATER**. BUT THAT IS AN IMPOSSIBLE TASK SINCE THERE ARE NEW CHEMICALS AND COMPOUNDS BEING RELEASED EVERY DAY.
- THERE ARE SOME THINGS THAT WE CAN DO THOUGH, AT A LOCAL OR PROVINCIAL/ STATE LEVEL. **PLANTING TREES AND BUSHES** KEEPS THE SOILS AND SEDIMENTS FROM RUNNING OFF AS EASILY. REDUCING THE AMOUNT OF CHEMICALS APPLIED ON YOUR LAWN ARE SIMPLE WAYS THAT INDIVIDUALS CAN HELP KEEP LAKE HURON CLEANER.
- THE GOVERNMENT HAS CREATED **THE CLEAN WATER ACT** WHICH ESTABLISHES GOALS AND STANDARDS FOR WASTEWATER TREATMENTS AND OVERALL WATER QUALITY. ABIDING BY THESE NEW RULES AND ENSURING SAFE DISPOSAL OF TOXIC MATERIALS, THEN SLOWLY THE CLEANLINESS OF LAKE HURON WILL IMPROVE.
- THE CLEAN WATER ACT REGULATES THE LARGEST FARMS, SUCH AS CONCENTRATED ANIMAL FEEDING OPERATIONS (CAFOS), YET IT DOES NOT REGULATE SMALL OPERATIONS OR LAWNS, GOLF COURSES, AND OTHER SOURCES OF RUNOFF. ADJUSTING LEGISLATION TO INCLUDE THESE SOURCE OF NON-SOURCE POLLUTANTS WILL HELP.

# SOURCES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