

CHLORIDE CONTAMINATION OF WELLS

- PRESENTED BY:
 - LEIGH BRODERICK, L.E.H.S., DIRECTOR
 - CARROLL COUNTY BUREAU OF ENVIRONMENTAL HEALTH
- ****BALTIMORE COUNTY INFORMATION PROVIDED BY:**
 - KEVIN KOEPENICK, L.E.H.S.
 - BALTIMORE COUNTY DEPARTMENT OF ENVIRONMENTAL PROTECTION AND SUSTAINABILITY

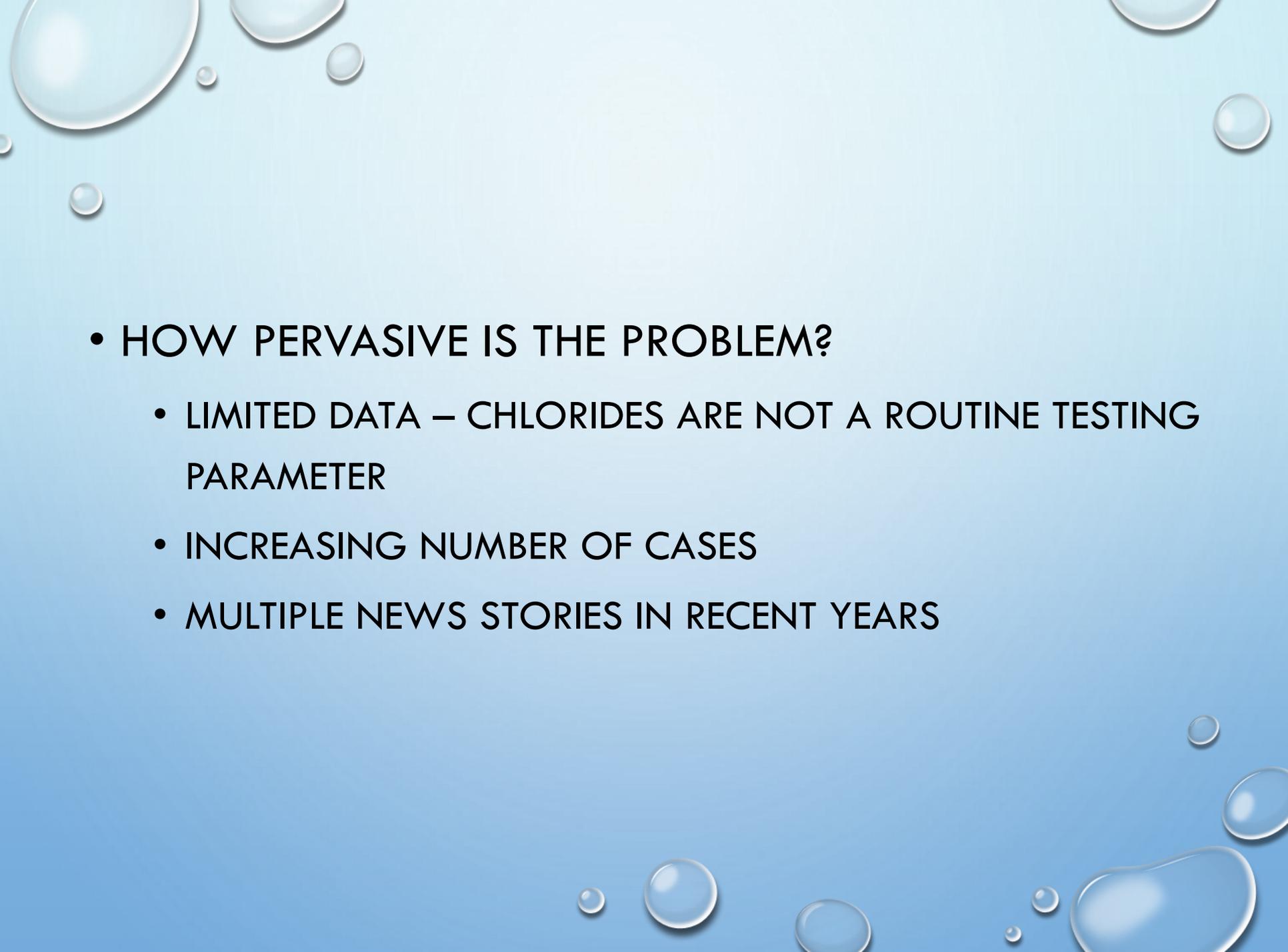
- **WHAT ARE CHLORIDES?**
 - **CHLORIDES ARE NEGATIVELY CHARGED IONS THAT DISSOLVE VERY READILY IN WATER.**
 - **CHLORIDES FORM SALTS**
 - **SODIUM CHLORIDE**
 - **POTASSIUM CHLORIDE**
 - **CHLORIDES ARE VERY CORROSIVE**

- HOW DO CHLORIDES END UP IN A WELL?
 - IN SOME CASES, THE CHLORIDES ORIGINATE ON SITE
 - SALT WATER INTRUSION, OLD OCEAN BEDS, SALT DEPOSITS
 - ELSEWHERE, THE CHLORIDES HAVE LIKELY BEEN “IMPORTED”
 - ROAD SALT
 - WATER TREATMENT BACKWASH
 - OTHER – FERTILIZERS, DISINFECTANTS, ETC.

HOW WE HEAR ABOUT THESE:

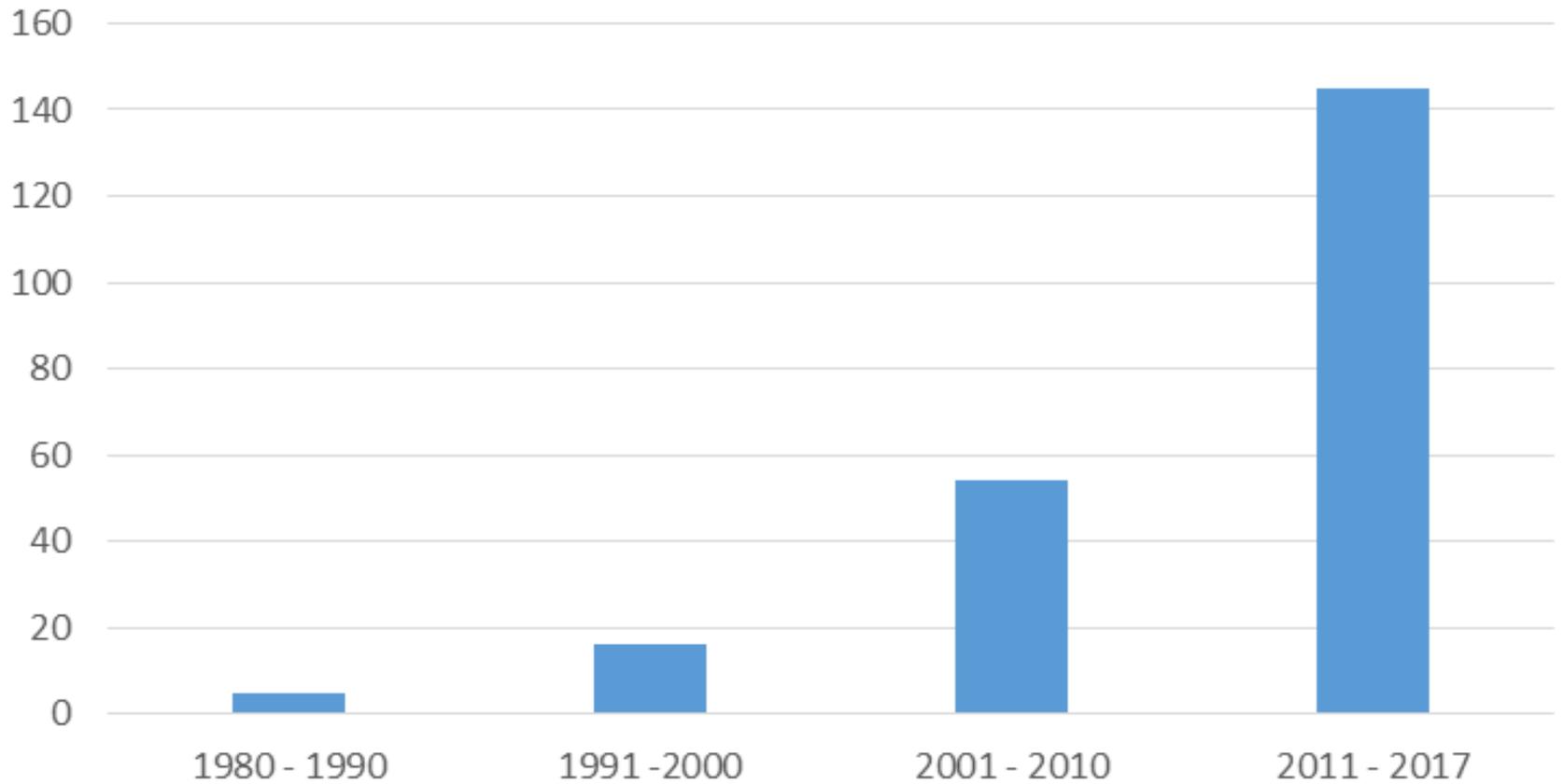
- **OFTEN FOLLOWING EVALUATION OF A HOME'S WATER SUPPLY BY WATER TREATMENT COMPANY**
- **PLUMBING/APPLIANCE ISSUES**
 - **CORROSION/DETERIORATION**
- **TASTE COMPLAINTS**

- WHAT CONSTITUTES A PROBLEM WELL
 - NO MCL (MAXIMUM CONTAMINANT LEVEL) FOR CHLORIDES
 - EPA SECONDARY (AESTHETIC) STANDARD FOR CHLORIDES – 250 MG/L

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- **HOW PERVASIVE IS THE PROBLEM?**
 - LIMITED DATA – CHLORIDES ARE NOT A ROUTINE TESTING PARAMETER
 - INCREASING NUMBER OF CASES
 - MULTIPLE NEWS STORIES IN RECENT YEARS

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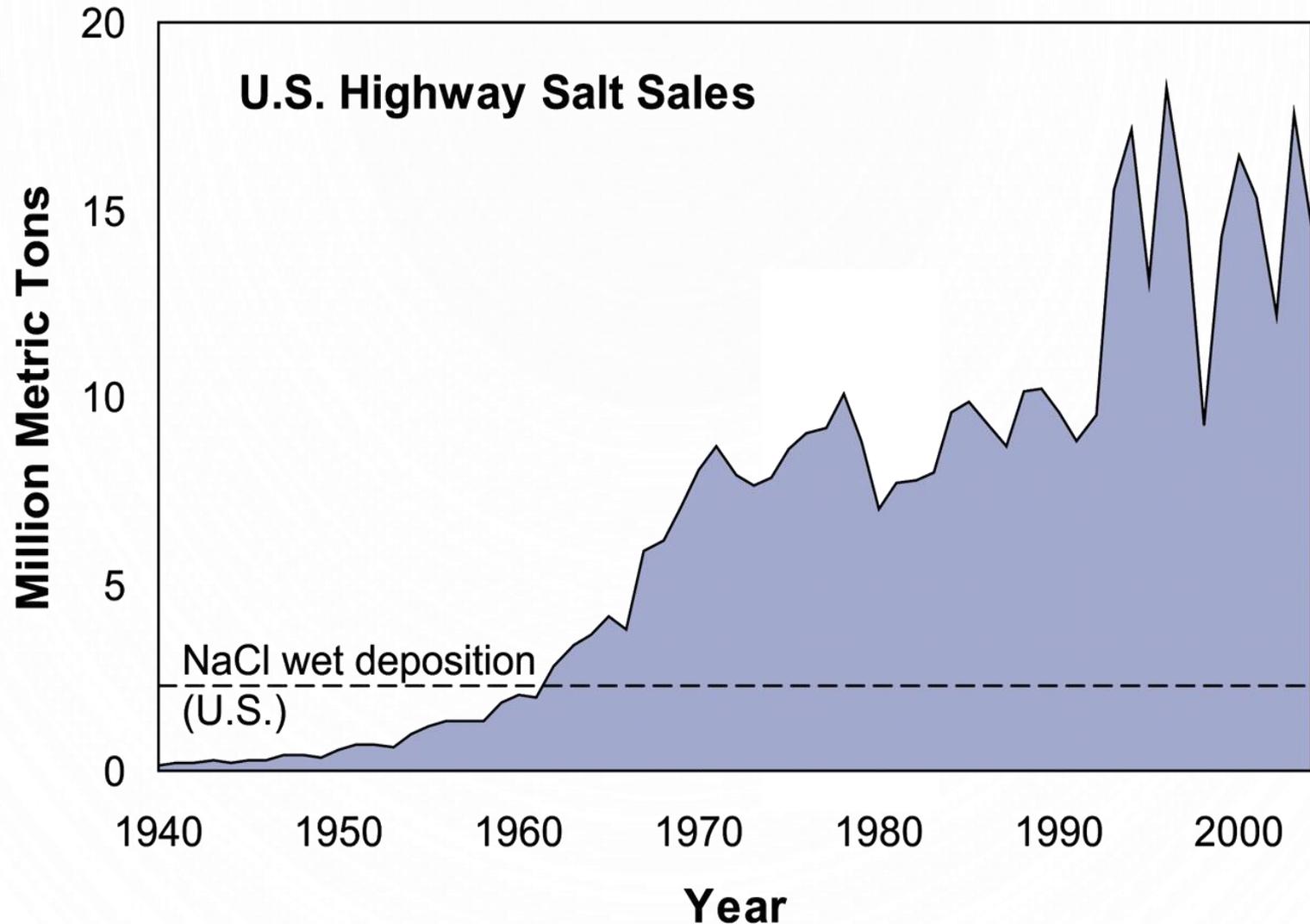
Chloride Complaints in Baltimore County



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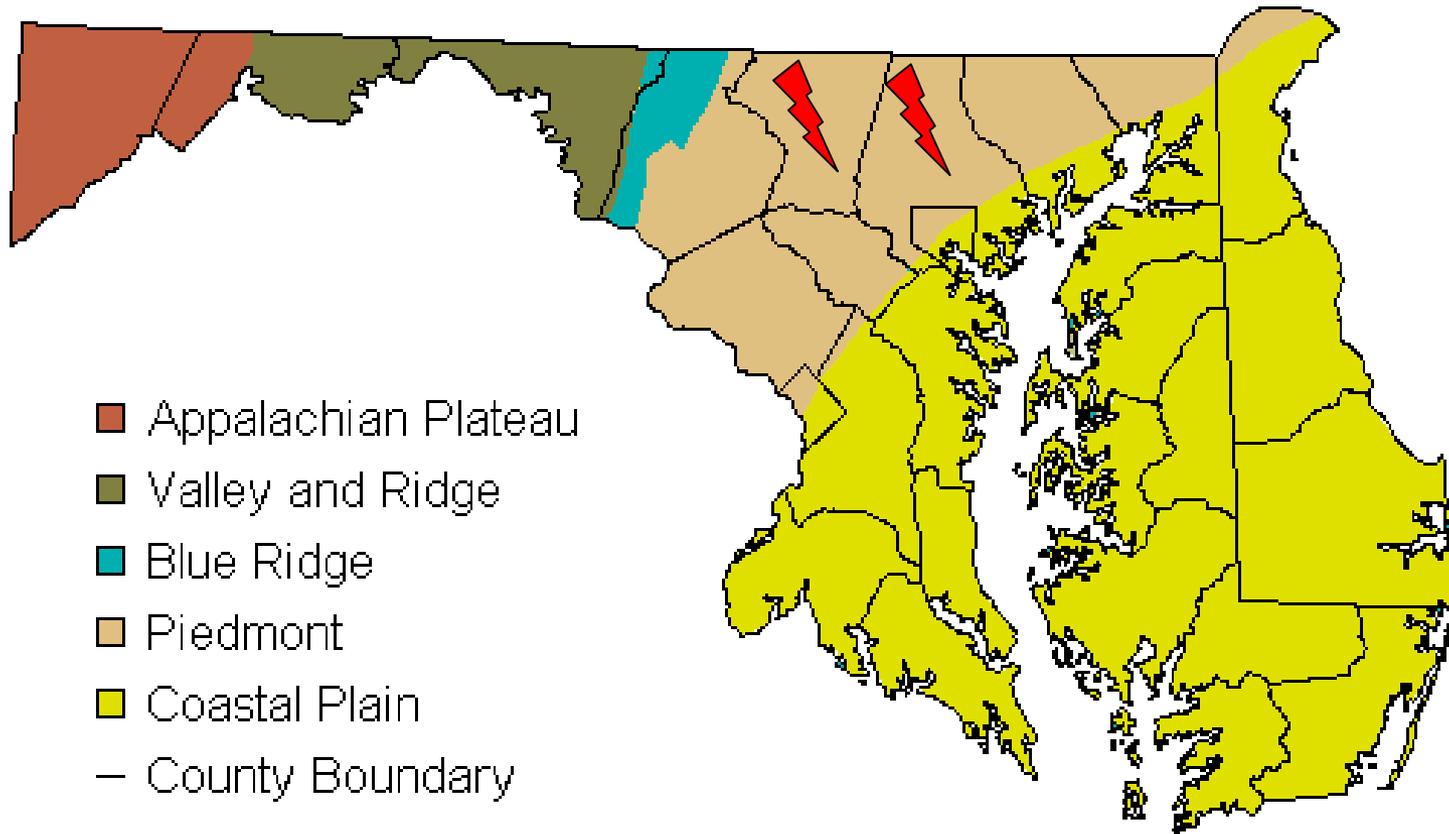
INCREASED ROAD SALT USE

- JACKSON R. B., JOBBÁGY E. G. (2005) *PNAS*; KAUSHAL & BELT (2012) *URBAN ECOSYS*



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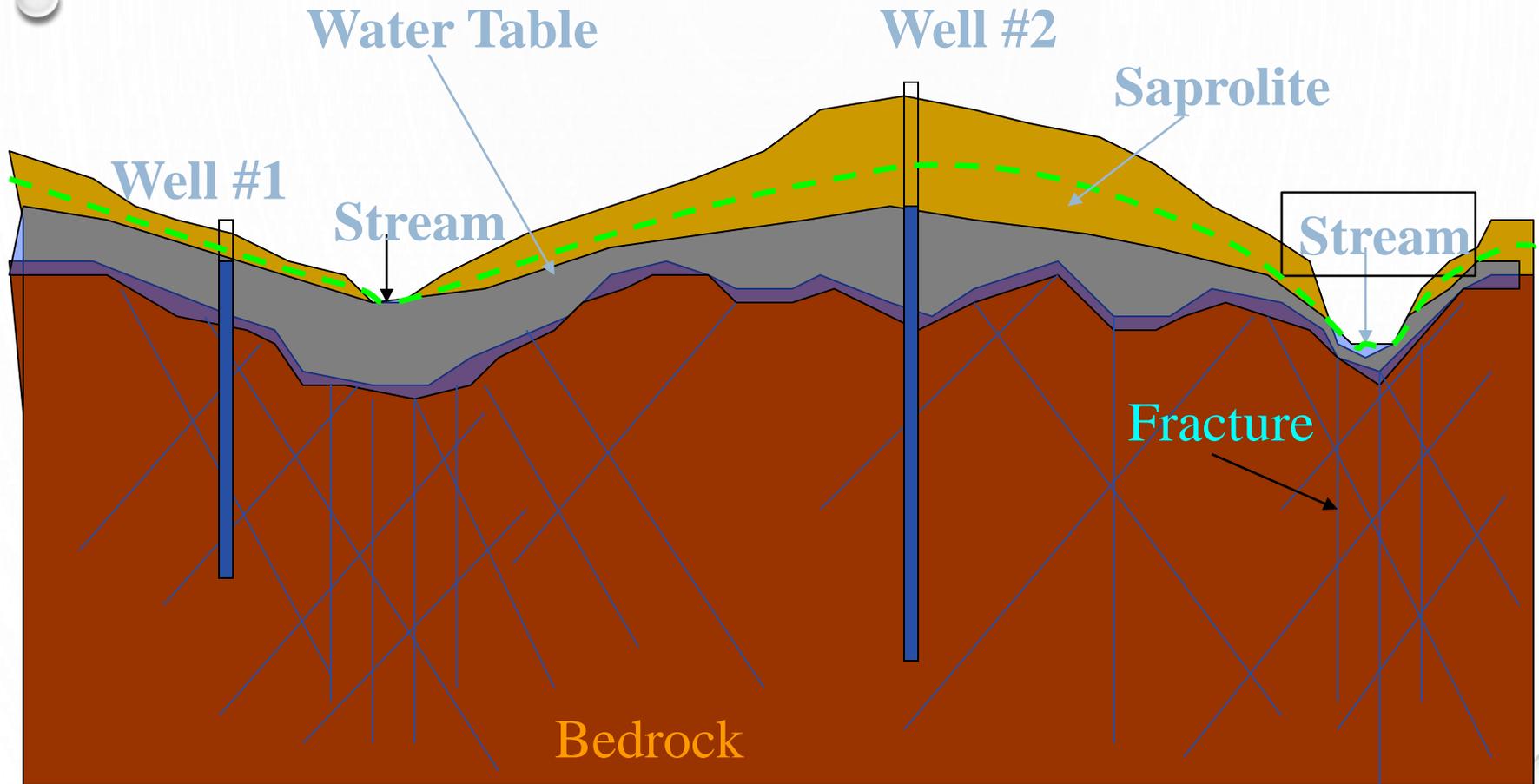
Physiographic Provinces of Maryland and Delaware



- Appalachian Plateau
- Valley and Ridge
- Blue Ridge
- Piedmont
- Coastal Plain
- County Boundary

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Occurrence of Ground Water in the Piedmont



- HOW TO RESOLVE THE PROBLEM (OPTIONS)
 - REPLACEMENT WELL – NO GUARANTEES
 - MODIFICATION OF WELL CONSTRUCTION – SAME
 - STORMWATER RETROFIT (RARE)
 - WHOLE HOUSE REVERSE OSMOSIS (R/O)
 - EXPENSIVE (\$15-20K)
 - INEFFICIENT – CAN DOUBLE “SEWAGE” FLOWS
 - DISPOSAL ISSUE
 - JUDICIOUS USE OF CHLORIDES

VOLUME OF R/O DISCHARGE

- RECOVERY RATES VARY WIDELY
 - SOME OF THE BETTER (COMMERCIAL) SYSTEMS GENERATE A GALLON OF “WASTEWATER” FOR EVERY GALLON OF DRINKING WATER PRODUCED.
 - THIS EFFECTIVELY DOUBLES WATER DEMAND AND “SEWAGE” OUTPUT

WHERE TO DISPOSE OF R/O BACKWASH

- DISCHARGE TO EXISTING OSDS
 - WHEN AND HOW? PLUMBING AND CAPACITY ISSUES
- SEPARATE ABSORPTION BED/TRENCH
- ON GROUND SURFACE WHEN PERMITTED (RARE)

ISSUES TO BE CONSIDERED

- RISK TO GROUNDWATER AND NEIGHBORING WELLS/LIABILITY ISSUES
- PROBLEM SITES
 - INADEQUATE LAND AREA
 - PROBLEM SITES/SOILS
 - HOLDING TANK? WHO WILL BEAR THE COST?

MARYLAND REGULATION

- DISCHARGE TO SURFACE MUST BE INDIVIDUALLY PERMITTED BY MDE
- DISCHARGE TO OSDS ALLOWED PROVIDED ADEQUATE CAPACITY
- BYPASS OF TANKS RECOMMENDED

IS R/O DISCHARGE “SEWAGE”?

- PRESENTLY, MARYLAND REGULATIONS CLASSIFY BACKWASH AS SEWAGE:
 - (39) “SEWAGE” MEANS WATER-CARRIED HUMAN, DOMESTIC AND OTHER WASTES AND INCLUDES ALL HUMAN AND ANIMAL EXCRETA.
 - A. SEWAGE FROM BATHROOMS, KITCHENS, LAUNDRY FIXTURES, AND OTHER HOUSEHOLD PLUMBING, EXCLUSIVE OF THE BACKWASH FROM POTABLE WATER TREATMENT DEVICES, SHALL RECEIVE ADEQUATE TREATMENT FROM A SEWAGE TREATMENT UNIT BEFORE THE EFFLUENT IS DISCHARGED TO AN APPROVED ON-SITE SEWAGE DISPOSAL AREA.
- GENERALLY, SUBSURFACE DISCHARGE IS REQUIRED.
- EXCEPTIONS MAY BE MADE IF CERTAIN CONDITIONS ARE MET
 - ADDITIONAL PERMITS, PUBLIC COMMENT PERIODS, ETC.
 - SEE MDE MEMO DATED OCTOBER 23, 2015

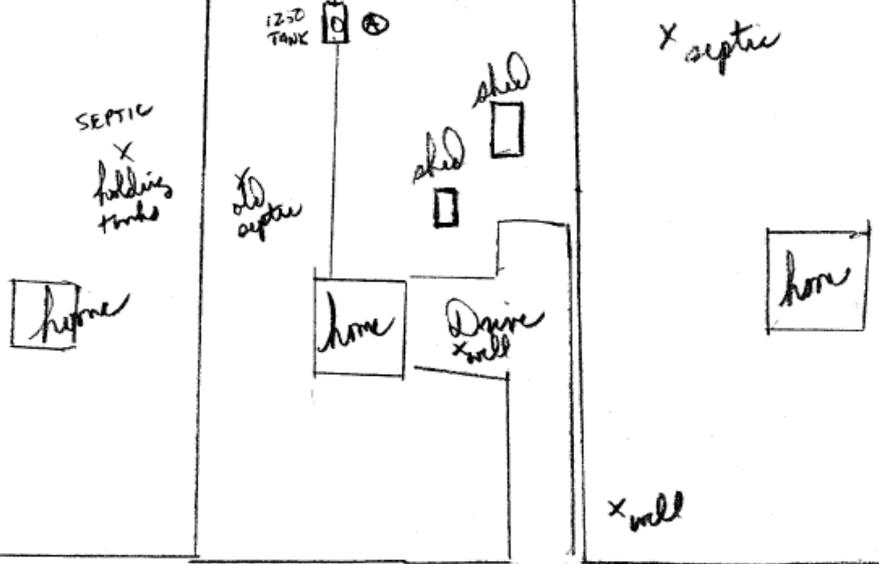
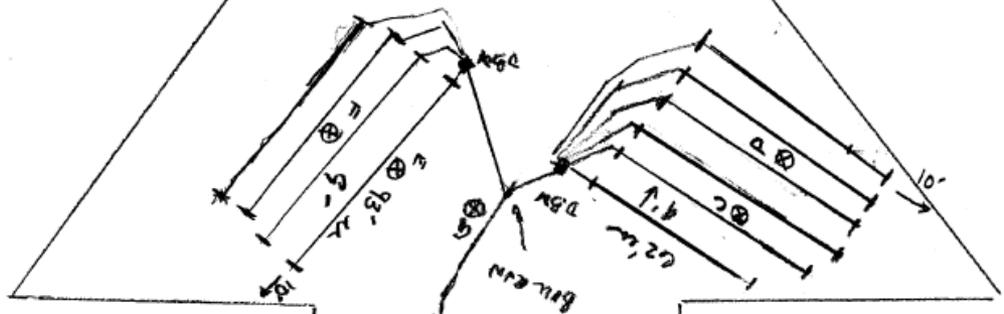
The purpose of this memorandum is to clarify the Department's recommendation on the disposal of backwash from water treatment units. Backwash from water treatment units may only be discharged under the auspices of an appropriate permit. Code of Maryland Regulation (COMAR) exempts the discharge from water treatment units from the requirement for pretreatment units such as septic tanks and BAT, but otherwise has no specific provisions regarding water treatment unit discharges. Waste from water treatment units may be discharged to an adequately sized onsite sewage disposal system. Recognizing that primary settling may not be necessary for water treatment unit discharges, and that this wastewater may be detrimental to septic tanks and advanced pretreatment units including BAT, the discharge may be directly to a drain field, sand mound, at-grade or other approved dispersal system. This discharge can also be directed to a dedicated drainfield that meets the requirements for on-site sewage disposal, except that no pretreatment is required.

Although not generally recommended, property owners may alternatively request permission to discharge the liquid waste from water treatment units as an industrial waste, by land application, as a discharge to surface waters, or through the use of a holding tank to pump and haul. With the exception of pump and haul, these methods would require either an individual groundwater discharge or an NPDES permit, including requirements for public comment and monitoring.

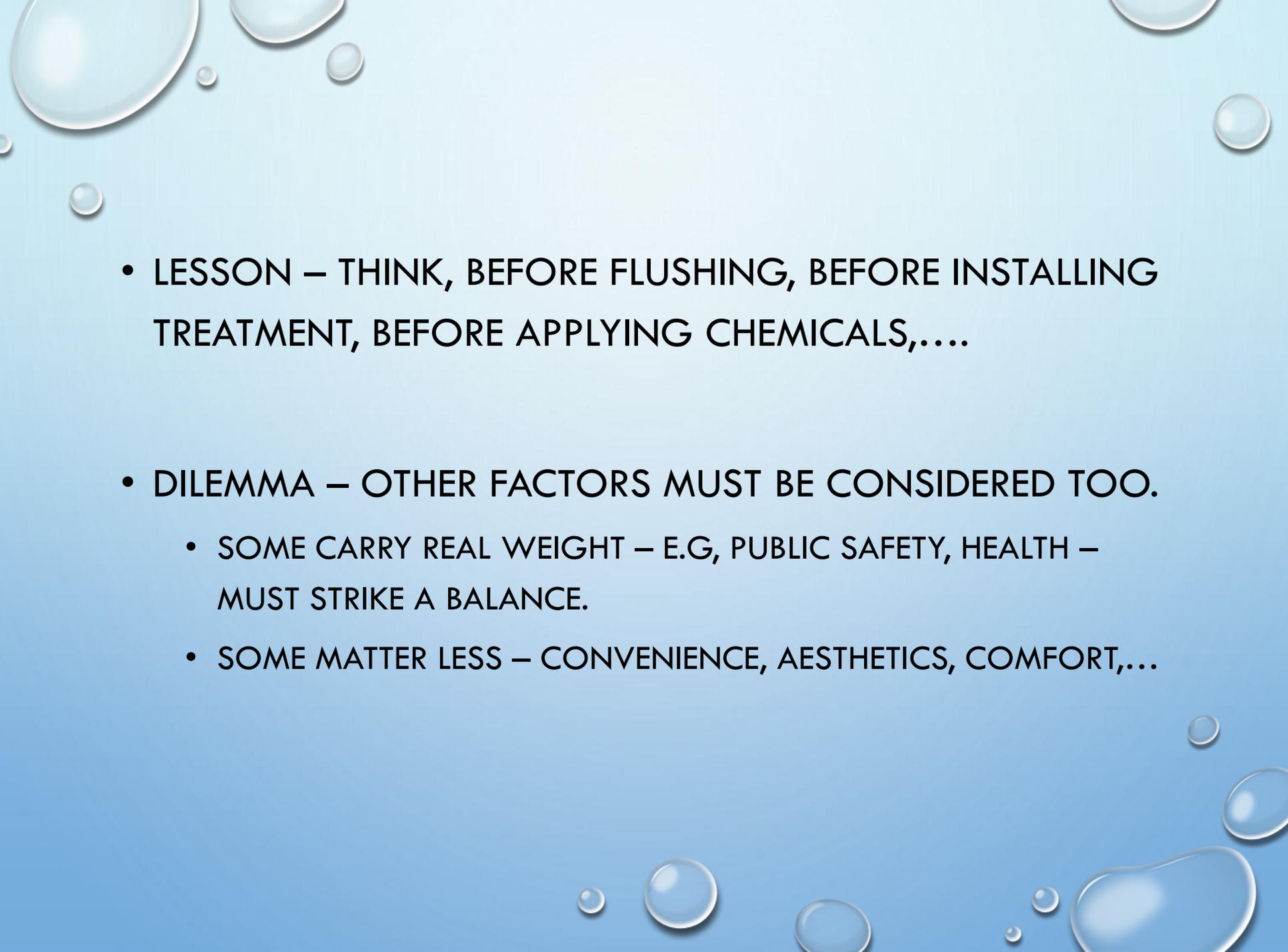
OTHER STATES

- RHODE ISLAND ALLOWS DIRECT DISCHARGE TO SURFACE OR OSDS
- MASSACHUSETTS AND CONNECTICUT PROHIBIT DISCHARGE TO OSDS
- DELAWARE – NEED WAIVER TO SEND TO OSDS OR CAN SEND TO FRENCH DRAIN
- PENN. – ALLOWS DISCHARGE TO OSDS
- VIRGINIA – ALLOWS DISCHARGE TO OSDS

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- GENERAL PRINCIPLE – THERE IS A DIRECT CORRELATION BETWEEN OUR ACTIVITIES ON THE EARTH'S SURFACE AND IN OUR HOMES AND PLACES OF WORK AND THE QUALITY OF OUR WATER RESOURCES.
- BRINGING IT HOME – WHAT WE PUT ON OUR ROADS AND LAWNS AND DOWN OUR DRAINS WILL FIND ITS WAY INTO OUR GROUNDWATER AND STREAMS, RIVERS, AND BAY.
 - NUISANCE OR HEALTH RISK TO US
 - TOXIC TO VEGETATION AND FRESH WATER ORGANISMS

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- LESSON – THINK, BEFORE FLUSHING, BEFORE INSTALLING TREATMENT, BEFORE APPLYING CHEMICALS,....
 - DILEMMA – OTHER FACTORS MUST BE CONSIDERED TOO.
 - SOME CARRY REAL WEIGHT – E.G, PUBLIC SAFETY, HEALTH – MUST STRIKE A BALANCE.
 - SOME MATTER LESS – CONVENIENCE, AESTHETICS, COMFORT,...

QUESTIONS ?

