The background of the slide is a light blue gradient with several realistic water droplets of various sizes scattered across it. The droplets have highlights and shadows, giving them a three-dimensional appearance. The text is centered on the slide.

# TRENDING E.COLI THAT FLOWS INTO COOTES PARADISE

A LOOK AT BACTERIA CONTRIBUTIONS OVER TIME, SEASONS AND  
CONDITIONS

# INTRODUCTION



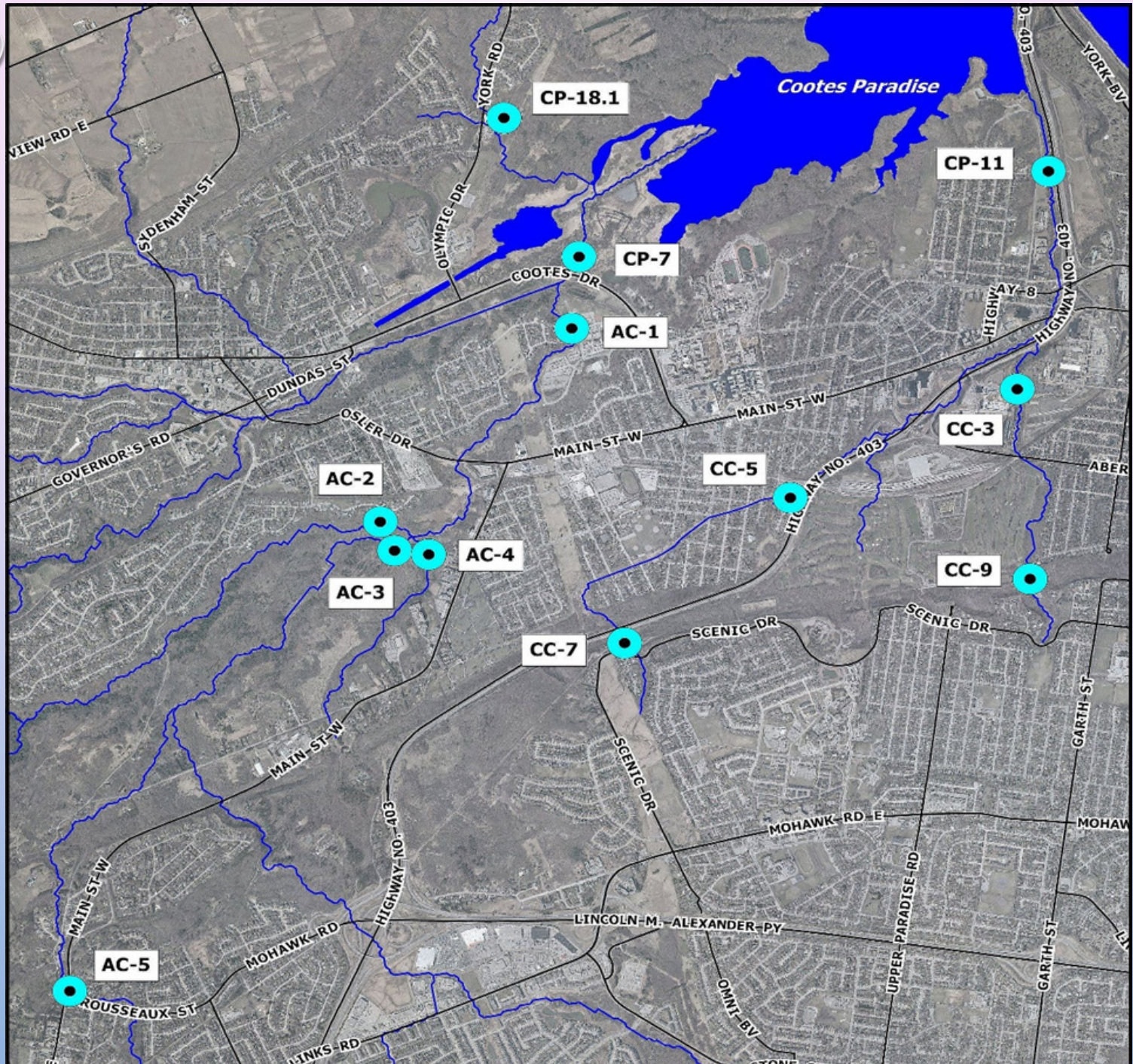
- CHRIS POLAP - MONITORING TECHNOLOGIST
- COLLECTING DATA IN THE HAMILTON WATERSHED FOR 10 YEARS
- TODAY'S DATASET IS FROM HAMILTON HARBOUR REMEDIAL ACTION PLAN (HHRAP)
  - AIM TO DELIST AREA OF CONCERN IN THE HAMILTON HARBOUR
- HCA MONITORS TRIBUTARIES FLOWING INTO COOTES PARADISE
- COLLABORATION WITH ALL LEVELS OF GOVERNMENT, CHARITY AND PRIVATE ORGANIZATIONS

# PRESENTATION OVERVIEW

- DATA FROM 2014 – 2021
- COVERING ANCASTER, LOWER SPENCER, BORERS AND CHEDOKE SUBWATERSHEDS
- DATA COLLECTED YEAR ROUND
- DATA BREAKDOWNS
  - LONG TERM ANNUAL GEOMEAN E.COLI CONCENTRATIONS
  - LONG TERM ANNUAL GEOMEAN WET VS. DRY CONDITIONS\*
  - SEASONAL GEOMEAN CONCENTRATIONS
  - SEASONAL WET VS. DRY CONDITIONS
- USING TARGET OF 200 COLIFORM UNITS PER 100 ML

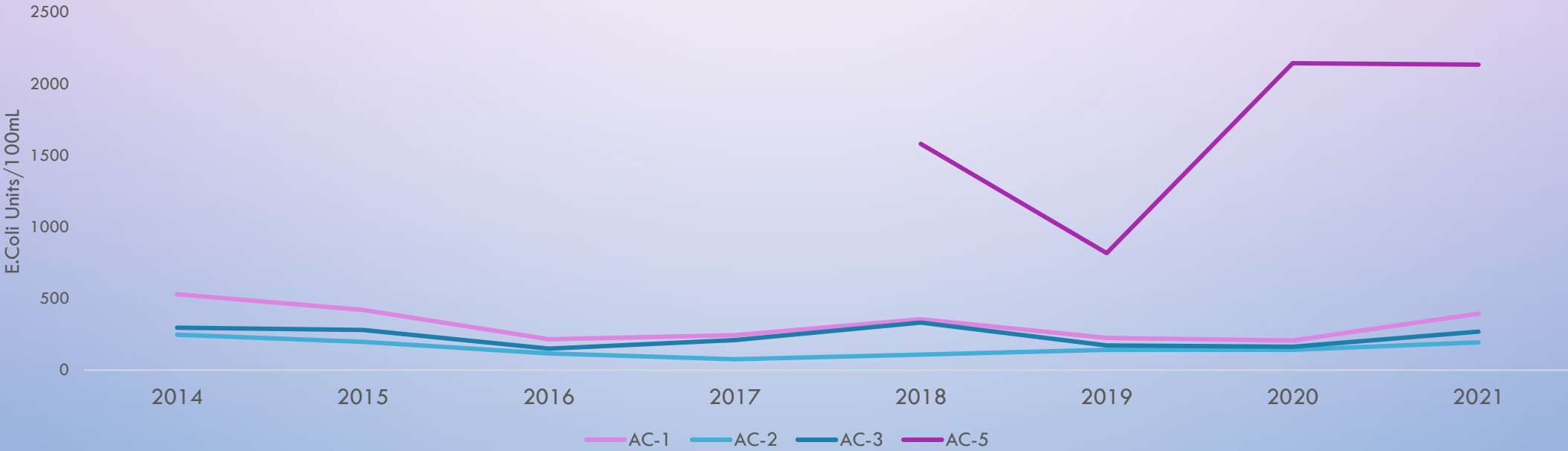


\*WET CONDITION CLASSIFIED AS >5MM RAIN IN 24 HOURS

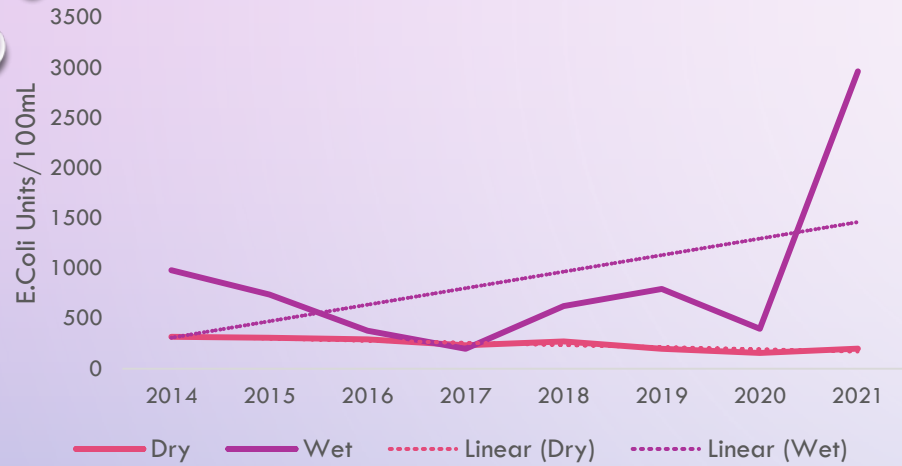


# ANCASTER CREEK

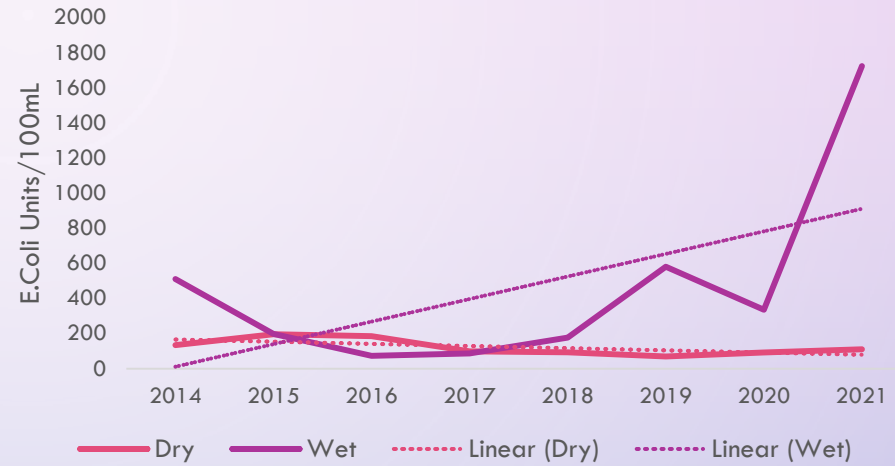
Ancaster Creek Annual E.coli Trends



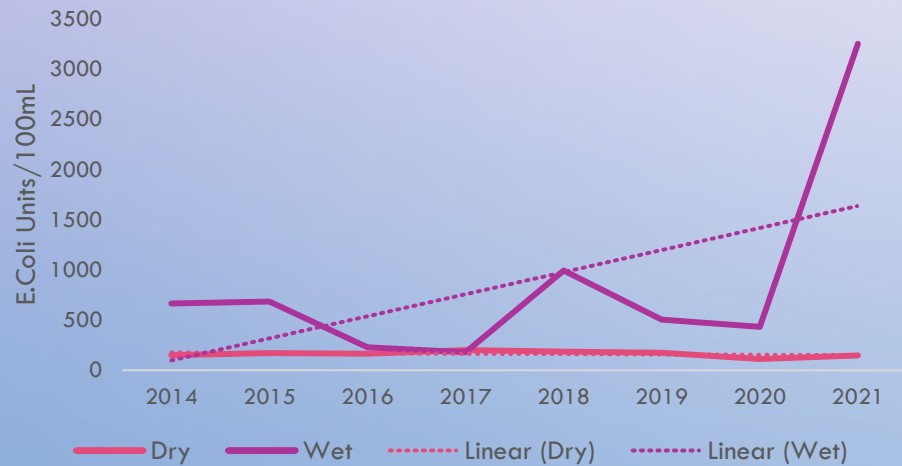
### AC-1 Dry v. Wet



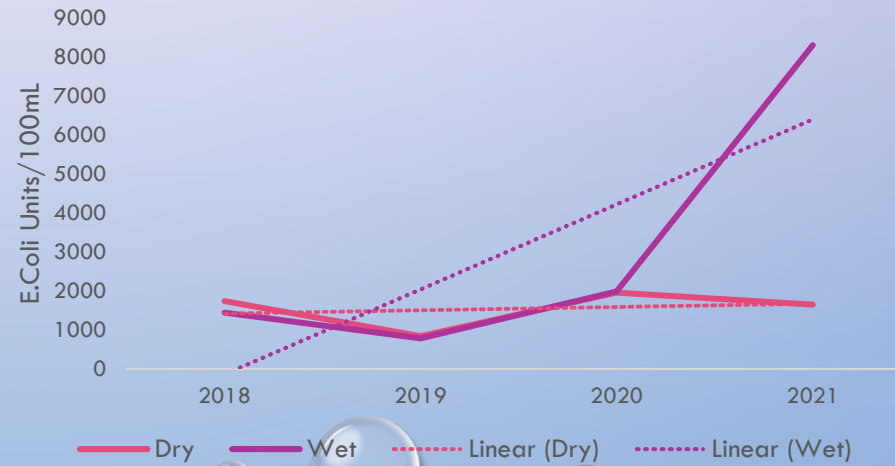
### AC-2 Dry v. Wet



### AC-3 Dry v. Wet



### AC-5 Dry v. Wet



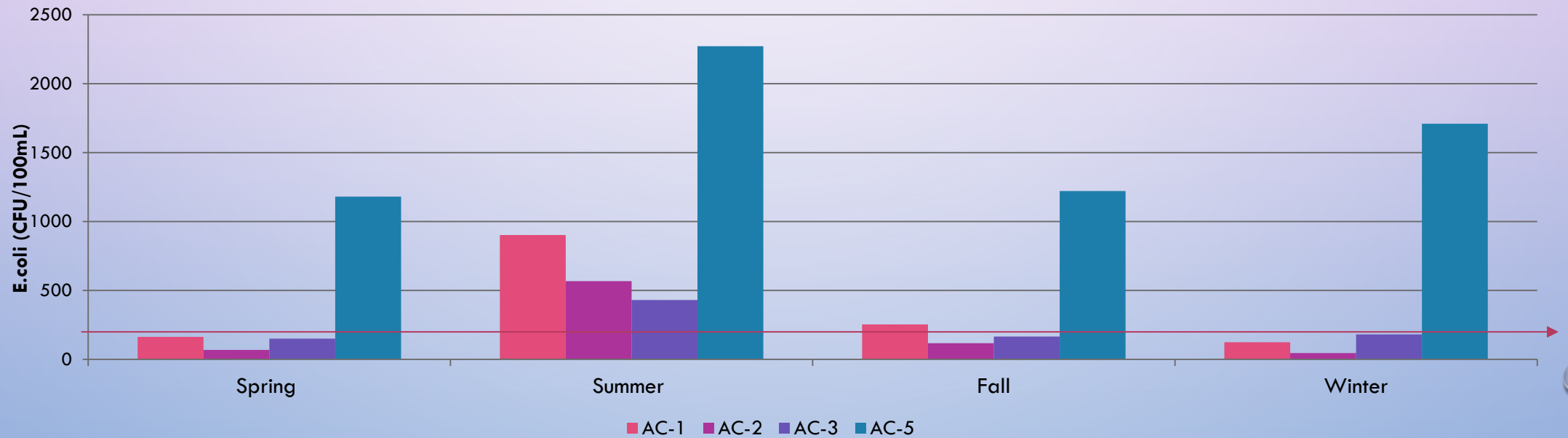
# WHAT CAN WE SAY ABOUT ANCASTER CREEK? LONG TERM WET VS. DRY

- **AC-5** HAS HIGHER ANNUAL AVERAGE E.COLI
  - OTHER LOCATIONS ARE WITHIN TARGET OBJECTIVE AREA
- **DRY LONG TERM AVERAGE** IS AROUND TARGET OF 200 CFU/100 ML AT AC-1, AC-2 & AC-3
  - RELATIVELY STABLE AT ALL SITES - INCLUDING AC-5
- **WET LONG TERM AVERAGE** CONCENTRATIONS ON THE RISE
  - SPIKE AT ALL LOCATIONS IN 2021

OVERALL DECENT WATER QUALITY – WATCH FOR WET EVENT EXCEEDANCES

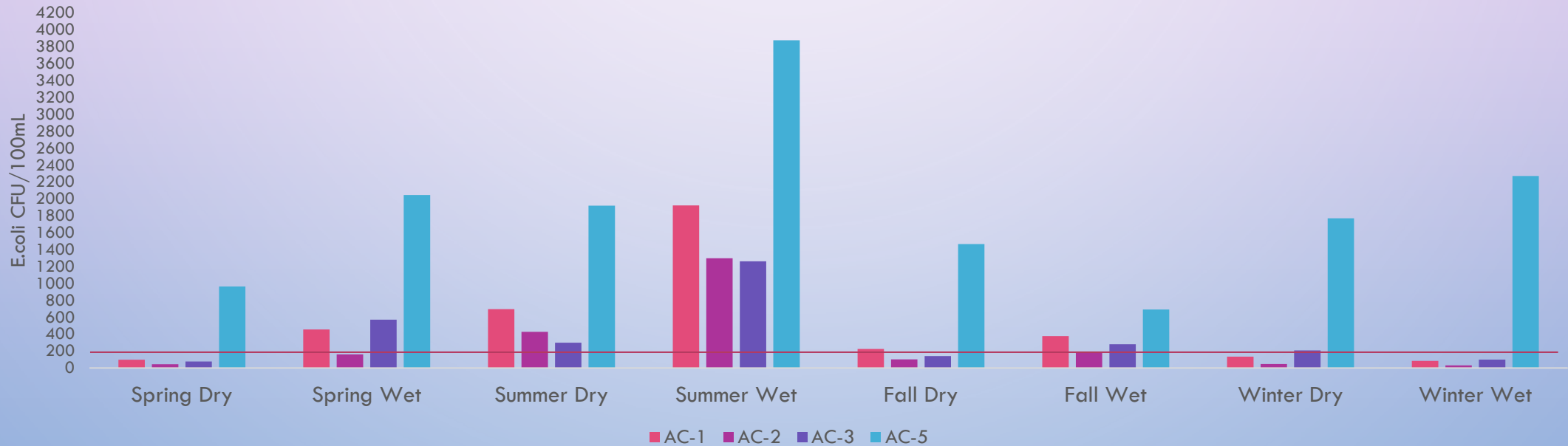
# ANCASTER CREEK SEASONAL

## Average Seasonal E.coli 2014-2021



# ANCASTER CREEK SEASONAL WET V. DRY

Ancaster Creek Seasonal E.coli Wet v. Dry Geomean 2014-2021



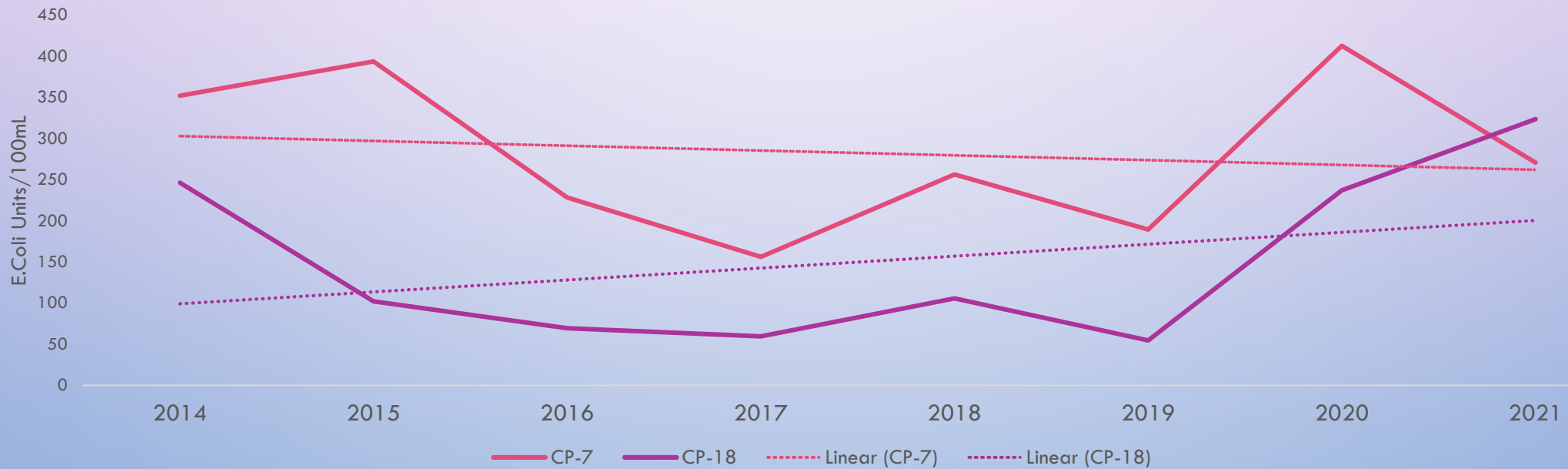
# WHAT CAN WE SAY ABOUT ANCATSER CREEK? SEASONAL WET VS. DRY

- **AC-1, AC-2 & AC-3** IN GOOD SHAPE FOR 3 SEASONS
  - SUMMER CONCENTRATIONS MUCH HIGHER AT ALL LOCATIONS
- **TARGET EXCEEDED IN WET SUMMER CONDITIONS**
  - **SUMMER WET** EVENTS ACCOUNT FOR 25 – 56% OF AVG. ANNUAL E.COLI
- **AC-5** EXCEEDANCES OCCUR NO MATTER OF SEASON OR CONDITION
  - **SUMMER WET** EVENTS ACCOUNT FOR 25% OF E.COLI

OVERALL GOOD E.COLI CONCENTRATIONS OUTSIDE OF SUMMER WET CONDITIONS

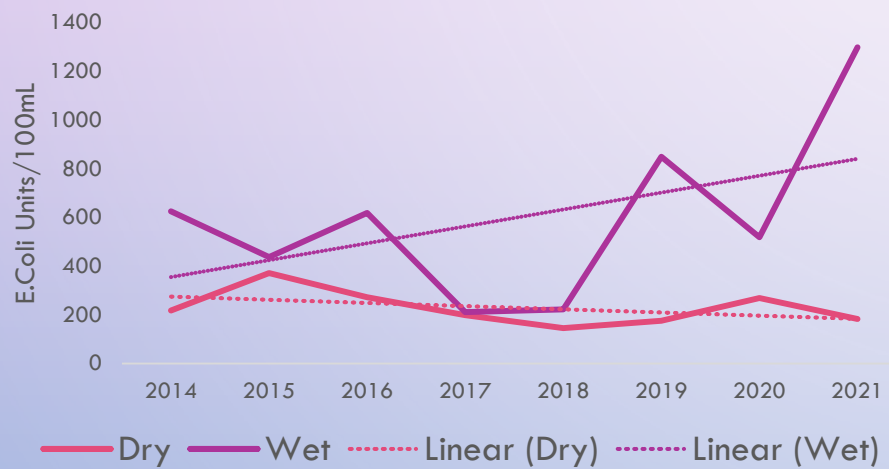
# SPENCER & BORERS CREEK

Spencer & Borers Creek Annual E.coli Trends

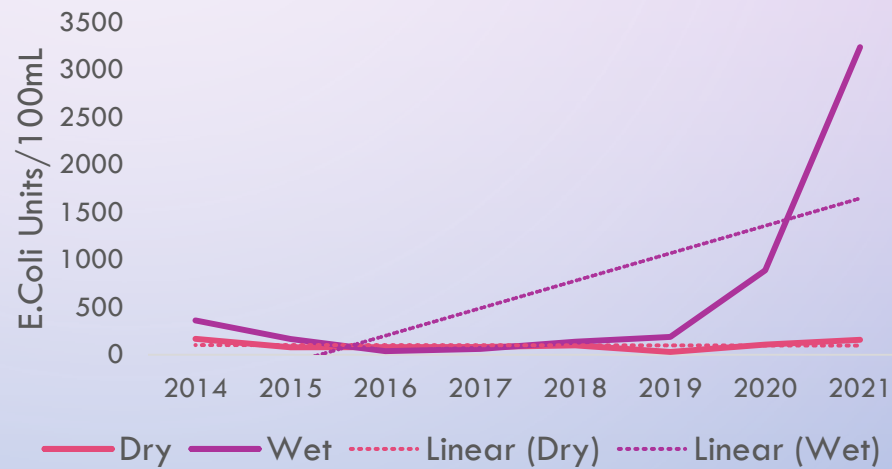




### CP-7 Dry v. Wet



### CP-18 Dry v. Wet



# WHAT CAN WE SAY ABOUT SPENCER & BORERS CREEK?

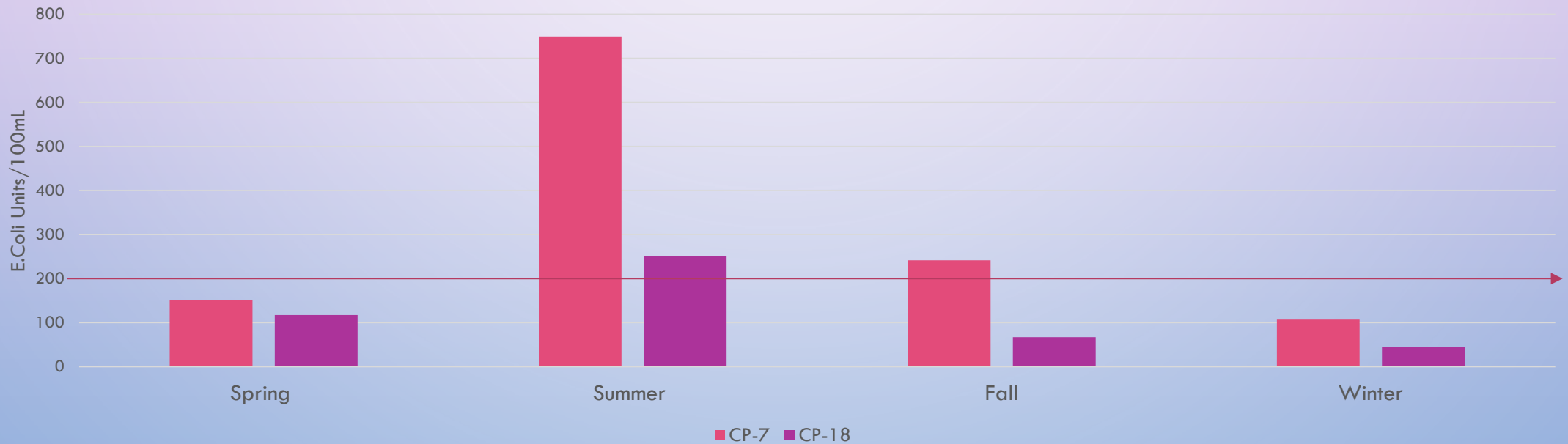
## LONG TERM WET VS. DRY

- SIMILAR LOOKING TREND FOR BOTH CREEKS
- **SPENCER CREEK** HISTORICALLY HIGHER ANNUAL AVERAGE E.COLI CONCENTRATIONS
  - 2021 SAW **BORERS CREEK** REACH HIGHER CONCENTRATIONS
- **DRY LONG TERM AVERAGE** IS AROUND OR BELOW TARGET OF 200 CFU/100 ML AT BOTH SITES
  - RELATIVELY STABLE THROUGHOUT STUDY PERIOD
- **WET LONG TERM AVERAGE** IS HIGHER IN SPENCER CREEK/RELATIVELY LOW IN BORERS CREEK
  - SPIKE AT BOTH LOCATIONS IN 2021

OVERALL GOOD BASEFLOW E.COLI CONCENTRATIONS – WATCH FOR WET EVENT SPIKES

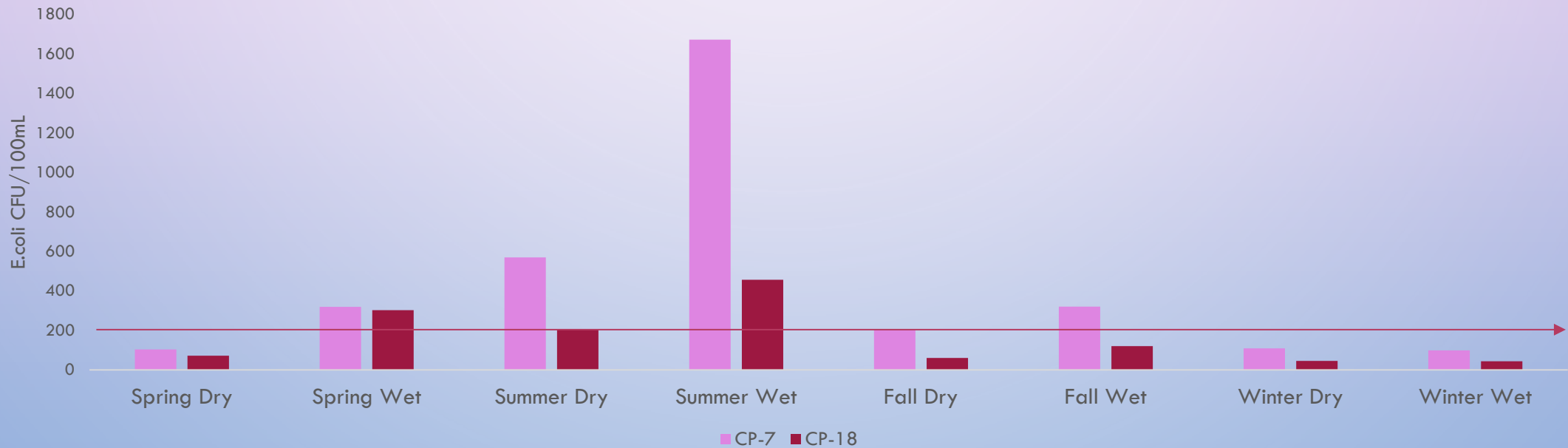
# SPENCER & BORERS CREEK SEASONAL

Average Seasonal E.coli 2014 - 2021



# SPENCER & BORERS CREEK SEASONAL WET V. DRY

Spencer & Borers Creek Seasonal E.coli Geomean 2014-2021



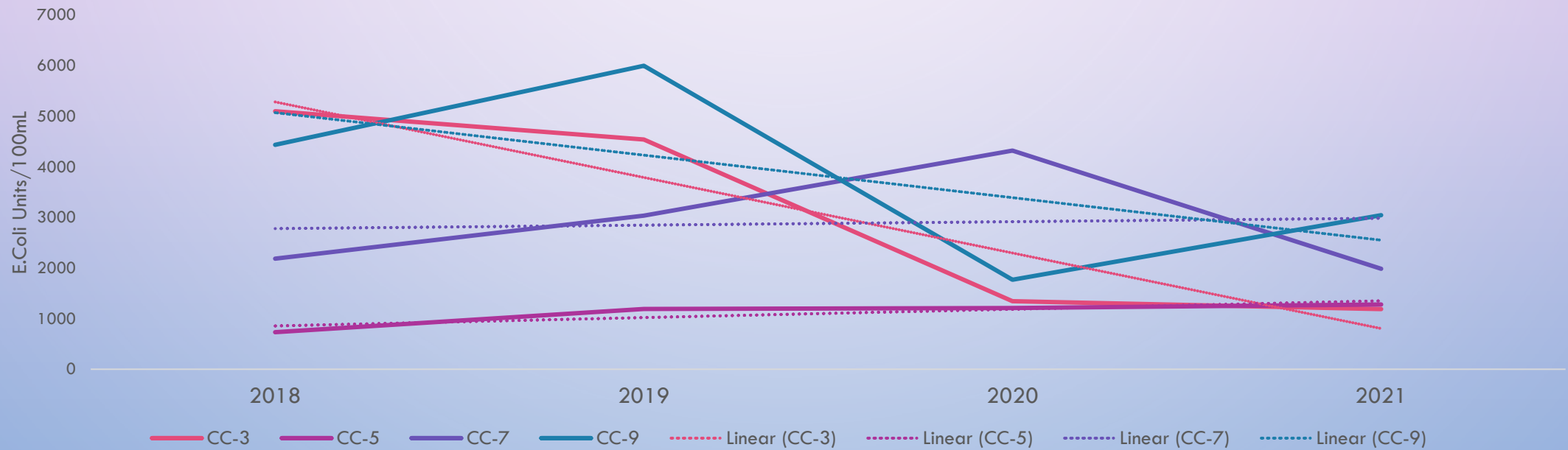
# WHAT CAN WE SAY ABOUT SPENCER & BORERS CREEK?

## SEASONAL WET VS. DRY

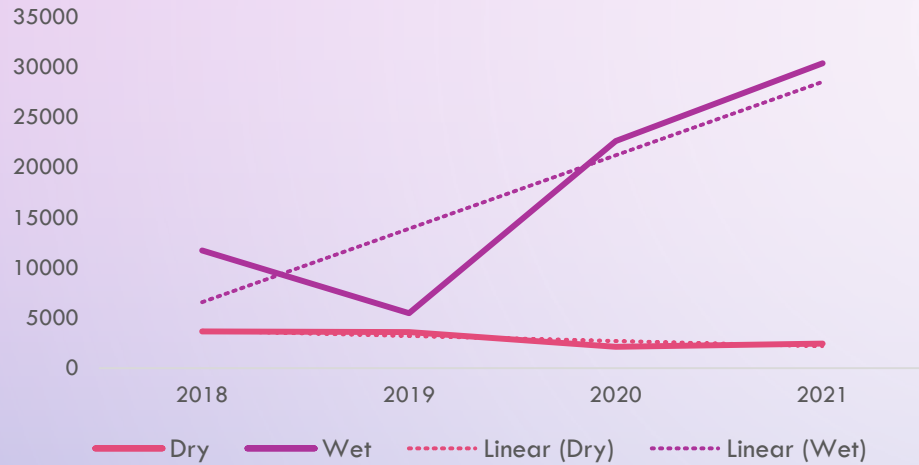
- SPENCER CREEK IN GOOD SHAPE FOR 3 SEASONS
  - SPIKE IN AVERAGE E.COLI CONCENTRATIONS IN SUMMER
- BORERS CREEK LOW SEASONAL AVERAGE CONCENTRATIONS YEAR-ROUND
- WET SUMMER CONDITIONS IN **SPENCER CREEK** ACCOUNTS FOR 49% OF AVG. ANNUAL E.COLI
  - IN RELATIVELY GOOD SHAPE OTHER 3 SEASONS
- **BORERS CREEK** IN GOOD SHAPE THROUGHOUT ALL SEASONS
  - SUMMER WET CONDITIONS ACCOUNT FOR 35% OF ANNUAL E.COLI

# CHEDOKE CREEK

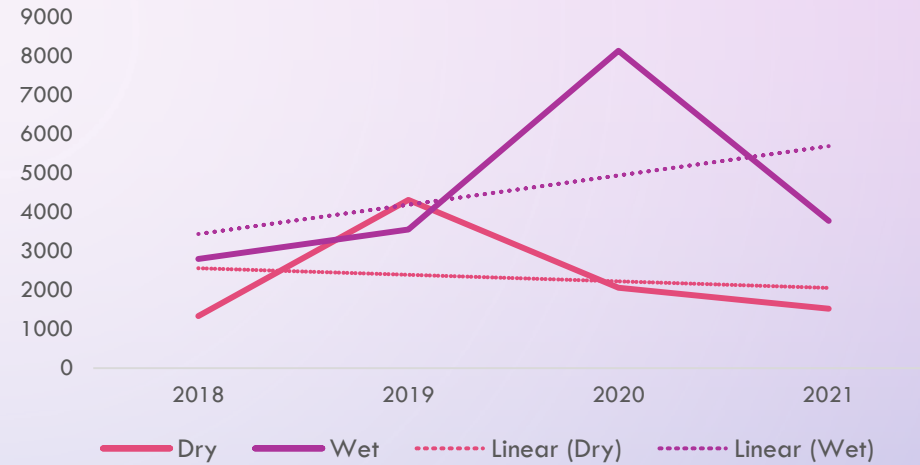
## Chedoke Creek Annual E.coli Trends



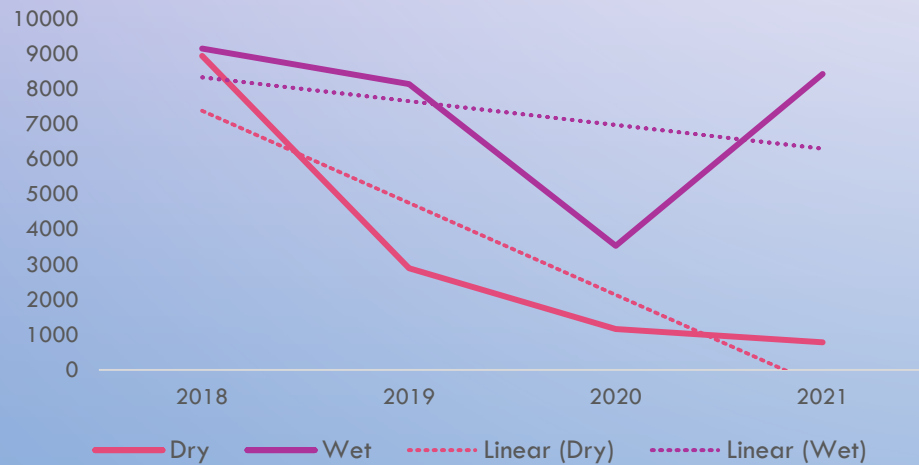
### CC-9 Dry v. Wet



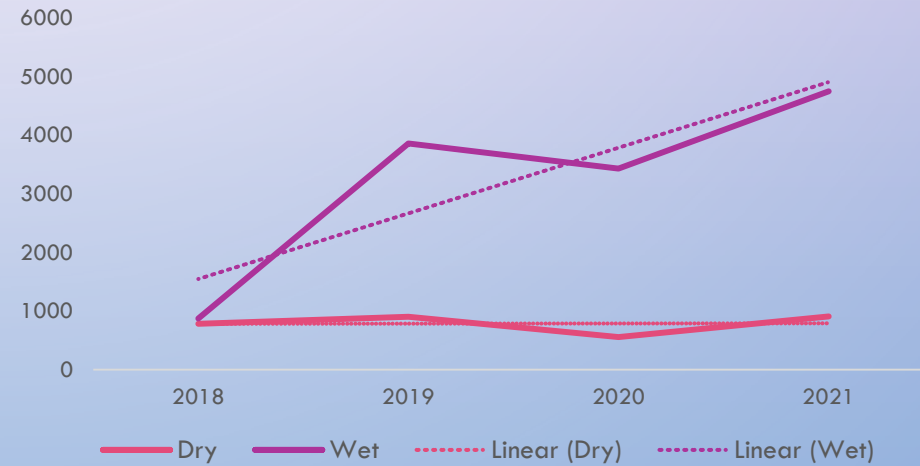
### CC-7 Dry v. Wet



### CC-3 Dry v. Wet



### CC-5 Dry v. Wet

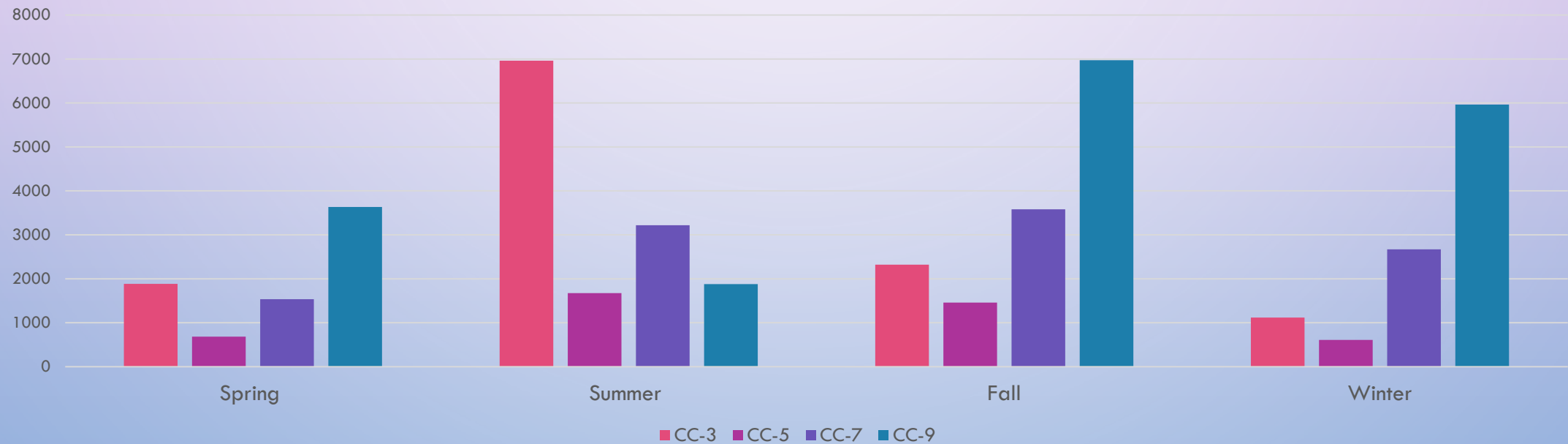


# WHAT CAN WE SAY ABOUT CHEDOKE CREEK? LONG TERM WET VS. DRY

- LONG TERM ANNUAL E.COLI CONCENTRATIONS APPEAR TO BE **STEADY OR IN SLIGHT DECLINE/INCLINE** AT ALL SITES
    - CONCENTRATIONS STILL RELATIVELY HIGH COMPARED TO OTHER SUBWATERSHEDS
  - **DRY LONG TERM AVERAGE** IS DECLINING AT ALL LOCATIONS
  - **WET LONG TERM AVERAGE** IS INCREASING AT A HIGH RATE AT MOST SITES
- OVERALL POOR WATER QUALITY CONDITIONS THROUGHOUT SUBWATERSHED

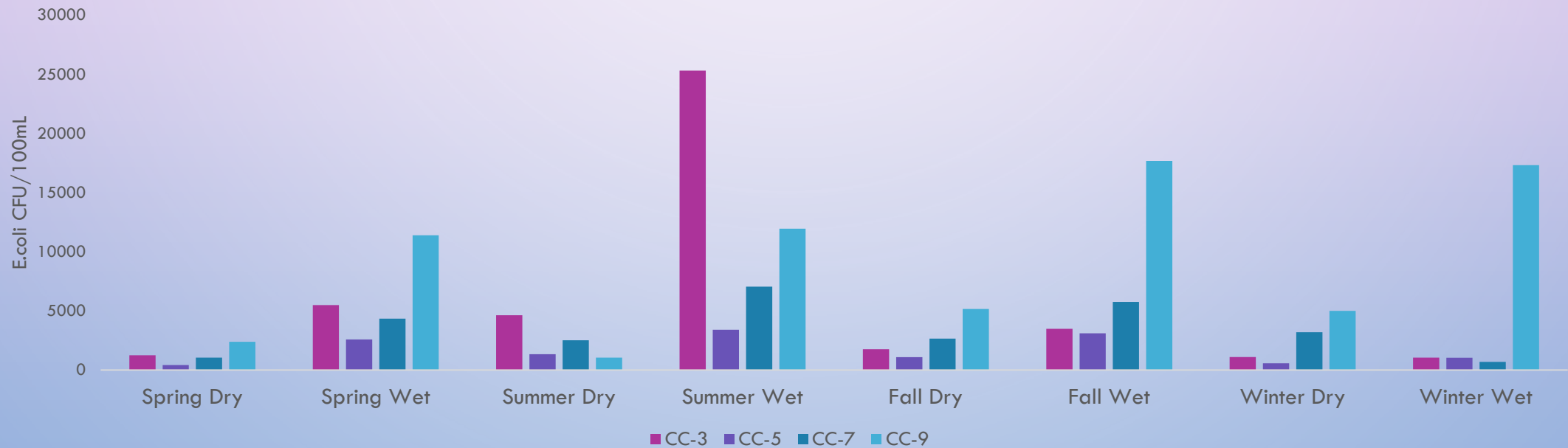
# CHEDOKE CREEK SEASONAL

Average Seasonal E.coli 2014 - 2021



# CHEDOKE CREEK SEASONAL WET V. DRY

Chedoke Creek Seasonal E.coli Geomean 2018-2021



# WHAT CAN WE SAY ABOUT CHEDOKE CREEK? SEASONAL WET VS. DRY

- IN GENERAL, ALL SITES IN CHEDOKE CREEK SEE **HIGH CONCENTRATIONS OF E.COLI** (ROUTINELY WELL ABOVE THE TARGET OF 200 CFU/100ML)
- **LESS VARIABILITY** IN SEASONAL DISTRIBUTION THAN OTHER SUBWATERSHEDS
- **CC-3** SUMMER WET CONCENTRATIONS ACCOUNT FOR 57% OF AVG. ANNUAL E.COLI
- **CC-9 WET CONCENTRATIONS** ARE HIGH YEAR-ROUND
  - ACCOUNTING FOR 81% OF ANNUAL E.COLI

# WHAT ARE WE KEEPING OUR EYE ON?

- SUMMER WET EVENTS ACCOUNT FOR 16 – 57% OF AVG. ANNUAL E.COLI ACROSS ALL SITES
  - SUMMER DRY EVENTS ARE 2 – 18% OF ANNUAL E.COLI
- 2021 WET E.COLI SPIKES AT ALL LOCATIONS
  - FEWER STORMS, HIGHER CONCENTRATIONS
- AC-5 IN ANCASTER CREEK EXCEEDING IN BOTH WET & DRY CONDITIONS
  - POSSIBLE CONSISTENT SOURCE OF E.COLI IN THE AREA
- ANNUAL E.COLI CONCENTRATIONS APPEAR TO BE STEADY OR IN DECLINE AT ALL SITES
  - CLOSER LOOK WE CAN SEE BASEFLOW CONCENTRATIONS ARE MOSTLY STEADY/IN DECLINE WHILE WET EVENT CONDITIONS ARE INCREASING RAPIDLY
- BORERS CREEK SUDDEN DRAMATIC INCREASE IN E.COLI CONCENTRATIONS DURING WET EVENTS
- CC-3 IN CHEDOKE CREEK HUGE SPIKE IN SUMMER WET CONCENTRATIONS

# WHAT CAN WE DO?

- HONE IN ON WHEN/WHERE EXCEEDANCES ARE HAPPENING
  - HOW DO WE IMPROVE STORMWATER/RUNOFF CONDITIONS IN THE SUMMER?
    - RETAIN WATER AT THE POINT OF IMPACT (LOW IMPACT DEVELOPMENT)
- WHICH SITES ARE EXCEEDING REGARDLESS OF CONDITIONS OR SEASONS?
  - FOCUS ON INFRASTRUCTURE REPAIRS AND LAND USAGES IN THOSE AREAS
- CONTINUE TO OBSERVE MORE RECENT TRENDS AND INVESTIGATE ACCORDINGLY
  - REPORT ON UNUSUAL DATA POINTS AND INCREASING CONCENTRATIONS

# THANK YOU!

- QUESTIONS?
- CONTACT:
  - [CHRIS.POLAP@CONSERVATIONHAMILTON.CA](mailto:CHRIS.POLAP@CONSERVATIONHAMILTON.CA)

