

## Appendix I - Longitudinal Screening Class Assessment

Appendix I provides figures that compare the distribution of screening classes along the length of a river and along with an upstream – downstream comparison of guideline exceedances. Figures are provided considering all years and distinct temporal periods. This Appendix is organized by river and time period as follows:

- 1) The following Rivers were assessed, major tributaries of the Athabasca River are presented sequentially from upstream to downstream based on the location of their confluence with the Athabasca River:
  - a. Athabasca River Mainstem;
  - b. Clearwater-Christina River and tributaries;
  - c. Steepbank River and tributaries;
  - d. Muskeg River and tributaries;
  - e. Mackay River and tributaries;
  - f. Ells River and tributaries;
  - g. Firebag River and tributaries;
  - h. Other tributaries of the Athabasca River with fewer than 3 sampling sites;
  - i. Cold Lake region;
  - j. Peace River and Tributaries;
  - k. Peace Athabasca Delta and Tributaries; and
  - l. Slave River.
- 2) Each River includes a figure for the following time periods:
  - a. All years;
  - b. All data collected before 1994;
  - c. Data collected between 1994 and 1998;
  - d. Data collected between 1999 and 2003;
  - e. Data collected between 2004 and 2008;
  - f. Data collected between 2009 and 2013;
  - g. Data collected between 2014 and 2018;
  - h. Data collected between 2019 and 2023.
- 3) Figures I1 to I81 consider screening classes when parameters were screened against the most protective of all guidelines included within the assessment and Figures I82 to I160 consider screening classes when parameters were screened against the most protective of all EPA guidelines.
- 4) Figures I161 to I363 provide an upstream downstream comparison for the guidelines assessed.

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## I.1.0 Most Protective Guidelines

### I.1.1 Athabasca River Mainstem

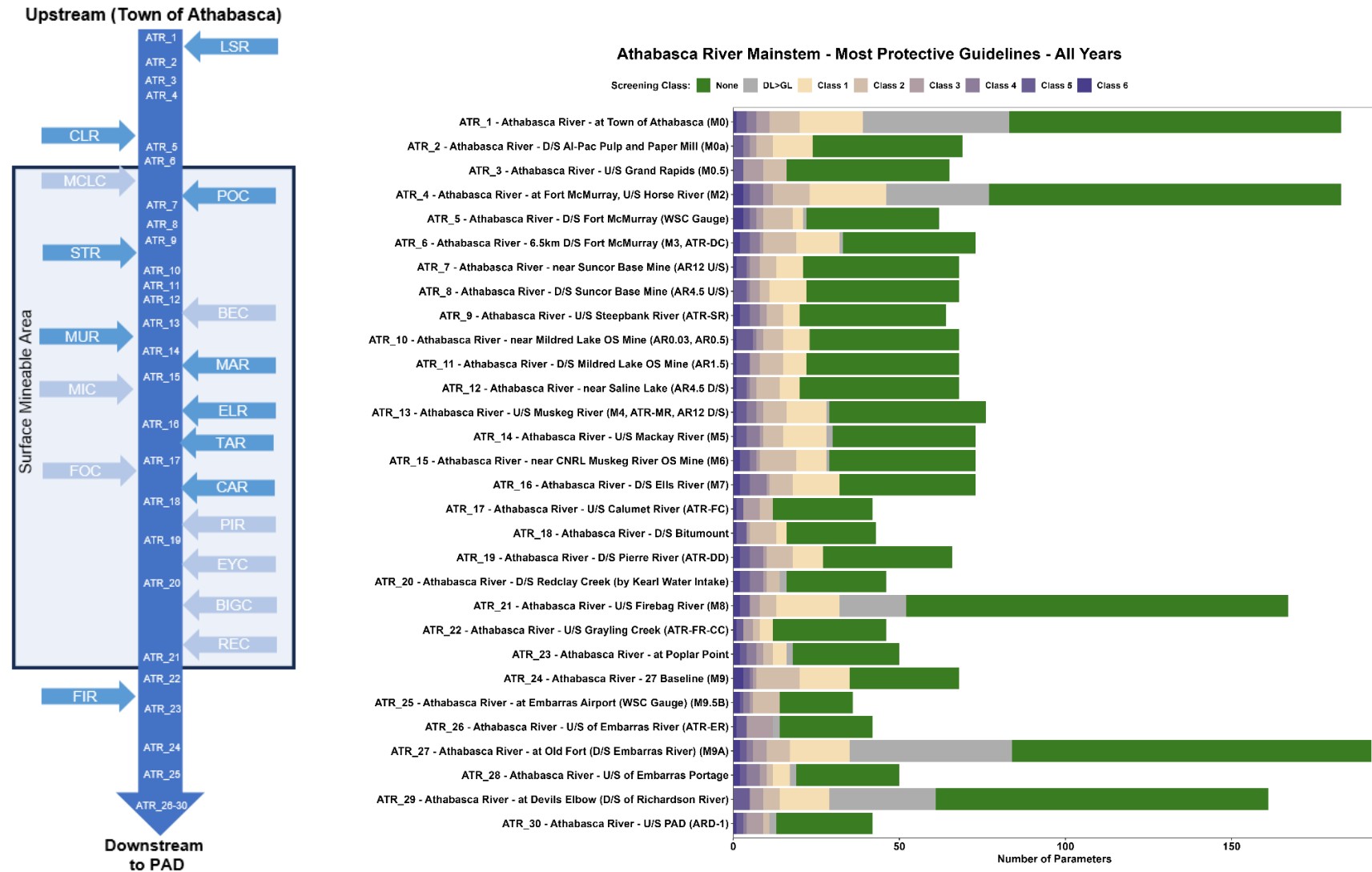


Figure I1: Athabasca River Mainstem - Most Protective Guideline Assessment for All Years

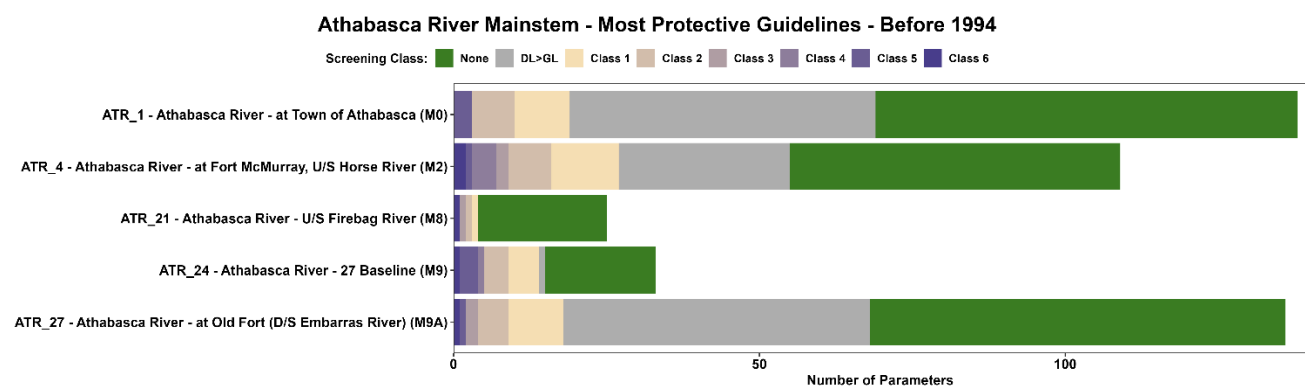
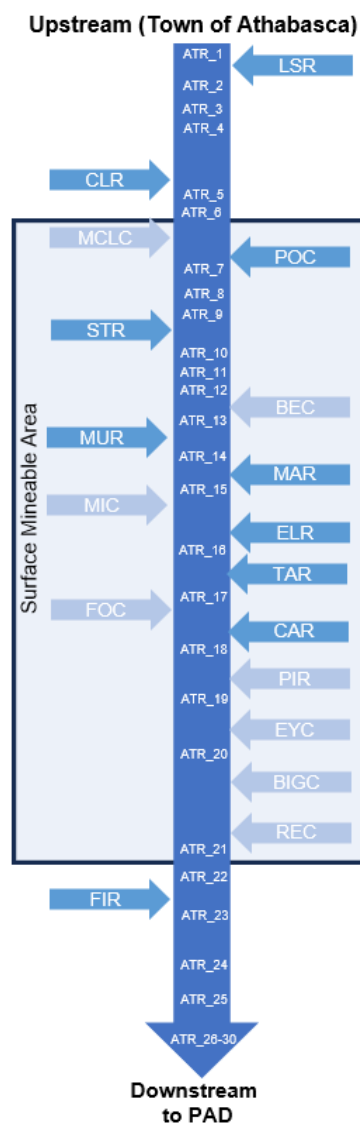


Figure I2: Athabasca River Mainstem - Most Protective Guideline Assessment from before 1994

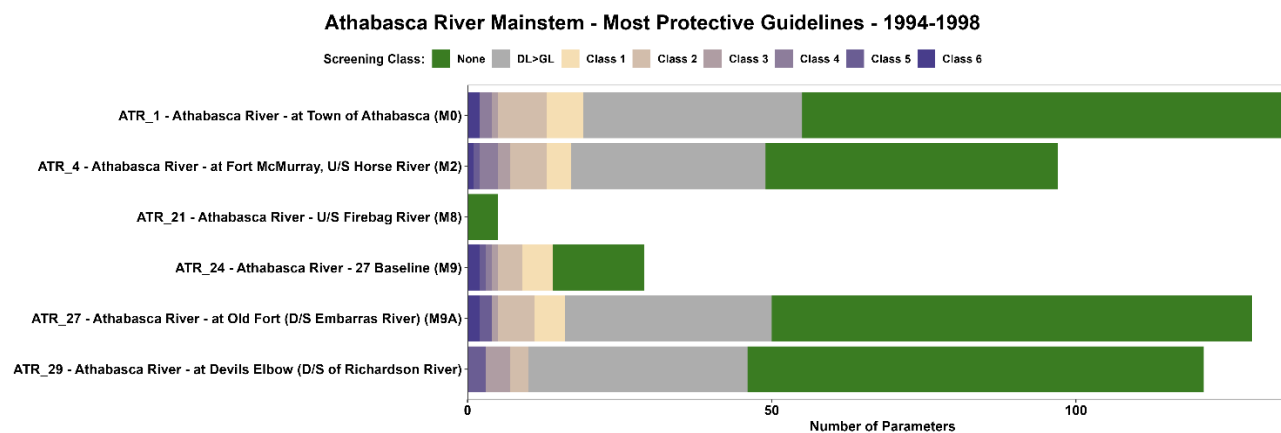
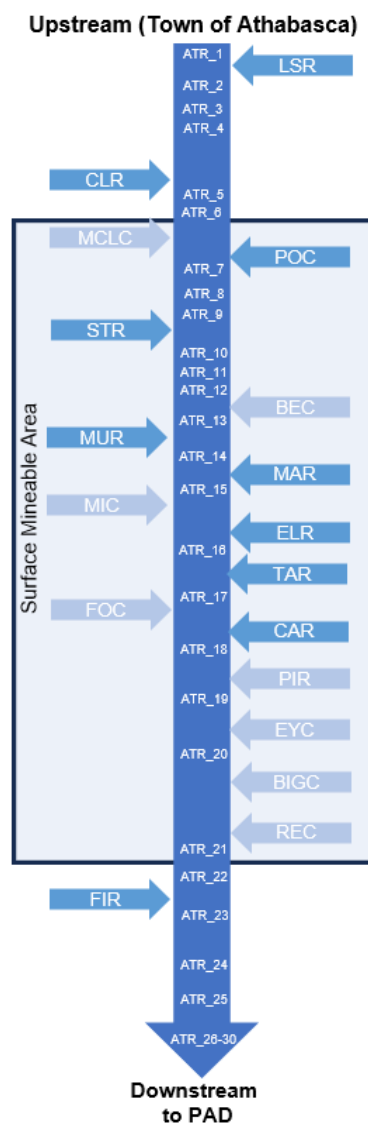


Figure I3: Athabasca River Mainstem - Most Protective Guideline Assessment for 1994 to 1998

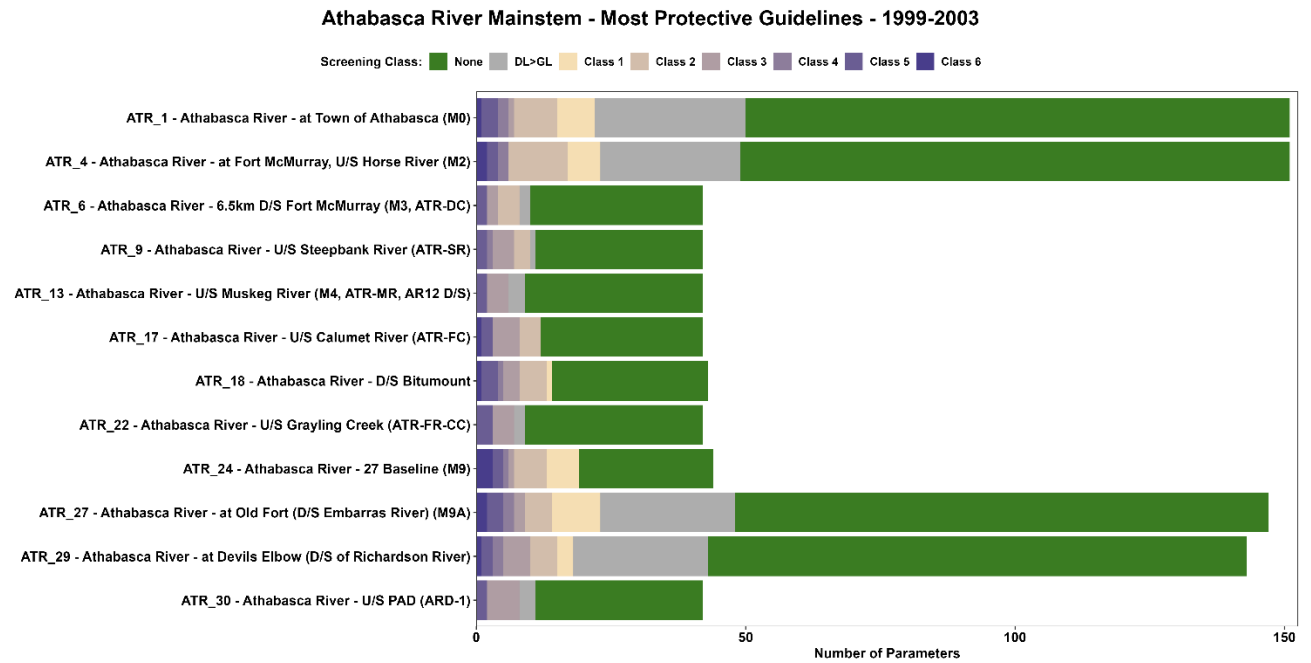
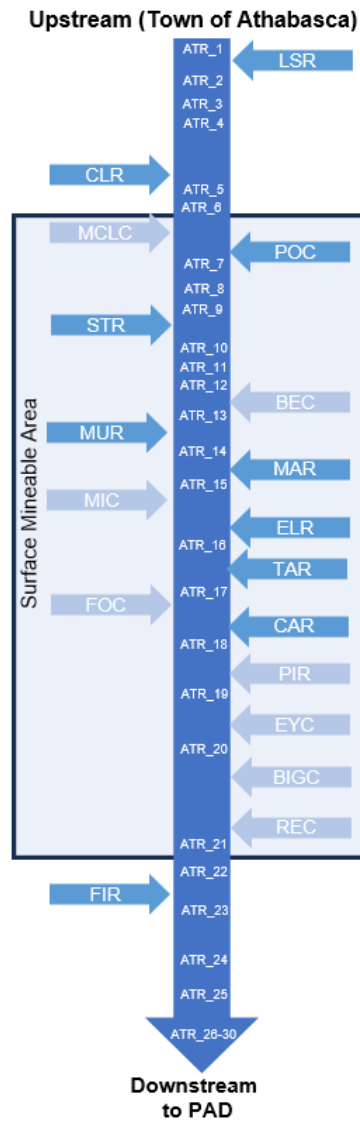
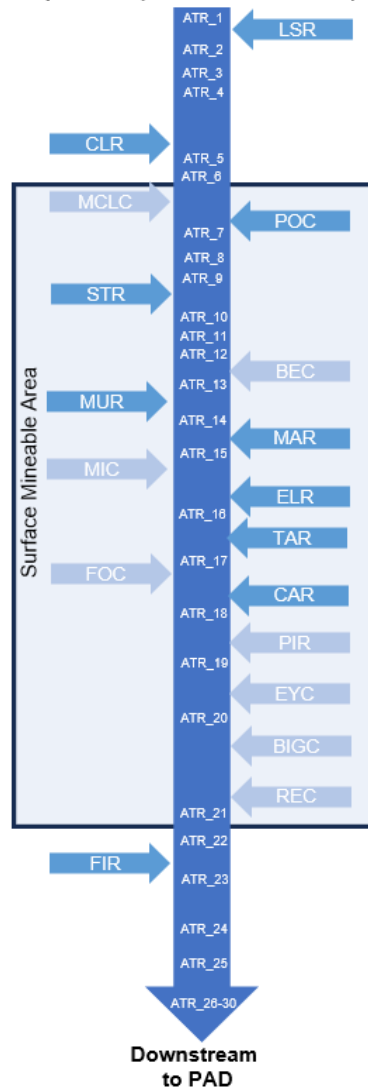


Figure I4: Athabasca River Mainstem - Most Protective Guideline Assessment for 1999 to 2003

Upstream (Town of Athabasca)



#### Athabasca River Mainstem - Most Protective Guidelines - 2004-2008

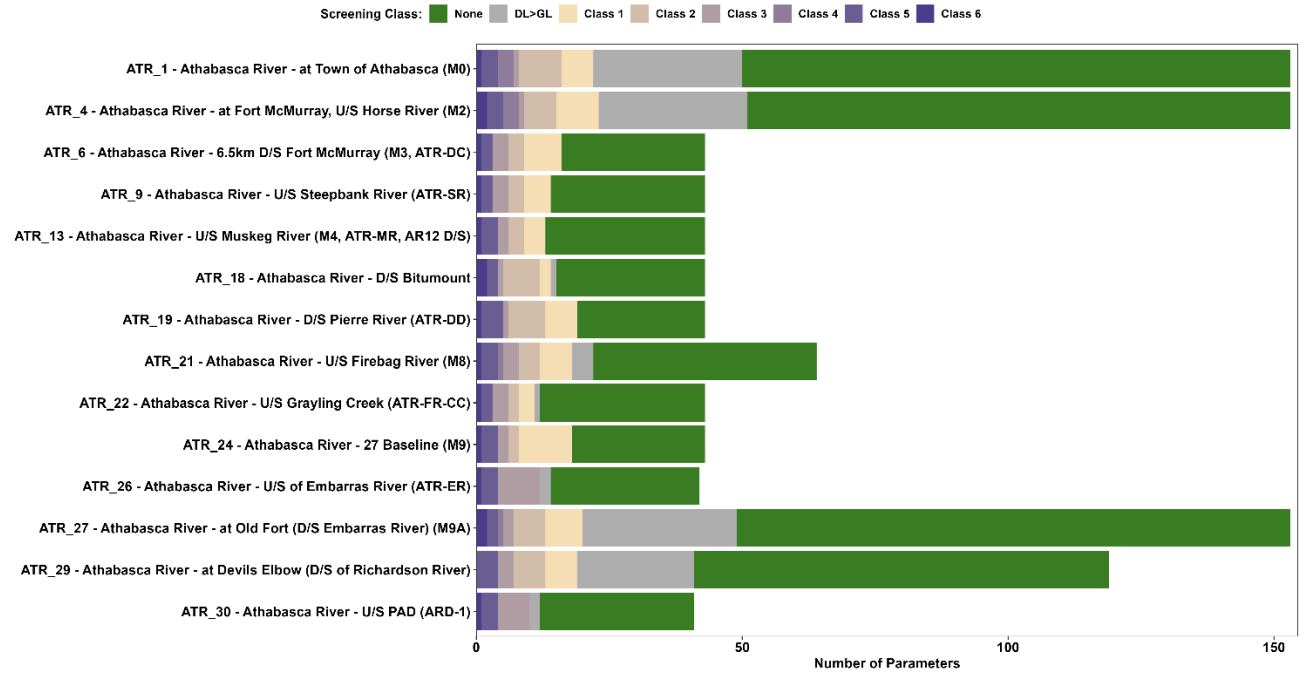


Figure I5: Athabasca River Mainstem - Most Protective Guideline Assessment for 2004 to 2008



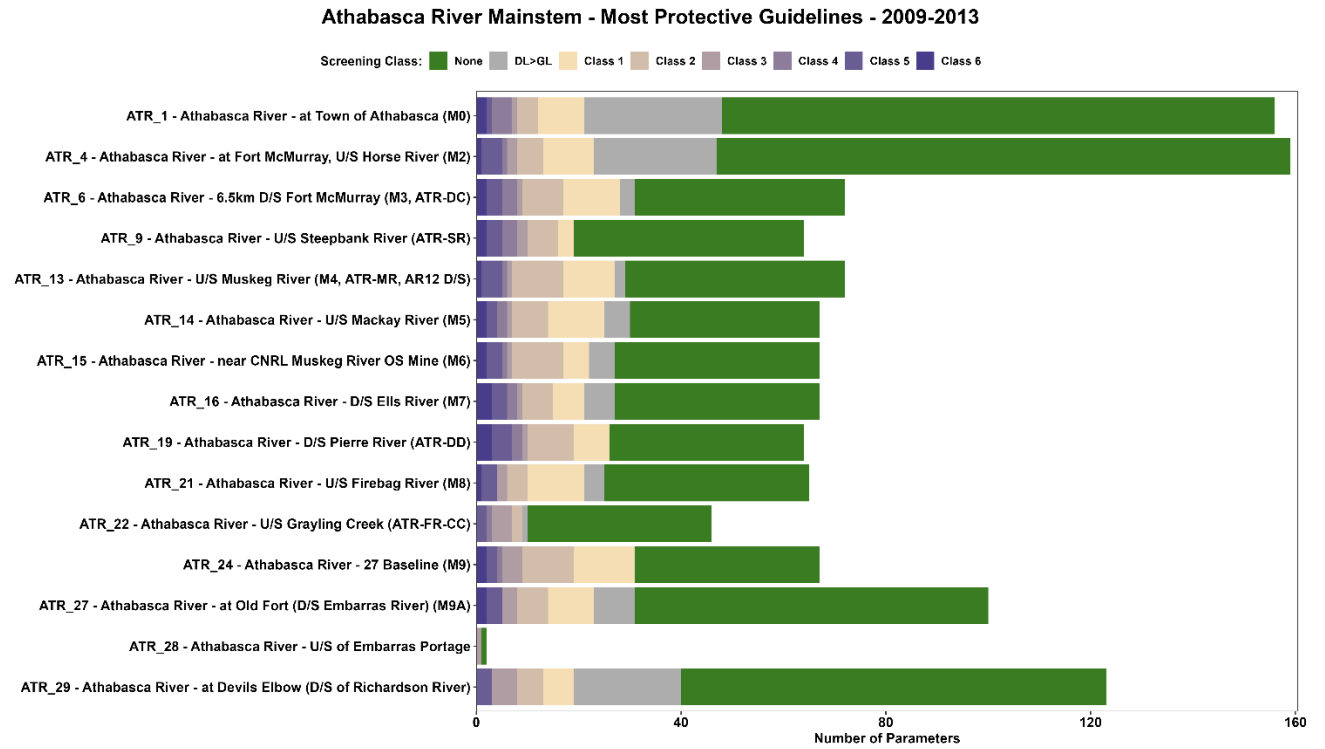
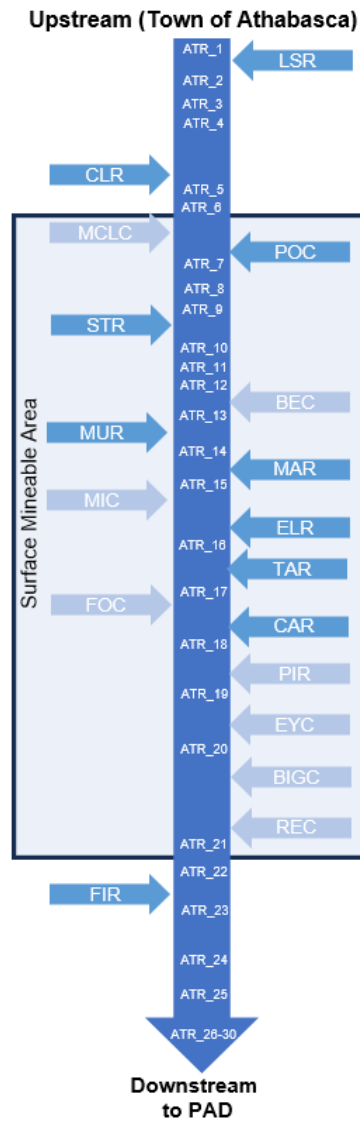
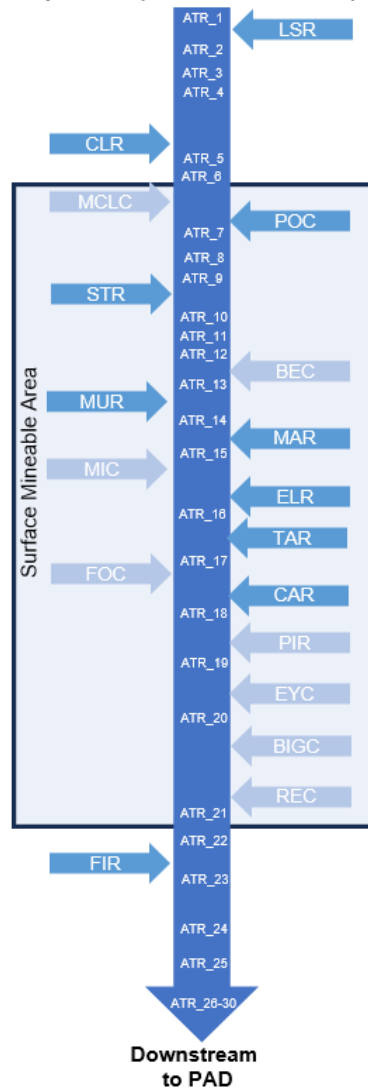


Figure I6: Athabasca River Mainstem - Most Protective Guideline Assessment for 2009 to 2013

Upstream (Town of Athabasca)



### Athabasca River Mainstem - Most Protective Guidelines - 2014-2018

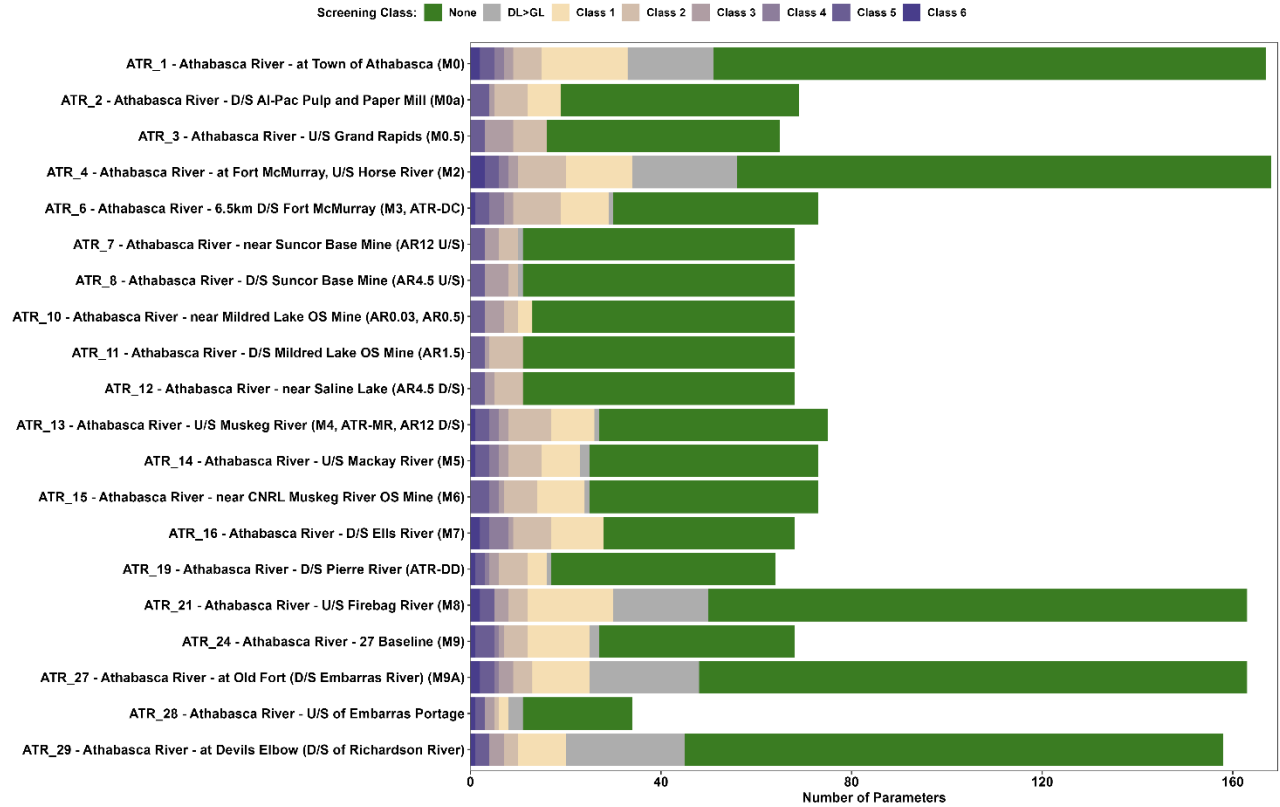
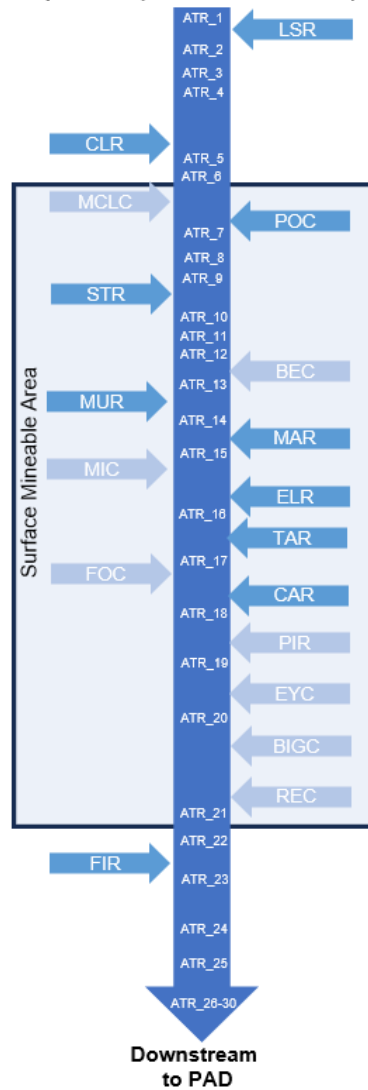


Figure I7: Athabasca River Mainstem - Most Protective Guideline Assessment for 2014 to 2018

Upstream (Town of Athabasca)



### Athabasca River Mainstem - Most Protective Guidelines - 2019-2023

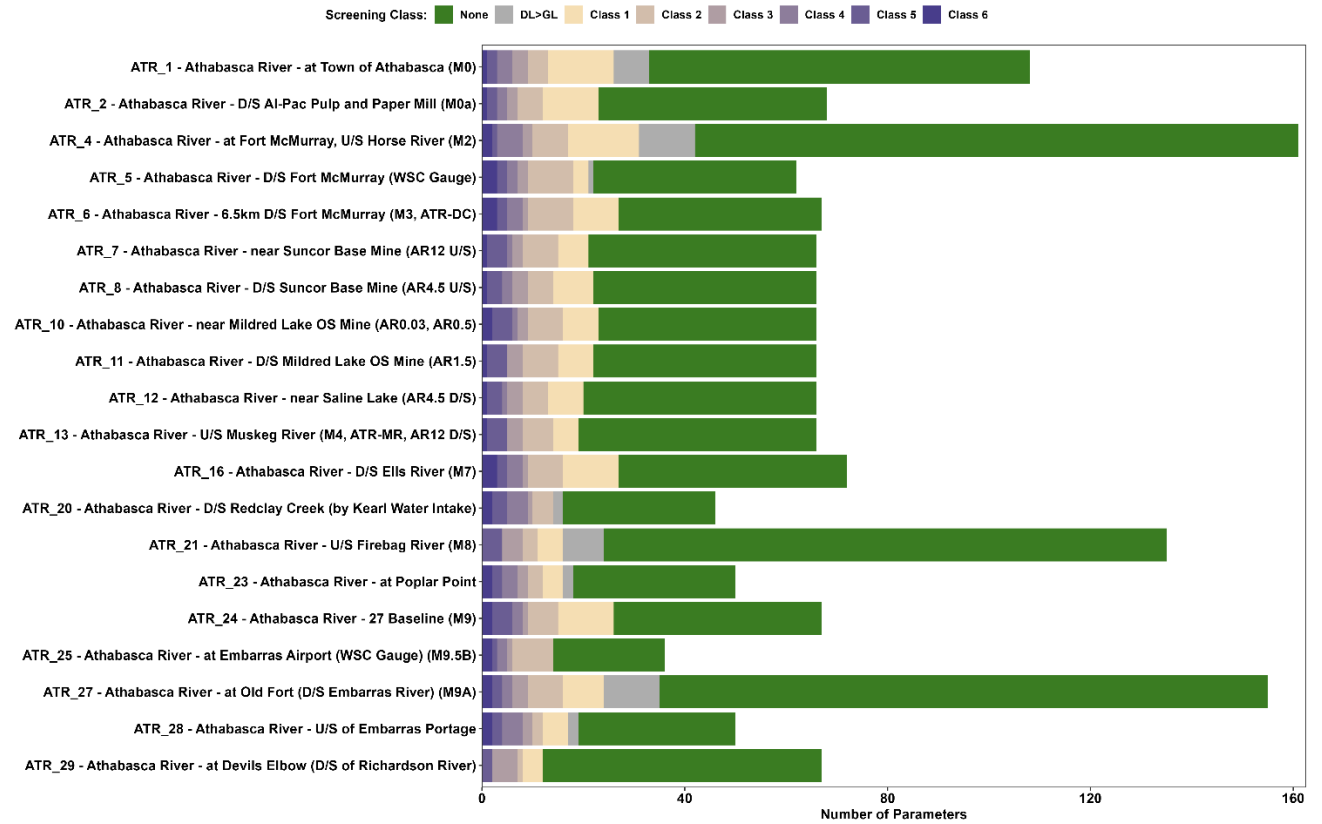


Figure I8: Athabasca River Mainstem - Most Protective Guideline Assessment for 2019 to 2023

## I.1.2 Athabasca River Tributaries – Most Protective Guidelines

### 1.2.1 Clearwater-Christina River and Tributaries

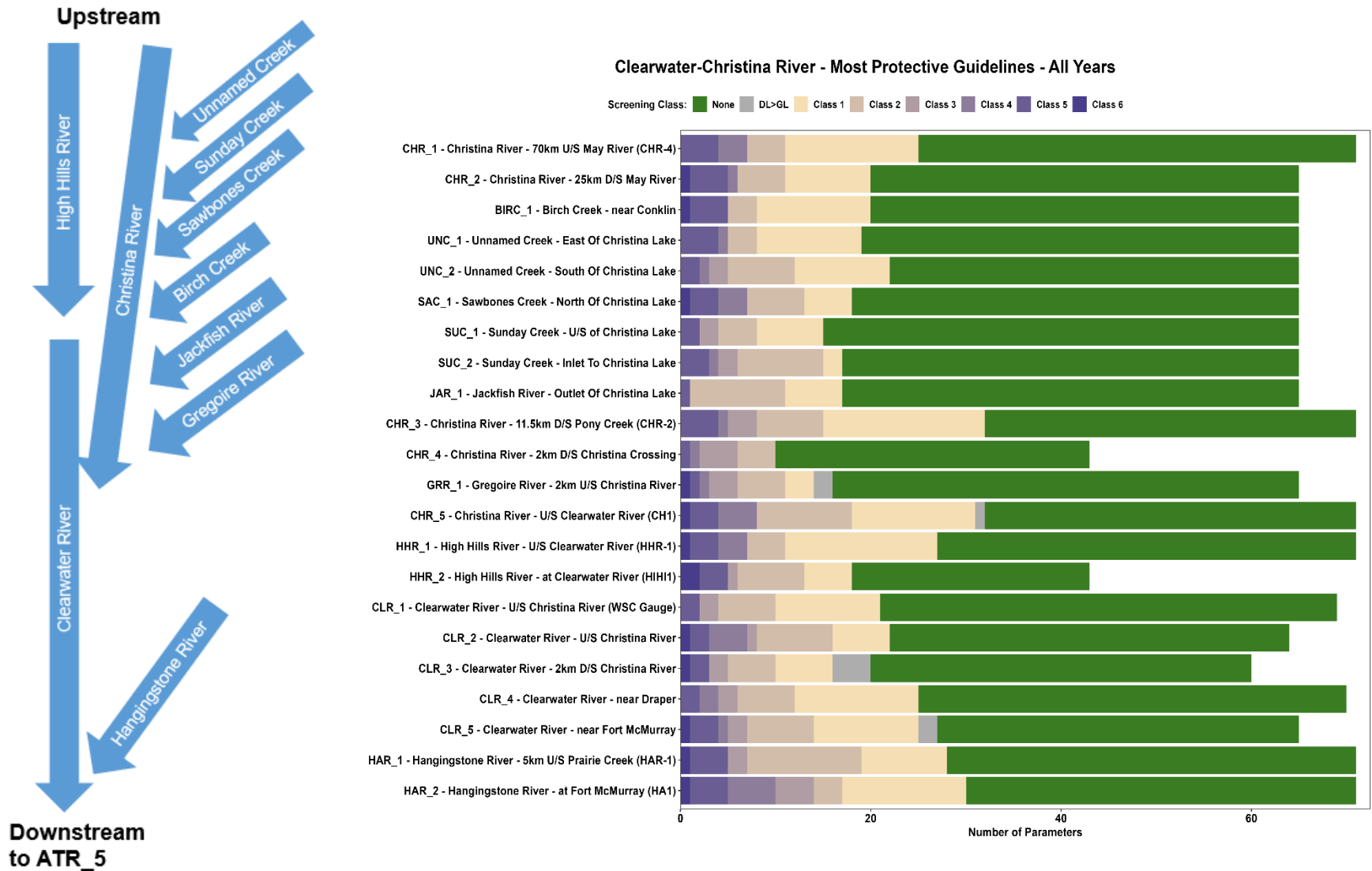


Figure I9: Clearwater-Christina Rivers and Tributaries - Most Protective Guideline Assessment for All Years

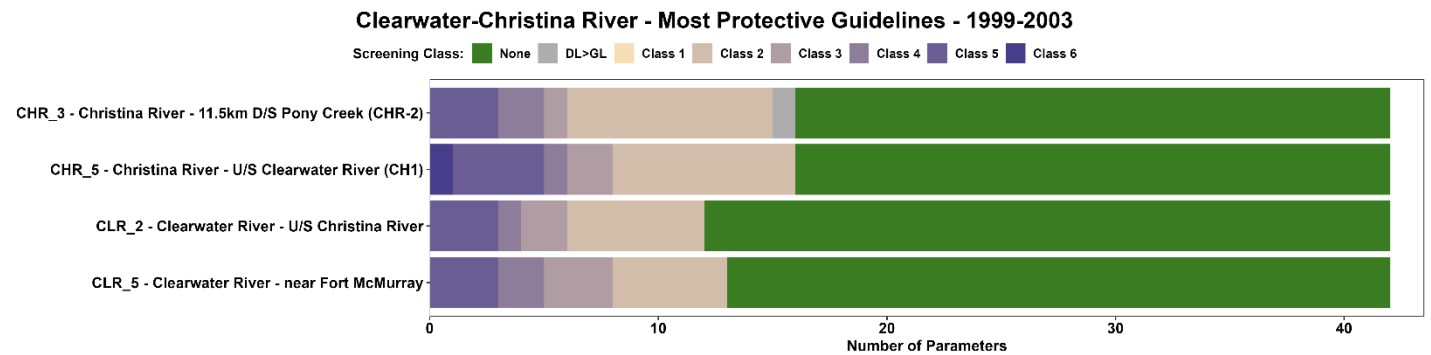
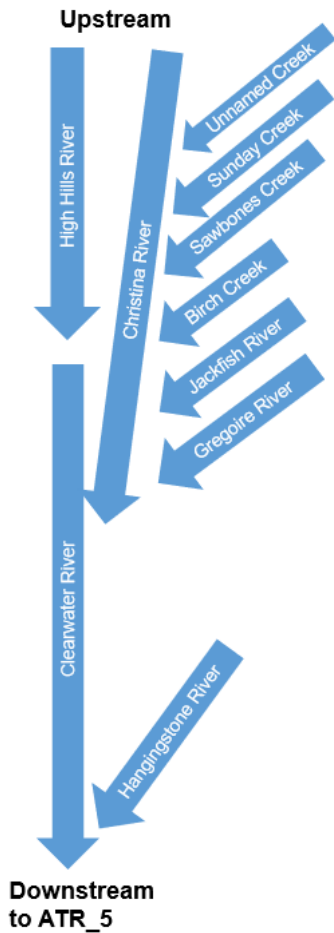


Figure I10: Clearwater-Christina Rivers and Tributaries - Most Protective Guideline Assessment for 1999 to 2003

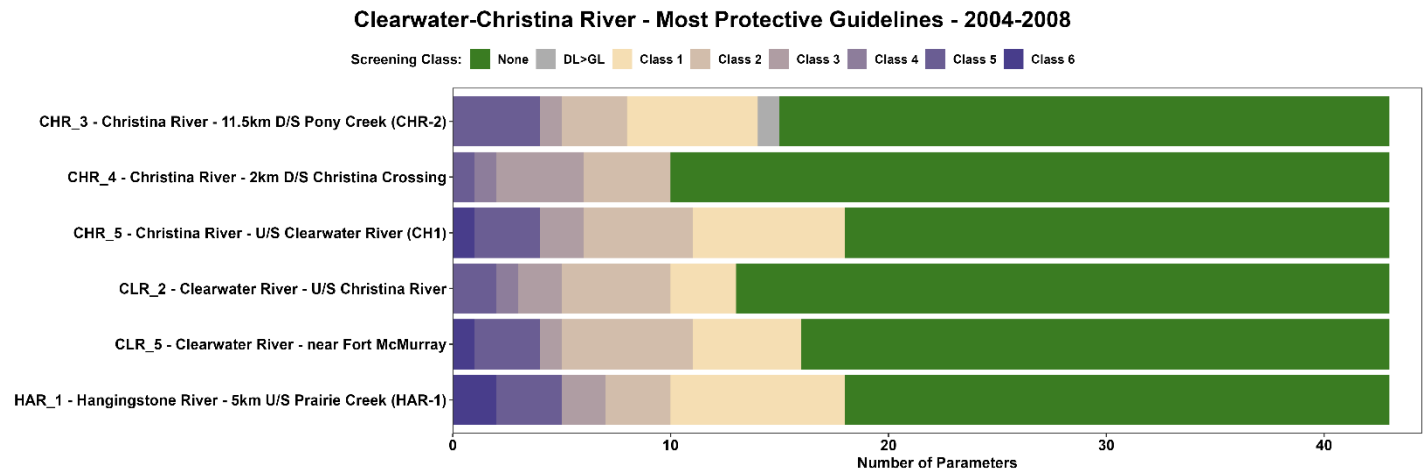
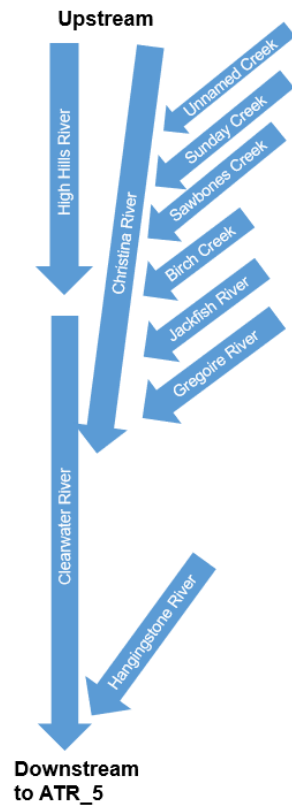


Figure I11: Clearwater-Christina Rivers and Tributaries - Most Protective Guideline Assessment for 2004 to 2008

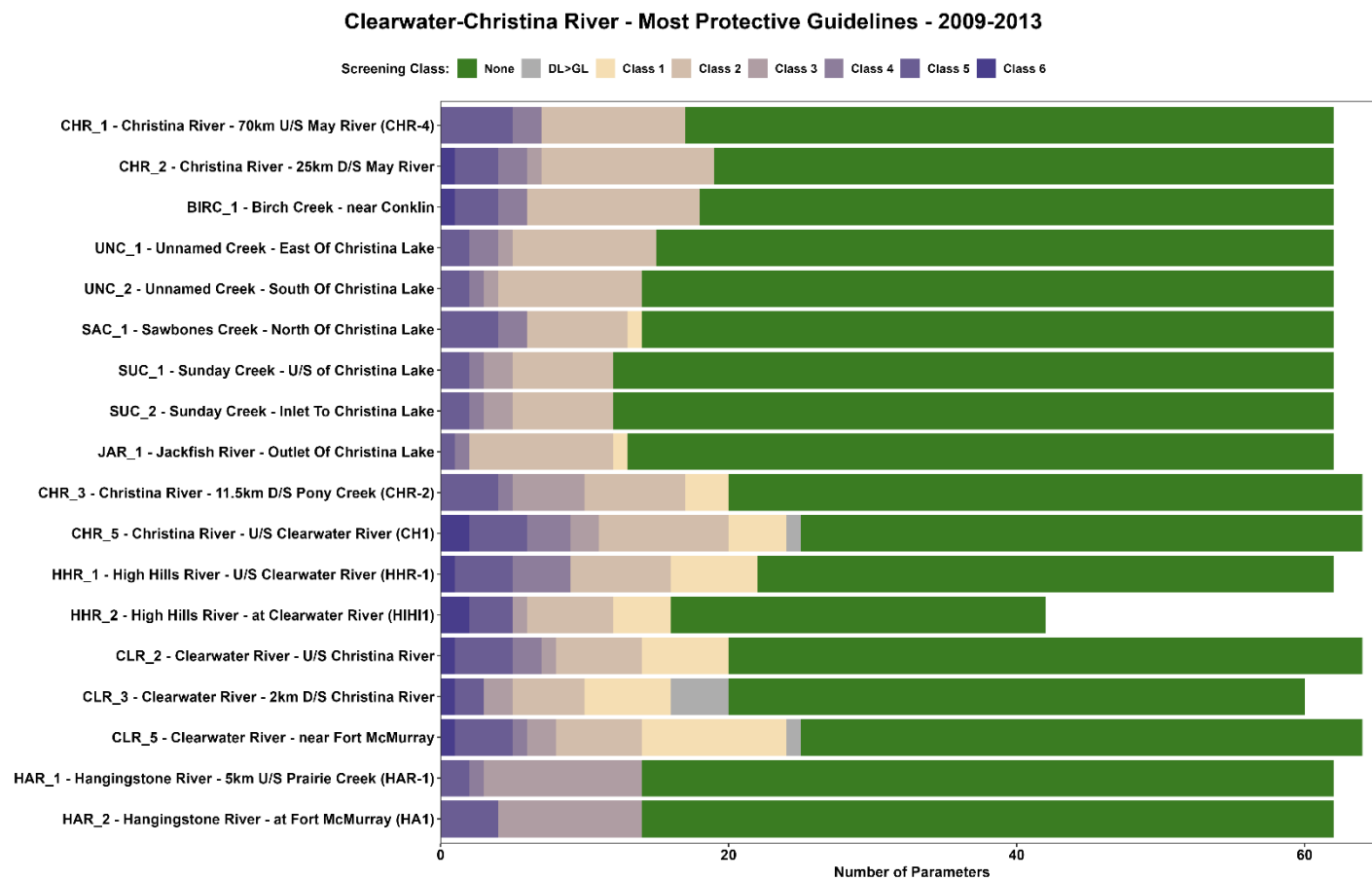
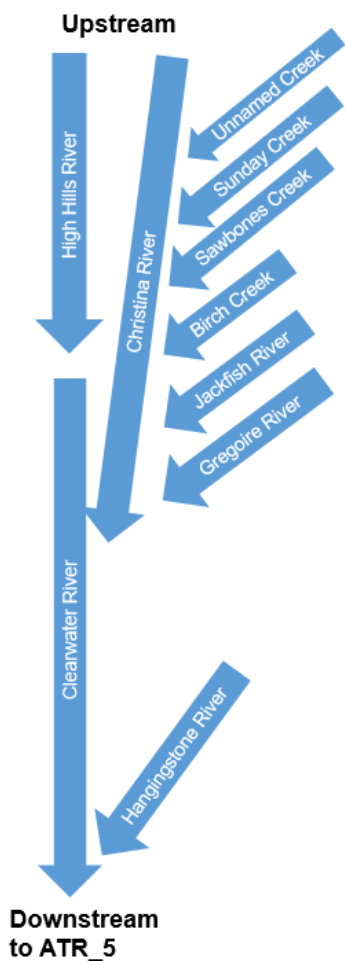


Figure I12: Clearwater-Christina Rivers and Tributaries - Most Protective Guideline Assessment for 2009 to 2013

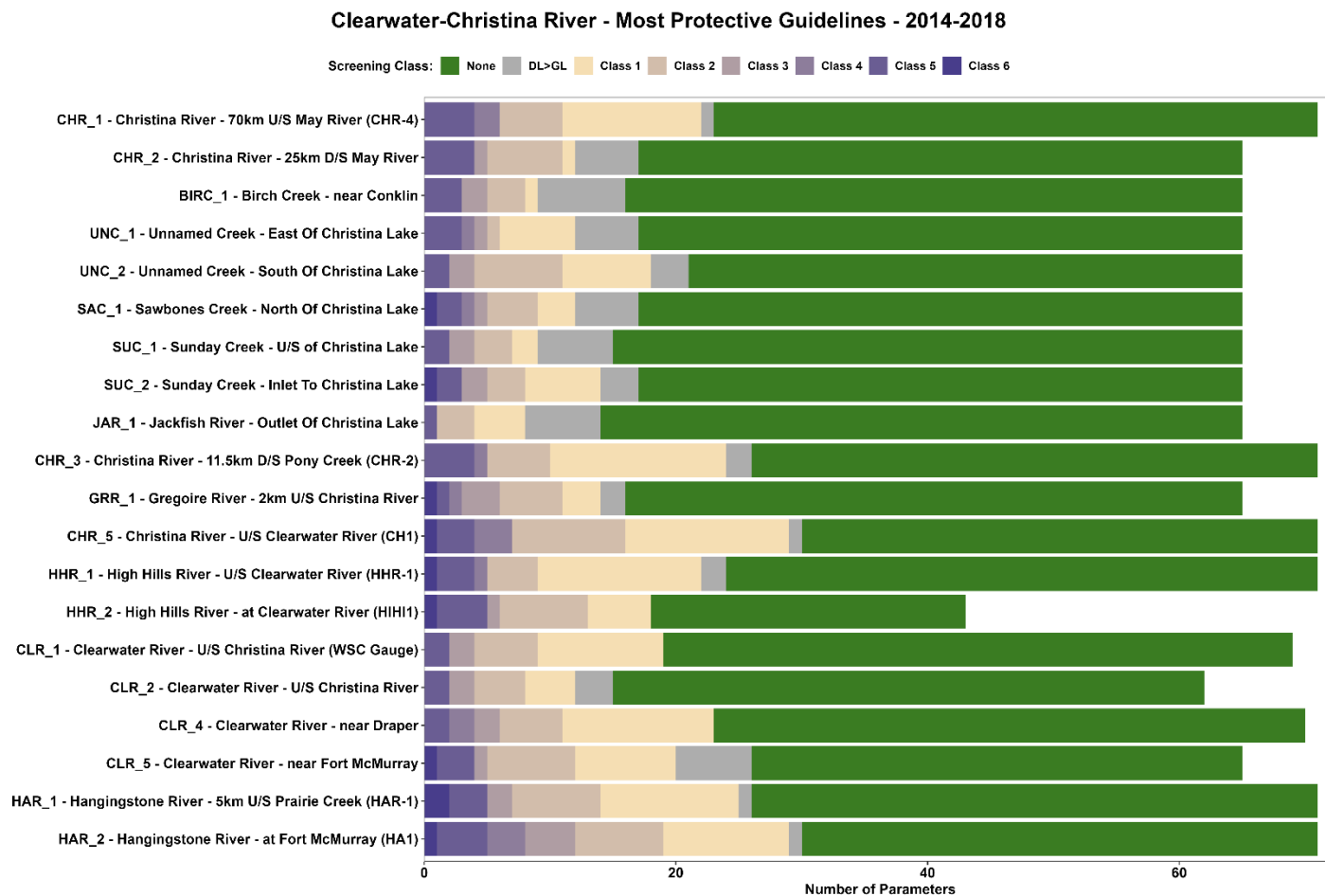
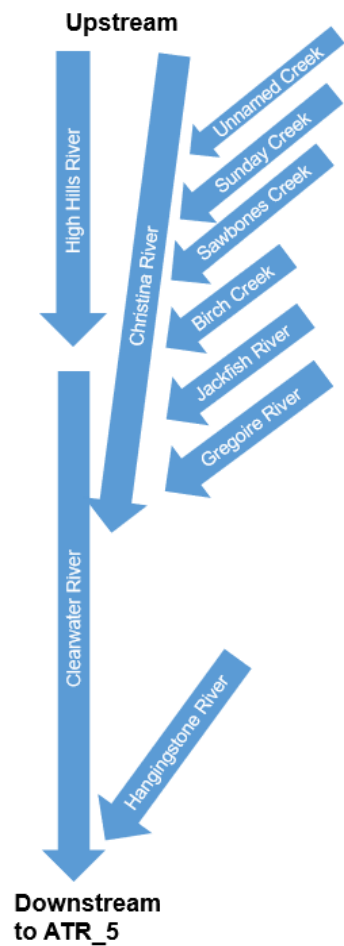


Figure I13: Clearwater-Christina Rivers and Tributaries - Most Protective Guideline Assessment for 2014 to 2018



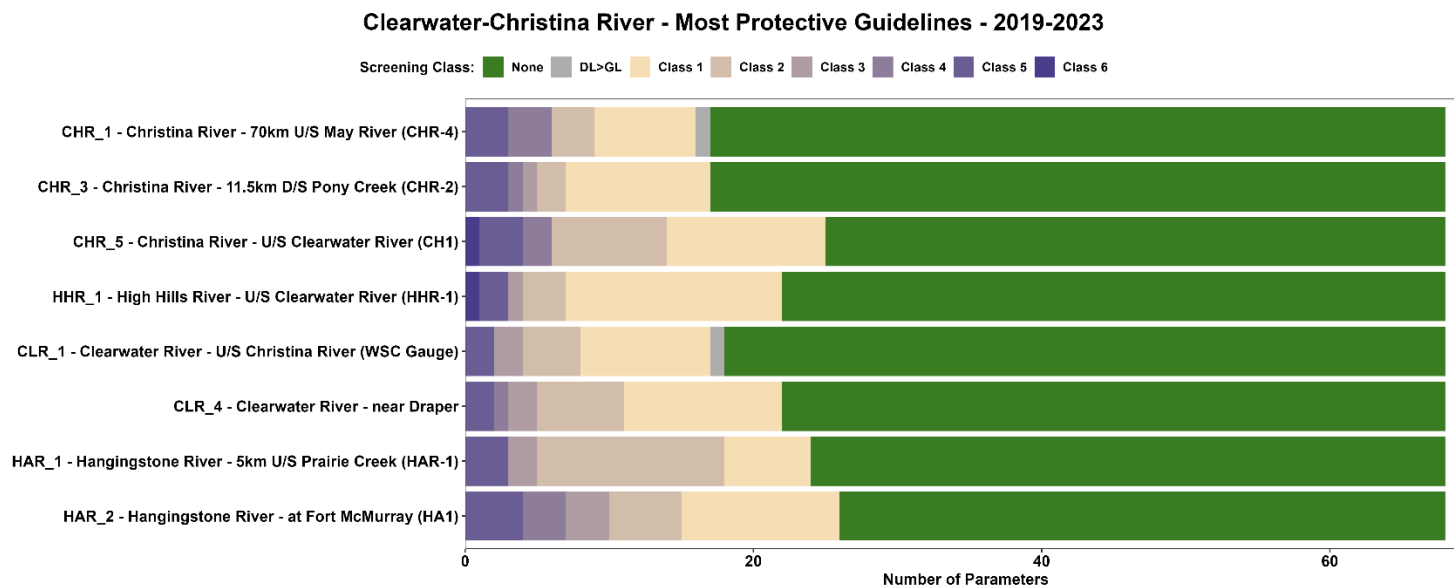
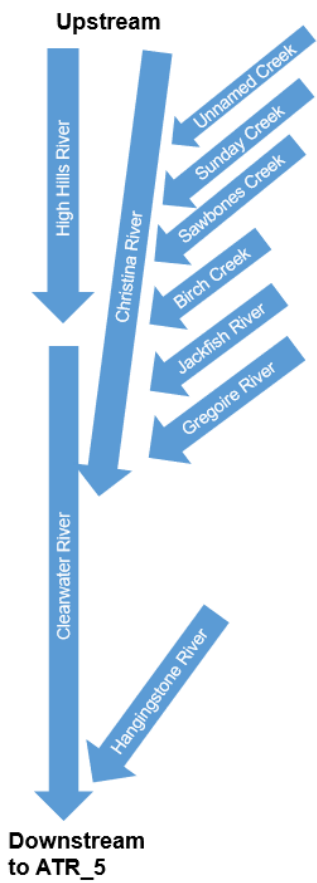


Figure I14: Clearwater-Christina Rivers and Tributaries - Most Protective Guideline Assessment for 2019 to 2023

## 1.2.2 Steepbank River and Tributaries

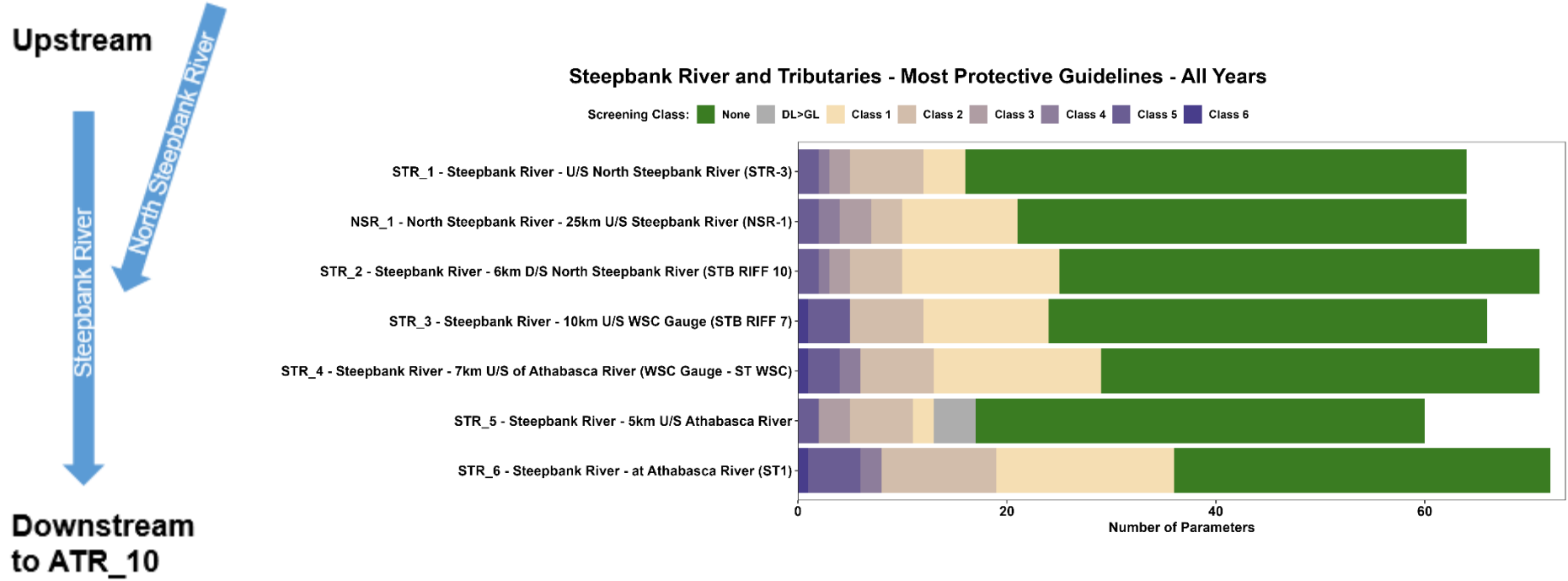


Figure I15: Steepbank River and Tributaries - Most Protective Guideline Assessment for All Years

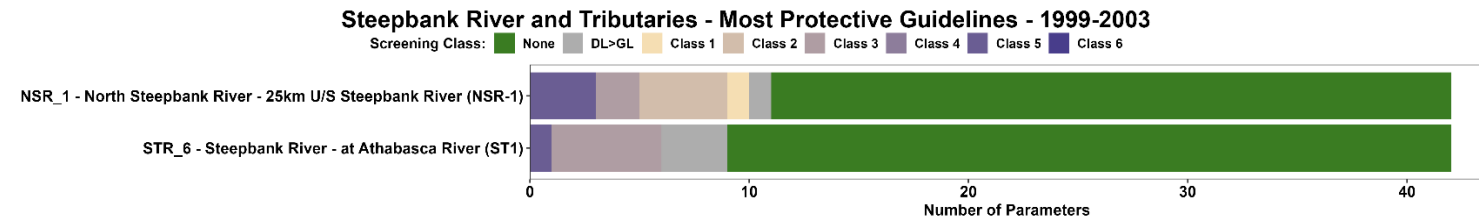
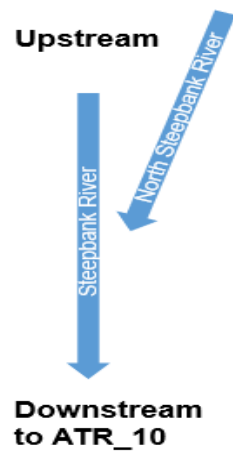


Figure I16: Steepbank River and Tributaries - Most Protective Guideline Assessment for 1999 to 2003

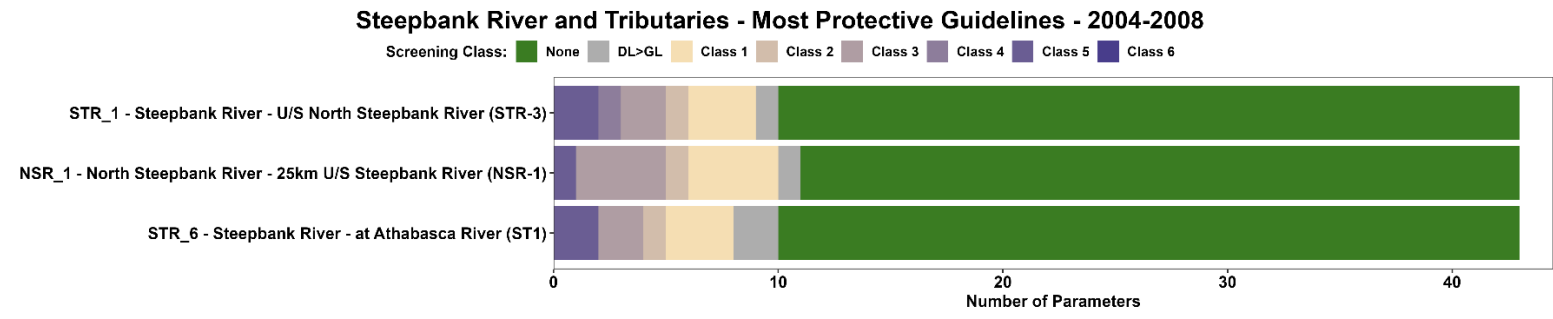
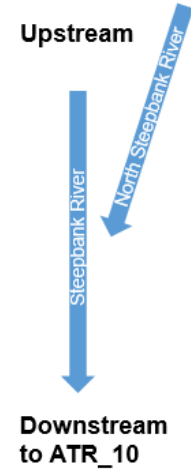


Figure I17: Steepbank River and Tributaries - Most Protective Guideline Assessment for 2004 to 2008

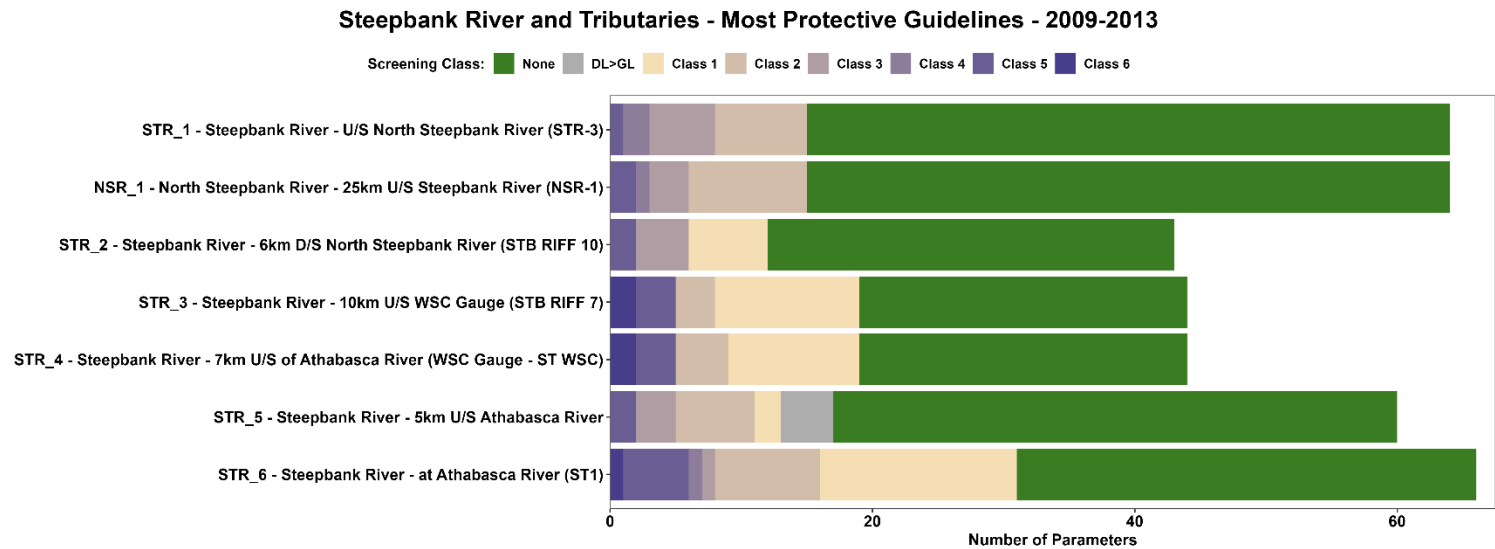
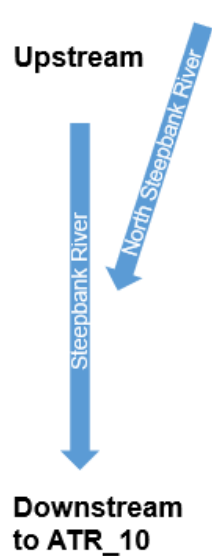


Figure I18: Steepbank River and Tributaries - Most Protective Guideline Assessment for 2009 to 2013

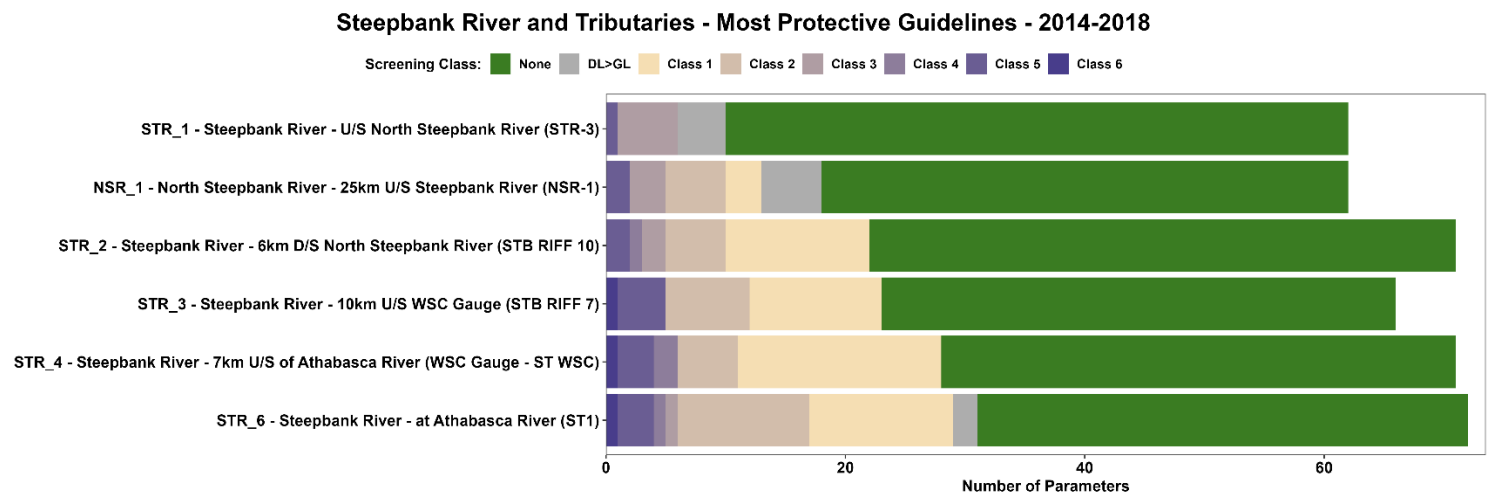
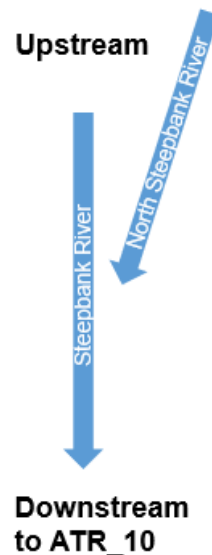


Figure I19: Steepbank River and Tributaries - Most Protective Guideline Assessment for 2014 to 2018

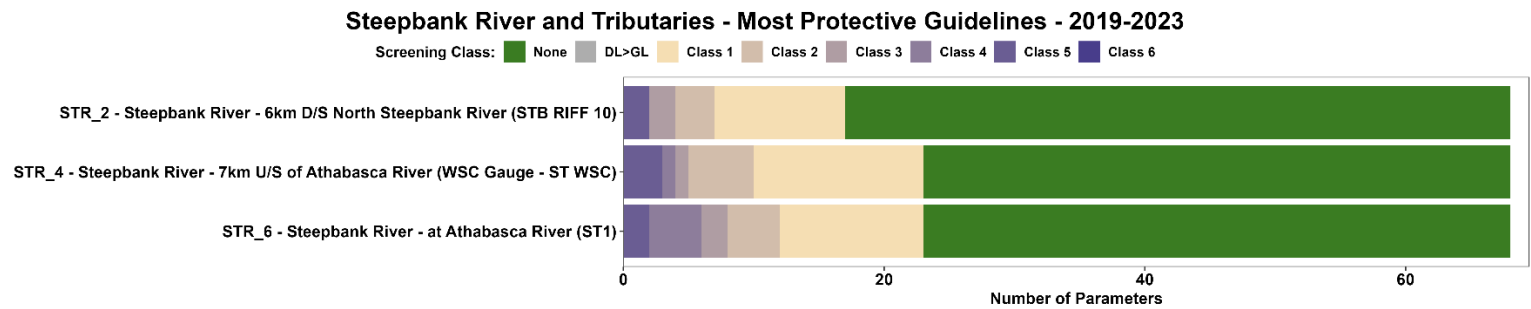
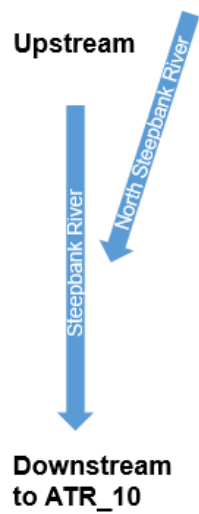
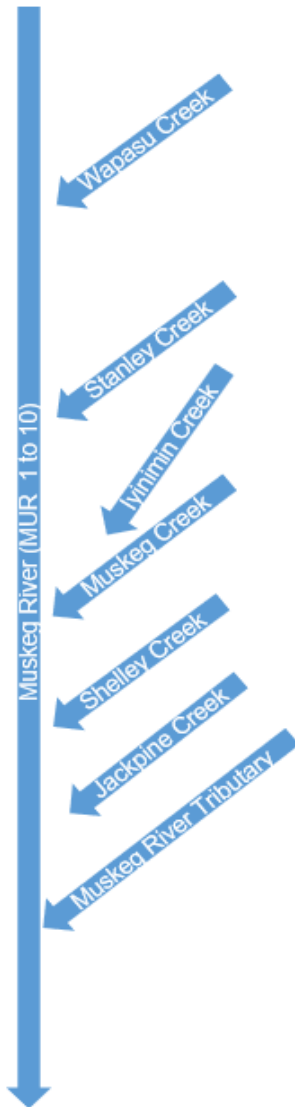


Figure I20: Steepbank River and Tributaries - Most Protective Guideline Assessment for 2019 to 2023

### 1.2.3 Muskeg River and Tributaries

Upstream



Downstream  
to ATR\_14

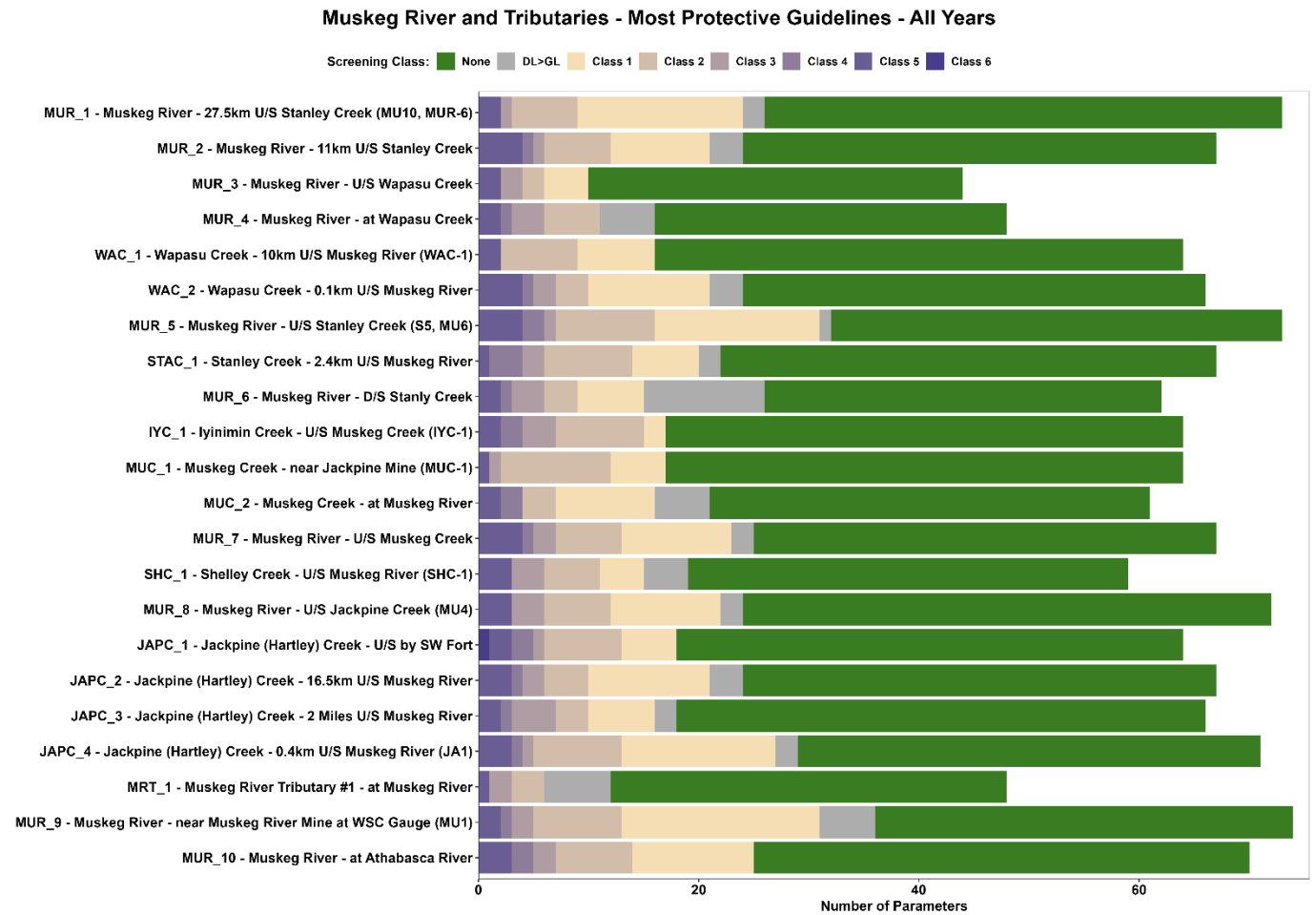
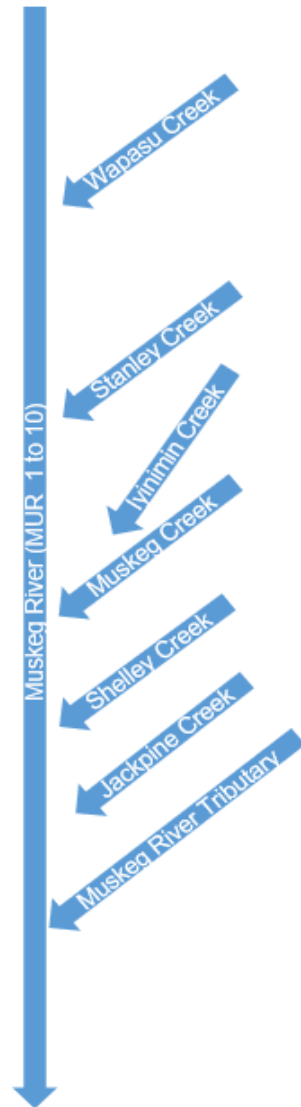


Figure I21: Muskeg River and Tributaries - Most Protective Guideline Assessment for All Years

Upstream



Downstream  
to ATR\_14

### Muskeg River and Tributaries - Most Protective Guidelines - 1994-1998

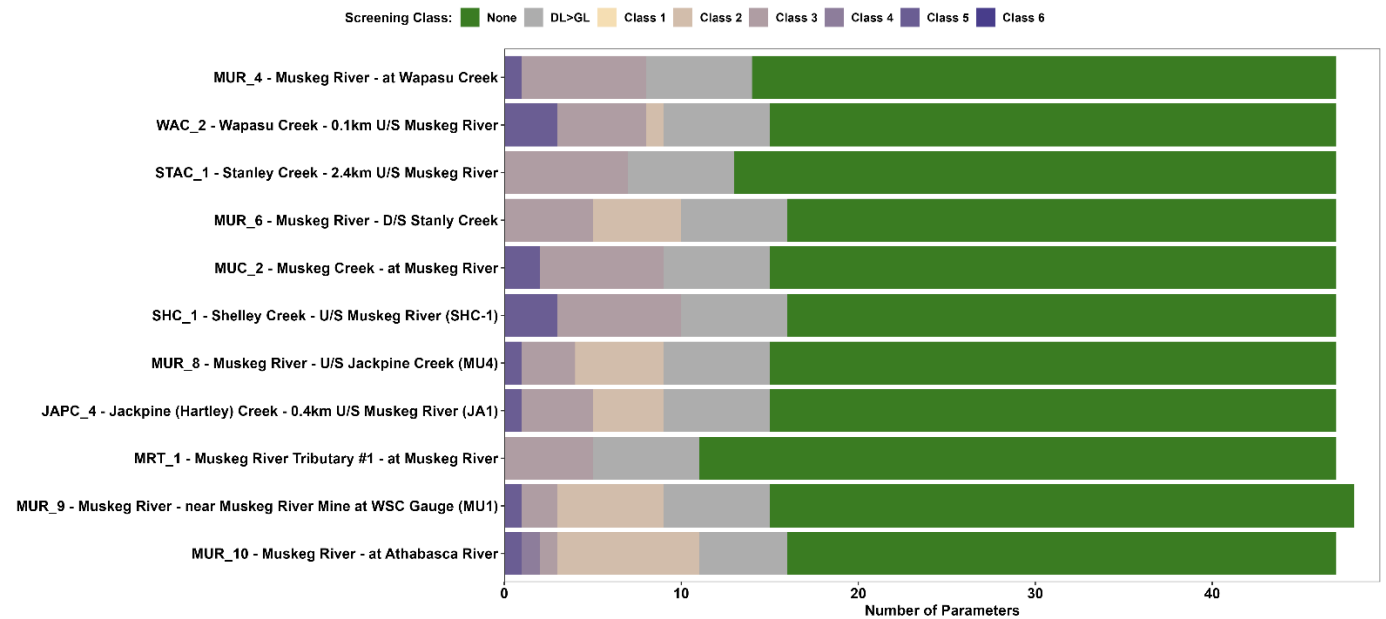


Figure I22: Muskeg River and Tributaries - Most Protective Guideline Assessment from 1994 to 1998

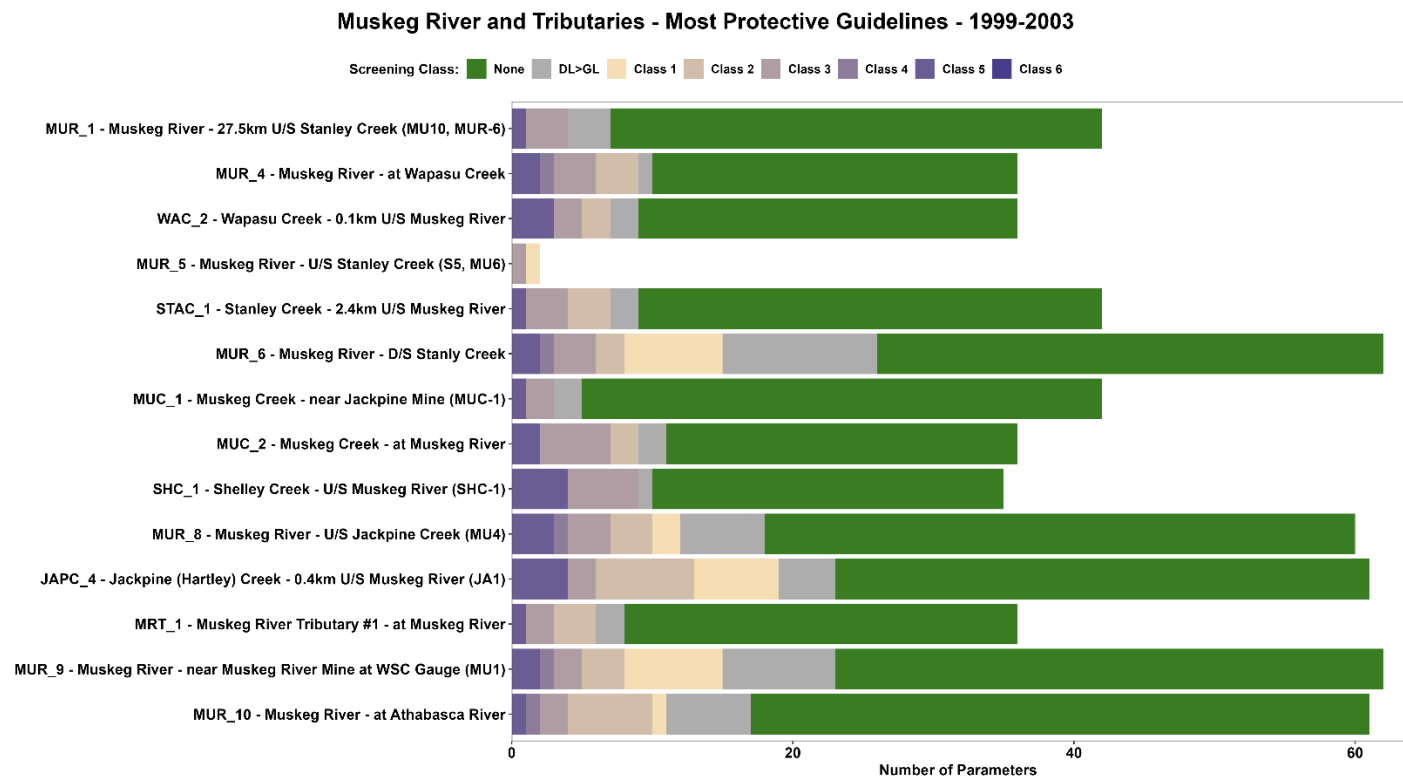
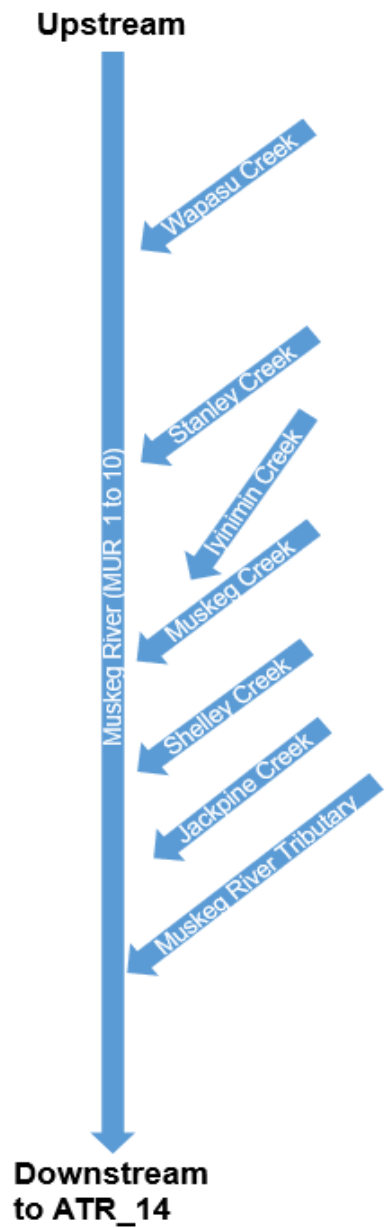
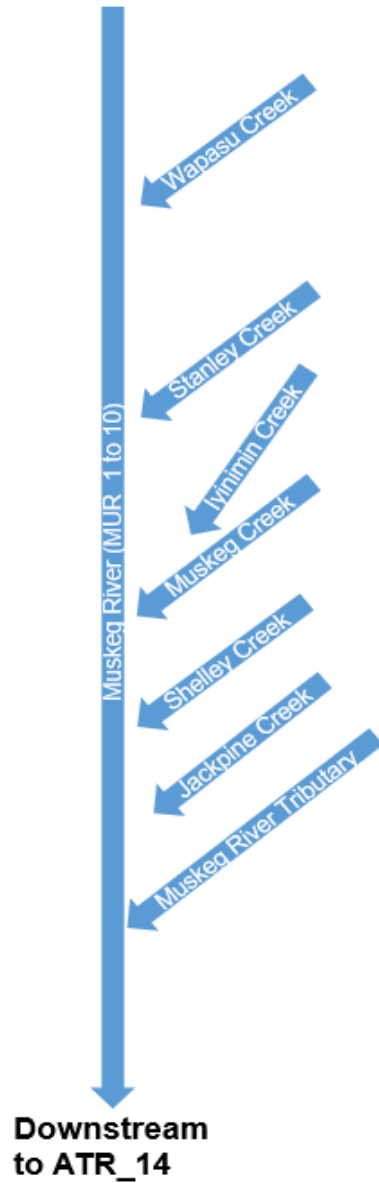


Figure I23: Muskeg River and Tributaries - Most Protective Guideline Assessment from 1999 to 2003



Upstream



#### Muskeg River and Tributaries - Most Protective Guidelines - 2004-2008

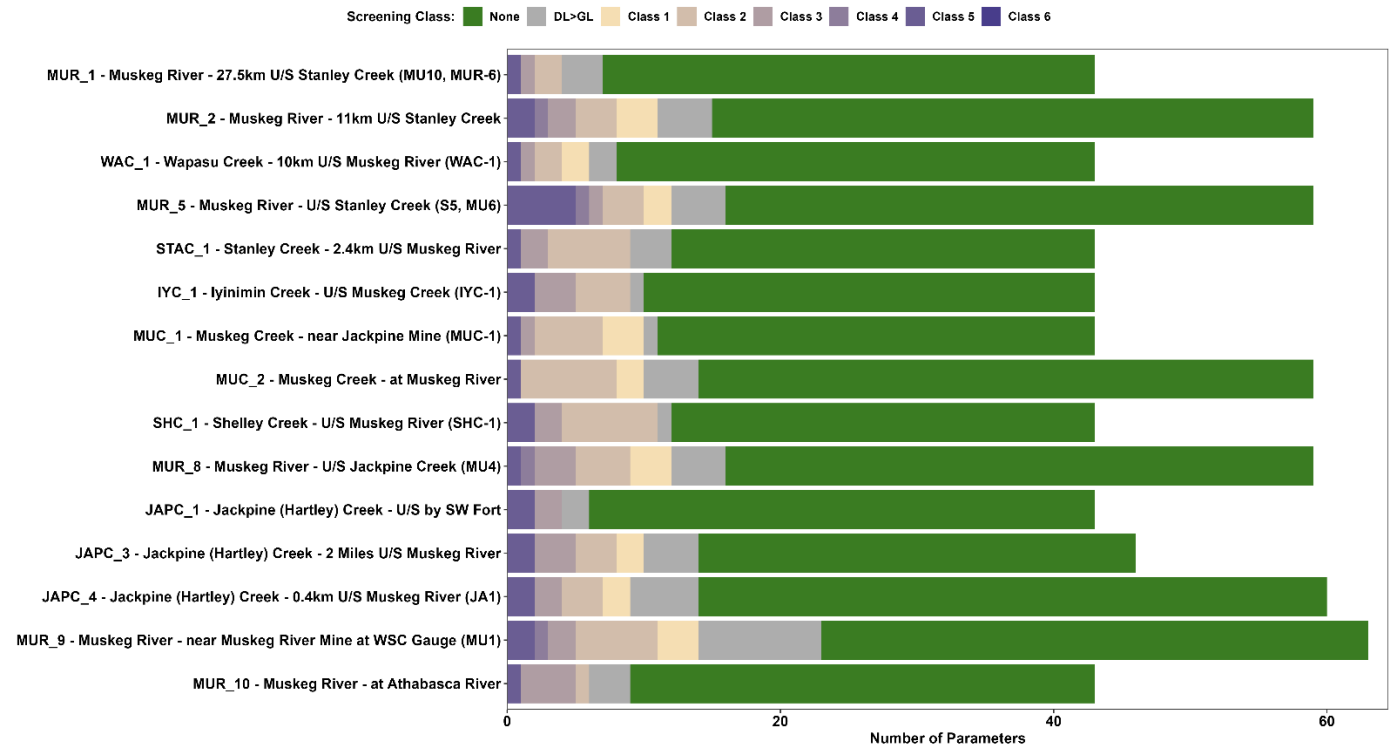


Figure I24: Muskeg River and Tributaries - Most Protective Guideline Assessment from 2004 to 2008

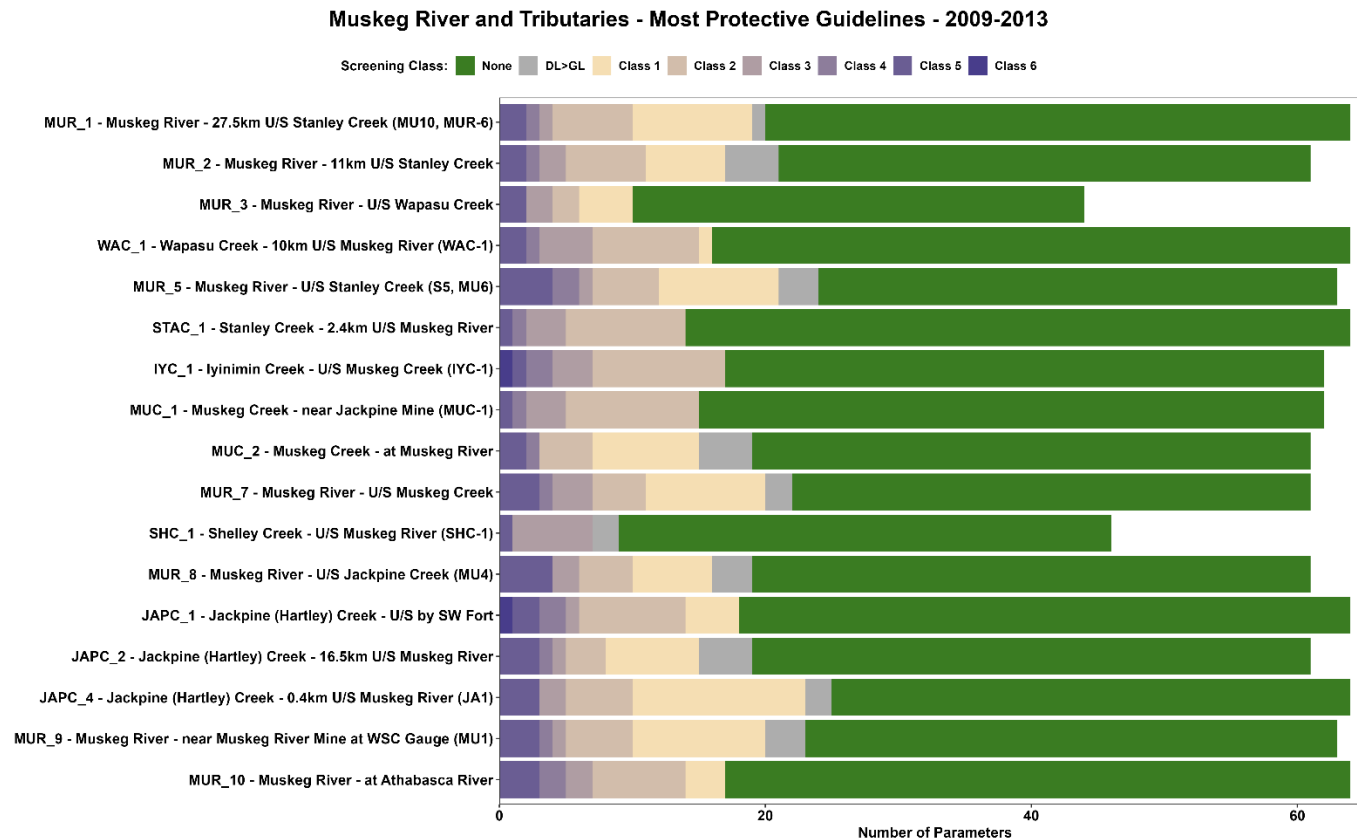
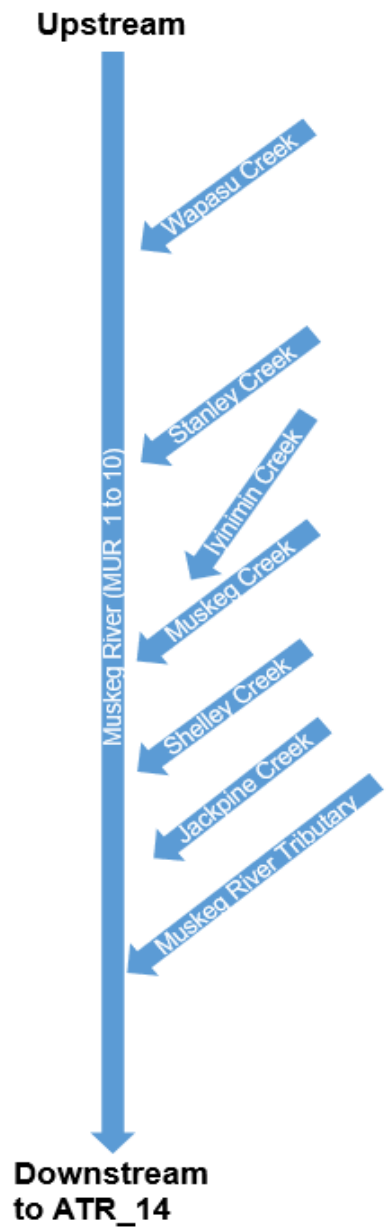
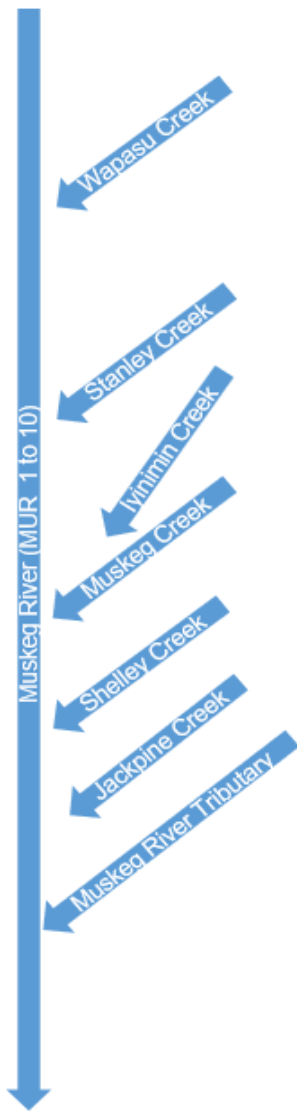


Figure I25: Muskeg River and Tributaries - Most Protective Guideline Assessment from 2009 to 2013

Upstream



Downstream  
to ATR\_14

### Muskeg River and Tributaries - Most Protective Guidelines - 2014-2018

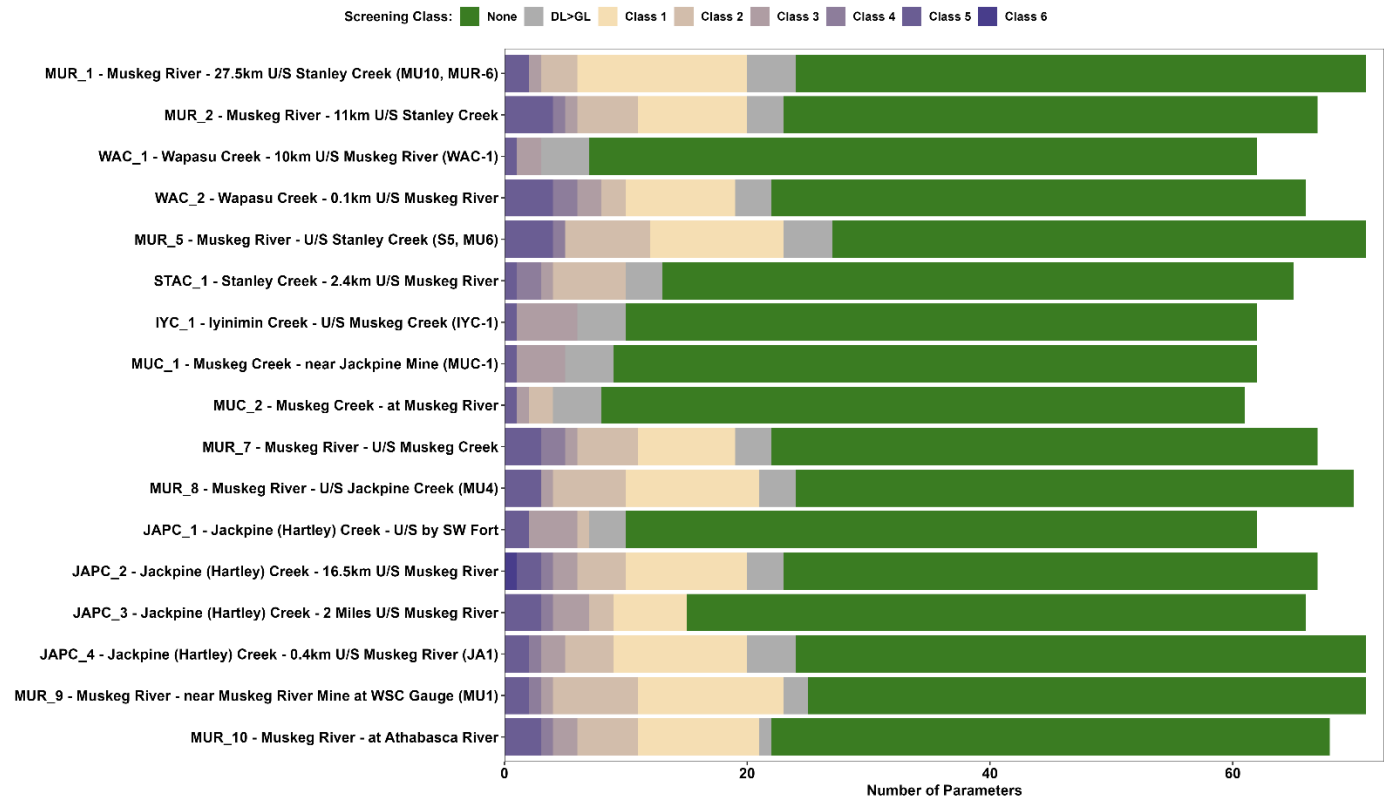


Figure I26: Muskeg River and Tributaries - Most Protective Guideline Assessment from 2014 to 2018

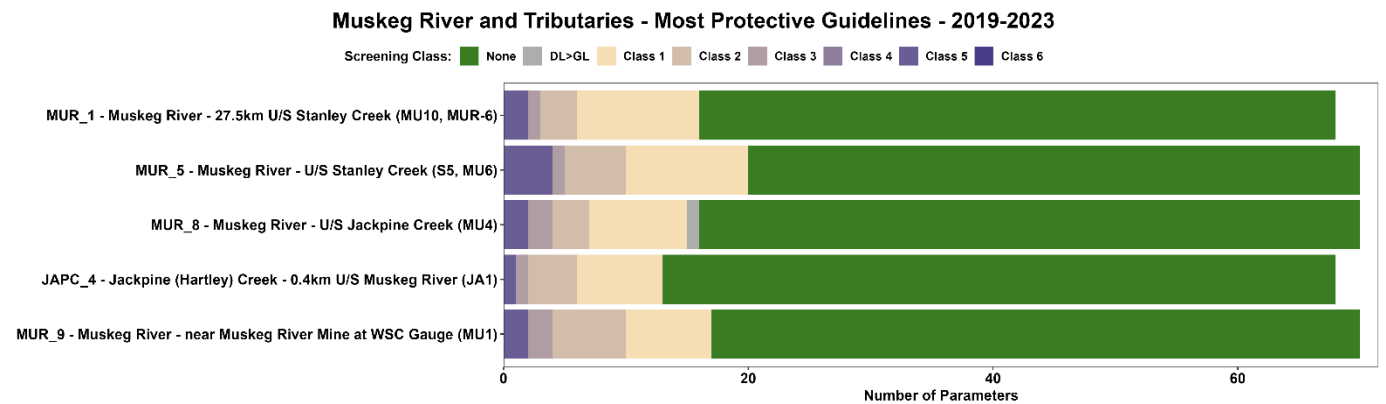
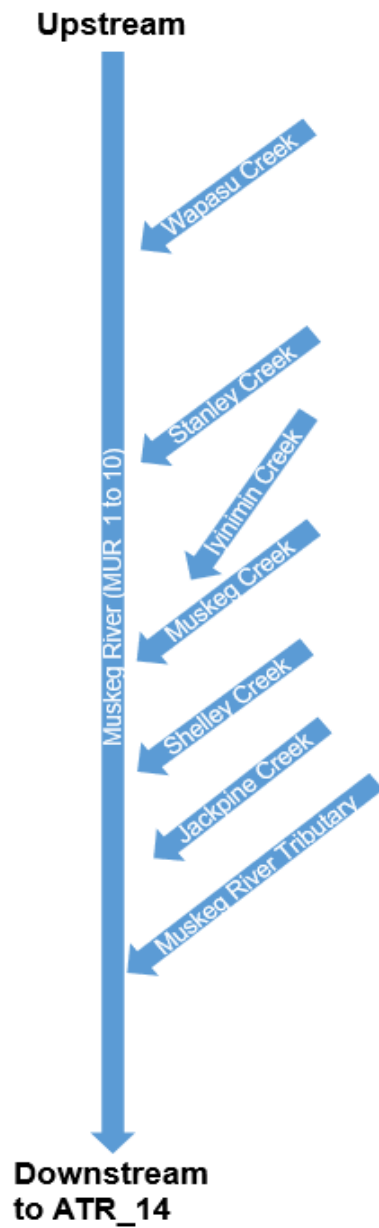


Figure I27: Muskeg River and Tributaries - Most Protective Guideline Assessment from 2019 to 2023

## 1.2.4 Mackay River and Tributaries

Upstream



Mackay River and Tributaries - Most Protective Guidelines - All Years

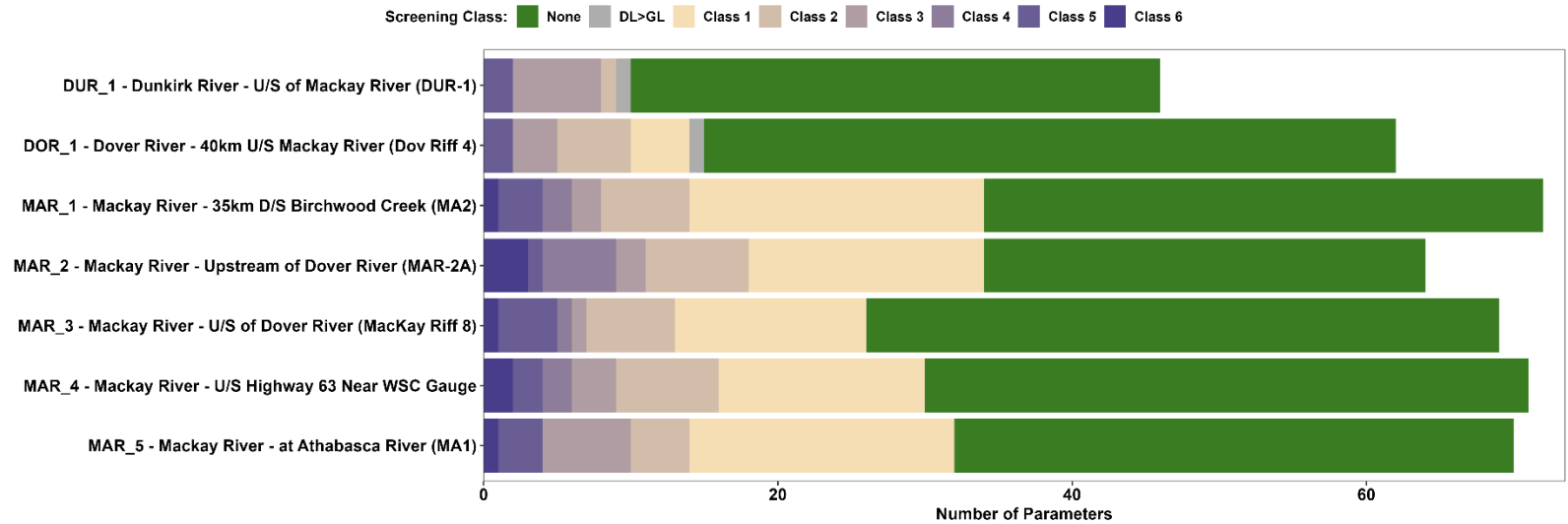


Figure I28: Mackay River and Tributaries - Most Protective Guideline Assessment for All Years

Upstream



Mackay River and Tributaries - Most Protective Guidelines - 1999-2003

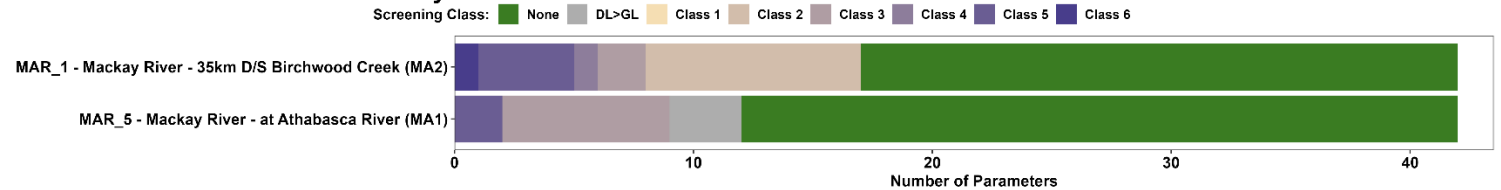


Figure I29: Mackay River and Tributaries - Most Protective Guideline Assessment from 1999 to 2003

Upstream



Downstream  
to ATR\_15

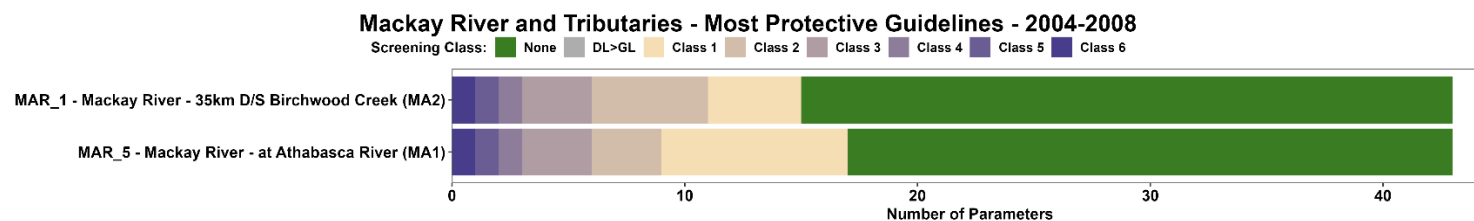


Figure I30: Mackay River and Tributaries - Most Protective Guideline Assessment from 2004 to 2008

Upstream



Downstream  
to ATR\_15

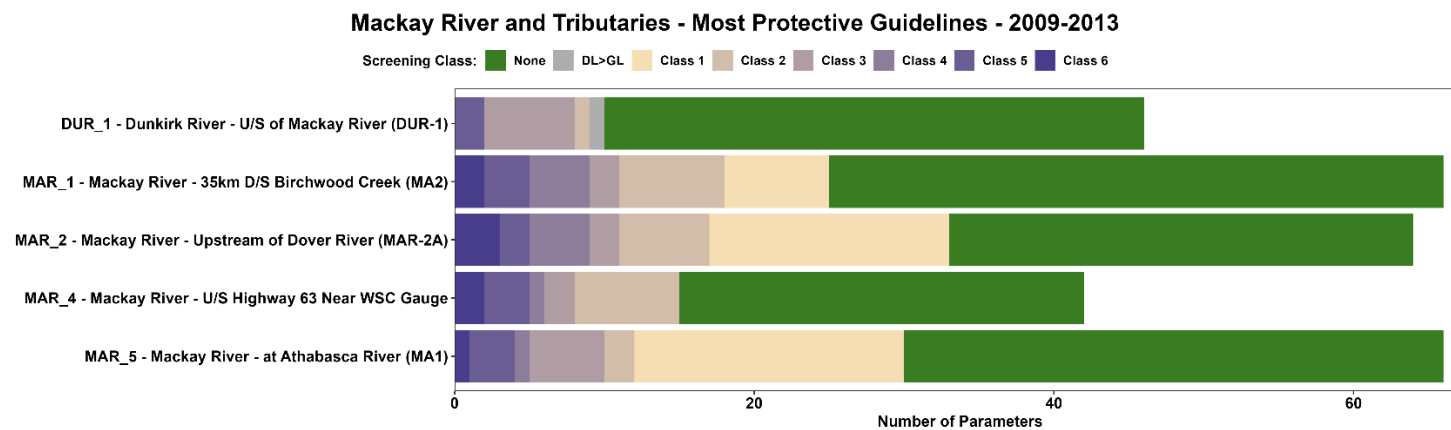


Figure I31: Mackay River and Tributaries - Most Protective Guideline Assessment from 2009 to 2013

Upstream



Downstream  
to ATR\_15

### Mackay River and Tributaries - Most Protective Guidelines - 2014-2018

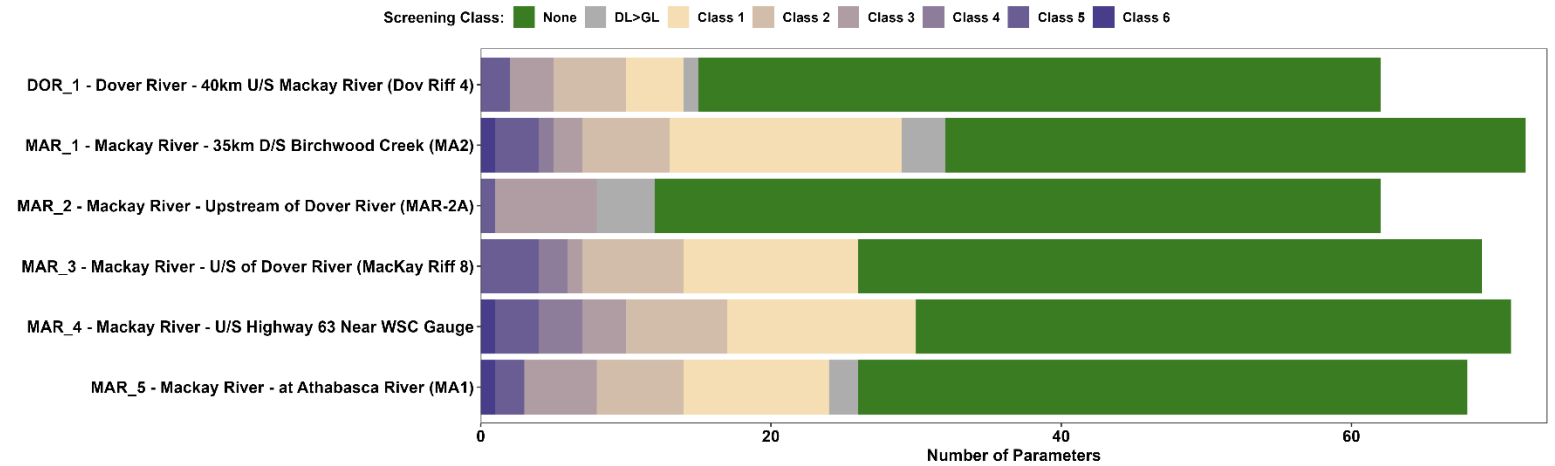


Figure I32: Mackay River and Tributaries - Most Protective Guideline Assessment from 2014 to 2018

Upstream



Downstream  
to ATR\_15

### Mackay River and Tributaries - Most Protective Guidelines - 2019-2023

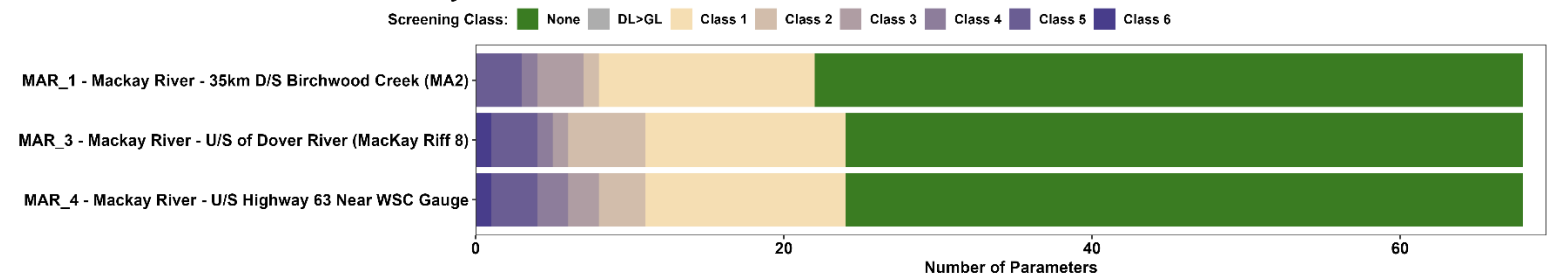


Figure I33: Mackay River and Tributaries - Most Protective Guideline Assessment from 2019 to 2023

### 1.2.5 Ells River and Tributaries

Upstream

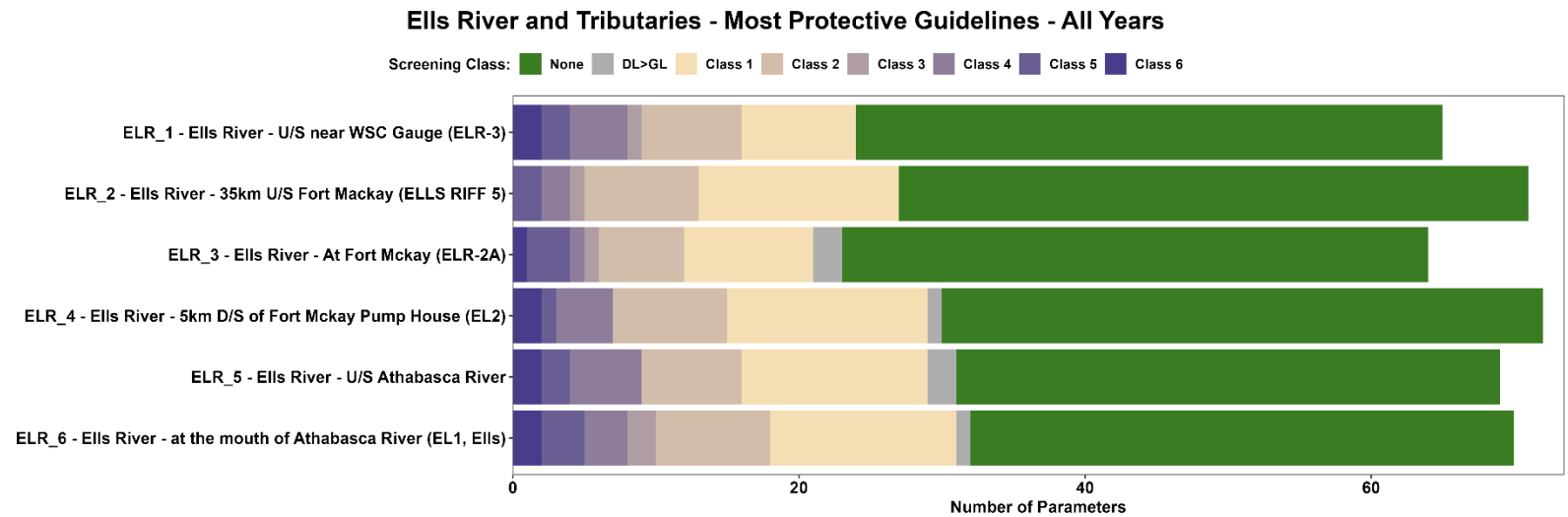
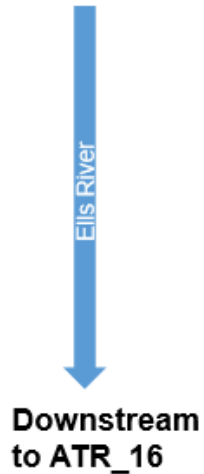


Figure I34: Ells River and Tributaries - Most Protective Guideline Assessment for All Years

Upstream

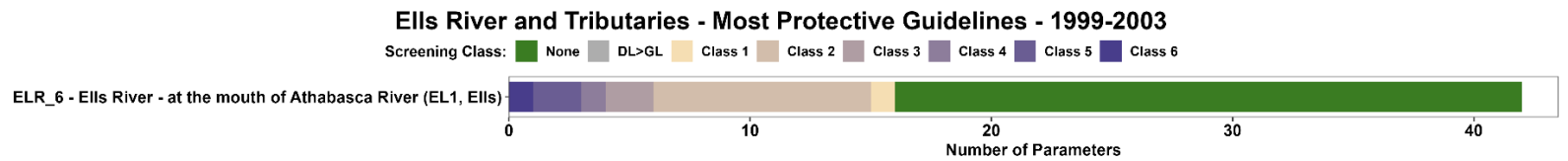
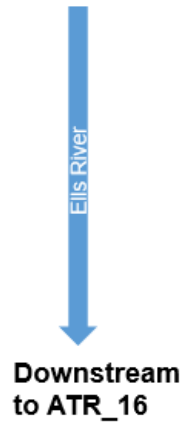


Figure I35: Ells River and Tributaries - Most Protective Guideline Assessment from 1999 to 2003



Upstream



Downstream  
to ATR\_16

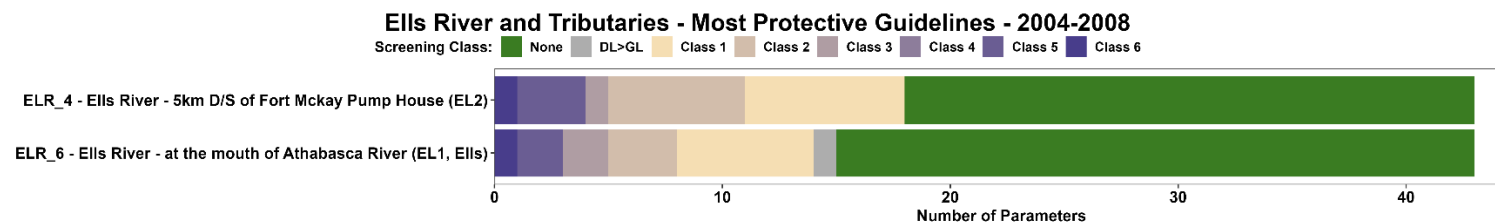


Figure I36: Ellis River and Tributaries - Most Protective Guideline Assessment from 2004 to 2008

Upstream



Downstream  
to ATR\_16

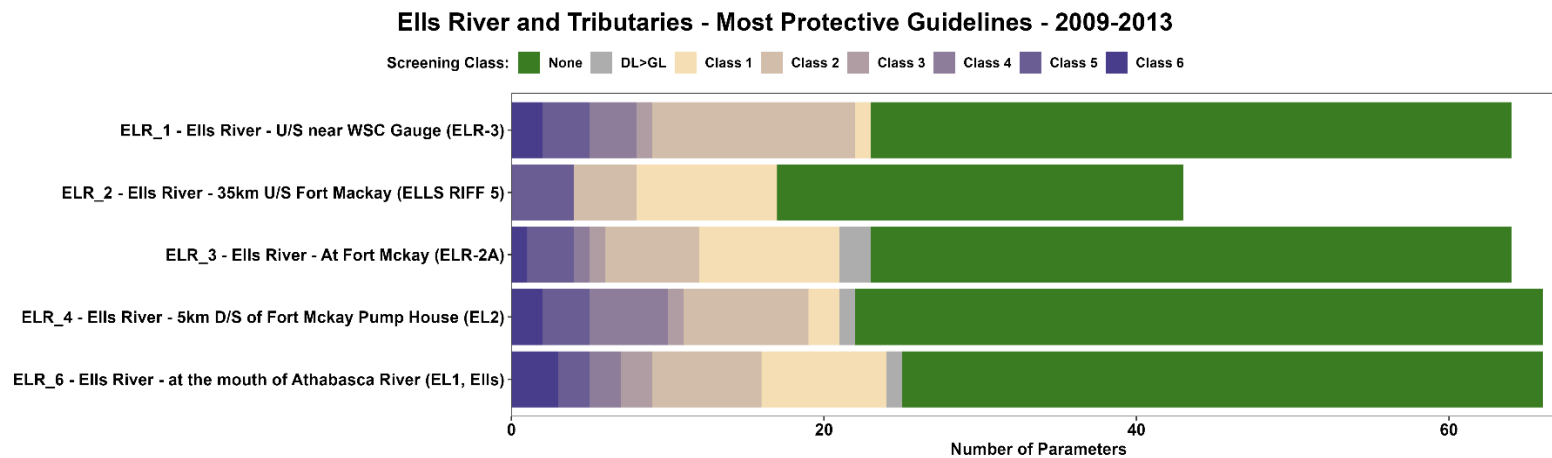


Figure I37: Ellis River and Tributaries - Most Protective Guideline Assessment from 2009 to 2013

Upstream



Downstream  
to ATR\_16

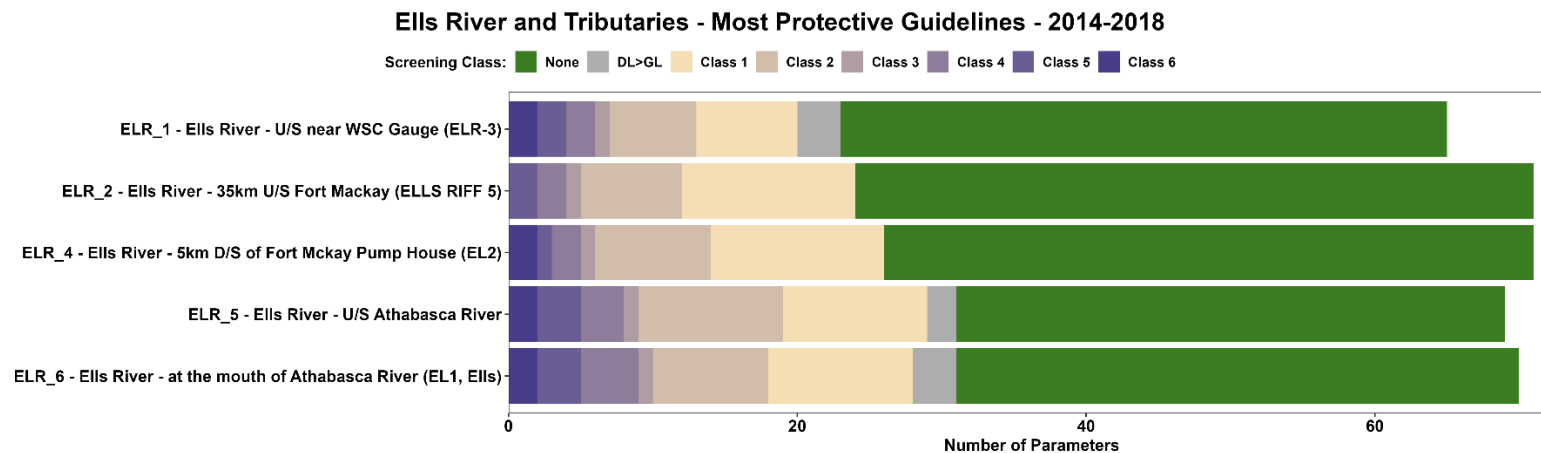


Figure I38: Elis River and Tributaries - Most Protective Guideline Assessment from 2014 to 2018

Upstream



Downstream  
to ATR\_16

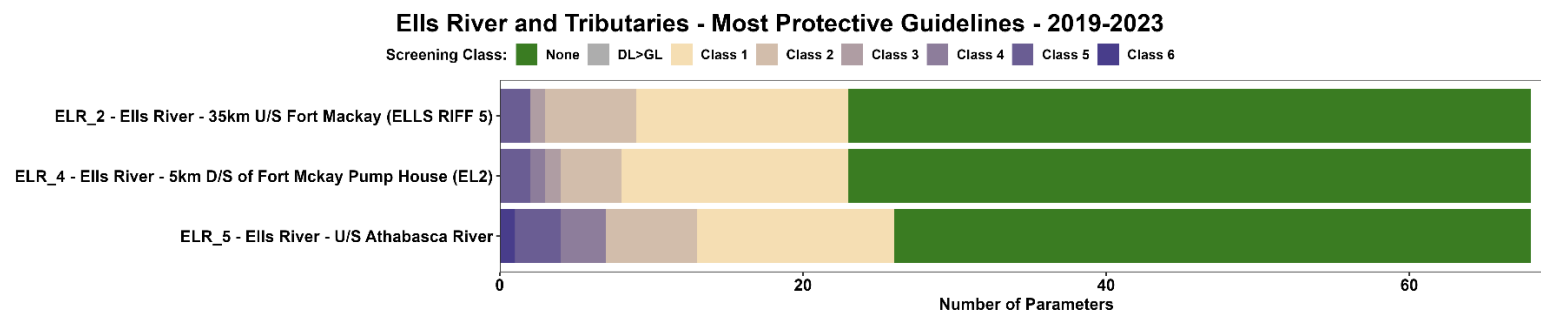
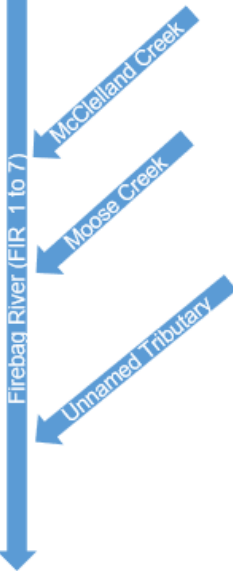


Figure I39: Elis River and Tributaries - Most Protective Guideline Assessment from 2019 to 2023

## 1.2.6 Firebag River and Tributaries

Upstream



Downstream  
to ATR\_23

Firebag River and Tributaries - Most Protective Guidelines - All Years

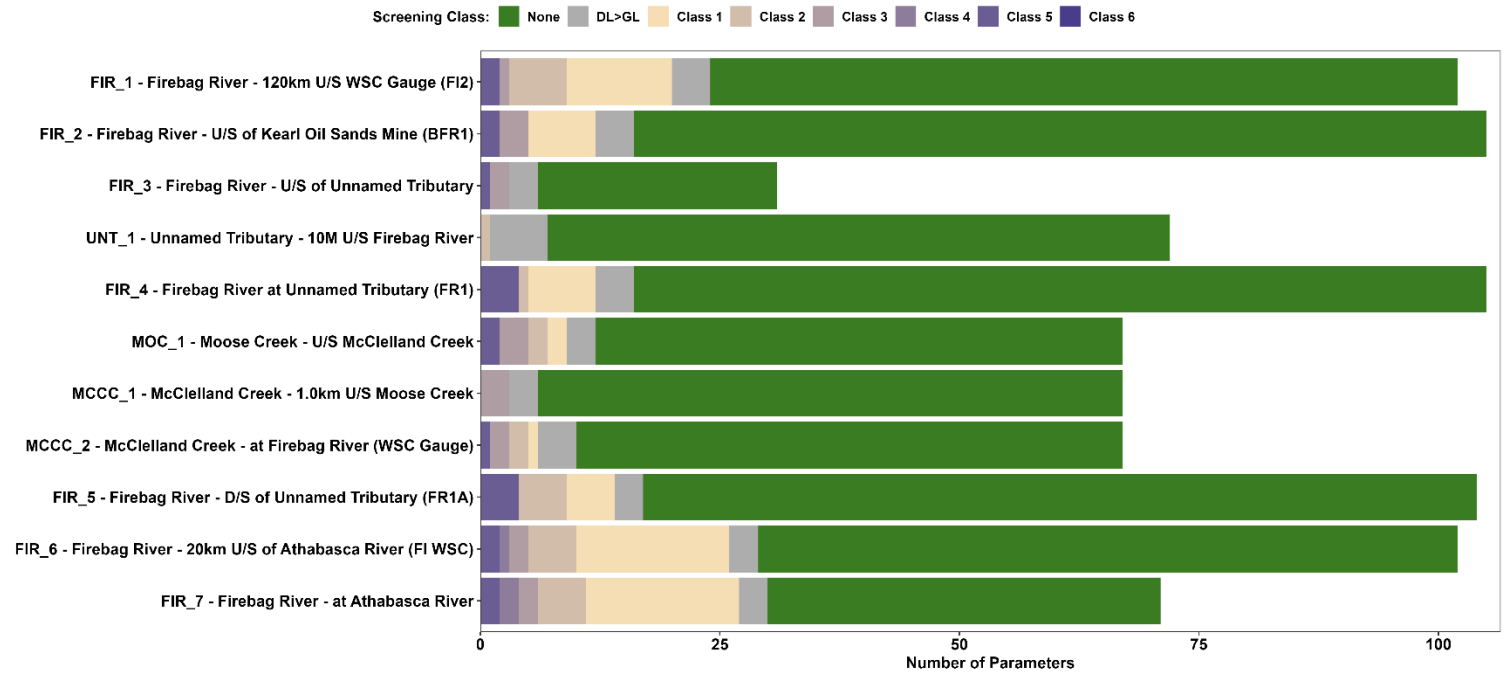


Figure I40: Firebag River and Tributaries - Most Protective Guideline Assessment for All Years

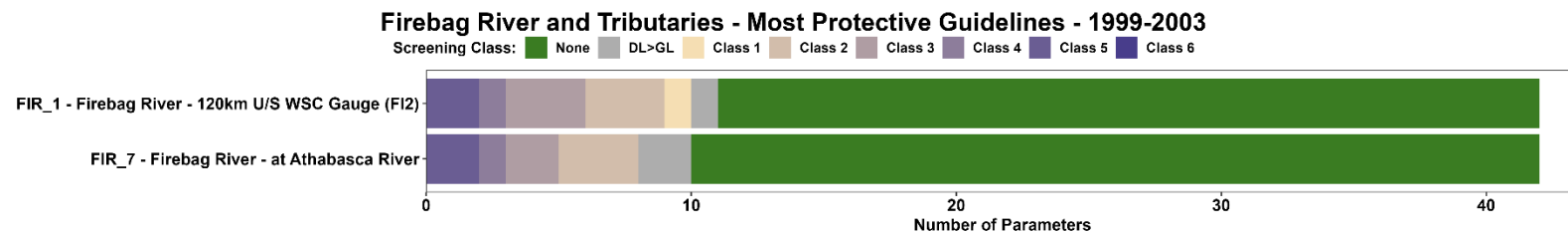
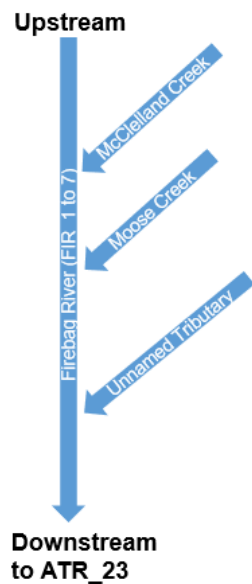


Figure I41: Firebag River and Tributaries - Most Protective Guideline Assessment from 1999 to 2003

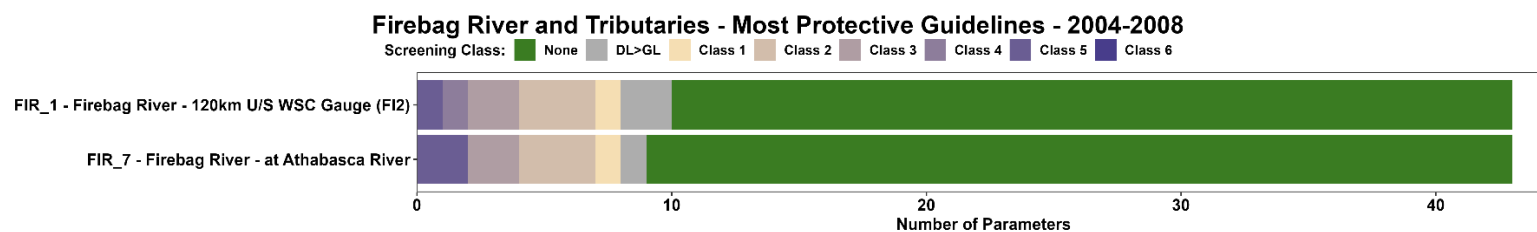
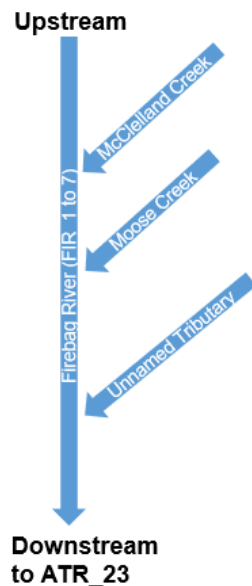


Figure I42: Firebag River and Tributaries - Most Protective Guideline Assessment from 2004 to 2008

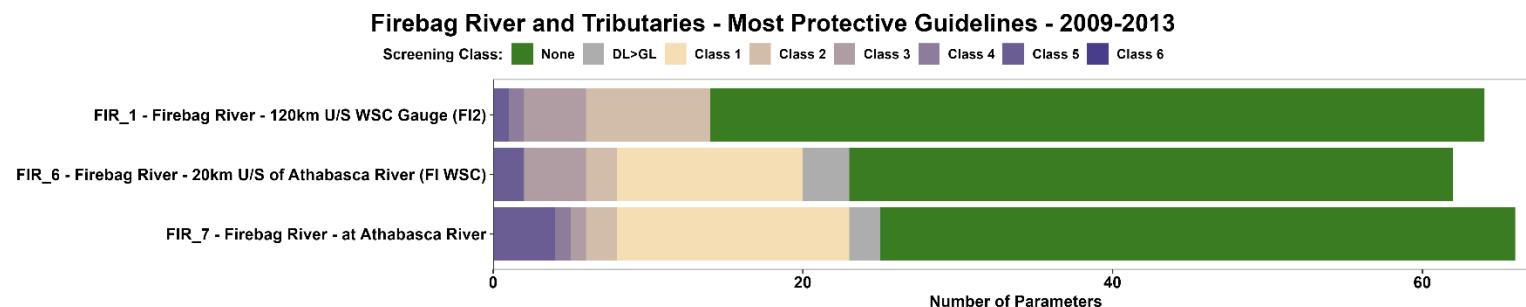
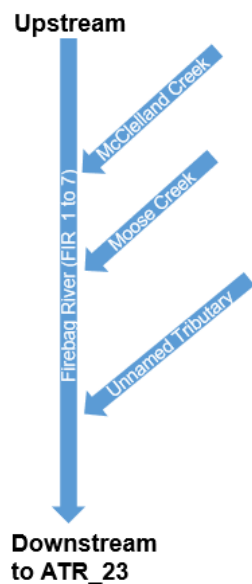


Figure I43: Firebag River and Tributaries - Most Protective Guideline Assessment from 2009 to 2013

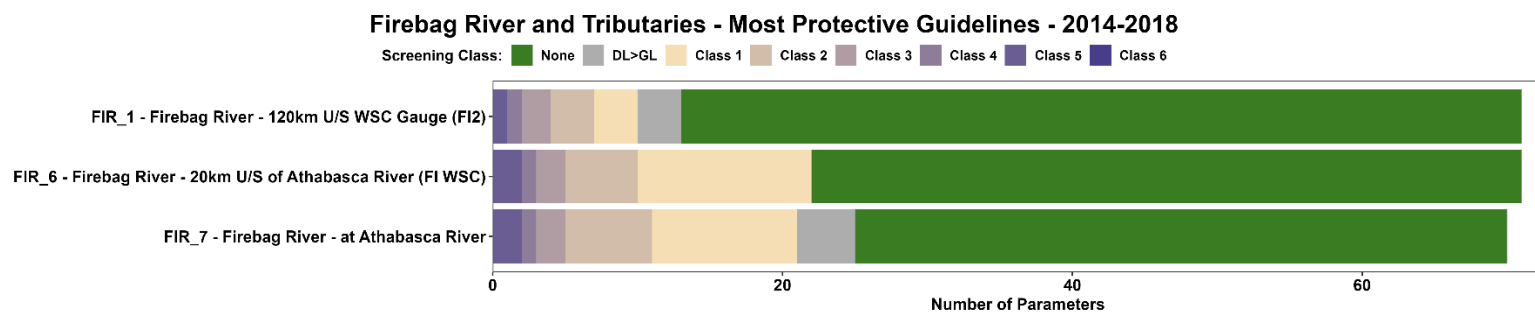
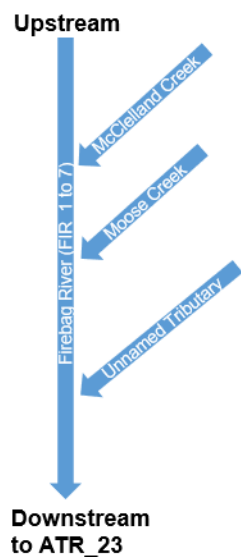
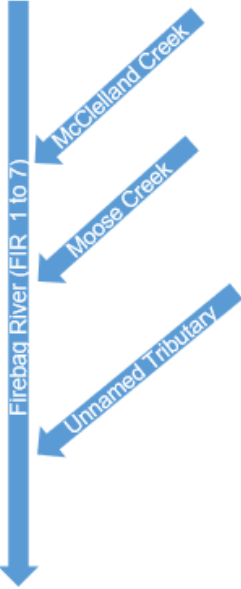


Figure I44: Firebag River and Tributaries - Most Protective Guideline Assessment from 2014 to 2018

Upstream



Downstream  
to ATR\_23

### Firebag River and Tributaries - Most Protective Guidelines - 2019-2023

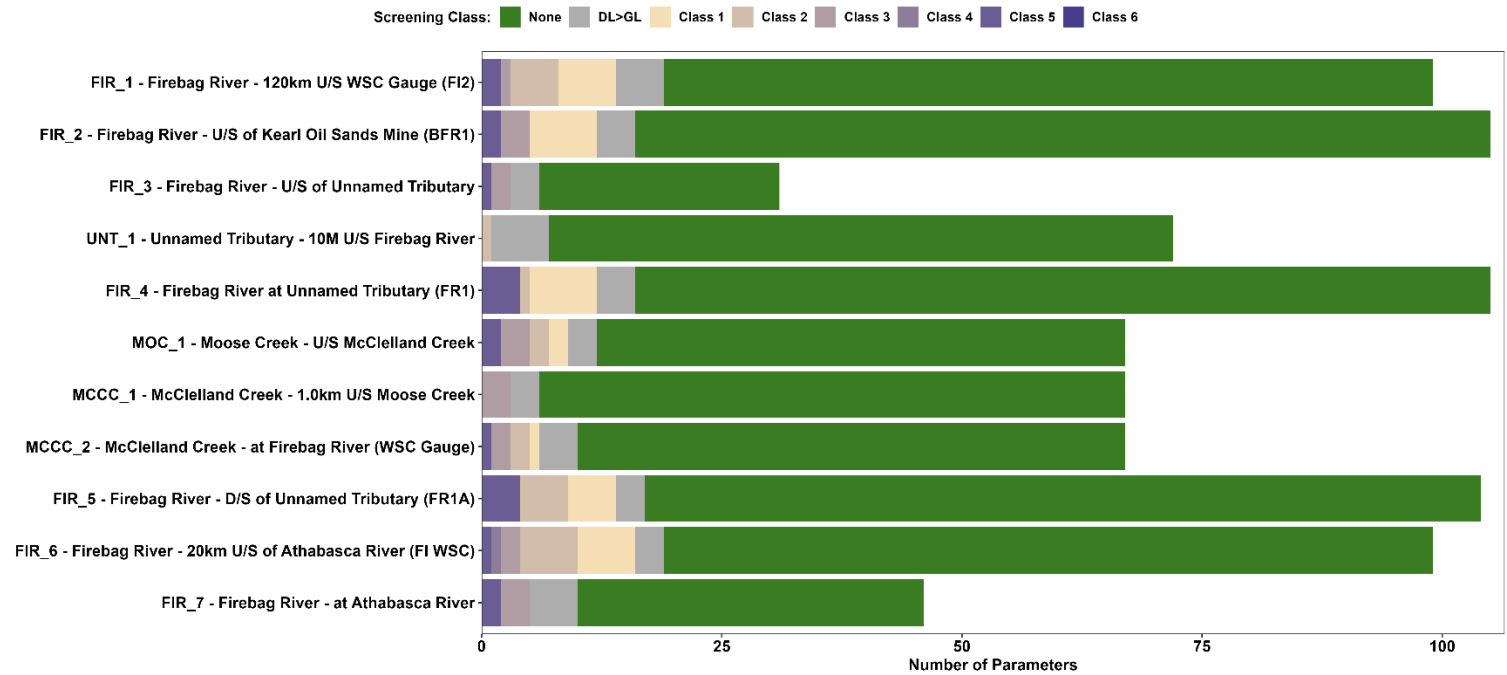


Figure I45: Firebag River and Tributaries - Most Protective Guideline Assessment from 2019 to 2023

#### 1.2.7 Other Athabasca River Tributaries

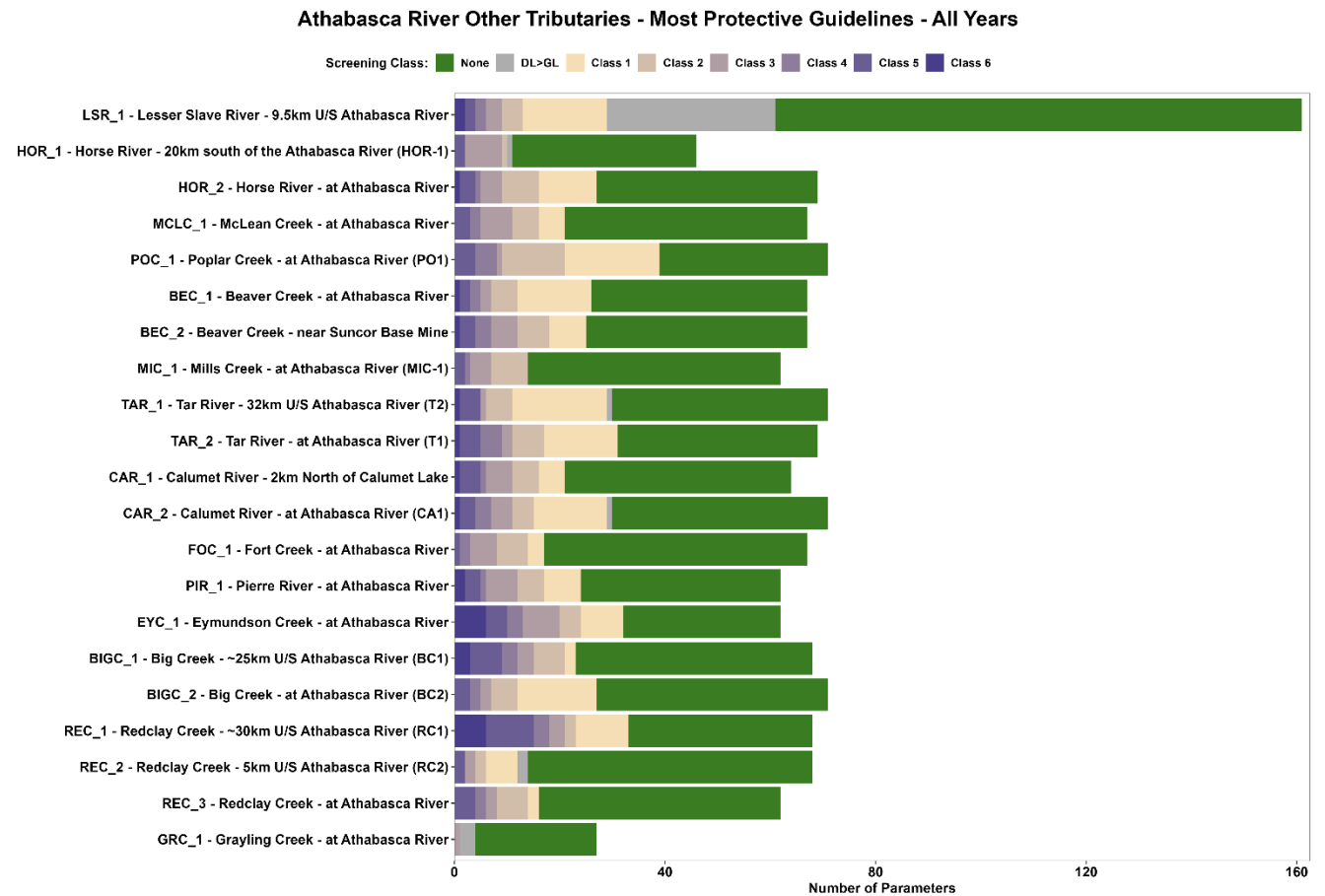
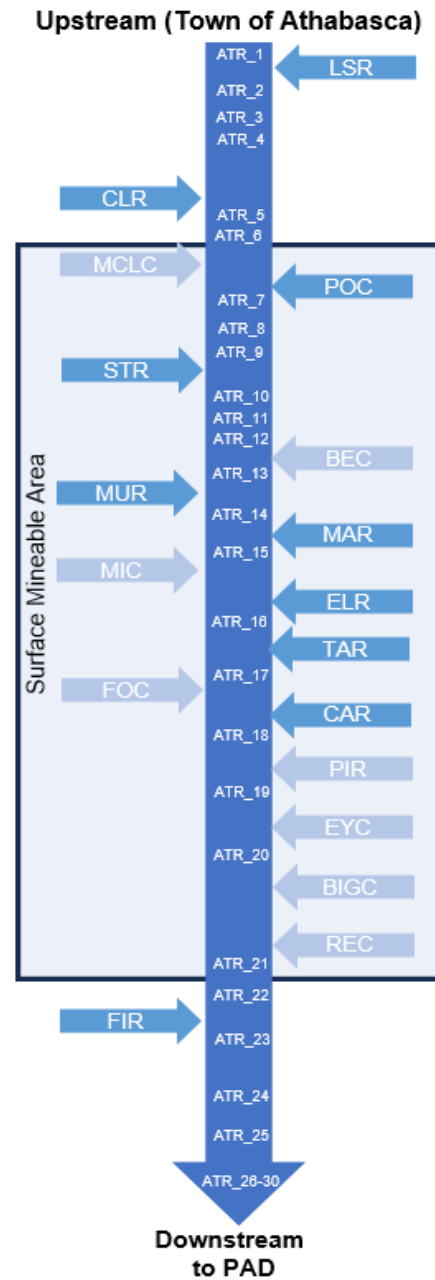


Figure I46: Athabasca River Tributaries - Most Protective Guideline Assessment for All Years

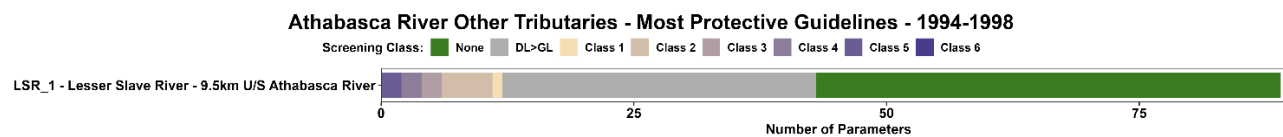
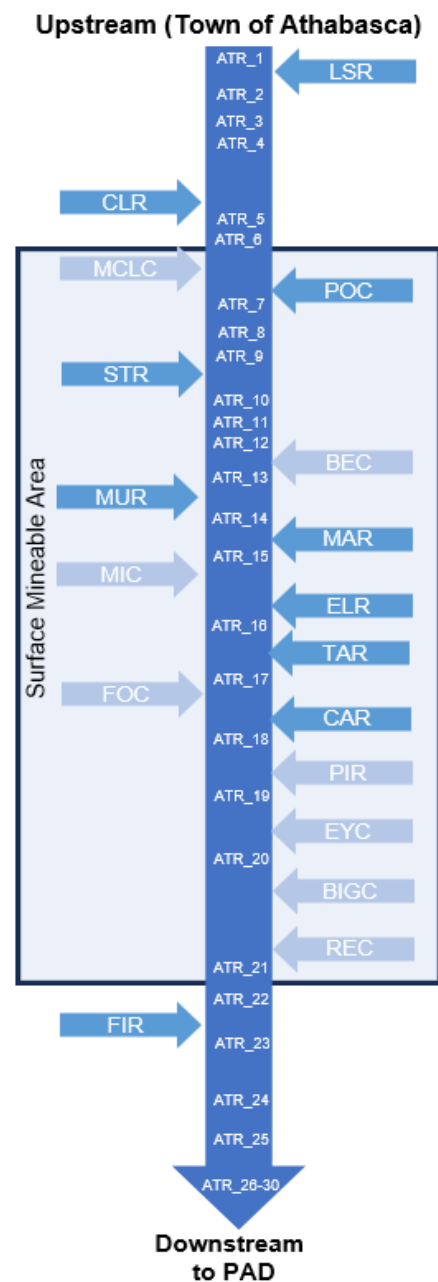


Figure I47: Athabasca River Tributaries - Most Protective Guideline Assessment for 1994 to 1998



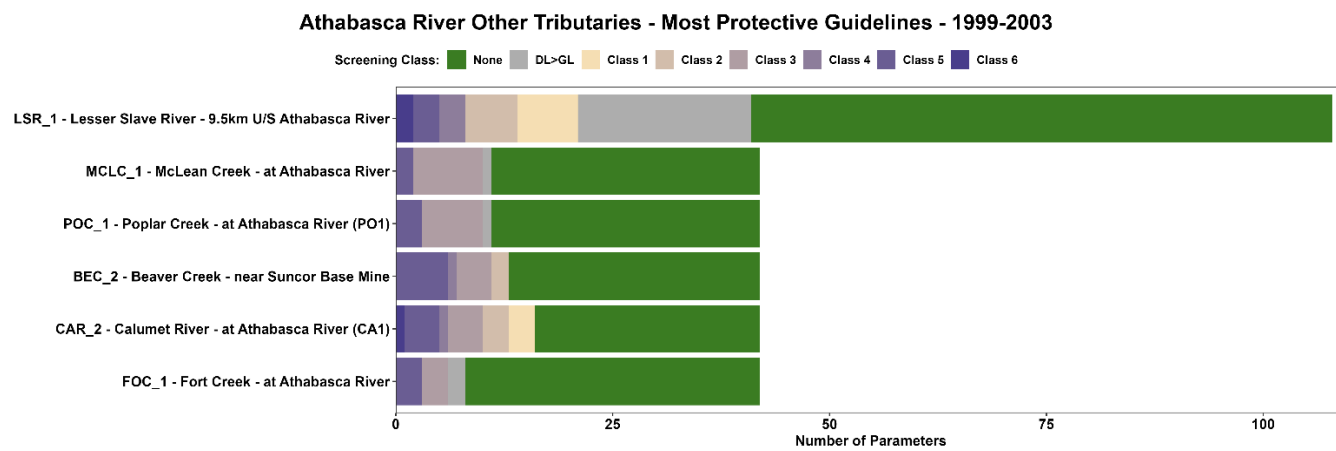
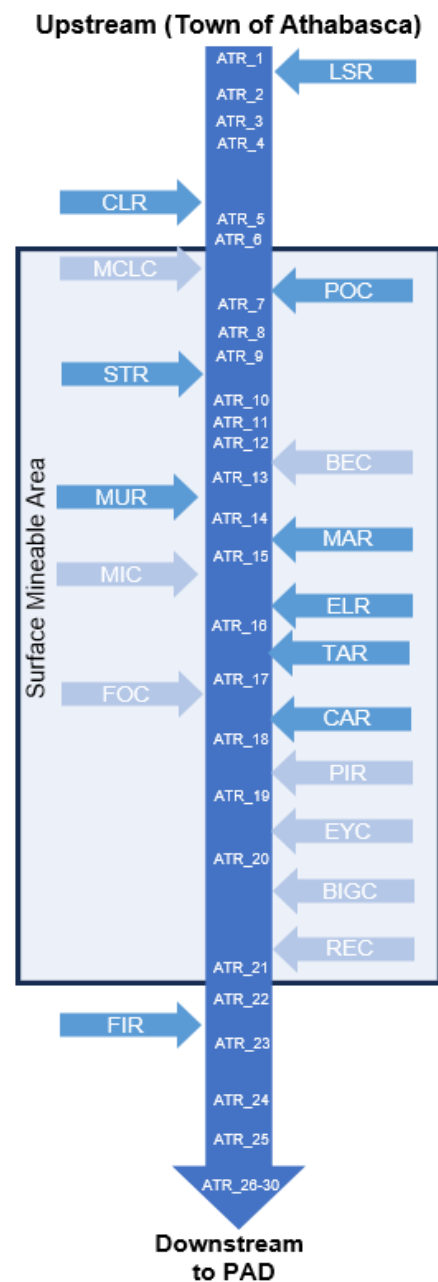


Figure I48: Athabasca River Tributaries - Most Protective Guideline Assessment for 1999 to 2003

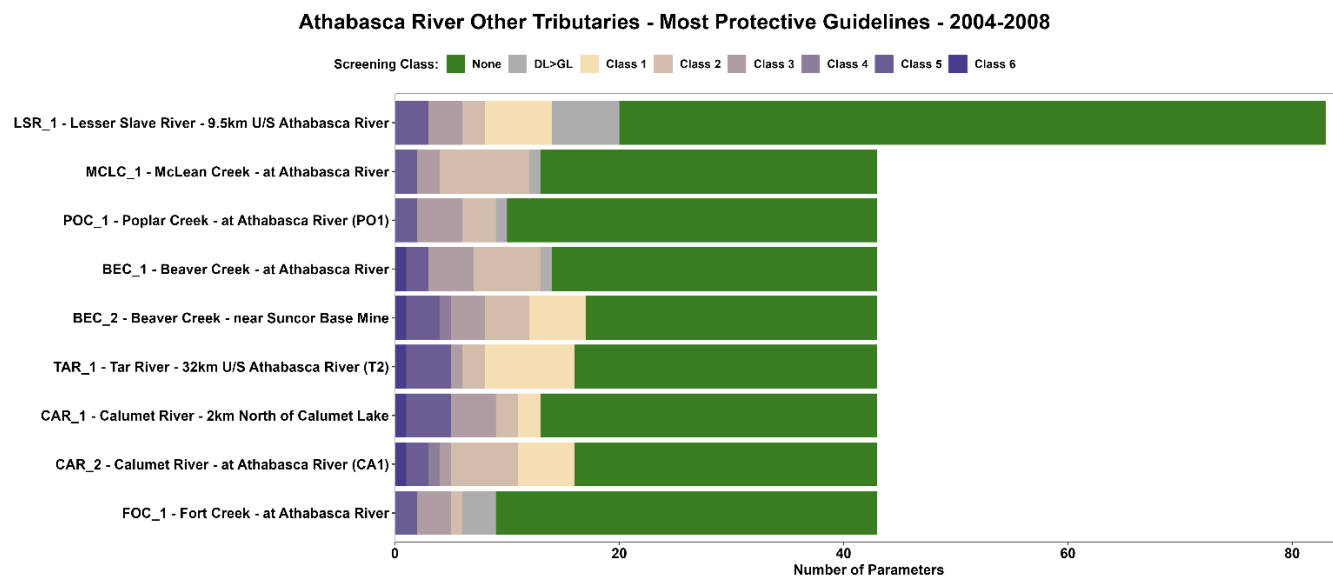
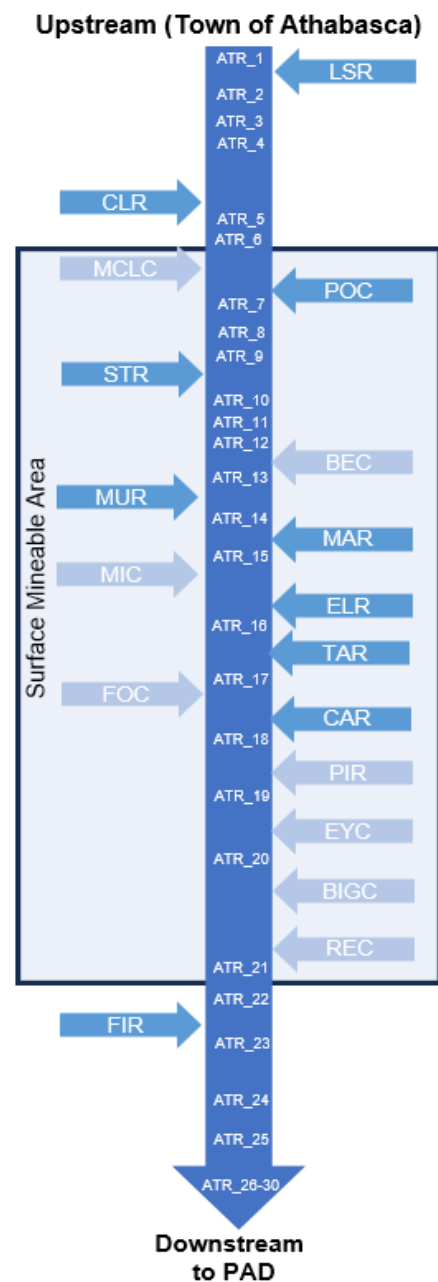


Figure I49: Athabasca River Tributaries - Most Protective Guideline Assessment for 2004 to 2008

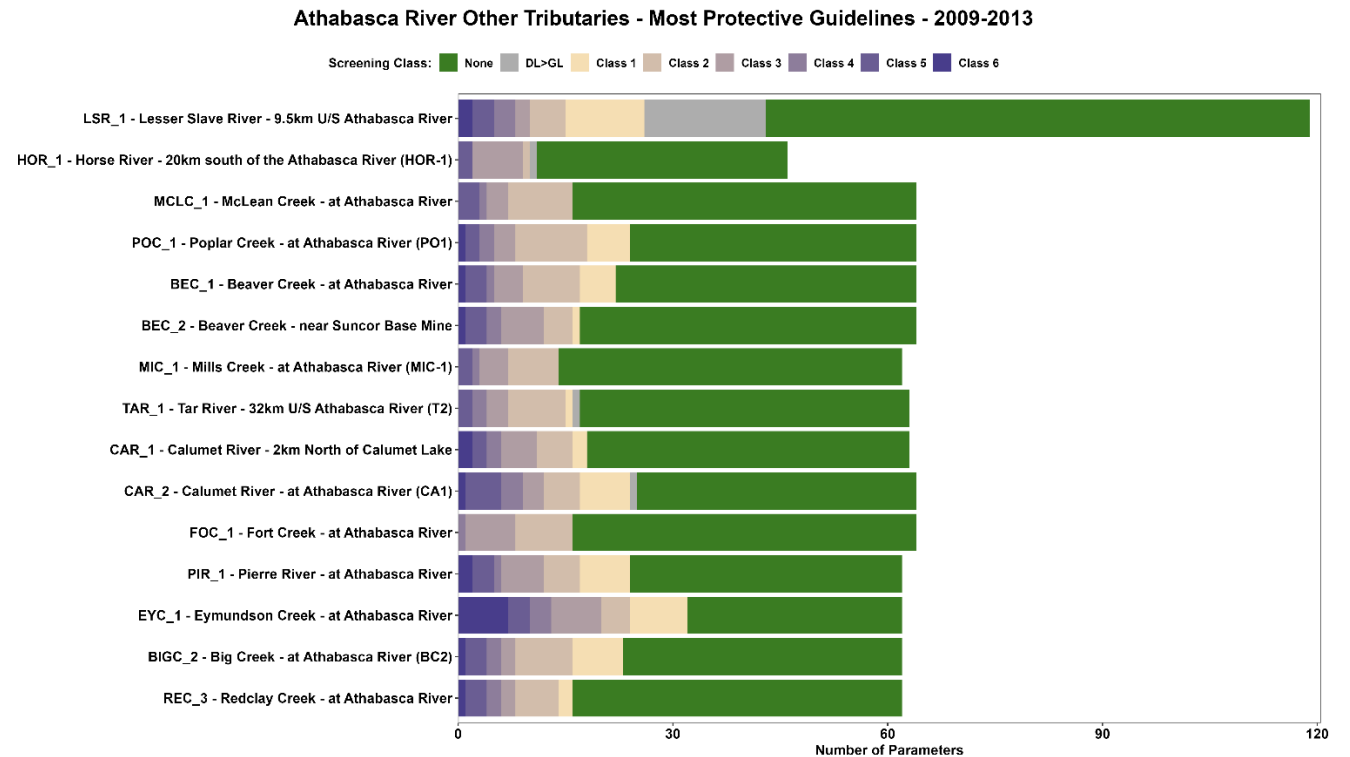
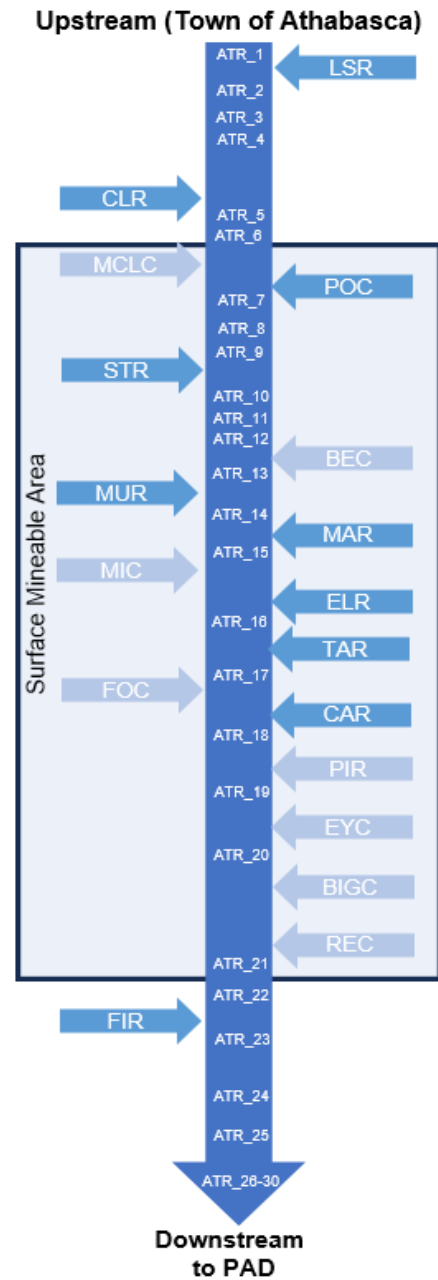


Figure I50: Athabasca River Tributaries - Most Protective Guideline Assessment for 2009 to 2013

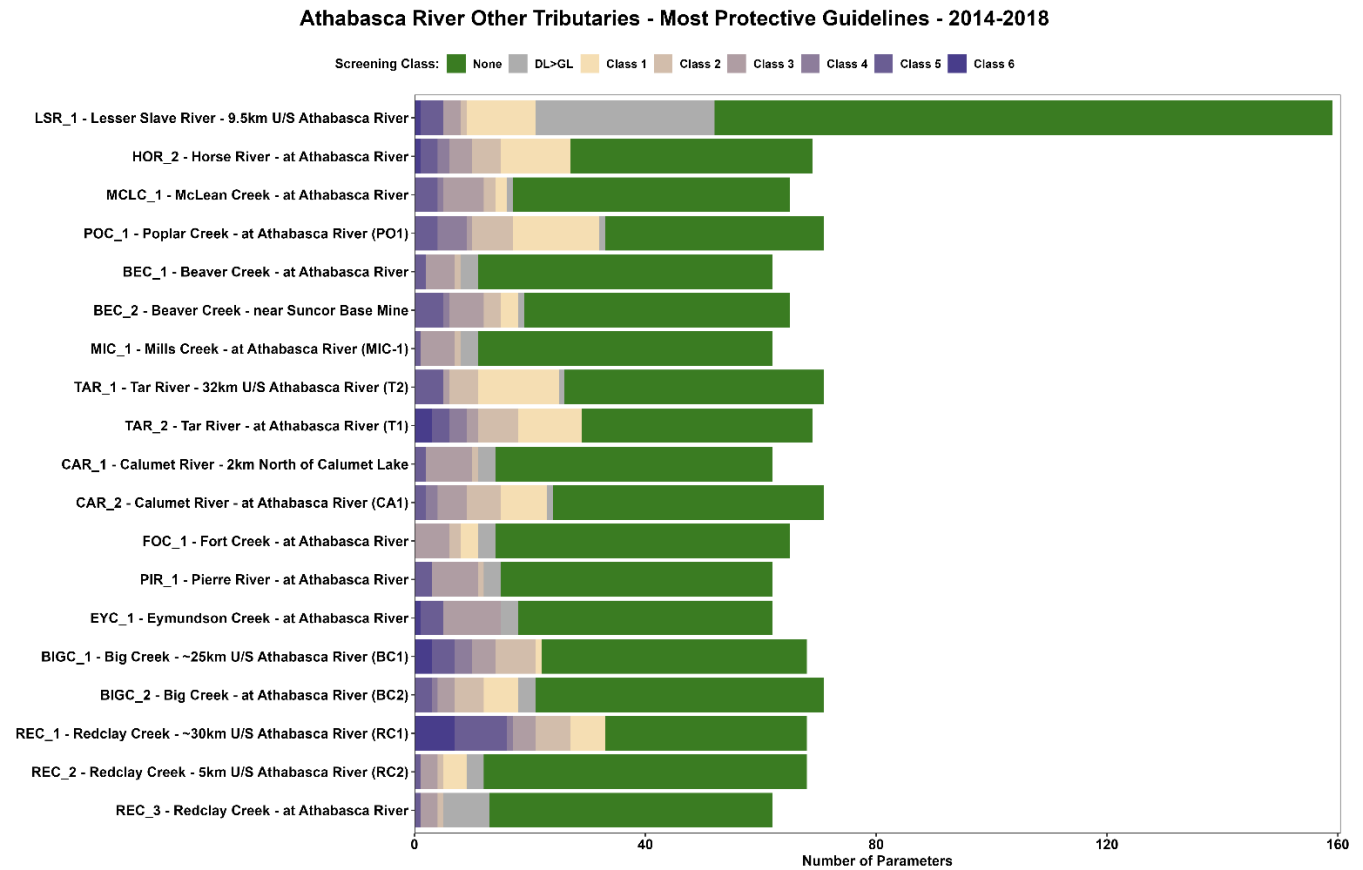
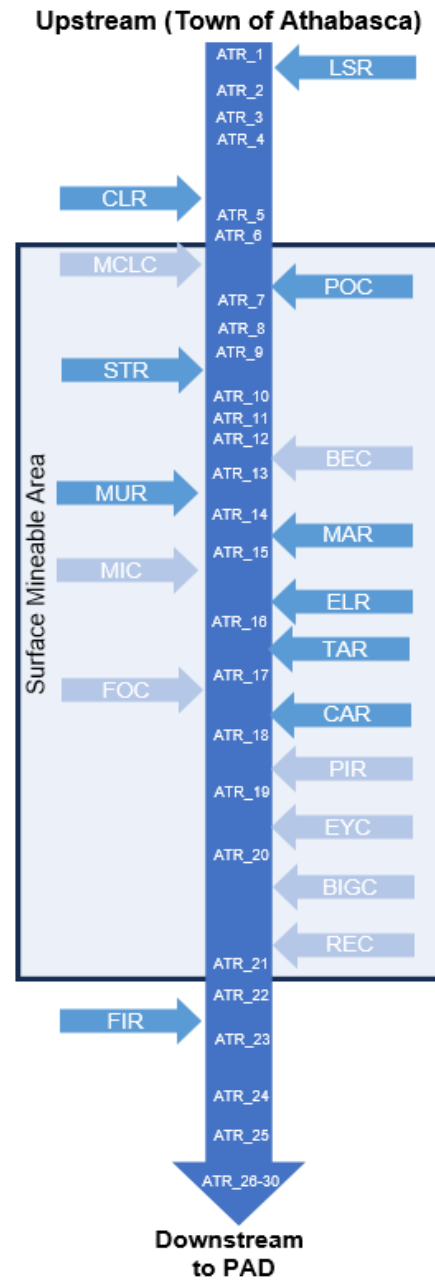


Figure I51: Athabasca River Tributaries - Most Protective Guideline Assessment for 2014 to 2018

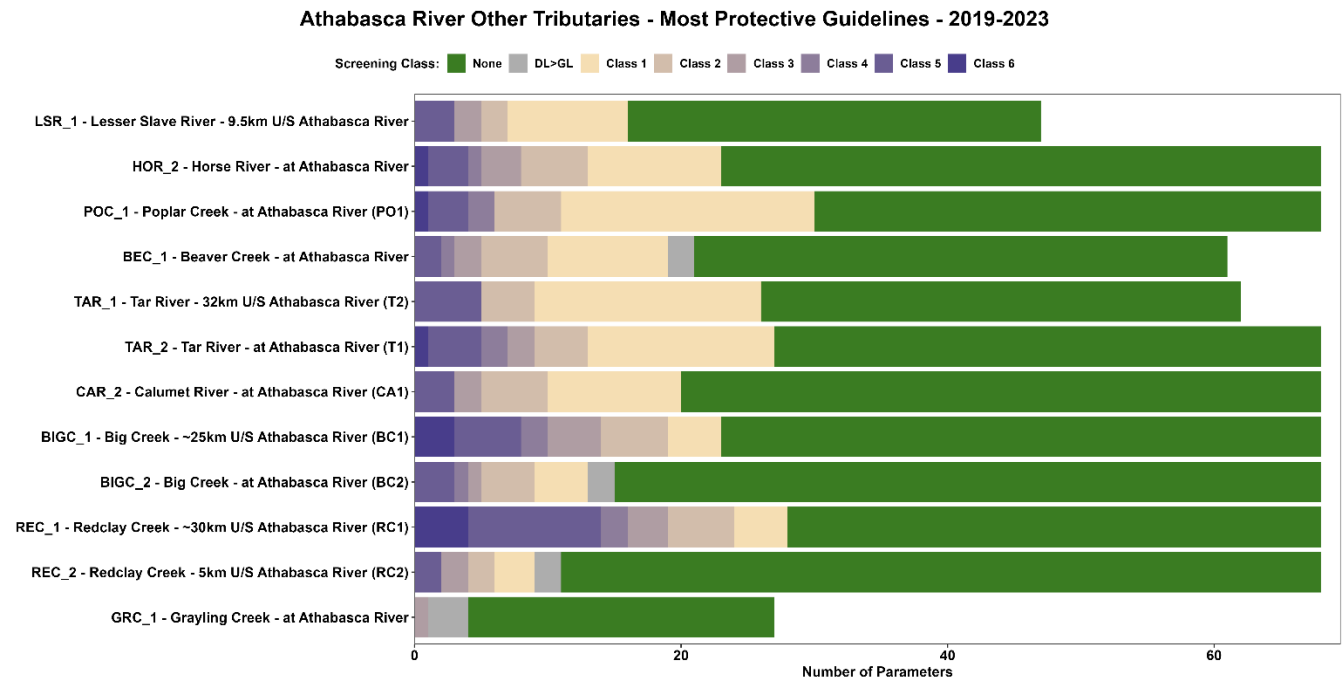
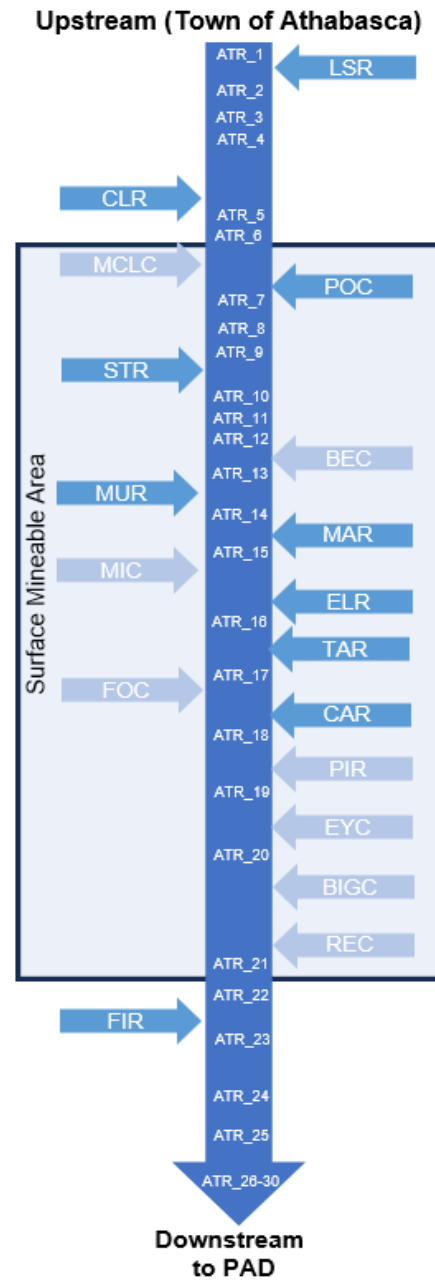


Figure I52: Athabasca River Tributaries - Most Protective Guideline Assessment for 2019 to 2023

### I.1.3 Cold Lake Region

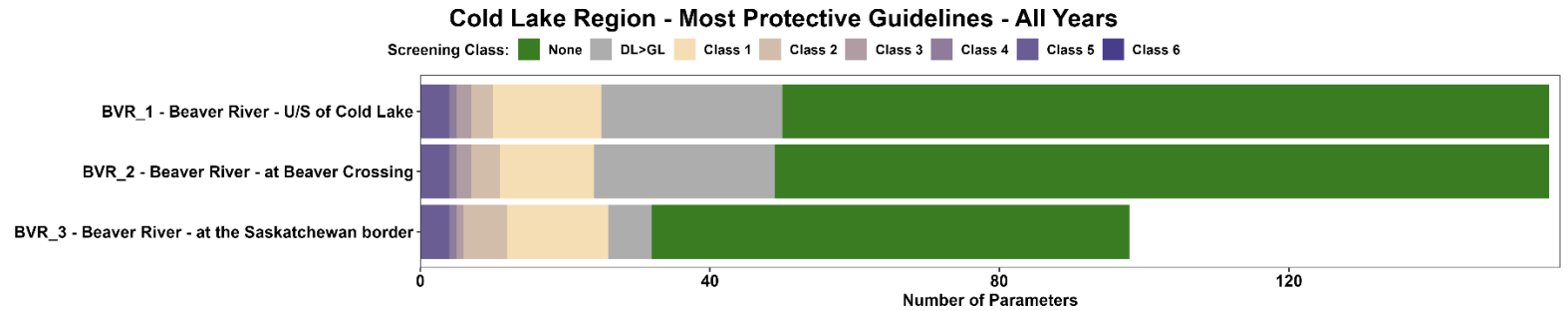


Figure I53: Cold Lake Region – Beaver River - Most Protective Guideline Assessment for All Years

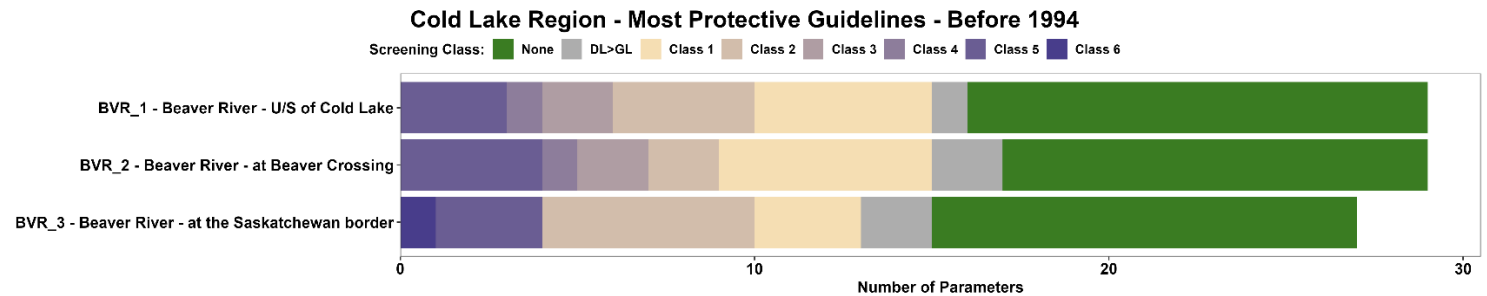


Figure I54: Cold Lake Region – Beaver River - Most Protective Guideline Assessment from Before 1994

Upstream



Downstream to  
Saskatchewan

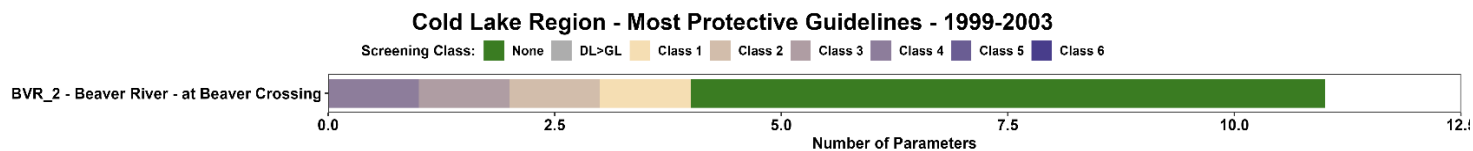


Figure I55: Cold Lake Region – Beaver River - Most Protective Guideline Assessment from 1999 to 2003

Upstream



Downstream to  
Saskatchewan

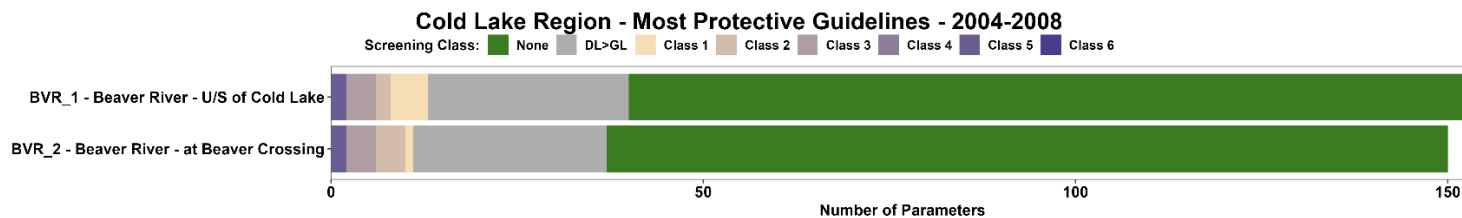


Figure I56: Cold Lake Region – Beaver River - Most Protective Guideline Assessment from 2004 to 2008

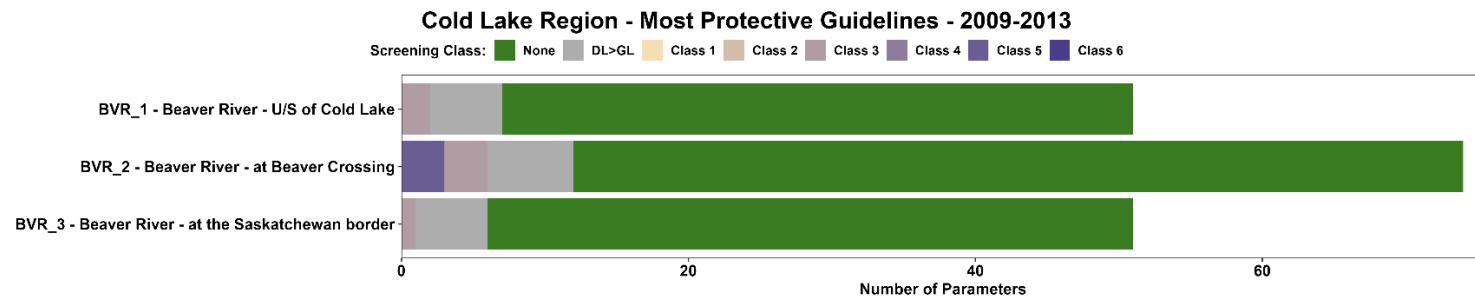


Figure I57: Cold Lake Region – Beaver River - Most Protective Guideline Assessment from 2009 to 2013

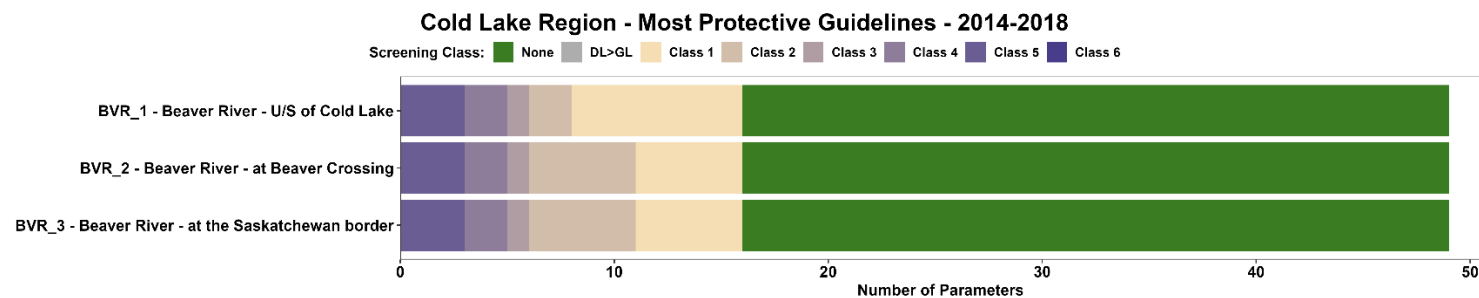


Figure I58: Cold Lake Region – Beaver River - Most Protective Guideline Assessment from 2014 to 2018



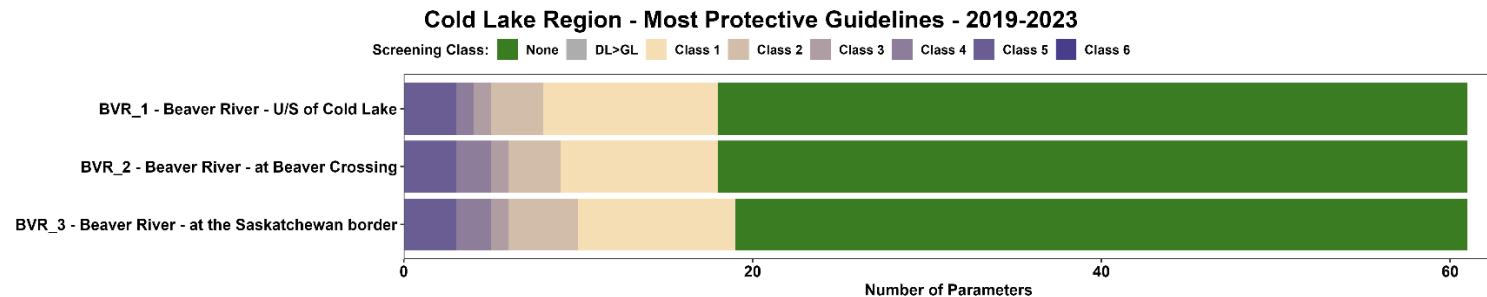


Figure I59: Cold Lake Region – Beaver River - Most Protective Guideline Assessment from 2019 to 2023

## I.1.4 Peace River and Tributaries

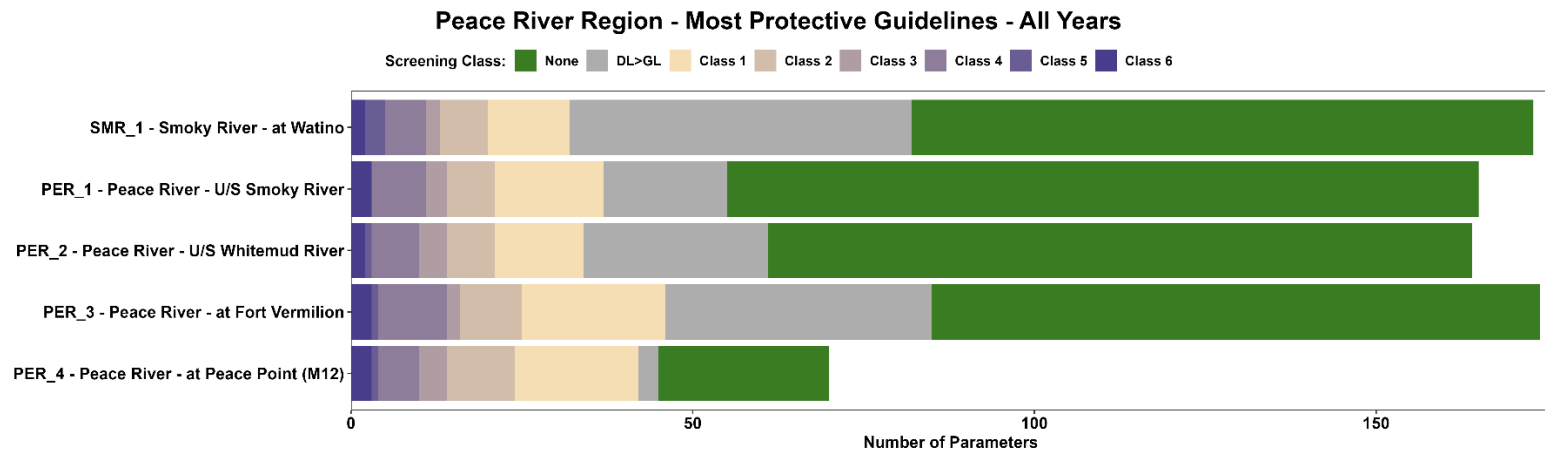
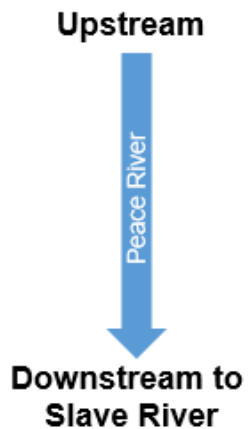


Figure I60: Peace River and Tributaries - Most Protective Guideline Assessment for All Years

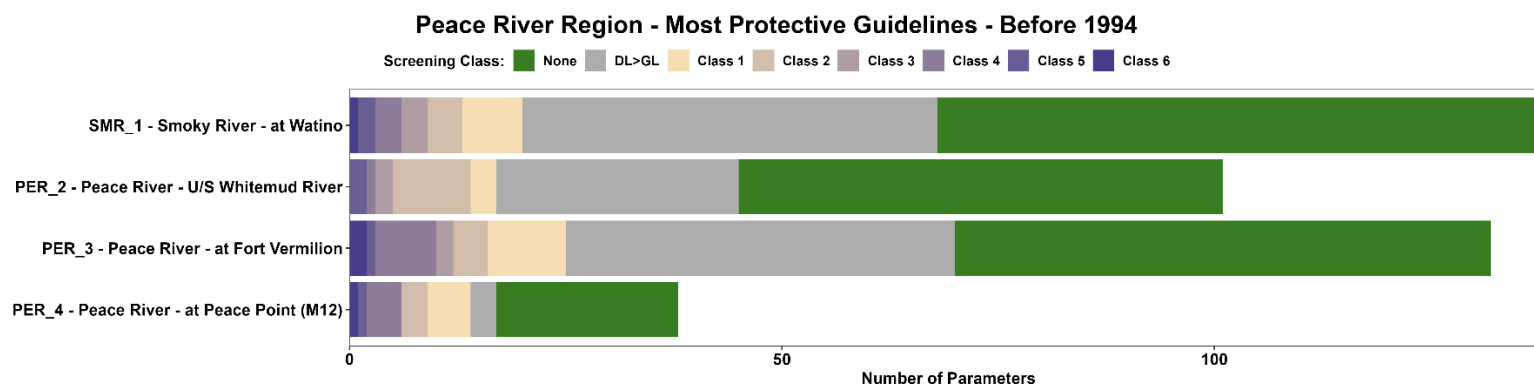


Figure I61: Peace River and Tributaries - Most Protective Guideline Assessment from Before 1994

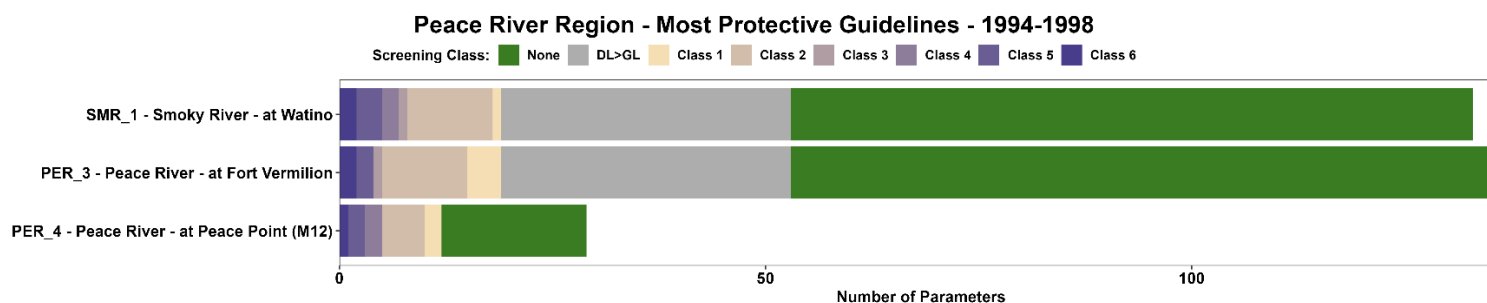
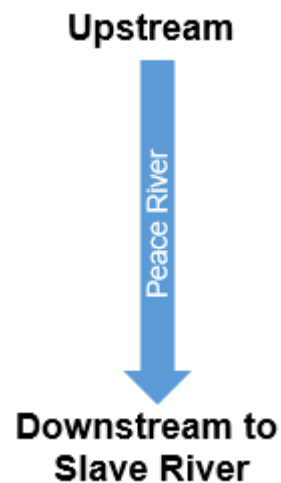


Figure I62: Peace River and Tributaries - Most Protective Guideline Assessment for 1994 to 1998

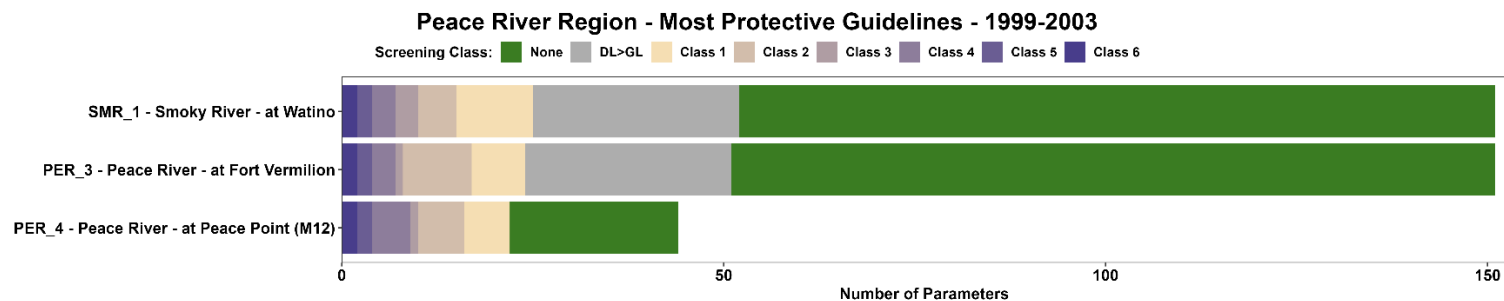
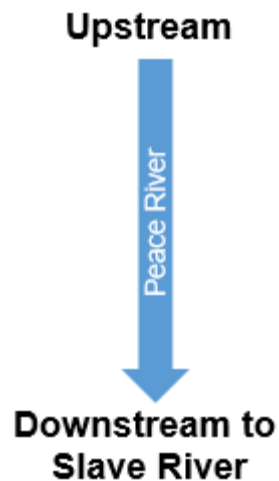


Figure I63: Peace River and Tributaries - Most Protective Guideline Assessment for 1999 to 2003

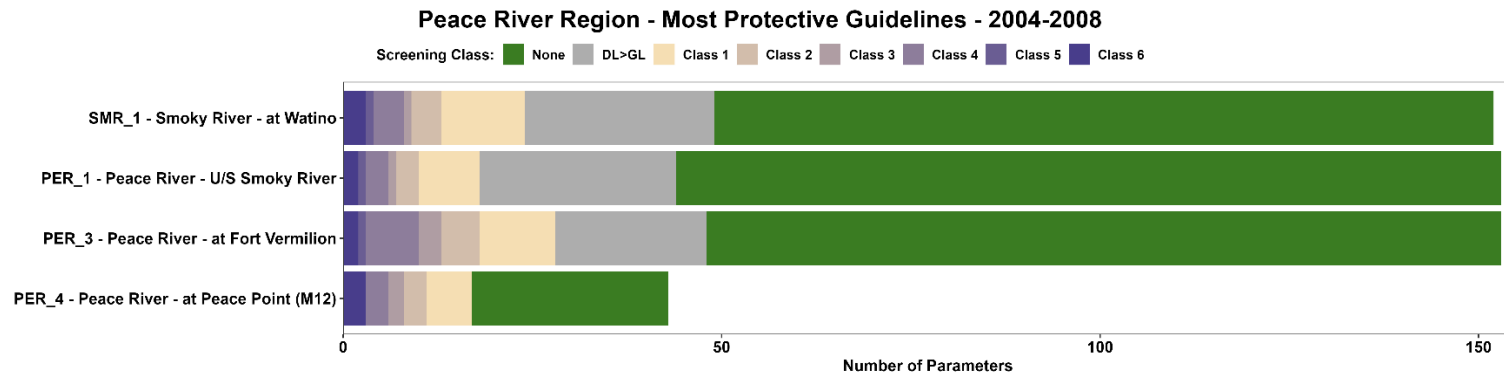
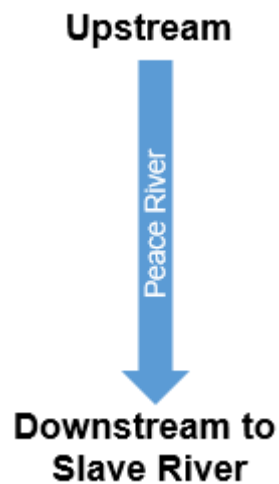


Figure I64: Peace River and Tributaries - Most Protective Guideline Assessment for 2004 to 2008

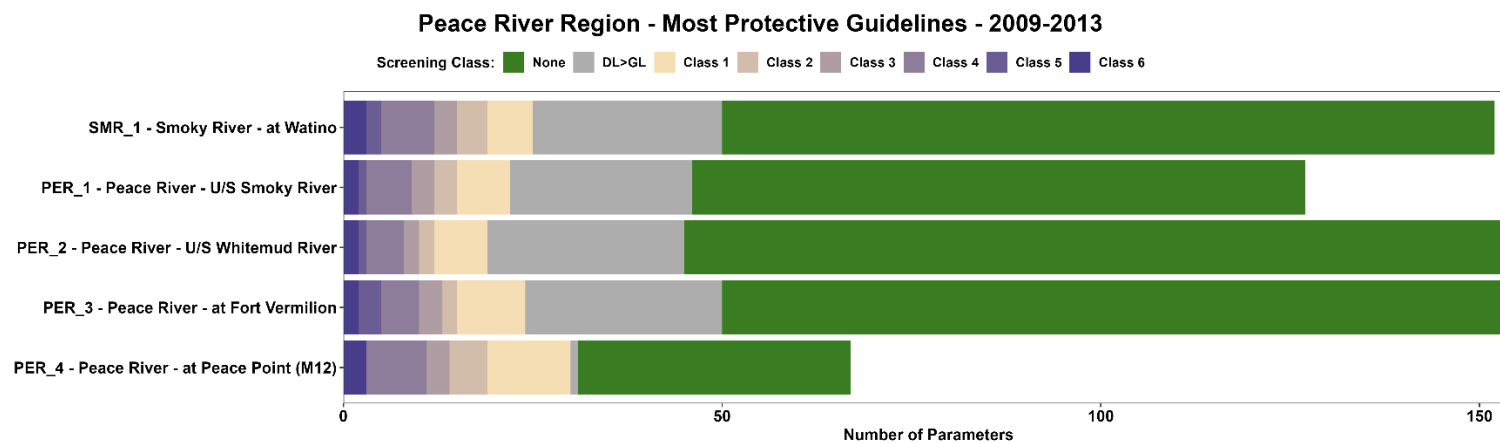


Figure I65: Peace River and Tributaries - Most Protective Guideline Assessment from 2009 to 2013

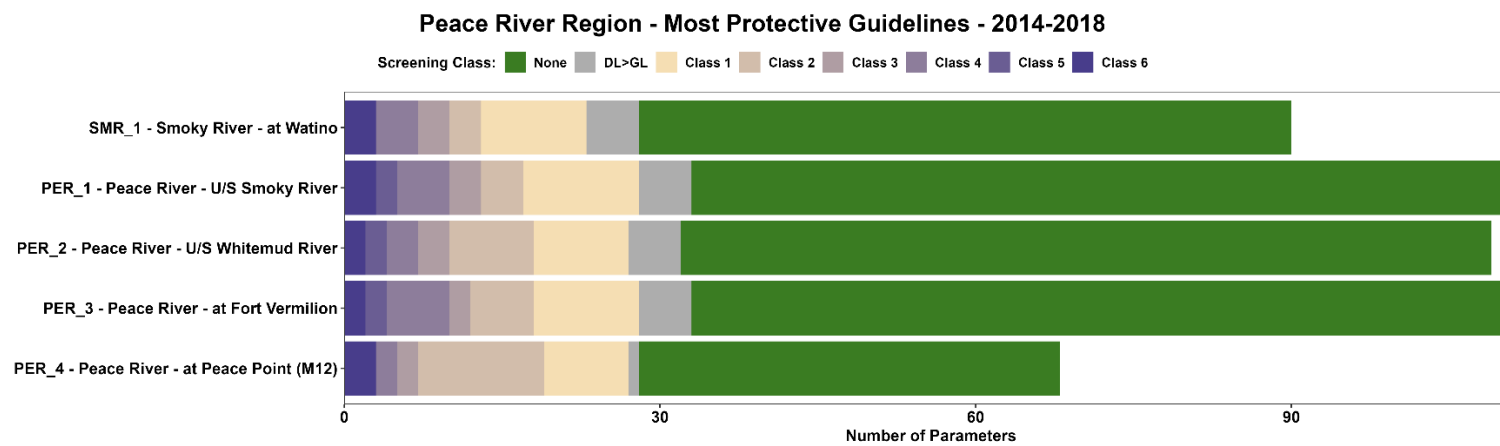
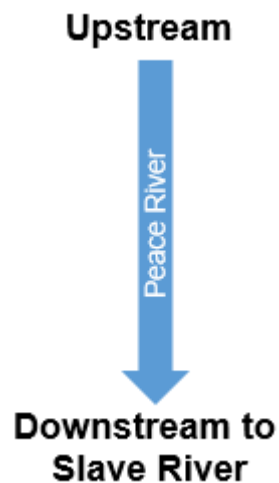


Figure I66: Peace River and Tributaries - Most Protective Guideline Assessment from 2014 to 2018

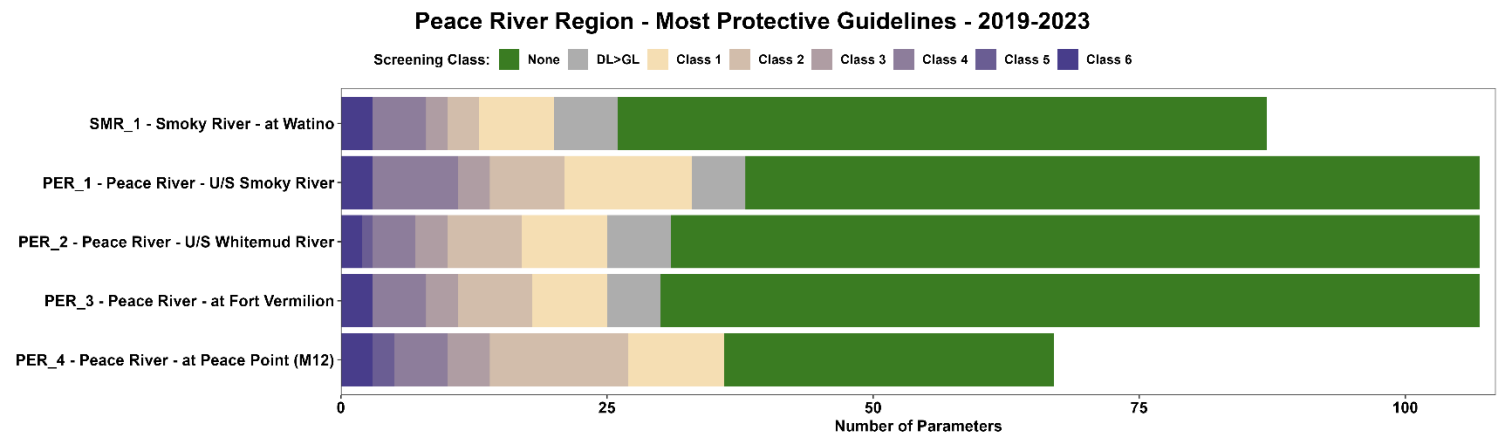
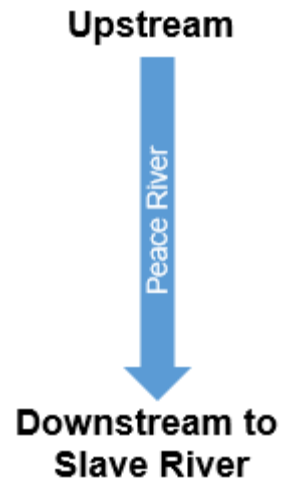


Figure I67: Peace River and Tributaries - Most Protective Guideline Assessment from 2019 to 2023

## I.1.5 PAD and Tributaries

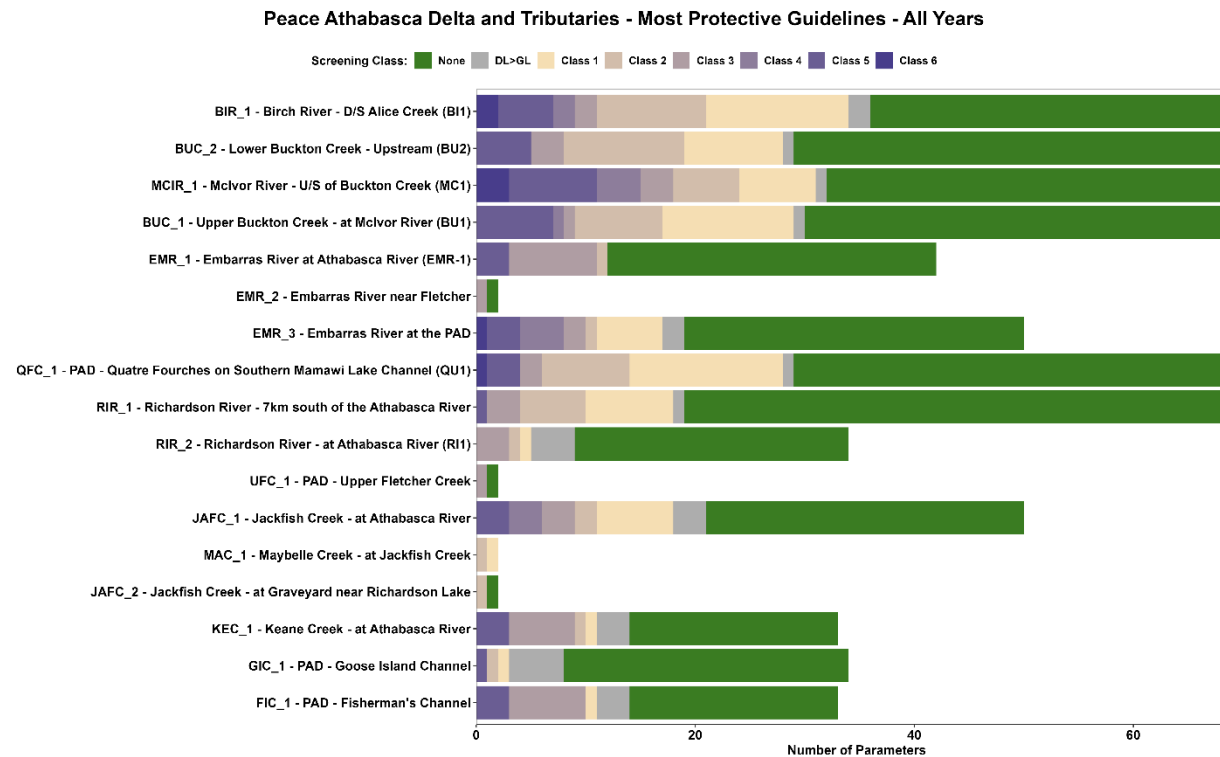
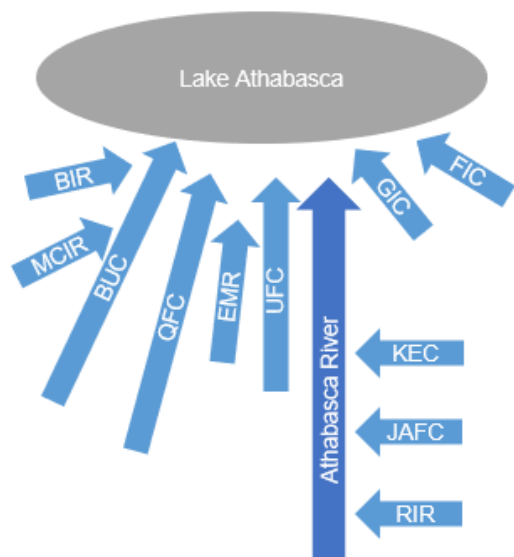


Figure I68: Peace Athabasca Delta and Tributaries - Most Protective Guideline Assessment for All Years

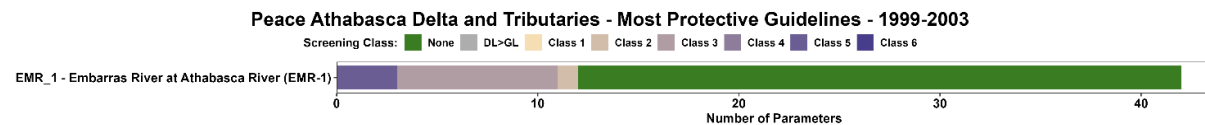
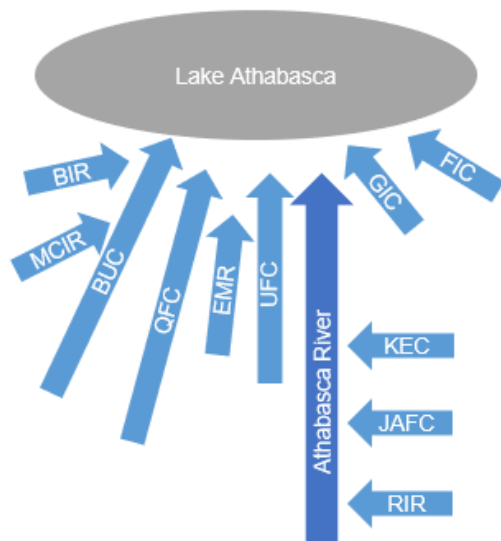


Figure I69: Peace Athabasca Delta and Tributaries - Most Protective Guideline Assessment from 1990 to 2003

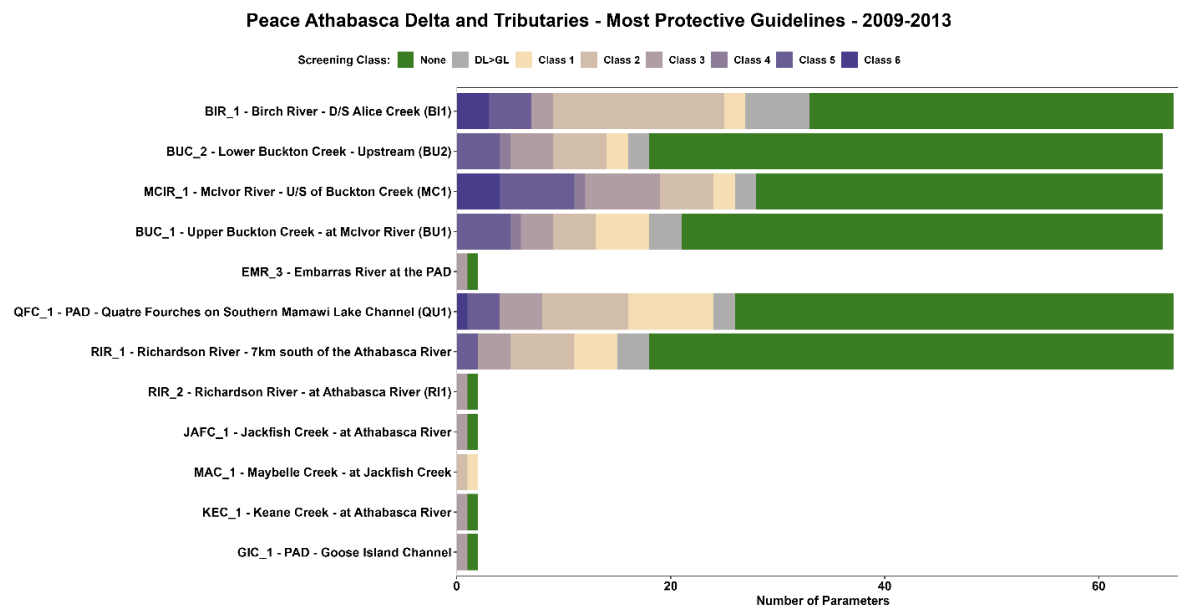
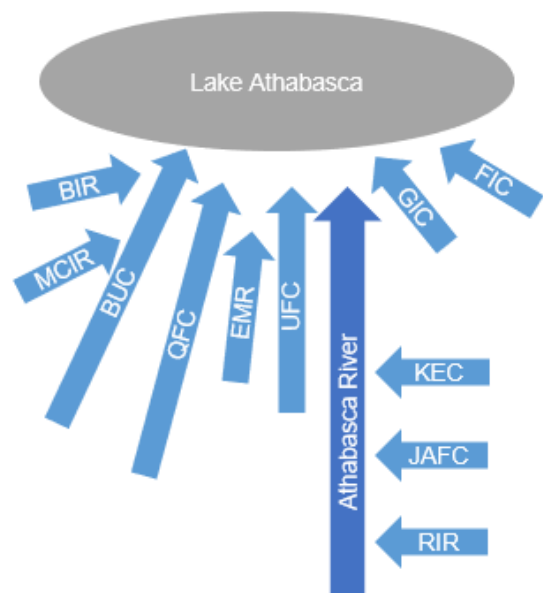


Figure I70: Peace Athabasca Delta and Tributaries - Most Protective Guideline Assessment from 2009 to 2013

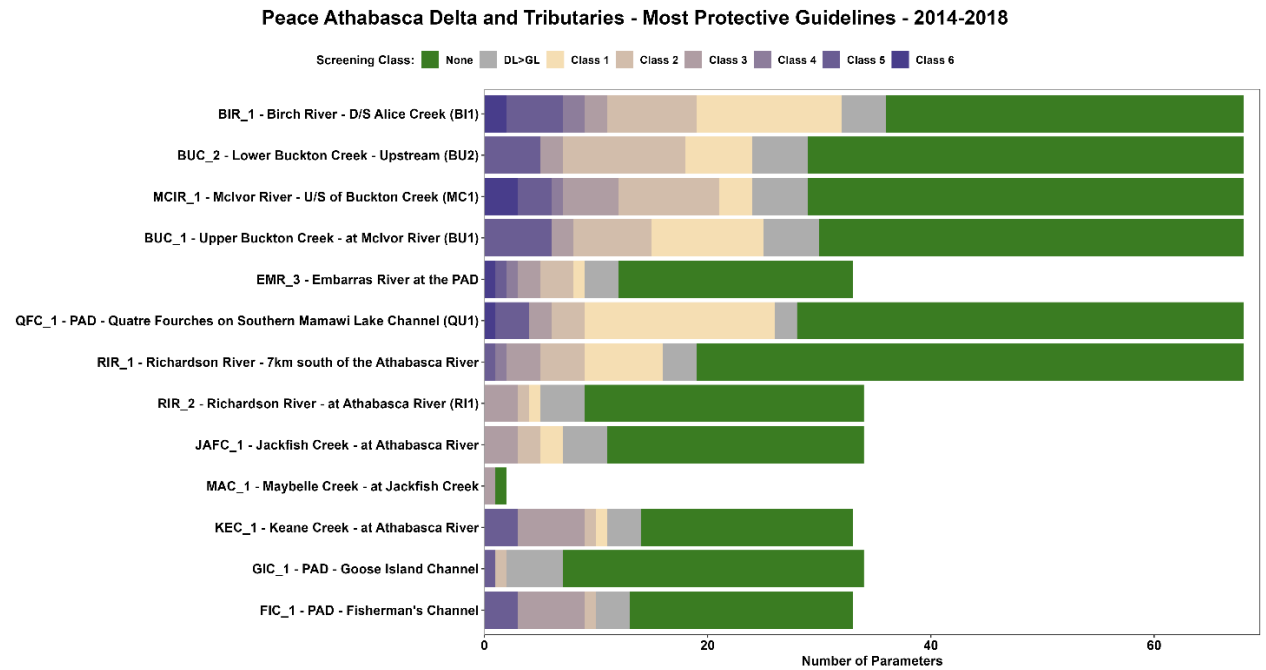
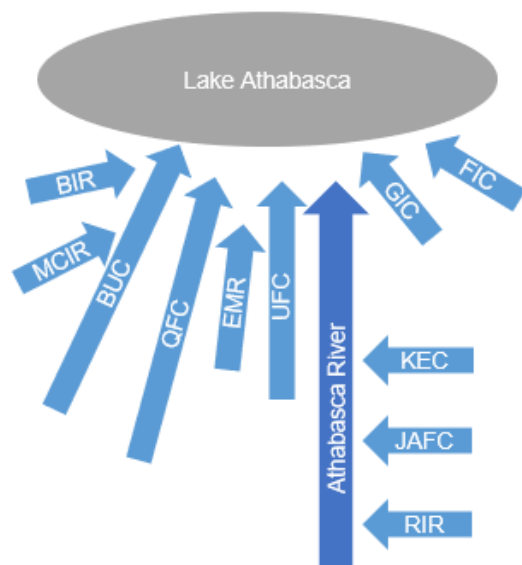


Figure I71: Peace Athabasca Delta and Tributaries - Most Protective Guideline Assessment from 2014 to 2018



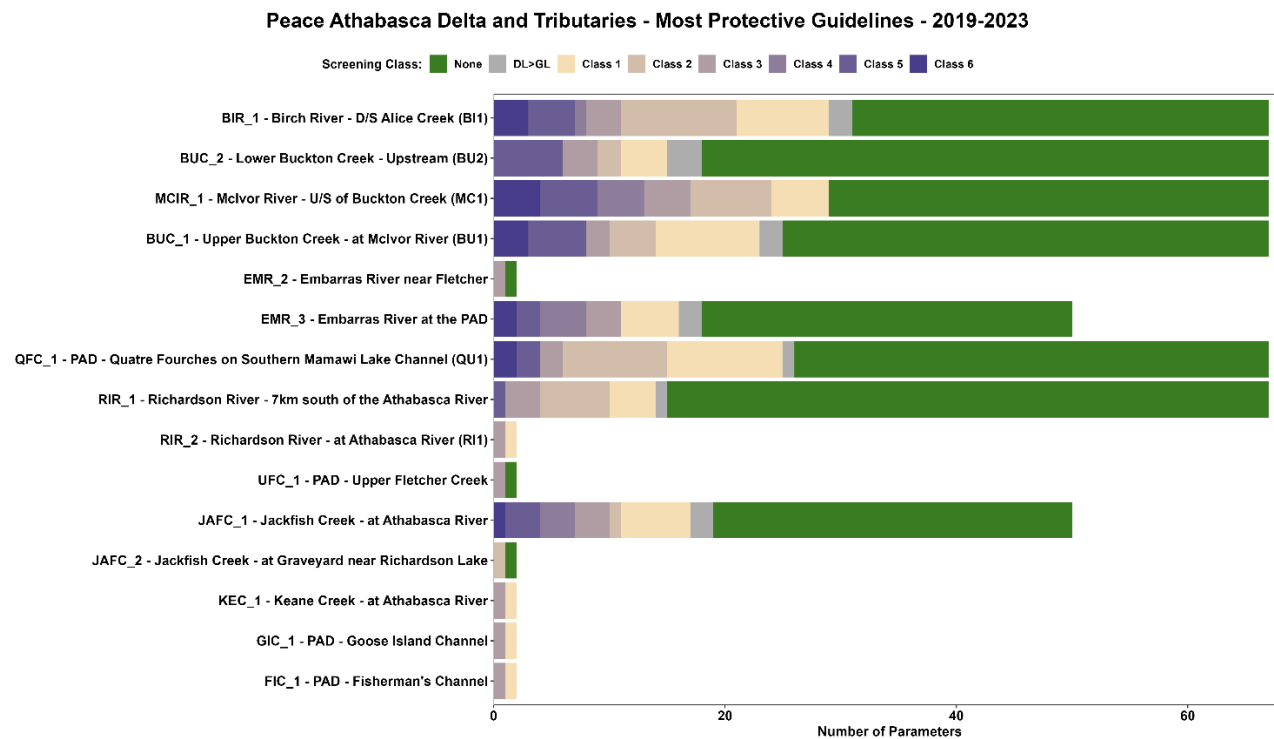
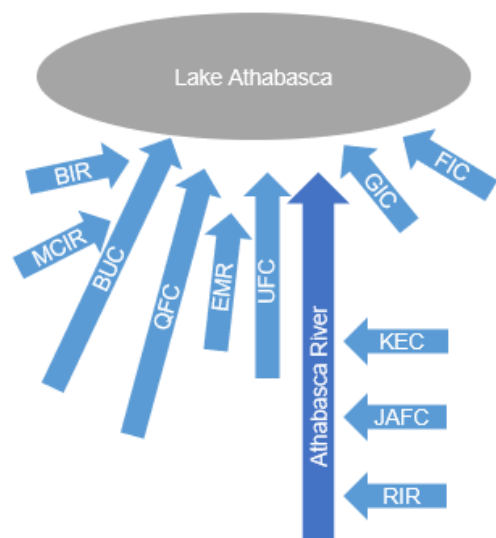


Figure I72: Peace Athabasca Delta and Tributaries - Most Protective Guideline Assessment from 2019 to 2023

## I.1.6 Slave River and Tributaries

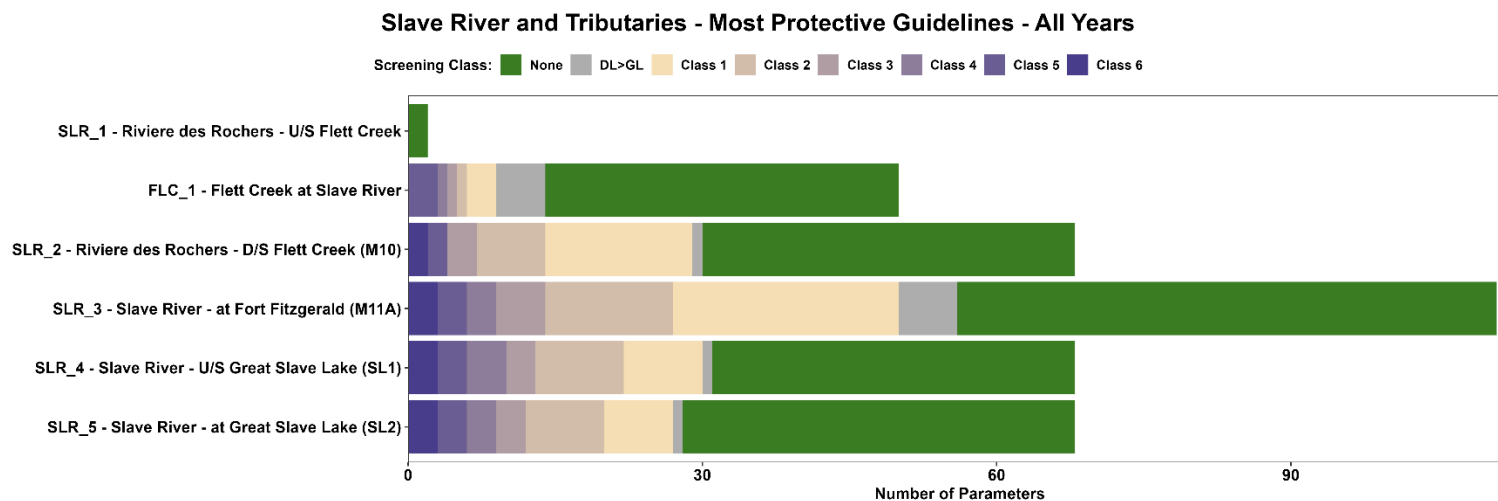


Figure I73: Slave River and Tributaries - Most Protective Guideline Assessment for All Years

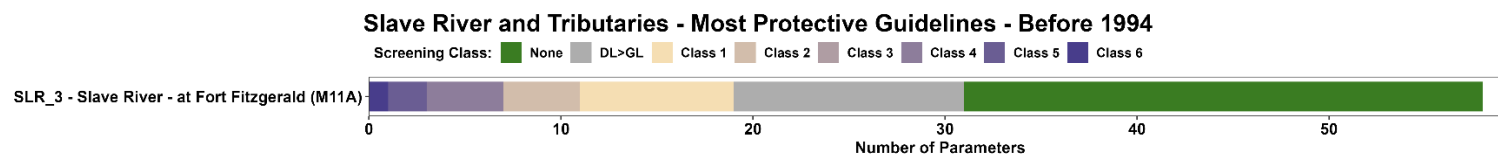


Figure I74: Slave River and Tributaries - Most Protective Guideline Assessment from Before 1994

Upstream



Downstream to  
Slave Lake

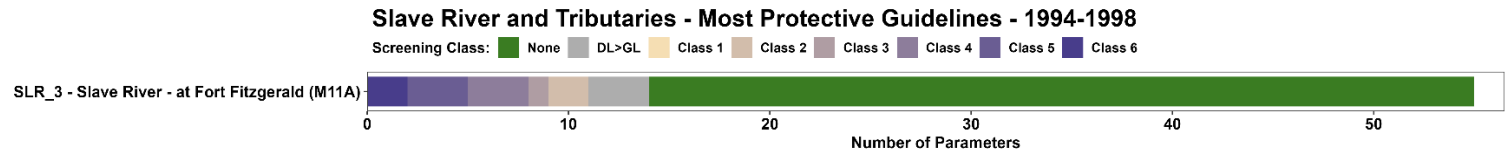


Figure I75: Slave River and Tributaries - Most Protective Guideline Assessment from 1994 to 1998

Upstream



Downstream to  
Slave Lake

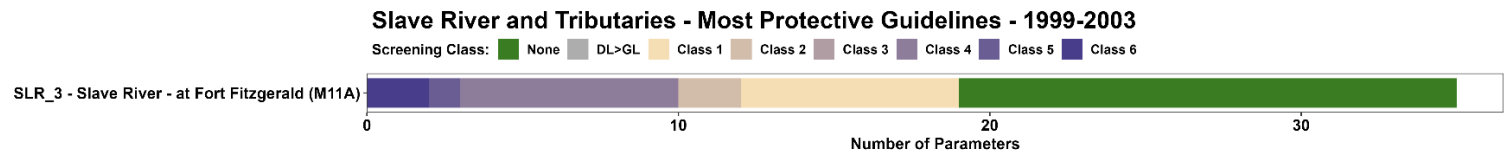


Figure I76: Slave River and Tributaries - Most Protective Guideline Assessment from 1999 to 2003

Upstream



Downstream to  
Slave Lake

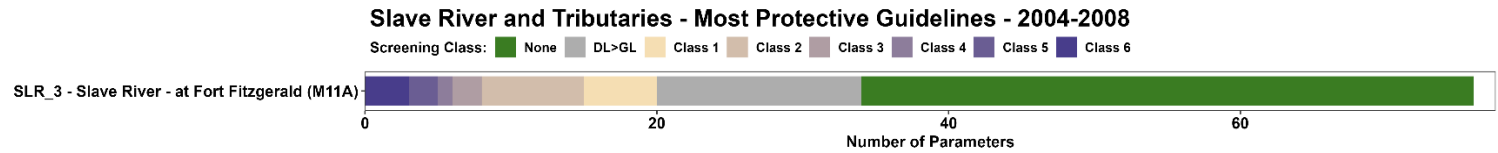


Figure I77: Slave River and Tributaries - Most Protective Guideline Assessment from 2004 to 2008

Upstream



Downstream to  
Slave Lake

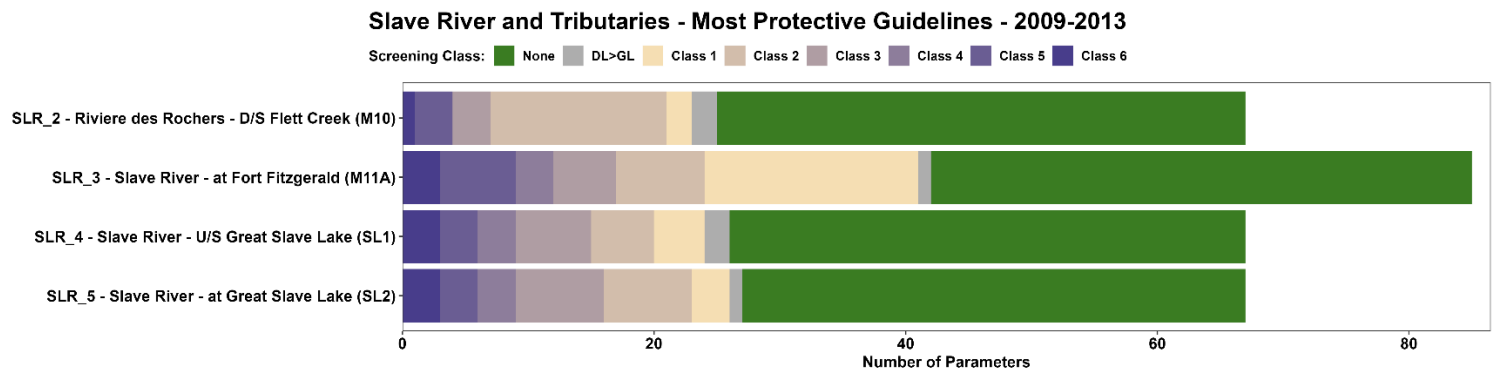


Figure I78: Slave River and Tributaries - Most Protective Guideline Assessment from 2009 to 2013

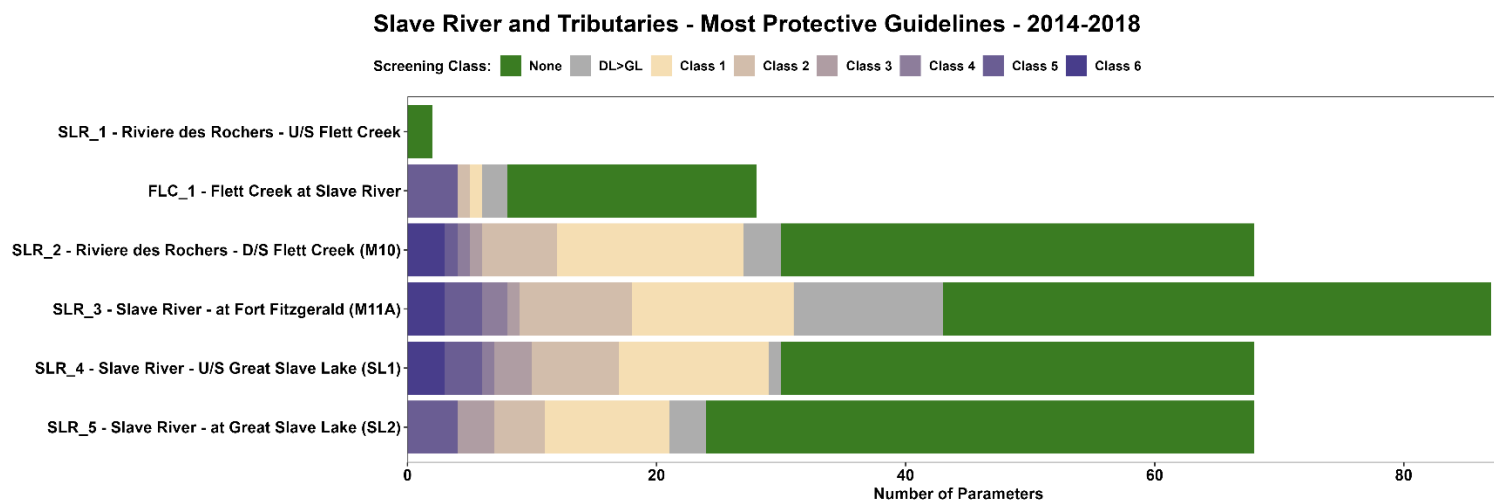
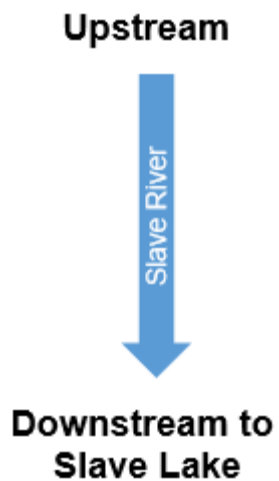


Figure I79: Slave River and Tributaries - Most Protective Guideline Assessment from 2014 to 2018

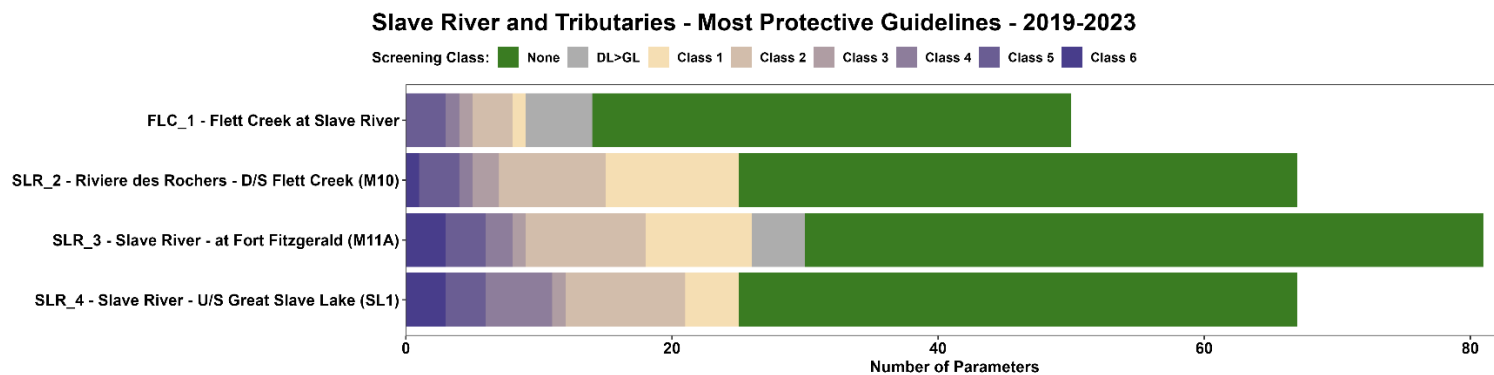


Figure I80: Slave River and Tributaries - Most Protective Guideline Assessment from 2019 to 2023

## **I.2.0 Resource Management Considerations**

### **I.2.1 Athabasca River Mainstem**

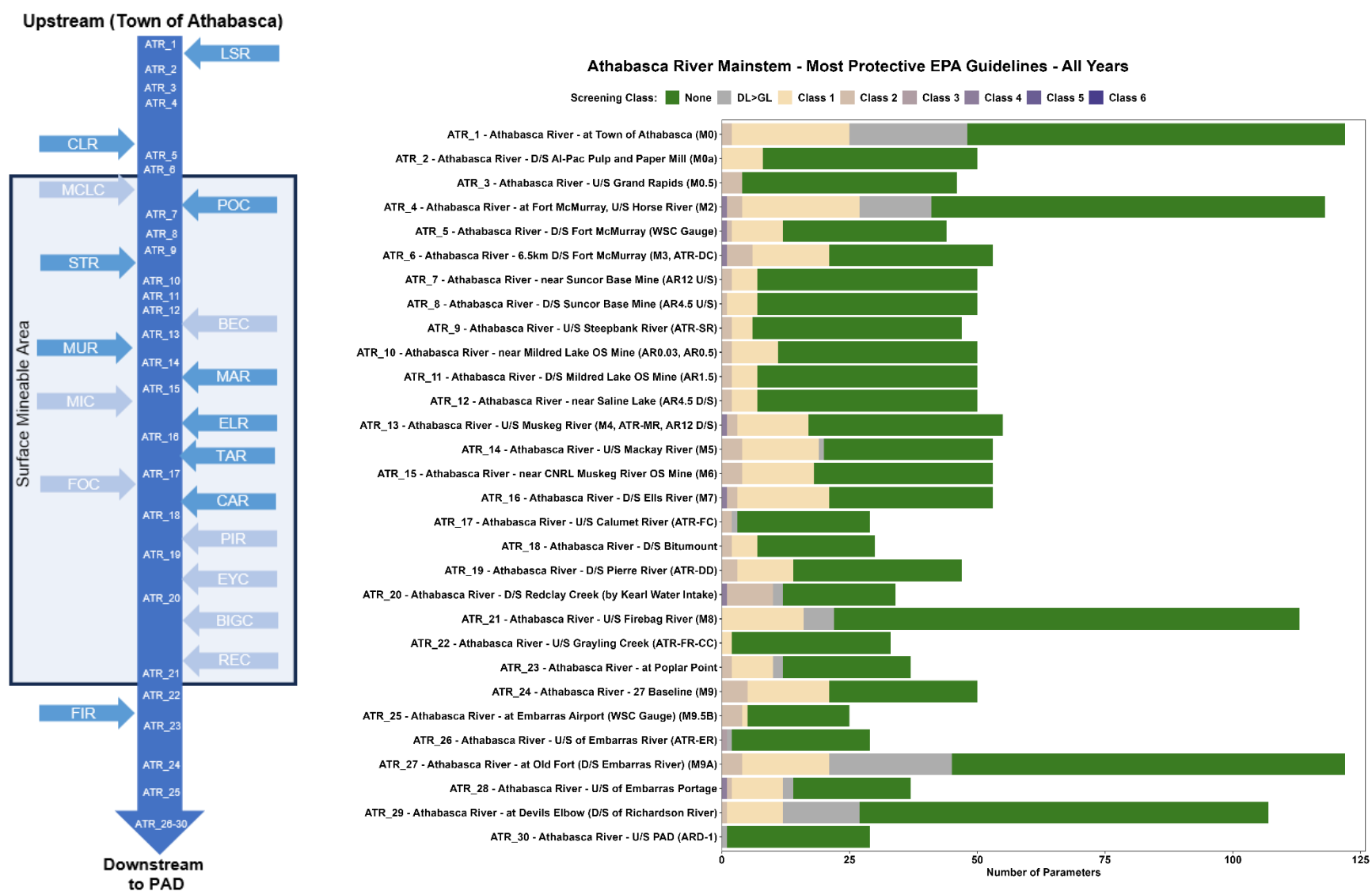


Figure I81: Athabasca River Mainstem - Most Protective EPA Guideline Assessment for All Years

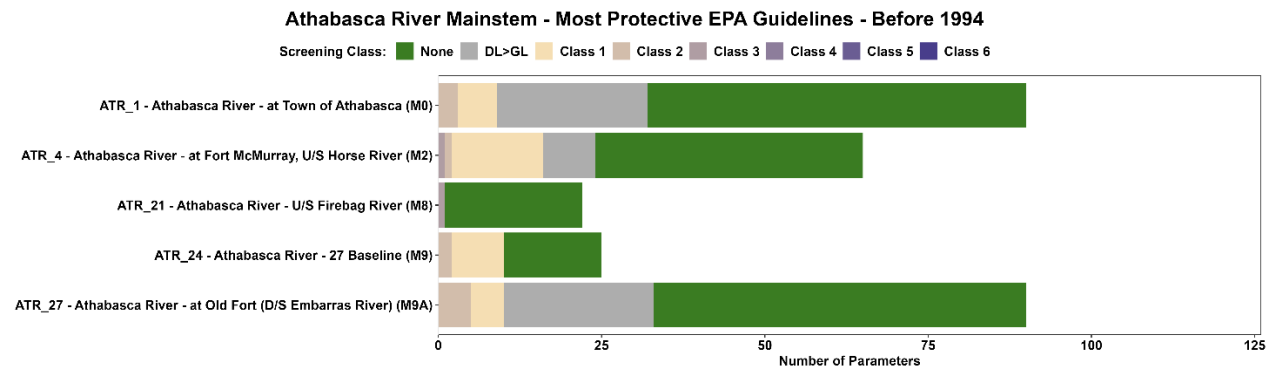
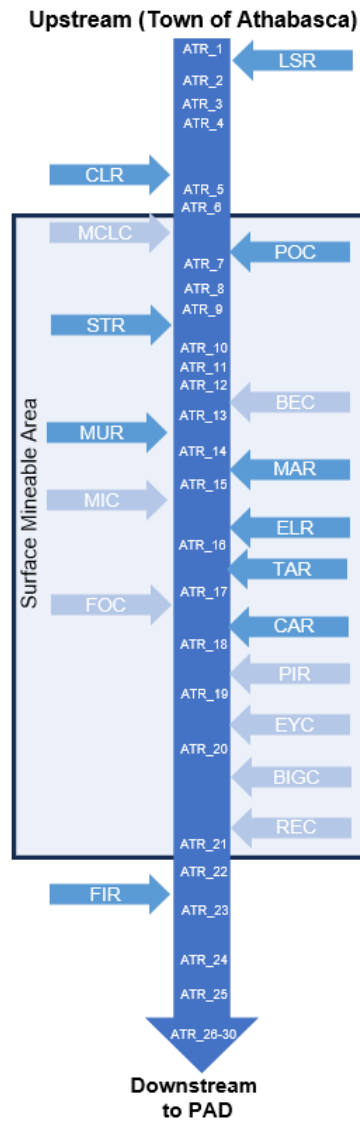


Figure I82: Athabasca River Mainstem - Most Protective EPA Guideline Assessment from before 1994



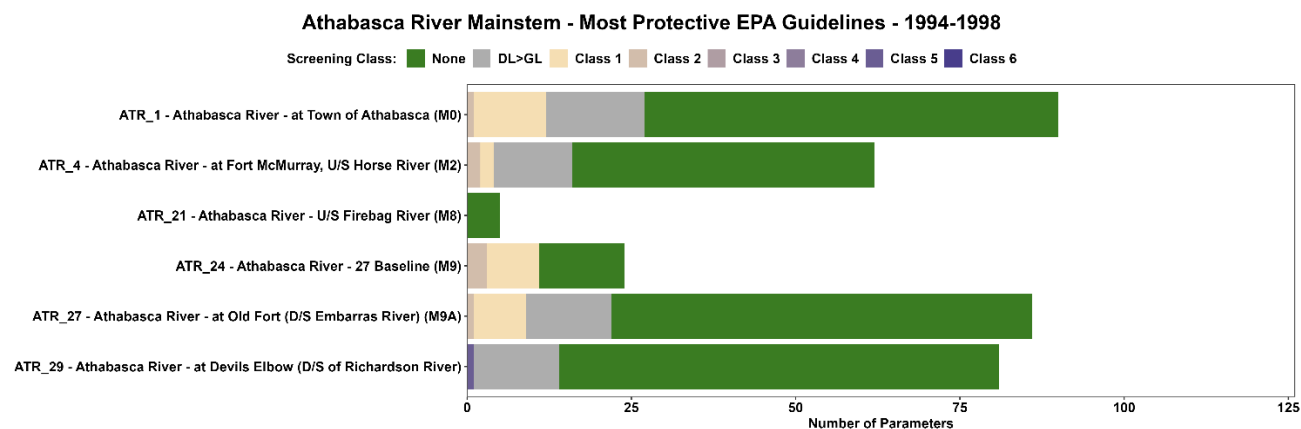
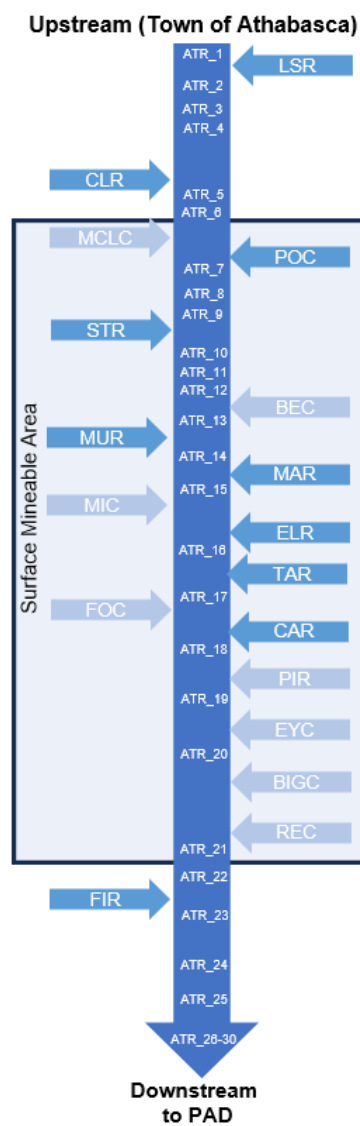


Figure I83: Athabasca River Mainstem - Most Protective EPA Guideline Assessment for 1994 to 1998

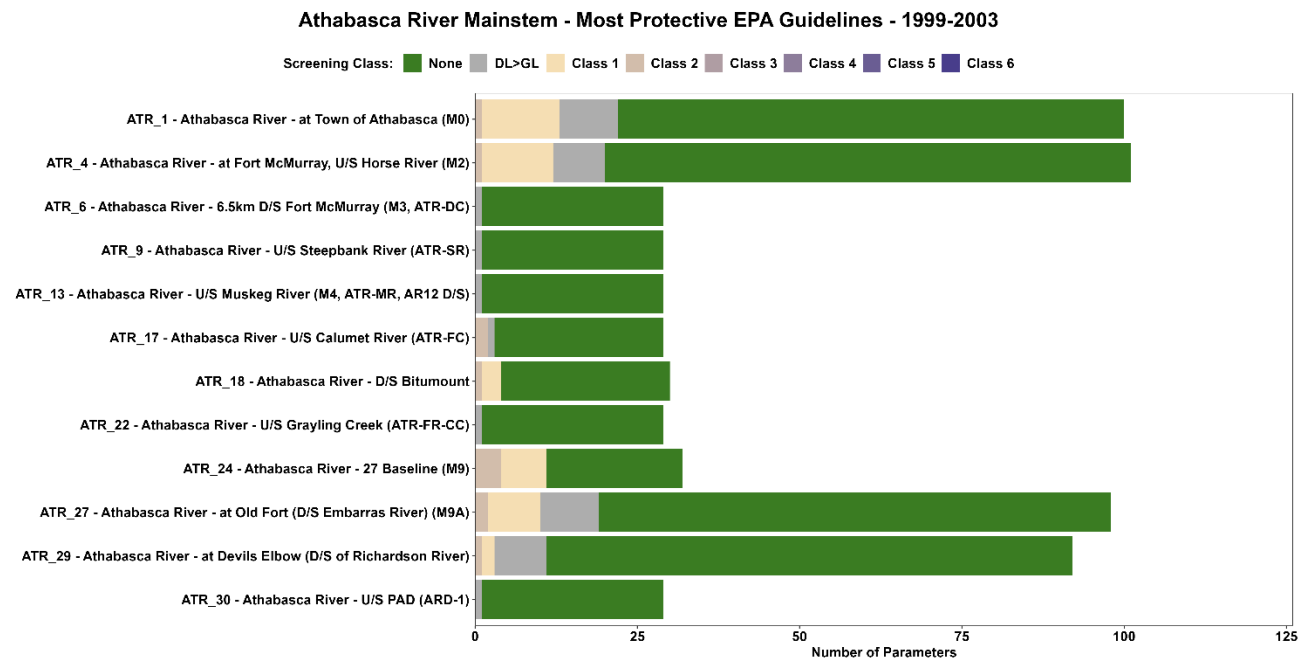
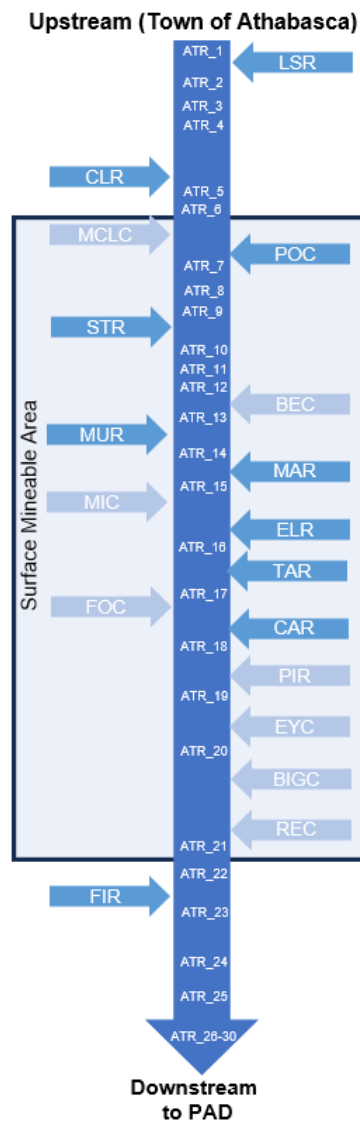


Figure I84: Athabasca River Mainstem - Most Protective EPA Guideline Assessment for 1999 to 2003

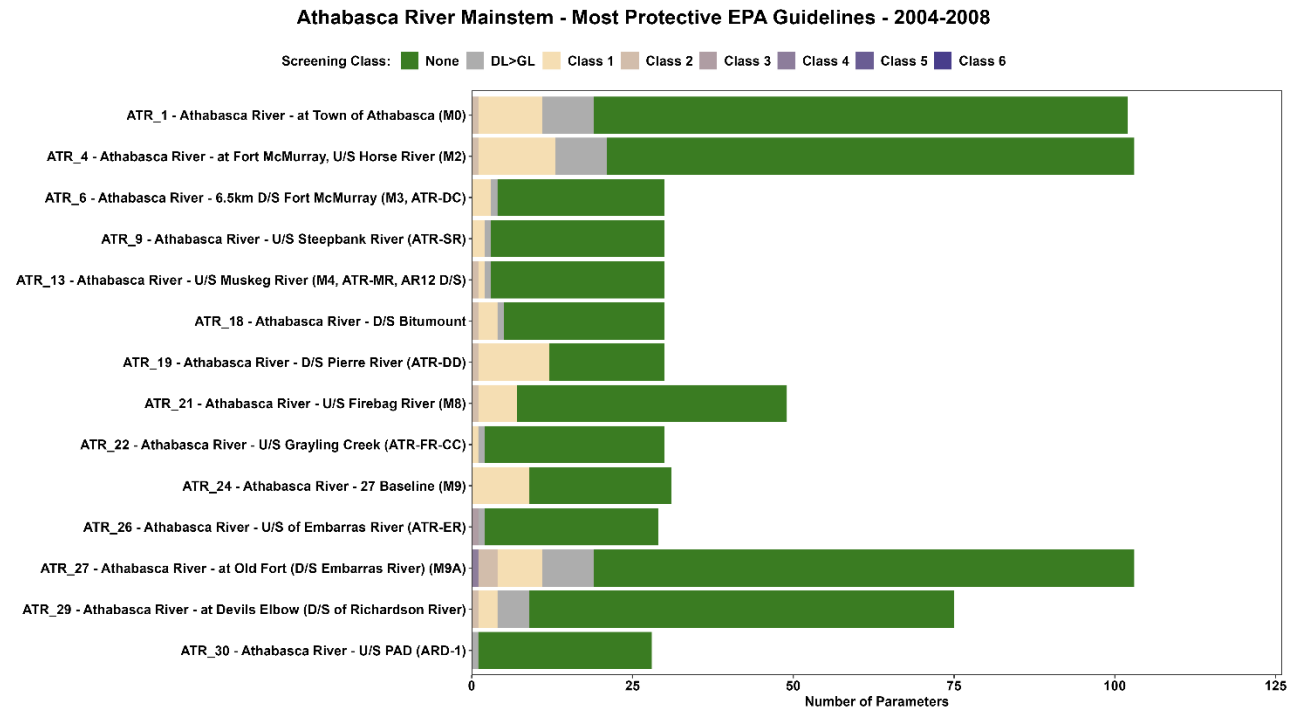
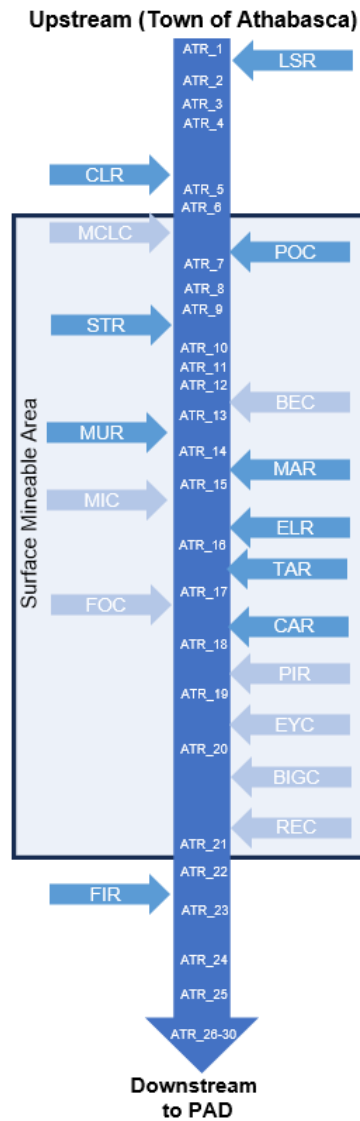


Figure I85: Athabasca River Mainstem - Most Protective EPA Guideline Assessment for 2004 to 2008

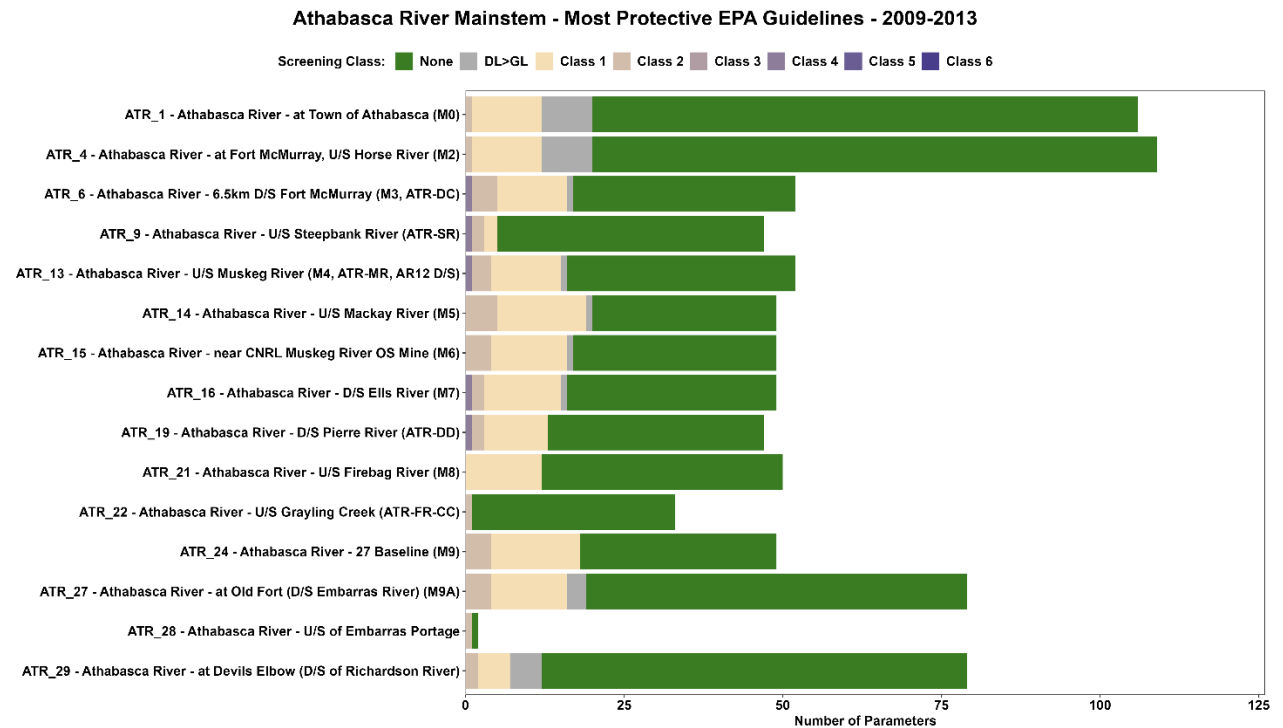
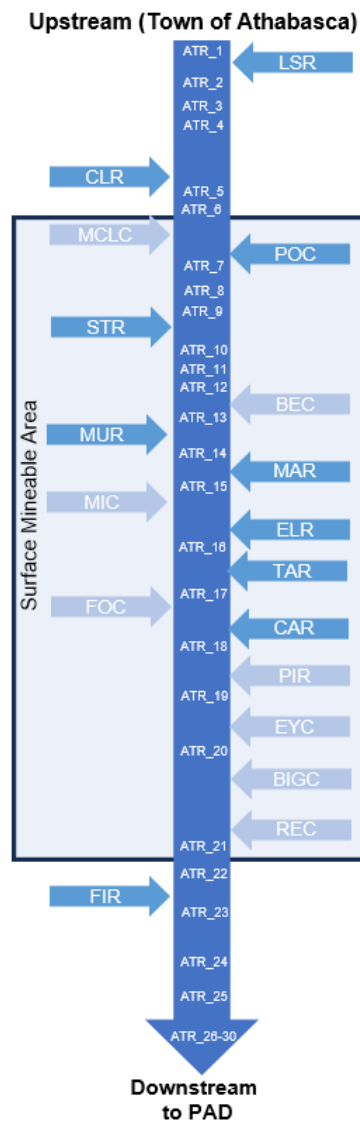


Figure I86: Athabasca River Mainstem - Most Protective EPA Guideline Assessment for 2009 to 2013

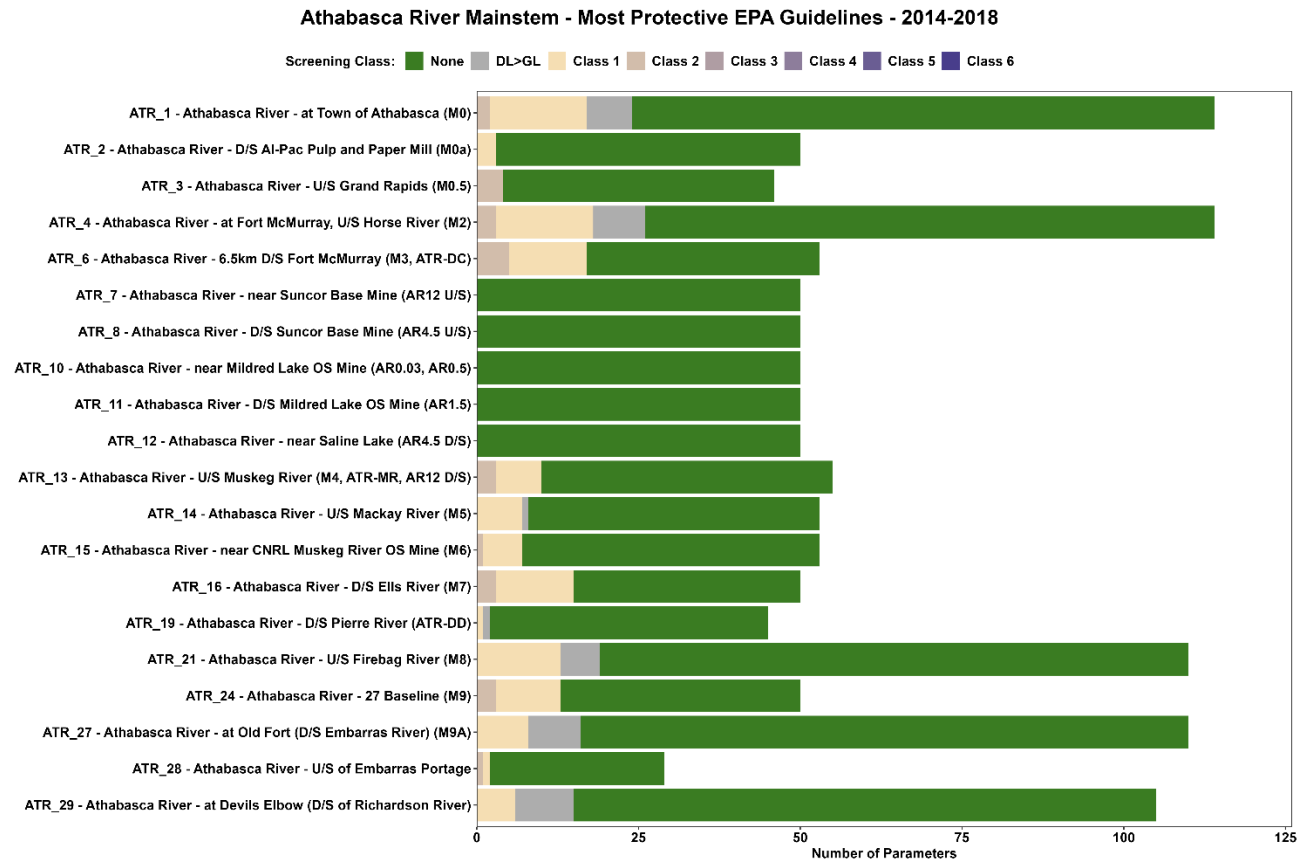
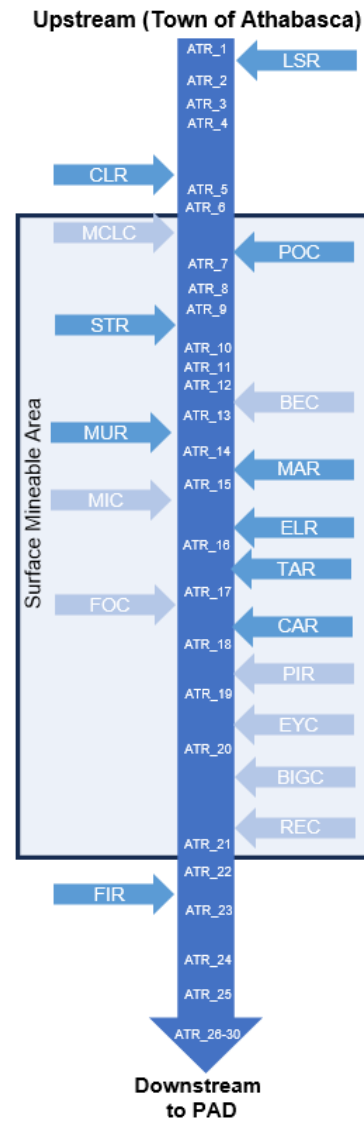
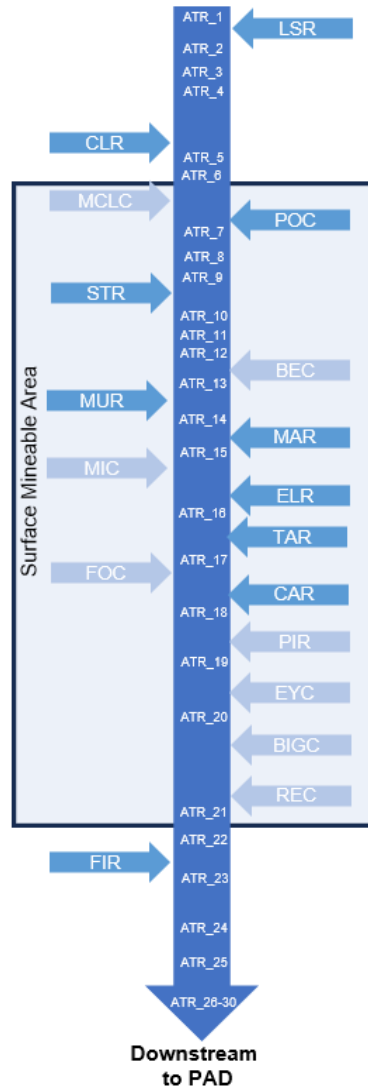


Figure I87: Athabasca River Mainstem - Most Protective EPA Guideline Assessment for 2014 to 2018

Upstream (Town of Athabasca)



#### Athabasca River Mainstem - Most Protective EPA Guidelines - 2019-2023

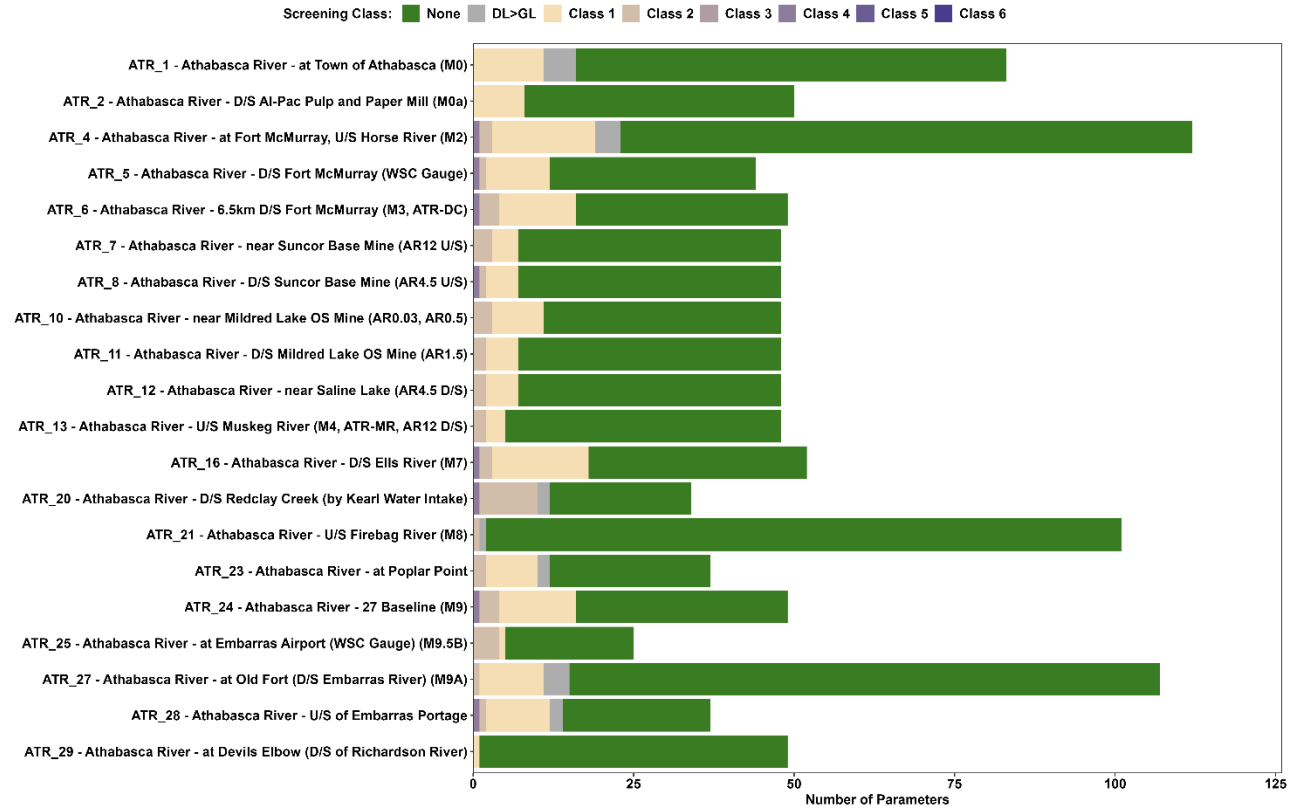


Figure I88: Athabasca River Mainstem - Most Protective EPA Guideline Assessment for 2019 to 2023

## I.2.2 Athabasca River Tributaries – Most Protective EPA Guidelines

### 2.2.1 Clearwater-Christina River and Tributaries

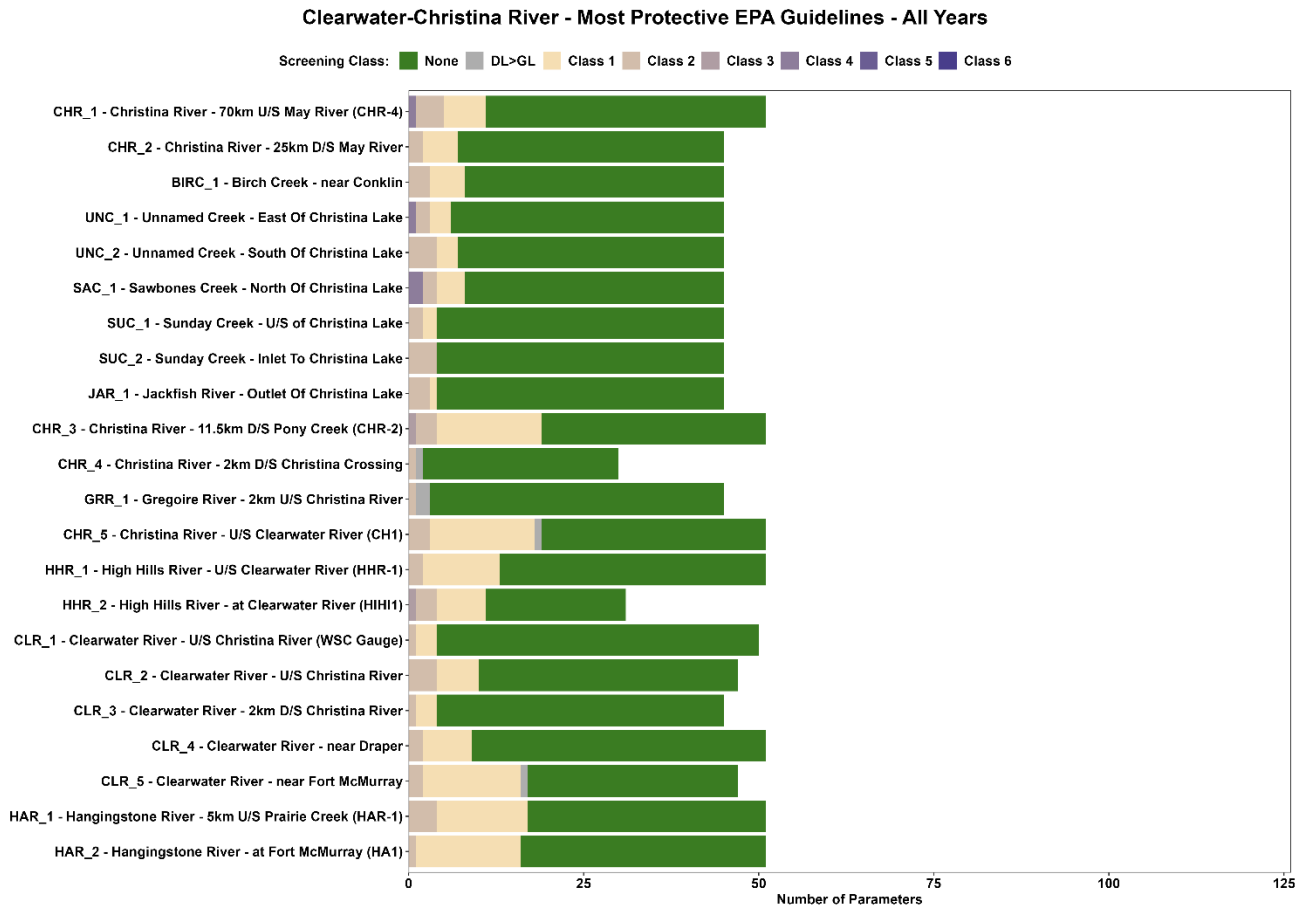
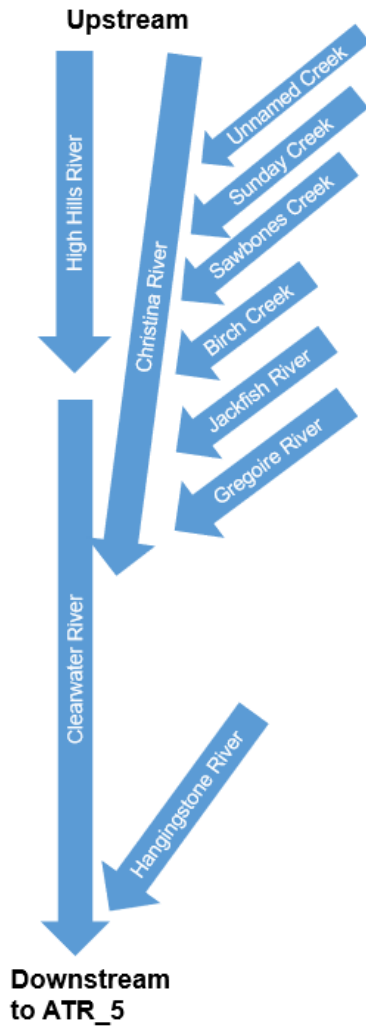


Figure I89: Clearwater-Christina Rivers and Tributaries - Most Protective EPA Guideline Assessment for All Years

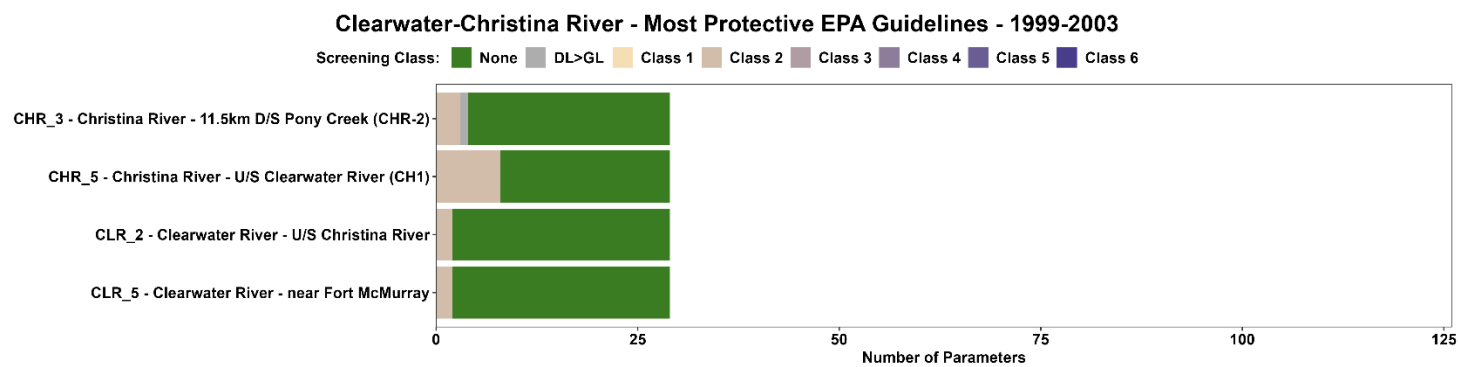
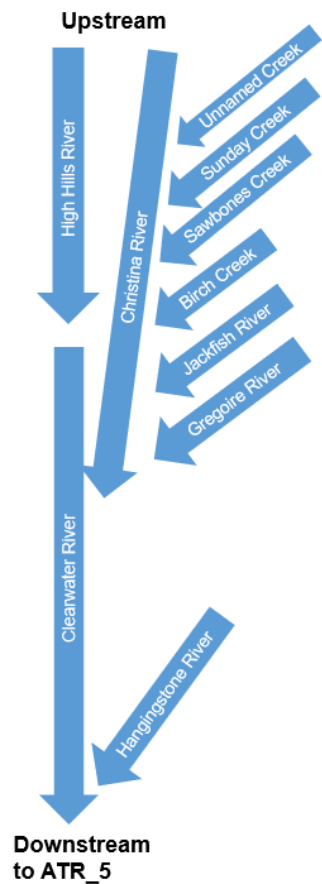


Figure I90: Clearwater-Christina Rivers and Tributaries - Most Protective EPA Guideline Assessment for 1999 to 2003



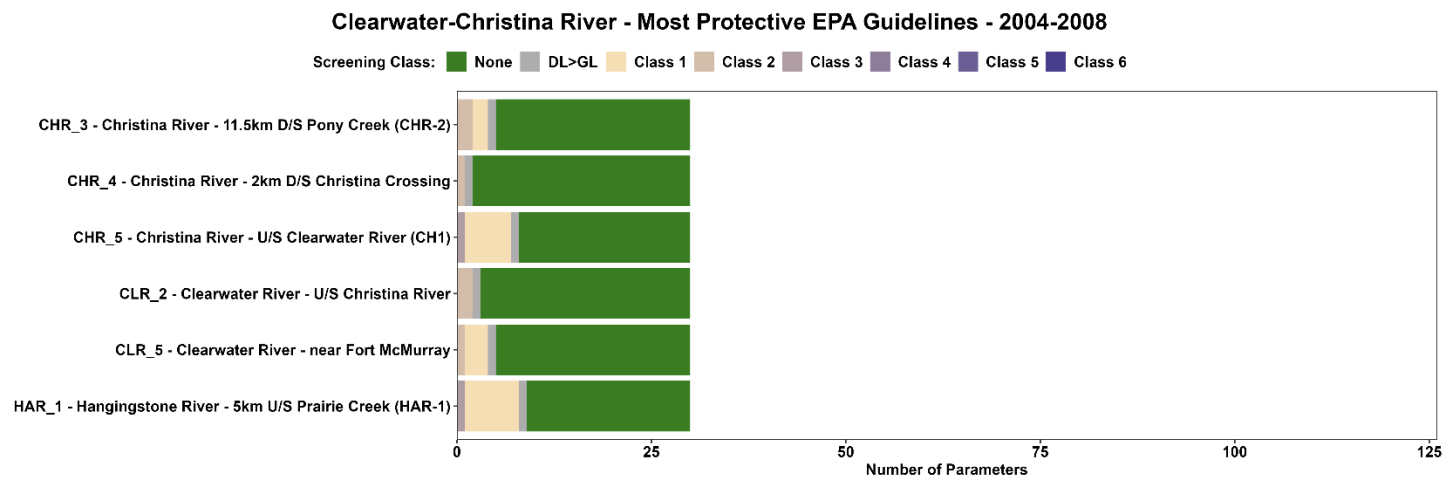
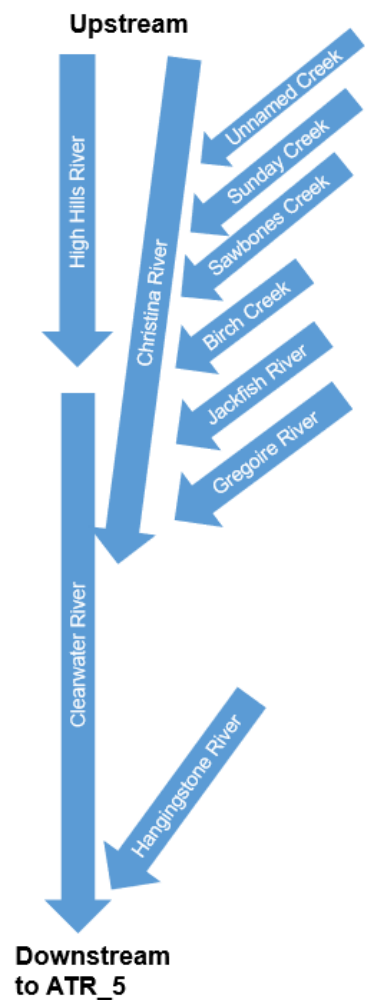


Figure I91: Clearwater-Christina Rivers and Tributaries - Most Protective EPA Guideline Assessment for 2004 to 2008

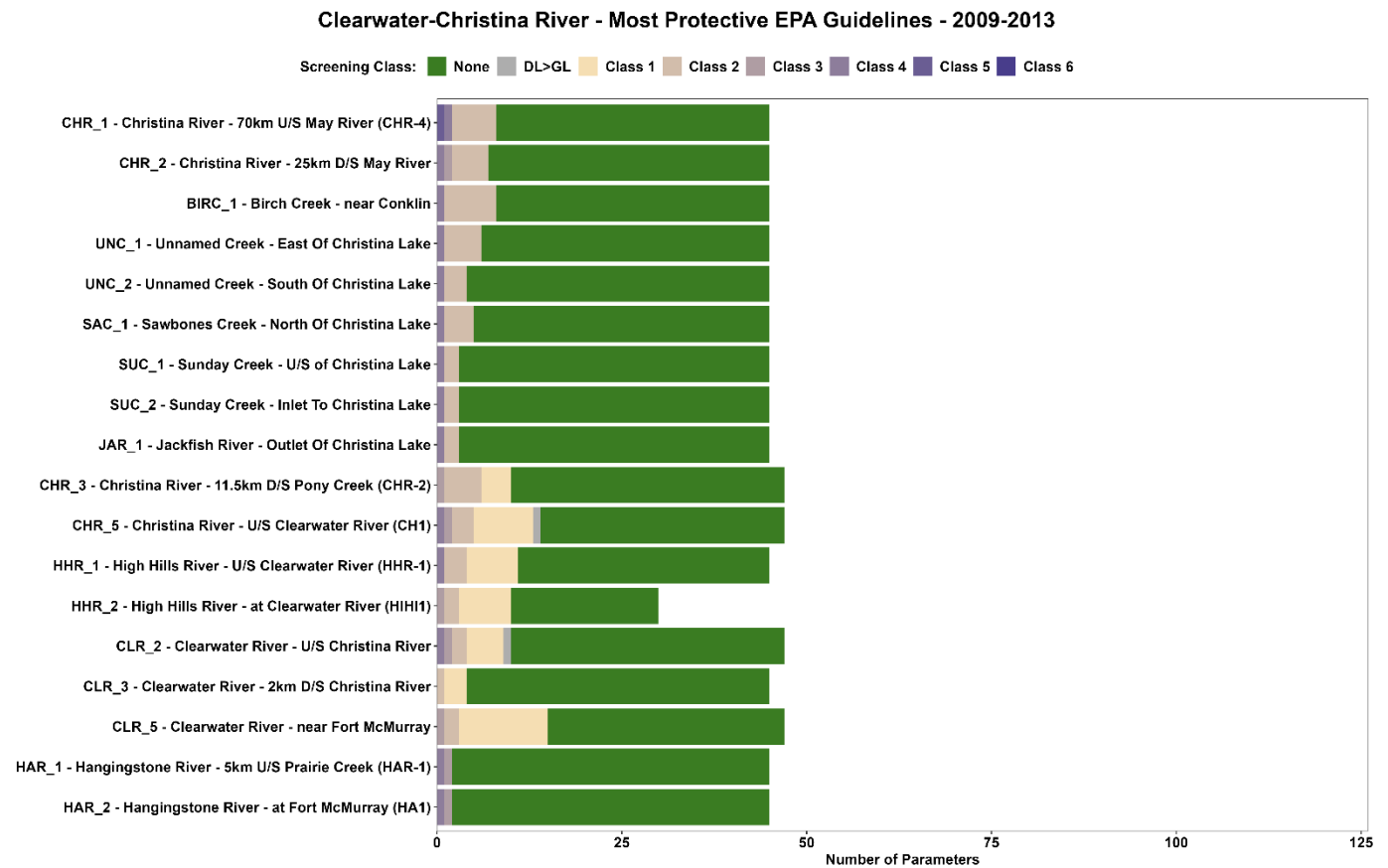
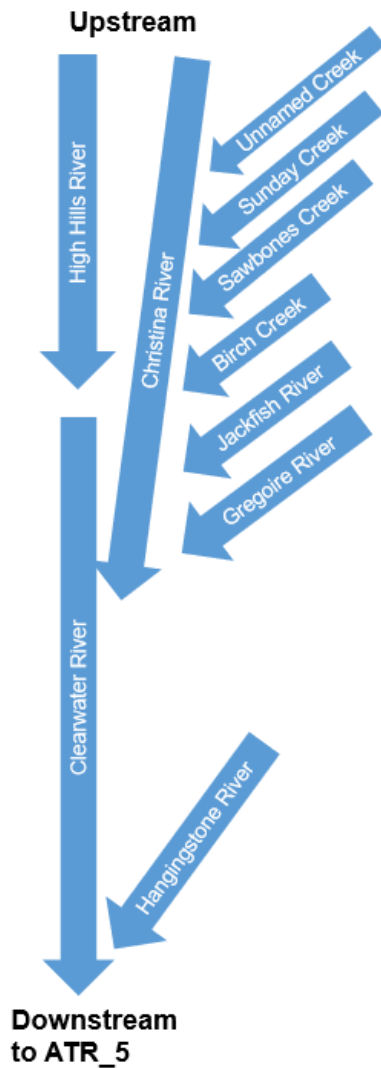


Figure I92: Clearwater-Christina Rivers and Tributaries - Most Protective EPA Guideline Assessment for 2009 to 2013

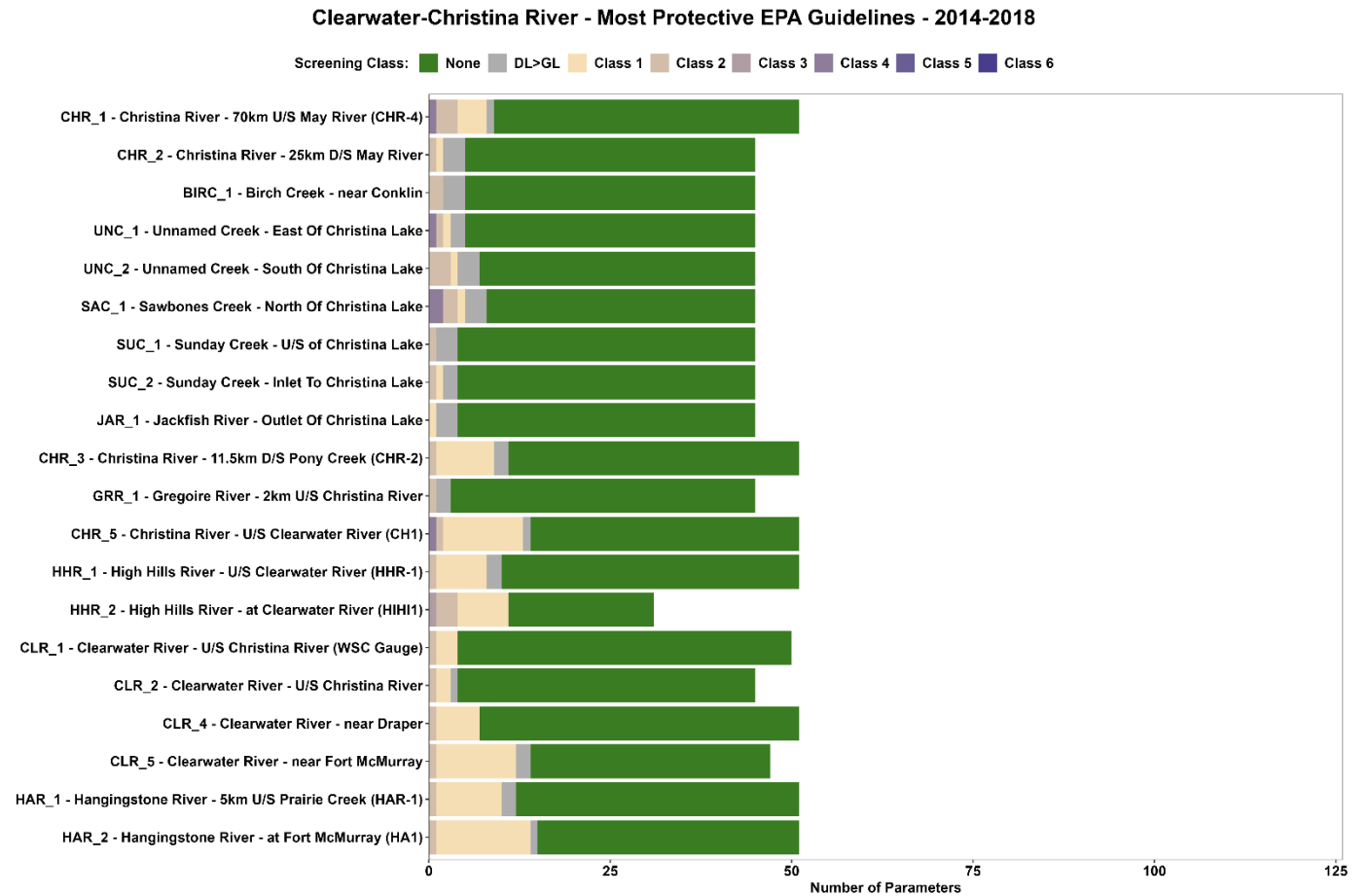
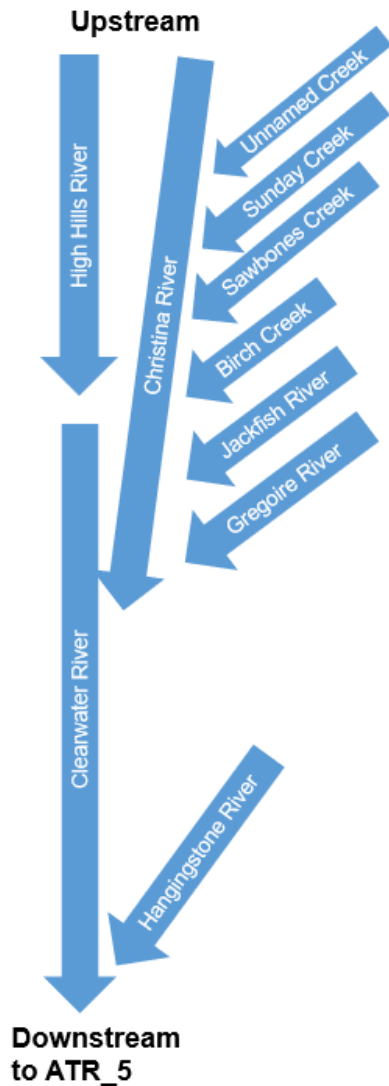


Figure I93: Clearwater-Christina Rivers and Tributaries - Most Protective EPA Guideline Assessment for 2014 to 2018

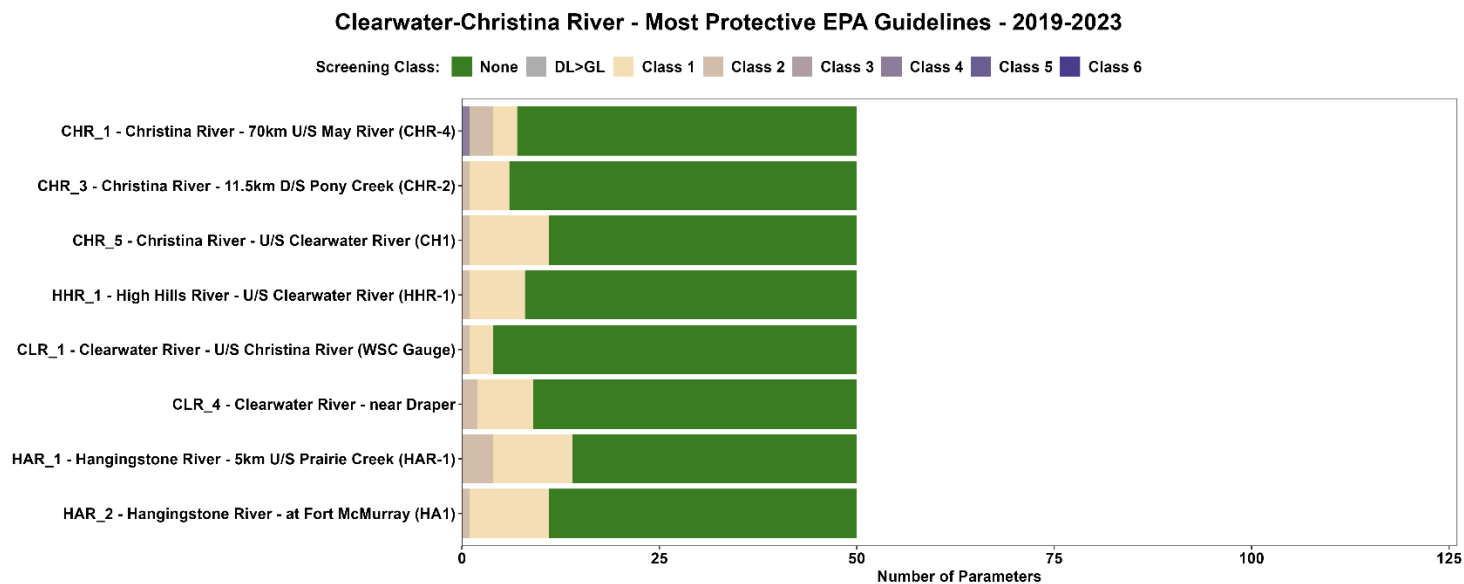
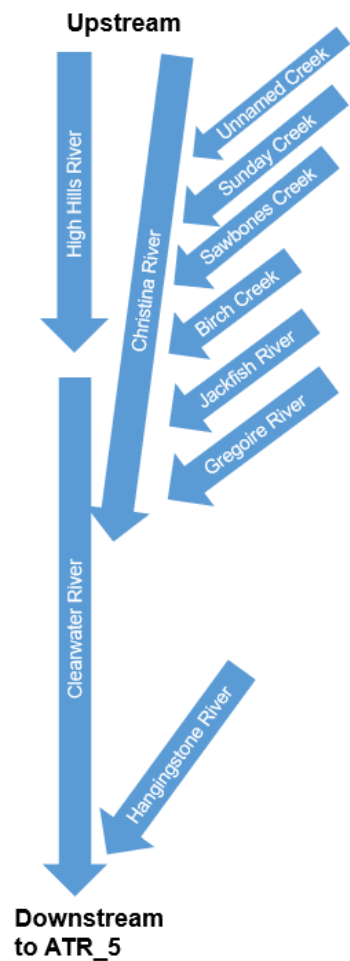


Figure I94: Clearwater-Christina Rivers and Tributaries - Most Protective EPA Guideline Assessment for 2019 to 2023

## 2.2.2 Steepbank River and Tributaries

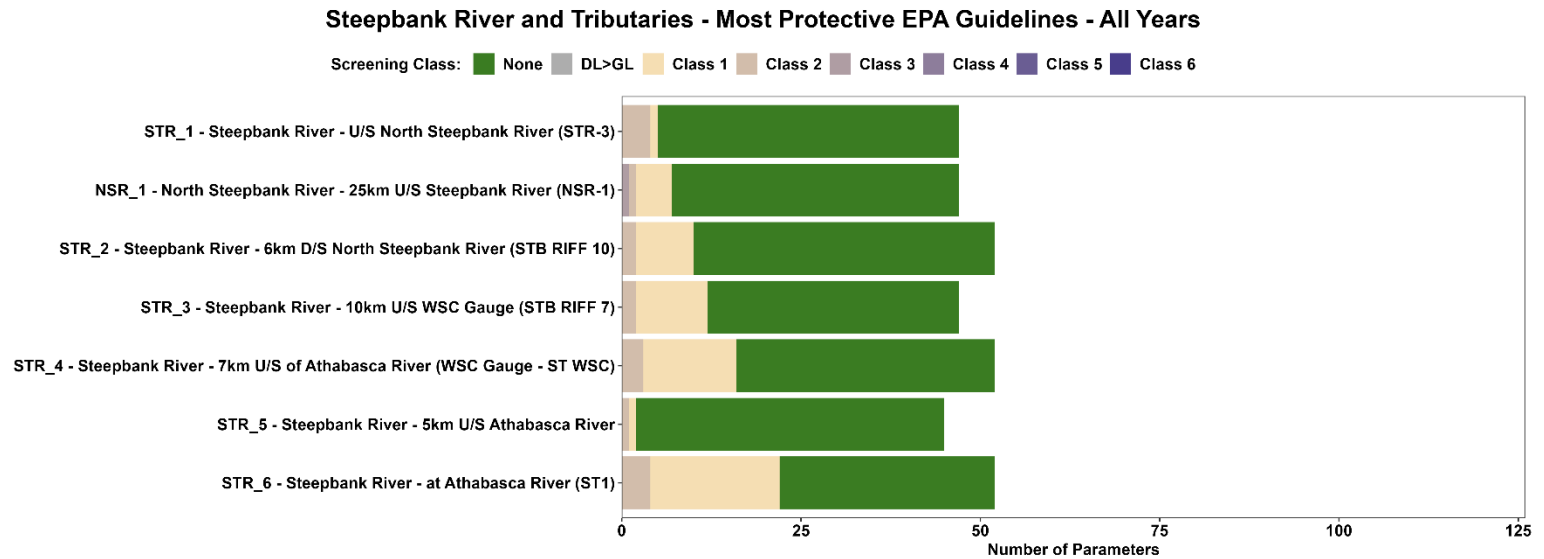
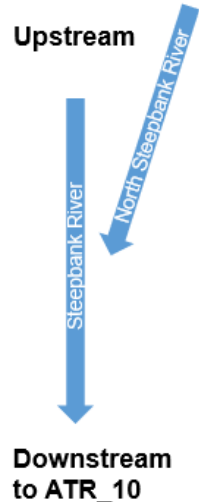


Figure I95: Steepbank River and Tributaries - Most Protective EPA Guideline Assessment for All Years

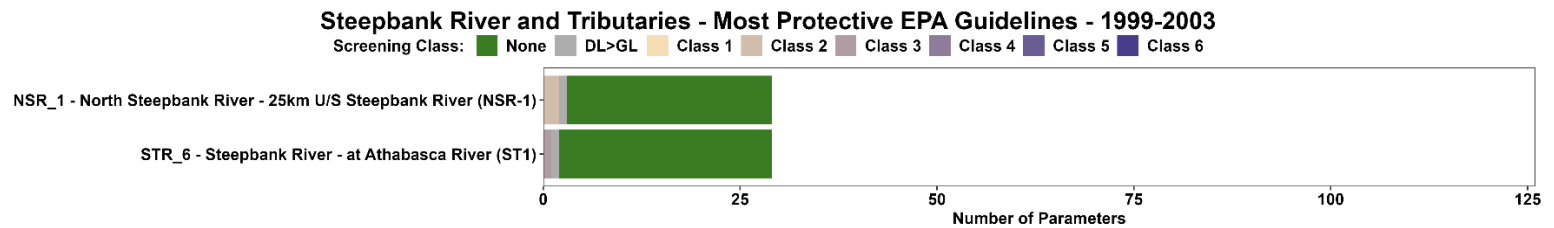
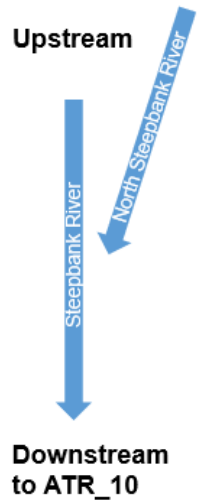


Figure I96: Steepbank River and Tributaries - Most Protective EPA Guideline Assessment for 1999 to 2003

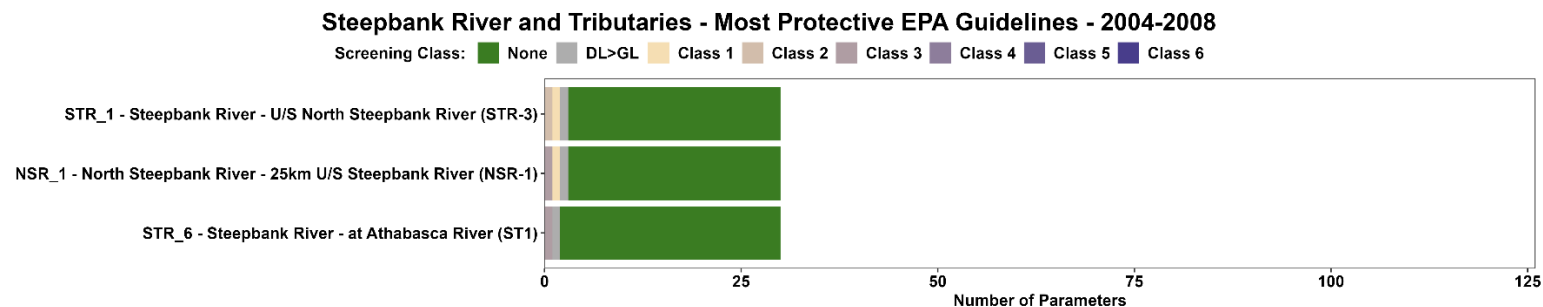
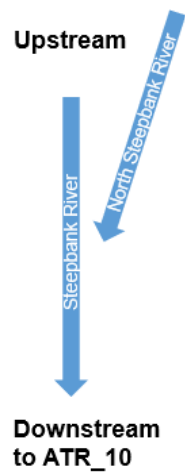


Figure I97: Steepbank River and Tributaries - Most Protective EPA Guideline Assessment for 2004 to 2008

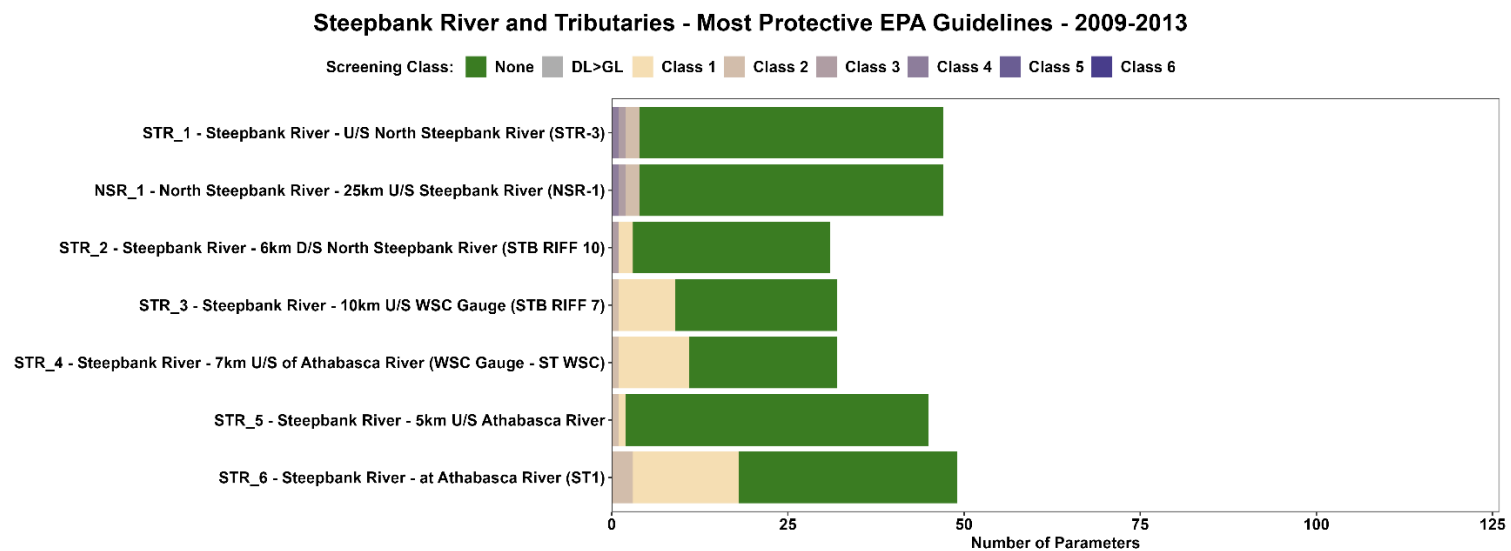
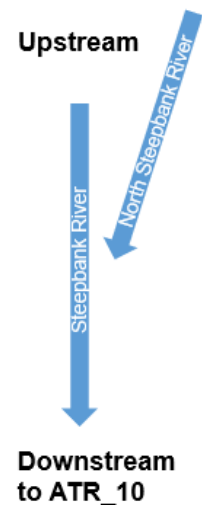


Figure I98: Steepbank River and Tributaries - Most Protective EPA Guideline Assessment for 2009 to 2013

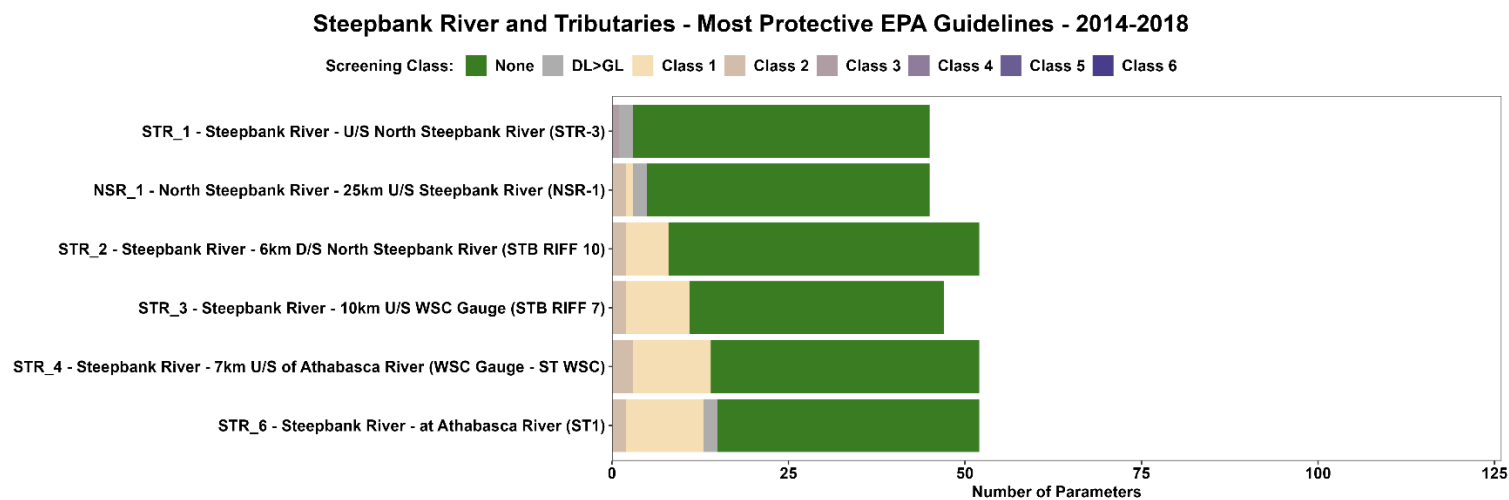
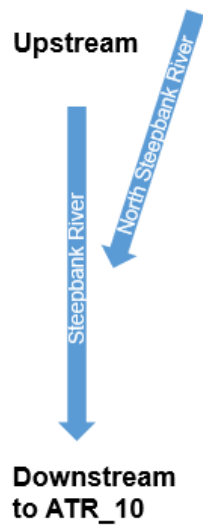


Figure I99: Steepbank River and Tributaries - Most Protective EPA Guideline Assessment for 2013 to 2018

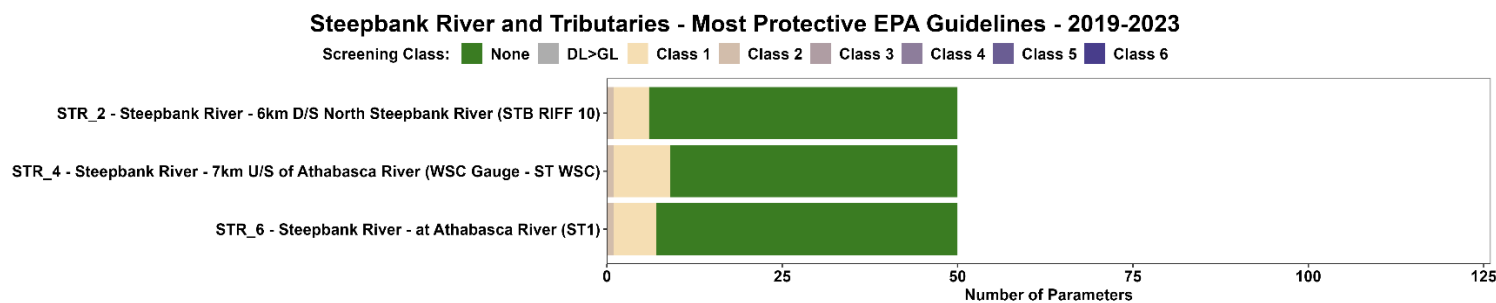
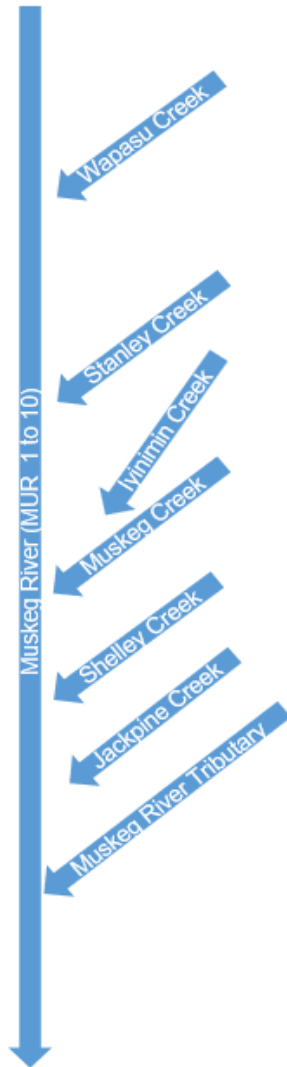


Figure I100: Steepbank River and Tributaries - Most Protective EPA Guideline Assessment for 2019 to 2023

### 2.2.3 Muskeg River and Tributaries

Upstream



Downstream  
to ATR\_14

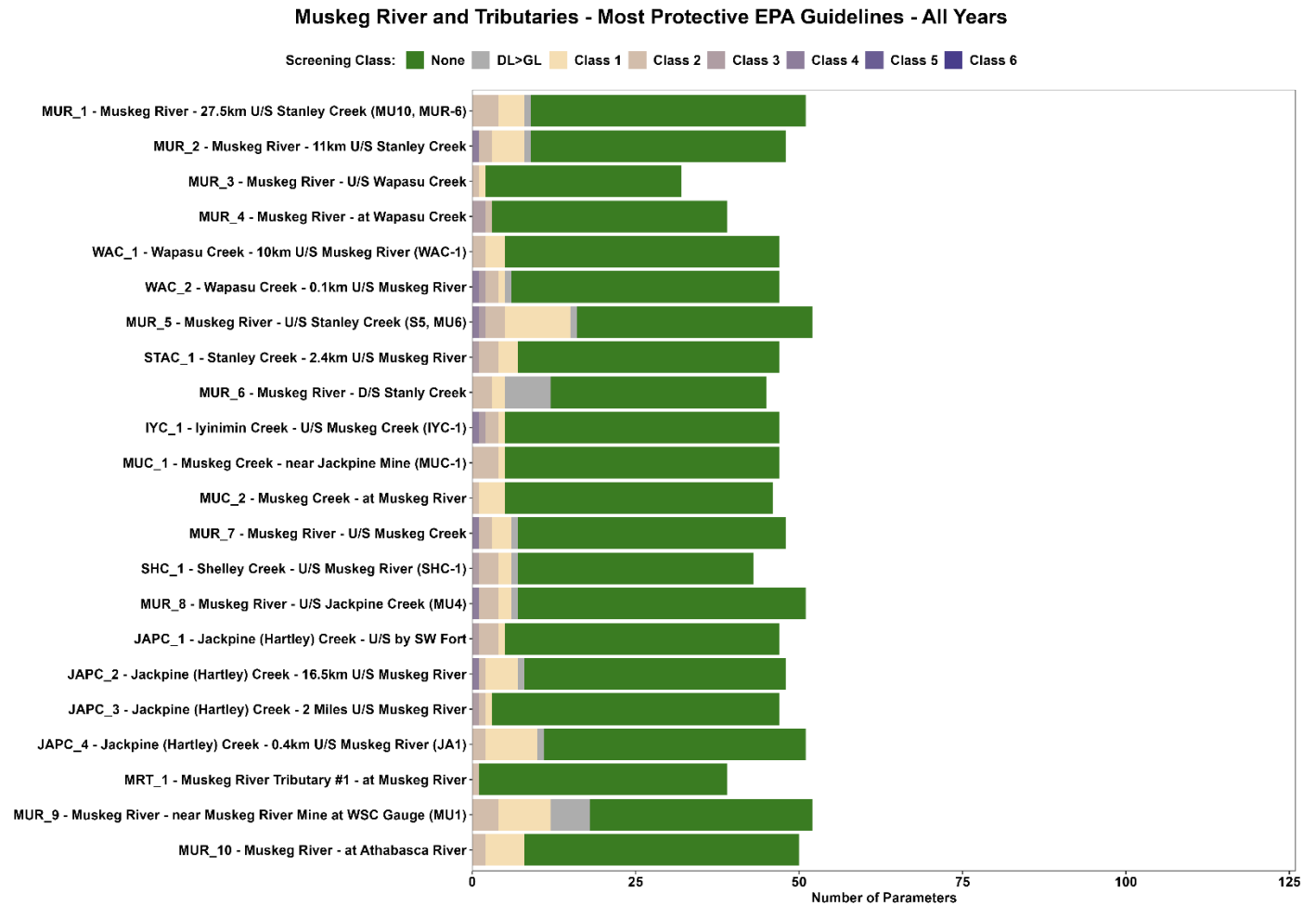
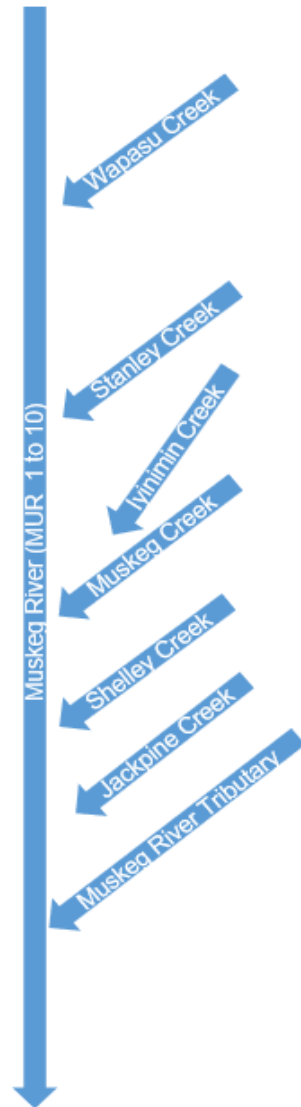


Figure I101: Muskeg River and Tributaries - Most Protective EPA Guideline Assessment for All Years



Upstream



Downstream  
to ATR\_14

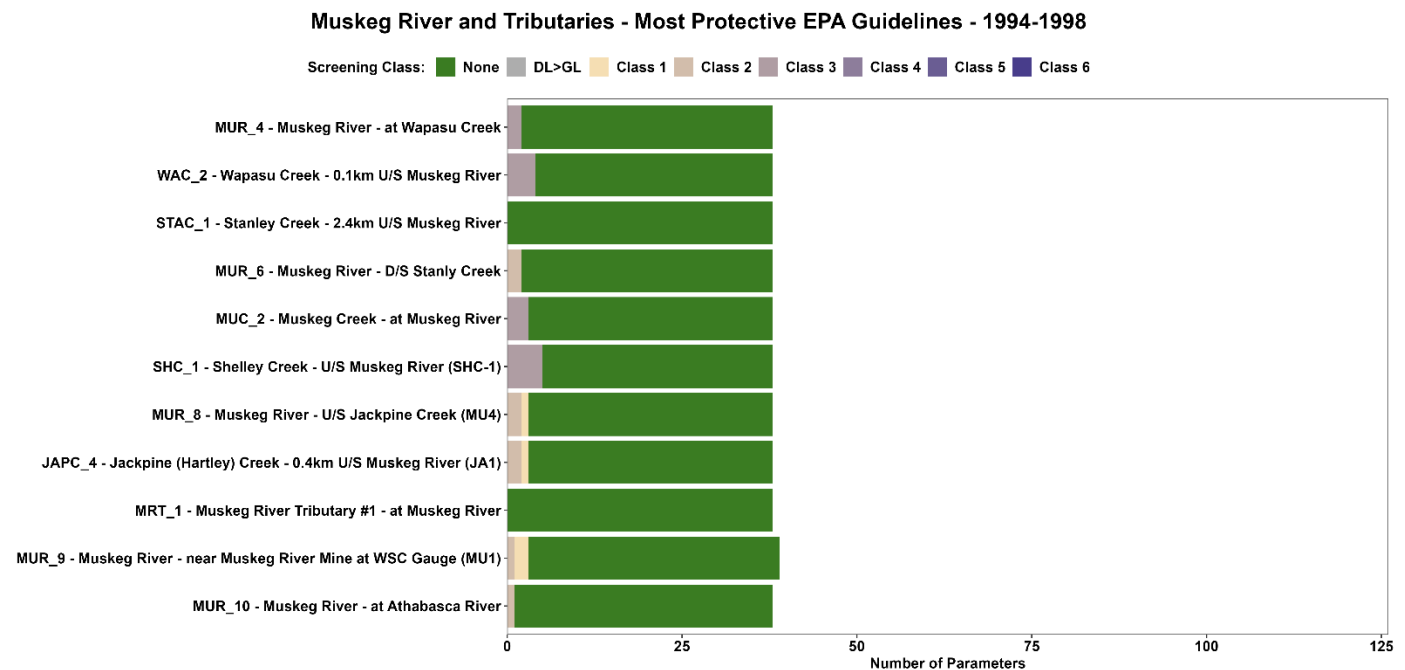
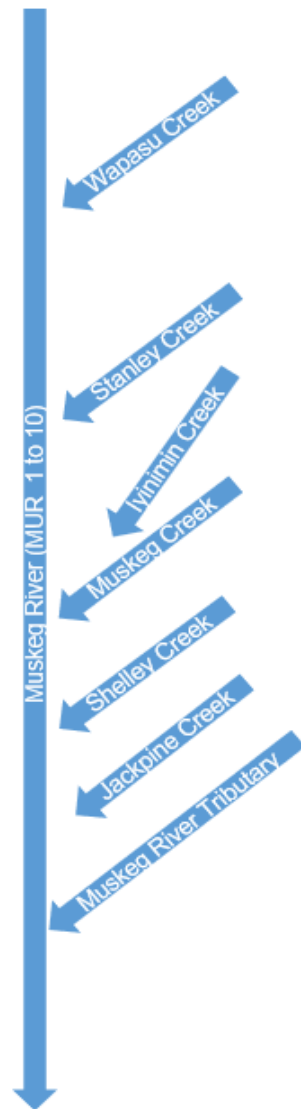


Figure I102: Muskeg River and Tributaries - Most Protective EPA Guideline Assessment from 1994 to 1998

Upstream



Downstream  
to ATR\_14

### Muskeg River and Tributaries - Most Protective EPA Guidelines - 1999-2003

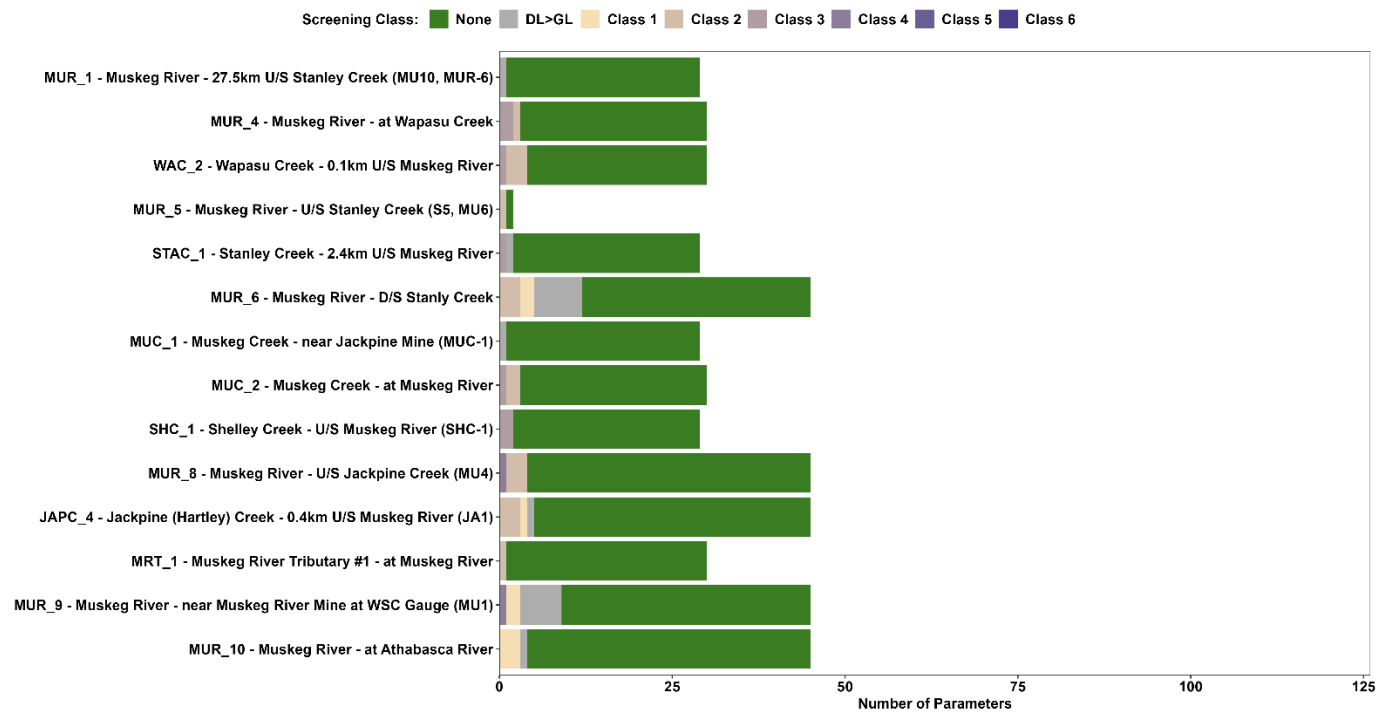
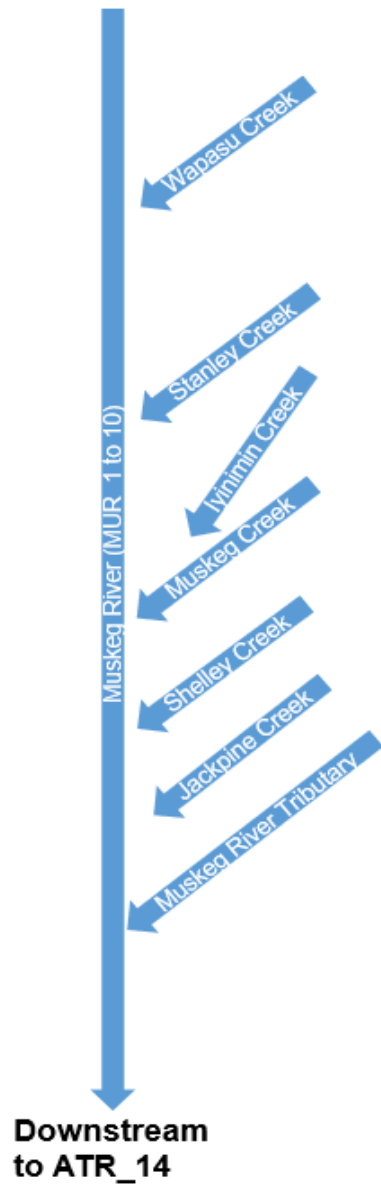


Figure I103: Muskeg River and Tributaries - Most Protective EPA Guideline Assessment from 1999 to 2003

Upstream



#### Muskeg River and Tributaries - Most Protective EPA Guidelines - 2004-2008

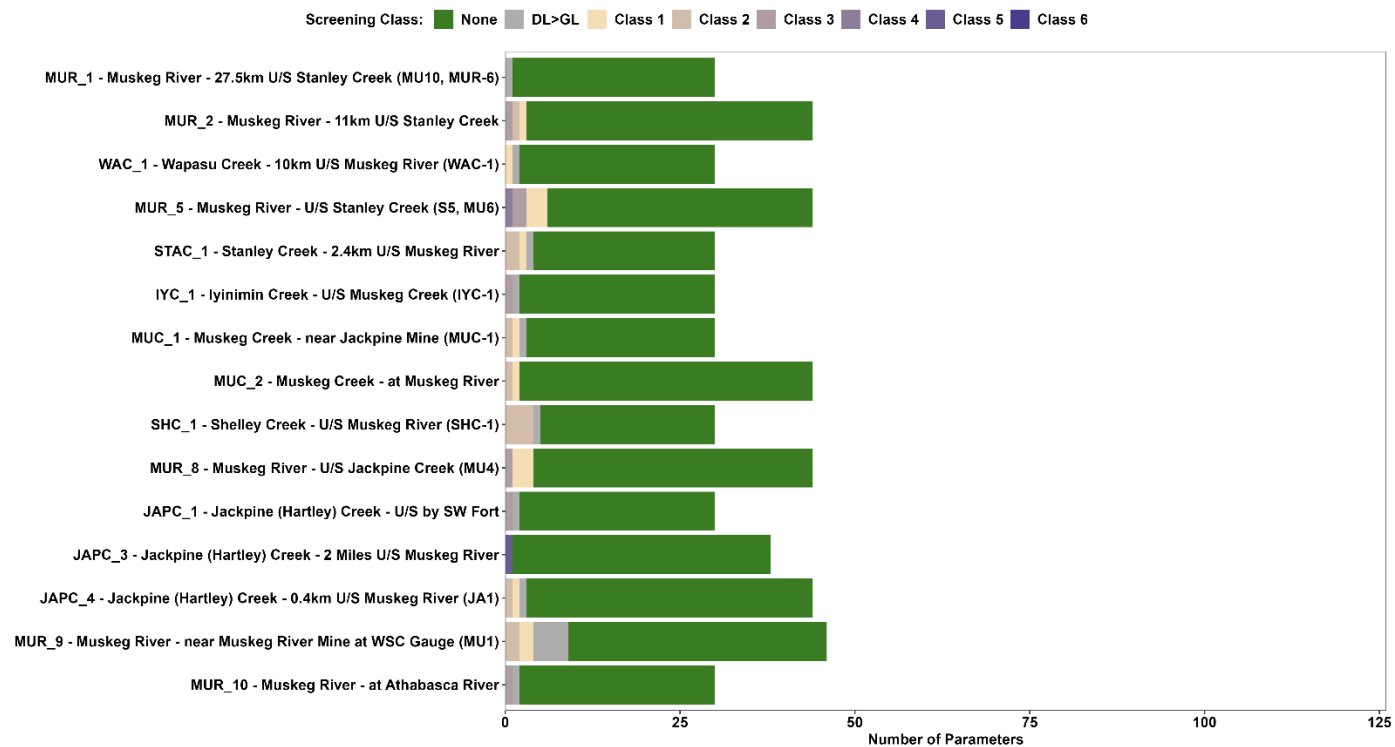
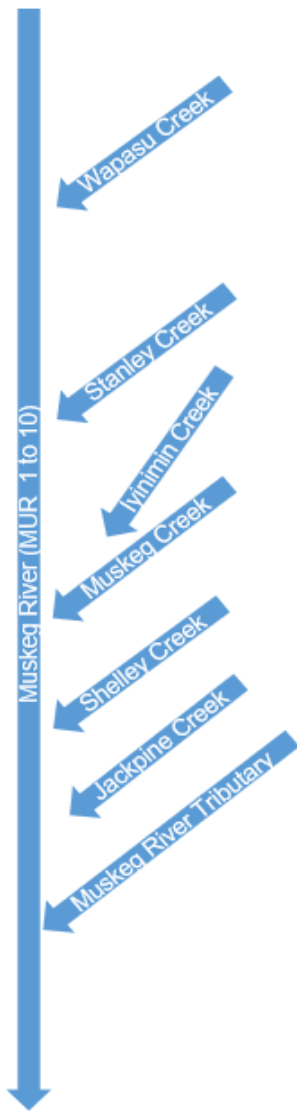


Figure I104: Muskeg River and Tributaries - Most Protective EPA Guideline Assessment from 2003 to 2008

Upstream



Downstream  
to ATR\_14

### Muskeg River and Tributaries - Most Protective EPA Guidelines - 2009-2013

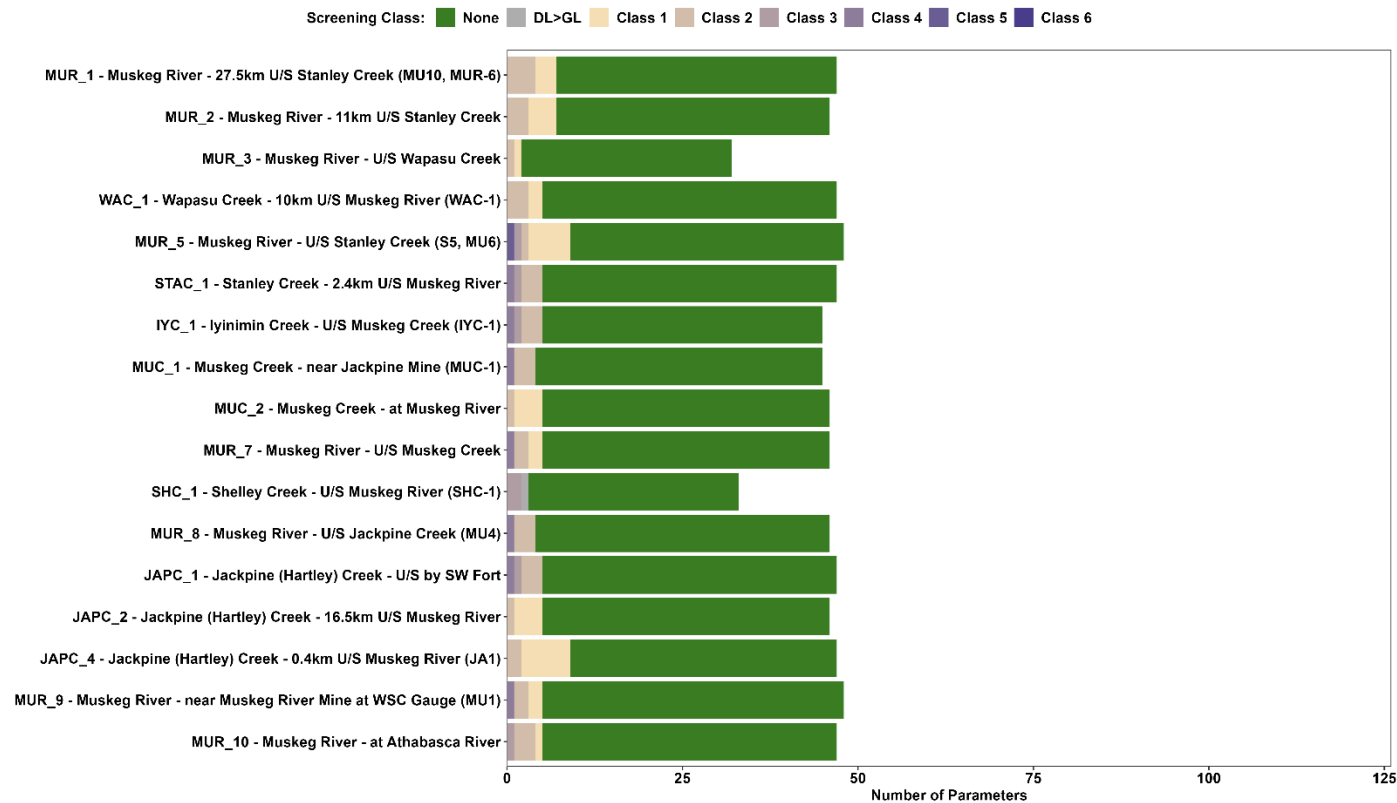
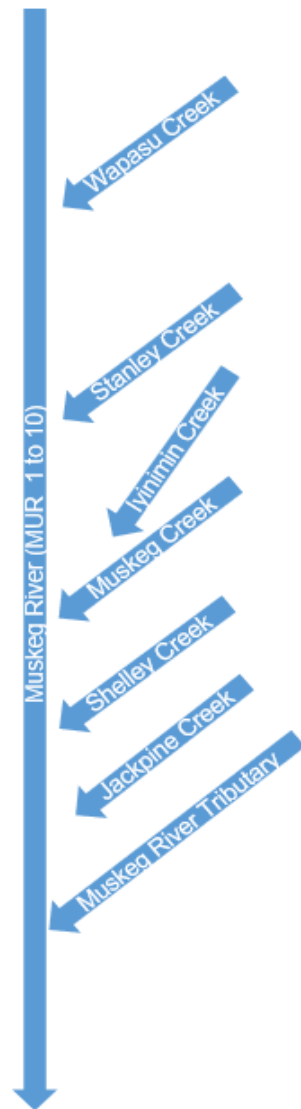


Figure I105: Muskeg River and Tributaries - Most Protective EPA Guideline Assessment from 2009 to 2013

Upstream



Downstream  
to ATR\_14

#### Muskeg River and Tributaries - Most Protective EPA Guidelines - 2014-2018

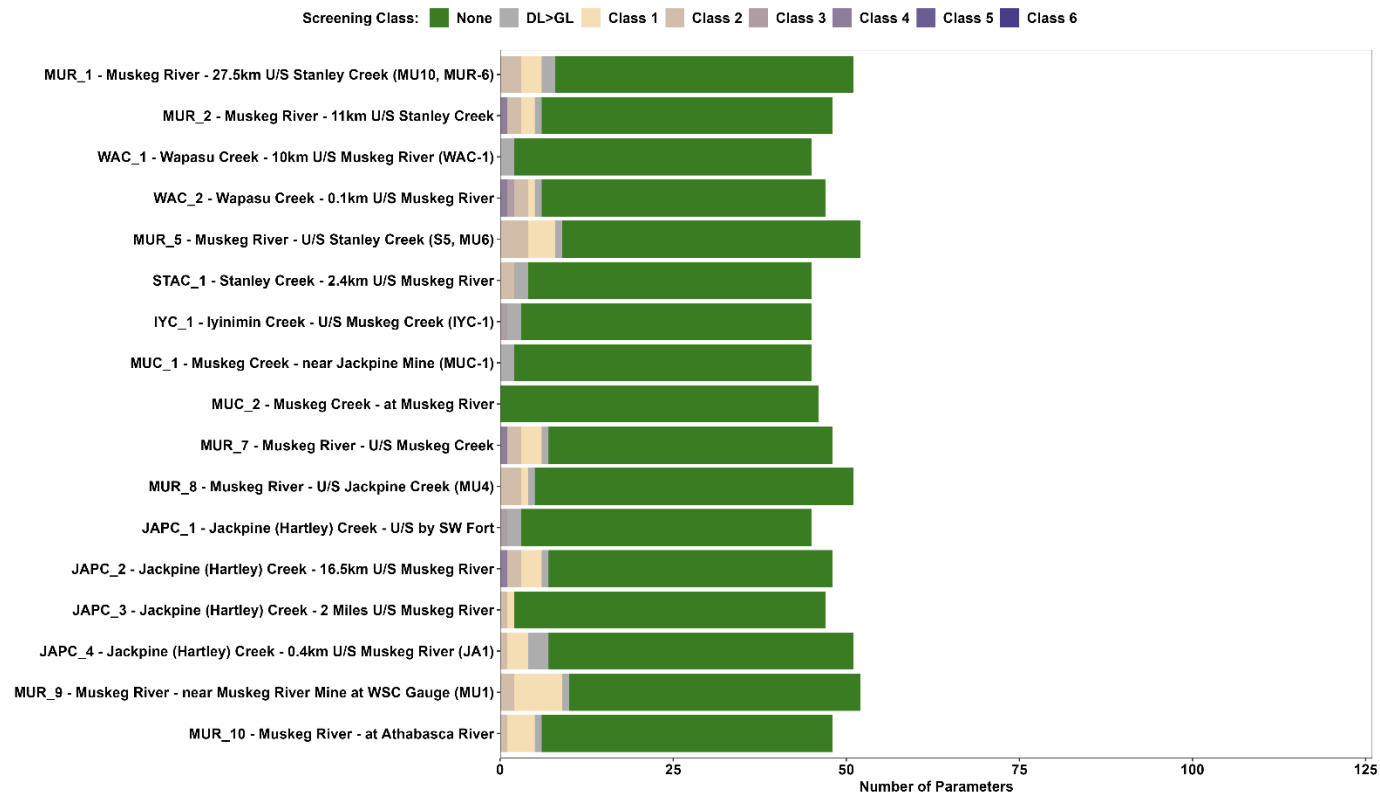


Figure I106: Muskeg River and Tributaries - Most Protective EPA Guideline Assessment from 2014 to 2018

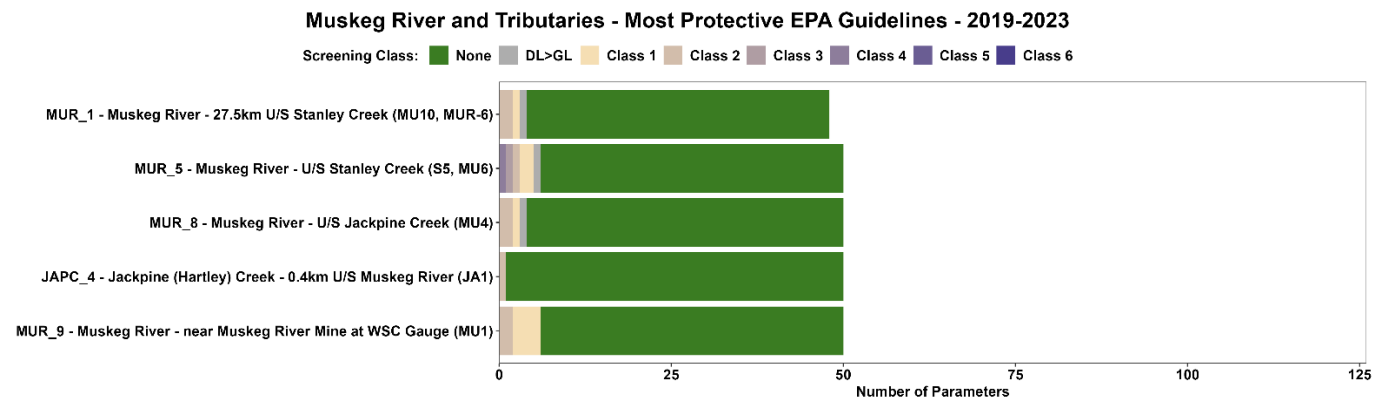
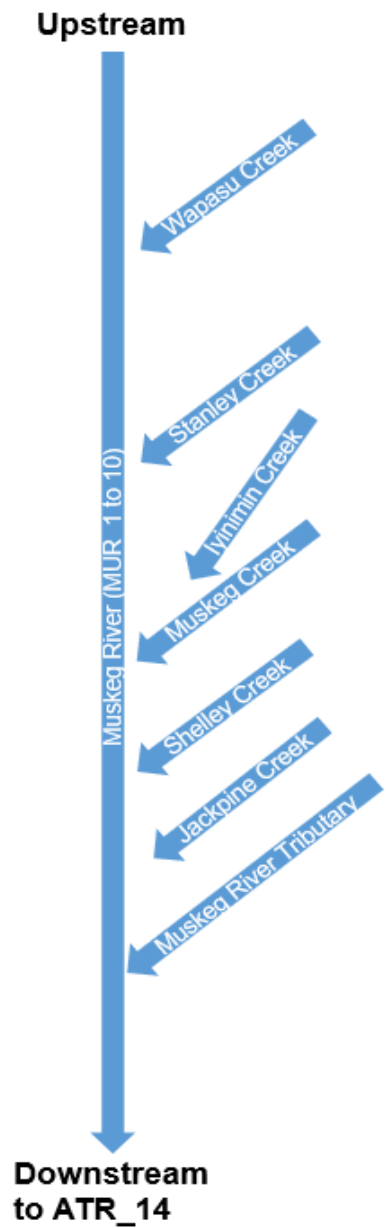


Figure I107: Muskeg River and Tributaries - Most Protective EPA Guideline Assessment from 2019 to 2023

## 2.2.4 Mackay River and Tributaries

Upstream



Downstream  
to ATR\_15

Mackay River and Tributaries - Most Protective EPA Guidelines - All Years

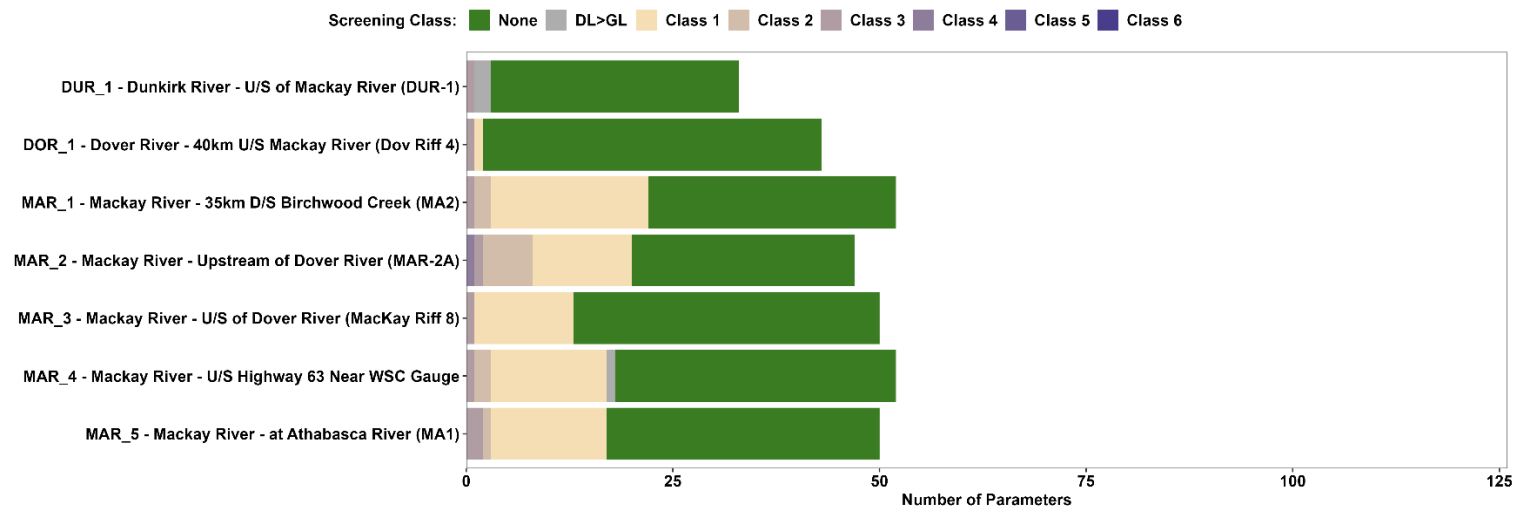


Figure I108: Mackay River and Tributaries - Most Protective EPA Guideline Assessment for All Years

Upstream



Downstream  
to ATR\_15

Mackay River and Tributaries - Most Protective EPA Guidelines - 1999-2003

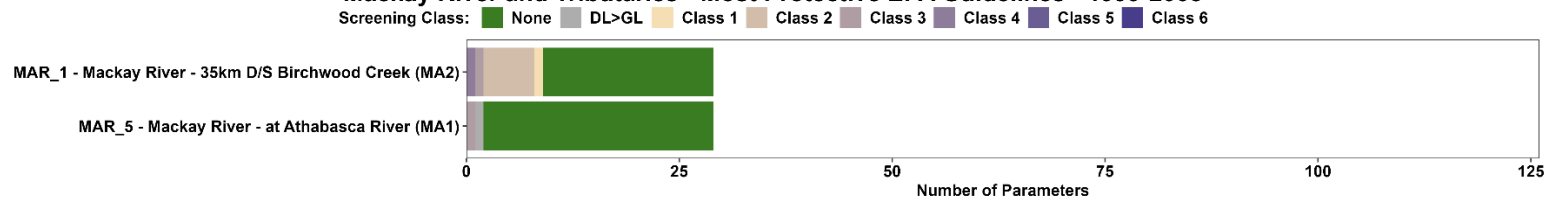


Figure I109: Mackay River and Tributaries - Most Protective EPA Guideline Assessment from 1999 to 2003

Upstream



Downstream  
to ATR\_15

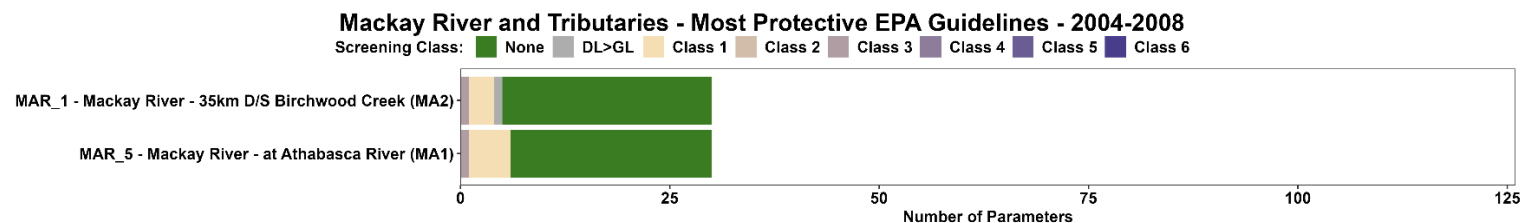


Figure I110: Mackay River and Tributaries - Most Protective EPA Guideline Assessment from 2004 to 2008

Upstream



Downstream  
to ATR\_15

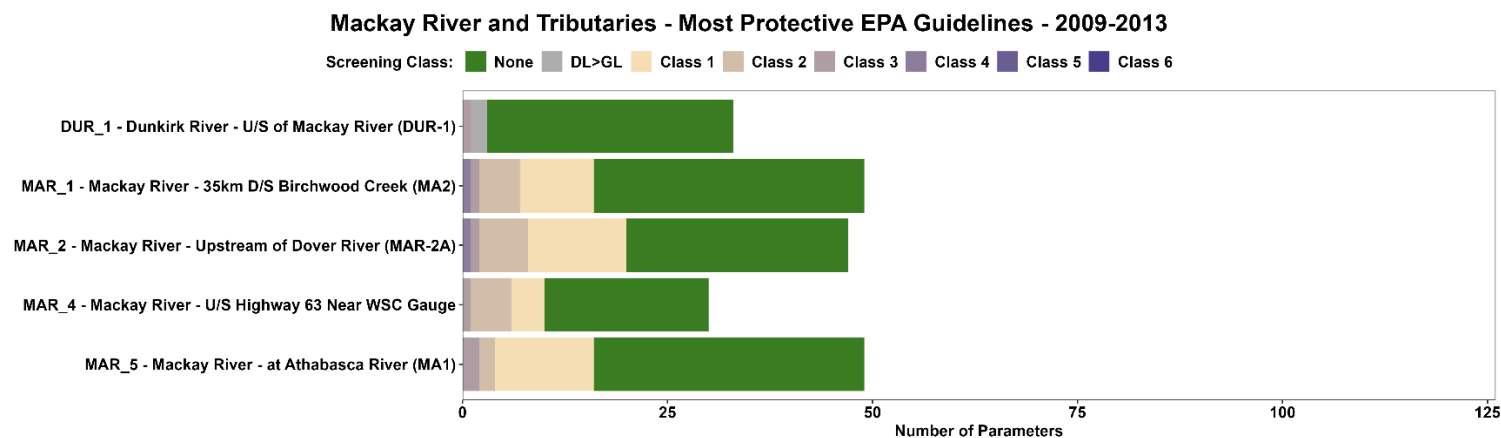


Figure I111: Mackay River and Tributaries - Most Protective EPA Guideline Assessment from 2009 to 2013



Upstream



Downstream  
to ATR\_15

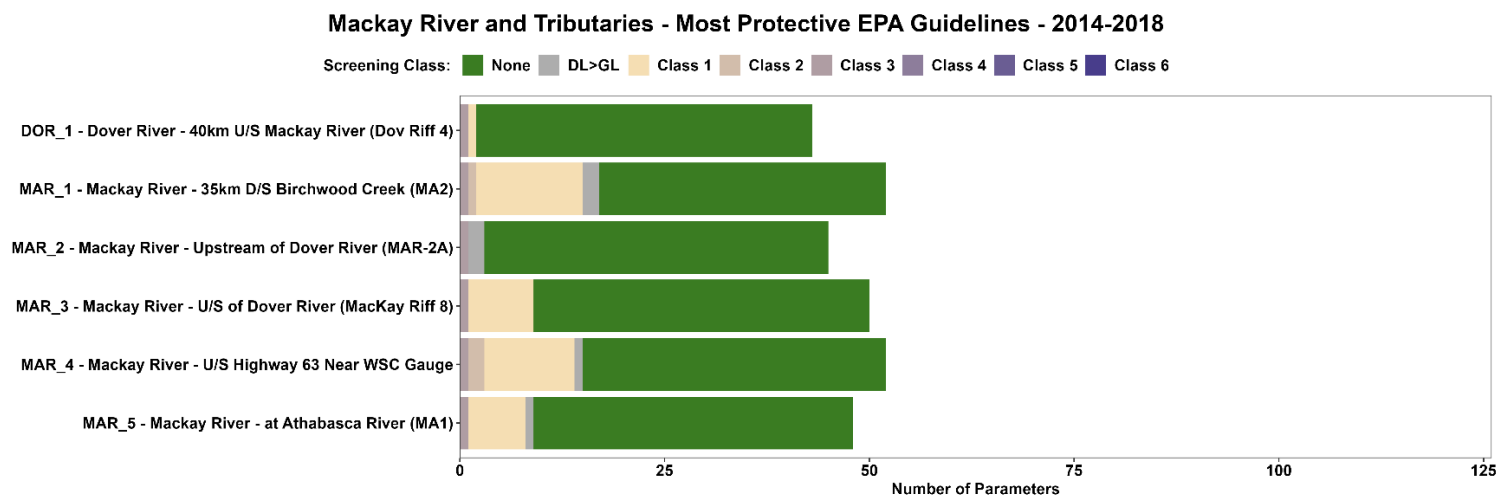


Figure I112: Mackay River and Tributaries - Most Protective EPA Guideline Assessment from 2014 to 2018

Upstream



Downstream  
to ATR\_15

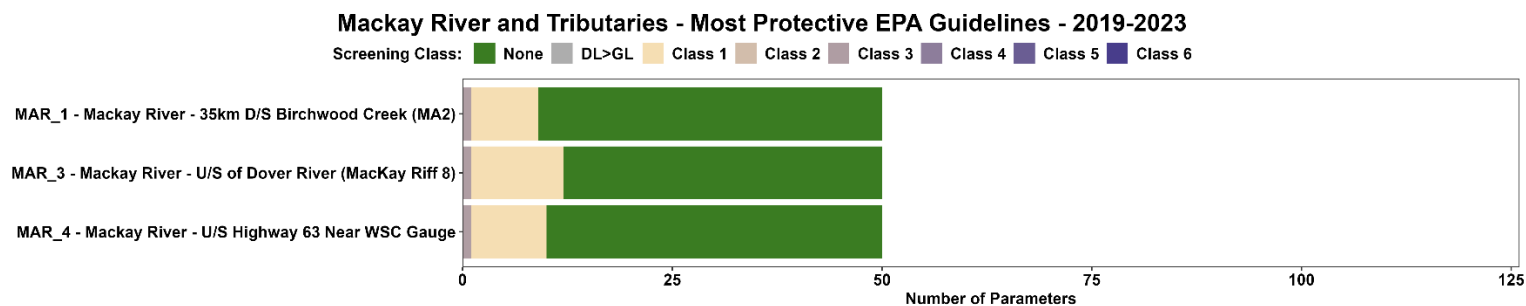


Figure I113: Mackay River and Tributaries - Most Protective EPA Guideline Assessment from 2019 to 2023

## 2.2.5 Ells River and Tributaries

Upstream



Downstream  
to ATR\_16

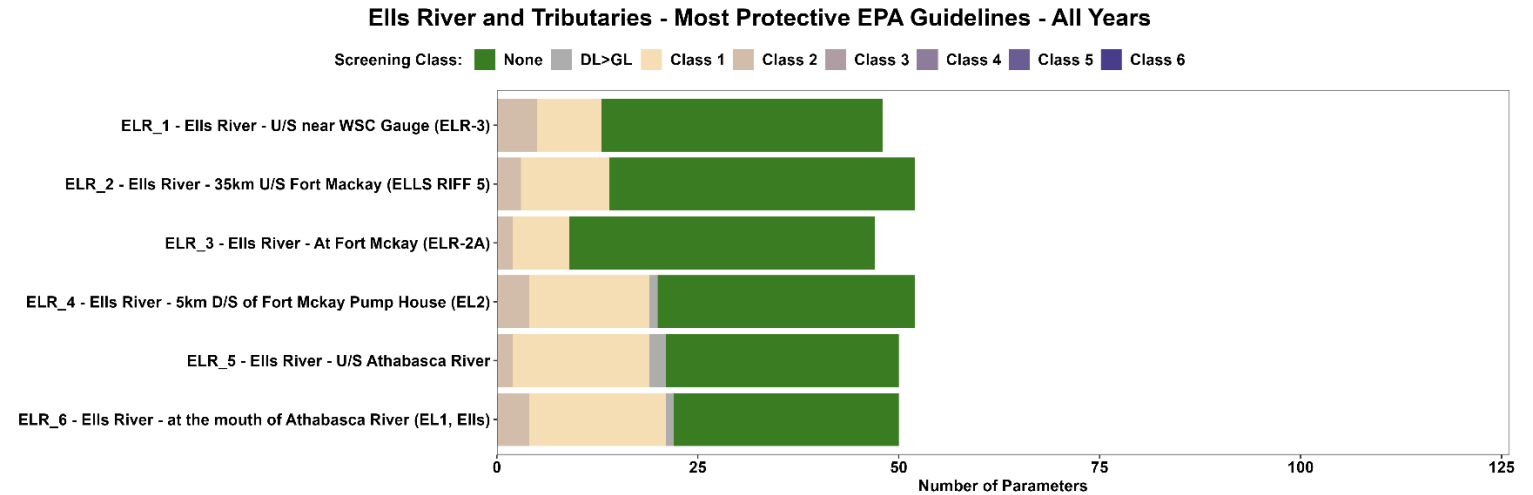


Figure I114: Ells River and Tributaries - Most Protective EPA Guideline Assessment for All Years

Upstream



Downstream  
to ATR\_16

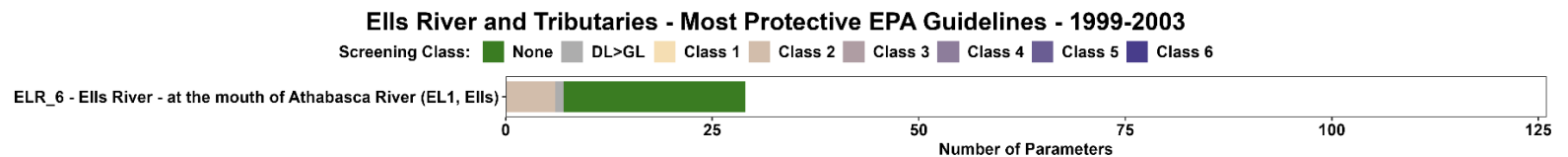


Figure I115: Ells River and Tributaries - Most Protective EPA Guideline Assessment from 1999 to 2003

Upstream



Downstream  
to ATR\_16

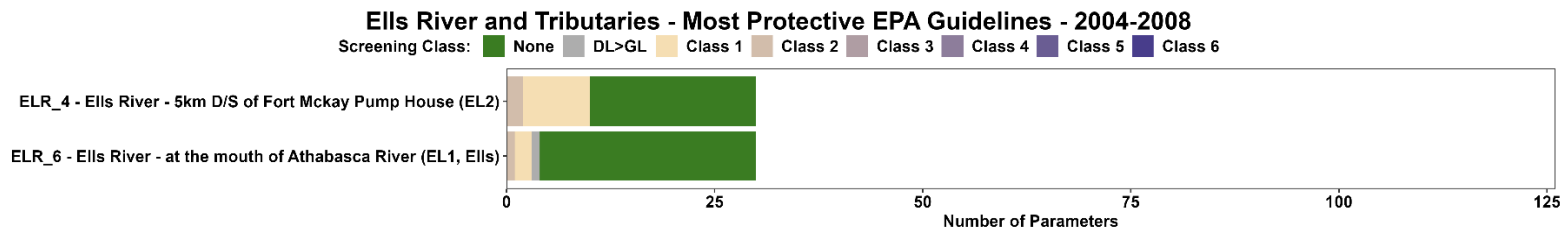


Figure I116: Elis River and Tributaries - Most Protective EPA Guideline Assessment from 2004 to 2008

Upstream



Downstream  
to ATR\_16

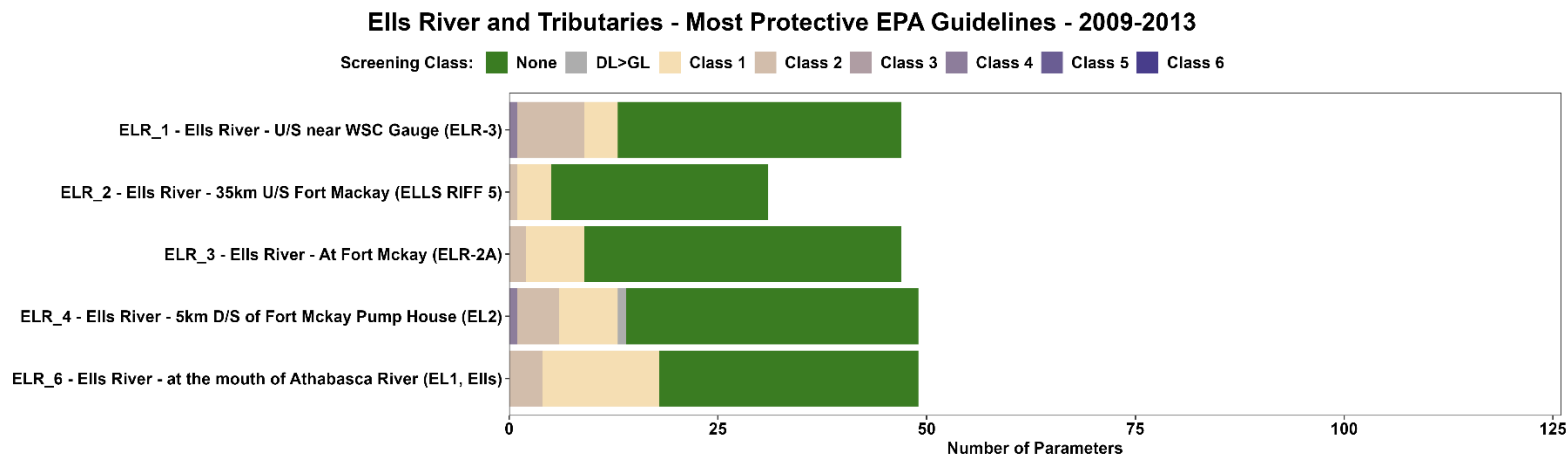


Figure I117: Elis River and Tributaries - Most Protective EPA Guideline Assessment from 2009 to 2013

Upstream



Downstream  
to ATR\_16

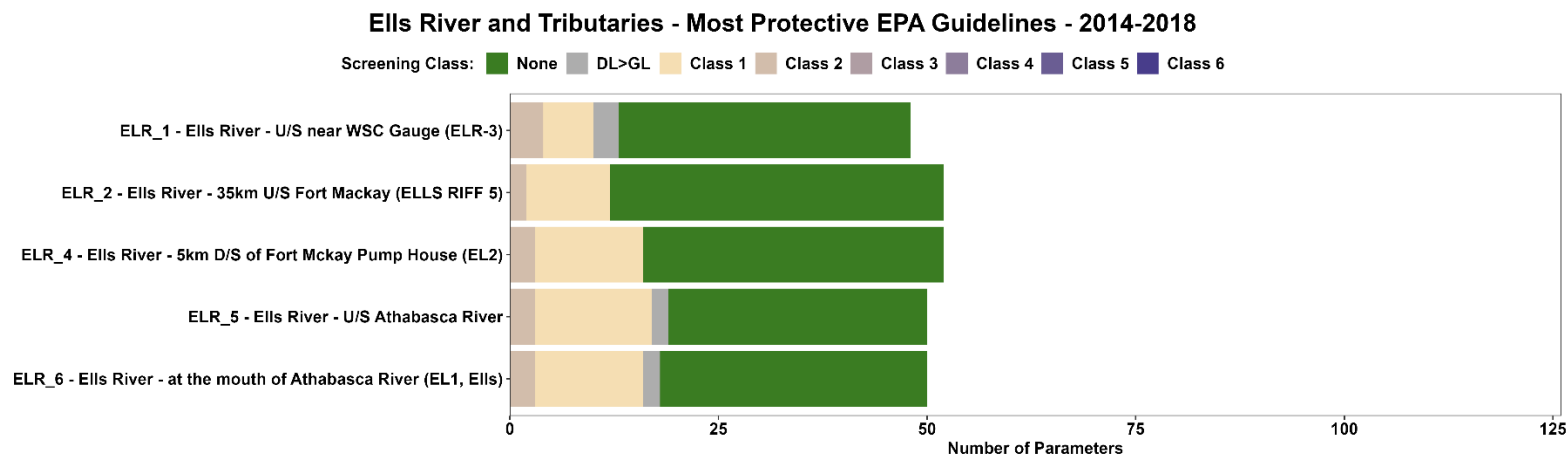


Figure I118: Elis River and Tributaries - Most Protective EPA Guideline Assessment from 2014 to 2018

Upstream



Downstream  
to ATR\_16

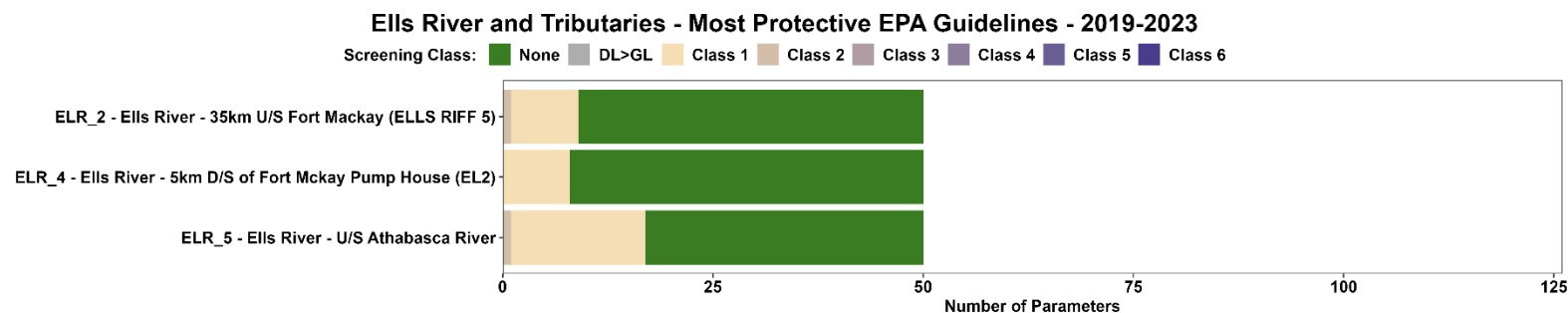
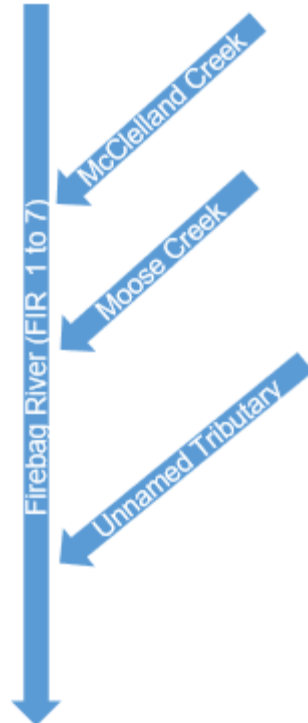


Figure I119: Elis River and Tributaries - Most Protective EPA Guideline Assessment from 2019 to 2023

## 2.2.6 Firebag River and Tributaries

Upstream



Downstream  
to ATR\_23

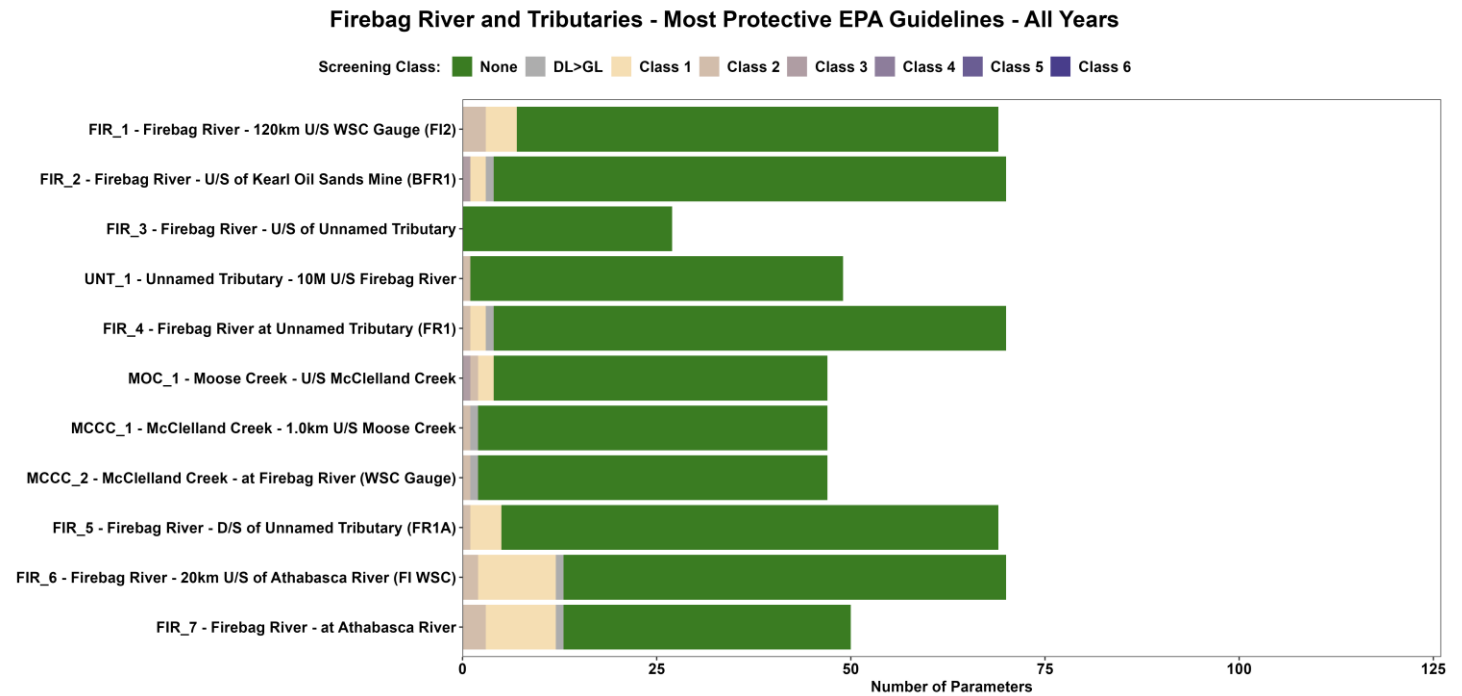


Figure I120: Firebag River and Tributaries - Most Protective EPA Guideline Assessment for All Years

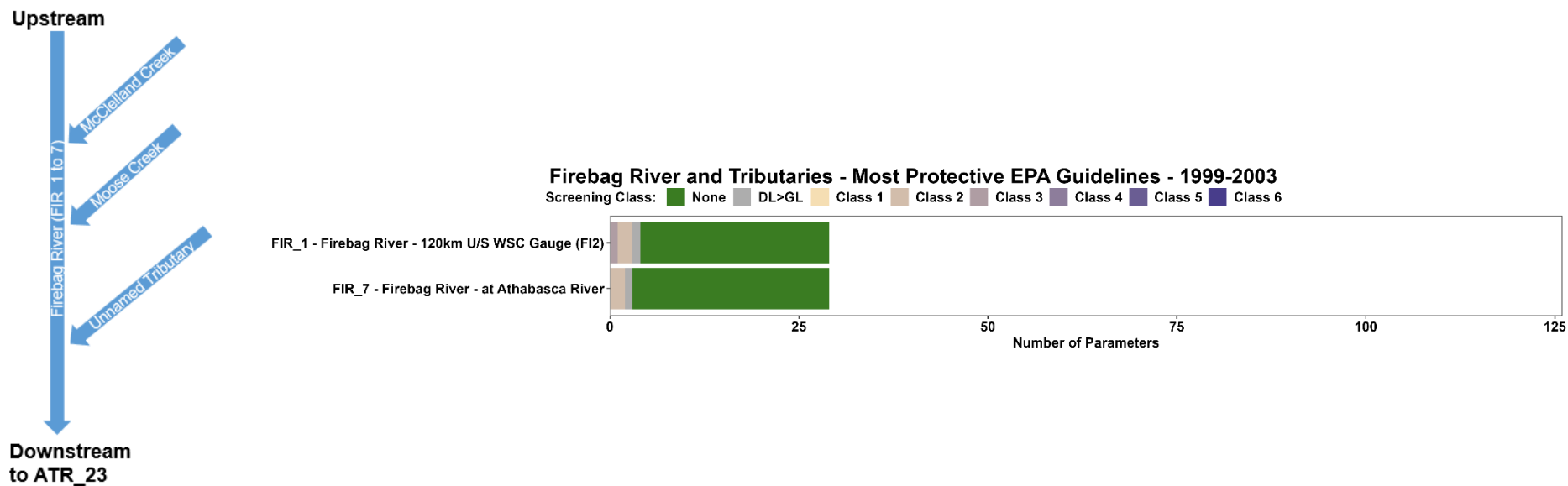


Figure I121: Firebag River and Tributaries - Most Protective EPA Guideline Assessment from 1999 to 2003

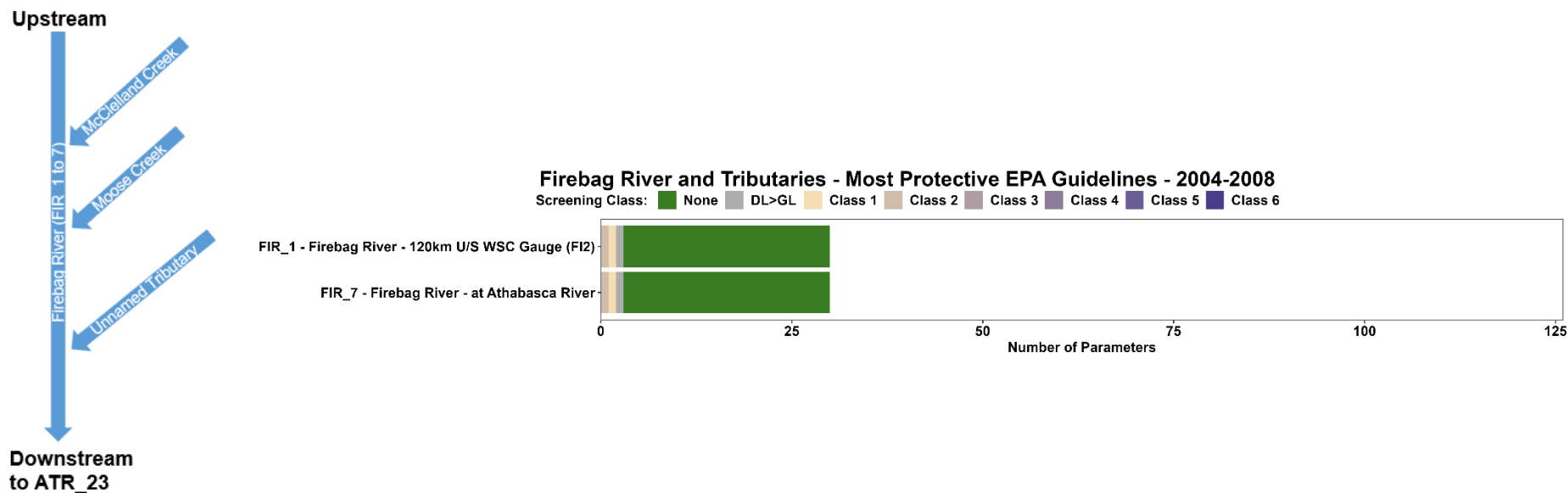


Figure I122: Firebag River and Tributaries - Most Protective EPA Guideline Assessment from 2004 to 2008

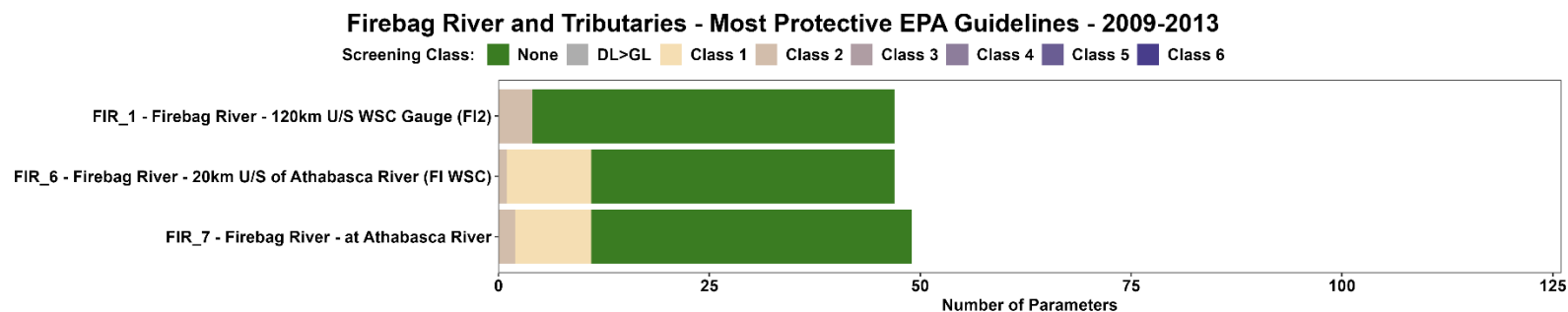
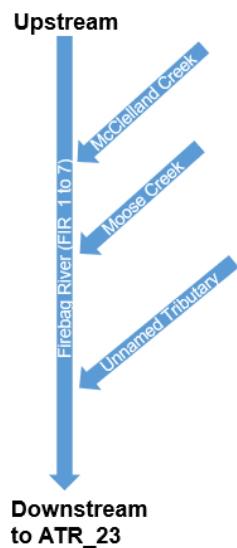


Figure I123: Firebag River and Tributaries - Most Protective EPA Guideline Assessment from 2009 to 2013

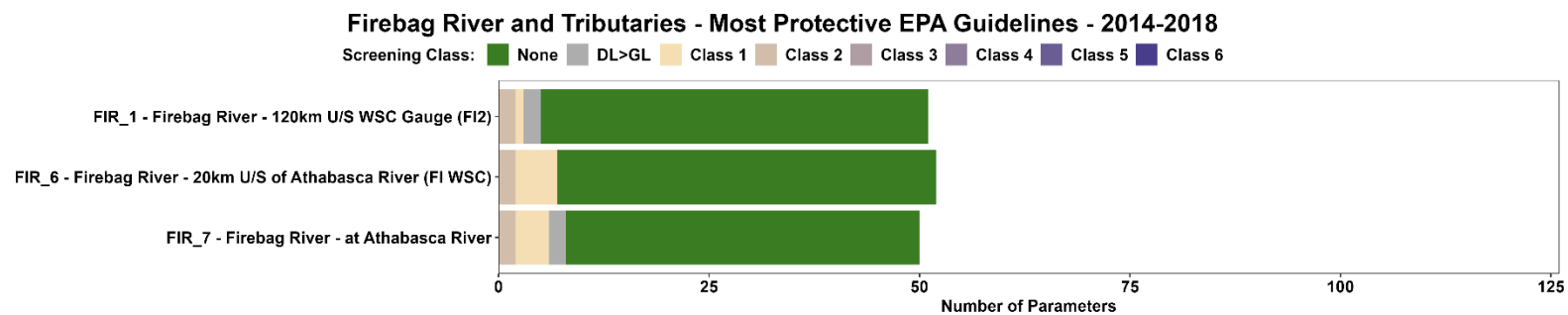
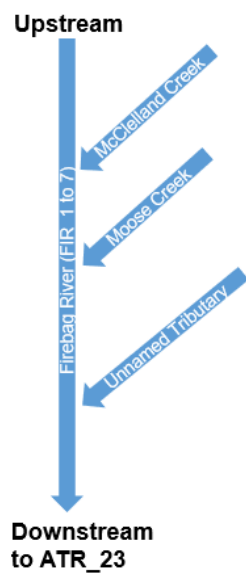


Figure I124: Firebag River and Tributaries - Most Protective EPA Guideline Assessment from 2014 to 2018

Upstream



Downstream  
to ATR\_23

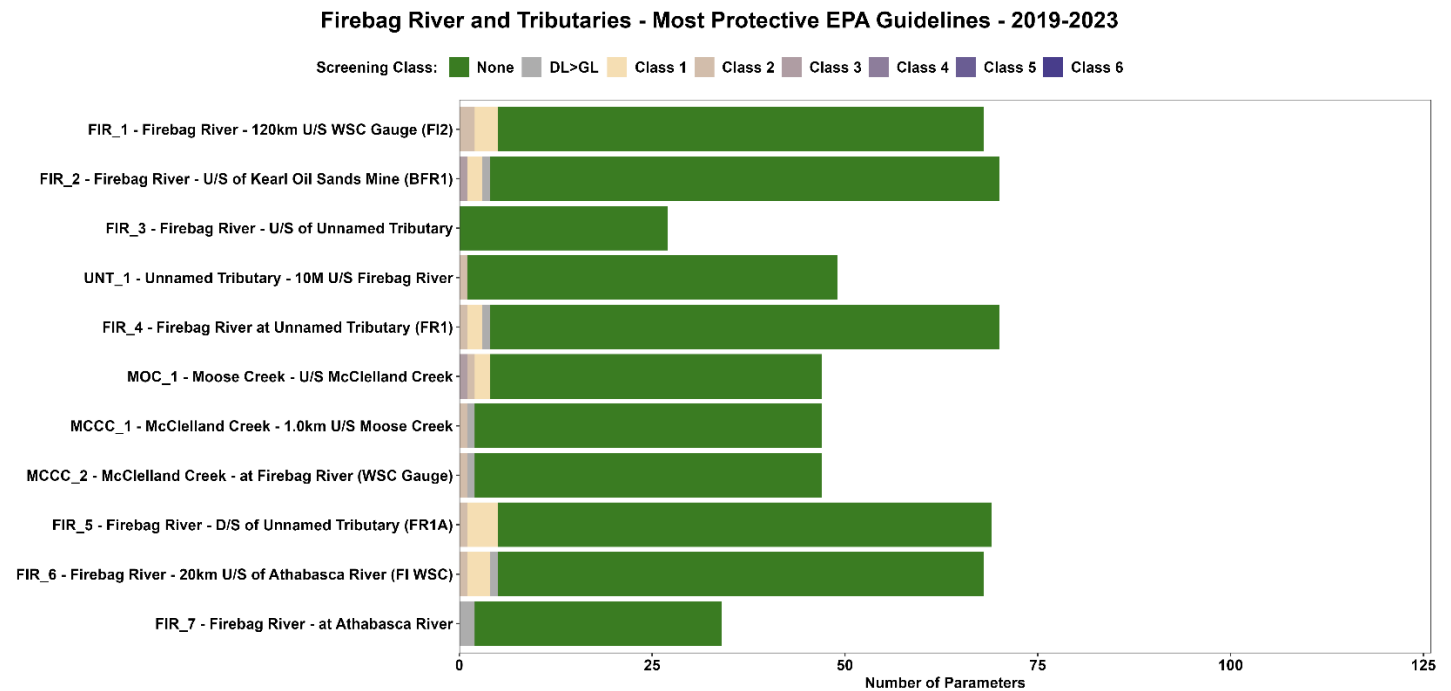


Figure I125: Firebag River and Tributaries - Most Protective EPA Guideline Assessment from 2019 to 2023

## 2.2.7 Other Athabasca River Tributaries



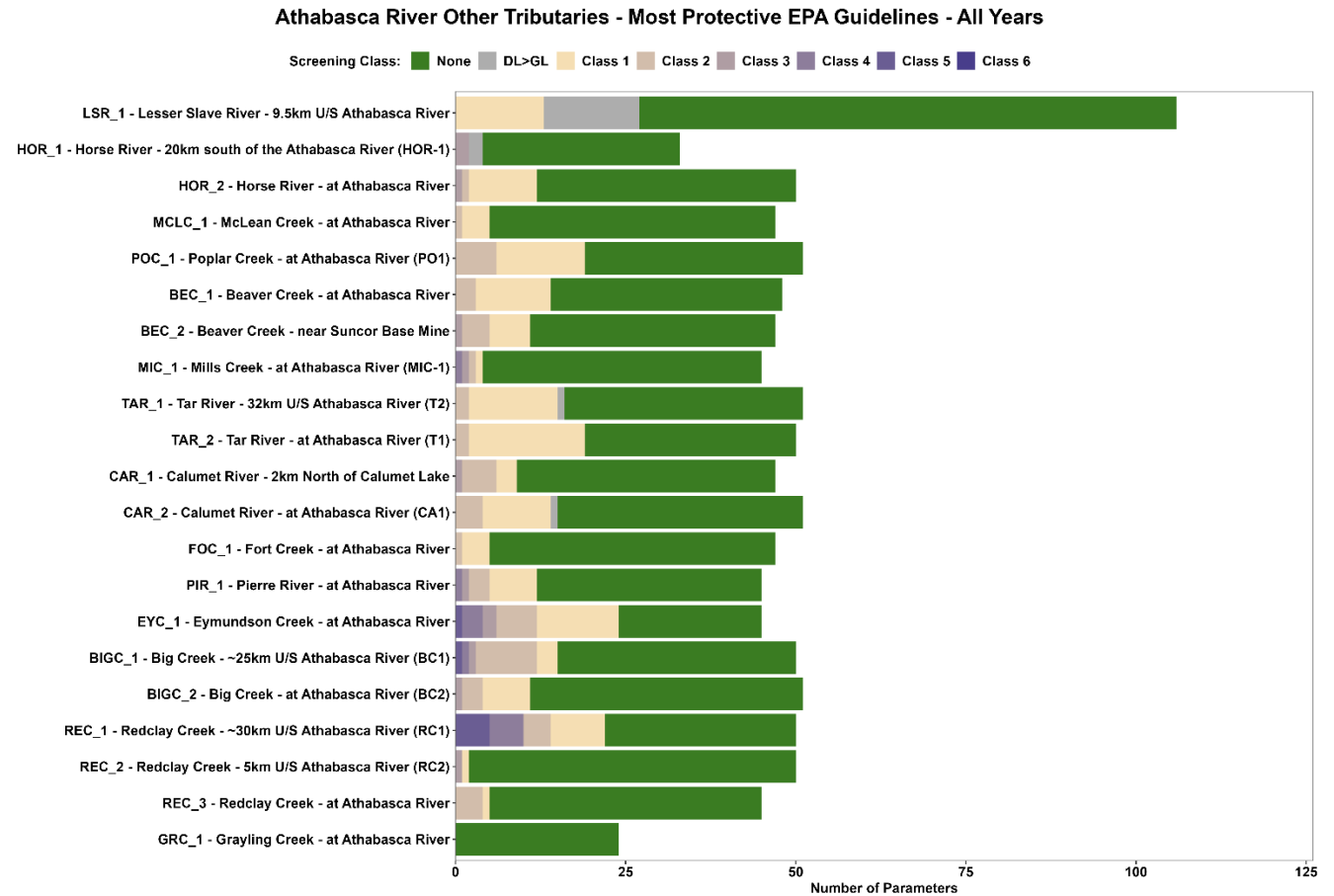
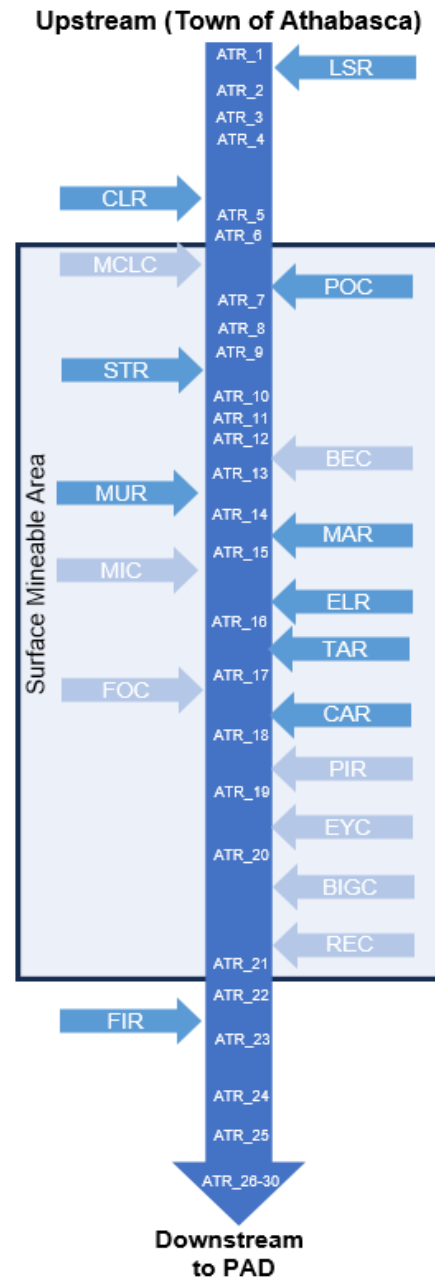


Figure I126: Athabasca River Tributaries - Most Protective EPA Guideline Assessment for All Years

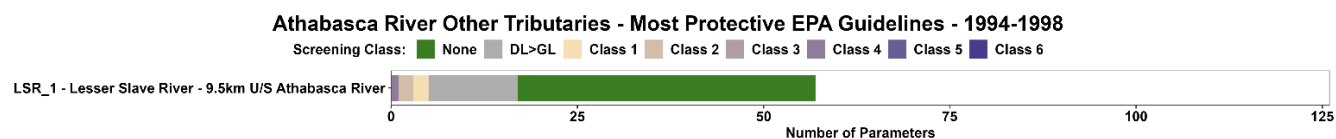
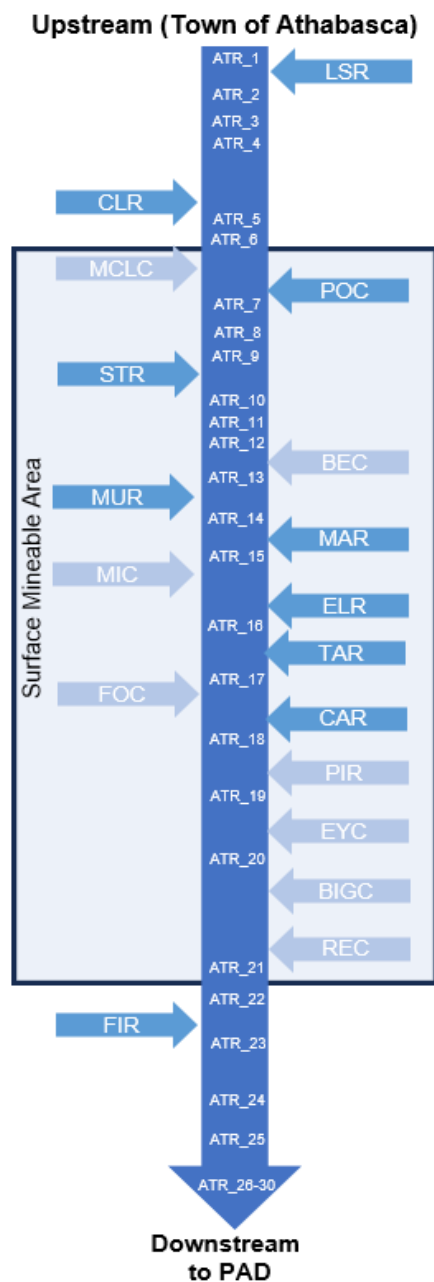


Figure I127: Athabasca River Tributaries - Most Protective EPA Guideline Assessment for 1994 to 1998

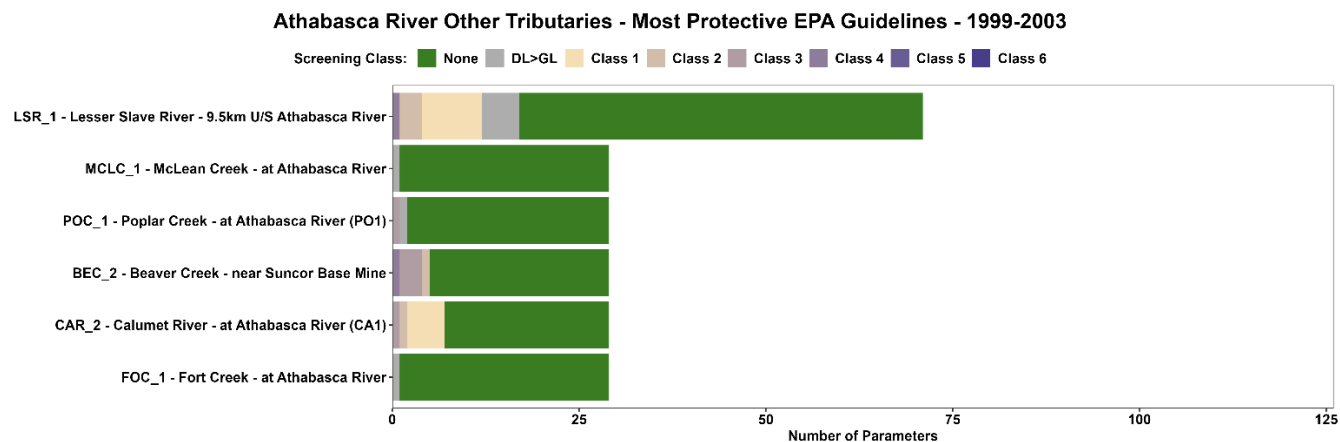
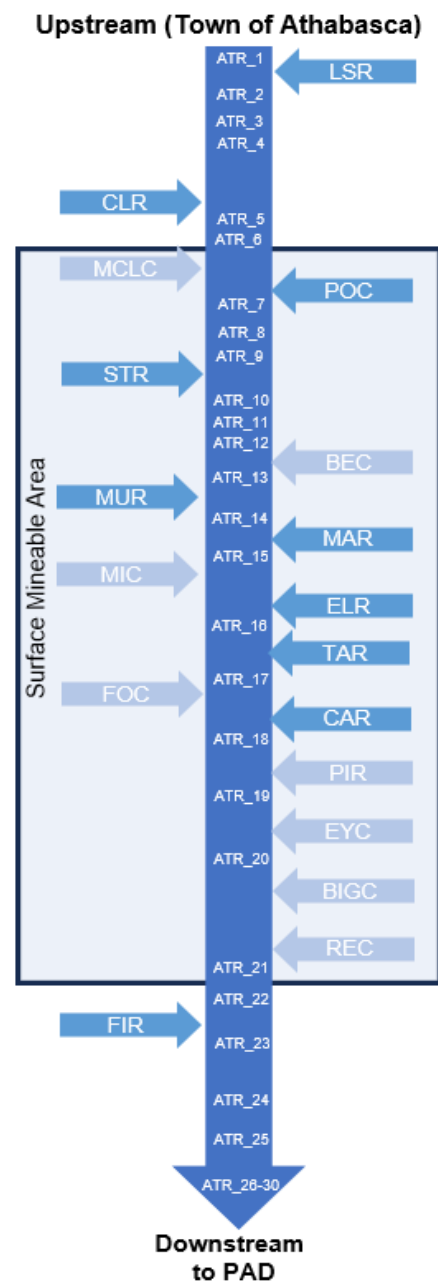


Figure I128: Athabasca River Tributaries - Most Protective EPA Guideline Assessment for 1999 to 2003

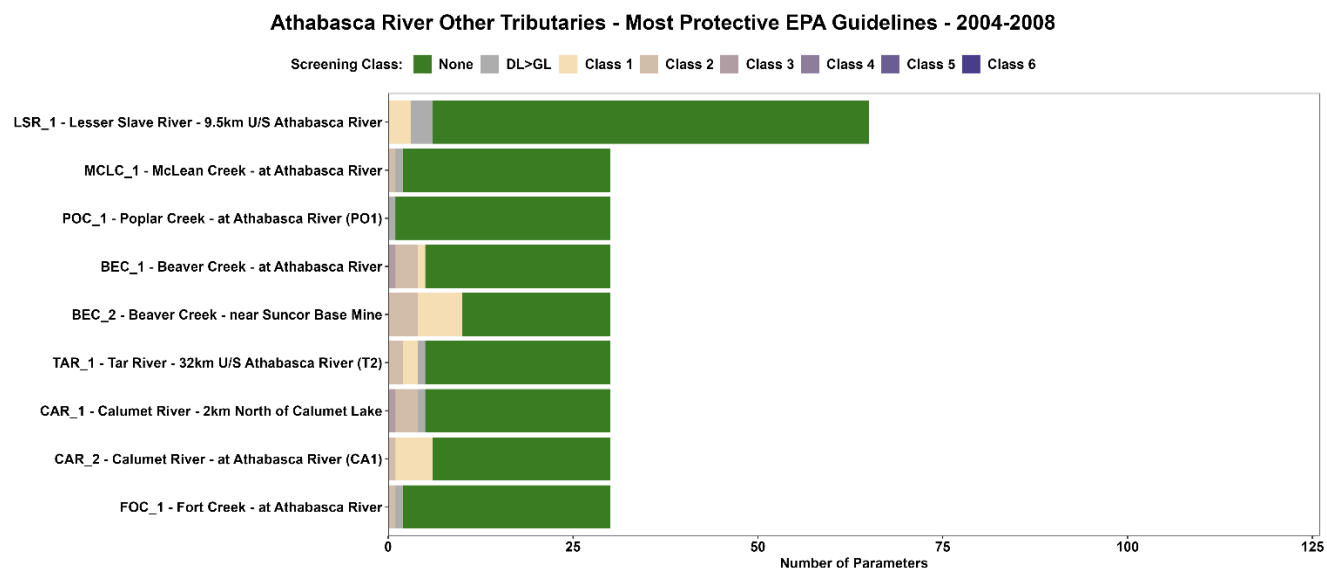
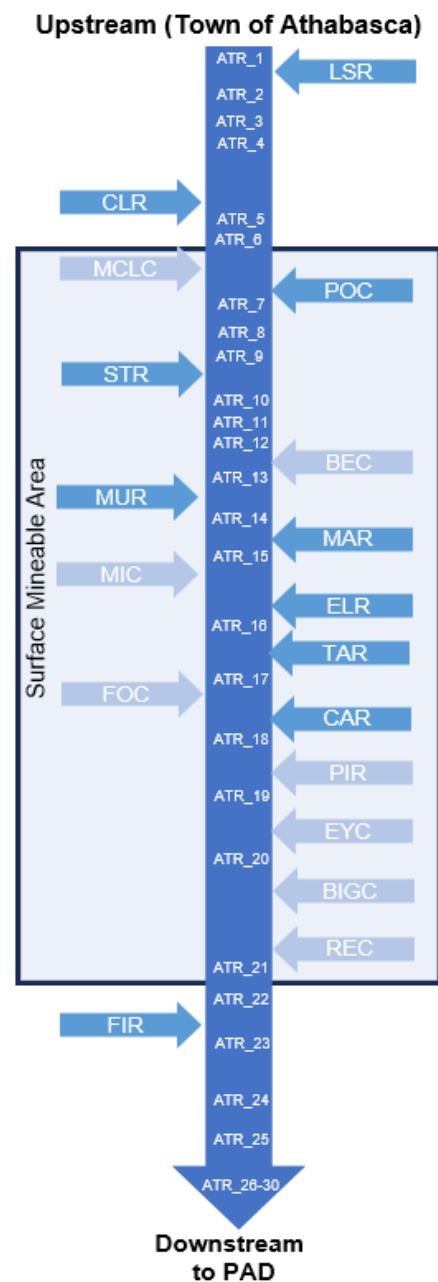


Figure I129: Athabasca River Tributaries - Most Protective EPA Guideline Assessment for 2004 to 2008

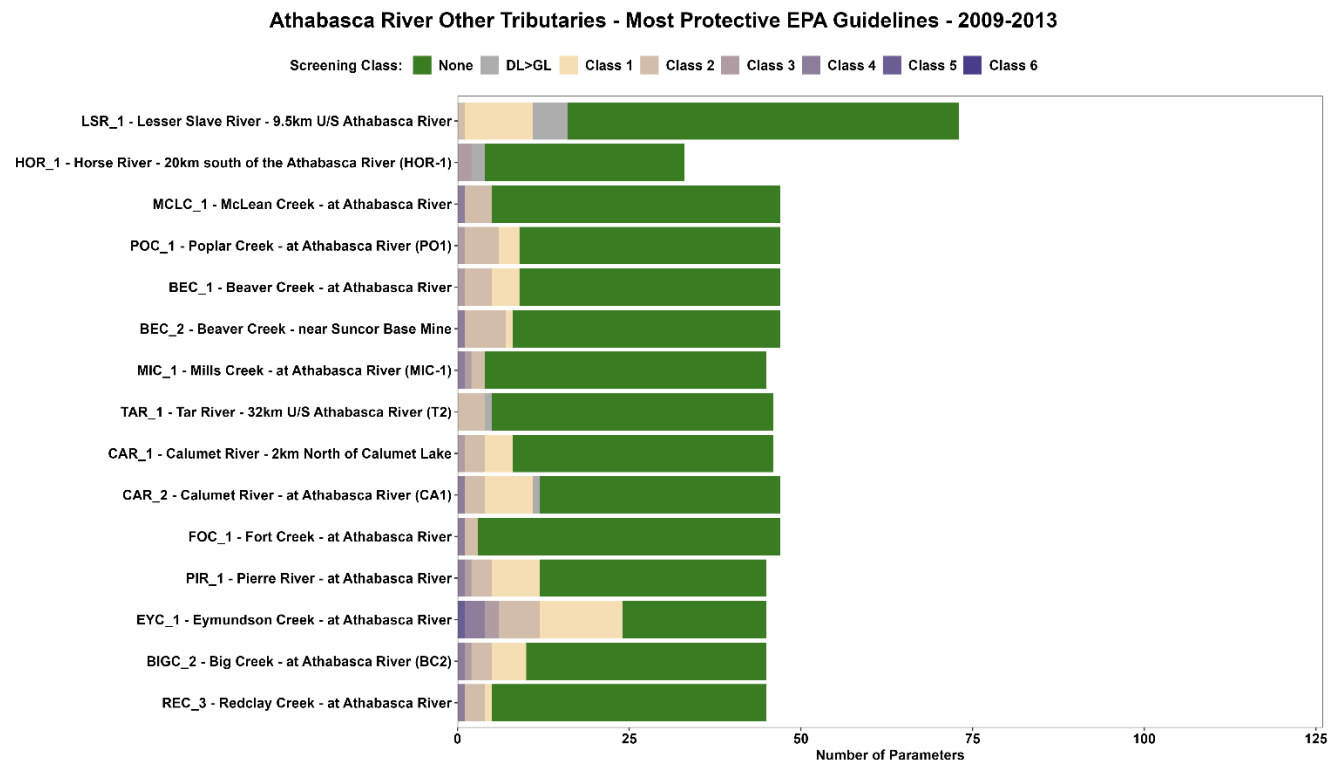
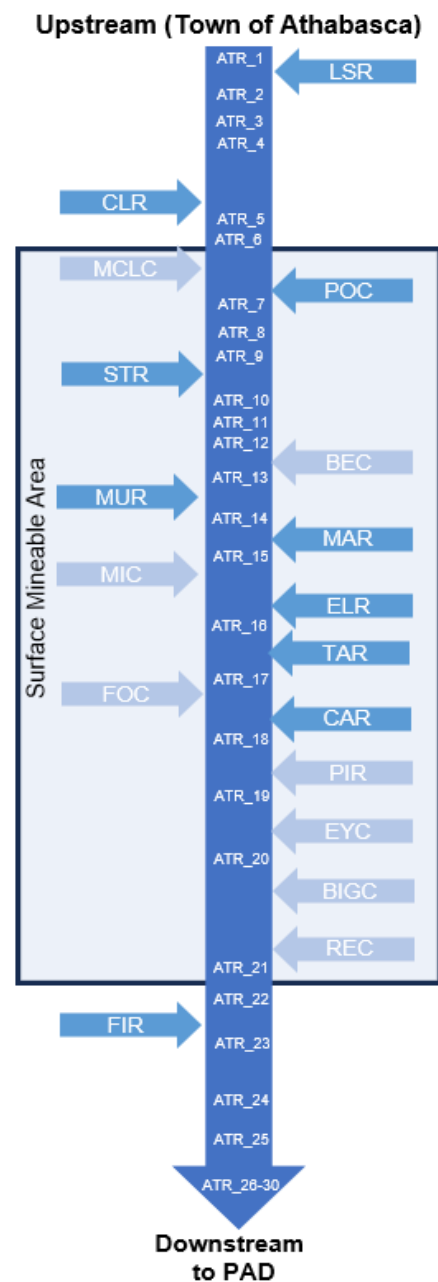


Figure I130: Athabasca River Tributaries - Most Protective EPA Guideline Assessment for 2009 to 2013

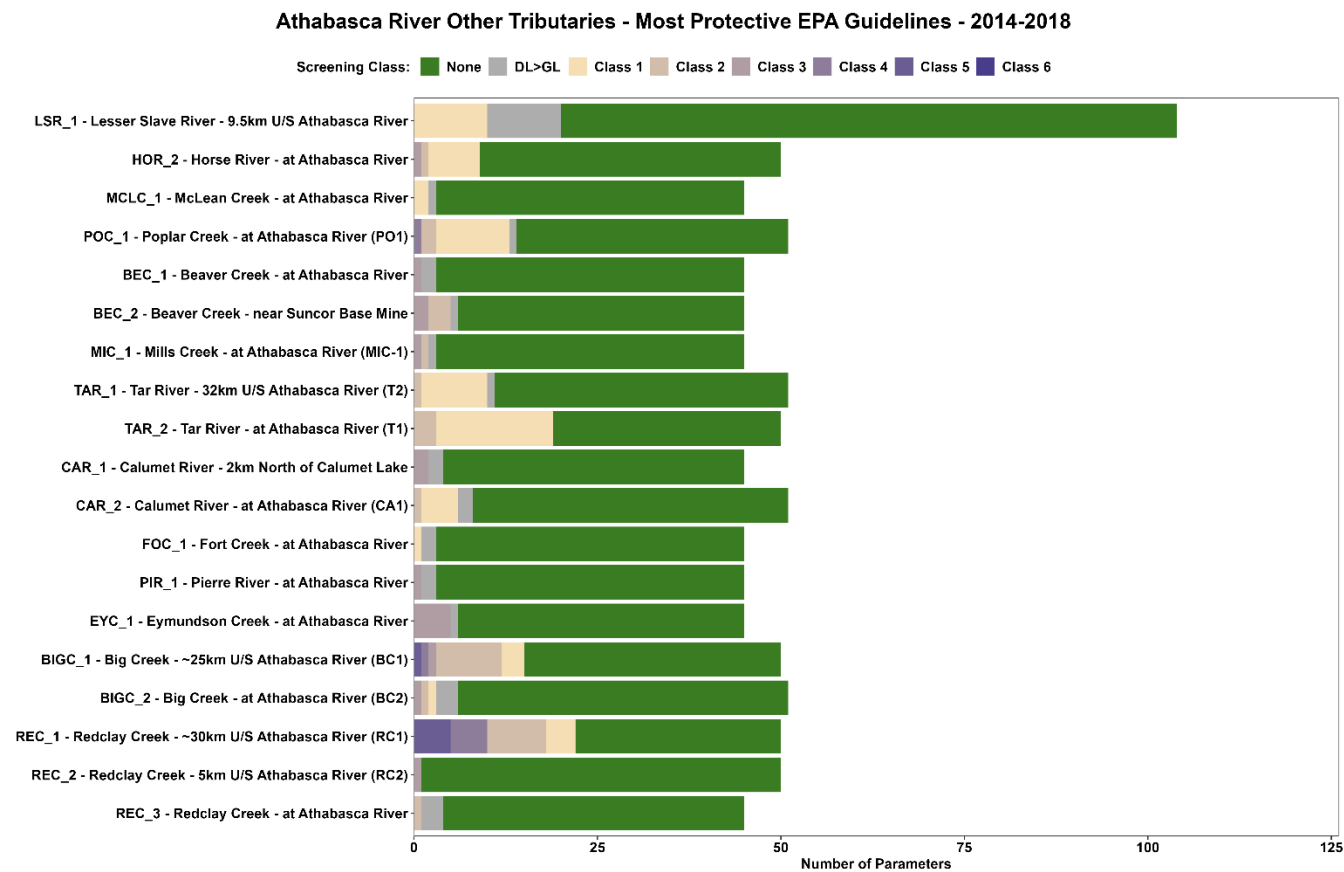
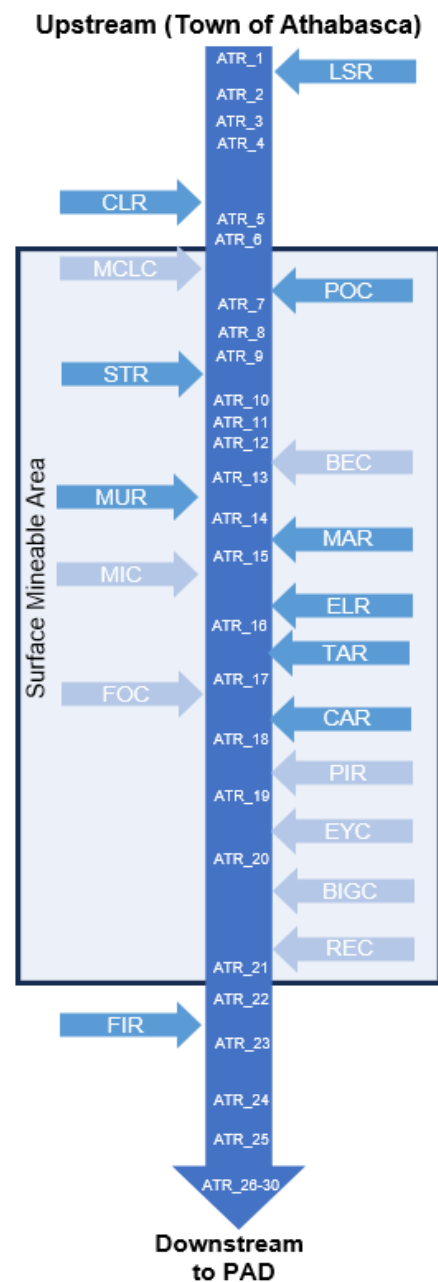


Figure I131: Athabasca River Tributaries - Most Protective EPA Guideline Assessment for 2014 to 2018

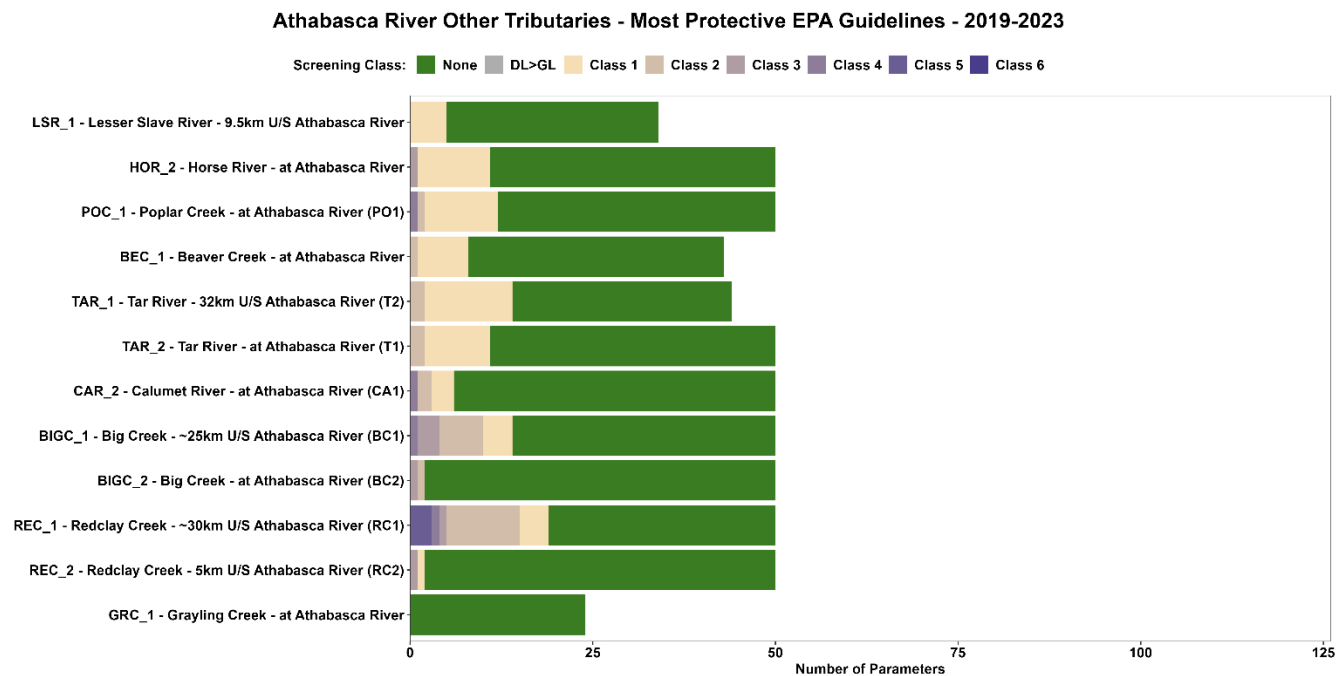
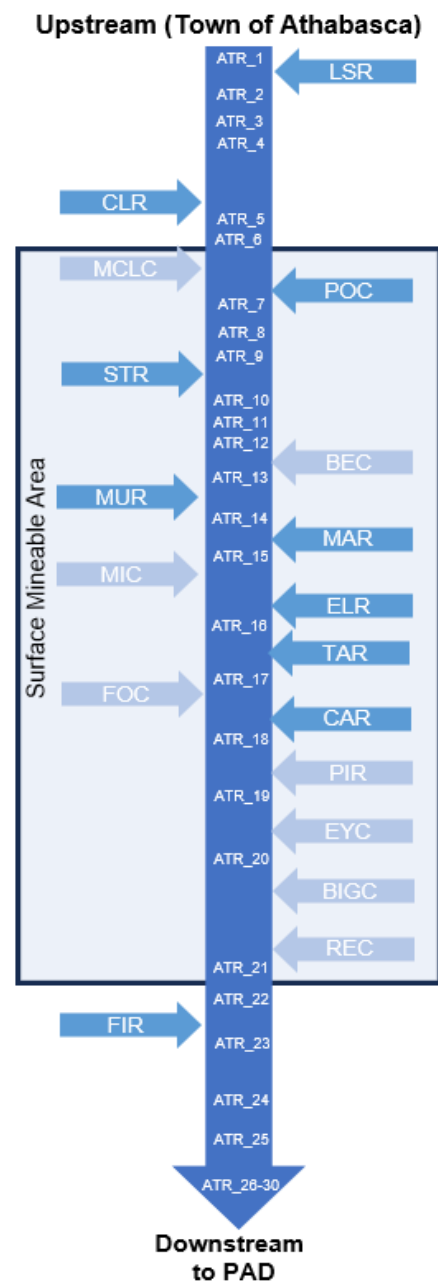


Figure I132: Athabasca River Tributaries - Most Protective EPA Guideline Assessment for 2019 to 2023

## I.2.3 Cold Lake Region

Upstream



Downstream to  
Saskatchewan

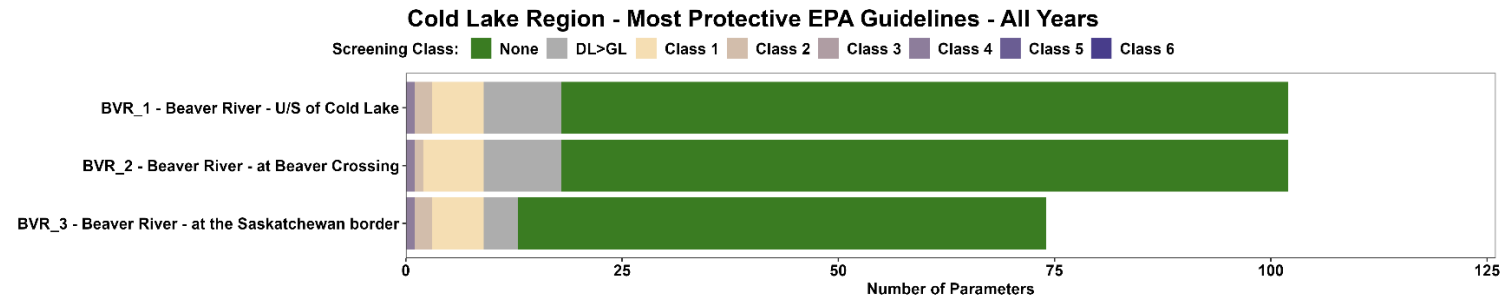


Figure I133: Cold Lake Region – Beaver River - Most Protective EPA Guideline Assessment for All Years

Upstream



Downstream to  
Saskatchewan

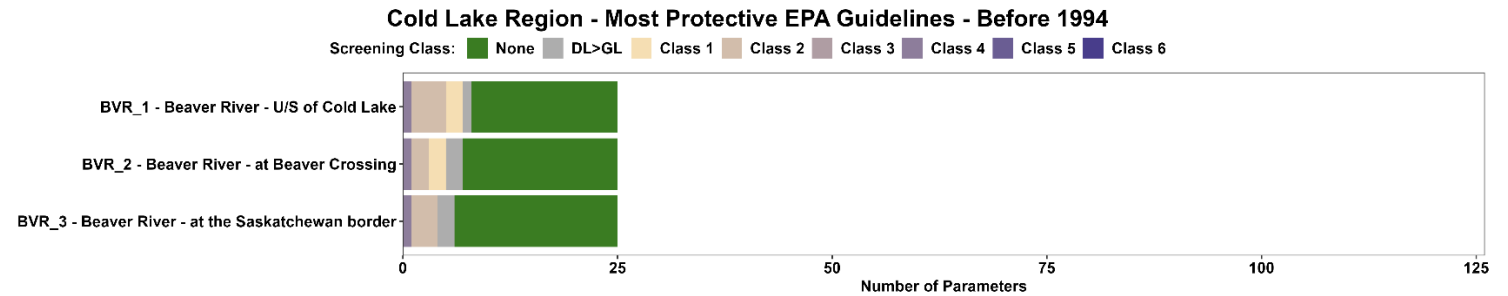


Figure I134: Cold Lake Region – Beaver River - Most Protective EPA Guideline Assessment from Before 1994



Upstream



Downstream to  
Saskatchewan

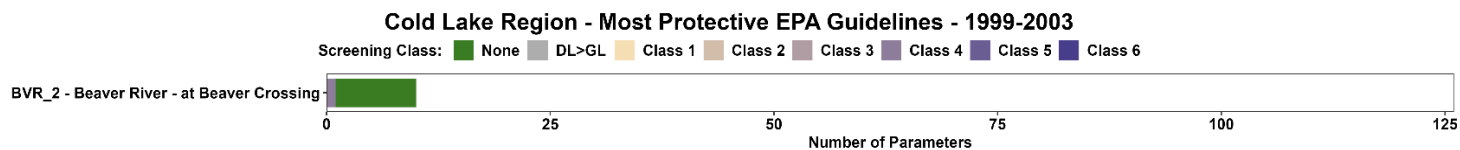


Figure I135: Cold Lake Region – Beaver River - Most Protective EPA Guideline Assessment from 1999 to 2003

Upstream



Downstream to  
Saskatchewan

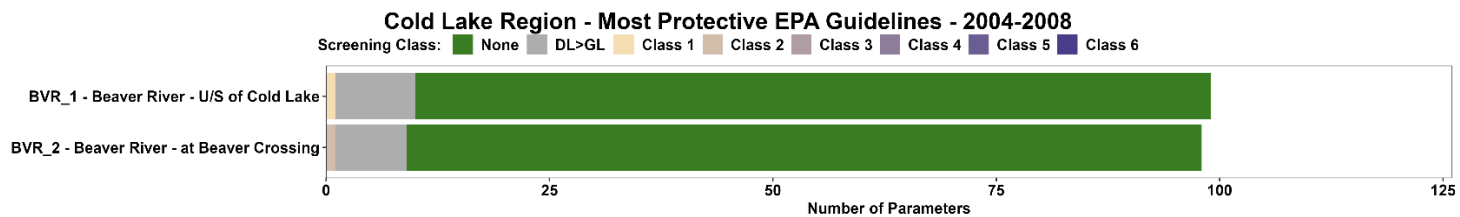


Figure I136: Cold Lake Region – Beaver River - Most Protective EPA Guideline Assessment from 2004 to 2008

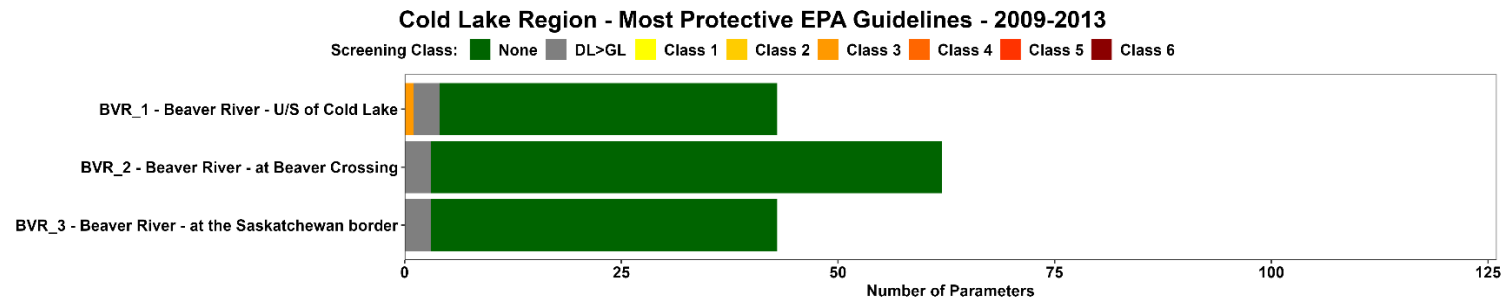


Figure I137: Cold Lake Region – Beaver River - Most Protective EPA Guideline Assessment from 2009 to 2013

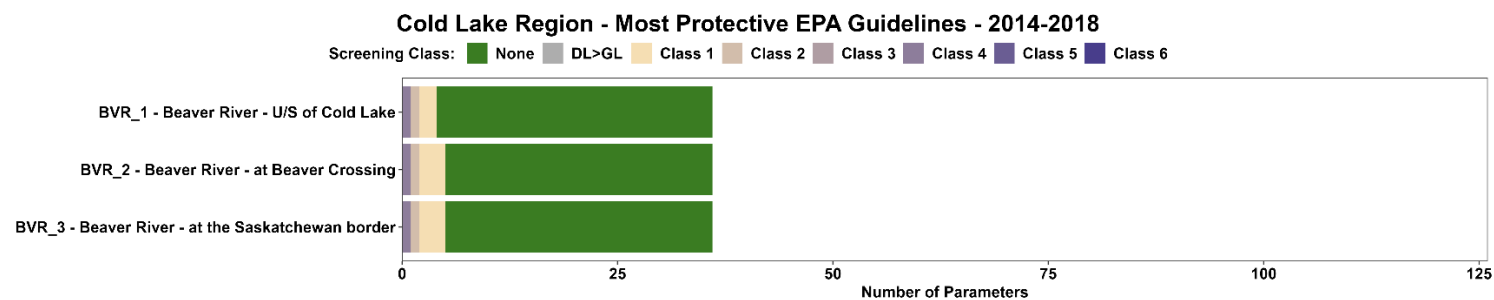


Figure I138: Cold Lake Region – Beaver River - Most Protective EPA Guideline Assessment from 2014 to 2018

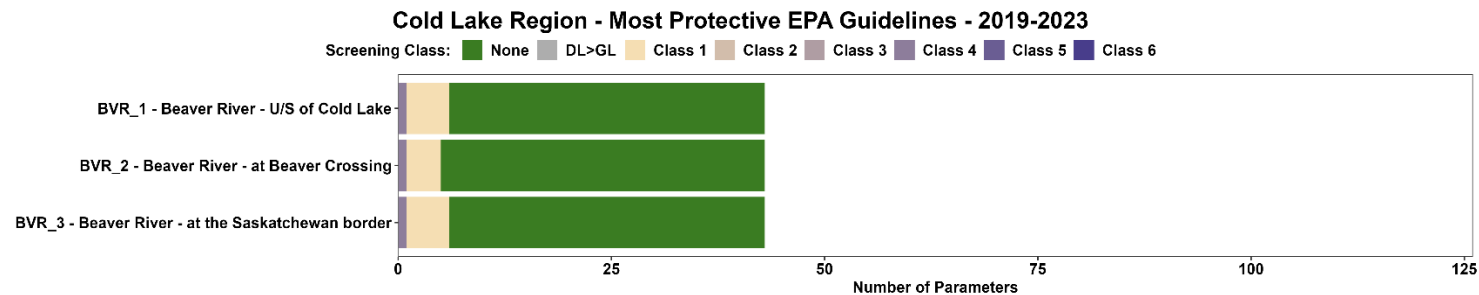


Figure I139: Cold Lake Region – Beaver River - Most Protective EPA Guideline Assessment from 2019 to 2023

## I.2.4 Peace River and Tributaries

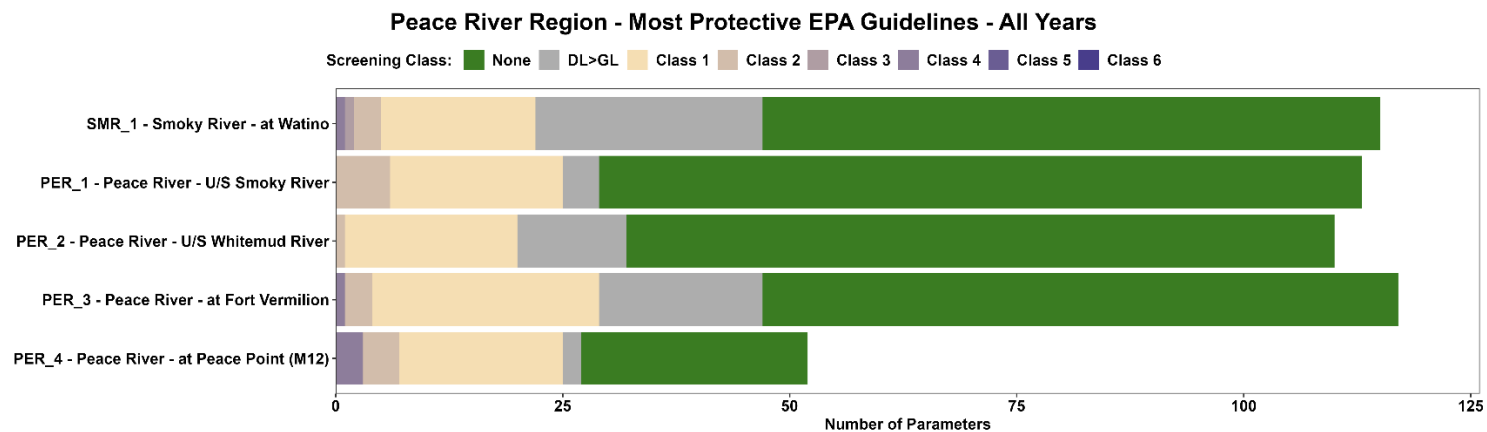
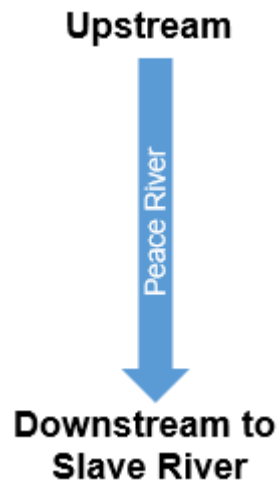


Figure I140: Peace River and Tributaries - Most Protective EPA Guideline Assessment for All Years

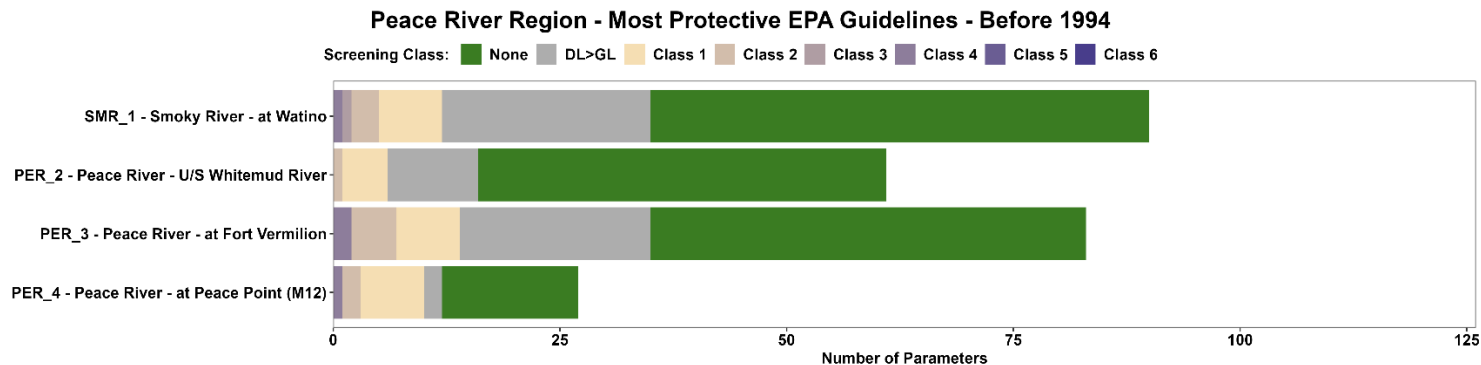


Figure I141: Peace River and Tributaries - Most Protective EPA Guideline Assessment from Before 1994

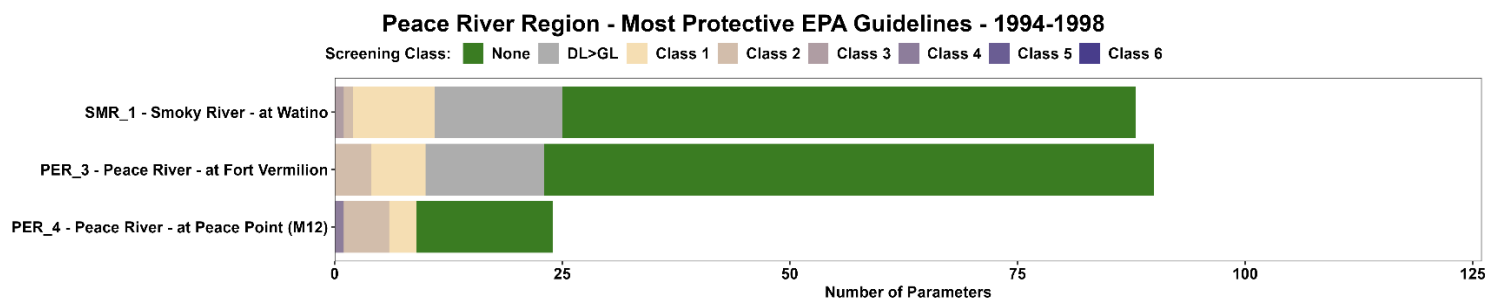
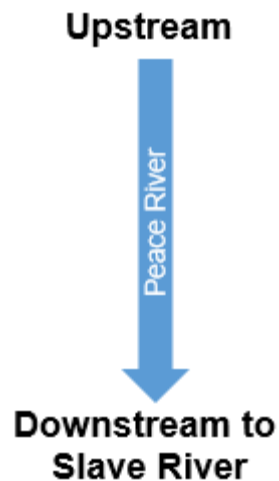


Figure I142: Peace River and Tributaries - Most Protective EPA Guideline Assessment for 1994 to 1998

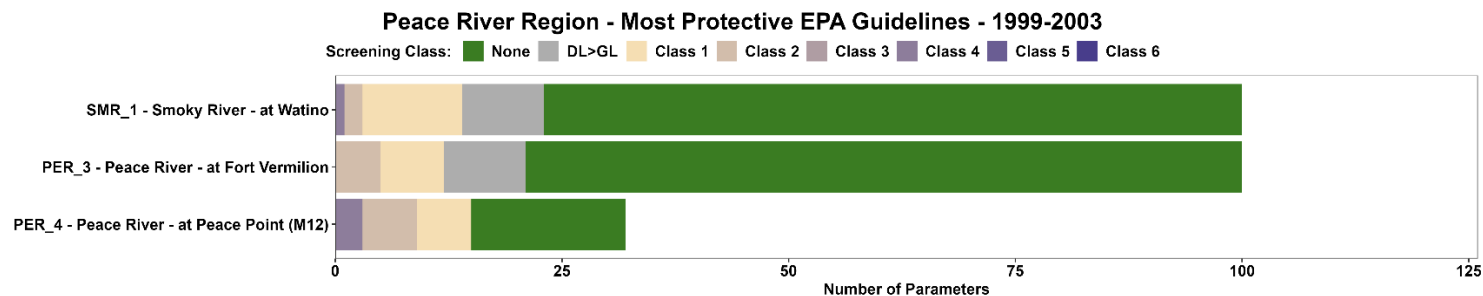


Figure I143: Peace River and Tributaries - Most Protective EPA Guideline Assessment for 1999 to 2003

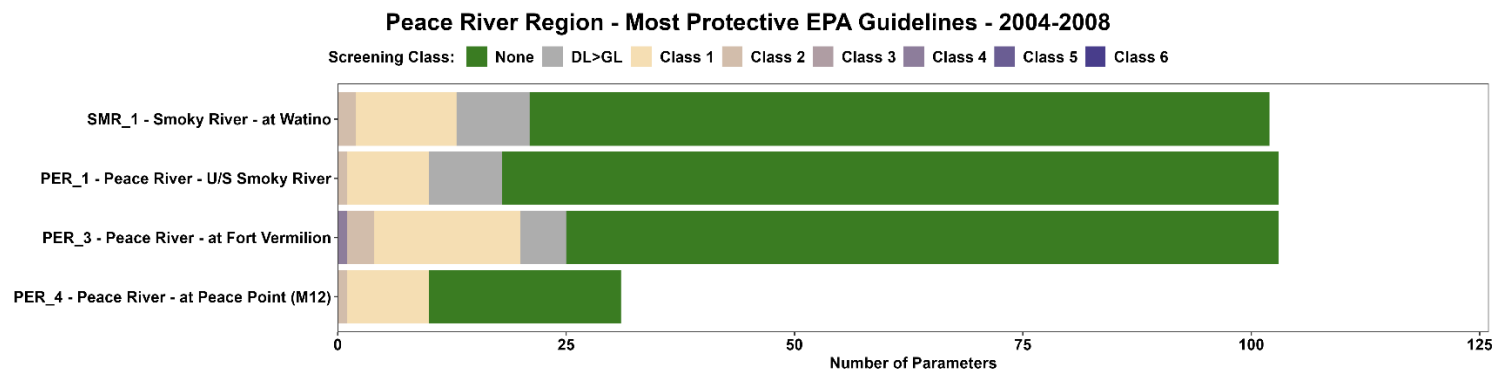
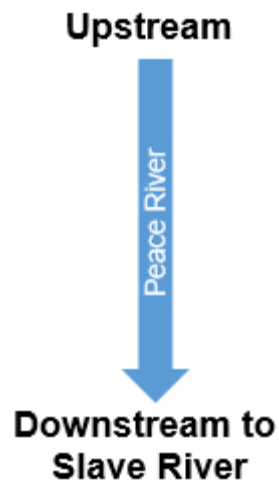


Figure I144: Peace River and Tributaries - Most Protective EPA Guideline Assessment for 2004 to 2008

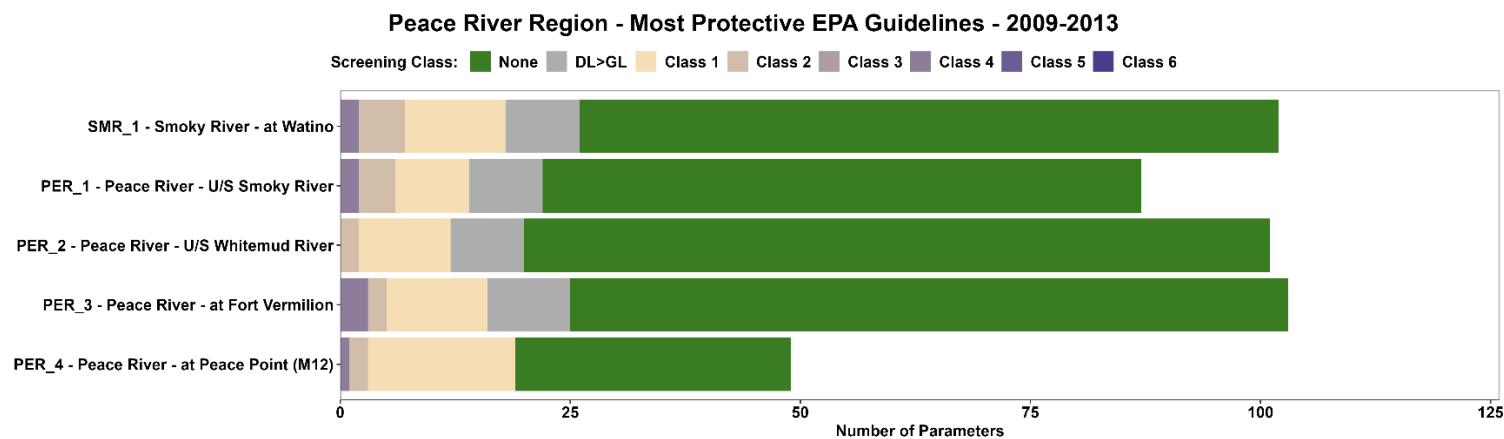


Figure I145: Peace River and Tributaries - Most Protective EPA Guideline Assessment from 2009 to 2013

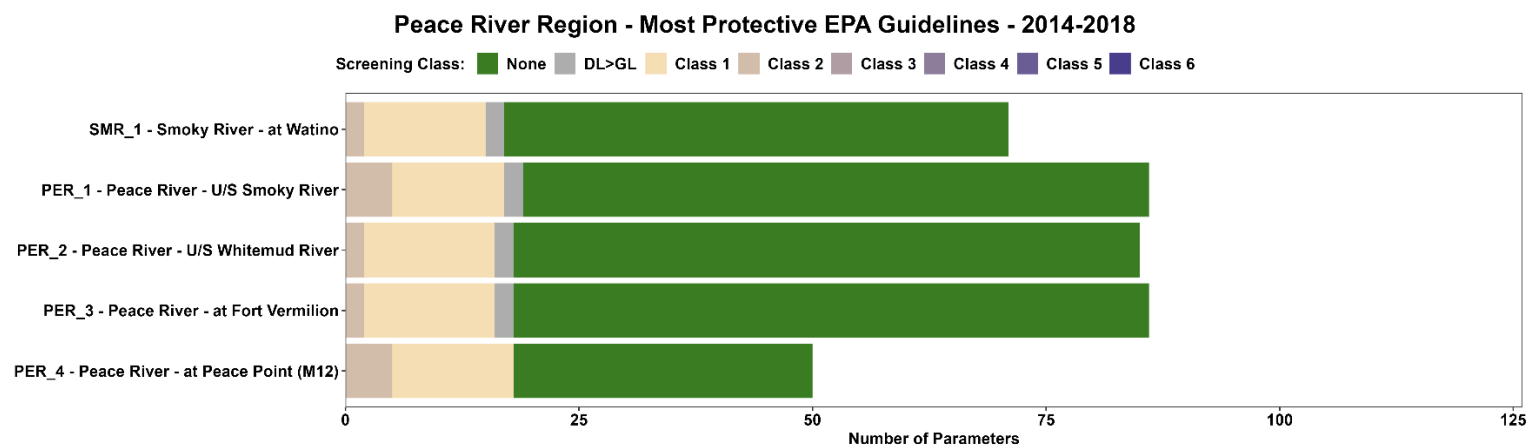


Figure I146: Peace River and Tributaries - Most Protective EPA Guideline Assessment from 2014 to 2018

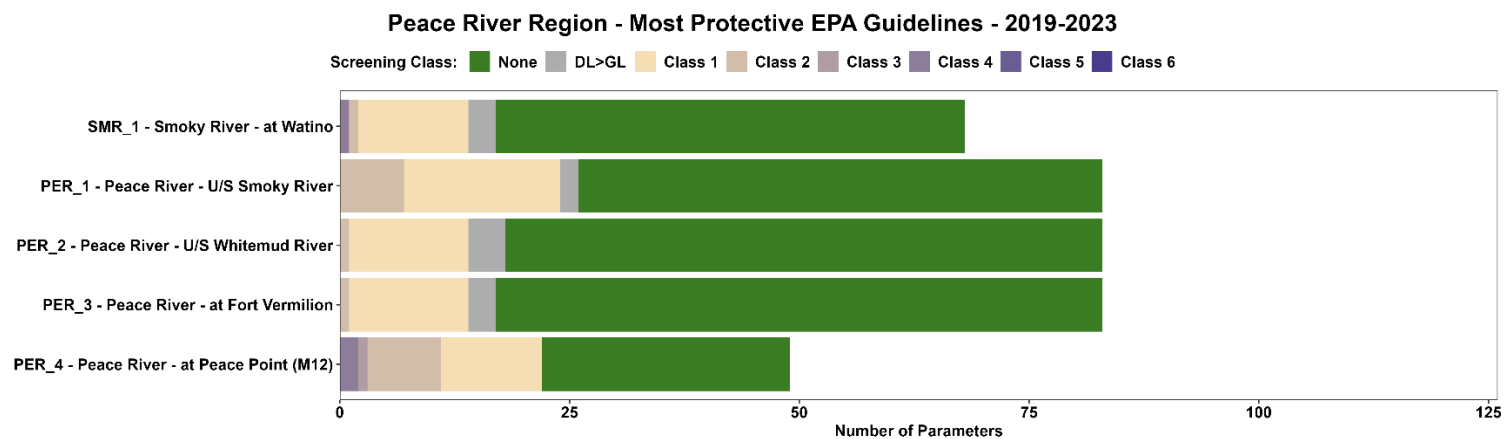
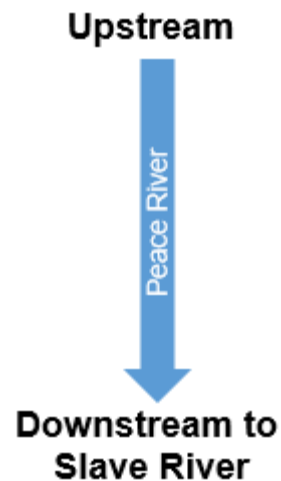


Figure I147: Peace River and Tributaries - Most Protective EPA Guideline Assessment from 2019 to 2023

## I.2.5 PAD and Tributaries

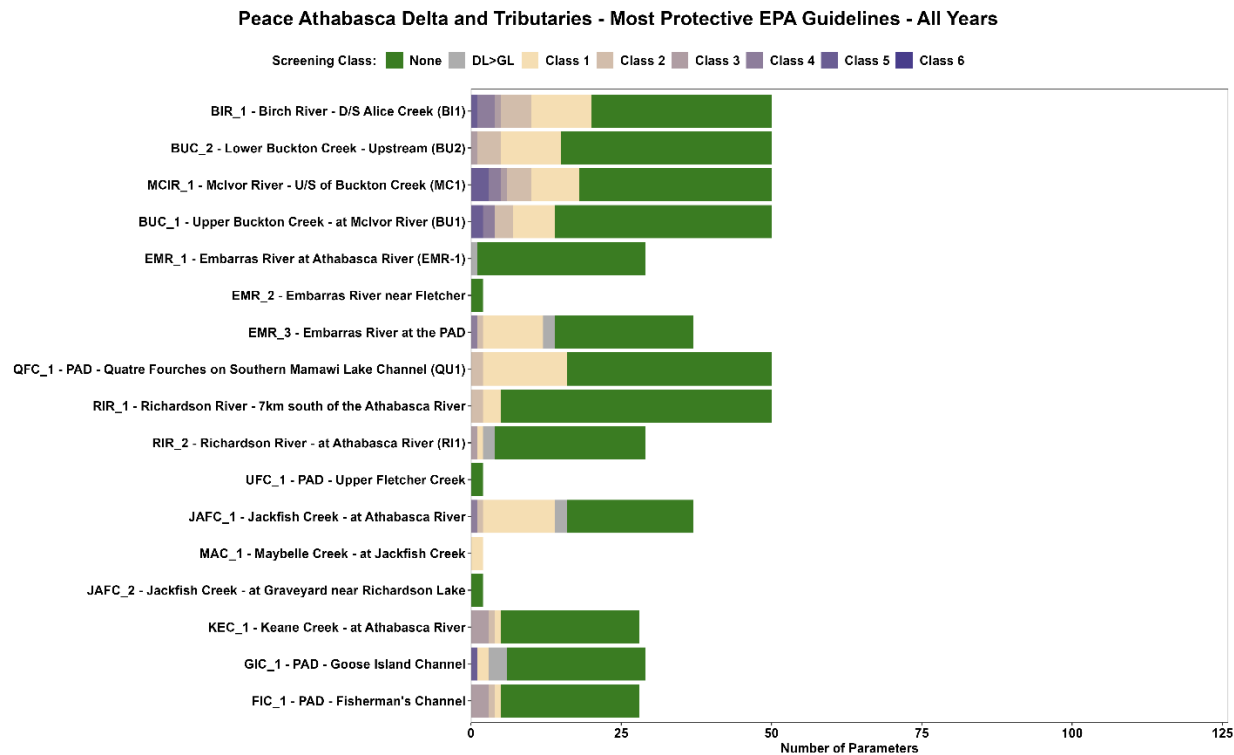
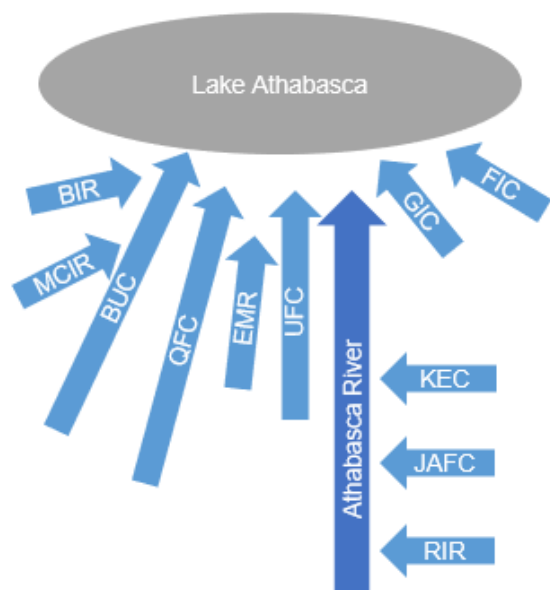


Figure I148: Peace Athabasca Delta and Tributaries - Most Protective EPA Guideline Assessment for All Years



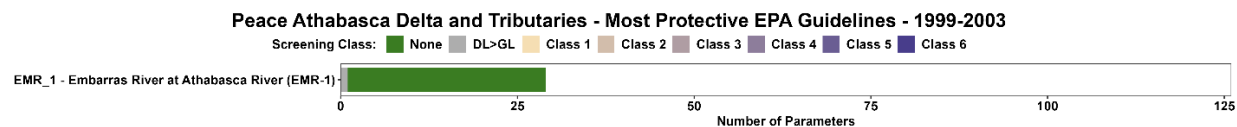
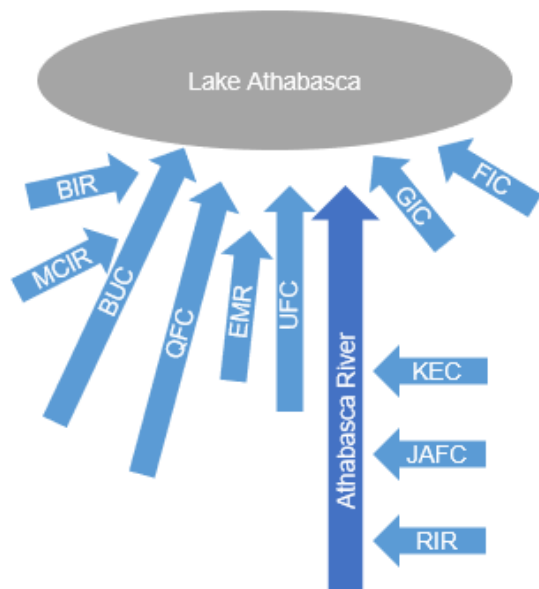


Figure I149: Peace Athabasca Delta and Tributaries - Most Protective EPA Guideline Assessment for 1999 to 2003

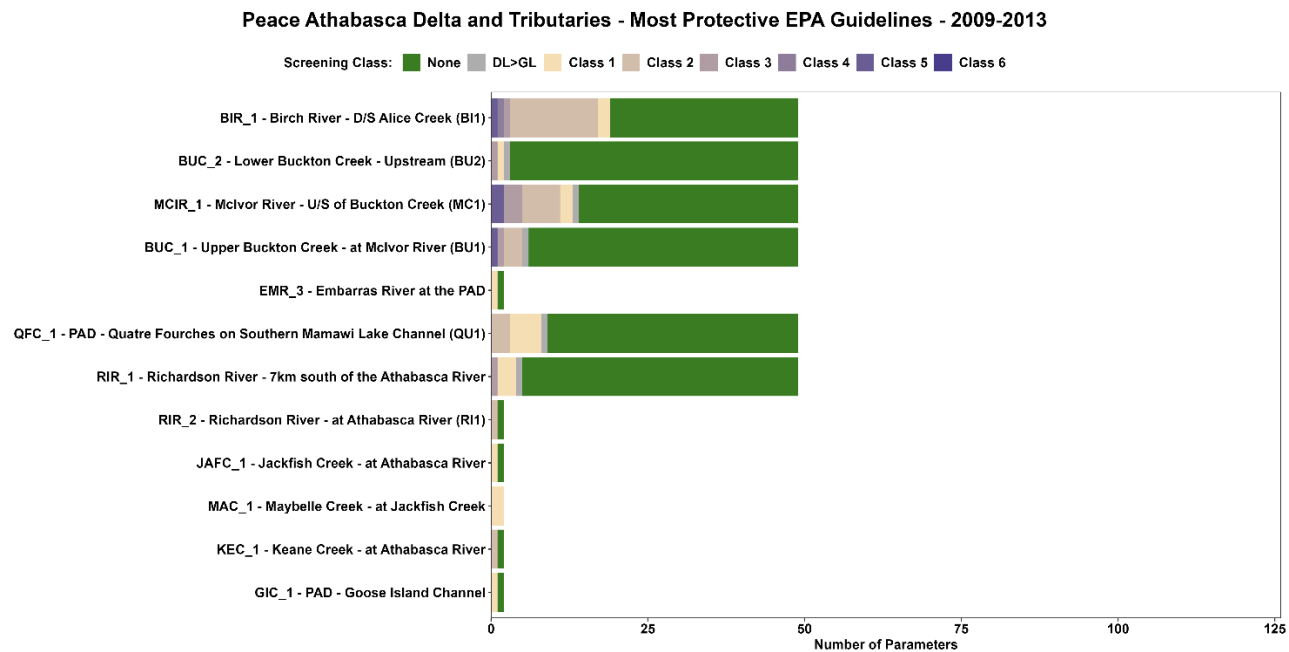
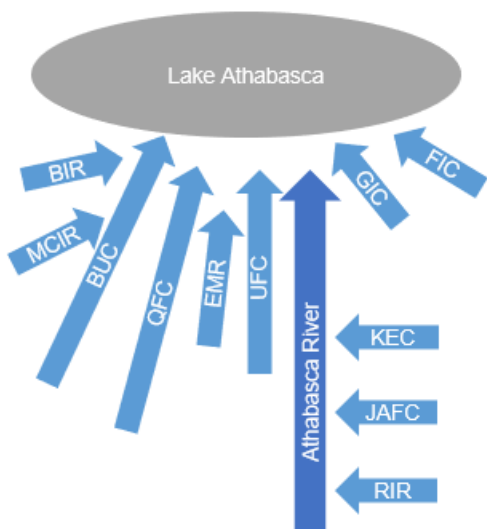
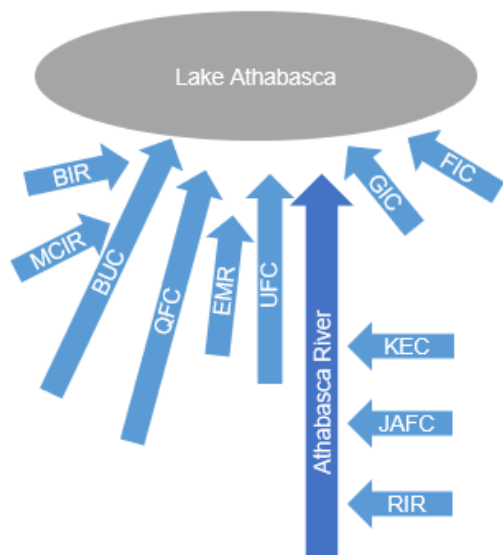


Figure I150: Peace Athabasca Delta and Tributaries - Most Protective EPA Guideline Assessment from 2009 to 2013



Peace Athabasca Delta and Tributaries - Most Protective EPA Guidelines - 2014-2018

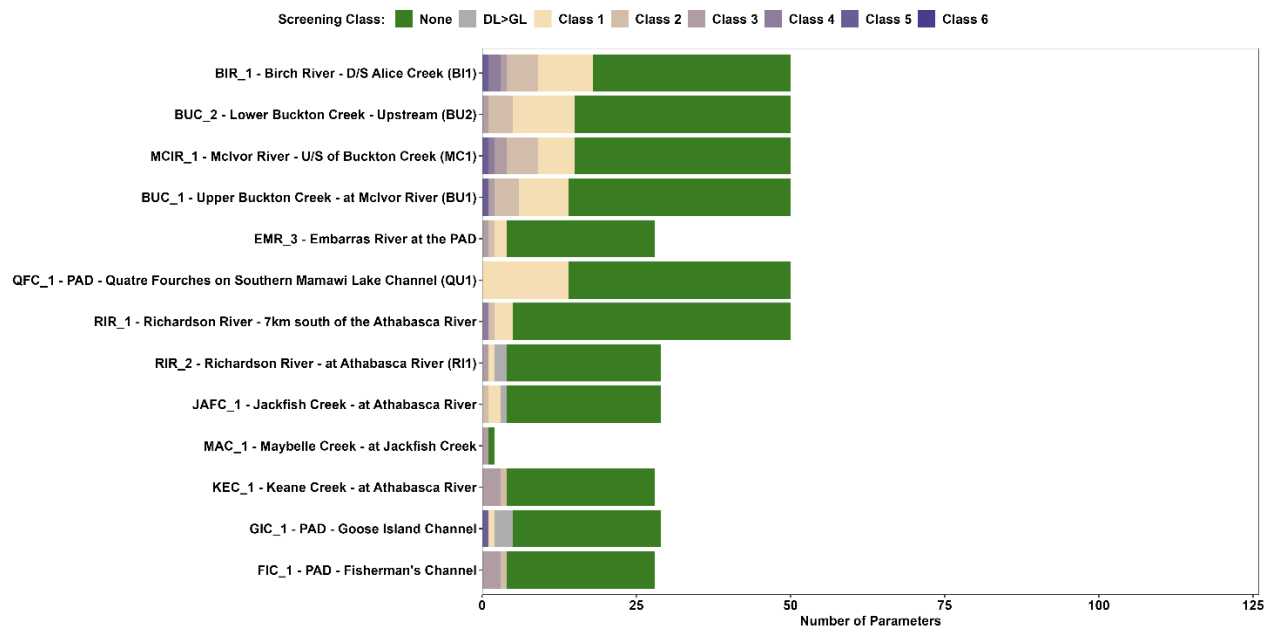


Figure I151: Peace Athabasca Delta and Tributaries - Most Protective EPA Guideline Assessment from 2014 to 2018

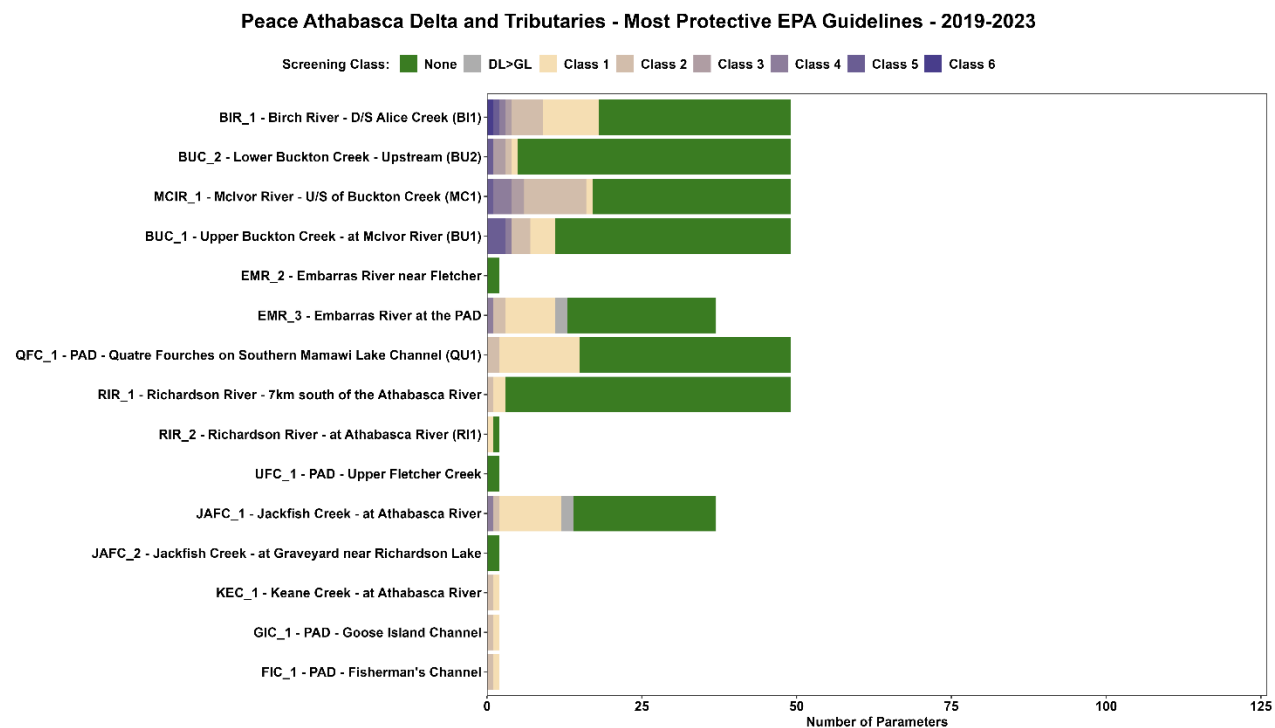
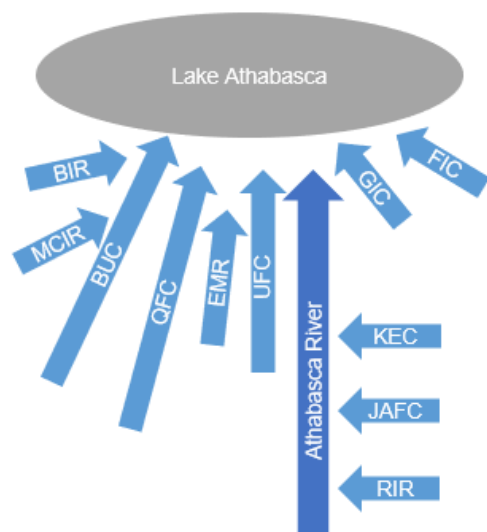


Figure I152: Peace Athabasca Delta and Tributaries - Most Protective EPA Guideline Assessment from 2019 to 2023

## I.2.6 Slave River and Tributaries

Upstream



Downstream to  
Slave Lake

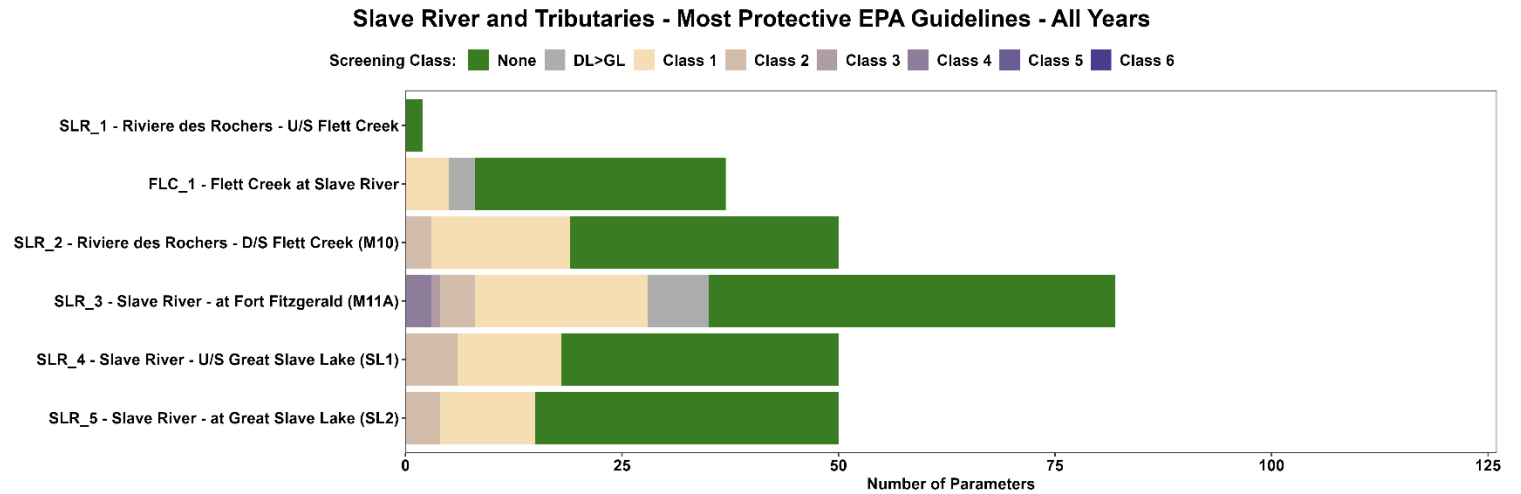


Figure I153: Slave River and Tributaries - Most Protective EPA Guideline Assessment for All Years

Upstream



Downstream to  
Slave Lake

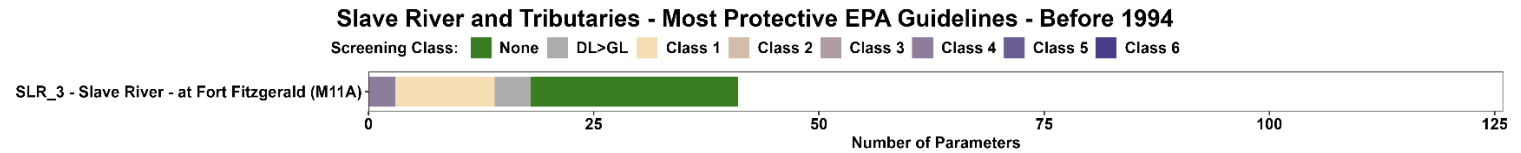


Figure I154: Slave River and Tributaries - Most Protective EPA Guideline Assessment from Before 1994

Upstream



Downstream to  
Slave Lake

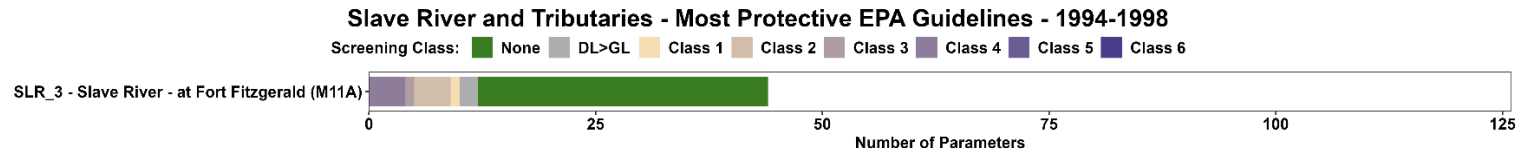


Figure I155: Slave River and Tributaries - Most Protective EPA Guideline Assessment from 1994 to 1998

Upstream



Downstream to  
Slave Lake

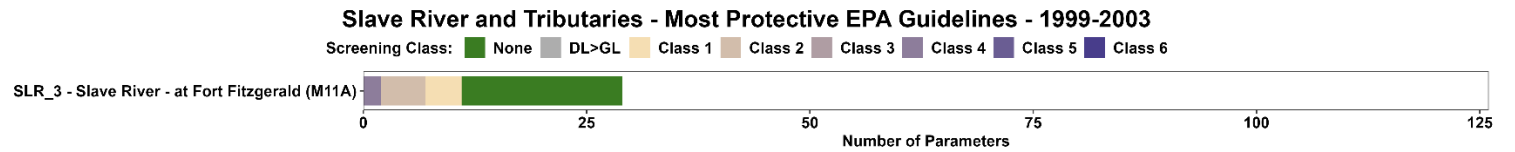


Figure I156: Slave River and Tributaries - Most Protective EPA Guideline Assessment from 1999 to 2003

Upstream



Downstream to  
Slave Lake

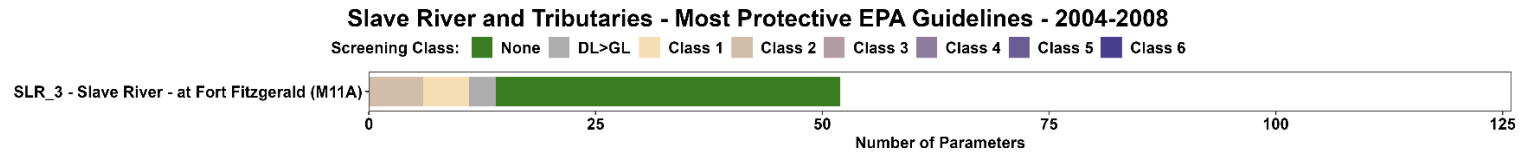


Figure I157: Slave River and Tributaries - Most Protective EPA Guideline Assessment from 2004 to 2008

Upstream



Downstream to  
Slave Lake

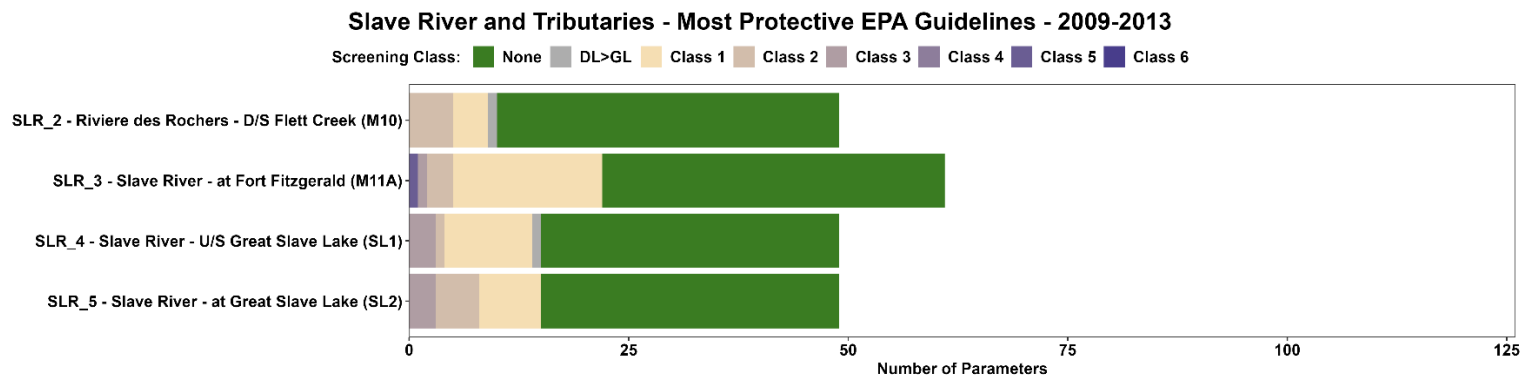


Figure I158: Slave River and Tributaries - Most Protective EPA Guideline Assessment from 2009 to 2013

Upstream



Downstream to  
Slave Lake

### Slave River and Tributaries - Most Protective EPA Guidelines - 2014-2018

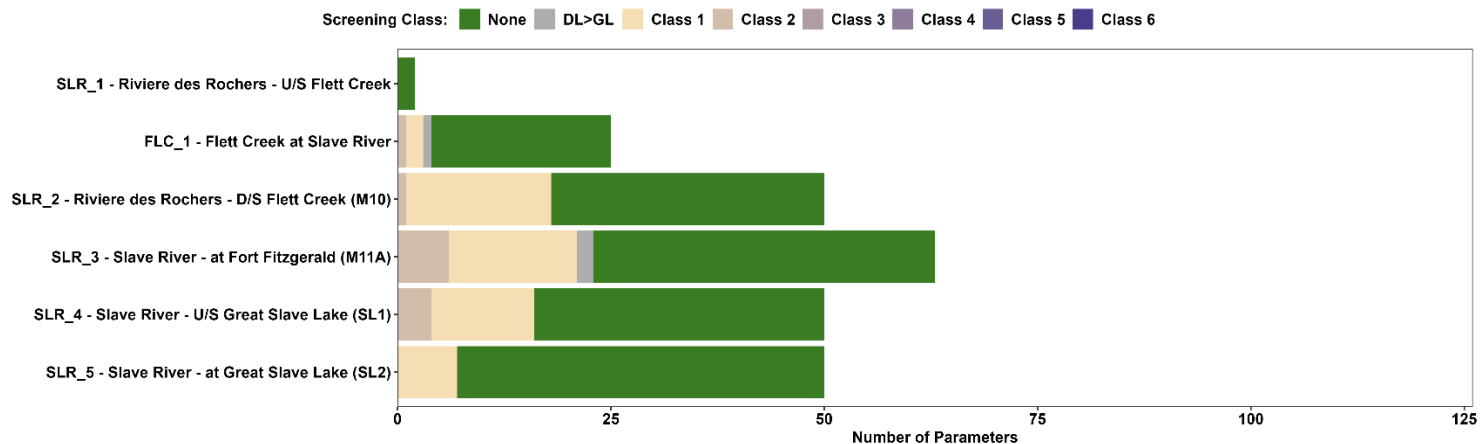


Figure I159: Slave River and Tributaries - Most Protective EPA Guideline Assessment from 2014 to 2018

Upstream



Downstream to  
Slave Lake

### Slave River and Tributaries - Most Protective EPA Guidelines - 2019-2023

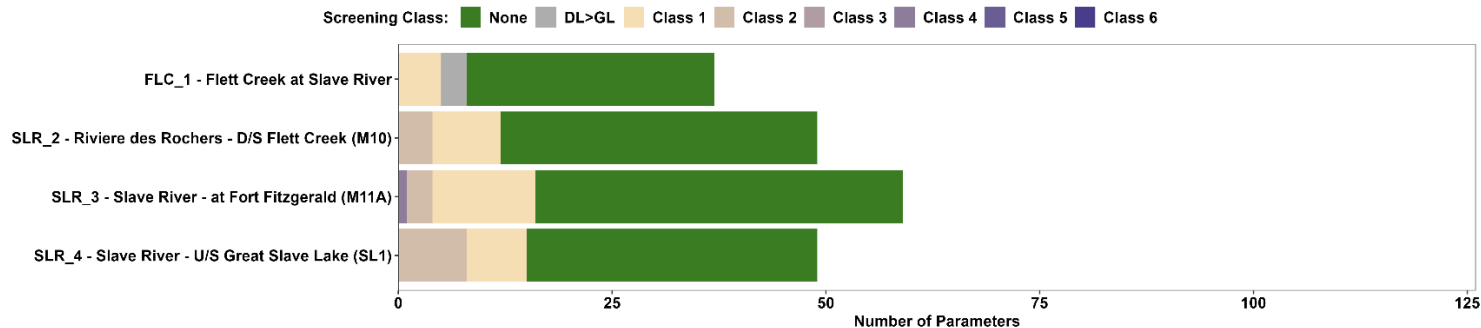


Figure I160: Slave River and Tributaries - Most Protective EPA Guideline Assessment from 2019 to 2023

### **I.3.0 Most Protective Guidelines – Upstream to Downstream Site Comparisons**

#### **I.3.1 Athabasca River Mainstem**



## WHO-DW Exceedances Above Detection

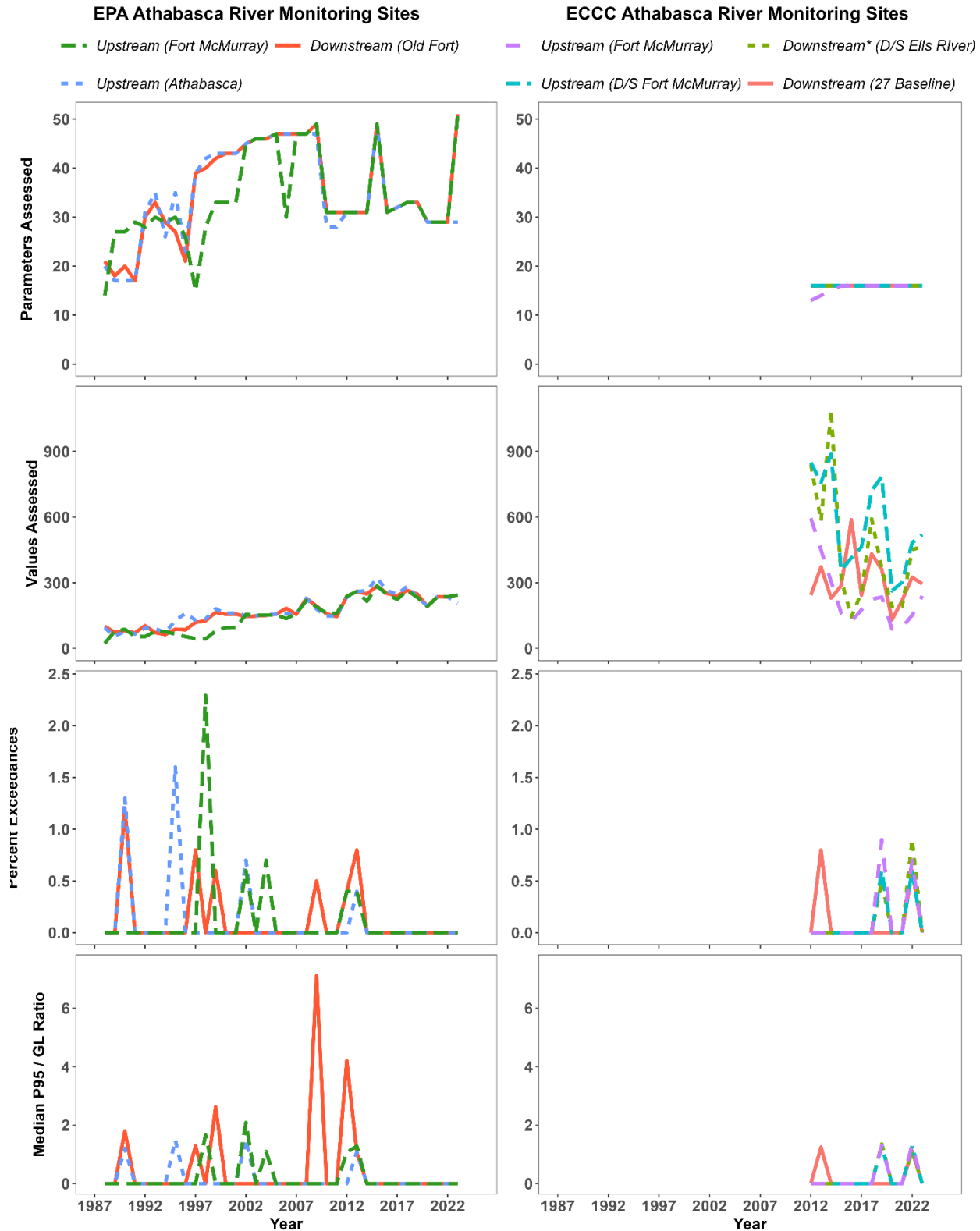


Figure I161: Comparison between exceedances at upstream and downstream sites on the Athabasca River when considering WHO drinking water guidelines.

## USEPA-SWQ-RA Exceedances Above Detection

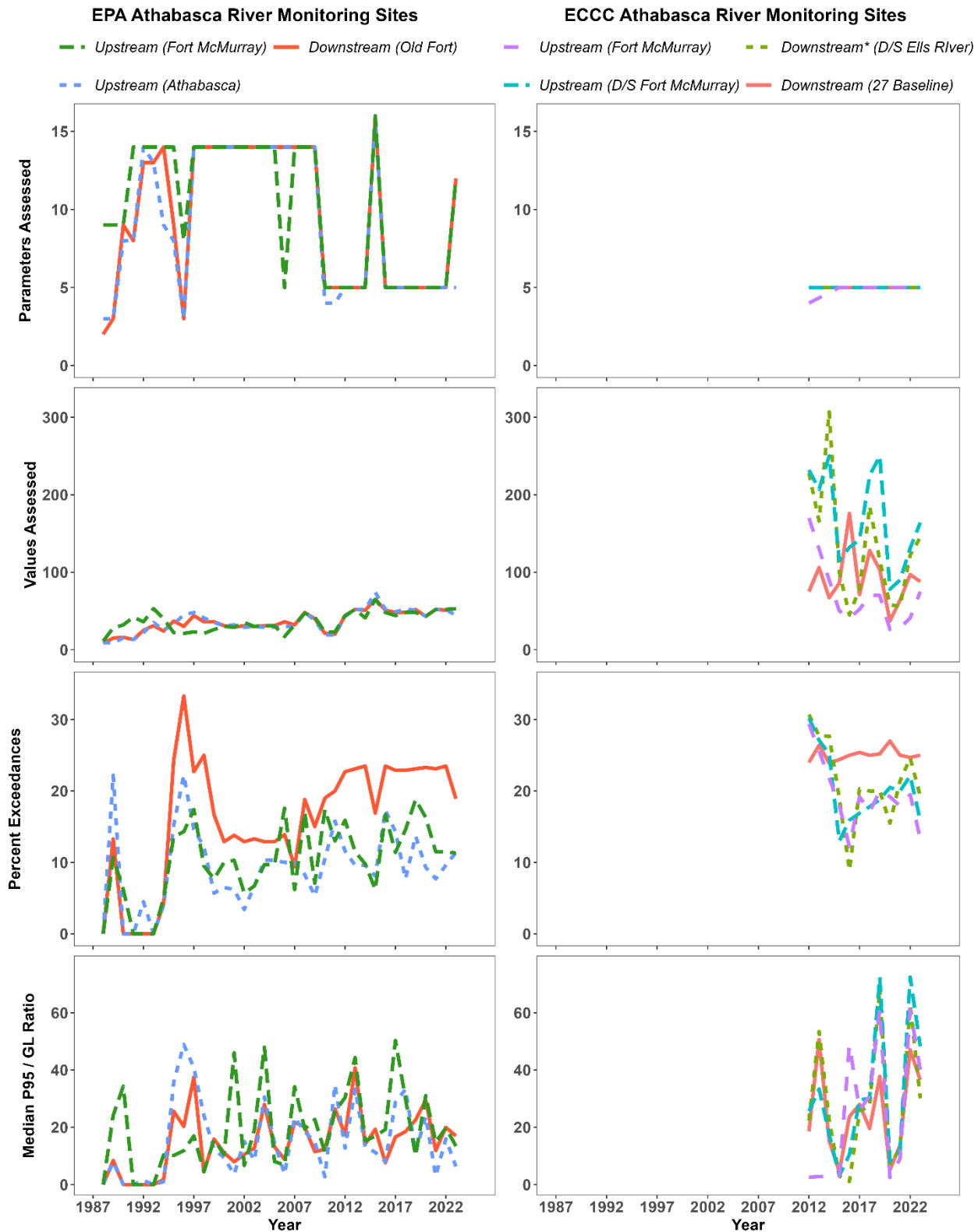


Figure I162: Comparison between exceedances at upstream and downstream sites on the Athabasca River when considering USEPA recreational aesthetics guidelines.

## USEPA-SWQ-PAL-CHRONIC Exceedances Above Detection

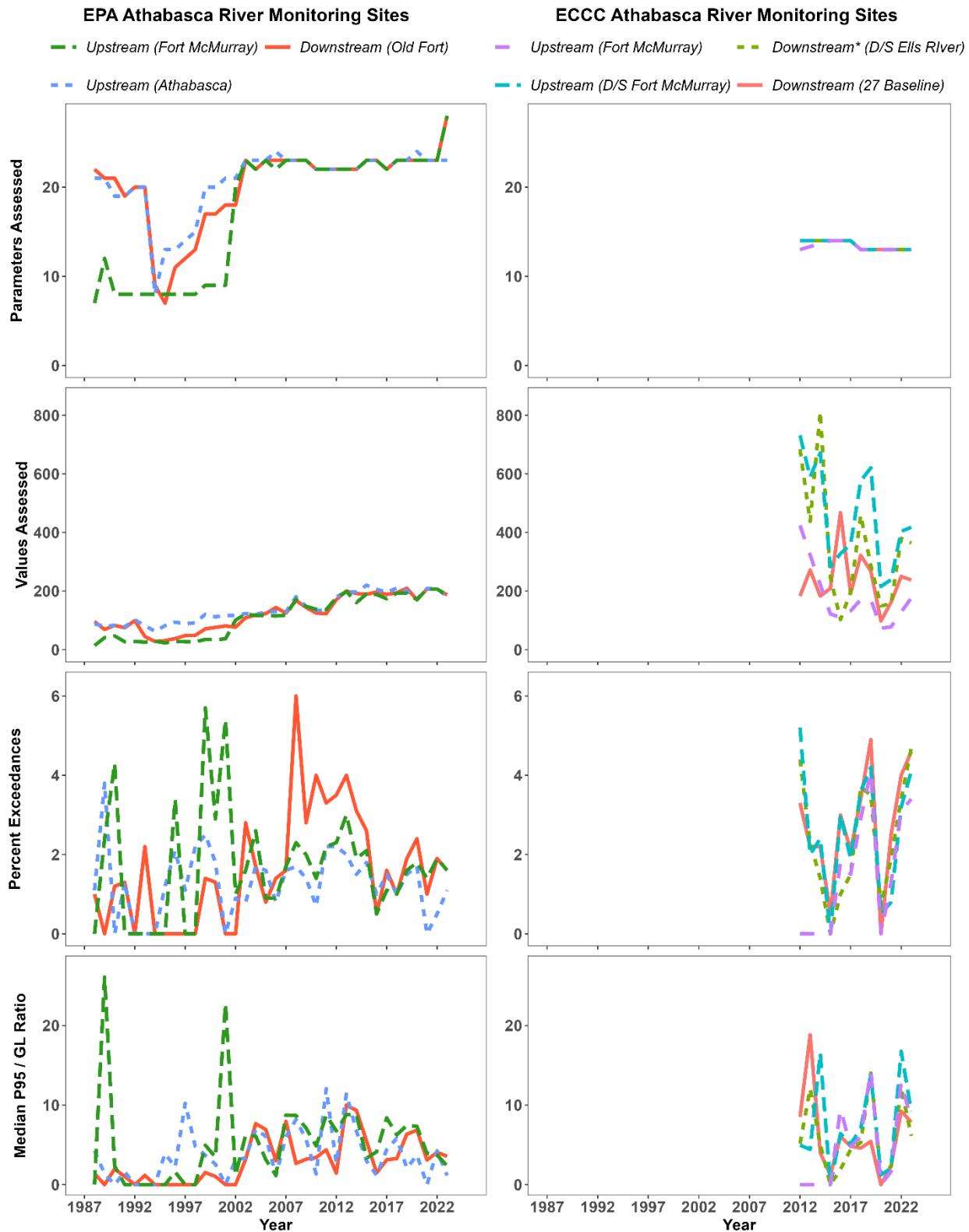


Figure I163: Comparison between exceedances at upstream and downstream sites on the Athabasca River when considering USEPA protection of aquatic life chronic guidelines.

## USEPA-SWQ-PAL-ACUTE Exceedances Above Detection

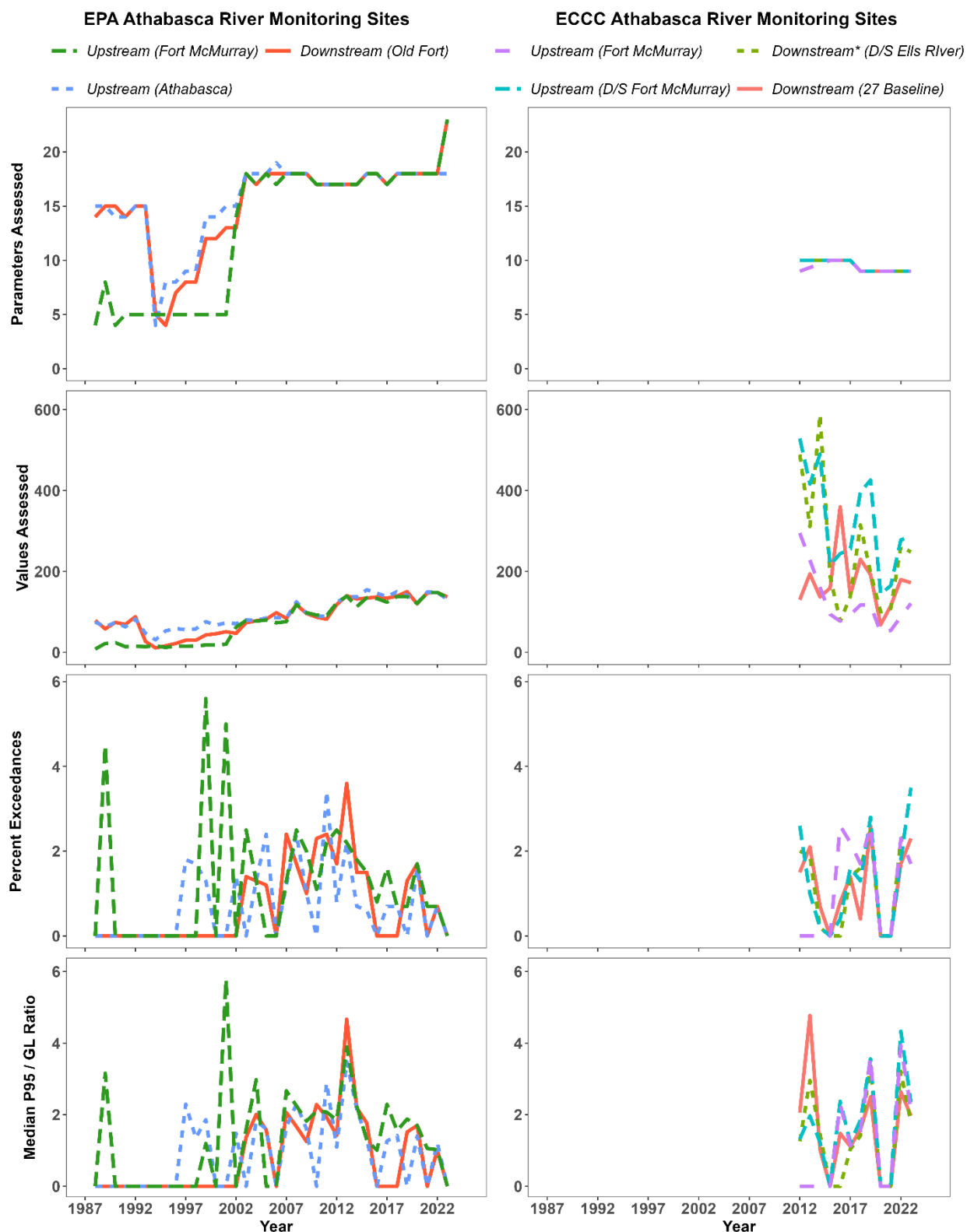


Figure I164: Comparison between exceedances at upstream and downstream sites on the Athabasca River when considering USEPA protection of aquatic life acute guidelines.

## USEPA-SWQ-O Exceedances Above Detection

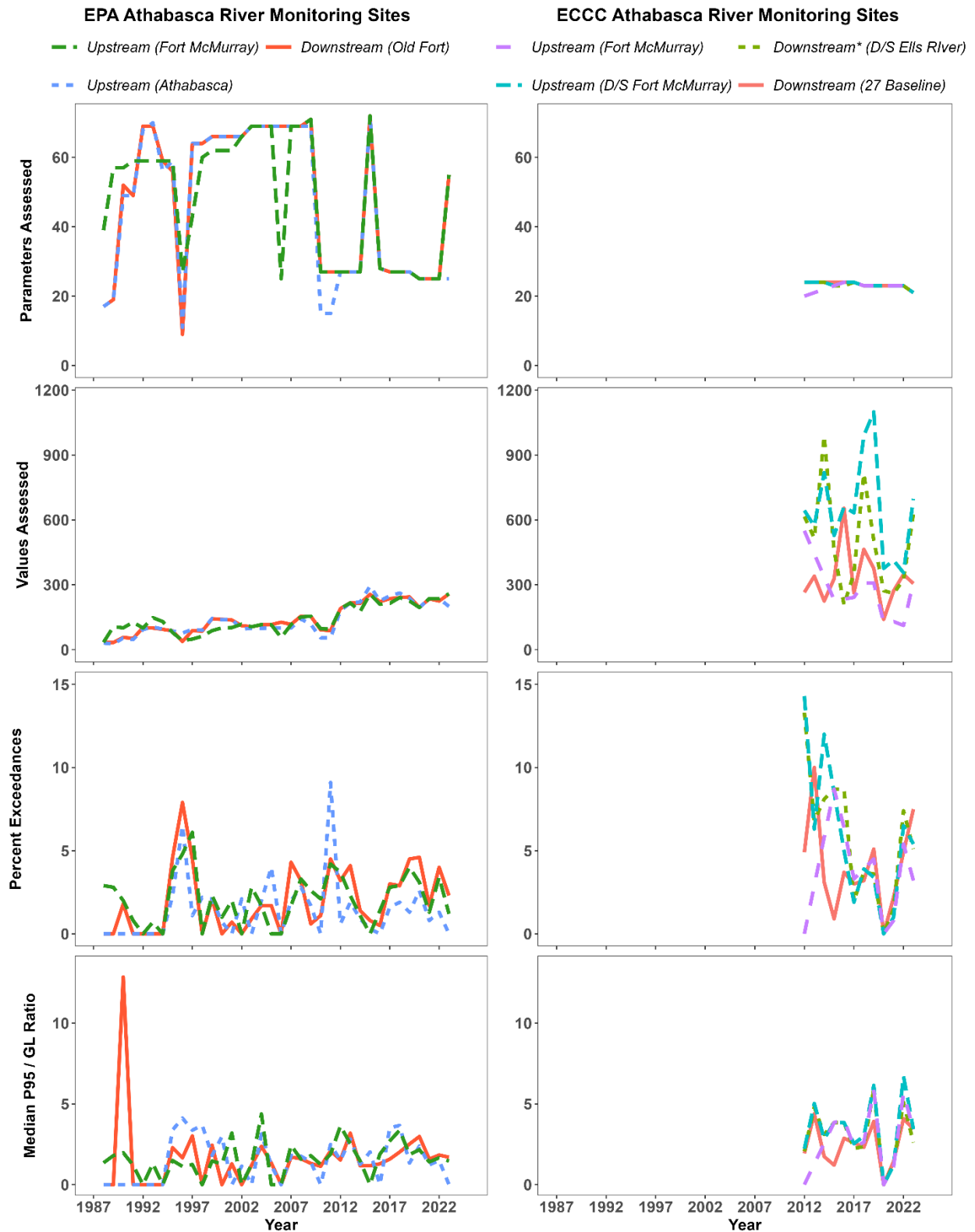


Figure I165: Comparison between exceedances at upstream and downstream sites on the Athabasca River when considering USEPA protection of human health from consumption of aquatic organisms guidelines.

## USEPA-SWQ-DW+O Exceedances Above Detection

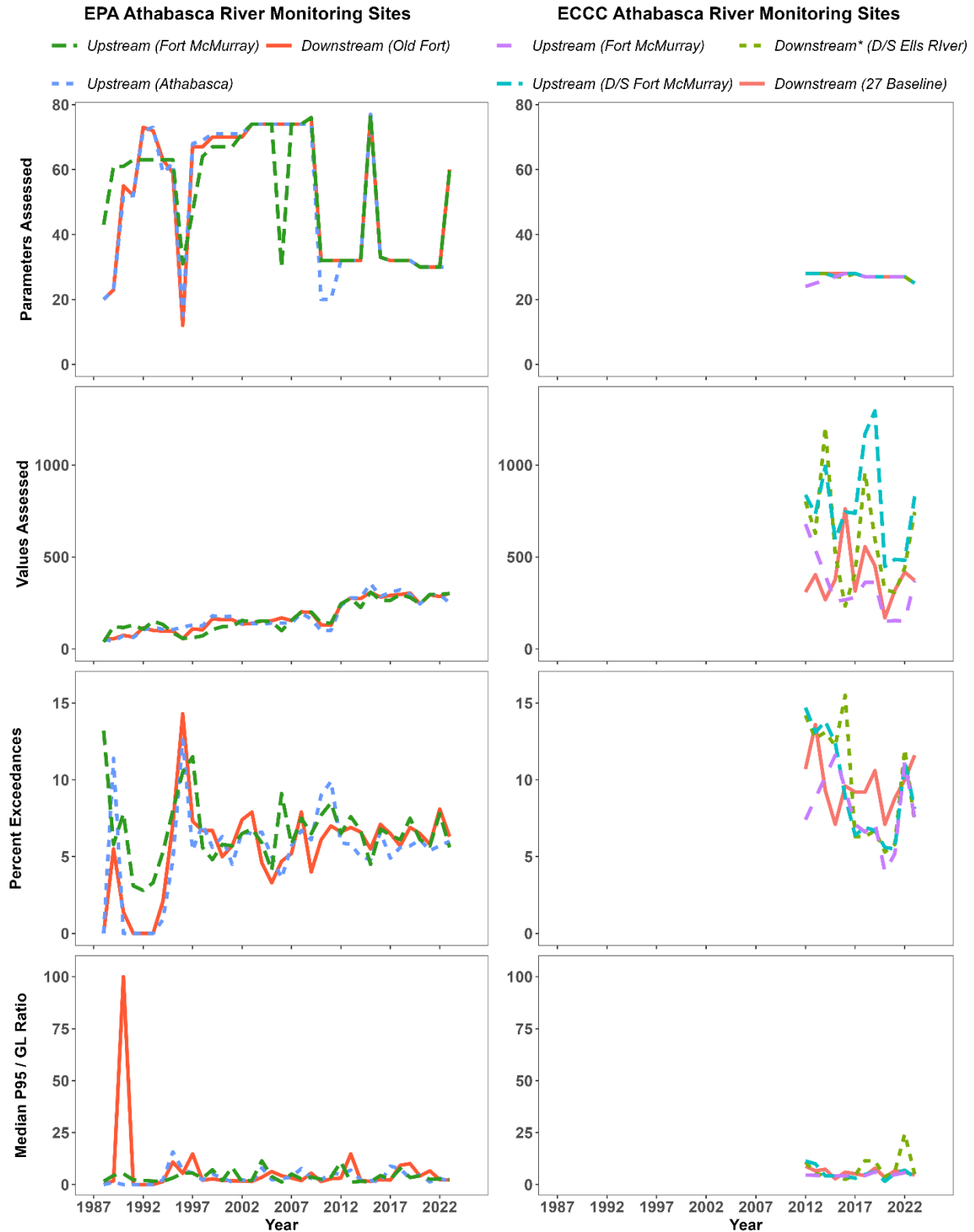


Figure I166: Comparison between exceedances at upstream and downstream sites on the Athabasca River when considering USEPA protection of human health from consumption of surface water and aquatic organisms guidelines.

## USEPA-DW-MCLG Exceedances Above Detection

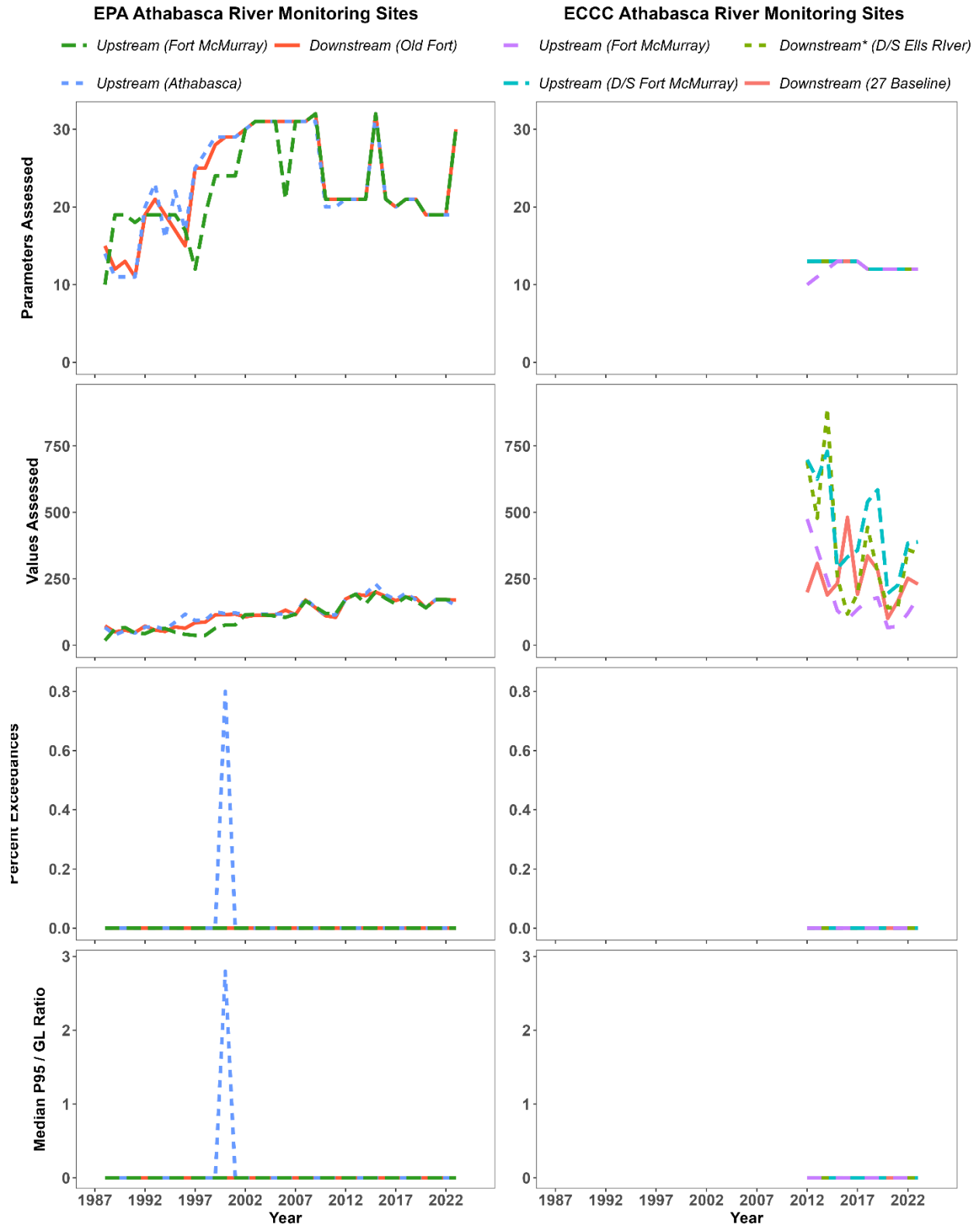


Figure I167: Comparison between exceedances at upstream and downstream sites on the Athabasca River when considering USEPA drinking water quality goals.

## USEPA-DW-MCL Exceedances Above Detection

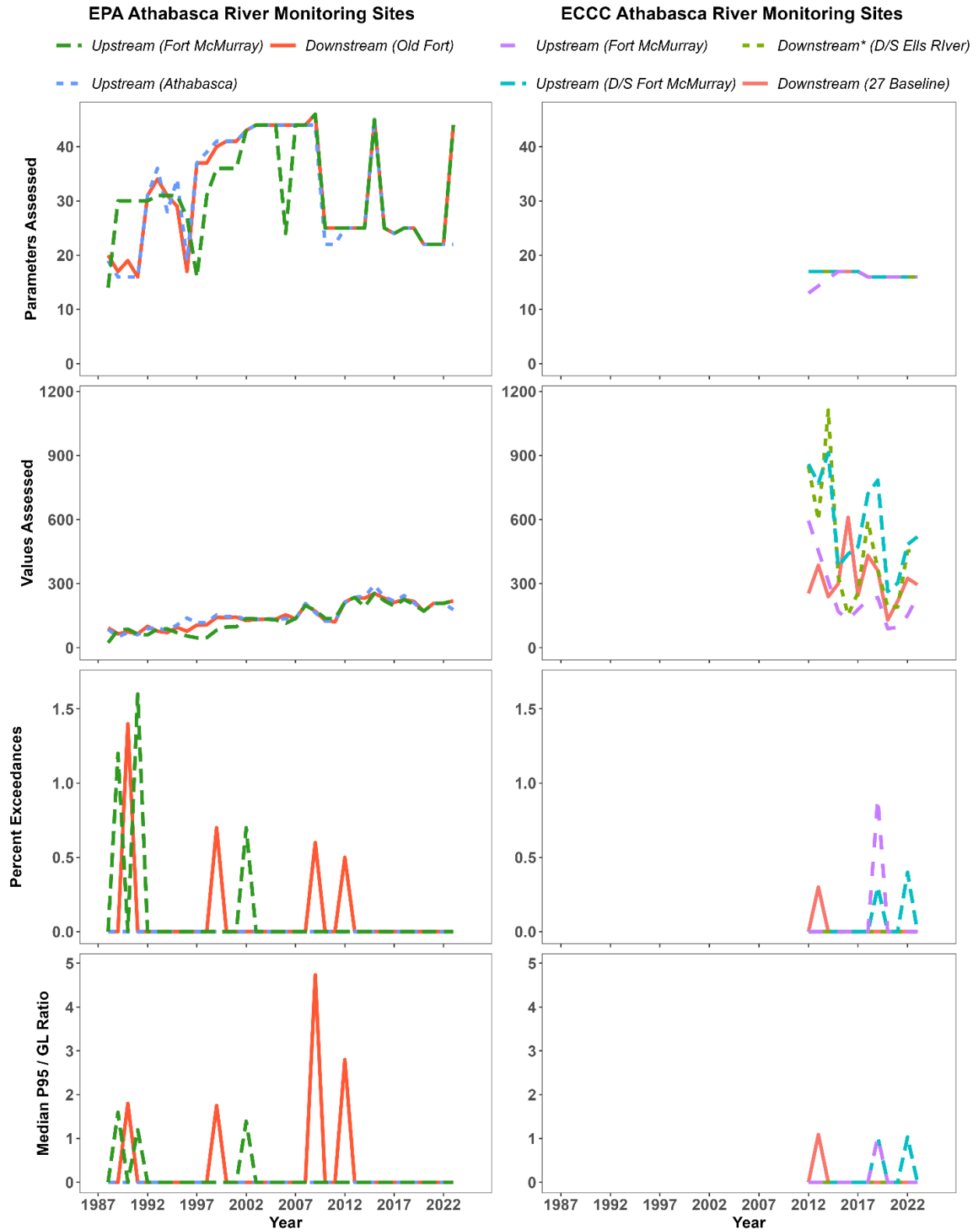


Figure I168: Comparison between exceedances at upstream and downstream sites on the Athabasca River when considering USEPA drinking water quality limits.



## USDOE-SWQ-WL-NOAEL Exceedances Above Detection

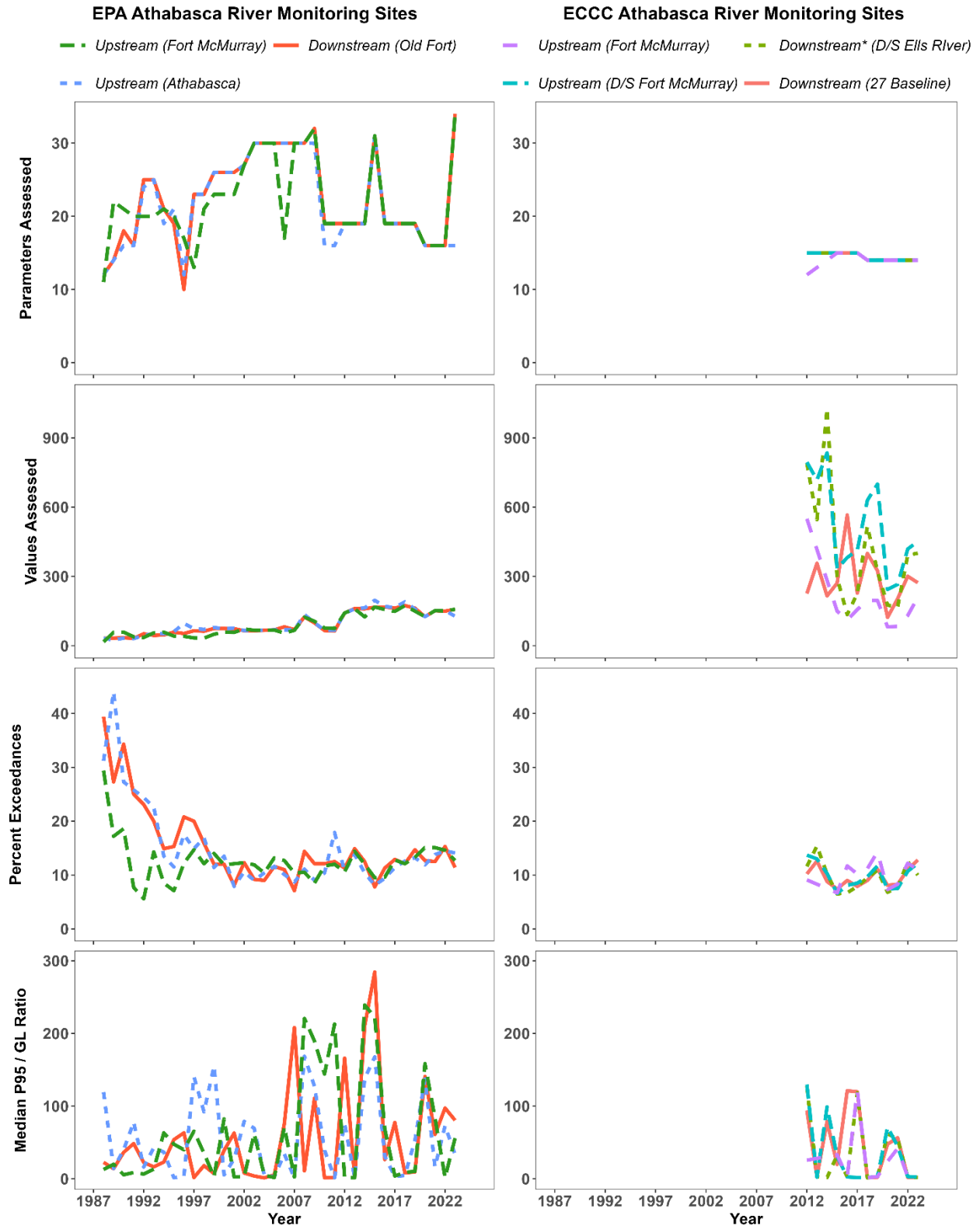


Figure I169: Comparison between exceedances at upstream and downstream sites on the Athabasca River when considering USEPA protection of piscivores NOAEL guidelines.

## USDOE-SWQ-WL-LOAEL Exceedances Above Detection

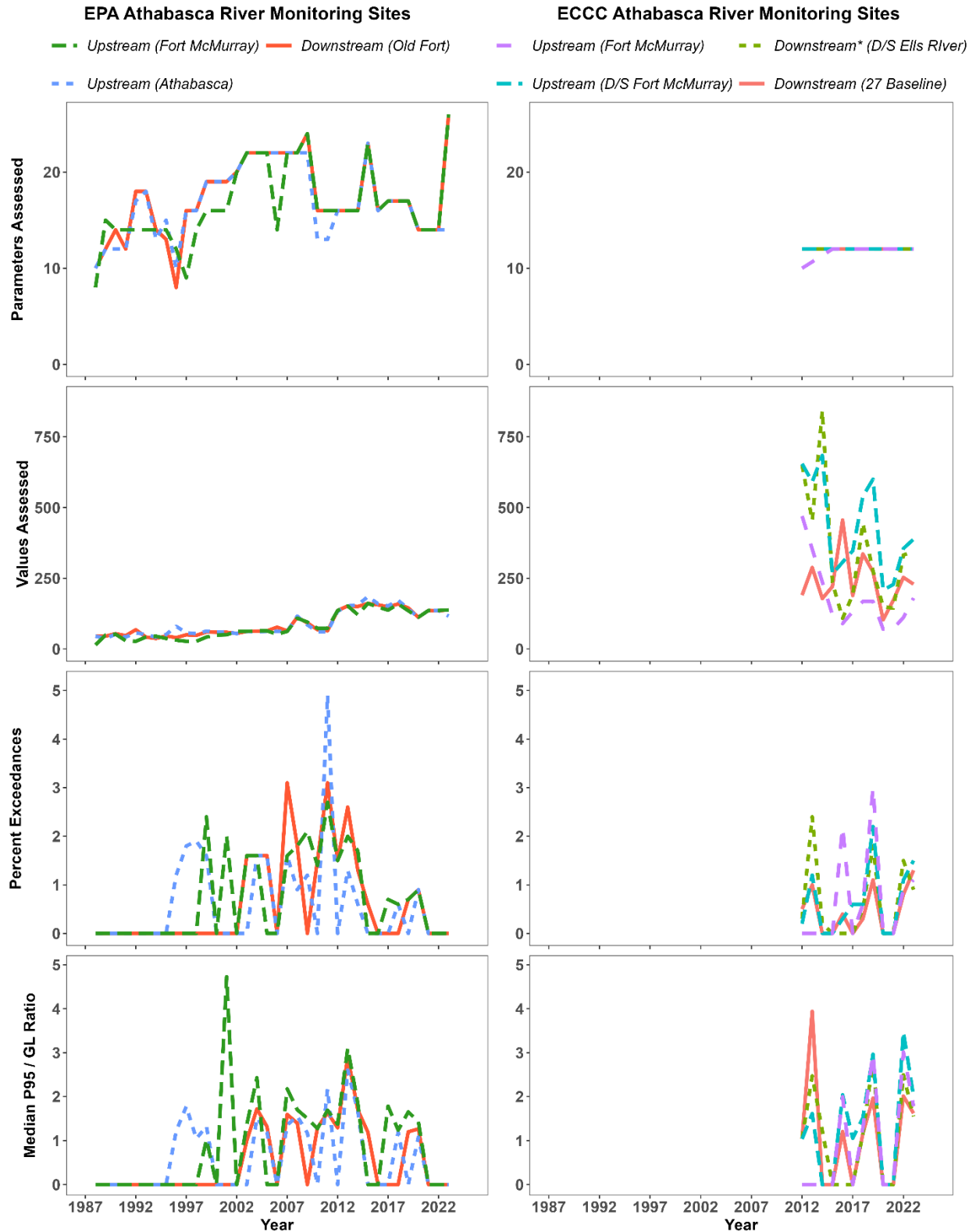


Figure I170: Comparison between exceedances at upstream and downstream sites on the Athabasca River when considering USEPA protection of piscivores LOAEL guidelines.

## Most Protective Guideline Exceedances Above Detection

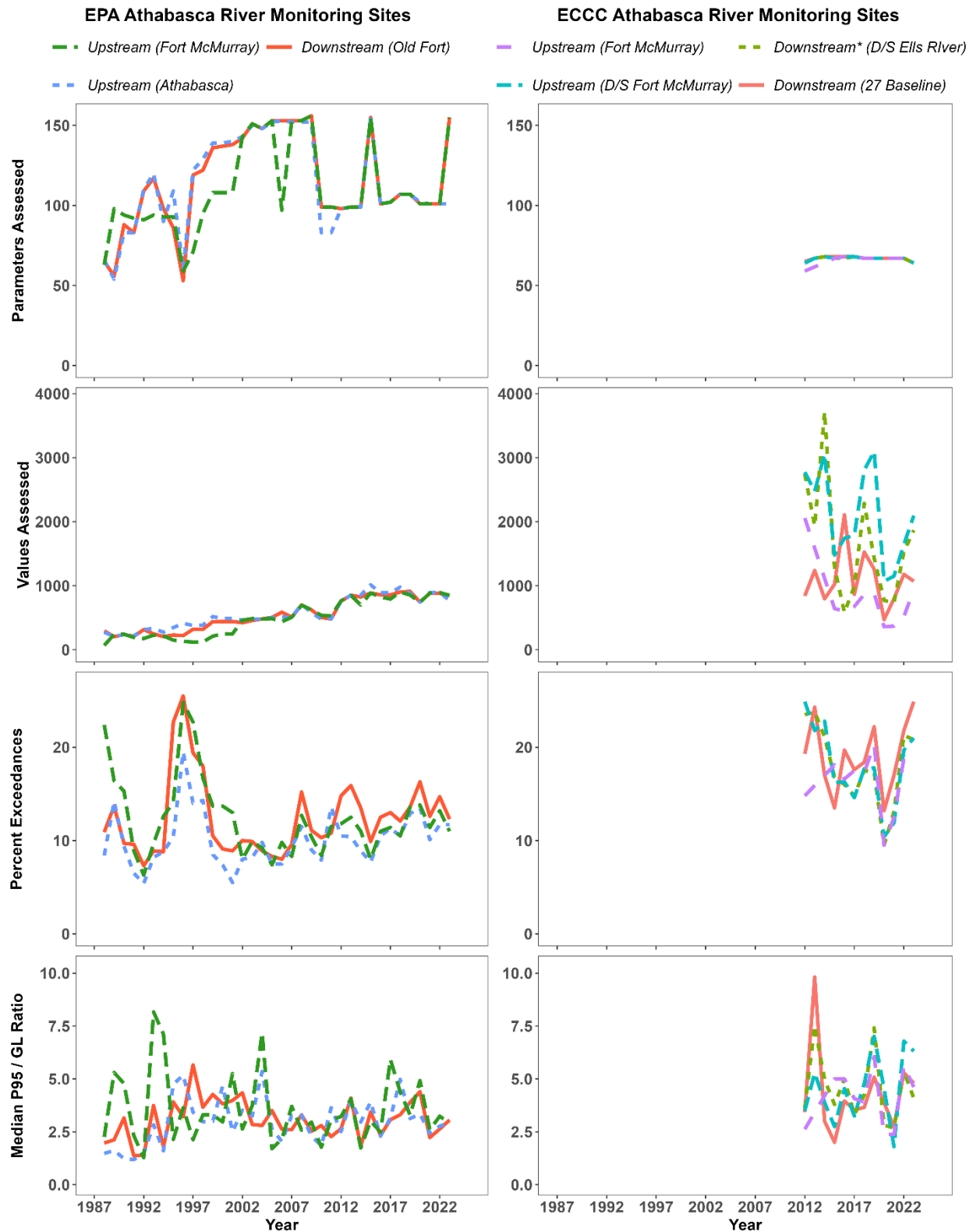


Figure I171: Comparison between exceedances at upstream and downstream sites on the Athabasca River when considering the most protective guidelines.

## Most Protective EPA Guideline Exceedances Above Detection

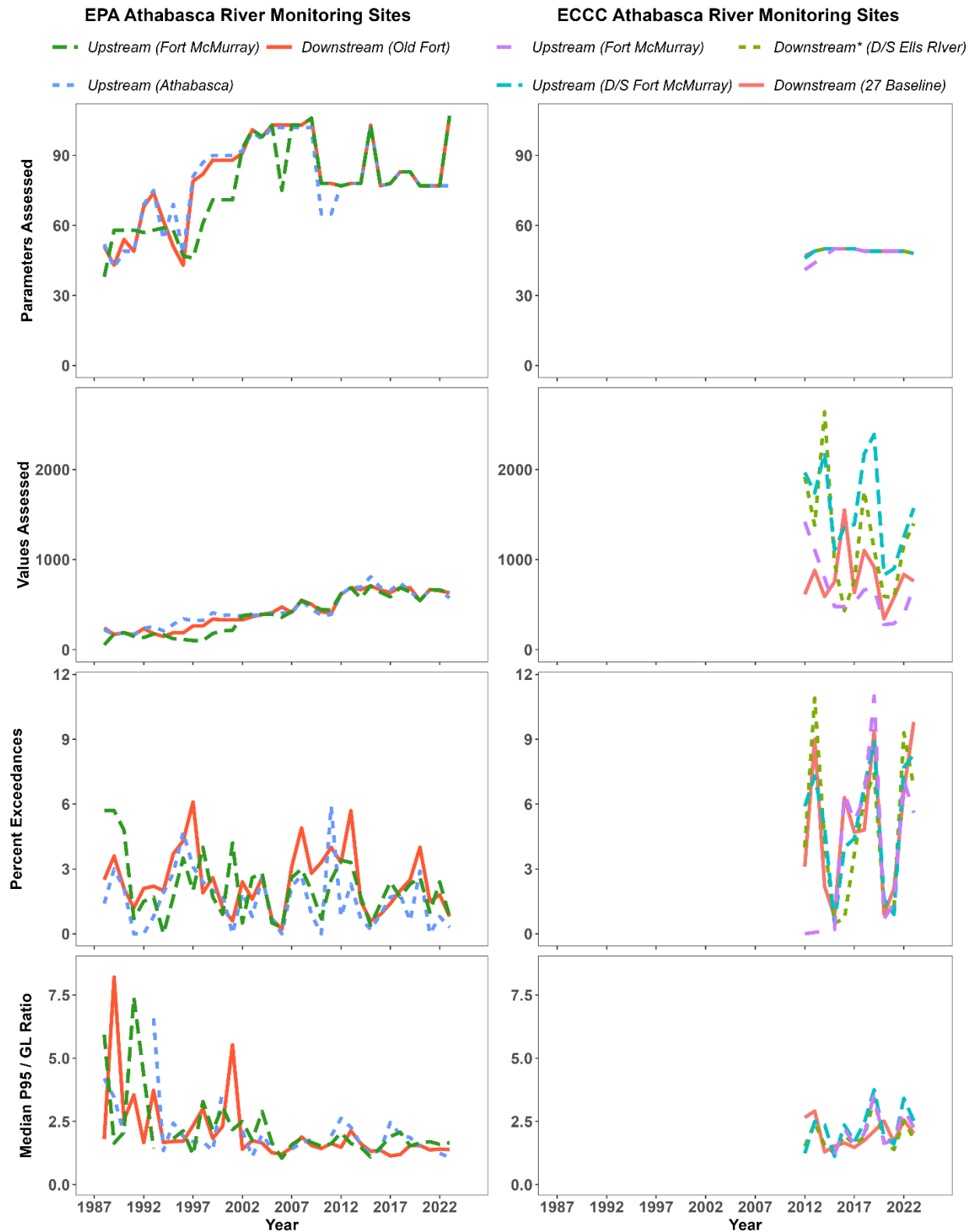


Figure I172: Comparison between exceedances at upstream and downstream sites on the Athabasca River when considering the most protective EPA guidelines.

## ICBM-SWQ-IU Exceedances Above Detection

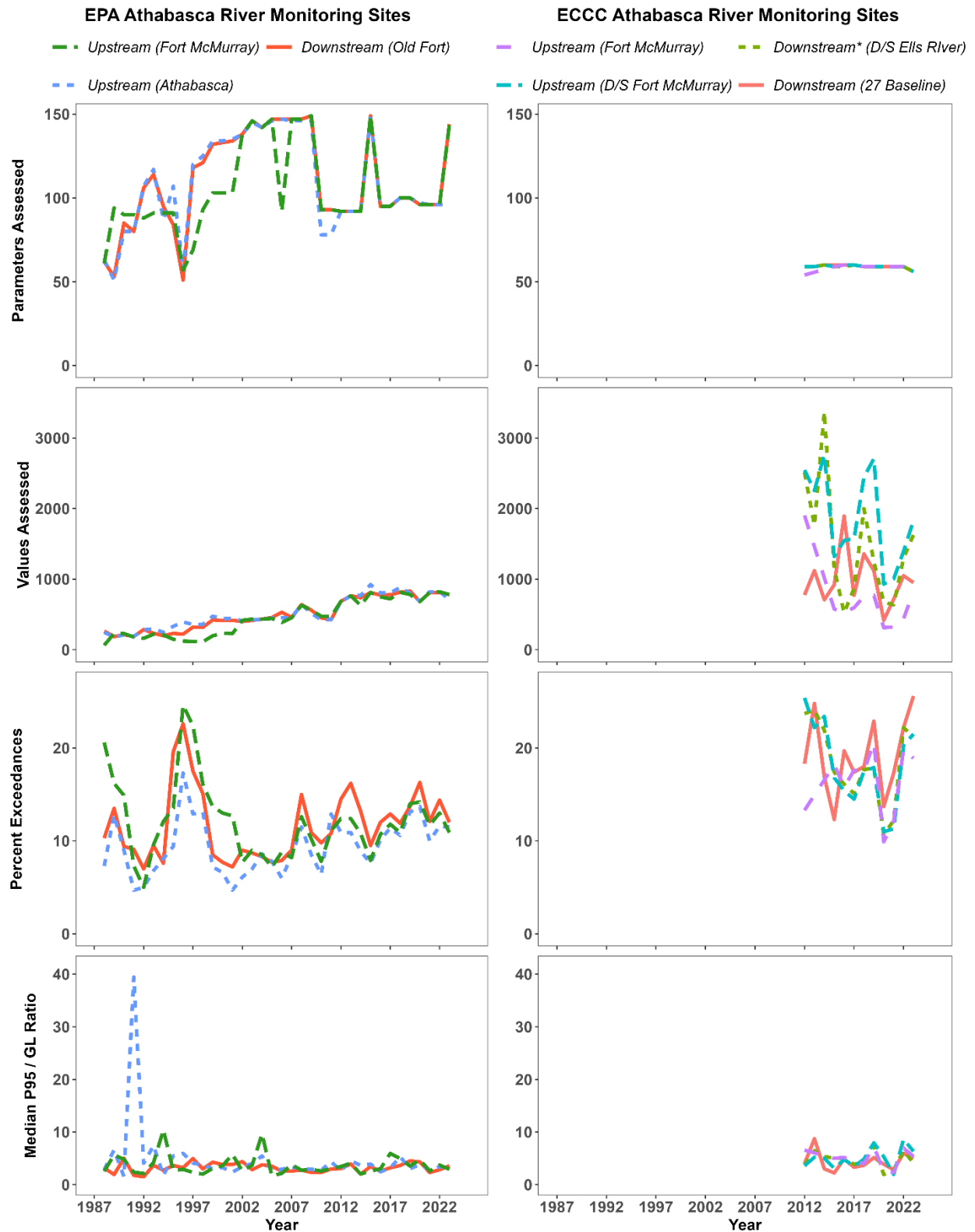


Figure I173: Comparison between exceedances at upstream and downstream sites on the Athabasca River when considering guidelines protective of indigenous use.

## ICBM-SWQ-IU(DW+O-Derived) Exceedances Above Detection

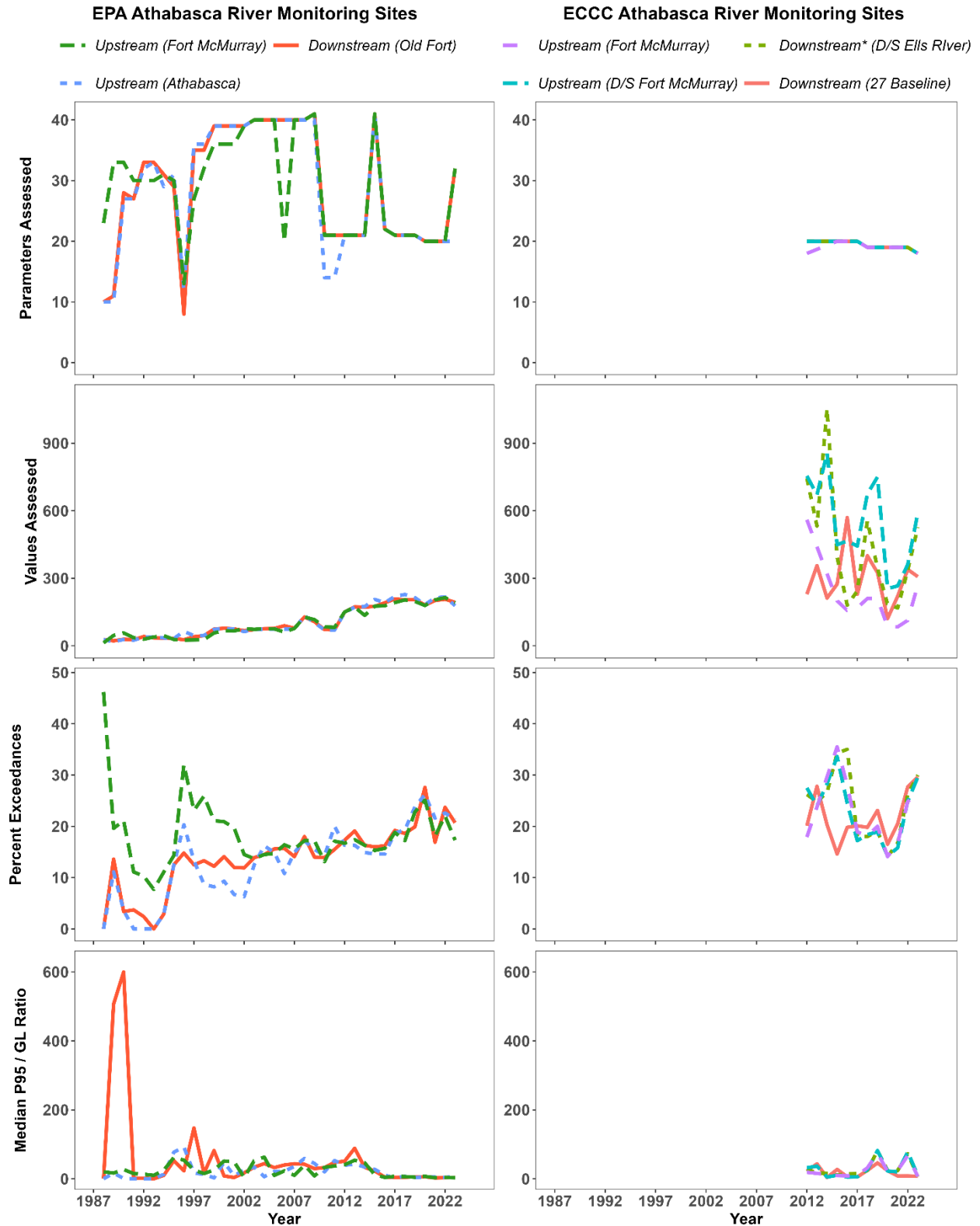


Figure I174: Comparison between exceedances at upstream and downstream sites on the Athabasca River when considering guidelines protective of indigenous use from consumption of surface water and aquatic organisms.

## HC-SWQ-RA Exceedances Above Detection

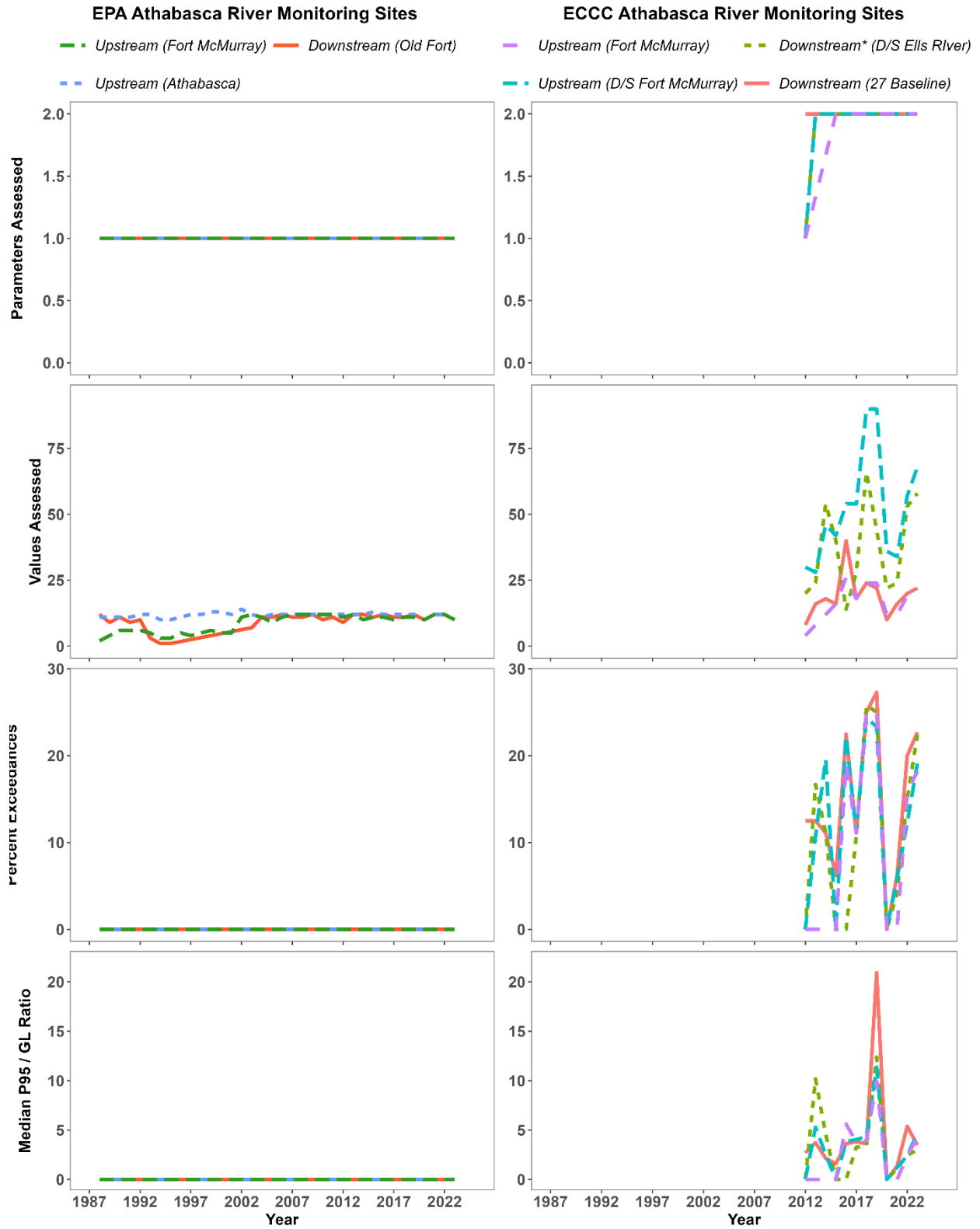


Figure I175: Comparison between exceedances at upstream and downstream sites on the Athabasca River when considering Health Canada recreation aesthetics guidelines.

## HC-DW-MAC Exceedances Above Detection

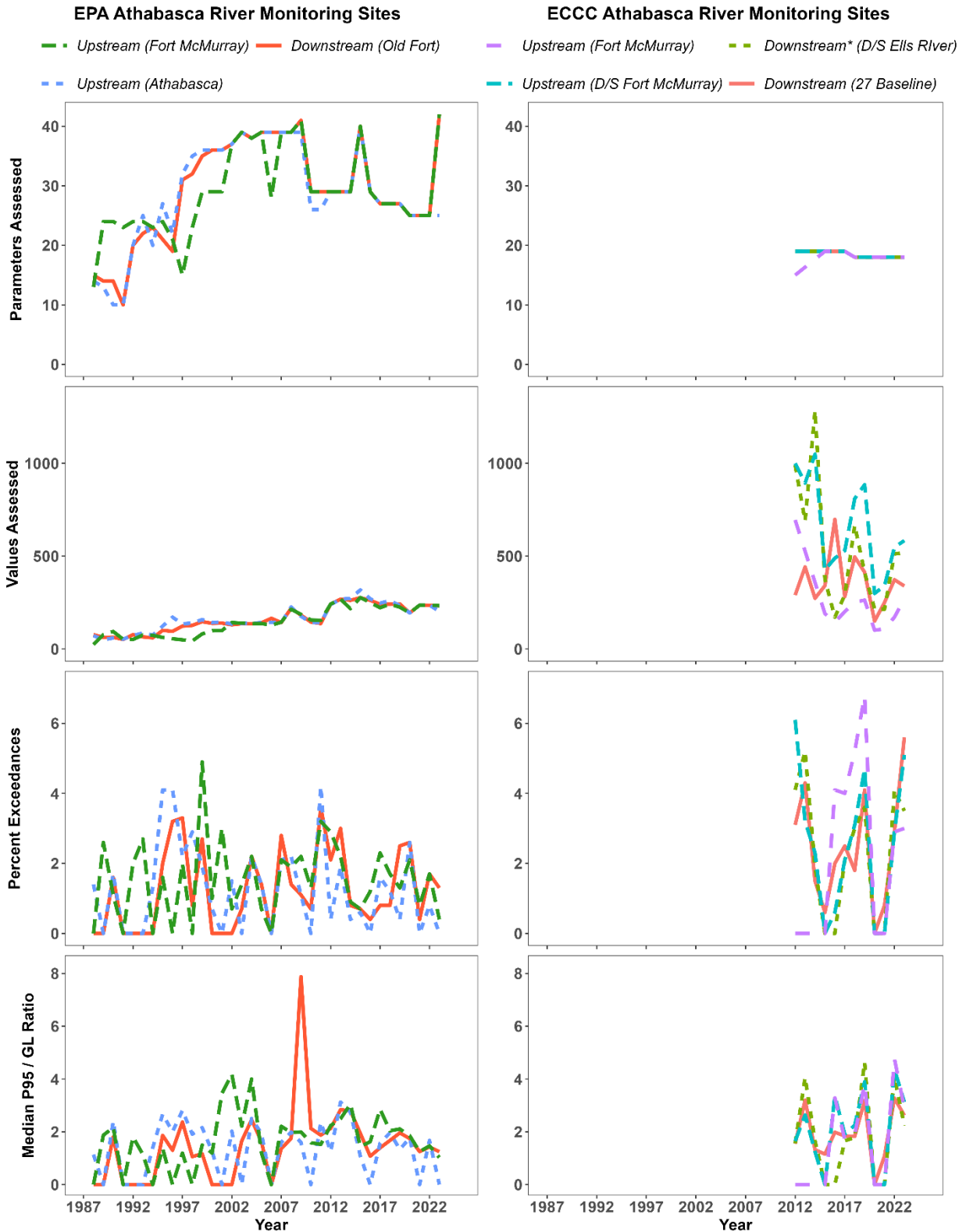


Figure I176: Comparison between exceedances at upstream and downstream sites on the Athabasca River when considering Health Canada drinking water maximum acceptable concentration guidelines.



## HC-DW-AO Exceedances Above Detection

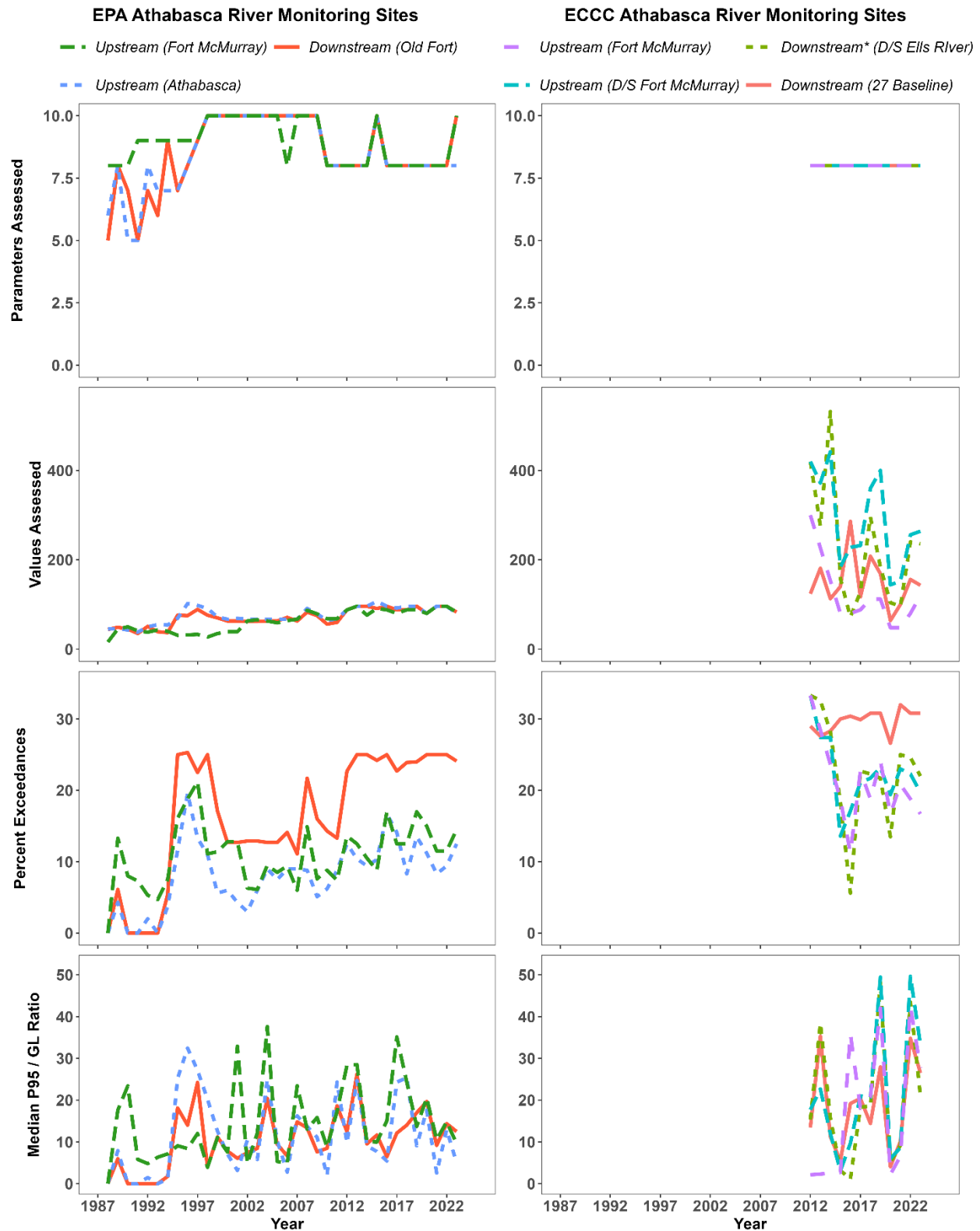


Figure I177: Comparison between exceedances at upstream and downstream sites on the Athabasca River when considering Health Canada drinking water aesthetics objectives.

## EPA-SWQ-RA Exceedances Above Detection

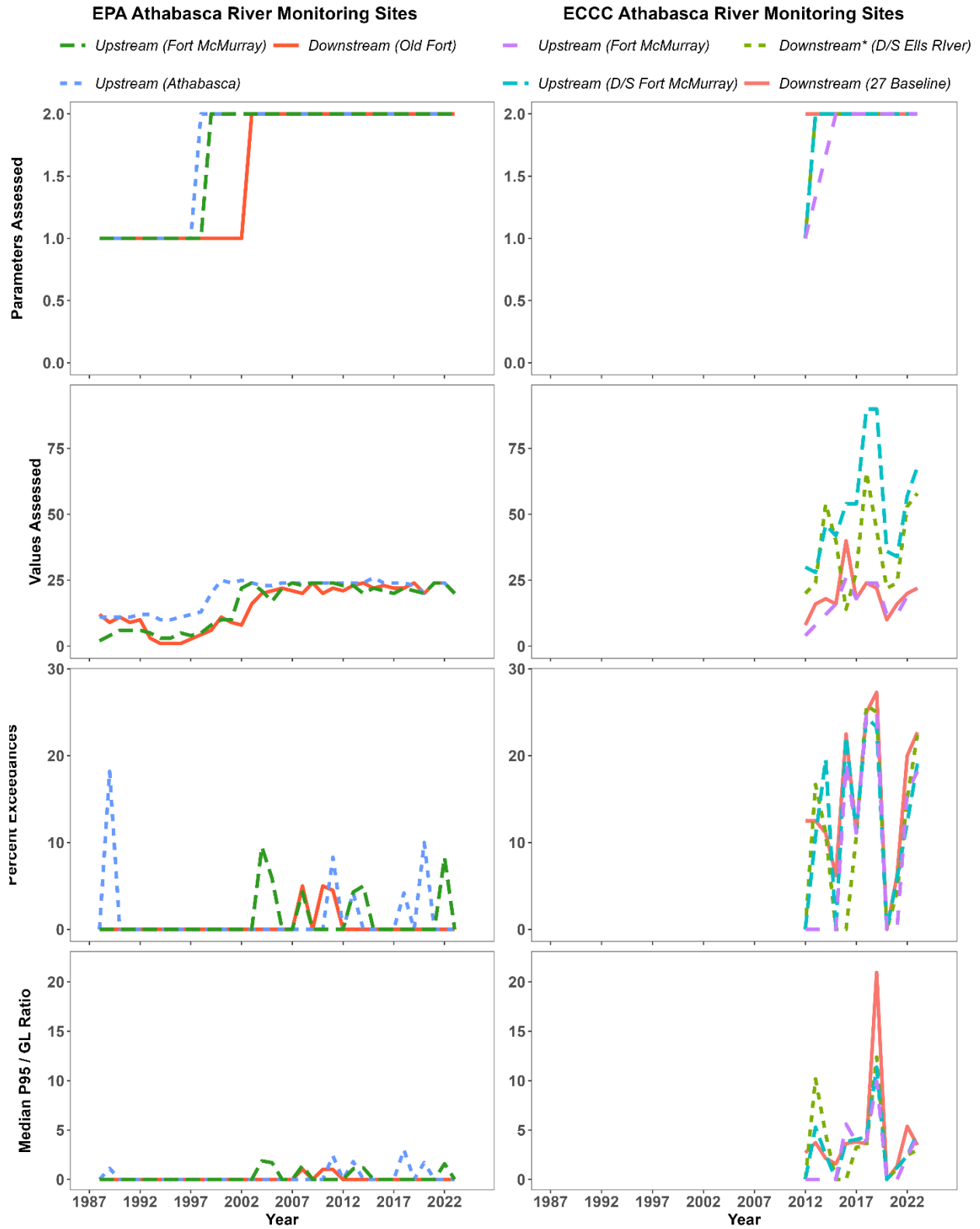


Figure I178: Comparison between exceedances at upstream and downstream sites on the Athabasca River when considering Alberta EPA recreation aesthetics guidelines.

## EPA-SWQ-PAL-CHRONIC Exceedances Above Detection

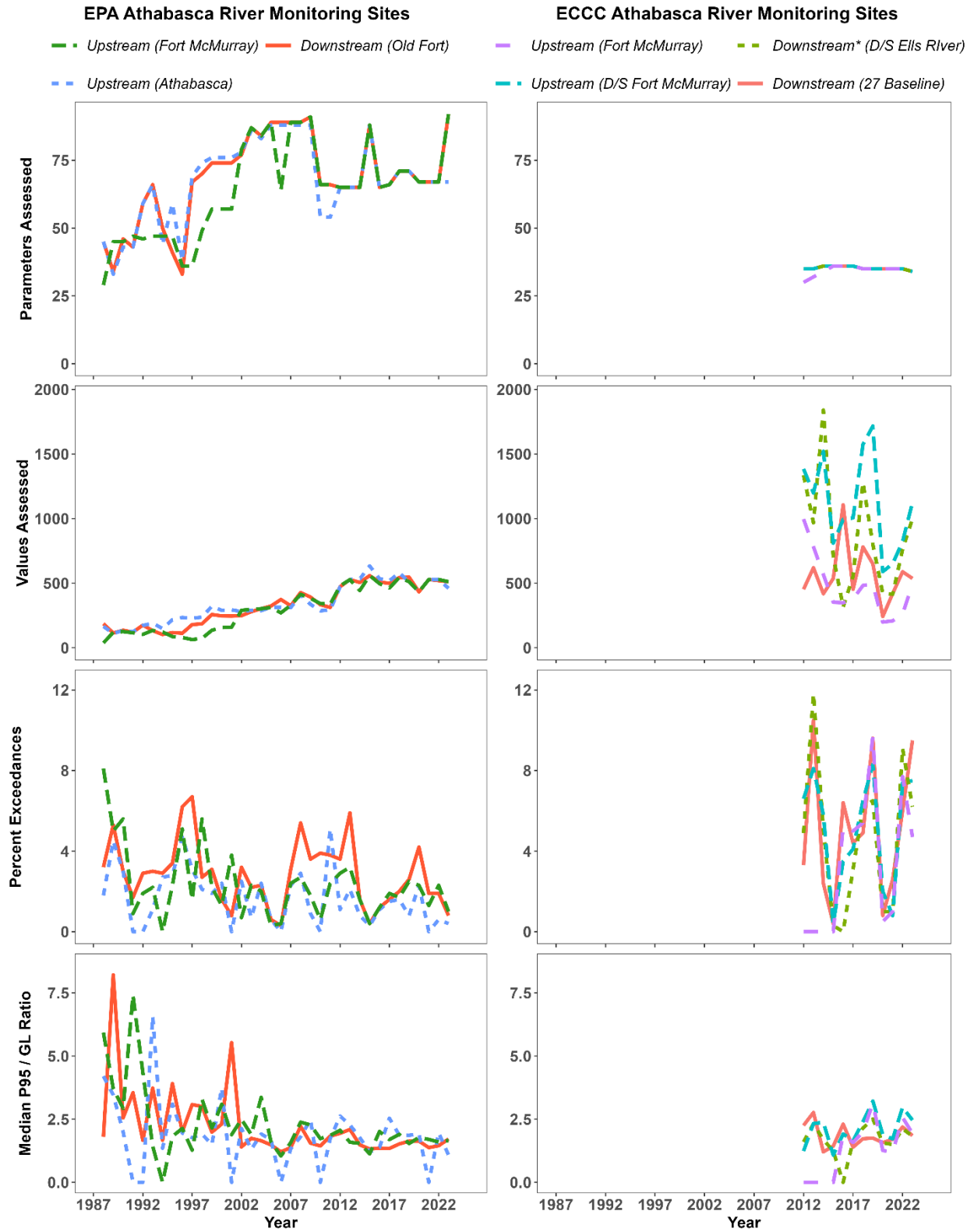


Figure I179: Comparison between exceedances at upstream and downstream sites on the Athabasca River when considering Alberta EPA protection of aquatic life chronic guidelines.

## EPA-SWQ-PAL-ACUTE Exceedances Above Detection

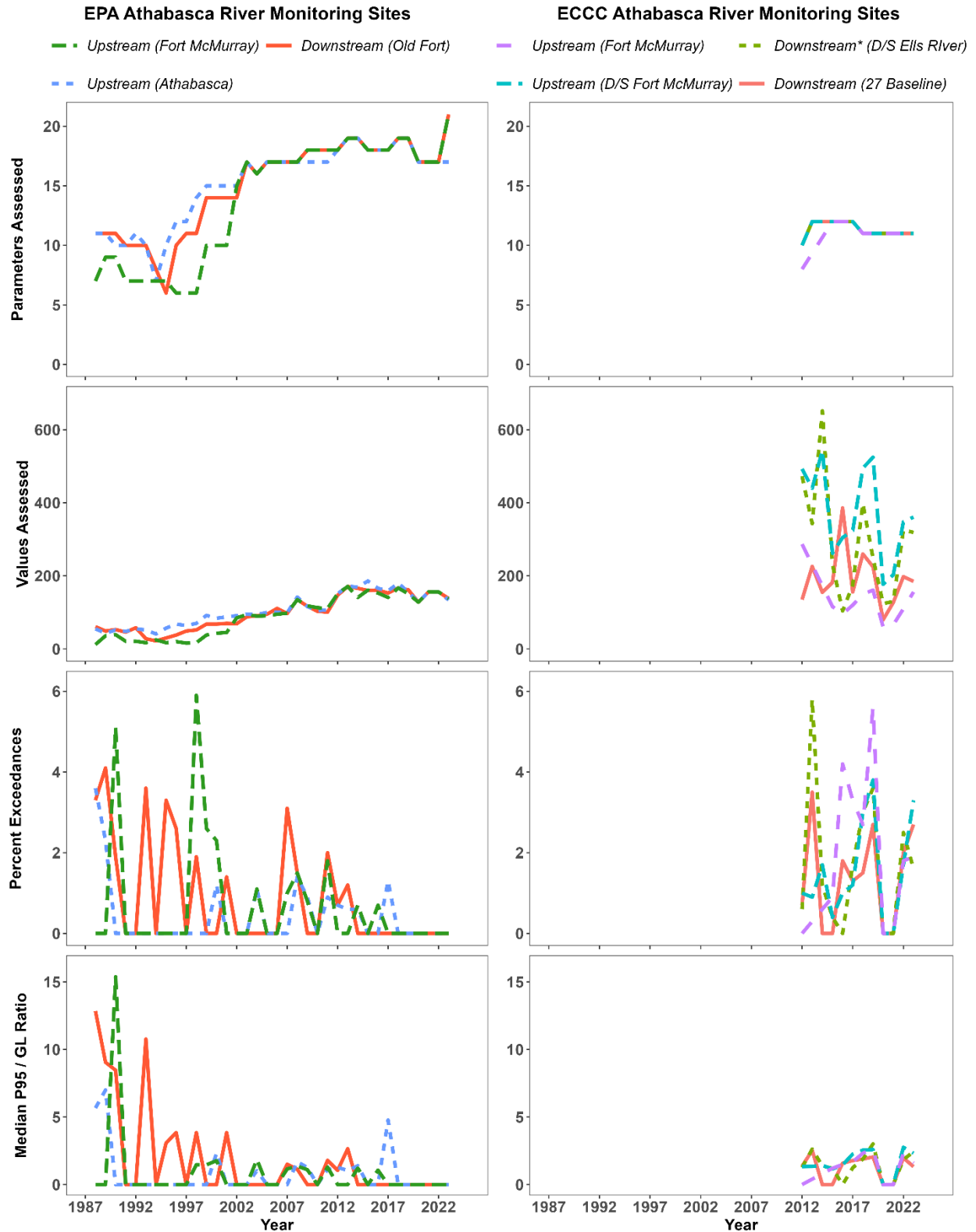


Figure I180: Comparison between exceedances at upstream and downstream sites on the Athabasca River when considering Alberta EPA protection of aquatic life acute guidelines.

## EPA-SWQ-LIVESTOCK Exceedances Above Detection

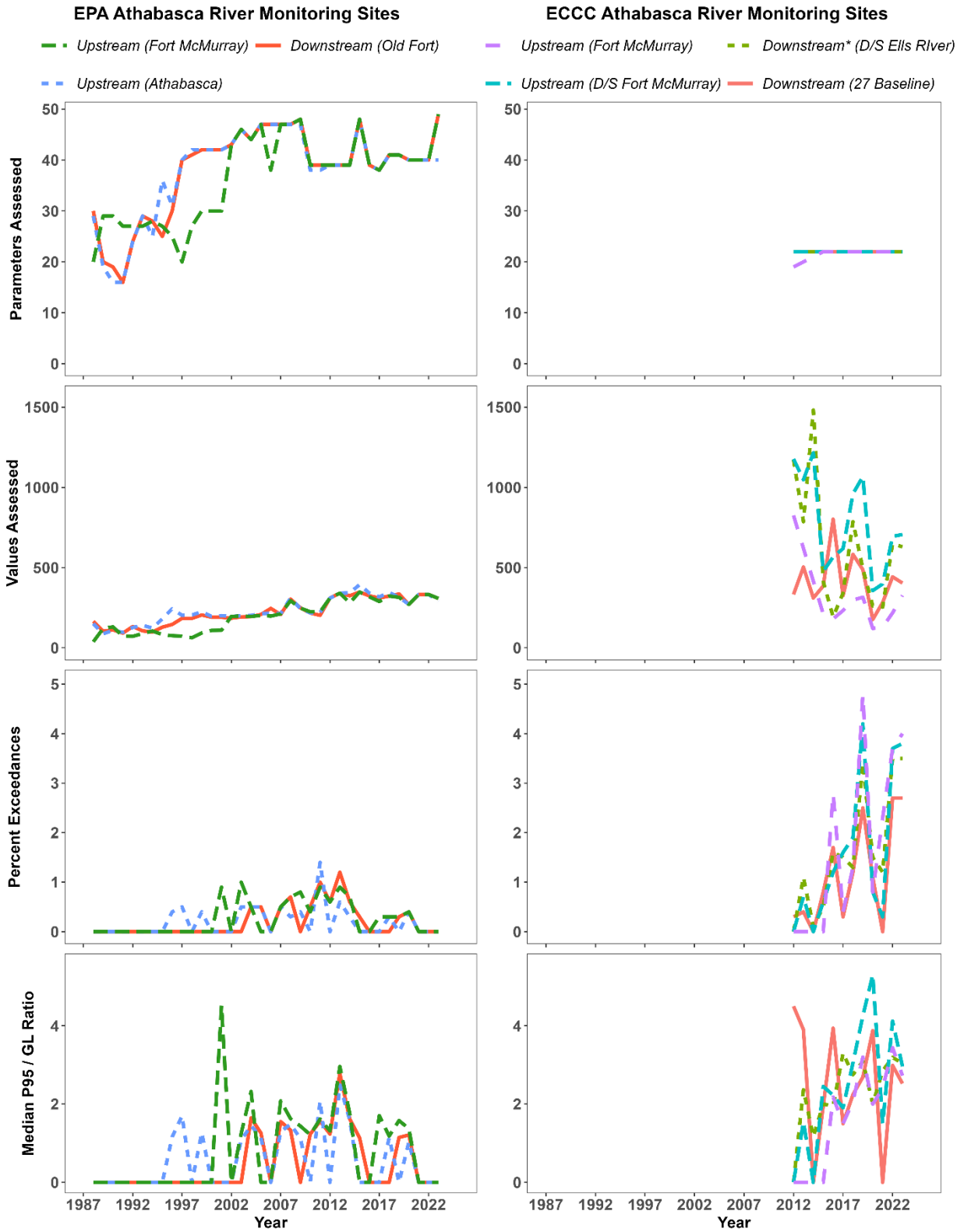


Figure I181: Comparison between exceedances at upstream and downstream sites on the Athabasca River when considering Alberta EPA protection of livestock watering guidelines.

## EPA-SWQ-AG-IRRIGATION Exceedances Above Detection

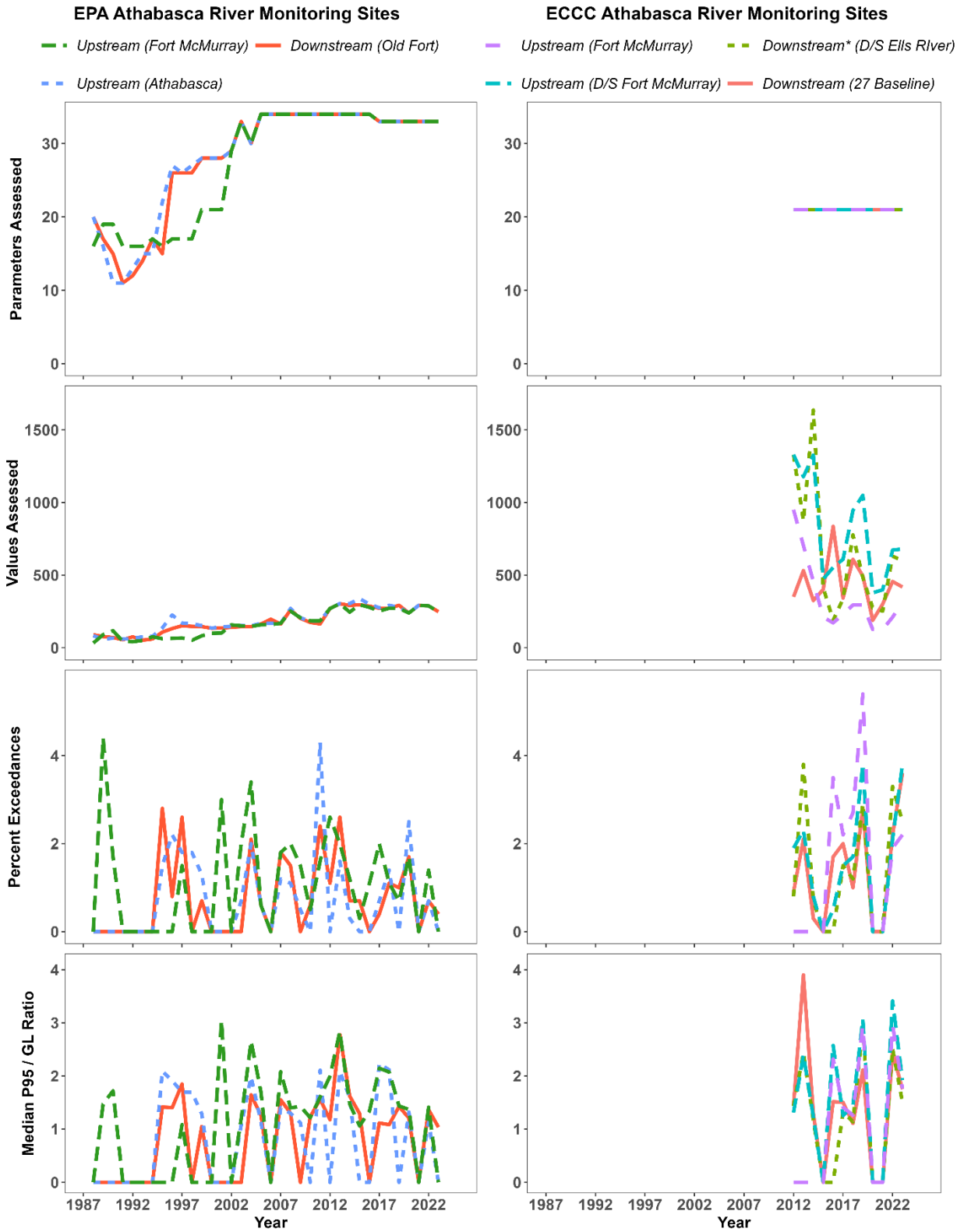


Figure I182: Comparison between exceedances at upstream and downstream sites on the Athabasca River when considering Alberta EPA protection of irrigation water guidelines.

## ECCC-SWQ-FEQG-Acute Exceedances Above Detection

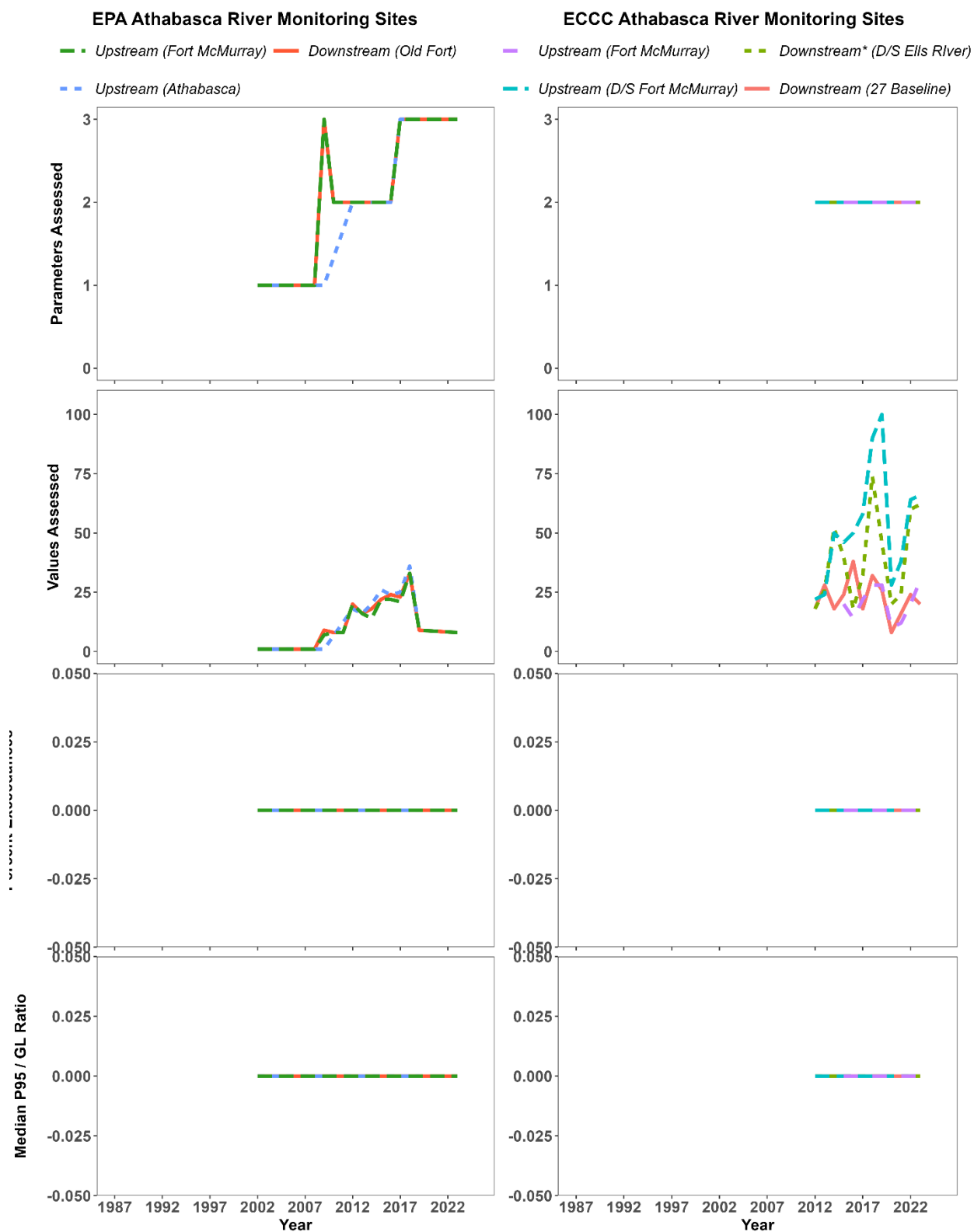


Figure I183: Comparison between exceedances at upstream and downstream sites on the Athabasca River when considering ECCC Federal Environmental Quality Guidelines protection of aquatic life acute guidelines.

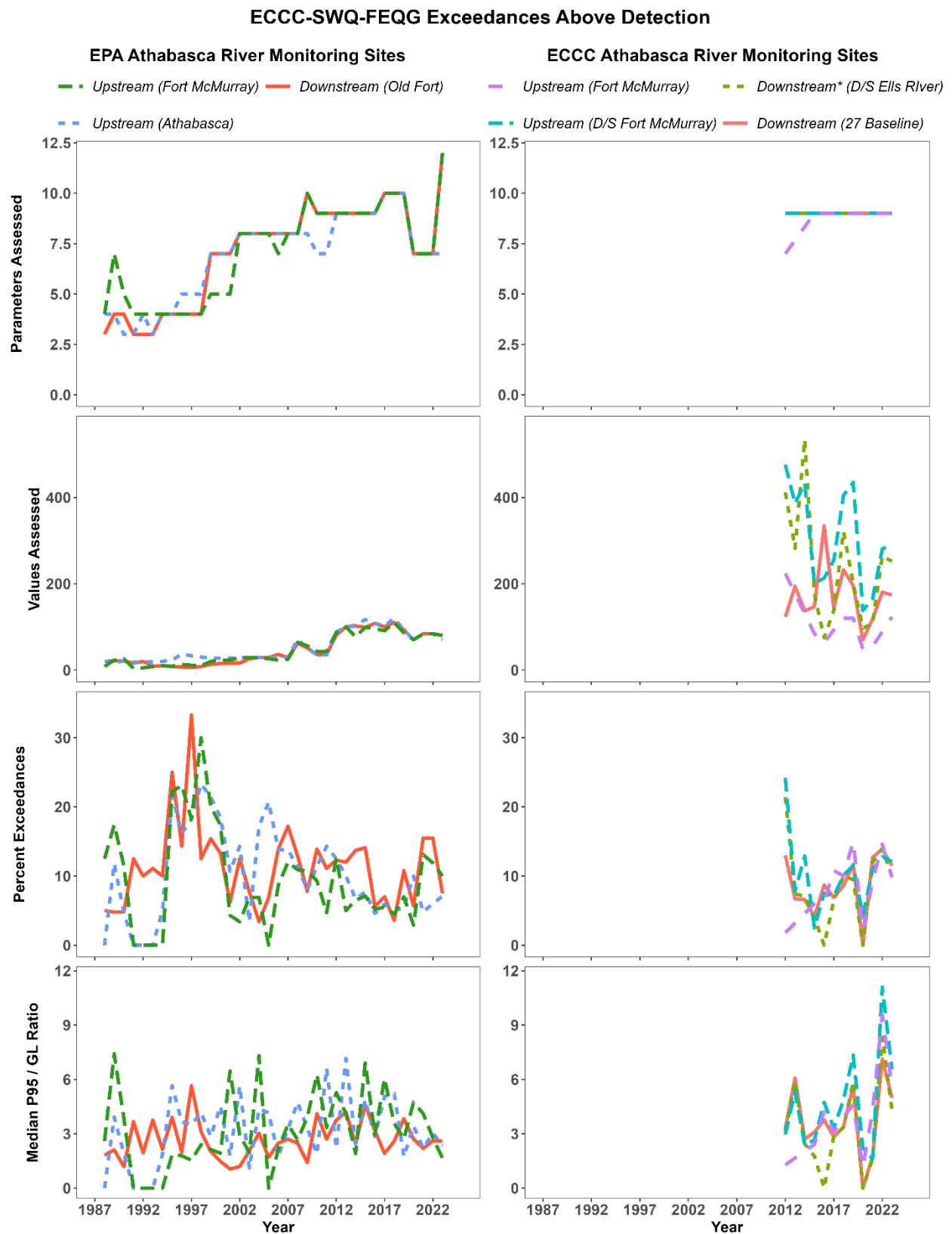


Figure I184: Comparison between exceedances at upstream and downstream sites on the Athabasca River when considering ECCC Federal Environmental Quality Guidelines protection of aquatic life chronic guidelines.



## CCME-SWQ-PAL-CHRONIC Exceedances Above Detection

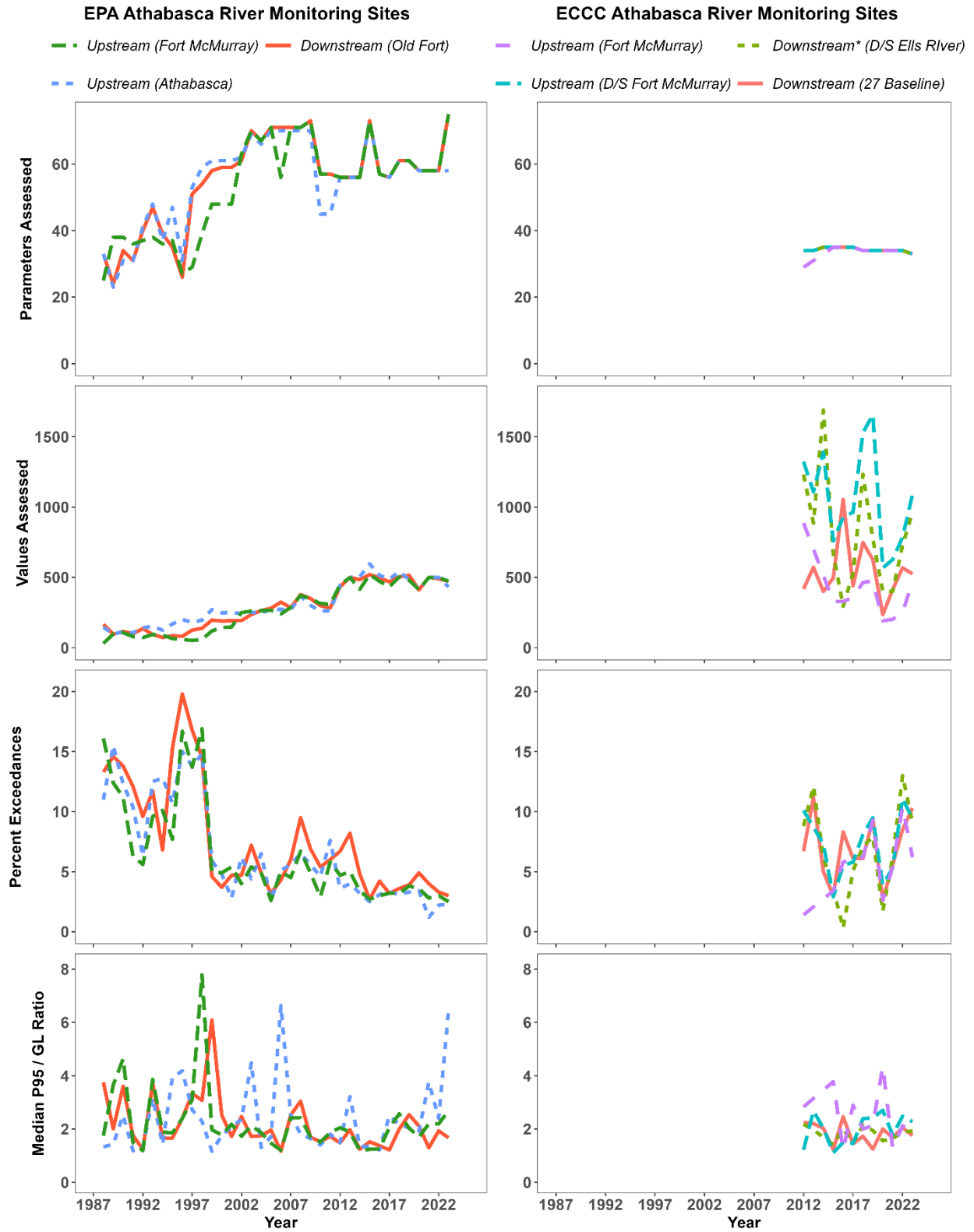


Figure I185: Comparison between exceedances at upstream and downstream sites on the Athabasca River when considering CCME protection of aquatic life chronic guidelines.

## CCME-SWQ-PAL-ACUTE Exceedances Above Detection

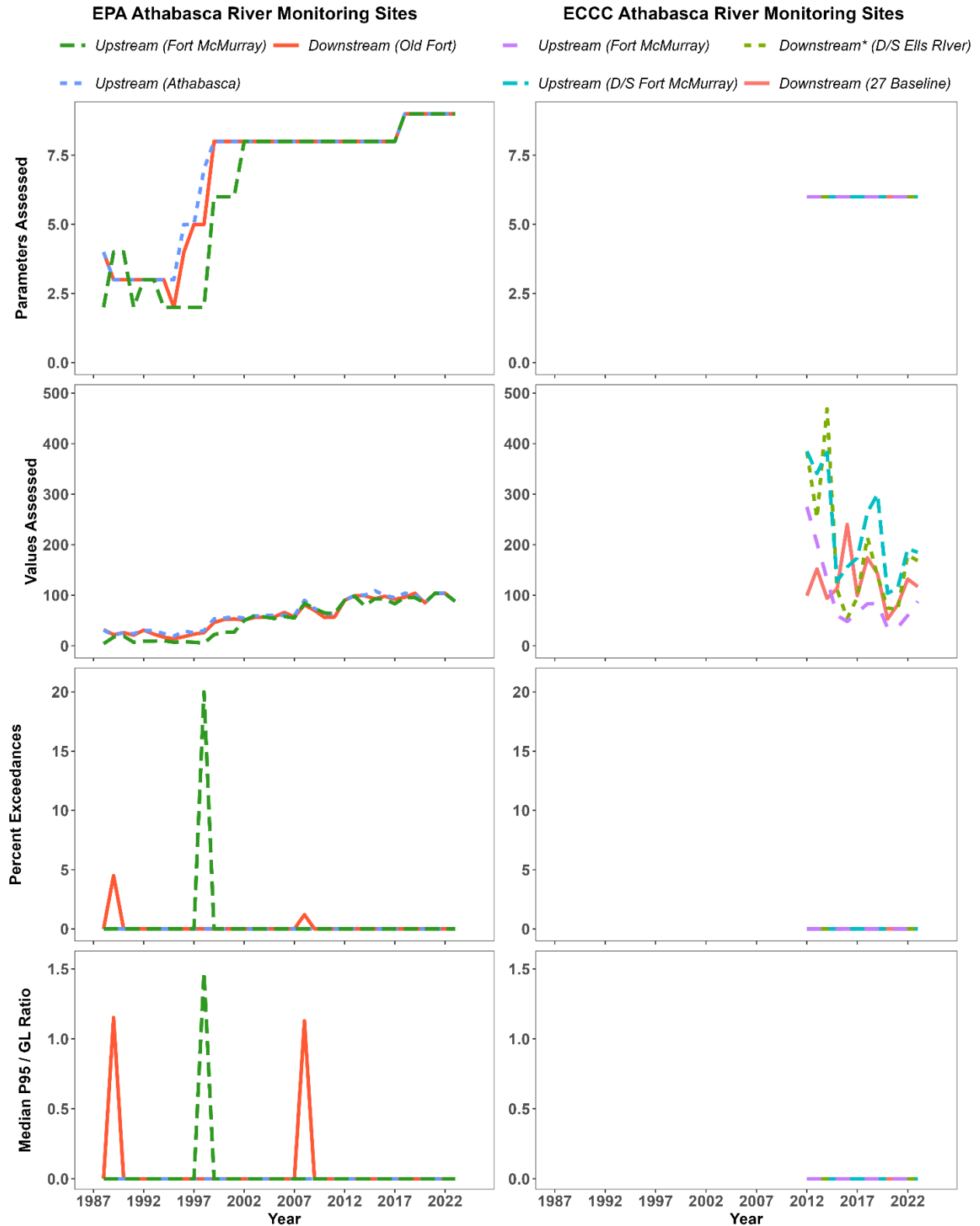


Figure I186: Comparison between exceedances at upstream and downstream sites on the Athabasca River when considering CCME protection of aquatic life acute guidelines.

## CCME-SWQ-AG-LIVESTOCK Exceedances Above Detection

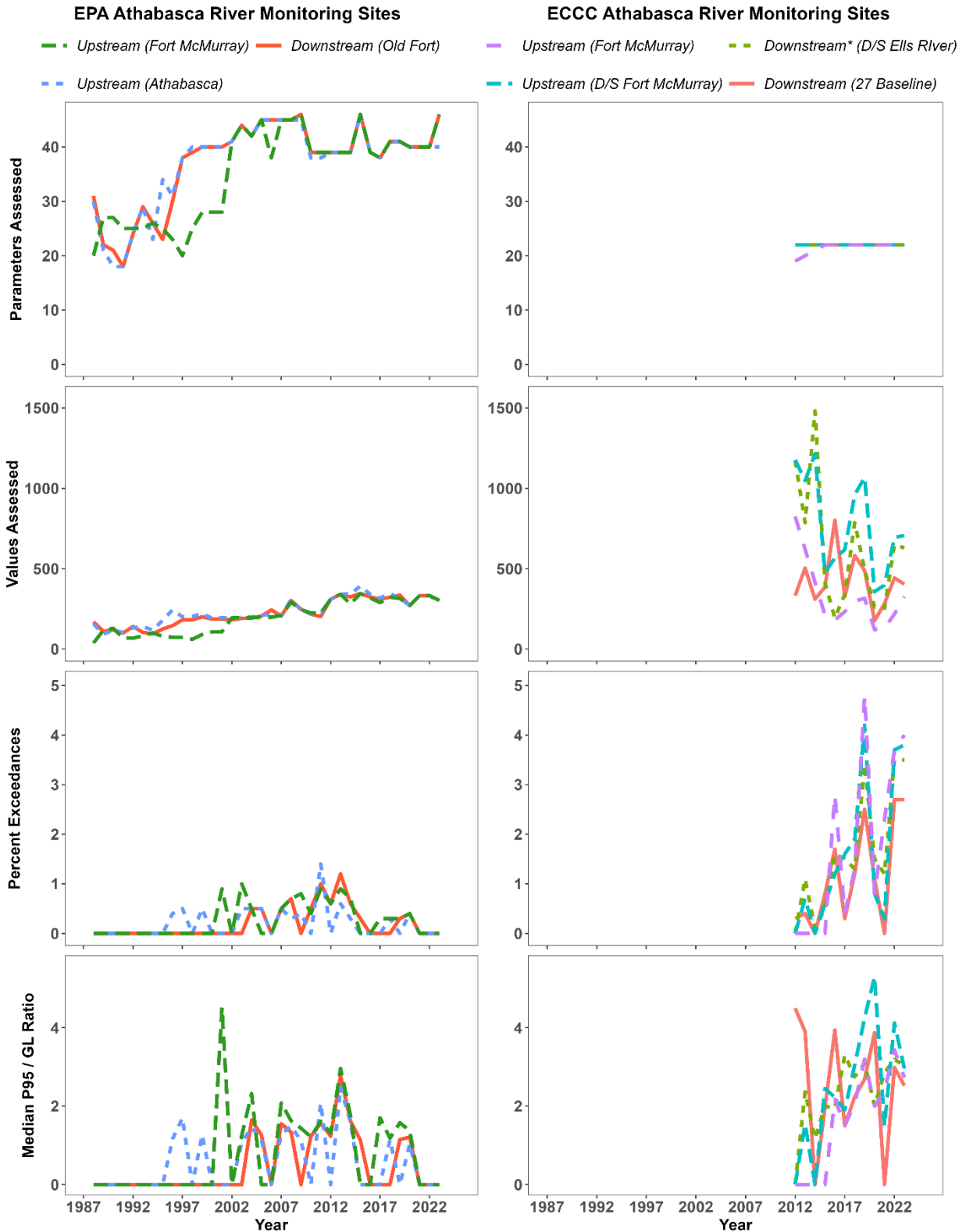


Figure I187: Comparison between exceedances at upstream and downstream sites on the Athabasca River when considering CCME protection of livestock watering guidelines.

## CCME-SWQ-AG-IRRIGATION Exceedances Above Detection

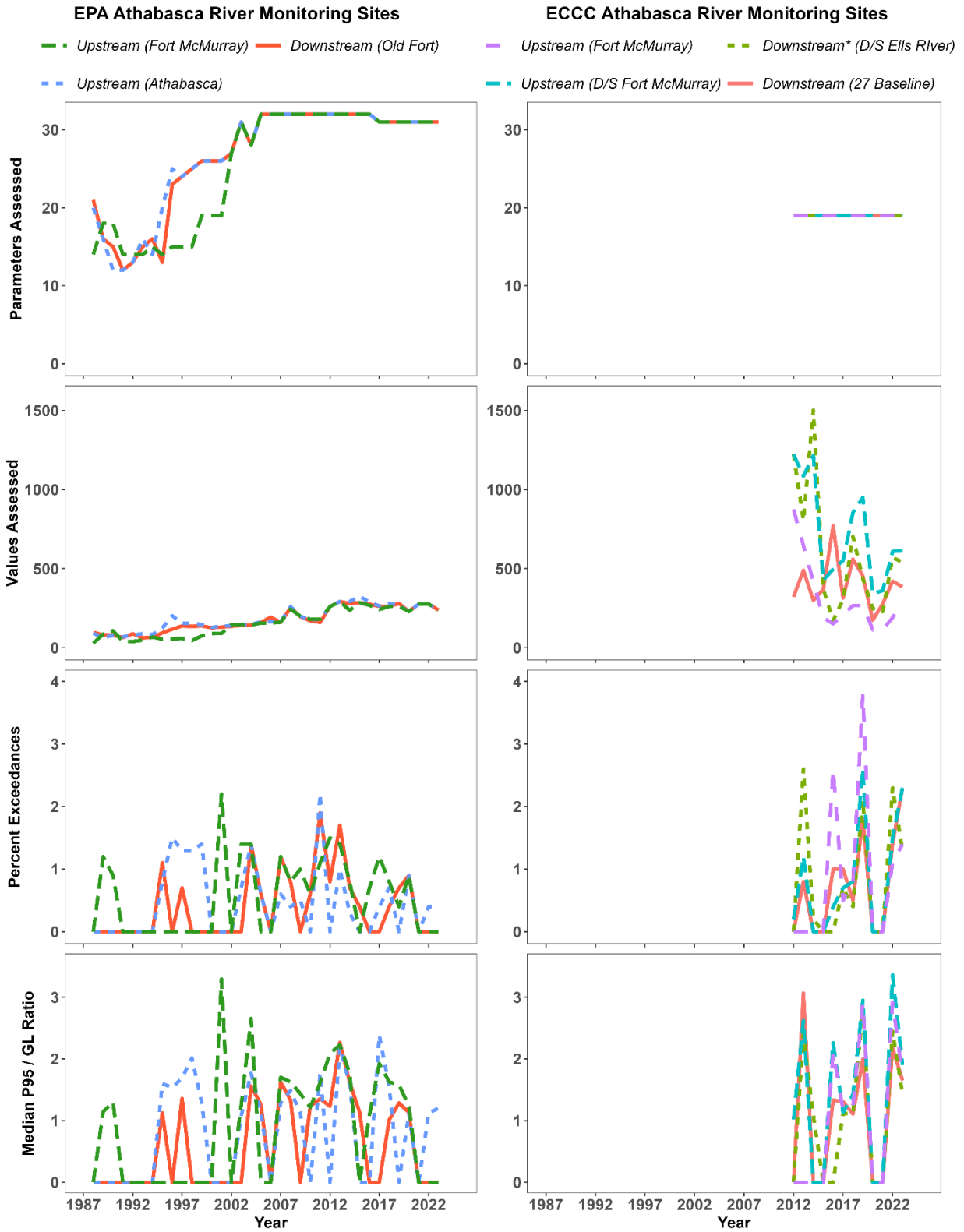


Figure I188: Comparison between exceedances at upstream and downstream sites on the Athabasca River when considering CCME protection of irrigation water guidelines.

## All Guideline Exceedances Above Detection

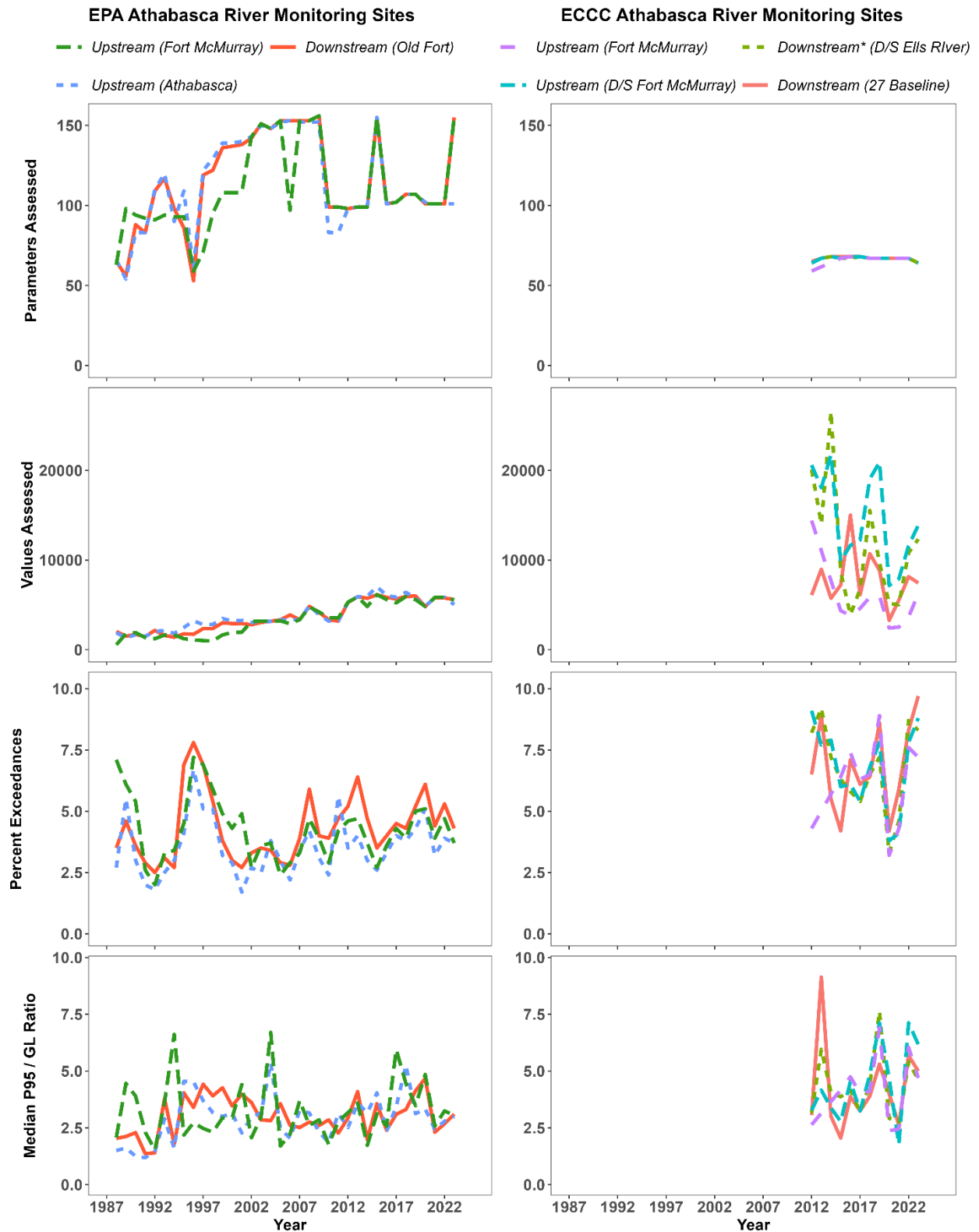


Figure I189: Comparison between exceedances at upstream and downstream sites on the Athabasca River when considering all guidelines.

## I.3.2 Athabasca River Tributaries

### 3.2.1 Steepbank River

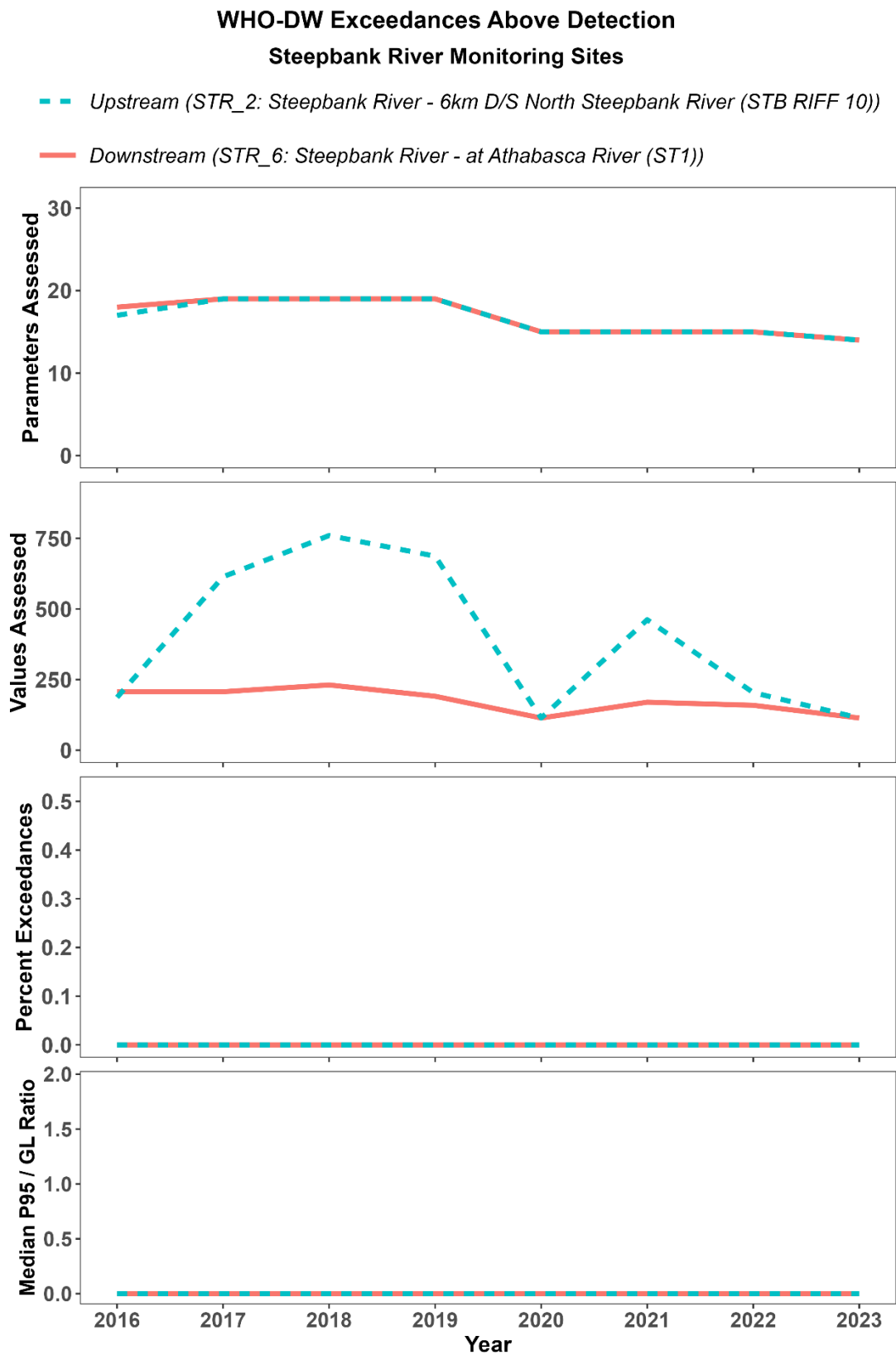


Figure I190: Comparison between exceedances at upstream and downstream sites on the Steepbank River when considering WHO drinking water guidelines.

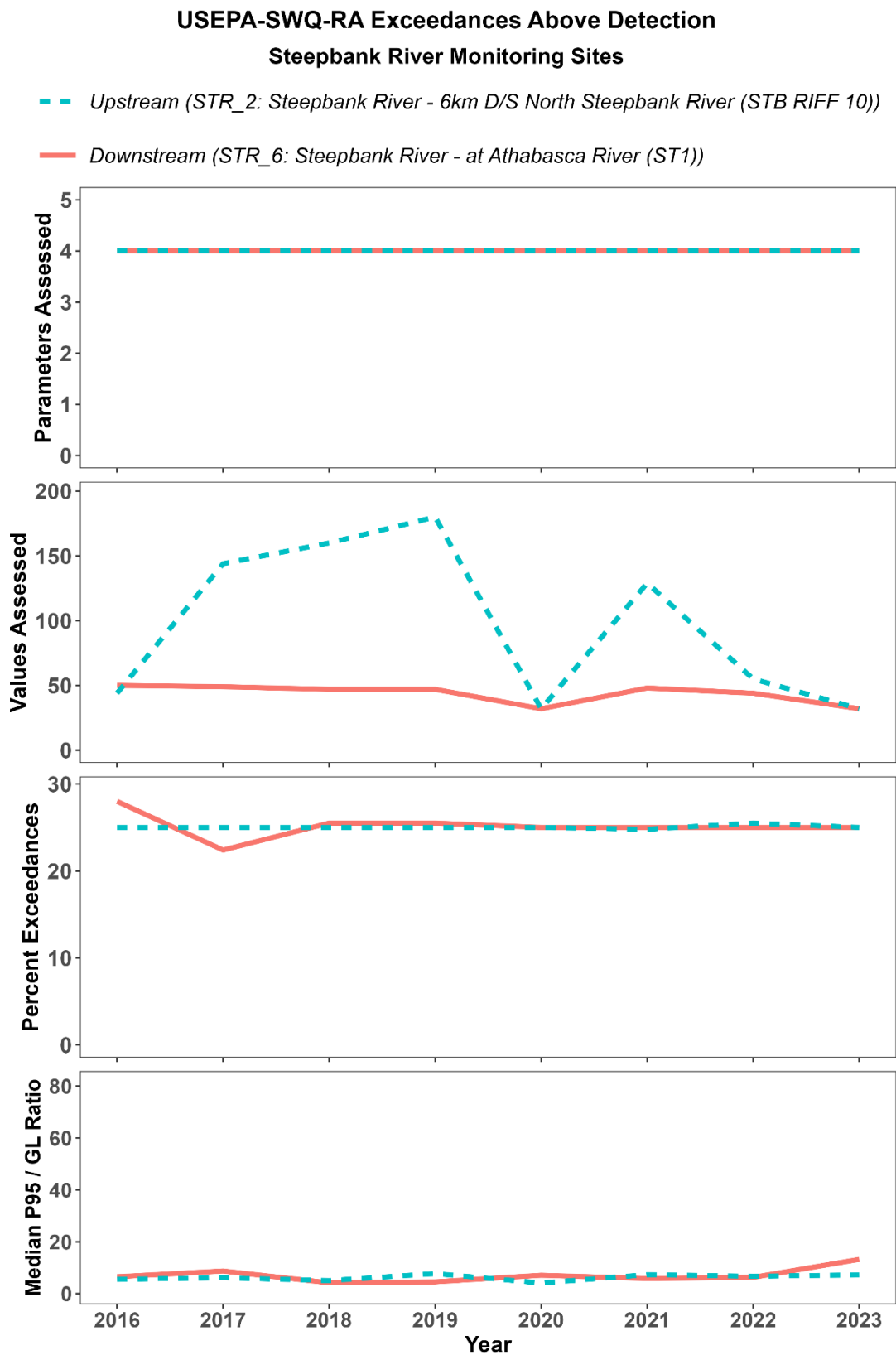


Figure I191: Comparison between exceedances at upstream and downstream sites on the Steepbank River when considering USEPA recreational aesthetics guidelines.



# **USEPA-SWQ-PAL-CHRONIC Exceedances Above Detection** **Steepbank River Monitoring Sites**

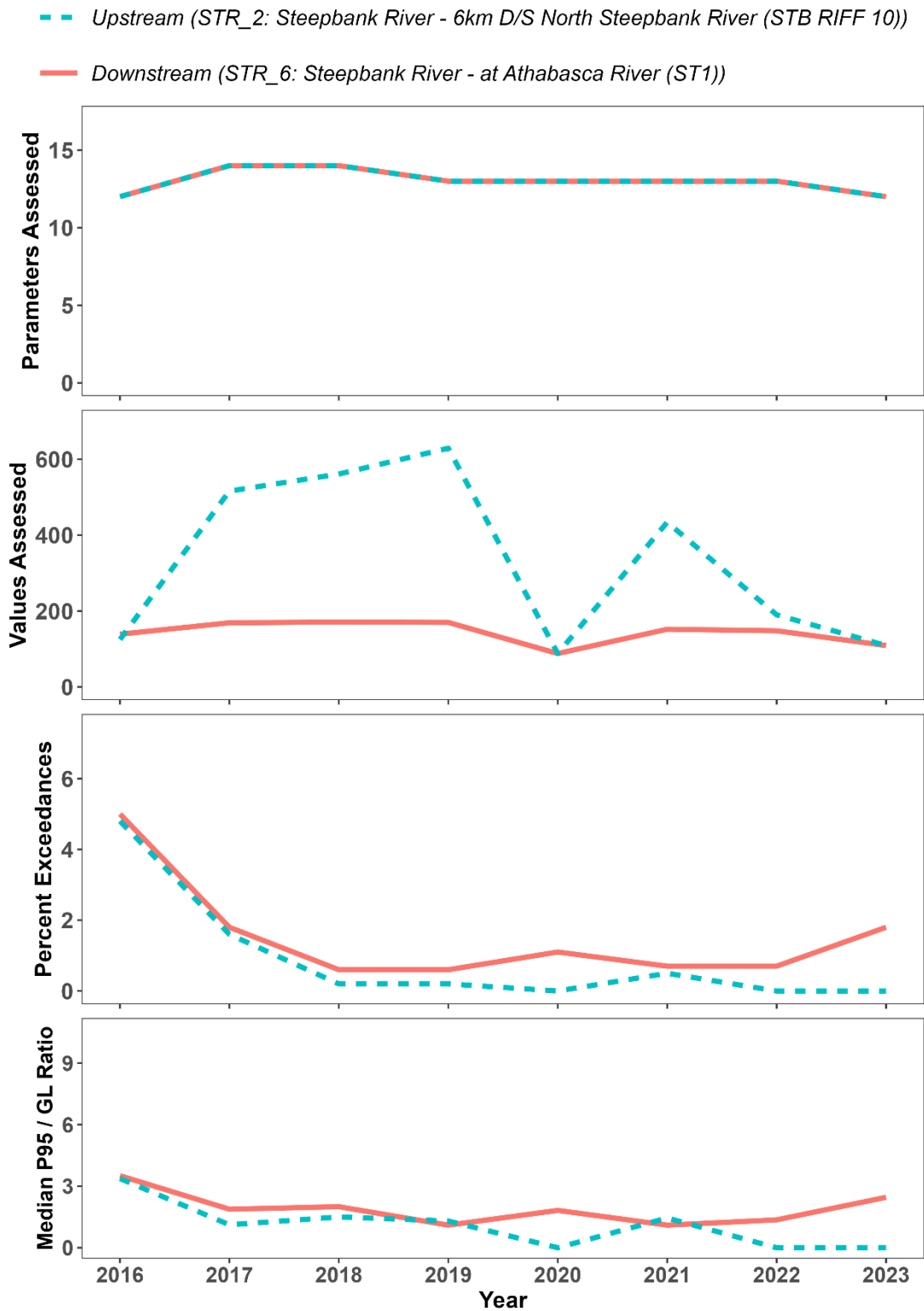


Figure I192: Comparison between exceedances at upstream and downstream sites on the Steepbank River when considering USEPA protection of aquatic life chronic guidelines.

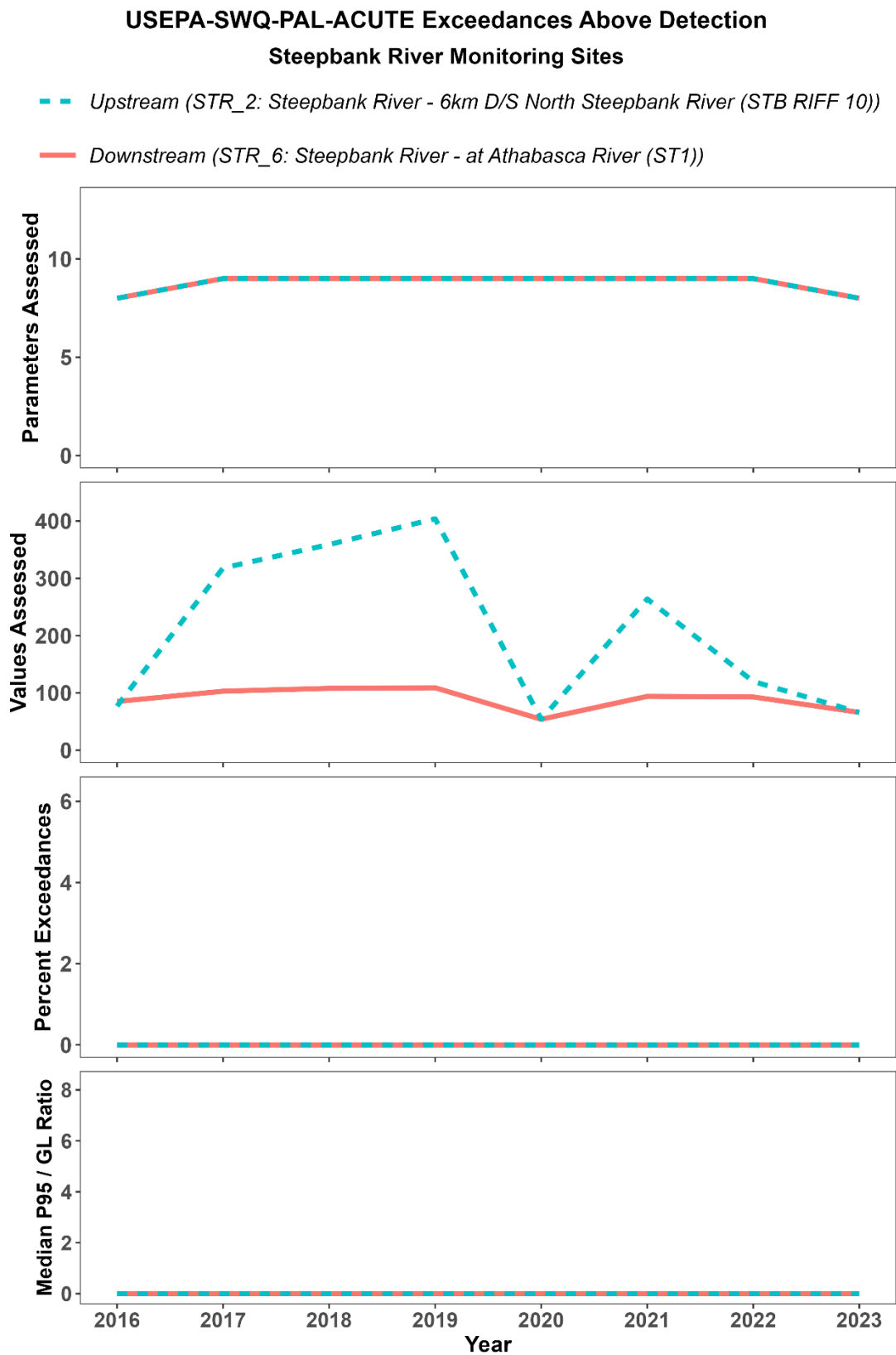


Figure I193: Comparison between exceedances at upstream and downstream sites on the Steepbank River when considering USEPA protection of aquatic life acute guidelines.

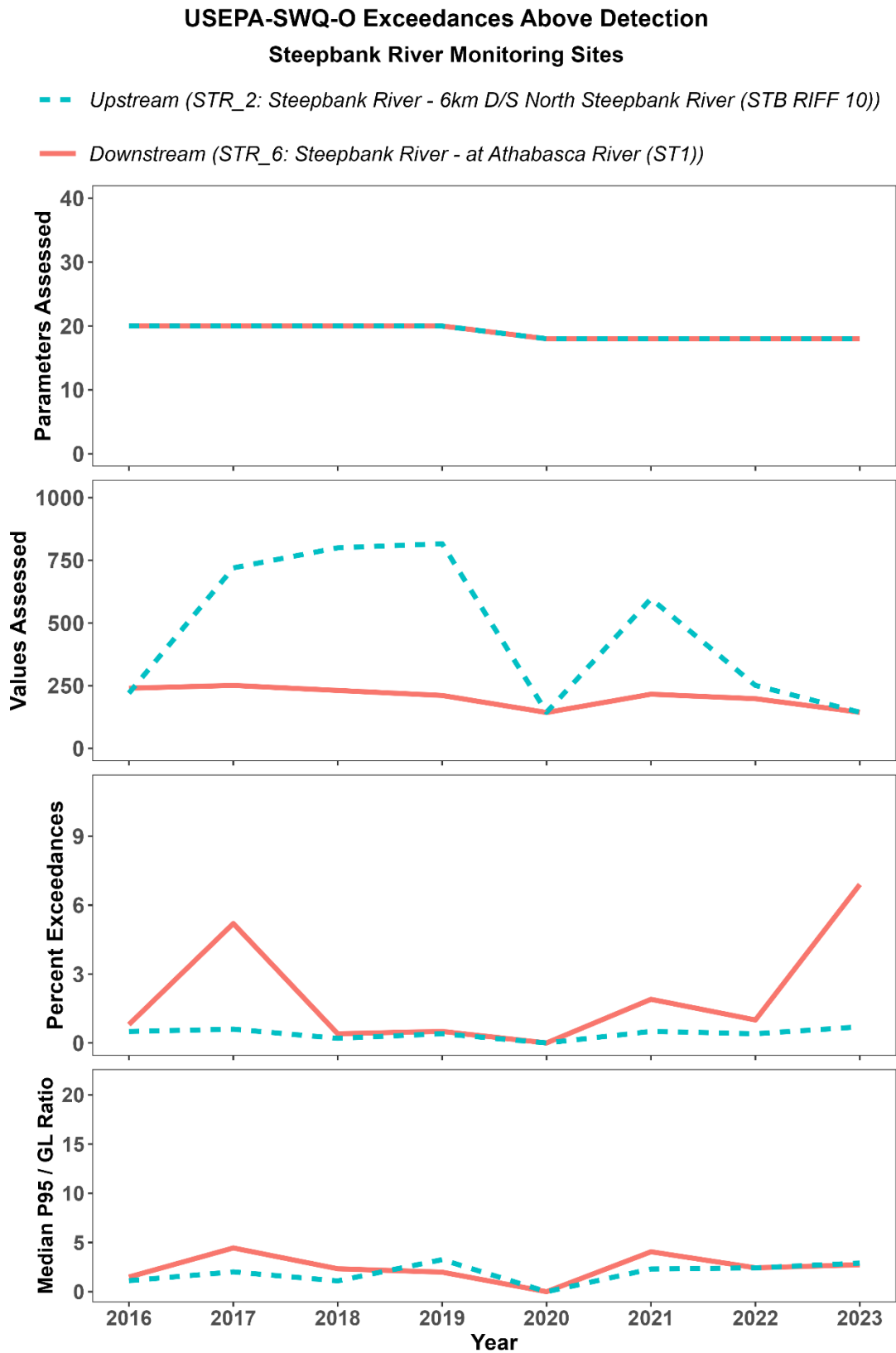


Figure I194: Comparison between exceedances at upstream and downstream sites on the Steepbank River when considering USEPA protection of human health from consumption of aquatic organisms guidelines.

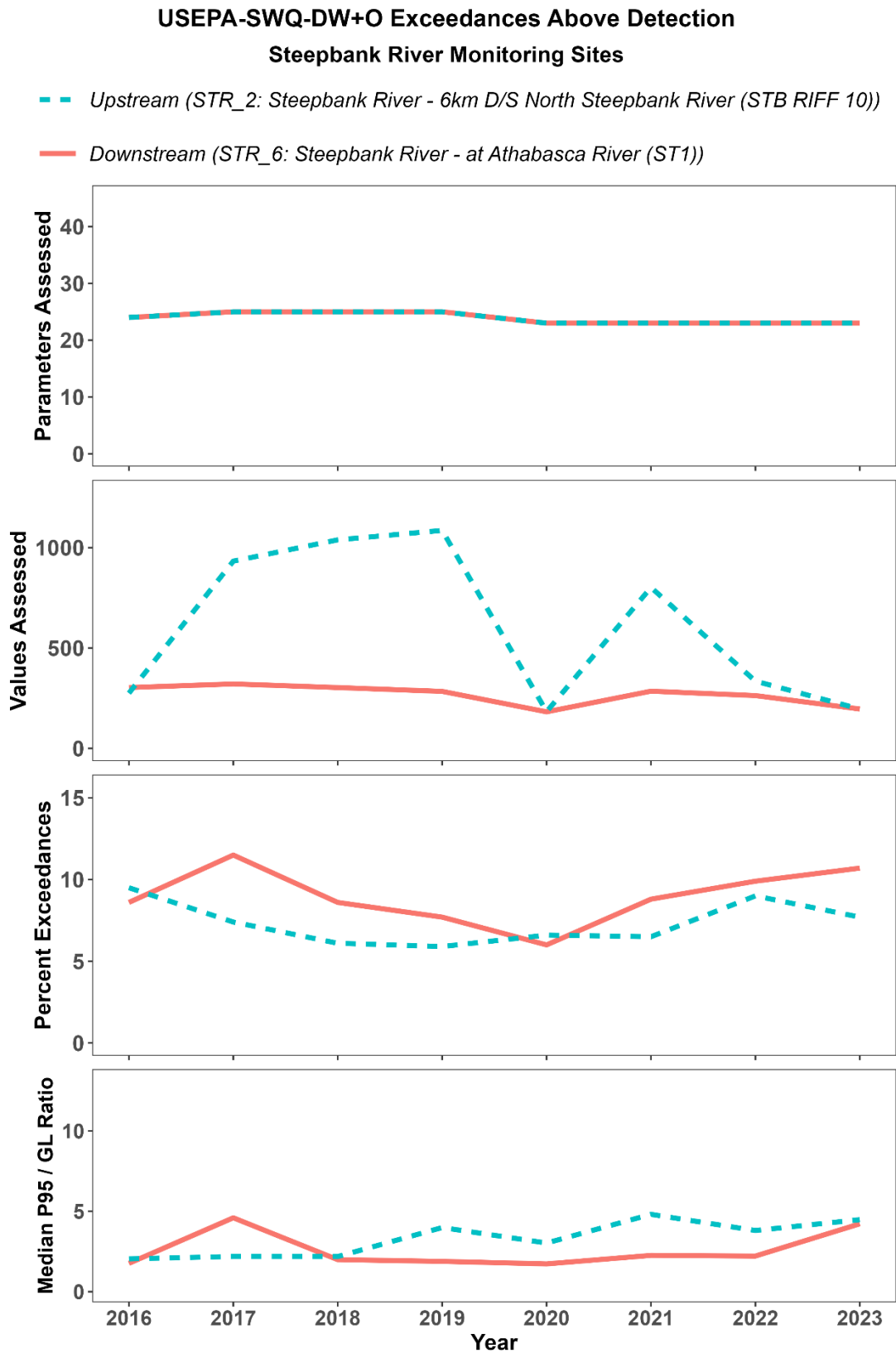


Figure I195: Comparison between exceedances at upstream and downstream sites on the Steepbank River when considering USEPA protection of human health from consumption of surface water and aquatic organisms guidelines.

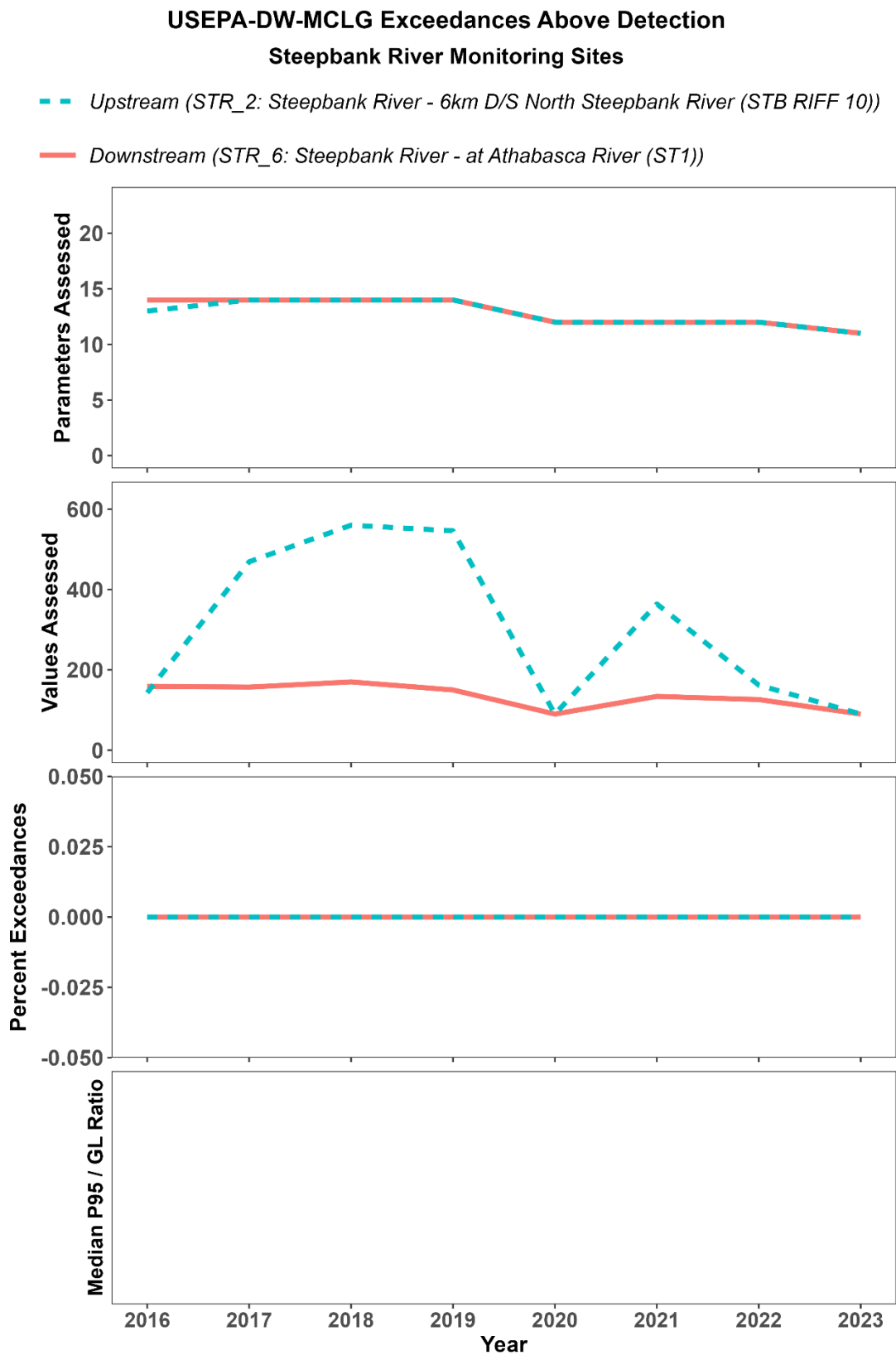


Figure I196: Comparison between exceedances at upstream and downstream sites on the Steepbank River when considering USEPA drinking water quality goals.

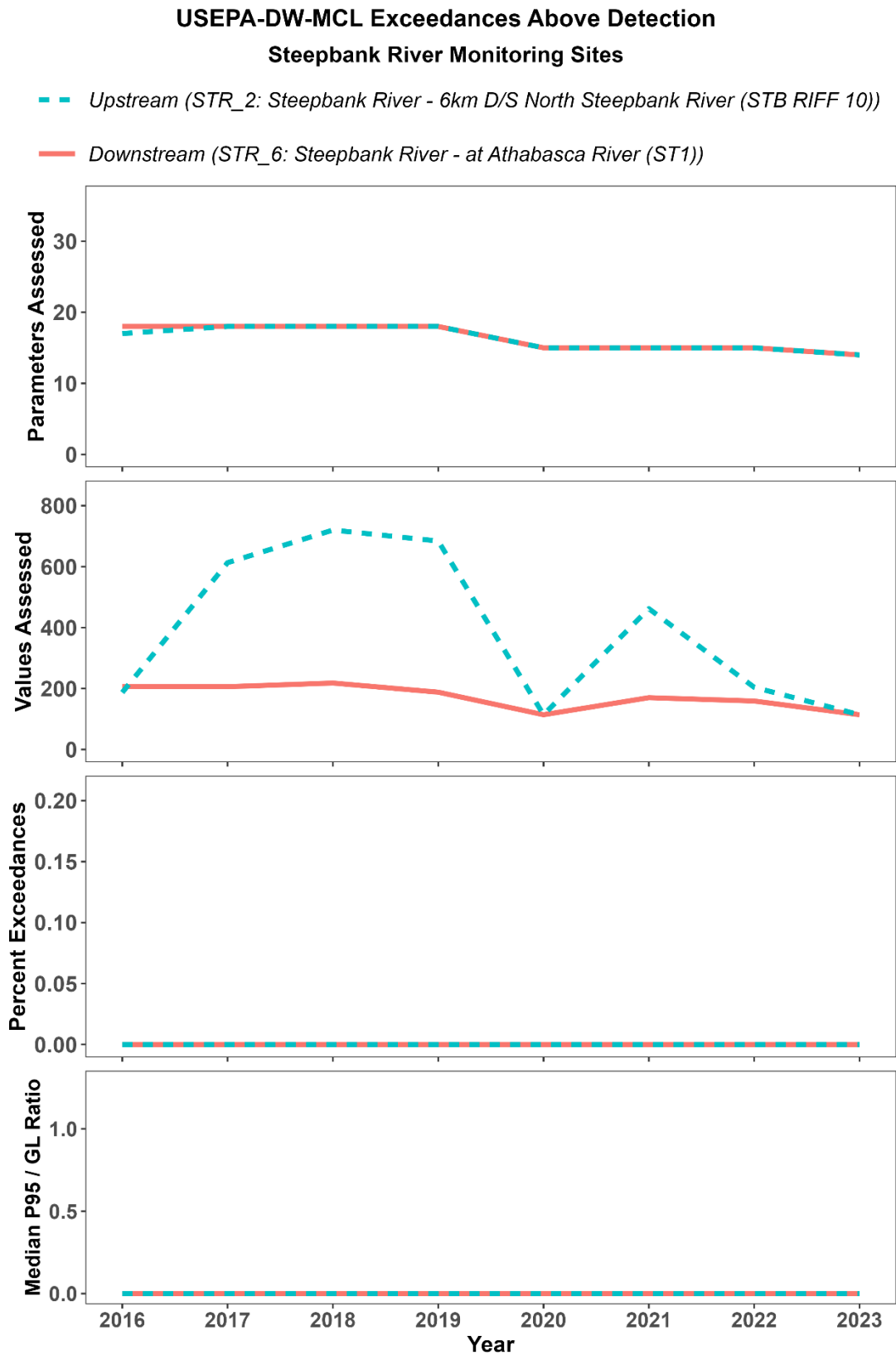


Figure I197: Comparison between exceedances at upstream and downstream sites on the Steepbank River when considering USEPA drinking water quality limits.

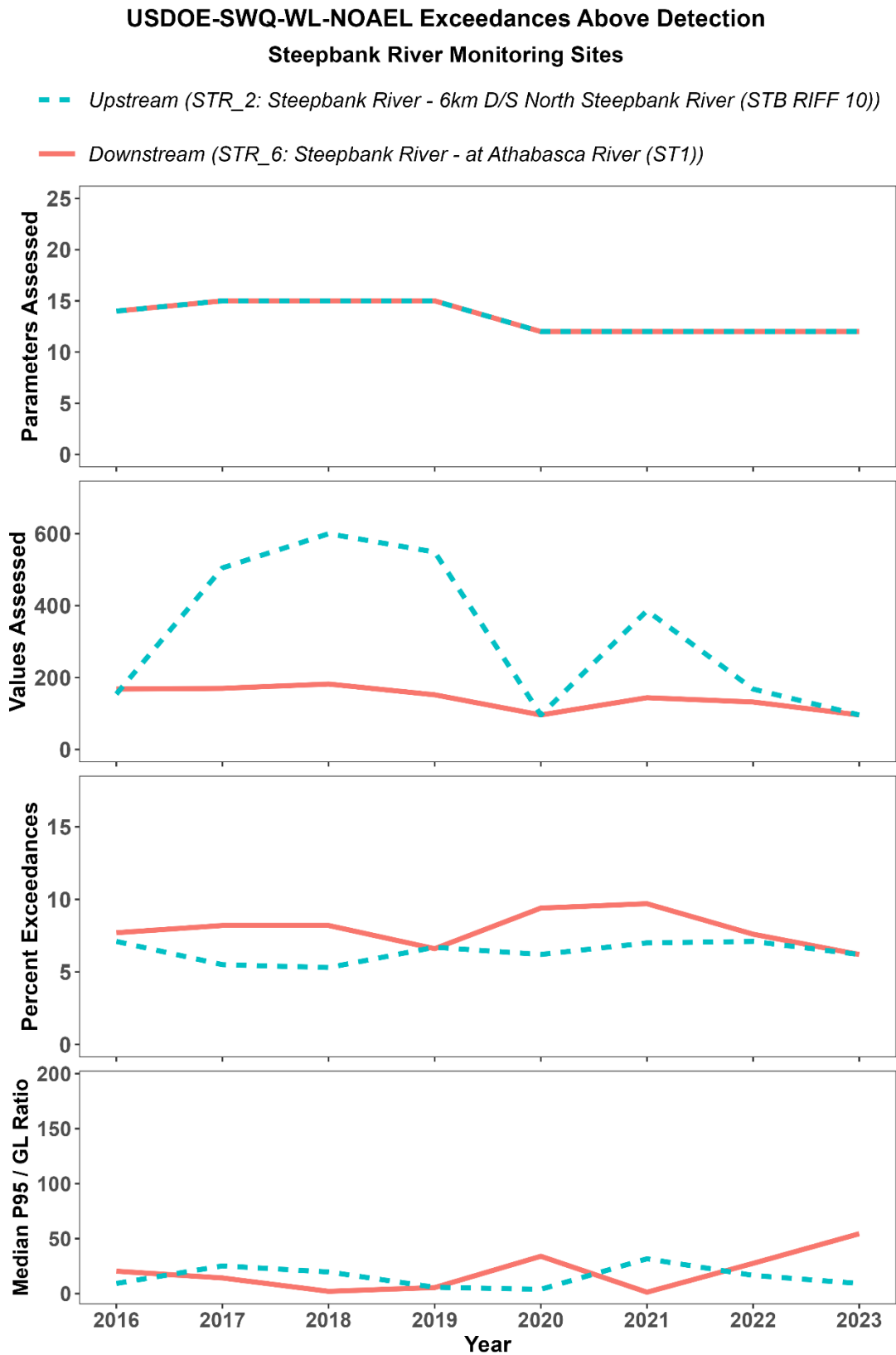


Figure I198: Comparison between exceedances at upstream and downstream sites on the Steepbank River when considering USEPA protection of piscivores NOAEL guidelines.

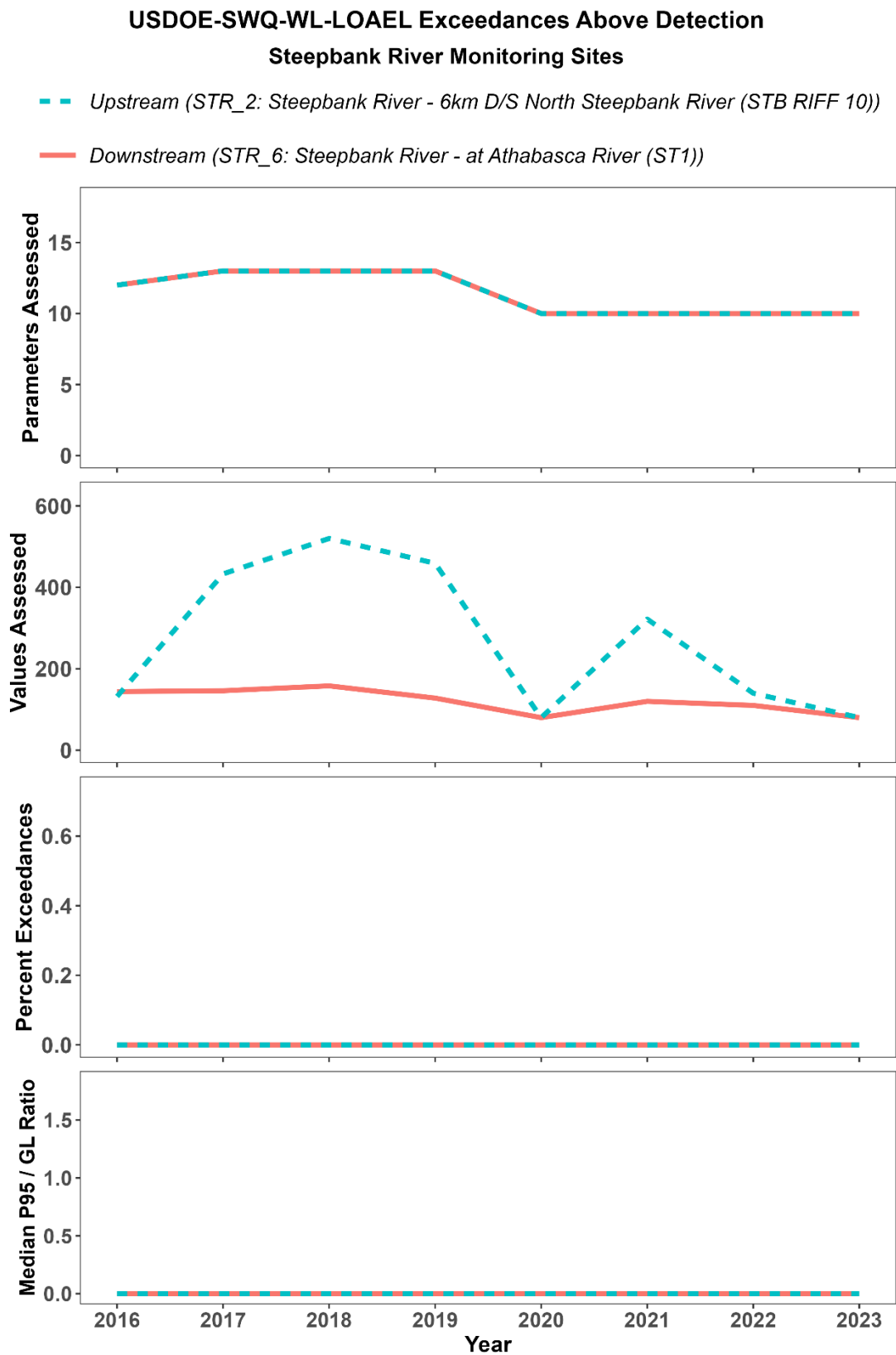


Figure I199: Comparison between exceedances at upstream and downstream sites on the Steepbank River when considering USEPA protection of piscivores LOAEL guidelines.



### Most Protective Guideline Exceedances Above Detection Steepbank River Monitoring Sites

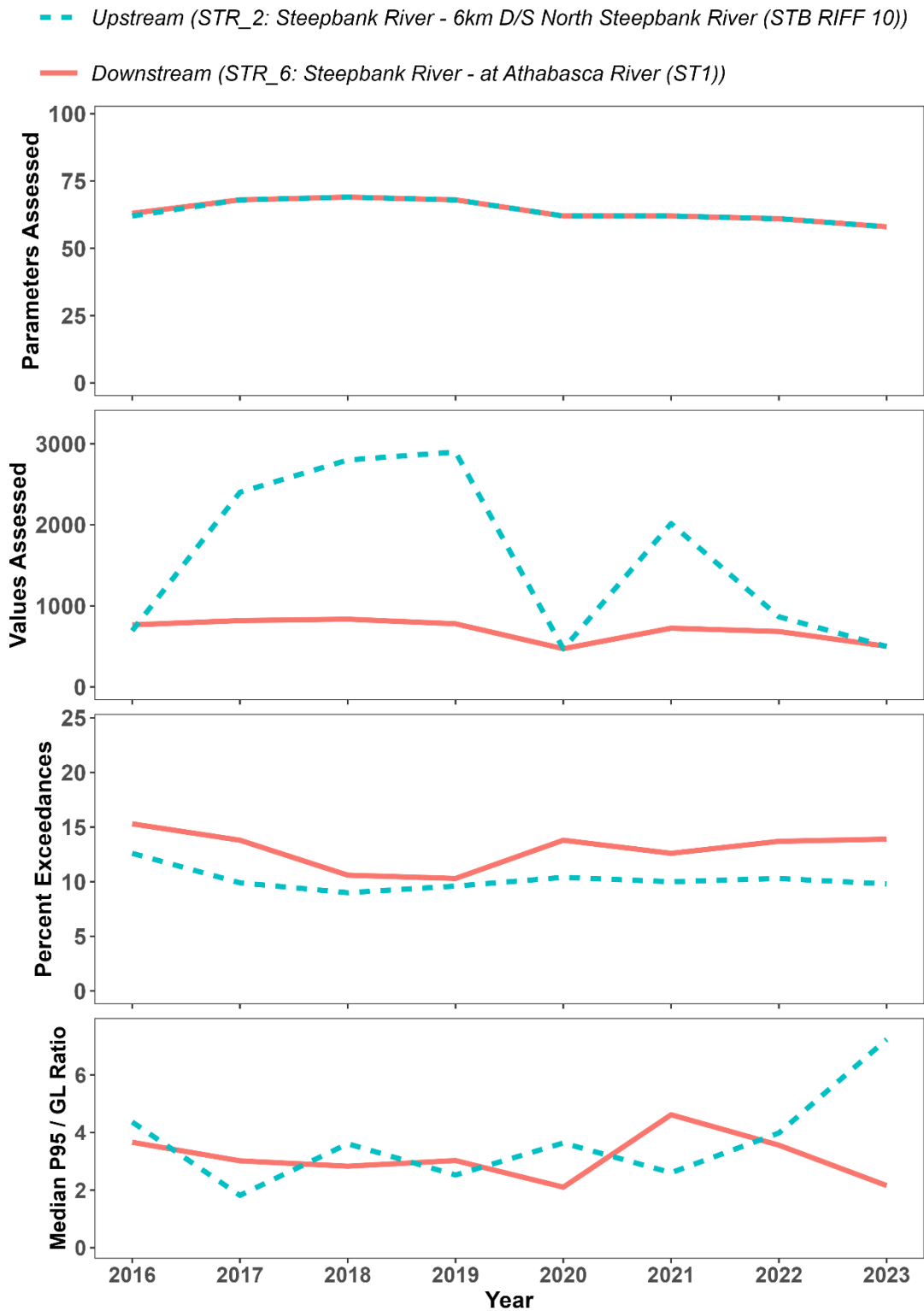


Figure I200: Comparison between exceedances at upstream and downstream sites on the Steepbank River when considering the most protective guidelines.

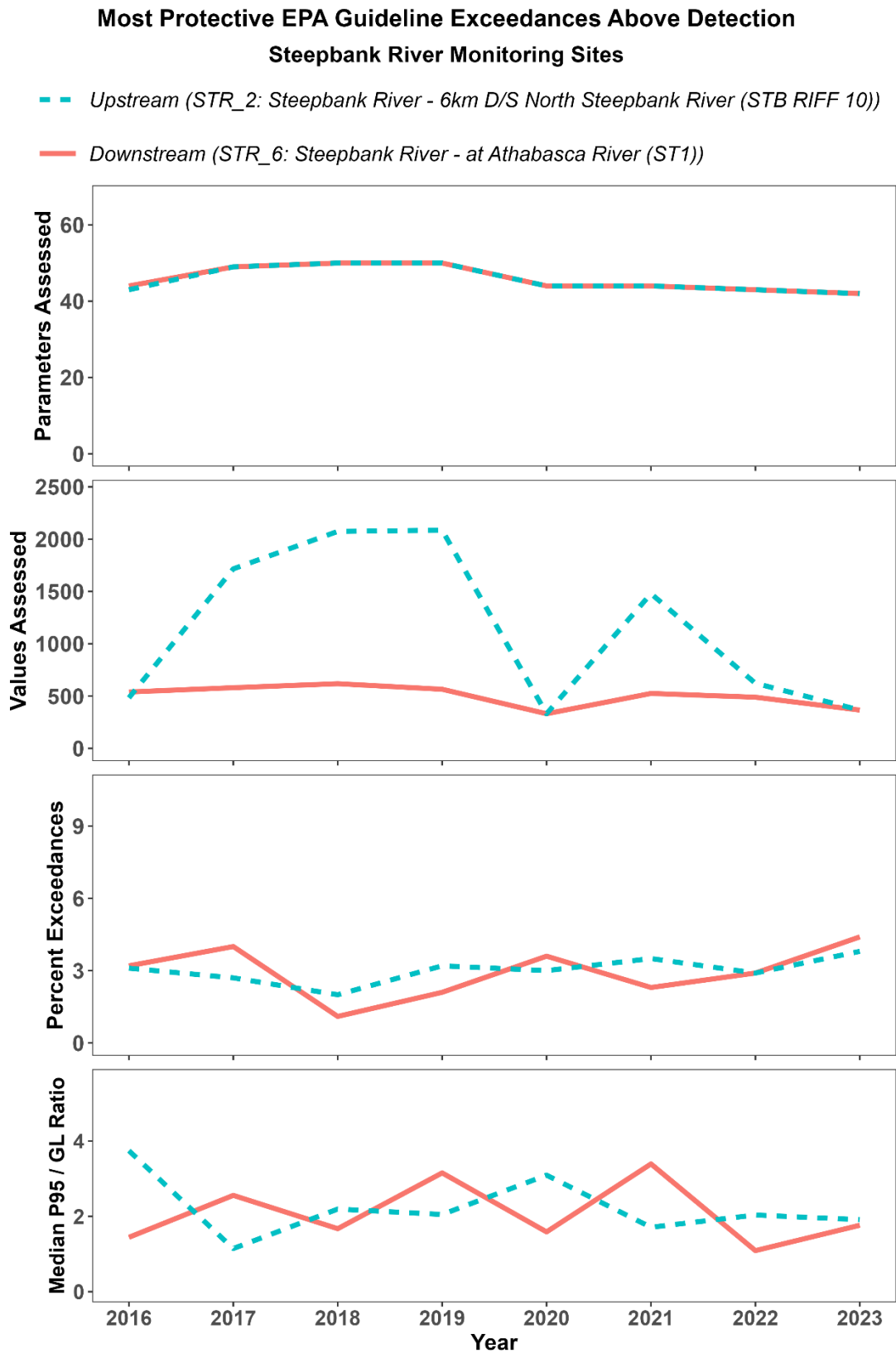


Figure I201: Comparison between exceedances at upstream and downstream sites on the Steepbank River when considering the most protective EPA guidelines.

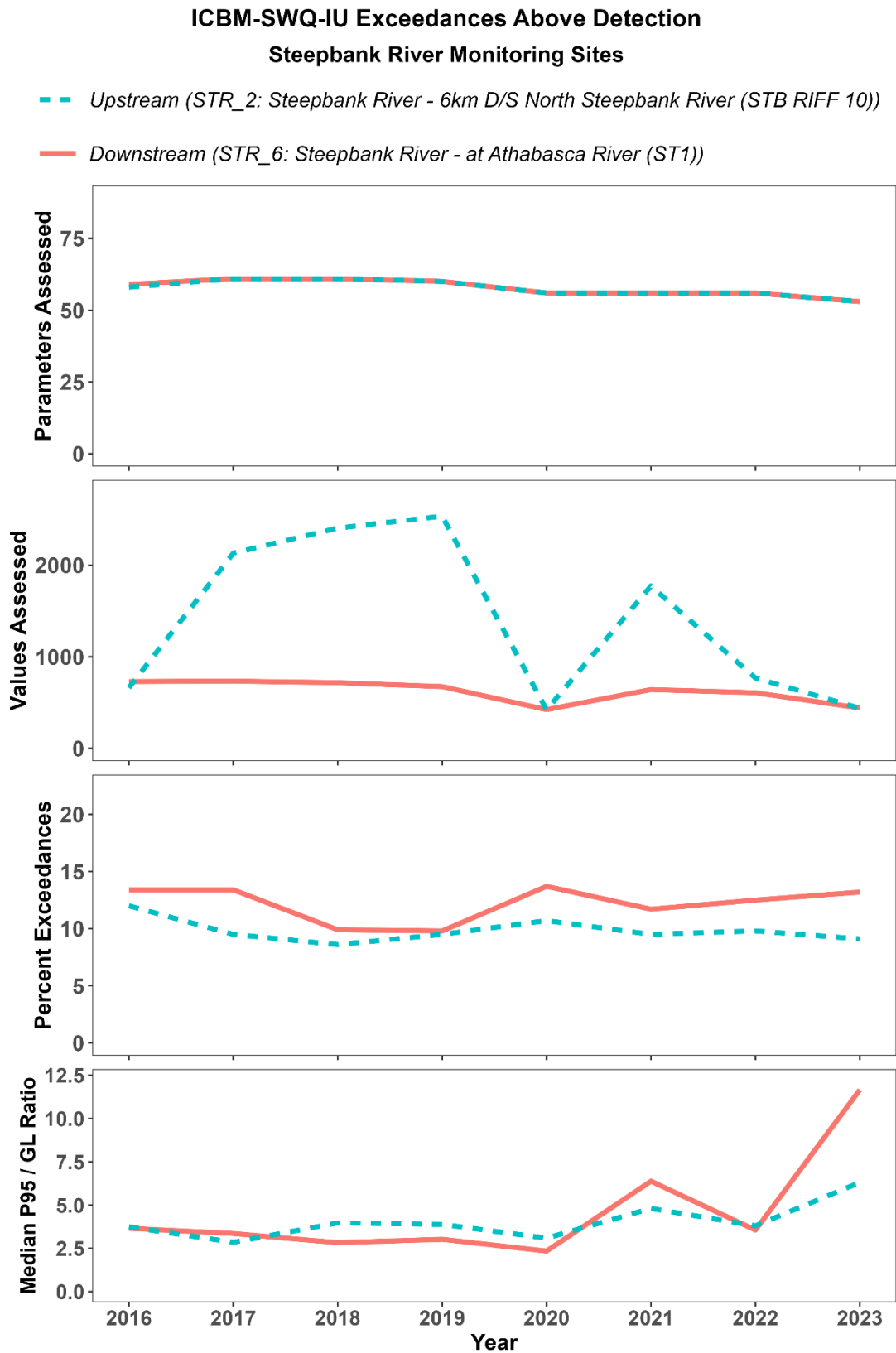


Figure I202: Comparison between exceedances at upstream and downstream sites on the Steepbank River when considering guidelines protective of indigenous use.

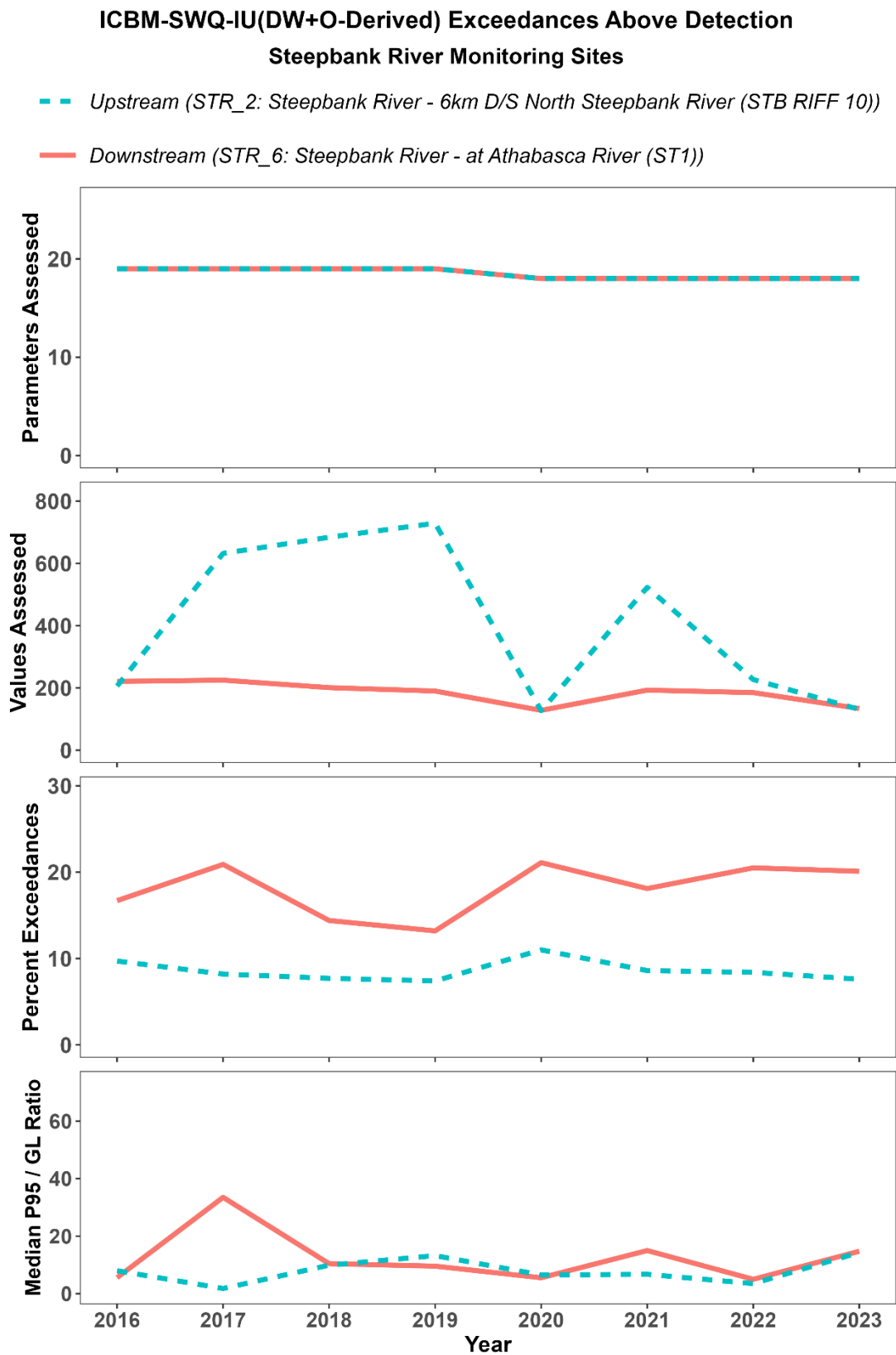


Figure I203: Comparison between exceedances at upstream and downstream sites on the Steepbank River when considering guidelines protective of indigenous use from consumption of surface water and aquatic organisms.

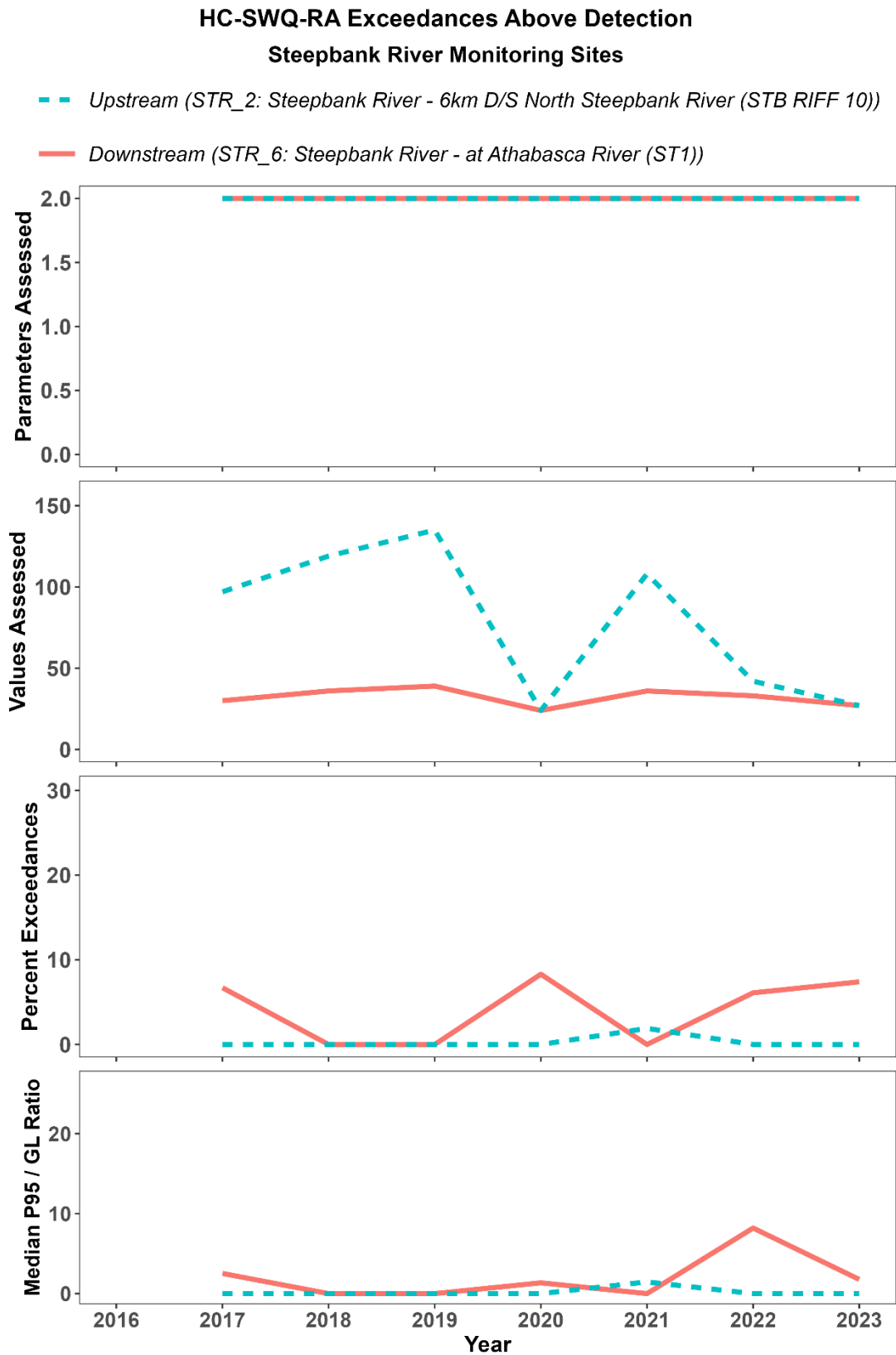


Figure I204: Comparison between exceedances at upstream and downstream sites on the Steepbank River when considering Health Canada recreation aesthetics guidelines.

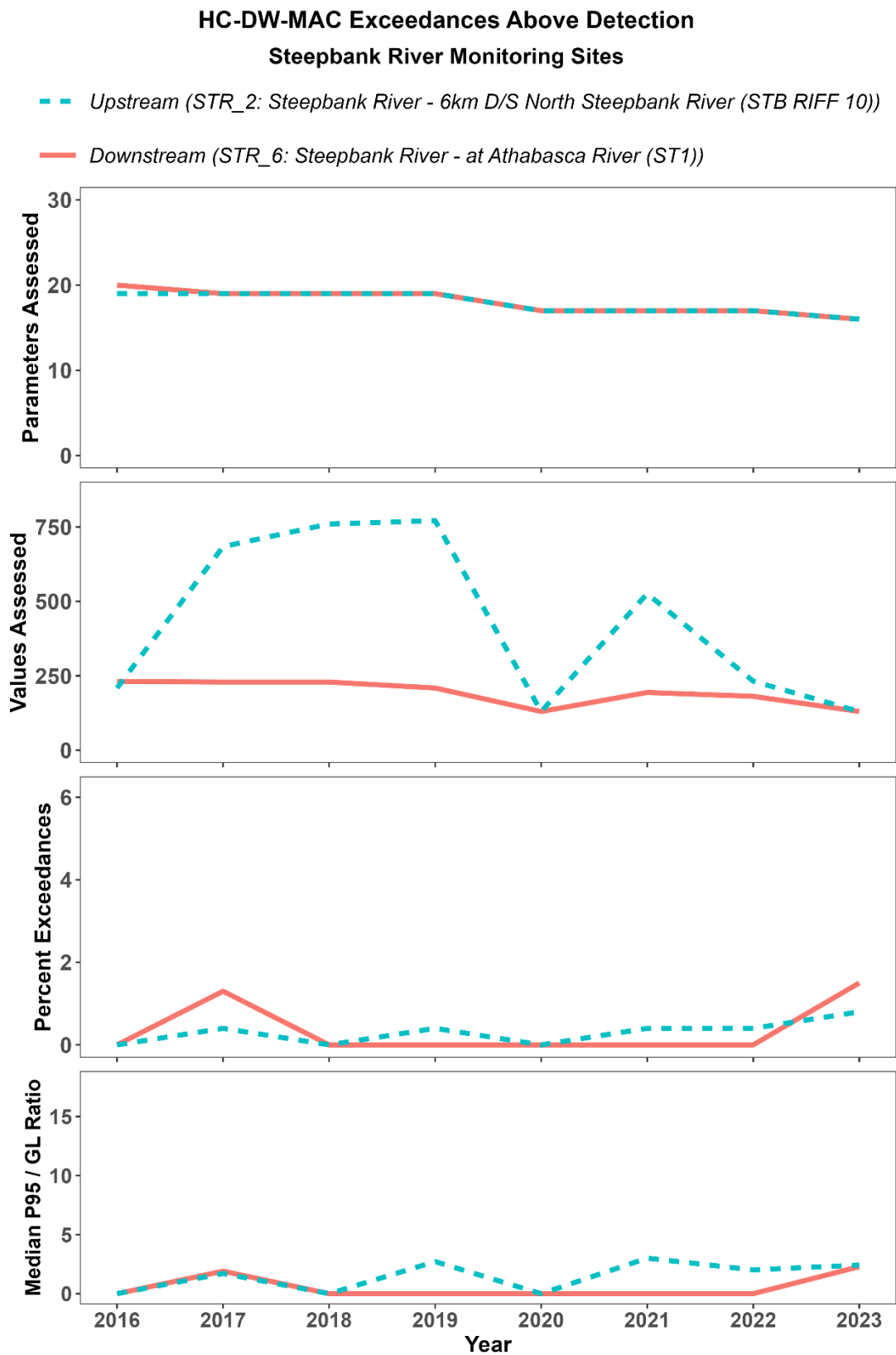


Figure I205: Comparison between exceedances at upstream and downstream sites on the Steepbank River when considering Health Canada drinking water maximum acceptable concentration guidelines.

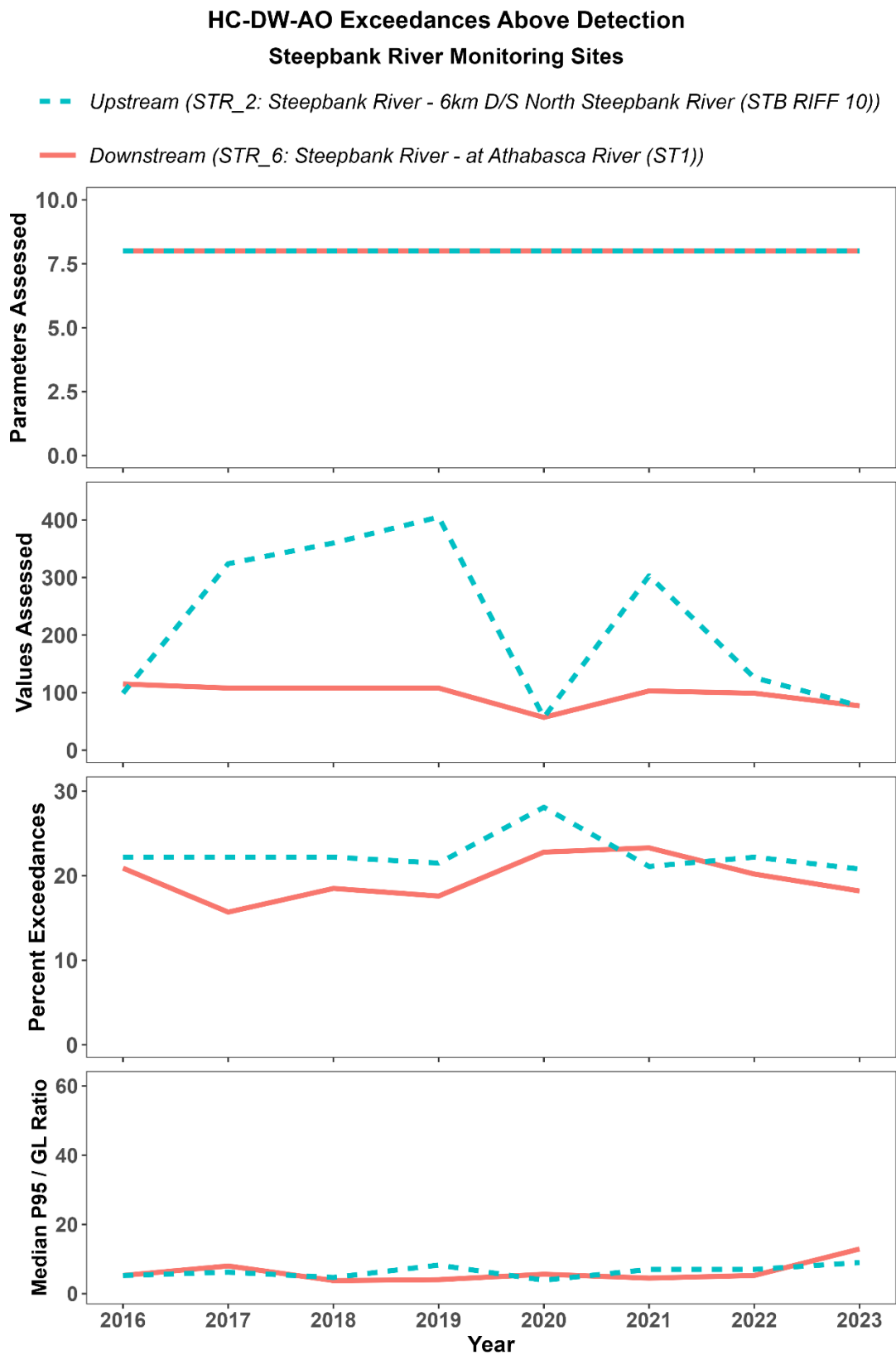


Figure I206: Comparison between exceedances at upstream and downstream sites on the Steepbank River when considering Health Canada drinking water aesthetics objectives.

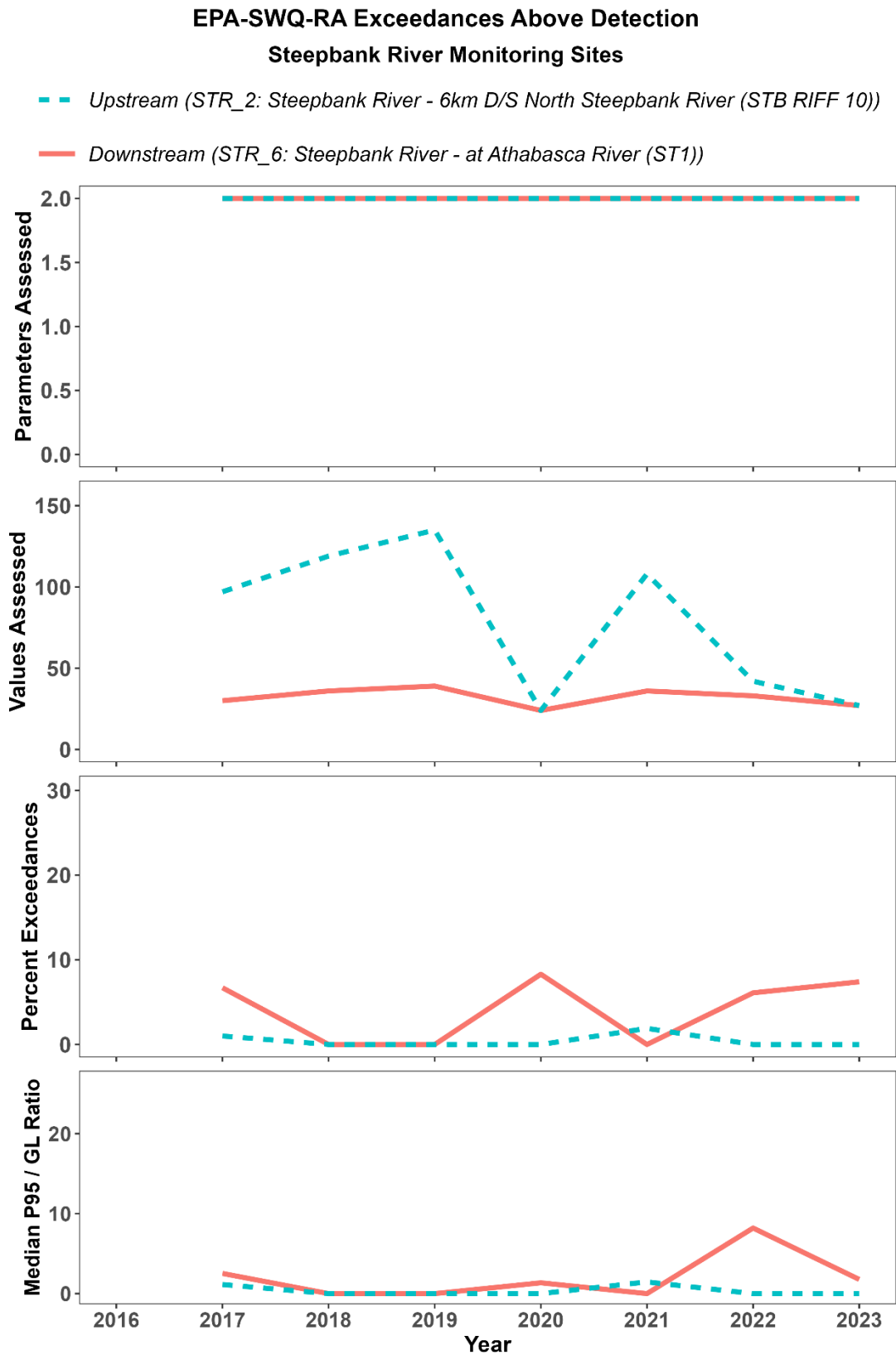


Figure I207: Comparison between exceedances at upstream and downstream sites on the Steepbank River when considering Alberta EPA recreation aesthetics guidelines.



## EPA-SWQ-PAL-CHRONIC Exceedances Above Detection Steepbank River Monitoring Sites

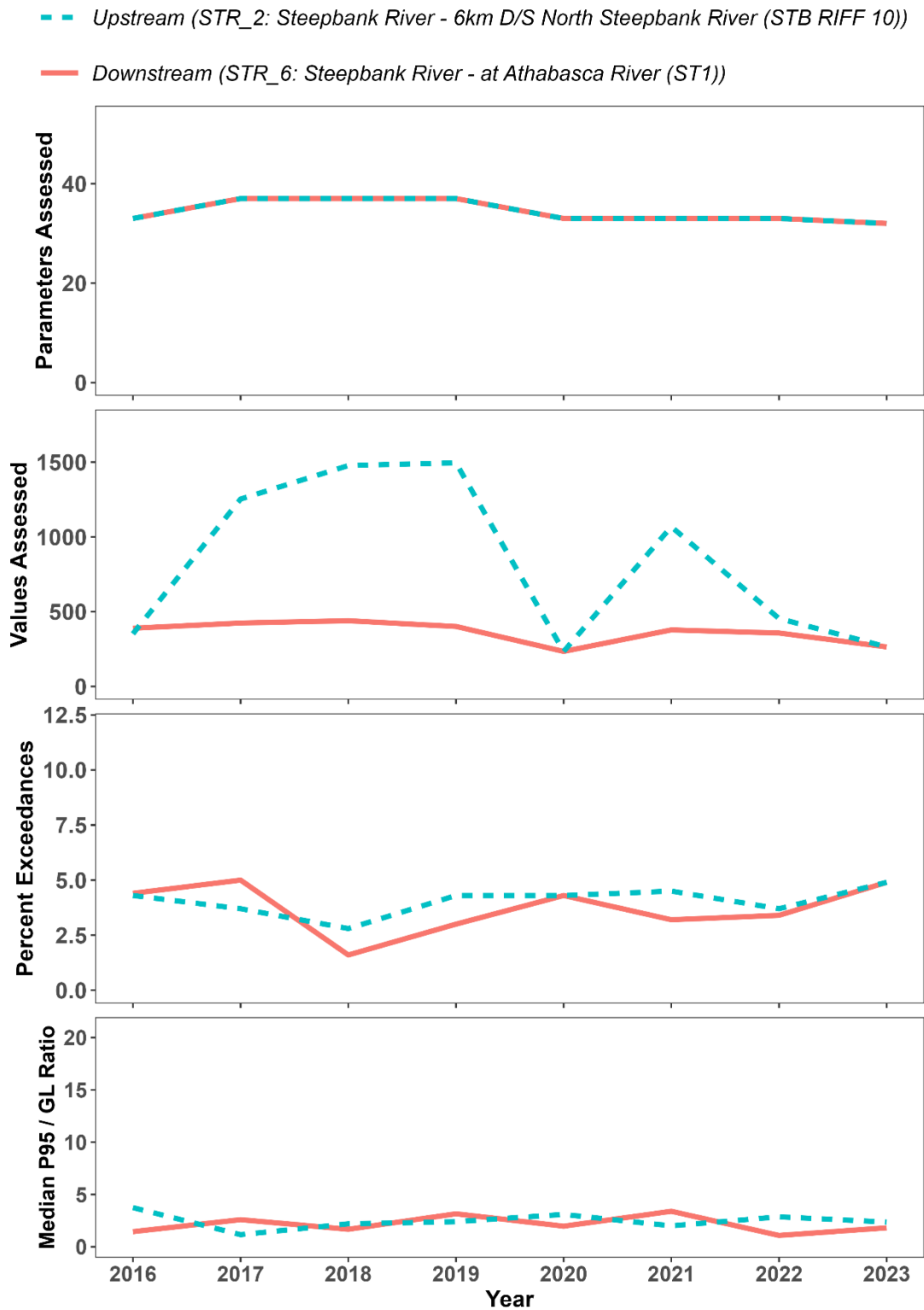


Figure I208: Comparison between exceedances at upstream and downstream sites on the Steepbank River when considering Alberta EPA protection of aquatic life chronic guidelines.

## EPA-SWQ-PAL-ACUTE Exceedances Above Detection Steepbank River Monitoring Sites

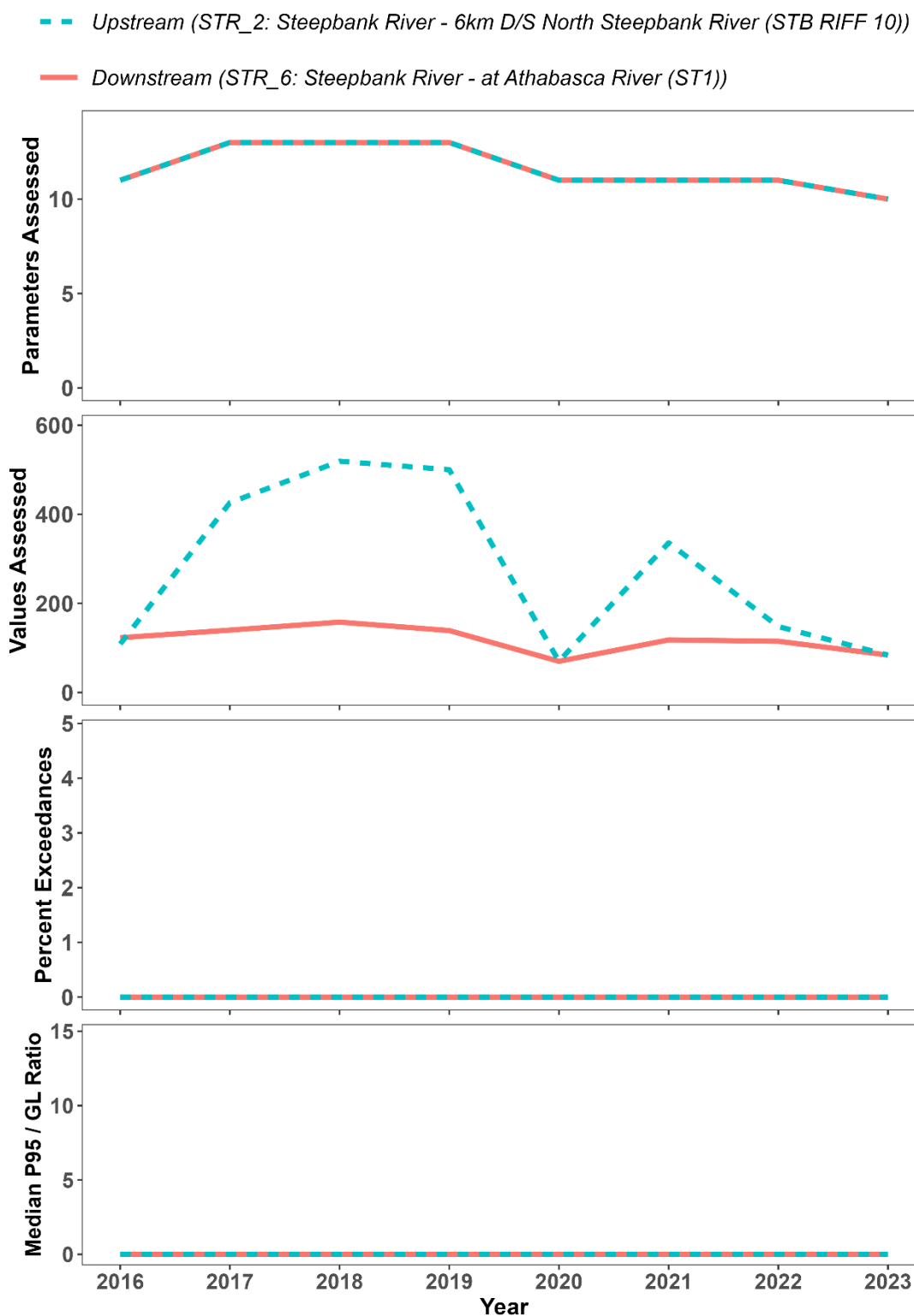


Figure I209: Comparison between exceedances at upstream and downstream sites on the Steepbank River when considering Alberta EPA protection of aquatic life acute guidelines.

## EPA-SWQ-LIVESTOCK Exceedances Above Detection Steepbank River Monitoring Sites

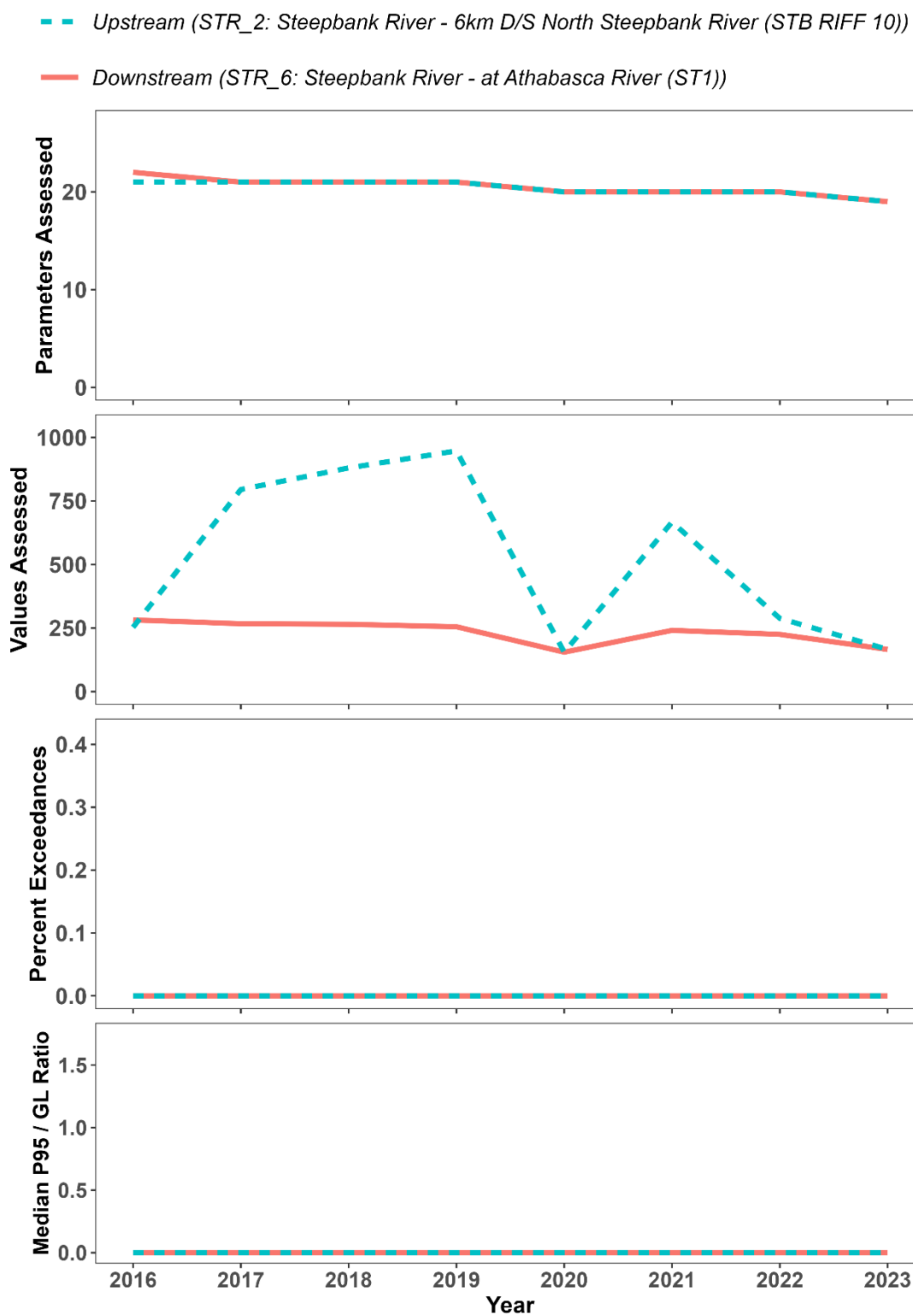


Figure I210: Comparison between exceedances at upstream and downstream sites on the Steepbank River when considering Alberta EPA protection of livestock watering guidelines.

## EPA-SWQ-AG-IRRIGATION Exceedances Above Detection Steepbank River Monitoring Sites

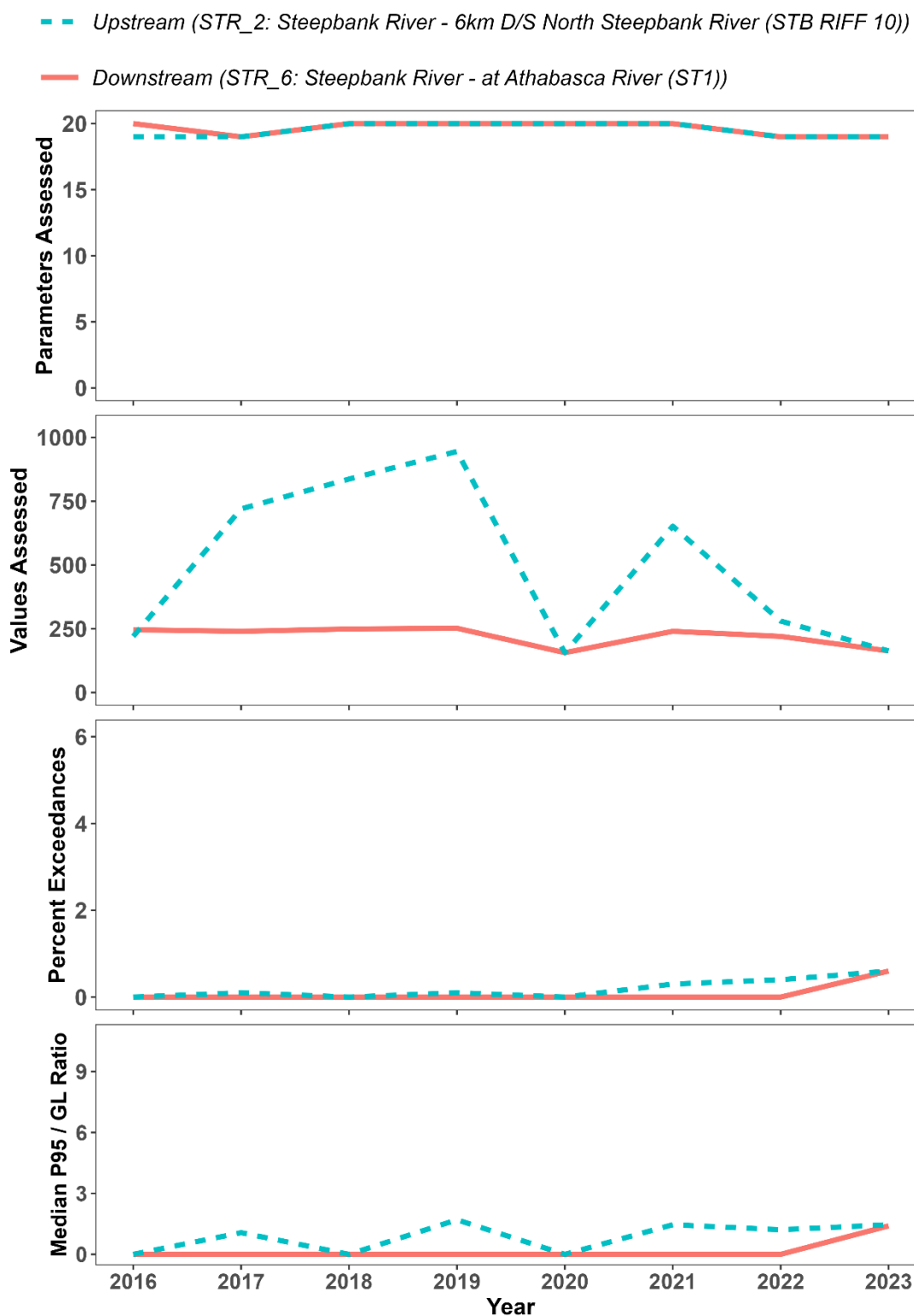


Figure I211: Comparison between exceedances at upstream and downstream sites on the Steepbank River when considering Alberta EPA protection of irrigation water guidelines.

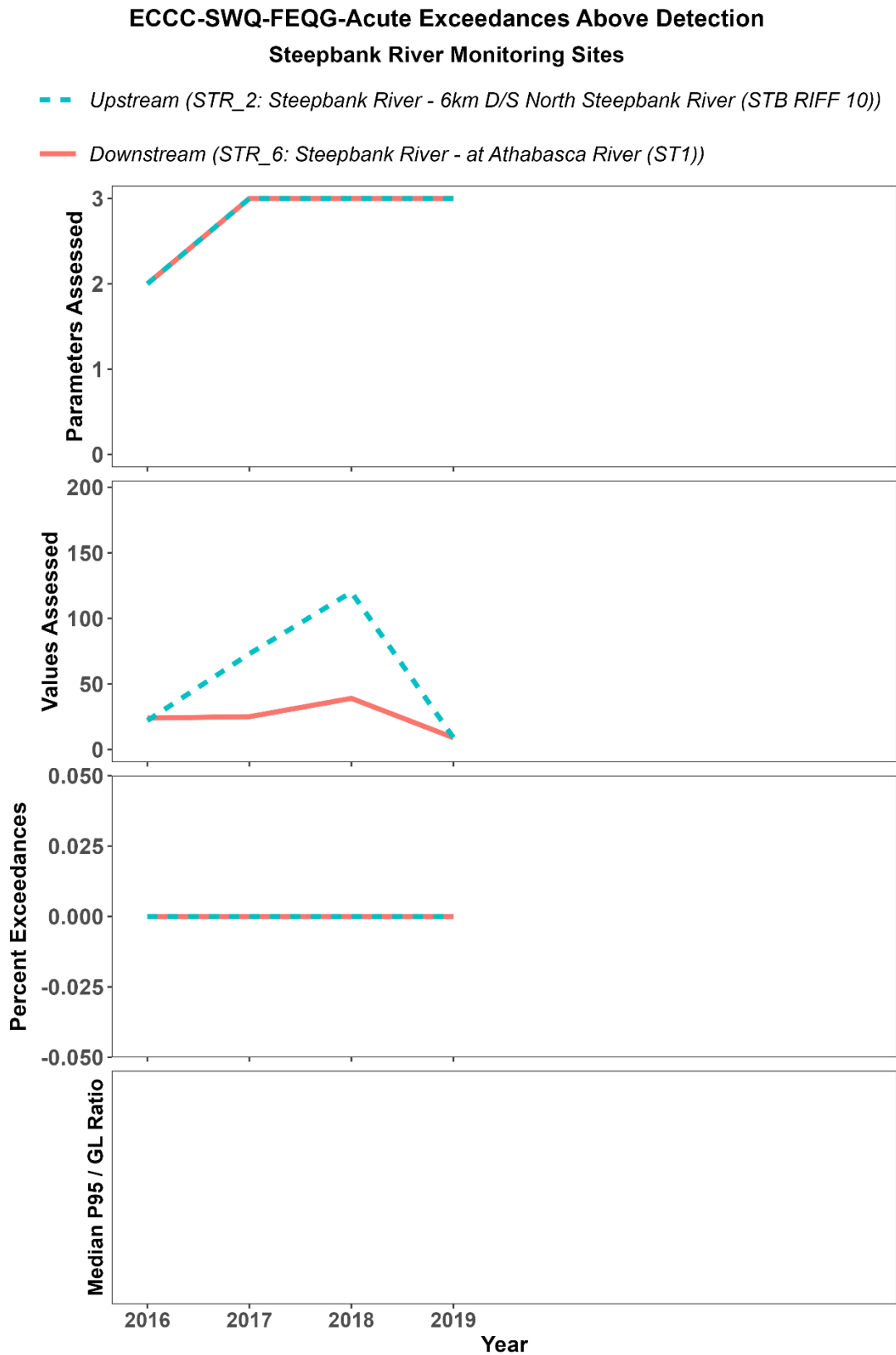


Figure I212: Comparison between exceedances at upstream and downstream sites on the Steepbank River when considering ECCC Federal Environmental Quality Guidelines protection of aquatic life acute guidelines.

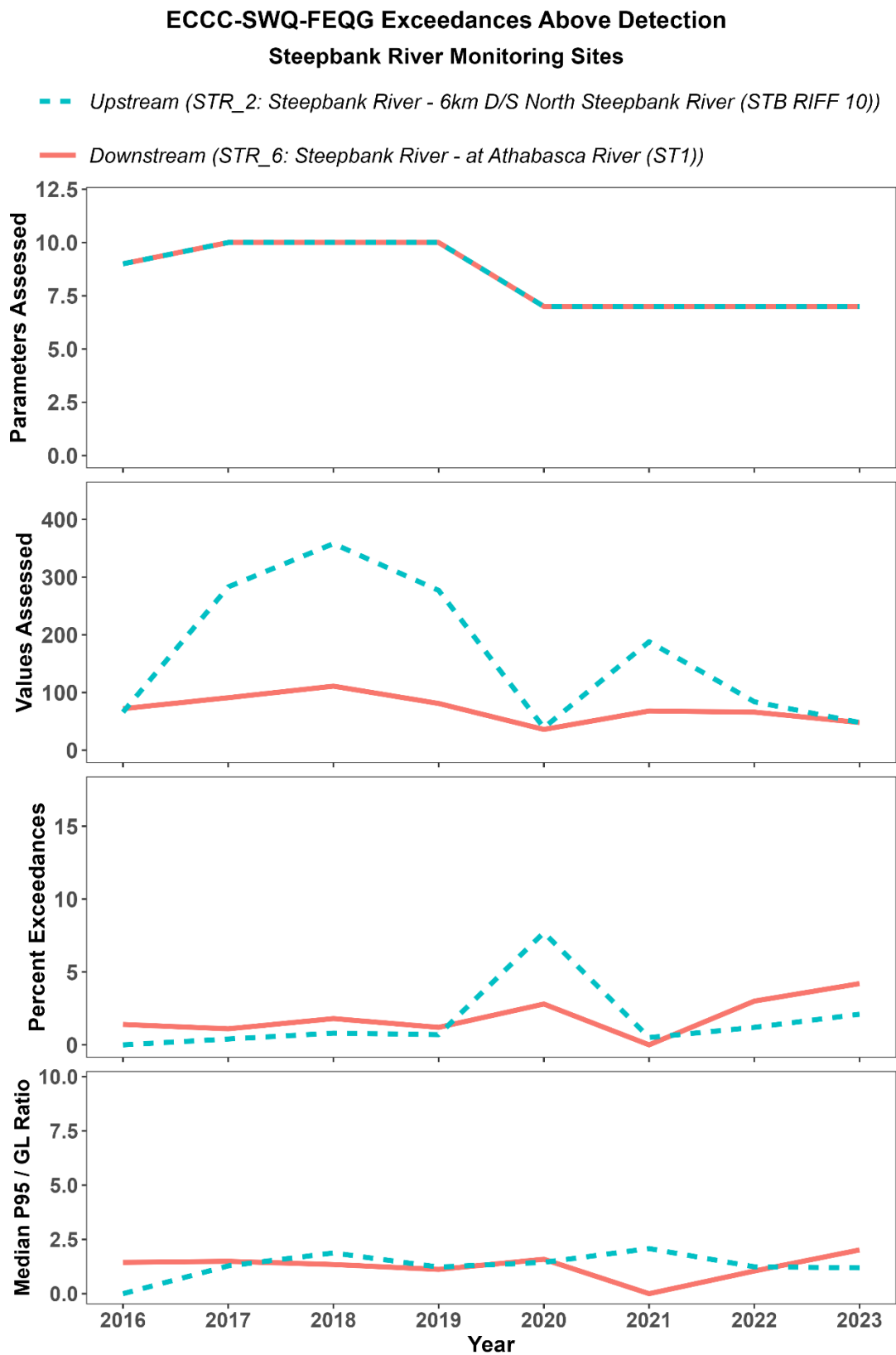


Figure I213: Comparison between exceedances at upstream and downstream sites on the Steepbank River when considering ECCC Federal Environmental Quality Guidelines protection of aquatic life chronic guidelines.

### CCME-SWQ-PAL-CHRONIC Exceedances Above Detection Steepbank River Monitoring Sites

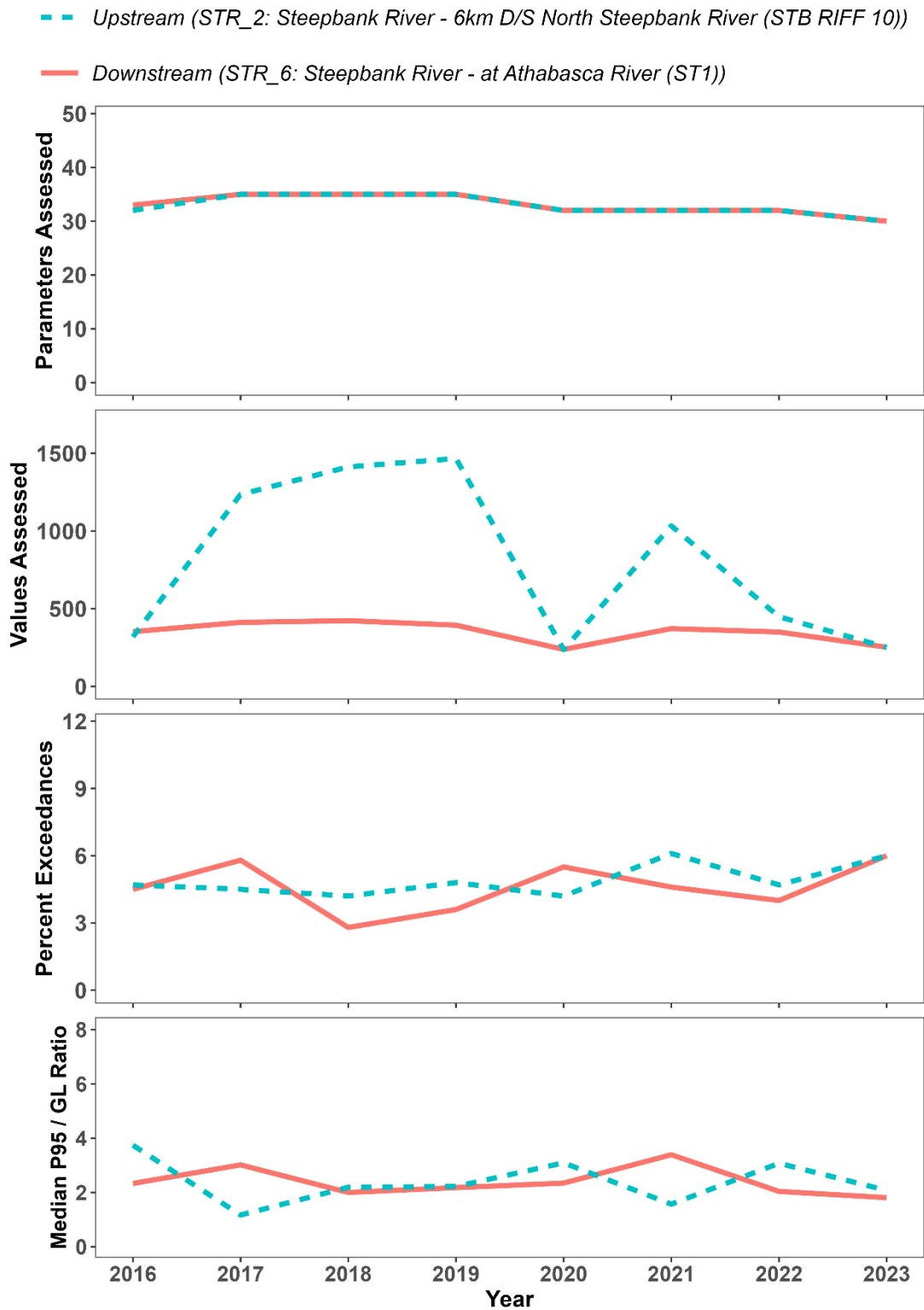


Figure I214: Comparison between exceedances at upstream and downstream sites on the Steepbank River when considering CCME protection of aquatic life chronic guidelines.

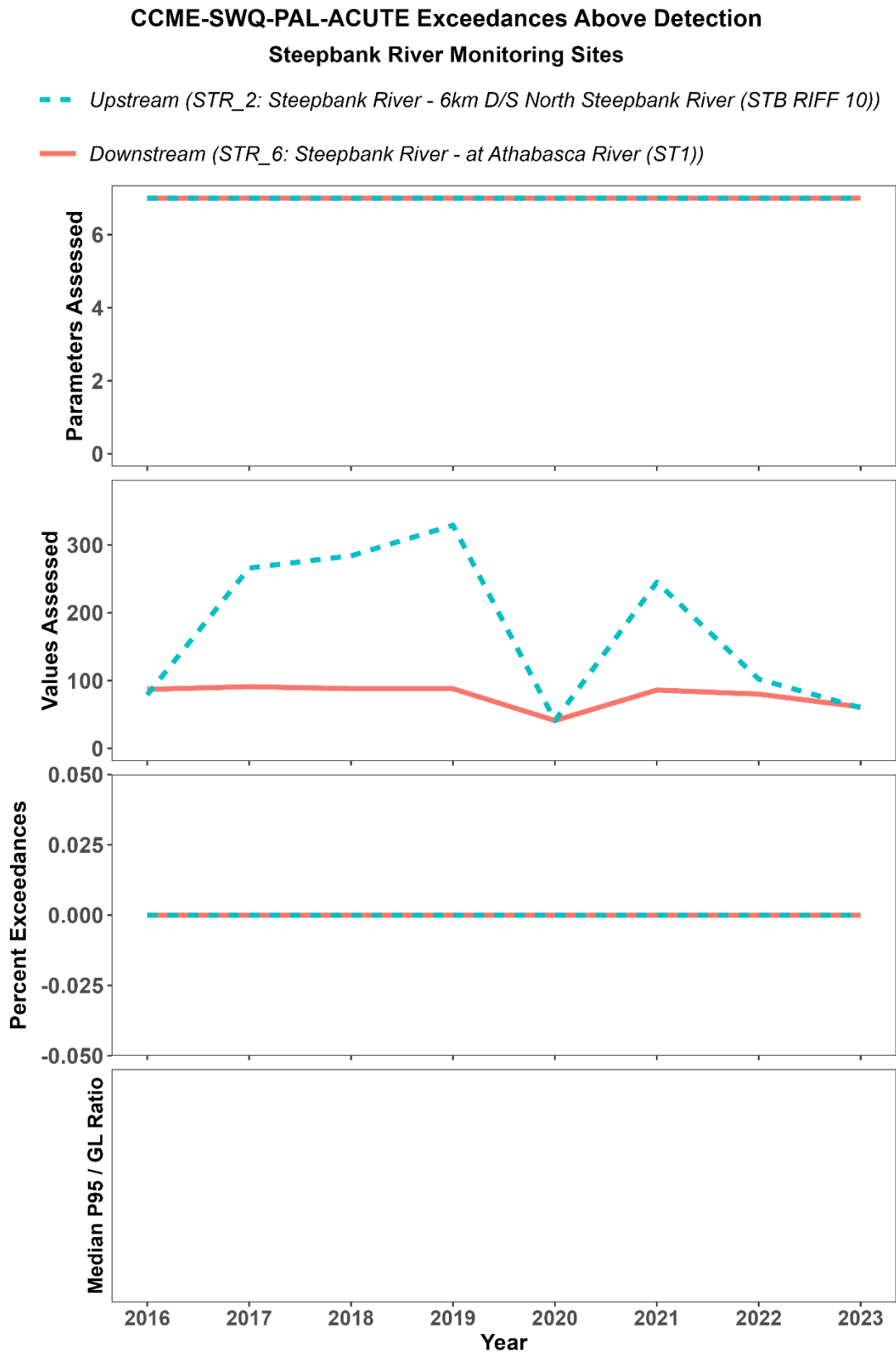


Figure I215: Comparison between exceedances at upstream and downstream sites on the Steepbank River when considering CCME protection of aquatic life acute guidelines.



# **CCME-SWQ-AG-LIVESTOCK Exceedances Above Detection** **Steepbank River Monitoring Sites**

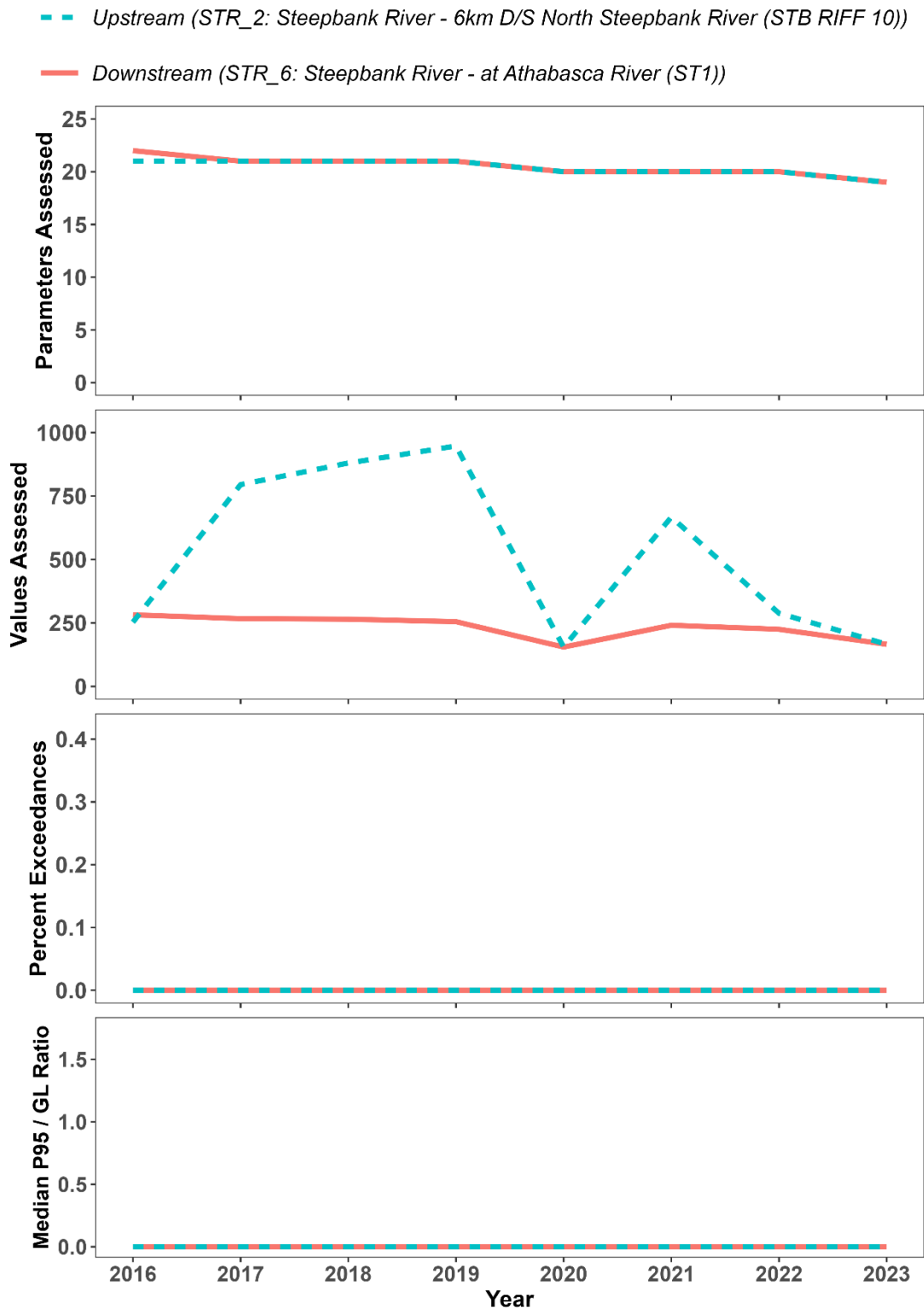


Figure I216: Comparison between exceedances at upstream and downstream sites on the Steepbank River when considering CCME protection of livestock watering guidelines.

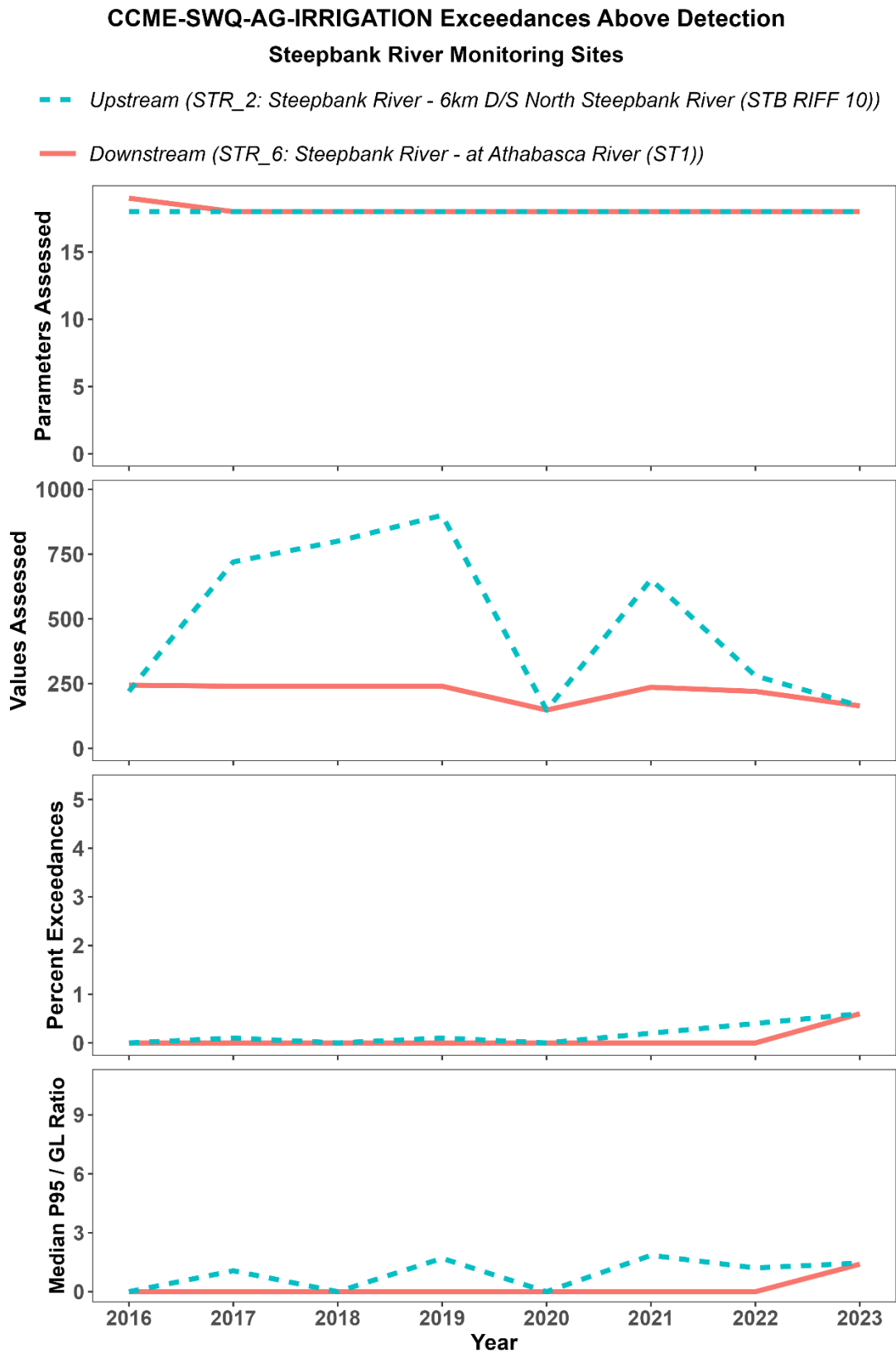


Figure I217: Comparison between exceedances at upstream and downstream sites on the Steepbank River when considering CCME protection of irrigation water guidelines.

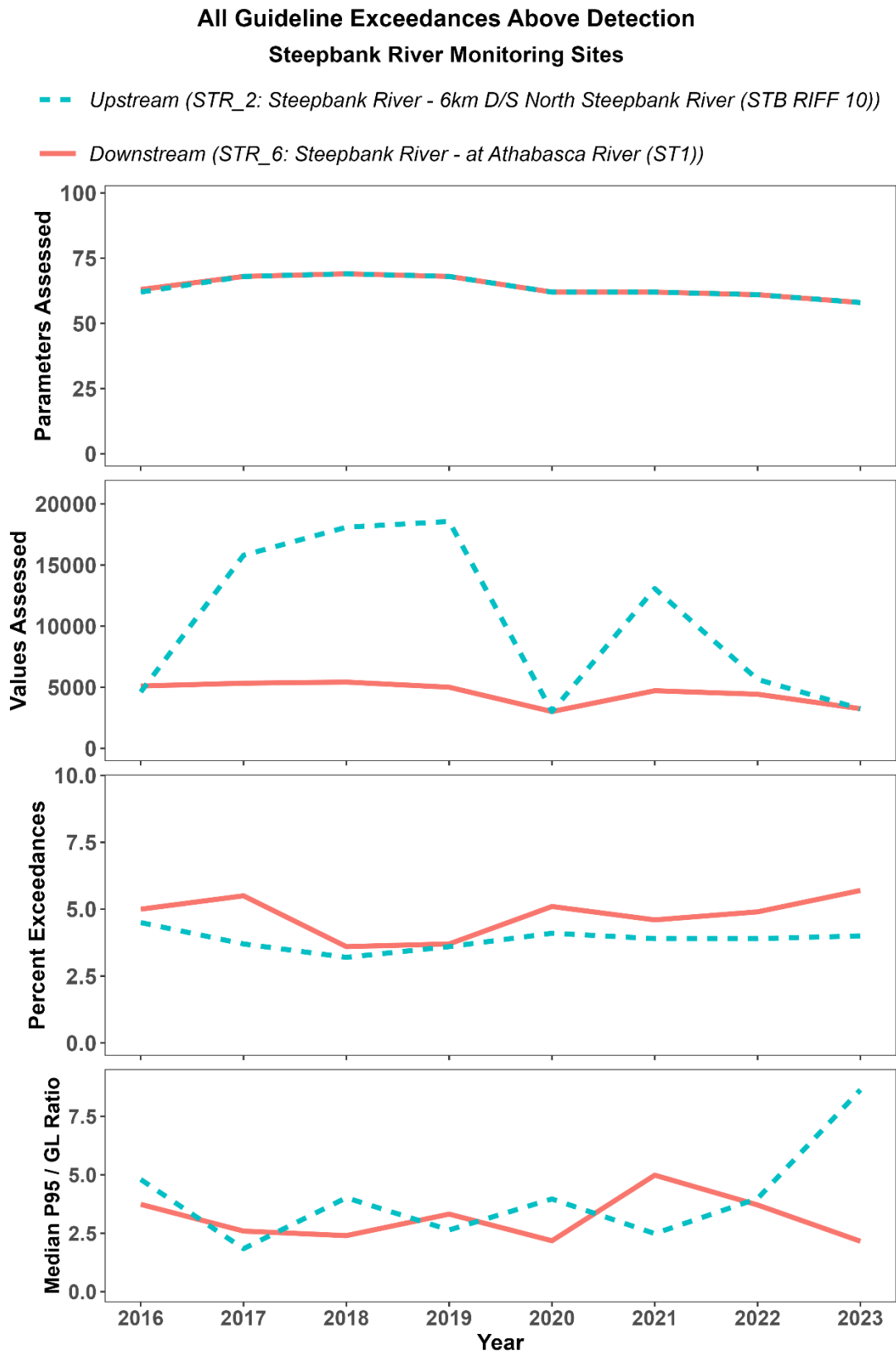


Figure I218: Comparison between exceedances at upstream and downstream sites on the Steepbank River when considering all guidelines.

### 3.2.2 Tar River

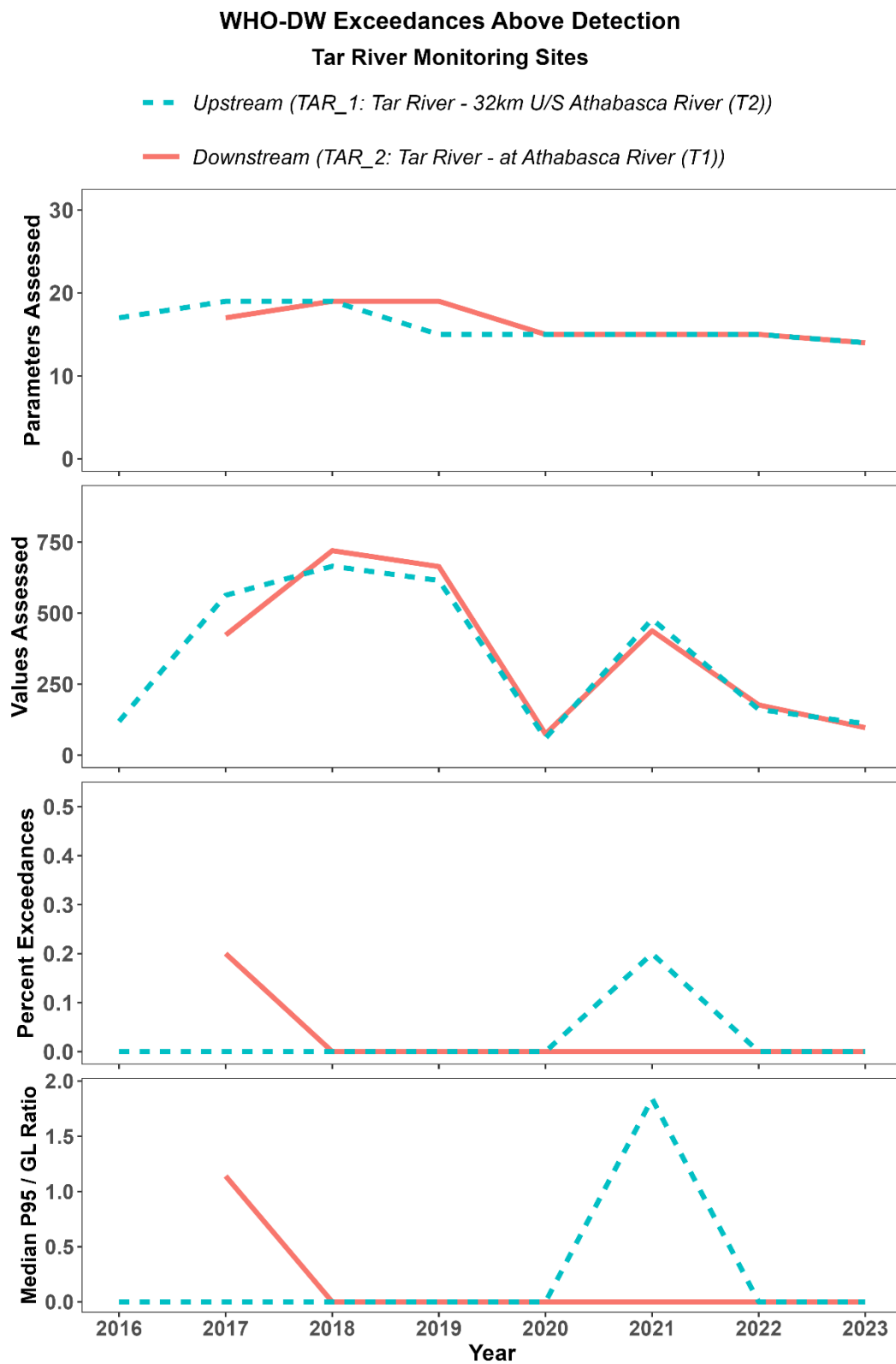


Figure I219: Comparison between exceedances at upstream and downstream sites on the Tar River when considering WHO drinking water guidelines.

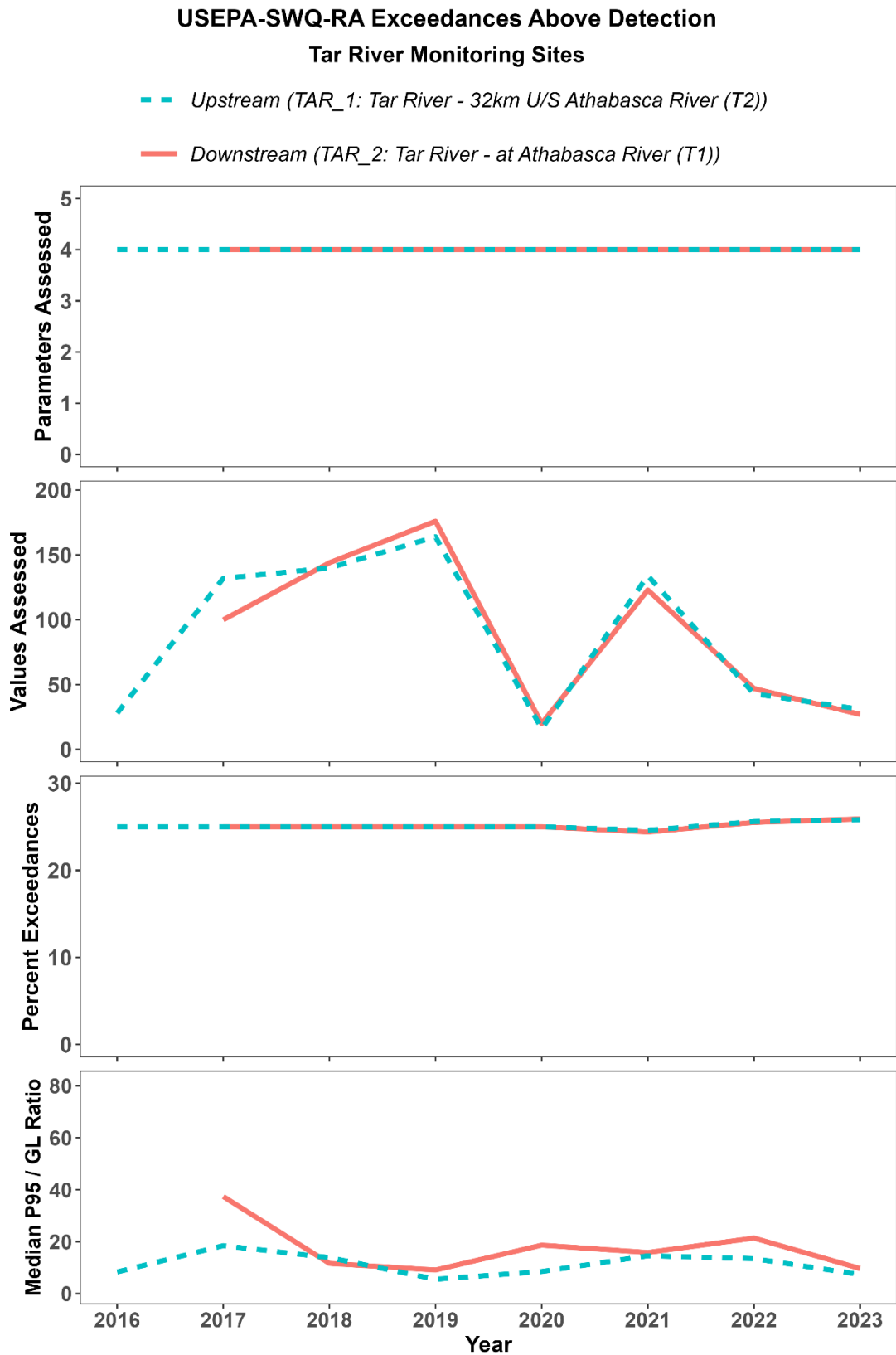


Figure I220: Comparison between exceedances at upstream and downstream sites on the Tar River when considering USEPA recreational aesthetics guidelines.

# **USEPA-SWQ-PAL-CHRONIC Exceedances Above Detection** **Tar River Monitoring Sites**

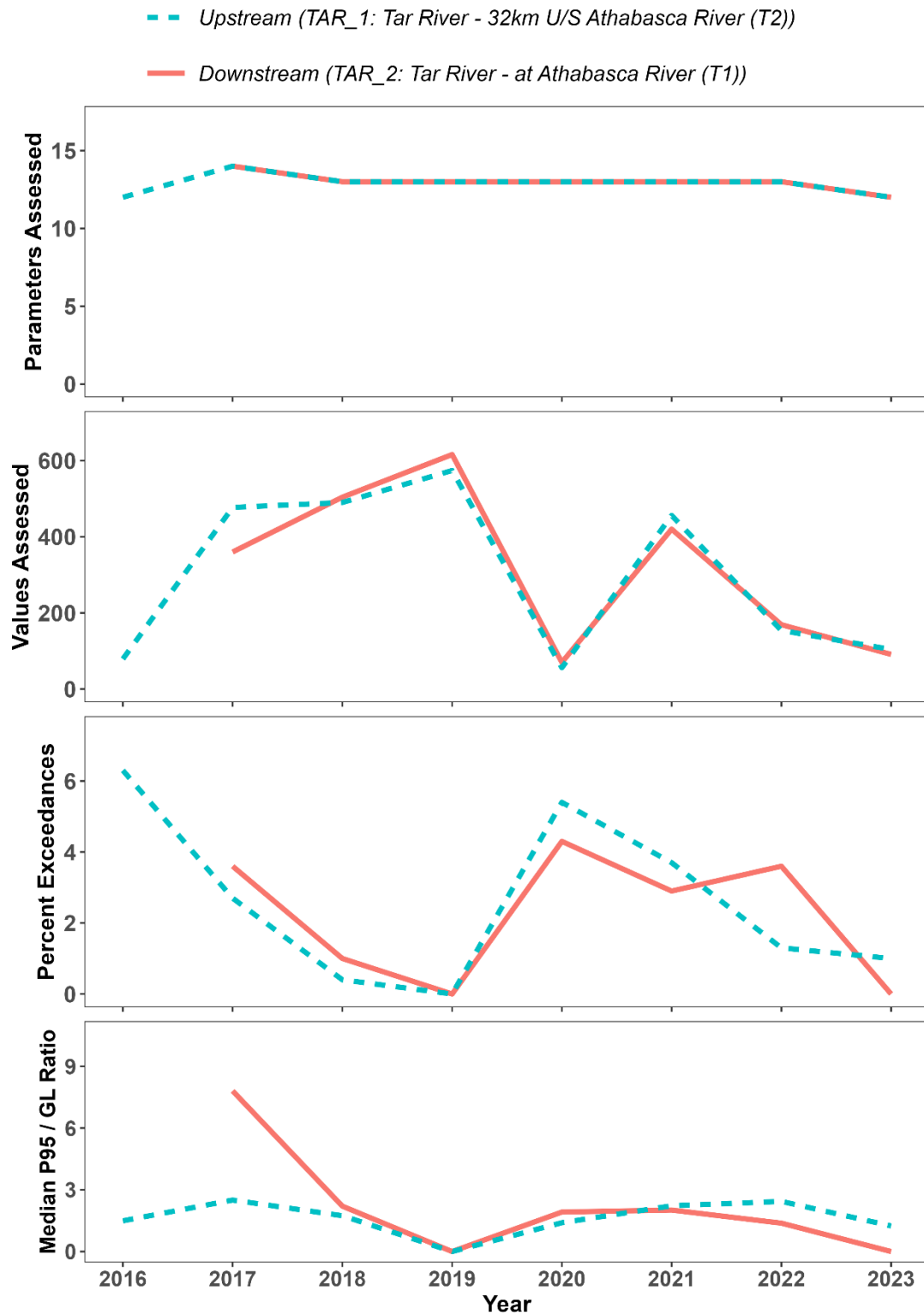


Figure I221: Comparison between exceedances at upstream and downstream sites on the Tar River when considering USEPA protection of aquatic life chronic guidelines.

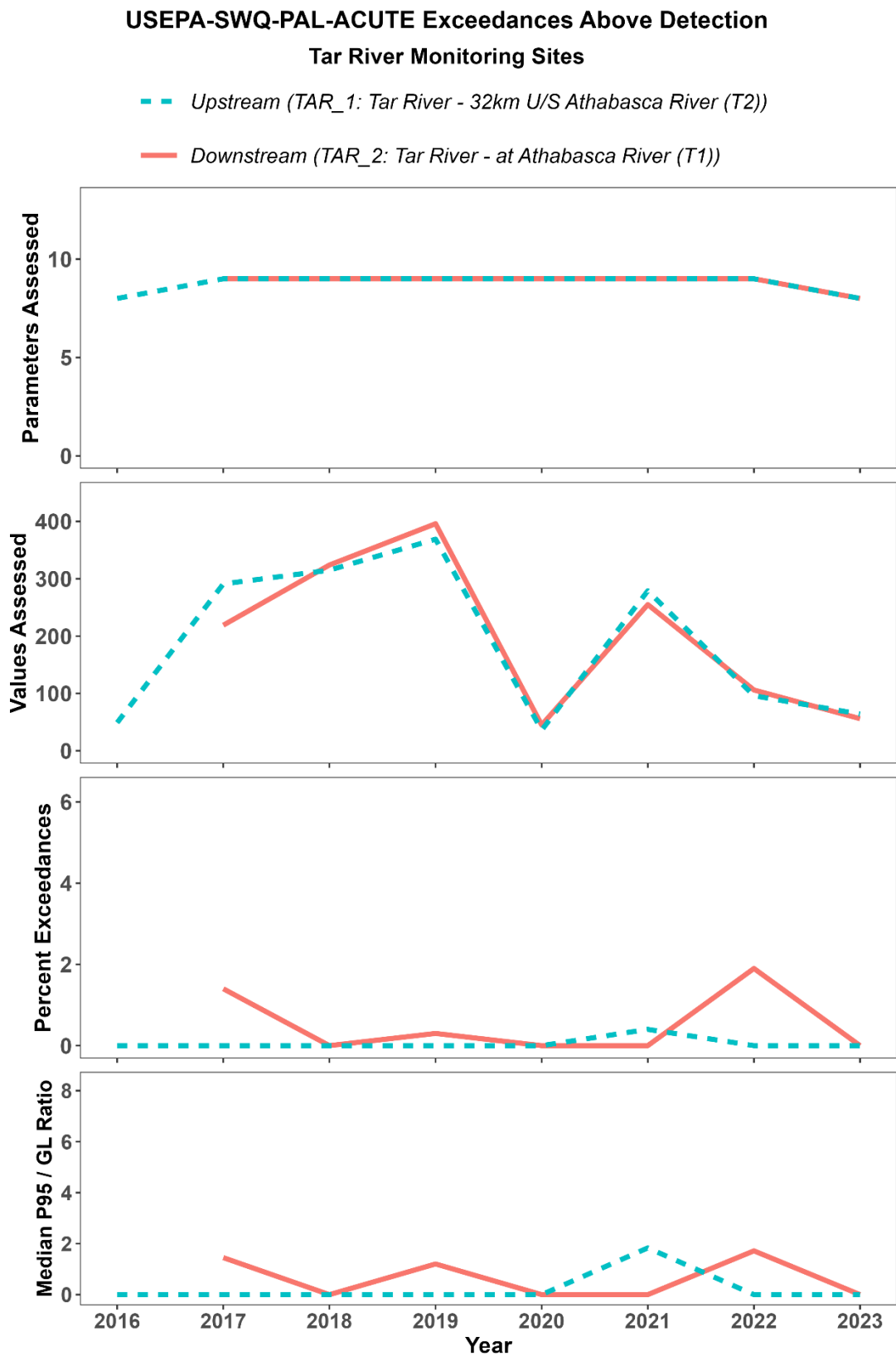


Figure I222: Comparison between exceedances at upstream and downstream sites on the Tar River when considering USEPA protection of aquatic life acute guidelines.

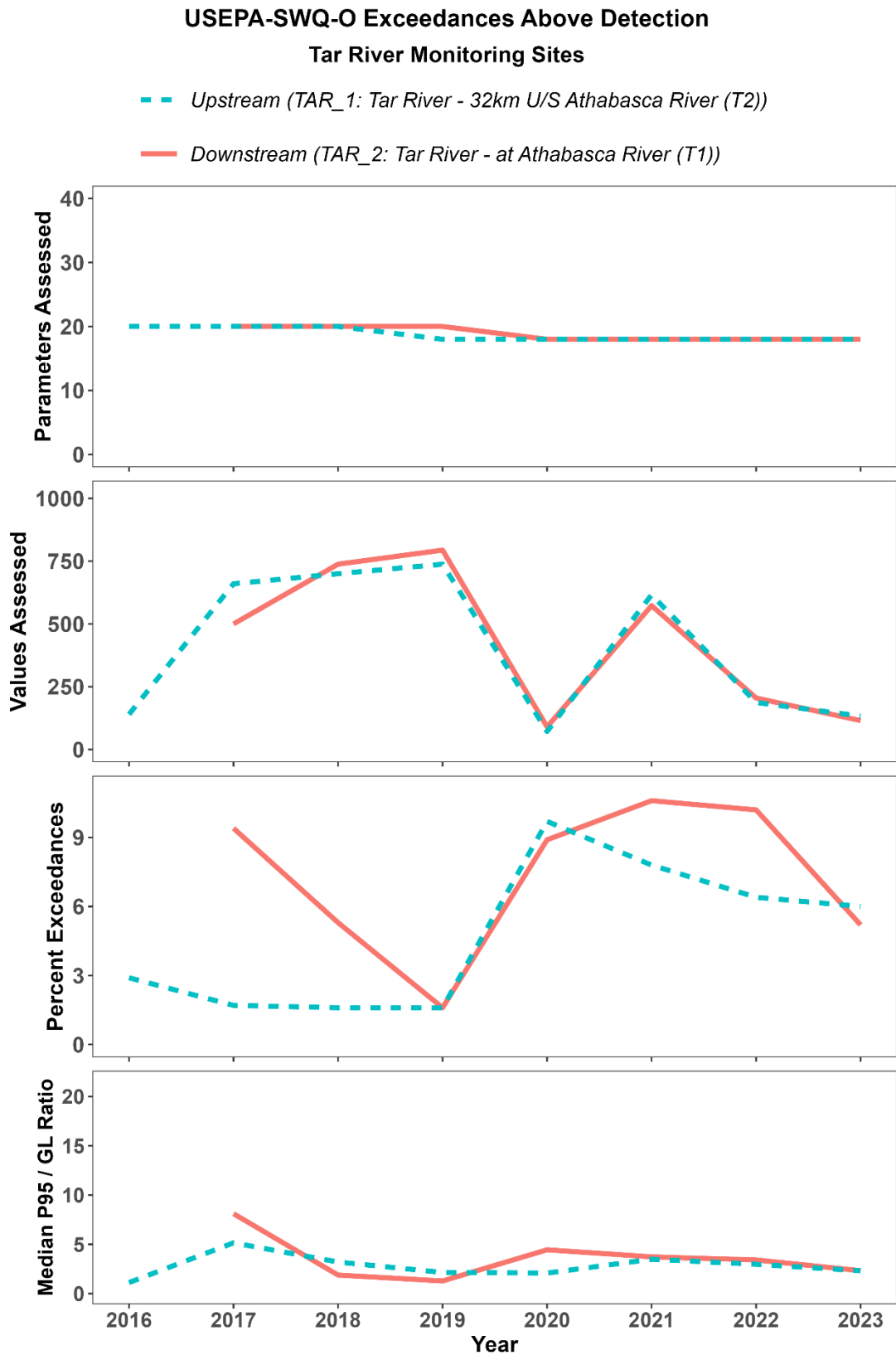


Figure I223: Comparison between exceedances at upstream and downstream sites on the Tar River when considering USEPA protection of human health from consumption of aquatic organisms guidelines.



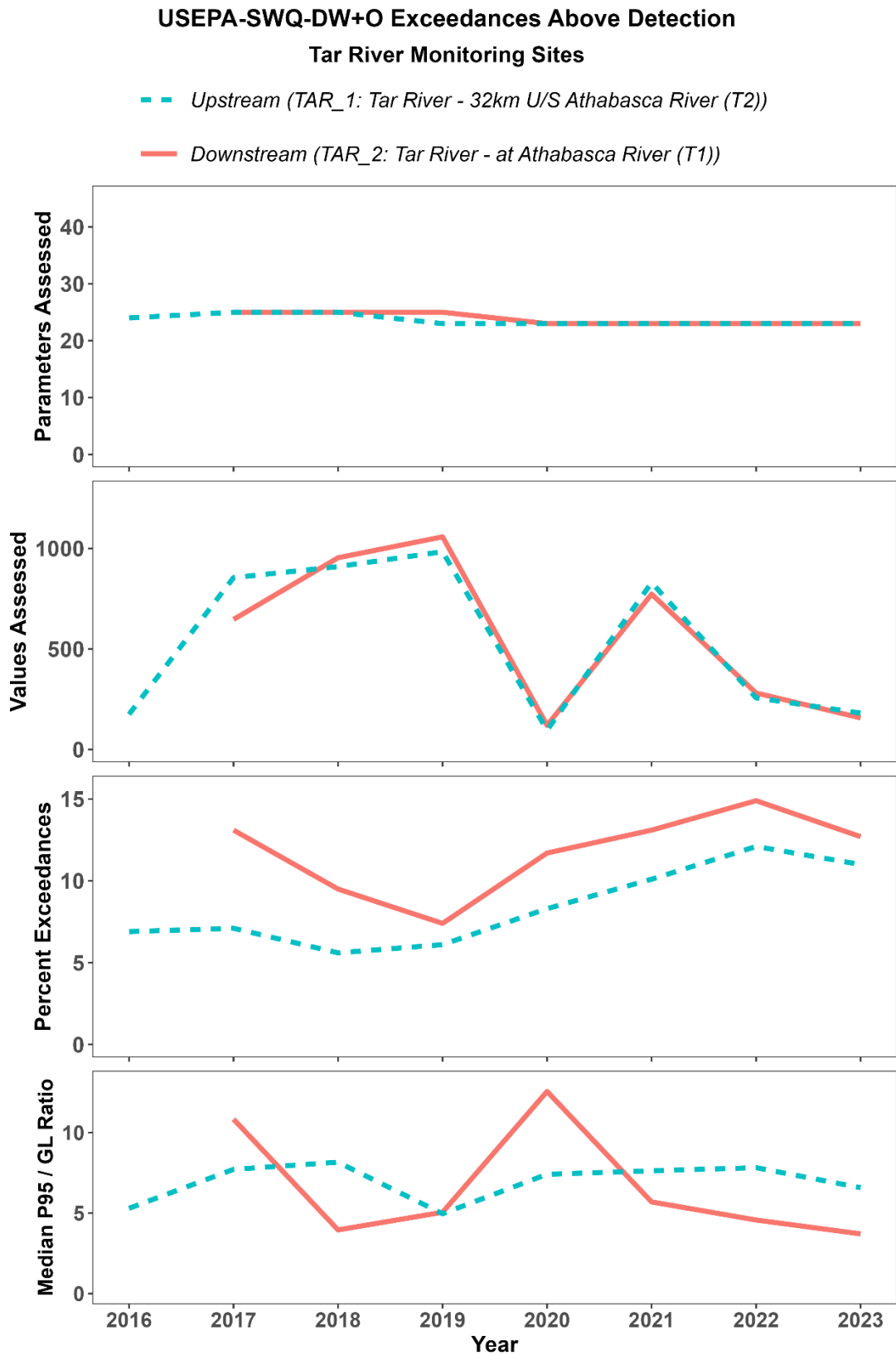


Figure I224: Comparison between exceedances at upstream and downstream sites on the Tar River when considering USEPA protection of human health from consumption of surface water and aquatic organisms guidelines.

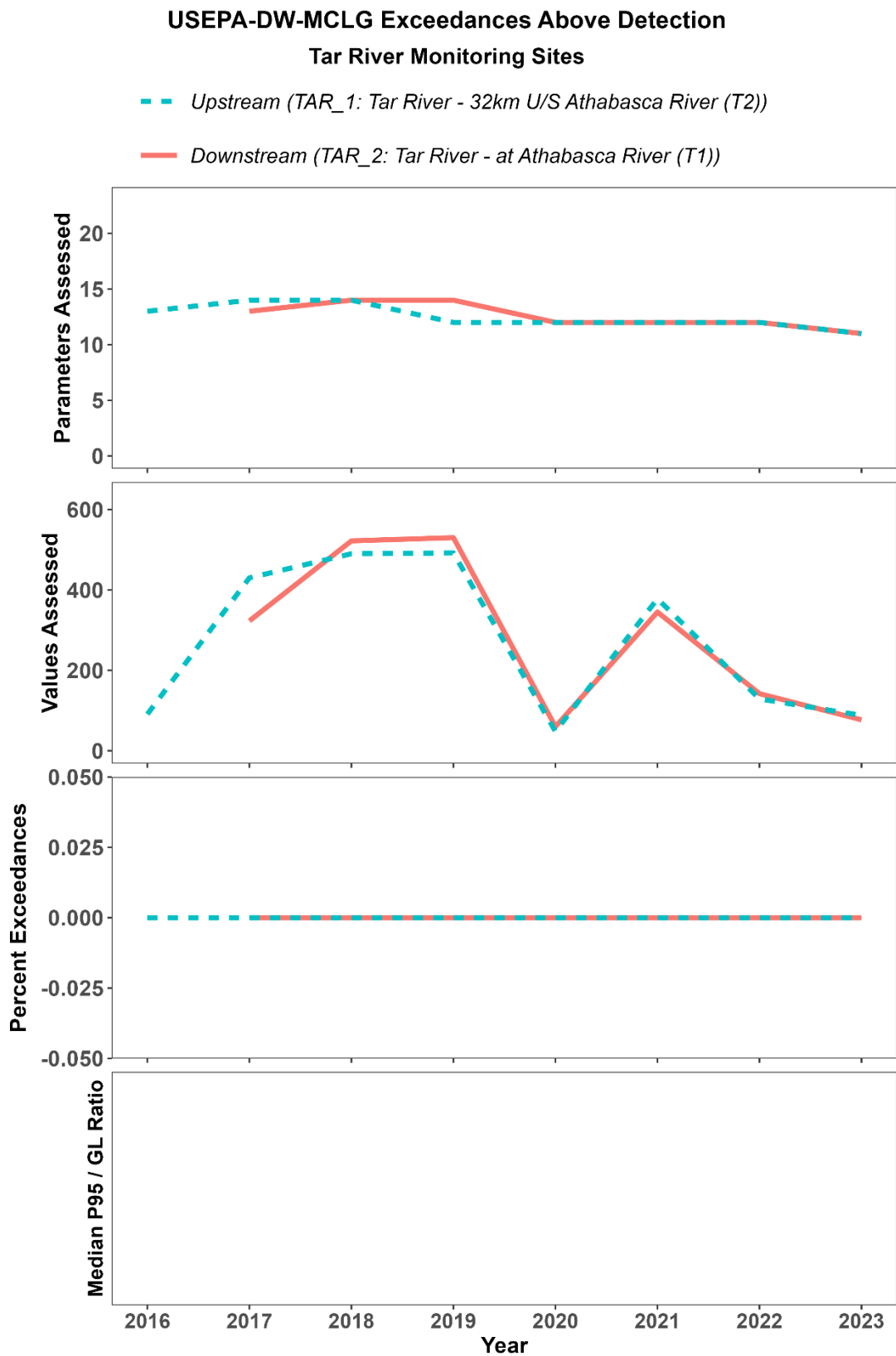


Figure I225: Comparison between exceedances at upstream and downstream sites on the Tar River when considering USEPA drinking water quality goals.

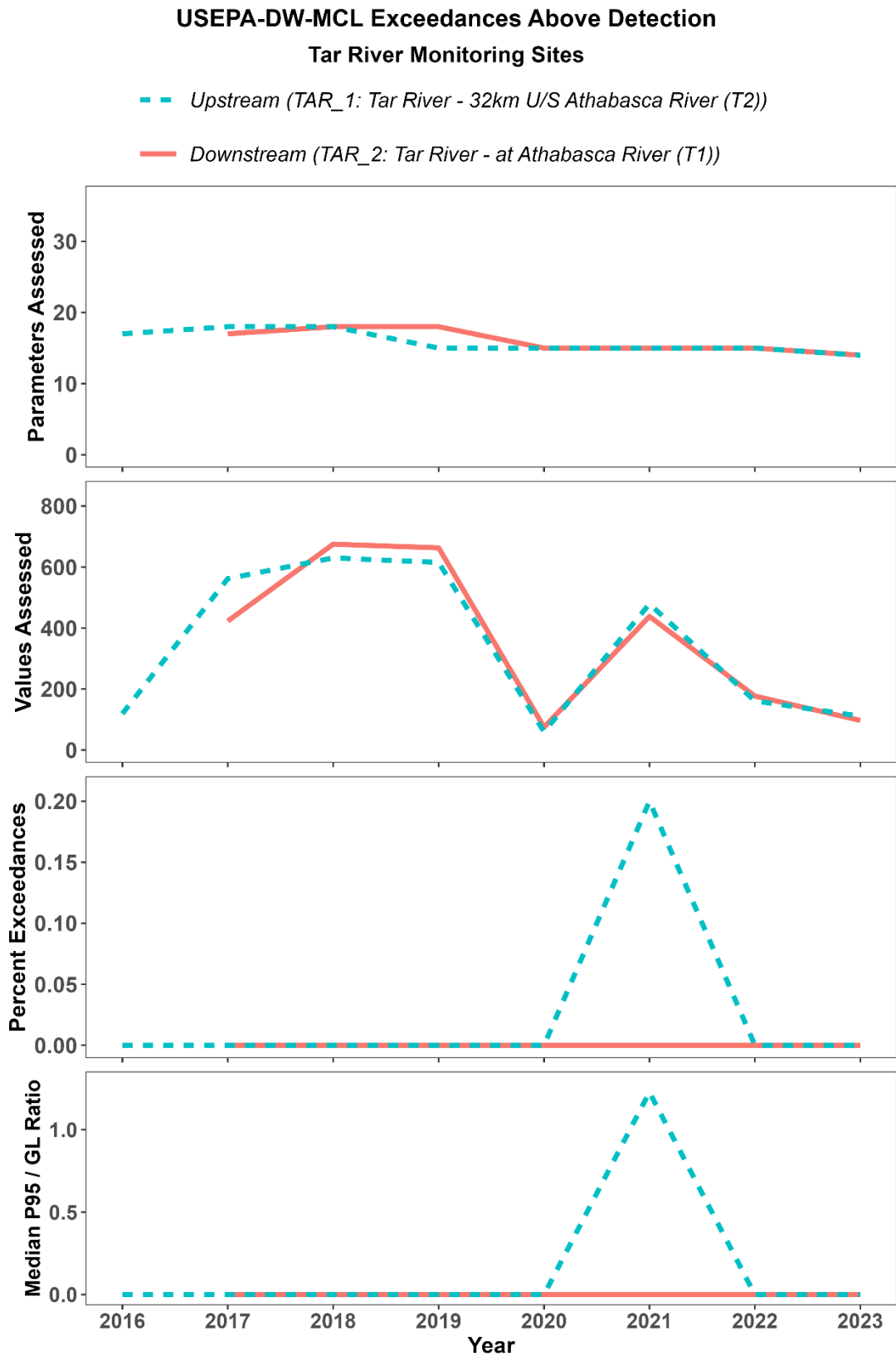


Figure I226: Comparison between exceedances at upstream and downstream sites on the Tar River when considering USEPA drinking water quality limits.

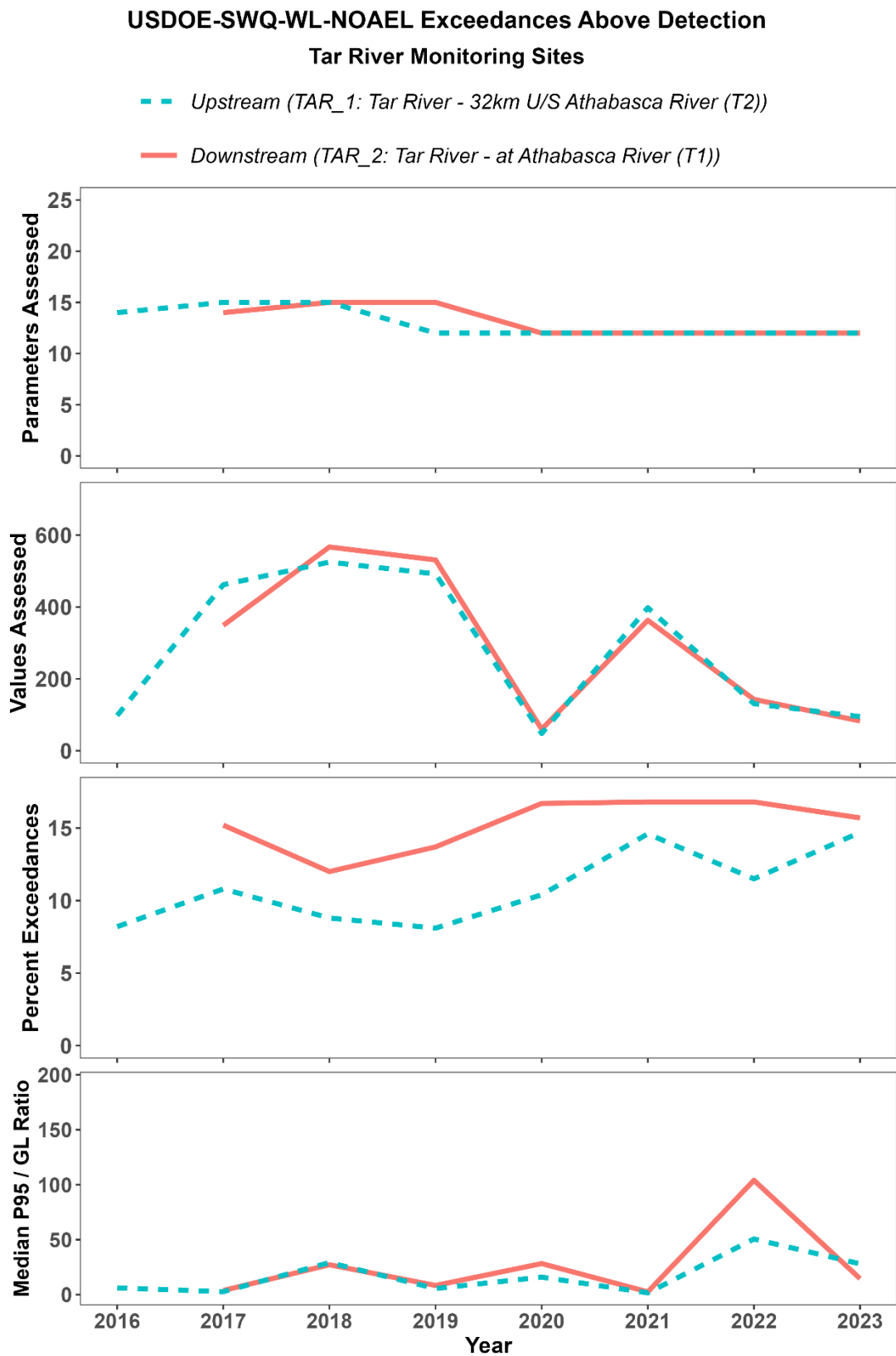


Figure I227: Comparison between exceedances at upstream and downstream sites on the Tar River when considering USEPA protection of piscivores NOAEL guidelines.

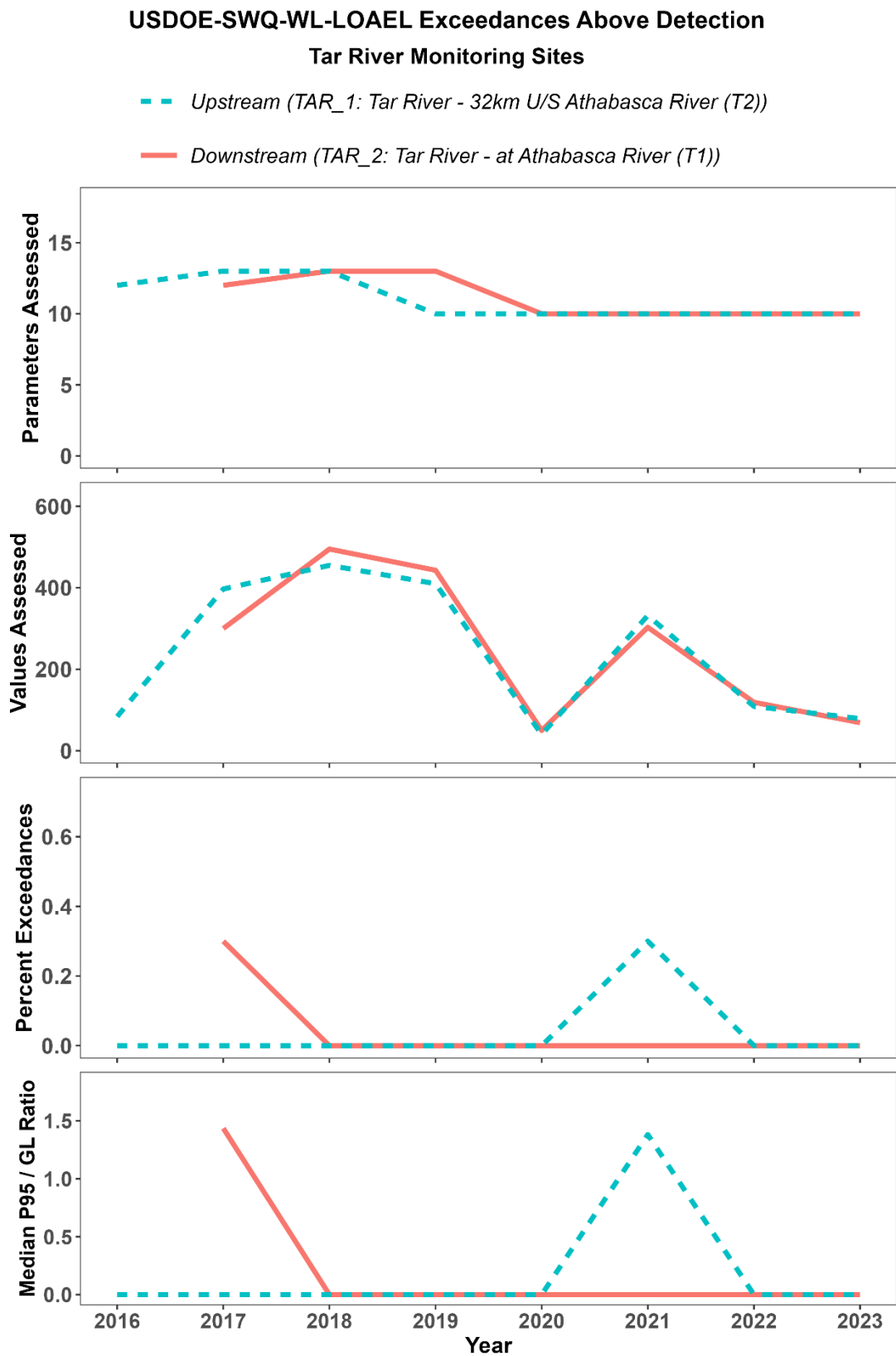


Figure I228: Comparison between exceedances at upstream and downstream sites on the Tar River when considering USEPA protection of piscivores LOAEL guidelines.

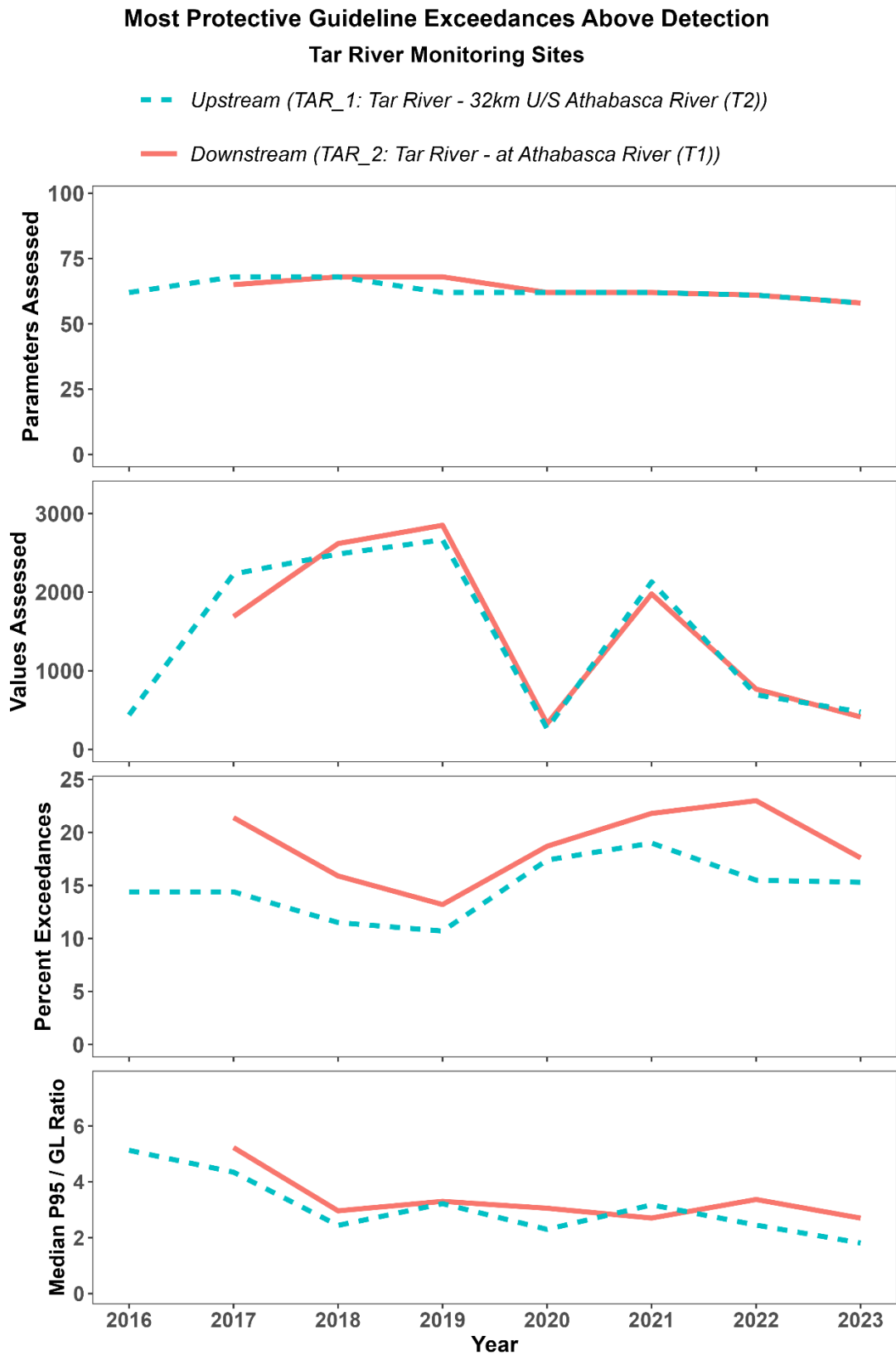


Figure I229: Comparison between exceedances at upstream and downstream sites on the Tar River when considering the most protective guidelines.

### Most Protective EPA Guideline Exceedances Above Detection Tar River Monitoring Sites

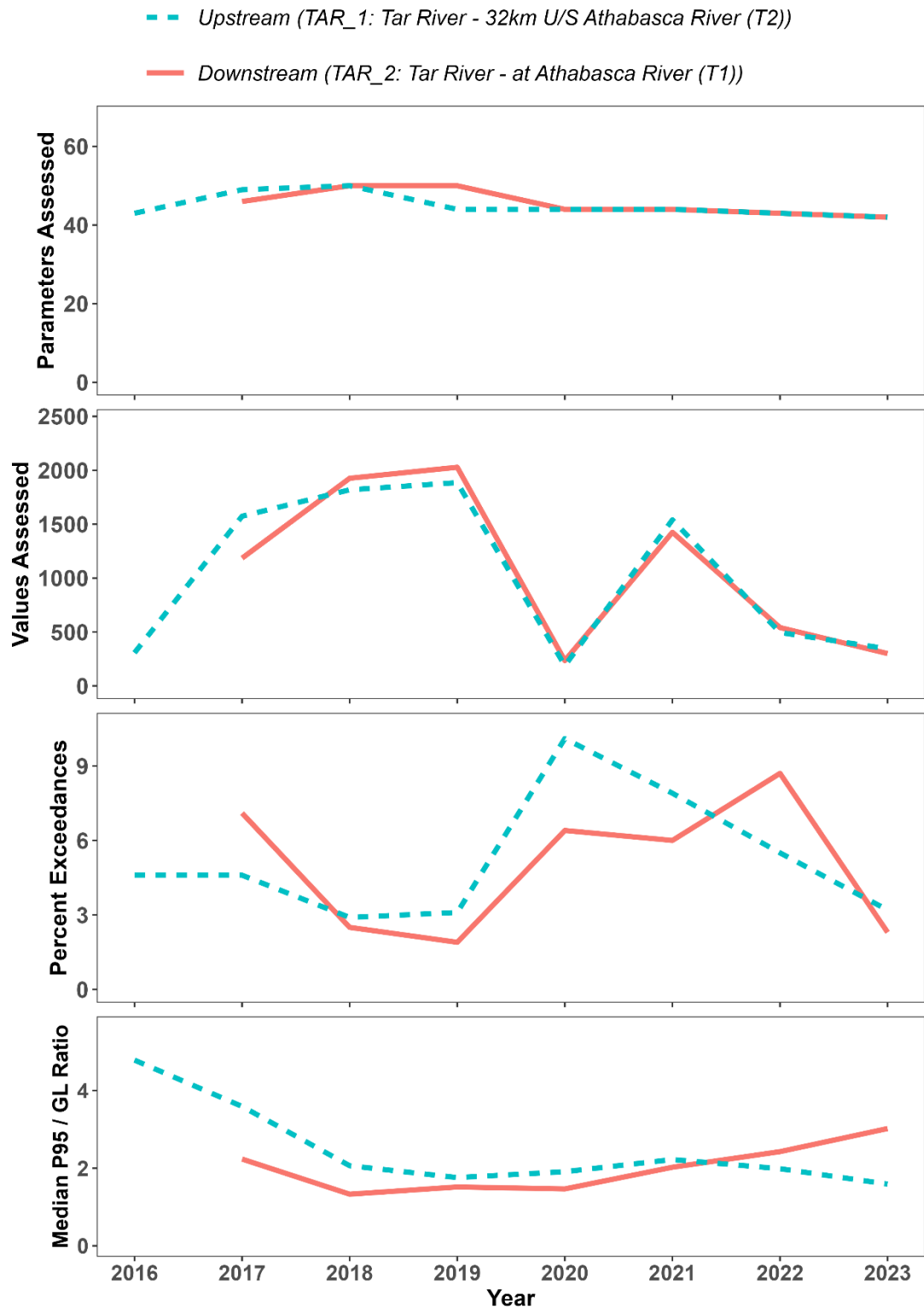


Figure I230: Comparison between exceedances at upstream and downstream sites on the Tar River when considering the most protective EPA guidelines.

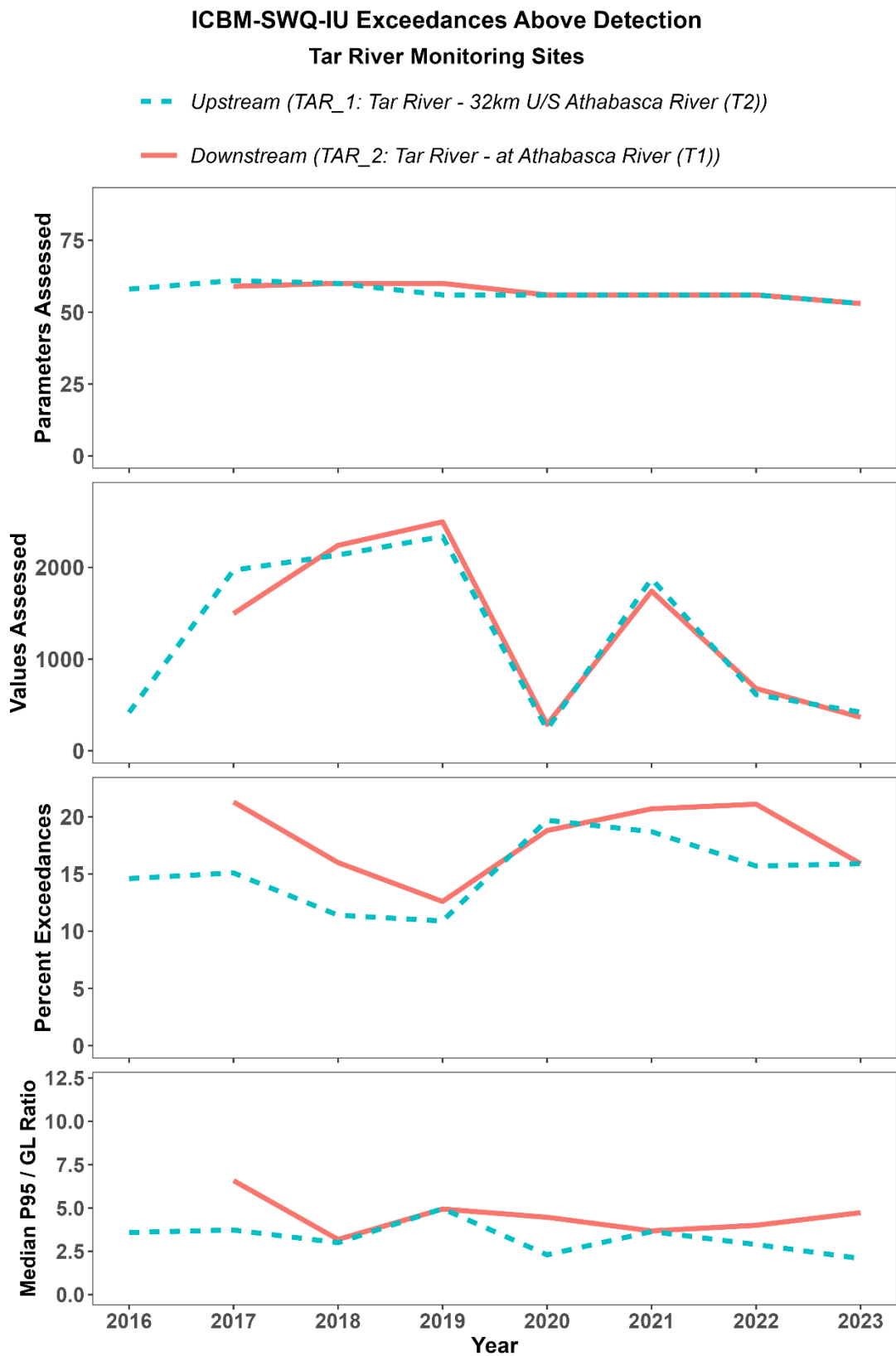


Figure I231: Comparison between exceedances at upstream and downstream sites on the Tar River when considering guidelines protective of indigenous use.



# ICBM-SWQ-IU(DW+O-Derived) Exceedances Above Detection Tar River Monitoring Sites

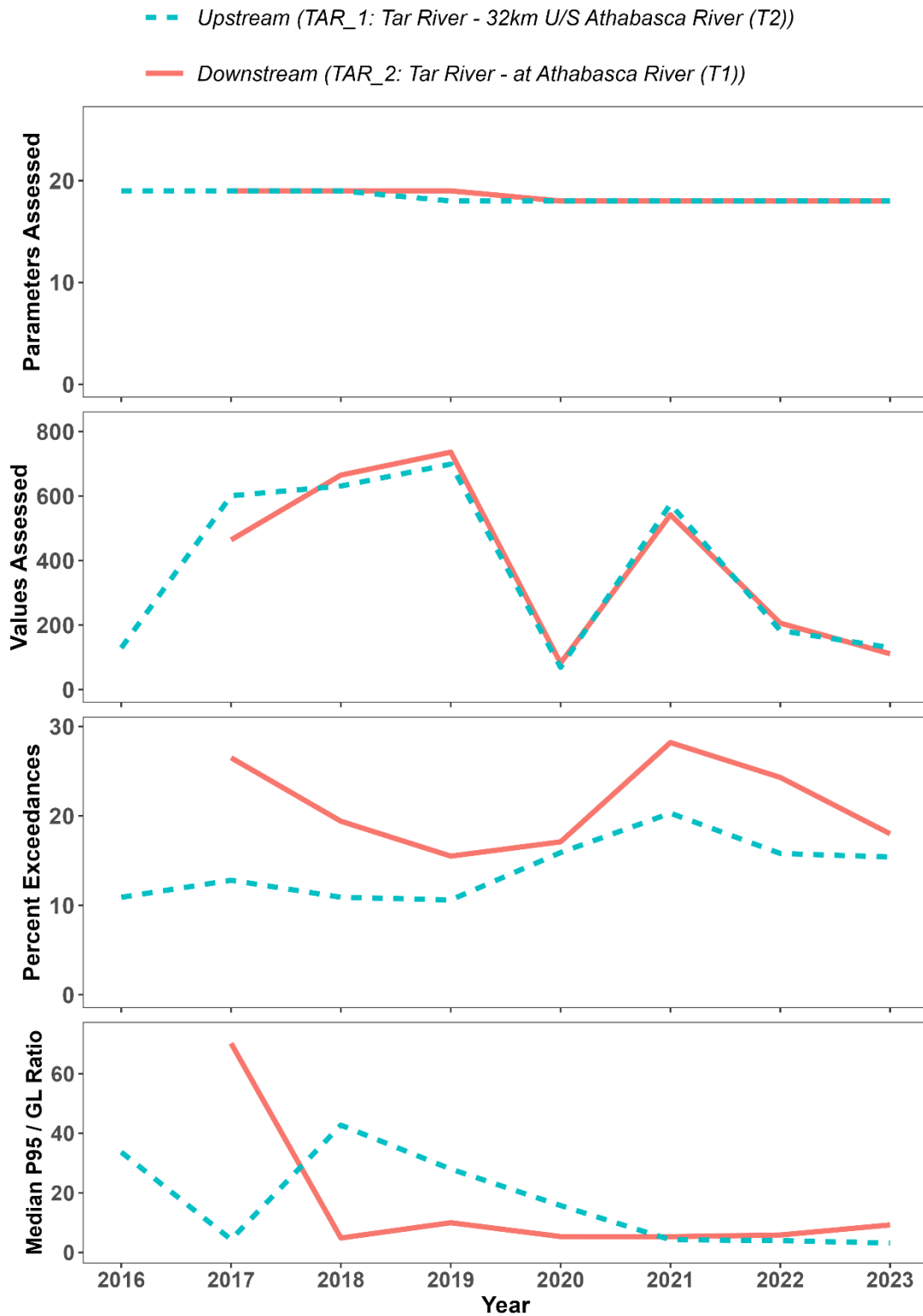


Figure I232: Comparison between exceedances at upstream and downstream sites on the Tar River when considering guidelines protective of indigenous use from consumption of surface water and aquatic organisms.

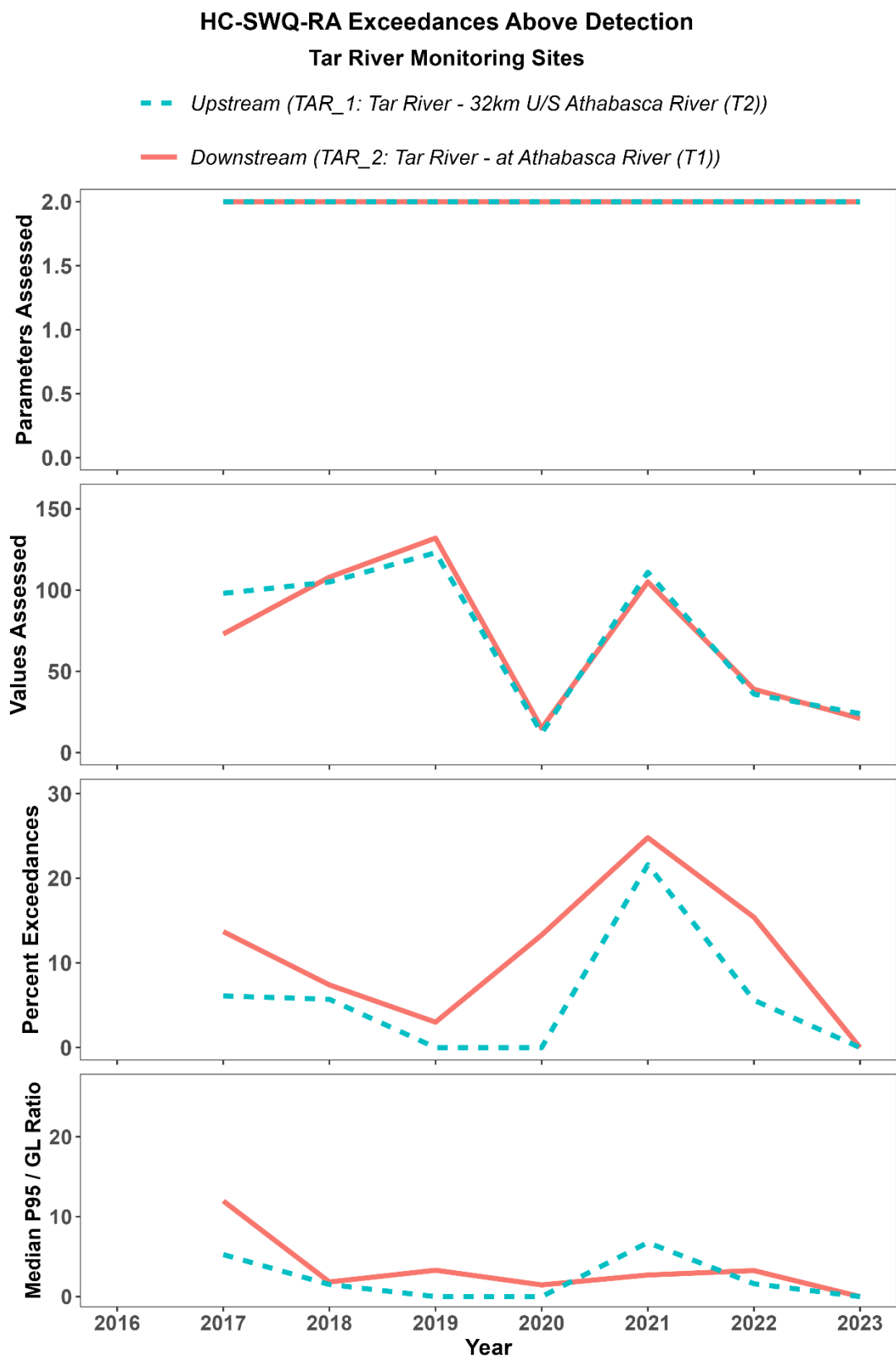


Figure I233: Comparison between exceedances at upstream and downstream sites on the Tar River when considering Health Canada recreation aesthetics guidelines.

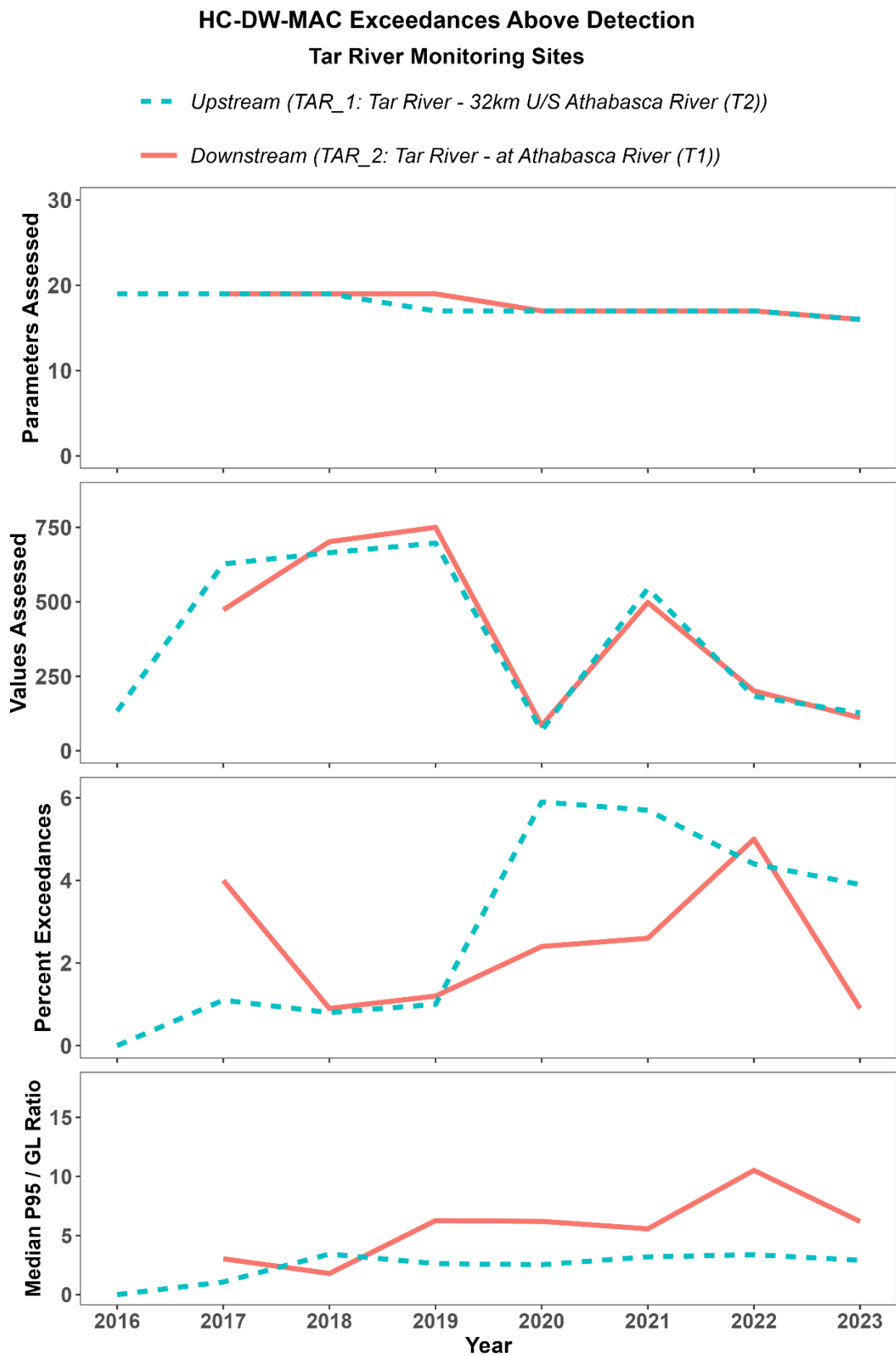


Figure I234: Comparison between exceedances at upstream and downstream sites on the Tar River when considering Health Canada drinking water maximum acceptable concentration guidelines.

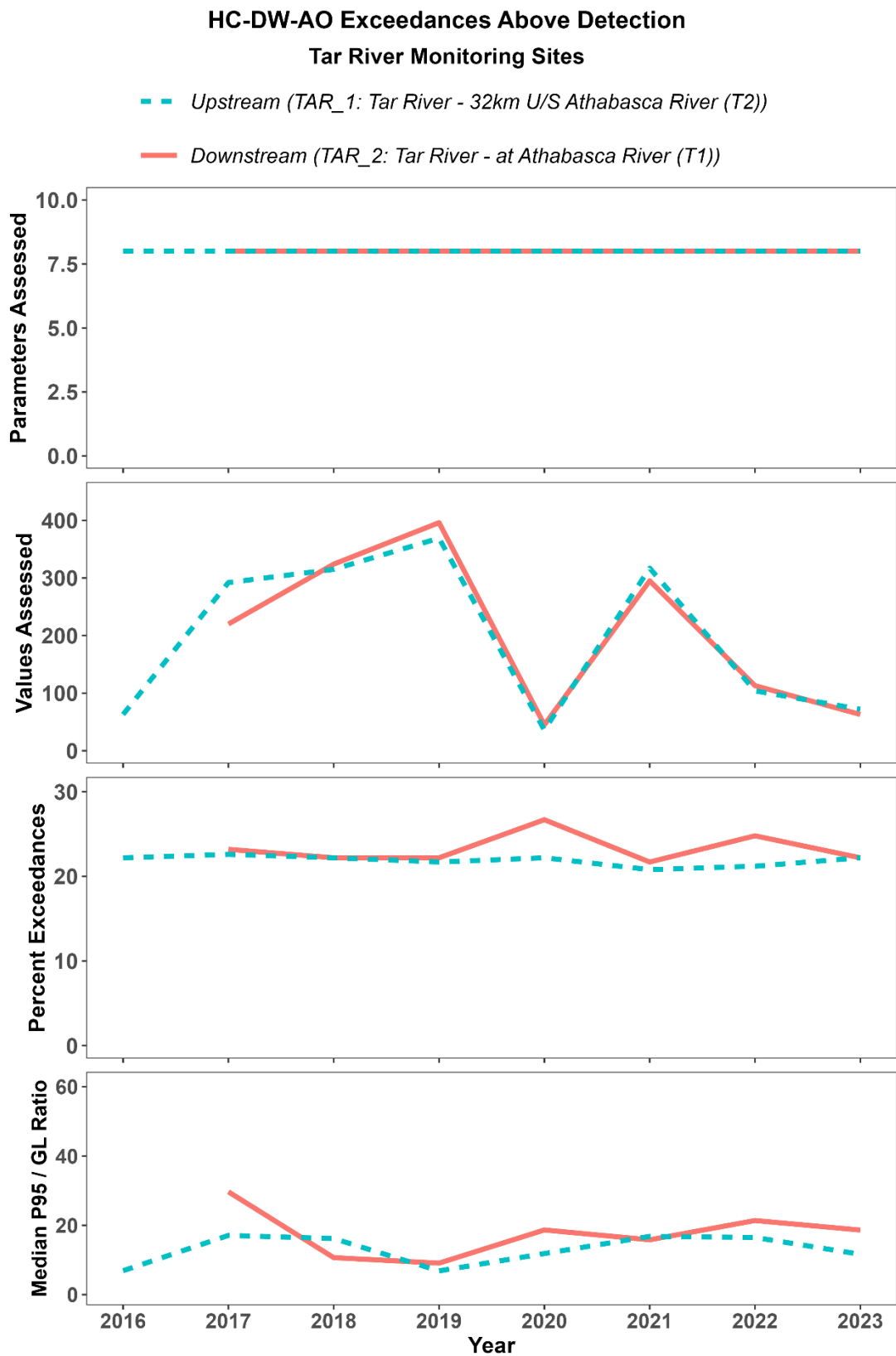


Figure I235: Comparison between exceedances at upstream and downstream sites on the Tar River when considering Health Canada drinking water aesthetics objectives.

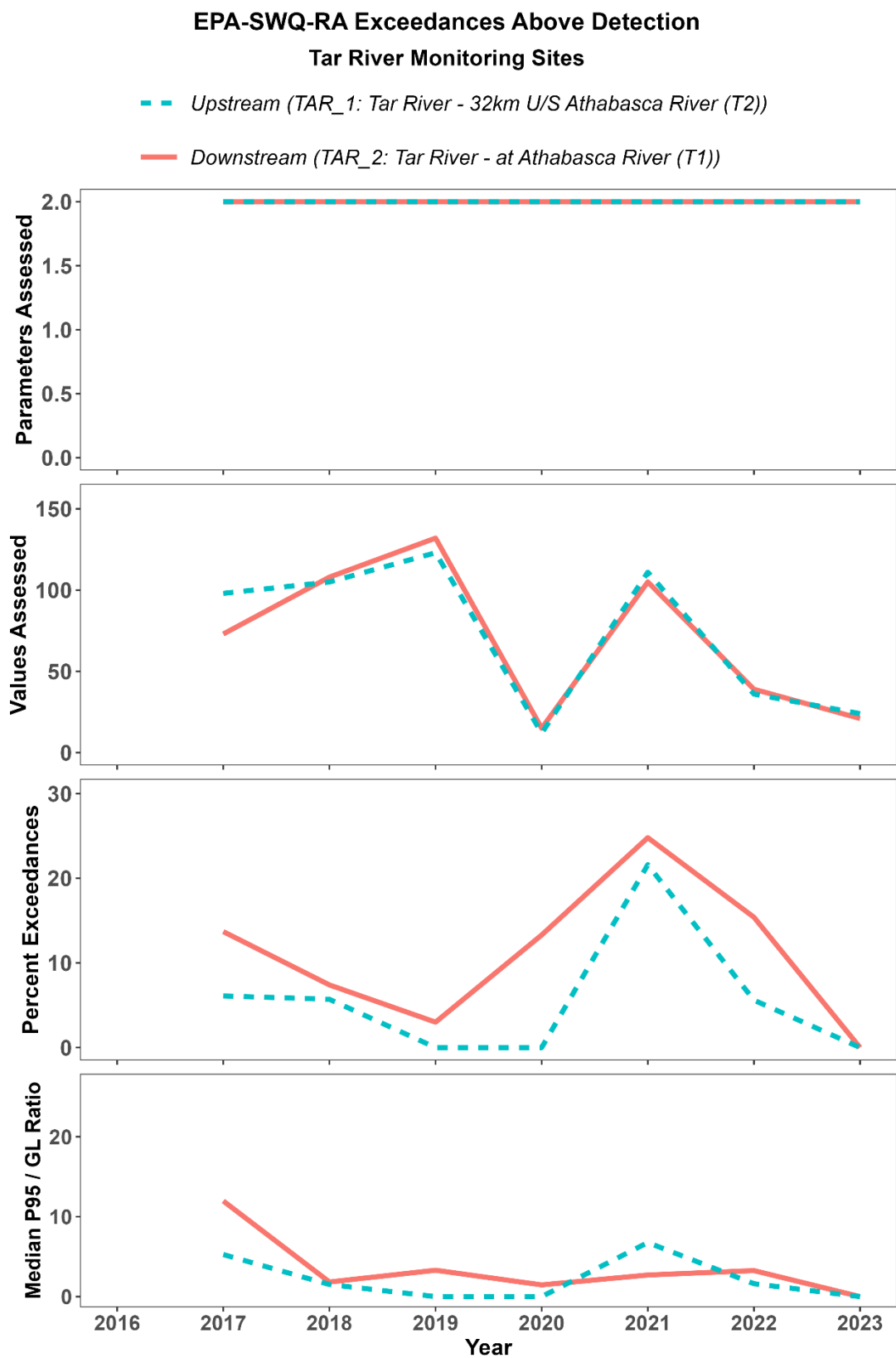


Figure I236: Comparison between exceedances at upstream and downstream sites on the Tar River when considering Alberta EPA recreation aesthetics guidelines.

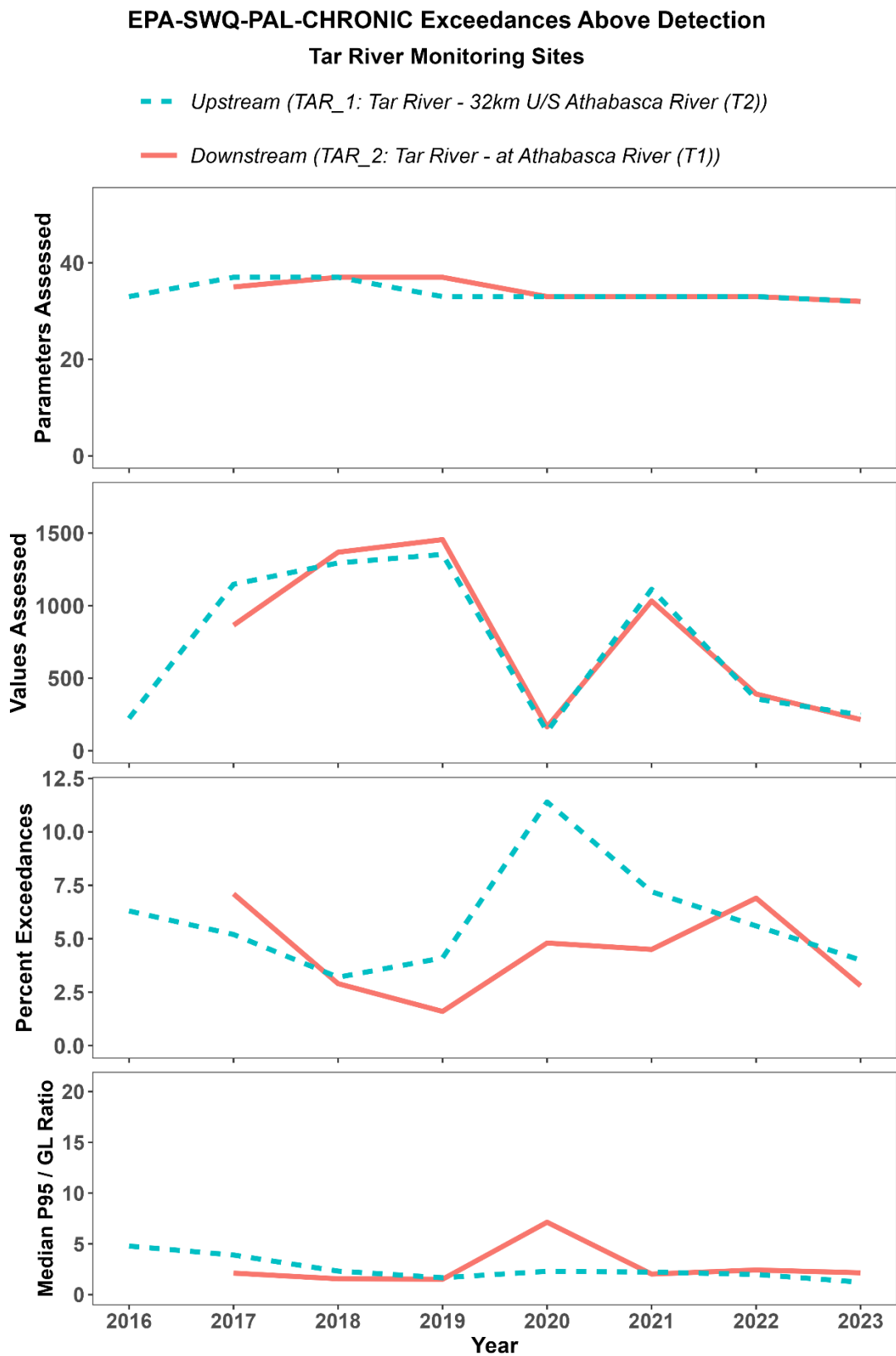


Figure I237: Comparison between exceedances at upstream and downstream sites on the Tar River when considering Alberta EPA protection of aquatic life chronic guidelines.

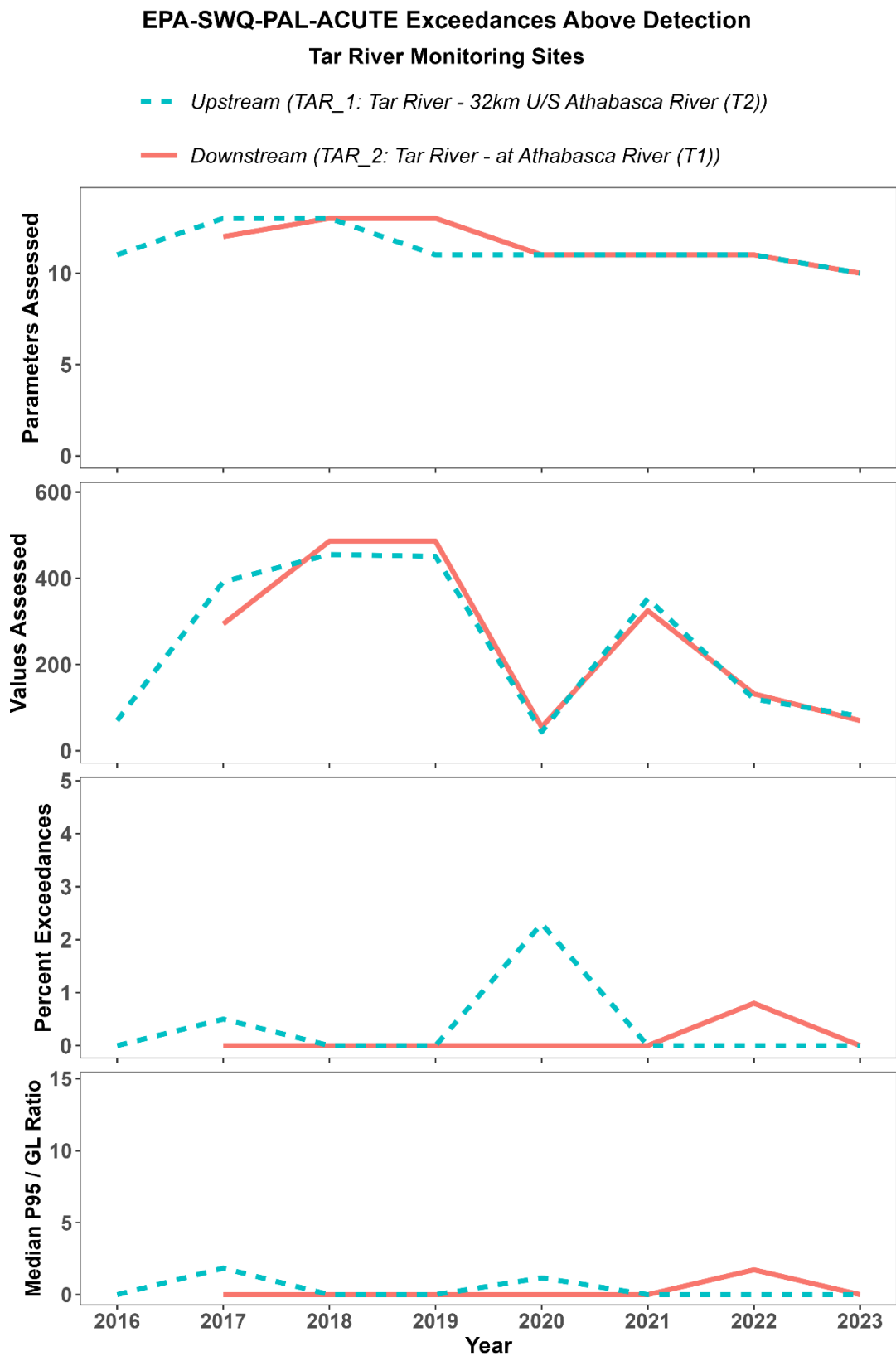


Figure I238: Comparison between exceedances at upstream and downstream sites on the Tar River when considering Alberta EPA protection of aquatic life acute guidelines.

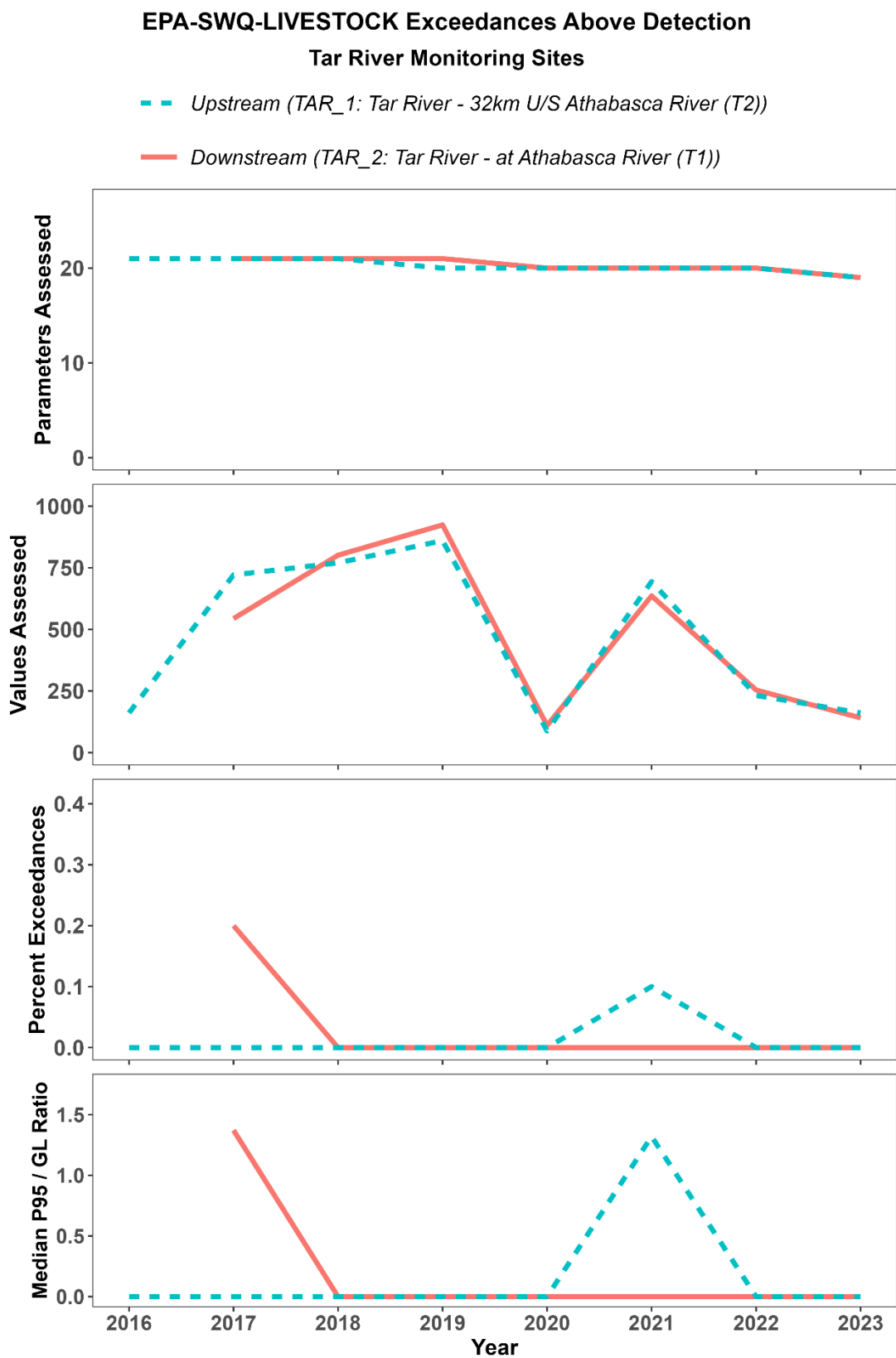


Figure I239: Comparison between exceedances at upstream and downstream sites on the Tar River when considering Alberta EPA protection of livestock watering guidelines.



## EPA-SWQ-AG-IRRIGATION Exceedances Above Detection Tar River Monitoring Sites

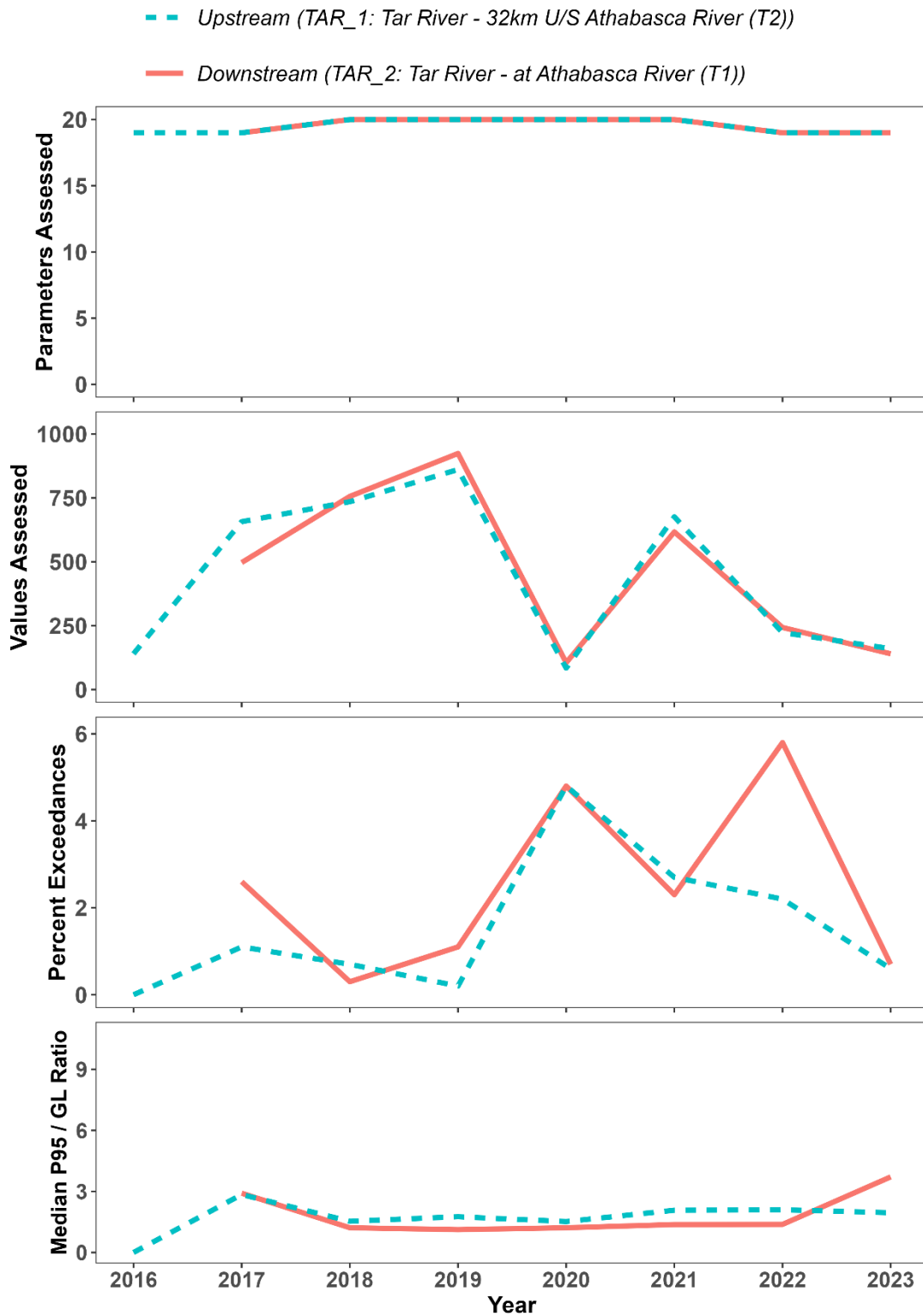


Figure I240: Comparison between exceedances at upstream and downstream sites on the Tar River when considering Alberta EPA protection of irrigation water guidelines.

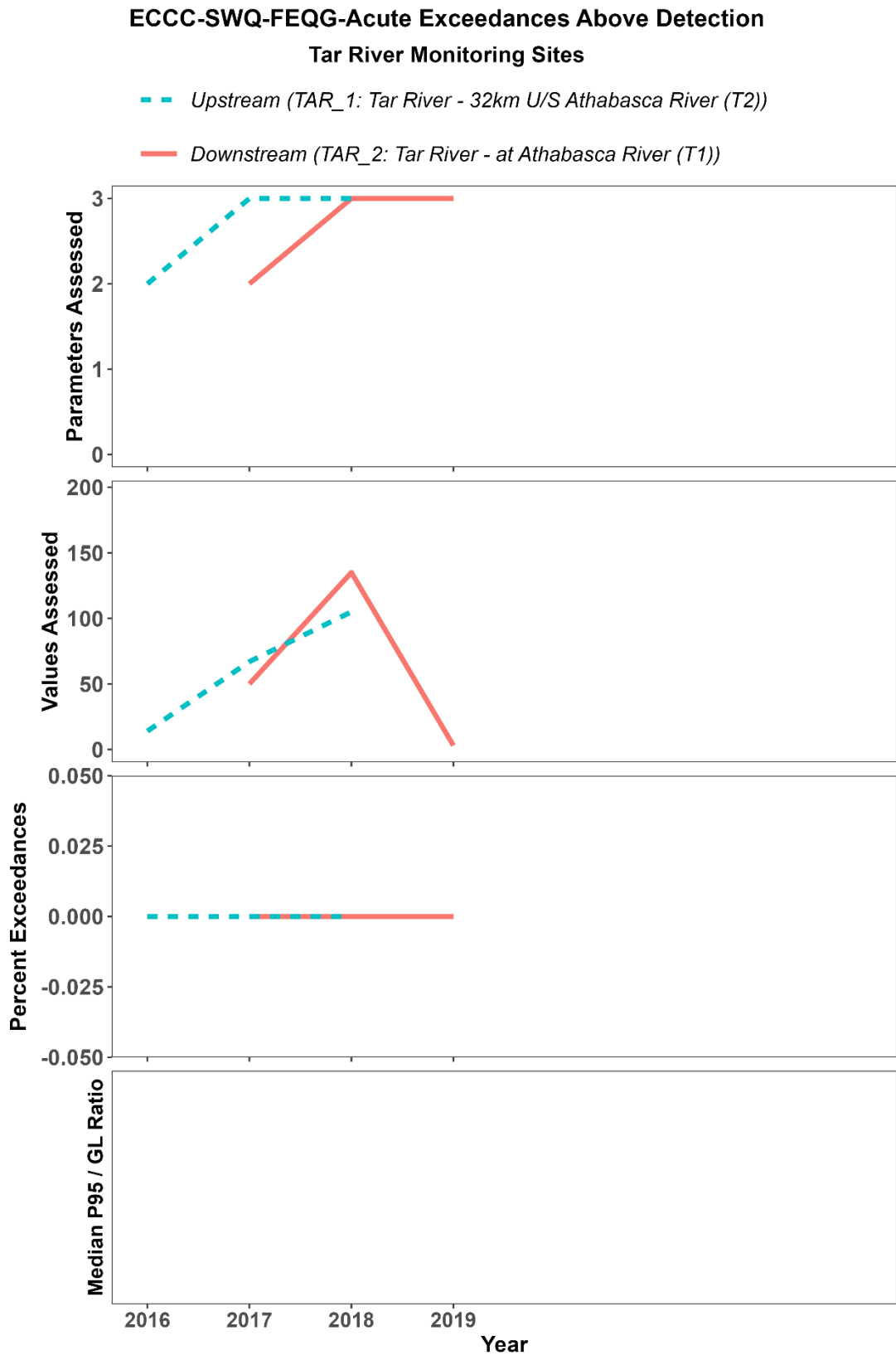


Figure I241: Comparison between exceedances at upstream and downstream sites on the Tar River when considering ECCC Federal Environmental Quality Guidelines protection of aquatic life acute guidelines.

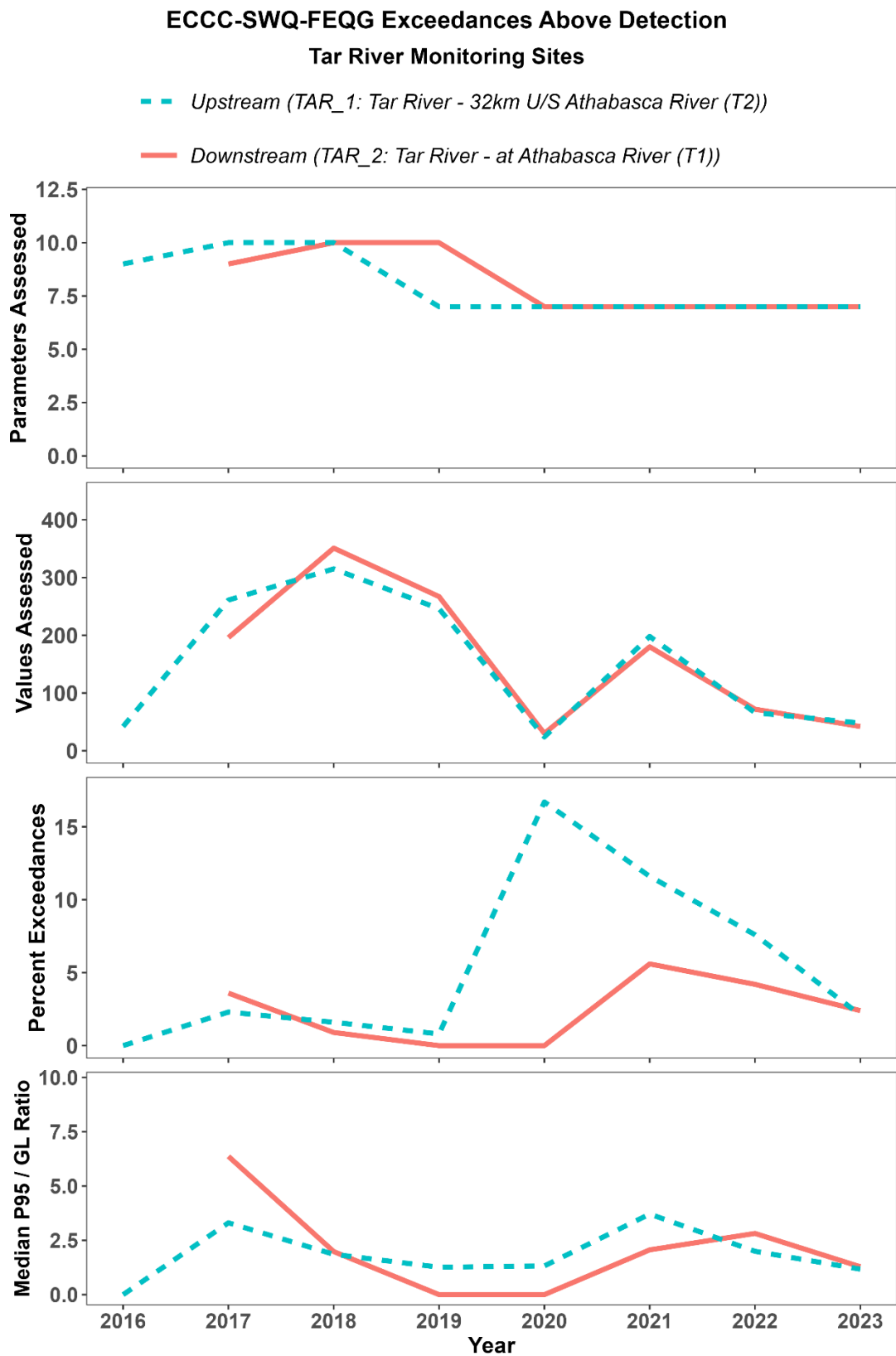


Figure I242: Comparison between exceedances at upstream and downstream sites on the Tar River when considering ECCC Federal Environmental Quality Guidelines protection of aquatic life chronic guidelines.

# CCME-SWQ-PAL-CHRONIC Exceedances Above Detection Tar River Monitoring Sites

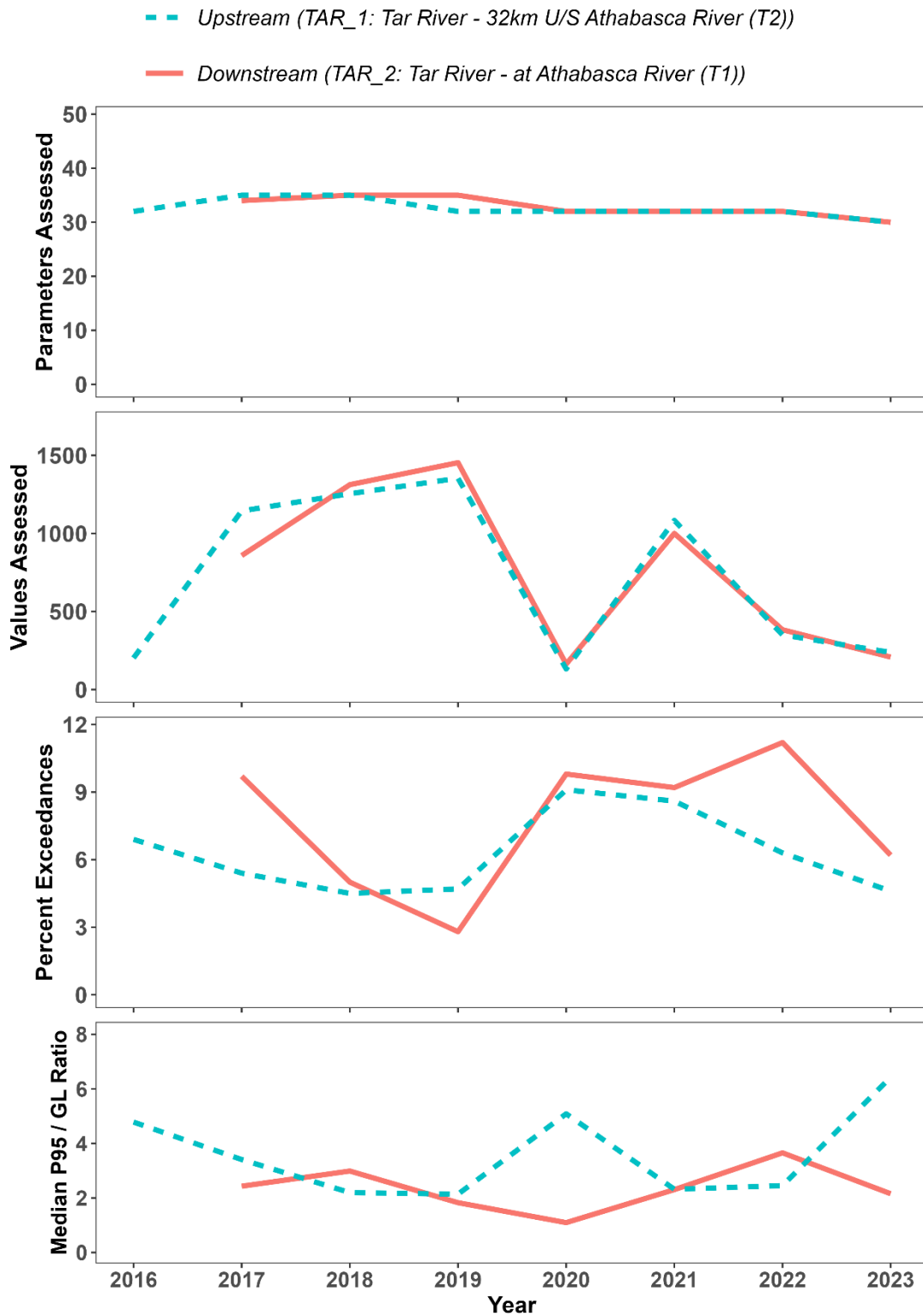


Figure I243: Comparison between exceedances at upstream and downstream sites on the Tar River when considering CCME protection of aquatic life chronic guidelines.

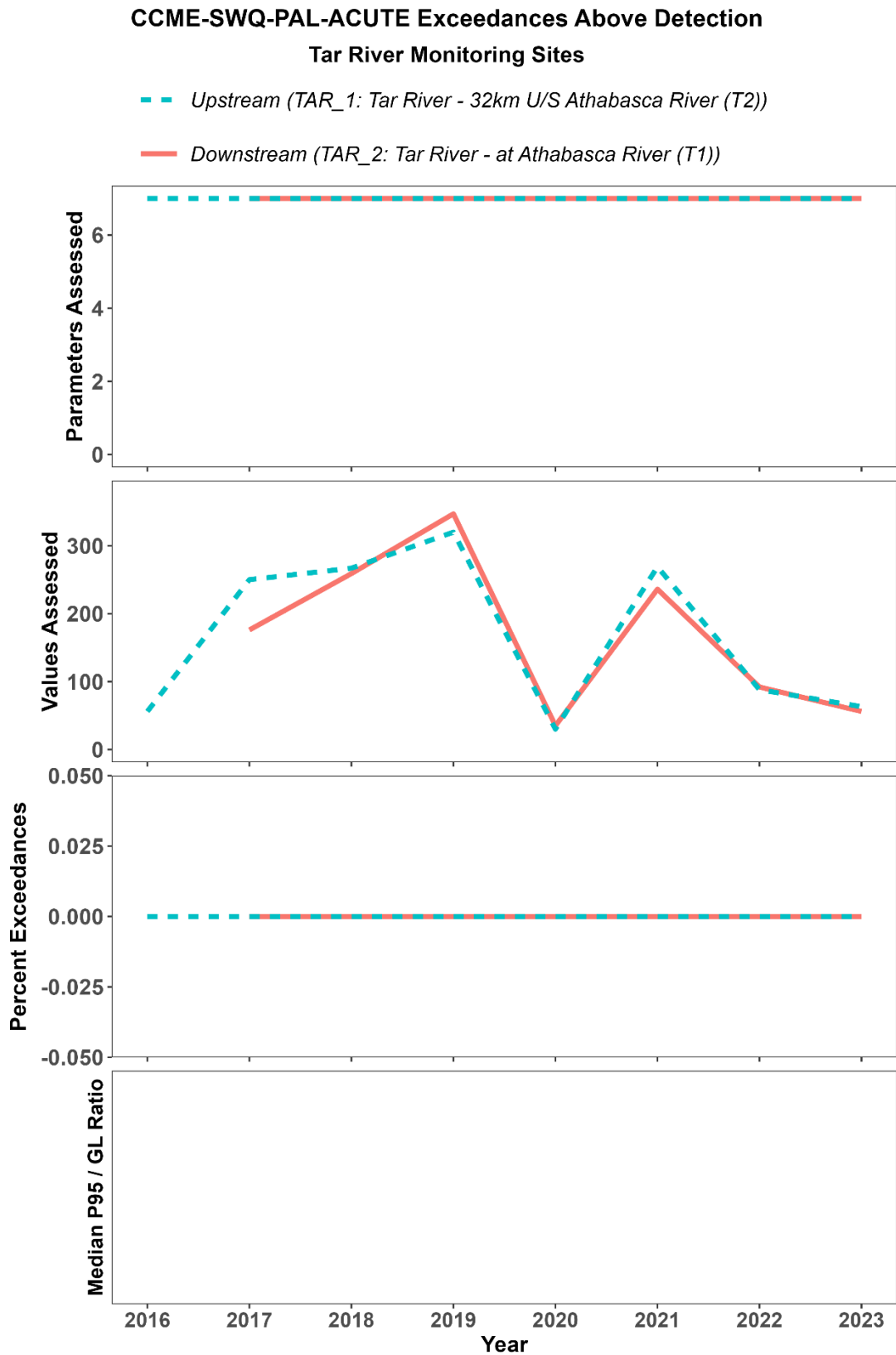


Figure I244: Comparison between exceedances at upstream and downstream sites on the Tar River when considering CCME protection of aquatic life acute guidelines.

## CCME-SWQ-AG-LIVESTOCK Exceedances Above Detection Tar River Monitoring Sites

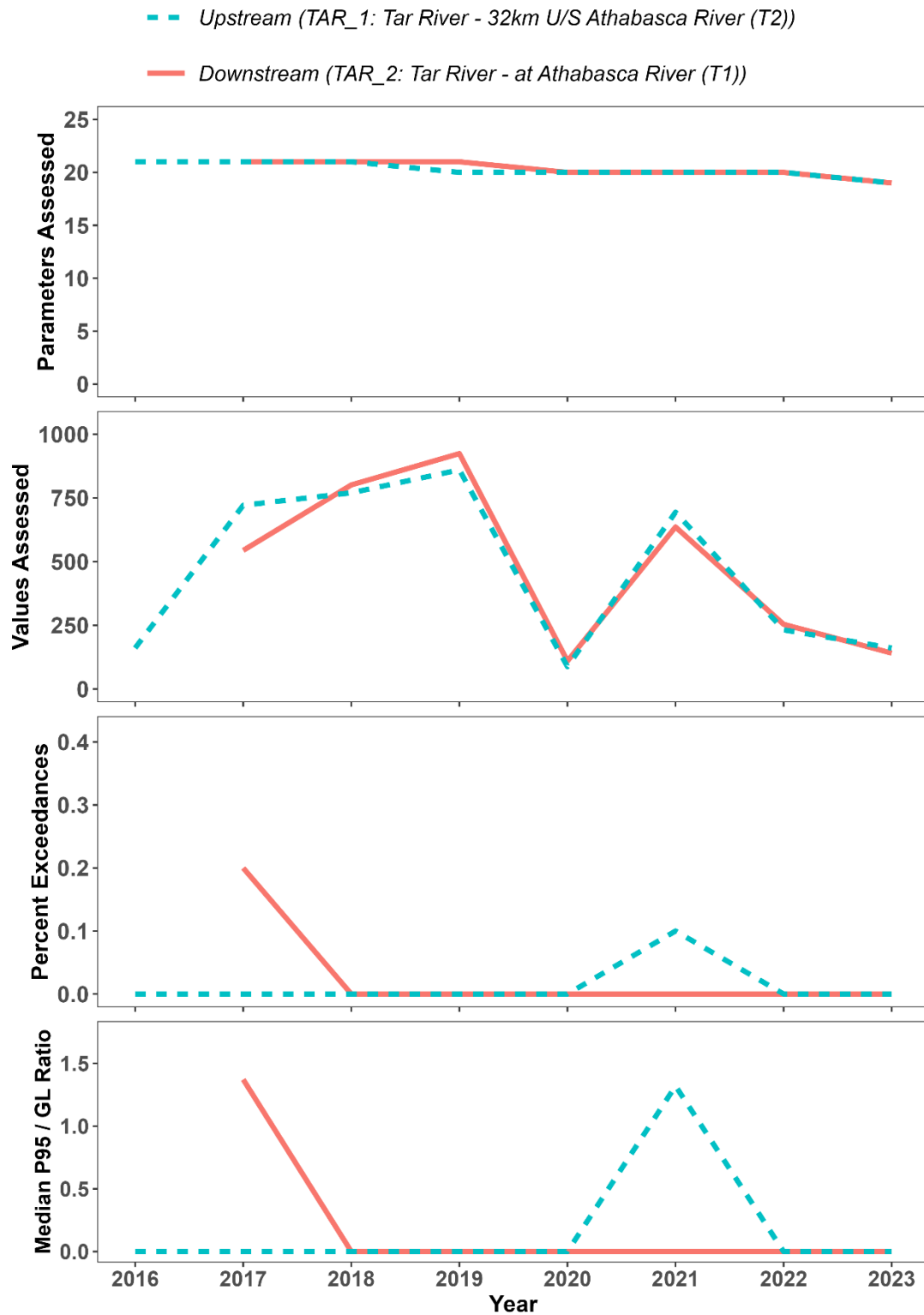


Figure I245: Comparison between exceedances at upstream and downstream sites on the Tar River when considering CCME protection of livestock watering guidelines.

# CCME-SWQ-AG-IRRIGATION Exceedances Above Detection Tar River Monitoring Sites

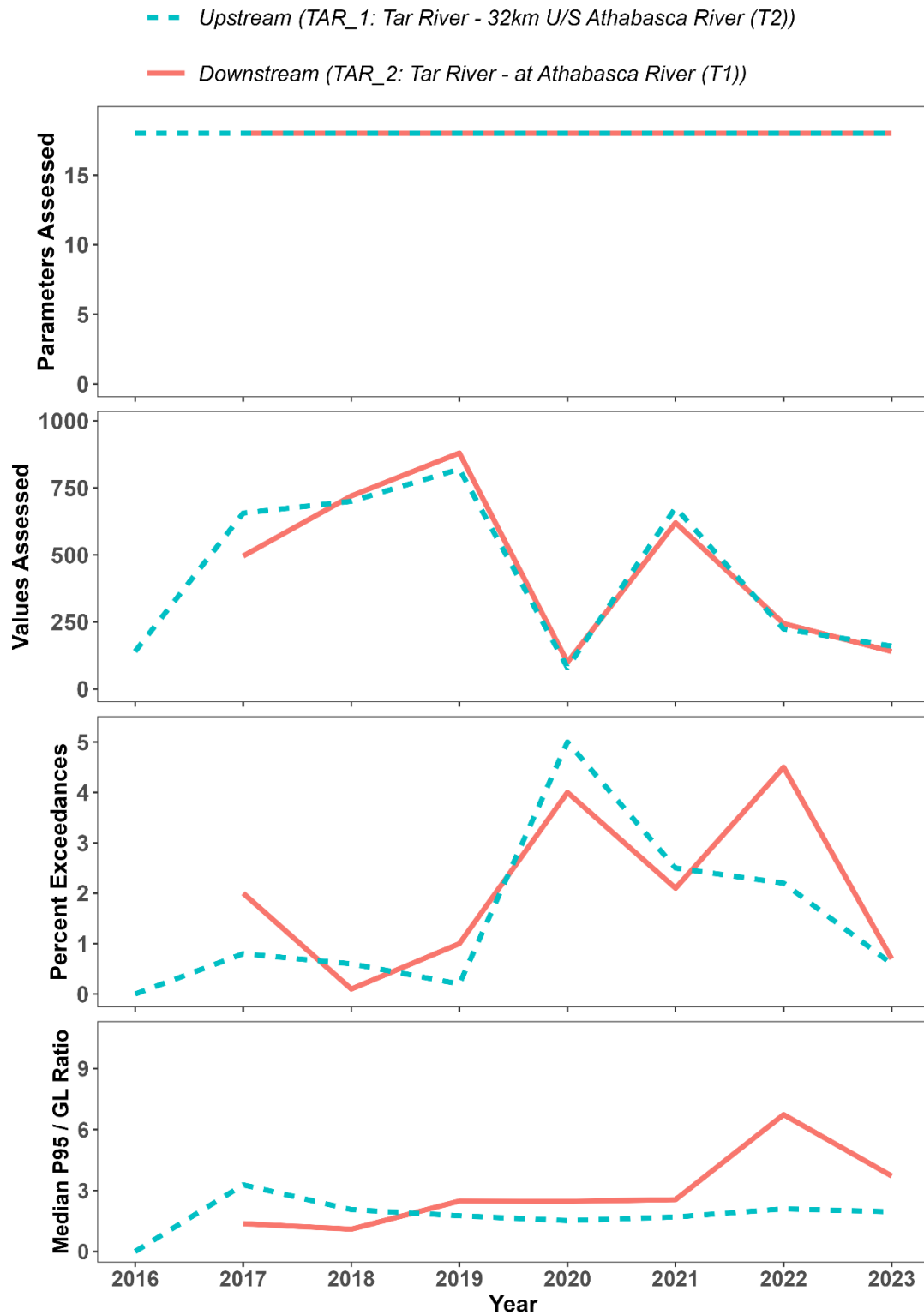


Figure I246: Comparison between exceedances at upstream and downstream sites on the Tar River when considering CCME protection of irrigation water guidelines.

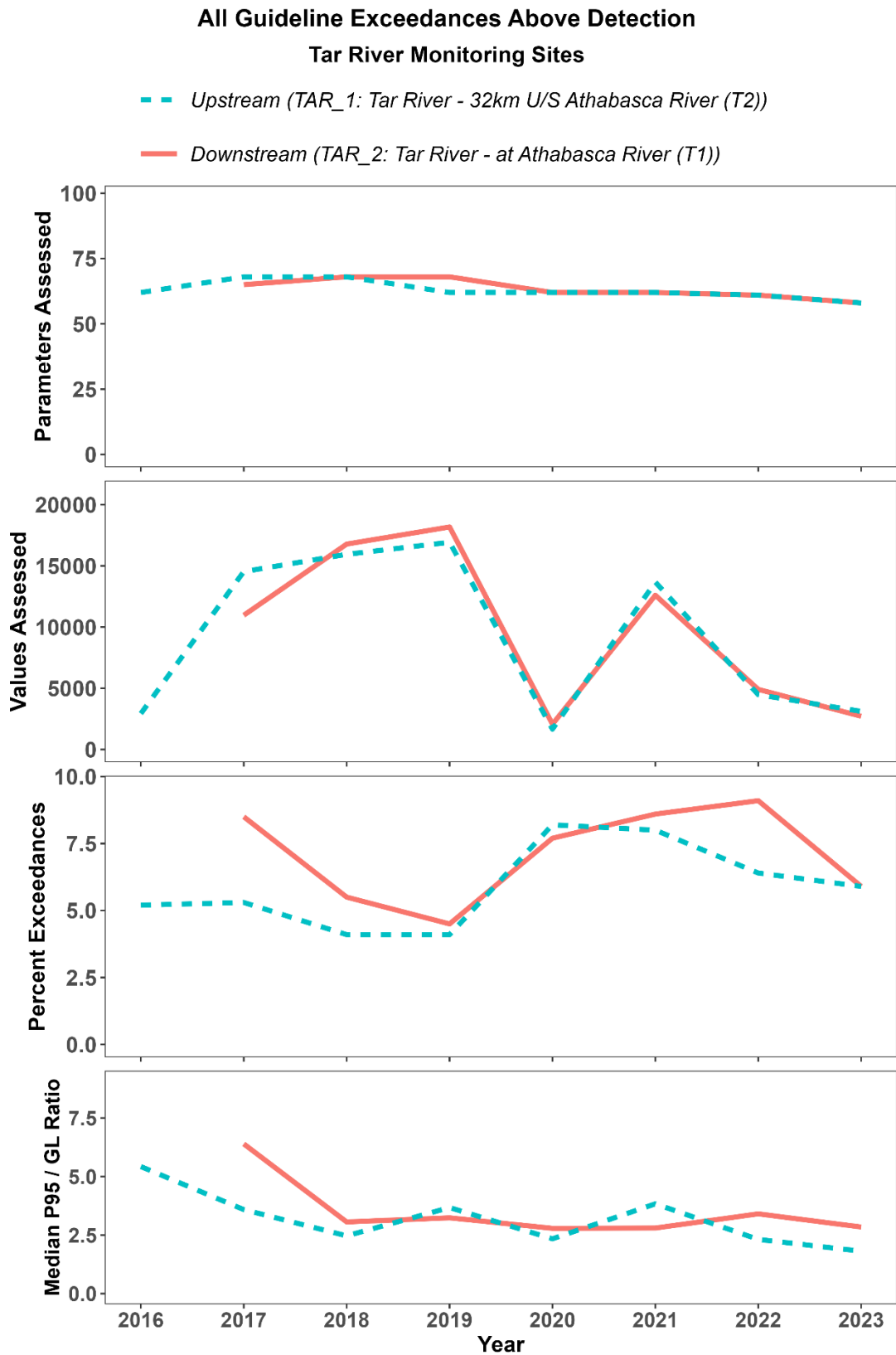


Figure I247: Comparison between exceedances at upstream and downstream sites on the Tar River when considering all guidelines.



### 3.2.3 Mackay River

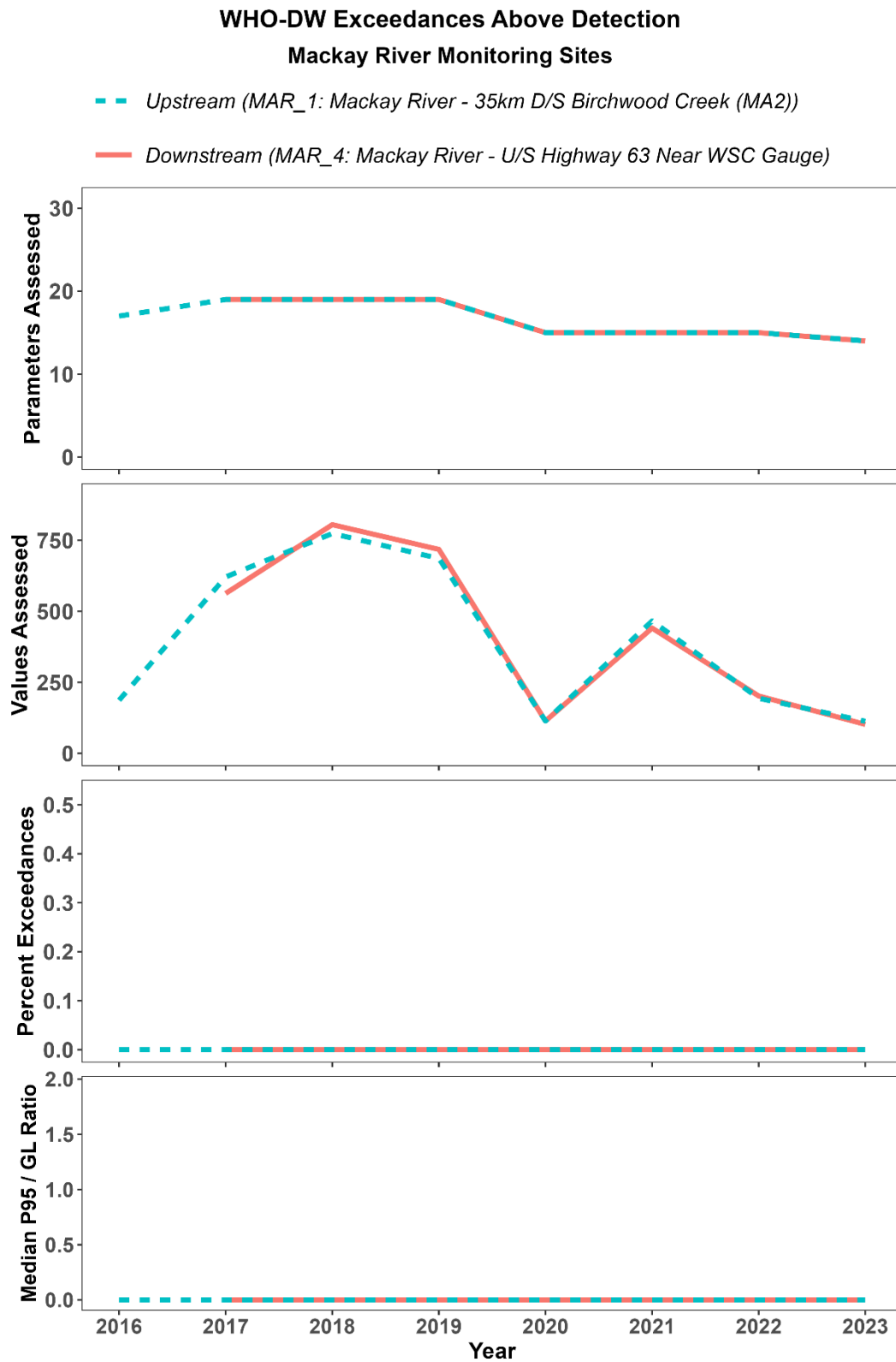


Figure I248: Comparison between exceedances at upstream and downstream sites on the Mackay River when considering WHO drinking water guidelines.

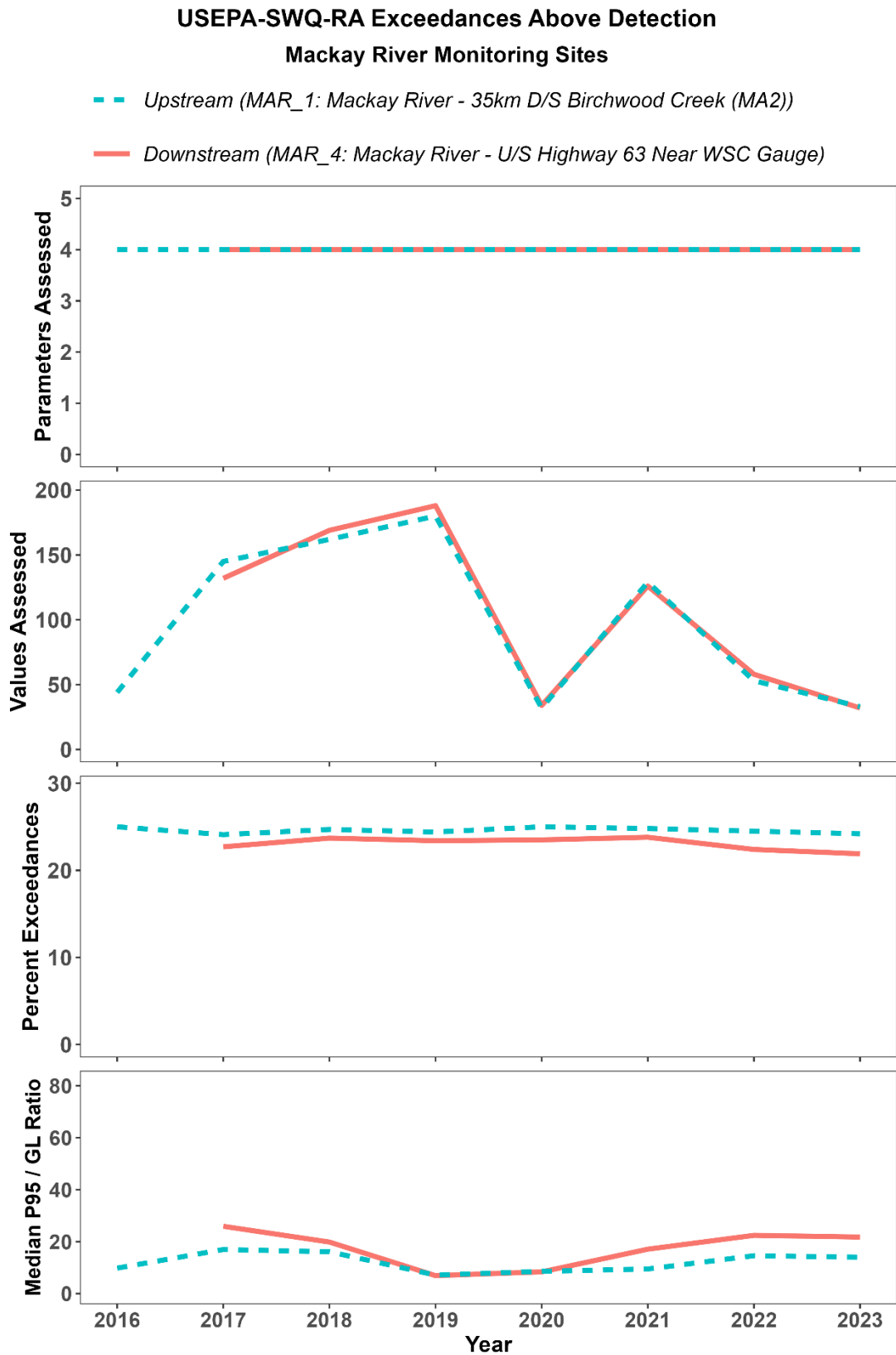


Figure I249: Comparison between exceedances at upstream and downstream sites on the Mackay River when considering USEPA recreational aesthetics guidelines.

# USEPA-SWQ-PAL-CHRONIC Exceedances Above Detection Mackay River Monitoring Sites

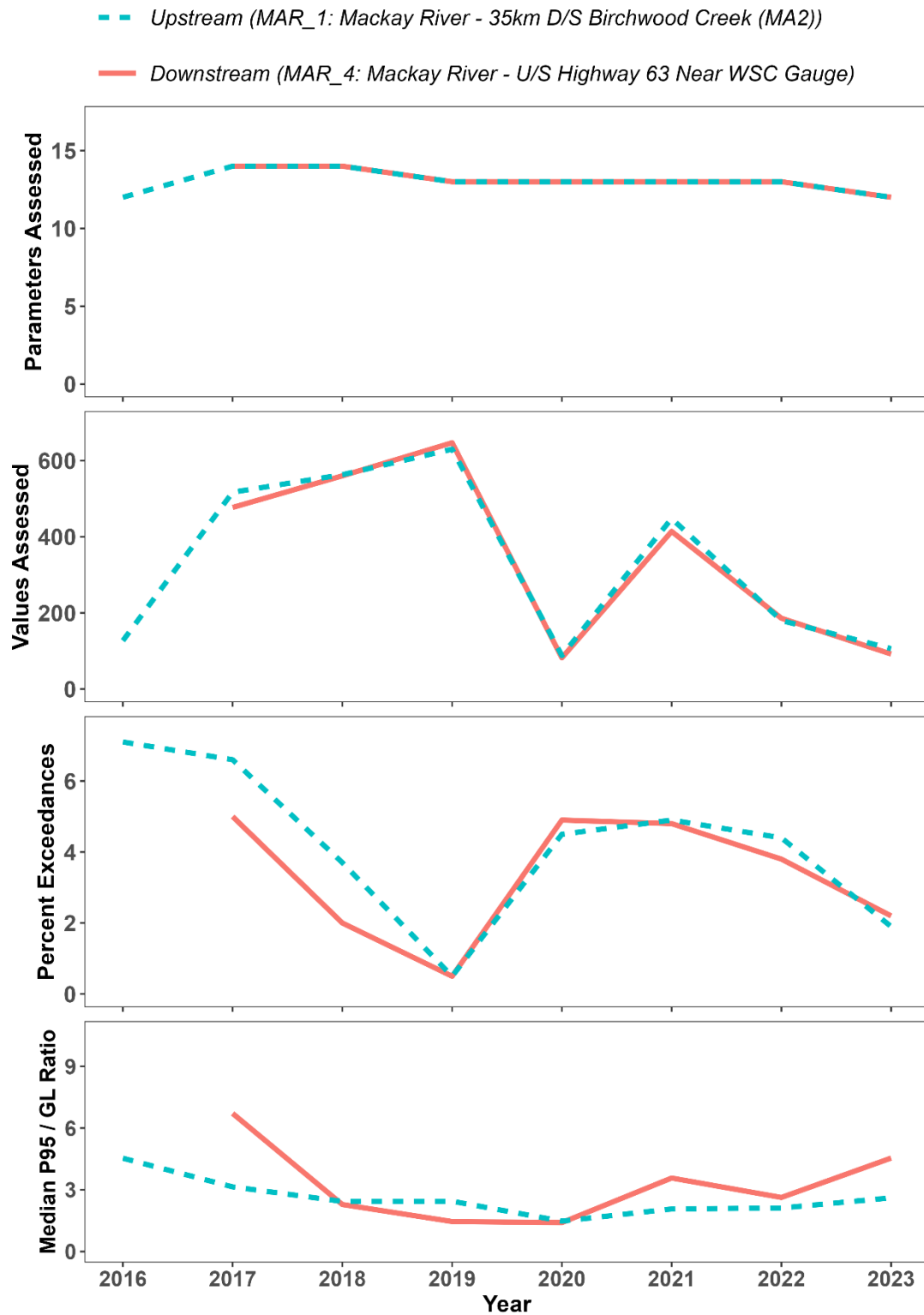


Figure I250: Comparison between exceedances at upstream and downstream sites on the Mackay River when considering USEPA protection of aquatic life chronic guidelines.

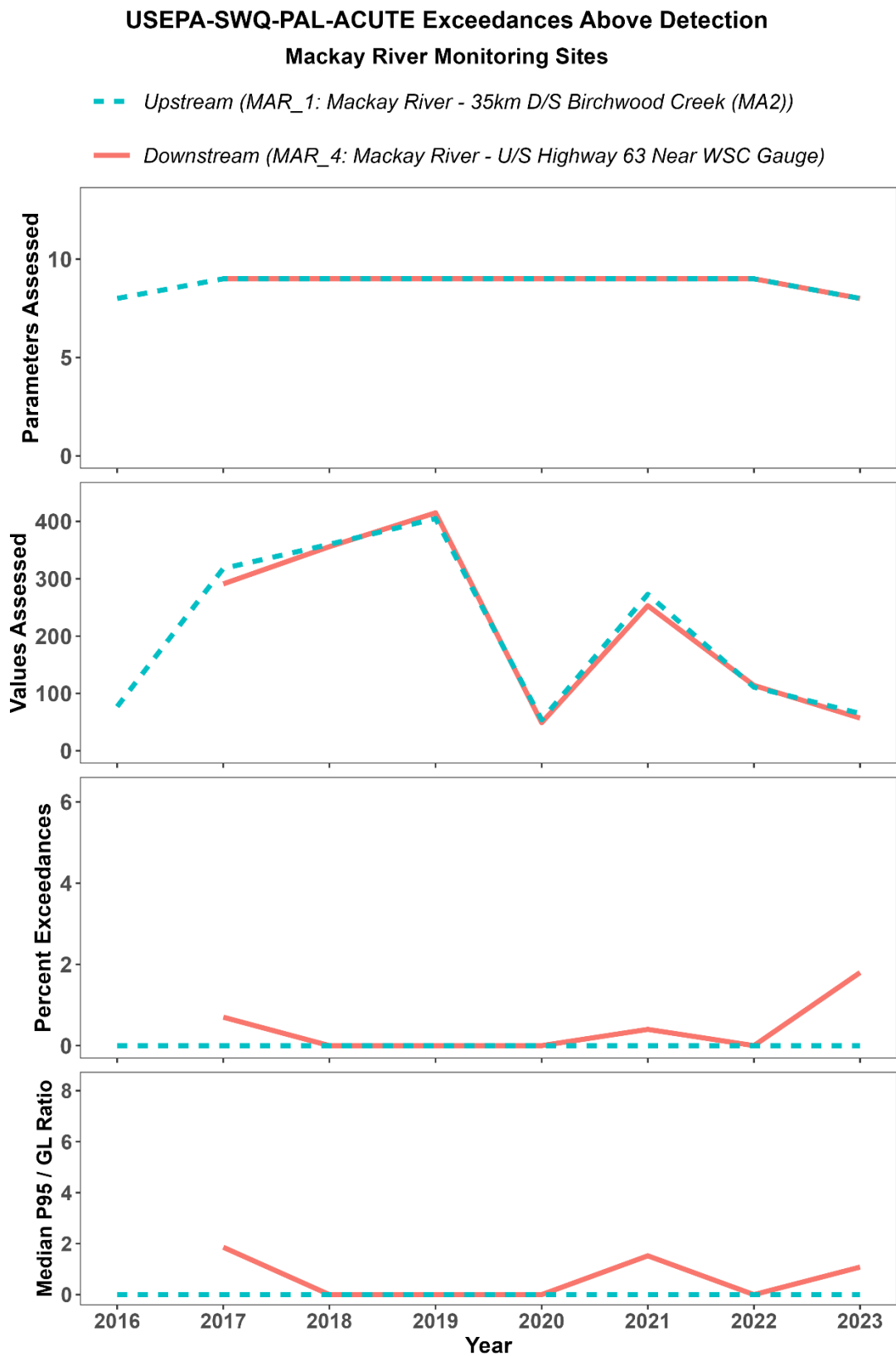


Figure I251: Comparison between exceedances at upstream and downstream sites on the Mackay River when considering USEPA protection of aquatic life acute guidelines.

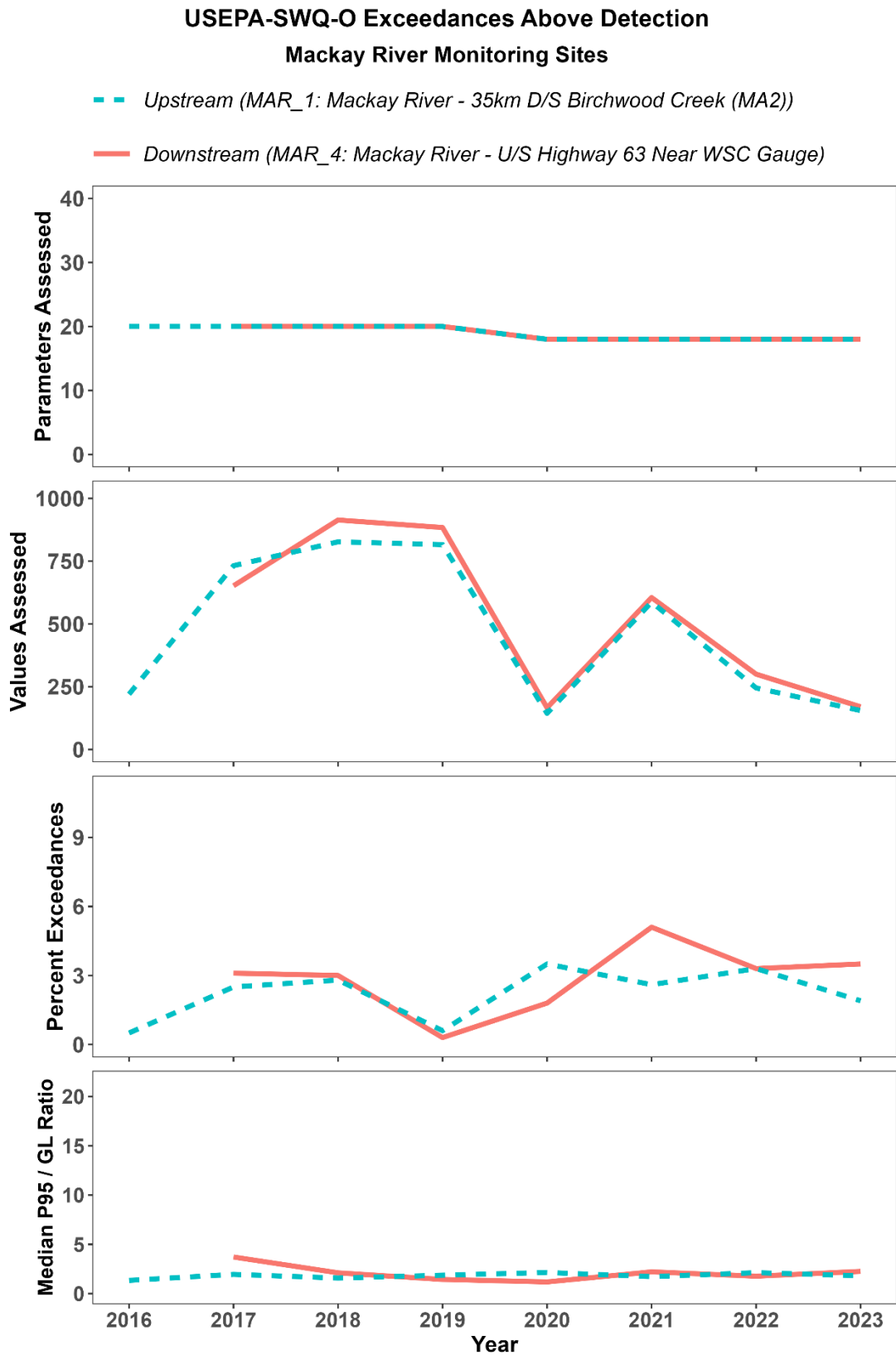


Figure I252: Comparison between exceedances at upstream and downstream sites on the Mackay River when considering USEPA protection of human health from consumption of aquatic organisms guidelines.

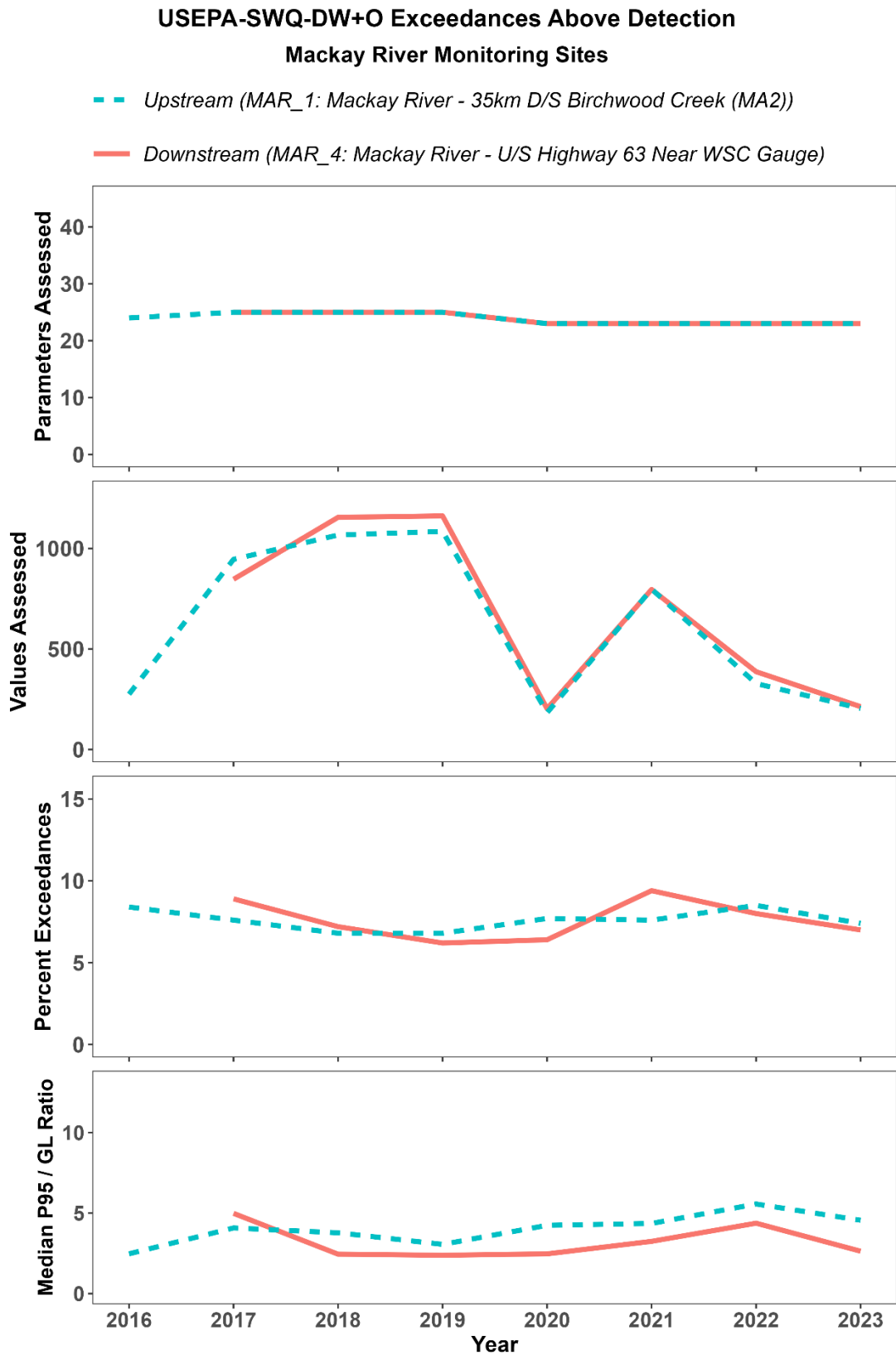


Figure I253: Comparison between exceedances at upstream and downstream sites on the Mackay River when considering USEPA protection of human health from consumption of surface water and aquatic organisms guidelines.

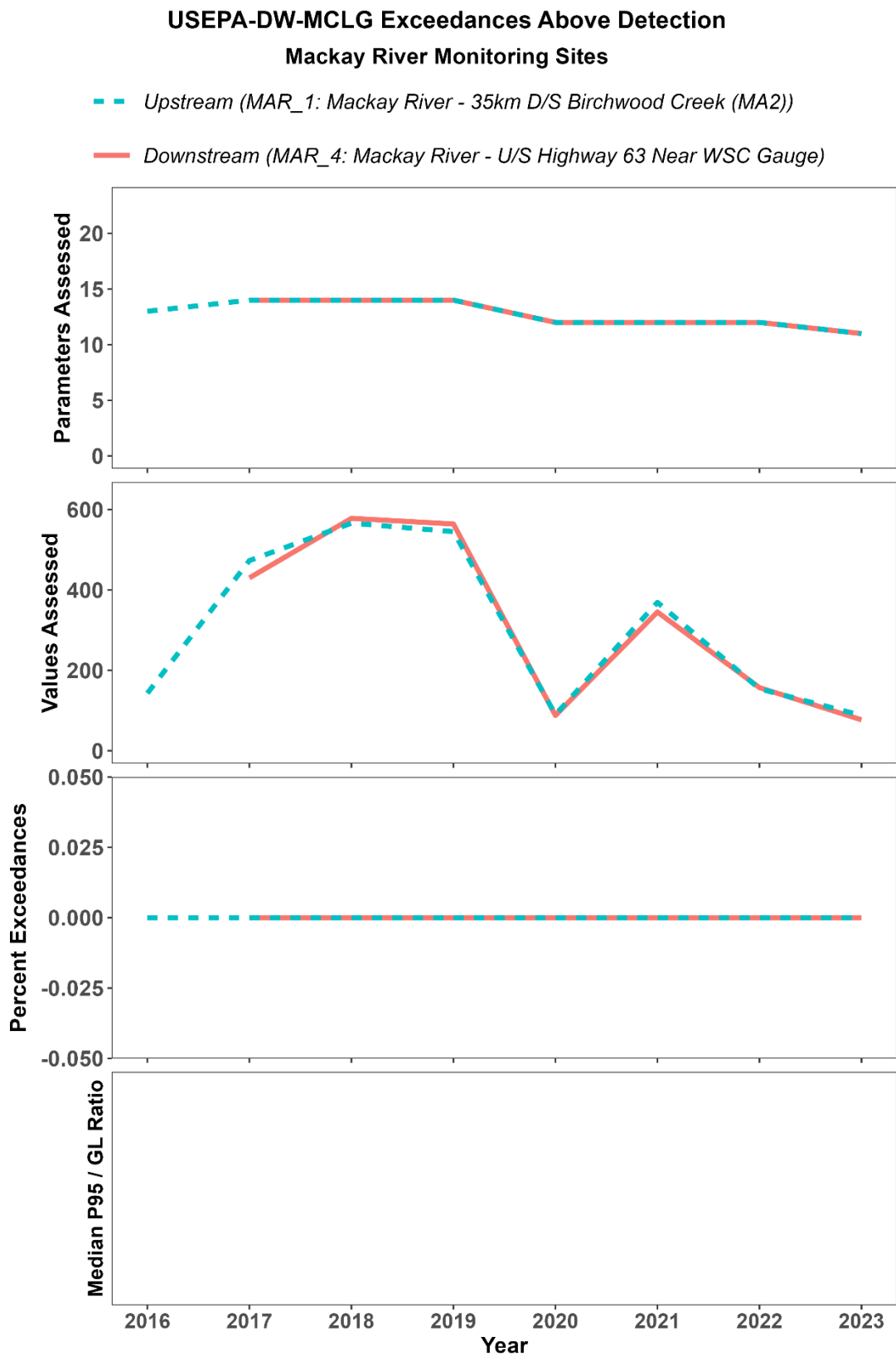


Figure I254: Comparison between exceedances at upstream and downstream sites on the Mackay River when considering USEPA drinking water quality goals.

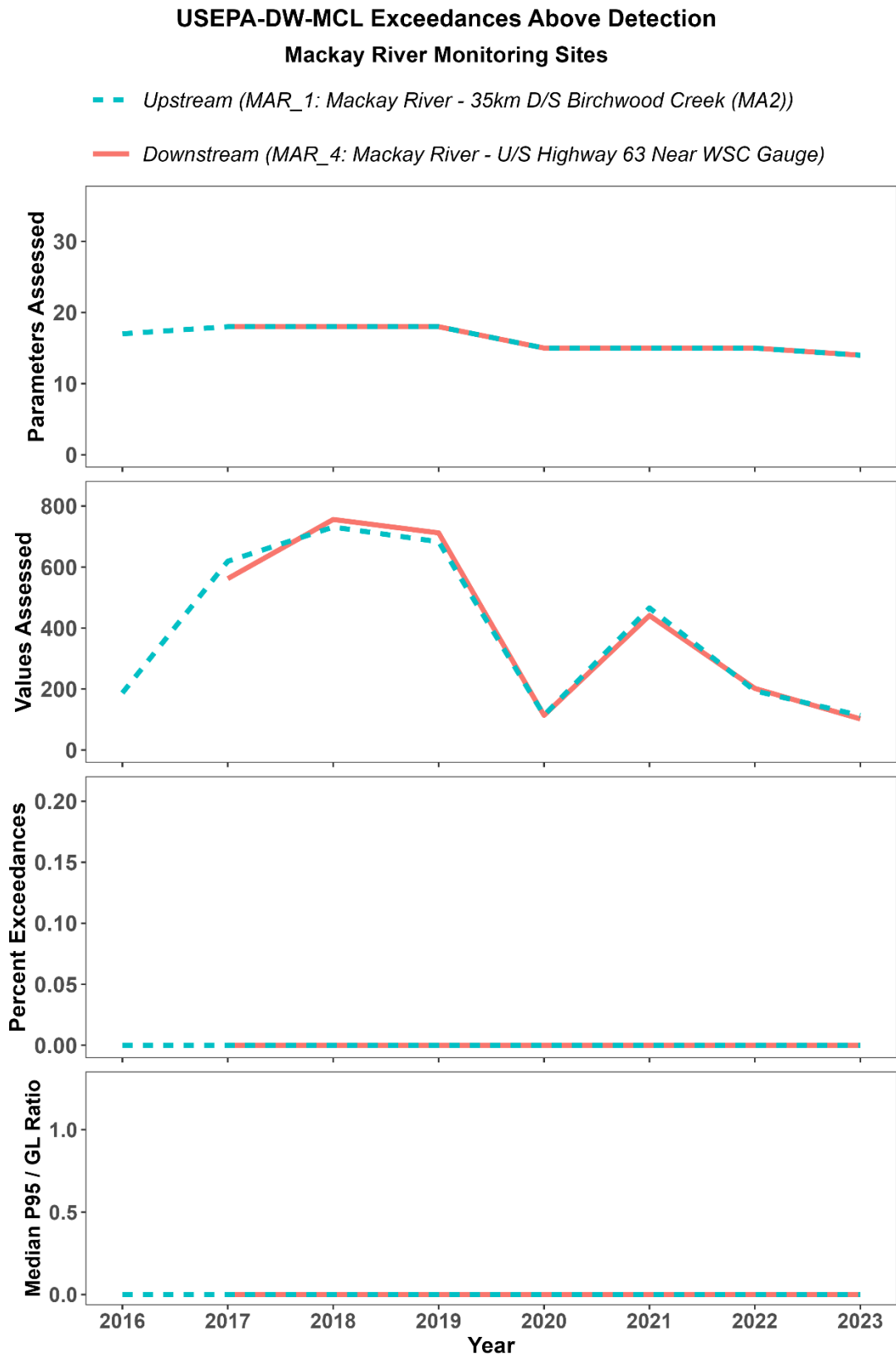


Figure I255: Comparison between exceedances at upstream and downstream sites on the Mackay River when considering USEPA drinking water quality limits.



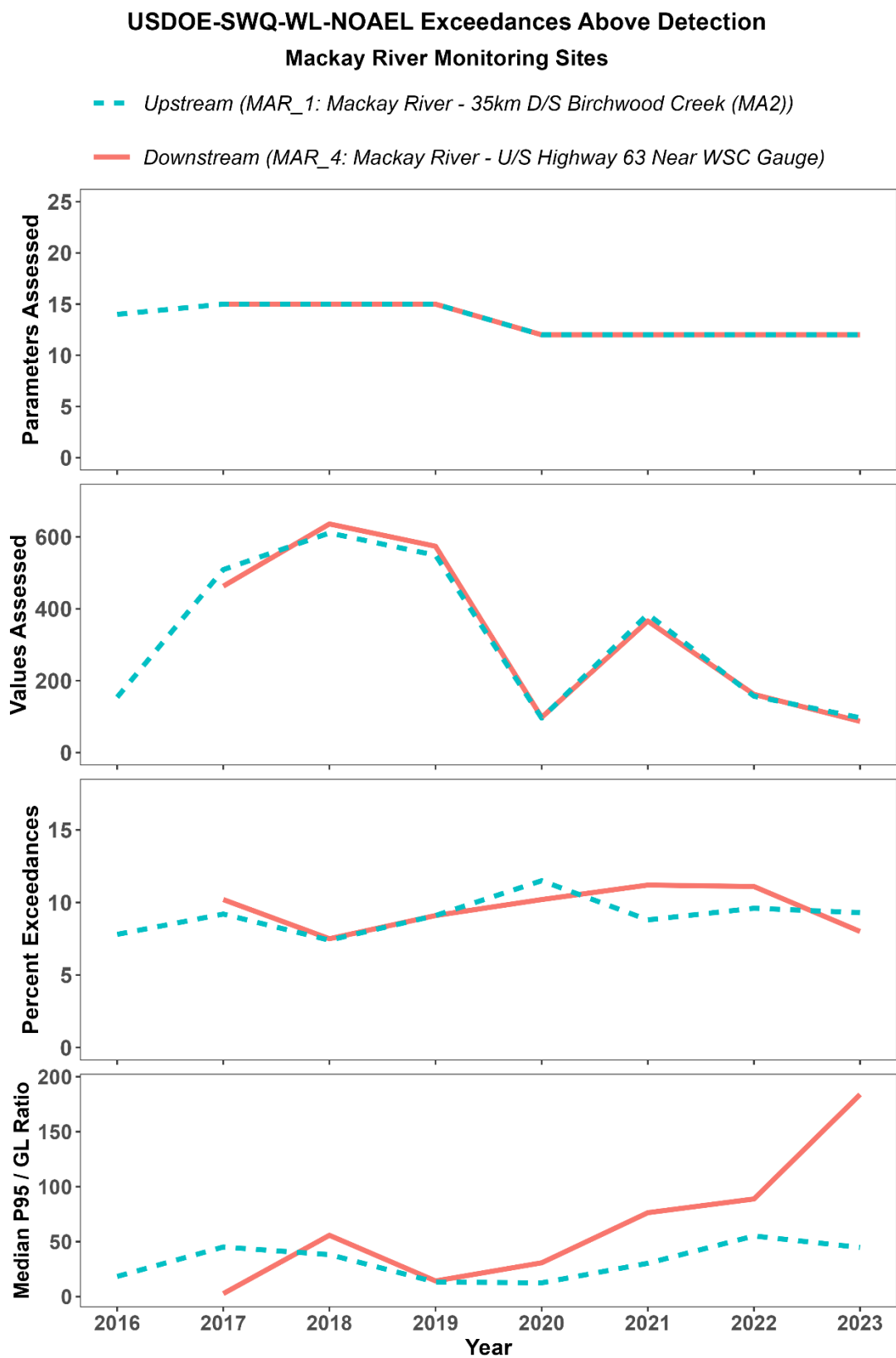


Figure I256: Comparison between exceedances at upstream and downstream sites on the Mackay River when considering USEPA protection of piscivores NOAEL guidelines.

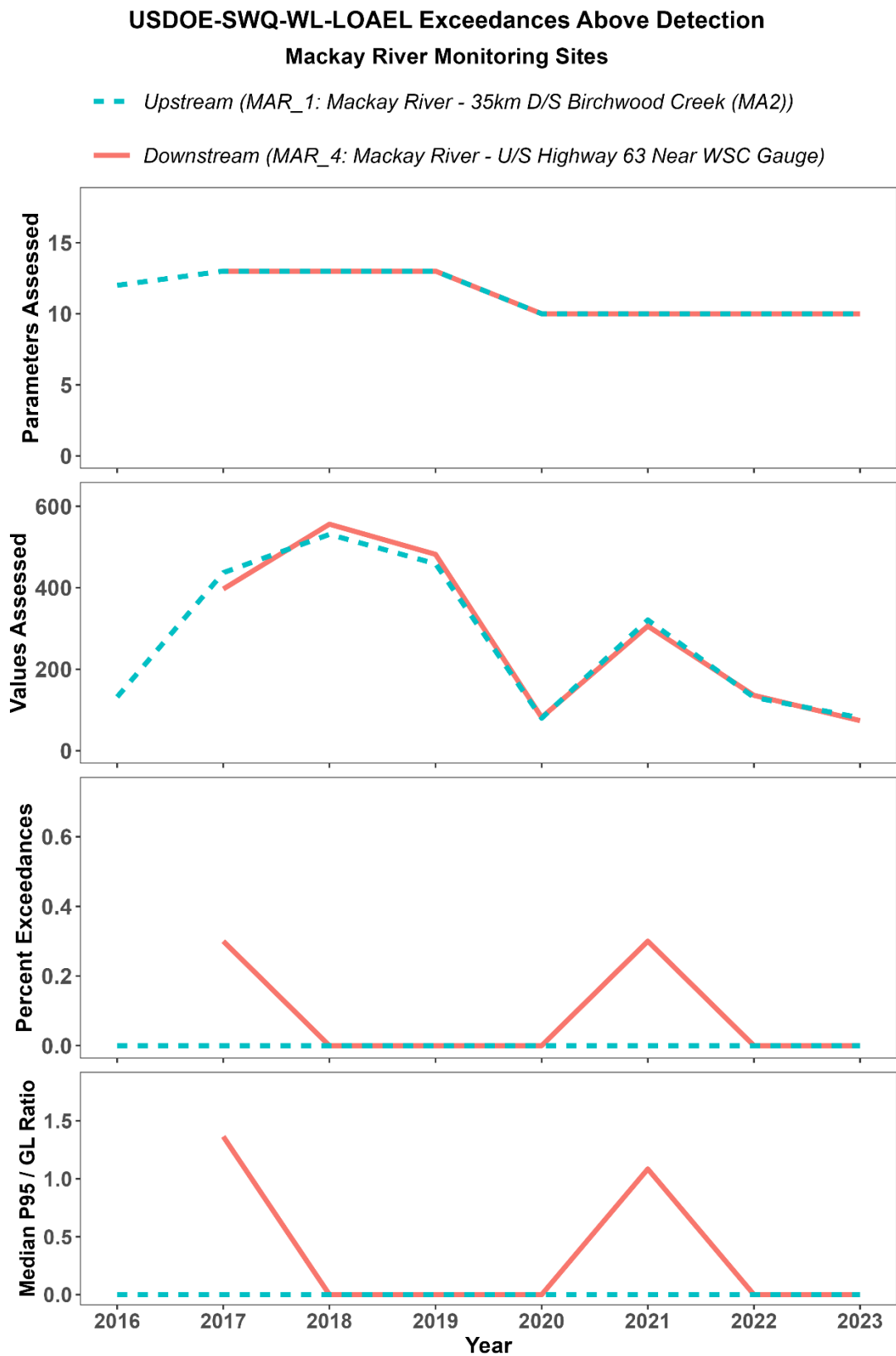


Figure I257: Comparison between exceedances at upstream and downstream sites on the Mackay River when considering USEPA protection of piscivores LOAEL guidelines.

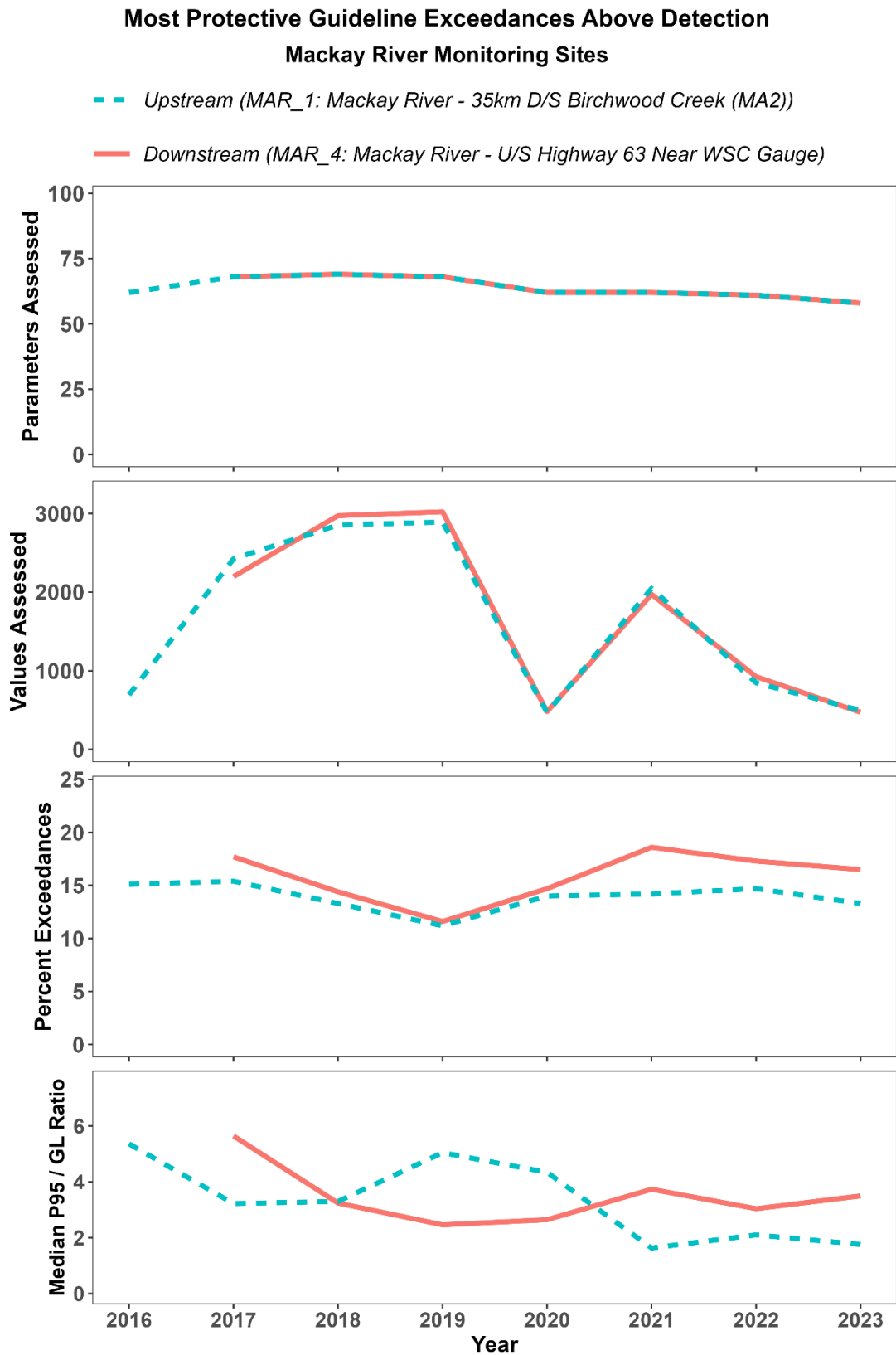


Figure I258: Comparison between exceedances at upstream and downstream sites on the Mackay River when considering the most protective guidelines.

### Most Protective EPA Guideline Exceedances Above Detection Mackay River Monitoring Sites

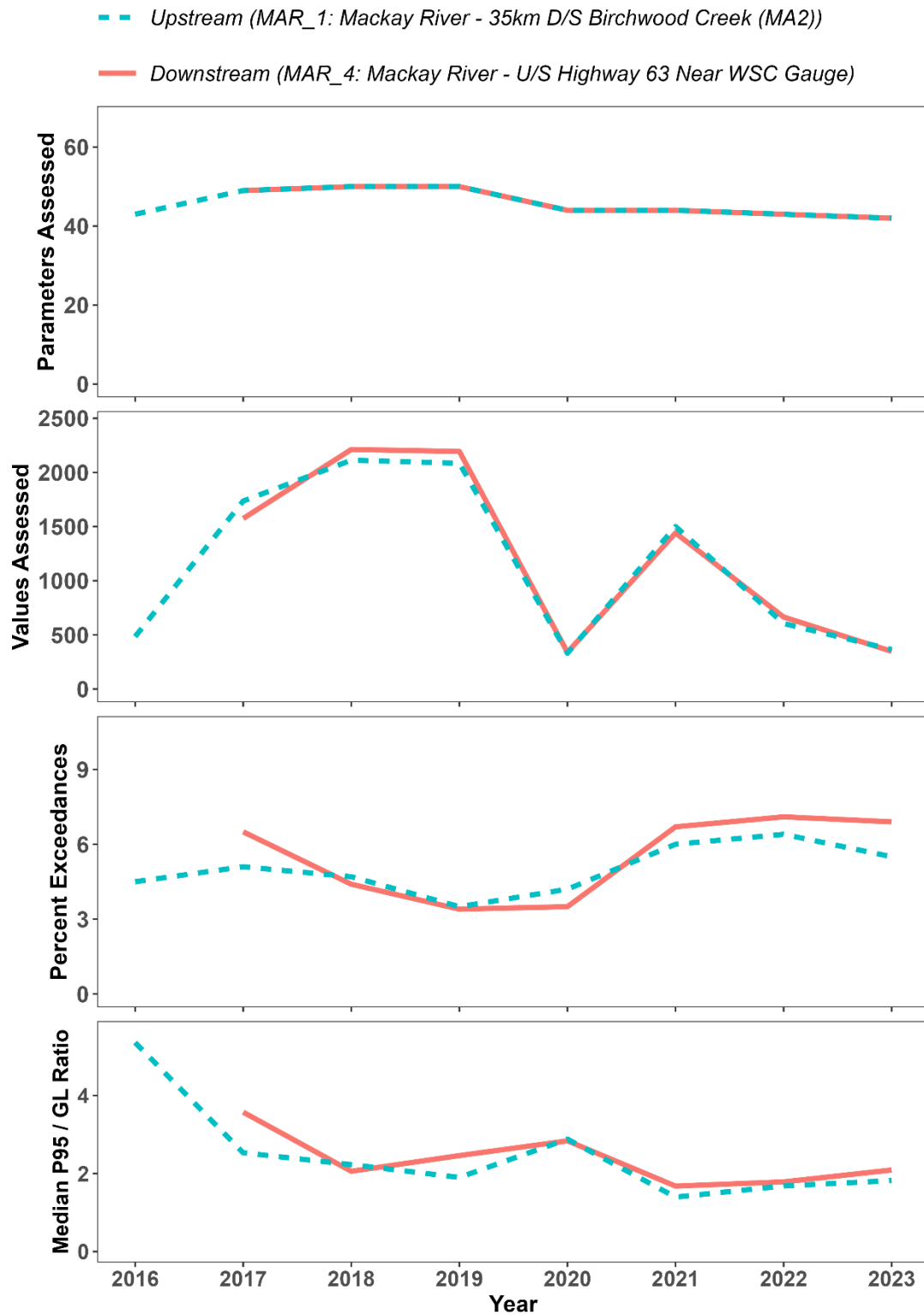


Figure I259: Comparison between exceedances at upstream and downstream sites on the Mackay River when considering the most protective EPA guidelines.

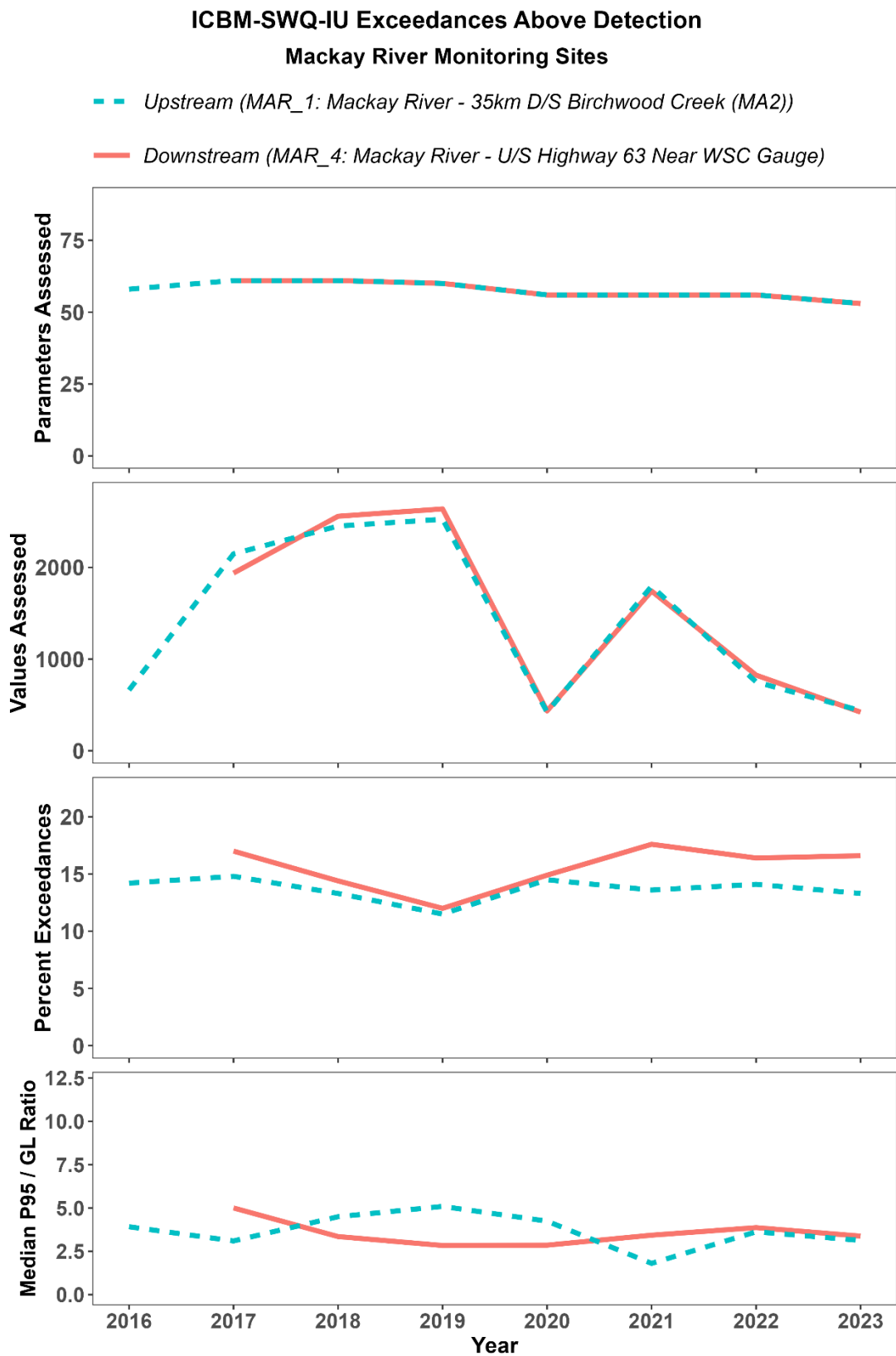


Figure I260: Comparison between exceedances at upstream and downstream sites on the Mackay River when considering guidelines protective of indigenous use.

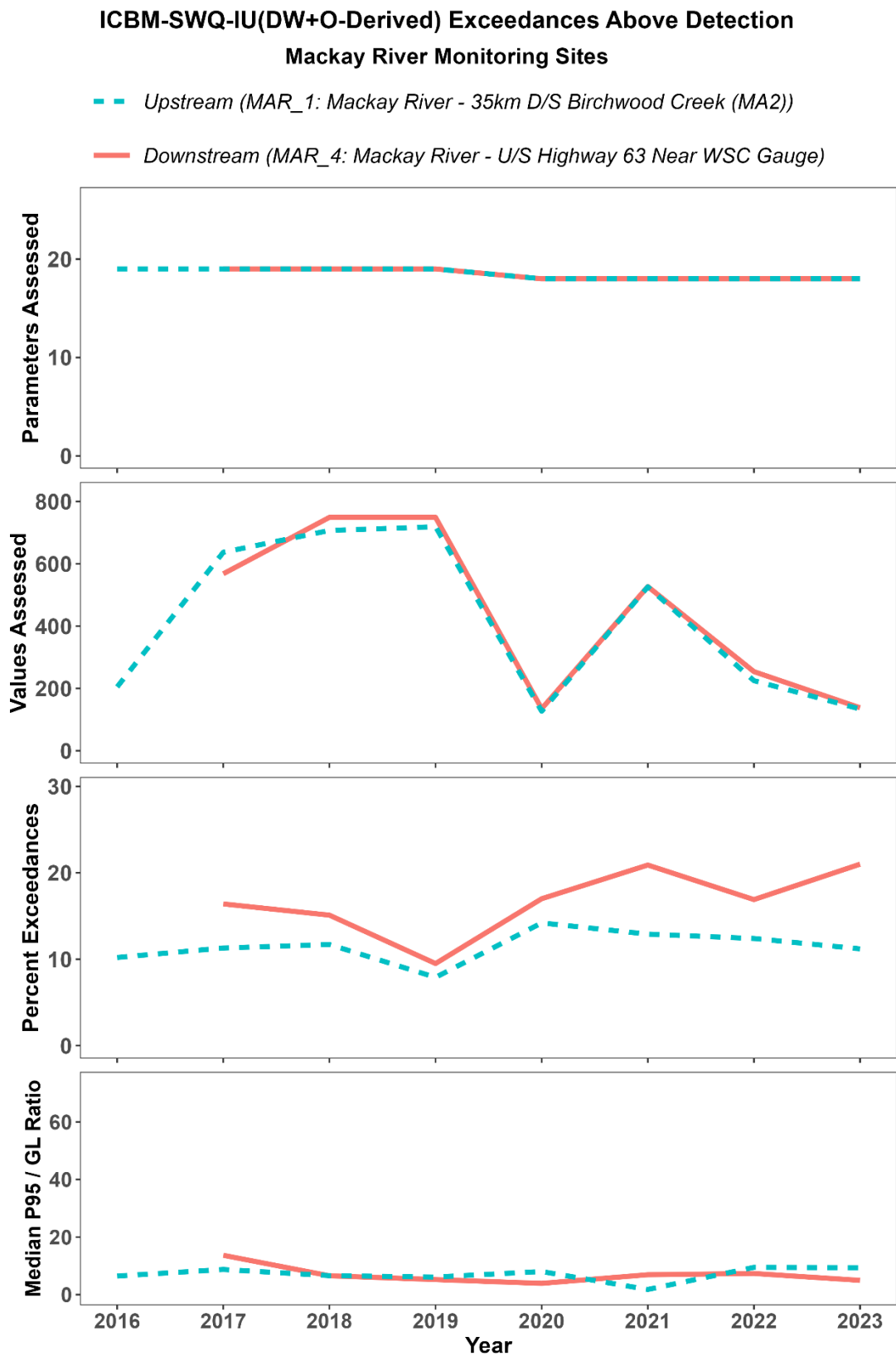


Figure I261: Comparison between exceedances at upstream and downstream sites on the Mackay River when considering guidelines protective of indigenous use from consumption of surface water and aquatic organisms.

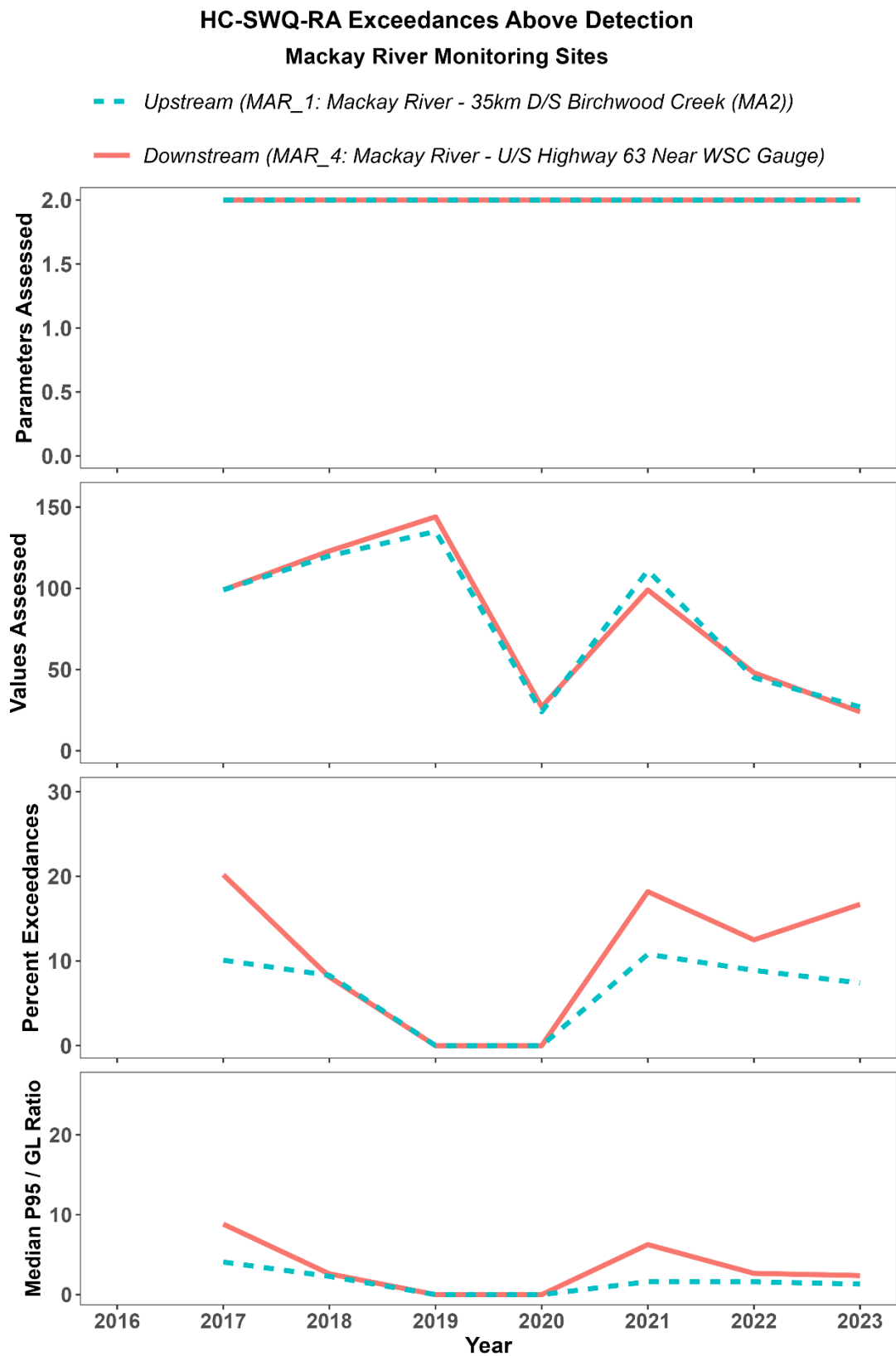


Figure I262: Comparison between exceedances at upstream and downstream sites on the Mackay River when considering Health Canada recreation aesthetics guidelines.

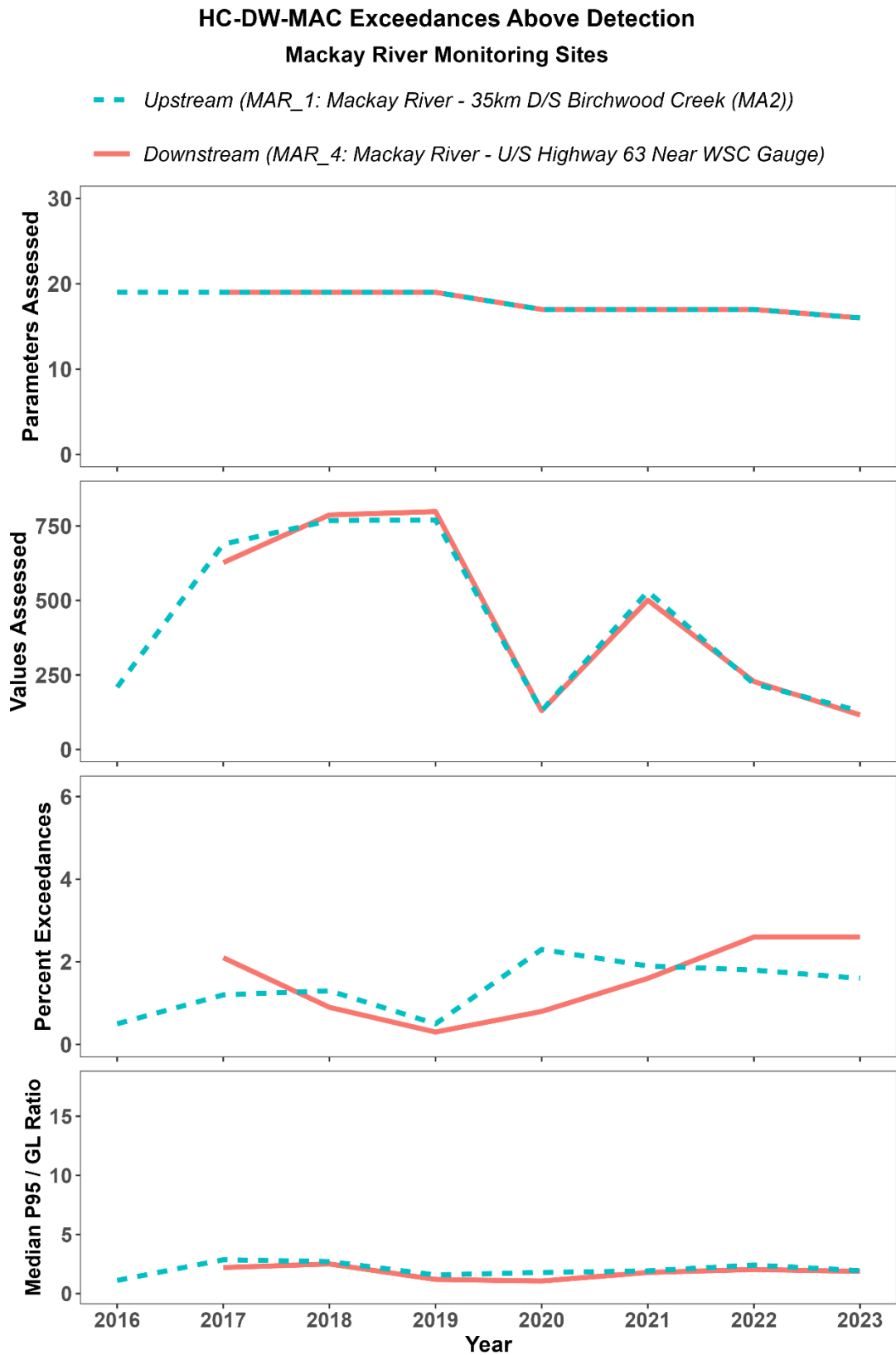


Figure I263: Comparison between exceedances at upstream and downstream sites on the Mackay River when considering Health Canada drinking water maximum acceptable concentration guidelines.



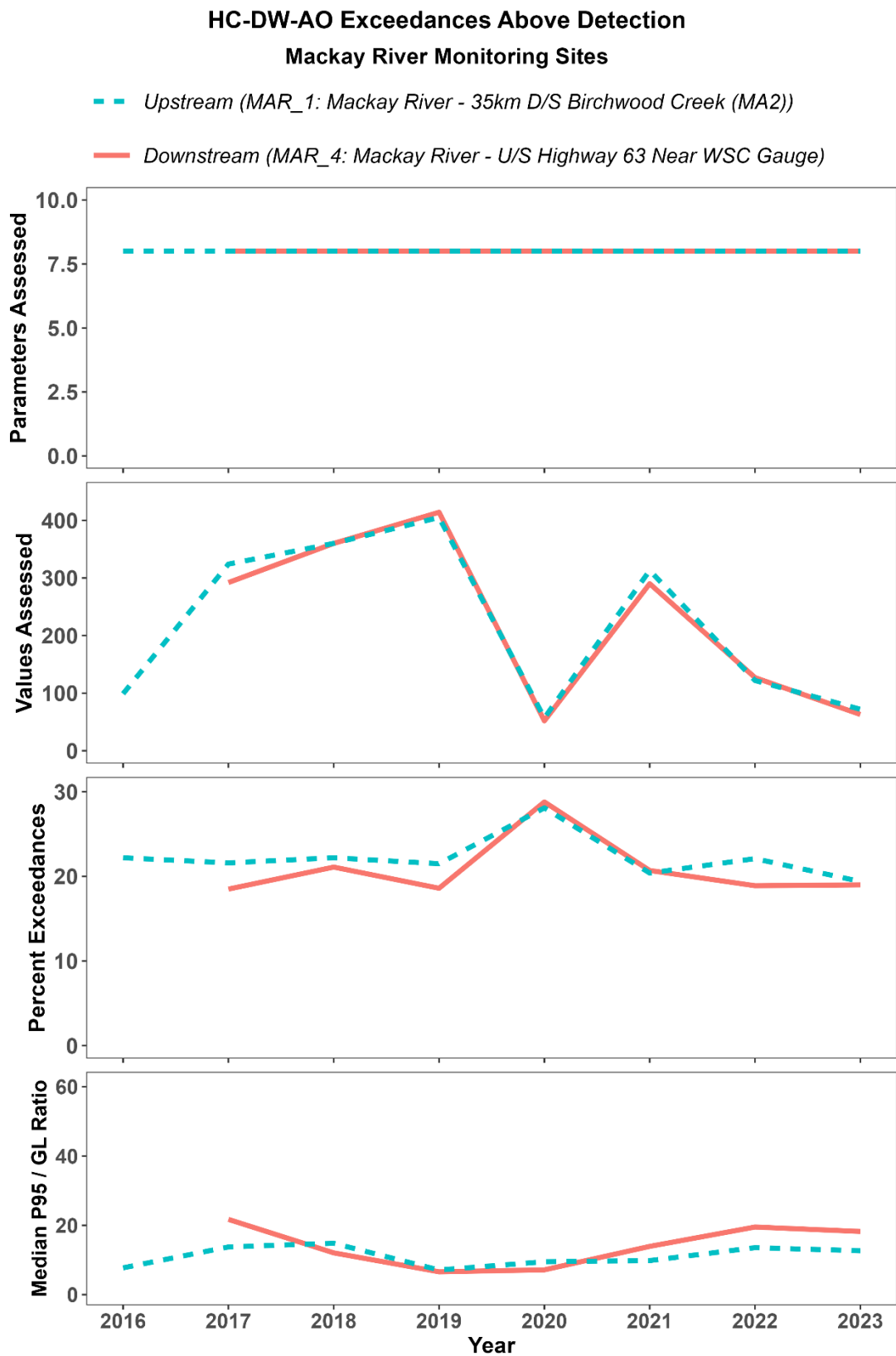


Figure I264: Comparison between exceedances at upstream and downstream sites on the Mackay River when considering Health Canada drinking water aesthetics objectives.

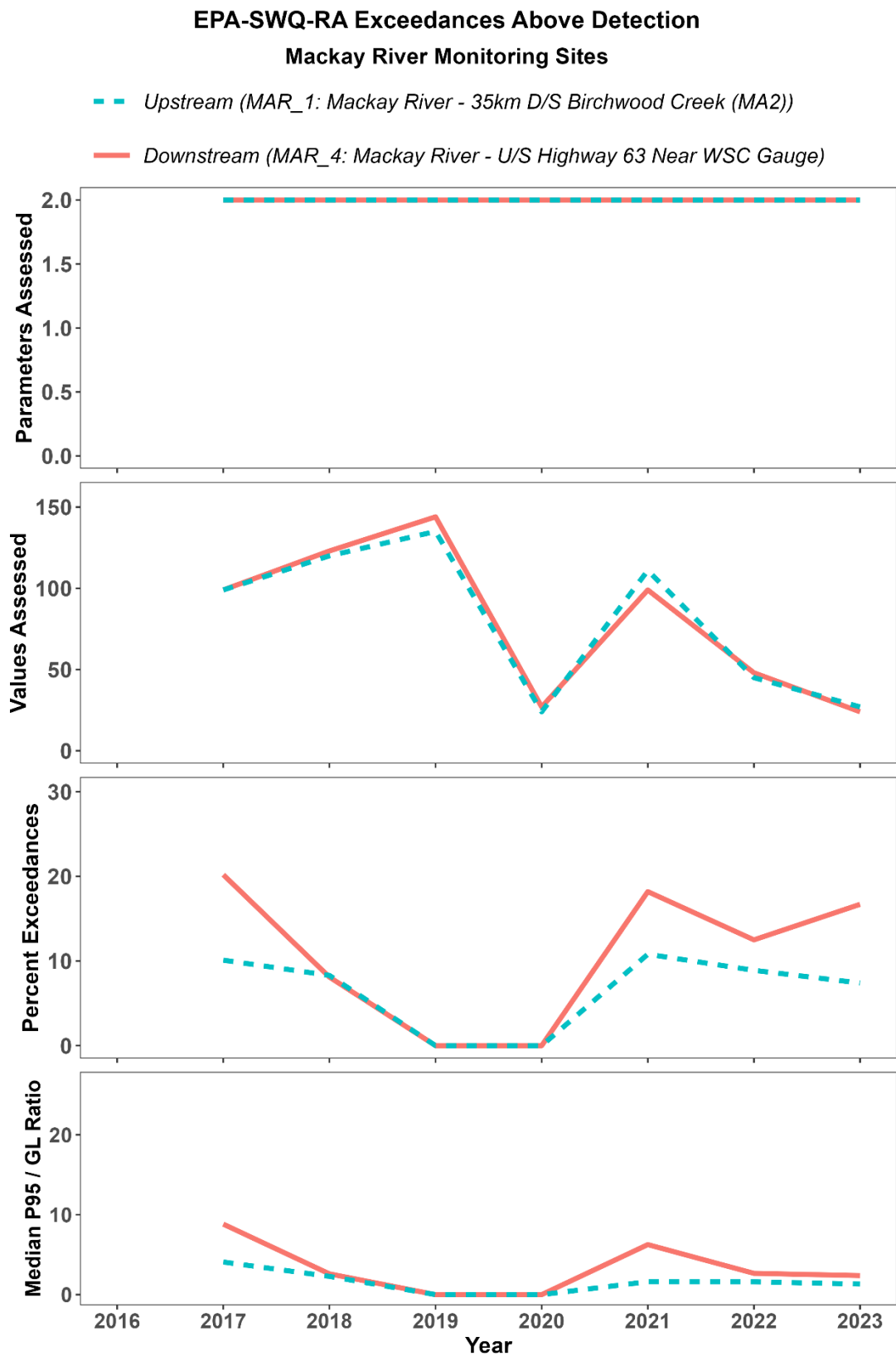


Figure I265: Comparison between exceedances at upstream and downstream sites on the Mackay River when considering Alberta EPA recreation aesthetics guidelines.

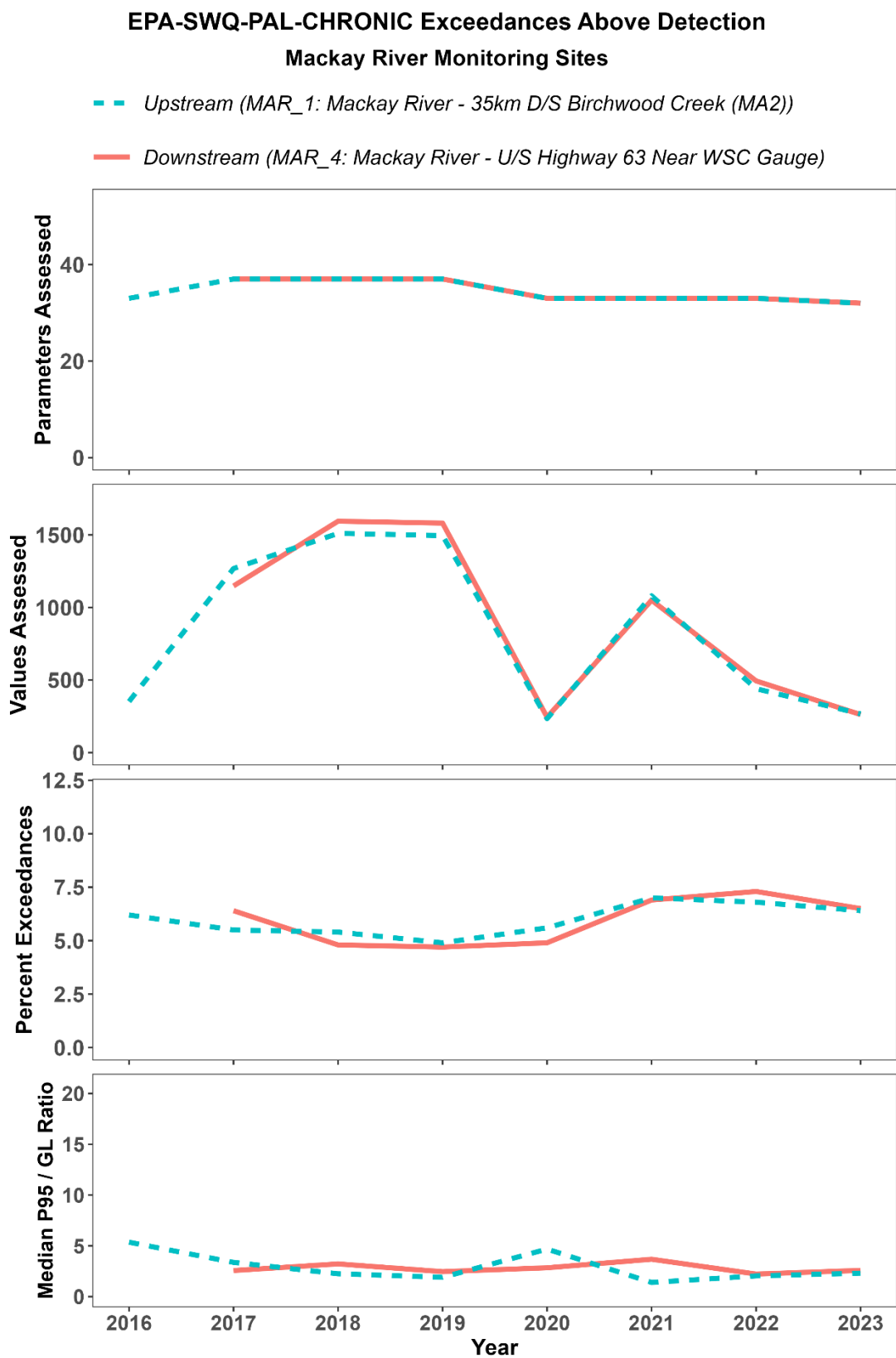


Figure I266: Comparison between exceedances at upstream and downstream sites on the Mackay River when considering Alberta EPA protection of aquatic life chronic guidelines.

## EPA-SWQ-PAL-ACUTE Exceedances Above Detection Mackay River Monitoring Sites

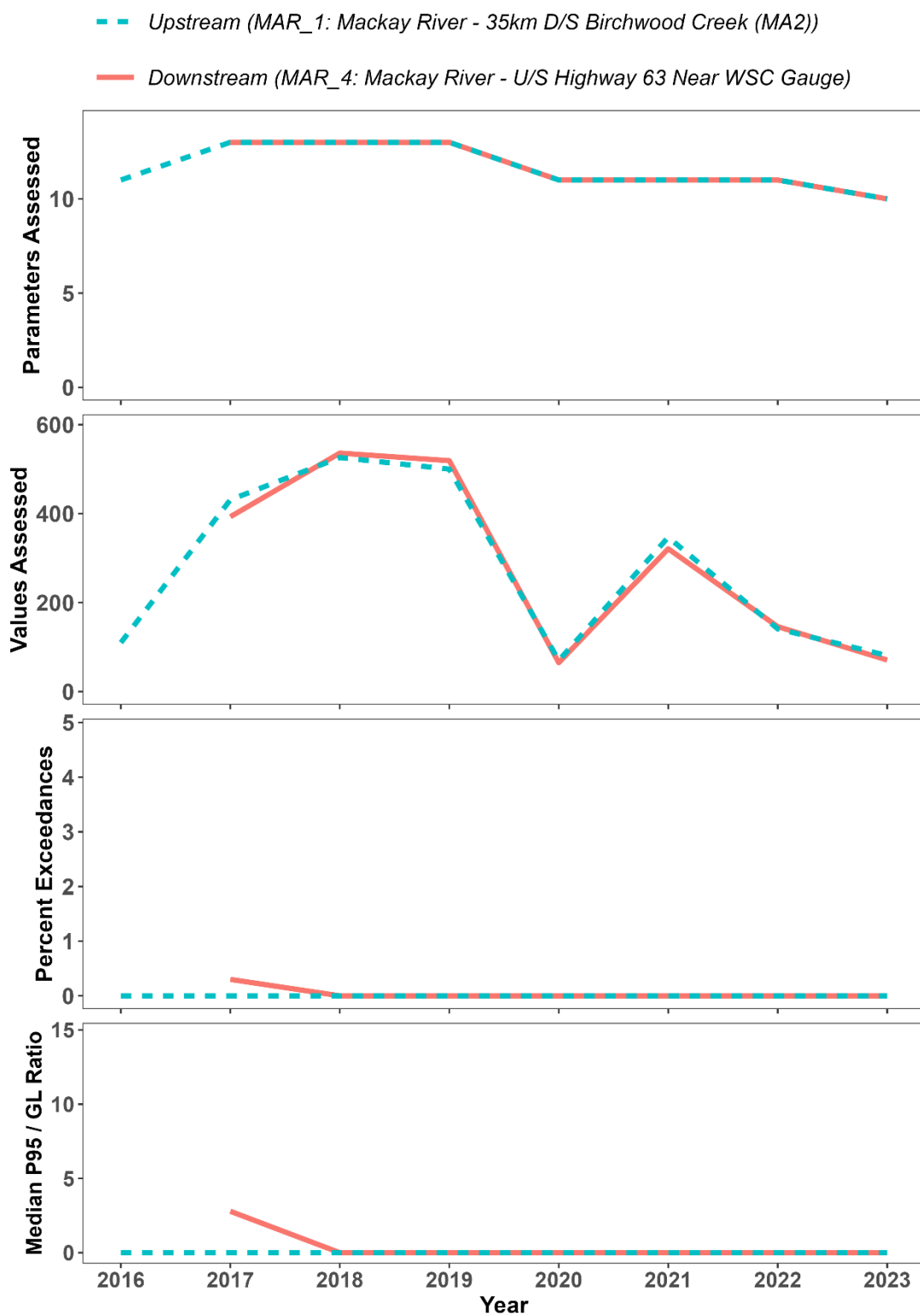


Figure I267: Comparison between exceedances at upstream and downstream sites on the Mackay River when considering Alberta EPA protection of aquatic life acute guidelines.

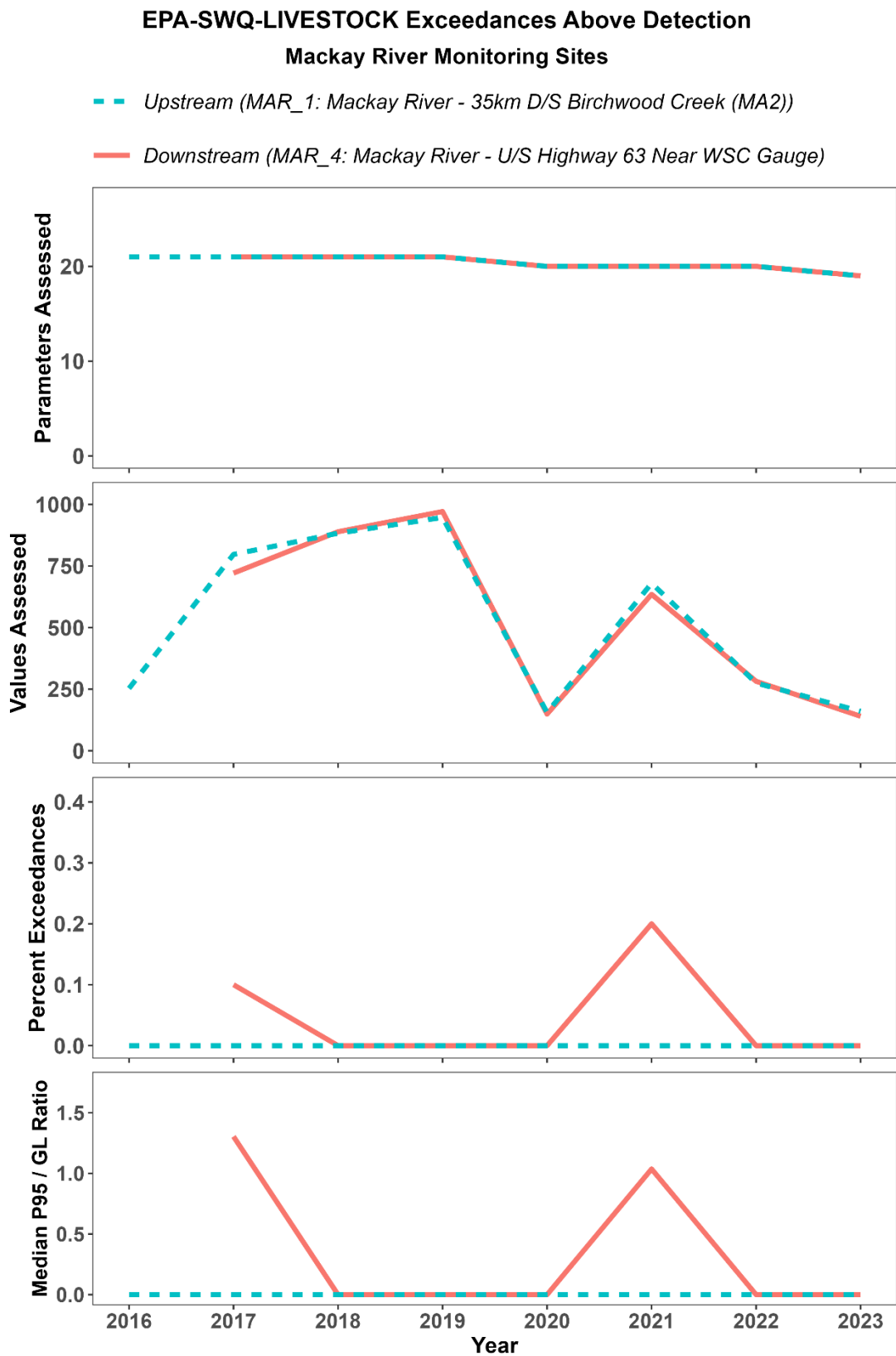


Figure I268: Comparison between exceedances at upstream and downstream sites on the Mackay River when considering Alberta EPA protection of livestock watering guidelines.

## EPA-SWQ-AG-IRRIGATION Exceedances Above Detection Mackay River Monitoring Sites

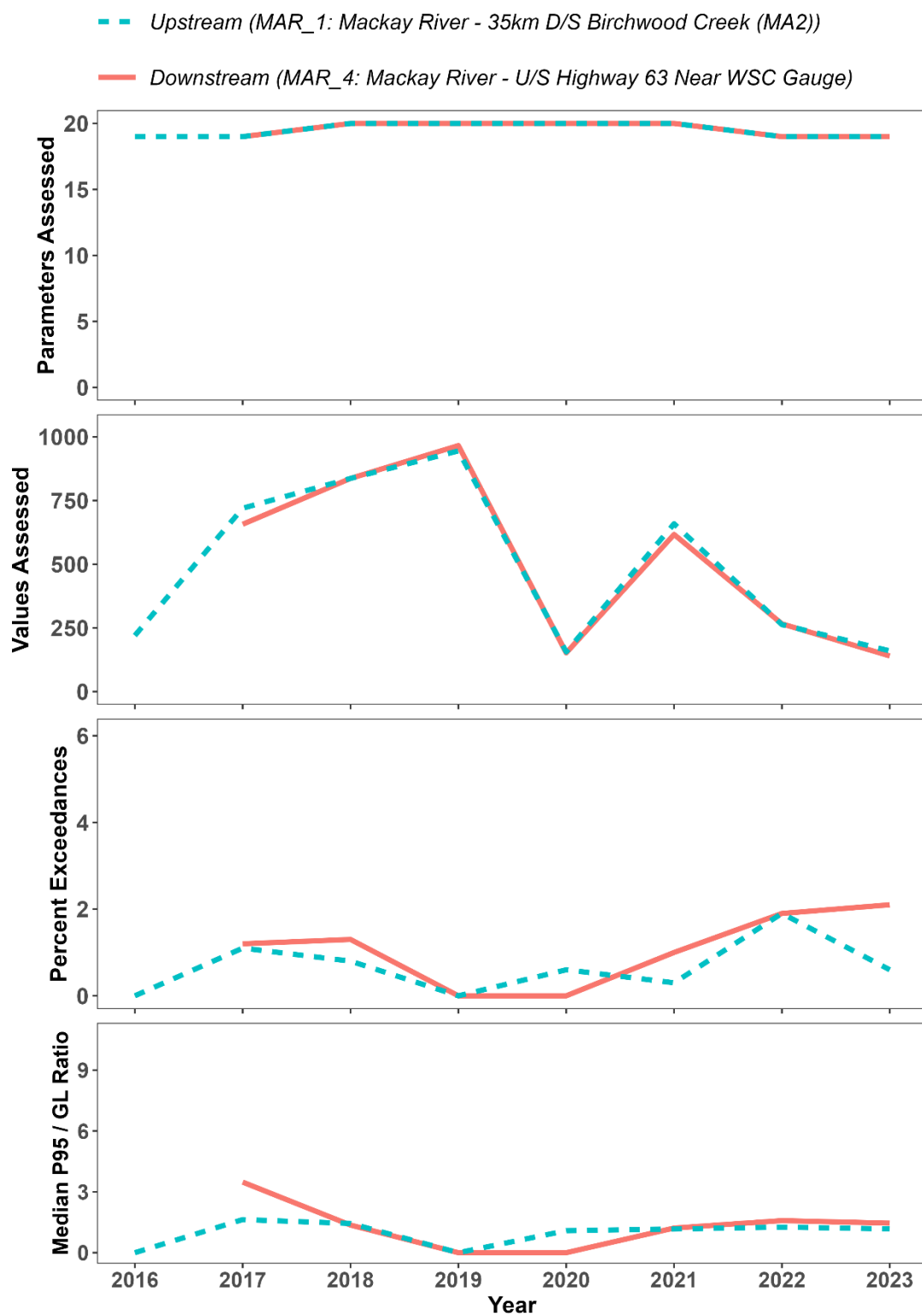


Figure I269: Comparison between exceedances at upstream and downstream sites on the Mackay River when considering Alberta EPA protection of irrigation water guidelines.

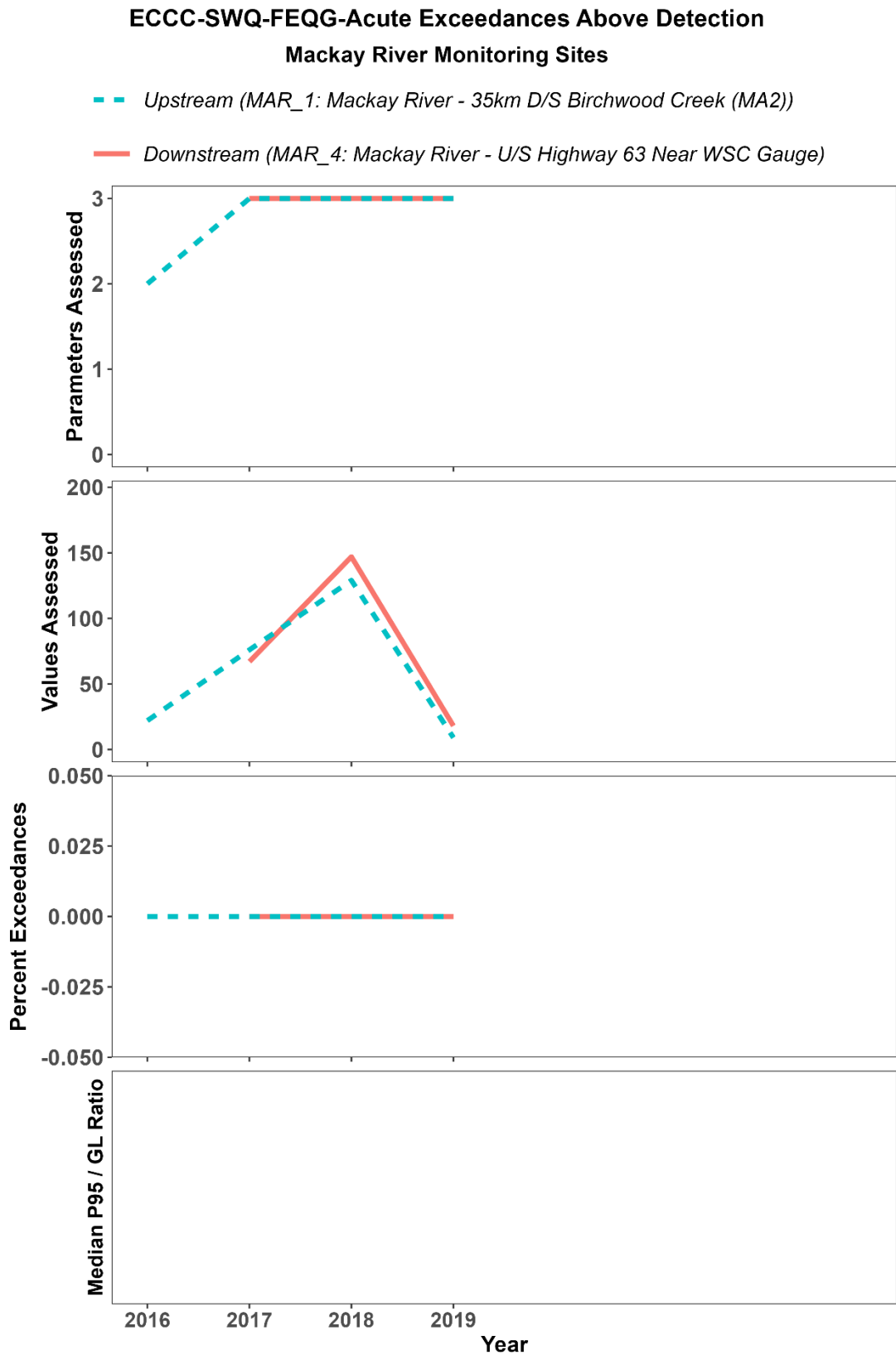


Figure I270: Comparison between exceedances at upstream and downstream sites on the Mackay River when considering ECCC Federal Environmental Quality Guidelines protection of aquatic life acute guidelines.

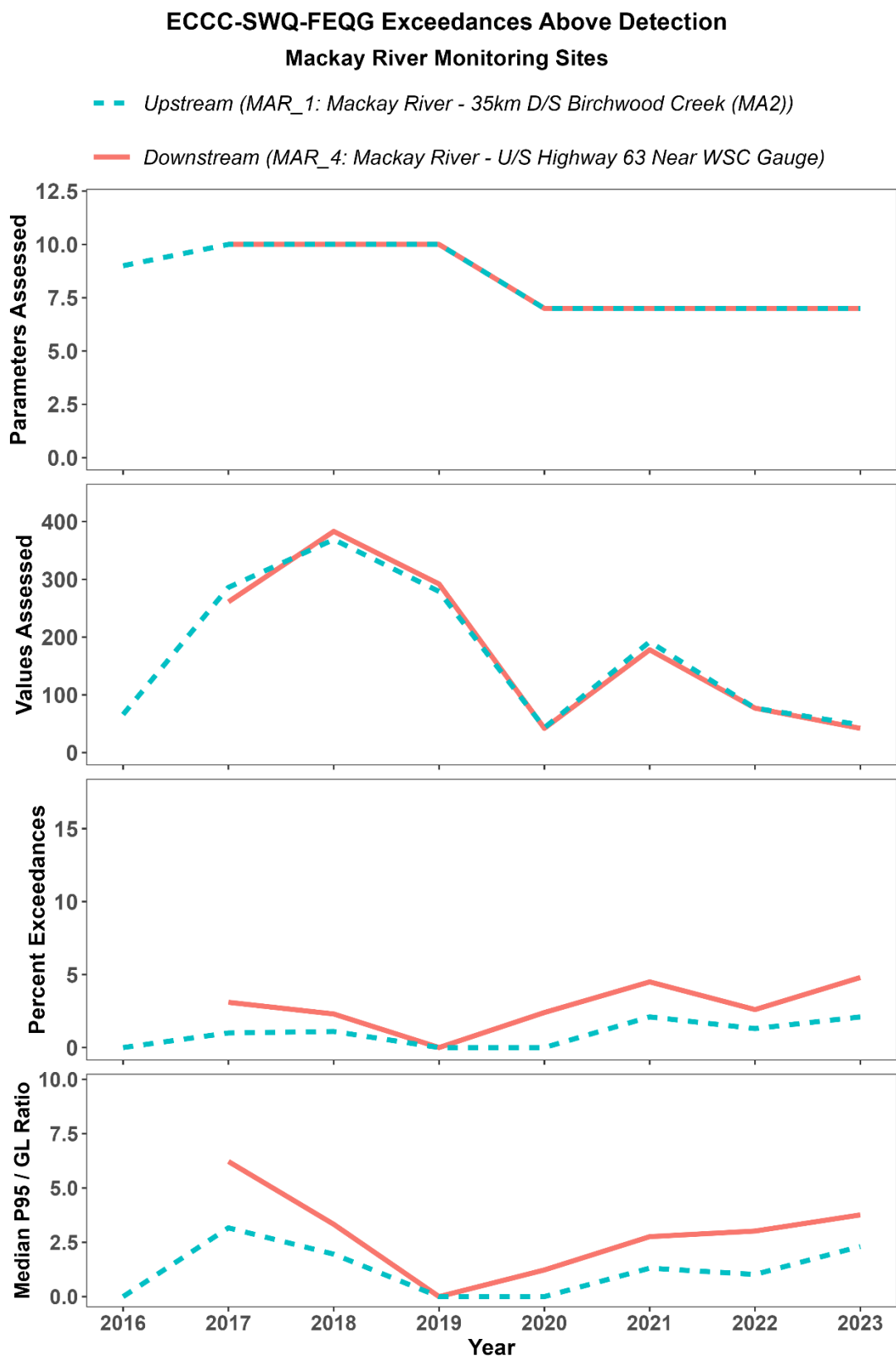


Figure I271: Comparison between exceedances at upstream and downstream sites on the Mackay River when considering ECCC Federal Environmental Quality Guidelines protection of aquatic life chronic guidelines.



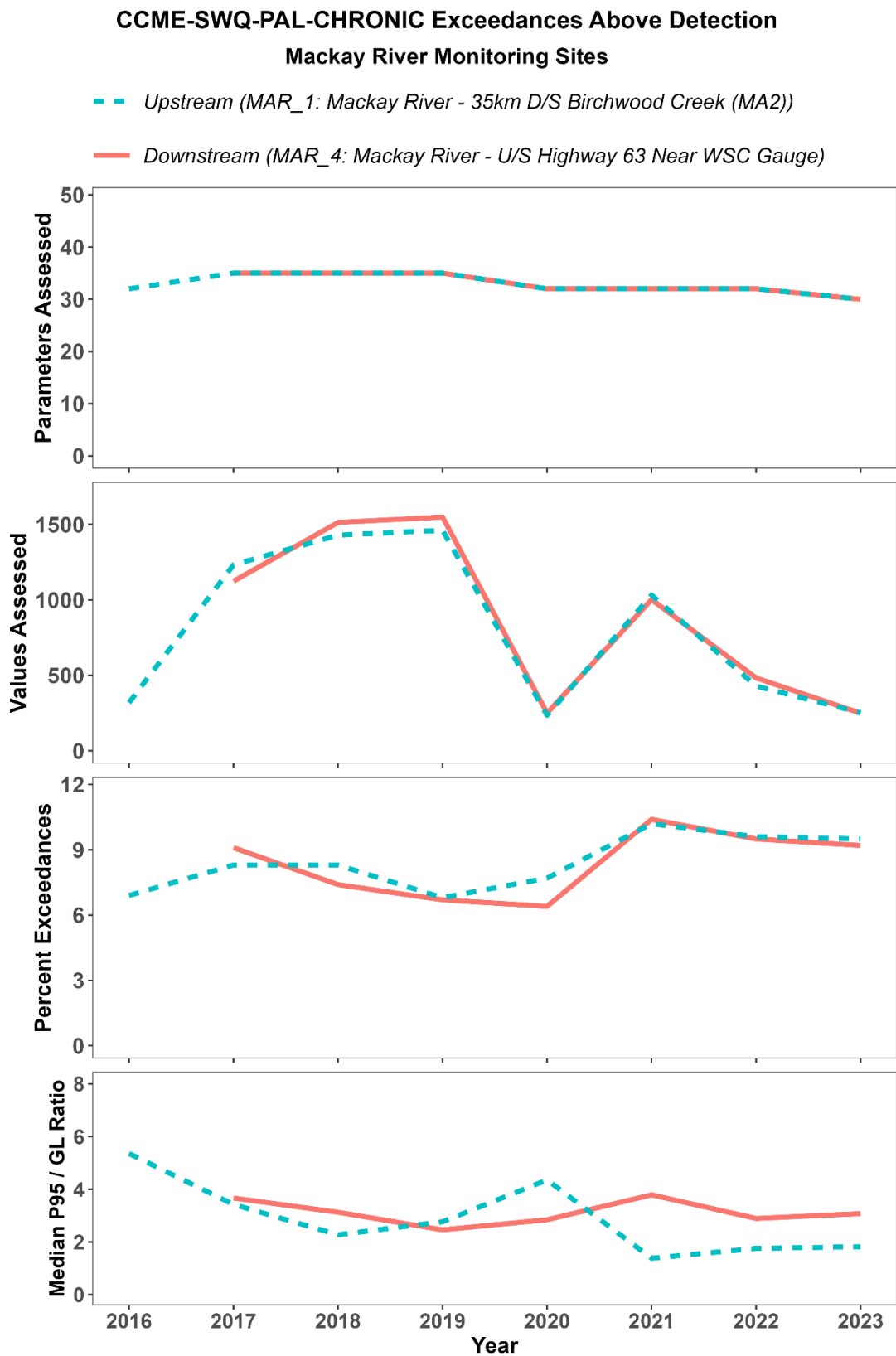


Figure I272: Comparison between exceedances at upstream and downstream sites on the Mackay River when considering CCME protection of aquatic life chronic guidelines.

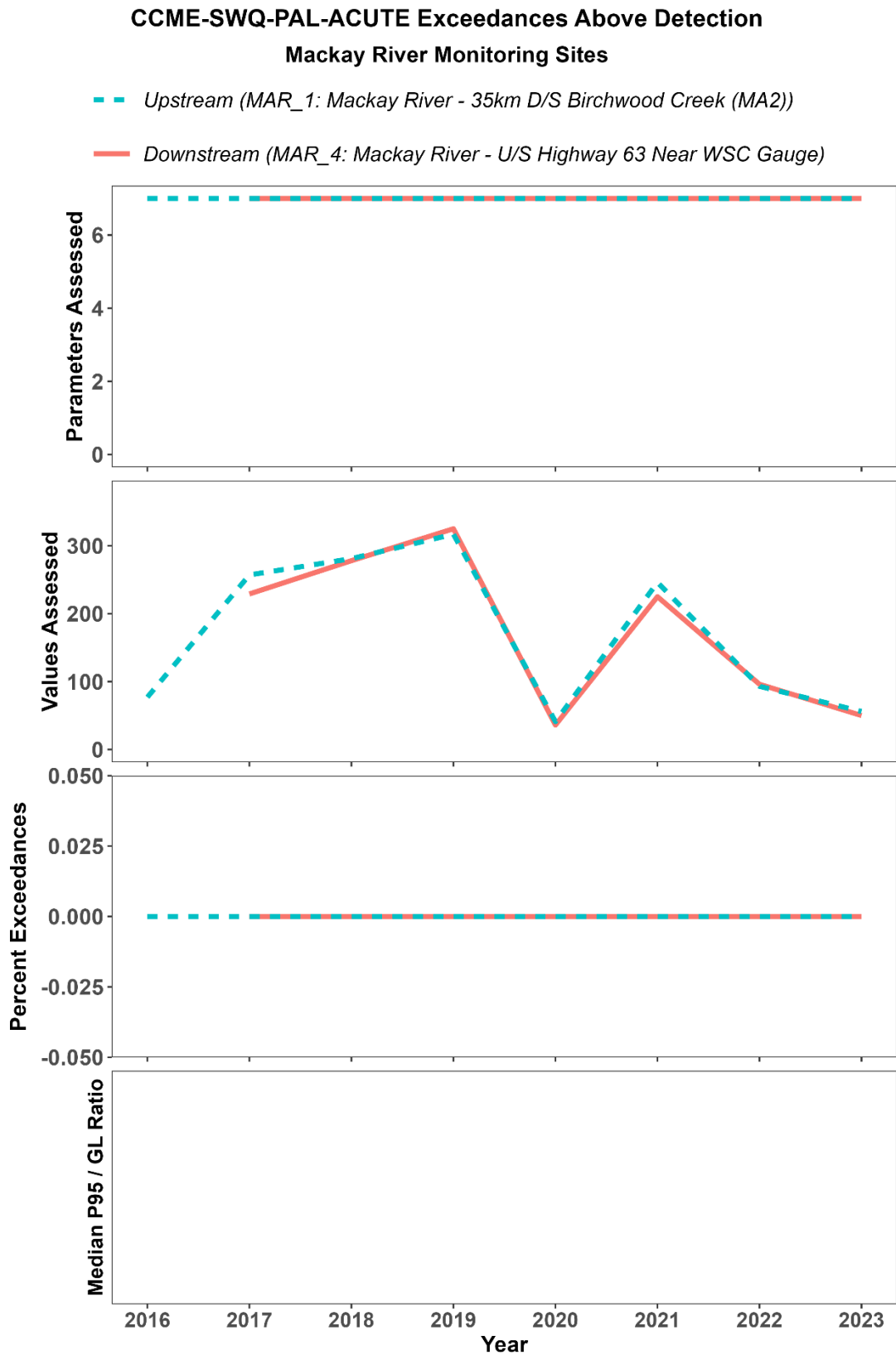


Figure I273: Comparison between exceedances at upstream and downstream sites on the Mackay River when considering CCME protection of aquatic life acute guidelines.

# **CCME-SWQ-AG-LIVESTOCK Exceedances Above Detection** **Mackay River Monitoring Sites**

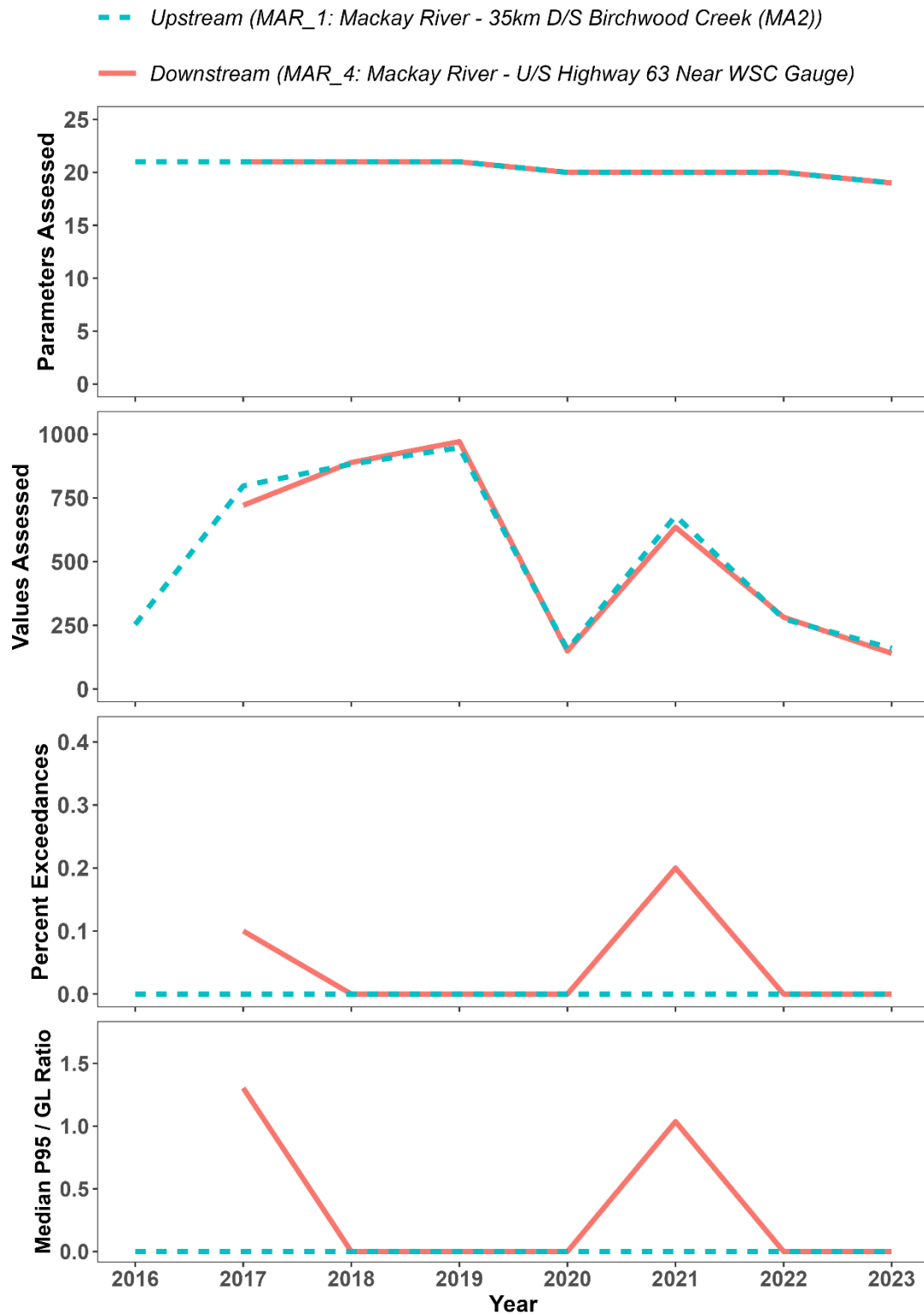


Figure I274: Comparison between exceedances at upstream and downstream sites on the Mackay River when considering CCME protection of livestock watering guidelines.

# **CCME-SWQ-AG-IRRIGATION Exceedances Above Detection** **Mackay River Monitoring Sites**

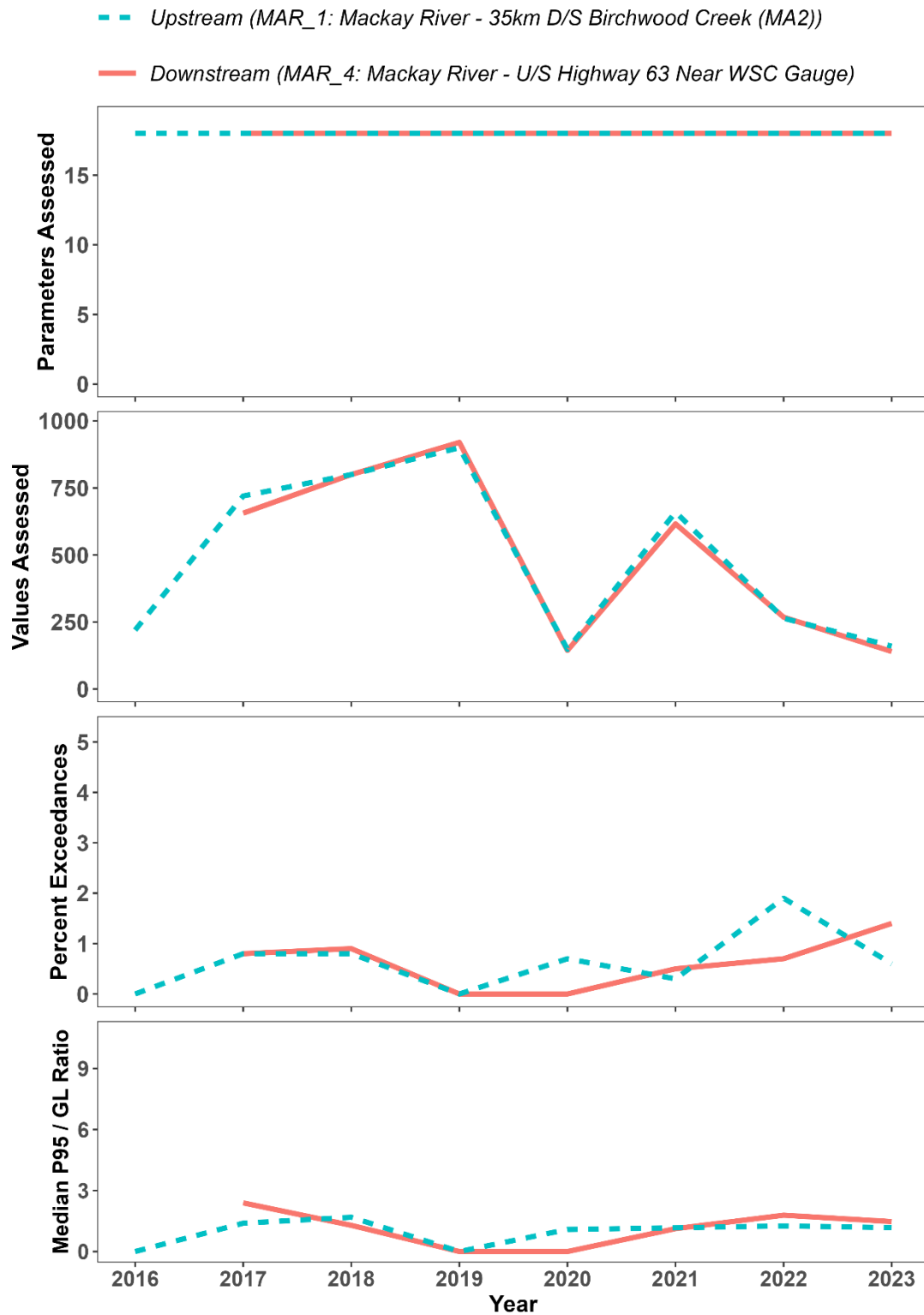


Figure I275: Comparison between exceedances at upstream and downstream sites on the Mackay River when considering CCME protection of irrigation water guidelines.

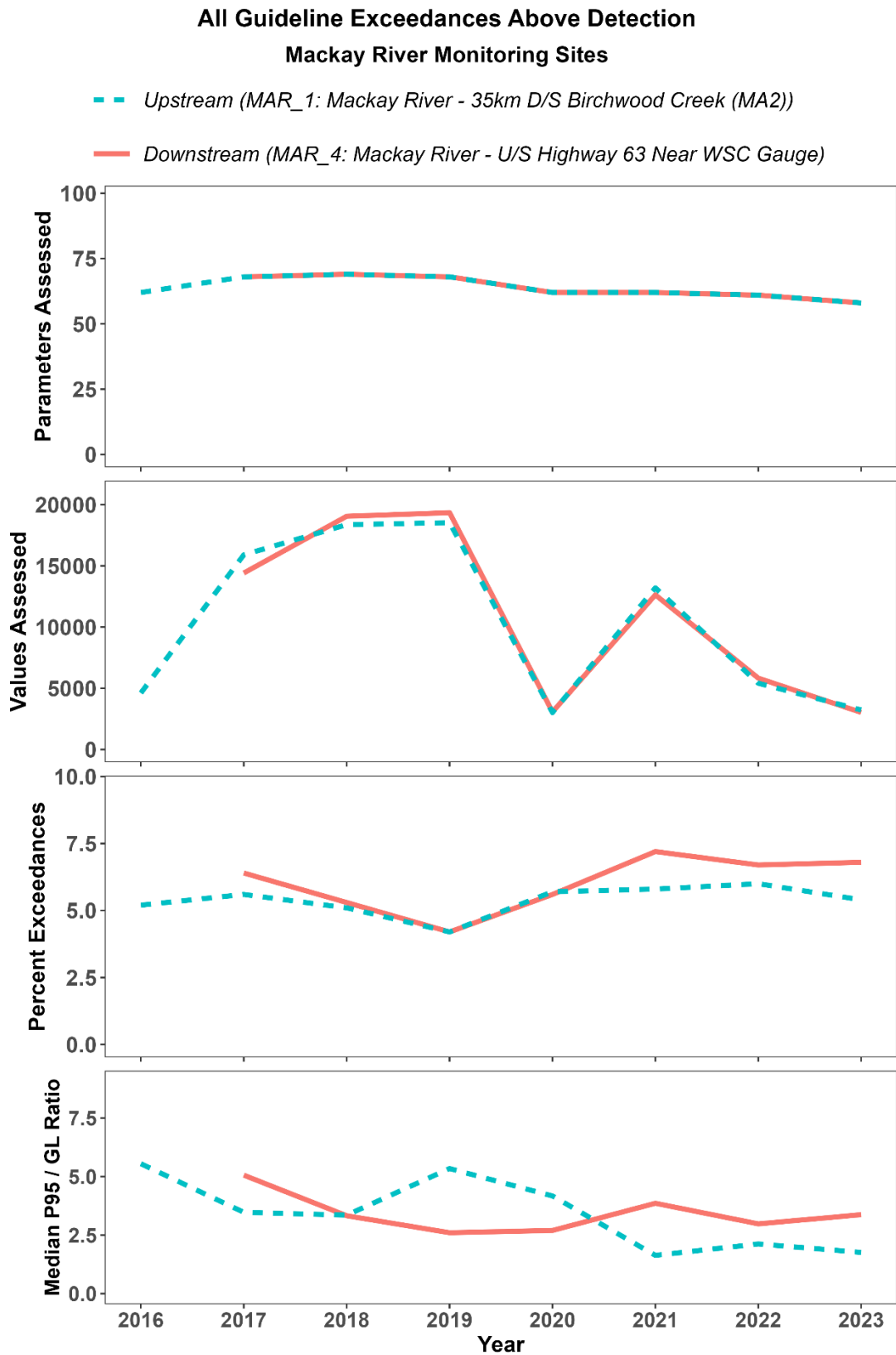


Figure I276: Comparison between exceedances at upstream and downstream sites on the Mackay River when considering all guidelines.

### 3.2.4 Muskeg River

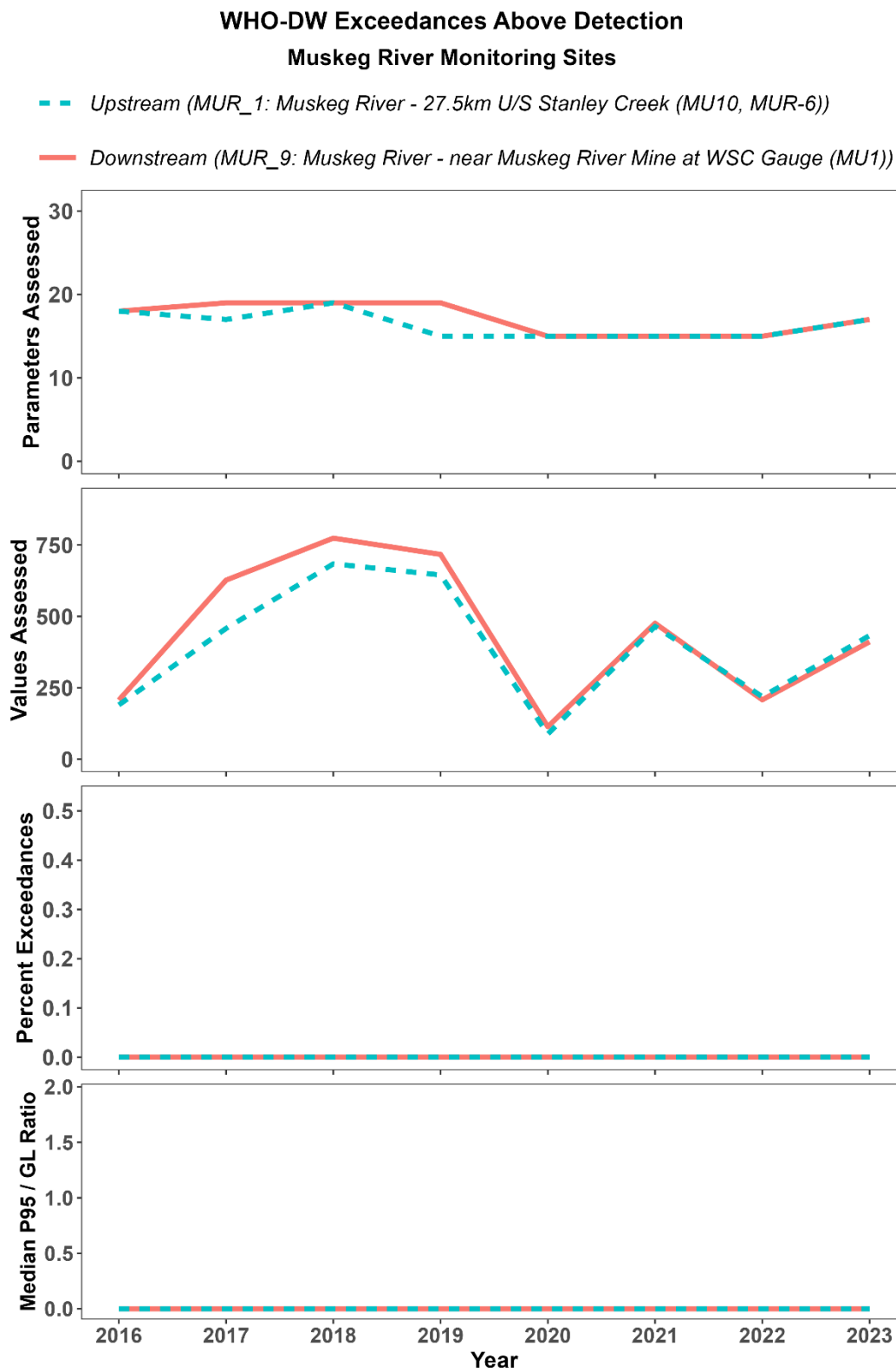


Figure I277: Comparison between exceedances at upstream and downstream sites on the Muskeg River when considering WHO drinking water guidelines.

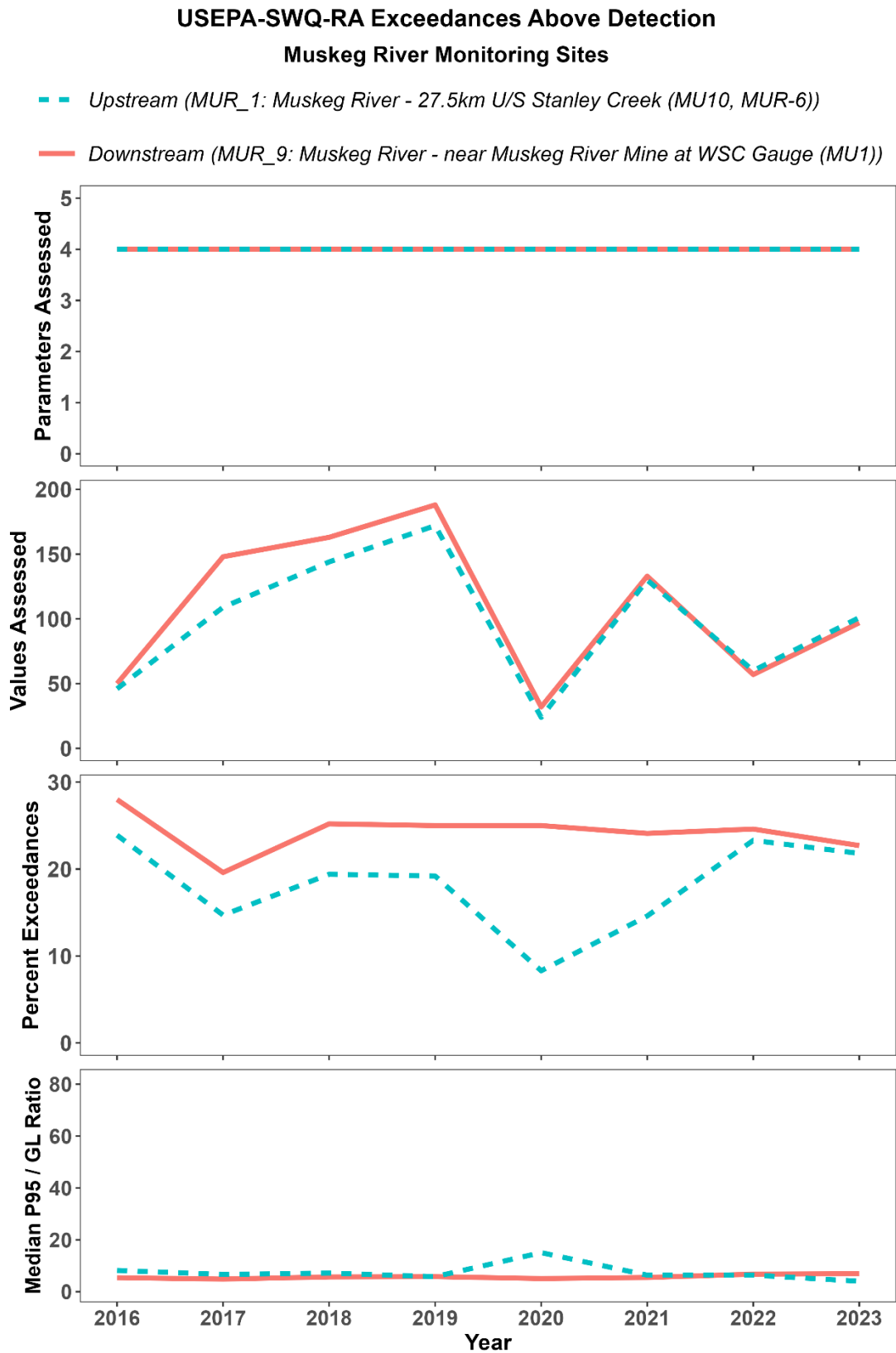


Figure I278: Comparison between exceedances at upstream and downstream sites on the Muskeg River when considering USEPA recreational aesthetics guidelines.

# USEPA-SWQ-PAL-CHRONIC Exceedances Above Detection Muskeg River Monitoring Sites

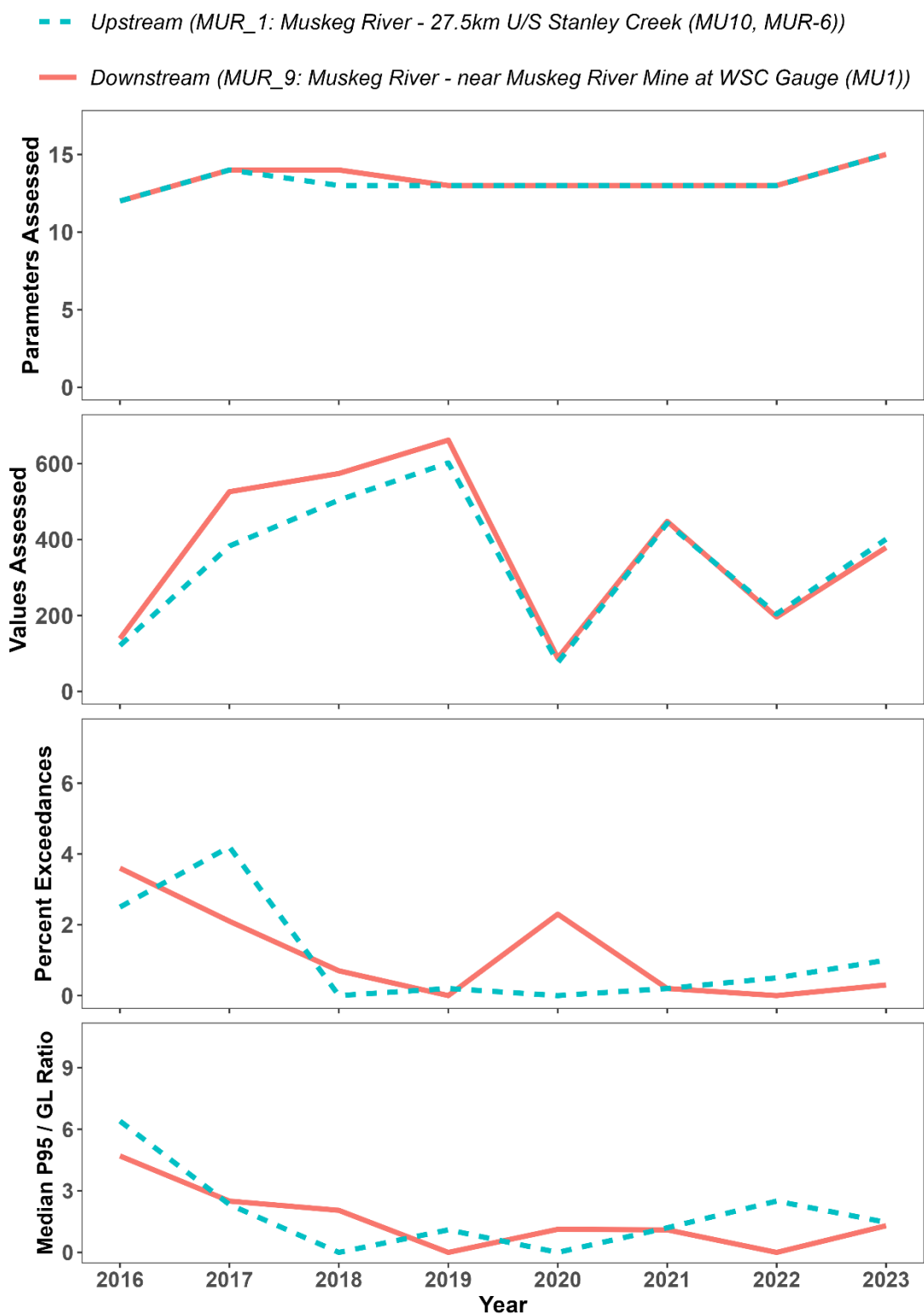


Figure I279: Comparison between exceedances at upstream and downstream sites on the Muskeg River when considering USEPA protection of aquatic life chronic guidelines.



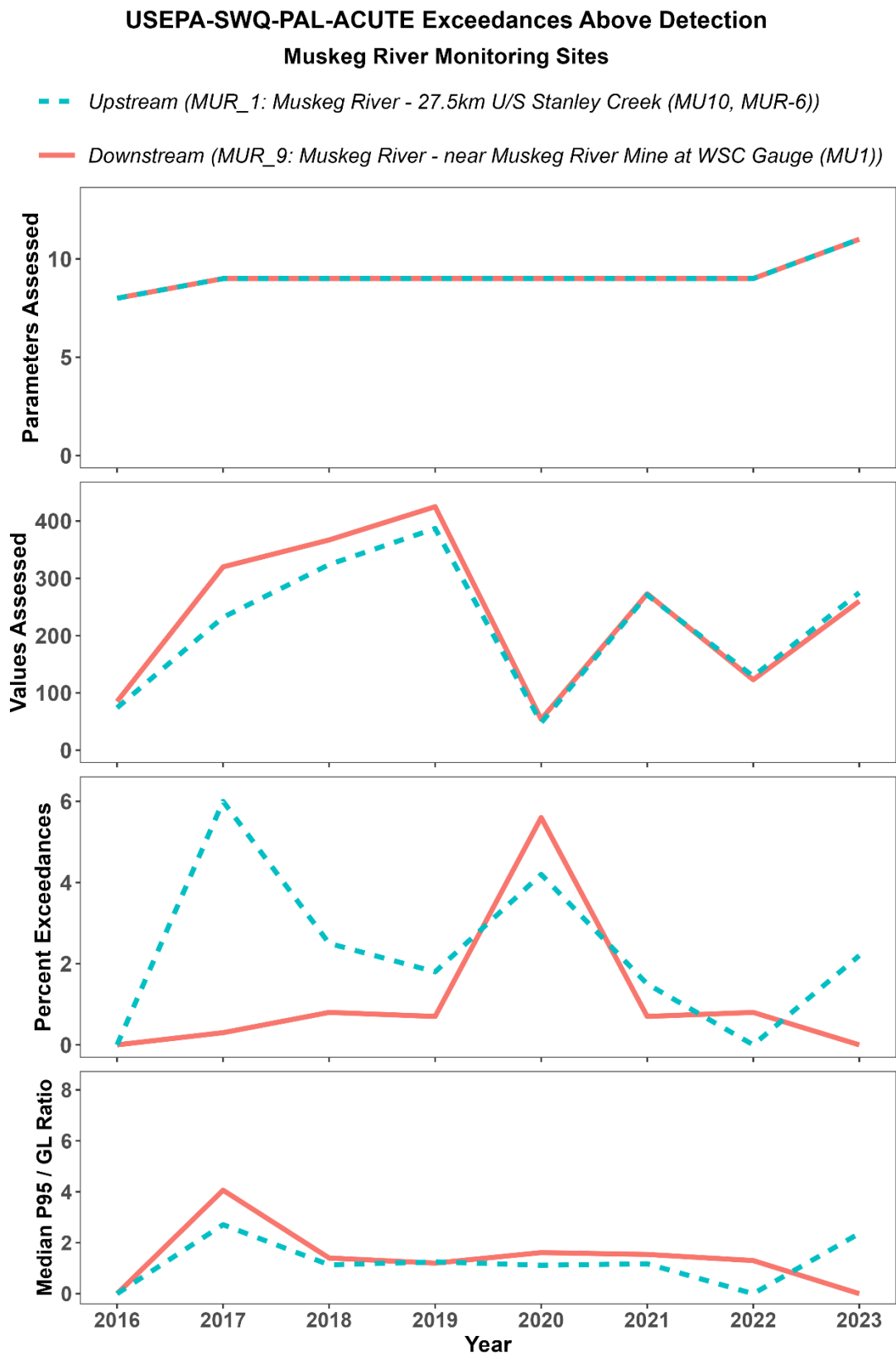


Figure I280: Comparison between exceedances at upstream and downstream sites on the Muskeg River when considering USEPA protection of aquatic life acute guidelines.

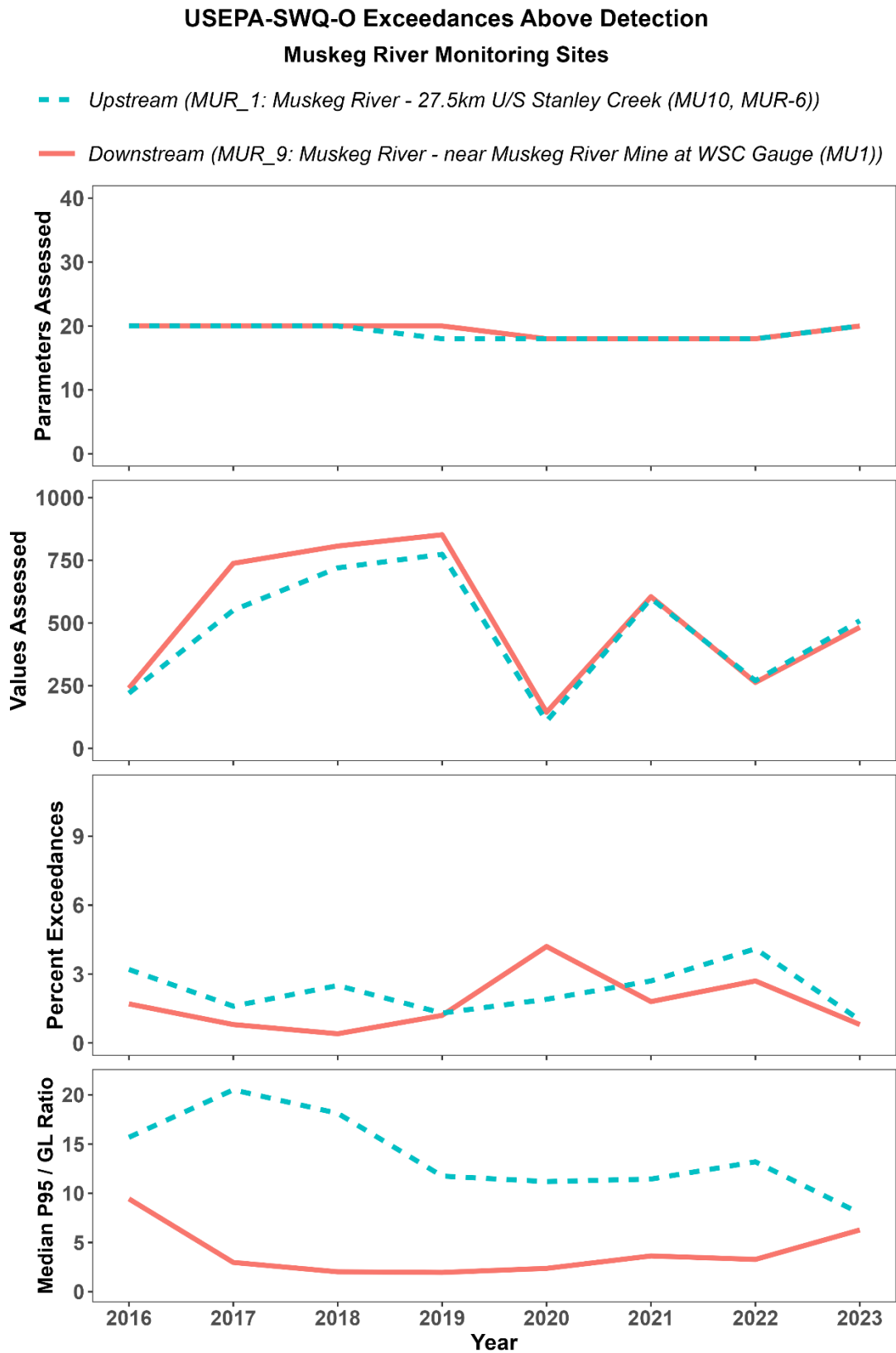


Figure I281: Comparison between exceedances at upstream and downstream sites on the Muskeg River when considering USEPA protection of human health from consumption of aquatic organisms guidelines.

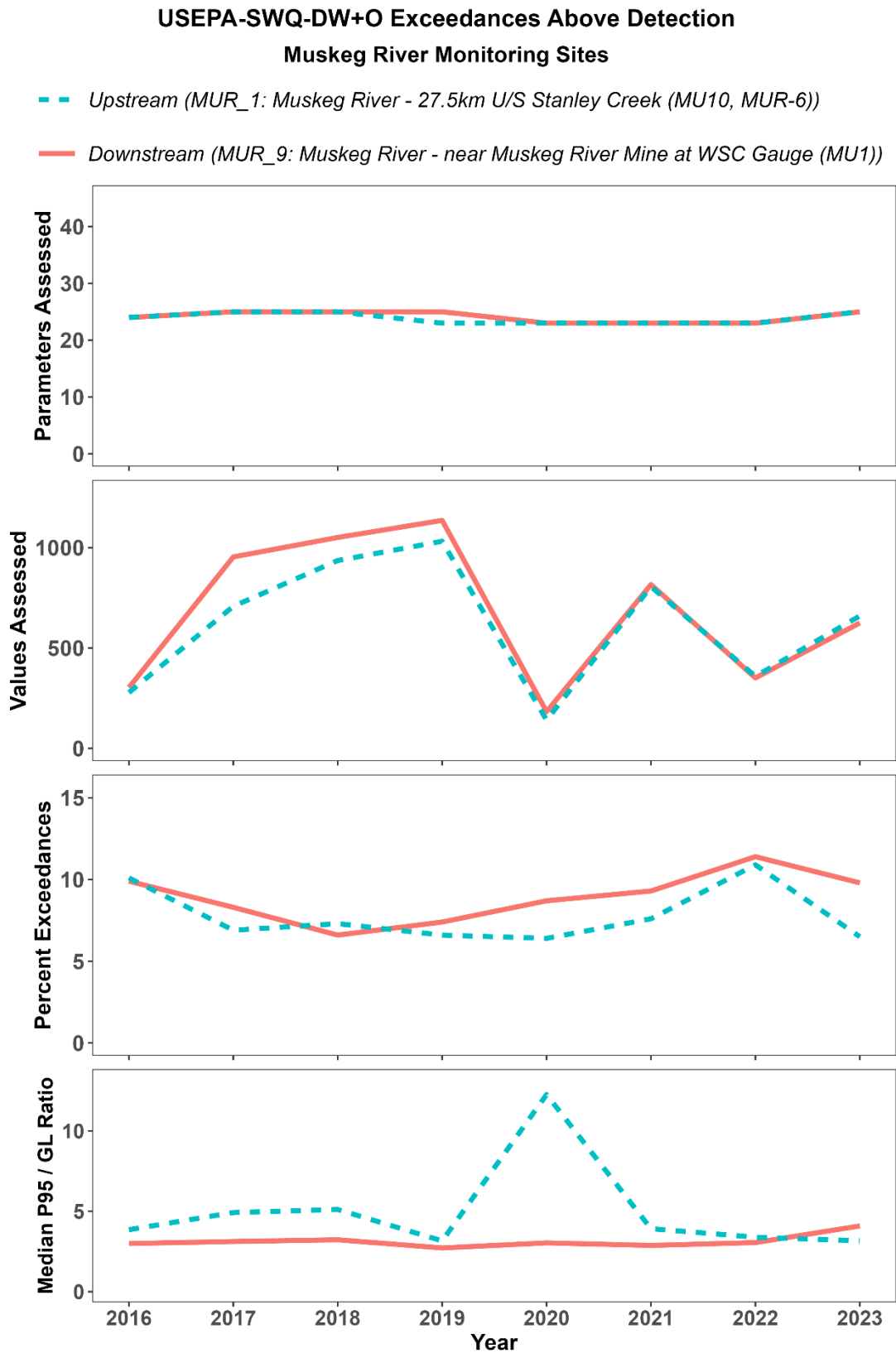


Figure I282: Comparison between exceedances at upstream and downstream sites on the Muskeg River when considering USEPA protection of human health from consumption of surface water and aquatic organisms guidelines.

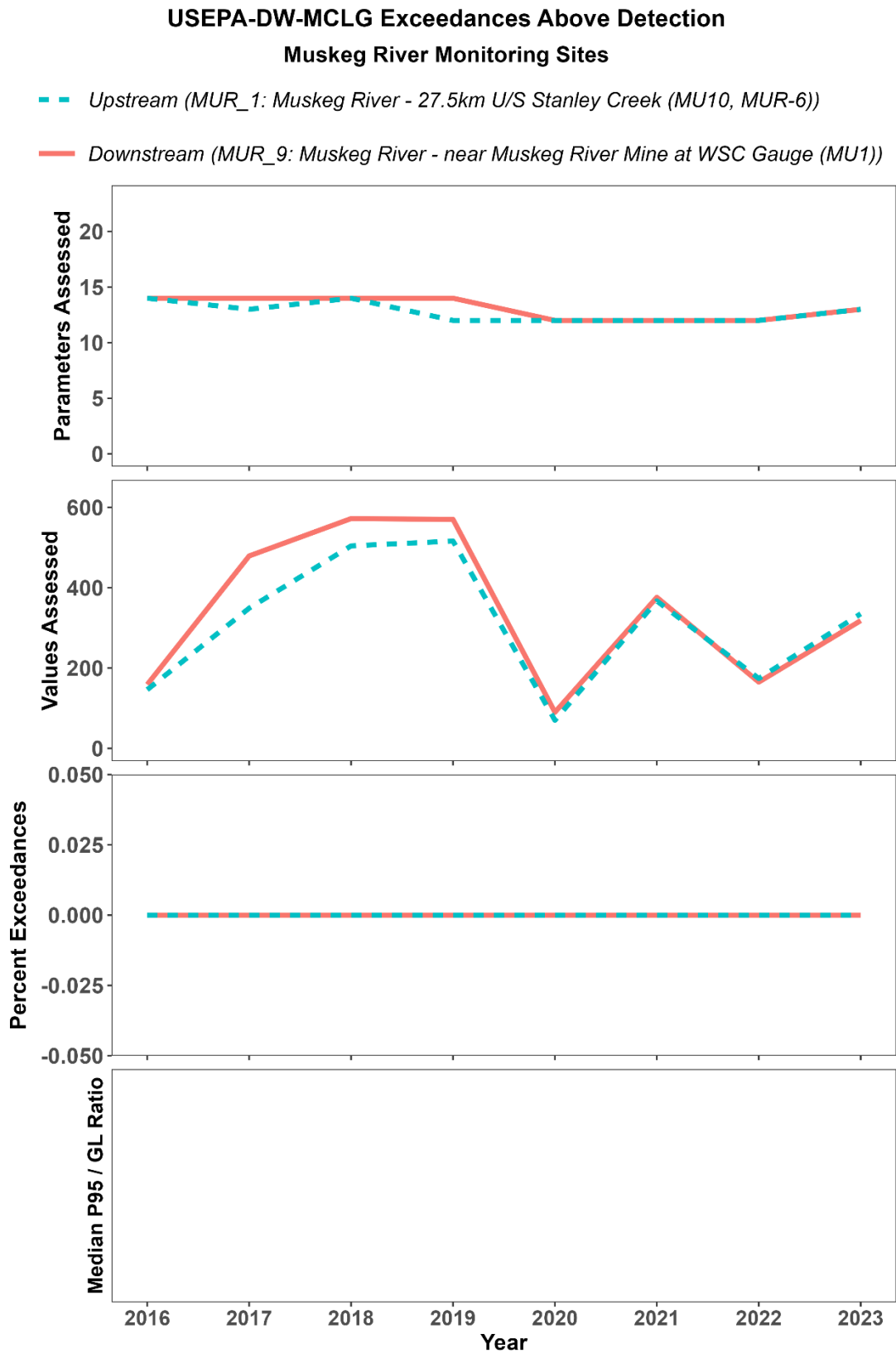


Figure I283: Comparison between exceedances at upstream and downstream sites on the Muskeg River when considering USEPA drinking water quality goals.

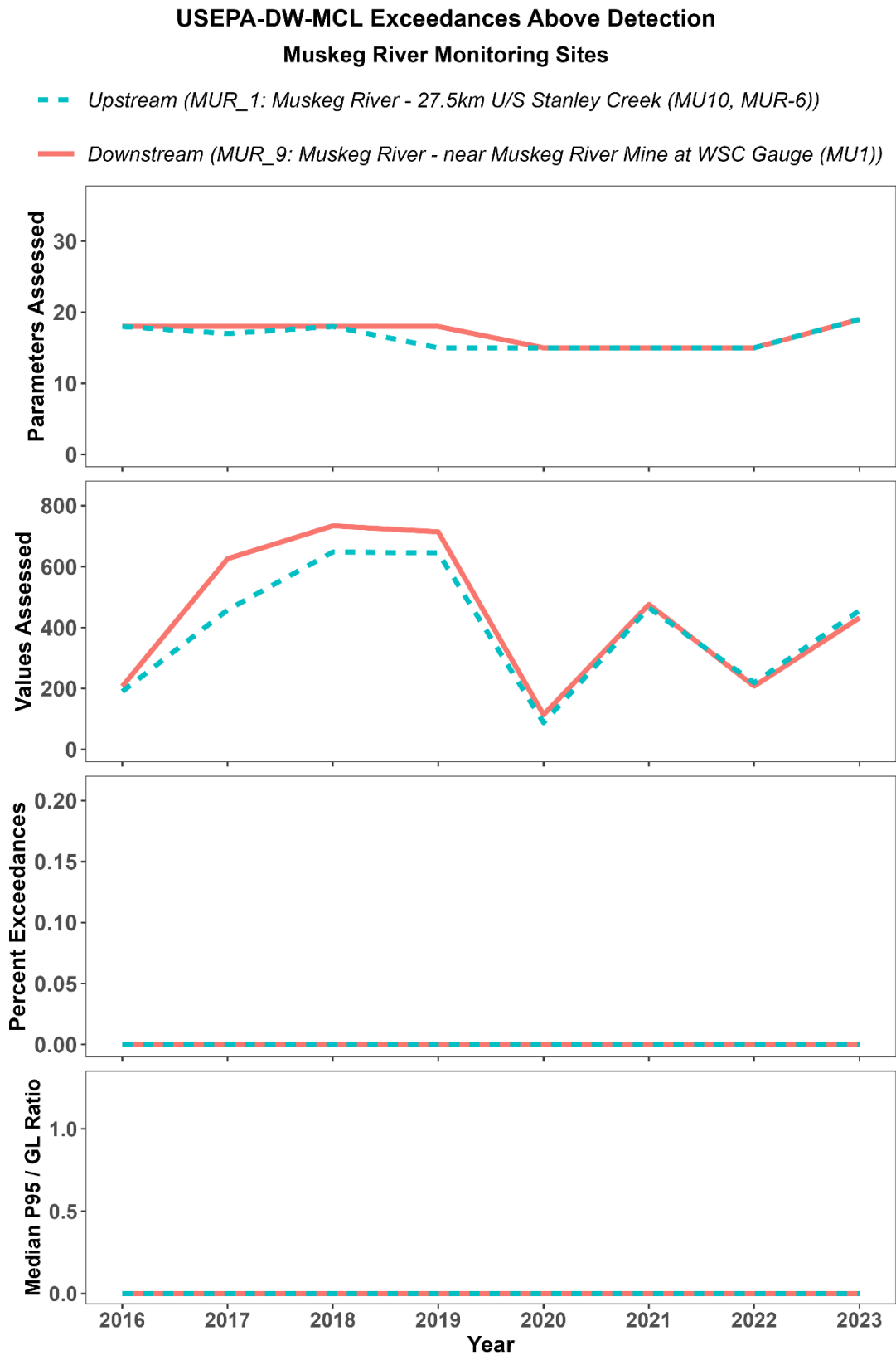


Figure I284: Comparison between exceedances at upstream and downstream sites on the Muskeg River when considering USEPA drinking water quality limits.

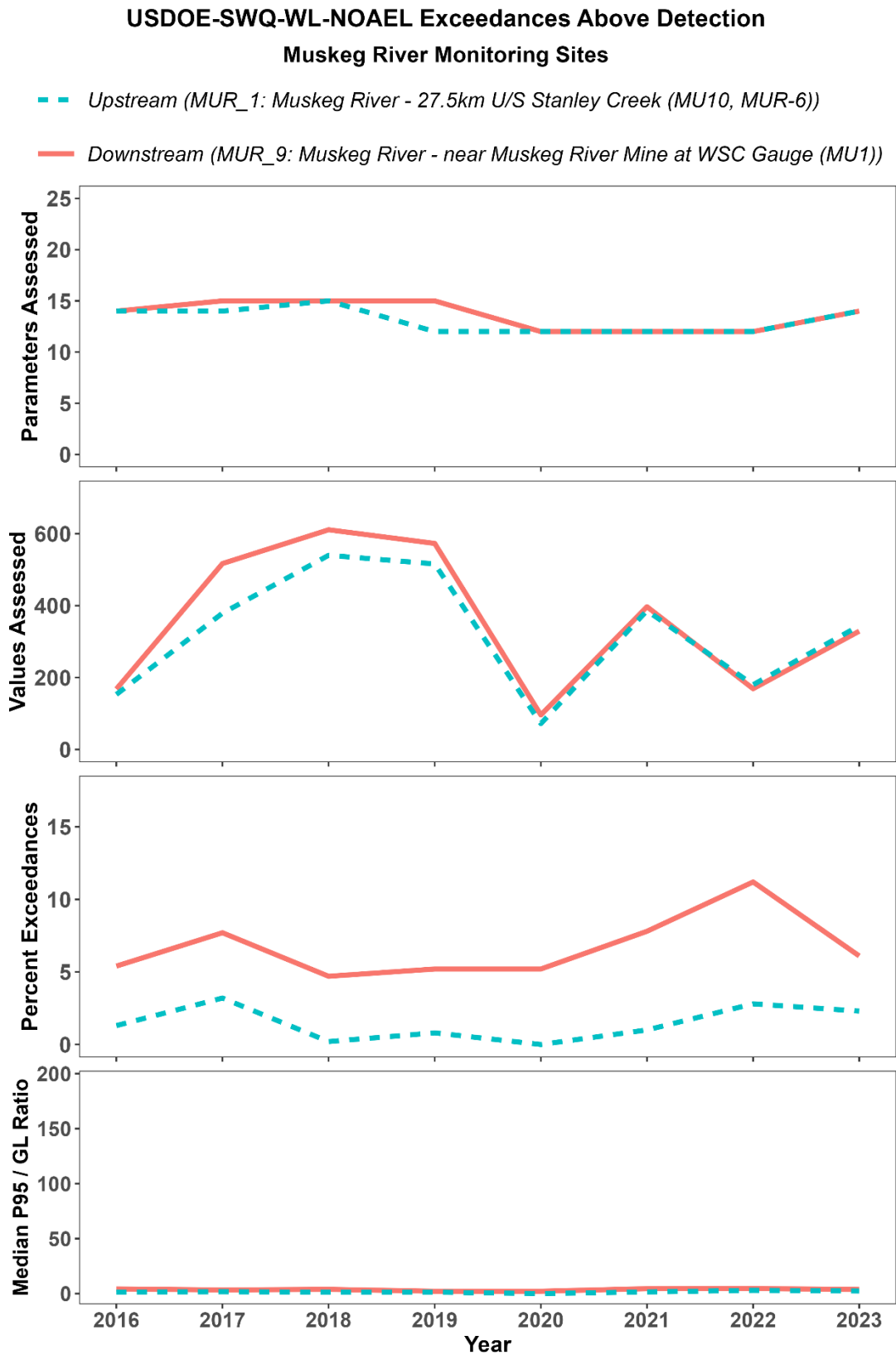


Figure I285: Comparison between exceedances at upstream and downstream sites on the Muskeg River when considering USEPA protection of piscivores NOAEL guidelines.

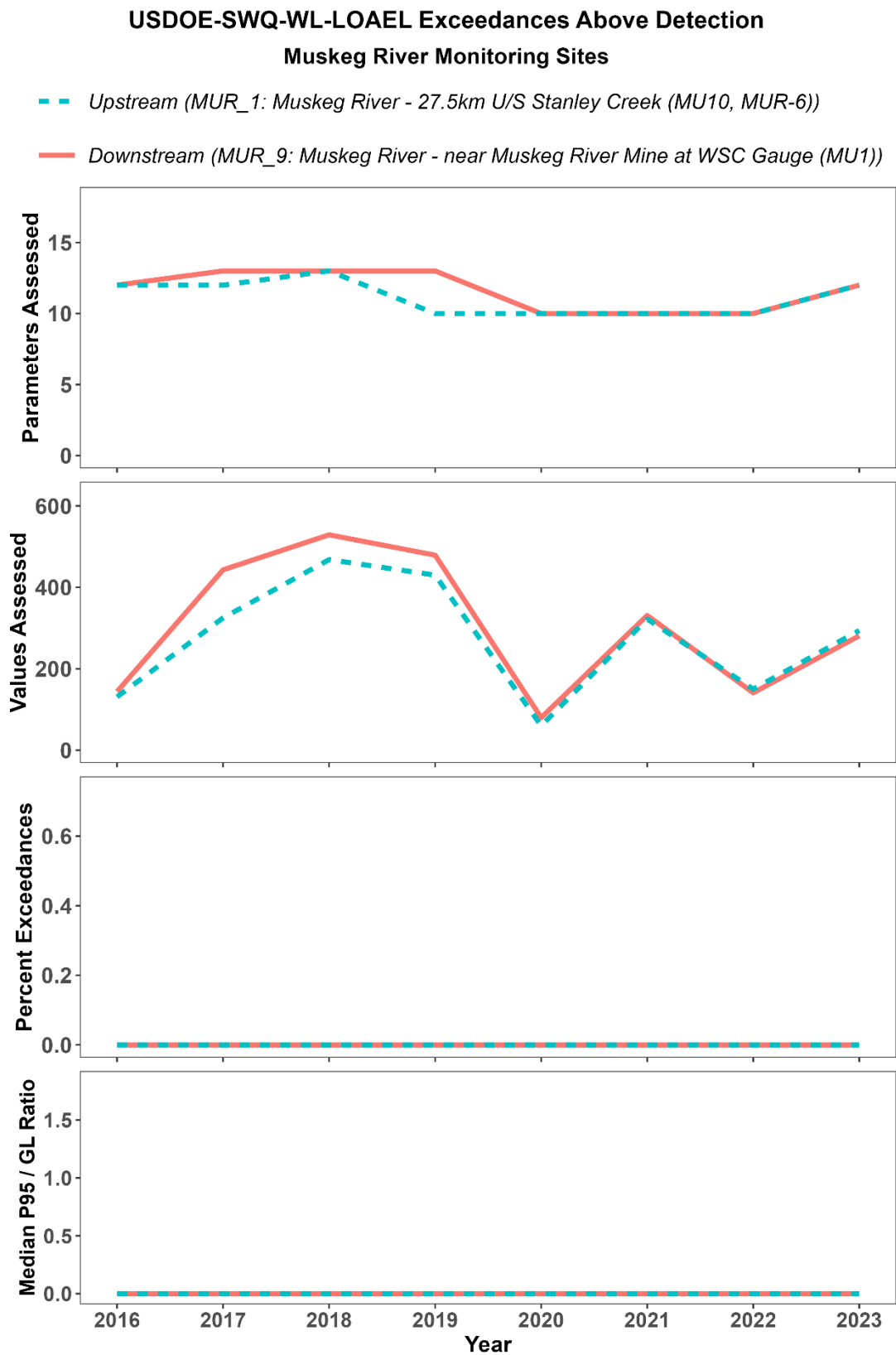


Figure I286: Comparison between exceedances at upstream and downstream sites on the Muskeg River when considering USEPA protection of piscivores LOAEL guidelines.

### Most Protective Guideline Exceedances Above Detection Muskeg River Monitoring Sites

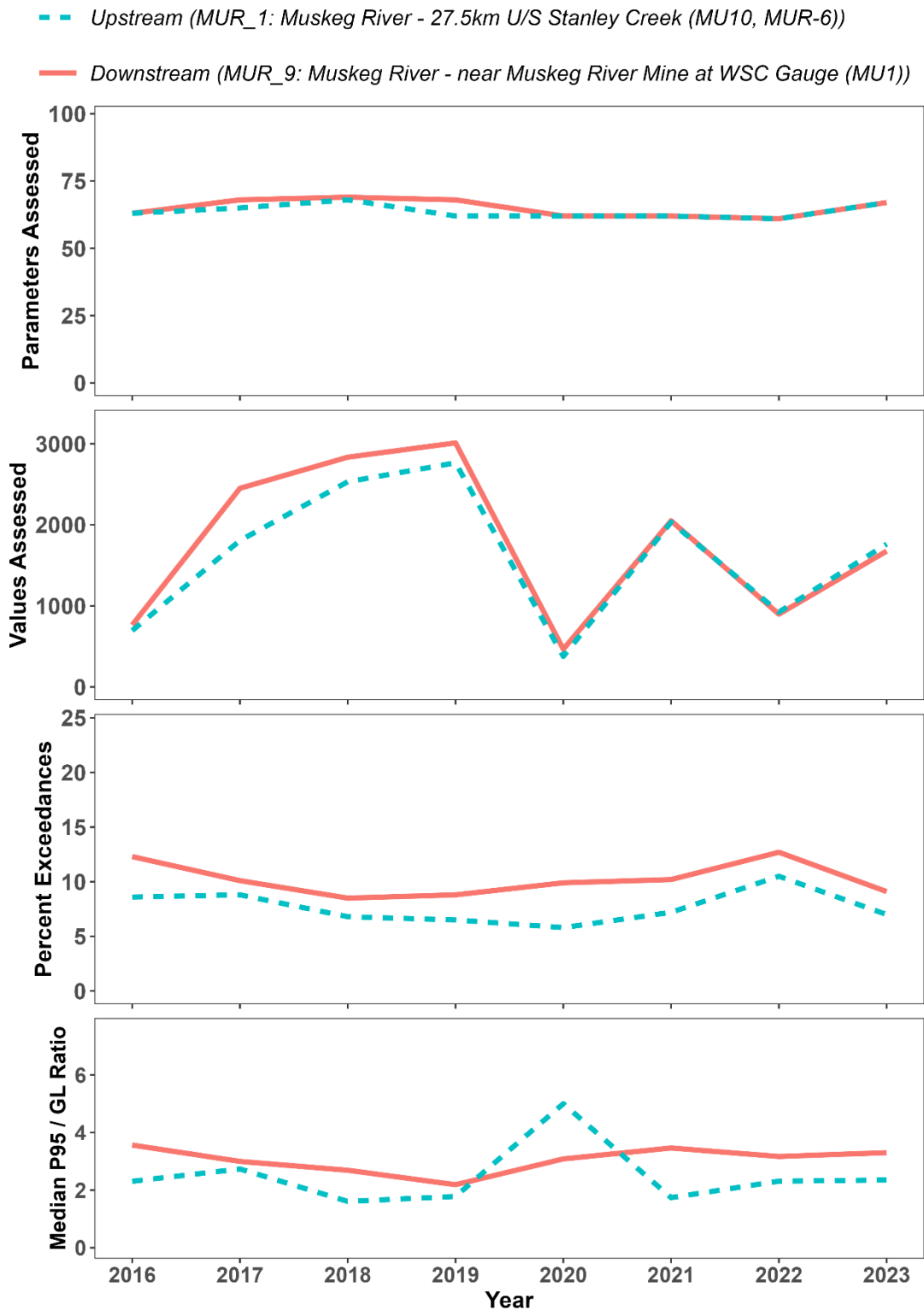


Figure I287: Comparison between exceedances at upstream and downstream sites on the Muskeg River when considering the most protective guidelines.



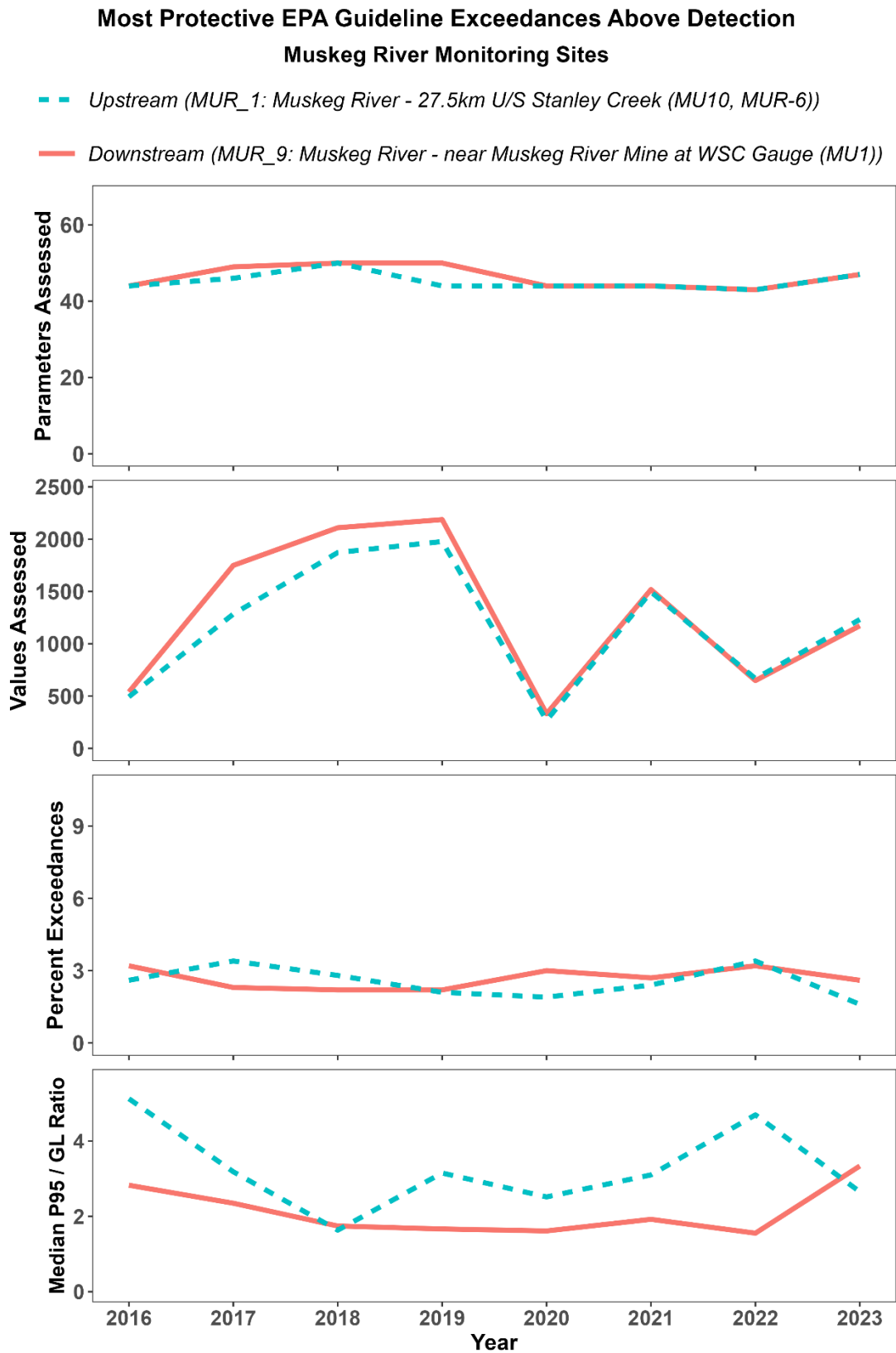


Figure I288: Comparison between exceedances at upstream and downstream sites on the Muskeg River when considering the most protective EPA guidelines.

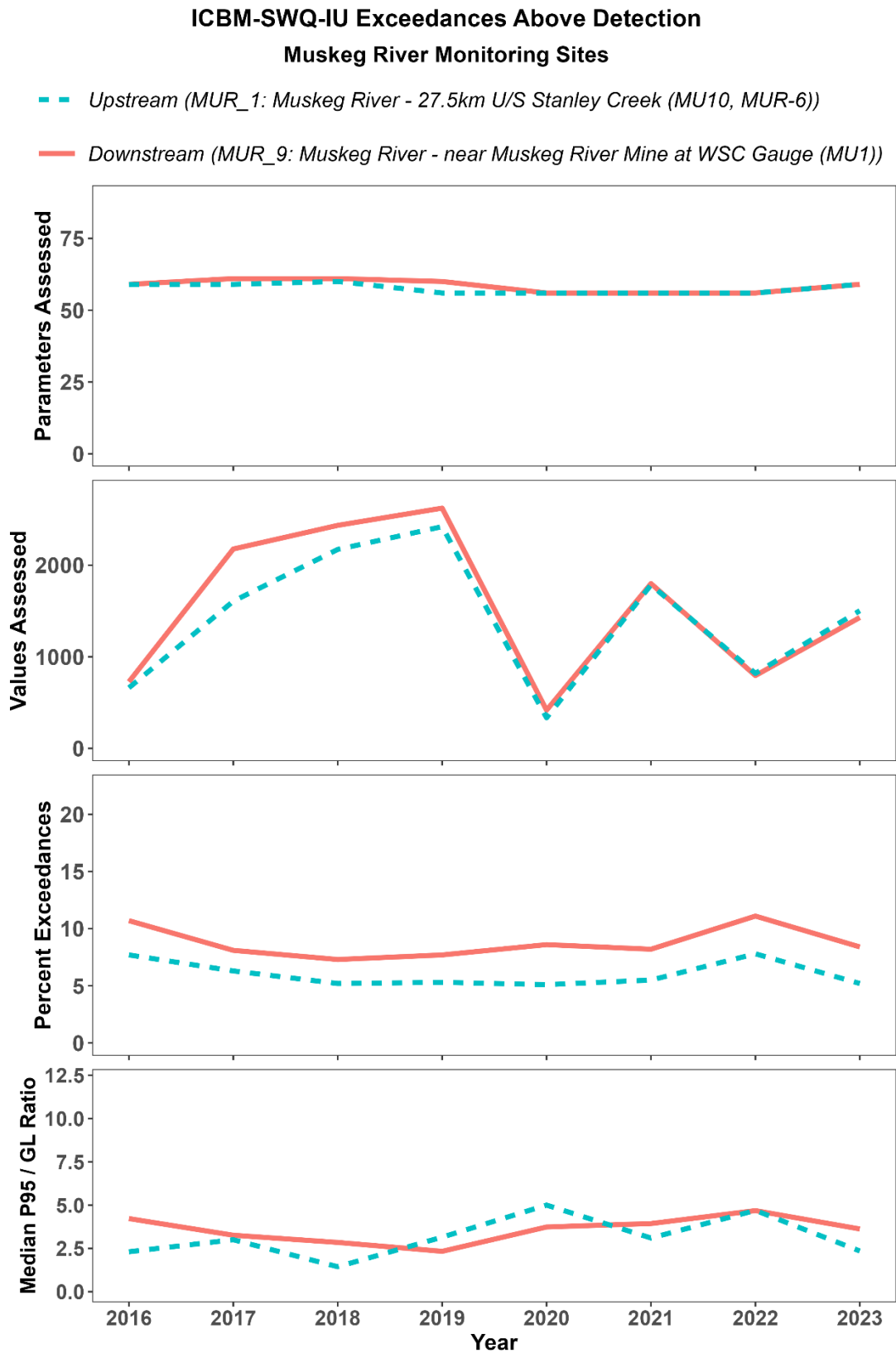


Figure I289: Comparison between exceedances at upstream and downstream sites on the Muskeg River when considering guidelines protective of indigenous use.

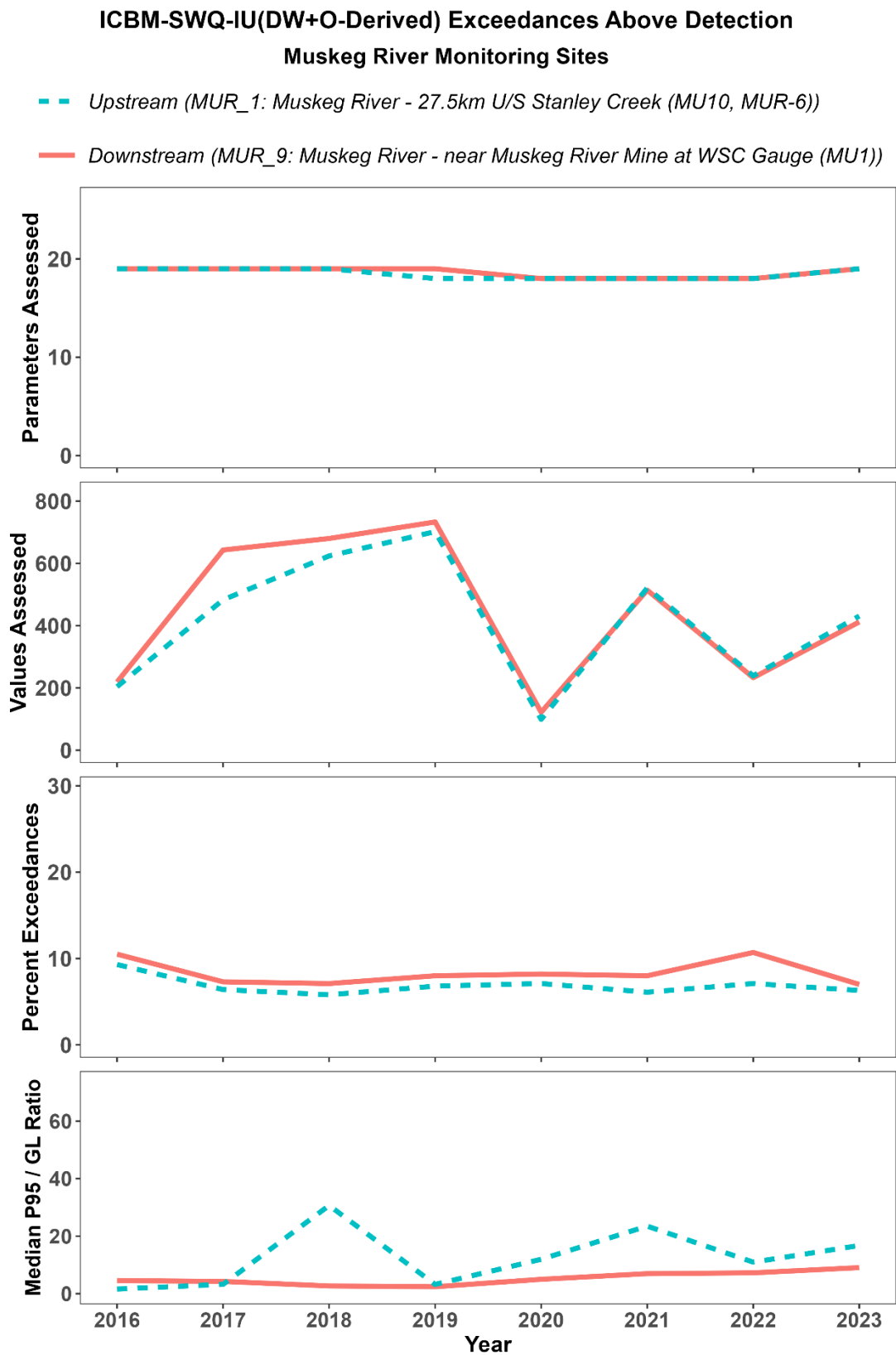


Figure I290: Comparison between exceedances at upstream and downstream sites on the Muskeg River when considering guidelines protective of indigenous use from consumption of surface water and aquatic organisms.

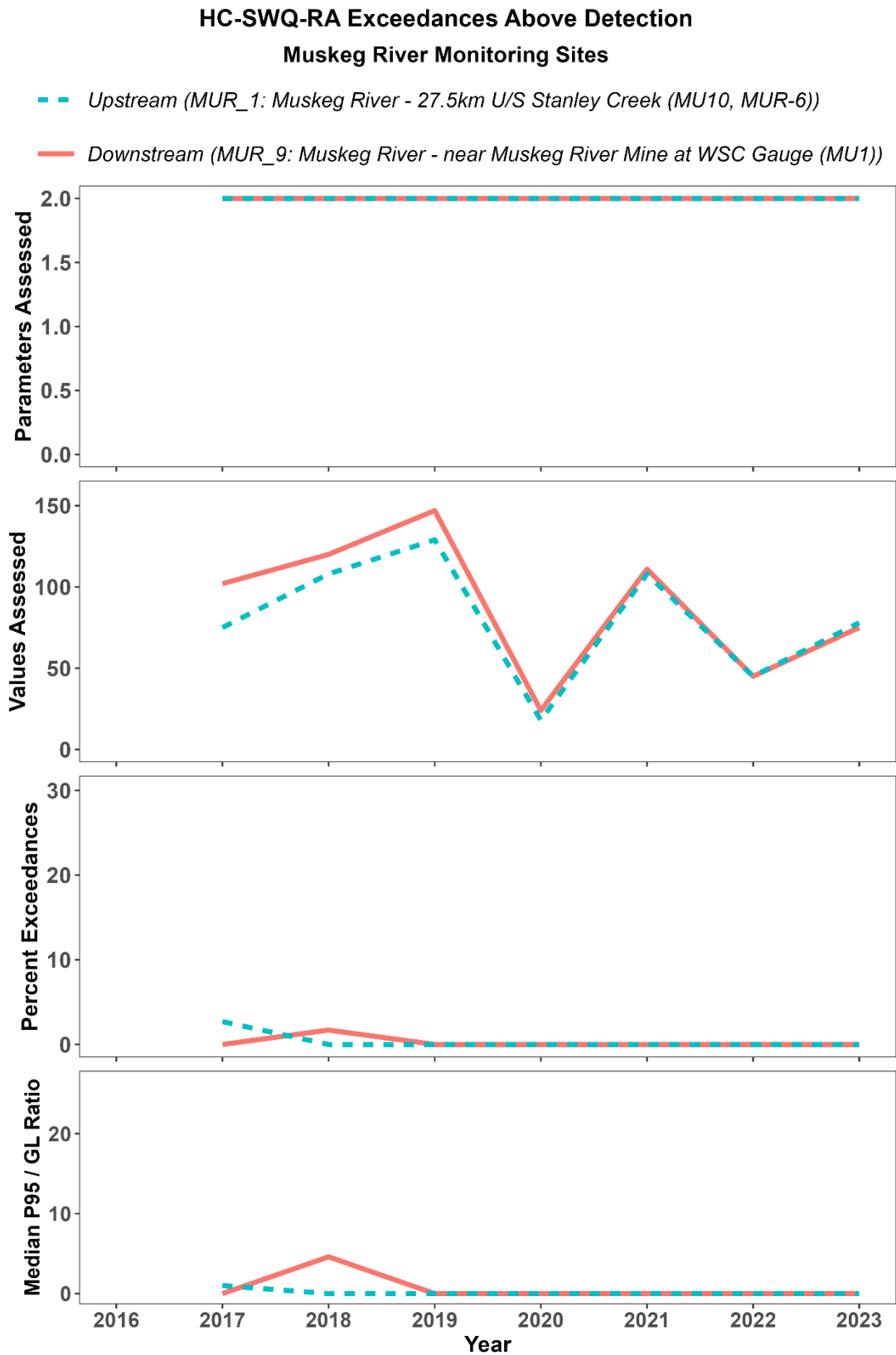


Figure I291: Comparison between exceedances at upstream and downstream sites on the Muskeg River when considering Health Canada recreation aesthetics guidelines.

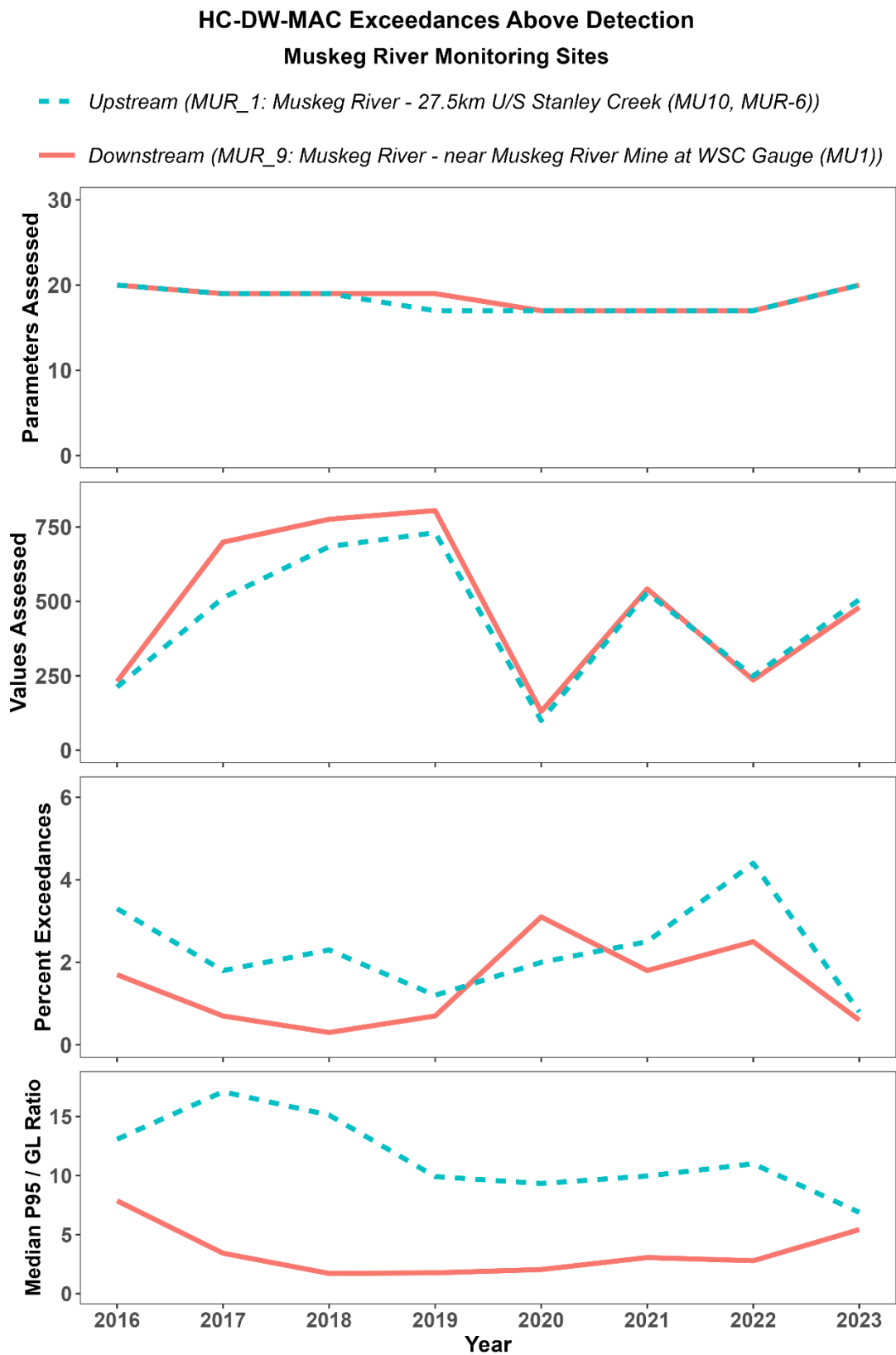


Figure I292: Comparison between exceedances at upstream and downstream sites on the Muskeg River when considering Health Canada drinking water maximum acceptable concentration guidelines.

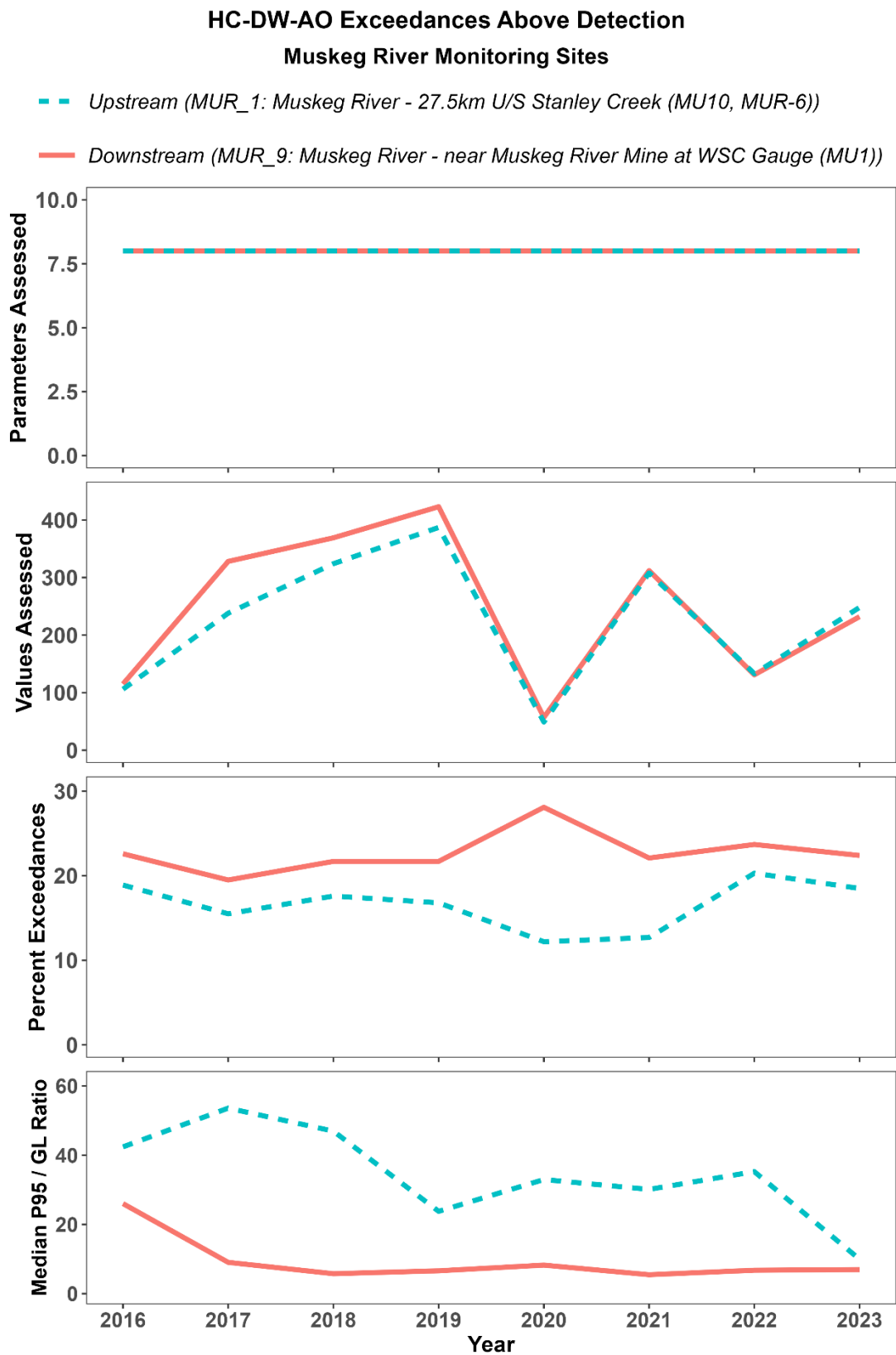


Figure I293: Comparison between exceedances at upstream and downstream sites on the Muskeg River when considering Health Canada drinking water aesthetics objectives.

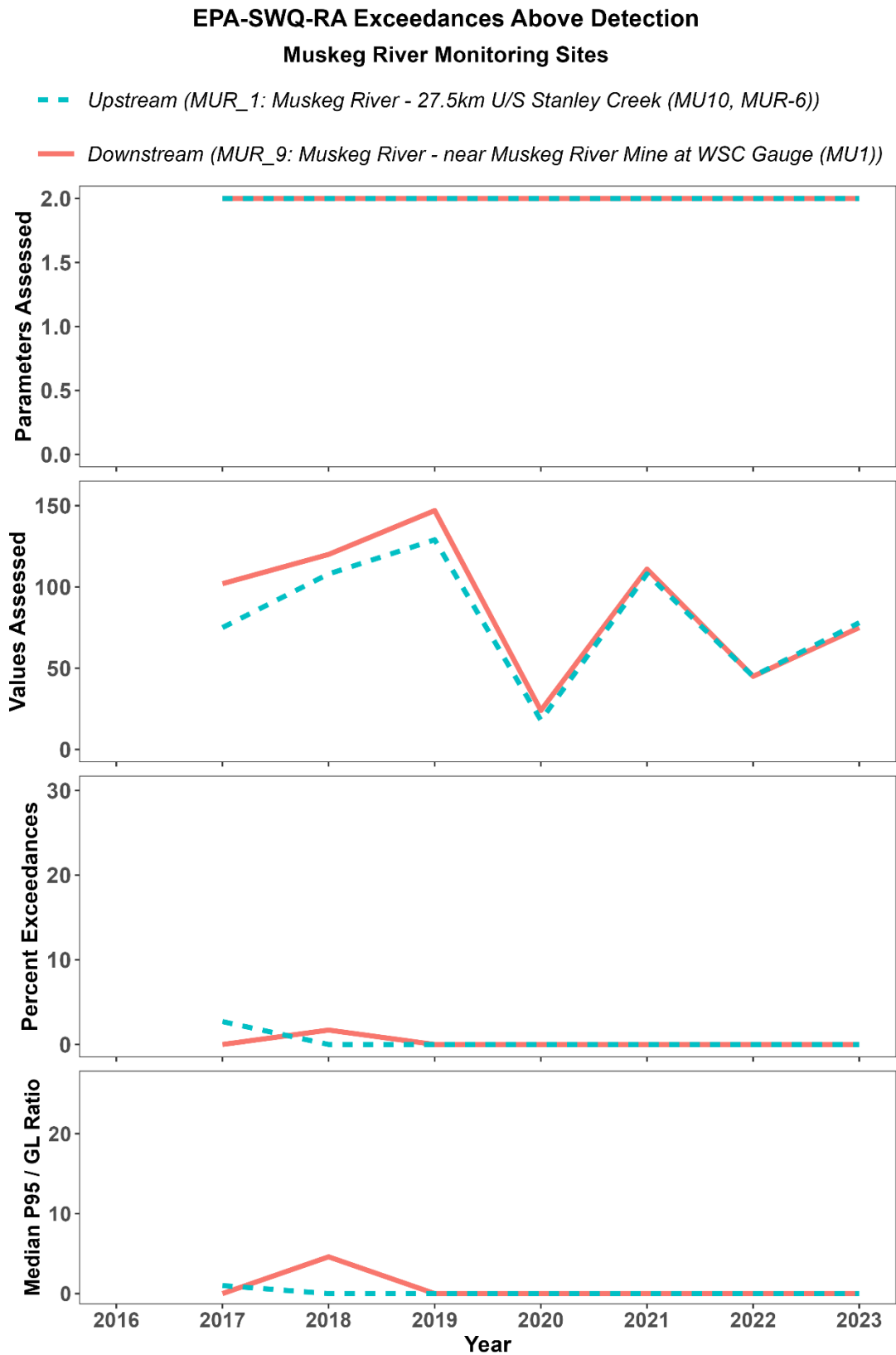


Figure I294: Comparison between exceedances at upstream and downstream sites on the Muskeg River when considering Alberta EPA recreation aesthetics guidelines.

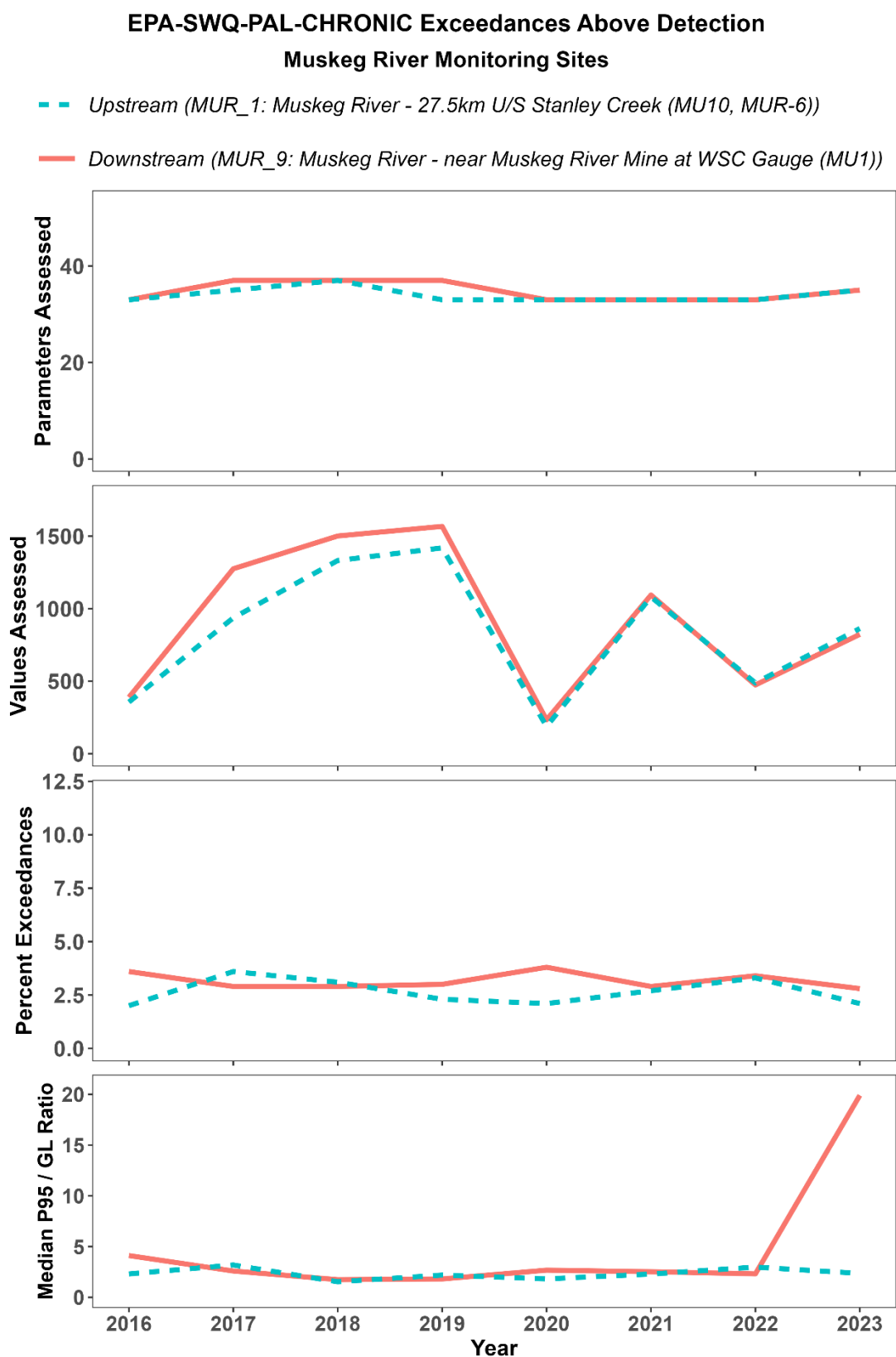


Figure I295: Comparison between exceedances at upstream and downstream sites on the Muskeg River when considering Alberta EPA protection of aquatic life chronic guidelines.



## EPA-SWQ-PAL-ACUTE Exceedances Above Detection Muskeg River Monitoring Sites

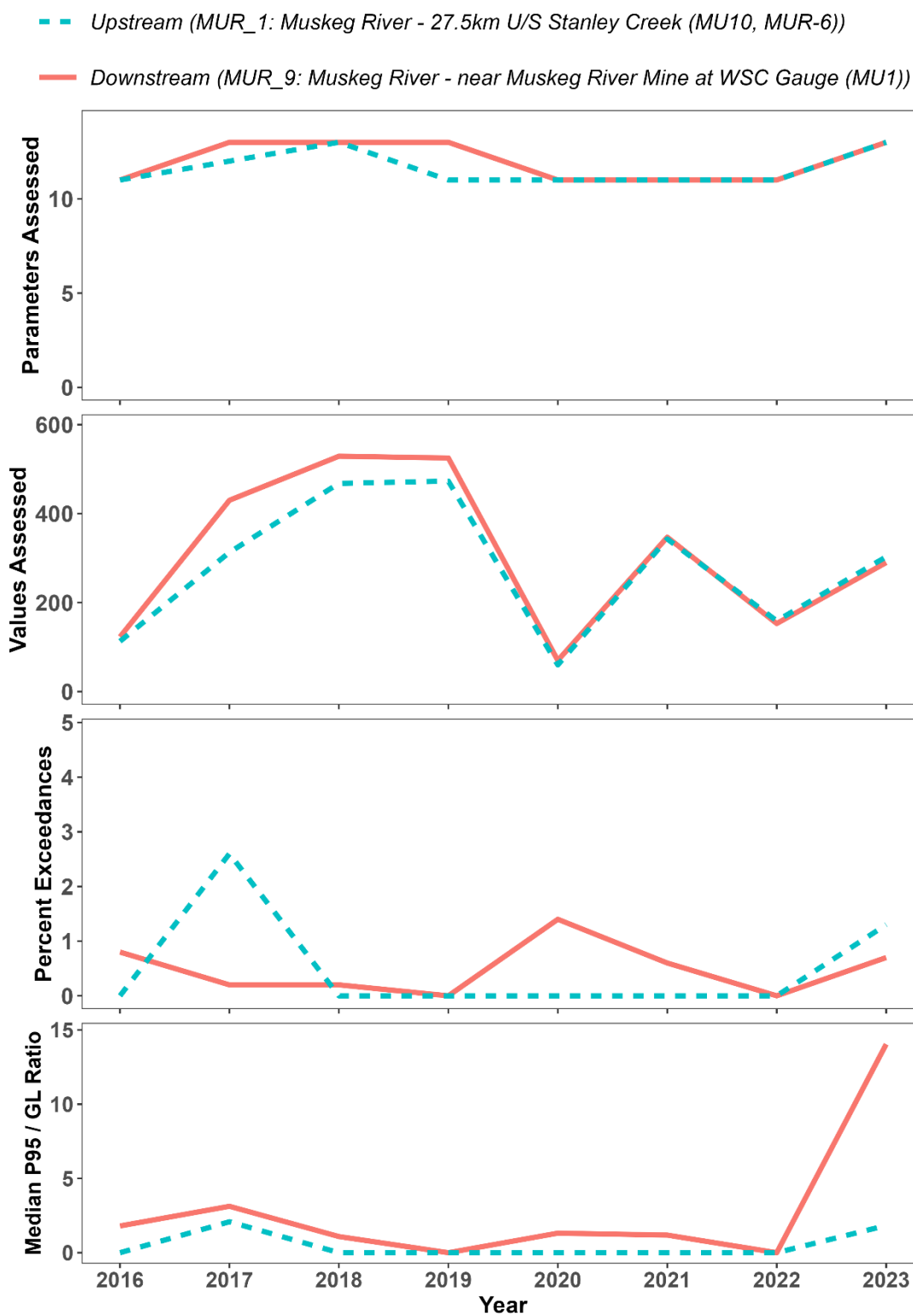


Figure I296: Comparison between exceedances at upstream and downstream sites on the Muskeg River when considering Alberta EPA protection of aquatic life acute guidelines.

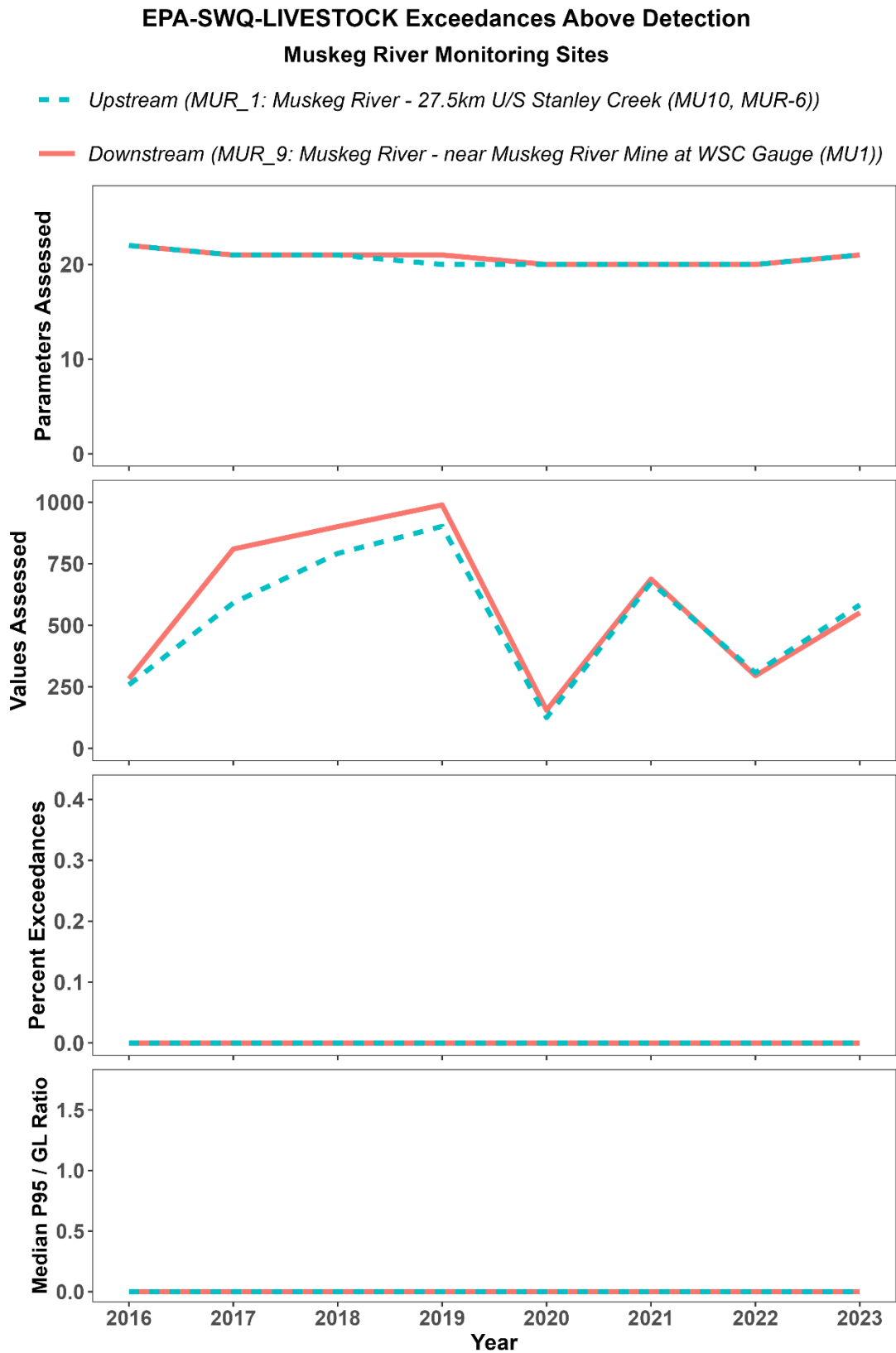


Figure I297: Comparison between exceedances at upstream and downstream sites on the Muskeg River when considering Alberta EPA protection of livestock watering guidelines.

## EPA-SWQ-AG-IRRIGATION Exceedances Above Detection Muskeg River Monitoring Sites

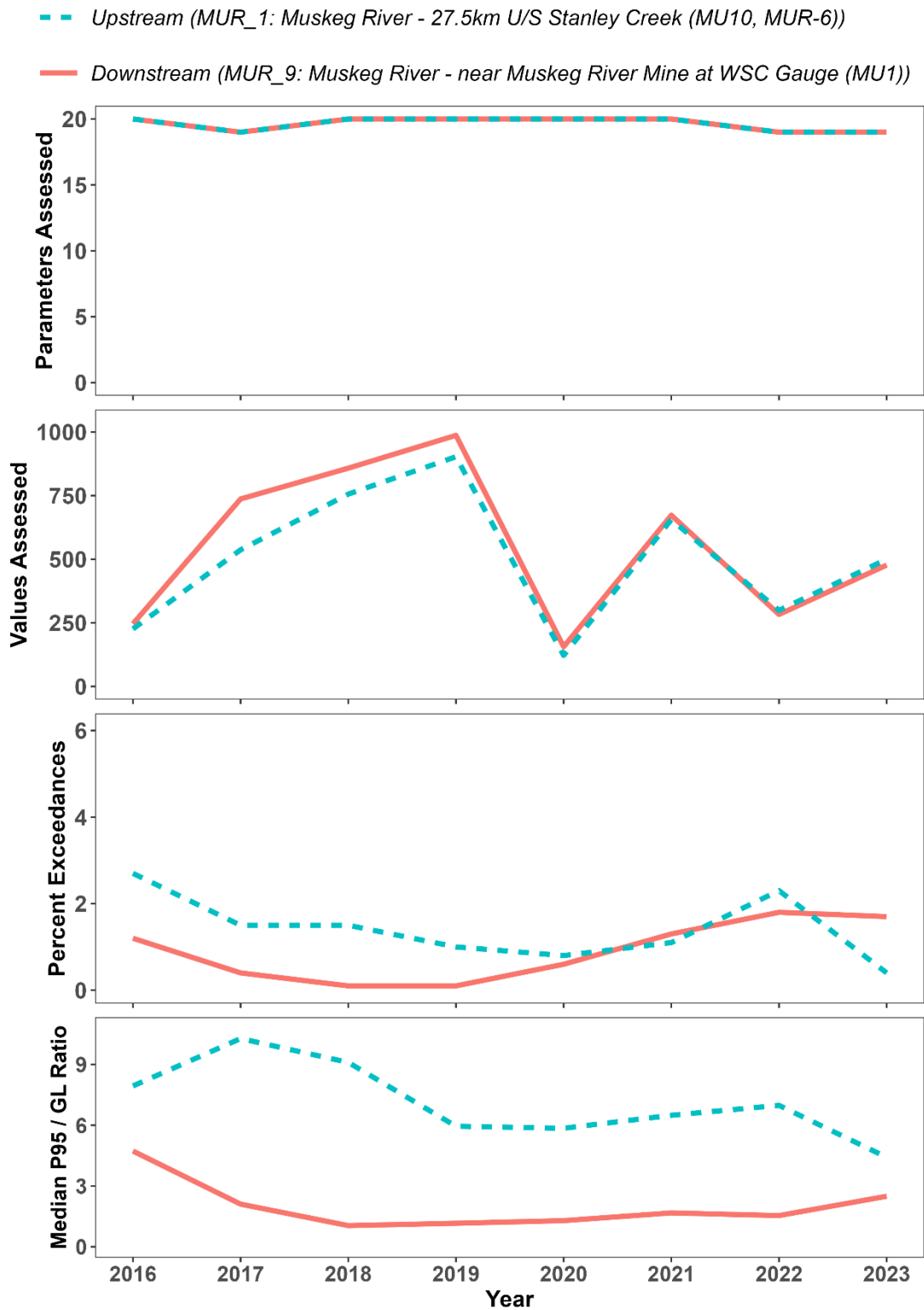


Figure I298: Comparison between exceedances at upstream and downstream sites on the Muskeg River when considering Alberta EPA protection of irrigation water guidelines.

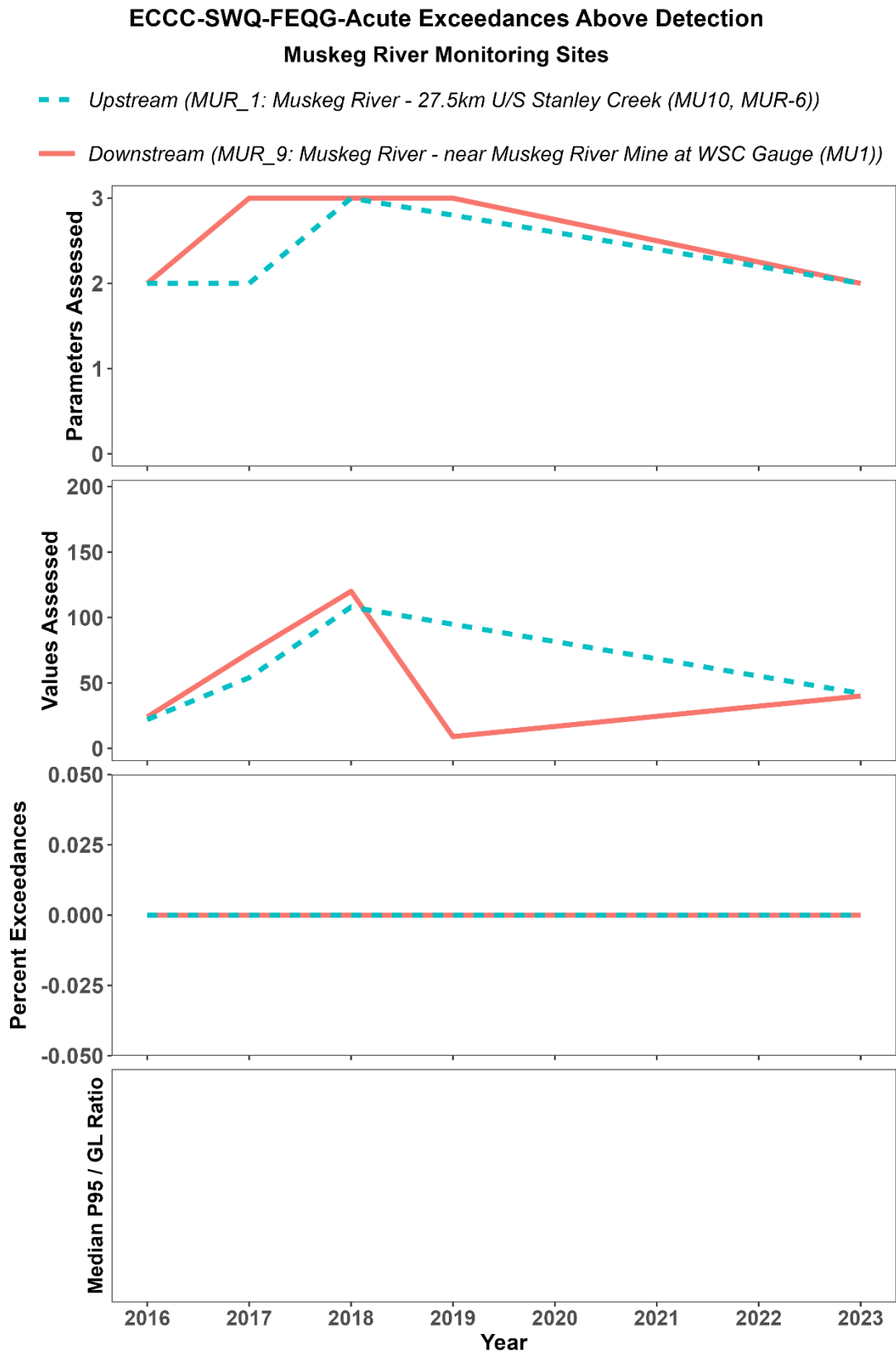


Figure I299: Comparison between exceedances at upstream and downstream sites on the Muskeg River when considering ECCC Federal Environmental Quality Guidelines protection of aquatic life acute guidelines.

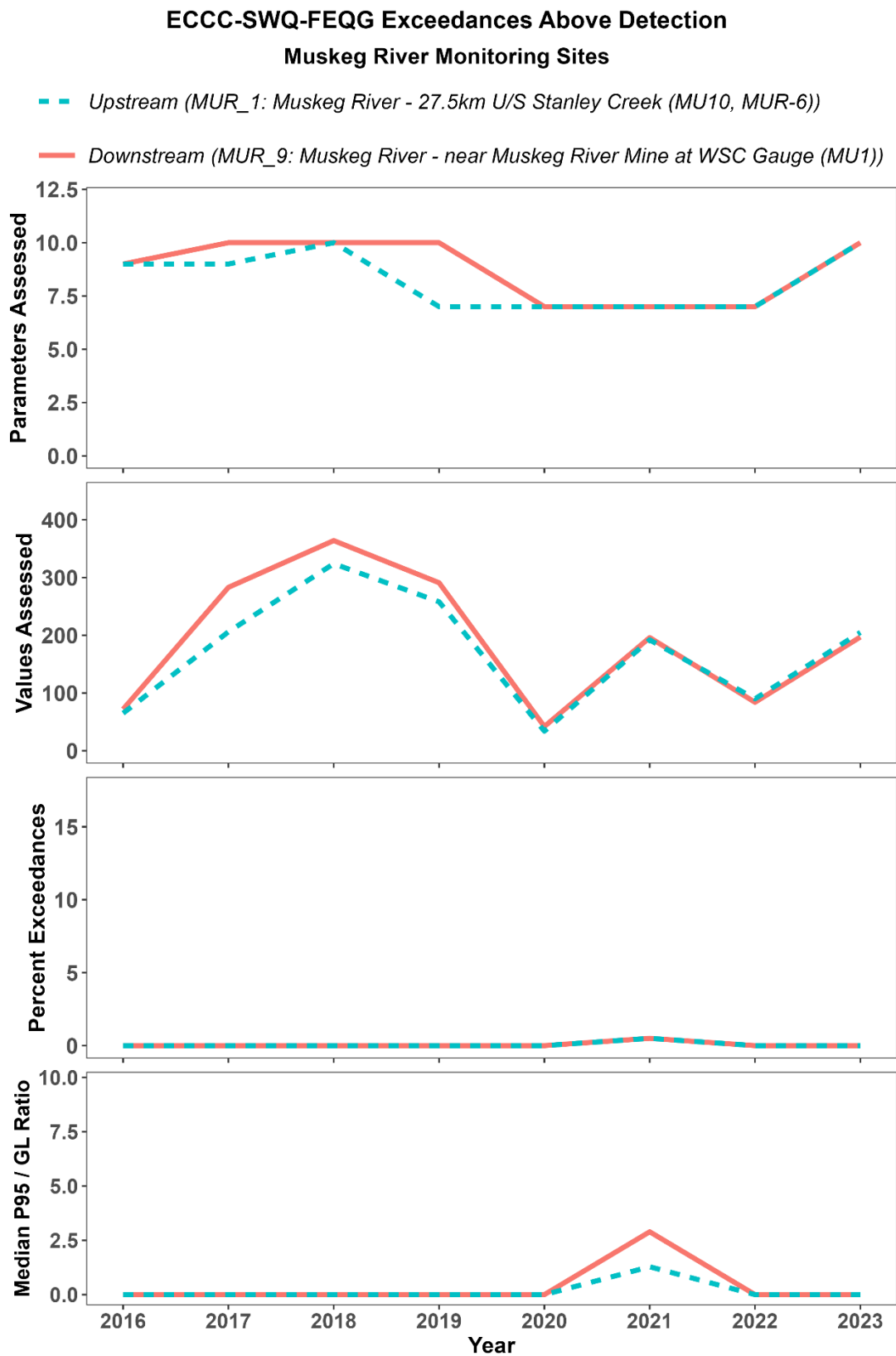


Figure I300: Comparison between exceedances at upstream and downstream sites on the Muskeg River when considering ECCC Federal Environmental Quality Guidelines protection of aquatic life chronic guidelines.

### CCME-SWQ-PAL-CHRONIC Exceedances Above Detection Muskeg River Monitoring Sites

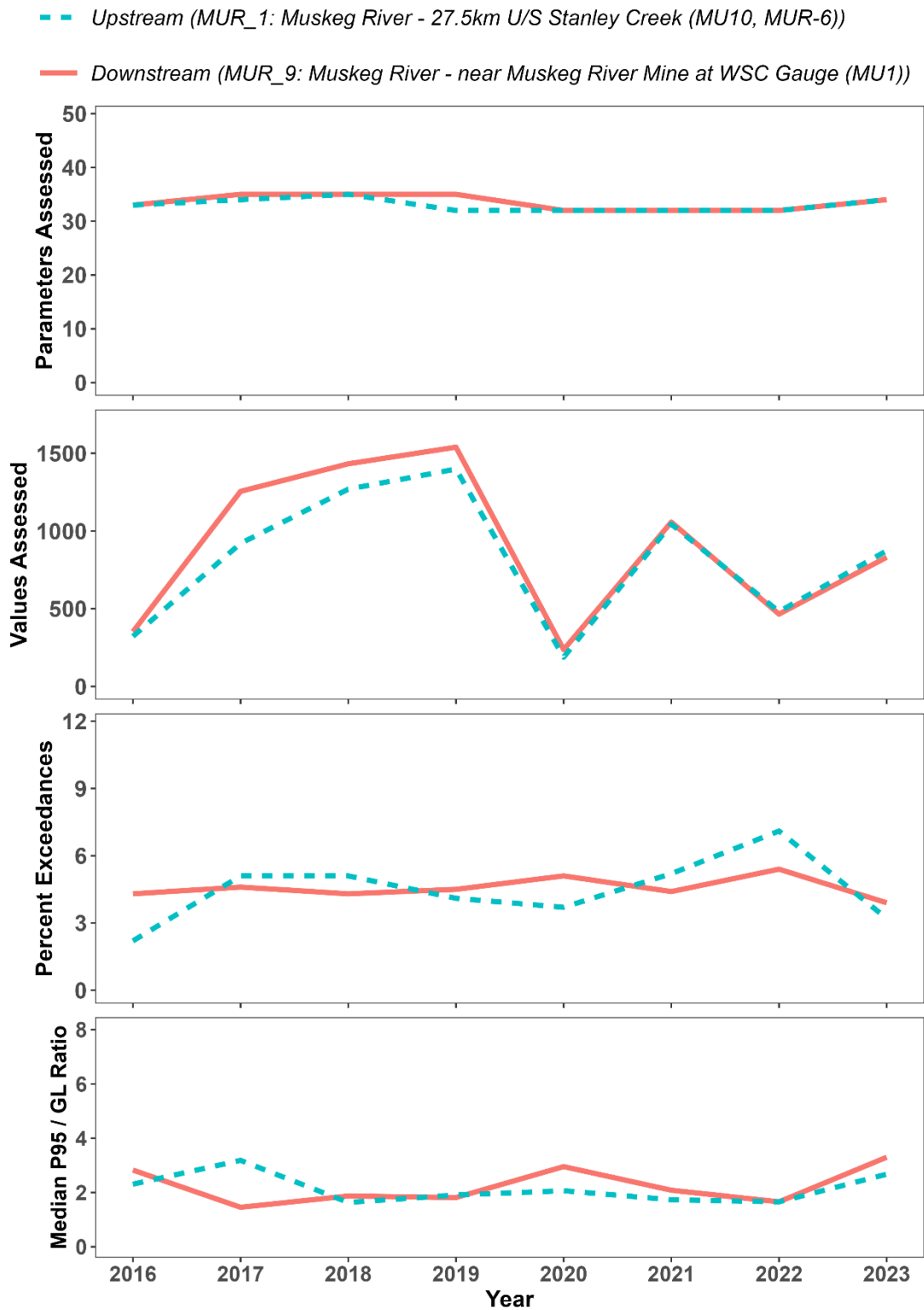


Figure I301: Comparison between exceedances at upstream and downstream sites on the Muskeg River when considering CCME protection of aquatic life chronic guidelines.

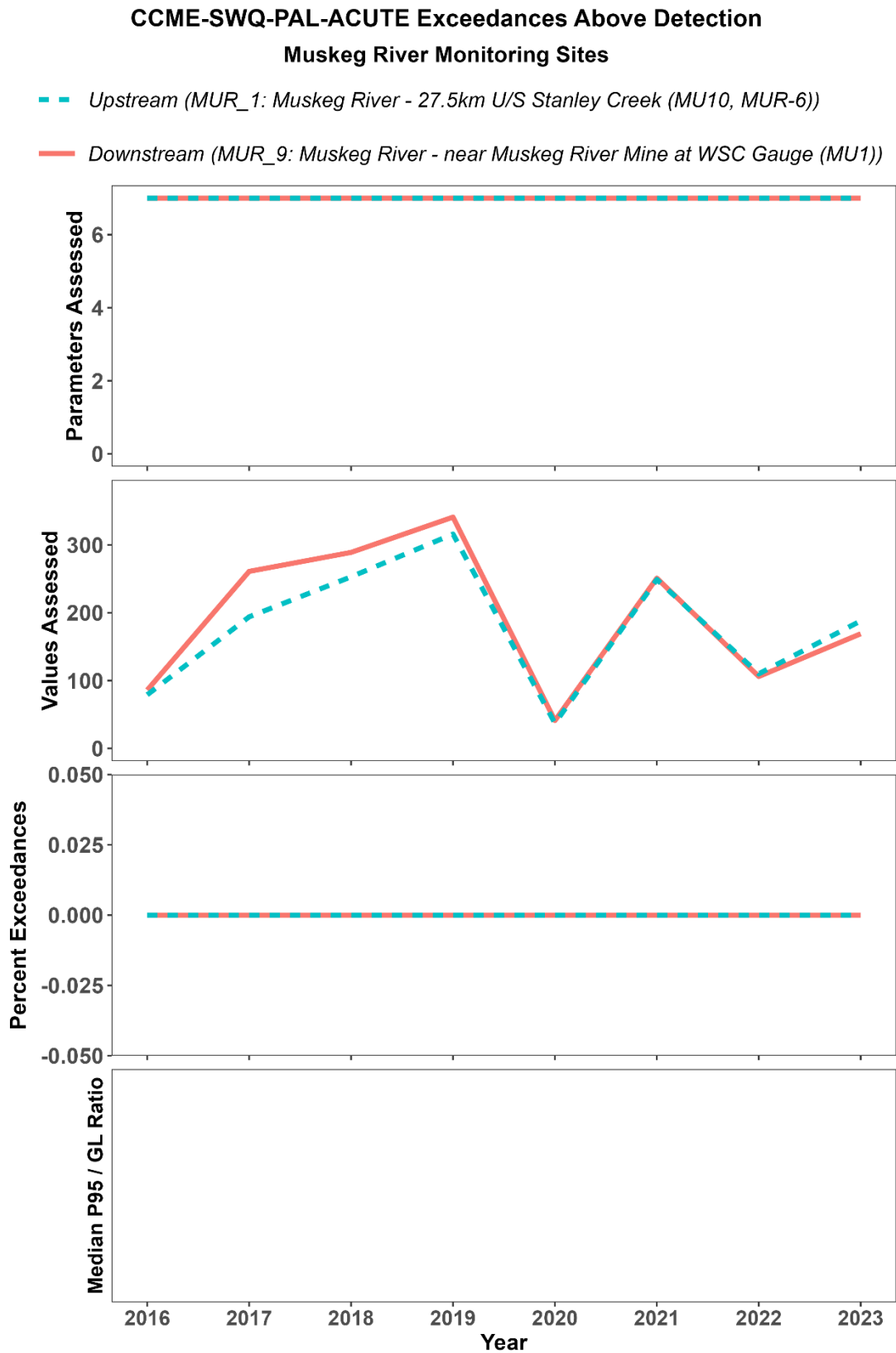


Figure I302: Comparison between exceedances at upstream and downstream sites on the Muskeg River when considering CCME protection of aquatic life acute guidelines.

### CCME-SWQ-AG-LIVESTOCK Exceedances Above Detection Muskeg River Monitoring Sites

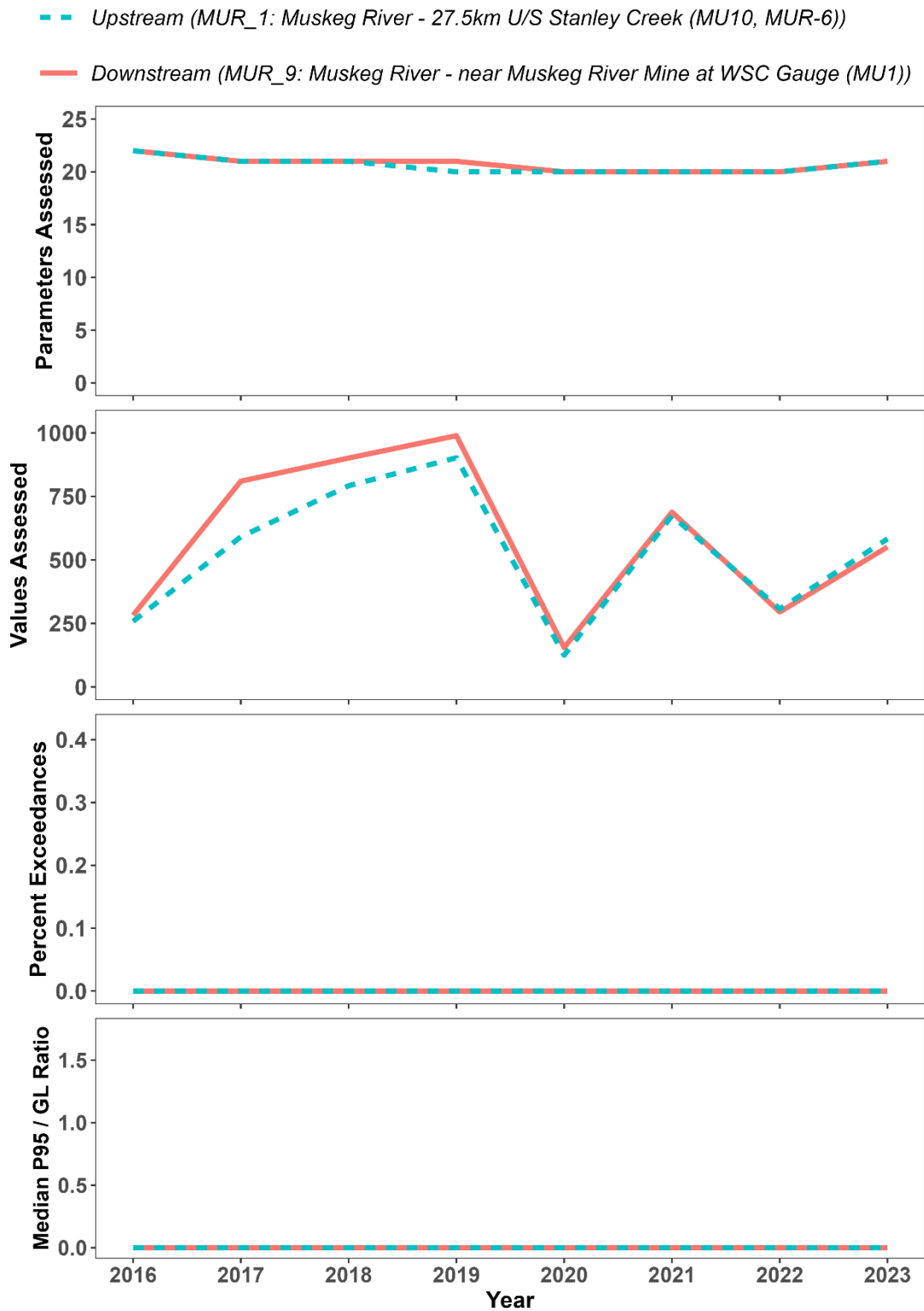


Figure I303: Comparison between exceedances at upstream and downstream sites on the Muskeg River when considering CCME protection of livestock watering guidelines.



# **CCME-SWQ-AG-IRRIGATION Exceedances Above Detection** **Muskeg River Monitoring Sites**

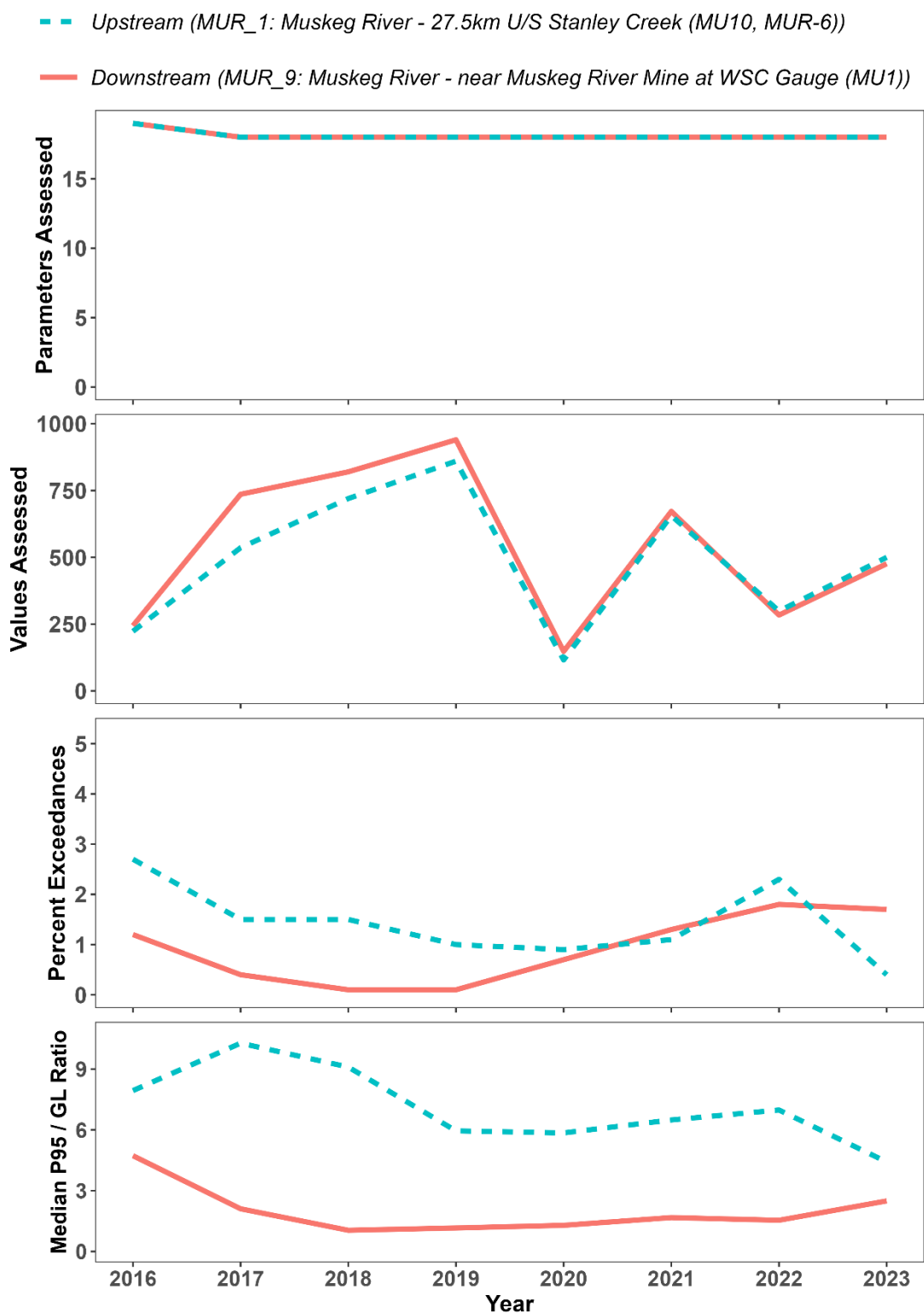


Figure I304: Comparison between exceedances at upstream and downstream sites on the Muskeg River when considering CCME protection of irrigation water guidelines.

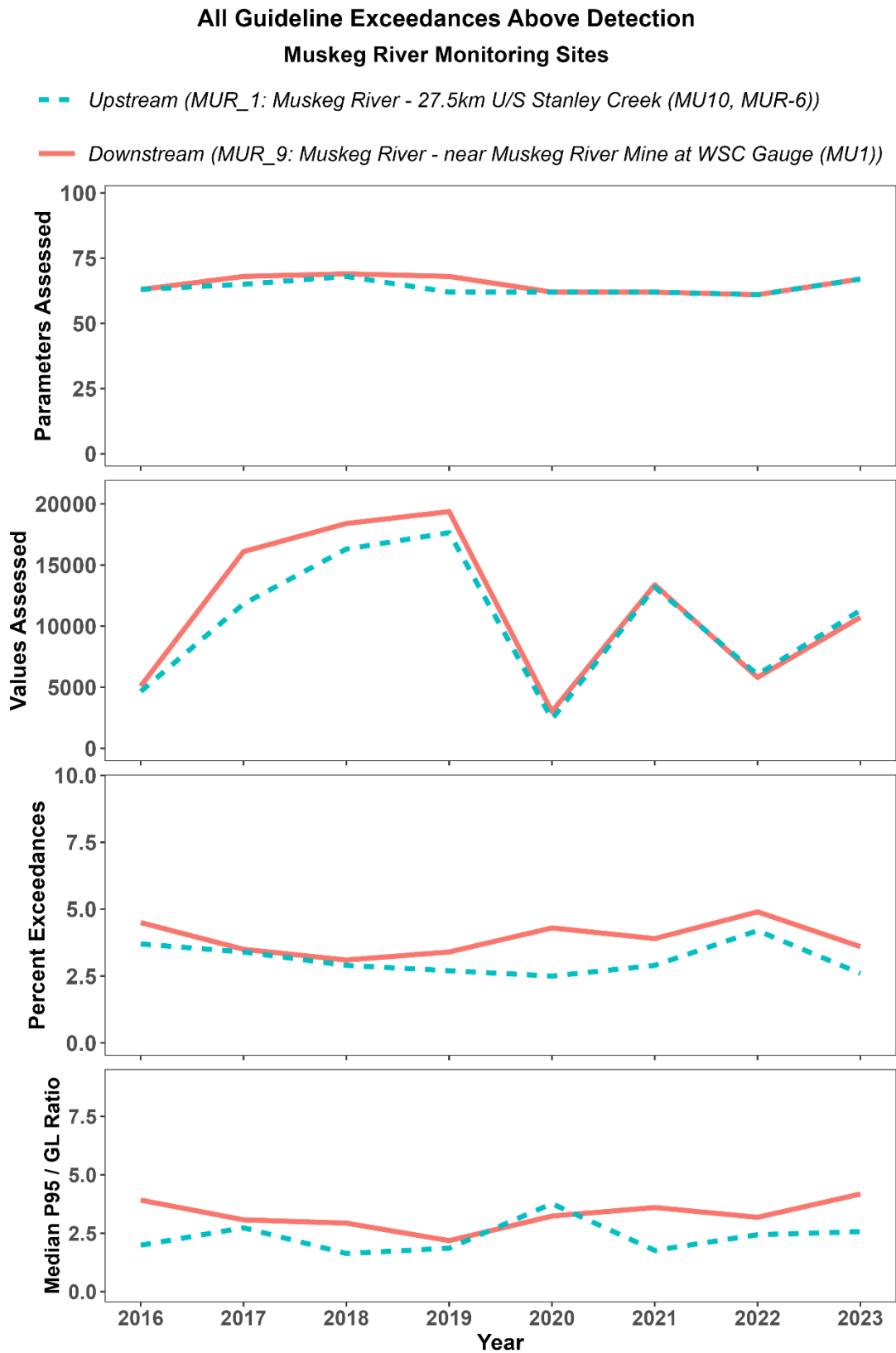


Figure I305: Comparison between exceedances at upstream and downstream sites on the Muskeg River when considering all guidelines.

### 3.2.5 Ells River

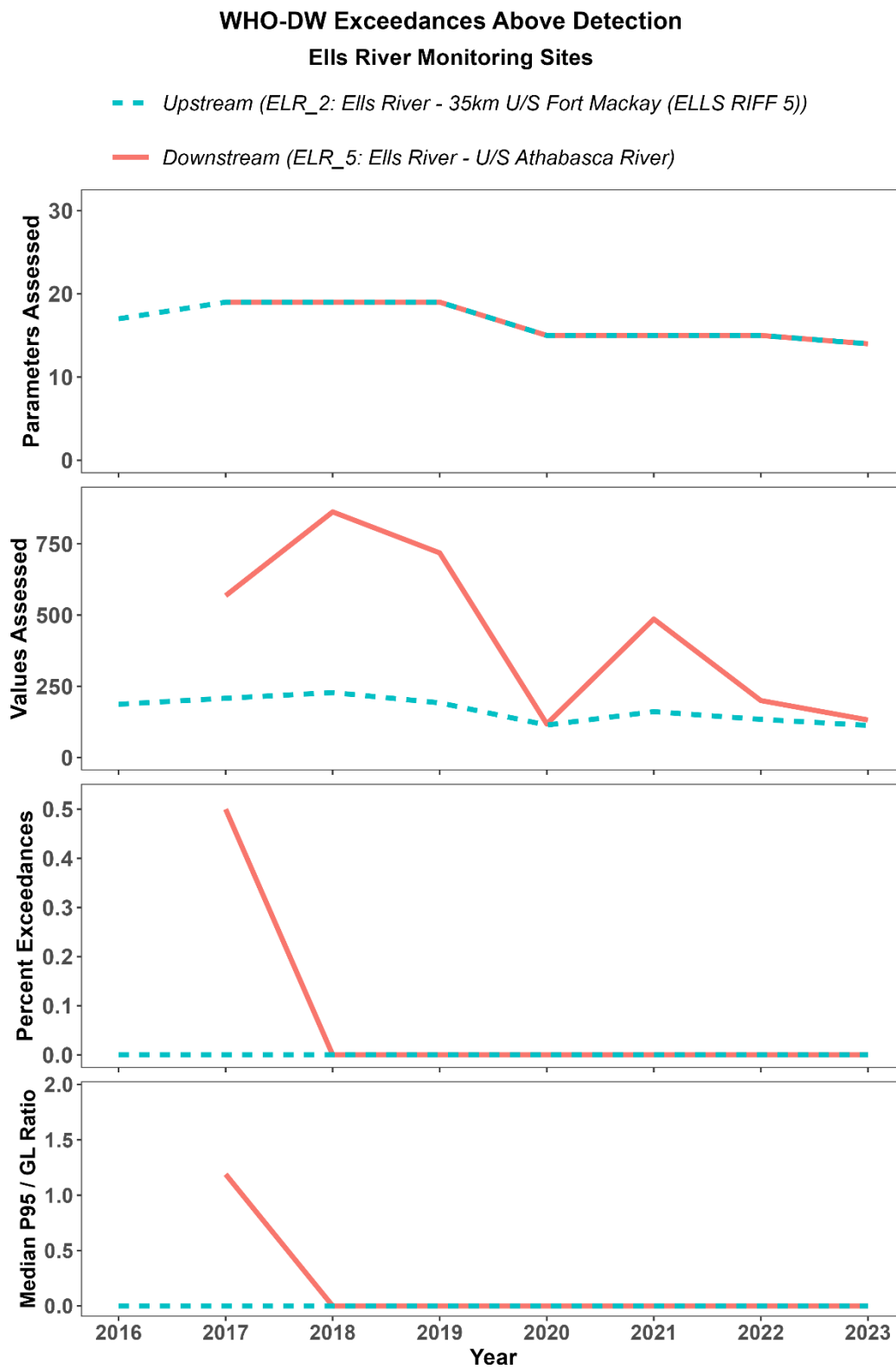


Figure I306: Comparison between exceedances at upstream and downstream sites on the Ells River when considering WHO drinking water guidelines.

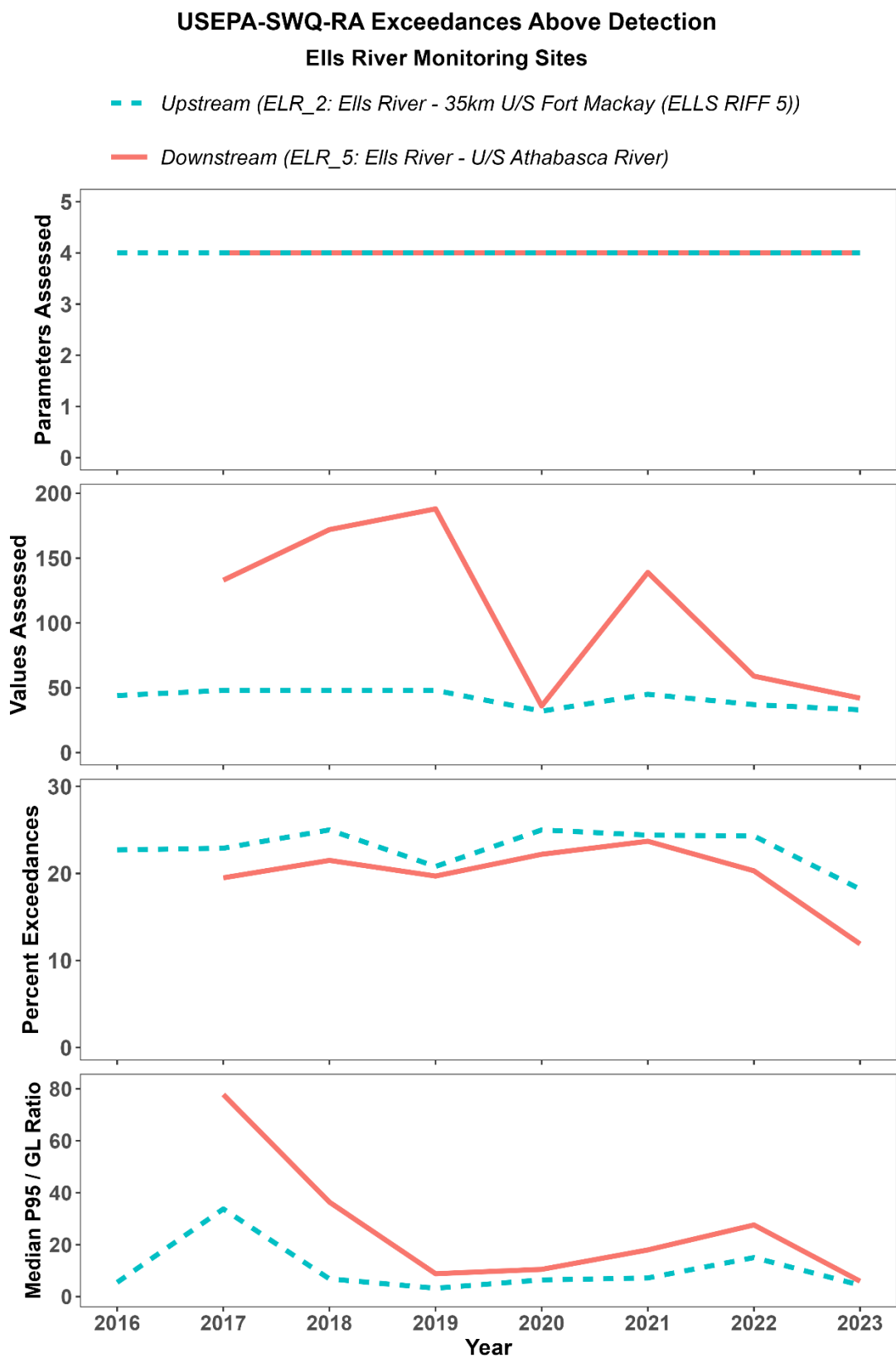


Figure I307: Comparison between exceedances at upstream and downstream sites on the Ells River when considering USEPA recreational aesthetics guidelines.

# **USEPA-SWQ-PAL-CHRONIC Exceedances Above Detection** **Ells River Monitoring Sites**

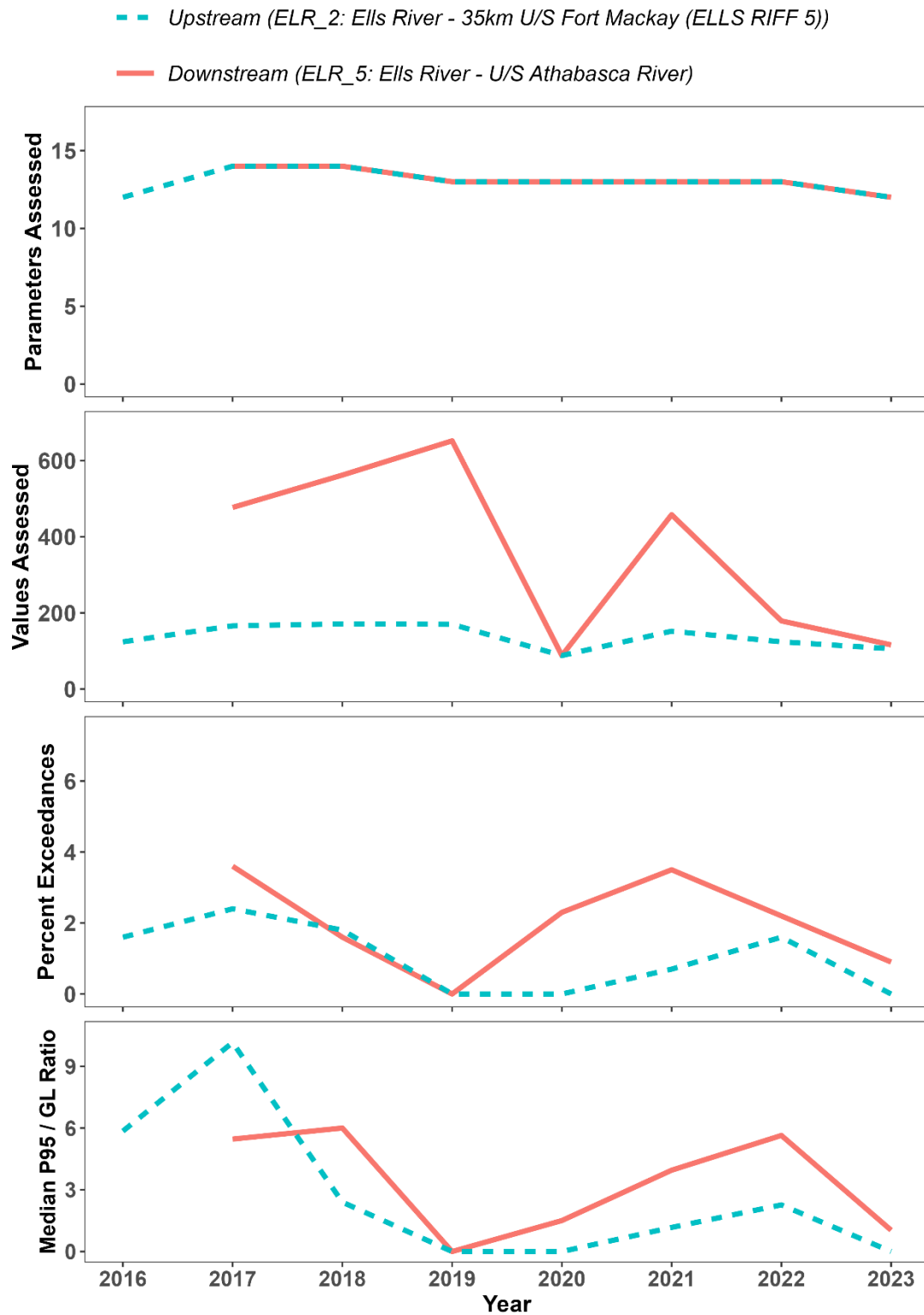


Figure I308: Comparison between exceedances at upstream and downstream sites on the Ells River when considering USEPA protection of aquatic life chronic guidelines.

### USEPA-SWQ-PAL-ACUTE Exceedances Above Detection Ells River Monitoring Sites

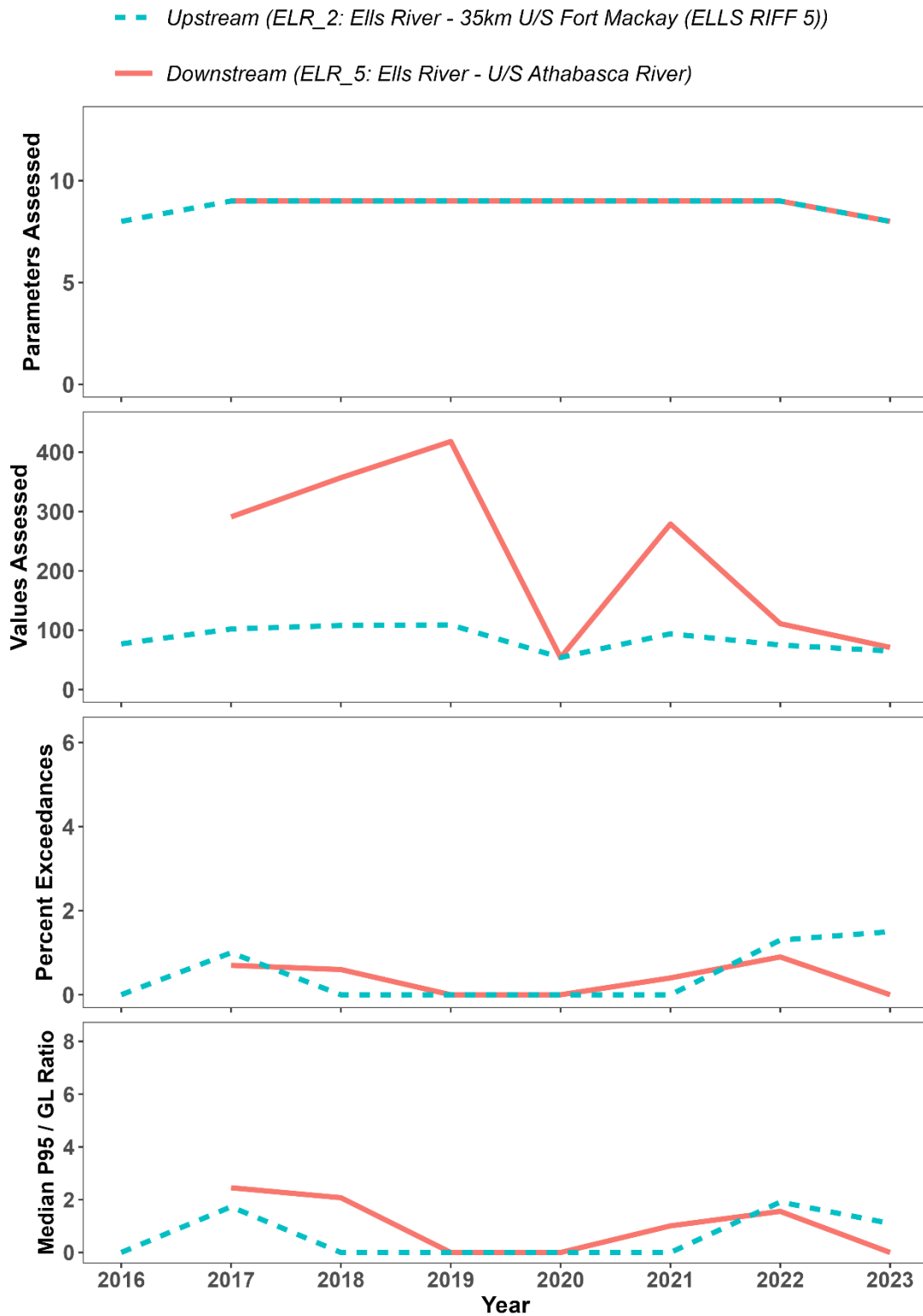


Figure I309: Comparison between exceedances at upstream and downstream sites on the Ells River when considering USEPA protection of aquatic life acute guidelines.

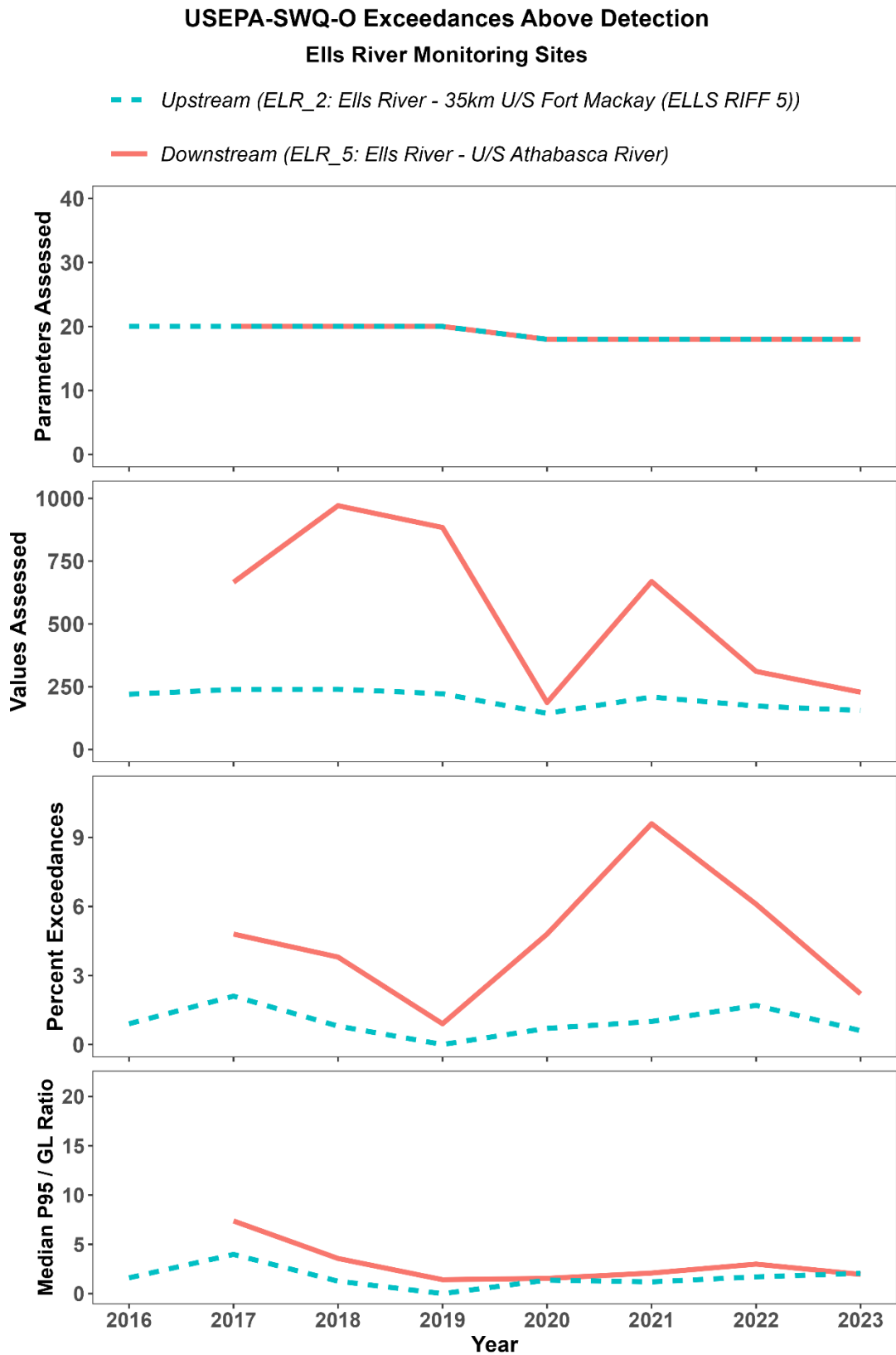


Figure I310: Comparison between exceedances at upstream and downstream sites on the Ells River when considering USEPA protection of human health from consumption of aquatic organisms guidelines.

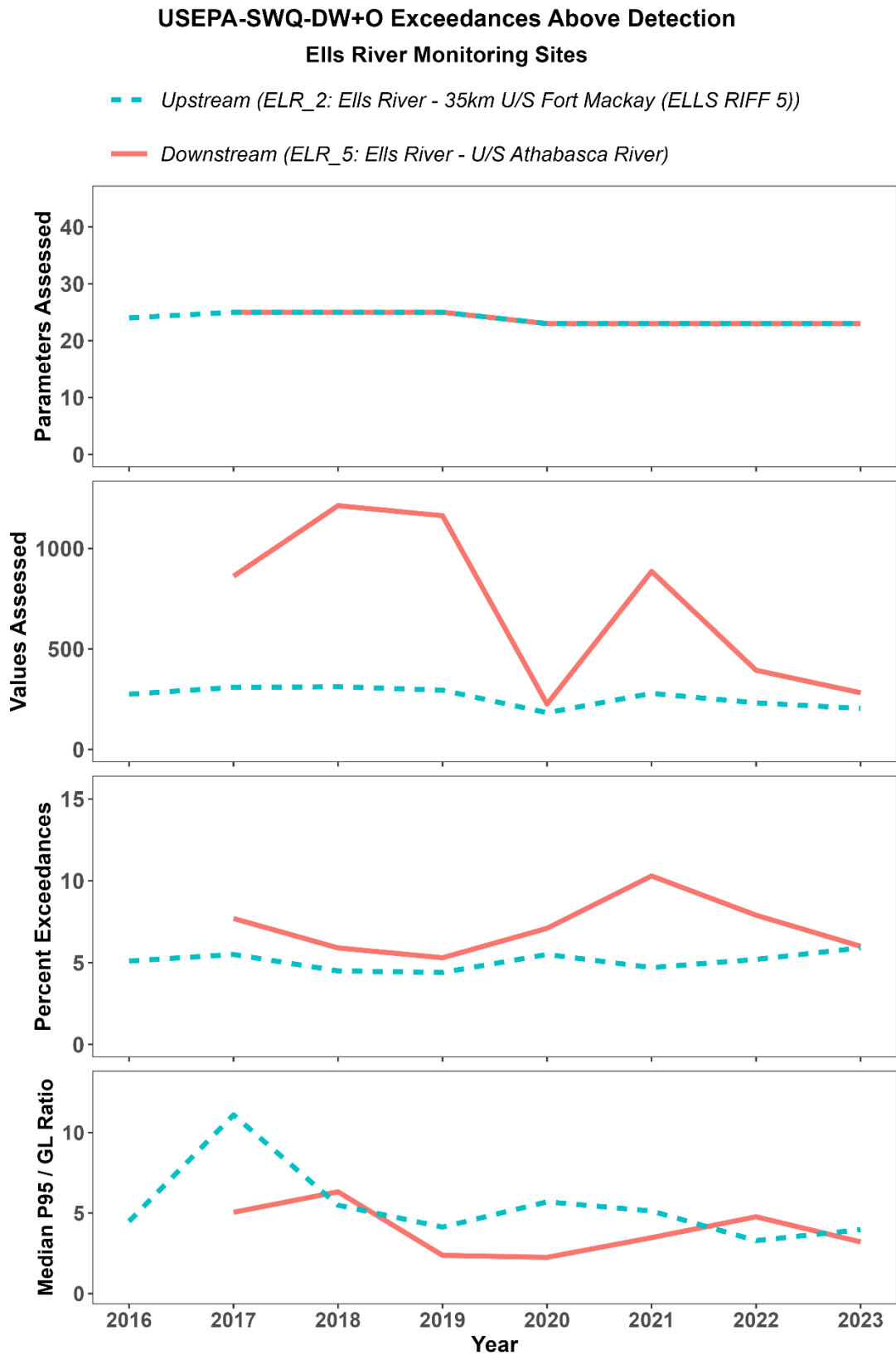


Figure I311: Comparison between exceedances at upstream and downstream sites on the Ells River when considering USEPA protection of human health from consumption of surface water and aquatic organisms guidelines.



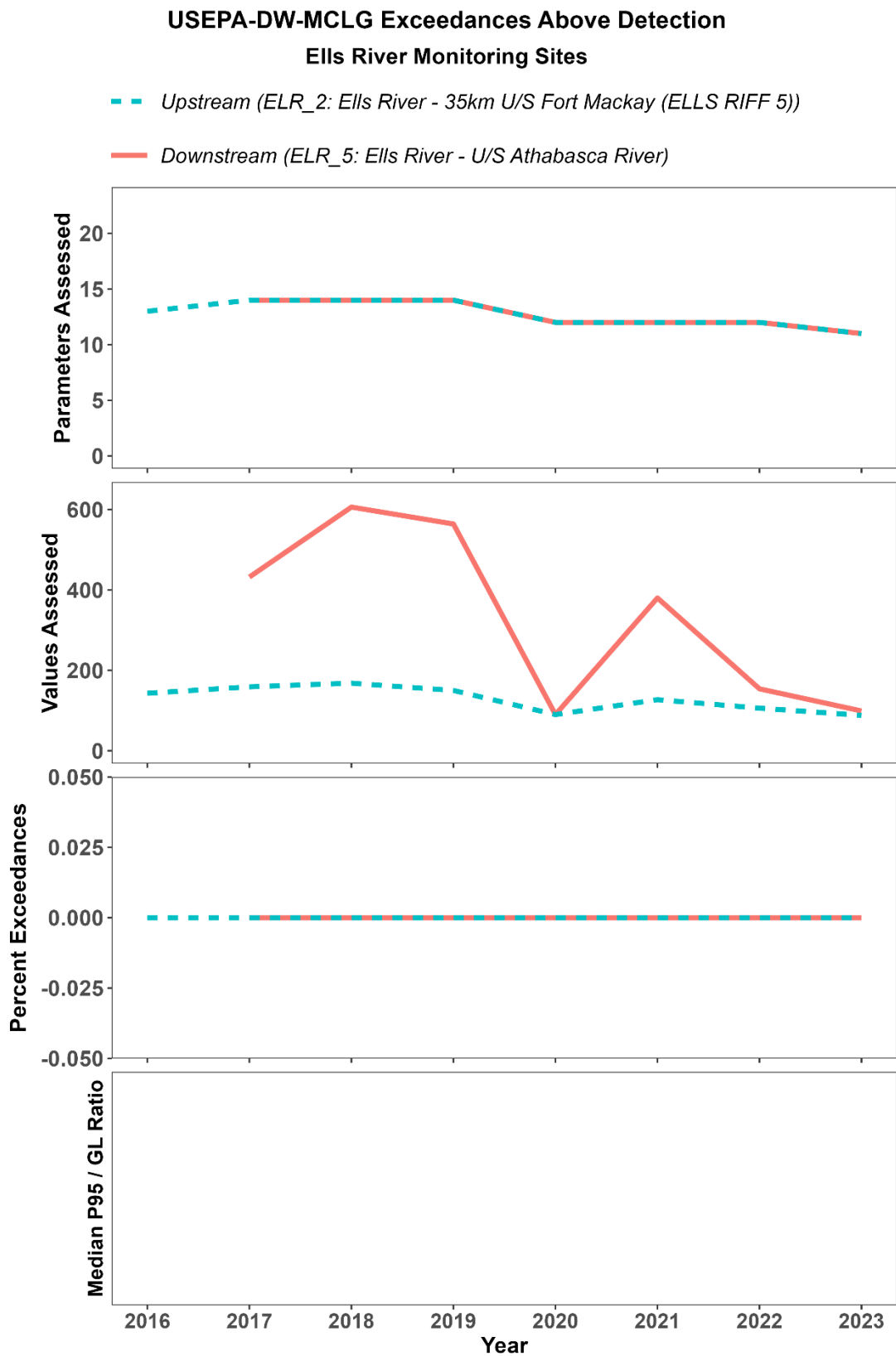


Figure I312: Comparison between exceedances at upstream and downstream sites on the Ells River when considering USEPA drinking water quality goals.

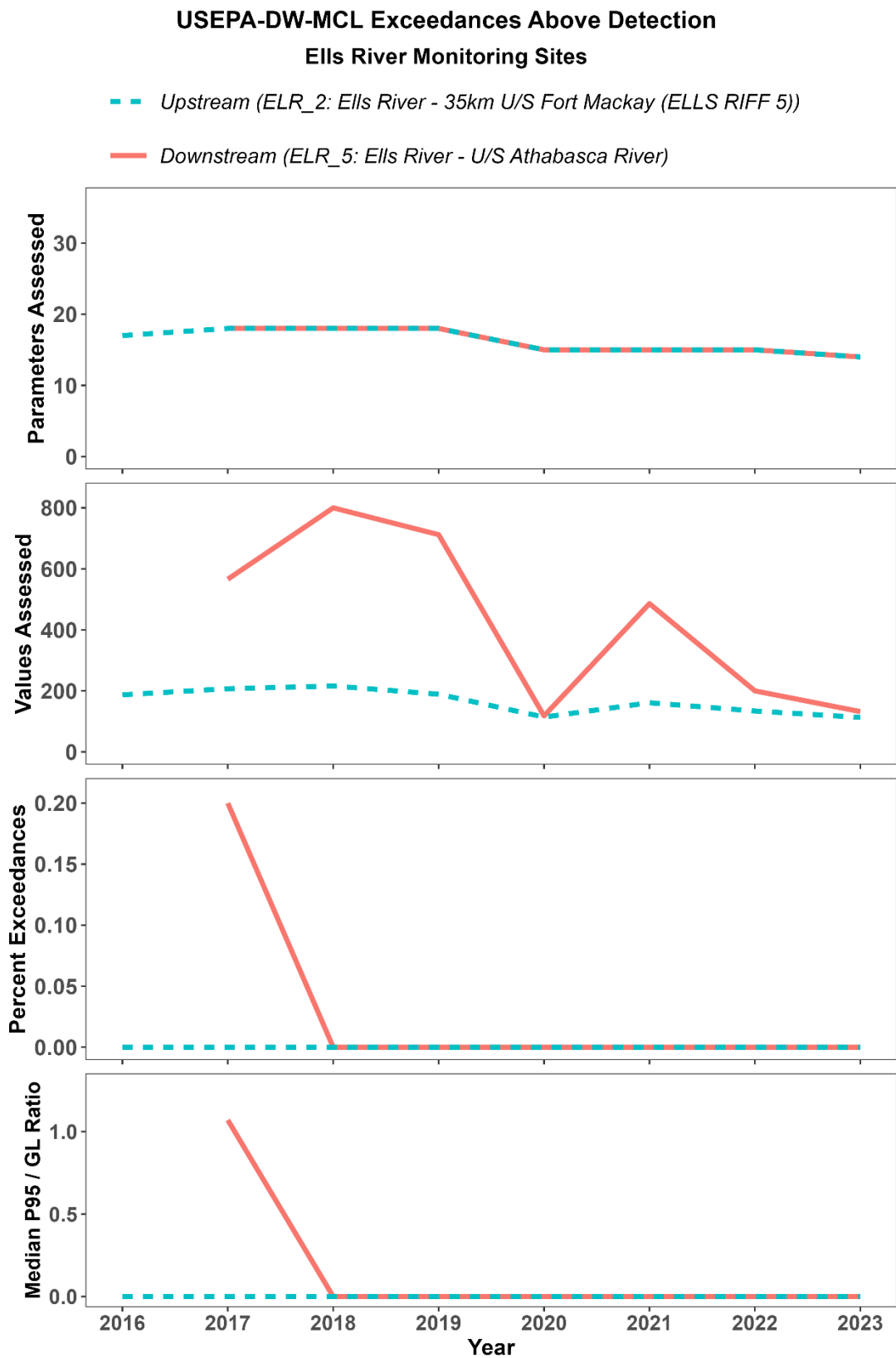


Figure I313: Comparison between exceedances at upstream and downstream sites on the Ells River when considering USEPA drinking water quality limits.

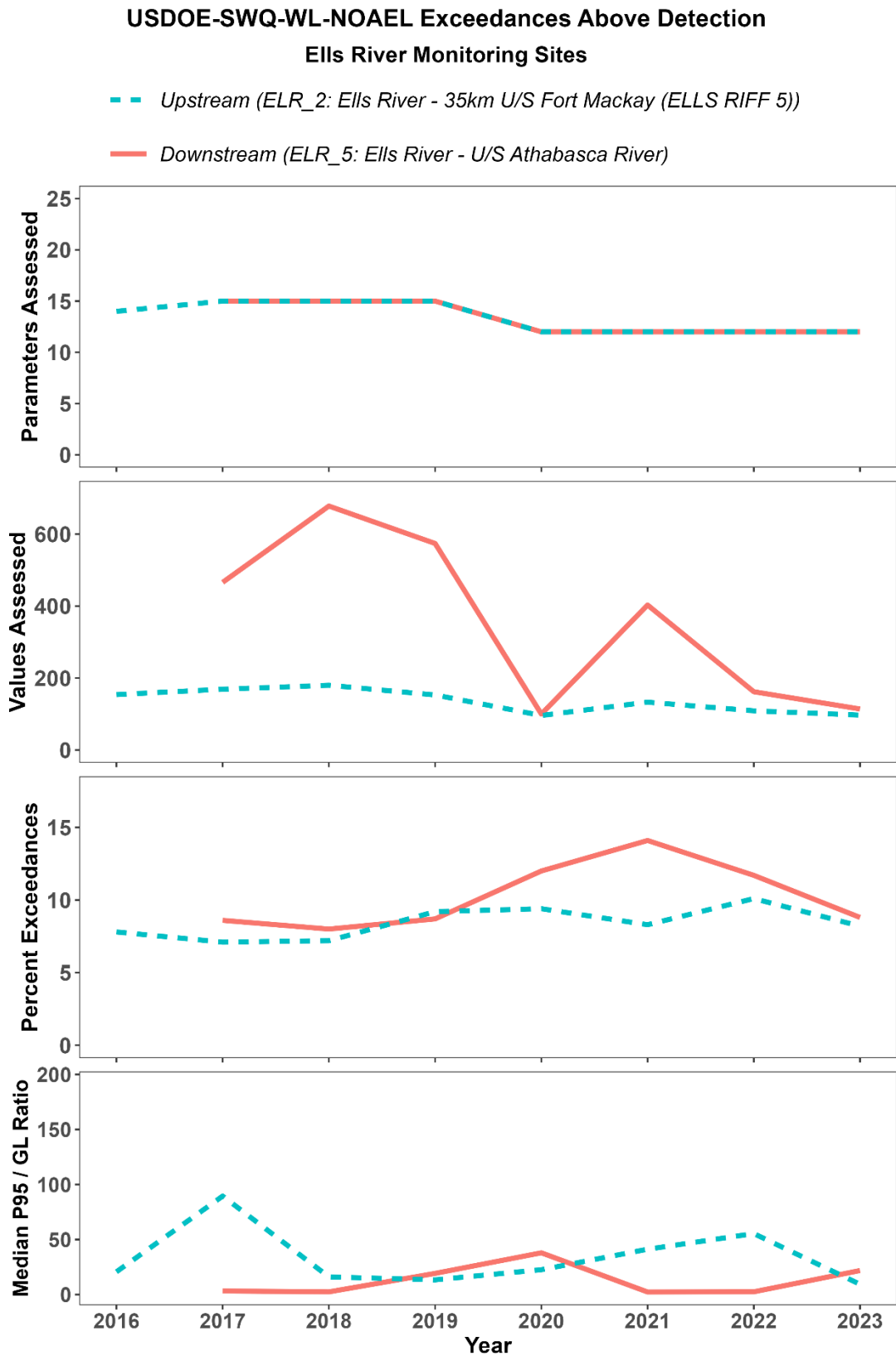


Figure I314: Comparison between exceedances at upstream and downstream sites on the Ells River when considering USEPA protection of piscivores NOAEL guidelines.

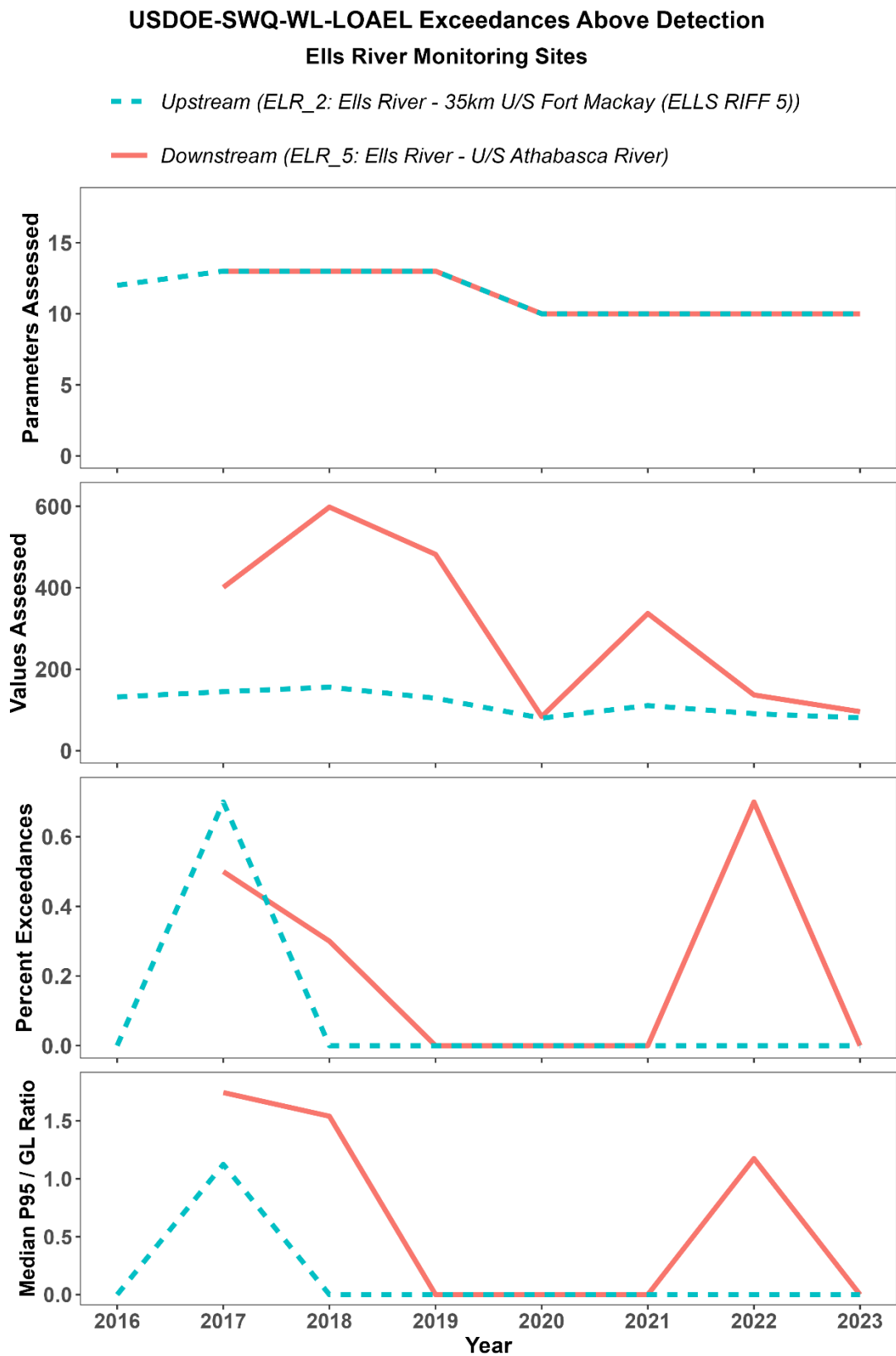


Figure I315: Comparison between exceedances at upstream and downstream sites on the Ells River when considering USEPA protection of piscivores LOAEL guidelines.

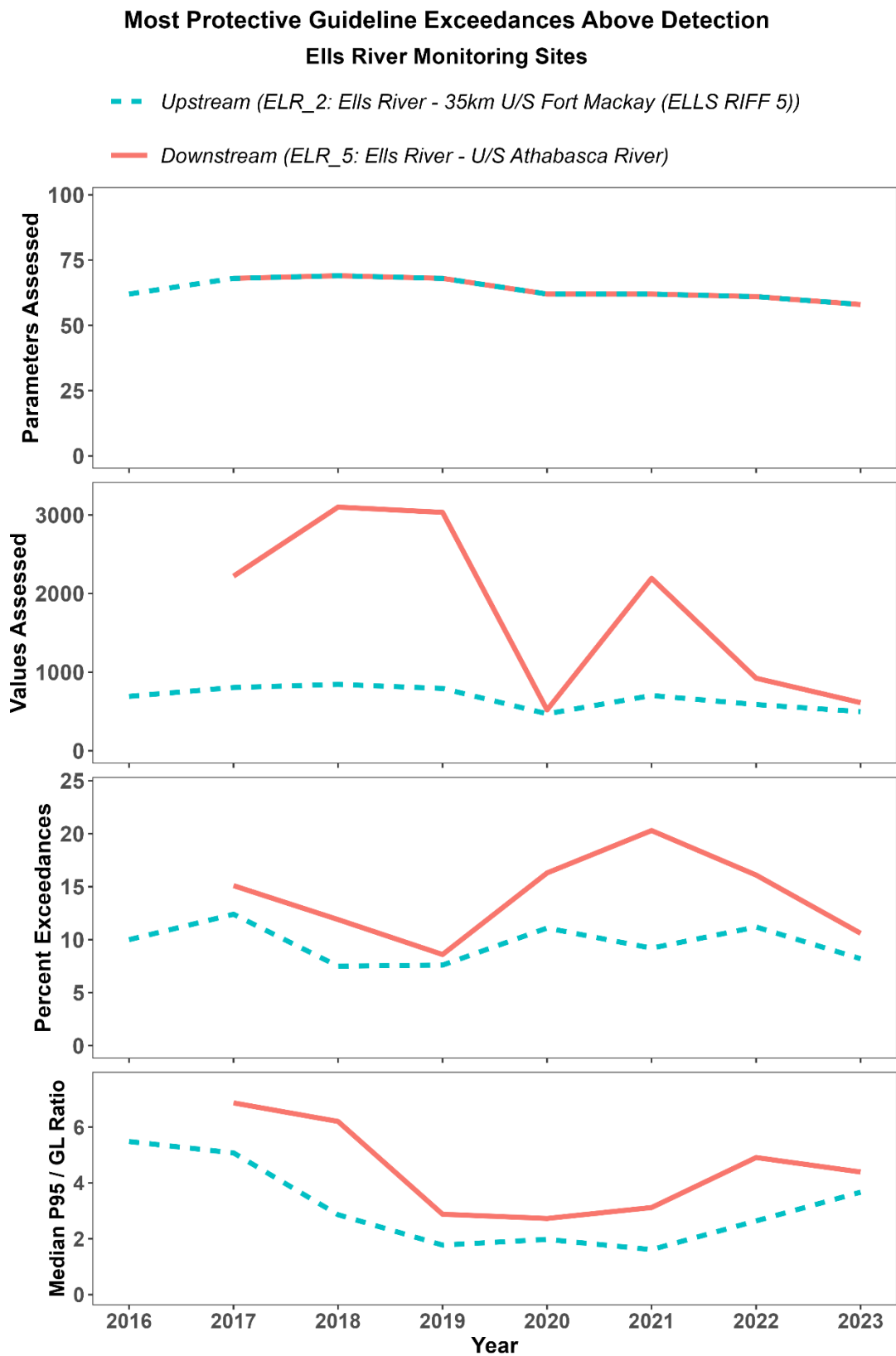


Figure I316: Comparison between exceedances at upstream and downstream sites on the Ells River when considering the most protective guidelines.

### Most Protective EPA Guideline Exceedances Above Detection Ells River Monitoring Sites

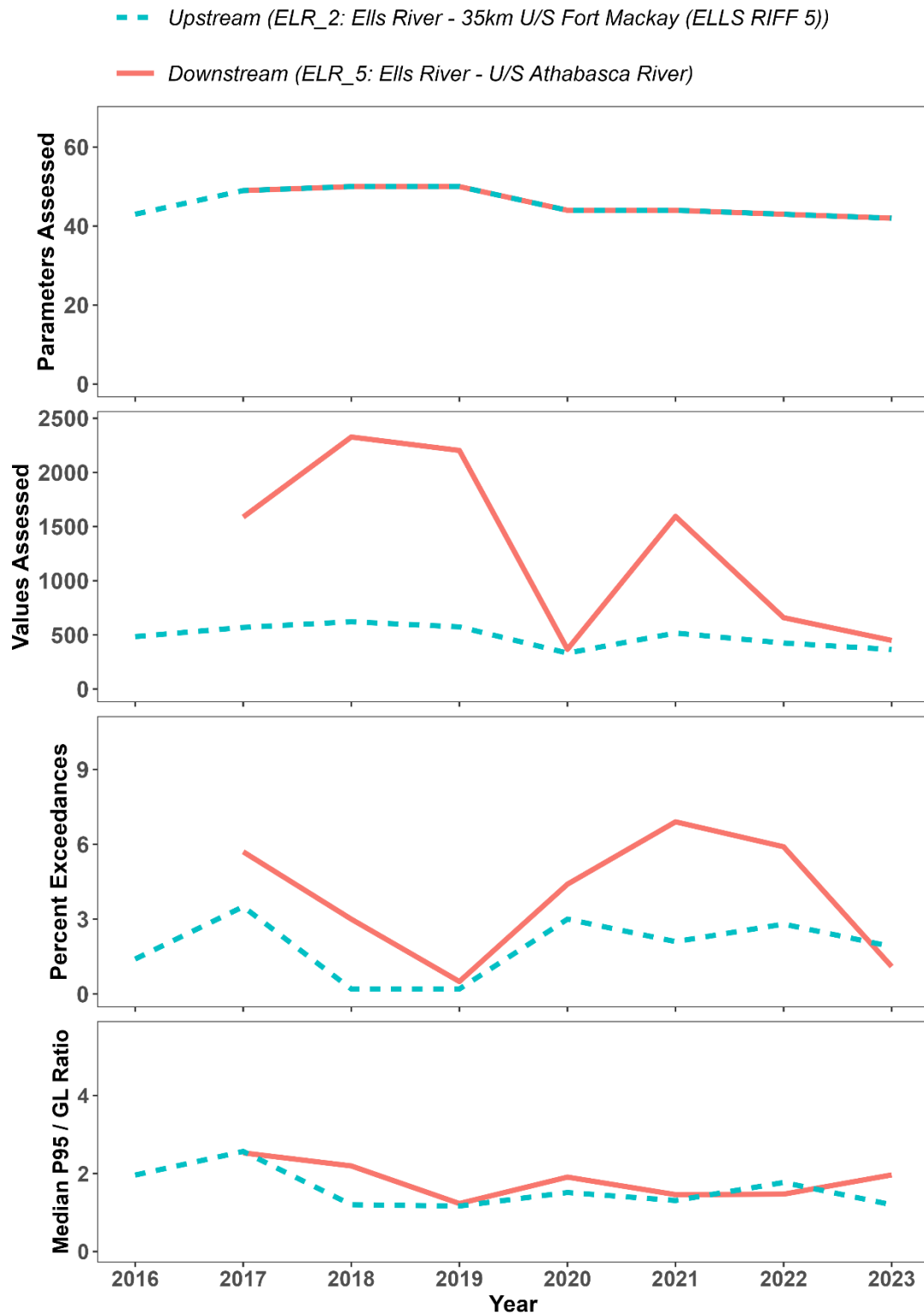


Figure I317: Comparison between exceedances at upstream and downstream sites on the Ells River when considering the most protective EPA guidelines.

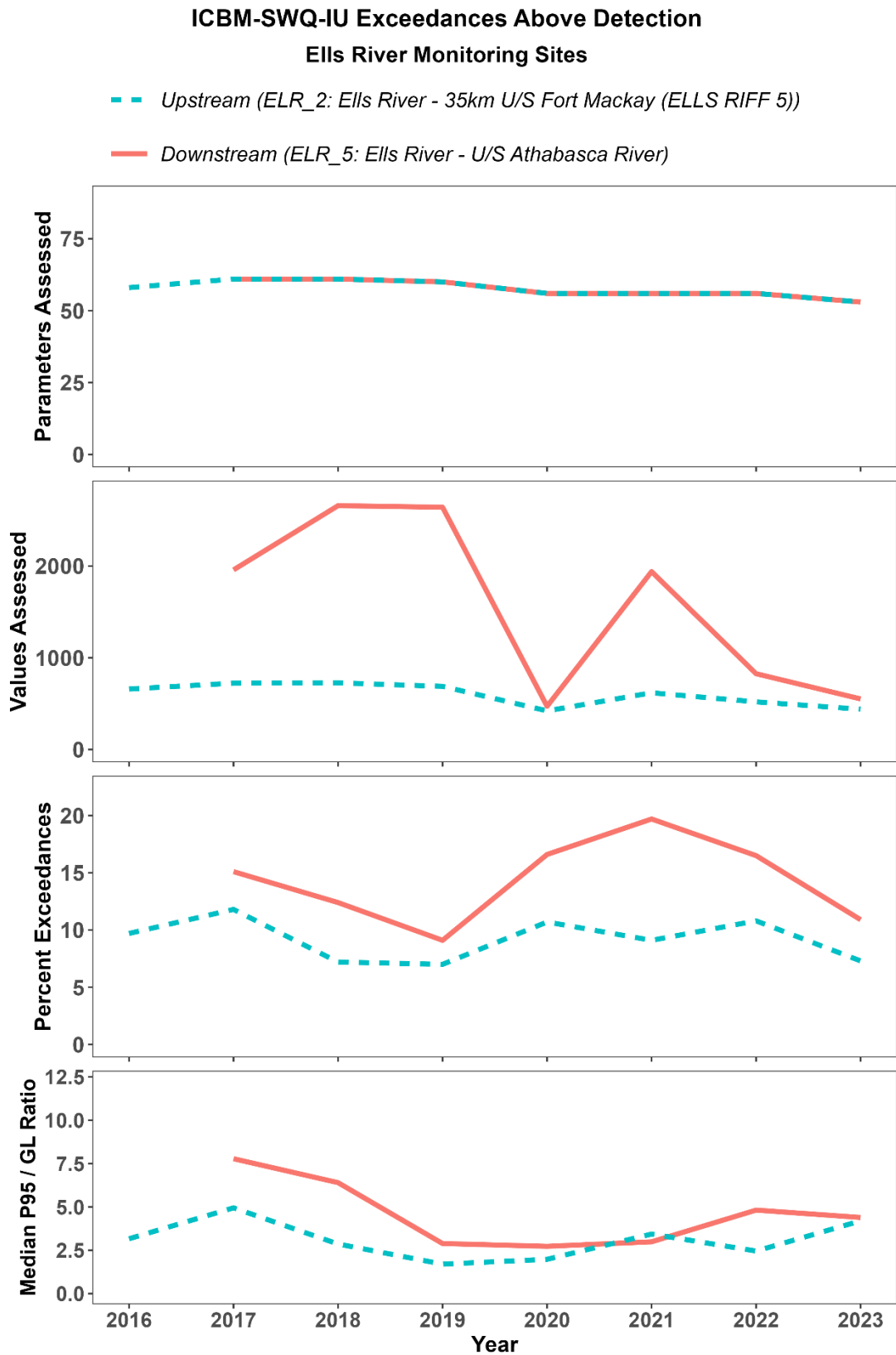


Figure I318: Comparison between exceedances at upstream and downstream sites on the Ells River when considering guidelines protective of indigenous use.

### ICBM-SWQ-IU(DW+O-Derived) Exceedances Above Detection Ells River Monitoring Sites

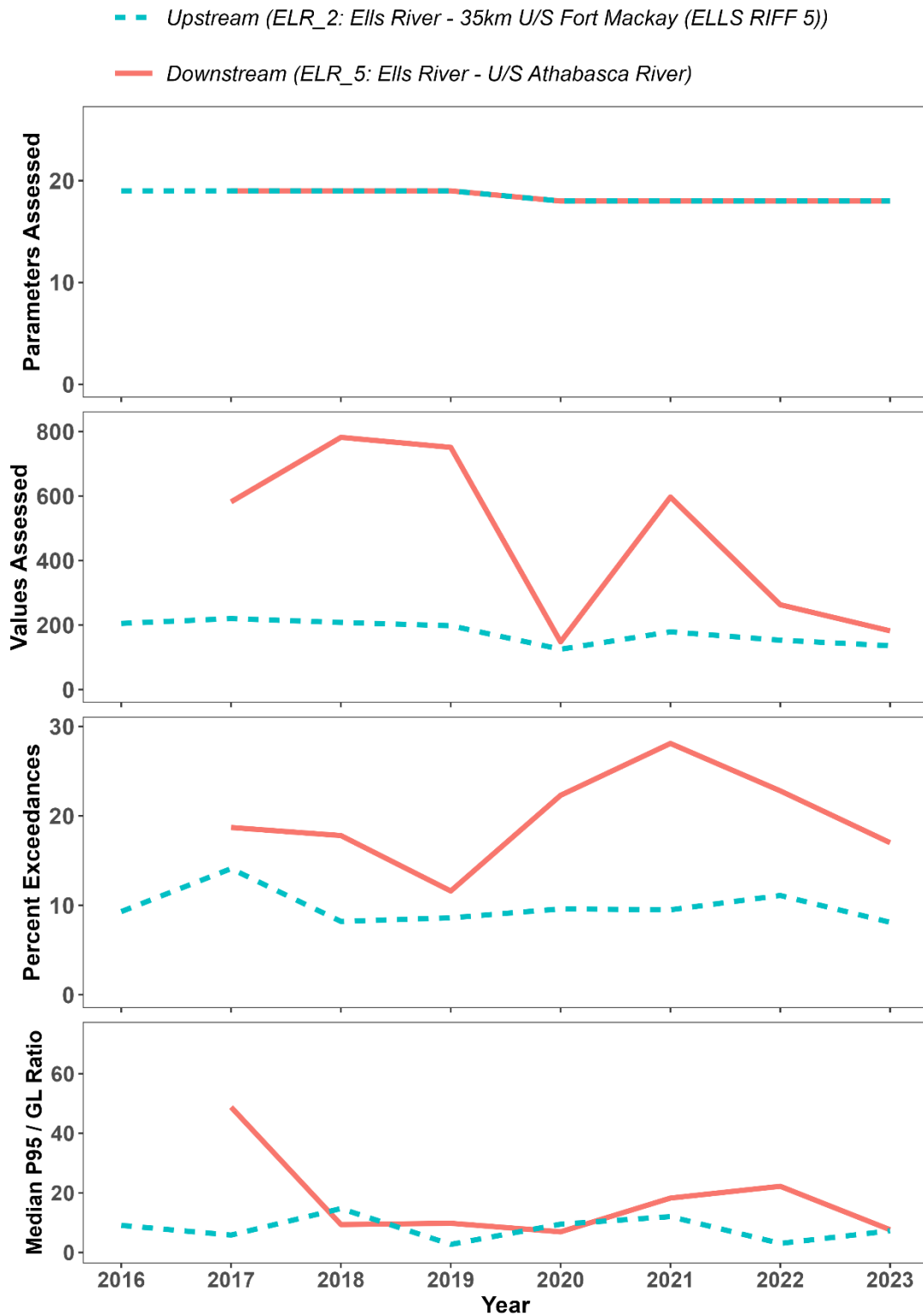


Figure I319: Comparison between exceedances at upstream and downstream sites on the Ells River when considering guidelines protective of indigenous use from consumption of surface water and aquatic organisms.



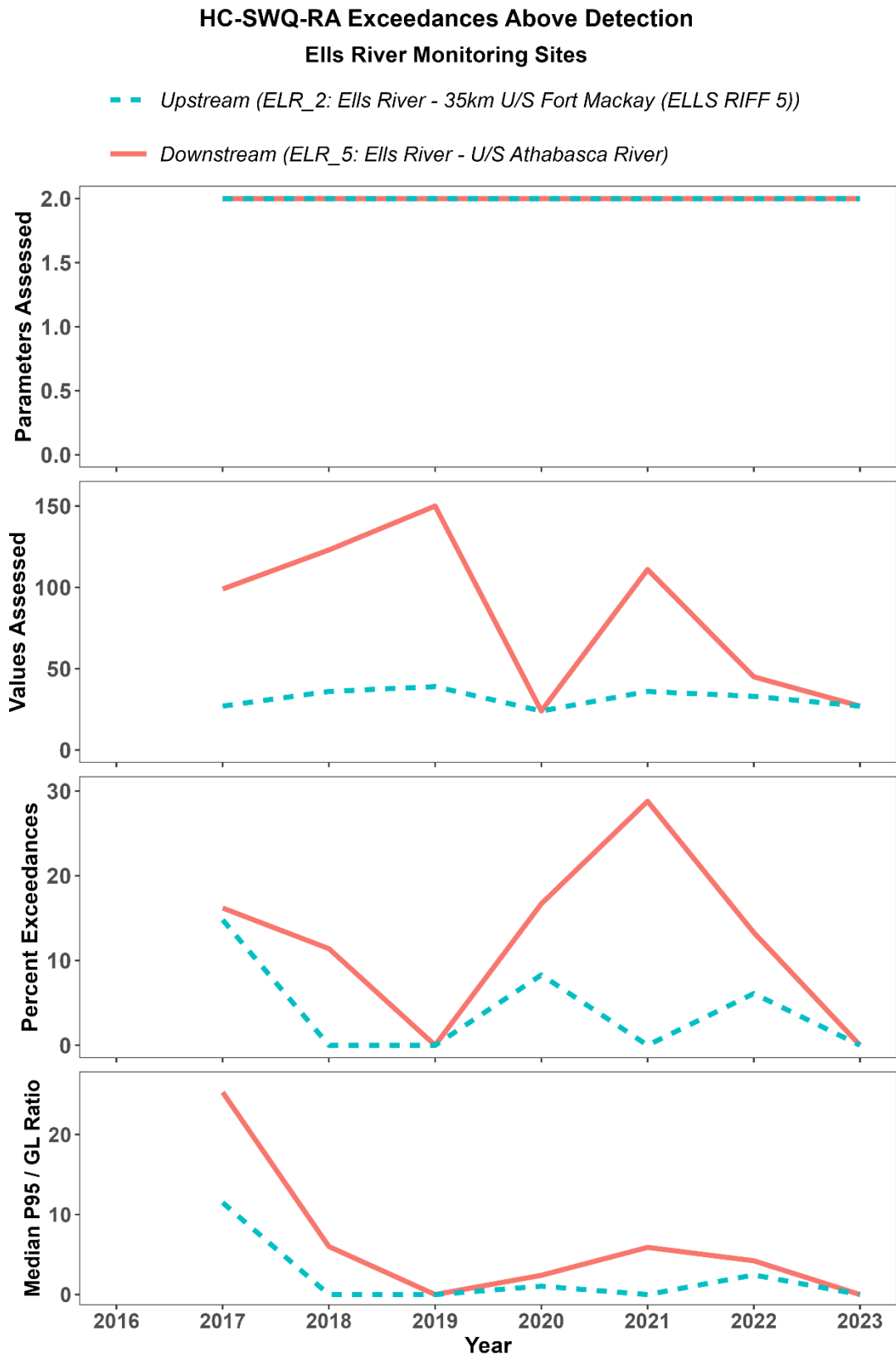


Figure I320: Comparison between exceedances at upstream and downstream sites on the Ells River when considering Health Canada recreation aesthetics guidelines.

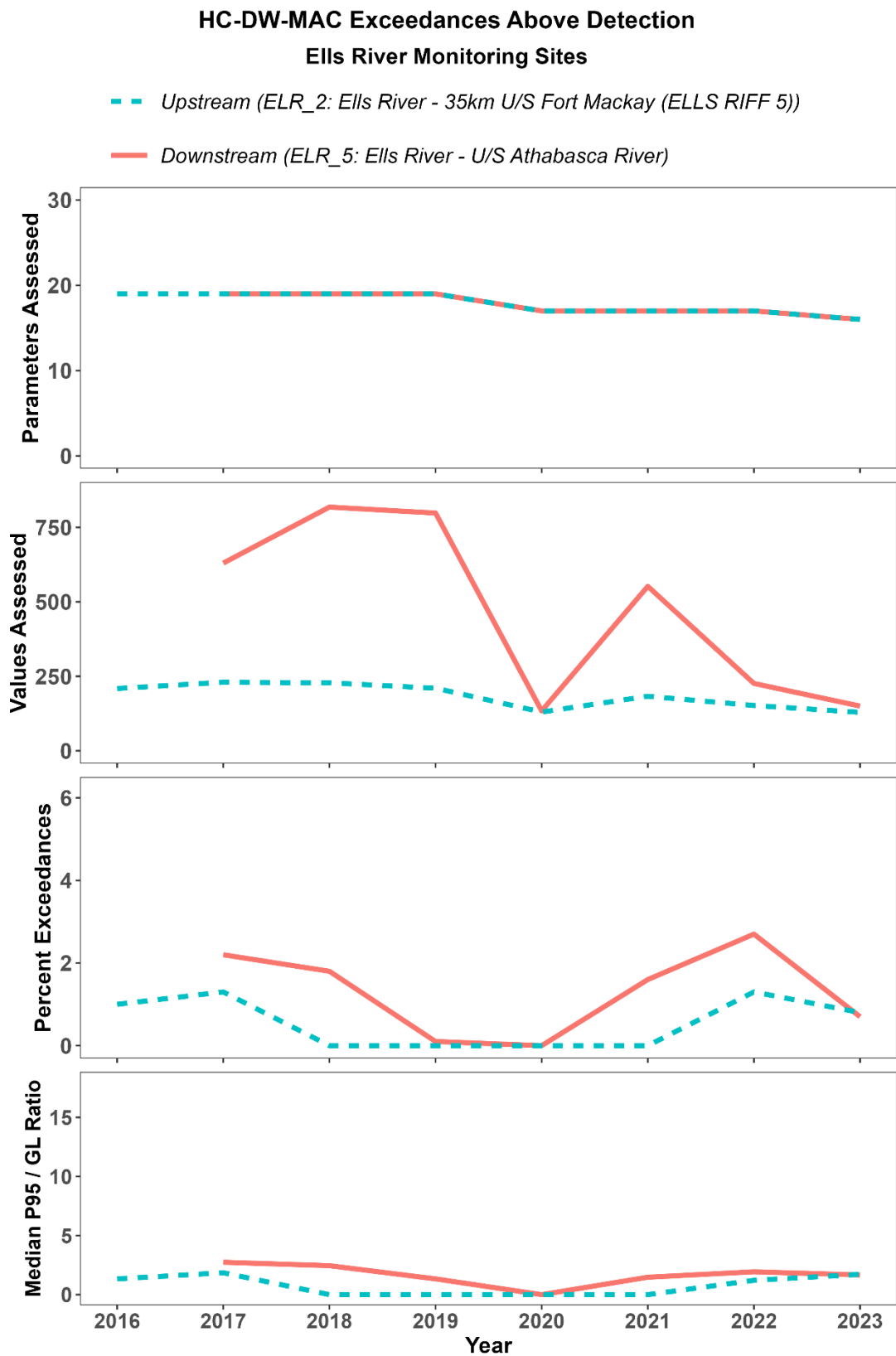


Figure I321: Comparison between exceedances at upstream and downstream sites on the Ells River when considering Health Canada drinking water maximum acceptable concentration guidelines.

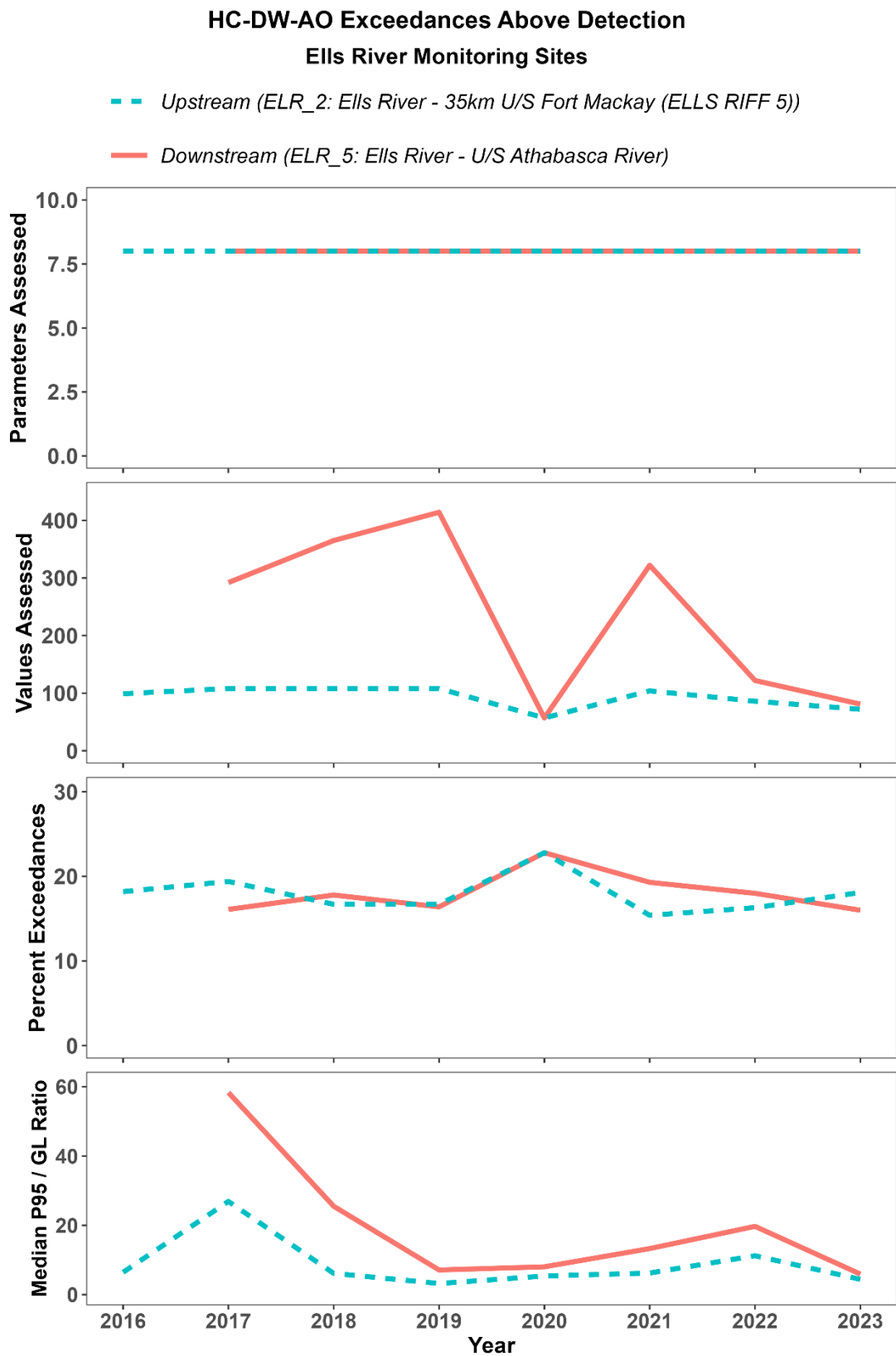


Figure I322: Comparison between exceedances at upstream and downstream sites on the Ells River when considering Health Canada drinking water aesthetics objectives.

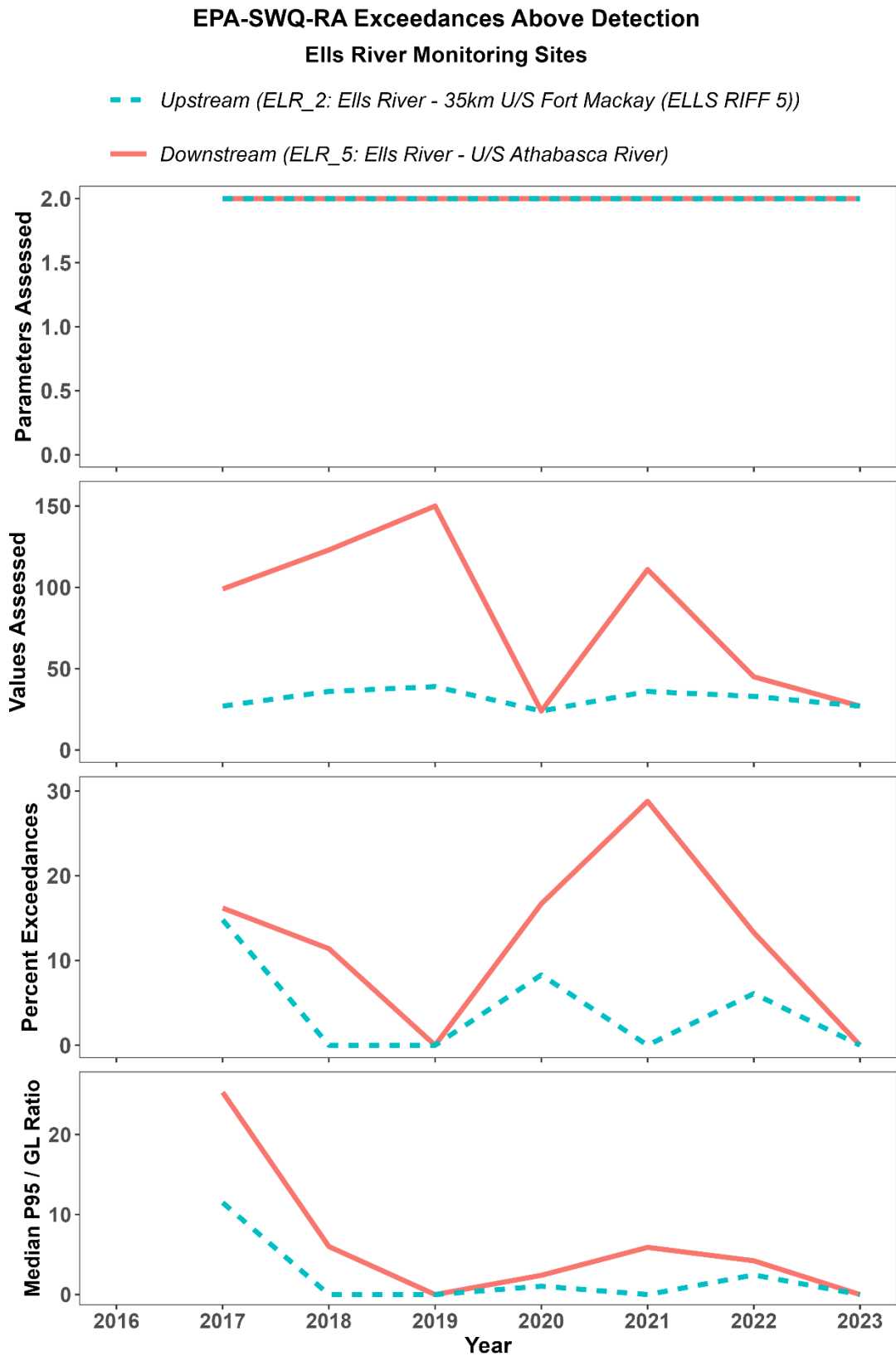


Figure I323: Comparison between exceedances at upstream and downstream sites on the Ells River when considering Alberta EPA recreation aesthetics guidelines.

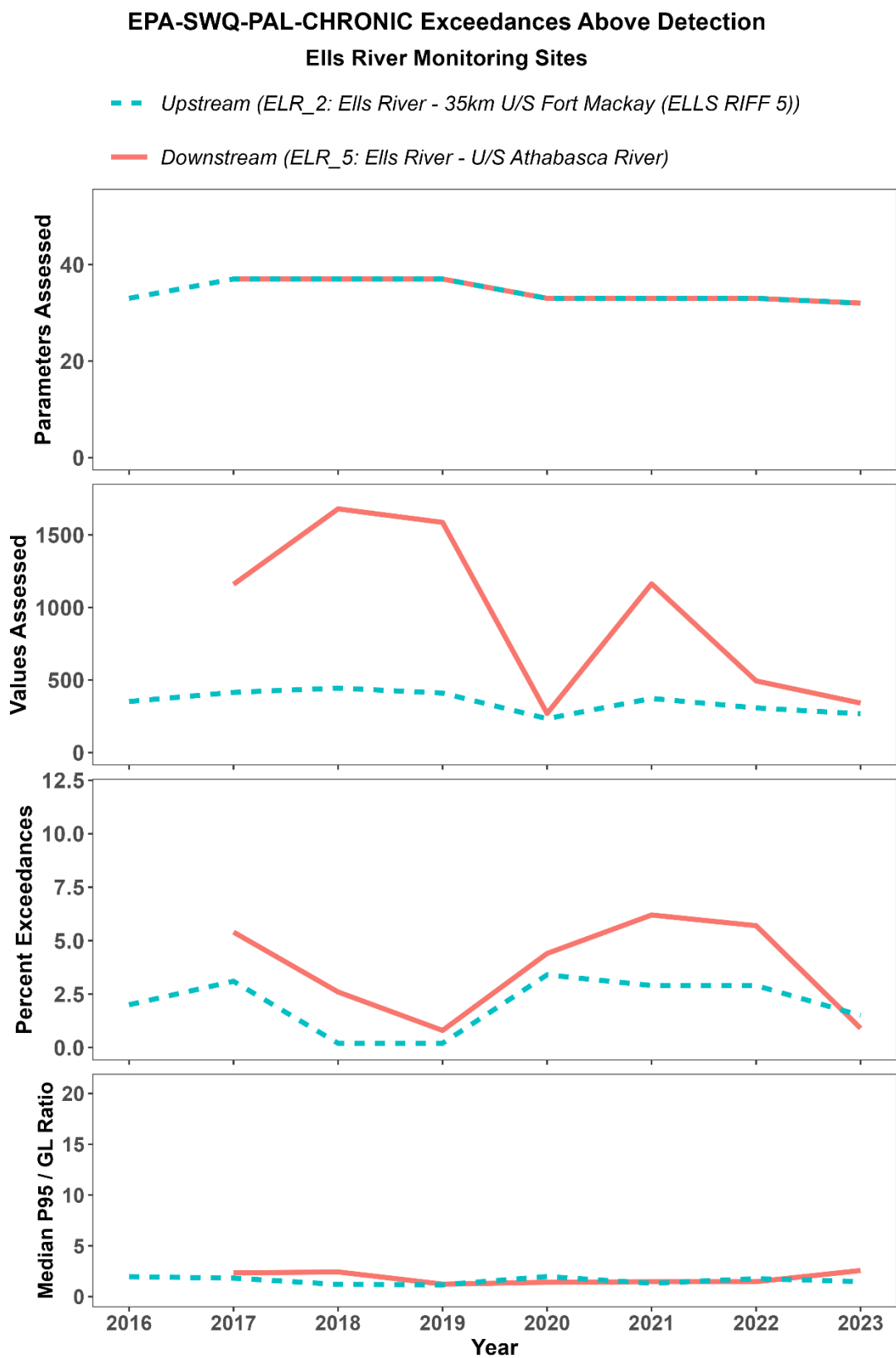


Figure I324: Comparison between exceedances at upstream and downstream sites on the Ells River when considering Alberta EPA protection of aquatic life chronic guidelines.

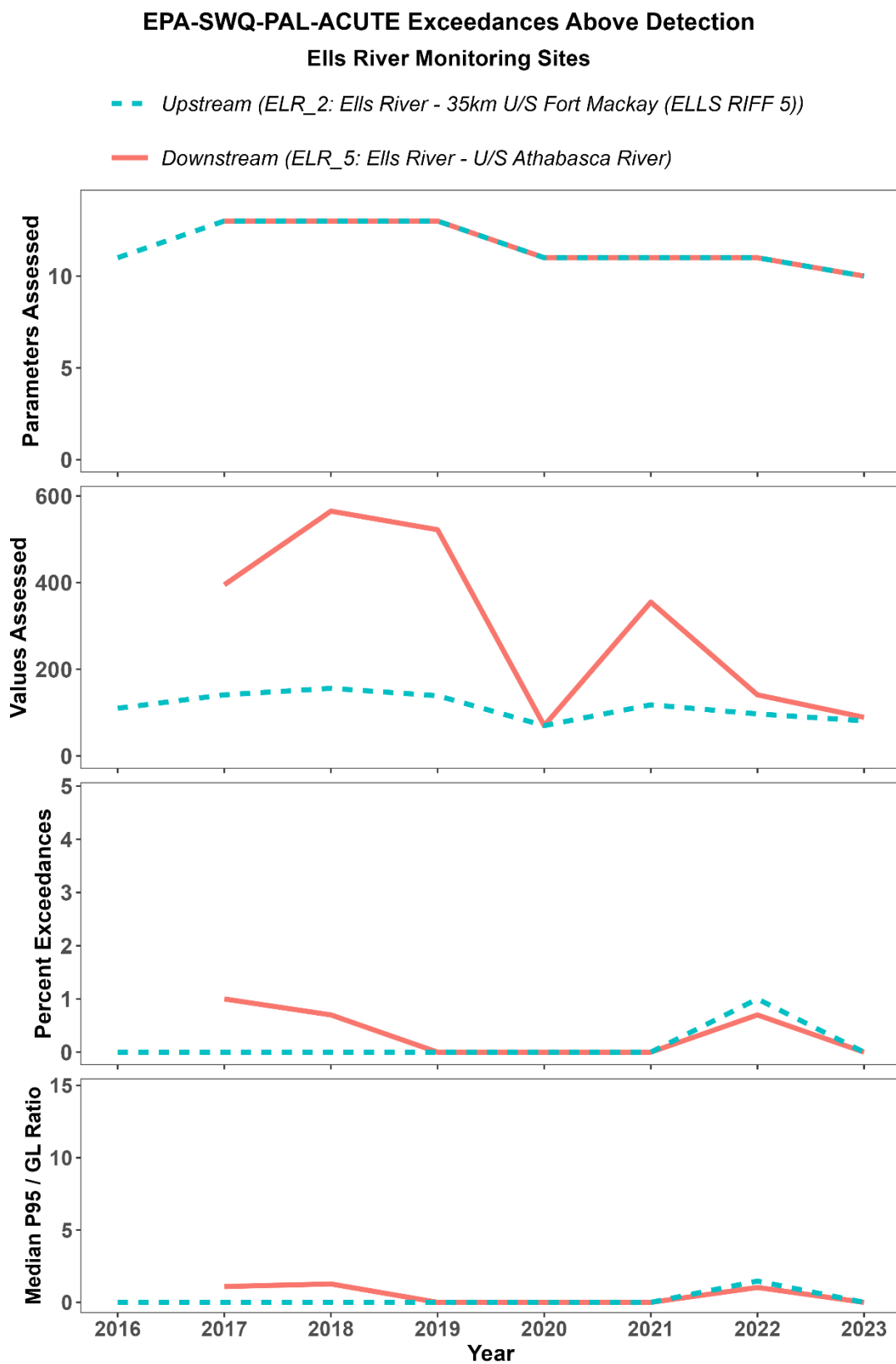


Figure I325: Comparison between exceedances at upstream and downstream sites on the Ells River when considering Alberta EPA protection of aquatic life acute guidelines.

### EPA-SWQ-LIVESTOCK Exceedances Above Detection Ells River Monitoring Sites

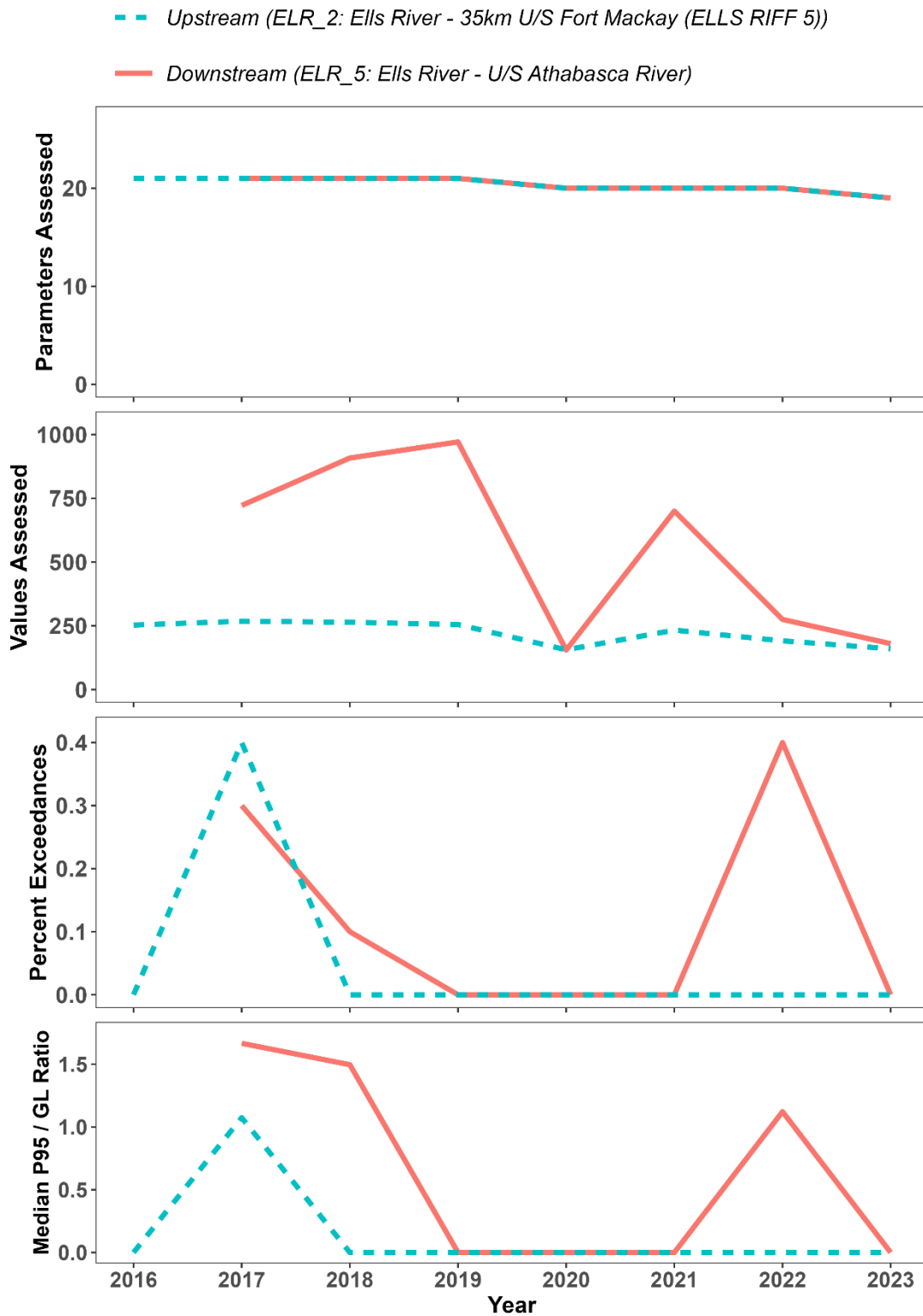


Figure I326: Comparison between exceedances at upstream and downstream sites on the Ells River when considering Alberta EPA protection of livestock watering guidelines.

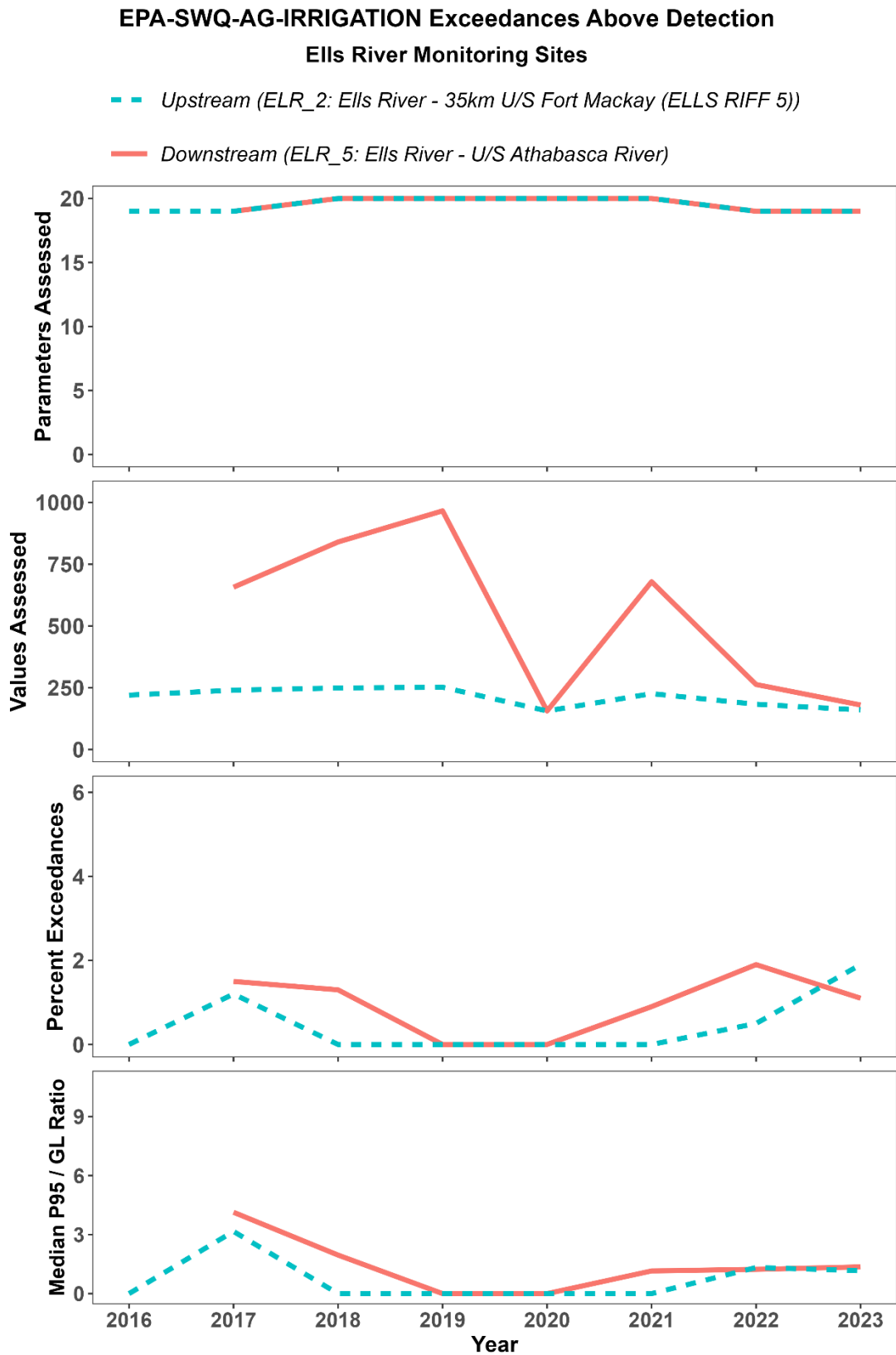


Figure I327: Comparison between exceedances at upstream and downstream sites on the Ells River when considering Alberta EPA protection of irrigation water guidelines.



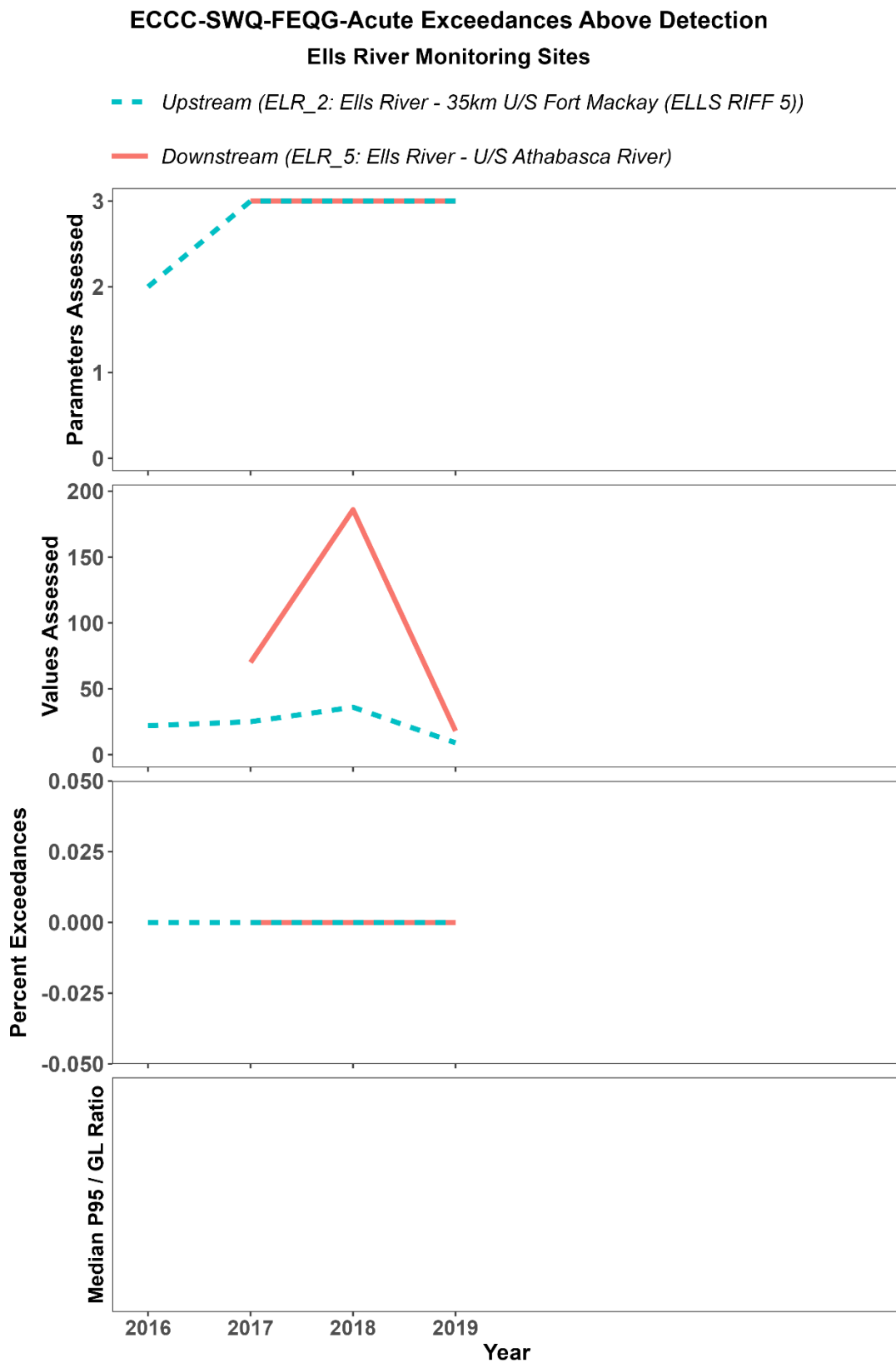


Figure I328: Comparison between exceedances at upstream and downstream sites on the Ells River when considering ECCC Federal Environmental Quality Guidelines protection of aquatic life acute guidelines.

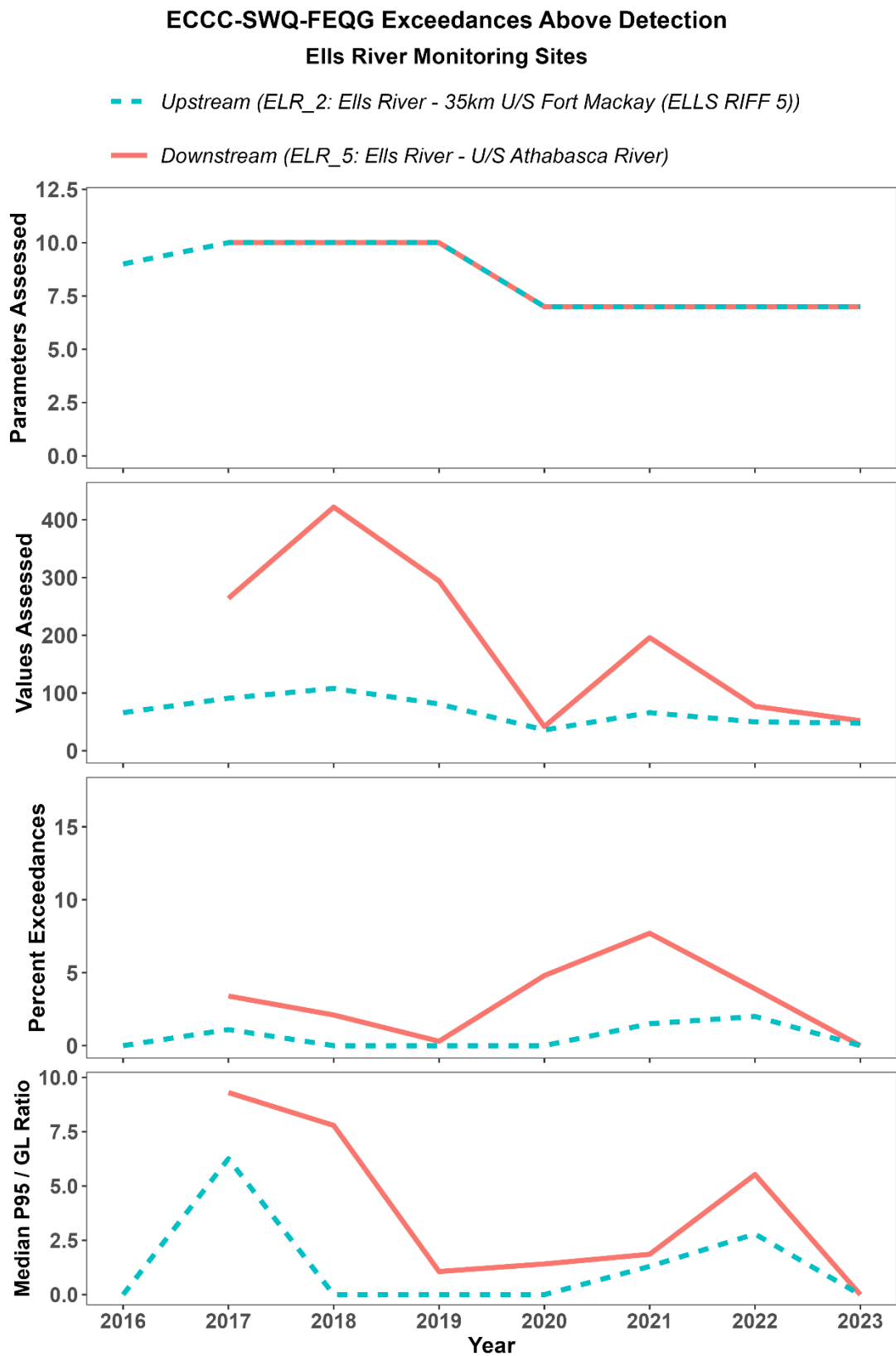


Figure I329: Comparison between exceedances at upstream and downstream sites on the Ells River when considering ECCC Federal Environmental Quality Guidelines protection of aquatic life chronic guidelines.

### CCME-SWQ-PAL-CHRONIC Exceedances Above Detection Ells River Monitoring Sites

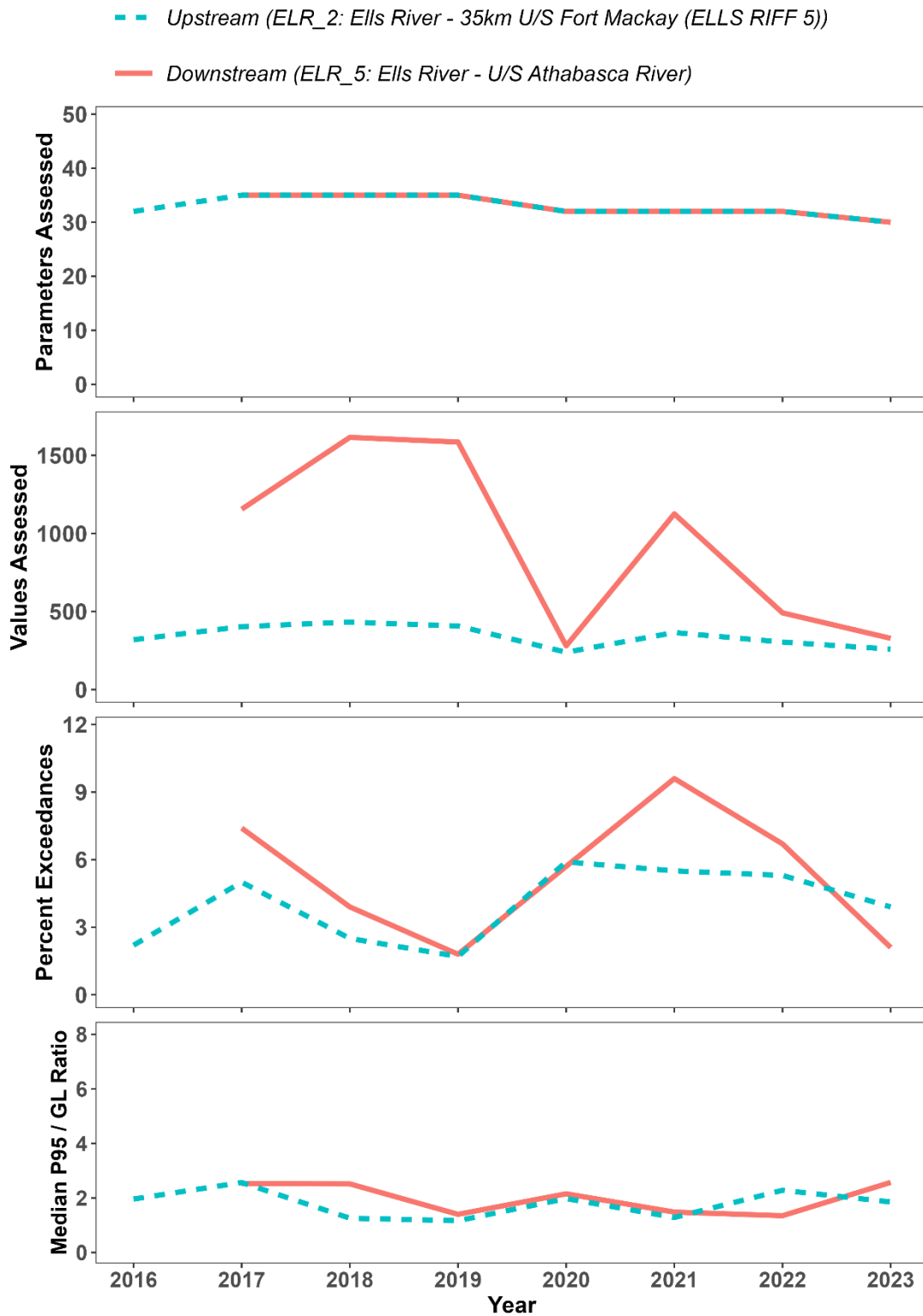


Figure I330: Comparison between exceedances at upstream and downstream sites on the Ells River when considering CCME protection of aquatic life chronic guidelines.

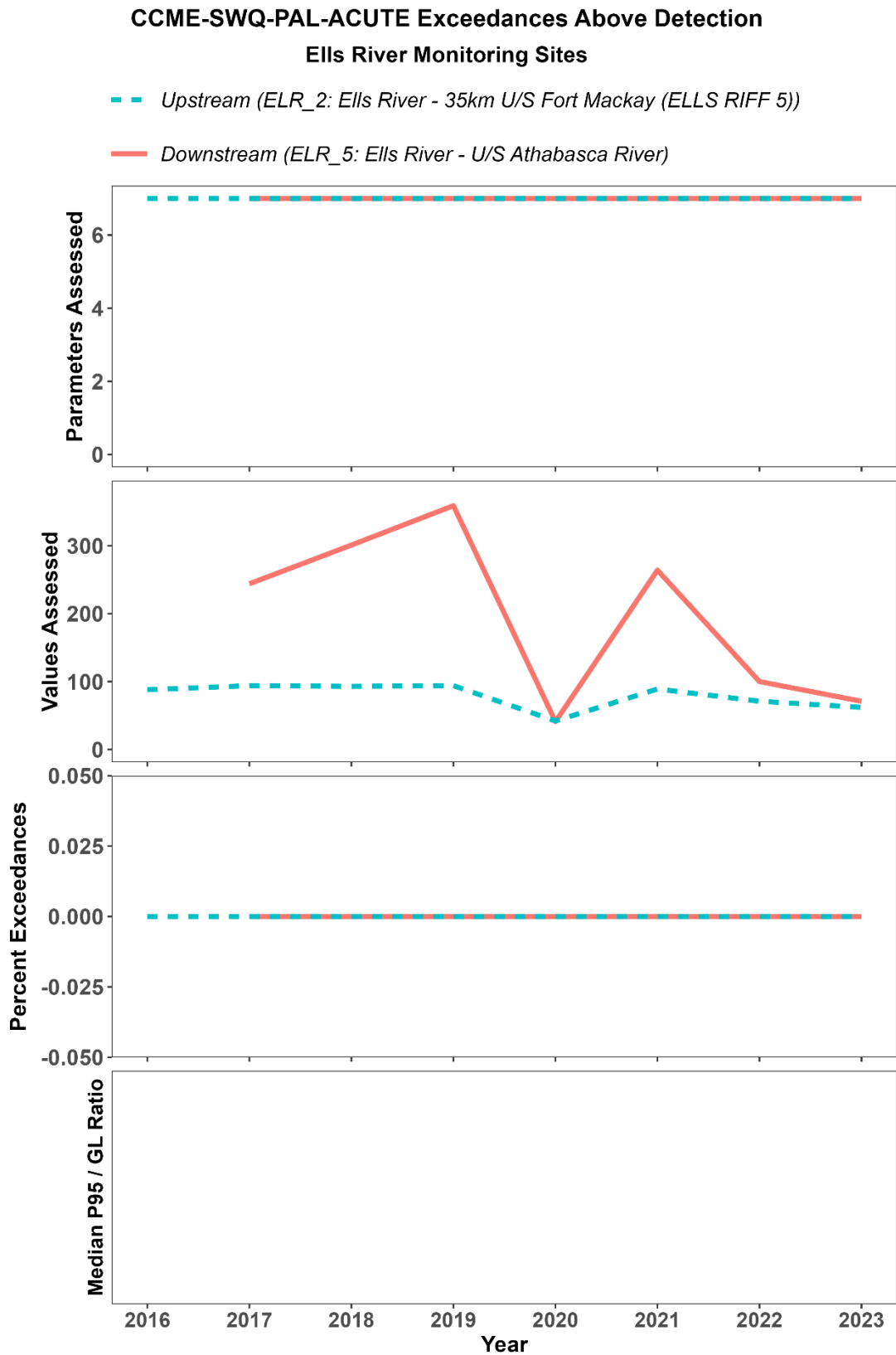


Figure I331: Comparison between exceedances at upstream and downstream sites on the Ells River when considering CCME protection of aquatic life acute guidelines.

# **CCME-SWQ-AG-LIVESTOCK Exceedances Above Detection** **Ells River Monitoring Sites**

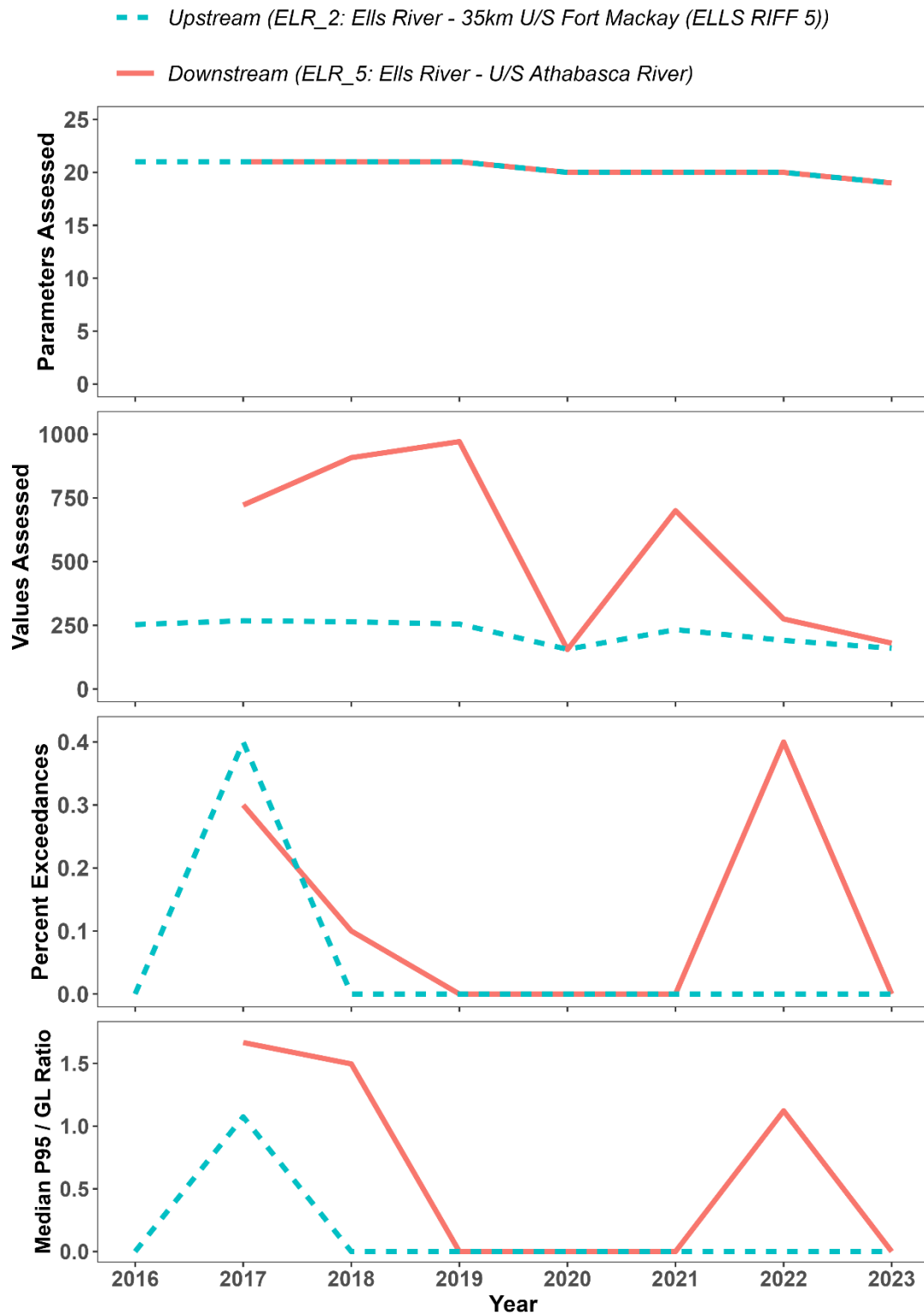


Figure I332: Comparison between exceedances at upstream and downstream sites on the Ells River when considering CCME protection of livestock watering guidelines.

### CCME-SWQ-AG-IRRIGATION Exceedances Above Detection Ells River Monitoring Sites

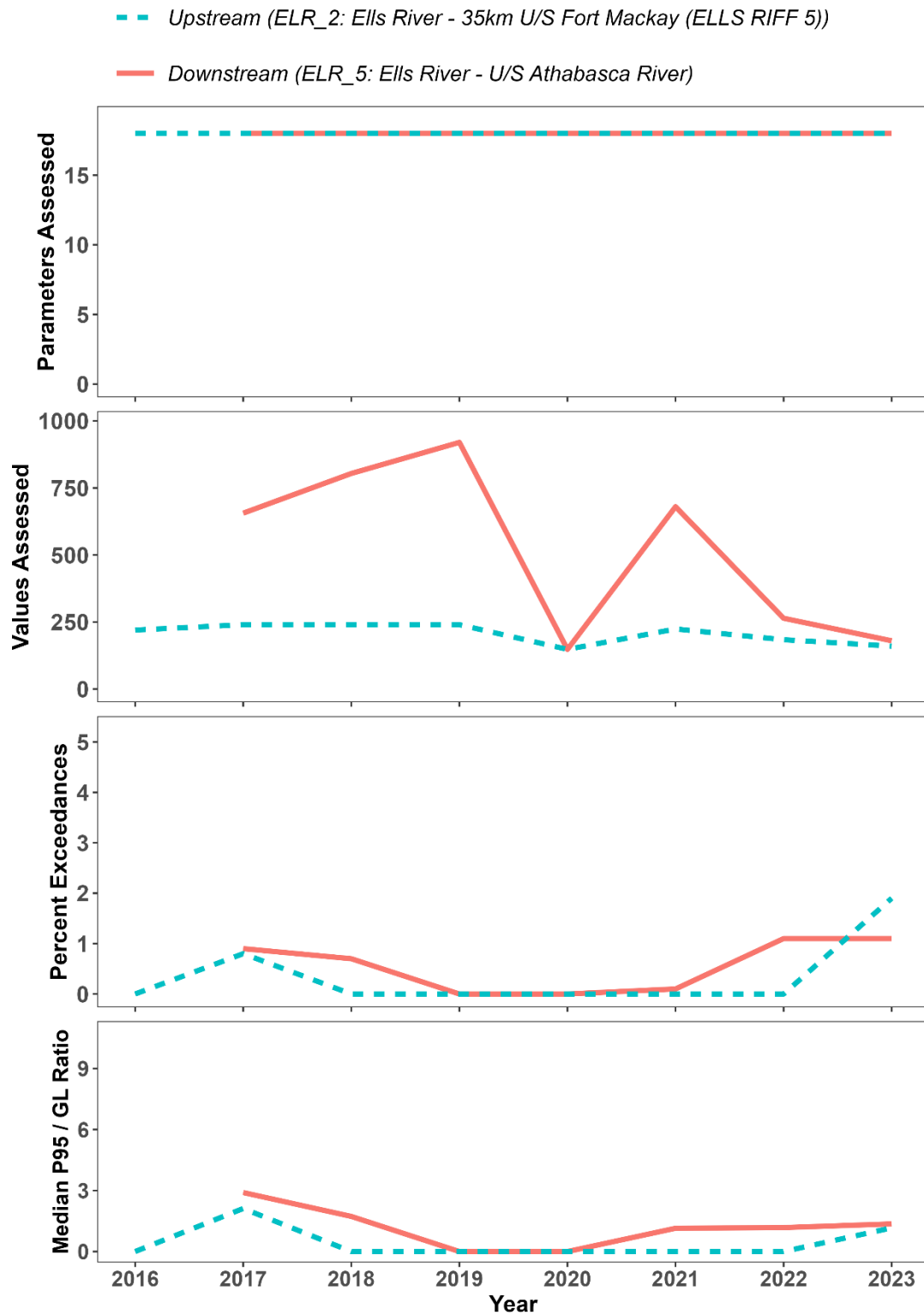


Figure I333: Comparison between exceedances at upstream and downstream sites on the Ells River when considering CCME protection of irrigation water guidelines.

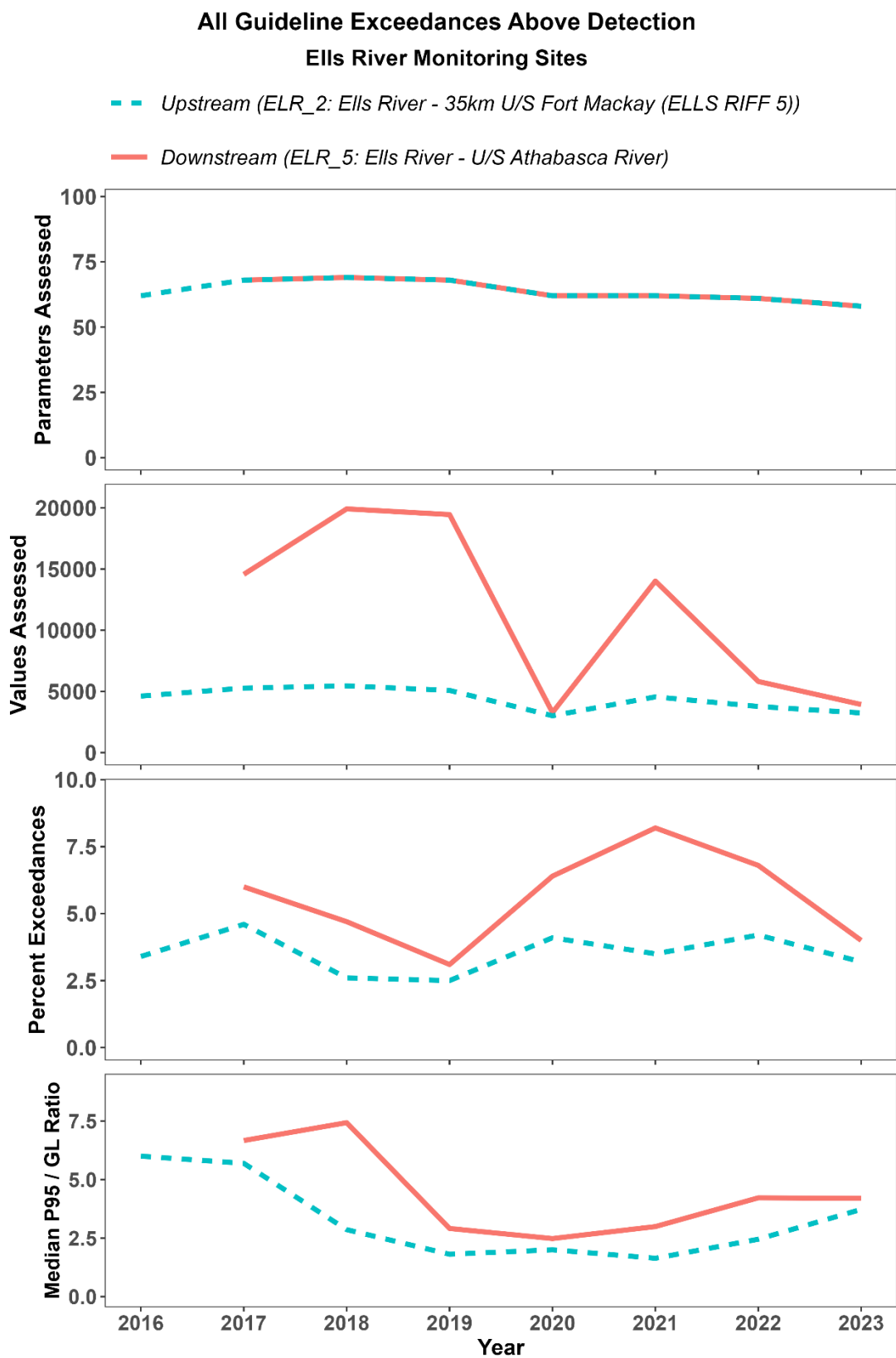


Figure I334: Comparison between exceedances at upstream and downstream sites on the Ells River when considering all guidelines.

### 3.2.6 Firebag River

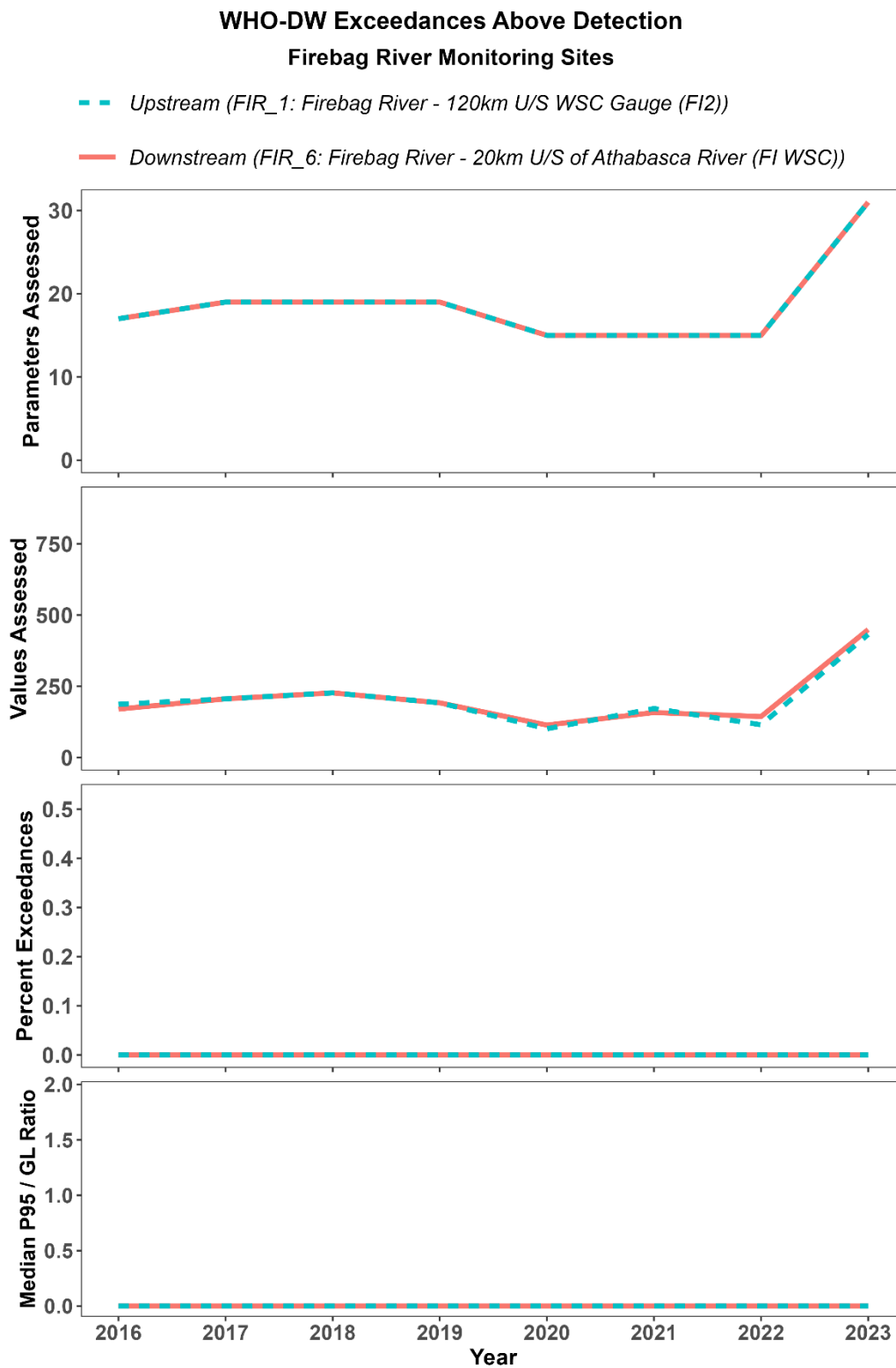


Figure I335: Comparison between exceedances at upstream and downstream sites on the Firebag River when considering WHO drinking water guidelines.



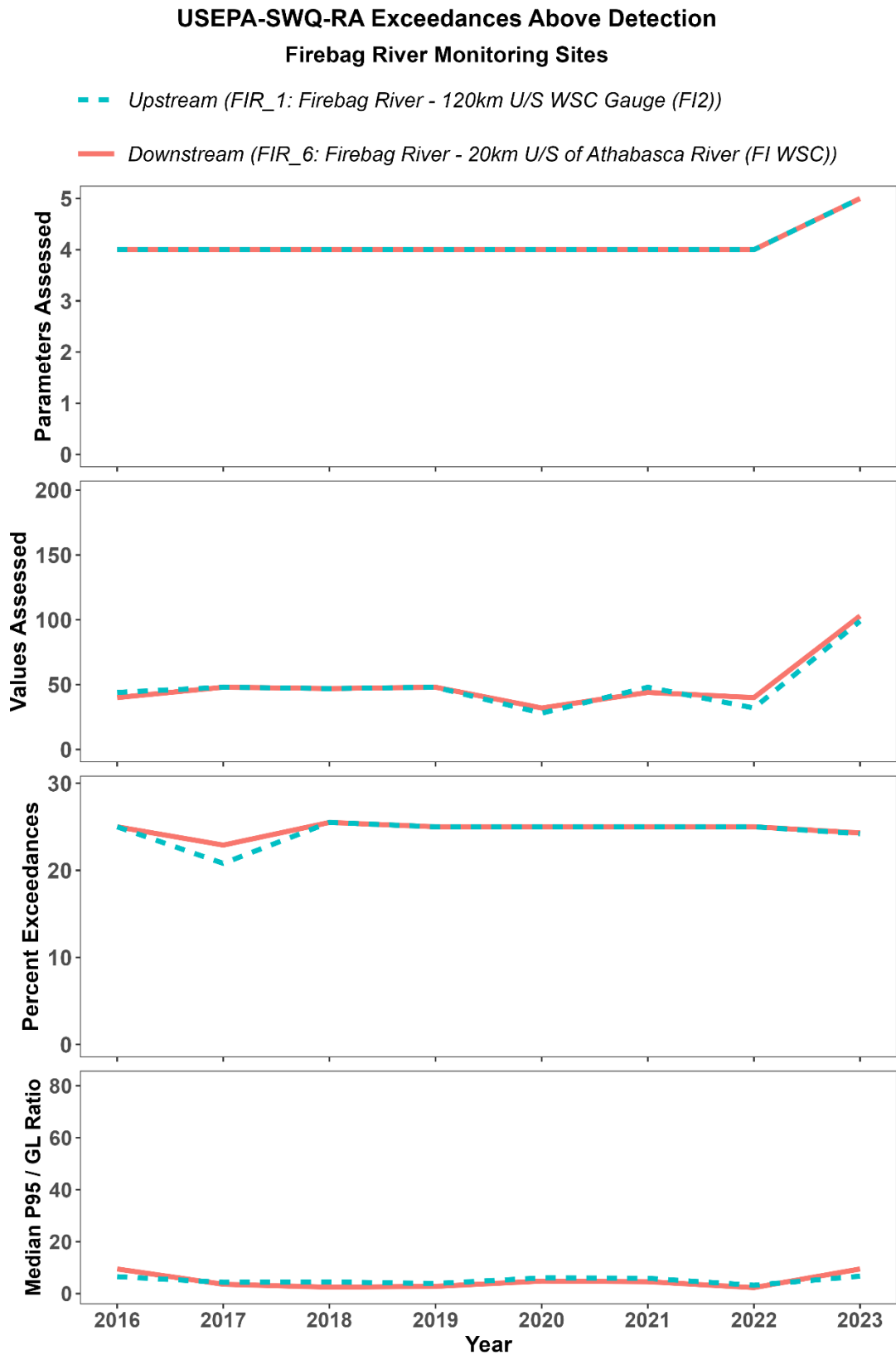


Figure I336: Comparison between exceedances at upstream and downstream sites on the Firebag River when considering USEPA recreational aesthetics guidelines.

# **USEPA-SWQ-PAL-CHRONIC Exceedances Above Detection** **Firebag River Monitoring Sites**

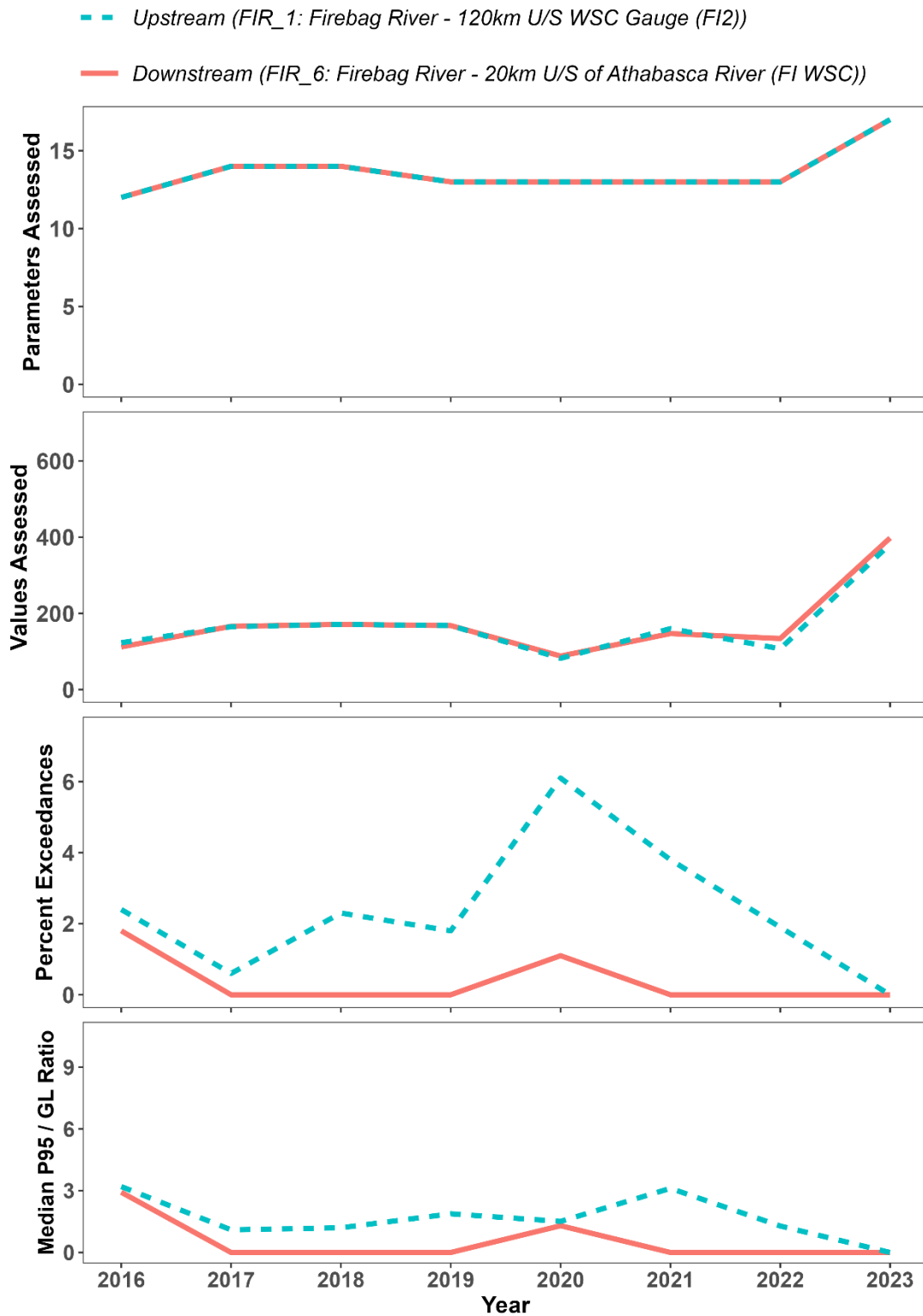


Figure I337: Comparison between exceedances at upstream and downstream sites on the Firebag River when considering USEPA protection of aquatic life chronic guidelines.

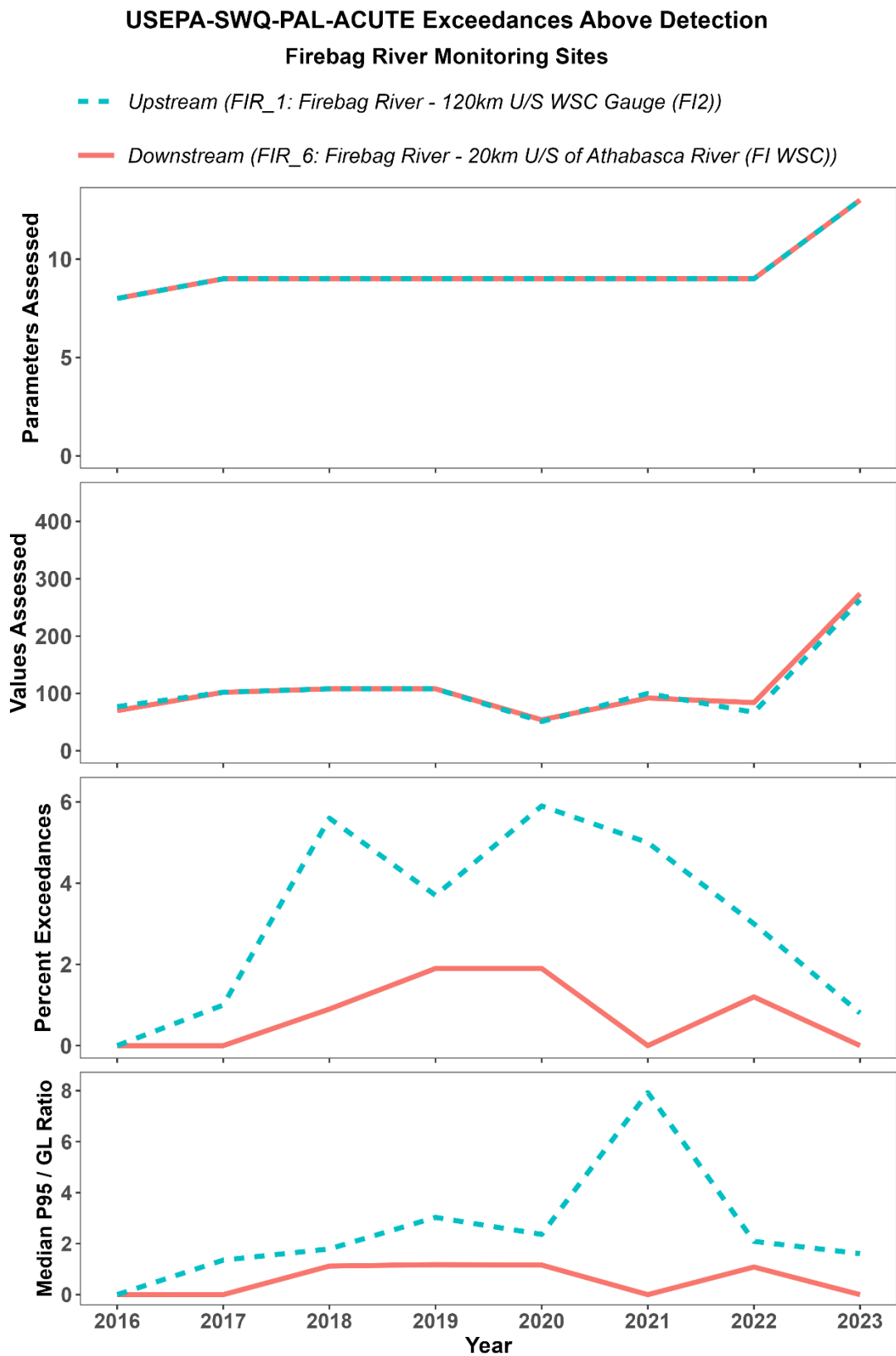


Figure I338: Comparison between exceedances at upstream and downstream sites on the Firebag River when considering USEPA protection of aquatic life acute guidelines.

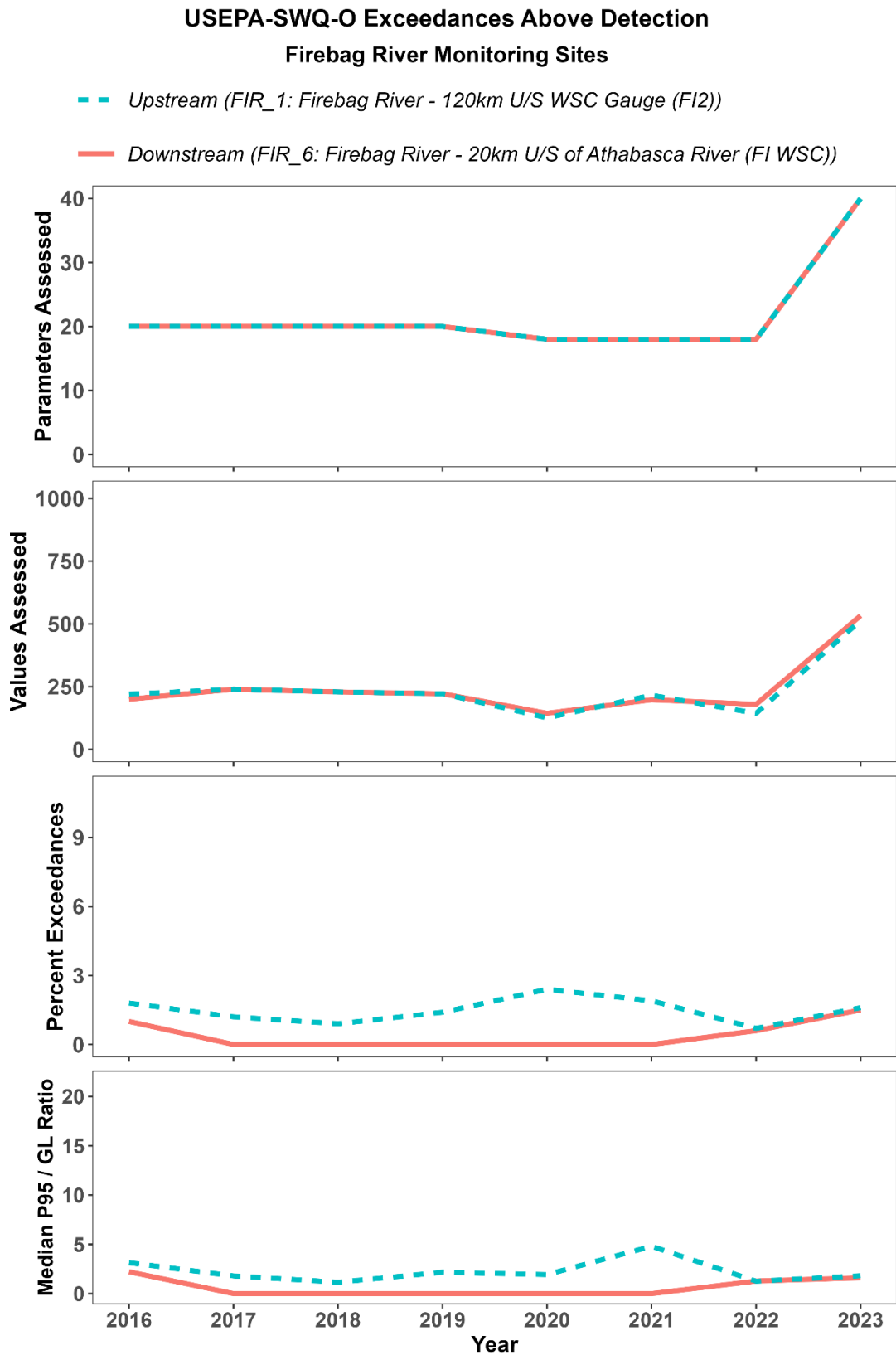


Figure I339: Comparison between exceedances at upstream and downstream sites on the Firebag River when considering USEPA protection of human health from consumption of aquatic organisms guidelines.

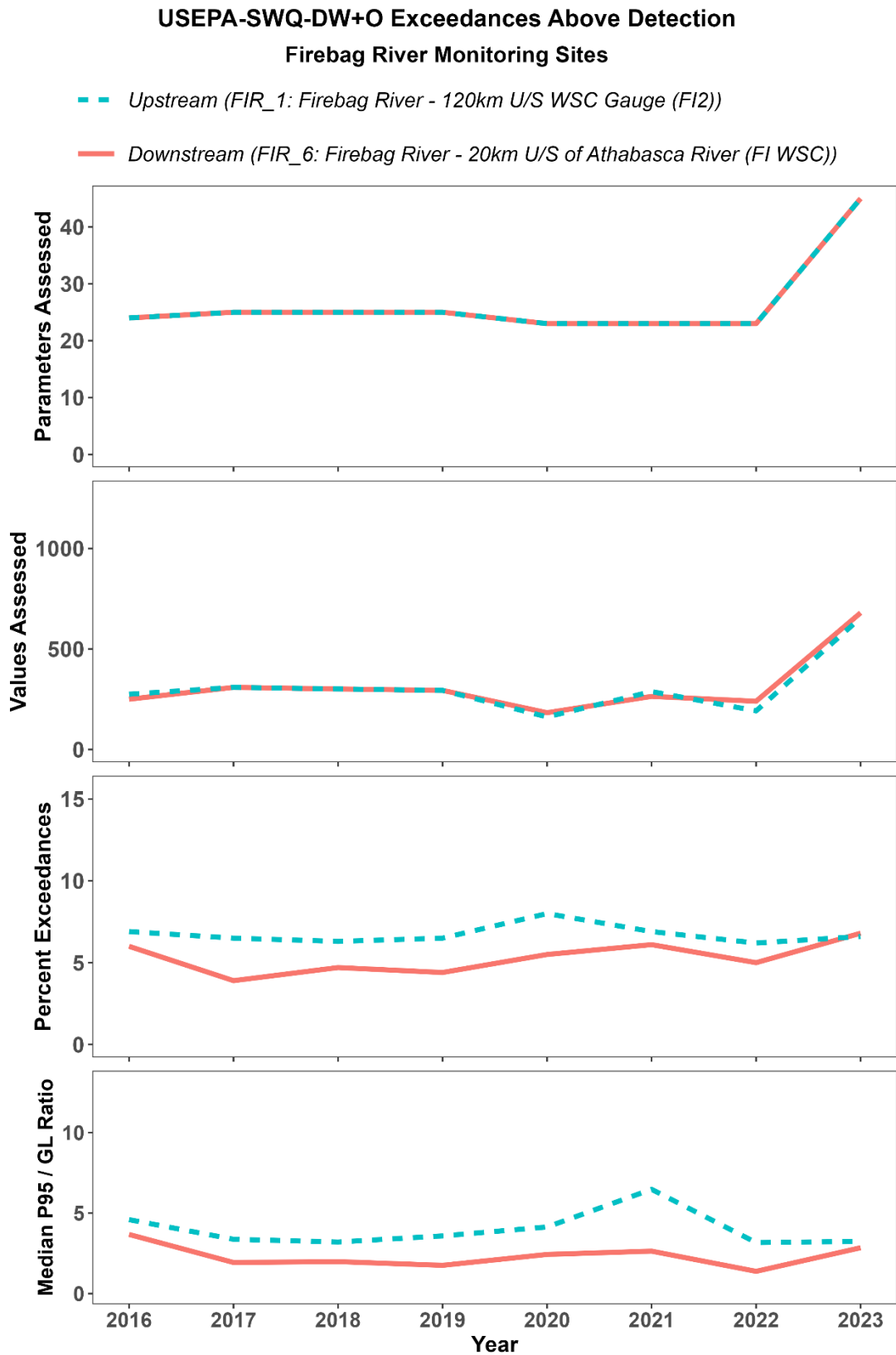


Figure I340: Comparison between exceedances at upstream and downstream sites on the Firebag River when considering USEPA protection of human health from consumption of surface water and aquatic organisms guidelines.

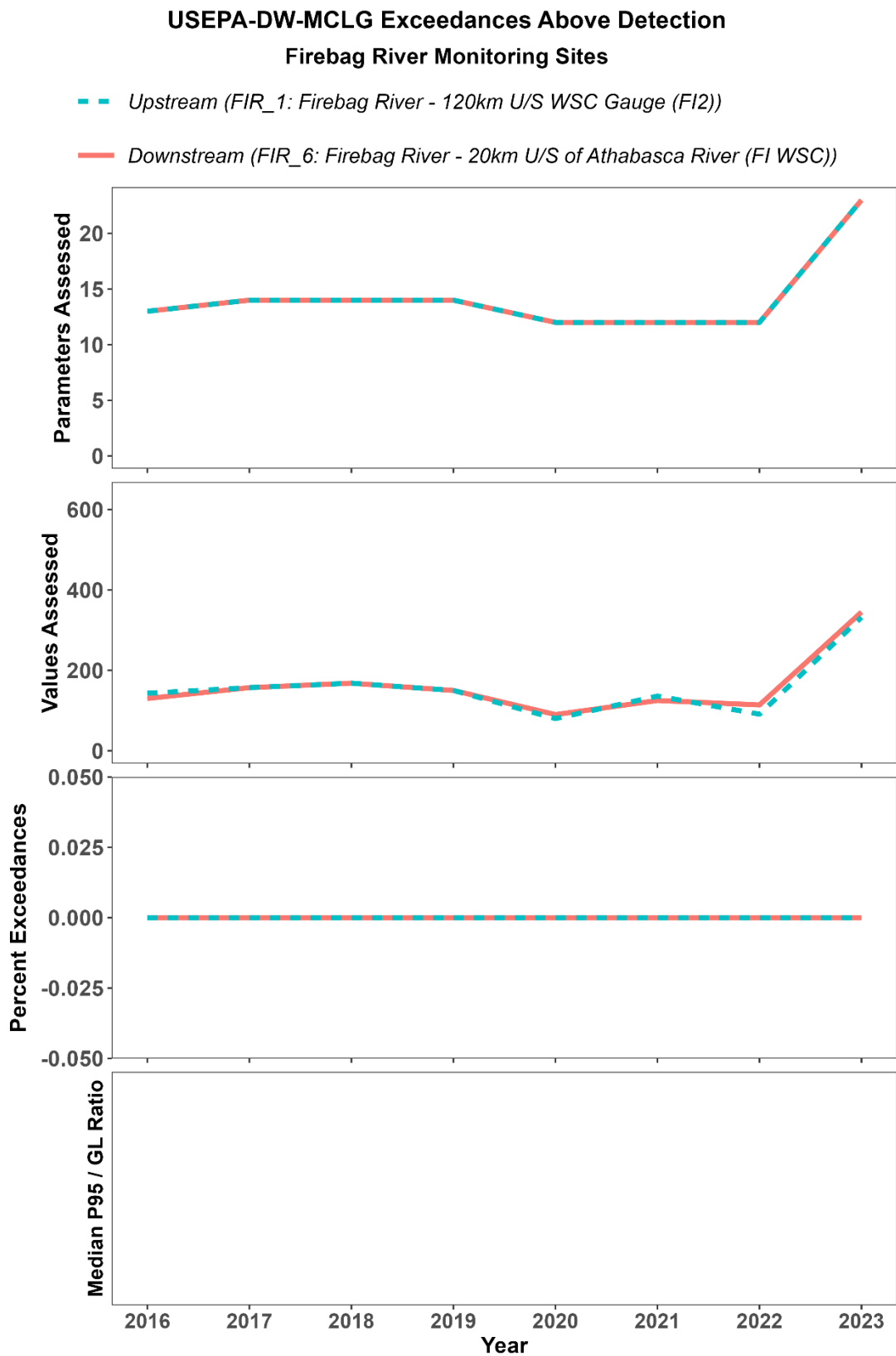


Figure I341: Comparison between exceedances at upstream and downstream sites on the Firebag River when considering USEPA drinking water quality goals.

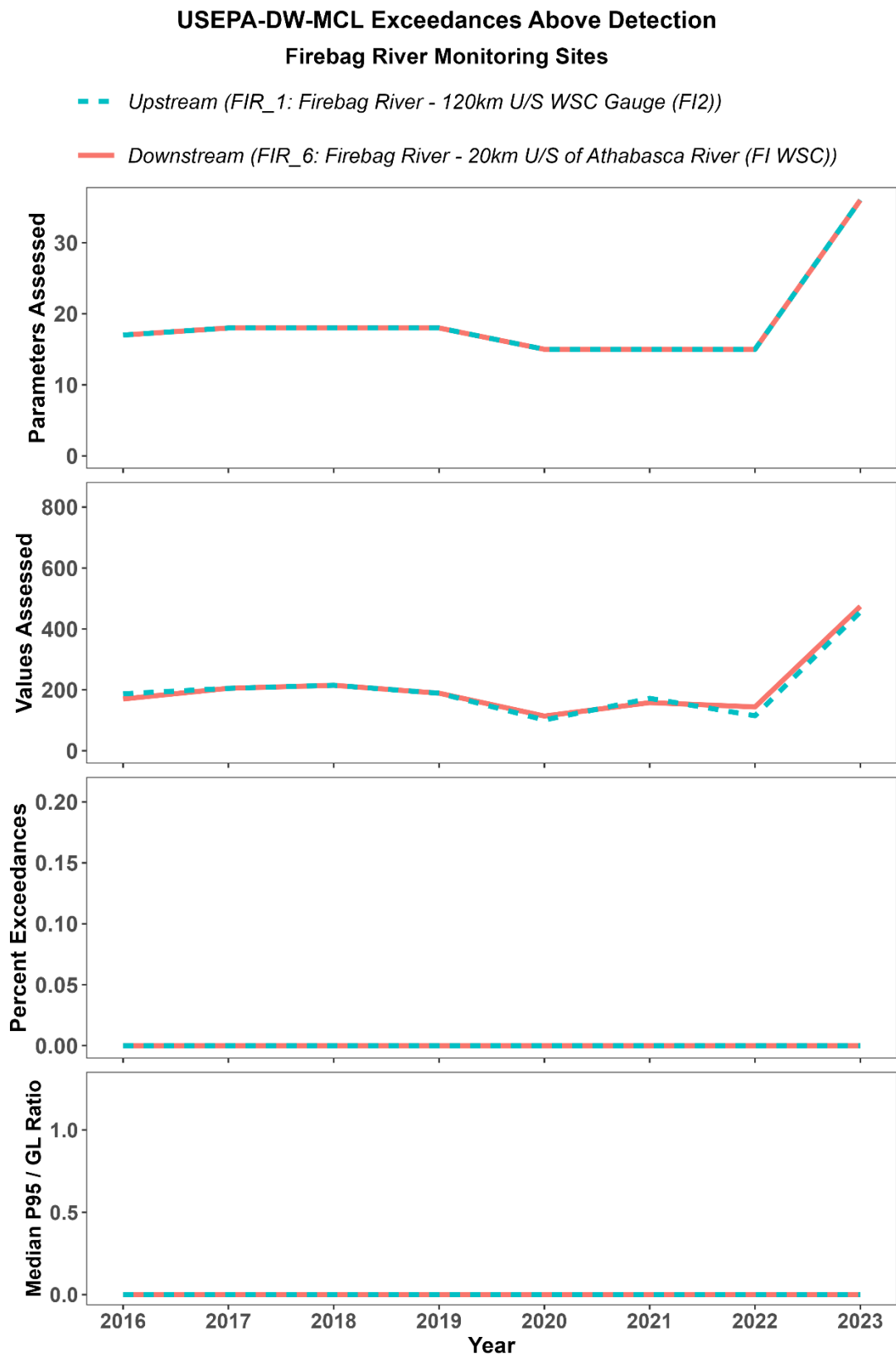


Figure I342: Comparison between exceedances at upstream and downstream sites on the Firebag River when considering USEPA drinking water quality limits.

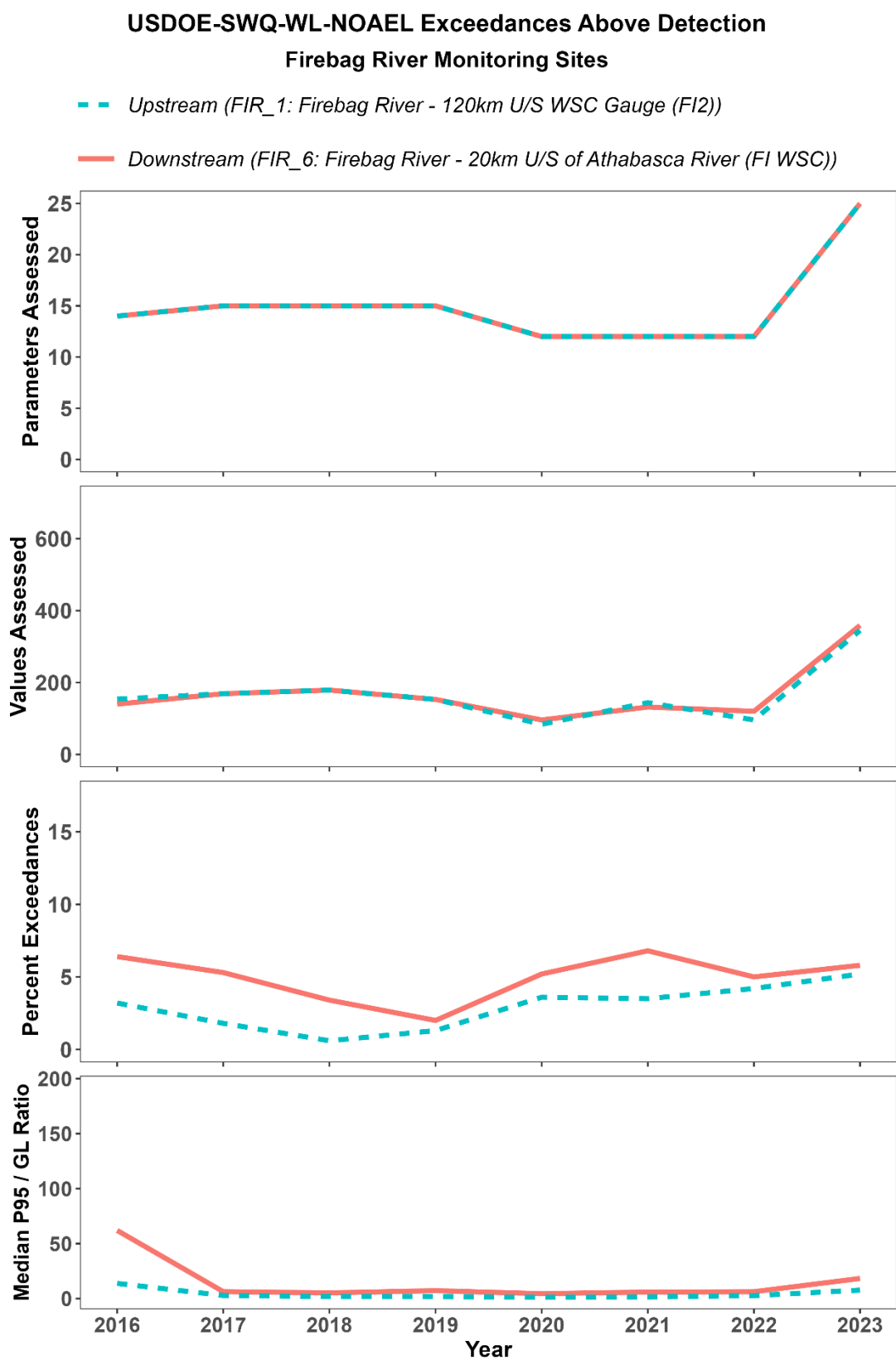


Figure I343: Comparison between exceedances at upstream and downstream sites on the Firebag River when considering USEPA protection of piscivores NOAEL guidelines.



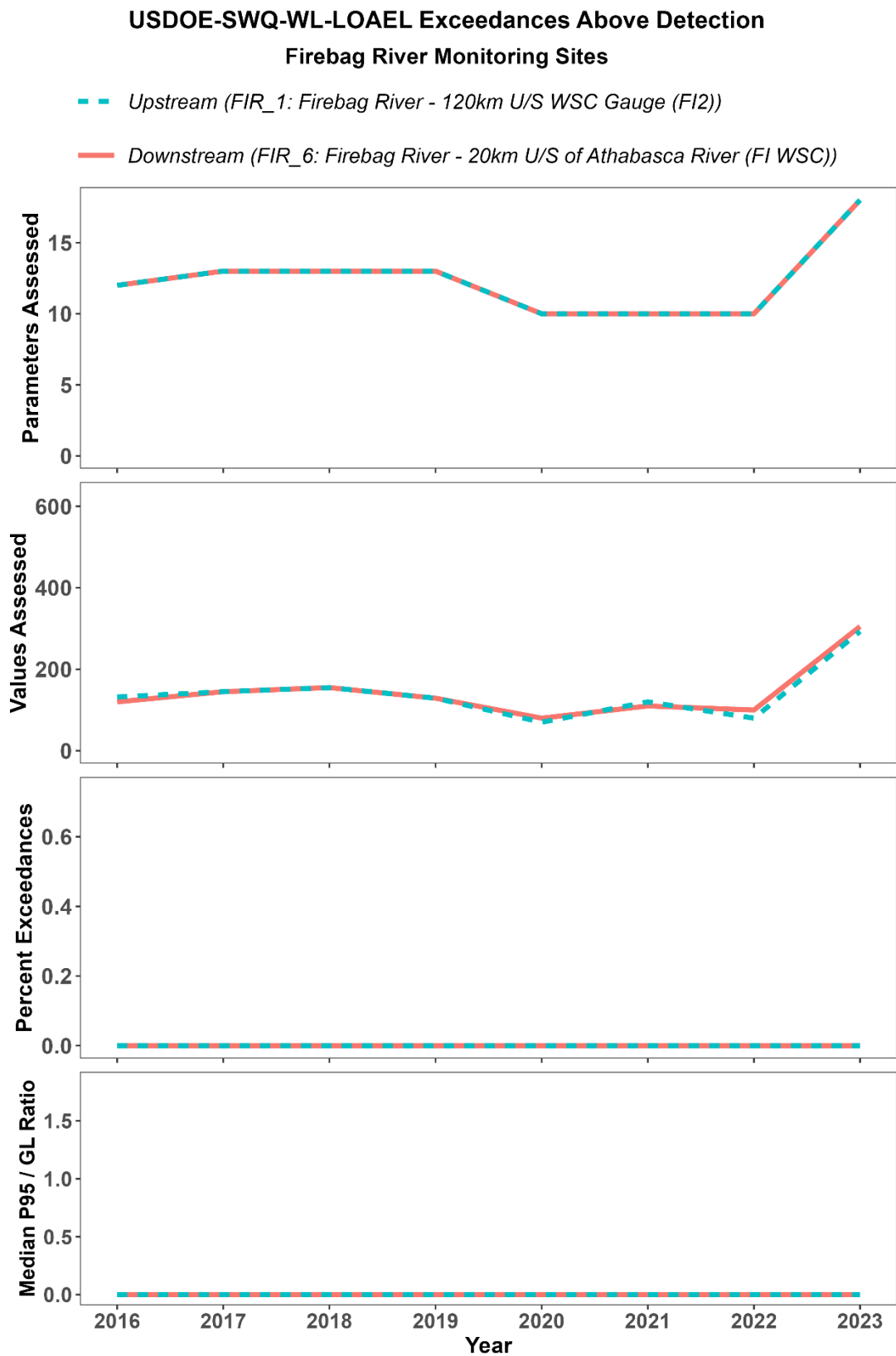


Figure I344: Comparison between exceedances at upstream and downstream sites on the Firebag River when considering USEPA protection of piscivores LOAEL guidelines.

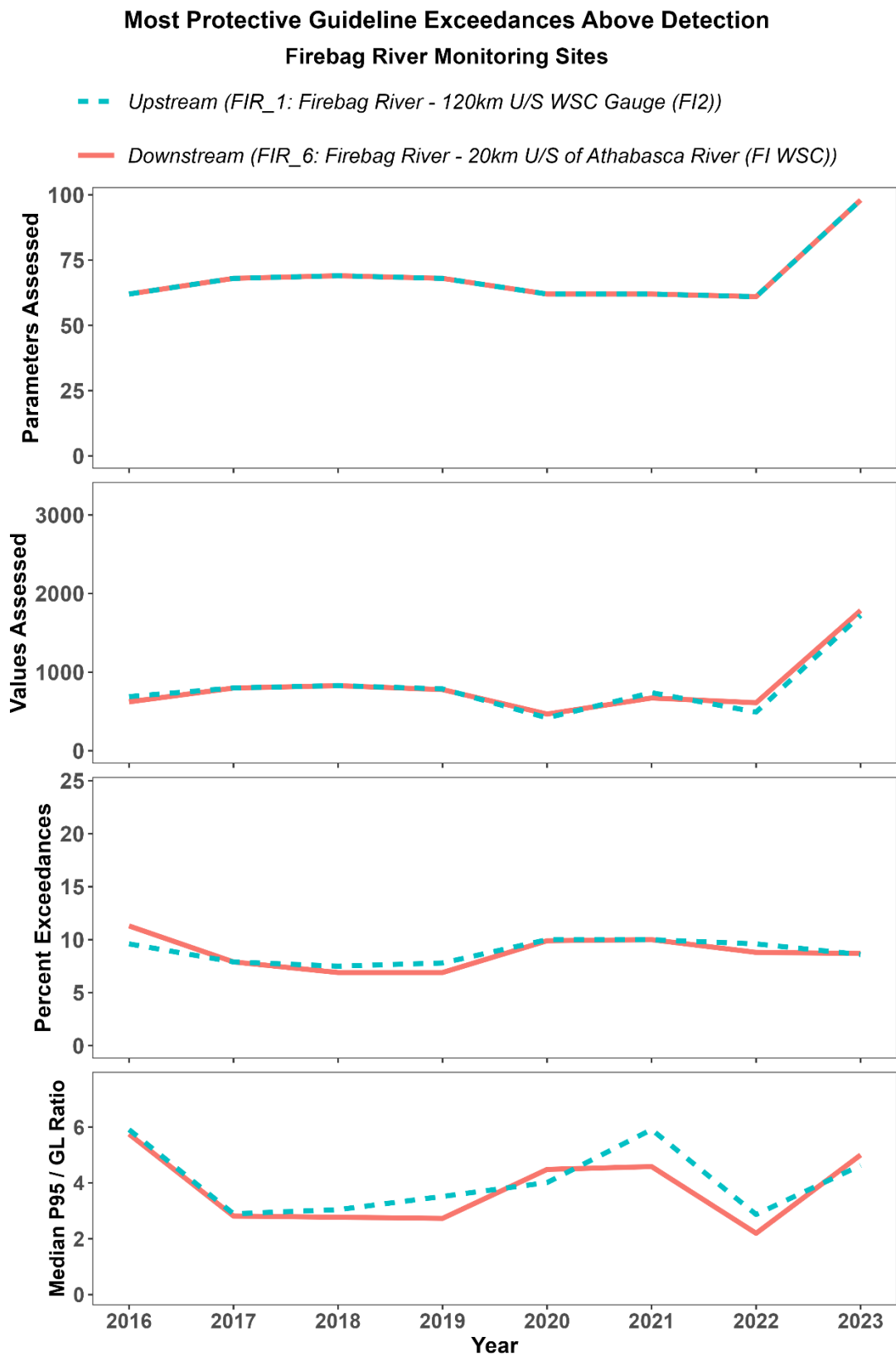


Figure I345: Comparison between exceedances at upstream and downstream sites on the Firebag River when considering the most protective guidelines.

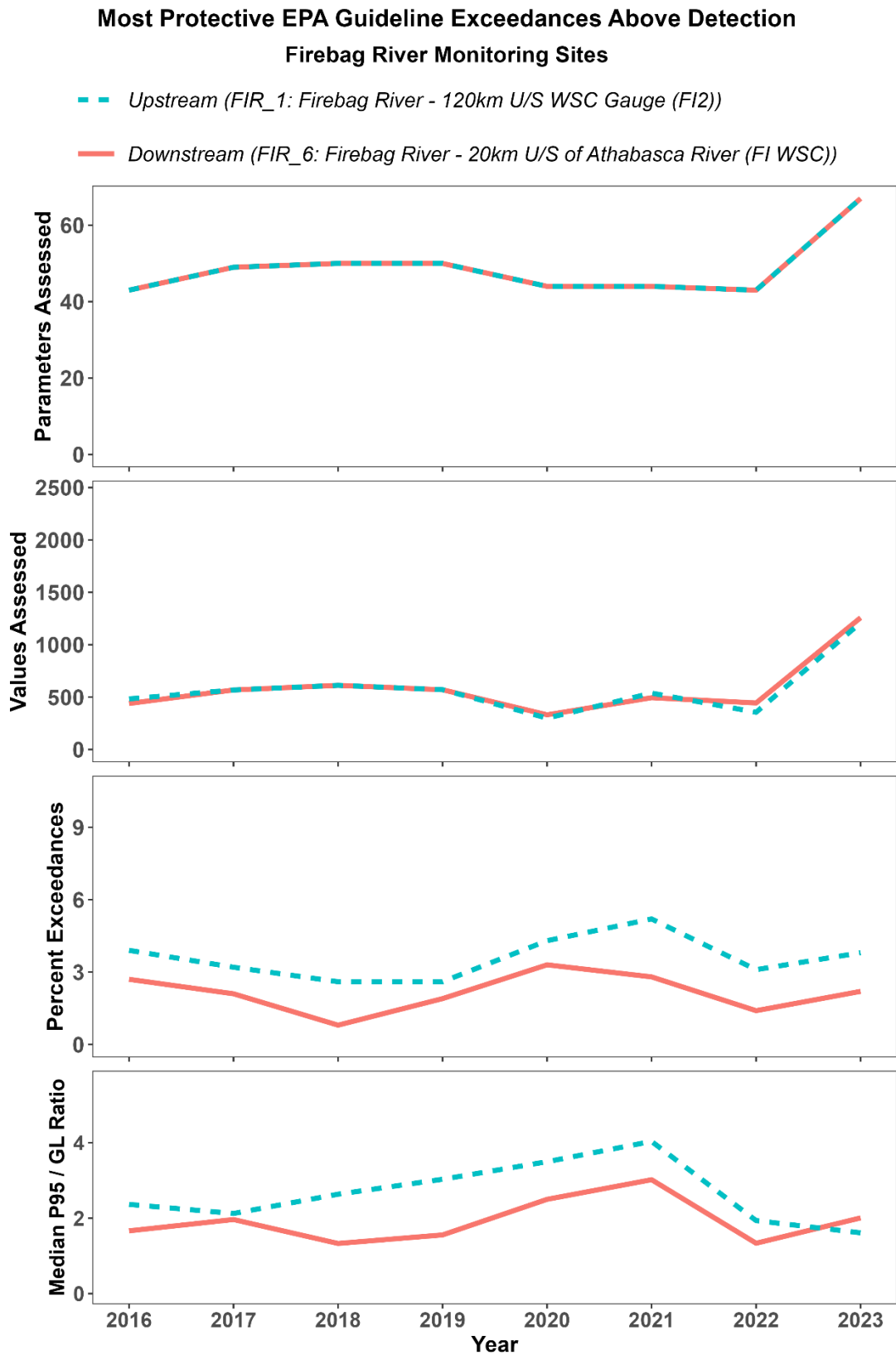


Figure I346: Comparison between exceedances at upstream and downstream sites on the Firebag River when considering the most protective EPA guidelines.

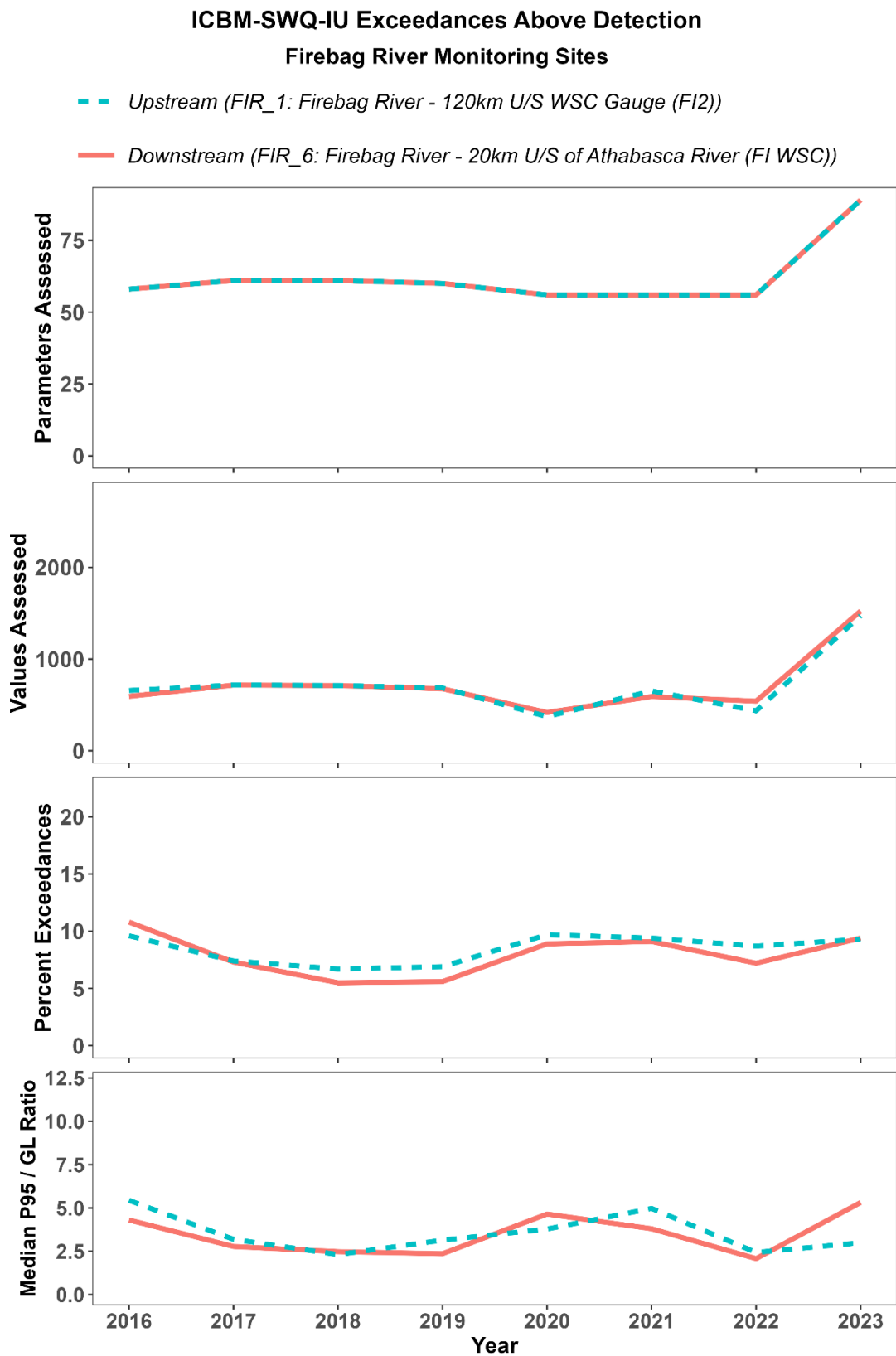


Figure I347: Comparison between exceedances at upstream and downstream sites on the Firebag River when considering guidelines protective of indigenous use.

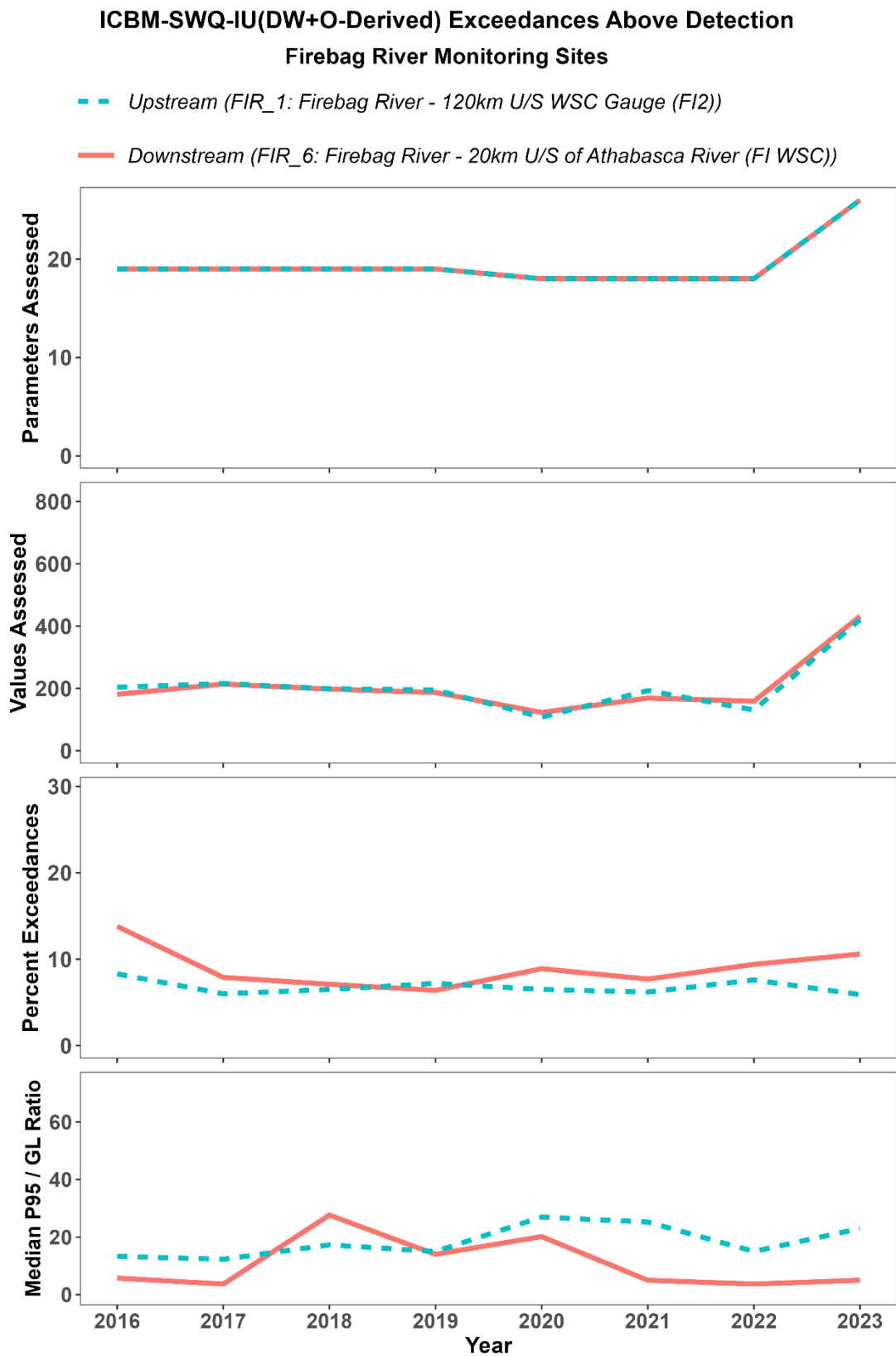


Figure I348: Comparison between exceedances at upstream and downstream sites on the Firebag River when considering guidelines protective of indigenous use from consumption of surface water and aquatic organisms.

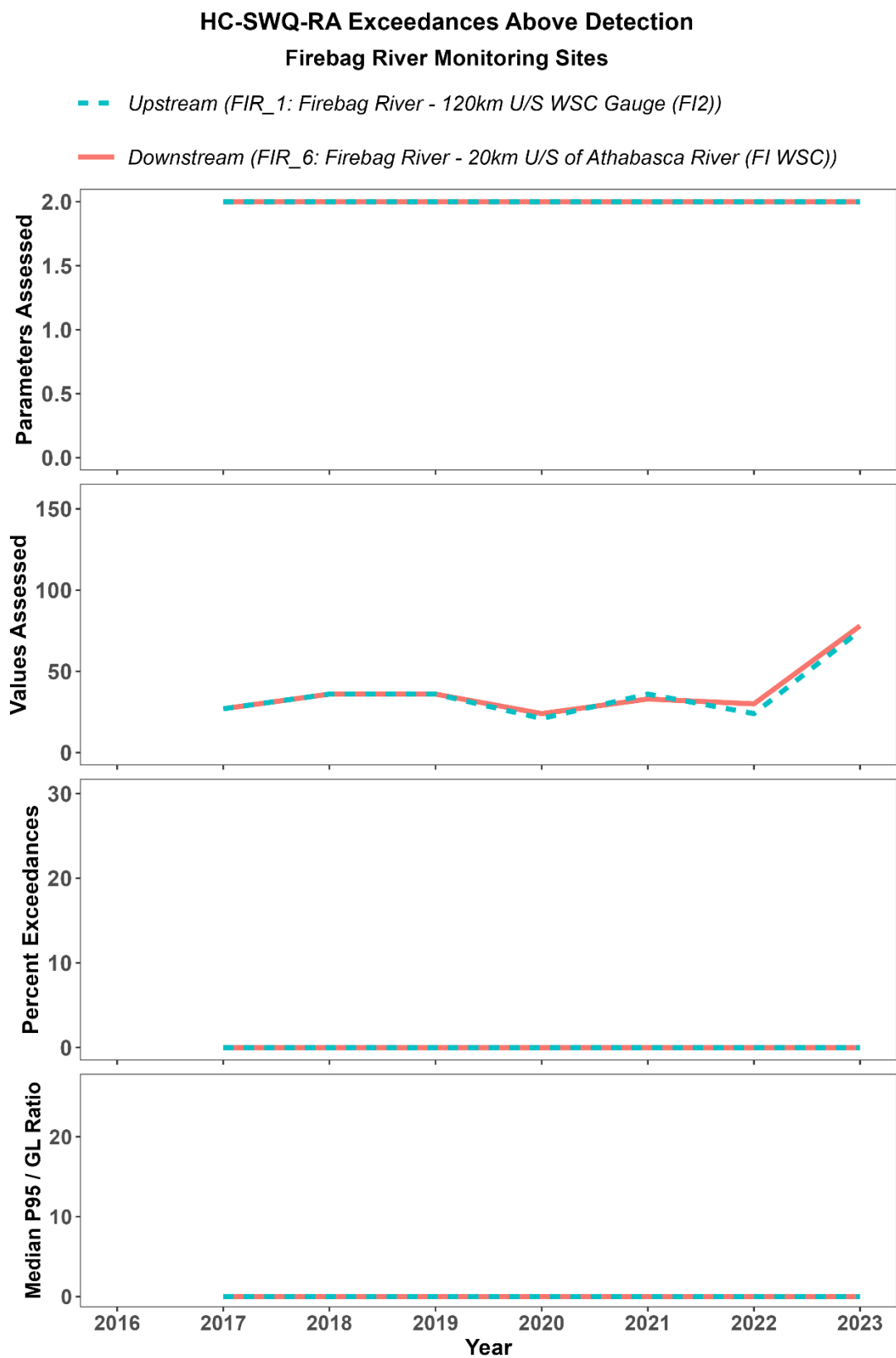


Figure I349: Comparison between exceedances at upstream and downstream sites on the Firebag River when considering Health Canada recreation aesthetics guidelines.

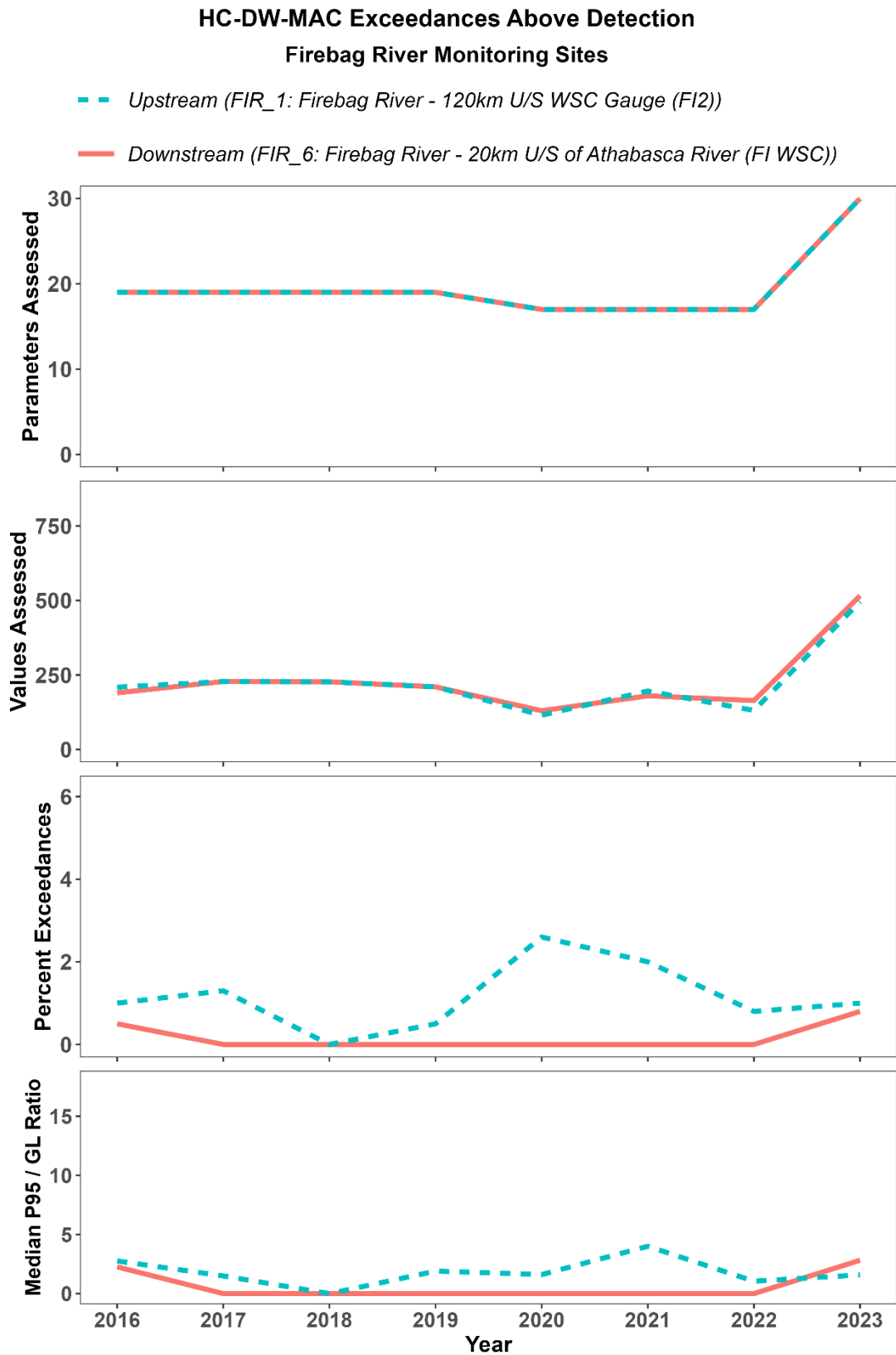


Figure I350: Comparison between exceedances at upstream and downstream sites on the Firebag River when considering Health Canada drinking water maximum acceptable concentration guidelines.

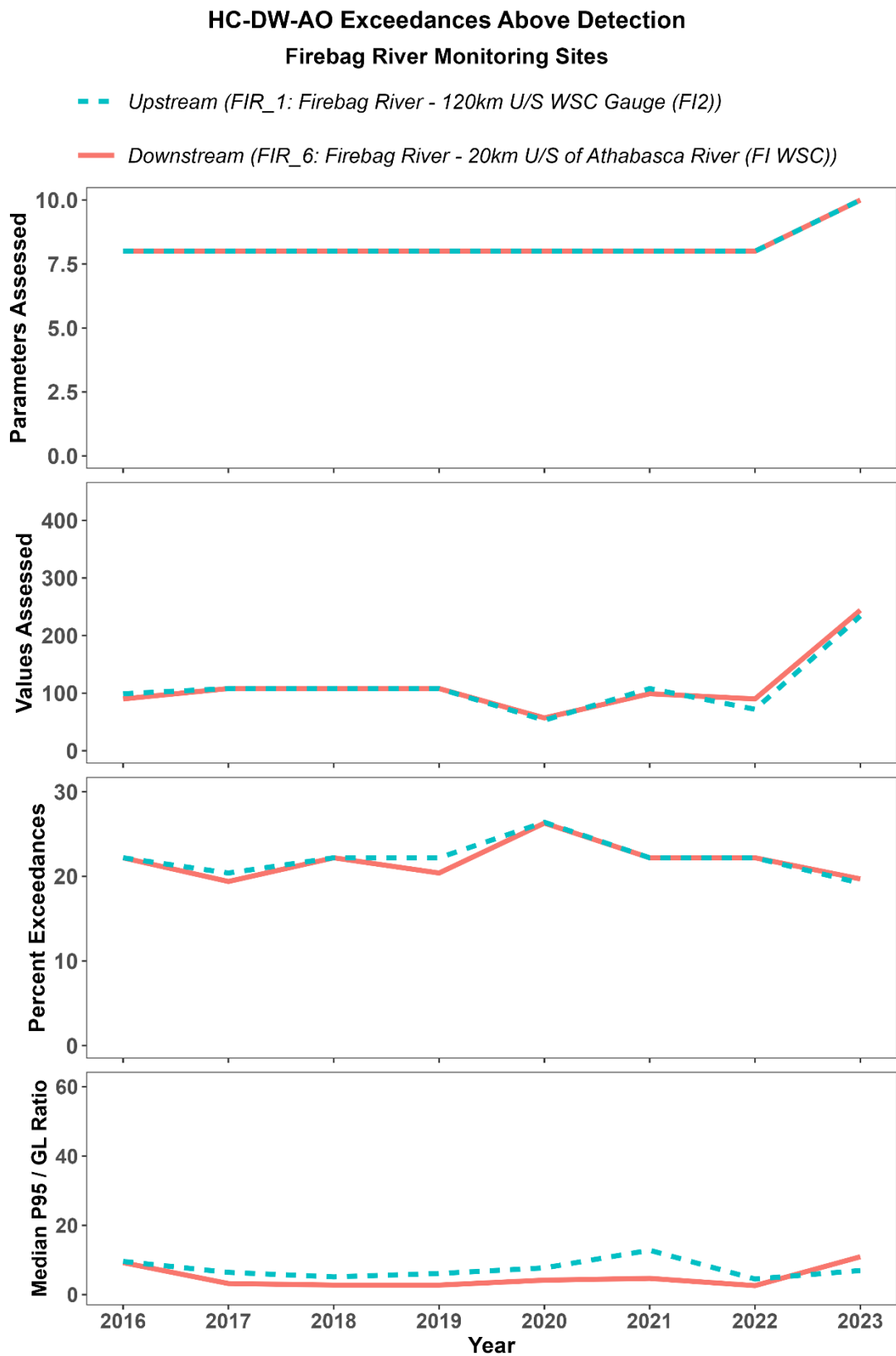


Figure I351: Comparison between exceedances at upstream and downstream sites on the Firebag River when considering Health Canada drinking water aesthetics objectives.



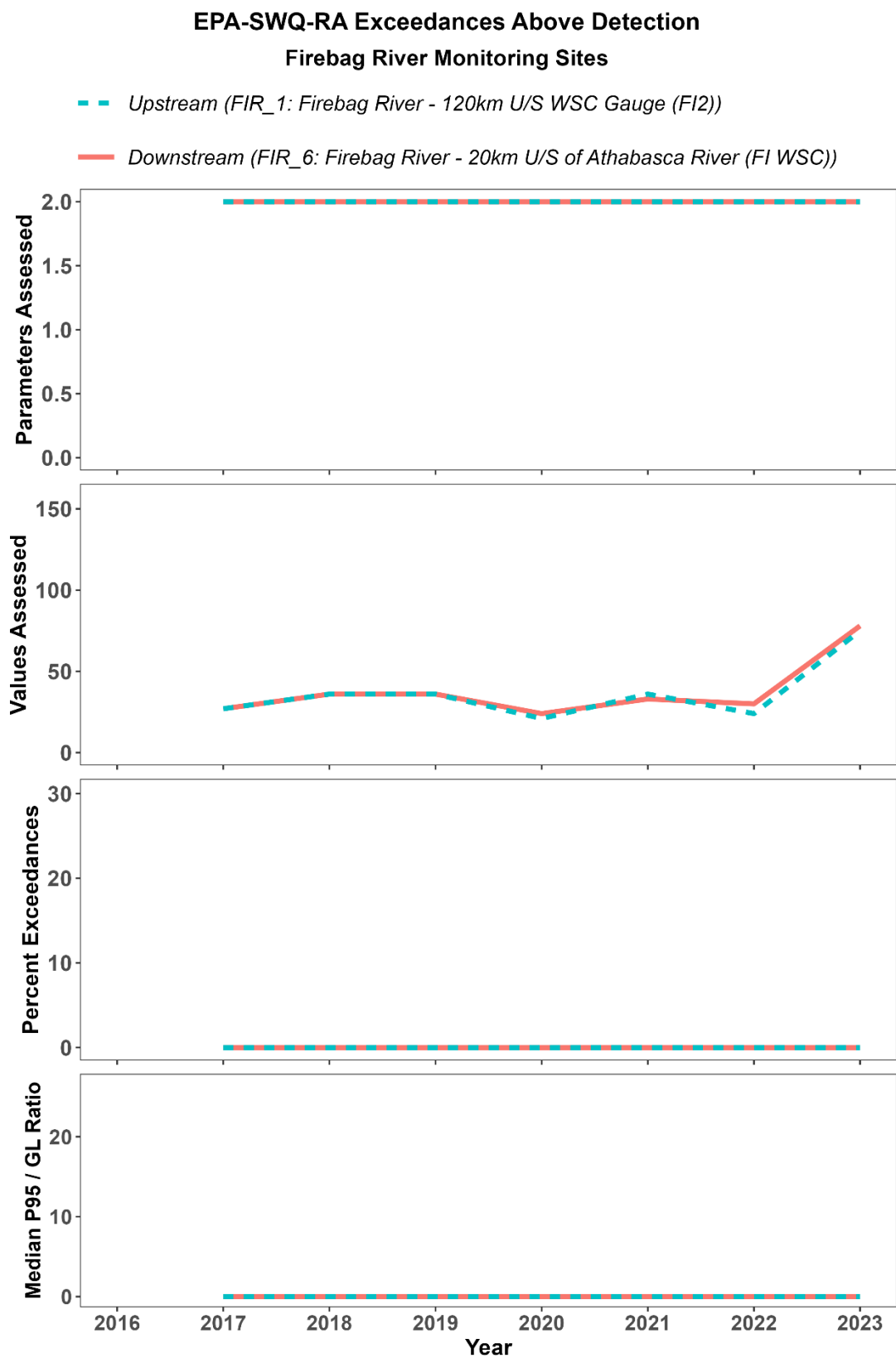


Figure I352: Comparison between exceedances at upstream and downstream sites on the Firebag River when considering Alberta EPA recreation aesthetics guidelines.

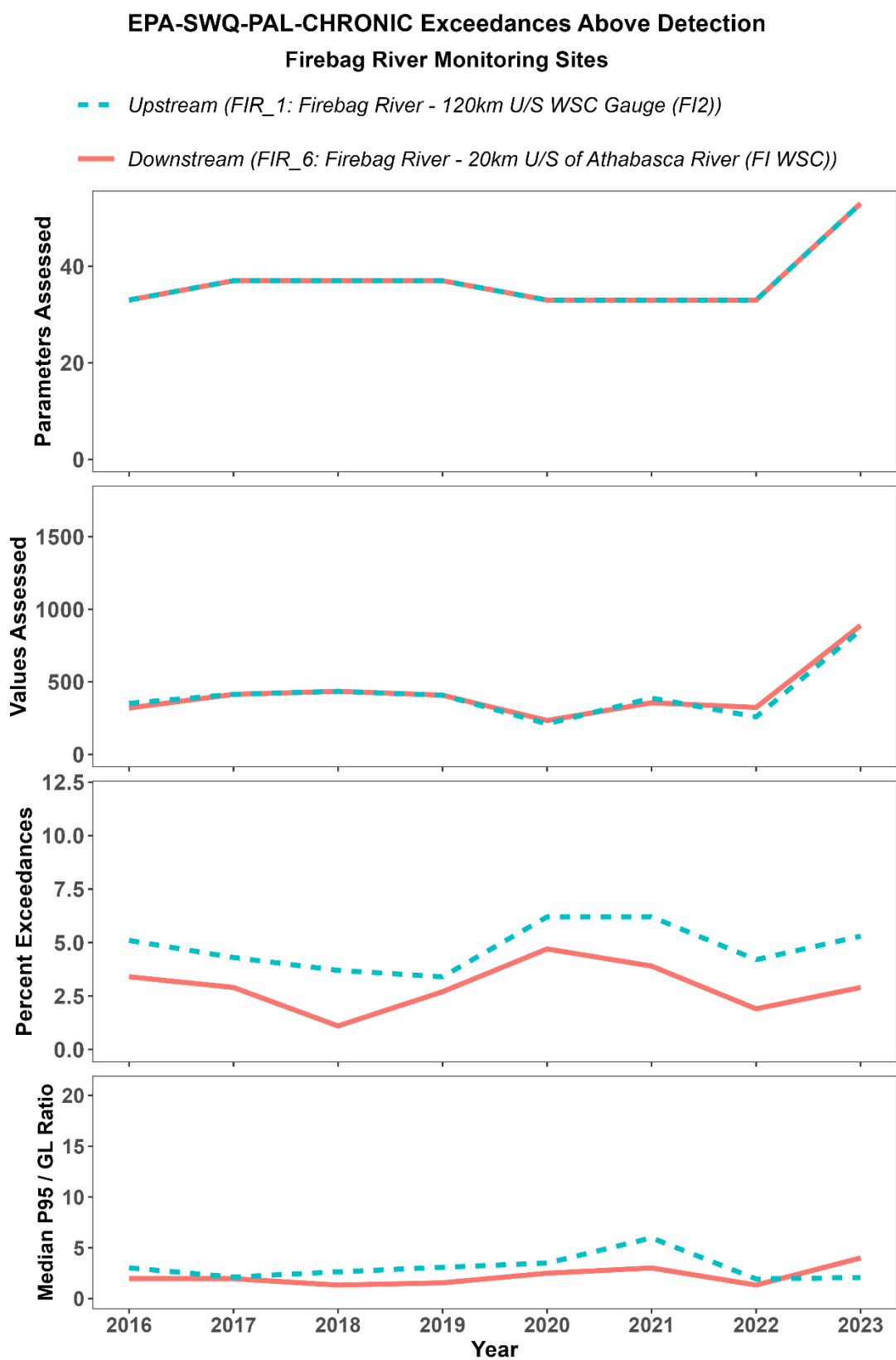


Figure I353: Comparison between exceedances at upstream and downstream sites on the Firebag River when considering Alberta EPA protection of aquatic life chronic guidelines.

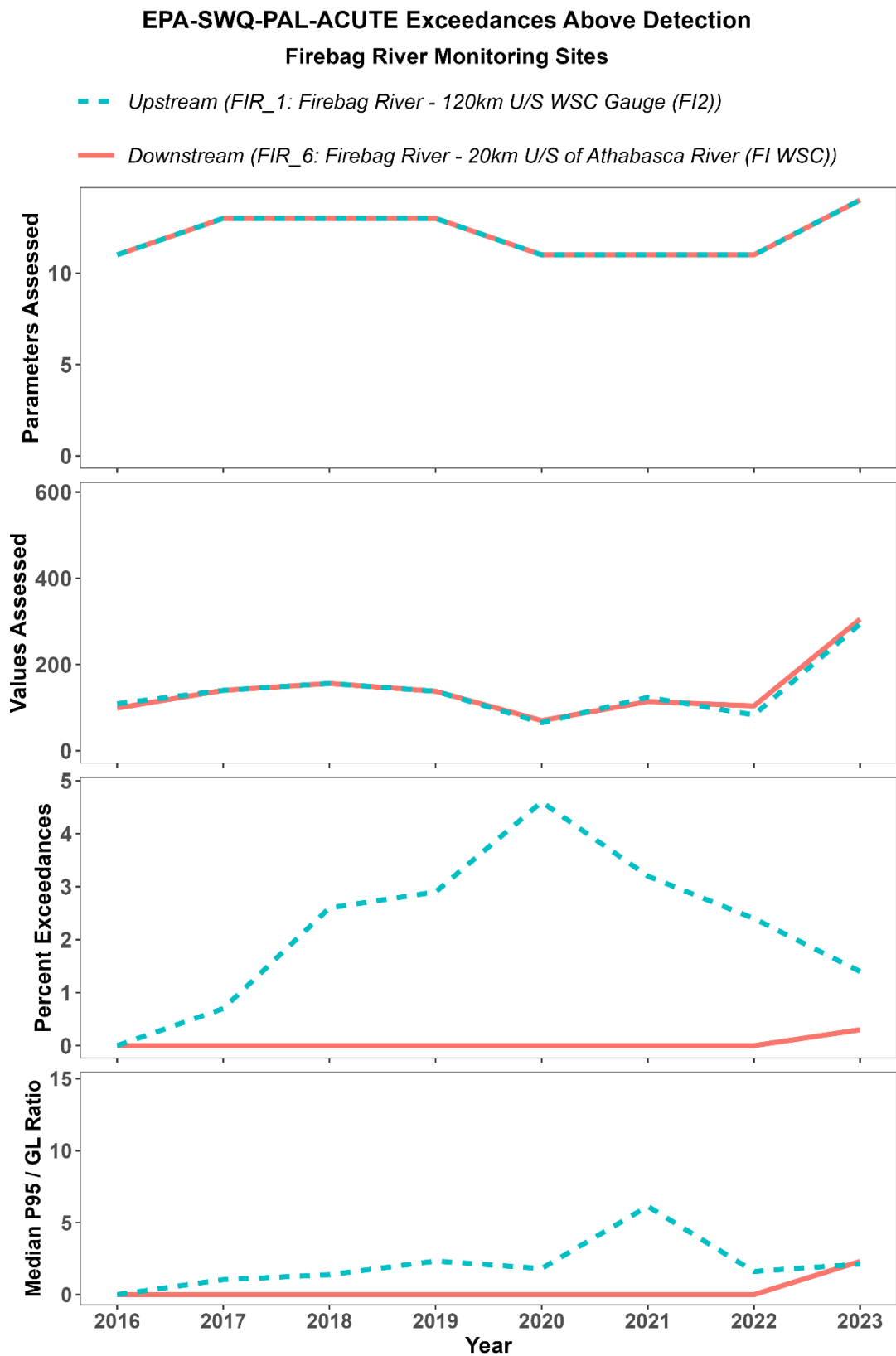


Figure I354: Comparison between exceedances at upstream and downstream sites on the Firebag River when considering Alberta EPA protection of aquatic life acute guidelines.

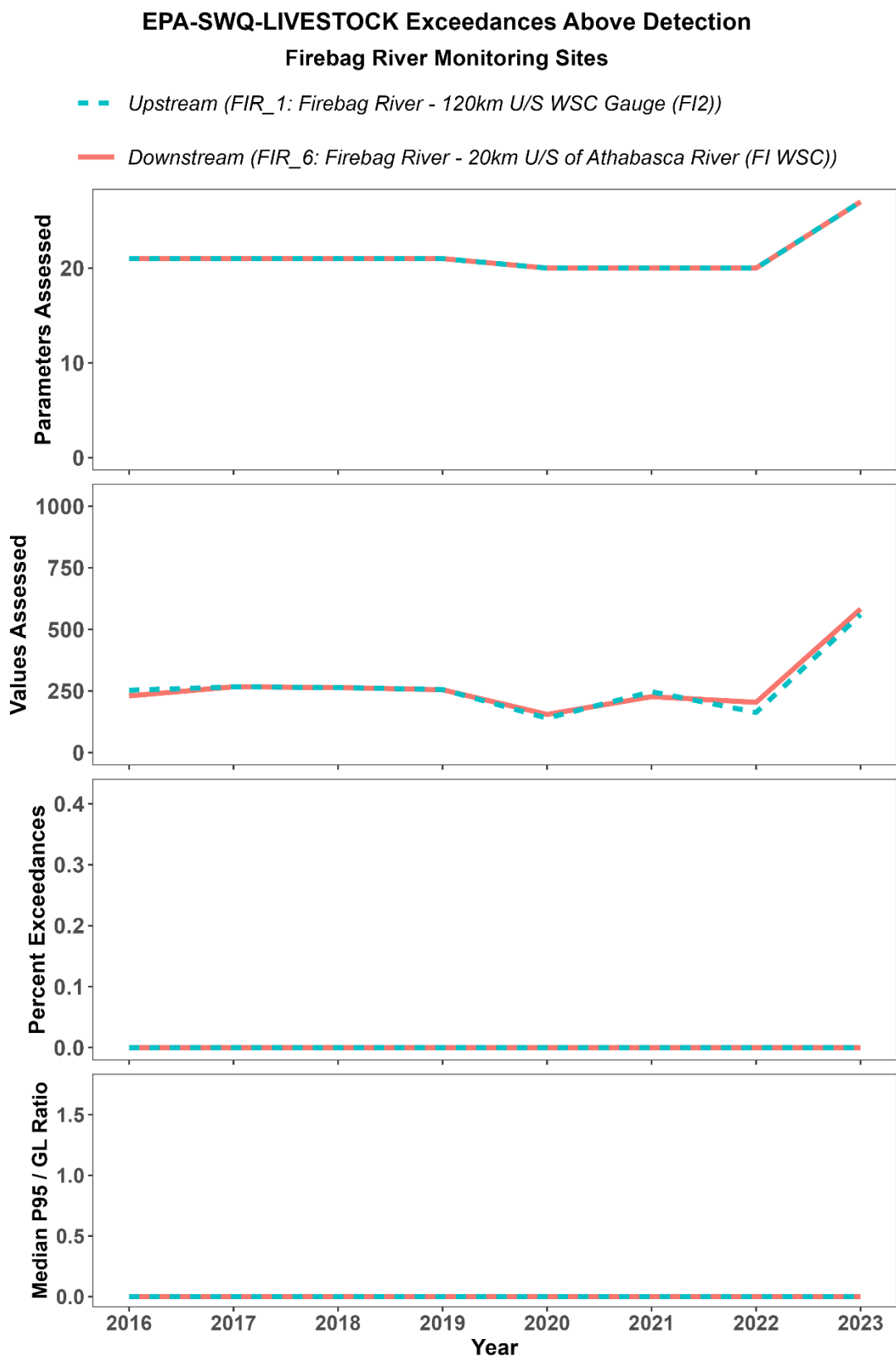


Figure I355: Comparison between exceedances at upstream and downstream sites on the Firebag River when considering Alberta EPA protection of livestock watering guidelines.

## EPA-SWQ-AG-IRRIGATION Exceedances Above Detection Firebag River Monitoring Sites

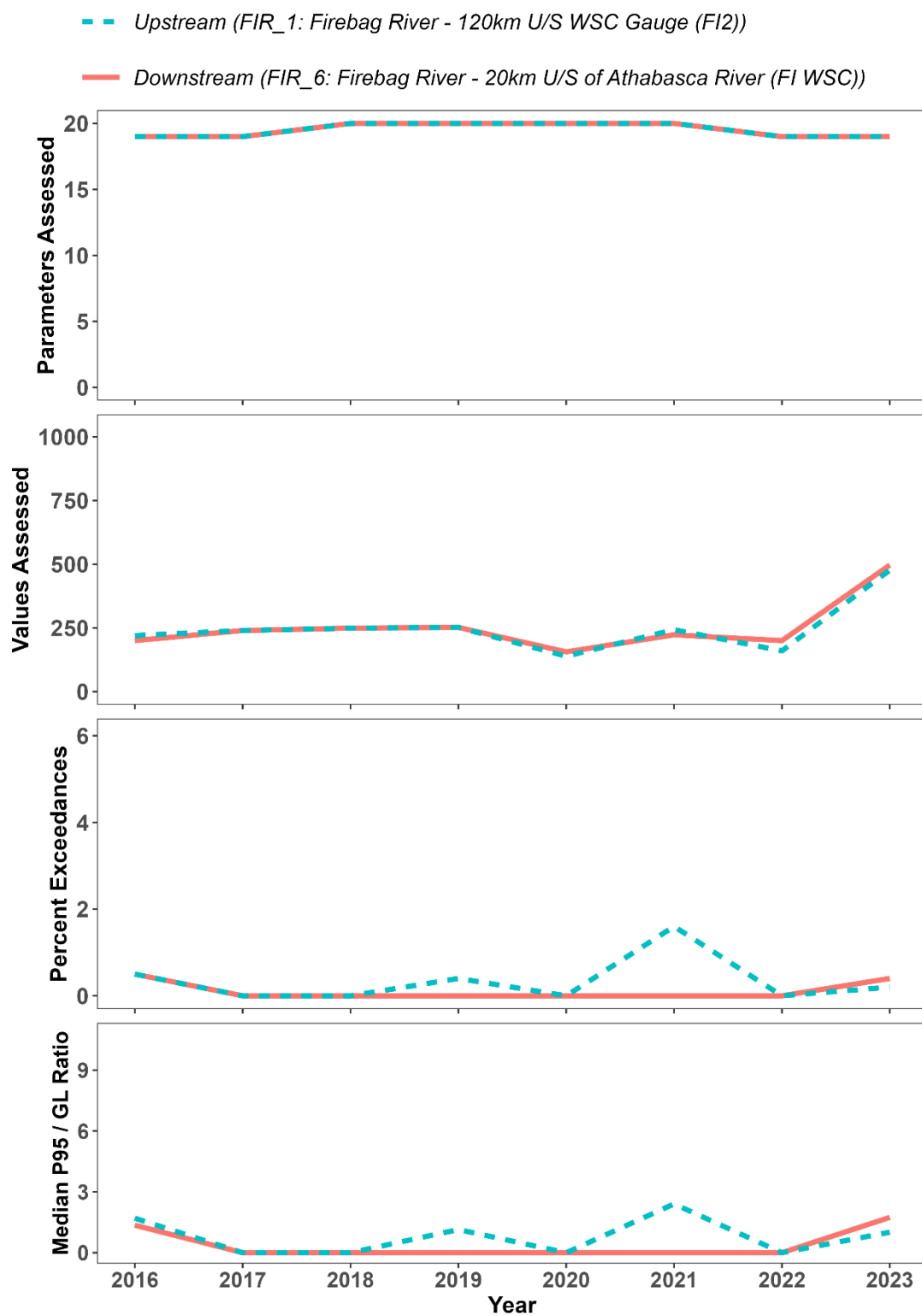


Figure I356: Comparison between exceedances at upstream and downstream sites on the Firebag River when considering Alberta EPA protection of irrigation water guidelines.

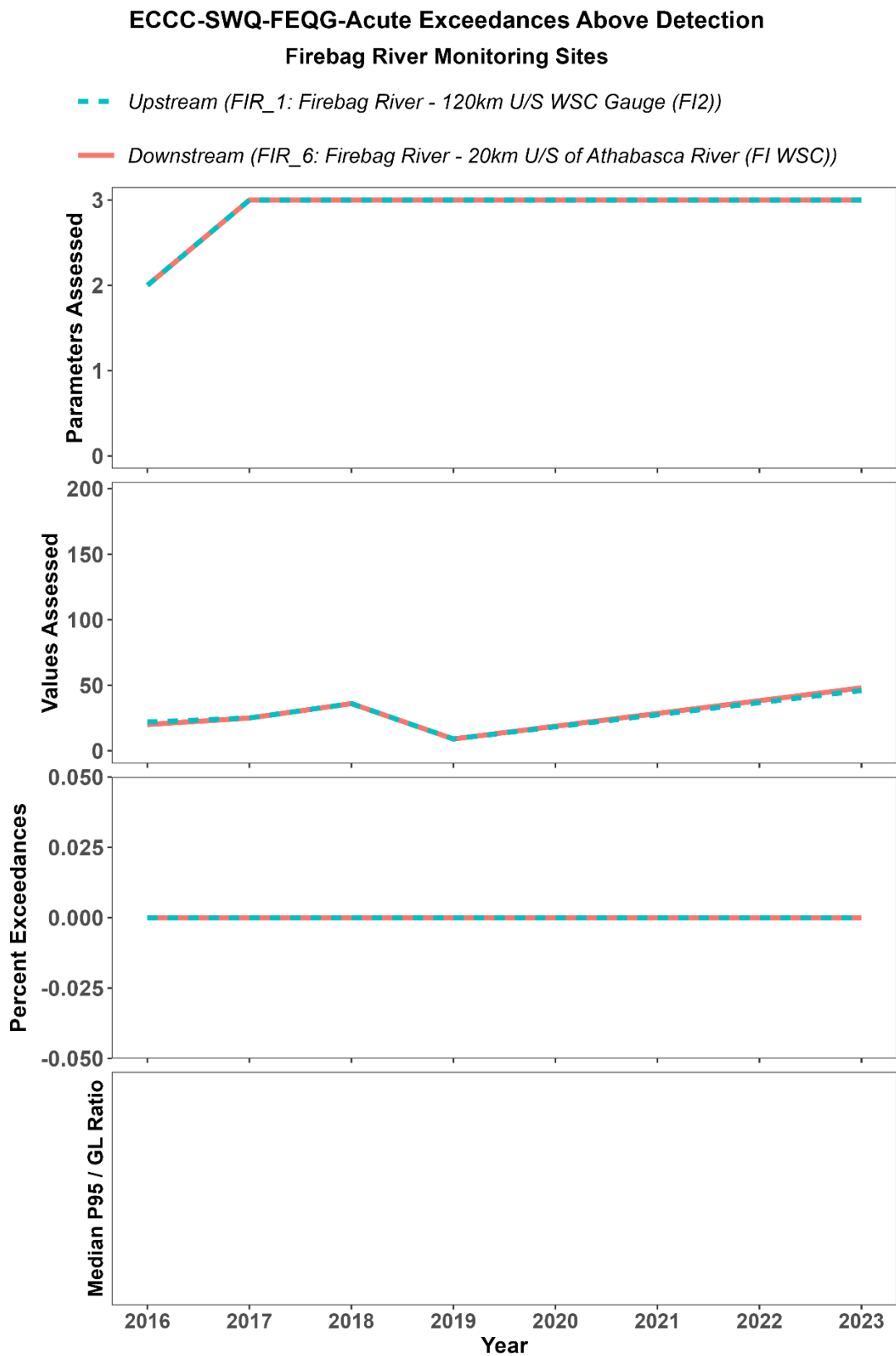


Figure I357: Comparison between exceedances at upstream and downstream sites on the Firebag River when considering ECCC Federal Environmental Quality Guidelines protection of aquatic life acute guidelines.

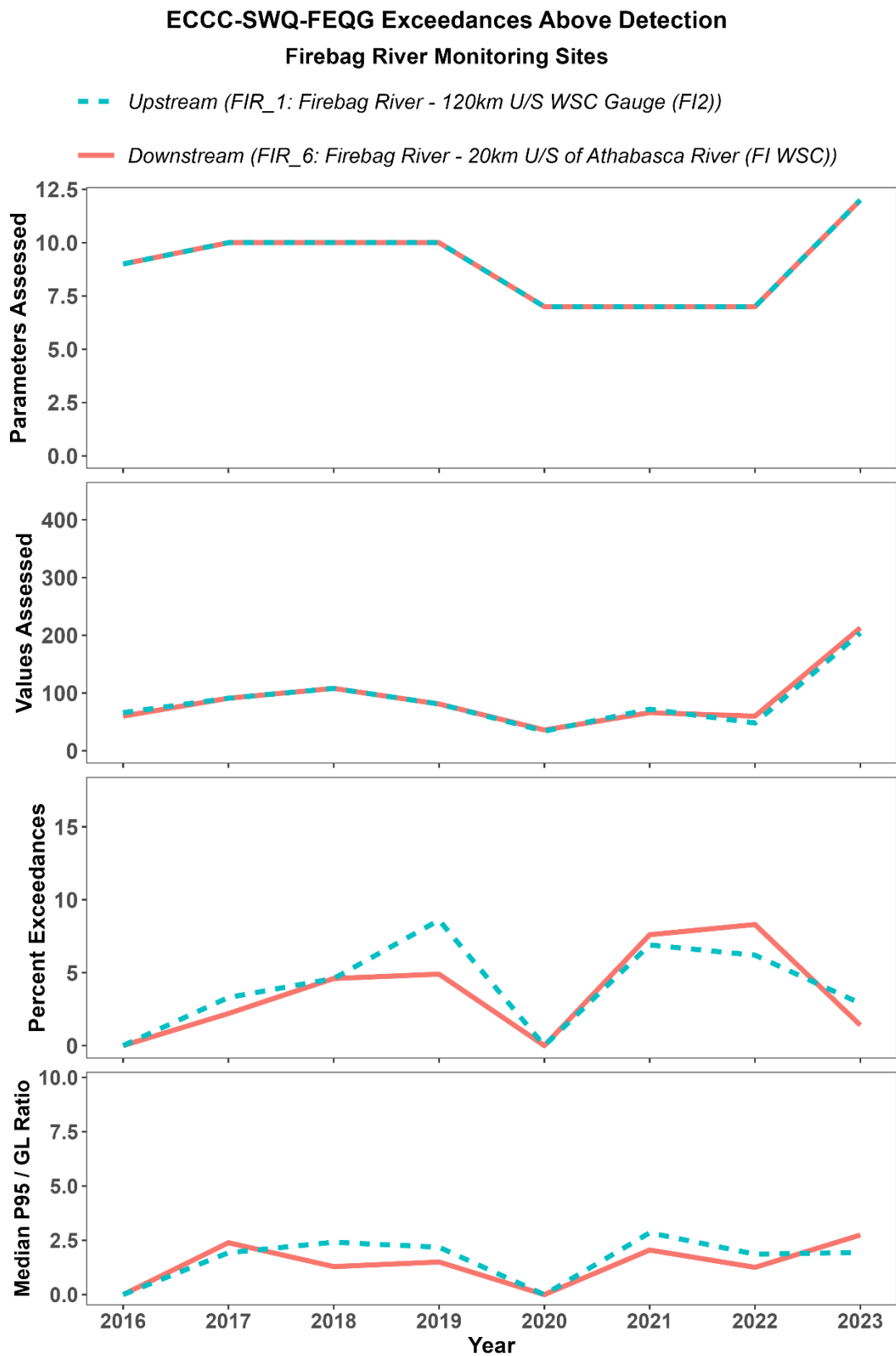


Figure I358: Comparison between exceedances at upstream and downstream sites on the Firebag River when considering ECCC Federal Environmental Quality Guidelines protection of aquatic life chronic guidelines.

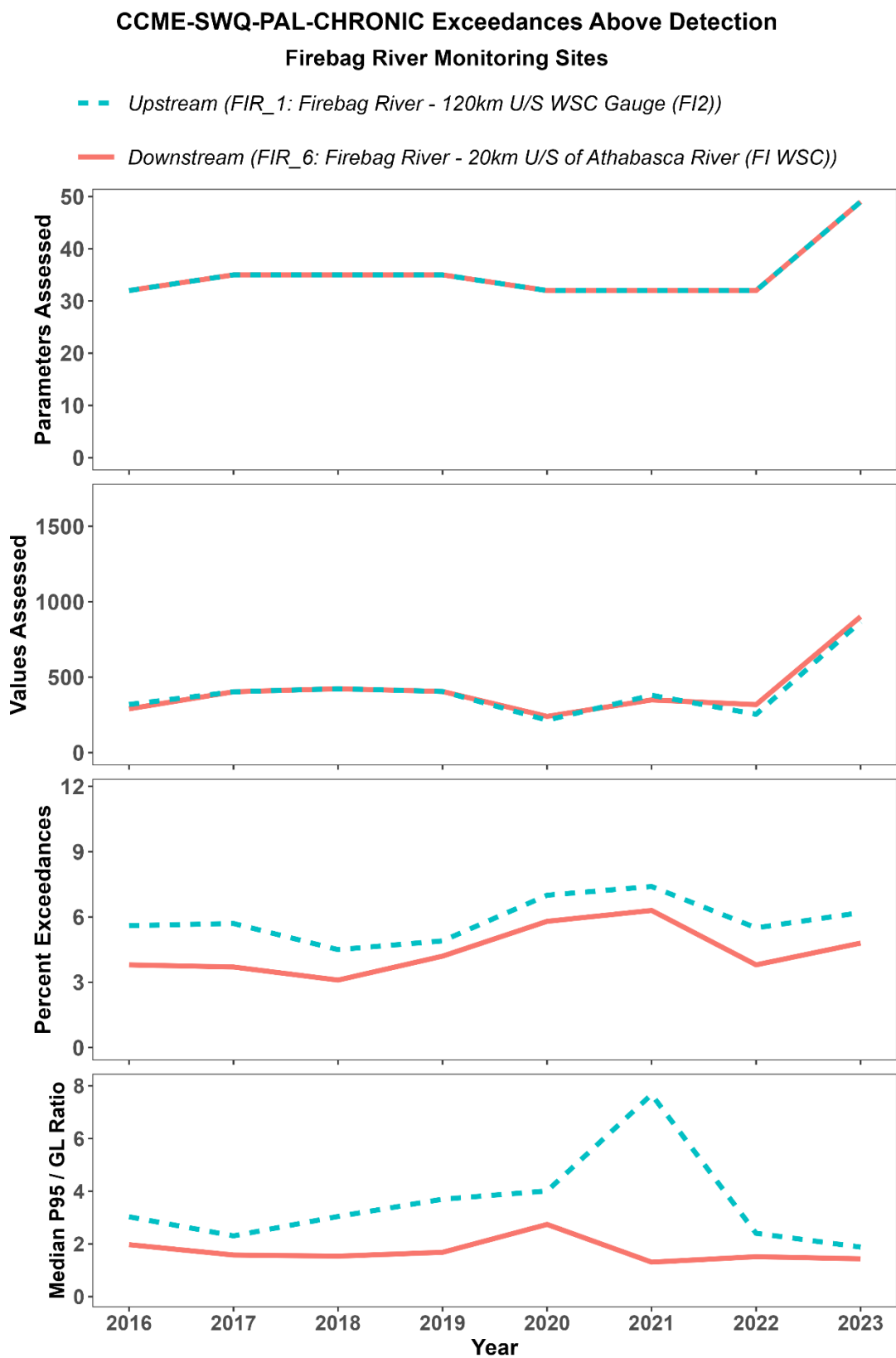


Figure I359: Comparison between exceedances at upstream and downstream sites on the Firebag River when considering CCME protection of aquatic life chronic guidelines.



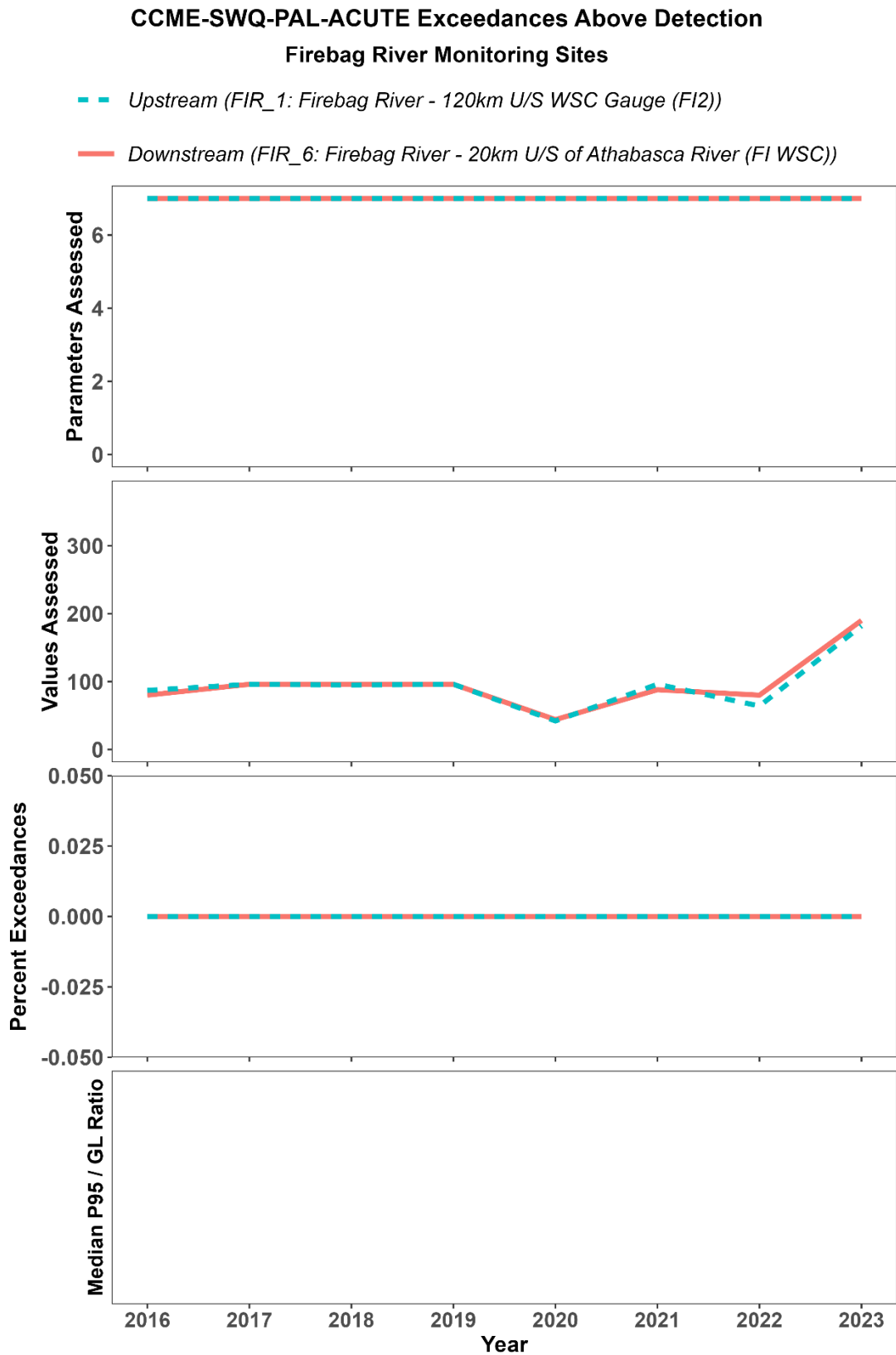


Figure I360: Comparison between exceedances at upstream and downstream sites on the Firebag River when considering CCME protection of aquatic life acute guidelines.

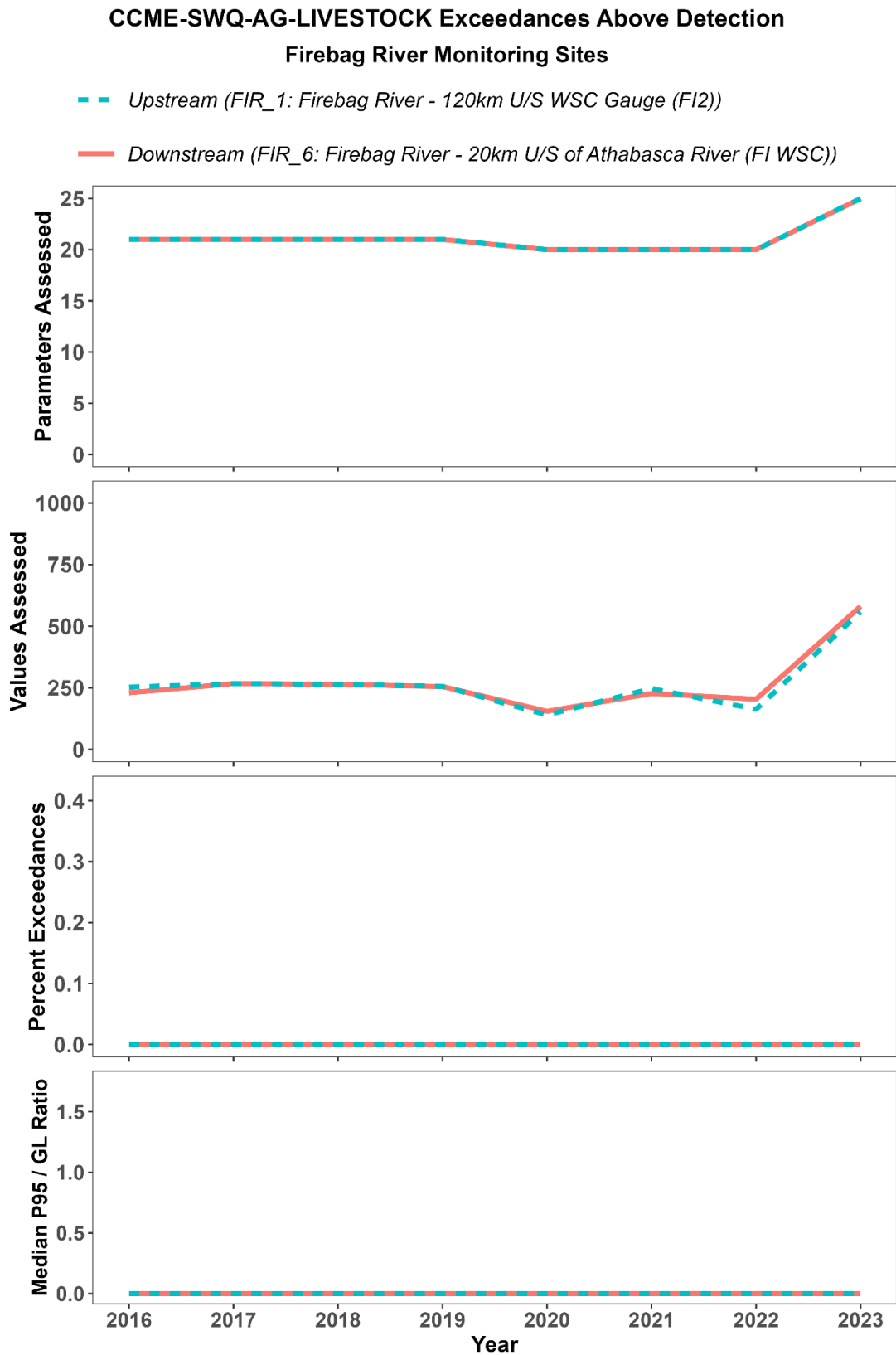


Figure I361: Comparison between exceedances at upstream and downstream sites on the Firebag River when considering CCME protection of livestock watering guidelines.

### CCME-SWQ-AG-IRRIGATION Exceedances Above Detection Firebag River Monitoring Sites

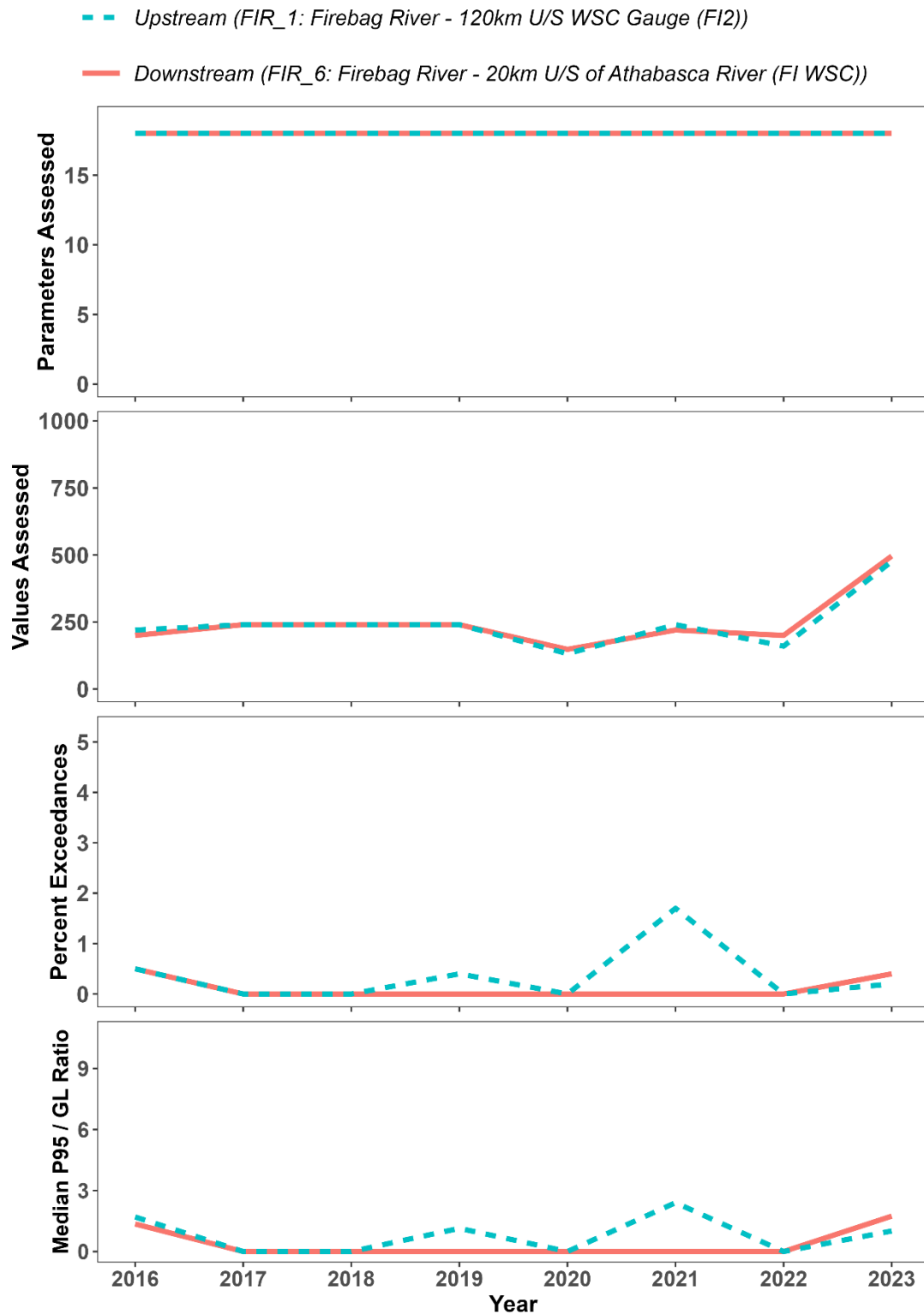


Figure I362: Comparison between exceedances at upstream and downstream sites on the Firebag River when considering CCME protection of irrigation water guidelines.

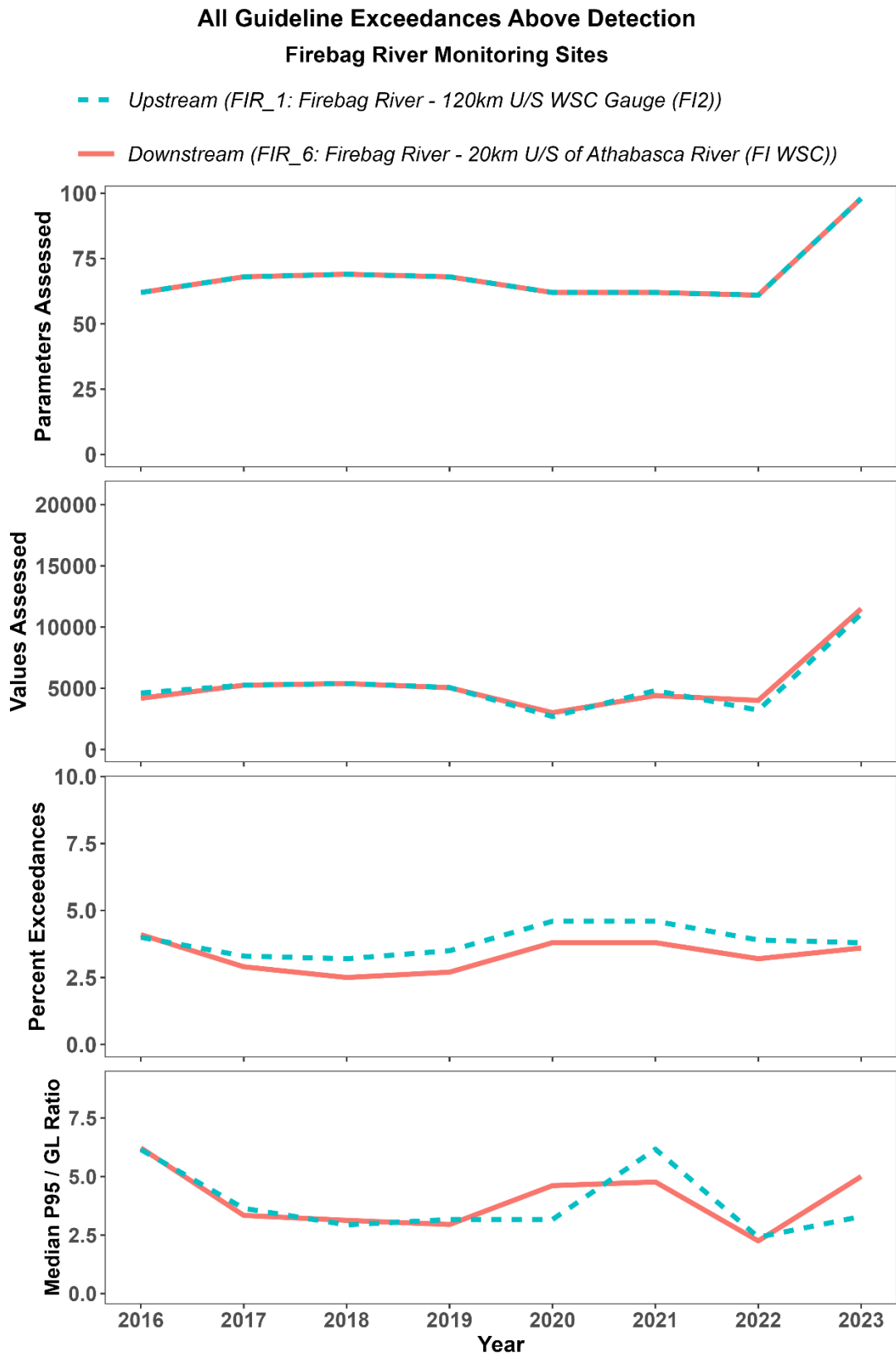


Figure I363: Comparison between exceedances at upstream and downstream sites on the Firebag River when considering all guidelines.