

# Traffic light index (TLI) of forage balance of Atlantic Menhaden and resident Striped Bass in Maryland's portion of Chesapeake Bay - update through 2024



See the following report for a full technical explanation of the traffic light index:

*A traffic light index for communicating forage balance of Atlantic Menhaden and resident Striped Bass in Maryland's portion of Chesapeake Bay*

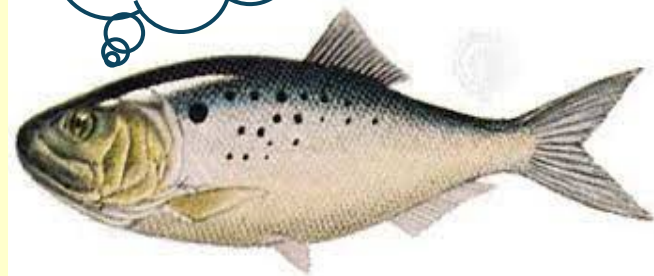
# **What you will find in this presentation on the traffic light index (TLI)**

- **A brief description of what it is and how it's done (methods)**
- **The TLI time-series color display**
- **A brief summary statement of current status**
- **Time-series graphs of status indicators**
  - **Time series for indicators starting at the beginning of the reference period with the TLI boundaries for good, bad, and caution intervals**
  - **Long term time-series for indicators**

# Traffic light index (TLI)

- The TLI is a communication tool
- TLI colors represent good (green), poor (red), and caution (yellow) status of indicators
- Presents and integrates time-series of stock, fishery, and ecosystem indicators
- **The TLI is not directly linked to management**

Poor  
Caution  
Good



# Three core TLI Menhaden indices

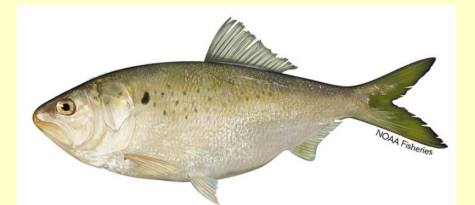
- **Harvestable biomass: 1 year-old and older (ages 1+) index**
  - Menhaden big enough for harvest
  - Potomac River pound net catch weight per net day
  - 1964-present; continuous estimates
  - From Potomac River Fisheries Commission
  - Used in past coastal stock assessments



- **Age 0 abundance: MD juvenile index (JI)**
  - This year's production; too small for harvest
  - Catch per standard seine haul (geometric mean) at fixed tributary stations
  - 1959-present
  - Index or data used in coastal assessments
  - JI used in multiple journal publications



- **Fishing mortality (F): Trend in relative F in Bay**
  - Relative F = Bay landings / 2 yr mean of PRFC indices
  - 1964-present
  - Change in migration could be an issue

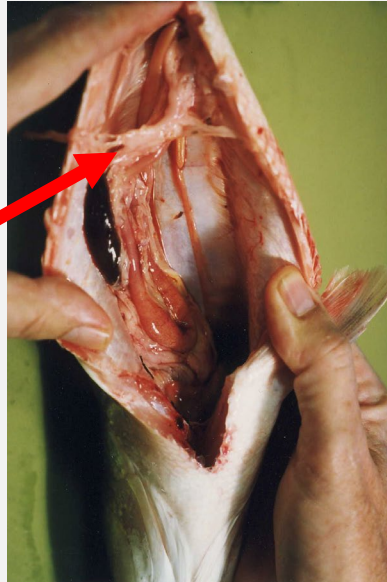


# Three core indices for Striped Bass

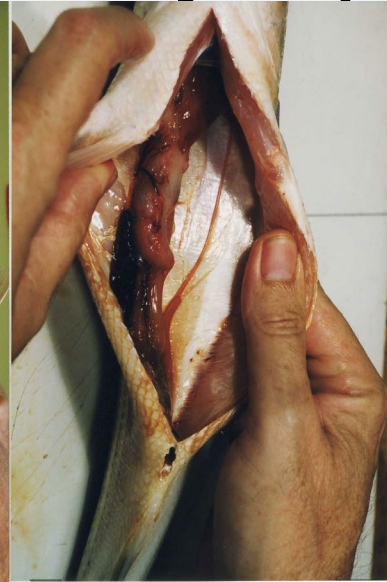
- **Fall condition (proportion without body fat present)**

- October-November
- Starvation potential
- 1998-present

Fat present



Fat absent



- **Menhaden availability = Potomac River (ages 1+) or JI (age 0) index / Striped Bass biomass**

- Striped Bass ages 3-6 biomass from coast stock assessment
- Striped Bass biomass not Bay specific, but should reflect Bay trend

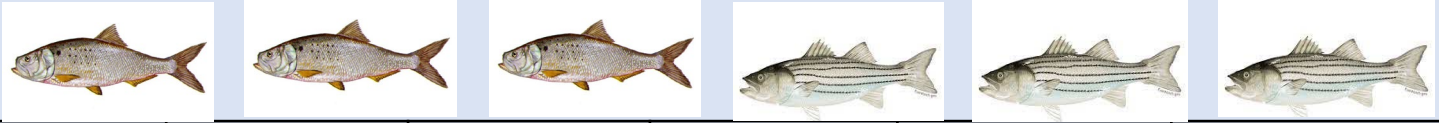
# Traffic light boundaries for indices

- Boundaries developed from reference period
- Use 25% for poor conditions (red).
  - Lowest 25% for metrics where higher is better
  - Highest 25% for metrics where lower is better
- Use median (50%) as indicator of good conditions (green)
  - Highest 50% for metrics where higher is better
  - Lowest 50% for metrics where lower is better
- Between is yellow – uncertain, use caution

•  
**Reference period is 1995-2021 (to be updated as needed)**

- **Recovered stock: Striped Bass managed for high abundance and bigger fish**
- **Increased forage demand due to low Striped Bass F, high size limits, and strong year-classes**
- **Major MD forage indices shifted downward (Menhaden, Spot, Bay Anchovy, Blue Crab)**
- **Increased angler reports of lesions and skinny or starving Striped Bass**
- **Mycobacteriosis became widespread in Bay Striped Bass**
- **Tag-based estimates of Striped Bass natural (non-fishing) mortality increased**

# Traffic light index, 1995-2007



	Biomass	Fishing mortality	Juvenile Index	Available Ages 1+	Available Age 0	Condition
1995	Red	Red	Red	Yellow	Red	White
1996	Red	Red	Red	Red	Red	White
1997	Red	Red	Yellow	Red	Yellow	White
1998	Red	Red	Yellow	Red	Red	Red
1999	Yellow	Yellow	Yellow	Red	Yellow	Red
2000	Yellow	Yellow	Yellow	Yellow	Red	Red
2001	Red	Red	Yellow	Red	Yellow	Red
2002	Red	Red	Red	Red	Red	Yellow
2003	Red	Red	Red	Red	Red	Red
2004	Green	Yellow	Red	Yellow	Red	Red
2005	Yellow	Yellow	Green	Yellow	Green	Yellow
2006	Yellow	Green	Yellow	Yellow	Red	Yellow
2007	Green	Green	Yellow	Green	Yellow	Yellow

Bay  
Cap



# Traffic light index, 2008-2020



	Biomass	Fishing mortality	Juvenile Index	Available Ages 1+	Available Age 0	Condition
2008	Green	Green	Green	Green	Yellow	Green
2009	Yellow	Yellow	Green	Yellow	Green	Green
2010	Green	Yellow	Green	Green	Green	Green
2011	Green	Green	Yellow	Green	Green	Yellow
2012	Green	Green	Green	Green	Green	Yellow
2013	Green	Green	Green	Green	Green	Yellow
2014	Yellow	Green	Green	Green	Green	Green
2015	Yellow	Green	Green	Green	Green	Green
2016	Green	Green	Green	Green	Green	Yellow
2017	Yellow	Green	Red	Green	Yellow	Green
2018	Green	Green	Green	Green	Green	Green
2019	Green	Green	Green	Green	Green	Green
2020	Green	Green	Green	Green	Green	Green

**2013 = coastal quota for Menhaden**

# Traffic light index, 2021-2024



	Biomass	Fishing mortality	Juvenile Index	Available Ages 1+	Available Age 0	Condition
2021		*****				
2022		*****				
2023		*****				
2024		!!!!!!!		^^^^^^		

**\*\*\*\*\*** Indicates that average 2016-2020 bait landings were used because estimates were not available.

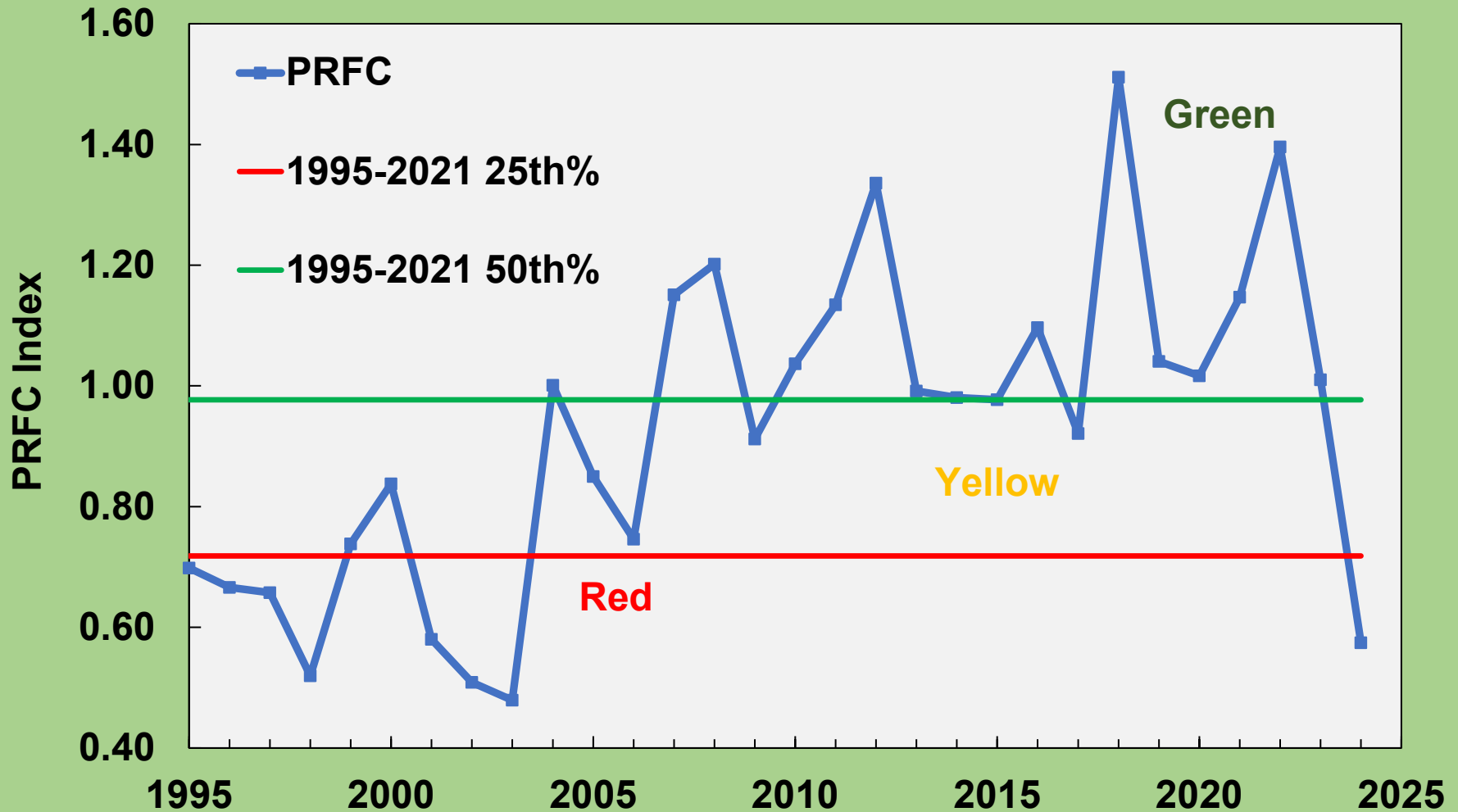
**!!!!!** Indicates that an estimate is unavailable because an index for the next year is required by the formula.

**^^^^** Indicates a projection of Striped Bass biomass was used. Current assessment goes to 2023.

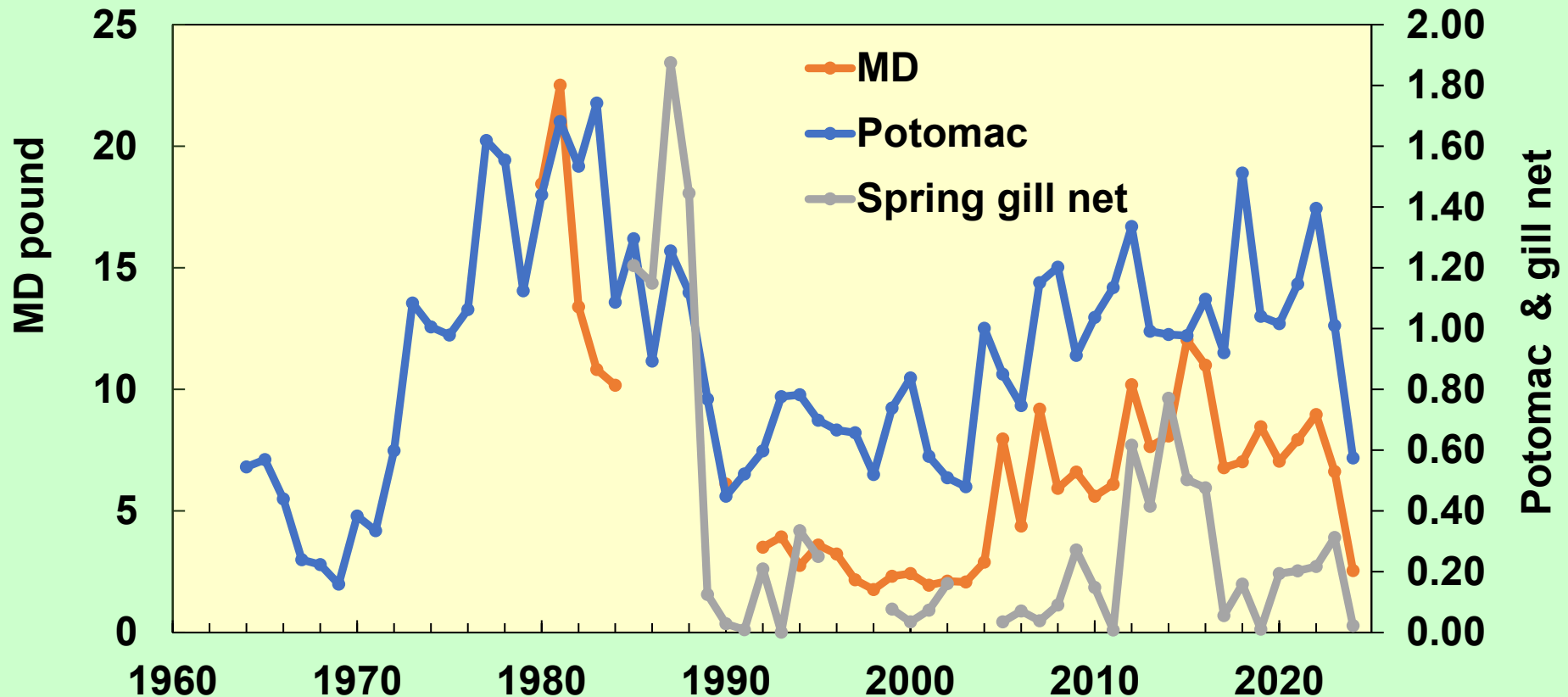
# Basic questions and answers

- **How are Menhaden doing in Maryland's part of the Bay?**
- Biomass of ages 1+ abruptly became poor in 2024. It was good from 2018-2023. Juvenile index has been good during 2018-2024. Relative fishing mortality has been good (low) during 2018-2023; a 2024 estimate will not be available until 2025 (formula needs a 2025 biomass index).
- **Are there enough for Striped Bass?**
- Condition and age 0 Menhaden availability indices were good in 2024. Ages 1+ Menhaden availability is in the caution region.

# Potomac River ages 1+ Menhaden index and its traffic light boundaries, 1995-2024



# Age 1+ Menhaden indices through 2024: relative biomass (MD and Potomac pound net) or relative abundance (MD Head-of-Bay spring Striped Bass gill net survey). MD indices are supplemental.

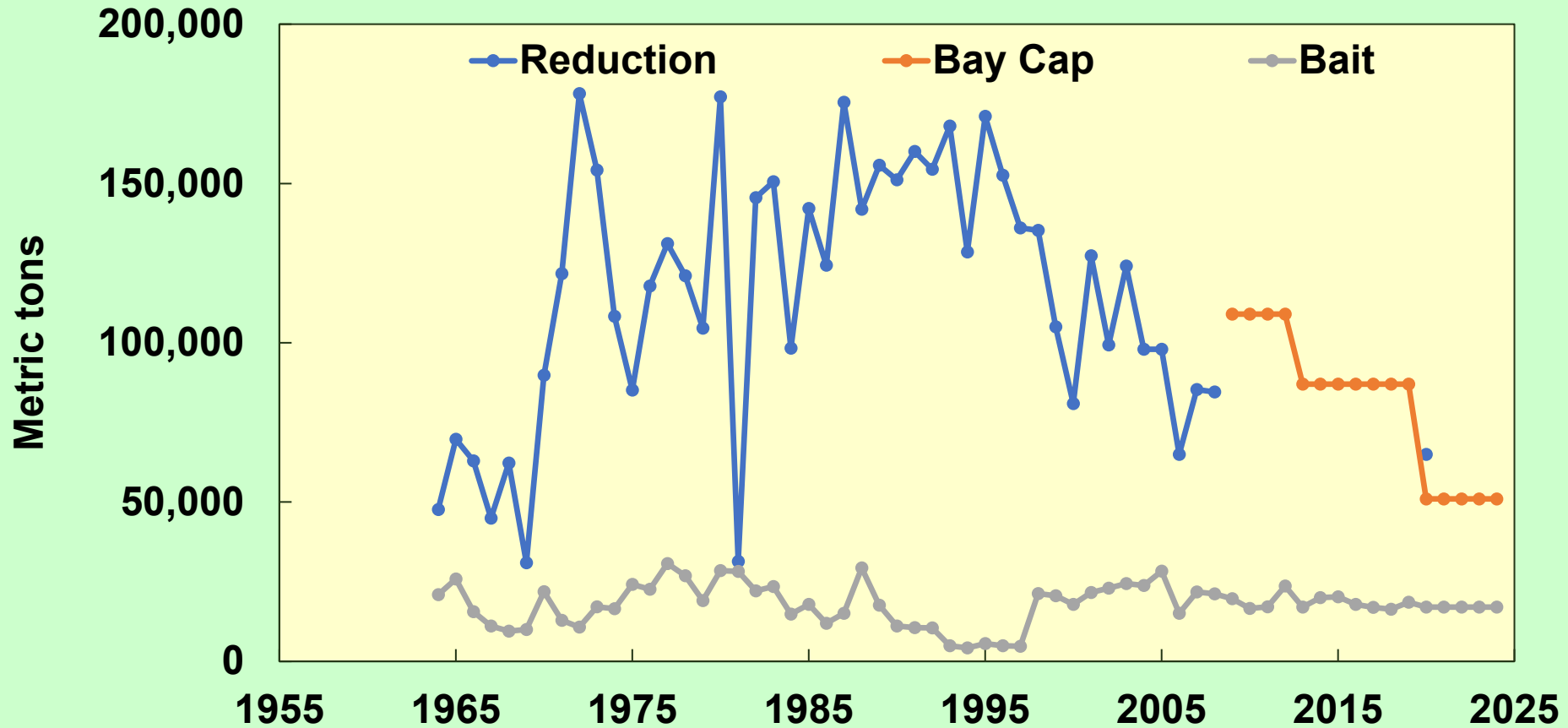


# Ostensible harvest:

## Bay reduction landing estimates, caps, and bait landings.

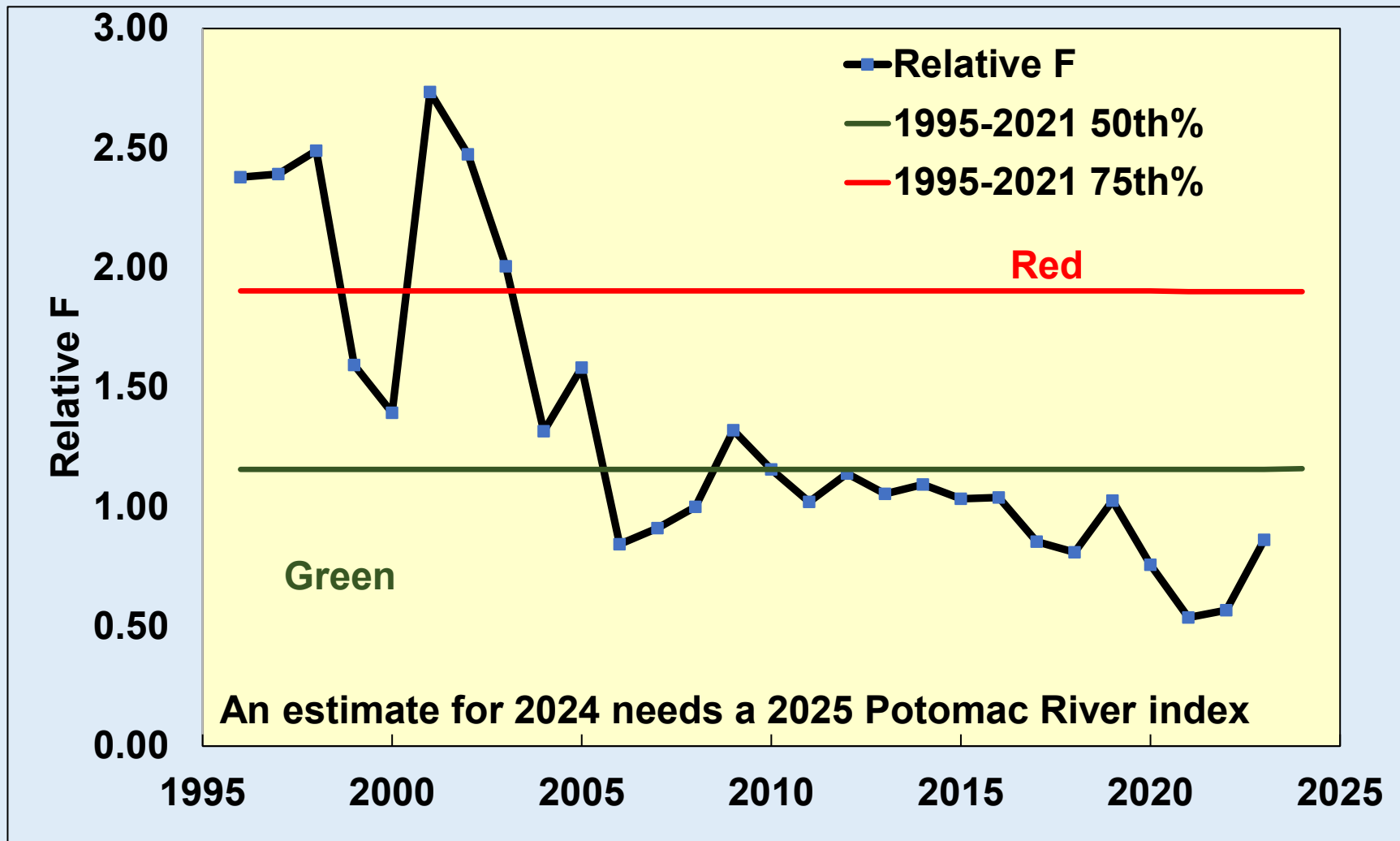
Bay-specific reduction landings estimates from Atlantic States Marine Fisheries Commission (ASMFC) available until 2008 then Bay reduction fishery caps used (2020 reported overage used).

Bait landings 2021-2024 = average of 2016-2020 ASMFC Plan Development Team landings



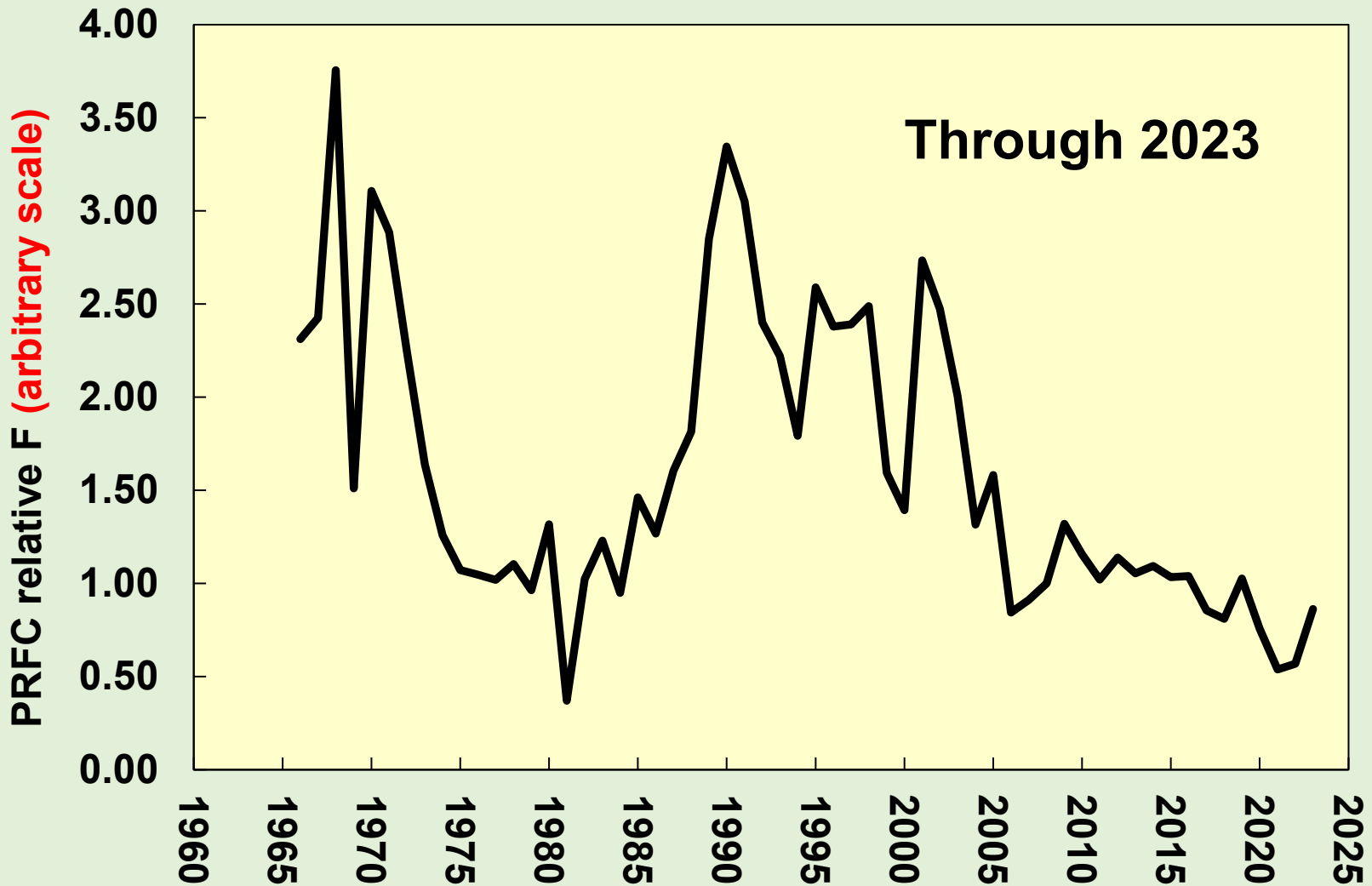
# Bay Menhaden relative F (fishing mortality trend) during 1995-2023 and its traffic light boundaries

Bait landings 2021-2024 = average of 2016-2020 ASMFC Plan Development Team landings



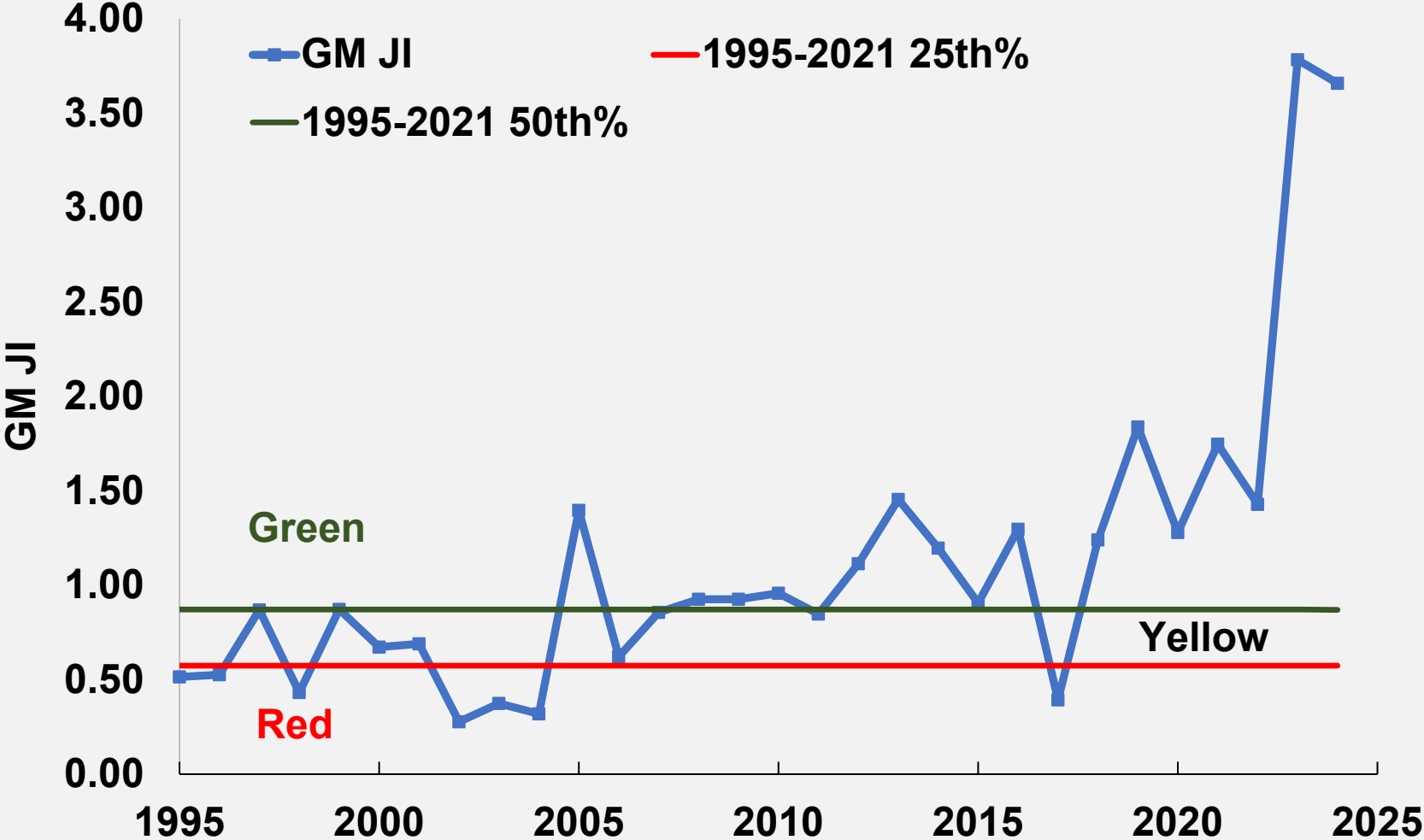
Bay Relative F = trend in F (if no major migration change)  
Relative F = Ostensible landings in year t / (mean Potomac R.  
index in yr t & t+1).

Landings = bait + reduction harvest or cap.  
Landings divided by a scalar to remove leading 0's.

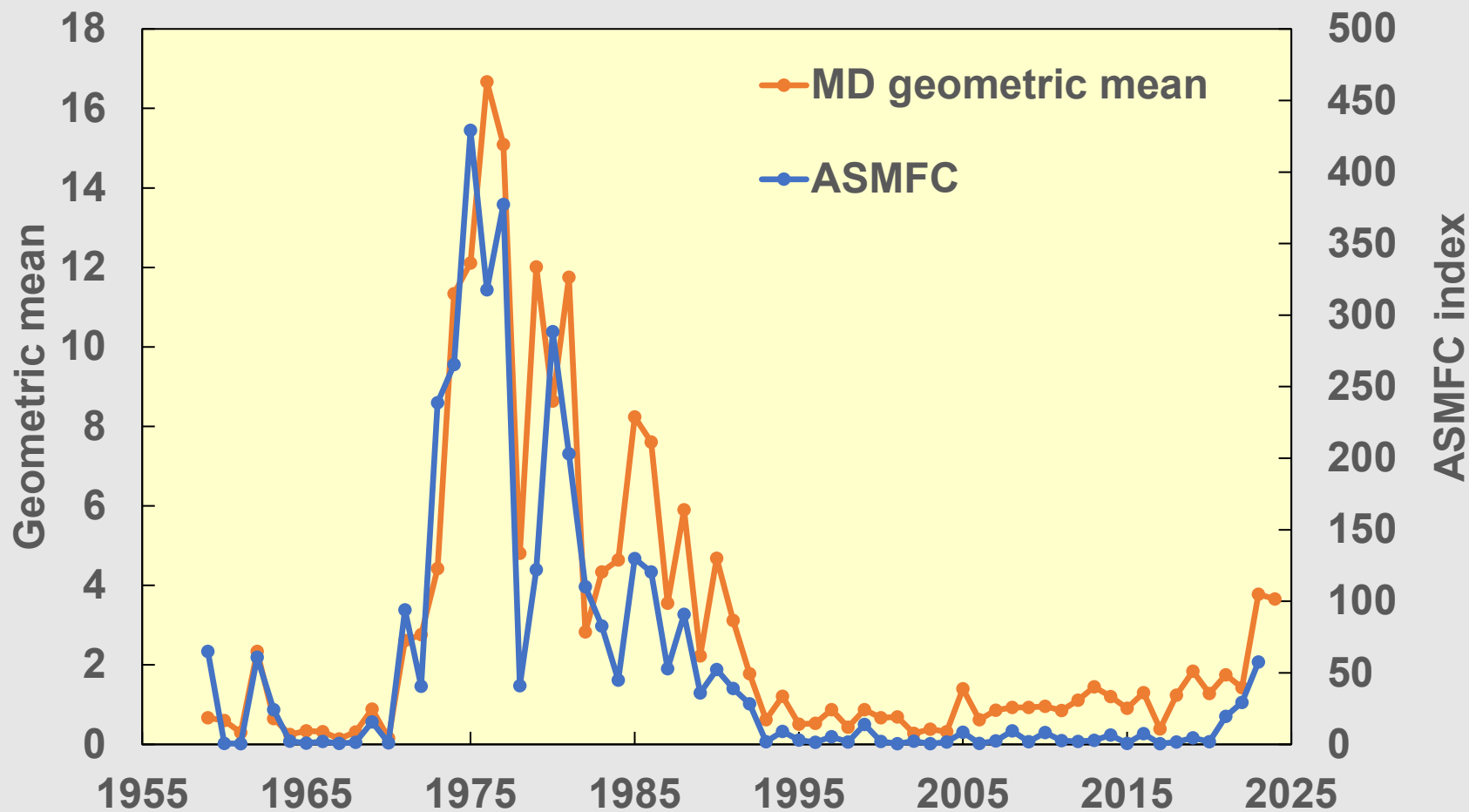




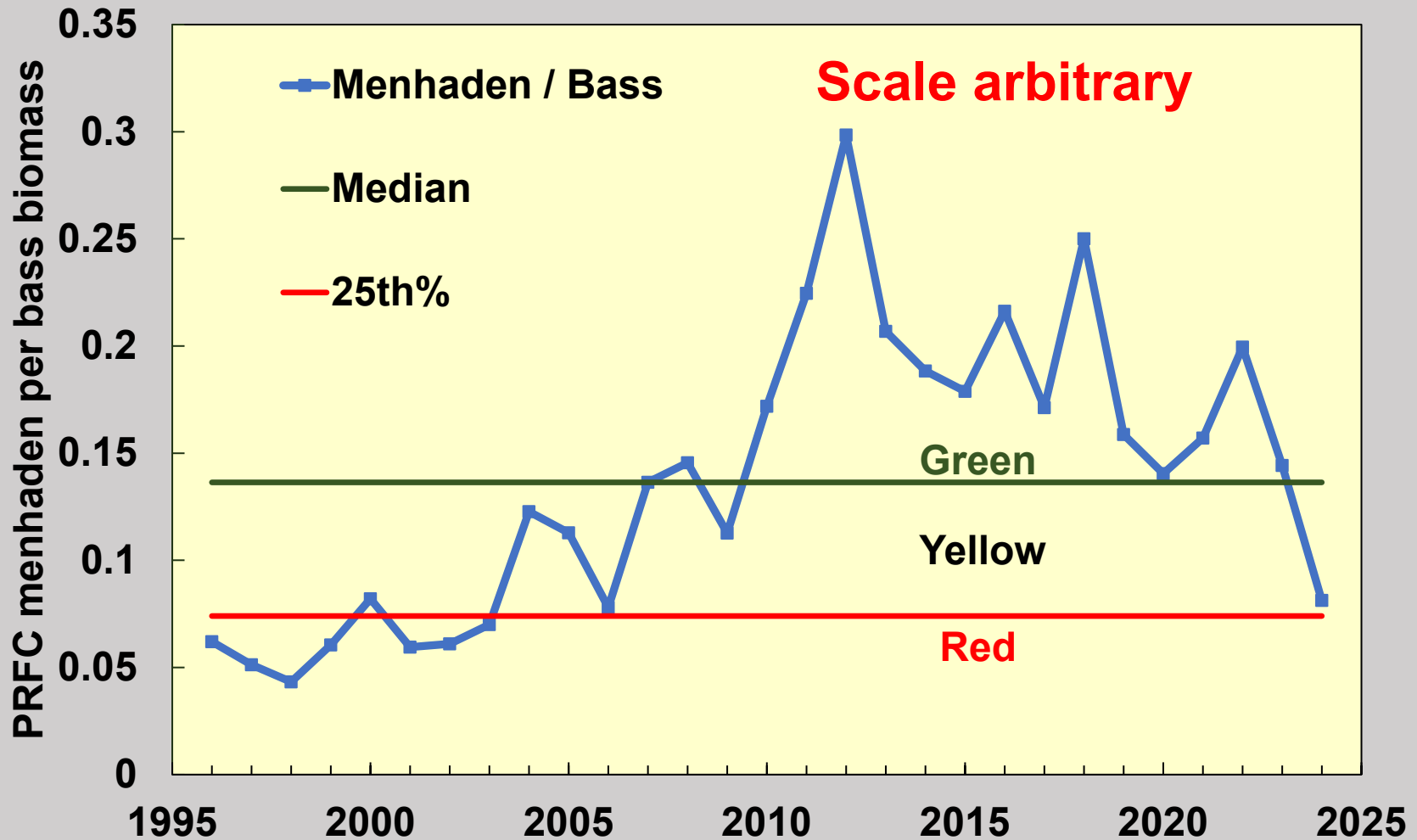
# Menhaden juvenile index through 2024 and its traffic light boundaries



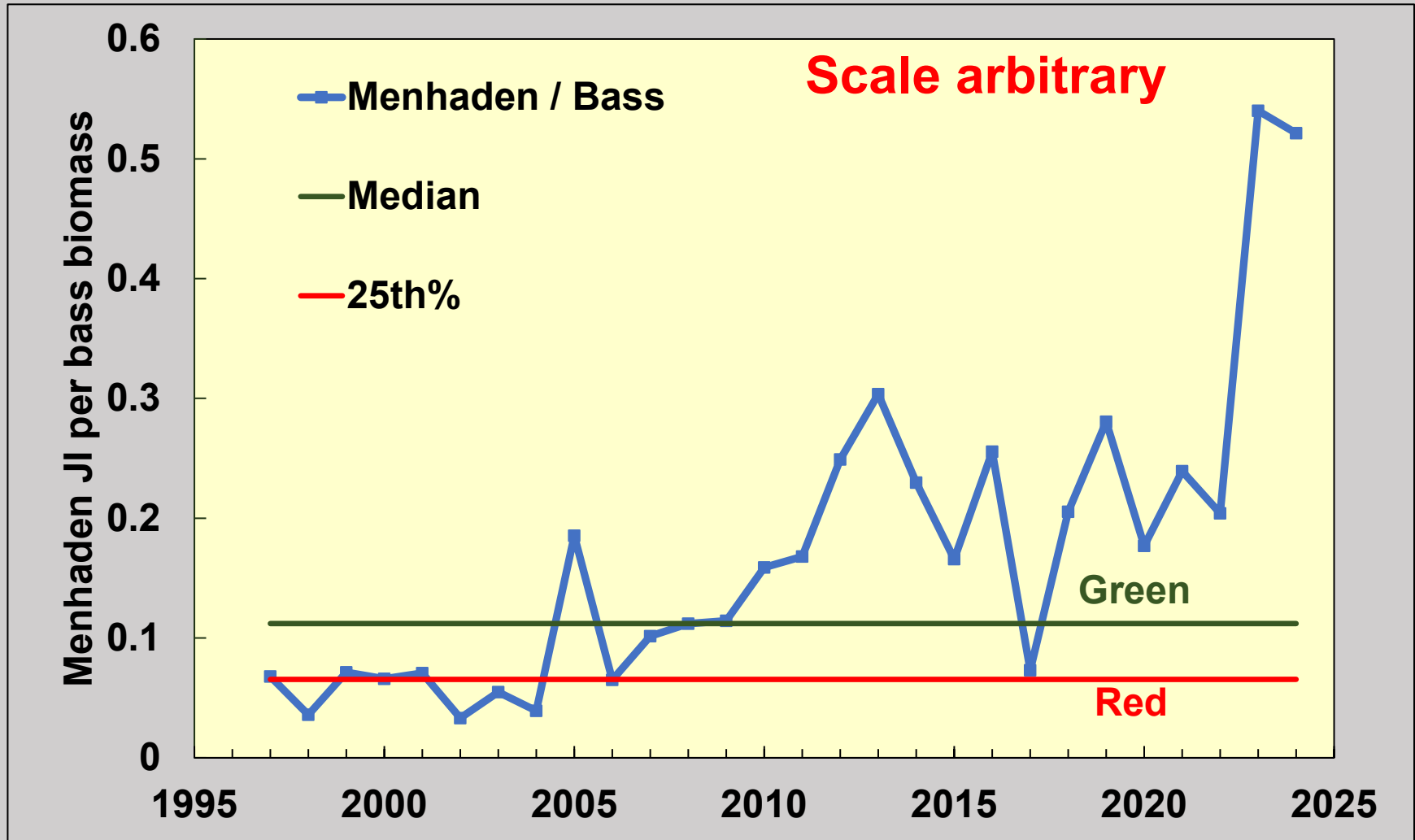
# Maryland juvenile index (a core index) and the supplemental ASMFC juvenile index, 1959-2024



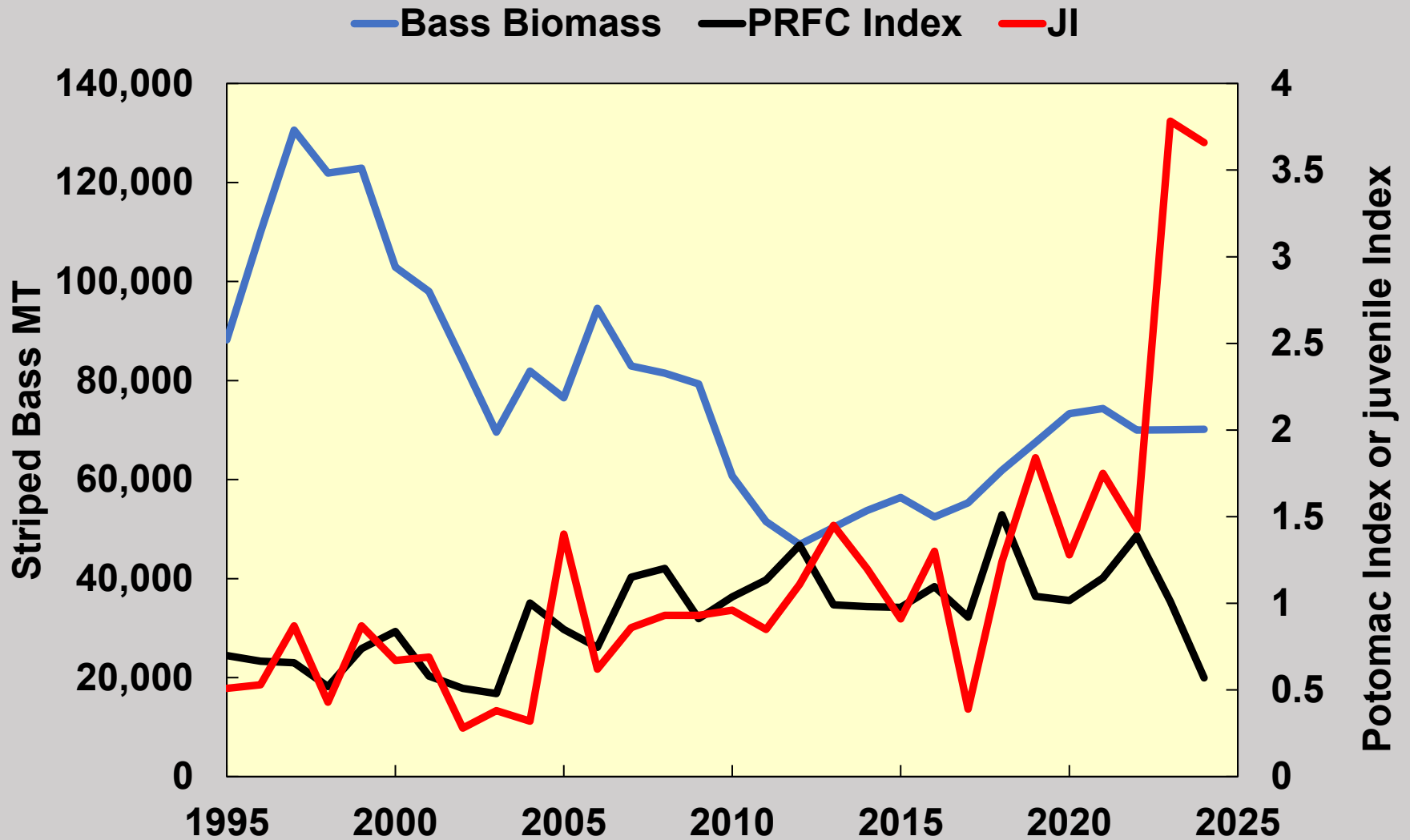
# **Ages 1+ availability index: Potomac River Menhaden index per age 3-6 bass biomass ( $\div$ scalar) trend and its traffic light boundaries**



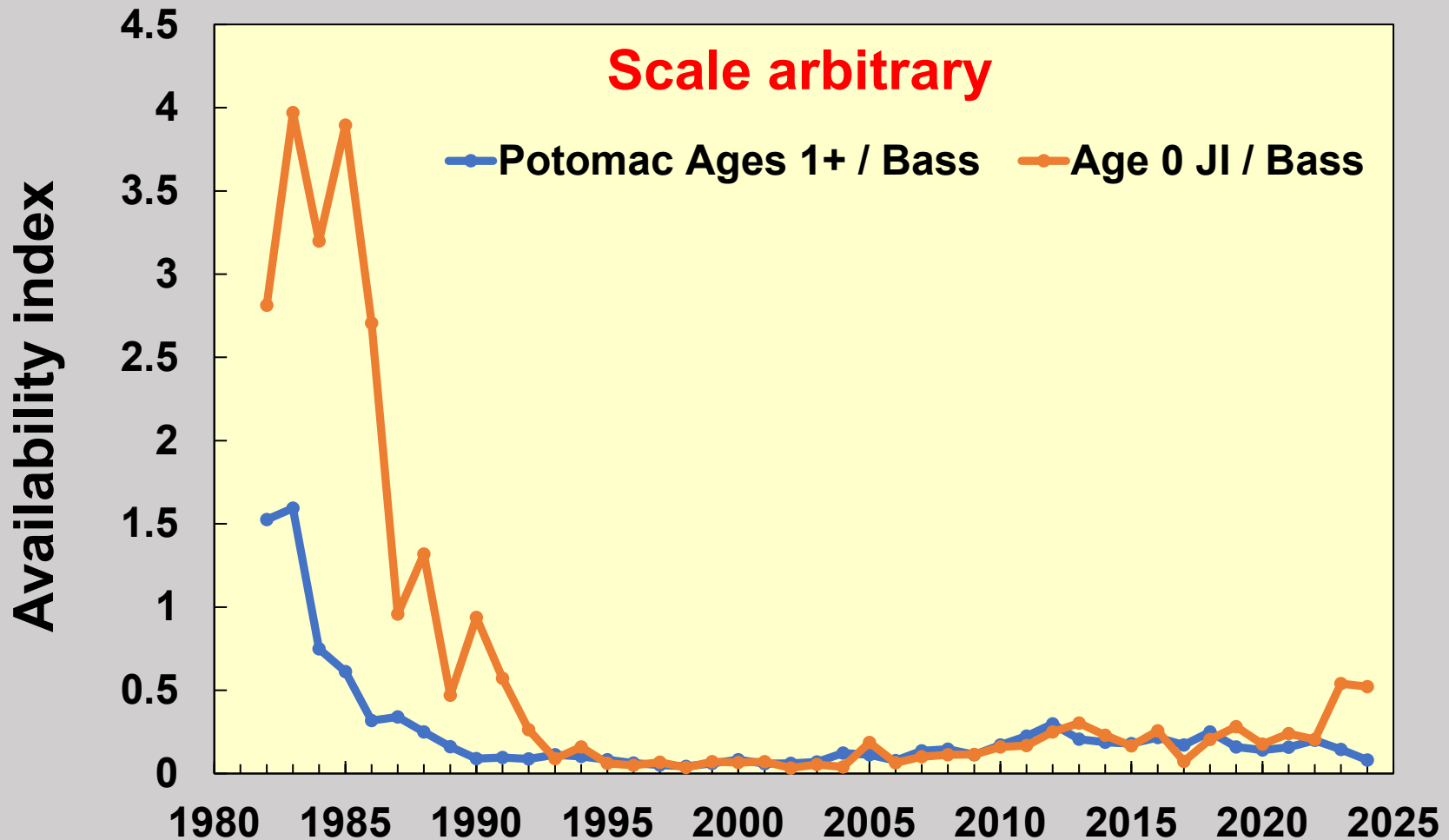
# Age 0 availability index: Menhaden juvenile index per age 3-6 bass biomass ( $\div$ scalar) trend and its traffic light boundaries



# Trends in components of Menhaden availability indices, 1995-2024



# Long-term trends of availability of age 0 or ages 1+ Menhaden.



**Condition: Proportion of Striped Bass (457-711 mm, 18-28 inches) without body fat during October-November DNR health survey and 90% confidence interval, with traffic light index boundaries.**

