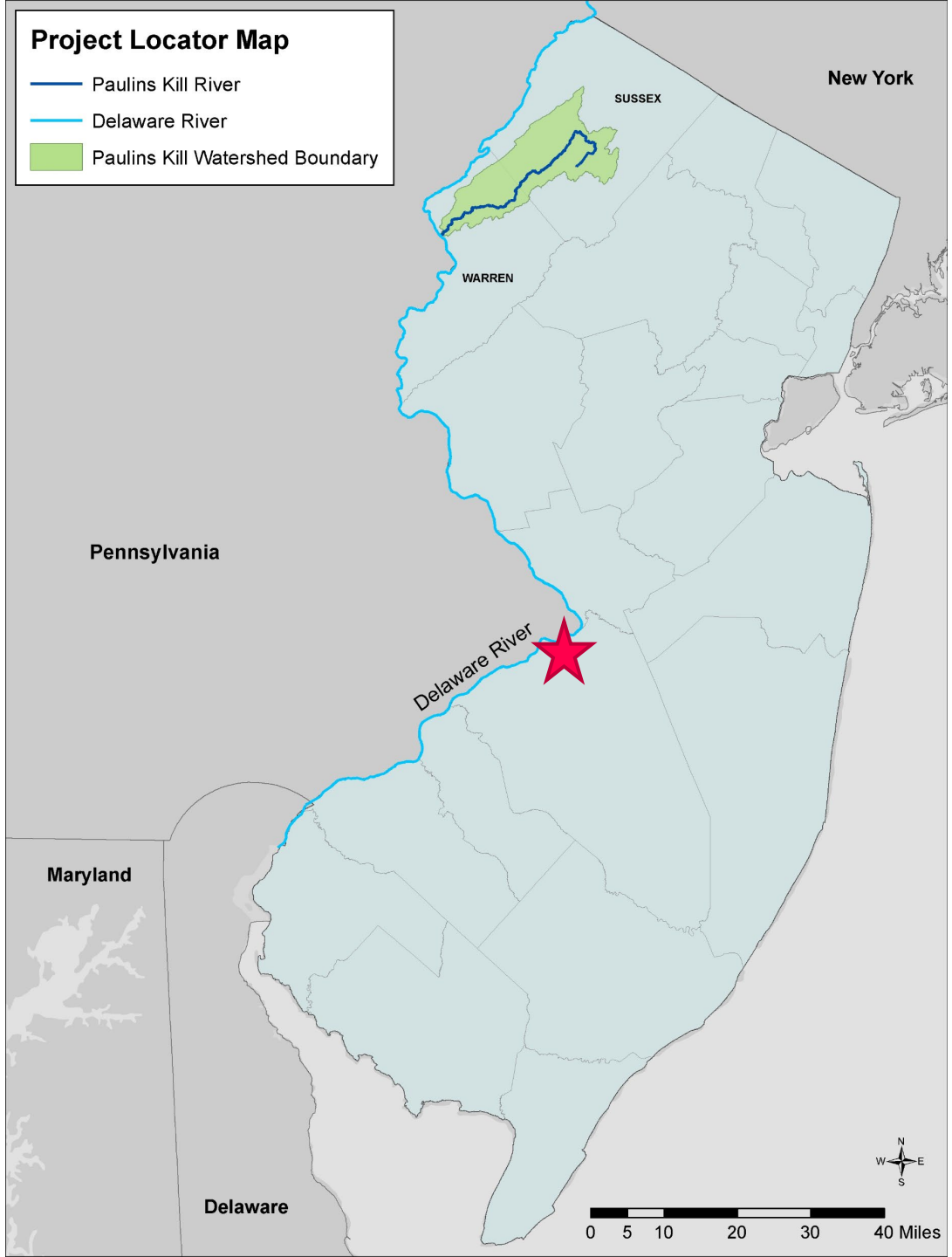
The Nature Conservancy

A Decade of Monitoring the Paulins Kill Watershed

Chloe Pearson

Freshwater Science Specialist



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Paulins Kill

Location: Northwest NJ

Length: ~42 miles

Feeds into Delaware River

- Third largest contributor in NJ

★ Rutgers Eco Complex

Good to Great

Before starting this work:

- ~3/4 of floodplain natural cover
- >1/4 of watershed already protected
- Popular for fly fishing, birding, hiking, hunting, kayaking

Human Impact

Barriers

Impaired water quality

Unstable stream banks

Erosion

Disconnection from floodplain

Paulins Kill Watershed Wide Initiative

2016-2025

The Nature Conservancy

NEW JERSEY DEP Fish and Wildlife

NEW JERSEY • DEPARTMENT OF ENVIRONMENTAL PROTECTION

biodrawversity

Vision and Goals for the Paulins Kill

Natural flow, clean water, and connected in-stream habitat

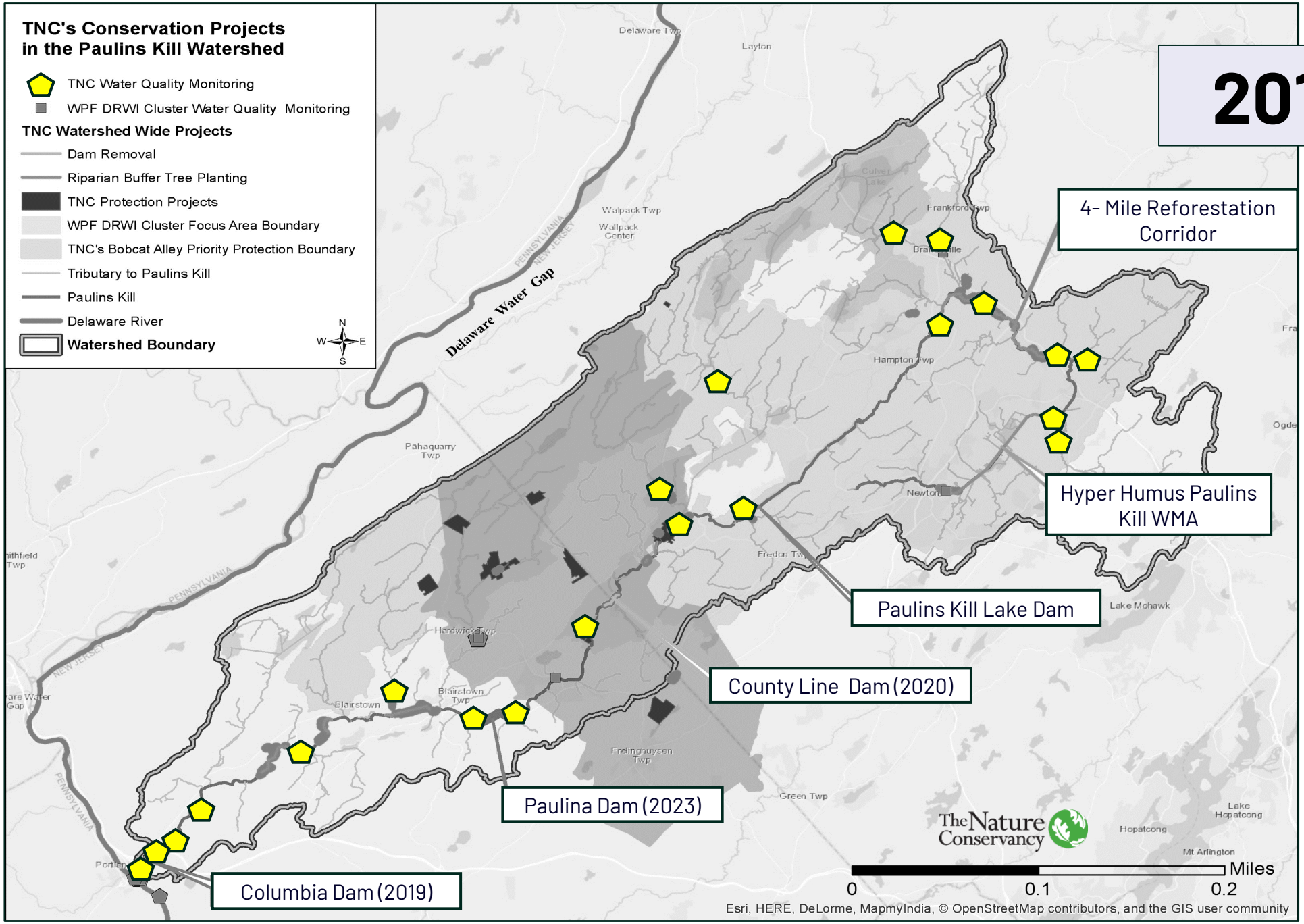
Balanced land-use in watershed, including intact riparian habitats

Inform further watershed conservation

Restoration

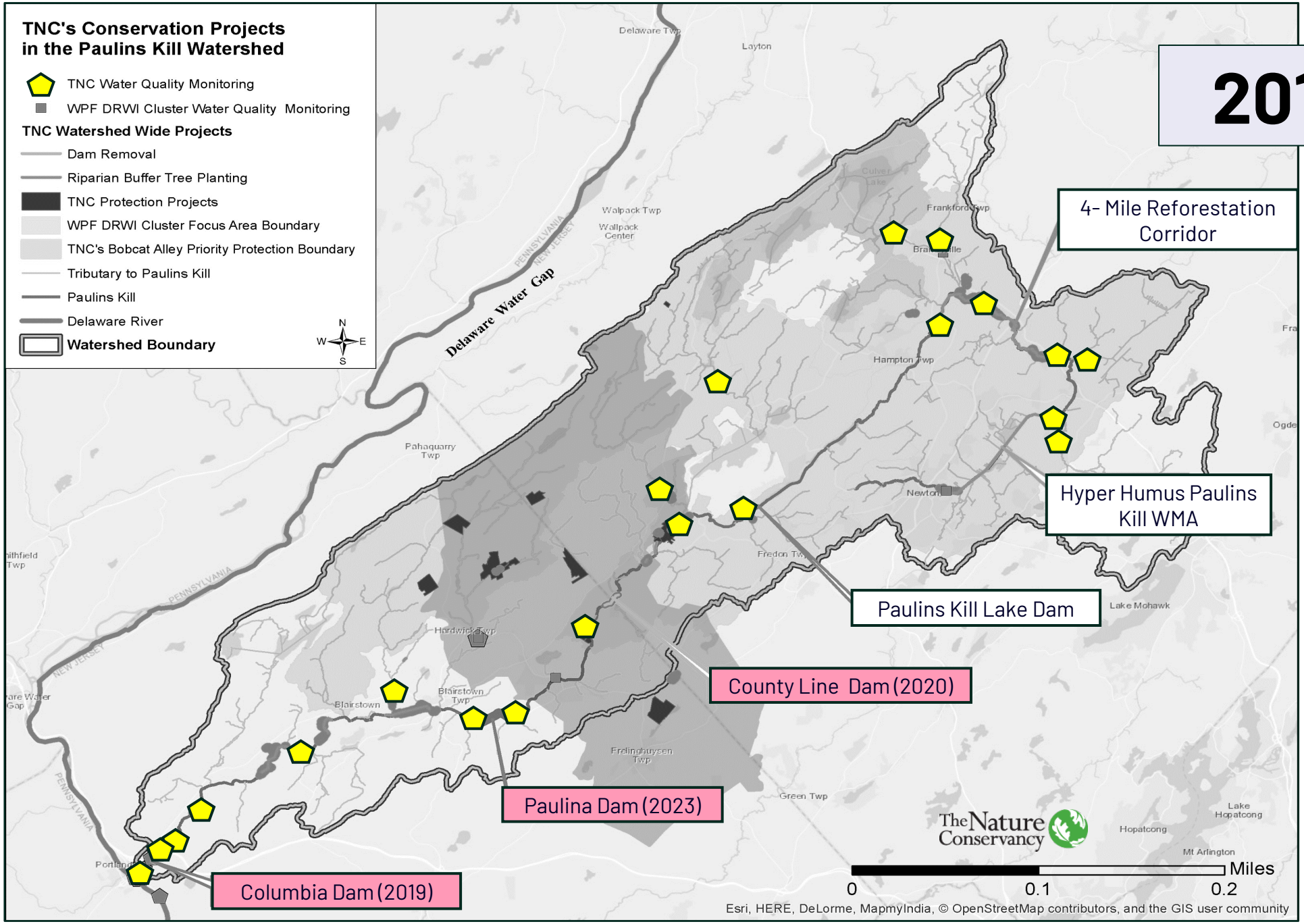
Dam removal x4 (Columbia and remnant, County Line, Paulina)

Floodplain restoration (58,000 trees)



2016 – 2025

21 sites in dataset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NEW JERSEY
4- Mile Reforestation Corridor
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The Nature Conservancy
Miles
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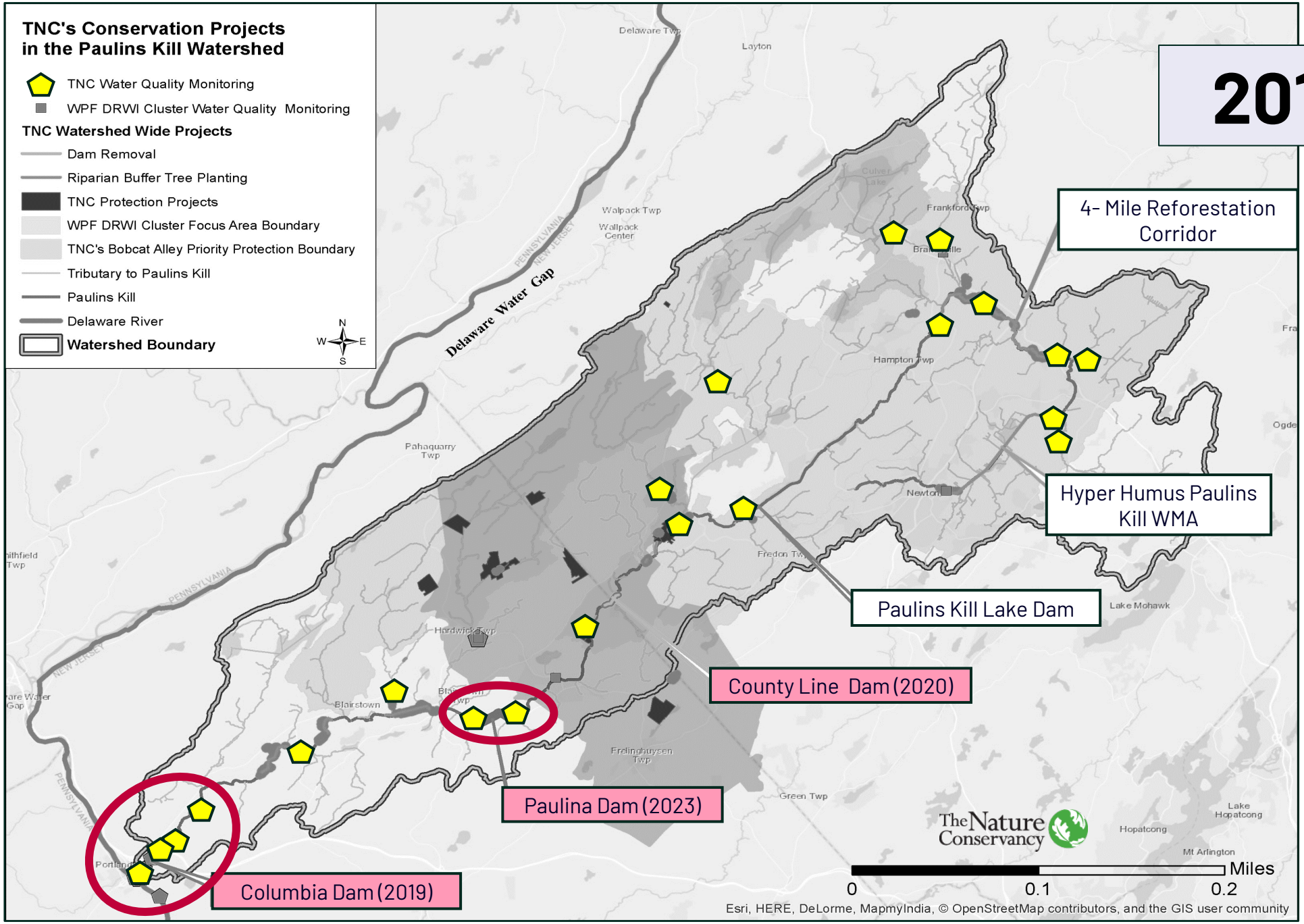
2016 – 2025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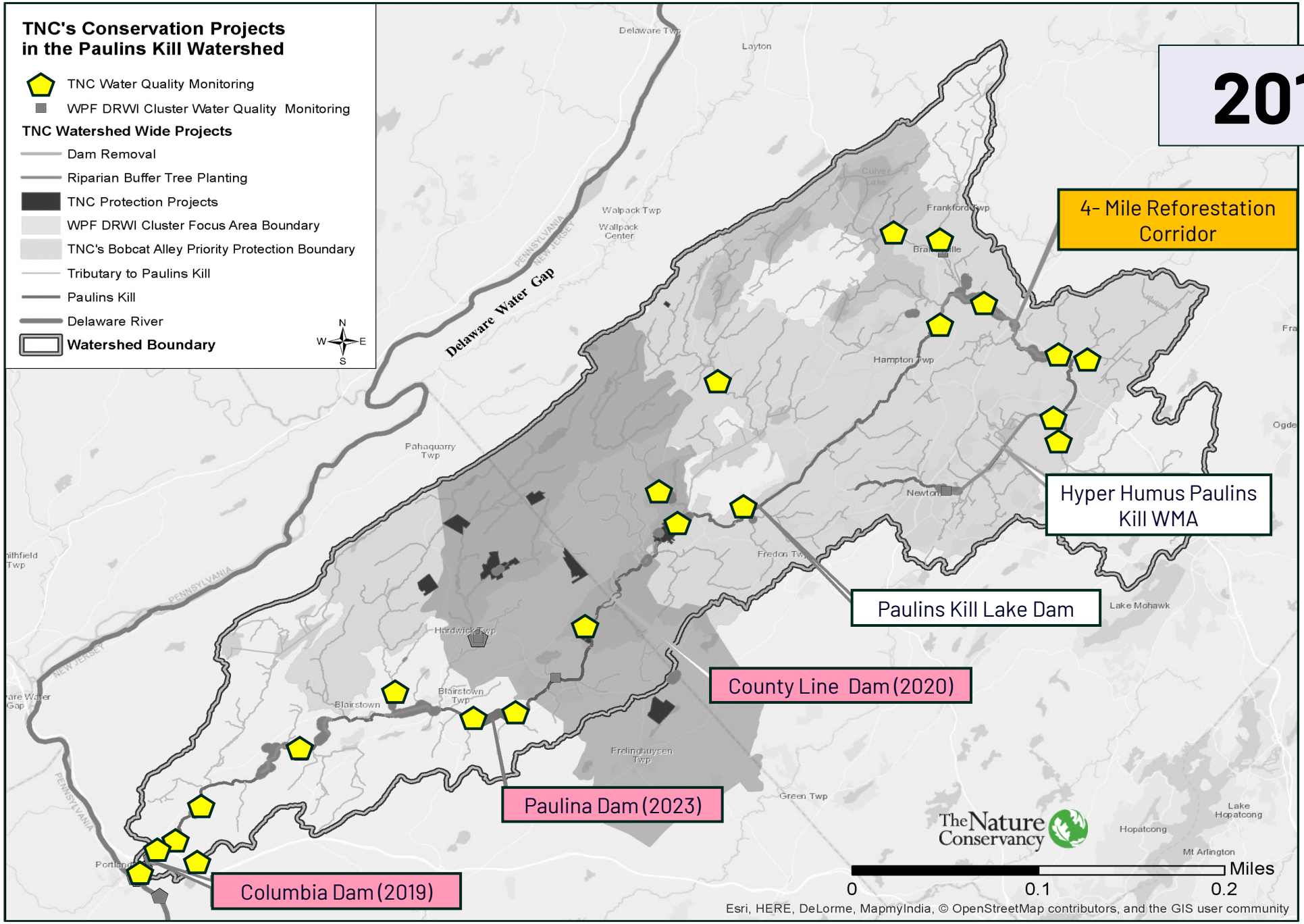
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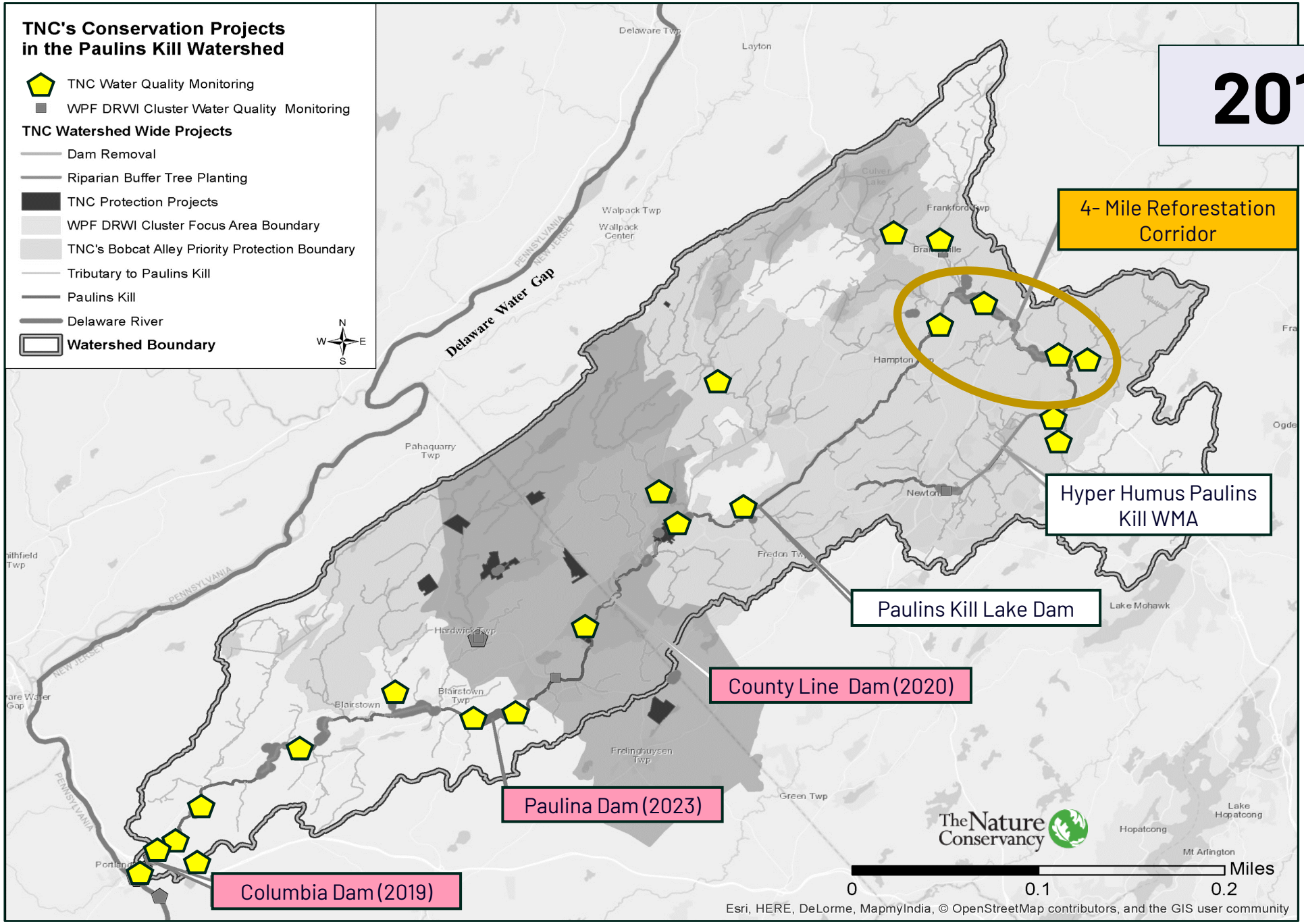
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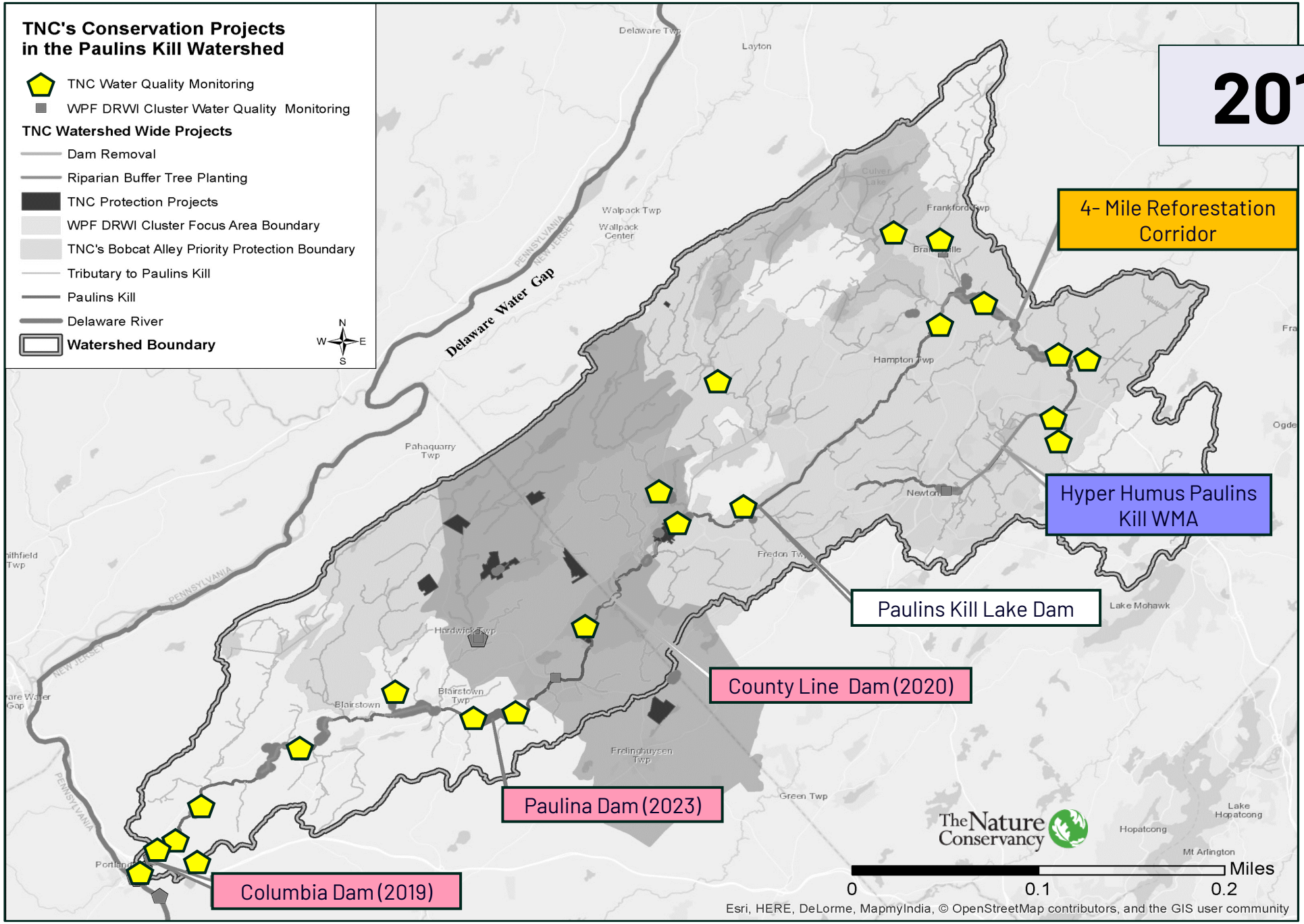
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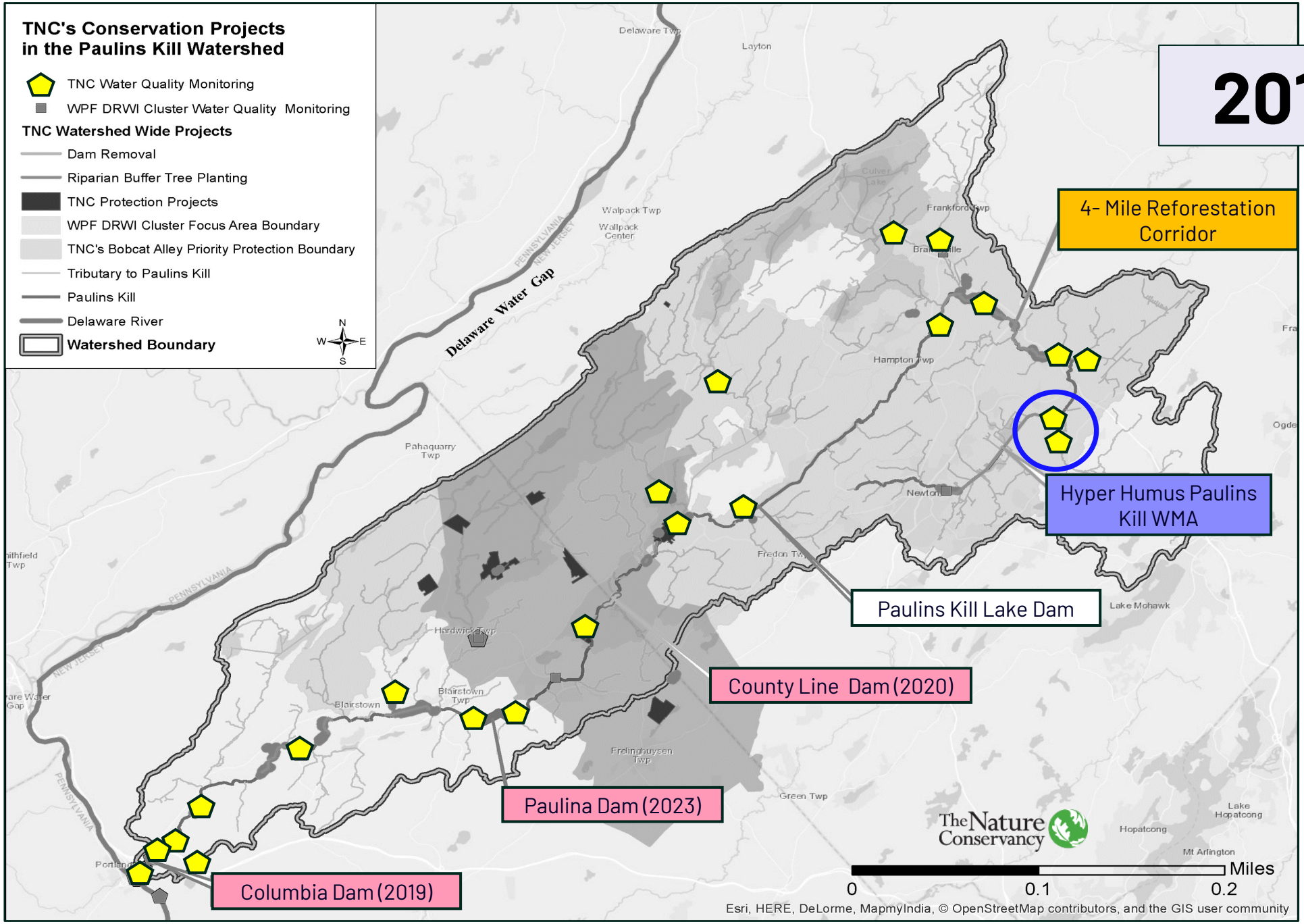
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2016 – 2025

Data collection

Physical indicators of water quality:

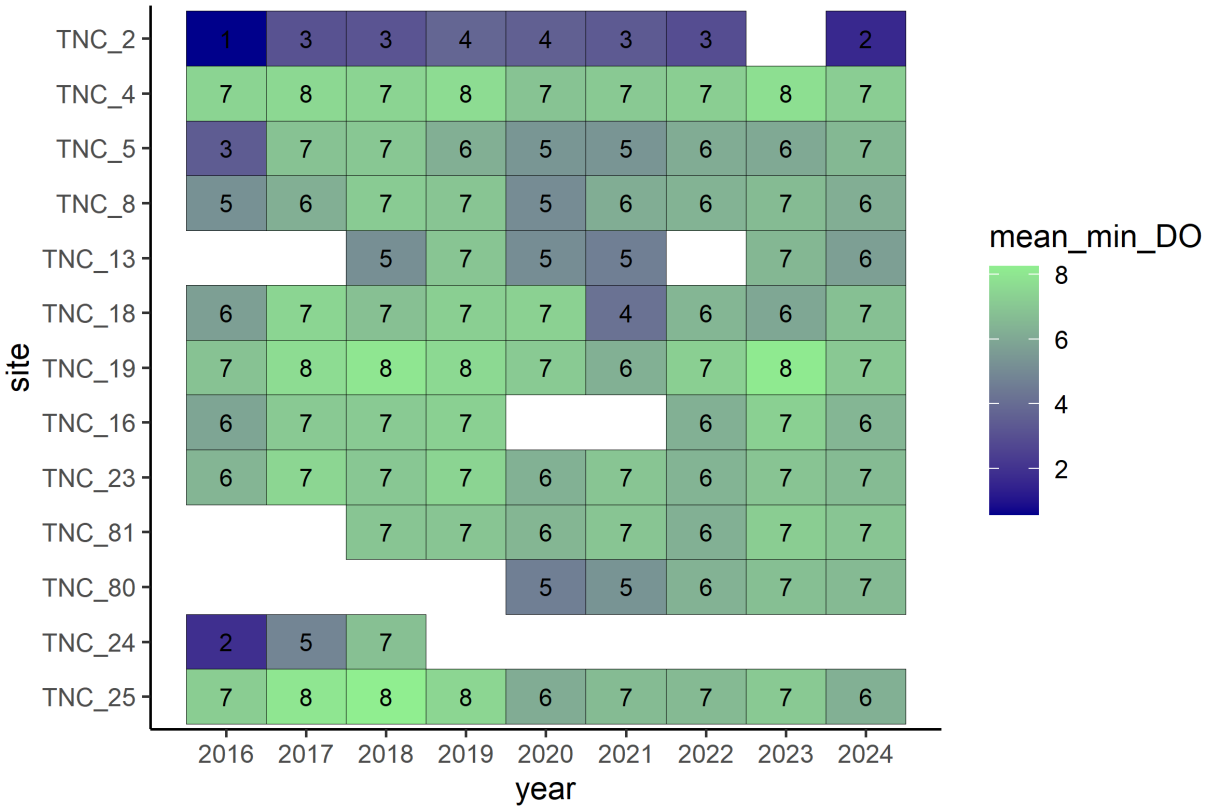
- Continuous instream monitoring
  - Temperature
  - Dissolved oxygen
  - Turbidity
  - Conductivity
- EPA rapid bioassessment

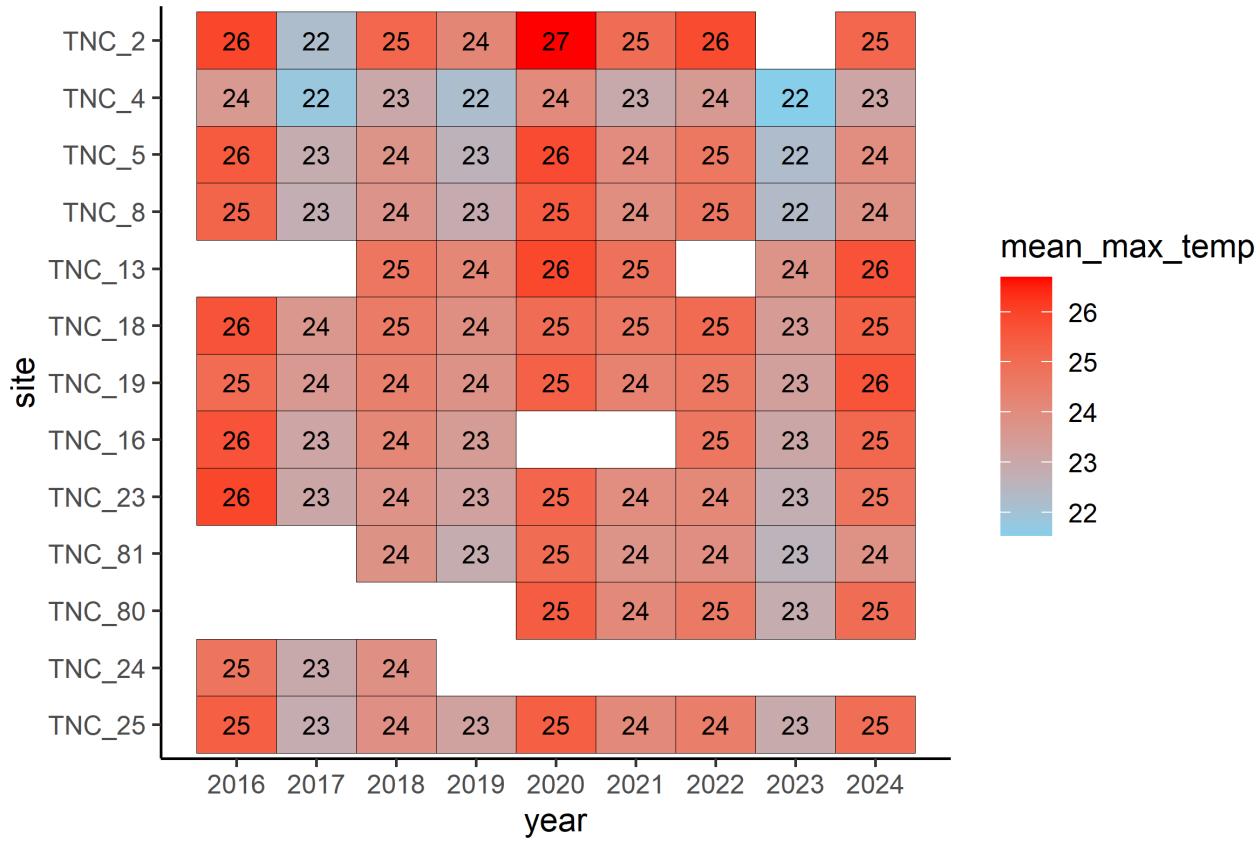
Biological indicators:

- Benthic macroinvertebrates

Watershed-Wide Results

Upstream





Downstream

New Jersey Department of Environmental Protection (NJDEP)

Surface Water Quality Standards (SWQS)

NT: non-trout
TM: trout maintenance
TP: trout production

Dissolved Oxygen (mg/L)

NT: 24-hour average not less than 5.0, but not less than 4.0 at any time
TM: 24-hour average not less than 6.0, but not less than 5.0 at any time
TP: Not less than 7.0 at any time

Temperature (degrees Celsius)

NT: daily maximum shall not exceed 31C or rolling seven-day average of more than 28C
TM: daily maximum shall not exceed 25C or rolling seven-day average of more than 25C
TP: daily maximum shall not exceed 22C or rolling seven-day average of more than 19C

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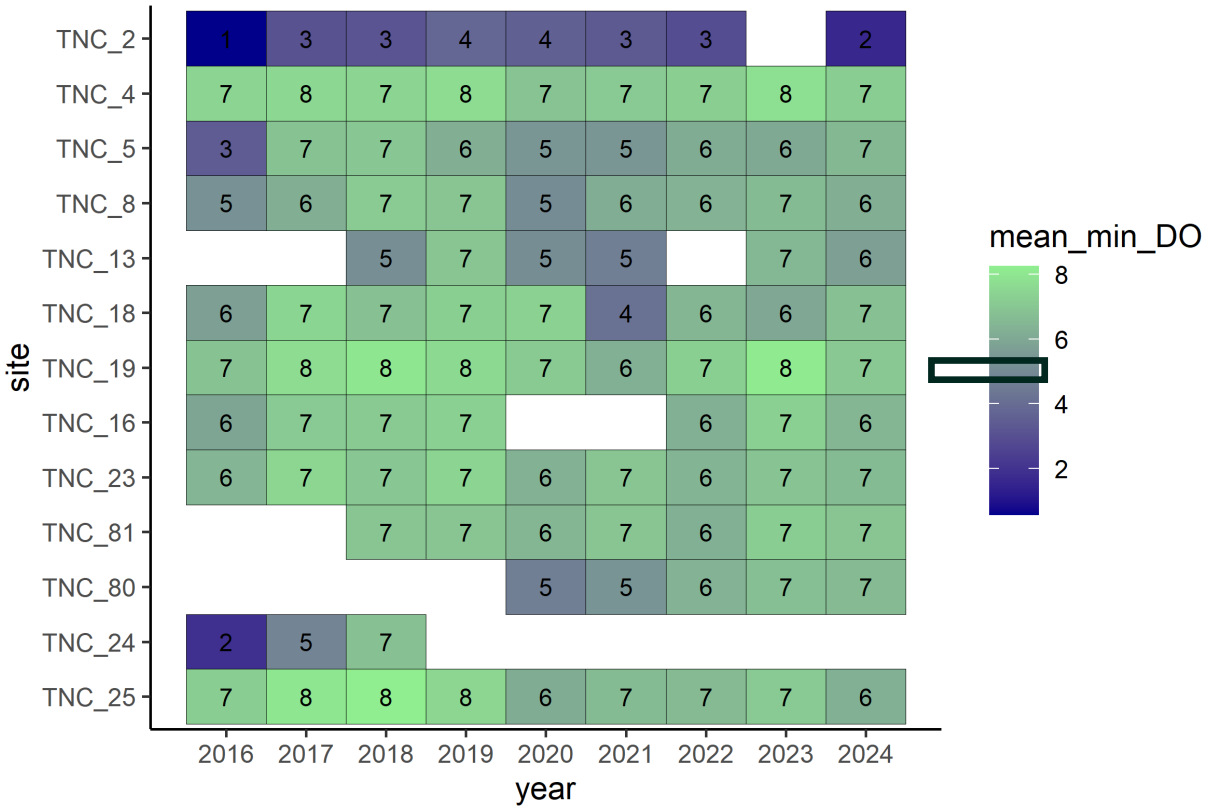
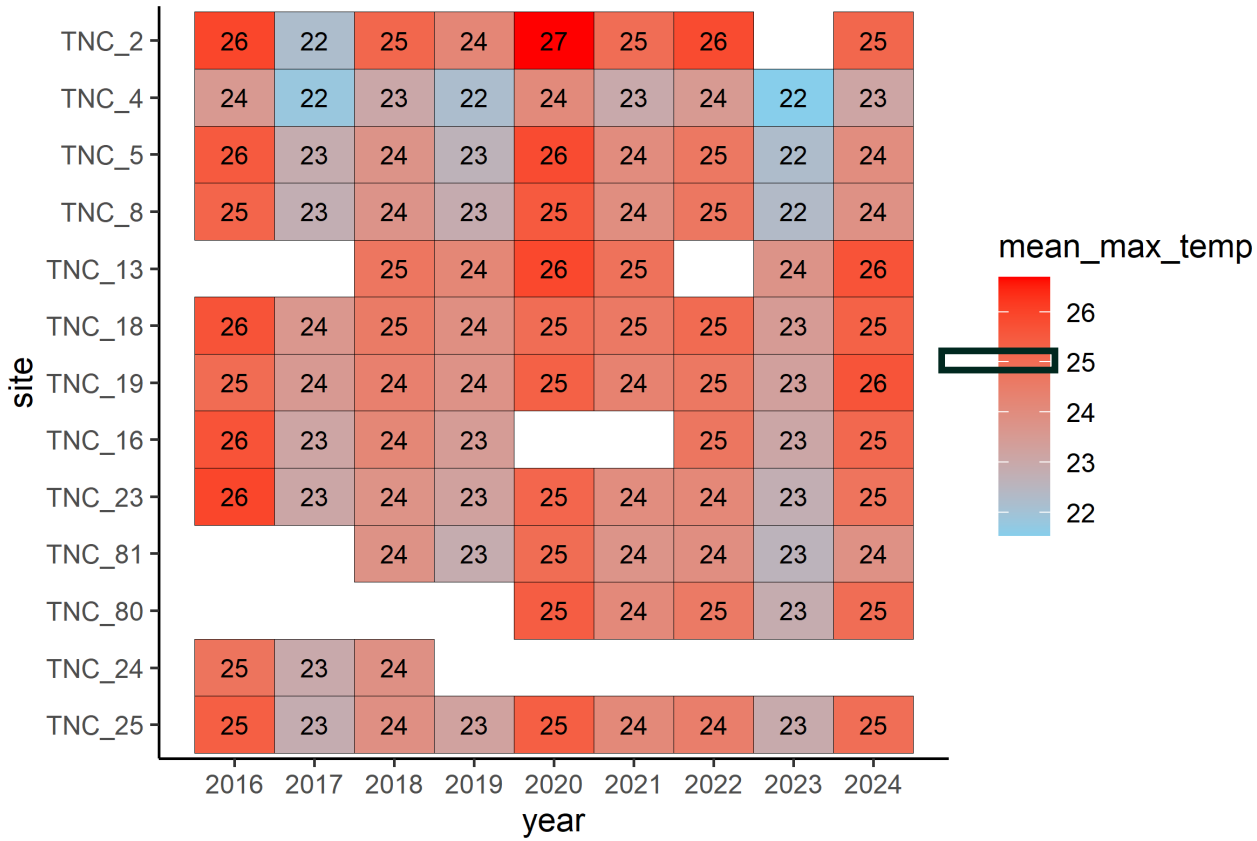
Watershed-Wide Results

DO > 5 mg/L



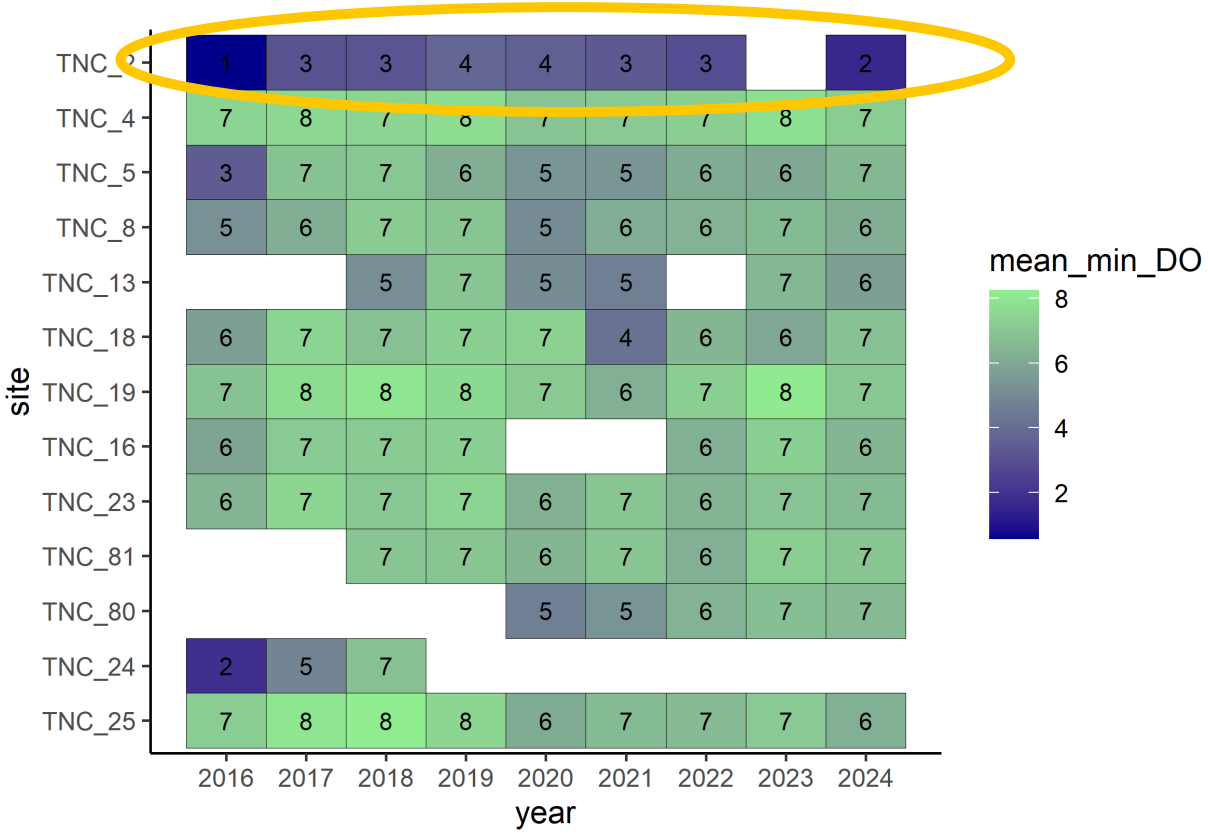
Temp < 25 ℃



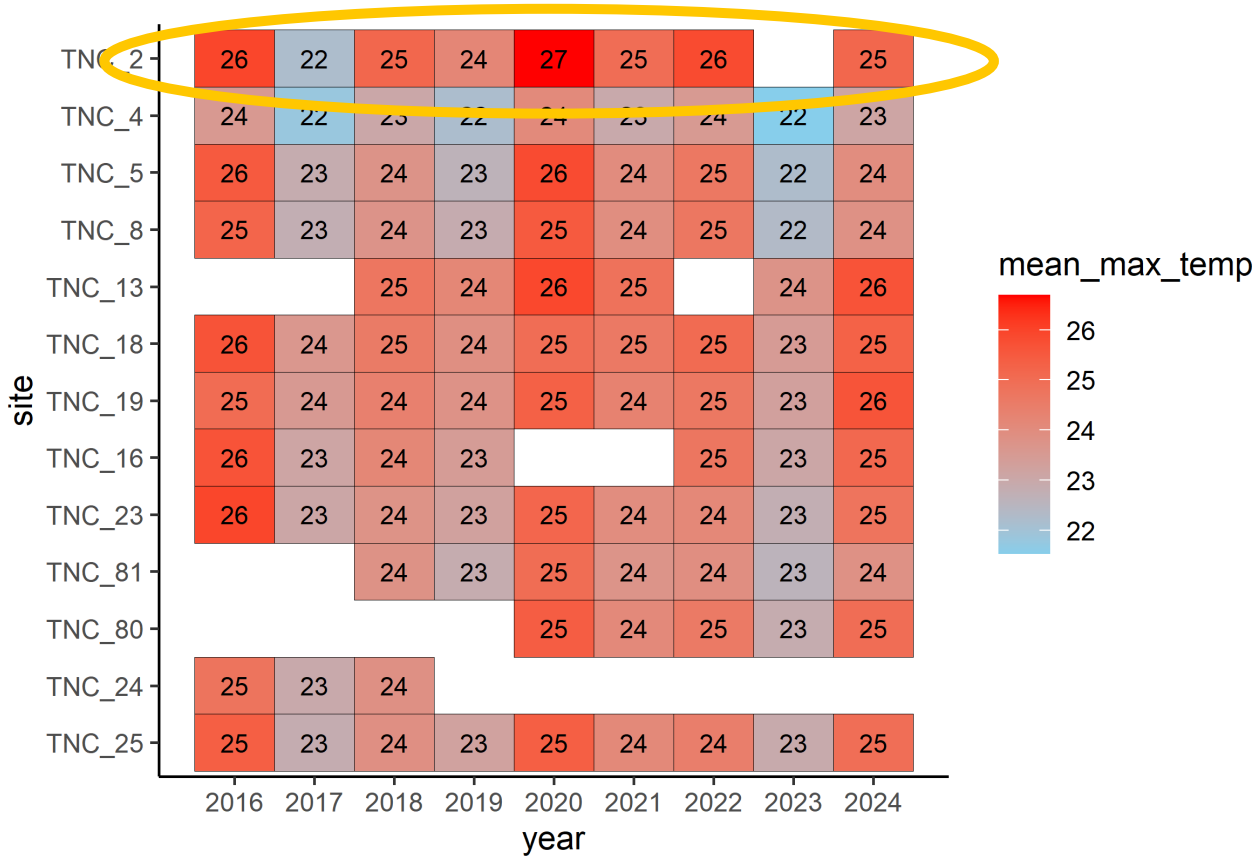
Watershed-Wide Results

DO > 5 mg/L

Downstream Hyper Humus



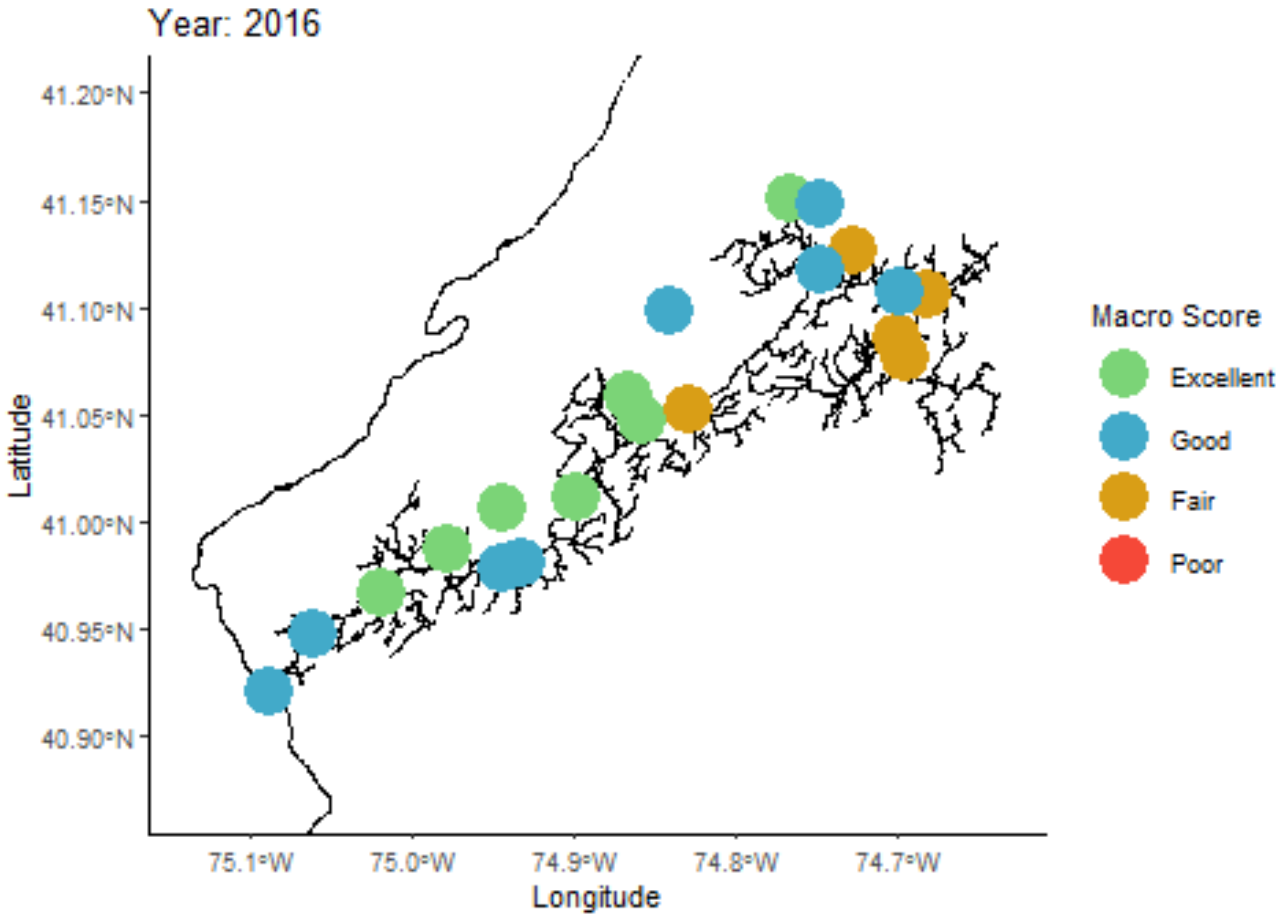
Temp < 25 ℃

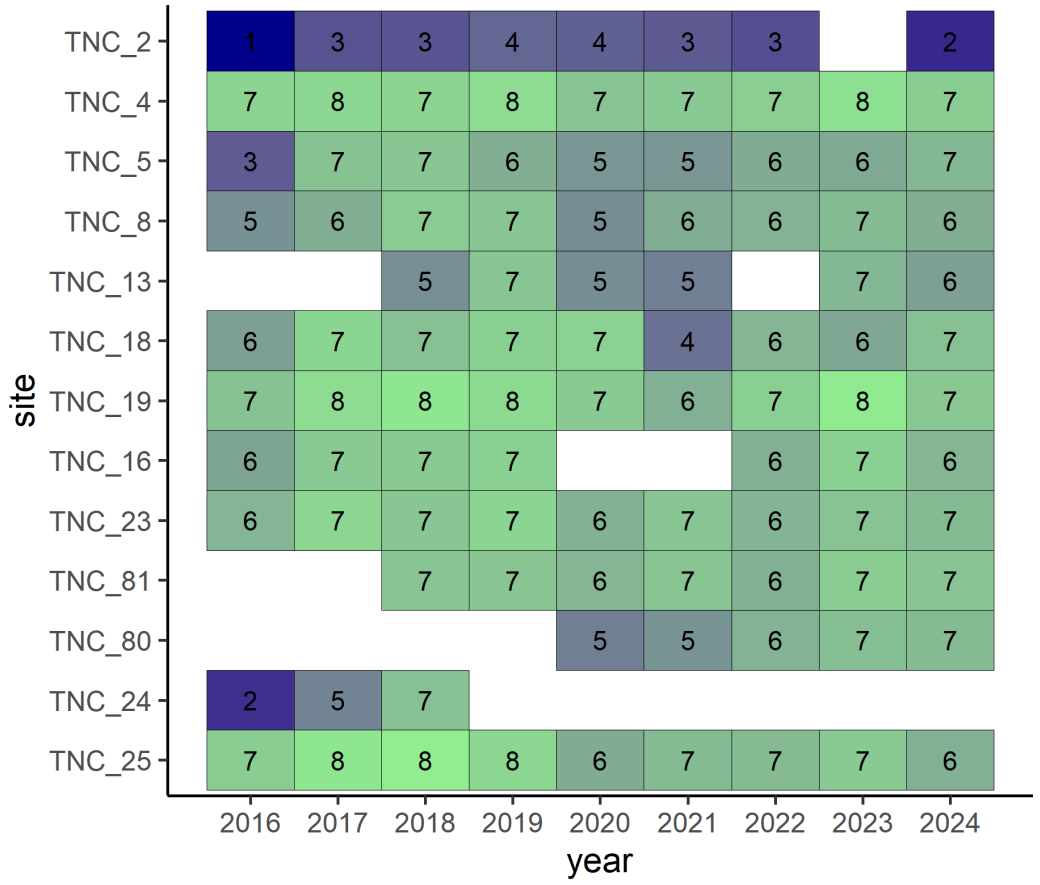


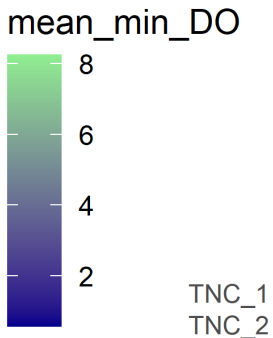
Macroinvertebrate Scores (2016-2025)

Lots of ‘Excellent’ and ‘Good’ scores, particularly in the lower PK

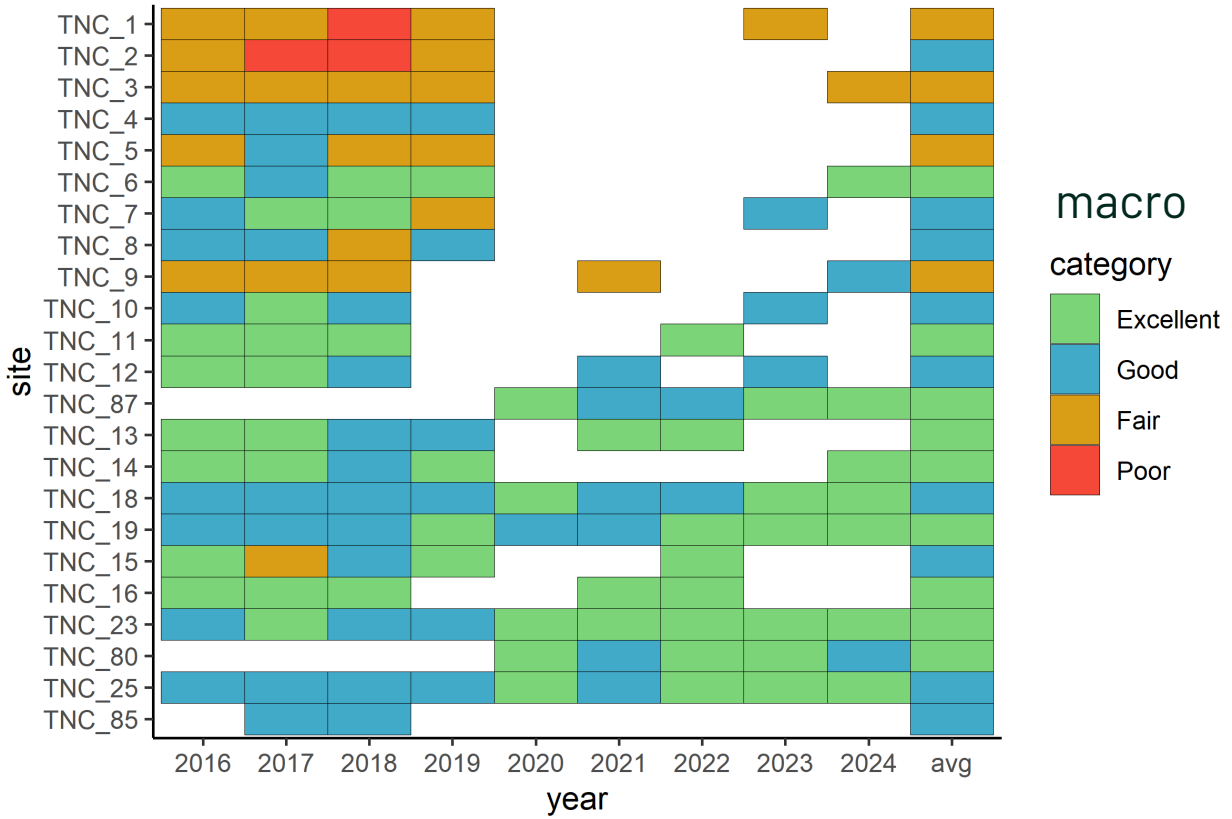
Lower scores in upper watershed, including near Hyper Humus







Significant positive correlation between DO and macroinvertebrate score, with an increase of ~10 points for each 1mg/L of DO increase

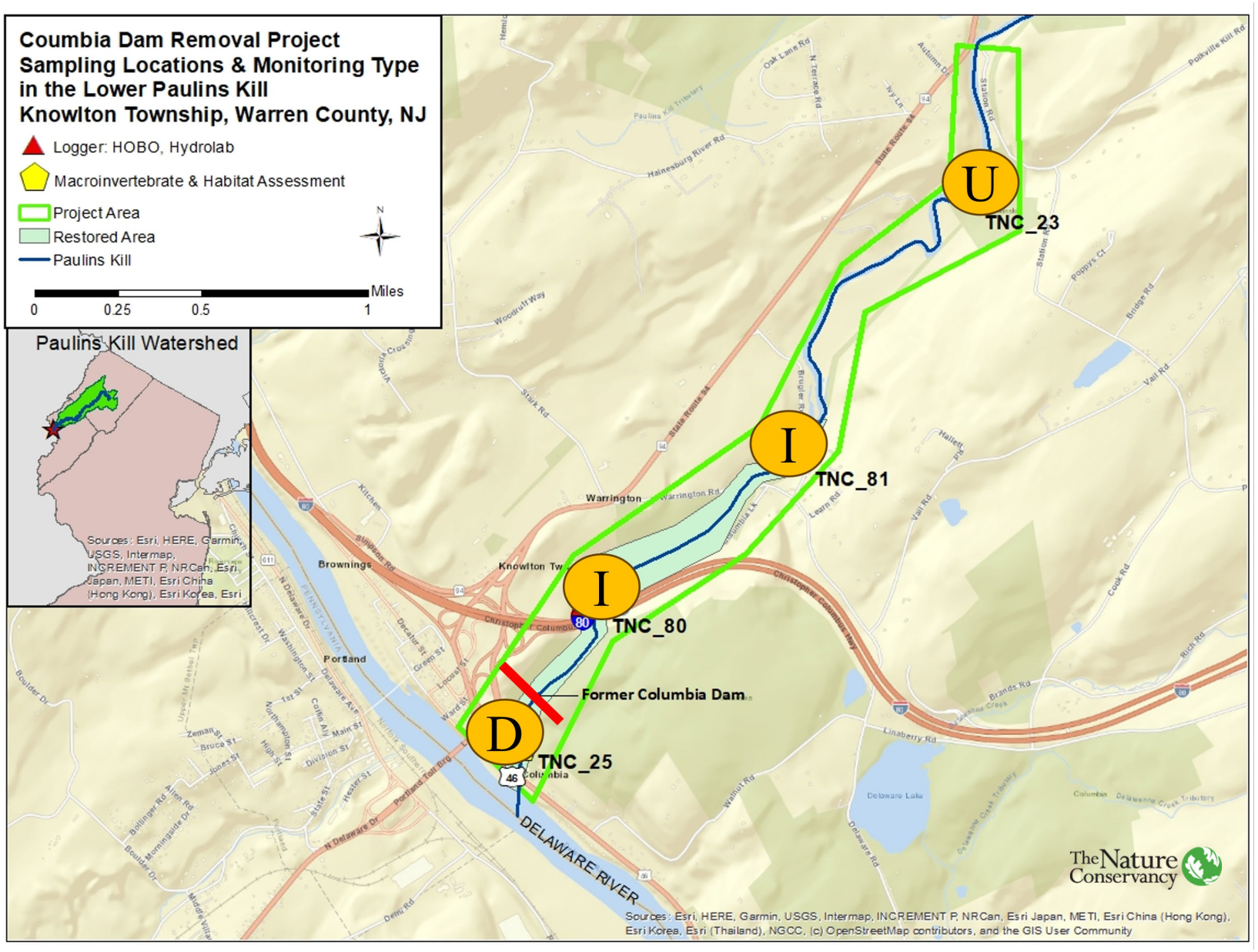


Restoration Specific Results, Dam Removal

Columbia Dam

9-year dataset (2016-2024)

- Before (2016-2017)
- During (2018-2019)
- After (2020-2024)



Columbia Dam

U = Upstream
TNC_23

I = Impoundment
TNC_81
TNC_80

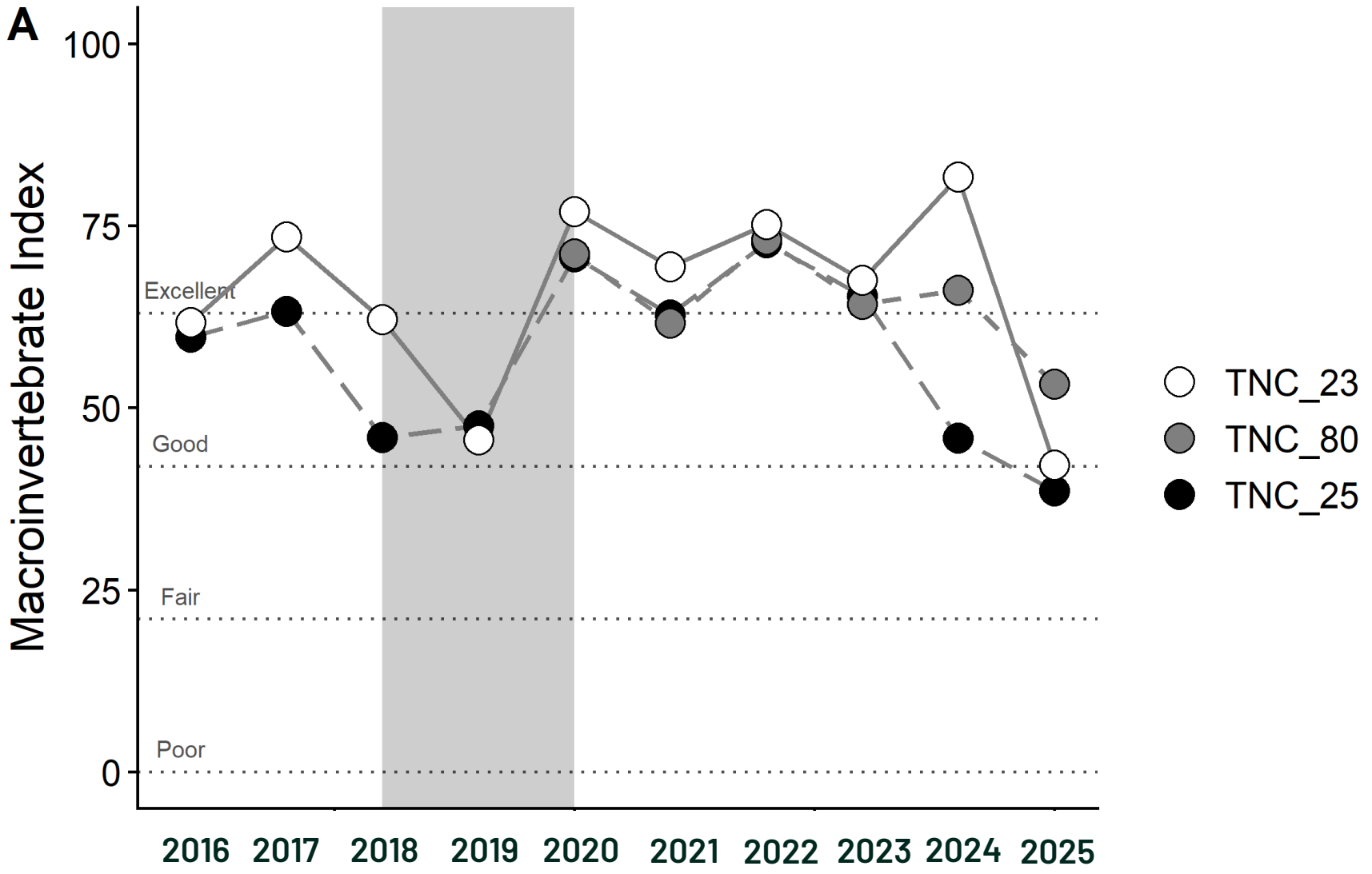
D = Downstream
TNC_25

TNC_80- the old impoundment from the Columbia dam (removed in 2019)

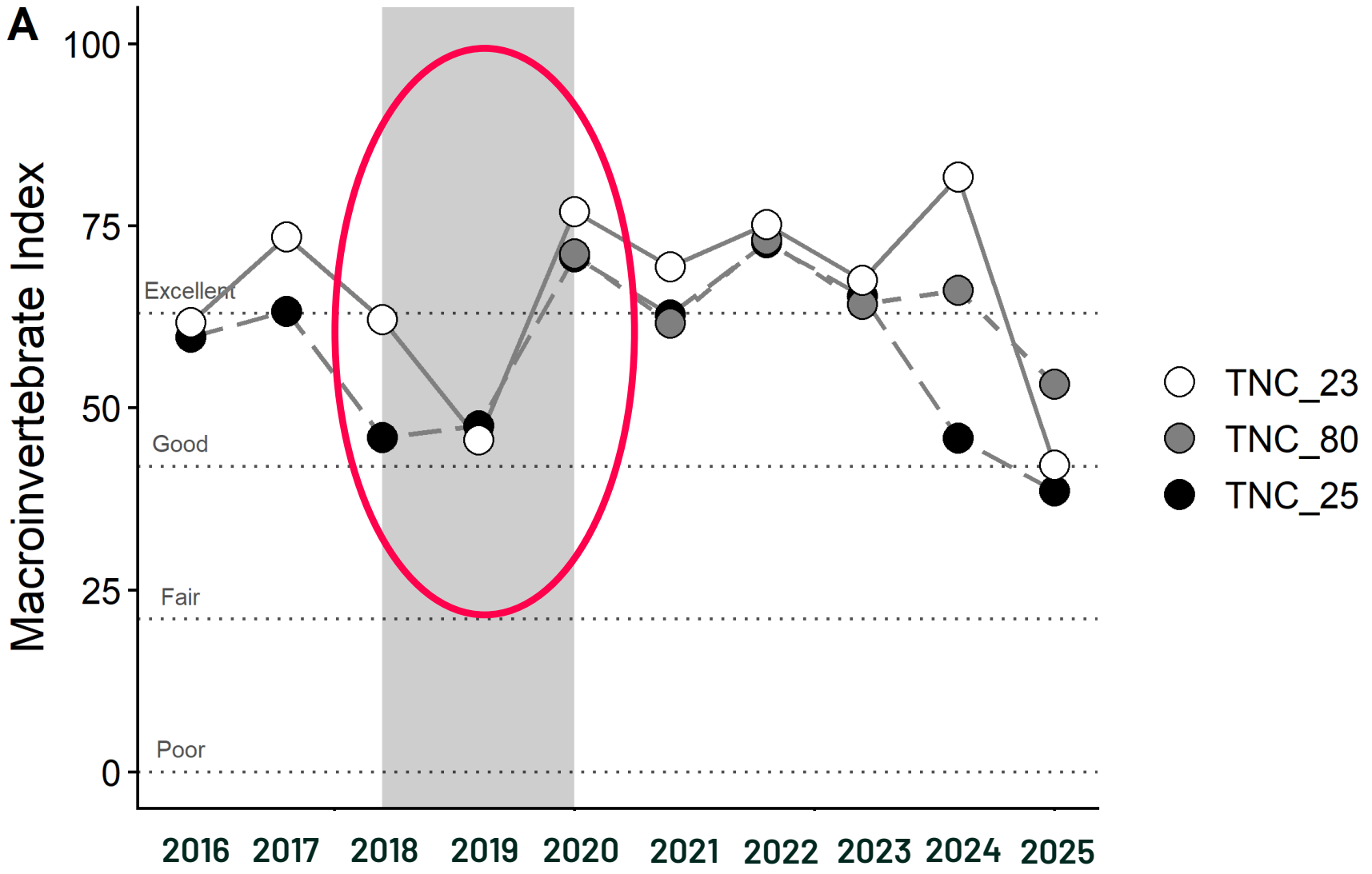
days exceeding trout maintenance threshold for DO

42 and 30 in 2020 and 2021, respectively

Single digits 2022-2025



2018-2019 = During Removal



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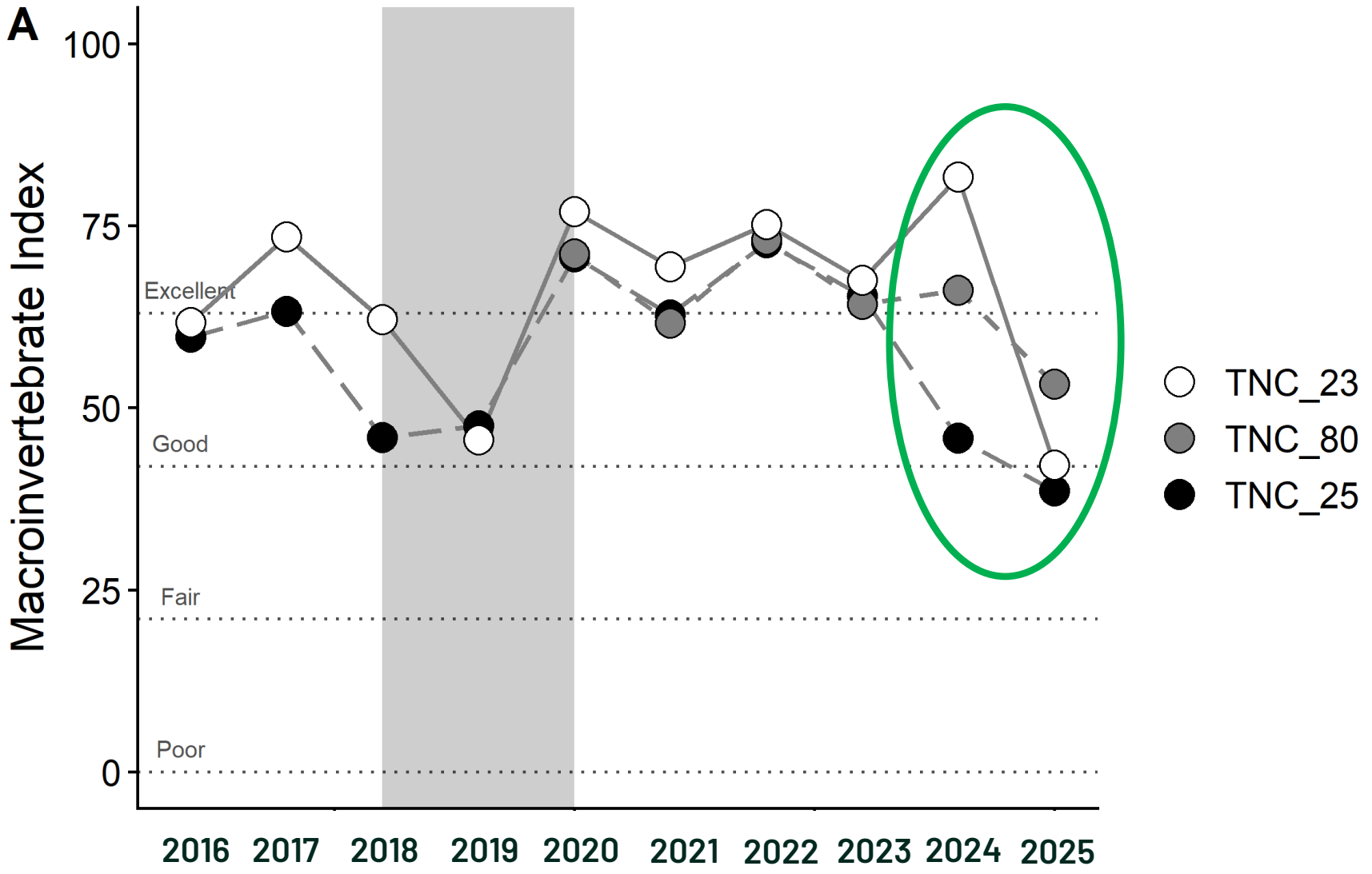
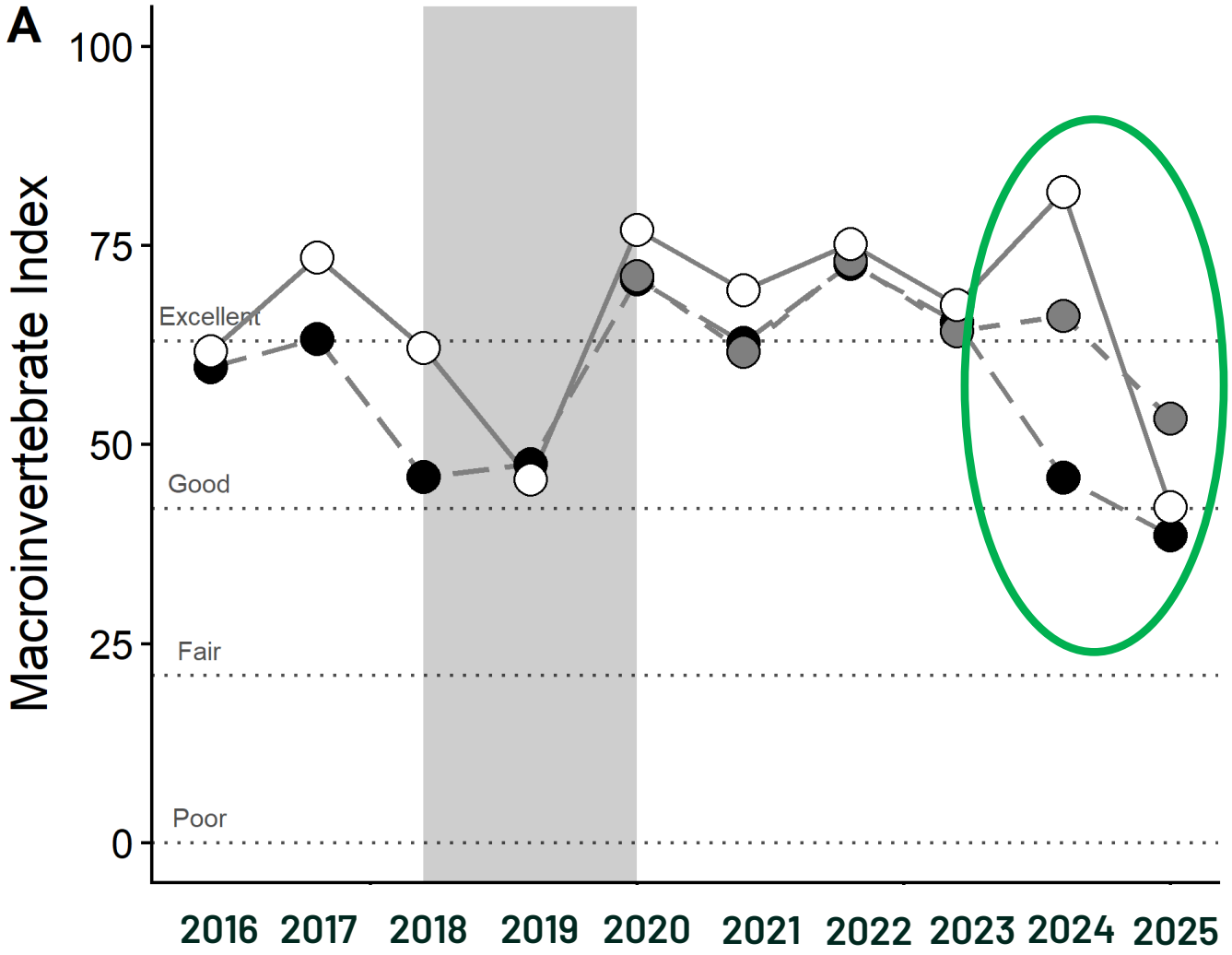
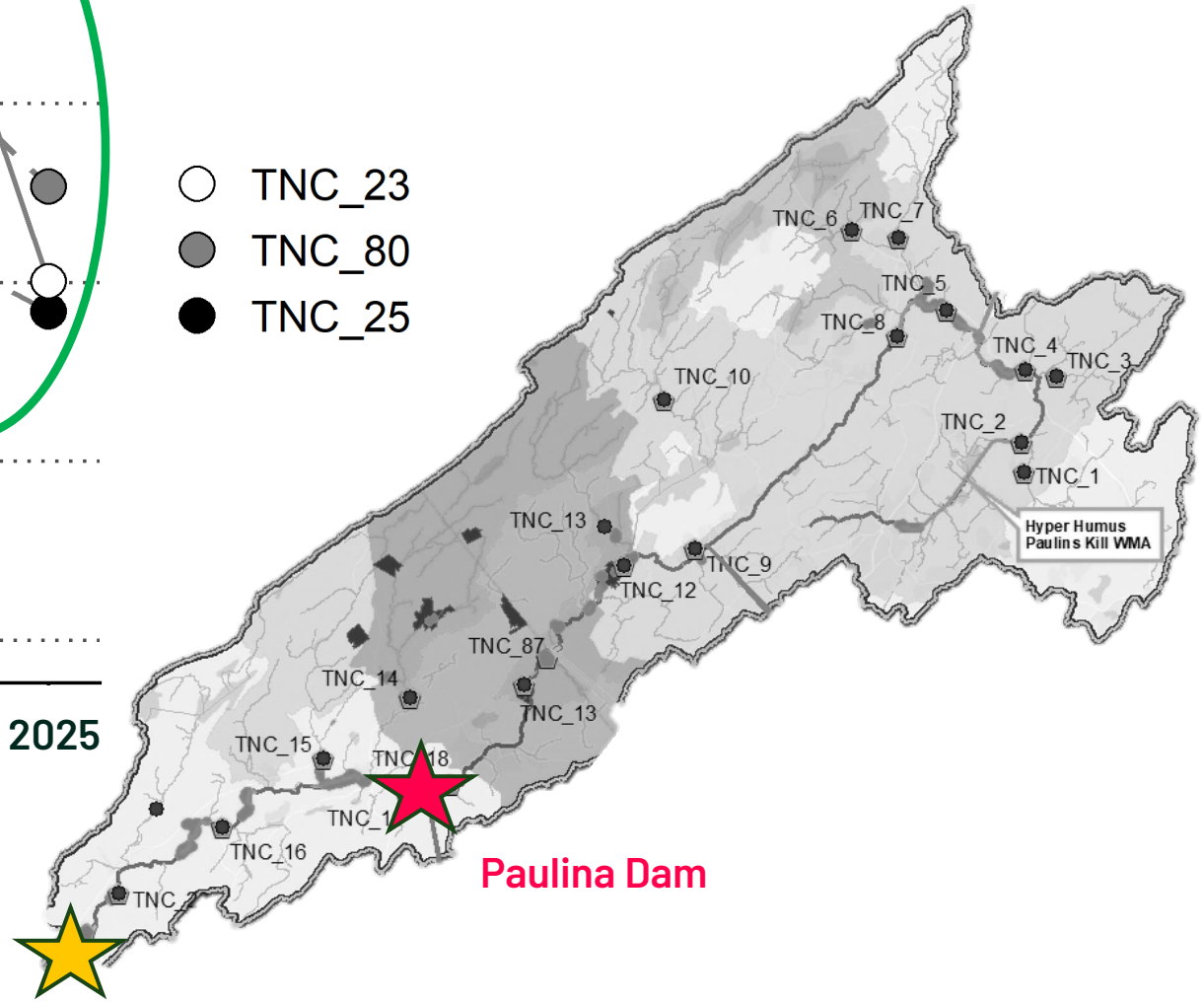


2018-2019 = During Removal



2023/2024 Paulina Dam removal

TNC_23
TNC_80
TNC_25



Inform Management

Paulina Dam removal- informed by Columbia dam removal

Inform further watershed conservation

Manuscripts

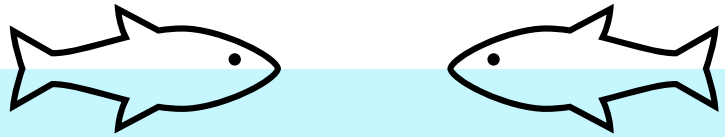
Scientific and Academic Audience

- **Columbia Dam removal**

Long-term monitoring of physical and biological stream parameters to quantify the success of river restoration through dam removal in the Paulins Kill NJ, USA.

Chloe Pearson[1*], Michelle DiBlasio[1], Ellen Creveling[1], David H. Keller[2], John Vile[3], Mike Allen[4, 5], Beth Styler Barry[1]

Manuscripts



Talk more about fish

- **Columbia Dam removal**

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Manuscripts

- Columbia Dam removal
- Paulins Kill Watershed
- Floodplain Restoration
    - Survivability
    - Water quality

Broader audiences

Social media

74 1

nature_nj Our Freshwater Team heard it's trick or treat season and wanted to share a trick they use while out in the field! Pictured above is a device called a logger. Underwater loggers record water data like turbidity, temperature, dissolved oxygen and more. This data helps us understand the water quality and track changes over time.

Broader audiences

Social media

Community involvement

Broader audiences

Social media

Community involvement

‘Take-home message’ reports

Thank you!

Chloe Pearson

chloepearson@tnc.org

Habitat Scores

(2016-2025)

Similar pattern to macroinvertebrate scores, lots of ‘Optimal’ and ‘Sub-Optimal’

Lower ‘Marginal’ scores in upper watershed near Hyper Humus