



June 27th, 2024

Megan Sims
Water Quality Standards Coordinator
Maine Department of Environmental Protection
17 State House Station
Augusta, ME 04333

Dear Ms. Sims,

Midcoast Conservancy appreciates this opportunity to propose changes to the classification of surface waters as part of the Department's Triennial Review of Maine's Water Quality Standards. The following proposal recommends upgrading a segment of the Sheepscot River from Class B to Class A.

1. Waterbody name, town.

Sheepscot River, in the towns of Whitefield, Windsor, Jefferson, and Somerville.

2. Location of proposed change in classification

Sheepscot River from Route 17 (44.258202, -69.553709) to the Somerville/Palermo townline (44.335110, -69.456800) (Figure 1).

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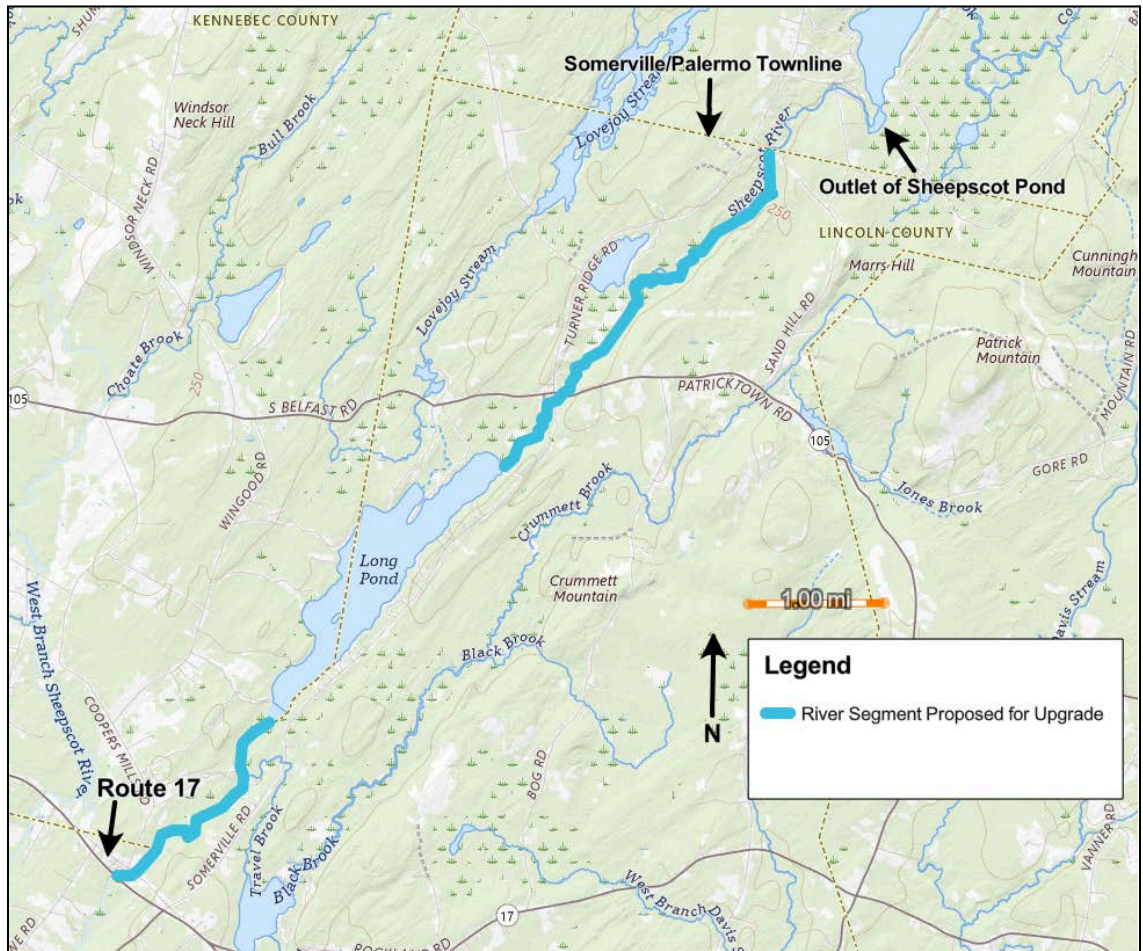


Figure 1. Location of the proposed river segment of the Sheepscot River for upgrade from Class B to Class A, beginning at Route 17 in Whitefield upriver to the Somerville/Palermo townline.

3. Write a brief statement that describes why the waterbody should be considered for a classification change.

This section of the Sheepscot River should be considered for an upgrade from Class B to Class A because of the removal of the Coopers Mills Dam (located ~900 ft upstream of Route 17) in 2018, the supporting water quality and other relevant data presented in Appendix A, and the importance of the Sheepscot River to endangered Atlantic salmon and other native sea-run fish.

As part of the Coopers Mills Dam removal project, the impoundment created by the dam was restored to natural free-flowing river and can now be categorized as riffle-run habitat (Figure 2). The dam was the only barrier between Route 17 and the



outlet of Sheepscot Pond (Figure 1), and its removal improved fish passage to 26 miles of river and 900 acres of alewife pond habitat upstream of the dam site.



A.

B.

Figure 2. Coopers Mills Dam in 2017 before removal (A) and after removal in 2018 (B). Note the impoundment above the dam was restored to riffle-run habitat. Photos were taken from the same vantage point, courtesy of the project engineer Interfluve.

Except for one geometric mean calculation from 2023, the water quality data provided in Appendix A show attainment of Class A criteria for the State of Maine's bacteria standards from data collected from 2019 to 2023 (Appendix A: Figures 3 and 4, Table 1), which was after the dam removal. Dissolved oxygen data presented in Appendix A show attainment of Class A criteria most of the time (Appendix A: Figures 5 - 9, Table 1). Additionally, the Maine Department of Environmental Protection's Biomonitoring station S-73 shows attainment for macroinvertebrates in 2022.

The Sheepscot River hosts all 12 of Maine's native sea-run fish, including endangered Atlantic salmon (*Salmo salar*) and other rare and protected species, such as brook floater mussel (*Alasmidonta varicosa*). The sea-run Atlantic salmon in the Sheepscot are the southern-most genetically distinct population in the United States, and it is hypothesized that they are likely the most thermally tolerant population with respect to warming waters as a result of climate change. The Maine Department of Marine Resources (DMR) has noted that adult Atlantic salmon redds (or nests) have been consistently found upriver of the Coopers Mills Dam site since its removal in 2018. Additionally, other native sea-run fish that have been observed



upstream of the proposed upgrade segment include: river herring, sea lamprey, and American eel. This river segment is also an important economic resource because of the active commercial alewife harvest at the former Coopers Mills Dam site. Although the water quality data show there are times when this segment does not meet Class A standards, this segment should be obtaining Class A standards and deserves the protections associated with a Class A classification because of recent restoration projects, and its ecological and economic importance.

The section of the Sheepscot River from Route 17 in Whitefield (Coopers Mills Village) up to the outlet of Sheepscot Pond, is the only segment of the river currently listed as Class B. While we would like to upgrade this entire river segment to Class A, because of the current wastewater discharge from the Inland Fisheries and Wildlife (IFW) Palermo Rearing Station (MEPDES Permit #ME0001074) located just below the outlet of Sheepscot Pond (Appendix A, Figure 1), we are not including the section between the Somerville/Palermo townline and Sheepscot Pond as a part of this proposal.

4. State how the proposed change will affect other users of the waterbody, for example holders of wastewater or stormwater discharge permits, or holders of land-development permits.

Currently, there are no known discharge or land-development permits affecting the river segment proposed for upgrade.

5. Provide water quality data if available (including source of data) that documents the attainment status of the candidate waterbody relative to the designated uses and criteria of the proposed classification.

Water quality and other relevant data are presented and summarized in Appendix A.

6. Provide a summary of known human activities in the watershed of the proposed reclassification that might jeopardize attainment of standards of the proposed classification, for example land-use altering activities, landfills, hazardous waste sites, wastewater discharges, etc.

There are no known activities that would jeopardize attainment of Class A standards for the river segment proposed for upgrade. There is an active commercial alewife harvest where the Coopers Mills Dam was removed, but we believe upgrading this segment would be a benefit to the harvest. The surrounding land is primarily



forested and consists of rolling hills that also include farmland, roads, homes and businesses.

Thank you for your consideration of this proposal. Please reach out with any questions or to request more information regarding the information presented.

Sincerely,

Melissa Cote
Sheepscot River Watershed Manager
Midcoast Conservancy
melissa@midcoastconservancy.org
(207) 386-6490



Appendix A - Sheepscot River Water Quality and Other Relevant Data

Sheepscot Samplers Site S013.5 Data:

The Sheepscot Samplers is a group of volunteer citizen-scientists managed by Midcoast Conservancy that have been monitoring water quality in the Sheepscot River for the past 30 years. Site S013.5 is located just downstream of the former Coopers Mills Dam (Figure 1), which was removed in 2018. As part of the dam removal project, the impoundment created by the dam was restored to natural free-flowing river and can now be categorized as riffle-run habitat (Figure 2). The dam was the only barrier between Route 17 and the outlet of Sheepscot Pond, and its removal improved fish passage to 26 miles of river and 900 acres of alewife pond habitat upstream of the dam site.

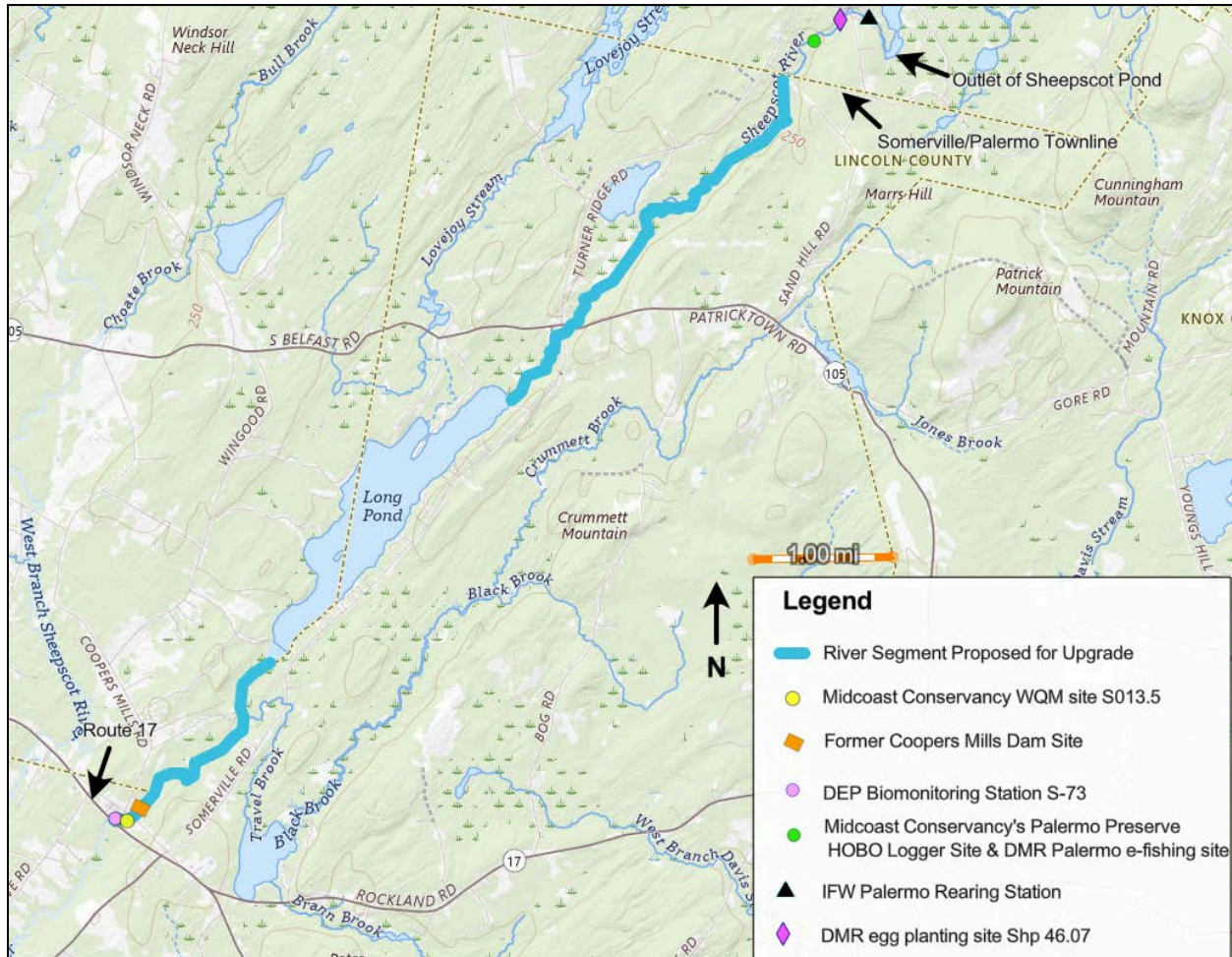


Figure 1. Map showing the location of the river segment proposed for upgrade, relevant monitoring sites, and other important landmarks.

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A.

B.

Figure 2. Coopers Mills Dam site in 2017 before removal (A) and after removal in 2018 (B). Note the impoundment above the dam was restored to riffle-run habitat. Photos were taken from the same vantage point, courtesy of the project engineer Interfluve.

Bacteria and dissolved oxygen data are provided below from the 2019 - 2023 Sheepscot Sampler monitoring seasons (Figures 3 - 6, Table 1) and were collected to investigate water quality after the Coopers Mills dam removal in 2018. The Sheepscot Samplers also monitored bacteria and dissolved oxygen data from 1999-2008 for site S013.5, but since this data is from more than 10 years before the dam removal, it was not included. However, the 1999-2008 data is available upon request. All data presented was collected and processed according to the Sheepscot Valley Conservation Association 2014 Quality Assurance Project Plan¹ (QAPP) and Midcoast Conservancy's 2020 QAPP, which were approved by the Maine Department of Environmental Protection. Sampling occurs from May through September, every other Tuesday morning between 6 - 8am. Additional information about sampling protocols and analysis is available upon request. Note, bacteria samples were not collected for the 2020 sampling season due to the COVID-19 pandemic.

Sheepscot Sampler Bacteria Data:

All Sheepscot Sampler bacteria data from 2019 - 2023 shows compliance with the State of Maine's Class A and B standards, except one 90-day running geometric mean (geomean) datapoint in September 2023 (Figures 3 and 4, Table 1). The one noncompliant datapoint

¹ One of the four founding organizations that merged in 2016 to form Midcoast Conservancy. The Medomak Valley Land Trust merged in 2019.



has a geomean of 64.1 MPN/100mL, which is barely higher than the standard of ≤ 64 MPN/100mL (Figure 4, Table 1). All geomeans were calculated using a minimum of 5 data points.

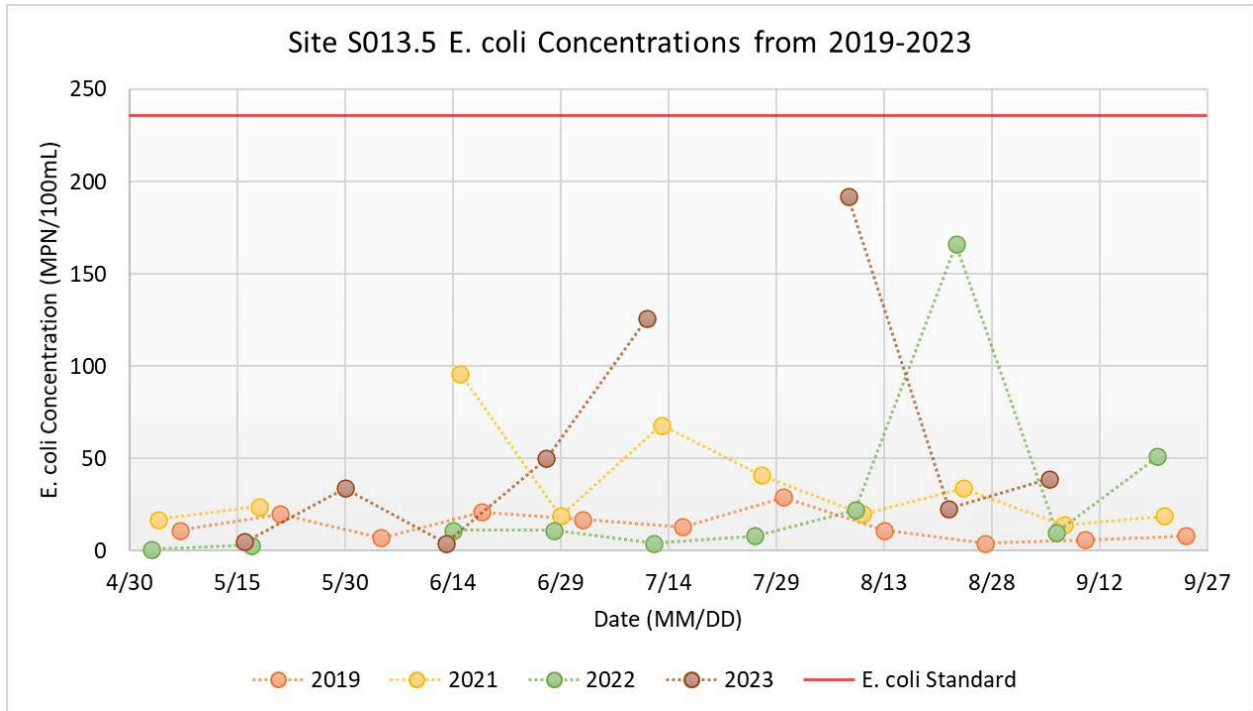


Figure 3. E. coli concentrations for site S013.5 from 2019 to 2023, all of which meet the State of Maine's Class A and B standards of ≤ 236 MPN/100mL for instantaneous sampling.



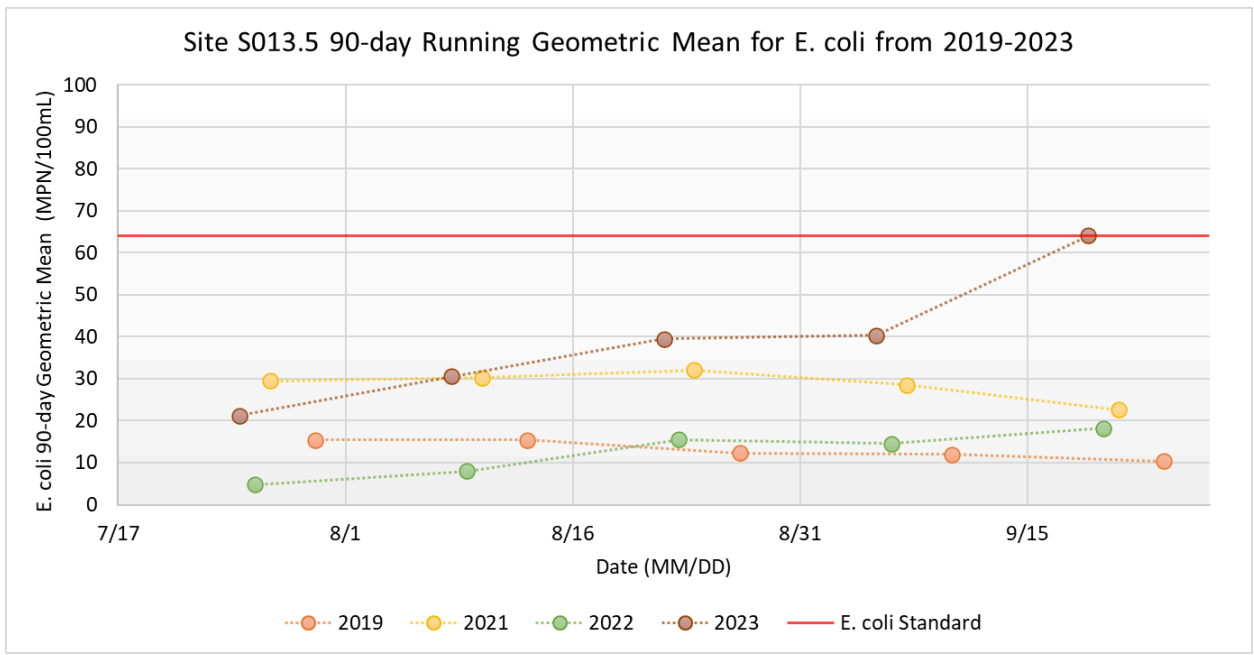


Figure 4. 90-day running geometric mean (geomean) for E. coli at site S013.5 from 2019 to 2023. All 90-day geomeans meet State of Maine’s Class A and B standards of ≤ 64 MPN/100mL except for the 2023 September datapoint, which has a geomean of 64.1 MPN/100mL. All geomeans were calculated using a minimum of 5 data points.



Table 1. Number of days samples were in violation of Class A and B standards for E. coli (90-day geomean and instantaneous samples) and dissolved oxygen or D.O. (concentration [mg/L] and percent saturation [%]) at site S013.5 from 2019-2023. Years where there was a minimum of one violation are highlighted in yellow.

[]= Number of data points used for 90-running geomean, ()=total sample days that year

Year	E. coli 90-Day Geomean Days in Violation (MPN/100mL)	E. coli Days in Violation of 90-Day Instantaneous Value	D.O. Days in Violation (mg/L)	D.O. Percent Saturation Days in Violation (%)
2019	0 [5] (11)	0 (11)	5 (11)	3 (11)
2020	No samples	No samples	1 (11)	0 (11)
2021	0 [6] (10)	0 (10)	4 (10)	0 (10)
2022	0 [6] (10)	0 (10)	4 (10)	1 (10)
2023	1 [5] (8)	0 (10)	6 (11)	3 (10)

Sheepscot Sampler Dissolved Oxygen Data:

Sheepscot Sampler dissolved oxygen concentrations were determined using a LaMotte Dissolved Oxygen Test Kit. Not all data points meet the State of Maine's Class A and B standards of ≥ 7 mg/L (Figure 5, Table 1). However, the dissolved oxygen percent saturation data shows more compliance with the State's Class A and B standards of $\geq 75\%$ saturation (Figure 6, Table 1). Percent saturation was calculated from the measured dissolved oxygen concentrations in mg/L and temperature. It should be noted that sampling occurs early in the morning when dissolved oxygen concentrations are expected to be the lowest.



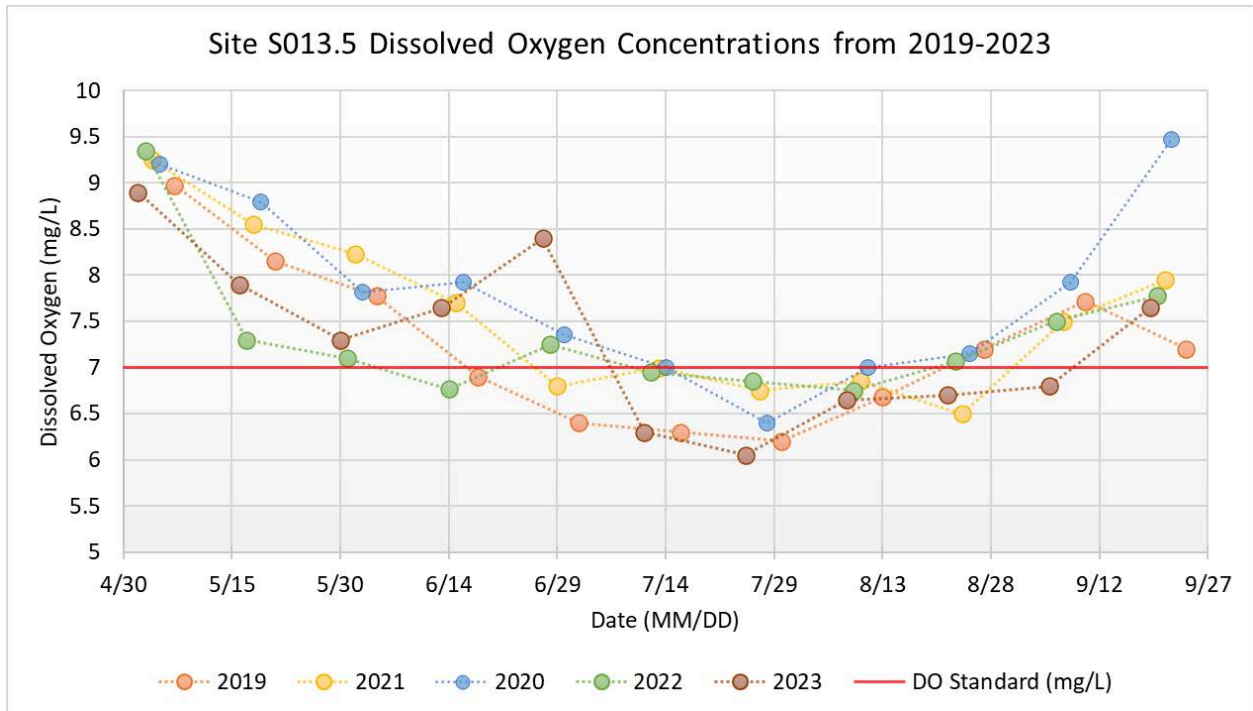


Figure 5. Dissolved oxygen concentrations (determined using a LaMotte dissolved oxygen kit) for site S013.5 from 2019 - 2023. Not all data points meet the State of Maine's Class A and B standards of ≥ 7 mg/L. Sampling occurs early in the morning when dissolved oxygen concentrations are expected to be the lowest.



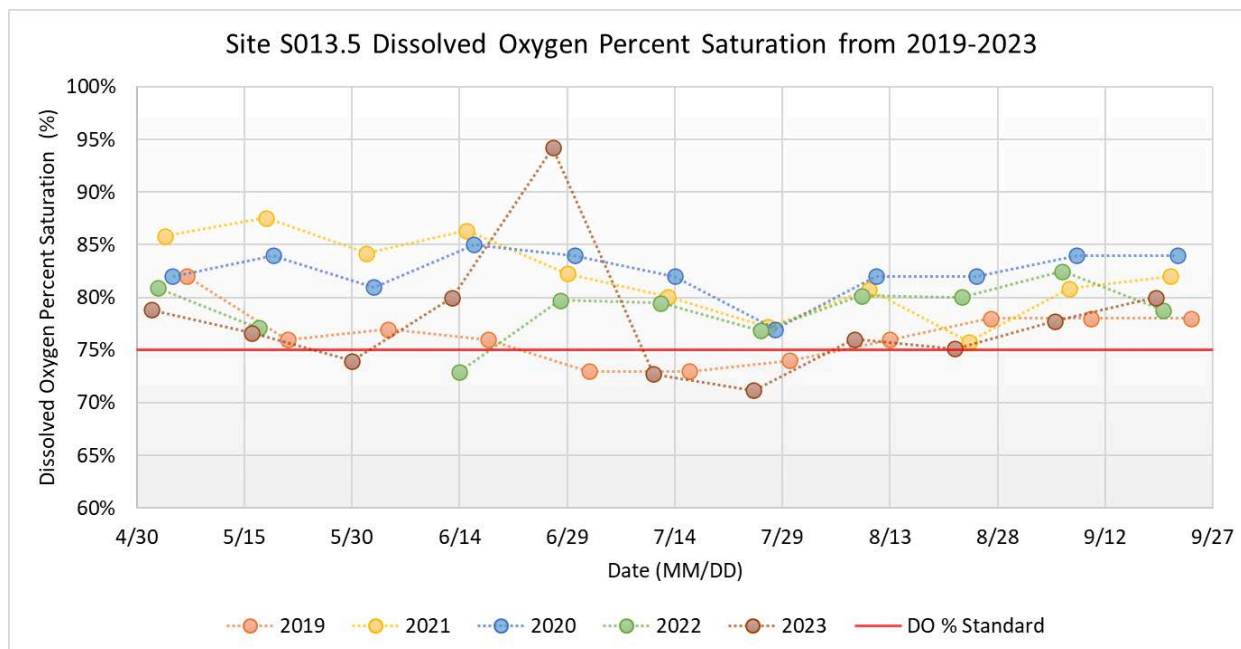


Figure 6. Dissolved oxygen percent saturation (calculated from measured concentrations in mg/L and temperature) for site S013.5 from 2019 - 2023. Not all data points meet State of Maine's Class A and B standard of $\geq 75\%$ saturation, however there is more compliance than the dissolved oxygen concentrations in mg/L shown in Figure 5. Sampling occurs early in the morning when dissolved oxygen concentrations are expected to be the lowest.

Continuous Dissolved Oxygen Monitoring:

Site S013.5 Data:

As a part of monitoring water quality after the 2018 Coopers Mills Dam removal, continuous dissolved oxygen concentrations were collected using a HOBO Dissolved Oxygen Data Logger (model U26-001) from 2021 - 2023 at Site S013.5 (Figure 1). Loggers were deployed in June and removed in October, except in 2023 when there was a logger malfunction in August. Sampling intervals were set to log dissolved oxygen and temperature every 30 minutes. Pre-deployment lab calibrations and field calibrations were conducted according to the U26-001 manual. Field calibrations were performed approximately every 3 weeks. Erroneous outliers were removed from the data and drift corrections were applied when the difference between measured DO and calculated DO was $> \pm 0.3$ mg/L as outlined in DEP's Continuous Monitoring Water Quality Standard Operating Procedures. Data cleaning was conducted using the Water Resources Database (WRDB). The full tabular datasets are available upon request.



In 2021, a HOBO Dissolved Oxygen Logger was deployed from 6/8/21 to 10/29/21 at site S013.5. All continuous dissolved oxygen data show attainment of Class A and B dissolved oxygen standards of ≥ 7 mg/L (Figure 7). Interestingly, this does not match the Sheepscot Sampler 2021 DO data, which shows 4 violations during the 2021 sampling season (Figure 5, Table 1). This may be due to the difference in equipment used, i.e. HOBO logger versus LaMotte dissolved oxygen sampling kits.

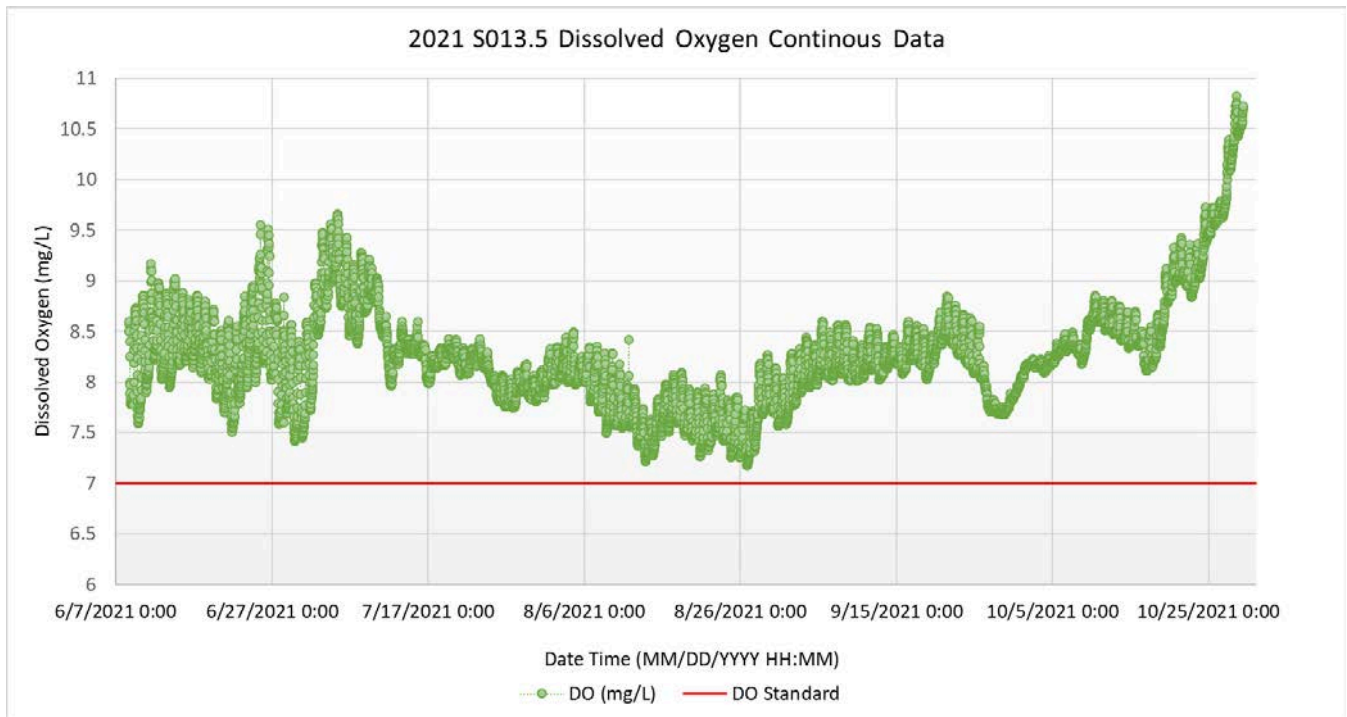


Figure 7. Continuous dissolved oxygen data at site S013.5 from 6/8/21 to 10/29/21 showing attainment of Class A and B dissolved oxygen standards of ≥ 7 mg/L.

In 2022, a HOBO Dissolved Oxygen Logger was deployed from 6/14/22 to 11/3/22 at site S013.5. Not all continuous dissolved oxygen data show attainment of Class A and B dissolved oxygen standards of ≥ 7 mg/L (Figure 8). A total of 54 out of the total 13,847 recorded values, or 0.39%, violate the ≥ 7 mg/L standard.



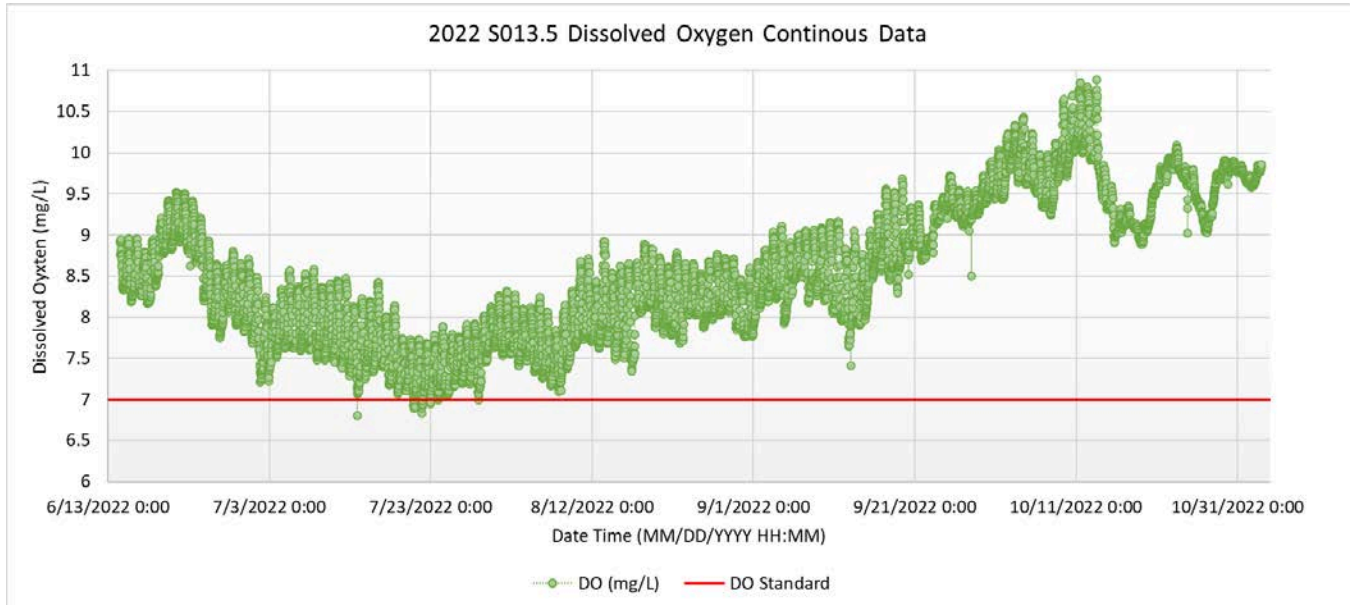


Figure 8. Continuous dissolved oxygen data at site S013.5 from 6/14/22 to 11/3/22. A total of 54 out of the total 13,847 recorded values, or 0.39%, violate the Class A and B dissolved oxygen standards of ≥ 7 mg/L.

In 2023, a HOBO Dissolved Oxygen Logger was deployed from 6/7/23 to 8/3/23 at site S013.5. Not all continuous dissolved oxygen data show attainment of Class A and B dissolved oxygen standards of ≥ 7 mg/L (Figure 9). A total of 218 out of the total 2,670 recorded values, or 8%, violate the Class A and B dissolved oxygen standards of ≥ 7 mg/L. On 8/10/23, the logger would not connect to the shuttle during a routine field calibration and a forced offload of the data was performed. It was found that the logger malfunctioned and stopped recording on 8/3/23. Therefore, the data from the previous calibration date on 7/21/23 to 8/3/23 (marked in yellow) may be unreliable. An appropriate calculation for drift cannot be determined since there is no dissolved oxygen value from the logger on 8/10/23 when the calibration would have been performed. When removing the data points from 7/21/23 to 8/3/23, 67 out of 2,099 recorded values, or 3% of measured DO values, violate the Class A and B dissolved oxygen standards.



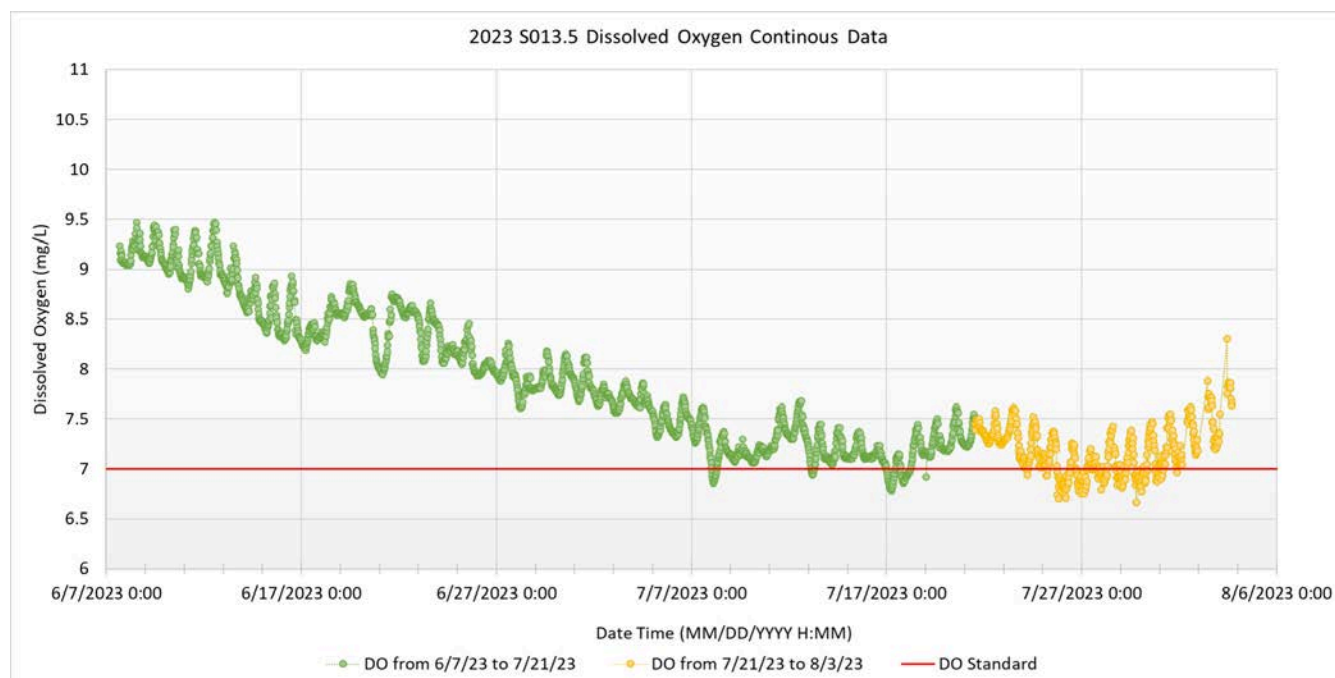


Figure 9. Continuous dissolved oxygen data at site S013.5 from 6/7/23 to 8/3/23. A total of 218 out of the total 2,670 recorded values, or 8%, violate the Class A and B dissolved oxygen standards of ≥ 7 mg/L. On 8/10/23, the logger would not connect to the shuttle during a routine field calibration and a forced offload of the data was performed. It was found that the logger malfunctioned and stopped recording on 8/3/23. Therefore, the data from the previous calibration date on 7/21/23 to 8/3/23 (marked in yellow) may be unreliable. An appropriate calculation for drift cannot be determined since there is no dissolved oxygen value from the logger on 8/10/23 when the calibration would have been performed. When removing the data from 7/21/23 to 8/3/23, 67 out of 2,099 recorded values, or 3% of measured DO values, violate the Class A and B dissolved oxygen standards.

Palermo Preserve 2022 Data:

As a part of ground truthing for a Rapid Stream Assessment project, continuous dissolved oxygen concentrations were collected using a HOB0 Dissolved Oxygen Data Logger (model U26-001) in 2022. The logger was deployed from 5/20/22 to 11/3/22 at Midcoast Conservancy's Palermo Preserve, which was placed ~600 feet upstream from the Somerville/Palermo townline and ~3,700 feet downstream the Maine Inland Fisheries and Wildlife Department's Palermo Rearing Station (Figure 1). The sampling, calibration, and data correction methods are the same as outlined in the previous section (*Site S013.5 Data*). All continuous dissolved oxygen data measured show attainment of Class A and B dissolved oxygen standards of ≥ 7 mg/L (Figure 10). The full tabular dataset is available



upon request.

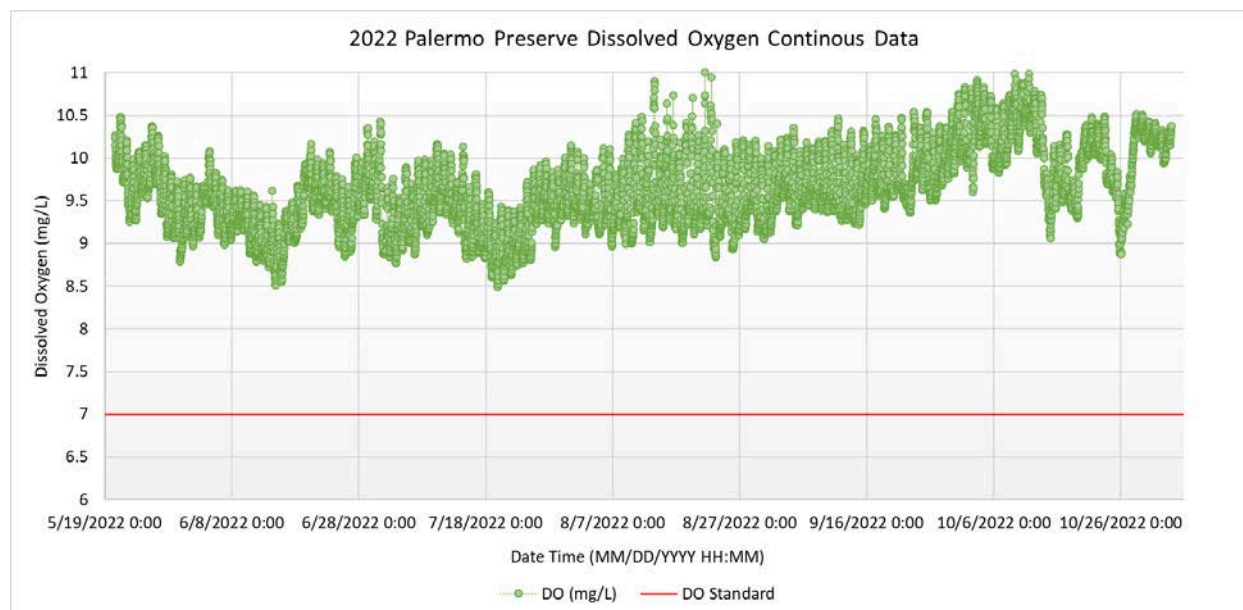


Figure 10. Continuous dissolved oxygen data at Midcoast Conservancy's Palermo Preserve from 5/20/22 to 11/3/22 showing attainment of Class A and B dissolved oxygen standards of ≥ 7 mg/L.

The Maine Department of Environmental Protection Biomonitoring Data at site S-73:

The Maine Department of Environmental Protection's (DEP) Biological Monitoring Program assesses the health of rivers, streams, and wetlands by evaluating the composition of resident aquatic benthic macroinvertebrate and algal communities. DEP biomonitoring station S-73 is ~120 feet downstream of Midcoast Conservancy's water quality monitoring site S013.5 (Figure 1). In 2022, DEP biomonitoring data for macroinvertebrates at S-73 had a final determination of Class A. DEP macroinvertebrate reports from 1991 and 1984 also have a final determination of Class A. Algal communities were also monitored by DEP at S-73 in 2022, however the report has not yet been publicly released.

The Maine Department of Marine Resources Atlantic salmon data:

The Sheepscot River hosts all 12 of Maine's native sea-run fish, including endangered Atlantic salmon (*Salmo salar*). The sea-run Atlantic salmon in the Sheepscot are the southern-most genetically distinct population in the United States, and it is hypothesized that they are likely the most thermally tolerant population with respect to warming waters as a result of climate change. The following data provided by the Maine Department of Marine Resources (DMR) are from the reach between the IFW Palermo Rearing Station and



the Somerville/Palermo townline (Figure 1), which is upstream of the proposed upgrade segment.

As a part of the endangered Atlantic salmon Recovery Program, DMR stocks Atlantic salmon in the watershed by egg planting and fry stocking. Egg planting, which involves depositing Atlantic salmon eggs in the gravel of the riverbed, is the preferred method because the eggs produce fish that grow up in the river and are better suited to the riverine conditions compared to the artificial hatchery conditions fry are grown in. A DMR study investigating the emergence of fry from egg planting locations was conducted over 3 years from 2010 to 2013. The results of the study show that emergence of fry from egg planting sites in the Sheepscot watershed was highest at site Shp 46.07, which is just below the IFW Palermo rearing station (Table 2, Figure 1). Even though Shp 46.07 is outside of the proposed river segment for upgrade, it is important to note that DMR plants Atlantic salmon eggs upstream of the proposed segment, which has the best emergence results in the drainage according to this study.

Table 2. The Maine Department of Marine Resources Atlantic salmon emergence results from egg planting across the Sheepscot drainage over three years (2010 - 2013). Highlighted in yellow are the results from just below the IFW Palermo rearing station.

Site	Planting Date	Eggs Planted	First/Last Catch Date	Median Catch Date	Average Temp. *C	% Survival
West B. 20.68	12/20/2010	3268	5/5-5/31	5/19	14.1	1.68
West B. 24.67	12/20/2010	2271	5/3-5/31	5/24	14.3	2.07
West B.25.65	12/20/2010	2930	5/3-5/31	5/14	14.6	17.61
West B.0.61	12/22/2012	1979	4/25-5/14	5/1	13.1	5.29
West B. 20.72	1/4/2012	2637				0
West B. 23.22	1/20/2012	2906	4/11-5/29	5/1	12.2	5.75
West B. 24.24	1/4/2012	2636	4/16-5/29	5/9	12.4	11.27
West B. 26.20	12/22/2012	2320	4/27-4/28	4/27	11.7	0.13
West B. 29.39	12/22/2012	2145	4/11-4/29	4/23	13.1	9.18
West B. 25.51	1/15/2013	1168	5/11-		13.8	0.09
West B. 25.51	1/15/2013	1250	5/4-5/22	5/10	15.2	10.24
West B. 25.51	1/15/2013	1108	5/8-5/18		16.1	0.18
West B. 26.20	1/15/2013	1219	5/8-5/23	5/12	15.4	13.86
West B. 26.20	1/15/2013	1133	5/19-5/22	5/12	15.3	4.06
West B. 26.20	1/15/2013	1242				0
Shp 46.07	2/20/2013	902	5/12-6/5	5/21	15.4	63.19
Shp 46.07	2/20/2013	856	5/20-6/4	5/21	15.6	54.91
Shp 46.07	2/20/2013	1122	4/28-6/4	5/15	14.1	28.34



DMR also surveys the Sheepscot watershed for Atlantic salmon redds, or nests, annually in the fall. They have reported that since the Coopers Mills dam was removed in 2018, they have consistently found Atlantic salmon redds upriver of where the dam existed. Due to potential adult Atlantic salmon poaching concerns, the exact location of redds is not publicly available. However, it should be noted that adult Atlantic salmon are consistently migrating through and utilizing the segment of river proposed for upgrade to spawn.

As part of a Rapid Stream Assessment Project, DMR conducted electrofishing (e-fishing) of 4 locations in 2022. These locations were chosen because they are near DMR egg planting sites. Results from relative abundances of fish calculated from the e-fishing data show the Palermo site, located at Midcoast Conservancy's Palermo Preserve between the Somerville/Palermo townline and the IFW Palermo Rearing Station (Figure 1), had the second highest relative abundance from the 4 sites for both Atlantic salmon YOY (young-of-the-year) and parr (juvenile Atlantic salmon) (Table 3). Relative abundances calculated from e-fishing data should not be used as a population estimate, but as a measurement to compare the quantity of fish relative to other surveyed reaches. The average weight and length of each Atlantic salmon YOY and parr were measured, revealing that out of the 4 sites, the Palermo Preserve produces the largest Atlantic salmon YOY and parr (Table 4).



Table 3. Relative abundance of fish species caught electrofishing at sites in the Sheepscot River in 2022 as part of ground truthing for a Rapid Stream Assessment Project (formerly known as a Rapid Geomorphic Assessment or RGA). The Palermo site is located at Midcoast Conservancy's Palermo Preserve, which is between the Somerville/Palermo townline and the IFW Palermo Rearing Station.

Relative abundances of species caught in RGA sites				
	Palermo	Pullen Mills	Below Weeks Mills	Maxcy's Mills
Atlantic salmon YOY	0.48	1.14	0.38	0.00
Atlantic salmon parr	0.43	0.71	0.19	0.00
American Eel	0.11	0.24	0.09	0.75
Black nosed dace	2.80	5.39	6.50	1.85
Brown trout	1.34	0.00	0.00	0.00
Brook trout	0.05	0.00	0.33	0.00
Common shiner	0.00	1.51	0.09	0.10
Sea lamprey	0.00	0.09	0.00	0.00
Creek chub	0.00	0.85	0.24	0.00
White Sucker	0.00	0.24	0.47	0.15
Northern red bellied dace	0.00	0.00	0.14	0.00
Fallfish	0.00	0.00	0.09	2.30
Small mouth bass	0.00	0.00	0.00	0.15
<i>Relative abundances = fish/minute</i>				

Table 4. Average length and weight of Atlantic salmon young-of-the-year (YOY) and parr (juveniles) caught electro-fishing as part of ground truthing for a Rapid Stream Assessment Project (formerly known as a Rapid Geomorphic Assessment or RGA). The Palermo site is located at Midcoast Conservancy's Palermo Preserve, which is between the Somerville/Palermo townline and the IFW Palermo Rearing Station.

Salmon Sizes in each RGA site					
		Palermo	Pullen Mills	Below Weeks Mills	Maxcy's Mills
YOY	Av. Length (mm)	80.6	50.4	57.4	N/A
	Av. Weight (g)	6.5	1.3	1.9	N/A
Parr	Av. Length (mm)	153.4	105.0	124.5	N/A
	Av. Weight (g)	41.2	12.3	20.7	N/A

Overall, the DMR data provided demonstrates the importance of the reach between the IFW Palermo Rearing Station and the Somerville/Palermo townline for Atlantic salmon. However, because of the existing discharge from the IFW Rearing Station, we are not



including this section as a part of the proposed upgrade at this time. It is important to have good water quality and greater protections downstream of important Atlantic salmon habitat as we know adult salmon are annually migrating through the proposed upgrade reach.

