June 13, 2025

Testimony of:

Carlton Wilcox, P.E.
Minot, Maine

Ref: DEP Water Quality Certification Application:

#L-17472-33-L-N (Weston)
#L-19751-33-J-N (Shawmut)
#L-011244-33-Q-N (Hydro Kennebec)
#L-31534-33-A-N (Lockwood)

Dear Maine Department of Environmental Protection:

The Maine Department of Environmental Protection should deny Brookfield White Pine Hydro LLC's (BWPH) request for a Water Quality Certification (WQC) for the Shawmut Hydroelectric Project and also deny the request for a WQC by Merimil Limited Partnership, Hydro Kennebec LLC, and BWPH for the Lockwood, Hydro Kennebec, and Weston Hydroelectric Projects.

BACKGROUND

I'm Carl Wilcox, P.E., I was born in Maine and I have lived all but 7 years of my life in Maine. I'm a practicing licensed environmental engineer with over 35 years of experience in industrial wastewater treatment and other environmental work throughout Maine including at six Maine papermills, three of which are still operating, and I have worked on projects across the nation. In my professional and personal travels, I have seen the poverty of both urban and rural Maine and it is particularly noteworthy in the Kennebec River valley from urban Waterville to Madison on the Kennebec and throughout the Sandy River valley from Madison to Madrid.

MAINE RIVER CONTAMINATION & REBOUND

I grew up on a hog farm in rural Maine. The hog operation was our sole source of income. In the early 1970s we raised hogs under contract with Hillcrest Poultry which at the time its Lewiston plant processed between 100,000 to 150,000 broiler chickens per day. Sheffield Ranch

in nearby Greene was Hillcrest Poultry's egg laying and hatchery operation to hatch about 100,000 chicks per day to be grown for poultry processing. When you have that many laying hens in one location with breeding roosters, a few hundred hens and roosters would die each day. A few times per week we would pick up the dead birds that had been dropped into drums laying in the hot summer sun. The truck like most vehicles back then was not air conditioned. We drove with the windows down with a load of dead fermenting chickens in the back. Servicing Sheffield Ranch required crossing the Androscoggin River twice each trip on what is now the Longley Bridge.

As a pre-teen I clearly recall hand cranking up the truck windows before we crossed the Androscoggin River which was covered with foam that spanned river bank to bank so thick that seagulls walked on it and foam bergs broke of the downriver leading edge. The river's stench greatly exceeded that of the maggot ridden fermenting chickens in back.

A lot of money has been invested by the nation's citizens and businesses to clean up our one-time gut-wrenching rivers. Since 1970 the US has spent approximately $4.8 trillion (in 2017 dollars) to clean up surface water pollution and provide clean drinking water, or over $400 annually for every American. In the average year, this accounts for 0.8 percent of GDP (Timothy Taylor, Some Economics of the Clean Water Act, Conversable Economist, November 12, 2019).

In my opinion, by 1985 the Androscoggin River no longer stunk. During the 1990s development began to sprout along the riverbank in Auburn with a large TD Bank followed by a Hilton Garden Inn in the early 2000s and Gritty's Pub outdoor deck overlooking the river opened. On the Lewiston side, Simard Park opened in the 1990s and a Hampton Inn was built in 2014. While I have not been as closely connected to the Kennebec River, I believe its cleanliness track closely resembles the Androscoggin River timeline. However in Waterville and Winslow, with the exception of the Hathaway shirt factory redevelopment and the creation of Head of Falls Park (which is an oxymoron because any existing falls at that location are submerged by the Lockwood dam impoundment) along the river, there has been little to no economic development. That is because the beauty of the Kennebec River downtown is submerged by the 1.25-mile Lockwood impoundment. That impoundment submerges a river with an 18

feet/mile gradient. Similarly, the Hydro Kennebec dam in upriver Waterville floods a 2.25-mile impoundment up to Bridge Street in Fairfield submerging a river with a 14 feet/mile gradient. The 3-mile free flowing river section from Bridge Street up to the Shawmut dam has a 1.3 feet/mile gradient. For comparison, the Kennebec River 8-mile runout from exiting the gorge upstream of the Forks where the Hydro-Quebec transmission line goes under the river, to The Forks has a 15 feet/mile gradient. This river stretch is a quickwater providing a relaxing raft ride that moves along, and some people ride it standing on paddle boards. If unsubmerged, the river segment from Fairfield Bridge Street to Lockwood Dam discharge would be a quickwater interspersed with some rapids.

LOCKWOOD & THREE OTHER KENNEBEC DAMS PREVENT ECONOMIC OPPORTUNITY

The Lockwood Dam was last FERC licensed on March 4, 2005 which expires in 2036, 30 plus years. The Shawmut Dam was last licensed by FERC on January 4, 1981, and expired on January 4, 2021, a 40-year period. It is long past time for the Kennebec and Sandy River communities and for Maine to recover its investment in clean water. The region still has a long way to go. The last few years I have be doing some work in Madison. On a recent winter trip in which it snowed that previous night, I stopped at the Waterville Hannaford for some morning meeting muffins. I walked over to the newly installed empty 12-unit Tesla Supercharger station. A sedan in good condition was parked in a non-charger stall. As I walked by, I stirred a male in his twenties from his sleep in the backseat. It was quite apparent he was living out of his car and had not left it since at least the evening before when the snowfall had begun.

It is noteworthy that the 12-unit Tesla Supercharger installation, which I believe is the single largest installation of Tesla Superchargers in Maine, is installed in Waterville. I have been told that Tesla selected the location because Waterville is approximately equidistant and one standard EV battery charge between Boston and Quebec City. Waterville is 180 miles from Boston and 200 miles from Quebec City. Waterville's location is a valuable attribute.

On another business trip, on the way home I decided to check out the fish lift and truck transport system at Lockwood Dam. What a pathetic attempt at fish passage. Per the Maine DMR fish trap counts, the 2020 – 2024 5-year average for salmon being caught and trucked above Lockwood Dam was 73 fish. And that includes a highly successful 2023 in which 159 salmon were caught and trucked. Shad is even worse, averaging 60 fish over that same period which also included one big year of 180 shad in 2020. However, the combined total for 2022 and 2023 was 6 fish. It is well below pathetic.

While at the Lockwood Mill complex, I noticed that three of the four Lockwood Mill buildings were abandoned in a disheveled state. The Lockwood Textile Mill that used the power from the Lockwood Dam closed in 1956. Mill 2 building was used by the Hathaway Shirt Company from 1957 to 2002 when it closed. That building was redeveloped into commercial office space and apartments. But the other three buildings that comprised mills 1 and 3 remained vacant from 1956 until very recently when North River Company out of New York City, the owner of redeveloped mill 2, has begun redevelopment of those three buildings that sit on the banks of Kennebec immediately upstream of the Lockwood Dam and turbine building, into mixed use and market rate housing.

If the Lockwood Dam FERC license had not been reissued in 2005 and the dam and its power generation building removed, the river in downtown Waterville/Winslow would have become free flowing, much more attractive, and would have attracted redevelopment interest many years prior to the present, helping to solve Maine's housing crisis.

The shortest route home from the Madison area is along the Sandy River to Farmington Falls then across to Livermore Falls. The poverty in Starks and New Sharon is very evident. Driving up Route 4 to Rangeley the poverty from Farmington through to Madrid is obvious. You can see what were once inns on the Sandy River are now abandoned.

The pre-European run of Atlantic salmon in the Kennebec has been estimated at 70,000 fish. If a small fraction of that number were to be reestablished to allow catch and release fishing for salmon, the economic impact in the Sandy River valley would be very meaningful. A 2014 study

for the Maine Office of Tourism and Maine Department of IFW, by SA Southwick Associates, determined that open freshwater fishing resulted in $196 million in direct spending ($270 million in 2025 dollars) with $51 million (2025 dollars) of that in the Kennebec Valley. When the economic contribution multiplier effect is included, the Kennebec Valley total economic impact is $82 million. The Southwick study determined that the average non-resident fisherman spent $1,030 (2025 dollars) per trip and with the economic multiplier effect that would equal $1,650 per non-resident angler trip. A Maine resident spends $648 per trip with a resulting economic multiplier of $1,040.

Southwick from the study surveys determined that in 2013 there were 188,000 resident and 70,600 non-resident trips for a total of 258,000 trips. Per the study, only 15% of the fishing trips (38,700) have the Kennebec Valley as their destination. Assuming a conservative 5,000 trip increase due to opportunity to catch and release an Atlantic salmon, that would result in a $6 million annual fishing impact to the Kennebec River Valley. And, IFW could introduce an Atlantic salmon catch and release lottery. Maine's moose lottery for 4,105 permits brings in $1.47 million in revenue to IFW ($358 per issued permit). IFW could require an Atlantic salmon catch and release stamp for $50 raising $250,000 for IFW.

The following table lists the median household income and poverty rate of Kennebec Valley communities compared to the State and nation.

Regional Economic Vitality Comparison

Community	Median Household Income	Poverty Rate
United States	$74,580	11.5%
State of Maine	$69,543	10.8%
Waterville	$45,208	23.05%
Strong	$40,030	15.3%
Madrid	$41,076	Unorganized territory, no data
Franklin County	$56,890	14.2%

Waterville and the Sandy River valley area median household income rates are well below the State and nation median incomes

M.R.S. Title 38 §464. Classification of Maine waters:

> Section 1. Findings; objectives; purpose. The Legislature finds that the proper management of the State's water resources is of great public interest and concern to the State in promoting the general welfare; in preventing disease; in promoting health; in providing habitat for fish, shellfish and wildlife; as a source of recreational opportunity; and as a resource for commerce and industry.

Yellow bolding has been added for emphasis.

The economics of these four dams do not justify their continued existence. For the general welfare of Maine residents particularly for that of the Kennebec and Sandy River valley residents there is a need for improved commerce to provide economic opportunity by removing these dams that have become economically obsolete. With the advent of cheap solar, the power production landscape in Maine has dramatically changed in the last 5-years, never mind what it is going to be 30-years from now.

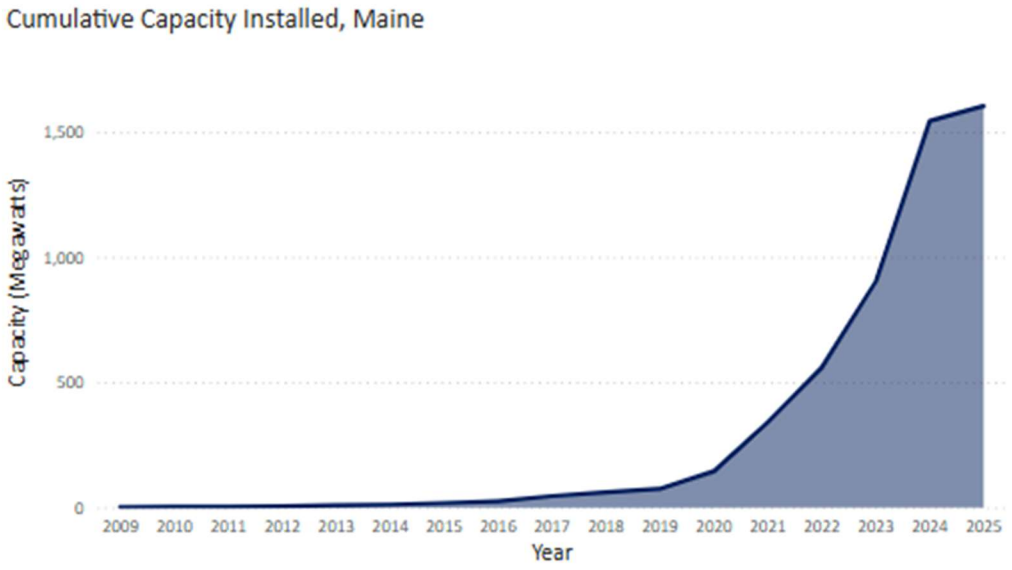
MAINES POWER ECONOMICS HAVE CHANGED IN THE LAST FIVE YEARS

From US Energy Information Administration data, for the 3-year average period 2020 through 2022,

- Maine produced 11,244 GWhr/yr of electrical energy.
- Maine's hydro production averaged 2,920 GWhr/yr for that period.
- By the end of 2022 there was about 480 MW of installed PV solar in Maine (Maine Governor's Energy Office Solar Dashboard). At a 17% capacity factor, solar in 2022 produced about 710 GWhr.

Forward to Maine's current installed PV solar energy capacity.

Maine's Cumulative Installed PV Solar
Current to May 20, 2025



As of May 20, 2025 Maine has 1,604 MW of installed PV solar (Maine Solar Dashboard). Using a 17% capacity factor for solar in Maine, the value used by Sustainable Energy Advantage, in its analysis of net benefits of net energy billing for Maine PUC, as of May 20, 2025 the installed solar will produce 2,390 GWhr/yr. Solar now produces 82% as much power as all Maine hydro dams combined. If as much solar comes online in 2025 as did in 2024, 2,198 MW will be online

by the end of 2025 producing 3,270 GWhr/yr of energy. By the end of 2025, Maine solar will produce 12% more electricity than all Maine hydro dams combined produce.

The following table shows the energy production of each of the four dams and the combined total:

- The dam's power capacity.
- The dam's energy production.
- The dam's percentage of total Maine hydro production.
- The dam's percentage of total Maine electricity production.
- The dam's energy output as a percent of Maine PV solar energy production.
- The value of the dam's energy using the weighted average energy price offered by renewable energy developers to Maine PUCs RFP for renewable energy, Tranche 1 and Tranche 2, (Report Regarding the Status of Contracts for Class 1A Resources Procured Pursuant to 35-A M.R.S. § 3210-G and the Distributed Generation Resources Procurement Conducted Pursuant to 35-A M.R.S. § 3219-D, Maine PUC, March 31, 2025).

Hydro Power Production of the Four Lower Kennebec Dams

Dam	From DEIS Installed Capacity MW	From FEIS Actual Energy Production, MWh	Percent of Total Maine Hydro Energy	Percent of Total Maine Electrical Energy	Percent of Maine PV Solar Energy (1)	Value @ $0.033/kWhr PUC Procured Energy Weighted Average	Dam Energy Value @ $0.042/kWhr PUC Procured Energy Highest Price
Lockwood	6.915	41,082	1.4%	0.4%	1.7%	$ 1,356,000	1,725,000
Hydro-Kennebec	15.4	88,500	3.0%	0.8%	3.7%	$ 2,921,000	3,717,000
Shawmut	8.65	51,058	1.7%	0.5%	2.1%	$ 1,685,000	2,144,000
Weston	14.178	89,453	3.1%	0.8%	3.7%	$ 2,952,000	3,757,000
Total		270,093	9.2%	2.4%	11.3%	$ 8,913,000	11,344,000
		270	GWhr				
(1) Based on solar installed as of May 20, 2025							

The salient items of the table are:

- all four dams combined produce 9.2% of Maine's hydro energy;
- the energy from all four dams combined is 2.4% of Maine's total electrical energy production;
- the combined energy production of all four dams equals 11.3% of Maine's PV solar energy production based on May 20. 2025 installed solar;
- the value of the energy produced by each dam and collectively at $0.033 per kWhr and at $0.042 per kWhr is shockingly low.

These two kWhr electricity values are from the referenced PUC report to Maine Legislature's Joint Standing Committee on Energy, Utilities and Technology, submitted March 31, 2025. PUC issued two requests for proposals to provide renewable electrical energy: Tranche 1, issued on February 14, 2020 and Trance 2 issued on January 15, 2021.

Tranche 1 includes 1, biomass, 1 wind, and 13 solar renewable energy production offers ranging in price from $29.75 to $42/MWhr (excluding the one biomass offer at $53/MWhr) producing an estimated annual output of 1,060,225 MWhr.

Tranche 2 includes 1 wind and 6 solar projects ranging in price from $29.89 to $39.50/MWhr producing an estimated annual output of 714,534 MWhr

The combined weighted average cost of energy of the two tranches is $33 MWhr ($0.033/kWhr).

Brookfield's PPA price is proprietary. I don't know if they have a PPA with a power distribution utility or a buyer in another state, or the contract length of their PPAs. But as a Maine rate payer using the standard offer, I don't want to be paying more than the maximum price of the 21 renewable wind or solar proposals which was $0.042/kWhr. The price should be preferably closer to or less than the weighted average price of $0.033/kWhr.

At these two energy rates, the value of the electricity all four dams produce should be no more than $9 to $11.3 million per year.

For the environmental damage these dams cause and the economic loss to residents' economic opportunity, welfare and commerce, the price of their energy should be zero or negative.

It is interesting that probably the largest electric user in Waterville/Winslow area, the Huhtamaki paper products plant, corporate Huhtamaki announced on February 24, 2022 that they had entered a 42-MW PPA to supply 30% of its electricity needs for its 18 manufacturing units in the US and Mexico. The PPA was signed with NextEra Energy for a portion of its 300 MW project in Texas. Huhtamaki didn't sign a PPA with Brookfield for hydro dam energy.

No one held a gun to Brookfield's head to purchase the 19 Maine dams from NextEra in 2013 which includes the four on the lower Kennebec. Brookfield certainly should have known that the Atlantic salmon was placed on the endangered species list in 2000. If not, it is their own fault. There is no reason that Maine residents should lose economic opportunities due to Brookfield's due diligence failure.

At the time of sale, it was reported in the Portland Press Herald that NextEra was selling the dams because NextEra saw greater growth opportunities in wind and solar than hydropower. In January 2018, Jim Robo, NextEra CEO, stated, "By early in the next decade (that would be early in the 2020s) … we expect that without incentives, solar will be $0.03 to $0.04 per kWhr". The following month, February 2018, NextEra submitted a bid to Xcel Energy in Colorado to provide solar-plus-battery storage for $0.036 kWhr.

Maine currently has 63 MW of battery storage with 175 MW currently under construction at the Gorham Cross Town Energy Storage project that will deliver 350 MWhr of energy. That is nearly one-half day of the combined production from these four dams.

The proposed iron-air battery for Lincoln is planned to deliver 85 MW for 100-hours (8,500 MWhr). That is equal to 11.5 days of annual average power production from these four dams.

All four of these dams are run of river dams with no significant ability to store water to provide peaking power in the evening. They get whatever water that is released by the Wyman dam in

Bingham whenever that water gets to them with the flow peak equalized passing through the three dams downstream of Wyman down to the Weston dam.

From a power perspective, Maine will do fine without these four dams and never miss them. Maine and the local population will do much better with them gone.

WHAT MAINE WILL LOSE IF THE DAMS REMAIN

First Maine will lose Atlantic salmon from the best spawning habitat in the State. The FEIS states the dams will result in the loss of 15% or the returning adults and 12% of the juveniles migrating downstream. First that has never been achieved in a four-dam combination and if it was it still doesn't pass the straight face test. Maine's moose herd is approximately 60,000 animals. The 5-yearaverage moose harvest is 2,339 animals. That is an annual 3.9% of the population harvested. Meanwhile the proposed FERC plan is to annually kill 12% of the returning adult salmon.

Second, any potential Atlantic salmon fishing revenue of $6,250,000 per year will be lost with loss of the salmon.

Third, a free-flowing river through Fairfield and Waterville will bring development similar to what has happened in Lewiston and Auburn.

Fourth, removal of the Weston dam will reduce or eliminate flooding of Skowhegan neighborhoods that flooded in December 2023.

Fifth, a free flowing Kennebec from Bridge Street to the Lockwood Mills has a flowage to attract rafters, kayakers, and surfers if standing waves are installed in the flooded Lockwood and Hydro Kennebec impoundments. A water park in the Kennebec and its economics is well presented on Skowhegan's run of the river website. That economic analysis determined in year one an in-river water park would bring $8 million in 2025 dollars to the Skowhegan economy.

From personal experience when passing through Boise Idaho on multiple occasions, their Boise Whitewater Park on the Boise River, that has a standing wave has had a line of surfers and body

board riders waiting in line for their turn. The adjacent surf shop, 400 miles from the Pacific Ocean, was busy along with the bar next door. I have been told the fabricated surf waves in Cascade Idaho at Kelly's Whitewater Park on the Payette River are more popular. That is an endorsement for the drawing power of standing wave surfing being that Kelly's is an hour and 45 minutes from Boise, the only significant population center around with the next closest being Salt Lake City a 6 plus hour drive away.

From my personal local experience as a part time tour bus driver hauling cruise ship tourists from Portland to Kennebunkport, I have noticed when the surf is up on Goose Rocks Beach, the traffic is also up, along with Quebec plates that are not normally there. There are vans of Quebec surfers. When surf is forecasted, they come down.

At whitewater parks with standing waves the surf is always up. The only problem is only one or two people can be on a standing wave at a time. There is a long line at the Boise whitewater park. There is far more surfing demand than can be met with by a few standing waves in Skowhegan. Waterville is perfectly located for surfers from Quebec City, Boston and points between.

At Boise and elsewhere people like to watch people. Put a standing wave at Ticonic Falls and there will be a riverside pub on Front Street. If salmon return to the river, I would certainly drive up to Waterville to have a beer at a riverside pub to watch people and salmon.

In addition to the Boise whitewater park, Boise has Float Boise, tubing and rafting on the Boise River through the city. It is a 6 – mile float on a river with a 11 feet/mile gradient that includes three class II rapids. You can rent a tube, a 4 or 6 person raft, or an inflatable kayak or bring your own. Running the river is free, but there is a fee to rent the equipment, parking, taking the school buses from the take out to the put in. All in a family of four is going to spend $98 for a raft for four, plus eating out and lodging. About 125,000 people a year ride the school buses to Float Boise. Assuming groups of four taking a raft, the annual fee income to the City is over $3 million per year.

The Kennebec with an 18 feet/mile gradient through Waterville may be a bit too rigorous for tubers but will be fine for kayakers and rafters. The segment below Shawmut to the present Hydro Kennebec dam should have good tubing if not to deep. Fishermen are going out in waders below Shawmut dam so isn't very deep.

SHAWMUT DAM

The Shawmut Dam impoundment that reaches up to near the base of the Weston Dam is about 13-miles long. If the dam were to be removed the river gradient will be about 2.2 feet/mile. This impoundment is a class C water from the dam to the Skowhegan town line which is just upstream from the Sappi wastewater discharge. The Lockwood Dam impoundment is also class C. From the Lockwood Dam to Merrymeeting Bay the river is class C. The Kennebec is also class C in the Hydro Kennebec Dam created impoundment.

In a search of the web, I was surprised to not find any dissolved oxygen data for the Shawmut Dam impoundment. The Gulf Island Pond impoundment below the now closed Jay papermill was in non-compliance with its class C water classification for dissolved oxygen. The three papermills on the Androscoggin were required to inject oxygen into Gulf Island Pond for decades in an attempt to achieve 5.0 mg/l dissolved oxygen (DO) in the impoundment. From my experience monitoring the Royal River Elm Street Dam impoundment, that water a class B water did not achieve class C DO.

Sappi has been granted a 5.5 mile long mixing zone from their effluent discharge pipe to the Shawmut Dam discharge. It is speculated that this mixing zone is to blend the mill's thermal discharge. The warm mill water added to the river near the river bottom rises to the surface and stays there until it is blended with the river's water through the Shawmut's turbines. I have spoken with a fisherman who has fished the impoundment and confirms a white discharge comes to the surface in the middle of the river where Sappi's diffuser outfall is located. As described, the discharge fans out across the river to form a triangle.

Sappi is operating under a discharge permit dated December 2, 2015. It is unknown to me why a new permit was not issued in 2020. The permit fact sheet contradicts itself regarding mixing

zones. It appears the Sappi's discharge did not comply with the State's thermal discharge regulations. In1996 mixing zone assessment was conducted by a Sappi contractor. The study found that complete mixing did not occur until approximately 5 miles downstream to a point 500 feet below Shawmut Dam. The report concluded that based on the data collected, complete mixing occurred at the dam or apparently below the dam. Per Sappi's discharge permit, the study was inconclusive as to whether the thermal discharge complied with 06-096 CMR 582 at Shawmut Dam.

From the discharge permit text, it appears that a mixing zone was required all the way to Shawmut Dam and through the dam. And apparently even downstream there is question as to whether Sappi's discharge is mixed with the river. Sappi has been granted a mixing zone 5.5 miles in length passing through Shawmut Dam (pages 15 and 16 of the Fact Sheet).

But on page 11 of the Fact Sheet discussing aquatic toxicity testing, it states,

> "The Department has determined that the discharge at Outfall #001A does achieve complete and rapid mixing with the receiving waters. Thus, the Department is utilizing the full 1Q10 stream flow in acute evaluations pursuant to 06-096 CMR 530."

This clearly conflicts with the thermal discharge that has a 5.5 mile mixing zone that extends through the dam. It can't go both ways.

If Sappi needs a thermal mixing zone that encompasses more than ¼ of the river's cross-sectional area, per Chapter 581 they can ask MDEP for one and hold a public hearing on the matter.

In my opinion until there is data to support otherwise, Sappi's warm discharge rises to the top on the impoundment spreading out as described by the fisherman, maybe nearly shore to shore and is not mixed until it passes through Shawmut Dam. This poor mixing is due to discharge entering a slow-moving impoundment.

Prior to a Water Quality Certificate being issued for the Shawmut Dam, this mixing zone issue needs to be resolved.

DO profile transects should be done across the river, measured at every meter depth: 100 yards upstream from the diffuser, and 100 yards downstream of the diffuser, 1-mile, 2-mile, and 5-miles downstream and 500 feet below Shawmut Dam. Dye or tracer testing should also be done to confirm the required mixing zone.

The Sappi discharge entering the slow-moving impoundment water may be creating a thermal cap across the impoundment preventing oxygenation below the near surface resulting in DO levels below the cap being less than 5.0 mg/l, the class C minimum.

SAPPI MILL WATER INTAKE & EFFLUENT DISCHARGE

Much has been made about the Sappi water intake as if it is an insurmountable task which it is not.

Matthew D. Manahan with Pierce Atwood LLP, on April 27, 2022 submitted a letter to Michael Pentony, Regional Administrator, National Marine Fisheries Service, NOAA basically stating that if the Shawmut Dam were removed, the Sappi mill would not be able to obtain water and shut down. This letter was a cover letter for two letters from TRC to James Brooks, the mill Environmental Manager. The first letter, March 11, 2022 presents a few concept designs for water withdrawal and wastewater discharge, very basic concept level costs. The second April 22, 2022 letter is more a summary layer that opines on fish passage efficiency.

The concept design study includes some fantastical statements and the summary letter contains an erroneous statement.

Sappi's wastewater discharge permit states that Sappi was required to submit an outfall diffuser design to MDEP for approval. I requested that documentation from MDEP and they provided it along with limited plans of the river water withdrawal system. It is presumed that these submitted compliance documents are accurate.

Clearly upon Shawmut Dam removal the river water level will significantly drop and require modifications. The TRC concept design states the current normal river level is at 112-feet elevation will drop 15 to 20 feet upon dam removal. The water intake figures, in the State files, show that the pumphouse wetwell floor elevation is at 100-foot elevation. From the figure the river bottom elevation cannot be determined but it is at least as low as 100-feet.

EFFLUENT DISCHARGE

The wastewater effluent discharge diffuser diagrams provide more detail. The effluent diffuser is 3,900 feet downstream from the mill's water intake. Until documentation is provided that shows otherwise, it is assumed that the river bottom and bedrock elevations between the two points are similar.

1. An important point is the water intake structure profile calls out a 106.3 minimum river water level. Presumably if minimum water level is called out the inlet pump installation was designed to operate at this minimum level. The diffuser discharge profile calls out two normal river operating levels: 112 normal water surface with flashboards, 108 feet normal water surface w/o flashboards. 106 - feet is listed as the minimum recorded water surface elevation.
2. This highly suggests that the inlet pumps can operate at 106 feet elevation for a while but presumably not for a prolong period. At 106 feet elevation, the intake screen inlet velocity may be greater than preferred, trapping fish on the screen face. Details of the pumps or their installation are not available currently. I'm very skeptical that the pumps are cavitating at low river level. There should be plenty of net positive suction head available in this application to avoid cavitation. The pumps may well be vortexing due to low submergence.

3. The river profile diagram at the effluent diffuser shows the river bottom elevation varies from 85 to 90 – feet where the diffuser discharge outlets are located before the river bottom begins to rise to the riverbank at elevation 112.
4. The crown of the 42” diffuser pipe is 85 – feet elevation.
5. Assume the greatest range of TRC’s water drop of 20 –feet is correct, then the river water level will be 92- feet elevation.
6. The diffuser has 4-feet tall 4-inch diameter diffuser outlets coming out of the crown of the 42-inch pipe. Thus the diffuser outlet elevation is approximately at 89 – feet elevation.
7. There does not seem to be anything critical about the four-foot riser length. It appears it could easily be cutoff two feet lower at 87 – feet.
8. Using the greatest range of TRC’s modeled water level drop, the diffuser outlets will be 5-feet below the river surface. Using TRCs 15 feet river level drop, the river surface will be at 97 – feet elevation and the diffuser outlets will be 7-feet below the water surface.
9. There are many treatment plant outfalls in small rivers such as the Sandy in Farmington, Oxford and Norway and Mechanic Falls POTWs on the Little Androscoggin. They all seem to survive fine.
10. There appears to be very little work required to modify the effluent diffuser. If the 15-foot river drop is accurate, no work on the effluent diffuser will be required.

Per the TRC modeling, the river surface will drop by 20-feet from 112-feet to 92-feet elevation. The river bottom in the center of the channel where the diffuser is located is 85 to 90-feet elevation. Assuming the river channel is symmetric. the diffuser drawing ends a little beyond

half way across the river, the river bank will come towards the channel center by 200 feet. The river at the diffuser is approximately 850 feet wide. Modeling as a rectangular bathtub, the current river cross section is 25 -feet deep by 850-feet wide for 21,250 SF cross sectional area. Post dam the river cross section will be 5-feet deep by 450 feet wide for 2,250 SF cross sectional area. The resulting average river velocity will be about 9.5 times greater than the present impoundment velocity. This increase in flow velocity will greatly help mixing Sappi's effluent and should significantly shorten the present 5-mile-long thermal mixing zone that extends through the Shawmut Dam.

Mill Water Intake and Pumphouse:

TRC's analysis looked at two potential solutions for replacing the mill water intake and pumphouse:

1. In river basin water intake.
2. Vertical well caissons.

In River Basin Water Intake

TRC is proposing 500 -feet square mat in the river that has 16,000 linear feet of perforated pipe below a bed of engineered fill that will supply a new pumphouse.

A much simpler and less expensive solution follows:

1. Do bathymetry followed by refraction geophysics to determine river bottom and bedrock elevations.
2. Follow with geotechnical probing.

3. The new pumphouse will be as TRC describes close but downstream of the existing pumphouse.
4. Lower the impoundment level to the limit that mill pumps can operate.
5. Build a jetty into the river at an approximate 45 degree angle from the river bank. Extend as necessary to get to sufficiently deep water to supply the new pumphouse.
6. Extend the jetty parallel to the river bank a distance to be determined – 100 feet.
7. Neither the diffuser drawings or the pump station intake drawings show bedrock. Apparently, bedrock is not present. Drive a clam shell crane onto the jetty and excavate the river gravel to form a channel back to new pumphouse.
8. If bedrock is present, construct a coffer dam square off the jetty and blast a channel back to the pumphouse intake.
9. Build a cofferdam for the pumphouse.
10. Construct the pumphouse install new pumps or relocate the five existing mill pumps in stages.
11. Remove the cofferdam. At this point the pumphouse wetwell will be flooded.
12. Run new force main to the existing 36-inch main that supplies the mill.
13. Hot tap the 36-inch mill pipe so the mill will not need a shutdown.
14. Move the remainder of the five mill pumps.

The benefit of this jetty design is it diverts gravel and grit down river away from the pumphouse intake channel. Only fine sand and silt will take the 180 degree turn at end of the jetty to enter the pumphouse channel. If fine sand accumulates in the pumphouse channel it can be excavated with a clam shell excavator from the jetty or river bank.

This design was successfully implemented at the Old Town mill utilizing the existing former dam's tailrace jetty. TRC's statement that the Old Town mill's water intake system was a failure is inaccurate. TRC may well be accurately describing what the Old Town mill employees told but what Old Town told TRC is not accurate.

I did a little bit of work at the Old Town mill in their wastewater treatment plant. I had no involvement with the removal of the Great Works Dam. The Great Works Dam was removed by I believe Trout Unlimited in the effort to restore salmon to the Penobscot River.

The mills water intake was in the Great Works Dam. That intake was removed when the dam was removed. Prior to dam removal, a new water intake structure was provided by Trout Unlimited or similar organization. You can look at the Google Earth photos with historical imagery on.

- In October 2011 you can see construction has begun on the intake which is a long narrow box looking like a semi-trailer parked near the river. In this photo the river flow is very high with the dam's tailrace jetty submerged.
- In November 2011 you can see the tailrace jetty has been breached. The dam is still in place. Work on the water intake continues with what looks like a floating construction berm in the tailrace channel.
- July 2012 the mill intake structure is installed and likely operating. The dam has been breached.
- August 2013 the dam is gone. The mill is operating.
- August 2014, Old Town Fuel and Fiber goes bankrupt and closes operations.
- April 2015 note where the tailrace jetty is breached it directs river water from the main channel directly into the new water intake structure like a college student drinking a beer bong.

- April 2018 the breach in the jetty is closed. Water is flowing around the end of the berm into the new water intake structure.
- April 2023 (no Google Earth photo) ND Paper closes operations.
- March 2024 the mill has been closed for nearly a year. The tailrace is frozen over but there is no ice from the end of the tailrace berm to water intake structure.

1. About January 2014 I get a call from Old Town Fuel and Fiber. They want the breach in the tailrace jetty filled to stop it from directing river trash and silt to the water intake structure that has now been operating for 2-years. To fill it when the mill wants, they need a salmon expert to write an opinion of no harm letter to MDEP. The mill has already found who they want to hire for $600. A retired MDEP or MMR salmon expert who has become a middle school science teacher. I don't recall his name. The mill wants me to hire the school teacher so they don't have to fill out the IRS paperwork for a new contractor. The mill employees are a bunch of lazy bastards or later I discover lying crooks.
2. I hire the school teacher for $600. I send him a safety work plan and tell him what the mill needs and the mill contact. I never meet him or speak with him again.
3. I send Old Town Fuel and Fiber the contract for $1,200.
4. He goes to the mill looks at the breach, writes his letter to MDEP.
5. MDEP approves the work and when the mill wants it done.
6. I get the school teachers bill. It is only $600. I pay it even though the contract is pay when paid. He is a school teacher. He must need the money.
7. I send Old Town Fuel and Fiber my $1,200 invoice.

8. 30-days not paid, 60-days, 90 -days not paid. I'm calling asking for payment and they tell me I'm going to get paid.
9. 120-days the same story from the same lying bastard who hired me.
10. Old Town Fuel and Fiber goes bankrupt.
11. About a year later the bankruptcy court awards me 2 cents on the dollar.
12. I don't bother to take the time to fill out the paperwork for the $24.

Subsequently, years later I met Jeff Reardon who worked for Trout Unlimited as a project manager on the mill intake project. Jeff Reardon told me Trout Unlimited didn't do anything without mill approval. The mill was concerned ice would form in the channel to the new intake structure. The mill wanted the tailrace jetty breached. Those lying mill morons self-inflicted themselves by making that breach. As can be seen March 2024 Google Earth photo the channel to the water intake does not freeze over. And if it did, just dig it a little deeper.

Additionally, a few years after Old Town Fuel and Fiber took me for $1,200, a new hired co-worker, who was a contractor on the Great Works Dam removal project, told me the Old Town Fuel and Fiber managers were the biggest bunch of back stabbers he had ever worked with.

Whatever those god damn lying Red Shield I/ Red Shield II/Old Town Fuel and Fiber/ND Paper, all but ND Paper went bankrupt, bastards tell you, you can count that you are being lied to. They are the same guys who continue from one Old Town bankruptcy to the next. That ND Paper crowd are just a bunch of paper making buddies that told TRC what Sappi wanted to hear.

Jeff Reardon told me when the mill intake was in the dam the mill had problems getting clogged with balls of eels. Eels having sex form a big ball that tumbles down river with the current and get caught into the screen intake, clogging it and shutting down the mill due to water loss. So much for the great intake system in the dam.

Vertical Well Caissons

By TRC's description of vertical well caissons, they are describing a Ranney Well which is a patented well system. There are about 300 installations in the US. Depending upon the geology along and below the river, it may be a very good solution for the mill.

A caisson 13'-6" in diameter is sunk into the earth through excavating from the inside. Then well screens are jacked out radially several hundred feet. In this application the horizontal radial wells would run parallel to the river under the riverbank and others would project out underneath the river. They work well in granular material and can produce very large flow rates. If conditions are favorable, it is possible that one Ranney well would suffice but likely two would be needed and a third for redundancy. Cincinnati Ohio has a Ranney well. Cedar Rapids Iowa has one that produces 15 MGD.

With bedrock showing in the river below Shawmut Dam and up in Skowhegan, I assumed the Kennebec river bottom would be bedrock controlled. However, in neither the intake drawings or the diffuser drawings was there mention of bedrock. There needs to be a depth of granular material below the river bottom and bedrock. To have built the water intake structure, geotechnical borings must have been taken. If they show shallow bedrock that would rule out a Ranney well. But if a sufficiently deep bed of coarse granular material is present, a Ranney well is a viable solution. The river water is filtered through the gravel into the caisson where it would be pumped to the mill. The water to the mill would be of higher quality than what the existing intake system provides. Plus, there would be no incidental take as there is with screened inlets. Fish, or eels, are not going to get stuck to the river bottom.

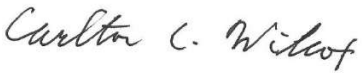
SUMMARY - CLOSURE

The advent of solar has changed the power generation industry. These small Kennebec dams have become economically obsolete when value is placed on the economic opportunities that are created when they are gone.

Sappi's intake water structure will need to be replaced if the Shawmut Dam is removed. It is very doable, it just costs money.

It is in the best interest for the fish and the citizens of Maine for these dams Water Quality Certifications be denied.

Sincerely,



Carlton C. Wilcox P.E.