

TOWN OF HART'S LOCATION

REPORT: THREAT ANALYSIS FOR LOCAL WATER RESOURCE PROTECTION PLANNING



PREPARED FOR:

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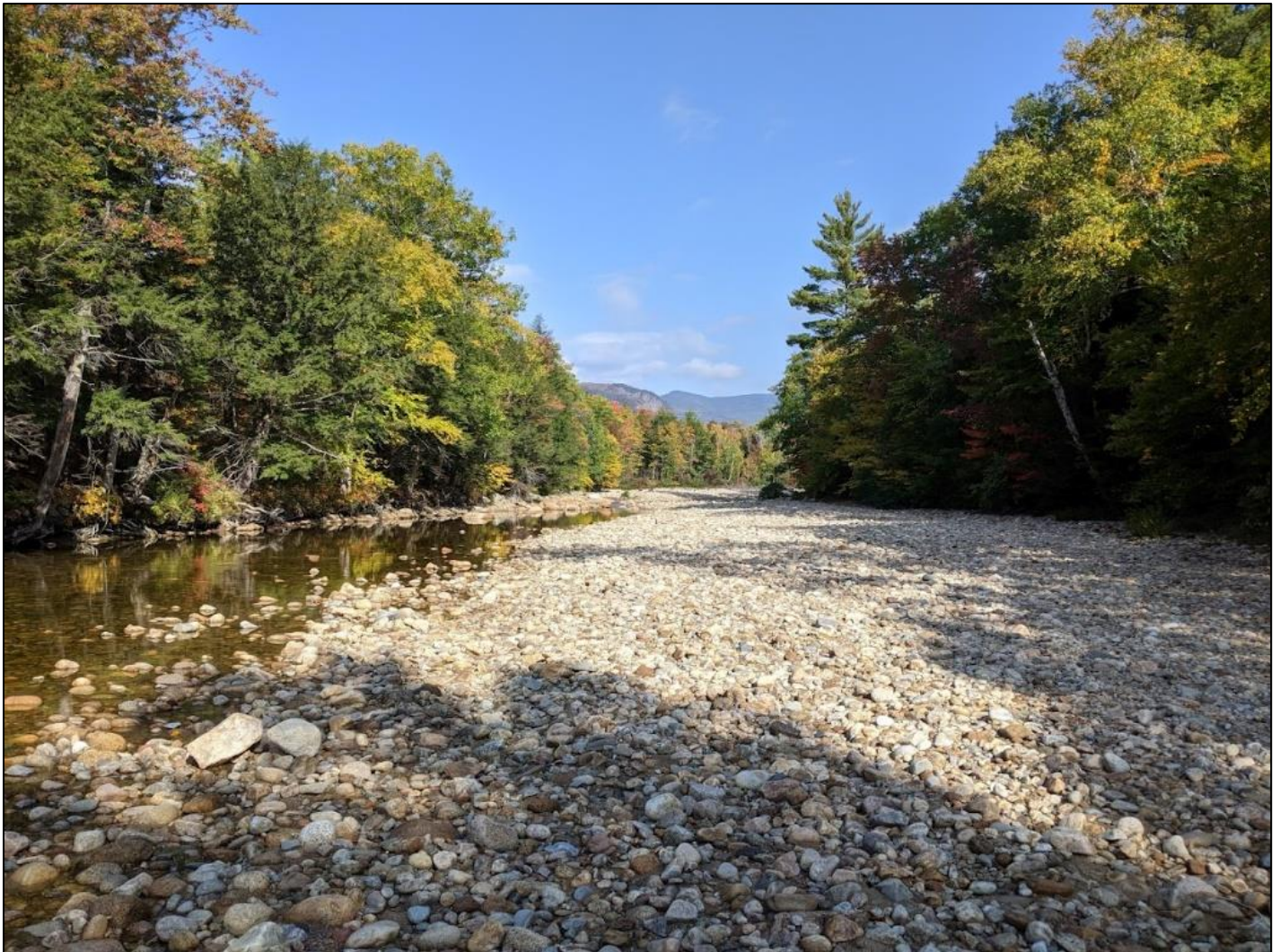


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A view of the Saco River at the Bemis Footbridge, Davis Path, Hart's Location

INTRODUCTION

Hart's Location sits in a scenic mountain valley at the highest headwaters of the Saco River, which holds great significance and value for the New Hampshire and Maine communities downstream. Along the river, and throughout the watershed, many individuals, organizations, and institutions are working daily to protect the Saco from threats and sustain its currently excellent water quality, both for the present day and to pass it on as a resource to future generations. Without continued planning, collaboration, and water resource protection, pressure on the river will likely increase as residential and commercial development and climate change proceed, with declining water quality a looming possibility.

As a largely rural community with low population density, flanked by federally protected lands in the higher elevations, at first glance Hart's Location may not seem the model of a community that needs to worry about threats to its water quality. To be sure, there are many communities in the Saco River watershed that face greater risk of contamination than their farthest upstream neighbor, whether due to their patterns of development, their stormwater management practices, or other local factors. Nevertheless, Hart's Location has been leading the way in proactively filling data gaps to aid the process of watershed planning and protection, not only for its own benefit but for the benefit of its downstream neighbors. In 2018, Hart's Location voters passed a groundwater protection ordinance that extends protection to key groundwater resources such as the stratified drift aquifer, many of which are highly connected to the waters flowing in the Saco River and its tributaries. Any contamination that happens in Hart's Location is passed downstream to neighboring communities.

The work described in this report fills important data gaps by assessing the current or potential threats to water quality within Hart's Location. In 2019, the Town of Hart's Location submitted a preapplication for a principal forgiveness loan for stormwater planning from the Clean Water State Revolving Fund (CWSRF) loan program, administered by the New Hampshire Department of Environmental Services (NHDES), which was approved for funding beginning in 2020. The principal forgiveness loan provides funds for the Town to hire consultants to conduct floodplain mapping and a water quality threat analysis in Hart's Location. The Town identified a need for floodplain maps to be used as a basis for regulating the Saco River floodplain within town boundaries using their Flood Plain Conservation District Ordinance, which currently relies on soils-based district boundaries that can be difficult to define with the level precision and accuracy that is needed for parcel-scale decisions, especially where floodplain development is being proposed. Another key motivation for the study linking floodplain management and water quality was the recurrence of bridge and culvert failures in Hurricane Irene and the October 2017 storm (remnants of Tropical Storm Phillipe) that caused scouring, erosion, and sediment release.

The threat analysis that is the focus of this report consists of a desktop and field analysis of current and potential threats to water quality led by FB Environmental Associates. The types of threats considered included potential groundwater contamination sources, nonpoint source pollution sites, sites with stormwater management problems, and stream crossings – categories that admittedly have some overlap. (The report on the floodplain mapping component of this project, led by HEB Engineers, has been submitted under separate cover, while the newly produced floodplain maps (Figure 1) provide valuable context for this report.) The purpose of producing the data and conclusions reported here is to generally inform future planning and actions for water quality protection in Hart's Location. To serve this end, this report makes specific

recommendations that will inform future prioritization, planning, and design of best management practices (BMPs) for pollutant load reduction, flood resilience, and aquatic organism passage.

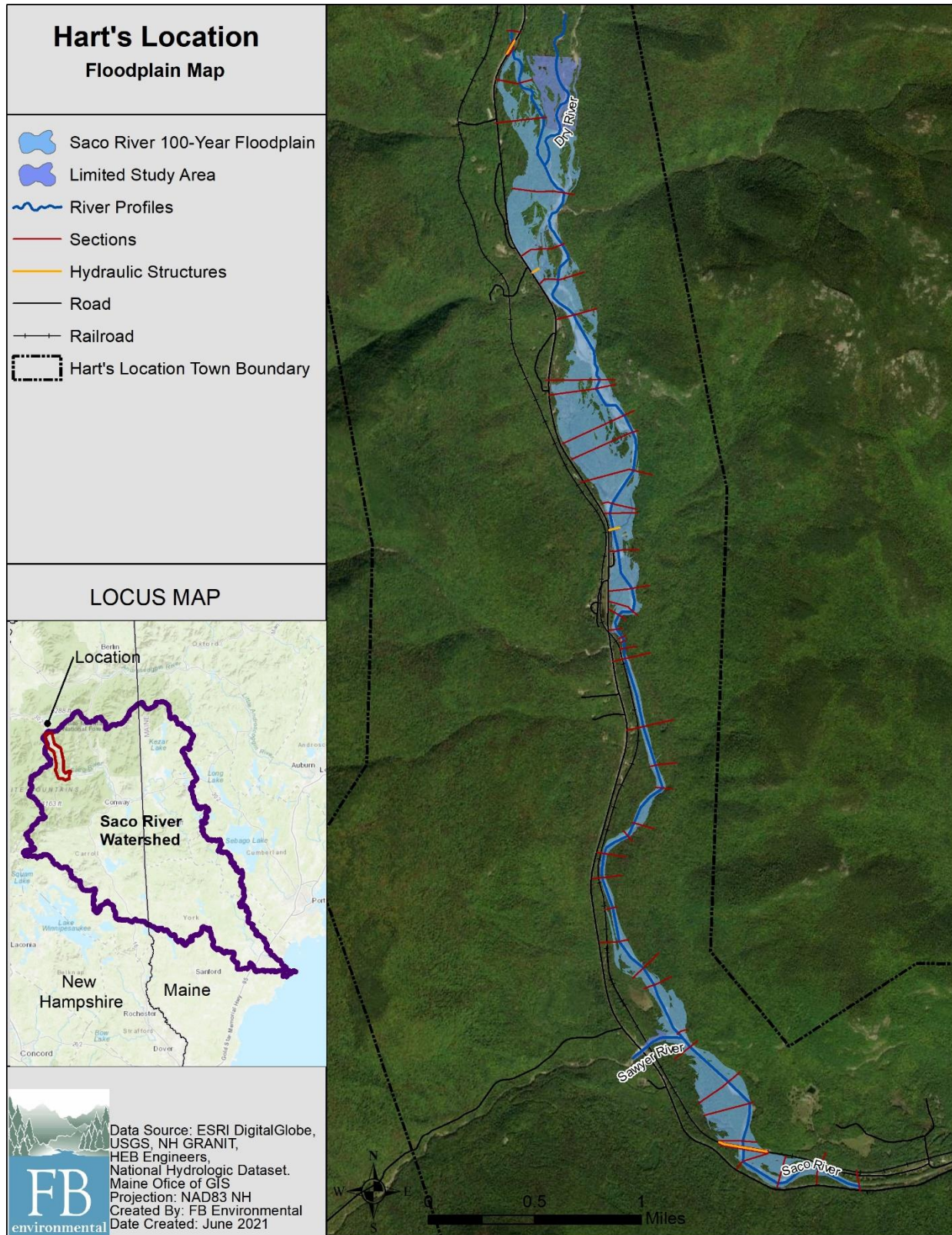


Figure 1: Saco River 100-year floodplain map (generated by HEB Engineers for the current project) from the past terminus of the Carroll County Floodplain Maps of Record near the Hart's Location-Bartlett town line to the Route 302 bridge located shortly upstream of the Saco River and Dry River confluence.

METHODS

A water quality threat analysis was conducted via desktop and field investigation beginning in July 2020. The scope of the investigation was to identify current and potential water quality threats to the Saco River, its tributaries, drinking water sources and protection zones, and areas underlain by stratified drift aquifer from publicly available data and field site visits. Geographically, the entire town limits of Hart's Location were included in the analysis.

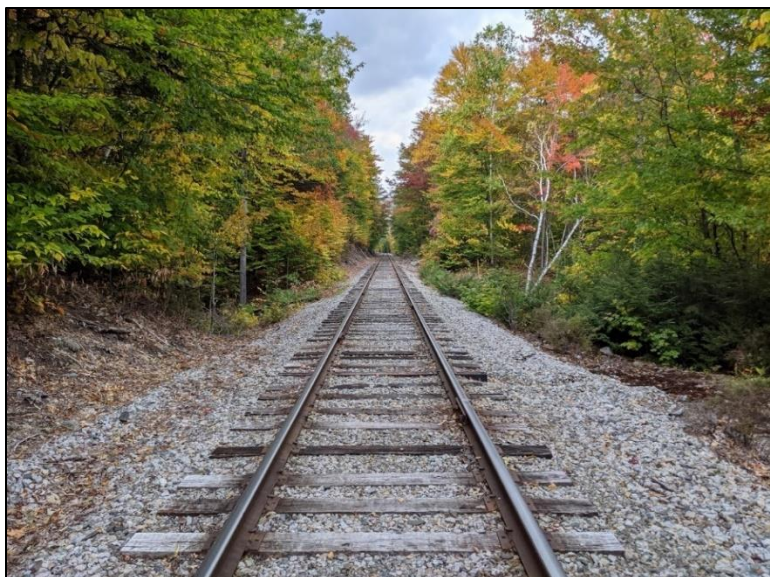
First, a desktop review of the NHDES OneStop environmental database for nonpoint source pollution sites and potential contamination sources (terminology shared by NHDES and the US Environmental Protection Agency for "any facility or activity that stores, uses, or produces contaminants of concern which could find their way into a source of drinking water") was conducted. For all identified sites, aerial maps were reviewed for consistency.

Second, stream crossings within Hart's Location were identified by reviewing geographic information system (GIS) layers including the National Hydrography Dataset (NHD), the National Wetlands Inventory (NWI), and transportation layers including roads, railroads, and recreational trails from GRANIT. The NHDES Aquatic Restoration Mapper was also used to identify previously assessed and unassessed stream crossings. Aerial maps were reviewed for consistency with the aforementioned GIS layers and online mappers.

Third, FBE had email and phone communications with numerous individuals who helped identify water quality issues, potential nonpoint source and contamination sites, and high priority stream crossings. Mark Dindorf, Chair of the Hart's Location Board of Selectmen, Michelle Moren-Grey, Executive Director of the North Country Council, Tom Gross, President of the Saco Headwaters Alliance, and Mark Prout, Forest Fisheries Biologist with the White Mountain National Forrest all provided extremely valuable input.

From these data sources, FBE generated a list of sites from the desktop analysis for further investigation. These lists are reproduced in table 1 (nonpoint source sites) and table 2 (stream crossings). From these lists, a smaller number of nonpoint source sites and stream crossings were selected for assessment in the field.

Nonpoint source assessments were conducted using a field watershed survey protocol developed by FBE based on NHDES and Maine Department of Environmental Protection guidance documents and decades of experience in the field of watershed surveys. Stream crossings were assessed using the multiagency Statewide Asset Data Exchange System (SADES) New Hampshire Stream Crossing Assessment protocol, which lays out a streamlined data collection process in the field that is then used by NHDES to score each crossing on its aquatic organism passage, flood resilience, and geomorphic suitability. Crossings owned, managed, or administrated by the New Hampshire Department of Transportation were excluded from further assessment in coordination with the North Country Council, who carried out assessments of those crossings in 2020. The interagency Stream Crossing Initiative now has



the assessment data available to be used in future stream crossing restoration work.

RESULTS – DESKTOP ANALYSIS

The desktop analysis confirmed that Hart's Location, despite its low population density, flanked by federally protected lands in the higher elevations, is not completely without water quality concerns. Through review of GIS layers produced by NHDES, NHDOT, other state, federal, and county-level agencies, personal correspondence, and aerial photographs, FBE produced a list of ten nonpoint source sites with detailed descriptions of the potential issues posed (Table 1). In addition, FBE also produced a list of seven stream crossings – serving roads, railroads, and footpaths – that merited investigation for possible water quality issues (Table 2). These tables succinctly summarize what was gathered about the sites (17 sites overall).

Of the ten nonpoint source sites, three were potential contamination sources listed in the NHDES inventory – the Notchland Inn, the Crawford Notch Campground, and the White Mountain National Forest East Central Septic Lagoon. Under New Hampshire's groundwater protection laws and regulations, any business, property, or facility that qualifies as a potential contamination source (again, “any facility or activity that stores, uses, or produces contaminants of concern which could find their way into a source of drinking water”) must follow the New Hampshire Administrative Rules Env-Wq 401 (Required Best Management Practices for Groundwater Protection) as a matter of state law. NHDES administers these rules. In addition, Hart's Location has local authority over such facilities by virtue of its Model Groundwater Protection Ordinance, passed in 2018. The inventory in Hart's Location included sites with aboveground storage tanks (Crawford Notch Campground), commercial septic systems (Notchland Inn), and septic lagoons (East Central Septic Lagoon), all of which handle contaminants of concern (i.e., petrochemicals in the aboveground storage tank and wastewater in the septic system and the septic lagoon). FBE staff selected one site fitting the category of a potential contamination source, the East Central Septic Lagoon. See Results – Field Assessments for descriptions of the follow-up fieldwork conducted.

Three more of the nonpoint source sites were associated with the railroad corridor. Two sites were of concern because of creosote, a preservative used in railroad ties: the Frankenstein trestle, where new ties leaked excessive creosote, and a pile of railroad ties stored by NHDOT along the rail corridor. FBE staff reviewed federal agency guidance available from the Centers for Disease Control (CDC). Though creosote is known to be toxic to human beings in certain high-dosage situations (e.g., workers at creosote-producing facilities), the CDC Agency for Toxic Substance and Disease Registry downplays the risk of environmental exposure through groundwater contamination. Nevertheless, a prudent precautionary measure would be to take steps to reduce human exposure and introduction into groundwater by using only dried railroad ties and promptly disposing of unused ties. Indeed, Hart's Location has sent requests to NHDOT to remove unused ties in recent years.

The third railroad corridor site is adjacent to the Hart's Location town offices, where oak trees have died back in recent years. A review of NHDOT vegetation control practices along the Conway Scenic Railroad corridor was outside the purview of this project, but it stands to reason that the possible connection between tree dieback and herbicide use along the railway should be investigated further. The potential connection to water quality and human health is obvious – excessive herbicide (and other pesticide) use can be detrimental to terrestrial and aquatic life, and toxic to human beings if absorbed through skin or ingested in food or drinking water.

Lastly, four nonpoint source sites were identified by FBE for assessing any potential stormwater and erosion issues: a steep section of the US Route 302 corridor immediately adjacent to the bank of the Saco River, two

public campgrounds adjacent to the river (Fourth Iron and Dry River), and one private property located between the Saco and Bemis Brook where a secondary channel formed during Tropical Storm Irene.

Table 1: Priority nonpoint source sites in Hart's Location identified by FBE during desktop analysis. Sites that were selected for further assessment in the field are marked with an asterisk (see section on Results – Field Assessments).

#	Site	Coordinates	Description
1	Crawford Notch Campground	44.134151, -71.359427	Privately owned campground adjacent to the Saco River. Listed in the NHDES Potential Contamination Source inventory with an aboveground storage tank.
2	Notchland Inn	44.115748, -71.355282	Private lodging facility along Route 302. Listed in the NHDES Potential Contamination Source inventory with a private commercial septic system.
3*	East Central Septic Lagoon	44.083046, -71.349653	White Mountain National Forest septic waste storage facility. Listed in the NHDES Potential Contamination Source inventory with a septic lagoon accepting campground wastewater from numerous campgrounds and facilities in the National Forest. Located adjacent to the Sawyer River.
4	Pile of railroad ties	44.103144, -71.352509	Most were removed a few years ago after the Town wrote NHDOT, but they are starting to accumulate again.
5	Frankenstein trestle	44.155481, -71.366274	Creosote dripping from new ties was so excessive that the State Park installed a tarp covering for the trail beneath.
6	Railroad corridor (areas with dead trees near Town Hall/Post Office)	44.181976, -71.399251	Use of herbicides to control brush resulting in brush fires, potential groundwater contamination, and tree mortality (dead oaks are visible behind town offices).
7*	US Route 302 - Stormwater runoff and road salt	44.207813, -71.403644	Areas with little or no buffer between road and stream along a steep section of US Route 302 near northern town border.
8	Dry River Campground	44.154999, -71.362999	Public campground in Crawford Notch State Park adjacent to Saco River and Dry River.
9	Fourth Iron Campground	44.084106, -71.344472	Public campground operated by White Mountain National Forest, adjacent to Saco River.
10*	Property adjacent to breached US ACOE berm	44.137995, -71.361366	An Army Corps of Engineering berm from the 1940s was built to protect the transportation corridor, but a breach has allowed a secondary channel to flow during high water into an adjacent property, which may threaten Route 302.

Table 2: Stream crossings in Hart's Location identified by FBE's desktop analysis. (NHDOT-administered crossings are not included as they were assessed by the North Country Council in 2020.) Sites that were selected for further assessment in the field are marked with an asterisk (see section on Results – Field Assessments).

#	Site	Coordinates	Description
1*	Footbridge over Saco – Davis Path	44.120522, -71.353826	168-foot Bemis Bridge completed in 2000. Designed to withstand 100-yr flood. Weathered both Hurricane Irene and October 2017 storm.
2*	Sawyer River Road crossings	44.077110, -71.372837	Culverts under Sawyer River Road (White Mountain National Forest-administered road and crossings maintained primarily for recreational use). FBE received reports that multiple culverts had previously failed and then been replaced in recent years.
3	Footbridge over Saco River – Webster Cliff Trail	44.171436, -71.385646	Similar to Bemis Bridge, a long footbridge spanning more than the Saco bankfull width. Approximately 1/8 mile hike from US Route 302.
4*	Bridge/dam on Saco River at Willey House	44.182128, -71.398318	Footbridge and seasonal dam on the Saco within Crawford Notch State Park. Dam pond drained for the winter months (late October – early May).
5	Culverts between Dry River Campground and Dry River Trailhead	44.157915, -71.364610	Assessed by North Country Council in 2020. Washed out and undermined US Route 302 during Irene and October 2017 floods.
6*	Private bridge over Bemis Brook	44.137995, -71.361366	Private bridge over Bemis Brook providing access to residence situated near a recently formed secondary channel of the Saco River where the Army Corps of Engineers berm breached.
7*	Railroad bridge over Kedron Brook	44.171436, -71.385646	Kedron Brook railroad crossing along the Conway Scenic Railroad (administered by NHDOT; trains operated by private company). FBE received a report that the 19 th century stone trestle has undermined abutments caused by erosion.

RESULTS – FIELD ASSESSMENTS

Sites from the desktop analysis were selected for further assessment in the field based on several factors: expected priority level, with likely problem sites rising to the top; accessibility, with inaccessible or difficult-to-access sites falling to the bottom; and representativeness, where FBE staff qualitatively selecting a variety of sites to serve as models of the different types of potential high-priority restoration projects that could result from these preliminary investigations.

The maps in Figures 2 and 3 depict all sites from the desktop analysis and sites selected for the field assessments (orange symbols). Nonpoint source (NPS) assessments were conducted by FBE on September 25th and December 8th, 2020. Three nonpoint source sites were assessed in detail in the field, the US Forest Service East Central Lagoon (NPS site #3), the steep sections of Route 302 near the Hart's Location-Carroll town line (NPS site #7), and the property adjacent to the breached berm on the Saco near the confluence of the Dry River (NPS site #10).

Stream crossing assessments were also conducted on September 25th and December 8th, 2020. Three stream crossings were assessed using the NH Stream Crossing Assessment protocol (stream crossing #1, 6, & 7). Additionally, two stream crossings (#2 & 4) were visited by FBE technical staff and a preliminary visual assessment was conducted for signs of erosion, scour, or aquatic organism passage deficiencies, though field staff did not undertake the full NH Stream Crossing Assessment protocol.

As noted above in the Methods section, many stream crossing sites double as nonpoint source sites due to the fact that stream crossings are often inadequately sized or placed inappropriately to the direction of streamflow, or at too high or too low of an elevation. These shortcomings mean that many stream crossings are sources of sediment and nutrients from active erosion, and they are also causes of geomorphic instability, flood risk, and aquatic organism barriers. Thus, FBE staff also paid attention to nonpoint source concerns when assessing stream crossings, and the summaries below reflect assessment of both varieties.

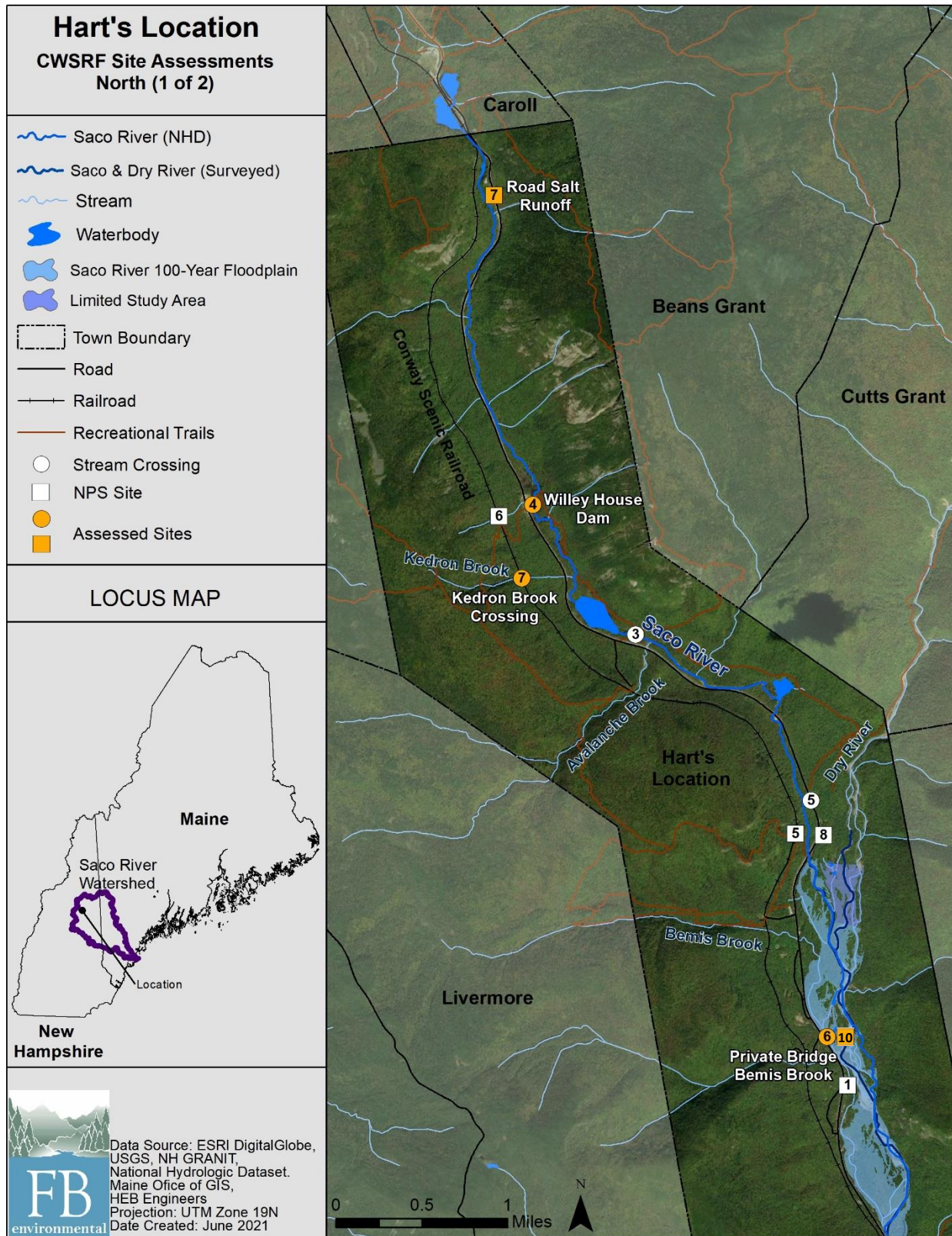


Figure 2: Map depicting locations of nonpoint source and stream crossing sites in Hart's Location (northern extent).

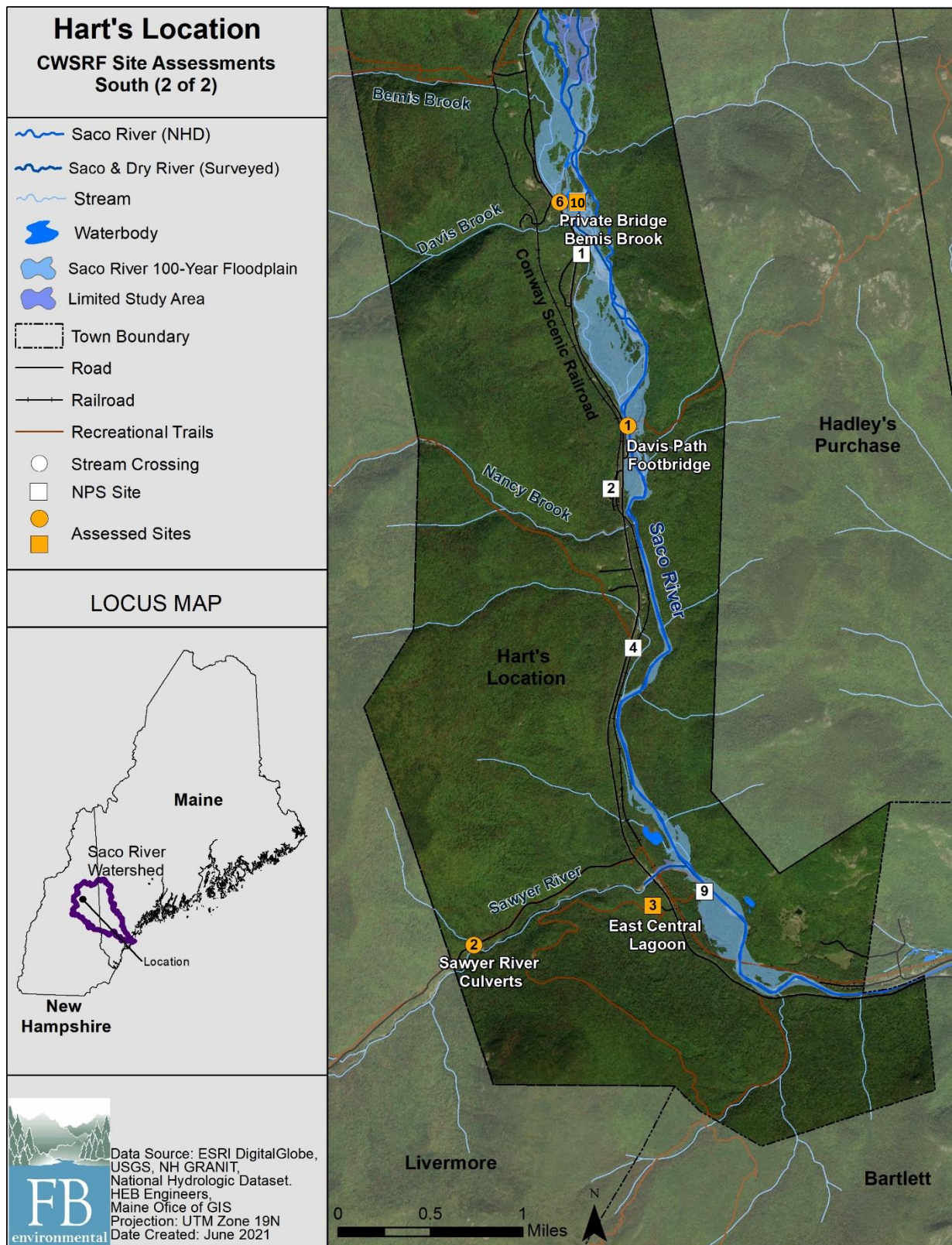


Figure 3: Map depicting locations of nonpoint source and stream crossing sites in Hart's Location (southern extent).

US ROUTE 302 - STORMWATER RUNOFF

Sections of US Route 302, near the town boundary between Hart's Location and Carroll, NH, were identified as potential NPS pollution threats of stormwater runoff and road salt to the Saco River. This highly trafficked section of Route 302 is at a high elevation (over 1,800 ft above sea level) and steep grade, requiring heavy road salt applications to maintain safe travel conditions.

During the site visit in December 2020, FBE staff visually inspected this stretch of Route 302. Numerous places were identified where little buffer exists between the road and the Saco River (see example in Figure 4). The road is very close to the streambank, with very little room for natural vegetation to stabilize the bank. Riprap is instead relied upon for bank stabilization and armoring. These areas, where steep grade and little buffer coincide, are high risk for the export of sediment, nutrients, and chloride from the highway surface into the river with very little opportunity for vegetative buffering or infiltration into groundwater. Runoff transporting chloride (road salt) into rivers in the northeast is a large issue causing decreased water quality and habitat degradation (e.g., Kelly et al. 2019). These areas are also high risk for streambank erosion that could impact the roadway.

Establishing a buffer in this area would decrease the risk of chloride pollution and erosion from stormwater runoff, and would increase the resiliency of the streambank and the adjacent road to large storm events.



Figure 4: Location of little buffer between on US Route 302 and the Saco River, Hart's Location during winter conditions.

EAST CENTRAL SEPTAGE LAGOON

The East Central Lagoon is owned, operated, and maintained by the US Forest Service. Its purpose is to treat waste from all the vault toilets located in the White Mountain National Forest (WMNF). The East Central Lagoon was listed in the NHDES Potential Contamination Source inventory and was prioritized for field assessment due

to its comparatively large size. WMNF staff invited FBE and Town of Hart's Location personnel for a tour and discussion of the facility's water quality protection practices.

The lagoon is designed to treat up to 4,000 gallons of wastewater per day. It is aerated during the spring and summer seasons and is drawn down in the fall. Lagoon effluent is pumped into a sand filter on-site where the wastewater is further aerated and filtered through layers of sand and stone before percolating into the native soil. This treatment system was well sited, situated well above the 100-year floodplain where it has little risk of being impacted by large flooding events. Monitoring wells on-site show that the lagoon is effectively treating the influent waste to desired standards, with low levels of bacteria, nutrients, and pollutants of concern. White Mountain National Forest staff shared printouts of these water quality data with FBE staff, who verified that the data did not highlight any water quality issues in the wellfield.

assessment by FBE staff has shown that the Lagoon is well-sited, designed, operated, and maintained, and is a low risk as a pollution source. The East Central Lagoon is an example of a well-functioning best management practice for the treatment of wastewater and stormwater.

PROPERTY ADJACENT TO BREACHED ARMY CORPS BERM

The private property in question is situated between the main channel of the Saco River and Bemis Brook, adjacent to the breached US Army Corps of Engineers berm built alongside the Saco River in the 1940's. This property historically contained a small dam and reflection pond next to a small dwelling. At present, the property is accessed by a single vehicle private truss bridge that crosses the Bemis Brook from US 302 (described in detail in Stream Crossing section of this report).

The Army Corps berm was constructed along the Saco River just upstream of the private property to retain the Saco River and keep it from extending west into the property. During Tropical Storm Irene in 2011 the berm was breached and a secondary channel of the Saco River that now flows through the private property was first formed during that flooding event. The dam and pond were washed away by the high flows of the secondary channel, which field observations suggest scoured significant amounts of sediment. The NHDES Dam Bureau did not have any information about this dam or the Army Corps berm upstream.



The current condition of the property is unstable and is at risk of erosion of the channel and banks. The dwelling on this property is well within the Saco's 100-year floodplain and very vulnerable to further impacts by large flooding events.

Figure 5: Secondary channel of the Saco River at the private property situated between Bemis Brook and the Saco main channel. The dam previously impounded streamwater into a reflection pond, but was destroyed by flooding in Tropical Storm Irene.

DAVIS PATH FOOTBRIDGE, AKA “BEMIS BRIDGE”

The Bemis Bridge is an asymmetrical cable stay foot bridge that spans across the Saco River. The bridge serves as access to a residential property on the east side of the Saco River, as well as access to the Davis Path from the trailhead.

The Bemis Bridge appears to be in good condition with respect to erosion concerns around footings. There was no visible evidence of any impacts from tropical storm Irene or the October 2017 storm that would have caused any soil or bank instability, erosion, or sedimentation. The bridge received an aquatic organism passage (AOP) compatibility score of Full Passage and a geomorphic compatibility score of Fully Compatible (as reported by NHDES). This bridge is well designed for future flooding events and the historical evidence suggests that it is not at risk of damage or erosional processes from high flow events of the scale of recent decades.



Figure 6: Bemis Brook bridge over the Saco River.

PRIVATE BRIDGE OVER BEMIS BROOK

A small single car bridge with abutments crosses the Bemis Brook, connecting US 302 with a private property (discussed above). This bridge is currently in poor, unusable condition, with failing abutments and severe bank and channel scour on both sides of the bridge.

This area of Bemis Brook has been identified as a predicted coldwater fishery. The bridge received an aquatic



Figure 7: Failing Bridge over Bemis Brook providing access to private property.

organism passage compatibility score of Full Passage and a geomorphic compatibility score of Partially Compatible (as reported by NHDES). While fish passage is currently functioning, this bridge is at high risk of failure and additional streambank erosion in future flooding events. Bridge removal or replacement is recommended and FBE received a report that a replacement has been proposed.

KEDRON BROOK RAILROAD TRESTLE

Kedron Brook flows from the mountains to the west of the Saco River and passes under the Conway Scenic Railroad and then Route 302 before entering the Saco. The railroad crosses Kedron Brook via a stone arch-bridge. This area of Kedron Brook has been identified as a predicted coldwater fishery.

The bridge received an aquatic organism passage compatibility score of Full Passage and a geomorphic compatibility score of Partially Compatible (as reported by NHDES). The bridge is in fair condition, with some undermining of the footers and wingwalls and some failing masonry. The downstream slope of the bridge is failing and eroding into Kedron Brook. Significant debris build-up is occurring on the downstream side of the bridge. Large cut stone blocks have tumbled into the channel and are obscuring the streambed, undoubtedly impeding the passage of aquatic organisms, despite the Full Passage score of the bridge itself. Furthermore, the failing slope is a risk of sediment inputs into Kedron Brook and the Saco River, especially during high flow events. Stabilization of the downstream bank of the crossing is recommended. FBE received a report that NHDOT has prioritized this trestle for rehabilitation or replacement.

The section of the Saco adjacent to the Kedron Brook railroad crossing does not yet have flood maps. It is likely that the crossing is situated above the Saco's 100-year floodplain. According to the hydraulic vulnerability model run by NHDES, the crossing is not at risk of being overtopped during a 100-year flooding event.



Figure 8: Kedron Brook Railroad crossing.

WILLEY HOUSE DAM AND REFLECTING POND

The Willey House historical site along Route 302 in Hart's Location includes a small dam in the Saco River that creates a reflection pond. The dam does not serve as a flood control structure but is for scenic purposes. The dam is lowered in the fall and the reflection pond is drained, allowing the Saco to regain its channel, until the dam is raised in the late spring.

The Willey House Dam is the only dam in Hart's Location for which the NHDES Dam Bureau has records or safety information. All dams in New Hampshire are classified by the flood hazard or other environmental hazard they would pose if they were to fail. The Willey House Dam is classified as a non-menace, the lowest hazard class, because of its small size and its lack of contamination potential if it were to fail.

This site was assessed using the NH Stream Crossing protocol by NCC in August 2020. The crossing received an AOP compatibility score of Reduced Passage and a geomorphic compatibility score of Mostly Incompatible. According to the hydraulic model run by NHDES, the crossing is overtopped during a 10-year flood event.

The dam appeared to be in good condition during the site visit in September 2020. Geese and ducks were present in the water and on shore, and field staff noted a significant quantity of waterfowl waste on the grassy shore areas adjacent to the reflecting pond. Artificial ponds that attract large numbers of waterfowl are potential sources of bacterial contamination above and beyond the background levels of fecal waste that would otherwise be present, sometimes exceeding safe levels.

The dam restricts fish passage and, though a detailed hydrologic study was not within the scope of this project, it is likely that the river's hydrology is severely altered both upstream and downstream due to the impoundment. Regular maintenance, including the dredging of sediment that has been deposited on the upstream side of the dam, is recommended in accordance with all applicable water quality protection measures and BMPs. Removal of this dam should be considered in order to restore natural river processes to this reach of the Saco River.



Figure 9: Dam and reflection pond at the Willey House on US Route 302, Hart's Location.

SAWYER RIVER CULVERTS

Two culverts under Sawyer River Road, approximately 1.5 miles from Route 302, that convey drainages from the north to Sawyer River, have failed multiple times in recent years. These culverts were under-sized, allowing for the drainages to overtop Sawyer River Rd during large storm events, eroding the road. These two culverts have recently been replaced with larger pipes to allow for more effective conveyance. The eroded banks on the downstream sides of the culverts have been stabilized.

These culverts have not been assessed using the NH Stream Crossing protocol. However, FBE staff briefly assessed their condition. No issues with erosion or sedimentation, or geomorphic incompatibility, were identified at these sites and the modifications made to these culverts appear to be functioning effectively.

SUMMARY AND CONCLUSIONS

In summary, FBE staff analyzed 17 nonpoint source and stream crossing sites in Hart's Location and developed the following list of recommended actions that could be undertaken by the Town in partnership with state, federal, and county partners, as well as private property owners, to protect the Saco River and serve as a model to downstream communities. The information gathered as part of this study informs FBE's set of recommended follow-up actions:

1. Consider establishing a vegetated buffer alongside the steep section of US Route 302 atop the east bank of the Saco near the northern town boundary.
2. Work with private property owners in the floodplain to plan and design projects that protect water quality and promote flood resiliency. Emphasize good stream crossing design that is sized appropriately, promotes aquatic organism passage, will not overtop or flood in high flows, and is geomorphically appropriate for the setting.
3. Restore the Kedron Brook flume abutments. FBE understands that a project is already proposed to accomplish this.
4. Consider a dam removal and ecological restoration project to remove the dam at the Willey House. Removing the dam would restore natural river processes to this reach of the Saco River, and could serve as a model for responsible dam decommissioning in mountain environments.
5. Coordinate with the New Hampshire Department of Transportation, ideally to plan a dedicated meeting, to address the issues and sites discussed in this report that fall under their authority:
 - o Implementing Recommendations 1 and 3 above.
 - o Using stream crossing assessment data collected by the North Country Council in 2020 to evaluate the US-302 culverts that washed out in both Hurricane Irene and the October 2017 storm. According to the 2020 data, are the replacement culverts near the Dry River Campground adequately sized for a 100-year event, a 50-year event, or less? Are there any other problem culverts? (A brief review of the NHDES Aquatic Restoration Mapper confirms that yes, there are other problem culverts, including three along US-302 that would overtop in a 10-year event.) Can the floodplain mapping study produced by this project better inform future culvert replacement in Hart's Location and elevate any existing crossings in NHDOT's priorities?
 - o Examine and review pesticide use and storage of railroad ties along the railroad corridor.

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