Draft Falmouth Strategic Watershed Plan Project Methodology and Findings

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Task 1: Watershed Health Metrics

Extensive work was completed to determine a comprehensive list of watershed health metrics to be used to assess water health in Falmouth and other Maine municipalities. Three different U.S. Environmental Protection Agency (USEPA) tools as well as the New England Landscape Futures (NELF) Explorer tool were consulted to guide the development of these metrics.

This analysis led to the following comprehensive list of metrics that offer a robust and holistic view of water health:

- <u>Aquatic Organism Health</u>, aka, Biological Condition: The diversity, composition, abundance, and condition of aquatic organisms and communities are the ultimate indicator of watershed health. If a waterbody is rich in macroinvertebrates, it's a positive indicator of overall health.
- 2. <u>Water Quality</u>: The chemical and physical characteristics of water. Parameters used to assess water quality include concentrations of pollutants and nutrients, pH and dissolved oxygen, and water temperature and turbidity. Optimal metrics vary by water body.
- 3. <u>Hydrology Condition</u>: Water flow, driven by climatic processes, surface and subsurface characteristics, and human activities (such as water and land use). Hydrologic regime parameters include % of impervious surface, % forested, and % wetland remaining.
- 4. <u>Geomorphology</u>: Refers to the stream sediment size and volume being in balance with the stream channel slope and discharge. Natural disturbances, such as floods or forest fires, or human disturbances can cause a stream to become unbalanced and "seek" equilibrium by adjusting to a new form, affecting habitat and other conditions.
- 5. <u>Habitat Condition</u>: Habitat extent and quality are directly related to water quality, landscape condition, and hydrologic and geomorphic processes. Changes to these conditions and connectivity influence species population health.
- 6. <u>Landscape Condition</u>: The condition and configuration of natural land cover, which helps to cycle nutrients, regulate temperature, and provide habitat, for example. Landscape condition can change due to natural or human disturbances, impacting water health.
- 7. <u>Attributes of Vulnerability:</u>
 - Land Use Change: natural or human disturbances that can affect all the *Watershed Health Metrics*
 - Water Usage: more applicable to watersheds that are used for drinking water, not being assessed for this project.
 - Wildfire: more applicable to watersheds in arid locations, not being assessed for this project.

These metrics work together to tell a complete story of waterbody health and prioritize actions. The importance of each metric depends on each municipality's goals and the best management practices that it is interested in implementing. That being said, there is a direct link between the amount of impervious area surrounding a waterbody and its health, making it a top indicator of watershed health.

Task 2: Watershed Health

Data analysis was completed to evaluate the health of each watershed by analyzing existing data from the DEP, the 2013 Stormwater Management Plan, Cumberland County Soil and Water Conservation District, and the Casco Bay Estuary Partnership using the *Watershed Health Metrics*.

Impaired Waterbodies in Falmouth

A designation that is commonly used by the Maine DEP in characterizing waterbodies is if they are "impaired" or not. Waterbodies that do not meet water quality criteria or standards are categorized as "impaired." Impaired streams use data from multiple monitoring programs, including the DEP Biomonitoring Program and the Surface Water Ambient Toxics (SWAT) Monitoring Program. Every 2 years the DEP publishes the results of the assessments, identifying which waters are meeting their designated classifications, and which are considered impaired.

Impaired streams have stricter stormwater discharge requirements, which are regulated by the Maine DEP. In addition, the Municipal Separate Storm Sewer Systems (MS4) permit that covers Falmouth also has specific requirements for "Urban Impaired Streams," waterbodies that are impaired because of urban development and the amount of impervious cover. The Town updates and implements a Stormwater Management Plan to meet the requirements of the MS4 General Permit and utilizes best management practices to reduce further water quality issues.



Falmouth watershed map created by GPCOG. #10 (Mussel Cove) and #17 (Hobbs Brook) are Falmouth's two impaired waterbodies.

Falmouth does not currently have any Urban Impaired Streams. However, there are currently two impaired waterbodies:

- Mussel Cove, an impaired marine water; and
- Hobbs Brook, an impaired stream that is not in the urbanized area.

<u>Mussel Cove</u>: While this strategic plan does not address marine waterbodies, such as Mussel Cove, the streams that make up the frontal drainage system to Mussel Cove (Webes Creek, Norton Brook, Chenery Brook, Mill Creek, Scitterygussett Creek) have been assessed and prioritized in this plan with this impairment in mind.

<u>Hobbs Brook:</u> The 1.54 miles impaired segment of Hobbs Brook begins just north of Range Road and flows south, through an area of mixed agricultural and residential land. Agriculture is thought to be the largest contributor of nonpoint source pollution to the stream. Based on its impaired status, a Total Maximum Daily Load (TDML) assessment was completed to determine the total amount of pollutants Hobbs Brook can receive and still meet water quality standards.

The <u>Hobbs Brooks TDML summary</u> and other data relevant to the impaired status of these waterbodies has been reviewed and incorporated into this plan, playing a key role in determining final priorities and recommendations.

In addition, Webes Creek and Norton Brook, which are located within Falmouth's Growth Area, are at the highest risk of being listed as Urban Impaired Streams in the future. Implications of these waterbodies being considered Urban Impaired Streams include:

- Increased difficulty, cost, and time needed to restore water quality health;
- Stricter permitting requirements by the State of Maine:
 - Review of the Site Location of Development Law ("Site Law") would apply to projects 3 acres and above; if no impaired waterbody, Site Law applies to projects with 20+ acres;
 - Stormwater permit threshold for meeting the general standard would be 20,000 sq. ft. of new impervious surface, rather than 1 acre, resulting in additional fees and regulations for smaller developments to meet Urban Impaired Stream standard;
- More State oversight of development projects, resulting in longer timelines and more regulatory fees;
- More Town oversight, including the potential establishment and implementation of a "Compensation Fund" for developers to contribute to in order to offset new impervious area. These funds would be used by the Town to help finance specific improvement projects.

| Basin or | Basin or Major Subwatershed Vatershed | Health Metrics | | | |
|----------------------------------|---|---|---|---|--------------------------------|
| Major Watershed | | Biological Condition + Water Quality | Hydrology | Geomorphology + Habitat | Landscape |
| Casco Bay Frontal Drainage | | Data is most plentiful within this basin. DEP's Assessment Unit gathered a significant amount of data within the subwatersheds during this project in | 52% forested with 10% protected forests | 31 stream-road crossings with 28 of them occurring within Falmouth; 6 of the 28 in Falmouth are considered barriers | 29% disturbed Riparian Zone |

Data Analysis – High Level Metrics and Key Takeaways

| | | 2018 and 2019. DEP's rock bag samples, which determine if water quality standards are being met, are not available to fully characterize watershed health | | | |
|----------------------|--------------------------|--|--|---|---|
| | Scitterygussett Creek | In 2018-2019, DEP has done additional field work in this watershed, but results have not been shared yet. | 46% forested cover with 10% protected forest | Subwatershed with most stream-road crossings at 10 with only 1 being a barrier | 43% disturbed Riparian Zone |
| | Webes Creek | According to DEP: Water quality standards are NOT being met. | Subwatershed with the least amount of forested land cover at 26% with only 1% protected forest. | 1 stream-road crossing within Falmouth, but do not become barriers for aquatic organism passage | 44% disturbed Riparian Zone |
| | Chenery Brook | According to DEP's 2019 rock bag sampling efforts: Not meeting water quality standards | 65% forested cover with 6% protected forest. | 1 stream-road crossing within Falmouth, but do not become barriers for aquatic organism passage | 26% disturbed Riparian Zone |
| | Mill Creek | According to DEP's 2019 rock bag sampling efforts: Water quality standards are being met. | Subwatershed with the most forested land cover at 77% with 19% protected forest. | 6 stream-road crossings with 2 (33%) being barriers | 15% disturbed Riparian Zone |
| | Norton Brook | According to DEP's Integrated Report: Water quality standards are being met. | 64% forested cover with 3% protected forest | 1 stream-road crossing within Falmouth, but do not become barriers for aquatic organism passage | 12% disturbed Riparian Zone |
| | Mussel Cove | According to DEP's Integrated Report: Water quality standards are NOT being met. | 34% forested cover with 4% protected forest | No stream-road crossings | 76% disturbed Riparian Zone |
| | Other Subwatersheds | Little to no water quality data exists for other subwatersheds. | Forested cover ranges from 14 to 57% in these other subwatersheds (with 2 to 36% protected forest) | 9 stream-road crossings are located within Falmouth in this watershed, but 3 (33%) are considered barriers | 53% to 100% of the Riparian Zones are disturbed in other watersheds. |
| Presumpscot River | | Data is plentiful within the main stem of the river because of the volunteer river monitoring program. | Relatively densely forested at 64% watershed wide with 5% protected forest. | 18 stream-road crossings with 8 of them occurring within Falmouth. | 11% disturbed Riparian Zone |

| | | However, there is little to no data in the smaller tributaries, such as Meader and Minnow Brooks. | | | |
|---------------------|------------------------------------|--|---|--|--|
| | Meader Brook | Little to no water quality data available. | 81% forested cover with only 1% protected forest. | 5 of 7 stream-road crossings occurring in Falmouth with 4 becoming barriers. | 4% disturbed Riparian Zone |
| | Minnow Brook | Little to no water quality data available. | 78% forested cover with only 4% protected forest. | Minnow Brook has 1 stream-road crossing becoming a barrier, but none occur in Falmouth. | 11% disturbed Riparian Zone |
| | Other Subwatersheds | Other Little to no water quality data available for other Presumpscot River subwatersheds. | | No other stream- road crossings are located within Falmouth in this watershed, but there are 10+ in upstream locations outside of Falmouth. | 62% to 91% of the Riparian Zones are disturbed. |
| Piscataqua River | | Data is relatively sparse in the subwatersheds, but DEP has augmented data in Hobbs Brook watershed. | Relatively forested at 66% watershed wide. Protected forest in this basin is 11%. | 30 stream-road crossings with 12 of them occurring within Falmouth; 5 out of 12 in Falmouth are considered barriers. | 13% disturbed Riparian Zone |
| | Hobbs Brook | According to DEP's 2019 field sampling efforts: Not meeting water quality standards. | 66% forested cover with 15% protected forest. | 6 stream-road crossings with 1 in Falmouth that is not a barrier. | 6% disturbed Riparian Zone |
| | East Branch Piscataqua River | Meeting Class B standards but threats of E. Coli are documented by DEP. | 53% forested cover with 7% protected forest. | 13 stream-road crossings with 3 being barriers in Falmouth. | 12% disturbed Riparian Zone |
| | Other Subwatersheds | Little to no water quality data exists for other subwatersheds, | Forested cover ranges from 29% to 100% in the subwatersheds with 4-84% protected forest. | No other stream- road crossings are located within Falmouth in this watershed, but there are 40+ in upstream locations outside of Falmouth. | 86% to 99% of the Riparian Zone are disturbed. |

Task 3: Prioritization of watershed needs based on data analysis

| Basins or Relative | | USEPA's PHWA | Current | Watershed served |
|--------------------|----------|---------------|------------|------------------|
| Major Watersheds | Priority | Vulnerability | Impervious | by Public Sewer |
| in Falmouth | | Index | Area | |
| | | Source: WSIO | | |
| Casco Bay | | | | |
| Frontal Drainages | HIGH | 0.594 | 11% | 20% |
| Presumpscot River | MODERATE | 0.525 | 8% | 5% |
| Piscataqua River | LOW | 0.344-0.412 | 4% | 3% |

The Casco Bay Frontal Drainage Basin continues to be the highest priority basin over the Presumpscot and Piscataqua basins, with the exception of Hobbs Brook. Due to the relatively small size of each nested watershed (all predominantly located within the Town of Falmouth) and the impaired nature of Mussel Cove (the receiving water for Casco Bay Frontal Drainage Basin), it would be most logical and cost effective to address Casco Bay Frontal Drainage watersheds altogether, rather than individually.

Prioritized Watershed Needs Based on Data Analysis

These priorities and needs inform the action recommendations as described in Task 4.

| Basins or Major Watersheds in Falmouth | Subwatershed | Relative Priority | Needs to Inform Actions |
|--|--------------------------|----------------------|---|
| | | HIGH | Continue multi-phase approach (e.g., developing model ordinance language, creating a BMP selection guide, etc.) with an anchor organization to address the needs of each (sub)watershed |
| Casco Bay Frontal Drainages | Scitterygussett Creek | HIGH | Address stream crossings Continue the multi-phase approach (mentioned above) will allow for more protections for remaining forests and undisturbed riparian zone |
| | Webes Creek | HIGH | Protect remaining forest canopy (lowest forested cover of all subwatersheds) and remaining undisturbed riparian zone |

| | Chenery Brook | HIGH | • Work with Cumberland to discuss protections efforts for shared watersheds (e.g., Chenery and Hobbs Brooks) |
|-------------------|--|---------------------------|--|
| | Mill Creek | HIGH | See recommendations for Casco Bay Frontal Drainage |
| | Norton Brook | HIGH | See recommendations for Casco Bay Frontal Drainage |
| | Mussel Cove | HIGH | Gather hydraulics & hydrology (H&H) info/reports and/or conduct geomorphic assessments of watersheds draining to Mussel Cove |
| | Other Subwatersheds | HIGH | Gather H&H reports and/or conduct geomorphic assessments Consider addressing stream crossings (culverts) |
| | | MODERATE | This waterbody is in flux (stabilizing from dam removal activity and a 2020 landslide) and is being studied carefully by DEP. Consider organizing a Presumpscot River Leadership Team. |
| Presumpscot River | | | |
| Presumpscot River | Meader Brook | MODERATE - HIGH | Consider addressing stream-road crossings |
| Presumpscot River | Meader Brook Minnow Brook | MODERATE - HIGH LOW | Consider addressing stream-road crossings See recommendations for Presumpscot River Basin |
| Presumpscot River | Meader Brook Minnow Brook Other Subwatersheds | MODERATE - HIGH LOW | Consider addressing stream-road crossings See recommendations for Presumpscot River Basin Begin outreach to upstream communities to address/discuss issues not occurring in Falmouth |

| Hobbs Brook | HIGH | • Begin outreach to Cumberland (who shares the watershed) to coordinate efforts in the watershed, including a WMP to be developed |
|---------------------------------|------|---|
| East Branch Piscataqua River | LOW | Address recommendations from the 2008 Watershed Survey, including remaining NPS sites. |
| Other Subwatersheds | LOW | Consider an overlay district or strengthening ordinances |