TACTICAL BASIN PLANNING AS THE VEHICLE FOR IMPLEMENTATION OF THE VERMONT CLEAN WATER ACT

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INTRODUCTION[3]

A comprehensive and transparent planning process is necessary to achieve full implementation of the Lake Champlain TMDL over the long-term and to stage and document interim progress and improvement.[4] In Vermont, the state relies on the tactical basin planning process for this purpose. Tactical basin planning is a watershed management planning process by which water quality monitoring and pollution source assessment information is integrated with modeling or other land-based prioritization factors to identify necessary actions to protect, maintain, enhance, and restore surface waters.[5]

Basin planning is not a new concept in Vermont or elsewhere in the United States. Many states have their own forms of watershed-based pollution control planning and the U.S. Environmental Protection Agency ("EPA") promotes specific guidance on the development of such plans to address impaired waters.[6] In this article, Vermont's unique approach to

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3. The planning work that is described in this article is the product of many talented individuals. Karen Bates, DEC's longest-serving watershed planner was involved in the very first efforts to develop and implement the Guidelines and her work continues to this day. Steven Syz, Tom Willard, and Wallace McLean, with the guiding vision of Canute Dalmasse, were the true architects of the initial Watershed Initiative and Canute is missed by many. The current or prior contributions of Jim Ryan, Marie Levesque-Caduto, Benjamin Copans, Ryan McCall, Josh Gorman, Catherine Kashanski, Tim Clear, and Danielle Owczarski to the basin planning process and its on-the-ground outcomes must not be understated. The effectiveness of these individuals is of course a reflection of the many DEC staff, watershed partners, and advocates, far too numerous to mention here. The authors also thank Mike Kline for his long-term knowledge, patience, and guidance in the development of the surface water management strategy and tactical planning process. Above all, we thank Pete LaFlamme, Director of Watershed Management in Vermont, for his steadfast support of science-based watershed planning to protect, maintain, enhance, and restore surface waters.

4. *See generally* David K. Mears & Trey Martin, *Foreword: Restoring and Maintaining the Ecological Integrity of Lake Champlain*, *supra* p. 470.

5. VT. DEP'T OF ENVTL. CONSERVATION, VERMONT SURFACE WATER MANAGEMENT STRATEGY, CHAPTER 4 TACTICAL BASIN PLANNING (2011), http://dec.vermont.gov/sites/dec/files/documents/WSMD_swms_Chapter_4_Approach_to_TacticalBasinPlanning_Rev2_V5.pdf [https://perma.cc/6JBW-BHHE] [hereinafter TACTICAL BASIN PLANNING].

6. U.S. ENVTL. PROT. AGENCY, HANDBOOK FOR DEVELOPING WATERSHED PLANS TO RESTORE AND PROTECT OUR WATERS (2008), https://www.epa.gov/sites/production/files/2015-

large-scale watershed planning, called the "tactical basin planning process" ("TBPP"), is described in terms of its role in implementing the Lake Champlain or other large watershed TMDLs and several aspects of the Vermont Clean Water Act ("Act 64"). The TBPP delivers a nationally unique approach to watershed management planning. The content of this article describes the foundations of the TBPP and key evolution points from Vermont's earliest attempts to plan implementation of the Federal Clean Water Act ("CWA") requirements when they were newly minted in the 1970s. This evolution culminated recently in a set of incremental improvements that reflect important and necessary technological and scientific advancements to basin planning to support Vermont's implementation of the Lake Champlain TMDL. Setting the stage for these advancements, we review the legal basis of basin planning with an emphasis on Federal and Vermont Statutes, and describe the general development approach for any given plan. In the close of this article, we described the technological advances representing the next stages of TBPP evolution, which are being undertaken as of this writing by the Department of Environmental Conservation ("DEC") Watershed Management Division. These changes will yield a planning process poised to integrate and deliver prioritized pollution control or mitigation actions for all Vermont surface waters, especially for Lake Champlain.

I. TACTICAL BASIN PLANNING IS REQUIRED BY STATE AND FEDERAL STATUTE

Section 303(e) of the CWA requires that states engage in water quality planning.[7] Title 40 C.F.R. part 130, in part, directs state agencies to prepare basin plans, focus on priority issues and geographic areas, identify priority point and nonpoint water quality problems, consider alternatives, and recommend control solutions and funding sources.[8] In the Vermont statute, basin and watershed planning requirements are found in a number of statutory and regulatory provisions, including, but not limited, to 10 V.S.A. sections 1251, 1253, and 1258, 24 V.S.A. section 3438, and section 1-02.D of the Vermont Water Quality Standards ("VWQS").

09/documents/2008_04_18_nps_watershed_handbook_handbook-2.pdf [https://perma.cc/PW7B-4NPB].

7. 33 U.S.C. § 1313 (2012).

8. 40 C.F.R. pt. 130.

A. 40 C.F.R. Part 130[9]

In part 130 of the CWA regulations, EPA provides a framework for how states may develop Water Quality Management ("WQM") plans in accordance with sections 208 and 303(e) of the Clean Water Act and certified and approved updates of those plans.[10] The first efforts to develop basin plans in Vermont in the 1970s followed on the enactment of these CWA provisions and provided the first accounting of point source discharges to all rivers of the state. This planning work was focused specifically on identifying, prioritizing, and upgrading wastewater treatment and the execution of those plans yielded improvements to individual rivers and streams. A review of Vermont's federally-required biennial reporting under section 305(b) provides an impressive view into the investments made in wastewater and point source pollution control.[11]

B. 10 V.S.A. Section 1253(d)

The Vermont General Assembly promulgated legislation in 1998, amended in 2015 by Act 64, which requires the Agency of Natural Resources ("ANR") to revise all fifteen basin plans on a five-year cycle.[12] Moreover, ANR is also tasked to prepare an overall management plan, envisioned by 40 C.F.R. part 130.5 as the "continuous planning process," to ensure that the water quality standards are met in all state waters.[13] In Vermont, this continuous planning process is published under the title of the "Vermont Surface Water Management Strategy" ("SWMS").[14] Concurrent with the CWA, ANR must ensure that basin plans take inventory of the existing and potential causes and sources of pollution that may impair surface waters.[15] New provisions of 10 V.S.A. section 1253(d) stipulate that basin plans shall consider approved municipal and regional

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9. AGENCY OF NAT. RESOURCES, VERMONT WATER QUALITY STANDARDS ENVIRONMENTAL PROTECTION RULE CHAPTER 29(A) (2014), http://dec.vermont.gov/sites/dec/files/documents/WSMD_WaterQualityStandards_2014.pdf [https://perma.cc/3LW6-EYU7] [hereinafter VERMONT WATER QUALITY STANDARDS CHAPTER 29(A)].

10. 40 C.F.R. pt. 130.

11. *Assessment and Listing*, VT. DEP'T OF ENVTL. CONSERVATION, http:// http://dec.vermont.gov/watershed/map/assessment#Assessment [https://perma.cc/69ZT-F94Z] (last visited Apr. 12, 2016).

12. VT. STAT. ANN. tit. 10, § 1253(d)(1) (as amended by Act 64) (2015).

13. 40 C.F.R. § 130.5.

14. *Vermont Surface Water Management Strategy*, VT. DEP'T. ENVTL. CONSERVATION, http://dec.vermont.gov/watershed/map/strategy [https://perma.cc/2EAS-588H] (last visited Apr. 26, 2016).

15. *Id.*

plans adopted under title 24.[16] Chapter 17 in title 24 and this coordination between ANR and Regional Planning Commissions ("RPCs") to ensure tactical basin and regional plan consistency is described later in this article.

C. Vermont Water Quality Standards

Basin planning is an ongoing process. It is designed to be compatible with the VWQS and is in-fact guided by those rules. The term "basin" refers to the fifteen major river basin planning units that cover the Vermont. DEC now employs a tactical planning process as described by the SWMS to streamline the production of tactical basin plans.[17] The TBPP empowers people with information and tools and provides focus for activities to protect and restore water quality that reflect appropriate levels of stakeholder input.

D. Water Quality Assessment

Every two years, the general water quality conditions of the state are documented pursuant to section 305(b)[18] of the CWA and specific lakes, ponds, rivers, and streams across Vermont with documented water-quality-standards violations are identified and listed as impaired in the CWA section 303(d) listing process.[19] In conjunction with this federal listing process, ANR also identifies and separately lists other priority waters that need further assessment or are altered by flow regulation or exotic aquatic species.[20] These priority listings guide the development of pollution source control strategies, TMDLs, restoration actions, and assessment actions, all of which are integrated by the tactical basin plans. The WQS section 1-02.D requires that basin plans:

- inventory the existing and potential causes and sources of pollution that may impair waters;[21]

16. VT. STAT. ANN. tit. 10, § 1253(d); VT. STAT. ANN. tit. 24, § 4348 (2015).

17. *Vermont Surface Water Management Strategy*, *supra* note 14.

18. *National Water Quality Inventory Report to Congress*, U.S. ENVTL. PROT. AGENCY, https://www.epa.gov/waterdata/national-water-quality-inventory-report-congress [https://perma.cc/D2TF-AJBT] (last updated Sept. 30, 2015) (citing to the listing of each water quality report).

19. VT. DEP'T OF ENVTL. CONSERVATION, VERMONT SURFACE WATER ASSESSMENT AND LISTING METHODOLOGY 27 (2016), http://dec.vermont.gov/sites/dec/files/wsm/mapp/docs/WSMD_assessmethod_2016.pdf [https://perma.cc/PH5C-ZVKY].

20. *Id.*

21. VERMONT WATER QUALITY STANDARDS CHAPTER 29(A), *supra* note 9.

- establish a strategy to improve or restore waters and to ensure full support of uses;[22]
- identify strategies, where necessary, by which to allocate levels of pollution between various sources and between individual discharges; [23] and
- to the extent appropriate, contain specific recommendations by the Secretary that include, but are not limited to:
  - the identification of all known existing uses and salmonid spawning or nursery areas important to the establishment or maintenance of such fisheries; [24]
  - reference to conditions appropriate for specific waters; [25]
  - any recommended changes in classification and designation of waters; [26] and
  - schedules and funding for remediation, stormwater management, riparian zone management, and other measures or strategies pertaining to the enhancement and maintenance of the quality of waters within a basin.[27]

II. THE TACTICAL BASIN PLANNING PROCESS EVOLVES OVER TIME

These enabling statutes and rules, as of 1998, allowed for the development of the first coordinated basin-planning framework for Vermont's surface waters. In 1998, this was known as the Watershed Planning Initiative, Guidelines for Watershed Planning (referred to subsequently as the "Guidelines" approach).[28] This framework established that the state-led water quality planning process would focus annually on priority issues and geographic areas and on the development of water quality controls leading to implementation measures.[29] In doing so, the original 2002–2008 water quality management basin plans (herein referred to as "traditional" basin plans) were used to direct implementation at the strategic level by drawing upon general water quality assessments to identify priority point and nonpoint water quality problems, considering alternative solutions, and recommending control measures, including the

22. *Id.*
23. *Id.* at 10–11.
24. *Id.*
25. *Id.*
26. *Id.*
27. *Id.*
28. VT. DEP'T OF ENVTL. CONSERVATION, VERMONT WATERSHED INITIATIVE, GUIDELINES FOR WATERSHED PLANNING (2003, rev. 2007), http://www.vtwaterquality.org/planning/docs/pl_planningguidelines.pdf.
29. *Id.* at 22.

financial and institutional measures recommended for implementing identified solutions.[30] The State and partner organizations worked collaboratively and with enthusiasm to develop the initial traditional basin plans, including the White River,[31] Poultney-Mettowee,[32] West-Williams-Saxtons,[33] Lamoille,[34] and Waits-Wells-Ompompanoosuc.[35] The last traditional basin plan issued in draft form was the North Lake Champlain Direct Drainages watershed management plan.[36]

Over the course of the ten years since the inception of the original Guidelines approach, six traditional basin plans were approved. While these plans culminated important public processes involving many stakeholders, many of these plans were deficient with respect to geographic precision and progress in executing the overall process was hampered by a number of challenges, as described by annual legislative reports required by 10 V.S.A. section 1253(d). Inherent to these challenges were certain key and well-intentioned components of the Guidelines, which ultimately exhibited top-heavy characteristics.

The Guidelines approach featured an emphasis on general water quality education as a precursor to obtaining stakeholder input and plan development.[37] This was critical at the time as the citizenry in general and watershed agents in particular were not nearly as educated about water quality issues as they are now. Further, in many watersheds, a contingent of stakeholders needed to be developed "from whole cloth." A significant challenge to the Guidelines process was that it took far more time than initially anticipated to carry out an inclusive, educational process involving

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30. *Id.* at 16.

31. VT. AGENCY OF NAT. RES., WHITE RIVER BASIN PLAN (2002), http://dec.vermont.gov/sites/dec/files/wsm/mapp/docs/pl_wrbplan.pdf [https://perma.cc/SKD4-A753].

32. VT. DEP'T OF ENVTL. CONSERVATION, POULTNEY-METTOWEE BASIN PLAN (2005), http://dec.vermont.gov/sites/dec/files/wsm/mapp/docs/pl_basin2.final-plan.3-07.pdf [https://perma.cc/C5EZ-83VT].

33. VT. AGENCY OF NAT. RES., BASIN 11 MANAGEMENT PLAIN: WEST RIVER, WILLIAMS RIVER, AND SAXTONS RIVER (2008), http://dec.vermont.gov/sites/dec/files/wsm/mapp/docs/pl_basin11%20Plan.6-08.pdf [https://perma.cc/FJ7W-TFDA].

34. VT. AGENCY OF NAT. RES., LAMOILLE RIVER BASIN WATER QUALITY MANAGEMENT PLAN (2009), http://dec.vermont.gov/sites/dec/files/wsm/mapp/docs/pl_basin7.finalplan.pdf [https://perma.cc/R34P-UGXQ].

35. VT. AGENCY OF NAT. RES., BASIN 14 "LITTLE RIVERS" WATER QUALITY MANAGEMENT PLAN (2008), http://dec.vermont.gov/sites/dec/files/wsm/mapp/docs/pl_basin14.final_plan.6-30-08.pdf [https://perma.cc/LKX8-8L4H].

36. VT. AGENCY OF NAT. RES., DRAFT WATERSHED MANAGEMENT PLAN FOR THE NORTHERN LAKE CHAMPLAIN DIRECT DRAINAGES (2009), http://dec.vermont.gov/sites/dec/files/wsm/mapp/docs/pl_basin5.Finalplan.pdf [https://perma.cc/MEH2-U4JZ].

37. TACTICAL BAIN PLANNING, *supra* note 5.

the many stakeholders to develop a watershed management plan with which *all* of the public could identify. This grassroots effort in some river basins started from square one where no watershed organizations existed; though in fairness, there were mature organizations in other watersheds. In those instances where capacity was lacking, DEC Watershed Coordinators formed diverse and inclusive watershed councils and conducted numerous public forums and panel discussions in order to provide the council and other interested persons with the technical information necessary to formulate strategies and develop the information needed to draft a basin plan. Yet, the watershed councils of several basin-planning processes, which were comprised of well-intentioned and intelligent citizens, never truly became the agents of implementation. Accordingly, DEC's Watershed Coordinators were educating one stakeholder group who formulated the plan while working with another to implement the plan. This resulted in inefficiency and a lack of common goals. Further, due to the coarse geographic specificity of traditional basin plan strategies, the determination of what specific actions to undertake to fulfill a basin plan often occurred in subsequent, more sector-specific planning efforts, such as river corridor[38] or stormwater master planning, [39] better backroads capitol inventories,[40] or thru the use of more contemporary water quality monitoring data.

The reader should not take from this discussion a diminishment in value of the Guidelines era of basin planning in Vermont. The significant benefit of the Guidelines approach, and truly the brilliance behind its development, was to educate a generation of watershed stewards and advocates. In some cases, those stewards did ultimately form the basis for watershed implementation or advocacy organizations, which ultimately have grown in capabilities to be strong partners for identifying and executing pollution control projects. Examples of organizations that expanded capacity coincident with the implementation of watershed-specific guidelines planning efforts include, but are not limited to, the White River Partnership, the Memphremagog Watershed Association, the Southeast Vermont Watershed Association (which was deeply involved in initial efforts to conduct basin planning in Southeastern VT), the Lewis Creek Association,

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38. *River Corridor Protection*, VT. DEP'T OF ENVTL. CONSERVATION, http://dec.vermont.gov/watershed/rivers/river-corridor-and-floodplain-protection/protection [https://perma.cc/UCG9-4HMQ] (last visited May 2, 2016).

39. VT. AGENCY OF NAT. RES., VERMONT STORMWATER MASTER PLANNING GUIDELINES (2013), http://dec.vermont.gov/sites/dec/files/wsm/erp/docs/SWMPFinal6-23-16.pdf [https://perma.cc/T6VA-NH8E].

40. *Better Roads*, VT. DEP'T OF TRANSP., http://vtransengineering.vermont.gov/bureaus/mab/better-back-roads [https://perma.cc/4MFF-2ZQX] (last visited Apr. 12, 2016).

and numerous natural resource conservation districts.[41] Nonetheless, the development of capacity for watershed implementation did not always track with the basin-specific planning processes carried forth under the Guidelines years. With increasing need to provide more complete technical information in the development of basin plans, and in order to expend well-documented and efficiently-spent remediation funds from the Clean Water Initiative Program,[42] ANR recognized the need to change the Guidelines process to become more information-rich and data driven.

The tactical planning process recognizes the importance of an educated citizenry and stakeholder base, but capitalizes on the education conferred by the Guidelines approach by reversing the order of the planning and education components of that approach. Plans are now developed by first focusing on how state or partner programs are targeted to priority areas as identified by water quality monitoring or sector-specific assessment information.[43] These results are then communicated to incrementally broader stakeholder groups prior to issuance of a draft tactical plan. This transition was envisioned and set into motion with the development of the SWMS in 2009 and 2010. As the SWMS approached completion, and as DEC's Watershed Management Division realigned its programs around the SWMS's guiding principles, the TBPP itself evolved. Reflecting staff and stakeholder input on how planning could better be accomplished, tactical planning was revised. Specifically, the process changed from one that provided generalized information and then solicited feedback on prospective problems to one that watershed stakeholders, the regulated community, and citizens could learn through a tactical basin plan and the development process exactly where water quality issues exist, why and how they were so-identified and prioritized, and how they would be addressed through watershed stressor management.[44]

The benefits of the evolved, geographically-explicit, and data-driven TBPP, include:

- more direct focus on surface water resources, tailored to basin-specific stressors and conditions that are germane to that basin and sub-basins;

41. TACTICAL BAIN PLANNING, *supra* note 5.

42. During the period of 2004 to 2010, the current DEC Clean Water Initiative Program was known as the ANR's Clean and Clear Program. Clean and Clear, developed by Governor James Douglas, was the precursor for the Ecosystem Restoration Program, which itself was renamed the Clean Water Initiative Program in 2015, in recognition of the goals and provisions of Act 64.

43. TACTICAL BAIN PLANNING, *supra* note 5.

44. *Id.*

- coordination among programs and agencies, thereby making technical assistance and available funding a more efficient and predictable process;
- improved capabilities to address complex environmental issues that cross agencies' jurisdictions;
- improved basis for management decisions as better coordination of monitoring is established and more information is gathered on a specific basin;
- encouragement of consistency and continuity as an initial framework prepared and applied to all basins and sub-basins in a systematic and sequential (rotational) fashion;
- opportunities for enhanced data sharing as agencies and organizations improve communication and coordination;
- encouragement of innovative solutions with input from the various stakeholders and partners;
- geographically explicit/targeted implementation actions identified and funded through a comprehensive and robust prioritization process; and
- tracking and accountability.

The two-year period, during which the TBPP was developed, saw the issuance of five additional "hybrid" basin plans, which were initially developed using the Guidelines approach. Owing to long-plan development processes reflective of the more intensive Guidelines approach, these plans were modified prior to publication to provide some additional geographic specificity reflective of modern tactical basin plans. These plans were the Ottauquechee/Black,[45] Memphremagog,[46] Winooski,[47] Otter Creek,[48] and Missisquoi.[49]

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45. VT. AGENCY OF NAT. RES., BASIN 10 WATER QUALITY MANAGEMENT PLAN: OTTAUQUECHEE & BLACK RIVER (2012), http://dec.vermont.gov/sites/dec/files/wsm/mapp/docs/mp_basin10final.pdf [https://perma.cc/MJ2B-CV9N].

46. VT. AGENCY OF NAT. RES., BASIN 17 WATER QUALITY MANAGEMENT PLAN (2012), http://dec.vermont.gov/sites/dec/files/wsm/mapp/docs/mp_basin17final.pdf [https://perma.cc/536W-MEK3].

47. VT. AGENCY OF NAT. RES., WINOOSKI RIVER BASIN WATER QUALITY MANAGEMENT PLAN (2012), http://dec.vermont.gov/sites/dec/files/wsm/mapp/docs/mp_basin8final.pdf [https://perma.cc/H6AM-W5K6].

48. VT. AGENCY OF NAT. RES., OTTER CREEK BASIN WATER QUALITY MANAGEMENT PLAN (2012), http://dec.vermont.gov/sites/dec/files/wsm/mapp/docs/mp_ottercreekplan.pdf [https://perma.cc/W9SP-MM9Z].

49. VT. AGENCY OF NAT. RES., MISSISQUOI BAY BASIN WATER QUALITY MANAGEMENT PLAN (2013), http://dec.vermont.gov/sites/dec/files/wsm/mapp/docs/mp_Basin06Plan.pdf [https://perma.cc/59H6-XZNP].

III. MODERN TACTICAL BASIN PLANS FEATURE CONSISTENT PROCESS, SPECIFIC CONTENT, AND ARE RELIANT ON PARTNERSHIPS

In Vermont, there are fifteen planning basins, six of which occur in the Lake Champlain Basin (Figure 1). These are the Missisquoi, Lamoille, North Lake Champlain Direct Drainages, Winooski, Otter Creek, and South Lake Champlain Basins. These plans are renewed and re-authorized on a five-year rotating cycle as is described by the SWMS.[50]

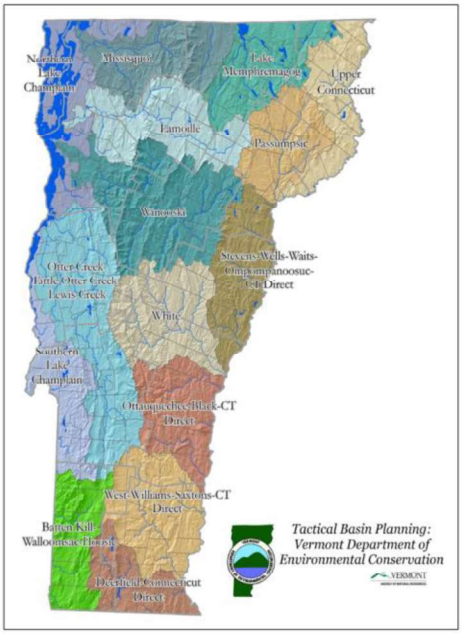

Figure 1. Tactical basin planning watersheds in Vermont.

The watershed-specific findings of tactical basin plans may vary by planning basin but the content is consistently expressed across the basins, such that the reader can access and obtain similar information for any basin of interest. For example, the highest-priority subwatersheds for phosphorus pollution and abatement are all shown in the same location of any given plan.[51] The outline is as follows.

An executive summary presents an overview of known stressors, issues, and proposed actions in the plan for its five-year lifespan.[52] The top ten actions are listed along with a summary of waterbody re-classification opportunities to achieve higher levels of water quality protection.[53]

In a given basin plan, the introduction presents a brief basin description, purpose of the plan, planning process, the partners involved in the process to develop the plan's recommendations, and the expected outcomes over the five-year implementation horizon.

The section titled "Chapter 2. Water Quality in the Basin" presents a textual and graphical characterization of the basin, which relies on water quality monitoring and sector-specific assessments to substantiate why the

50. TACTICAL BASIN PLANNING, *supra* note 5.
51. *Id.*
52. *Id.*
53. *Id.*

subsequent prioritized implementation actions are as stated.[54] Key items include: surface waters exhibiting very good or excellent biological, geomorphic, and chemical fisheries; impaired, stressed, and altered waters; waterbody-specific TMDLs; and the status of direct discharges—municipal or industrial wastewater. Also shown are priority watersheds for focused monitoring and assessment, priority subwatersheds for targeted implementation, and individual surface waters identified for protection through reclassification or designation. This section of the plan is derived by a thorough analysis of several types of assessments. These include water quality monitoring data, stream geomorphic, bridge, and culvert assessments, stormwater infrastructure mapping and illicit discharge identifications, stormwater master plans, road erosion risk assessments, and available municipal road network capitol inventories.

In "Chapter 3. Establishing Management and Protection Goals for Surface Waters," each tactical plan outlines opportunities for augmented protections for surface waters.[55] This plan chapter lists those waters identified through the planning process that present opportunities for outstanding resource water designations,[56] waterbody reclassifications,[57] or wetland reclassifications.[58]

The most important component of any tactical plan is the implementation table in chapter four of every tactical basin plan, which presents individual plan actions that reflect priority protection and restoration actions that have been identified from sector specific assessments and subjected to stakeholder review.[59] These are typically projects or geographically explicit strategies.

Each implementation table documents projects that have been identified, the stressor that will be addressed by implementing the project, involved partners, prospective funding sources, and a statement of prioritization. This is one area of the tactical plan that is currently seeing rapid evolution and improvement.

The process and timing by which tactical basin plans are developed is described in detail in chapter four of the SWMS. The public and stakeholder involvement in the TBPP comes in various stages and is structured to ensure that all relevant partners have had input to the plan before it is released for citizen review and comment prior to signature by

54. WINOOSKI RIVER BASIN WATER QUALITY MANAGEMENT PLAN, *supra* note 47, at 5.
55. *Id.* at 13.
56. *Id.* at 55.
57. *Id.* at 8.
58. 12-004-056 VT. CODE R. § 4 (2016).
59. TACTICAL BASIN PLANNING, *supra* note 5.

the ANR Secretary. The TBPP has been structured such that the following steps are undertaken to develop a plan:

1) Internal Plan Development—all available data and assessments are reviewed internally under the direction of the Watershed Management Division's Watershed Coordinators. During this stage, all relevant DEC and ANR programs are consulted to determine the priorities of each program for water quality management. Also during this stage, Watershed Coordinators are interacting with staff of the agencies of Agriculture Food and Markets, Transportation, and Conservation and Community Development and federal partners such as the U.S. Department of Agriculture's Natural Resources Conservation Service ("NRCS") and the Forest Service ("USFS") to obtain additional State priorities. At this stage, RPCs begin the identification of municipal priorities and integrate the priorities identified in RPC-led hazard mitigation[60] or transportation[61] into the tactical plans that have opportunity to improve surface water conditions or specific regional plan priorities.[62]
2) Partner Organization Outreach—during this stage, the initial priorities derived above are brought forth to watershed-based organizations, which play an important role in planning and implementation as described in more detail below.[63] This is an incremental process whereby the Watershed Coordinator will expand the growing prioritized implementation table of the draft basin plan based on partner input. At the close of this process, it is expected that all stakeholders in the watershed will have contributed their knowledge and priorities to the developing draft tactical basin plan.
3) Prioritization—using a new prioritization approach that stages projects according to pre-set criteria describing project readiness and importance, the Watershed Coordinator will work with RPC planners to prioritize actions in the implementation table of the plan.[64] The RPC represents the many municipalities

60. *Local Hazard Mitigation Plan*, VT. DEP'T OF PUB. SAFETY, http://demhs.vermont.gov/plans/local-hazard [https://perma.cc/9V3M-X4XW] (last visited Apr. 12, 2016).

61. *Regional Planning*, VT. AGENCY OF TRANSP., http://vtransplanning.vermont.gov/planning/regional [https://perma.cc/EQ3D-J87C] (last visited July 7, 2016).

62. VT. STAT. ANN. tit. 24, § 4341.

63. TACTICAL BASIN PLANNING, *supra* note 5.

64. *Id.*

that may be identified as responsible parties in the execution of priority projects in a tactical basin plan.

IV. PARTNERSHIPS ARE KEY TO DEVELOPING AND IMPLEMENTING TACTICAL BASIN PLANS

The efforts necessary to implement the TMDL span a wide range of land uses and phosphorus source sectors. A growing interaction with agencies in state and federal government is implicit in the development of tactical plans and the establishment of their priorities. Major state funding agencies, including agencies of Agriculture, Food and Markets ("VAAFM"), Transportation, Conservation and Community Development, and USFS and NRCS, are key partners whom are involved in developing, then adopting within their own work plans, tactical plan priorities. Examples from NRCS include recent (2016-2017) targeted planning and practice interventions for the Rock and Pike Rivers and St. Albans Bay watersheds and also the direct drainages to South Lake Champlain.[65] In addition, USFS has been involved in developing watershed protection and habitat restoration priorities in several southern Vermont tactical plan areas.[66] The Agency of Transportation is a regular partner in the planning process, directing stormwater quality remediation efforts at the localized level for all of their projects.

This focus among agencies is critical. Yet without additional, more localized partnerships with watershed organizations, advocates and concerned citizens progress toward attainment of the Lake Champlain TMDL, or cleanup of other waters, cannot be assured. The combination of capacity development supported by the guidelines and funding support during the "goldrush" years of river assessments produced a wide cadre of qualified local scientists and planners with significant capacity for watershed improvement. The TBPP works with many stakeholders to ensure that relevant parties understand and agree with the priorities of each tactical basin plan. Several key partnerships are described, though the list presented is decidedly incomplete.

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65. News Release, U.S. Dep't of Agric., USDA to Invest $45 Million to Improve Water Quality in Lake Champlain (Aug. 28, 2014), http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/newsroom/releases/?cid=STELPRDB1260116 [https://perma.cc/X96B-B3NM].

66. TACTICAL BASIN PLANNING, *supra* note 5.

A. Regional Planning Commissions

Act 64 has set forth a new relationship between DEC and the RPCs to fulfill the specific roles and responsibilities toward development of tactical basin plans. Through this cooperative process, the Vermont Association of Planning and Development Agencies ("VAPDA") and DEC have agreed to a series of activities that each RPC shall undertake in support of tactical planning for all watersheds in the state, which is codified by Act 64.[67] This new organizational alignment recognizes that significant municipal outreach is now needed to expand understanding of Act 64 authorities, develop tactical basin plans, and ultimately to track the implementation of the projects and best management practice ("BMP") installations highlighted in tactical plans that are carried out by municipalities or other partners. The roles and responsibilities articulated in Act 64 for RPCs specifically recognize the strengths of the RPCs in supporting municipal activities aimed at water quality protection and restoration. As of this writing, all Vermont RPCs are actively engaged in the process of Act 64 outreach and tactical basin plan development in one manner or another.

B. The Vermont Association of Conservation Districts

The Vermont Association of Conservation Districts ("VACD") is both a local and state-wide partner in efforts to improve the water quality of Vermont's lakes, rivers, and streams, and supports the goals of protecting, maintaining, enhancing, and restoring the biological, chemical, and physical integrity of the state's surface waters.[68] Act 64 also identifies the Natural Resources Conservation Council (the governing body of conservation districts) as statutory partners to the TBPP and VACD facilitates this work in a number of ways. At the local level, Vermont's fourteen natural resource conservation districts host and sponsor many educational and informational events while promoting watershed-wide awareness and action to address water quality issues.[69] At the state level, VACD technical programs—including staff and district consultations—work with both state and federal partners to initiate, develop, and implement a variety of targeted on-farm conservation projects within priority watersheds. Natural resource conservation districts are principal partners in the implementation of tactical basin plans.

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67. VT. STAT. ANN. tit. 10, § 1253(d)(1).

68. *Who We Are*, VT. ASS'N OF CONSERVATION DISTRICTS, http://www.vacd.org/who-we-are [https://perma.cc/4TVU-4J2V] (last visited July 7, 2016).

69. TACTICAL BASIN PLANNING, supra note 5.

VACD has recently entered into a coordinated effort with DEC, NRCS, and VAAFM to develop a common framework for identifying and assessing agricultural water quality resource concerns specific to statewide initiatives and to implement the priorities of each tactical basin plan. This is exemplified by the recently awarded Regional Conservation Partnership Programs ("RCPP") for the Lake Champlain and Connecticut River watersheds, which have recently brought millions of federal funds to address agricultural and forest-sector pollution sources in Vermont.[70] VACD has provided necessary outreach at the local level to inform and educate landowners about the funding opportunities provided by the RCPP to address the most critical areas of concern.[71] In this regard, prioritized practice implementation, coupled with innovative environmental stewardship programs, will implement proven BMPs and creative methods to enhance the long-term sustainability of farms and further contribute to nutrient reduction and co-benefits such as flood and climate resilience. This work is focused on high priority critical source areas in each tactical basin plan and priority sub-basins.

VACD, through each conservation district, has also evolved to include planning and project implementation efforts to address stormwater management, river corridor assessment and planning, and water quality monitoring. Annually, VACD implements a statewide "Trees for Streams" program which implements dozens of acres of riparian buffer plantings, which reflects the priority river corridor restoration opportunities identified in tactical basin plan as well as the goals of the RCPP.[72]

C. Watershed Organizations

Several watershed organizations in Vermont have evolved from initially focusing on single-issue or topic-specific initiatives to multi-dimensional, holistic organizations. Since these groups are too numerous to list here, the examples provided simply reflect the diversity and strength of these organizations as partners in the tactical planning process. One such

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70. *Regional Conservation Partnership Program*, U.S. DEP'T OF AGRIC., http://www.nrcs.usda.gov/wps/portal/nrcs/main/vt/programs/farmbill/rcpp/ [https://perma.cc/MR6E-3PRS] (last visited Apr. 12, 2016); *Three Connecticut Projects Selected for RCPP Funding*, U.S. DEP'T OF AGRIC., http://www.nrcs.usda.gov/wps/portal/nrcs/detail/ct/programs/farmbill/rcpp/?cid=nrcseprd376207 [https://perma.cc/293M-49XG] (last visited Apr. 12, 2016).

71. WINOOSKI RIVER BASIN WATER QUALITY MANAGEMENT PLAN, *supra* note 47, at 10.

72. VT. DEP'T OF ENVTL. CONSERVATION, PROJECT 10: TREES FOR STREAMS-RIPARIAN BUFFER PLANTINGS, STATEWIDE, ANNUAL REPORT ON THE VERMONT CLEAN WATER INITIATIVE PROGRAM 36 (2016), http://legislature.vermont.gov/assets/Legislative-Reports/2016-Clean-Water-Initiative-Program-Annual-Report.pdf [https://perma.cc/P5BC-H2ZS].

example is the Lewis Creek Association ("LCA").[73] Originally formed as the Lewis Creek Conservation Committee, LCA formed around the concept of defining and establishing a "greenway" along the Lewis Creek main stem and eventually its tributaries.[74] Following on one successful riparian land conservation project, principal members of the Hinesburg Land Trust envisioned a broader mission for conservation throughout the watershed, which eventually led to the establishment of LCA and its multi-dimensional mission.[75] LCA also took on a data-driven, science-based approach to watershed activism and was instrumental in the piloting of the first iteration of the DEC River Management Program's Stream Geomorphic Assessment protocols. Similar organizations now are active in many areas of Vermont, conducting assessments or follow-up implementation projects, and their assessment results comprise critical elements of tactical basin plans.[76]

Many watershed associations in the state have evolved from primarily water quality generalists to astute citizen scientists and have contributed greatly to the state's long-term database of water quality monitoring and assessment data in this effort. Such is the case with the Addison County River Watch Collaborative ("ACRWC"), formed in late 1997 to unite ongoing stream-monitoring efforts by citizens in the Addison County region.[77] Prior to the efforts of these volunteer water quality monitoring organizations, there was a lack of long-term water quality monitoring baseline data regarding the health of surface waters in Vermont. ACRWC is one of a number of citizen-based water monitoring groups in Vermont who now support part time staff and undertake robust water quality monitoring activities as an integral component of their outreach and education efforts.[78] In partnering with the Addison County Regional Planning Commission, ACRWC established effective online and one-on-one means of sharing this data with towns in Addison County.[79] Through the TBPP, this model has been shared among other watershed groups in Vermont and adopted in most of the Lake Champlain watersheds.

As watershed organizations continue to mature, they encounter an increasing challenge to convey information that is compelling, coherent,

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73. *History*, LEWIS CREEK ASSOC., http://www.lewiscreek.org/history [https://perma.cc/P6WD-UTED] (last visited Apr. 12, 2016).

74. *Id.*

75. *Id.*

76. *Id.*

77. *Addison County River Watch Collaborative*, ADDISON CTY. REG'L PLANNING COMM'N, http://acrpc.org/programs-services/natural-resources/acrwc/ [https://perma.cc/ANR3-CD9Z] (last visited Apr. 12, 2016).

78. *Background*, ADDISON CTY. REG'L PLANNING COMM'N, http://acrpc.org/background/ [https://perma.cc/585Z-UD92] (last visited Apr. 12, 2016).

79. *Id.*

and interpretable. As groups seek to provide updated monitoring results to the communities they serve, it remains an ongoing challenge to "tell the water quality story" that engages and motivates the public to take ownership and responsibility for local and municipal actions. By coordinating their efforts through the TBPP, these groups have contributed to a long-term database of information that continues to inform Vermont's assessment, listing, and reporting requirements.[80] This has proven to be an invaluable contribution to tactical plans and to the implementation of municipal actions outlined by those plans.

Many watershed organizations (one example being the Friends of the Winooski River) also interact with towns for planning and zoning assistance regarding water resource issues.[81] Translating data into communicable actions requires an understanding of policies and regulations that can affect change and influence behavior. Taking this information and using it to influence local and state policy requires an inherent understanding of state and local government in Vermont, the gaps, and where municipalities have the ability to become more proactive.

D. Watersheds United Vermont: The Synergy of Coordination

Watersheds United Vermont ("WUV") is a statewide network of local groups dedicated to the health of their home watersheds.[82] WUV was formed within the last three years, resulting from the dedicated work of several key water quality professionals from statewide and watershed-specific associations, the consulting sector, and the state. WUV grew in response to the obvious need for a more organized framework to enhance communication and general coordination. The mission of WUV is to empower community-based watershed groups in all parts of the state to protect and restore Vermont's waters.[83] Members include informal neighbor groups who join together for water quality monitoring, more mature associations that conduct river cleanups and public education, and professionally staffed organizations that carry out major restoration projects.[84] Member groups collaborate effectively and efficiently with diverse partners to improve the state's water quality and the resilience of

80. *Vermont Integrated Watershed Information System*, VT. DEP'T OF ENVTL. CONSERVATION, https://anrweb.vt.gov/DEC/IWIS/ [https://perma.cc/R97B-PUKM] (last visited Apr. 12, 2016).

81. WINOOSKI RIVER BASIN WATER QUALITY MANAGEMENT PLAN, *supra* note 47, at 18.

82. WATERSHEDS UNITED VT., http://www.watershedsunitedvt.org/ [https://perma.cc/E93Y-WV3T] (last visited Apr. 12, 2016).

83. *Id.*

84. *Id.*

Vermont's rivers and streams. The organization of this umbrella group recognizes a long-standing need to provide information sharing and enhanced coordination. This organization serves an important role as conduit for communicating updates on tactical basin planning, emerging priorities, and funding opportunities and as a feedback mechanism for tactical basin planning, water quality policies, and program efficiencies. WUV maintains a comprehensive list of watershed associations that are active in Vermont,[85] most of which participate in the TBPP.

E. Peer-to-Peer Networks for Agricultural Water Quality Coordination

In response to the growing attention and awareness around the Lake Champlain TMDL, other TMDLs, Act 64, and tactical basin planning priorities, a number of peer-to-peer networks have evolved to address their increasing roles and responsibilities to ensure that agricultural activities are conducted in a sustainable fashion to meet water quality goals and objectives. Groups like the Franklin County-based Farmers Watershed Alliance[86] and the Champlain Valley Farmers Coalition[87] are committed to providing a network of support for members to meet the requirements of the TMDLs and Act 64 while remaining viable farming operations. These groups foster enhanced coordination with state agencies and other watershed partner organizations, such as Friends of North Lake Champlain, to provide for technical assistance and funding opportunities to bring farming operations in compliance with agricultural and water quality standards. Through the TBPP, DEC Watershed Coordinators work with these networks to maintain awareness of agricultural water quality outreach and remediation efforts and assist in directing remediation actions to the highest priority subwatersheds.

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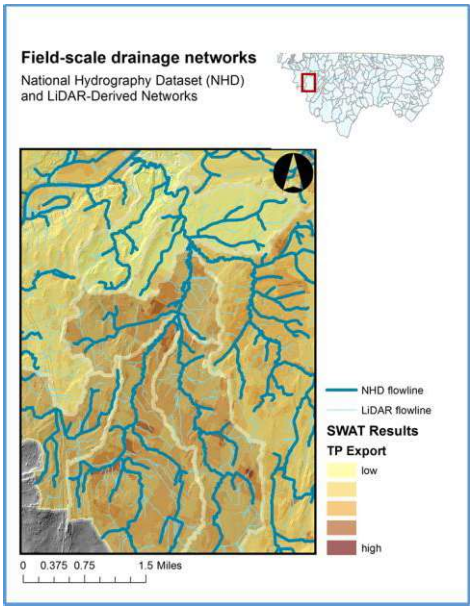
85. *Id*.

86. *Request for Proposal*, FARMER'S WATERSHED ALL. (2015), http://farmerswatershedalliance.com/ [https://perma.cc/HS6K-JRQU].

87. CHAMPLAIN VALLEY FARMERS COAL., http://www.champlainvalleyfarmercoalition.com/ [https://perma.cc/G42R-3TZA] (last visited Apr. 12, 2016).

V. TACTICAL BASIN PLANS ESTABLISH REGULATORY PRIORITIES FOR ACHIEVEMENT OF TMDLS

Achievement of the Lake Champlain TMDL will not rely solely on execution of individual projects as identified by tactical plan implementation tables. Achieving the TMDL will require that BMPs be installed in locations not currently identified by available assessments.[88] The Lake Champlain TMDL accountability framework envisions that the programs and management approaches spelled out by Act 64 and the BMPs envisioned by the Lake Champlain Scenario Tool[89] need to be deployed onto the landscape in such a manner as to incrementally pursue achievement of the respective TMDL load and land-based wasteload allocations at the watershed scale. These explicit, Phase-II watershed-specific plans comprise the blueprints by which the TMDL is to be accomplished. The Lake Champlain TMDL and the Lake Champlain Phase I Plan[90] identify tactical basin planning as the vehicle by which Phase II rosters of BMPs, identified projects, and regulatory measures will be identified. Further, Act 64 specifically tasks certain new



One use of the of the Missisquoi Basin "SWAT" model shows the intersection of high levels of nutrient export, superimposed upon extremely high-resolution water conveyance features derived from LiDAR data. Note the precision with which high-nutrient runoff potential areas can be integrated with conveyances that may connect to watercourses.

88. VT. DEP'T OF ENVTL. CONSERVATION, LAKE CHAMPLAIN TMDL PHASE I IMPLEMENTATION PLAN 23 (2015), https://www.epa.gov/sites/production/files/2015-09/documents/vt-lake-champlain-tmdl-phase1-ip.pdf [https://perma.cc/K2YY-TZB6].

89. TETRATECH, INC., & U.S. ENVTL. PROT. AGENCY, LAKE CHAMPLAIN TMDL SCENARIO TOOL: REQUIREMENTS AND DESIGN (2015), https://www.epa.gov/sites/production/files/2015-09/documents/lake-champlain-bmp-scenario-tool-report.pdf [https://perma.cc/E6XN-R2FV]; *National Water Quality Inventory Report to Congress*, U.S. ENVTL. PROTECTION AGENCY, https://www.epa.gov/waterdata/national-water-quality-inventory-report-congress [https://perma.cc/67SP-EEQD] (last updated Sept. 30, 2015).

90. LAKE CHAMPLAIN TMDL PHASE I IMPLEMENTATION PLAN, *supra* note 88.

permit programs to articulate, in state law, how tactical planning will be used to inform promulgation of permit coverage.[91] Tactical plans themselves are not regulatory instruments; however, their development and public approval process is intended to notify all interested parties as to the breadth of activities necessary to achieve the Lake Champlain TMDL, improve water quality generally, and spotlight the regulatory programs and project activities that are staged for promulgation over the subsequent five-year plan lifecycle to pursue the longer-term goal of full implementation.[92]

This work requires a significant investment of water quality modeling capacity into the TBPP. As described in the Lake Champlain Phase I TMDL Implementation Plan, tactical basin plans, beginning with those issued in 2016, will feature several technological improvements to support this work.

High-resolution topographic data will be used to model how water moves over the landscape. This information will be combined with predicted nutrient loadings from the Lake Champlain Soil Water Assessment Tool ("SWAT") model,[93] other models, and other watershed characteristics—slope, soil type, etc.—to prioritize BMP selection and placement. This will allow the Watershed Management Division to apply and refine the broad recommendations from the Lake Champlain TMDL Scenario Tool into geographically explicit prescriptions in order to meet the load allocations of the TMDL.[94] The nutrient loading reductions at the project-level can then be predicted to account and track progress toward achievement of the allocations as practices are put into place.[95] These modeling approaches will improve tactical basin plans and assist the promulgation of the new permit programs or performance standards put in place by Act 64. TBPP modeling efforts assist certain permit programs and standards: the Municipal Roads General Permit, the "Three-acre" Developed Lands Permit, the Transportation General Permit, the Required

91. VT. STAT. ANN. tit. 10, § 1264(e) (as amended by Act 64 § 31).

92. *Id.* § 1264(b)(18).

93. TETRATECH, INC., & U.S. ENVTL. PROT. AGENCY, LAKE CHAMPLAIN BASIN SWAT MODEL CONFIGURATION, CALIBRATION AND VALIDATION (2015), https://www.epa.gov/sites/production/files/2015-09/documents/swat-model-configuration-calibration-validation.pdf [https://perma.cc/269R-N3V4].

94. VT. DEP'T OF ENVTL. CONSERVATION, PROGRESS REPORT ON RIVER BASIN WATER QUALITY MANAGEMENT PLANNING DURING 2015 7 (2016), http://legislature.vermont.gov/assets/Legislative-Reports/2016-Basin-Planning-Legislative-Report-1-15-16Final.pdf [https://perma.cc/VW8C-RGXZ].

95. *Id.*

Agricultural Practices, and the Accepted Management Practices for Forestry.[96]

VI. EVOLUTION OF PROJECT IDENTIFICATION, STAGING, FUNDING, AND PUBLIC DISPLAY OF TACTICAL BASIN PLANS

A recent evolution of the TBPP relied upon lean[97] business process evaluation tools promoted by the State of Vermont to examine and improve approaches by which remediation projects are identified, prioritized, and funded. The most important outcome to this evaluation was development of integrated criteria allowing prospective projects to be prioritized for implementation within tactical basin plans then funded using available federal and state funds. The development of these "Stage Gate"[98] criteria to be applied to tactical basin plan implementation tables is premised on the idea that any given project is completed through a series of discrete phases: inception, scoping and feasibility, design, and construction. For any given project phase or stage, there have been developed predictable criteria, or "gates," that should be satisfied to move a project forward to the next stage. This approach ensures that incrementally higher-cost investments necessary to move a project through the stages are made on the most important projects first and that projects which do not merit additional investment are identified at the earliest possible point in time.

This type of business practice will engender public confidence in the management of water quality remediation funding, but only when the process is transparently executed and easily monitored. As such, the Watershed Management Division is developing a comprehensive database tracking system that supports the management of tactical basin plan implementation tables and Lake Champlain TMDL Phase II actions. This system is being developed to allow public access to view the breadth of projects to be undertaken, their stage, criteria-based prioritization, and status. The development and deployment of this database should be considered a foundational shift in the capabilities of the TBPP. The database will track the lifespan of projects from proposal to design,

96. *Municipal Roads Program*, VT. DEP'T ENVTL. CONSERVATION, http://dec.vermont.gov/watershed/stormwater/permit-information-applications-fees/municipal-roads-program#Development of Permit [https://perma.cc/6YVB-VMFH] (last visited July 10, 2016).

97. VT. DEP'T OF ENVTL. CONSERVATION, STRATEGIC PLAN 2013-2015 5 http://dec.vermont.gov/sites/dec/files/co/documents/DECStrategicPlan2013-2015.pdf [https://perma.cc/S4RG-H8L7] (last visited July 7, 2016).

98. STAGE GATE INT'L, http://www.stage-gate.com/resources_stage-gate.php [https://perma.cc/U5NN-AB5J] (last visited Apr. 12, 2016) (providing one consulting firm's description of an industry-standard process for managing innovation costs).

implementation to operation and management, and eventually termination. The database will also help facilitate reporting to the legislature, EPA, and the public. The first application of stage-gate criteria is being implemented within the new database for the 2016 Missisquoi and Lamoille tactical plans and the 2017 South Lake Champlain and Ottauquechee tactical plans. The same database will be used to track and account for the full suite of clean water projects statewide to meet the reporting requirements of Act 64 and support the accountability needs of the Lake Champlain TMDL.

With this level of modernization, the TBPP is poised to further evolve into a "within-basin Continuing Planning Process," involving stakeholders and organizations who can carry out the process by ensuring and tracking high-priority implementation actions. Each tactical plan will establish a schedule that ensures a rotational cycle of monitoring, assessing, planning, and implementing recommendations contained in that plan. Each newly developed assessment that is called for in an implementation table will yield a suite of prospective projects to be added into the tracking system during the lifecycle of the tactical plan. Thus, each tactical planning process will yield a continually-evolving implementation table that shows steady progress toward attaining priority actions. With this type of technology underlying each tactical basin plan, the five-year updates become a simple process of taking stock of progress, elevating unfulfilled projects to higher priority, introducing new strategies or projects, and identifying new reclassification or designation opportunities. The modern tactical planning process will provide Vermont citizens a transparent and readily accessed one-stop resource to understand the breadth and status of pollution control activities being undertaken in Vermont as a result of the newly enacted Vermont Clean Water Act.