



Vermont Agency of Natural Resources

A SUMMARY of the WHITE RIVER BASIN PLAN

Executive Summary
Goals, Objectives and Strategies from Chapters 4 and 5
Chapter 6

November, 2002

Executive Summary

The White River Basin Plan describes water quality and water resource problems in the basin and recommends strategies for remediation of these problems. The principle purpose of the plan is to improve water quality by guiding the Agency of Natural Resources in its own work and in collaborative projects with the public as well as other State and federal agencies.

Presently, overall water quality in the surface waters of the White River Basin is exceptionally good. In addition, the White River mainstem is unrestricted by dams, making the White River the longest free flowing large river in the State. The water quality and its free flowing nature sustain high quality recreational opportunities as well as habitat for plants and animals. In addition, the water quality supports the use of surface waters for irrigation and drinking water.

Although water quality is exceptionally good overall, impacts to water quality and the uses it supports do exist. Sedimentation is the greatest source of impact to uses, followed by thermal modification, nutrients, turbidity, and pathogens. Streambank destabilization and loss of riparian buffers are the main causes of sedimentation, thermal modification, and turbidity. Numerous land uses contribute nutrients and pathogens.

Basin planning is one tool for addressing water quality and water resource problems. Its effectiveness depends on the willingness of the local community, landowners, and State and federal entities to undertake projects that will enhance or protect water quality. The potential successes are based on the assumption that if given the means, people will work together to resolve problems that they have identified. The planning process facilitates this collaborative effort.

The most prevalent surface water concerns in the community and the strategies for their remediation are outlined in Chapter 4 of this basin plan. The concerns and strategies have been developed through public input, including work completed by the White River Partnership, a local watershed group. They are as follows:

- Stream channel instability and streambank erosion
- Lack of awareness of water quality problems
- Extent and quality of public access to recreational opportunities on the water
- Impacts to fisheries

The remediation strategies are based on work that is presently being conducted by the Agency or others and on discussions with the Partnership and other groups. Implementation of these strategies should promote stable stream corridors, which will reduce streambank erosion, the greatest sources of impacts to water quality in the basin. In addition, public awareness of water quality and appreciation for its ability to support public access and fisheries should be increased as strategies are implemented. This awareness and appreciation should work to increase involvement in water quality protection and restoration activities.

Chapter 5 lists specific waters that the Agency of Natural Resources has identified as having water quality problems. They are either clearly in violation of the Vermont Water Quality Standards or in need of further assessment to determine the degree of the problem. Through the basin planning process, strategies have been developed that leverage existing resources from State and federal agencies and the community to improve or better understand water quality problems in these specific waters.

Chapter 6 describes the different processes of setting goals for the management of specific surface waters. Once the goals are established, the Agency of Natural Resources will conserve or restore water quality and uses to attain the management goals.

Processes for setting goals can include the designation of water quality classes and management types, warm or cold water fisheries and Outstanding Resource Waters as well as the determination of existing uses. These goals become part of the Agency's review of activities regulated under State and federal law.

As part of the Agency of Natural Resources' obligations under the Vermont Water Quality Standards, Chapter 6 includes the Agency's proposal to establish new management goals through the reclassification of Class B waters. The Agency's proposal designates Class B waters into management types B1, B2 or B3. The Agency proposes B3 designations for Silver Lake, Pond Brook, and a segment of each of the following: Flint Brook, Blaisdell Brook, the Third Branch near Bethel Mills Dam, and the First Branch in Tunbridge. The Agency proposes B1 designations for waters listed in Appendix D. Appendix D includes waters that are mostly in mountainous areas and where goals for surrounding land use in town or government agency plans are compatible with goals for B1 waters. The Agency also proposes B2 designation for all the remaining Class B waters, and for Lake Casper, a former water supply that is no longer used for that purpose. The proposal largely represents present-day management of waters in the basin.

Chapter 6 also establishes management goals by identifying existing uses for specific waters. In addition, the chapter stresses the importance of community involvement in developing goals and includes strategies to encourage community involvement.

Within the next five years, the Agency of Natural Resources will focus its efforts in these areas in collaboration with the community and other State or federal agencies as set forth in the plan (Chapters 4, 5 and 6). The next basin plan will document work completed and address any new issues that have emerged.

Use of this Plan

The basin plan has two primary uses:

1. It is a resource to any individual or group that works on watershed issues.
2. It is a guide to the Vermont Agency of Natural Resources in its efforts to protect and improve surface waters to the level required by the Vermont Water Quality Standards.

Groups will be able to use information in the plan for the following purposes:

- To improve understanding of the watershed and threats to water-based resources
- To develop project ideas relating to water quality or water resource improvements
- To find technical or financial resources
- To identify the technical and financial needs of potential partners
- To support grant proposals
- To provide guidance to regional and local planning and zoning processes

Chapter 4. Local Concerns

4.1 Stream Channel Instability and Streambank Erosion

GOAL: PROMOTE STABLE STREAMS AND RIVERS BY ENCOURAGING ACTIVITY THAT IS CONSISTENT WITH THE RIVER'S EFFORTS TO BECOME STABLE AND AT THE SAME TIME, WORK TO MINIMIZE CONFLICTS, AND BALANCE THE NEED TO PROTECT ECONOMIC INVESTMENTS IN INFRASTRUCTURE AND LAND.

Stable stream channels and wooded riparian buffers reduce the potential for erosion within the stream corridor, thereby protecting water quality. Strategies for meeting this goal are based on an understanding of the present condition of streams and their buffers in the White River Basin, and the factors that are responsible for the condition. The following objectives and strategies are based on the projects listed above that improve or protect stream corridors as well as public input. The most significant lesson learned in this basin and others is that mitigating land uses that place infrastructure in conflict with natural stream processes should be a higher priority than expending the large amounts of resources it takes to attempt to restore a river corridor.

OBJECTIVES LISTED FROM HIGHEST PRIORITY	
①	Protect stable reaches
②	Promote land use practices that enhance stream channel stability and improve riparian buffers
③	Encourage increased participation of towns in stream corridor protection
④	Develop and implement successful stream restoration projects that incorporate natural channel design to achieve stability
⑤	Increase awareness of the costs of replacing infrastructure that is in conflict with natural stream stabilization processes.
⑥	Maintain and enhance relationships among partners

OBJECTIVE ①: STRATEGY

Geomorphic surveys of streams in the watershed identify stable and unstable reaches. This information can be used to identify stable reaches for protection and to design stream restoration projects. The USDA report and the Agency’s work in 2001 will produce such a survey for the Third Branch by the end of 2002. Protecting stable reaches (conservation reaches) of a river is less expensive and time consuming than attempting to repair eroding streambanks and restoring channel stability.

- 1 Conduct DEC Phase I & II geomorphology assessments in subwatersheds throughout the basin.

Lead Agency/Organization: WRP (planning phase has begun as of 10/01)
Partners: DEC, FWD, USFWS, USFS, NRCS
Potential funding sources: WRP and state and federal programs
Time-frame: Ongoing
Benchmark: Increase the linear miles of assessed streams over the next 5 years.

OBJECTIVE ②: STRATEGIES

Appropriate land use practices protect and enhance the river corridor in both stable and unstable reaches. Practices that protect the river corridor ensure an adequate riparian buffer and floodplain. The floodplain allows the energy of floodwaters to dissipate, reducing erosion. The space provided by a floodplain lacking structures allows an unstable stream channel to shift as it seeks a new equilibrium. Voluntary efforts of landowners are gained through education and economic incentives. Once instituted for the Connecticut River, the federal Conservation Reserve

Enhanced Program will help to provide a greater level of economic incentive than is presently available from the federal government.

- 2 Encourage and support local efforts to protect river corridors: Expand riparian buffer protection programs including enhanced economic incentives to landowners (see list of agricultural programs in Appendix B); encourage landowners to voluntarily stabilize streambanks; use data developed for the hazard map for the Third Branch to identify areas where a vegetated streambank would be considered sufficient to reduce or eliminate erosion; work with willing landowners to establish trees and shrubs within the riparian buffer; and use as demonstration sites particular areas of channel that have been restored through these strategies. Distribute fact sheets written by the Connecticut River Joint Commissions (CRJC), DEC and others on riparian buffer protection.
 - Lead Agency/Organization: FWD, USFWS, WRP
 - Partners: Chateaugay-No Town Committee, CRJC, DAFM, local residents, NRCS, National Wildlife Federation, RPC
 - Potential funding sources: DEC grant programs, other state and federal programs
 - Time-frame: Ongoing
 - Benchmark: Not applicable
- 3 Initiate and fund the Conservation Reserve Enhanced Program (CREP) for White River Basin landowners.
 - Lead Agency/Organization: DAFM
 - Partners: NRCD, USDA/FSA, EPA, NRCS
 - Potential funding sources: State and federal programs
 - Time-frame: By 2005
 - Benchmark: 300 acres of riparian buffer are enrolled in CREP
- 4 Develop and implement river corridor restoration projects on eroding streambanks that include structural protection using bioengineering techniques, e.g., tree revetments.
 - Lead Agency/Organization: WRP
 - Partners: NRCS, NRCD, towns, USFWS,
 - Potential funding sources: DEC grant programs, other state and federal programs
 - Time-frame: Ongoing every spring
 - Benchmark: Increase linear miles of riparian zones with trees and shrubs
- 5 Increase riparian buffers on State and federal lands.
 - Lead Agency/Organization: FWD, USFS
 - Partners:
 - Potential funding sources: State and federal programs
 - Time-frame: Ongoing
 - Benchmark: Increase miles of State and federally owned riparian zones that are vegetated with trees and shrubs
- 6 Develop and hold workshops for state employees who issue permits or develop or implement projects that potentially place infrastructure in conflict with natural stream stabilization processes.
 - Lead Agency/Organization: DEC
 - Partners: FWD, VTrans
 - Potential funding sources: State programs
 - Time-frame: Ongoing
 - Benchmark: Development and presentation of workshops on stream stabilization processes

OBJECTIVE ③: STRATEGIES

The Two Rivers-Ottauquechee Regional Plan and the Connecticut River Corridor Management Plan (Connecticut River Joint Commissions, 1997) both recommend that towns increase their involvement in the protection of surface waters.

- 7 Offer information and technical support to selectboards and planners on the local planning, zoning and regulatory opportunities that protect or enhance water quality, including the use of the hazard assessment for the Third Branch.

Lead Agency/Organization: DEC

Partners: Municipal Planners, EPA, RPC, WRP

Potential funding sources: Clean Water Act Section 604(b) pass through funds, Federal Emergency Management Funds, other state and federal programs

Time-frame: Ongoing

Benchmark: Language in town plans or zoning that promotes increased protection of water resources in the town

- 8 Develop criteria for allocating state river restoration funds and technical assistance that prioritize projects in watershed that have begun a geomorphic assessment and in towns with riparian buffer protection, including zoning set backs from water and shoreline management policies and road maintenance techniques.

Lead Agency/Organization:

Partners: DEC, Regional Planning Commissions

Potential funding source: Clean Water Act Section 604(b) pass through funds, other State and federal programs.

Time-frame: By 2005

Benchmark: Development of criteria for allocating river restoration funds and technical assistance

OBJECTIVE ④: STRATEGIES

Based on a geomorphic survey of rivers in the basin, rank restoration projects as follows if the river system in the watershed is to be stabilized in the most efficient and effective manner (in order from highest to lowest priority).

1. Incising reaches - river reaches that due to disturbance, have become incised enough (deepening of river channel) to lose access to their floodplain. If access to their floodplain is not restored, the additional flows in the channel will destabilize other reaches.

2. Reaches with high recovery potential - these include reaches that have a potential for self-adjustment, but minimally invasive approaches will accelerate recovery. Work should focus on reaches that are adjacent to stable reaches. Examples include streams that have access to their floodplain, but lack lateral stability due to a loss of riparian vegetation

3. Moderate to highly degraded sites - these include sites that require invasive management. In most cases, restoration should only go forward once consideration has been given to upstream stability, sediment budgets, and riparian vegetation. Restoration projects should take place where upstream sites have been stabilized and watershed-wide sediment and vegetation management plans have been implemented. In some cases, downstream sites that have a very high degree of erosion or sedimentation may become a priority over high elevation areas.

When opportunities or a crisis makes a river restoration project necessary in an area that has not been surveyed, a geomorphic analysis-based approach should be used. The projects should focus on areas in the headwaters where they can do the most good and they are the least apt to be disturbed by land practices. Where possible, consideration should be given to allowing the river to continue to shift until it reaches a stable course.

- 9 Leverage existing resources in implementing stream corridor restoration or protection projects. This may include meeting annually to develop a plan for ranking river corridor restoration.

Lead Agency/Organization: WRP

Partners: DEC, FWD, RPC, USFS, USFWS

Potential funding sources: Disaster Mitigation Funding and other state and federal programs

Time-frame: Ongoing

Benchmark: River restoration projects that are supported by more than one resource agency

- 10 Assess both morphological and ecological responses to restoration efforts. Comparisons then could be made with reference data and pre-treatment data to assess the success of restoration efforts.

Lead Agency/Organization: WRP

Partners: DEC, FWD, USFS, USFWS

Potential funding sources: State and federal programs

Time-frame: By 2005

Benchmark: A report assessing the morphological and ecological responses to restoration efforts

- 11 Purchase or receive donations of conservation easements or property along riparian corridors to conserve the property.

Lead Agency/Organization: ANR, USFS

Partners: DAFM, DFPR, landowners, municipalities, NRCS, Vermont Land Trust, USFS, Upper Valley Land Trust, Vermont Land Trust, Vermont River Conservancy, WRP

Potential funding sources: CRP, municipal conservation funds, The Vermont River Conservancy, Vermont Land Trust, DFPR Forest Legacy Program, other state and federal programs

Time-frame: Ongoing

Benchmark: Property along a riparian corridor bought by a land conservation organization or placed in a conservation easement

OBJECTIVE ⑤: STRATEGIES

- 12 Hold Better Backroads and VTrans workshops with town highway managers and crews to increase awareness of factors that affect natural stream processes and the cost of stabilizing rivers and streams.

Lead Agency/Organization: DEC

Partners: VTrans, town road crews, WRP, Regional Planning Commissions

Potential funding sources: Better Backroads Program, DEC grant programs

Time-frame: Ongoing

Benchmark: A series of workshops completed across towns in the watershed

13 Encourage joint projects between the Agency of Natural Resources River Restoration Teams and VTrans and town road crews.

Lead Agency/Organization: DEC

Partners: Town road crews, VTrans, WRP

Potential funding sources: State and federal programs

Time-frame: Ongoing

Benchmark: Initiation of joint projects that improve riparian corridor management

OBJECTIVE ⑥: STRATEGY

In the White River Basin, riparian corridors are managed and restored collaboratively by the private landowners, the White River Partnership, Two Rivers-Ottawaquechee Regional Commission, USDA-Natural Resource Conservation Service, US Fish and Wildlife Service, US Forest Service, the VT Agency of Natural Resources, the VT Agency of Transportation and others. A collaborative approach is essential: the expense of some of the projects requires many sources of funding; and one group or organization cannot always complete the tasks involved.

The Partnership, especially, plays an important role in stream corridor restoration. The labor provided by volunteers is often essential as a form of matching funds needed to earn grants. Volunteers from the community are excellent long-term stewards of remediated areas. Consideration should be given to the objectives of all partners, especially community groups, when developing collaborative efforts.

Implementation of any of the strategies should consider the following:

- The Two Rivers-Ottawaquechee Regional Plan and the White River Partnership's business plan both indicate that economic needs must be balanced with environmental concerns. Therefore, potential loss of property, and the interest in voluntary participation in conservation projects should be taken into consideration before including such projects/property in ranking stream corridor restoration.
- The Partnership's business plan also includes outreach and education, and capacity building as objectives. The Partnership's criteria for projects also include visibility to the public.
- Any assistance to town planning or zoning should be coordinated through the appropriate regional planning commission.

Another strategy that will support local groups follows:

14 Encourage the application of Supplemental Environmental Project (SEP) funds towards community-led projects that improve water quality in the White River Basin.

Lead Agency/Organization: ANR

Potential funding sources: State programs

Time-frame: Ongoing

Benchmark: Water quality improvement projects in the White River Basin funded through SEP money

4.2 Improving Water Quality Awareness

GOAL: DEVELOP A MORE COMPREHENSIVE PICTURE OF THE HEALTH OF THE WHITE RIVER BASIN'S SURFACE WATER AND A PROCESS FOR INCREASING PUBLIC KNOWLEDGE ABOUT WATER QUALITY ISSUES

The following objectives and strategies will assist in the continuation of efforts to develop a comprehensive picture of water quality in the basin and will provide this information to the public.

OBJECTIVES LISTED FROM HIGHEST PRIORITY
① Identify reference reaches based on biological and morphological information
② Improve communication about water quality between State agencies, towns and other stakeholders
③ Assist volunteers in conducting water quality monitoring that provides high quality data and addresses relevant concerns in the basin

OBJECTIVE ①: STRATEGY

In the development of a basin-wide picture of water quality, certain surface waters in their natural condition are identified as reference waters. The condition of all other surface waters can then be judged based on their deviation from the condition of these reference waters.

- 15 Use all available good quality data on the physical, chemical, and biological values of the waters, and collect any additional necessary data in the basin to establish reference reaches (see Appendix G for existing biological data).

Lead Agency/Organization: DEC

Partners: FWD, WRP

Potential funding source: State and federal programs

Time-frame: By summer 2005

Benchmark: Reference types identified in the basin

OBJECTIVE ②: STRATEGY

An understanding of *E. coli* data by citizen groups can lead to a dialogue within the local community on the importance of adequate treatment of human waste and lead to local solutions. In addition, town health officers can use the information to more accurately decide whether or not swimming areas should be closed.

- 16 Educate citizens and towns about different pollutants, including the health risk associated with *E. coli* levels, to help them make decisions that protect public health and the environment.

Lead Agency/Organization:

Partners: DEC, DOH, town health officers, WRP

Potential funding source: State programs

Time-frame: Ongoing

Benchmark: Appearance of newspaper articles, stories, columns and other publications or educational forums addressing water quality in the White River Basin.

OBJECTIVE ③: STRATEGY

DEC recognizes that groups involved in water quality monitoring may be able to help DEC find appropriate sample sites and identify potential river reaches of concern. Watershed groups such as The Friends of the Mad River, The Friends of the Winooski River, and River Network (RN) have all indicated that while volunteer groups can collect useful data, they generally do not have the technical or financial resources needed to develop long-term, viable monitoring programs.

To develop successful partnerships, the Agency and volunteer monitoring groups need to be aware of each other’s objectives. The formation of citizen monitoring groups who are interested in testing for *E. coli* creates an additional opportunity for the long-term monitoring of waters that are popular for contact recreation. The most significant challenge for volunteers and the community is interpreting how *E. coli* levels relate to a health risk.

- 17 Develop a written protocol for how the Agency will assist volunteer monitoring groups

Lead Agency/Organization: DEC

Partners: WRP and other watershed groups

Potential funding source: State programs

Time-frame: Ongoing

Benchmark: A plan that describes the process for how ANR will work with volunteer groups

4.3 Public Access

GOAL: IMPROVE & MAINTAIN PUBLIC ACCESS TO WATER-BASED RECREATIONAL USES

Although no one organization is responsible for ensuring sufficient and adequate public access to water-based recreational uses, many different groups are involved in one aspect or another. The following objectives and strategies will assist in the continuation of efforts to address concerns surrounding water-based recreation.

OBJECTIVES LISTED FROM HIGHEST PRIORITY
① Maintain public and private access sites available for public use
② Increase the number of publicly owned access sites
③ Encourage recreational use that avoids conflicts with other recreational uses and natural resources

OBJECTIVE ①: STRATEGIES

Many of the sites that are presently available to the public are not maintained. Overuse or misuse of some of the sites adversely affects the user's and the landowner's experience. Increasing the number of sites available to the public and developing some degree of oversight to reduce erosion, garbage, and other hazards will enhance both the user and the landowner's experiences. The likelihood of landowners revoking access to the public due to misuse may decrease. These improvements should not result in the loss of all informal sites, whose small size, narrow paths, and hidden beaches characterize recreation in the White River Basin.

- 18 Identify the location and evaluate the condition and accessibility of streamside properties owned by the Department of Fish and Wildlife and publicize the information.

Lead Agency/Organization: WRP (As Stream Teams desire)

Partners: FWD

Potential Funding Source: State and federal programs

Time-frame: By 2005

Benchmark: A map of State-owned sites produced and made available to the public

- 19 During bridge and road improvement projects, incorporate the improvement or creation of access points to adjacent waters into the design. Any new property needed for an access point should be acquired from a willing landowner.

Lead Agency/Organization: VTrans

Partners: DEC

Potential Funding Source: State and federal programs

Time-frame: Ongoing

Benchmark: New or improved access sites designed into VTrans projects

- 20 Improve trails to access sites, including cleaning for safety and, trash removal, etc.

Lead Agency/Organization:

Partners: Community groups, towns, USFS

Potential Funding Source: State and federal programs

Time-frame: Ongoing

Benchmark: New commitments made to improve and/or maintain informal access sites

- 21 Develop agreements with landowners of informal sites to maintain public access, which may include improvement and/or maintenance of the site by another entity.

Lead Agency/Organization: WRP (As Stream Teams desire)

Partners: Landowners, USFS

Potential Funding Source: FWD, and other state and federal programs

Time-frame: Ongoing

Benchmark: New agreements made with landowners to continue or open a public access to water-based recreational opportunities on landowner's property

OBJECTIVE ②: STRATEGY

- 22 Purchase property or easements on riverside property for public access. Sites most important to the community for recreation should be prioritized for purchase.

Partners: USFS, Vermont River Conservancy, Vermont Land Trust, WRP

Potential Funding Source: State and federal programs, private funds

Time-frame: Ongoing

Benchmark: New riverside properties protected for public access

OBJECTIVE ③: STRATEGY

Any group that looks to improve access to recreational sites may create potential conflicts with other natural resource values. A recreational activity can conflict with other recreational activities, or with the protection of natural resources, and public safety.

For example, areas managed for fishing may not be appropriate for boat launching and swimming. Conflict with natural resources can also occur. River and riverbanks can be habitat for threatened or rare plants and animals, or plant communities such as those associated with seeps and sandy bluffs. Riverbanks need to be vegetated by woody plants to maintain their integrity, and archeological sites often occur along rivers. Paths, parking lots, and increased human activity have the potential to harm these resources if the access is not designed correctly. In addition, the design of access sites must consider safety, including parking and the movement of cars on and off major road. The improvement should not encourage activity that could become a nuisance for surrounding landowners.

Some of these conflicts are addressed through State and federal permit processes that protect natural resources. It is recognized that citizen groups may not have the resources to address all these issues without assistance.

Other issues surrounding public access will evolve as the community continues to focus on its recreational resources. The survey by the DownStream Team is a start. The DownStream Team and the White River Partnership will continue to be a forum for discussion and community-based solutions for all issues surrounding access.

- 23 Assist community groups in developing access sites, including assistance in obtaining State and federal permits, design, and implementation.

Lead Agency/Organization: DEC

Partners: National Wildlife Federation, RPC

Potential Funding Source: State and federal programs

Time-frame: Ongoing

Benchmark: Access sites developed by community groups with assistance from the listed partners or others

4.4 Fisheries

GOAL: MAINTAIN AND ENHANCE SELF-SUSTAINING FISH POPULATIONS

The following objectives and strategies will assist in the continuation of efforts to address concerns regarding fisheries.

OBJECTIVES LISTED FROM HIGHEST PRIORITY	
①	Protect fish populations and their habitat
②	Reduce impacts to fish habitat
③	Maintain free flowing rivers, existing fish passages at dams and culverts, and enhance fish passage where needed
④	Restore degraded fish habitat

OBJECTIVES ① AND OBJECTIVE ④: STRATEGIES

24 Assess fish habitat through the coordination of existing data. Data may include fish and macroinvertebrate populations, riparian condition, in-stream habitat, and physical channel condition, and water quality. Assessment should include the identification of self-sustaining fish populations and any gaps in existing data.

Lead Agency/Organization: FWD

Partners: USFS, WRP

Potential Funding Source: State and federal programs

Time-Frame: By 2005

Benchmarks: A document listing sources of existing data and contact information

25 Identify factors limiting fish populations and having an impact on fish habitat.

Lead Agency/Organization: FWD

Partners: DEC, USFS, WRP, Connecticut River Atlantic Salmon Commission, CRWC, Silvio O. Conte National Fish and Wildlife Refuge

Potential Funding Source: State and federal programs

Time-Frame: By 2005

Benchmarks: A report that describes factors limiting fish populations and factors that have an impact on fish habitat

26 Develop a process to prioritize fish habitat improvement projects. Prioritization should consider the information generated in strategies 24 and 25.

Potential Partners: FWD, Ct. River Watershed Council, Trout Unlimited, USFS, USFWS, WRP

Potential Funding Source: State and federal programs

Time-Frame: By 2005

Benchmarks: A report describing the process for prioritizing fish habitat improvement projects

27 Conduct habitat protection and restoration projects based on the prioritization results (see Strategy 26). In addition, monitor a selection of habitat restoration projects to determine their effects on fish habitat.

Lead Agency/Organization: WRP stream teams

Partners: DEC, FWD, Trout Unlimited, USFS, USFWS, WRP

Potential Funding Source: State and federal programs

Time-Frame: Ongoing

Benchmarks: Completion of habitat protection and restoration projects

OBJECTIVE ② : STRATEGIES

- 28 Provide state, federal, non-profit groups and the public with assessment information (information gathered in previous strategies) that will assist them in their efforts to protect fish habitat.

Lead Agency/Organization:

Partners: FWD, VTrans, WRP

Potential Funding Source: State and federal programs

Time-Frame: Ongoing

Benchmark: Distribution of fact sheets or reports on fish habitat assessment

- 29 Provide information on fish habitat needs, including fluvial geomorphic principles, to state and town employees who issue permits or develop projects and regional planning commission staff who also help develop projects to help them assess the potential of projects to affect fisheries habitat.

Lead Agency/Organization:

Partners: DEC, FWD, RPC

Potential funding sources: State and federal programs

Time-frame: Ongoing

Benchmark: Not applicable

OBJECTIVE ③ : STRATEGIES

- 30 Assess existing culverts for fish passage and distribute assessment to state and local road managers.

Lead Agency/Organization: FWD

Partners: VTrans, DEC, RPC, Trout Unlimited, WRP, USFS

Potential Funding Source: Connecticut River Watershed Council

Time-frame: Ongoing

Benchmark: Completion and distribution of road culvert assessments

- 31 Develop and provide towns with guidelines for installing fish-friendly culvert¹.

Lead Agency/Organization: FWD

Partners: DEC, RPC, VTrans, Trout Unlimited

Potential Funding Source: Connecticut River Watershed Council, state and federal programs

Time-frame: Ongoing

Benchmark: Distribution of guidelines to towns for installing fish-friendly culverts

- 32 Evaluate dam assessment data to identify those dams that may be good candidates for removal, modification, or other treatment to improve fish habitat.

Lead Agency/Organization: DEC

Partners: Connecticut River Watershed Council, FWD, WRP Stream Teams, Vt. Office of Historic Preservation

Potential Funding Source: State and federal programs

Time-frame: By 2005

Benchmark: Complete report on evaluation of dams

¹ The Vermont Department of Fish and Wildlife and the Vermont Agency of Transportation are working to together to develop fish and wildlife friendly passages.

33 Remove dams based on assessment data and the interest of the dam owners.

Lead Agency/Organization: Vermont Dams Task Force

Partners: Connecticut River Watershed Council, DEC, landowner, Vt. Office of Historic Preservation, WRP Stream Teams

Potential Funding Source: Connecticut River Watershed Council, WHIP, NOAA, Federal Emergency Management Agency funds and other State and federal programs.

Time-frame: Ongoing

Benchmark: Dams are removed

Chapter 5. Specific Waters with Water Quality Problems

**GOAL: ENSURE THAT SURFACE WATERS ARE IN COMPLIANCE
WITH THE VERMONT WATER QUALITY STANDARDS**

The Agency of Natural Resources is responsible for maintaining water quality in each waterbody in accordance with the Vermont Water Quality Standards. Water quality is determined using biological, physical, and chemical criteria. The Agency, through the Department of Environmental Conservation (DEC), monitors selected surface waters for conformance with these criteria, assesses use attainment, and documents violations. Plans for remediation of water quality problems are developed and carried out by the Agency and, where appropriate, the Department of Agriculture, Food and Markets.

In the White River Basin, the Agency has identified impaired waters (Table 3), waters in need of further assessment (Table 4) and waters with altered flow (Table 5). An impaired water has a measured violation of at least one criterion of the Vermont Water Quality Standards. To be called “impaired,” the violation of the Vermont Water Quality Standards must be substantiated by data collected through chemical, physical and/or biological monitoring and identified on a listing that DEC prepares for EPA. In addition, DEC or members of the public have identified threats to a number of other river or stream reaches (Tables 4 and 5); however, available data on these waters are insufficient to conclusively demonstrate a violation of Water Quality Standards. The Agency will gather more data on these waters.

5.1 Strategies to Remediate Impaired Waters

Table 3. Impaired Waters in the White River Basin

Water Segment Name/Description	Town	Impairment(s)	Reasons for Surface Water Quality Problem(s)
Jones Pond Brook (about 3 miles)	Chelsea	Unknown	Absence of fish; unknown reason(s) 1995 data
Adams Brook (1.5 miles)	Randolph	Undefined	Sediment in runoff from agricultural land and roadway surfaces; elevated nutrient and pathogen levels likely
Skylight Pond	Ripton	PH	Extremely sensitive to acidification from rain on an episodic basis; local geologic conditions offer poor buffering capacity
North Pond	Chittenden	PH	Extremely sensitive to acidification from rain on an episodic basis; local geologic conditions offer poor buffering capacity
All surface waters	Entire basin	Mercury	Elevated levels of mercury in fish tissue likely

The following are strategies for remediation.

Jones Pond Brook

A Department of Fish and Wildlife fisheries biologist observed a total absence of fish during an electrofishing survey conducted in 1995. It appears that some event, either natural or otherwise, eliminated the fish population in 1995 and the population reestablished in subsequent years. The surveys by the FWD in 1996, 1997 and the DEC surveys in 2000 substantiate the absence of an impairment.

STRATEGY

- 34 Propose removing brook from the List of Impaired Waters in 2002.

Lead Agency/Organization: DEC

Potential Funding Sources: State programs

Time-frame: 2002 (If not removed from list then TMDL schedule for 2013)

Benchmark: Removal of Jones Pond Brook from the draft List of Impaired Waters in 2002

Adams Brook

STRATEGIES

- 35 In the Adams Brook watershed, work with willing landowners to identify appropriate agricultural assistance programs using a nine step planning process by NRCS (see Agricultural Runoff Control Programs in Appendix B and planning process in Appendix H).

Lead Agency/Organization: DAFM, NRCS

Partners: landowners

Potential Funding Sources: Federal programs including EPA

Time-frame: By 2006

Benchmark: Plan describing appropriate BMPs for specific areas

- 36 Implement practices identified by NRCS described above.

Lead Agency/Organization: DAFM, NRCS

Partners: DEC, landowners, USFWS, WRP

Potential Funding Sources: EPA, Partners for Wildlife. See Appendix B for other federal programs

Estimated Cost (based on work with landowners): \$40,000

Time-frame: By 2006

Benchmark: Implementation of BMPs

- 37 Determine appropriateness of a Watershed Improvement Permit from the Agency of Natural Resources for sections of Adams Brook based on impact from road and parking lot runoff.
- Lead Agency/Organization: DEC
 - Partners: landowners, VTrans, Town of Randolph
 - Potential Funding Sources: State and federal programs
 - Time-frame: By 2006
 - Benchmark: If appropriate, a Watershed Improvement Permit
- 38 Design and build stormwater treatment structures to handle runoff from impervious areas running into Adams Brook.
- Lead Agency/Organization: DEC
 - Partners: landowners, VTrans
 - Potential Funding Sources: State and federal programs
 - Estimated Cost: \$100,000
 - Time-frame: By 2006
 - Benchmark: Stormwater treatment structures that handle runoff in Adams Brook watershed
- 39 Evaluate remediation progress through periodic biological monitoring and field inspections.
- Lead Agency/Organization: DEC
 - Potential Funding Sources: State and federal programs
 - Time-frame: Ongoing
 - Benchmark: Removal of Adams Brook from the List of Impaired Waters

Skylight Pond

STRATEGIES

- 40 Conduct monitoring of pH levels in the pond.
- Lead Agency/Organization: DEC
 - Potential Funding Sources: State and federal programs
 - Time-frame: Ongoing (TMDL scheduled for 2005)
 - Benchmark: Periodic monitoring of pH levels in Skylight Pond

North Pond

The Lakes and Pond section re-sampled the pond in 2001, which confirmed the absence of an impairment.

STRATEGY

- 41 Propose removing pond from the List of Impaired Waters in 2002.
- Lead Agency/Organization: DEC
 - Potential Funding Sources: State and federal programs
 - Time-frame: By 2002
 - Benchmark: Removal of North Pond in the draft List of Impaired Waters in 2002.

All surface waters

Vermont currently has in effect a fish consumption advisory for all waters due to the presence of elevated mercury (Hg) levels in fish tissues, therefore, all surface waters in the state are listed as impaired.

STRATEGY

- 42 Determine the level of contamination and the associated risk to human health using fish tissue samples taken from the White River Basin.

Lead Agency/Organization: DEC

Partners: Lake associations

Potential Funding Sources: State and federal programs

Time-frame: By 2005

Benchmark: A report describing the concentration of mercury in fish in at least one lake in the White River Basin

5.2 Strategies for Waters in Need of Further Assessment

Table 4. Waters in need of further assessment because of observed impacts or threats

Water Segment Name/Description	Town	Possible Impairment(s)	Possible Problem Needing Assessment
lower White River (mouth upstream 5 miles)	Hartford	Pathogens	elevated bacteria levels in early 1990's - no recent sampling; unknown source(s)
lower White River	West Hartford	Metals	elevated levels of chromium & nickel in river sediments; unknown source(s)
mid-White River	Royalton	metals, organic enrichment	uncertainty regarding Bethel/Royalton landfill leachate entering river via groundwater
2 nd Branch, White River (16 miles)	Brookfield, Randolph, Bethel, Royalton	sediment, nutrients, pathogens	streambank erosion, agricultural runoff, loss of riparian vegetation
3 rd Branch, White River (11 miles)	Randolph, Bethel	sediment, nutrients, pathogens	stormwater & agricultural runoff, livestock access, streambank erosion, loss of riparian vegetation, morphological instability
Ayers Brook	Randolph	Metals	elevated levels of chromium & nickel in brook sediments; unknown source(s)
Ayers Brook	Brookfield, Braintree, Randolph	Sediment	morphological instability, loss of riparian vegetation
Spear Brook (0.2 miles)	Randolph	nutrients, sediment	agricultural runoff
upper-White River	Granville, Hancock, Rochester	Sediment	morphological instability
First Branch ²	Tunbridge, Chelsea	sediment, temperature	loss of riparian vegetation
Open Meadow Brook	Braintree and Brookfield	sediment, nutrients, pathogens	agricultural runoff, streambank erosion
Cold Brook	Braintree and Brookfield	sediment, nutrients, pathogens	agricultural runoff, streambank erosion

² Shaded entries in Table 4 are waters brought to the attention of DEC during the basin planning process

Table 4 lists all surface waters in the White River Basin known to be in need of further assessment. A comprehensive assessment of water quality in the basin has not been conducted. The following is a brief description of the current status of each water in Table 4, and strategies for remediation where appropriate.

Upper White River

STRATEGY

- 43 Design and schedule restoration of the remaining 4,000 feet of the upper White River in the Granville area.

Lead Agency/Organization: WRP

Partners: DEC, FWD, landowners, USFS, USFWS

Potential Funding Sources: State and federal programs

Time-frame: By 2005

Benchmark: Completion of channel restoration project along 4,000 feet of the upper White River.

Middle White River

STRATEGY

- 44 Continue monitoring water quality of groundwater as required by the landfill's post-closure certification.

Lead Agency/Organization: Town of Bethel

Potential Funding Sources: Town of Bethel

Time-frame: Twice a year until 2013

Benchmark: Reports to DEC twice a year

Lower White River

STRATEGY

- 45 Continue to assist the Partnership with their volunteer water quality monitoring program. See Section 4.3, which outlines strategies for assisting volunteer groups.

Spear Brook

STRATEGIES

- 46 Inspect Spear Brook to determine whether buffers have been reestablished.

Lead Agency/Organization: DEC

Partners:

Potential Funding Sources: State programs

Time-frame: By summer 2003

Benchmark: DEC report describing compliance with Act 250 permit with regard to buffers on Spear Brook

- 47 Monitor water quality in Spear Brook.

Lead Agency/Organization: DEC

Partners:

Potential Funding Sources: State and federal programs

Time-frame: By 2003

Benchmark: Biological sample taken and analyzed

Second Branch

See below for strategies.

Third Branch

STRATEGIES FOR THE SECOND AND THIRD BRANCH

48 According to the Vermont Department of Agriculture, Food, and Markets, the Second and Third Branch could benefit from many agricultural best management practices. The highest priority practices included waste storage facilities and systems; improved barnyards and heavy use area protection; roof runoff management; milk-house waste management; stream crossings, walkways and access lanes for animals; fencing along streams to exclude animals; riparian forested and herbaceous buffers along waterways; nutrient management planning; pasture management; surface water diversions; sediment basins; streambank stabilization; grade stabilization structures along the river channel; stream channel stabilization; streambank and shoreline protection; and wildlife habitat management.

Lead Agency/Organization: DAFM, NRCS

Partners: Landowners, USFWS

Potential Funding Sources: EPA and other state and federal programs

Time-frame: By 2005

Benchmark: Implementation of BMPs

49 Monitor water quality.

Lead Agency/Organization: DEC

Partners: WRP

Potential Funding Sources: State and federal programs

Time-frame: By 2003

Benchmark: Biological samples taken and analyzed

See Section 4.1 for additional strategies that address stream channel instability and streambank erosion.

Ayers Brook

Loss of riparian buffer is responsible for streambank and sedimentation along Ayers Brook in Brookfield, Braintree, and Randolph. Ayers Brook has a number of agricultural producers within its watershed.

STRATEGY

50 According to the Vermont Department of Agriculture, Food, and Markets, some BMPs to improve water quality on Ayers Brook include fencing along streams to exclude animals; riparian forest buffers and grass filter strips along waterways; stream crossings, walkways and access lanes for animals; streambank stabilization; grade stabilization structures along the river channel; stream channel stabilization; streambank and shoreline protection; waste storage facilities and systems; improved barnyards and heavy use area protection; roof runoff management; milk-house waste management; silage leachate management; nutrient management planning; pasture management; strip cropping; and surface water diversions.

Lead Agency/Organization: DAFM, NRCS

Partners: Landowners, USFWS
Potential Funding Sources: EPA and other state and federal programs
Time-frame: By 2005
Benchmark: Implementation of BMPs

See Section 4.1 for additional strategies that address stream channel instability and streambank erosion.

First Branch

Fisheries biologists from FWD state that the fisheries habitat is compromised due to a loss of riparian vegetation and streambank erosion. These conditions appear to be the result of surrounding land uses.

STRATEGIES

- 51 Monitor streams for biological conditions.
Lead Agency/Organization: DEC
Partners: FWD
Potential Funding Sources: State programs
Time-frame: By 2003
Benchmark: Biological sample taken and analyzed

See Section 4.1 for additional strategies that address stream channel instability and streambank erosion.

Cold Brook and Open Meadow Brook

STRATEGIES

- 52 Assess and monitor streams for biological health and integrity.
Lead Agency/Organization: DEC
Potential Funding Sources: State programs
Time-frame: By 2003
Benchmark: Biological sample taken and analyzed
- 53 According to the Vermont Department of Agriculture, Food and Markets, water quality in Cold Brook and Open Meadow Brook watershed could benefit from the implementation of the following agricultural best management practices: waste storage facilities and systems; improved barnyards and heavy use area protection; roof runoff management; milk-house waste management; nutrient management planning; pasture management; alternative watering facilities; stream crossings, walkways and access lanes for animals; fencing along streams to exclude animals; buffers along waterways; streambank stabilization; and surface water diversions.
Lead Agency/Organization: DAFM, NRCS
Partners:
Potential Funding Sources: EPA and other state and federal programs
Time-frame: By 2005
Benchmark: Implementation of BMPs

5.3 Strategies to Remediate Waters Altered by Regulated Flows

Table 5. Waters altered by regulated flows in the White River Basin

Water Segment Name/Description	Location (Town)	Flow Alteration
Silver Lake	Barnard	water level management (lake drawdown) may impair lake's aquatic habitat and/or biota
Pond Brook	Barnard	water level management of Silver Lake may impair brook's aquatic habitat and/or biota
Flint Brook ³	Roxbury	water withdrawal/diversion to fish hatchery may impair brook's aquatic habitat and/or biota

The following is a brief description of the current status of waters altered by regulated flows and strategies for remediation.

Silver Lake

STRATEGY

- 54 Determine the extent of near shore area actually exposed by such a draw-down to determine whether the draw-downs may be having a significant negative impact on aquatic biota and habitat in the lake, a situation that would warrant further study and possible corrective action.

Lead Agency/Organization: DEC

Partners: FWD, Silver Lake Association

Potential Funding Sources: State programs

Time-frame: By 2005

Benchmark: A report on the extent of area exposed by draw-downs and likelihood of significant negative impacts to biota

Pond Brook

STRATEGY

- 55 Determine whether replacement of the stop logs in the Silver Lake dam each spring is having a significant negative impact on aquatic biota and habitat in the brook, and if so, implement corrective action.

Lead Agency/Organization: DEC

Partners: FWD, Silver Lake Association

Potential Funding Sources: State programs

Time-frame: By 2005

Benchmark: A report on the effects of the management practices of Silver Lake dam on Pond Brook biota.

³ Shaded entries in Table 5 are waters brought to the attention of DEC during the White River Forums (December, 2000)

Flint Brook

STRATEGY

56 DEC and FWD will cooperatively characterize the hydrology of Flint Brook. Using the 2001 study as a starting point, the DEC and FWD will discuss the findings and make further decisions as to the adequacy of flows in Flint Brook or the need for additional data collection.

Lead Agency/Organization: DEC, FWD

Potential Funding Sources: DEC, FWD

Time-frame: By 2003

Benchmark: The analysis of data collected during the summer of 2001 and beyond and institution of mitigation as necessary

Chapter 6. Establishing Management Goals For Surface Waters

GOAL: ESTABLISH MANAGEMENT GOALS WITHIN THE BASIN THAT PROTECT BOTH THE BENEFICIAL USES AND VALUES OF SURFACE WATERS AND MEET THE NEEDS OF THE COMMUNITY

The protection or improvement of water quality and water-related uses can also occur by establishing management goals for particular bodies or stretches of water. The management goals describe the values and uses of the surface water that are to be protected or achieved through appropriate management. Management goals can be established through the following processes, which will be described in this chapter:

- Classification of waters and designation of water management types,
- Designation of waters as warm and cold water fisheries,
- Designation of existing uses of a water,
- Designation of waters as Outstanding Resource Waters.

The Agency of Natural Resources is responsible for designating existing uses and the Vermont Water Resources Board is responsible for all of the other designations. Once the Agency or the Board establishes a management goal, the Agency manages State lands and issues permits to achieve all management goals established for the associated surface water.

Before the Agency recommends, or the Board establishes management goals through a classification or designation of surface waters, input from the public on any proposal is required and considered. The public is also able to present a proposal for establishing management goals to the Agency or the Board to consider at any time.

When the public develops proposals regarding management goals, the community's increased awareness can lead to protection of uses and values by the community and individuals.

Proposing Outstanding Resource Waters designations under 10 V.S.A. §1424a or assisting the

Agency in designating existing uses require river inventories and studies that can be completed by a citizen group with little technical training. The local involvement in the collection of information about the river creates awareness and cooperation among a broad spectrum of environmental and economic interests. In addition, citizen groups can hold discussions within the community about the uses and values of surface waters with little technical background. This in turn may build consensus within the community on the value of their surface waters and improve land stewardship by individuals and the towns.

During basin planning, the Agency proposes designations for particular waters and could incorporate a proposal by a citizen group as part of a basin plan. In this basin plan, the Agency proposes the designation of new management types for Class B waters and the reclassification of one water from A(2) to B2 as shown on the map in Appendix C. In addition, the Agency proposes the designation of boating and swimming as existing uses in surface waters listed in Tables 7 and 8.

6.1 Typing and Classification

Since the 1960s, Vermont has had a classification system for waters that establishes management goals. These goals describe the values and uses of surface waters that are to be protected or restored through appropriate management. The system includes Classes A and B. Class A waters are divided into two subclasses: A(1) and A(2). As part of the Vermont Water Quality Standards revisions in 2000, Class B waters must be divided into Water Management Type 1 (B1), Type 2 (B2) and Type 3 (B3) as part of the basin planning process.

The typing system for Class B waters is for the most part a continuum of acceptable conditions for beneficial uses including aquatic habitat and recreational opportunities. A simplification of the B1, B2 and B3 designations would be to say that the spectrum from B3 to B2 to B1 is described as representing “good,” “better” and “best” aquatic conditions. All Class B waters must still support the designated uses described in the Water Quality Standards for Class B waters, which includes suitability for boating, swimming, and drinking with treatment.

The present classification of waters in the White River Basin is as follows:

- A(1) – By Vermont statute, all waters above 2,500 feet in elevation. The management objective for A(1) waters is to maintain them in their natural condition.
- A(2) - Waters used as public water supplies. The management objectives for A(2) waters are similar to those of A(1) except that a moderate change to aquatic habitat and biota is permitted to allow for the water level fluctuations of water supply reservoirs. In the White River Basin, Class A(2) waters include Lake Casper and Lake John (Village of South Royalton and Fire District #1 water supply) and two miles of Farnsworth Brook (Village of East Braintree water supply).
- Class B - All remaining waters

In addition to their present classification of B, the river reaches that receive water from wastewater treatment facilities in Bethel, Chelsea, Randolph, and Royalton have one-mile long Waste Management Zones downstream of each facility's outfall. This zone is designated to accept the discharge of properly treated wastes that prior to treatment contained organisms pathogenic to human beings. Throughout the zone, numeric water quality criteria for Class B waters must be achieved, but increased health risks exist.

Proposal for Typing and Classification of Waterbodies in the White River Basin

In this basin plan, the Agency proposes water management types for all Class B waters. During the five-year interval between basin plans, this proposal should enhance the community's understanding of the classification system. An understanding of the system will allow interested communities to develop their own proposals for re-typing surface waters. When members of a community have developed a proposal, they may either decide to present their proposal directly to the Water Resources Board at any time or attach it to the Agency's proposal during the next basin planning process.

The Agency of Natural Resources proposal for typing Class B waters in the White River Basin considers existing water quality and attempts to be consistent with each community's expectations for land use. To this end, the effect of present and desired future land use on water quality was considered (see Appendix C for maps illustrating the proposed typing and classification and Appendix D for a list of proposed B1 waters). The Agency used town plans to identify present and desired land uses. The Agency also met with interested towns to ask them to review the proposal for consistency with the town plan.

The proposal designates most Class B waters as B2, which is the middle type of Class B waters. Proposed waters for B1 are located predominantly within mountainous terrain (but below 2500 feet), and within or adjacent to publicly owned lands. All Class B waters that are presently managed for a moderate change in flows or stream habitat because of a dam presence, water level fluctuation, or water withdrawal, are proposed to be designated B3, which allows for flow alterations. Table 6 further describes the proposal for waters of the White River Basin. For more information on the classification system, see Appendix I and the Vermont Water Quality Standards.

Other Waters for Consideration of B1 Designation

Quantitative data compiled by the Vermont Department of Fish and Wildlife identifies streams within the Basin that support quality wild trout fisheries resources. Some but not all of these streams are included in the proposal contained in this plan for B1 designation. The Agency encourages municipalities and organizations to consider these data for possible support of a locally driven proposal for B1 designation of such streams. Although the presence of high quality wild trout populations is not alone enough to indicate that a stream has all characteristics of B1, these populations may be indicative of good water quality, and other criteria characteristic of B1. The map entitled High Quality Fish Habitat (Appendix C) illustrate these waters.

Achieving Management Goals Through Appropriate Land Use

The Agency does not know exactly how waters respond to adjacent agricultural, tree harvesting, and development land uses. In addition, it is difficult to precisely predict the cumulative effects of land use on waters as one moves downstream. It is presumed that the use of good land stewardship will preserve the health of surface waters. The use of Accepted Agricultural Practices (AAPs) and Acceptable Management Practices (AMPs) for silvicultural activities creates a presumption of compliance with the Vermont Water Quality Standards. Good riparian buffers with woody vegetation that bind the soil protect the land and the water and go a long way to creating good conditions in streams and rivers. Implementation of the new stormwater rules adopted by the Agency for all projects received after June 1, 2002 should also help ensure adequate treatment of urban runoff before it reaches surface waters.

Table 6. Proposed classification and water management typing of surface waters in the White River Basin

Waterbody	Present Class or Type	Proposed Class or Type	Rationale
Specific waters in mountainous areas (see Appendix D)	A1 above 2,500, B below 2,500 feet elevation	A1- waters unchanged B1 - Certain waters below 2,500 feet in mountainous areas.	B1 waters have minimal changes from reference conditions ⁴ for aquatic macroinvertebrates and fish assemblages. This is a probable condition in mountainous regions and a widely held goal for waters in the Green Mountains and on State lands.
Silver Lake (Barnard)	B	B3 - Changes in the aquatic habitat shall be limited to moderate difference from the reference condition consistent with the full support of all aquatic biota and wildlife uses. When such habitat changes are the result of hydrologic modification or water level fluctuation compliance may be determined on the basis of aquatic habitat studies.	Silver Lake is drawn down 18 inches annually with a probable moderate change to the aquatic biota. Water Resources Board issued order in 1968. If this draw-down is not in the public interest a petition should be filed with the Water Resources Board.
Pond Brook below Silver Lake to Locust Creek (Barnard)	B	B3 - Changes in the aquatic habitat shall be limited to moderate difference from the reference condition consistent with the full support of all aquatic biota and wildlife uses. When such habitat changes are the result of hydrologic modification or water level fluctuation compliance may be determined on the basis of aquatic habitat studies.	At a minimum, necessary minimum flows should be maintained during refilling of Silver Lake. Even such minimum flows may result in a moderate difference in the aquatic biota from reference conditions in Pond Brook. Further investigation of minimum and maximum flows, community goals, and condition of Pond Brook are indicated.
Third Branch of White River from Bethel Mills Dam to tail race (Bethel)	B	B3 - Changes in the aquatic habitat shall be limited to moderate difference from the reference condition consistent with the full support of all aquatic biota and wildlife uses. When such habitat changes are the result of hydrologic modification or water level fluctuation compliance may be determined on the basis of aquatic habitat studies.	Moderate difference in habitat from reference conditions (more than minor) probably occurs in impoundment, falls and by-passed reach due to the operation of the impoundment.

⁴Reference condition is the range of chemical, physical, and biological characteristics of waters minimally affected by human influences.

Waterbody	Present Class or Type	Proposed Class or Type	Rationale
Flint Brook from water intake to Roxbury State Fish Hatchery to Third Branch of White River (Roxbury)	B	B3 - Changes in the aquatic habitat shall be limited to moderate difference from the reference condition consistent with the full support of all aquatic biota and wildlife uses. When such habitat changes are the result of hydrologic modification or water level fluctuation compliance may be determined on the basis of aquatic habitat studies.	Withdrawal from Flint Brook during low flows may have a greater than minor influence from reference conditions on Flint Brook aquatic habitat. Necessary required minimum flows should be established and maintained.
Tunbridge Mill Corporation project (to be developed) from dam to tail race.	B	B3 - Changes in the aquatic habitat shall be limited to moderate difference from the reference condition consistent with the full support of all aquatic biota and wildlife uses. When such habitat changes are the result of hydrologic modification or water level fluctuation compliance may be determined on the basis of aquatic habitat studies.	There will be a moderate difference in habitat from reference conditions (more than minor) in impoundment, falls and by-passed reach due to the operation of the impoundment.
Blaisdell Brook, from the confluence of flows from Spring A (as named by Vermont Pure Springs, Inc.) to the confluence with the Second Branch. (Randolph)	B	B3 - Changes in the aquatic habitat shall be limited to moderate difference from the reference condition consistent with the full support of all aquatic biota and wildlife uses. When such habitat changes are the result of hydrologic modification or water level fluctuation compliance may be determined on the basis of aquatic habitat studies.	Vermont Pure Springs, Inc. is permitted to remove water from a spring that contributes water to Blaisdell Brook. The reduction in flows may result in a more than minor difference from reference condition to the Brook's aquatic habitat.
Lake Casper (South Royalton)	A2	B2 - Changes in the aquatic habitat shall be limited to minor differences from the reference condition consistent with the full support of all aquatic biota and wildlife use.	Pond no longer used for municipal water supply.

6.2 Warm Water and Cold Water Designations

In addition to the foregoing classifications and designations, two ponds, Lamson Pond in Brookfield and Silver Lake in Barnard are designated for management as Warm Water Habitat by the Vermont Water Quality Standards which specifies a lower minimum dissolved oxygen concentration than waters in the remainder of the basin which are Cold Water Habitat.

6.3 Existing Uses

All surface waters in Vermont are managed to support uses valued by the public including swimming, boating, and fishing. The degree of protection afforded to these uses is based on the water's management type or class as described in Section 6.1 of this plan. In particular surface waters, however, some uses are protected absolutely if the Agency of Natural Resources identifies them as existing uses under the anti-degradation policy of the Vermont Water Quality Standards (VWQS).

The Agency identifies existing uses of particular waters either during the basin planning process or on a case-by-case basis during application reviews for state or federal permits. The following factors are considered by the Agency when identifying existing uses (see VWQS Section 1-03 B):

- Aquatic biota and wildlife that utilize or are present in the waters;
- Habitat that support existing aquatic biota, wildlife or plant life;
- The use of the waters for recreation or fishing;
- The use of the water for water supply, or commercial activity that depends directly on the preservation of an existing high level of water quality; and
- With regard to the factors considered under the first two bullets above, evidence of the use's ecological significance in the functioning of the ecosystem or evidence of the use's rarity.

During the planning process in the White River Basin, the Department of Environmental Conservation has collected sufficient information to identify the existing uses listed in Tables 7 and 8. The lists are not meant to be comprehensive. The public is encouraged to nominate other existing uses, which may be included in the basin plan or catalogued for a more thorough investigation when an application is submitted for an activity that might adversely affect the use.

Boating

Table 7 lists white water and flat water boating as existing uses in several specific segments of the White River and the Hancock Branch. The White River is noted for its long uninterrupted flow from its headwaters to its mouth. No other river in Vermont has such extensive free flowing waters. These segments were identified in the *Vermont's Whitewater Rivers* (DEC, 1989), a comprehensive inventory of Vermont whitewater streams that includes a rating of the importance of each run. Information regarding the use of these rivers for boating was also obtained from the *AMC River Guide* (AMC, 1989) and information from boaters.

Table 7. Boating as an existing use of specific waters within the White River Basin

Location	Documentation	Rating (DEC, 1989)	Characteristics that support use	Put in	Take out
Hancock Branch (3 miles)	<i>Vermont's White Water Rivers</i>	Important	No dams, good water quality, Class II-III rapids	Road to Texas Falls	Not specified
White River Mainstem Granville to Stockbridge (14 miles)	<i>AMC River Guide</i>	Not rated	No dams, good water quality, Class II rapids	1 mile north of Rt. 100/125 junction in Hancock	Rt. 14 or Rt. 100
White River Mainstem Stockbridge to Bethel (11 miles)	<i>AMC River Guide, Vermont's White Water Rivers</i>	Highly Important	No dams, good water quality, quick water through Class II rapids	Rt. 14 or Rt. 100	Rt. 107 Bridge

Location	Documentation	Rating (DEC, 1989)	Characteristics that support use	Put in	Take out
White River Mainstem Bethel to Connecticut River (25 miles)	<i>Vermont's White Water Rivers</i>	Highly Important	No dams, good water quality, quick water though Class II rapids	Rt. 107 Bridge	Bridges at White River Junction
First Branch Chelsea to Tunbridge (9 miles)	<i>AMC River Guide, Vermont's White Water Rivers</i>	Important	Good water quality, Class II-III rapids	Lower Rt. 110 bridge from side road with permission	Before sawmill dam when river is near Rt. 110

The Department has considered the use of the waters in Table 7 for boating and has found boating to be an existing use based on documentation of recreational value (WQS Section 1-03 B 1a-e).

Swimming

Table 8 lists several regionally significant swimming access areas. These swimming areas were included in an inventory by the White River Partnership of access points to the White River. The Water Quality Standards aim to provide ambient water quality that protects swimming in the entire White River Basin. The public's recognition of these sites requires that they receive special protection. The Department has given due consideration to the sites listed in Table 8 under the Water Quality Standards (1-03 B 1 a-e) and finds that use of the river for swimming at these sites is far more than incidental. Swimming at these sites constitutes existing uses because the public recognizes them as having high recreational value.

Table 8. Swimming as an existing use of specific waters within the White River Basin

Swimming Sites Name	Town	Location
Hancock Overlook, White River	Hancock	On Rt. 100, 910 ft. north of Rt. 125
Lions Club Park, White River	Rochester	Intersection of Rt. 100 and Beans Bridge Rd.
U. S. Forest Service Peavine Park, White River	Stockbridge	On Pit Rd., 1040 ft. north of Rt. 100
Silver Lake State Park, Silver Lake	Barnard	East side of Hill Rd.
Clifford Park, White River	West Hartford	Off Westfield Drive (located off Quechee West Hartford Rd.)
Lyman Point, White River	Hartford	Intersection of Prospect and Maple St.

6.4 Outstanding Resource Waters

In 1987, the Vermont Legislature passed Act 67, "An Act Relating to Establishing a Comprehensive State Rivers Policy." A part of the law provides protection to rivers and streams

that have “exceptional natural, cultural, recreational or scenic values” through the designation of Outstanding Resource Waters (ORW).

The Vermont Water Resources Board has the authority to designate a water as an Outstanding Resource Water (ORW), and can do so either on its own motion, or in response to a petition by State agencies, citizens, or town governments (see 10 V.S.A. §1424a.(a)-(b) in Appendix J). In making its decision, the Board may consider characteristics listed in 10 V.S.A. §1424a.(d)1-14 (see Appendix J). When designating a water as an ORW, the Board bases its decision on one or more of the following values: exceptional natural, cultural, recreational or scenic.

The values of the water that merited the ORW designation are then protected by the Agency during review of permit applications. If the ORW is found to be valuable for water quality, the existing quality “...shall, at a minimum, be protected and maintained” (10 V.S.A. §1424a.d.1) (Section 1-03(D) of the Vermont Water Quality Standards). It is the Agency interpretation that the quality of waters designated as an ORW for *water quality* may not be reduced at all below current conditions. This could have significant implications for growth within the watershed. The standard for review for other values is that regulated activity cannot adversely affect the value.

State statute also reduces the amount of gravel that can be removed from an ORW by a landowner from 50 cubic yards to 10 cubic yards per year (the Agency must be notified 72 hours before any gravel is removed).

Many surface waters in the White River Basin have characteristics that would support an ORW petition. In addition, support from within and outside the basin is present for designating at least the mainstem an ORW.

The maps in Appendix C (High Quality Fish Habitat) show the area of the mainstem that has high recreational use for fishing as noted by the Department of Fish and Wildlife. These waters also have high quality recreational opportunities for swimming and boating and may be considered by municipalities and organizations in a petition for ORW designation.

A report by the National Wildlife Federation supports a designation of the White River as an ORW for *water quality and adequate streamflow* (lack of a dam). The report, “The White River Valuation Study: A report on the Value of Maintaining Natural River Flows on Vermont’s White River.” (National Wildlife Federation, 1998) also provides information that could be used in preparing a petition to the Board.

Finally, in August 2001, the Vermont Natural Resource Council (VNRC) submitted 65 signatures of people from the White River Basin who support designating the mainstem as an ORW for *water quality as well as recreation*.

The limitation on the amount of gravel that a landowner can remove may be the strongest point of opposition in the basin to an ORW designation. During the basin planning process, the communities in the basin have expressed support for using graveling as a river management tool as well as a source of material for town roads. Although state regulations already limit the extent of these activities without the ORW designation, further limitations may be opposed.

If limitations on the removal of gravel can be accepted by the community in the basin, the ORW petition would be an effective way for a community to develop increased awareness of local rivers and to protect them based on the community's values. To gain the designation, the petition must show that a river has one or more of the fourteen characteristics listed in 10 V.S.A. §1424a.d.1-14 (see Appendix J). The characteristics described are not technical in nature and a community has the choice to come to agreement on any one or more of the fourteen. Local river interest groups and towns have worked with the Agency to develop successful petitions to designate the following four rivers ORWs: Great Falls of the Ompompanoosuc River, the lower Poultney River, the North Branch of Ball Mountain Brook – Pike's Falls, and the Battenkill.

6.5 Recommendations for Further Action

OBJECTIVE
Encourage community involvement in identifying existing uses, Outstanding Resource Waters and proposing new typing and classification for waters in their community

STRATEGIES

- 57 Provide technical assistance and information to community-led efforts to develop inventories of natural communities, recreational opportunities, other beneficial values and uses of surface waters.
 Lead Agency/Organization: DEC
 Partners: Communities, RPC
 Potential Funding Source: State and federal programs
 Time-frame: Ongoing
 Benchmark: Participation of technical staff in community-led effort to develop resource inventories
- 58 Provide technical assistance and information to community-led efforts to petition for revised water quality management types or classifications. Assistance shall include arranging for input from town governments.
 Lead Agency/Organization: DEC
 Partners: Town government, RPC
 Potential Funding Source: state and federal programs
 Time-frame: Ongoing
 Benchmark: Participation of technical staff in community-led effort to revise water quality management types or classification
- 59 Provide technical assistance and information to community-led efforts to develop a proposal for Outstanding Resource Waters designation of any surface water in the White River Basin. Assistance shall include arranging for review by town governments and regional planning commissions for possible effects on landuse.
 Lead Agency/Organization: DEC, Watershed Coordinator
 Partners: RPC
 Potential Funding Source: state and federal programs
 Time-frame: Ongoing
 Benchmark: Participation of technical staff in community-led efforts to petition for an ORW designation of a surface water