

Essex No. 19 Hydroelectric Project
Water Quality Certification
Public Responsiveness Summary

The Department of Environmental Conservation conducted a public hearing on October 7, 1993 at the Essex Junction Village offices on Lincoln Street in Essex Junction for the purpose of receiving oral testimony or written statements and data bearing on the issuance of a water quality certification to Green Mountain Power Corporation (GMP or the applicant) for the continued operation of the Essex No. 19 Hydroelectric Project located on the Winooski River in the towns of Williston and Essex. In addition to the hearing, written comments were accepted through the end of business day on October 15, 1993.

A total of twelve persons, representing themselves or organizations, presented oral testimony at the hearing. Written testimony was received from twelve persons and organizations.

Following is a summary response to the comments received; many of the comments are paraphrased. The commenters are cited in parentheses following the paraphrased comment. The full text of these comments is available for inspection or copying at the Department's office of the Water Quality Division. The Department of Fish and Wildlife assisted in this response through a memorandum dated November 3, 1993.

1. WATER QUALITY STANDARDS

a. Hydroelectric generation as an existing use

Comment: The Vermont Natural Resources Council (VNRC) comments that Essex No. 19 should not be considered an existing use qualified for protection in accordance with Section 1-03(B) of the anti-degradation provisions of the Standards. VNRC argues that Essex No. 19 is not a commercial activity that depends directly on the preservation of an existing level of water quality (reference Section 1-03(B)(1)(d)).

Comment: The applicant believes that the project, as well as downstream hydroelectric facilities, should be provided with the special protection afforded existing uses under Section 1-03(B).

Response: The Department must consider whether or not the activity proposed for certification, which is Essex No. 19 in this case, would degrade any existing uses, whether or not those uses are designated uses. Candidate existing uses include commercial activities that depend directly on the preservation of an existing level of water quality (Section 1-03(B)(1)). The Department does not believe that the Board intended that hydropower projects, which generally tend to degrade water quality, merit protection as existing uses.

The Standards specifically requires that determinations of what constitutes an existing use shall be made by the Secretary on a case-by-case basis. The operation of hydropower projects, which generally tend to degrade water quality behind the dam, in the bypass, and downstream of the project, is not dependent on, and is unaffected by the river's level of water quality.

Use of the water body to receive or transport discharges of waste is explicitly not considered to be an existing use for the purposes of the anti-degradation policy. (Standards, Section 1-03(B)(1)(d)) Similarly, the Standards are not intended to consider hydropower facilities as an existing use.

Even were hydroelectric facilities to qualify as existing uses, state statute (10 V.S.A. § 1250) and the Standards (Section 1-03(A)) provide statements indicating that Vermont clearly intends to preferentially restore, protect and maintain beneficial uses and values in a manner consistent with the classification of the water:

The Secretary shall manage the waters of the State in accordance with the Water Quality Standards to protect, maintain, and improve water quality in such a manner that the beneficial values and uses associated with their classification are attained. All waters, except mixing zones, shall be managed so that, at a minimum, a level of water quality compatible with all beneficial values and uses associated with the assigned classification are obtained and maintained. (Standards, Section 1-03(A))

b. The Public Trust Doctrine

Comment: The applicant states that it has been made clear that the spillage for aesthetics is not in the best interests of the public trust.

Comment: A determination that the Essex No. 19 project is an existing use under the relevant sections of the anti-degradation standards could be violative of the public trust doctrine. (VNRC)

☛ Response: The river is a public trust resource of the state. Issues related to the appropriateness of the Department's proposed decision in the context of the public trust doctrine are beyond the scope of this responsiveness summary.

c. Water Chemistry

Comment: Table 3 of the draft certification shows that the proposed operating mode provides more than sufficient dissolved oxygen levels to meet standards without the special spillage requirement contained in Condition A of the draft certification.

Vermont's water quality standards list the highest year round dissolved oxygen criteria as being for salmonid spawning and nursery areas in cold water streams. Although neither of these descriptions apply to the Lower Winooski River, the dissolved oxygen concentrations and saturation levels at Essex and Gorge plants are at or above the 7 mg/l (milligram per liter) or 75% saturation criteria for coldwater salmonid spawning and nursery areas under both the applicant and the Agency's proposals. Under both proposals, the optimum dissolved oxygen concentrations for the dominant game species, smallmouth bass, are greater than or equal to 6.0 mg/l. The literature indicates that 7-day mean minimum dissolved oxygen concentrations as low as 5.0 mg/l result in slight to no production impairment for fish such as rainbow trout and smallmouth bass.

Based on the literature and the fact that the dissolved oxygen concentrations calculated by the Agency are based on river flows, river temperatures, and wastewater treatment plant loadings that rarely, if ever occur, it can be concluded that both proposals allow for the Class B value of "high quality habitat for aquatic biota, fish and wildlife" to be achieved based on dissolved oxygen concentrations. (GMP)

☛ Response: The Essex No. 19 dam is at the upper end of a water quality limited segment of the Winooski River, a segment that terminates at the river's mouth. Under design wastewater loadings and critical flow, temperature, and algal respiration conditions, the river reaches critical dissolved oxygen levels near the mouth. However, even though the reach from Essex No. 19 to Gorge No. 18 dams does not approach minimum standards for dissolved oxygen (5 mg/l and 60% saturation), the river's aquatic community is benefitted

physiologically (reduced stress, improved growth rates, etc.) by the additional dissolved oxygen entrained through dam spillage. It is clear from Table 3 that significant increases in dissolved oxygen concentrations occur when the station is off line during low flow periods. This is a characteristic of the applicant's project as proposed for relicensing--full spillage at any time the inflow is less than 270 cfs. The value to stream community of spilling a portion of the flow when inflow exceeds 270 cfs may not be significant, and no documentation, such as research findings, has been provided to support a conclusion that continuation of spillage of more than 50 cfs when flows exceed 270 cfs is merited. The certification has been revised to reflect this.

Comment: Hydroelectric facilities should not be asked to pass flows to improve dissolved oxygen and subsidize wastewater treatment plant operations.

☛ **Response:** Both wastewater treatment plants and hydroelectric facilities detrimentally affect the concentration of dissolved oxygen in the river and both must ameliorate their impacts on the river.

d. General

Comment: The use of the river which has been granted to the applicant is conditioned upon fulfilling obligations to the people of Vermont, among them maintaining adequate water quality and aesthetics. (Krassner)

☛ **Response:** The Department agrees that compliance with standards and compatibility with designated and existing uses must be demonstrated for certification.

2. DOWNSTREAM FLOWS

a. Fisheries management

Comment: Both the applicant's 340 cfs and the Agency's 500 cfs proposal for rainbow trout are enhancements to a new recreational use. While recreation is a designated use, a rainbow trout fishery would be a new and experimental recreation use that would have a detrimental impact on an existing hydropower use. (GMP)

Comment: The differences in minimum flow proposals should be viewed in the context that rainbow trout are currently not actively managed for in this reach; future rainbow trout management will be somewhat experimental; the expected temperature regime will be less than optimum for rainbow trout; and there is no significant rainbow spawning habitat in this reach.

Comment: Creation of a spring put-and-take fishery for rainbow trout should be considered in place of attempting to support a put-grow-and-take fishery.

Comment: How much is actually known about temperature refuge availability in the affected reach? (GMP)

☛ **Response:** Outside of Lake Champlain, the northwestern quarter of the state offers fewer stream trout fishing opportunities than much of the rest of the state. A put-and-take fishery would not provide the same level of quality recreation as a put-grow-and-take fishery. The Winooski River is large, fertile and capable of growing large trout. There is a high demand for large trout and for trout that are either wild or have been in the stream long enough take on some of the attributes of wild fish. Put-grow-and-take management would provide these additional benefits.

Trout are currently stocked above the Essex No. 19 impoundment, and some of the stocked fish survive over the summer and the winter. GMP has indicated that there is no difference in temperatures up and downstream of the project. If that is the case, it can be concluded that the rainbow trout management plan has every likelihood of success. Furthermore, anglers have reported catching large rainbow trout in the reach below the Essex No. 19 dam. Rainbow trout apparently already reside in this reach without the benefit of a stocking program.

Although the water temperature regime is not ideal for trout, less-than-optimum temperature conditions are the case for most of Vermont's trout streams. This does not preclude trout survival or management. No record of locations of thermal refugia within the reach has been provided to the Department.

Comment: A minimum flow of 340 cfs provides in excess of 88% of the maximum habitat possible for all life stages of smallmouth bass and fallfish except for juvenile fallfish. The minimum flow of 340 cfs provides 75% of the maximum habitat for juvenile fallfish. Habitat values of this magnitude constitute high quality habitat. (GMP)

☛ Response: A minimum flow of 340 cfs does not provide high quality habitat for the aquatic species the river is being managed to support. Based on the IFIM results, a minimum flow of 500 cfs, coupled with peaking constraints, is considerably better for macroinvertebrates and bass fry (a detailed discussion follows). It also provides better habitat for the juvenile and adult stages of fallfish and smallmouth bass.

Comment: Rainbow trout and smallmouth bass are not indigenous to the project area.

☛ Response: The project area is within the range of the smallmouth bass, and there is no reason to believe it is not indigenous. Historically, salmonids such as brook trout and Atlantic salmon probably occupied the area; although rainbow trout are not indigenous, the Standards do not discriminate between indigenous species and introduced species.

Comment: There is uncertainty about what level of macroinvertebrate production is needed to support the optimum level of fish production. One school of thought is that if a minimum flow is established to take care of fish populations, macroinvertebrates will be taken care of. (GMP)

☛ Response: Macroinvertebrates are an important part of the food chain; however, under the Standards, macroinvertebrates are protected under their own right, not just for their value as fish food. The flow management restrictions contained in the draft certification provide better habitat conditions for the aquatic community as a whole.

Comment: The Department should be required to reassess the sturgeon restoration program every two years. This review should include a formal finding by the Department as to the viability of the restoration program. (GMP)

☛ Response: Fish culture efforts with lake sturgeon in the midwest indicate that it is a viable program. After one season of growth, sturgeon reach sufficient size to limit predation, resulting in very high survival. The primary goal of a restoration effort would be to re-establish a self-sustaining population. Since females do not mature until about age 25, this effort is a long-term one. The draft of the report, Lake Champlain Lake Sturgeon Restoration Study, includes recommendations that call for assessments every 10 years. A biannual assessment would be inconsistent with the time frame and nature of this program.

b. Peak flow control

Comment: VNRC recommends a maximum generation flow of 1000 cfs from June 16 to September 30 unless exceeded by inflow. Even this peaking flow, it is argued, will adversely affect immobile species and life stages of certain biota, such as macroinvertebrates and smallmouth bass black fry.

Comment: The studies and resulting data for macroinvertebrate habitat clearly demonstrate that there is no need for a year-round flow constraints. The macroinvertebrate habitat at the design flow of 2000 cfs is equivalent to 85% or greater of the maximum habitat available for all macroinvertebrates and greater than 95% for many. For the majority of macroinvertebrates analyzed, the suitable habitat available for low flows is in the same stream location for a flow of 2000 cfs. Provision for 85% of the maximum habitat meets the Class B designated use of high quality habitat. (GMP)

Response: The bulk of scientific literature indicates that peaking is problematic. A review article by Cushman¹ describes effects that have been documented, including changes in species composition, reduced diversity, abundance, and growth, increased drift in response to peak flows, and reduced river productivity. Additional references are listed. Bovee² stressed the importance of not overlooking effects of fluctuating flows on a river's food base and used a dual flow analysis to address the issue at a specific project.

Hydropower projects vary considerably in terms of the difference in magnitude between the minimum and generation flows, the frequency and duration of the store-and-release cycle, and the nature of the affected river channel configuration and biotic community. As a result, site-specific information must be brought to bear in an impact analysis.

Department of Environmental Conservation Population Study

The Department sampled invertebrate populations in the vicinity of the IFIM study Reach #1 during the summers of 1986, 1987 and 1991. Only channel areas that were wetted on a continual basis were sampled. Other similar surveys have shown that streambed areas that are dewatered on a frequent basis (such as on a daily basis, as is typical of this project's operation) are drastically affected and cannot be considered to contribute to macroinvertebrate productivity. The surveys of the continually wetted channel showed a reasonable assemblage of invertebrates. Ephemeroptera, Plecoptera, and Trichoptera species (mayflies, stone flies, and caddis flies) dominated over chironomids (midges). While some species were less abundant than might be expected (such as the swimmer type of macroinvertebrate), the sampling did not indicate that a major problem existed.

IFIM Wetted Area Analysis

The IFIM study provided data on the total wetted area that exists at various flows. In reach #1, total area is reduced by about 11% when flows are reduced from the maximum on-peak release (2000 cfs) to the minimum flow proposed by GMP. The increase in minimum flows to 500 cfs, with peaking controls during the summer, reduces this change in wetted area. With an adequate minimum flow, the potential impact on macroinvertebrate results more from changes in habitat quality than from dewatering.

¹Cushman, R.M. 1985. Review of ecological effects of rapidly varying flows downstream from hydroelectric facilities. *North American Journal of Fisheries Management* 5:330-339.

²Bovee, K.D. 1985. Evaluation of the effects of hydropowering on aquatic macroinvertebrates using PHABSIM. Pages 236-241 in *Proceedings of the Symposium on Small Hydropower and Fisheries, Aurora, Colorado.*

IFIM Steady State Analysis

The applicant has criticized the Agency's use of binary habitat suitability criteria to assess impacts on macroinvertebrates. As referenced in the draft certification, GMP had recently developed habitat/flow curves for six specific macroinvertebrate genera using habitat suitability criteria from a Niagara Mohawk study. Results relative to the minimum flow issue are summarized below. (Habitat quantities have been estimated from the GMP graphs.)

Target Organism	Maximum Weighted Useable Area (s.f./1000 ft.)	Weighted Useable Area as a % of Maximum	
		340 cfs	500 cfs
Acroneuria	105,000	63	78
Cheumatopsyche	137,000	66	80
Baetis	96,000	70	83
Stenonema	134,000	71	85

These data show that 19% to 24% more habitat is available at 500 cfs than at 340 cfs.

IFIM Dual Flow Analysis

Subsequent to the public notice on the draft certification, Fish and Wildlife conducted a dual flow analysis using the Niagara Mohawk criteria for *Acroneuria* (stone fly), which was selected as a relatively sensitive organism, as opposed to the caddis genera which tend to be more tolerant of stressful conditions; however, the habitat/flow relationship is similar for all seven target organisms. It can be concluded from this new analysis that the use of binary criteria overstated the loss of habitat due to peaking effects. However, the case remains that much less effective habitat exists with a minimum flow of 340 cfs as opposed to 500 cfs, regardless of the generation flow. The results are provided in the following table. The habitat loss is the percentage habitat is reduced by hydro peaking from what would have been available under natural flows.

Percent Habitat Loss for *Acroneuria* due to Peaking

Natural Flow (cfs)	Habitat Quantity (sf/1000 ft)	Peaking Condition (cfs)	Habitat Loss (%)	Peaking Condition (cfs)	Habitat Loss (%)
500	79,700	340 to 1000	30	Not allowed	0
		340 to 1500	40	Not allowed	0
		340 to 2000	47	Not allowed	0
800	93,600	340 to 1000	41	500 to 1000	22
		340 to 1500	49	500 to 1500	32
		340 to 2000	55	500 to 2000	39
1200	100,300	340 to 1500	52	500 to 1500	36
		340 to 2000	58	500 to 2000	43
1500	101,600	340 to 2000	58	500 to 2000	44

The *Acroneuria* analysis indicates that peaking has a substantial effect on habitat as measured for Reach #1 and that raising the minimum flow and limiting the total fluctuation (minimum to peak) significantly reduces the impact. For example, under a natural flow regime of 800 cfs, 93,600 square feet of habitat per 1000 feet of stream length is available. Cycling as proposed by GMP would result in an effective habitat quantity of 42,500 square feet per 1000 feet, or a loss of more than half of the habitat. Raising the minimum flow to 500 cfs and limiting the fluctuation to 500 cfs retains 72,800 square feet of habitat per 1000 feet, reducing the loss to 22% (as opposed to 55%).

Although total habitat as measured in weighted useable area units (IFIM based) is substantially reduced by peaking, the population work done by the Department suggests that the actual impacts are not as severe. This is probably in large part due to the fact that locational shifting of habitat is limited; in the model, individual cell quality changes, but the cells remain useable, and the insects are not forced to move (if physically possible) to find suitable habitat. Aquatic organisms have some level of tolerance for changing flow conditions that the IFIM-based analysis does not reflect. However, it is likely that macroinvertebrate productivity would improve under a more controlled flow regime, and such controls are also necessary for fish protection. More effective habitat is provided with a minimum flow of 500 cfs and a fluctuation limit of 500 cfs, than is available at a minimum flow of 340 cfs, without peaking.

Comment: Habitat for black fry and young-of-the-year life stages of smallmouth bass are maximized at a flow of 150 cfs. In order to achieve 80 percent of the maximum of this habitat, flows would have to be less than 700 cfs. Irrespective of peaking operations, flows greater than 700 cfs are exceeded a high percentage of the time during the month of June when smallmouth black fry would be in the stream. The draft certification states that smallmouth bass are abundant in this section of this stream. One would therefore conclude that under existing flow conditions, the black fry are thriving. Perhaps a criteria not tied to the percentages of maximum habitat should be utilized for these lifestages. (GMP)

It needs to be decided if there are sufficient smallmouth bass nursery areas in other parts of the affected segment that were studied within the IFIM study to provide high quality aquatic habitat. Apparent habitat constraints

for smallmouth bass black fry and young of the year need to be reconciled with Finding 80, which states that smallmouth bass are abundant. (GMP)

☛ **Response:** Relative to Finding 80 of the draft certification, the Department of Fish and Wildlife conducted electrofishing at the upstream end of the Gorge No. 18 impoundment for the purpose of removing the bass for stocking elsewhere. Bass were subjectively characterized as abundant in this area. Age and growth information was not obtained. No population data was collected upstream of the Gorge No. 18 impoundment where the greatest habitat impacts from peaking and minimum flows occur.

The IFIM study results show that the quantity of bass fry habitat is limited. GMP has offered two possible explanations to reconcile this fact with the field observation that adult bass are abundant. First, GMP suggests that suitable nursery habitat may exist in the river segment outside of the IFIM study reach. Neither of the IFIM study reaches was specifically selected to represent nursery habitat for bass. It is likely that the effects of peaking are less pronounced in the Gorge No. 18 impoundment and that this area provides better habitat for the immobile life stages of bass. Bass produced in this area may seasonally migrate upstream as far as the Essex No. 19 powerhouse.

Secondly, GMP states that flows during the June black fry period commonly exceed conditions which provide good nursery conditions. Although generally true, high flows become less frequent later in the month. Also, the June flow regime varies considerably from year to year, such that fry production could be high in some years but low in others. As the model results suggest, high flow events may be problematic for bass fry and young of the year. Years where natural flow conditions are conducive to high fry production are not by themselves sufficient to produce adult bass, since the young-of-year fish³ must be protected from harmful flow fluctuations.

Orth and Maughan⁴ found that the standing stock of juvenile and adult smallmouth bass was not correlated with weighted useable area in Glover Creek, Oklahoma. They felt that these fish were limited in abundance by factors other than useable habitat. Concerning juvenile fish, they agreed with the suggestion of other researchers that flooding during or after the spawning period may be the dominant factor influencing survival of eggs and fry for Glover Creek. Regarding the adult fish, they suggested several possibilities:

1. that this flooding limited the production such that the useable habitat for adults was not limiting;
2. that their definition of usable habitat is inaccurate (suitability criteria do not match actual habitat use); and
3. that sport harvest may have kept the adults below carrying capacity.

The authors also indicate that the validity of the IFIM model for the spawning and early life stages of bass has not been established, indicating that there are many factors of influence. Indeed, the smallmouth bass "bluebook"⁵ contains numerous qualifiers on the use of its habitat suitability curves.

³By definition, newly born fish are considered to be fry during the month of June and then are young of the year until their first birthday. The concern over peaking is with the fish while they are still small--throughout their first growing season.

⁴Orth, D.J. and O.E. Maughan. 1982. Evaluation of the incremental methodology for recommending instream flows for fishes. *Transactions of the American Fisheries Society* 111:413-445.

⁵Edwards, E.A., G. Gebhart, and O.E. Maughan. 1983. Habitat suitability information: smallmouth bass. U.S.D.I., Fish and Wildlife Service FWS/OBS-82/10.36. 47pp.

The study by Orth and Maughan, that of Bain et al.⁶, and the IFIM results for this project all suggest that the juvenile life stages of smallmouth bass are likely to be more susceptible to impacts of the project's operation than the adult life stage. Since fishing pressure in the reach is low, the population observed is relatively unexploited. The adults present likely represent a variety of age classes. The abundance of this population may not be able to stand up to increased angling pressure, given the fact that production of young fish is probably limiting. Abundance of adult fish is not necessarily indicative of good production of young fish, but may be indicative of an unexploited population of adult fish that has built up over time from even poor juvenile production. The amount of production needed to sustain a good population of adults is not known.

The concern over spring high water is largely a factor outside of the influence of project operation. We do not believe it precludes bass production. There is a need to protect the early life stages. The peaking at issue is for the non-spring period which does not begin until June 16; the peaking influence on the fry stage would therefore be for June 16-30, at which time the life stage changes to young of year by definition. Protection of bass throughout their first growing season is a concern; the juvenile fish are small, and their swimming ability is less than that of larger fish.

A study on the Huron River in Michigan showed that the population of adult bass was significantly related to the amount of habitat available for young-of-the-year bass (Bovee, personal communication with Roderick Wentworth). Bovee also found that bass become relatively dormant over the winter, and that it is more important to provide a minimum flow that maintains winter habitat (including undercut banks) than to limit high flows. Providing a more stable flow regime during the first summer of life is the primary concern.

Available scientific literature and the site-specific IFIM results indicate that the peaking operation exerts a negative influence on young bass. While the exact magnitude of this influence is uncertain, the IFIM results for bass suggest that the impact on fry is severe. The results of the dual flow analysis are tabulated below.

Percent Habitat Loss for Black Fry due to Peaking

Natural Flow (cfs)	Habitat Quantity (sf/1000 ft)	Peaking Condition (cfs)	Habitat Loss (%)	Peaking Condition (cfs)	Habitat Loss (%)
500	24,900	340 to 1000	63	Not allowed	0
		340 to 1500	84	Not allowed	0
		340 to 2000	92	Not allowed	0
800	21,300	340 to 1000	56	500 to 1000	40
		340 to 1500	81	500 to 1500	70
		340 to 2000	91	500 to 2000	83
1200	14,570	340 to 1500	72	500 to 1500	56
		340 to 2000	87	500 to 2000	75
1500	9,950	340 to 2000	81	500 to 2000	63

⁶Bain, M.B., J.T. Finn and H.E. Booke. 1988. Streamflow regulation and fish community structure. Ecology 69:382-392.

As with macroinvertebrates, raising the minimum flow and limiting the total fluctuation significantly reduces the impact. For example, under a natural flow regime of 800 cfs, 21,300 square feet of habitat per 1000 feet of stream length is available. Cycling as proposed by GMP would result in an effective habitat quantity of 1860 square feet per 1000 feet, or a habitat loss of 91%. Raising the minimum flow to 500 cfs and limiting the fluctuation to 500 cfs retains 12,670 square feet of habitat per 1000 feet, reducing the loss to 40%.

Comment: Since the purpose in setting a continuous minimum flow is to set some flow at which the plant will generate during non-peak demand periods and since under most flow and demand conditions, hydroelectric plants experience these demands for at least one hour each day, Condition D essentially renders the Essex No. 19 plant useless as a peaking facility and relegates it to a run-of-the-river operation. Condition D coupled with Condition A would be near impossible for a plant operator to implement. Condition D makes operation of Gorge No. 18 and the Winooski One developments run-of-the-river. (GMP) This will result in the loss of 18.5 megawatts of peak hydroelectric capacity that would be replaced with fossil fuel generation. (Winooski One Partnership)

Response: Use of a less-than-or-equal-to symbol in the table contained in draft Condition D (ref. the fourth and sixth line under the heading, second column) resulted in an assumption on GMP's part that the station would have to be operated run-of-the-river. If the station were operated at 500 cfs on any given day, it would not be permitted to peak. Of course, if GMP chose to release 501 cfs during the off-peak period, it would be able to operate out of storage in a peaking mode. The symbol has been corrected (changed to a less than symbol) to reflect the actual intent of the Department to allow peaking with a minimum release of 500 cfs for the season and periods shown. GMP has purposely chosen to read something into this that was clearly never intended.

c. Run-of-river operations

Comment: Run-of-river operations should be considered to realize benefits to the aquatic community and habitat. (Trout Unlimited)

Response: The Department has concluded that operation in a peaking mode, with certain constraints, meets standards; however, this is not meant to infer that further improvement of water quality and river uses and values cannot be realized were a true run-of-the-river mode of operation instituted.

d. Ramping

Comment: The applicant requests that it be given one year to develop a ramping schedule to allow for any delays caused by weather.

Response: In order to allow a summer season for completion of any necessary field work, the deadline is being extended to October 1, 1994, or about 10 months from certification issuance.

e. Boating and fishing

Comment: Flows of 500 to 1000 cfs are needed for the average canoeist in the downstream reach for reasonable navigability or boating. (Gonda)

Comment: Flows from 350 cfs at the low end and from 1250 to 1750 at the high end would be the range for fishing from a canoe. (Gonda)

Comment: The useable range of flows for white water canoeing and kayaking is between 350 cfs and 1750 cfs with the optimal range from 1250 to 1500 cfs. (Gonda)

Comment: For canoeists who prefer "downriver running," flow in the range or 1500 to 1750 cfs would be needed. (Gonda)

Response: These ranges of flows will be provided at different times under the requirements of the certification.

3. BYPASS FLOWS:

a. Aesthetics

Comment: Optimal flow over the dam for aesthetic purposes is in the range of 275 to 350 cfs. A bypass flow of 167 cfs should be considered a minimum value to mitigate the aesthetic impacts of the dam. (VNRC)

Comment: Water over the dam for aesthetics seems to create an artificial waterfall. In the operation of any dam anywhere in the country, in low flow periods, you normally are using the dams to impound water, not as an artificial waterfall. (Gerecke) The dam is not a scenic area. (Vile)

Comment: The dam is a rather ugly structure but it is quite interesting and attractive when water is flowing over it. At certain times of the year when there is real excessive water it draws crowds of people to watch it. (Krassner)

Comment: As for the aesthetic spillage, the applicant maintains that there is no viable method for accomplishing this goal while still maintaining a peaking facility. More over, the local interest, mainly the 21,000 people who live in Williston, Essex Junction, and Essex have voiced their opposition to an aesthetic flow through the representation of their elected officials. Not one individual or group participating in the Comprehensive Rivers Plan process cited this as a concern.

Response: The bypass consists of two features for which appropriateness of minimum flows for aesthetics have been evaluated and considered--the dam and the natural gorge. The site is identified in the Village of Essex Junction Comprehensive Plan (March 1991) as one of three sites with outstanding view sheds. The dam is the major landscape feature that dominates the upstream view from Vermont 2A. The project as proposed will eliminate spillage caused by flashboard leakage; spillage will only occur when the station is off line during low flow periods and when inflow exceeds station capacity plus the 50 cfs gate discharge.

Williston Gorge will contain a continuous flow of 50 cfs or more when spillage occurs.

During the aesthetic flow evaluation (August 1992), observation flows less than 162 cfs (55 and 82 cfs) were generally rated as poor or fair.

Increased flows in the bypass for aesthetics has received very little public support and is no longer being required through this certification. It will be given further consideration in the FERC licensing process.

b. Fisheries in the bypass

Comment: The Agency's draft certification does not provide adequate consideration of the existing use of fishing in the bypass and protection of that existing use. (VNRC)

Response: Evidence regarding the current use of the bypass for fishing is very limited. Anecdotal reports suggest fishing is limited. This may be due to the lack of fish resident in the bypass, a condition that appears to be primarily due to conditions unrelated to project operation.

Comment: Trout Unlimited's recommendations to FERC are met by a flow of 50 cfs in the bypass.

Comment: The draft certification does not adequately quantify existing biota and aquatic habitat in the bypass. It fails to consider anything other than a life cycle of one game species of fish. The analysis is incomplete. The bypass flow requirements should be set at a value which will provide for habitat for rainbow trout adults, smallmouth bass and macroinvertebrates in addition to aesthetic and dissolved oxygen concerns. (VNRC)

Comment: VNRC maintains that additional questions need to be answered before minimum bypass flows can be set. At what flows will adult rainbow trout be able to enter the bypass from downstream? What flows are optimal for such passage? What flows would be optimal for rainbow trout in the bypass reach? How will various salmon and steelhead life stages be affected by the bypass flows? Without answering these questions, VNRC argues, the draft certification is arbitrary and contrary to the water Standards and Clean Water Act. Based on the information available at this time, VNRC recommends a bypass flow of at least 167 cfs around the clock and throughout the year.

Response: The results of the demonstration flow assessment of habitat for adult smallmouth bass are shown below.

Grading of bypass habitat for smallmouth bass adults.

Flow (cfs)	Site 3	Site 11	Site 12	Composite	Score
350	E	G	F	G	3.0
275	E	F	G-F		2.8
216	E	P	G-F	G-F	2.5
162	E	P	G		2.7
82	G	P	E-G	G-F	2.5
55	G	P	G		2.3

The rating scale was Excellent, Good, Fair, and Poor. This scale was assumed to be an interval scale of measurement, meaning that the differences between each rating are quantitatively equal. As a result, it is possible to assign each rating a numerical value, so that the three sites can be averaged to produce a composite rating. Each site is weighted equally. The composite reflects the overall change in habitat conditions. The scores shown assume E=4, G=3, F=2, P=1 and that an intermediate rating has an intermediate score (G-F=2.5).

The composite habitat ratings vary from Good to slightly below Good-Fair. Overall, a bypass minimum flow of 50 cfs provides habitat conditions for adult smallmouth bass rated as slightly below "good-to-fair." Of the three

sites assessed as part of the flow demonstration study, two were rated as "good" and one as "poor" at 55 cfs. Overall, the assessment indicates that the highest flows observed provided only slightly better habitat than that available at 55 cfs.

Fish are not expected to be abundant in the bypass. Ledge drops at the downstream end of the bypass are likely to prevent the upstream movement of fish into the bypass, except for those with strong leaping ability. Specifically, bass are not expected to be able to move up from downstream. Some bass may occur in the bypass as a result of downstream movement, but such movement is expected to be minimal. Rainbow trout stocked below the bypass can probably ascend the ledge falls under high to moderate flow conditions to access the bypass. During the spring, bypass spillage of high to moderate flows occurs.

Under the range of flows assessed, the bypass does not provide much suitable habitat for trout; it is better suited for bass due primarily to the low velocities. Providing high quality habitat conditions for rainbow trout in the bypass would require flows in excess of 350 cfs. Extension of rainbow trout management into the bypass reach cannot be justified based on the fishery potential and generation cost.

The value of the habitat for macroinvertebrates is expected to be low due to substrate type.

Comment: The Department should not require a contingency plan for prevention of walleye mortality in the bypass since there is no evidence that walleye are spawning in the bypass during the spring. The applicant is not aware of even one complaint or observation that the walleye mortality has resulted from the flows diverted from the bypass. (GMP)

☛ Response: Walleye may spawn in the left bypass channel unobserved. Subsequent dewatering of eggs would not be noticed without a purposeful investigation. The condition, however, has been modified to require Agency confirmation of spawning use before development of a contingency plan is necessary.

4. FISH PASSAGE:

Comment: Downstream fish passage facilities should be installed at Gorge No. 18 and Essex No. 19 by spring of 1995 to accommodate the anticipated smolt run of landlocked Atlantic salmon. (TU)

☛ Response: The first run of age 2 salmon smolts will occur in the spring of 1996. The Agency has requested that downstream fish passage be operational at that time.

Comment: Post-licensing studies on the success of downstream fish passage facilities should be required and operational and structural changes made if necessary. (TU)

☛ Response: The U.S. Fish and Wildlife Service has requested fish passage monitoring in its comments to FERC. In order to assure that any facilities installed are effective and efficient, the related certification condition has been modified to require such information and structural changes, if necessary.

Comment: Consider other approaches to fish passage in addition to trap and truck such as a fish ladder for long term effectiveness.(VNRC)

☛ Response: Due to the large number of dams on the Winooski River, providing upstream fish passage at each one (such as via a fish ladder) would be much more costly than the trap-and-truck alternative. A trap-and-truck facility has already been installed at the Chace Mill Project and will serve all basin dams. Ladders will only be considered if the trap-and-truck facility is found to be ineffective.

5. IMPOUNDMENT FLUCTUATIONS

Comment: Elimination of pond level fluctuations would be beneficial to fisheries habitat, littoral zone spawners, and other aquatic organisms. (TU)

☛ Response: Minimizing the impoundment level fluctuation to three feet will reduce many of the detrimental affects of a wider fluctuation. The establishment of a littoral zone, which is very important to lakes and reservoirs, is less influential in the Essex No. 19 impoundment because it is more riverine in nature. The applicant's proposal for a three foot fluctuation is expected to allow for a partially functioning littoral zone with new establishment of aquatic plants and subsequent habitat improvement for fisheries, spawners and aquatic habitat. Curtailment of pond-level management would result the conversion of the project to run-of-the-river and the loss of enhanced peak-power production.

Comment: GMP comments that it will, whenever practical, provide prior notice to the Agency of scheduled drawdowns below elevation 272 feet. When this is not practical, GMP shall provide the Agency with notice as soon as practical but in no event later than two business days after such occurrence explaining the circumstances that caused such an occurrence. GMP states that exceptions must be written into the certification to allow for emergency maintenance and emergency system voltage support.

☛ Response: Intermittent drawdowns below elevation 272 feet would cause the types of environmental damage that the proposed project modifications are intended to prevent. Therefore, such drawdowns must be evaluated case specifically. GMP has not explained the types of emergencies that would necessitate intentional drawdowns greater than three feet and the associated magnitudes of the drawdowns.

6. RECREATION

Comment: A canoe portage should be provided on the North (Essex Junction) side of the river. This is the best, safest and shortest route and can provide for equipment security. (Gonda)

☛ Response: The applicant has proposed such a portage, and the portage is required under Condition M of the certification.

Comment: A double lock gate should be provided at the entrance to the power house to allow for unloading boats and equipment at the river's edge and parking behind the power house. (Gonda)

☛ Response: The Agency will be working further with the applicant on the details of the project recreation plan as part of the FERC process and general common interest in enhancing recreational use.

Comment: Investigate how a portage around the Gorge No. 18 facility can be provided. (Gonda)

☛ Response: The applicant is working with the Winooski Valley Park District to site and develop a portage route around Gorge No. 18 separate from this relicensing proceeding.

Comment: When releasing higher flows from Essex No. 19, keep the Gorge No. 18 pond lower to provide boater access to braided and meandering stretches of the river above the Gorge dam. (Gonda)

☛ **Response:** The Department is not placing operational restrictions on Gorge No. 18 as part of the Essex No. 19 relicensing, as No. 18 is not part of the federal license under review. However, the Agency has been working cooperatively on modifications at No. 18 for improvements to flow management and recreation throughout the relicensing process.

Comment: There is no support or request by interest groups or others for a cartop boat put-in area in the impoundment. The Essex No. 19 project clearly has no impact on boat access in the impoundment. (GMP)

☛ **Response:** The project backwater is bounded by fourteen miles of shoreline. FERC AIR No. 17 involved the identification of access points to the impoundment. Only two informal access points within the project boundaries were identified. It is reasonable to expect GMP to provide formal access to the impoundment for car-top boats in order to support boating use.

Comment: In emergency situations, it may be appropriate to immediately limit public access in order to assure the public safety. At a minimum appropriate exceptions should be allowed to access provisions. (GMP)

☛ **Response:** In the event of a true emergency and clear and immediate danger, the Department would certainly not object to limiting access, but would expect the applicant to obtain concurrence from the Department after the fact.

Comment: A formal flow notification system is unwarranted and would merely impose unnecessary costs on the applicant. (GMP)

☛ **Response:** The project site is ideally located on the most urbanized part of Vermont and would be likely to receive more use by whitewater paddlers if a convenient method of finding out what the flows at the site were at any given time. This method has been used very successfully at other projects in Vermont and the Northeast.

Comment: Williston staff have come up with some proposed changes and modifications to the park on the south side of the river in Williston. (Gerecke)

☛ **Response:** The applicant is responsible for the development of a final recreation plan and the coordination of parties of interest, including the Agency. The Agency is interested in any ideas for changes to the recreation design for Overlook Park.

Comment: Higher flows during the day, during peaking, are good for the canoeists. (Marcotte of Essex)

☛ **Response:** A flow regime consistent with the certification conditions will offer many opportunities for canoeists, while limiting conflicts with fish and other resource values.

7. ECONOMICS

Comment: VNRC comments that the Department does not have the authority nor the expertise nor the information to consider economics (costs and benefits) in the issuance of the certification. VNRC further comments that the only possible consideration of economics under the Standards is in Section 1-03(C), Protection of High Quality Waters. This section provides that high quality waters may be reduced to a limited extent based upon a finding of substantial and widespread adverse economic or social consequences to the people of the state specifically resulting from the maintenance of the higher water quality.

Comment: The applicant argues that if enhancements are contemplated that will impact or change existing use, the impact on hydropower must be considered. If the Standards allow high quality waters to be degraded for economic or social reasons then the Secretary could limit the enhancements to water quality proposed for a water quality limited section of the river for economic and social reasons. Economics is to be considered particularly if the use is an existing use. Economic and social impacts are the direct fallout of conditions that are to be placed in the certification.

Response: The Department will manage the waters to allow beneficial and environmentally sound development (see Standards, Section 1-02), as long as no undue adverse effects to any beneficial value or use result. In certifying individual projects or activities, the Department considers both the relevant standards and the social and economic implications of its decision.

Comment: Economic impacts and the air emissions that will result from the burning of replacement fuels are of "Social Significance" in paragraph (d). (GMP)

Comment: The applicant believes that a better balancing can be done than appears in the draft certification. The applicant is of the opinion that if no balancing is allowed under the certification rules then no discharge, dam flow alteration or other actions requiring a permit for impacts to the river could be allowed since every change to the river will have some impact on the river. Balancing is the only way to protect all of the uses

Comment: The Agency has done an incomplete analysis of economic impacts. Consideration of the environmental cost of replacement power is inappropriate in the context of the certification process. There has been no analysis of the economic benefits of improvement of water quality to a level beyond which has been suggested by either by the applicant or the Agency. Those opportunity costs can be valued and have not been valued nor considered. (VNRC)

Comment: There were comments that flows should not be passed over the dam to improve aesthetic conditions because it would increase electric rates. On the other hand, there were also comments that the cost of passing flow over the dam for aesthetics and for other reasons (fisheries, dissolved oxygen, aquatic biota) is negligible, and persons so commenting were willing to bear the small rate increase. There also were comments that the rate increases would adversely affect business competitiveness, jobs, and commercial development in the area.

Comment: The applicant believes that the cost of flow related enhancements as proposed by the applicant is \$552,000 per year. The cost of flow regime enhancements proposed by the Agency is \$1,202,000 per year and result in air emissions that are more than double the applicant's proposal.

Response: No analysis of the economic benefits of improving water quality to a level beyond that proposed by GMP or the Department has been attempted. No evidence has been introduced evaluating what those economic benefits or opportunity costs might be.

The Department had carefully estimated the costs associated with the changes proposed in the draft certification and had concluded that the small additional cost of power would not appreciably increase rates. No evidence was presented concerning how business competitiveness would be hurt or how jobs would be lost. There was no evidence presented that the conditions of the draft certification would result in substantial and widespread adverse economic or social impacts on the people of the state specifically resulting from maintaining the higher water quality in the area of this project.

Following is a more detailed response, which presents information, estimates and discusses the complexities of cost:

Many comments received at the public hearing concerned the cost to the ratepayer to replace the power lost due to the release of minimum flows. Although there was a comment that there should be no flow restrictions at all, most of those who commented agreed that improved downstream minimum flows are necessary to maintain a healthy fishery and are acceptable. The concern was mainly the increased costs to the ratepayer from lost power generation due to the spillage requirement.

Both the Agency and GMP provided the interested public with estimates of the cost to the ratepayer due to minimum flow requirements proposed by GMP and those proposed in the draft certification by the Agency. The estimated rate increases, which include modifications at both Essex No. 19 and Gorge No. 18, are 0.4% (preliminary Agency analysis) and 1.1% (GMP analysis).

Both of these estimates are high for different reasons. The Agency estimate was high because the value of replacement power (to replace production lost due to minimum flow requirements) used to estimate the rate increase was high. The Agency used the value set forth by GMP which was based on older replacement power costs. Use of more recent replacement power costs would lower the estimates by at least 40% according to the Public Service Department. This results in an estimated cost or increase in rates of 0.24%.

The GMP estimate was found to be very high for two main reasons:

1. Use of an outdated estimate of replacement power cost as explained above; and
2. Use of a baseline condition of the project as licensed with no minimum flow constraints (the pre-1987 operating condition, prior to its current voluntary operating mode); the cost of the voluntary operation minimum flows is probably reflected in the present rate.

The Public Service Department indicates that the environmental costs of replacement power (air emissions) will, in the future, accrue to ratepayers as the Public Service Department and the Public Service Board, by policy and regulations, force utilities to consider the environmental costs of replacement power in the decision as to which replacement power source is acceptable. Replacement power sources with high environmental costs (although low in price) will not be acceptable and therefore the more expensive, less environmentally damaging power will be chosen. Thus, electric rates will increase somewhat to reflect this policy and decision.

On the other hand, Public Service Department and the Public Service Board will need to balance its policy on replacement power with a policy on the environmental costs, including decreases in aquatic habitat quality, stress on aquatic organisms, and reduced recreational opportunities. It is the Department's conclusion that the environmental costs of replacement power and the environmental costs of hydroelectric generation tend to balance out. It will be necessary to review each situation to see what the best balance is in order to minimize the total overall environmental costs.

GMP, in its presentation to the public, indicated that the increase in rate due to minimum flow requirements at Essex No. 19 was only the first of eight increases in rates, one each at all eight GMP hydroelectric facilities. GMP simply multiplied their estimate of the Essex No. 19 increase of 1.1% by eight to represent the total potential increase in rates attributable to environmental mitigation at the level desired by the Department. This is a substantial misrepresentation for the following reasons:

1. Included in the Essex No. 19 rate-increase estimates is a portion of the costs of implementing minimum flows at the Gorge No. 18 facility;
2. Several facilities are run-of-the-river or recently licensed with minimum flow requirements, and no substantial additional costs are expected (Middlesex, West Danville and Bolton Falls, or DeForge Station); and

3. GMP did not prorate the cost of minimum flow requirement based on power output of any of the other facilities. Essex No. 19 and Gorge No. 18 account for about 39% of the power produced by GMP hydro facilities and expected losses at any of the other facilities would be much less.

If these factors are taken into account, the total potential increase in rates for the eight facilities would be 1.64 times instead of 8 times the rate increase associated with the changes at Essex No. 19 and Gorge No. 18. The estimated rate increase for mitigation at all projects would be 0.4%, based on the Department's analysis.

Based on the best information and estimates of replacement power (from Public Service Department) and using the GMP estimates power lost in meeting the minimum flow requirements proposed in the draft certification, the total increased cost to the average residential ratepayer would have been 23 cents per month. Of this cost, 7 cents per month is the cost of GMP-proposed mitigation, and 16 cents per month was the additional cost due to the draft-certification requirements. Most of this 16 cent increase was for mitigation of aquatic-biota impacts, and only a small portion, about one cent per month, was for the provision of an aesthetic spill over the dam crest.

In summary, the Agency has concluded that the additional cost from present operation of Essex No. 19 (and including Gorge No. 18) to comply with the draft certification conditions would have been the equivalent of a 0.24% rate increase for all residential, commercial, and industrial users. For the average residential ratepayer, this equals 23 cents per month.

8. OTHER

Comment: VNRC believes that significant benefits could be obtained from the long term protection of project lands associated with Essex No. 19 and other GMP lands which are located in the Winooski River Basin.

Response: The disposition of lands outside the project boundaries is not within the purview of water quality certification review.

Comment: VNRC considers that Gorge No. 18 should be considered in concert with the certification of Essex No. 19 since the two dams are significantly inter-related.

Response: The application before the Department is only for the Essex No. 19 Project. The Gorge No. 18 Project is an unlicensed facility presently not subject to Federal jurisdiction.

Comment: The applicant should not be responsible for debris which floats over the dam or for natural debris such as wood and leaves which exists naturally in the river and does not harm the biotic environment.

Response: The applicant has a responsibility under the Standards, as well as state solid waste and anti-litter laws, to properly dispose of any material that it removes from the river.

Comment: Inspections by the Department of the facility will be subject to compliance with all GMP as well as State and Federal safety requirements while on the applicant's property. (GMP)

Response: The Department expects that it will have free access to any of the project areas where general public access is not restricted. If there are special areas where there are access limitations or special safety protocols, then GMP should so inform the Department.

Comment: The Agency should acknowledge that the applicant's application for a water quality certification has been supplemented with a copy of Green Mountain Power's Reply Comments to the Comments, Recommendations, Terms and Conditions, and Prescriptions (August 20, 1993). (GMP)

☛ **Response:** The document is part of record in this decision.

9. APPLICANT'S SPECIFIC COMMENTS ON FINDINGS

The applicant commented individually on many of the specific findings. Following are responses for those comments that have not already received an adequate response above. The comments are direct quotes.

Comment on Finding 6: In addition to GMP, many small power producers and municipal utilities own hydroelectric projects in the Winooski River Basin.

☛ **Response:** Washington Electric Co-operative and several small power producers own hydroelectric projects in the basin. No municipalities own projects to the Department's knowledge.

Comment on Finding 17: The 20% probability of flashboard failure with the rubber dam in place was associated with an earlier GMP proposal that would have retained the 84' curved tip section of flashboards. GMP's current proposal is to place a rubber dam along the entire spillway length.

☛ **Response:** The applicant has not indicated what the reduced frequency of failure is for a rubber dam that covers the entire crest. The finding has been changed to clarify this.

Comment on Finding 25: It should be clear that the on-peak periods referred to in FERC AIR No 18, page 23, refer to periods when the power is valued as on-peak power and not hours of typical generation.

☛ **Response:** The Department recognizes that the actual number of hours of on-peak generation vary within the hours stated in the finding. GPM provided very little information on operating characteristics.

Comment on Finding 26: The July 27 to August 27, 1975 hydrograph is a snapshot in time. The VANR is cautioned against characterizing this as typical operation. Generating hours depend on a number of factors including streamflow, energy demand, and maintenance.

☛ **Response:** In the absence of the data for the hours and discharges for typical generation, the Agency used the available data to interpret typical generation patterns. The Agency has also examined data from 1992, which was found to be similar to the 1975 data, except for the higher minimum flow release.

Comment on Finding 28: Another important reason for drawdowns greater than 5 feet could potentially be the need for voltage support for the local distribution network in the event of a generation/transmission system emergency.

☛ **Response:** This finding only listed the reasons for past drawdowns in excess of five feet. No information has been filed relative to if and when the impoundment has been drawn for voltage support.

Comment on Finding 31: In addition to GMP's Gorge No. 18, the Winooski One Project is also operated in tandem with Essex No. 19. Although Winooski One is a run-of-river plant, it receives the benefits of peak power production due to the operation of Essex 19.

☛ Response: The finding has been changed to reflect this.

Comment on Finding 33: It should be acknowledged that since 1987 it has been GMP's practice to monitor inflows during low flow periods and to maintain the impoundment near the top of the flashboards during such periods to minimize the chance of occurrence of such lag time events.

☛ Response: This is noted. It will be necessary to develop a specific proposal for maintenance of minimum flow standards at all times, and the proposal will have to compensate for lag time.

Comment on Finding 40: GMP's verbal proposal of April 9, 1993 was part of an overall attempt to settle the issues over which GMP and VANR disagree. It has meaning only in that context, was not an official proposal for the record, and should not be cited in the 401. While not terribly important when taken alone, due to the fact that GMP made an official proposal in August 1993 (as cited), VANR is reminded that GMP attempts at settlement are not official proposals unless some agreement can be reached between GMP and VANR on an overall enhancement proposal.

☛ Response: The reference to the April 9, 1993 offer has been deleted from the certification.

Comments on Findings 43-47, 48, 49: Perhaps the most important information realized and presented in the June 1993 report and ironically, not stated in the Department's findings, is the fact that after GMP's review of ALL the possible alternatives for providing a uniform spillway veil flow, NONE of them would work without compromising worker safety, system operation and maintenance, hydraulic or structural changes to the dam, or cost of installing, operating and maintaining the system. In addition, they would compromise the stability of the impoundment level and its value to the aquatic biota.

Difficulties resulting from any of the design considerations listed above will render a veil flow system useless. This is why no such system can be found at any peaking hydroelectric facility in this country or elsewhere for that matter. It is essential the record reflects these important facts and should be modified as such.

Additionally, a point discharge system would be easily accessible and consequently, easier to conform to all of OSHA's mandated safety procedures. Inlet screens or trashrack bars which are susceptible to clogging, would not be necessary with a point discharge system.

Attached are two memorandums relative to several discussions concerning the proposed rubber flashboard system that GMP believes should be included in the final 401 under this finding. (Attachments 2 and 3)

It is particularly interesting to note that in the VANR's previous findings of assessing the various veil flow alternatives analyzed by GMP, the VANR accepts each conclusion and subsequent rejection of each alternative as it related to system operational difficulties, excessive maintenance or construction feasibility problems but not as it related cost. Considering the strong public opposition to any type of aesthetic spillage requirement expressed at the public hearing by the Towns of Williston and Essex, the Village of Essex Junction and the Essex Conservation Commission, issuing a final 401 as currently written would not be in the best interests of the Public Trust.

☛ Response: The Department believes that the technology exists to provide the spillage over the rubber dam. This option has been further discussed with the manufacturer, Bridgestone. The draft certification did not require spillage under winter conditions, where the greatest uncertainty existed, as noted in the GMP

memorandum cited. The Department understands the concern to be more with respect to the risk potential for untried technology. Unless spillage is required by FERC, the issue is now moot as the spillage requirement is no longer in the certification.

The Department understands the positions of the municipalities to be better expressed as not supporting a spillage requirement because of the effect that decision may have on rates. Without the rate implications, we have every reason to believe that the municipalities would support spillage.

Comment on Finding 61: Since the term "mixing zone" has been replaced by the term "waste management zone" and since the entire Lower Winooski River has been classified as a waste management zone does this criteria even apply?

☛ Response: Mixing zones still exist. Mixing zone allow for temporary relief from standards within the plume from a wastewater discharge. Waste management zones replace Class C waters. The finding is correct.

Comment on Finding 66: Which facilities provide advanced wastewater treatment and for what water quality parameters do they provide this treatment? (i.e., what are the NPDES permit requirements?)

☛ Response: All wastewater treatment facilities on the Lower Winooski River are advanced treatment facilities. They all remove phosphorus and have specific limits on BOD and TKN effluent concentrations.

Comment on Finding 71: Attachment 1 is an annotated version of Table 3 that GMP would like included in the final 401. These annotations list percent saturation and identify the VANR proposal as listed in the draft conditions.

☛ Response: Percent saturation values have been added.

Comment on Finding 73: This paragraph is difficult to follow and unclear. It is assumed that the numbers are taken from Table 3 under the total flow rate of 386 cfs. Terms such as "reduction in the dissolved oxygen deficit" are hard to understand. Perhaps the actual dissolved oxygen concentration and/or percent saturations should be used. It should also be pointed out that dissolved oxygen concentrations for all of the proposals listed in Table 3 are generally considered excellent water quality.

☛ Response: The finding is technically correct. The numbers are derived through interpolation in Table 3.

Comment on Finding 74: VANR's point that "Depending on the design the aeration may be even less efficient than has occurred under present conditions of flashboard leakage" is well taken but out of place. The single source outlet has not been designed yet. It is quite possible that it could be designed to provide aeration at the same level as the flashboard leakage.

☛ Response: This is possible; however, it is noted that the same device may be designed for fish passage, which may reduce its reaeration potential.

Comment on Finding 145: What is the basis for VANR's population assessment of the bypass?

☛ Response: Profession judgement of Agency biologists. GMP has not furnished population data.

Comment on Finding 205: It should be clarified that the reason there were no perspectives from the bypass area of spillage over the dam is that the vast majority of people who would view spillage would be on Route 2A.

☛ **Response:** The applicant is proposing to improve access to the Gorge, which will increase the existing use of people walking down into the Gorge and below the level of Vermont 2A to view the bypass. Therefore, it is reasonable to mention that this perspective was not evaluated in the aesthetics study.

Comment on Finding 216: It should also be pointed out that citizens who participated in the Lower Winooski Comprehensive River Planning process expressed a desire to retain peak power production in the basin and endorsed the theme of use with stewardship of the basin's waters.

☛ **Response:** The majority of citizens who participated in the comprehensive planning process did not specifically express an opinion on river use by hydroelectric projects. There was general agreement that hydro projects should continue to operate, but only if water quality and fisheries were not adversely impacted.

From the Alternative Futures Project, a scenario of river use with stewardship was preferred by participants, but it was noted that "these uses [including power production] defer to the primary role of the watercourses, namely, the support of native plants and animals." (Lower Winooski River Basin Alternative Futures Project, Project Summary, March 1991, Vision Statement, Lower Winooski River Basin, 2010) Most participants favored maintenance of minimum flows for fisheries support (70%) and high levels of access with education to encourage responsible use (55%). No participants favored the element of Scenario #1 (Full Corridor Development) that prioritized flow management for peak power and snowmaking.

10. APPLICANT'S SPECIFIC COMMENTS ON CONDITIONS

The applicant commented individually on most of the individual conditions. Following are responses for those comments that have not already received an adequate response above. The comments that follow are not direct quotes.

Comment: The applicant states that none of the conditions included in the draft certification are appropriate under the Clean Water Act nor necessary to assure that there is no impact to the water quality.

☛ **Response:** This is a matter under litigation in Vermont and nationally, and beyond the scope of this responsiveness summary.

Comment on Conditions H: Plans for monitoring instantaneous flow releases at the project should be made less onerous. Rating curves should be used to demonstrate compliance with downstream flows. The applicant would like to provide a hydrologic calculation to serve as a means of assuring bypass minimum flows.

☛ **Response:** The condition does not preclude the use of the rating curves; however, use of the downstream U.S. Geological Survey gage will also be considered. The condition is not onerous.

Comment on Condition M: No condition for portage is needed as the applicant has already committed to building the portage on the Essex side of the river.

☛ **Response:** As it is already proposed, no hardship is created, and there should be no objection.

Comments on Conditions R and S: The Department cannot predetermine that any possible change in operation will constitute a material impact on water quality. Prior review and written approval should only be required for significant changes that will impact water quality and notice regarding changes resulting from emergency conditions should be made within two business days of such emergency.

☛ Response: These conditions have been rewritten as one, and the objection considered.

Comment on Condition T: The applicant is willing to include conditions of the certification in any conveyance but it cannot legally assure compliance with the conditions if the project is leased or conveyed to another party.

☛ Response: The condition has been changed.

Comment on Condition U: Jurisdiction of the project lies exclusively with FERC. Even if the Department could amend a certification, it would not become part of a license unless FERC adopts the amendment, after petition to reopen the license.

☛ Response: The condition has been changed.