VERMONT ENVIRONMENTAL BOARD
10 V.S.A. Chapter 151

Re: Okemo Mountain, Inc. Application #2S0351-12A—EB

FINDINGS OF FACT, CONCLUSIONS OF LAW, AND ORDER

This decision, dated March 27, 1992, pertains to an appeal filed with the Environmental Board on February 27, 1990 by Okemo Mountain, Inc. (Okemo) from a decision of the District #2 Environmental Commission dated January 30, 1990. The District Commission denied approval for Okemo to amend Land Use Permit #2S0351-12 to decrease the minimum flow to be maintained in the Black River in Ludlow during water withdrawal for snowmaking from 1.0 cubic feet per second per square mile *(csm)* of upstream watershed area to 0.5 csm.

The Environmental Board concludes that maintenance of a minimum downstream flow of 0.8 csm complies with 10 V.S.A. § 6086(a)l(E), 1(F), 8(A), and 9(K) and issues a land use permit authorizing such flow.

I. SUMMARY OF PROCEEDINGS

After the appeal was filed, Conservation Law Foundation (CLF) filed a request for party status and, along with the Connecticut River Watershed Council (CRWC), filed a motion to dismiss the appeal, alleging that the public trust doctrine prohibits the Board from issuing permits that authorize water withdrawals. A prehearing conference was convened on March 30, 1990 by the former Chairman, Stephen Reynes. A prehearing conference report was issued on April 6, 1990. After extensive briefing and oral argument by the parties, the Board issued a Memorandum of Decision on September 18, 1990 denying the motion to dismiss.

A second prehearing conference was held on October 15, 1990 and a second Prehearing Conference Report was issued on October 25. Because of conflicts of interests of certain Board members, the Board lacked a quorum needed to make decisions on preliminary issues. With the appointment of additional members, preliminary issues were decided and a Memorandum of Decision was issued on July 18, 1991 in which the Board granted party status to CLF and the Vermont Ski Area Association (VSAA) on Criteria 1(E), 1(F), 8(A), and 9(K), pursuant to Rule 14(B) (1) (b), and denied Okemo's motion to find that Criteria 1(E) and 1(F) are not applicable to this appeal.

Hearings were held on September 18, 19, and on October 2, 3, and 22, 1991. The following parties participated in the hearings:

Okemo by Lawrence G. Slason, Esq.
State of Vermont, Agency of Natural Resources (ANR) by Kurt Janson, Esq.
Conservation Law Foundation (CLF) by Lewis Milford, Esq.
Connecticut River Watershed Council (CRWC) by Peter Richardson
Vermont Ski Areas Association by William P. Cohen, Esq.

On November 26, the parties filed proposed findings of fact and conclusions of law.

The Board deliberated concerning this matter on December 4, 1991, January 15 and 29, February 12, March 12, and March 25, 1992. On March 25, 1992, following a review of the proposed decision and the evidence and arguments presented in the case, the Board declared the record complete and adjourned the hearing. This matter is now ready for decision. To the extent any proposed findings of fact and conclusions of law are included below, they are granted; otherwise, they are denied.

II. ISSUES

1. Whether the project will, whenever feasible, maintain the natural condition of the Black River and not endanger the health, safety, or welfare of the public or of adjoining landowners, as required by Criterion 1(E) (streams).

2. Whether the project must of necessity be located on a shoreline in order to fulfill its purpose and whether the project will, insofar as possible and reasonable in light of its purpose, retain the shoreline and the waters in their natural condition, as required by Criterion 1(F) (shorelines).

3. Whether the project will destroy or significantly imperil necesssary wildlife habitat and, if so, (i) whether the public benefit from the project outweighs the loss of the habitat, (ii) whether Okemo has applied all feasible and reasonable means of preventing or lessening the destruction or imperilment of the habitat, and (iii) whether Okemo owns or controls a reasonably acceptable alternative site, pursuant to Criterion 8(A).

4. Whether the Black River is considered "public lands" and, if it is, whether the project will unnecessarily or unreasonably endanger any public investment in the river and whether the project will materially jeopardize or interfere with the public's use of, enjoyment of, or access to the river, pursuant to Criterion 9(K).

III. FINDINGS OF FACT

A. Description of the Project

1. On July 12, 1988, the District Commission issued Land Use Permit #2S0351-12 to Okemo authorizing the construction of a pump house, an intake structure, 9,000 feet of welded steel pipe, and additional snowmaking pipeline. The permit also authorized the withdrawal of a maximum of 3,000 gallons of water per minute (gpm) maximum from the Black River for snowmaking purposes and required that a minimum flow of 1.0 cubic feet per second per square mile (csm) of upstream watershed be maintained in the river downstream from the point of withdrawal. During the District Commission's review of the application, Okemo requested a minimum flow of 0.5 csm. The District Commission rejected the request because Okemo had not provided justification based upon site-specific studies that the 0.5 csm flow would be adequate for protection of the Black River's fishery habitat.

2. Okemo subsequently conducted an Instreaxn Flow Incremental Methodology (IFIM) study of the Black River to justify a lower minimum flow. After completion of the study, Okemo filed this amendment application with the District Commission which included an agreement with ANR entitled "Joint Proposal for 'Step-Down' Water Withdrawal Mitigation Measures." This proposal, known as the Step—Down Proposal, would allow Okemo to withdraw up to 3,000 gpm from the Black River whenever the natural flow upstream of the withdrawal point is greater than .75 csm. When natural upstream flows are between .75 and 0.5 csm, Okemo must step down the pumping to a rate that reduces the flow downstream from the withdrawal point to no less than 0.5 csm.

3. Okemo's current proposal also requires Okeino to design and implement several measures to enhance fisheries habitat in the Black River. These measures, the

specific details of which have not been submitted to the Board, include placing instream structures to provide needed cover habitat for juvenile and adult fish; planting streamside vegetation to increase cover and reduce summer water temperatures; and stabilizing the stream banks. Okemo has also agreed to provide an easement to allow the public access for fishing in the Black River.

B. Snowmaking

4. Okemo ski resort has 400 acres of ski trails, 360 of which are covered by snowmaking. This 90 percentage of overall snowmaking coverage is the highest among all of Vermont's ski areas. Since 1988, Okemo has added over 60 acres of ski trails to its snowmaking system. In the 1989-90 ski season, Okemo used approximately 280 million gallons of water for snowmaking, the most ever used in its history.

5. Last year Okemo employed close to 700 people. During the 1990-91 ski season, Okemo generated $432,000 in sales and use tax revenues, $210,000 in rooms and meals tax, and $43,000 in liquor tax revenues to the general fund of the State. Okemo's lease payment to the State of Vermont, based on lift ticket revenues, was $238,000. Okemo claims that increased snowmaking capacity will enable it to remain competitive and contribute to the overall economy of the region and state by increasing the number of days it can make snow. Okemo has been profitable since 1982.

6. From 1982 to 1988, Okemo relied exclusively on water supplied by the West Hill Reservoir for snowmaking. Since 1988, Okemo's snowmaking system has depended on water withdrawals from the Black River, where Okemo has a pump house and an intake structure, and from a withdrawal point at the West Hill Reservoir, which is located on town land. Okemo has a contractual right to use the reservoir. The reservoir is a flood control pond which has a current capacity of 27 million gallons of available storage. The average annual water withdrawal rate from the reservoir has been approximately 100 million gallons.

7. Okemo's pumping system connects the Black River both to the West Hill Reservoir and to Okemo's snowmaking system. Okemo pumps water into the reservoir from the

Black River when the flow in the river is more than 1.0 csm and Okemo does not need to pump directly onto the slopes. Okemo is limited to pumping a maximum of 3,000 gpm from the Black River and 2,400 gpm from the West Hill Reservoir.

8. Okemo used 280 million gallons of water last year for snowmaking. Of that total, approximately 100 million gallons were pumped from the West Hill Reservoir and 180 million gallons were pumped directly from the Black River. This 280 million gallons of water provided 90 percent coverage of its skiable terrain, for a total of 360 acres of coverage.

9. Okemo intends to use the increase in water it seeks to withdraw from the Black River, from 280 million gallons to 447 million gallons, for several purposes. One is to gain the capacity to make sufficient snow to recover from thaws and maintain 18 inches of snow cover on novice trails, two feet of cover on intermediate trails, and three feet of cover on advanced terrain. Okemo also plans to use the additional water to extend its snowmaking pipeline to four additional trails which comprise the remaining 40 acres of skiable terrain.

10. Okemo has an interruptable electric power contract with the Ludlow Electric Company which restricts Okemo from using any power when the Town's demand is at peak. As the Town approaches peak level, Okemo must shed electrical demand by shutting down a portion of its snowmaking system. There were a number of hours during the 1990-91 ski season during which Okemo did not have sufficient available power to run its snowmaking at full capacity. This contract is renewable on an annual basis.

C. <u>Criteria 1(E) (streams), 1(F) (shorelines), 8(A) (wildlife habitat), and 9(K) (public investments</u>)

11. The Board takes official notice of the findings of the District Commission in Land Use Permit #2S0351—12 and the accompanying Findings of Fact and Conclusions of Law that the Black River is a stream, that the project is located on a shoreline, and that the components of the natural condition of a stream include volume, depth, velocity of water flow, physical features, aesthetic values, bank stability, water quality, and habitat for fish and a variety of other life forms.

12. Okemo's water withdrawal is located within Ludlow Village and occurs within a Class C water quality portion of the river.

13. The Black River supports limited populations of brown, brook and rainbow trout. Populations of brown and brook trout are supported to some extent by natural reproduction. The river is stocked with rainbow trout and is used for fishing and other recreation by the public. Brown trout is the principal sports fish species inhabiting the portion of the Black River affected by Okemo's water withdrawal.

14. The IFIM incorporates computer modeling and site specific information for a given stream to provide an objective method of assessing the effects of changes in stream flow on trout habitat by life stage. Variables such as temperature, water velocity, and depth and substrate type under certain flow rates are analyzed to estimate the amount of habitat that may exist for a particular species under various stream flows.

15. Using the indicator species and life stages identified in the scoping process and the hydrological data of the stream in question, the IFIM simulates the amount of habitat that will be present for that particular indicator species during its different life stages.

16. The IFIM does not give a single value for acceptable habitat under predicted conditions. The IFIM produces, instead, a range of values for the amount of suitable habitat predicted under each flow regime. The more site specific and less extrapolated the data that are entered into the computer simulations, the more likely it will be that the predictions made in the IFIM will represent actual habitat conditions.

17. The IFIM consists of several steps. These include 1) defining the objectives, the boundaries, the resources at risk, the methods to be used for hydrologic and habitat estimations, and the time scale necessary to estimate long-term impacts; 2) studying the hydrology of the stream; and 3) analyzing the instream microhabitat for the biota of concern. The instream microhabitat data are used in a computer model known as "Physical Habitat Simulation Model" (PHADSIN).

18. The IFIM generally relies on species-specific Suitability Index (SI) Curves for the weighting factor. These curves present the relative value from zero (least favorable) to one (most favorable) of a range of micro-habitat values (such as depth) in a stream. A different set of SI curves for each micro—habitat parameter (depth, velocities, substrate, etc.) is used with PHABSIM to estimate the amount of optimal habitat and square feet per thousand linear feet of the stream that is theoretically available for each life stage (adult, juvenile, incubation, and spawning) of the species of concern.

19. The SI curves have been developed for a select number of fish species. An SI curve identifies the range and preference of each specie's life history stage, including spawning, incubation, juvenile, and adult passage, for various depths, velocities, substrates, and temperature conditions in the stream. SI curves are calculated by using habitat data from many streams; the curves may or may not reflect the habitat condi- tions in any one particular stream. SI curves can be quite variable from stream to stream for the same species. The United States Fish and Wildlife Service (USFWS) recognizes that the reliability of transferring SI curves developed in one stream to another is questionable, particularly when used to distinguish suitable, marginal and unusable microhabitats in the stream of concern. The U.S. Fish and Wildlife Service is initiating a study to attempt to resolve this problem.

20. Brown trout were selected for Okemo's IFIM study as the key species for assessing aquatic habitat because they spawn and their eggs incubate during periods of the year when the water withdrawals occur, and they are the fish species most sensitive to changes in flow. Brown trout use riffles (shallow fast waters) for spawning. Riffle habitat was chosen as the key focus for the IFIM study because it is most sensitive to physical changes in stream flows and is the area of the stream in which brown trout spawning and incubation principally occur.

21. The IFIM study performed by Okemo contained weighted usable area (WUA) curves that show the optimal levels in the Black River for certain life stages of brown trout. WUA curves show the relationship between stream

flow and habitat. The "optimal" flow rates on a WUA curve are where flows would result in the most habitat. WUA declines as stream flows are reduced.

22. ANR determined that "optimal" flow rates in the Black River represent the rates where there would be the least amount of environmental risk to the habitat. The "optimal" flow rate in the Black River for brown trout spawning and incubation found in the IFIM Study was 1.1 csm. The "optimal" flow rate in the Black River for juveniles was .8 csm. Both of these "optimal" flow rates were based on an average of all study stations in the IFIM Study reach. Based on the Okemo IFIM Study, the total WUA the combined measure of habitat quantity and quality declines as flow rates decrease from these "optimal" flow rates.

23. The IFIM study used by Okemo has significant limitations. These include the lack of analysis of any invertebrate species that will also be affected by the water withdrawal. Aquatic insects, macro—invertebrates, non—game fish species, amphibians, reptiles, birds, mammals, and plant life were not considered in the IFIM analysis. Little evidence was provided that the use of the brown trout as the target species represents an adequate surrogate for information on the other natural aquatic biota. Decisions about river flow require consideration of an entire ecosystem, not just a single life stage of a single species.

24. During low flows, pools in the river are critical for the survival of both large juvenile and adult brown trout. However, Okemo collected no base line data on the WUA for various flows for adults in pools in the Black River and provided no data on the effects of the withdrawal on the adult population in pools, even though Okemo found pools to be the most limited habitat resource. Thus no information was submitted concerning the effect of the withdrawal on brown trout population in pools.

25. Standing stock estimates for brown trout population are not available and therefore the size of the brown trout resource in the Black River is not known. ANR does not have fisheries measurements or population data on fisheries in the area of the Black River at issue in this case. Okemo provided no specific field biological

data on the fishery in the Black River and no information on invertebrate population in pools or riffles in the Black River.

26. Most suitability indices have been developed from information gathered from streams in the western United States and contained in a publication known as the "Blue Book." The SI curves extrapolated from the "Blue Book" literature were never validated for the Black River. Flow, depth, and velocity characteristics of the river were taken over just a few sample days. A field survey of the river stretch of concern to verify the SI curves was not done.

27. There is general consensus among experts that site specific field verification of the SI curves and collection of specific biological data should be done as part of an IFIM study.

28. River ice can harm the habitat of fish and their food chain. Freezing of the river substrate affects invertebrates, deposited eggs, and certain fish species which overwinter in the gravels. Fluctuating water levels caused by ice formation and ice break—up can disturb the river banks, cause substrate scouring, and drive fish into areas not normally used; when the water level drops, the fish can become stranded. Extensive river ice accumulations can drive fish from limited overwintering areas to other less desirable locations. These are all natural processes; the degree of impact from stream flow modifications is difficult to assess without extensive observations.

29. Any changes in ice formation from reduction in stream volume of less than 15 percent would be so small that they would not be measurable or quantifiable. The estimated changes in stream hydrology resulting from the Step—Down Proposal are as follows: the maximum reduction in stream flow is 15 percent; the maximum reduction in depth is approximately one-half inch or 5.9 percent; the maximum change in velocity is a reduction of .08 feet per second or 8.3 percent; the maximum reduction in wetted area is 1.5 percent. These are relatively small changes and are well within the large fluctuations in stream flow which naturally occur in the Black River. It is therefore unlikely that the

proposed water withdrawal will have any significant or statistically identifiable effect on the ice formation processes that occur naturally in the river.

30. Quality habitat for spawning and incubation, and for wintering of adults and juveniles, is critical to the perpetuation of a self-sustaining trout population.

31. The USFWS requires a minimum flow of 1.0 csm to protect fall spawning and winter incubation periods. ANR's draft policy on minimum stream flows provides that the USFWS recommended flows operate as a presumption that stream values and uses are protected, and that lower flows may be acceptable based on site specific studies.

32. Because there are no historical flow records for this portion of the Black River, Okemo used information gathered at the United States Geological Survey (USGS) gauge at Ayers Brook in Randolph, Vermont as being representative for purposes of developing a unitized stream flow rate per unit area of watershed. This unitized rate was then used to estimate stream flow rates from 1938 through 1989 for the Black River at the point of withdrawal. The reliability of the hydrologic comparison between Ayers Brook and the Black River was verified by comparing actual daily stream flow rates for the Black River during the winter of 1988-89 with actual daily flows from Ayers Brook.

33. Based upon the data from Ayers Brook, the estimated median flows (csm) in the Black River are as follows: January 0.84; February 0.78; March 1.43; April 4.49; May 2.10; June 0.94; July 0.43; August 0.27; September 0.28; October 0.43; November 0.83; December 0.94.

34. Years with natural low flow conditions alternate with years with favorable flow conditions. Natural populations of fish, plant, and invertebrate species will fluctuate in a "boom or bust" cycle with good and bad flow conditions. For instance, production of adult brown trout can be limited by winter low flow conditions that cause high mortality among incubating eggs or overwintering juvenile fish. Good conditions, such as adequate river flows, allow populations to rebound. Fish and invertebrate species that can withstand one year of low flows are affected more severely when there

are several consecutive years of low flow conditions. When the frequency of bad conditions increases, the species may have inadequate periods of good conditions to recover. Without adequate recovery, the fish species can suffer an irreversible population loss.

35. Increasing the frequency and magnitude of stressful conditions by increasing the frequency and magnitude of naturally occurring low flow conditions is likely to increase the mortality of fish and fish eggs.

36. During winter adult brown trout concentrate in pools. Low flow winter conditions can decrease the area of pools available for the fish, causing overcrowding. Even though changes on the pools could be small from lower water withdrawals, the effects could be large.

37. Under Okemo's proposal, the number of days that the Black River flow rate is between 0.5 and .75 csm will increase from 31 to 51 in an average year.

38. Based upon Okemo's IFIM analysis, Okemo's water withdrawals under the Step-Down Agreement will decrease the weighted usable area (the IFIM measurement for habitat quality and quantity) of spawning and incubation habitat by 8.1 percent and for juvenile habitat by approximately 6 percent.

39. Several factors, including channelization of the river for flood control, have already caused aquatic habitat quality to decline in the Black River.

40. Using the so-called Aquatic Base Flow (ABE) methodology, the United States Fish and Wildlife Service has developed a New England-wide minimum wintertime flow guideline of 1.0 csm. If Okemo' s estimates of the Black River's flow rates are used in the ABF methodology, the resulting minimum flow requirement would be approximately 0.8 csm. This minimum flow is equal to the estimated February median flow in the Black River based upon Okemo's data.

41. Maintenance of a 0.8 csm minimum flow downstream from the point of withdrawal would provide a reasonable level of protection for the habitat in the river. The 0.8 csm February median flow is a natural low flow

condition to which the aquatic biota has adapted and a flow which will allow the fish time to recover periodically from the stress of occasional lower flows.

42. Based upon extrapolated flow data from Ayers Brook, the naturally occuring flows in the Black River from November through March in 1948, 1966, 1971, and 1975 were as follows:

Flow rate (csm)	Number of Days			
	1948	1966	1971	1975
< 0.5	21	16	70	0
0.5 – 0.75	22	5	31	56
0.75 – 1.0	36	22	42	19
> 1.0	103	62	6	93

43. Allowing Okemo to decrease its minimum flow from 1.0 csm to 0.8 csm will enable Okemo to increase its water withdrawal over what it is allowed under its existing permit.

44. Okemo analyzed various options for different sources of water and places to store water as an alternative to increasing withdrawals from the Black River. The alternatives Okemo considered were withdrawal from other streams and from groundwater, and creation of new storage ponds at two locations on land owned by Okemo. Okemo rejected the alternative water supply sources as being insufficient to meet its needs. Okemo also rejected the two alternative storage sites, the so-called "gravel well site" and "parking lot/Skokemo parcel," on the basis of cost, environmental considerations, and safety. No other specific sites controlled by Okemo were explored for storage feasibility.

45. The only alternative explored by Okemo regarding the West Hill Reservoir is to increase the storage capacity of the existing structure. Okemo concluded that as currently constructed this reservoir has no more storage capacity. Okemo has not explored the option of altering the construction or design of the reservoir to increase its storage capacity. Okemo has not done an engineering or safety analysis of any reconstruction or expansion of the West Hill Reservoir to increase the storage capacity of the facility. A redesigned and expanded reservoir might provide Okemo with the

capability to draw water from the Black River at high flow conditions and pump that excess water to the West Hill Reservoir to be stored for later use during low flow conditions. This may require an addition to the piping system and construction work that Okemo also has not explored. It is also possible that Okemo would be prohibited by the U. S. Army Corps of Engineers or the Town of Ludlow from increasing the storage capacity of this reservoir.

46. Over 40 percent of Okemo's operating budget consists of snowmaking operating costs. Okemo thus has the financial incentive to make sure its system is run as efficiently as possible both in its use of water and its use of energy. The Board finds credible Okemo's testimony that it makes continual efforts to ensure that its water use is as efficient as possible, that the pumps it uses at the Black River pumphouse are reasonably efficient, that its air cooling compressors are the most advanced available, that it experiments with the latest technology in snow guns, that it uses the most efficient gun depending on the existing temperatures, that its snowmaking employees are well trained to achieve the highest efficiency possible, that its snowmaking equipment is constantly maintained to ensure that it is operating efficiently, and that it is designing a control system to make it easier to adjust and monitor the air/water ratio at the hydrants by measuring back pressure of the snow gun. Okemo has recently installed a weather monitoring and recording system that will routinely monitor and record temperatures and humidity at six different locations on the mountain and relay that information to the pump station so that the snowmaking crews can respond as quickly as possible to unanticipated changes in weather.

47. All water applied to the ski trails at Okemo in the form of snow remains within the watershed of the Black River, except for loss through evaporation.

48. Okemo proposes to undertake stream improvement measures to enhance other habitat in the river to replace the loss of the habitat caused by the water withdrawal. The habitat enhancement program involves two primary purposes: 1) to enhance the availability of pool habitat; and 2) to improve streamside vegetation for

shading and cover. Okemo proposes placing log type structures in the river which would realign flow patterns to allow for ponding and development of pools.

49. Okemo intends to develop a detailed habitat enhancement work plan after obtaining the permit amendment and thus it provided no specific details concerning the plan or its potential success in enhancing habitat in the Black River.

50. Although the habitat enhancement plan was an integral part of ANR's agreement to the Step-Down proposal, the testimony was contradictory concerning whether the plan will actually provide mitigation because its details are not known and the success of such enhancement projects has not been conclusively proven. Additionally, "ice—out" during the spring thaw can damage enhancement structures.

IV. CONCLUSIONS OF LAW

A. Criterion 1(E)

Criterion 1(E) requires an applicant whose project will involve lands on or adjacent to the banks of a stream to demonstrate that its project will, "whenever feasible, maintain the natural condition of the stream, and will not endanger the health, safety, or welfare of the public or of adjoining landowners." 10 V.S.A. § 6086(a) (1) (E).

While the Board concludes that the proposed water withdrawal will not endanger the health, safety, or welfare of the public or of adjoining landowners, the Board also concludes that the water withdrawal, as proposed, will not maintain the natural condition of the Black River to the extent feasible.

In reaching the conclusion that the water withdrawal will not maintain the natural condition of the Black River to the extent feasible, the Board is mindful of the evidence presented by Okemo's own witnesses that the Step-Down Proposal will result in a loss of up to 8.1 percent of spawning and incubation habitat for brown trout and approximately 6 percent of juvenile habitat. These are significant changes to the natural condition of the river. The Board is also concerned that even greater loss could occur if any of the assumptions which provided the basis for the IFIM analysis were not accurate or if the cumulative effect of stresses further reduce the aquatic populations.

Although there was evidence that the natural condition of the Black River has been degraded, the river currently supports habitat that would be further degraded by the additional withdrawal of water down to 0.5 csm. The fact that the river has already been degraded does not justify further degradation; if anything, it justifies a greater degree of protection. See Robert P. Foley and Theodore R. Barnett, #5L1018-l—EB/5L0426-6-EB, Findings of Fact, Conclusions of Law, and Order at 6 (July 19, 1991).

The testimony of ANR raises further questions concerning the likelihood that the Step-Down Agreement will provide sufficient protection for the habitat. The approval of the 0.5 minimum flow by ANR was apparently predicated upon the implementation of a stream enhancement program. Since the details of such a program have not yet been developed, the Board has no way of evaluating its potential to offset habitat lost by the water withdrawal. Moreover, the little information that was presented indicates that instream habitat enhancement structures are of doubtful effectiveness and are prone to damage or destruction during times of ice movement in the spring.

The Board must also consider whether maintenance of the natural condition of the stream is feasible. The Board believes that the Applicant must demonstrate that it has explored all reasonable alternatives which would allow the Black River to remain in its natural condition.

Based upon the evidence, the Board concludes that Okemo did not fully explore all reasonable alternatives to withdrawing additional water from the Black River. Additional storage capacity could provide additional water for snowmaking because water could be pumped from the Black River during times of high flow when water is not being used for snowmaking. However, no studies were conducted to determine the possibility of reconstructing the West Hill Reservoir to provide more storage capacity.[1] Okemo did not demonstrate that it is foreclosed from negotiating an arrangement with the Town that would allow Okemo to reconstruct the reservoir to enlarge its storage capacity.

[1]The Board is cognizant of the testimony that Okemo does not own or control the West Hill Reservoir. However, the consideration of alternatives under Criterion 1(E) is not limited to land owned or controlled by the applicant, especially where the applicant has obtained permission for some use of one potential alternate site.

Nor was any serious analysis provided to the Board concerning the construction of storage facilities on other land owned or controlled by Okemo that could provide at least some portion of the additional snowmaking capacity that Okemo seeks. Okemo has the burden of proof on this criterion. 10 V.S.A. § 6088. The Board is not persuaded that other reasonable alternatives do not exist which would enable Okemo to increase its snowmaking capacity without significantly changing the natural condition of the river.

The Board does conclude, however, that allowing a reduction in the minimum downstream flow to 0.8 csm, which is a natural low-flow condition to which the aquatic biota in the river has adapted, would provide a reasonable level of protection for the habitat in the river. Maintenance of a minimum downstream flow of 0.8 csm would allow Okemo to increase the number of days it may withdraw water from the river, but would not cause significant changes to the river's natural condition. By not allowing the flow to go below the February median low flow, the flow in the river will be maintained at a level to which the aquatic biota has adapted naturally, and time for the river to recover from natural lower flows will be provided.

Accordingly, the Board concludes that it is feasible for Okemo to maintain the natural condition of the river by restricting its withdrawal to maintain a minimum flow of 0.8 csm, a rate which will not cause significant changes to the river's natural condition. The Board notes, however, that its conclusion is based strictly upon the facts of this case and that maintenance of a different flow rate might be appropriate in other situations.

B. Criterion 1(F)

Criterion 1(F) requires an applicant to demonstrate that its project

> [M]ust of necessity be located on a shoreline in order to fulfill the purpose of the development ... and ... will, insofar as possible and reasonable in light of its purpose:
>
> (i) retain the shoreline and the waters in their natural condition,

(ii) allow continued access to the waters and the recreational opportunities provided by the waters,

(iii) retain or provide vegetation which will screen the development or subdivision from the waters, and

(iv) stabilize the bank from erosion, as necessary, with vegetation cover.

Okemo submitted this application to enable it to increase the amount of water withdrawn from the Black River. Land Use Permit #2S0351-12 authorized the construction of an intake structure on the shoreline of the Black River. In that decision, the District #2 Environmental Commission found that the intake structure must of necessity be located on the shoreline. Since this application is for an amendment to that permit, the Board takes official notice of the District Commission's finding and concludes that the project must of necessity be located on the shoreline to fulfill its purpose.

The Board has already concluded under Criterion 1(E) that the natural condition of the river will not be maintained. The Board similarly concludes, with regard to subcriterion (i) of Criterion 1(F), that the waters of the Black River will not be retained in their natural condition. The Board must now determine whether the waters will nevertheless be retained in their natural condition "insofar as possible and reasonable in light of Ethe project's] purpose." The Board believes that this determination of ''reasonableness involves a balancing of the effect on the resource resulting from the water withdrawal with Okemo's need to affect the resource in order to obtain additional water for snowmaking.

The Board has found that the effect of the Step-Down Proposal on the fishery habitat in the affected section of the Black River will be significant. The expected loss of approximately 8 percent of habitat for brown trout spawning and incubation and 6 percent of habitat for juvenile brown trout constitutes significant changes in the natural condition of the stream. In addition, there may be additional losses of various species due to the increased stresses on the river and the reduced ability for populations to recover from stress.

The Board is not persuaded that the habitat in the river must incur significant losses in order for Okemo to increase its snowmaking ability. As discussed above, Okemo has not demonstrated that additional water storage is not an economically viable possibility.

However, the Board believes that if Okemo were to restrict its withdrawals so that a downstream minimum flow of 0.8 csm is maintained and the habitat reasonably protected, the Black River would be maintained in its natural condition "insofar as possible and reasonable in light of its purpose," and that subcriterion (i) would be satisfied.

With respect to the remaining subcriteria, the Board concludes that Okemo will allow continued access to the waters and the recreational opportunities provided by the waters under subcriterion (ii), and that subcriteria (iii) and (iv) are not applicable to this amendment application.

C. Criterion 8(A)

Criterion 8(A) states:

> (A) Necessary wildlife habitat and endangered species. A permit will not be granted if it is demonstrated by any party opposing the applicant that a development or subdivision will destroy or significantly imperil necessary wildlife habitat or any endangered species, and
>
> > (i) the economic, social, cultural, recreational, or other benefit to the public from the development or subdivision will not outweigh the economic, environmental, or recreational loss to the public from the destruction or imperilment of the habitat or species, or
> >
> > (ii) all feasible and reasonable means of preventing or lessening the destruction, diminution, or imperilment of the habitat or species have not been or will not continue to be applied, or

(iii) a reasonable acceptable alternative site is owned or controlled by the applicant which would allow the development or subdivision to fulfill its intended purpose.

The Board concludes that the withdrawal of water down to 0.5 csm will destroy and significantly imperil the necessary wildlife habitat for trout in the section of the Black River affected by the water withdrawal. The Step-Down Proposal, as proposed, will result in the loss of approximately 6 percent of juvenile habitat and 8 percent of incubation and spawning habitat for brown trout. As discussed above, due to the stresses placed upon the river by the additional days of low flows, more substantial losses of species populations could occur.

With regard to subcriterion (i), the Board concludes that in this case the loss of the habitat that will result from the Step—Down Proposal outweighs the economic, social, cultural, recreational or other benefit to the public from the water withdrawal. In reaching this conclusion, the Board is mindful of the testimony that established that the ski industry in general and Okemo in particular contribute to the economy and the recreational industry of Vermont and that snowmaking is of increasing importance to the ski industry in Vermont. With respect to the requirements of subcriterion (i), however, the Board concludes that neither Okemo nor any other party has adequately demonstrated the public benefit that would specifically accrue from the Step-Down Proposal as opposed to the general benefits of snowmaking and Okemo's operations.

The Board is also cognizant of the evidence that Okemo already has one of the most, if not the most, extensive snowmaking systems of any ski area in Vermont. Even with the current minimum flow requirement of 1.0 csm, Okemo has been able to operate profitably in recent years. Balancing these facts against the loss of habitat in the Black River leads the Board to conclude that the loss of habitat is not outweighed by the economic, social, cultural, recreational or other benefit to the public from Okemo's proposal for additional water withdrawal.

Concerning subcriterion (ii), the Board believes that all feasible and reasonable means of preventing or lessening the destruction and imperilment of the habitat have not been applied. As discussed above, Okemo has an extensive and

advanced snowmaking system. Even with the current minimum flow requirement of 1.0 csm, Okemo was able to withdraw 280 million gallons of water and achieve 90 percent coverage of its trails during the 1990-91 ski season. Given these facts, the Board believes that reducing the minimum flow requirement to 0.8 csm instead of to 0.5 csm with stepped-down withdrawals below 0.75 csm is a reasonable means of lessening the habitat loss pursuant to subcriterion (ii).

Concerning subcriterion (iii), as discussed above, the Board is not persuaded that there are no reasonably acceptable alternative sites owned or controlled by Okemo for additional storage capacity. While finding such alternatives may require the reconstruction of the West Hill Reservoir or the placing of several above-ground structures, Okemo provided little concrete evidence that these would not be reasonably possible.

The Board has previously considered the efficiency of a snowmaking system relevant to its consideration of alternative sites. Re: Killington, Ltd. and International Paper Realty Corp., supra, at 27. With regard to the efficiency of Okemo's snowmaking system, the Board is persuaded that Okemo uses the most efficient snowmaking equipment available and that its snowmaking employees are trained in the most efficient use of the equipment.

The conclusion of the Board that the project will destroy and significantly imperil necessary wildlife habitat, and its negative conclusions with respect to the subcriteria of Criterion 8(A), are based upon the Step-Down Proposal that would allow withdrawal of water down to a minimum flow of 0.5 csm. The Board believes, however, that if Okemo were to restrict the withdrawal so that a minimum downstream flow of 0.8 csm is maintained, the habitat would not be significantly imperiled or destroyed. In that case, the three subcriteria are not relevant and Okemo satisfies Criterion 8 (A).

D. Criterion 9(K)

Criterion 9(K) requires an applicant to demonstrate that if its project involves lands adjacent to public lands, the development "will not unnecessarily or unreasonably endanger the public or quasi—public investment in the …lands, or materially jeopardize or interfere with the function, efficiency, or safety of, or the public's use or enjoyment of or access to the …lands."

The Board concludes that the applicable section of the Black River constitutes a public investment within the meaning of Criterion 9(K). The river is used for fishing and other recreation by the public, and the State has stocked it with rainbow trout.

Okemo has agreed to provide access to the public for continued fishing. However, the Board is concerned that the loss of the habitat projected to occur with the Step-Down Agreement will materially jeopardize the public's use and enjoyment of the recreational benefits of the river to the extent that the habitat loss will result in decreased fish populations.

Thus, with regard to Okemo's withdrawal proposal, the Board must conclude that Okemo has not demonstrated compliance with Criterion 9(K). As discussed above, the Board believes that restricting the minimum downstream flow to 0.8 csm would afford reasonable protection to the habitat. Accordingly, at a minimum flow of 0.8 csm, the Board concludes that the public's investment in and use and enjoyment of the Black River will not be materially jeopardized.

V. ORDER

Okemo is authorized to increase its water withdrawal in the Black River as long as the flow downstream from the point of withdrawal is maintained at a minimum rate of 0.8 csm. At no time may Okemo withdraw at a rate greater than 3,000 gpm. On this basis, Land Use Permit Amendment #250351-12A-EB is hereby issued. Jurisdiction is returned to the District #2 Environmental Commission.

Dated at Montpelier, Vermont this 27th day of March, 1992.

ENVIRONMENTAL BOARD

_*/s/Charles Storrow*_____
Charles F. Storrow,Acting Chair
Lixi Fortna
Arthur Gibb
Samuel Lloyd
Anthony Thompson
Lawrence Bruce
Robert Opel