

# Interbasin Transfers in Vermont: Review of Existing Regulatory Framework

Jeff Crocker

Act 173: Surface Water Diversion and Transfer Study Group

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# Purpose and Goal

## Study Group Duty:

- Recommend whether or not surface water transfers between watershed should occur.
  - Currently, one interbasin transfer of surface waters in Vermont.
  - Review existing regulatory framework used by the Agency during the permitting process.
  - Group discussion on regulatory framework and interbasin transfers.

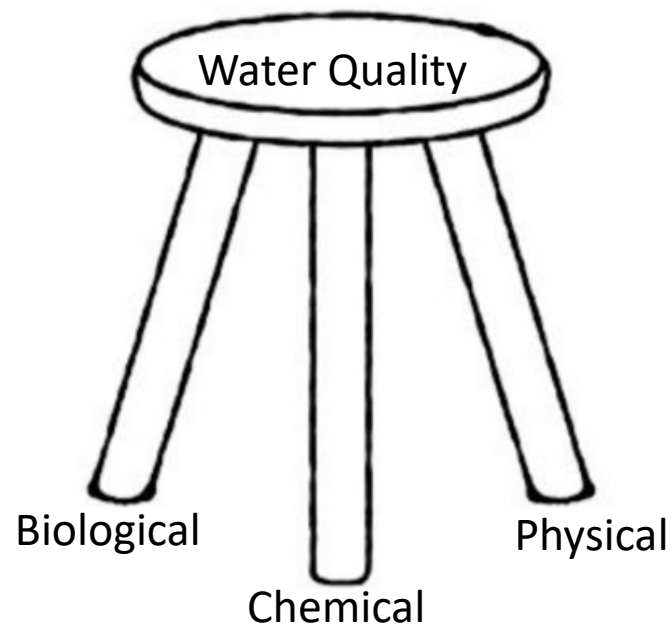
# Vermont Water Quality Standards

*“A water quality standard defines the water quality goals of a water body, or portion thereof, by designating the use or uses to be made of the water and by setting criteria necessary to protect the uses.”*

40 CFR 131.2

## Components:

- Physical
- Biological
- Chemical



# Killington / Pico Snowmaking System

- Killington Snowmaking System

- Four surface water withdrawals
  - Falls Brook
  - Roaring Brook
  - Ottauquechee River
  - Woodward Reservoir
- Two reservoirs
  - Bear Mountain Pond – 1.5 Mgal
  - Snowshed Reservoir – 24 Mgal

- Pico Snowmaking System

- Two surface water withdrawals
  - Upper Mendon Brook
  - Lower Mendon Brook
- Two reservoirs
  - Upper and Lower Reservoir – 6 Mgal

# Interbasin Transfer Proposal

- To construct an approximately 8,800-foot pipeline that would interconnect the Killington and Pico snowmaking systems. The pipeline would transport water from Killington to Pico on a as needed basis for snowmaking.
  - Transfer of surface water from the Ottauquechee watershed to the Otter Creek watershed.
- Additionally, proposed to increase conservation flows to the applicable hydrologic standards at existing water withdrawals and to modify the water level management regime at Woodward Reservoir.

# Interbasin Transfers: Existing Regulatory Framework

*Protects Hydrology, Water Quality, Aquatic Biota, and Aquatic Habitat*

## **Waters of Origin**

- Vermont Water Quality Standards
  - Hydrology Criteria  
(Streamflow Protection)  
(Water Level Fluctuation)
- Snowmaking Rule
- Agency Procedure for Determining Minimum Streamflows

## **Receiving Waters**

- Vermont Water Quality Standards
  - Hydrology Criteria  
(High Flow Regime)
  - Water Chemistry Criteria
  - Aquatic Habitat Criteria  
(Stream Processes)
- 10 V.S.A. § 1454 (Transport of Aquatic Plant and Animal Species)

# Existing Regulatory Framework for the Waters of Origin

# Hydrology Criteria – Streamflow Protection

- Class A(2) and B(2) Waters for Aquatic Habitat or Recreation – Boating. Any change from the natural flow regime shall provide for maintenance of flow characteristics that ensure the full support of uses and comply with the applicable water quality criteria. The preferred method for ensuring compliance with this subsection is a site specific flow study or studies. In the absence of site specific studies, the Secretary may establish hydrologic standards and impose additional hydrologic constraints, consistent with any applicable *Agency of Natural Resources rule or procedure*, to ensure compliance with the requirements of this subsection.

## Action

- Water withdrawals for Snowmaking Rule
  - Site-specific February median conservation flow



# Hydrology Criteria – Water Level Fluctuation

- Class A(2) and B(2) Waters for Aquatic Habitat or Recreation – Boating. Lakes, ponds, reservoirs, riverine impoundments, and any other waters may exhibit artificial variations in water level when subject to water level management, but only to the extent that such variations ensure full support of uses.

## Action

- Littoral Habitat Assessment of Woodward Reservoir was conducted to develop an acceptable water level management regime.

# Existing Regulatory Framework for the Receiving Waters

# Hydrology Criteria – High Flow Regime

- Class A(2) and B(2) Waters for Aquatic Habitat or Recreation – Boating. No change from the natural flow regime that would result in runoff causing an increase in the frequency, magnitude, or duration of peak flows adversely affecting channel integrity or prevent the full support of uses.

## Action

- Conducted a hydrologic analysis of how the increase water in form of snow and runoff could potentially increase magnitude or duration of peak flows.
  - Conditions included a runoff management plan.

# Aquatic Habitat Use

- Management Objectives. Waters shall be managed to achieve and maintain high quality aquatic habitat. The physical habitat structure, *stream processes*, and flow characteristics of rivers and streams and physical character and water level of lakes and ponds necessary to fully support all life-cycle functions of aquatic biota and wildlife, including overwintering and reproductive requirements, are maintained and protected.
- Criteria. Rivers and Streams. Changes to flow characteristics, physical habitat structure, and *stream processes* limited to moderate differences from the natural condition and consistent with the full support of high quality aquatic habitat

# Aquatic Habitat Use – Stream Process

- “Stream processes” means the hydrologic, bed-load sediment, and large woody debris regimes of a particular stream reach and is a term used to describe stream channel hydraulics, or the erosion, deposition, sorting, and distribution of instream materials by the power of flowing water. Stream processes work toward an equilibrium condition, are governed by flow characteristics, stream morphology, channel roughness, and floodplain connectivity and, in part, determine physical habitat structure and aquatic habitat quality

## Action

- Conducted a geomorphic assessment of stream that would potentially high volume of runoff to assess channel integrity.
  - Instream channel restoration (i.e., replacement of under sized culvert)

# Aquatic Invasive Species

- 10 VSA § 1454 (a) Transport of aquatic nuisance species; prohibition. A person shall not transport an aquatic plant, aquatic plant part, or aquatic nuisance species to or from any Vermont water.

## Action

- Aquatic invasive species monitoring program required that identifies steps the Applicant shall complete. Includes immediately ceasing the transfer of water to Pico.

# Interbasin Transfers: A Case Study

## *Killington/Pico Interconnect*

### **Waters of Origin – Ottauquechee River**

- Conservation flows consistent with the hydrology criteria to support aquatic habitat (and other uses)
  - October 1 to March 31 - Site specific FMF as prescribed by the Snowmaking Rule
  - April 1 to May 31 and June 1 to September 30 – Seasonal median flows consistent with Procedure

### **Receiving Waters – Mendon Brook**

- Flow regime that does not adversely affect channel integrity, water quality, or alter stream processes
  - Hydrology and Geomorphology study
  - Runoff management and instream restoration measures
- Aquatic Invasive Species monitoring and operational protocols

Questions / Discussion