

Carnelian-Marine-St. Croix Watershed District

# TURTLE LAKE WEIR OPERATIONAL PLAN

For

BIG MARINE LAKE – TURTLE LAKE CONTROLS

LAST REVISED March 2017

APPROVED April 12, 2017

TURTLE LAKE WEIR OPERATIONAL PLAN  
for BIG MARINE-TURTLE LAKE CONTROLS

**A. PURPOSE & DISCHARGE CONTROL**

1. Big Marine Lake Outlet Structure: This weir was constructed to alleviate high water problems that caused structural damage to public and private real property and the degradation of water quality in Big Marine Lake due to inundation of septic systems on riparian property. Control of the discharge rate from Big Marine Lake has been established at the Big Marine Lake Outlet Structure. By design, this weir is a fixed crest weir at an elevation of 940.8 (NGVD 29) with a set capacity and no provisions for operation or control of discharge rates. Discharge rates are fixed in the DNR-approved design and controlled by the fixed crest weir length.
  
2. Turtle Lake Weir: Control of the discharge rate and elevation of Turtle Lake and upstream wetlands has been established at the Turtle Lake Weir. This weir was established to maintain a range of water elevations in Turtle Lake and surrounding wetlands to protect and reflect the natural characteristics and hydrologic function of the area and to maintain the recreational and commercial usage of these areas by the riparian property owners. This weir has two 7-foot stop log bays with a total depth of 16-inches. Each bay of the weir is equipped with one 8-inch and two 4-inch stop logs. The 8-inch stop logs have long been considered “permanent” stop logs, installed all year round. The 4-inch stop logs are considered “removable” stop logs and are installed and removed according to the flow control procedures identified in Paragraph “D”. The weir elevation with all stop logs installed is 940.0 (NGVD 29). During extreme rainfall events, high water levels will be experienced throughout the watershed district regardless of the control exercised at Turtle Lake. This is due to additional inflows from the Carnelian Creek Watershed, and the reduction in outflow from Big Marine Lake caused by restrictions at the culvert under 155th Street.

**B. AGREEMENTS WITH MNDNR**

1. Agreements made with the Minnesota Department of Natural Resources (MNDNR) call for the water surface elevation on the south side of County Road 4 to be targeted at an elevation of 940.6 (0.2-ft below the Big Marine Outlet Structure Crest).
  
2. The Minnesota Department of Natural Resources requires the “permanent” installation of the 8-inch stop logs at in the Turtle Lake Weir at all times. The 8-

inch stop logs are only to be removed upon motion by the CMSCWD Board and approval from the Minnesota Department of Natural Resources. Any motion for the removal of the 8-inch logs must include provisions for their reinstallation within 90 days of their removal.

3. There is no expiration date set for this plan. There is also no requirement to revise the plan. The plan may be revised by CMSCWD and submitted for approval by the MNDNR any time CMSCWD deems necessary. Notwithstanding the above, on or before October 1, 2020, the District shall submit to the DNR any amendments to this Management Policy and Operating Procedures deemed necessary by the District for the three (3) year period commencing January 1, 2021. At least thirty (30) days prior to any submittal to the DNR, the District shall provide the municipalities within the watershed a copy of the proposed amendments such that sufficient opportunity to submit comments to the DNR is allowed. Within sixty (60) days of receipt, the DNR shall advise the District in writing of the acceptance, rejection, modification or additions to the proposal. This review procedure shall be repeated every three (3) years.

#### **C. FLOW CONTROL PROCEDURE**

##### **1. PURPOSE**

The purpose of this procedure is to:

- a. Maintain the integrity of the wetlands located between the Turtle Lake Weir and County Road 4. It is understood that due to the hydrology of the watershed and hydraulics of the system, water may flow north into Big Marine Lake following significant runoff events.
- b. Maintain as free an outflow over the Big Marine Outlet Structure as possible by attempting to maintain a 0.2 foot difference between upstream and downstream elevations at the Big Marine Outlet Structure when water overtops the Structure. District hydrologic and hydraulic modeling of the system shows that maintaining this 0.2 foot separation or greater maintains a minimum of 90% of the Big Marine Outlet Structure capacity.
- c. To provide some downstream storage capacity for large precipitation events.

##### **2. SUMMER FLOW CONTROL OPERATIONS**

- a. Summer shall be defined as April 1<sup>st</sup> through November 30<sup>th</sup>.
- b. Head-water (Big Marine Lake) and tail-water (wetland south of County Road 4) elevations are to be monitored at least once every two weeks at the Big

Marine Outlet Structure. Two staff gauges will be installed and calibrated annually: one upstream from County Road 4 and one downstream from County Road 4. The gauge installed downstream of County Road 4 will have the target elevation, noted in Paragraph B, clearly demarcated. On a biweekly schedule, stop logs are then added or removed from the Turtle Lake Weir according to the procedures below.

- c. When Big Marine Lake is not discharging all 4-inch stop logs of the Turtle Lake Weir are to be installed after the tail-water elevation (south side of County Road 4) is below the crest of the Big Marine Lake Outlet Structure by more than 0.2 feet.
- d. When Big Marine Lake is discharging and the tail-water surface elevation has risen to a point where it is at or less than 0.2 feet below the Big Marine Outlet Structure crest all 4-inch stop logs will be removed from the Turtle Lake Weir.
- e. The process of removing and installing the 4-inch stop logs will continue on a biweekly basis throughout the summer.

### 3. WINTER FLOW CONTROL OPERATIONS

- a. Winter shall be defined as December 1<sup>st</sup> through March 31<sup>st</sup>.
- b. All 4-inch stop logs will be removed for the winter season.
- c. The 8-inch stop logs will remain in place for the winter season.

### D. MAINTENANCE

1. Normal maintenance by the CMSCWD at or upstream of the Big Marine Outlet Structure includes removal of accumulated vegetation (and ice) from the outlet grate, floating bog control upstream of the weir, and sediment excavation, as necessary, at the Lohman Narrows.
2. The channel from Big Marine Lake to May Avenue will be inspected on an annual basis with maintenance excavation scheduled as necessary. MnDNR will be informed on planned maintenance activities under the existing permit.