

Dynamic Weir

The problem

During heavy rainfall periods, the combined flows from the Bear Creek and Lake Sammamish basins exceed the capacity of the Sammamish River. In these cases Bear Creek flow backs up the flow from the lake and the lake fills up.

Candidate solutions

1. Dredge the river to restore its capacity
2. Create a large stormwater retention system for the Bear Creek basin to reduce its contribution during heavy rainfall periods
3. Lower the lake in advance of these rainy periods to increase its capacity for storage without going excessively high

Assessment of these solutions

Dredging the river (#1) and creating a large retention system for Bear Creek (#2) are clearly impractical, at least in the near term, and may face insurmountable hurdles...

(cost, land acquisition, fishery regulations, etc.)

Assessment of these solutions

Lowering the lake in advance of rainy periods (#3) is quite workable; create a “dynamic weir”

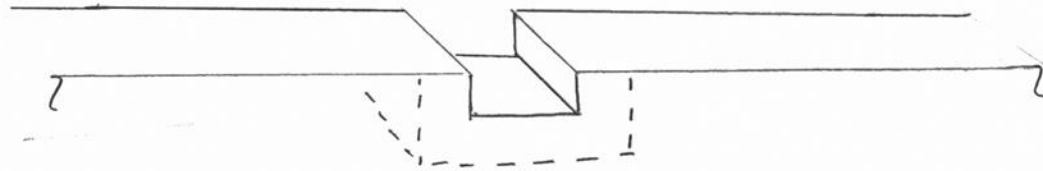
Existing weir



Existing weir

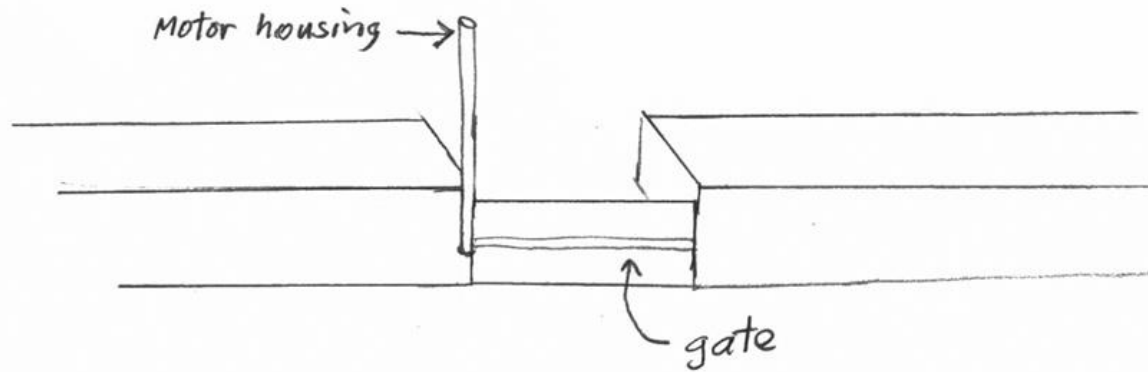
- Basically a very low dam with a slot in it
- Purpose is to limit minimum lake level in late summer while still allowing fish passage
- Once level of the river goes above that – early in the rainy season – weir does not have any further effect on outflow from the lake; basic capacity of the river dominates

Concept of a dynamic weir



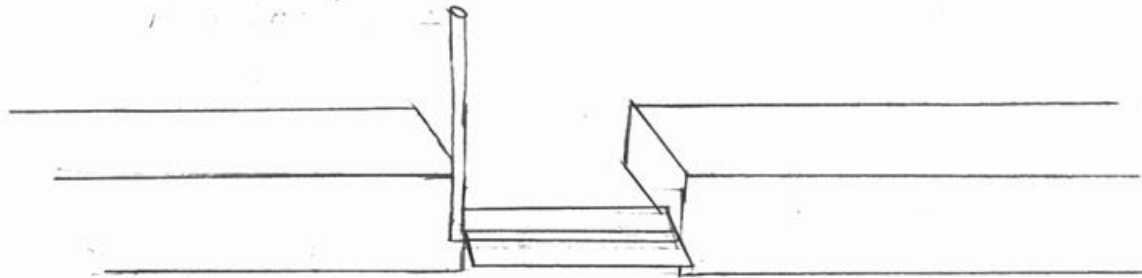
Enlarge notch in existing slab

Concept of a dynamic weir



Add gate at upstream side of slot

Concept of a dynamic weir



Gate shown partially opened

Concept of a dynamic weir

- Use lake as giant catch basin
- Open gate to release more water in advance of forecast heavy rain. Thereby, reduce lake level temporarily so lake can accommodate the increased inflow without going excessively high

Concept of a dynamic weir

- Gate driven by electric motor in column
- Operable from shore or remote location
- Gate pivots on central axis to minimize control force required
- Gate sized so that when closed, flow over it is equivalent to existing low-flow notch, but...
- Gate can be opened slightly to increase flow for fish migration if desired

Is a dynamic weir practical?

In principle, yes. Analysis needs to be performed to determine:

- by how much the notch in the weir needs to be enlarged to allow sufficient increased flow
- how far in advance of forecast heavy rain events the gate needs to be opened

The county needs to follow thru on the promised “dynamic weir analysis” to determine this.

Is a dynamic weir affordable?

It should be. The concept is relatively simple and its implementation straightforward.

Conceptual model

