

Water Diversion Engineering

⦿ Off-Channel Storage

- Typically managing the diversion of small flows
- Typically passing large flows downstream (without managing them)

⦿ In-Channel Storage

- Typically managing and passing a design peak flow downstream until reservoir fills

Typical Flow Management

⊙ Orifice

- Piped outlet
- Gated outlet

⊙ Weir

- Fixed spillway
- Gated spillway
- Adjustable spillway

South Yamhill Example

- ◎ 85 Percent Peak Average Flow - 6,050 Cubic Feet per Second (cfs)
- ◎ 15 Percent Peak Average Flow - 1,010 cfs
- ◎ Off-Channel Storage Flow Control
 - Divert and control up to 1,010 cfs
 - 40-foot-long fixed weir at 4 feet deep, or
 - 8-foot gate for orifice control (small motor operator - approximately 1 horsepower)
 - Flood flows stay in main channel

South Yamhill Example

- ◎ In-Channel Storage Flow Control
 - Orifice control while filling - pass 6,050 cfs downstream
 - 15-foot x 15-foot gate is needed, but not practical
 - Use 10-foot x 10-foot, 8-foot x 8-foot, and 6-foot x 6-foot gates
 - Flood flows are stored in reservoir until full
 - Weir control after full - pass probable maximum flood
 - This is a requirement for all in-channel storage no matter what diversion method or rate is used

Catherine Creek Example

- ◎ 85 Percent Peak Average Flow - 430 cfs
- ◎ 15 Percent Peak Average Flow - 80 cfs
- ◎ Off-Channel Storage Flow Control
 - Divert and control up to 80 cfs
 - 10-foot-long fixed weir at 2 feet deep, or
 - 4-foot gate for orifice control
 - Flood flows stay in main channel

Catherine Creek Example

- ◎ In-Channel Storage Flow Control
 - Orifice control while filling - pass 430 cfs downstream
 - 6-foot x 6-foot orifice control, or
 - 45-foot-long weir at 2 feet deep
 - Store all flood flows until full
 - Weir control after full - pass probable maximum flood
 - This requirement exists for basically all in-channel storage dams

Off-Channel Feasibility Considerations

- ⦿ Off-channel storage is easier to provide fish passage.
- ⦿ Feasible off-channel storage is difficult to locate.
- ⦿ Off-channel storage is more expensive to build if a natural canyon is not used.
- ⦿ Off-channel diversion improvements will be similar in size and costs as existing diversions.

In-Channel Feasibility Considerations

- ⦿ In-channel storage is more common.
- ⦿ In-channel storage is easier to site.
- ⦿ In-channel storage provides fish passage concerns that can be expensive to address.
- ⦿ In-channel storage removes flood flows above the peak design flow until storage is full.