

Skagit Feasibility - Alternatives for Analysis

Alternative 1, Swinomish Diversion Channel

1. Up to a 25 year flood event contained within the existing levees.
2. In 3 bridge corridor, between Burlington and Mount Vernon, set back levee 500 feet including 20 foot deep bank excavation. Lengthen the 3 bridges.
3. Inlet structure on River Bend, to the Southwest, will allow 80,000 cfs into a 2,000 foot wide diversion channel that will empty into the Swinomish Channel. Channel will only be used in floods greater than a 25 year frequency. Improvements in channel will include habitat and flooded areas. Provide sheet pile grade control structure in the channel.
4. Provide 2 bridges across the channel to cross channel during 100 year flood event. Remainder of local roads would be flooded during a 25 year flood event.

Benefits of this alternative

1. The river contains a 25 year event.
2. The Diversion Channel carries 80,000 cfs.
3. The flood plain is protected from the 100 year flood.
4. Habitat areas can be built in the diversion channel, inside setback levee and the diversion channel outlet.
5. Low flow channel can be built in the diversion.

Acreage required for this Alternative is 2,500 acres.

Alternative 2, Small Swinomish Diversion Channel

1. Up to a 50 year flood event contained within the setback levees.
2. In 3 bridge corridor, between Burlington and Mount Vernon, set back levee 500 feet including 20 foot deep bank excavation. Lengthen the 3 bridges.
3. Inlet structure on River Bend will allow 40,000 cfs into a 1,000 foot wide diversion channel that will empty into the Swinomish Channel. Channel will only be used in floods greater than a 50 year frequency. Improvements in channel will include habitat and flooded areas. Provide sheet pile grade control structure in the channel.
4. Provide 2 bridges across the channel to cross channel during 100 year flood event. Remainder of local roads would be flooded during a 50 year flood event.
5. In West Mount Vernon; set back levee to Ball Street and include 20 foot deep bank excavation. Lengthen highway bridge.
6. Downstream of MV, set back levees combined total of 500 feet, no bank excavation. Taper back to natural channel at bridges on both North and South Forks.

Benefits of this alternative

1. The river contains a 50 year event.
2. The Diversion Channel carries 40,000 cfs.
3. The flood plain is protected from the 100 year flood.
4. Low flow channel can be built in the diversion.
5. Habitat areas can be built in the diversion channel, inside setback levee and the diversion channel outlet.

Acreage required for this Alternative is 3,400 acres.

Alternative 3, Ring Dike with selective Overtopping

1. Up to a 25 year flood event contained within the existing levees.
2. In 3 bridge corridor, between Burlington and Mount Vernon, set back levee 500 feet including 20 foot deep bank excavation. Lengthen the 3 bridges.
3. In West Mount Vernon; set back levee to Ball Street and include 20 foot deep bank excavation. Lengthen highway bridge.
4. Dike for 100 year protection 1. between Sedro Woolley and Burlington, 2. ring dike Burlington, 3. West mount Vernon, 4. Mount Vernon and 5. Levee from South end of Mount Vernon to mouth. This will protect the transportation corridor, also.
5. Provide overtopping sections for 25 year events or greater at 1. River Bend, a 1,000 foot overtopping section, to the East, 2. River Bend, a 4,000 foot overtopping section, flooding to the West, 3. Fir Island, a 1,000 foot overtopping section and 4. North of the North Fork a 2,000 foot overtopping section to flood the area towards La Conner, Swinomish Channel and Padilla Bay. Overtopping levees prevent catastrophic failure of the dike when higher floods overtop levee design heights.

Benefits of this alternative

1. The river contains a 25 year event.
2. The Overtopping carries 80,000 cfs.
3. Transportation corridor is protected, including I-5.
4. Habitat areas can be built inside setback levee.

Acreage required for this Alternative is 500 acres.

Negative points

1. The flood plain is not protected from the 100 year flood
2. 60 square miles will be flooded in a 25 year frequency event.

Alternative 4, Ring Dike with Overtopping

1. Up to a 25 year flood event contained within the existing levees.
2. In 3 bridge corridor, between Burlington and Mount Vernon, set back levee 500 feet including 20 foot deep bank excavation. Lengthen the 3 bridges.
3. In West Mount Vernon; set back levee to Ball Street and include 20 foot deep bank excavation. Lengthen highway bridge.
4. Dike for 100 year protection 1. ring dike Burlington, 2. West Mount Vernon, 3. Mount Vernon and 4. South end of Mount Vernon. This will NOT protect the transportation corridor.
5. Provide overtopping sections for 25 year flood events or greater at 1. Downstream of Sedro Woolley a 1,000 foot overtopping section, 2. River Bend, a 1,000 foot overtopping section, to the East, 2. River Bend, a 3,000 foot overtopping section, flooding to the West, 3. Fir Island a 1,000 foot overtopping section, 4. North of the North Fork, a 2,000 foot overtopping section to flood the area towards La Conner, Swinomish Channel and Padilla Bay and 5. East from the South Fork, a 1,000 foot overtopping section, flooding the area South of Mount Vernon. Overtopping levees prevent catastrophic failure of dike when higher floods overtop levee design heights.

Benefits of this alternative

1. The river contains a 25 year event.
2. The Overtopping carries 80,000 cfs.
3. Habitat areas can be built inside setback levee.

Acreage required for this Alternative is 500 acres.

Negative points

1. The flood plain is not protected from the 100 year flood
2. 90 square miles will be flooded in a 25 year frequency event.
3. The transportation corridor is not protected, including I-5

Alternative 5, Setback Levee

1. Up to a 100 year flood event contained within the setback levees.
2. In 3 bridge corridor, between Burlington and Mount Vernon, set back levee 500 feet including 20 foot deep bank excavation. Widen River down to 536 Bridge. Lengthen the 3 bridges.
3. In West Mount Vernon; set back levee to Wall Street and include 20 foot deep bank excavation. Lengthen highway bridge.
4. Downstream of MV, set back levees combined total of 1,000 feet, no bank excavation. Taper back to normal at bridge on North Fork. Continue to setback the levees to the fork in the sloughs, downstream of Conway on the South Fork.
5. Widen area by Conway 500 feet and excavate the bank. Lengthen the bridge.

Benefits of this alternative

1. The river contains a 100 year event.
2. The flood plain is protected from the 100 year flood.
3. Habitat areas can be built inside setback levee.

Acreage required for this Alternative is 2,300 acres.

Alternative 6, Samish Diversion Channel

1. Up to a 25 year flood event contained within the existing levees.
2. Inlet structure between Sedro Woolley and Burlington will allow 80,000 cfs into a 1,500 foot wide diversion channel that will empty into the Samish Bay. Channel will only be used in floods greater than a 25 year frequency. Improvements in channel will include habitat and flooded areas. Provide sheet pile grade control structure in the channel.
3. Provide bridges across the channel during 100 year flood event. They include I-5, Highway 99 and Rail Road. At Sedro Wooley, bridges would also be required at Highway 20 and the Railroad. Remainder of local roads would be flooded during a 25 year flood event.

Benefits of this alternative

1. The river contains a 25 year event.
2. The Diversion Channel carries 80,000 cfs.
3. The flood plain is protected from the 100 year flood.
4. Habitat areas can be built in the diversion channel, and the diversion channel outlet.
5. Low flow channel can be built in the diversion.

Acreage required for this Alternative is 2,000 acres.

Alternative 7, North Swinomish Diversion Channel (along Highway 20)

1. Up to a 25 year flood event contained within the existing levees.
2. In 3 bridge corridor, between Burlington and Mount Vernon, set back levee 500 feet including 20 foot deep bank excavation. Lengthen the 3 bridges.
3. Inlet structure on River Bend, to the Northwest, will allow 80,000 cfs into a 2,000 foot wide diversion channel that will empty into the Swinomish Channel. Channel will only be used in floods greater than a 25 year frequency. Improvements in channel will include habitat and flooded areas. Provide sheet pile grade control structure in the channel.
4. Provide 2 bridges that cross channel during 100 year flood event. Remainder of local roads would be flooded during a 25 year flood event.

Benefits of this alternative

1. The river contains a 25 year event.
2. The Diversion Channel carries 80,000 cfs.
3. The flood plain is protected from the 100 year flood.
4. Habitat areas can be built in the diversion channel, inside setback levee and the diversion channel outlet.
5. Low flow channel can be built in the diversion.

Acreage required for this Alternative is 2,500 acres.

Other Alternatives,

Additional Flood Control at Existing Dams

- Additional flood control storage will not have a dramatic reduction in downstream flooding.
- Reduce peak flows by 5,000 cfs

Sauk River Dam

- Endangered species considerations would probably lead to a jeopardy determination for chinook and bull trout if the dam is built.
- Wild and Scenic River Designation prohibits structure
- Inundation of spawning and rearing areas
- Delays in passage of adult and juvenile fish
- Alterations in downstream flows (could be positive or negative)
- Loss of riparian vegetation
- Loss of wildlife habitat
- Creation of waterfowl habitat

Dredging

- Dredging the river to convey the 100 year flood would require over a 10-20 foot dredge depth from the mouth to Sedro Wooley, 20 miles. (60,000,000 cu. yds.)
- Short term fix to the problem and would have a high O&M cost.
- Severe impact to fish habitat
- Regular disruption of habitat due to ongoing maintenance. Migration of fish would be impacted.

Avon By Pass

- Direct ecological and hydraulic impacts to Padilla Bay
- Appears to be prohibited by enabling regulations for Estuary Reserve