Overview of No Action Alternative

No Action

The Satsop River in the study reach (SR 12 to the Chehalis River) is constrained at several locations including the Highway 12 bridge at its upstream end and at least 4 riprap revetments (as shown in the attached figure). Although the overall condition of the revetments has not been investigated, several of them exhibit obvious failures over some portion of their length. Within the constraints provided by the revetments, the Satsop River has historically migrated aggressively in some locations, laterally shifting hundreds of feet in a few years, eroding tens of acres of farmland, and threatening homes and public and private infrastructure (Key Road, WDFW boat ramp, Port of Grays Harbor well). In particular the lateral movement of the river since 1997 appears to be more aggressive and widespread than what was seen between the 1940s and 1996. Channel migration, at least in the reach just downstream of SR 12, appears to have been exacerbated by significant sediment deposition during the March 1997 flood event. In addition to risks from lateral migration, the study reach is also prone to significant flooding from both the Satsop and Chehalis Rivers. The "No Action" alternative included in each element below should not be taken to imply that current conditions will continue unchanged. Instead it means that historical channel migration, bank erosion, and flooding will continue and the reach will continue to evolve over time. While future evolution of the river in the study reach is difficult to predict the current situation poses significant risks to Keys Road, the Port well site, the Willis property and residence, and the Scott property, among others.

Element	Potential Actions	Description of Action	Potential Benefits of Action	Potential Consequences of Action	Implementation Issues	Discussion of Actions
Rip-rap revetment	No Action					
	Complete removal	Remove the entire rip-rap revetment.	Removal of the entire rip-rap revetment will free the river to migrate in this reach and would increase river connectivity with the left bank including portions of the WDFW property. This may reduce flow in the main channel and in the right overbank.	If the entire revetment is removed it is likely that the current river bend along the revetment will shift to the east and southeast, which will threaten Keys Road. Ultimately the bend may migrate far enough to encroach upon the WDFW property and may capture the WDFW ponds. Responses in other parts of the system, including the west bank downstream of the rip-rap revetment, may be seen although these are more difficult to predict. Removal of the revetment will require significant disturbance to the river bank and riparian vegetation.	Permitting Complexity: Moderate Anticipated Cost: High Land Acquisition: None	Risk to Keys Road is high. Would require additional modeling and analysis if pursued.
	Partial Removal	Remove a portion of the revetment (approximately 500-1000 feet) at its southwest end.	Removal of a portion of the revetment will increase the river connectivity with the left bank including portions of the WDFW property. This may reduce flow in the main channel and in the right overbank. The northeast portion of the revetment would be retained (and repaired) to continue to provide protection to Keys Road.	Channel response along the west bank downstream of the rip-rap revetment is difficult to predict. Areas where the revetment is removed will require significant disturbance to the river bank and riparian vegetation.	Permitting Complexity: Moderate Anticipated Cost: Moderate Land Acquisition: None	Requires additional modeling and analysis to evaluate benefits/impacts and to refine design.
	Lower bank elevation or create notches	Lower the bank elevation or create notches (small overflow sections) in the left bank of the river along the revetment but leave the riprap in place to prevent lateral migration of the river.	Lowering the crest of the left bank or creating notches in the bank along the riprap would temporarily increase river connectivity with the left bank floodplain including portions of the WDFW property.	If the revetment is not removed, and the river is held in place at its current location, the river will, over time, deposit sediment along the top of this bank filling any created notches and/or raising the ground elevation of a lowered bank. This action would require disturbance to river bank and riparian vegetation along some or all of the revetment.	Permitting Complexity: Moderate Anticipated Cost: Moderate Land Acquisition: None	Short term impact to riparian corridor may exceed potential benefit. Would require additional modeling and analysis if pursued.
	Partial removal and lower crest	Combine removal of some portion of the rip-rap with lowering of the crest of the remainder of the left bank.	Would gain the benefits of both the partial rip-rap removal and lower bank elevation actions.	Would require significant disturbance to river bank and riparian vegetation. Long term it is uncertain how effective lowering the bank crest will be in reconnecting the floodplain.	Permitting Complexity: Moderate Anticipated Cost: Moderate Land Acquisition: None	See above
	Repair failure near upstream end	Replace and repair riprap at the point near the upstream end of the revetment that has failed. Rebuild bank to pre-failure conditions.	Repair of the recent failure would restore the previous erosion protection to Keys Road and the surrounding properties.	This action would require work in the channel.	Permitting Complexity: High Anticipated Cost: Moderate Land Acquisition: None	Required to restore historical protection to Keys Road. Would require additional modeling and analysis.
Right bank revetment	No action					
	Remove	Complete or partial removal of the riprap revetment along the right bank across from the primary revetment.	Removal of this revetment would likely allow the river to migrate to the west.	This revetment currently deflects and redirects flow to the south and prevents the river from migrating towards the west. Removal of the revetment could lead to substantial loss of farmland.	Permitting Complexity: Moderate Anticipated Cost: Moderate Land Acquisition: None	Little benefit and high potential risks. Would require additional analysis if pursued.
Scott revetment	No action					
	Remove	Complete or partial removal of the riprap revetment along the left bank upstream from the primary revetment.	Removal of this revetment would allow the river to migrate to the east .	This revetment currently deflects and redirects flow to the south and prevents the river from migrating to the east. Removal of this revetment could allow the river to outflank the downstream revetment, erode substantial farmland, and/or threaten Keys Road.	Permitting Complexity: Moderate Anticipated Cost: Moderate Land Acquisition: None	Little benefit and high potential risks. Would require additional analysis if pursued.
	Relocate or reconfigure	Change the location or orientation of the revetment to better accommodate today's flow conditions.	Reconfiguration of the revetment could improve hydraulic conditions reducing the potential for failure of this revetment or the downstream revetment. This would enhance protection for Keys Road.	This action would require work in the channel which may be difficult to permit.	Permitting Complexity: High Anticipated Cost: High Land Acquisition: Moderate	Likely high cost with limited apparent benefit. Would require additional modeling and analysis if pursued.
Keys Road	No action (Emergency Repairs only)	Status quo				Address problems if they arise.

Element	Potential Actions	Description of Action	Potential Benefits of Action	Potential Consequences of Action	Implementation Issues	Discussion of Actions
Port of Grays Harbor Well	No action					
	Relocate Well and remove rip-rap	Relocate the Port well to a new site away from the Satsop River.	Relocation of the well would eliminate risks associated with Satsop River bank erosion. It would also allow the existing protective revetment to be removed, allowing channel migration.	The current protective revetment to the west of the well site provides some protection to Keys Road which would be lost if the rip-rap were removed. Channel responses in other parts of the system, including the west bank downstream of the rip-rap revetment, are difficult to predict with any certainty.	Permitting Complexity: Low Anticipated Cost: High Land Acquisition: None	High cost (evaluation is beyond the scope of the current study).
	Repair rip-rap failure	A section of the current riprap has slumped several feet indicating a possible problem with the stability of the protection.	The cause and extent of the current problem would be investigated and a repair designed. The repair would seek to restore the revetment to its original design condition.	The cause and extent of the current problem would be investigated and a repair designed. The repair would seek to restore the revetment to its original design condition and address future channel changes.	Permitting Complexity: Moderate Anticipated Cost: Unknown Land Acquisition: None	Localized problem that should be evaluated, but is beyond the scope of the current study.
	Extend rip-rap to tie in to Keys Road	The river is currently migrating to the east near the upstream end of the revetment. This option would extend the revetment to Keys Road to prevent the river from outflanking the well site.	This option would enhance the protection of the well and Keys Road.	Channel responses in other parts of the system, including the west bank downstream of the rip-rap revetment, may occur if the revetment is modified. However these are difficult to predict with any certainty.	Permitting Complexity: Moderate Anticipated Cost: Moderate Land Acquisition: None	Additional localized enhancement of the well bank protection could be investigated.
Channel modifications	No action					
	Bar scalping	Removal of gravel from specific bars in the study reach.	Targeted gravel removal could temporarily reduce the propensity for the river to migrate which could reduce bank erosion and loss of floodplain property.	This action would require work within the ordinary high water line and may be difficult to permit.	Permitting Complexity: High Anticipated Cost: Low Land Acquisition: None	Additional modeling and analysis could be undertaken to evaluate benefits.
	Initiate avulsions	Cut pilot channels at targeted location in the floodplain to initiate chute cutoffs	Avulsions could temporarily reduce the meandering of the river which could reduce bank erosion and loss of floodplain property.	This action would require work within the ordinary high water line and will be difficult to permit. It will also be difficult to predict, with any certainty, the channel response to an avulsion and as such some properties may be harmed by the action.	Permitting Complexity: High Anticipated Cost: Low Land Acquisition: None	If permitable, this action would likely provide some short term benefit. Longer term response of the river is difficult to predict. Would require additional analysis.
Bank Migration Control	No action					
	Add barbs	Install rock barbs throughout the study reach to contain channel migration to the current planform.	Maintenance of the current planform of the river (minimizing channel migration), if accomplished, would provide the greatest certainty with respect to future flooding and erosion.	Widespread use of barbs to control river migration would be extremely expensive and difficult to permit.	Permitting Complexity: High Anticipated Cost: Very High Land Acquisition: Unknown	High cost and low permitting potential. Would require significant additional modeling and analysis.
	Add Engineered Log Jams (ELJs)	Install engineered log jams throughout the study reach to contain channel migration to the current planform.	Maintenance of the current planform of the river (minimizing channel migration), if accomplished, would provide the greatest certainty with respect to future flooding and erosion.	Widespread use of ELJs to control river migration would be extremely expensive and difficult to design in a manner that would be effective.	Permitting Complexity: High Anticipated Cost: High Land Acquisition: Unknown	High cost and uncertainties in long term performance. Would require significant additional modeling and analysis.
Willis property	No action					
	Purchase land/relocate house	Purchase land and home and allow erosion to continue unabated. Relocate house outside the future meander belt and floodplain of the Satsop River.	Would allow river to migrate freely and enhance public safety. Might eliminate the need for some other actions.	Would require longtime residents to relocate. Future unabated erosion might lead to significant loss of neighboring land and/or an avulsion outside the current channel migration zone	Permitting Complexity: Low Anticipated Cost: Moderate Land Acquisition: High	Option could be evaluated, no additional analysis required.
	Localized bank protection	Design and install bank erosion countermeasures to protect the home from current and future erosion threats.	Would reduce public safety risks and minimize loss of valuable farmland at this location.	Localized bank protection may lead top problems elsewhere in the system. Could be expensive relative to the value of the land. Could be difficult to design in a manner that would be completely effective in the future.	Permitting Complexity: High Anticipated Cost: High Land Acquisition: Unknown	Conceptual design and preliminary cost estimate could be developed.
WDFW Property	No Action					
	Remove dikes and spoils	Remove placed fill on the property to enhance connectivity to the river and improve floodplain conveyance.	Might reduce flow on right bank west of WDFW site which could reduce the likelihood of future bank migration. Removed material could be used to fill in portions of ponds to enhance habitat.	Might allow a headcut to form reaching the Satsop River and leading to a channel avulsion through the property.	Permitting Complexity: Low Anticipated Cost: Moderate Land Acquisition: None	Combine with pond connections as in USACE 2004. Would require significant additional modeling and analysis.
	Connect ponds	Dig shallow channels to connect floodplain ponds to each other and/or to the Satsop River.	Improved hydraulic connectivity could enhance floodplain habitat.	None identified	Permitting Complexity: Low Anticipated Cost: Moderate Land Acquisition: None	Combine with dike and spoils removal as in USACE 2004. Would require significant additional modeling and analysis.
	Remove dikes and spoils and connect ponds	Combine previous two actions (as in USACE 2004 Study Alternative 3B)	Benefits as described for separate actions above.	Potential consequences as described above.	Permitting Complexity: Low Anticipated Cost: Moderate Land Acquisition: None	Perform additional modeling and analysis to evaluate benefits and risks of this alternative.