# Geomorphic Strategy Effects Attachment

Tables 1–6 provide a list, by strategy, of the general reach geomorphic trends addressed (not in order of importance), the geomorphic effects of implementing each strategy in a reach, additional potential strategies that address the same geomorphic trends (complementary strategies), and the geomorphic effects of strategy implementation in downstream and upstream reaches. Observed geomorphic trends may be directly addressed by a strategy through stopping the trend, reducing the trend, reversing the trend, and allowing the trend to continue while reducing the need for river maintenance. The tables describe the geomorphic effects from strategy implementation based on the currently observed relationship between sediment transport capacity and sediment supply. The addressed strategy changes are different if the sediment transport capacity is greater than or less than the sediment supply. If a strategy only lists one condition, such as sediment transport capacity less than sediment supply for Reconstruct and Maintain Channel Capacity, then it can be assumed that this strategy is not applicable to the other condition—sediment transport capacity greater than sediment supply. These are general reach effects; therefore, uncertainty may exist in the magnitude of physical effect. Where the probable magnitude of physical effect is known, it is so stated. In tables 1–6, method categories are used for some strategies where effects of methods within a method category have essentially the same reach effects. For some strategies, specific methods are included where there are dissimilar effects of methods within a method category. Where possible, the effects relating to a common geomorphic response are grouped together. Method categories and methods associated with strategies are described in the River Maintenance Methods Attachment.

**Table 1. Promote Elevation Stability Strategy: Trends Addressed and Geomorphic Effects**

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| **Trends Addressed** | Increased bank height<br>Incision or channel bed degradation<br>Coarsening of bed material<br>Aggradation |
| **Reach Effects**<br><br>*Sediment transport capacity greater than sediment supply (erosional)* | **General**<br>• Strategy maintains or raises bed elevation, but effects upon channel capacity are expected to be small.<br>• Effects evaluation is based upon cross channel features ~ 2 feet high or less.<br>• Fixes local lateral channel location and width (to prevent flanking, except deformable; see below).<br>• Reduces the probability of additional future bed material coarsening.<br>• Stabilizes current bed elevation (except deformable; see below).<br>• Could increase bank erosion if bank stability below erosion threshold. This effect could be local when the future potential channel slope change is small.<br>• Downstream degradation is expected to continue and may create possible fish passage issues. This can be addressed through adaptive management.<br>• Can prevent lateral migration by preventing erosion below root zone or beyond geotechnically stable height. This effect could be local when the future potential slope change is small.<br>*Cross channel features*<br>At bed – Maintain upstream water surface elevation (WSE) at same discharge.<br>• No effect on bed elevation downstream—sediment passes through structure; does not halt downstream channel degradation.<br>• Current slope and upstream bed elevation maintained.<br>Above bed – Raise WSE at same discharge (effects evaluation is based upon low height cross channel structures ~ 2 feet high or less).<br>• Long-term effect is raise bed upstream, ~ height of structure tapering to the next upstream riffle or high point in the bed.<br>• No long-term effect on bed elevation downstream—sediment passes through structure, but local initial degradation possible that would fill in later.<br>• Previous upstream slope is generally recreated.<br>• Temporary – Aggradation from back water effect.<br>• Can promote increased flood plain connectivity and greater velocity and depth variability depending upon the amount of past channel incision.<br>Deformable – Maintain upstream water surface elevation at same discharge. Reduces and slows bed erosion—structure is mobile at design discharge. |

**Table 1. Promote Elevation Stability Strategy: Trends Addressed and Geomorphic Effects**

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| **Reach Effects (continued)** *Sediment transport capacity greater than sediment supply (erosional)* | • Effects are similar to at bed or above bed structures when cross channel feature is intact, except that lateral channel location and width may not be fixed.<br><br>**Complementary strategies:**<br>• Promote Alignment Stability, Increase Available Area to the River– – Increases length of channel.<br>• Manage Sediment – Increases sediment supply.<br>• Rehabilitate Channel and Flood Plain – Reduces sediment transport capacity. |
| **Effects on Upstream/ Downstream Reaches**<br><br>*Sediment transport capacity greater than sediment supply (erosional)* | *Cross channel features*<br>At bed<br>• Upstream effects: Because future channel bed degradation is reduced or halted, there may be a reduced tendency for degradation in the upstream reach. This would most likely result in the bed material size remaining the same, or coarsening at a reduced rate.<br>• Downstream effects: There could be a small reduction in the downstream sediment supply since future degradation is reduced or halted. This is likely to have only a minimal effect upon the downstream reach bed elevation and potential future channel evolution. Bed material size is not likely to be affected in the downstream reach.<br><br>Above bed<br>• Upstream effects: The bed would be raised to the nearest riffle or high point in the bed upstream of the structures. Sediment fills the reach upstream at about the previous slope, which is determined by channel width, hydrology, sediment load and size, bed and bank material size, and any geologic controls, etc. Thus, there would be little, if any, additional effects upon upstream bed elevation, bed material size, or channel slope from those listed for the at bed condition.<br>• Downstream effects: Initially, sand sizes or finer gravel sizes could deposit upstream of these structures depending upon the size of the supplied sediment. This could reduce downstream sediment supply for a temporary period of time. During this temporary period of time, there could be a small amount of downstream channel degradation; however, this effect would be minimal, because the amount of sediment storage upstream of these structures is small. After this temporary period of time, sediment delivery to the downstream reaches would be about the same as pre-implementation. Bed material size is not likely to be affected in the downstream reach.<br><br>Deformable<br>• Effects are similar to the above bed and at bed structures when cross channel feature is intact, except that lateral channel location and width may not be fixed. |

**Table 1. Promote Elevation Stability Strategy: Trends Addressed and Geomorphic Effects**

| **Reach Effects** | **Addressed through complementary strategies:** |
|---|---|
| *Sediment transport capacity less than sediment supply (depositional)* | Reconstruct/Maintain Channel Capacity – Increases sediment transport capacity.<br>Manage Sediment – Reduces sediment supply.<br>Increase Available Area to the River – Increases area for sediment deposition. |
| **Effects on Upstream/ Downstream Reaches**<br><br>*Sediment transport capacity less than sediment supply (depositional)* | See complementary strategy effects on upstream/ downstream reaches for the sediment transport capacity less than sediment supply case. |

**Table 2. Promote Alignment Stability: Trends Addressed and Geomorphic Effects**

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| **Trends Addressed** | Bank erosion<br>Channel plugging with sediment<br>Perched channel conditions |
| **Reach Effects**<br>*Sediment transport capacity greater than sediment supply (erosional)* | **General**<br>• Strategy allows lateral migration until infrastructure is threatened.<br>• Some increase in sinuosity with potential for new deposition.<br>*Bank Protection/Stabilization*<br>Longitudinal features: Fixed bank<br>• Bank line does not move.<br>• No sediment supply from banks.<br>• No new depositional zones.<br>• Increase in local flow velocity and depth.<br>Longitudinal features: Mobile bank - degree of mobility varies with method.<br>• Moves to a fixed location—then effects same as above.<br>o Either fixed in advance or when needed.<br>o Temporary sediment supply from banks.<br>o Temporary continuation of lateral migration channel process.<br>• Reduces sediment supply from banks.<br>• Reduces new depositional zones.<br>• Temporary increase in local flow velocity and depth.<br>Transverse Features or Flow Deflection Techniques.<br>• Fixed bend – Constructed from bank line into channel.<br>• Mobile Bend – Constructed in channel bank.<br>o New location either fixed in advance or as needed.<br>o Moves to a fixed location—then effects same as above.<br>o Temporary sediment supply from banks.<br>• Reduces sediment supply from banks.<br>• Potential for local bank sediment deposition and/or scalloping between structures.<br>• Reduces new depositional zones on opposite bank.<br>• Creates local eddies, with variable turbulence and velocity shear zones.<br>• Local channel deepening with greater deepening at tip.<br>• Creates local scour pools.<br>• Variable depth and velocity effects are reduced at higher flows.<br>• Local sediment deposition upstream and along scour pool.<br>• May help form and maintain side channels.<br>• May form bars and islands. |

**Table 2. Promote Alignment Stability: Trends Addressed and Geomorphic Effects**

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| **Reach Effects (continued)**<br>*Sediment transport capacity greater than sediment supply (erosional)* | **Complementary strategies:**<br>• Promote Elevation Stability – Reduces channel incision through cross channel structures which could either increase or reduce bank erosion.<br>• Reconstruct/Maintain Channel Capacity – Keeps the channel in the same location or a selected relocated alignment.<br>• Rehabilitate Channel and Flood Plain – Reduces sediment transport capacity.<br>• Increase Available Area to the River – Moves infrastructure.<br>• Manage Sediment – Increases sediment supply. |
| **Effects on Upstream/ Downstream Reaches**<br>*Sediment transport capacity greater than sediment supply (erosional)* | Upstream and downstream effects are expected to be similar within the Bank Protection/Stabilization method category.<br>Upstream – As the channel lengthens, sediment transport capacity is reduced, lowering the tendency for channel bed degradation. If the upstream reach is degrading then this tendency could be reduced. A less degrading upstream bed could result in the bed material sizes remaining about the same or become smaller. Potential changes in flow velocity and channel depth are expected to be minimal.<br>Downstream – To the extent that the sediment supply from bank erosion of the affected reach is reduced, there could be possible impacts to the downstream reach. These impacts could be incision or bed degradation, slope reduction and increased bed material size depending upon the portion of the sediment load being supplied by lateral migration. Depending upon reach sediment supply from tributaries, this effect could be small. |
| **Reach Effects**<br>*Sediment transport capacity less than sediment supply (depositional)* | When the trends of channel plugging with sediment or perched channel conditions are present, channel avulsion or relocation is possible. This strategy reinforces the new bank and has the same effects as listed under sediment transport capacity greater than sediment supply<br>**Complementary strategies:**<br>Reconstruct and Maintain Channel Capacity – Removes sediment, relocates channel, or raises/strengthens levees.<br>Increase Available Area to the River – Moves infrastructure.<br>Manage Sediment – Reduces sediment supply. |
| **Effects on Upstream/ Downstream Reaches**<br>*Sediment transport capacity less than sediment supply (depositional)* | Upstream – No change is expected.<br>Downstream – If active bank erosion within the affected reach adds significantly to the sediment supply, and this is reduced, than this may bring the sediment supply of the affected reach and the downstream reach more into a dynamic equilibrium with the sediment transport capacity. This may help to minimize deposition within the channel downstream. |

**Table 3. Reconstruct and Maintain Channel Capacity: Trends Addressed and Geomorphic Effects**

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| **Trends Addressed** | Channel narrowing<br>Vegetation encroachment<br>Aggradation<br>Channel plugging with sediment<br>Perched channel conditions |
| **Reach Effects**<br><br>*Sediment transport capacity less than sediment supply (depositional)* | **General**<br>Since the implementation reach is experiencing loss of channel capacity, maintenance of this strategy is likely. Implementation effects are described below. Maintenance would not incur additional geomorphic strategy effects beyond those listed below. This strategy may help reduce future differential between bed and valley elevation.<br>*Channel Modification (for applicable methods, see River Maintenance Methods Attachment)*<br>Complete Channel Reconstruction and Maintenance<br>• Generally more uniform width, depth, and velocity.<br>• Low-flow bars can form within excavated channel with increased local depth and velocity variation. Adaptive management can allow more variation.<br>• Reduces braiding and split delta channels.<br>• Reduces water surface area.<br>• Lowers ground water table.<br>Pilot Cuts Through Sediment Plugs<br>• Temporary increase in velocity and bed lowering.<br>• Temporary increase in sediment load delivered downstream.<br>• Generally less uniform width, depth, and velocity than complete reconstruction.<br>• Extent of sediment removal is flow peak and duration dependent.<br>o Channel width may be narrower than existed before sediment plugging with increase in depth and velocity.<br>o Spoil piles may disconnect flood plain, but adaptive management could reduce this effect.<br>• Effects which occur at a slower rate:<br>o Reduces braiding and split delta channels.<br>o Reduces water surface area and evapotranspiration losses.<br>o Lowers ground water table.<br>Longitudinal Dikes<br>• Can create zone of increased main channel flow velocity and depth.<br>o Created at high flows and may remain for low flows.<br>• Can increase uniformity of channel dimensions.<br>o Created at high flows and may remain for low flows. |

**Table 3. Reconstruct and Maintain Channel Capacity: Trends Addressed and Geomorphic Effects**

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| **Reach Effects (continued)**<br>*Sediment transport capacity less than sediment supply (depositional)* | • Decreases surface area of overbank flow.<br>  o Adaptive management can reduce this effect.<br>• Can cause local bed lowering.<br>Levee Strengthening<br>• Increased high-flow capacity.<br>• May allow channel relocation closer to levee.<br>**Complementary strategies:**<br>• Increase Available Area to the River – Moves infrastructure.<br>• Manage Sediment – Decreases sediment supply. |
| **Effects on Upstream/ Downstream Reaches**<br>*Sediment transport capacity less than sediment supply (depositional)* | Upstream and downstream effects are expected to be similar for the applicable methods within the Channel Modification method category.<br>Upstream – Bed degradation could occur which would increase sediment transport capacity. Higher flows would be required to go over bank and lowered groundwater tables may accompany degradation. Sediment supply could increase temporarily during the degradational process. Bed material size may coarsen. Since the implementation reach is experiencing aggradation, maintenance of this strategy is likely. As the channel fills between periods of river maintenance, the upstream reach could begin to aggrade and then degrade after river maintenance, with this cycle potentially being repeated.<br>Downstream – Increased sediment supply, because the sediment transport capacity is restored to its previous condition. This could steepen the channel slope in the downstream reach due to sediment deposition and channel aggradation. The bed material could become finer. It is likely that maintenance of this strategy will be needed since the channel is aggrading in the implementation reach. As the channel fills between maintenance events, there could be a decrease in sediment supply to the downstream reach causing channel bed degradation. There would then be an increase in the sediment supply in the downstream reach after periods of river maintenance in the implementation reach. This cycle could potentially be repeated with each river maintenance action. |

**Table 4. Increase Available Area: Trends Addressed and Geomorphic Effects**

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| **Trends Addressed** | *Sediment transport capacity greater than sediment supply* (allows evolution and/or increased length):<br>Channel narrowing<br>Increased bank height<br>Incision or channel bed degradation<br>Bank erosion<br>Coarsening of bed material<br>Increased channel uniformity<br>*Sediment transport capacity less than sediment supply (*allows channel relocation):<br>Aggradation<br>Channel plugging with sediment<br>Perched channel conditions |
| **Reach Effects**<br>*Sediment transport capacity less than or greater than sediment supply (depositional or erosional)* | **General**<br>*Infrastructure relocation or setback/Conservation Easements*<br>• Wider area for natural channel processes.<br>• Encourages new flood plain areas and side channels.<br>• Provides opportunity to reconnect historical flood plain and side channels.<br>• Encourages variability in channel dimensions and velocity.<br>• Provides opportunity to increase bank erosion and new deposition.<br>• Preserves flood plain connectivity.<br>• Possible temporary change in sediment supply. For reaches with sediment transport capacity less than sediment supply, this would likely be a reduction through deposition. For reaches with sediment transport capacity greater than sediment supply, this would likely be an increase through bank/bed erosion.<br>• Reduces future maintenance. Extent of reduction depends upon the area needed versus. the area acquired.<br>**Complementary Strategies (Transport capacity greater than supply)**<br>• Reconstruct/Maintain Channel Capacity – Strengthens/raises levee to allow channel migration closer to levee and reduce area needed.<br>**Complementary Strategies (Transport capacity less than supply)**<br>• Manage Sediment – Sediment removal |

**Table 4. Increase Available Area: Trends Addressed and Geomorphic Effects**

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| **Effects on Upstream/ Downstream Reaches**<br>*Sediment transport capacity greater than sediment supply (erosional)* | Upstream –The channel slope in the implementation reach would likely decrease as the channel lengthens. If the upstream reach is degrading, then this tendency could be reduced resulting in bed material sizes to remain about the same or become smaller than the current size. This may also cause a slight reduction in the sediment supply.<br><br>Downstream – There may be a short-term effect of increased sediment supply from bank erosion, but the long-term effect downstream would likely be reduced sediment supply as the channel lengthening lowers sediment transport capacity. In addition, there would likely be new depositional features such as bars, or an inset flood plain, which would form and/or grow in size during lateral migration. These sediment storage areas could also lower downstream sediment supply. Reduced sediment supply could initiate channel incision or bed degradation, coarsen the bed material, increase channel discharge capacity, and increase flows necessary to go over bank. |
| **Effects on Upstream/ Downstream Reaches**<br>*Sediment transport capacity less than sediment supply (depositional)* | Upstream –The upstream reach effect depends upon whether or not there is a change in the water surface elevation in the area where the river migrates or avulses to. For the case where the water surface elevation in the implementation reach decreases, then the upstream bed will degrade increasing the sediment transport capacity and the discharge to go over bank. Bed material size would likely increase but remain sand-sized in sand-dominated reaches. Upstream degradation will continue until such time as the relocated channel bed fills with sediment. Then, the upstream bed elevation could increase to the previous or higher level. For the case where the water surface elevation does not change, then the upstream effect would be minimal.<br><br>Downstream – Sediment deposition could occur in the area where the river migrates or avulses to, which would decrease downstream sediment supply. This could cause bed degradation, bed coarsening, increased channel capacity, and increased flow necessary to go over bank. Over time the area available for sediment deposition may fill, during which time downstream sediment supply would increase potentially leading to channel aggradation and finer bed material sizes. |

**Table 5. Rehabilitate Channel and Flood Plain: Trends Addressed and Geomorphic Effects**

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|---|---|
| **Trends Addressed** | Channel narrowing<br>Vegetation encroachment<br>Increased bank height<br>Incision or channel bed degradation<br>Bank erosion<br>Coarsening of bed material<br>Increased channel uniformity |
| **Reach Effects**<br>*Sediment transport capacity greater than sediment supply (erosional)* | **General**<br>This strategy applies to implementation reaches that are experiencing channel degradation or incision associated with channel narrowing. Implementation of this strategy would reduce channel erosion, and encourage sediment deposition by increasing flood plain connectivity. Maintenance may be needed that would not incur additional geomorphic effects beyond those listed below. Conservation easements could provide additional area for river relocation and side channel development.<br>*Channel Modification*<br>Complete construction – Longitudinal bank lowering and channel reconstruction flow goes overbank at lower discharge—greater flood plain connectivity.<br>• Can increase high flow capacity.<br>• Wider surface area at high flows.<br>• More depth and velocity variation at high flows.<br>• Decrease high-flow velocity and depth because reduces energy of higher flows that could reduce future incision, bank erosion, or induce overbank deposition.<br>• Could increase braiding.<br>• Promotes increased connectivity with backwaters and side channels.<br>• Preserves ground water table.<br>Partial construction – Clearing, destabilizing, encouraging sediment movement.<br>• Takes longer, only applicable where there is some flood plain connection already.<br>• May induce temporary bank erosion until transport/load balanced.<br>• Same effects as complete construction above but to lesser degree.<br>Partial channel realignment – Clearing, pilot cut, encourage channel widening along new alignment.<br>• May reduce high- flow energy, which reduces incision and/or migration.<br>• May change channel length.<br>• Promotes increased connectivity with backwaters and other side channels (if close enough to bank line).<br>• Temporary decrease in velocity and depth variability.<br>• Temporary increase in sediment supply downstream. |

**Table 5. Rehabilitate Channel and Flood Plain: Trends Addressed and Geomorphic Effects**

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| **Reach Effects (continued)**<br>*Sediment transport capacity greater than sediment supply (erosional)* | Side channel construction<br>• May raise ground water table.<br>• Promotes increased connectivity with backwaters and other side channels (if close enough to bank line).<br>• May reduce high-flow energy which reduces incision and /or migration.<br>• Increase velocity and depth variability.<br>• May reduce high-flow water surface elevations.<br>• Increase high-flow water surface area.<br>**Complementary strategies:**<br>• Promote Elevation Stability – Reduces channel incision.<br>• Manage Sediment – Increases sediment supply.<br>• Increase Available Area to the River – Allows space for river to readjust. |
| **Effects on Upstream/ Downstream Reaches**<br>*sediment transport capacity greater than sediment supply (erosional)* | Upstream and downstream effects are expected to be similar for the Change Sediment Supply and applicable methods within the Channel Modification method category.<br>Upstream: This strategy may allow the reach of implementation to experience sediment deposition. This may have the effect on upstream reaches of also causing a slope reduction that, in turn, may cause the sediment supply to decrease and the bed material to become finer. This sediment deposition could also result in lower discharges to go over bank.<br>Downstream: There may be a short-term effect of increased sediment supply depending upon the method and where the excavated material is placed. But the long-term effect downstream would likely be reduced sediment supply, potentially resulting in channel degradation and coarsening of bed material. The slope of the channel could decrease. Channel degradation would likely result in a higher discharge being needed to go over bank and increased sediment transport capacity. |

**Table 6. Manage Sediment: Trends Addressed and Geomorphic Effects**

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|---|---|
| **Trends Addressed** | *Transport Capacity greater than Supply*<br>• Increased bank height<br>• Incision or channel bed degradation<br>• Coarsening of bed material<br>• Increased channel uniformity<br><br>*Transport Capacity less than Supply*<br>• Aggradation<br>• Channel plugging with sediment<br>• Perched channel conditions<br>• Increased channel uniformity |
| **Reach Effects**<br><br>*Sediment transport capacity greater than sediment supply (erosional)* | **General**<br>Once sediment is added, this would need continue indefinitely for benefits to be realized in the long term.<br><br>*Change Sediment Supply*<br>Sediment Augmentation<br>• Effects are dependent on volume of sediment, and sediment volume depends upon high-flow discharge amount and duration.<br>• Flow goes overbank at lower discharge.<br>• May have wider surface area at high flows.<br>• May increase depth and velocity variation at high flows.<br>• May decrease high-flow velocity and depth.<br>• Could induce overbank deposition.<br>• Could increase braiding.<br>• Promotes increased connectivity with backwaters and side channels.<br>• Preserves groundwater table.<br>• Likely to require adaptive management (continuing adjustment of augmentation volume and location).<br>• Could reduce bed material size (dependent on size supplied).<br>• May fill in pools and/or create bars.<br>• May increase width-depth ratio.<br><br>*Channel Modification*<br>Some methods within this method category provide indirect sediment augmentation—clearing, destabilization, encouraging sediment movement.<br>• Effects are similar to direct augmentation<br>• Slower rate of additional sediment supply<br><br>**Complementary Strategies**<br>Increase Available Area – potential area to increase channel length thus decreasing sediment transport capacity.<br><br>Rehabilitate Channel and Flood Plain – Reduces sediment transport capacity. |

**Table 6. Manage Sediment: Trends Addressed and Geomorphic Effects**

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|---|---|
| **Effects on Upstream/ Downstream Reaches**<br>*Sediment transport capacity greater than sediment supply (erosional)* | Upstream and downstream effects are expected to be similar for the applicable methods to augment sediment supply<br><br>Upstream – If the augmentation results in the river bed elevation increasing, then the downstream portion of the upstream reach bed elevation could increase potentially resulting in a reduced channel slope. It is expected that the augmentation rate and location can be planned and adaptively managed in the implementation reach so that the upstream bed elevation remains at about the current elevation.<br><br>Downstream – The effects downstream are dependent on the amount of sediment augmentation, but an increase in the sediment supply may be possible. This would have the effect of increasing the channel slope through deposition/aggradation of the bed elevation in the implementation reach increases. Deposition in local subreaches of the downstream reach could result in a local flatter slope. The bed material size could reduce depending upon the size of augmentation sediments. The downstream channel bed elevation could increase resulting in lower discharge to go over bank. The effects can be adaptively managed. |
| **Reach Effects**<br>*Sediment transport capacity less than sediment supply (depositional)* | **General**<br>Once sediment is removed, this will need to continue indefinitely for benefits to continue in the long term.<br><br>*Change Sediment Supply*<br>Constructed basins<br>• Slows or reverses aggradational trends.<br>• Could increase discharge necessary to go over bank.<br>• Could cause downstream bed size coarsening.<br>• Reduce braiding potential.<br>• Provide new areas of deposition.<br>• In-Channel – Dredging low area in the channel bed, then allowing deposition to occur and re-dredge.<br>  o Local widening and subsequent dredging or movement to new area.<br>  o Provides new areas of deposition.<br>• Flood plain (berm enclosed basin with inlet and outlet channel).<br>  o Similar to In-channel.<br>  o More likely to relocate when full than tributary.<br>  o More vegetation clearing than tributary or channel.<br>• Tributary – More likely to dredge than flood plain. |

**Table 6. Manage Sediment: Trends Addressed and Geomorphic Effects**

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| **Reach Effects (continued)**<br>*Sediment transport capacity less than sediment supply (depositional)* | Natural topography basins<br>• Similar effects to constructed basins.<br>• Becomes the new channel alignment.<br>• In-Channel – May relocate when full and provides new areas of deposition.<br>• Flood plain similar effects to in-channel but more vegetation clearing than channel.<br>**Complementary Strategies**<br>Increase Available Area – Potential area for sediment deposition. |
| **Effects on Upstream/ Downstream Reaches**<br>*Sediment transport capacity less than sediment supply (depositional)* | Upstream and downstream effects are expected to be similar for the applicable methods within the Change Sediment Supply.<br>Upstream<br>• Constructed Basins- Depending upon the method used, the subsequent maintenance, and the sediment deposition area volume relative to the incoming sediment supply, upstream aggradation or channel bed raising could occur. This could result in lower discharges being needed to go overbank, decreased bed sediment size, and increased tendency for braiding.<br>• Natural topography basins – Effects would be similar to upstream effects for the Increase Available Area strategy for the sediment transport capacity less than sediment supply case.<br>Downstream<br>• Constructed Basins – No change expected unless amount of sediment reduced is significant. If the sediment load reduction is significant, there may be channel degradation or bed lowering, which would cause a higher discharge to go over bank, less velocity, depth variability, and bed material coarsening. The amount of bed lowering is not expected to increase bank erosion rates or lead to significant lateral migration.<br>• Natural topography basins – Effects would be similar to downstream effects for the Increase Available Area strategy for the sediment transport capacity less than sediment supply case. |