Accomplishment of Riparian Area Management Goals

Activities, Effects and Resources To Be Measured.

Accomplishment of riparian area management goals.

Methods.

Sequential photo points, forage utilization level measurements (total and browse), stream channel stability ratings, stream channel morphology measurements, streambed materials measurements annually

Location.

Surveys were completed by the Hydro Crew unless otherwise noted:

- Water Canyon – Pine Valley District: 3 cross-sectional surveys (XS) and photos on 6/8/04.
- Magotsu Creek – Pine Valley District: 3 XS, 3 pebble counts (PC), and photos on 7/20/04.
- Bunker Creek – Cedar City District: 3 XS, 3 PC, discharge (Q), and photos on 6/22/04.
- Cottonwood Creek – Cedar City District: 3 XS, 3 PC, Q, and photos on 7/8/04.
- Haycock Creek – Cedar City District: 3 XS, 3 PC, Q, and photos on 7/13/04.
- Little Creek – Cedar City District: 3 XS and Q on 6/17/04.
- Red Creek – Cedar City District: 3 XS, 3 PC, Q, and photos on 7/12/04.
- Sandy Creek – Cedar City District: 3 XS, 3 PC, Q, and photos on 6/17/04.
- Stout Canyon – Cedar City District: 3 XS, 1 PC, Q, and photos on 7/14/04.
- Tommy Creek – Cedar City District: 3 XS, 3 PC, and photos on 6/15/04.
- Castle Creek – Cedar City District: 6 XS and 3 PC – analysis of 1997 and 2002 data.
- Cottonwood Creek – Powell District: 3 XS, 3 PC, Q, and photos on 7/22/04.
- Deep Creek – Powell District: 3 XS, 3 PC, Q, and photos on 8/11/04.
- Deep Creek – Powell District: Level II Inventory photo points by S. Brazier on 6/18/04.
- Right Fork Sanford Creek – Powell District: 5 XS, Q, and photos on 7/6-7/04.

Variation.

Exceed Forest standards and guidelines.

Results.

Castle Creek Survey–

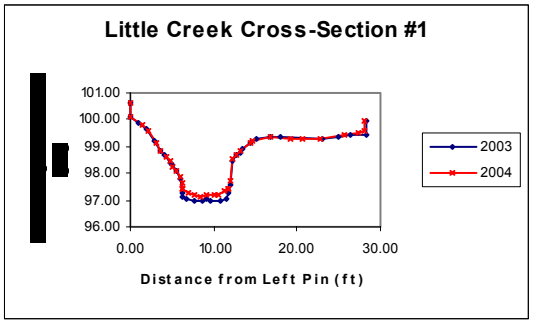
Surveys point toward an increase in wetted perimeter between 1997 and 2002. This indicates that the stream channel may be widening due to higher flows, in response to the loss of mature spruce forest from beetle-kill.

Table 1. Comparison of 1997 and 2002 BF Geometry on Castle Creek.

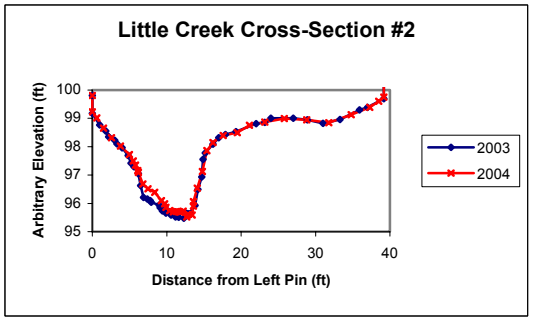
	X-Sec 1		X-Sec 2		X-Sec 3			
Year	**1997**	**2002**	**1997**	**2002**	**1997**	**2002**		
BF Stage	1.37	1.29	1.4	1.33	0.84	1.38		
Area	7.3	7.84	12.3	10.41	6.2	9.66		
Wp	8.9	9.23	23.2	21.49	9.8	15.65		
	X-Sec 4		**X-Sec 5**		**X-Sec 6**		**Means**	
Year	**1997**	**2002**	**1997**	**2002**	**1997**	**2002**	**1997**	**2002**
BF Stage	1.19	1.23	1.1	1.15	1.42	1.03	1.22	1.235
Area	7.2	9.74	11.4	9.96	8.6	5.66	8.833333	8.878333
Wp	10.1	23.31	15.4	15.59	10.1	7.89	12.91667	15.52667

Bankfull stage (BF Stage), cross-sectional area (Area), and wetted perimeter (Wp).

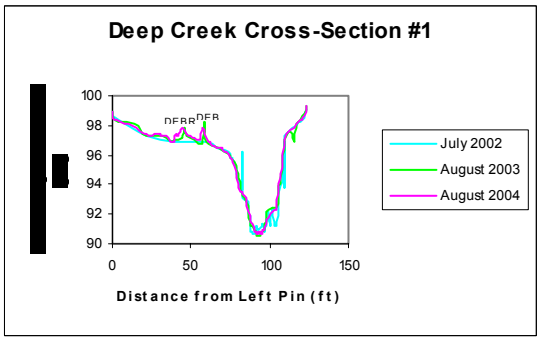
Little Creek Survey –

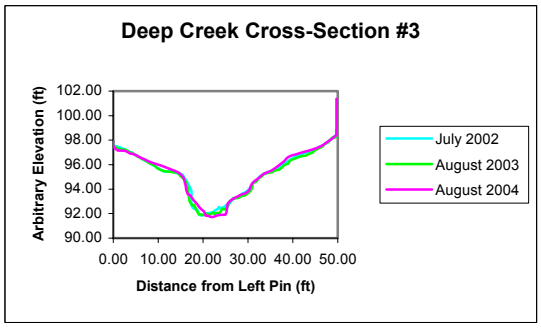


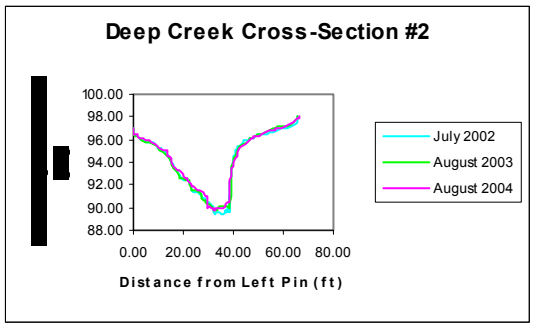
Cross-Section #3 between 2003 and 2004 is not comparable, so is not included here.



Channel has aggraded roughly six inches. This may be due to a lack of high flows due to drought that would normally flush sediment through the system.Deep Creek Survey –







Comparing cross-sectional surveys taken in 2002, 2003 and 2004, no significant adverse channel adjustments have occurred. Cross-section 1 remains stable with last year conditions and continues to develop new bankfull characteristics. The stream at cross-section 2 is developing a new floodplain with approx. 4-6 inches of deposition on its left bank; the channel bottom is stable. The stream at cross-section 3 is narrowing and shifting to the right, with roughly 8 inches of new deposits on the left bank. At this location the stream is approaching a bend with the outside meander on the right bank. Pebble counts are showing a shift to coarser materials in riffles in XS #2. XS #3 shifted to finer materials between 2003 and 2004, which could be reflecting the bank erosion occurring in this location as the channel shifts.

Table 2. Summary of Pebble Count data for Deep Creek.	**2002 XS#2**	**2003 XS#2**	**2004 XS#2**
D16	Fine sand	Very fine sand	None
D25	Fine sand	Very fine sand	Fine sand
D50	Very fine gravel	Fine gravel	Medium gravel
D75	Medium gravel	Medium gravel	Very coarse gravel
D84	Coarse gravel	Coarse gravel	Very coarse gravel
	2002 XS#3	**2003 XS#3**	**2004 XS#3**
D16	Silt	Very fine sand	Very fine sand
D25	Fine sand	Fine sand	Very fine sand
D50	Medium sand	Medium gravel	Medium sand
D75	Coarse gravel	Very coarse gravel	Very coarse sand
D84	Very coarse gravel	Very coarse gravel	Very coarse sand

Deep Creek Level II Photos –

Photos have been taken in 1994, August 2002, September 2003 and June 2004, and are located in the Deep Creek watershed file, located in the west zone watershed files on the Cedar City District. Riparian shrubs and aspen are showing significant yearly growth. Equisetum is colonizing banks along the stream that were bare before, and riparian grasses and forbs are increasing. A later visit in August revealed trespass cattle grazing that left most riparian forbs and grasses trimmed to about 1 inch stubble height or less.

All Other Surveys –

Data has only been collected for one year, representing baseline, so there is nothing to compare data to. Data is located within the watershed folder for each site, located in the watershed files on the Cedar City District, and on the 2004 Watershed Monitoring CD.

Interpretation.

Measurements such as pebble counts, cross-sections, Level II riparian surveys, and photo points are being done on an annual basis, but so far have mostly been to establish long-term monitoring sites and collect baseline data. Very few sites have been established long enough to warrant re-sampling, since changes in channel dynamics can be subtle over time. Fifteen sites were monitored in FY2004, but the majority of those were to collect baseline data. Further data will be needed for those sites before it can be interpreted.

Castle Creek – We hypothesized that with the death of the spruce forest in the watershed, stream channel flows would increase since less water would be taken up by vegetation. It was expected that these higher flows would be reflected in changes to the physical structure of the stream channel. Data collected so far is indicating that the stream channel is widening. Further measurement and evaluation of Castle Creek is recommended to validate that a change in the channel cross-section is occurring. Since this area has been in a drought the last several years, it would be beneficial to revisit this stream after an above average snow pack year to see if more drastic changes occur.

Little Creek – The build-up of fine sediment in this reach likely exceeds the Forest Plan guideline that no more than 25% of stream substrate should be covered by inorganic sediment less than 3.2mm in size. However, fines may be accumulating in the channel due to low flows from the drought that would normally be flushed through. Since both surveys were conducted during drought conditions it is not known what channel conditions are like during normal or above average runoff, and not possible to discern drought effects from management effects. The site should be surveyed again after an average runoff year.

Deep Creek – The channel cross-sections, pebble counts, and photo points indicate that the stream system is recovering from the wildfire in 2002. However, trespass livestock grazing is not meeting Forest Plan standards and guidelines for overhanging grasses, forbs, and sedges. If this use continues it could inhibit long-term recovery of the stream system and riparian ecosystem.

Monitoring Resources Available.

Financial resources were adequate to complete the monitoring in 2004. A drop in funding that would limit or eliminate our ability to have a summer field crew would significantly reduce the amount of monitoring that could be completed in the future.

Recommendation.

Continue monitoring to acquire data from which to compare in the future. Repeat sites on an approximate 5-year schedule, versus annually.

Compliance with State Water Quality Standards

Activities, Effects and Resources To Be Measured.

Compliance with State Water Quality Standards

Methods.

Baseline monitoring as described in the Dixie Water Quality Monitoring Plan in coordination with the State of Utah Department of Environmental Quality, Division of Water Quality.

Location.

Water quality on eight sites were sampled and analyzed from July 1, 2003 to June 30, 2004 (State of Utah Fiscal Year).

1. Bowery Creek (STORET 4940540), tributary to Parowan Creek
2. Santa Clara River (STORET 4950640), tributary to Virgin River
3. Threemile Creek (STORET 4949730), tributary to Sevier River
4. Carcass Creek (STORET 4953890), tributary to Fremont River
5. East Fork Boulder Creek (STORET 4953910), tributary to Escalante River
6. West Fork Boulder Creek (STORET 4953920), tributary to Escalante River
7. Bear Creek (STORET 4953970), tributary to Bear Creek
8. Pleasant Creek (STORET 4954540), tributary to Fremont River

Variation.

Violation of Utah Water Quality Standards.
State Phosphorus Standards for 2A, 2B, 3A, 3B: 0.05 mg/l – acute /streams; 0.025 mg/l – chronic/lakes & reservoirs[1].
State Water Temperature Standards for 3A: 20°C.

Results.

View the EPA STORET database to view all the data elements.

Santa Clara River – Eleven samples were taken; exceedence occurred with phosphorus in seven samples. One sample exceeded acute water quality standards, and 7 samples exceeded chronic water quality standards. Phosphorus levels were within the standards in September, October, November and December of 2003, and were generally during the lowest flows. All field conditions save one month (May 2004) recorded clear stream conditions, and no months had evidence of recent high flows, so there is not a clear link with runoff and sedimentation.

[1] Acute and chronic numeric criteria for water quality are determined through the EPA by exposing aquatic organisms to known concentrations of a chemical and measuring the short-term (acute) and long-term (chronic) effects. The results are used to set water quality criteria that will protect the most sensitive of species. For the State of Utah, the Division of Water Quality has designated the acute criteria for phosphorus of 0.05 mg/l as the criteria not to be exceeded in streams, and the chronic criteria for phosphorus of 0.025 mg/l as the criteria not to be exceeded in lakes and reservoirs. Note that if a sample exceeds the acute criteria, it also exceeds the chronic criteria, i.e. one sample, but two exceedences.

Threemile Creek – Ten samples were taken; exceedences occurred with phosphorus (in 10 samples) and stream temperature (in two samples). For phosphorus, nine samples exceeded acute water quality standards, and 10 samples exceeded chronic water quality standards. Low flows (0.2-0.3 cfs) with clear water ranged between 0.047 and 0.059 mg/l. All other months recorded cloudy water, and had higher phosphorus levels ranging from 0.08 to 0.116 mg/l. The month of August 2003 had a current low flow of 0.4 cfs, but had evidence of a recent very high flow event and cloudy water, and had the highest phosphorus level (0.116 mg/l). This sampling indicates that phosphorus levels are linked to runoff and sedimentation into the stream.

Temperature exceeded the state standard of 20°C in July 2003 (24.6°C) and June 2004 (22.26°C).

Bowery Creek – Twelve samples were taken; exceedence occurred with phosphorus in two samples. Two samples exceeded chronic water quality standards and one exceeded acute water quality standards – 0.086 mg/l in July 2003 and 0.032 mg/l in August 2003. Cloudy water was recorded for July and evidence of recent high flow was recorded for August, indicating a likely relationship between phosphorus levels and runoff/sedimentation into the stream. For all other months phosphorus was undetectable.

Carcass Creek – Four samples were taken; exceedence occurred with phosphorus (in four samples) and water temperature (in two samples). One sample exceeded the acute water quality standards for phosphorus – 0.093 mg/l in August 2003, and all samples exceeded chronic water quality standards for phosphorus. Normal stream flow conditions were recorded, but water clarity was noted only once – clear in June 2004, which also had the highest recorded turbidity reading of the four samples taken at the site, at 17.2 NTU[2]. These limited observations do not clearly link phosphorus levels with runoff and sedimentation into the stream.

Two samples exceeded the state standard for water temperature – 29°C in July 2003 and 26.7°C in August 2003.

East Boulder Creek – Four samples were taken; chronic water quality standards for phosphorus were exceeded on all four samples – 0.03385 mg/l in July 2003, 0.03 mg/l in August 2003, 0.043 mg/l in May 2004, and 0.035 mg/l in June 2004. Normal stream flow conditions were recorded, but water clarity was noted only once – clear in June 2004, which also had the highest recorded turbidity reading of the four samples taken at the site, at 2.2 NTU. These limited observations do not clearly link phosphorus levels with runoff and sedimentation into the stream.

West Boulder Creek – Three samples were taken; one sample exceeded chronic water quality standards for phosphorus, in July 2003 at 0.04346 mg/l. Normal stream flow conditions were recorded, but water clarity was noted only once – clear in June 2004 (no

[2] Nephelometric turbidity units. Turbidity is an optical measurement that estimates the amount of suspended clay and silt particles in the water through measuring the amount of light that is scattered or absorbed by this suspended sediment. A 'high' versus 'low' and 'good' versus 'bad' turbidity reading and associated suspended sediment load is relative to the natural variability of each stream system and what the organisms associated with each system have adapted to.

exceedences), which also had the highest turbidity reading of the three samples taken at the site, at 0.9 NTU. These limited observations do not clearly link phosphorus levels with runoff and sedimentation into the stream.

Bear Creek – Three samples were taken; exceedence occurred with phosphorus (in three samples) and temperature (in one sample). Acute and chronic water quality standards for phosphorus were exceeded on all three samples – 0.1268 mg/l in July 2003, 0.09 mg/l in August 2003, and 0.065 mg/l in June 2004. Normal stream flow conditions were recorded, but water clarity was noted only once – clear in June 2004, which also had the highest turbidity reading of the three samples taken, at 14.5 NTU. These limited observations do not clearly link phosphorus levels with runoff and sedimentation into the stream.

Temperature was exceeded in August 2003, at 26^{o}C.

Pleasant Creek – Five samples were taken; exceedence occurred with phosphorus (in four samples) and temperature (in one sample). One sample exceeded acute standards for phosphorus – 0.072 mg/l in May 2004, and four samples exceeded chronic standards for phosphorus. Normal flow conditions were noted in August 2003, and June 2004 (June also noted clear water, and had the highest recorded turbidity reading of the five samples taken, at 3.8 NTU), and anchor and solid ice were noted in March 2004. These limited observations do not clearly link phosphorus levels with runoff and sedimentation into the stream.

Temperature was exceeded in August 2003, at 25^{o}C.

Interpretation.

Approximately 67% of our samples exceeded the state phosphorus criteria, and approximately 12% of our samples exceeded state water temperature criteria. One hundred percent of our samples for all other parameters were in compliance with state water quality standards.

Streambank stability and riparian and upland vegetation play a key role in reducing sedimentation into streams. In systems where sampling shows a direct relationship with sedimentation to increased phosphorus levels, such as Threemile Creek, opportunities may exist to improve vegetation and channel stability. However, some streams may not have the capability to meet water quality standards for phosphorus due to the nature of the native geology, which may also influence phosphorus levels. The Santa Clara River and Threemile, Carcass, Boulder and Bear Creek flow through igneous geology, and have overall higher phosphorus levels year-round, whereas Bowery Creek flows through sedimentary limestone, and phosphorus levels are usually not detectable.

All four streams that had exceedences in water temperature are suffering from a reduction or loss of riparian vegetation that would normally provide stream shading. For Carcass, Pleasant, and Bear Creeks, this has also resulted in a wider, shallower stream that is more prone to overheating due to increased water surface area. Threemile Creek's loss of riparian vegetation is exacerbated by its west-east orientation that gives it maximum exposure to the sun throughout the day. Impacts to riparian vegetation in these systems are due to high current and/or past grazing impacts (Bear and Threemile Creeks), dispersed camping (Carcass and Threemile Creeks), a developed campground in the riparian area (Pleasant Creek), and roads in the riparian area (Carcass, Pleasant, and Threemile Creeks).

The limited number of samples and field data collected at Carcass, West Fork Boulder, East Fork Boulder, Bear, and Pleasant Creeks make the formulation of any solid interpretations of causes for exceedence at those individual sites difficult and inconclusive, particularly for phosphorus.

Monitoring Resources Available.

The FY2004 budget was sufficient to complete monitoring.

Recommendation.

The State Division of Water Quality has started to require a minimum of 10 months of sampling per site per year in their protocol. The number of sites monitored during the 2003-2004 sampling year became a significant drain on resources, especially with additional time needed during winter months. Therefore, the number of sites selected for the next sampling year has been reduced. The requirement to collect 10 months of samples also greatly reduces the streams on the forest that can be sampled and meet protocol due to inaccessibility during winter months.

A Forest Plan Amendment is recommended. The variance should read, "exceeds water quality standards" rather than "violation" of water quality standards. Monthly measures may not be appropriate for some measures and may not be affordable as well.

Effectiveness and Maintenance Needs of Watershed Improvements

Activities, Effects and Resources To Be Measured.

Effectiveness and maintenance needs of watershed improvements.

Methods.

Visual inspection 1st year after installation every 5 years thereafter.

Location.

The following FY2003 Soil and Water Resource Improvements were monitored in FY2004 and the findings were put into the NRIS Watershed Improvement Tracking system.

- Highway Springs Exclosure – Pine Valley District, June 28, 2004 by Hydro Crew; October 29, 2004 by Joni Brazier and Chris Butler.
- Moody Wash and Magotsu Creek Willow Planting – Pine Valley District, July 19, 2004 by Hydro Crew.
- Lower Swains Creek Willow Planting – Cedar City District, July 29, 2004 by Hydro Crew.
- Everett Hollow Headcut Restoration – Cedar City District, by Chris Butler.
- Pass Creek Protection Fence – Cedar City District, August 30, 2004 by Joni Brazier and Chris Butler.
- Pass Creek Snow Fence – Cedar City District, by Chris Butler.
- Rock Canyon Road Rehabilitation – Cedar City Ranger District, August 30, 2004 by Joni Brazier and Chris Butler.
- Limekiln Boundary Fence, Flood restoration, Cattle guard – Powell District, September 2004 by Alicia Ulwelling.
- East Fork Collector Road Improvements – Powell District, September 2004 by Alicia Ulwelling.
- Cabin Hollow Headcut Restoration – Powell District, July 28, 2004 by Hydro Crew.
- Casto Bowl Headcut Restoration – Powell District, July 28, 2004 by Hydro Crew.
- Jones Corral Rim Fence (Parkland Protection) – Powell District, September 2004 by Alicia Ulwelling.
- Kanab Creek Stream Corridor Project – Powell District, September 2004 by Alicia Ulwelling.
- Death Hollow Stabilization Improvements – Escalante District, July 2004 by Hydro Crew.
- Cameron Wash Upper Gully Fence – Escalante District, July 2004 by Hydro Crew.
- Ranch Creek Riparian/Dispersed Recreation Rehabilitation – Escalante District, July 2004 by Hydro Crew.
- Horse Springs Riparian Improvement – Escalante District, July 2004 by Hydro Crew.

Additional projects monitored:

- Swains Creek Riparian Exclosures – Cedar City District, August 24, 2004 by Hydro Crew; October 5, 2004 by Joni Brazier and Chris Butler. Implemented 2001.

- Swains Creek Riparian Restoration – Cedar City District, July 29, 2004 by Hydro Crew. Implemented 2001, seeded 2002.
- Lars Fork Headcut and Bank Stabilization – Cedar City District, July 29 and August 4, 2004 by Hydro Crew. Implemented 1997 and 2000.
- CCC Camp Gully Plugs – Cedar City Ranger District, by Chris Butler.

Variation.

Maintenance required or project not accomplishing stated objectives.

Results.

- Highway Springs Exclosure: Channel reconstruction and willow planting have met restoration objectives so far. However, the spring has now been completely diverted through a pipe to the trough below the exclosure, which could jeopardize revegetation efforts during the dry season.
- Moody Wash and Magotsu Creek Willow Planting: Moody Wash had a 95% survival rate for the willow plantings with an average of 3ft of new growth. Magotsu Creek had about a 40% survival rate for the willow plantings. Tamarisk is beginning to invade Magotsu Creek in the vicinity of the willow planting, and livestock grazing was evident.
- Lower Swains Creek Willow Planting: Only one cutting was found to have sprouted and survived.
- Everett Hollow Headcut Restoration: Inspection revealed that no filter cloth was placed below the stone. Restoration has yet to be tested with a runoff event.
- Pass Creek Protection Fence: Fences were maintained and in operational condition.
- Pass Creek Snow Fence: Implementation monitoring indicated that they were placed and constructed properly.
- Rock Canyon Road Rehabilitation: Road braiding and rutting has been effectively rehabilitated. New road surface and drainage has been successful at preventing further resource damage. New cutbanks is a potential sediment source, it needs to be seeded and covered with erosion matting.
- Swains Creek Riparian Exclosures: Fences were maintained and in operational condition. Stream channel and riparian vegetation conditions are stabilizing and improving. Concern over increasing compaction and loss of sponge-filter of floodplain where people drive up to the spring.
- Swains Creek Riparian Restoration: Sloped banks were revegetating, and no significant erosion from them was noted. The stream channel had experienced spring flows after a couple years of no flow due to drought. No willow cuttings from 2002 were found alive, despite 10% first year success in 2003.
- Lars Fork Headcut and Bank Stabilization: Headcut stabilization structures are intact and effective. Revegetation of banks is mixed, and no willow cuttings survived. Livestock continue to impact the area.
- CCC Camp Gully Plugs: These plugs have functioned properly over the years and have added stability to the adjacent wetlands.
- Limekiln Boundary Fence, Flood restoration, Cattle guard: This project was installed correctly. To see a vegetative response we will need to monitor this project again in FY2008.
- East Fork Collector Road Improvements: This project was successfully completed.

- Cabin Hollow Headcut Restoration: The restoration efforts from 2003 have yet to be tested with any flow events due to drought. There is some concern that not enough rock was used for the stabilization structure and that too much of the fill is fine soil. It is estimated that approximately 60% is made up of fines, with 40% in larger cobbles and boulders.
- Casto Bowl Headcut Restoration: The restoration efforts from 2003 have yet to be tested with any high flow events due to drought. The catchment basin and dyke consist entirely of fine soils, and are not yet vegetated. There is some concern that a high flow event could overtop and downcut through the dyke.
- Jones Corral Rim Fence (Parkland Protection): This project was installed correctly. To see a vegetative response we will need to monitor this project again in FY2008.
- Death Hollow Stabilization Improvements: The project consisted of small logs placed perpendicular to the channel to create pool structure. The remains of possibly three log structures were found. The logs were either washed out on both sides (ends of the logs) or the water coming over the top created a head cut under the logs and washed it out from below.
- Cameron Wash Upper Gully Fence: Fences were maintained and in operational condition.
- Ranch Creek Riparian/Dispersed Recreation Rehabilitation: The fence has eliminated camping use next to the stream and the stream channel is in good shape; stable banks, willow and other riparian vegetation are now present.
- Horse Springs Riparian Improvement: Fences were maintained and in operational condition.

Interpretation.

- Highway Springs Exclosure: Water diversion is not contributing to the DFC for wetlands. The diversion of the spring needs to be addressed and water allowed to flow through the restoration area in order for this project to succeed in the long term. Continued complete diversion would move the area away from desired conditions. Design needs to allow for a riparian bypass flow and monitor after implementation.
- Moody Wash and Magotsu Creek Willow Planting: Moody Wash is meeting objectives and moving towards desired conditions. Magotsu Creek is meeting objectives, but may not move toward desired conditions if willow declines due to continued livestock pressure, and/or if the area is invaded with tamarisk. This site should be revisited within the next two years.
- Lower Swains Creek Willow Planting: Implementation was not successful. The main cause for failure was drought conditions that caused the channel to dry up for the majority of the summer following the planting.
- Everett Hollow Headcut Restoration: Evaluate again after the first runoff event occurs in this area.
- Pass Creek Protection Fence: Revegetation is progressing due to the continued annual maintenance of the protection fences. Success of the Pass Creek gully stabilization project is dependent upon this annual maintenance.
- Pass Creek Snow Fence: Need to visit this area in late winter or early spring to determine if snow accumulation occurred.

- Rock Canyon Road Rehabilitation: The new road is meeting resource objectives and moving the area towards desired conditions. Cutbanks were seeded this summer and covered with erosion matting to prevent any potential erosion. Cutbanks should be monitored the next three years.
- Swains Creek Riparian Exclosures: This project is partially meeting objectives. The stream channel and riparian vegetation are moving towards desired conditions, but compaction of the floodplain at the spring from vehicles is moving that area away from desired conditions. The configuration of the exclosure and issues related to use of the spring need to be resolved.
- Swains Creek Riparian Restoration: This project is meeting the primary objective of reducing sedimentation into the stream channel. Success with increasing the willow community for plant diversity and channel stabilization is dependent upon moisture conditions adequate to support cuttings/plugs.
- Lars Fork Headcut and Bank Stabilization: This project is meeting the primary objective of stabilizing the stream system. Revegetation efforts have been hampered by drought and continued livestock use. Completion of a water development at the mouth of the drainage will allow Lars Fork to be excluded from livestock grazing in the future. Dispersed recreation use in the drainage is increasing and beginning to impact the riparian area. This use should continue to be monitored to curb resource damage from impacts.
- Limekiln Boundary Fence, Flood restoration, Cattle guard: Monitor again in FY2008.
- East Fork Collector Road Improvements: Monitor again in FY2008.
- Cabin Hollow Headcut Restoration: This site needs to be visited again once it experiences a flow event. This could be as soon as spring of 2005.
- Casto Bowl Head cut Restoration: This site needs to be visited again once it experiences a flow event. This could be as soon as spring of 2005.
- Jones Corral Rim Fence (Parkland Protection): Monitor again in FY2008.
- Death Hollow Stabilization Improvements: These structures are actually moving the stream system further away from desired future conditions. Most logs placed perpendicular to stream channels wash out and these are no exception. Pool habitat could have been provided using a "spider type" backhoe or an excavator and large rock building a rock step pool type structure. This would have been more expensive but would be able to pass higher flow, and debris. If pool habitat is needed, perpendicular log structures are not a viable option.
- Cameron Wash Upper Gully Fence: Revegetation is progressing and exclusion of grazing has resulted in a diverse mix of groundcover.
- Ranch Creek Riparian/Dispersed Recreation Rehabilitation: The fence has been effective at stopping dispersed camping in the riparian zone.
- Horse Springs Riparian Improvement: Revegetation is progressing; exclusion of grazing has resulted in a diverse mix of groundcover.

Monitoring Resources Available.

Adequate dollars and resources were available to accomplish monitoring in FY04. A cut in funding and/or crew would impact our ability to meet monitoring needs in FY05 and beyond.

Recommendation.

Monitoring of watershed improvement projects is essential for accountability in project funding spending, and to effectively design future projects. The established monitoring schedule is typically adequate, with some exceptions. Exclosures require annual maintenance needs. Also, some sites should be visited more often if any red flags are involved, until concerns can be dismissed or proven. Otherwise extensive resource damage could result if problems are not fixed as soon as they start.

Effectiveness of Best Management Practices in Meeting Water Quality Objectives and Goals

Activities, Effects and Resources To Be Measured.

Effectiveness of Best Management Practices in Meeting Water Quality Objectives and Goals

Methods.

Inspection of drainage and erosion control measures on ground disturbing activities.

Location.

- Blue Springs Timber Sale – Cedar City District
- Central Fuel Break- Pine Valley District
- Rhyolite Timber Sale Snow Road- Cedar City District
- Ikes Valley Underburning – Cedar City District
- Turkey Tract Underburning – Cedar City District

Variation.

- Blue Springs Timber Sale – Further rill erosion was minimal in the area 2 years following harvest
- Central Fuel Break- Rill erosion and soil displacement did not occur within the Fuel Break
- Rhyolite Timber Sale Snow Road- Logs left at stream crossing and tread pattern left on meadow.
- Ikes Valley Underburning – Rill erosion and soil displacement was occurring on steep slopes and is
- Turkey Tract Underburning – Effective needle cover was left inplace following the fire.

Results.

None available

Interpretation.

- Blue Springs Timber Sale – Timber harvest using full tree harvest with surface skidding when the soil is dry does not indicate that long term erosion will occur
- Central Fuel Break- Hand limbing, tree removal and hand piling during the construction of fuel breads does not result in additional detrimentally disturbed soil. Burn piles were placed such that about 5% of the area would be detrimentally disturbed by burning.
- Rhyolite Timber Sale Snow Road- Logs left in the channel are causing high flow damage to the banks, further use of road during end of cold season has left a noticeable two track pattern on the meadow

- Ikes Valley Underburning – Rilling and soil displacement was occurring on slopes greater than 30% and soil movement is making it down into intermittent drainages
- Turkey Tract Underburning – Soil displacement and rilling was not apparent.

Monitoring Resources Available.

FY2004 budget was sufficient to cover the cost of monitoring

Recommendation.

- Blue Springs Timber Sale – Monitoring of this sale is no longer necessary but as additional timber sales are completed they need to be monitored for BMP and SWCP effectiveness
- Central Fuel Break- Monitoring of this fuel break is no longer necessary but as additional fuel breaks are completed they need to be evaluated.
- Rhyolite Timber Sale Snow Road- This site needs to be revisited each year after the use of the snow road and adjustments made to the following years plan
- Ikes Valley Underburning – Continue to monitor the 30% or greater slopes for stability until rilling ceases to occur and needle litter forces runoff to be of a laminar or close to laminar flow.
- Turkey Tract Underburning – No further monitoring necessary for this area.

Stability of Streambanks in East Fork of Sevier River Drainages

Activities, Effects and Resources To Be Measured.

Stability of Stream banks in East Fork of Sevier River drainages.

Methods.

Sequential photo points, measure stability rating in representative reaches annually

Location.

Blubber and Skunk Creeks on August 10, 2004 by the Hydrology Crew.

Variation.

Exceed Forest standards and guidelines of maintaining 50% or more of total stream bank length in stable condition.

Results.

Site visits consisted of a visual review of stream condition and photos. Both stream systems do not show any significant bank erosion, and meet the Forest standards and guidelines.

Interpretation.

Blubber and Skunk Creeks contain impoundments and control structures throughout their stream systems that were originally constructed primarily to control channel adjustments and erosion. These structures have slowed any significant erosion and vegetation is stabilizing the channel bottoms and banks.

Monitoring Resources Available.

(Was enough dollars and resources available to accomplish this monitoring to the standards required? If not, what would be needed in terms of money, equipment, people, etc.?) There was enough funding available for visual review and photos only. Measurements require additional funding and resources, and are not necessary to meet data needs.

Recommendation.

Trend monitoring for bank stability is more appropriately monitored approximately every 5 years or longer in order to detect measurable change, instead of annually, as the Forest Plan requires. In addition, for the level of information needed and the funding and time that is available, repeatable photo points and ocular estimation typically meet data needs. Taking measurements does not need to be required.

Water Yield Increases in East Fork of Sevier Watershed

Activities, Effects and Resources To Be Measured.

Water Yield Increases in East Fork of Sevier Watershed

Methods.

WRENSS water yield methodology.

Location.

Item not monitored.

Variation.

Exceed minimum management requirements in timber harvest model.

Results.

This monitoring item has been dropped from consideration, as it is not our intent to increase the spring discharge of the Sevier River but rather to improve and maintain the channel, floodplain and sponge/filter system of the watershed in such a way as to maintain a dynamic equilibrium within the watershed.

Interpretation.

The premise for this monitoring is no longer accepted science.

Monitoring Resources Available.

No resources have been allocated for this monitoring.

Recommendation.

A Forest Plan amendment is needed to drop this monitoring requirement.