South Fork of Chalk Creek

Coordinated Resource Management Plan

Prepared By:
The Summit Conservation District

2015

“A society grows great when old men plant trees whose shade they know they shall never sit in.”
-Greek Proverb

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Preface

Dwight D. Eisenhower is credited with saying: “plans are nothing; planning is everything.” The idea president Eisenhower was attempting to relate is that the “plan” is not the item of most value nor should be considered the most important object just because it is tangible. The most important and worthwhile products of a planning process are the insights, relationships, knowledge, and vision gained through taking strategic steps that require introspection, information gathering, analysis, discussion within an environment of collaboration even though these products are difficult to quantify.

This idea is at the heart of the South Fork Coordinated Resource Management Plan. This process was not a knee-jerk reaction to a looming issue or a process to bring hostile opposing viewpoints to a table to talk. Rather, it was envisioned as an opportunity to visualize and plan for a future scenario that is better than the current situation. The hope is that in the future, by following the steps the South Fork Watershed will be near what this group envisioned and the landowners as a group will be satisfied with the direction the watershed as taken.

This document is a record of the powerful and life changing process that has occurred in the South Fork watershed over the past year and a half. The coordinated resource management process has allowed families that have shared fences to become neighbors, to get to know each other on a personal level, openly discuss challenges and issues, learn from each other and resource experts, formulate a vision for their individual properties in the context of an entire watershed, and begin to take steps toward creating a future that generations to come will enjoy.

“Planning is bringing the future into the present so that you can do something about it now.”
- Alan Lakein

View of the South Fork Watershed from the top of the watershed.

1.0 Executive Summary

The development of a Coordinated Resource Management Plan (CRMP) requires a multifaceted approach in order to have a working, functional plan that will result in meaningful improvements to the natural resource challenges that exist in the watershed. The South Fork of Chalk Creek CRMP is a product of a grass-roots, landowner driven process that followed a series of intuitive steps that provided a simple but organized methodology for addressing complex problems at a meaningful scale.

An understanding of the history of the watershed is vital to understanding why this process is important and the resources identified in the plan. The South Fork is a primary tributary to Chalk Creek, which flows into the Weber River. In the early 1990's Chalk Creek was identified by the Utah Division of Water Quality as not meeting its beneficial use (supporting cold water aquatic life) and was placed on the 303d list as an impaired stream due to phosphorus and sediment loading. This resulted in an intensive effort over several years to provide educational resources and opportunity for landowners and on the ground projects that worked to address the causes and sources of this impairment. These efforts resulted in meaningful improvements to water quality as well as the physical habitat of the stream and the overall watershed.

Echo Reservoir which Chalk Creek flows into was also listed as an impaired water body and a TMDL was completed in March of 2014. As part of that TMDL process tributaries to Echo Reservoir were assessed and areas of concern were identified in the implementation plan. The South Fork was still identified in the TMDL and implementation plan as a significant source of sediment and phosphorous and continues to be listed as impaired. Causes of impairment on the South Fork are total phosphorus, sedimentation/ siltation and physical substrate alterations. In addition to water quality concerns, other resource challenges exist in the watershed that landowners want to address.

The South Fork watershed is a diverse and varied landscape that was homesteaded in the mid 1800's. Land ownership is held by approximately 22 owners. The primary land use in the watershed has been agriculture, mainly livestock production utilizing the expansive rangelands that cover the uplands and the fertile pastures found in the lower areas of the

watershed. Petroleum extraction from the overthrust belt in the mid 70's-80's resulted in an extensive network of roads and well sites. In the last decade guided big game hunting has become an important economic factor in the watershed and its importance continues to grow.

These varied interests rely on resources that exist and operate on a scale larger than any single landowner. Often these interests are in both indirect and direct competition for finite resources. With these challenges in mind, the need for a management plan that addresses issues and challenges at an appropriate scale as well as respecting the landowners that have an intimate knowledge of the resources on their property began to develop. The planning process selected to satisfy both the challenges to the watershed as well as allow the landowners to be integral to the process was the Coordinated Resource Management planning process.

There are a number of key elements needed to develop a successful, multifaceted CRMP plan. These include: developing a process that has broad involvement, is open, voluntary, non-regulatory, collaborative, and consensus based. The South Fork landowners are a group of proactive, conservation minded individuals that are seeking to improve their properties. They have support from the Summit Conservation District, several partnering state and federal agencies, Summit County, Trout Unlimited, and the Upper Weber Watershed Coordinator who facilitates and provides guidance through the entire process.

The first meeting was held in February of 2014 with the South Fork landowners in which the CRMP process was outlined and a steering committee was assembled to help with decision making, form a cooperative partnership and drive the process. During this first meeting landowners were asked to brainstorm and identify "common values." These "common values" were described as what they would want to preserve and enhance in the watershed. After these items were identified, the group was asked what was seen as threats or challenges that may compromise those identified values. These threats or challenges were also recorded.

Subsequent CRMP planning meetings were held in April, June, August, September, October, and November of 2014. April's meeting provided assessment information on the

View of the unique rock formations and geology found near the confluence of Fish Creek and the South Fork.

watershed that was gathered by Utah State University using GIS and a discussion of additional information that would be needed to help develop the plan.
June's meeting revolved around a resource prioritization workshop which gave landowners the opportunity to rank and prioritize the resource concerns in the watershed from previous meetings. These findings will be summarized later in this report. All involved then created a list of individuals who had expertise in the various areas that were identified who could provide education and guidance on how the CRMP could address these issues. We came to call these individuals "resource experts"

Subsequent meetings allowed for these resource experts to attend meetings and present their viewpoints regarding the South Fork watershed. They provided expert assessments of resource conditions as well as recommended changes in management that would preserve and improve these natural resources. These invited guests discussed issues such as: range management, climate, water, wildlife, fish populations, riparian health, forests and natural resource and ranch economics.

A key element needed to make informed decisions as to management actions needed to address resource concerns is quality baseline data collection that is generated through assessments that take place in the watershed. Utah State University graduate students from the Department of Landscape Architecture and Environmental Planning Department conducted a semester long research project to assess, map, and research the wildlife habitat as part of their "Planning for Wildlife" studio. The findings were assembled as a report providing baseline data and recommendations regarding wildlife habitat in the watershed. The results of this report were integrated into this CRMP document.

A Stream Visual Assessment Protocol or (SVAP) was completed during the months of July-August 2014 to assess ecological conditions on the main South Fork and its major tributaries. This tool provides a qualitative assessment of ecological conditions and is designed to give a snapshot of stream ecosystem conditions and allow planners to identify and prioritize areas of concern and assist landowners with determining the quality of

USU Planning for Wildlife Studio students pose for a photo during a site visit to the South Fork Watershed

View looking down towards the South Fork Valley.

stream habitats on their property. This was conducted by a combination of conservation district employees, agency personnel, volunteers, and landowners.

Additionally a range trend and condition report was initiated for the South Fork in September of 2014 along with a Hydrology report which which are being produced by the Natural Resource Conservation Service (NRCS). A forest resources report was also developed assessing conditions in the aspen/conifer regions of the watershed by the Division of Forestry Fire and State Lands area forester. All of this information was used to identify and quantify various resource concerns in the watershed. This information will be reviewed later in the report.

An important piece of information that was needed to understand and respect the knowledge and understanding accrued though generations of people living on the landscape was a 1 on 1 resource concern meeting with each landowner. Establishing group consensus on resource concerns was a critical first step, but in some cases some landowners were not present at the group meetings or possibly they felt timid at voicing their concerns. The CRMP steering committee wanted to make sure landowners had an opportunity to provide input towards plan development. We made attempts to contact all major landowners within the watershed and meet them with a large scale map of their property and a resource concern checklist. We then sat down and drew on maps to identify locations of key infrastructure, irrigation diversions, spring development, ponds, problem weed areas, critical big game winter range, etc. Pertinent information was collected on land use, stock type, numbers, duration of grazing period and other information that may be useful in developing the plan. In addition, landowners specifically identified locations or areas they would like to complete work that would address some of the identified resource concerns. This format gleaned a great deal of information that may have otherwise not been shared in a group setting. The effort also

provided a more detailed picture of the management activities and issues that occur in each portion of the watershed. The results of these meetings were integrated throughout this CRMP document in an effort to capture and respect the needs and values of the people who will ultimately be the ones that implement the recommendations on their own lands.

With assessments completed, the landowner group considered strategies to address resource concerns and created appropriate action plans and goals to provide guidance for the long term improvement of the natural resources of the watershed.

So where do we go from here?.... The landowners of the South Fork Watershed are armed with a vision of the future established through assessing conditions using sound assessments and consensus. The South Fork CRMP steering committee and the Summit Conservation District will continue to function as a group dedicated to helping link interested landowners with agencies and programs interested in providing technical as well as financial assistance. As partnerships develop, and funding opportunities become available the landowners of the CRMP with assistance from the Summit Conservation District and its partners will be able to transition the ideas in this plan efficiently and effectively into meaningful, impactful projects on the ground.

1.1 Resources of Concern and Priority Rankings

In February of 2014, the local landowners and conservation agencies met to brainstorm and address local resource concerns and to form the South Fork Watershed Coordinating Council (SFWCC) as the planning group for addressing these concerns. Using the CRMP process, stakeholders and the SFWCC discussed issues regarding local resources and the potential for actions to remediate and restore these resources. Participants at the meeting listed the resources about which they had concerns. This list of concerns was then prioritized by the landowners.

In order to engage the landowners in the prioritization and minimize the tenancy for a the more vocal landowner's personal priorities being substituted for the priorities of the group an activity was used to establish the priorities. This prioritization activity entailed providing each participant with a stack of 5 post-it notes with the numbers 1 through 5 written on them. Each of the notes represented a priority ranking with 5 being the highest priority and 1 being the lowest. Each participant was instructed to put their post-it notes on large pieces of paper that had the name of each resource concern and a brief description printed on it. The participants were allowed to put as many of their post-it notes on any of the resource concerns as they felt applicable to their operation. Thus each participant was able to invest as much of their "ranking points, or funds" into any particular resource concern. It also provided insight into not only what received the most points, but also provided information on the number of post-it notes applied to that resource concern. Table 1-1 lists these concerns which are ranked in order of importance by the participants.

Natural Resource Concerns for the South Fork Watershed			
	Resource Concern	**Ranking Points**	**# of Responses**
1	Water Quantity/Water Conservation	34	9
2	Stream and Riparian Health	25	9
3	Wildlife/Habitat Conservation	21	5
4	Forest Health	16	6
5	Range/Pasture/Cropland Productivity	15	7
6	Economic Sustainability	15	5
7	Conserving Fish Populations	14	4
8	Spring Protection	9	3
9	Roads and Rights of Way	4	1
10	Livestock Health and Production	2	2
11	Policy (Endangered Species, etc.)	0	0

1.2 Results of the Resource Assessments

The resource assessments conducted for the CRMP identified specific concerns, degraded conditions, and land-use activities that could be better managed. The potential actions and recommendations focus on improving water quality and water management, conserving water, improving rangeland and pastureland, encouraging sustainable wildlife populations and restoring riparian and aquatic habitats while allowing a compatible level of agricultural use.

Some actions and projects were identified under various resource assessments. For instance, remediation or possible removal of irrigation diversion structures on the main stem of the South Fork was identified in the SVAP assessment as a benefit to facilitating fish movement. Likewise, stream restoration is valued as a water quality improvement through potentially reducing the transport of sediment and also as a way to improve aquatic habitat by providing shading and pool/riffle environments.

1.3 Recommended Strategies

Through the CRM process the following goals were set forth and approved by the CRMP steering committee, conservation district, and landowners. This list is intended as an overview, additional information regarding specific strategies and actions is located later in the document.

Although each strategy is listed independently, these strategies are naturally inter-related and each of these efforts must be assessed and utilized in combination with other related these actions to ensure the most benefit to the resources of concern.

These strategies should not be seen as a laundry list of tasks, but rather as a guideline and pathway for landowners to transition the current watershed into the watershed they envisioned and described during the CRM process and landowner meetings.

Resource/Strategies

	Resource Concern	*Strategies*
1	Water Quantity	Enhance the capacity for the watershed to retain seasonal runoff and snow storage
2	Stream and Riparian Health	Enhance and restore healthy riparian corridors
3	Wildlife/Habitat Conservation	Improve wildlife habitat on a watershed scale
4	Forest Health	Encourage forest stand improvements and fuels reduction
5	Range/Pasture/Cropland Productivity	Improve rangeland health and productivity
6	Economic Sustainability	Encourage partnership that allow for economic sustainability through traditional as well as non-traditional methods
7	Conserving Fish Populations	Improve stream habitat for all aquatic species, with a focus on Bonneville Cutthroat Trout.
8	Spring Protection	Protect and enhance high priority springs throughout the watershed.
9	Roads and Rights of Way	Improve ease of access for landowners and reduce the need for debris clearing from county roads reduce the amount of sediment contributed from roadways
10	Livestock Health and Production	Continue to utilize the resources in the watershed for livestock production without sacrificing other watershed values.
11	Policy	Encourage the CRMP Steering committee to be involved in policy decisions.

2.0 Coordinated Resource Management and Planning

Coordinated Resource Management and Planning (CRMP) is a voluntary, locally led planning process that has proven to be successful in managing natural resources. CRMP is a people focused process that allows local people to actively participate in developing and implementing proactive natural-resource-management decisions. CRMP brings all the affected interests, both private and public, together to establish common goals and to resolve issues as a team. CRMP is a process open to everyone who is interested in resource issues and strives to balance environmental concerns while considering human and cultural needs.

Increasing demand for natural resources has led to intensified conflicts between interest groups, land users, and resource-management agencies. Coordinated Resource Management and Planning has evolved as a way to reduce these conflicts and reach mutually agreeable management strategies.

2.1 What is CRMP?

Coordinated Resource Management and Planning is a consensus-based process by which natural-resource owners, managers, land users, and related interests work together as a team to formulate and implement plans for managing all major resources and ownerships within a specific area and/or resolving specific conflicts.

The purpose of CRMP is to resolve conflicts or issues that can hinder or preclude sound resource-management decisions. It can also proactively plan for improving natural resources and is based on the belief that people with common interests can work together to develop viable management strategies.

The goal of CRMP is to enhance the quality and productivity of natural resources by achieving compatibility among the multiple uses in a specific area. The objective is to improve and maintain natural resources in ways that are consistent with the priorities of the landowners, land users, interest groups, and land-management agencies.

CRMP is a voluntary, non-regulatory process that uses consensus as its strength. Landowners, users, managers, and other interested parties work together as a team from beginning to end. The exchange of values and viewpoints on objectives, problems, and alternatives is essential to achieving common goals and meeting resource needs. The most effective process is one that involves the local community from the outset and in which the regulating agency is comfortable with the local community being involved at the highest level of decision-making.

2.2 Rules of CRMP

CRMP has three simple rules that govern the process and ensure a respectful, fair and transparent environment to discuss relevant issues and concerns:

1. Management by consensus - Participation in CRMP is voluntary, and consensus promotes involvement. Everyone must agree on conclusions before they can be accepted by the group.

2. Commitment - All participants must be committed to the success of the program.

3. Broad involvement - All interested and/or affected parties should participate.

2.3 Initiating the CRMP Effort

The South Fork CRMP was initiated because coordinated management was needed to resolve immediate resource problems and to prepare plans to keep problems from developing and undermining the common values shared in the watershed. The CRMP program was initiated at the local level by the Summit Conservation District and landowners in the South Fork watershed. The Summit Conservation District is a legal special district and political subdivision of state government with responsibility for land and water conservation. For this reason, the District, with assistance from the Upper Weber River Watershed Coordinator took the lead to organize the CRMP process and complete the final document.

The Summit Conservation District worked to develop preliminary assessments, created timetables and schedules with the other agencies, organizations, and involved interests. The CRMP process was explained and reviewed with all parties to help them decide whether to proceed.

The general flow of the CRMP process is as follows:

- A private or public entity requests a CRMP program.
- Private and public landowners and managers, resource managers, and other interested parties in the general planning area are invited to an initial meeting.
- At the end of the initial meeting, consensus is reached about whether a plan should be developed.
- The specific planning area is defined; issues, problems, and concerns are listed; and goals and objectives are developed.
- The information that is available and needed is determined.
- A checklist is developed to ensure that all resources have been considered.
- Each objective is addressed, and all actions needed to accomplish it are determined. For each action, the planning group determines who, what, when, and how long.
- A plan is developed using all information from the prior steps, and the plan is re-evaluated.
- A system is set up to maintain and implement the plan.
- The plan is implemented.

Once the plan is implemented, there is an annual review of the plan, plan progress, accomplishments, and problems and development of new objectives.

3.0 The South Fork of Chalk Creek Watershed CRMP

3.1 Initiation of the South Fork CRMP

The South Fork CRMP was initiated by the Summit Conservation District on February 27th, 2014. Local landowners and conservation agencies met in a public meeting to address local resource concerns. The meeting was conducted by Colby Pace, a local landowner and member of the Summit Conservation District board. The Upper Weber River Watershed Coordinator facilitated the meeting to ensure everyone had an opportunity to present their input.

Using the CRMP process, everyone was given the opportunity to speak about the local resources and the potential for protection and restoration. During the plan's initial phase, a public visioning session was held at which participants identified their resource concerns for the watershed. Participants at the meeting listed resources about which they had a concern. Once those were listed, a ranking and prioritization exercise was conducted where everyone was given an opportunity to rank, by priority, those resources needing the highest level of attention.

At the same public meetings, representatives were chosen to represent the landowners and the Summit Conservation District on the South Fork Coordinating Council. Members of the watershed council are identified below in Section 3.3: South Fork Coordinating Council.

Because of this ranking, this CRMP identifies recommendations and implementation activities for the following watershed resources: riparian corridors, rangeland, water quality, wildlife, water resources, forestland, and pastureland.

Natural Resource Concerns for the South Fork Watershed

	Resource Concern	Ranking Points	# of Responses
1	Water Quantity/Water Conservation	34	9
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11	Policy (Endangered Species, etc.)	0	0

3.2 Resource Concern Descriptions

Each resource concern that was identified and ranked was discussed during a landowner meeting. During these meetings resource experts that were identified by the landowners and invited to the meeting provided expert opionions and assessments based on their knowledge of the watershed issues and their expertise. These meetings provided information to landowners to assist in making sound resource decisions both as a group and individually. The information gleaned at these meetings provided the backbone to understanding each resource concern in both its depth and breadth. The following explanations summarize some of the key ideas discussed during these landowner meetings.

3.2.1 Water Quantity

Landowners in the South Fork identified water quantity as their primary concern, both in its total ranked points as well as the number of responses. Indicating that most of the participants not only felt it should be considered, but decided to use their highest ranking cards on this item.

During the course of the coordinated resource management (CRM) process this resource concern was discussed multiple times. Landowners expressed that all the other resources rely upon having stable, adequate water supplies. This topic is also overshadowed by the projected changes to climate in the region. As described by Brian McInerny during the August 2014 meeting, the climate outlook for the watershed is one of less precipitation in the form of snow and more precipitation in the form of rain. This has long term impacts to the hydrology and agricultural heritage of the watershed and will require water to be stored in another form if streamflows are to be maintained in the late summer and fall months. The CRM process provides an opportunity for forward thinking and planning that can anticipate and address the future changes in precipitation regimes. CRM participants discussed the unique challenge that this resource concern presents. This resource concern in one respect touches all aspects of all resource concerns identified. However, this resource concern is outside the realm of anyone's complete control. The landowners and resource specialists discussed what actions could be taken to properly plan and prepare for the projected changes in precipitation. With less storage in snowpack in the future the need for the watershed to maximize infiltration in an effort to store water in the soil and natural aquifers was identified as a primary response to this challenging resource concern.

In order to maximize infiltration the entire landscape of the watershed must be

utilized. This will require improving soil health to minimize compaction, and improve infiltration. This resource concern will require they synergy of improving several other resources to be addressed. Without a holistic, watershed scale approach, this resource concern has the capacity to undermine and degrade all the other values in the watershed.

3.2.2 Stream and Riparian Health

The water that makes up a stream, landforms and channels that streams it creates are indicators of the overall health and land use patters on the entire watershed. If a watershed has healthy rangeland, forests, and wetlands then stream systems are usually stable, with floodplains that have robust vegetation and the stream is correctly connected to the groundwater within the watershed. When a watershed is healthy the systems that govern the function of the streams are in sync.

In order to quantify the health of the streams and riparian areas of the South Fork watershed the CRMP team employed an assessment tool called a Stream Visual Assessment Protocol or SVAP. This was conducted in order to efficiently gauge the quality of each stream section (reach) using assessments born from on the ground assessments. An understanding of the implications of each category assessed in the SVAP provides a holistic perspective of the implications of riparian health on the watershed and the inhabitants of the watershed. The SVAP was conducted during the summer of 2014 using trained staff and volunteers from partner agencies as well as CRMP landowners and steering committee volunteers.

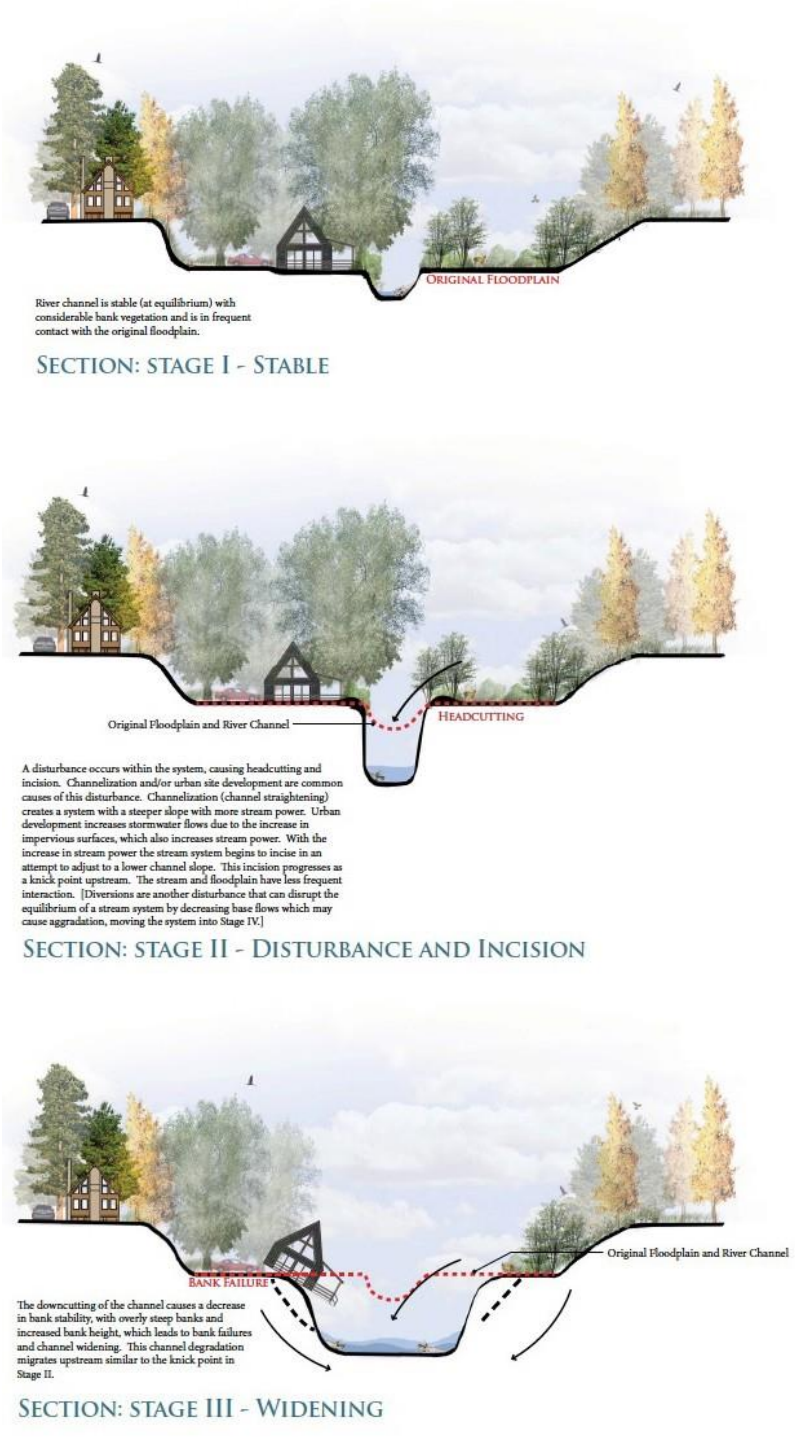
A streambank with no riparian area and significant, active, erosion occuring.

Channel Condition

When a watershed had degraded forests, rangeland, meadows, and wetlands the streams are often deeply entrenched and thus disconnect the groundwater from near the surface and eliminating the streams connection with its active floodplain. When a stream becomes disconnected from its floodplain through incision its ability to release energy during high flow events is reduced, creating more incision thus creating a cycle of still greater incision with each high flow event.

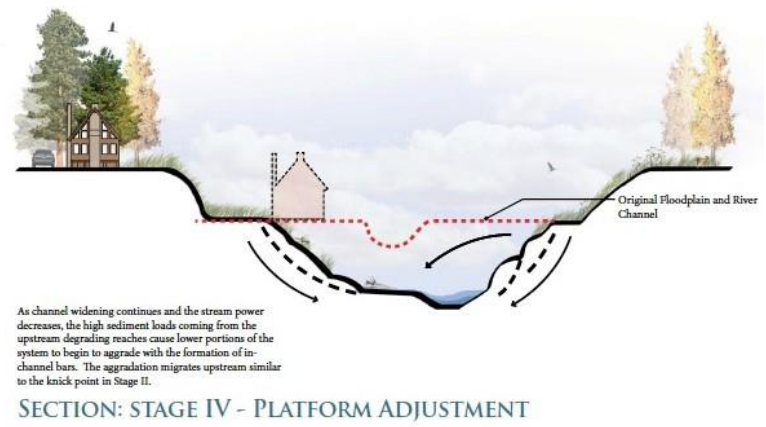
Areas of the South Fork watershed exhibit significant incision and disconnection from the floodplain (See SVAP results). These areas typically had narrow riparian areas and low habitat diversity and overall riparian health. Incision is a challenging problem to correct but not impossible. Either the stream channel must be allowed to re-establish a new floodplain which requires hundreds of years of waiting for natural erosion to take place or the stream can be aggraded, or the bed of the stream can be raised until it can interact with its historic floodplain.

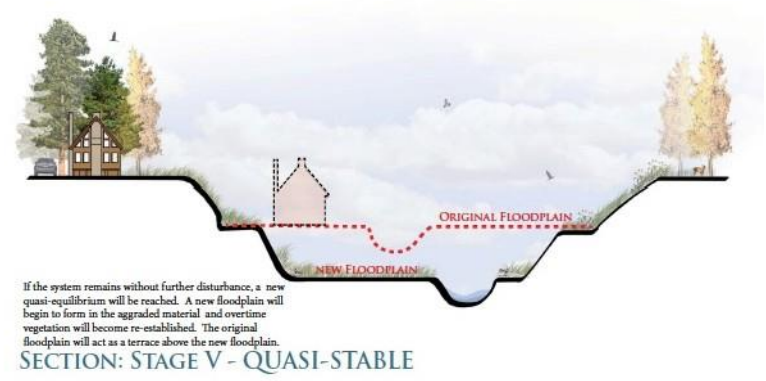
The most financially viable and effective way to raise a stream bed and re-engage the floodplain is to slow the flow of the stream to encourage sediment to drop from the water column and build the base of the stream. Beaver dams are a natural way streams can aggrade and re-engage natural processes on the floodplain. Slowing water and raising its level also provides the hydraulic head required to



The evolution of an incised stream: www.buffer.forestry.iastate.edu

push water deeper and further into the surrounding soils thus sub-irrigating riparian vegetation, nearby meadows, and providing water for springs and seeps that are hydrologically connected to the stream.





The evolution of an incised stream cont.: www.buffer.forestry.iastate.edu

Hydrologic Alteration

This assessment refers to structures in the watershed that can alter natural flow patters throughout the year such as reservoirs and irrigation structures. The South Fork has a very limited number of these structures and they are of a scale that they have a small effect on the natural flow patterns of the watershed.

Bank Condition

A robust and healthy riparian corridor surrounding a stream allows for a diverse root system to hold stream banks in place during high flow events. A healthy, diverse riparian corridor surrounding a stream is the best all-around defense against loosing valuable lands to erosion.

Many stream banks within the South Fork watershed are bare and prone to erosion both in high flow events as well as during normal flows. These banks are a significant source of sediment due to the highly erosive nature of the native soils in the South Fork. Stabilization of these banks will require the attention of landowners as well as CRMP partners to properly address these areas and provide long term management changes to keep the banks from eroding in the future.

Riparian Area Quantity/Quality

The extent and quality of riparian areas are another metric to gauge general riparian health. This assessment measured the average width of the riparian area and then assessed the diversity of plant and habitat types within that area. A diverse riparian area provides redundancy in plant life as well as a diversity of age classes in order to provide several habitat types for the largest variety of animal species to utilize.

Often the health of riparian areas are threatened and degraded by livestock and wildlife grazing. Riparian areas are often the lushest and most shaded areas in the watershed. Grazing animals are attracted to this easy source of food, water, and shelter and all too often spend the bulk of their time along stream banks. If left unchecked, the areas along streams become compacted, overgrazed, and ripe for erosion. Additionally grazing animals can quickly devour desirable young tender woody plants. This grazing pressure eliminates the next generation of riparian plants, leaving only older trees and shrubs. If this cycle continues, when these older trees and shrubs eventually die there will be no younger trees and shrubs

to replace them. Within several areas of the South Fork watershed only very old Cottonwood trees remain over stream banks with little or no young Cottonwoods or willows. Reversing this trend is of upmost concern for the long term riparian health of the South Fork watershed.

Grazing management must be focused on protecting riparian areas from becoming livestock and wildlife hangouts for long durations. Stream access should be limited to discreet areas or other resources such as mineral should be located away from streams to encourage livestock and wildlife to stray away from riparian areas. This technique also encourages livestock and wildlife to utilize more evenly the landscape without concentrating use on the riparian areas.

Canopy Cover

Canopy cover is a measure of how much of the stream is shaded during times when the sun is shining directly upon the stream. Healthy riparian areas provide critical shade to keep water cool for aquatic wildlife that depend on stable water temperatures such as trout and macroinvertebrates. Temperature studies conducted on the South Fork watershed indicate that temperatures increase substantially from the top of the watershed to the confluence with Chalk Creek. This dramatic difference indicates that the stream is exposed to the full force of the sun for much of the day and far too little of the streams in the South Fork have adequate canopy cover.

Water Appearance

The appearance of the water is another visual indicator of the quality of the water. Water that is murky or cloudy can indicate an unhealthy nutrient, sediment, or chemical imbalance. Typically, the water in the South Fork is clear except for during runoff events. This indicates that erosion of fine sediments from the uplands, stream banks, and within the stream continues to be a problem for overall water quality.

Nutrient Enrichment

Healthy riparian areas improve water quality by creating a filtering buffer between the uplands and the stream channel. When upland erosion occurs robust vegetation can slow water flows causing sediment and nutrients to settle out before the water gets to the stream. Nutrient enriched streams suffer from excessive algal growth which can lead to

large daily swings in the amount of oxygen available in the water for aquatic organisms. This creates a cycle of too much oxygen during the day and too little oxygen at night after the sun sets. This cycle is very dangerous for fish and other aquatic organisms.

Manure or Human Waste

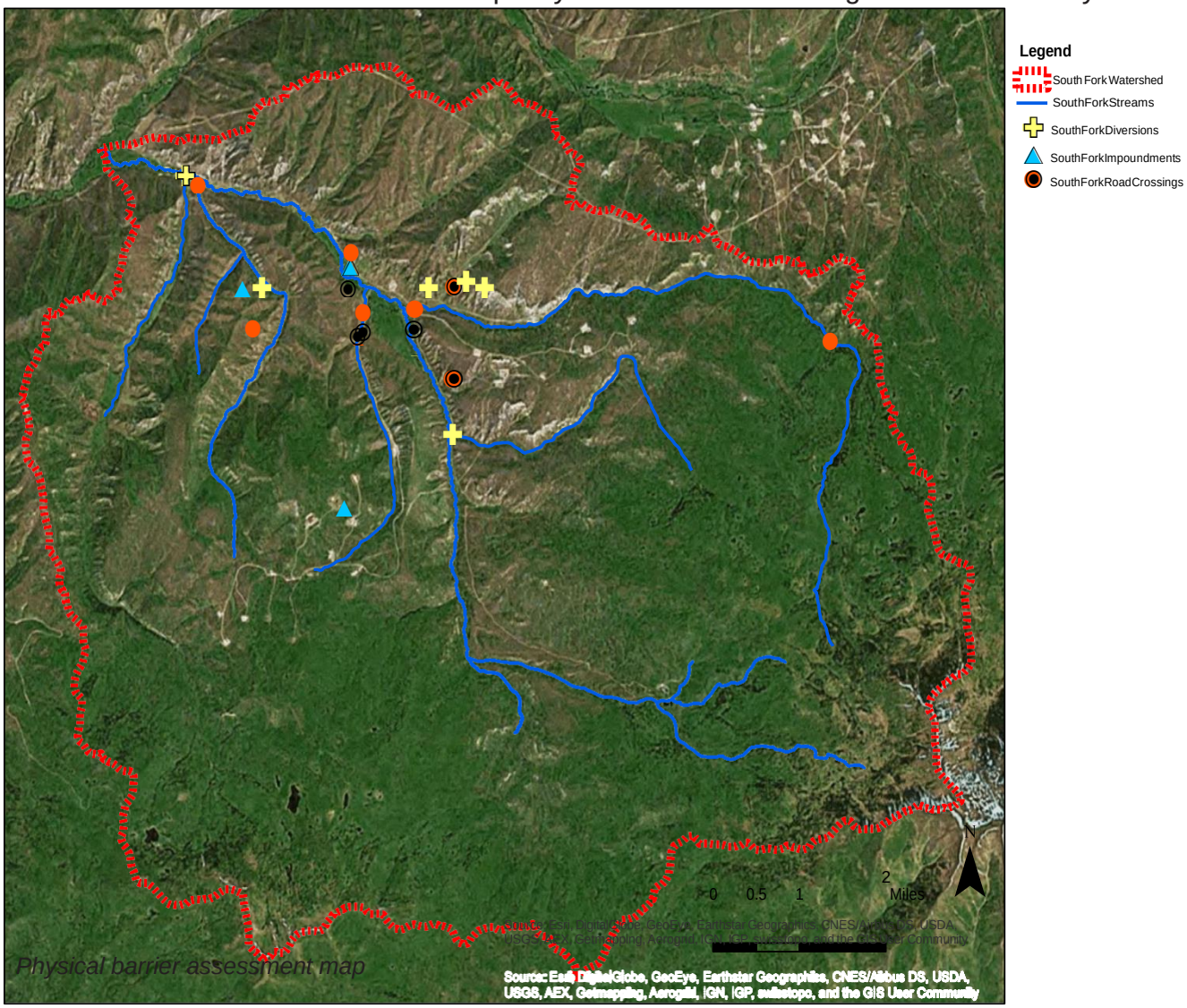
Manure of human waste in the water can lead to dangerous micro-organisms being present in the water. The micro-organism of concern is most often E-coli, which are found in the digestive systems of animals and humans. Animal and human waste was not typically an issue found in the South Fork SVAP but was found occasionally in areas where livestock were concentrated along stream channels.

Pools

Deep pools provide important habitat for aquatic organisms. Pools in the streams of the South Fork provide areas where cool water can often be found in the hottest times during the summer. They also provide another habitat type that improves the diversity of habitats for all aquatic species.

Barriers to Movement

The SVAP also assessed the capacity for fish to move throughout the stream system.



Physical barrier assessment map

Barriers within the system eliminated opportunities for fish to travel upstream in order to utilize habitat and sometimes complete portions of their life histories. The South Fork watershed has a limited number of barriers that keep fish species from having the entirety of the stream system for habitat.

Fish Habitat Complexity

In addition to the quantity of available fish habitat, the diversity or complexity of the available habitat is an important measurement of stream and riparian health. A diverse habitat allows for more aquatic species to inhabit a single area. This redundancy also allows for the aquatic community to rebound from a disturbance. Habitat complexity was measured by assessing the quantity of different habitat types that were found along the given stretch of stream.

Aquatic Invertebrate Habitat/Community

Riparian areas are critical habitat for most of the mammals, insects, amphibians, and birds that call the South Fork home. Ensuring the health of the areas near the streams benefit not only the stream but the entire ecosystem of the watershed. The health of these aquatic invertebrate communities directly relate to the health of the fishery. The SVAP assesses the capacity for these communities to exist in a stream reach by assessing the different habitat types that would facilitate a life stage in an aquatic invertebrate's existence.

A Mayfly (a sensitive invertebrate) on a rock in Fish Creek

Additionally the presence of absence of certain types of aquatic invertebrate species is and indicator of stream and riparian corridor health. Aquatic invertebrates that are more sensitive to water quality challenges will not be found in a stream with low water quality and only the heartiest of species will be left in the stream. Conversely, if a stream has good water quality and a healthy riparian system, a full diversity of aquatic invertebrates can be expected. This assessment is completed within the SVAP by observing and analyzing what aquatic invertebrates are in the stream reach and grouping them into general insect families that are known to inhabit different areas within known water quality thresholds.

Riffle Embeddedness

Riffle embeddedness is a is a measurement of how buried, or surrounded with sediment rocks are and is a simple measure of how much sediment is on the bottom of a given stream channel. When a stream is high in sediment it tends to build up on the bottom of the stream, this buildup chokes the spaces in between rocks on the bottom that aquatic invertebrates call home and where fish lay eggs and eliminates oxygen rich water from moving between these spaces.

3.2.3 Wildlife/Habitat Conservation

All wildlife are dependent upon viable habitat to survive and thrive and without habitat sufficient to meet the specific needs of wildlife species, there will not be wildlife. Thus habitat and wildlife conservation were considered a single resource concern. No single set of species were considered as "wildlife" in the discussions with landowners, but particular focus was given to more iconic wildlife species such as mule deer, elk, and moose.

Not only are wildlife a key component to a healthy ecosystem, wildlife species are an important resource for South Fork landowners. Wildlife are an important part of the ecology, ecosystem, history, and aesthetic of the South Fork. Big game species such as Mule Deer and Elk are also a significant economic resource to many of the landowners.

Mule Deer in Utah: http://www.utah.com/

Several of the landowners in the watershed participate in the Cooperative Wildlife Management Unit (CWMU) program organized by the Utah Division of Wildlife Resources. The CWMU that covers portions of the South Fork is known statewide and nationally as a premier hunting unit. This recognition is a credit to the inherent natural resources of the area as well as the management of CWMU operators and landowners. Dave Rich, the area big game biologist from the Utah Division of Wildlife Resources presented at the November 11, 2014 meeting and discussed the wildlife concerns for the South Fork and answered questions regarding herd health and numbers for both elk and mule deer. Dave focused much of his discussion on the interplay between herd size and health and habitat requirements.

Wildlife species are reliant upon adequate and healthy habitats to survive. When components of required habitats are diminished or do not exist in a particular area, wildlife species typically move to find the required habitats or are eliminated from the area. For example, deer in the South Fork require both summer and winter range habitat to survive. During the warm summer months deer spend time in the upper reaches of the watershed and feed on understory plants and grasses that occur on range sites, forested areas, and riparian areas. However, during the winter the cold and snow eliminate much of the food sources once available to deer. This forces them to move to areas typically on southern facing aspects with lower snow depths and vegetation that remains nutritionally adequate even during the coldest months of the year.

Without both of these habitat types deer will not be able to complete their life cycle within the South Fork watershed and may not remain full time residents of South Fork. Additionally, if any of the habitat types are lacking, this will be the limiting factor influencing the carrying capacity and health of the entire species within the watershed.

The challenge becomes how to manage for wildlife species that require a complex diversity of habitats that occur throughout the watershed. This challenge is especially paramount because land ownership rarely encompasses all of the habitat types needed by any wildlife species. This requires management that recognizes that wildlife and the habitats they rely on do not respect fences, nor does management of these resources on a landowner by landowner scale provide the holistic view required to ensure management occurs at a proper scale and addresses the resource concern to the extent possible.

3.2.4 Forest Health

The South Fork watershed is comprised of several important vegetation communities. The forest community is composed of large swaths of low and mid-elevation aspen forests as well as vibrant high elevation conifer stands. These forest communities are facing a variety of challenges that threaten the long term health of these systems.

An aspen stands that is lacking a diversity of understory vegetation.

PJ Abraham from the Utah Division of Forestry, Fire, and State Lands attended the October 23, 2014 meeting and explained the components of a healthy forest and the challenges the forest in the South Fork are facing.

In order for forest systems to be considered healthy they must be resilient. Resiliency means they can experience disturbances, diseases, etc. without a significant decline in the long term health of the forest. Historic forest management across the west has created forest systems that are not very resilient. Historically, small disturbances such as a forest fire or disease destroyed areas of the forest, thereby allowing new trees to grow and multiple age classes of trees to coexist. However, efforts to minimize or eliminate disturbances such as fire have created forests that are often old and overgrown. This has created a situation where our forests are overstuffed with trees competing for limited resources. This adds additional stress on the trees which

makes them vulnerable to diseases.

Aspen stands across the west are in decline and the aspen stands in the South Fork are experiencing many of the same challenges. Aspen are fast growing trees that are relatively short lived. When older trees die, younger trees spring up to take their place. In the South Fork grazing from livestock and wildlife has suppressed much of the sapling growth which has minimized the opportunity for sapling recruitment. This lack of aspen regeneration has resulted in shrinking aspen stands and a lack of sustainable, diverse age classes.

Conifer encroachment continues to threaten aspen forest health. When conifer trees replace and occupy areas that were once aspen stands, conifers quickly out compete aspens for sunlight, water, and nutrients. This begins a cycle where conifers spread and aspen disappear. This cycle is happening in the South Fork watershed.

Aspen forests are critical for wildlife habitat as well as integral for livestock grazing. Aspen stands also play an important role in the hydrology of the watershed. While conifers capture snow on their branches aspen forests allow most of the snow to fall to the ground. The snow held in conifer branches is more likely to evaporate into the atmosphere, while the snow lying on the ground is more likely to infiltrate into the ground. This means that typically aspen stands allow more moisture to infiltrate into the soil than conifer stands. With water quantity being of paramount importance to the South Fork watershed, the trend for the forests within the South Fork transitioning from aspen stands to conifer stands is alarming.

3.2.5 Range/Pasture/Cropland Productivity

This natural resource concern is tightly related to the economics of the watershed. Since most of the watershed is used for either livestock grazing or wildlife production, the health and long term viability of landscapes that provide abundant and nutritious feed sources is important to South Fork landowners.

Thomas Hoskins from the Natural Resources Conservation Service (NRCS) and Bill Hopkin from the Utah Grazing Improvement Program (GIP) attended the August 14, 2014 landowner meeting to explain how grazing can be a sustainable and beneficial component to a healthy range and pasture ecosystem. Bill explained three key principles to proper grazing management: Timing, Duration and intensity.

These keys to management have been realized throughout the west and the improvements to both productivity and to overall rangeland health are impressive. Bill used his experience as the manager at the Deseret Land and Livestock ranch as a case study and showed how once degraded rangelands were brought back to health by implementing grazing management practices.

Thomas explained the environmental and ecological benefits of proper range management. Thomas explained the ability for a vibrant and healthy rangeland to capture and retain water as well as provide sufficient biomass for both livestock and wildlife. Thomas also explained that invasive species such as Bulbous Bluegrass and Cheatgrass limit production and turn acres once able to support high livestock stocking densities into areas that may appear green but have grasses with little nutritional value.

Within the South Fork watershed, rangeland conditions vary significantly. These variations are both in the spatial extent of the conditions as well as the severity. Poor range conditions are most often concentrated in areas of localized disturbance, such as surrounding a livestock watering area or near a mineral source. However, some large areas of the

An example of a robust and diverse rangeland that provides for a healthy watershed, livestock, and wildlife.

watershed experience almost constant grazing pressure. In these areas invasive species are prevalent and noxious weeds are a constant worry. Where livestock have unrestricted, yearlong access to any single area over grazing can easily occur.

Over grazing refers to a condition when the ability of the plant being grazed to regrow in the next growth cycle is limited by the grazing done at the time. When overgrazing occurs the long term trend of the plan is negative, meaning that over time the rangeland's ability to sustain its own functions will diminish. Over time, this results in the plants that provide the best nutrition being grazed out of the system, leaving only the least desirable and often least healthy plants. While this trend takes time to develop it is challenging to reverse. The result is that less livestock and wildlife can exist on the same acreage due to the lack of feed that is both abundant and nutritious.

Unhealthy range conditions also provide opportunities for noxious weeds that both further limit forage production and add extra time and expense to combat. As was explained by Bill Hopkin, the best way to combat noxious weeds is to have a range robust and healthy enough that they cannot compete with the range native plants.

3.2.6 Economic Sustainability

The natural resources of the South Fork watershed are a critical economic resource for landowners. Farming, ranching, hunting, and forestry are some of the uses within the watershed that transfer natural resources into dollars. If the transfer of these natural resources fails to provide sustainable incomes the natural resources will require some other form of management. Danny McBride, area Resource Conservationist for the Natural Resources Conservation Service (NRCS) attended the October 23, 2014 meeting and provided valuable information regarding the realities of running an economically viable agricultural operation. He also presented some ideas regarding opportunities

for landowners to utilize outside grants and loans to complete projects that benefit the watershed and their own operation.

The landowners expressed the need for the businesses that depend on the resources of the South Fork to remain sustainable into the future. Since the economic viability of these businesses is tied to the health of the natural resources, sound management is both good for the watershed and good for business. If businesses in the watershed are to be sustainable, a long term management approach must be considered. If a practice that might be profitable in the short term damages the long term health of the resource then it must be considered as threatening the economic sustainability of the resource. For example, if overgrazing that is required to sustain a large livestock herd is profitable for a few seasons but reduces the same acreage's ability to produce sufficient feed for that same herd in the future this short term profit will reduce the future earning potential. In this scenario, other costs will also be accrued from this management, i.e. extra money being spent on herbicide, lowered sale weight per animal in the future, etc.

Conversely, landowners expressed the need for any relevant proposed conservation measures to be considered through the lens of economics. Conservation measures should be analyzed to understand the potential economic benefits and consequences in order to assess their value. It was also brought up by landowners that not all changes will have direct economic benefits, and that some decisions must be made based on moral or emotional values regardless of the economic consequences. This may be the case in many conservation planning decisions into the future but the goal of the planning process is to make the economic costs and benefits transparent.

3.2.7 Conserving Fish Populations

The South Fork watershed is home to Utah's native Bonneville Cutthroat Trout. The Chalk Creek watershed is one of the last remaining strongholds for this beautiful native fish. Landowners identified conserving fish populations as one of their resource concerns.

A Bonneville Cutthroat Trout native to the South Fork watershed.

Bonneville Cutthroat Trout are commonly referred to as “cutthroats” by locals and they require the clean gravelly stream bottoms, and clean cold water of small tributary streams like the South Fork to spawn, lay eggs, and hatch young fish.

When asked about this resource concern, many landowners recounted stories of many large fish, caught historically in the South Fork and nearby Chalk Creek. Paul Burnett, Trout Unlimited’s Weber River Coordinator provided some background on Bonneville Cutthroat Trout, their life stages, and their habitat requirements during the September 19, 2014 2015 landowner meeting.

Each spring cutthroats come from within the South Fork and Chalk Creek to many reaches of the South Fork so small that it is a wonder any fish can live there. When a female fish finds a spot with just the right flow, gravel size, and locations she will force gravel along the bottom into a depression and lay her eggs. She will then pile a layer of gravel on top of them and guard her “nest” called a redd. When these eggs are later fertilized by a male the small fish that hatch out will remain in these redds until they are ready to live in the stream.

When sediment covers up these gravelly areas, oxygenated water is unable to contact the eggs or the young fish and they are quickly suffocated. Fish populations also require redundancy to be resilient to changes in the watershed. One aspect relevant to the South Fork is fish being able to move throughout the watershed. If barriers exist that limit the fish’s ability to move upstream or downstream the fish is unable to adjust to changes in habitat, stream temperature, or select another stream if the fish becomes stressed in another stream. Barriers also eliminate opportunities for fish to re-colonize and share unique genetics if a population is wiped out or severely diminished.

The South Fork is a unique watershed with tremendous habitat and is home to a unique species with significant conservation value.

3.2.8 Spring Protection

Springs and seeps are special ecological areas for wildlife as well as important natural sources of water for livestock. Naturally occurring springs are areas where the underlying geology and hydrology force groundwater to the surface. Some springs provide very consistent water sources with reliable flow rates.

Areas where subsurface water surfaces are sensitive parts of the watershed.

Some springs may only provide water during wet years, when irrigation systems elsewhere are being used. These areas represent an interface between subsurface water and the surface which means that groundwater resources have the potential to be contaminated through the contamination of a spring.

Since springs and seeps are wet for some period of the year they become very sensitive to damage from concentrated wildlife and livestock hoof action. Lush, viable springs can become a sloppy mud pit if unlimited, concentrated access is provided to unsustainable numbers of livestock or wildlife. Contamination of springs most often occurs when microrganisms, like bacteria, present in the digestive systems of animals or humans enter the groundwater through manure. These microrganisms can multiply until their numbers can cause sickness to animals and humans that drink from these springs.

Limiting access to springs and seeps can protect these valuable resources. Where springs or seeps are necessary sources of water the spring can be developed and a simple system that gathers the water underground and then distributes it through a system of pipe to troughs eliminates livestock concentration in wet areas and provides protection as well as a watering system that can disperse wildlife and livestock as part of a grazing management system.

3.2.9 Roads and rights of Way

Roads were identified as an issue of concern and discussed several times during the landowner meetings. Access to the South Fork watershed is dependent upon one developed access point, Blonquist Lane, a county road. The importance of this road was apparent during 2011 when the road was washed out where it crosses Fish Creek.

This resource concern was not addressed in any single meeting, however, landowners and the CRMP steering committee discussed the need to work together to continue to allow access and keep the road from where the county maintenance ends to the top of the watershed passable and maintained.

Just after a rainstorm, sediment from the hillsides covering the county road, the primary access to the watershed.

3.2.10 Livestock Health and Production

Livestock production has been an important component of the South Fork watershed since the first settlers used the lush meadows and rangeland for livestock grazing. This tradition remains strong in the watershed. Livestock grazing remains a primary method to transfer the natural resources of the watershed into an economic resource for the landowners in the watershed.

Livestock health and production were discussed by Bill Hopkin and Thomas Hoskins during the August 14, 2014 meeting. These resource experts discussed grazing and explained that invasive species and declining rangeland health reduces livestock health and productivity which in turn lowers the economic potential of the watershed. They explained that adequate and sustainable feed, water, and protection from predators are critical for livestock to remain on the landscape of the South Fork. Having these resources in adequate supplies as well as in the right place at the right time of year are the difference between healthy livestock that utilize the landscape without damaging it, versus livestock that can damage healthy rangelands and riparian areas and lower the animal units that can sustainably graze in the watershed.

Livestock health and watershed health are one-in-the-same. What is good for the watershed will be good for the livestock. A healthy and robust rangeland, meadows, and riparian areas are good for the overall health of any type of livestock, and will allow for the rich history of livestock production in the watershed to continue into the future.

Rangeland within the watershed that supports multiple uses

3.2.11 Policy (Endangered Species, etc.)

This topic was suggested as a way to discuss policy issues that affect the watershed but are much larger in geographical as well as political scope. Although landowners suggested this topic as a concern it was seen by the steering committee as beyond the scope of the CRM process and was not explored in depth.

3.3 Conservation Strategies and Actions

Resource	*Strategy*	*Proposed Action*	*Partner (s)**
1: Water Quantity	Enhance the capacity for the watershed to retain seasonal runoff and snow storage	1.1- Improve rangeland health to allow for more moisture infiltration (see strategy 5)	NRCS, 319, UDWQ, TU UDWR, UDAF/GIP, WBWCD
2: Stream and Riparian Health	Enhance and restore healthy riparian corridors	2.1 - Restore areas where active erosion is occurring or where riparian vegetation has been damaged or eliminated. (Refer to areas identified in the SVAP)	NRCS, 319, UDWQ, TU UDWR, UDAF/GIP
3. Wildlife/ Habitat Conservation	Improve wildlife habitat on a watershed scale	3.1 - Enhance winter range habitat for mule deer and elk populations	NRCS, WRP UDWR, UDAF/GIP

Resource	*Strategy*	*Proposed Action*	*Partner (s)**
4. Forest Health	Encourage forest stand improvements and fuels reduction	4.1 - Encourage landowners that do not have forest stewardship plan to obtain one in partnership with the Utah Division of Forestry, Fire, and State Lands.	NRCS, DFFSL UDWR, UDAF/GIP
5:Range/ Pasture/ Cropland Productivity	Improve rangeland health and productivity	5.1 -Enhance and improve grazing management systems on rangeland areas that are identified as impaired or currently not meeting their potential in the rangeland assessment.	NRCS, UDAF/GIP Summit County Weed Department
6. Economic Sustainability	Encourage partnerships that allow for economic sustainability through traditional as well as non-traditional methods	6.1 – Utilize and support partnerships and synergistic relationships to provide economic opportunities for landowners. (These can be easements, guided eco-tourism, etc.)	Land Conservancy Groups, NRCS

Resource	*Strategy*	*Proposed Action*	*Partner (s)**
7. Conserving Fish Popula-tions	Improve stream habitat for all aquatic species, with a focus on Bonneville Cutthroat Trout.	7.1 - Remove barriers or create opportunity for fish passage at all current areas considered a barrier to fish movement throughout the watershed.	NRCS, 319, UDWQ, TU UDWR, UDAF/GIP
8. Spring Protection	Protect and enhance high priority springs throughout the watershed.	8.1- Limit access to undeveloped springs not expected to be developed.	NRCS, 319, UDWQ, UDWR, UDAF/GIP
9. Roads and Rights of Way	Improve ease of access for landowners and reduce the need for debris clearing from county roads reduce the amount of sediment contributed from roadways	9.1 -Implement stabilization on hillsides and within drainages that connect to roads and rights of way to minimize sediment and de-bris flows during storm events.	Summit County, Landowners

Resource	*Strategy*	*Proposed Action*	*Partner (s)**
10 Livestock Health and Production	Continue to utilize the resources in the watershed for livestock production without sacrificing other watershed values.	10.1 - Continue to use livestock as a management tool to improve rangeland, reduce fire danger, and manage invasive weeds.	Summit County, NRCS, UDAF/GIP
11. Policy	Encourage the CRMP Steering committee to be involved in policy decisions.	11.1 - Encourage and support the CRMP steering committee in supporting changes in policies that will continue to enhance the goals outlined in the CRMP.	TBD
*Partners are potential organizations that may be able to provide technical or financial assistance in accomplishing resource conservation strategies and actions.			

3.4 Implementation Plan

In order to transfer the lofty strategies outlined in this plan into real and lasting results, changes must occur in the daily decisions and long range plans of the people that control the watershed - the landowners of the South Fork Watershed. The future of the watershed is squarely on their shoulders. This plan has provided a forum to discuss watershed scale issues as well as a framework to propose a suite of strategies that address identified resource concerns.

However, this CRM process is only talk and wishful thinking unless the landowners take the knowledge and relationships gained through the process and enact the principles learned on their own property. In order to translate the watershed scale discussions and strategies into a farm or ranch scale, representatives from the Summit Conservation District will consult with landowners on an individual basis to help them develop conservation plans for their own property. These plans will identify specific areas of concern as well as record conservation goals for the property. The intent of the plan is to clearly record goals, challenges, and desired areas of change and the projects that would be needed to address these challenges and thoese outlined in this CRMP document. These plans will be developed with the lessons learned, challenges, and strategies identified in the CRMP as overarching framework, but allow the landowners to focus on a landscape they are connected to, able to control, and they will benefit from its improvement.

The role of the conservation district representative will be to identify areas where neighbors, or groups of landowners might benefit from collaboration and propose and foster partnerships if they exist and landowners are interested.

These plans are also intended to provide individual landowners and groups of landowners in partnership with the information needed to approach agencies that have a mutual interest in the identified project and funding to assist the landowners in

accomplishing a well thought out plan that fits within a larger watershed scale framework of strategies.

In order for a plan to become more than words on paper, real people with real relationships must take what is said and put it into action. These people must have a relationship of mutual respect. In order to continue and build upon the relationships that were formed during this CRMP process the CRMP steering committee will organize semi-annual meetings with landowners. These meetings will be to discuss funding opportunities, discuss projects, share information, tour project sites, and amend and correct the current CRMP document. The proposed schedule is to meet during the winter to discuss more formal topics and meet again in the fall in a BBQ setting to socialize and tour project sites.

This implementation plan is intended to be organic and evolve as issues and needs evolve. The intent is that through working toward a common goal using common strategies that a collection of landowners have developed and agreed upon, this CRMP is to grow to accomplish its goal of improving the natural resources of the watershed as well as the social and economics of the watershed as well.

3.5 Participating Agencies

The South Fork CRMP was prepared with input from the following agencies and participants:

Lead Organization:

Summit Conservation District

Participating agencies:

- U.S. Department of Agriculture (USDA)
- Natural Resources Conservation Service (NRCS)
- Utah Division of Wildlife Resources
- Utah Division of Water Rights
- Utah Division of Water Quality
- Utah Division of Forestry Fire and State Lands

Consultants:

Utah State University-Department of Landscape Architecture and Environmental Planning

In cooperation with:

- Local landowners
- Trout Unlimited
- Summit County
- Weber Basin Water Conservancy District
- Uinta Headwaters RC&D Council
- R and K Hunting Co.

Funding to complete the CRM process and produce a plan was generously provided by the Utah Department of Agriculture and Food (UDAF). Our many thanks for their generous support in making this process a reality.

3.6 South Fork Watershed Coordinating Council

The South Fork Watershed Coordinating Council (SFWCC) was formed as the planning group for the CRMP. The coordinating council consists of local citizens and property owners. The SFWCC currently consists of the following members:

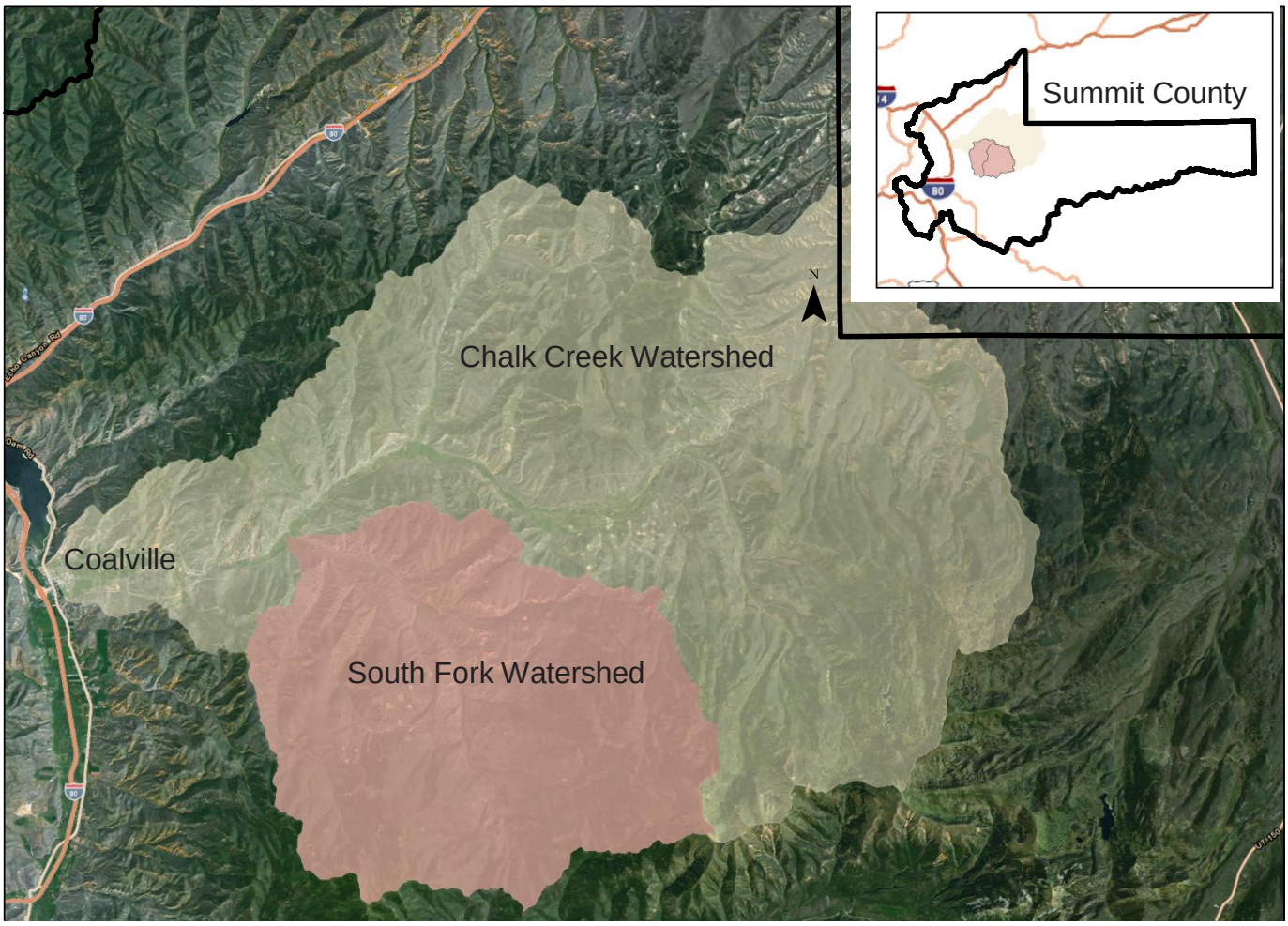
Name	*Representing*
Colby Pace	Summit Conservation District/Landowner
Andrew Blonquist	Landowner - Six Feathers Ranch
Tonya Hansen, Ashley and Anita Lewis	G&E Blonquist Ranch
Becky Gillmor	Landowner - G-Bar Ventures
Fred Oswald	Landowner - William Oswald Ranch
Gavin Blonquist	G&E Blonquist Ranch
Jake Powell	Summit Conservation District
Doug Garfield	Summit Conservation District

Meetings were held on the following dates, with the following topics discussed:

- February 24, 2014 – Overview of CRMP process and an invitation to participate in the South Fork Watershed CRMP. Discussion of watershed issues and concerns.
- April 24, 2014 – Wildlife habitat presentation from USU graduate students.
- June 26, 2014 – Resource Prioritization Workshop
- August 14, 2014 – Discussion of Water Quantity with Brian McInerny (NOAA) and rangeland productivity and livestock health from Bill Hopkin (Utah Grazing Improvement Program) and Thomas Hoskins (NRCS)
- September 19, 2015 – Presentations and discussion of riparian health from Jake Powell (UACD) and fish populations from Paul Burnett (Trout Unlimited)
- September 20, 2014 – South Fork landowner BBQ and opportunity to converse and discuss issues as neighbors.
- October 23, 2015 – Presentations and discussion on economic sustainability from Danny McBride (NRCS) and Forestry from PJ Abraham (DFFSL)
- November 12, 2014 – A discussion of wildlife habitat and big game populations from Dave Rich (DWR)
- January 24, 2015 – CRMP landowners meeting to discuss draft CRMP and steps moving forward

4.0 Watershed Characterization

This section provides a general description of the South Fork of Chalk Creek Watershed with the intent of identifying opportunities for implementing projects that would improve conditions in the watershed. This review of the of the physical, biological, and chemical condition of the watershed, as well as the social components such as agricultural and recreational use, identify areas that might benefit from the implementation of some type of watershed project. This section specifically addresses the following aspects of the watershed: watershed area, authorities and jurisdictions, population and land use, social environment and recreation, climate, water resources, and wildlife and habitat. The best available information was used to develop this characterization. In several cases, further data collection and analyses were conducted to provide additional information that was used to assess the watershed and identify potential projects and management strategies.



Context map of the South Fork watershed within the Chalk Creek watershed.

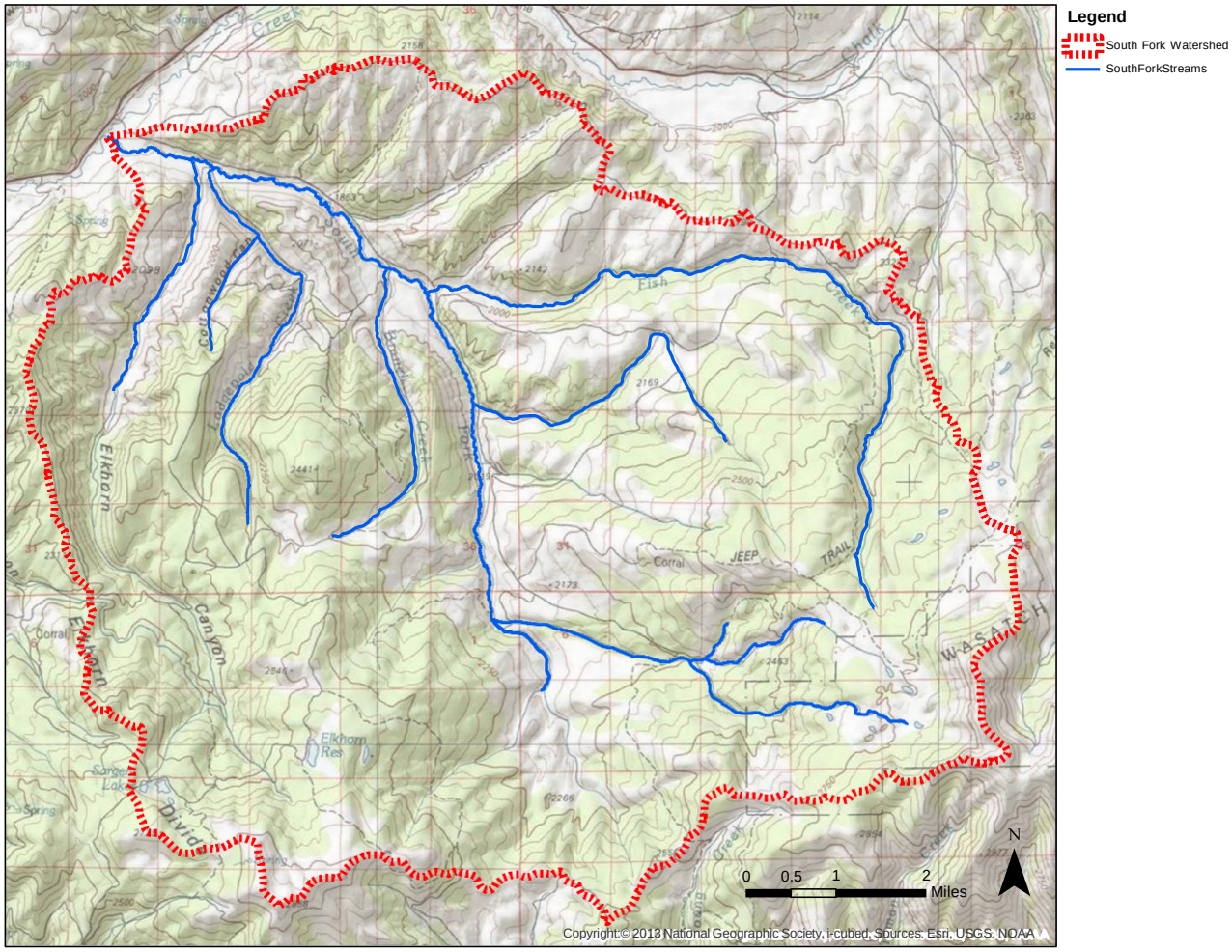
4.1 Watershed Area

The South Fork of Chalk Creek watershed is a subwatershed to Chalk Creek and is located 6 miles east of Coalville, Utah. The watershed drains the extreme west slope of the Uinta Mountains. The watershed is about 12 miles long and 9 miles wide and encompasses about 47,600 acres (74.4 square miles) in Summit County. The following sections include general descriptions of the topography, roads and climate in the watershed.

4.1.1 Topography

The South Fork watershed is broad bowl shaped drainage bounded by mountainous terrain on the east, south and west. The valley bottom is quite narrow and the watershed slopes to the northwest following the South Fork, with the highest mountains located on the east side of the watershed. These mountains constitute the western terminus of the Uinta Mountains with elevations over 10,000 ft. The south and west borders of the watershed consist of high mountain ridges. The Elkhorn divide on the west margin of the watershed tops out at 9,300 ft. The bottom of the watershed lies at an elevation of 5,800 ft. where the South Fork meets Chalk Creek. Major tributaries are Fish Creek, Elkhorn Creek with additional smaller tributaries.

The lower reaches of the watershed are used primarily for agriculture as irrigated hayland and pasture. Irrigation ditches convey water from South Fork across the valley bottom. The mid and upper reaches of the watershed consist of rangeland that is used primarily for grazing, and big game hunting. Oil and Gas exploration has been extensive in upper portions of the watershed which has resulted in a network of roads and pads in parts of the drainage.



Map of the topography of the South Fork watershed.

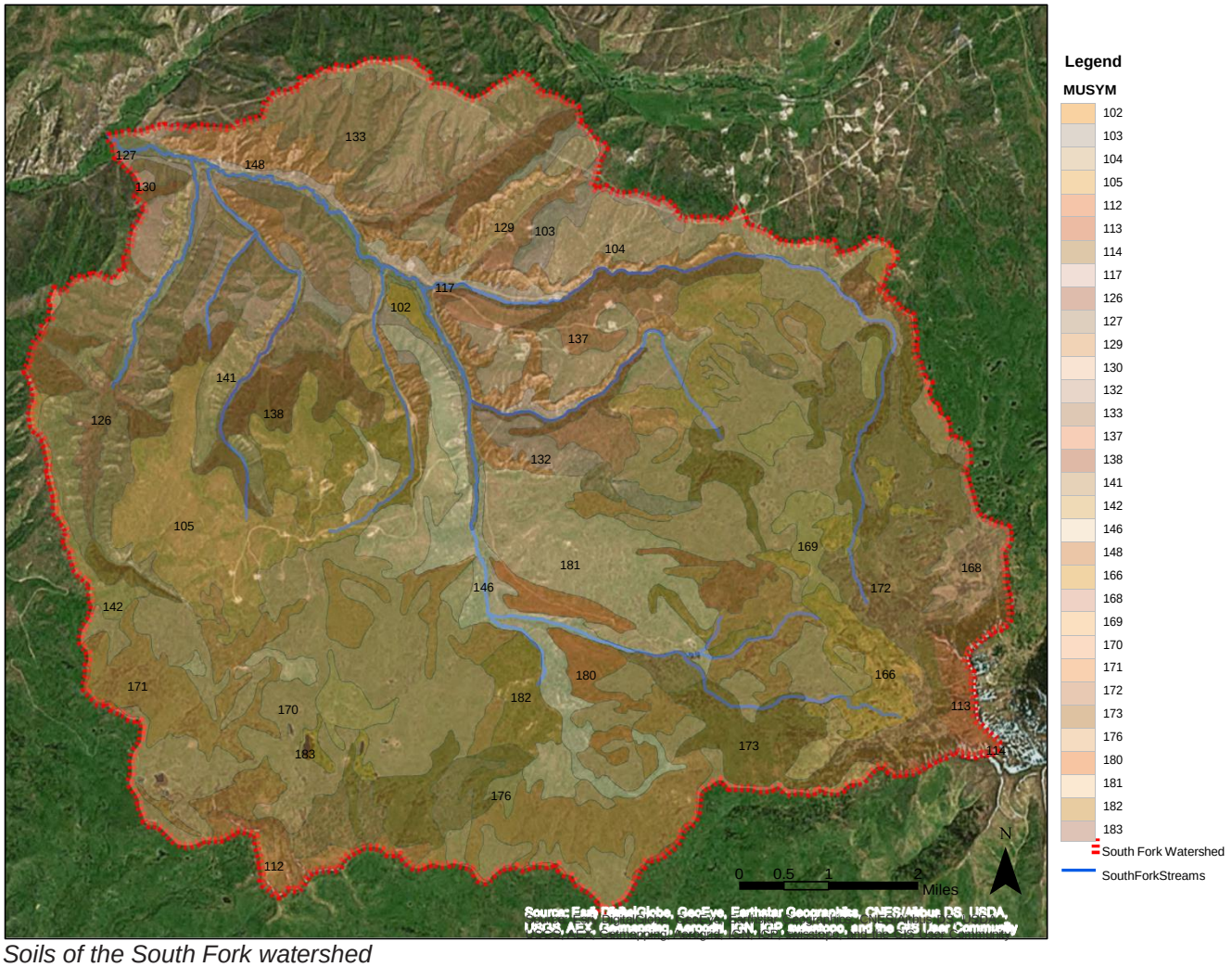
A very sediment laden main stem of the South Fork after a summer rain storm.

4.1.2Geology

The soils in the watershed vary from loams to clay loams. Most soils have a moderate clay content. They range from deep to shallow, but well over 80% are deep and occur on mountainside slopes. Alluvial bottoms have scattered patches of poorly drained wetland soils. Mass movements are common in the upper portions of the watershed and have resulted in large slides and instability adjacent to the South Fork of Chalk Creek, particularly on wet years.

Two major geologic formations are found in the watershed. They are: Wasatch Mountain formation and Upton sandstone and Arapein shale. The Wasatch Mountain formation covers 80 to 90 percent of the land; and the rest is a mixture of Upton sandstone and Arapein shale, which is a very weathered and eroded formation.

Sediment is the most serious problem within the watershed, which has caused serious water



Soils of the South Fork watershed

quality issues. The sediments are resulting from bank erosion, downcutting of the stream, deteriorating alluvial fans, steep shale and sandstone escarpments, irrigation induced erosion and sediment from eroding rangeland. Oil pads and disturbances related to exploration and extraction of oil such as pipelines, roads, cuts and culverts have also contributed.

4.1.3 Roads

There is one main county road which runs north-south, the South Fork road up to Blonquist Ranch. Beyond that point all existing roads are privately owned and maintained in the watershed with no public access.

4.1.4 Climate

The nearest weather station is located in Coalville (Station 421590), elevation 5,560 feet) about 8 miles downstream and west of the watershed. Annual precipitation at Coalville is 16.02 inches, with the majority received between October and May. January is reported as the coldest month of the year with a normal mean temperature of 25 degrees Fahrenheit, an average maximum of 35.8 F and average minimum of 8.5 F. July is the hottest month with a normal mean temperature of 68 degrees Fahrenheit, an average maximum of 82.8 F and average minimum of 45 F. These conditions would be more reflective of the bottom of the watershed with conditions becoming much cooler and wetter as you move up the watershed towards the headwaters at an elevation of 10,000 feet.

4.2. Authorities and Jurisdictions

This section describes the authorities and jurisdictional controls of federal, state and municipal governments and agencies.

4.2.1 Federal Agencies

Natural Resources Conservation Service (NRCS)

Since 1935, the Natural Resources Conservation Service (originally called the Soil Conservation Service) has provided leadership in a partnership effort to help the U.S.'s private landowners and managers conserve their soil, water, and other natural resources.

The conservation provisions in the 2014 Farm Bill provide conservation opportunities for farmers and ranchers. The new provisions build on the conservation gains made by farmers and ranchers through the 1985, 1996, 2002, and 2008 Farm Bills. They simplify existing programs and create new programs to address high priority environmental goals.

The Conservation Technical Assistance (CTA) program provides voluntary conservation technical assistance to land users, communities, units of state and local government, and other federal agencies in planning and implementing conservation systems.

U.S. Army Corps of Engineers (USACE)

Section 404 of the Clean Water Act grants primary authority for regulation of wetland development to the U.S. Army Corps of Engineers. Currently, wetlands are "those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted to life in saturated soil conditions." There are a number of streams and creeks within the watershed that could fall under jurisdiction of the Corps if they are altered

Federal Emergency Management Agency (FEMA)

The mission of the Federal Emergency Management Agency (FEMA) is to reduce the loss of life and property and protect communities nationwide from all hazards, including natural disasters, acts of terrorism, and other human-made disasters. FEMA leads and supports the nation in a risk-based, comprehensive emergency management system of preparedness, protection, response, recovery, and mitigation.

The majority regulatory authority exercised by FEMA that affects watershed function is delineating and managing floodplain zones. For this reason, FEMA works closely with state and local officials to identify flood hazard areas and flood risks.

U.S. Environmental Protection Agency (EPA)

The U.S. Environmental Protection Agency (EPA) leads the nation's environmental science, research, education, and assessment efforts. EPA is responsible for numerous activities that include developing and enforcing regulations and performing environmental research. The two most applicable statutes affecting watershed management are the Clean Water Act (U.S. Congress, 1972) and the Safe Drinking Water Act (U.S. Congress, 1974). States are typically given the principal responsibility for implementing the provisions of these federal acts. Utah has been granted primacy for implementing the provisions of the Clean Water Act (CWA).

The CWA is the cornerstone of water quality protection in the U.S. EPA divides water pollution sources into two categories: point and non-point. Point sources of water pollution are stationary locations such as sewage-treatment plants. There are no point sources of pollution in the South Fork watershed. Non-point sources are more diffuse and include agricultural runoff, septic tanks, and paved roads and parking lots. EPA works with state and local authorities to monitor pollution levels in the nation's water and provide status and trend information on a representative variety of ecosystems.

The Safe Drinking Water (SDWA) focuses on all waters that are either actual or potential sources for drinking water. EPA regulates the quality of the nation's drinking water by issuing and enforcing safe-drinking water standards. EPA also protects the nation's drinking water by safeguarding our watersheds and regulating the release of pollutants into the environment. In partnership with local authorities and community groups, EPA encourages water conservation. EPA also works with these partners to develop contingency plans for source contamination and other water emergencies.

The Utah agencies that are responsible to regulate the CWA and the SDWA are the Division of Water Quality, the Division of Water Rights, the Division of Drinking Water, and the Division of Water Resources.

4.2.2 State Regulatory and Management Agencies

Utah Department of Environmental Quality, Division of Water Quality (UDWQ)

The Utah Division of Water Quality is responsible for regulating surface water discharges, wastewater treatment, stormwater, and groundwater in Utah. As a regulatory division, the Division of Water Quality oversees all permits for discharge, monitors water quality, establishes water quality standards, sets beneficial-use designations, oversees total maximum daily load (TMDL) studies, and administers groundwater discharge permits.

Utah Department of Natural Resources, Division of Water Rights (UDWRi)

The Utah Division of Water Rights is the state agency that regulates water right appropriations (that is, the designation of a legal right to take possession of specific water at a specific time) and the distribution of water in Utah. Water rights are granted based on quantity, source, priority date, nature of use, point of diversion, and physically putting water to beneficial use.

The doctrine of prior appropriation allows those who first made beneficial use of water to use and distribute the water from a certain source before those entities with later priority dates.

In addition to overseeing water right appropriations, the Division of Water Rights administers a Stream Alteration Permit Program that regulates activities affecting the bed and banks of natural streams.

Utah Department of Natural Resources , Division of Water Resources (UDWRe)

The Utah Division of Water Resources is responsible for promoting the orderly and timely planning, conservation, development, use and protection of Utah's water resources. The division evaluates the state's water resources and supply demands on a river-basin basis.

Utah Department of Natural Resources, Division of Forestry, Fire and State Lands (DFFSL)

The management objectives of the Utah Division of Forestry, Fire and State Lands are to protect and sustain the beneficial uses of state lands consistent with their long-term protection and conservation. Any beneficial use of public-trust resources is subsidiary to long-term conservation of resources. The Division oversees permits uses, grants easements, and leases land for specific beneficial uses of the State lands and resources.

DFFS area foresters provide technical advice and can assist landowners with developing forestry stewardship plans that will assist landowners in effectively managing and enhancing their forest resources.

Utah Department of Natural Resources, Division of Wildlife Resources (UDWR)

The Utah Division of Wildlife Resources has authority for managing and conserving wildlife. The Division operates Grass Valley Clarks Canyon Cooperative Wildlife Management Unit (CWMU) that lies within the watershed. It issues hunting permits for the CWMU pursuant to Title 23 of the Utah Administrative Code.

Summit County

The South Fork watershed lies within Summit County, Utah. Roads that provide paved access to the watershed are maintained by Summit County. Summit County also is The South Fork is within the planning boundaries of the Eastern Summit County planning district. The zones that govern land use in the water shed are AP, AG-100, and AG-160. Current definitions and requirements of these zones are from the Eastern Summit County Development Code are:

AGRICULTURE PROTECTION (AP):

"The AP zone district is established for the purpose of allowing development in a manner

that preserves, promotes, maintains, and enhances the use of land for commercial agricultural purposes; minimizes scattered and leap frog non-agricultural development; protects and preserves natural resource areas; and protects and promotes the open space values of Eastern Summit County. The AP zone district is intended for use or consideration only for lands that are adjacent to or within the primary county infrastructure and service areas. “

The AP zone allows for 1 unit per forty acres, and has large setbacks of 100’ from public right-of-ways, and 40’ from streams and wetlands.

AGRICULTURE-GRAZING 100 (AG-100):

“The AG-100 zone district is established for the purpose of allowing development in a manner that lessens the danger of fire and damage to property; protects lands for agriculture, raising of livestock, and production of timber where they exist; protects water supplies, wildlife, and other natural resources; and protects and promotes the values of Eastern Summit County. Additionally, residential density is directly related to distance from primary county infrastructure and service areas which result from the wide scattering of residential development. “

The AG-100 zone allows on unit per 100 acres, and 100’ setbacks from public right-of-ways and 40’ setbacks from streams and wetlands.

AGRICULTURE-GRAZING 160 (AG-160):

“The AG-160 zone district is established for the purpose of allowing development in environmentally sensitive and remote areas of Eastern Summit County in a manner that protects agricultural values where possible and whenever they exist; minimizes disturbances to the natural environment; lessens the danger of fire and damage to property; protects water supplies, wildlife, and other natural resources; and protects and promotes the open space values of Eastern Summit County. Residential densities are directly related to the extreme distance from primary county infrastructure and service areas and avoiding the excessive costs for public services which result from the scattering of residential development.”

The AG-160 zone allows for 1 unit per 160 acres, and 100’ setbacks from public right of ways and 40’ setbacks from wetlands and streams.

4.3 Population and Land Use

The USU report located in appendix A provides detailed information, figures, and maps regarding topics summarized in this section.

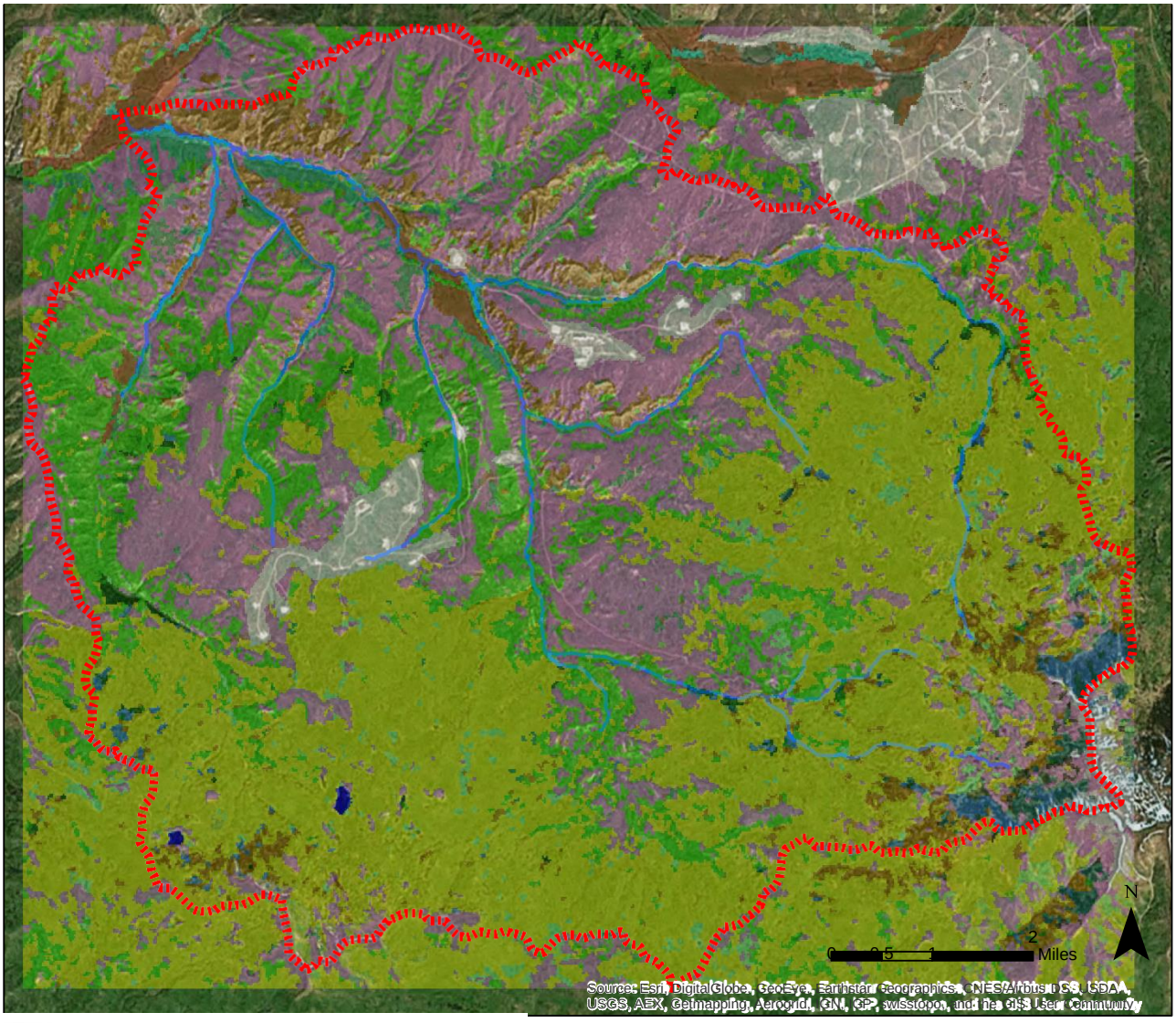
4.3.1 Population

The South Fork watershed is sparsely populated in an unincorporated area of Summit County. Total full time residences in the watershed number less than 10. A hunting lodge, 3 cabins and a yurt constitute the only other part time residences in the watershed. The closest municipality Coalville is 8 miles west with a population of approximately 1,363.

4.3.2 Land Cover, Ownership, and Land Use

Land Cover

The land cover in the watershed was determined through GAP data from 2004. The majority of the land cover in the watershed is defined by 3 major types which make up 84% of the total coverage. These include rocky mountain aspen forests and woodland, intermountain basins montane sagebrush steppe, and rocky mountain gambel oak-mixed montane shrublands. (USU Wildlife habitat Report 2014)



- Agriculture
- Colorado Plateau Pinyon-Juniper Woodland
- Developed, Medium - High Intensity
- Developed, Open Space - Low Intensity
- Disturbed, Oil well
- Inter-Mountain Basins Big Sagebrush Shrubland
- Inter-Mountain Basins Big Sagebrush Steppe
- Inter-Mountain Basins Montane Sagebrush Steppe
- Inter-Mountain Basins Mountain Mahogany Woodland and Shrubland
- Invasive Perennial Grassland
- Open Water
- Rocky Mountain Alpine Bedrock and Scree
- Rocky Mountain Alpine-Montane Wet Meadow
- Rocky Mountain Aspen Forest and Woodland
- Rocky Mountain Bigtooth Maple Ravine Woodland
- Rocky Mountain Cliff and Canyon
- Rocky Mountain Gambel Oak-Mixed Montane Shrubland
- Rocky Mountain Lodgepole Pine Forest
- Rocky Mountain Lower Montane Riparian Woodland and Shrubland
- Rocky Mountain Montane Dry-Mesic Mixed Conifer Forest and Woodland
- Rocky Mountain Montane Mesic Mixed Conifer Forest and Woodland
- Rocky Mountain Subalpine Dry-Mesic Spruce-Fir Forest and Woodland
- Rocky Mountain Subalpine Mesic Meadow
- Rocky Mountain Subalpine Mesic Spruce-Fir Forest and Woodland
- Rocky Mountain Subalpine-Montane Limber-Bristlecone Pine Woodland
- Rocky Mountain Subalpine-Montane Riparian Shrubland
- Southern Rocky Mountain Montane-Subalpine Grassland

Dominant Land Covers	
Land Cover Type	*Percent of Coverage*
Rocky Mountain Aspen Forest and Woodland	38%
Inter-Mountain Basin Montane Sagebrush Steppe	29%
Rocky Mountain Gambel Oak-Mixed Montane Shrubland	17%
Total	83%

Land Ownership

Land in the South Fork watershed is almost completely held in private ownership. Two small isolated parcels of BLM ground are found just east of the main south fork above its confluence with Fish Creek and are the only public land located in the watershed.

Land Use

Historically development was confined to the central valley bottoms of the watershed. This consisted of crop production in the form of hay and pasture production, with the associated irrigation infrastructure. The majority of this irrigation is flood irrigation. The rangelands have been used for livestock grazing primarily sheep and cattle since settlement.

In the 1970's-80's petroleum exploration and production created an extensive infrastructure of roads, well sites and pipelines in the upper portions of the watershed. This use has declined steadily over the last 2 decades, however the associated impacts are still resulting in resource concerns in some areas of the watershed.

4.4 Social Environment and Recreation

The landowners in the South Fork watershed desire to preserve their property rights while maintaining the open, rural feel of the watershed. There is a strong desire to preserve the agricultural heritage and unique natural qualities that are present in the watershed. Open spaces within the watershed are valued for their ecological, agricultural, cultural and recreational qualities.

The desire to preserve these qualities has led some of the larger landowners to enter into conservation easements to preserve the qualities and characteristics unique to these lands. Easements currently are held on G & E Blonquist Ranch, Six Feathers Ranch and the William Oswald ranch. Other large landowners in the watershed are currently pursuing easements on their lands as well. This watershed provides a unique opportunity to pursue natural resource work on a large scale. Rarely is the opportunity presented to conduct work on a watershed scale where a large percentage of the private lands are protected permanently from development.

Popular recreational activities within the watershed include big game hunting, fishing, and camping.

The Utah Division of Wildlife Resources cooperatively manages the privately owned Grass Valley/Clarks Canyon Cooperative Wildlife Management Unit (CWMU), which consists of a total of 67,990 acres in Chalk Creek. A large percentage of this is located in the South Fork watershed. Public hunting permits are issued for Mule Deer, Elk and Moose each year on this CWMU.

A county road provides access to the G & E Blonquist Ranch, with a network of dirt

roads providing seasonal access to the upper portions of the watershed. There is no public access to the watershed without landowner permission.

4.5 Water Resources

This section describes the water resources in the South Fork watershed. These resources are surface waters, including natural streams, ponds, wetlands, and water quality.

4.5.1 Surface Waters

The main stem of the South Fork of Chalk Creek flows from its headwaters on the west end of the Uinta Mountains northwest and discharges into Chalk Creek 8 miles east of Coalville near the Chalk Creek highway. Primary tributaries of the South Fork are Fish Creek, Lodgepole Creek and Elk Horn Creek which are fed by seeps, springs and precipitation. The main south fork provides irrigation water for a number of ranches located in the lower portions of the watershed. Some irrigation also occurs from ElkHorn Creek.

All surface waters in the South Fork watershed eventually discharge into Chalk Creek.

The South Fork, Fish Creek, Lodgepole Creek and Elkhorn Creek are designated as perennial streams. Irrigation diversions on South Fork and Elkhorn Creek can result in critically low flows in dry years on both streams.

Within the watershed, other minor tributaries seasonally flow from the upper watershed mountains and discharge into South Fork. These include Winter Quarters Creek, Branch Creek, Buck Hollow Creek, Snake Creek and Road Hollow Creek.

The above-mentioned creeks and tributaries might be considered jurisdictional waters of the U.S., and, if they are, any impacts to the creeks and tributaries would require permitting through Section 404 of the Clean Water Act under jurisdiction of the U.S. Army Corps of Engineers and through the Stream Alteration Permit process administered by the Utah Division of Water Rights.

4.5.2 Irrigation Ditches

A total of 235 acres of cropland are irrigated in the South Fork watershed, of those the majority are flood irrigated from 6 diversions from south fork.(Echo TMDL 2014) There is approximately 68 acres of sprinkler irrigated alfalfa on the G & E Blonquist Ranch.

4.5.3 Wetlands

The National Spatial Data Infrastructure (NSDI) database identifies wetlands across the country based on information collected in 1986 (USFWS 1986). This data typically identifies riparian corridors as potential wetlands. Projects that would disturb areas adjacent to and along streams in the watershed would require a site-specific wetland delineation study. If an area has wetland characteristics, the Corps, would need to evaluate whether the specific wetland is jurisdictional under the Corps' regulatory program.

4.5.4 Water Quality

The Utah Water Quality Board, the Utah Division of Water Quality, the Utah Drinking Water Board, and the Utah Division of Drinking Water are responsible for regulating and managing water quality in Utah.

The Division of Water Quality determines beneficial-use classifications for streams,

rivers, lakes, and reservoirs in Utah. Narrative and numeric water quality standards (Utah Code Annotated [UCA], R317-2-7) apply to all waters in the state.

Designated Beneficial Uses

All surface waters in the South Fork watershed that are tributary to Chalk Creek which is tributary to Echo Reservoir, are classified for the following beneficial uses:

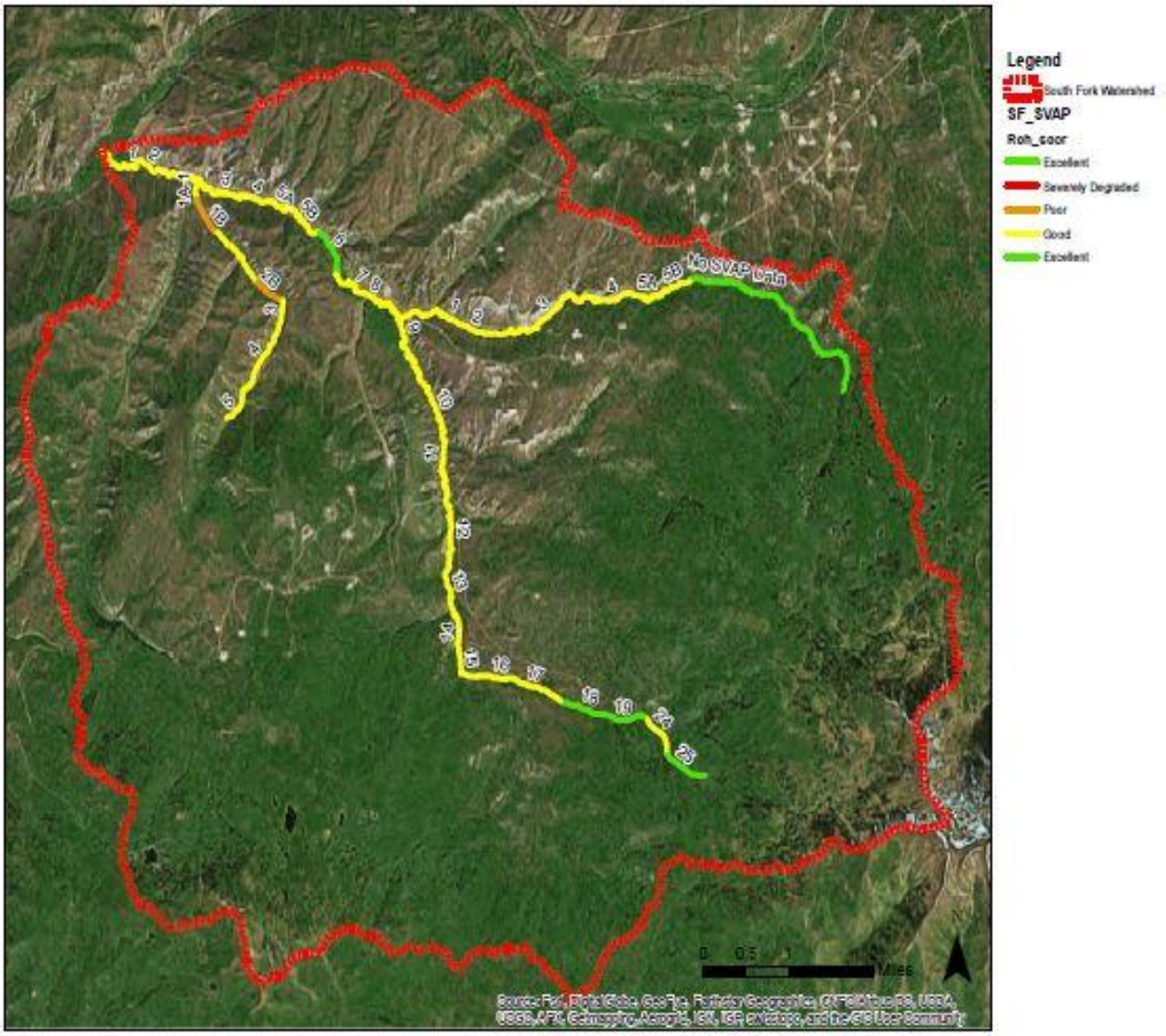
- 1C - Protected for domestic purposes with prior treatment by treatment processes as required by the Utah Division of Drinking Water.
- 2B - Protected for infrequent primary contact recreation. Also protected for secondary contact recreation where there is a low likelihood for ingesting water or a low degree of bodily contact with water the water. Examples include wading, hunting, and fishing.
- 3A - Protected for cold-water species of game fish and other cold-water aquatic life, including the necessary aquatic organisms in their food chain.
- 4 - Protected for agricultural uses including irrigating crops and stock watering.

4.5.5 SVAP Results

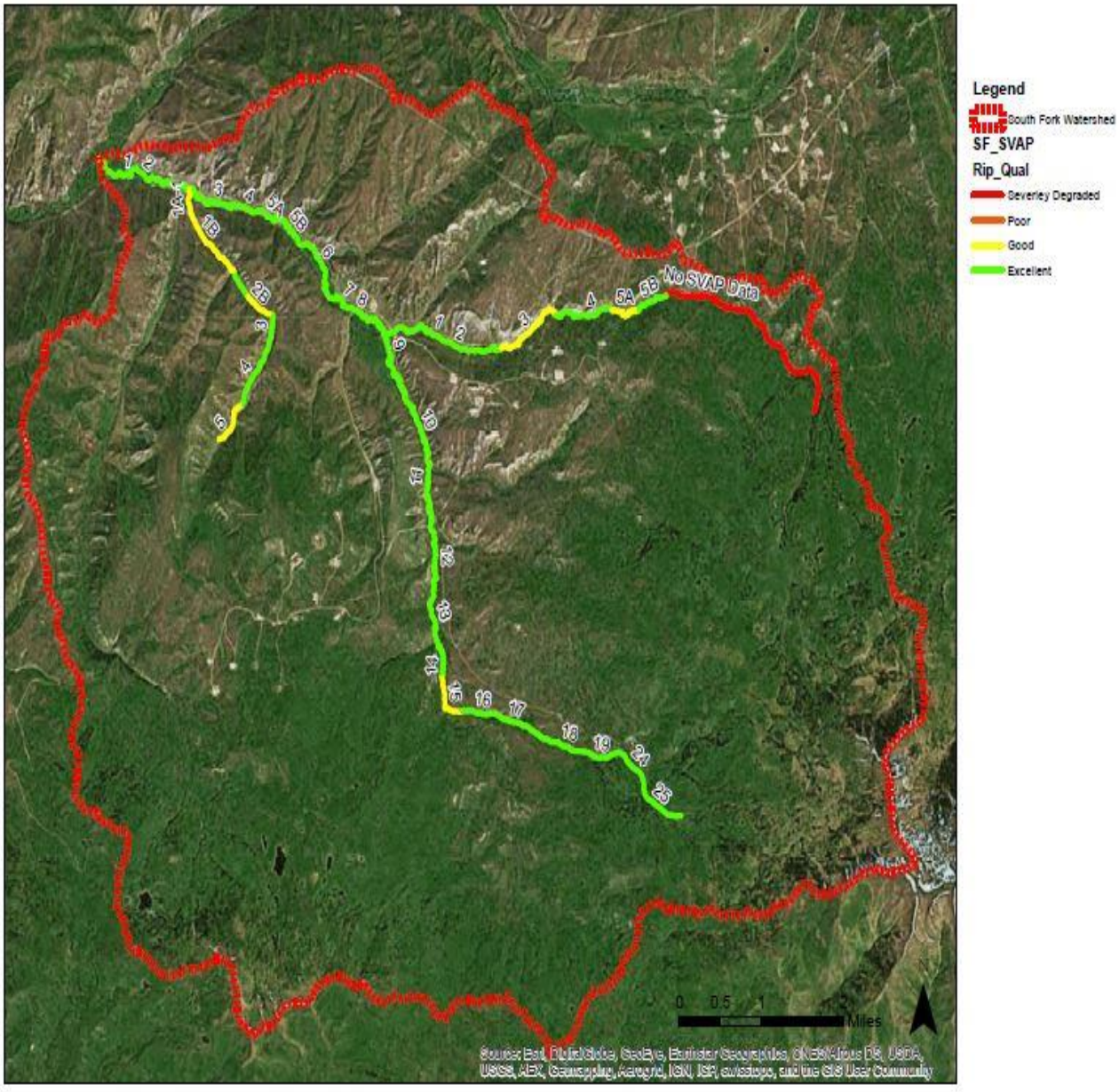
An Stream Visual Assessment Protocol (SVAP) version 2 was conducted within the watershed during the summer of 2014 by trained staff, agency partner volunteers and landowners. The results were tabulated and mapped using GIS.

SVAP Watershed Totals		
SVAP2 Score	*Condition*	*South Fork Watershed*
1 to 2.9	Severely Degraded	0
3 to 4.9	Poor	8,196 (7%)
5 to 6.9	Fair	49,038 (44%)
7 to 8.9	Good	46,604 (42%)
9 to 10	Excellent	7,904 (7%)
		Total Inventory 111,742’ (21.16 miles of stream)
*Totals are measured in linear feet		

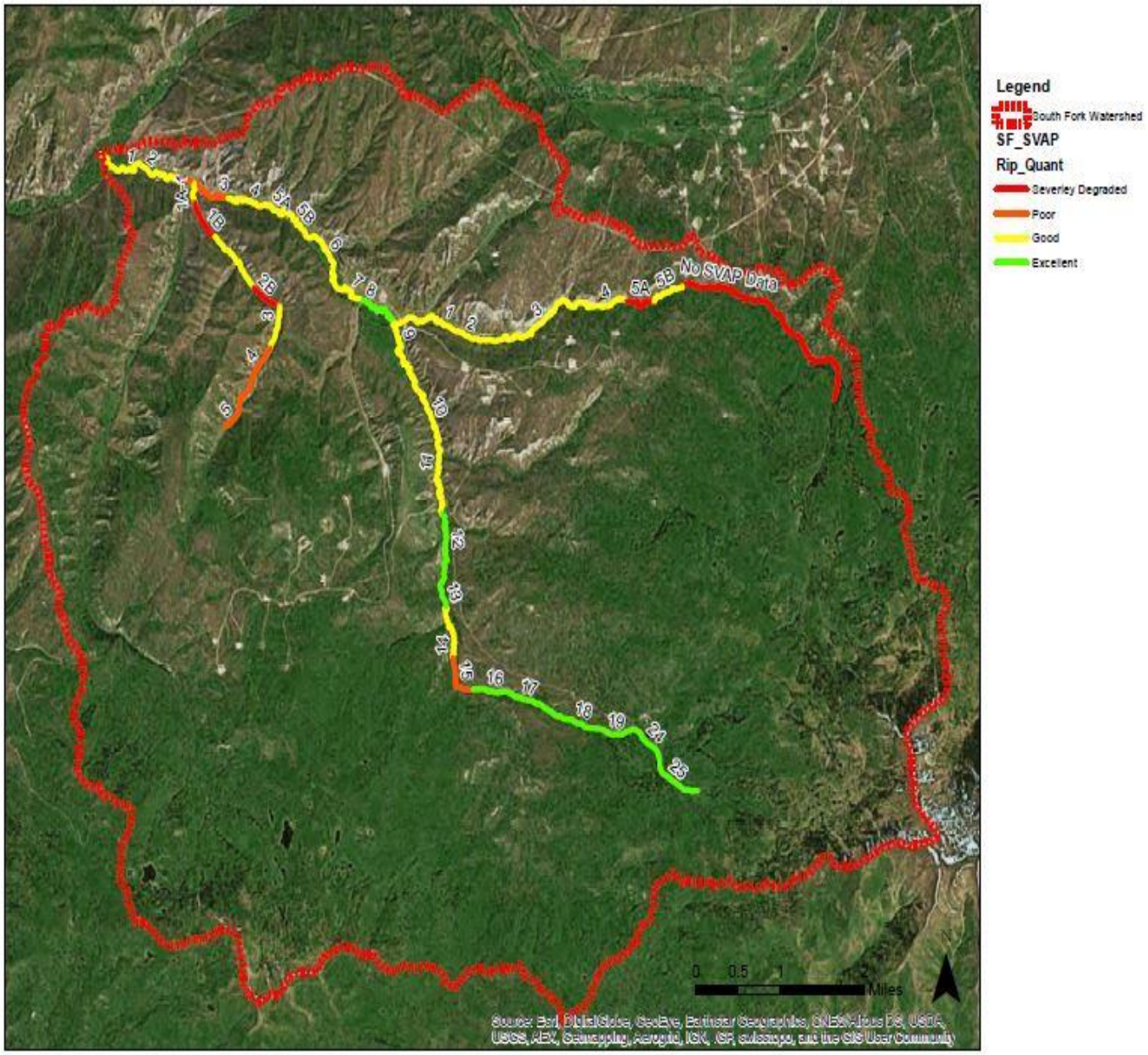
SVAP Totals for the South Fork of Chalk Creek Watershed				
SVAP2 Score	*Condition*	*Main Stem South Fork*	*Lodge Pole Creek*	*Fish Creek*
1 to 2.9	Severely Degraded	0	0	0
3 to 4.9	Poor	0	8,196 (43%)	16,756 (73%)
5 to 6.9	Fair	21,463 (31%)	10,819 (57%)	6,255 (27%)
7 to 8.9	Good	40,349 (58%)	0	0
9 to 10	Excellent	7,904 (11%)	0	0
Total Inventory		69,716 (100%)	19,015 (100%)	23,011 (100%)
*Totals are measured in linear feet				



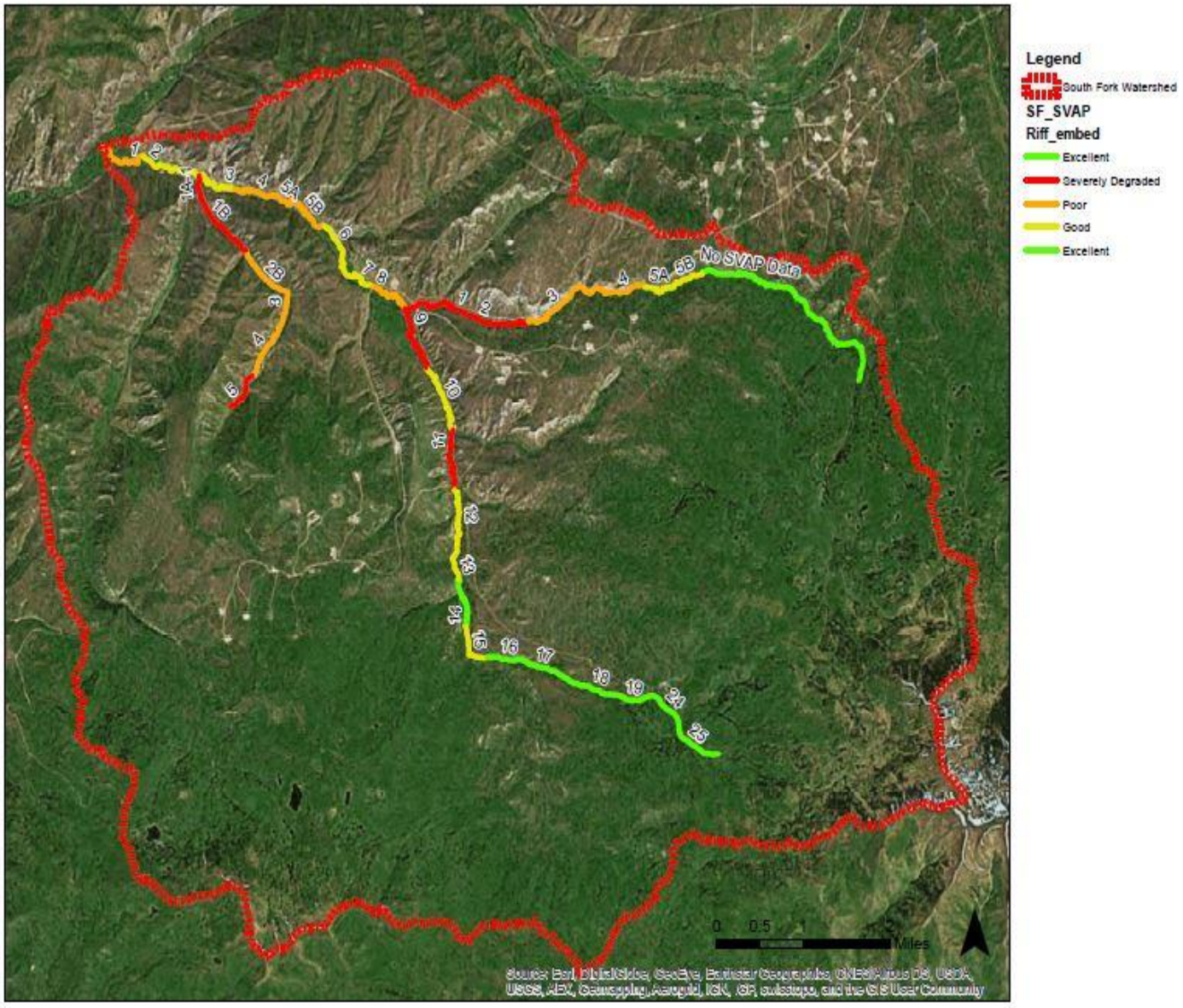
SVAP Reaches and general conditions map.



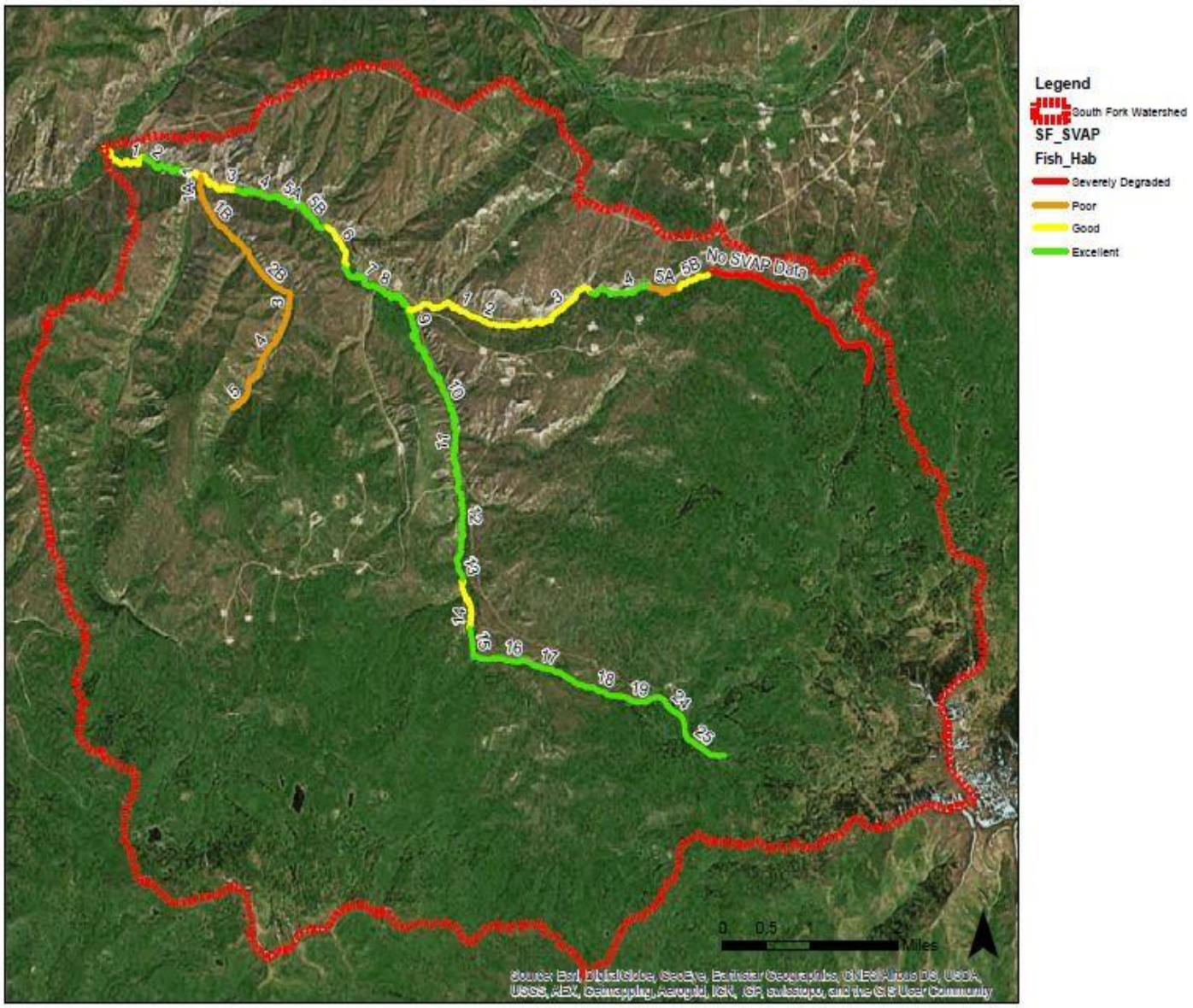
Riparian qualitiy condition scores by reach



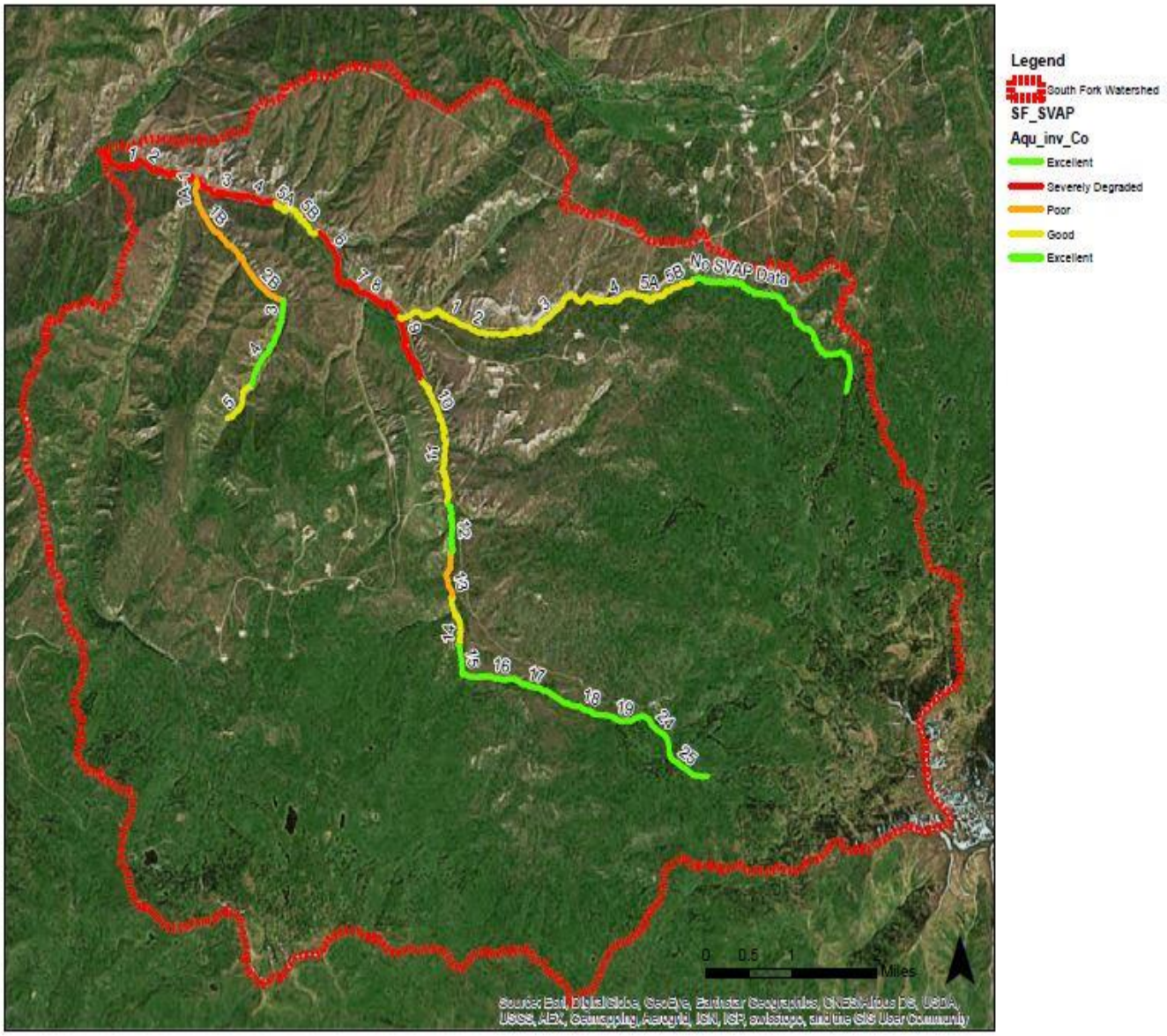
Riparian quantity condition scores by reach



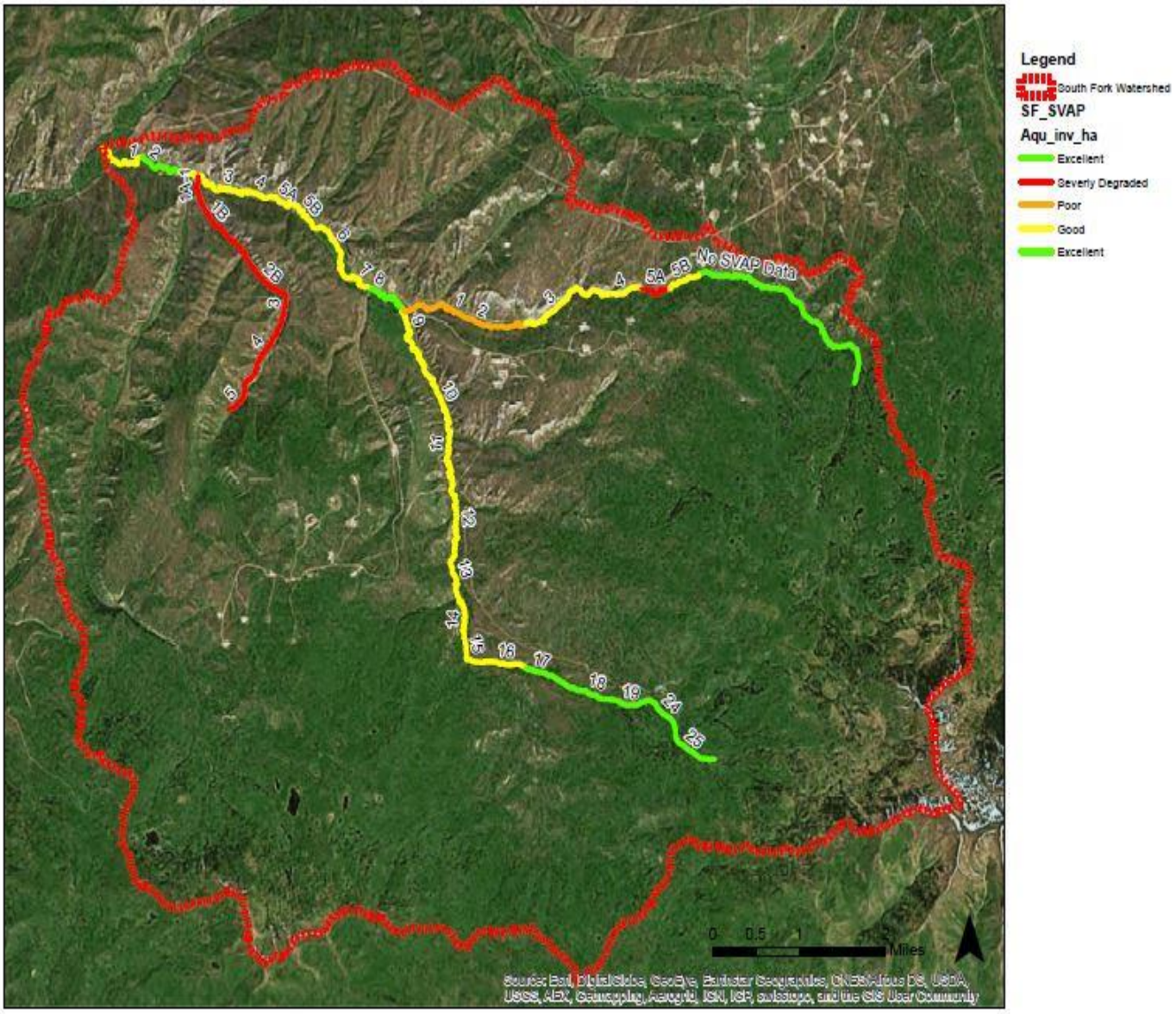
Riffle Imbededness condition scores by reach



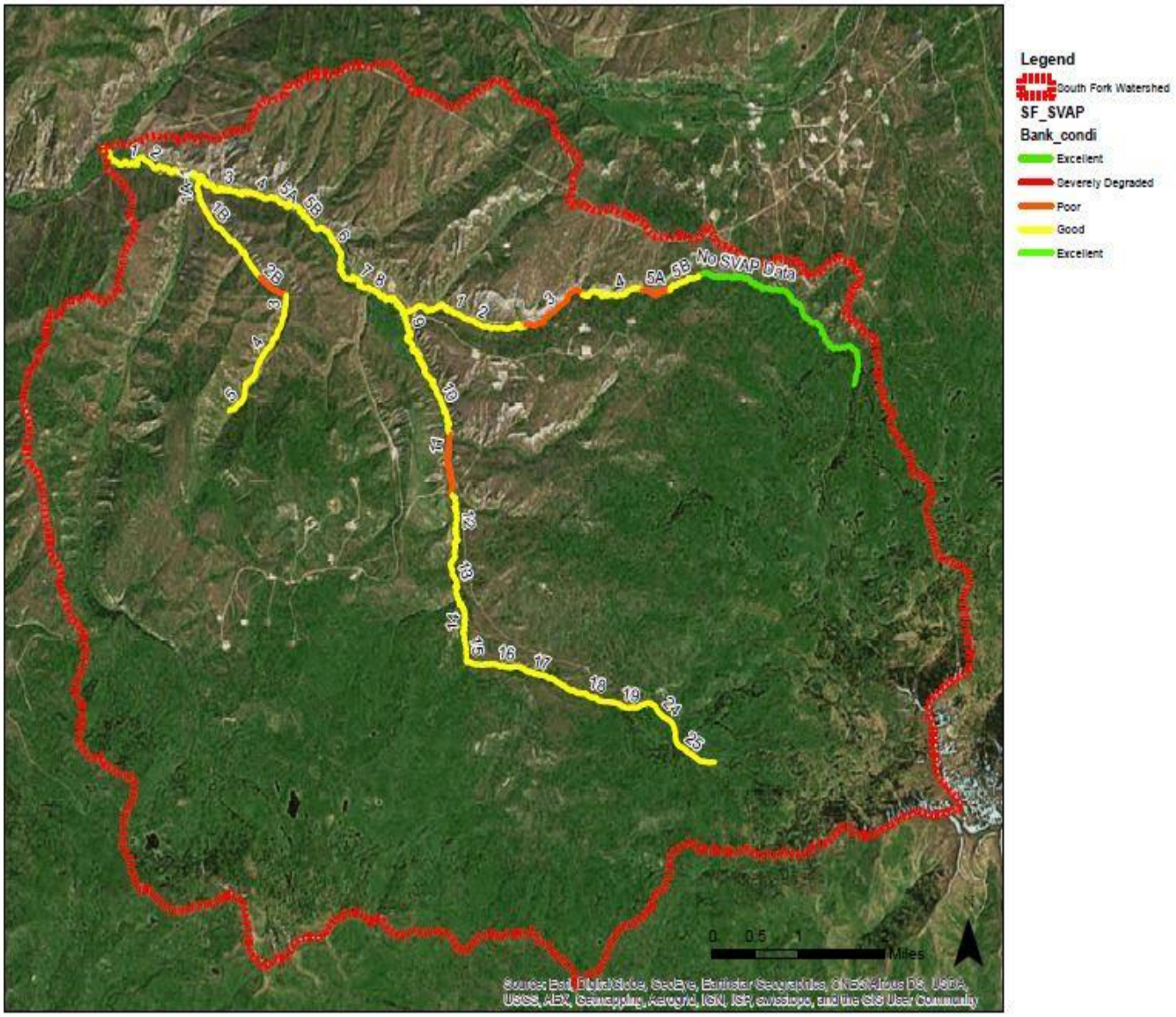
Fish habitat condition scores by reach



Aquatic invertebrate habitat condition scores by reach



Aquatic invertebrate habitat condition scores by reach



Bank condition scores by reach

5.0 South Fork of Chalk Creek Implementation Plan

5.1 Identify causes and sources of pollution

The load analysis indicates that agricultural and grazing activities on private land contribute to a large portion of both nitrogen and phosphorus loading to South Fork of Chalk Creek Watersheds. The nonpoint source nature of these activities and their occurrence on private land pose a challenge for addressing loads in a comprehensive and successful manner and requires active engagement and interest by local private landowners.
Landowners in the watershed have come together and found that water quality is there major priority. The goal of the plan is to address water quality concern within the watershed while keeping agriculture sustainable.

5.2 Estimate Load Reductions

Table 1: Estimated Load Reductions

South Fork of Chalk Creek	Storm water	Grazing Private	Irrigation/ Fertilizer	Septic Systems	Channel Erosion	Natural Background
Total Phosphorus Load Allocations	11	33	2	0	158	89
Nonpoint Source Total Phosphorous Loads	37	109	6	1	528	89
Total Phosphorous Load Reductions	0	76	4	0	370	0
South Fork of Chalk Creek	**Storm water**	**Grazing Private**	**Irrigation/ Fertilizer**	**Septic Systems**	**Channel Erosion**	**Natural Background**
Total Nitrogen Load Allocations	5	133	7	1	129	1,072
Nonpoint Source Total Nitrogen Loads	42	1,024	54	6	997	572
Total Nitrogen Load Reductions	0	891	47	0	868	0

5.3 Targeted Critical Areas

The major area of concern is sub-watershed Fish Creek. We found during of initial surveys of the watershed is Fish Creek is degraded due to poor management practices. In the 80's oil exploration was going on in the watershed. After the oil companies left they did not full mitigate the drill pads and oil pipe lines. Currently there is eroding hill sides and exposed pipelines over Fish Creek. There is also over grazing going on in the same area. The landowner is willing to fence part of the creek from the animal and install a water trough system.
This is not the only area impacted in the watershed. Other landowner want to improve grazing on their land by installing cross fencing and improve watering areas. There is also crop land at the bottom of the valley. This is causing stream bank issues due to excess water running into South Fork of Chalk Creek. The landowner has discussed installing a sprinkler system to be more water efficient and to stop excess runoff.
Improving grazing and irrigation we will be able to see significant improvements in water quality. This was the goal of all the landowners plus continue to keep agriculture sustainable in the area.

5.4 Grazing Management

To properly address the grazing management issues present in the watershed, it will require a combination of BMP's. While proper grazing management is a viable option in the upper reaches of the watershed where landowners are able to distribute their cattle across a very large landscape, this may not be as effective in the lower sections of the watershed where cattle are concentrated in smaller areas, such as the irrigated pastures found in the lower reaches of the watershed. In these situations, it may be necessary to install riparian fences along the creek, and restrict access to the stream. The section inside the riparian fencing may still be grazed, but the animals will need to be removed when the plants within the riparian area become stressed, or over grazed.

Using SVAP survey, the locations that will require riparian fencing were identified. Most of the areas where this fencing will be required were found in the Fish Creek and Lower South Fork of Chalk Creek watersheds.

When riparian fencing is installed livestock will need other access to water. This will require the development of springs, or the installation of water trough system with a minimum of three days of water in case of a failure within the system.

5.5 Estimate technical and financial assistance needed

To generate the estimated cost for the Best management practices recommended in this CRMP, the Natural Resource Conservation Service Cost list for EQIP FY 2017 was used. The costs identified in this cost list include the cost for materials, and labor to install the BMPs listed.

In addition to the cost of the BMPs that are recommended in this implementation plan, there will also be costs associated with the technical assistance needed to help plan the projects and oversee the management of the grants that are used to fund this plan. The technical assistance needs include the engineering designs that will be needed in areas where a harder fix will be required such as the segment of South Fork of Chalk Creek, where old car bodies need to be removed and rock structures will need to be installed. Additional technical support will include obtaining the proper permits and clearances need such as stream alteration permits, Archeological clearances, and NEPA clearances.

Table 2: Proposed Practices and Cost

Practice	Amount	Unit	Unit Cost	Cost	Phase 1	Phase 2
Pumping Plant (533)	10	each	$ 6,817.43	$ 68,174.30	$ 68,174.30	$ -
Livestock Pipeline (430)	220440	pound	$ 3.20	$ 705,408.00	$ 705,408.00	$ -
Watering Facility (614)	50000	gallons	$ 1.17	$ 58,500.00	$ 58,500.00	$ -
Range Planting (533)	100	ac	$ 121.03	$ 12,103.00	$ -	$ 12,103.00
Forest Stand Improvement (666)	500	ac	$ 286.50	$ 143,250.00	$ 71,625.00	$ 71,625.00
Brush Management (314)	4000	ac	$ 123.10	$ 492,400.00	$ -	$ 492,400.00
Fencing (382)	132000	ft	$ 1.37	$ 180,840.00	$ 90,420.00	$ 90,420.00
Diversion Dams (362)	5	each	$ 50,000.00	$ 250,000.00		$ 250,000.00
Stream Bank Stabilization (580)	9000	ft	$ 29.09	$ 261,810.00	$ 130,905.00	$ 130,905.00
Riparian Forest buffer (391)	200	ac	$ 3,441.21	$ 688,242.00	$ 344,121.00	$ 344,121.00
Irrigation Pipeline (430)	11690	pound	$ 2.47	$ 28,874.30	$ -	$ 28,874.30
Sprinkler System (442)	10	each	$ 167.18	$ 1,671.80	$ -	$ 1,671.80
Education/Outreach				$ 20,000.00	$ 10,000.00	$ 10,000.00
Total Cost				***$ 2,911,273.40***	***$ 1,479,153.30***	***$ 1,432,120.10***

Due to the cost associated with implementing this CRMP, funding will come from more than one source. At this point multiple agencies have come forward with special funding to help implement this CRMP. We also have many landowners that do not qualify for many funding specific funding sources, so having many partners has becomes critical.

Potential funding sources

- Natural Resources Conservation Service (NRCS)
- Utah Division of Wildlife Resources
- Utah Department of Agriculture and Food
- Utah Division of Water Quality
- Utah Division of Forestry Fire and State Lands
- Trout Unlimited

5.6 Education and Outreach

South Fork of Chalk Creek Watershed is 100% privately owned. This makes it a challenge to educate landowners on what state and federal agencies can provide. In order to educate the landowner they created a CRMP work group that hosts monthly meetings were they bring in experts to talk about how to improve conditions in the watershed. When experts to talk we had them talk about the following bullets

- Understand the importance of managing for clean water and the potential benefits proper management can have on their operations and other landscape-scale resources including soil, forage, animal health, and water availability on their lands).
- Understand and be trained on the Best Management Practices (BMPs) that can be used to improve or protect water quality.
- Be aware of the various sources of funding and other technical assistance available to help in implementing best management practices;
- Be aware of changes in regulatory requirements.

- Understand what resource concerns are found in the watershed.

By having monthly meeting landowners have found resource concerns on their properties and have contacted different agencies to find the BMP's that would help restore the resource concern.

5.7 Implementation Schedule and Milestones

The key element of any implementation plan is the ability to implement the plans entirety while measuring progress and make sound adjustments. To help determine if the local working group is accomplishing all of the activities identified in the implementation in a timely manner it is beneficial to develop milestones. These milestones identify what should be accomplished and when to help stay on task and complete the tasks identified in the implementation schedule.

Table 3: Implementation Schedule and Milestones

Activity	Agency Responsible	Timeline
Development of Local Working Group	Summit CD	By 2013
Begin project monitoring	UDWQ, UDAF, Summit CD	2017-2022
Milestones		
Sampling Analysis Plan Developed in coordination with the Local Working Group	*Summit CD*	*Spring of 2017*
Implement Phase 1 (Fish Creek and South Fork of Chalk Creek)	UDWQ, UDWR, NRCS, Private Landowners	2017-2022
Milestones		
Identify landowners willing to implement BMPs within the South Fork of Chalk Creek watersheds,	*UDWQ, UDWR*	*2017*
Solicit funding for Phase 1 of the South Fork of Chalk Creek Project- $1.4 million	*UDWQ, UDWR, NRCS,TU*	*Fall of 2017*
Reduce temperature and sediment in South Fork of Chalk Creek by Implementing 310.2 acres of riparian Improvements, and manage livestock along the creek.	*UDWQ, UDWR, NRCS, TU Private Landowners*	*Fall of 2022*
Implement Phase 2 (Elkhorn and South Fork of Chalk Creek)	UDWQ, UDWR, BLM, Private Landowners	2022-2025

Milestones		
Identify landowners willing to implement BMPs within the South Fork watershed,	*Summit CD*	*2022*
Solicit funding for Phase 2 in the South Fork of Chalk Creek Watershed- $1.4millon	*UDWQ, NRCS, TU*	*Fall of 2022*
Reduce temperature and sediment in South Fork of Chalk Creek by Implementing 257.6 acres of riparian	*UDWQ, UDWR,NRCS,TU, Private Landowners*	*Fall of 2025*
Revaluation of Watershed Plan/CRMP	Summit CD	2027

To help determine if the local working group is accomplishing all of the activities identified in the implementation in a timely manner it is beneficial to develop milestones. These milestones identify what should be accomplished and when to help stay on task and complete the tasks identified in the implementation schedule.

Appendices

Appendix A
EPA's 9 required element

Appendix B (Bound Separately)
South Fork of Chalk Creek Forestry Assessment

Appendix C (Bound Separately)
2014 South Fork CRMP BBQ Invitation

Appendix D (Bound Separately)
Utah State University Department of Landscape Architecture and Environmental Planning - Planning for Wildlife Course Report: South Fork Watershed Wildlife Habitat Report

Appendix A

9 Required Elements of a Watershed Plan

a. Identify causes and sources of pollution

The sources and causes have been identified in section 5.1. In section 5.4, we identified grazing management as one of the critical steps to improve water quality within the watershed.

b. Estimate load reductions expected

The Estimated load reductions can be found in sections 5.2. These load reductions where based off of the Rockport Reservoir and Echo Reservoir TMDL implementation plan.

c. Describe management measures and targeted critical areas

For section 5.3, it talks about the critical areas that are being targeted on Phase 1 of implementation. It also talks about the past management practices that lead to the degrading of water quality and the land.

d. Estimate technical and financial assistance needed

In section 5.5, a table was created using input from landowners of what they will be able to accomplish. A table was created using NRCS 2017 payment schedule for EQIP.

e. Develop an information and education component

South Fork of Chalk Creek is 100% privately owned. It is critical that all landowners are aware of what we are trying to accomplish. In section 5.6, it describes how we are going to reach out and educate the landowners.

f. Develop a project schedule

A project timeline was created based on what Summit Conservation District felt was acceptable. It can be found in section 5.7

g. Describe interim, measureable milestones

Within the timeline we has also put in milestones for South Fork of Chalk Creek. They can be found in section 5.7.

h. Identify indicators to measure progress

In section 5.7, for each milestone we indicate what amount of area we are projecting to improve. For each phase there is a different amount of area affected.

i. Develop a monitoring component

This was part of our milestones in section 5.7. Summit Conservation District is working with the local watershed coordinator to create a sampling analysis plan for the Chalk Creek Watershed. This plan will be completed spring of 2017.