

*“Creating Healthy Watersheds/Forests and  
Resilient Communities”*

Rio Grande Basin  
Watershed and Community  
Health and Resilience  
Assessment  
& Action Plan

Forest Stewardship Concepts, Ltd. 12/17/2014  
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## EXECUTIVE SUMMARY

RWEACT (Rio Grande Watershed Emergency Action Coordination Team) was established in July 2013 in response to the West Fork Fire Complex. RWEACT brings together local, state and federal agencies, organizations, and individuals to develop an effective, coordinated approach to address fire-caused hazards resulting in the protection of human life, property, and the natural health of the Rio Grande watershed and its environment.

While the immediate mission of RWEACT has focused on emergency actions in the interest of public safety, a partnership has been developed between RWEACT and the US Forest Service, Rio Grande National Forest with the shared vision to improve forest health and protect associated watersheds. This cutting-edge partnership is focused on improving active forest management in a way that may reduce the threat of future landscape scale wildfires and at the same time improve community economic resilience in the face of such events.

Healthy watersheds have high biotic integrity and are resilient following natural and human disturbances. They provide important ecosystem services, such as high quality water, stream and aquifer recharge, high quality wildlife habitat, and long-term soil productivity.

Forest health is the perceived condition of a forest derived from factors such as its age, structure, composition, function, vigor, presence or absence of unusual levels of insects or disease, and resilience to disturbance.

Rural community vitality refers to the ability of rural community members to work together and realize positive social, economic, and environmental outcomes.

Currently, the headwaters region of the Rio Grande Basin is in a state of flux. Forests have been subjected to significant insect mortality which is aggravating wildfire potential and intensity, and simultaneously impacting long term economics of both tourism and forest products industries. The region is one of the most economically depressed areas in the state of Colorado, as well as the nation. The upper Rio Grande Basin is vulnerable to further degradation of watershed values and community vitality as the consequences of the insect epidemic and climate change becomes evident.

Sound forest stewardship is key to mitigating long-term impacts on watershed condition, forest health, and community strength. Broad based agreement on appropriate actions is likely to be elusive. There are deep-seated conflicts over the purpose of public lands in general: Are they to be managed for multiple human uses or to be protected as the nation's remaining biological heritage in the midst of landscapes long dominated by humans? RWEACT is interested in sponsoring a constructive dialog that creates an opportunity to develop community consensus on adaptive management to protect or enhance watershed conditions, and improve forest and community vigor and resilience.

Research on social dynamics associated with bark beetle outbreaks is outlined with summaries of findings and management implications. Sculpting consensus on public land policies and finding compatible solutions is complex and time consuming. Entities attempting to do so must have a

clear understanding of the challenges and necessary time commitment. Success is best defined as having gone through a collaborative process and come to eventual consensus on actions to be taken.

Rigid, predetermined solutions seldom make the final settlement. Once agreement is reached, decisions are still vulnerable to administrative appeals and litigation. Well-reasoned, community based plans can be derailed by regional and national level interest groups with little or no affiliation in the community. Still there is a need for a credible group to serve as the catalyst for sound public land management.

Acknowledging all of the challenges and investment of time and finances required, RWEACT plans to establish itself as an advocacy entity, believing the potential benefit is worth the effort. At the end of this report, an Action Plan containing timelines, milestones, and responsibilities to accomplish stewardship advocacy can be found.

## INTRODUCTION

### BACKGROUND

RWEACT (Rio Grande Watershed Emergency Action Coordination Team) was established in July 2013 in response to the West Fork Fire Complex. RWEACT brings together local, state and federal agencies, organizations, and individuals to develop an effective, coordinated approach for immediate actions addressing fire-caused hazards resulting in the protection of human life, property, and the natural health of the Rio Grande watershed and its environment.

While the immediate mission of RWEACT has focused on emergency actions in the interest of public safety, a partnership has been developed between RWEACT and the US Forest Service, Rio Grande National Forest (RGNF) with the shared vision to improve forest health and protect the Rio Grande watershed through management activities. This cutting-edge partnership is focused on utilizing active forest management in a way that may reduce the threat of future landscape scale wildfires and at the same time improve community economic resilience in the face of such events. This public/private collaborative recognizes that the 88,000-acre West Fork Fire Complex scar combined with nearly 500,000 acres of spruce beetle infested forests creates a forest/watershed health challenge of significant magnitude and urgency. For example, watershed health and protection can be achieved through the reduction of wildfire size and intensity by removing dead woody material from the forest as directed by the RGNF Forest Plan. The partnership/collaborative may enable this work to be completed through USFS Stewardship Agreements, which can be implemented by contractors at both the local and regional scale.

This lead to the question of how much total biomass would need to be removed from the forest to reduce wildfire hazard and improve watershed/forest health and whether it could be done economically without significant external financial subsidies. RWEACT requested that Forest Stewardship Concepts, Ltd. complete an evaluation of the opportunities to improve watershed health and community viability through the utilization of biomass. As the evaluation progressed,

it became evident that removal of material, other than sawlogs, was going to cost more than the anticipated value of the biomass delivered to yet to be identified processors.

RWEACT then asked how they may become an advocate for watershed/forest health and community vitality in light of the fact that the Rio Grande National Forest was embarking on a three year process to revise its forest plan. This paper describes the need for such advocacy and suggests a path toward that end.

## **DEFINING WATERSHED HEALTH & RESILIENCE**

Watershed condition is the state of the physical and biological characteristics and processes within a watershed that affect the hydrologic and soil functions supporting aquatic ecosystems. Watershed “condition” and “health” are synonymous for the purposes of this report.

Factors that influence watershed condition are described in the “Watershed Condition Classification Technical Guide” (Potyondy, 2011).

Watershed condition reflects a range of variability from natural pristine (functioning properly) to degraded (severely altered state or impaired). Watersheds that are functioning properly have terrestrial, riparian, and aquatic ecosystems that capture, store, and release water, sediment, wood, and nutrients within their range of natural variability for these processes. In general, the greater the departure from the natural pristine state, the more impaired the watershed condition is likely to be. Watersheds that are functioning properly are commonly referred to as healthy watersheds. Watersheds that are functioning properly have five important characteristics (Williams et al. 1997):

1. They provide for high biotic integrity, which includes habitats that support adaptive animal and plant communities that reflect natural processes.
2. They are resilient and recover rapidly from natural and human disturbances.
3. They exhibit a high degree of connectivity longitudinally along the stream, laterally across the floodplain and valley bottom, and vertically between surface and subsurface flows.
4. They provide important ecosystem services, such as high quality water, the recharge of streams and aquifers, the maintenance of riparian communities, and the moderation of climate variability and change.
5. They maintain long-term soil productivity.

## **DEFINING FOREST HEALTH & RESILIENCE**

Helms (1998) defines forest health as, “the perceived condition of a forest derived from concerns about such factors as its age, structure, composition, function, vigor, and presence of unusual levels of insects or disease and resilience to disturbance.” Perception and interpretation of forest health are influenced by individual and cultural viewpoints, land management objectives, spatial and temporal scales, the relative health of stands that comprise the forest, and the appearance of the forest at a point in time. The Forest Service Manual 2020 – Ecological Restoration and Resilience Policy defines resilience as “the capability of an ecosystem to endure disturbances and retain its structure and functions; the capacity of an ecosystem, which is subject to disturbance or change, to organize and renew itself.” (FSM 2020, 2014)

The forests surrounding the San Luis Valley have experienced significant insect mortality. They appear to be well beyond their normal range of “natural” variability. Again, the Forest Service Manual 2020 defines natural range of variation (NRV) as “spatial and temporal variation in ecosystem characteristics under historic disturbance regimes during a reference period. The reference period considered should be sufficiently long to include the full range of variation produced by dominant natural disturbance regimes, often several centuries, for such disturbances as fire and flooding and should also include short-term variation and cycles in climate. NRV is a term used synonymously with historical range of variation or range of natural variation. The NRV is a tool for assessing ecological integrity, and does not necessarily constitute a management target or desired condition. The NRV can help identify key structural, functional, compositional, and connectivity characteristics, for which plan components may be important for either maintenance or restoration of such ecological conditions.” While periods of increased insect activity are normal, the scale of the present activity may be beyond historic epidemics. Spruce forests normally have long (300 – 400 year) periods between large-scale disturbances such as fire or insect mortality. Presently, most old growth spruce stands have been killed. Fortunately spruce seedlings and saplings are present in the understory of many stands. Their presence assures continuing spruce forests following the present insect activity.

## **DEFINING COMMUNITY VITALITY & RESISTANCE**

Rural community vitality refers to the ability of rural community members to work together and realize positive social, economic, and environmental outcomes.

Research on community vitality indicates that vital rural communities need to be situated in macro-contexts in which there is limited inequality, resource extraction is done in a gradual manner, human migration patterns are relatively stable, and externally-driven shocks to the system inspire local innovation and do not unseat the stability at the core of the community. In addition, rural communities need to be situated in a federal policy environment that supports

steady trade relations between them and other communities, highly paid rural workforces, rural industries, and development of both public and private rural infrastructure, but also deters unregulated, large monopolies from exploiting rural consumers and workers. Given the large influence the macro-context has on rural communities, changes to factors in this realm have the greatest chance of setting the stage for the realization of rural vitality (Etuk, 2012).

In a sense, community vitality can be thought of as a process of capacity building toward the goal of economic development, the latter incorporating both issues of growth and distribution. A host of interrelated factors are considered important in this process (but difficult to sort out from broader literature on economic development) (Grigsby, 2001):

- § Affordable and diverse housing opportunities
- § Agricultural viability
- § Sustainable use of natural resources
- § Employment creation and business creation, attraction, retention and expansion
- § Expanded, diverse educational opportunities, in K-12, post-secondary, private and non-institutional settings, that respond to economic conditions
- § Local investment
- § Retention of youth
- § Access to local government, decision-making processes

## **HISTORICAL CONTEXT**

President Theodore Roosevelt created the San Juan Forest Reserve on June 3, 1905. It included the San Juan Mountains in La Plata, San Juan, Hinsdale, Archuleta, Mineral, Rio Grande, and Conejos Counties. His proclamation listed five reasons for the designation based upon examinations by early foresters working for the General Land Office Bureau of Forestry, the predecessor to the Forest Service, before it was created in the Department of Agriculture by the legendary midnight move:

1. Prevent spring floods and summer droughts, which was supported by ranchers and farmers dependent on irrigation water.
2. Ensure a steady timber supply for developing the area's mineral resources. It was noted that the railroads had poached significantly on the available timber for railroad ties for the Denver and Rio Grande and the Railroads on the Front Range on the reserve already.
3. Prevent overstocking of the range and regulate disputes between sheep and cattlemen.
4. Prevent and control repeated forest fires. At the time of creation it was noted that 12% of the reserve had been burned over, 5% since 1899.
5. Ensure a steady supply of timber to local markets and prevent control of supply from passing into hands of large timber companies.



A few days later he created the Cochetopa Forest Reserve on June 13, 1905. This Forest Reserve included 1.1 million acres in Saguache County with projections into Rio Grande, Mineral, Hinsdale, Gunnison, and Chaffee Counties. It was noted the reserve establishment was strongly supported locally by cattlemen and farmers who were having serious conflicts with roving sheepherders and bands of sheep denuding the forage on the range and causing watershed and erosion problems in the valley floor. (Godfrey, 2012)

Then on July 1, 1908 the Rio Grande National Forest was created by executive order that withdrew lands from the San Juan NF and the Cochetopa NF. This put the RGNF entirely within the headwaters of the Rio Grande River (and the San Luis Valley). The other portions not withdrawn were either at the time or shortly thereafter put into reserves within the boundaries we are familiar with now (i.e. into the Gunnison NF, the San Isabel NF, and the San Juan NF).

## GOAL

The Goal of this document is to outline how RWEACT will develop into a “non-profit” entity of some iteration that will develop an effective, active advocacy partnership with the US Forest Service in forest health, watershed protection, and community and economic resilience within the Rio Grande Basin and on a Regional scale.

## OBJECTIVES

- ☐ Define watershed protection, forest health, and community, economic resilience
- ☐ Describe the current state of Rio Grande Basin watershed/forest health and community economies.
- ☐ Identify desired future watershed/forest and anthropocentric conditions.
- ☐ Identify actions needed to migrate from present to desired future conditions.
- ☐ Identify barriers and/or challenges to reaching desired future conditions.
- ☐ Outline opportunities to use collaborative processes to develop a consensus of the desired condition of natural resources in the Rio Grande watershed.
- ☐ Describe methods and means for RWEACT to advocate for adaptive management in forest planning and implementation including actively participating in the Forest Plan Revision process.
- ☐ Develop an Action Plan containing timelines, milestones and responsibilities to accomplish the above.

## CURRENT OPERATIONS

Average yearly outputs (Forest Service)

Wood products are measured in many ways. You will see the following terms in this report: CCF, MMBF, Tons, dbh. They are defined as follows:

CCF = 100 cubic feet (1 cubic foot is 12" x 12" x 12")

MMBF = 1,000,000 board feet (1 board foot is 12"x 12" x 1" thick)

Ton = 2,000 pounds @ 15% moisture content

dbh = diameter at breast height or diameter at 4.5 feet above the ground

Currently, the Rio Grande National Forest (RGNF) sells an average of 30,000 CCF of material annually through a variety of different timber and salvage sales as well as commercial and personal fuelwood permits. The 30,000 CCF is broken up between sawlog material (sound material to a 6" top) and fuelwood. For fiscal year 2014, the RGNF sold 22,868 CCF in saw timber and 8,955 CCF in fuelwood. For fiscal year 2015, the goal is 28,446 CCF in saw timber and 6,500 CCF in fuelwood. It is important to note that in the past couple of years, all of the RGNF commercial saw timber has been selling for more than the required \$5/CCF for material that is larger than 8" dbh base advertised rate. Most of the timber sales had considerable competition between local businesses within the San Luis Valley and Montrose Forest Products. Although the Forest Plan allows up to 28.8 MMBF to be harvested yearly, the amount of volume that is currently being harvested and sold is quite a bit less due to two primary factors: funding and National Environmental Policy Act (NEPA) clearance (RGNF Personnel, 2014). For the past couple of years, the RGNF has received approximately \$1 - 1.4 million dollars annually for the timber program. This funding pays for a wide variety of costs including personnel salaries, timber sale preparations, NEPA analysis, and timber sale contract administration. Basically, it costs the USFS approximately \$51/CCF just to manage the timber program (RGNF personnel, 2014).

In addition to funding, the timber volume that can be sold is dependent upon the number of acres that have been approved through NEPA. Unfortunately, several projects that had gone through the NEPA process and were cleared for treatment, burned during the 2013 fires, and at this time are no longer suitable for harvest. As such, the number of NEPA ready acres throughout the forest is relatively low. The RGNF has been working on, and is projected to sign soon, the Cumbres EA, which will have approximately 2,500 acres of treatment. Furthermore, the RGNF is also working on the La Garita Hills analysis, which covers about 187,778 acres, including about 23,155 acres of spruce salvage (USFS/BLM 2014).

## CURRENT DEMAND (INDUSTRY)

Total wood demand in the United States has declined in recent years. According to the United Nations, demand for "industrial" roundwood – the logs used at manufacturing facilities – declined 33% from 2005 to 2011, from 508 million tons to 341 million tons per year. According to the USFS, demand for roundwood – as measured by forest removals – declined 34% from 2005 to 2011, from 491 million tons to 326 million tons per year. According to forest industry

analysis and forecast work conducted by Forisk, demand for wood declined 31% from 2005 to 2012, from 500 million tons to 347 million tons per year (FORISK Consulting 2013).

Each of these sources indicates rising demand for wood over the past two years as markets continue to strengthen. As of year-end 2012, for example, USFS and Forisk analysis indicate forest industry demand for wood increased between 7 and 9% since 2011. Analysis and tracking of wood bioenergy projects by technology type and region affirm the slow, stuttered development of wood bioenergy markets in the United States (FORISK Consulting 2013).

At this time, about half of the wood removed from the Rio Grande National Forest is processed within the San Luis Valley by the following businesses:

- Mountain Valley Lumber – located in Saguache. This mill can utilize all species and produces tongue and groove (T&G) round house logs, dimensional lumber, T&G flooring and paneling, log siding, rustic slab siding, beams, rough sawn material, planed lumber, and grade stamped material.

Mountain Valley Lumber did not purchase any new sales during 2014, but does have approximately 5,739 CCF under contract (RGNF Personnel, 2014).

- Alpine Lumber Company – located in La Jara and has a milling capacity of 1 to 1.5 MMBF/year. This mill can utilize all species and produces log homes, logs, log siding, wood paneling, beams, furniture, decking, wood flooring, rough dimensional lumber, and molding. Waste from the sawmill is utilized as compost, animal bedding and landscape material.

Alpine Lumber Company is not considered a major player in terms of the timber program on the RGNF. They historically have not purchased their material from the Forest (RGNF Personnel, 2014).

- Rocky Mountain Timber Products – located in Del Norte. This mill has an annual milling capacity of 3-4 MMBF/year and can utilize all species. Primary products include surfaced and rough cut timber, logs, paneling, siding, beams, mulch, and firewood. Sawmill waste is utilized as mulch, animal bedding and landscape material.

Rocky Mountain Timber Products is the largest volume user from the RGNF within the San Luis Valley. They currently have approximately 22,294 CCF under contract (RGNF Personnel, 2014).

- Pleasant Western Lumber, Inc. – located in Monte Vista. Following a recent sawmill fire they have converted to a firewood operation that is on track to cut about 3,000 cords of firewood a year.

Trinchera Ranch presently supplies their raw material. Pleasant Western Lumber may be interested in purchasing firewood from the Rio Grande National Forest dependent upon species available and price (RGNF Personnel, 2014).

Outside of the San Luis Valley, the primary business that is removing wood from the Rio Grande National Forest is Montrose Forest Products, which is owned by Neiman Enterprises, LLC. and located in Montrose, Colorado. It has a milling capacity of 110 MMBF/year. The Montrose mill is primarily a stud mill and can utilize all species. Montrose Forest Products has historically purchased between 6-7 MMBF/year from the RGNF and currently has about 18,519 CCF under contract (RGNF Personnel, 2014).

## THE NEED FOR CHANGE

### VULNERABILITY

The word vulnerable means open to attack or assault (Random House College Dictionary, 1982). The forests in the Upper Rio Grande Basin are vulnerable to unprecedented, during recorded history, insect infestations and subsequent wildfires. Climate change is thought to be the primary provocation for both increased insect activity and unusually warm and dry weather during the last decade.

Fully functioning ecosystems are dependent upon natural processes. One could develop a philosophy that watershed and or forest health is just fine when “natural processes” prevail. That in fact, no human intervention is warranted when natural events occur. So was watershed health intact following the Mount Saint Helens eruption? Is it possible that some natural events are of such scale and impact on human activities that restoration or mitigation activities are warranted?

### POINTS to PONDER

Has the current bark beetle epidemic created an unusually large-scale impact on the landscape? We know it has killed the vast majority of old growth spruce forests on the San Juan and Rio Grande National Forests and is working its way north with impunity. Are 100,000 acre wildfires really within the past range of natural variability? Fire scar and vegetative evidence does not appear to support such a conclusion. Has watershed condition been enhanced by a natural insect epidemic? These are points to ponder as we attempt to improve watershed and forest health in the Rio Grande Basin. Additionally, while large-scale insect outbreaks by themselves are not necessarily unnatural, the situation does get complicated when these outbreaks occur in areas that are routinely used by forest visitors or are the foundations for community economic vitality.

## VULNERABLE WATERSHEDS & FORESTS

### WATERSHEDS

Water originating in forests throughout Colorado is valued for many reasons, from its use for domestic needs to providing the foundation for agricultural activities. The forests adjacent to streams and rivers collect and purify the water, funneling it through a network of stream channels into larger rivers. The ability of the forests to act as a watershed is affected by the condition, structure, and composition of the forest and the impacts of disturbances within these systems.

Because of its widespread implications, water quality and quantity have become major forest management issues. In some watersheds, logging, fires, road building, livestock grazing, and mining have negatively impacted riparian areas and stream channels. Indirectly, these same events occurring on upland areas may also affect water quality and streamside conditions. Some relationships between water quality and quantity, and the condition of the upland vegetation are poorly quantified. However, it is certain that changes in the density, stand structure, and composition of vegetation, both live and dead, within a watershed affect several aspects of water quality and quantity.

Forest conditions impact the timing and amount of water produced by a watershed, retention of snow-pack, nutrient and sediment loading in water, and water temperature. Variation in characteristics over time and across a watershed is normal and desirable for the proper function of the system. The variation is a function of the amount of plant cover alive and dead, successional stage, pattern, and structure of the vegetation across the watershed. Changes in the vegetative condition may be the result of fire, timber harvest, insect or disease activities, and developments including roads, mining or subdivisions. Concerns are raised when the variation of these attributes exceeds the normal variation.

As with most natural systems, delicate relationships are involved. There are no absolutes, and serving societal demands while mitigating related human-induced impacts are complex and expensive. Abundant clean water is a necessity, but simply opening the forest spigot by allowing unchecked natural disturbances or unregulated cutting is neither practical nor desirable. Perhaps no aspect of forestry requires the combined knowledge of biological science, geology, hydrology, meteorology, social studies and law more than the practice of wise watershed management, and perhaps none is more critical.

Quantifying watershed condition is not straightforward. Various models and on site studies have come to wide ranging conclusions on watershed condition for the RGNF.

The 1996 Forest Plan indicates that fifty eight percent of the total forest area is undeveloped. Late successional stage forests occupy sixty-two percent and only two percent had been clear-cut at that time. The Forest Plan FEIS describes water quality as excellent over most of the forest.

Fifteen of the five hundred and fifty watersheds were classified as watersheds of concern; with most of the concern being generated by past mining activity. The RGNF has 11,160 miles of stream channel, 1,180 of it is perennial.

A 2012 Assessment of Wetland Condition on the Rio Grande National Forest by Joanna Lemly, Colorado Natural Heritage Program, Warner College of Natural Resources, Colorado State University, concludes that wetland condition measures indicate that wetlands on the RGNF are in excellent to good condition. Floristic quality assessment indices were high for most wetlands, though did vary by both elevation and wetland type. A handful of wetlands received C-ranks (Moderate Deviation from Reference), due to stressors including grazing, hydrologic modifications, and surrounding land use.

The 2010 Watershed Condition Classification by the USFS found that 41% of the forest watersheds were functioning properly while 57% had their function at risk and 2% had impaired function. This overall score does not seem to support previous findings. Table 1: RGNF 2010 Watershed Condition Classification provides a breakdown of the various factors considered in assigning an overall watershed condition class to the various watersheds.

**Table 1: RGNF 2010 Watershed Condition Classification**

<b>Watershed Indicator/Attribute</b>	<b>Functioning Properly %</b>	<b>Function at Risk %</b>	<b>Impaired Function %</b>
<b>Overall Watershed Condition</b>	41	57	2
<b>Water Quality</b>	89	9	2
<b>Water Quantity</b>	85	8	7
<b>Aquatic Habitat</b>	60	32	7
<b>Aquatic Biota</b>	6	29	65
<b>Riparian Vegetation Condition</b>	35	55	10
<b>Roads &amp; Trails</b>	15	77	8
<b>Soils</b>	20	78	2
<b>Fire Regime &amp; Wildfire</b>	81	19	0
<b>Forest Cover</b>	99	1	0
<b>Range Vegetation Condition</b>	49	51	0
<b>Terrestrial Invasive Species</b>	71	28	1
<b>Forest Health</b>	79	21	0

#### HYDROLOGIC CONSEQUENCES OF BARK BEETLE DISTURBANCES

A review of research findings relative to bark beetle impacts on watershed function and the possible effects of widespread salvage operations to improve watershed condition does not provide certainty or clarity on the topic. Results vary widely and can be inexplicable.

The abstract in “Bark beetle infestation impacts on nutrient cycling, water quality, and interdependent hydrological effects” summarizes the review of over ninety research papers and provides an insight into the complexity and variability of the topic. (Mikkelsen et al 2013)

“Bark beetle populations have drastically increased in magnitude over the last several decades leading to the largest-scale tree mortality ever recorded from an insect infestation on multiple wooded continents. When the trees die, the loss of canopy and changes in water and nutrient uptake lead to observable changes in hydrology and biogeochemical cycling. This review aims to synthesize the current research on the effects of the bark beetle epidemic on nutrient cycling and water quality while integrating recent and relevant hydrological findings, along with suggesting necessary future research avenues. Studies generally agree that snow depth will increase in infested forests, though the magnitude is uncertain. Changes in evapotranspiration are more variable as decreased transpiration from tree death may be offset by increased understory evapotranspiration and ground evaporation.

As a result of such competing hydrologic processes that can affect watershed biogeochemistry along with the inherent variability of natural watershed characteristics, water quality changes related to beetle infestation are difficult to predict and may be regionally distinct. However, tree-scale changes to soil–water chemistry (N, P, DOC and base cation concentrations and composition) are being observed in association with beetle outbreaks, which ultimately could lead to larger-scale responses. The different temporal and spatial patterns of bark beetle infestations due to different beetle and tree species lead to inconsistent infestation impacts. Climatic variations and large-scale watershed responses provide a further challenge for predictions due to spatial heterogeneities within a single watershed; conflicting reports from different regions suggest that hydrologic and water quality impacts of the beetle on watersheds cannot be generalized. Research regarding the subsurface water and chemical flow-paths and residence times after a bark beetle epidemic is lacking and needs to be rigorously addressed to best predict watershed or regional-scale changes to soil–water, groundwater, and stream water chemistry.”

**NOTE:** *Most research pertaining to bark beetles in Colorado has been conducted on sites dominated by lodgepole pine. While these studies are thought to be relevant to spruce they may not reflect outcomes in spruce stands because of differences in stand structure, understory cover, elevation, and precipitation.*

Research also indicates that:

Logging as opposed to retaining beetle-killed trees will likely produce more and faster spring snowmelt for approximately 15 years unless: “the retained stand experiences extensive blowdown and lacks advanced regeneration, or the retained stand has an unusually small amount of structure and lacks advanced regeneration, or the retained stand burns.” (Teti, P. 2008)

Seedling density was significantly greater in logged stands compared to uncut stands. In particular, lodgepole and aspen seedlings/sprouts were 10 and 7 times more abundant respectively. Harvested stands contained a significantly higher mass of fine fuels and sound, coarse fuels than untreated stands, while the mass of rotten, coarse fuels and litter/duff did not significantly differ between the two. (Collins et al 2012)

#### **CLIMATE CHANGE ~ WATER QUALITY & QUANTITY**

Many believe climate change is driving the beetle epidemic and will have profound impacts on overall watershed/forest conditions. Understanding climate change impacts at the local level is important to guide decisions on actions to improve resilience well into the future.



“The West-Wide Climate Risk Assessment: Upper Rio Grande Impact Assessment,” Bureau of Reclamation, 2013 provides a projection of future climate in the basin:

- Over the period 1971 through 2011, average temperatures in the Upper Rio Grande Basin rose at a rate of just under 0.7 degrees Fahrenheit (°F) per decade, a rate approximately double the global rate of temperature rise (Rahmstorf et al. 2012). Such rates of warming are unprecedented over the last 11,300 years (Marcott et al. 2013). This rate of warming has the potential to cause significant environmental harm and change the region’s hydrology.
- In future years, pronounced changes in climate are anticipated for the Upper Rio Grande. The climate modeling used to support this study suggests that average temperatures in the Upper Rio Grande Basin may rise by an additional 4 to 6 °F by the end of the 21st century. These model simulations do not consistently project changes in annual average precipitation in this basin, but they do project changes to the magnitude, timing, and variability of inflows to the system. Such precipitation changes, coupled with temperature-driven increases to evaporative demands within the system, are expected to cause significant changes in the available water supply and demand. These projections present a picture of changing hydrology for the Upper Rio Grande, with implications for water management, human infrastructure, and ecosystems. Although there are uncertainties in the details, some general patterns are clear. The list below discusses possible implications of those general patterns.

**Decreases in overall water availability.** Supplies of all native sources to the Rio Grande are projected to decrease on average by about one third, while flows in the tributaries that supply the imported water of the San Juan-Chama Project are projected to decrease on average by about one quarter.

**Changes in the timing of flows.** The seasonality of flows is projected to change. Anticipated changes include earlier snowmelt runoffs as well as increased variability in the magnitude, timing, and spatial distribution of streamflow and other hydrologic variables. Projections indicate that this basin will experience a decrease in summertime flows and less of a decrease (or potentially even an increase) in wintertime flows.

**Increases in the variability of flows.** All simulations used in this study project an increase in the month-to-month and inter-annual variability of flows over the course of the century. The frequency, intensity, and duration of both droughts and floods are projected to increase.

The decreases in supply, changes in magnitude and seasonality of flows, and increases in the availability of water supply projected in this study will present considerable challenges for water management within the Upper Rio Grande Basin. Such challenges are evaluated in this URGIA in terms of the parameters defined in the Secure Water Act (SWA), including:

**Water Infrastructure and Operations, and Water Delivery.** The reduced surface-water inflows to the Upper Rio Grande Basin, coupled with increases in the demand for irrigated agricultural and riparian vegetation, are projected to result in decreased reservoir storage throughout the system, with commensurate impacts on water delivery.

**Hydropower Generation.** Lower flows and lower reservoir levels associated with climate change are projected to lead to less hydropower generation. The projected decrease is substantial, from an initial generation within the Upper Rio Grande system of around 15 megawatts, the rate drops almost 50 percent to around 8 megawatts by the end of the 21st century, with most of the decrease coming during the months of May through September.

**Flood Control Operations.** Floods are projected to become more extreme with climate change, and thus flood control operations would be needed more often in the future, even as overall supplies decrease.

**Water Quality.** Concentrations of nitrogen, phosphorus, suspended solids, and salt may increase in the future in response to increased evaporation rates for surface water and increased precipitation intensity, which would wash a greater volume of pollutants into the river, despite a decreased overall flow volume.

**Fish and Wildlife Habitat, Including Endangered Species Act (ESA) Listed Species and Critical Habitat.** Climate change is projected to reduce available water in the Upper Rio Grande system. This reduction in water is expected to make environmental flows in the river more difficult to maintain, and reduce the shallow groundwater available to riparian vegetation. Both of these impacts have implications for the habitat of fish and wildlife in the Upper Rio Grande Basin riparian ecosystems.

**Flow and Water-Dependent Ecological Resiliency.** Ecological and human systems within the basin already operate close to thresholds (i.e., points at which small changes could have larger-scale repercussions) related to available water supply. It is possible that some systems in the basin have already crossed ecological thresholds. In the future, as projected water supplies decrease and demands increase, water availability thresholds may be crossed—causing additional key systems to undergo regime shifts.

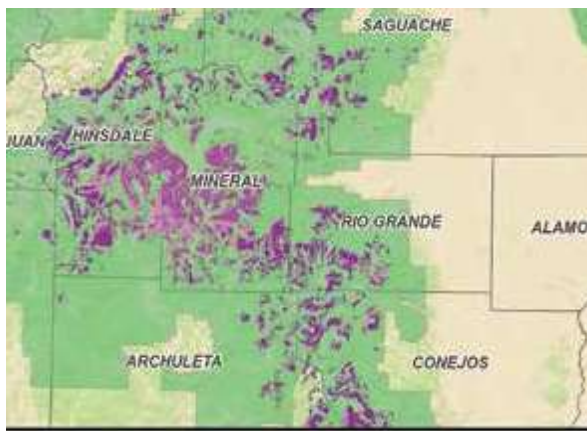
**Recreation.** The availability of water-based recreation at Reclamation and USACE reservoirs and river-based recreation, including whitewater rafting and fishing, may be negatively impacted by the projected decreases in flows. Moreover, increased temperatures may increase the usage of available water-based recreational opportunities.

**The Rio Grande Compact.** Analyses presented in this report assume that Colorado would use its ability for priority administration to assure its obligations are met under the Rio Grande Compact. The analyses assume that New Mexico would take additional management actions to meet its obligations under the Rio Grande Compact, although in this study, Reclamation makes

no assumptions about what those management actions would be. The irrigation system would be significantly impacted.

## FORESTS

The spruce-fir forests in the Upper Rio Grande Basin have experienced a significant spruce bark beetle epidemic. About 500,000 acres of the total 560,000 acres of spruce fir forests within the basin have been impacted (RGNF Personnel, 2014). The outbreak of insect carnage developed shortly after the forest plan was approved. While insects have always been a part of the landscape, the scale of recent damage is unprecedented in written history.



*2002 to 2013 spruce bark beetle activity.*

Other pathogens are also more active than “normal”. How the recent outbreak of tent caterpillars will eventually impact aspen stands is yet to be determined. Douglas-fir bark beetles are killing older trees. Spruce budworm populations are surging. Long term drought and warmer temperatures have set the stage for the rise in insect and disease activity. Abnormally dense stands of trees are unable to counter attacks because they are under considerable moisture stress. Warm, dry conditions have allowed insects to exponentially multiply, creating a tsunami of forest destruction.

The West Fork Fire Complex may provide some indication of how bug killed forests in the basin are likely to burn in the future. If long-term weather conditions unfold as predicted by the Bureau of Reclamation, we can expect wildfire frequency and intensity to increase.

## VULNERABLE COMMUNITIES

For the purposes of this discussion, the Rio Grande Basin includes the entire San Luis Valley (SLV), which includes six counties of Alamosa, Conejos, Costilla, Mineral, Rio Grande and Saguache. The SLV has a total of 5,243,000 acres with 53.1% being federally owned. 39.3% is forested, 43.6% is considered rangeland and 11.8% is classified as agricultural. The following statistics come from the San Luis Valley Statistical Profile of January 2012 provided by the San Luis Valley Development Resources Group. Table 2: compares the statistics of the San Luis Valley to overall Colorado.

**Table 2: San Luis Valley Statistics Compared to Colorado\***

Item	SLV	Colorado
Population (2010 census)	46,027	5,026,000
Population Change (2000-2010) % change	-0.4	16.9
Median Age	42.6	36.1
Hispanic %	46.9	20.7
Median Value owner occupied housing (\$s)	120,200	234,100
Estimate housing vacancy rate	26.5	10.62
Female-headed household w/ children (%)	6.8	6.0
Median household income (\$s)	34,710	56,456
Median income <\$50,000 (%)	66.6	33.8
Source household income – cash public assistance (%)	5.3	1.9
Households with food stamp/SNAP assistance (%)	16.4	5.7
Labor force	25,076	2,680,000
Unemployment rate (%)	8.4	8.9
Unemployed, underemployed & discouraged workers (%)	21	21
Annual average weekly wage – Agriculture – Forestry (\$)	532	550
Annual average weekly wage – All industry (\$)	563	901

\*Source: San Luis Valley Statistical Profile of January 2012 provided by the San Luis Valley Development Resources Group

Sixty-five percent of the Cities/Towns in SLV have lost population since the 2000 census.

Without consistent industries, communities suffer due to the loss of jobs and revenue. Large fires can significantly impact communities that are dependent upon tourism, logging, or grazing for economic viability.

There is a substantial amount of research focused on community reactions to bark beetle outbreaks and subsequent management of the forests. Much of this information has application in the Upper Rio Grande Basin.

Communities characterized by overall active participation of its residents had a greater likelihood of collective involvement in tackling the impacts and risks associated with forest disturbance. While local residents were generally highly concerned with urgent risks such as fire, threats to broader environmental and community values such as water quality and impacts on tourism are what drove them to participate in community actions. However, at the community level, this relationship did not always hold, emphasizing the importance of recognizing community differences in response to disturbance. (Flint and Haynes 2006)

Depending on one's perspective, forest disturbance can have both positive and negative economic consequences. For example, those involved in timber harvest operations may benefit while those dealing with increased fire hazard may incur considerable costs.

Human response to the aesthetic deterioration of beetle-killed landscapes can be an emotional grieving process characterized by stages of "denial, shock, anger, sadness, resignation, and moving on." For others, the forest renewal characteristics of disturbance may generate a more positive emotional response. Different communities are expected to react and respond differently to forest disturbances. Attitudes of visitors to beetle-killed recreational areas may vary greatly from those of local residents. Visitors that are well informed about the function of bark beetles in ecosystems may be willing to accept the visual degradation of landscapes if coupled with the protection of ecosystem integrity. (Flint, C. G., McFarlane, B., & Müller, M. 2009).

Land managers' focus on economic impacts and fire risk will certainly impact management approaches and public messaging. The public might share these concerns, but also have additional concerns that may go unattended to and become a source of discontent regarding response to MPB. (McFarlane, B. L., Parkins, J. R., & Watson, D. O. 2012).

## **VULNERABLE FOREST INDUSTRIES**

Both the forest products industry, and accordingly, the forestry sector, in the United States (U.S.) have experienced extreme volatility, unprecedented challenges, and substantial change over the past two decades. In many areas, old operating assumptions have been challenged and discarded at an increasingly rapid pace, and practitioners, policy makers, researchers, and educators have struggled to keep up (Goergen 2013).

Emerging from a recession that depressed some markets to levels that equaled the Great Depression, the near-term future for U.S. forest products markets is generally optimistic. The longer-term future suggests both opportunities and challenges. (Goergen 2013)

The last few years have been hard on the wood products industry across the entire country. Housing construction plummeted in 2008 and has not recovered to pre-recession levels. The Colorado forest products industry reflects this similar decline in business. The largest sawmill, located in Montrose, went bankrupt. It has since been purchased by a firm, with deep roots in sawmilling with hopes of making it a viable entity. One local mill in the San Luis Valley had a serious fire that ruined much of its capacity to produce lumber. They have decided not to rebuild the sawmill, deciding instead to process firewood.

Sawmill operations in the SLV have been declining for a number of years. The large stud mill in South Fork closed when it could no longer compete with lumber originating in Canada. Many local sawmills have been reluctant to invest in upgrades due to concerns about the reliability of

future raw materials. USFS funding levels have fluctuated. Appeals of timber sales have blocked an even flow of sales and spruce bark beetles have killed a significant portion of the trees the mills rely upon. How long the dead trees will be economically viable is a question in most sawmill operator's minds.

An approaching Forest Plan Revision has local forest products folks wondering about the USFS commitment to a definable, sustainable annual sale offer. Once that issue is resolved they may be in a position to make plans for future operations and appropriate investments to utilize what will be offered. An uneven or unpredictable flow of raw materials makes it difficult to sustain payments on equipment loans to get financing for new product opportunities. It also creates enough uncertainties in the workforce that good employees move on if/when they sense instability in their present forest products employer.

## **ACRES OF TREATMENT NEEDED**

When one sees all the dead spruce in the Rio Grande Basin numerous questions simultaneously cross the mind. Among them: How does all that dead woody material impact watershed conditions? If it will have deleterious long-term impacts on the watershed, can anything be done to mitigate those impacts? If removing much of the dead material is warranted, is it possible to pay for the watershed condition enhancement by capturing the value of the dead material before it deteriorates? If so, how much material is out there and how long might it maintain its value? Will the public support such a program? Is there initiative within the Forest Service to take on such an ambitious task? Is there a market for the material? Is there a way to streamline NEPA in the face of such an abnormal natural event? And perhaps finally, will Congress be willing to fund such a bold program?

Many questions, few immediate answers. What we do know:

The spruce bark beetle in the Rio Grande Basin has decimated approximately 500,000 acres of spruce forest. Many more acres of high elevation spruce forests across Colorado have been killed or are in the clutches of the bark beetle.

Close to 74,000 acres of dead spruce trees are accessible to present road systems, on slopes <30%, are outside wetlands and stream corridors, and are within Forest Plan Management Units that call for silvicultural management.

An Estimated 1,805,000 CCF of dead material is found on those acres, which amounts to 2,238,112 tons of wood.

At the present logging rate of 30,000 CCF/year it will take sixty-one years to cover the ground needed to improve watershed condition.

If the present program was ramped up to the 1996 Forest Plan authorized treatment level of 42,000 CCF/year it would take forty-three years to cover the same ground.

The large dead spruce trees are likely to maintain sawlog quality for roughly 10 years. They may be viable house logs for another twenty years. Smaller material will not pay its way off the mountain within seven to eight years.

A ten year accelerated watershed condition improvement program would have to cover 7,400 acres and remove 180,500 CCF per year (6 times the present program) to take advantage of the value of the dead material to fund watershed improvement.

Presently there isn't a local or regional market for that volume of material, which presents an opportunity for additional business growth within the San Luis Valley.

Since it is unlikely that anything approaching the watershed treatment program described above is probable in a timely way other coping actions need to be explored. How should we approach watershed condition concerns in the face of congressional ineptitude, anemic funding and agency malaise?

#### **WILDFIRE SUPPRESSION CONSIDERATIONS:**

Fire behavior during the West Fork Fire Complex of 2013 demonstrated the new norm for wildfires in beetle-killed spruce forests. Individual dead trees torched and threw burning embers into the convection column to ignite new fires as much as a half mile ahead of the burning front. With the probability of ignition as high as ninety percent, most embers that landed on receptive fuel beds became new fires. Containment of fires of this nature requires robust, pre-existing, fire control features on the ground with many safety zones scattered along the control features for firefighters to migrate to when it is no longer safe to make a stand along firelines.

One reason the West Fork Complex got so large was the scarcity of safe places to make a stand against it. One way to provide opportunities to catch future wildfires in the spruce type is to create fuelbreaks by removing dead standing trees and cleaning up dead woody debris on the ground. When this cleaned up area coincides with roads that provide access for fire apparatus and escape routes for firefighters, there is a much more likely chance fire suppression activities will prevail. These fuelbreaks will provide a much safer place to engage future fires.

It should be noted that the fire not only burned dead trees but also killed almost all the living young seedlings and saplings in the understory. In some cases aspen sprouts will fill the void in areas adjacent to aspen clones. In other areas forest regeneration is decades to centuries away.

#### **TRAVEL CORRIDOR SAFETY:**

Fuelbreaks along existing roads also significantly reduce the probability that hazardous trees will blow down on people in these corridors. It is currently almost impossible to find a place to camp in the spruce type on the RGNF without being at least a tree length away from the forest edge and well into an open meadow. Many historical dispersed recreation sites are extremely hazardous at the present time.

#### **USER SAFETY & WILDFIRE CONTAINMENT OPTION:**

Perhaps the best we can hope for given real world constraints, is to protect forest users from falling trees and provide wildland firefighters with a safer place to make a stand against the next large wildfire. This can be accomplished by creating strategic fuelbreaks along road corridors

that lend themselves to wildfire control. By removing dead standing or recently fallen trees from an area 660 feet on each side of some existing roads we begin to improve conditions for firefighters, forest users and watershed integrity simultaneously.

This stopgap approach will treat 160 acres per mile on 12.5 miles of road per year at the current annual treatment program level of around 2,000 acres per year.

## **LACK OF FOREST SERVICE CAPACITY**

### **STAFFING & FUNDING**

As discussed previously, the RGNF is cutting far less material than is allowed under the 1996 Forest Plan due to funding and NEPA ready projects. In order for the timber program to accelerate to the level of treatment needed as described above, several barriers will need to be addressed. First, the \$1 – 1.4 million dollars the RGNF currently receives only allows for 30,000 CCF of volume per year. To increase the amount of volume available to the level of treatment needed (1,805,000 CCF per year), the RGNF will need to increase their budget by 5-6 times. Secondly, at this time, there are four vacant positions within the timber program on the RGNF: 1) Timber Program Manager (Supervisor's Office position), 2) Forester in Saguache, 3) Marking Crew Supervisor, and 4) a forestry technician position at Conejos Peak. Although the RGNF has received clearance to hire for the first two positions, they have yet to be advertised and go through the hiring process (RGNF Personnel, 2014). Without full staffing, the timber program is already under strain to meet the current goal and it will be very difficult to increase the amount of volume offered. If acceleration is to occur, it is crucial that additional employees be hired to increase the overall capacity of the timber program.

Thirdly, because Forest Plan Revision is just being started on the RGNF and will most likely be a four year process, many of the non-timber staff that would normally work on preparing an environmental assessment (EA) or environmental impact statement (EIS) will simply not have the time. The Forest Plan Revision is a major priority for the RGNF until it is completed and without significant additional resources, taking on more work at this time is not feasible.

## **COMMUNITY DECISION MAKING**

CSU professor Antony Cheng described the complexity of finding consensus on natural resource issues in his opening remarks at the conference on Fire, fuel treatments, and ecological restoration in 2002 (Omi, Philip N.; Joyce, Linda A., technical editors, 2003). He is quoted here in-depth.

“Despite the recent attention to fuel treatments among forestry professionals in the Intermountain West, questions remain about the true goals of such treatments, especially on public lands. The different perceptions of goals mirror the deep-seated conflicts over the purpose of public lands in general: Are they to be managed for multiple human uses or to be



protected as the nation's remaining biological heritage in the midst of landscapes long dominated by humans?

Again, context matters: specific treatments and prescriptions may be acceptable at a general level, but there are likely significant differences across particular contexts. For example, one may support thinning out dense stands of ponderosa pine across the Rocky Mountain West, but would resist logging "in my backyard." Why the change of heart?

A medical analogy may be useful. Prescribing morphine to dull intense pain and minimize suffering is generally accepted as sound practice. However, should a doctor prescribe morphine to cure a headache? A morphine prescription is a treatment, but the treatment depends on the nature of the problem. Therein lies a significant difference between forest resource management and medicine: reaching consensus on the nature of "the problem" is often elusive and the source of intractable conflict. Even in the wake of catastrophic wildfires, there remains public debate over the true nature of "the problem." Is it to protect private property? To protect public safety and welfare? To restore a small area of forest like a domestic watershed or across a large landscape like the entire Interior West? Forest resource and fire managers should not take for granted the existence of a consensus on the definition of the problem.

Forest management has always been a blend of science and values, yet the process of blending science and values has often been arbitrary and unsystematic. One result has been the increased intervention of the legislative and judicial systems in removing discretion and judgment from resource professionals in favor of highly regimented statutes, regulations, and procedures. A second result is that resource professionals are placed in the role of arbiter among competing stakeholder claims – the classic "loggers versus environmentalist" split being one such competition. Integrating science and public values can become obscured, leading to decisions that are neither technically sound nor socially acceptable.

Efforts are being undertaken across the West to move beyond "analysis paralysis" towards more collaborative approaches to defining and addressing problems related to unhealthy forests and fire risk. However, collaboration is easier said than done. Collaborative efforts are time-consuming and often do not produce expected results – perhaps because expectations are unrealistically high for collaborative processes. Much work remains to be done in designing and evaluating collaborative planning processes and adaptive management strategies.

One thing is clear: there is no one universal model. However, collaborative processes hold the promise that determining the appropriate places and times for fuel treatments can be widely supported and readily implemented. The sustainability of forest ecosystems may indeed depend on collaborative processes making honest and earnest efforts."

Unbiased information is often the key to a breakthrough in understanding of natural resources issues. **Our Future Forest: Beyond Bark Beetle** is a series of 10 short films meant to help the

public better understand the bark beetle outbreak in our local forests is one such source of a neutral scientific information. The Medicine Bow-Routt National Forests in south central Wyoming and northern Colorado partnered with the Ruckelshause Institute of Environment and Natural Resources at the University of Wyoming to develop the series. It is recommended to view the videos in the order of the menu. Please click on the following link <http://www.beyondbarkbeetles.org/> each video is 4 to 4.5 min long.

## MOVING FORWARD

### BUILDING COLLABORATION

The Merriam-Webster dictionary online defines collaboration as “working with another person or group in order to achieve or do something.” While this sounds easy in theory, collaboration, especially with regards to natural resource issues, has proven to be quite frustrating and time consuming. But, although it is hard, collaboration has proven to be absolutely essential to achieving the desired results. As highlighted by the National Forest Foundation “good relationships build trust and goodwill and provide a solid foundation for partners to work together towards mutual goals and objectives.” The following features have proven to help make collaborative efforts successful:

- Neutral Facilitator
- Joint Conveners
- Clear Objectives
- Agreed-upon Scope and Timeline
- Mutual Benefits and Responsibility
- Respect for the Process
- Careful Process Management
- Good Communication
- Inclusion
- Compliance with Legal Requirements
- Planning for Implementation and Evaluation
- Incentives to Participate
- Accountable Representation
- Equal Access
- Transparency
- Sufficient Resources and Information

If RWEACT is going to help advance forest management within the Rio Grande National Forest, collaboration will need to be a fundamental part of the equation. As Flint et al. 2009 found, “open communication among managers and stakeholders and opportunities for community participation in critical management decisions are likely to help reduce opposition to these decisions.”

Having said this, it is important to realize that while collaboration can help make a project more successful through increased trust among stakeholders and the ability to leverage resources, collaboration does not change the overall required NEPA process. As stated by NFF in “A Roadmap for Collaboration Before, During and After the NEPA Process,” collaboration is: NOT a one-way street, and cannot be turned on and off like a faucet. Effective collaboration requires building and maintaining long-term relationships with, and understanding the interests of, those who are willing to get involved. This includes working with others to understand and expand zones of agreement between participants.

- ✓ Collaboration does not mean shared (or transferred) decision authority for land management decisions. In terms of the Rio Grande National Forest, decision authority is the responsibility of the District Ranger, Forest Supervisor, Regional Forester, or Chief. Simply put, just because the collaborative group comes to a decision doesn’t necessarily mean the Forest Service will agree or recommend that course of action.
- ✓ Collaboration does not replace the requirement to inform and involve potentially interested and affected members of the public.
- ✓ Collaboration does not remove the requirement that actions taken on federal land comply with all applicable laws and regulations, including NEPA, the Endangered Species Act, National Historic Preservation Act, and others.
- ✓ Collaborative efforts must still fall within the Forest Plan and other relevant planning documents.
- ✓ Collaborative efforts do not neutralize the appeals and litigation avenues for dissatisfied publics.

Additionally, before RWEACT takes on this project of advancing forest management within the Rio Grande National Forest, it is very important that RWEACT and the RGNF look at the overall capacity needed in order to make a collaborative effort successful. As research by Flint et al. 2006 determined, it is extremely important to “identify capacity for community action and build local relationships. The “U.S. Forest Service Partnership Capacity Assessment Tool,” developed by Resolve, Inc. in 2004 will help RWEACT, the RGNF, and other partners assess their collaborative capacity.

([http://www.fs.usda.gov/Internet/FSE\\_DOCUMENTS/stelprdb5396088.pdf](http://www.fs.usda.gov/Internet/FSE_DOCUMENTS/stelprdb5396088.pdf))

Finally, it is important to recognize that a lot of research has been done on collaborating, especially with regards to natural resource issues and there is a lot of available help. The Northern Arizona University Ecological Restoration Institute has published two different papers regarding this very issue. The first, “Collaboration as a Tool in Forest Restoration” was published in 2005. The second, “What to Expect from Collaboration in Natural Resource Management: A Research Synthesis for Practitioners” was published in 2008. Both of these are a great resource for determining which type of collaborative is best for the current situation and also how to

avoid failure. Both of these papers can be found on the following:  
<http://nau.edu/ERI/Publications-Media/>

## **STRENGTHENING RELATIONSHIPS / BECOMING AN ADVOCATE**

Since RWEACT was formed following the West Fork Fire Complex in 2013, RWEACT has been very successful in bringing local, state, and federal partners together to deal with the aftermath. Since inception, over 30 organizations and partners have joined the effort to help achieve the primary goal of educating and alerting the public. Working together, RWEACT has been able to accomplish a wide variety of projects that would not have been done without their help and support. For the most up to date list, please visit [www.rweact.org](http://www.rweact.org). Also, a copy of the 2014 Summer Newsletter can be found in the Appendix.

Typical of many emergency situations, the group that came together during and after the 2013 fires includes a broad representation of individuals and organizations from both the San Luis Valley and outside of the region that came together for a fairly specific objective. While RWEACT may not currently represent the entire valley, they have developed and demonstrated an incredible ability to engage the entire valley. Therefore, if RWEACT is to grow as an organization, expand their mission and take on the task of representing the entire RGNF, it will be necessary to connect with an even larger group of users including water users, ranchers, timber industry and county representatives from outside the Rio Grande headwaters. RWEACT will need to demonstrate to those not currently involved why they can and should represent a larger group and take on an expanded mission. For example, rather than taking on a project to harvest all of the acres of treatment needed, perhaps it makes the most sense for RWEACT to start with a project in the Rio Grande headwaters area to test collaborative processes and develop a track record of accomplishment to serve as a prototype. If successful in becoming the primary advocacy group, research by Flint et al. (2009) clearly shows that “since community residents may not always consider land managers to be unbiased and trustworthy, creation of an independent program, center, or taskforce may assist disturbance management and communication among management agencies and resident stakeholders.”

## **PREDICTABLE PROGRAM OF WORK**

In order for businesses to be viable and the USFS to have a successful forest management program, it is necessary to have a predictable program of work. This allows funding and staffing within the Forest Service to be equalized from year to year and it also allows businesses to plan accordingly. It is very hard on everyone involved if the allowable harvest volume changes drastically from year to year. As mentioned above, the USFS simply does not have the capacity to react quickly. Hiring can take months, sometimes even longer. In terms of businesses, being without harvesting work or wood to mill for even a short time can seriously jeopardize the financial solvency of a business and unfortunately, sometimes put a business into bankruptcy. Once a business is lost, it is very difficult to replace that capacity.

Given the number of acres that need to be treated before the wood starts to decompose and lose value, an ideal program would be to harvest approximately 7,400 acres per year and remove about 180,500 CCF of material. But, acceleration of a program does not happen overnight, and therefore, it is best that the Forest Service, working with a collaborative, develop a predictable program of work. Currently, the Forest Service has a Five-Year Timber Program Action Plan that goes through fiscal year 2018, but it is set for the current goal of selling 30,000 CCF per year. If acceleration is going to occur, a new plan will need to be developed.

Predicting economic significance of various changes in industry activity is both a science and an art form. Table 3: Employment Direct Response Coefficients by Industry Sector Four Corners States, provides an insight into the likely effects of increasing an areas timber harvest by one million cubic feet and is based upon “Employment Impacts of Timber Harvesting & Processing in the United States” (Morgan et. al 2014). Chart 1: Job Growth by Program Level, displays the anticipated job growth created by an accelerated restoration/salvage program on the RGNF.

**Table 3: Employment Direct Response Coefficients by Industry Sector Four Corners States**  
(Jobs per one million cubic feet 1MMCF\*)

Industry Sector	# Jobs
Forestry & Logging	32
Softwood mill	17
Energy - small	10
Post & Pole	15
House log/Log home	100
Log furniture	125
Residue other	2

\*Assumes all one million cubic feet will be used by only one processing sector. Example: If 75% of the 1 MMCF is milled at a sawmill then 75% of 17 jobs or 12.75 new jobs will be created in the sawmill sector. The remaining .25 MMCF would be available to create more jobs in energy, residue, log furniture or house logs.

Chart 1: Job Growth by Program Level

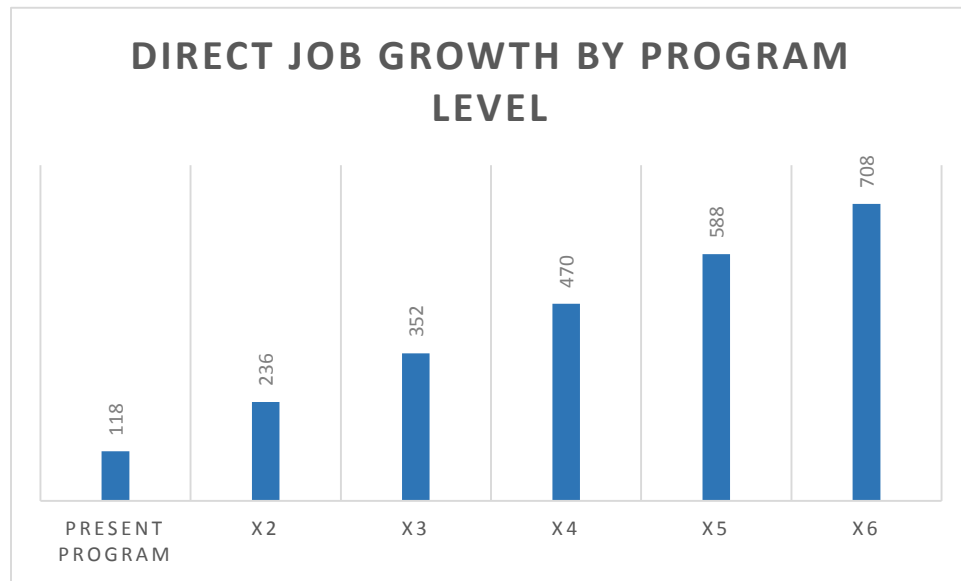
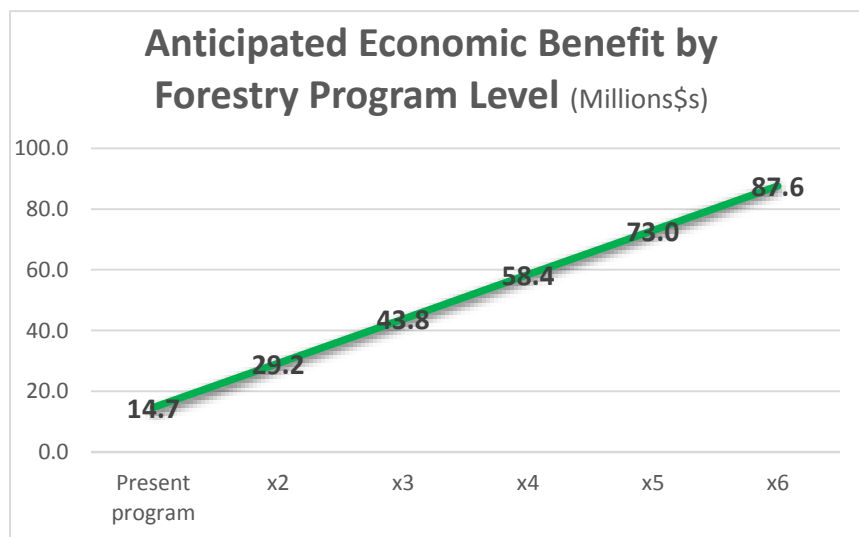


Chart 2: Anticipated Economic Impacts of Forestry Program Level RGNF is based upon expected job responses outlined above, average weekly wages from the Quarterly Census of Employment and Wages for the first quarter of 2014 obtained from Colorado Labor Market section of the Colorado department of Labor and Management. Economic multipliers were gleaned from the 1997 RIMS (regional input-output modeling system) for the Southwest Agricultural Recreation region, prepared by the U.S. Bureau of Economic Analysis. Hew Hallock, Director of Research – San Luis Valley Development Resources Group and San Luis Valley Council of Governments, provided invaluable assistance in gathering the basic information to develop the these economic projections.

Chart 2: Anticipated Economic Impacts of Forestry Program Level



# MAKING THE CHANGE HAPPEN

## COMPLETING A WOOD SUPPLY ANALYSIS

Prior to starting the NEPA process for a project, it can be very beneficial to complete a wood supply analysis for a specific project area in order to find levels of agreement and see if proceeding with a project will likely have a high potential for success. In general terms, a wood supply analysis is an exercise in which a collaborative group goes through various exercises to determine where treatment should occur and what types of treatments are the most appropriate for a particular type of land. In theory, a mini wood supply analysis has already been completed for the purposes of this paper and the data can be found in the section above titled “Acres of Treatment Needed.” However, that data was developed with a very limited perspective and, therefore is very broad and not a reliable predictor of what could or should be harvested and removed. Instead, this information could be used as a starting point for a collaborative group such as RWEACT to start the discussion regarding accelerating the timber management program on the RGNF. As Flint et al. (2006) established, in order “to make sure certain that opinions are not being marginalized, it is critical to identify the level of consensus behind community actions. Expensive problems in the future can be avoided by collaborating with communities early on in the management and mitigation process.”

In order to provide perspective regarding the importance of an activity such as a wood supply analysis, it is valuable to look at an example. The Analysis of Small-Diameter Wood Supply in Northern Arizona was an ambitious endeavor completed in 2007 by a 20-member working group representing environmental non-governmental organizations, private forest industries, local government, the Ecological Restoration Institute at NAU, and state and federal land and resource management agencies. The objective of this group was to analyze 2.4 million acres of Ponderosa pine forests across four National Forests in Arizona to identify what types of treatments were appropriate for different types of land and from this information, determine how much wood volume would be generated. From this exercise, it was established that there was an unprecedented high level of agreement among those involved on what should be occurring on the land. With a document detailing the level of agreement, the collaborative group was able to garner state, regional and national support for moving forward with this project. It is now called the Four-Forest Restoration Initiative (4FRI) and is considered the largest landscape level project in the United States. It has received funding support from a variety of different sources including congressional support and if successful, will be considered a true blueprint on how to complete forest restoration projects.

Two front page stories in the December 3 and 4, 2014 Arizona Republic newspaper provide a status report on 4FRI accomplishments and frustrations. The final environmental impact statement cover a portion of the area on the Kaibab and Coconino National Forests is nearing completion. The 1,000 page document, five years in the making, covers one million acres and prescribes specific treatments on 600,000 acres. It is the USFS’s biggest undertaking of its kind. Implementation has been slowed by the failure of the initial contractor to secure funding to build infrastructure to utilize the material being produced during thinning operations. The contract

was transferred to a second company hoping to make biofuels. Biofuels plans have been scrapped and the second company is scrambling to reconfigure its operations to fulfill contract expectations. “The progress is just maddeningly slow” according to Todd Schulke from the Center for Biological Diversity. Some biomass processing capability exists within the 4FRI area but it is located on the eastern edge of the project area, which aggravates haul costs from western portions of the project.

## **IDENTIFYING A MARKET**

We know the demand for sawlogs exceeds supply in the San Luis Valley. How much more material can be utilized within the present market is yet to be determined. Developing outlets for the surplus material will be as important as getting it offered. There has been some preliminary discussion focused on exporting logs from the area using the railroad. If it appears that Congress is likely to fund an accelerated watershed restoration program, markets for any material surplus to regional demand will have to be established.

## **DETERMINING IMPLEMENTATION STRUCTURE**

Once a wood supply analysis has been completed for either a specific project area within the RGNF or for the entire area of spruce salvage, it will be necessary to determine which type of implementation structure is the most appropriate for achieving the identified objectives. Since most of the wood that needs to be removed within the San Luis Valley is located on the RGNF, selling of wood will be through Federal contracting. Procurement options for the type of work being discussed include the following:

- ✓ Timber Sales – Historically and even currently, most wood is removed through the use of a timber sale. Timber sales can vary in size and are usually awarded on the highest bid. Timber sales do not typically include service work, with the exception of road work, and a portion of receipts generated must be returned to the US Treasury. The remaining funds can be used to support salvage and thinning projects.
- ✓ Stewardship Contracts – Stewardship contracts are used when a project will include both forest product removal and service work items (such as thinning, installing fish barriers, trail development, etc.). Stewardship contracts can be awarded for multiple years (up to 10) and can be awarded on a “best-value” basis. Currently, there are several Stewardship Contracts within the Rocky Mountain Region of the Forest Service. One example is the Front Range Long Term Stewardship Contract which is being implemented by West Range Reclamation, LLC and has a primary objective of restoring Forest Service lands along the front range of Colorado to historic conditions in order to prevent catastrophic wildfire and improve overall forest health. The other example is the 10-Year Stewardship Contract on the San Juan National Forest that was awarded to Pagosa Cattle Company. Similar to the Front Range project, it has a primary goal of improving the health and



resiliency of a large heavily forested area, thus reducing community concerns related to fire danger.

- ✓ Stewardship Agreements – New stewardship agreements are typically tied to an existing Master Agreement within the Region and historically have been through large non-profit organizations such as the Turkey Federation and the Rocky Mountain Elk Foundation. Stewardship agreements require that partners provide at minimum at 20% project match in the form of cash, non-cash, or in-kind contributions. The 20% is based on the total project less the value of timber. An agreement does not have to be with a non-profit, but those involved are not allowed to make a profit and if a profit is realized, the funds are either used for additional service work or paid back to the Forest Service as excess receipts.

Of the three types of procurement options, it should be recognized that for the spruce mortality situation on the RGNF, there are definite pros and cons for each option.

Timber sales have been the primary procurement option used on the RGNF for many different reasons. First, since timber sales are routine, both the Forest Service and industry are used to the requirements and know what is involved. Second, each sale is a competitive process, which allows a business to raise or lower their price, depending on individual circumstances and the market conditions. Third, the USFS can package timber sales in a variety of sizes to encourage both small and large operators to be involved. On the negative side, timber sales can be limiting to industry in that they are usually not long-term and the amount of wood from year to year can vary. Since timber sales are competitive, there is no guarantee that a certain business will be successful in bidding, and therefore might run out of work or wood. In terms of the businesses located within the San Luis Valley, this dynamic has become even more evident now that Montrose Forest Products is once again operating and is purchasing substantial wood from the RGNF.

While the RGNF has not had a stewardship contract of their own, lessons learned from other areas can easily be translated. Stewardship contracts have been widely popular for projects that require tremendous service work and overall have very little saw timber material that needs to be removed. For example, the White Mountain Stewardship Contract was implemented on the Apache-Sitgreaves National Forest in Arizona and over 50% of the material that was cut and removed was smaller than 5" dbh. In these types of situations, the Forest Service is typically paying for work to be accomplished and very little timber receipts are generated. Stewardship contracts have been successful in these situations because they have given industry a long-term commitment (typically 10 years), which gives them the financial backing to purchase equipment and build infrastructure for processing. Even though it is a competitive process, other factors besides bid price come in to play like the number of jobs created, use of local workforce, best use of material, etc.

On the RGNF, a long-term stewardship contract could have negative impacts for both the forest and the locally owned businesses within the San Luis Valley. Even if the contract is bid at zero

cost due to the amount and type of volume being removed, they typically require more work for the Forest Service due to additional requirements. In terms of local businesses, it is possible they will not be successful in outbidding Montrose Forest Products or some other yet to be identified entity. Since Montrose Forest Products has substantially more capacity than any of the mills located with the San Luis Valley, they need more wood volume than any other business in the state. This gives them the incentive to purchase any and all wood that comes up for bid, either through a timber sale or stewardship contract. This is especially true for wood on the RGNF, due to proximity to the mill in Montrose. Additionally, Region 2 of the USFS has made it very clear that they want to ensure Montrose Forest Products stays open and has invested significant resources to make sure it has a reliable wood supply. Furthermore, stewardship contracts typically have costs associated with the contract and since there are already several in the region, the Regional Office is not very interested in another long-term contract. Finally, while stewardship agreements have the ability to pull in other types of funding sources from non-profit organizations, they have many of the same issues as a stewardship contract. Since timber sales on the RGNF have historically been selling above the base rate, it would better to utilize funding from non-profit organizations and partners to help offset the hard costs for the USFS associated with timber management. For more detail, see the section below titled "Funding."

## **ONGOING ECONOMIC DEVELOPMENT INITIATIVES**

It is important to note that there are multitudinous economic development activities focused on creating jobs and industry in the Upper Rio Grande Basin. Hinsdale and Mineral Counties are particularly dependent upon opportunities emanating from public lands. Only 3% of the lands within Hinsdale County are taxable with only 5% private lands in Mineral County. This dramatic imbalance of public to private lands becomes a major driver of economic opportunities.

The Lake City and Hinsdale County Community plan of 2006 outlines numerous actions that focus on their relationship with public land management agencies and the importance of working together. The Upper Rio Grande Development Council, a 501 (c) 6 non-profit is also active in economic development in the area.

San Luis Valley Development Resources Group (SLVDRG) and SLV Council of Governments (SLVCOG) have also both been actively seeking opportunities to improve the economic viability of communities throughout the San Luis Valley.

RWEACTs initiative to improve collaboration and develop informed consent is one more constructive facet in the often complex quest for long term community vitality.

Mike Wisdom, Executive Director of SLVDRG and SLVCOG, provided the following insights into possible roles for these two organizations in facilitating forest stewardship activities in the upper Rio Grande area:

The SLVDRG represents the historical merging in January 1994 of the San Luis Valley Regional Development and Planning Commission, the San Luis Valley Economic Development Council, and the SLVCOG. The SLVDRG is a Colorado nonprofit corporation and federally recognized 501(c)3 organization doing economic and community development in the eighteen communities and six counties of the San Luis Valley of Colorado. In 2008 there was a specific request that we re-establish the San Luis Valley Council of Governments to stand on its own as a geopolitical organization focused on Governmental issues. We have representatives from all six counties and a locally elected municipal representative from each county also.

We believe that having both a geopolitical organization and a Federally recognized 501(c)3 that represent the entire San Luis Valley will provide benefit to a Stewardship effort whether we lead or partner on the efforts. Our first effort to create this type of Stewardship agreement was a proposed partnership between the State and Federal land managers, the local elected officials, all forest products contractors (mostly in the Valley, but with a few outside of the Valley) and staff of the local development organizations. We worked towards forming an “executive board” that could affect day-to-day decisions until a director could be hired. We started our process by inventorying the assets, which included all of the current and proposed “contracts” to be let by the State and Federal land managers. We assembled the forest products contractors and local development organizations to do the “on the forest” tour of all of the current and proposed contracts. After the tour, it was obvious that most of the contracts were not perfect for anyone’s benefit. The conversation turned to the possibility of using this new Stewardship group to work with the land managers and the forest products contractors to negotiate all of the contracts and divide parts of contracts to the greatest benefit for all. Aspen within contracts would go to the mills that focused on that softwood to include excelsior manufacturing in Mancos, Colorado – the lodge pole to the fence builders, the spruce and firs would also be directed to the most appropriate contractors. This initial effort did not meet its potential.

We, the SLVDRG & the SLVCOG, believe the potential for this project is greater today than it was the first time we pursued it. We believe that the entire Valley could benefit from the partnership and the project. We believe that there is no better use of all regional development organizations to pursue the economic and community development opportunities that this idea offers. We will continue to offer our participation, our partnership and our leadership where it is most appropriate.”

## **FOREST PLAN REVISION**

The RGNF is currently operating under the 1996 Forest Plan, but just recently (August of 2014) has started the process to revise the 1996 Plan under the 2012 Planning Rule. As highlighted on the RGNF website, “the forest plan is the overarching document that guides all management decisions and activities on the entire RGNF, including activities such as wildfire management, grazing, timber production, recreation, wildlife management, and firewood cutting.” The Forest

Plan lays out the standards and guidelines for development of individual projects on the Forest. Forest Plan revision is usually a long process, typically taking 4 or more years to complete. In the meantime, the RGNF will continue to operate under the 1996 Plan.

The revision of the plan is significant to the work that RWEACT is suggesting in terms of management of the dead spruce for multiple reasons, both positive and negative. Since a good portion of the RGNF has significant mortality due to the spruce beetle epidemic, the revision of the Forest Plan will provide a platform for individuals and organizations to get involved and help the Forest Service determine what should and shouldn't be done in terms of dealing with the impact. Similar to the old plan, the new plan will layout the standards and guidelines for any new projects, including spruce salvage and reforestation. This is truly a unique opportunity to help decide how the forest will look in the coming decades and RWEACT is well situated to be an active part of this discussion. It is important that RWEACT be involved to ensure the mission and goals of the organization are incorporated into the new plan.

Unfortunately, Forest Plan Revision is a long-term, major undertaking for any National Forest in that it ties up resources, including both funding and personnel, making it difficult to take on any new large projects. This is especially true for the RGNF, given that they have several positions unfilled at this time and typically receive the least amount of money in the entire region. Additionally, they are already working on La Garita Hills Analysis (discussed above), further tying up resources.

## **FUNDING / PARTNERSHIPS**

As highlighted in the sections above, accelerating the timber management program on the RGNF will require substantial new funding. Since it is highly unlikely that this new funding will come from the USFS in the short term due to declining budgets and lack of demonstrated need, other funding sources will be needed. This is important to understand and consider as RWEACT evolves and determines what type of organization will best meet their overarching mission and goals. Certain types of non-profit organizations such as 501 c3 designated organizations are able to apply for and receive grant funding, whereas 501 c6 designated organizations are not eligible.

Once RWEACT has chosen and developed their operating structure, it will be time to determine how the organization will be financially sustainable over time. While RWEACT received substantial money right after the fire, that type of funding is not typical and usually occurs only once. Without funding, it is difficult to stay operational as an organization. If RWEACT chooses to be a formal 501 c3, it can work to develop partnerships with other non-profits such as the Rocky Mountain Elk Foundation, Trout Unlimited, The Nature Conservancy, National Forest Foundation, and many others whom offer grant programs for specific projects. Additionally, they can choose to be a member-based organization where the partners/organizations that have come together to help with projects associated with the fire pay a determined membership fee.

Keep in mind that memberships can vary from year to year, making it difficult to plan over time. Fundraising is also an option, but results can be very mixed depending on the scope and capacity to pull events together.

## ACTION PLAN

Step	Action	Target Date	Responsibility
1	RWEACT made a policy decision to develop a spinoff entity to advocate for watershed health/community vitality and take an active part in the RGNF Forest Plan revision.	Sept 2014	RWEACT Board
1a	Define mission, vision, values, scope, structure, and funding to establish entity	1/2015	RWEACT ED/Board
1b	Develop charter and legal structure to implement 1a. Establish relationship under non-profit Board for RGH Restoration Project.	2/2015	RWEACT ED/Board
1c	Explore partnership with Trinchera Ranch Biomass project	1/2015	RWEACT ED etc.
1d	Identify/Cultivate reliable long term funding stream.	2/2015	RWEACT ED/ Board & RWEACT <sup>2</sup>
2	Through public outreach, develop broad based support for RWEACT <sup>2</sup> with local, regional, state and national leaders.	6/2015	RWEACT ED & RWEACT <sup>2</sup>
2a	Develop written summary of research on watershed/forest health and community vitality and publish RWEACT <sup>2</sup> land ethic paper describing the desired future condition of the Rio Grande Basin. Dove-tail with RGBIP.	5/2015	RWEACT <sup>2</sup>
3	Explore various collaborative models and select the approach that best fits 1a. Particularly, RGHRP Board umbrella.	2/2015	RWEACT <sup>2</sup> w/ RGNF
3a	Determine/ develop staffing needs appropriate to the determined “Collaborative” focused on both current management projects and Forest Plan revision.	4/2015	RWEACT <sup>2</sup>
4	Work with RGNF to develop plan to accelerate salvage of dead spruce.	4/2015	RWEACT <sup>2</sup> w/ RGNF
4a	Complete a wood supply analysis	8/2015	RGNF & RWEACT <sup>2</sup>
4b	Get commitment from regional and national leaders in USFS and Congress to fund the accelerated program level for long haul.	9/2015	RWEACT <sup>2</sup>
4c	Hire personnel to accomplish accelerated program.	8/2015	RGNF & RWEACT <sup>2</sup>
4d	Seek ways to expedite administrative impediments to the accelerated program levels.	9/2015	RGNF & RWEACT <sup>2</sup>
4e	Develop new markets for salvage materials that exceed established industry demands.	5/2016	RWEACT <sup>2</sup> & CSFS & RGNF
5	Develop long-term strategy to deal with the decline of commercial value of salvaged material.	6/2016	RWEACT <sup>2</sup> & CSFS & RGNF
6	Advocate for a project or issue outside the main stem of the Rio Grande River to establish regional relevance and support.	10/2015	RWEACT <sup>2</sup>
7	<i>Simultaneously with steps 4 &amp; 5:</i> Become actively involved in the RGNF Forest Plan revision.	1/2015 ongoing	REWACT ED and designated others
8	Celebrate successes and troubleshoot issues as they evolve.	ASAP	RWEACT <sup>2</sup> w/ RGNF

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## APPENDICES



RWEACT Core Team: Tom Spezze, Executive Director; Travis Smith, San Luis Valley Irrigation District / CWCB Board of Directors; Cindy Dozier, Hinsdale County Commissioner; Ramona Weber, Mineral County Commissioner; Karla Shriver, Rio Grande County Commissioner and Economic Recovery Team Leader; Heather Dutton, Rio Grande Headwaters Restoration Project Executive Director and Natural Resources Team Leader; Steve Belz, Black Creek Hydrology and Hydrology Team Leader; Kristine Borchers, Assistant and Communications Team Leader; Jerry Dennis, Rio Grande Emergency Manager, and Jerry Gray, Hinsdale County Emergency Manager, as Emergency Management Team Leaders. Dan Dallas, Forest Supervisor for the Rio Grande National Forest; Adam Mendonca, Acting Forest Supervisor for the Rio Grande National Forest; Martha Williamson, District Ranger for the Divide Ranger District; and Dale Gomez, liaison with the Divide Ranger District, serve RWEACT in ex-officio, non-voting capacities.

Fall 2014 Update -- What RWEACT Has Done Since July 2013:

- **Organization**
  - Formation of organizational structure and function of RWEACT
  - Develop/foster multi-jurisdictional partnership/cooperation with agencies, organizations, cities, and counties along the Rio Grande.
  - Regular RWEACT committee and overall meetings held
  - Develop Strategic Plan, Executive Summary, and Organizational Structure
  - Develop and implement Core Committees (Hydrology, Emergency Management, Natural Resources, Communication and Economic Development) and identify Team Leaders for each.
  - Leadership (CORE) Team developed to establish forum for business.
  - Establish Hinsdale County as the Fiscal Agent of RWEACT (Rio Grande County to be fiscal agent for DOLA funds and Executive Order for Recovery)
  - Field trips / presentations with Governor Hickenlooper, Senator Udall, and Natural Resources Chief of Staff for Congressman Tipton
  - Presentation to RWEACT by CUSP (Coalition for the Upper South Platte on what worked)
  - Presentation to RWEACT by the Army Corps of Engineers
  - Presentation by RWEACT to the San Luis Valley Commissioners Association
  - Further partnership development with Mountain Studies Institute
  - Develop budget protocol and procedures
  - Participate in long-term recovery meetings with Forest Service



- Communications
  - Partner with BAER in presentation of findings at public meetings
  - Develop a Communications Strategy, Target Audiences, Key Messages, and Distribution Plan
  - Consistent branding with logo and all materials
  - Rack Card – development / distribution
  - Mailing to all residents in Hinsdale / Mineral / Rio Grande Counties
  - Website development and launch / update
  - Flood Awareness Poster / development / distribution
  - Facebook development / postings & flyer development / distribution
  - Periodic newsletters, press releases, and media cultivation
  - Regional advertisement campaign (seasonally – fall / spring)
  - Interactive Burn Scar/ RWEACT action Map with multiple layers
  - “Photo of the month” to visually depict natural changes
  - Commemorative poster
  - Safety message signs for posting at trailheads / campgrounds
  - Crisis Communication Plan with all Committees / Partners
  - Water 101 Publication (in progress)
  - 2 three-minute videos (one finalized / two additional videos not yet released)
  - Billing inserts for San Luis Valley Rural Electric Company (in progress)
- Hydrology
  - Initial modeling of hydrological impacts and projections related to the burn scar
  - In coordination with DWR, FS and Office of Emergency Management, Installation of 6 rain gauges and coordination with 4 additional stream gauges and 2 RAWS (remote, automated weather stations) for a landscape-wide instrumentation process for storm forecasting, early warning system related to public safety

- Coordination of all data and identification and implementation with emergency management
- Deployment/ installation of temporary Doppler radar system on Bristol Head (Center for Severe Weather Research) at 11,000 feet.
- Coordinate Doppler, National Weather Service, Emergency Management Team
- Review and comment on findings of BAER team for modeling of hydrological conditions
- Meetings with private landowners and Forest Service recreation special use permit holders to assess conditions and model outcomes



- Install additional Stream Gauges (Little Squaw) with audible alarms for resort
  - Install protective signage for existing rain gauges
  - Post-Wildfire Flood Risk Potential Mapping (in progress)
- Natural Resources
    - Initial field verification of July 3<sup>rd</sup> Burn Severity mapping to identify levels and locations
    - Coordination with the BAER team to identify Values at Risk
    - Review of High-Value, No BAER Treatment areas to identify opportunities (Little Squaw Resort, Box Canyon Summery Home Group, Road 520 Corridor, Goose Creek and Lake Humphreys, Crooked Creek) for RWEACT Values at Risk projects.
    - Initial field studies, hosted field trips, and design research for high-value areas identified
    - Release of findings with Debris Flow Potential Mapping with USGS
    - Coordination of research with other organization and agencies including Division of Water Resources, CSU Research, Willow Creek Restoration Foundation, San Juan Silver, etc.
    - Support of Natural Resource Conservation Service / private landowners visits
    - In coordination with DWR, Installation of 6 water quality probes to monitor dissolved oxygen, pH, temperature, dissolved solids, dissolved sediments etc.
    - Concept Design work for debris flow abatement structure at Little Squaw
    - Coordinate additional research with Dr. Stednick
    - Cost-share for design work with trash rack and boom at Lake Humphreys
    - Cost-share with initial dredging work at Lake Humphreys

- Facilitate design work / any assistance necessary for installation of Rosgen-designed check dams above the 4UR in Mineral County
- Installation of six Test Plots for research on best practices and continued monitoring
- Hydrological Sciences Research project with Colorado School of Mines
- Volunteers for Outdoor Colorado – two weekends on fire-impacted trails (June and July 2014)
- Fuels mitigation for Upper Rio Grande (submitted grant application for project with CSFS)
- Fuels mitigation for Ptarmigan Meadows (grant with Dpt of Natural Resources secured)
- Great Divide Project with Rio Grande National Forest (in progress)
- Fuels Biomass Project research, feasibility, and design (Study by Forest Stewardship Concepts ongoing)
- Little Squaw safety treatments (10 acre portion treated)
- Saw Crews with Southwest Conservation Corps (in progress)
- Archaeological assistance through internship opportunities



## Emergency Management

- Identify locations for installation of instrumentation for best-possible early warning system
- Development of approved Three County Flood Plan & Emergency Management Protocol
- Mapping zones for Emergency Notification and Response
- Creation of Weather Spotter Program Checklist and Volunteer Training Held (May 2014)
- Installation of manual Rain Gauges and distribution of weather radios in key areas
- Distribution of materials and encouragement of Code Red sign-ups
- Creation / implementation of a County deployment plan for contacting high-risk residences
- Coordination with CDOT for highway Reader Board in South Fork to Move Up Not Out
- Site / homeowner visits to high-risk areas / distribution of literature

- Sandbagging Workshop with the Army Corps of Engineers held during Fire Preparedness Day
- Design of structure to protect historic Forest Service structure
- Installation of Weather Radio Transmitter to improve coverage on Pool Table Road (in progress)
- Tabletop Exercise
- Doppler Installation (Fall 2014)
- Economic Recovery
  - Identification of a National Disaster Area
  - Small Business Agency meetings with individual business owners and offerings of low-interest loans (South Fork, Del Norte, Creede, Lake City)
  - El Pomar Foundation emergency assistance grant application for “Immediate Needs” such as mortgage, utilities, emergency assistance for Rio Grande / Mineral residents
  - Letter of support to Colorado Tourism Office requesting regional assistance
  - Timber Sale Replacement discussions / public meeting with timber contractors
  - Flood Insurance Workshop for public residents (Summer 2013, Spring 2014)
  - Release of information of Colorado Wildlife & Parks for big-game hunting impacts and fishing
  - Discussions with local Lodging Tax Boards about regional efforts
  - Provided letter of support for the City of Creede’s letter of intent to the Colorado Main Street program
  - Implement Three-County Innovative Marketing Plan with DOLA of \$100,000 (in progress)
    - Recommendation to Rio Grande County Fiscal Agent regarding Consultant
    - Silver Thread Scenic Byway Council re-initiated
    - Participation with Archuleta County
  - Implement Recovery Efforts through Executive Order (\$195,000) for economic development
    - New recreation-based activities, development of heritage-tourism based activities, study feasibility of biomass industry, increased marketing, support existing businesses

More information can be found at [www.rweact.org](http://www.rweact.org)

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