U.S. Forest Service
U.S. Department of Agriculture

Gunnison National Forest

West Elk Wilderness

Wilderness Character Baseline Assessment Report

Prepared by Jen Stagner

October 2018

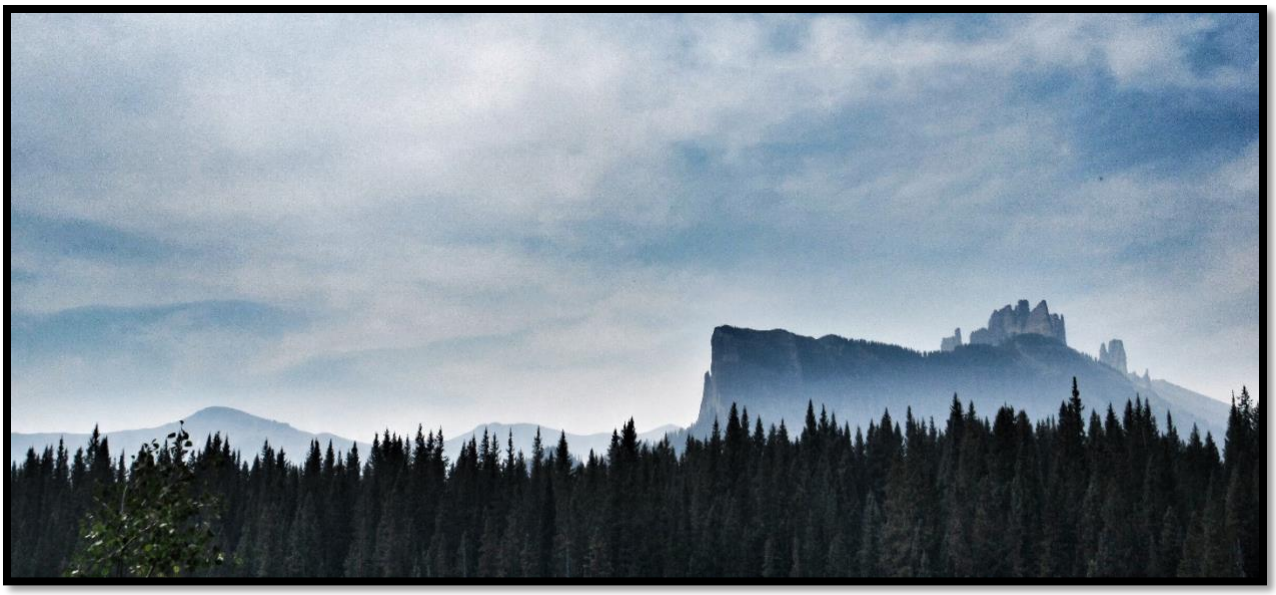

Figure 1, Castles Formation in Wildfire smoke

ON THE COVER; Storm Ridge and Cliff Creek from the north eastern boundary of the West Elk Wilderness.
(J. Stagner)

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Grand Mesa, Uncompahgre and Gunnison National Forests
U.S. Forest Service
2250 Highway 50
Delta, Colorado, 81416

Prepared by
Jen Stagner
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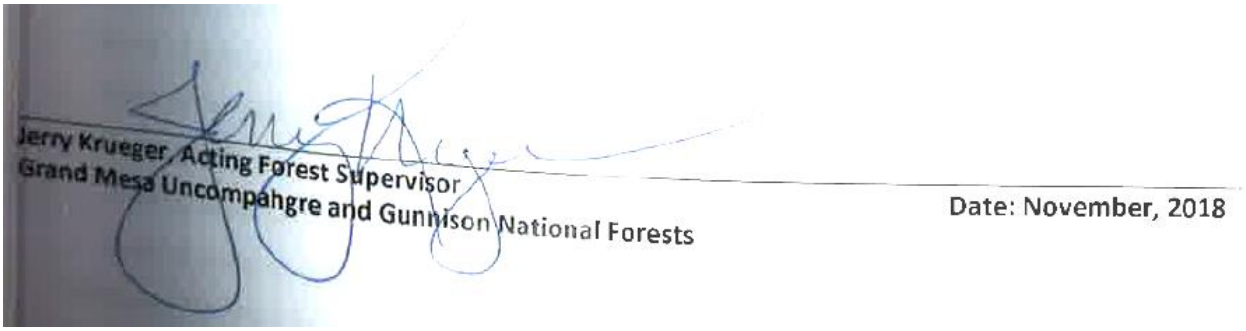
October, 2018



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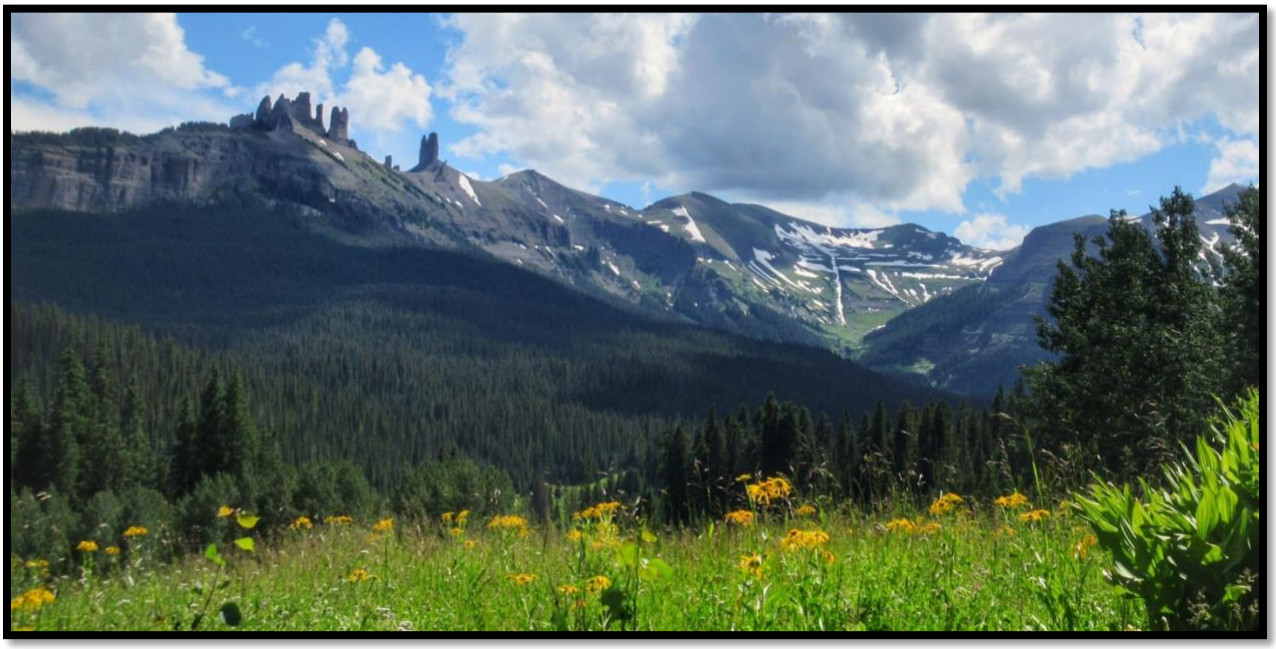

Figure 2; Castle Pass trail in summer (photo, J Stagner)

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INTRODUCTION

The Wilderness Act of 1964 (Pub. L. No. 88-577, 78 Stat. 890) was passed by a nearly unanimous vote in the United States Congress to protect natural lands from the seemingly endless threats of "expanding settlement and growing mechanization." The primary mandate of the Wilderness Act is given in Section 4(b) and states that "each agency administering any area designated as wilderness shall be responsible for *preserving the wilderness character of the area*" [emphasis added]. In order to establish a common understanding of this directive, wilderness character was formally defined by an interagency monitoring team representing the Forest Service (Department of Agriculture), as well as the U.S. Fish and Wildlife Service, National Park Service, and Bureau of Land Management (Department of the Interior):

> Wilderness character is a holistic concept based on the interaction of (1) biophysical environments primarily free from modern human manipulation and impact, (2) personal experiences in natural environments relatively free from the encumbrances and signs of modern society, and (3) symbolic meanings of humility, restraint, and interdependence that inspire human connection with nature. Taken together, these tangible and intangible values define wilderness character and distinguish wilderness from all other lands. (Landres et al. 2015)

Wilderness character encompasses the five qualities that are described in the definition of wilderness from Section 2(c)) of the Wilderness Act. Together, these five qualities are used to monitor how stewardship actions, impacts from modernization, and other changes occurring outside of a given wilderness area, affect said wilderness over time. The five qualities apply nationally to all wilderness areas—regardless of their size, location, administering federal agency, or other unique place-specific attributes—because they are based on the legal definition of wilderness. Descriptions of these qualities as derived from Section 2(c) of the Wilderness Act are below.

Untrammeled

Wilderness is *"…an area where the earth and its community of life are untrammeled by man"*

Wilderness ecological systems are essentially unhindered and free from the actions of modern human control or manipulation when the untrammeled quality is preserved.

Natural

Wilderness *"…is protected and managed so as to preserve its natural conditions"*

Wilderness ecological systems are substantially free from the effects of modern civilization when the natural quality is preserved.

Undeveloped

Wilderness is *"…an area of undeveloped Federal land … without permanent improvements or human habitation"*

Wilderness retains its primeval character and influence, and is essentially without permanent improvement or modern human occupation when the undeveloped quality is preserved.

Solitude or Primitive and Unconfined Recreation

Wilderness *"…has outstanding opportunities for solitude or a primitive and unconfined type of recreation"*

Wilderness provides outstanding opportunities for solitude or primitive and unconfined recreation when the quality of solitude or primitive and unconfined recreation is preserved.

Other Features of Value

Wilderness *"…may also contain ecological, geological, or other features of scientific, educational, scenic, or historical value"*

Other tangible features of scientific, educational, scenic, or historical value in wilderness preserve wilderness character when they are preserved.

In addition to these five tangible qualities of wilderness character, wilderness also has important intangible aspects that are difficult or impossible to quantify or monitor. These intangible aspects are diverse and can include the scenic beauty, spiritual experiences, immensity of an area, and opportunities for self-discovery, self-reliance, and challenge that come from wilderness settings. Currently, these intangible aspects of wilderness can only be addressed in narrative form.

Wilderness character may change over time, and may be improved or diminished by the actions or inaction of managers. The challenge of wilderness stewardship is that decisions and management actions taken to protect one quality of wilderness character may degrade another quality. In addition, the accumulated result of seemingly small decisions and actions may cause a significant gain or loss of wilderness character over time. Because of this complexity, preserving wilderness character requires that agency staff document decisions made in wilderness and the impacts of those decisions.

To assess trends in wilderness character over time, a national and interagency monitoring strategy was developed in 2008 titled *Keeping it Wild*: *An Interagency Strategy for Monitoring Trends in Wilderness Character Across the National Wilderness Preservation System* (Landres et al. 2008). Based on lessons learned from implementing this framework from 2008 to 2014, it was revised and updated in 2015 as *Keeping it Wild 2: An Updated Interagency Strategy to Monitor Trends in Wilderness Character Across the National Wilderness Preservation System* (Landres et al. 2015). The national monitoring framework described in *Keeping it Wild 2* was formally endorsed by the Interagency Wilderness Policy Council in 2015, and all four wilderness-managing agencies have since begun implementing the updated strategy.

The national interagency framework of wilderness character monitoring described in *Keeping it Wild 2* is based on the qualities defined above. Each quality is divided into a hierarchical set of monitoring questions, indicators, and measures to assess trends in wilderness character over time. Monitoring questions frame wilderness character monitoring to answer particular management questions; indicators are distinct and important elements within each monitoring question; and measures are a specific aspect of wilderness on which data are collected to assess trend in an indicator (Landres et al. 2008 and 2015). While the qualities, monitoring questions, and indicators are nationally consistent, measures are specific and sometimes unique to individual wilderness areas (Figure 1).

This framework balances national and local needs for monitoring by defining locally relevant measures whose trends can be compiled at higher levels for national or regional reporting. This interagency monitoring strategy:

- Provides on-the-ground information to assess trends and make defensible decisions;
- Provides valuable information on wilderness on regional and national scales;
- Provides a set of key wilderness stewardship goals;
- Communicates a common definition of wilderness character;
- Communicates a tangible vision of wilderness within the agency and to the public;
- Clarifies how stewardship decisions and actions influence wilderness;

- Evaluates and documents the effects of actions taken inside the wilderness and effects from threats outside the wilderness;
- Synthesizes data into a single, holistic assessment of wilderness character;
- Creates a legacy of staff experience and knowledge of a wilderness;
- Improves on-the-ground wilderness stewardship.

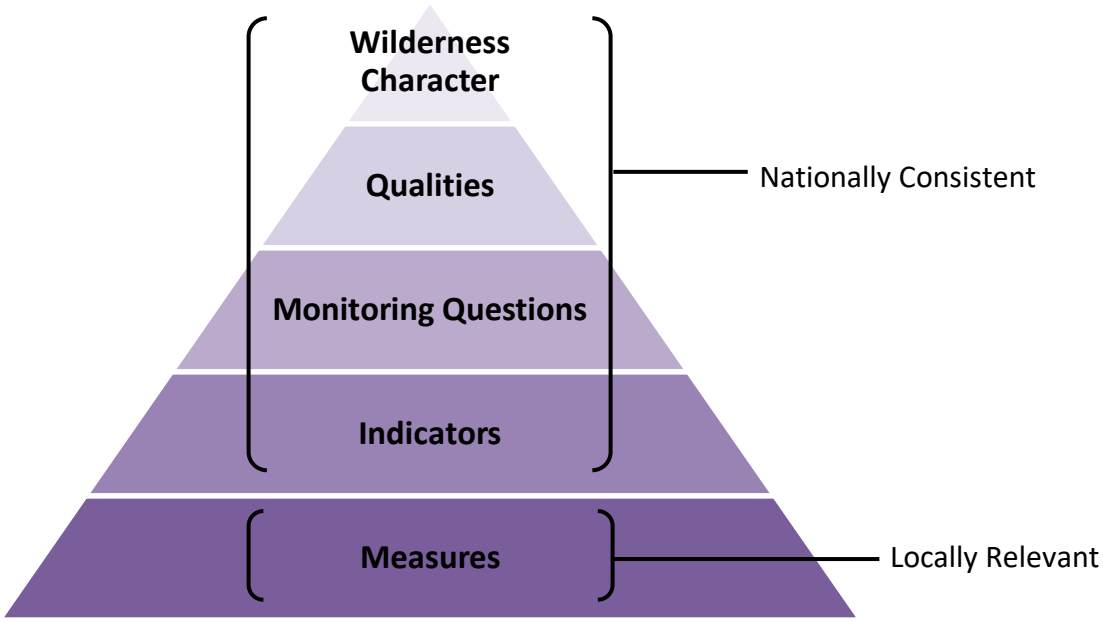


Figure 3. *Keeping It Wild* hierarchical framework

This monitoring strategy offers a consistent means for documenting the status and trends in wilderness character and wilderness management within a wilderness. Under this monitoring strategy, trends in wilderness character are classified as improving, degrading, or stable. These trends are both nationally consistent and independent of the unique aspects specific to any given wilderness; therefore, trends in wilderness character can be compared between wildernesses or across regions. These trends cannot be used to "rate" or "grade" stewardship, however, since they are meaningless when taken out of the context of wilderness character monitoring—wilderness character monitoring is a tool to holistically assess the preservation of wilderness character, not to place judgment on managers. Similarly, while *trends* can be compared between wildernesses, comparing *wilderness character itself* among different wildernesses is inappropriate. Each wilderness is unique in its legislative and administrative direction, and in its social and biophysical setting; therefore wilderness character in a particular wilderness cannot, and will not, be compared to that of another wilderness.

The purpose of this report is to improve wilderness stewardship by informing managers' understanding of the wilderness they manage, how wilderness character is changing over time, and why changes may have occurred. The following report establishes a baseline condition and monitoring strategy for the West Elk Wilderness based on the five qualities of wilderness character as well as the measures that are specific to the West Elk Wilderness and indicative of local trends in wilderness character. Trends are monitored through the online Wilderness Character Monitoring Database (WCMD; at https://wc.wilderness.net/) which includes entries for all measures and baseline data specific to this wilderness. In order to assure that data will be collected and entered into the WCMD in the future, it is recommended that wilderness character monitoring be added to annual workload planning.

Wilderness Character Monitoring in the Forest Service

Preserving wilderness character in the Forest Service is vital to national wilderness preservation. The Forest Service administers 445 designated wilderness areas comprising 33% (37 million acres) of lands within the National Wilderness Preservation System. Approximately 19% of the total acreage managed by the Forest Service is designated wilderness. Forest Service policy affirms the mandate of the Wilderness Act to preserve wilderness character, and cites wilderness character as a consideration for a range of actions including public use, research, and resource management (Forest Service Manual 2320).

The Forest Service has been involved in wilderness character monitoring from the outset. Starting in 2001, the Forest Service Wilderness Monitoring Committee developed an initial wilderness character monitoring strategy titled *Monitoring Selected Conditions Related to Wilderness Character: A National Framework* (Landres et al. 2005). This was the direct impetus for, and precursor to, the interagency framework described in *Keeping it Wild*. Following the publication of the Forest Service monitoring strategy, the agency then developed a *Technical Guide for Monitoring Selected Conditions Related to Wilderness Character* that provided specific protocols for data collection, storage, analysis, reporting, and use (Landres et al. 2009). This 2009 technical guide was never implemented nationally.

In 2015, the Forest Service began the process of writing a new technical guide based on the updated wilderness character monitoring framework of *Keeping it Wild 2*. The new Forest Service *Wilderness Character Monitoring Technical Guide* was published in 2018 and provides a national framework and detailed protocols to monitor trends in wilderness character within the Forest Service (Landres et al. 2018). The 2018 technical guide updates and completely replaces the former technical guide published in 2009. Its approach is consistent with the *Keeping it Wild 2* interagency wilderness character monitoring strategy used by the other wilderness-managing agencies and endorsed in 2015 by the Interagency Wilderness Policy Council. This wilderness character baseline assessment report for the West Elk Wilderness reflects the monitoring strategy described in the 2018 Forest Service technical guide.

The Forest Service WCM strategy, as described in the 2018 technical guide, is structured as follows:

- The Forest Service uses *Keeping It Wild 2*'s organizational framework of qualities, monitoring questions, and indicators to ensure interagency consistency.
- At least one measure must be used for each indicator. For each indicator, the technical guide describes a required measure, or a set of measures from which at least one must be used.
- In addition to the required measures, optional measures described in the technical guide may be chosen for a wilderness if they are highly relevant. Additional locally developed measures may be used for a wilderness, and are encouraged to more fully describe trend in wilderness character, as long as they adhere to the guidelines described in the technical guide.
- Data are gathered or compiled for each measure by using the best available information.
- Once there are at least two data points per measure, a trend (improving, stable, or degrading) is determined based on agency established rules, or locally developed rules for locally developed measures. Trends in each measure are reported at 5-year intervals even though data for some measures may need to be gathered annually.
- If there is more than one measure within an indicator, trends in these measures are compiled by using consistent rules to determine the trend in the indicator. Only the trends in the measures, not the data, are compiled. These same rules are then used to determine the trend in each monitoring question, each quality, and ultimately the overall trend in wilderness character.

- Wilderness character is considered “preserved” (i.e., as required by law and Forest Service policy) when there is a stable or improving trend. Once the trend in wilderness character for each wilderness is determined, the percentage of wildernesses with a stable or improving trend in wilderness character within a region and across the entire Forest Service can be derived.

The Forest Service approach to wilderness character monitoring also includes writing a Wilderness Character Narrative to provide a qualitative and holistic description of the tangible and intangible aspects of an area’s wilderness character. The Wilderness Character Narrative describes what is unique and special about a wilderness in terms of the five qualities of wilderness character. It is a foundational document intended to convey the current and foreseeable future condition of the wilderness, identify fundamental wilderness resources, and acknowledge important intangible values associated with the wilderness. The Wilderness Character Narrative for the West Elk Wilderness was written as a separate document prior to completing the wilderness character baseline assessment report.

WILDERNESS CHARACTER NARRATIVE

This wilderness character narrative, written by Matthew Quinn in 2017, qualitatively describes what is unique and special about the West Elk Wilderness in terms of the five qualities of wilderness character. It is a foundational document intended to convey the current and foreseeable future condition of the wilderness, identify fundamental wilderness resources, and acknowledge important intangible values associated with the wilderness. (Photos in the Narrative provided by John Fielder)

Volcanic ridges, long valleys, castle-like spires, rolling mountainsides, and big game are the iconic features of the West Elk Mountains and define the West Elk Wilderness. Solitude and extended expeditions are the norm, where many mountain passes lead to secluded and seldom-seen valleys filled with beaver ponds and lined with trembling aspen that put on a golden show each fall.

One of the lesser-known wilderness areas in Colorado, the West Elk Wilderness west of Gunnison has a rich history. The area was first slated to be preserved for its wilderness characteristics in 1932 when the West Elk Primitive Area was established under the Forest Service “L-20” regulation, the first nationwide policy for wilderness preservation.

In 1957 it was reclassified as a “Wild Area” under the Forest Service U-2 regulation, and in 1964 it was one of five Colorado Wilderness Areas designated with the passage of the Wilderness Act. Colorado’s 1980 Wilderness Act expanded it by more than 120,000 acres to its present size of 176,412 acres, the fifth largest Wilderness Area in Colorado.

The entire wilderness is located in Gunnison County and is managed by the Paonia and Gunnison Ranger Districts of the Grand Mesa, Uncompahgre and Gunnison National Forests. Nearby towns include Gunnison, Crested Butte, Paonia, and Crawford.

The West Elk mountains consist of a broad dome smothered with intrusive volcanic rock. Sometime around 30 million years ago stood a massive volcano that towered over the present town site of Gunnison. This volcano has since eroded into the peaks and valleys we see today.

Near the center of the wilderness is an intrusive center with numerous dikes and stunning outcrops that radiate outward, called the West Elk Breccia. The West Elk Breccia consists of coarse volcanic tuff that

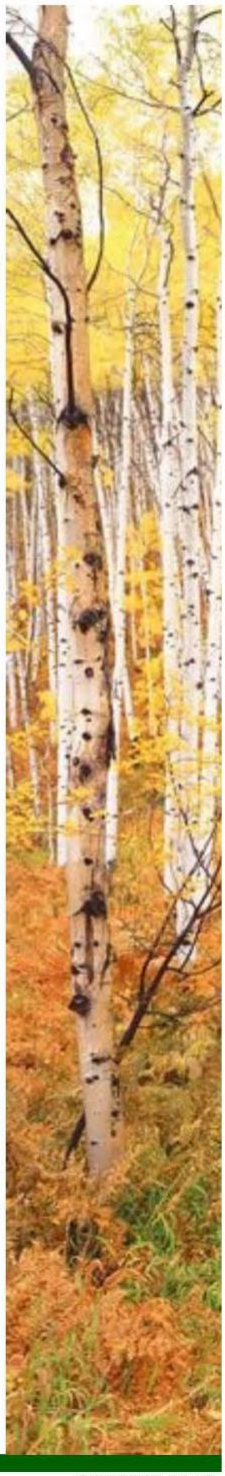
has eroded into the dramatic spires, pinnacles and cliff faces that are found throughout the southern portion of the wilderness.

The topography is reflected in many of the area's geographic names: Castle Pass, Castle View, Castle Creek, and the Castles. The 500-foot spires called "The Castles" are the signature landmark for the West Elks. The northern boundary of the wilderness is marked by the laccolith intrusions, East and West Beckwith Mountains.
The Ohio Creek area on the eastern boundary is characterized by wide valleys and draws rising up to cliffs which rim higher mesas. Known for its scenic beauty and display of fall colors, other points of interest in this wilderness are West Elk Peak, Sheep Lake, North/Middle/South Baldy Mountain, and Mount Gunnison.

1. Fall colors near Castle Pass (Photo by Jen Stagner)

Wilderness maintains ecological systems that are substantially free from the effects of modern civilization.

NATURAL



By mandate of the Wilderness Act, wilderness is "protected and managed so as to preserve its natural conditions." This means that wilderness has retained its natural conditions, and its ecological and geological processes remain intact.

Whereas the San Juan Mountains to the south, or the Elk Mountains to the northeast are well-known for their towering, 14,000-foot peaks and dramatic backdrops, the West Elk Mountains are better characterized by its botanical, geological, wildlife or ecological features—spectacular beauty and rugged grandeur.

The elevation ranges from 6,800 – 13,000 feet with approximately 79% of the acreage occurring within 9,000 to 12,000 feet elevation. The dominant vegetation is spruce-fir and spruce fir-aspen with a small percentage of Douglas fir. This wilderness has several long, secluded aspen-filled valleys. Below alpine peaks and subalpine forests, gently rolling mountain parks, mountain ridges, and foothills are interspersed with a mosaic of vegetation including aspen, oak brush, and grassland parks providing for a diversity of unique textures and autumn colors. In autumn aspen vary in color from yellow to pink to orange and are contrasted by rich reds and oranges of Gambel oak.

Lower elevation slopes provide valuable winter range for big game and are dominated by Pinyon pine, juniper, Gambel oak, serviceberry, snowberry, and chokecherry shrub communities and areas of interspersed grasslands may include slender wheat grass, Kentucky blue grass, mutton grass, western wheat grass, Arizona fescue, and mountain big sage brush. Higher up, forests of Engelmann spruce and subalpine fir are typical, as are glades of apsen. Above timberline, around 11,500', stretches of alpine tundra intermix with rock outcrops and boulder fields. Wildflowers include blue columbine, Indian paintbrush, and alpine sunflower.

The Canada lynx (threatened) is the only federally listed species in the wilderness. A conservation population of cutthroat trout occurs in this wilderness. The West Elks are renowned for its big game. Elk and mule deer who make their home in the open parks and surrounding hillsides number in the thousands. Other wildlife species include black bear, bobcat, mountain lion, bighorn sheep, coyote, snowshoe hare, golden eagle and other small species.

Streams and riparian areas are plentiful and add movement and variety to valley bottoms. This wilderness is the headwaters of Anthracite Creek, a major tributary in term of volume of water, to the North Fork of the Gunnison River. Four alpine lakes occur above 11,000 feet and several other lakes are located in this wilderness. This is the headwaters of numerous creeks that flow into the Gunnison, North Fork of the Gunnison, and Ohio Creek.

The West Elk Wilderness is within a Class 1 Airshed. The airshed typically experiences winter inversions which occur when cold air is confined below the heights of the surrounding mountains. The topography and meteorology can be classified as a trapping valley system where the accumulation of pollution in mountain-valley circulations can persist for a week or more. A small lake in the Castle Creek watershed has a long term monitoring station where two water samples are analyzed every year for high elevation deposition, a measurement of air quality. Several years of visibility monitoring was done from a station at the Irwin Lodge looking southwest into the wilderness

UNTRAMMELED

Wilderness is essentially unhindered and free from modern human actions that control or manipulate the community of life

The term "untrammeled" is defined in the American Heritage dictionary as "allowed to run free," and synonyms include unrestrained, unrestricted, unhindered, unimpeded, unencumbered, and self-willed. The word was included in the Wilderness Act very deliberately, and it is said that it is the essence of wilderness is to be untrammeled, to be managed with the utmost humility and restraint so that the landscape and its community of life can run its natural course, unaided and unobstructed. Howard Zahniser, the primary author of the Wilderness Act, noted that the inspiration for wilderness preservation "is to use 'skill, judgement, and ecologic sensitivity; for the protection of some areas within which natural forces may operate without man's management and manipulation"

"If ecological processes operate essentially uncontrolled within the Wilderness frame of reference, the results, whatever they might be, are desirable by definition. The object is not to stop change, nor to recreate conditions as of some arbitrary historical date, nor to strive for favorable change in big game populations or scenic vistas. The object is to let nature 'roll the dice' and accept the results with interest and scientific curiosity."

Robert C. Lucas

To preserve the Untrammeled Quality of wilderness, managers need to exercise restraint when authorizing actions that manipulate any aspect of wilderness. Management actions may sometimes be taken to achieve some positive outcome (for example, to improve one of the other qualities of wilderness character, or to comply with federal law such as the Endangered Species Act), but if those actions intentionally manipulate the biophysical environment, they still degrade the Untrammeled Quality.

One example of a management action in the West Elks that has offsetting effects for wilderness character is the use of chemical pesticides to control noxious weeds such as leafy spurge and toadflax. While this is a trammeling action that is intentionally manipulating a part of the biophysical environment, it is also improving the natural quality of wilderness character by controlling an invasive species. These trade-offs need to be considered for the overall trend of wilderness character.

A wilderness information needs assessment from 2013 identified the impacts of wildfire suppression and its effects on natural ecological systems to be a priority concern for the Untrammeled Quality in the West Elk Wilderness. The questions to be addressed included: What were the natural conditions before suppressing fire, and what are they now? What were our suppression actions? Can we return to a natural fire regime, and how?

Overall, the West Elk Wilderness is a self-willed landscape that is primarily affected by natural forces. Management takes a hands-off approach for management in this wilderness, with the recognition that actions may sometimes be necessary to mitigate impacts from recreational use, encroaching pests or diseases, and developmental pressures from outside the wilderness.

Wilderness retains its primeval character and influence, and is essentially without permanent improvements or modern human occupation

UNDEVELOPED

The basic idea that wilderness is undeveloped runs through every definition of wilderness. Aldo Leopold envisioned wilderness as "a continuous stretch of country preserved in its natural state, open to lawful hunting and fishing, devoid of roads, artificial trails, cottages, or other works of man." This quality is affected by prohibited or nonconforming uses, which include the presence of modern structures, installations, and habitations, and the administrative and emergency use of motor vehicles, motorized equipment, or mechanical transport.

One of the main attractions and defining features of the West Elk Wilderness is its undeveloped state. It is the fifth largest wilderness area in Colorado and represents more than 170,000 acres of contiguous lands that has remain relatively free from most signs of modern human developments. There are no roads, dams, powerlines, or other permanent structures. Few wildernesses, however, have escaped at least some modern human occupation and modification. Some developments and motorized or mechanized uses have been allowed by special provisions in the enabling legislation. For example, several water irrigation ditches are authorized within the West Elk Wilderness, as is occasional motorized use for the maintenance of those ditches.

Probably the most notable sign of human occupation in the West Elk Wilderness is the heavy presence of livestock grazing in a large percentage of the wilderness. There is a rich ranching heritage in both the Gunnison Valley to the east of the wilderness and the North Fork Valley to the west, and grazing on these lands goes back more than a hundred years to the 19th century. It predates the designation of the West Elk Wilderness (as well as the West Elk Primitive Area, designated in 1932), and both the 1964 Wilderness Act and the 1980 Colorado Wilderness Act authorized the continuation of grazing.

The ranchers who are permitted for grazing within the wilderness are generally good stewards of the land and have been doing so for generations. This area provides for their livelihoods, and here is extensive cooperation with the Forest Service to sustain a healthy and productive rangeland. Nonetheless, the presence and administration of livestock effects the overall character of the wilderness as a persistent reminder of human occupation. Rangeland improvements such as fence lines do exist, and comments at the trailhead registration box frequently refer to a general disapproval of livestock presence. Chainsaw use to clear stock driveways within the wilderness is common and has been authorized for at least four decades. The livestock and integrity of the wilderness can coexist, but it must be carefully managed to prevent future degradation of the wilderness character.

Several outfitter camps have also been known to operate in the West Elk's. While many outfitters are authorized and permitted for their temporary camps and activities, illegal outfitting has been known to occur in the past and sometimes includes illegal structures or gear caches.

OPPORUNITIES for SOLITUDE or PRMITIVE and UNCONFINED RECREATION

Wilderness provides outstanding opportunities for solitude or primitive and unconfined recreation

The Wilderness Act states that wilderness has "outstanding opportunities for solitude or a primitive and unconfined type of recreation." This means that wilderness provides opportunities for recreation in an environment that is relatively free from the encumbrances of modern society, and for the experience of the benefits and inspiration derived from self-reliance, self-discovery, physical and mental challenge, and freedom from societal obligations.

The Crested Butte area is a popular winter and summer tourist destination. Summer/fall recreation includes a wide range of activities including OHV riding, mountain biking, hiking, backpacking, horseback riding, rock climbing, big game hunting, and camping.

Like most wilderness areas, recreational developments are modest or non-existent. The West Elk's most attractive offering may be a large and untamed area with few encounters with other visitors. The area receives little visitation in comparison to other nearby wilderness areas because of the lack of 14,000 foot peaks, or many high alpine lakes. This is a wilderness where you can hike for days in solitude, with remote areas that can only be accessed with some cross-country travel and refined navigation skills.

This wilderness is popular with outfitters who provide horse packing access to the remote areas of this wilderness, especially during the fall hunting season. Some of the best big-game hunting in the country can be found in the West Elk Wilderness. Elk and mule deer are the primary game for bow and rifle seasons each fall. Photographers will also find the fall one of the most splendid times to visit the West Elk Wilderness, hoping to capture the changing leaves. An occasional early dusting of snow on the mountain peaks and castle-like formations provides an especially nice back drop for the mix of orange yellow, and green treetops.

Winter brings upward of 400 inches of snow each winter and backcountry skiing has been gaining popularity at Anthracite Range, where snowmobile trails to the top of Ohio Pass provides access to the eastern boundary of the wilderness. Cross-country skiing and snowshoeing allow people winter access to the wilderness in lower elevations, such as at Mill Creek.

WILDERNESS CHARACTER MONITORING

This wilderness character baseline assessment report describes the wilderness character monitoring strategy for the West Elk Wilderness based on the Forest Service 2018 *Wilderness Character Monitoring Technical Guide* and the interagency monitoring framework of *Keeping it Wild 2*. It discusses the measures selected for monitoring the West Elk Wilderness and provides quantitative baseline data for each. In contrast to the qualitative descriptions found in the Wilderness Character Narrative, this is a quantitative assessment of the area's wilderness character. The measures selected for the West Elk Wilderness, and the corresponding data compiled and analyzed for each, establish a foundation for continued monitoring of the wilderness character of the West Elk Wilderness into the future.

Figure 4; Volcanic Formation along the Mill-Castle trail (photo, J Stagner)

Overview of Wilderness Character Monitoring Measures

Table 1 provides a basic overview of the 17 wilderness character monitoring measures selected for the West Elk Wilderness. Each measure is described in more detail in its respective section later in the report.

Table 2. Overview of measures selected for the West Elk Wilderness

Quality	Indicator	Measure	Measure Type
Untrammeled	Actions authorized by the federal land manager that intentionally manipulate the biophysical environment	Number of authorized actions and persistent structures designed to manipulate plants, animals, pathogens, soil, water, or fire	Required
	Actions not authorized by the federal land manager that intentionally manipulate the biophysical environment	Number of unauthorized actions and persistent structures by agencies, organizations, or individuals that manipulate plants, animals, pathogens, soil, water, or fire	Required
Natural	Plants	Acres of nonindigenous plant species	Required
	Animals	Index of nonindigenous aquatic animal species	Required to select at least one
	Air and Water	Deposition of nitrogen	Required to select at least one
		Amount of haze	
		Extent of waterbodies with impaired water quality	Required
		Number of animal unit months of commercial livestock use	Required to select at least one

Table 1. Overview of measures selected for the West Elk Wilderness			
Quality	Indicator	Measure	Measure Type
Undeveloped	Presence of non-recreational structures, installations, and developments	Index of authorized non-recreational physical development	Required
	Presence of inholdings	Acres of inholdings	Required
	Use of motor vehicles, motorized equipment, or mechanical transport	Index of administrative authorizations to use motor vehicles, motorized equipment, or mechanical transport	Required
		Index of special provision authorizations to use motor vehicles, motorized equipment, or mechanical transport	Optional
Solitude or Primitive and Unconfeined Recreation	Remoteness from sights and sounds of human activity *inside* wilderness	Index of encounters	Required
		Index of recreation sites within primary use areas	Required to select at least one
	Remoteness from sights and sounds of human activity *outside* the wilderness	Acres of wilderness away from adjacent travel routes and developments outside the wilderness	Required
	Facilities that decrease self-reliant recreation	Index of National Forest System (NFS) developed trails	Required to select at least one
	Management restrictions on visitor behavior	Index of visitor management restrictions	Required

For each measure, this report includes the following subsections: measure baseline value, year(s) of data collection, measure description, background and context, data source, data adequacy, frequency, and threshold for change. The content and purpose of each of these subsections is described below.

Measure Baseline Value—The first value reported for a measure. The first year that data are compiled for a measure forms the measure baseline, and is the reference point for evaluating the trend in a measure over time. The measure baseline (i.e., the first year that data are compiled for an individual measure) is distinct from the wilderness character monitoring baseline (i.e., the first year that data are compiled for *all* measures). While the measure baseline year will often be the same as the wilderness character monitoring baseline year, it may predate it if legacy data are used, or it may post-date it if the data source or data protocol change. The first value reported for a measure from this measure baseline year is called the measure baseline value.

Year(s) of Data Collection—The year(s) the data were collected or compiled. Measures using rolling averages will report three years of data collection, e.g., 2016–2018.

Measure Description—A brief description of what is being measured and how. Full measure descriptions and protocols are defined in the Forest Service 2018 *Wilderness Character Monitoring Technical Guide* and are not included here, except for locally developed measures. For locally developed measures, this subsection also includes a detailed protocol for data compilation, analysis, and data entry.

Background and Context—A description of the context and relevance of the measure at an individual wilderness. This subsection addresses why the measure was selected and discusses the current state of the measure as well as any known previous conditions or reasonably foreseeable future changes. Any available legacy (historical) data for the measure are also included here.

Data Source—The source(s) for baseline information and any historical data for the measure. The intent of this section is to encourage written documentation of wilderness character data and data sources so that information is accessible into the future.

Data Adequacy—A description of the reliability of the data to assess trends in the measure at an individual wilderness. Data adequacy is based on both data quantity and data quality. Data quantity refers to the level of confidence that all appropriate data records have been gathered. Data quality refers to the level of confidence about the source(s) of data and whether the data are of sufficient quality to reliably identify trends in the measure. Local resource specialists must evaluate data quantity and quality for all potential data sources using the categories described in Table 2. An overall determination of data adequacy (high, medium, or low) is derived by combining the assessments of both data quality and quantity, as shown in Table 3. Further information on the role of data quantity and quality in wilderness character monitoring is available in the Forest Service 2018 *Wilderness Character Monitoring Technical Guide*.

Table 3. Data quantity and quality categories	
Data Quantity	1. *Complete*—This category indicates a high degree of confidence that all data records have been gathered. For example, to assess the occurrence of nonindigenous plants, a complete inventory of a wilderness was conducted or all likely sites were visited. Similarly, to assess encounters, all trailheads were inventoried. 2. *Partial*—This category indicates a medium degree of confidence that all data records have been gathered. Some data are available but are generally considered incomplete, such as with sampling. For example, to assess the occurrence of nonindigenous plants, only a partial inventory was conducted; to assess encounters, only selected trailheads were sampled. 3. *Insufficient*—This category indicates a low degree of confidence that all records have been gathered. Few or no data records are available. For example, no inventory for nonindigenous plants has been conducted, and encounters were not assessed anywhere, requiring professional judgment in both cases.
Data Quality	1. *Good*—This category indicates a high degree of confidence that the quality of the data can reliably assess trends in the measure. Data are highly accurate, reliable, and relevant for the measure. For example, data on the occurrence of nonindigenous plants are from ground-based inventories conducted by qualified personnel; for encounters, data comes from encounter monitoring following the national minimum solitude monitoring protocol. 2. *Moderate*—This category indicates a medium degree of confidence about the quality of the data. Data are only moderately accurate, reliable, or relevant. For example, data on nonindigenous plants could come from national or regional databases; for encounters, data could come from visitor permit data. 3. *Poor*—This category indicates a low degree of confidence about the quality of the data. The accuracy, reliability, or relevancy of the data is minimal or unknown. For example, data on nonindigenous plants and encounters data could come from professional judgment.

Table 4. Data adequacy matrix

		Data Quality		
		Good	**Moderate**	**Poor**
Data Quantity	**Complete**	High	Medium	Medium
	Partial	Medium	Medium	Low
	Insufficient	Medium	Low	Low

Frequency—How often data for this measure are compiled, analyzed, and entered into the WCMD. Further information on frequency is available in the Forest Service *Wilderness Character Monitoring Technical Guide*.

Threshold for Change—The amount of change in the data necessary to qualify as a meaningful change in the measure (i.e., indicating a changing trend in the measure). Further information on the threshold for change is available in the Forest Service *Wilderness Character Monitoring Technical Guide*.

Together, these subsections provide a comprehensive overview of each measure, provide transparency into the wilderness character monitoring measures selected, and form the basis of the wilderness character monitoring strategy of the West Elk Wilderness.

UNTRAMMELED

Wilderness is essentially unhindered and free from modern human control or manipulation

The Untrammeled Quality monitors the *actions* of humans in wilderness that intentionally manipulate the biophysical environment. Actions that intentionally manipulate or control ecological systems inside wilderness degrade the Untrammeled Quality regardless of what instigated the action or if benefits to other qualities of wilderness character are gained by the action. Withholding action is a key concept for understanding this quality; management of wilderness, in contrast to management of other types of land, should be approached with restraint and humility. When monitoring the Untrammeled Quality we can track either the decision to manipulate the biophysical environment or the opportunity for humans to let natural processes occur without intervention. Further information on determining whether an action meets the criteria for the Untrammeled Quality can be found in the Forest Service *Wilderness Character Monitoring Technical Guide*, Part 2, Section 2.1.

Table 5. Untrammeled Quality

Indicator	Measure	Measure Type	Frequency	Measure Baseline Value (Year(s) of Data Collection)	Data Adequacy
Actions authorized by the federal land manager that intentionally manipulate the biophysical environment	Number of authorized actions and persistent structures designed to manipulate plants, animals, pathogens, soil, water, or fire	Required	1 year	20 (2016-2018)	Medium
Actions *not* authorized by the federal land manager that intentionally manipulate the biophysical environment	Number of unauthorized actions and persistent structures by agencies, organizations, or individuals that manipulate plants, animals, pathogens, soil, water, or fire	Required	1 year	0 (2016-2018)	Low

Number of authorized actions and persistent structures designed to manipulate plants, animals, pathogens, soil, water, or fire

Measure Type: *Required*

Measure Baseline Value: 20
Years of Data Collection: 2016-2018

Measure Description: This measure assesses the 3-year rolling average of authorized trammeling actions, based on an annual count of authorized actions and persistent structures intended to manipulate any component of the biophysical environment within wilderness (including vegetation, fish, wildlife, insects, pathogens, soil, water, or fire). Local data are compiled and entered in NRM-WCM annually. NRM-WCM calculates the annual value, and the WCMD then calculates the 3-year rolling average (the measure value).

Background and Context: One of the challenges of Wilderness management is to not hinder, alter or manipulate the free play of natural processes. Management actions should be minimal; focusing on activities which directly improve the other qualities of Wilderness with the least intrusion. Restraint is essential to maintaining the wild essence of Wilderness.
Decisions and actions taken by CPW to manage wildlife and stock fish have a direct impact on the natural balance of wildlife and aquatic communities in the West Elk Wilderness. Previously fishless lakes and lakes that winter-kill are stocked with hatchery raised fish. In previous decades non-indigenous fish species were added to the aquatic systems of the Wilderness, altering the composition of native fish communities and their genetic purity.
Elk and deer populations are managed in a variety of ways, including the number of tags issued to hunters and actions such as supplemental feeding of elk herds (once they have left the Wilderness for the winter). Elk populations especially are monitored and maintained to provide recreational hunting opportunities. Elk and moose with tracking collars may be present at various times of the year. Actions such as releasing moose and non-indigenous mountain goats outside of the Wilderness have resulted in these animals making their way into the area. The migration of Mountain goats from the nearby Raggeds Wilderness into the West Elk Wilderness is a very new situation which may result in direct action by CPW as they do not want the goats to displace or interact with Bighorn sheep populations. CPW has also proposed releasing Bighorn sheep into the northern portion of the Wilderness.

Invasive plants have impacted the natural quality of the West Elks, and both herbicide and bio control treatments are ongoing. Toadflax beetles have been released to help contain the spread of several large monoculture populations of Yellow Toadflax in the West Elks. Herbicide applications are ongoing.

Irrigation ditches are persistent structures which divert and collect water for human purposes. Several privately maintained ditches are located within the Wilderness.

Though fire is not frequent in the West Elk Wilderness, suppression of even small, lightning caused fires seems to be the default response if the fire has any potential to leave the Wilderness. This does not allow the natural role of fire to act on the landscape.

Ongoing cooperative efforts between CPW and Forest Service fisheries staff leads to an average of 5 days/year of electroshocking in the Wilderness.
Livestock have long had an influence on the landscape in the West Elk Wilderness and will continue their presence for the foreseeable future.

Data Source: Some of these actions are well established (such as grazing) and well documented. Fire data came from a variety of sources including WFDDS GIS layers and a FY 18 update provided by Cordell Taylor. William Tony Smith provided GIS history of GMUG fires. Some information was provided in personal communications with Wildlife Biologist Dennis Garrison and Fisheries Biologist Melvin Woody. Weed treatments were pulled from FACTS and GIS and verified by Kyler McCarrel.

Data Adequacy: MEDIUM. Though the actions taken by the USFS are well known and documented, I found that actions taken by CPW in the Wilderness are not directly or consistently reported to the Forest, and obtaining this information proved difficult. The quality and quantity of State data is medium/low.

Frequency: 1 year

Threshold for Change: A 5-percent change in the 3-year rolling average number of authorized actions and persistent structures. Once there are five measure values, the threshold for meaningful change will switch to regression analysis. A decrease in the 3-year rolling average beyond the threshold for meaningful change results in an improving trend in this measure.

Number of authorized trammeling actions from 2013 to 2018. The comments indicate the authorized action and any other relevant information regarding trammeling actions for that year.

Year	Number of Authorized Trammeling Actions	Comments
2013	6	Permitted Livestock Grazing Persistent Water Diversions Herbicide application Electroshocking Fish Stocking Game management
2014	7	Permitted Livestock Grazing Herbicide application Fish Stocking Game management Persistent Water Diversions

		Electroshocking Biological Controls
2015	7	Permitted Livestock Grazing Herbicide application Fish Stocking Game management Persistent Water Diversions Electroshocking Biological Controls
2016	6	Permitted Livestock Grazing Herbicide application Fish Stocking Game management Persistent Water Diversions Electroshocking
2017	7	Permitted Livestock Grazing Herbicide application Fish Stocking Game management Persistent Water Diversions Electroshocking Fire Suppression
2018	7	Permitted Livestock Grazing Herbicide application Fish Stocking Game management Persistent Water Diversions Electroshocking Fire Suppression

Table 6: Invasive Weed Treatments

Number	Equipment type	Date Accomplished	Total Acres
3728166010602	Hand sprayer	8/13/2012	1.678
4648348010602	Livestock sprayer	8/11/2015	1.678
4308268010602	Livestock sprayer	8/21/2014	0.399
3728652010602	Hand sprayer	8/21/2012	0.399
3730584010602	Hand sprayer	9/20/2012	0.239
3730228010602	Hand sprayer	9/13/2012	0.246
4308056010602	Livestock sprayer	8/22/2014	0.246
4725104010602	Backpack sprayer	9/23/2015	32.271
3721650010602	Hand sprayer	7/18/2012	1.542

3723728010602	Bio Control	8/2/2012	5.077
3723761010602	Bio Control	8/2/2012	5.06
3723777010602	Bio Control	8/2/2012	5.067
3723849010602	Bio Control	8/2/2012	5.067
3723874010602	Bio Control	8/2/2012	5.057
3723916010602	Bio Control	8/2/2012	5.06
3723929010602	Bio Control	8/2/2012	5.077
3721385010602	Hand pulled	6/12/2012	1.238
3721398010602	Hand tools	6/12/2012	1.985
3721511010602	Hand pulled	6/21/2012	1.614
3721528010602	Hand pulled	6/21/2012	1.885
3721536010602	Hand pulled	6/21/2012	1.423
3721555010602	Hand pulled	6/21/2012	1.388
3722759010602	Mobile ground Sprayer	8/15/2012	63.043
3724018010602	Bio Control	8/2/2012	5.078
3724028010602	Bio Control	8/2/2012	5.058
3724041010602	Bio Control	8/2/2012	5.058
3724053010602	Bio Control	8/2/2012	5.067
4351060010602	Bio Control	6/16/2014	5.078
4725212010602	Bio Control	5/11/2015	5.078
4351136010602	Bio Control	6/19/2014	5.058
4725269010602	Backpack sprayer	9/30/2015	5.058
4351104010602	Bio Control	6/16/2014	5.067
4724305010602	Livestock sprayer	9/2/2015	0.675
5245142010602	Hand sprayer	9/13/2016	32.271
5455538010602	Mobile ground Sprayer	7/12/2017	168.683
5504173010602	Backpack sprayer	8/31/2017	6.357
5739339010602	Mobile ground sprayer	6/23/2018	143.504
5739795010602 5743879010602	Backpack sprayer Backpack sprayer	7/2/2018 7/3/2018	50.699 0.614
5737047010602	Livestock Sprayer	7/24/2018	1.025
5736999010602	Livestock Sprayer	7/24/2018	1.678
5715029010602	Mobile ground sprayer	8/28/2018	120.846
5734624010602	Hand sprayer	9/11/2018	1.82

Table 7: Map of weed treatment locations, created 2018

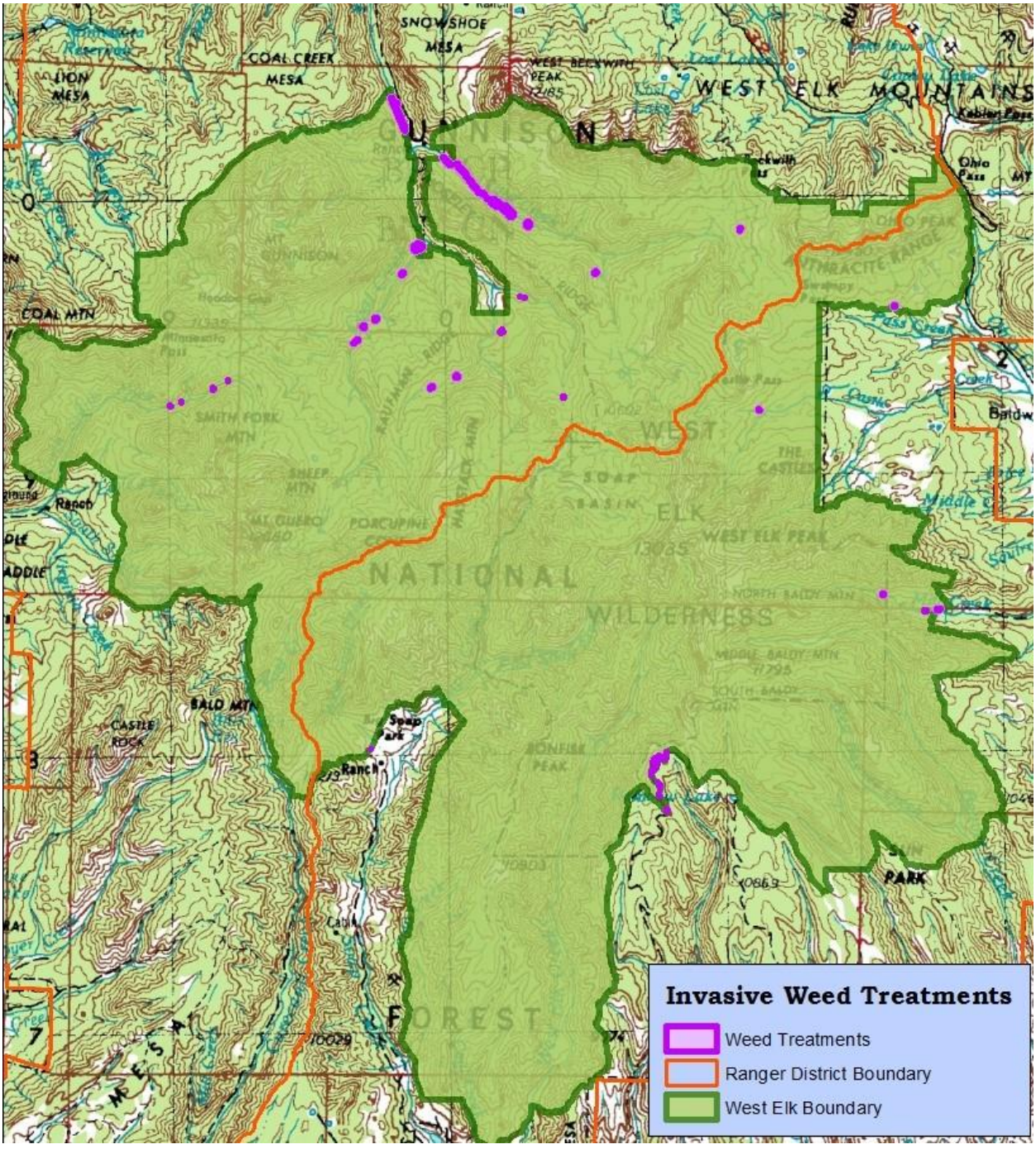


Table 8: Fire Suppression

YEAR	TOTAL ACRES	FIRENAME	DISCOVERY	CAUSE
1974	265	COAL CREEK	10/17/1974	CAMPFIRE
1975	15			CAMPFIRE
1975	0.1			CAMPFIRE
1975	0.1			CAMPFIRE
1977	0.1	LITTLE SAND	6/23/1977	LIGHTNING
1977	0.1	ELK BASIN	7/6/1977	LIGHTNING
1977	0.1	FERRIER	8/2/1977	LIGHTNING
1978	0.1	SEATTLE	10/2/1978	CAMPFIRE
1980	0.1		8/3/1980	CAMPFIRE
1980	10	RED ROCK	9/3/1980	SMOKING
1987	0.1		10/16/1987	CAMPFIRE
1990	0.2	CHARLEY HORSE	8/1/1990	LIGHTNING
1991	0.1	HORSEBACK	10/22/1991	CAMPFIRE
1991	288	MILL CREEK	7/5/1991	CAMPFIRE
1997	0.1	GEORGE	10/22/1997	CAMPFIRE
2000	0.1	SOAP	9/2/2000	LIGHTNING
2000	0.3	ELK BASIN	8/10/2000	LIGHTNING
2002	40	SOAP CREEK	6/29/2002	LIGHTNING
2002	4	EAST SOAP CREEK	8/23/2002	LIGHTNING
2002	0.1	WEST ELK CREEK	8/16/2002	LIGHTNING
2002	0.3	SHEEP	8/31/2002	LIGHTNING
2003	3	BIG SOAP PARK	8/20/2003	LIGHTNING
2003	0.1	RAINBOW LAKE	8/28/2003	CAMPFIRE
2003	0.1	LITTLE PASS CREEK	11/5/2003	CAMPFIRE
2004	0.1	SOUTH SMITH FORK	10/11/2004	LIGHTNING
2004	0.1	MILL CREEK	8/17/2004	CAMPFIRE
2006	0.1	CASTLE CREEK	6/29/2006	CAMPFIRE
2008	1587	WEST ELK	7/4/2008	LIGHTNING
2010	0.1	LITTLE ROBINSON TRAIL	9/22/2010	UNKNOWN
2012	219	EAST COAL CREEK	8/10/2012	LIGHTNING
2013	0.3	ELK	7/22/2013	LIGHTNING
2016	0.1	SOAPY	Unknown whether suppressed	CAMPFIRE
2017	0.1	BECKWITH	11/2017	CAMPFIRE
2018	0.1	NAVAJO	7/2018	LIGHTNING

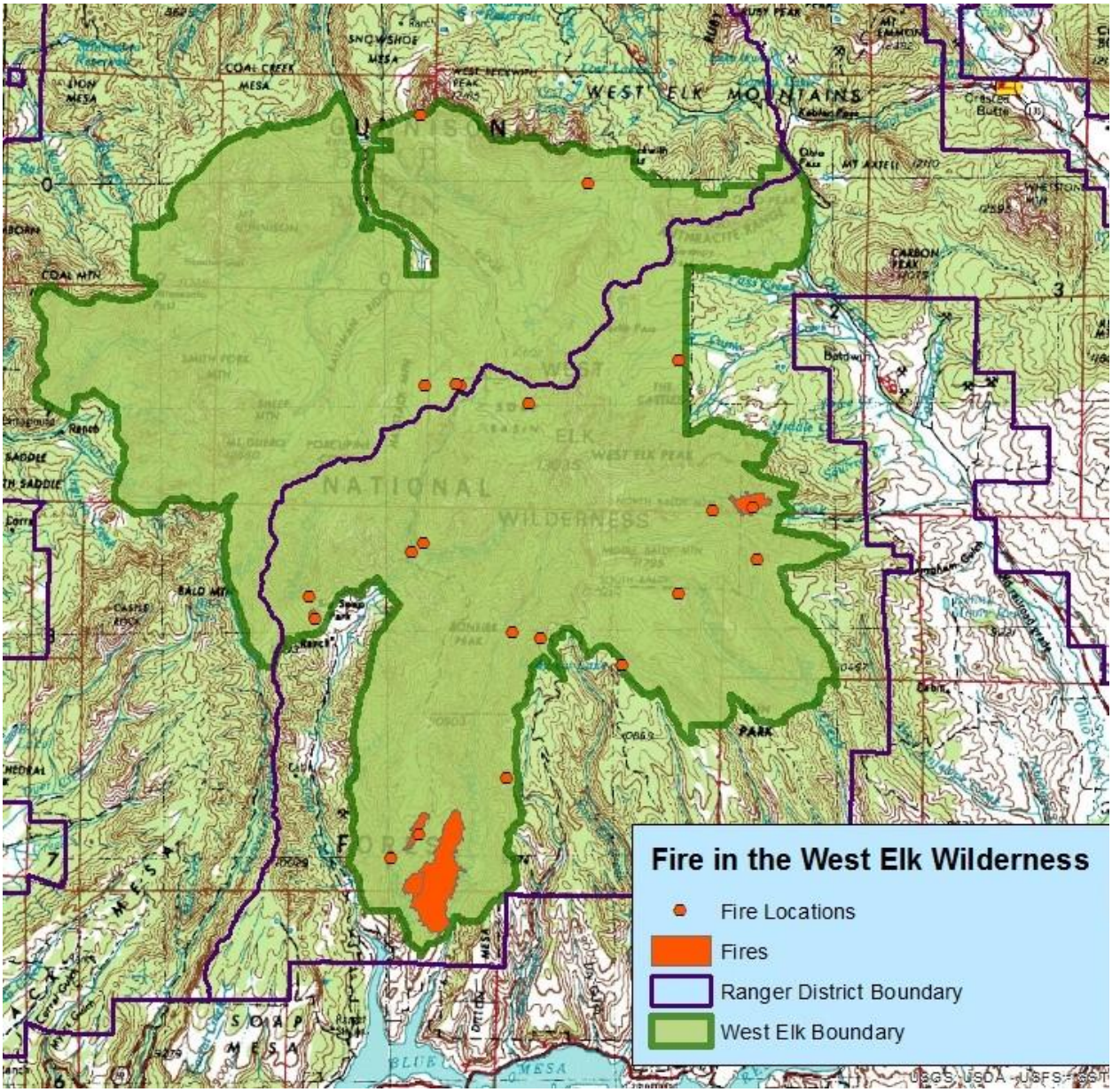


Figure 5: Documented Fires in the West Elk Wilderness

UNTRAMMELED QUALITY	Actions not authorized by the federal land manager that intentionally manipulate the biophysical environment

Number of unauthorized actions and persistent structures by agencies, organizations, or individuals that manipulate plants, animals, pathogens, soil, water, or fire

Measure Type: *Required*

Measure Baseline Value: 0
Years of Data Collection: 2016-2018

Measure Description: This measure assesses the 3-year rolling average of unauthorized trammeling actions based on an annual count of known actions not authorized by the Forest Service taken by other Federal and State agencies, organizations, or individuals that are intended to manipulate any component of the biophysical environment within wilderness (including vegetation, fish, wildlife, insects, pathogens, soil, water, or fire). Local data are compiled and entered in NRM-WCM annually. NRM-WCM calculates the annual value, and the WCMD then calculates the 3-year rolling average (the measure value).

Background and Context: The primary challenge of reporting unauthorized actions in Wilderness is the fact that they are typically unreported and done without prior notification. Quite often these actions are discovered after the fact, or heard of through rumors or verbal accounts.

Some of the undocumented actions that I learned of in the gathering of West Elk data have little or no means of being verified and are not included. However, there seems to be at least District level verification that predator populations outside of the Wilderness are being directly controlled by Wildlife Services. Capture and relocation of problem bears from nearby communities in the Aspen/Carbondale area to lands near the Wilderness boundary have been observed by Forest staff. There are also dozens of predators legally killed each year by nearby sheepherders and cattlemen in lands adjacent to (and likely sometimes inside of) the West Elk Wilderness. These actions may be having a direct influence on predator/prey balances in the Wilderness.
A small marijuana grow was found in the Wilderness in 2009.

Data Source: Verbal communications with District staff

Data Adequacy: LOW. Data for these kinds of unauthorized actions is anecdotal and difficult to document. Data based on verbal accounts is also likely to be incomplete.

Frequency: 1 year

Threshold for Change: A 5-percent change in the 3-year rolling average number of unauthorized actions and persistent structures. Once there are five measure values, the threshold for meaningful change will switch to regression analysis. A decrease in the 3-year rolling average beyond the threshold for meaningful change results in an improving trend in this measure.

NATURAL

Wilderness ecological systems are substantially free from the effects of modern civilization.

The Natural Quality assesses the integrity of local ecosystems and their freedom to change and develop without human manipulation. The Natural Quality tracks the *effects* of human actions and modern civilization on natural ecosystems (in contrast to the Untrammeled Quality which tracks the actions themselves). Ecosystems include all living and non-living things in an area, as well as the interactions between them. Within wilderness, changes to the Natural Quality can be caused directly or indirectly, and intentionally or unintentionally. While some aspects of the Natural Quality may be under the control of wilderness managers, other aspects (such as air quality) may not be. Monitoring ecosystem changes inside wilderness is critical to understanding the unique character of each wilderness area and how it is impacted by human actions. Further information on selecting measures for the Natural Quality can be found in the Forest Service *Wilderness Character Monitoring Technical Guide*, Part 2, Section 3.6.

Table 9. Natural Quality

Indicator	Measure	Measure Type	Frequency	Measure Baseline Value (Year(s) of Data Collection)	Data Adequacy
Plants	Acres of nonindigenous plant species	Required	5 years	*None* – less than 1% (2018)	Medium
Animals	Index of nonindigenous aquatic animal species	Required to select at least one	5 years	22 (2018)	Medium
Air and Water	Deposition of nitrogen	Required to select at least one	5 years	3.23 kg/ha (2000-2015)	High
	Amount of haze		5 years	Stable Deciview (2001-2016)	High
	Extent of waterbodies with impaired water quality	Required	5 years	101.88 miles (2018)	High
	Number of animal unit months of commercial livestock use	Required to select at least one	1 year	3,805 (2016-2018)	Medium

Acres of nonindigenous plant species

Measure Type: *Required*
Protocol Option: *Protocol option 2, categories based partially on data*

Measure Baseline Value: *None* – Less than 1 percent of the total Wilderness acreage
Year of Data Collection: 2018

Measure Description: This measure assesses the estimated percentage of acres occupied by selected nonindigenous plant species in wilderness. Data are compiled from a variety of local, state, regional, and national data sources. Local staff calculate the measure value.

Background and Context:

Invasive and non-indigenous weeds pose a threat to the integrity of native ecosystems through their potential to displace native plant communities. Disruption to the natural balance of native vegetation can cause degradation in wild (and domestic) animal forage. Impacts to soil health, nutrient cycling and natural habitat can be exacerbated by the tendency of the invasive species to monoculture.

With the right conditions, some of these invasive plants can spread rapidly, displacing acres of native vegetation, especially along critical corridors of watershed habitat.

While many of the invasive and non-indigenous plants in the West Elk Wilderness fall within historic grazing allotments, the point should be made that the rocky, steep terrain, thickly timbered canyons and high altitudes in the Wilderness naturally contain some of the invasive plants to the same areas which tend to produce the best grazing forage. Species such as Toadflax prefer grassland areas and are not likely to be found in the scree slopes and talus fields of the higher West Elk peaks.

While the acreage of documented weeds may seem insignificant when compared to the total acreage of the West Elk Wilderness, when thought of in terms of the limited potential habitat for these plants to grow, 300+ acres of Yellow Toadflax becomes a more serious threat to the biological integrity of the area.

The two species of greatest concern in the West Elk Wilderness are Yellow Toadflax (*Linaria vulgaris*) and Houndstounge (*Cynoglossum officinale).* Most of the known communities of Toadflax reside in the northern portion of the Wilderness, which is managed by the Paonia Ranger District. Large mono-cultured communities have been discovered and previous herbicide treatments have proven ineffective at eradication. Biological controls (Toadflax beetles) have been released in the Wilderness and herbicide treatments continue. Toadflax does not respond to hand-pulling or grubbing.

Houndstounge is known to be toxic to livestock and has the potential for rapid growth due to its unique seeding habit which allows burr-like seeds to attach to hair, fur or clothing and thus get carried

throughout the Wilderness. While hand picking has been effective in smaller infestations, the treatment must be repeated for many years. Herbicide is also used.

Canada Thistle (*Cirsium arvense)* and Musk Thistle (*Carduus nutans)* are also of concern. Musk thistle, with its distinct, nodding pink flower head, can create dense thickets of mono-culture which are difficult to eradicate. This plant is mostly contained to areas around Soap Creek and Coal Creek.

In the West Elk Wilderness, Canada thistle is the more pervasive of the thistles and is also treated with herbicide. These tend to flourish around disturbed areas such as areas of heavy livestock use, old beaver dams and outfitter camps.

Oxeye Daisy (*Leucanthemum vulgare)* is found primarily in the Mill Castle drainage and has been treated with Milestone.

Though many of these treatment areas and infestations have been inventoried by both Wilderness and Range staff in recent years and added to a corporate GIS layer, there are many remote, less travelled areas of the Wilderness in which it is possible that these plants have spread.

For this reason, the District and Forest level Range Specialists I spoke with felt that relying solely on the current GIS data might not capture the full extent of the infestations. It is the hope of both Range and Wilderness staff that a more extensive weed inventory can be completed in upcoming field seasons.

Data Source: Data was obtained from the most current GIS layer maintained by Range and GIS specialists for the GMUG National Forests. The most current version available was last updated in 2017. Professional knowledge from both Range and Wilderness staff was also used to evaluate the data for accuracy and comprehensiveness.

Data Adequacy: Medium. There are many known infestations and populations of invasive plants in the West Elk Wilderness. However, there are remote, less traveled areas which have not been adequately inventoried. There exists a potential for finding previously undocumented weeds or finding that existing infestations may have experienced rapid spread in the years since the last inventory. The data that is collected is considered to be of High quality due to the expertise of the staff conducting the inventories.

Frequency: 5 years

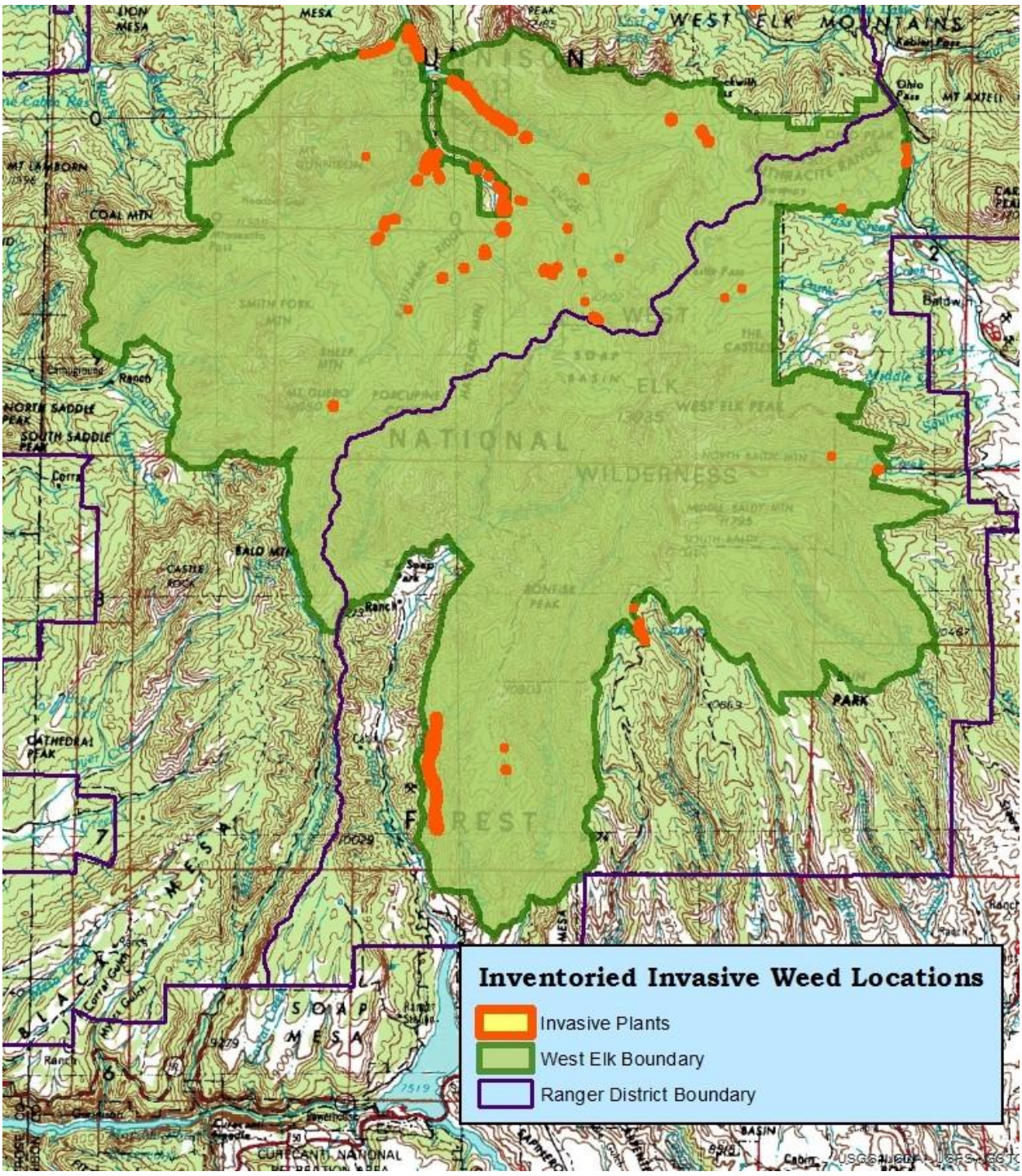
Threshold for Change:
Any change in categories:
•None—less than 1 percent of the total wilderness acreage.
•Low—1 to 5 percent of the total wilderness acreage.
•Moderate—6 to 20 percent of the total wilderness acreage.
•High—greater than 20 percent of the total wilderness acreage.
A change to a lower “percent occupied” category results in an improving trend in the measure.

Common Name	Latin Name	GIS acres	West Elk acreage	% of Wilderness
Knapweed	**Acroptilon repens**	1.88	176,431	0.0010%
Corn chamomile	**Anthemis arvensis**	1.68	176,431	0.0009%
Lesser burdock	**Arctium minus**	1.62	176,431	0.0009%
Whitetop	**Cardaria draba**	3.20	176,431	0.0018%
Musk thistle	**Carduus nutans**	0.012	176,431	0.000006%
Canada thistle	**Cirsium arvense**	189.37	176,431	0.1073%
Houndstounge	**Cynoglossum officinale**	1.49	176,431	0.0008%
Oxeye Daisy	**Leucanthemum vulgare**	1.68	176,431	0.0009%
Toadflax	**Linaria vulgaris**	308.15	176,431	0.1746%
TOTAL ACRES (GIS): 509.08			TOTAL % of Wilderness:	0.288%

Figure 6, Invasive Weeds, West Elk Wilderness

Figure 7; releasing bio-controls (Toadflax beetles) in the West Elk Wilderness (photo, J Stagner)

Table 10: Inventoried Weed Locations



Index of nonindigenous aquatic animal species

Measure Type: *Required to select at least one*

Measure Baseline Value: 22
Year of Data Collection: 2018

Measure Description: This measure is an index that assesses the geographic distribution and estimated impact of selected nonindigenous aquatic species (NAS), including amphibians, fish, crustaceans, mollusks, gastropods, aquatic insects, and aquatic pathogens and diseases. Data are compiled from a variety of local, state, regional, and national data sources. The WCMD calculates the measure value.

Background and Context:
The West Elk Wilderness has a long history of fish stocking by State Game agencies. Fish stocking is done for recreational purposes. Lakes in the Wilderness (including Sheep, Gunnison, Cascade, Costo, and North and South Golden lakes) were stocked with non-native species. Waters which were likely fishless (due to winter kill or other factors) have also been stocked. These non-indigenous fishes have made their way into the streams and creeks of the Wilderness, often out competing native fishes to the point of extirpation.

While current fish stocking activities utilize native fish, remnant populations of non-native fish are widespread.

I found documentation of a plan to re-introduce native Colorado Native Cutthroat into the West Beaver Creek drainage of the West Elks in 1992. This *Bring Back the Natives* plan (1994) was a cooperative agreement between the USFS, BLM and (now) Colorado Parks and Wildlife (CPW). However, non-native fish populations are still pervasive in the West Elk Wilderness.

Based on the recommendation of our Fisheries Biologist, Melvin Woody, we decided that Brook Trout and Rainbow Trout were the two priority species for monitoring. Golden trout has also been stocked in the West Elk Wilderness, primarily in the lakes within Storm Ridge (which is how the lakes received the local names of North and South Golden). However, since Golden trout are a sub-species of Rainbow trout, they are covered by the selection of Rainbow trout.
Other options included monitoring Chytrid, though the non-indigenous fish are a more widespread, direct impact to the Natural quality of the Wilderness.

Where Brook Trout are present they outcompete Cutthroat Trout and will push them to extirpation (local extinction). If densities of Rainbow Trout are low then hybridization will not destroy the genetic integrity of Cutthroat. If Rainbow trout are abundant in sympatry with Cutthroat trout, genetic hybrids will destroy integrity of the Cutthroat population.

Data Source: Information was provided directly by our GMUG NF Fisheries Biologist, Melvin Woody.

Data Adequacy: Medium. While the data quality is High and very reliable, there are still 9 streams for which no data is yet available, which makes the data quantity Partial.

Frequency: 5 years

Threshold for Change: A 5-percent change in the measure value for all selected nonindigenous aquatic animal species. Once there are five measure values, the threshold for meaningful change will switch to regression analysis. A decrease in the measure value beyond the threshold for meaningful change results in an improving trend in this measure.

Species	Distribution rating	Impact Rating	Component Score	comments
Brook Trout *	Wide – 3	High - 3	9	Priority species
Brown Trout	Low – 1	Low - 1	1	
Cutthroat Trout	Wide – 3	Low - 1	3	
Rainbow Trout *	Wide - 3	High - 3	9	Priority species
		Total index value	22	

West Elk Wilderness Fish Inventory Data

Species	Length, miles	Percentage occupied
Unknown	34.957121	19.5%
Brook Trout	46.788865	26.1%
Brown Trout	7.125584	4.0%
Cutthroat Trout	46.966522	26.2%
Rainbow Trout	43.662058	24.3%
Grand Total	179.50015	

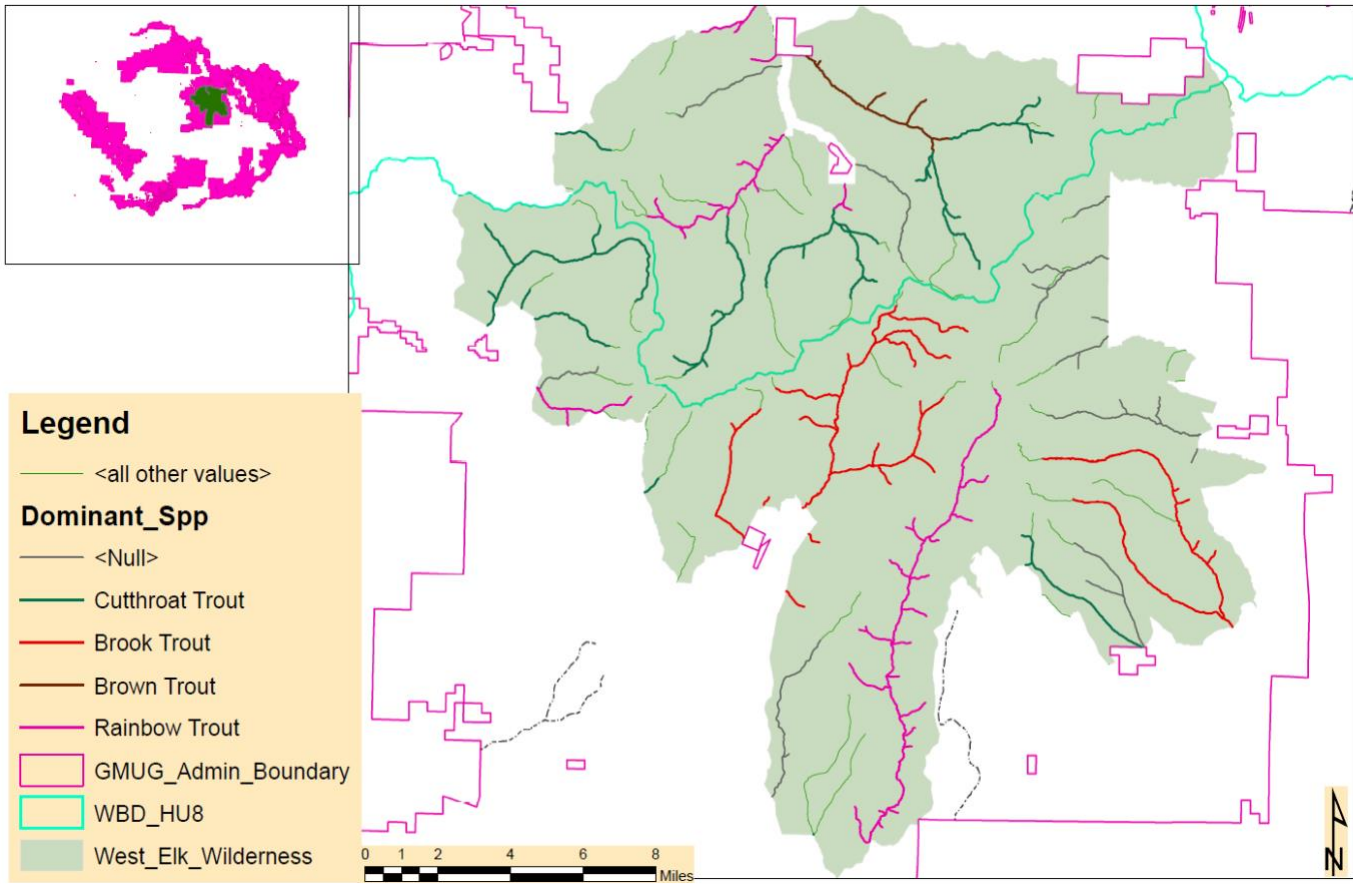


Figure 8; Fish Distribution in the West Elk Wilderness

Figure 9; Trout from a stocked Wilderness Lake (photo, J Stagner, fish caught by B Funka)

Figure 10; Sheep Lake is in the CPW fish stocking rotation (photo, J Stagner)

Figure 11; Gunnison Lake (south) is a stocked Wilderness lake (photo, J Stagner)

Deposition of nitrogen

Measure Type: *Required to select at least one*
Protocol Option: Protocol Option 1; Total Deposition

Measure Baseline Value: 3.23 kg/ha
Year of Data Collection: 2000 - 2015

Measure Description: This measure assesses the amount of nitrogen deposition in a wilderness by using either the average total deposition (based on nationally modeled or measured spatial data. Data are compiled from either the NADP website, the Forest Service Air Resource Management Program website, or other local or regional databases. The central data analyst calculates the measure value.

Background and Context:
The West Elk Wilderness is part of a Class 1 air shed and receives monitoring as mandated by the Clean Air Act.
Air Monitoring Plans for the GMUG National Forests call for haze monitoring as well as lake water sampling. Water samples are obtained from Deep Creek Lake in the Raggeds Wilderness (falls under the West Elk Air shed) and from South Golden Lake in the West Elk Wilderness. Three water samples from each lake are collected each year and sent to the Rocky Mountain Research Station Biochemistry Lab in Ft. Collins, CO for analysis.
These lakes were identified for their ANC value (Acid Neutralizing Capacity) as well as location, aspect and other hydrological factors.

Industrial pollution creates nitrogen in the atmosphere while agricultural activities contribute ammonia. Nitrogen is deposited from the atmosphere into lakes and watersheds where it is integrated into every natural cycle.
Protocol option 1 (total deposition) was recommended by R2 air and water specialist, Jeff Sorkin, as well as the inclusion of haze monitoring.

Data Source: Data was pulled by Central Data Analyst, Jim Edmonds from National data sets (NADP)

Data Adequacy: HIGH

Frequency: 5 years

Threshold for Change: Statistical significance as determined by regression analysis. A statistically significant decreasing trend in the data results in an improving trend in the measure.

Total nitrogen deposition in the West Elk Wilderness based on values from the NADP website.	
Year	Nitrogen Total Deposition (kg/ha)
2000	3.35
2001	3.45
2002	3.48
2003	3.36
2004	3.17
2005	3.26
2006	3.35
2007	3.66
2008	3.48
2009	3.00
2010	3.10
2011	3.13
2012	3.03
2013	3.92
2014	3.37
2015	3.23

Figure 12; South Golden Lake is a collection site for water samples. Data from these samples contributes to Nitrogen Deposition monitoring in the West Elk Air shed (photo, J Stagner)

Amount of haze

Measure Type: *Required to select at least one*

Measure Baseline Value: Stable Deciview
Year of Data Collection: 2001-2016

Measure Description: This measure assesses the trend in average deciview for the 20 percent most impaired days, based on the Forest Service Air Resource Management Program's annual analyses of national visibility monitoring data. Data are compiled from the Forest Service Wilderness Air Quality website. The central data analyst calculates the measure value.

Background and Context: The West Elk Wilderness is part of a Class 1 air shed and receives monitoring as mandated by the Clean Air Act.
Air Monitoring Plans for the GMUG National Forests call for haze monitoring as well as lake water analysis. Air and Water Specialists from the USFS Rocky Mountain Region 2 office recommended using Nitrogen Deposition and Haze monitoring for monitoring trends in the West Elk Wilderness.
Haze Monitoring stations are located outside of the Wilderness, but close enough to convey an accurate assessment of conditions within the Wilderness.
The haze monitoring station used for this report is WHRI1.

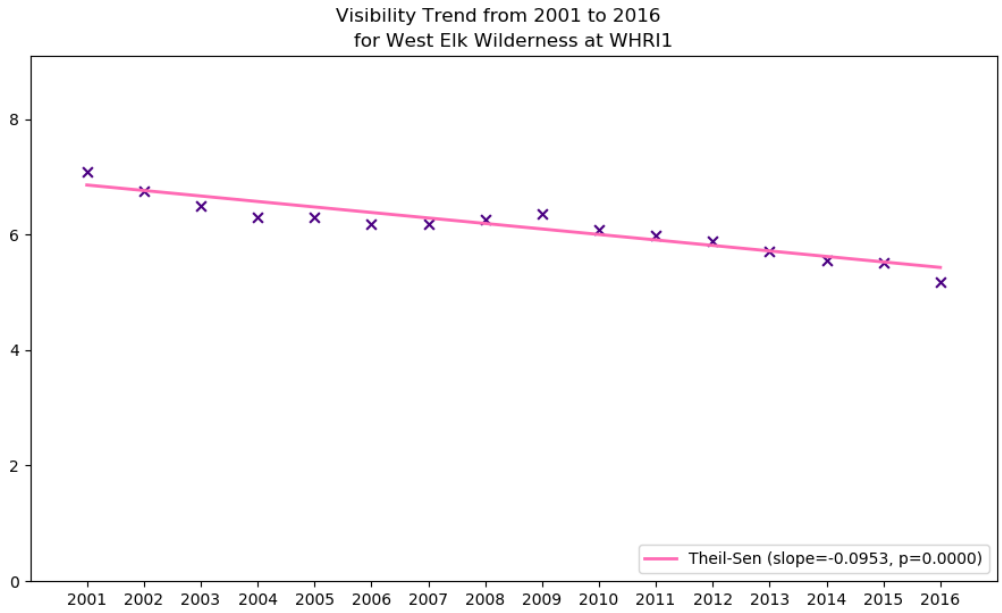
Data Source: Data was collected by Jim Edmonds, Central Data Analyst, from National Data sets

Data Adequacy: HIGH
Frequency: 5 years

Threshold for Change: Any change in categories:

- *Decreasing deciview*—there is a statistically significant decreasing trend in the 5-year average deciview for the 20 percent most impaired days.
- *Stable deciview*—there is no statistically significant trend in the 5-year average deciview for the 20 percent most impaired days.
- *Increasing deciview*—there is a statistically significant increasing trend in the 5-year average deciview for the 20 percent most impaired days.

A change towards decreasing deciview results in an improving trend in the measure.



Year	5 yr moving average deciview	Trend
2001	7.1016	6.8632
2002	6.7627	6.7679
2003	6.4966	6.6727
2004	6.2976	6.5774
2005	6.3119	6.4821
2006	6.1807	6.3869
2007	6.183	6.2916
2008	6.2577	6.1964
2009	6.3622	6.1011
2010	6.0881	6.0059
2011	5.9951	5.9106
2012	5.8976	5.8154
2013	5.7149	5.7201
2014	5.5496	5.6249
2015	5.5218	5.5296
2016	5.1774	5.4343

Figure 13; West Elk Visibility Trends

Extent of waterbodies with impaired water quality

Measure Type: *Required*
Protocol Option: *1* - Miles of Streams

Measure Baseline Value: 101.88 miles
Year of Data Collection: 2018

Measure Description: This measure assesses miles of streams inside wilderness with impaired water quality, based on national or state **303(d) list of impaired water bodies** or local monitoring data. Data are compiled from national or state 303(d) databases, or other local, state, regional, or national data sources. Local staff calculate the measure value.

Background and Context:
We chose to monitor streams rather than lakes based on the extensive system of creeks and feeder streams which flow through the West Elk Wilderness. There are not many lakes in the Wilderness when compared against the size of the area.
The watersheds on the north/west generally drain into the North Fork of the Gunnison, primarily through Coal Creek, Smith Fork (drains to the main Gunnison River just above the confluence with the North Fork of the Gunnison) and Anthracite Creek.
The southern/eastern waters mostly flow into the Gunnison River and the waters of Curecanti National Recreation area. After flowing through a series of dams and into the Black Canyon of the Gunnison, these waters meet the waters of the North Fork and become the main Gunnison River. These creeks and rivers are essential in many aspects to the local communities they flow through.

Data Source: Data for this measure was sourced from the current 303d list of impaired waters EPA data set and clipped to the West Elk Wilderness boundary by our Forest GIS Specialist, Carol Howe.

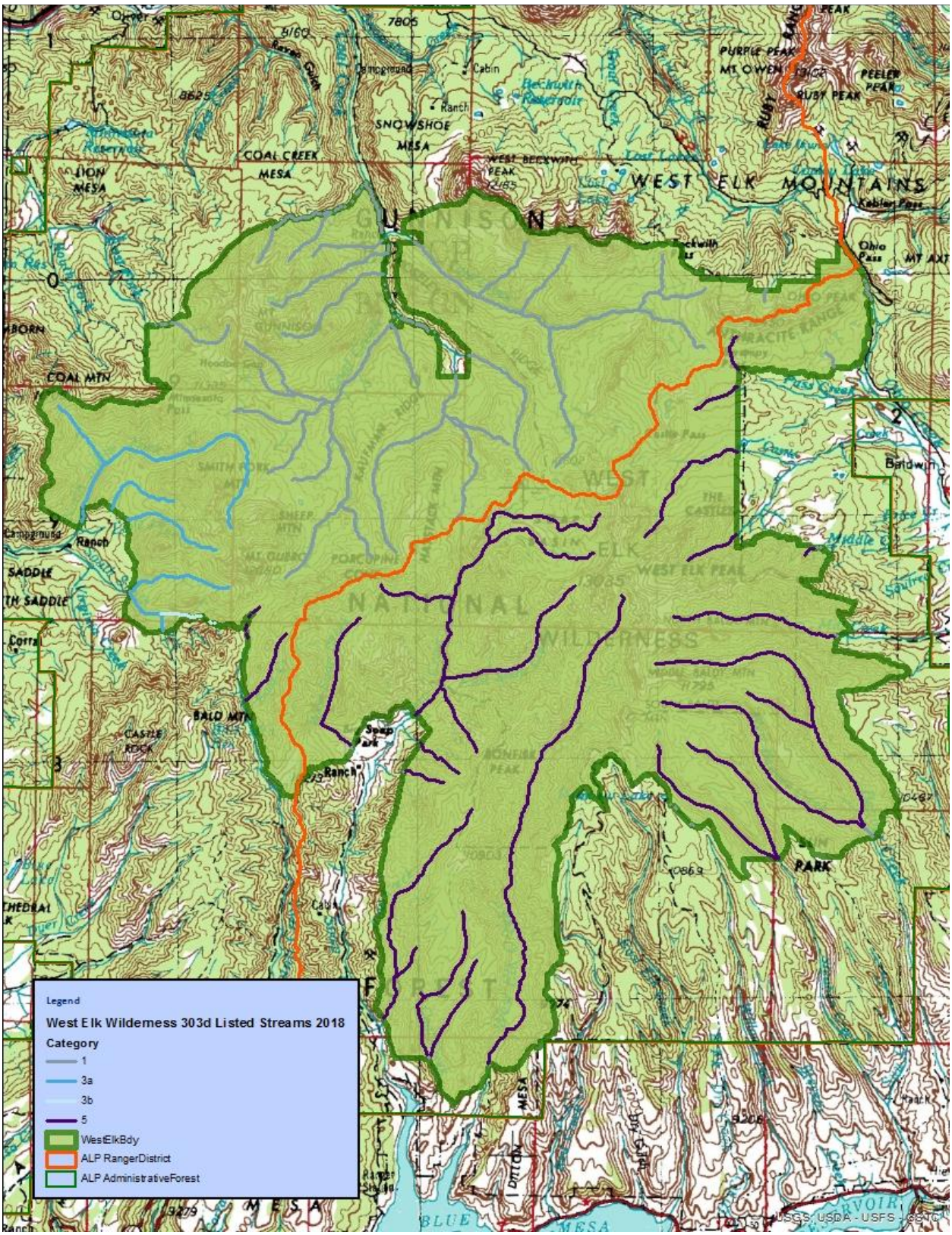
Data Adequacy: High. The 303(d) data is sourced from EPA research and is presumably of high quality and quantity.

Threshold for Change: A 5-percent change in the total mileage of impaired streams. Once there are five measure values, the threshold for meaningful change will switch to regression analysis. A decrease in the amount of impaired waterbodies beyond the threshold for meaningful change results in an improving trend in this measure.

Frequency: 5 years

West Elk Wilderness Impaired Streams	
Impaired streams	Distance (miles)
All tributaries to the Gunnison River, including wetlands, within the West Elk, Wilderness Area, (excluding Stewart Creek) (34 segments)	99.88 miles
Ruby Anthracite Creek and its tributaries in the National forest except for the tributaries to Lake Irwin.	2.0 miles
Total :	101.88 miles

Table 11: 303d listed streams



Number of animal unit months of commercial livestock use

Measure Type: *Required to select at least one*

Measure Baseline Value: 5,805
Years of Data Collection: 2016-2018

Measure Description: This measure assesses the 3-year rolling average of commercial livestock use, based on an annual count of animal unit months (AUMs) within a wilderness. Local data are compiled and entered in NRM-Range annually. The WCMD calculates the annual value and the 3-year rolling average (the measure value).

Background and Context:

We chose this measure since livestock grazing has been a part of the West Elk Wilderness area for over 50 years. Grazing was occurring at the time of designation in 1964.
When the Wilderness was expanded in 1980 under the Colorado Wilderness Act, many of the lands which were brought into the Wilderness were actively grazed by cattle.

Some anecdotal stories claim that it was the local ranchers who most strongly supported the expansion of the Wilderness to protect grazing lands from development. While this is likely true, there has also been a long standing conflict in the West Elks between the cattlemen and other Wilderness visitors who have complained about over-grazing, water quality and damage to/ proliferation of trails from the cows.

There are currently five active allotments which have acreage within the Wilderness, all of which run cows rather than sheep.

The AUM data was pulled from NRM Range by the Paonia Ranger District Range Specialist, Kyler McCarrel. Allotment data was obtained by using a GIS layer which was felt to be the most accurate and current information by our Forest GIS Specialist, Carol Howe.
At one point in the process of gathering this information, a different set of AUM data populated into NRM Wilderness. These numbers did not match up well with the numbers I had obtained. After discussing the issue with the GMUG NF Range Specialist, Clare Hydock, it was determined that the allotment data in NRM is not the most current or accurate source, so she directed me to use the GIS allotment data for greater accuracy.

Although GIS did show a very small portion of the Snowshoe Allotment landing within the Wilderness, Range staff recommended not including the data. The portion in question is a very steep, talus/scree field on the far end of a sheep allotment; the likeliness of any sheep accessing that part of the allotment is very low. Grazing would be inconsequential if any sheep did manage to enter that area.

The Antelope/Beaver Allotment has over 13,000 acres in the Wilderness but is currently vacant.

Data Source: The AUM data was pulled from NRM Range by the Paonia Ranger District Range Specialist. Allotment data was obtained by using a GIS layer which was felt to be the most accurate and current information by our Forest GIS Specialist.

Data Adequacy: HIGH. While there could be minor fluctuations from year to year, the AUMs remain mostly stable from year to year since these are allotments which have been in use for many years. Therefore the AUM data is complete and reliable. The Allotment spatial data may have some small errors but is considered to be more reliable than older NRM data. The consistent and well-established nature of both the AUM numbers and the Allotment boundaries makes the data reliable.

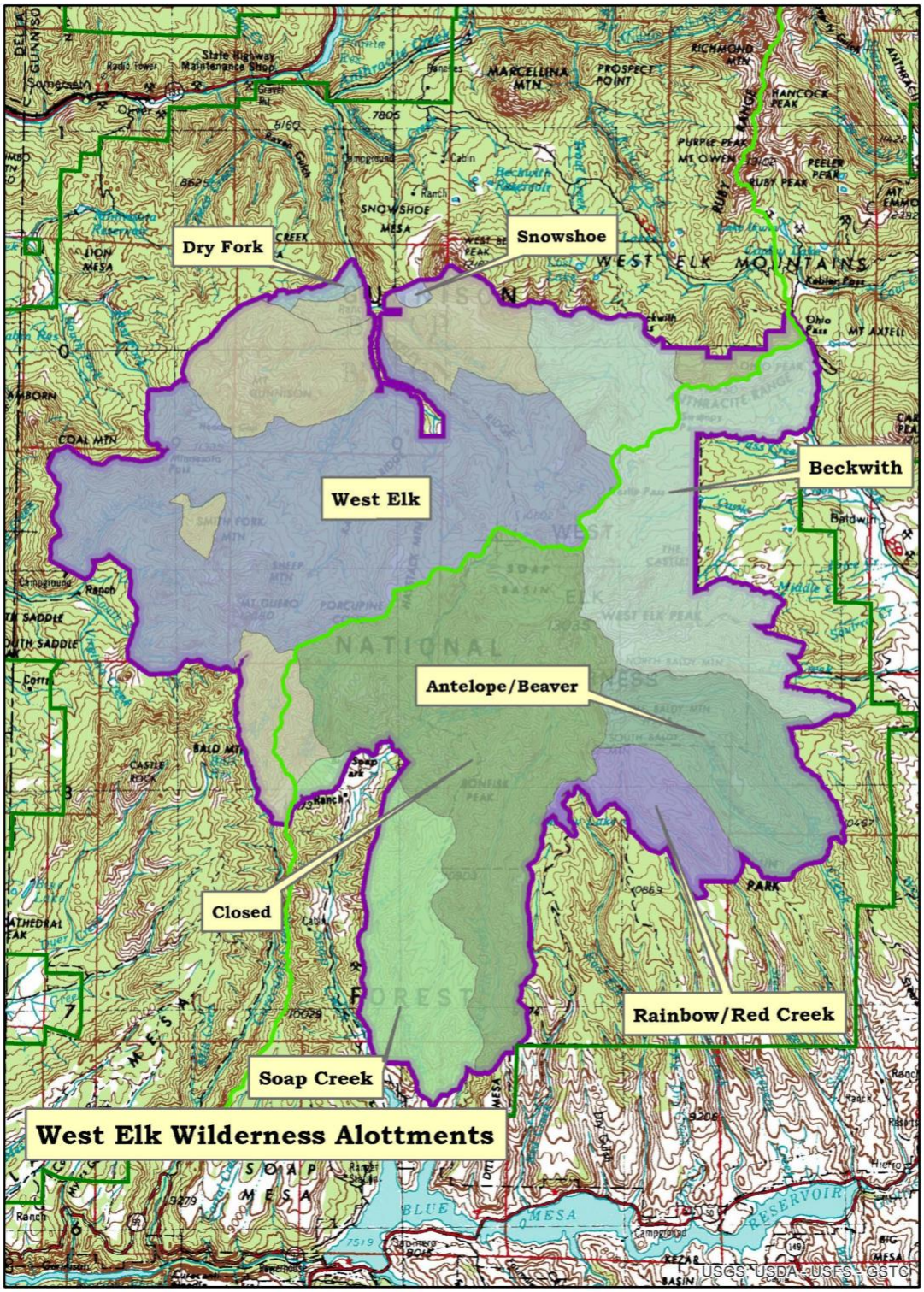
Frequency: 1 year

Threshold for Change: A 5-percent change in the 3-year rolling average number of authorized wilderness AUMs. Once there are five measure values, the threshold for meaningful change will switch to regression analysis. A decrease in the 3-year rolling average beyond the threshold for meaningful change results in an improving trend in this measure.

UNIT NAME	GIS ACRES	ACRES IN WILDERNESS	% ACRES IN WILDERNESS	AUMS PER UNIT	AUMS IN WILDERNESS
BECKWITH	42695	28624.2	67	2906	1947
SOAP CREEK	28444	13255.9	46	491	226
WEST ELK	100814	50551.5	50	6377	3189
RAINBOW/RED CREEK	31848	5955.5	18	1984	357
DRY FORK	21748	680.8	3	2915	86

Figure 14; cows grazing in Mill Castle, part of the Beckwith Allotment (photo, J Stagner)

Table 13: West Elk Wilderness Allotments



UNDEVELOPED

Wilderness retains its primeval character and influence, and is essentially without permanent improvement or modern human occupation

The Undeveloped Quality is the most familiar and recognizable quality of wilderness for many people. Without buildings, roads, evidence of other people, or improvements on the landscape, the Undeveloped Quality speaks to the idea that humans are visitors that do not remain. The Wilderness Act of 1964 makes the following allusions to the Undeveloped Quality of wilderness character:

- The National Wilderness Preservation System was created *"in order to assure that an increasing population, accompanied by expanding settlement and growing mechanization, does not occupy all areas within the United States"* (2a);
- Wilderness is *"in contrast with those areas where man and his own works dominate the landscape"* (2c);
- Wilderness should be managed in such a way that *"the imprint of man's work is substantially unnoticeable"* (2c);
- And that *"there shall be no permanent road within any wilderness area…no temporary road, no use of motor vehicles, motorized equipment or motorboats, no landing of aircraft, no other form of mechanical transport, and no structure or installations within any such area"* (4c).

Table 14. Undeveloped Quality

Indicator	Measure	Measure Type	Frequency	Measure Baseline Value (Year(s) of Data Collection)	Data Adequacy
Presence of non-recreational structures, installations, and developments	Index of authorized non-recreational physical development	Required	5 years	95 (2018)	Medium
Presence of inholdings	Acres of inholdings	Required	5 years	None (2018)	High
Use of motor vehicles, motorized equipment, or mechanical transport	Index of administrative authorizations to use motor vehicles, motorized equipment, or mechanical transport	Required	1 year	None (2016-2018)	High

Table 14. Undeveloped Quality					
Indicator	Measure	Measure Type	Frequency	Measure Baseline Value (Year(s) of Data Collection)	Data Adequacy
	Index of special provision authorizations to use motor vehicles, motorized equipment, or mechanical transport	Optional	1 year	3,634 (2016-2018)	High

Figure 15; Flowers near East Beckwith Pass, looking towards Storm Ridge and Swampy Pass (photo, J Stagner)

UNDEVELOPED QUALITY **Presence of non-recreational structures, installations, and developments**

Index of authorized non-recreational physical development

Measure Type: *Required*

Measure Baseline Value: 95
Year of Data Collection: 2018

Measure Description: This measure is an index that assesses selected elements for each type, or component, of non-recreational physical development. Data are compiled from a variety of local and national data sources and entered in various NRM applications. NRM-WCM calculates the measure value.

Background and Context: Features in the Wilderness which were constructed for purposes not related to recreation are documented by this measure. These include grazing infrastructure, buildings, irrigation and water diversions, utilities and mines, and fixed instrumentation sites**.** The presence of these structures degrades the undeveloped quality by providing evidence of human works.
The West Elk Wilderness sits upon coal seams of Anthracite coal and has been explored for other minerals. Some remnant evidence of this activity was documented in a statewide inventory of mining related infrastructure. There are no active mines in the Wilderness and all claims have been closed. However, the remains of the Ruby Mine, a mine shaft, numerous adits and tailing piles still remain as visible reminders of exploration and prospecting.
Grazing infrastructure is widespread through the parts of the Wilderness with grazing allotments. Most of these are in the form of spring developments and stock ponds, some of which may utilize PVC piping or other non-native materials. The Paonia RD Range staff have been working to reduce fences in the Wilderness and many of the cattle permitees have switched from permanent fencing to temporary electric tape - or wire fence - which is removed when not in use.
Two cow camps are occupied during a part of the summer months, and account for two of the buildings. The Outlaw cabin is an unauthorized structure which pre-dates the Wilderness designation. The cabin was allegedly the hideout of a local livestock rustler and has a place in local lore. The Beaver cabin is documented as an abandoned Cow Camp, but I was unable to confirm whether it is still physically present. The Navajo Cabin is another abandoned structure which once had local historic curiosity but is now partially dismantled and a candidate for removal (pending archeological evaluation).
An unauthorized “trespass” cabin was removed from the Wilderness by Paonia RD staff in 2010.
Several active ditches are maintained in the Wilderness. Other ditches exist but are not being maintained for use.
There are no roads, utility infrastructure or fixed instrumentation sites in the Wilderness.

Data Source: Data for buildings was obtained through NRM and the input of Paonia RD Lands/Realty specialist Albert Borkowski, as well as employee knowledge of the area. Grazing infrastructure is mapped in GIS. Ditch related information was obtained from GIS information associated with Ditch Bill research. Mines were inventoried in a statewide survey in 2000 and added to GIS.

Data Adequacy: Medium**.** For several of the elements of this measure (such as roads, utility infrastructure, fixed instrumentation and mines) the data is of high quality since these are all features which would be both known and documented if they existed. The grazing infrastructure data is in need of updating. Upon review of the available information, both the Paonia Range Specialist and I found some infrastructure to be missing from the inventory. The data for irrigation related structures was recorded during the GMUG National Forest's Ditch Bill inventories and is of high quality.

Frequency: 5 years

Threshold for Change: A 3-percent change in the development measure value. Once there are five measure values, the threshold for meaningful change will switch to regression analysis. A decrease in the development measure value beyond the threshold for meaningful change results in an improving trend in this measure.

MEASURE COMPONENT	COMPONENT SCORE
BUILDINGS	4
INSTREAM STRUCTURES	8
ROADS	0
FIXED INSTRUMENTATION	0
UTILITY INFRASTRUCTURE	0
MINES	46
GRAZING INFRASTRUCTURE	37
INDEX VALUE:	**95**

GRAZING INFRASTRUCTURE

Improvement type	Number of Improvements	Primitive or Non-Primitive materials
Spring development	10	Non-Primitive
Stock Pond	13	Primitive
Cow Camp	2	Non-Primitive
Totals:	13 Primitive	12 Non-Primitive

Point data, Range Improvements in the West Elk Wilderness			
Number of Point sites	Materials	Value rating	Totals
13	Primitive	X 1	13
12	Non-Primitive	X 2	24
	Component score:		37

INFRA ID	DISTRICT	COMMENTS	TYPE	NAME
811CC02	Paonia	structure	cow camp	
811P62	Paonia	native materials	pond	
927S24	Gunnison	non-Native materials	Water system	EAST FORK
927S25	Gunnison	non-Native materials	Water system	BEAR SPRINGS
811P69	Paonia	native materials	pond	
901S18	Gunnison	non-Native materials	Water system	EAST COW CAMP SPRING
811P70	Paonia	native materials	pond	
811P68	Paonia	native materials	pond	
811P70	Paonia	native materials	pond	
901S16	Gunnison	non-Native materials	Water system	AIRPORT SPRING
811P64	Paonia	native materials	pond	
927S21	Gunnison	non-Native materials	Water system	WEST FORK
927S17	Gunnison	non-Native materials	Water system	ROCK SPRINGS
922P15	Gunnison	non-Native materials	Water storage	UPPER MAIN GULCH
811P60	Paonia	native materials	pond	
927S22	Gunnison	non-Native materials	Water system	
811P59	Paonia	native materials	pond	
811P65	Paonia	native materials	pond	
811P67	Paonia	native materials	pond	
811CC01	Paonia	structure	cow camp	
811P61	Paonia	native materials	pond	
811P66	Paonia	native materials	pond	
927S23	Gunnison	non-Native materials	Water system	HORSE GULCH SPRING
927S20	Gunnison	non-Native materials	Water system	POISON SPRINGS
901S17	Gunnison	non-Native materials	Water system	WEST OF OLD COW CAMP
811P63	Paonia	native materials	pond	
	Paonia	non-Native materials	spring	Spike Spring

Table 15: Range Improvements

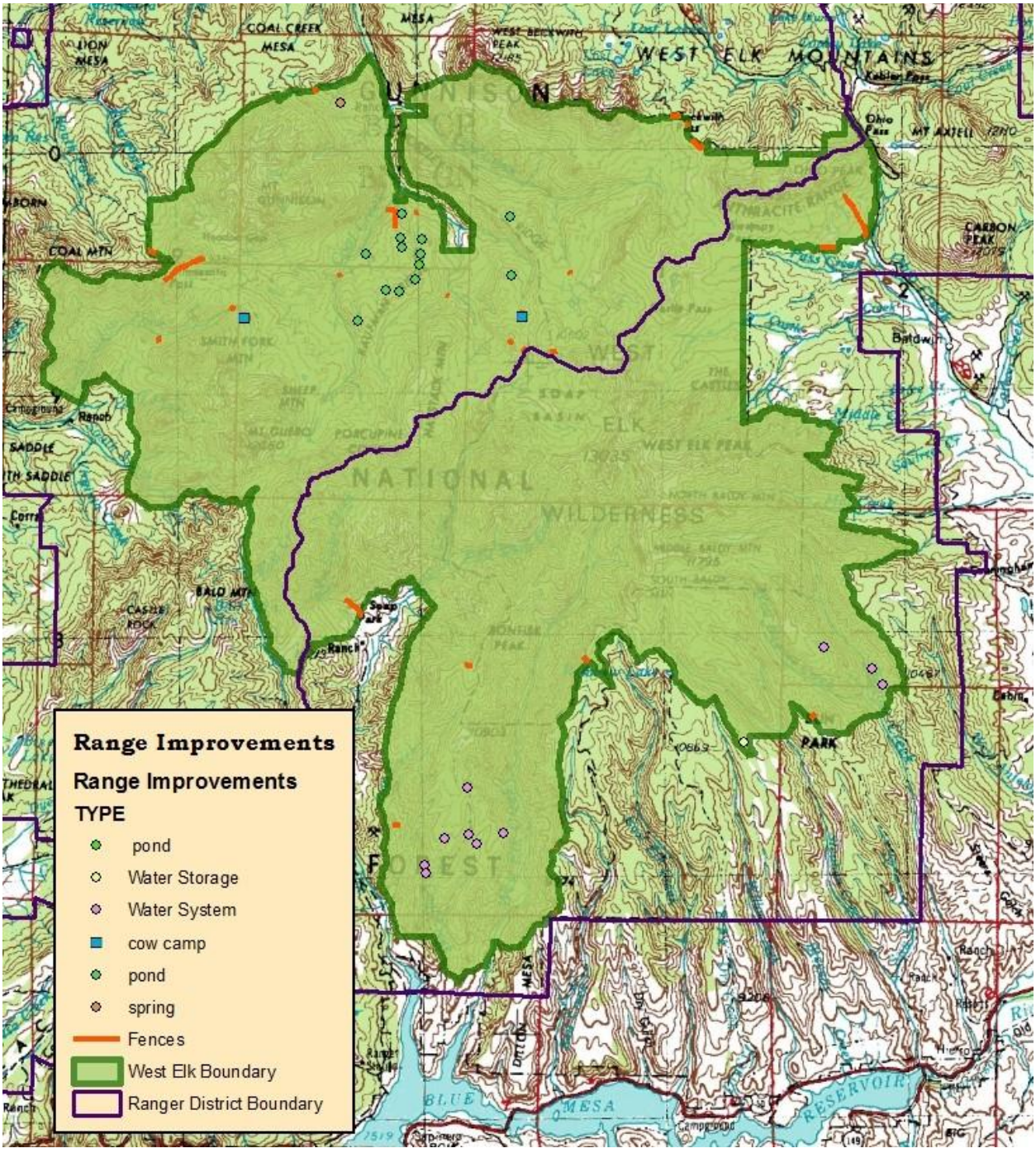


Figure 16; Little Robinson Cow Camp is occupied for part of the summer season for gazing operations (photo, J Stagner)

Irrigation structures

Irrigation ditches in the West Elk Wilderness				
Ditch Bill ID	Name of Facility	Maintenance	Length (ft.)	Ave. Width
G015	ELK HOME	active	4175.89	3 - 10 feet
G021	KEEVER	active	1056.63	0 - 3 feet
G047	SPRING BRANCH	active	2403.14	0 - 3 feet
G016	ELK HOME NO. 2	intermittent	4814.68	3 - 10 feet
G058	UPPER FEEDER SILKA DITCH	neglected	2200.49	0 - 3 feet
G033	MIDDLE FEEDER SILKA	active	5501.96	3 - 10 feet
G049	SUNKI 2	intermittent	1480.98	0 - 3 feet
G045	BIG SOAP PARK DITCH	abandoned	2844.85	0 - 3 feet

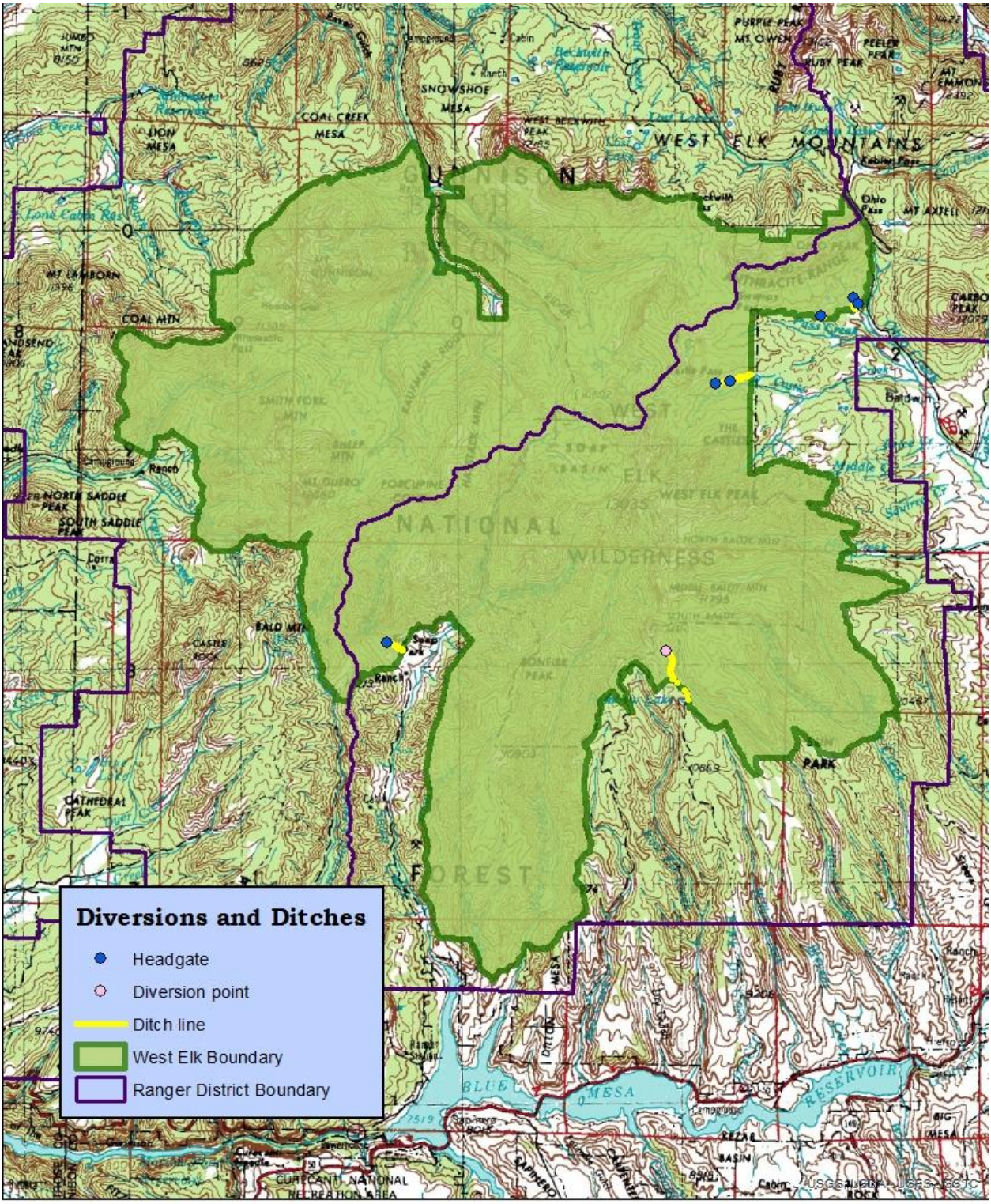
Instream Diversions, West Elk Wilderness				
Ditch Bill ID	Diversion Type	Acts as fish barrier		
G016	Native Material	Yes		
G033	Native Material	Yes		
Instream structures Value:	Size Value = 1	Materials Value = 1	Number of features = 2	Total score = 2

Irrigation head gates, West Elk Wilderness		
Ditch Bill ID	Maintenance	Status
G047	active	lockable
G058	neglected	other
G033	neglected	primitive
G045	abandoned	primitive
G021	intermittent	lockable
G049	neglected	other

BUILDINGS

Buildings, West Elk Wilderness						
Name	ID	Category	Value	Size	Value	Total
Minnesota Cow Camp	197481	Part time residential	2	Small	1	2
Little Robinson Cow Camp	186642	Part time residential	2	Small	1	2
Navajo Cabin	186634	Abandoned	1	Small	1	1
Outlaw Cabin	none	Abandoned	1	Small	1	1
West Beaver Cabin	none	unknown	Unk.	Small	1	
				Total Value		6

Table 16: Water Diversions and irrigation features



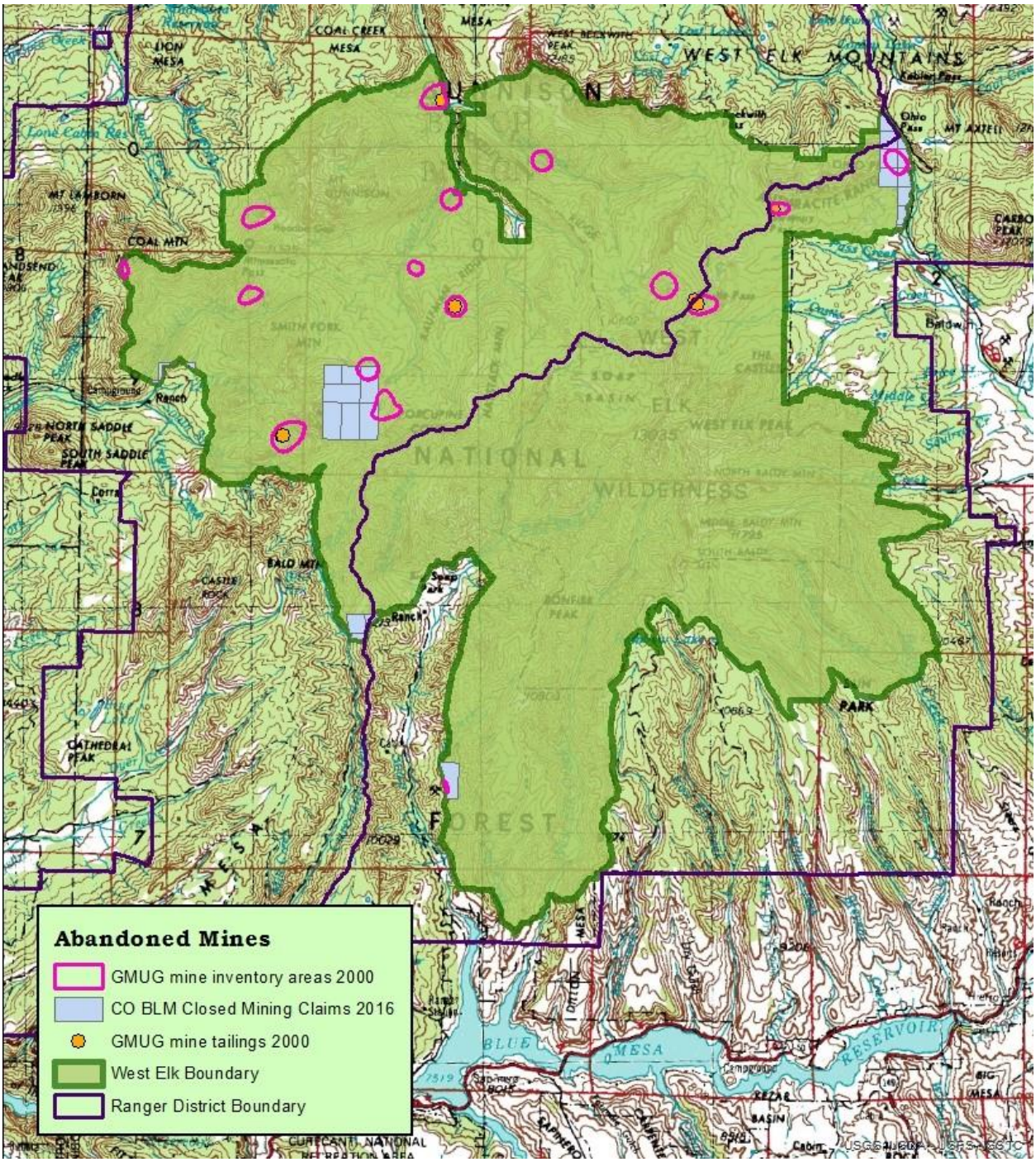
MINES

Category- Scale	value	Number of sites	x	Category- status	value	score
Small	1	23		Inactive	2	46
Moderate	2	0		Active	3	0
Large	3	0			total	46

Mining Features Inventoried in the West Elk Wilderness				
Type	Number	Size	Status	Condition
Adit	5	small	inactive	Varied cond.
Prospect hole	6 (15?)	small	inactive	9 not locatable in 2000, varied cond.
Shaft	1	small	inactive	intact
Tailings pile	10	small	inactive	stable
Mine	1	small	inactive	unknown
Total	23			

Figure 17; The Ruby Mine sits on a remote flank of the Anthracite Range (photo, J Stagner)

Table 17: Mining related infrastructure



Acres of inholdings

Measure Type: *Required*

Measure Baseline Value: 0
Year of Data Collection: 2018

Measure Description: This measure assesses the acres of inholdings in a wilderness, even if the existence of the inholding is imperceptible to an observer. Data from the Land Status Record System (LSRS) are automatically compiled via the EDW and entered in NRM-WCM. NRM-WCM calculates the measure value.

Background and Context:

There are no inholdings in the West Elk Wilderness**.**

As a side note, there was previously a 240 acre parcel within the West Elk Wilderness, owned in partnership by Robert Minerich and real estate broker, Tom Chapman. In 1993 Chapman used helicopters to begin construction of a cabin on the inholding.
A land swap was initiated and Mr. Chapman dropped the construction project. The 240 acre West Elk Wilderness inholding was exchanged for 105 acres of highly valuable Forest Service land near the Alta Lakes area of Telluride.
Mr. Chapman was later investigated for fraud over this incident.
The cabin remains have since been removed.

Data Source: NRM and Land Status Record System, confirmed by Paonia Ranger District Lands and Special Uses Specialist, Albert Borkowski.

Data Adequacy: High
Frequency: 5 years

Threshold for Change: Any change in the number of inholding acres. A decrease in the total number of acres results in an improving trend in this measure.

Index of administrative authorizations to use motor vehicles, motorized equipment, or mechanical transport

Measure Type: *Required*

Measure Baseline Value: 0
Years of Data Collection: 2016-2018

Measure Description: This measure assesses the 3-year rolling average of a use-level index evaluating administrative authorizations to use motor vehicles, motorized equipment, or mechanical transport, based on the type and number of pieces of equipment and the days of use. Local data are compiled and entered in NRM-Wilderness annually. NRM-WCM calculates the annual value, and the WCMD then calculates the 3-year rolling average (the measure value).

Background and Context: There were no Administrative authorizations to use motorized or mechanized equipment in the 3 year reporting period.
In 2006 two Paonia RD employees received verbal permission from the acting District Ranger to use chainsaws to clear trees from the Throughline trail after a hazardous wind-throw event closed the trail approximately ½ mile into the Wilderness. No written documentation was prepared at the time, though the particularly dangerous location and amount of trees posed a safety hazard to Range Staff working in that area.
USFS staff from the Paonia RD will often assist with the Special Provision authorized chainsaw clearing of specific trail corridors in the West Elk Wilderness. However, this is already captured in the reporting for *Special Provision Authorizations*.
Fire Suppression activities in the West Elk Wilderness have used chainsaws and helicopters, as have a very few SAR incidents, but this information would be reported under the *Percent of Emergency Incidents using Motorized/Mechanized Equipment* measure, which was not selected for this Wilderness.

Data Source: NRM and the knowledge of Forest employees familiar with the management of the West Elk Wilderness.

Data Adequacy: HIGH. Use of motorized/mechanized equipment for Administrative use would need to go through a Minimum Requirements Analysis and there would be documentation and knowledge of the action among staff.

Frequency: 1 year

Threshold for Change: Any change in the 3-year rolling average measure value. Once there are five measure values, the threshold for meaningful change will switch to regression analysis. A decrease in the 3-year rolling average beyond the threshold for meaningful change results in an improving trend in this measure.

Index of special provision authorizations to use motor vehicles, motorized equipment, or mechanical transport

Measure Type: *Optional*

Measure Baseline Value: 3,634
Years of Data Collection: 2016-2018

Measure Description: This measure assesses the 3-year rolling average of a use-level index evaluating special provision authorizations to use motor vehicles, motorized equipment, or mechanical transport, based on the type and number of pieces of equipment and the days of use. Local data are compiled and entered in NRM-Wilderness annually. NRM-WCM calculates the annual value, and the WCMD then calculates the 3-year rolling average (the measure value).

Background and Context:
With the long history of livestock grazing in the West Elk Wilderness comes an equally long history of authorizing motorized equipment for this special provision use. We chose this measure to more accurately account for the use of motorized equipment in the Wilderness. While administrative use of equipment is typically rare, special provision authorizations – primarily related to grazing or irrigation ditches – are common.
One issue which was encountered in reviewing this data was the inconsistency in reporting. While the Paonia RD has an agreement in place which allows for chainsaw use during a specified timeframe, it has only been reported for some of the years. Some of the reporting did not include numbers for days/pieces of equipment.
Likewise, there is a cattle permitee on the Beckwith Allotment, based on the Gunnison RD, who uses chainsaws to clear trails around Castle Creek, Swampy Pass and Castle Pass. This activity is not covered by the so-called Cattle Pool Agreement which is in place on the Paonia RD. This yearly trail clearing does not appear to have ever been reported in NRM.
There is also an Outfitter who has been given verbal authorization to clear trails with a chainsaw, but this is not explicitly covered under the actual Cattle Pool agreement. The outfitter does not adhere to the timeframe specified in the Agreement and has been known to keep chainsaws in permitted camp locations throughout the year.
Also, irrigation ditches in the West Elk Wilderness, including Sunki, Castle Creek, Big Soap Park, Elk Home and Middle Feeder have authorizations in place which allow for the use of heavy equipment and chainsaws for maintaining the ditches. These uses do not appear to have always been included in Wilderness reporting, so it is difficult to determine from NRM how often the maintenance takes place.

Data Source: For the 3 year rolling average, data was pulled from NRM reporting. For the 2016 and 2017 cattle pool authorization, the number of pieces of equipment was not reported, so I made an estimate.

Data Adequacy: MEDIUM. As mentioned above, there are significant gaps in the reporting of these uses. Even the Special Provision authorizations which have been reported do not always provide the

information used to calculate the 3 year rolling average for this measure. Therefore the quality of the data is medium and the quantity is partial.

Frequency: 1 year

Threshold for Change: A 5-percent change in the 3-year rolling average measure value. Once there are five measure values, the threshold for meaningful change will switch to regression analysis. A decrease in the 3-year rolling average beyond the threshold for meaningful change results in an improving trend in this measure.

Special Provision Authorizations for use of equipment in the West Elk Wilderness								
Auth #	Equip type	Description	FY	Type	Number of pieces	Actual days	Weight	Score
00535	Chainsaw	Cattle Pool	2017	SPECIAL PROVISION	10 (est)	36	3	1080
00016	Chainsaw	Cattle Pool	2016	SPECIAL PROVISION	10 (est)	65	3	1950
00014	Chainsaw	Cattle Pool	2015	SPECIAL PROVISION	15	10	3	30
00013	Chainsaw	E Coal Cr Fire	2012	EMERGENCY		7	3	
00013	Helicopter	E Coal Cr Fire	2012	EMERGENCY		7	4	
00012	Chainsaw	Cattle Pool	2011	SPECIAL PROVISION	15	30	3	90
00009	Chainsaw	Cattle Pool	2009	SPECIAL PROVISION	15	10	3	30
00009	Chainsaw	Cattle Pool	2006	SPECIAL PROVISION	15	na	3	
00020	Excavator	Cattle Pool	2018	SPECIAL PROVISION	1	22	4	88
00020	Chainsaw	Cattle Pool	2018	SPECIAL PROVISION	15	8	3	360
00020	ATV	Cattle Pool	2018	SPECIAL PROVISION	1	22	3	66
00021	Chainsaw	Cattle Pool	2018	SPECIAL PROVISION	1	22	3	66
00022	Chainsaw	Big Soap Ditch	2018	SPECIAL PROVISION	1	8	3	24
				TOTAL (2016-18)				3,634

Known equipment uses **without** documented or reported authorizations			
Equipment Type	Description	Year	Other info
Chainsaw	Cattle Pool	2014	SPECIAL PROVISION
Chainsaw	Cattle Pool	2013	SPECIAL PROVISION
Chainsaw	Cattle Pool	2012	SPECIAL PROVISION
Chainsaw	Cattle Pool	2010	SPECIAL PROVISION
Chainsaw	Cattle Pool	2008	SPECIAL PROVISION
Chainsaw	Cattle Pool	2007	SPECIAL PROVISION
Chainsaw	Beckwith Cattle	2009	Spec. Provision with issues
Chainsaw	Beckwith Cattle	2015	Spec. Provision with issues
Chainsaw	Beckwith Cattle	2016	Spec. Provision with issues
Chainsaw	Beckwith Cattle	2017	Spec. Provision with issues
Chainsaw	Beckwith Cattle	2018	Spec. Provision with issues

Chainsaw	Dry Fork Cattle	2015	Spec. Provision with issues
Chainsaw	Outfitter	Ongoing (10+ years)	No formal agreement in place
ATV	Beckwith Cattle	2015	Fence project on Boundary
Chainsaw	USFS trail crew /Admin	2006	Hazardous windfall removal
UTV	USFS range crew/ Admin	2012	Weed spraying, Cliff Creek
Helicopter	SAR	1987	EMERGENCY
Heavy Equipment	Middle Feeder ditch	1982	Ditch maintenance

Figure 18; Cliff Creek, Moseley Ridge area from Storm Ridge. This area is at the head of a large cherry-stem of private land

Figure 19; Coal Basin and the Beaver Jungle, taken near the District Boundary close to Porcupine Cone (photos, J Stagner)

SOLITUDE OR PRIMITIVE AND UNCONFINED RECREATION

Wilderness provides outstanding opportunities for solitude or primitive and unconfined recreation.

As populations increase and technology advances, wilderness provides opportunities for solitude and for a primitive or unconfined type of recreation that are not available in many other places. Wilderness is unique in that its managers are mandated to provide outstanding opportunities for a specific type of recreational experience. Although managers cannot guarantee or require that visitors experience solitude or primitive and unconfined recreation, they must protect and uphold the *opportunity* to have said experiences. The Solitude or Primitive and Unconfined Recreation Quality focuses on the tangible aspects of the setting that affect the visitor experience, and not on the subjective nature of the visitor experience itself. There are many intangible aspects of wilderness recreation (challenge, self-reliance, self-discovery, etc.) that are not included under this quality but that are still integral to the wilderness experience.

Table 18. Solitude or Primitive and Unconfined Recreation Quality

Indicator	Measure	Measure Type	Frequency	Measure Baseline Value (Year(s) of Data Collection)	Data Adequacy
Remoteness from sights and sounds of human activity *inside* wilderness	Index of encounters	Required	5 years	Stable (2018)	LOW
	Index of recreation sites within primary use areas	Required to select at least one	5 years	925 (2010-2012)	MEDIUM
Remoteness from sights and sounds of human activity *outside* the wilderness	Acres of wilderness away from adjacent travel routes and developments outside the wilderness	Required	5 years	156,607 acres (2018)	HIGH
Facilities that decrease self-reliant recreation	Index of National Forest System (NFS) developed trails	Required to select at least one	5 years	442 (2018)	MEDIUM
Management restrictions on visitor behavior	Index of visitor management restrictions	Required	5 years	12 (2018)	HIGH

SOLITUDE OR PRIMITIVE AND UNCONFINED RECREATION QUALITY **Remoteness from sights and sounds of human activity *inside* wilderness**

Index of encounters

Measure Type: *Required*
Protocol Option: *4. Trend in Visitation*

Measure Baseline Value: Stable visitation
Year of Data Collection: 2018

Measure Description: This measure monitors encounters by assessing the trend in visitation. Local data are compiled and stored in local archives. Local staff calculate the measure value.

Background and Context: As a whole, visitor use tracking has been sporadic at best in the West Elk Wilderness. A visitor use study was conducted in 1973, but focused primarily on visitor perceptions. Also, the boundary of the Wilderness was expanded in 1980, eliminating several of the trailhead survey locations used in previous use monitoring efforts.

For many years (1964 – 1997) some of the West Elk Wilderness reports to Congress provided RVDs and visits, but it is not clear how these numbers were obtained. Also, it is unclear in some of the reports whether the reported numbers are for the entire Wilderness or for the District submitting the report.

A full record of yearly reports was not available.

A 2009 Colorado Wilderness Assessment report for the West Elk Wilderness indicated that social encounters were not being exceeded in the Paonia District portion of the wilderness. Gunnison District did not have the necessary data to make a determination. It is unknown what methodology or source of user data was used for this report. No actual use numbers are reported, though the following areas were identified as medium use (10-50 daily summer visitors):

- Rainbow Lakes – the Baldies
- Mill Castle – Storm Pass
- Castle Creek to Castle Pass or Costo Lake

These areas still hold true as areas which draw higher use. Anecdotally, areas of higher visitor concentration also include Coal Mesa near the campground, Little Robinson/Throughline and Swampy Pass trail (from Ohio Pass road, primarily).

East Beckwith Pass also can see significant day use, originating both from Horse Ranch Park and Lost Lake Campground. Many of these visitors seem to end their hike/ride at East Beckwith Pass, which is the Wilderness boundary. They may only venture a few 100 yards into the Wilderness for a lunch stop.

During elk hunting season, the Little Robinson and Throughline trailheads (Coal Creek road) can receive periods of very high use.

For many years the overall sense of West Elk visitor use was that backpacker traffic was generally low and cattle administration/ elk hunting uses moderately high.

Anecdotally, it seems that recreational hiking and day use not related to hunting is on the rise, especially in the areas most accessible to Gunnison and Crested Butte.

The overall numbers of hunting tags issued by Colorado Parks and Wildlife (CPW) for the units in the West Elks have also been slowing rising, implying an upward trend in hunting use.

A seasonal bump in use can typically be expected in the fall in areas of the Wilderness which have aspen trees. This is primarily on the northern and eastern sides of the Wilderness. Though usually only lasting a few weeks, the fall foliage can attract a boost in visitation.

Increasing backpacking use has been observed by Wilderness Rangers, with visitor comments often remarking how enjoyable it was to camp and not see anyone. The modern phenomenon of sharing quiet, secret spots on social media could potentially bring more use from hikers seeking solitude. Only time will bear out whether this comes to be the case, but it should not be discounted as a possibility.

Solitude Monitoring has been implemented in the West Elk Wilderness according to National Minimum Protocols, but as of 2018, insufficient data is available for assessing trends or determining if standards are being exceeded.

The overall assessment, based primarily on observation and Ranger experience, is that there is a general upward trend in visitation. For reporting purposes for the Baseline year, the trend will be listed as Stable.

Data Source: Given the lack of reliable, consistent user data, anecdotal knowledge of the area was used. Some Solitude Monitoring efforts have yielded a small data set. Legacy data came from a handful of hardcopy reports dating back to the mid 1960's.

Data Adequacy: Low. Visitor use data is insufficient and inconsistent. While there is a Solitude Monitoring Plan for the West Elk Wilderness, data collection has not yet yielded enough information to infer trends. Wilderness Ranger observation is anecdotal, but based on over a decade of experience specific to the West Elks.

Frequency: 5 years

Threshold for Change:

Any change in categories:

- *Decreasing visitation*—visitation levels appear to be trending over time towards fewer visitors.
- *Stable visitation*—visitation levels appear to be remaining about the same.
- *Increasing visitation*—visitation levels appear to be trending over time towards more visitors.

A change in categories towards decreasing visitation results in an improving trend in the measure.

Legacy data, no source provided for how this data was obtained			
YEAR	VISITS	RVD	Notes
1964	2,300	7,200	
1966	1,000	6,300	
1967	n/a	400 / 108	Paonia and Sapinero RDs
1970	2,663	7,084	
1973	800 (use survey July/Aug)	n/a	
1978	16,788	50,340	RVD seems suspect?
1990	n/a	n/a	Cows messed up trail counter data
1993	11,000	9,500	
1994	15,149 or 44,465	10,821 or 25,186	Both were reported numbers
1995	7,205	15,850	Might be Gunnison RD only
1997	n/a	14,420	Might be Gunnison RD only

SOLITUDE MONITORING data:

Swampy Pass; 2018					
Date	Total # foot	Total #horse	Camps	Camps in S/s	Weekend/holiday
7/4/2018	8	0	0	0	yes
8/4/2018	4	0	1	0	yes
8/10/2018	3	0	0	0	no
8/27/2018	1	0	0	0	yes
9/29/2018	8	0	0	0	yes

Mill Creek Data: Weekday					
Date	Total # foot	Total # horse	Camps	Camps in sight	Notes
6/24/16	1	0	1	0	

Swampy Data: Weekday					
Date	Total # foot	Total # horse	Camps	Camps in Sight	Notes
6/15/16	0	0	0	0	
6/20/16	0	2	0	0	
7/27/16	0	0	0	0	
8/26/16	2	0	1	0	
8/30/16	2	2	1	0	Camp was Outfitter Camp

Swampy Data: Weekend/Holiday					
Date	Total # foot	Total # horse	Camps	Camps in Sight	Notes
7/4/17	10	0	0	0	All were on Pass straddling boundary
9/2/17	2	0	0	0	All were on Pass straddling boundary
9/16/17	6	5	0	0	Horse users were Cattle permitees

Throughline Data: Weekday					
Date	Total # foot	Total # horse	Camps	Camps in sight	Notes
6/3/16	0	0	0	0	

Figure 20; Mill Creek Solitude Monitoring area ends just above tree line near Storm Pass (Photo, J Stagner)

SOLITUDE OR PRIMITIVE AND UNCONFINED RECREATION QUALITY **Remoteness from sights and sounds of human activity *inside* wilderness**

Index of recreation sites within primary use areas

Measure Type: *Required to select at least one*

Measure Baseline Value: 925
Year of Data Collection: 2010-2012

Measure Description: This measure is an index that assesses the number of recreation sites and their condition, based on the national minimum protocol for recreation site monitoring. Local data are compiled and stored in local archives. Local staff calculate the measure value.

Background and Context:
Campsite inventories have been completed in the West Elk Wilderness for many years, though not in the 5 year rotation which is often recommended. An as-of-2018 not digitized set of Code-a-Site data from the 1970s sits in a box at the Paonia RD.
Several partial surveys of campsites have occurred in the West Elk Wilderness since the mid-1980s.
The Forest Plan for the GMUG National Forests calls for Frissell as the default campsite monitoring protocol. For the most part, even the legacy Code-a-site data assigned a Frissell score. West Elk protocols in the 1990s and later also collected additional data about horse use, barren core, proximity to water and several other attributes.
The 10 Year Wilderness Stewardship Challenge (10YWSC) campsite inventories completed on the Paonia RD used Frissell and Modified Cole protocols.
However, the Rapid Assessment Team which inventoried the Gunnison RD portion dropped the Frissell rating from their protocol. This left a round of inventories with site data which does not directly overlap with the rest of the West Elk data.
Using the most recent round of inventories (10YWSC) made the most sense for a Baseline Assessment, since many of the sites in the most current inventory are sites which have been visited in previous inventories. The lack of consistency in protocols between the two Ranger Districts indicated a need for a Universal Scoring system.
For reference, I have also compiled totals for separate inventories, though this does not include earlier Code-a-site surveys since that data has not been digitized yet. This hard-copy Code-a-site data could offer significant legacy data.
Campsite inventory data from the Gunnison RD was not available in GIS, though in the process of sorting through hard copy files, I created an Excel spreadsheet for the 1994-97 inventory.
I began the process of adding point data from the 2011 Gunnison RD campsite inventory to an existing GIS map of West Elk campsites, but this process is not complete as of 2018. The point data does not yet have any photos or attribute tables and will still require more time to complete.
The Paonia RD campsite inventory data, spanning back to the late 1980s, is in Excel, NRM/INFRA and GIS.

Data Source: Campsite inventories from the 10YWSC, are recorded in GIS and Excel documents. The campsite data used for calculating the measure value was collected on the Gunnison RD by a Region 2

Rapid Assessment Team and entered into a spreadsheet. The Paonia RD utilized a Wilderness Ranger and a pair of seasonal employees trained by the Wilderness Ranger. Data was collected in a Trimble GeoExplorer and entered into GIS, INFRA/NRM and recorded on a spreadsheet

Data Adequacy: Medium. While the data quality is likely to be high, it is difficult to discern whether the Rapid Assessment Team explored areas away from the main trail corridors. There were also two small basins on the Paonia side which were not inventoried in 2010-2012. Therefore the quantity is partial.

Frequency: 5 years

Threshold for Change: A 5-percent change in the recreation site measure value. Once there are five measure values, the threshold for meaningful change will switch to regression analysis. A decrease in the measure value beyond the threshold for meaningful change results in an improving trend in this measure.

Universal scoring	Frissell (1-5)	Cole (1-5)	RA (0-8)
1	1	1	0-1
2	2	2	2-3
3	3	3	4-5
4	4	4	6-7
5	5	5	8

Component Scoring for Campsites in the West Elk Wilderness		
Universal score x	Number of sites	= Component Score
1	172	172
2	144	288
3	86	258
4	43	172
5	7	35
	INDEX Value:	925

Legacy Data, Paonia RD 1987-91	
Frissell Score	Number of Sites
1	13
2	16
3	13
4	12
5	0
Total # of sites:	54

Legacy data, 1997 partial survey Paonia RD	
Frissell Score	Number of Sites
1	5
2	3
3	1
4	5
5	8
Total # sites	22

2010-2012 Data, Paonia RD, Frissell	
Frissell Score	Number of Sites
1	98
2	64
3	35
4	14
5	4
Total # of sites	215

Of the 215 sites inventoried in the West Elk Wilderness on the Paonia RD during the 2010-2012 inventory cycle, 98 sites were also assigned a Cole Condition Class rating.

Paonia RD Sites with a Cole Rating, 2010-12	
Cole Condition Class	Number of Sites
1	39
2	29
3	15
4	12
5	3
Total # of sites	98

Gunnison RD, 2011, Rapid Assessment	
Rapid Assessment score	Total # sites
0	21
1	53
2	39
3	41

4	28
5	23
6	20
7	9
8	3
Total number of sites:	237

Gunnison RD inventory, 1994-1997	
Frissell Rating	Total # of sites
1	14
2	37
3	14
4	9
5	9
Total number of sites:	83

Figure 21; a campsite in the West Elk Wilderness, trail #856, 2011 survey, Paonia RD (photo, J Stagner)

SOLITUDE OR PRIMITIVE AND UNCONFINED RECREATION QUALITY **Remoteness from sights and sounds of human activity *outside* the wilderness**

Acres of wilderness away from adjacent travel routes and developments outside the wilderness

Measure Type: *Required*

Measure Baseline Value: 156,607 acres
Year of Data Collection: 2018

Measure Description: This measure assesses the total number of wilderness acres more than ½ mile from roads, structures, and other developments that are located outside a wilderness or on the boundary, including cherry-stemmed access road corridors and developed inholdings. Data are compiled from the EDW, or other local or national data sources, and validated locally. The central data analyst calculates the measure value.

Background and Context: The West Elk Wilderness is a large area located well away from urban communities; the opportunity to distance oneself from the press of the modern world is still present**.** Visitors need not travel very far into the Wilderness to find an escape from humanity.

This measure calculates the amount of acres located at least ½ mile away from roads, developments or private lands. Sights and sounds from vehicle traffic, developments and structures, and other evidence of human habitation can negatively impact a visitor's Wilderness experience.

The results of this analysis revealed that over 156,000 acres of the West Elk Wilderness are at least ½ mile from roads and developments.
This measure was required for the Baseline Assessment. However, we did not select the counterpart measure, *Acres of Wilderness away from access and travel routes and developments inside Wilderness.* As will be further discussed in the Measures Not Selected narrative, those 156,000 acres become fragmented not just by the maintained trail system, but also by the many miles of user created routes.

Data Source: Jim Edmonds, Central Data Analyst

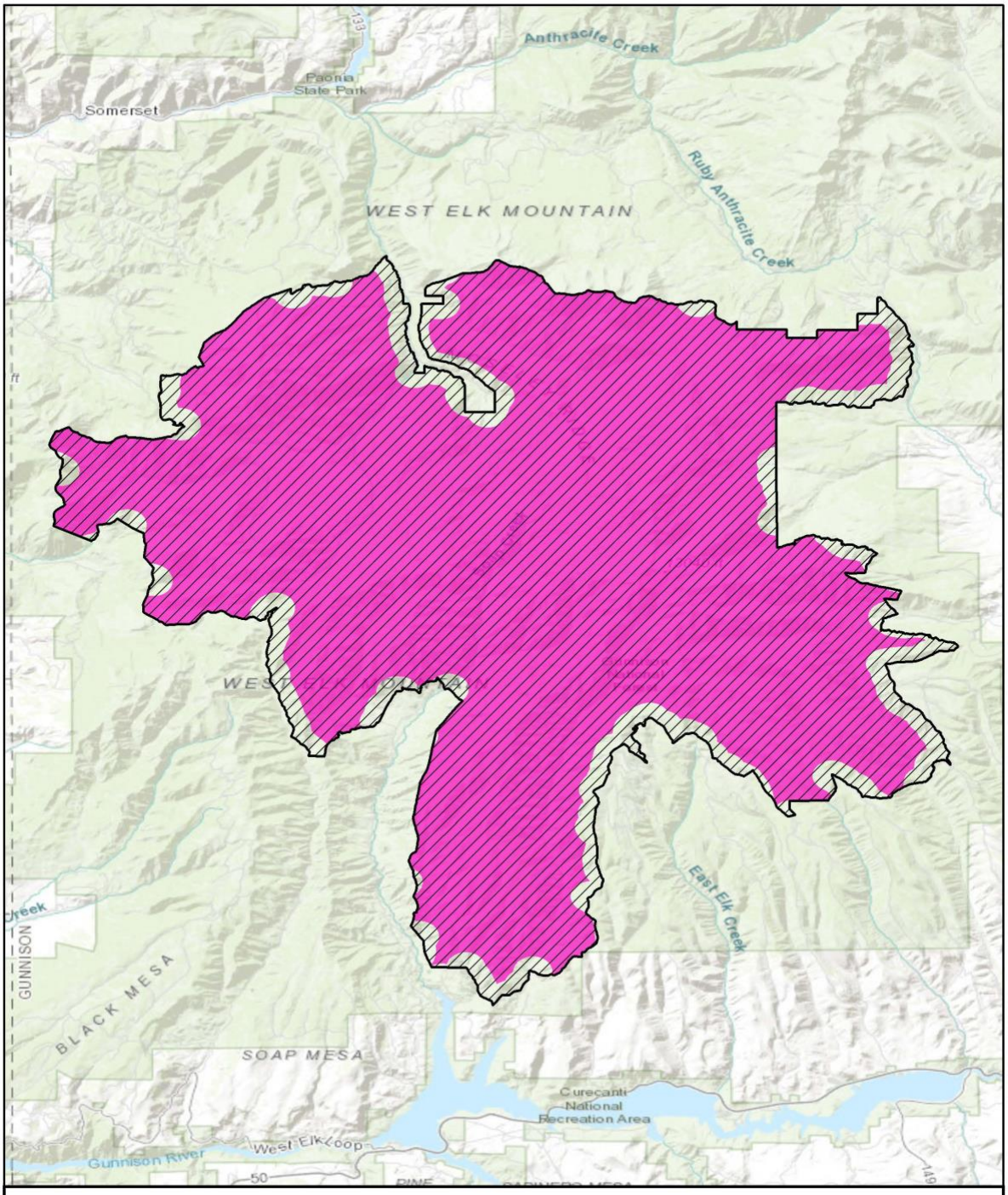
Data Adequacy: High. Spatial analysis performed by the Central Data Analyst. Data quality is considered good and data quantity is considered complete.

Frequency: 5 years

Threshold for Change: A 3-percent change in the acres of wilderness away from travel routes and developments outside wilderness. Once there are five measure values, the threshold for meaningful change will switch to regression analysis. An increase in the number of wilderness acres beyond the threshold for meaningful change results in an improving trend in this measure.

West Elk Wilderness

Remoteness from activity outside wilderness: Acres of wilderness away from adjacent travel routes and developments outside the wilderness



	TOTAL ACRES	OUTROADS ACRES
West Elk Wilderness	176431.07739977	156607.87940268

Index of National Forest System (NFS) developed trails

Measure Type: *Required to select at least one*

Measure Baseline Value: 442
Year of Data Collection: 2018

Measure Description: This measure is an index that assesses the miles of NFS trails and their trail classes. Local data are compiled and periodically entered in NRM-Trails. NRM-WCM calculates the measure value.

Background and Context: One intent of the Wilderness Act of 1964 was to preserve wild spaces to allow for visitors to experience solitude and self-reliance. National Forest System trails in Wilderness provide visitors access into the area while ideally protecting the landscape by concentrating travel to a hardened surface. Approximately 190 miles of constructed trails lead visitors across the varied landscapes of the West Elk Wilderness.
Some of these trails are shared with cattle and are popular with recreational stock users, leading them to be wide, well established corridors. By contrast, some of the West Elk trails see very low use and may provide a navigation challenge.

West Elk Wilderness trail data was updated in NRM at the beginning of FY 2018. Trail classes were also assigned at this time.

While the NRM data for this element does not capture the user created trails in the Wilderness, it is a reasonably complete data set. The caveat being that there are some locations in which user/cattle created trails have essentially become the new system trail. There are also secondary trail systems which intersect and overlap NFS trails. Overall the documented trail system has been captured with high precision GPS and entered into NRM, and can be considered to be reliable and accurate.

Data Source: The trails data was pulled from NRM

Data Adequacy: MEDIUM, though there are some challenges in the West Elk Wilderness trail system as described above.

Frequency: 5 years

Threshold for Change: A 3-percent change in the measure value for NFS trails. Once there are five measure values, the threshold for meaningful change will switch to regression analysis. A decrease in the measure value beyond the threshold for meaningful change results in an improving trend in this measure.

Trail Classes in the West Elk Wilderness		
TRAIL CLASS	Total Miles	Score
TC1 - MINIMALLY DEVELOPED	9.5663	10
TC2 - MODERATELY DEVELOPED	110.861	222
TC3 - DEVELOPED	70.121	210
		INDEX VALUE: 442

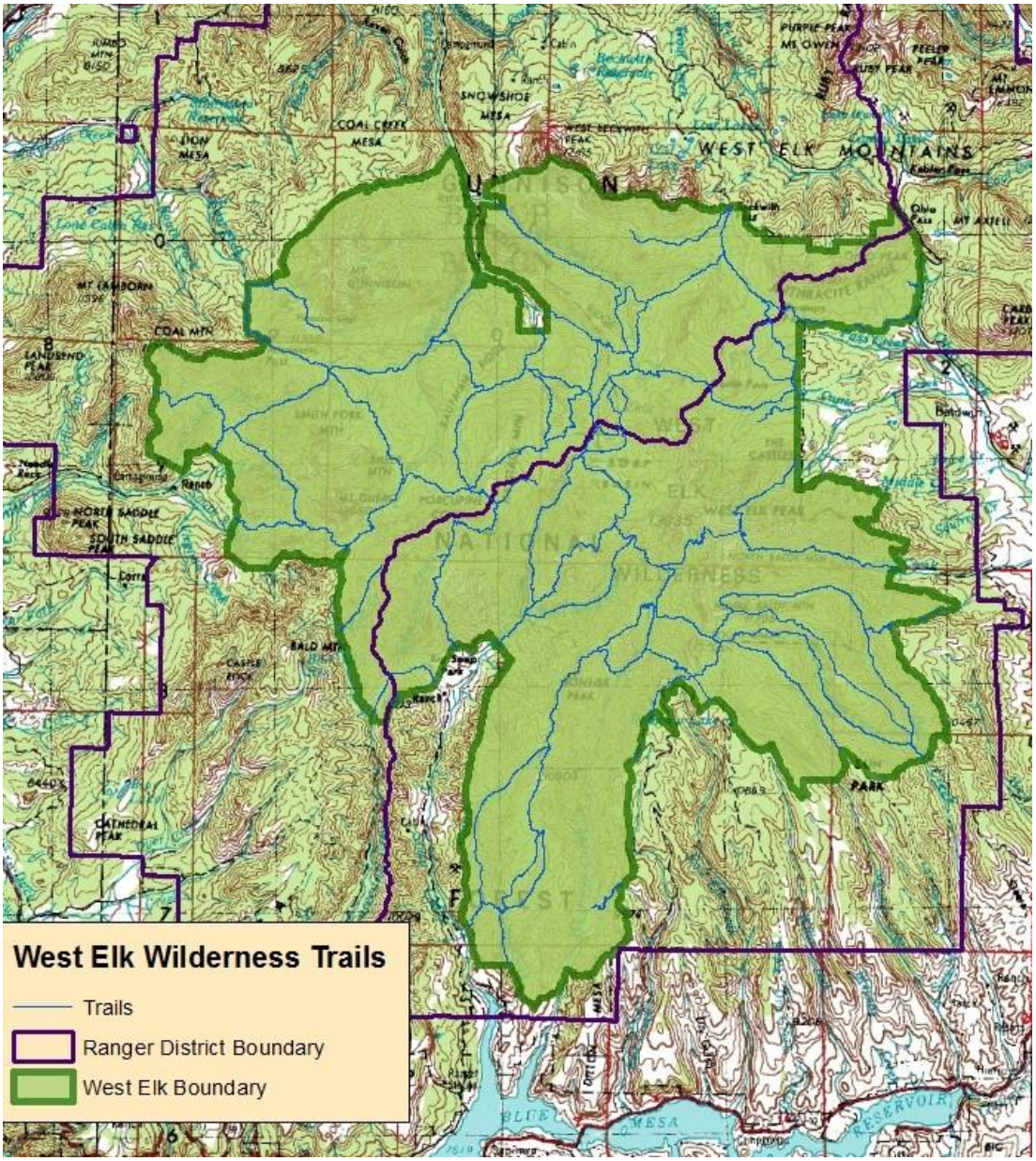


Figure 22; West Elk Trail system

Index of visitor management restrictions

Measure Type: *Required*

Measure Baseline Value: 12
Year of Data Collection: 2018

Measure Description: This measure is an index that assesses the relative degree of imposition or inconvenience of certain visitor management restrictions as well as the geographic extent of those restrictions. Local data are compiled and entered in NRM-Wilderness and NRM-WCM annually. NRM-WCM calculates the measure value.

Background and Context: Wilderness Regulations act as both a means to protect the Wilderness from human impacts and as a constraint on the Wilderness visitors' sense of freedom. Ideally the balance exists in which the resource of Wilderness is kept intact while still allowing for human enjoyment. Many regulations restrict activities or behaviors known to cause the most direct effects to Wilderness.

West Elk Wilderness regulations were updated and re-issued in 2016. In the most recent revision, we chose to eliminate a closure around Sheep Lake, specifying instead a 300 ft. camping/stock set back, which essentially prevents camping at the lake.

There are no permits or fees required in the West Elks. Most of the regulations which are in place address common issues in the Wilderness, such as camping too close to trails or water. Impacts to solitude and campsites are addressed by limiting group size and length of stay. A new regulation was added to remind stock users not to tie their horses to trees (a common source of resource damage/campsite impacts in the West Elks).

Data Source: West Elk Wilderness regulations

Data Adequacy: HIGH

Frequency: 5 years

Threshold for Change: Any change in the measure value. A decrease in the measure value beyond the threshold for meaningful change results in an improving trend in this measure.

West Elk Wilderness Regulations			
Regulation Category	Impact Rating	Geographic weight	Component Score
Area Closure	0	None	0
Campfire Restrictions	2	Entire	4
Campsite Restrictions	1	Entire	2
Dogs/Domestic animals	1	Entire	2
Fees	0	None	0
Group Size	1	Entire	2
Human Waste	0	None	0
Length of Stay	0	Entire	0
Permits	0	None	0
Stock Use	1	Entire	2
Swimming/Bathing	0	None	0
INDEX VALUE:			**12**

Figure 23; View into the West Elk Wilderness from West Beckwith Pass (photo, J Stagner)

Wilderness Regulations

Please respect the following practices to protect your Wilderness area:

Large groups cannot exceed 15 people per group, with a maximum combination of people and stock not to exceed 25 per group. Please do not shortcut switchbacks in the trail.

Camp at least 100 feet from all lakes, streams or other sources of water and at least 100 ft. from National Forest System Trails. Camping is not allowed within 300 ft. of Sheep Lake. There is a 14 day camping limit.

Campfires should be at least 100 feet from all lakes, streams, and National Forest System Trails and are not allowed at or above tree line. Campfires are not allowed within 300 feet of Sheep Lake.

If planning to highline or hobble your pack or saddle animals, do so at least 100 feet from all lakes, streams, and National Forest System Trails. Tying stock directly to trees is only allowed for brief loading and unloading. All hay and feed pellets must be certified weed free on all National Forest Lands.

All dogs (except for working stock dogs, guide dogs or dogs used for legal hunting) must be restrained on a leashed and/or under direct verbal control of the dogs' owner or handler at all times.

And remember, motorized and mechanized equipment is prohibited by law in Wilderness Areas. This includes but is not limited to: bicycles, motorcycles, snowmobiles, ATV's, hangliders, chainsaws, game carts and wagons.

For more information please call us at (970) 527-4131 or
write to: Paonia Ranger District, USDA Forest Service
P.O. Box 1030
Paonia, Colorado 81428

Figure 24; West Elk Wilderness Regulations

Measures Not Used for Wilderness Character Monitoring

The measures described below were considered as measures for wilderness character monitoring but were ultimately not used. Descriptions of each measure and the rationales for exclusion are included in this section.

INDEX OF USER CREATED TRAILS:

In the first round of discussions related to selection of measures for the West Elk Wilderness, there was agreement that this measure should be used. As we looked into the data needs for reporting this measure we realized that we were not in a position to provide or collect sufficient data at this point in time.
However, there is a significant network of cattle trails, outfitter trails and user-created trails which intersects with the NFS trail system. In some locations the cattle trails are logged out and marked and can appear to be a system trail. Even seasoned Wilderness staff have become confused in some areas where multiple unmarked trails overlap and the split off from primary trails into a confusing tangle of routes.

Routes have also been cut into 8A / Pristine areas of the Wilderness by visitors wanting access into a specific area.
The Mt Gunnison area is a good example of this type of activity. While official maps show no routes on or around the peak, a user route accesses the summit from Hoodoo Gap. Another trail accesses Gunnison Lake south from Coal Creek road. Part way up the lake access route, another user route crosses over and accesses Cascade Creek and Cascade Lake/ Gunnison Lake north. Additionally, a cattle route ties into the northern flank of the Cascade drainage from a spur trail off of the Hammond Trail. Most of these unofficial routes have been maintained by local hunters/fishermen and chainsaws have been involved.

Mapping of these secondary routes is imperative if we want to have an honest assessment of fragmentation and impact to areas zoned for lower trail densities.

The possibility of implementing a Social Trail Monitoring Plan has been discussed. If staffing allows, documenting non-system user routes is a high priority information need. The complicating factor, as is likely common for most Wilderness areas, is the insufficient funding for staff on the ground to accomplish all of the many monitoring needs. With workloads already high for trail maintenance, patrols, sign repair, campsite clean-up and site rehab, outfitter guide administration, campsite inventories, solitude monitoring, weed monitoring, lake sampling etc. there is only so much time to spend on mapping these routes. Skilled people in the field is the key missing component for taking care of the many needs in the West Elk Wilderness.
The large size and complexity of the West Elk Wilderness requires a higher degree of navigation skills and sending volunteers out into some of these remote areas is a questionable decision.
Despite those hurdles, the intent is to address this need for information/inventory and hopefully add this measure to the Character Assessment in the future.

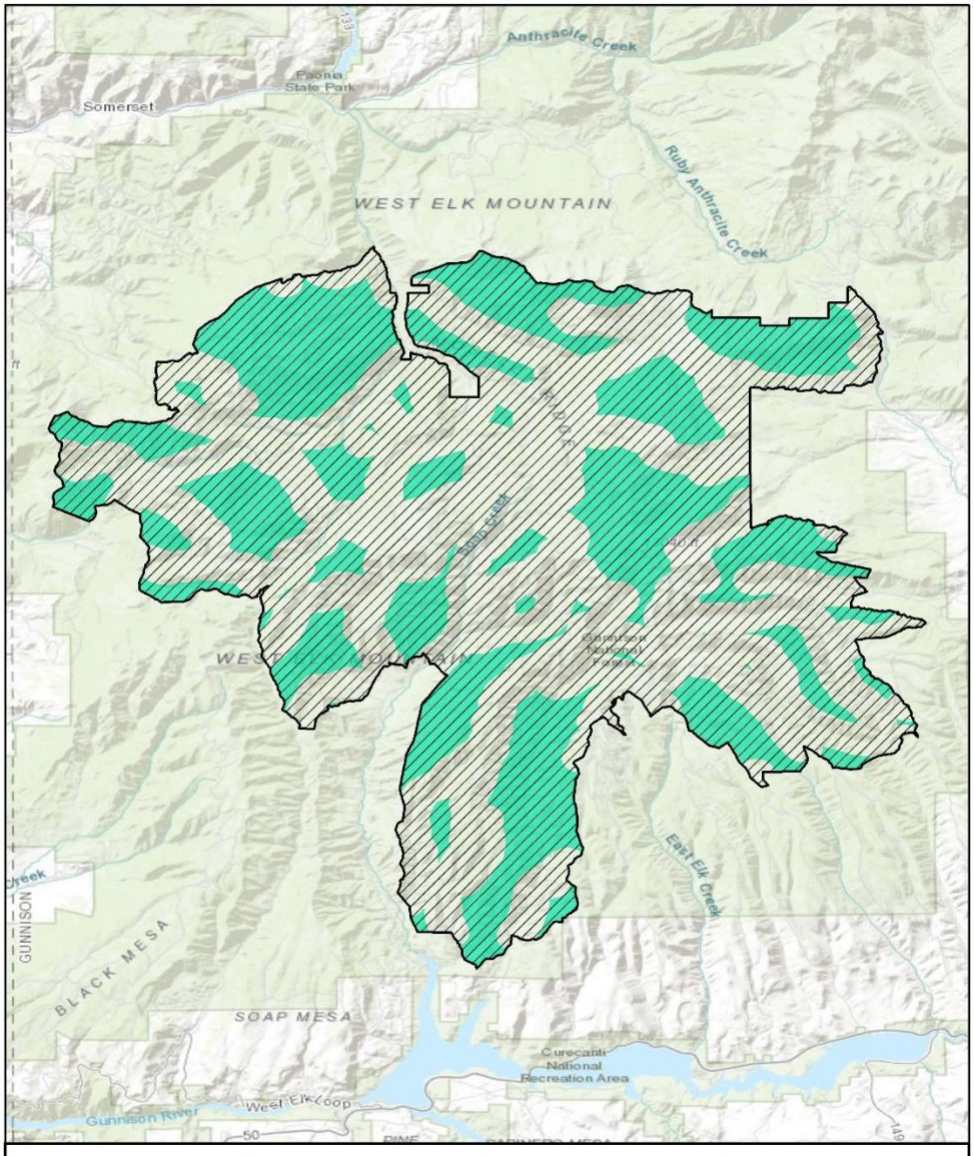
ACRES AWAY FROM DEVELOPMENTS WITHIN WILDERNESS

This measure ties in directly with the concern regarding user created trails in the West Elk Wilderness. Although the data pulled by the Central Data Analyst shows some large, intact areas of Wilderness away from travel routes, this data did not take into account the presence of chainsaw cleared cattle routes, outfitter trails and user-created routes which further fragment the Wilderness.

Though this has not yet been formally discussed as a future action, I believe it would be beneficial to recalculate the acres away from developments inside Wilderness if a Social Trail Monitoring Plan is implemented and the unofficial trail system can be mapped.

West Elk Wilderness

Remoteness from activity inside wilderness: Acres of wilderness away from access and travel routes and developments inside wilderness



	TOTAL ACRES	INROADS ACRES
West Elk Wilderness	176431.07739977	67640.1865717823

INDEX OF SENSITIVE LICHEN SPECIES
CONCENTRATION OF AMBIENT OZONE
CONDITION INDEX FOR INTEGRAL CULTURAL FEATURES
CONDITION INDEX FOR OTHER FEATURES

These measures were not selected for the West Elk Wilderness because they do not capture information which is relevant and useful for this individual area.
There are currently no known lichen studies.
Nitrogen and Haze are already well established air monitoring measures for the West Elks.
Very few cultural or other (geologic, historic etc.) features stand out as a distinguishing element of the character of this Wilderness.

PERCENT OF EMERGENCY INCIDENTS USING MOTOR VEHICLES, MOTORIZED EQUIPMENT, OR MECHANICAL TRANSPORT

This measure was not selected due to relatively low frequency of these events. To make sure we were not missing a key piece of information of the West Elk Wilderness, I contacted West Elk SAR, a local volunteer SAR group, for statistics. They had only one response in the West Elk Wilderness in 2016-2018. That incident involved an overdue backcountry skier who self-rescued. No motorized equipment was used.

Fire suppression in the West Elks sometimes utilizes chainsaws. One helicopter was used in the past 10 years for fire response. The potential for a large fire does exist, primarily in the southern portion of the West Elk Wilderness, but statistically the fires have been small and infrequent and therefore fire response is not a predominate activity in this Wilderness.

INDEX OF NONINDIGENOUS TERRESTRIAL ANIMAL SPECIES

This measure was considered, in part for the potential to capture the presence of domestic livestock utilizing the Wilderness. However, the grazing use of the Wilderness is tracked by the **Number of Animal Unit Months of Commercial Livestock Use** measure. Overall, the feeling among District Wildlife Biologists familiar with the area is that the non-indigenous fish populations pose a greater biological disruption than any of the terrestrial animal species.

WATERSHED CONDITION CLASS

Although we did not select this measure, this information is available in Forest GIS.

Watershed condition class, West Elk Wilderness		
WATERSHED	CONDITION	WCC ACRES
Miller Creek	Functioning Properly	3051.037339
Cow Creek-Soap Creek	Functioning Properly	9752.959512
Curecanti Creek	Functioning Properly	3558.51399
Upper Smith Fork	Functioning at Risk	15645.97356
Middle Smith Fork	Functioning at Risk	10.31314073
Upper Ohio Creek	Functioning at Risk	5695.665987
Castle Creek	Functioning Properly	9499.577367
Mill Creek	Functioning Properly	5282.967527
Middle Ohio Creek	Functioning at Risk	416.6209553
Antelope Creek	Functioning at Risk	1.249078431
Ruby Anthracite Creek	Functioning Properly	1606.348198
Snowshoe Creek	Functioning at Risk	8.910714955
Robinson Creek	Functioning Properly	11215.21137
Headwaters Coal Creek	Functioning Properly	17411.49115
Cliff Creek	Functioning Properly	21814.40845
Outlet Clear Creek	Functioning Properly	7229.331642
Raven Gulch	Functioning at Risk	340.3953033
Beaver Creek	Functioning Properly	13402.23732
Steuben Creek	Functioning at Risk	5322.379466
Willow Creek-Blue Mesa Reservoir	Functioning at Risk	225.5520698
East Elk Creek	Functioning at Risk	296.2364755
Red Creek	Functioning at Risk	30.63003725
West Elk Creek	Functioning Properly	18099.87682
West Soap Creek-Soap Creek	Functioning Properly	26513.02192

Conclusions

As an original 1964 Wilderness Act designated area (and a protected area prior to that) there is a long and rich history in the West Elk Wilderness. Its remoteness, size and rugged terrain have kept the heart of this Wilderness intact.
There still remains a deep wildness in some of this Wilderness, but that can be lost without diligence and caution.
The expansion of the Wilderness in 1980 brought with it greater acreage, but also a legacy of non-conforming motorized uses. The consistent yearly use of chainsaws to clear cattle routes is an essential part of a continuing grazing program that was established long prior to Wilderness designation, but it does pose a concern to the continued fragmentation and mechanization of the Wilderness.

The need to document the user and cattle created trail system brought home a larger concern which I believe is universal to Wilderness Managers everywhere. How are we going to keep on top of all of our monitoring needs (in addition to all of the other work that needs to be done) with extremely limited staff and other Wildernesses for which we are responsible?

There is a great need for more skilled people on the ground; the challenge lies in finding beneficial partnerships and the time to train and work with them to ensure quality monitoring data.

This Baseline Assessment also revealed our lack of quality data for user numbers. With time the Solitude Monitoring will help indicate whether we are exceeding our standards for opportunities for solitude in our 8B and 8C zoned areas, but it is not meant to be used as an accurate tally of visitor use.
Moving forward, looking into the use of trailhead counters and a better focus on tracking encounters while working in the Wilderness may be needed.

What was not captured, but perhaps should have been, is the frequency of *unauthorized* motorized and mechanized uses or illegal actions/violations in the Wilderness. Bicycle trespass, use of chainsaws and game carts and dirt bikes by visitors. Wilderness users who trespass with vehicles and ATVs. Visitors constructing structures/cabins, caching gear, removing signs, using generators, illegally outfitting and more. These actions and activities are problematic, but they did not find a place in this assessment.

As a whole, we have some good data for the West Elk Wilderness, but there is a substantial amount of legacy data and information which simply resides in file folders, binders and boxes. Archiving and digitizing this information would be a valuable addition to add context to the long history of this Wilderness.
Moving forward, it is my intent, if the opportunity is provided, to consolidate all of the best available information and data into shared files, for both Gunnison and Paonia Wilderness staff to reference and update. Better information sharing between Districts will be key to collecting quality monitoring data.

Projecting a few years ahead, there could be future concerns of increasing pressure on the Wilderness as nearby Wilderness areas become more crowded and people turn to the West Elks for solitude. Increased use can bring with it a greater need for enforcement of regulations, issues with sanitation and the potential proliferation of new campsites.

Warmer, drier trends in weather may cause higher frequency in fire activity or population expansion of some of our invasive weed communities. These outcomes would require more trammeling actions.

It is my hope that we will have the resources and support to both continue with Wilderness monitoring and to be able to anticipate and address future and current threats to Wilderness Character before they have the strength to cause an irreparable loss of wildness in the West Elk Wilderness.

Figure 25; Smoke-filled sunset in the West Elk Wilderness (photo, J Stagner)

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