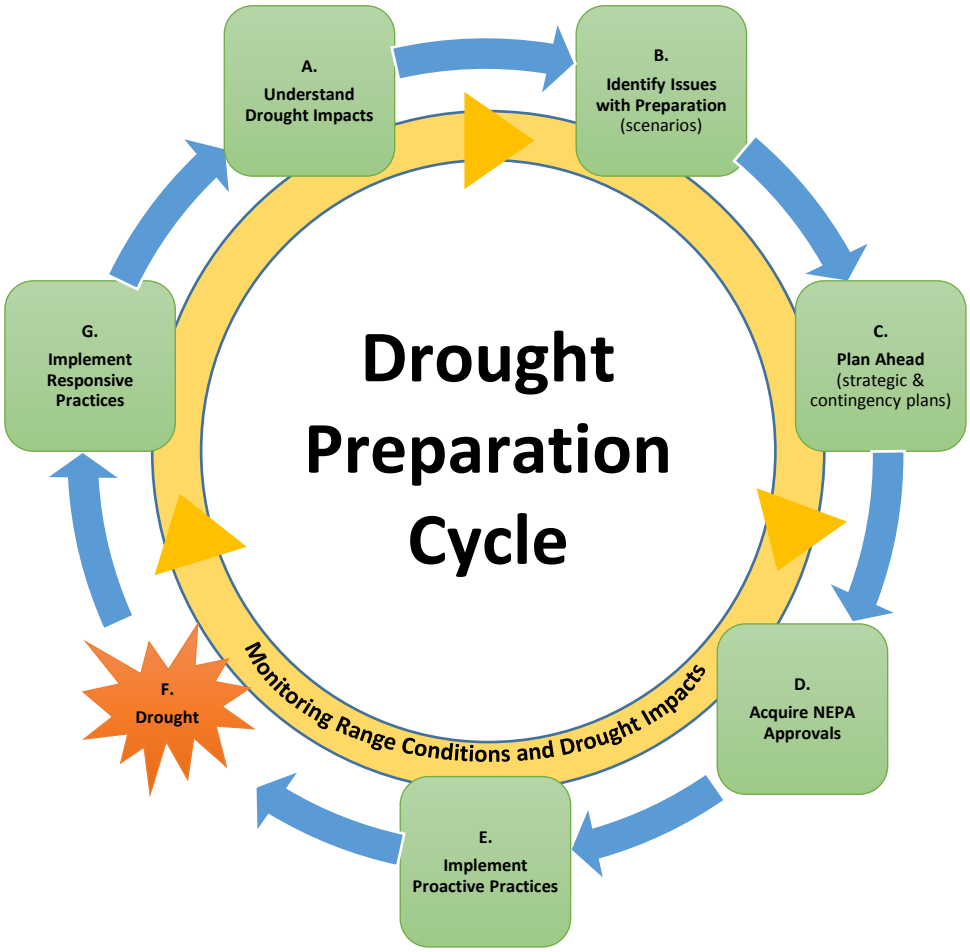
DRAFT – 04 October 2017

Guide to Co-Developing Drought Preparation Plans for Livestock Grazing on Southwest National Forests



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Preface / Acknowledgements

This Guide is one output of a long-term project organized by researchers from the University of Arizona, which intended to address drought concerns for livestock grazing in the Southwestern United States. At an initial workshop held in 2013, local stakeholders identified the lack of flexibility in the administration of public land grazing as a challenge to managing for and becoming prepared for drought.

Then in 2014, the University researchers received a grant from the National Oceanic and Atmospheric Administration (NOAA) Sectoral Application Research Program (grant #NA140AR4310242) to explore this issue further, together with the Tonto National Forest staff and livestock grazing permittees (ranchers), as well as the Forest Service Region 3 leadership and Gila County Cattle Growers Association. From this effort, the need for a guide to drought preparation emerged.

This Guide is intended to assist the Forest Service and livestock grazing permittees work together to address drought concerns and policy constraints facing livestock operations that utilize national forest grazing allotments in the Southwest Region (Figure 1). In addition, this Guide is intended to help those two parties develop and implement strategic (long-term) plans tailored to individual allotments/ operations with the overall goal of improving preparation for future drought.

Thank you to all who contributed to the ideas and approach of this Guide and to those who took extra time to ensure that it is as accurate as possible and practical for the greatest number of people. You know who you are – thank you!

More information on the proceedings and outcomes of this project (i.e. project team members, goals and objectives, or findings from surveys, interviews, and workshops) can be found at: www.cals.arizona.edu/droughtandgrazing

Figure 1: Map of National Forests and Grasslands in the Southwest Region (Region 3)

Map from: https://www.fs.usda.gov/main/r3/about-region/overview

List of Important Acronyms

AMP	Allotment Management Plan
AOI	Annual Operating Instructions
AU	Animal Units
AUM	Animal Unit Months
CE	Categorical Exclusion
EA	Environmental Assessment
EIS	Environmental Impact Statement
ESA	Endangered Species Act
FS	Forest Service
IDT	Interdisciplinary Team
NEPA	National Environmental Policy Act
NOAA	National Oceanic and Atmospheric Administration
NRCS	Natural Resources Conservation Service
SPI	Standardized Precipitation Index

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1. INTRODUCTION

While there are many existing guides and manuals that focus on such topics as planning for drought, mitigating drought risk, and using strategic planning for ranching in general, this *Guide to Co-Developing Drought Preparation Plans* is specifically intended for ranching operations that utilize national forest allotments in the Southwest Region of the Forest Service (Region 3, Arizona and New Mexico).

Many ranchers in the Southwest may not feel threatened by the risk of drought because they have already adapted their operations to the normally arid conditions of the region. However, when conditions become abnormally dry, even for just a short season or for consecutive years, will livestock operations be prepared and have sufficient management flexibility to cope with the drought while minimizing financial losses and negative impacts to the rangeland?

This Guide specifically addresses challenges associated with ranching on national forest lands. As public lands, national forests are managed to be consistent with laws and regulations that aim to both protect the environmental integrity and sustainability of the forest ecosystems as well as involve the public in decision-making. Livestock grazing management on national forests therefore must also adhere to those laws, which places limitations on allowable management practices. The National Environmental Policy Act (NEPA) in particular can add considerable amount of time between planning and implementation phases of new practices.

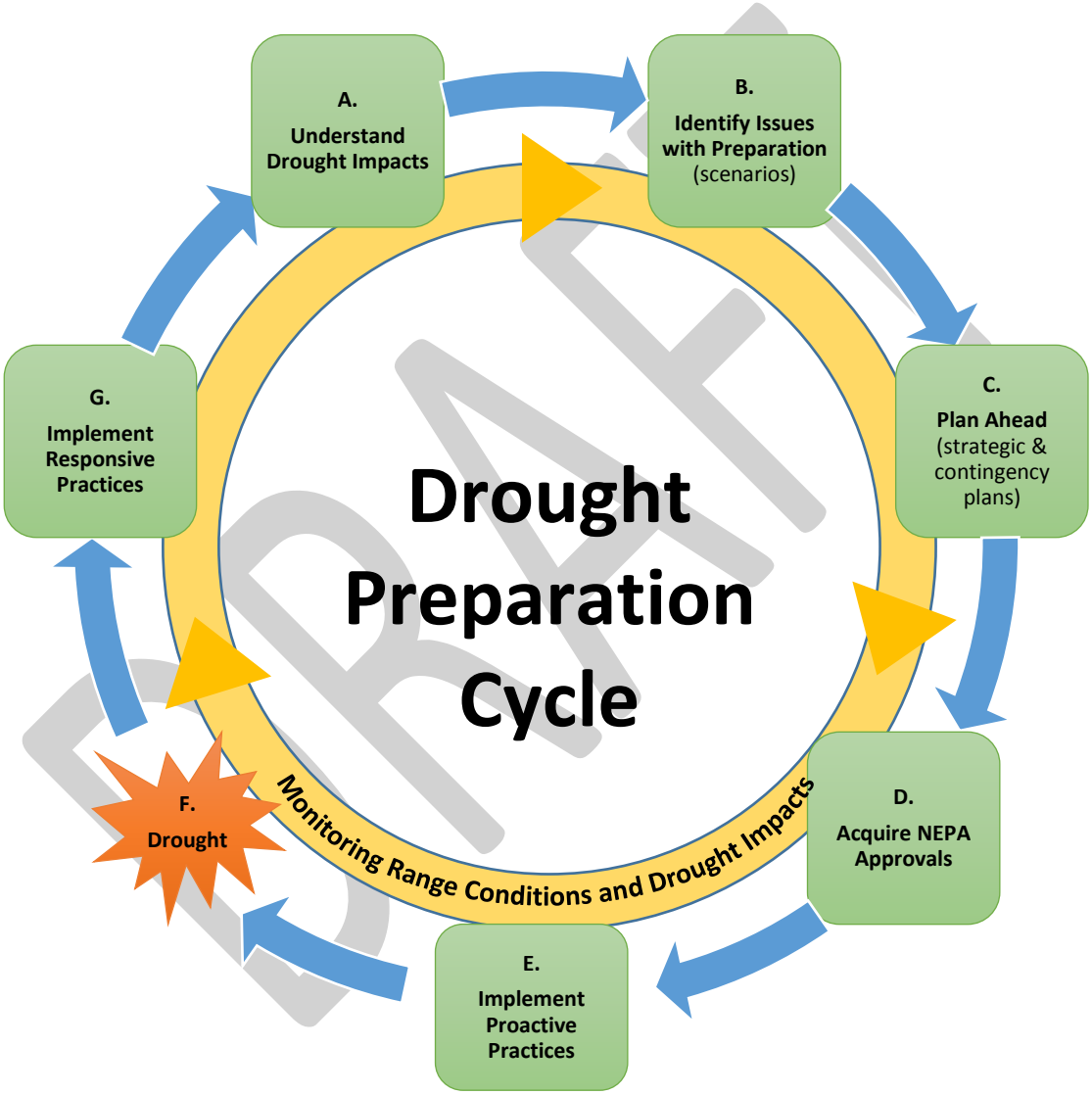
Planning ahead (5 years or more) is therefore essential in order to efficiently make modifications needed to prepare a national forest livestock operation for future drought. A Drought Preparation Plan is intended to identify and prioritize strategic, proactive practices and projects that need to be implemented *before* the next drought in order to increase flexibility of management options in response to drought.

This Guide helps the Forest Service and rancher work together to discuss drought risk and impacts, identify issues with current level of preparedness using scenario planning, and select and prioritize practices to include in their Drought Preparation Plan (Figure 2, Boxes A-C). In addition, this Guide helps those two parties begin the discussion and develop shared expectations about how these proposed practices will be evaluated during the NEPA review process by the Forest Service (Figure 2, Box D). Once approvals are received, the two parties are then expected to implement the proactive practices in their Drought Preparation Plan before the next drought, use their increased flexibility to respond to drought, then reassess drought impacts and preparation needs (Figure 2, Boxes E-G).

The Forest Service and the ranchers must work together and maintain good communication in order for drought planning to be effective. The Forest Service and ranchers may have different priorities about

effective public land resources management and the success of the ranching business, but having the shared goal of sustainably managing forest resources is a good foundation for collaborative drought planning. Some of the many benefits of working together include improved relationships, trust, co-learning, and management that is more effective.

Figure 2: Drought Preparation Cycle for Livestock Grazing on Southwest National Forests



2. WHY PLAN AND PREPARE FOR DROUGHT?

2.1 What is Drought?

Drought can generally be defined as a deficiency in the average, or expected precipitation over a given period of time. The deficiency is commonly expressed as a percentage of average precipitation (e.g. 75%). Drought can also be expressed by precipitation indices that calculate the likelihood of occurrence of precipitation totals (e.g. 1 in 10 years or 10th lowest percentile).

2.2 Drought is Inevitable

You've heard it before: it's not a matter of *if* drought is going to happen, but *when* it's going to happen, how bad it will be, and how long it will last. For example, drought conditions in the Southwest occur 43% of the time when using the Society for Range Management definition of drought (<75% of average precipitation). Knowing that drought is certain to happen again, why not plan for it? Planning needs to begin *now* while you still have time to prepare for the next drought.

2.3 Drought is Difficult to Predict

Drought is different than other natural disasters, such as hurricanes and tornadoes, which have a clear start and end time and clearly defined impacts. Drought creeps up slowly, and when the lack of precipitation becomes apparent, managers are too often faced with a dilemma about whether or not to hold out in hope of rain, or start to change the management in case the drought continues.

Unfortunately, seasonal (3 month) climate predictions provided by NOAA Climate Prediction Center (www.cpc.noaa.gov) have low accuracy and spatial scales that are too coarse for the ranch-unit management scale. While winter season predictions have become more accurate in recent decades for events related to the El Niño Southern Oscillation (also known as ENSO), the summer season precipitation in the Southwest remains relatively unpredictable.

2.4 Drought is Variable in Space and Time


Photo by: K. Hawkes

The Southwest Region (Arizona and New Mexico) experiences two rainy seasons which provide benefits at different times of year and both are subject to drought:

Summer Monsoon (June-Sept)

- Typically heavier, isolated storms with high spatial variability
- Warm-season plant growth

Winter Season (Oct-May)

- Typically widespread, gentle storms
- Replenish drinking water catchments
- Cool-season plant growth

Storms may occur at spatial scales smaller than a single pasture, leaving "patches" of dry areas, or storms may be widespread across an entire allotment. Timing of precipitation can also influence vegetation growth: fewer large storms may not have the same benefits as more frequent smaller events.

2.5 Drought Creates Impacts

Drought may result in many negative short- and long-term impacts:

Impacts to National Forest

- Low plant production
- Low water levels
- Higher chance of wind and water erosion
- Increase in bare soil
- Invasion of non-native species
- Change in plant species composition
- Fewer resources for wildlife

Impacts to Livestock Operation

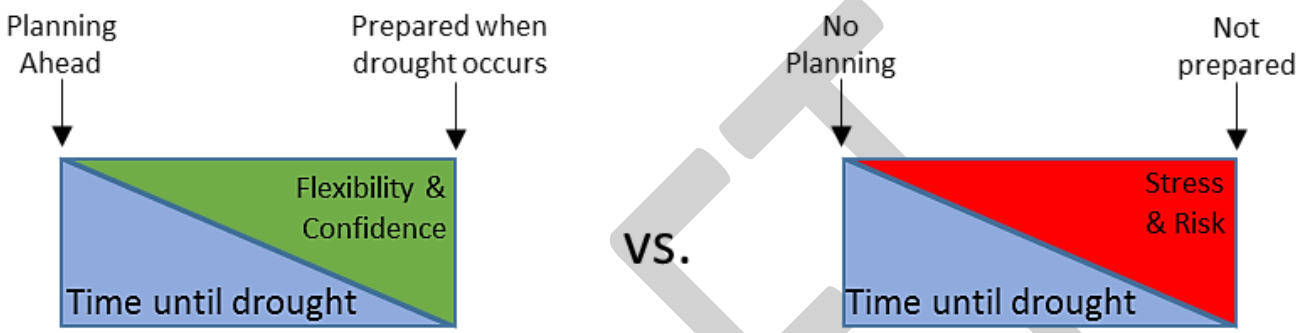
- Decreased forage
- Decreased drinking water
- Decreased flow from wells and springs
- Decreased animal productivity
- Selling animals at lower prices
- Possible loss of access to grazing allotment to avoid grazing of drought-stressed vegetation

2.6 Drought Management is Risk Management

Being prepared for drought risk means that you have the management flexibility needed to respond quickly and effectively as drought conditions develop. Preparing for drought requires a process of

strategic planning to identify what is needed to improve management flexibility in order to implement responses (such as those designated in a contingency plan) as drought worsens. Planning ahead reduces risk of impacts from drought compared to waiting to react only after drought is in full swing (Figure 3).

Figure 3: As time runs out until the next drought, planning ahead helps increase flexibility and confidence and reduce the stress of making last-minute, risky decisions (adapted from Tolleson 2017).



2.7 Start Thinking About Your Current Drought Preparedness

In regards to your national forest livestock grazing responsibilities, take a few moments to ask yourself these general questions to help you start thinking about your current drought preparedness:

- Do I feel prepared to handle the next *minor* or *severe* drought?
- What will be my plan of action if a minor drought occurs? If a severe drought occurs?
- Am I as prepared as I want to be?
- What does my Plan B look like? Do I have multiple back-up plans?
- What can I do now to become more prepared for minor or severe droughts?
- Have I discussed drought preparation with my Forest Service range manager / permittee?

If your answers to any of the questions were unsatisfactory, then it is time to begin planning to become more prepared for drought. This Guide will help you and your managing partners to explore issues with a livestock operation that make it vulnerable to drought impacts as well as use creativity and strategy to co-develop plans for improving preparation for a variety of drought circumstances amidst the challenges inherent in public lands ranching.

3. THE NATIONAL FOREST CONTEXT

3.1 Livestock Grazing on National Forests

Livestock grazing is valued within American society because it provides food security, opportunities for rural livelihoods and traditions, and contributes to local economies. National forests, which also serve a very important role in American society, have long supported the range livestock industry by providing both forage and water resources where suitable.

Agency handbooks and manuals assist the Forest Service staff to manage responsible and ecologically sustainable livestock grazing on national forests. Two important chapters from the agency's Grazing Permit Administration Handbook (2209.13) provide guidance for carrying-out these responsibilities: Chapter 10 – Permits with Term Status, and Chapter 90 – Rangeland Management Decision-Making.

KEY PARTNERS

National Forests are subdivided into management areas called Ranger Districts. A **District Ranger** is responsible for all of the livestock grazing allotments within his/her District among other important management concerns, such as wildlife, endangered species, recreation, watersheds, and cultural resources. As "line officers", District Rangers have authority to make official management decisions for their District. Other line officers include the Forest Supervisor and Regional Forester.

District Range staff, also known as Rangeland Management Specialists ("**Range Specialists**") are resource specialists who assist with livestock grazing-related tasks and provide management recommendations to the District Ranger. A Forest-wide Rangeland Program Manager oversees and assists with all livestock grazing activities on a national forest.

A permit may be issued to a rancher ("**grazing permittee**") to graze livestock on a designated allotment(s) on a national forest, and that permit also specifies the allowable number, kind, and class of livestock, period of use, authorized grazing management practices, and associated infrastructure.

3.2 Region 3 Drought Policy for Livestock Grazing Allotments

This policy is a supplement (established in 2006, and most recently updated in 2015) to the Forest Service Grazing Permit Administration Handbook, Chapter 10 (No. 2209.13-2015-1). The full text is located in Appendix A.

PURPOSE: This supplement establishes guidelines for Forest Service employees to perform drought evaluations on individual allotments, assess livestock management, adjust stocking before, during, and after drought, and set standards for communicating with the livestock industry and other affected interests.

KEY POINTS:

- Encourages planning ahead for drought
- The Regional Forester monitors trends in the Standardized Precipitation Index (SPI; covered next): **"whenever the SPI for a national forest reaches a value of minus 1.00 (-1) or less for the preceding 12-month period, grazing allotments should be evaluated for existing drought conditions."**
- Evaluations for on-the-ground drought effects will be done on an allotment-by-allotment basis using an interdisciplinary perspective.
- Evaluations are done by the Range Specialist, ideally with the grazing permittee, and should consider a variety of local factors. The evaluations are then used to make recommendations to the District Ranger, who, in consultation with the affected grazing permittee, makes official management decisions for the livestock grazing that prioritize protection of the national forest rangeland resources
- Rangeland resources should be re-evaluated periodically to adjust livestock management where needed
- Reducing stocking rate is a very likely possibility depending on the circumstantial drought effects discovered in the evaluation
- Special concern should be given to rangeland recovery following drought, including prioritizing plant vigor and restoring soil cover through plant litter, implementing pasture rest or incremental re-stocking, using pastures when key forage species are dormant or only after key forage species have produced mature seed.
- Early communication with the grazing permittee and collaborating agencies about drought conditions and potential management changes is essential.

STANDARDIZED PRECIPITATION INDEX

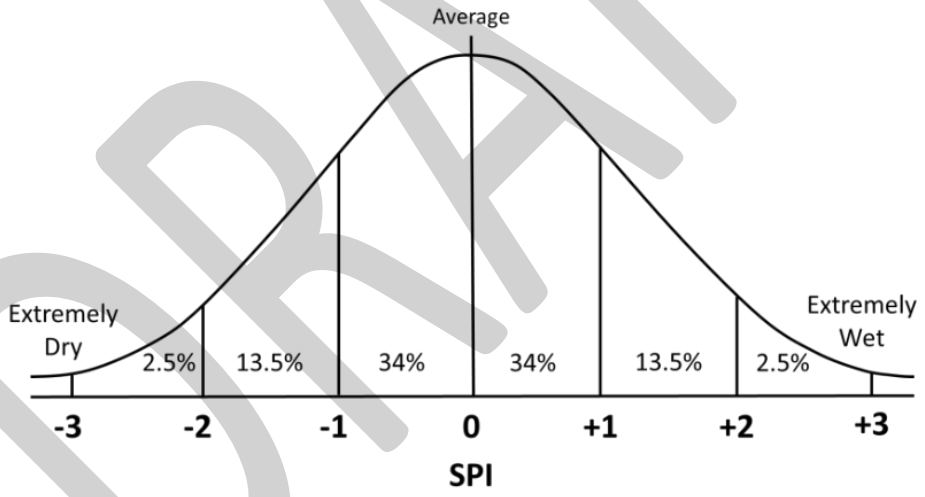
The Standardized Precipitation Index (SPI) is a measure of intensity of drought relative to the average from the historic record for that location. It uses only precipitation data, and is versatile because it can

be tailored to any spatial, temporal or historic record scale. Because all SPI values represent a standardized departure from average, they can be compared between locations of different average annual precipitation. However, it is necessary to know the spatial, temporal, and historic record scale being used in individual SPI values before making the comparison. Knowing how to interpret SPI values is useful because of their role in the Region 3 policy and because it allows the Forest Service staff and grazing permittees to speak a common language about drought.

KEY FEATURES OF SPI:

- SPI values are actually "standard deviation" units, where zero represents the average precipitation received over that historic time period; and values greater or less than zero represent above- and below-average respectively (Figure 4).
- SPI also represents the frequency, or likelihood, of a particular precipitation amount occurring based on the historic record (see percentages in Figure 4). For example, a value of SPI -2 or lower occurs about 2.5% of the time, while a value of SPI -1 or lower happens about 16% of the time (i.e., 2.5 + 13.5 = 16).

Figure 4: Likelihoods and Dryness-Wetness Intensity of SPI Values



- An SPI value is dependent on the *timescale* or "window" being represented. That is:
    - Are you interested in knowing how the most recent *annual* total (12-month) compares to the historic record annual average for that location?
    - Are you interested in knowing how the total precipitation for a *single month*, e.g. July of this year (1-month), compares to the overall *July average* in the historic record?
    - Are you interested in how the total precipitation for a summer *season* (3-month) this year compares to the average summer season in the historic record?
- SPI can be represented in any time scale, but keep in mind that a longer time scale (e.g. 12-month – used in the Region 3 policy) may mask any important seasonal variability in precipitation. For example, a dry summer may not be detected in a 12-month SPI value if a wet winter also took place to balance the annual total. Knowing how much each rainy season

contributed to the annual total may improve decision-making, because winter and summer seasonal precipitation have different effects on livestock management in the Southwest. More information about seasonal SPI values for Southwest national forests is located in Appendix B.

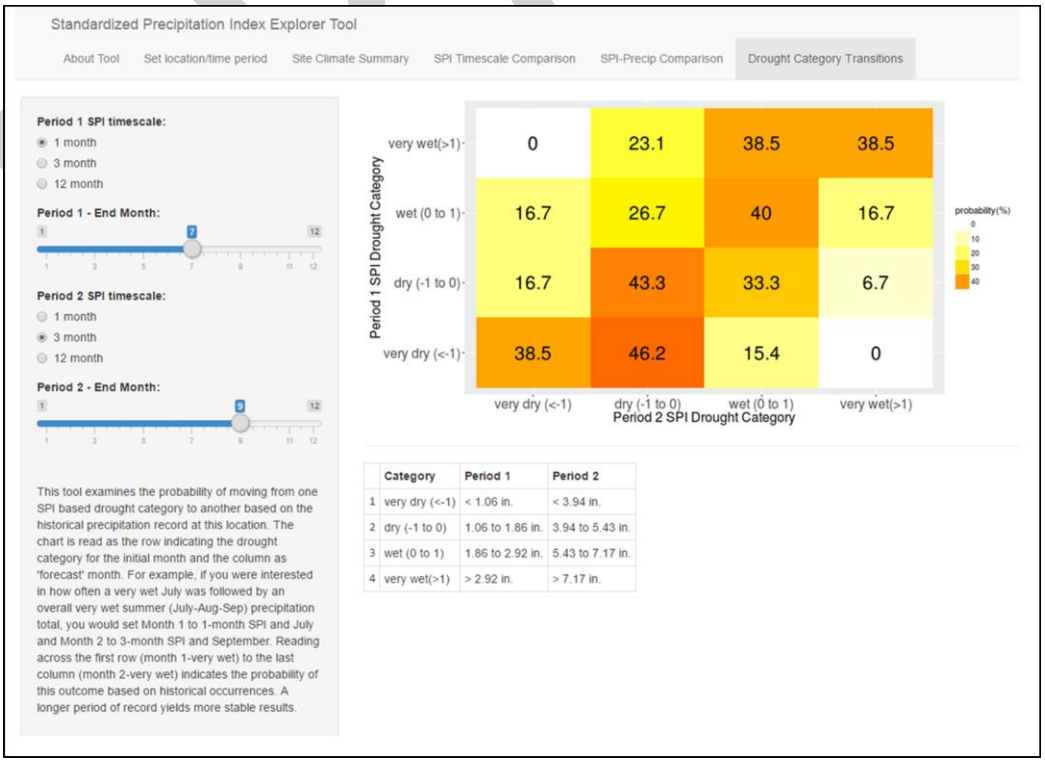
- You are not expected to know how to convert your precipitation data into SPI values, nor do you need to have a long-term precipitation record in order to understand trends in the SPI for your location throughout the last century. Instead, check out the **SPI Explorer Tool** (Box 1).

Box #1

SPI EXPLORER TOOL

The SPI Explorer Tool was developed at the University of Arizona, and is accessible online at: https://uaclimateextension.shinyapps.io/SPItool/

The SPI Explorer Tool can be used to learn the historic SPI values and the relationship between SPI and actual precipitation for any location in the continental United States. In addition, the Tool can be used to describe the likelihood of future conditions given the current condition. For example, the Tool will report the likelihood of wet or dry conditions at the end of the monsoon season (July-September, Period 2) based on the conditions at the end of July (Period 1).



PLANNING IMPLICATIONS

Given that the SPI -1 (or less) trigger for closer evaluation occurs about 1 in 6 years, or about 16% of the time in any historic record, it is never too soon to begin planning to increase preparations for the next drought. Planning ahead is particularly important for livestock grazing operations that rely on national forests because all new practices must first be authorized by the Forest Service through the NEPA review process, which can sometimes take a considerable amount of time to complete.

3.3 National Environmental Policy Act and Review Process

WHAT IS IT? "NEPA" is a federal law (of 1969) that requires federal agencies to analyze the environmental impacts of their proposed actions on federally managed lands and to inform and involve the public prior to making decisions about which actions to pursue. *Livestock grazing on any portion of a national forest is considered a proposed action which requires a NEPA analysis before a decision can be made to authorize it.*

Authorizing livestock grazing through the NEPA process requires that four categories of specific proposed actions are analyzed for environmental impacts:

1. General Livestock Use Conditions: proposed number, kind, and class of livestock, period of use, and allotment(s) where grazing is permitted
2. Management: proposed grazing practices, herd rotations, allowable vegetation utilization levels, resource protection measures, and adaptive management strategies
3. Improvements: proposed structural (e.g. water developments, fences, erosion control) or non-structural (e.g. land treatments such as prescribed fire or juniper removal) rangeland improvements
4. Monitoring: proposed strategies for monitoring rangeland condition (vegetation, surface water, precipitation) and how that data will be collected and used to inform adaptive management strategies.

The NEPA process described above for authorizing livestock grazing on a particular allotment is repeated ideally every 10 years in order to incorporate necessary changes in management over time. This repeated procedure is known as the "**Allotment NEPA**" or sometimes informally referred to as the "big NEPA" for an allotment.

No new grazing management actions can be taken on a national forest allotment that have not already been analyzed and authorized through the NEPA process or without line officer approval. This is important from a planning perspective because the ten-year (or sometimes much longer) interval between Allotment NEPAs can be too long to wait before new strategies for drought preparation can be incorporated into the grazing management.

To overcome this lengthy time challenge for grazing management adjustments, some District Rangers may choose to pursue a separate NEPA analysis dedicated to individual projects or small groups of projects in between Allotment NEPAs in order to more quickly approve important new practices. Because these NEPA analyses cover only one or a small handful or practices compared to the entire Allotment NEPA, it is typically a much quicker NEPA process to complete. These types of NEPA analyses are known as "**Project NEPAs"** or sometimes informally referred to as "small NEPAs".

TYPES OF NEPA PROCESS ANALYSES FOR NEW ACTIONS

When the NEPA process is needed to analyze the environmental impacts of and make a decision about a proposed action, the District Ranger (or other line officer) decides how thorough an analysis is needed depending on whether or not the environmental impacts of the proposed action are expected to be significant. There are three different types of NEPA analyses that a District Ranger may pursue:

- *Environmental Impact Statement* (EIS) is a very thorough analysis completed for a proposed action that is expected to have a significant impact on the environment. EIS is very *uncommon* for livestock grazing related decisions. An EIS requires that alternative actions are analyzed, including taking "no action". A document called a "Record of Decision" is used to report which action was selected from the alternatives following the EIS analysis.

- *Environmental Assessment* (EA) is a less thorough analysis for a proposed action that is expected to have *no* significant or *unknown* environmental impact. An EA is the most common analysis used for authorizing livestock grazing and related management practices on national forest allotments, i.e. used most commonly for both Allotment NEPAs and Project NEPAs. An EA also requires analysis of multiple alternative actions and an optional "no action" alternative. A document called a "Decision Notice" is used to report which action was selected following the EA analysis, and it is accompanied by a document called a "Finding of No Significant Impact".

- *Categorical Exclusion* (CE) is a special NEPA option that allows a decision to be made about a proposed action without the thorough environmental analysis if that action is covered within a designated category that has already been cleared for environmental impacts. Therefore, a CE *excludes* certain actions from the analysis and documentation requirements of an EA or EIS. In addition, using a CE requires that there are no other extraordinary circumstances to consider, e.g. endangered species, wilderness areas, cultural resources. When an action is authorized via a CE, it is reported within a document called a "Decision Memo". There are two types of CEs that can be used for livestock grazing management:

    1. Category 6: Used when range projects will improve wildlife habitat or timber stands

    2. Category 9: Used to implement or modify minor management practices to improve allotment condition or animal distribution *when an Allotment Management Plan is not yet in place*

DISCRETIONARY DECISION-MAKING

A District Ranger, or other line officer designated as the responsible official (decision-maker) has the discretion to determine which type of NEPA analysis (EIS, EA, or CE) will be necessary for a proposed action and makes the decision about which alternative action to pursue from those that are analyzed for environmental impacts (See Basic Steps in NEPA Process figure in Appendix C). District Rangers must follow policy guidelines, but to a certain extent they also use their discretion to make those decisions on a case-by-case basis depending on specific circumstances of the action, perceived level of risk, and recommendations from specialists.

In addition, District Rangers make decisions about the priority for completing a NEPA analysis. Because human resources and financial resources are limited, there is typically a long list of proposed projects waiting to have a NEPA analysis. The District Rangers may bump a project up the list depending on urgencies and other criteria. Including the District Ranger in the planning effort is not expected, but doing so may provide the benefit of knowing early on which proposed practices are likely to be put on the list for a NEPA analysis and how high up the list they will be placed.

WHY NEPA REVIEW CAN TAKE A LONG TIME

NEPA is a federal law which the Forest Service is required to abide by. The Forest Service must follow specific **legal procedures** in order to ensure consistency and accountability to the public.

The NEPA process requires **interdisciplinary specialists** (e.g. wildlife biologist, archaeologist) to review proposed actions and provide feedback about possible environmental effects. In addition, sometimes the Forest Service is required to consult specialists from other agencies, such as the U.S. Fish and Wildlife Service when threatened or endangered species may be affected. The NEPA procedures require a minimum amount of time for specialists to provide comments about proposed actions, but it is not uncommon for those reviews to take longer than expected, depending on their work load and priorities.

The presence of "**extraordinary circumstances**" (e.g. endangered species, wilderness areas, cultural resources, wetlands) typically requires that proposed actions receive a more thorough analysis for environmental impacts to avoid **risk of litigation**. Proposed livestock management practices that would interfere with interests for endangered species, cultural resources, or another non-negotiable value will automatically be rejected and the proposed practice will need to re-enter the NEPA process when it has been altered to avoid such conflicts.

It is not uncommon for some national forests to have **limited staff** to complete NEPA analyses, among their other duties. High **turnover in agency employees** is also common, and new employees may first need to take time to adjust to and learn their new positions before taking on NEPA-related tasks.

If the proposed **project design** is not precise from the beginning, extra time will be needed to develop the details. It is okay and very common to ask professional engineers, such as from the Natural Resources Conservation Service (NRCS), for help with project design.

There may be **other high priority tasks** within the agency that need to be addressed first, such as large-scale, high publicity proposed projects. Prioritization of livestock projects may be based on many factors, including:

- Is there a low risk of litigation?
- How quickly can the project be completed?
- Is the project well designed?
- Is the project essential and urgently needed, or is it considered a luxury?
- Does the project have multiple beneficiaries, such as providing water to wildlife?
- Is the purpose of the project consistent with the goals for the allotment management?
- Will the project address other risks and challenges, such as wildfire?

Inefficient use of time can contribute to the backlog of proposed projects waiting for a NEPA analysis. For example, in some Districts, a grazing permittee may need a new archaeological clearance prior to cleaning and re-sealing existing dirt tanks: in this case, if the grazing permittee identifies several (4+) tanks that need to be cleaned in the next 2 or 3 years, it will save the archaeologist a lot of time by visiting all of them in one day, instead of having to visit each one in separate trips because they had not been grouped into one project proposal for NEPA from the beginning.

3.4 Forest Service Planning Documents

An *Allotment Management Plan (AMP)* is the official document which details the long-term (10+ years) goals and objectives for a particular livestock grazing allotment, as well as a plan for implementing the practices authorized in the most recent Allotment NEPA decision. The AMP is revised ideally every 10 years to reflect new NEPA decisions for livestock grazing management practices. When a rancher is issued a permit to graze livestock in a particular allotment, the AMP is their reference for allowable (i.e. NEPA-compliant) long-term livestock management practices for the term of their permit.

Annual Operating Instructions (AOI) are issued to a grazing permittee at the beginning of each year to outline the short term plan for livestock management. The AOI includes details such as the allowable number of livestock, which pastures the herd will be in and when, which pastures to rest or designate as reserves, and improvements scheduled for maintenance or construction. In addition, the AOI is used for developing backup plans for management (such as contingency plans) in the event of drought or other risks, such as wildfire. Ideally, a grazing permittee helps to develop the AOI as a managing partner with valuable on-the-ground knowledge to bring to the table.

4. PRACTICES TO INCREASE FLEXIBILITY, FUNDING SOURCES, AND MONITORING

4.1 Increasing Options for Responding to Drought

Being prepared for drought means that you have a variety of options for responding as drought conditions develop. For example, *responsive* options might include altering the sequence of pastures used by the herd to avoid drier pastures, moving into "reserve" pastures where forage was left ungrazed for such emergencies, or culling the least important animals in the herd. The more responsive options that are available means greater flexibility to handle drought impacts.

Increasing the number of responsive options may first require implementation of *proactive* practices. Proactive practices, such as equipping a reserve pasture with reliable water that is unlikely to dry out, are planned and implemented ahead of time in order to account for the time needed to acquire NEPA approvals and put them in place *before* the next drought. In this example, the responsive practice of using the reserve pasture may not be possible until the proactive practice of providing reliable water source is approved and implemented. This example also requires a proactive effort to ensure that a reserve pasture exists at all in order to provide additional forage when drought reduces forage production.

> *"The time needed to construct these projects is lengthy, and considering the clearance process is critical. You can't expect to go into the agency and say 'I want to build a windmill next month.' There's a longer period of preparation before you put it into play."*
>
> *- Rancher, Tonto National Forest, 2017*

Contingency plans (not covered in detail in this Guide) can be developed to help you plan out responsive actions that you want take given the occurrence of varying degrees of drought conditions. But until those responsive options (and the proactive actions needed to make responsive options possible) have

been approved, the contingency plan is not fully operational. Therefore, it is imperative to begin the proactive process of identifying and approving practices and improvements that provide the options to be flexible. The following sections provide examples of proactive and responsive practices to increase flexibility and preparation for drought.

HERD SIZE AND COMPOSITION

Many ranching operations have successfully coped with drought impacts by using strategic herd size and composition characteristics. For some, implementing a **flexible, customized herd size** makes it easier to sell less important animals (e.g. yearlings, stockers) and maintain the important core herd when drought occurs (Figure 5). However, this approach is challenging because of the unpredictability of precipitation in the Southwest and fluctuating market prices. Alternatively, others have used herd structures which make the livestock operation less susceptible to drought impacts overall, therefore making responsive actions easier to implement, if needed at all: such proactive practices may include using a **conservative stocking rate** relative to the carrying capacity of the allotment or incorporating **breeds of livestock or smaller size of animals within a breed** that are better suited for arid environments (Figure 6). Conservative stocking rates are widely recommended because they are less affected by the variability of precipitation, therefore essentially avoiding drought impacts except in the most severe drought. The lower demand of the conservatively sized livestock herd is also beneficial to the health of the rangeland.

Figure 5: Flexible Herd Size Allows Selling Less Important Animals When Drought Occurs

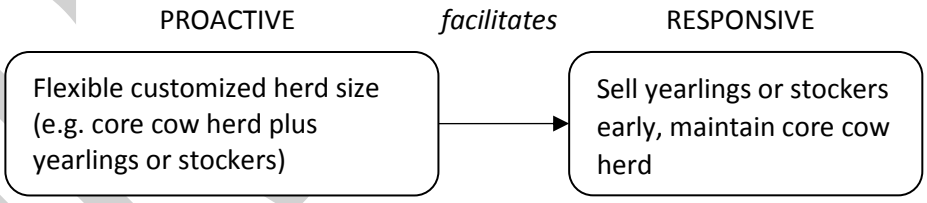
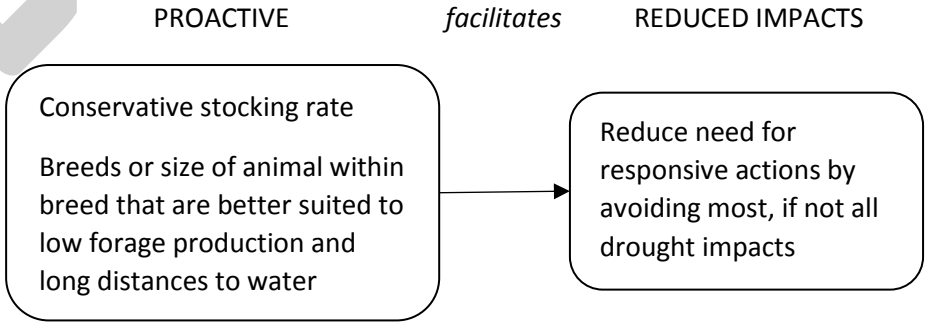


Figure 6: Herd Characteristics that Make Drought Impacts Less Significant



GRAZING SYSTEM AND PASTURE ROTATION

Increasing the flexibility to move between pastures in response to drought can also be achieved by proactively building up forage and water reserves, monitoring conditions, and ensuring that water and other infrastructure are in place and in good working condition at all times (Figure 7).

Figure 7: Practices that Increase Flexibility to Move Between Pastures

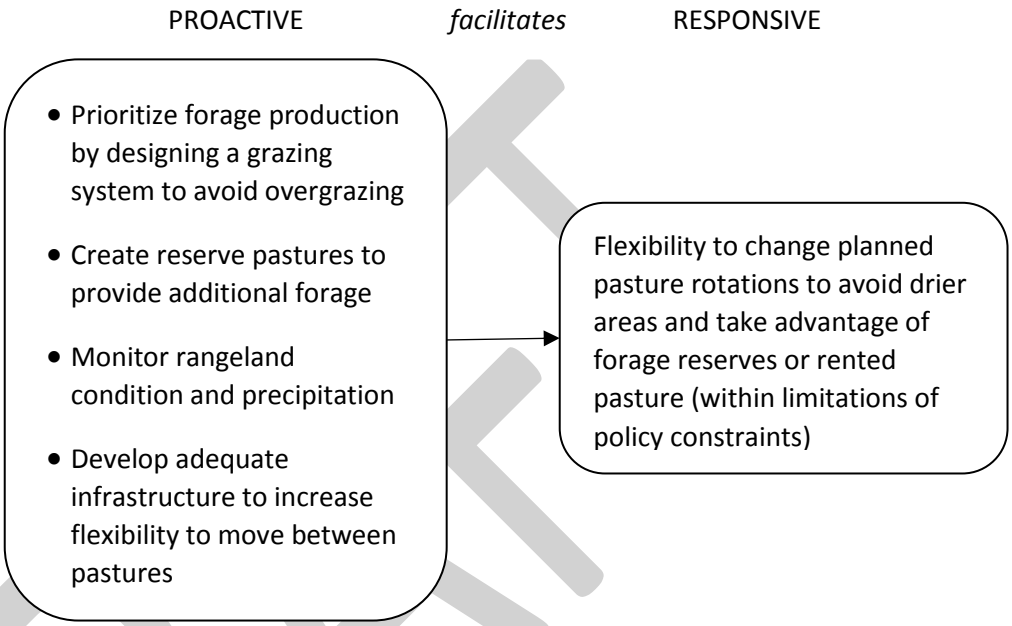



Photo by: J. Brugger

PROACTIVE INFRASTRUCTURE TO INCREASE OPPORTUNITIES TO FLEXIBILY MOVE BETWEEN PASTURES

CORRALS and FENCES

Fences can help distribute the herd throughout the allotment to achieve more uniform utilization of vegetation or to avoid certain areas. Corrals can help move the herd more easily from all parts of the ranch, and are also helpful if the herd needs to be moved due to wildfire. Maintaining corrals and fences can help ensure that pastures are prepared to be used in case they are needed as backup pastures in times of drought.

LIVESTOCK WATERS

Providing drinking water for livestock is easily one of the most important proactive management practice for a livestock operation in the Southwest. Unfortunately, many rangeland water sources, whether man-made or natural, are reliant on precipitation, and therefore are affected by drought. It is important to ensure that livestock waters are well distributed throughout the allotment and are able to withstand drought – that is, they are not likely to dry out and become entirely unavailable. Without water, livestock cannot survive: even if forage is available during a drought, livestock cannot utilize that forage if there is no drinking water in those areas. In addition, concentrating the livestock herd around the remaining water sources that have not dried out can lead to overuse and degradation of rangeland resources. Common water developments are included in Table 1.

"Water is everything."

- Rancher
Tonto National Forest, 2017

Table 1: Common Water Developments

New or Recommissioned Well	Permanent Pipeline Systems
❖ Typically not affected by short-term drought ❖ Power options (solar, windmill, gas) dependent on preference and circumstances, e.g. budget, proximity to recreation areas	❖ Source of water (e.g. well, spring, creek, dirt tank) and amount of storage determines degree to which pipeline systems are impacted by drought ❖ Consider burying long-distance pipelines along roads if possible to minimize new ground disturbance
Trick Tanks	**Dirt Tanks**
❖ Reliant on precipitation, but not affected by evaporation ❖ Early installation allows more time for precipitation to fill storage tanks ❖ Amount of storage capacity determines degree to which trick tanks are impacted by drought ❖ See Box 2 Case Study	❖ Reliant on precipitation and high evaporative losses, and therefore very susceptible to drying out ❖ Cleaning and re-sealing tanks should be done regularly: know the time windows when each tank is likely to be dry so that cleaning can occur

Box #2

Case Study: Trick Tanks

Using trick tanks to provide water for livestock and wildlife has been very beneficial for one rancher on the Tonto National Forest. Trick tanks have been useful for moving cattle into areas of the allotment where the rough country makes drilling wells difficult. This rancher partnered with the NRCS to design and fund several trick tanks throughout his allotment. While trick tank installation does require at least an archaeological clearance from the Forest Service, the District Ranger was able to approve the projects using a Categorical Exclusion. The NEPA process took about 6-7 months to complete. The Mule Deer Foundation was another partner in the project, and in exchange, the rancher provides water year-round for wildlife at the tanks even if livestock are not present. Other benefits of using trick tanks include: less evaporative losses because it is a closed system; adding storage tanks to increase water capacity is easy and adds protection against drought; and an absence of moving parts because the trick tanks are completely gravity fed. While trick tanks are dependent on rain or snow, building them ahead of drought with enough storage can increase responsive options during drought.

Photo by: M. Hemovich

Considerations for making waters less prone to drought:

- Keep dirt tanks cleaned and sealed on a regular basis to improve their water-holding capacity and water retention during drought
- Refurbishing dirt tanks to make them deeper without increasing the surface area lessens evaporative losses.
- Increase the number of storage tanks at existing wells and tank sites. This action is typically easy to get approved through the NEPA process because it is simply adding a storage tank to an already disturbed site.
- Create new waters that are more permanent, e.g. drilling a new well, extending a pipeline from an existing reliable well.
- Water hauling and temporary pipelines should only be used in emergency circumstances: do not regularly rely on them to make up for lost water during drought. These are only short-term, responsive fixes and do not give the livestock operation water security for the long-term. In the event that these practices are needed in an emergency situation (e.g. vandalism drains storage tanks), they should be planned out (e.g. location, materials) ahead of time with the District Ranger.

OTHER MANAGEMENT CONSIDERATIONS

- Improve forage conditions using non-structural improvements, e.g. targeted grazing, juniper removal, or prescribed burns, where appropriate.
- Diversify income sources to reduce reliance on the livestock operation.

4.2 Funding for Projects

In general, projects must have NEPA authorization before contract funding can be awarded so that funding is not lost if the NEPA process takes longer to complete than expected. There are many potential sources of funding to assist the grazing permittee to pay for project costs. Keep in mind that the Forest Service has legal ownership of all improvements that are placed on national forest lands, even if the grazing permittee or another organization or agency pays for them. Some of the common sources include:

- Forest Service grants
- Other agencies:
  - → Natural Resources Conservation Service
  - → Department of Game and Fish (Arizona, New Mexico)
- Partnering Organizations
  - → The Mule Deer Foundation is an example of an organization that has built partnerships with ranchers for projects that improve water available to wildlife

→ Other local organizations may provide financial assistance, volunteer labor, or supplies for projects, such as those that improve hunter access, wildlife habitat, or opportunities for youth learning.

Involving partners on projects indicates that the project will benefit more resources and users than livestock production. This expanded list of beneficiaries can positively influence the District Ranger's decision to perform a NEPA analysis for a proposed project.

4.3 Monitoring Precipitation, Vegetation, and Water


Photo by: J. Sprinkle

The frequency and extent of monitoring that actually occurs on an allotment may vary depending on the national forest and number of staff available. Monitoring may involve taking actual measurements on vegetation, water, or other natural resources using scientific methods of data collection, or it may involve recording visual observations of rangeland condition. Knowing the amount of rain, condition of the vegetation, and condition of waters in each pasture can help you decide whether or not to use particular pastures, how long to use them, or how long to let them rest.

MONITORING PRECIPITATION


Photo by: J. Lyman

There are relatively few official NOAA rain gauges that record daily measurements in the remote areas where ranching occurs and needs them the most. Therefore, it is important to install your own rain gauges in order to better monitor the spatial distribution of precipitation throughout an allotment and better inform drought evaluations that may be completed as a part of the Region 3 drought policy. Rain gauges should be measured at least twice a year: once at the end of each rainy season to characterize the difference between winter and summer seasonal totals. Measuring gauges more frequently than twice a year helps to better track the timing of precipitation events throughout the season.

Precipitation measurements can be helpful when making drought-related management decisions. For example, the amount of precipitation a pasture receives is one factor that contributes to vegetation productivity and replenishment of livestock water catchments each year. Pastures that received little to no precipitation may need to be rested or deferred that year or in subsequent years. See Box 3 for information about a new precipitation monitoring tool called myRAINge Log.

Box #3

myRAINge Log

A new tool, called **myRAINge Log**, is now available online and as a smartphone app to help you better keep track of and visualize the precipitation that you have received in each of your rain gauges throughout the allotment. The tool provides you with charts comparing your actual observations with estimates of local precipitation as well as long-term historic reference climate conditions. Using the smartphone app, you can capture observations, notes, and pictures while offline in remote areas, and the app will automatically synchronize that data with your account when back online. For any rain gauge, the tool also allows you to generate reports with charts, notes, and pictures.

myRAINge Log can be accessed online at https://myraingelog.arizona.edu/. You will first be prompted to create an account, then you can begin to add each rain gauge to your account for which you want to record observations. There are also instructions on constructing your own PVC rain gauges and a precipitation monitoring 'best practices' guide available on the website by clicking on the 'Support' button at the top of any page.

MONITORING VEGETATION AND WATER

Measuring **vegetation production** (i.e. this year's growth, usually in lbs/acre or kg/hectare) of key forage species can be estimated in each upcoming pasture as the planned rotation schedule progresses in order to determine whether or not each will have enough forage available for the livestock herd. Similarly, the **condition and amount of water sources** in upcoming pastures will identify whether or not those pastures will be able to support the livestock herd. If a pasture is determined to not have sufficient forage or water available for the amount of planned livestock because of drought conditions, the Range Specialist should work together with the grazing permittee and District Ranger to adjust the management, such as by changing the rotation to avoid that pasture. Planning ahead, such as by equipping pastures with permanent reliable water, improves flexibility to adjust management in response to drought.

Rangeland Trend may also be measured annually at permanent "key areas" which have been established to track changes in important forage species and rangeland condition over time in response to management and environmental changes. Monitoring rangeland trend helps managers to identify where and how much livestock use, if any, to allow in each pasture in upcoming years. For example, managers may choose to rest, defer use, or reduce allowable use of a pasture in which a recent drought resulted in a noticeable decline in forage production of key species. In addition, monitoring trend also helps to identify where restoration efforts are needed.

The Forest Service may place limitations on the percentage of annual forage production that livestock are allowed to utilize. **Utilization monitoring** is usually done while the herd is within a pasture or after the herd has just left the pasture in order to acquire an estimate of the amount of forage that has been utilized and to determine whether or not the pasture rotation schedule is on track. It is also recommended that utilization monitoring be conducted at the end of the growing season to validate your expectation of sustainable stocking rate. This is an important measurement during drought because water stressed vegetation may not produce as much growth as in wetter years, and it is important to prevent grazing from depleting the leaf area of perennial grasses which is needed to produce new growth through photosynthesis in subsequent years.

WHO SHOULD BE INVOLVED IN MONITORING?

The Forest Service is responsible for monitoring the vegetation, but it is ideal to have the grazing permittee involved in the monitoring as much as possible so that the two parties can collect and discuss the data and management implications together. On the other hand, grazing permittees typically take responsibility for measuring precipitation in the rain gauges, but sharing that information with the Forest Service staff can strengthen the managing partnership. In some cases, a grazing permittee who has been trained in the vegetation monitoring method will be authorized by the Forest Service to collect the needed data (via either actual measurements or visual observations) when a Forest Service employee is not able to make time to do so. However, monitoring the range together provides opportunities for collaborative interactions which help to build trust and co-learning.

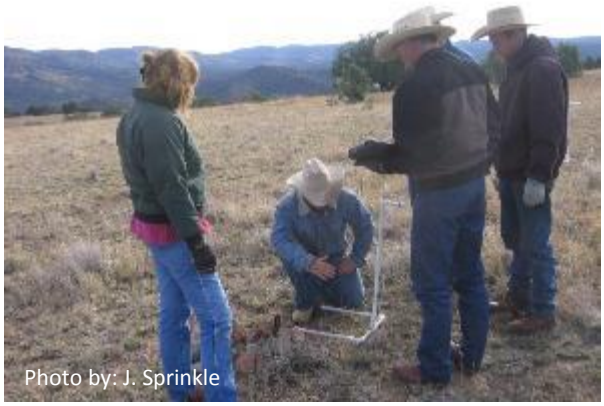


Photo by: J. Sprinkle


Photo by: J. Sprinkle

5. WORKING TOGETHER TO INCREASE PREPARATION

5.1 BENEFITS OF WORKING TOGETHER

By now it should be clear that managing livestock operations on national forests requires coordination and agreement between the Forest Service staff and the grazing permittee. This coordination and agreement is more likely, and more productive if the parties work together early and often to develop a shared understanding of challenges that drought presents and a shared vision of the practices that will increase the options for responding to the next drought.

Developing these shared perspectives begins with recognizing that each party brings their own perspective to the discussion. But these different perspectives don't have to be a barrier to developing a shared understanding of the potential impacts from drought and co-developing a plan to increase preparation for the next drought (Figure 8).

Working together has many positive benefits to your working relationship:

- Improved understanding of each other's priorities and constraints
- Improved interactions and communication
- Increased trust
- More efficient and productive discussions
- Creating a shared understanding of drought impacts and preparations to increase flexibility for responding to drought

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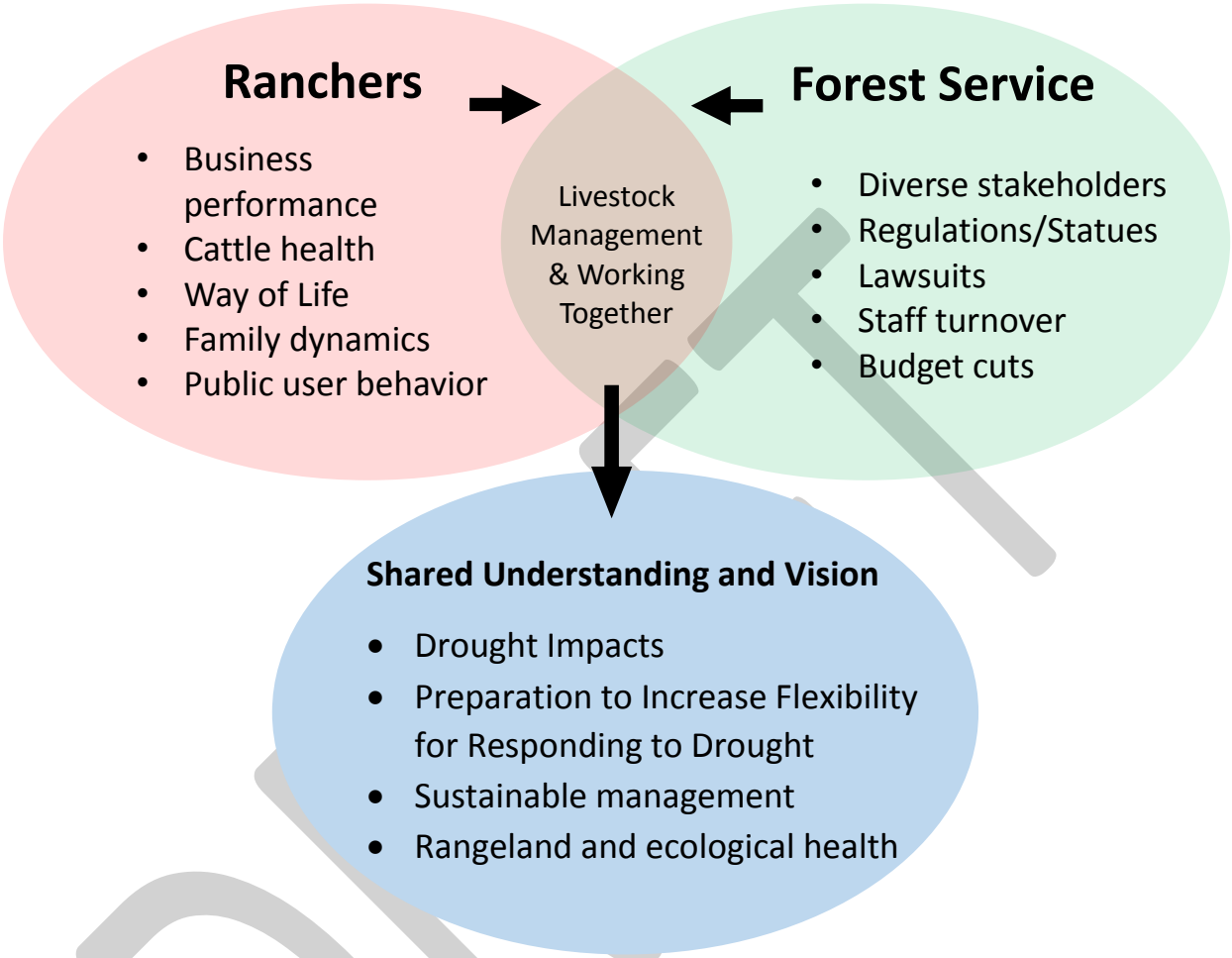
"Take time to walk in the other person's shoes. It was really eye-opening for me [to hear the permittee's perspective] because I want to make sure that I'm managing the land appropriately, not only to my rules and regulations, but to what the permittee needs. Now we can say, 'Okay, is this possible?' And if it's not possible here, then, 'What are some alternatives?'"

- Rangeland Specialist from the Tonto National Forest, 2017

Figure 8: Ranchers and Forest Service have many different priorities, but working together to co-develop a drought preparation plan helps to build a shared understanding and vision.



5.2 OPPORTUNITITES TO INTERACT

The Forest Service staff and grazing permittees have many formal and informal opportunities to interact and discuss ways to increase preparation for drought. These include, but are not limited to:

- AOI meetings
- On-site monitoring of rangeland trend, utilization, water sources, and rain gauges
- Inspections for new improvements
- Adaptive management needs
- Any other mid-year discussions about new or existing projects
- For some national forests, the Forest Service staff organize regular events open to all permittees to provide information and discuss current issues as a group
- During the period of grazing authorization Allotment NEPA analyses, and AMP renewal

"At the next AOI meeting, I would like to bring up what we are doing about drought mitigation and what preparations we are making now for the following drought because it takes that long to get those clearances.'"

- Rancher from the Tonto National Forest, 2015

TIPS FOR RELATIONSHIP-BUILDING

- **Good Communication can solve a lot of problems before they even become problems**. Talk frequently with each other about what is going on with the allotment. Be precise and clear to remain on the "same page". Good communication builds trust quickly.
- **Be cautious before making any promises**. Estimating the time that it may take to complete a NEPA analysis is okay, but be sure to maintain realistic expectations with each other that the estimated time frame may not hold. For example, promising a grazing permittee that a NEPA analysis will be complete within 6 months may lead to tension and distrust if that analysis takes longer to complete than expected; it is very easy for an unexpected delay to occur, and both parties should be prepared to encounter those potential delays.
- **Get out on the ground.** New Range Specialists, and even District Rangers if possible, should consider getting to know their allotments and grazing permittees not by spending countless hours reviewing the allotment files and paperwork, but by getting out on the ground with the grazing permittee and touring the land and improvements. Getting to know the allotment file and computer files can be learned as you go instead of all at once.

MOVING TOWARDS THE CO-DEVELOPMENT PLANNING EFFORT

With the help of exercises and worksheets presented in the next section, the Forest Service staff and grazing permittee are expected to work together to co-develop a drought preparation plan by identifying potential impacts to an allotment from drought, identifying proactive practices that will increase preparation to flexibly cope with drought impacts, and charting an expected path through the NEPA review process in preparation for submitting the proposed plan to the District Ranger.

Photo by: J. Brugger

6. CO-DEVELOPING A DROUGHT PREPARATION PLAN

6.1 Drought Preparation Plans Are Strategic Plans

A drought preparation plan is "strategic" when it focuses on *preparing* a livestock operation for drought in the long-run (5-10 years) by identifying proactive practices to implement ahead of time in order to increase options for flexibly responding to drought. In other words, strategic plans help you to see the "bigger picture" by understanding where you are now, where you want to be in the long run, and how you plan to get there.

The focus of this planning effort is not to create a contingency plan by prescribing a checklist of responsive actions to take once drought becomes apparent; rather it is to identify which preparations need to be made ahead of time so that you have the ability to make those preferred short-term responsive actions when the time comes. The co-development approach is important to ensure that the Forest Service staff and grazing permittee partners have the same vision for drought preparation needs and receive the benefits of working together that were described earlier.

A drought preparation plan is not a legally binding document. Rather, it is a record of the two parties' deliberations to identify and prioritize actions that are needed to increase preparation before the next drought. The drought preparation plan might be included in an Allotment NEPA and newly developed AMP or into Project NEPAs that are needed to approve new practices. The plan can also serve as a reference document for each AOI meeting to support the conversations between the Forest Service and the permittee.

"Don't always just think a month or so down the road. Think as far ahead as you can. And think about different situations, even if they're undesirable or scary ones."

- Rangeland Specialist, Tonto National Forest, 2017

Because strategic planning is focused on the long-term, it requires the setting of priorities among the possible projects based on the 1) urgency of the need and 2) expected time to complete the NEPA analysis. It is important to give high priority to projects that will require several years to complete a NEPA analysis so that they will be in place before the next drought.

Ask yourselves:

What can we begin to work on now to ensure that there is the flexibility needed to cope with the next drought?

6.2 Creating a Co-developed Strategic Drought Plan

THERE ARE FOUR MAIN STEPS IN THIS PLANNING EFFORT:

1. Assess current situation and define objectives for drought preparation
2. Use scenario-planning to identify deeper issues with drought preparation
3. Select and prioritize specific projects to resolve issues
4. Prepare to navigate the NEPA review and approval process for new projects

WORKSHEETS

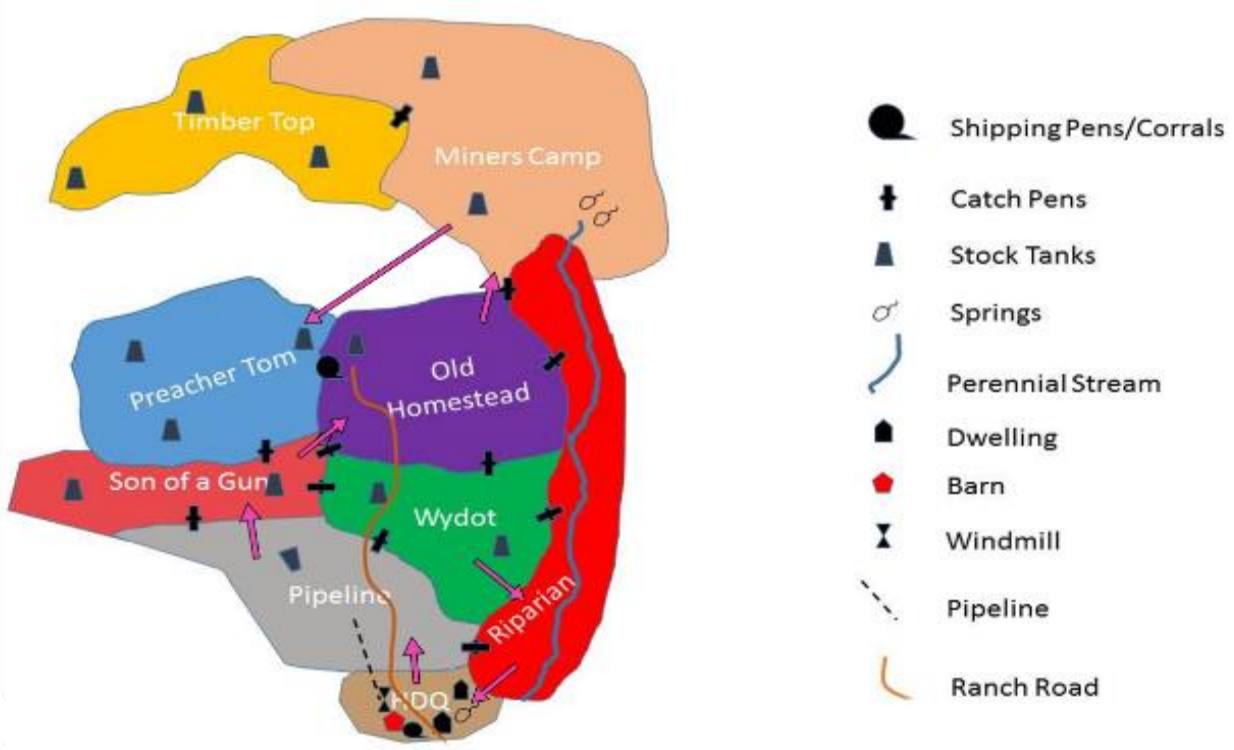
This Guide provides examples of paper worksheets that may be helpful to create the co-developed drought preparation plans. Blank worksheets can be photocopied and used directly from Appendix D of this book, or you might consider using a computer program, such as Microsoft Excel©, in order to organize the plan components within digital spreadsheets.

SPRINKLE RANCH ALLOTMENT EXAMPLE FOR WORKSHEETS

The Sprinkle Ranch Allotment (Figure 9) is a hypothetical ranch characteristic of the Southwest Region which is used to help demonstrate how to use the worksheets in this Guide.

Photo by: J. Brugger

Figure 9: Sprinkle Ranch Allotment Map and Livestock Operation Characteristics



Herd Composition	
Cows	300
Bulls	20
Yearlings	150
Total AUs	435

Pasture	Acres	2017 Schedule	# Days	Allowable AUMs	Waters	Policy Constraints
Wydot	3900	January 01	50	715	dirt tanks	
Riparian	3000	February 20	43	614	perennial stream	No use May-Sept (Recreation)
Headquarters	800	April 04	19	272	permanent well	
Pipeline	4000	April 23	60	858	permanent pipeline	
Son of A Gun	2800	June 22	40	572	dirt tanks	No use Feb 01-June 01 (spotted owl)
Old Homestead	3200	August 01	52	744	dirt tanks	
Miners Camp	4800	September 22	25	358	dirt tanks	
Preacher Tom	4000	October 17	76	1087	dirt tanks	
Timber Top	3500	Rest, use alternates with Miner's Camps	0		dirt tanks	

GETTING STARTED ON YOUR DROUGHT PREPARATION PLAN

The time it takes to co-develop a drought preparation plan depends on the thoroughness of the discussions and level of detail developed. Expect to spend no less than one hour co-developing the plan. While some teams may only need that one hour, others more realistically may need several hours, which might take place all at once or broken into separate meetings. Avoid selling yourself short – it is important to dedicate ample time to develop a robust long-term plan that does not need to be re-written for several years, except where minor revisions are needed.

The Forest Service staff and grazing permittee are equally expected to initiate the conversation with the other person about creating a co-developed drought preparation plan. Schedule some time to meet in a location that is convenient for the people involved. For some, the next AOI meeting may be the best time to initiate this planning effort. At a minimum, the Range Specialist and grazing permittee will need to be present; other potential partners to include are the ranch manager or District Ranger.

> *"We're in the conversation stage, but the fact that conversation's even happening is pretty exciting because we can start hoping that in the future we can be a lot more adaptive and be able to work with the permittees."*
>
> *- Rangeland Specialist, Tonto National Forest, 2017*

WHAT TO BRING?

It is important that the grazing permittee and/or Range Specialist take time to assess the condition of each pasture and existing structural improvement on the allotment prior to writing the strategic plan. Prepare a list of improvements and a short note about the condition, including any repairs that are needed, to bring to the meeting (see Step 1 and Worksheet 1 next).

A printed copy of the ranch map will be helpful for discussing drought preparation strengths, issues, and needs. Consider bringing different colored pens or pencils to draw ideas for drought preparation projects directly onto the map.

Monitoring data may be useful to help you devise strategies for using pastures in the next five to ten years. For example, you might consider grazing plan strategies that will help to increase forage supply in some pastures for times of drought. In addition, having a summary of your previous pasture use schedule on hand can be a helpful reference.

Have a copy of the AMP on hand for reference and to identify whether or not it includes any existing goals and objectives for drought preparation and management. Your drought preparation plan will help you to supplement any drought-related topics in the AMP to create a more comprehensive list of objectives for drought preparation on which to focus over the next several years.

STEP 1: ASSESS CURRENT SITUATION AND DEFINE OBJECTIVES FOR DROUGHT PREPARATION

INVENTORY AND CONDITION OF IMPROVEMENTS AND PASTURES

Having a thorough understanding of the current state of the livestock operation and allotment is critical to determine where there are strengths, and where improvements in preparation for drought are needed. Begin by creating an inventory of the allotment (if you do not already have one). This inventory should at least include a list of all structural improvements, by pasture and type, and a note on the condition of each. The inventory should also include a note about the type and condition of forage available, best season of year to use that pasture, and the allowable or expected amount of grazing use for each pasture (use your preferred metric, such as Animal Unit Months or Animal Days/Acre). Lastly, the inventory should include known livestock-use restrictions, such as times of year when pastures are not available due to endangered species management, wilderness boundaries, or riparian area season of use.

- **Worksheet 1** is an example of how to organize the inventory if there is not a current inventory already. Complete one worksheet for each pasture or management area in the allotment, or create your own format in Microsoft Excel© or another computer program. Consider characterizing the condition of improvements using a categorical scale (e.g. poor, fair, good, or excellent) or a number scale (e.g. 3 out of 5). In addition to the list, use a ranch map to indicate where each structural improvement or type of forage/condition is located.

Photo by: J. Sprinkle

WORKSHEET 1: Inventory and Condition of Improvements and Pastures

PASTURE: Son of a Gun Pasture ALLOTMENT: Sprinkle Ranch Page: 1

Updated: January 2017 Allowable/Expected Grazing Use: 572 AUM

Types and Condition of Forage:

Summer perennials (grama, 3-awn) - good

Policy Constraints / Use Restrictions:

No use Feb 01-June 01 spotted owl nesting season
Cultural Resources site in northwest corner of pasture

Best Season of Use: Winter _____ Spring _____ Summer X Fall X

WATERS

Name	Condition	Issues	Maintenance Needs
west dirt tank	Fair	Low storage capacity	Clean & re-seal; fix spillway
East dirt tank	Excellent	None – cleaned 2016	

PASTURE FENCES / CORRALS

Location	Condition	Issues	Maintenance Needs
Shared with Preacher Tom	Good	Cut through at 3 places	Repair gaps
Shared with Pipeline Pasture	Excellent	None	
Shared with Wydot Pasture	Excellent	None	

OTHER

Location	Condition	Issues	Maintenance Needs
Four catch pens	Good	No major issues	

- **DISCUSS:** Now that you have completed an inventory of the allotment and you have a better idea of the condition of the pastures, discuss the following points to help you identify strengths and weaknesses in your current level of preparation for drought.

Herd Characteristics

1. Is the herd size conservative? Is there any flexibility in the herd size?

Pasture Conditions

2. Which pastures have well distributed, permanent reliable water? Which pastures will not have sufficient livestock water during drought? Which waters are likely to dry out?
3. Which pastures have fences and corrals in good working condition? Which fences and corrals need repairs to increase flexibility for moving between pastures?
4. Which pastures have the best rangeland condition? Which pastures have the worst?

Pasture Flexibility and Policy Constraints

5. Which pastures have the greatest flexibility in season of use? Which pastures have the least flexibility in season of use?
6. Which pastures have non-negotiable policy-related, pasture-use restrictions that limit flexibility (e.g. endangered species)?

After discussing the current state of the livestock operation and allotment, you may have already started to realize potential issues with drought preparedness. Hold on to those thoughts until Worksheet 4 where you will have an opportunity to record issues and solutions (i.e. practices, projects) that you want to address. The next task is to first use your knowledge of the current condition and preparedness of the operation and allotment to define shared objectives for increasing drought preparation.

DEFINE OBJECTIVES FOR DROUGHT PREPARATION

Goals and objectives are used to help create a vision for where you want your allotment to be in the long run. In this case, the shared, overarching goal is *to increase preparation for drought*. Objectives, however, are more specific targets that you want to achieve in either the short- or long-term in order to reach that goal. Objectives should be motivating, important to you, and focused on high-priorities for your operation. Objectives should be specific, attainable, and ideally include a time-line for accomplishment. Importantly, objectives should be shared between the Forest Service and grazing permittee. Furthermore, writing objectives down gives them clarity and accountability, especially if wet years tend to distract you from preparing for the next drought.

Ask Yourselves:

"Where do we want the livestock operation and allotment to be in the long run?

- Use **Worksheet 2** to record your objectives for increasing drought preparation. You will have an opportunity later in this planning process to identify specific practices and projects to pursue in order to achieve each of your objectives. Examples of objectives are included in the Sprinkle Ranch Allotment example on the next page.

WORKSHEET 2: Co-Develop Objectives for Drought Preparation

Allotment: Sprinkle Ranch Date: 10 January 2017 Page: 1 of 1

Objective #	Details of Each Objective
1	We want to improve preparation for drought by distributing permanent reliable water for livestock throughout Son of a Gun, Preacher Tom, and Miner's Camp pastures by the year 2020.
2	We want to transition to a more flexible herd composition by the year 2020 so that the next drought does not impact the core cow herd.
3	We want to improve our ability to flexibly move the livestock herd between pastures for times of drought and/or wildfire by the year 2025.
4	We want to improve the forage quantity and quality in the Preacher Tom and Old Homestead Pastures by the year 2025.
5	We want to improve our ability to monitor the timing and spatial distribution of precipitation throughout the allotment by the end of 2017.

STEP 2: USE SCENARIO-PLANNING TO IDENTIFY ISSUES WITH DROUGHT PREPARATION

WHAT IS SCENARIO PLANNING?

Scenario planning is a very common tool used to assist managers with long-range planning in complex systems with inherent uncertainty. Scenarios are not used for predicting the future; rather, they ask "what if…" questions so that managers can explore the potential consequences of likely future conditions.

When thinking about livestock management, you may already ask yourself questions such as "what if drought happens" or "what if a wildfire occurred?" – "What am I going to do?" Scenario planning exercises can help you to dig deeper into those questions to think about how a variety of different drought circumstances might affect the allotment and whether or not the livestock operation in its current state (and with relevant policy constraints) will be able to cope with those effects.

CREATING A SCENARIO

The Forest Service and grazing permittee planning partners should work together to create scenarios and discuss their potential impacts. Don't be intimidated – creating scenarios is not rocket science, and you probably already think in terms of the future. While there are an infinite number of potential situations that could occur in the future, scenario planning experts recommend discussing at least 2 or 3 scenarios that best capture the range of possible drought situations. It is very important that the scenarios include drought and policy components that are *realistic* and *plausible*. Table 2 lists examples of different types of drought attributes that you may consider including in a scenario.


Photo by: J. Brugger

Table 2. Examples of Attributes of Drought to Consider Including in a Scenario

Intensity of Drought
• Trends in local or regional indices, such as the Standardized Precipitation Index:
  ○ SPI -1, SPI -2
• Precipitation throughout the allotment
  ○ In inches
  ○ As a percent of average
  ○ Amount or percentage associated with a specific SPI value
	Time of Year that Drought Occurs
	• Winter season (October – May)
	• Summer season (June – September)
	• Both winter and summer in same year
	• During 3 of the next 5 years

Impact on Forage Availability • As a percent of average production in one or more pastures (e.g. 75%) • By vegetation heights or color	**Impact on Water Availability** • By dirt tanks, springs, and/or creeks drying partially or completely • By storage tanks reliant on surface water not filling to capacity
Spatial Variability of Drought • One pasture affected • Several pastures affected • Entire allotment affected	**Other Factors** • Wildfire occurring due to drought, affecting management during and after the fire

Representing the impact of your hypothetical drought to forage and water availability in each scenario should be "best estimates". It is very difficult to make a prediction about the exact impact to forage and water given a particular drought intensity. Instead, use your professional judgement and experience to estimate the impact in a way that is useful in this planning process. Keep in mind that underestimating the impact of the drought might result in being "underprepared", while overestimating the impact of drought may lead to an inefficient investment of resources. *Remember, the scenario is intended to pose hypothetical, but realistic questions that stimulate discussion about whether there is enough flexibility for responding to drought.*

Use your judgement to combine attributes from Table 2 (or others if not listed in the table) to describe the drought component of a scenario.

- Use **Worksheet 3** to record each scenario that you create. After creating a scenario, follow the instructions in the next section to analyze and discuss that particular scenario before moving on to create each subsequent scenario. The Sprinkle Ranch example of Worksheet 3 on the next page lists examples of co-developed scenarios.

WORKSHEET 3: Co-Develop Drought Scenarios

Allotment: Sprinkle Ranch Date: 10 January 2017 Page: 1 of 1

Scenario # 1

What if...
- Winter drought with only 50% average precip. (SPI -1) from Dec-March
- All dirt tanks are dry or mostly dry by March in Son of a Gun, Preacher Tom, Old Homestead, and Miner's Camp Pastures
- Forage is relatively unaffected where warm-season grasses dominate
- Pastures with cool season grasses (Miner's Camp, Timber Top) produce only 70% of average growth this season

...What will we do? What flexibility do we have? What could we have done ahead of time to prepare?

Scenario # 2

What if...
- Summer season drought
- By Aug. 31, southwestern pastures only approaching SPI -1 (Jun-Aug)
- Forage production in those pastures is 60% of average growth
- Those pastures are next on the rotation schedule
- Plentiful rain in September seems unlikely

...What will we do? What flexibility do we have? What could we have done ahead of time to prepare?

Scenario # 3

What if...
- Dry winter season results in most dirt tanks dry or less than full capacity
- By June, conditions still dry
- Mid-July, a couple large storms occur only in OH, SG, and MC pastures
- By end of August, not much more rain received throughout allotment
- 12-month SPI for allotment is approaching a low value of -2
- Forage production throughout most pastures is between 30-80% of average

...What will we do? What flexibility do we have? What could we have done ahead of time to prepare?

ANALYZING AND DISCUSSING THE OUTCOMES OF A SCENARIO

When analyzing and discussing a scenario, it is critical that you keep in mind policy constraints for each pasture: those constraints may prevent preferred management actions from taking place, such as by prohibiting the use of a pasture during certain times of year even if it has plenty of forage and water to support the livestock herd. If helpful, use the ranch map to draw in potential impacts from the scenario to help you visualize strengths and issues with preparation. Analyzing scenarios is an important discussion between the Range Specialist and grazing permittee because it is an opportunity to create a shared understanding of drought preparation issues with a livestock operation on a particular allotment, and it is an opportunity to co-develop strategic solutions to resolve those issues.

- **DISCUSS:** After you have developed each scenario discuss the following topics. Use Worksheet 4 to keep track of your analyses and the topics for discussion. These notes will be critical for developing a prioritized list of future activities in Worksheet 5.

Initial Issues

1. How has the scenario impacted forage and water throughout the allotment? Is there enough to support the current size of the livestock herd in each pasture? And at any time of year?
    - Draw on your discussion about the current state of the livestock operation and allotment (from Table 2) and record any issues with preparation on the first part of Worksheet 4: "Issues"
2. Do you need to change management of the livestock in order to cope with this scenario? If you do need to change the management, describe the reason for the change. For example, there is not enough forage production to support the livestock in the next scheduled pastures).
    - Record any identified issues on the first part of **Worksheet 4**: "Issues" if not already listed.

Current Flexibility

3. Which management change(s) do you most prefer to make in order to cope with the drought in the scenario? For example: do you want to sell animals, or move to a different pasture ahead of the expected schedule? (Note: if developing a contingency plan, these are likely the kind of responsive practices you would want to include.)
4. Is that preferred management change possible based on the amount of forage and water available to the herd?
5. Are there policy constraints that prevent you from taking that course of action?
6. What if your preferred management change is not possible: can you do something different instead?
7. What are some other management options?

Continued next page…

…Continued from previous page

Limitations in Flexibility

8. What are the reasons that your preferred management changes are not possible?
    - Record those issues on the first part of **Worksheet 4**: "Issues" if not already listed.

Potential Solutions and Preparations

9. What would you do to resolve each issue? Can the actual issues that prevented your preferred management actions be fixed or are there non-negotiable policy constraints?
    - Brainstorm and record possible solutions to each issue (i.e. management practices, projects, actions) on the second part of **Worksheet 4**: "Possible Solutions"
10. What preparations could you have done ahead of time to prevent such issues?
    - Brainstorm and record possible solutions to each issue on the second part of **Worksheet 4**: "Possible Solutions"
11. Are there any practices that have already been approved through the NEPA process, but only need to be implemented in order to improve management flexibility and drought preparation?
    - Record those practices with the respective issues on the second part of **Worksheet 4**: "Possible Solutions"

Likely NEPA Authorizations Needed

12. What kind of NEPA analysis is likely to be required in order to authorize each potential solution? Why?
    - Record the NEPA analysis (EA, CE) that is likely to be required for each potential solution on the third part of **Worksheet 4**: "Likely NEPA analysis". If the solution is already NEPA-compliant but just needs to be implemented, indicate on Worksheet 4 that a NEPA decision already exists as well as the year that decision was made.

Tips for Analyzing Scenarios

- Keep your objectives in mind when brainstorming possible solutions to the issues that you discovered from the scenarios. You may discover new issues from scenario planning that had not been obvious during the inventory of pastures and improvements in Step 1. List any new objectives on Worksheet 2 that may have become apparent from this exercise.

- If you have found no issues with management flexibility and you will easily be able to cope with the drought conditions in the scenario, create another one or two scenarios that are much more challenging with more widespread drought effects and policy constraints to work around.
- Be creative when brainstorming possible solutions to the issues. One advantage of having multiple planning partners is that each person may bring new ideas to the table that otherwise might not have been considered. For example, you should expect an increase in planning efficiency when combining the grazing permittee's on-the-ground knowledge with the Range Specialist's knowledge of the NEPA process (or access to NEPA specialists).
- It is important that potential solutions are realistic within the legal requirements of managing a national forest.
- Don't be discouraged from suggesting and listing potential solutions for reasons such as lack of funding or labor to implement a project. Instead, get all of the potential solutions "out on the table". There will be an opportunity to refine and organize the desired solutions in Worksheet 5.

WORKSHEET 4: Identify Issues with Preparation and Co-Develop Possible Solutions

Allotment: Sprinkle Ranch Date: 10 January 2017 Page: 1 of 1

Issues	Possible Solutions	Likely NEPA Analysis	Scenario Addressed
Son of a Gun Pasture – both dirt tanks have potential to dry out without backup reliable water sources	• Keep clean and re-seal on a regular basis • Extend buried pipeline from headquarters well • Install trick tanks • Drill new well	• Archaeological clearance • EA • EA or CE (Category 6) • EA	1, 3
Catch pen between Preacher Tom and Old Homestead only serves animal movement between two pastures and limits rotational flexibility	• Increase size of catch pen to allow more flexible movement among four pastures (Preacher Tom, Old Homestead, Son of a Gun, and Wydot)	• Archaeological clearance • EA or CE (Category 6) • EA	2
Old Homestead Pasture – the one dirt tank has potential to dry out without backup reliable water sources	• Keep clean and re-seal on a regular basis • Install trick tanks • Drill new well at corrals; extend pipeline to Old Homestead and Preacher Tom Pastures	• Archaeological clearance • EA or CE (Category 6) • EA	1, 3
Miner's Camp Pasture – both dirt tanks have potential to dry out without backup reliable water sources	• Keep clean and re-seal on a regular basis • Install trick tanks • Drill new well • Develop spring	• Archaeological clearance • EA or CE (Category 6) • EA • EA	1, 3
Cattle herd size is almost at full capacity; any decline in forage likely to result in needing to sell cows	• Change the herd composition to incorporate yearlings or stockers; therefore, more flexible • Consider more conservative stocking rate • Seek alternative forage by renting/leasing pastures	• None • None • None	1, 2, 3

STEP 3: SELECT AND PRIORITIZE SPECIFIC PROJECTS TO RESOLVE ISSUES

At this point in the planning process, you should have a good idea of how possible future drought conditions might affect the allotment and livestock operation and how flexibility may or may not be limited. *Take a moment to think about how much of a gap exists between the current state of the livestock operation and what would be needed to better cope with those drought scenarios. Which management practices and improvements need to be in place in order to close that gap and achieve your objectives for drought preparation?*

SELECTING SPECIFIC PROJECTS

Using your list of possible solutions from Worksheet 4, begin to assess which of those specific projects you would like to actually accomplish in the next 5-10 years to resolve the identified issues and achieve objectives. You will use Worksheet 5 "Select and Prioritize Projects" to refine your list of projects into a simple version of a drought preparation plan. Consider the following factors when selecting projects:

- Which are already approved with a NEPA decision?
- For those that still need a NEPA decision, which may have the fewest number of complications getting through the NEPA review process?
- Which solutions address the greatest range of drought scenarios?
- Which address the greatest number of objectives?
- Which are critical for improving management flexibility?
- Which are the most urgently needed?
- Will the project have multiple beneficiaries, such as wildlife habitat improvement?
- Will the project address other management concerns, such as also being prepared for wildfire?
- Which projects can be efficiently grouped together into the same NEPA? Note: if considering a Project NEPA, be cautious about grouping a project that is likely to get held up within the NEPA process with other simpler projects, because that project can prevent the other simpler projects from becoming approved quickly. On the other hand, grouping several simpler projects together, e.g. cleaning several dirt tanks at once, may make the NEPA process more efficient.

> - Record your selected practices in the first column of **Worksheet 5**: "Projects". Think of this list as a "wish list". Include as many drought preparation projects that you think you will want to get accomplished in the next 5-10 years. Remember, it is important for the Forest Service staff and grazing permittee partners to thoroughly discuss each project together and agree that the project is realistic, practical, and will help improve management flexibility for drought.
>
> - In the second column of **Worksheet 5**, list which objectives from Worksheet 2 are addressed by each specific project.

EXPECTED TIME NEEDED FOR NEPA

Discussing the expected time it may take for each project to get through the NEPA process is important because it helps to create shared, realistic expectations. While some projects may take much longer to get through NEPA than others, no new projects are ever approved overnight.

> ➢ In the third column of **Worksheet 5**, indicate the approximate time that you expect each project to take in the NEPA review process once that process begins and given that each project is able to get on the District Ranger's list for NEPA review at all. You may also indicate the amount of time it may take to actually *implement* the project once approved with a NEPA decision.

Considerations for filling out the "Expected Time for NEPA" column:

- You may plan to authorize all of the desired projects together in the next Allotment NEPA, or you may plan to authorize them separately with Project NEPAs if allowed by the District Ranger.
- High priority practices that may take a long time to analyze through the NEPA process should be proposed for an analysis sooner than later so that they can be implemented as soon as possible.
- The expected timeline for each may be a span of months or years (e.g. 1-3, or 18-24 months)
- Timelines are not legally binding, but are estimates to help create shared, realistic expectations.

IDENTIFYING POTENTIAL PARTNERS

> ➢ In the fourth column on **Worksheet 5**, list any potential partners you may involve in each specific project listed, for example, other organizations or agencies that may provide engineering design, funding, materials, or labor for implementing projects. Consider partnering with wildlife organizations for practices such as water developments because they may have benefits for wildlife as well as livestock.

PRIORITIZING SELECTED PRACTICES

Prioritizing practices is an organizational tactic to help you determine which projects are the most important and need your attention early on.

> ➢ In the fifth (last) column of **Worksheet 5**, begin to assign priority levels for each specific practice. Consider prioritizing your practices according to how soon they need to be proposed for NEPA analysis and how critical they are for improving management flexibility and overall preparation for drought. Indicate the type of priority (e.g. as "low", "medium" or "high" categories, or rank numerically) and list any justification for that priority level (e.g. "high priority – will add reliable water source to Son of a Gun Pasture to supplement small dirt tanks and improve livestock distribution").

WORKSHEET 5: Select and Prioritize Projects

Allotment: Sprinkle Ranch Date: 10 January 2017 Page: 1 of 1

Basic Details of Each Project/Action	Objectives Addressed	Expected Timeline	Potential Partners	Priority
1. Clean and seal dirt tanks in Son of a Gun, Old Homestead, and Miner's Camp Pastures	1, 3, 4, 5	Archaeological clearance by March 2017; permittee cleans by May/June 2017	NA	High – already authorized in current NEPA decision; critical for water
2. Son of a Gun Pasture – extend buried pipeline from Pipeline Pasture (source Headquarters well); includes storage tanks and drinkers, and potential pumping station along one incline	1, 3	EA – 18-24 months once NEPA starts; 3-6 months for implementation	NRCS – engineering help; Mule Deer Foundation – potential cost-share; AZGFD	High – will provide permanent reliable water to one pasture
3. Old Homestead Pasture – drilling a new well near corrals; extend buried pipelines into Preacher Tom and Old Homestead Pastures with storage tanks and drinkers	1, 3	EA – 24-36 months once NEPA starts; 6-12 months for implementation	NRCS – engineering help; Mule Deer Foundation – potential cost-share; AZGFD	High – will provide permanent reliable water to 2 pastures; start NEPA early
4. Increase size of catch pens between Son of a Gun and Old Homestead Pastures to include Preacher Tom and Wydot Pastures	3	EA – 18-24months once NEPA starts; 3-6 months for implementation	NA	High – will increase flexibility of rotation among pastures
5. Add 1-2 rain gauges for precipitation monitoring to Pipeline, Wydot, Old Homestead, and Preacher Tom Pastures	5, 3	1-3 months to implement	University of Arizona Cooperative Extension	High – will increase spatial measurements of precipitation throughout allotment
6. Begin retaining yearlings instead of selling early if forage and water are plentiful; in drought years, sell yearlings and maintain core herd	2	None – likely requires only authorization from District Ranger	NA	Medium – will increase flexibility of herd size

GIVING YOUR PLAN TO THE DISTRICT RANGER TO GET ON THE LIST FOR NEPA

At this point, this Guide has demonstrated an approach for co-developing a strategic drought preparation plan for a livestock grazing operation using scenario planning to identify issues and solutions for increasing drought preparation. With your list of objectives on Worksheet 2 and your refined list of drought preparation projects you want to pursue in the next 5-10 years on Worksheet 5, you now have the components of a basic strategic drought preparation plan which will help you to begin working on proactive projects that need to be completed *before* the next drought. It may help to clean up and transform the handwritten information from Worksheets 2 and 5 into a single plan document using a computer program, such as Microsoft Word©, with formatting of your choice.

- **DISCUSS** your plan with the District Ranger who will ultimately decide which, if not all, of your identified projects will be added to list of other projects in that District waiting for a NEPA review, and how high up that list to place your projects. In the event that the District Ranger chooses not to add specific projects to the list for NEPA, it is important to discuss reasons why those projects were rejected in order to identify possible alterations that can be made to projects that would make them more favorable and likely to succeed.

STEP 4: PREPARING TO NAVIGATE THE NEPA REVIEW PROCESS

Now that you have worked with the District Ranger to get desired projects on the list for a NEPA review, the next step is to prepare to navigate through the NEPA process with your Forest Service or grazing permittee planning partner using **Worksheet 6**. For each project or grouping of projects that will be analyzed for environmental impacts, Worksheet 6 helps you to set realistic, shared expectations about the steps in the upcoming analysis process, including the time it may take to complete each step, who is responsible for each step, and communication responsibilities throughout the process.

- **DISCUSS** the following points when assigning NEPA process responsibilities:

1. How can you best delegate responsibilities?
2. What steps, in general, will be the grazing permittee's responsibility?
3. What steps, in general, will be the Range Specialist's or District Ranger's responsibility?
4. Who else will be involved in the NEPA review, i.e., Forest Service specialists assigned to the Interdisciplinary Team (IDT) to review the project?
5. What steps can the grazing permittee and Range Specialist or District Ranger accomplish together?
6. How frequently should communication occur to share updates about the status of each step?

Documenting responsibilities is simply a way to understand how each partner is accountable throughout the process. In addition, writing down the intended responsibilities for each planning partner is recommended, especially in the event of employee turnover within the agency so that new employees can more easily pick up where the former left off.

In addition, Worksheet 6 allows you to discuss and record simple plans for altering the project (i.e. Plan B) in case it cannot be approved as is, as well as simple plans for funding, implementing, and monitoring the success of each project if approved with a NEPA decision. Worksheet 6 is not a legally-binding document; rather it is a means for helping you get on the same page and stay on the same page throughout and after the NEPA process.

- Fill out a separate **Worksheet 6** for each practice listed or each grouping of practices that you plan to propose for NEPA together.

Photo by: J. Sprinkle

WORKSHEET 6

Managing the NEPA Process Together and Setting Shared, Realistic Expectations

Allotment: Sprinkle Ranch **Date:** 20 February 2017

People Involved: Permittee and Rangeland Specialist from Example Ranger District;
Potential partners: NRCS (EQIP application); Mule Deer Foundation; AZ Game and Fish Dept.

Which project/practice are you proposing for a NEPA analysis? List all if grouping multiple practices into the same NEPA analysis:

Extend buried pipeline from Pipeline Pasture (source Headquarters well) into the Son of a Gun Pasture; install 4 storage tanks and 4 drinkers; 1 pumping station required
Will provide reliable drinking water for livestock and wildlife year-round in 1 additional pastures that does not have permanent water now.

Expected NEPA Analysis Required (EA, CE category): Environmental Assessment

Reasons Why: Pipeline will be buried; known cultural artifacts site in same pasture, but not in pipeline route

Major Steps to Take Through the NEPA Process

Action	Person Responsible	Communication Responsibilities	Likely Amount of Time to Complete Step
Project Design, scoping, notice and public comments	Range Specialist and permittee; NRCS consult	Range Specialist with Permittee; Permittee with NRCS	3-6 months
Analysis and specialist review; respond to comments	Range Specialist will coordinate with IDT specialists	Range Specialist to permittee when step is complete	6-10 months
Draft Decision Notice and Finding of No Significant Impact	District Ranger or Range Specialist will develop	District Ranger or Range Specialist with collaborate with permittee on decision	3 months
Objection Period	Rangeland Specialist; permittee	Both rangeland specialist and permittee	2 months
Resolve objections; make decision	District Ranger; Rangeland specialist	Range Specialist will communicate decision to permittee	1 month
			Total Expected: 15-22 months

Managing the NEPA Process Together and Setting Shared, Realistic Expectations

Plan for Funding Each Practice (if applicable)

Practice	Funding Plan
Buried pipeline	1. Cost share with NRCS – EQIP application 2. Cost-share with Mule Deer Foundation 3. Permittee pays for remainder

Potential Reasons that Practice(s) May Not Be Approved As Is:	Plan B to Resolve Issues (e.g. alternative location, design specifications)
Discovery of cultural resources in route	Potential re-route up ranch road, then west through Wydot Pasture and into Son of a Gun Pasture

Plan for Implementing Practice if Approved:

Permittee will take lead; enlist help from Mule Deer Foundation to install storage tanks and drinkers

Plan for Monitoring Success of Practice after Implementation:

Permittee and Rangeland Specialist will collaborate to determine success of project. Permittee will monitor condition of pipeline, storage tanks, and drinkers on a regular basis and will communicate with the Rangeland Specialist if any repairs/adjustments are needed. The Range Specialist will work with the permittee to assess re-vegetation of disturbed soil following burial of the pipeline. The Range Specialist and the permittee will collaborate to assess water availability during drought.

Remember, NEPA legally requires the Forest Service to follow procedures for analyzing potential environmental impacts of proposed actions on national forests. Those legal procedures must involve several other individuals, including agency specialists, the agency decision-maker, and the general public. In addition, national forests have many stakeholders and many other proposed actions and management needs occurring simultaneously. These factors, among others, can affect the length of time it takes to complete a NEPA analysis for livestock management practices on your allotment. Therefore, this worksheet is not legally binding, but rather a structured approach to help you (the permittee and rangeland specialist) more effectively plan for and manage the NEPA process together with shared expectations.

7. IMPLEMENTING YOUR DROUGHT PREPARATION PLAN AND APPLYING FLEXIBILITY

7.1 Short-Term Efforts for Implementing the Drought Preparation Plan

In order for a long-term strategic plan to be successful, the Forest Service and grazing permittee partners need to regularly communicate about the status of plan components, as well as identify any specific short-term tasks or efforts that are needed in order to move any plan components forward. These conversations should occur at least at every AOI meeting, and more frequently if possible. There are three main topics that should be included in those conversations:

STATUS OF DESIRED PROJECTS IN THE CO-DEVELOPED STRATEGIC DROUGHT PLAN

For this conversation, discuss the following points:

1. Which desired projects have been proposed to the District Ranger to get on the list for NEPA review?
2. Which projects have made it onto the list and are awaiting a NEPA review?
3. How far down the waiting list are those projects? About how long until you can expect the projects to get to the top of the list and officially begin the NEPA review?
4. Were any projects proposed to the District Ranger and rejected from the list for NEPA review? Why? Do alterations to those projects need to be made?

STATUS OF PROJECTS IN THE NEPA REVIEW AND APPROVAL PROCESS

For this conversation, discuss the following points about projects that made it to the top of the list and have officially entered the NEPA review:

1. What stage of the NEPA review are each of your projects?

2. What steps still need to be completed in the NEPA review?
3. Who is responsible for completing these steps?
4. Have major expected timelines changed or is the process proceeding as expected?
5. Have any new unexpected circumstances occurred that have affected the projects? If so, is there anything that can be done to help get the project back on track in the NEPA review?
6. When is the NEPA decision likely?

STATUS OF IMPLEMENTING APPROVED PROJECTS

Implementing new projects is an important requirement to being prepared for drought. Projects need to be in place and ready to use *before* drought occurs so that you are not scrambling to get them in place at the last second.

Implementing NEPA-compliant projects requires a degree of tactical planning. Tactical planning is a way of determining how you will prioritize your time, resources, and energy in the short term (next month to year) to get projects accomplished once they have been approved by the District Ranger or other line officer. In other words, tactical planning is basically determining which projects you are going to work on that year, including identifying what steps or tasks need to be done, how they will be done, and who will be responsible for completing them. Have this conversation together in order to stay on the same page about the status of projects on the ground.

In this tactical planning conversation, discuss the following points:

1. Are projects that need funding getting funded? If not, what sources of funding are available and who will be responsible for pursuing funding?
2. Which projects have already been implementing?
3. Which projects still need to be implemented?
4. Which are most important to get implemented now?
5. Which projects are you going to work on this year?
6. What steps need to happen in order to get those projects implemented this year? Who will be responsible for which tasks?

7.2 Reviewing and Revising Your Drought Preparation Plan

Planning is never a “one-and-done” effort. Strategic plans require regular reviews to ensure that goals and objectives are being met. Discuss the progress and success of the drought preparation plan at least once a year, possibly at the AOI meeting, and consider repeating the scenario planning process to help identify new issues that need to be resolved over time. Revisions can be made to your drought preparation plan at any time to remove accomplished projects, identify new projects, or modify the details for a pending project as new information, technology, funding, or other circumstances become

apparent. Regularly monitor rangeland conditions in order to identify impacts from drought and to subsequently identify new issues with rangeland condition, livestock waters, other structural improvements, or herd characteristics that need to be addressed.


Photo by: J. Brugger

ADAPTIVE MANAGEMENT

Adaptive management is a cyclical process of monitoring the outcomes of planned management actions in order to determine whether or not those actions are achieving the desired objectives, and if not, then adjusting planned management actions as needed in order to more closely achieve the desired objectives. Adaptive management is important to ensure the long-term success of drought preparation efforts.

As new projects are implemented and then tested by drought, it is then critical to assess whether or not those projects are meeting your drought preparation needs as intended. If not, take time to revise the strategic drought preparation plan in order to incorporate newly identified management actions and projects as needed (Refer back to Figure 2). For example, did new livestock water developments withstand drought as intended? If employing a flexible herd composition/size that incorporates stocker cattle with the cow-calf operation, were you able to maintain the core cow herd through drought? If employing a new grazing system, did forage conditions improve as intended? If not, what adjustments are needed? Will those adjustments need to be authorized through the NEPA review process?

8. SUMMARY

- Drought creates many negative impacts. Unfortunately, it is nearly impossible to know when and where the next drought will occur, but it is certain that droughts are going to occur. It is not a matter of *if* they will occur, but only a question of *when*.

- Planning now is essential to ensure that flexibility is in place and practices are approved through NEPA ahead of the next drought.

- It is essential that the Forest Service staff and grazing permittee *work together* to create and implement a drought preparation plan for an allotment, therefore creating a shared vision and setting realistic expectations for the NEPA process. Good communication is key.

- Scenario planning is a common and valuable technique to identify issues with preparation and identify proactive management practices to resolve those issues.

- Monitoring the rangeland is essential in order to understand how drought may affect the allotment and livestock operation over time and for initiating responsive practices.

- The Standardized Precipitation Index is a measure of drought intensity used by the Forest Service to monitor drought conditions in Region 3 national forests and trigger closer evaluations of individual livestock allotments. SPI is also a helpful tool for understanding trends in seasonal precipitation. The SPI Explorer Tool (online) is a helpful tool for understanding precipitation trends in your area.


Photo by: J. Sprinkle

9. ADDITIONAL RESOURCES

9.1 Impacts of Drought to Rangelands

1. **Rangeland Management Before, During, and After Drought** (2016)
   Howery, Larry
   University of Arizona Cooperative Extension AZ1136. Originally published July 1999. Revised 2016. https://extension.arizona.edu/sites/extension.arizona.edu/files/pubs/az1136-2016.pdf

   Synopsis: Drought affects almost every physiological and biochemical process in individual plants. Planning should identify livestock management practices that aim to sustain or improve rangeland condition and conservatively use forage.

2. **Enduring a Decade of Drought: Patterns and Drivers of Vegetation Change in a Semi-Arid Grassland (2017)**
   Bodner, Gitanjali S. and Marcos D. Robles
   Journal of Arid Environments 136:1-14.

   Synopsis: Drought impacts vary by ecological site.

9.2 Climate Variability of the Southwest

3. **The Climate of the US Southwest** (2002)
   Sheppard, Paul R., Andrew C. Comrie, Gregory D. Packin, Kurt Angersbach, Malcolm K. Hughes
   Climate Research 21: 219-238.
   file:///C:/Users/kelsey/Downloads/The_climate_of_the_US_Southwest.pdf

   Synopsis: This non-technical article describes the climate patterns of the Southwest region of the United States (Arizona and New Mexico), ranging from seasonal to decadal trends, including many atmospheric, oceanic, topographic, and geographic factors that influence precipitation variability and temperature of the region.

4. **Recent Drought Phase in a 73-Year Record at Two Spatial Scales: Implications for Livestock Production on Rangelands in the Southwestern United States** (2014)
   McClaran, Mitchel P. and Haiyan Wei

Agriculture and Forest Meteorology 197: 40-51.
http://www.sciencedirect.com/science/article/pii/S0168192314001464?via%3Dihub

Synopsis: Livestock producers in the Southwest can make more informed decisions about drought by capturing the seasonal variability and spatial patchiness of precipitation at the pasture scale (<25km2) using an on-site rain gauge network.

5. **National Climate Assessment – Southwest Region** (2014)
http://nca2014.globalchange.gov/report/regions/southwest

Synopsis: This non-technical report describes key challenges of climate change in the Southwest region, including effects on snowpack, stream flows, agricultural outputs, wildfires, and heat threats.

9.3 Drought Planning for Flexibility

6. **An Easy to Use System for Developing a Drought Management Contingency Plan** (2017)
Tolleson, Doug
University of Arizona Cooperative Extension AZ1725. January 2017.
https://extension.arizona.edu/sites/extension.arizona.edu/files/pubs/az1725-2017.pdf

Synopsis: This brief article provides useful guidance on developing a simplified and structured contingency plan for managing during a drought using large-scale and local-scale indicators to inform an array of pre-planned responsive management decisions.

7. **Precipitation Monitoring Best Practices Guide** (2017)
Crimmins, Michael A., Mitchel P. McClaran, Julie Brugger, Ashley Hall, and Douglas Tolleson
University of Arizona Cooperative Extension
https://myraingelog.arizona.edu/support

Synopsis: This guide discusses some of the basics of thinking through a precipitation monitoring plan in support of rangeland management, like: how many gauges do I need and where should I put them; how often do I need to make observations; and how should I manage and interpret my precipitation data?

8. **Managing Drought Risk on the Ranch: A Planning Guide for Great Plains Ranchers** (2012)
University of Nebraska – Lincoln, National Drought Mitigation Center.
www.drought.unl.edu/ranchplan

Synopsis: A Guide to help rangeland managers and ranchers in the Great Plains to better prepare for and manage during drought.

9. **Strategic and Scenario Planning in Ranching: Managing Risk in Dynamic Times (2007)**
   Dunn, Barry H., Roger N. Gates, Jack Davis, and Agustin Arzeno
   South Dakota State University Extension. *Extension Circulars*. Paper 488
   http://openprairie.sdstate.edu/cgi/viewcontent.cgi?article=1487&context=extension_circ

   Synopsis: A Guide to help ranchers plan and prepare for a variety of risks and uncertainties.

10. **A Drought-Planning Methodology for Ranchers in the Great Plains** (2013)
    Knutson, Cody and Tonya Haigh
    Rangelands 35(1): 27-33.
    https://journals.uair.arizona.edu/index.php/rangelands/article/view/19576

    Synopsis: Describes a process developed by experienced ranchers, advisors, and researchers in the Great Plains for creating a ranch drought plan.

11. **Adaptive Decision-Making and Coping with Drought** (2016)
    Roche, L.M.
    Sustainability 8: 1334; http://www.mdpi.com/2071-1050/8/12/1334/pdf

    Synopsis: A survey of 479 California ranchers revealed that having a combination of reactive and proactive practices available with an emphasis on adopting the greatest number of total practices provided the highest level of flexibility for coping with drought.

12. **Drought Mitigation for Grazing Operations: Matching the Animal to the Environment** (2016)
    Scasta, John Derek, David L. Lalman, and Leticia Henderson
    Rangelands 38(4):204-210
    http://www.sciencedirect.com/science/article/pii/S0190052816300281

    Synopsis: The lower forage requirements and reproductive efficiency of smaller cows make them favorable as a drought-mitigation strategy.

13. **Adaptive Management: The U.S. Department of the Interior Technical Guide (2009)**
    Williams, Byron K., Robert C. Szaro, and Carl D. Shapiro
    Adaptive Management Working Group, U.S. Department of the Interior, Washington, D.C.
    https://www2.usgs.gov/sdc/doc/DOI-%20Adaptive%20ManagementTechGuide.pdf

    Synopsis: Provides a thorough definition and application for the term "Adaptive Management"

14. **Drought and Grazing Website & Dashboard: Co-Developing Ways to Increase Preparation for Future Droughts** (Established 2014)
    University of Arizona
    www.cals.arizona.edu/droughtandgrazing

Synopsis: The dashboard displays regularly updated maps of Arizona-wide precipitation and temperature indices, as well as a national fire danger rating, NOAA 3-Month Precipitation Outlook, and access to the SPI Explorer Tool. The website also provides reports and summaries from three workshops held from 2014-2017 as a part of the project described in the Preface, and provides access to download the Drought Scenario Planning Tool used in those workshops.

9.4 Using Seasonal Forecasts

15. **Where Do Seasonal Climate Predictions Belong in the Drought Management Toolbox?** (2016)
Crimmins, Michael A. and Mitchel P. McClaran
Rangelands 38(4): 169-176.
http://www.sciencedirect.com/science/article/pii/S0190052816300268

Synopsis: Seasonal climate predictions have generally low accuracy and coarse precision, and should therefore be used with prudence, understanding when and where they perform best. In addition, being prepared for drought involves more advanced planning than simply responding to seasonal climate predictions.

9.5 Benefits of Working Together

16. **Making Collaboration Work: Lessons from Innovation in Natural Resources Management** (2000)
Wondolleck, Julia M. and Steven L. Yaffee
Island Press, Washington DC. pp. 8-9, 25-26, 89-92, 132-134.

Synopsis: The authors use over a decade of experience working with collaborate groups involving agencies, community groups, public stakeholders, businesses, and private individuals to offer an invaluable set of lessons on the role of collaboration in natural resources management and how to make it work.

17. **Changes on the Range: Exploring Climate Change with Range Managers** (2007)
Crimmins, Michael A., George Zaimes, Niina Haas, Christopher K. Jones, Gregg Garfin, and Theresa M. Crimmins
Journal of Natural Resources and Life Sciences Education 36:76-86.

Synopsis: A workshop exercise brought scientists and land managers together to facilitate discussion about the challenge of rangeland management decision-making and climate variability in the southwestern U.S and improve knowledge of State-and-Transition Models.

18. **Ranchers, Forest Service, University of Arizona Co-Develop Approaches to Improve Planning for Drought on Public Lands, Part I** (2015)
    Brugger, J. and M.P. McClaran
    DroughtScape (Summer 2015). Pages 12-13. National Drought Mitigation Center Newsletter.
    http://drought.unl.edu/newsoutreach/droughtscape.aspx

    Synopsis: A summary of the first of three workshops held as a part of the University of Arizona project described in the Preface.

19. **Ranchers, Forest Service, University of Arizona Co-Develop Approaches to Improve Planning for Drought on Public Lands, Part II** (2016)
    Brugger, J. and M.P. McClaran
    DroughtScape (Winter 2016). Pages 12-14. National Drought Mitigation Center Newsletter.
    http://drought.unl.edu/newsoutreach/droughtscape.aspx

    Synopsis: A summary of the second of three workshops held as a part of the University of Arizona project described in the Preface.

20. **Groups Co-Developing Approaches to Improve Planning for Drought on Public Lands, Part III** (2016)
    Brugger, J., Crimmins, M., and McClaran, M.P.
    DroughtScape (Summer 2016). Pages 15-18. National Drought Mitigation Newsletter.
    http://drought.unl.edu/newsoutreach/droughtscape.aspx

    Synopsis: A summary of the third of three workshops held as a part of the University of Arizona project described in the Preface.

9.6 Forest Service Decision-Making

21. **NEPA for Ranchers** (2012)
    Sprinkle, Jim, Carolyn Eppler, George Ruyle, and David Cook
    University of Arizona Cooperative Extension.
    https://extension.arizona.edu/sites/extension.arizona.edu/files/resources/gila-nepa-for-ranchers.pdf

    Synopsis: Describes how and why ranchers (grazing permittees) can get involved in each step of the NEPA process for National Forest or Bureau of Land Management grazing allotments.

22. **Institutional Barriers to Climate Change Adaptation in the US National Parks and Forests** (2010)
Jantarasami, L.C., J.J. Lawler, and C.W. Thomas
Ecology and Society 15(4): 33.

Synopsis: Prescriptive environmental laws (e.g. Endangered Species Act) and institutional dynamics (e.g. unclear mandates from superiors and bureaucratic rules and procedures) are perceived by managers as barriers to pursuing and completing climate adaptation strategies on National Parks and National Forests. Process-oriented environmental laws (e.g. National Environmental Policy Act) are conversely perceived as enablers of adaptation strategies.

23. **Risk Tradeoffs in Adaptive Ecosystem Management: The Case of the U.S. Forest Service** (2014)
Stern, M.J., C.A. Martin, A.A. Predmore, and W.C. Morse
Environmental Management 53(6):1095-1108.

Synopsis: Perceptions of external relationship risk (i.e. public involvement and conflict) and incremental, discretionary decisions made by interdisciplinary resource specialists throughout the NEPA process largely influence the outcome and justification for the ultimate decision made about a proposed action.

24. **Factors Influencing Line Officers' Decision about National Environmental Policy Act Project Design and Development** (2008)
MacGregor, D.G. and D.N. Seesholtz
General Technical Report. PNW-GTR-766. USDA Forest Service.

Synopsis: There is very high variability in how District Rangers use their discretion to make decisions through the NEPA process, with decisions influenced by a variety of factors, such as project context, an individual's background and area of expertise, reliance on resource specialists, management styles, interpretation and prioritization of resource-use values within a Ranger District, and risk of litigation.

25. **Trust Ecology and the Resilience of Natural Resource Management Institutions** (2015)
Stern, M.J. and T.D. Baird
Ecology and Society 20(2):14 http://dx.doi.org/10.5751/ES-07248-200214.

Synopsis: Having a greater diversity of four different types of trust (i.e. dispositional, rational, affinitive, and systems-based) within an institution or collaboration can strengthen the adaptive capacity of that institution and build more effective and resilient governance of natural resources.

10. APPENDICES

LIST OF APPENDICES

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APPENDIX A. Drought Guidelines – US Forest Service Region 3 Grazing Permit Administration Handbook, Chapter 10 Supplement

R3 SUPPLEMENT 2209.13-2015-1 2209.13_10
EFFECTIVE DATE: 2/23/2015 Page 61 of 74
DURATION: This supplement is effective until superseded or removed.

FSH 2209.13 – Grazing Permit Administration Handbook
Chapter 10 - Permits With Term Status

19 – General Administration of Grazing Permits.

19.1 – Drought Guidelines.

Drought is an inevitable occurrence in the southwestern United States. The question for land managers is not *will* drought occur, but *are land managers prepared for drought*? Land managers and grazing permittees, must plan for drought as a normal part of management and business. The Standardized Precipitation Index (SPI) is a unit of measure that compares recent precipitation values for a period of interest with long term historical values to assess moisture conditions in a given area. In the Southwestern Region, anytime the SPI reaches a value of minus 1.00 or less for the preceeding 12 month period, grazing allotments should be evaluated for existing drought conditions.

It is imperative that land managers understand how drought affects plants, thereby affecting rangeland resources and how management can buffer the consequences of drought. It is equally imperative to communicate the effects of drought and the associated management actions taken to buffer those consequences.

Drought effects are varied, depending upon the attribute being reviewed. On an individual plant basis, vigor and reproductive ability may be hampered. On a landscape scale, various species within a vegetation community may be affected differently, thereby affecting community dynamics amongst plants, soil conditions, and water quantity and quality.

A diversity of factors should be considered when devising management actions on the National Forests in the Southwestern Region. Such factors would include species diversity, past grazing use, timing of grazing, intensity of management, and conditions of improvements to support grazing activities. These factors along with precipitation data provide flexibility to the line officer to make decisions based on recommendations from district rangeland management specialists.

Livestock Grazing Guidelines consist of four elements.

1. Drought Evaluation.

   a. The Regional Forester will monitor trends in the SPI in order to provide Forest Supervisors and District Rangers adequate time to begin discussions with the livestock industry and grazing permittees before viable options for coping with drought conditions are foregone.
   b. Anytime the SPI reaches a value of - 1.00 or less for the preceeding 12 month period, grazing allotments will be evaluated for the existence of drought conditions.
   c. When drought conditions have been identified, Forest Supervisors will evaluate grazing allotments for drought related conditions from an interdisciplinary perspective.
   d. Although SPI may not have reached – 1.00, for the preceding 12 month period, Forest Supervisors may evaluate grazing allotments for apparent drought conditions.
   e. When the SPI for the preceding 12 month period becomes positive rangeland resources may be evaluated for indications of recovery of drought conditions.

2. Management Process

   a. Vegetation resources affected by drought across the Forest will be evaluated from an interdisciplinary perspective.

b. Drought evaluation should result in recommended management actions needed to protect rangeland resources.

c. Factors considered in evaluations include, but are not limited to, local precipitation data and departures from normal, current range management status, current stocking levels, available water, and management intentions of the permittee.

d. District Rangers have the responsibility to consider recommendations from drought evaluations and implement appropriate management in consultation with affected permittees.

e. Drought evaluations should be conducted periodically to reassess conditions and evaluate the need for further action.

3. Stocking During and After Drought

a. District Rangers will consider stocking levels on allotments based on precipitation events, and allotment specific conditions in collaboration with livestock permittees.

b. Stocking levels should consider circumstances such as: drought-induced mortality thereby reducing forage produced per acre, species diversity, plant vigor, condition of range improvements, management intensity, and availability of water.

c. Management following drought should be devoted to allowing for the recovery of the rangeland vegetation.

(1) This means providing for improved plant vigor and restoring soil cover through plant litter.

(2) Focusing on recovery of the resource through rest or incremental restocking will ensure more rapid and longer lasting recovery from drought.

d. General recommendations for drought recovery.

(1) Rest pastures for at least one entire growing season or more following severe droughts.

(2) Use pastures when key forage species are dormant for at least one growing season.

(3) Defer grazing until key forage species have produced mature seed.

(4) Assess various attributes of an allotment prior to making decisions regarding restocking.

(a) Plant vigor- The relative robustness of a plant in comparison to other individuals of the same species.

(b) Current forage production- The amount of forage currently produced usually expressed as pounds of herbaceous forage per acre.

(c) Multiple Use Values- The other values provided for by rangeland resource, i.e. wildlife habitat, and aesthetics.

(d) Permittees ability to restock- The ability of the permittee to place livestock on the allotment. This could be related to such items as current herd size, available labor, and current condition of range improvements.

4. Communication Plan. Most permittees will want to protect the grazing resource, which they are dependent upon. Early communication provides them maximum time to develop alternatives for their operations and provide suggestions to the Forest Service. Consistent effective communication with others, such as NRCS, FSA, BLM, State, Local, and Tribal Governments as well as non-governmental organizations regarding effects of drought, and potential collaborations is essential.

a. Drought related communications involving multiple Forests will be coordinated by Forest Supervisors with assistance from the Regional Forester as requested.
b. Communications concerning rangeland management during and after drought on individual Forests will be coordinated by Forest Supervisors.
c. District Rangers will initiate communication with grazing permittees at the first sign management changes may be needed due to drought.
d. Management due to drought must be approached in a collaborative manner between district personnel and permittees.

19.4 – References.

Howery, Larry. 1999. Rangeland Management Before, During, and After Drought. University of Arizona Cooperative Extension AZ1136.
http://extension.arizona.edu/sites/extension.arizona.edu/files/pubs/az1136.pdf

APPENDIX B. Using the Standardized Precipitation Index to Understand Variability of Precipitation on Southwest National Forests

Many ranchers estimate drought intensity based on the percent of average precipitation received. To help put SPI into that perspective, SPI values can be converted to percent of average precipitation for any given location with a record of precipitation data. The underlying distribution of historical precipitation values at a given location and timescale (e.g. winter vs. summer) will impact how a given SPI value translates into a percent of average precipitation. For example, a location that has experienced a large range of winter precipitation values historically could have a much lower percent of average precipitation with its corresponding -2 SPI value than a location with low variability in its historical record. Figures 10 and 11 illustrate an example from the Tonto National Forest, showing the corresponding percent of average precipitation for both SPI -1 and SPI -2 in the winter season and summer season separately. Similar information for each national forest within Region 3 is located in Table 3.

Figure 10: Relating SPI to Percent of average precipitation for the *summer* season

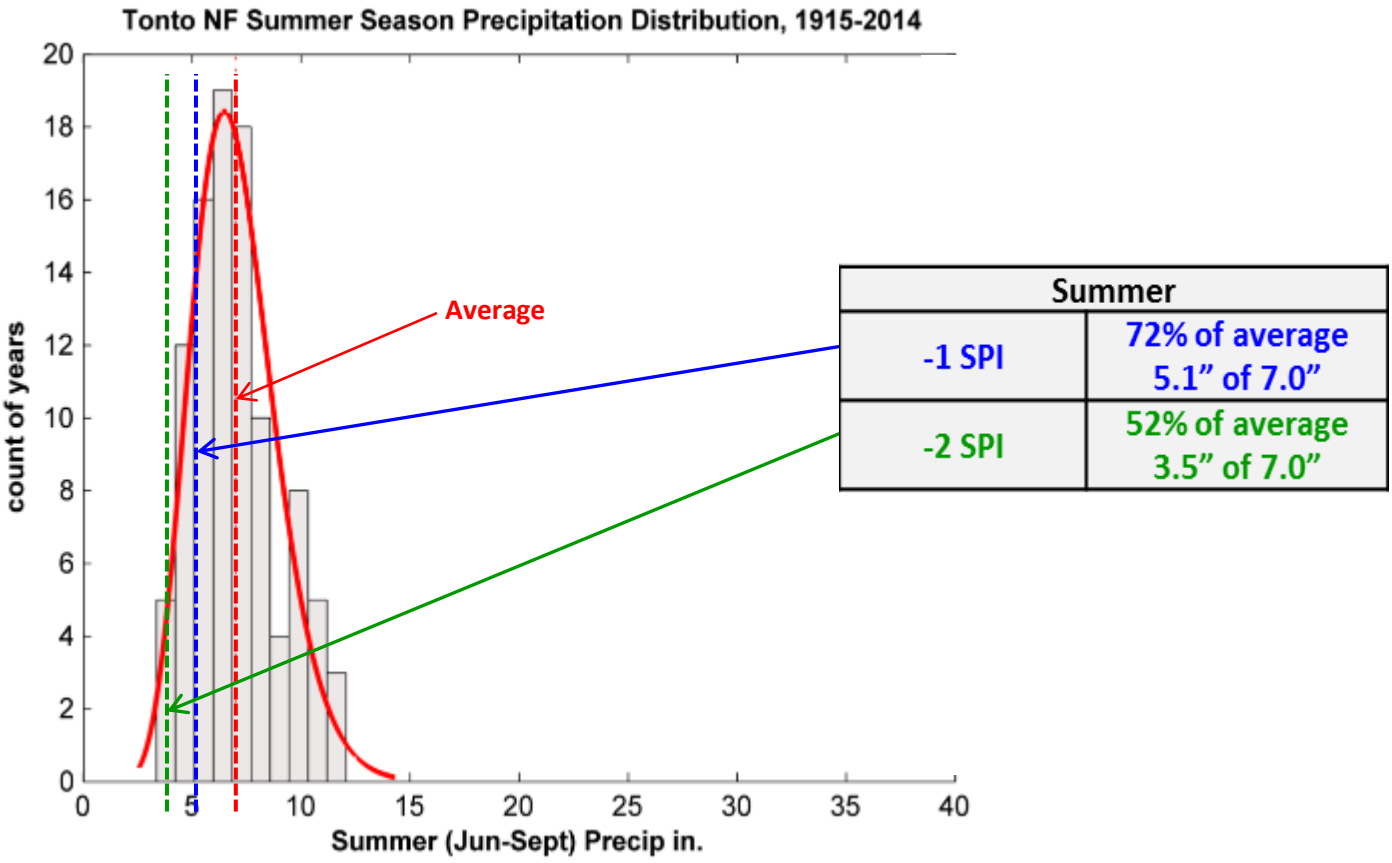


Figure 11: Relating SPI to Percent of average precipitation for the *winter* season

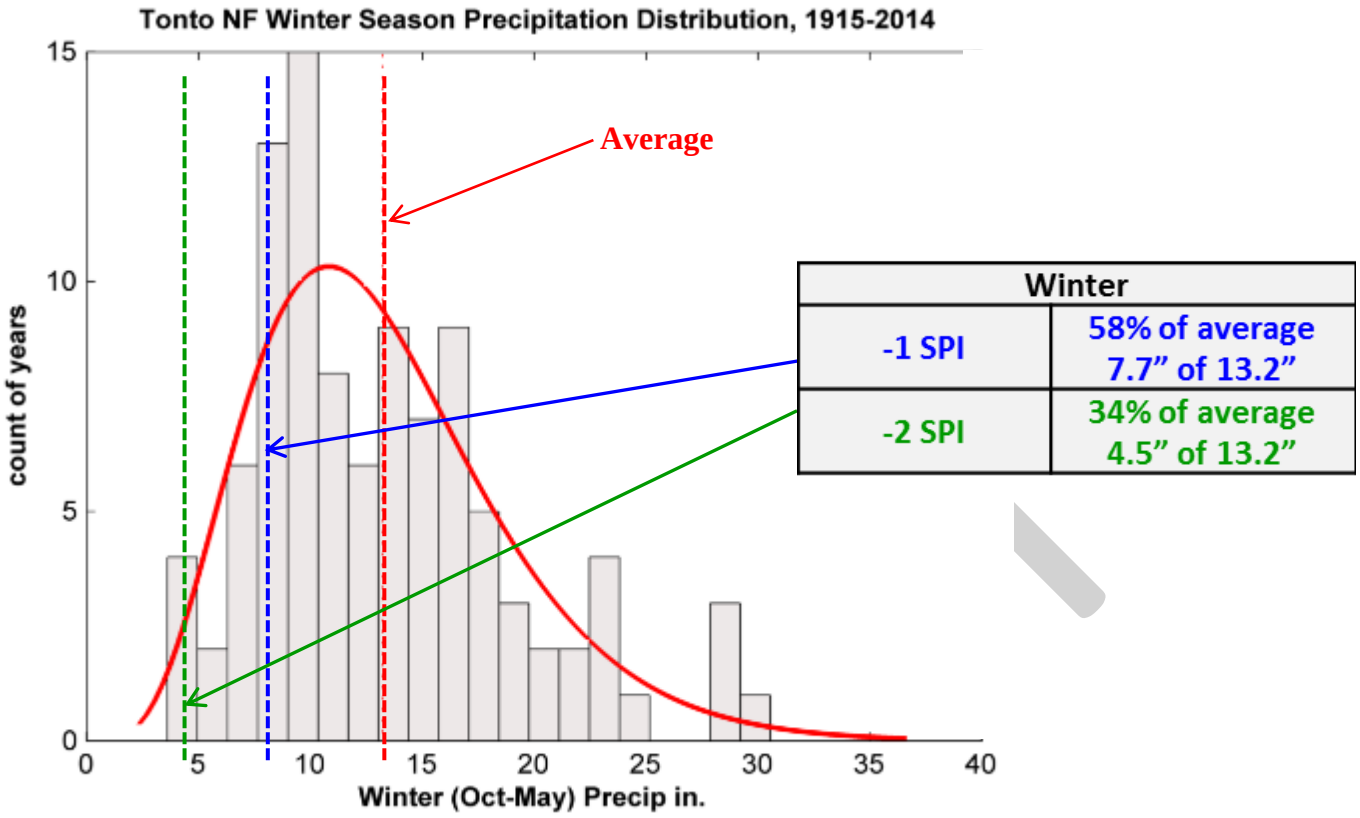
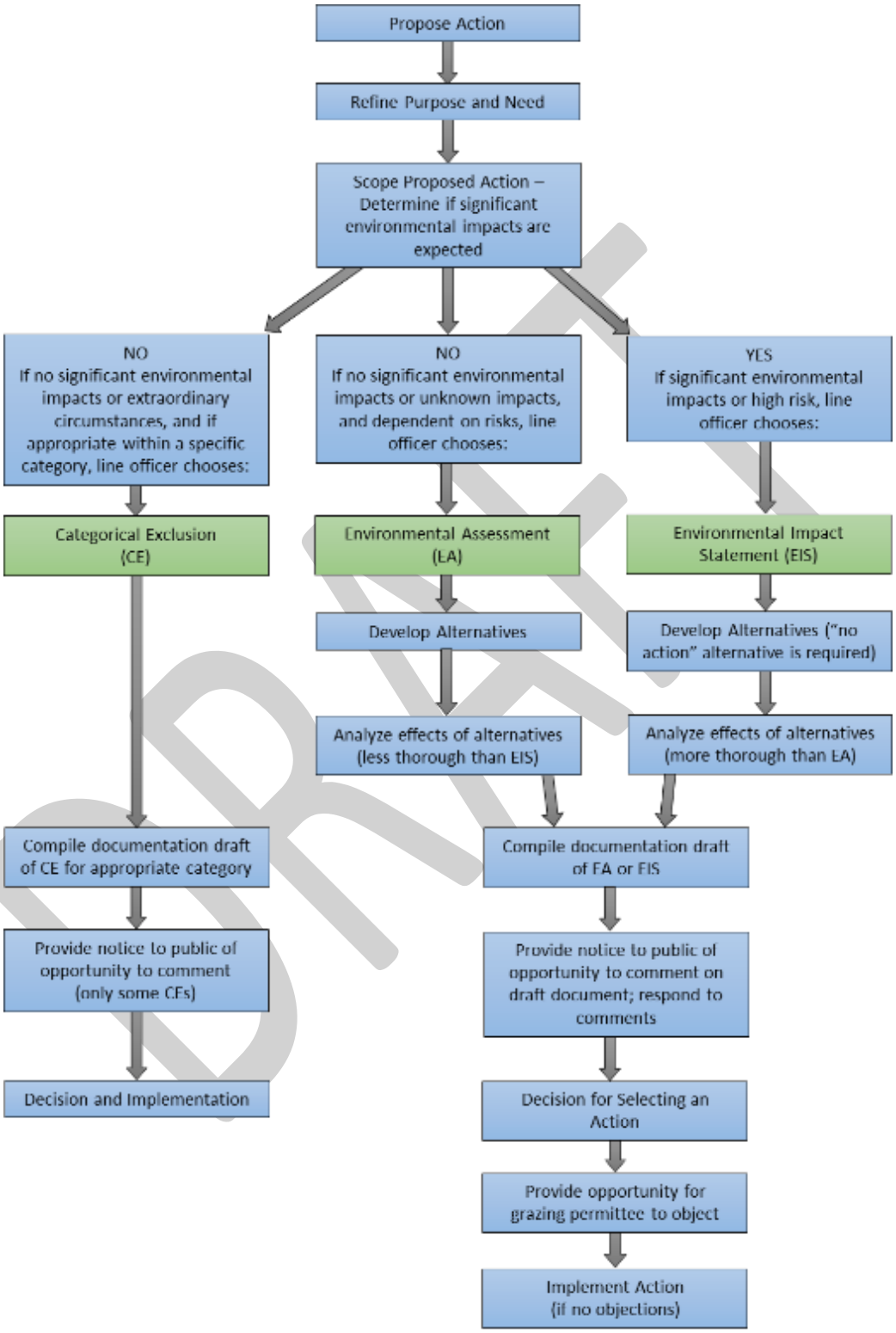


Table 3: SPI values tied to percent of average precipitation for each national forest in Region 3 for winter (Oct-May) and summer (June-Sept) seasons.

	Percent of Average Precipitation			
	Winter		Summer	
Region 3 Forest	**-2**	**-1**	**-2**	**-1**
Tonto National Forest	34	58	52	72
Kaibab National Forest	45	65	50	69
Coronado National Forest	29	56	63	79
Coconino National Forest	39	63	50	72
Prescott National Forest	37	56	49	70
Apache-Sitgreaves National Forest	41	65	63	78
Gila National Forest	33	60	59	78
Santa Fe National Forest	46	69	64	77
Lincoln National Forest	34	59	53	75
Cibola National Forest	41	65	66	79
Carson National Forest	53	73	54	76

APPENDIX C. Figure 12: Basic Steps in the NEPA Process



WORKSHEET 1: Inventory and Condition of Improvements and Pastures

PASTURE: _____ ALLOTMENT: _____ Page: _____

Updated: _____ Allowable/Expected Grazing Use: _____

Types and Condition of Forage:	**Policy Constraints / Use Restrictions:**

Best Season of Use: Winter _____ Spring _____ Summer _____ Fall _____

WATERS

Name	Condition	Issues	Maintenance Needs

PASTURE FENCES / CORRALS

Location	Condition	Issues	Maintenance Needs

OTHER

Location	Condition	Issues	Maintenance Needs

WORKSHEET 2: Co-Develop Objectives for Drought Preparation

Allotment: _____ Date: _____ Page: _____

Objective #	Details of Each Objective

WORKSHEET 3: Co-Develop Drought Scenarios

Allotment: _____ Date: _____ Page: _____

Scenario # _____

What if… _____

_____

_____

_____

_____

_____

…What will we do? What flexibility do we have? What could we have done ahead of time to prepare? _____

Scenario # _____

What if… _____

_____

_____

_____

_____

_____

…What will we do? What flexibility do we have? What could we have done ahead of time to prepare? _____

Scenario # _____

What if… _____

_____

_____

_____

_____

_____

…What will we do? What flexibility do we have? What could we have done ahead of time to prepare? _____

WORKSHEET 4: Identify Issues with Preparation and Co-Develop Possible Solutions

Allotment: _____ Date: _____ Page: _____

Issues	Possible Solutions	Likely NEPA Analysis	Scenario Addressed

WORKSHEET 5: Select and Prioritize Projects

Allotment: _____ Date: _____ Page: _____

Basic Details of Each Project/Action	Objectives Addressed	Expected Timeline	Potential Partners	Priority

WORKSHEET 6

Managing the NEPA Process Together and Setting Shared, Realistic Expectations

Allotment: | **Date:**

People Involved:

Which project/practice are you proposing for a NEPA analysis? List all if grouping multiple practices into the same NEPA analysis:

Expected NEPA Analysis Required (EA, CE category):

Reasons Why:

Major Steps to Take Through the NEPA Process

Action	Person Responsible	Communication Responsibilities	Likely Amount of Time to Complete Step

Managing the NEPA Process Together and Setting Shared, Realistic Expectations

Plan for Funding Each Practice (if applicable)

Practice	Funding Plan

Potential Reasons that Practice(s) May Not Be Approved As Is:	Plan B to Resolve Issues (e.g. alternative location, design specifications)

Plan for Implementing Practice if Approved:

Plan for Monitoring Success of Practice after Implementation:

Remember, NEPA legally requires the Forest Service to follow procedures for analyzing potential environmental impacts of proposed actions on national forests. Those legal procedures must involve several other individuals, including agency specialists, the agency decision-maker, and the general public. In addition, national forests have many stakeholders and many other proposed actions and management needs occurring simultaneously. These factors, among others, can affect the length of time it takes to complete a NEPA analysis for livestock management practices on your allotment. Therefore, this worksheet is not legally binding, but rather a structured approach to help you (the permittee and rangeland specialist) more effectively plan for and manage the NEPA process together with shared expectations.