Fishlake Forest Plan Monitoring Program

Evaluation of Monitoring Information

In Compliance With 36 CFR 219.12(d)

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Table of Contents

List of Tables

List of Figures

Introduction

The 2012 USDA Forest Service Planning Rule directs the development, amendment, and revision of land management plans for 155 forests, 20 grasslands, and 1 prairie in the National Forest System (NFS) in accordance with the National Forest Management Act (NFMA) of 1976. The planning rule ensures that collaborative and science-based plans are developed to provide for ecosystem sustainability, species diversity and conservation, watershed protection, and benefits to public users and communities. The planning rule's three-part adaptive management framework consists of assessments; developing, amending, or revising a plan; and monitoring. Monitoring, as described in 36 CFR 219.12(a)(1), informs management effectiveness, and enables the responsible official to determine if changes to plan components, content, or implementation strategies are warranted. Plan monitoring is integrated with broader-scale monitoring strategies outlined by the regional forester in coordination with State and Private Forestry, Research and Development, partners, and the public.

This Biennial Monitoring Report for the Fishlake National Forest (Fishlake) presents the monitoring evaluations for 2022-2023. The report is separated into two parts. Part I summarizes the determinations from the biennial monitoring evaluations as to whether changes to either the forest plan, management activities, the monitoring program, or an assessment relating to the forest plan is needed. Part II presents the program specific monitoring reports as per conformance with requirements of 36 CFR 219.12 (a)(5).

The Fishlake National Forest has been operating under the 1986 Land and Resource Management Plan (LRMP) (USDA Forest Service, 1986), with several amendments. To comply with the 2012 Planning Rule, modifications to plan monitoring requirements were developed in 2016 to assess key ecological conditions and public benefits; specifically, questions and associated indicators were identified to evaluate resource areas under these contexts.

Part I: Determinations from the monitoring evaluation

Monitoring indicators designed to inform management effectiveness toward achieving the Fishlake National Forest Plan's desired conditions and objectives were evaluated for 2020-2021. Based on the new information gathered, determinations as per 36 CFR 219.12(d)(2) are as follows:

Need for change to the Forest Plan

Monitoring evaluations did not indicate a need for change to the Fishlake National Forest Plan.

Need for change to Management Activities

The biennial monitoring evaluation did not indicate a need to change management activities.

Need for change to the Monitoring Program

No need for change to the monitoring program was detected through this biennial evaluation.

Need for an assessment relating to the Forest Plan

Monitoring evaluation did not indicate a need to assess the Forest Plan for change.

Overall, the monitoring evaluation for the Fishlake National Forest shows that the forest plan, management activities, and monitoring program are effectively managing resources to meet the goals outlined in the 2012 Planning Rule. Constraints, such as limited funding and capacity, point to a need to prioritize treatment types, use interdisciplinary approaches, and work with a variety of outside entities to meet collective desired goals for forest resources. Monitoring will continue on the Forest and inform not only adaptive management as conditions change but allow the Fishlake to identify potential future needs for forest plan revision.

Part II: Program Area Monitoring Evaluation

Recreation

Land and Resource Management Plan (LRMP) Desired Conditions for Recreation (Visitor Use)

Manage the land and activities on it, including visitor use, to achieve desired physical and social recreation settings (LRMP Page IV-3).

Activities and Monitoring Questions

Assure that developed and dispersed recreation site use and physical conditions meet Forest Plan standards.

- **LRMP Standard: "Manage Development Scale 3 and 4 Sites for full service when at least one of the following are met: A.) A campground is designated a fee site, B.) More than 20% of the theoretical capacity is being utilized, C.) A group campground or picnic ground has a reservation system and/or user fee, or D.) The site is a swimming site, a boating site with a constructed ramp, or a staffed visitor information center.**

- **LRMP Standard: Close or rehabilitate dispersed sites where unacceptable environmental damage is occurring (close sites that cannot be maintained in Frissell Condition Class 1, 2, or 3 and rehabilitate sites that are in Frissell Condition Class 4).**

Are developed and dispersed recreations sites meeting Forest Plan standards for use and site condition, and are visitors satisfied?

Monitoring Indicator

Site use and/or evidence of the extent of use. Developed site condition surveys; Frissell condition at dispersed sites; fee collection data; visitor satisfaction data.

Monitoring Methods and Data

Visitor use occurs in a variety of forms and at all times of the year. The Forest has used a variety of tools to collect data to determine use values.

For developed sites, tracking the fees collected provides a measure of use trends.

For dispersed sites, where fees don't apply, monitoring the impacts of visitor use provides information on use patterns to determine if there is an increase, decrease or stable trend at these sites. The LRMP identifies Frissell condition as the monitoring method for dispersed site condition. Sidney Frissell's article "Judging recreation impacts on wilderness campsites" (Journal of Forestry 1978) was adopted as a standard for the LRMP. *Frissell* proposed a *condition class* method of monitoring campsites, which describes site use in 5 classes:

1. Ground vegetation flattened but not permanently injured. Minimal physical change except for possibly a simple rock fireplace.

2. Ground vegetation worn away around fireplace or center of activity.

3. Ground vegetation lost on most of the site, but humus and litter still present in all but a few areas.

4. Bare mineral soil obvious. Tree roots exposed on the surface.

5. Soil erosion obvious. Trees reduced in vigor and dead.

The LRMP general guideline (LRMP p. IV-15) directs managers to close any sites that cannot be maintained at Frissell condition class 1, 2, or 3.

Formal surveys through the National Visitor Use Monitoring program are conducted on the forest every five years, with the most recent survey completed in 2018. The National Visitor Use Monitoring (NVUM) program provides reliable information about recreation visitors to national forest system managed lands at the national, regional, and forest level. Information about the quantity and quality of recreation visits is required for national forest plans, Executive Order 12862 (Setting Customer Service Standards), and implementation of the National Recreation Agenda. To improve public service, the agency's Strategic and Annual Performance Plans require measuring trends in user satisfaction and use levels. NVUM information assists Congress, Forest Service leaders, and program managers in making sound decisions that best serve the public and protect valuable natural resources by providing science based, reliable information about the type, quantity, quality, and location of recreation use on public lands. Specifics on methodology and sampling techniques are detailed in the NVUM Visitor Use Report 2018.

The NVUM classifies forest visits into 3 categories:

1. Day Use Developed Sites (DUDS)

2. Overnight Use Developed Sites (OUDS)

3. General Forest Area (GFA)

Interviews conducted by willing participants resulted in annual visitor use estimates and satisfaction of services provided.

Assumptions

- **Utilization of fee data will capture the majority of use at fee sites. Sites that are reserved through recreation.gov must be paid up front. Walk-in site payment is based on the honor system, especially when a campground host is not present.**

- **Frissell condition classes are adaptable to cover sites where the pre-use conditions exhibit bare mineral soil. This applies mainly to lower elevation sites where annual rainfall amounts from 8-11 inches do not support the development of humus and extensive ground cover vegetation.**

- **2018 NVUM data is sufficiently current to describe existing conditions for use.**

Results

Developed Sites

Developed recreation site use fee data indicates high volatility in use levels. The general trend for site use fees is increasing, suggesting site conditions are meeting the need and level of expectations for visitors. This data was gathered through National Recreation Reservation Service (NRRS) recipient distribution reports from 2015 through 2023. The reports show that use fees at developed recreation sites increased slightly from 2015 to 2019, then experienced a sharp peak in 2020 followed by a dramatic drop in 2021 and a rebound in 2022-2023 (Fig 1). The 2020 spike in site use fees was likely due to the Covid-19 pandemic and associated recreation trends. It should be noted that use fees are not the same as gross revenues, although trends in gross revenues generally mimic use fee trends.
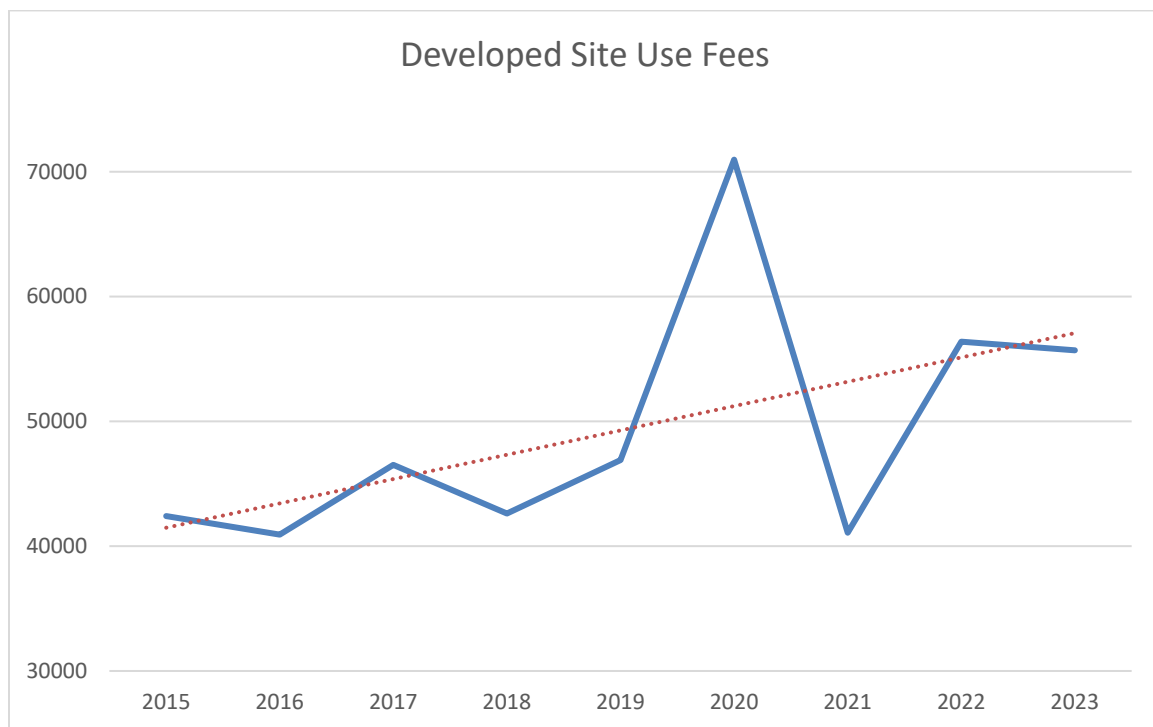
Figure 1. Developed Site Use Fees, 2015-2021.

The 2018 NVUM results indicate that satisfaction ratings for developed facilities, access, services, and feeling of safety range from 75 to 97 percent with most reports indicating a rating of "Keep up the Good Work". Undeveloped areas reported similar satisfaction ratings ranging from 72 to 95 percent (Figure 2). On average 75 percent reported being very satisfied with their overall recreation experience (Figure 3), which is identical to the 2013 NVUM results, indicating stable overall visitor satisfaction ratings. Updated satisfaction ratings will be available upon the release of the 2023 NVUM results.
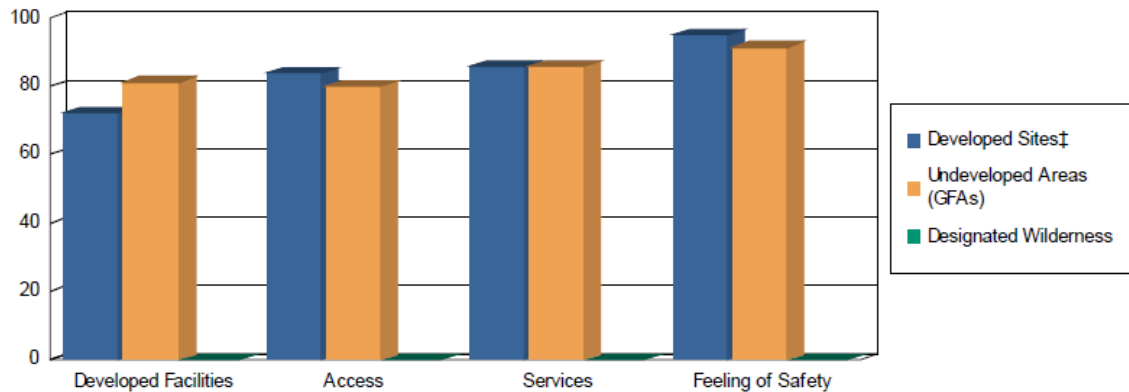
Figure 2. Visitor Satisfaction Rating for Developed and Dispersed Sites.

Dispersed Sites

In 2022 and 2023, no dispersed sites were identified in Frissell Condition Class 4 or 5, and closures or rehabilitation was not required. Satisfaction ratings for dispersed sites averaged 82 percent based on the most recent NVUM survey results (Fig 2).
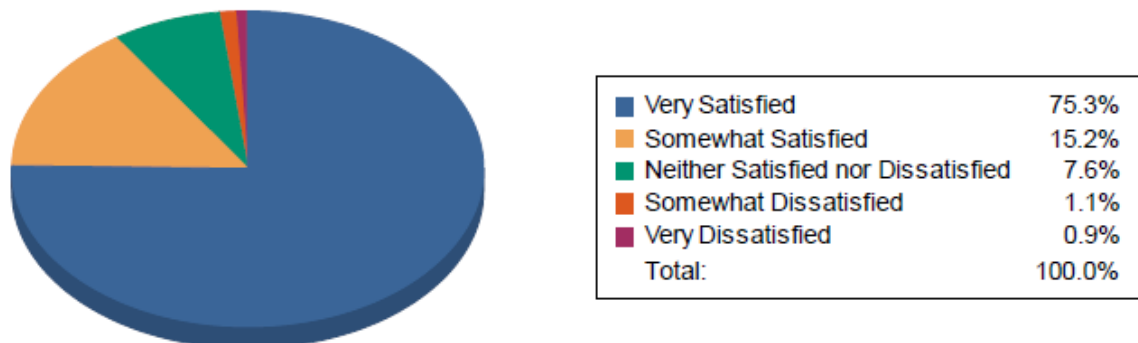
Figure 3. Overall Satisfaction Rating by Forest Visitors.

Recommendations

Plan to support NVUM surveys on the Forest. Monitor developed sites for infrastructure maintenance needs and educate volunteer campground hosts to provide the best visitor experience possible.

LRMP Desired Conditions for Recreation (Trails)

Provide a trail system for public and resource needs (LRMP Page IV-3).

Activities and Monitoring Questions

Assure that non-motorized and motorized trails are managed to standard, and visitors are satisfied.

- **Maintain all trails to meet standard of use designated in travel plan.**

- **Provide a full range of trail opportunities in coordination with other federal, state, and municipal jurisdictions and private industries both on and off NFS lands.**

Are trails meeting Forest Plan standards for use and condition, and are visitors satisfied?

Monitoring Methods and Data

Forest ranger districts record and report annual trail maintenance accomplishments. In addition, the program manager for the Forest motorized trail program prepares an annual report detailing work completed. The motorized annual report uses magnetic trail counters and trail cameras to gather data over 920.7 miles of motorized trail within the Paiute and Great Western Trail systems. This data provides an accurate indication of the quantity and trends of use.

Assumptions

- **The number of vehicles counted by electronic, non-photo trail counters assume 1 rider per vehicle. Acknowledgements are made to the increase in popularity of side by side and two-up configuration ATVs may underrepresent number of users in some instances. Use patterns are further refined through the use of trail cameras which record number of riders per vehicle and vehicle type.**
- **Implementers are aware of trail designations in the travel plan when completing repairs and trail maintenance.**

Results

In 2022 and 2023, trail maintenance activities on the Fishlake National Forest were completed by forest employees, conservation corps partners, and volunteers. In 2022, 1231.6 miles of trail were maintained, and 5.3 miles of trail were improved. In 2023, 1225.0 miles of trail were maintained, and 0.5 miles of trail were improved.

The motorized trail program is an inclusive approach to trail management that capitalizes on state, federal, and private resources to complete work. This approach has proven to be very successful to incorporate grant funding, maximize equipment deployment, and increase the workforce which has resulted in a nationally recognized trail system. The trail network that is maintained through the Fishlake Motorized Trail Program incorporates Bureau of Land Management, State of Utah, Private, and NFS lands.

Motorized trail activity and OHV use is the second highest reason visitors come to the Fishlake (NVUM 2018). Long-term use patterns for motorized trails show a steady increase over time, with a peak occurring in 2020 followed by a downturn in 2021 continuing into 2022, as shown in Figure 4.
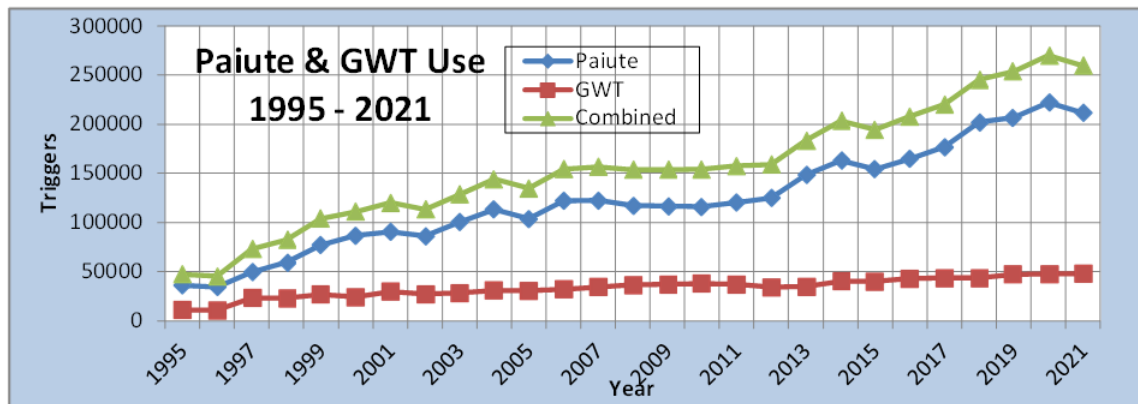
Figure 4. Paiute and Great Western Trail Use from 1995-2021.

Non-motorized trail activity includes hiking, equestrian, and mountain bike trails. These trails, together with the forest's motorized trail system, meet the standard of providing a full range of trail opportunities across multiple jurisdictions.

Access and services ratings associated with trail use recorded moderately high satisfaction with users; 87 percent and 76 percent respectively (NVUM 2018). These 2018 satisfaction ratings were about 13 percent lower than the 2013 satisfaction ratings. The decline in satisfaction ratings from 2013 to 2018 may be at least partially attributed to a trend of diminishing trail maintenance activities, which bottomed in 2019 and have since rebounded sharply, as depicted in Figure 5. The increase in trail maintenance activities in 2020 and 2021 is primarily due to an increase in available program funding, which has been received from a variety of sources including federal and state grants and the Great American Outdoors Act.
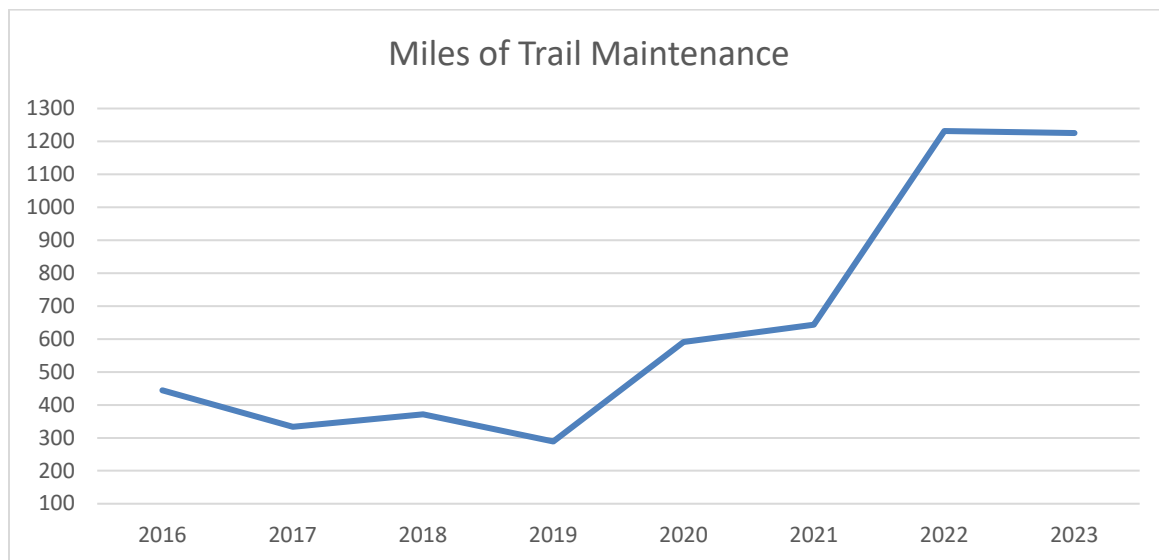
Figure 5. Trail Maintenance Performed from 2016-2023.

In summary, visitors are generally satisfied with the level of services and access currently provided, although satisfaction levels may be declining as visitation increases.

Recommendations

Continue to support the Forest Motorized Trail Program with partnerships between the State of Utah and private riding clubs. This program has been an effective way to meet users' needs and desires for OHV opportunities.

Continue to seek opportunities to increase non-motorized trail maintenance and improvement activities. Continue to seek out opportunities for partnerships and volunteer work for trail maintenance needs. Trail maintenance opportunities can be listed on volunteer websites such as https://www.justserve.org/. Partnerships with non-profit organizations that support non-motorized trail activities should also be pursued, as well as grant funding opportunities to support non-motorized trail maintenance work.

Cultural Resources

LRMP Desired Conditions for Cultural Resources (Protection)

Identify, protect, interpret, and manage significant cultural resources on the Fishlake National Forest (LRMP Page IV-3).

Activities and Monitoring Questions

Sites located and protected: Are historical and cultural resources being protected both from forest plan implementation activities and from vandalism or neglect?

Monitoring Indicator

Number of historical or cultural sites adversely impacted by projects or the public.

No known adverse impacts were documented in FY22 or FY23.

Data Limitations

In 2021, the Fishlake National Forest completed digitizing all working heritage program files and was collating Fishlake data with records housed at the Utah SHPO. This continued in FY22, and in FY23 as legacy heritage program files were reviewed. This work is ongoing and will continue in out-years as time permits.

Historical and Cultural Resource Protection

The following information, derived from the data in the new database, indicates cultural resources were located, monitored, and protected:

A. Priority Heritage Assets:

All the monitoring (condition assessments) for the Priority Heritage Assets were up to date for FY22 and FY23.

Nawthis (04080000007) and Rushton Village (04080000024) were revisited and updated in 2021 with Utah SHPO consultation and concurrence completed on February 9, 2022.

Koosharem Guard Station (04080001430) was visited on June 20, 2023. Photographs and notes were taken including work that had been completed since FY20 and work that was ongoing at the

time of visit. No condition assessment or stewardship project (Section 110) was entered into NRM.

Big Flat Guard Station (04080001597) was visited on September 6, 2023, as part of the Fishlake All Employee Workday for the replacement construction of a portion of fence. Photographs and notes were taken, but again, no condition assessment or stewardship project (Section 110) was entered into NRM.

B. Section 110 projects completed:

No Section 110 projects were completed for FY22 or FY23.

C. Section 106 projects completed (18 in FY22 and 21 in FY23):

2022
19-1285	Last Chance Wildlife Habitat Improvement
20-1331	Hans Pumpernickle North Habitat Restoration
20-1338	Fishlake Basin Recreation Improvements
21-1380	South Monroe Grazing Allotments Renewal EA
21-1391	Government Creek Vegetation Treatment Phase II
22-1398	Government Creek Vegetation Treatment Phase III
22-1399	Little Table Mx, Monroe Mt. Rx, Little Lost/Rex Reservoir Mx, Moroni Creek Rx
22-1400	Deer Trail Mine Exploration Drilling 2022
22-1402	Filmore Ranger Station Reroofing
22-1403	Oak Creek Guard Station Rehabilitation
22-1404	Lake View Rec Residence Cabin #40 Addition
22-1405	Pleasant Creek-Browns Ditch Fish Passage Barrier
22-1407	Dog Valley Geothermal Exploration
22-1408	Watts Mountain SNOTEL Site
22-1409	NRCS- Hampton Farming & Livestock-Water Hollow Allotment
22-1411	Beaver District Horse Pasture Water System
22-1420	Aspen Heart Recreation Residence Cabin #67 Additions
22-1426	CCC Road Mountain Bike Trailheads

2023
22-1406	Box Creek and West Lost Creek Vegetation Management
22-1413	Boulder Mountain Landscape Health Project
22-1414	Old Woman South Rx
22-1417	Austin Culinary Water Improvement Project
22-1422	Torrey Water Tank Project
22-1427	East End Boulder Mountain Springs Upgrade
22-1429	Torrey Pipeline and Circleville Culinary Water Improvements
22-1430	Hans Pumpernickle South Habitat Restoration Project
22-1431	DT Mining Upper Carissa Road
23-1433	Kent's Lake Ditch Company Weir
23-1435	Sand Creek Trailhead and Beehive Peak Overlook
23-1436	NRCS Millard County EWP Project
23-1438	Flat Canyon Grazing Allotment EA
23-1439	Pleasant Creek Ditch Fish Barrier
23-1441	Gooseberry East Phase 3 Habitat Restoration
23-1444	Forsyth Reservoir-Danish Ridge Vegetation Management
23-1445	Cove Fort Geothermal Leasing EA

23-1446   Ivie Creek Enclosure Fencing
23-1448   Hans Pumpernickle Habitat Restoration
23-1452   T-Mobile Oak City Communications Site
23-1454   Mackinaw-Bowery Campground GAOA Upgrade

Recommendations

No changes to the cultural resources monitoring program are recommended.

Monitoring Methods and Data

The Fishlake National Forest employs a Forest Archaeologist to develop, coordinate, and implement the Cultural Resources program on the unit, including planning, directing, and executing surveys for the location and verification of historical sites and providing guidance to management in marking, protecting, and salvage of these sites. The forest archaeologist ensures that scientific and systematic procedures are followed in identifying, evaluating, and classifying cultural resources. Identified cultural resources are documented and recorded using appropriate site forms, and this data is recorded in the Forest Service Natural Resource Manager (NRM) Database and sent to the Utah State Historic Preservation Office (SHPO) for consultations.

Timber

LRMP Desired Conditions for Forest Vegetation (Protection)

Prevent and control insect infestation and disease (LRMP Page IV-5).

Activities and Monitoring Questions

Assure that timber manipulation will not favor an increase in forest pests (insects, diseases, etc.): Are Forest vegetation conditions stable or moving toward Forest Plan desired conditions?

Monitoring Indicator

Extent of insect and disease infestations.

Monitoring Methods and Data

Since 1955 the Forest Service's Forest Health Protection (FHP) aviation group has conducted annual insect and disease detection surveys across the United States. Using fixed wing aircraft, the FHP flies in a grid pattern over the forest while entomologists sketch map the foliage below. These Insect and Disease Detection Surveys (IDS) are used to detect and monitor insect outbreaks. The completed sketch maps are digitized for use in Geographic Information Systems (GIS), while the results are published in condition reports (USDA Forest Service 2024).

Assumptions

Data and Data Quality

Aerial detection surveys are an efficient and economical method of collecting and reporting data on forest insects, diseases, and other disturbances. Aerial sketch mapping is the primary data-collection method: data are collected by aerial observers from the Forest Service and other

cooperating state and federal agencies. Areas of damage are captured as polygons on hardcopy 1:100,000 scale maps or through a Digital Sketch Mapping System (D-ASM). The D-ASM uses a moving map display, GPS tracking, and touch screen technology to create a digital version of the data on-the-fly in the aircraft. Regardless of the method, it is important to note that sketch mapping is a valuable but subjective endeavor with inherent spatial and attribute inaccuracies.

Polygons are coded to identify the damage agent, damage type, and other attributes. Reporting the number of dead trees or dead trees per acre is required for areas with mortality. In large areas where mortality is widely scattered, other attributes may be used (but are not required) to capture the pattern of damage. In all cases, mortality may be continuous or discontinuous; therefore, acres are reported as acres "with" mortality.

Areas with mortality are summarized on the map by 12-digit or 6th-level USGS sub-watersheds. These 10,000-to-40,000-acre units are consistent with those in the Forest Service Watershed Condition Framework (Potyondy & Geier, 2011). At the national scale, watershed summarization makes it easier to visualize mortality information. It especially helps highlight areas where activity consists of small and sparsely located polygons as is the case with some key species like southern pine beetle and emerald ash borer.

Managing Insects and Diseases

While there is little scientific support for the notion that insect epidemics or diseases can be arrested or "prevented" through silviculture (DeRose & Long, 2007), there is ample evidence that forest management can provide for stand conditions that are less conducive to high levels of disease and mortality (Amman & Logan, 1998; Wallin et al., 2008). Treatments that provide for reduced stand density, enhanced individual tree vigor, and reduced competition for light, water, and nutrients have long been used to reduce the risk of insect and disease induced mortality. Moreover, treatments that provide for structural diversity may improve resiliency—as larger trees are killed by beetles, smaller ones remain to replace them.

Providing for Healthy Forests

Among the many conditions that promote insect and disease infestations in the forests of the Fishlake, there are some conditions over which managers have some control: Stand composition, density, and age. It has long been known that stands densely packed with mature and over-mature trees of uniform composition are ripe for an epidemic (Fettig et al., 2007). Forests on the Fishlake can be managed to provide for a wide range of age, size, stocking, and species classes, reducing the susceptibility to wide-spread insect or disease induced mortality.

Results

Current Value

There are ten known and two unknown impacts from insect and diseases affecting the Fishlake National Forest over the three-year period from 2021 to 2023. See Table 1 below.

As was the case in 2022, fir engraver had the most impact on forested stands across the Fishlake, affecting approximately 5,929 acres in 2023. Fir engraver is a bark beetle affecting true firs such as white fire and subalpine fir. These beetles affect the bole, large branches, and slash (Forest Health Protection, Rocky Mountain Region 2011).

Following fir engraver, subalpine fir decline and pinyon ips are responsible for the second and third highest numbers of acres impacted across the Forest, 550 and 540 acres, respectively.

Subalpine fir decline has continued to affect acres across the Forest (Table 1). The cause of subalpine fir decline is unclear. Harvey et al. (2021) states "Subalpine fir decline is a poorly understood phenomenon that has killed millions of hectares in Western North America." Other researchers, such as Perret et al. 2023, believe that subalpine forests in the western United States are threatened by rapid climate change, increased activity by endemic and exotic insects and disease, and changing wildfire regimes. A personal discussion with Jose Negron (2024), Research Entomologist with the Rocky Mountain Research Station, suggested more research needs to be done. Dr. Negron suspects that unlike other bark beetle species, western balsam bark beetle and armillaria root rot, in conjunction with drought, are the primary culprits in subalpine fir decline. Dr. Negron further notes that the western balsam bark beetle is a fungus carrier and there is suspicion that the fungus, rather than the beetle larvae (as is the case with most other bark beetle), may be the cause of tree mortality. A similar example of this relationship is Dutch elm disease.

Pinyon ips is a bark beetle that mainly attack pinyon pine and to a lesser degree ponderosa pine, Douglas-fir, and spruce. They affect the bole of trees. Their numbers appear to be in decline since 2021.

Western spruce budworm affected 393 acres in 2023. Western spruce budworm is a defoliator affecting the outer buds of the tree. Tree species on the Fishlake affected are subalpine fir, Douglas-fir, white fir, Engelmann spruce, and Colorado blue spruce. Smaller trees tend to suffer more from the effects of defoliation, and larger trees tend to suffer more mortality from subsequent bark beetle attack (Halloin, 2003).

Douglas fir beetle has increased over the three-year period (Table 1). This beetle is exclusive to Douglas fir trees and attacks the boles. This is a natural and common pest for Douglas fir on the Fishlake NF.

There are some unknown defoliators identified in 2022 and 2023, as well as Marssonia Blight affecting tree health across the Forest. The latter is a fungus that attacks the leaves of aspen and, to a lesser degree, narrowleaf cottonwood and other poplars (FHP Rocky Mountains Region 2011). Whereas defoliators usually imply an insect of some kind, Marssonia Blight can also defoliate trees and may be responsible for some of the damage attributed to unknown defoliators. Although not detected during the timeframe of this report, one insect defoliated that has affect the Fishlake in the past is the western tent caterpillar. These are also common pests affecting the Populus family of aspen, cottonwoods, and willows.

Table 1. Affected acres from insect and disease on the Fishlake National Forest, 2021-2023.

Species	2021 Acres	2022 Acres	2023 Acres
Western Spruce Budworm - 12040	692	940	393
Fir Engraver - 11050	-	2,054	5,929
Subalpine Fir Decline - 29005	421	671	550
Unknown Defoliator - 12900	-	81	241
Pinyon Ips - 11019	2,376	760	540
Douglas-fir Beetle - 11007	1	12	293
Unknown - 90000	-	22	17

Species	2021 Acres	2022 Acres	2023 Acres
Western Pine Beetle - 11002	71	57	1
Mountain Pine Beetle - 11006	-	-	3
Ips Engraver Beetles - 11030	-	19	3
Spruce Beetle - 11009	-	-	-
Marssonina Blight - 25036	-	31	-
Total	**3,561**	**4,647**	**7,970**

Trends

Western spruce budworm is in decline across the Forest. Populations of spruce budworm rise and fall naturally, mostly affected by colder weather. Fir engraver seems to be on the rise, nearly tripling in acreage affected from 2022. There are no reports of acres affected in 2021, likely due to fewer acres surveyed during the Covid-19 pandemic. Subalpine fir decline has been relatively constant during the past three years.

The Fishlake has been in a drought for at least the past decade. However, last year there was a large amount of moisture which significantly improved drought conditions (95% of the Utah faced severe drought in the 2022 water year (Oct.1 – Sept. 30) whereas the 2023 water year was above average) (UDWR, 2024). For subalpine fir decline, it is believed that drought plays a role in susceptibility; however, the decline is not fully understood. Dr. Negron noted that a portion of the subalpine fir decline is likely attributable to western balsam bark beetles (unlike other bark beetles, this species does not attack a tree en mass and as such, the tree does not die immediately). Subalpine fir mortality may be attributed to beetle and/or a fungus, with drought making the trees more susceptible to both insect and disease.

Douglas fir beetle had a drastic increase from the previous two years, but this may be the result of a combination of drought and western spruce budworm. Previously affected areas on Mytoge Mountain and around the Fish Lake Basin had mature Douglas fir trees killed by the Douglas fir beetle. These areas were in a drought and had spruce budworm impacts. Reports from that time (2002 and 2009) from Forest Health Protection stated that beetles sometimes attack trees injured by defoliation. Stressed trees lack the ability to pitch out attacking beetles. This suggests previous impacts from other stressors increased attacks on Douglas fir.

Marssonia Blight was only detected in 2022. Fungi usually increase with increased moisture. However, the significant moisture received in 2023 did not increase the blight within the period of detection.

Recommendations

Forest vegetation on the Fishlake is currently managed—removed, regenerated, thinned, and restocked—by way of commercial timber cutting and non-commercial thinning. Providing commercial forest products is one of the missions of the Forest Service, and the Fishlake contributes to this mission by offering timber sales to local loggers. The Forest is currently thinning and regenerating Engelmann spruce by implementing several thousand acres of commercial timber sales in the Dark Blue Vegetation Improvement and Big Flat Vegetation Management project areas. In addition, the Fishlake is currently implementing several thousand acres of non-commercial stand improvement treatments composed of hand cutting, piling, and

burning of primarily small-diameter, shade-tolerant species such as subalpine and white fir. These projects are occurring across the Fishlake National Forest.

While projects such as these were designed, in part, to provide for age class diversity and reduced stand density, they are also necessarily small in scale. Both commercial and non-commercial cutting require access (roads) and operable ground. Neither treatment is truly feasible in the "back-40," where there are no roads, and the ground is often very steep. Moreover, much of the Fishlake is not administratively "suitable" for tree cutting, especially commercial logging, because it has been planned for wilderness, recreation, wildlife, or rangeland management, each of which is also part of the agency's mission.

Mechanical options for treating some of the insect and disease are not always effective in areas of high use. Density management appropriate to address such impacts can be achieved in some areas via methods described above, whereas in high impact areas (i.e. campgrounds) higher tree densities are needed to maintain the shade desired for the site(s). Therefore, use of insecticides or pheromones have been used to control infestations and may be employed again to achieve the desired control and protect the resource.

Fire is another disturbance that kills trees, and that may be undesirable in many circumstances, but it is also a management tool that can be used across large acreages and outside of roaded and operable ground. The Forest Service recognizes that fire can be a "good" disturbance that can serve to regenerate over-mature forests, reduce stand densities, and create diverse assemblages of species and age classes across the landscape (Parker et al., 2006). Fire—both natural and managed—has been used in recent years on the Fishlake to accomplish those purposes, helping reduce risk of insect and disease infestation in those stands. In the North Beaver project area on the Beaver Ranger District (BRD), for example, prescribed fire is currently being implemented on tens of thousands of acres. Moreover, during 2016, the BRD experienced the remote Briggs Fire, a lightning-ignited fire managed to reduce heavy pockets of insect-killed trees while regenerating aspen. Fires like the Briggs, far from any roads and in steep country, will likely remain the Fishlake's best tool to reduce forest susceptibility to insect attack by thinning stands and providing for increased age class and compositional diversity.

Thus, despite the potential for reducing the susceptibility of stands to insect attack using silvicultural treatments, the most promising tool may be the reintroduction of fire into many of the stands on the Fishlake.

Fuels Treatment

LRMP Desired Conditions for Fuels Treatment (Protection)

Use prescribed fire to reduce fuel buildup and meet resource objectives. Provide cost-effective (level of) fire protection (LRMP Page IV-5).

Activities and Monitoring Questions

Assess the effectiveness of fuel treatments on wildfire behavior and effects: Are fuel treatments projects protecting property, human health, and safety, and reducing the potential for unwanted fire effects?

Monitoring Indicator

Effectiveness of fuel treatments in reducing unwanted fire effects.

Monitoring Methods and Data

The Fuel Treatment Effectiveness Monitoring (FTEM) database can be found at the following website: https://fireportal.usda.gov. Fuel treatment effectiveness assessments are completed on all wildfires which start in, or burn into, a fuel treatment area that has been completed within the last 10 years. If a wildfire impacts more than one treatment unit, all treatment units that were affected must be entered into FTEM. All fuel treatment effectiveness assessment reports must be submitted within 90 days of control of the fire. Data will be reviewed from fire management resources, post fire field visits, and information within the FTEM database to determine the success of the fuels treatment in reducing the effects and behavior of the wildfire.

Results

From 2022 through 2023, the Fishlake experienced one vegetation treatment (Horse Hollow) that was impacted by wildland fire. The treatments and effectiveness are summarized below:

Horse Hollow (Halfway Hill Wildfire 2022) - Fillmore Ranger District

The Horse Hollow project area is approximately 20,000 acres. It was designed to be a phased project, meaning that the project would be implemented over time as funds come available. Treatments include both prescribed fire and mechanical methods. The first two phases of the project were strategically placed treatment areas designed to lessen the risk of wildland fire to nearby homes and the Fillmore City culinary water system. This phase was implemented in late 2016 and early 2017. This phase included hand thinning and hand piling of approximately 250 acres of pinyon and juniper. The piles were left to cure, and later burned in early 2018. Phase 3 was designed to bolster the effectiveness of the phase 1 and 2 treatments, with the objective of further lessening the risk to nearby values. The project was implemented in the spring and summer of 2018. This phase included thinning approximately 800 acres of pinyon and juniper. The resultant activity fuels were left to cure and later burned in early 2020.

On July 08, 2022, the Halfway Hill Fire, several miles south of Fillmore, Utah, was reported. The wildfire became established, exhibiting extreme fire behavior. The fire spread rapidly to the northeast. Due to terrain, environmental conditions, and associated fire behavior, initial attack suppression resources had difficulty meeting their objectives. The fire continued to grow to the northeast. On July 09, 2022, the fire impacted the west and north perimeter of the Horse Hollow treatments. Once the fire spread into the treatment area, the fire behavior drastically moderated. This decrease in fire behavior made it possible for ground and aerial resources to establish containment line and an anchor point on this portion of the Halfway Hill Fire.

The completion of the Horse Hollow treatments (thinning, hand piling, and prescribed burning) proved valuable in the containment efforts on the Halfway Hill Fire. These completed treatments moderated fire behavior and prohibited spread and establishment of spot fires in the treated area. Resources were able to establish containment line and anchor point, address any spot fires quickly and safely within the treatment, and burn out from the perimeter of the treatment. Nearby houses and the Fillmore City culinary water system were protected because of the forethought of fire managers, strategic placement, and completion of these phases of the Horse Hollow project.

If left untreated, the natural fuel load in the area would have supported extreme fire behavior. This would have made it nearly impossible for suppression resources to be successful in meeting their objectives related to protecting nearby values. Crown fire would have become established, and short- and long-range spotting would have presented additional challenges. The impacts to nearby values from the Halfway Hill Fire could have been severe.

Conclusion

Fuels treatments across the Fishlake have been and are implemented to reduce and/or redistribute ground, surface, and canopy fuels by removing trees, masticating small diameter trees and shrubs, mechanically and/or hand piling fuels then later burning them, or applying prescribed fire. An effective fuel treatment will slow the spread of fire and reduce the likelihood of crown fire, aid suppression efforts, and reduce the intensity and severity of a wildfire under all but the most extreme weather conditions (Vaillant & Reinhardt, 2017).

Fuel treatments strategies on the Fishlake typically fall within two overreaching land management objectives: ecosystem restoration/maintenance or fire control. The primary goal of ecosystem restoration is to promote or maintain fire resilient landscapes. For fire control, the goal of fuel treatments is to facilitate wildfire suppression activities through the reduction of fuel hazards with strategic placement across the landscape (Vaillant and Reinhardt 2017). Because fuel treatments are an important aspect of land management, we have implemented fuel treatments on numerous acres across the landscape. Reported accomplishments from 2014 to 2023 are summarized below (Table 2).

Table 2. Reported Acres of Fuels Treatments across the Fishlake National Forest, 2014-2023.

Year	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Acres	8,449	11,636	24,513	9,346	34,800	29,553	41,597	39,910	50,628	80,098

It is not realistic or necessary to do fuel treatments on every acre of the Fishlake National Forest. With limited funding and capacity along with other constraints, we must realize the importance to prioritize when, where, and how to properly plan and implement successful fuel treatments.

During the monitoring period, one wildland fire has been recorded that impacted fuel treatments. The impacted treatments were successful in moderating fire behavior and effects. We believe that fuel treatments are an effective way to manage fire across the landscape and provide increased protection to identified values.

Facilities

LRMP Desired Conditions for Facilities

Develop and implement a road management system. Construct, reconstruct, and maintain roads to facilitate safe access and management of the Forest. (LRMP Page IV-5).

Activities and Monitoring Questions

Is adequate road access and maintenance being provided? Are open roads maintained to standard?

Monitoring Indicators

Miles of classified road open for public use and miles of road maintained to standard.

Monitoring Methods and Data

The indicators for this program area will be extracted from the Natural Resource Management (NRM) database.

Results

Results for Facilities are forthcoming. This section will be updated as results are received.

Recommendations

Recommendations will be developed as results are received and reviewed.

Watershed (Soil and Water Resources)

Over the last two years (2022-2023) several different hydrologic resources, soil resources, and implemented projects have been monitored for condition and effectiveness on the Fishlake National Forest. This section is a summary of these monitoring activities. This is an effort to be compliant with the standards and guidelines outlined in the Fishlake National Forest Land and Resource Management Plan (LRMP) and an effort consistent with the mission and obligation of the agency to manage these public lands. The monitoring effort summarized here is a collaboration between federal and state agencies and employees. Monitoring on the Fishlake National Forest is ongoing and expanding. Summary data may reference outside databases where both internal and external interested parties can pursue greater detail (links below).

During the following biennial monitoring period there was some turnover in the Fishlake NF watershed program, with a new Forest Hydrologist beginning in April 2023.

LRMP Desired Conditions for Forest Vegetation (Protection)

Maintain water quality to meet State standards for beneficial uses (LRMP Page IV-4).

Manage municipal watersheds to protect quality and water supplies (LRMP Page IV-4).

Maintain productive streams, lakes, and riparian areas and mitigate hazards on floodplains (LRMP Page IV-4).

Maintain or improve current soil productivity and restore areas with watershed problems (LRMP Page IV-5).

R4-Soil Quality Standard and Guideline for Accelerated Soil Loss Forest wide or are management activities impairing soil productivity of the land (no more than 15% of an activity area).

Application of appropriate extent of upland adjacent upland areas (Riparian Protection by buffers) (LRMP Page IV-43).

Best Management Practices (BMP) effectiveness and compliance on land disturbing projects (LRMP Page V-9).

Goals of Monitoring Efforts

Compliance with the Fishlake National Forest Land and Resource Management Plan.

Monitoring water quality on the Fishlake National Forest and identifying streams and bodies of water with impairment concerns to better inform forest management direction: 303d listed water bodies, established TMDLs, and priority watersheds (this effort is led by the State of Utah Division of Environmental Quality).

Manage municipal watersheds effectively to support the protection of water quality and quantity.

Assess the efficacy of implemented projects on NFS lands and identify issues and ways to improve project implementation on NFS lands.

Identify sources of pollutants, soil erosion, and water quality hindrances.

Inventory and assess the condition of Groundwater Dependent Ecosystems on NFS lands.

Assess the soil disturbance of completed timber sales on NFS lands.

Monitoring Indicators

Water Quality uses impaired and listed on the 303(d) list.

Feedback from community partners and other governmental agencies.

Issues with municipal watershed operators regarding Forest management.

BMP implementation and effectiveness.

Conditions of stream banks.

Conditions of groundwater-dependent ecosystems.

Soil disturbance parameters.

Impacts from management activities (livestock, ATV recreation, etc.).

Watershed Condition Framework status and priority watersheds.

Monitoring Methods

Water Quality Monitoring

The State of Utah Division of Environmental Quality, Water Quality Division conducts monitoring of all streams, lakes, and reservoirs on the Fishlake National Forest and the State of Utah. They conduct this monitoring on a rotational basis. Recently, a new report outlining changes to water quality and impairment status has been released by the State. This report can be found at the link below:
2022 Integrated Report - Utah Department of Environmental Quality

BMP Monitoring

BMP monitoring is conducted following the National Best Management Practices for Water Quality Management on National Forest System Lands.
https://www.fs.fed.us/biology/resources/pubs/watershed/FS_National_Core_BMPs_April2012

GDE Inventory

Groundwater Dependent Ecosystem Inventory was conducted following Forest Service methodology found here:
https://www.fs.fed.us/geology/GDE_Level_I_FG_final_March2012_rev1_printing.pdf

Forest Service Soil Disturbance Monitoring Protocol

Soil disturbance within timber sales in conducted using the Forest Service Soil Disturbance Monitoring Protocol found here:
https://www.fs.usda.gov/treesearch/pubs/34427

Level II Riparian Inventory

Monitoring of stream and riparian health, including conditions of stream banks using the Forest Service Level II Riparian Inventory Protocol found here:

https://www.fs.usda.gov/emc/rig/documents/protocols/Stream-Inventory-Handbook-Level-I-II.pdf

Data and Graphics

Watershed Condition Framework (WCF)

Figure 6, below, shows the condition classification of the watersheds on the Forest. Some watersheds on the Dixie and Manti La Sal National Forests are visible in this map. Most watersheds on the Fishlake are functioning or functioning at risk per the WCF classification. There were no changes to WCF status within this reporting period. The Fishlake watershed staff plans to reassess watersheds within the upcoming reporting period.
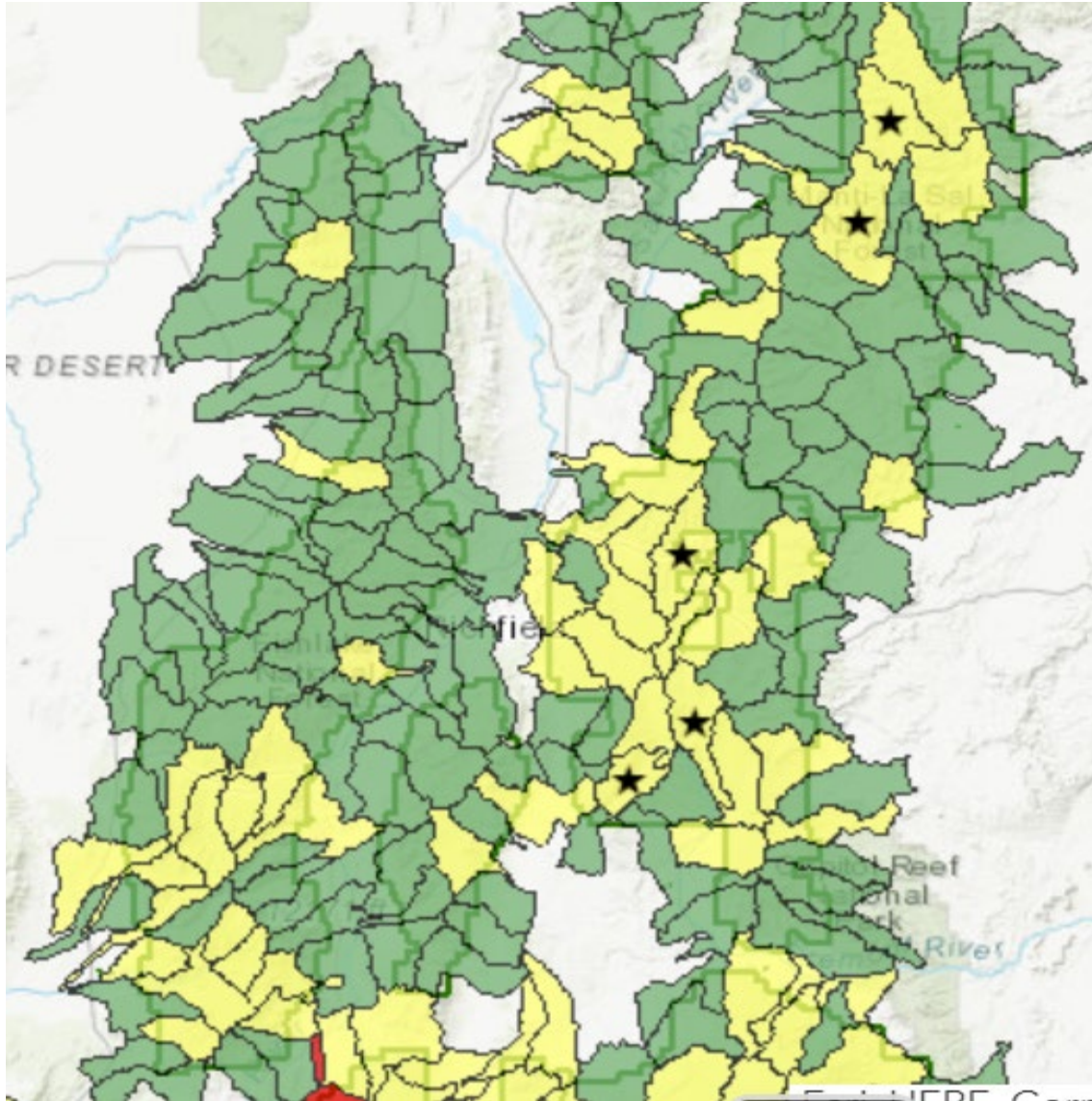
Figure 6. Fishlake National Forest Watershed Condition Framework Map.

Key: Green= Functioning, Yellow= Functioning at Risk, Red= Impaired

Water Quality Results

The following is a table summary of water quality listings, parameters, and results from the 2022 DEQ Integrated 303d report.

Table 3. Water Quality Summary, Water Bodies Fishlake National Forest.

Name	Assess ID	Description	BEN Class	Mgmt. Unit	Assessment	Impairment
Fish Lake	UT-L-14070003-006_00	Fish Lake	2B, 3A, 4	Western Colorado River	2: Supports all assessed uses	None
Johnson Valley Reservoir	UT-L-14070003-010_00	Johnson Valley Reservoir	2B, 3A, 4	Western Colorado River	4A: Approved TMDL. Impaired	Use Class 3A: Total Phosphorus

Name	Assess ID	Description	BEN Class	Mgmt. Unit	Assessment	Impairment
Mill Meadow Reservoir	UT-L-14070003-015_00	Mill Meadow Reservoir	2B, 3A, 4	Western Colorado River	4A: Approved TMDL. Impaired	Use Class 3A: Total Phosphorus
Forsyth Reservoir	UT-L-14070003-019_00	Forsyth Reservoir	2B, 3A, 4	Western Colorado River	4A: Approved TMDL. Impaired	Use Class 3A: Total Phosphorus, Dissolved Oxygen
Piute Reservoir	UT-L-16030001-011_00	Piute Reservoir	2B, 3A, 4	Upper Sevier River	5: TMDL Required (Impaired 303d list)	Use Class 3A: Temperature, Total Phosphorus, Dissolved Oxygen, pH
Otter Creek Reservoir	UT-L-16030002-004_00	Otter Creek Reservoir	2B, 3A, 4	Upper Sevier River	5: TMDL Required (303d List) / 4A: TMDL Approved (Impaired)	Use Class 3A: Temperature, Total Phosphorus
Lower Box Creek Reservoir	UT-L-16030002-005_00	Lower Box Creek Reservoir	2B, 3A, 4	Upper Sevier River	5: TMDL Required (303d List) / 4A: TMDL Approved (Impaired)	Use Class 3A: pH, Dissolved Oxygen, Total Phosphorus
Koosharem Reservoir	UT-L-16030002-011_00	Koosharem Reservoir	2B, 3A, 4	Upper Sevier River	5: TMDL Required (303d List) / 4A: TMDL Approved (Impaired)	Use Class 3A: pH, Temperature, Dissolved Oxygen, Total Phosphorus
Barney Lake	UT-L-16030003-005_00	Barney Lake	2B, 3A, 4	Lower Sevier River	2: Supports all assessed uses	None
Manning Meadow Reservoir	UT-L-16030003-006_00	Manning Meadow Reservoir	2B, 3A, 4	Lower Sevier River	5: TMDL Required (Impaired 303d list)	Use Class 3A: pH, Total Phosphorus
Redmond Lake	UT-L-16030003-012_00	Redmond Lake	2B, 3B, 4	Lower Sevier River	2: Supports all assessed uses	None
Rex Reservoir	UT-L-16030003-016_00	Rex Reservoir	2B, 3A, 4	Lower Sevier River	2: Supports all assessed uses	None
Kents Lake	UT-L-16030007-020_00	Kents Lake	2B, 3A, 4	Cedar-Beaver	5: TMDL Required (Impaired 303d list) / 4A: Approved TMDL (Impaired)	Use Class 3A: pH, Dissolved Oxygen, Total Phosphorus
Anderson Meadow Reservoir	UT-L-16030007-024_00	Anderson Meadow Reservoir	2B, 3A, 4	Cedar-Beaver	2: Supports all assessed uses	None
Three Creeks Reservoir	UT-L-16030007-025_00	Three Creeks Reservoir	2B, 3A, 4	Cedar-Beaver	5: TMDL Required (Impaired 303d list)	Use Class 3A: pH
LaBaron Lake	UT-L-16030007-027_00	LaBaron Lake	2B, 3A, 4	Cedar-Beaver	4A: Approved TMDL. Impaired	Use Class 3A: Dissolved Oxygen, Total Phosphorus
Puffer Lake	UT-L-16030007-028_00	Puffer Lake	2B, 3A	Cedar-Beaver	4A: Approved TMDL. Impaired	Use Class 3A: Dissolved Oxygen, pH
Quitchipah Creek Upper	UT14070002-002_00	Quitchipah Creek from U-10 to headwaters	2B, 3A, 4	Western Colorado River	5: TMDL Required (Impaired 303d list)	Use Class 3A: Temperature, Dissolved Oxygen, Benthic Macroinvertebrate Bioassessment
Saleratus Creek - Emery	UT14070002-003_00	Saleratus Creek and tributaries from U-10 crossing to headwaters	2B, 3A, 4	Western Colorado River	5: TMDL Required (Impaired 303d list)	Use Class 3A: Benthic Invertebrate Assessment

Name	Assess ID	Description	BEN Class	Mgmt. Unit	Assessment	Impairment
Ivie Creek Upper-2	UT14070002-004_02	Ivie Creek and some tributaries from U-10 crossing to headwaters	2B, 3A, 4	Western Colorado River	3: Insufficient Data. Need more information	None
Last Chance Creek	UT14070002-005_00	Last Chance Creek and tributaries from Ivie Creek confluence to headwaters	2B, 3C, 4	Western Colorado River	3: Insufficient Data. Need more information	None
Johnson Valley	UT14070003-001_00	Johnson Valley Reservoir tributaries	1C, 2A, 3A, 4	Western Colorado River	5: TMDL Required (Impaired 303d list)	Use Class 1C: E. coli; Use Class 2A: E. coli; Use 3A: Dissolved Oxygen, Temperature
UM Creek	UT14070003-002_00	UM Creek and other tributaries to Forsyth Reservoir	1C, 2A, 3A, 4	Western Colorado River	5: TMDL Required (Impaired 303d list)	Use Class 1C: E. coli; Use Class 2A: E. coli; Use Class 3A: Zinc, Nutrient/ Eutrophication Biological Indicators
UM Creek Lower	UT14070003-003_00	UM Creek and tributaries from Mill Meadow to Forsythe Reservoir	1C, 2A, 3A, 4	Western Colorado River	1: Supports all designated uses	None
Fremont River-1	UT14070003-004_00	Fremont River and tributaries from Mill Meadow Reservoir to Johnson Valley Reservoir	1C, 2A, 3A, 4	Western Colorado River	1: Supports all designated uses	None
Fremont River-2	UT14070003-005_00	Fremont River and tributaries from Bicknell to Mill Meadow Reservoir near USFS boundary	1C, 2A, 3A, 4	Western Colorado River	5: TMDL Required (303d List) / 4A: TMDL Approved (Impaired)	Use Class 1C: E. coli, pH; Use Class 2A: E. coli, pH; Use Class 3A: pH, Total Phosphorus; Use Class 4: pH
Fremont River-3	UT14070003-008_00	Fremont River and tributaries from east boundary of Capitol Reef National Park to Bicknell	1C, 2A, 3A, 4	Western Colorado River	5: TMDL Required (Impaired 303d list) / 4A: TMDL Approved (Impaired)	Use Class 1C: E. coli; Use Class 2A: E. coli; Use Class 3A: Temperature; Use Class 4: Total Dissolved Solids (TDS)
Fish Lake Tributaries	UT14070003-015_00	Fish Lake tributaries	1C, 2A, 3A, 4	Western Colorado River	3: Insufficient Data. Need more information	None
Piute West	UT16030001-001_00	Piute Reservoir west side tributaries (City Creek) above USFS boundary and south of HUC boundary 16030003	2B, 3A, 4	Upper Sevier River	3: Insufficient Data. Need more information	None
Sevier River-4	UT16030001-002_00	Sevier River and tributaries from Piute Reservoir to Circleville Irrigation Diversion, excluding East Fork Sevier River and tributaries	2B, 3A, 4	Upper Sevier River	5: TMDL Required (Impaired 303d list)	Use Class 3A: Temperature
Sevier River-3	UT16030001-005_00	Sevier River and tributaries from Circleville Irrigation Diversion to Horse Valley Diversion	2B, 3A, 4	Upper Sevier River	5: TMDL Required (Impaired 303d list) / 4A: Approved TMDL (Impaired)	Use Class 2B: E. coli; Use Class 3A: Temperature, Total Phosphorus, Sediment
Piute	UT16030001-013_00	Piute Reservoir tributaries below USFS boundary and excluding Sevier River inlet	2B, 3A, 4	Upper Sevier River	3: Insufficient Data. Need more information	None

Name	Assess ID	Description	BEN Class	Mgmt. Unit	Assessment	Impairment
Otter Creek-4	UT16030002-001_00	Otter Creek and tributaries from Koosharem Reservoir to headwaters, within Utah jurisdiction, excluding tribal jurisdictions	2B, 3A, 4	Upper Sevier River	5: TMDL Required (Impaired 303d list)	Use Class 2B: E. coli; Use Class 3A: Temperature
Otter Creek-1	UT16030002-002_00	Otter Creek and tributaries from Otter Creek Reservoir to Koosharem Reservoir, except Box and Greenwich Creeks	2B, 3A, 4	Upper Sevier River	5: TMDL Required (Impaired 303d list)	Use Class 2B: pH; Use Class 3A: pH, Temperature, Benthic Invertebrate Assessment, Nutrient/ Eutrophication Biological Indicators; Use Class 4: pH
Otter Creek-3	UT16030002-003_00	Greenwich Creek and tributaries from confluence with Otter Creek to headwaters	2B, 3A, 4	Upper Sevier River	5: TMDL Required (Impaired 303d list) 4A: Approved TMDL (Impaired)	Use Class 2B: E. coli; Use Class 3A: Temperature, Dissolved Oxygen, Sediment, Total Phosphorus
Otter Creek-2	UT16030002-004_00	Box Creek and tributaries from confluence with Otter Creek to headwaters	2B, 3A, 4	Upper Sevier River	4A: Approved TMDL. Impaired / 4C: Habitat Impaired	Use Class 3A: Dissolved Oxygen, Sediment, Total Phosphorus, Habitat Alteration
East Fork Sevier River-4	UT16030002-005_00	East Fork Sevier River and tributaries from confluence with Sevier River upstream to Antimony Creek confluence, excluding Otter Creek and tributaries	2B, 3A, 4	Upper Sevier River	5: TMDL Required (Impaired 303d List) / 4A: TMDL Approved (Impaired)	Use Class 3A: Temperature, Total Phosphorus
Antimony Creek	UT16030002-008_00	Antimony Creek and tributaries from confluence with Sevier River to headwaters	2B, 3A, 4	Upper Sevier River	1: Supports all designated uses	None
Sevier River-19	UT16030003-001_00	Sevier River west side tributaries from Sevier Bridge Dam to Salina Creek confluence	2B, 3B, 4	Lower Sevier River	3: Insufficient Data. Need more information	None
Willow Creek - Axtell	UT16030003-002_00	Willow Creek and tributaries from USFS boundary to headwaters	2B, 3A, 4	Lower Sevier River	3: Insufficient Data. Need more information	None
Salina Creek-1	UT16030003-003_00	Salina Creek and tributaries from confluence with Sevier River to USFS boundary	2B, 3B, 4	Lower Sevier River	4A: Approved TMDL. Impaired	Use Class 4: Total Dissolved Solids
Sevier River-16-1	UT16030003-004_01	Sevier River east and west side tributaries from Salina Creek confluence to Rocky Ford Reservoir (excludes Lost Creek)	2B, 3B, 4	Lower Sevier River	3: Insufficient Data. Need more information	None
Sevier River-16-2	UT16030003-004_02	Sevier River east and west side tributaries from Salina Creek confluence to Rocky Ford Reservoir (excludes Lost Creek)	2B, 3B, 4	Lower Sevier River	3: Insufficient Data. Need more information	None
Sevier River-16-3	UT16030003-004_03	Sevier River east and west side tributaries from Salina Creek confluence	2B, 3B, 4	Lower Sevier River	3: Insufficient Data. Need more information	None

Name	Assess ID	Description	BEN Class	Mgmt. Unit	Assessment	Impairment
		to Rocky Ford Reservoir (excludes Lost Creek)				
Lost Creek-1	UT16030 003-005_00	Lost Creek and tributaries from confluence with Sevier River upstream approximately 6 miles	2B, 3B, 4	Lower Sevier River	5: TMDL Required (Impaired 303d list)	Use Class 3C: Temperature; Use Class 4: Boron, Total Dissolved Solids (TDS)
Salina Creek-2	UT16030 003-006_00	Salina Creek and tributaries from USFS boundary to headwaters	2B, 3A, 4	Lower Sevier River	5: TMDL Required (Impaired 303d list)	Use Class 2B: pH, E. coli; Use Class 3A: pH, Temperature, Dissolved Oxygen; Use Class 4: pH
Beaver Creek-1 Sevier	UT16030 003-007_00	Beaver Creek and other west side tributaries to Sevier River below USFS boundary from Clear Creek upstream to HUC boundary	2B, 3A, 4	Lower Sevier River	1: Supports all designated uses	None
Lost Creek 2-Salina	UT16030 003-008_00	Lost Creek and tributaries from ~6 miles upstream to USFS boundary	2B, 3B, 4	Lower Sevier River	3: Insufficient Data. Need more information	None
Sevier River-11	UT16030 003-009_00	Sevier River west side tributaries from the Annabella Diversion upstream to Sevier River confluence with Clear Creek and below USFS boundary, within Utah jurisdiction, excluding tribal jurisdictions	2B, 3A, 4	Lower Sevier River	3: Insufficient Data. Need more information	None
Lost Creek 3-Salina	UT16030 003-010_00	Lost Creek and tributaries from USFS boundary to headwaters	2B, 3A, 4	Lower Sevier River	5: TMDL Required (Impaired 303d list)	Use Class 2B: E. coli; Use Class 3A: Dissolved Oxygen, Temperature
Sevier River-12	UT16030 003-011_00	Sevier River west side tributaries from approximately due West of Salina Creek confluence upstream to Clear Creek confluence and above USFS boundary	2B, 3A, 4	Lower Sevier River	5: TMDL Required (Impaired 303d list)	Use Class 2B: E. coli
Sevier River-17	UT16030 003-012_00	Sevier River from Yuba Dam upstream to confluence with Salina Creek	2B, 3B, 4	Lower Sevier River	4A: Approved TMDL. Impaired	Use Class 3B: Total Phosphorus, Sediment; Use Class 4: Total Dissolved Solids
Monroe Creek	UT16030 003-013_00	Sevier River east side tributaries above USFS boundary from Mill Creek-Water Creek area upstream to Durkee Creek	2B, 3A, 4	Lower Sevier River	1: Supports all designated uses	None
Sevier River-14	UT16030 003-014_00	Sevier River east side tributaries from Rocky Ford Reservoir upstream to Annabella Diversion and below USFS boundary	2B, 3B, 4	Lower Sevier River	2: Supports all assessed uses	None
Sevier River-8	UT16030 003-015_00	Sevier River from Rocky Ford Reservoir upstream to Annabella Diversion	2B, 3B, 4	Lower Sevier River	1: Supports all designated uses	None

Name	Assess ID	Description	BEN Class	Mgmt. Unit	Assessment	Impairment
Sevier River-10	UT16030 003-016_00	Sevier River east side tributaries below USFS boundary from Anabella Diversion upstream to Clear Creek confluence	2B, 3A, 4	Lower Sevier River	3: Insufficient Data. Need more information	None
Sevier River-6	UT16030 003-017_00	Sevier River from Clear Creek confluence to HUC unit 1603003-1603001 boundary	2B, 3A, 4	Lower Sevier River	5: TMDL Required (Impaired 303d list)	Use Class 3A: Temperature
Clear Creek-I70	UT16030 003-018_00	Clear Creek and tributaries from confluence with Sevier River to headwaters	2B, 3A, 4	Lower Sevier River	5: TMDL Required (Impaired 303d list)	Use Class 3A: Aluminum; Use Class 4: Total Dissolved Solids
Sevier River-9	UT16030 003-019_00	Sevier River from Annabella Diversion to Clear Creek confluence	2B, 3A, 4	Lower Sevier River	3: Insufficient Data. Need more information	None
Beaver Creek 2-Piute	UT16030 003-020_00	Beaver Creek and other west side tributaries to Sevier River above USFS boundary from Clear Creek upstream to HUC boundary	2B, 3A, 4	Lower Sevier River	3: Insufficient Data. Need more information	None
Manning Creek	UT16030 003-021_00	Manning Creek and tributaries from confluence with Sevier River to headwaters	2B, 3A, 4	Lower Sevier River	5: TMDL Required (Impaired 303d list)	Use Class 2B: pH; Use Class 3A: pH, Dissolved Oxygen; Use Class 4: pH
Sevier River-5	UT16030 003-022_00	Sevier River east side tributaries from Manning Creek confluence to HUC unit boundary	2B, 3A, 4	Lower Sevier River	3: Insufficient Data. Need more information	None
Sevier River-18	UT16030 003-023_00	Sevier River east side tributaries from Sevier Bridge Dam to Salina Creek confluence, excluding San Pitch River and waters above USFS boundary	2B, 3B, 4	Lower Sevier River	3: Insufficient Data. Need more information	None
Sevier River-15	UT16030 003-024_00	Sevier River form confluence with Salina Creek upstream to Rocky Ford Reservoir	2B, 3B, 4	Lower Sevier River	2: Supports all assessed uses	None
Sevier River-13	UT16030 003-025_00	Sevier River west side tributaries from Rocky Ford Reservoir upstream to Annabella Diversion and below USFS boundary	2B, 3B, 4	Lower Sevier River	3: Insufficient Data. Need more information	None
Sevier River-7	UT16030 003-026_00	Sevier River east side tributaries from the Clear Creek confluence upstream to Manning Creek confluence	2B, 3A, 4	Lower Sevier River	5: TMDL Required (Impaired 303d list)	Use Class 2B: pH; Use Class 3A: pH, Temperature; Use Class 4: pH
Peterson Creek	UT16030 003-027_00	Petersen Creek and tributaries from confluence with Sevier River to USFS boundary	2B, 3B, 4	Lower Sevier River	5: TMDL Required (Impaired 303d list)	Use Class 3C: Temperature; Use Class 4: Total Dissolved Solids (TDS)
Sevier River-27	UT16030 005-008_00	Sevier River south side tributaries from DMAD Reservoir upstream to Yuba Dam, excluding all	2B, 3B, 4	Lower Sevier River	1: Supports all designated uses	None

Name	Assess ID	Description	BEN Class	Mgmt. Unit	Assessment	Impairment
		waters above USFS boundary				
Ivie Creek	UT16030 005-012_00	Ivie Creek and tributaries from Scipio Dam to headwaters	2B, 3A, 4	Lower Sevier River	2: Supports all assessed uses	None
Goose Creek-2	UT16030 005-014_00	Goose Creek and tributaries from USFS boundary to headwaters	2B, 3A, 4	Lower Sevier River	3: Insufficient Data. Need more information	None
Pioneer Creek-2	UT16030 005-016_00	Pioneer Creek and tributaries from USFS boundary to headwaters	2B, 3A, 4	Lower Sevier River	3: Insufficient Data. Need more information	None
Chalk Creek 2-Fillmore	UT16030 005-019_00	Chalk Creek and Pine Creek (Millard County) and tributaries from USFS boundary to headwaters	2B, 3A, 4	Lower Sevier River	5: TMDL Required (Impaired 303d list)	Use Class 2B: pH; Use Class 3A: pH; Use Class 4: pH
Corn Creek	UT16030 005-021_00	Corn Creek and tributaries from mouth to headwaters	2B, 3A, 4	Lower Sevier River	1: Supports all designated uses	None
Meadow Creek	UT16030 005-023_00	Meadow Creek and tributaries from mouth to headwaters (Juab County)	2B, 3A, 4	Lower Sevier River	2: Supports all assessed uses	None
Round Valley Creek	UT16030 005-024_00	Round Valley Creek from mouth upstream to Scipio Reservoir	2B, 3A, 4	Lower Sevier River	3: Insufficient Data. Need more information	None
Beaver River-2	UT16030 007-002_00	Beaver River and tributaries from Minersville Reservoir to USFS boundary	2B, 3A, 4	Cedar-Beaver	5: TMDL Required (303d List) / 4A: TMDL Approved (Impaired)	Use Class 2B: E. coli; Use Class 3A: Benthic Invertebrate Assessment, Dissolved Oxygen, Temperature
Beaver River-3	UT16030 007-003_00	Beaver River and tributaries from USFS boundary to headwaters	2B, 3A, 4	Cedar-Beaver	2: Supports all assessed uses	None
Pine Creek-Tushar	UT16030 007-004_00	Pine Creek and tributaries from I-15 to headwaters	2B, 3A, 4	Cedar-Beaver	3: Insufficient Data. Need more information	None

Best Management Practices Monitoring Results

Within the reporting period no official BMP monitoring was conducted. The national monitoring period for BMPs is the FY 2023 and FY 2024 period. Therefore, a significant amount of BMP monitoring is scheduled to be completed in the FY24 field season.

Groundwater Dependent Ecosystem (GDE) Inventory

Groundwater Dependent Ecosystem assessments are full of both qualitative and qualitative data. It would be difficult to describe and show conditions in a tabular format. For the sake of usefulness of this report, the sites visited within the monitoring period are listed below. Table 4, below, is a collection of photos taken at various GDE sites inventoried across the forest. Readers will notice the varying conditions on the forest from the photos. These can be viewed in greater detail here: https://springsdata.org/spatial/index.php

Table 4. GDE Sites Visited.

Site ID	Site Name	Land Unit Detail
N/A	Little Spring	Fishlake NF, Richfield RD
148420	Willow Spring	Fishlake NF, Richfield RD
148082	Stock Spring	Fishlake NF, Richfield RD
N/A	Dry Lake Guard Station	Fishlake NF, Richfield RD
N/A	Fen Spring	Fishlake NF, Richfield RD
N/A	Fire Fen	Fishlake NF, Richfield RD
N/A	Hillside Fen	Fishlake NF, Richfield RD
N/A	Aspen Spring	Fishlake NF, Richfield RD
N/A	S. Fork Greenwich Ck. Headwaters	Fishlake NF, Richfield RD
148424	Will's Pond	Fishlake NF, Richfield RD
N/A	Cold Spring	Fishlake NF, Richfield RD
148139	79788189 NHD_ID	Fishlake NF, Richfield RD
148131	79788161 NHD_ID	Fishlake NF, Richfield RD
148308	Forshea Spring	Fishlake NF, Richfield RD
148261	Brindley Spring	Fishlake NF, Richfield RD
148106	79788055 NHD_ID	Fishlake NF, Richfield RD
148373	Rim Seep	Fishlake NF, Richfield RD
148276	Christensen Spring	Fishlake NF, Richfield RD
N/A	Dairy Meadow Spring	Fishlake NF, Richfield RD
148415	White Ledge Spring	Fishlake NF, Richfield RD
N/A	Meeks Mesa 1	Fishlake NF, Fremont River RD
N/A	Meeks Mesa 2	Fishlake NF, Fremont River RD
148341	Maple Spring	Fishlake NF, Beaver RD
163876	Mud Spring	Fishlake NF, Beaver RD
N/A	Fisk Ck. Tributary Spring	Fishlake NF, Beaver RD
N/A	Serviceberry Ck. Tributary Spring	Fishlake NF, Beaver RD

The following images capture some of the GDEs visited:

Forest Service Soil Disturbance Monitoring Protocol (FSDMP)

Within the monitoring reporting period, no official FSDMP surveys were conducted. New surveys will be conducted within the next monitoring period. The watershed monitoring program on the Fishlake is currently expanding and becoming more comprehensive, with new efforts implemented within this monitoring period.

Level II Riparian Inventory

Level II Riparian Inventories provide qualitative and quantitative data on a wide range of information, including bankfull, substrate composition, bank condition, Rosgen stream classification, land use impacts, soils, riparian vegetation, and Pfankuch stream channel stability. The sites visited during this monitoring period were revisits from surveys conducted in 2005 by Shell Valley Consulting. Due to time and personnel constraints, not all the information was collected for each reach. Vegetation data was resurveyed by the Botany staff. The stream reaches visited within the monitoring period by Hydrology staff are listed below, as well as the percent of the reach within each Pfankuch stream stability score. Table 5, below, depicts stream conditions at various riparian inventory sites across the Forest.

Table 5. Level II Riparian Inventory reaches visited.

Stream Name	Stream Length Surveyed (ft)	% Excellent	% Good	% Fine	% Poor
Fish Creek	27,718	0	20	46	35
Shingle Creek	35,151	0	37	29	34
Mill Creek	29,726	0	83	8	9
Joe Lott Creek	19,379	6	44	41	9

The following images capture some of the stream reaches visited:
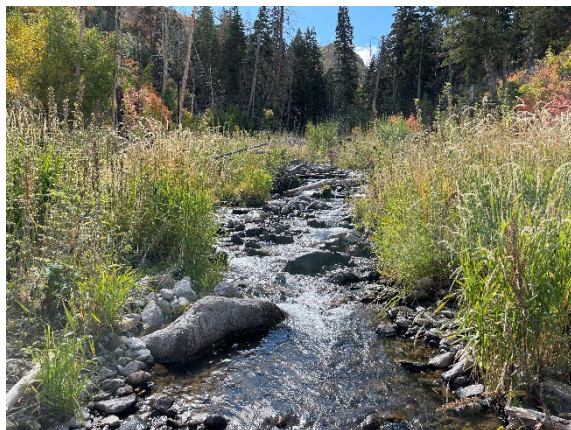
Conclusion

It is apparent there are impacts from management activities on the Forest based on the data summarized in this document. While conditions do remain good in many places on the Forest, it is important to collect data on problem areas and implement activities to restore conditions. Monitoring data will allow Forest leadership to make informed decisions by examining results from management practices and determining how to best protect hydrologic resources for future generations. As extreme drought continues to peril the region and increased services are expected from public lands (recreational opportunities, water resources, forest products, etc.) having a robust monitoring program is integral to managing these resources for sustainability.

Range Management

LRMP Desired Conditions for Range Management (Permitted AUM)

Provide livestock grazing consistent with range capacity and other uses (LRMP Page IV-4).

Activities and Monitoring Questions

Are goods and services being provided in accordance with Forest Plan goals and objectives?

Monitoring Indicator

Level of permitted livestock grazing.

Monitoring Methods and Data

The level of grazing is allocated based on Term Grazing Permits (FS-2200-10) that have been issued to permittees on various allotments within the Forest. Each year, after the permittee has validated their permit and prior to the beginning of the grazing season, the Forest Service will send the permittee a Bill for Collection specifying for the current year the kind, number, and class of livestock allowed to graze, the period of use, the grazing allotment, and the grazing fees. This bill, when paid, authorizes use for that year and becomes part of their permit. Data for the 2023 grazing season were queried from IWEB Rangeland Information Management System (RIMS) database for annual grazing statistics.

Results

Statistics for the 2023 grazing season are displayed in Table 6.

Table 6. Grazing Statistics for 2023 for livestock type and authorized Head Months (HMs) and equivalent Animal Unit Months (AUMs).

District	Number of Permittees	Cattle No.	Cattle HMs/ AUMs	Horses/ Burros No.	Horse/ Burro HMs/ AUMs	Sheep/ Goats No.	Sheep/ Goat HMs AUMs	Total No.	HMs/ AUMs
Fillmore	68	6,609	25709/ 33,849	20	60/ 71	1,500	2,663/ 799	8,129	28432/ 34,719
Fremont River	71	7,588	33,192/ 42,786	5	22/ 27	5,492	14,631/ 4,391	13,085	47,845/ 47,204

District	Number of Permittees	Cattle No.	Cattle HMs/ AUMs	Horses/ Burros No.	Horse/ Burro HMs/ AUMs	Sheep/ Goats No.	Sheep/ Goat HMs AUMs	Total No.	HMs/ AUMs
Beaver	35	4,172	10,968/ 14,221	10	25/ 30	0	0/ 0	4,182	10,993/ 14,251
Richfield	88	10,821	42,807/ 54,133	0	0/ 0	3,347	7,573/ 2,271	14,168	50,380/ 56,404
Total	262	29,190	112,676/ 144,989	35	107/ 128	10,339	24,867/ 7,461	39,564	137,650/ 152,578

Recommendations

Range Specialists will continue to monitor grazing utilization so that forage can be provide and utilized by permittees with valid Term Grazing Permits.

LRMP Desired Conditions for Range Management (Forage Utilization)

Maintain range lands being used by livestock in at least fair condition with stable or upward trend through the use of proper management and restoration measures (LRMP Page IV-4).

Establish proper grazing capacity for each allotment (LRMP Page IV-4).

Activities and Monitoring Questions

Are goods and services being provided in accordance with Forest Plan goals and objectives?

Monitoring Indicator

Forage Utilization.

Monitoring Methods and Data

The 1986 Forest Plan set out "management requirements" for forage use throughout the Fishlake National Forest. Those requirements included general direction statements specifying "the actions, measures, or treatments (management practices) to be done when implementing …management activit[ies]…." General Direction Statement No. 2 for forest-wide, range-resource management was to "[m]anage livestock and wild herbivores forage use by implementing proper use guides." These "proper use guides" included numeric forage-utilization limits for different grazing systems. For example, the 1986 Plan established a maximum forage-utilization standard for rest-rotation systems of 55 percent of total forage (80 percent of key species) on late-use pastures and 45 percent of total forage (70 percent of key species) on early-use pastures. A separate set of forage-use standards applied in riparian areas.

In 2001, the Forest amended the Forest Plan through an environmental assessment (EA) under the National Environmental Policy Act (NEPA) with a "Decision Notice and Finding of No Significant Impact: Forest Plan Amendment of Forage Utilization Standards & Guidelines" which evaluated alternatives for forage-use management requirements. The Forest chose to amend the

Plan by adopting "Alternative 3" described in the EA. The amendments prescribed in Alternative 3 made two main changes. First, the forest-wide range-resource General Direction Statement No. 2 was replaced with a new statement: "Manage ungulate forage use by implementing maximum allowable forage use criteria and modifying these criteria where necessary to obtain 'proper use.'" Second, the forest-wide range-resource and riparian-area standards and guidelines for forage use were replaced with the following "maximum allowable use standards" (See Table 7).

The glossary in the EA elaborates on what the terms "allowable use" and "proper use" mean. "Allowable use" is the degree of utilization considered desirable and attainable on various specific parts of an allotment considering the present nature and condition of the resource, management objectives, and level of management. Allowable use is based on the morphological and physical characteristics of forage species and is the amount of use that can occur for a specified period while meeting basic resource needs and associated resource management goals.

"Proper use," in contrast, "is determined from allowable use and is the level of grazing utilization that can be permitted on an area considering the need to maintain or reach desired conditions while at the same time considering all limiting factors." The "limiting factor" is that which "becomes critical first," whether seral condition, key hydric species, damage to fisheries, critical wildlife habitat, or any other measurable factor. Under this limiting-factor approach, "the site-specific development and application of Proper Use criteria may prescribe lower utilization levels than those presented as maximum allowable use standards."

Table 7. Maximum Allowable Forage Use Criteria.

Vegetation Type	Stubble Height/Use	Comments
Riparian Hydric Species	4"	Triggers the time to move livestock between units or off the allotment
Riparian Emphasis Management Areas	6"	Triggers the time to move livestock between units or off the allotment
Non-hydric Sod-Forming Grass Species in Riparian Areas	1 ½"	Primarily Kentucky bluegrass--Triggers the time to move livestock between units or off the Allotment
Wheatgrass Seedings	60%	Management option to exceed 60% use to maintain healthy seedings
Riparian/Upland Browse Sprouts and Young-Aged Plants	≤40%	# of current year's available twigs removed
Riparian/Upland Mature Browse	≤50%	# of current year's available twigs removed

Vegetation Type	Stubble Height/Use	Comments
Upland Grass/Forb	40–60% of key species; varies by grazing system and desired condition	% of current year's growth
Riparian Ground Cover	Maintain ground cover of at least 70% within riparian areas	

Results

The above utilization use standards are incorporated into the respective Term Grazing Permits unless different standards have been identified in an Allotment Management Plan (AMP). Forest Range Specialists monitored approximately 1,147,956 acres to the defined standard in 2023, respectively. This requires that the specialists monitor the grazing utilization on their respective allotments. The monitoring is tracked in the RIMS database.

Recommendations

Range Specialists will continue to monitor grazing utilization so that forage can be provide and utilized by permittees with valid Term Grazing Permits.

LRMP Desired Conditions for Range Management (Range Trend)

Maintain range lands being used by livestock in at least fair condition with stable or upward trend through the use of proper management and restoration measures (LRMP Page IV-4).

Establish proper grazing capacity for each allotment (LRMP Page IV-4).

Provide livestock grazing consistent with range capacity and other uses (LRMP Page IV-4).

Control noxious weed infestations (LRMP Page IV-4).

Activities and Monitoring Questions

Do rangeland plant communities have desired species composition and is ground cover adequate?

Monitoring Indicator

Range condition and trend.

Monitoring Methods and Data

Long term trend data are gathered using a variety of different methods which include established photo plots, ocular macro plots, and nested frequency sites. Noxious weed locations have been identified and are treated using a variety of chemical, mechanical, and biological methods.

Results

There were 140 long-term trend studies monitored in 2023. There were 30 studies completed in 2021 using the sage-grouse Habitat Assessment Framework (HAF) protocol. The HAF studies are initial studies so no long-term trend data will be available until the studies are re-read in the future. Data that is gathered from these studies is and will be used to determine effects from ungulate grazing and to make sure that utilization is at proper use so that rangelands continue in a stable or upwards trend. In 2023, 4,193 acres were treated for noxious weeds.

Recommendations

Continue to acquire long term trend data and utilize the data to make informed decision on grazing management. Continue to treat noxious weed populations.

Wildlife and Fish

LRMP Desired Conditions for Wildlife and Fish

Protect aquatic habitats which are in good or excellent condition and improve habitats where ecological conditions are below biological potential (LRMP Page IV-3).

Identify and improve habitat for sensitive, threatened, and endangered species including participation in recovery efforts for both plants and animals (LRMP Page IV-4).

Improve or maintain the quality of habitat on big game winter ranges (LRMP Page IV-4).

Determine current status and monitor trends in management indicator species and their habitats (LRMP Page IV-4).

Activity: Wildlife Habitat Diversity

Monitoring Question

Is the diversity of wildlife habitat being maintained by managing Vegetative Structural Stages (VSS)?

Monitoring Indicator

Diversity of forest and rangeland vegetation.

Monitoring Methods and Data

The Forest has been monitoring habitat diversity at various scales from the landscape level to site-specific project level scales using several different sources. Some of these sources may include a review of Utah Division of Wildlife Resources (UDWR) long-term range trend data, old growth evaluation data, soil surveys, visual reconnaissance, Forest stand exam data, and Vegetational Structural Stages (VSS).

In reviewing Forest standards, direction, project level information and monitoring information, edge habitat for terrestrial species is not lacking and is adequate in abundance and distribution to support the species that use edge. Although it was not logistically or economically feasible to assess every project that modified wildlife habitat diversity across the Fishlake National Forest,

sample projects have been looked at and edge is present in abundance with good distribution. Based on this evaluation, the diversity of wildlife habitat, except for mature and old growth forests, is being maintained across the Forest in sufficient amounts with good distribution. Old growth and mature stands of aspen and fir are generally below desired conditions.

Results

As discussed in the Fishlake National Forest Life History report (2017 draft) viability of Threatened, Endangered, Regionally Sensitive, and Forest Management Indicator Species is generally strong across the Forest with the exception of the northern goshawk and mule deer. Population estimates for both these species are down forest wide. The remaining species represent a variety of habitats across the Forest and healthy populations are a reasonable indicator of habitat diversity and effectiveness on the Forest. It is possible to have populations that struggle while habitat diversity and quality remain high. Many variables can contribute to strong persistent populations; however, population numbers are a reasonable indicator and are used for this summary.

Activity: Modification of Ecosystem

Monitoring Question

Are forest management activities and/or natural events affecting the structure and function of upland and riparian ecosystems?

Monitoring Indicator

Structure and function of forest and riparian ecosystems.

Monitoring Methods, Data, and Results

Forest management activities are designed to improve forest function. Implementation teams discuss upcoming projects and identify potential impacts to ecosystems and opportunities to improve these ecosystems. Natural events such as drought and wildfire affect both the structure and function of upland and riparian ecosystems. These effects can be both positive and negative. For example, recent wildfires have short term negative impacts as they remove vegetation and increase erosion. However, long-term effects often include increased habitat diversity and forage sources for wildlife species.

Drought conditions have persisted since 2020, with two of the driest years on record for this area. These conditions have negatively impacted many wildlife species on the forest as upland and riparian resources have been, and continue to be, negatively impacted. A reduction in overall forage and the diversity of forage species have resulted. See 2021 Hadley et. al. report for details on Bonneville cutthroat trout.

Wildlife habitat diversity is being maintained and enhanced across the Forest using a variety of tools. These tools include mechanical methods as well as prescribed fire. There are numerous projects that have happened the last few years and many more projects are occurring on the ground. The Fishlake completed approximately 130,000 acres of vegetation treatment projects over the last couple of years. Treatments are done with a goal of maintaining and improving the diversity of wildlife habitat. These projects are occurring on all ranger districts of the Forest.

Activity: Big game habitat condition

Monitoring Question

Is big game habitat maintained to meet Forest Plan desired conditions?

Monitoring Indicator

Big game habitat condition.

Monitoring Methods and Data

The Forest has been monitoring big game habitat at various scales from the landscape level to site-specific project level scales using several different sources. Some of these sources include review of UDWR long-term range trend data, old growth evaluation at the project and landscape level, visual reconnaissance, Forest stand exam data, and VSS.

Big game habitat diversity is being maintained and enhanced across the Forest using a variety of tools. These tools include mechanical methods as well as prescribed fire. In reviewing Forest standards and guidelines direction, project level information and monitoring information, edge habitat for terrestrial species is not lacking and is adequate in abundance and distribution to support the species that use edge. It was not logistically or economically feasible to assess every project that modified wildlife habitat diversity across the Fishlake National Forest; sample projects have been looked at and edge is present in abundance with good distribution. Based on this evaluation, the diversity of big game habitat and its condition is being maintained across the Forest in sufficient amounts with good distribution.

Results

The following tables show mule deer and elk (both are focal species) population objectives and annual population estimates. While these data demonstrate that big game populations are viable and persistent across the Fishlake Forest, they also show that mule deer populations are well below objective in every unit. While elk populations are within or close to population objectives, mule deer populations have declined dramatically in the last 5 years (Tables 8 and 9).

Table 8. Mule Deer Winter Population Estimates by WMU.

WMU	Plan Objective	2016	2017	2018	2019	2020	2021	2022	2023
Beaver	14,000	14,700	13,950	13,750	12,000	10,300	9,400	9,200	9,400
Boulder	8,500	8,500	7,900	7,200	6,600	6,350	6,150	7,050	7,650
Fillmore	9,600	8,900	8,800	8,800	6,700	6,500	6,700	7,100	8,000
Fishlake	7,000	6,800	6,600	6,300	5,100	4,900	4,400	4,500	4,600
Monroe	7,000	6,700	6,000	6,300	5,400	5,200	5,000	5,000	5,000
Thousand Lake	1,400	1,250	1,150	1,150	1,000	850	750	760	600
Total	**47,500**	**46,850**	**44,400**	**43,500**	**36,800**	**34,100**	**32,400**	**33,610**	**35,250**

While various factors impact mule deer survival, prolonged drought is thought to be responsible for declines from 2020 to 2022 in these populations. The Fishlake National Forest experienced severe to exceptional drought during these years (Figure 7). These conditions have contributed to declining forage conditions on critical mule deer habitats. Drought conditions were reduced significantly in 2023, but several good water years are needed to restore ideal forage conditions.

Table 9. Elk Winter Population Estimates by WMU

WMU	Objective	2016	2017	2018	2019	2020	2021	2022	2023
Beaver	1,050-1,350	1,500	1,450	1,050	1,275	1,200	850	900	900
Boulder	1,200-1,700	1,200	1,200	1,300	1,050	1,150	1,200	1,250	1,300
Fillmore	1,450-1,750	1,450	1,400	1,450	1,350	1,400	1,350	1,400	1,500
Fishlake	5,000-5,900	4,400	4,900	5,200	4,750	5,100	5,450	4,500	4,750
Monroe	1,000-1,400	1,000	1,000	1,050	1,100	1,150	1,100	1,100	1,100
Total	**9,700-12,100**	**9,550**	**9,950**	**10,050**	**9,525**	**10,000**	**9,950**	**9,150**	**9,550**

While various factors impact mule deer survival, prolonged drought is thought to be responsible for current declines in these populations. The Fishlake National Forest has experienced severe to exceptional drought conditions since 2020 (Figure 7). These conditions have contributed to declining forage conditions on critical mule deer habitats.
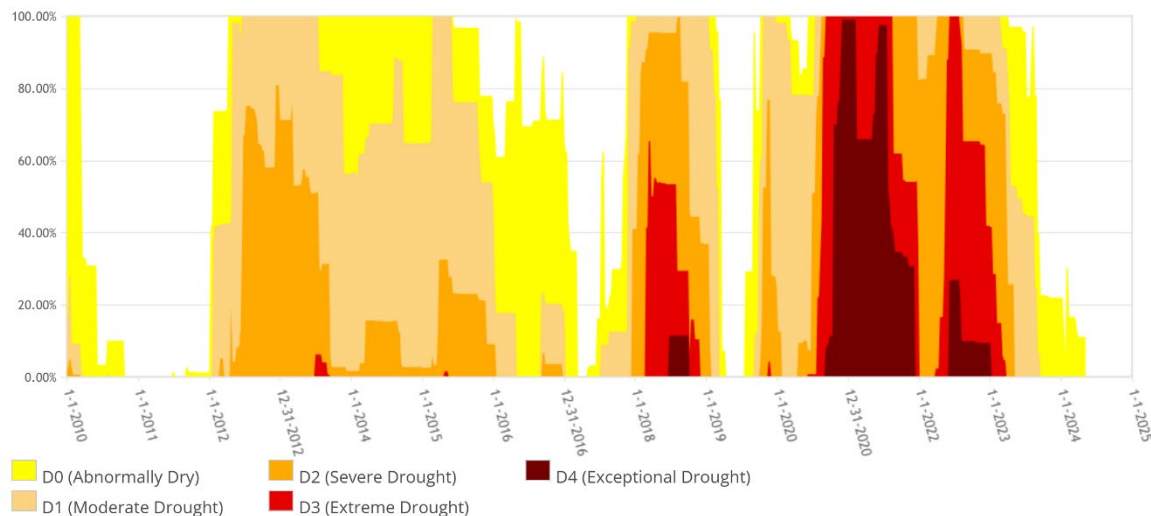
Figure 7. Drought conditions on the Fishlake National Forest since 2010.

Activity: Threatened Plant Species

Monitoring Question

Are Threatened, Endangered, Proposed, and Candidate (TEPC) plant habitats being protected from forest plan implementation activities?

Monitoring Indicator

Number of TEPC plant locations adversely impacted.

Results

Recently there have been a variety of vegetation treatment projects in TEPC plant habitat. Specifically, the Last Chance and Governor Creek projects are in habitat for *Townsendia aprica*. Prior to these projects being implemented, surveys for this species occurred. Following surveys, a

determination of effects will be made in a Biological Assessment and concurrence to this determination will be sought from the US Fish and Wildlife Service. Other projects within *Townsendia aprica* habitat are planned for future years and surveys will be conducted for them at that time.

Activity: Threatened, Endangered, and Sensitive (TES) Animals

Monitoring Question

Are TES animal habitats being protected from forest plan implementation activities?

Monitoring Indicator

TEPC habitat conditions retained across the planning area.

## Monitoring Methods, Data, and Results

Listed animals are rare on the Fishlake National Forest. Currently, small populations of Utah prairie dogs are found on the Fremont Ranger District. The Forest also has critical habitat for Mexican spotted owl and additional areas are considered dispersal habitat for these birds. The Forest is also considered foraging habitat for California Condors. Habitat conditions for T&E species are reviewed during project development analysis. Where applicable T&E species habitat is protected or enhanced as a planned proposed actions are implemented.

The California condor may occasionally occur in areas on the Forest. Because no nesting occurs on the Forest, use by condors is only incidental if any. Foraging habitat is retained across the Forest and is well distributed and abundant.

The Mexican spotted owl is limited in habitat to steep walled canyon complexes on the Fremont River Ranger District which contains approximately 17,500 acres of designated critical habitat and two Protected Activity Centers (PACs). The Fishlake Forest Plan provides protection along with the Mexican Spotted Owl Recovery Plan (2012). Little to no use occurs in the 2 PACs on the Fishlake National Forest.

Annual counts of Utah Prairie Dogs are carried out in cooperation with the Utah Division of Wildlife Resources. Occupied habitat for these small mammals is protected and evaluated during project planning (Figure 8).
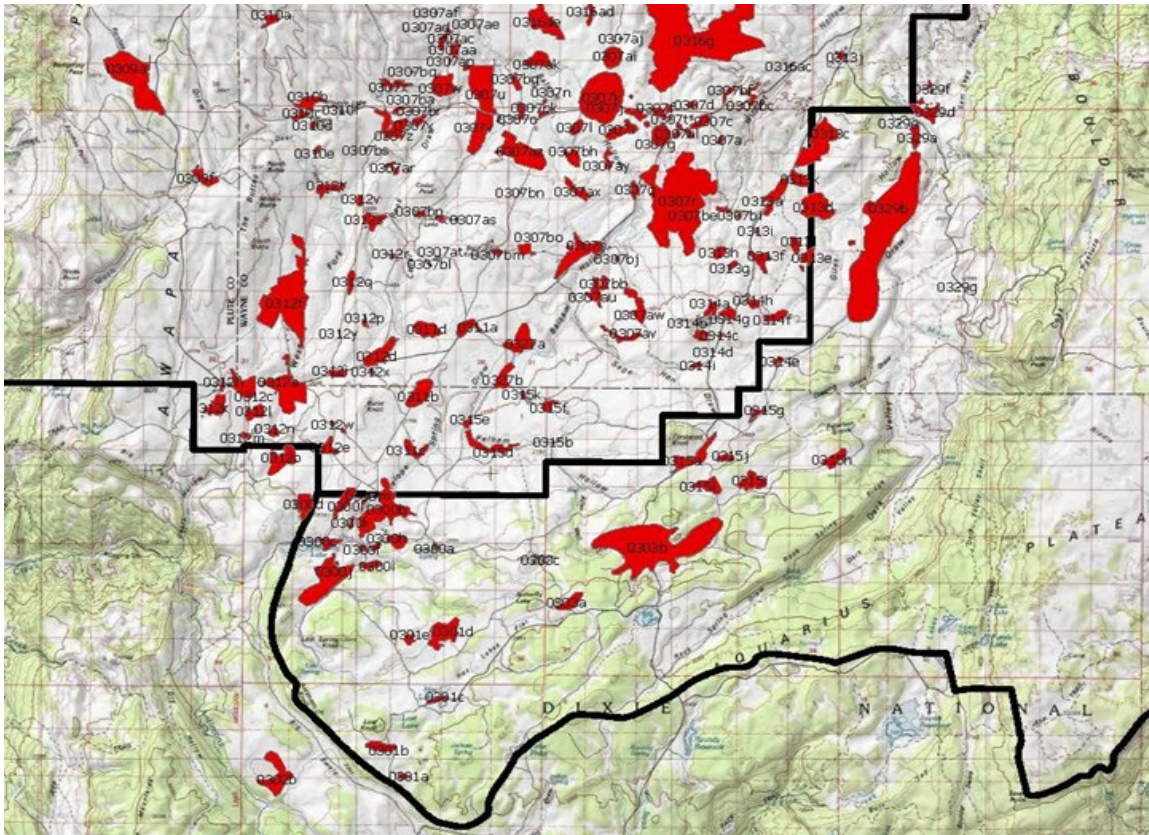
Figure 8. Occupied Utah Prairie Dog Colonies on or near the Fishlake National Forest.

Additional habitat work is scheduled to improve and increase Utah Prairie dog habitat.

Activity: Nongame Species

Monitoring Question

Are forest management activities and natural events affecting the ecological conditions indicated by the status of focal species?

Monitoring Indicator

Habitat across the planning area.

Monitoring Methods, Data, and Results

Nongame animals include many species on the Fishlake Forest. These are represented by 19 Focal Species that are selected to represent forest habitats and species that utilize those habitats. They are listed below with the habitats they represent (Table 10). Healthy populations of Focal Species are assumed to indicate healthy forest ecosystems.

Table 10. Focal species of the Fishlake National Forest.

Species	Habitat/Ecosystem	Currently Monitored
Rydberg's Milkvetch	High Elevation/Alpine Meadow	Unsure
Mule Deer	General Forest/Multiple	Yes [1]
Rocky Mountain Elk	General Forest/Multiple	Yes [1]
American Goshawk	Mature Forest	Yes
Brewer's Sparrow	Sage Steppe	Yes [2]
Vesper Sparrow	Sage Steppe	Yes [2]
Sage Thrasher	Sage Steppe	Yes [2]
Hairy Woodpecker	Mature Forest/Snags	Yes [2]
Western Bluebird	Mature Forest	Yes [2]
Mountain Bluebird	Mature Forest/Snags	Yes [2]
Lincoln's Sparrow	Riparian	Yes [2]
Yellow Warbler	Riparian	Yes [2]
MagGillvray's Warbler	Riparian	Yes [2]
Aquatic Macroinvertebrates	Stream Water Quality	Periodically
Bonneville Cutthroat Trout	Streams	Yes
Rainbow Trout	Lakes and Rivers	Yes [1]
Brown Trout	Lakes and Rivers	Yes [1]
Brook Trout	Lakes	Yes [1]
Lake Trout	Lakes	Yes [1]

[1] Monitored by the Utah Division of Wildlife Resources

[2] Data from the Integrated Monitoring in Bird Conservation Regions (IMBCR) Website

A variety of monitoring and survey data are used to determine the status of these species; projects are developed with design features and best management practices to mitigate negative effects of these projects to wildlife species. Most projects have an ancillary goal to improve habitat for wildlife and fisheries. Vegetation treatment projects are designed and implemented to increase diversity and a variety of seral stages and habitats. Monitoring methods vary by species.

Ryder's milkvetch will not be discussed in this document. Mule deer and Rocky Mountain elk are discussed above in the big game section, while American goshawk is addressed in several sections below. Hairy woodpecker, western bluebird and mountain bluebird are discussed below in the snag section, while aquatic species are addressed in the aquatic sections below. Sage steppe and riparian habitats are addressed here using migratory bird counts to monitor their status.
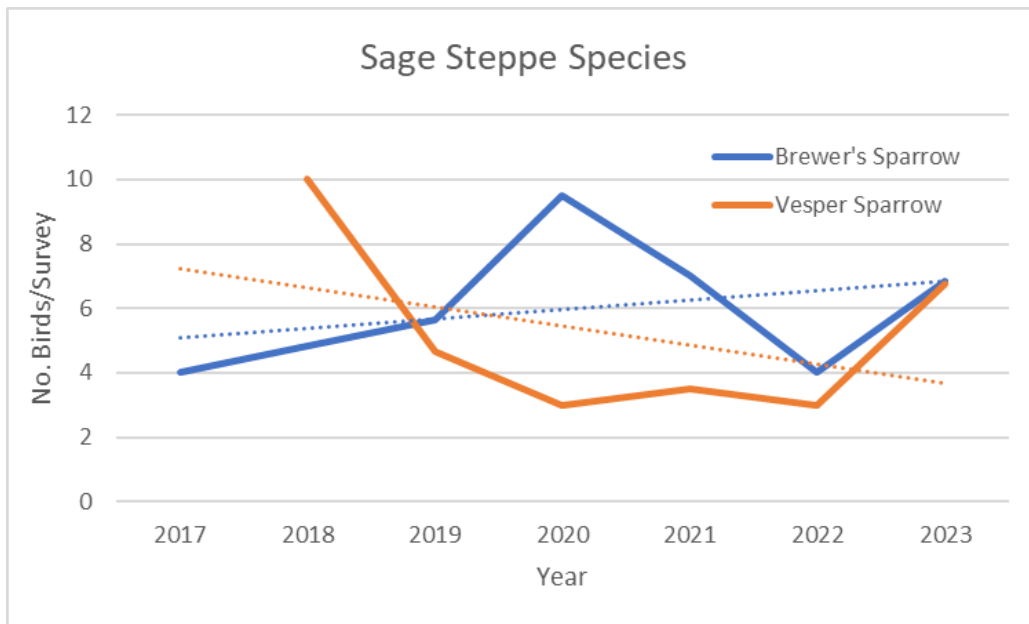
Figure 9. Survey data from 2017 through 2023 for Brewer's and Vesper Sparrow as indicators of sage steppe habitat health.
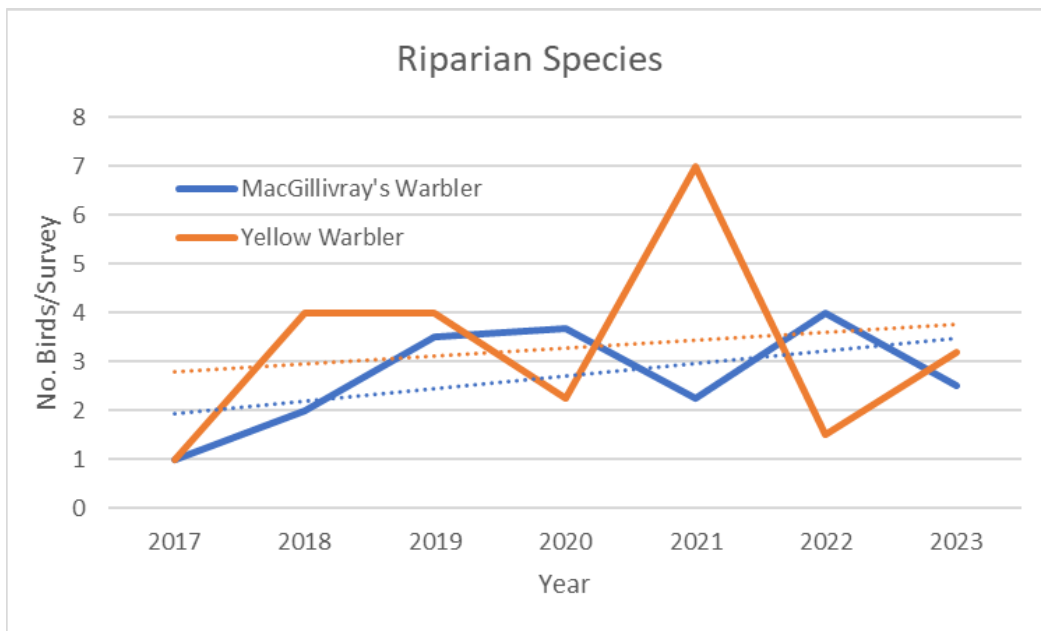
Figure 10. Survey data from 2017 through 2023 for MacGillivray's Warbler and Yellow Warbler as indicators of riparian habitat health.

Currently, there are healthy populations of Brewer's and Vesper sparrow – both indicators of healthy sage steppe habitats (Figure 9). This habitat is critical for wintering mule deer and elk and for year-round use of sage grouse. Consequently, habitat projects to reduce pinyon and juniper encroachment have been implemented to improve this habitat in several areas across the Forest.

Riparian habitats make up a small portion of the Fishlake Forest but are critical for over 90 percent of wildlife species on the Forest. Riparian species that reflect the health of riparian habitats include MacGillivray's and Yellow Warblers. Trends for these species are positive and indicate that riparian habitats are intact (Figure 10).

Activity: Snag management

Monitoring Question

Are snags in condition to meet needs of cavity nesters?

Monitoring Indicator

Snag condition.

Monitoring Methods, Data, and Results

Focal species that utilize snags and therefore are good indicators of snag conditions on the Forest include mountain bluebirds and hairy woodpeckers. Breeding bird surveys have been conducted on the Forest at multiple stations since 2017. These surveys show variable, but not decreasing, populations of both mountain bluebirds and hairy woodpeckers, indicating that snag retention has not changed in the last seven years on the Forest (Figure 11).
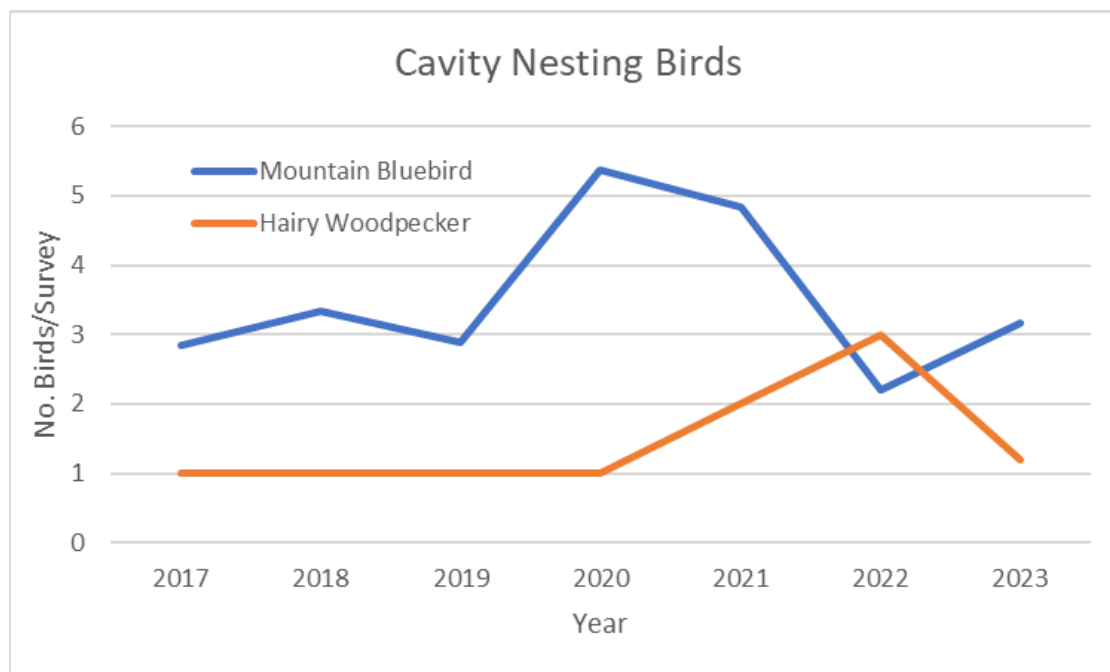
Figure 11. Number of mountain bluebirds and hairy woodpeckers per survey counted on the Fishlake National Forest from 2017 through 2023.

Landscapes throughout the Forest have been impacted by endemic and epidemic outbreaks of spruce bark beetle resulting in large areas of dead spruce across the Forest. Wildfire in mixed conifer stands have also resulted in large areas of dead standing wood. These events have led to

an excess of snags in many forested habits. Other tree species, such as ponderosa pine, are not as plentiful nor as widespread, and snags of these species are less plentiful.

The Fishlake Forest Plan provides strong protection for the management of snags of all tree species across the Forest. Based on observations while conducting northern goshawk and general wildlife surveys during project clearance analyses, snags are adequate to support healthy, well-distributed populations of cavity-dependent species and secondary obligates across the Forest.

Fisheries

Activity: Fish-Bonneville Cutthroat Trout (BCT)

Monitoring Question

Are Forest management activities and natural events affecting the ecological conditions indicated by the status of the focal species?

Monitoring Indicators

BCT population estimates.

Monitoring Methods

Complete population surveys were conducted during 2021 in Birch Creek (East - near Circleville), on the Fishlake National Forest as part of the Upper Sevier River Bonneville cutthroat trout monitoring effort by Fishlake National Forest, Utah Division of Wildlife Resources, and Dixie National Forest. Standard protocol for BCT monitoring in the Southern Bonneville Geographic Management Unit (GMU) calls for surveying all known populations within the selected drainage during a single field season (Hadley et al., 2015).

In 2022, the East Fork of the Sevier River Hydrological Unit (HUC) was sampled. All the East Fork Sevier River stations are on the Dixie National Forest and Bureau of Land Management administered lands and did not involve the Fishlake National Forest.

In 2023, the Beaver River Hydrological Unit was sampled. No Conservation Populations of Bonneville cutthroat trout occur on the mainstem of Beaver River or in its main headwaters watershed just east of Beaver. The Bonneville cutthroat trout populations occupy west flowing drainages off the west slope of the Tushar Mountains that have confluences on the lower Beaver River. These drainages are isolated by either water depletions and water diversions and/or constructed fish barriers.

Specifically, the streams sampled in 2023 are: Birch Creek (West) which is southwest of Beaver City, (3 Forest stations, 1 BLM station); South Fork of North Creek (4 stations) and its tributary Briggs Creek (2 stations), North Fork of North Creek (3 stations) and its tributary Pole Creek (2 stations) and Pine Creek (near Sulphurdale) (4 stations). Since Birch Creek (West) also flows across BLM administered lands, BLM employees assisted in sampling of the lower Birch Creek stations.

Fish populations were sampled using backpack electrofishing units (Smith-Root models 12-B, LR-20B, and/or LR-24). UDWR, Dixie National Forest, and Fishlake National Forest personnel conducted surveys when stream conditions allowed for effective sampling. Surveys were

generally conducted at a similar time of year as previous surveys. A minimum of two stations were electrofished in each second or higher order stream, while at least one station was surveyed in first order tributaries. The target length of each station was 100 meters, though the exact length was modified as needed to fit available habitat and allow for effective sampling. Fish populations were sampled in each station using the multiple-pass removal method (Zippin, 1958). Surveyors attempted to collect all trout except young-of-the-year, although relative abundance of current year reproduction was documented. Total length and weight were recorded for all yearling, sub-adult, and adult trout collected.

Mean wetted stream width (m) was determined by measuring ten random transects within each survey station. Population estimates were calculated by the program MicroFish 3.0 (Van Deventer, 1989 (Demo Version)). Stream dimensions were combined with population estimates and mean trout weight to calculate trout density (fish/km, fish/hectare) and biomass (kg/ha). Upstream and downstream ranges of BCT were determined in each surveyed stream through electrofishing, ocular observation, or professional judgement. Range limits, steam distances, and barrier locations were documented and/or measured with a global positioning system (GPS) unit, U.S. Geological Survey topographical maps, and ArcGIS software (by Esri). Reaches currently occupied by BCT were classified as occupied habitat. BCT biomass and distribution were compared to results from previous surveys. Trends were classified as increasing, decreasing, or stable, depending on if current values differed by more than 10 percent from previous surveys.

Results

Survey results were compiled by stream (see Hadley et al. 2021 for detailed analysis). Birch Creek is the only stream on Fishlake National Forest within the Upper Sevier River HUC. Appreciable numbers of BCT were observed in Birch Creek.

Stream length occupied by BCT, as well as observed BCT biomass, decreased in 2021 in all streams of the upper Sevier River drainage where BCT had been previously documented, including Birch Creek (Table 11). Decreases resulted from habitat restriction and marginal environmental conditions incident to severe drought (Birch Creek: -1.7 km). For more information on Upper Sevier River Bonneville cutthroat trout monitoring results, see Hadley et al. 2021.

Table 11. Comparison of Bonneville Cutthroat Trout population status in Birch Creek of the Upper Sevier River drainage, 2002 to 2021.

State water identification number	Stream/ tributary (indentation denotes tributaries)	Year	Occupied Habitat		Biomass		Comments
			km	Trend	kg/ha	Trend	
VI AA 550	Birch Creek	2002	>0	--	>0	--	Restoration in progress
		2008	6.3	↑	30	↑	Population expansion
		2014	6.3	↔	30	↔	Population stable but marginal
		2021	5.6	↓	20	↓	Impacted by drought

Trends noted as an increase (↑) or decrease (↓) if values changed by more than 10%; >0 indicates that trout were present, but biomass or range was not measured. Biomass presented is a mean of all sampling stations where BCT were detected.

Results for the 2023 surveys are currently being analyzed in Roundy et al. (in press) and will be included in the next monitoring report.

Activity: Macro-invertebrate

Monitoring Question

Are Forest management activities and/or natural events affecting aquatic habitats?

Monitoring Indicator

Aquatic habitat condition.

Monitoring Methods, Data, and Results

Macroinvertebrate sampling results (BCI: Biotic Control Index).

In 2021, a total of eight stations were sampled on seven streams. Streams surveyed include Clear Creek (two stations), Fish Creek, Indian Creek (two stations), Birch Creek (East), Manning Creek, and Shingle Creek.

A total of six stations were sampled on six streams in 2022. Streams sampled include Salina Creek, Seven Mile Creek, Manning Creek, Fish Creek, Shingle Creek, and Corn Creek. In 2023, only one station was sampled on one stream (Manning Creek).

The Forest Plan Monitoring Plan of sampling five streams/year was met in 2021 and 2022 but not in 2023. It is anticipated a minimum of five streams will be sampled in 2024, bringing the sampling into compliance with the Forest Plan for 2021-2024. The 2021 and 2022 samples have been processed by the laboratory, but due to recent laboratory processing changes, additional processing by the Forest is necessary to develop the BCI. The results will be included in the next monitoring report.

For the entire 38-year period for which Fishlake LRMP has been in effect (1986 through 2023), the Forest has averaged sampling 4.42 streams/year with an average of 7.16 stations/year. This is slightly below the Forest Plan level of monitoring five streams/year.

Activity: Habitat Condition Inventory

Monitoring Question

Is aquatic habitat maintained to meet Forest Plan Desired Conditions?

Monitoring Indicators

Aquatic and riparian condition; in-stream channel condition.

Monitoring Efforts and Results

The monitoring indicators for determining whether aquatic habitat is being maintained to meet Forest Plan Desired Conditions include aquatic and riparian condition as well as in-stream channel condition. Monitoring efforts by Fishlake Fisheries and Hydrology personnel resulted in data collected that reflect Forest Plan Desired Conditions.

The following highlights some of the monitoring and aquatics work that is being conducted across the Forest.

In 2022 and 2023, Forest hydrology personnel conducted Groundwater Dependent Ecosystem (GDE) surveys, primarily on Monroe Mountain in 2022 and the Joe Lott/Fish Creek Allotment (on the north end of the Tushar Mountains) and Meeks Mesa project area (south side of Thousand Lake Mountain). GDEs have very high resource values, may harbor unique flora, are very valuable for wildlife, as well as providing for human values. These ecosystems can easily be impacted and their function impaired or even lost.

In 2023, Forest hydrology personnel conducted riparian plant surveys and Pfankuch stream stability surveys on Shingle Creek and Fish Creek on the Beaver Ranger District.

Other monitoring efforts by Fishlake personnel include:

- Conducted fish population surveys on Manning Creek:
  - 2021 – Manning Creek S01 and S02 were surveyed to document impacts of the summer 2021 post-fire floods that came off 2019 prescribed burned areas on upper and middle Manning Creek. All BCT and non-native brown trout appeared to be killed on middle and lower Manning Creek.
  - Surveys in 2022 and 2023 confirmed that S01 and S02 continued to be fishless. The UDWR released BCT fry from the Manning Meadow 2023 broodstock take near S02 in fall of 2023 to see if the stream had recovered sufficiently from the flooding for the fish to survive to the 2024 planned BCT surveys on Manning Creek.
- Shingle Creek S01 and S03 sampled in 2022. Biomass of BCT appeared to have increased slightly from the 2017 sampling but was well below the peak pre-Twitchell fire biomass levels recorded in 2004 for S03 and 2007 for S01.
- Monitored streams temperature (deployed/retrieved probes and downloaded data) for Manning Creek, North Fork Box Creek, Box Creek, Greenwich Creek, Koosharem Creek, Vale Creek, Birch Creek (East), Birch Creek (West), Fish Creek, Salina Creek and its Beaver Creek tributary. Data has found that water temperatures are generally within cold water fisheries thresholds (less than ~20 degrees Celsius/~70 degrees Fahrenheit) on the Fishlake National Forest. Areas that have been identified which exceed these levels are typically low-flow, high elevation streams with minimal or low shading, and some low elevation streams, particularly with minimal shading.
- Boreal toad surveys on Monroe Mountain, Thousand Lake Mountain, and Boulder Mountain. Boreal toads are a species of concern but were only relatively recently added to the Region 4 Sensitive Species list. A major concern is a fungus infection called Bd or chytrid that is causing issues for amphibians worldwide. There are historic records of boreal toad in the Beaver River drainage and Seven Mile drainage that are not currently occupied, indicating these were probably extirpated prior to the Forest Plan.
  - Monroe Mountain was considered one of the strongest boreal toad populations in Utah prior to chytrid being documented there in 2012. After a comprehensive NEPA analysis, extensive vegetation cutting and burning projects have been undertaken to restore aspen on Monroe Mountain. Due to the chytrid-caused boreal toad population decline, some elements of the boreal toad monitoring plan were not able to be implemented. In 2022 and 2023, the Forest conducted

frequent monitoring of 6-10 known historic breeding sites in early summer on southern Monroe Mountain to ensure that no natural or land management impacts occurred to any potential boreal toad breeding habitat. Boreal toad breeding was documented both years.

- o In 2022 and 2023, the Forest conducted occupancy modeling at 20 established known historic boreal toad sites with the UDWR and Hogle Zoo. In addition, this same interagency crew conducted inventory monitoring at 9 sites in 2022 and 14 sites in 2023. Surveys in 2022 identified major drought impacts in middle Monroe Mountain which reduced habitat suitability for boreal toads. Some vegetation project work that did not follow design features was found on north Monroe Mountain in 2022 and rectified in 2023.
- o The breeding site, inventory, and occupancy surveys indicate boreal toads appear to be absent from the middle and northern portions of Monroe Mountain and stable at low numbers in the southern portion of their range on Monroe Mountain. It is possible that boreal toads could be present in middle or northern Monroe Mountain in extremely low numbers.
- o The Forest, UDWR, and Hogle Zoo conducted boreal toad monitoring on Thousand Lake Mountain in 2022 and 2023. Three historic breeding sites were checked in both years, 13 inventory sites were checked in 2022, and 23 sites in 2023. A considerable number of adult boreal toads were PIT tagged in these inventories. Localized reproduction was documented on Thousand Lake Mountain at differing sites each year. The Thousand Lake Mountain population of boreal toads appears to be stable.
- o In 2022 and 2023, the Forest, UDWR, and Hogle Zoo conducted boreal toad monitoring on Boulder Mountain. Two historic breeding sites were checked each year with no reproduction documented. In 2022, 14 inventory sites were checked and15 inventory sites were checked in 2023. The historic population stronghold in Pine Creek was barren for the fifth consecutive year. Drought impacted spring-fed stream flow in that area in mid-summer 2023, but the heavy snowfall of 2022-2023 winter seemed to restore flow by autumn of that year. Excessive wildlife and livestock grazing is also impacting this site, which has made it unsuitable for the beaver that formerly occupied the area. Boulder Mountain seems to have considerable unoccupied habitat and the boreal toad population appears to be declining and low. Based on survey results, discussion is beginning on taking management steps to improve the former boreal toad stronghold in Pine Creek.

- Worked with Snow College in 2022 and 2023 to test combining small drone imagery, RTK GPS survey, and classical hydrological survey methods in upper Seven Mile Creek to develop comprehensive riparian, aquatic, and hydrological methods. A hydrological longitudinal profile and several cross-section profiles were surveyed to combine with the Snow College drone imagery. The Forest also conducted a fish population survey station in the imagery area in 2022, documenting good numbers and biomass of brook trout.
- Worked with the USDA Forest Service Geospatial Technology and Applications Center (GTAC) to conduct sensor flights on Fish Creek and Upper Seven Mile Creek in August 2023. Approximately 1.4 miles of lower Fish Creek (142 acres) were flown with drones to obtain RGB, infrared, and thermal imagery and LiDAR data. Approximately 0.9 miles of Upper Seven Mile (220 acres) were flown with the same drone and sensor suite. The

    purpose of the flights was to obtain an orthorectified data set for comparison to 2018 and 2019 imagery data on these same areas. Potential items to be examined are changes in stream location, changes in stream elevation, identification of erosion areas and sediment aggradation, and changes in vegetation. Finished imagery and data products have been delivered to the Forest from GTAC. Analyses of the data by the Forest has not yet begun.

- Qualitative field visit on Birch Creek (East) in 2023 to assess Thompson Fire and retardant application impacts to the Bonneville cutthroat trout population. No retardant impacts were noted. The visit determined that there was potential for a partial or full fish kill in middle and lower Birch Creek (East) from burned area ash-flows due to late season monsoon storms.

Goshawk

Activity: Goshawk territory occupancy at the forest level

Monitoring Question

Are known goshawk territories on NFS lands remaining occupied?

Monitoring Indicator

Goshawk territory occupancy.

Results

Goshawk territories on the Fishlake National Forest are not remaining occupied. Occupancy – the percent of territories with goshawk activity - has declined from over 50 percent in the mid-2000s to just 4 percent in 2023 (Figure 12). Goshawk population trends are also down throughout Utah, across the Intermountain region, and across all survey areas. Goshawk population numbers across the Fishlake National Forest reflect these region-wide trends. Suggested monitoring changes would include new searches for active nesting pairs and abandoning the monitoring of nests that have been destroyed by wind and fire or territories that have been abandoned for many years. Suggested management changes would be to evaluate goshawk territory occupancy on the Forest in relation to regional goshawk population levels. The monitoring assessment does not account for factors influencing regional population levels beyond management control on the Forest. Further planning efforts are also needed at the Forest level to protect and enhance mature/old growth habitat for wildlife species dependent on this habitat type.

Several factors may be contributing to the continued decline in occupied goshawk territories. These include recent drought conditions, large wildfire impacts, Forest activities, and monitoring methods.

Environmental conditions have been shown to affect goshawk nesting success. Drought from a previous year has been correlated to a reduction in small mammal production, an important component of the food supply for northern goshawk. The years 2018, 2020, 2021, and 2022 were marked by severe drought and may have negatively impacted goshawk nest survival.

At least six nest territories in two districts were destroyed by fire in the last 12 years. These territories were not replaced into the affected areas so they register as unoccupied during monitoring.

Forest activities that have been shown to negatively impact northern goshawk nesting include prescribed fire, timber harvest and grazing. Goshawk territories are monitored annually by standard methods. However, when nest sights are burned, blown down, or abandoned for long periods of time, the current protocol does not adapt to those changes and biologists are directed to continue monitoring these sites. This leads to a perceived decrease in occupancy, when in reality the same nesting goshawks may have simply moved to nearby habitats.
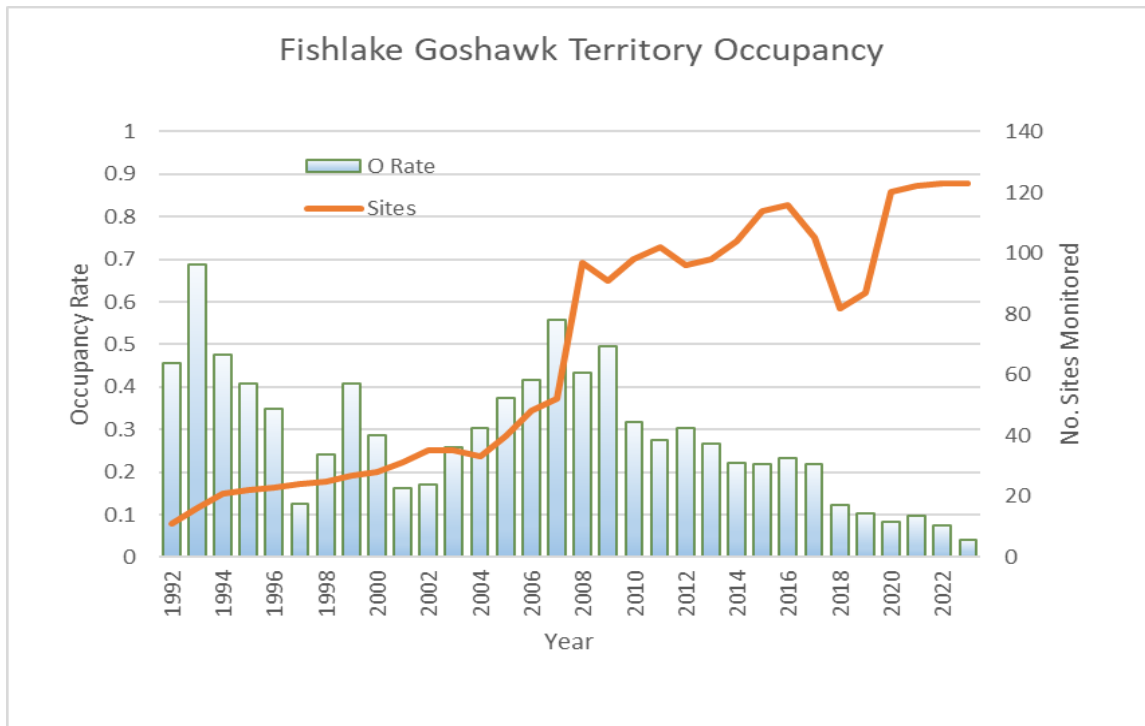
Figure 12. Fishlake National Forest Goshawk Territory Occupancy Rates, (1992-2023).

Activity: Goshawk territory occupancy following vegetative management treatments

Monitoring Question

Are goshawk territories remaining occupied following vegetation management?

Monitoring Indicator

Goshawk territory occupancy.

Results

In general, goshawk territories are not remaining occupied regardless of vegetation management. However, in some territories, it appears that management activities may have reduced occupancy of some territories. During 2021, 2022, and 2021, a total of 123 goshawk territories were monitored on the Fishlake National Forest. Of these territories only five (approximately ten percent) were occupied in 2023. Some of these nest monitoring sites occurred in or near treatment areas. Territory abandonment due to vegetation management projects is difficult to determine as birds may not re-nest in a territory for several reasons. For example, bark beetle impacts have

decreased habitat effectiveness across the Forest, as has fire and weather events. Still, it appears that some of these territories were abandoned as a result of vegetation management at these sites.

Activity: Dispersion and patch size of mature/old forest groups

Monitoring Question

Is mature and old forest habitat connectivity being adequately maintained?

Monitoring Indicator

Percent and distribution of mature and old forest cover.

Results

The northern goshawk is an indicator of old, or mature forests and is identified in the Fishlake LRMP as such. A significant portion of the Fishlake's mature and old growth forest stands were logged prior to today's contemporary science- based practices. As a result, habitat for wildlife species dependent on mature and old growth forests is often lacking. During project development, mature and old growth stands (VSS 5 & VSS 6) are assessed, and project-specific design features are incorporated into proposed actions to protect these stands. Currently, there is a lack of stand exam data collected from which to base conclusions. From 2021 through 2023, a total of 19 stand exams were recorded in the FSVEG database. The amount of stands exams recorded is a very small amount of the overall forested landscape, so the amount of mature and old growth stands are unknown.. The lack of mature old growth forests may be a contributor to the decline of goshawk on the forest.

Activity: Snag densities/sizes within a 100-acre treatment block

Monitoring Question

Is snag habitat being maintained in desired spatial arrangement?

Monitoring Indicator

Density and distribution of snags.

Results

Snag density data are collected as part of regular stand exam data on the Fishlake Forest. However, these data represent a small portion of the forest. A total of 19 surveys include data to quantify snags from 2021 through 2023. These data show an average of 4.3 snags per acre, from 8 to 18 inches in diameter. However, visual inspections show that snag numbers in the spruce/fir and aspen types are well distributed and abundant across the Forest. The abundance of snags has increased over time due to bark beetle and wildfire impacts. These natural events have added to the habitat effectiveness of the spatial arrangement of snags on the landscape.

Specific snag management recommendations are in the Fishlake LRMP and are being implemented across the Forest in all vegetation management projects, thus providing a desired spatial arrangement. Figure 13, below, depicts snags remaining after intense fire disturbance.

Figure 13. Snags created by wildfire. These will eventually topple and add to the downed wood already in place.

Activity: Down log and woody debris amounts/sizes within a 10-acre treatment block

Monitoring Question

Is downed wood being maintained in sufficient amount, size, and location?

Monitoring Indicator

Quantity of downed logs and woody debris.

Results

Within the Fishlake LRMP, specific down woody debris recommendations are listed by cover type. These recommendations are required on each vegetation management project that occurs in northern goshawk habitat across the Forest and is designed to provide downed woody debris in sufficient size, amount, and distribution for habitat needs.

Surveys for downed wood are lacking. However, the large number of snags in the Forest leads to a high volume of downed wood, measured as tons per acre. Fire suppression efforts accompanied by large beetle kills have resulted in an overabundance of downed wood in conifer and mixed aspen/conifer habitats. In addition, large wildfires in several areas of the Forest have resulted in excess downed wood. Only ponderosa pine forest habitats appear to have limited downed wood. Periodic underburning in these stands can reduce downed wood below recommended levels.

Activity: Ungulate grazing practices in identified at-risk locations

Monitoring Question

Are appropriate adjustments to grazing practices being made where grazing is contributing to at-risk conditions?

Monitoring Indicator

Ungulate grazing practices in at-risk locations.

Results

Grazing impact monitoring is conducted regularly. Previously, ungulate grazing practices (i.e., utilization, season of use, grazing system) in identified "at risk" locations were looked at in northern goshawk territories. A review of grazing practices on at least two allotments were identified and monitored. Based on monitoring on the Fremont River Ranger District and Richfield District, no "at risk" locations were identified. Grazing was not impacting the allotments reviewed or contributing to a decrease in habitat effectiveness for goshawk prey species. The greatest risk of impacts from grazing is to riparian habitat. Riparian exclosures have been, and continue to be, used to reduce impacts to those resources. In addition, range specialists review utilization data and discuss grazing impacts with permittees during annual permit review meetings. Despite these efforts, recent drought conditions have significantly reduced forage resources and have increased areas at risk. To adjust for these conditions, livestock numbers and dates of use were reduced on many allotments across the Fishlake National Forest.

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Appendix

Table 12. Monitoring and Evaluation Program

Program	Activity	Monitoring Question	Monitoring Indicator
Recreation	Developed Sites; Actual Use	Are developed recreation sites meeting Forest Plan standards for use, and are visitors satisfied?	Developed site use and visitor satisfaction
	Developed Sites; Condition	Are developed recreation sites meeting Forest Plan standards for condition?	Developed site condition
	Dispersed Actual Use	Are dispersed recreation sites meeting Forest Plan standards for use, and are visitors satisfied?	Dispersed site use and visitor satisfaction
	Dispersed campsite condition	Are dispersed recreation sites meeting Forest Plan standards for condition, and are visitors satisfied?	Dispersed site condition
	Trail condition	Are trails meeting Forest Plan standards for use and condition, and are visitors satisfied?	Trail use, and visitor satisfaction; miles of motorized trail managed to standard; miles of non-motorized trail managed to standard
Cultural Resources	Sites located and protected	Are historical and cultural resources being protected both from forest plan implementation activities and from vandalism or neglect?	Number of historical or cultural sites adversely impacted by projects or the public
Fish and Wildlife	Wildlife Habitat Diversity	Is the diversity of wildlife habitat being maintained?	Diversity of forest and rangeland vegetation
	Modification of Ecosystem	Are forest management activities and/or natural events affecting the structure and function of upland and riparian ecosystems?	Structure and function of forest and riparian ecosystems
	Big game habitat condition	Is big game habitat maintained to meet Forest Plan desired conditions?	Big game habitat condition
	Fish (BCT)	Are forest management activities and natural events affecting the ecological conditions indicated by the status of focal species?	BCT population estimates
	Threatened Plant Species	Are TEPC plant habitats being protected from forest plan implementation activities?	Number of TEPC plant locations adversely impacted
	Nongame Species	Are forest management activities and natural events affecting the ecological conditions indicated by the status of focal species?	Habitat across the planning area
	Macro-invertebrate	Are forest management activities and/or natural events affecting aquatic habitats?	Aquatic habitat condition
	T&E and Sensitive Animals	Are TEPC animal habitats being protected from forest plan implementation activities?	TEPC habitat conditions retained across the planning area
	Habitat Condition Inventory	Is aquatic habitat maintained to meet Forest Plan desired conditions?	Aquatic and riparian condition; in-stream channel condition
	Snag Management	Are snags in condition to meet needs of cavity nesters?	Snag condition

Program	Activity	Monitoring Question	Monitoring Indicator
Range	Permitted AUM	Are goods and services being provided in accordance with Forest Plan goals and objectives?	Level of permitted livestock grazing
	Forage Utilization	Are goods and services being provided in accordance with Forest Plan goals and objectives?	Forage utilization
	Range Trend	Do rangeland plant communities have desired species composition and is ground cover adequate?	Range condition and trend
Timber	Assure that timber manipulation will not favor an increase in forest pests (insects, diseases, etc.).	Are forest vegetation conditions stable or moving toward Forest Plan desired conditions?	Extent of insect and disease infestations
Water	Water Quality	Are beneficial uses, identified by the state of Utah, being maintained for all water bodies?	Impairment or degradation of water quality
	Changes in riparian Areas Due to Management	Are forest management activities affecting riparian ecosystems?	Riparian ecosystem condition
	Best Management practices effectiveness and compliance on land disturbing projects	Which forest management activities may affect riparian ecosystems?	BMP compliance and effectiveness
Soils	Accelerated Soil Loss Forestwide	Are forest management activities impairing soil productivity of the land?	Changes in soil properties (physical, chemical, and/or biological) that result in the loss of the inherent ecological capacity or hydrologic function of the soil resource
Facilities	Transportation System Management	Is adequate road access and maintenance being provided?	Miles of classified road open for public use
	Road Maintenance	Are open roads maintained to standard?	Miles of road maintained to standard
Protection	Fuel Treatment	Are fuel treatment projects protecting property, human health, and safety, and reducing the potential for unwanted fire effects?	Effectiveness of fuel treatments in reducing unwanted fire effects
	Insect & Disease	Are forest vegetation conditions stable or moving toward Forest Plan desired conditions?	Extent of insect and disease infestations
Goshawk	Goshawk territory occupancy at the forest level	Are known goshawk territories on NFS lands remaining occupied?	Goshawk territory occupancy
	Goshawk territory occupancy following vegetative management treatments	Are goshawk territories remaining occupied following vegetation management?	Goshawk territory occupancy
	Dispersion & patch size of mature/old forest groups	Is mature and old forest habitat connectivity being adequately maintained?	Percent and distribution of mature and old forest cover

Program	Activity	Monitoring Question	Monitoring Indicator
	Snag densities/sizes within a 100-acre treatment block	Is snag habitat being maintained in desired spatial arrangement?	Density and distribution of snags
	Down log & woody debris amounts/sizes within a 10-acre treatment block	Is downed wood being maintained in sufficient amount, size, and location?	Quantity of downed logs and woody debris
	Ungulate grazing practices in identified at-risk locations	Are appropriate adjustments to grazing practices being made where grazing is contributing to at-risk conditions?	Ungulate grazing practices in at-risk locations