# Town of Jackson Ecosystem Health Indicator Report

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# Executive Summary

The vision of the Jackson/Teton County Comprehensive Plan is to *preserve and protect the area's ecosystem in order to ensure a healthy environment, community, and economy for current and future generations*. To actualize this vision, we must define a healthy environment, community, and economy, and measure progress towards achieving it. The answers may lead us to protect aspects of the ecosystem that are functioning and healthy, or to take actions to improve conditions that are not. A healthy ecosystem is *intact in its physical, chemical, and biological components and their interrelationships, such that it is resilient to withstand change and stressors*. Ecosystem health indicators may reflect one or more of these components.

A healthy environment is inextricably connected to a healthy community and economy. Air pollution, water pollution, and light pollution impact the health of our environment; they also impact human health, increase medical expenses and insurance premiums, and are expensive to clean up. Healthy wildlife populations are critical for a functioning ecosystem; they are also important for the economic health of outdoor recreation industries, for the ability of community members to hunt and fish and to pass those traditions on to the next generation, and for visitors and locals alike to experience a sense of awe for the natural world. Human-wildlife conflicts impact populations by altering wildlife behaviors, which can lead to animals being relocated or euthanized; conflicts can also lead to property damage, physical injury, or death for humans, livestock, and pets.

The goal of this report is to provide an overview of ecosystem health through an analysis of twelve key indicators that provide a glimpse of air quality, water quality, wildlife, habitat, and landscape health. Indicators allow us to focus on a few important markers of ecosystem health rather than attempting to track every component of the ecosystem. The Ecosystem Health Indicator Report is aligned with two strategies in the Town of Jackson/Teton County Comprehensive plan:

- Strategy 1.G.S.1: Identify appropriate indicators that measure the status of, and progress towards, the Chapter 1 goal. For example, measuring stewardship of natural resources may include establishing indicators of percent change of site development within the Town and County, or tracking contaminant loading from wastewater discharge at the Town of Jackson treatment facility.
- Strategy 1.G.S.2: Establish and Ecosystem Stewardship target for an Adaptive Management Program that will be used to track the Town and County's progress toward goals related to this chapter, including evaluation of threats to the ecosystem's health, and opportunities for helping preserve and protect it.

Work on the Ecosystem Health Indicator Report began in 2022 with stakeholder interviews and continued in 2023 with a series of focus group meetings. Attendees were asked to define what a healthy ecosystem looks like, how it could be measured, and what our targets should be. Attendees were then asked to select the most important indicators of ecosystem health in their

areas of expertise. Dozens of statements generated by participants were summarized into a working definition of a healthy ecosystem and ten statements of desired conditions, which are included in this executive summary.

Stakeholder generated indicators were separated into three tiers. The 2025 report highlights the first tier of indicators – those for which data is already being collected by agencies and organizations. Tier 2 and 3 indicators either require additional studies or require additional staff to incorporate. They could be included in future reports if funding is allocated. Most indicators included in the 2025 Ecosystem Health Indicator Report utilize longitudinal data sets and will be included in future annual reports. However, one indicator in the 2025 report is based on an additional study that may not be funded annually: PFAS in surface waters.

The geographic scope of the Ecosystem Health Indicator Report is the Snake River Headwaters Watershed above the confluence of the Gray's River. Parts of Teton County that are west of Teton Pass are not included in this report, nor are parts of the watershed south of the Teton County line unless noted. For the inaugural report, no data from the southern end of Yellowstone National Park is included, though it may be added in future reports. However, since water, air, light, plants, and wildlife all move within and across boundaries, data collected outside of the geographic focus is occasionally introduced for context. Geographic delineations like hunting zones also cross boundaries, and data gathered in geographic zones that differ from watershed boundaries sometimes expand or alter the geographic scope.

The Town of Jackson Ecosystem Health Indicator Report offers an assessment of key environmental indicators that are crucial for understanding the health of the ecosystem. By examining current conditions and trends, this report provides information that will help guide effective management and policy decisions. It is impossible to simplify the health of our ecosystem into a pass or fail grade. Rather, ecosystem health is a point along a spectrum. However, in an attempt to quantify those points, each indicator has been assigned a grade of "good" (green), "moderate" (yellow), or "poor" (red). Trends are indicated by arrows going up if conditions are improving, down if conditions are declining, and with a squiggly line if the trend is highly variable or does not show a clear trend. Indicators with a "poor" grade require immediate action, and those with a "moderate" score have room for improvement. Indicators rated "good" also require attention to ensure that they remain healthy. It is less expensive to invest in protection of the environment than to pay for cleanup later.

Readers may want to go straight to the State of the Ecosystem Snapshot to view all of the indicators, their status, and how they are trending. The Status Threshold Key outlines how the indicator's status was determined. The Status Summary provides a sentence or two about each indicator and potential mitigation measures or next steps. Finally, readers can use the table of contents to navigate to a more detailed analysis of each indicator. References and footnotes are at the end of the report and can be used to find more information.

# Definition of Healthy Ecosystem and Vision Statements

A healthy ecosystem is intact in its physical, chemical, and biological components and their interrelationships, such that it is resilient to withstand change and stressors.

We have a healthy environment if:

1. Air quality is within healthy ranges for our community, there are no harmful algal blooms in high alpine lakes, and future generations can enjoy the same clarity and visibility of the Teton Range that we enjoy today.

2. The Milky Way is visible from anywhere in Teton County.

3. Our surface waters sustain cold water fisheries and are free of invasive species, our groundwater is not depleted from present levels, and we can safely recreate in surface waters and drink from the faucet.

4. Invasive species are eradicated.

5. There is an appropriate collage of native plant habitats with rich species diversity and sufficient reproductive success to maintain healthy populations over time.

6. Habitat is ample, provides natural connectivity between intact patches, and is void of barriers to wildlife movement or ecological processes.

7. Topsoil is retained and has the biological, chemical, and physical properties needed to support natural functions.

8. Land use efficiently supports natural systems, provides resilience to disturbance, and mitigates the impacts of climate change.

9. Our community understands and values our unique water resources, values healthy land and is aware of the threats and impacts of soil degradation, values wildlife and recognizes its importance as a main driver of our economy, has the knowledge and tools to prevent the spread of invasive species, and is ecologically literate.

10. Our community anticipates wildfires, flood, drought, and natural disaster risk, has a resiliency plan, and implements it.

# State of the Ecosystem Snapshot

| Indicator | Status | Trend | Target |
|---|---|---|---|
| ***Air Quality:*** **Particulate Matter 2.5** | **Moderate** 🟡 | ↝ | Annual average PM2.5 concentrations below 9 µg/m³ and 24-hour averages below 35 µg/m³ |
| ***Air Quality:*** **Particulate Matter 10** | **Good** 🟢 | ↝ | Annual average PM10 concentrations below 20 µg/m³ and 24-hour averages below 150 µg/m³ |
| ***Light Pollution:*** **Night Sky Brightness** | **Moderate** 🟡 | ↓ | The Milky Way is visible at night from anywhere in Teton County and has a maximum magnitude of 21 or higher |
| ***Water Quality:*** **Snake River Water Temperature** | **Moderate** 🟡 | ↝ | Temperature in the Snake River does not exceed 68°F |
| ***Water Quality:*** **Snake River Discharge (Streamflow)** | **Good** 🟢 | ↑ | The hydrograph below Jackson Lake Dam mimics the natural hydrograph and includes a strong spring flush |
| ***Water Quality:*** **Macroinvertebrates** | **Moderate** 🟡 | ↝ | Macroinvertebrate EPT species richness of 24 or greater in local streams |
| ***Water Quality:*** **PFAS Detection** | **Good** 🟢 | **N/A** | No detectable concentrations of PFAS in local surface waters |
| ***Invasive Species:*** **Spread of Aquatic Invasive Species** | **Good** 🟢 | → | No quagga or zebra mussels are detected in regional waterways |
| ***Invasive Species:*** **Spread of Invasive Plant Species** | **Moderate** 🟠 | ↓ | Fewer than 12,000 acres are affected by invasive species |
| ***Wildlife:*** **Fencing Modified or Removed** | **Moderate** 🟡 | ↑ | Fencing does not interfere with critical wildlife corridors |
| ***Wildlife:*** **Human-Wildlife Conflicts** | **Poor** 🔴 | ↓ | Fewer than 50 total bear conflicts annually in the Jackson District and Grand Teton National Park |
| ***Wildlife:*** **Spread of CWD** | **Moderate** 🟡 | ↓ | ≤1% of tested animals are CWD positive |

# Status Thresholds Key

| | Good | Moderate | Poor |
|---|---|---|---|
| **PM2.5** | Annual PM2.5 concentration is ≤ 9 µg/m³; Daily 24-hour averages are ≤ 35 µg/m³ | 10 or fewer 24-hour periods are > 35 µg/m³ | Annual PM2.5 concentration is > 9µg/m³; More than 10 24-hour periods are > 35 µg/m³ |
| **PM10** | Annual PM10 concentration is < 20 µg/m³; Daily 24-hour averages are < 150 µg/m³; | 10 or fewer 24-hour periods are > 50 µg/m³ | Annual PM10 concentration > 20 µg/m³; More than 10 24-hour periods are > 50 µg/m³ |
| **Night Sky Brightness** | The maximum nightly Jackson magnitude in Summer is ≥ 21 | The maximum nightly magnitude is between 20 and 21 | The maximum nightly magnitude is <20 |
| **Water Temperature** | 0 days have water temperatures ≥ 68°F at any site | ≤ 5 days have water temperatures ≥ 68°F at any site | > 5 days have water temperatures ≥ 68°F at any site; ≥ 1 day > 70°F at any site |
| **Streamflow** | Downstream hydrographs model that of Flagg Ranch peak runoff and decline | | Peak runoff downstream of the Jackson Dam does not match Flagg Ranch |
| **Macroinvertebrates** | EPT species richness ≥ 24 | EPT species richness ≥ 10 | EPT species richness < 10 |
| **PFAS Detection** | No PFAS compound detection in local waterways; Stormwater outflow concentrations of PFOA and PFOS < 4 ppt and all other PFAS compounds < 10 ppt | PFOA and/or PFOS detected in surface waters at concentrations < 4 ppt; Other PFAS compounds detected at concentrations < 10 ppt | PFAS and PFOA detected in surface waters in concentrations ≥ 4 ppt; Other PFAS compounds detected in surface waters at concentrations ≥ 10 ppt |
| **Aquatic Invasive Species** | No zebra or quagga mussels detected in waterways | | Zebra or quagga mussels detected in waterways |
| **Invasive Plant Species** | < 12,000 Acres are impacted by invasive species | 12,000 to 15,000 acres are impacted by invasive species | ≥ 15,000 acres are impacted by invasive species |
| **Fencing** | No harmful fencing remains in critical wildlife corridors | Net decrease in fencing in critical wildlife corridors | Net increase in fencing in critical wildlife corridors |
| **Wildlife Conflicts** | ≤ 50 total bear conflicts annually | Between 50 and 100 total bear conflicts annually | > than 100 conflicts annually |
| **Spread of Disease** | ≤ 1% CWD prevalence for all species | ≤ 20% CWD prevalence for all species | > 20% CWD prevalence for all species |

# Status Summary

The 2025 Ecosystem Health Indicator Report provides insight into our ecosystem's health through 12 key indicators. These findings can help guide local policy, management, and educational strategies to preserve and protect our ecosystem.

**Four indicators are currently in good condition, but they require continued attention to maintain that status.**

1. Local air quality has PM10 annual and daily averages that are well below regulatory thresholds. However, hourly concentrations are occasionally high for short periods. Public education programs can inform visitors and residents when there are elevated hourly concentrations so sensitive individuals can avoid exposure.
2. PFAS concentrations in surface waters in Cache Creek and Flat Creek were undetectable in the first two samples collected in 2025. PFAS concentrations in Karns meadow inflows and outflows should continue to be monitored to ensure PFAS do not enter Flat Creek, and additional measures should be taken to reduce potential sources of PFAS.
3. The Snake River's streamflow mimics a natural hydrograph with a strong spring flush, supporting healthy ecosystems downstream of Jackson Lake Dam. Coordinated efforts are critical to ensure that dam operations mimic natural flows and support healthy fish populations and seed dispersal downstream.
4. No zebra or quagga mussels have been detected in local waterways. Watercraft inspections and invasive species prevention programs should be continued.

**Seven indicators fall into the moderate category, which means that action should be taken to improve conditions and prevent further decline.**

1. While PM2.5 concentrations meet annual health thresholds, short-term spikes, specifically during periods of wildfire smoke, create unhealthy air quality conditions in Jackson. Wildfire smoke readiness programs are an effective way to protect public health during wildfire smoke events and should be implemented in Jackson. Local ordinances and resolutions could help reduce anthropogenic sources of PM2.5.
2. Light pollution has increased in recent years, and the Milky Way is not consistently visible from the Town of Jackson. Improvements to lighting infrastructure, enforcement of shielding ordinances, and community education could help reverse this trend.
3. Snake River temperatures occasionally exceed 68°F in some reaches, stressing aquatic life and limiting recreational fishing activities. Climate models predict higher air and water temperatures in the future, which will exacerbate this issue. Locally, stormwater management practices and green infrastructure can help reduce the amount of heated runoff entering streams. Identification and protection of cold-water refugia could help

protect native fish species. Regionally, drought management practices will become more important as food producers navigate drier conditions in the West. Finally, educating anglers about best practices is critical for protecting local fish populations.

4. Flat Creek's macroinvertebrate diversity has declined since the 90s, but improvements in stormwater treatment, the addition of new thaw wells, and habitat restoration could support recovery. Continued monitoring is important for tracking changes.
5. Invasive plant species continue to impact more than 13,000 acres. Treatment efforts should be encouraged through partnerships with Teton County Weed and Pest, volunteer weed removal projects, and public education.
6. Wildlife fencing removal and improvement efforts have made significant progress, but barriers still remain in migration corridors. Addressing fencing outside of Teton County is crucial to maintain migration corridors for local herds. GIS mapping of existing fencing will help identify the areas of greatest impact.
7. Finally, while Chronic Wasting Disease (CWD) prevalence in elk remains low in Teton County hunt areas, infection rates in deer are slowly rising. This highlights the importance of hunter education, testing, and safe carcass disposal, as well as larger, ongoing conversations around feedground management.

**The only indicator categorized as poor is the level of human-wildlife conflicts.**

1. The majority of human-bear conflicts were related to unsecured trash and food attractants. Reducing human-bear conflicts will require stronger enforcement of bear-resistant container policies, public outreach to residents, commuters, and visitors about BearWise practices, and consistent compliance checks.

Many of Jackson's environmental indicators show signs of strength, especially where local organizations are making progress and leading educational initiatives. However, moderate and poor indicators reflect how development, recreation, pollution, resource management, and climate change pose threats to our ecosystem. Protecting ecosystem health depends on a continued commitment to strong local policy, community involvement, and investment in long-term resilience.

# Air Quality

## Particulate Matter 2.5

Status: Moderate

Trend:

**Overview:** Particulate Matter 2.5 (PM2.5) is defined as particles with a diameter ≤2.5 micrometers that originate from sources such as vehicle exhaust, smoke, industrial emissions, and dust. PM2.5 particles can harm the respiratory systems in animals, including humans, and can lead to declines in lichen and plant populations. PM2.5 harms humans by penetrating deeply into the lungs and bloodstream, posing serious health risks.[i] Due to their small size, PM2.5 particles can travel long distances from their source before being deposited by gravity or diffusion (dry deposition) or washed out of the atmosphere by precipitation (wet deposition). Atmospheric deposition can impact water quality by carrying pollutants to remote alpine lakes and other habitats.[ii]

**Metric:** PM 2.5 concentration is measured in micrograms per cubic metric (µg/m³).

**Target:** Annual average PM2.5 concentrations below **9 µg/m³** and 24-hour averages below **35 µg/m³** per United States Environmental Protection Agency (US EPA) guidelines for human health[iii]. 35µg/m³ corresponds to an Air Quality Index (AQI) of 100.

**Summary:**

- 2022 average annual PM2.5 was 2.8 µg/m³, 0 24-hour periods measured ≥ 35 µg/m³, and 2 days had hourly measurements ≥ 35 µg/m³.
- 2023 average annual PM2.5 was 1.8 µg/m³, 0 24-hour periods measured ≥ 35 µg/m³, and 2 days had hourly measurements ≥ 35 µg/m³.
- 2024 average annual PM2.5 was 3.8 µg/m³, 2 24-hour periods measured ≥ 35 µg/m³, and 10 days had hourly measurements ≥ 35 µg/m³.

**Findings:**

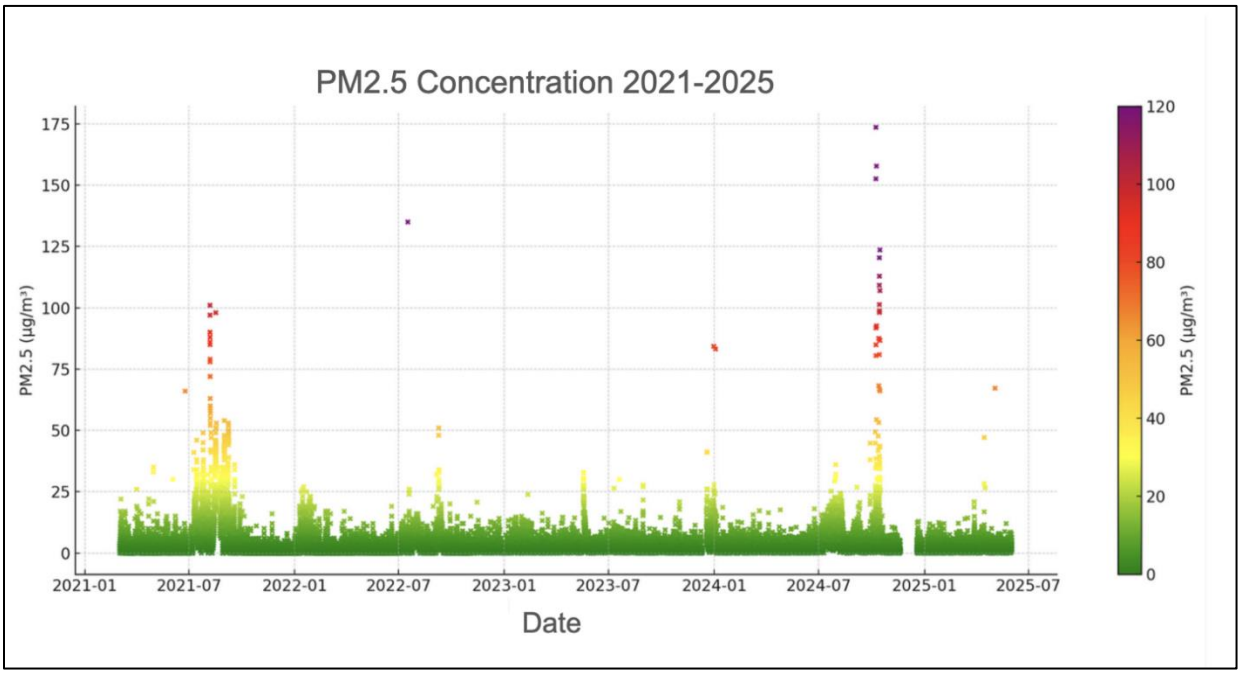


*Figure 1. PM2.5 measurements from Jackson State Local Air Monitoring Systems (SLAMS) taken hourly from March 2021 – June 2025. Source: Wyoming Department of Environmental Quality (WYDEQ).*

Figure 1 shows hourly measurements taken at the Jackson SLAMS station since March 2021, and the majority of samples fall within the desired range of ≤ 35 µg/m³. The largest spikes correspond to periods of wildfire smoke in the summer of 2021 and fall of 2024. Smaller spikes occurred annually in January.

The annual average PM2.5 concentration was 2.8 µg/m³ in 2022, 1.8 µg/m³ in 2023, and 3.8 µg/m³ in 2024. Since hourly data collection began at the SLAMS site in February of 2021, the annual average PM2.5 concentration has not exceeded the EPA threshold of 9 µg/m³. Although the average annual concentration increased from 2023 to 2024, it remained 58% below the EPA annual threshold.

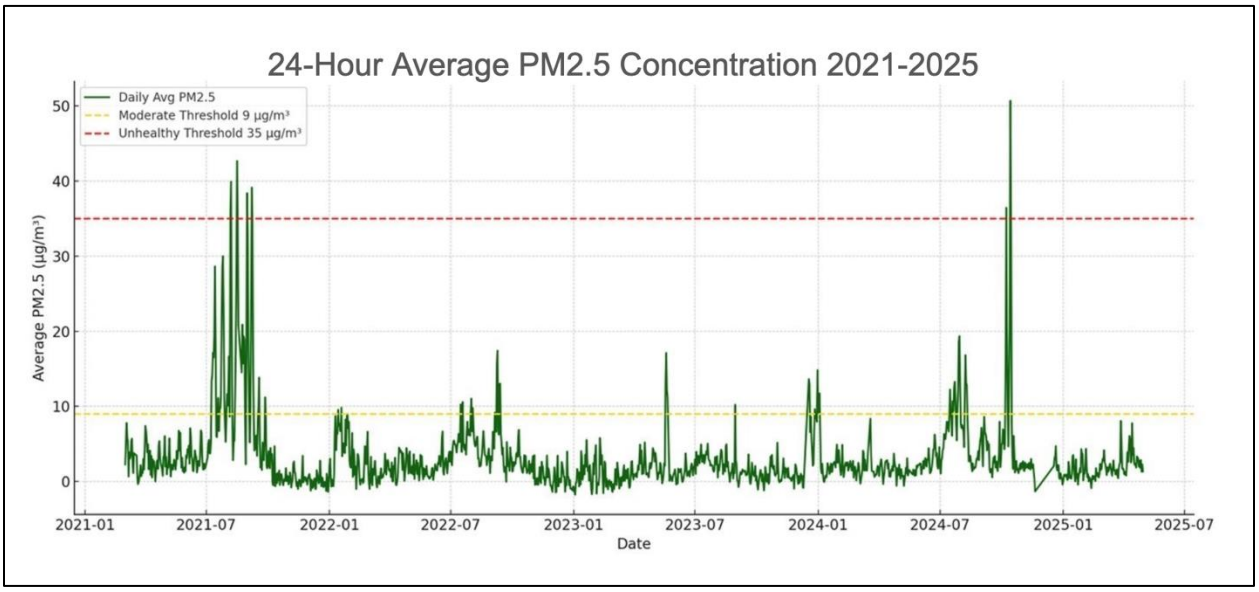


*Figure 2. 24-hour PM2.5 averages between March 2021 and April 2025. Source: WYDEQ.*

Figure 2 shows the daily 24-hour average PM2.5 concentrations from the winter of 2021 to the spring of 2025. Only two 24-hour averages exceeded the 35 µg/m³ limit in 2024, while the rest of the days remained well below the threshold. Both exceedances occurred during periods of wildfire smoke during the Pack Trail Fire in October 2024. Four 24-hour exceedances occurred in 2021, and none occurred in 2022 or 2023. In 2024, 10 days had single-hour measurements that exceeded 35 µg/m³, which is an increase from two days in 2022 and 2023.

Unusually sensitive individuals may experience negative impacts when PM2.5 24-hour average concentrations are at moderate concentrations between 9 µg/m³ and 35 µg/m³ (WYDEQ). The 24-hour averages reached moderate levels on 42 days in 2021, 13 days in 2022, 9 days in 2023, and 25 days in 2024. Most days in which 24-hour averages reached moderate concentrations took place in the summer or fall, and a few occurred in early January.

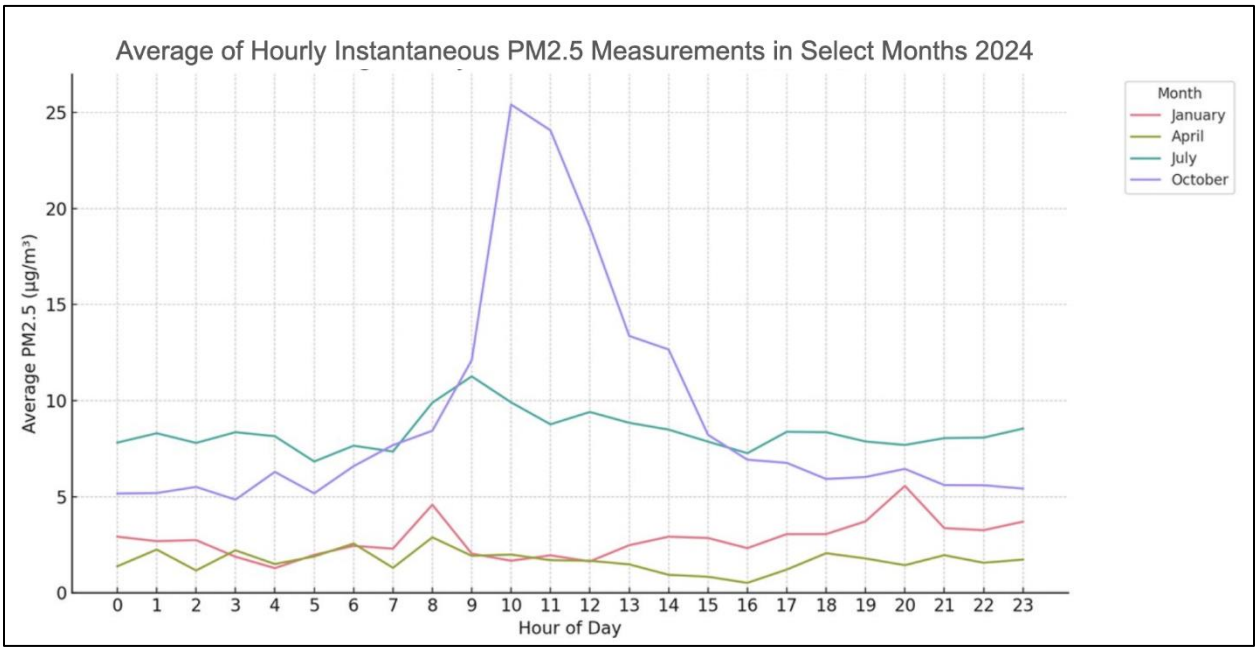


*Figure 3. Average of Hourly Instantaneous PM2.5 concentrations at each hour of the day in January, April, July, and October of 2024. Source: WYDEQ.*

Figure 3 displays the average PM2.5 concentrations at each hour of the 24-hour day in four different months and seasons in 2024. In January, PM2.5 concentrations peaked at 8 am before steadily increasing throughout the afternoon and peaking again at 8 pm. April had the lowest average concentrations but experienced slight increases in the morning and evening. July saw the highest average PM2.5 concentrations, with peaks around 8 am and 5 pm. The largest daily spikes occurred in October, when PM2.5 concentrations drastically increased at 10 am and then decreased throughout the day.

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**Discussion:** PM2.5 levels in Jackson during 2024 mostly remained within the desired range. Annual averages staying below the 9 µg/m³ threshold for healthy air quality. However, short-term spikes occurred in August and October when smoke from the Fish Creek Fire and Pack Trail Fire settled in the valley, leading to elevated PM2.5 concentrations. Two days exceeded the 24-hour threshold during the Pack Trail Fire, which contributed to a higher annual average than previous years.

There are several factors that could cause seasonal and daily fluctuations in PM2.5 levels. In winter, specifically in early January, morning inversions and ice crystals can trap pollutants near the ground, which increases PM2.5 levels. Additionally, emissions from motor vehicles and wood stoves are potential sources of particulate matter pollution that fluctuate seasonally. In the height of summer, dry conditions, heightened vehicle traffic, and regional wildfire smoke transported through winds could contribute to an increase in PM2.5.

Throughout the year, PM2.5 concentrations are elevated during the morning commuting hours. However, levels are not consistently elevated in the afternoon and evening. The observed decrease in PM2.5 after the morning peak suggests that afternoon wind and storm activity may help disperse pollutants, particularly during periods of wildfire smoke. These seasonal and hourly patterns reveal the importance of continuous monitoring, as short-term exposure to elevated PM2.5, especially during outdoor activity, can pose health risks for sensitive individuals.

**Status:** PM 2.5 concentrations are moderate. While the annual average met the target, daily 24-hour averages did not. Trends are variable and highly dependent upon the presence of wildfire smoke.

## Particulate Matter 10

Status: Good 

Trend: 

**Overview:** Particulate Matter 10 (PM10) are particles with a diameter ≤ 10 micrometers. The particles originate from many of the same sources as PM2.5, along with dust and debris from construction sites, agriculture and open-lands, industry, pollen, unsealed dirt roads, and fragments of bacteria. PM10 particles are harmful to wildlife and plants and can disrupt food sources and decrease reproductive success. Additionally, atmospheric deposition of PM10 can affect soil and water quality.[i] PM10 can cause a variety of human health issues, including lung inflammation and tissue damage.[ii] PM2.5 concentrations have been sampled hourly at the Wyoming Department of Environmental Quality (WYDEQ) Jackson State Local Air Monitoring Systems (SLAMS) station on High School Road since 2021.

**Metric:** PM10 concentration is described in microgram per cubic metric (µg/m³).

**Target:** Annual average PM10 concentrations below **20 µg/m³** per the World Health Organization (WHO) and 24-hour averages below **150 µg/m³** per United States Environmental Protection Agency (US EPA). A PM10 concentration of 150 µg/m³ corresponds to an AQI of 100. The US EPA also states that the 24-hour threshold should not be exceeded more than once every three years.

**Summary:**

- 2022 average PM10 was 12.6 µg/m³, no 24-hour periods measured ≥ 150 µg/m³, and 4 days had hourly measurements ≥ 150 µg/m³.
- 2023 average PM210 was 11.6 µg/m³, no 24-hour periods measured ≥ 150 µg/m³, and 11 days had hourly measurements ≥ 150 µg/m³.
- 2024 average PM10 was 13 µg/m³, no 24-hour periods measured ≥ 150 µg/m³, and 8 days had hourly measurements ≥ 150 µg/m³.

**Findings:**

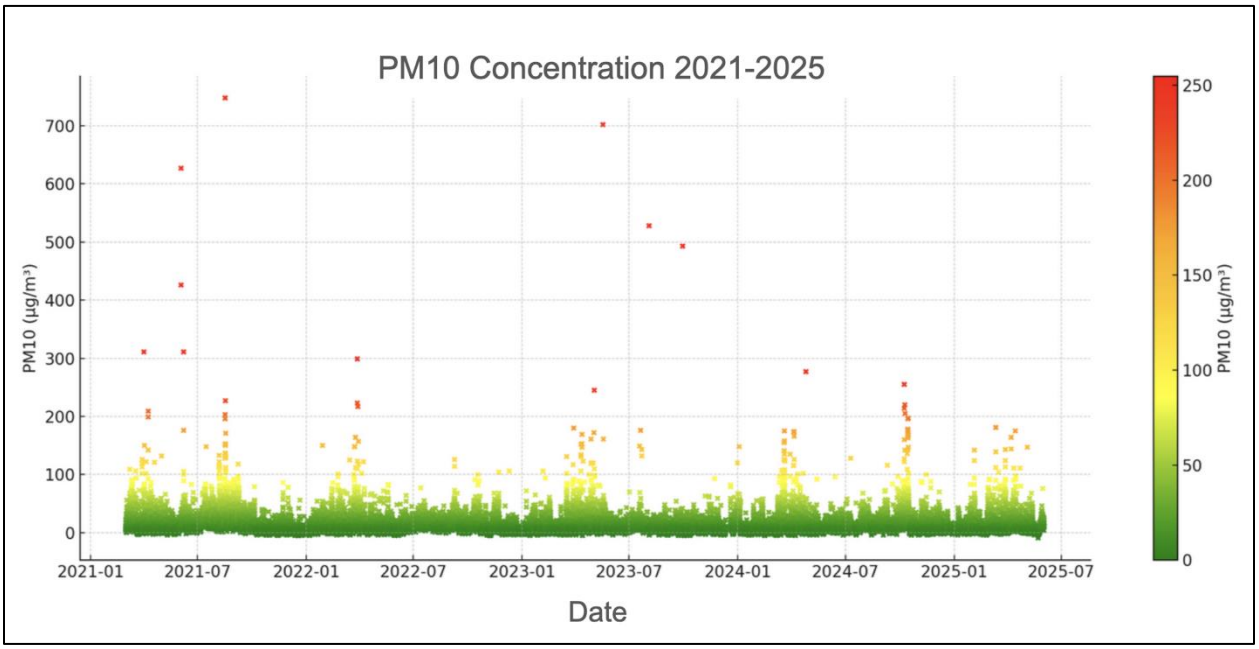


*Figure 4. PM10 concentration readings from March 2021 - June 2025. Measurements taken hourly. Source: WYDEQ.*

Figure 4 shows the hourly PM10 concentrations at the Jackson SLAMS site on High School Road. Concentrations usually fall within the healthy range, with a small number of samples showing moderate or high concentrations. The past three annual averages were below the WHO threshold of 20 µg/m³, and measured 12.6 µg/m³ in 2022, 11.6 µg/m³ in 2023, and 13 µg/m³ in 2024. Between 2023 and 2024, annual average concentrations increased 12.1%. PM10 levels were low in the autumn months in the years prior to 2024 when the Pack Trail wildfire occurred.

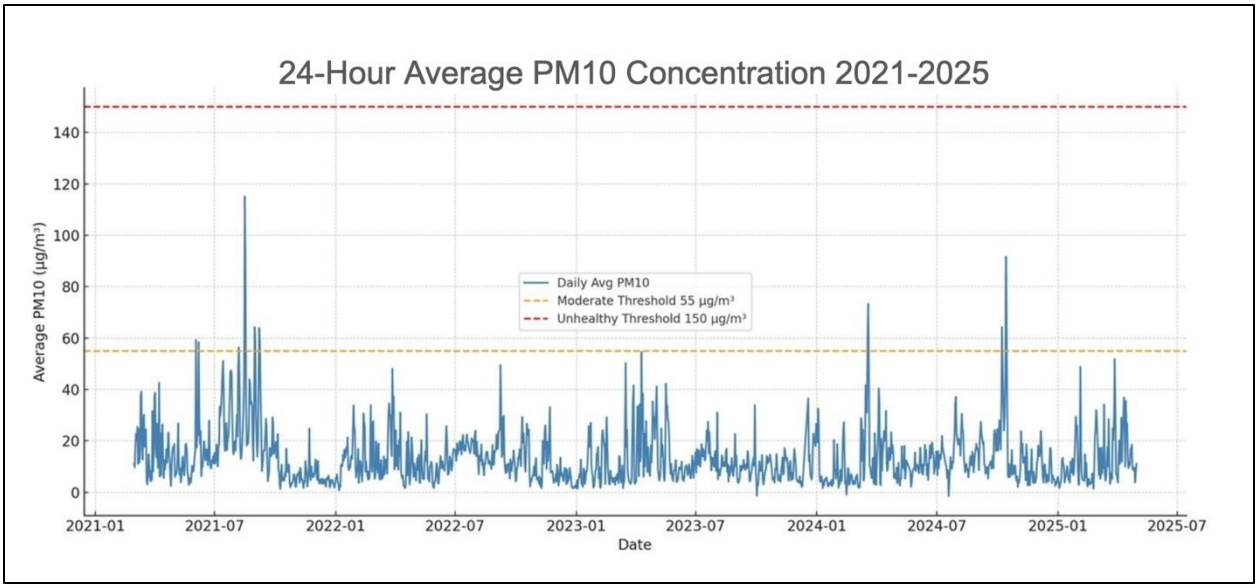


*Figure 5. 24-hour average PM10 concentrations between March 2021 and April 2025. Source: WYDEQ.*

Figure 5 shows that between March 2021 and April 2025, no days exceeded the 24-hour average threshold, which meets the EPA daily and 3-year standards. However, 6 days in 2021, 4 days in 2022, 11 days in 2023, and 8 days in 2024 had single-hour measurements ≥ 150 µg/m³.

While the EPA lists 150 µg/m³ as the 24-hour threshold for unhealthy levels, WYDEQ notes that sensitive individuals should consider reducing prolonged or heavy outdoor activity when PM10 reaches moderate levels of 55 µg/m³. In 2024, 5 days reached moderate PM10 concentrations, whereas 2023 and 2022 had no 24-hour averages ≥ 55 µg/m³. There were 52 days in 2022, 49 days in 2023, and 64 days in 2024 where single-hour measurements exceeded 55 µg/m³.

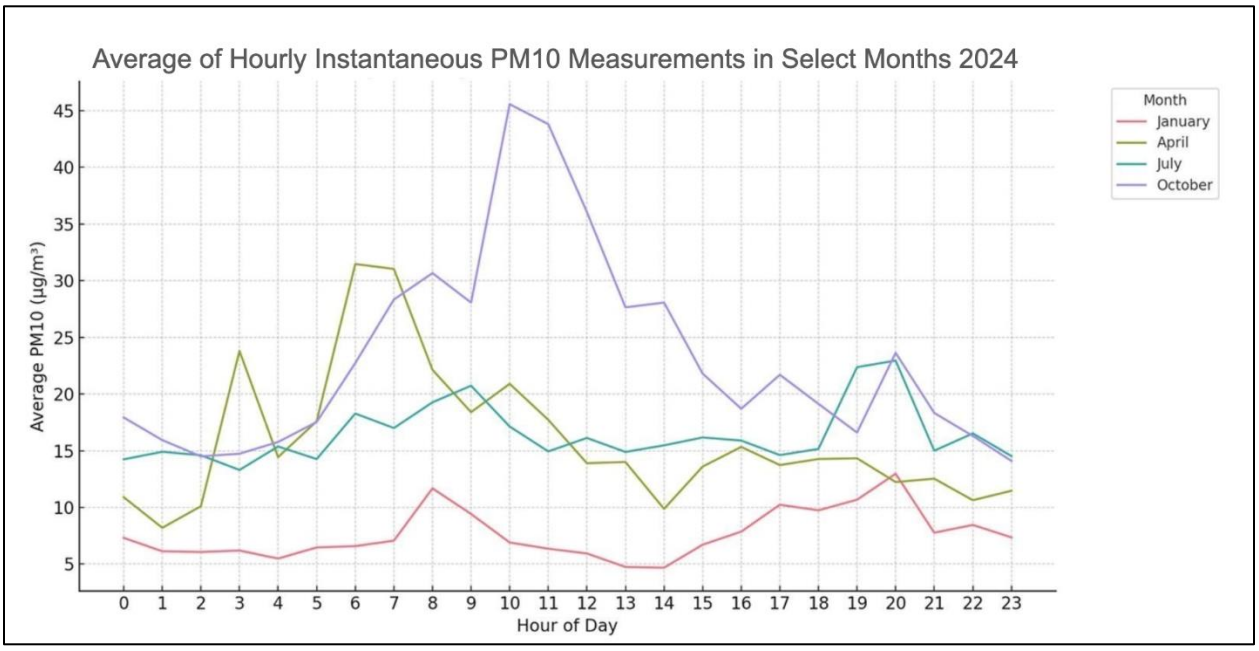


*Figure 6. Average of Hourly Instantaneous PM10 concentrations at each hour of the day in January, April, July, and October of 2024. Source: WYDEQ.*

Figure 6 shows average PM10 concentrations at each hour of the 24-hour day in four months of 2024, each representing a different season. January experienced the lowest concentrations, with small increases from 7 am to 10 am and from 4 pm to 9 pm. The highest concentrations in January were lower than the lowest concentrations in the other months represented. In April, concentrations were highest at 3 am and from 6 am to 7 am. In July, PM10 concentrations were highest at 9 am and between 7 pm and 8 pm. October had the highest concentrations of PM10 of the months depicted, with levels peaking at 10 am and decreasing throughout the day.

**Discussion:**

PM10 concentrations in Jackson were within the desired range from 2021 through 2024, with no annual or 24-hour averages exceeding thresholds. However, there are temporal patterns that highlight potential exposure risks during certain times of day and year. Elevated PM10 levels in the morning and early evening may correspond to vehicle emissions and dust from unpaved

roads during rush hour. In the spring, early morning spikes may also be linked to morning street sweeping, which is essential in Jackson for removing debris and pollutants that accumulate during winter. These elevated concentrations typically occur when fewer humans are outside. Pollen is another potential springtime contributor to springtime PM10 peaks, with pollen counts typically highest in the early morning.

The notable rise in PM10 during October 2024 was driven by wildfire smoke from the Pack Trail Fire. Since previous autumns did not have elevated PM10 concentrations, the 2024 fire contributed to a higher annual average. Although long-term trends indicate that PM10 levels remain well within a healthy range, short-term spikes into the moderate and unhealthy range can pose risks to sensitive individuals.

**Status:** PM10 averages in Jackson are good. Concentrations remained below the annual and 24-hour thresholds.

# Light Pollution

## Night Sky Brightness

Status: Moderate

Trend: ↓

**Overview:** Light pollution disrupts ecosystems by interfering with the natural behaviors of wildlife, specifically those of nocturnal species and migratory birds. It also affects human health by disrupting circadian rhythms, which can contribute to sleep disorders and other health issues.[iv] Light pollution decreases visibility of the Milky Way, limiting access to a desired natural resource.

**Metric:** Magnitude per arc second squared (mag/arcsec²) is a measure of how bright the sky is on an inverse scale; the higher the magnitude, the darker the sky. In this report, it will be referred to simply as magnitude (mag).

**Target:** The target for Jackson is for the Milky Way to be visible at night. This equates to a magnitude of ~21 and higher.

**Summary:**

- The 2022 maximum magnitude in Jackson reached 20.99.
- The 2023 maximum magnitude in Jackson reached 20.50.
- The 2024 maximum magnitude in Jackson reached 20.45.

**Findings:**

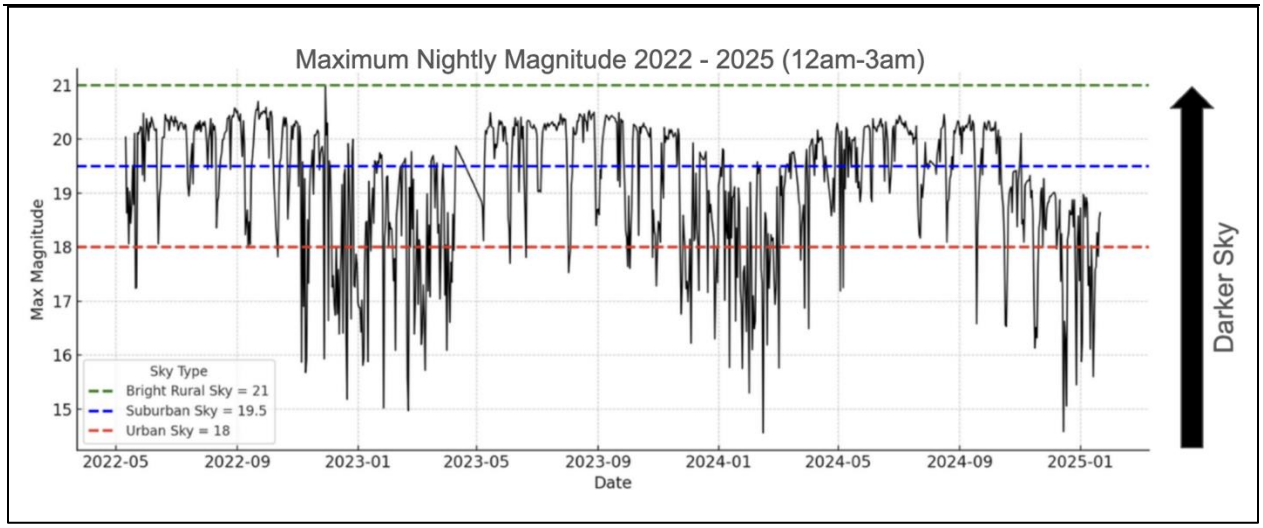


*Figure 7. Maximum nightly magnitude in Jackson from May 2022 – January 2025. The higher the magnitude, the darker the night sky. Source: Wyoming Stargazing.*

Figure 7 shows sky brightness in the Town of Jackson from May 2022 to January 2025, revealing a moderate level of light pollution. The average maximum magnitude in 2024 was 18.98, indicating that the town experienced a sky brightness comparable to a bright suburban sky. On the darkest nights in 2024, the maximum magnitude reached 20.45, which does not meet the target of a semi-rural sky (~21) and the ability to view the Milky Way.

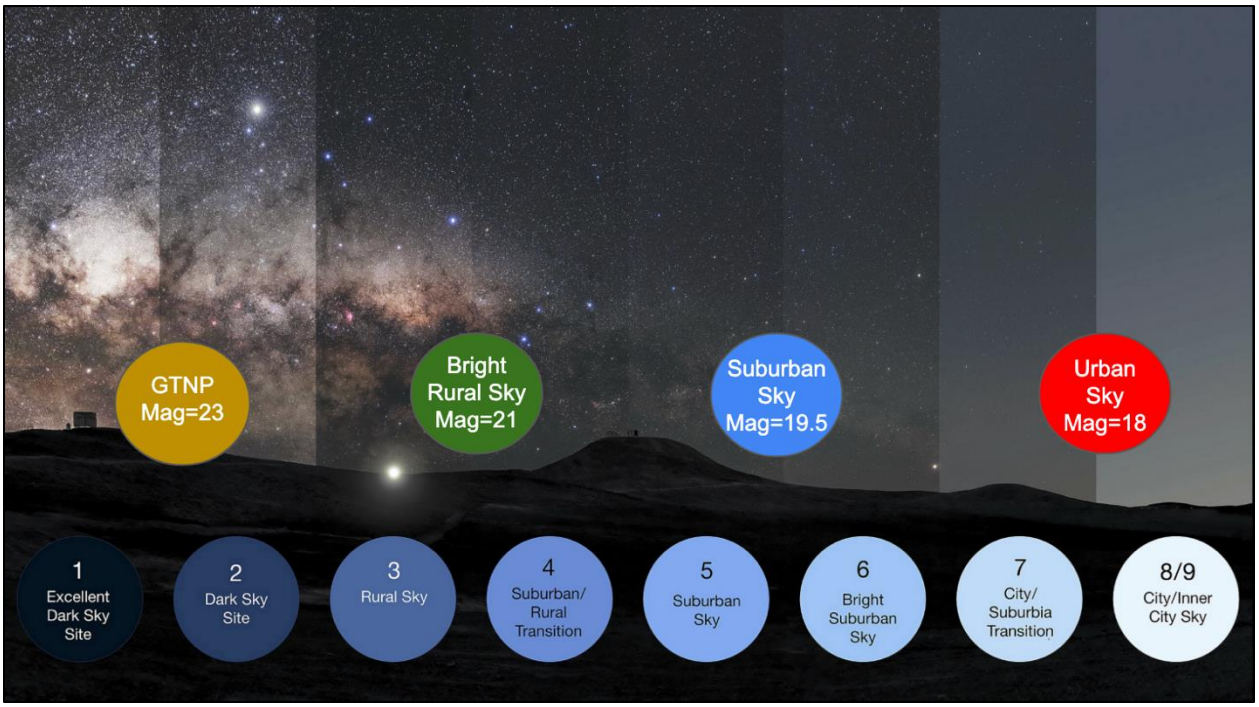


*Figure 8. The Bortle Scale visualized. Bortle, J. E. (2001).*

Figure 8 shows the Bortle scale, which is a qualitative assessment of sky brightness. Rural sky levels of 3-4 correspond to a magnitude of 21, Suburban sky levels of 5-6 correspond to a magnitude of 19.5, and Urban sky levels of 7-8 correspond to a magnitude of 18. The darkest nights in the Town of Jackson measure a magnitude between 20 and 20.5, which corresponds to a 4.5 to 5 on the Bortle scale. The darkest night sky in the Town of Jackson is closest to that of a Suburban Sky.

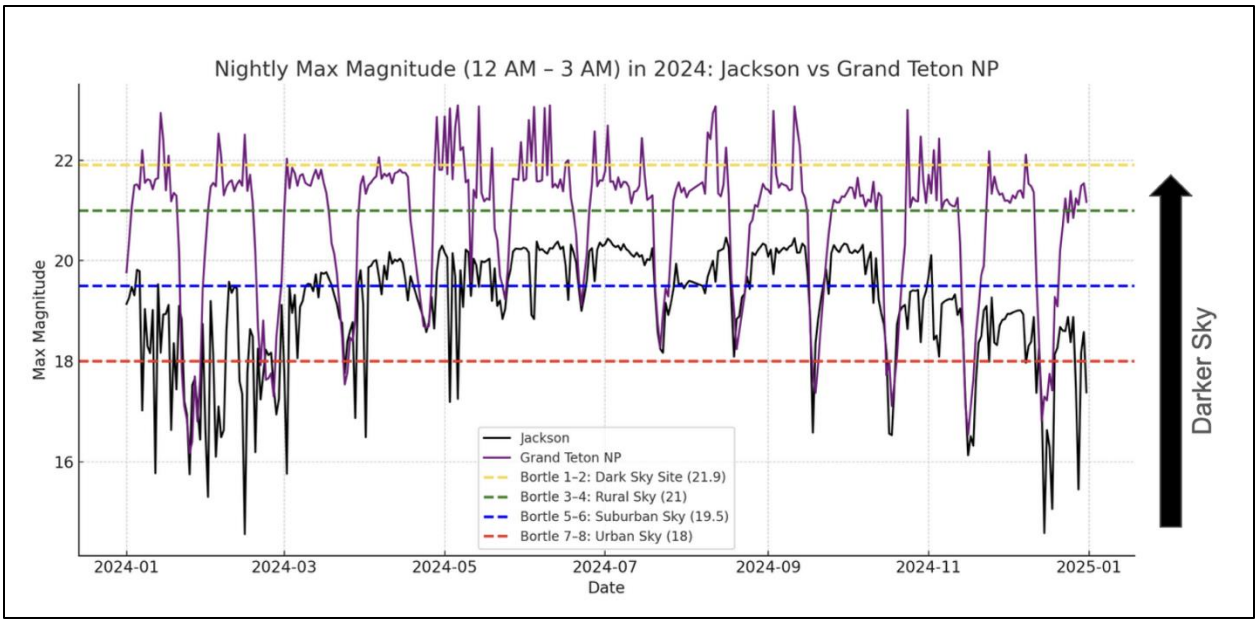


*Figure 9: Max Magnitude in Jackson and Grand Teton National Park (GTNP) in 2024. Source: Wyoming Stargazing and GTNP.*

Monitoring of sky brightness began at the Teton Science Schools Kelly Campus in Grand Teton National Park (GTNP) in 2024. Figure 9 compares the maximum nightly magnitude in GTNP and Jackson for 2024. The nightly maximum magnitude in GTNP was consistently higher than in Jackson and frequently exceeded a magnitude of 21.9, which corresponds to a 1-2 and dark sky site on the Bortle scale. The darkest night in GTNP reached a magnitude of 23.09.

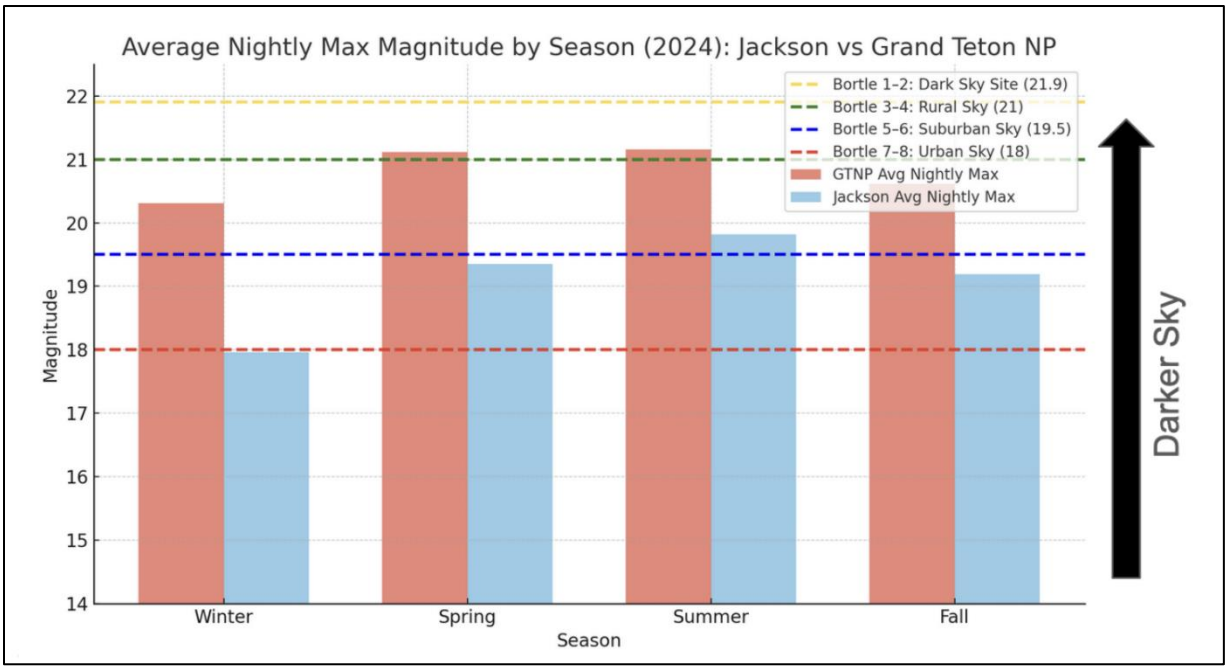


*Figure 10. Average nightly magnitude by season in 2024 for Jackson and GTNP. Source: Wyoming Stargazing and GTNP.*

Figure 10 displays the seasonal averages in Jackson and GTNP. In Jackson, winter has the lowest average maximum magnitude (17.97) and the highest light pollution, while summer has the highest average maximum magnitude (19.82) and is the darkest month. The same is true in GTNP, where the average winter magnitude (20.31) is lower than the average summer magnitude (21.15). The difference in magnitude between Jackson and GTNP is 13.04% in winter, 9.10% in spring, 6.73% in summer, and 7.43% in fall.

**Discussion:**

While Grand Teton National Park often experienced night sky magnitudes above 21, the maximum magnitude in Jackson was below the target at 20.45. The slight downward trend in Jackson's maximum magnitude indicates increasing sky brightness, potentially due to expanded urban and rural development and poor lighting practices.

Both Jackson and GTNP had the highest light pollution in the winter. Cloud cover, snow albedo that reflects moonlight, atmospheric clarity, and the reflection of light in ice crystals in the atmosphere all contribute to increased sky brightness in the winter. However, the difference in sky brightness between the Town of Jackson and GTNP is greater in the winter, indicating that other factors may also be contributing. Holiday lights, winter recreation in town, and reduced tourism activity in the park are potential factors for the seasonal difference.

**Status:** Light Pollution in Jackson is moderate and declining. The darkest nights in Jackson do not reach the target magnitude of 21.

# Water Quality

## Snake River Summer Water Temperature Status: Moderate Trend: ↝

**Overview:** River temperature influences the metabolic rates and life cycles of aquatic organisms, including fish and macroinvertebrates.[v] Temperature changes can affect dissolved oxygen levels, nutrient cycling, and the overall health and diversity of the ecosystem. River temperature is an essential component of ecosystem health and resilience.

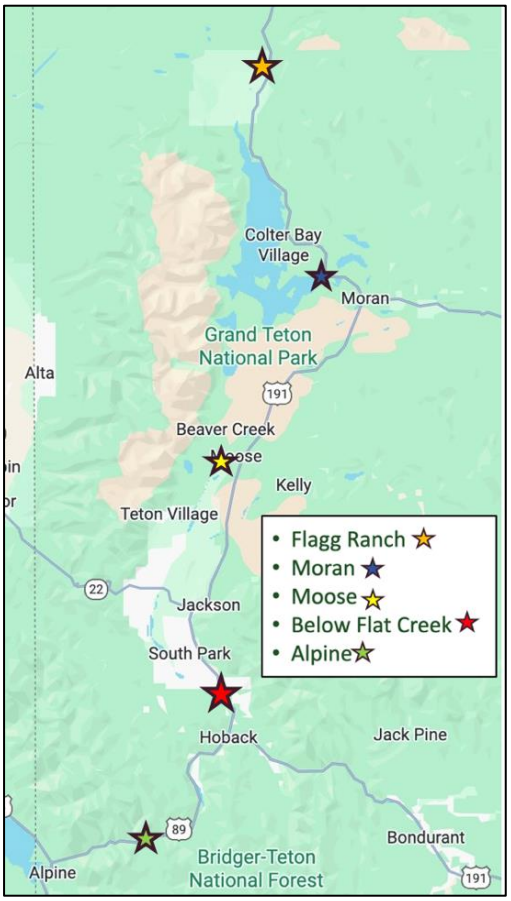


*Figure 11: Map of select water monitoring sites along the Snake River.*

The United States Geological Survey (USGS) tracks temperature along the Snake River to monitor ecosystem health. For this report, three USGS monitoring locations were chosen to compare the Snake River upstream and downstream of Town and County inputs: Moose, Below Flat Creek, and Alpine. The Moose site is located in Grand Teton National Park near Moose, WY. It has fewer human inputs than downstream sites, which makes it a good benchmark to compare with the southern USGS monitoring sites.[vi] The Below Flat Creek site, located near Swinging Bridge, is downstream of Flat Creek, the Town of Jackson, the Wastewater Treatment Plant, and the majority of development in the County. The Alpine location, upstream of the Town of Alpine, is further downstream in the Snake River Canyon and exhibits more stream shading than upstream reaches and also demonstrates influences from the Hoback River.

The Moran site, a USGS testing location near the boat ramp below Jackson Lake Dam, is used for comparison (Figure 15). The water flowing by that site has been released from the dam at depth, where water is typically colder than at the surface. Data from the Moran site are available starting in 2022. The Flagg Ranch USGS testing site is upstream of Jackson Lake and used as a natural comparison to the downstream locations. Data from the Alpine location are available starting in May 2023 and data from the Below Flat Creek location are available starting in May 2022. Data from the Moose location (Figure 14) are available starting in 2013.

**Metric:** Temperature (°F) is measured in three locations along the Snake River from May 1 through October 31.

**Target:** Below 68°F. Grand Teton National Park recommends not fishing when river temperatures **reach and exceed 68°F** for the health of freshwater fish populations.

**Summary:**

- Avg. daily max. summer temperature at Moose in 2022 was 59.1°F with 32 days ≥ 68°F.
- Avg. daily max. summer temperature at Moose in 2023 was 58.2°F with 9 days ≥ 68°F.
- Avg. daily max. summer temperature at Moose in 2024 was 57.7°F with 2 days ≥ 68°F.

**Findings:**

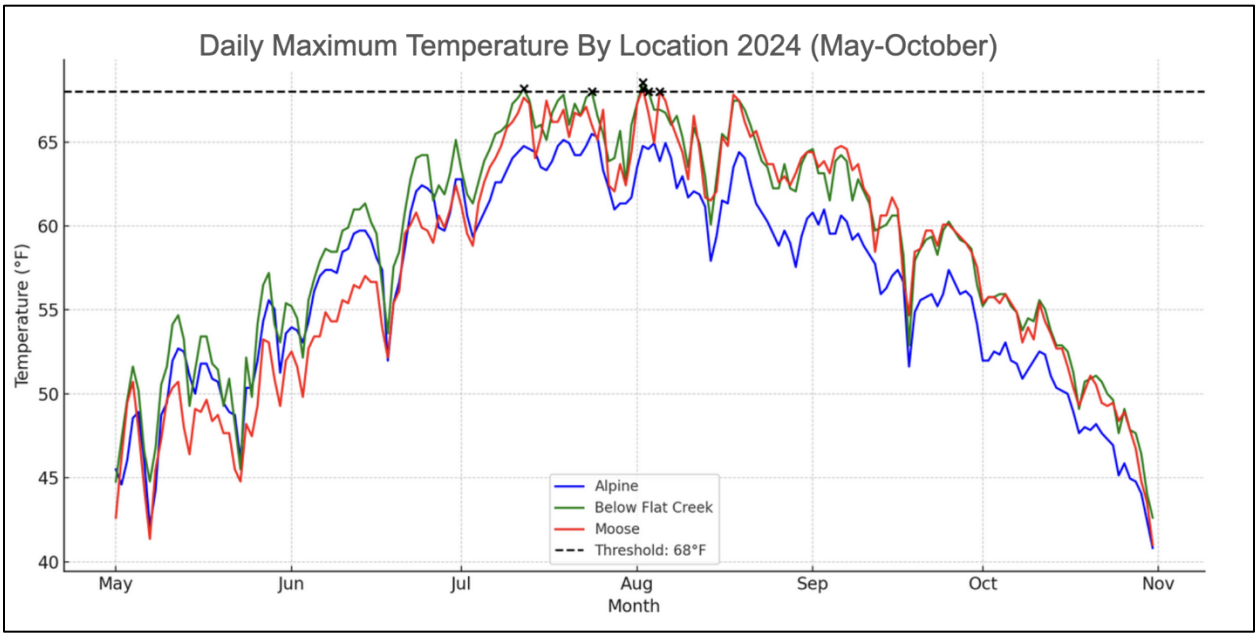


*Figure 12. Daily maximum temperature readings from USGS sites along the Snake River May - October 2024. Measurements are taken hourly. Temperatures ≥ 68°F are marked by an x. Source: USGS.*

Figure 12 displays daily maximum water temperatures at all three locations from May 1 to October 31, 2024. Between May and July, the coldest temperatures occurred at Moose. Beginning in July, Moose and Below Flat Creek consistently recorded higher temperatures than Alpine. Exceedances of 68°F occurred at both Moose and Below Flat Creek, while temperatures near Alpine remained below the threshold throughout the season.

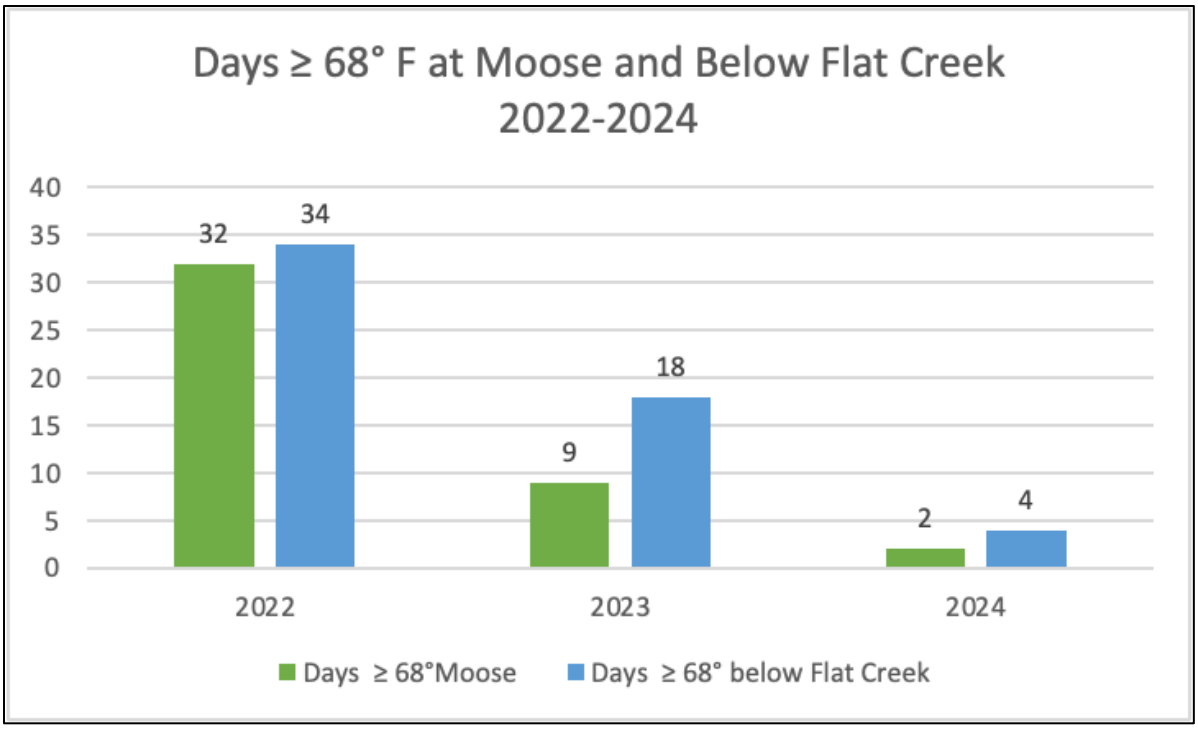


*Figure 13: Number of Days over 68°F at Moose and below Flat Creek 2022, 2024. Source: USGS.*

Figure 13 shows the number of days at the Moose and Below Flat Creek locations that reached or exceeded 68°F over a three-year period. No days reached the threshold at the Alpine location. 2022 had the highest number of exceedances at both Moose and Below Flat Creek. The number of days that daily maximum temperatures reached or exceeded 68°F decreased by 77.8% percent at both the Moose and Below Flat Creek locations between 2023 and 2024. Between the three sites, there were 66 total instances where the daily maximum water temperature reached or exceeded 68°F in 2022, 27 instances in 2023, and 8 instances in 2024.

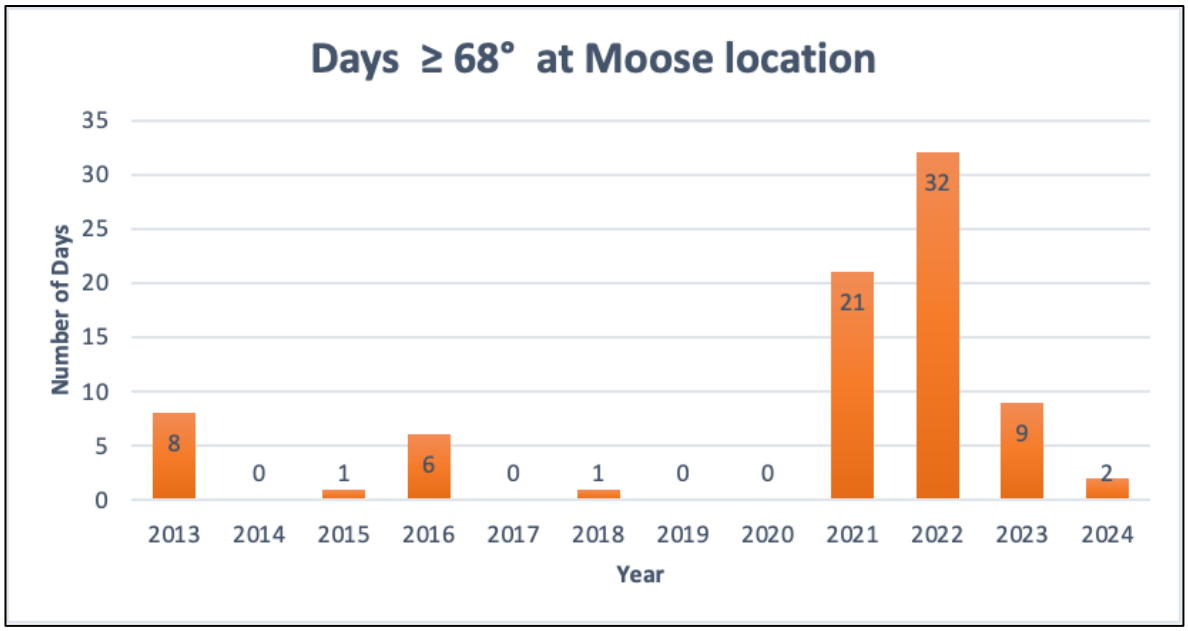


*Figure 14. Number of days the Snake River at Moose water temperature was above critical temperature thresholds (68°F) for fish populations since 2013. Source: USGS.*

Figure 14 shows the number of days with exceedances at the Moose sampling location. Between 2013 and 2020, fewer than 8 days per year had daily maximum temperatures that reached or exceeded 68°F. That number increased to 21 days in 2021 and 32 days in 2022 before decreasing to 9 days in 2023 and 2 days in 2024.

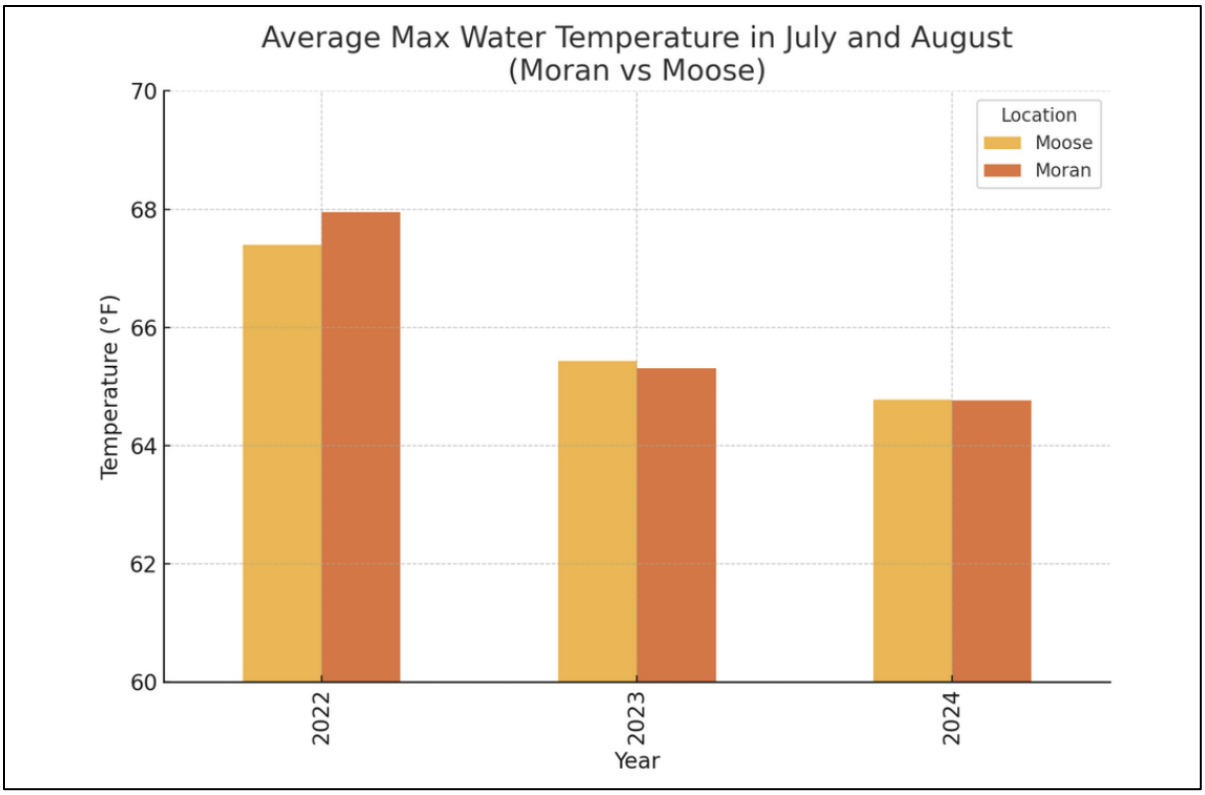


*Figure 15: Average maximum temperature in July and August at Moran and Moose 2022-2024. Source: USGS.*

Figure 15 compares the average daily maximum water temperatures in July and August at the Moran USGS station, which is located by the boat ramp below the Jackson Lake Dam, and Moose, which is twenty-five miles downstream. Average daily high temperatures were higher at both sites in 2022 and have decreased since then. In 2022, temperatures at the Moran station were higher than at Moose. In 2023 and 2024, temperatures at the Moran station were slightly lower than at Moose.

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**Discussion:**

Many natural factors contribute to river temperatures, including daytime high air temperatures, overnight low air temperatures, annual snowpack, speed of snowpack melt, influx from geothermal features and springs, shade, water depth and flow, channel width, and thermal pollution from industry and stormwater runoff. Therefore, water temperature varies throughout the Snake River. Additionally, the Bureau of Reclamation's ability to release water from the dam affects the fullness of Jackson Lake and streamflow, which can impact temperature downstream. Examining temperatures at four sites does not provide a full picture of water temperature in the Snake River. Areas of the river with the highest temperatures may not be represented; likewise, cold-water refugia are also not represented. However, these four sampling locations provide longitudinal data that can be used to observe trends and investigate correlations. Correlation does not equal causation.

Some possible reasons for temperature increase between these locations include changes in water depth, channel width, flow rate, and shade. Additionally, the stretch of the Snake River between the Moose and Below Flat Creek sampling locations receives greater inputs from agriculture, stormwater runoff, and discharge from the wastewater treatment plant, all of which could contribute to higher water temperatures.

Daytime high air temperatures and overnight low temperatures both increased over the observed period, but do not directly correlate with water temperature trends. However, the high number of exceedances in 2021 and 2022 aligns with periods of low lake levels at Jackson Lake Dam, as drought conditions downstream required increased water releases to support agriculture. The water that passes through the dam normally comes from deep water that is colder than surface water, but lower lake levels may have led to increased solar warming of the water released.

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**Status:** Summer water temperatures in the Snake River are moderate. Temperatures exceeded 68°F for fewer than 5 days at Moose and Below Flat Creek in 2024.

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## Snake River Discharge (Streamflow) Status: Good Trend: ↑

**Overview:** Streamflow depends on many variables, including winter snowpack, the timing of snowmelt, rainfall intensity, dam releases from Jackson Lake, and the landscape's capacity to absorb moisture. In Teton County, peak runoff typically occurs between mid-May and mid-June.[vii] A strong flood pulse supports healthy ecosystems by enabling the exchange of nutrients between the river and the floodplain and seed dispersal along riverbanks.[viii] However, excessive flooding can threaten nearby human life and property.

**Metric:** Cubic feet per second (cfs) measures the amount of water passing through a given point per second.

**Target:** Streamflow below Jackson Lake Dam mirrors the natural hydrograph, with Flagg Ranch (above the dam) serving as an unregulated, natural target. The target is a strong spring peak, with a steady and consistent reduction in streamflow throughout the summer season that mimics natural flows.

**Summary:**

- A natural peak streamflow occurs in late May/ early June at Flagg Ranch.
- Streamflow in the Snake River increases downstream.
- Streamflow at the Moose, Below Flat Creek, and Alpine locations model the peak runoff of Flagg Ranch.

**Findings:**

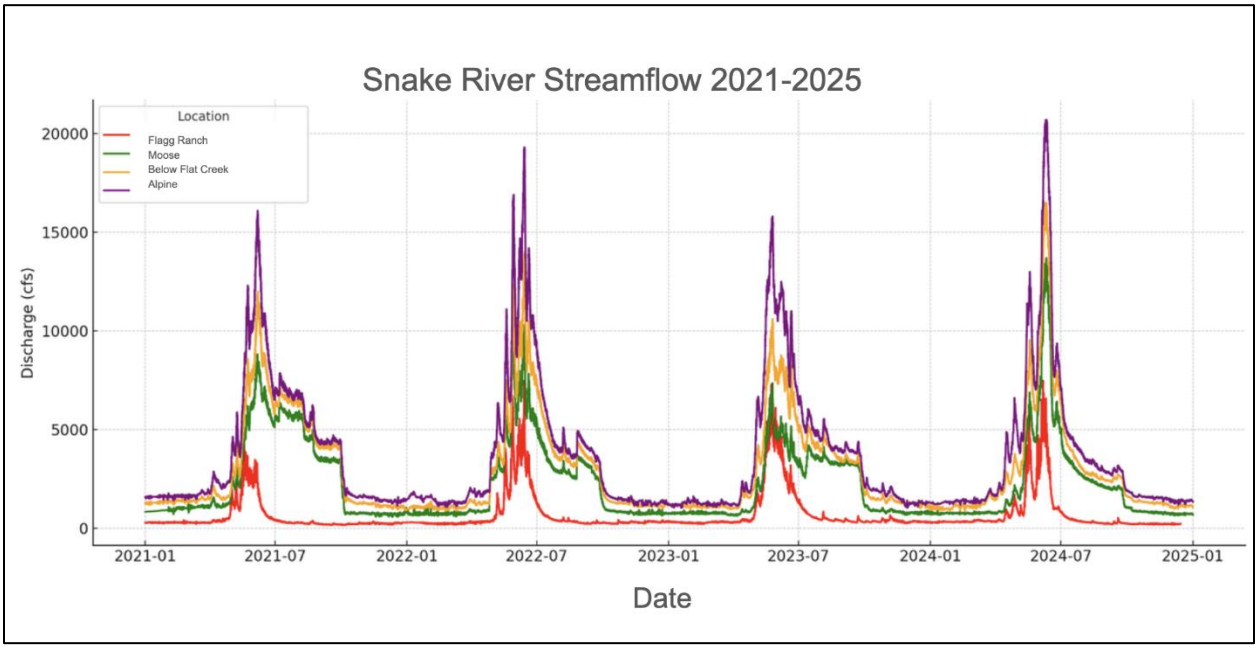


*Figure 16. Streamflow from 2021-2024. The Flagg Ranch location measures natural/unregulated flow, whereas streamflow at the other locations is controlled by the Jackson Lake Dam. Source: USGS.*

Figure 16 shows that the peak runoff occurs simultaneously at all of the locations annually. The period for a high streamflow is much shorter at Flagg Ranch than at the other three locations. The extended high streamflow downstream is the result of operations at Jackson Lake Dam. In 2024, the average annual streamflow was lower at the Moose, Below Flat Creek, and Alpine locations than in 2021. Conversely, the streamflow was 40.8% higher at Flagg Ranch in 2024 than in 2021.

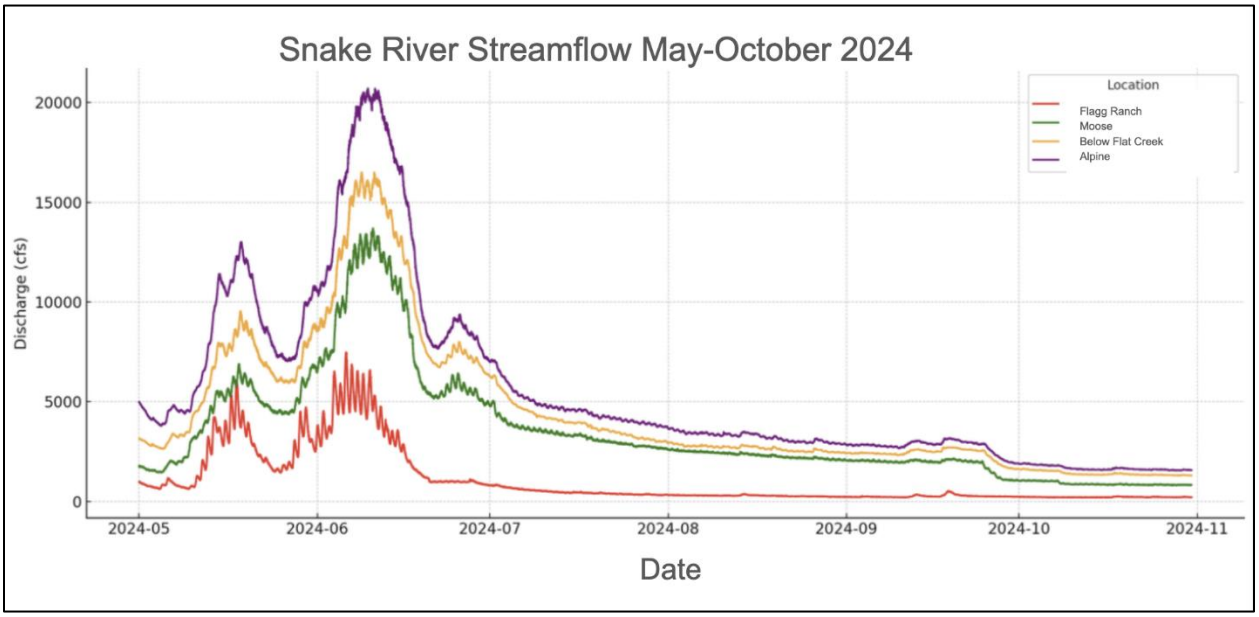


*Figure 17. Summer 2024 discharge at Flagg Ranch and three locations below the dam. Source: USGS.*

Figure 17 displays how the natural river flow at Flagg Ranch had two peak periods throughout the summer of 2024. The other three locations experience a small third increase along with extended elevated discharge rates, revealing the impact of water released at the dam. Peak streamflow in 2024 was 13,700 cfs at the Moose gauge, 16,500cfs at the Below Flat Creek gauge, and 20,700 cfs at the Alpine gauge.

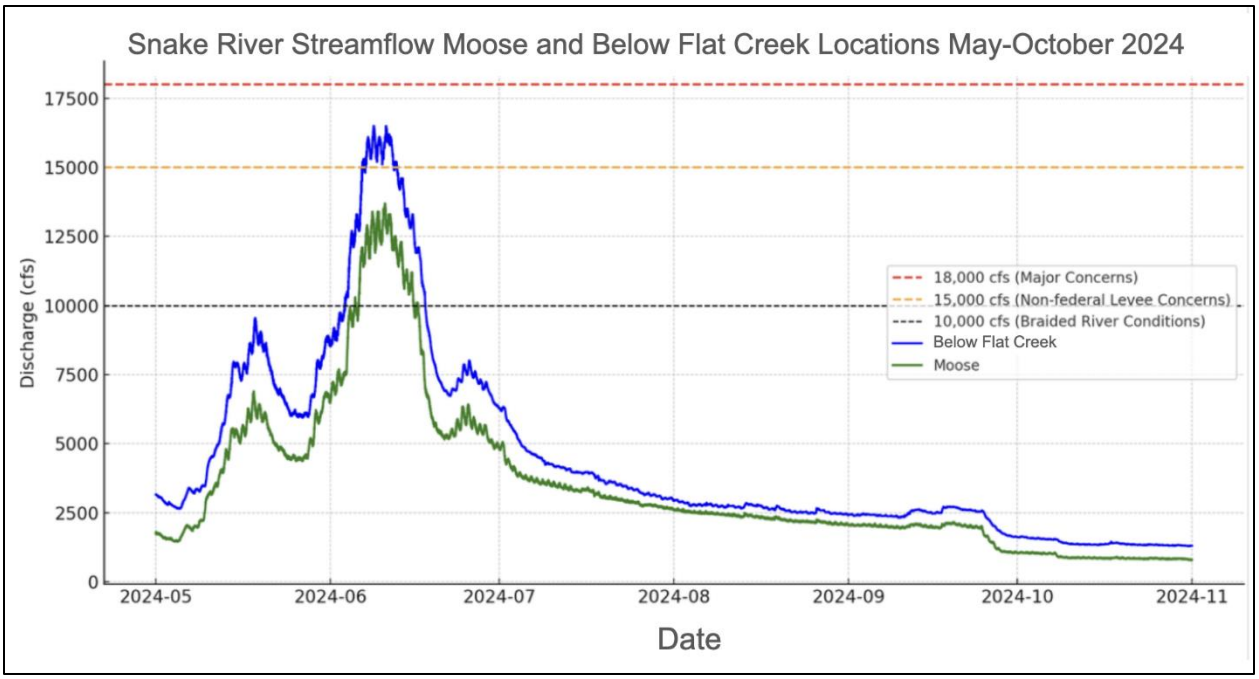


*Figure 18. Summer Discharge at Below Flat Creek and Moose locations with levee damage thresholds. Source: USGS.*

Development along the Snake River floodplain has necessitated the use of levees to constrain the natural flow of the river, mitigate potential flood damage, and protect human life and property. Although periodic "flushes" with high streamflow are crucial for ecosystems, too much discharge can threaten human infrastructure. Additionally, flooding can cause environmental harm if human-made structures are washed into waterways. Figure 18 shows discharge at Moose and Below Flat Creek relative to three thresholds: braided river conditions, non-federal levee concerns, and major levee concerns. The thresholds on the graph indicate how often the levees must be checked and managed to ensure they are stable. In 2024, streamflow exceeded the non-federal levee concern level of 15,000 cfs during peak runoff.

**Discussion:**

Since the Snake River below the Jackson Lake Dam is greatly impacted by human infrastructure and management, a good indicator of ecological health of the river system is if hydrographs downstream are similar to those upstream of the dam. Between 2021 and 2024, the hydrographs of the three downstream sites model that of the Flagg Ranch location during peak runoff season, though they maintain higher flows throughout the summer to support downstream irrigation.

A high peak streamflow is crucial to ecosystems but can negatively impact human infrastructure. Releasing water from the dam allows for an extended period of high discharge rate at downstream locations, which is critical for downstream agricultural irrigation. Downstream locations also receive influxes from tributaries and groundwater, so streamflow should increase

along the Snake River from Flagg Ranch to Alpine. Decreased discharge at downstream locations could indicate greater ecological problems, such as severe drought or excess diversions. Currently, streamflow increases between each downstream location, indicating that influxes from tributaries are reaching the Snake River.

**Status:** Streamflow in the Snake River is considered good because the peak runoff timing at the three downstream locations matches that of the natural flow measured at Flagg ranch.

## Flat Creek Macroinvertebrates

Status: Moderate 🟡 Trend: ↝

**Overview:** Benthic macroinvertebrates are tiny insects that live in streams and play a critical role in the aquatic food web. Some live their entire lives in streams, but many live there only as juveniles and emerge from the water to live their adult lives on land. Some species of macroinvertebrates are sensitive to changes in water quality and stream habitat, such as pollution, water temperature, and sediment loads.[ix] Thus, monitoring macroinvertebrates can reveal a lot about stream health.

**Metric:** "*EPT*" refers to three insect orders that are sensitive to water pollution: Ephemeroptera (mayflies), Plecoptera (caddisflies), and Trichoptera (stoneflies). *Taxa* are defined as taxonomic groups of any rank, such as species, family, or genus. *EPT Taxa Richness* is the total number of distinct taxa of these three major orders of stream insects in a sample.

**Target:** 24 species is the expected EPT Taxa Richness of a healthy local stream (WYDEQ). Cache Creek upstream of the Town of Jackson is the reference for a healthy local stream.

**Summary:**

- EPT Richness in Flat Creek peaked in 1997 at 18 species.
- EPT Richness in Flat Creek was lowest in 2002 at 9 species.
- EPT Richness in Flat Creek in 2024 measured 13.

**Findings:**

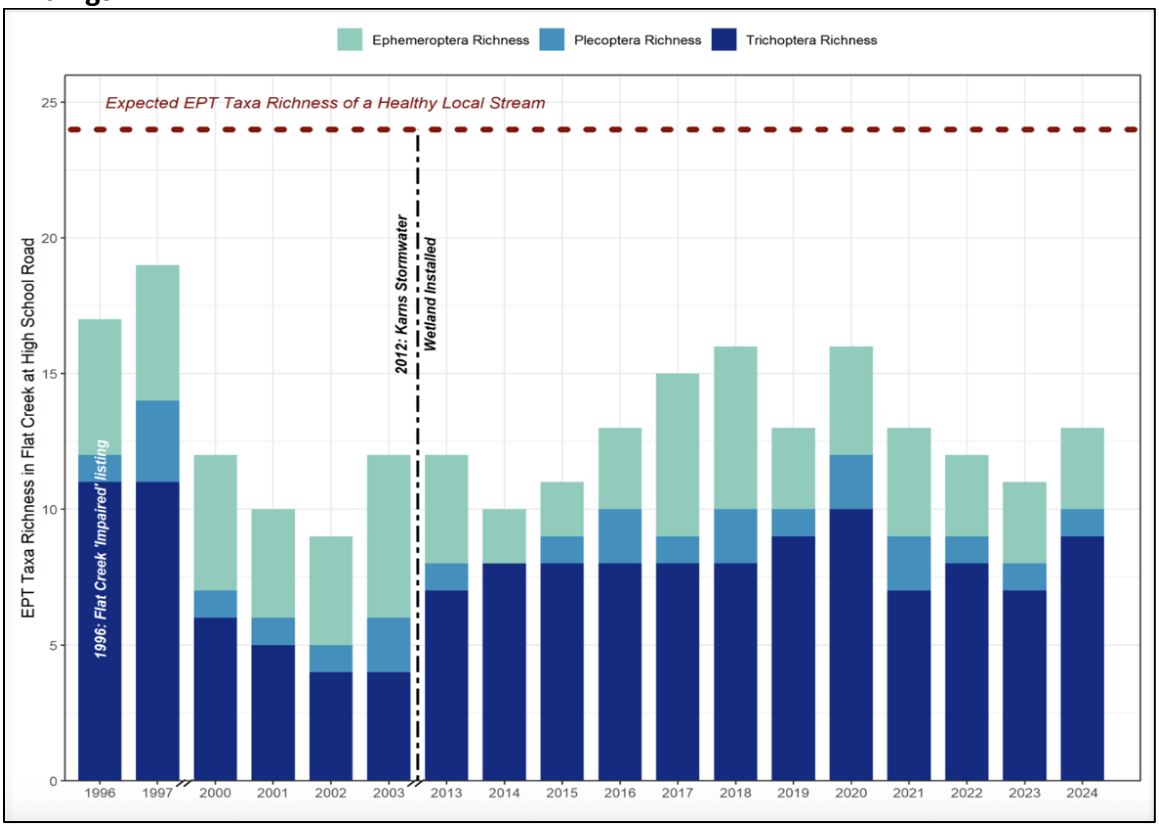

*Figure 19. EPT Richness in Flat Creek at High School Road from 1996 - 2024. Data and visual from Teton Conservation District.*

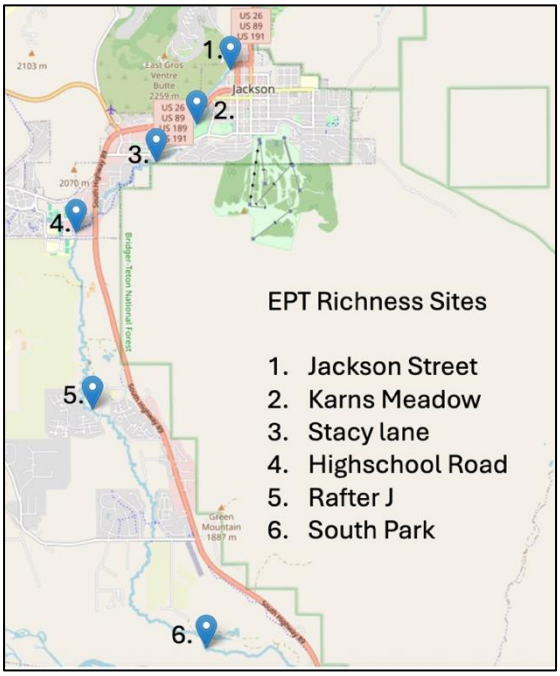


Figure 20: EPT Richness sampling sites.

The Teton Conservation District has sampled macroinvertebrates annually in September in Flat Creek at High School Road since 1996 (Figure 19), and at five additional locations along Flat Creek since 2013 (Figure 20). At the High School Road sampling location, EPT richness was highest in the late 1990s, declined in the early 2000s, and increased after the installation of the Karns Meadow Stormwater Treatment Wetland in 2012. EPT richness declined again between 2021 and 2023 and has never returned to the levels seen in the late 1990s. EPT richness at the other five sites on Flat Creek shows similar trends, though they are not included in this report.

**Discussion:**

Many factors influence EPT richness, and some natural fluctuations should be expected. For example, low streamflow correlates with higher stream temperatures, which could decrease EPT richness. Flat Creek is heavily influenced by human activities, including pollution from illegal dumping and stormwater runoff, and the alteration of the stream bed that occurs when heavy equipment is used to break up frazil ice (anchor ice) to mitigate flooding. The Flat Creek hydrograph is influenced by irrigation diversions that augment stream flows through the Town of Jackson and divert water to agricultural fields at multiple locations upstream and downstream of the High School Road sampling location. These anthropogenic changes to the natural stream flow could also impact EPT richness.

Efforts to reduce and treat stormwater runoff and associated pollution and sedimentation within the Town of Jackson may contribute to increased EPT Richness in the future. Additionally, the Teton Conservation District is working to install two new thaw wells, which should decrease the number of days heavy equipment is needed to break up ice and could lead to an improvement in EPT richness. Continued monitoring of EPT richness can measure changes in stream health after these investments are made to improve water quality in Flat Creek.

**Status:** EPT Richness in Flat Creek is moderate. Species count is above the 2002 low of 9 species but has not reached the target level of 24.

## PFAS Detection

Status: Good

Trend: N/A

**Overview:** PFAS refers to per- and polyfluoroalkyl synthetic chemical substances, also referred to as "forever chemicals". They are found in many consumer and industrial products, including fabrics, food packaging, cosmetics, non-stick pans, and ski wax. PFAS take an extremely long time to break down and can infiltrate water and soils, eventually making their way into food sources and bioaccumulating in fish, wildlife, and humans.[x]

The Town of Jackson contracted with Alder Environmental to conduct PFAS testing at Cache Creek near the trailhead in the Bridger Teton National Forest, Karns Meadow at the stormwater treatment wetlands, and Flat Creek on High School Road on April 16th, June 9th, and July 23rd. These three locations were chosen because the Cache Creek site is upstream of most of the Town's development, the Karns Meadow wetlands collect and treat stormwater runoff from Town of Jackson streets, and Flat Creek at High School Road is downstream of both the wetland stormwater treatment system and most Town inputs. The three dates were selected to collect data that included snowmelt from the piles at the rodeo grounds, peak streamflow, and summer drought conditions.

**Metric:** PFAS is detected through water sampling and is reported in parts per trillion (ppt). **Target:** Ideally, no PFAS should be detected in any of the Town's surface or groundwater. However, extremely small detection amounts have low levels of reliability. The EPA maximum contamination level for drinking water is 4 ppt for PFOA and PFOS, and 10 ppt for several other varieties of PFAS.

**Summary:**

- April testing detected 1 PFAS compound in the Karns Meadow inflow.
- June testing detected 8 PFAS compounds in the Karns Meadow outflow.

**Findings:**

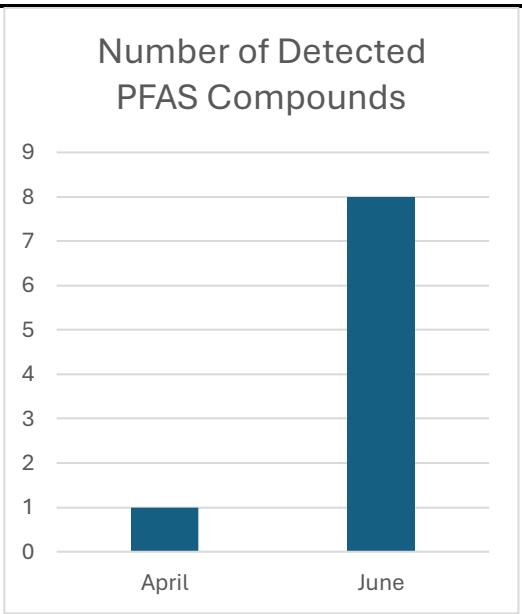


*Figure 21: The number of PFAS compounds detected in Karns Meadow in April (inflow) and June (outflow) of 2025. Source: Alder Environmental.*

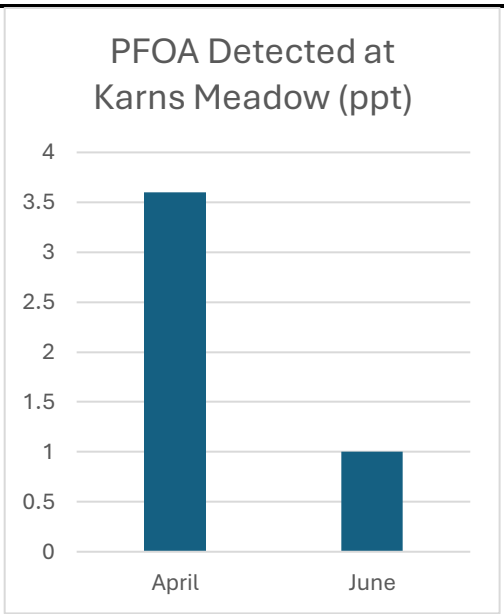


*Figure 22: PFOA in Karns Meadow in April (inflow) and June (outflow) of 2025. Source: Alder Environmental.*

Of the 40 PFAS compounds tested, only PFOA was detected at Karns Meadow in April, and 8 compounds were detected in June. Results from the July sampling are not yet available. 3.6 ppt of PFOA was detected in April in a sample of inflow into the stormwater treatment wetlands. 1.0 ppt of PFOA was detected in June in a sample of outflow from the treatment wetlands.

**Discussion:**

While it is likely that there are low levels of PFAS in Cache Creek and Flat Creek, it is a sign of a healthy ecosystem that levels were too low to be detected by existing sampling methods. However, detections at the Karns Meadow treatment wetlands indicate that PFAS are entering our environment. The decrease in PFAS concentration between the inflow and the outflow suggests that the artificial wetlands provide some treatment of PFAS before they enter Flat Creek. Taking steps now to reduce inputs and treat stormwater runoff will help protect our surface waters and the species that inhabit them. It will also reduce the likelihood of costly cleanups later. A more detailed report by Alder Environmental is forthcoming.

**Status:** PFAS levels are considered good in Jackson, as no compounds were detected in the surface waters tested at Cache Creek and Flat Creek. Although low concentrations of PFAS were detected in samples collected at the inflow and outflow of the stormwater treatment wetlands at Karns Meadow, the levels reported were below the minimum reporting levels. Since data is only available for one year, no trend is established.

# Invasive Species

## Aquatic Invasive Species

Status: Good

Trend: →

**Overview:** Aquatic invasive species threaten native species by outcompeting them for resources and by changing the water chemistry. They can spread when equipment and watercraft are not properly cleaned and dried between bodies of water. Some of the most threatening aquatic invasive species include zebra mussels (*Dreissena polymorpha)* and quagga mussels (*Dreissena bugensis*). Both species are small mussels that originated in Eurasia and have infiltrated waterways in 48 U.S states. They cause fisheries to collapse, impair water quality, damage boats and infrastructure, and are hazardous to swimmers. Zebra and Quagga.[xi] Watercraft inspections are a critical prevention mechanism to ensure aquatic invasive species do not enter local waterways. The number of annual watercraft inspections is a performance measure for aquatic ecosystem health.

**Metric:** The number of annual watercraft inspections and mussel-fouled vessels indicates efforts to keep invasive mussels out of regional waterways.

**Target:** No zebra or quagga mussels are detected in Teton County waterways.

**Summary:**

- No zebra or quagga mussels have infiltrated Teton County waterways.
- In 2024, invasive mussels were detected on two watercrafts during inspection.
- The New Zealand mud snail is the only invasive species currently in waterways.

**Findings:**

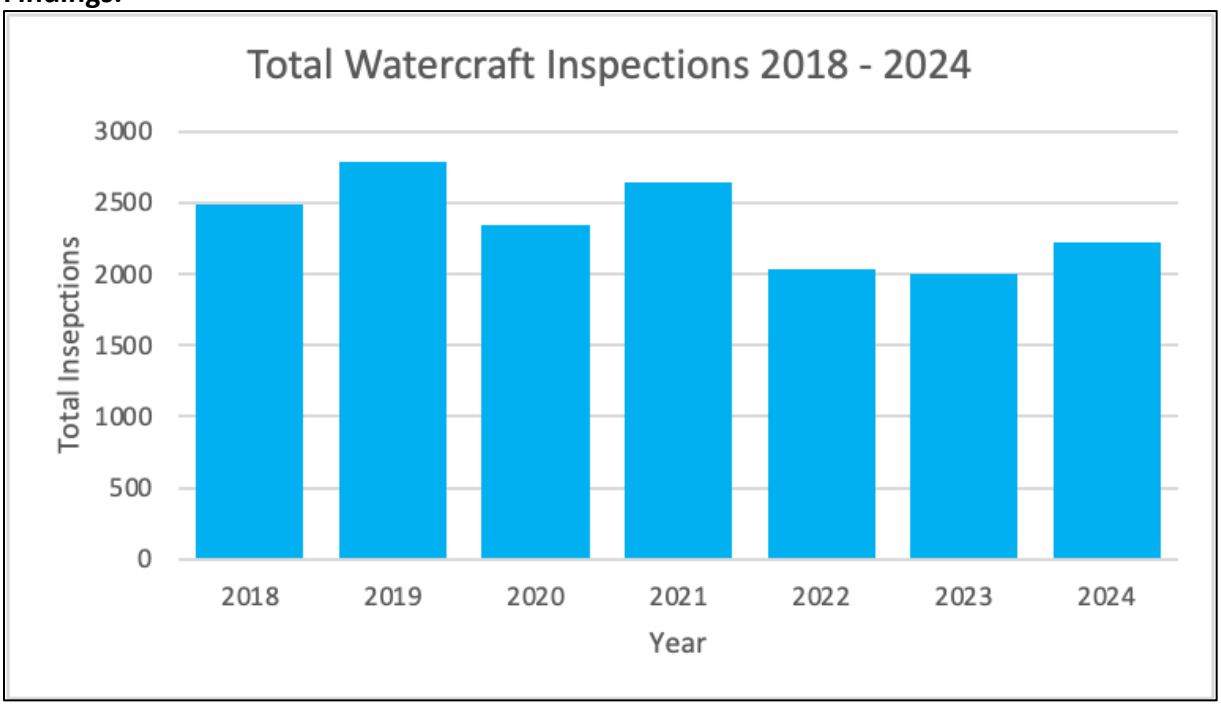


*Figure 23: The total number of watercraft vehicles inspected for aquatic invasive species before entering regional waterways from 2018 – 2024. Source: Wyoming Game and Fish Department (WGFD).*

Figure 23 shows the number of watercraft inspections that have occurred each year starting in 2018. Inspection rates peaked in 2019 with 2487 inspections. In 2024, 2226 vessels were inspected before entering local waterways.

## Inspected Watercrafts with Invasive Mussels Attached

| Year | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 | 2024 |
|---|---|---|---|---|---|---|---|
| Mussel-Fouled Watercraft | 0 | 0 | 1 | 2 | 1 | 0 | 2 |

*Figure 24: The number of inspected watercrafts on which invasive mussels were attached from 2018 – 2024. Source: WGFD.*

Figure 24 lists the number of vessels on which an invasive mussel was detected during inspection. The first detection year since data have been collected was 2020. There were two detections in 2024, which is the maximum number of mussel-fouled vessels in a single year.

**Discussion:**

Overall, watercraft inspections have effectively prevented invasive zebra and quagga mussels from entering Teton County waterways. Currently, The New Zealand mud snail is the only aquatic invasive that has infiltrated waterways in Teton County. Like the mussels, they outcompete native snails and alter water chemistry. These snails were first introduced by watercraft and fishing gear and were then transported downstream. New Zealand mud snails cannot be removed by native species, as they are not digestible and therefore not a viable food source

(WGFD)[xii]. Populations of New Zealand mud snails have been present in Polecat Creek and the Snake River at Flagg Ranch since at least 2000 (WGFD). Their spread appears to be limited.

**Status explanation:** Aquatic invasive species are considered good because zebra and quagga mussels have not been detected in local waterways.

## Spread of Invasive Plant Species Status: Moderate Trend: ↓

**Overview:** Invasive species outcompete native species that provide critical ecosystem services and wildlife habitat. They also harm soil, and drier species can exacerbate the spread of wildfires.[xiii] Common invasive plants in the Jackson region include Canada thistle, musk thistle, houndstongue, spotted knapweed, and cheatgrass, among others.[xiv] Total acres treated and the percentage of impacted acreage treated are key performance indicators for measuring efforts to reduce infestation and restore native habitats.

**Metric:** Acres impacted by invasive species each year.

**Target:** Fewer than **12,000 acres are affected** by invasive species annually.

**Summary:**

- 2012 had the most acres impacted: 18416.78.
- 2015 had the fewest acres impacted: 11930.3.
- In 2023, 13336 acres were impacted, and 299.61 acres (2.25%) were treated.

**Findings:**

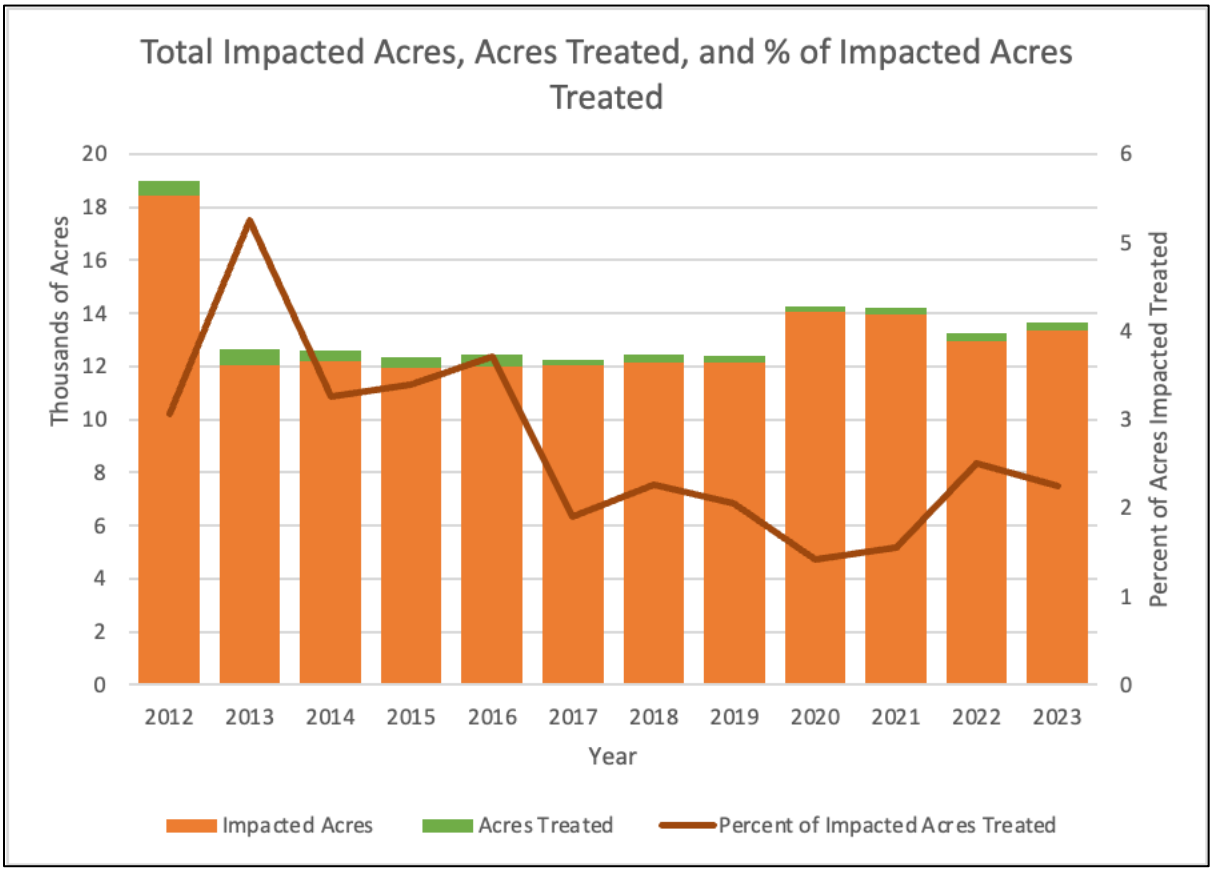


*Figure 25: Total acres impacted by invasive species, total acres treated, and the percent of the impacted acreage treated each year 2012-2023. Source: Teton County Weed & Pest (TCWP).*

Figure 25 shows the annual acres of land affected by invasive species. The affected acreage peaked in 2012, then remained relatively stable from 2013 through 2019. Beginning in 2020, there was a slight increase in impacted acreage, followed by a decline in 2022, and a slight increase in 2023. In 2023, the impacted acreage was 11% higher than the 12,000 target.

Figure 25 also displays the percentage of impacted acres treated each year. The highest treatment coverage occurred in 2013, when 5.24% of impacted land was addressed following the peak spread in 2012. After 2013, the percentage treated gradually decreased until 2020. Although treatment efforts rose slightly in 2021 and 2022, they decreased again in 2023. Data for 2024 is not yet available.

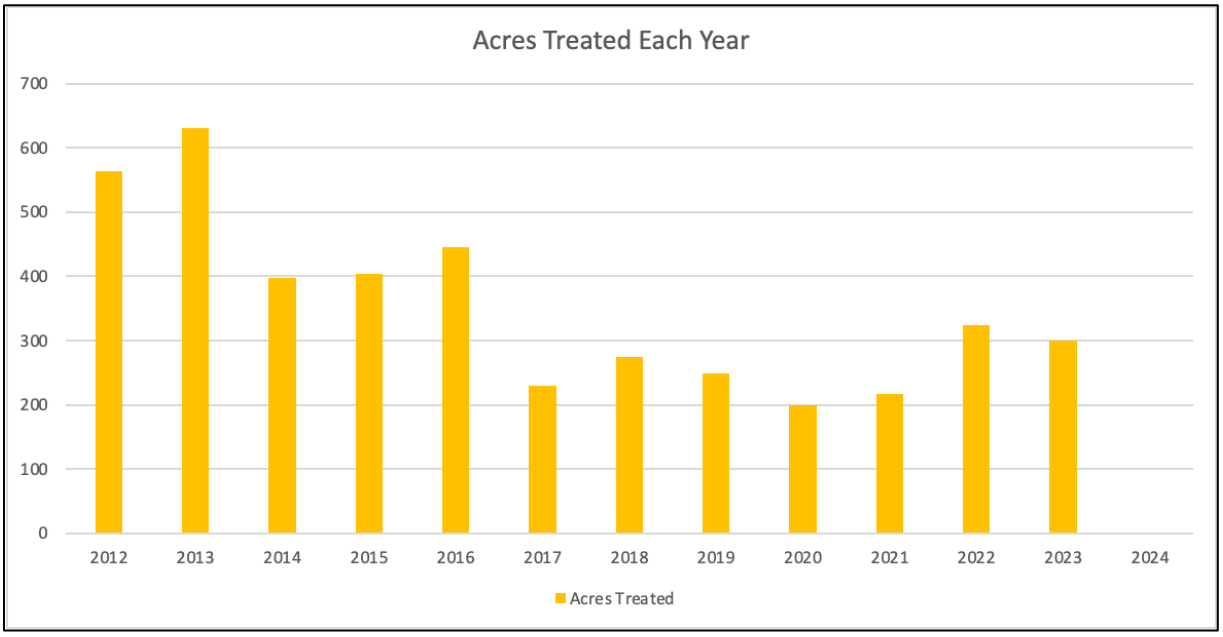


*Figure 26: Acres treated for invasive species each year 2012 – 2023. Source: TCWP.*

**Analysis:** Figure 26 shows the total number of acres treated for invasive species over 11 years. Treatment efforts peaked in 2013 and then steadily declined through 2020. From 2021 to 2022, treatment efforts rebounded slightly before declining again in 2023. While treatment levels initially responded strongly after 2012, they did not maintain early peak levels in subsequent years. Data for 2024 is not yet available.

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**Discussion:** Impacted acreage hovered near the 12,000-acre target from 2013-2019 and has exceeded it every year since. Stronger control efforts may be needed to reverse this trend. Possible methods for reducing impacted acreage include early detection and rapid response to new infestations, increased treatment coverage, improved monitoring, and restoration with native vegetation. However, acreage could increase due to factors such as reduced funding or

treatment capacity, prolonged drought creating favorable conditions for invasive plants, soil disturbances from development, and lack of coordination among landowners.

Invasive plant removal efforts are led by Teton County Weed and Pest, private landowners, and small volunteer groups led by the Jackson Hole Land Trust, Jackson Hole Wildlife Foundation, Teton Conservation District, and other organizations. It is important to note that while a higher percentage treated can indicate effective management, it may also correspond to higher prevalence levels. Therefore, tracking both impacted acreage and treatment coverage annually is necessary to accurately evaluate ecosystem health.

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**Status:** The spread of invasive species received a moderate score because the acres impacted in 2023 were between 12,000-15,000.

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# Wildlife

## Fencing Modified or Removed

Status: Moderate

Trend: ↑

**Overview:** Fencing is a crucial component of many ranches and farms, but it can interfere with wildlife movements, habitats, and behavior.[xv] Some fences remain on landscapes long after their original purpose has expired and can be removed to restore habitat connectivity and reduce wildlife injuries. Fencing that still serves a purpose can be modified to limit negative impacts on wildlife. Tracking annual miles of fencing removed or modified, along with total cumulative removals, can reveal new and restored wildlife movement corridors.

**Metric:** The miles of fencing modified removed inside and outside of Teton county annually.

**Target:** Fencing no longer interferes with critical wildlife corridors.

**Summary:**

- Tracking of fencing inside Teton County began in 2012 with 7.42 miles.
- Tracking of fencing outside of Teton County began in 2018 with 15.68 miles.
- In 2024, 27.48 miles of fencing were improved or removed.

**Findings:**

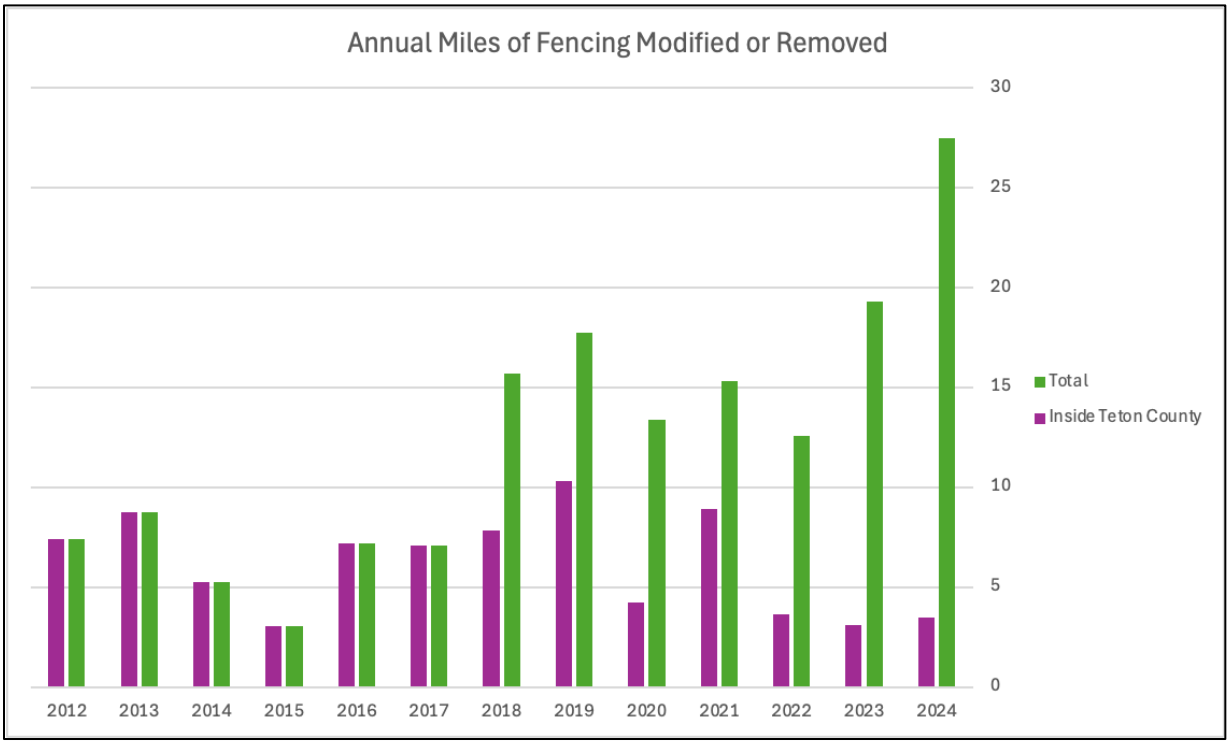


*Figure 27: Miles of fencing modified or removed each year in Teton County and in total (Teton County, Sublette County, areas outside Teton and Sublette County, and for Sage Grouse) between 2012-2024. Source: Jackson Hole Wildlife Foundation (JHWF).*

Figure 27 shows the miles of fencing that were removed or improved for wildlife each year between 2012 and 2024. Fence improvement efforts in Teton County peaked in 2019 and 2021 and have decreased over the past three years. The total miles of fencing removed or improved in Teton County and surrounding areas, including Sublette County, in sage grouse habitat, and other areas outside of Teton County, have increased. For the past three years, more fencing improvement projects have taken place outside of Teton County than within it. Data collection outside of Teton County began in 2018 and only includes projects supported by the Jackson Hole Wildlife Foundation.

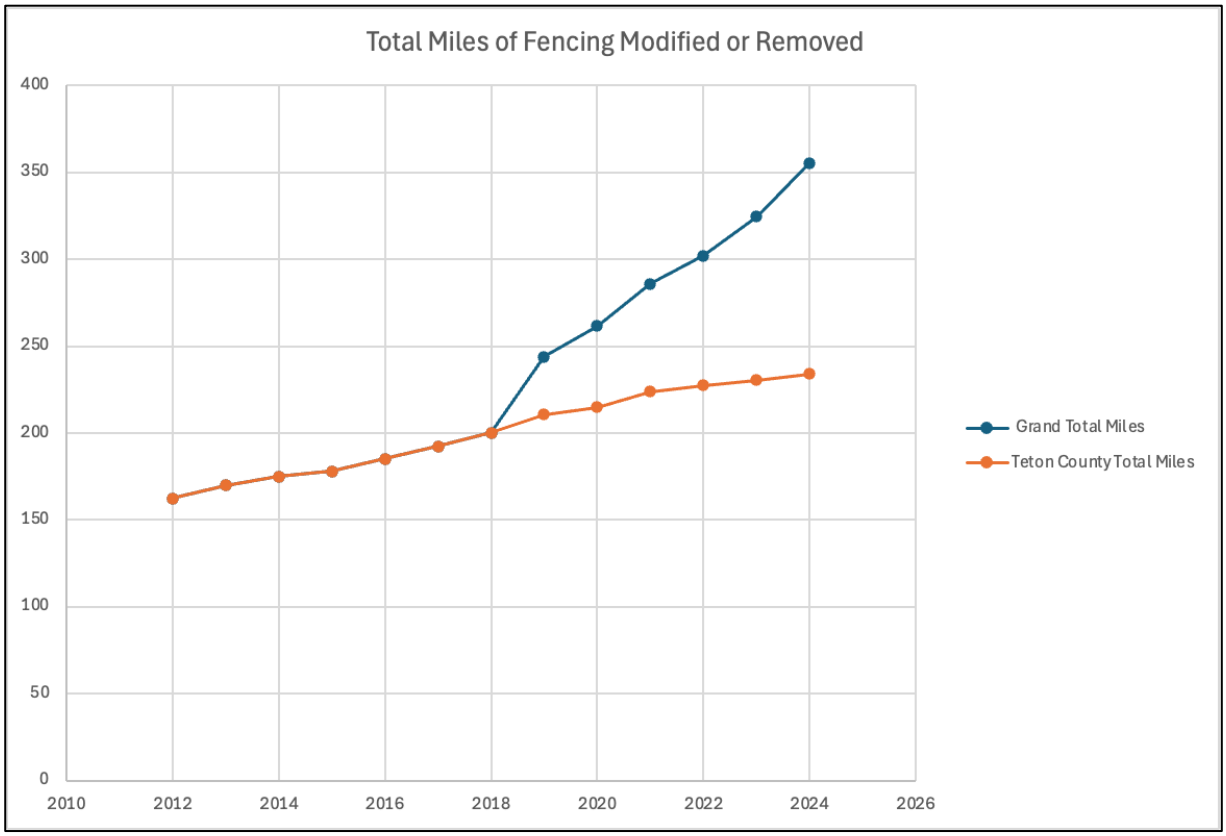


*Figure 28: Total miles of fencing that has been modified or removed from Teton County and in total (Teton County, Sublette County, areas outside Teton and Sublette County, and for Sage Grouse) from 2012 to 2024. Source: JHWF.*

Figure 28 displays the cumulative miles of fencing modified or removed beginning in 2012 within Teton County and in 2018 in the greater region. Data collection from within the county had a baseline of 162 miles in 2012. Since 2012, the total miles of fencing removed or improved increased by 118.9% and miles in Teton County increased by 44%. In 2024, the total miles of fencing removed or improved increased by 9.5%, while the miles in Teton County increased by 1.5%.

**Discussion:** The number of miles of fencing improved or removed within Teton County each year has decreased since 2021, but this trend does not indicate worsening ecosystem health. Instead, it may indicate that fencing in crucial wildlife habitat has already been removed or improved, that remaining fencing is in areas that are difficult to access, or that removal of fencing in critical habitat outside of Teton County is a higher priority. Fencing improvements outside of Teton County are critical for maintaining healthy wildlife populations, as species migration patterns extend beyond county lines and the health of our local ungulate herds depends on their ability to migrate to and from winter range.

The total miles of fencing improved or removed cannot be used to determine the total miles of fencing remaining. To use this data most effectively, GIS data on the miles of fencing that currently exist in Teton County and in wildlife corridors would be required.

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**Status**: Fencing improved or removed received an overall score of "Moderate". The efforts of nonprofit organizations and volunteers to remove or improve more than 350 miles of fencing is commendable. However, fencing that impedes movement in critical wildlife corridors remains in the ecosystem.

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## Human-Wildlife Conflicts

Status: Poor 🔴 Trend: ↓

**Overview:** Human-wildlife conflicts are encounters that lead to physical harm, property damage, or loss of property or livelihood. Human-bear conflicts often result in the bear being trapped, relocated, or euthanized. Unsecured trash is the leading cause of human-bear conflicts in Teton County. Fruit trees, bird feeders, and agricultural activities such as chicken coops and apiaries are also frequent sources of conflicts.[xvi] The number of conflicts does not directly correlate to a healthy ecosystem or desired population numbers. However, monitoring human-bear conflicts helps gauge the effectiveness of wildlife feeding regulations and the transition to bear-resistant trash bins.

**Metric:** The number of conflicts between humans and grizzly bears and black bears each year.

**Target:** Fewer than 50 total bear conflicts annually in the Jackson District and Grand Teton National Park.

**Summary:**

- Since 2017, the highest number of black bear conflicts was in 2024 at 164.
- Since 2017, the highest number of grizzly bear conflicts was in 2021 at 66.
- In 2024, there were 164 black bear conflicts and 22 grizzly bear conflicts.

**Findings:**

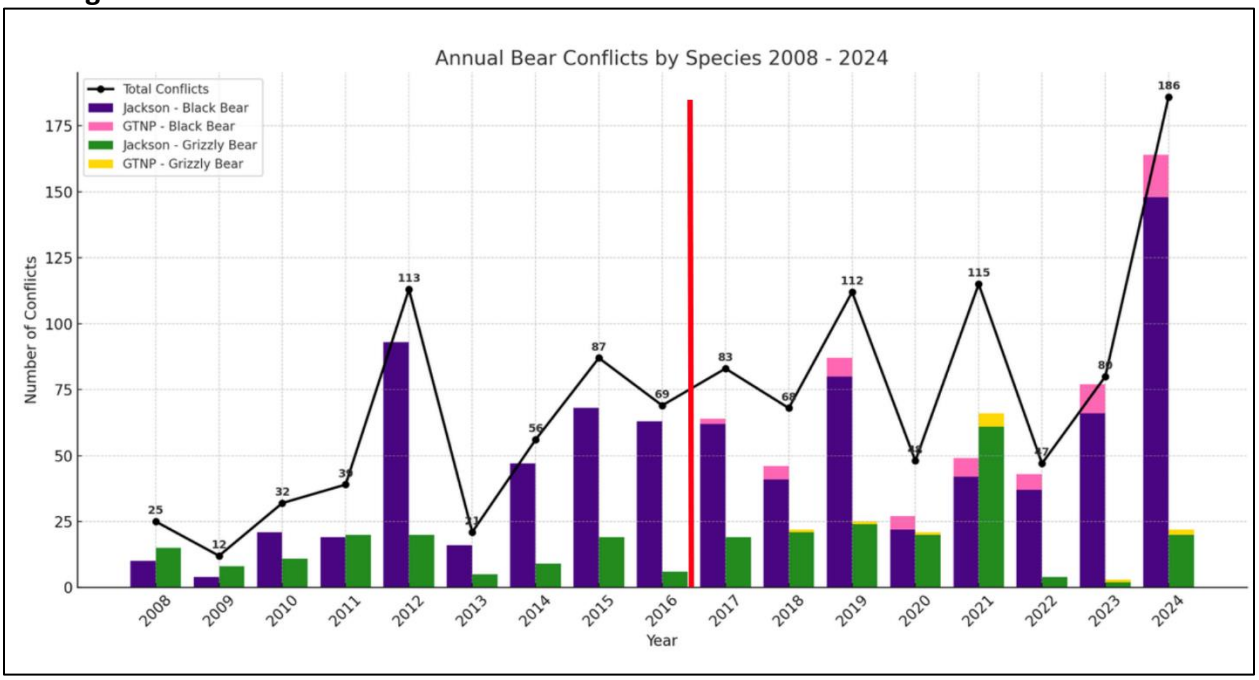


*Figure 28: The number of black bear and grizzly bear conflicts in the Jackson district, 2008-2024, and Grand Teton National Park (GTNP), 2017-2024. Source: GTNP and WGFD.*

Figure 28 displays the number of bear conflicts in the Jackson district outside of GTNP, the number of numbers within the park, and the total annual number of conflicts. Data from GTNP begins in 2017. The number of conflicts has fluctuated annually for both species. Black bear conflicts exceeded grizzly bear conflicts every year with the exception of 2021.

Between 2023 and 2024, the Jackson district experienced an increase from 68 conflicts to 168 conflicts. While black bear conflicts increased in 2024 to their highest point since 2008, grizzly bear conflicts have decreased since they peaked in 2021.

In 2024, only two conflicts occurred in the Town of Jackson, and both resulted from out-of-compliance trash cans. 166 conflicts occurred in the Jackson District in 2024 outside of GTNP and the Town of Jackson, with the majority of conflicts taking place on the West Bank. 127 conflicts resulted from trash, and 12 resulted from pet, livestock, and bird feed encounters. As a result of these conflicts, 18 bears were captured and 7 were euthanized. [xvii]

## Bear Conflicts in Grand Teton National Park

| Year | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 | 2024 |
|---|---|---|---|---|---|---|---|---|
| Black Bear Conflicts | 2 | 5 | 7 | 5 | 7 | 6 | 11 | 16 |
| Grizzly Bear Conflicts | 0 | 1 | 1 | 1 | 5 | 0 | 1 | 2 |
| Total Conflicts | 2 | 5 | 8 | 6 | 12 | 6 | 12 | 18 |

*Figure 29: The number of black bears, grizzly bear, and total conflicts in GTNP and the John D. Rockefeller Memorial Parkway each year, 2017-2024. Source: GTNP.*

Figure 29 shows only the number of human-bear conflicts inside Grand Teton National Park. With 16 black bear conflicts and 2 grizzly bear conflicts, total conflicts in 2024 were the highest reported since 2017. Human food and trash caused 12 of the black bear conflicts (75%). Three black bear conflicts resulted in property damage, and only one involved a direct human encounter. One grizzly bear conflict resulted in property damage, while the other caused human injury. [xviii]

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**Discussion:** In 2024 there were 186 total bear conflicts in the Jackson District and Grand Teton National Park, which is far above the target of 50 annual conflicts. One explanation for annual fluctuations is changes in natural feed availability, which can drive bears to seek out human food sources. Anthropogenic reasons for increased conflict include insufficient trash, food, crop, and livestock security. Increasing compliance with Town and County regulations along with visitor education may help mitigate the number of conflicts. Conflict data should be tracked over time

so that the leading natural and human causes of annual conflicts can be identified and addressed through policy and education.

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**Status**: Human-wildlife conflicts received an overall score of “Poor”. While there were only 18 conflicts in GTNP and 2 in the Town of Jackson, there were a total of 186 conflicts, which exceeds the moderate threshold of 100 conflicts.

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## Spread of Wildlife Disease

Status: Moderate

Trend: ↓

**Overview:** Chronic Wasting Disease (CWD) is a neurological disease that attacks large mammals and is eventually fatal. It is spread through prions, which can be transmitted through contact, environmental contamination, and movement of infected individuals. Additionally, it is spread when hunted animals are brought to new environments and disposed of improperly.[xix] CWD was first detected in Teton County in a mule deer in 2018. The first detection in an elk in Teton County occurred in December 2020, in Grand Teton National Park. The total count of infected deer, elk, and moose in the state of Wyoming provides insight into the prevalence and potential for further spread into Teton County through species migration and interactions.

**Metric:** Number of infected individuals each year.

**Target:** ≤1% of tested animals are CWD positive.

**Summary:**

- In 2024, 12.83% of animals tested were CWD-positive in the state of Wyoming.
- In 2024, 0.52% of elk tested were CWD-positive in hunt areas in Teton County.
- In 2024, 8.33% of deer tested were CWD-positive in hunt areas in Teton County.

**Findings:**

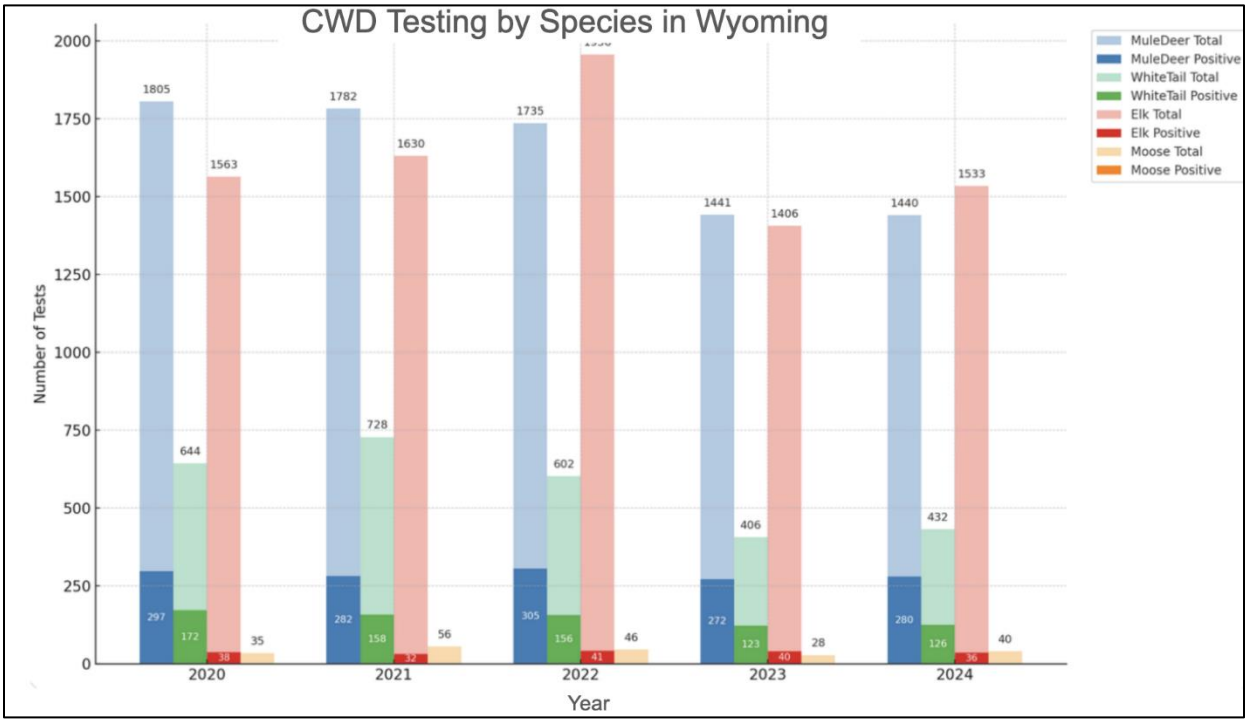


*Figure 30: Total number of each species tested and positive for CWD in Wyoming each year from 2020 - 2024. Source: WGFD.*

Figure 30 displays annual testing for mule deer, white tailed deer, elk, and moose in Wyoming 2021-2024. Mule deer and elk consistently had the largest sample sizes, while only around 40 moose were tested each year. The highest number of detections was in sampled mule deer.

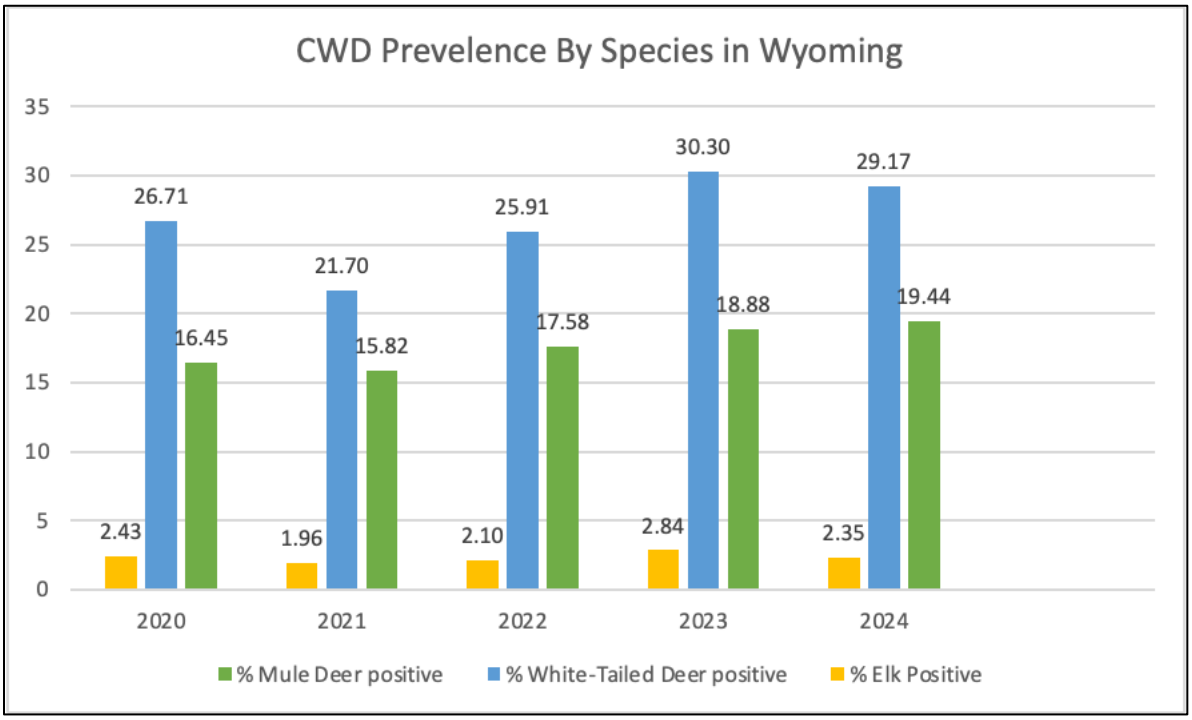


*Figure 31: Percent positive (prevalence) for CWD of each individual animal species In Wyoming each year from 2020-2024. Source: WGFD.*

Figure 31 shows CWD prevalence by species each year. White-tailed deer consistently had the highest infection rates, followed by mule deer and then elk. that CWD is currently more prevalent in deer than in elk in Wyoming. No moose tested positive for CWD in Wyoming during this period.

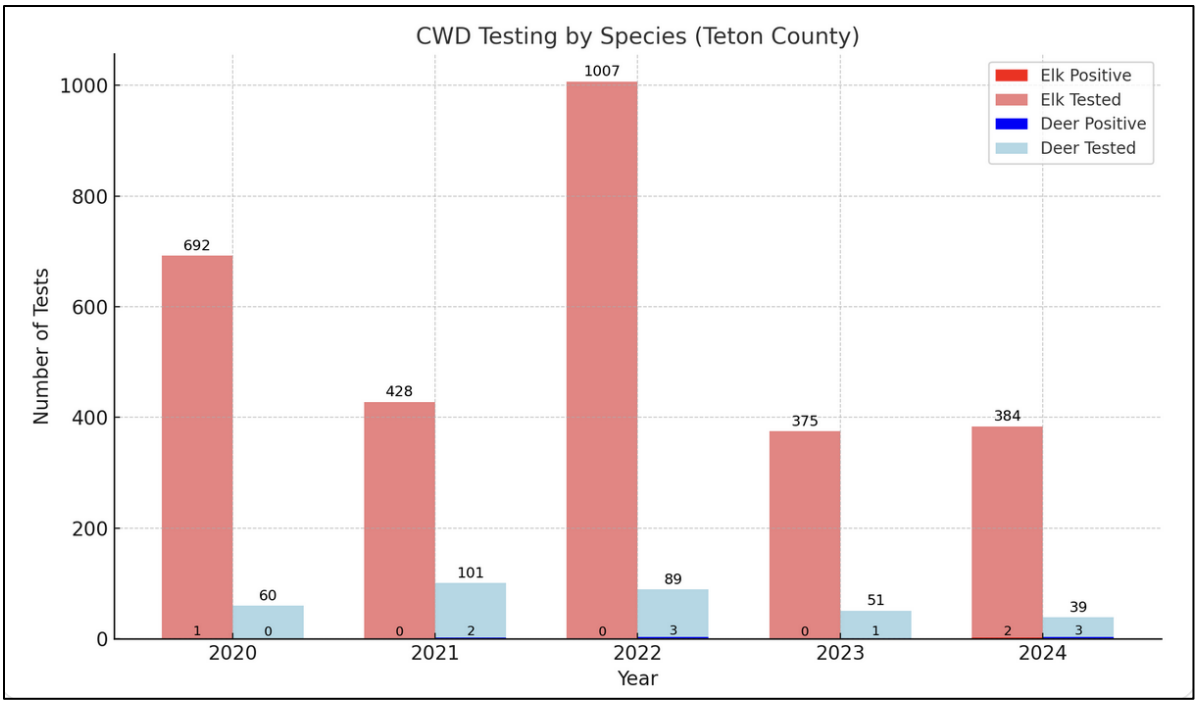


*Figure 32: Total number of each species tested and positive for CWD in hunt areas partially or entirely within Teton County each year from biological year (June1 – May1) 2020 - 2024. Source: WGDF.*

Figure 32 shows the total number of deer and elk tested and positive in the Teton County hunt areas between 2020 and 2024. The data includes all animals tested (hunter harvest, roadkill, found dead, and calves) in deer hunt areas 148, 149, 150, 151, 152, 155, and 156, and elk hunt areas 70, 71, 73, 75, 77, 78, 80, 81, 82, 83, 84 and 8.[xx] The sample size of elk was larger than deer annually, and detections in both species were rare but present in 2024.

## CWD Testing and Prevalence by Species in the Teton Region

| | Deer | | | Elk | | |
|---|---|---|---|---|---|---|
| | Tested | Positive | Prevalence | Tested | Positive | Prevalence |
| 2020 | 60 | 0 | 0.00% | 691 | 1 | 0.14% |
| 2021 | 99 | 2 | 2.02% | 428 | 0 | 0.00% |
| 2022 | 86 | 3 | 3.49% | 1007 | 0 | 0.00% |
| 2023 | 50 | 1 | 2.00% | 375 | 0 | 0.00% |
| 2024 | 36 | 3 | 8.33% | 382 | 2 | 0.52% |

*Figure 33: Total number of each species tested, positive for CWD, and the percent positive (prevalence) for CWD of each individual animal species in hunt areas partially or fully within Teton County each year from biological year (June 1 – May 1) 2020-2024. Source: WGFD.*

Figure 33 show that the prevalence has remained below 1% for elk 2022 to 2024. In biological year 2024 (June 1 – May 31), there were 2 positives and a 0.52% prevalence. CWD prevalence in deer has grown from 0% in 2020 to 8.33% in 2024. However, the total number of deer positive for CWD remains low. 3 deer tested positive for CWD in both the 2022 and 2024 biological years. However, fewer deer were tested in 2024, so the percentage of deer that tested positive is higher.

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**Discussion:** To address the prevalence of CWD in Wyoming, the Wyoming Game and Fish Department established the Chronic Wasting Disease Management Plan in 2020. The plan aims to limit the spread of CWD in deer and elk herds through increased testing, targeted hunting, and changes to winter feeding practices. Since 2020, WGFD has released an annual report on CWD testing throughout the state. They encourage the hunter to harvest adult elk and adult male deer, as they tend to have higher CWD positive rates. Additionally, WGFD plans to remove individual animals that exhibit signs of CWD.

Statewide CWD prevalence is much higher than within Teton County hunt regions, though CWD is now present in Teton County in both deer and elk. WGFD states that individual actions, such as increasing testing of harvested deer, elk, and moose, properly disposing of carcasses, and hunter education, could help detect and manage the disease early.

Although recent statewide detections have slightly decreased, they remain above the target and therefore pose a threat to the Jackson area. Without preventative measures, CWD could become widespread locally and make eradication efforts difficult. Continued monitoring, hunter engagement, and collaboration with state wildlife agencies are essential to keep CWD prevalence as close to zero as possible in the region and maintain healthy wildlife populations.

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**Status:** Spread of CWD is moderate in Teton County. Prevalence in Elk is below 1% and considered good, but deer prevalence reached 8% in 2024, when fewer deer were tested, exceeding the target. CWD prevalence is also high in Wyoming, which puts Teton County at risk to experience an increase in cases.

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