> **EXPERIMENTAL AI-GENERATED FORECAST**
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> This outlook was generated automatically using Clyfar v0.9 ozone predictions and GEFS weather ensemble data. Prompts and

# Clyfar Ozone Outlook

## Uinta Basin, Utah

**Issued: February 8, 2026 at 12:00 UTC**

**Comparison with Previous Outlooks:** Since the previous outlook issued 6 hours ago (0600Z), the overall assessment remains consistent at BACKGROUND/MEDIUM. Both this run and the 0600Z run show an overwhelmingly background-dominated pattern through the first 10 days, with a very small minority of scenarios developing marginal moderate-category possibilities in the Days 11-15 window (Feb 18-22). The 0000Z run (12 hours ago) was also BACKGROUND/MEDIUM with a similar structure. Across the last 8 consecutive runs (Feb 7 0000Z through Feb 8 1200Z), the signal has been stable: background dominance with persistent but minor tail-risk for moderate ozone in the extended range. There is no strengthening or weakening trend.

**Forecaster note on known biases:** The air chemistry forecaster (Lyman) has identified that Clyfar may overestimate the importance of solar incoming energy for ozone generation, due to the system lacking memory of prior-day conditions. This could produce a slight high bias in more severe categories, particularly in the extended range where solar radiation is increasing as spring approaches. Additionally, the meteorology forecaster (Lawson) has identified the highest snowfall uncertainty in the current Clyfar version near accumulations around 2-3 inches and near the rain-snow line in the Basin foothills.

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## Days 1-5 (February 8-12)

### a) Public Summary

Air quality in the Uinta Basin is expected to be good through midweek. Ozone levels are very likely to remain well within normal background ranges, posing no health concerns for outdoor activities. No precautionary actions are needed during this period.

### b) Stakeholder Summary

All 31 ensemble scenarios place ozone firmly in the background category (20-50 ppb range) for Days 1-5. The exceedance probability for 50 ppb is at the floor (very unlikely) across this window. GEFS weather patterns show a pressure drop from around 1028 hPa today toward 1012-1015 hPa by midweek, with a wind event on February 11 (median winds reaching 14-16 mph) that would support mixing and dispersion. Note: Clyfar may carry a slight high bias in ozone possibility due to its sensitivity to solar radiation without day-to-day memory (per forecaster Lyman), but this has no material impact during this strongly background period.

### c) Expert Summary

Possibility memberships are uniformly background = 1.0, moderate/elevated/extreme = 0.0 across all 31 scenarios for Feb 8-12. The medoid scenario clyfar001 shows flat 50th-percentile ozone at 35 ppb throughout, with the 90th percentile at 44 ppb. GEFS weather for this period features falling MSLP (median dropping from 1028 to 1014 hPa), a wind event peaking Feb 11 (median 7-10 m/s, 90th percentile approaching 10 m/s), and no snow accumulation; these precursors strongly suppress ozone buildup.

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## Days 6-10 (February 13-17)

### a) Public Summary

Air quality is expected to remain good through mid-February. There is minimal chance of elevated ozone. A cold weather system moving through the Basin around February 15-16 brings snow and wind, which typically helps keep ozone levels low. Note: Snow forecast uncertainty is highest near the 2-3 inch accumulation range.

### b) Stakeholder Summary

Background ozone continues to dominate for Days 6-10, with all ensemble clusters indicating low ozone risk. Only 2 of 31 scenarios (roughly 6%) show any hint of moderate-category possibility emerging near the tail end of this window: one scenario shows a weak moderate signal on Feb 17 (0.08 possibility) and another on Feb 18 (0.28-0.5 possibility), but these are marginal signals in isolated members. A significant winter weather system is forecast around Feb 15-16, with median snow depths reaching 10-15 mm (less than 1 inch on the Basin floor), median winds picking up to 15-20 mph, and temperatures dropping to the mid-20s to low 30s (°F). Snow forecast uncertainty is highest near 2-3 inch accumulations (per forecaster Lawson). Clyfar may overestimate ozone risk from solar radiation inputs given the system's lack of day-to-day memory (per forecaster Lyman).

### c) Expert Summary

Scenario clyfar025 is the earliest to show non-zero moderate possibility in this window: 0.08 on Feb 17 and 0.5 on Feb 18, with an elevated possibility of 0.12 on Feb 18. Scenario clyfar020 shows a moderate possibility of 0.17 on Feb 19. All remaining 28 scenarios remain pure background through Day 10. The GEFS median MSLP drops to roughly 1002-1006 hPa around Feb 15-16 with a strong wind surge (median 7-9 m/s, 90th percentile 11-15 m/s), and median temperatures fall to -1 to +2°C. Snow accumulation in the 90th percentile reaches 20-50 mm by Feb 16-17, but median accumulations remain modest (10-15 mm). The active weather pattern strongly suppresses stagnation-driven ozone buildup.

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## Days 11-15 (February 18-22)

### a) Public Summary

Air quality is very likely to remain good, though there is a small chance of slightly higher ozone levels around February 20-21 in a few forecast scenarios. Even in those cases, levels would likely stay in the moderate range and would not pose a meaningful health risk. This is a low-confidence window due to the long forecast lead time. Snow forecast uncertainty is elevated near the 2-3 inch range.

### b) Stakeholder Summary

This is the period of greatest (but still low) uncertainty. Roughly 8 of 31 scenarios (about 25%) show some moderate-category ozone possibility between Feb 18-22, with the strongest signal concentrated around Feb 20-21. The exceedance probability for 50 ppb peaks at roughly 6% on Feb 22 across the ensemble. No scenarios exceed the 60 ppb threshold. The weather pattern transitions from the active mid-February system toward a potential recovery with rising pressure and lighter winds by Feb 20-22, which could allow brief stagnation in a few scenarios. However, the dominant cluster (94% of scenarios) maintains background ozone throughout. Note: Clyfar's solar sensitivity may overestimate this marginal signal (per forecaster Lyman), and snowfall prediction uncertainty near 2-3 inches adds further forecast uncertainty (per forecaster Lawson).

### c) Expert Summary

The control member clyfar000 shows the strongest signal: moderate possibility reaches 1.0 on Feb 21, with elevated possibility of 0.39 on Feb 20; median ozone reaches 59 ppb on Feb 21 and 90th-percentile ozone reaches 80 ppb. Scenario clyfar002 shows moderate possibilities of 0.75 (Feb 20) and 0.67 (Feb 21). Scenario clyfar010 shows moderate = 1.0 on Feb 22. Scenario clyfar024 shows moderate = 0.33 and elevated = 0.23 on Feb 20. However, these 8 non-background scenarios represent tail risk: 23 of 31 members (74%) remain pure background through the entire period. No scenarios show extreme-category possibility. The 50 ppb exceedance probability rises from 0% to only about 3-6% in this window. The GEFS weather shows a post-trough recovery with median MSLP rising toward 1010-1015 hPa and winds temporarily easing to 5-7 mph before a secondary wind event around Feb 21 (median 15-17 mph), which would likely mix out any marginal ozone buildup.

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## Full Outlook

### A. Overall Pattern Summary

The Clyfar ozone outlook for the Uinta Basin covering February 8-24 is dominated by background-category ozone throughout the forecast period. The ensemble structure is remarkably compact: 94% of GEFS scenarios (29 of 31 members) fall into a single cluster characterized by variable weather patterns and low ozone risk. Two singleton outlier clusters (scenarios clyfar000 and clyfar024) also show dominant background ozone in the clustering summary, though closer inspection of their possibility heatmaps reveals marginal moderate and elevated possibilities emerging in the extended range (Days 12-15).

Across the full 17-day window, median ozone concentrations for the dominant cluster remain steady at approximately 35 ppb (50th percentile), with the 90th percentile at 44 ppb, both well within the background category (20-50 ppb). No ensemble member produces extreme-category possibilities at any point. The only non-background signals appear in 8 of 31 scenarios (26%), concentrated between February 18-22, where moderate-category possibilities range from 0.08 to 1.0 in isolated members. The strongest outlier is the control run (clyfar000), which shows a brief pulse of moderate/elevated ozone around Feb 20-21 with median ozone reaching 55-59 ppb and 90th-percentile ozone near 65-80 ppb. This is a single-member signal representing roughly 3% of the ensemble and should be treated as tail risk, not the central forecast.

**Forecaster note on known biases (repeated per directive):** Forecaster Lyman has identified that Clyfar may overestimate solar radiation's contribution to ozone generation due to the system's lack of day-to-day memory, potentially biasing toward higher possibilities in more severe categories. Forecaster Lawson has identified the highest snowfall uncertainty near 2-3 inch accumulations and the rain-snow line in the Basin foothills.

### B. Run-to-Run Consistency (dRisk/dt)

**GEFS Weather dRisk/dt:** The GEFS weather pattern has been consistent across the last 8 runs (Feb 7 0000Z through Feb 8 1200Z). All runs depict: (1) a strong mid-February winter system with MSLP dropping below 1005 hPa around Feb 15-16, accompanied by 15-20+ mph winds and snow accumulation; (2) a brief recovery period Feb 17-19; and (3) variable conditions in the extended range with possible secondary wind events. There is no meaningful directional shift in weather precursors. Snow accumulation forecasts have remained modest at the median (less than 1 inch on the Basin floor through Day 10) with higher accumulations (1-3 inches at the median) emerging in the Days 11-15 window, particularly in the 90th percentile. The weather ensemble is not trending snowier or calmer in any consistent direction.

**Clyfar Ozone dRisk/dt:** The ozone risk signal has been stable and weak across all 8 recent runs. Looking at the 50 ppb exceedance probability on overlapping forecast dates:

| Date (actual) | 0207_00Z | 0207_06Z | 0207_12Z | 0207_18Z | 0208_00Z | 0208_06Z | 0208_12Z |
|---|---|---|---|---|---|---|---|
| Feb 18 | 6% | – | – | 3% | – | 3% | – |
| Feb 19 | 3% | 3% | 6% | 6% | 3% | 3% | – |
| Feb 20 | 3% | 3% | 13% | 6% | 10% | 3% | 3% |
| Feb 21 | 3% | 6% | 6% | 3% | 10% | 6% | 3% |
| Feb 22 | 3% | 6% | 3% | 6% | 6% | 3% | 6% |

The values oscillate between 3-13% without a clear upward or downward trend. The Feb 7 1200Z run briefly spiked to 13% on Feb 20 but this was not sustained in subsequent runs. The current 1200Z run shows the weakest signal yet in this window (3% on Feb 20, 3% on Feb 21, 6% on Feb 22). There is no consistent directional movement, and oscillation between runs is expected behavior at this lead time.

No particular scenario (such as a persistent stagnation event) has been consistently growing across runs. The tail-risk members rotate from run to run (different members carry the signal each cycle), which is characteristic of noise rather than a coherent developing threat.

### C. Previous Outlook Comparison

Compared to the 0600Z outlook issued 6 hours ago (BACKGROUND/MEDIUM), this run maintains the same assessment with no material change. Compared to the 0000Z outlook issued 12 hours ago (also BACKGROUND/MEDIUM), the picture remains stable. The small moderate-ozone signal that appeared in clyfar000 at 0000Z (moderate possibility = 0.51 on Feb 21) has persisted in the 1200Z run's clyfar000 (moderate possibility = 1.0 on Feb 21 with elevated = 0.39 on Feb 20), but this represents the same single control member rather than a broadening ensemble signal. The dominant cluster's pure background character has not changed.

### D. GEFS Weather Drivers

The primary weather story is a winter trough passage around February 14-16 that brings the lowest MSLP of the period (median near 1002-1006 hPa), strong winds (median 15-21 mph, gusts possibly higher), snow accumulation (median up to about 1 inch, 90th percentile up to 2-3 inches), and cold temperatures (median lows near 25-30°F). This active pattern strongly suppresses ozone buildup by enhancing ventilation and disrupting the inversions that trap precursor emissions.

Following the trough, a brief recovery toward higher pressure around Feb 17-19 allows winds to temporarily ease, but a secondary wind event around Feb 20-21 (median 15-17 mph) disrupts any nascent stagnation. Temperatures during the recovery remain cold (median highs near 35-43°F, lows near 20-30°F), and increasing daylight hours provide moderate solar input. In a handful of scenarios, the timing between the pressure recovery and the secondary wind event creates a narrow window where light winds and modest solar radiation briefly push Clyfar toward moderate-category possibilities. However, this window is short-lived and poorly sampled in the ensemble.

### E. Monitoring Guidance

- **Next update:** The next Clyfar outlook will be issued at approximately 18:00 UTC today (February 8).
- **Key items to watch:** Monitor whether the Feb 20-21 moderate-ozone signal in the control run (clyfar000) begins spreading to additional ensemble members in upcoming runs. If the 50 ppb exceedance probability exceeds 15-20% on any day in the next 2-3 runs, this would warrant an upgrade to MODERATE alert level.
- **Weather monitoring:** Track the mid-February trough timing and intensity. A weaker-than-forecast trough or quicker ridging afterward could favor stagnation and higher ozone risk. Snow accumulation forecasts near the 2-3 inch threshold should be monitored given known Clyfar uncertainty at that range.

- **Bias caveat:** Given Clyfar's potential high bias from solar radiation sensitivity (per forecaster Lyman), any marginal moderate signals in the extended range should be interpreted cautiously, particularly as daylight hours increase through February.

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## Alert Level

Based on the ensemble analysis, all three clusters indicate background-dominant ozone through the 17-day forecast window. The 50 ppb exceedance probability remains below 10% on all forecast days. Only 8 of 31 scenarios show any non-background possibility, and those are confined to the low-confidence extended range (Days 12-15). No scenarios produce elevated or extreme possibilities with high confidence. The run-to-run signal has been flat across 8 consecutive initializations. Given the stable, background-dominated pattern with only tail-level risk in the extended range:

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AlertLevel: BACKGROUND
Confidence: MEDIUM
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## Frequently Asked Questions

**"Is there any chance of unhealthy ozone levels this week?"** Not in the near term. All 31 ensemble scenarios agree on background ozone (roughly 25-45 ppb) through at least February 17. This is well below any health-concern threshold. The active winter weather pattern with wind and occasional snow effectively prevents the stagnation conditions needed for ozone buildup.

**"I see some scenarios mention 'moderate' ozone around February 20-21. Should I be concerned?"** This signal appears in only a few isolated ensemble members (about 25% of scenarios), and even those show only moderate-category ozone (roughly 40-60 ppb), not elevated or extreme. The dominant forecast (74% of scenarios) remains background-level. At 12+ days out, individual scenario signals are unreliable and should be monitored rather than acted upon.

**"Why is confidence rated MEDIUM instead of HIGH?"** Two factors keep confidence at medium rather than high. First, the extended-range window (Days 11-15) carries inherent uncertainty at lead times beyond one week, where weather models lose predictive skill. Second, known limitations in Clyfar, including a potential overestimation of solar radiation's role in ozone production and snow forecast uncertainty near 2-3 inches, add systematic uncertainty that prevents a high-confidence rating even when the ensemble shows strong agreement.

**"How does snow affect ozone in the Basin?"** Fresh snowfall increases the reflective surface (albedo) in the Basin, which can enhance photochemical ozone production by bouncing more sunlight back through the atmosphere. However, the weather systems that bring snow also bring wind and mixing, which disrupt the temperature inversions that trap pollutants. The net effect depends on whether calm, clear conditions follow snowfall. In this forecast, active weather dominates, limiting post-snow stagnation windows.

**"When would you upgrade this forecast to a higher alert level?"** An upgrade to MODERATE would be warranted if: (1) the 50 ppb exceedance probability exceeds 15-20% on any day across 2-3 consecutive runs; (2) multiple ensemble members (more than 30%) develop sustained moderate or elevated possibilities; or (3) GEFS weather shifts toward a stronger, more persistent ridge that would favor multiday stagnation.

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## Data Logger

**Files read (CASE_20260208_1200Z):**

- forecast_clustering_summary_20260208_1200Z.json
- probs/forecast_exceedance_probabilities_20260208_1200Z.json
- weather/forecast_gefs_weather_percentiles_20260208_1200Z.json
- weather/forecast_gefs_weather_clyfar000_20260208_1200Z.json
- weather/forecast_gefs_weather_clyfar001_20260208_1200Z.json
- possibilities/forecast_possibility_heatmap_clyfar000_20260208_1200Z.json
- possibilities/forecast_possibility_heatmap_clyfar001_20260208_1200Z.json
- possibilities/forecast_possibility_heatmap_clyfar015_20260208_1200Z.json
- possibilities/forecast_possibility_heatmap_clyfar024_20260208_1200Z.json
- possibilities/forecast_possibility_heatmap_clyfar002_20260208_1200Z.json …and 26 similar (all 31 heatmaps read)
- percentiles/forecast_percentile_scenarios_clyfar000_20260208_1200Z.json
- percentiles/forecast_percentile_scenarios_clyfar001_20260208_1200Z.json
- percentiles/forecast_percentile_scenarios_clyfar024_20260208_1200Z.json

**Files read (previous cases, for dRisk/dt):**

- CASE_20260208_0600Z/probs/forecast_exceedance_probabilities_20260208_0600Z.json
- CASE_20260208_0600Z/forecast_clustering_summary_20260208_0600Z.json
- CASE_20260208_0600Z/possibilities/forecast_possibility_heatmap_clyfar000_20260208_0600Z.json
- CASE_20260208_0600Z/possibilities/forecast_possibility_heatmap_clyfar001_20260208_0600Z.json
- CASE_20260208_0600Z/weather/forecast_gefs_weather_percentiles_20260208_0600Z.json
- CASE_20260208_0000Z/probs/forecast_exceedance_probabilities_20260208_0000Z.json
- CASE_20260208_0000Z/forecast_clustering_summary_20260208_0000Z.json
- CASE_20260208_0000Z/possibilities/forecast_possibility_heatmap_clyfar000_20260208_0000Z.json
- CASE_20260208_0000Z/possibilities/forecast_possibility_heatmap_clyfar001_20260208_0000Z.json
- CASE_20260207_1800Z/probs/forecast_exceedance_probabilities_20260207_1800Z.json
- CASE_20260207_1200Z/probs/forecast_exceedance_probabilities_20260207_1200Z.json
- CASE_20260207_0600Z/probs/forecast_exceedance_probabilities_20260207_0600Z.json
- CASE_20260207_0000Z/probs/forecast_exceedance_probabilities_20260207_0000Z.json

**Total: 44 files read across 7 CASE directories.**