Protecting the Confluence Roost: Assessing the Impact of Proposed Development on Bald Eagle Habitat

Introduction

The Confluence Bald Eagle Communal Roost, located near the confluence of Boulder and St. Vrain Creeks, serves as a vital winter habitat for bald eagles. Like all communal roosts, the Confluence Roost supports non-breeding eagles during the winter months by providing safety, energy conservation, and proximity to food resources (Hansen et al. 1980, Keister et al. 1987, Grubb et al. 1989, Wilson and Gessaman 2003). For this reason, communal roosts are often established and disbanded in response to the availability of these resources or in response to human disturbance (Steenhof 1976, Grubb 1984, Keister et al. 1987).

The Confluence Roost plays a critical role as part of a roost network with three discrete roost areas or hubs that are nearly evenly dispersed along a 4-mile stream corridor (Figure 1). Studies by Watts and Turrin (2017) indicate that communal roosts play a more significant and complex role in the eagle life cycle than previously understood and recommend 800-meter buffers to avoid disturbance not only to the roost site but also to the surrounding prey resources. The recognition that communal roosts are important elements within the life cycle of bald eagles led to their protection under the “disturb” clause of the Bald and Golden Eagle Protection Act (BGEPA).

However, data collected by Colorado Parks and Wildlife (2004–2019) and Front Range Nesting Bald Eagle Studies (FRNBES, 2020 to January 2025) demonstrate a long-term and concerning decline in eagle counts at the Confluence Roost. This trend underscores the fragility of the roost and raises significant concerns about its viability.

The City of Longmont’s proposed development of the Distel property, situated just 0.45 miles from the Confluence Roost (Figure 1), poses a risk to the continued use of this critical habitat. The proposed uses, which include a composting facility and fire training center, would bring increased noise, light pollution, and human activity to the area, further compounding the challenges already faced by the roost. Protecting the Confluence Roost is imperative to preserving bald eagle populations and ensuring compliance with established legal protections.

Compliance with CPW Guidelines and BGEPA

Colorado Parks and Wildlife (CPW) issued updated raptor guidelines in 2020 that specifically address the protection of communal roosts (CPW 2020). For roosts within direct line of sight, the guidelines recommend a disturbance-free buffer of 0.5 miles from November 15 to March 15. Given the proximity of the proposed facilities—just 0.45 miles from the Confluence Roost and within direct line of sight—the planned development would fall short of these protective standards.

The Bald and Golden Eagle Protection Act (BGEPA), which prohibits activities that "disturb" bald eagles, explicitly includes communal roosts under its protection. Disturbance is defined as actions that disrupt normal behaviors such as roosting and foraging, to the extent that they impair the bird's ability to survive or successfully reproduce. The proposed activities on the Tull property risk violating these provisions by introducing significant disturbances near the Confluence Roost, potentially leading to its abandonment.

Evidence of Decline at the Confluence Roost

Data Presentation

Long-term monitoring data collected by Colorado Parks and Wildlife (2004–2019; CPW unpublished data) and Front Range Nesting Bald Eagle Studies (2020–2025; Table 1) reveal a significant decline in eagle counts at the Confluence Roost (Figure 2). In the early 2000s, this site supported between 40–50 bald eagles on winter evenings, highlighting its role as a key communal roost. In recent years, however, counts have frequently fallen below 10 individuals, indicating a dramatic reduction in use.

A linear trend analysis of eagle counts from 2002–2024 reveals an average decline of approximately two eagles per year, as illustrated in Figure 2. The calculated R^2 value of 0.47 supports a moderately strong correlation between time and the decreasing roost counts, providing clear evidence of a long-term downward trend. These findings are consistent across multiple years of monitoring and suggest increasing environmental pressures on the Confluence Roost.

Discussion and Interpretation

The sharp decline in eagle counts at the Confluence Roost likely reflects the cumulative effects of several environmental and anthropogenic factors. The 2013 flood shifted the St. Vrain Creek bed from its original position, disrupting local hydrology and damaging old-growth cottonwoods that historically served as primary roosting sites. Many of these trees died in the years following the flood, possibly due to changes in water availability impacting their shallow root systems, leading to a substantial reduction in live perch trees. While eagles continued to utilize the remaining dead trees along St. Vrain Creek for some time, the center of main roosting activity shifted in 2020 approximately 0.9 miles (1.5 kilometers) northeast, aligning more closely with the Boulder Creek corridor CPW unpublished data; FRNBES unpublished data).

Over the past five years, roosting eagles have typically staged along a 0.5-mile (0.8-kilometer) reach on the east side of Boulder Creek, with some perches extending to the northern boundary of the Tull property. By nightfall, eagles commonly congregate in or near a single dominant tree at the Confluence. Notably, this primary roost tree is also the nesting site of a pair of territorial bald eagles, underscoring its ecological significance.

The timing of this shift in roosting activity coincided with the destruction and abandonment of the Middle Roost, a nearby communal site that historically supported up to 23 eagles nightly (Appendix A). The loss of the Middle Roost disrupted roost-switching behavior within the network, placing additional pressure on the Confluence Roost and potentially amplifying the observed declines in eagle counts.

Broader environmental factors, including climate change and human development, may also have contributed to the decline. Changes in prey availability, increased disturbances, and habitat fragmentation have likely compounded the challenges faced by bald eagles in this region. The shift in roosting activity northeastward along the Boulder Creek corridor reflects the adaptability of these eagles but also highlights the fragility of this interconnected roost network.

The linear trendline and corresponding data emphasize the urgency of implementing conservation measures. Without intervention, the continued decline in eagle counts at the Confluence Roost could result in its eventual abandonment, jeopardizing the broader roost network and the bald eagles that depend on it.

The Loss of the Middle Roost and Its Implications

The abandonment of the Middle Roost serves as a cautionary case study in the consequences of habitat disruption. Prior to 2019, the Middle Roost supported up to 23 bald eagles nightly and functioned as a critical node within the three-roost network along Boulder Creek (Appendix AC). Field studies, augmented by 24-hour video camera monitoring over the past four years, have confirmed that the Middle Roost is now effectively abandoned, with only two eagles observed using it on a single night in the past three years (FRNBES unpub. data).

The Middle Roost previously facilitated roost-switching movements among bald eagles, enhancing the connectivity of the entire network. Its loss has likely disrupted these movements, placing additional strain on the remaining roosts, particularly the Confluence Roost. This connectivity is a key component of bald eagle winter ecology, and its degradation highlights the network's sensitivity to habitat disturbances.

The disruption of the Middle Roost was the subject of a formal petition filed by FRNBES with the Colorado Oil and Gas Conservation Commission (COGCC) in 2021. This petition (COGCC Complaints #200449290 and #200449342) documented violations of wildlife protection guidelines and emphasized the Middle Roost's critical role in the roost network. The findings outlined in this petition provide important context for understanding the potential consequences of additional disturbances to the Confluence Roost. For full documentation of these findings, see Appendix A (Petition for Review, COGCC) and Appendix B (Figures and data graphics).

Impact of the Proposed Development on the Confluence Roost

The proposed development of the Distel property introduces risks to the already vulnerable Confluence Roost. Research by Watts and Dyer (2018) demonstrates that the loss of highly connected roosts can have cascading effects on the functionality of the entire network. With the abandonment of the Middle Roost, the Confluence Roost now bears an even greater ecological burden.

The proximity of the proposed facilities to the roost—just 0.45 miles—violates CPW's 2020 guidelines and introduces disturbances that are likely to disrupt the eagles' behavior. Noise, light, and human activity associated with the development could cause eagles to abandon the roost entirely. Such a loss would not only impact the regional bald eagle population but could render the entire Boulder Creek corridor unsuitable for communal roosting.

Research and planning required by Longmont and Boulder County for the proposed composting facility. It is critical that the planning for the proposed facility includes comprehensive due diligence to address potential impacts on wildlife. In our review of available literature, most studies on wildlife and waste facilities focus on landfills or older systems, offering limited direct applicability to modern covered composting systems. This underscores the need for targeted investigation into pre-processing and covered operations to fully understand and mitigate potential attractants. This must be achieved by incorporating the following steps:

1. **Conduct Comprehensive Research on Wildlife Risks:** Specifically, evaluating how pre-processing methods and facility design can prevent attracting bald eagles and other wildlife. While USFWS and CPW may provide general guidance, the specific nuances of communal roost disturbance in this area require additional study, that can be informed by our research and findings. We collaborate with CPW researchers that are currently studying front range bald eagles, and I'm sure they would be happy to weigh in with their insights on our studies
2. **Collaborate with Technology Providers and Consult with Existing Facilities:** Reach out to system developers like GORE to request detailed case studies and unpublished data on wildlife interactions near facilities using similar covered systems. Their expertise and operational insights could be invaluable in designing effective mitigation strategies. Engage experts in wildlife management and composting operations to assess potential risks and recommend best practices for minimizing attractants, including measures for pre-processing areas and secondary attractants. Investigate facilities such as the Otay Compost Facility (Chula Vista) or Jepson Prairie Organics (Vacaville) that use modern covered systems. Reviewing their experiences with wildlife interactions, particularly in pre-processing areas, can provide practical guidance.
3. **Document Research Process**: We ask that the findings, methodologies, and decisions are formally documented and shared, so there is transparency and accountability in how risks are being addressed.

4. **Incorporate Wildlife and Groundwater Impact Mitigation Into Design Plans**: Use the research findings to inform the facility's design and operations, with an emphasis on ruling out any risks of attracting roosting eagles or other wildlife.
5. **Commission Independent Analysis:** Engage experts in wildlife management and composting operations to assess potential risks and recommend best practices for minimizing attractants, including measures for pre-processing areas and secondary attractants.
6. **Incorporate Findings into Planning:** Integrate these insights into the facility's design to proactively address potential issues, such as enclosing pre-processing areas, implementing rigorous odor control measures, and establishing wildlife monitoring protocols.
7. **Establishing Ongoing Monitoring**: Developing a long-term monitoring plan to ensure the facility continues to meet its wildlife impact goals. This monitoring will allow for timely adjustments if unforeseen issues arise.

These actions would not only demonstrate Boulder County and Longmont's commitment to environmental stewardship but also ensure the facility's success as a model for sustainability and coexistence with wildlife.

As strong advocates for wildlife and raptor research, as well as supporters of Boulder County's and Longmont's environmental goals, FRNBES is committed to ensuring that both priorities are addressed.

Conclusion and Recommendations

To ensure an informed decision, we recommend that the City of Longmont:

1. Delay decision-making until a comprehensive environmental assessment, as outlined in steps 1 through 7 above, can be conducted.
2. Require a detailed analysis of the proposed development's impacts on the Confluence Roost and surrounding wildlife, in compliance with CPW's 2020 guidelines and BGEPA protections.
3. Engage stakeholders, including FRNBES, CPW, and other wildlife experts, to assess long-term strategies for monitoring and preserving the roost network.

This situation represents a critical opportunity for Longmont to demonstrate leadership in environmental stewardship. By ensuring a thorough review and prioritizing the protection of the Confluence Roost, the City of Longmont and Boulder County can uphold its responsibility to safeguard these vital habitats for future generations.

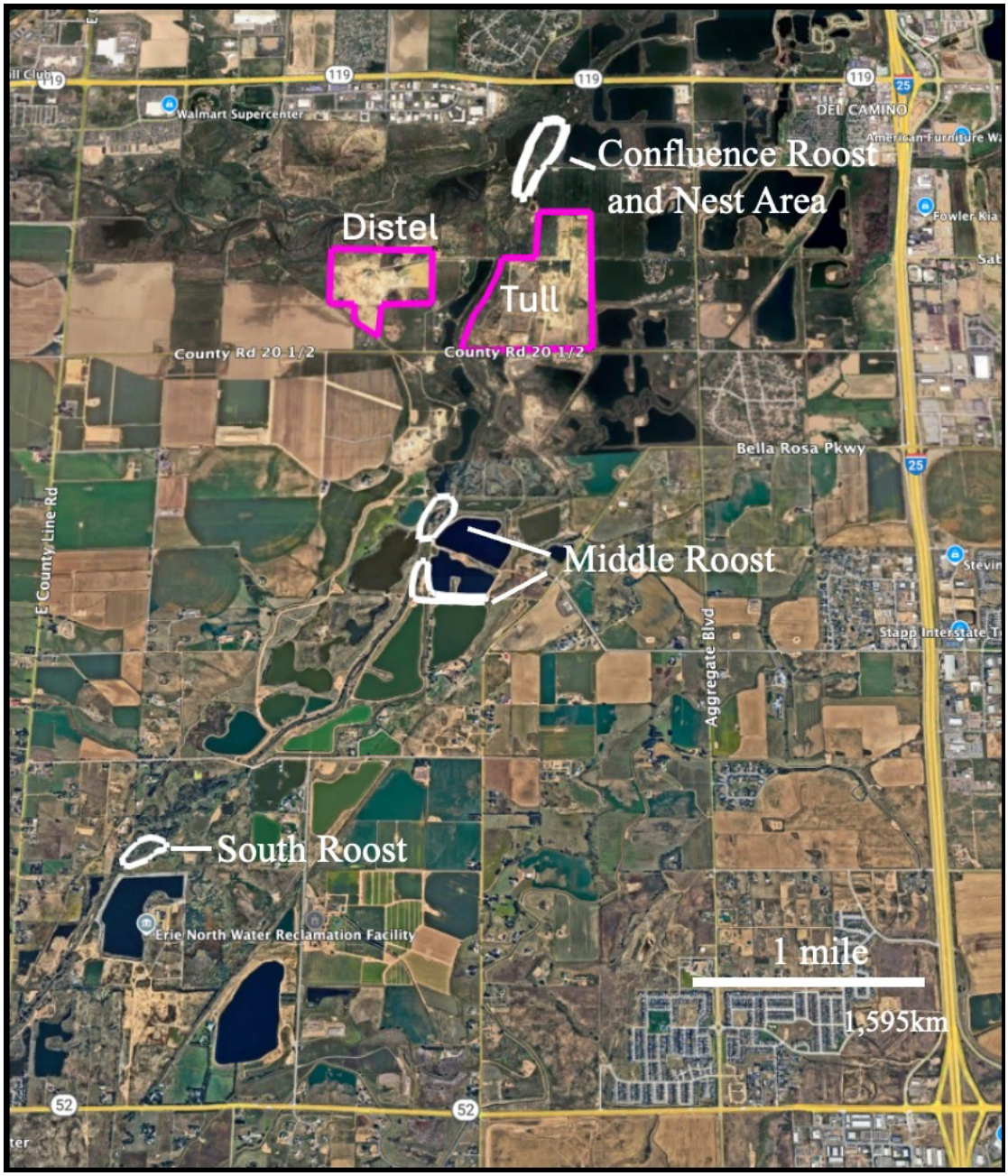

Figure 1. Confluence bald eagle communal roost and interconnected roost system including the Middle and South Roosts. Note the proximity of the Tull Property to the Confluence Roost is 0.28 miles.

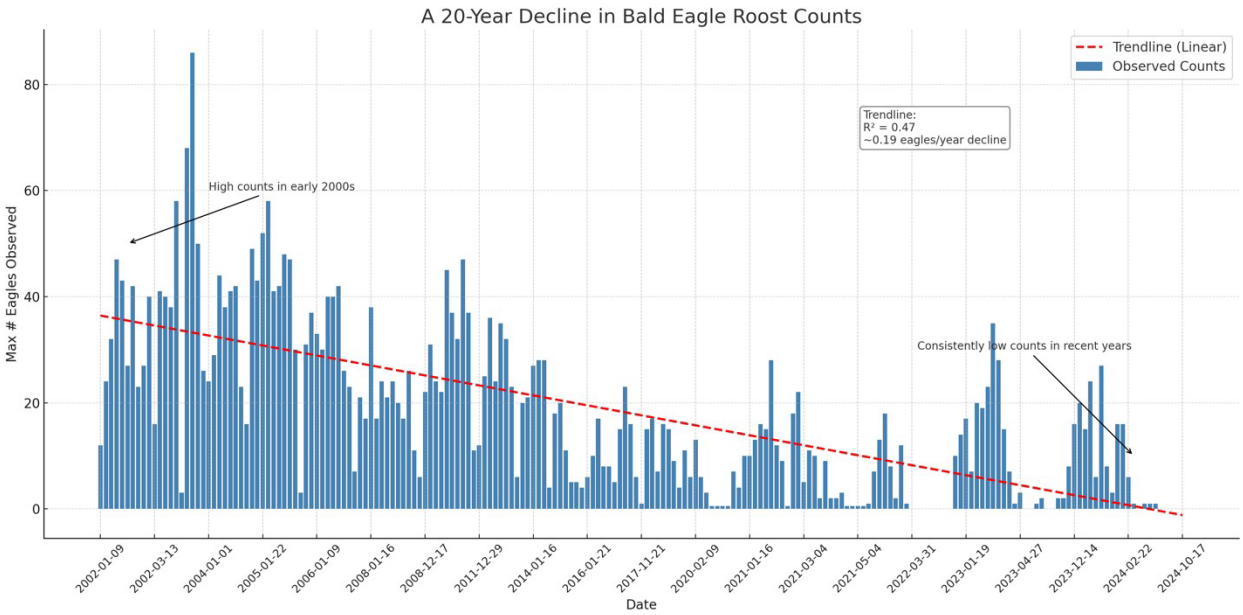

Figure 2. Confluence bald eagle communal roost counts from 2004 thru 2024 from CPW and FRNBES studies.

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Appendices, Exhibits, Data

Appendix A. Petition for review for the Oil and Gas Conservation Commission's dismissal of complaints #200449290 and #200449342 and failure to issue a notice of alleged violation.

Appendix B. Exhibits that accompany Appendix A.