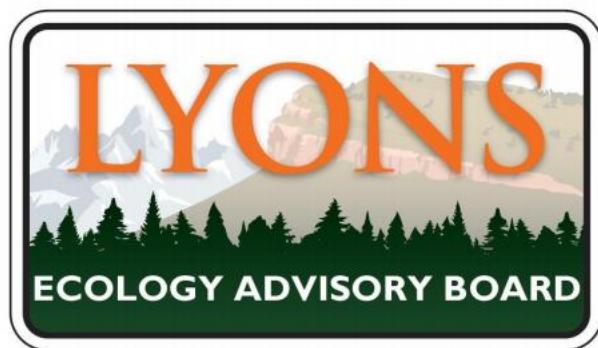


Protecting and Preserving Lyons, Colorado: The Next Ten Years

Joint Statement from the Town of Lyons Ecology Advisory Board (EAB)*, May 31, 2021

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Executive Summary

This Position Statement has been prepared as part of Town of Lyons Ecology Advisory Board (EAB) input to the town's comprehensive planning process. It is offered in the hope that the town will have its quality of life and natural environment improved and protected as it moves forward into the 21rst century.

The new Comprehensive Plan can play an important role in this. Provided below is a summary of EAB's specific recommendations. Each is supported in more detail in the text.

- 1) **The Town lies within a regional context of rapid population growth and development.** The Front Range Urban Corridor is growing rapidly. The Comprehensive Plan must respond to this context.
- 2) **The Comprehensive Plan should address how the town grows (or does not grow) and also how town services are financed.** As "build out" occurs, the present town use of fees associated with new construction must transition to a sustainable funding model. Also, EAB agrees with the findings of the Planning Area Master Plan that annexations and housing development in the South St Vrain and the Apple Valley planning areas would create additional net costs to the town.
- 3) **The Plan should provide an objective update regarding how residents feel about limiting or promoting growth.** One of the objectives of Comprehensive Plans under Colorado law is to describe community aspirations; these should be accurately recorded and expressed.
- 4) **Lyons water supply will be increasingly affected by greater regional demand and by climate change and drought.** The new Comprehensive Plan should include a strategy for reducing or at least stabilizing the town's overall water use.
- 5) **The vulnerability of the Town to the flood of 2013 and also the fires of 2020 underscores the need for exceptional care in planning, design, and location of new development.** EAB recommends that the town's Comprehensive Plan indicate how it addresses the need to reduce Lyons' exposure to flood and fire hazard.
- 6) **The flood hazards identified in the town and also its planning areas should be fully incorporated into the Comprehensive Plan.** In particular, the 100-year stormwater hazard areas identified in the Stormwater Master Plan should be regulated in the same way as the FEMA 100-year floodplains.
- 7) **Residents demonstrated through town-wide votes how strongly they value the existing park and open space lands.** Through special elections, Lyons residents provided for direct input into annexations greater than 5 acres. Also, the town municipal code now requires that conservation easement-protected land not be zoned to commercial or residential

uses without referral to the registered electors. The new Comp Plan can highlight such properties as assets that help preserve the town's ecology, economy, and quality of life.

- 8) **Lyons public parks and open space lands are heavily used and should be protected and expanded where possible.** Lyons is already experiencing negative effects from regional growth, including increased traffic and overcrowding of its parks and open space. How will the town ensure that its parks and open spaces remain available for local residents?
- 9) **To help mitigate anthropogenic climate change and accord with national policy, the Town should revise its development standards to favor renewable energy sources.** The nation is transitioning away from the burning of fossil fuels. The new Comp Plan should incentivize the needed transition away from fossil fuel-based energy in Lyons.
- 10) **Many undeveloped lands in and near Lyons support healthy bird and insect (including pollinator) populations.** Development on such land can be designed to help preserve bird and insect habitat, food sources, and migration pathways. The Comprehensive Plan should decrease stone-on-fabric landscaping, favor xeric but green land covers, and also continue the town's dark sky lighting policies.
- 11) **The Comprehensive Plan should provide development policies that help protect vital wildlife habitat, including endangered and protected species.** For example, it can reinforce the County's efforts to preserve the golden eagle hunting and other raptor and nesting habitat within and bordering the town.
- 12) **There is a confluence of purpose in discouraging development on the floodplain for public safety purposes and for protecting wetlands ecology.** Town planning should avoid conversion of St. Vrain river floodplains and associated wetlands out of forest landcover. The Town's 100 ft wetland setback requirement should be included in the new Comp Plan.
- 13) **Expansion of impervious land cover and related storm sewer runoff should be constrained in order to reduce the negative effects on river water quality and flow.** Permeable pavement designs should be encouraged.
- 14) **The planning consultant should obtain objective information regarding resident's attitudes about growth, ecological, and open space issues via mail surveys.** It can provide the results within the Comprehensive Plan as an objective record of town aspirations at this time.

Introduction

The Town of Lyons Ecology Advisory Board (EAB)'s mission is to: "*advocate for the protection of ecological integrity and the aquatic and terrestrial natural resources of the Town of Lyons and its surrounding areas to support a dynamic and resilient ecosystem, a quality environment for all, and a vibrant economy.*" There are many natural resources within and around the town (Figure 1). Without protection, there are some that could be lost. This Position Statement has been prepared as part of EAB's input to the town's comprehensive planning process. We hope that the town's quality of life and natural environment will be safeguarded as we move forward together in the 21rst century.

The new Comprehensive Plan will build on prior planning efforts. For example, the Master Plan for the Town of Lyon's Principal Planning Areas was prepared as "a roadmap for ensuring that development and redevelopment are accomplished in a manner that balances private investment objectives with social and environmental sustainability" [1]. It provides "strategies intended to inform private and public decisions regarding the future use of properties in the planning areas." That Plan includes discussion of natural amenities that, together with other assets, should be protected and leveraged when pursuing development [1]. The new Comprehensive Plan can expand on this discussion, on the existing Comprehensive Plan [2], and on post-2013 flood planning efforts [3] as well.

Also, following the flood of 2013, EAB prepared the "Sustainable River Corridor Action Plan" [4], which was adopted by the Board of Trustees and is provided to all flood recovery contractors and consultants for guidance. This Plan identifies objectives designed to "enhance the functionality of the river and riparian areas and maximize its recreational, ecological, and economic values". These objectives include:

- Enhance the flood mitigation potential of the St. Vrain rivers and riparian areas in Lyons.
- Minimize channelization of the rivers.
- Designate areas for permanent and temporary wetlands.
- Re-establish intentional floodplain area to allow flood overflow.
- Preserve and improve public river access.
- Conserve and enhance the riverine natural habitats.
- Ensure that any development is constructed in an environmentally sensitive manner.
- Maintain connectivity of open space.

EAB believes these objectives should be included within the Comprehensive Plan.

Finally, during the flood recovery process, another community planning effort resulted in a land use management Plan for the Deed-Restricted Buyout properties (DRBOP) acquired by the town in the floodplain. These parcels are permanently restricted from many land uses and from private ownership. This Plan provides "a shared vision, a way forward that may foster a sense of closure for the community in the wake of disaster." It is "intended to serve as a reference for residents

and decision makers for years to come" [5]. The DRBOP Plan is a blueprint for the future of the buy-out sites, which total nearly 20 acres of public land located in the heart of Lyons. One property in particular, the Martin parcel, is envisioned as a wildlife area with only limited development in order to protect and preserve its ecological resources and services. We consider that the new Comprehensive Plan should build on this community-led effort and highlight the new areas such as the Martin parcel for their value in preserving Lyons' ecological systems.

The town of Lyons is small, with a population of approximately 2200. It faces many development choices over the next 10 years. It is now facing more difficult environmental circumstances, including regional drought in many years, an uncertain long term future for its water supply as the region grows, a recent local history of extreme flooding, and increasing fire hazard. Nearly all of development choices have the potential to either decrease or to accentuate these concerns. These choices can affect the many ecosystem services and amenities provided by the natural environment, and thereby impact public safety, the economy, and the local quality of life. The EAB's input is predicated on the assumption that our residents value the ecological services and amenities, and that we would be a poorer community if left without.



Figure 1. Left, Old South St Vrain Road and the river's floodplain, looking upstream, just outside of present town limits in the South St Vrain planning area. Right, looking up at the Heil Ranch ridge, across town land, at the site of the future Carter Drive and housing subdivision.

There are several overarching questions for town residents to consider. For example: how should the town and its planning areas grow? One relevant document, the 2015 Lyons-Boulder County intergovernmental agreement, suggests an eventual Lyons population of ~2800, which would be a 27 % increase. Do the residents accept this as a desirable planning goal? Also, should nearby properties remain outside of town and be governed by the County, or instead be annexed? Are there ecological or environmental concerns related to such annexations? Finally, to what extent can future development in the area, inside or outside of town limits, be compatible with conserving the local ecological systems? The following narrative provides a broad perspective on the issues which EAB believes are of most concern for the coming decade.

The Rapidly Urbanizing Front Range Corridor

The Town of Lyons, founded in 1880, is uniquely situated immediately within the Rocky Mountain Front Range at its border with the High Plains. It is a mountain town, but also part of the Front Range Urban Corridor that includes the nearby Plains. The Town cannot escape this regional context. Any realistic Comprehensive Plan must specifically acknowledge it.

The Front Range Corridor had an estimated population exceeding 5 million in 2019. An increase of 15% occurred since 2010. Fifteen minutes (by car) from Lyons to the east, the City of Longmont's population increased to nearly 100,000, by 14.5%, since 2010 (Figure 2). Twenty minutes to the south, the City of Boulder's population increased by 9 % The nearest incorporated town to the west, Estes Park increased by 11.1% (even though its development is constricted by topography and by protected lands). Meanwhile, the critical resource of water supply is being affected not just by this increased demand, but by climate and reduced supply.

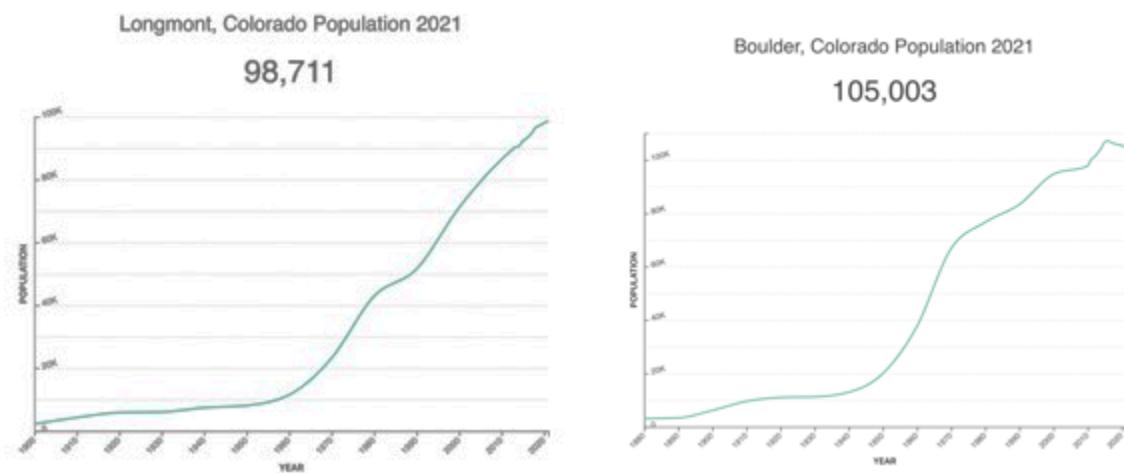


Figure 2. The populations of nearby Longmont and Boulder, Colorado illustrates the rapid urban growth near the Town of Lyons. Most other nearby municipalities have experienced similar increases.

Lyons has also grown during this period. Its population increased by several hundred inhabitants (~11%) since 2010. A major subdivision, Lyons Valley Park, expanded by 34 new homes since the 2010 Comprehensive Plan (Figure 3). The town area has been recently extended by annexation of land in the “Eastern Corridor” planning area (Figure 4) and the Planet Bluegrass farm parcel. A major affordable housing development of 40 units with new roads and courts is to be constructed for the Carter Drive area.

By additional annexations, to the west, in the South St. Vrain Planning Area, and also in the Apple Valley Planning Area, and by the town otherwise promoting residential and commercial development, Lyons could grow further (Figure 4). By annexing land, and removing or reducing some restrictions to housing development, such as the “blue line” elevation limit for water services, Lyons could encourage this growth. It could allow building higher on the hillslopes that surround it, and also further east and west, on the level river terraces adjacent to the major local



Figure 3. The build-out of the Lyons Valley Park subdivision from 2012 to 2018. Thirty-four Homes were added. A forty unit housing development is currently anticipated in the southeast corner of these images.

drainages. Although some of this land is protected by County conservation easements, in Boulder County, “in perpetuity” easements have, in certain cases, been removed. In the end, it can and should be partly up to the residents of Town of Lyons whether or not more annexation and development occurs. Expressing this is central to the purpose of a Comprehensive Plan.

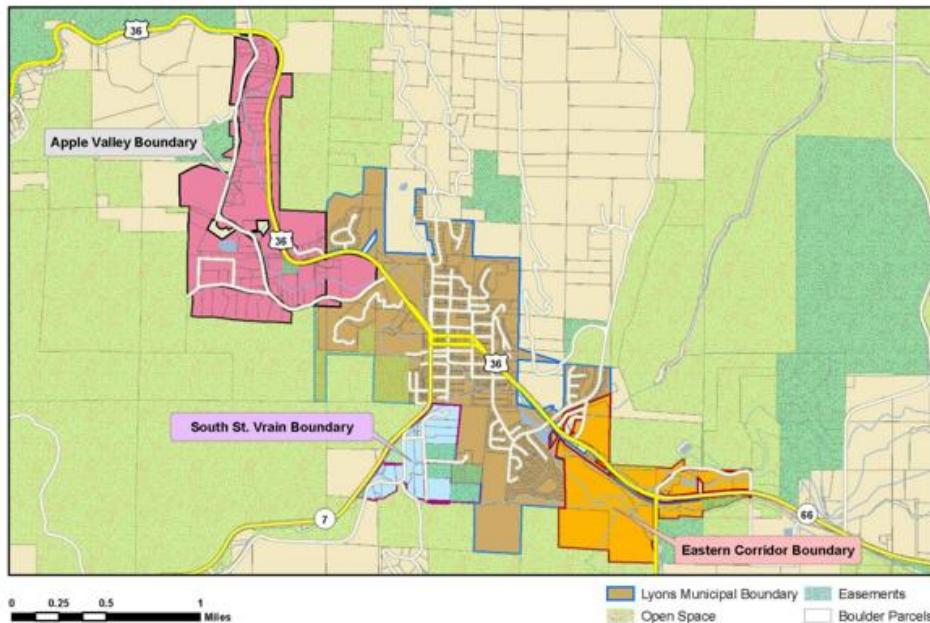


Figure 4. Map of Lyons Primary Planning Area, showing the South St Vrain (lower left), Apple Valley, (upper left) and Eastern Corridor (right) areas: where annexations may be allowed.

Changes Caused by The Flood of 2013

In the Great Flood of 2013, Town of Lyons lost a large number of housing units situated on its floodplains. Many of those displaced have been unable to return due to the lack of similar

replacement housing. Two heavily damaged mobile home courts have not been rebuilt; one court was rezoned to commercial and the other is now town land and part of the buy-out properties.

The loss of this inexpensive housing means that the diversity of housing stock has been reduced. After the flood, the availability of federal disaster housing recovery funds led some residents and town officials to advocate for building ~60 subsidized rental units on town park land. It was said that the town had “too much park land” and not enough housing. When the plan came to a town-wide vote, the 614 to 498 defeat indicated, even after the destruction caused by the flood, how strongly residents value preserving the existing park and open space land. New residents may enjoy the present Bohn Park and the active and passive recreational uses it provides, without knowledge of this history: a significant piece of this park would have been developed had not residents organized to voice their opposition and then, in a record turn-out, vote.

The vulnerability of the community in 2013 also underscores the need for exceptional care in planning any future growth (Figure 5). Again, the newer residents will not have this internalized memory of how much damage and suffering major flooding can cause. They and future town officials and staff will need to rely on maps and associated risk assessments; and, in turn, a Comprehensive Plan that fully incorporates such information.



Figure 5. Left: destroyed McConnell Avenue bridge crossing over the St. Vrain, September 13, 2013. Loss of bridges isolated some neighborhoods of the town for several days. Right, briefing being provided by the Town Administrator, Victoria Simonsen on September 14, in which residents are being told to prepare to shelter in place for another day. Only in 2021 has the 2nd Avenue bridge crossing finally been replaced.

Choices, Not Fate: Annexation and Development

Even while acknowledging the housing losses, and seeking to rectify them, the town still faces choices similar to that confronted by other towns in areas of rapid growth. To what extent should Lyons planning efforts and governance work to enable its own growth, even though this may mean building on lands within or near town that have never been developed? Like other jurisdictions that have faced similar choices, Lyons is widely considered a “desirable location”.

Here is what one planner describes the options for towns such as Lyons, which are embedded in a context of regional population growth, in-migration, and high demand for housing:

"Arguably, there are really only two future scenarios for communities in desirable areas: 1) high housing costs with some preserved open space and agricultural land, and 2) high housing costs without open space and agriculture. Accommodating growth never ends, therefore the rational choice is to draw the line now while you still have something to save" [6].

Thus, on one side of this issue is a perceived need for more housing of all kinds in the region as growth is expected to continue for the foreseeable future. On the other, there is the desire, earlier expressed by Lyons residents in the last Comprehensive Plan [2], to preserve the small size of the town, and its open space setting. Should any land now in open space or zoned for rural lots be developed? How much such loss is acceptable? Where should the line be drawn?

The Town of Lyons is presently very close to buildout unless annexations occur and some restrictions to growth are removed. There will be only 5-6 buildable lots left in town once the Summit affordable housing development is complete. There may be limited expansion as Main Street is redeveloped and perhaps residential units may be added to second and third levels of refurbished buildings. Some of the older neighborhoods could, if rezoned, support higher density housing. Meanwhile, the pressure to accommodate additional people who wish to live in Lyons will continue and have a profound effect on the Town if it is not tempered with ecological and quality of life concerns.

Lyons government leaders may view development as a positive for the Town; certainly, permit fees and tap fees have long fed the Town's revenue stream. However, it has also been noted, including in the 2010 Comprehensive Plan, that this is an unsustainable funding model. As well, financial impact studies demonstrate that residential homes built in Lyons create a net operating financial loss (see the Summit Development Company's contracted financial analysis, prepared and made public as part of their Development Application). Thus, further growth may cost residents more, in fees and taxes, rather than allow any reduction.

Perhaps the Lyons Comprehensive Plan can benefit from the contrasting experience of other municipalities along the Front Range. For example, to the south, the City of Boulder long ago acted to limit sprawl and annexations. If it had not done so, its city limits would likely have expanded much further to the north; the city's growth is now proceeding mainly by densification of existing developed land. The City of Longmont, in contrast, has sprawled, with large areas annexed, while some interior areas suffer from neglect and are being addressed through urban renewal plans. This noted, Longmont has also converted some large annexed parcels from farmland into parks and open space: for the use of its rapidly expanding population. Longmont has the topography, and, through annexations, the land to facilitate both. It could be argued that Lyons does not. Also, in 2021, even in Longmont, moving towards higher density housing is under discussion by town officials.

According to Colorado law and the town's municipal code, any annexation must be determined to be mutually beneficial to both parties. It must be consistent with the town's Comprehensive Plan, and the applicant must provide a narrative discussing how the project relates to Plan goals and policies. There must be included a statement of the impact on the environment of the Town and how any negative impacts would be mitigated. The territory proposed to be annexed must be urban or to be urbanized in the near future and be capable of being integrated with the Town. Finally, the annexation of lands to the Town must not create any additional cost or burden on the then-existing residents of the Town. EAB agrees with the findings of the Lyons Planning Area Master Plan that only some properties in the Eastern Corridor planning area might meet such criteria, and that annexation and housing development in the South St Vrain and the Apple Valley planning areas would create additional net costs to the town [7].

We recommend that the Comprehensive Plan forthrightly acknowledge the difference of perspectives among those who advocate for further development and expansion of Town of Lyons, and those who are opposed. It should accurately describe the trade-offs between different growth scenarios. As did the 2010 Plan, it should provide an update regarding how residents feel in limiting or promoting growth. What choices do we wish to make as a community?

Crowding of Parks and Open Space

Lyons is one of two main gateways to Rocky Mountain National Park (commonly, via US Route 36). In 2019, the Park experienced 4.7 million visitors, a 1.7 percent increase over 2018. Many of these visitors drive through the Lyons downtown during the summer.

The Park is the third most-visited national park in the U.S. It is over-taxed with summer visitors and in 2021 is adopting a reservation system to limit use. There is also outdoor recreation in the national forests above Lyons on Colorado Route 7. Trail-head parking lots now fill by mid-morning during the summer, even on weekdays. Four Boulder County Open Space properties (Heil Valley Ranch on the south, Hall Ranch to the west, and Rabbit Mountain and Pella Crossing to the east) are also exceptionally popular year-round for outdoor recreation such as mountain biking and hiking. They also fill to capacity, often quite early each day. The Button Rock Preserve and associated water supply reservoir, close to the town to the west, experiences heavy use.

Population growth in the region is placing perhaps unsustainable demands on these local natural areas. They *all* fill to capacity on days with good weather. Visitors drive long distances to access them. Lyons is a "gateway city" for these outdoor recreation properties. In short, the town is not only adjacent to rapidly expanding urban areas along the Front Range Urban Corridor, but it is also situated astride the major traffic arteries to some of the region's most desired recreational destinations. The intensity of this traffic is increasingly felt by many Lyons residents, and the open space lands are becoming harder for them to access. What makes Lyons a desirable place to live is being progressively offset by the difficulties already experienced with the heavy motorized traffic and the overcrowding. A *Comprehensive Plan must not ignore these realities. Instead it must look into the future, extrapolate present trends, and attempt to plan accordingly.*

The Town (and other organizations, such as Go Colorado) have invested in the four town parks, and also other recreational locations in town along the rivers. These too, are very attractive, including to people living in other cities. Some come from locations 40+ miles away. The town parks fill up on summer weekends and there have been problems with crowd control, noise, trash, etc. Lyons residents have reasons to wonder if what they enjoy is being progressively lost. How usable will the park amenities be, if their use continues to climb as the region overall continues to grow? How can the Town plan to accommodate this upward rise in demand, while preserving the natural land areas that are attracting such use? Should the town's Comprehensive Plan focus mainly on planning for development, or, instead, attempt to mitigate these concerns?

EAB considers that the town parks and open space lands are heavily used and must be protected and even expanded where possible. They are an asset to be protected, not only for the benefit of the Town, but for much of the expanding population in the region surrounding it. EAB does not believe that Lyons has "too much" parks and open space land. *We request that the present overcrowding be described and addressed. Because growth will very likely continue around Lyons, the Lyons Comprehensive Plan should seek parks and open space futures and management plans that address the overcrowding that is very likely to increase during the coming decade..*

Impact of Global Climate Change on Lyons

Unlike in its 2010 Comprehensive Plan, it is now clear that Lyons cannot plan effectively for the coming 10 years without taking into account the effects of global climate changes. These changes are already directly affecting the town. Responsible planning must be directed at both *mitigation* (Lyons' own contributions towards reducing the climb of greenhouse gasses), and *adaptation* (steps by which Lyons can respond directly to changing environmental circumstances).

Climate Change Mitigation

Lyons planning can encourage local development of solar or wind energy. Instead of additional gas stations, the town can encourage more electric vehicle hookups. Instead of new housing serviced by natural gas for heating and cooking, electricity should be incentivized. Mass transit that uses alternative energy sources is also an important local goal: this addresses both reduction of greenhouse gas emissions and the transportation needs of Lyons residents.

Most homes and businesses in town use natural gas for heat. To the extent that local electricity (from the MEAN Cooperative) is derived from coal-burning power plants, increasing use of natural gas favors reductions in greenhouse gas emission. However, the coal-burning plants are being phased out. In 2021, it now appears likely that natural gas will soon also be considered unacceptable as a substitute for cleanly generated electricity. It is imperative that planning for the Town incorporate these new circumstances; some municipalities (including Denver) are already reducing new natural gas connections through building code changes [8].

Meanwhile, electricity generation in the region is itself under stress, and “brown outs” during, for example, intervals of hot weather may become more frequent. In this regard, evaporative coolers are being installed in some homes and are much more energy efficient; this technology should be encouraged. It is now illegal in the State of Colorado for homeowner’s associations (HOAs) to ban such cooling units. Town of Lyons needs to encourage their use, because they are energy efficient and appropriate to our dry climate. Another example: if the ponds in the town River Park require aeration to achieve acceptable water quality, solar panels capable of supporting the electricity needed could be installed and make their operation both more economical (over time) and more supportive of the need to reduce greenhouse gas emissions.

EAB recommends that the Town consider revising its development infrastructure standards to favor electric rather than natural gas heating of residences. The new Comp Plan should incentivize the needed transition away from fossil fuel-based energy in Lyons.

Should underground gas connections continue to be constructed at all? It has recently been determined that a major contributor of methane (a potent greenhouse gas) to the atmosphere is fugitive emission from natural gas pipelines; also, aging gas connections and leaks in many parts of the country are causing municipal safety hazards. *EAB believes that these considerations should be part of the town’s new Comprehensive Plan; it is clear that construction to support local development must take into account the nation’s transition away from fossil fuel energy sources.*

Greenhouse gas emissions also occur from other sources, including motor traffic and landfills. In regard to the first, the Town and CDOT share a difficult task: facilitating traffic flow through town and avoiding idling gas-powered automobiles. To the extent that Lyons becomes a traffic bottleneck during the peak tourist season, it increases local greenhouse gas emissions. New approaches could be explored: for example, parking facilities in the Eastern Corridor area, and shuttle service to various destinations, including downtown Lyons.

In regard to landfills, Lyons recently voted against a plan that would have required single hauler trash pickup, and universal composting: to reduce the town’s trash contribution to landfills, where decomposition of organics produce the greenhouse gas methane. There remain regulatory tools that can be employed by Lyons to increase the amount of organic material that is composted rather than sent to landfills. For example, the Town could require town trash haulers to bundle compost bins with their trash pickups. We encourage the Comprehensive Plan to incorporate recommendations provided by the town’s Environmental Sustainability Action Plan.

Climate Change Adaptation

Climate modeling and prediction remain an inexact science, but there is agreement by independent approaches that the climate of Lyons will become significantly warmer and drier on the average, and that this will result in increased fire hazard. The same models also predict an increase in the frequency and magnitude of torrential storms that can lead to flash flooding. These predictions have profound implications for how Lyons (and other regional communities) manage these natural hazards, and for how they plan development over the next ten years.

Drought and Water Supply

Figure 6 shows the national drought situation as of early April, 2021. Like other areas of the western U.S., portions of Colorado have been experiencing very severe drought. For large portions of the state, record-setting drought is predicted for this summer:

“In the past 20 years, the two worst stretches of drought came in 2003 and 2013, but what is happening right now appears to be the beginning stages of something even more severe. And as, in spring, 2021, we head into the summer dry season, the stage is set for an escalation of extreme dry conditions, with widespread water restrictions expected and yet another dangerous fire season ahead” [9].

Droughts are a recurring economic issue in Colorado due to the effect on agriculture and water supplies; they also impact many plant and animal species. Although intervals of drought have always occurred (Figure 7), there is now firm science indicating that they will become more severe and more frequent. Wet years will still occur, but be less frequent. Also, water shortages are being exacerbated by the increasing population, which is putting into competition municipal and agricultural uses. Water supplies are regionally sourced: drought elsewhere in states belonging to the Colorado River Compact will affect water supply to Longmont and to Lyons. The Colorado River Drought Contingency Plan (DCP) was enacted into law in 2019; the Upper Basin areas are required to initiate water conservation if drought lower in the basin occurs.

Towns and cities in the West have long adapted to the dry climate by importing water from the “water towers” represented by the more humid mountains. Colorado River water is shared by all of the basin states and with Mexico, and the agreements that have long governed allocations are now threatened by the common knowledge that the water was over-promised: there is not enough to share, and there will be less in the future. The Town of Lyons will increasingly be affected by a growing regional drought-induced and demand-induced water supply crisis. Like

Map released: April 8, 2021

Data valid: April 6, 2021

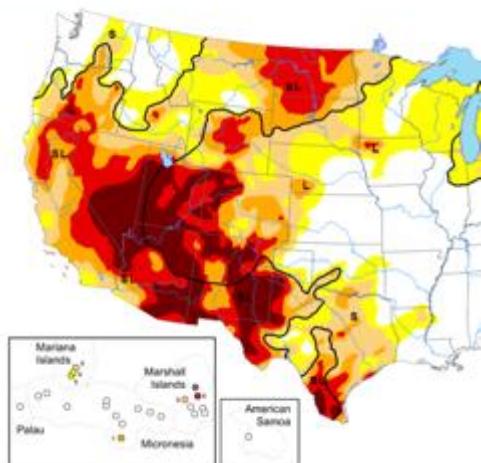


Figure 6. A recent National Drought Monitor map showing severe drought affecting Utah, New Mexico, Arizona, and parts of western and southern Colorado.

other Front Range communities, Lyons must prepare; and cannot itself adapt by locating significant new surface water sources. Presently, the town uses water to irrigate its town park system, including parcels that were, pre-2013, without irrigation. Adding more land maintained by irrigation is counter-productive going forward.

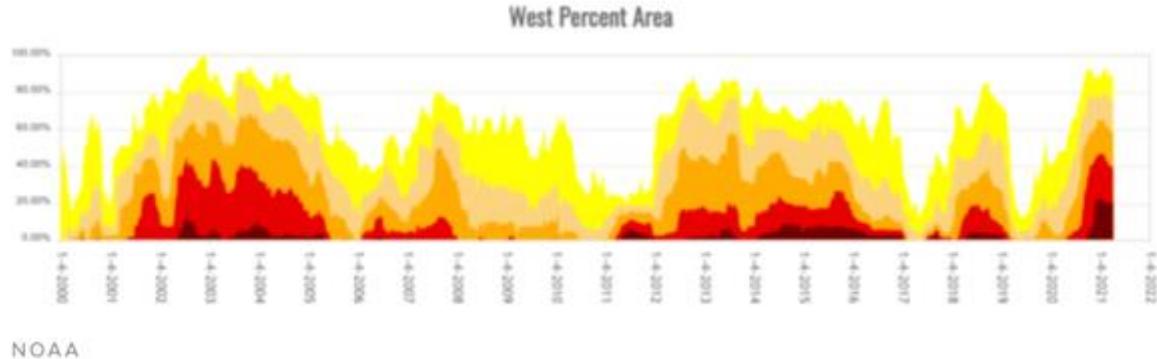


Figure 7. Time series of drought in the western states from 2000 to 2021. The latest, 2020-2021 spike (on the right), exhibits one notable difference: the area of "exceptional drought" (dark brown) is far larger than any earlier drought, with an aerial coverage of over 20%.

EAB recommends that the Comprehensive Plan include a strategy for reducing the town's overall water use. Xeriscaping residential and town park land helps reduce water demand. Low water usage toilets and home appliances are also available. Rainwater harvesting at both residential and municipal addresses is now legal in Colorado law and should be encouraged.

Fire Hazard

With warmer and drier weather conditions comes increasing fire hazard on lands already prone to intermittent wildfire. Portions of the town are considered relatively safe, with no nearby fuel sources. Thus, Bohn Park can function as a fire break for wildfire approaching from the partly-forested private parcels bounding it to the west. Other portions of the town and its planning area are more vulnerable (including the South St Vrain and the Apple Valley planning areas). After the intense fire season of 2020 (Figure 7), there are community efforts underway to produce a more detailed understanding of local risk. Lyons also now fully understands that, even if wildfire does not occur in town, nearby fires bring smoky air and falling ash and strongly impact public health.

Figure 8 is a portion of a regional fire hazard map produced by Boulder County. Housing development can in some cases actually decrease fire hazard, but, in general, it is problematical to extend new housing into areas where surrounding fire hazard is already high, likely to increase, and difficult to mitigate. There are more detailed maps and studies available, including guidelines for mitigation. The usual public safety requirements for easy ingress and egress become critical imperatives in areas of wildfire risk. As is the case for flood hazard (see below), there is a need

for exceptional thoughtfulness regarding new construction which potentially puts new families into harm's way. This care has long been appropriate in the region; it is now more urgent.



Figure 7. The Calwood fire over the Heil Ranch ridge from Lyons Valley Park, October 19 2020. Fires at this time of year in this part of Colorado were once highly unusual but are now becoming more frequent and intense.

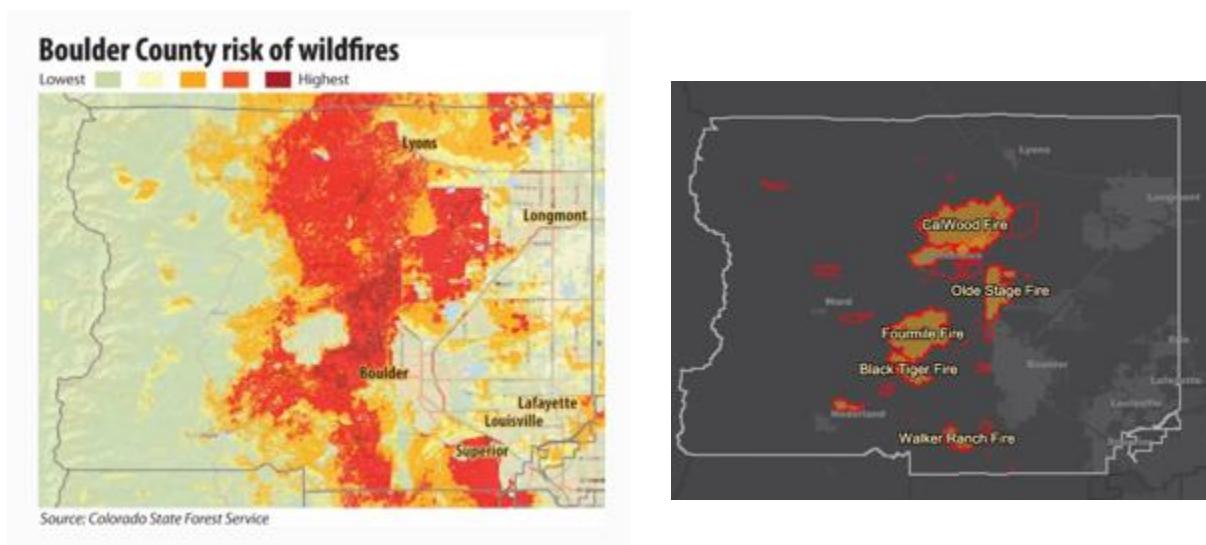


Figure 8. Fire hazard map for Boulder County (left) and the exceptional fire year of 2020 in the County, right.

Flood Hazard

In 2013, historic flooding killed one resident, devastated portions of central Lyons, destroyed a key bridge crossing, rendered inoperative the town's sewage treatment plant, cut all other utilities, prevented resident egress from several Lyons "islands" for 2-3 days, and forced the evacuation of the town for greater than 2 months (Figure 5).

Since then, the size of the regulatory flood discharge (the 100-year recurrence interval flood) has increased by 34% due to re-evaluation of the hydrologic record. Also, a new FEMA flood hazard map has been prepared (Figure 9). As expected, this map increases the extent of the regulatory floodplain at some locations. The 2013 flood is a cautionary tale whose lessons must be heeded. Any claim that "the town cannot plan for a flood of this size" must be rejected; such would ignore the reality of climate change as well as the town's very recent history.

Post-flood, using federal disaster recovery funds, the town commissioned a Stormwater Master Plan. Some of its results are shown in map form (Figure 9). Several areas of evident 100-year flood hazard are not depicted on the FEMA map, but still must be acknowledged in development planning [10]. For example, consider an area of flood hazard from a steep drainage on Heil Valley Ranch ridge. That flooding is shown entering a portion of Bohn Park and the private properties in the South St Vrain Planning area immediately to the west. These hazard areas are not shown on the FEMA map (compare the two maps in Figure 9). A stormwater flood area also enters the Lyons Valley Park subdivision at the western Carter Drive terminus, and thence continues into a significant portion of the subdivision (Figure 9). To our knowledge, this hazard has not so far been addressed in planning for the new Carter Drive affordable housing project. A previously unmapped flood hazard is also depicted in a portion of the Stone Canyon subdivision.

EAB recommends that the flood hazards identified in the town and also its planning areas be fully incorporated into the Comprehensive Plan, and that 100-year areas of stormwater hazard be treated in the same manner as the regulatory floodplains of the two St Vrain Rivers. These areas pose a significant constraint to further development.

In regard to flash flooding from local drainages, Lyons has experienced significant damage at intervals in the 21rst and 20th centuries. Also, though the 2013 flood was clearly a catastrophic event, it was not unprecedented. In 1894, a major flood whose discharge was not measured produced similar effects in town, including the rafting of houses downriver, and a very large "inland sea" on the eastern edge of town and extending into Longmont. Another very large river flood occurred in 1944. Post-2013, USGS hydrologists have cautioned that the future flood that should be of most concern for loss of life is a Big Thompson River, Colorado (1976) type of event. That riverine flash flood, which resulted in 176 fatalities, was the result of a stalled thunderstorm over the headwaters of the drainage. In 2013, a period of three days of extensive rain provided some warning to Lyons residents that the rivers would be rising. In contrast, the Big Thompson flash flood was initiated upstream, at night, and caught downstream population by surprise. It was the deadliest flood in Colorado history, and it occurred in a very similar geographic setting as Town of Lyons.

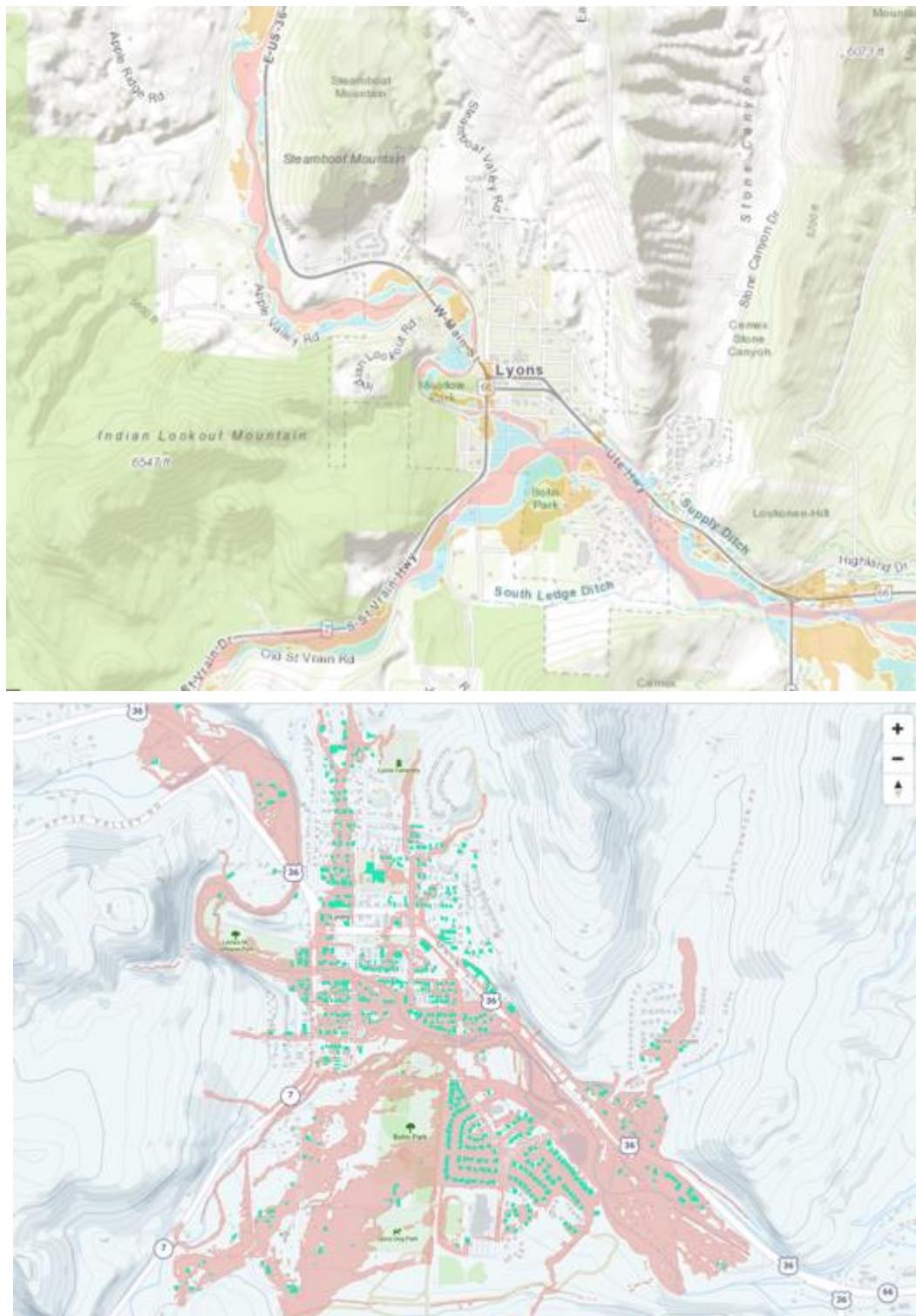


Figure 9. Top: the FEMA floodplain map, showing in blue and light red the 100 year (regulatory) floodplain and the floodway. Bottom: The 100 year flood event as depicted in the Lyons Storm Water Master Plan. The flood hazard areas extending down into Lyons Valley Park (lower center) and from Red Gulch (lower left) are not indicated on the FEMA map, which includes only flooding from the two St Vrain creeks.

In summary, the Town of Lyons and its planning areas will certainly again be subject to major flooding. Flash floods in particular are expected to increase in frequency and magnitude with a warming climate [11]. Some of the river restoration projects that have so far been accomplished were not designed to provide additional protection from such very large events despite this reality. The town's bridges are indeed stronger, its utilities more protected, and the public works facility is now situated on somewhat higher ground. A better flood warning system has been established. But land within the FEMA regulatory floodplain will again be flooded, the areas in the storm water master plan will be as well, and the parks that occupy the floodplain will again suffer some damage. Some rebuilt homes in the floodplain may again be damaged. In the present era of climate change, this hazard will become more severe. *EAB recommends that the town's Comprehensive Plan indicate how planning for future growth addresses the evident need to continue reductions in Lyons' exposure to flood damage*

Declines in pollinator insects and birds

Pollinator insects and bird populations are declining dramatically in many parts of the world, including the U.S. [12-17]. Research implicates monoculture farming, pesticides, and habitat loss. Agricultural lands border Lyons, and herbicides are routinely applied in these and the nearby national forest and national park lands also. The documented declines among moths, beetles, bees, butterflies, other insects, and some bird populations may have local effects. We consider that there are some things Lyons can do, as it plans for its future, and seeks to preserve local industries (such as bee-keeping).

Three reasons why this issue is appropriate to be addressed locally: 1) The preservation of undeveloped lands favor maintenance of healthy native insect and bird populations. 2) When such land is developed, it can become either hostile or friendly to native insect and bird species, depending on the development designs. 3) Although the town can play only a small role in addressing national losses of habitat, and the harmful cumulative effects of pesticides, it can avoid itself contributing additionally to the declines (Figure 10).

Lyons could, for example, promote “pollinator-friendly” land covers and associated “IPM” (integrated pest management), as recommended by the North American Pollinator Protection Campaign and the U.S. Forest Service [18]. In 2021, the Xerces Society was listing 133 city affiliates in 43 states (in Colorado, including Westminster). To be listed, an array of land management practices must be in effect, and an IPM Plan must be in place. Town of Lyons already has such a Plan, and it is in accord with progressive reductions in pesticide/herbicide use. However, the town also must address a legacy of gravel-on-fabric and other hardscape land covers (Figure 10), where weed control has proved difficult to address without synthetic herbicides. The new Comprehensive Plan could include language discouraging the installation of more of this type of public-area landscaping, which also aggravate “urban heat island” effects. It could instead encourage landscapes that help to support insect and bird species and produce a greener and cooler town.

Another factor in protecting bird populations is light pollution. Inclusion of this consideration within the town's Comprehensive Plan could make an important difference to that ecological issue. Bright lights from public facilities such as town parks and schools have long been a contentious issue in Lyons, which is mainly without streetlights. The lighting effects on bird populations, however, are only recently being investigated and are now documented to be significant. According to the National Audubon Society, 70% of birds in North America migrate and more than 80% of them make their seasonal flights at night. Many songbirds are nocturnal migrants. Without the light of the sun, these travelers use the moon and the stars to navigate. Artificial light disrupts bird migration in a variety of ways, including disorienting birds from their routes and causing collisions with buildings. As a result, advocacy organizations (e.g., the "Lights Out" programs) are working to encourage individuals and businesses to take action to reduce light pollution. The National Audubon Society established its first Lights Out Program in Chicago in 1999 and keeps an expanding list of over thirty active Lights Out Programs in the United States. Together, the groups work to educate the public about the ways that light pollution can endanger migrating birds. They encourage reductions in the use of artificial lights at night, especially during peak bird migration periods. Today, both within the present town limits and outside, in the planning areas, the skies above Lyons are mainly dark. *The Comprehensive Plan should include maintenance of this attractive attribute of Town of Lyons into its future.*



Figure 10. Early in 2010, a developer landscaped a strip of town property adjoining McConnell Drive, opposite to its model home (left). The strip was xeriscaped with plants that provided bird and insect habitat. In 2019, after sale of the home, the vegetation was removed (at the request of the town) and the pre-existing landcover (gravel on fabric) was restored (right). This landcover now presents a challenge for weed control; a combination of oryzalin and indaziflam herbicides were sprayed at this location in 2020. Left: landcover is pollinator- and bird-friendly. Right: the gravel-on-fabric landscape being installed is not.

Wildlife and Development

Nature is abundant and visible in the present Town of Lyons in its upland hills, on the river terraces, and within its developed areas. Native wildlife is perhaps especially abundant along the two St. Vrain branches and their associated floodplains and wetlands.

Many residents are aware of how rich with wild nature the town and surroundings are: from the diverse birds and small animals associated with the oak gallery forest remnants on the floodplains, to the local herds of elk and mule deer who use the uplands, to the predator species such as golden eagles and mountain lions. Residents witness the annual migrations and local nesting of bird species. An occasional moose enters town; bighorn sheep are often sighted in its planning areas to the west. Foxes forage in some of the neighborhoods at night, coyotes can be seen hunting in the prairie dog town near the Middle/Senior High School. The golden eagles prey on prairie dogs and on rabbits; an eagle pair nests every year in town, at Lavern Johnson Park. A number of other raptors are common and help control local rodent and snake populations.

Development unavoidably alters the ecosystems it occurs in. These changes commonly benefit some species and have negative effects on others. For example, elk formerly entered the Lyons Valley Park area of town. As building continued, their movements then preferred the uplands of the Heil Valley Ranch ridge, but in recent years they are much less common or are absent on the town side of that ridge. EAB stresses the complex interactions among wildlife known to be part of the present Town of Lyons. There is a need to anticipate any negative effects of development so that they can be mitigated where possible.

Some further examples: black bears visit the town's settled neighborhoods when their native forage is low, or when residents leave their trash unprotected. A small rodent, the Preble's meadow jumping Mouse, has been trapped by wildlife ecologists in Lyons. It is a threatened species and lives along the banks of the town's two rivers. Minks hunt along the St. Vrain river banks. Beaver dams are present, great blue herons fish along the river banks and also on the town's River Park ponds. A wide variety of snake and amphibian species are present. Ducks and geese use the town's parks and its ponds. The ecosystems in the town and nearby properties support local mosquito-hunting bat and swallow populations. Bat houses have been erected by some residents to support these animals. Rainbow and brown trout and other native fish depend on the riverine aquatic insects and other invertebrate prey species that, in turn, depend on river water quality. The town's catch-and-release fishery attracts anglers living throughout the region; few residents would agree with any changes that hurt this asset to the town.

In short, wild nature is still abundant within the Town of Lyons. EAB seeks to conserve such. There is, plainly, a complex and abundant web of wildlife species resident in Lyons that can and should be protected wherever possible. Lyons hosts many species that are missing from other urban or suburban settings. EAB lacks quantitative data to demonstrate this, but the diversity of wildlife in Lyons appears to be unusually high. This may largely be because of the riparian corridor and also the extensive protected lands bordering the town where wildlife habitat is preserved (Figure

11). Some of the species now in Lyons will be extirpated locally if their necessary habitat is lost. The risk to Lyons wildlife from development posed in the coming years will largely be from potential loss of critical habitat. *The Comprehensive Plan for the town should provide development policies that protect wildlife habitat and the abundant and functioning ecosystems this town still retains.*



Figure 11. Cohmap mapping of the protected lands surrounding Town of Lyons. Are these protected lands impediments to development, or outstanding assets for the Lyons community?

One Lyons wild species, in a little more detail. Residents can, quite commonly, see and hear golden eagles. This is one of the Earth's largest bird species and it is an "apex" species, a predator that has a disproportionate influence on prey species and other ecosystem components compared to its numbers. Once widespread across the higher latitudes of the northern hemisphere, it has disappeared from many areas which are now more heavily populated. Many regions of the central and western U.S. lost this species in the 20th Century. Although the use of DDT was one of the major factors, another, still-ongoing factor, is loss of habitat. Golden eagles require large hunting territories (on the order of 60 square miles), and they rely on undisturbed nesting areas: monogamous golden eagle mates return to the same nest year after year. They are likely to abandon nests during incubation if they are disturbed.

In this part of the U.S., the eagles subsist largely on rabbits, prairie dogs and carcasses. They also require a cliff or a lone cottonwood, upon which to perch. They are vulnerable to vehicle collisions if they consume roadkill, and, in Wyoming, relatively large numbers are known to die from either starvation or disease. Wild golden eagles live into their 30s and don't reproduce until they're at least five years old. Thus, the loss of individual adult eagles in a small population can have a great impact; the loss of a nesting site an even greater one. It would be a tragedy for Town of Lyons to



Figure 13. Looking south: the 10-acre town parcel south of the Dog Park fence and west of the school's ball field (see figure 11). This parcel was considered for housing development post-flood, in 2014, even though it is protected by a restrictive covenant. In the middle of the image is a strip of shrub vegetation along the South Ledge Ditch and a trail that continues to trailhead parking on Red Gulch Road. A prairie dog town is located just south of the Ditch trail; coyotes and raptors prey on these rodents.

Health of Lyons Wetlands

Human-induced negative impacts have long been apparent on the St. Vrain branches and their aquatic features and flora and fauna. These include pollution from stormwater, from intervals of very low flow; and from development encroachment on the floodplains and channels which support the aquatic species.

The North St Vrain also recently experienced a gasoline spill from an overturned truck on Route 36 near Apple Valley road which resulted in a massive fish kill. This river's flow is partly controlled by the Buttonrock dam and reservoir upstream. Water supply diversions impact its low flow status and also affect the fishery. In contrast, the South St Vrain is one of the West's few remaining uncontrolled rivers, all the way to its headwaters at high elevation. This makes it a unique asset to the town and preservation of natural flora and fauna is very appropriate. Below their confluence, the combined St Vrain waters thread their way between Route 36, housing, and industrial properties. The water quality is still good, there are trout in the river, and also heavy recreational use in the summer by tubers and kayakers. The river bounds the Eastern Corridor properties, past the intersection of Route 36 and 66. It is a resource that must be preserved, even while flooding along the river is a potential threat to development in that area (figures 9 and 14).

Part of the river landscape is occupied by the town's most natural park (its River Park). This park poses the greatest potential for preservation of pieces of the original wetlands and river floodplain ecology (Figure 14). That noted, the same landscape of riverine forest should be encouraged and preserved through the eastern corridor properties, and also upstream of Lyons. Forest vegetation on the river floodplains retards flood flow, supports healthy soils and wetlands, and provides abundant wildlife habitat. It provides a real ecosystem service. *Town planning should seek to avoid conversion of St Vrain river floodplains and associated wetlands into non-forested landscapes.*

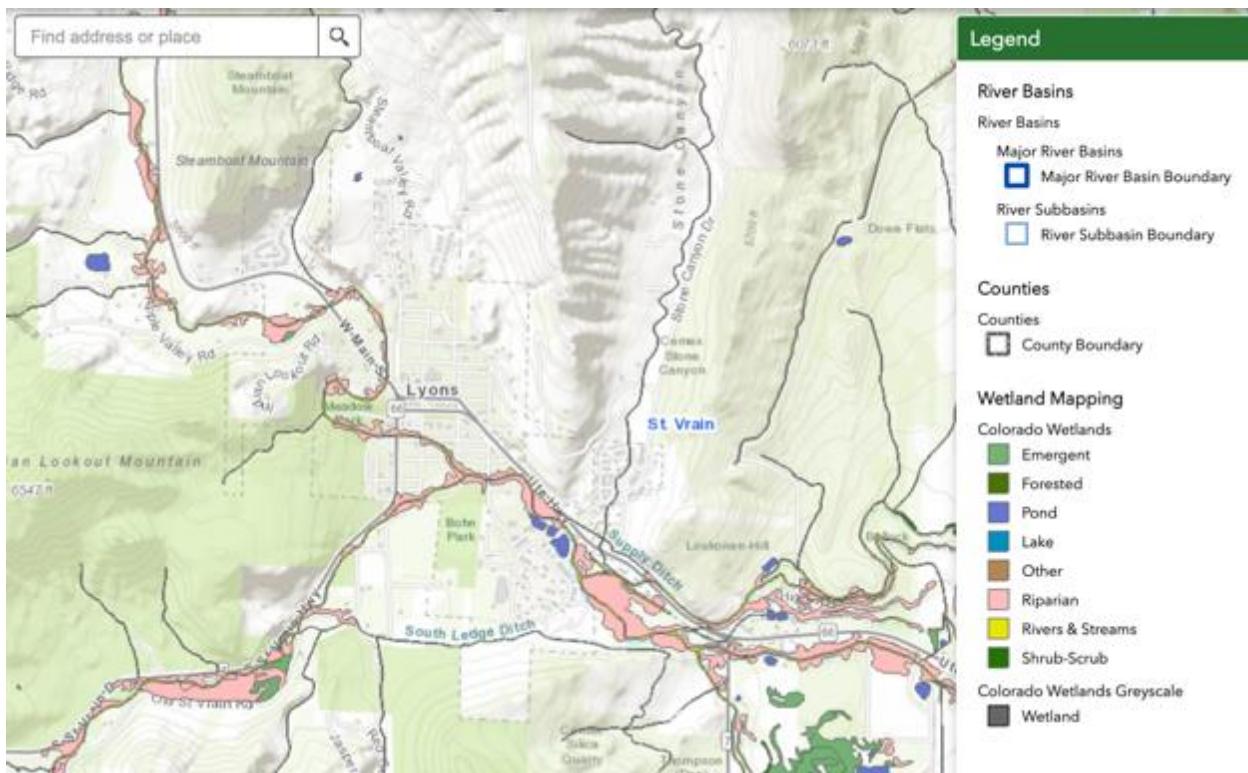


Figure 14. Part of the Colorado wetlands inventory, shown here for Town of Lyons and planning areas. These wetlands are exceptionally valuable as locations of floral and faunal diversity and host remnants of the oak gallery forest ecosystem once found all along the main rivers throughout the eastern foothills of the Front Range. Town of Lyons has a 100 ft setback requirement for any development near wetlands.

As shown in Figure 14, protecting these areas directly impacts development planning decisions in the South St Vrain planning area (lower left, figure 14), the Apple Valley planning area (upper left, figure 14) and the eastern corridor planning area (right side of figure 14). In part, floodplain development regulations help protect these areas from inappropriate development (figure 9). There is also a 100 ft Town of Lyons setback requirement for development near wetlands. *EAB considers that there is a confluence of purpose in discouraging housing or business development on the floodplain for public safety purposes, and for protecting wetlands ecology.*

This is a difficult challenge for Lyons, because a considerable amount of its older developed areas are within the regulatory floodplain and occupy what used to be natural floodplain wetlands. However, given the expectation of increased flooding in the future, and the important ecological resource provided by wetlands, *EAB recommends strict application of floodplain development and wetland setback constraints, and acknowledgement that these properties are a critical resource for the town and the region. They should be protected and preserved.*

There are other sources of potential harm affecting the wetlands in Lyons. One is pollution from storm runoff from the town's storm sewers. These provide unfiltered, sometimes very pollutant-bearing water into the rivers after storm events. Like many other communities, the Town has

acknowledged this negative impact by marking storm sewer inlets with cautionary information (Figure 15). However, at the same time it has allowed (or itself conducted) spraying of synthetic herbicides at locations where transport via storm runoff into the rivers is probable. Some of these chemicals are known to be toxic to fish and other aquatic species. Fertilizers on lawns, pet waste in yards, minor oil spills on the streets all add incrementally to the load of pollutants the rivers and wetlands must accommodate; all of this runoff is untreated.



Figure 15. Left: typical storm sewer warning to the public in Lyons. Right: herbicide spraying by the local Middle/Senior High School at a location next to sewer inlets (yellow marks the spray).

As well as pollution affecting water quality, the increasing amount of land drained by storm sewers and covered by impervious ground has a negative effect on the rivers' flow regime and on flood hazard: flooding is increased, as all runoff in these areas is delivered quickly to the rivers. The effect is opposite of the dampening induced by forested floodplains. Continued increases in impervious area drained by storm sewers can combine to make the St. Vrain rivers more "flashy", and quickly responsive to local storms, with resulting effects on sediment load and water quality.

The health of our rivers is central to Lyons; they pose both a great hazard and strong ecological and public recreation benefits. *EAB recommends that the effects of development, and the accompanying expansion of impervious land cover and related storm sewers be incorporated into the town's Comprehensive Plan. Wise planning would minimize the creation of more impervious land cover.*

In this regard, Figure 16 illustrates the present land cover on a piece of private land soon to be converted to the Carter Drive affordable housing development. The land is currently providing wildlife habitat some of which will be lost. Less obvious are the predictable effects of the housing development on the St Vrain river. The town's stormwater master plan shows a major 100-year



Figure 16. Portion of the Carter Drive development site south of McConnell Drive. Heil Valley Ranch ridge in background.

flood drainage route from the Heil Valley Ranch ridge downslope, and thence into the western leg of the platted Carter Drive and its junction with McConnell Drive (and then along the road and into one or more storm sewers; see figure 9). After development, much the land shown in Figure 16 will be mainly impervious ground and drained by storm sewers into the McConnell Drive sewers. The development will increase flood runoff directly into the St Vrain Creek. Although some of the effects are specific to this proposed housing and road site, wherever such development occurs, another increment of impervious ground is added, and further cumulative impact on the St. Vrain. This would be the same in all three planning areas, but with wise planning, such negative effects on the St Vrain can be avoided. The Town should guide development in order to retain a healthy river hydrology and associated fishery and wetlands.

Public Engagement

EAB believes that public engagement as a Comprehensive Plan is prepared should not be limited to meetings, but instead acknowledge that many residents care about their town but cannot participate in public meetings and make their voices heard in person. EAB recommends that the engagement process include public surveys of all residents by mail: so that Plan preparation can be data-driven. Given the importance of this planning effort, EAB believes obtaining objective information from as many residents as possible should be mandatory.

Sample mail survey questions that EAB suggests on the issues raised here are:

- “Do you believe that the Town of Lyons should pursue policies designed to encourage annexations and further housing development?”
- “Is housing and commercial development desirable for Lyons via annexation of nearby properties, or would you prefer that the Town only support business and housing development on the existing built areas of the town?”
- “Should the Town plan for increasingly scarce and expensive water by incentivizing conservation?”
- “Is it acceptable for the Town to convert some park and open space properties into housing and commercial development?”
- “Should the St. Vrain river branches and their associated floodplains and wetlands be kept in their natural forested condition whenever possible?”

EAB recommends that the consultant obtain objective information regarding growth, ecological, and open space issues from all of the town's residents via mail surveys, and provide those results in the Comprehensive Plan as a record of town aspirations at this time.

Closing Statement

The executive summary at the front of this document summarizes some specific concerns EAB provides for the Comprehensive Plan process. These are all described at more length in the text. We close with a broad question, one which has no “right” answer. However, it is central to the Comprehensive Plan, which, across the state, is mandated to be more than simply a vehicle for facilitating economic growth and development.

Thus, from the 2010 Plan:

“Purpose: The Lyons Comprehensive Plan provides the framework for decisions that affect the Town's physical, social and economic realm. It is intended to provide a foundation for policy direction, land use decisions and public investments. It can also help the Town prioritize and direct resources toward specific initiatives that will help achieve the community's goals.”

What should be this community's goals? Lyons could, if it takes relevant policy action, continue to grow. Or it could instead choose to redevelop existing areas of town and remain geographically constricted; even as its mix of commercial, industrial, and residential properties will likely change over time. The Plan could, in other words, focus on the steps needed to sustain and improve the town's quality of life.

Should Lyons continue to plan for growth? EAB considers that development comes at a cost, and that residents can and should consider different options for the future of their town and weigh the costs and benefits. The updated Plan will be an important document that guides the town on these matters for the next decade. Over the years, and especially after the damaging flood of

2013, many voices have spoken to the need for more growth and economic development in Lyons. However, at this juncture in the town's and the region's history, EAB believes it must point out the costs of more growth. From our perspective, and given our mission within town governance to "advocate for a balanced ecosystem", EAB stresses the importance and centrality of the following question. We urge that the Comprehensive Plan provide a means for the community to address it:

"On issues like annexation for large-scale development, the people deserve a voice. Growth for growth's sake in Lyons is not the answer. Witness the changes caused by growth along the Front Range in the past 30 years, then reflect on whether you wish Lyons to be part of the diminished quality of life, traffic nightmares and pollution. We have a unique town. We're surrounded by conserved open space, unbuildable slopes and a national forest, all of which serve as brakes on rampant development. The town is within a blink of total buildout within its limits; the only way to grow is to expand and annex. But is that what you want?"

-G. Lowell, Town Trustee.

References Cited

1. Lyons, *Lyons Primary Planning Area (LPPA) Master Plan, Comprehensive Plan Amendment and Three-Mile Plan*. 2017.
2. Lyons, *Town of Lyons Comprehensive Plan*.
<https://www.townoflyons.com/DocumentCenter/View/155/2010-Comprehensive-Plan-PDF>, 2010.
3. Lyons, *Recovery Action Plan*.
<https://www.townoflyons.com/DocumentCenter/View/388/LyonsRecoveryActionPlan-FullResolution?bidId=>, 2014.
4. EAB, *Sustainable River Corridor Action Plan for the Town of Lyons, Colorado*.
<https://www.townoflyons.com/DocumentCenter/View/37/Sustainable-River-Corridor-Action-Plan-PDF?bidId=>, 2014: p. 20.
5. Lyons, *Land use and management plan for deed-restricted buy-out properties (DRBOP)*.
<https://www.townoflyons.com/DocumentCenter/View/1477/Lyons-DRBOP-Final-Plan>, 2017.
6. Williamson, C., *Is No Growth Also Smart Growth?*
<https://www.planetizen.com/node/43>, 2002.
7. Lyons, *Lyons Primary Planning Area (LPPA) Master Plan: 3-Mile Plan and Proposed Amendment to the Lyons Comprehensive Plan*.
<https://www.townoflyons.com/DocumentCenter/View/948/LPPA-Master-Plan-Final?bidId=>, 2017: p. 85.
8. WSJ, *Battle Brews Over Banning Natural Gas to Homes*. Wall Street Journal, 2021.
<https://www.wsj.com/articles/battle-brews-over-banning-natural-gas-to-homes-11622334674>.

9. Berardelli, J., *Western U.S. may be entering its most severe drought in modern history.* <https://www.cbsnews.com/news/drought-western-united-states-modern-history/>, 2021.
10. ICON ENGINEERING, I., *Lyons Stormwater Master Plan.* 2016.
11. Stanley, S., *Extreme rainfall statistics may shift as U.S. climate warms.* Eos, 2021. **102**.
12. 360, Y.E., *VANISHING ACT: What's Causing the Sharp Decline in Insects, and Why It Matters.* Published at the Yale School of the Environment, 2016.
13. Cameron, S.A.a.o., *Patterns of widespread decline in North American bumble bees.* PNAS, 2011. **108**: p. 662-667.
14. Grixtia, J.C., et al., *Decline of bumble bees (Bombus) in the North American Midwest.* Biological Conservation, 2009. **142**: p. 75-84.
15. Li, Y., R. Miao, and M. Khanna, *Neonicotinoids and decline in bird biodiversity in the United States.* Nature Sustainability, 2020. **3**: p. 1027-1035.
16. Rosenberg, K.V.a.o., *Decline of the North American avifauna.* Science, 2019. **366**: p. 120-124.
17. Wagner, D.L., et al., *Insect decline in the Anthropocene: Death by a thousand cuts.* PNAS, 2021. **118**
18. USFS, NAPPC (North American Pollinator Protection Campaign) *Pollinator Friendly Practices* 2020.