From: Robert Wells
To: bvcpchanges@bouldercolorado.gov
Subject: No more jobs
Date: Saturday, August 27, 2016 11:24:18 PM

I am amazed that the city is not moving aggressively to **curb all future growth of the job base** here in Boulder. Please register me as one who advocates this policy: no more job growth, no more courting of companies to move here, no more helping nurture startups, and encourage companies to move away from Boulder if they are considering doing so. Terrible errors were made in past years letting the employment base grow rapidly while housing was kept relatively static. We have too many incommuters, too much traffic, and too many developers building more, and more, and more, office space. Permits for building any more office space should be curtailed, period.

Sincerely

Robert Wells
3460 4th St
Boulder 80304

Bob Wells

Email: bobwells2@me.com
boulderreporter.com
huffingtonpost.com/bob-wells
lennoxresearch.com/people
Office: (303) 447-3400
Cell: (303) 746-9928

From:	Barbara Hill
To:	council@bouldercolorado.gov; commissioners@bouldergov.org; #LandUsePlanner; boulderplanningboard@bouldercolorado.gov; Ellis, Lesli; hyserc@bouldercolorado.gov; zachariasc@bouldercolorado.gov; hirtj@bouldercolorado.gov
Cc:	Fogg, Peter; Shannon, Abigail; Giang, Steven; Barbara Hill
Subject:	Input regarding potential new policy concerning affordable housing
Date:	Sunday, August 28, 2016 7:09:37 AM

Dears Officials,

I am writing to express my disagreement with your proposed new policy regarding affordable housing. Please do not implement these changes. I hope you realize that the term "community benefit" is a euphemism.

It seems to me that the reasons you are considering these alterations are largely a result of your own previous policies. You have allowed big developments of expensive apartments, and you have allowed developers to give you cash in lieu of including affordable units in their expensive buildings. Now you are looking to build big, relatively cheap apartment blocks.

You should be aware of the negative consequences of these large, relatively cheap (thus "affordable") apartment blocks. Residents of such edifices frequently disdain such sequestration and believe that they should be included in other buildings, not tenements.

For once, please consider the opinions of long-time Boulder residents.

Barbara Hill

> **Potential New Policy: Commuity Benefit of Affordable Housing**
> *Key Policy Choice: Staff is currently analyzing a request from affordable housing providers and Boulder Housing Partners regarding a new policy that explicitly recognizes affordable housing as a community benefit that should receive special consideration, including:*
> *• regulatory changes that unlock more "diverse housing" opportunities.*
> *• priority review to meet funding timelines and improve overall project feasibility.*

• clear guidance on areas open to community input.

From: Scott Papp
To: bvcpchanges@bouldercolorado.gov
Subject: comments on BVCP
Date: Sunday, August 28, 2016 8:09:56 AM

Dear Comp Plan Team,

Please remove the LOS clause "for all modes." The existing Master Plans do not indicate the measure regarding "all modes."

Please do not move forward with meetings and public engagement until you have released the draft plans. I am concerned about large-scale changes to the underlying land use designations. But it is impossible to understand your thinking, since **no details** have been released. You should not claim public engagement when the public has not seen the most critical maps and plans.

Please remove mention of "Complete Streets" from the plan. There has obviously been significant disagreement amongst the community with this concept. The BVCP should not move further into the unknown concept of Complete Streets, without that term having a precise form of implementation in the City.

Best regards,
Scott

From: JOHN DRIVER
To: bvcpchanges@bouldercolorado.gov
Subject: We need to Manage Growth
Date: Monday, August 29, 2016 7:12:41 PM

Please take this as my feedback from tonight's meeting at the Presbyterian Church.

The Policy for Option 1 is D – manage the growth in non-residential structures. Do that until we get a better balance of jobs vs. commuters

At the same time utilize Option 1 Policy C – wrap new residential around existing industrial buildings as the top priority for new living structures.

Then after C is exhausted move on the Policy B & A.

Thank you,

John Driver

From:	Kristin Bjornsen
To:	#LandUsePlanner
Subject:	Letter for Planning Commission regarding BVCP policy changes
Date:	Monday, August 29, 2016 12:06:09 PM

Dear Planning Commission,

I saw that the BVCP Open House will discuss proposed policy changes. While some of the changes seem beneficial, several appear to significantly weaken Boulder's environmental protections. To borrow a friend's phrase, they add a lot of "wiggle words."

Although I don't have the knowledge to speak to all the proposed changes, I pasted below my concerns about four of them.

Thanks for your time,

Kristin

1) 3.09 Urban Environmental Quality. The following changes are proposed:

"the city will develop community wide programs and standards for new development and redevelopment ~~so that negative~~ to mitigate environmental impacts ~~will be mitigated~~to the extent possible and seek opportunities to improve urban environmental quality when practicable.vi ~~and overall environmental quality of the urban environment will not worsen and may improve~~.

COMMENT: Currently, Policy 3.09 has a strong standard that "the environment will not worsen and may improve." The proposed change strikes that out. Instead it adds these extremely subjective standards: Environmental impacts will be mitigated "to the extent possible" and improved "when practicable." This sets a much lower bar.

2) BVCP Core Values. This paragraph is added:

"The city and county strive to support all of the values listed below but recognize that may not be possible with each and every decision. They are not listed in any priority order. Careful consideration of important tradeoffs among these values and all the plan's policies should be employed in implementing the Boulder Valley Comprehensive Plan."

COMMENT: This is a rather vague and subjective standard also. Policies and decision makers need objective standards. This paragraph could become a permission slip to pick and choose whichever policies support a project de jour.

That defeats the purpose of a Comprehensive Plan. This subjective standard also makes things unpredictable for property owners and citizens, because they would never know which policies will be waived aside and which ones enforced.

3) In 3.04, Ecosystem Connections and Buffers, the word "undeveloped" is deleted.

"The city and county will work together to preserve, enhance, restore and maintain ~~undeveloped~~ lands critical for providing ecosystem connections and buffers for joining significant ecosystems."

Why are they deleting the word undeveloped? This could be interpreted as green-lighting development as long as token mitigation efforts are made. Perhaps a better option is, at the end of the paragraph, to add a sentence such as, "Efforts also will be made to enhance connections and buffers on already developed land."

4) In Policy 3.04, this new paragraph is added (highlighting is mine):

Urban areas also are important for supporting biodiversity and maintaining wildlife habitat. Efforts should be made to best use and manage public lands to optimize the quality and quantity of natural habitat and provide connections and corridors within the urban built environment between natural lands to support movement of native organisms. The city and county recognize the importance of buffers to mitigate the effects of urban and intensive land uses and human activity upon natural areas and where practicable will work together to establish and maintain buffers between areas of urban development and high levels of human activity and those with significant ecological value. **iii**

Why does the second sentence refer just to "public lands"? That will limit the effectiveness of connections. Also, the goal of the BVCP is to best use and manage ALL lands.

The words "where practicable" and "significant" are rather nebulous qualifying words. They could also offer an easy out to environmental protection.

From: Mark W Ely
To: bvcpchanges@bouldercolorado.gov
Subject: Support for Policy Option D
Date: Thursday, September 01, 2016 7:20:27 AM

We cannot build ourselves out of our housing problems. Our infrastructure can only support a limited population so we must limit our future commercial and job growth. If not we will be left with a city that is a California-like nightmare that no one will enjoy. Therefore I support Policy Option D.

Mark Ely
1821 Mapleton Avenue
Boulder, 80304

From: Klein,Christine Ann
To: bvcpchanges@bouldercolorado.gov
Subject: Support for policy option D
Date: Thursday, September 01, 2016 8:34:56 AM

Dear planning staff,

I am writing to express my strong support for Policy Option D.

Please slow down yet more commercial growth. Somewhere along the line (without any citizen input that I can recall), the City decided that Boulder is (or should become) a regional job center. Who decided that? It is certainly not my goal. We have already reversed the flow on I-36 such that there is more traffic coming into than leaving Boulder each morning for the daily commute. We don't need to cater to yet more commercial development and employers.

Thank you.

Christine Klein

1821 Mapleton Avenue

Spence, Cindy

From: Karen Hollweg <khollweg@stanfordalumni.org>
Sent: Thursday, September 08, 2016 5:50 PM
To: boulderplanningboard
Subject: Revision Suggestions for BVCP Draft Sec.3 Natural Environment Policies
Attachments: Ch1_Section_3_Natural_environment-DRAFT_8.24.16_+pbkhda revisions.docx

John, Bryan, Leonard, John, Crystal, Liz, Harmon

I am sending to you (attached) a copy of the Aug. 24, 2016 Sec. 3 Natural Environment Policies BVCP Draft in which we have added our suggestions for revision.

The 5 of us who have worked to produce this document have each been involved in the city's deliberations and decisions about open space and natural resource issues for decades, and believe our suggestions provide important updates, add a bit more clarity/specificity, and reflect our community's core values. We would like to ask you to consider our suggestions as part of the Planning Board's review of BVCP Policies and to include them in the final draft that you are preparing now.

With respect,
Karen Hollweg
Pat Billig
Dave Kunz
Allyn Feinberg
Ray Bridge

3. Natural Environment[i]

No new title. Natural Environment must be addressed separately and not mixed with transportation, recycling, or other "sustainability" or energy issues. The natural environment in general, and open space lands in particular, are what make Boulder such an attractive and special place.

Proposed new section title: ***Environmentally Sustainable Community.***

Note: This may be combined with other policies around energy and climate in addition to agriculture and food policies relating to land and environment. Also please note that a further round of editing will occur to improve organization, reduce verbosity and redundancies, and renumber policies as necessary.

In this section, the "natural environment" includes city and county open space lands as well as the environment within the urban area. Preservation and protection of ~~T~~the natural environment that characterizes the Boulder Valley is a core community value that has defined Boulder since the end of the 19th century. Within the Boulder Valley's complex ecological system, there are inextricable links among the natural environment, plants and animals, the built environment, the economy and community livability. ~~These natural and human systems are connected to the region and world, and~~ c Changes to the natural ecosystems within the Boulder Valley can have a profound effect on their viability and the quality of life desired by Boulder Valley citizens.

Over many decades, at the urging of and with the financial support of local citizens, the city and county have actively protected and managed open space around the urban area, and city and county open space plans and policies apply to those public lands acquired and managed as habitat conservation areas, natural areas, recreational areas, and agricultural areas. ~~or used for other purposes, such as agriculture.~~[ii]

As in the rest of the world, ~~T~~the ~~climate of the~~ Boulder Valley climate is changing. ~~has warmed and dried over the past three decades, and the potential for f~~Further changes and intensified weather events ~~because of climate change~~ heighten the need for the city and county to proactively ~~strengthen intervention and investment in natural resources (e.g. urban forestry, wetland and groundwater protection, and natural hazard mitigation) to~~ reduce risk and protect resources. Overall strategies need to include protection of the remaining large blocks of open space land that support the long-term viability of native plants and animals, active maintenance of stream flows and capacities, and more focus on the interface between the natural and urban environment to better understand how to work with natural systems instead of against them. ~~The more the community can assess risks of changes due to climate change and be prepared to preserve and protect environmental resources, the better prepared the community can be for mitigating the causes and impacts of those changes to the natural environment.~~

~~The natural environment that characterizes the Boulder Valley is a critical asset that must be preserved and protected. It is the framework within which growth and development take place. The city and county recognize that the Boulder Valley is a complex ecological system and that there are inextricable links among our natural environment, the economy,~~

~~the built environment and community livability. The Boulder Valley is an open system in that our natural and human systems are connected to the region as well as to the entire world. The city and county acknowledge that regional and global changes can have a profound effect on the local environment and that the local economy and built environment can have adverse impacts on natural systems beyond the Boulder Valley.~~

Boulder has been at the forefront of environmental protection and preservation for many years. ~~The predominantvast amount~~ Sixty-three percent of the land in the Boulder Valley Comp Plan area has been protected by the city and county as open space to support critical habitat for native plants and animals and agricultural productivity, and contribute~~s~~ to the high quality of life for residents ~~and critical habitat for native plants and animals~~. The community's historic and on-going emphasis on clean air and water, flood plain management, and preservation of native habitats has resulted in significant progress toward a sustainable, resilient and healthy urban environment.

The city and county ~~places strong emphasis on being a leader and role model to other communities for its exemplary environmental protection practices and accomplishments. The city~~ will continue to identify and ~~develop and~~ implement ~~state-of-the-art~~ environmental policies both community wide and within the city government organization to further ~~its~~ environmental sustainability goals.

The policies in this section support the following city and county goals related to the conservation and preservation of land, water, air resources and pollution prevention and resilience:

- Protecting Native Ecosystems and Biodiversity ~~and Native Ecosystems~~
- Enhancing Urban Environmental Quality
- Protecting Geologic Resources and Reducing Risks from Natural Hazards
- Sustaining Water and Air Quality

Reaching these goals requires an overall planning and management strategy that incorporates an understanding of ecological systems and uses adaptive management principles for monitoring and course corrections.

3.1 Incorporating Ecological Systems into Planning

The city and county will approach planning and policy decisions in the Boulder Valley through an ecosystem framework in which natural regions like bioregions, airsheds and watersheds are considered and incorporated into planning.

3.2 Adaptive Management Approach

The city and county will employ an adaptive management approach to resource protection and enhancement. An adaptive management approach involves ongoing monitoring of resource conditions, assessment of the effectiveness of management actions, revision of management actions based on new information from research, and learning from experience what works and what does not.

Protecting Native Ecosystems and Biodiversity ~~and Native Ecosystems~~

3.3 Natural Ecosystems

The city and county will protect and restore significant native ecosystems on public and private lands through land use planning, development review, conservation easements, acquisition and public land management practices. The protection and enhancement of biological diversity and habitat for state and federal endangered and threatened species ~~and state~~, as well as ~~county~~ critical wildlife habitats/migration corridors, environmental conservation areas, high biodiversity areas, rare plant areas, and significant natural communities and local species of concern will be emphasized.[iii] Degraded habitat may be restored and selected extirpated species may be reintroduced as a means of enhancing native flora and fauna in the Boulder Valley.

3.4 Ecosystem Connections and Buffers

The city and county recognize the importance of preserving large areas of unfragmented habitat ~~in~~to support~~ing~~ the biodiversity of its natural lands and viable habitat for native species. The city

and county will work together to preserve, enhance, restore and maintain ~~undeveloped~~land~~s~~ identified as critical and having significant ecological value for providing ecosystem connections and buffers to support the natural movement of native organisms (e.g., wildlife corridors) between ~~for joining significant~~ ecosystems.

(Note: Suggest adding new policy language to "Built Environment chapter" to address conservation and design of open space connections and buffers in urban areas, recognizing that urban lands can also be important for supporting biodiversity and maintaining wildlife habitat.)

3.5 Maintain and Restore Natural ~~Disturbance and~~ Ecological Processes

Recognizing that natural ecological processes, such as wildfire and flooding, are integral to the productivity and health of natural ecosystems, the city and county will work to ensure that, when appropriate precautions have been taken for human safety and welfare, ecological processes will be maintained or ~~mimicked~~ replicated in the management of natural lands.

3.6 Wetland and Riparian Protection

Natural and human-made wetlands and riparian areas are valuable for their ecological ~~and, where appropriate, recreational~~ functions, including their ability to enhance water and air quality and reduce the impacts of flooding. Wetlands and riparian areas also function as important wildlife habitat, especially for rare, threatened and endangered plants, fish and wildlife. The city and county will continue to support and develop programs to protect, ~~and~~ enhance, and educate the public about the value of wetlands and riparian areas in the Boulder Valley. The city will strive for no net loss of wetlands and riparian areas by discouraging their destruction. ~~or requiring the creation and restoration of wetland and riparian areas i~~In the rare cases when development in urban areas is permitted and the filling of wetlands or destruction of riparian areas cannot be avoided, the creation and restoration of wetland and riparian areas will be required to mitigate the loss. Management of wetland and riparian areas on open space lands is ~~also covered~~addressed in the OSMP Grasslands Ecosystem Management Plan.

3.7 Invasive Species Management

The city and county will promote efforts, both public and private, to prevent the introduction or limit and reduce areas and opportunities for growth ~~culture~~ of invasive, ~~and~~ non-native plant and animal species and seek to prevent or control their spread. High priority will be given to managing invasive species that are defined and listed by the Colorado Noxious Weed Act and have, or potentially could have, a substantial impact on city and county resources. ~~Management of both non-native and non-local native species will be based on weighing impacts vs. benefits that includes documented threats to species of concern specific to each site, acknowledging that some non- native species may have become naturalized. Management decisions should also take into account changing species composition due to climate change and other human impacts, as well as the role in the ecosystem provided by each organism based on the best available science.~~[iv]

3.8 Public Access to Public Lands

Certain city and county-owned or managed lands provide a means for educating users on the importance of the natural environment. Public lands may include areas for recreation, preservation of agricultural use, preservation of ~~-~~ unique natural features, and preservation of wildlife and plant habitat. Public access to natural lands will be provided where appropriate and where it can be adequately managed and maintained, ~~for,~~ except where closure is necessary to protect areas from unacceptable degradation or impacts to agriculture, habitat or wildlife; ~~,~~ provide for public safety; ~~,~~ or reduce visitor conflicts ~~or limits on access necessary to preserve the quality of the visitor experience~~.

See New Policy at the End of Section 3

~~New Policy: Climate Change Preparation and Adaptation~~

~~The city and county are both working on climate mitigation and recognize that adaptation plans will be necessary as well. To prepare open space lands and natural areas for climate change, the city and county will consider allowing or facilitating ecosystems' transition to new states in some sites (e.g., newly adapting plants and wildlife) and increasinge the stability and resiliency of the~~

~~natural environment elsewhere. Biological indicators can help to identify high risk species for monitoring and/or relocations and may conduct restoration projects using arid-adapted ecotypes or species. Open space master plans guide other topics related to climate change, such as visitor experiences to open space.~~[v]

Urban Environmental Quality

3.9 Management of Wildlife-Human Conflicts

The city recognizes the intrinsic value of wildlife in both the urban and rural setting. The city will promote wildlife and land use management practices to minimize conflicts with residents and urban land uses while identifying, preserving and restoring appropriate habitat for wildlife species in the urban area. When a wildlife species is determined to be a nuisance or a public health hazard, a full range of alternative wildlife and land use management techniques will be considered by the city and county in order to mitigate the problem in a manner that is humane, effective, economical and ecologically responsible.[vi]

3.10 Urban Environmental Quality

To the extent possible, the city and county will seek to protect the environmental quality of areas under significant human influence such as agricultural and urban lands and will balance human needs and public safety with environmental protection. The city will develop community-~~-~~wide programs and standards for new development and redevelopment so that negative environmental impacts will be mitigated and overall environmental quality of the urban environment will not worsen and may improve.

3.11 Urban Forests

The city will support, promote and, in some cases, regulate the protection of healthy existing trees and the long-~~-~~term health and vitality of the urban forest in the planning and design of public improvements and private development. Urban canopy plays an important role in a semi-arid climate in ameliorating the role of climate change; ~~t~~therefore. ~~T~~the city will~~l~~ guide short- and long- term urban forest management.[vii] that encourages overall species diversity and, native and low water demand tree species~~ where appropriate~~.

3.12 Water Conservation

The city and county will promote the conservation of water resources through water quality protection, public education, monitoring and policies that promote appropriate water usage. The city will endeavor to minimize water waste and reduce water use during peak demand periods by, e.g., promoting xeriscaping. New development and redevelopment designed to conserve water will be encouraged.

3.13 Integrated Pest Management

The city and county will discourage ~~encourage efforts to reduce~~ the use of pesticides and synthetic, inorganic fertilizers.[viii] In its own practices, the city and county will carefully consider when pest management actions are necessary and focus on creating healthy and thriving ecosystems to lower pest pressure by natural processes. When pest management is necessary, the city commits to the use of ecologically-based integrated pest management principles, which emphasize~~s~~ the selection of the most environmentally sound approach to pest management and the overall goal of reducing or eliminating the dependence on chemical pest-control strategies. When public or environmental health risks are identified, the city will balance the impacts and risks to the residents and the environment when choosing ~~management~~control measures.[ix]

New Policy: Soil Carbon Sequestration

The city recognizes that soil sequestration has a range of potential benefits, including water retention, soil health and stabilization. The city and county will consider soil sequestration strategies, including land management practices in cultivated agricultural areas that may be used to sequester carbon out of the atmosphere, and explore opportunities to incentivize carbon sequestration.[x]

The capacity of native grasslands and forests to sequester carbon will be especially important in this effort and native grasslands and forests will be maintained wherever possible to accomplish this objective.

(Note: This policy will continue to be refined.)

Geologic Resources and Natural Hazards

3.14 Unique Geological Features

Due to its location at the interface of the Great Plains and the Rocky Mountains, the Boulder Valley has a number of significant or unique geological and paleontological features. The city and county will ~~attempt to~~ protect these features in situ from alteration or destruction through a variety of means, such as public acquisition, public land management, land use planning and regulation, and density transfer within a particular site.

3.15 Mineral Deposits

Deposits of sand, gravel, coal and similar finite resource areas will be delineated and managed according to state and federal laws and local government regulations. ~~Mineral deposits and other non-renewable resources will be used with the greatest practical efficiency and the least possible disturbance to existing natural and cultural resources.~~ The use of~~of mineral deposits and other~~ non-renewable resources will be ~~evaluated~~ consideed~~r~~ ed~~ing~~ only when conservation and recycling is not a feasible alternative. The impacts of resource use will be balanced against,~~the need for these resources and~~ other community values and priorities, including environmental ~~such as natural~~ and cultural resource protection, ~~community and environmental~~ health concerns and carbon emission reduction. ~~-~~ The city and county will work together to limit drilling and mining impacts by acquiring~~e~~ mineral rights. ~~as appropriate.~~[xi]

3.16 Hazardous Areas

Hazardous areas that present danger to life and property from flood, forest fire, steep slopes, erosion, unstable soil, subsidence or similar geological development constraints will be delineated, and development in such areas will be carefully controlled or prohibited.

3.17 Erosive Slopes and Hillside Protection

Hillside and ridge-line development will be carried out in a manner that, to the extent possible, avoids both negative environmental consequences to the immediate and surrounding area and the degrad~~a~~tion~~ing~~ of views and vistas from and of public areas. Due to the risk of earth movement and/or mud slides ~~under adverse weather conditions~~, special attention needs to be paid to soil types and underlying geological strata before and during planning, design and construction of any urban or recreational (e.g., trails) development on or at the base of hillsides.[xii]

3.18 Wildfire Protection and Management

The city and county will require on-site and off-site measures to guard against the danger of fire

in developments adjacent to natural lands and consistent with forest and grassland ecosystem management principles and practices. Recognizing that fire is a widely accepted means of managing ecosystems, the city and county will integrate ecosystem management principles with wildfire hazard mitigation planning and urban design.

3.19 Preservation of Floodplains

Undeveloped floodplains will be preserved or restored where possible through public land acquisition of high hazard properties, private land dedication and multiple program coordination. Comprehensive planning and management of floodplain lands will promote the preservation of natural and beneficial functions of floodplains whenever possible.

3.20 Flood Management [xiii]

The city and county will protect the public and property from the impacts of flooding in a timely and cost-effective manner while balancing community interests with public safety needs. The city and county will manage the potential for floods by implementing the following guiding principles: a) Preserve floodplains; b) Be prepared for floods; c) Help people protect themselves from flood hazards; d) Prevent unwise uses and adverse impacts in the floodplain; and e) Seek to accommodate floods, not control them. The city seeks to manage flood recovery by protecting critical facilities in the 500-year floodplain and implementing multi-~~-~~hazard mitigation and flood response and recovery plans.

3.21 Non-Structural Approach

The city and county will seek to preserve the natural and beneficial functions of floodplains by emphasizing and balancing the use of non-structural measures with structural mitigation. Where drainageway improvements are proposed, a non-structural approach should be applied wherever possible to preserve the natural values of local waterways while balancing private property interests and associated cost to the city. Flood insurance will be required for all residential or commercial buildings and structures in identified and mapped floodplains.

3.22 Protection of High Hazard Areas

The city and county will prevent redevelopment of significantly flood-damaged properties in high hazard areas. The city, following the county's lead, will prepare a plan for property acquisition and other forms of mitigation for flood-damaged and undeveloped land in high- hazard flood areas. Undeveloped high hazard flood areas will be retained in their natural state whenever possible. To reduce risk and loss, ~~In urban areas, c~~~~Compatible uses of~~ riparian corridors will be preserved~~, such~~ as natural ecosystems, and wildlife habitat and wetlands will be protected.~~encouraged wherever appropriate. Trails or other open recreational facilities may be feasible in certain areas.~~[xiv]

3.23 Larger Flooding Events

The city and county recognize~~s~~ that floods larger than~~ae~~n the 100-year event will occur resulting in greater risks and flood damage that will affect even improvements constructed with standard flood protection measures. The city will seek to better understand the impact of larger flood events and consider necessary floodplain management strategies, including the protection of critical facilities.

Water and Air Quality

3.24 Protection of Water Quality

Water quality is a critical health, economic and aesthetic concern. The city and county have made great strides in ~~will~~ protecting, maintaining and improving~~e~~ water quality within the Boulder Creek watershed as a necessary component of existing ecosystems and as a critical resource for the human community. The city and county will continue ~~seek~~ to reduce point and nonpoint sources of pollutants, protect and restore natural water systems, and conserve water resources. Special emphasis will be placed on regional efforts, such

as watershed planning, and ~~priority will be placed~~ on pollution prevention over treatment.

3.25 Water Resource Planning and Acquisition

Water resource planning efforts will be regional in nature and incorporate the goals of water quality protection~~, and~~ as well as surface and ground water conservation. The city will ~~–~~continue to obtain additional municipal water supplies to e~~i~~nsure~~-~~ adequate drinking water, maintain instream flows and preserve agricultural uses. The city will seek to minimize or mitigate the environmental, agricultural and economic impacts to other jurisdictions in its acquisition of additional municipal water supply. This will ~~to~~ further the goals of maintaining instream flows, minimizing the use of water from transmountain diversions, dewatering watersheds non-contiguous to Boulder County streams -- and preventing the permanent removal of land from agricultural production elsewhere in the state.

3.26 Drinking Water

The city and county will ~~continually~~ seek to improve the quality of drinking water, as needed, and work with other water and land use interests ~~as needed~~ to assure the integrity and quality of its drinking water supplies. The city and county will employ a system-wide approach to protect drinking water quality from source~~s~~ waters to the water treatment plant and throughout the water distribution system.

3.27 Minimum Flow Program

The city will pursue expansion of the existing in-stream flow program consistent with applicable law and manage stream flows to protect riparian and aquatic ecosystems within the Boulder Creek watershed.

3.28 Surface and Ground Water

Surface and groundwater resources will be managed to prevent their degradation and to protect and enhance aquatic, wetland and riparian ecosystems. Land use and development planning and public land management practices will consider the interdependency of surface and groundwater and potential impacts to these resources from pollutant sources, changes in hydrology, drilling and mining, and dewatering activities.

(Note: Additional policies and regulatory standards will be analyzed to strengthen this language about groundwater to -identify risks and potential impacts.)[xv]

3.29 Wastewater

The city will pursue sustainable wastewater treatment processes to achieve water quality improvements with greater energy efficiency and minimal chemical use. Pollution prevention and proactive maintenance strategies will be incorporated in wastewater collection system management. The county will discourage the installation of private on-site wastewater systems where municipal collection systems are available or where a potential pollution or health hazard would be created.

3.30 Protection of Air Quality

Air quality is a critical health, economic and aesthetic concern. The city and county will seek to reduce stationary and mobile source emissions of pollutants. Special emphasis will be placed on local and regional efforts to reduce pollutants, which cause adverse health effects, ~~and~~ impair visibility, and contribute to climate change.

(Note: Suggest adding language in "Built Environment" chapter about the important role of street trees and vegetative plantings in mitigating air quality and reducing exposure to pollutants

at the street level.)[xvi]

Potential New Policy: Protecting the Resilience of the Natural Environment ~~Investments for Resilience~~

The city and county recognize that the natural environment ~~investments~~ contributes to ~~ward resilience by reducing risk~~ and promoting sustainability. ~~Additionally, urban forestry, tree planting, natural hazard mitigation, improvement of air quality, added recreational activities and storm water mitigation activities have co-benefits.~~[vii]

A primary strategy for confronting threats to our native ecosystems due to climate change is designing and implementing ecosystem management programs that include large-scale reserves. These reserves must be on landscape-level and watershed-level scales and must be integrated with other similarly designated areas on public and private lands. Preserving such ecological reserves enhances the resilience of native ecosystems, and reduces the possible loss of native biodiversity, ecological processes and ecosystems.

This strategy also helps to protect the resilience of our urban environment and achieve climate change goals through achieving carbon sequestration and sustaining ecosystem services, reducing risks and costly damage from flooding by preserving drainages and facilitating the absorption of precipitation into our greenbelt. Within the urban natural environment, the city and county's efforts will focus on promoting urban forestry and xeriscaping, and providing opportunities for enjoyment of natural areas.

(Note: Policy directions about coordinated approach, vulnerable populations and resident involvement are suggested in HR&A Report and will need further review over coming weeks.)

ENDNOTES

[i] The changes to this chapter reflect work since the 2010 Plan including:

- The city currently is working on updates to its Integrated Pest Management policy, an Urban Forest Strategic Plan, the Resilience Strategy, and draft Climate Commitment.
- The city adopted the Bee Safe Resolution (2015) banning the use of neonicitinoids on city property and a Bear Protection Ordinance to secure waste from bears (2014). The county adopted a resolution to reduce and eliminate pesticide use to protect both people and pollinators (2015).
- Boulder County adopted the Environmental Resources Element of the Boulder County Comprehensive Plan (2015) and is currently working on policy related to Genetically Modified Organisms in the county.
- The city will be developing an Open Space Master Plan (2017).
- Boulder County is analyzing on how to address local oil and gas regulations, and looking at potential policy updates to better align the Fourmile Canyon Creek Watershed Master Plan (2015), Boulder Creek Watershed Master Plan (Urban Drainage and Flood Control District, 2015), and Consortium of Cities Water Stewardship Task Force Final Report (2013).
- HR&A's Recommendations for Resilience Integration (2016)

[ii] OSBT in particular asked for clarification about how this section of policies apply – to the urban vs. wildlands area, and to OSMP lands vs. more generally. This added language aims at providing that clarification. Additionally, the board asked that the section be edited to sound a bit less human-centric.

[iii] North Trail Study process clarification and better integration with Boulder County Comprehensive Plan.

[iv] Clarification of how city and county are programmatically operating – learning from best practices about an ecosystems management approach. OSBT also suggested some language for this policy, reflected here.

[v] From city's Climate Commitment document

[vi] OSBT asked for clarification of this policy regarding "nuisance species". This language is consistent with the Urban Wildlife Management plan which has not been updated recently, so it may need some minor adjustments over coming months to clarify.

[vii] City is in process of developing an Urban Canopy Master Plan.

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[viii] Stronger language suggested by Planning Board (including applying for private lands, which the city cannot regulate according to state law). Also consistent with city programs.
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[xv] Planning Board suggested such language.
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[xvii] From HR&A Resilience Report.

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Spence, Cindy

From: Karen Hollweg <khollweg@stanfordalumni.org>
Sent: Monday, September 12, 2016 9:53 AM
To: boulderplanningboard
Subject: Revision Suggestions for BVCP Sec.3 Natural Environment Policies - DRAFT in PDF
Attachments: Ch1_Section_3_Natural_environment-DRAFT_8.24.16_+pbkhda revisions.pdf; Managing Ecosystems in a Changing World, 11-2015, Frontiers in Ecol.pdf

John, Bryan, Leonard, John, Crystal, Liz, Harmon

Some of you have had problems accessing the docx version of our revision suggestions sent on Sept 8. So, here I am sending to you (attached) a PDF copy of the Aug. 24, 2016 Sec. 3 Natural Environment Policies BVCP Draft in which we have added our suggestions for revision.

COLOR KEY: In this PDF version, the **black** type is the original 2010 BVCP text, the **blue** text are the revisions proposed by staff and revisions added by OSBT and Planning Board in August, and the **red** text shows our suggested revisions.

The 5 of us who have worked to produce this document have each been involved in the city's deliberations and decisions about open space and natural resource issues for decades, and believe our suggestions provide important updates, add a bit more clarity/specificity, and reflect our community's core values. We would like to ask you to consider our suggestions as part of the Planning Board's review of BVCP Policies and to include them in the final draft that you are preparing now.

I have also attached a paper from the Ecological Society of America's journal "With and without warning: managing ecosystems in a changing world" (Nov 2015). It provides the current thinking of ecologists and grounds the revision we propose for the new policy section re: climate change and resilience (it is the last section, just before the ENDNOTES).

With respect,
Karen Hollweg
Pat Billig
Dave Kuntz
Allyn Feinberg
Ray Bridge

3. Natural Environment[i]

No new title. Natural Environment must be addressed separately and not mixed with transportation, recycling, or other "sustainability" or energy issues. The natural environment in general, and open space lands in particular, are what make Boulder such an attractive and special place.

Proposed new section title: ***Environmentally Sustainable Community.***
Note: This may be combined with other policies around energy and climate in addition to agriculture and food policies relating to land and environment. Also please note that a further round of editing will occur to improve organization, reduce verbosity and redundancies, and renumber policies as necessary.

In this section, the "natural environment" includes city and county open space lands as well as the environmental components within the urban area. Preservation and protection of ~~T~~the natural environment that characterizes the Boulder Valley is a core community value that has defined Boulder since the end of the 19th century. Within the Boulder Valley's complex ecological system, there are inextricable links among the natural environment, plants and animals, the built environment, the economy and community livability. ~~These natural and human systems are connected to the region and world, and c~~ Changes to the natural ecosystems within the Boulder Valley can have a profound effect on their viability and the quality of life desired by Boulder Valley citizens.

Over many decades, at the urging of and with the financial support of local citizens, the city and county have actively protected and managed open space around the urban area, and city and county open space plans and policies apply to those public lands acquired and managed as habitat conservation areas, natural areas, recreational areas, and agricultural areas. ~~or used for other purposes, such as agriculture.~~[ii]

As in the rest of the world, ~~T~~the ~~climate of the~~ Boulder Valley climate is changing. ~~has warmed and dried over the past three decades, and the potential for f~~Further changes and intensified weather events ~~because of climate change~~ heighten the need for the city and county to proactively ~~strengthen intervention and investment in natural resources (e.g. urban forestry, wetland and groundwater protection, and natural hazard mitigation) to~~ reduce risk and protect resources. Overall strategies need to include protection of the remaining large blocks of open space land that support the long-term viability of native plants and animals, active maintenance of stream flows and capacities, and more focus on the interface between the natural and urban environment to better understand how to work with natural systems instead of against them. ~~The more the community can assess risks of changes due to climate change and be prepared to preserve and protect environmental resources, the better prepared the community can be for mitigating the causes and impacts of those changes to the natural environment.~~

~~The natural environment that characterizes the Boulder Valley is a critical asset that must be preserved and protected. It is the framework within which growth and development take place. The city and county recognize that the Boulder Valley is a complex ecological system and that there are inextricable links among our natural environment, the economy,~~

~~the built environment and community livability. The Boulder Valley is an open system in that our natural and human systems are connected to the region as well as to the entire world. The city and county acknowledge that regional and global changes can have a profound effect on the local environment and that the local economy and built environment can have adverse impacts on natural systems beyond the Boulder Valley.~~

Boulder has been at the forefront of environmental protection and preservation for many years. ~~The predominantvast amount~~ Sixty-three percent of the land in the Boulder Valley Comp Plan area has been protected by the city and county as open space to support critical habitat for native plants and animals and agricultural productivity, and contribute~~s~~ to the high quality of life for residents ~~and critical habitat for native plants and animals~~. The community's historic and on-going emphasis on clean air and water, flood plain management, and preservation of native habitats has resulted in significant progress toward a sustainable, resilient and healthy urban environment.

The city and county ~~places strong emphasis on being a leader and role model to other communities for its exemplary environmental protection practices and accomplishments. The city~~ will continue to identify and ~~develop and~~ implement ~~state- of- the- art~~ environmental policies both community wide and within the city government organization to further ~~its~~ environmental sustainability goals.

The policies in this section support the following city and county goals related to the conservation and preservation of land, water, air resources and pollution prevention and resilience:

- Protecting Native Ecosystems and Biodiversity ~~and Native Ecosystems~~
- Enhancing Urban Environmental Quality
- Protecting Geologic Resources and Reducing Risks from Natural Hazards
- Sustaining Water and Air Quality

Reaching these goals requires an overall planning and management strategy that incorporates an understanding of ecological systems and uses adaptive management principles for monitoring and course corrections.

3.1 Incorporating Ecological Systems into Planning

The city and county will approach planning and policy decisions in the Boulder Valley through an ecosystem framework in which natural regions like bioregions, airsheds and watersheds are considered and incorporated into planning.

3.2 Adaptive Management Approach

The city and county will employ an adaptive management approach to resource protection and enhancement. An adaptive management approach involves ongoing monitoring of resource conditions, assessment of the effectiveness of management actions, revision of management actions based on new information from research, and learning from experience what works and what does not.

Protecting Native Ecosystems and Biodiversity ~~and Native Ecosystems~~

3.3 Natural Ecosystems

The city and county will protect and restore significant native ecosystems on public and private lands through land use planning, development review, conservation easements, acquisition and public land management practices. The protection and enhancement of biological diversity and habitat for state and federal endangered and threatened species ~~and state~~, as well as ~~county~~ critical wildlife habitats/migration corridors, environmental conservation areas, high biodiversity areas, rare plant areas, and significant natural communities and local species of concern will be emphasized.[iii] Degraded habitat may be restored and selected extirpated species may be reintroduced as a means of enhancing native flora and fauna in the Boulder Valley.

3.4 Ecosystem Connections and Buffers

The city and county recognize the importance of preserving large areas of unfragmented habitat ~~in~~to support~~ing~~ the biodiversity of its natural lands and viable habitat for native species. The city

and county will work together to preserve, enhance, restore and maintain ~~undeveloped~~land~~s~~ identified as critical and having significant ecological value for providing ecosystem connections and buffers to support the natural movement of native organisms (e.g., wildlife corridors) between ~~for joining significant~~ ecosystems.

(Note: Suggest adding new policy language to "Built Environment chapter" to address conservation and design of open space connections and buffers in urban areas, recognizing that urban lands can also be important for supporting biodiversity and maintaining wildlife habitat.)

3.5 Maintain and Restore Natural ~~Disturbance and~~ Ecological Processes

Recognizing that natural ecological processes, such as wildfire and flooding, are integral to the productivity and health of natural ecosystems, the city and county will work to ensure that, when appropriate precautions have been taken for human safety and welfare, ecological processes will be maintained or ~~mimicked~~ replicated in the management of natural lands.

3.6 Wetland and Riparian Protection

Natural and human-made wetlands and riparian areas are valuable for their ecological ~~and, where appropriate, recreational~~ functions, including their ability to enhance water and air quality and reduce the impacts of flooding. Wetlands and riparian areas also function as important wildlife habitat, especially for rare, threatened and endangered plants, fish and wildlife. The city and county will continue to support and develop programs to protect, ~~and~~ enhance, and educate the public about the value of wetlands and riparian areas in the Boulder Valley. The city will strive for no net loss of wetlands and riparian areas by discouraging their destruction. ~~or requiring the creation and restoration of wetland and riparian areas i~~In the rare cases when development in urban areas is permitted and the filling of wetlands or destruction of riparian areas cannot be avoided, the creation and restoration of wetland and riparian areas will be required to mitigate the loss. Management of wetland and riparian areas on open space lands is ~~also covered~~addressed in the OSMP Grasslands Ecosystem Management Plan.

3.7 Invasive Species Management

The city and county will promote efforts, both public and private, to prevent the introduction or limit and reduce areas and opportunities for growth ~~culture~~ of invasive, ~~and~~ non-native plant and animal species and seek to prevent or control their spread. High priority will be given to managing invasive species that are defined and listed by the Colorado Noxious Weed Act and have, or potentially could have, a substantial impact on city and county resources. ~~Management of both non-native and non-local native species will be based on weighing impacts vs. benefits that includes documented threats to species of concern specific to each site, acknowledging that some non- native species may have become naturalized. Management decisions should also take into account changing species composition due to climate change and other human impacts, as well as the role in the ecosystem provided by each organism based on the best available science.~~[iv]

3.8 Public Access to Public Lands

Certain city and county-owned or managed lands provide a means for educating users on the importance of the natural environment. Public lands may include areas for recreation, preservation of agricultural use, preservation of ~~-~~ unique natural features, and preservation of wildlife and plant habitat. Public access to natural lands will be provided where appropriate and where it can be adequately managed and maintained, ~~for,~~ except where closure is necessary to protect areas from unacceptable degradation or impacts to agriculture, habitat or wildlife;~~,~~ provide for public safety;~~,~~ or reduce visitor conflicts ~~or limits on access necessary to preserve the quality of the visitor experience~~.

See New Policy at the End of Section 3

~~New Policy: Climate Change Preparation and Adaptation~~

~~The city and county are both working on climate mitigation and recognize that adaptation plans will be necessary as well. To prepare open space lands and natural areas for climate change, the city and county will consider allowing or facilitating ecosystems' transition to new states in some sites (e.g., newly adapting plants and wildlife) and increasinge the stability and resiliency of the~~

~~natural environment elsewhere. Biological indicators can help to identify high risk species for monitoring and/or relocations and may conduct restoration projects using arid-adapted ecotypes or species. Open space master plans guide other topics related to climate change, such as visitor experiences to open space.~~[v]

Urban Environmental Quality

3.9 Management of Wildlife-Human Conflicts

The city recognizes the intrinsic value of wildlife in both the urban and rural setting. The city will promote wildlife and land use management practices to minimize conflicts with residents and urban land uses while identifying, preserving and restoring appropriate habitat for wildlife species in the urban area. When a wildlife species is determined to be a nuisance or a public health hazard, a full range of alternative wildlife and land use management techniques will be considered by the city and county in order to mitigate the problem in a manner that is humane, effective, economical and ecologically responsible.[vi]

3.10 Urban Environmental Quality

To the extent possible, the city and county will seek to protect the environmental quality of areas under significant human influence such as agricultural and urban lands and will balance human needs and public safety with environmental protection. The city will develop community-~~-~~wide programs and standards for new development and redevelopment so that negative environmental impacts will be mitigated and overall environmental quality of the urban environment will not worsen and may improve.

3.11 Urban Forests

The city will support, promote and, in some cases, regulate the protection of healthy existing trees and the long-~~-~~term health and vitality of the urban forest in the planning and design of public improvements and private development. Urban canopy plays an important role in a semi-arid climate in ameliorating the role of climate change; ~~t~~therefore. ~~T~~the city will~~l~~ guide short- and long- term urban forest management.[vii] that encourages overall species diversity and, native and low water demand tree species~~ where appropriate~~.

3.12 Water Conservation

The city and county will promote the conservation of water resources through water quality protection, public education, monitoring and policies that promote appropriate water usage. The city will endeavor to minimize water waste and reduce water use during peak demand periods by, e.g., promoting xeriscaping. New development and redevelopment designed to conserve water will be encouraged.

3.13 Integrated Pest Management

The city and county will discourage ~~encourage efforts to reduce~~ the use of pesticides and synthetic, inorganic fertilizers.[viii] In its own practices, the city and county will carefully consider when pest management actions are necessary and focus on creating healthy and thriving ecosystems to lower pest pressure by natural processes. When pest management is necessary, the city commits to the use of ecologically-based integrated pest management principles, which emphasize~~s~~ the selection of the most environmentally sound approach to pest management and the overall goal of reducing or eliminating the dependence on chemical pest-control strategies. When public or environmental health risks are identified, the city will balance the impacts and risks to the residents and the environment when choosing ~~management~~control measures.[ix]

New Policy: Soil Carbon Sequestration

The city recognizes that soil sequestration has a range of potential benefits, including water retention, soil health and stabilization. The city and county will consider soil sequestration strategies, including land management practices in cultivated agricultural areas that may be used to sequester carbon out of the atmosphere, and explore opportunities to incentivize carbon sequestration.[x]

The capacity of native grasslands and forests to sequester carbon will be especially important in this effort and native grasslands and forests will be maintained wherever possible to accomplish this objective.

(Note: This policy will continue to be refined.)

Geologic Resources and Natural Hazards

3.14 Unique Geological Features

Due to its location at the interface of the Great Plains and the Rocky Mountains, the Boulder Valley has a number of significant or unique geological and paleontological features. The city and county will ~~attempt to~~ protect these features in situ from alteration or destruction through a variety of means, such as public acquisition, public land management, land use planning and regulation, and density transfer within a particular site.

3.15 Mineral Deposits

Deposits of sand, gravel, coal and similar finite resource areas will be delineated and managed according to state and federal laws and local government regulations. ~~Mineral deposits and other non-renewable resources will be used with the greatest practical efficiency and the least possible disturbance to existing natural and cultural resources.~~ The ~~-~~use o f~~of mineral deposits and other~~ non-renewable resources will be ~~evaluated~~ consideed~~r~~ ed~~ing~~ only when conservation and recycling is not a feasible alternative. The impacts of resource use will be balanced against,~~the need for these resources and~~ other community values and priorities, including environmental ~~such as natural~~ and cultural resource protection, ~~community and environmental~~ health concerns and carbon emission reduction.~~.~~ The city and county will work together to limit drilling and mining impacts by acquiring~~e~~ mineral rights. ~~as appropriate.~~[xi]

3.16 Hazardous Areas

Hazardous areas that present danger to life and property from flood, forest fire, steep slopes, erosion, unstable soil, subsidence or similar geological development constraints will be delineated, and development in such areas will be carefully controlled or prohibited.

3.17 Erosive Slopes and Hillside Protection

Hillside and ridge-line development will be carried out in a manner that, to the extent possible, avoids both negative environmental consequences to the immediate and surrounding area and the degrad~~a~~tion~~ing~~ ~~-~~of views and vistas from and of public areas. Due to the risk of earth movement and/or mud slides ~~under adverse weather conditions~~, special attention needs to be paid to soil types and underlying geological strata before and during planning, design and construction of any urban or recreational (e.g., trails) development on or at the base of hillsides.[xii]

3.18 Wildfire Protection and Management

The city and county will require on-site and off-site measures to guard against the danger of fire

in developments adjacent to natural lands and consistent with forest and grassland ecosystem management principles and practices. Recognizing that fire is a widely accepted means of managing ecosystems, the city and county will integrate ecosystem management principles with wildfire hazard mitigation planning and urban design.

3.19 Preservation of Floodplains

Undeveloped floodplains will be preserved or restored where possible through public land acquisition of high hazard properties, private land dedication and multiple program coordination. Comprehensive planning and management of floodplain lands will promote the preservation of natural and beneficial functions of floodplains whenever possible.

3.20 Flood Management [xiii]

The city and county will protect the public and property from the impacts of flooding in a timely and cost-effective manner while balancing community interests with public safety needs. The city and county will manage the potential for floods by implementing the following guiding principles: a) Preserve floodplains; b) Be prepared for floods; c) Help people protect themselves from flood hazards; d) Prevent unwise uses and adverse impacts in the floodplain; and e) Seek to accommodate floods, not control them. The city seeks to manage flood recovery by protecting critical facilities in the 500-year floodplain and implementing multi-~~-~~hazard mitigation and flood response and recovery plans.

3.21 Non-Structural Approach

The city and county will seek to preserve the natural and beneficial functions of floodplains by emphasizing and balancing the use of non-structural measures with structural mitigation. Where drainageway improvements are proposed, a non-structural approach should be applied wherever possible to preserve the natural values of local waterways while balancing private property interests and associated cost to the city. Flood insurance will be required for all residential or commercial buildings and structures in identified and mapped floodplains.

3.22 Protection of High Hazard Areas

The city and county will prevent redevelopment of significantly flood-damaged properties in high hazard areas. The city, following the county's lead, will prepare a plan for property acquisition and other forms of mitigation for flood-damaged and undeveloped land in high- hazard flood areas. Undeveloped high hazard flood areas will be retained in their natural state whenever possible. To reduce risk and loss, ~~In urban areas, c~~~~Compatible uses of~~ riparian corridors will be preserved~~, such~~ as natural ecosystems, and wildlife habitat and wetlands will be protected.~~encouraged wherever appropriate. Trails or other open recreational facilities may be feasible in certain areas.~~[xiv]

3.23 Larger Flooding Events

The city and county recognize~~s~~ that floods larger than~~e~~ the 100-year event will occur resulting in greater risks and flood damage that will affect even improvements constructed with standard flood protection measures. The city will seek to better understand the impact of larger flood events and consider necessary floodplain management strategies, including the protection of critical facilities.

Water and Air Quality

3.24 Protection of Water Quality

Water quality is a critical health, economic and aesthetic concern. The city and county have made great strides in ~~will~~ protecting, maintaining and improving~~e~~ water quality within the Boulder Creek watershed as a necessary component of existing ecosystems and as a critical resource for the human community. The city and county will continue ~~seek~~ to reduce point and nonpoint sources of pollutants, protect and restore natural water systems, and conserve water resources. Special emphasis will be placed on regional efforts, such

as watershed planning, and ~~priority will be placed~~ on pollution prevention over treatment.

3.25 Water Resource Planning and Acquisition

Water resource planning efforts will be regional in nature and incorporate the goals of water quality protection~~,~~ ~~and~~ as well as surface and ground water conservation. The city will ~~–~~continue to obtain additional municipal water supplies to e~~i~~nsur~~e~~ adequate drinking water, maintain instream flows and preserve agricultural uses. The city will seek to minimize or mitigate the environmental, agricultural and economic impacts to other jurisdictions in its acquisition of additional municipal water supply. This will ~~to~~ further the goals of maintaining instream flows, minimizing the use of water from transmountain diversions, dewatering watersheds non-contiguous to Boulder County streams -- and preventing the permanent removal of land from agricultural production elsewhere in the state.

3.26 Drinking Water

The city and county will ~~continually~~ seek to improve the quality of drinking water, as needed, and work with other water and land use interests ~~as needed~~ to assure the integrity and quality of its drinking water supplies. The city and county will employ a system-wide approach to protect drinking water quality from source~~s~~ waters to the water treatment plant and throughout the water distribution system.

3.27 Minimum Flow Program

The city will pursue expansion of the existing in-stream flow program consistent with applicable law and manage stream flows to protect riparian and aquatic ecosystems within the Boulder Creek watershed.

3.28 Surface and Ground Water

Surface and groundwater resources will be managed to prevent their degradation and to protect and enhance aquatic, wetland and riparian ecosystems. Land use and development planning and public land management practices will consider the interdependency of surface and groundwater and potential impacts to these resources from pollutant sources, changes in hydrology, drilling and mining, and dewatering activities.

(Note: Additional policies and regulatory standards will be analyzed to strengthen this language about groundwater to identify risks and potential impacts.)[xv]

3.29 Wastewater

The city will pursue sustainable wastewater treatment processes to achieve water quality improvements with greater energy efficiency and minimal chemical use. Pollution prevention and proactive maintenance strategies will be incorporated in wastewater collection system management. The county will discourage the installation of private on-site wastewater systems where municipal collection systems are available or where a potential pollution or health hazard would be created.

3.30 Protection of Air Quality

Air quality is a critical health, economic and aesthetic concern. The city and county will seek to reduce stationary and mobile source emissions of pollutants. Special emphasis will be placed on local and regional efforts to reduce pollutants, which cause adverse health effects, ~~and~~ impair visibility, and contribute to climate change.

(Note: Suggest adding language in "Built Environment" chapter about the important role of street trees and vegetative plantings in mitigating air quality and reducing exposure to pollutants

at the street level.)[xvi]

Potential New Policy: Protecting the Resilience of the Natural Environment ~~Investments for Resilience~~

The city and county recognize that the natural environment ~~investments~~ contributes to ~~ward resilience by reducing risk~~ and promoting sustainability. ~~Additionally, urban forestry, tree planting, natural hazard mitigation, improvement of air quality, added recreational activities and storm water mitigation activities have co-benefits.~~[xvii]

A primary strategy for confronting threats to our native ecosystems due to climate change is designing and implementing ecosystem management programs that include large-scale reserves. These reserves must be on landscape-level and watershed-level scales and must be integrated with other similarly designated areas on public and private lands. Preserving such ecological reserves enhances the resilience of native ecosystems, and reduces the possible loss of native biodiversity, ecological processes and ecosystems.

This strategy also helps to protect the resilience of our urban environment and achieve climate change goals through achieving carbon sequestration and sustaining ecosystem services, reducing risks and costly damage from flooding by preserving drainages and facilitating the absorption of precipitation into our greenbelt. Within the urban natural environment, the city and county's efforts will focus on promoting urban forestry and xeriscaping, and providing opportunities for enjoyment of natural areas.

(Note: Policy directions about coordinated approach, vulnerable populations and resident involvement are suggested in HR&A Report and will need further review over coming weeks.)

ENDNOTES

[i] The changes to this chapter reflect work since the 2010 Plan including:

- The city currently is working on updates to its Integrated Pest Management policy, an Urban Forest Strategic Plan, the Resilience Strategy, and draft Climate Commitment.
- The city adopted the Bee Safe Resolution (2015) banning the use of neonicitinoids on city property and a Bear Protection Ordinance to secure waste from bears (2014). The county adopted a resolution to reduce and eliminate pesticide use to protect both people and pollinators (2015).
- Boulder County adopted the Environmental Resources Element of the Boulder County Comprehensive Plan (2015) and is currently working on policy related to Genetically Modified Organisms in the county.
- The city will be developing an Open Space Master Plan (2017).
- Boulder County is analyzing on how to address local oil and gas regulations, and looking at potential policy updates to better align the Fourmile Canyon Creek Watershed Master Plan (2015), Boulder Creek Watershed Master Plan (Urban Drainage and Flood Control District, 2015), and Consortium of Cities Water Stewardship Task Force Final Report (2013).
- HR&A's Recommendations for Resilience Integration (2016)

[ii] OSBT in particular asked for clarification about how this section of policies apply – to the urban vs. wildlands area, and to OSMP lands vs. more generally. This added language aims at providing that clarification. Additionally, the board asked that the section be edited to sound a bit less human-centric.

[iii] North Trail Study process clarification and better integration with Boulder County Comprehensive Plan.

[iv] Clarification of how city and county are programmatically operating – learning from best practices about an ecosystems management approach. OSBT also suggested some language for this policy, reflected here.

[v] From city's Climate Commitment document.

[vi] OSBT asked for clarification of this policy regarding "nuisance species". This language is consistent with the Urban Wildlife Management plan which has not been updated recently, so it may need some minor adjustments over coming months to clarify.

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[xvii] From HR&A Resilience Report.

DRAFT

With and without warning: managing ecosystems in a changing world

Michael L Pace[1*], Stephen R Carpenter[2], and Jonathan J Cole[3]

Many ecosystems are likely to experience abrupt changes and extreme conditions due to forces such as climate change. These events and their consequences – including the loss of ecosystem services – may be predictable or may occur without warning. Given these considerations, greater efforts are needed in two areas of research: improvements in early warning capability and advances in the management of ecosystems to enhance resilience. Current research has provided enhanced forecasting ability, scenario analysis, and detection of statistical anomalies that indicate abrupt change, but two key concerns remain: the detection of early warning signs near thresholds of change and the use of such warnings for ecosystem management. Furthermore, there may be no advance warning for some types of abrupt change, reinforcing the need to enhance resilience by managing ecosystems to reduce the possibility of crossing thresholds of change. Designing and implementing large-scale management programs is one way to confront these problems.

Front Ecol Environ 2015; 13(9): 460–467, doi:10.1890/150003

In 2011, the worst algal bloom in the history of North America's Lake Erie developed in the western basin of the lake (Stumpf *et al.* 2012), the result of a combination of agricultural fertilizer runoff, heavy spring rains, and stable summer conditions that favored heavy algal growth (Michalak *et al.* 2013). Analysis of the dynamics and projections of climate change, including a prediction of increased storm intensity, led Michalak *et al.* (2013) to call the 2011 Lake Erie bloom "a harbinger of future blooms". They were right. In the summer of 2014, another massive bloom developed in western Lake Erie, and drinking water drawn from the lake was found to contain unsafe levels of a cyanobacterial toxin. Consequently, the water supply for the city of Toledo, Ohio (population 284 000), was shut down and citizens were soon waiting in long lines for bottled water. In this case, ecologists provided advance warning; in the future, it will be possible to provide even more detailed predictions of the timing, intensity, and even toxicity of algal blooms in Lake Erie because the causes and conditions leading to such blooms are better understood (Obenour *et al.* 2014).

Climate warming and other human-driven forces mean that, in contrast to the Lake Erie algal blooms, some abrupt ecosystem changes – as well as losses of ecosystem services – may arise without apparent warning. Even in hindsight, the causes of such rapid changes will be hard to discern because of multiple interacting forces. Thus, in the future, abrupt changes are likely to occur both with and without warning. This raises two questions. First, can research improve forecasts and the detection of warning signs? Second, can research help foster ecosystem resilience to limit the risk of crossing irreversible thresholds? Maintaining ecosystem services in the future will require a substantial amount of research on both these questions. Improved forecasts and warnings can help in the management of ecosystems and help to sustain ecosystem services by avoiding unwanted changes and by warning of undesirable conditions. Promoting resilience, especially in cases where there is no forewarning of change, can help avoid thresholds or mitigate abrupt change when thresholds are crossed.

This paper addresses approaches to anticipating and managing adverse ecosystem changes, specifically those resulting from threats such as climate warming, intensification of agriculture, fisheries exploitation, and the introduction of invasive species. Extreme climate events associated with these drivers are of special interest because they may push ecosystems into new states and impede recovery to desirable states. We consider warnings provided by model forecasts and by statistical anomalies indicating loss of resilience as thresholds are approached. We also discuss changes that may occur without warning,

In a nutshell:

- Some ecosystem changes occur without warning; to avoid crossing undesirable thresholds, we need to improve our ability to predict such transitions, to understand the likelihood of their occurrence, and to foster resilience
- Loss of resilience can be assessed using models and statistics, as long as the necessary long-term monitoring is maintained
- Strategies to foster resilience are currently being applied to ecosystems and can have positive ecological and economic outcomes; the Great Barrier Reef (GBR) in Australia provides one such example
- However, regional and global forces are threatening the stability and provision of ecosystem services in ecosystems like the GBR

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especially when driven by extremes (eg severe weather events). Enhancing ecosystem resilience can limit ecosystem change and loss of services and this can be achieved through management, governance, and integration of natural and human infrastructure. We analyze these issues with examples drawn primarily from aquatic ecosystems, but the concepts and lessons are broadly applicable and represent a critical research topic for the future.

Extremes and consequences

Climate change is influencing the frequency of extreme weather events. Over a recent 31-year period in the US (1980–2011), there were 134 weather events in the form of floods, droughts, cyclones, and blizzards that caused more than $1 billion in damage (NRC 2014). Extreme events like these may be predictable in the sense of frequency of occurrence (eg Graham *et al.* 2013) but, depending on the location, severe conditions can be difficult to forecast accurately in terms of when and where these extremes occur (Ghil *et al.* 2011).

Climate extremes may cause marked shifts in ecosystems and alter ecosystem services such as carbon (C) storage. For example, a 1999 windstorm that heavily damaged forests reduced the total annual net production of organic matter (ie net biome production) in Europe by 30%, and droughts in the Amazon Basin in 2005 and 2010 resulted in estimated losses of 1.6 petagrams and 2.5 petagrams of C, respectively (Reichstein *et al.* 2013). While forests generally recover from damaging weather, the periodic effects of extreme events can diminish C sequestration. If C sequestration is a goal of managing forests, the impacts of extreme events that kill trees should be considered, as well as risks that may be increased (eg fire and pest outbreaks).

Extreme events associated with increased precipitation intensity are also becoming more frequent. For instance, while total rainfall increased by 7% in the US during the 20th century, the top percentile of heaviest rainfalls increased by 20% (ie there were more extremely heavy rain events; Bull *et al.* 2007). These types of extremes in precipitation can dramatically alter the loading of nutrients and sediments to aquatic ecosystems. Wisconsin's Lake Mendota is a well-studied example; over 8000 daily observations of the lake were used to fit a three-part statistical distribution of phosphorus (P) loading (Carpenter *et al.* 2015). The distribution represented days of low, medium, and high loads. High loads were delivered on an average of 29 days, collectively accounting for 74% of the annual input. Most days delivered intermediate P inputs (accounting for 21% of the annual load), and some delivered low amounts of P (5% of the annual load). High-load days were associated with the effects of spring precipitation on soils enriched with P, where runoff and P transport rates were high (Carpenter *et al.* 2015).

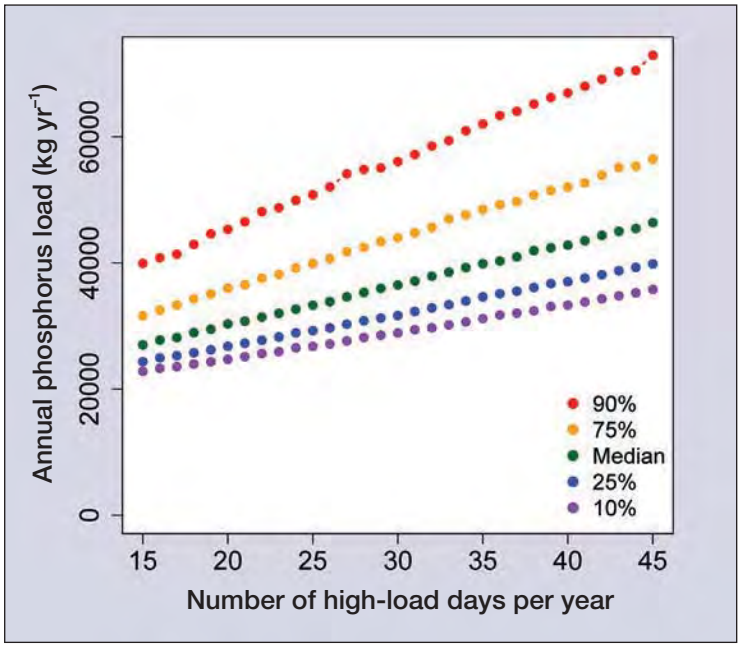

Figure 1. *Simulated annual phosphorus loads to Lake Mendota (Wisconsin) in relation to number of days of high phosphorus loads. Percentiles (see key on figure) indicate uncertainty based on 10 000 simulated years. Reproduced with permission from Carpenter* et al. *(2015).*

As with the US as a whole, high-intensity rain events have increased in frequency in the Lake Mendota watershed over time (Kucharik *et al.* 2010). What does this suggest for the future? Simulations of P loading based on the three-part statistical distribution reveal a positive relationship between the number of high-load days per year and annual P loads (Carpenter *et al.* 2015). The trend is linear (Figure 1) but steeper for the higher percentiles (eg for the 90% percentiles, represented as red circles in Figure 1). The more frequent occurrence of extreme precipitation events projected for the future (Vavrus and Van Dorn 2010) will lead to greater numbers of high P loading days. This scenario will limit – and perhaps even reverse – ongoing efforts to reduce P loading and improve water quality in Lake Mendota and similar waterbodies elsewhere. One possible response to this likely future is to initiate changes in watershed management that reduce the amount of P available for runoff.

Model-based warnings: ecological forecasting

While predictions are always uncertain, models can provide forecasts and scenarios that guide actions and provide warnings regarding different risks. Several types of models are used for this purpose (eg statistical, process, and simulation models) and the relative merits of each are assessed by Cuddington *et al.* (2013). Here, we focus on short-term (days to months) ecological forecasts based on statistical and process models, and long-term (decades to centuries) projections based on process and simulation models. Short-term forecasts (akin to weather reports)

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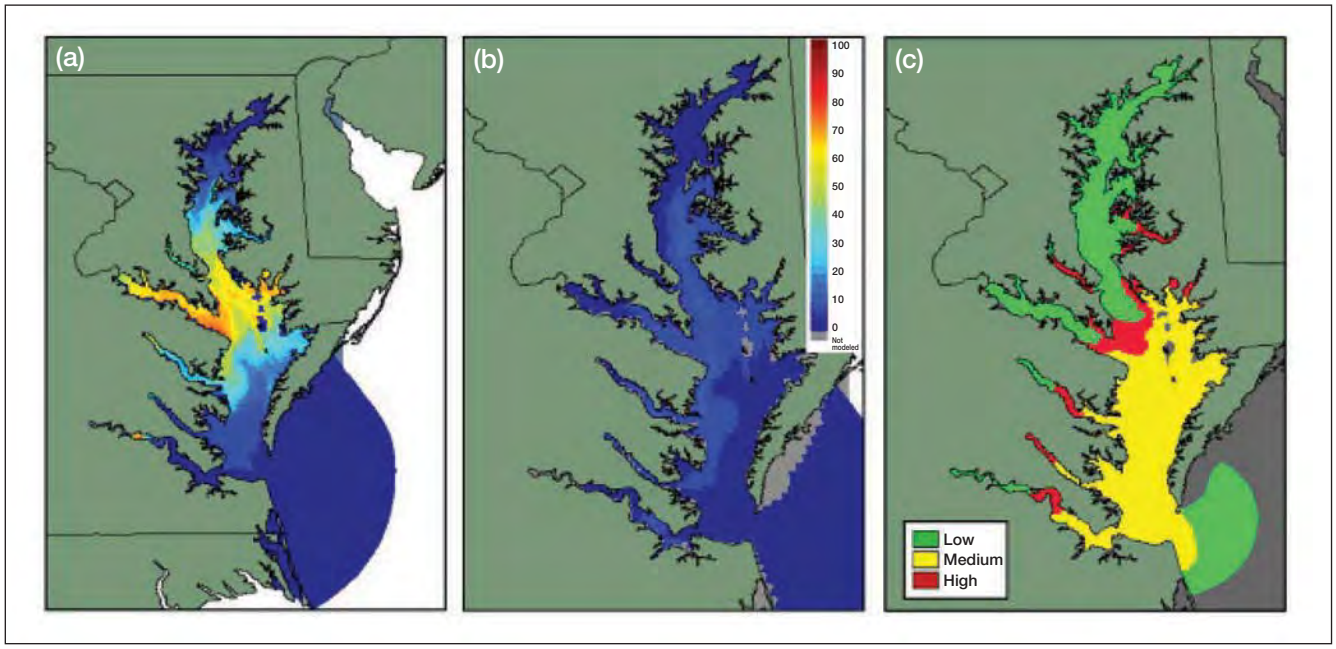

Figure 2. *Example of forecasts from Chesapeake Bay models. (a) Probability of encountering Atlantic sea nettles (*Chrysaora quinquecirrha*) on 17 August 2007; (b) probability of encountering pathogenic* Vibrio vulnificus *bacteria on 20 April 2011; (c) relative abundance of the harmful dinoflagellate (*Karlodinium veneficum*) on 20 April 2005. Probabilities for (a) and (b) are 0% (blue) to 100% (red). Colors for (c) are based on low (< 10), medium (10–2000), and high (> 2000) abundances of* K veneficum *cells per milliliter. Reproduced with permission from Brown* et al. *(2013).*

provide warnings about the status of ecosystem services (eg phytoplankton blooms in Lake Erie that affect drinking water), while long-term projections are more useful for identifying threats to services and risks of major changes to ecosystems.

A good example of short-term forecasting comes from a modeling system used for the Chesapeake Bay estuary, located in the mid-Atlantic region of the US. The foundation for forecasting in this instance is a physical–chemical model based on the Regional Ocean Modeling System (ROMS). The ROMS model for the Chesapeake Bay simulates hydrodynamics, temperature, and biogeochemical conditions (eg dissolved oxygen concentrations). Ecological forecasts are based on the physical and chemical characterizations of the bay and use empirical relationships that define habitat suitability for target organisms produced by ROMS. Both "now-casts" (ie current conditions) and "three-day-ahead" forecasts predict the presence and relative abundance of harmful algal taxa, pathogenic bacteria, and other nuisance organisms. These forecasts are updated daily and posted on public websites (Brown *et al.* 2013).

Forecasting is possible because the abundances of organisms of interest in Chesapeake Bay are related to salinity, temperature, and other environmental conditions and all these variables are used to develop empirically based habitat-suitability models. For example, Atlantic sea nettles (*Chrysaora quinquecirrha*, a jellyfish that delivers a nasty sting) are abundant when water temperatures are warm (26–30°C) and salinity is in the range of 10–16 practical salinity units. Data on temperature, salinity, and abundance of sea nettles were used to develop a logistic regression that indicates probability of occurrence of this species.

These forecasts are useful for both bay users and managers. If, for instance, you were planning to swim in the Chesapeake Bay on August 17, 2007, you would have wanted to avoid mid-bay locations, including portions of the Potomac River, where the odds of encountering sea nettles were high (Figure 2a). On the other hand, the probability of getting an infection in a wound or becoming sick from eating raw shellfish due to the pathogenic bacterium *Vibrio vulnificus* was low throughout the bay on April 20, 2011 (Figure 2b). Forecasts of the relative abundance of harmful algal bloom taxa (Figure 2c) are helpful to managers who must consider when to close beaches and shellfish beds. These forecasts have been shown to predict occurrence reasonably, but comparison with actual data also highlights areas where improvements are needed (Brown *et al.* 2013).

Warnings provided for the Chesapeake Bay suggest great potential for ecological forecasting, but these forecasts are also limited to situations where the system is operating within current bounds. What about projections of longer-term, novel ecosystem conditions that could arise due to environmental drivers such as climate change? For these longer-term situations, models can provide a series of scenarios. For example, the ranges of cold-water fish species are likely to change in the future due to climate warming. Trout inhabiting the rivers of the Southern Appalachian Mountains, for instance, are restricted to higher elevation streams with suitable water

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temperatures. Climate warming will reduce the extent of this habitat, and models that project these changes suggest that trout habitat loss will vary from 4% for a 0.5°C rise in mean temperature to 52% for a 2.5°C rise (Flebbe *et al.* 2006). With even higher temperature increases (warming of ~4.5°C), almost all (>90%) suitable habitat will be lost and trout are likely to be eliminated from the region. Furthermore, these habitat suitability models do not account for ecological effects and other changes (eg altered hydrodynamics) that could potentially accelerate the loss of suitable habitat. Thus, models that use these types of warming scenarios do not provide reliable forecasts because many factors not included in the models will affect how trout respond to warming; nonetheless, the models serve to highlight the risks and qualitative patterns of habitat loss that would accompany a warming climate. Evaluating risks is important in managing ecosystems, especially in relation to future uncertainties associated with large-scale environmental drivers such as climate change (Seidl 2014).

Regime shifts and warnings from statistical anomalies

One form of abrupt change is a "regime shift", in which changes in feedbacks on the controls of ecosystems result in critical transitions that lead to different states. Regime shifts are well described conceptually and mathematically (eg Scheffer *et al.* 2001; Scheffer 2009), and in many cases ecosystems either have undergone such changes or exhibit alternate state behavior consistent with regime-shift models (Carpenter 2001; Scheffer 2009; for database of examples of regime shifts see www.regimeshifts.org). Examples of observed regime shifts include transitions from grassland to shrubland that may occur through a variety of mechanisms including fire, grazing, drought, past land use, and other factors (Peters *et al.* 2015). At an even larger scale, sharply defined continental distributions of tropical forests, savannas, and treeless land suggest that each type of vegetation cover represents an alternate state, an observation that is consistent with regime-shift theory (Hirota *et al.* 2011).

Prior to regime shifts, ecosystems respond more slowly after disturbance as thresholds are approached. Responses to successive disturbances are compounded, leading to greater variance in ecosystem states over time. Slow recovery and increasing variance are characteristic of ecosystem states that are becoming less resilient as they approach thresholds of critical change (Scheffer *et al.* 2012). These changes can be observed as statistical anomalies in time and/or space for ecosystem variables (Scheffer *et al.* 2009). A variety of statistical indicators have been evaluated to provide early warnings of pending regime shifts, as detailed by Dakos *et al.* (2012) and Kéfi *et al.* (2014).

The dynamics of statistical indicators in experimental systems approaching and then undergoing a regime shift are consistent with the concept of early warning, as for example in a food-web model (Carpenter *et al.* 2008), and in laboratory populations of algae (Veraart *et al.* 2012), water fleas (Drake and Griffin 2010), and yeast (Dai *et al.* 2012). We tested this idea in a whole-lake experiment involving the introduction of an apex predator, largemouth bass (*Micropterus salmoides*; Carpenter *et al.* 2011). The manipulated lake was compared to a bass-dominated reference lake. Additions of fish to the manipulated lake triggered a trophic cascade that reorganized the food web. By the final year, bass were plentiful in the manipulated lake, and the system had fully transitioned to a new state similar to that of the reference lake, to which no bass had been added. This manipulation led to changes in the relative abundance of species of plankton and small fish that were consistent with a regime shift (Carpenter *et al.* 2011; Seekell *et al.* 2012; Pace *et al.* 2013). High-frequency measurements were used to analyze whether statistical anomalies occurred during the period of food-web transition (Batt *et al.* 2013). In the manipulated lake, there was a loss of resilience, as represented diagrammatically in Figure 3, and state variables such as small fish abundance and chlorophyll concentrations eventually converged toward conditions resembling those in the reference lake (Figure 3). During the transition, leading indicator statistics (eg moving-window measurements of variance and autocorrelation) spiked, as shown in Figure 3c. These sharp increases in leading statistical indicators occurred more than a year before the full transition to the alternate state (Figure 3). The results of this study were consistent with both theory and prior experiments and, importantly, demonstrated that early warning signals are detectable even amidst the messy variability of complex ecosystems.

Because thresholds for abrupt change are usually unknown, early warnings provide impetus for managers to initiate actions. Ideally, those actions would modify ecosystems so that they move away from threshold levels, maintaining them in a safe operating range (Scheffer *et al.* 2015). Alternatively, actions might help to mitigate the consequences of regime shifts. One issue concerns what variables within an ecosystem should be monitored to provide early warnings, as there is no theoretical basis for deciding on appropriate indicator variables; for now, an investigator's or manager's understanding of a specific system is probably the most reliable guide. Further work is needed to understand the propensity of ecosystems to exhibit warnings near thresholds of change, to determine surveillance methods needed to measure warnings, and to ascertain whether and when warnings come early enough to avoid undesirable changes. The potential for early warning signals also reinforces the value of monitoring.

Absence of warning

Despite the possibilities offered by forecasting, and improved detection and interpretation of statistical anomalies, many ecosystems are likely to change without warning (Hastings and Wysham 2010). This will happen

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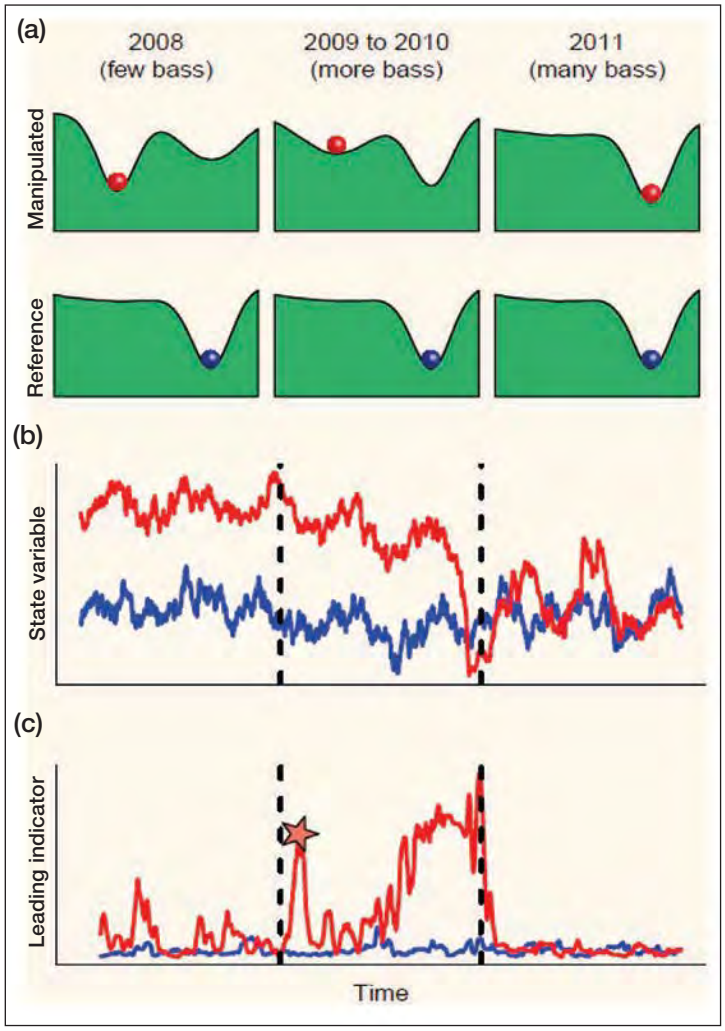

Figure 3. *Conceptual model of early warning of a food-web shift, based on a whole-lake apex predator addition experiment. (a) The ball and valley diagrams represent the states of the manipulated (red ball) and reference (blue ball) lakes. When the balls are in a deep valley, the system is stable and unlikely to change. When the ball is in a shallow valley, resilience is lower and change is more likely. Note the loss of resilience in the manipulated lake, illustrated by the flattening of the valley in 2009 and 2010 (middle column). (b) State variable (eg chlorophyll* a*) dynamics in the manipulated (red) and reference (blue) lakes. (c) The shift in the leading indicator to high values (eg a shift to high variance in chlorophyll* a *values) provides early warning, such as denoted by the star. This model is a diagrammatic representation of the predator addition experiment; see the references cited in the text for more detailed explanations. Reproduced with permission from Batt* et al. *(2013).*

for at least three reasons: (1) unknown thresholds are crossed rapidly; (2) some types of abrupt change will give no warning, statistical or otherwise (Boettiger *et al.* 2013); and (3) potential warnings will not be detected because many systems are not routinely monitored. Since human drivers of ecosystem change are in many cases intensifying, fostering ecosystem resilience is prudent and may limit future loss of services. This raises the question: can ecosystems be managed to improve resilience, especially in relation to climate change?

Establishing goals and managing ecosystems

A starting point for fostering resilience and preparing ecosystems to cope with new kinds of change is to establish goals. What is the system being managed for? What is feasible in terms of either restoring or sustaining services? Governments and communities typically establish management goals for ecosystems and their services, while ecologists contribute perspective and expertise about what is achievable, implement restoration measures, and assess evolving conditions relative to the stated goals.

The management plan for the Hudson River estuary (www.dec.ny.gov/lands/5104.html), developed by environmental agencies in New York State, is one example of effective goal establishment. Twelve goals – encompassing conservation, restoration, education, human use, and improved infrastructure for human access – are specified in the plan. The first goal is to restore both commercial and recreational fisheries. The principal commercial fisheries in the Hudson River are striped bass (*Morone saxatilis*), American shad (*Alosa sapidissima*), Atlantic sturgeon (*Acipenser oxyrinchus*), river herring (*Alosa* spp), and American eel (*Anguilla rostrata*). Commercial fishing is currently not permitted for several species because of their small population sizes (shad, herring, sturgeon, eel) or because of contamination (striped bass). Bringing these species back to abundances that would support commercial harvest requires protection from overfishing outside the Hudson estuary, improvements of both within-river and oceanic habitats, removal of obstructions to migrations (eg barriers in Hudson tributaries for herring and eels), and reductions of persistent contaminants. In addition, sea level is rising and the Hudson River is warming, which will have unknown consequences for fisheries (Seekell and Pace 2011; Strayer *et al.* 2014). Long-term prospects for achieving the commercial fishing goal outlined in the management plan are uncertain because, despite management efforts, the populations of many commercial fish species are at historical lows. Nonetheless, the Hudson River Estuary Action Agenda provides clear direction, laudable goals, and specific actions needed to protect and restore fish populations that are considered to be both culturally important resources and positive indicators of river ecosystem conditions.

Once goals are determined, ecosystem management can begin. Here, we are specifically concerned with deliberate management actions that reduce risk and promote resilience in order to sustain, restore, or buffer ecosystems and their services. What can researchers learn and what actions can managers implement to help ecosystems withstand forces that shift them away from desirable conditions?

Managing ecosystems in the face of future uncertainties

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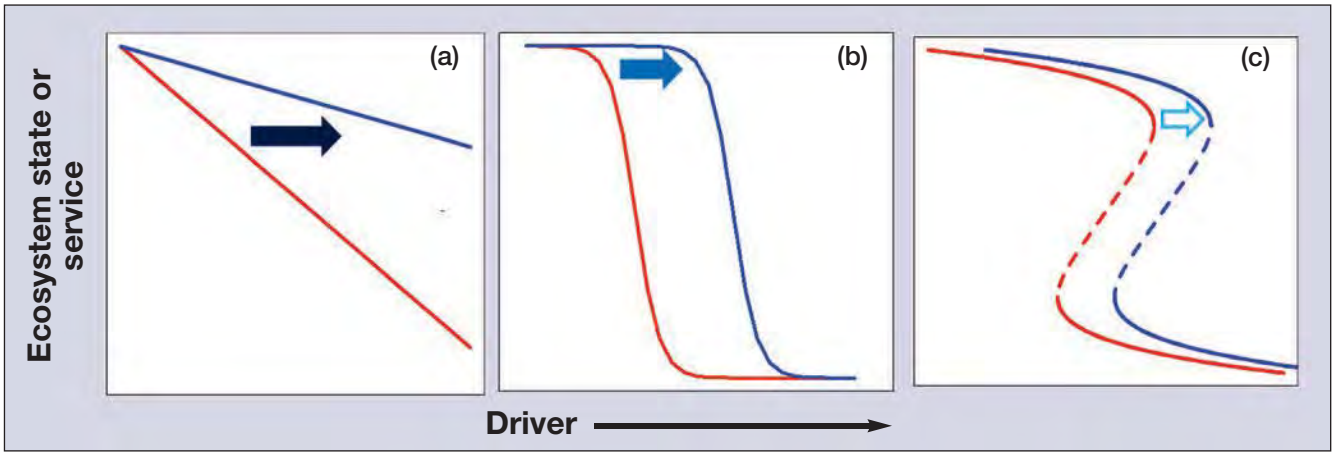

Figure 4. *Response of an ecosystem state variable or an ecosystem service to an increase in a driver where a driver represents controlling processes (eg climate controls or harvesting) in the case of: (a) a linear decline, (b) a non-linear decline, and (c) a regime shift. The change from red lines to blue lines reflects actions that increase resilience reducing declines. Arrows within the graphs indicate the points where actions modify or reduce risk of decline in relation to a driver. The dark blue arrow (a) represents a shift in system dynamics from the red line to the blue line that lowers the response rate to a driver. The light blue arrow (b) represents a shift in the threshold at which the driver causes a large decline. The open blue arrow (c) represents a shift from the red line to the blue line where a collapse to an alternate state occurs.*

requires increasing resilience of key variables to drivers of change. Consider a simple linear response to a driver, where an ecosystem state or service degrades as a driver increases. To limit degradation, the driver must be reduced and/or the slope of the response must be flattened (Figure 4a). For changes where there are thresholds, actions can move the system/service away from the threshold or alter the relationship of the threshold relative to the driver (Figure 4b). For a regime shift – where the system or service abruptly moves to an undesirable state – actions can also move the system away from a threshold or change the point where the system collapses in response to increases in the driver (Figure 4c). In some cases, it may be possible to change the shape of the curve in Figure 4c such that the system is not subject to a regime shift and transitions are more similar to those shown in Figure 4, a and b. Such a change could build resilience by eliminating an adverse ecosystem state.

Enhancing resilience

Biggs *et al.* (2012) described seven principles for maintaining or enhancing resilience. Three of these principles are related to properties of social–ecological systems, whereas the other four relate to governance of social–ecological systems. Management actions that can build or preserve resilience of ecosystems are ones that maintain diversity, manage connectivity, and monitor slow variables. Diversity of species and types of ecosystems provide a greater set of potential responses to disturbances or directional environmental changes (eg warming) and may thereby ameliorate unwanted changes. For example, combinations of species that vary in their resilience to temperature fluctuations stabilize total biomass in a changing climate (Ives *et al.* 1999). Connectivity promotes recovery from disturbance by facilitating colonization from refuges, but too much connectivity can promote the spread of pests and pathogens (Vander Zanden and Olden 2008); thus, optimum connectivity for resilience may be at an intermediate level. Slowly changing regulating variables affect the response of ecosystems to changing drivers and disturbance. In freshwater ecosystems, nutrients accumulated in sediments over decades may stabilize eutrophication, despite strong nutrient-loading reductions by lake managers (Søndergaard *et al.* 2007). For terrestrial systems, the Amazonian tropical forest provides an example of a situation where changing drought intensity and frequency may increase vulnerability, leading to a rapid shift from forest to savanna conditions (Hirota *et al.* 2011). One slowly changing variable that could trigger such a shift would be a decline in deep soil moisture, a resource that tree roots tap into during the dry season to maintain high rates of evapotranspiration, thereby promoting the water recycling needed to sustain the forest (Nepstad *et al.* 1994; Harper *et al.* 2010). Thus, gradual changes in such variables as sediment nutrients and deep soil moisture can either stabilize a current state or shift an ecosystem to a critical point where abrupt transitions occur (Rinaldi and Scheffer 2000).

Resilience can be increased by modifying a managed system in such a way that it moves away from a threshold of unwanted regime shifts. Rangelands in Australia, for instance, exhibit a critical threshold of grass cover (Walker and Salt 2012): in moist rangelands, too little grass leads to shrub encroachment; in dry rangelands, too little grass leads to desertification. Experienced rangeland managers avoid the threshold of shifts from grasslands to shrubs or deserts by lowering cattle densities. However, crossing a second threshold – in this case a financial threshold of income-to-debt ratio – can force pastoralists to overstock

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the range, leading to regime shifts that take decades to reverse. Economic considerations often drive managed ecosystems close to thresholds where resilience is low and the risk of a regime shift is high (Ludwig *et al.* 2005).

How can unwanted changes, such as regime shifts, be avoided? Managers of Kruger National Park in South Africa developed the concept of "thresholds of potential concern" (TPCs) as a management tool to identify potentially important changes in the park (Biggs and Rogers 2003). The key words are "potential concern", because it is not usually known whether reaching one of these thresholds will trigger unwanted change. Rather, managers identify boundaries for park conditions that they seek to operate within, and if a TPC is breached, management intervention is considered. TPCs in Kruger National Park are also updated periodically, as new ecological information becomes available, and so provide a basis for continued surveillance, making management actions more likely when changes occur. Management action is often most difficult when a crisis is acute, and thus TPCs also provide a mechanism to reduce management inertia.

Resilience by design

Assessing and increasing resilience is an important goal and research topic, and attempts to manage ecosystem resilience at large scales are now underway. Approaches may include altering and improving natural and human infrastructure, managing species harvests through the establishment of quotas and "no-take" zones, promoting policies that provide economic benefits while conserving species and ecosystems, and sustaining cultural practices in ways that also preserve ecological systems. These strategies, and many others, go beyond simply creating protected areas. We use as an example the management of the Great Barrier Reef (GBR) in Australia, where a network of marine reserves was created under a reef-wide zoning plan. The reef, which occupies an area of >300 000 km^2, is managed, in part, by demarcating spatial units that differ in fishery regulations, including no-entry zones, no-take zones, limited-fishing zones, and fished zones. Fish abundance and biomass, as well as average fish size, have typically increased in areas where fishing is banned, and especially in no-entry areas (McCook *et al.* 2010). Reef fishes, which characteristically have restricted home ranges, have increased in abundance more than wide-ranging species, such as sharks. Additionally, the GBR supports dugongs (*Dugong dugon*) and a variety of marine turtles of conservation concern – all species that are wide-ranging, and thus cannot be protected by simple zoning of habitat. Nevertheless, the creation of reserves, in combination with other management activities (eg those that reduce bycatch), is improving conditions for these threatened species (McCook *et al.* 2010). The costs of these changes in GBR management are well-documented and are modest in comparison to the direct economic-use benefits. Overall, the changes associated with marine zoning have induced some negative impacts on commercial fishing and their associated communities but are also associated with substantial growth in tourism revenues (McCook *et al.* 2010). Importantly, the spatial management program has resulted in increased coral growth, reductions in outbreaks of coral-consuming crown-of-thorns starfish (*Acanthaster planci*), and additional protection of non-reef habitats (eg from damage caused by trawling). These changes, especially the increases in coral cover, sustain foundational ecosystem processes and enhance the resilience of the GBR (McCook *et al.* 2010). Despite these successes, there is ongoing deterioration of the GBR as a result of dredging activity, development of fossil-fuel infrastructure, watershed runoff, fishing, and climate change (Hughes *et al.* 2015). These mainly external drivers erode resilience, and there is concern that without action at regional and global scales the GBR will transition to an undesirable state (Hughes *et al.* 2015).

Synthesis and conclusions

Ecologists cannot prevent the effects of an anthropogenic global climate warming period that will likely occur over the next few centuries. However, over the next few decades, ecologists can assist in the development of management approaches that foster resilience and create warnings. While the examples we present here are drawn from specific ecosystems, the issues and concepts apply to the biosphere with similar needs for forecasts and early warnings at the global scale (Barnosky *et al.* 2012). These advances will help sustain ecosystems and their services in the face of future uncertainty and change. In this context, the study of extremes – particularly those related to climate – is critical, because extreme conditions have the greatest potential for causing ecosystems to cross thresholds, resulting in the loss of key ecosystem services. Designing and implementing large-scale ecosystem management programs is one way to confront these problems and potentially provide positive ecological and economic outcomes.

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Spence, Cindy

From: Elizabeth Black <elizabeth@elizabethblackart.com>
Sent: Monday, September 12, 2016 1:48 PM
To: 'Karen Hollweg'; Billig, Pat; feinberga@comcast.net; rbridge@earthnet.net
Cc: boulderplanningboard; KenCairn, Brett; Harkins, Jamie; Ellis, Lesli
Subject: RE: Revision Suggestions for BVCP Sec.3 Natural Environment Policies - DRAFT in PDF

Hello Planning Board and FOBOS, Thanks very much for sharing your suggested edits with me. I have a couple of comments regarding two particular areas: #1 **Soil Sequestration of Carbon**, and #2 **Species Management**, in regards to Climate Change. (Your edits are included below (aqua/red/black), with my suggested edits in highlighted yellow.)

#1 Soil Sequestration of Carbon

I am very pleased that Soil Sequestration of Carbon has made it into the draft! However, I am disturbed that you are limiting yourself to "cultivated agricultural areas", which is a very small percentage of OSMP lands (less than 10%??). The vast majority of OSMP lands are rangelands, pasture, native grasslands and forest. These 4 land-types have great carbon sequestration potential, through techniques such as compost application to grazed rangelands (accepted for carbon credits by the American Carbon Registry, pioneered by the Marin Carbon Project), managed rotational grazing (or holistic range management / the "Savory method"), and slash management techniques or biochar applications for forest lands. I believe you are severely restricting Boulder's ability to sequester carbon by limiting sequestration to "cultivated agricultural areas."

I also sense the fear that soil carbon sequestration will lead to the plowing up of "native grasslands". That is not at all the case. And this highlights a further problem, in that the phrase "native grassland" is being used here as a placeholder for a wide variety of different kinds of grasslands. I think we all would agree that an upland meadow which has not seen cattle for 50 years is not the same as a grazed irrigated lowland pasture or a grazed dryland range, or an enclosed, denuded prairie-dog pale. All 4 are quite different, and carbon sequestration techniques which are appropriate for one may not be appropriate for another. But they all seem to have been lumped under the heading of "native grasslands" here, which is unfortunate. **So I am suggesting the addition of "and grazed/degraded pasture or rangeland" to the first sentence. (See below)**

I also suggest the addition of a final sentence : "**Current management of rangelands and forests will be studied for opportunities to enhance carbon sequestration**." There are many things that might increase carbon sequestration within OSMP's current scope of land management. In forest thinning projects, inoculation of slash with fungal rich compost might lead to greater carbon sequestration and more soil building in our forests. Weed control projects using cattle and goats could be managed with soil sequestration in mind, as well as weed control. Leasees of rangelands might increase grass diversity and quality with managed rotational grazing, as has been reported in the literature. Degraded rangelands or prairie dog pales might be restored with compost applications. You won't know until you try, and I believe the language as currently proposed precludes your even trying some of these techniques.

New Policy: Soil Carbon Sequestration

The city recognizes that soil sequestration has a range of potential benefits, including water retention, soil health and stabilization. The city and county will consider soil sequestration strategies, including land management practices in cultivated agricultural areas and grazed/degraded pasture or rangeland that may be used to sequester carbon out of the atmosphere, and explore opportunities to incentivize carbon sequestration. x The capacity of native grasslands and forests to sequester carbon will be especially important in this effort and native grasslands and forests will be maintained wherever possible to accomplish this objective. Current management of rangelands and forests will be studied for opportunities to enhance carbon sequestration. *(Note: This policy will continue to be refined.)*

#2 Species Management

In your suggested edits, it looks like you are deleting language in red that is also crossed out in **sections 3.7** and **New Policy End of Section 3**. Am I reading this correctly? I have highlighted in yellow the sections of text that I believe you should leave in. (See below)

Current climate projections for Boulder are that if we stick to the commitments the world made at COP 21, we can expect Boulder's climate to be the same as Albuquerque's by 2100. This means that a tree planted today will have to

survive an Albuquerque-like environment when it reaches maturity. This also means that we have to start thinking RIGHT NOW about the varieties of trees we are planting on Open Space. We need to at least consider using tree seed from further south, from New Mexico, for reforestation projects. We can still plant the Doug firs, Ponderosas, etc. which currently make up our forests, but we need varieties adapted to a much warmer climate. Trees cannot move their ranges fast enough on their own to keep up with the changing climate. We have to help them expand their ranges quickly, since we made this mess in the first place. I know it's uncomfortable and violates all kinds of dearly held environmental tenets, but the alternative is a forest that won't be able to survive or thrive. The biggest bang for our carbon sequestration buck is to keep our forests as healthy as possible and growing as well as possible in this changing climate. That means even more forest thinning projects, as well as using seed sources from more arid regions, for reforestation post-burn. **Please leave in the areas highlighted in yellow below.**

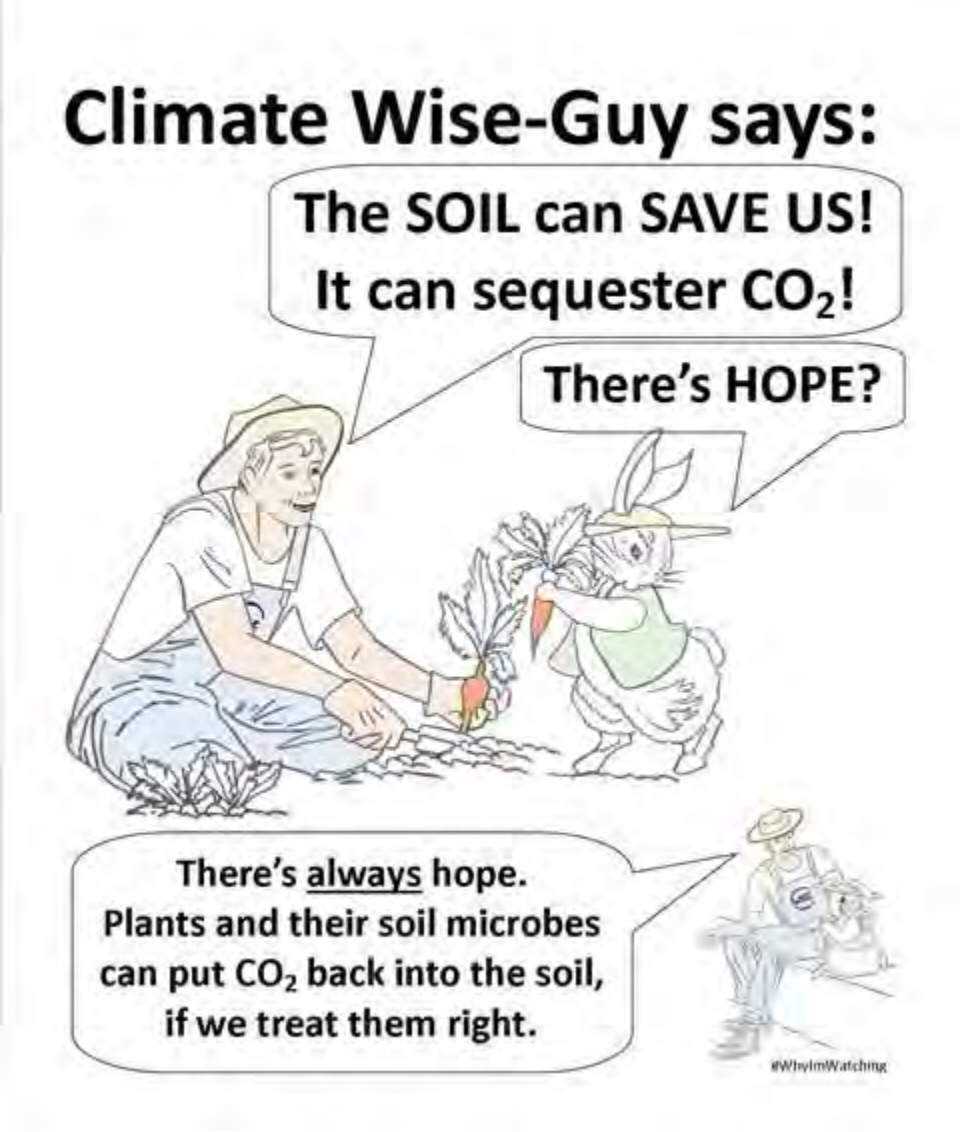
3.7 Invasive Species Management

The city and county will promote efforts, both public and private, to prevent the introduction or limit and reduce areas and opportunities for growth ~~culture~~ of invasive, ~~and~~ non-native plant and animal species and seek to prevent or control their spread. High priority will be given to managing invasive species that are defined and listed by the Colorado Noxious Weed Act and have, or potentially could have, a substantial impact on city and county resources. ~~Management of both non-native and non-local native species will be based on weighing impacts vs. benefits that includes documented threats to species of concern specific to each site, acknowledging that some non- native species may have become naturalized. Management decisions should also take~~
~~into account changing species composition due to climate change and other human impacts, as well as the role in the ecosystem provided by each organism based on the best available science.~~

~~**See New Policy at the End of Section 3**~~
~~**New Policy: Climate Change Preparation and Adaptation**~~
~~The city and county are both working on climate mitigation and recognize that adaptation plans will be necessary as well. To prepare open space lands and natural areas for climate change, the city and county will consider allowing or facilitating ecosystems' transition to new states in some sites (e.g., newly adapting plants and wildlife) and increasinge the stability and resiliency of the natural environment elsewhere. Biological indicators can help to identify high risk species for monitoring and/or relocations and may conduct restoration projects using arid-adapted ecotypes or species. Open space master plans guide other topics related to climate change, such as visitor experiences to open space.~~

Thanks very much for your consideration. Please call me with any questions you have. Elizabeth Black

Elizabeth Black
303-449-7532
4340 N 13th St
Boulder CO 80304
Elizabeth@ElizabethBlackArt.com



From: Karen Hollweg [mailto:khollweg@stanfordalumni.org]
Sent: Monday, September 12, 2016 10:20 AM
To: Elizabeth@ElizabethBlackArt.com
Subject: FW: Revision Suggestions for BVCP Sec.3 Natural Environment Policies - DRAFT in PDF

Here/below & attached are the suggestions we are making – including the one we want you especially to be aware of re carbon sequestration in our native grasslands and forests.
Karen

From: Karen Hollweg [mailto:khollweg@stanfordalumni.org]
Sent: Monday, September 12, 2016 9:53 AM
To: boulderplanningboard@bouldercolorado.gov
Subject: Revision Suggestions for BVCP Sec.3 Natural Environment Policies - DRAFT in PDF

John, Bryan, Leonard, John, Crystal, Liz, Harmon

Some of you have had problems accessing the docx version of our revision suggestions sent on Sept 8. So, here I am sending to you (attached) a PDF copy of the Aug. 24, 2016 Sec. 3 Natural Environment Policies BVCP Draft in which we have added our suggestions for revision.

COLOR KEY: In this PDF version, the **black** type is the original 2010 BVCP text, the **blue** text are the revisions proposed by staff and revisions added by OSBT and Planning Board in August, and the **red** text shows our suggested revisions.

The 5 of us who have worked to produce this document have each been involved in the city's deliberations and decisions about open space and natural resource issues for decades, and believe our suggestions provide important updates, add a bit more clarity/specificity, and reflect our community's core values. We would like to ask you to consider our suggestions as part of the Planning Board's review of BVCP Policies and to include them in the final draft that you are preparing now.

I have also attached a paper from the Ecological Society of America's journal "With and without warning: managing ecosystems in a changing world" (Nov 2015). It provides the current thinking of ecologists and grounds the revision we propose for the new policy section re: climate change and resilience (it is the last section, just before the ENDNOTES).

With respect,
Karen Hollweg
Pat Billig
Dave Kuntz
Allyn Feinberg
Ray Bridge

From:	Hollie Rogin
To:	boulderplanningboard
Subject:	Comments regarding the BVCP
Date:	Wednesday, September 14, 2016 3:54:44 PM

Planning Board,

In advance of tomorrow evening's meeting, I wanted to send you my thoughts on the BVCP Scenarios, and on the BVCP changes in general.

1. Though it may not be popular, reigning in commercial growth will be key to preserving Boulder's desirability and livability, and to easing the pressure on housing and traffic. Neighboring towns such as Longmont could share in the benefits of growing, vibrant economies.

2. Regarding infill: What's not being addressed is whether the current infrastructure can support increased density. Here's a personal example: in 2007, I replaced the main sewer line that goes from my house to the street. The original 1954 line had collapsed because when my neighborhood was constructed, the contractor laying water lines and sewer lines placed a concrete water meter pit on top of my clay sewer line. Instead of digging two trenches, they dug one. I'm quite sure mine isn't the only home in Boulder at which this occurred. What will happen if neighborhoods like mine become more dense with people, be it through infill or co-ops?

3. Let's consider easing the focus on creating more housing and increasing Boulder's population. Instead, is it possible to convert existing market rate housing to affordable housing? Could the City use in-lieu funds to purchase existing properties and transfer them to BHP?

4. Let's also be extremely careful about turning existing light industrial areas into residential neighborhoods. We rely on the businesses in them. Let's not be forced to drive to Longmont to get a lawnmower fixed or to buy plumbing supplies.

5. Open space acquisition should still be a goal. Curious to know why that was stricken.

6. Low density neighborhoods should remain low density. Let's not assume that everyone wants to live in an urban environment. Some of us, like me, value the small

town feel of our neighborhoods. It's why I moved here from Chicago 20 years ago. I did not move here and try to change Boulder; the city was what I was moving away from. I strongly support implementing neighborhood planning. There are many diverse neighborhoods within different areas of Boulder, and that diversity should be respected.

7. I do not support incentive-based zoning. If I understand correctly, BHP properties do not pay property taxes; lifting zoning regulations will mean that those of us who do pay property taxes will pay more.

8. Define community benefit. One cannot measure what is not defined.

9. In regards to Section 3, Natural Environment: Please stet the following. It is still true and important.

The natural environment that characterizes the Boulder Valley is a critical asset that must be preserved and protected. It is the framework within which growth and development take place.

10. In regards to 4.04 Energy-Efficient Land Use

“The city and county will encourage energy conservation through land use policies and regulations governing placement and orientation of land use to minimize energy use, including co-location of mixed use developments that are surrounded by open space.” Please add: where neighborhood character is not degraded, and where existing neighborhoods indicate such developments would be acceptable, either through neighborhood planning or neighborhood outreach.

11. Finally, and I will be addressing this in person tomorrow evening, in regards to Section 5, Economically Viable Community:

5.01:

"As an integral part of redevelopment and area planning efforts, the city acknowledges that displacement and loss of service and affordable retail uses need to be considered as a potential tradeoff in the context of redevelopment and planning goals."

This language must be stronger, and we should take action. It’s not simply a potential tradeoff, and acknowledgement would do absolutely nothing for the business owners who will lose their spaces.

5.05 Support for Local Business and Business Retention

This language and intent is not strong enough. We are talking about people's livelihoods, their families, and their employees. The good news is that there are proven policies that can be implemented now. There are cities and towns around the world that have implemented specific policies, with great success, to retain and encourage the small businesses that contribute character and diversity to their hometowns. I suggest changing this language to:

Small, local, independent businesses of all kinds are essential to Boulder’s economic sustainability, diversity, and inclusiveness. The city and county will develop and implement policies in order to nurture, support and retain them.

Thank you for your consideration,

Hollie Rogin

From: Greg Wilkerson
To: boulderplanningboard
Subject: Respectful Opinion on the Comp Plan from: Greg Wilkerson
Date: Wednesday, September 14, 2016 3:56:58 PM

Dear Planning Board Members,

It is my sincere considered opinion that Boulder has way too many jobs already and we don't need anymore.

I recommend that you choose Policy Option D.

I request that you put stringent limits on any additional commercial growth.

Further, I request that you make "Neighborhood Plans" be an integral part of the comp plan. These neighborhood plans should be written by the neighbors themselves as they do in many other small cities.

It is my sincere considered opinion that Boulder already has plenty of money and we don't need any further expansion in the commercial sector.

Best regards,

Greg

PS These opinions are mine alone and do not represent any organization.

Greg Wilkerson

Metro Brokers

(303) 447-1068
realtorgreg@hotmail.com
SEARCH HOMES INSTANTLY AT www.GregWilkerson.com

From: Su Chen
To: boulderplanningboard
Subject: Boulder Valley Comprehensive Plan
Date: Wednesday, September 14, 2016 5:26:08 PM

Dear Planning Board,

I understand that the BVCP will be discussed at your meeting this Thursday evening. I have read about some of the changes that have been proposed, and the "scenario options" that were presented. To me, the ONLY option that makes any sense is "POLICY OPTION D". Boulder's job growth is way out of line with its housing capacity, and this trend MUST BE SLOWED or REVERSED in order to start solving the fundamental problem. All of the other options appear to be band-aid solutions which are unlikely to be effective. Commercial and job growth has to be slowed down, or spread evenly throughout the region, not concentrated just in the city of Boulder. Let's get that under control, and then concentrate on transportation solutions for the region.

Also, I was alarmed to see that statements pertaining to environmental protection are being watered down with weasel words like "whenever practical" and "to the extent possible". This is just wrong for Boulder. Environmental concerns should be placed above all other considerations.

Regards,
Su Chen
755 13th St

From:	rmheg@aol.com
To:	boulderplanningboard
Cc:	Council
Subject:	Comp plan
Date:	Wednesday, September 14, 2016 5:46:43 PM

I am writing to recommend that policy option D be adopted which limits commercial growth.
I also request Thatcher City incorporate neighborhood plans written neighborhood residents
I request th st the comp plan preserve the unique character of Boulder neighborhoods and honor existing zoning limits.
I request that community benefits be defined in this comp update. No more buy outs for affordable housing Developers need to build affordable housing into their projects onsite of the development Period.

Sincerely,

Rosemary Hegarty PT, APT,CCRT
303-499-4602 office
rmheg@aol.com
www.rosemaryhegarty.com

From: Harold Hallstein
To: boulderplanningboard
Subject: BVCP Update - Ahead of Meeting
Date: Wednesday, September 14, 2016 6:20:24 PM

Dear Planning Board,

If our City is serious about affordable housing, we should scrap or drastically alter cash-in lieu in the BVCP update. My area, where I serve a local HOA, is made up of nearly *50% affordable housing.* It is an absolutely wonderful community! The reason it is so is very simple. The deed restricted property is interspersed with market property leading to cohesion. The majority is also ownership based - thus creating community buy-in by all residents. Clearly, cash-in-lieu and the centrally planned approach of sticking 100% affordable developments abreast of market developments is creating intense strife and ultimately will cause bifurcated social outcomes.

Almost everyone I speak with personally on staff in all agencies agrees the interspersed model creates better outcomes for all. So let's actually do something about that and make a very clear statement about the values we have regarding these programs - and with rare exception make developers solve this problem for us on each parcel and redevelopment.

I'm also highly supportive of Policy Option D - which respects the special nature of our surroundings in Boulder, and actively seeks to control and manage growth in a way that will take pressure off housing prices. It is one of the few suggestions I've seen that actually stands to make the market rate stock relatively more affordable over time.

I also think neighborhoods should have a leading role in the creation of neighborhood plans. A great deal of City community engagement seems to be ignored these days. This would be a nice way to put democracy back into action.

Lastly, and most critically, as far as zoning is concerned, I think the current rush of upzoning is simply a strategically veiled way of breaking promises to homeowners and voters - for the benefit of select special interests and agencies. The same is true regarding the repurposing of obviously dedicated lands, and annexation for the sake of non-integrated high density development.

Many of us moved here specifically because the zoning was done pretty well and that it is why we think it is a lovely place. Many of us simply did not seek out city living and want those older contracts/commitments/promises kept. I think you will find this is the case for many of the affordable owners in our community as well. I know it is in mine. Many affordable owners intentionally bought deed restricted

property after much hesitation - in order to make a known financial sacrifice so they could live in a community with this exact zoning and historic record of environmental stewardship.

Thank you very much for your consideration.

Harold Hallstein

(303) 895-8500

From:	Kimman Harmon
To:	boulderplanningboard
Subject:	Re: comp plan
Date:	Wednesday, September 14, 2016 7:03:11 PM

Dear Planning Board members;

I would like to say that we should restrict commercial growth in Boulder.
Meaning let's not be thinking of trying to out do Broomfield, Louisville or Longmont. Let them have some jobs. We have more than we can handle.
As my friends from the south say, "Slow up".
Thanks for listening!

Kimman
-
www.kimmanharmon.com

From: Sgt. Groovy
To: boulderplanningboard
Subject: Comp Plan Review
Date: Wednesday, September 14, 2016 8:09:52 PM

Dear Planning Board,

I'd like to share my thoughts with you regarding the Comp Plan as you prepare for tomorrow's meeting.

Please recommend "Policy Option D," out of the four Comp Plan scenarios. It, alone, recommends limiting commercial growth. Many of us feel it's about time that surrounding communities like Longmont, Superior, etc, share the burden of commercial growth.

Here in Boulder we've unfortunately created more jobs than housing. This is the primary reason our housing market is so stressed an, unfortunately, puts greater pressure on our residential neighborhoods to solve this issue. Let's keep low density neighborhoods as they are. We didn't buy our homes in low density neighborhoods to live next to high density situations such as co-ops or other "gentle infill" ideas. There is a place for everything in our community and up-zoning our neighborhoods in an attempt to provide dense housing is not a viable solution.

I do not support incentive based zoning. Lifting zoning regulations for entities like BHP will only mean those of us who pay property taxes will pay more. Many of us last year had unexpected astronomical rises in our property taxes. This is unfair to seniors, middle and low income residents that simply wish to stay in their homes.

Please illustrate a concrete definition of "community benefit" in the Comp Plan.

In regards to Section 3, Natural Environment: Please state the following, "The natural environment that characterizes the Boulder Valley is a critical asset that must be preserved and protected. It is the framework within which growth and development take place."

This is very concerning to me. The newly-inserted language in the Comp Plan that advises doing environmental protection: "whenever practical," and "to the extent possible," etc. Environmental protection is a non-negotiable imperative. This type of language could lead to eventual development on our open space. This issue is near and dear to the vast majority of Boulderites that live here. Let's not destroy what makes Boulder such a unique community.

Thanks for listening,

Jan Trussell
Martin Acres

From:	Judrenfroe@aol.com
To:	boulderplanningboard
Subject:	BVCP Update
Date:	Wednesday, September 14, 2016 10:05:51 PM

To Boulder Planning Board:

Like many other Boulder area residents, I feel that Boulder's growth has put us at the edge of a precipice. Not enough is being done in regard to planning to pull us back to what the Boulder Valley can sustain, now and in the future, without becoming indistinguishable from "downtown wherever" with the Flatirons in the background, if we can still see them.

It is not being recognized, in practice, that we are almost at "build out." We keep pushing the definition of how much building we can tolerate. We are teetering and about to go over the edge, the point of no return, if we do not severely limit job growth, slow everything, and instead use the available land to balance jobs with housing.

Boulder has reached a point where a Master Plan is not necessary to prevent leap frog development and sprawl. There is no where to leap or sprawl. The 5 year updates of the BVCP are beginning to remind me of a board game where we shuffle around additional game pieces to see where we can make room for more of them. It doesn't seem like the numbers of those additional pieces are determined by our residents. Bigger, taller, and denser, in and of themselves, are not better. The people who think they are should have moved to where that already exists, not here. Unless they fill a specific need, such as the hospital, they benefit no one except those few who directly profit from them. The rest of us pay, both in money and in quality of life.

The traffic, noise (ambient sound level), and pollution are severely impacting the outlying neighborhoods. The irritation involved in just getting into town is growing. The inner neighborhoods are being threatened with de-facto rezoning to squeeze in a few more residences, while the job growth is still outpacing the housing. The same threat of de-facto rezoning is probably coming to the rest of us.

Developers are allowed to put affordable housing off site from their high density developments, while denser housing types are being forced into neighborhoods and even destroying wildlife habitats in the name of affordable housing. This just isn't right.

The communities to the east of us are growing, and sprawling, in spite of what we do. We do not need to ruin Boulder on the basis of some theory that is not working to prevent that. Let the jobs go there also -- instead, not in addition. If Boulder continues on its present trajectory, those communities will be more desirable than Boulder.

We pay lip service to many of the right ideals, but we are not carrying them out in practice much of the time because too much is based on subjective interpretation, and because we make exceptions for each development that comes along. Boulder has become the frog in the hot water. One does not realize how the density, traffic, noise (ambient sound level), and pollution are stressing us until we go somewhere it does not exist and we can appreciate the relaxing quiet and the fresh air. (But no, I'm not moving.)

The only answer is something we should have done long before this. Limit job growth. Better late than never. That is **"Policy Option D"** of the four possible scenarios. Limit it to what is necessary for the welfare of the existing residents and save some options for the next 150 years without needing skyscrapers.

The answer is not to increase the pace of housing growth, and certainly not de-facto rezoning of existing neighborhoods with tactics such as co-ops and ADU/OAU's and "tiny houses" in back yards. To that end, please make it a real policy to preserve the unique character of all of Boulder's existing

neighborhoods, and to incorporate Neighborhood Plans, written by the neighborhoods themselves, not merely subcommunity plans. Please make it a strong policy to honor and enforce existing zoning limits.

In addition, to promote the above goals and provide the kinds of housing we need, please make the necessary changes to require affordable housing on-site, and to include more moderate and medium income housing in that policy. If you want "diversity" to be more palatable, that should mean a full spectrum of income levels for each project.

Regarding other policies, Environmental Preservation should not be optional, only where convenient. Please remove the recently inserted phrases the require environmental protection "whenever practical" and "to the extent possible." Those phrases render the policy useless. Environmental Preservation should be required.

Thank you for reading.

Judy Renfroe

From: ellen friedlander
To: boulderplanningboard
Cc: Council
Subject: Boulder Valley Comprehensive Plan Policies
Date: Thursday, September 15, 2016 7:26:19 AM

Dear Boulder Planning Board:

- RE: the Boulder Valley Comp Plan, please **recommend Policy Option D**, alone, out of the four "scenarios." It is the only one that seeks to limit non-residential (commercial) growth. Boulder has an oversupply of jobs, by tens of thousands. This, in turn, greatly stresses our housing market, which, in turn, puts quiet residential neighborhoods under great pressure to solve the City's **self-created crisis**.
- Boulder can do much to undo its housing crisis, by easing off its economic "over-stimulus" approach. Let us return to a reasonable balance of jobs to population – not by swelling our population, but by easing off on the job front. There CAN be too much of a good thing. Please bolster all provisions of the Comp Plan that **preserve our neighborhoods' unique characters**.
- Please build into the Comp Plan the requirement that all development in and around neighborhoods must be **based on neighborhood plans**, written by the *actual neighborhood residents* themselves (the people who best know the neighborhoods, and what impacts they can absorb). We don't want "sub-community plans," in which many neighborhoods are all lumped together. Sub-community plans are written by city planners and they do not allow the level of detailed understanding necessary to really address neighborhood-specific issues.
- Avoid **any up-zoning changes to residential neighborhoods**, whether real up-zoning, or de-facto up-zoning, such as allowing things like co-ops, tiny houses, more ADU's etc., unless the neighborhood in question has expressed interest in these things, through its neighborhood plan process, by provable majority of neighborhood residents.
- Lastly, **remove the "squishy" language** from the environmental protection section of the Comp Plan. Remove the newly-inserted phrases that advise doing environmental protection: "whenever practical," and "to the extent possible," etc. **Environmental protection should be non-negotiable**.

Thank you for your consideration and attention to this very important matter.

Sincerely yours,

Ellen Friedlander

1665 Dogwood Lane

From:	Leslie Durgin
To:	boulderplanningboard
Cc:	Firnhaber, Kurt; Becky Marten; Ruzzin, Mark; Karen Klerman; Dick Harris; Nikki McCord; Jeremy Durham; Ellis, Lesli
Subject:	BVCP language and correcting mistaken impression
Date:	Tuesday, September 20, 2016 4:39:07 PM
Attachments:	Current Version Bens Ordinance 8.29.16.docx

Dear members of the City of Boulder Planning Board,

It has recently come to our attention that some members of the Planning Board may incorrectly believe that the Affordable Housing Network, organized by Boulder Housing Partners and comprised of 14 other affordable housing and service-providing organizations, is advocating an addition to the BVCP that would omit or reduce neighborhood and public review and involvement in affordable housing project development.

Not at all!!! In fact, as you can see in the attached version of our recommended addition to the BVCP, we have specifically called In Paragraph One for "...considering and balancing goals and values of the community and the Boulder Valley Comprehensive Plan (INCLUDING NEIGHBORHOOD CHARACTER)." (capitalization added.

And in Paragraph Two for "...predictable and thorough review of such projects WITHIN AN ENVIRONMENT OF ROBUST AND THOUGHTFUL COMMUNITY ENGAGEMENT." (Capitalization added).

We believe that projects are often better designed and always better accepted in the neighborhood, both in the planning and development phases and afterwards, with the involvement and engagement of neighbors.

We are not sure where the confusion and misunderstanding began but please know that reducing or omitting public participation is not part of our desired policy change.

We are instead seeking a broad policy statement (see below) that will allow the City Council and City staff. with advice and input from Planning Board, additional flexibility in adopting regulations, policies and processes that will enhance housing affordability while retaining public review and City oversight.

Thank you for your attention to this. We are happy to discuss our recommended policy addition to Chapter 7 with you at your convenience.

Sincerely,

Leslie Durgin

Strategic Policy Advisor

Boulder Housing Partners and the Affordable Housing Network

7.01 Local Solutions to Housing Diversity

The city and county recognize that housing diversity, including homeownership and rental housing for low, moderate, and middle income individuals and families, provides a significant community benefit. The city will encourage housing diversity by establishing an alternative process and standards for the review, analysis and approval of quality affordable housing developments, that gives consideration to the community benefit of housing diversity, while also considering and balancing other goals and values of the community and Boulder Valley Comprehensive Plan (including neighborhood character).

The purpose in identifying and applying alternative review standards for certain developments is to provide a flexible, yet predictable and thorough review of such projects within an environment of robust and thoughtful community engagement. The city will embrace a culture of problem solving to encourage more quality affordable housing development, where potential solutions could include streamlined administrative processing to aid such developments in meeting deadlines for outside funding; new zoning districts; density bonuses for the provision of affordable housing; the review and revision of floor area ratio, open space and parking requirements; and the revision or elimination of other regulatory barriers that may unnecessarily or inadvertently prevent housing diversity.

From: Karen Hollweg [mailto:khollweg@stanfordalumni.org]
Sent: Saturday, October 29, 2016 7:50 PM
To: 'Ellis, Lesli'; Wobus, Nicole
Cc: OSBT-Web@bouldercolorado.gov; boulderplanningboard@bouldercolorado.gov; Mark Gershman; 'allyn s feinberg'; Patricia Billig; Dave Kuntz ; Ray Bridge
Subject: Suggestions for Update of BVCP Sec. 3 - please enter the attached doc as a BVCP public comment submission

Lesli and Nicole,

Thank you for meeting with us yesterday to discuss our suggestions for the BVCP Update.

Attached to this e-mail is our current document containing **our suggestions for Updating Sec. 3**, based on our meetings with members of the Open Space Board of Trustees, Planning Board, OSMP staff Including ecologists, and our meeting yesterday with staff from the City's Planning and OSMP departments and from the County.

We are sending in a separate e-mail our comments re: 8.12 and 8.13.

We'll look forward to reviewing your next version of the BVCP Policies and staying involved as the Update process proceeds.

Karen Hollweg

Patricia Billig

Dave Kuntz

Allyn Feinberg

Ray Bridge

3. Natural Environment[i]

Proposed new section title: ***Environmentally Sustainable Community.***
Note: This may be combined with other policies around energy and climate in addition to agriculture and food policies relating to land and environment. Also please note that a further round of editing will occur to improve organization, reduce verbosity and redundancies, and renumber policies as necessary.

[No new title. The natural environment must be addressed separately and not mixed with transportation, recycling or other "sustainability" issues. The natural environment in general and open space lands in particular, are what make Boulder such an attractive and special place.]

In this section, the "natural environment" includes city and county open space lands as well as environmental components (like air, water, geological features) and remnants of the natural environment within the urban area. Preservation and protection of the natural environment that characterizes the Boulder Valley is a core community value that has defined Boulder since the end of the 19th century. ~~The natural environment that characterizes the Boulder Valley is a critical asset that must be preserved and protected.~~ Within the Boulder Valley's complex ecological system, there are inextricable links among the natural environment, plants and animals, the built environment, the economy and community livability. ~~natural and human systems are connected to the region and world, and c~~Changes to the natural ecosystems within the Boulder Valley can have a profound effect on their viability and the quality of life desired by Boulder Valley citizens.

A mixture of wildlands and urban lands exists throughout the Boulder Valley in a continuum often referred to as the "ubran-wildland" interface. High quality ecosystems containing primarily native plants and animals occupy one end of the natural environment gradient. Land that is not dominated by native species but that is in a natural condition without buildings or development is found further along the gradient. On the other end of the gradient are lands that contain mostly non-native plants and animals and are used primarily for developed recreation, transportation or other purposes (e.g., parks, greenways) in an urban environment. These lands are often managed differently for different purposes.

Over many decades, with the initiative and the financial support of local citizens, the city and county have actively protected and managed open space around the urban area.~~, and~~ Existing city and county open space plans and policies apply to those public lands acquired and managed as habitat conservation areas, natural areas, recreational areas, and agricultural areas. ~~or used for other purposes, such as agriculture.~~[ii]

As in the rest of the world, ~~T~~the ~~climate of the~~ Boulder Valley climate is experiencing local and regional climate change within the larger global climate regimes, including increasing aridity and warmer temperatures. ~~has warmed and dried over the past three decades, and the potential for~~ Anticipated further changes and intensified weather events ~~because of climate change~~ heighten the need for the city and county to proactively ~~strengthen intervention and investment in natural resources (e.g. urban forestry, wetland and groundwater protection, and natural hazard mitigation) to~~ reduce risk, exposure to risk, and protect resources. Overall strategies should include 1) protection of the remaining large blocks of open space land that support the long-term viability

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of native plants and animals, 2) sharpened focus on managing water resources to benefit the environment~~active maintenance of stream flows and capacities~~, 3) heightened attention on the interface between the natural and urban environments in order to better manage natural resources and human-wildlife interactions and to reduce the potential for wildfire, and 4) achieve a better understanding of actions necessary to maintain or restore the ecological functions of natural systems.

~~and 3) increased focus on the interface between the natural and urban environments to better understand how to maintain or restore the ecological functions of natural systems. The more the community can assess risks of changes due to climate change and be prepared to preserve and protect environmental resources, the better prepared the community can be for mitigating the causes and impacts of those chang s to the natural environment.~~

Boulder has been at the forefront of environmental protection and preservation for many years. Sixty-three percent (63%) of the Boulder Valley Comp Plan area has been protected by the city and county as open space to protect critical habitat for native plants and animals, maintain agricultural productivity, and ~~The predominant amount of natural land protected by the city and county~~ contribute~~s~~ to the high quality of life for residents. ~~and critical habitat for native plants and animals~~. The community's historic and on-going emphasis on clean air and water, flood plain management, preservation of natural habitats has resulted in significant progress toward a sustainable, resilient and healthy urban environment.

The city and county ~~places strong emphasis on being a leader and role model to other communities for its exemplary environmental protection practices and accomplishments. The city~~ will continue to identify and implement ~~state-of-the-art~~ environmental policies both community wide and within the city government organization to further natural environment~~al~~ sustainability goals.

The policies in this section support the following city and county goals related to the conservation and preservation of land, water, air resources to enhance~~and pollution prevention and~~ resilience:

- Protecting Native Ecosystems and Biodiversity
- Enhancing ~~the Natural~~ Urban Environmental Quality
- Protecting Geologic Resources and Reducing Risks from Natural Hazards
- Sustaining and Improving Water and Air Quality

Reaching these goals requires an overall planning and management strategy that incorporates an understanding of ecological systems and implements adaptive management principles for monitoring and course corrections.

3.1 Incorporating Ecological Systems into Planning

The city and county will approach planning and policy decisions in the Boulder Valley through an ecosystem framework in which natural regions like bioregions, airsheds and watersheds are considered and incorporated into planning.

3.2 Adaptive Management Approach

An adaptive management approach involves ongoing monitoring of resource conditions, assessment of the effectiveness of management actions, revision of management actions based on new information from research, and learning from experience what works and what does not. The city and county will employ an adaptive management approach to resource protection and

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enhancement. To avoid unduly risking damage to the environment a more conservative approach will be used where there is insufficient time and funding to support monitoring of pre and post conditions to support an experimental approach.

Protecting Native Ecosystems and Biodiversity

3.3 Nativeural Ecosystems

The city and county will protect and restore significant native ecosystems on public and private lands through land use planning, development review, conservation easements, acquisition and public land management practices. The protection and enhancement of biological diversity and habitat for state and federal endangered and threatened species, as well as critical wildlife habitats, /migration corridors, environmental conservation areas, high biodiversity areas, rare plant areas, and significant natural communities and local species of concern will be emphasized.[iii] Degraded habitat may be restored and selected extirpated species may be reintroduced as a means of enhancing native flora and fauna in the Boulder Valley. Important guidance for these efforts includes the Boulder County Comp Plan, and OSMP's Grasslands Ecosystem Management Plan and Forest Ecosystem Management Plan which identify and define strategies for protection and restoration.

3.4 Ecosystem Connections and Buffers

The city and county recognize the importance of preserving large areas of unfragmented habitat in supporting the biodiversity of its natural lands and viable habitat for native species. The city and county will work together preserve, enhance, restore and maintain land identified as critical and having significant ecological value for providing ecosystem connections and buffers (e.g., wildlife corridors) to support the natural m ovement of native organisms between ecosystems.

(Note: Suggest adding new policy language to "Built Environment chapter" to address conservation and design of open space connections and buffers in urban areas, recognizing that urban lands can also be important for supporting biodiversity and maintaining wildlife habitat.)

3.5 Maintain and Restore Natural Disturbance and Ecological Processes

Recognizing that natural ecological processes, such as wildfire and flooding, are integral to the productivity and health of natural ecosystems, the city and county will work to ensure that, when appropriate precautions have been taken for human safety and welfare, ecological processes will be maintained or replicatedmimicked in the management of natural lands.

3.6 Wetland and Riparian Protection

Natural and human-made wetlands and riparian areas are valuable for their ecological and, where appropriate, recreational functions, including their ability to enhance water and air quality and reduce the impacts of flooding. Wetlands and riparian areas also function as important wildlife habitat, especially for rare, threatened and endangered plants, fish and wildlife. The city and county will continue to support and develop programs to protect, and enhance, and educate the public about the value of wetlands and riparian areas in the Boulder Valley. The city will strive for no net loss of wetlands and riparian areas by discouraging their destruction. or requiring the creation and restoration of wetland and riparian areas iIn the rare cases when development is permitted and the filling of wetlands or destruction of riparian areas cannot be avoided, the creation or restoration of wetland or riparian areas in another area of the city or county will be required under federal, state, and local laws and regulations to mitigate the loss. Management of wetland and riparian areas on city open space lands is described in the OSMP Grasslands Ecosystem Management Plan.

3.7 Invasive Species Management

The city and county will promote efforts, both public and private, to prevent the introduction or limit and reduce areas and opportunities for growth of invasive ~~and~~ non-native plant and animal species and seek to prevent or control their spread. ~~The city and county will continue to cooperate in jointly managing invasive~~ species and will seek multi-agency cooperation and public-private partnerships to maximize the effectiveness of invasive species management. The city's Grassland Ecosystem Management Plan and Forest Ecosystem Management Plan contain specific provisions for managing invasive plants and animals. High priority will be given to managing invasive species that are defined and listed by the Colorado Noxious Weed Act and have, or potentially could have, a substantial impact on city and county resources. City and county resource management plans will provide direction and guidance for identifying other priorities for management and control of invasive non-native species. ~~Management of both non-native and non-local native species will be based on weighing impacts vs. benefits that includes documented threats to species of concern specific to each site, acknowledging that some non-native species may have become naturalized. Management decisions should also take into account changing species composition due to climate change and other human impacts, as well as the role in the ecosystem provided by each organism based on the best available science.~~[iv]

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3.8 Public Access to Public Lands

Certain city and county-owned or managed lands provide a means for educating users on the importance of the natural environment. These ~~P~~public lands may include areas for recreation, preservation of agricultural use, preservation of unique natural features and preservation of wildlife and plant habitat. ~~Public a~~Access to ~~natural~~ these lands ~~will~~may be provided ~~for~~where appropriate and where it can be adequately managed and maintained, except where closure is necessary to protect areas from unacceptable degradation or impacts to agriculture, habitat or wildlife, or to provide for public safety, or reduce visitor conflicts. ~~limits on access necessary to preserve the quality the visitor experience.~~

See New Climate Change Policy at the end of Section 3

~~New Policy: Climate Change Preparation and Adaptation~~

~~The city and county are both working on climate mitigation and recognize that adaptation plans will be necessary as well. To prepare open space lands and natural areas for climate change, the city county will consider allowing or facilitating ecosystems' transition to new states in some sites (e.g., newly adapting plants and wildlife) and increasing the stability and resiliency of the natural environment elsewhere. Biological indicators can help to identify high risk species for monitoring and/or relocations and may conduct restoration projects using arid-adapted ecotypes or species. Open space master plans guide other topics related to climate change, such as visitor experiences to open space.~~[v]

Urban Environmental Quality

3.9 Management of Wildlife-Human Conflicts

The city recognizes the intrinsic value of wildlife in both the urban and rural setting. The city will promote wildlife and land use management practices to minimize conflicts with residents and urban land uses while identifying, preserving and restoring appropriate habitat for wildlife species in the urban area. When a wildlife species is determined to be a nuisance or a public health hazard, a full range of alternative wildlife and land use management techniques will be considered by the city and county in order to mitigate the problem in a manner that is humane, effective, economical and ecologically responsible.[vi]

3.10 Urban Environmental Quality

To the extent possible, the city and county will seek to protect the environmental quality of areas under significant human influence such as agricultural and urban lands and will balance human needs and public safety with environmental protection. The city will develop community-wide programs and

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standards for new development and redevelopment so that negative environmental impacts will be mitigated and overall environmental quality of the urban environment will ~~not worsen and may~~ be maintained or improved.

3.11 Urban Forests

The city will support, promote and, in some cases, regulate the protection of healthy existing trees and the long-term health and vitality of the urban forest in the planning and design of public improvements and private development. Urban canopy plays an important role in ameliorating the effects~~role~~ of climate change; therefore, the city will guide short- and long-term urban forest management[vii] that encourages overall species diversity and native and low water demand tree species ~~where appropriate~~.

3.12 Water Conservation

The city and county will promote the conservation of water resources through water quality protection, public education, monitoring and policies that promote appropriate water usage. The city will endeavor to minimize water waste and reduce water use during peak demand periods by, e.g., promoting xeriscaping. New development and redevelopment designed to conserve water will be encouraged.

3.13 Integrated Pest Management

The city and county will discourage the use of pesticides and synthetic, inorganic fertilizers.[viii] In its own practices, the city and county will carefully consider when pest management actions are necessary and focus on creating healthy and thriving ecosystems to lower pest pressure by natural processes. When pest management actions are necessary, the city commits to the use of ecologically-based integrated pest management principles, which emphasize the selection of the most environmentally sound approach to pest management and the overall goal of reducing or eliminating the dependence on chemical pest-control strategies. When public or environmental health risks are identified, the city will balance the impacts and risks to the residents and the environment when choosing control ~~management~~ measures.[ix]

New Policy: Soil Carbon Sequestration

The city recognizes that soil carbon sequestration has a range of potential benefits, including water retention, soil health and stabilization. Soil health is especially important for both the natural environment and agricultural lands. Section 9 (Food and Agriculture) includes a description of ~~the~~ soil sequestration policy for tilled agricultural lands.

For the natural environment, the current capacity of native grasslands and forests to sequester carbon will be important in city and county soil carbon sequestration efforts. High quality native grasslands and forests will be maintained and protected, while the qualitative improvement of all native grasslands and forests will follow the guidelines in the city's and county's resource management plans. Standard tests of soil health may be conducted in native grasslands and forests to inform managers' understanding of ecological conditions, including soil health, and enable them to identify opportunities to enhance soil carbon sequestration.

~~The city and county will consider soil sequestration strategies, including land management practices that may be used to sequester carbon out of the atmosphere, and explore opportunities to incentivize carbon sequestration.*~~
~~*(Note: This policy will continue to be refined.)*~~

Geologic Resources and Natural Hazards

3.14 Unique Geological Features

Due to its location at the interface of the Great Plains and the Rocky Mountains, the Boulder Valley has a number of significant or unique geological and paleontological features. The city and county will ~~attempt to~~ protect these features, in situ, from alteration or destruction through a variety of means, such as public acquisition, public land management, land use planning and regulation, and density transfer within a particular site.

3.15 Mineral Deposits

Deposits of sand, gravel, coal and similar finite resource areas will be delineated and managed according to state and federal laws and local government regulations. The use of ~~mineral deposits and other~~ non-renewable resources will be ~~evaluated~~ considered only when conservation and recycling is not a feasible alternative. The impacts of resource use will be balanced against ~~ing the need for these resources and~~ other community values and priorities, including environmental ~~such as natural~~ and cultural resource protection, ~~community and environmental~~ health concerns and carbon emission reduction. The city and county will work together to limit drilling and mining impacts by acquiring~~e~~ mineral rights for city and county lands. ~~as appropriate~~.[xi]

3.16 Hazardous Areas

Hazardous areas that present a danger to life and property from flood, forest fire, steep slopes, erosion, unstable soil, subsidence or similar geological development constraints will be delineated, and development in such areas will be carefully controlled or prohibited.

3.17 Erosive Slopes and Hillside Protection

Hillside and ridge-line development will be carried out in a manner that, to the extent possible, avoids both negative environmental consequences to the immediate and surrounding area and the degradation of views and vistas from and of public areas. Due to the risk of earth movement and/or mud slides ~~under adverse weather conditions~~, special attention needs to be paid to soil types and underlying geological strata before and during planning, design and construction of any urban or recreational (e.g., trails) development on or at the base of hillsides.[xii]

3.18 Wildfire Protection and Management

The city and county will require on-site and off-site measures to guard against the danger of fire in developments adjacent to natural lands and consistent with forest and grassland ecosystem management principles and practices. Recognizing that fire is a widely accepted means of managing ecosystems, the city and county will integrate ecosystem management principles with wildfire hazard mitigation planning and urban design.

3.19 Preservation of Floodplains

Undeveloped floodplains will be preserved or restored where possible through public land acquisition of high hazard properties, private land dedication and multiple program coordination. Comprehensive planning and management of floodplain lands will promote the preservation of natural and beneficial functions of floodplains whenever possible.

3.20 Flood Management [xiii]

The city and county will protect the public and property from the impacts of flooding in a timely and cost-effective manner while balancing community interests with public safety needs. The city and county will manage the potential for floods by implementing the following guiding principles: a) Preserve floodplains; b) Be prepared for floods; c) Help people protect themselves from flood hazards; d) Prevent unwise uses and adverse impacts in the floodplain; and e) Seek to accommodate floods, not control them. The city seeks to manage flood recovery by protecting critical facilities in the 500-year floodplain and implementing multi-hazard mitigation and flood response and

recovery plans.

3.21 Non-Structural Approach

The city and county will seek to preserve the natural and beneficial functions of floodplains by emphasizing and balancing the use of non-structural measures with structural mitigation. Where drainage-way improvements are proposed, a non-structural approach should be applied wherever possible to preserve the natural values of local waterways while balancing private property interests and associated cost to the city. Recent flood events, including the 2013 flood, highlight the importance of requiring flood insurance for all residential and commercial buildings or structures in identified and mapped 100-year floodplains.

3.22 Protection of High Hazard Areas

The city and county will prevent redevelopment of significantly flood-damaged properties in high hazard areas. The city, following the county's lead, will prepare a plan for property acquisition and other forms of mitigation for flood-damaged and undeveloped land in high-hazard flood areas. Undeveloped high hazard flood areas will be retained in their natural state whenever possible. To reduce risk and loss, riparian corridors will be preserved. In urban areas, compatible uses of riparian corridors, such as and natural ecosystems, wildlife habitat and wetlands will be protected. and wetlands will be encouraged wherever appropriate. Trails or other open recreational facilities may be feasible in certain areas.[xiv]

3.23 Larger Flooding Events

The city and county recognizes that floods larger than the 100-year event will occur resulting in greater risks and flood damage that will affect even improvements constructed with standard flood protection measures. The city will seek to better understand the impact of larger flood events and consider necessary floodplain management strategies, including the protection of critical facilities.

Water and Air Quality

3.24 Protection of Water Quality

Water quality is a critical health, economic and aesthetic concern. The city and county have made great strides in will protecting, maintaining and improving water quality within the Boulder Creek watershed as a necessary component of existing ecosystems and as a critical resource for the human community. The city and county will continue seek to reduce point and nonpoint sources of pollutants, protect and restore natural water systems, and conserve water resources. Special emphasis will be placed on regional efforts, such as watershed planning, and priority will be placed on pollution prevention over treatment.

3.25 Water Resource Planning and Acquisition

Water resource planning efforts will be regional in nature and incorporate the goals of water quality protection, as well as surface and ground water conservation. The city will continue to obtain additional municipal water supplies to ensure adequate drinking water, maintain instream flows and preserve agricultural uses. The city will seek to meet future municipal consumptive demand through conservation, demand management, and reuse as first options, to minimize the need for acquisition of additional water rights and supplies. The city will seek to minimize or mitigate the environmental, agricultural and economic impacts to other jurisdictions in its acquisition of additional municipal water supply to further the goals of maintaining instream flows and preventing the permanent removal of land from agricultural production elsewhere in the state.

3.26 Drinking Water

The city and county will continually seek to improve the quality of drinking water and work with other water and land use interests as needed to assure the integrity and quality of its drinking water supplies. The city and county will employ a system-wide approach to protect drinking water quality from sources waters to the water treatment plant and throughout the water distribution system.

3.27 ~~Minimum~~ In-stream Flow Program

The city will pursue expansion of the existing in-stream flow program consistent with applicable law and manage stream flows to protect riparian and aquatic ecosystems within the Boulder Creek watershed.

3.28 Surface and Ground Water

Surface and groundwater resources will be managed to prevent their degradation and to protect and enhance aquatic, wetland and riparian ecosystems. Land use and development planning and public land management practices will consider the interdependency of surface and groundwater and potential impacts to these resources from pollutant sources, changes in hydrology, drilling, mining, and dewatering activities.

(Note: Additional policies and regulatory standards will be analyzed to strengthen this language about groundwater to identify risks and potential impacts.)[xv]

3.29 Wastewater

The city will pursue sustainable wastewater treatment processes to achieve water quality improvements with greater energy efficiency and minimal chemical use. Pollution prevention and proactive maintenance strategies will be incorporated n wastewater collection system management. The county will discourage the installation of private on-site wastewater systems where municipal collection systems are available or where a potential pollution or health hazard would be created.

3.30 Protection of Air Quality

Air quality is a critical health, economic and aesthetic concern. The city and county will seek to reduce stationary and mobile source emissions of pollutants. Special emphasis will be placed on local and regional efforts to reduce pollutants, which cause adverse health effects, ~~and~~ impair visibility and contribute to climate change.

(Note: Suggest adding language in "Built Environment" chapter about the important role of street trees and vegetative plantings in mitigating air quality and reducing exposure to pollutants at the street level.)[xvi]

Potential New Policy: Protecting the Resilience of the Natural Environment and Assessing Climactic Changes ~~Investments for Resilience~~

The city and county recognize that the natural environment contributes to city and county sustainability goals. A primary strategy for confronting climate change threats to our native ecosystems is designing and implementing ecosystem management programs that include large-scale reserves. These reserves must be on landscape-level and watershed-level scales. Achievement of these goals requires regional, multi-agency coordination to effectively protect and manage regional watersheds and landscapes. Such efforts will benefit from including adjacent designated areas of public and private lands to ensure connectivity and ecosystem function. Preserving such ecological reserves enhances the resilience of native ecosystems, and reduces the loss of native biodiversity, ecological processes and ecosystems.

An adaptive approach may be employed to assess potential impacts from changes in the local climate. Long term studies will be necessary to provide sufficient data for sophisticated analyses and to design subsequent best management practices that address climatic changes. These data will be essential to understand the

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response of native ecosystems to environmental change.

These strategies also help to protect the resilience of our urban environment and achieve climate change goals through soil carbon sequestration, sustaining ecosystem functions and services, reducing costly damage from flooding by preserving drainages, and facilitating the absorption of precipitation within the natural environment. Within the urban environment, the city and county's efforts will focus on promoting urban forestry, habitat enhancements for native pollinators, and xeriscaping and providing opportunities for enjoyment of natural areas. ~~investments contribute toward resilience by reducing risk and promoting stability. Additionally, urban forestry, tree planting, natural hazard mitigation, improvement of air quality, added recreational activities and storm water mitigation activities have co-benefits.~~[xvii]

(Note: Policy directions about coordinated approach, vulnerable populations and resident involvement are suggested in HR&A Report and will need further review over coming weeks.)

ENDNOTES

[i] The changes to this chapter reflect work since the 2010 Plan including:

- The city currently is working on updates to its Integrated Pest Management policy, an Urban Forest Strategic Plan, the Resilience Strategy, and draft Climate Commitment.
- The city adopted the Bee Safe Resolution (2015) banning the use of neonicitinoids on city property and a Bear Protection Ordinance to secure waste from bears (2014). The county adopted a resolution to reduce and eliminate pesticide use to protect both people and pollinators (2015).
- Boulder County adopted the Environmental Resources Element of the Boulder County Comprehensive Plan (2015) and is currently working on policy related to Genetically Modified Organisms in the county.
- The city will be developing an Open Space Master Plan (2017).
- Boulder County is analyzing on how to address local oil and gas regulations, and looking at potential policy updates to better align the Fourmile Canyon Creek Watershed Master Plan (2015), Boulder Creek Watershed Master Plan (Urban Drainage and Flood Control District, 2015), and Consortium of Cities Water Stewardship Task Force Final Report (2013).
- HR&A's Recommendations for Resilience Integration (20 6)

[ii] OSBT in particular asked for clarification about how this section of poli ies apply – to the urban vs. wildlands area, and to OSMP lands vs. more generally. This added language aims at providing that clarification. Additionally, the board asked that the be edited to sound bit less human-centric.
[iii] North Trail Study process clarification and better integration with Boulder County Comprehensive Plan. [iv] Clarification of how city and county are programmatically operating – learning from best practices about an ecosystems management approach. OSBT also suggested some language for this policy, reflected here. [v] From city's Climate Commitment document.
[vi] OSBT asked for clarification of this policy regarding "nuisance species". This language is consistent with the Urban Wildlife Management plan hich has not been updated recently, so it may need some minor adjustments over coming months to clarify.
[vii] City is in process of developing an Urban Canopy Master Plan.
[viii] Stronger language suggested by Planning oard (including applying for private lands, which the city cannot regulate according to ate law). Also consistent with city programs.
[ix] Change reflects decades f learning and best p ices to integrate Integrated Pest Management into an ecological approach to nd management.
[x] City and county are exploring soil carbon sequestration. Also requested by public.
[xi] Attempting to clarify th t intent of th policy is to balance relevant community values with the use of mineral deposit.
[xii] Recomm ded after 2013 flood experience. OSBT suggested to add "before"… and during development.
[xiii] s is an existing policy that hasn't been changed. It has generally not been applied to open space lands – its intent more focused around lands with development potential.

[xiv] Clarification suggested by OSBT.
[xv] Planning Board suggested such language.
[xvi] OSBT suggested some language about mitigating against pollutants at street level with plantings, etc.
[xvii] From HR&A Resilience Report.

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Sec. 3-

From: Karen Hollweg [mailto:khollweg@stanfordalumni.org]
Sent: Saturday, October 29, 2016 7:55 PM
To: 'Ellis, Lesli'; Wobus, Nicole
Cc: OSBT-Web@bouldercolorado.gov; boulderplanningboard@bouldercolorado.gov; 'Mark Gershman'; 'allyn s feinberg'; 'Patricia Billig'; 'Dave Kuntz '; 'Ray Bridge'
Subject: Suggestions for Update of BVCP Sec. 8 - please enter the attached suggestions as a BVCP public comment submission

Please enter into the public record our comments regarding the Aug 24, 2016 Draft of the BVCP Policy Update, Sections 8.12 and 8.13.

The following revisions are needed to update the sections regarding Trail Functions and Locations and Trails Networks:

· Designated and undesignated trails should not further fragment intact open space natural areas.

· Social/undesignated trails should be eliminated and measures should be taken to strongly discourage fragmentation by off-trail use.

· In the 4th sentence of 8.12 add the word "signed" – i.e., …ensuring that formal trails are well-designed, signed, …

Thank you for the opportunity to comment on the BVCP Update.

Karen Hollweg

Patricia Billig

Dave Kuntz

Allyn Feinberg

Ray Bridge

From: Wufoo
To: #LandUsePlanner
Subject: Public Comment: Boulder Valley Comprehensive Plan [#24]
Date: Thursday, December 15, 2016 4:18:38 PM

Name *	Martin Streim
Email *	mstreim@earthlink.net
Phone Number (optional)	(303) 955-7809
This comment relates to: *	Policy Updates

Comment: *

I am concerned about BVCP policy updates specifically with regard to the following section,

"The city will endeavor to create a culture of problem solving for affordable housing, where potential solutions could include streamlined administrative processing; new zoning districts; density bonuses for the provision of affordable housing; the review and revision of floor area ratio, open space and parking requirements; and the revision or elimination of other regulatory barriers that may unnecessarily or inadvertently prevent housing diversity."

As a county resident, I am concerned that adjacent city property or property considered for annexation could be developed without regard to established setbacks, height requirements, and other current standard zoning requirements.

Additionally, any changes to BVCP policy should NOT have any bearing on current land use requests.

Please check box below *	• I acknowledge receipt of the Open Records Notification

From: Wufoo
To: #LandUsePlanner
Subject: Public Comment: Boulder Valley Comprehensive Plan [#26]
Date: Tuesday, December 20, 2016 2:09:55 AM

Name *	Juliet Gopinath
Email *	julietgopinath@yahoo.com
Address (optional)	Boulder, CO 80301 United States
This comment relates to: *	Policy Updates

Comment: *

Dear Planning Commission,

I am writing with comments concerning the proposed changes to the Boulder Valley Comprehensive Plan. I cannot believe that changes to the BVCP plan are being considered for a land use change request currently under review. You should stay with the current BVCP plan policies until all land-use change request reviews are completed. Many of the changes are not well thought through and disenfranchise your constituents. However, there are a few that display foresight and give some hope for optimism. Specific comments follow each proposed change.
1. Local Solutions to Housing Diversity
"The city and county recognize that housing diversity, including homeownership and rental housing for low, moderate, and middle income individuals and families, provides a significant community benefit. The city will encourage housing diversity by establishing an alternative process and standards for the review, analysis and approval of affordable housing projects, that gives consideration to the community benefit of housing diversity, while also considering and balancing other goals and values of the community and Boulder Valley Comprehensive Plan (including neighborhood character). The purpose in identifying and applying alternative review standards for certain developments is to provide a more flexible, streamlined, predictable, and thorough review of such projects within an environment of robust and thoughtful community engagement. The city will endeavor to create a culture of problem solving for affordable housing, where potential solutions could include streamline d admini strative processing; new zoning districts; density bonuses for the provision of affordable housing; the review and revision of floor area ratio, open space and parking requirements; and the revision or elimination of other regulatory barriers that may unnecessarily or inadvertently prevent housing diversity."

Comment: The BVCP plan has made Boulder the place it currently is, a highly desirable area with good quality of life. I do not agree with the proposed change for the following reasons:

1. It does not specifically state how the review process will be changed. The specifics of a review process need to be included in a proposed change.
2. All development applications need to be considered equally. Creating a streamlined process for affordable housing is unfair to both the other applicants proposing development and the communities that can be impacted. The point of the BVCP is not to ram the agenda of the county commissioners down the throats of residents, but to work with everyone on a good solution.
3. The BVCP is for the citizens; it is not for the BHP, BCHA to rewrite for their own agenda. This change smacks of this sentiment. Consider your residents!

2. Potential New Policy: Community Benefit of Affordable Housing Key Policy Choice:
"Staff is currently in discussions with Boulder Housing Partners regarding a new policy that explicitly recognizes affordable housing as a community benefit that should receive special consideration, including:
• regulatory changes that unlock more “diverse housing” opportunities.
• priority review to meet funding timelines and improve overall project feasibility.
• clear guidance on areas open to community input."

Comment: The community deserves to be able to comment on all aspects of affordable housing. The proposed change seems to indicate that the community will not be able to comment on certain subjects. We are paying taxes, and as part of that, we have the right to comment on the use of our tax dollars for affordable housing. Policy 7.01 already states the community benefits of affordable housing, as well as the fact that regulations, policies and programs will be put in place to support this goal. This change is unnecessary as it is already covered in the existing comprehensive plan. You know citizens have a right to comment on what their tax dollars are used for!

3) Potential New Policy: Disposition of City Land
"Prior to the disposition of any city or county owned land, the city and county will consider the potential for affordable housing. The benefit of providing housing will need to be balanced with all other benefits of selling the land and any regulatory considerations."

Comment: Does this mean our beloved open space could be sold and developed for affordable housing? This would be an absolute disaster and generate an outcry of large proportions. This change is not acceptable and should not be considered.

4) 7.10 Balancing Housing Supply with Employment Base
Expansion of the Boulder Valley housing supply should reflect to the extent possible current and employer locations, projected employer workforce housing needs, industrial/commercial development sitesworkforce housing needs, the resulting variety of salary ranges, and the demand such developments bring for housing employees. Key considerations include housing type, mix, and affordability. The city will explore policies and programs to increase housing for Boulder workers and their families by fostering mixed-use and multi-family development proximate to transit, employment or services, and by considering the conversion of commercial and industrial zoned or designated land to residential use.”

Comments: The policy revision that would encourage conversion of commercial or industrial zoned land to residential is a good one. However, job growth needs to be balanced with the needs for housing and the infrastructure of the community. Simply building more houses will not solve the problem.

5) 7.13 Integration of Permanently Affordable Housing "Permanently affordable housing, whether publicly, privately or jointly developed and financed should be dispersed throughout the community and whenever possible affordable units should be provided on the site of and integrated into all new housing developments.

Comments: This is a well-thought policy change, assuming that you can limit or close the cash-in-lieu loop hole. According to city numbers, the cash-in-lieu program has resulted in <4% more units than had the program not been in place. Cash-in-lieu has driven concentrated, segregated developments that do not align with this policy and needs to be looked at carefully in the context of

the comprehensive plan.

6) Potential New Policy: Reducing Overall Housing Cost
Evaluate plans and investments for their impact on household cost, and consider ways to reduce the combined cost of housing, utilities, and/or transportation. Encourage net zero energy use investments to reduce overall housing cost

Comments: This is a well-thought out policy change.

7) Potential New Policy: Discourage New Large Single Family Homes
Recognizing that achieving affordable housing for low, moderate, and middle incomes is partly related to home size, and that existing neighborhoods are finding their character altered by new large homes, the city will discourage new homes that exceed size limits.
Comments: This is a well-thought out policy change.

8) "Key Policy Choice: Should the city continue to preserve existing parks, and/or to look for opportunities to redevelop them as other affordable housing types (e.g., small lot housing)?
The City of Boulder does not have land available for new Manufacture Home Parks, so "development of new" language is suggested for removal. Should this policy also discuss potential new configurations of affordable housing in manufactured home parks?"

Comment: You should preserve mobile home parks, as they provide truly affordable housing and close communities. Do not redevelop them.

Regards,

J. Gopinath

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From: Wufoo
To: #LandUsePlanner
Subject: Public Comment: Boulder Valley Comprehensive Plan [#28]
Date: Wednesday, December 28, 2016 3:17:11 PM

Name *	Jon Skuba
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Phone Number (optional)	(303) 817-5303
Address (optional)	4744 Tally Ho Court Boulder, CO 80301 United States
This comment relates to: *	Policy Updates

Comment: *

The BVCP has been a guide to development throughout the area. Numerous organizations and citizens have made plans based on the specifications of the plan. People have bought homes based on its promises.
The plan is a noble document whose apparent intention is to maintain an environment and ambiance in the Boulder Valley that keeps the area from becoming another Los Angeles. Now the powers in the City and County want to change the plan to be more permissive of the very thing it was written to prevent. And the timing of this change is obviously for the purpose of making several pet development projects allowable in the new plan that would have otherwise been prohibited.
When the motives are so transparent, such a move makes a mockery of the plan. It destroys any credibility its authors may have had and further validates popular opinion that government no longer represents its constituency.

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