

# Conservation Subdivision: Post-construction Phase— Policy Directions and the Importance of Assessing Stakeholder Opinions<sup>1</sup>

Daniel Feinberg and Mark Hostetler<sup>2</sup>

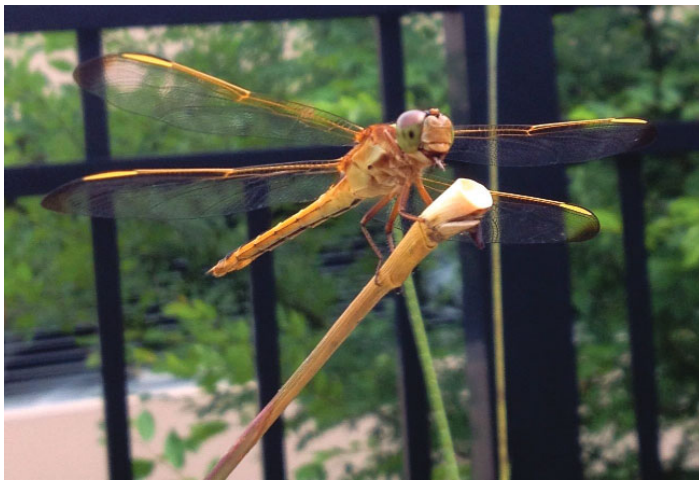


Figure 1. A dragonfly using an urban habitat patch in Gainesville, FL.  
Credits: Daniel Feinberg

## Introduction

As urban communities grow, design and management strategies for new developments become critical factors that determine impacts on natural resources. How can we accommodate growth and yet conserve natural resources such as biodiversity, water, and energy? In this document, we focus on conserving biodiversity when land is subdivided. The term biological diversity, or *biodiversity* refers to the variety of life and its processes. Biodiversity includes species diversity, habitat diversity, and genetic diversity.

For the purposes of this article, we focus on biodiversity conservation of *native* species. Native species in the United States are plants and animals that were present within a specific region before Europeans made first contact. Non-native (or exotic) plants or animals are defined as those species that were not present in the region before European contact (Florida Native Plant Society 2003).

Recently, a popular concept called *cluster development*, *conservation subdivision*, or *conservation development* (CD) has gained traction in many planning and design fields. Conservation development is intended to accommodate growth while simultaneously managing for biodiversity conservation. Typically in CDs, homes are clustered on small lots with the remaining land areas conserved as open space, as opposed to traditional development, where homes are spread out, fragmenting the original natural areas.

The goals for CD are twofold: 1) to improve biodiversity within a designated subdivision; and 2) to minimize development-related impacts on surrounding habitats. Often, though, the efforts are limited to just the initial phase of development: site design. To conserve and improve biodiversity within urban environments effectively, one must consider the following three phases of development: design, construction, and post-construction. Overall, these three phases must be addressed in order to create and

1. This document is WEC356, one of a series of the Wildlife Ecology and Conservation Department, UF/IFAS Extension. Original publication date December 2014. Visit the EDIS website at <http://edis.ifas.ufl.edu>.

2. Daniel Feinberg, graduate student, School of Environmental and Forest Sciences, University of Washington; and Mark Hostetler, professor and Extension specialist, Department of Wildlife Ecology and Conservation, University of Florida/IFAS, PO Box 110430, Gainesville, Florida, 32611-0430.

The Institute of Food and Agricultural Sciences (IFAS) is an Equal Opportunity Institution authorized to provide research, educational information and other services only to individuals and institutions that function with non-discrimination with respect to race, creed, color, religion, age, disability, sex, sexual orientation, marital status, national origin, political opinions or affiliations. For more information on obtaining other UF/IFAS Extension publications, contact your county's UF/IFAS Extension office.

U.S. Department of Agriculture, UF/IFAS Extension Service, University of Florida, IFAS, Florida A & M University Cooperative Extension Program, and Boards of County Commissioners Cooperating. Nick T. Place, dean for UF/IFAS Extension.

maintain biodiversity within residential subdivisions. The “Conservation Subdivision” series of EDIS publications discusses biodiversity conservation pertaining to all three phases of development. This fact sheet focuses on decisions made in the third phase: post-construction.

The design phase typically involves, among other aspects, lot size and open space designation and road distribution throughout the site. Goals for the development are discussed and prioritized. In this phase, homes and lots are placed across the site, and the remaining area is designated as natural open space. Basically, everything is laid out on paper and vertical structures (buildings) and horizontal structures (roads, lots, conserved areas, and shared spaces) are given specific spaces within the development, while remaining areas are designated as natural open space (often in environmentally sensitive areas such as wetlands) and other non-urbanized land uses.

Next, during the construction phase, built environment professionals including architects, contractors, and subcontractors take whatever is on paper and implement it on the ground, constructing homes, streets, waste treatment systems, and landscaped areas such as lots and parks. In the absence of fully trained or engaged contractors or landscapers, many things can happen during this phase that could destroy or decrease the viability of onsite and nearby natural habitat. For example, even if the most important large trees are planned to be preserved across the subdivision and built areas are designed around them, the placement of topsoil and routes used by heavy construction vehicles could impair the survival of these trees. If heavy construction vehicles continually run over the root zones of trees or if topsoil is placed against their trunks, the roots may not be able to acquire nutrients, water, and oxygen, and the trees may die.

In the final phase, post-construction, buyers purchase the homes and move into the community. It is now the responsibility of residents individually and collectively to manage their homes, yards, neighborhoods, and common areas in ways that do not compromise the original intent of the community. Additional problems can arise if residents are not fully engaged—imagine residents moving in and planting invasive exotic plants in each of their yards. Residents could also improperly apply fertilizers and pesticides. The spread of invasive plants (Pimentel et al. 2001) and polluted stormwater runoff could then severely reduce or destroy the diversity of animals and plants found in the conserved areas.

Simply designating open space is not enough to provide long-term protection for a variety of wildlife (McElfish 2004; Hostetler and Drake 2009; Hostetler 2010). There is limited evidence for CDs maintaining biodiversity over the long term, and some studies suggest that existing CDs fail to provide better wildlife habitat than conventional subdivisions (Lenth et al. 2006; Milder et al. 2008). As noted above, impacts stemming from built areas could compromise the intent of the CD to conserve biodiversity. Researchers and practitioners suggest that in order for a CD to maintain long-term biodiversity, it needs to have a management plan that assigns stewardship responsibilities to stakeholders (Arendt 1996; Pejchar et al. 2007). Thus, new policies need to be developed that encourage developers of conservation developments to adopt long-term management practices that support biodiversity conservation. Below, we discuss policy options that could be used to support conservation management practices in CDs and report on a survey of landowners in Colorado that have created conservation developments and their opinions about a policy option to support the implementation of management practices.

## Planning Policies and the Creation of Conservation Developments

In a few places, CD is regulatory instead of incentive-based, meaning that all of the developers in a given area are required to cluster the built space and to conserve open space. Larimer County, CO, is an example where CD “must be used if [a] development is 30 acres or larger and outside [the] Growth Management Area” (CD Process Guide). In this case, the planners only approve the construction of CDs and do not offer incentives to the developers for subdividing the land according to the conservation guidelines. However, in Larimer County, the CD policy primarily directs developers to conserve open space and does not specifically address long-term management of the conservation development for biodiversity.

In most regions throughout the United States, creating CDs is voluntary. City and county planners encourage developers to construct CDs by offering financial incentives to developers. Two of the most common types of incentives that planners offer when land is subdivided are density bonuses (Reed et al. 2014) and fast-tracking (Arendt 2009). With a density bonus, the developer is allowed to build and sell a greater number of homes in a given area. This is the case in Brevard County, FL, where developers can build with 25% greater density if they cluster the homes and designate a certain percentage of the neighborhood as open space (Romero and Hostetler 2007). With fast-tracking,

the permit approval process is expedited, so developers do not have to wait for as long (or take out loans) before they can begin construction. Even where incentives are used to create conservation developments, most only address clustering built areas and conserving a certain percentage of open space. The incentive-based policies do not address management of the built and open space for biodiversity. Along these lines, Wald and Hostetler (2010) found that most land development regulations addressing open space in the state of Florida did not sufficiently address management within the open space or methods to engage nearby residents.

Either regulatory or incentive-based policies could be crafted to support the implementation of management practices in CDS, but in general, regulatory policies are difficult to pass and voluntary policies are more easily accepted by stakeholders. In order to create successful incentive-based policies that address management within conservation developments, researchers need to assess the opinions of stakeholders—people who either impact or are impacted by the policies (Walker et al. 2002). Below, we describe the results of a case study in Colorado. In this study, developers of conservation developments were asked about their opinions regarding management practices for biodiversity and their likelihood to support an incentive-based policy.

## Developer Opinions Concerning the Implementation of Management Practices in Colorado Conservation Developments

Colorado is experiencing rapid population growth, and many of its counties have already created CD policies as a way to conserve open space (Hannum et al. 2012). However, the CDs tend to lack long-term management plans that are needed for conserving biodiversity (Reed et al. 2014). In order to assess policy directions and whether developers would implement certain management practices in CDs, we surveyed and interviewed developers that have created CDs in four counties of Colorado (Feinberg 2014).

We asked 25 developers about their willingness to adopt proposed management practices, their opinions on how to fund ongoing management, and their opinions on a policy incentive (a density bonus) that would reward them for adopting the management practices. This density bonus option, where developers are allowed to build more homes on the property above current zoning, was chosen based on

conversations with city and county planners who indicated that such an option is realistic in these Colorado counties. The survey listed four specific management practices to be implemented if developers received the density bonus:

1. Landscaping around the homes with native plants
2. Adding wildlife-friendly language to the neighborhood's codes, covenants, and restrictions (CCRs)
3. Installing interpretive signage to educate the homeowners about the conservation goals of the CD. (For more information on specific educational strategies to engage residents, please see [Conservation Subdivision: Post-construction Phase—Engaging Residents.](#))
4. Establishing a long-term management plan that involves removing invasive exotic plants from the open spaces and planting native vegetation

Out of the 25 survey respondents, 13 had bought the land specifically to develop it (“developers”), whereas 12 had previously owned and farmed the land (“landowners”). The developers’ neighborhoods conserved much less of the land as open space (an average of 26%), whereas the landowners’ neighborhoods conserved 68% of the land. Most of the respondents (76%) said that it was important for the open spaces to contain native plant and animal species, but only half (50%) were concerned about activities in the built spaces negatively impacting biodiversity in the open spaces.

Respondents generally supported the four proposed conservation practices, although they were neutral about requiring native landscaping around the homes (practice 1), perhaps due to a reluctance to dictate how homeowners manage their respective private properties. In terms of the two groups of respondents (landowners and developers), the long-term landowners were more supportive of environmental CCRs. The two groups did not differ in their opinions of the other practices.

There was some support for the policy incentive: seven survey respondents supported the density bonus (four opposed it) and ten (seven developers and three previous landowners) stated that they were neither unsupportive nor supportive of the policy incentive. Two interviewees (both long-term landowners) explained that the reason why they neither opposed nor supported the scenario was because they lacked experience with the proposed practices and incentives. In addition, four interviewees (three previous landowners and one developer) expressed interest in a fast-tracking incentive, with one (a previous landowner)



saying that it would be better than a density bonus because, “it takes forever to get through the permitting process.” Two developers stated that the appropriate incentive depends on the context of an individual developer and neighborhood. For instance, a density bonus might be more attractive if the developer seeks to build a senior community with smaller lawns, but fast-tracking is advantageous if the developer is on a tight schedule.

The study suggested that long-term funding is the greatest barrier to implementing management programs in the CDs, with developers expressing equal opposition to the proposed HOA dues and property tax. Overcoming this barrier may require more awareness among developers about their potential to profit from CDs; homes in CDs tend to sell for higher prices than those in conventional developments (Hannum et al. 2012), and the increased profits can help developers offset the initial costs of management (e.g., installing signs, landscaping with native plants). However, Bowman and Thompson (2009) found that although homeowners are willing to pay more to live in CDs, prospective developers are often unaware of this increased willingness to pay.

This case study demonstrated the importance of assessing stakeholder opinions and values when trying to construct new conservation policies. In Colorado, offering both a density bonus and a fast-tracking option could be viable options that encourage the implementation of management practices in CDs. However, this study and others (e.g., Bowman and Thompson 2009) suggest that developers often resist adopting novel conservation practices and policies due to a lack of familiarity with these tools and a lack of access to the data that support their efficacy. Developers might be more supportive of implementing management practices in CDs (including a long-term funding source such as HOA dues or a property tax) if they knew more about how policy incentives work, why certain management practices are critical for biodiversity conservation, and how CD can increase profitability. One approach for sharing this information, as well as emphasizing the importance of management, is through workshops in which planners and environmentalists work directly with prospective developers in their region. These workshops could be specifically targeted towards landowners or developers (e.g., educating developers on the importance of environmental CCRs, since developers reported lower support for this practice than landowners). Prospective developers can also learn more about CD and visualize some of the proposed management strategies by visiting existing neighborhoods;

two examples in the state of Florida are [Harmony](#) and [Madera](#).

## Additional Resources

For additional information on CDs and conserving urban biodiversity, a variety of online guides, books and other publications exist.

### Books and Scientific Publications

Arendt, R. 1996. *Conservation design for subdivisions: A practical guide to creating open space networks*. Washington, DC: Island Press.

Bowman, T., and J. Thompson. 2009. “Barriers to implementation of low-impact and conservation subdivision design: Developer perceptions and resident demand.” *Landscape and Urban Planning*, 92(2), 96–105.

Feinberg, D. S. 2014. “Evaluating strategies to manage biodiversity in conservation subdivisions: landowner opinions in Colorado” University of Florida thesis. Online: <http://ufdc.ufl.edu/UFE0046781/00001>

Hannum, C., Reed, S. E., Pejchar, L., Ex, L., and Laposa, S. 2012. “Comparative analysis of housing in conservation developments: Colorado case studies.” *Journal of Sustainable Real Estate*, 4, 149–176.

Hostetler, M. E. 2010. “Beyond design: the importance of construction and post-construction phases in green developments.” *Sustainability* 2:1128–1137.

Hostetler, M., and D. Drake. 2009. “Conservation subdivisions: A wildlife perspective.” *Landscape and Urban Planning* 90: 95–101.

Hostetler, M. E. 2012. *The Green Leap: A Primer for Conserving Biodiversity in Subdivision Development*. Berkeley, CA: University of California Press.

Lenth, B. A., R. L. Knight, and W. C. Gilgert. 2006. “Conservation value of clustered housing developments.” *Conservation Biology* 20(5): 1445–1456.

McElfish, J. M. 2004. *Nature-Friendly Ordinances: Local Measures to Conserve Biodiversity*. Washington, DC: Environmental Law Institute.

Milder, J. C., J. P. Lassoie, and B. L. Bedford. 2008. “Conserving biodiversity and ecosystem function through

limited development: An empirical evaluation.” *Conservation Biology* 22(1): 70–79.

Pejchar, L., P. M. Morgan, M. R. Caldwell, C. Palmer, and G. C. Daily. 2007. “Evaluating the potential for conservation development: Biophysical, economic, and institutional perspectives.” *Conservation Biology* 21(1): 69–78.

Pimentel, D., McNair, S., Janecka, J., Wightman, J., Simmonds, C., O’Connell, C., Wong, E., Russel, L., Zern, J., Aquino, T., and T. Tsomondo. 2001. “Economic and environmental threats of alien plant, animal and microbe invasions.” *Agriculture, Ecosystems, and Environment*, 84(1), 1–20.

Reed, S. E., Hilty, J. A., and D. M. Theobald. 2014. “Guidelines and incentives for conservation development in local land-use regulations.” *Conservation Biology*, 28(1), 258–268. doi – 10.1111/cobi.12136

Wald, D. M., and M. E. Hostetler. 2010. “Conservation value of residential open space: Designation and management language of Florida’s land development regulations.” *Sustainability* 2(6): 1536–1552.

Walker, B., Carpenter, S., Anderies, J., Abel, N., Cumming, G., Janssen, M., Lebel, L., Norberg, J., Peterson, G. D., and Pritchard, R. 2002. “Resilience management in social-ecological systems: A working hypothesis for a participatory approach.” *Conservation Ecology*, 6(1), 14.

## Online

Arendt, R. 2009. *Land conservation and developers* [Video file]. Retrieved June 18, 2014 from <https://www.youtube.com/watch?v=L836CvS8aw4>

Conservation Development Process Guide [http://www.larimer.org/planning/planning/ProjectDocuments/12-S3097\\_land\\_division\\_process\\_guide\\_-\\_conservation\\_development.pdf](http://www.larimer.org/planning/planning/ProjectDocuments/12-S3097_land_division_process_guide_-_conservation_development.pdf)

Feinberg, D., and M. Hostetler. 2013. *Conservation Subdivision: Post-construction Phase – Engaging Residents*. WEC334. University of Florida IFAS Extension, Gainesville, FL. <http://edis.ifas.ufl.edu/uw379>

Vaughn, R., M. Hostetler, and F. Escobedo. 2012. *Conservation Subdivision: Post-construction Phase – Urban Trees Can Reduce Household Carbon Footprint*. WEC321. University of Florida IFAS Extension, Gainesville, FL. <http://edis.ifas.ufl.edu/uw366>

Hostetler, M. 2014. *Covenants, Codes, and Restrictions that Address Environmental Issues in Residential Communities*. WEC213. University of Florida IFAS Extension, Gainesville, FL. <http://edis.ifas.ufl.edu/uw248>

Florida-Friendly Landscaping <http://www.floridayards.org/>

Harmony, Florida – Sustainability <http://harmonyfl.com/Central-Florida-Community/sustainability>

UF/IFAS Assessment of Non-Native Plants in Florida’s Natural Areas <http://plants.ifas.ufl.edu/assessment/>

Landscaping for Wildlife <http://www.wec.ufl.edu/extension/landscaping/>

Living Green in Madera <http://www.wec.ufl.edu/extension/gc/madera/>

Romero, M. and M.E. Hostetler. 2010. *Policies That Address Sustainable Site Development*. CIR1520. University of Florida IFAS Extension, Gainesville, FL. <http://edis.ifas.ufl.edu/uw254>