Reducing Risk through Ordinances, Codes, & Design:
Tools traditionally used by planners for guiding development and environmental management can also be used to reduce a community's vulnerability to hazards, to mitigate risks, and to lessen negative impacts of climate change.
Reducing Risk through Ordinances, Codes, & Design:

This packet presents commonly used regulatory and incentive planning tools. Each tool and its pros and cons are briefly described. In addition, the potential to utilize these tools for hazard mitigation and climate change adaptation is presented. Examples are also provided for each.

The information in this packet can help communities identify opportunities for utilizing planning tools, which are already used for growth, for hazard mitigation. In addition, it can help communities choose future regulatory and incentive tools for development management purposes as well as mitigation and adaptation.

Hazard mitigation and climate change adaptation measures are commonly grouped as follows:

- **Protection** measures prioritize protecting people, property and infrastructure from impacts in place. Protection measures typically employ land preservation, environmental restoration, or hard-engineered solutions to prevent impacts.

- **Accommodation** measures allow for continued development of new structures in vulnerable areas, but manage risks by requiring that structures be built or retrofit to be more resilient to impacts of hazards and climate change.

- **Relocation** or **Retreat** measures limit armoring, discourage development and redevelopment in threatened areas, and plan proactively for the eventual relocation of structures to less vulnerable locations.

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Euclidean Zoning

**Description**

Traditional, or Euclidean, Zoning is the dominant model of land use regulation in the United States. The central feature of Euclidean Zoning is the strict separation of different land uses; the three broadest categories of building use are residential, commercial, and industrial. Regulations in each zone generally include specifications about permitted building size and shape, setbacks, height restrictions, and density of development. The zoning ordinance and zoning map are both legally binding documents. Most zoning codes are rigid in their regulations and separation of land uses; therefore, conditional uses and variances are utilized to allow non-compliment uses and structures.

**Pros**

- Guaranteed authority by local and state governments
- Familiar process for developers and investors
- Provides consistency for landowners
- Allows for the regulation of nuisances, such as noisy or polluting industries, and separates those types of uses from residential areas
- Flexible in allowing for evolution over time through amendments, overlay districts, conditional uses, and variances

**Cons**

- Can prohibit mixed-use developments
- Can restrict diverse communities and exacerbate segregation of socio-economic groups
- Can increase reliance on automobiles and consumption of fossil fuels and encourage sprawling development patterns due to physically separated residential, civic, commercial, and industrial uses and minimum lot sizes.
- Development restrictions can drive up costs and disadvantage lower income residents

**Using this tool for hazard mitigation/climate adaptation:**

Tools traditionally used by planners for guiding development & environmental management can also be used to build resilience by helping to reduce a community’s vulnerability to hazards and climate impacts. Adaptation measures fall into the following categories: protection, accommodation, and relocation.

**Protection:**

Zoning allows local jurisdictions to designate land to be used for protection, ranging from hardened infrastructure to wetlands that slow storm surge and open space that can absorb rainwater.

**Accommodation:**

Within developable areas, planners can strategically utilize zoning to locate residential and commercial development, as well as critical facilities, mindful of the risks of hazards and climate change impacts.

**Relocation:**

Zoning can allow receiving communities to prepare for individuals and families who are relocating from more vulnerable areas by ensuring that adequate and appropriate residential and commercial needs are available. Proactively planning for an influx of population can allow a community to ensure they are in line with their goals and character, while offering incoming residents and businesses an appealing alternative that is still a part of their larger community.
Example: City of Ruston Zoning Ordinance

The City of Ruston, Louisiana overhauled their zoning ordinance in 2012. The new ordinance regulates permitted and conditional uses in established districts based on the primary type of land use desired for the area. Residential districts are divided by minimum lot sizes and between single and multi-family developments. Commercial and industrial districts are divided primarily by the type of businesses allowed to operate in the area. To allow for more mixed-use development and to preserve the character of established central neighborhoods, special districts and overlays were established near the downtown and Louisiana Tech University. Along with the written ordinance, color-coded maps, tables, and diagrams are used throughout to make the document user-friendly and easy to interpret.

This example illustrates how a community can use a Euclidean-style zoning ordinance to direct land use based on specific types of development, in part based on proximity to specific downtown features. Similarly, zoning can consider land suitability and proximity to risk-prone areas in designating land uses. In addition, this example presents a case of a small Louisiana community that has incorporated visual features into their zoning ordinance to improve its usability.

Example: Branson, Missouri

Branson, Missouri is a small waterfront city of approximately 10,800 people in the Ozark Mountains. It is a popular tourist destination. The city’s zoning code designates districts by uses, such as one-family residential, multi-family residential, commercial, etc. These zoning districts mostly apply to areas of the city that are already urbanized. The code utilizes the concept of cascading uses, where ‘R-1’ or one-family residential is the most restrictive, and each subsequent use up to C, commercial, is less restrictive by allowing all previously permitted uses. Cascading uses do not apply to other districts such as light industrial, agricultural, and downtown districts. To allow for flexibility and creativity in undeveloped parts of the community, Planned Development districts have been established.

This example illustrates how a community can use Euclidean zoning for most areas, while incorporating Planned Unit Development districts in other specific areas to give flexibility to developers of greenfield sites. With regards to risks from hazards and climate change, zoning districts can be determined in part by the appropriate uses for the area given those risks. The concept of cascading uses can be particularly useful when establishing regulations for places with varying levels of risk. The use of Planned Unit Development districts in a community otherwise zoned by use could be an applicable model for a community that is seeing, or anticipating, a rapid influx of individuals and families relocating from more risk-prone areas.
Conditional Uses

Description

These tools add flexibility to conventional zoning ordinances by assigning particular uses to a conditional use category, or by designating particular areas as conditional use districts. Conditional uses refer to those uses that may be permitted in a particular district, but which warrant greater scrutiny prior to approval. The conditions that these land uses have to comply with are specified in the code of ordinance and generally include discretionary standards that require a quasi-judicial approval process. In some cases, a conditional use zone is created, where individual, site-specific standards and conditions are incorporated into the zoning district regulations through rezoning.

Pros

- They give flexibility to the zoning ordinance while retaining oversight of individual projects addressing site specific concerns.
- They produce projects better aligned with community goals and plans, but also adapted to new circumstances.
- Concerns for approval can be raised in the review process through public hearings or other types of processes involving public engagement, thereby enhancing accountability and legitimacy.

Cons

- Individual review of permits and enforcement of the established conditions can lead to increased administrative costs.
- The bargaining-like process of approval for a conditional use permit may lead to decisions that are arbitrary, challenging the accountability and legitimacy of the process, and can lead to lengthy and costly litigation.
- Decision makers may be inclined to bow to public pressures, denying development permits for proposed projects that meet standards.

Using this tool for hazard mitigation/climate adaptation:

Tools traditionally used by planners for guiding development & environmental management can also be used to build resilience by helping to reduce a community’s vulnerability to hazards and climate impacts. Adaptation measures fall into the following categories: protection, accommodation, and relocation.

Accommodation: Conditional uses allow a community to consider local needs in conjunction with the specific local vulnerabilities by allowing certain types of development or determining appropriate regulations or conditions that respond to risks from hazards.
Example: GRuB Farmhouse, Olympia, WA – Conditional Use Permit

The landowner of a parcel located in an area zoned single-family residential allowed a non-profit organization - GRuB - to utilize her land to start a youth gardening project. After the owner passed away, her family sold the 2-acre parcel to GRuB, who announced to the city of Olympia that GRuB intended to demolish the single family residence on the parcel and construct a new farmhouse. The construction of a farmhouse, which would be categorized under a commercial designation, was not in accordance with the residential designation of that district. To operate the GRuB farmhouse, GRuB applied for a conditional use permit. Along with providing all of the required components, the project planner took special care to show the ways in which the new farmhouse would fit with the character of the neighborhood and benefit its residents. During a two week period, citizens could voice their opinions about how the change of zoning designation might affect the surrounding neighborhood through a public hearing. The Conditional Use permit was approved. GRuB continues to be an asset to the community by providing outreach to local youth, donating fresh products to the Thurston County Food Bank, and helping low-income households set up raised-bed gardens through its Kitchen Garden Program.

This example illustrates how conditional zoning can add flexibility to the zoning ordinance while retaining oversight of individual projects addressing site specific concerns. Furthermore, it shows how the social resilience of a community can be strengthened by increasing the flexibility of a rigid regulatory planning structure.

Example: Shoreland & Floodplain Conditional Use Permits, Dakota Co., MN

Dakota County, located to the south of the Mississippi and Minnesota Rivers in the Minneapolis/St. Paul metro, has hundreds of miles of river and lake shoreline. Additionally, a number of communities in the county are partially located within floodplains. To accommodate a variety of developments in shoreland and floodplains, the County allows property owners to apply for conditional use permits (CUP) for projects not permitted by-right in their respective zoning districts. Aside from gaining the approval through a public hearing before the Planning Commission, CUPs in these higher-risk and environmentally sensitive areas must first be reviewed by the county’s Environmental Resources Department and additional evaluation criteria for shorelands and floodplains must be meet. Site plans are also required for CUP applications in these zones.

This example illustrates how a community can use CUPS to accommodate a variety of uses along their waterfront while still enforcing a high standard for development.
Overlay Zoning

Overlay zones introduce additional zoning requirements on select areas of preexisting zoning districts in response to a particular need or concern. Unlike traditional zoning which addresses use, overlay zones are concerned with issues, such as historic character preservation and environmental protection. The requirements of an overlay zone promote certain types of development in response to those issues. Alternately, overlay zones can be used to lift or reduce restrictions from a certain part of a zoned area. Overlay zones do not follow the same boundaries as existing, traditional zoning patterns and can apply to a subset of a particular zone in a given place, or cross boundary lines between different uses. There are numerous types of overlay zones, limited only by planners’ imaginations, the community’s political will, and maybe the uniformity clause.

Pros
- Overlay zones give flexibility to traditional zoning to respond to additional needs or concerns not limited by use.
- Overlay zones are effective at protecting the environment or historic character of an area.
- Their creation and implementation are straightforward and familiar to planning staff, developers, and residents.
- They are generally publically and politically acceptable (although this varies according to their content).

Cons
- Overlay zones add another layer of review and regulation to the permitting process.
- Overlay zones can introduce a set of requirements that may be challenging or even impossible to adhere to given underlying zoning requirements.
- Very restrictive overlay zones can significantly curtail the reasonable use of property creating overregulation that could lead to a regulatory taking claim.

Using this tool for hazard mitigation/climate adaptation:

Tools traditionally used by planners for guiding development & environmental management can also be used to build resilience by helping to reduce a community’s vulnerability to hazards and climate impacts. Adaptation measures fall into the following categories: protection, accommodation, and relocation.

Protection: Overlay zones can be used to ban development, or certain types of developments, in specific areas that are critical to flood hazard mitigation.

Accommodation: Overlay zones can be used to require mitigation techniques in high-hazard districts, discourage hazardous construction, and manage the type and density of land uses in areas of known natural hazards.

Relocation: Overlay zones can be used to prepare for areas of new development specifically tailored to the needs of incoming communities. Alternatively, a community can designate a particularly vulnerable area as an area at greatest need for relocating.
Example: Watershed Protection Overlay (WPO) – Durham, NC

The purpose of the Watershed Protection Overlay zone in Durham is to preserve the quality of the region’s drinking water supplies through the application of development standards specified in the code of ordinance. The overlay zone is subdivided in six different watershed overlays, each one with specific requirements regulating minimum lot sizes, impervious surface limits, storm water controls, and hazardous materials, among others.

*This example illustrates how overlay zoning can be used to protect key natural resources while allowing development. Climate change, as well as natural and man-made disasters, can increase the vulnerability of natural resources such as clean water supplies. Overlay zones can be used to address this risk.*

Example: Environmental Overlay Zones – Portland, OR

Land use and development in Portland, OR is managed primarily through zoning on the basis of uses (residential, industrial, or commercial). However, in 1988, environmental overlay zones were established in some parts of the city to ensure that development resulted in minimal damage to significant natural resources and that unavoidable impacts would be mitigated. Environmental overlay zones benefit the public by protecting water quality, preserving wildlife habitat, preventing erosion/landslides, and reducing flooding. They cover streams, wetlands, and other water bodies, upland forests, and steep slopes. One type of environmental overlay zone, the conservation overlay zone, conserves important natural resources where they can be protected, while allowing environmentally sensitive development. A second type of environmental overlay zone, the protection overlay zone, provides the highest level of protection for the most important urban natural areas and streams.

*This example illustrates how overlay zoning can be used to protect key natural resources while allowing a certain level of development. The protection of these natural resources benefits neighboring communities by reducing risks of natural hazards as well as protecting wildlife, water quality, and the natural environment.*
Floating Zones

Description

In content, a floating zone is the same as an overlay zone or conditional zone. It describes the permitted uses, setback requirements, and other specific building or issue-related standards to be applied in a specific zone. Unlike regular zoning districts, however, the floating zone is not designated on the zoning map, rather it “floats”. Once a developer is interested in creating the type of development defined in the floating zone, he/she applies for a rezoning. Following the due process outlined in the floating zone code, the application can be approved (or not). Once approved, the zone is “anchored” to the official zoning map through an amendment.

Pros

- Floating zones provide flexibility to the planners to define the characteristics of a desired use without predetermining where that use will be located. This can expedite the approval of a zoning ordinance.
- Floating zones provide flexibility to the developers in terms of where to locate a development, and an indication of what type of development is desired in a jurisdiction.
- More discretion and control is given to the planners in allowing, or not allowing, a development through the approval process.

Cons

- Because they are often used to permit more intensive development of a site in a less intensively developed area, the granting of a floating zone permit may be challenged as a spot zoning.
- When language of the floating zone code is vague or there are too many such zones, the risk of contradicting the comprehensive plan is higher.
- They may simply postpone a conflict in the neighborhood where the floating zone is finally approved, due to potential local opposition to an undesirable use.

Pros and Cons

Relocation:

Floating zones can be used to decrease density in high-risk areas or increase development density in low-risk areas. They can be used to encourage flood friendly uses in risk-prone areas, without defining those areas in advance if there is uncertainty over the spatial extent of impacts from hazards and climate change.

Using this tool for hazard mitigation/climate adaptation:

Tools traditionally used by planners for guiding development & environmental management can also be used to help reduce a community’s vulnerability to hazards and climate impacts. Adaptation measures fall into the following categories: protection, accommodation, and relocation.

Protection: Floating zones can be used to create buffer areas that offer protection to neighboring communities, industries, or ecological systems.

Accommodation: Floating zones can be used to decrease density in high-risk areas or increase development density in low-risk areas. They can be used to encourage flood friendly uses in risk-prone areas, without defining those areas in advance if there is uncertainty over the spatial extent of impacts from hazards and climate change.

Relocation: Floating zones can be used to reduce densities in damaged areas following a disaster by defining the exact location and extents of the zone after damages from the disaster have been assessed.
Example: Hollis Open Space Planned Development – Town of Hollis, NH

The town of Hollis created a specific type of floating zone, called the Hollis Open Space Planned Development (HOSPD). The HOSPD is a floating zone for new subdivisions. It introduces additional standards to reduce lot size and other dimensional requirements in exchange for the preservation of permanently protected open space, recreational land, forests, and/or farmland. However, these additional standards do not change the permitted density of development in the area.

This example illustrates how floating zones can be used to encourage increased densities and, at the same time, protect open space.

Example: South Florida Regional Planning Council – Floating Zones

The South Florida Regional Planning Council is a regional organization of counties and municipalities in southeast Florida that come together to jointly address issues that extend beyond their jurisdictional boundaries, including water resources, flooding, transportation, and climate change. The Council recommends the use of floating zones as one element of a post-disaster redevelopment plan in which a community could decide in advance to activate predetermined density reductions based on the extent of overall property damage occurring in particular locations. In this way, in the recovery period following a disaster, this tool can be used effectively to control redevelopment in severely damaged areas, as the special conditions attached to the zone can then be put into effect.

This example illustrates how floating zones can be used to reduce densities in damaged areas following disasters. Given the uncertainty of where storms will strike and how climate change impacts will vary geographically, the flexibility of this tool could be a great asset to many communities.
A Unified Development Ordinance (UDO), also referred to as a Unified Development Code (UDC), is the combination of all of a community’s development regulations, guidelines, and procedures into one unified code. It condenses into one combined text areas of regulation that are more typically dealt with in separate ordinances. UDOs incorporate zoning and subdivision ordinances, signage standards, floodplain and stormwater regulations, overlay districts, historic preservation provisions, design standards, street, sidewalk, and utility standards, administrative and hearing procedures, etc.

**Pros**
- UDOs improve the quality and efficiency of permitting processes.
- UDOs are less confusing to the public and developers, as all laws are in the same document.
- UDOs eliminate redundancies present in multiple separate codes of ordinances.

**Cons**
- Creating a new UDO can be a complex and time consuming process.
- UDOs cannot be “copy and pasted” from other cities easily or successfully.
- Developing a UDO requires hiring consultants, whose fees can run very high depending on the scale of the document.

**Using this tool for hazard mitigation/climate adaptation:**

Tools traditionally used by planners for guiding development & environmental management can also be used to build resilience by helping to reduce a community’s vulnerability to hazards and climate impacts. Adaptation measures fall into the following categories: protection, accommodation, and relocation.

**Protection:**
UDOs are successfully used to incorporate hazard mitigation and environmental protection measures into development standards and permitting procedures.

**Accommodation:**
UDOs are compatible with multiple types of land use controls, without a fundamental change in the local approach to planning.

**Relocation:**
UDOs can help ensure that new developments for relocated citizens and businesses meet high standards in design, hazard mitigation, public facilities, etc.
Example: Hammond, Louisiana UDC

The population of Hammond, LA increased by 30 percent following Hurricane Katrina. Many business and military operations have relocated to Hammond from coastal areas in response to the risks associated with having a base of operations in vulnerable areas. This has created development pressures and the promise of rapid economic expansion. In June 2011, Hammond adopted the Hammond Comprehensive Master Plan, which established a collective vision and set of policies to direct future development in the city. To implement the Master Plan, Hammond is currently in the process of adopting a Unified Development Code (UDC). A key component of the draft UDC is Article 12: Floodways, Floodplains, and Stormwater Management. Through the NFIP program, FEMA sets regulatory standards for municipalities, but in the UDC, the City of Hammond is going beyond these basic regulatory standards to protect current and future development from increased flood risk often associated with urban expansion into rural areas, forests, and floodplains. The Hammond UDC will utilize performance standards for permitting new developments, requiring a Drainage Impact Study (DIS) developed by an engineer for most new construction to help reduce stormwater runoff and water pollution. All development within FEMA’s Special Flood Hazard Areas will require a special floodplain development permit to ensure buildings are resilient to most floods and do not increase flood risk or endanger the rest of the community.

This example illustrates how a community can incorporate higher regulatory standards for floodplain development and stormwater reduction through a unified development code. The pressures of increasing populations in vulnerable areas, as well as hazards and climate change, raise multiple concerns, which a unified development ordinance can incorporate into a combined set of regulations and standards that integrates many distinct issues.

Example: Duluth, Minnesota UDC

Duluth, MN, is a waterfront city along Lake Superior. Before 2010, development in the city had been governed by an outdated and cumbersome zoning code drafted in 1958. In addition to simplifying and updating local ordinances, the City of Duluth recently drafted a Unified Development Code (UDC) to incorporate form-based zoning provisions and design standards, promote revitalization and redevelopment, protect natural resources, and deliver a user-friendly document. Zoning districts were consolidated and some provisions changed to encourage mixed-use buildings and infill development in older parts of the city. A point system is used to encourage sustainable building, and performance-based standards are used to help protect waterways and shorelines. Open-space requirements and provisions for cluster development were incorporated to help protect open space as the city grows and new residential development moves outside of urbanized areas. These multiple policy instruments could be confusing, or even contradictory; however, by pulling them together into a UCD and providing detailed illustrations, photographs, diagrams, and tables throughout the document to explain the goals of the ordinances to citizens and developers, the city was able to avoid confusion. Despite adding new provisions, the City was able to greatly simplify their land use ordinances, which were previously divided in a seemingly random fashion between 9 separate chapters in the City Charter and Legislative Code.

This example illustrates how a community can accomplish multiple goals through the adoption of a unified development code, and how different policy and planning tools can be used in a complimentary manner - especially if they are integrated into one document to avoid confusion or conflicting requirements.
Form Based Codes (FBC) provide a rigorous set of design guidelines for development in a community or neighborhood. Form Based Codes emphasize the physical urban design of buildings within districts, unlike traditional zoning which governs the use of buildings within districts. Form Based Codes allow the market to determine the use of the buildings, within some parameters. They create districts where buildings of harmonious forms coexist within a neighborhood, allowing the type of development traditionally seen in mixed-use, walkable communities that existed before Euclidean (or use-based) zoning became the standard. This is achieved through: (1) abandonment of most use restrictions, (2) regulating maximum, instead of minimum, setbacks from public rights of way, and (3) requiring minimum, instead of maximum, height limits.

**Pros**
- FBC allow the market to determine the best use for a property, often tending towards mixed developments.
- FBC promote historic land use patterns.
- FBC can help create walkable communities and allow for the incorporation of multiple modes of transportation.

**Cons**
- Transitioning to a FBC can be cumbersome when implemented after a traditional zoning code.
- FBC present a steep learning curve for citizens, officials, and developers.
- Developing a new FBC can be expensive and time consuming.
- FBC, if not mindful of specific local assets, conditions, and needs, can encourage cookie-cutter developments.

**Using this tool for hazard mitigation/climate adaptation:**

Tools traditionally used by planners for guiding development & environmental management can also be used to build resilience by helping to reduce a community’s vulnerability to hazards and climate impacts. Adaptation measures fall into the following categories: protection, accommodation, and relocation.

**Accommodation:** Form Based Codes can help communities establish design standards that are appropriate to mitigating risks from local hazards while promoting a certain character for a community. They can encourage specific building techniques and specific streetscapes appropriate for, and in response to, known risks.

**Relocation:** Using Form Based Codes to develop new communities for relocated individuals and families could help create urban forms that are similar to their traditional communities, and thus provide desirable places to resettle and re-establish businesses.
Example: Denver, Colorado – Riverfront Commons

In 1997, Denver adopted a new plan for the Riverfront Commons area of the city to restore the neighborhood into high quality residences and visually appealing architecture. The City utilized design guidelines to drive building form and achieve this vision. City officials noted that “buildings must convey an urban disposition; buildings should be inviting and open to the street; the base of all buildings should be constructed of the highest quality materials; buildings should be “true” to their style; buildings should be arranged to reduce bulk near the top and create a varied skyline; special building rooftops can enhance the character of the skyline.” In order to achieve a varied and mixed-use community, 6 sub-areas were defined within the Riverfront Commons area, each with its own set of design guidelines.

By regulating the basic form of a building, the city allowed developers to exercise creativity in designing buildings that are specific to the region and focused on preserving historic character and high-quality values. Regulations including construction materials and relationships of structures to the street and each other can be used to not only create great neighborhoods but also address challenges of building in hazard-prone areas.

Example: Gulfport, Mississippi – Post Katrina Form Based Code

Hurricane Katrina left Gulfport, MS, and other damaged cities, searching for ambitious ways to rebuild while preventing past mistakes from being repeated. The hurricane damage was an impetus for the city to develop a form-based code (Gulfport’s SmartCode), approved and adopted in 2007. The form based code functions as an overlay to the existing zoning code in Gulfport. Consequently, use of the SmartCode is optional, except in areas south of the rail line, where use of the SmartCode is mandatory to ensure the compliance with new FEMA elevation requirements. The code includes specifications for sector-, community-, and building-scale plans, as well as a list of incentives to encourage the use of the code. The code has numerous graphics and an organized structure, allowing for reasonable access to its contents.

This example illustrates how a form-based code lays the foundation for a kind of urbanism that seeks to balance the interests of multiple stakeholders in such a way that safeguards the interests of the public. Specifically, this case highlights how hazard mitigation can be incorporated into promoting appropriate design for an area, given its vulnerability to impacts of hazards and climate change.
Subdivision Regulations

Description

Subdivision regulations govern the process for dividing land into developable units. In the United States, these units often involve single-family residential development. Subdivision regulations typically address infrastructure design requirements and provisions to be met by the developer. Upkeep of infrastructure becomes the responsibility of the municipality. Homeowners associations are sometimes created for residential subdivisions and can take on responsibility for operations and maintenance of specific infrastructure.

If a municipal ordinance allows it, subdivision exactions can be paid to address specific regulations. Exactions allow developers to pay the municipality to fund and manage the construction of necessary infrastructure, as required in a subdivision regulation, in lieu of providing it themselves.

Planned Unit Development (PUD) ordinances are similar to subdivision regulations in that they assign regulations, infrastructure requirements, and zoning guidelines for multiple parcels to be developed as a cohesive development on a larger tract of land. However, PUDs generally include stronger and more specific design guidelines than traditional subdivision regulations. In addition, PUDs generally allow developers to integrate residential, commercial, public, industrial, or other uses, to build at higher densities, and to develop with more efficient infrastructure.

Pros

- Can create the specific types of neighborhoods to achieve the goals of a community’s comprehensive plan
- Requires developers to be accountable for infrastructure development, taking the economic burden off the public sector
- Allows for expeditious legal proceedings due to legally binding regulations

Cons

- Can contribute to car-oriented suburban sprawl
- Difficult to provide affordable housing if regulations drive up costs of housing
- Subdivision exactions often underestimate the true cost of infrastructure construction
- Can create cookie-cutter developments

Using this tool for hazard mitigation/climate adaptation:

Tools traditionally used by planners for guiding development & environmental management can also be used to build resilience by helping to reduce a community’s vulnerability to hazards and climate impacts. Adaptation measures fall into the following categories: protection, accommodation, and relocation.

Accommodation: Subdivision regulations can require hazard mitigation measures to be integrated into the design of the overall neighborhood and infrastructure, as well as of individual homes (such as floodproofing, elevations, street designs that capture rainwater in flood-prone areas, infrastructure that is sized in anticipation of new temperature and precipitation patterns due to climate change, etc.)
Example: Cedar Falls, Iowa

Cedar Falls is a residential community located in eastern Iowa. It has traditionally been a bedroom community to Waterloo. Cedar Falls was developed on the banks of the Cedar River, which bisects a portion of the city. The city reports that the Cedar River has crested above flood stage at least 94 times since 1929. About 25 percent of the city is within the 100- and 500-year floodplain, as determined by the community’s official Flood Insurance Rate Maps (FIRMs). In response, the city has incorporated a variety of mitigation and recovery strategies in an effort to make the community more resilient. Among these strategies is a subdivision ordinance, updated in 2010, that complements the floodplain ordinance. The subdivision ordinance includes natural resource protection measures, including prohibiting the establishment of new building lots within the floodplain and protecting sensitive lands, such as floodplain and wetland areas.

This example illustrates how subdivision regulations can integrate hazard mitigation measures into land use planning.

Example: Palm Beach County, Florida

Florida is one of the states where the PUD (Planned Unit Development) concept gained much of its initial popularity. Florida even has a state-enabling statute for PUDs. Palm Beach County defines a PUD in its Unified Development Code as “a living environment consisting of a range of living opportunities, recreation, and civic uses, and a limited amount of commercial uses.” The code contains a minimum open space requirement of 40% for each PUD which may include only recreational and civic uses. It requires that a PUD in excess of 100 acres and 300 dwelling units provide a minimum of two residential use types, and a minimum of 10% of the residential dwellings should be built using the second use type.

This example illustrates how a community’s multiple and distinct goals can be addressed through subdivision regulations, and more specifically Planned Unit Developments. An interest in promoting multiple uses, including residential, commercial and recreational, can be paired with mitigation measures in building, neighborhood, and infrastructure design. This example highlights the potential to achieve many interests paired with growth of new developments.
Impact Assessment

Description

Development Impact Assessment is a process of evaluating the consequence of development on a community. It is designed to assist local planners and decision makers in understanding, in advance, the impacts a particular development may have on a community. The results of an impact assessment can be used to determine permitting approval, evaluate different alternatives, identify trade-offs and mitigation options, and/or assess impact fees. A large range of impacts can be evaluated, but commonly assessed impacts include water and wastewater infrastructure, schools, parks, fire and police, stormwater runoff, traffic, and costs. Development impact assessments provide a framework to integrate the models, data, spatial and statistical analyses, and experiences with local expertise and knowledge to predict development impacts.

Pros

- Impact assessments embed consideration of the impacts of a building or development on a community’s physical, environmental, social, and economic infrastructure into the permitting process.
- Impact assessments provide a transparent, clear, and unbiased way to evaluate decisions and calculate fees.
- Impact assessments provide valuable information to the municipality about the current state of infrastructure provisions and critical thresholds.

Cons

- Impact assessment reports can be extensive and complex, adding significant costs and time to the review process.
- Impact assessments can be seen to disproportionately affect non-major developments, but raise the impact on an infrastructure system just above a threshold.

Using this tool for hazard mitigation/climate adaptation:

Tools traditionally used by planners for guiding development & environmental management can also be used to build resilience by helping to reduce a community’s vulnerability to hazards and climate impacts. Adaptation measures fall into the following categories: protection, accommodation, and relocation.

Protection: Impact assessments can be used to determine where and under what conditions to forbid a certain development, thus protecting critical areas related to flood hazard mitigation. Impact assessments can also be used to evaluate the impact of a protective measure.

Accommodation: Use of impact assessments can ensure that developments minimize impacts and mitigate risks, to themselves as well as to the community.

Relocation: Impact assessments can help communities become more proactive in preparing for relocation - in areas of growth and decline.
The Town of Pittsford Comprehensive Plan 1995 recommended to protect up to 2,400 acres of land for agriculture and open space uses (primarily ecologically important lands) through a combination of different approaches, including a conservation easement program, sliding-scale incentive zoning (where small-scale developments are permitted a higher density than larger projects), a voluntary transfer of development rights program, and a purchase of development rights (PDR) program. Before implementing this recommendation 1,200 acres of important agricultural lands were identified and an impact assessment was developed to study the tax consequences of the bond-funded purchase of development rights. The Town of Pittsford concluded, through a Fiscal Impact Analysis, that over the twenty year repayment of the bonds, each homeowner in Pittsford could save approximately $5,000 in decreased property taxes, providing a net savings of $5 to $7 million across the town. Pittsford’s PDR funding program was approved by the voters in the Town and it is currently being implemented.

This example illustrates how an impact assessment can assist communities in making informed policy decisions, regarding land use among other issues. Natural hazards and climate change are increasingly causing communities to re-evaluate policy approaches. Impact assessments can provide an informed, clear, and transparent decision-making tool in this process.

The Rhythm is a large-scale mixed-used project in Washington County, FL, in the Florida Panhandle. The project was expected to cover 1,883 acres including residential, retail, and office space. In order to approve the initiative, and in compliance with requirements of Chapter 380.06 Florida Statutes (Florida Environmental Land and Water Management Act, 1975), an assessment of the potential impacts resulting from the approval and subsequent construction of the project was made. The project was evaluated according to several different impact criteria, including consistency with existing plans, revenue generation capacity (taxes and impacts fees), vegetation and wildlife, water, water supply, transportation, and housing. The assessment concluded that the impacts of the project were adequately addresses according to the requirements of the Florida Statutes.

This example illustrates how an impact assessments can assist communities to make informed decision about a particular development. Assessment of impacts related to hazards risks and reliance on environmental resources and conditions that can be impacted by climate change can also provide valuable information for a community to evaluate proposed projects.
Smart Codes

Description

SmartCode is a unified development ordinance that incorporates Smart Growth principles, which are predicated on managing and reducing sprawl through compact, mixed-use development, and incorporating sustainability into land use. The SmartCode introduces the concept of looking at settlement patterns as a transect with a series of specific divisions or zones, ranging from a dense urban downtown to a natural undeveloped landscape. These zones, and their placement along this urban-rural transect, dictate the appropriate development for a given zone. The development characteristics designated for each zone focus primarily on density and development patterns, rather than on use. The SmartCode can be described as a “formed-based zoning” model ordinance. SmartCode argues that the type of transect is apparent because zones (1) exist as characteristic places on the transect, and (2) evolve along the transect over time. SmartCode is a type of form-based code designed to incorporate sustainability into land use. Although few communities have made the Smart Code their sole governing code, many communities have utilized its principles or elements of SmartCode in their planning process or in guidelines for specific overlays and neighborhood designs.

Pros

- Creates a framework for designing a city that is mindful of the environment and surrounding natural areas.
- Promotes mixed-use development.
- Produces compact urban centers, reducing reliance on cars.

Cons

- Could allow for industrial and residential properties to be proximal.
- Could be a time-consuming or arduous process for a town to undo a traditional zoning framework that is currently in place.
- Can create confusion for residents and developers unfamiliar with the concept.

Using this tool for hazard mitigation/climate adaptation:

Tools traditionally used by planners for guiding development & environmental management can also be used to build resilience by helping to reduce a community’s vulnerability to hazards and climate impacts. Adaptation measures fall into the following categories: protection, accommodation, and relocation.

Protection: SmartCodes can keep development and urbanization away from natural areas, areas that are vulnerable to hazards, and natural areas that act as buffers or protection from natural hazards.

Accommodation: The urban form, design, and density standards promoted by SmartCodes can be used to encourage or enforce specific building patterns and construction techniques in response to hazard risks.

Relocation: SmartCode principles can be utilized for creating attractive transition zones as communities see residents move away from vulnerable areas. They can also be used to create appealing communities to draw people in and limit sprawl.
Example: Ridgeland, South Carolina

Following a public charrette and visioning process, Ridgeland, SC adopted its version of the SmartCode in March 2010. The mandatory SmartCode aims to retain the town's character and accommodate growth in a sustainable manner. The code includes provisions to encourage affordable housing, such as priority processing and expedited approval. Highest priority is given to affordable housing projects that are developed in partnership with a community land trust or nonprofit housing agency. Additionally, the town offers density bonuses and parking reductions for affordable housing units located within one quarter mile of a transit stop.

This case study provides a good example of planning for development that is mindful not only of environmental conservation but also of the needs of all residents, including local concerns over livability and affordability. Other communities can consider this example when integrating the principles of SmartCode with other local needs, including a range of hazard mitigation and climate adaptation goals.

Example: Leander, Texas

Leander, TX has become one of the fastest-growing cities in the state, in large part due to its location at the northwestern edge of the Central Texas growth corridor. Growth in the region was desirable, but sprawling development was a prevailing threat to the sustainability of the city. As a response to this, and after years of public deliberation, the local government decided to create a new master plan and unified development code based on the SmartCode. The new form-based code, rooted in the principles of Smart Growth, has completely replaced the previous zoning and subdivision ordinances. A major element of this change is planning transportation facilities with options to drive growth into sustainable, pedestrian-friendly, mixed-use neighborhoods.

This case study illustrates how smart growth principles have been used to reduce sprawl through compact, mixed-use development. Furthermore, the coordination of land use and transportation planning in this example illustrates the need for cooperation between disciplines when tackling multi-dimensional planning challenges and trying to direct growth in certain areas. This can be useful for planners steering growth away from risk-prone areas.
(Rural) Cluster Developments

Description

(Rural) cluster development requirements oblige, or provide incentives for, developers to subdivide large tracts of land by clustering new parcels and building in one portion of the property, while retaining a certain percentage of the property as permanent open space or undeveloped natural resources. This open space can become a conservation easement. Alternatively, it can be used for agriculture production or pasture land, or as a buffer area from these. Cluster development requirements are a type of subdivision requirement focused on efficient provision of infrastructure, prevention of sprawl, and preservation of open space, natural resources, or agricultural lands. They can be successfully implemented in areas where the urban population is encroaching.

Pros

- Open space serves as a buffer from natural, hazard, or agricultural areas.
- If done effectively, it can be used to prevent suburban sprawl and urban encroachment.
- Can provide a landowner or developer relative flexibility in how to achieve the required clustering of new developments.

Cons

- Land nearest to the urban-rural fringe can suffer: The urban land will drop in value because it is no longer urban, and the rural land will drop in value because it is no longer rural.
- Difficult to implement as a Floating or Overlay Zone.
- Sometimes rural clustering is not enough to curb uncontrolled sprawl into rural and undeveloped areas.

Using this tool for hazard mitigation/climate adaptation:

Tools traditionally used by planners for guiding development & environmental management can also be used to build resilience by helping to reduce a community’s vulnerability to hazards and climate impacts. Adaptation measures fall into the following categories: protection, accommodation, and relocation.

Protection: Open space preserved by clustering new development can provide flood retention or flood prevention areas. In coastal areas, undeveloped land can strategically include forests and marshes that reduce storm surge.

Relocation: Clustering development requirements or incentives can allow development to take place on large parcels that include floodplains without putting new buildings and people at high risk.
Example: Southampton, NY

The town of Southampton requires clustering of new developments, with the intention of maintaining Southampton’s rural character, which is the foundation of its tourism industry. This requirement first applied only to one specifically zoned area, but was later extended to all new developments throughout the community, which enhanced the success of the Planning Board’s efforts. Protecting land for agricultural use was very effective; however, concerns were raised about the rural visual quality of the area. A study on Southampton’s rural clustering concluded that “a clustering program should set a high percent of land to be preserved, use design criteria that protect the highest percentage of viable agricultural land, and identify the scenic views that are critical to visual quality in each subdivision.”

This example shows how cluster zoning helped maintain the rural character of a community while still allowing for new residential development. The land preserved can aid in hazard mitigation by providing buffers to storm surge or protecting areas prone to flooding or wildfires - areas that may be exacerbated by climate change. In addition, prohibiting open or undeveloped land through cluster developments can create new housing while allowing for migration of wildlife due to shifts in climate regions.

Example: Hunters Lake, Ottawa, WI

The “Preserve at Hunters Lake” neighborhood, in the town of Ottawa in northern Wisconsin, was constructed utilizing the principle of clustering development. The development covers 271 acres, of which 180 acres (66%) were preserved as undeveloped, open space. The undeveloped land consists of shoreland, forest, and wetlands and is protected as an open space conservation easement. This land is accessible through trails, marked with rustic fencing, and includes a lake, which is shared by all residents. The remaining land was subdivided into parcels clustered together closer to the street. The clustered development was neither a requirement nor even incentivized by the local government. Instead, the developer recognized that this development pattern brought added value to the properties. In his words, “the configuration of the land sells itself; once we get a potential buyer out on the property walking around, we are almost guaranteed a sale.”

This example shows how cluster development allows residents to enjoy the benefits of rural living without putting sensitive natural environments at risk from future residential subdivision. In addition, the conservation easement used for recreation and rural character could have been established to mitigate risks from natural hazards or impacts of climate change. Furthermore, this example illustrates how addressing multiple benefits, i.e. conservation and recreation, can be fiscally advantageous. Thus, if the ordinance is an option in a given jurisdiction, it could be utilized without imposing significant regulatory or financial burdens on local governments.
Performance Zoning

Description

Performance zoning ordinances, or any subset of performance requirements, provide a set of predetermined criteria to guide development or environmental management, or to determine if a building or land use meets the standards for a given area. These standards are measured by looking at the development itself and its impacts on the surrounding environment, such as design criteria, environmental building standards, impacts on surrounding traffic or stormwater runoff, etc. However, the means for achieving these performance standards are not specified, allowing for innovation. The “performance” of a building is decisive in receiving permit approval, unlike use and setbacks, which are driving factors in traditional, Euclidean zoning. Performance-based zoning allows for mixed-use developments, as long as the land use fulfills the requirements defined by the performance standards. Performance Zoning ordinances can vary widely, in response to local needs, conditions, and goals. To implement performance zoning ordinances, different scales or point systems can be utilized. For example, a point system can be used to evaluate the appropriateness of a proposed development for permitting or for additional benefits. Although some communities rely entirely on performance zoning ordinances, more commonly, some combination of traditional zoning and performance requirements are used.

Pros

- Can encourage creativity in building design
- Allows for mixed use developments
- Allows the market more freedom to determine the best land use
- Point systems can be used with other zoning techniques

Cons

- As a fairly new tool for development management, at the onset, it can be confusing for local government and developers.
- The review process can be extensive, if there are many complex performance indicators.
- Assessing the impacts of innovative construction techniques can be ambiguous or unclear.

Using this tool for hazard mitigation/climate adaptation:

Tools traditionally used by planners for guiding development & environmental management can also be used to build resilience by helping to reduce a community's vulnerability to hazards and climate impacts. Adaptation measures fall into the following categories: protection, accommodation, and relocation.

Accommodation: Performance zoning can require buildings, developments, and neighborhood design to address mitigation and adaptation to climate change impacts. Without specifying the means to achieving certain standards of mitigation and adaptation, local governments can simultaneously protect their residents while promoting innovative approaches and solutions.
Example: Doylestown, Pennsylvania

Doylestown, PA uses a combination of zoning tools. On top of its traditional use-based zoning requirements, which are mandatory, they also have an optional, incentive-based set of performance requirements. This program offers homeowners and developers the opportunity to earn benefits from a Green Points Worksheet. This is very successful mostly due to its voluntary nature. It provides tangible and financial benefits for even a small number of Green Points earned. The categories include, but are not limited to the following: use of recycled building materials; water conservation; use of specific types of lumber; and use of environmental design standards. There is even a category for ‘innovation’.

*Point system encourage citizens to be innovative, without putting a burden on those who did not want to participate.*

Example: Bucks County, Pennsylvania

In Bucks County, developers must first follow a procedure to determine the buildable area on a site by using site capacity calculations. After determining required open space and maximum dwelling units, the developer can design the units in any way he or she desires. Bucks County also employs the use of the following: development districts, flexible site design, bonus incentives, buffer yard provisions, and ‘performance’ street standards. Additionally, three primary performance criteria are used in the ordinance: minimum open space, maximum density, and maximum impervious surface.

*Performance standards are used to support more environmentally-friendly development.*
Incentive Zoning

Description

Incentive zoning allows for a trade-off between a community and a developer, where the developer receives an incentive in exchange for providing a public amenity. The incentives for the developer are most often density bonuses, permitting them to surpass some development criteria (i.e. floor/area ratio, height, bulk, etc.) in exchange for amenities to improve the community. These amenities can include parks, plazas, streetscape improvements, or public services that are scarce in the area, such as child care facilities, job training, etc. Density bonuses can also be granted for provision of affordable housing or a specific type of development, such as mixed use buildings.

Pros

- They provide flexibility and discretion to traditional zoning through market-based measures.
- This incentive based inclusionary program can be a way to circumvent the exclusionary tendencies of Euclidian zoning using a market mechanism.

Cons

- Implementing and overseeing incentive zoning measures involves an educated and engaged staff, possibly putting strain on understaffed planning departments.
- Local governments can put off providing public amenities, in the hopes that the public sector will supply them to receive development incentives. However, there is no guarantee that this will be adequate.

Using this tool for hazard mitigation/climate adaptation:

Tools traditionally used by planners for guiding development & environmental management can also be used to build resilience by helping to reduce a community’s vulnerability to hazards and climate impacts. Adaptation measures fall into the following categories: protection, accommodation, and relocation.

Accommodation: Incentive zoning can be utilized to offer density bonuses to developers in exchange for exceeding minimum mitigation requirements; for maintaining or protecting natural features that help mitigate hazards or climate change impacts; or for providing safe rooms or community shelters.
Example: Town of Goshen, New York

In order to encourage developers to provide affordable housing options, the Town of Goshen has implemented an incentive zoning option. With the use of this tool, developers are allowed to build more units on certain types of property if some percentage of the additional units are designated as affordable, as long as the groundwater resources can supply them in a sustainable manner. In the RU district, a 50% development bonus is allowed if 20% or more of the total dwelling units are permanently designated as affordable.

*This example illustrates how incentive zoning is assisting the town to implement the affordable housing policy, while properly managing groundwater resources, a limiting factor in the sustainable development of the town. Communities at risk of natural hazards and climate change impacts can consider similar incentives, within environmentally safe limits, in exchange for mitigation or affordable housing provisions above some required minimum.*

Example: Seattle, Washington

The City of Seattle has been using incentive zoning in different capacities since the 1960s. A complex program of incentive zoning for downtown commercial buildings was initiated in the 1980s. This program grants developers a bonus increment of developable floor-area ratio, in exchange for building a LEED (Leadership in Energy and Environmental Design) Silver certified structure. Additional square footage, up to a certain maximum established by the code, can be acquired by participating in a combination of bonus/TDR options. 75% of the additional square footage, must be earned through providing affordable housing and/or child care facilities. The remaining 25% can be earned through several options including open space TDR, landmark TDR, public amenities features, and within block TDR (See Transfer of Development Rights).

In 2006, a program for residential building incentive zoning was developed. By participating in this bonus program, developers within a certain building height range are able to acquire additional square footage, or build higher than established high limits. To participate in the program, developers must first commit to building a LEED Silver certified structure. To earn additional allowances, developers can either build affordable housing on site as part of the bonus program or contribute to an affordable housing fund at a certain cost per square foot.

*This example illustrates how incentive zoning can be used to promote affordable housing and environmentally friendly constructions, as well as the many variations of incentives and provisions that a community can establish to best meet its needs. Given the complex challenges of mitigation and climate change impacts, incentive zoning can encourage developers to address these challenges in exchange for desirable density bonuses, without disadvantaging smaller-scale developers who cannot afford to provide such amenities or build to higher standards.*
Rolling Easements

Description

Rolling easements are setbacks at a predetermined distance from the shoreline (often the high tide line), which can change if the shoreline changes. As the sea advances, the easement automatically moves or "rolls" landward. Essentially, they are a special type of easement placed along the shoreline to prevent property owners from holding back the sea through hard shoreline stabilization structures, but they allow any other type of use and activity on the land. However, some "soft" erosion control methods can be used, including the renourishment of beaches, building up artificial dunes, and temporarily placing small sandbags around homes. If homes are damaged or destroyed during a storm, they are allowed to rebuild as long as high ground still exists. If the lot is submerged during high tide, rebuilding/repairing is no longer allowed.

Pros

- Rolling easements often do not cost taxpayer money to implement, unlike purchasing development rights or property buyouts.
- Rolling easements ensure public access to beaches in perpetuity.
- Manipulation of the shoreline is prevented, protecting coastal ecosystems and scenic vistas.
- A rolling easement policy discourages development that abuts the shoreline.

Cons

- Rolling easements may not be constitutional in all states. The Texas Supreme Court overturned a 1956 law ensuring public beach access through the use of rolling easements.
- Although rolling easements make room for rising sea levels, homes built along the waterfront are still in danger from tropical storm damage.

Using this tool for hazard mitigation/climate adaptation:

Tools traditionally used by planners for guiding development & environmental management can also be used to help reduce a community’s vulnerability to hazards and climate impacts. Adaptation measures fall into the following categories: protection, accommodation, and relocation.

Protection: Rolling easements facilitate a gradual retreat as sea levels rise and as beaches erode over time by continual wave action and major storms. Gradual retreat will prevent loss of life and property, limit government investments in inherently unstable locations, and allow ecological systems to migrate and naturally respond to the impacts of storms, erosion, and rising sea levels.

Accommodation: Rolling easements can be used to temporarily permit beach front development without asking local or state government to predict the exact time when development will be unsafe in a particular area.

Relocation: Rolling easements can be used to initially encourage and later enforce the relocation of development from high-risk areas.
Example: South Carolina Rolling Easements

Rolling easements were established on South Carolina’s coast in the Beach Front Management Act of 1988. It allows development but prohibits structures from being built within a certain zone which “rolls back” as the shoreline encroaches inland. This allows natural habitats to migrate without impediments, while providing flexibility to property owners and coastal communities. The Beach Front Management Act of 1988 was put in place to establish a setback line on the coast of South Carolina. As such, some landowners on the sea side of the setback line owned property that no longer held its original value. In response, the legislature was prompted to amend the Beach Front Management Act in 1990 to allow for a rolling easement on any lot located on the sea side of the setback line.

*This example illustrates how rolling easements can be used to make way for rising sea levels and shoreline erosion.*

Example: Allowing Inward Migration of the Sea in Massachusetts

The state of Massachusetts has regulations in place requiring that any development on coastal dunes may not interfere with the landward or lateral movement of the dunes. Those same regulations further add that development on unconsolidated banks will not be allowed to use seawalls to prevent erosion, except for bank structures existing at the time of the law’s passage. In Massachusetts, intertidal land is not held in trust for the public by the state and the upland owner has a fee simple interest in it. Therefore, gaining the private property owner’s cooperation in order to preserve public access to the ocean is very important. There have been numerous court decisions that have struck down regulatory implementation of rolling easements that did not have the support of property owners or did not provide compensation to the landowners. Despite these complications, rolling easements have been used successfully in some communities, such as Falmouth, MA.

*This example illustrates how rolling easements can be used to allow the inland migration of coastal dunes. However, this could raise the issue of takings, and state law might require compensation to landowners.*
Inclusionary zoning ordinances either require or allow a developer to restrict the sale price or rent of a specified percentage of residential units in a development, as a condition of permit approval to construct the development. This allows for lower income families to live in desirable communities and have equal access to public amenities, good schools, and work opportunities. The most common inclusionary housing programs are mandatory, but are accompanied by incentives. The amount of property available for inclusionary housing generally ranges from 6% to 35% of the total project units, and the target income levels generally range from 50% to 120% of the area’s median income.

**Pros**
- Provides affordable housing for low- and moderate-income households
- Helps create economically and racially diverse communities
- Alleviates areas of concentrated poverty
- Allows greater access to jobs and education for low-income families

**Cons**
- Could place a financial and unappealing burden on developers
- Can be viewed as a “tax” on new housing development
- Could have the unintended consequence of exacerbating the need for affordable housing

**Using this tool for hazard mitigation/climate adaptation:**

Tools traditionally used by planners for guiding development & environmental management can also be used to build resilience by helping to reduce a community’s vulnerability to hazards and climate impacts. Adaptation measures fall into the following categories: protection, accommodation, and relocation.

**Relocation:**

The creation of new affordable housing units is an important aspect of helping low- and moderate-income families relocate from high-risk areas.
Example: New York City, New York

New York City offers an optional floor area bonus in exchange for the creation or preservation of affordable housing. The inclusionary housing program requires a percentage of the dwelling units to be set aside, or new or rehabilitated affordable units be provided offsite within one-half mile of the bonused development. These affordable residences must remain permanently affordable. They may be rental units or available for sale. In some areas, even moderate or middle-income households may have affordable housing available. There are now two programs eligible to achieve the inclusionary housing bonus: the Inclusionary Housing R10 Program and the Inclusionary Housing Designated Areas Program.

This example illustrates how inclusionary housing programs can be used to provide housing for low- and moderate-income households, helping to create diverse communities. Such programs can ensure that low- and moderate-income individuals and families are not destined to live only in the most vulnerable, hazard-prone areas, while only wealthier households can afford to live in parts of the city or county that are less vulnerable to hazards and climate change impacts. Furthermore, this example highlights how inclusionary housing can be achieved through incentive-based programs.

Example: Denver, Colorado

In 1999, the City of Denver’s Housing Task Force noted that “a severe housing problem exists… for moderately priced dwelling units.” The city quickly required all development of thirty or more detached single family homes and all for-sale multi-family projects include a minimum number of moderately priced units. For large-scale developments, 200 of the units were required to be affordable, and for non large-scale developments, 10% of the units were required to be affordable. Developer incentives include rebates, density bonuses, parking requirement reductions, and expedited permit processing. Since the beginning of Denver’s Inclusionary Housing Ordinance in 2002, over 1,150 affordable units have been produced.

This example illustrates how inclusionary housing programs can be used to produce affordable for-sale housing units at a rate consistent with population and economic growth. This mandatory program responded to a demonstrable need. Communities seeing current and future needs to relocate populations from areas that are highly prone to hazards and impacts of climate change should consider requirements for affordable housing to ensure that all residents of a community have access to housing in safer areas, as part of a diverse, resilient community.
Transfer/Purchase of Development Rights

Description

Transfer of Development Rights (TDR) and Purchase of Development Rights (PDR) are development management tools based on the concept that property rights consist of many types of rights, including development rights, which can be used, unused, transferred, or sold separately by the owner of a parcel. These programs are used to limit development in areas designated as sending zones, such as the rural edge of metropolitan areas, environmentally sensitive lands, or risk-prone areas, while promoting denser development in areas designated as receiving zones, such as downtown infill. In TDR programs, the transaction of development rights takes place between two private parties and responds to market demand. A landowner in a sending zone can sell a portion of their development rights, as established by the zoning ordinance, to a landowner in a receiving zone to allow the latter to build more densely than otherwise permitted. The acquisition of the development right is paid by the developer of the receiving sites. In the case of PDR, the transaction of development rights is between the private landowner and a government agency. The funding for buying development rights comes from grants or tax revenues. The development rights are not transferred but retired.

Pros

- Allows communities to redirect future development potentially from one location to another in a way that is fair and equitable to the landowners involved, supporting community development, planning, and conservation goals.

Cons

- Requires the development of a real estate “market” and related mechanisms for the buying and selling of development credits.
- Requires a sustained market for housing products above and beyond the baseline zoning in receiving areas.
- Requires time and resources for implementation.
- The pre-designation of sending and receiving zones requires considerable upfront planning.

Using this tool for hazard mitigation/climate adaptation:

Tools traditionally used by planners for guiding development & environmental management can also be used to help reduce a community’s vulnerability to hazards and climate impacts. Adaptation measures fall into the following categories: protection, accommodation, and relocation.

Protection: TDR and PDR programs can help steer development out of high risk areas, as well as limit development in areas that can act as buffers from natural hazards. These tools also provide a mechanism to benefit landowners while discouraging development in those areas.

Relocation: TDR and PDR programs can help promote relocation from more risk-prone areas to less risk-prone areas, both gradually and in response to the market. Directing new development to specifically designated areas, and away from others, can address obvious concerns, such as proximity to vulnerable coasts, as well as less visible concerns, such as migrating ecosystems due to climate change and rising sea levels. TDR and PDR programs allow communities to deliberately plan for relocation on both ends: where people are relocating from and to.
Example: Boulder County, CO – Transferable Development Rights Program

The main goal of Boulder County’s TDR program is to “promote county-wide preservation of agriculture, rural open space and character, scenic vistas, natural features, and environmental resources” (Boulder County Land Use Code, 6-700A). The sending sites to be preserved and protected through the application of this tool are defined in the Boulder County TDR Sending Sites Map, the Niwot Sending and Receiving Area Map, and areas designated through Intergovernmental Agreements with municipalities in Boulder County. Potential receiving areas are not mapped by the county so speculation in relation to property values does not occur. Instead, the county requires that any interested property owner show how their property meets the criteria for approval. Neighboring land owners are notified and public hearings are held once a receiving area is proposed. Unless there is an intergovernmental agreement that requires a higher percentage, 75% of the units transferred to the receiving site must come from the sub-area surrounding the site.

This example illustrates how a TDR program can be used to direct development from unsuitable lands to preferred areas. This concept can be further applied to limit development in areas susceptible to environmental degradation, damage from natural disasters, and climate change impacts.

Example: Town of Warwick, NY

The purpose of Warwick’s TDR program is to preserve important local resources, such as active farmland and significant open space, and relocate development to areas that are already served by public water and sewer or have the potential to be served by these services (Town of Warwick Code, Chapter 164-47.4). The sending areas in the town are designated through the Agricultural Protection Overlay District. The total number of permitted units (that can be transferred) is calculated using such information as acreage of different soil groups, FEMA 100-year floodplains, and existing permanent easements. It is intended that receiving areas in Warwick are either areas adjacent to the Town’s three village centers or in the Town’s five hamlets.

This example illustrates how a TDR program can be used to direct development from agricultural or flood-prone areas to preferred areas, as well as to promote efficient infrastructure investments.
A conservation easement is a voluntary, legally binding agreement that limits certain types of uses or prevents development on a piece of property now and in the future. The purpose of enacting these limits is to protect the property’s ecological or open-space values. By creating a conservation easement, a landowner voluntarily agrees to sell or donate certain rights associated with his or her property – often the right to subdivide or develop. A public agency or a nonprofit organization, such as a private land trust agrees to hold those property rights and enforce the landowner’s promise not to exercise those rights. Essentially these rights are forfeited and no longer exist, although other rights that make up the full bundle of property rights still belong to the property owner, including the right of disposition, the right of exclusion, air rights, etc. The restrictions on development are bound to the deed and remain in place even if the property is sold. Conservation easements can qualify a landowner for tax benefits - in compliance with I.R.S. and state rules. (See also Cluster Developments)

**Pros**
- Provide flexibility and timing to transactions compared to government-managed conservation lands that usually have constraints in their ability to act quickly and make commitments to landowners.
- Bring the ability to leverage multiple funding sources, e.g. local, federal and state grant programs, private funds, etc.

**Cons**
- Conservation may not be driven by public priorities or plans but by individual interests.
- By establishing a conservation easement, the development rights are permanently forfeited; however, the organization that administers it may not exist forever, raising questions over future responsibility.
- The permanence of a conservation easement may conflict with a community’s future goals, needs, and zoning efforts.
- Establishing a conservation easement can be accompanied by a complex negotiating process.

**Using this tool for hazard mitigation/climate adaptation:**

Tools traditionally used by planners for guiding development & environmental management can also be used to build resilience by helping to reduce a community’s vulnerability to hazards and climate impacts. Adaptation measures fall into the following categories: protection, accommodation, and relocation.

**Protection:** Conservation easements provide opportunities for protecting communities from natural hazards and impacts of climate change in multiple ways. Restricting development in areas can strategically prevent settlement in vulnerable areas, provide buffers from specific impacts like storm surge, and provide habitats for flora and fauna to migrate as climate zones shift.
Example: Rogue River Conservation Easement Project, MI

In 2004, a permanent conservation easement project was initiated in the Rogue River Watershed in western Michigan. It led to the creation of a conservation easement covering 270 acres, including wetlands and adjacent forested uplands and a quarter mile of frontage on the Rogue River. This conservation project has reduced multiple threats to the natural ecosystem. The wetlands alone play a significant role in reducing sediment loads and pollution levels of phosphorus and nitrogen into the river. Landowners received financial benefits through tax deductions for donated land, and the Nature Conservancy assumed the role of easement holder.

This example illustrates how conservation easements can be used to protect critical ecosystems. This approach can be useful in restricting development in hazard prone areas, as well as in areas that can buffer valuable natural resources at risk due to climate change.

Example: Ayer’s Creek, MD

Conservation efforts through the use of easements have taken place in Ayer’s Creek, a coastal tributary near Ocean City, MD, since the early 2000s. After one unsuccessful attempt to purchase a major 442-acre parcel proposed as a golf course, The Trust for Public Land (TPL) stepped in and secured an optional agreement in 2009 - through partnering with both federal organizations and individual land owners. TPL won a competitive matching grant from NOAA’S Coastal and Estuarine Conservation Program to be able to buy part of the land, and the property owner donated another portion.

This example illustrates how conservation easements can be used to protect critical ecosystems and leverage different financing sources. Communities can consider how to use similar approaches to leverage funding from multiple agencies, promoting hazard mitigation and climate change adaptation to restrict development that will help achieve those goals, while also protecting the local environment.

Example: Montana Legacy Project, MT

Plum Creek, a multinational timber/real estate conglomerate, was looking to divest 300,000 acres in Western Montana. The land, intermixed with properties managed by the Forest Service, was ecologically critical and likely to be sold to developers. The Trust for Public Land, partnering with the Nature Conservancy, purchased more than 310,000 acres of private forest land from the Plum Creek timber company. Ultimately, the land will be conveyed to a combination of public & private conservation owners. In the meantime, the Conservancy will own, and be responsible for managing, the land.

This example illustrates how conservation easements can be used to protect critical ecosystems, leverage different financing sources, and provide time to secure more funding. Although conservation easements are commonly donated from individuals, this example highlights that such conservation tools can be applied in a variety of creative ways. Restricting development on lands that are vulnerable to natural hazards or severe impacts of climate change can protect adjacent buildings as well as the larger community, in addition to allowing natural ecosystems to adapt, migrate, or evolve.
Site Plan Review

Description

A site plan is a detailed graphic and written document that shows how a site will be developed. It includes existing and proposed man-made features, as well as natural site characteristics. Site plan review is the process of reviewing documents and drawings required by the zoning ordinance to ensure that a proposed land use, development, or activity meets zoning ordinance standards as well as state and federal statutes. Many zoning ordinances have an entire section devoted to site plan review. Municipalities can require the process for all development, for certain types of development, or for a particular zoning district, such as subdivisions, large-scale commercial and industrial facilities, or development in the high-hazard or environmentally sensitive overlay districts. Site plan review processes typically allow for public comment during planning and zoning commission meetings. It also allows for a conversation between the local planners and developers to achieve consented decisions. When site plan review is required by a local zoning ordinance, an approved site plan is legally binding.

Pros

- The process requires developers to thoroughly consider landscape features, flooding threats, building design, etc. before starting a construction project.
- Site plan review gives local government officials and the public a say in what is built in their community.
- The process can stop undesirable or unsafe developments before construction begins.
- The site plan can be used as evidence to revoke permits or fine a developer if a project is not built as proposed.

Cons

- Requires trained, professional staff to carry out the site plan review process.
- Site plans must be prepared by licensed professionals, making the permitting process more expensive for small projects.
- Site plan reviews can be a lengthy process.
- Site plan review is only successful if the land development ordinances of a community are adequate in representing a community’s vision.

Using this tool for hazard mitigation/climate adaptation:

Tools traditionally used by planners for guiding development & environmental management can also be used to build resilience by helping to reduce a community’s vulnerability to hazards and climate impacts. Adaptation measures fall into the following categories: protection, accommodation, and relocation.

Accommodation: The site plan review process affords local governments the opportunity to hold developments to a high standard of risk reduction. By evaluating the proposed project at an early phase, local government staff and the public can ensure required provisions are met and suggest improvements to further mitigate impacts of hazards and climate change on a site, or its surroundings.
Example: Nantucket, MA

The island town of Nantucket, Massachusetts is a popular tourist destination, where the community places a high value on historic preservation and environmental conservation. To avoid the distasteful tourist-oriented development seen in some places along Cape Cod, Nantucket requires a multi-step site plan review for most new developments on the island. To help guide developers through the permitting process, a detailed manual for obtaining subdivision permits was created, explaining the site review process in detail. Before a developer pays for a professional site plan to submit for review, the property owner can present a non-legally binding “sketch plan” to the planning department for feedback in an informal setting. This helps reduce the number of projects that are completely unacceptable from going before the planning commission, saving time, energy, and costs on the part of volunteer planning commissioners, paid staff, and local property owners. The following steps in the review process include the submission and review of a preliminary plan, and a definitive plan. For environmentally sensitive areas, an environmental site analysis report must also be included. Major developments also require a traffic study and storm drainage system details. For most small subdivision projects, the review becomes a one-step review process approved by the planning commission without public comment.

This example illustrates how communities with stringent land use control measures can use a multi-step site plan review process, while also including an informal review option to minimize time and costs spent on unacceptable plans. This example also highlights an effective way to communicate and provide outreach materials to help guide developers to create projects that reflect the vision of the community. Such outreach can be particularly useful in informing property owners and developers of a community’s hazard mitigation and climate change adaptation goals, as well as the steps to achieving them, especially if or as they may change. Furthermore, the multi-step site review process can help guide developers in achieving those goals.

Example: Boulder, CO – Floodplain Permit Site Plan Review

The City of Boulder, Colorado uses site plan review to ensure new developments reflect their community goals of sustainability and livability. In Boulder, a Concept Plan and Site Plan Review are only mandatory for projects that require a variance, as well as for subdivision, rezoning, or alternation of historic or landmark sites in all regular zoning districts. However, Site Plan Review is required for all development within the floodplain overlay district. Concerning development in floodplains and wetlands, the City of Boulder holds higher regulatory standards than the state and federal agencies that also enforce special regulations for these environments. The floodplain permit site plan review process facilitates greater oversight of projects in high-risk areas by the city manager and community planning staff. Furthermore, modifications of the project can be required before issuing a permit and non-resilient projects can be cancelled before they are built.

This example illustrates how a community can use the site plan review process to govern development in the floodplain. This process can also be applied to areas at risk of other hazards or impacts of climate change.
Tax Increment Financing (TIF)

**Description**

Tax Increment Financing (TIF) is a method of financing public investments for infrastructure, redevelopment, and other community improvement projects that will increase the value of surrounding real estate. The increased value of property will generate additional tax revenue, the “tax increment,” proportional to the infrastructure investment. A community utilizing TIF dedicates those tax increments within a certain defined district (TIF district), over a set number of years, to finance or pay off the debt, usually in the form of municipal bonds, originally issued to pay for the project.

**Pros**

- TIF aids jurisdiction in implementing economic development projects that will be in the best interest of the community.
- TIF distributes the costs of public improvements among all overlying taxing jurisdictions that ultimately benefit from an increase in the area’s valuation.
- TIF bonds are usually not subject to municipal debt limits or public referendum requirements, giving local officials more discretion and debt capacity. (These vary by state.)

**Cons**

- The complex administrative process of TIF may limit small community application.
- TIF assumes that the project will lead to growth, although this is not always the case.
- With discretion given to local officials, TIF can present an opportunity for ignoring the interest of local residents.
- TIF may become a tool for encouraging private development that may not be in the interest of the community.
- TIF dedicates tax funding to infrastructure, leaving other needs, including police, social services, education, etc., underfunded.

**Using this tool for hazard mitigation/climate adaptation:**

Tools traditionally used by planners for guiding development & environmental management can also be used to build resilience by helping to reduce a community’s vulnerability to hazards and climate impacts. Adaptation measures fall into the following categories: protection, accommodation, and relocation.

**Protection:**

TIF can be used to finance flood related infrastructure and other interventions to mitigate risks, such as those used to reduce floods, storm surge, etc.

**Accommodation:**

TIF can be used to finance infrastructure improvements in areas prone to natural hazards and environmental change to prepare for these risks.

**Relocation:**

TIF can be used to finance improved infrastructure, redevelopment, and affordable housing to encourage the re-settlement of people from areas at high risk of natural hazards and climate change impacts.
Example: Waterfront TIF Program – City of East Providence, Rhode Island

The City of East Providence implemented a Tax Increment Financing (TIF) Program in an attempt to transform the East Providence Waterfront. The area is currently mostly vacant land that was formerly used for industrial or heavy commercial purposes. The city plans to use the TIF program to encourage quality developments and land uses that will generate year-round activity. This revitalized area will have linkages to the surrounding neighborhoods, downtown amenities, jobs, and the recreational and scenic attributes of a waterfront location - as proposed in the 2003 East Providence Waterfront Special Development District Plan. Based on a fiscal impact assessment, it was estimated that the development proposed in the TIF District will result in an increase in assessed property values of approximately $1 billion, without considering inflation. Property taxes generated in the Waterfront District are estimated to increase nearly ninety-fold.

This example illustrates how TIF can be used to finance redevelopment and affordable housing. Similarly, communities anticipating a potential influx of individuals, families, and businesses relocating from risk-prone areas can direct new investment or redevelopment in certain neighborhoods - ensuring adequate provision and funding of infrastructure without major upfront costs to the municipality and current residents who may not benefit from these investments directly.

Example: Ping Tom Memorial Park – City of Chicago, Illinois

Ping Tom Park’s 12-acre site was originally a Chicago and Western Indiana Railroad yard located along the South Branch of the Chicago River. Abandoned by 1998, the site was transformed into an open space and cultural asset for the nearby Chinatown neighborhood. Utilizing $3 million in TIF assistance, the Chicago Park District project created a variety of landscape and infrastructure improvements that reflect Asian design themes.

This example illustrates how TIF can be used to finance development of open spaces and cultural assets. With regards to hazard mitigation and climate change adaptation, it is useful to note the range of projects that can be financed through a TIF program - if it is carefully designed to overcome common pitfalls.
Urban Growth Boundaries

Description

An Urban Growth Boundary (UGB) is a line on a map that is used to demarcate the separation of land designated for urban development from rural land. It specifies the area within which urban growth should be contained for a period of time as specified by a growth management program. Main reasons for adopting a UGB are: 1) promoting compact urban development, 2) providing efficient and cost-effective infrastructure, 3) preserving resource lands, and 4) protecting natural resources and environmentally sensitive areas. UGBs are often used in combination with, or as a component of, other growth management tools, such as phased growth strategies or adequate facilities ordinances.

Pros

- An effective tool at framing and giving context to other growth management tools, such as phased growth and urban services boundaries.
- A clear directive that helps planners and developers understand priorities moving forward.

Cons

- UGB requires multiple steps, political capital, technical expertise, and resources.
- Enacting a UGB requires coordination between multiple jurisdictions, as metropolitan areas often cross political boundary lines, with some degree of collaboration and legislation.
- UGBs can create artificial real estate markets because they do not adapt to market conditions.
- Longtime residents can be unequally impacted by the introduction of a UGB solely based on if they fall inside or outside the line.

Using this tool for hazard mitigation/climate adaptation:

Tools traditionally used by planners for guiding development & environmental management can also be used to help reduce a community’s vulnerability to hazards and climate impacts. Adaptation measures fall into the following categories: protection, accommodation, and relocation.

Protection: UGB can facilitate the protection of areas at critical risk, areas that could effectively serve as buffers for neighboring communities, or areas inadequately prepared for impacts of hazards and climate change by excluding development in these areas.

Relocation: Although urban growth boundaries are often enacted to promote compact urban development and provide efficient and cost-effective infrastructure, these goals can also be paired with risk reduction by strategically locating new development. An UGB can limit relocation or further development in high-risk areas and encourage it in safer zones, or in areas better prepared to address the impacts of hazards and climate change.
Example: Miami-Dade County, Florida

The urban growth boundary (UGB) in Miami-Dade County dates to the 1970s. The main purpose of the UGB is to preserve its agricultural identity, protect its unique natural environment, encourage development in areas with existing infrastructure, transit, and other amenities, and keep development from spilling towards highly sensitive lands, namely Everglades National Park. Because of continuous growth in the County, the UGB has been moved to accommodate new jobs and residents in an incremental fashion in response to requests from developers and county staff. Currently, the County is assessing other methods to more efficiently manage growth inside and outside the boundaries of the UGB.

This example illustrates how UGB can exclude development in critical environmental areas.

Example: Portland, Oregon

Portland adopted an urban growth boundary (UGB) in 1979 that separated urban land from rural land and encouraged compact, transit-oriented growth. While metropolitan Portland’s population of 1.58 million has grown by 50% since 1973, the city’s land area has grown by only 2%. The boundary was based on a projection of the need for urban land, as well as the land development plans of individual property owners. The primary role of the boundary is to control urban expansion into farm and forested lands. By concentrating development within the boundary, the UGB promotes the efficient use of public facilities and services, as land inside the boundary supports such services as roads, water, sewer systems, parks, schools, and fire and police protection.

This example illustrates how UGB can be used to control urban expansion and at the same time promote the efficient use of public facilities and services. Furthermore, the notion of protecting farms and forests from development can also be extended to restricting development in critical environments that need space for ecological systems to migrate as climate zones shift.
Phased Growth and Adequate Public Facilities Ordinances

Description

Phased Growth regulates the timing and location of new development to coincide with the availability of public facilities. This strategy controls the rate of growth by paying attention to levels of public service in order to prevent a community from growing outside of its capabilities. A phased growth strategy can be applied as strictly as prohibiting development outside of a certain area, or as flexibly as applying a point system (see Performance Zoning) for permitting new development in the community. Adequate Public Facilities Ordinances (APFOs) are similar to phased growth strategies in that they also ensure that development takes place at a rate equal to the provision of infrastructure and services necessary for the community. However, an APFO can be applied to individual developments in a piece-meal fashion, while phased growth strategies offer a more comprehensive and long-term approach. APFOs can apply to amenities other than core infrastructure and apply to only one development at a time. Furthermore, phased growth strategies can place less of a burden on developers than subdivision exactions, which are also tied to infrastructure provisions for small increases in residential or commercial use that raise levels slightly above a given threshold.

Pros

- Easy to understand, and a very flexible concept.
- Works well with other planning methods including traditional zoning and performance zoning.
- Can prevent the need for moratoria in fast-developing communities.

Cons

- Funding infrastructure and facilities for new development can be a financial burden for jurisdictions that do not yet earn tax revenue from new residents or businesses.
- Providing adequate facilities may be inappropriate if development is undesirable in the area.
- Regulates the amount of development, based on adequate facilities, but does not regulate where that development occurs.

Using this tool for hazard mitigation/climate adaptation:

Tools traditionally used by planners for guiding development & environmental management can also be used to build resilience by helping to reduce a community’s vulnerability to hazards and climate impacts. Adaptation measures fall into the following categories: protection, accommodation, and relocation.

Relocation: Phased growth strategies and adequate public facilities ordinances can help communities anticipating population growth due to relocation to ensure provision of sufficient facilities for new residents, as additional developments are planned.
Example: Town of Amherst, NY – Phased Growth Bylaw

The Town of Amherst Phased Growth Bylaw, which was adopted in 1987, has three major components. (i) Growth Cap: An overall cap of 250 dwelling units during any two year period (based on a rolling two year calculation) is imposed. This cap, based on historical trends, was determined to be appropriate to provide time to respond to infrastructure needs created by growth. (ii) Development Schedule: All developments of four residential units or more are required to phase the construction of those units over a time period of two to five years, based on the number of units proposed. (iii) Point System: All developments of four residential units or more are reviewed against a series of criteria, including provision of affordable housing, open space and farmland protection, cluster developments and a discretionary category. Based on this review, positive or negative points are assigned, which in turn allow a development to be constructed in a faster time period, or require it to be phased out longer than the development schedule normally requires.

This example illustrates how phased growth regulations can be enacted to carefully time growth and ensure adequate infrastructure is in place for new residents. It shows that a municipality can have strong control over the pace of growth, but that it can also include flexibility to allow certain developments priority, given certain criteria. Phased growth strategies can be useful for communities starting to grow, in anticipation of an influx of people relocating from more risk-prone areas. However, as individuals and families often relocate in spurts in response to major events, instead of gradually, a flexible provision, such as the one used in this example, can be applied to accommodate such unusual circumstances.

Example: City of Muskego, WI

In October 2003, the City of Muskego amended its zoning and subdivision ordinances to include Adequate Public Facilities requirements. A Certificate of Adequate Public Facilities (CAPF) is required by a developer in order to obtain an approval for subdivision plats, certified survey maps, conditional use permits, and building site and operation plans. This document certifies that roads, solid waste facilities, potable water facilities, and stormwater facilities are in place or will be provided within a given time period before the new buildings are occupied. Service level standards are based on adopted engineering and design standards found within the municipal code and state statutes. A simplified certification process is provided for small and low density developments. In cases where the absence of a public facility does not pose a threat to public health or safety a waiver may be granted.

This example illustrates how adequate public facilities regulations can be used to balance the timing of private development with planned public improvements in order to protect public health and safety. As individuals and families relocate from areas prone to natural hazards and impacts of climate change, communities receiving an influx of residents and businesses should consider similar provisions to ensure that development does not outpace the provision of adequate facilities and infrastructure.
Moratoria and Interim Development Ordinances

Description

Moratoria and interim development ordinances are growth management tools designated to temporarily forbid some types, or all forms, of new development in a given area in response to a specific issue - usually a new environmental concern. These tools temporarily preserve the status quo by prohibiting the issuance of building permits, zoning changes, or subdivision plots. In this way, these are useful tools to stop development and provide time to consider and adopt a legislative control or land use not currently addressed in the present land use plan or ordinance. Although a moratorium could lead to a permanent cessation, usually followed by a taking, it is more often used temporarily in tandem with an interim development ordinance.

Pros

- Give local governments time to consider and adopt legislation for a situation not addressed in current regulation.
- Allow local governments to ensure that problems do not increase in relevance and complexity during the time it needs to formulate and implement a policy response to an issue.
- Prevent developers from racing to beat imminent land use changes by carrying out developments that are poorly planned or harmful to the community.

Cons

- Uncertainty over whether a development will occur can create distortion in local real estate markets.
- Stopping new development opportunities can temporarily result in a downturn in the local economy, affecting employment, municipal fees, and tax revenues.
- Overriding existing regulations, can change the expectations that landowners have for their property based on preexisting regulations, with potential legal ramifications.
- Municipalities can abuse moratoria powers to allow for the destruction of low income neighborhoods through the devaluing of private property, as well as the replacement of residential communities with divisive or unpopular projects.

Using this tool for hazard mitigation/climate adaptation:

Tools traditionally used by planners for guiding development & environmental management can also be used to help reduce a community's vulnerability to hazards and climate impacts. Adaptation measures fall into the following categories: protection, accommodation, and relocation.

Protection: They can be used to temporarily restrict development in critical areas for hazard mitigation, such as expanded flood zones, thus giving time to develop proper plans and regulations.

Relocation: These tools can encourage people and businesses to relocate to less vulnerable areas. De facto forced relocations can take place when permits are denied to property owners trying to repair buildings after natural disasters.
In early 2012, the Department of Interior (DOI) signed a 20-year moratorium on new uranium and other hard rock mining on one million acres of federal land around the Grand Canyon. The purpose of this moratorium is “to provide adequate time for monitoring to inform future land use decisions in this treasured area, while allowing currently approved mining operations to continue as well as new operations on valid existing claims” (DOI, 2012). This moratorium will provide time to develop a comprehensive and well-developed plan and accompanying regulation to manage mining claims in the area. It is predicted that during this period, up to 11 uranium mines could still be developed, instead of the 30 mines that would operate without the moratorium. The defenders of the moratorium say the ban is crucial to protecting the region - not only its natural features but also the potential for tourism and outdoor activities in the area that is being jeopardized due to mining activities. The mining industry and other opponents of the moratorium argue that the moratorium will be harmful to Arizona's economy and the nation's energy independence.

This example illustrates how potentially dangerous development to critical areas can be banned (at least temporarily) until better information and regulatory capacity is in place. With regards to natural hazards and climate change impacts, moratoria on development and interim development ordinances can be useful tools for assessing and formulating appropriate regulatory responses to new conditions.

The City of Lakewood, CO has taken a proactive approach to limiting development in risk-prone areas. According to the Code of Ordinance, any land on which the Director, Planning Commission, or City Council finds evidence of hazards shall not be approved for subdividing until an engineering design that sufficiently mitigates the potential harm has been submitted by the applicant and approved by the City Engineer. Potential hazards include, but are not limited to, flooding, swelling soils, subsidence, improper drainage, steep slopes (15%+), adverse geological formations, contamination, or other features which will be potentially harmful to the health, safety, and/or welfare of the present or future inhabitants of the subdivision or its environs.

This example illustrates how a moratorium can be used to prohibit development that may place people and investments at risk.