Duerksen et al. 1997: Habitat Protection Planning

Chapter 3. Linking Specific Problems with Appropriate Tools

Although protecting wildlife is a popular goal, implementing that goal is often difficult. As the old saying goes, "to plan is heavenly, but to implement is divine." Even if local residents and officials understand the basic framework and the workable principles of habitat protection described in Chapter 2, it is often unclear how to translate them into an effective set of wildlife protection programs. The problems are compounded by the fact that wildlife protection is never the only important goal of the community—it needs to be balanced and integrated with other objectives. Sometimes, that means finding the least intrusive way to implement wildlife protection goals. In addition, wildlife protection almost always involves a discussion about the use of real estate and the need to protect private property rights. In order to respect competing goals and rights, it is important that the community understand the different tools that are available to achieve habitat protection.

DISTINCTIONS IN SCALE AND LOCATION

The previous chapter distinguished between wildlife protection principles that apply at the landscape scale (such as a valley, a basin, or a major development site) and those that occur at the site scale (such as a single lot or a small development area). It is important to understand that the concepts of landscape-scale and site-scale planning have different implications depending on where the planning site is on the rural-urban continuum. That is because the planning concepts of "scale" and "location" are different.

- Distinctions in Scale, such as "Landscape Scale" and "Site Scale" relate to the question, How big is our planning area?
- Distinctions in Location, such as "Rural, Suburban, and Urban" relate to the question, Where is our planning site located?

In order to develop an effective plan for wildlife habitat protection at the local level, the community needs to take into account both the scale and location of their planning area. Each possible combination of scale and location produces its own distinct mix of opportunities and challenges.

Opportunities include situations where the scale of the planning effort or the location of the land make it relatively easily to achieve one or more of the biological principles discussed in Chapter 2. Communities should focus on those opportunities and should ensure that the planning effort does not compromise a principle that is relatively easy to achieve. Just because a principle is relatively easy to achieve in a given situation does not mean that it is not important. Sometimes very basic protections (e.g., the preservation of large patches of vegetation and effective buffering of those areas) can be very important to wildlife. In general, the broadest range of opportunities occurs when the community can design a habitat protection scheme based on landscape-scale planning for a rural area. In contrast, the list of opportunities is much shorter when the opportunity is for site-scale planning in a heavily developed urban area.

Challenges, on the other hand, are situations where either the small size of the planning area or the location of the land make it difficult to achieve one or more of the principles. This does not mean that the challenge is impossible; rather, it means that it may require careful attention or creative thinking to solve the problem. In general, the list of challenges increases as the scale of the planning decreases and the land becomes more urban. When planning is limited to a smaller-scale site in a developed urban area, it may be a challenge to implement any of the listed principles. In solving their particular challenges to wildlife habitat protection, communities should be careful not to compromise or forfeit those principles that are natural opportunities for the site and that may be easier to sustain over the long run.

THE OPPORTUNITY/CHALLENGE MATRIX

In Chapter 2, Tables 2-4 and 2-5 listed important biological principles that can help preserve wildlife habitat. Table 3-1 builds on those principles and summarizes a general set of opportunities and challenges that may present themselves in a wildlife

protection effort. Obviously, this breakdown of opportunities and challenges will differ for each community and will change depending on which species of wildlife are targeted for protection. In particular, opportunities and challenges may shift depending on whether large or small species are being targeted, and depending on whether the community is trying to preserve a relatively rare or a relatively common set of species.

Planning in rural areas can be done at either the landscape scale or at the site scale, depending on whether the community is engaged in an areawide planning effort or is drafting specific design standards for lots and subdivisions. Where the habitat lands have not been badly fragmented, it is important to do both.

In addition, Table 3-1 shows that planning for suburban areas can also be done at both the landscape scale and the site scale. Often, a community can predict that development will continue to trend outward from developed areas and can engage in an areawide protection effort for habitat in growth areas. Just because development has begun to move into an area does not mean that protection efforts are limited to site-scale principles. Although the inner edge of a growth area may have so much existing construction and population that site-scale principles are appropriate, the outer edge of the area may be so undeveloped that landscape principles can be effective. This is very important because suburban areas are the fastest-growing areas in the U.S. It is also the area in which potential habitat land is being lost at the fastest rate. Failure to use all of the tools available to protect habitat in suburban areas may have the largest impact on wildlife within a typical planning horizon of 20 years. Planning for wildlife habitat protection in suburban areas may also require the most careful thought simply because it is neither urban nor rural. This "in-between" status may make it difficult to determine which landscape- and site-scale principles will be effective, but it is essential that the community think through all of the potential principles that may apply.

In urban areas, the opportunities are more limited. This is simply because large patches of native vegetation seldom exist, corridors have already been blocked, and it is unreasonable to expect that natural events, such as floods and fires, can be allowed to occur where large numbers of people live nearby. Table 3-1 suggests that landscape-scale principles are largely inapplicable to urban areas, and that planning for urban infill projects should focus on site-scale principles. In those rare cases where very large areas are available for planning or redevelopment in urban areas (e.g., sites larger than 1,000 or 2,000 acres), and potential wildlife connections to other areas have not been irretrievably lost, communities should think of the site in suburban terms and should also attempt to apply landscape principles.

THE SCALE/TOOL MATRIX

A second way to approach wildlife habitat is to think about which specific habitat protection tools may be

Table 3-1. The Opportunity/Challenge Matrix

	Landscape Scale (Valley or Large Development Site)		Site Scale (Infill or Small Development Site)	
	Opportunities	Challenges	Opportunities	Challenges
Rural Area	Maintain large patches Prioritize species Protect rare landscapes Maintain habitat connections Protect regionally rare species Allow fire, flood, and wind Keep some areas off limits		Maintain buffers Facilitate wildlife movement Mimic natural features	Minimize contact with large predators Control pet-sized predators
Suburban Area	Prioritize species Protect rare landscapes Maintain habitat connections	Maintain large patches Protect regionally rare species Allow fire, flood, and wind Keep some areas off limits	Maintain buffers Minimize contact with large predators	Facilitate wildlife movement Control pet-sized predators Mimic natural features
Urban Area	N/A	N/A		Maintain buffers Facilitate wildlife movement Minimize contact with large predators Control pet-sized predators Mimic natural features

applicable at the scale for which planning is taking place. Some tools, such as land purchases or transferable developments rights programs, may be more effective when used at the landscape scale to protect relatively large areas of potential habitat. Other tools, such as clustering or the targeting of required land dedications, may be more effective when used at the site scale. Finally, some tools such as zoning and subdivision review standards can be effective at both scales. Table 3-2 (page 28) sets forth a general outline of potential tools and the scale at which they are traditionally used. It is important to realize, however, that almost all of the listed tools can be used effectively at any scale with a little creative thinking. Each of the tools listed in Table 3-2 is described in more detail with examples in Chapter 4.

Tools for the Landscape Level

In general, the tools that will be effective in implementing the landscape-scale principles described in Chapter 2 are those that can address the general location of development areas within an entire valley or basin. When wildlife protection is addressed at this level, it may require that new development or significant human activity be excluded from an area. If that area includes all or part of a private landowner's parcel, tools that provide compensation to the owner in terms of either money or the ability to develop elsewhere may be appropriate. Potential tools include habitat purchase, transferable development rights (TDRs), preferential taxation, and limited conservation development. Protection of large patches of native vegetation and corridors may also require the creation of new large-scale zones or overlay districts, or the use of new subdivision review standards. Finally, an effective approach to wildlife protection at the landscape scale may require the cooperation of several different governments in the valley or watershed or range area through the use of intergovernmental agreements. All of these tools attempt to steer new development activity away from sensitive areas through constitutional means. They do not attempt to address what the new development will look like, just where it will take place. The effective use of any of these tools should be based on accurate information about vegetation and the known range of the targeted species, both of which are sometimes available from a state's division of wildlife. If accurate information is not available from other sources, such information should be obtained from local knowledge of wildlife behavior patterns and locations.

Tools for the Site Level

Appropriate tools for site scale also address where development occurs, but on a much smaller scale. Instead of answering the question, Where are there sensitive patches of vegetation or wildlife corridors in this valley?, they answer the question, Where are there opportunities to buffer or connect wildlife-supporting vegetation on this particular property? Site-scale tools also address the question, How can the development be designed and human activity controlled within this area to minimize disturbance to the chosen species?

Appropriate tools to address these issues include the language of the zoning ordinance, which controls permissible uses of the land and the size and location of structures on their sites, and the subdivision standards, which control the layout of building sites and the amount and location of land parcels that must be set aside for parks within the development. Zoning and subdivision controls can also set standards for vegetation, buffering, noise, glare, and the number of domestic pets, all of which can affect nearby wildlife. Another appropriate tool is clustering, which allows a landowner to move permitted development density from one portion of the site to another in order to protect sensitive lands. Development density bonuses are also sometimes included to encourage such clustering. In contrast to landscape-level tools, site-level tools rarely attempt to prevent development or human activity on all of an owner's land, and so TDR or land purchase tools are seldom required. Instead, easements or limited conservation development plans may be more appropriate.

EXAMPLES OF PROTECTION PROGRAMS

The use of landscape- and site-scale tools should not be treated as an "either/or" choice. In many rural and suburban communities, an effective wildlife habitat protection program will include both types of tools. Set forth below are examples of possible wildlife habitat protection programs for three types of communities. These examples are not suggested as models because the tools appropriate for each community will always be determined by that city or county's specific wildlife protection goals. Instead, they are presented to show how local communities may need to pull different landscape-scale and site-scale tools from Table 3-2 in order to achieve their goals. All of the tools listed in these examples are described in more detail in Chapter 4.

The Jackelope Valley—a Rural Program

The citizens of Jackelope Valley moved there because they enjoyed watching large game animals and fishing on the gold medal trout stream that runs through the valley. They have also learned that the valley contains substantial areas with good habitat for two species of fox that are common in the valley but relatively rare in their portion of the state. After a thorough planning process, they decided to adopt a valleywide habitat protection program to preserve the abundance and increase the distribution of these species. Their program included the following elements.

Landscape-Scale Elements

1) A wildlife preservation overlay district requiring that development be kept 500 feet away from identified corridors connecting different areas of large game habitat and from identified corridors connecting different areas of fox habitat

2) A transferrable development rights (TDR) program allowing landowners whose entire property was designated as prime habitat to transfer their development rights to designated growth areas adjacent to the towns in the valley and giving them a density bonus for doing so

Table 3-2. The Scale/Tool Matrix

		Landscape-scale Tools	Site-Scale Tools
Regulatory Tools	Zoning Texts and Maps	X	X
	Special Overlay Districts	X	X
	Agricultural and Open Space Zoning	X	
	Performance Zoning		X
	Phasing of Development		X
	Subdivision Review Standards	X	X
	Sanctuary Regulations	X	
	Urban Growth Boundaries	X	
	Targeted Growth Strategies	X	
Incentive Tools	Density Bonuses	X	X
	Clustering		X
	Transferrable Development Rights	X	
	Preferential Tax Treatment	X	
Acquisition Programs	Fee Simple Purchase	X	X
	Sellbacks and Leasebacks	X	X
	Options and Rights of First Refusal	X	X
	Easements and Purchases of Development Rights	X	X
	Land Dedications and Impact Fees	X	X
Development Agreements			X
Control of Public Investments		X	X
Taxing and Assessment Districts		X	X
Private-Sector Initiatives	Land Trusts		X
	Limited Conservation Development		X
	Industrial Restoration Showcase Projects		X
Intergovernmental Agreements		X	
Education, Citizen Involvement, and Technical Assistance		X	X

Site-Scale Elements

1) New subdivision standards requiring that developed portions of lots be more than 200 feet away from the trout stream and requiring that the land within 200 feet of the stream be kept in natural vegetation to help clean runoff water

2) An educational program to encourage large ranchers whose property contained some prime habitat areas to cluster development, to work with private land trusts to develop the least sensitive areas of their property, and to donate easements over the sensitive areas in return for tax deductions

Hidden Valley Ranch Estates—a Suburban Example

Spruceland is a growing suburb located on land that was formerly agricultural. There are scattered stands of spruce and other trees, several small streams that were plowed over by the farmers, and an area of rising terrain leading to a unique "cragrock" formation. Leapfrog development has resulted in an irregular mixture of developed and undeveloped

parcels. The citizens of Hidden Valley Ranch Estates became concerned that they no longer saw deer on the undeveloped land or heard songbirds in the morning, and they decided to target those species for protection. They also noticed that they saw fewer types of small animals around the cragrock area. After reviewing information about predicted growth for the city and remaining areas of vegetation, they decided that their goal was to increase the abundance and distribution of mule deer and to preserve a viable population of songbirds. Their program has the following elements.

Landscape-Scale Elements

1) A habitat purchase program funded by a portion of their sales tax proceeds to purchase the cragrock area in order to preserve that rare landscape element.

2) A zoning text amendment requiring that all mature stands of more than five trees and their associated understory be preserved and integrated into new development, and that construction activities avoid disturbing the area within 25 feet of those trees.

Site-Scale Elements

1) A new subdivision regulation requiring that developers of land containing the old plowed-over streams grade and vegetate their land so as to recreate those old streams as possible mule deer migration corridors.

2) A clustering ordinance giving developers a development density bonus if they cluster development at least 500 feet away from the restored streams, which is approximately the flushing distance for mule deer.

Fort Palmer—an Urban Example

Fort Palmer is one of the larger cities in the state and is largely built out. There are still a few significant development parcels on the periphery, however, and continuous infill and redevelopment activity. Citizens still notice significant numbers of small animals like coyotes and rabbits in the drainageways and along the city's hike/bike trails. There are also significant numbers of ducks and geese that use the city's parks and undeveloped lands as winter habitat. After studying potential wildlife corridors and vegetation, the citizens decided to target these species and to aim at preserving their current numbers. Fort Palmer decided to pursue a site-scale strategy and adopted a wildlife habitat protection plan with the following elements.

Site-Scale Elements

1) A zoning text amendment requiring that native vegetation that serves as cover and food for ducks and geese be planted as part of the development or redevelopment of parcels larger than two acres, and that construction on those parcels not occur during nesting seasons.

2) A performance zoning system requiring that all new development near the drainageways or wooded areas earn a given number of points through wildlife-sensitive design (e.g., designating and buffering significant habitat areas, preserving existing vegetation, or preventing nighttime glare onto stands of trees or buffer areas) in order to proceed with development, and offering density bonuses to those who earn more than the minimum number of points.

3) A program to construct low-rise fencing along unpaved trails in the drainageways to make the disturbance from hikers more predictable and more limited in area.

The examples of Jackelope Valley, Hidden Valley Ranch Estates, and Fort Palmer illustrate several points. First, they show the importance of wildlife planning for the community. None of the three communities would have been able to craft an appropriate plan without first studying the land, the existing wildlife, the regional context, and the opinions of their residents. Second, they show how each community's habitat protection plan is likely to be different. Not only are different species important to different communities, but the preservation goals also differ. Some communities will want to expand the numbers of wildlife, others will focus on increasing the variety of wildlife, and yet others will be satisfied with preserving the types and kinds of wildlife that are already present. Third, the examples show the wide variety of wildlife habitat protection tools that can be used to achieve specific goals. Each of the tools mentioned above—and many more—are discussed in Chapters 4 and 5. Once again, the package of tools will have to be assembled and tailored to match the specific goals of the community.

Chapter 4. Crafting an Effective Implementation Program

This chapter discusses several wildlife habitat protection techniques in greater detail. Because each community has its own topography, ecology, political climate, and goals for wildlife, it is unlikely that one community's wildlife protection program can simply be transplanted to a new location. In addition, the process of debating which alternative goals and tools may be appropriate for a city or county makes it much more likely that the resulting program will be successful. Finally, it is important to remember that wildlife does not respect jurisdictional boundaries. Because of the interjurisdictional nature of wildlife and natural resource projects, it is also important to coordinate activities with other local governments on the basis of biological or geographical boundaries rather than on purely political ones.

Within each community, a committee or task force should be established to create workable systems out of the policy directives created in ordinances and intergovernmental agreements. However, local governments should generally try to avoid establishing new administrative structures simply to deal with wildlife, since this will be a source of criticism that distracts attention from wildlife issues. Local committees implementing habitat protection programs should strive to get representation from the top levels of relevant boards since that is where many decisions are made. At the same time, every effort should be made to design public outreach programs and citizen participation efforts to ensure that genuine community values are reflected in the program. This is particularly true when considering new regulations and acquisition programs.

Although a variety of different tools are available to protect wildlife habitat, all of them must conform to basic principles of constitutional law and to the requirements of the state statutes. Those restrictions are discussed in Chapter 5, which should be read in conjunction with this chapter.

REGULATORY APPROACHES

America's local communities have engaged in land-use regulation and growth management since the early 1900s when comprehensive planning first became popular. In the 1920s, the United States Department of Commerce began encouraging the individual states to adopt a standard zoning enabling act. In 1927, the United States Supreme Court ruled in *Village of Euclid v. Ambler Realty Company*, 272 U.S. 365 (1926), that zoning was a valid exercise of the police power inherent in local governments. Since that time, thousands of cities, towns, and counties throughout the country have adopted comprehensive land-use plans and have zoned their communities based on those plans. While comprehensive planning and zoning have become the basic tools of development and growth management in most places, there is increasing recognition that these traditional approaches have shortcomings and may need to be supplemented with other tools.

Modernizing land-use regulations is the most direct method of providing wildlife habitat protection. This can be accomplished by incorporating and combining wildlife habitat needs with traditional land-use controls. In a planning analysis, areas of conflict between human and wildlife needs will arise. For example, a desired recreational trail along a river could be found to disturb sensitive riparian habitat. By moving most of the trail out of the floodplain area and including rest stops near the river, both objectives can be met. Another example might be using wetland areas for stormwater control and enhancing wildlife habitat. Although many regulatory tools are available to promote wildlife habitat conservation, existing regulations need to be evaluated before any new regulations are adopted. This section describes some of the more common regulatory methods of protecting and enhancing wildlife habitat.

Application Requirements

In their simplest form, local regulations should provide that:

1. an applicant is provided with wildlife information and maps that the jurisdiction has on hand and/or a checklist of standards that will be used in reviewing applications;
2. the applicant has to submit an analysis of the impacts of the development on wildlife; and

3. the application will be reviewed by an agency (e.g., a state department of wildlife) or individual with the expertise to carry out the review.

Application requirements should make absolutely clear whether developments can be denied if, after the application is reviewed, it is determined that the impact on wildlife habitat is unacceptable.

Local governments may want to review the application standards being applied in habitat protection ordinances for tools to help make traditional land-use controls more responsive to community goals for habitat protection. For instance, a development application in Lee County, Florida, under its protected species ordinance, requires an applicant to submit a survey of the proposed development site if certain species are likely to be found on the site.

The determination of the likelihood of the presence of a species is made by an evaluation of the vegetative communities found on the site. These vegetation communities are mapped by the county. A matrix showing the listed species found in Lee County, the vegetative communities that they use, seasonal restrictions, recommended buffer guidelines, and a list of what is to be included in the survey is given to the applicant. Both the species matrix and the prescribed survey method were placed into the county's administrative code, rather than the protected species ordinance, to ensure flexibility and to make it unnecessary to amend the ordinance whenever new findings from the scientific community become available.

Practice has shown that the surveys required by this application process are far more effective in identifying the species that occupy a site than were surveys required under the previous zoning ordinance language. The result has been more certainty for the developer and the county that there will be no surpises as the development proceeds. If the survey identifies a protected species on the site, the applicant must submit a management plan for the development area with the application. It should be noted that these application procedures were developed in conjunction with county developers, environmental groups, and the county economic development coalition.

Zoning Texts and Maps

Enacting new zoning regulations or revising existing regulations is often one of the most effective ways of using local powers to protect important habitat. Those communities that have not yet enacted zoning controls are forfeiting a highly effective and versatile method of protecting wildlife habitat (Bissell et al. 1986). Because each ordinance is tailored to the circumstances of the local government, zoning can address specific local issues that may be important for wildlife habitat protection.

In general, zoning ordinances are implemented through the use of both regulatory text and maps. Zoning regulations can therefore often be updated or amended by addressing the specific requirements in the ordinance text, or by adopting new maps that apply regulations to new areas, or a combination of both. For example, if a community wanted to protect existing trees because of their wildlife value:

- one option would be for the town or county to enact a new subsection of text addressing tree protection and to make those requirements applicable to all zone districts;
- a second option would be to draft similar protection language but to add the new requirements to only specific zone districts through amendments to those chapters of the code;
- a third option would be to create a new chapter or subsection creating a "habitat protection zone" and then amend the zoning map to apply that zone where it is appropriate; and
- a fourth option would be to draft the protections into the text of an "overlay zone" and then amend the zoning maps to add the overlay district on the existing zoning districts.

Map amendments and broad text amendments are landscape-level tools, while text amendments related to only as few districts or small areas are considered to be site-level tools.

As the fourth option suggests, many of the protections described in this section as "specialized zoning controls" could also be imposed through the use of the "special overlay districts" (described in more detail below) and vice versa. In each case, the key question is whether the regulation is intended to apply across an area that does not conform to existing zone district boundaries. If it does, an overlay map district should probably be used. Regardless of whether a text, map, or overlay district approach is used, it is usually wise to consider whether variances or exceptions should be available where strict application of the regulations would create an unusual hardship or where unique circumstances make it unlikely that the regulation will in fact produce habitat protection benefits.

Use restrictions. Often, the most dramatic way to protect wildlife habitat is to control the permitted uses on habitat lands and surrounding areas. Through its listing of uses by right, conditional uses, and the criteria for approval of conditional uses, a zoning ordinance can prevent traffic-intensive or people-intensive activities from occurring close to prime habitat areas, migration corridors, calving areas, and similar lands. In some cases, it may be wise to amend existing zoning ordinances to convert current uses by right into conditional uses subject to criteria designed to measure the impact of the activity on wildlife. This approach would allow applicants for those uses to move forward with their projects if they could design the site and manage their operations in wildlife-sensitive ways.

Density restrictions. A second effective way to reduce impacts on wildlife is to control the density of development in and around habitat areas. At the landscape level, minimum lot size requirements or maximum residential densities can be amended to reduce the number of people on sensitive land and the frequency of human-animal interaction. At the site

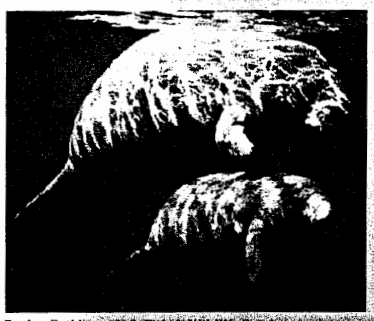
level, projects can be designed with a gradient of density away from the habitat sites. Areas near the habitat could have very low densities, and development further back could have correspondingly higher densities. Through the use of gradients and clustering of development away from prime habitat, wildlife impacts can be dramatically reduced while maintaining the overall number of residential units on the land.

Tree protection and vegetation management. One effective way to protect wildlife habitat is to regulate the cutting of trees or vegetation that the target species use for cover or food, and the use of this tool has been increasing dramatically. In 1984, a national study published by the University of Pennsylvania identified fewer than 100 tree protection ordinances in use in the U.S., with most of the ordinances coming from Florida or California (Coughlin, Mendes, and Strong 1984). By 1989, however, a survey of all incorporated cities in California showed 159 city tree ordinances, and more than 50 percent of those contained protections against removal of trees. Perhaps more importantly, tree protection laws are no longer confined to densely populated and rapidly growing states like Florida and California; they are being adopted everywhere. Some communities, such as Austin, Texas, and Thousand Oaks, California, prohibit the removal of any trees larger than a specified size.

Another important form of special regulation is vegetation management. Controlling the types of vegetation planted in, or removed from, an area is an effective way to attract desired species or discourage unwanted ones. Many approaches are available, but the more comprehensive and integrated ones will be more effective. For example, local regulations can specify the types of vegetation that must be maintained in designated greenways and wildlife corridors. Often, the vegetation requirements will differ from those in standard landscaping ordinances. Vegetation management can also be used to create a transition from undeveloped land to developed areas. In general, woodland and riparian areas are critically important for wildlife habitat, and such vegetation should be protected if possible. Wetlands should also be preserved to add biological diversity, filter runoff, and recharge groundwater systems (Aurelia 1986). Some communities, like Lake County, Illinois, and Fairfax County, Virginia, require that a certain percentage of tree or vegetation cover remain on a site.

Whenever tree preservation or vegetation protection management ordinances are adopted, regulations should also clarify that trees and vegetation adequately protected by the developer will count towards the satisfaction of applicable minimum landscaping requirements in the zoning code. The effectiveness of vegetation protection programs often depends on the identification of what specific species of trees or vegetation will actually benefit a given species of wildlife in a given location. Tree and vegetation protections are, therefore, generally considered as site-level tools.

River corridor protection standards. Zoning can also promote healthy wildlife populations by protecting river corridors. Several good examples of river corridor protection are available. Park City, Utah, and several other communities have adopted standards requiring that development be set back at least 100 feet from rivers and streams and be buffered from view. Near Atlanta, Georgia, Fulton County has passed the Chattahoochee River Corridor Tributary Act that creates a 35-foot buffer zone along all banks of tributaries of the Chattahoochee, a National Wild and Scenic River. Similar regulations were upheld by the Montana Supreme Court in a recent case. In the Denver Gateway area, development must be set back from First Creek a minimum of 200 feet, and other buffering controls apply.



Gaylan Rathburn, U.S. Fish & Wildlife Service

Death from speedboat propellers is an escalating threat to the West Indian manatee.

Requirements for vegetative barriers or buffer areas. Vegetative barriers can be used to increase the perceived separation between developed and natural areas. They can also be used to either attract or repel different species of wildlife. For example, in areas where big game is not wanted, zoning and landscaping standards can require the planting of vegetation that large game animals do not like. On the other hand, the same code might require the planting of species that attract songbirds. Similarly, buffer zones can be used to decrease "line of sight" distances for wildlife and humans, reduce noise disturbances, protect critical habitat, and protect bodies of water. In many cases, careful research will be needed to determine exactly how much buffer will be required in order to adequately protect the target species (Sikorski, Bissell, and Jones 1986). Barrier and buffer requirements are usually site-level tools.

Controls on fencing. Where local wildlife goals call for keeping humans and large animals apart, zoning regulations might require perimeter fencing that is impassable to certain species. On the other hand, if a new development threatens to cut off a historic migration route or to separate related feeding areas, the code might put a limit on the heights of fencing to ensure that the fences are passable to wildlife. In still other cases, the goal may be to make sure that wildlife see the fences as they approach them so that they can avoid entanglement. In general, fences lower than 40 inches tall will not be a barrier or a source of entanglement to large game animals. Fencing controls are usually site-level tools because their effectiveness often depends on the specific location and layout of the land.

Controls on public or vehicular access. Another important category of zoning control is access. The issue

of access is often an area of shared responsibility between the planning department and the public works or transportation department, and effective controls will require the joint efforts of both groups. In order to protect wildlife, it is often necessary to restrict human or vehicular access to areas that wildlife use or routes along which animals migrate. Access restrictions could include permanent road closures, locked or manned gates, or signs. In some cases, merely requiring that the point of access be hidden from the public may be adequate and may still leave a road or trail open for use by emergency vehicles and others. Where vehicular access is the problem and pedestrian access is acceptable, the zoning code or public works standards might require that minor roads be converted into trails (Sikorowski, Bissell, and Jones 1986, x28-x29). Again, because the appropriate level of access depends on the location and layout of development, it is usually a site-level tool.

Other development standards. Special zoning regulations can be drafted to address numerous other development factors that affect wildlife. For example, window-well covers might be required at ground level in order to prevent small animals from falling into areas from which they cannot escape.

Developments in rural areas might be required to implement garbage management standards so that the introduction of people into an area does not result in added opportunities for wildlife to scavenge for the food that humans throw away. Examples of garbage management techniques include requirements that no garbage be placed outside a primary or accessory structure or that all garbage be disposed of in a single, well-secured, odor-proof building serving an entire development and located far from habitat areas.

Finally, it may be necessary to adopt special standards restricting noise or nighttime noise in sensitive habitat areas. Sage grouse, which are periodically considered for listing as a threatened species, are particularly sensitive to noise. Noise standards can be adopted as a performance standard (such as "no more than X decibels as measured at the edge of the habitat area") or by explicitly prohibiting the activities that create unacceptable levels of noise (such as all-terrain vehicle use, hunting, or wood cutting).

Phasing of development. In some cases significant wildlife benefits can be gained by requiring new development to be constructed in specific phases. If the species to be protected can adjust to the presence of humans nearby, a phasing strategy might require that the first stages of development occur far from the prime habitat area, so that the animals are not presented with a dramatic disruption of their habitat. Instead, construction can begin far away and proceed towards the habitat area with development densities declining as construction gets nearer to the buffer area or habitat. If the species to be protected is unable to adjust to nearby development, it may still make sense to require construction to begin far away from the prime habitat and corridor areas in order to allow the animals time to find alternative habitat areas on their own.

Controls on construction activity. Any zoning regulation that involves the need to treat sensitive areas carefully should address not only the desired outcome, but also the rules that must be followed during construction activity. Even when carefully crafted standards are being implemented by a cooperative landowner or developer, a few careless activities during the construction phase can destroy the habitat that was to be protected. Construction controls may need to address:

1. prevention of accidental cutting of trees or vegetation;
2. restrictions on excavation near roots or root masses;
3. limitations on severe grade changes near the vegetation or in mating or calving areas;
4. restrictions on dumping of construction materials or toxic materials near important vegetation or other cover;
5. limitations on the use of fires to clear vegetation prior to construction;
6. limitations on the duration or hours of construction;
7. limitations on timing of construction to avoid critical times for the wildlife, such as calving periods;
8. limitations on the number of project personnel or construction vehicles on site at any one time through the use of transportation pools or staggered shifts;
9. restrictions on construction personnel access to wildlife areas; and
10. speed restrictions on access roads (Sikorowski, Bissell, and Jones 1986, x22-x24).

Integrated approaches. When considering a zoning approach to habitat issues, it is useful to use an integrated approach and to ensure that other regulations reinforce the new zoning provisions. For example, design standards for development need to be modified to include wildlife considerations. Stormwater management ordinances may need to reflect water-quality controls in natural areas that support wildlife. Other sensitive lands regulations may be needed to implement or reinforce a wildlife protection plan, such as scenic highway controls, river corridor protection, and steep slope protection.

In addition, when drafting new zoning regulations, it is always important to keep in mind the ability of the community to enforce the regulation and the cost and complexity of doing so. A sophisticated ordinance carefully targeted to achieve subtle goals is meaningless if the city or county does not have personnel who can and will enforce it or the budget to pay for the extra effort involved. Often, a simple zoning requirement can be as effective as a complicated clause and will require much less effort.

Special Overlay Districts

Overlay zones are special zone districts that supplement, but do not replace, the basic zoning regulations applicable to a property. They are a useful tool when an area containing hazards, sensitive lands, or unique opportunities crosses several different standard zoning districts. Overlay zones are becoming a popular and effective method of protecting wildlife habitat and natural resource features for larger areas that include several underlying zoning districts. An overlay zone effectively eliminates the need to revise the regulations for each zoning district. Instead, it superimposes additional regulations specifically targeted to protect important physical characteristics of the land.

The most common example of overlay zones involves floodplains. Many local governments adopt floodplain overlay zones that map those areas of the community subject to flooding and require that development in such areas meet certain standards over and above the standards imposed by the basic commercial, industrial, or residential zone district that already apply to the property.

Overlay zones that have particular importance for habitat protection are those that include provisions regulating:

- protection of vegetative cover, including trees;
- setbacks from sensitive areas such as wetlands and streams;
- percentage requirements for open space preservation; and
- avoidance of prime calving, nesting, and other critical areas.

As a wildlife habitat tool, overlay districts have several advantages. They allow local governments to tailor regulations to specific issues that are relevant to a discrete, mappable area. Since they do not affect the underlying zoning governing permissible densities and uses, they avoid the need to reopen old debates in those areas. The can also be drafted to reflect a balance of different goals, such as environmentally compatible development and open space protection. At the same time, overlay zoning has some drawbacks. If the terms of the zone are complicated, it may require skilled staff to implement and enforce them. Some residents will see them as adding a layer of complexity to development approval processes. In general, overlay zones are used to address land characteristics that extend across a wide area or a variety of properties and are therefore usually considered a landscape-level tool.

Sensitive lands. An increasing number of cities and counties are adopting special overlay regulations to protect sensitive environmental areas. For example, Park City, Utah, recently adopted overlay regulations to protect a broad range of environmentally sensitive features including wetlands, stream corridors, steep slopes, ridge lines, and view corridors. In 1994, Summit County, Colorado, adopted a special overlay district and regulations stating that the county "seeks to fully protect wildlife habitats within the wildlife overlay zone from the significant adverse affects of development." The ordinance includes detailed definitions of what constitutes "significant adverse

Environmental Resource Overlay Zone: Tucson, Arizona, Mountain Plan

One good example of the effective use of overlay districts for wildlife corridors comes from Tucson, Arizona, where natural resources are both limited and fragile because of the arid climate (Evans 1990). The Tucson area has lost 90 percent of its riparian vegetation through grading, bank protection, channelization of washes, and other flood control measures. Natural drainage corridors provide wildlife migration corridors between the Tucson area and the nearby Saguaro National Monument. In drought periods, wildlife wander up the drainages in search of food and water and encounter problems because of interactions with the urban environment. Problems stem from direct human impact, such as noise and pets, and from the loss of biodiversity and gene pool interaction because migration routes have been cut. Tucson recognized the need to protect the wildlife and in 1979 created the Tucson Mountain Plan that established a buffer area around a portion of the national monument, even though the city boundaries did not reach the monument.

Tucson adopted an environmental resource overlay zone ordinance in 1990 that was designed to protect the natural vegetation along washes originating in the national monument and mountain park areas. An important element was to maintain the natural vegetation in place because revegetation does not compensate for the ecosystem loss, especially in the arid desert climate. The ordinance includes tough restrictions but is geared to allow development that is compatible with the presence of wildlife, such as the strict protection of areas near washes. It allows revegetation if temporary encroachments are necessary. The approach is generally to encourage working with the natural resources so that wildlife is not driven away as development occurs in sensitive areas. The ordinance applies to all lot sizes and all types of construction permit applications.

Another feature that makes the ordinance effective is an option for developers that eliminates the requirement of a study of riparian resources if all development is outside of the 100-year floodplain. In Arizona, the 100-year contour can be quite wide, but simply leaving it alone substantially complies with the objectives of the ordinance. The ordinance has also been effective because it applies to both public and private projects. The city has also discontinued drilling wells for groundwater near the designated washes. The overall success of the ordinance can also be attributed to the project size because the protected washes represent an area large enough to effectively function as wildlife habitat. The Tucson resource overlay zone ordinance provides a good example of a landscape-scale protection tool.

effects" of development and contains detailed provisions allowing the county to require a wildlife impact report from the developer either at the start of the application process or later if available information is not adequate to make a decision. The Summit County ordinance is comprehensive, flexible, and relatively short, all of which increase its utility and clarity.

Wildlife corridors. A second popular use of overlay districts is to designate and protect corridors that serve as migration routes and provide continuous strips of habitat. They can also provide important aesthetic and recreational benefits to the community (Lyle and Quinn 1990). Because of this important overlap of wildlife and human benefits, the community may be able to support wildlife corridors without understanding the full ecological importance of open space preservation. Care should be taken not to plan for recreational access or trails, however, in areas where that will compromise wildlife goals. Not every corridor needs to be a hiking or biking trail. Because wildlife corridors need to be relatively continuous between patches of habitat in order to be effective, they are a good landscape-scale protection tool.

Voters often think of greenways and corridors as parks and trails, but, for wildlife, a corridor can also be an undeveloped parcel, a drainageway, or a utility right-of-way. A carefully designed overlay can protect existing and natural features that promote species richness and diversity. They can also facilitate cooperative planning with other local government functions, such as designing drainage and flood control systems. The important underlying objective is to minimize habitat fragmentation by creating or enhancing ecological connections between larger wildlife habitat areas. The protection of wildlife corridors and greenways can produce measurable results in a short time with a minimum of inventory and other staff-intensive procedures. Those initial positive results may also encourage local officials to pursue additional protection measures.

Often, the overlay zone requires minimum setbacks from known wildlife movement areas or riparian areas. Wildlife corridors can also be accomplished in conjunction with other projects. For example, a utility corridor through a forest area could be cut to provide a transition ecosystem and be more aesthetically pleasing than the traditional clear-cut swath. Flood and drainage control projects can use existing vegetation instead of replacing it with concrete. Stormwater management can be planned to support wetlands and riparian vegetation. Many other overlapping objectives exist within any local government system and can be developed through interagency communication. In addition, certain uses can be prohibited or converted into conditional uses in an overlay area.

A greenway overlay district needs to be tailored to prioritize wildlife habitat needs while accomplishing other purposes (Salwasser 1986). The more general objective underlying greenway and corridor development is creating species diversity. While this is usually a positive goal, under certain circumstances, it may not be totally desirable. For example, an ecosystem for a disturbed species could be further harmed by a corridor that would allow natural predators to have ready access to the area. Special considerations need to be made in some instances to protect species richness rather than diversity. These and other potential issues can be resolved through the principles outlined in Chapter 2.

Agricultural and Open Space Zoning

Zoning and subdivision ordinances commonly require minimum lot sizes. In suburban single-family residential areas, minimum lot sizes typically range from one-quarter to two acres. To preserve agricultural areas, forests, wetlands, floodplains, and other types of wildlife habitat, some communities have adopted a variety of special agricultural land and large-lot zoning programs that require larger minimum lot sizes. In addition, many of these ordinances increase the requirement that a specific percentage of each parcel must remain in open space. Lot-size controls are generally considered to be site-level controls.

A few communities have adopted exclusive agricultural zoning, which has proven to be quite effective in protecting farmland. To the degree that the community wants to protect types of wildlife habitat that are found in and around farming operations, this can be an effective wildlife tool. Generally, such zoning includes a large minimum parcel size (often 160 acres or greater), the exclusion of all nonfarm land uses, and other restrictions, such as limits on the number of building permits in the zone. Again, because they are usually aimed at large areas of farm or ranchland, agricultural zoning is a landscape-scale tool.

In many cases, however, wildlife habitat does not overlap with agricultural areas, and agricultural zoning will not be appropriate. In such cases, large-lot zoning may be a more direct tool for protecting habitat. In this approach, communities establish a large minimum lot size. For example, many Midwestern jurisdictions in Illinois, Michigan, Minnesota, and Wisconsin have required minimum lot sizes of 160 acres and more. In Weld County, Colorado, agricultural districts require minimum lot sizes of 80 acres per dwelling unit.

Large-lot zoning provisions may come in a variety of forms. So-called "quarter-quarter" zoning allows each landowner one buildable lot per 40 acres of farmland. Once the allowable number of lots have been developed anywhere on the property, no more construction is allowed. This approach works best in rural areas with only moderate growth pressure and larger farms, and is used extensively in the rural areas around Minneapolis/St. Paul.

In contrast, sliding-scale zoning decreases the number of residences allowed per acre as the parcel size increases. Thus a 10-acre parcel may be allowed one residence, a 40-acre parcel only two, and a 160-acre tract only three units. Sliding-scale zoning has shown to be effective in agricultural areas that are under development pressure. It allows some development to occur but still preserves some farmland, particularly larger parcels. Adequate buffers must be established between agricultural and residential uses.

Large-lot zoning has several features that work well to protect habitat. It prevents the development of large

tracts of open spaces and agricultural areas. In addition, it may reduce inflationary land speculation by reducing the prospects for easy conversions to higher-intensity, nonagricultural uses. It is also relatively simple to administer and involves little cost to government. On the other hand, large-lot zoning can be harmful to wildlife habitat protection if it encourages valley floors or watersheds to be broken up into checkerboards of individual lots that ignore habitat values. Communities that use large-lot zoning techniques to reduce overall densities should generally offer the alternative of clustering the same number of homesites in portions of the area without high habitat value and should consider offering a density bonus for such clustering. It will often be more economical and marketable for a large landowner to create 10 smaller homesites near existing roads and utility systems than to create 10 large lots scattered across a valley. This type of development will also have less impact on wildlife. In addition, communities that pursue large-lot zoning should ensure that the standards they adopt allow for some economic use of each parcel of land.

Performance Zoning

One alternative to traditional zoning is performance zoning, which regulates development primarily by limiting development impacts rather than densities or uses. Such ordinances may target either a single type of impact or a broad range of impacts (e.g., traffic generation, pollutant emissions, stormwater runoff, and development of open space). Developments that meet these standards are allowed regardless of the whether they are residential, commercial, industrial, or institutional, but even low-density developments that fail to meet the standards are prohibited. While performance zoning regulations have been used since the 1950s, they have become increasingly popular as local governments have realized that the impacts of development are relatively unrelated to the category of land use in question.

In the area of wildlife protection, performance standards may be expressed in terms of minimum open space ratios, maximum vegetation disturbance limits, maximum noise or glare limits, minimum contiguous landscaping standards, or similar standards. Since habitat protection focuses on the impact of development on critical areas, performance zoning is basically well suited to wildlife protection.

Sophisticated performance zoning ordinances targeting multiple impacts may incorporate point systems. Development proposals are assigned point values for their ability to minimize a variety of impacts, and all development proposals must achieve specified minimum scores. Breckenridge and Boulder, Colorado, are examples of communities that have embraced point systems, with emphasis on protection of environmentally sensitive areas and promotion of high-quality development. Performance zoning may either supplement or replace traditional zoning regulations. Thus, an overlay zone district might incorporate performance standards rather than specific development requirements. Communities that choose the performance approach, however, should make a commitment to careful measurement of individual impacts of development.

Performance standards have several distinct advantages over traditional zoning in some circumstances. They provide opportunities for developers to design innovative layouts that can accommodate development while attaining wildlife goals. Performance systems do not presume that the solution contained in a set of physical zoning regulations is the only way to achieve the community's goal.

In other circumstances, however, performance zoning can have disadvantages. It cannot prevent improper location of development when the problem is caused by a subjective factor that cannot be measured. Moreover, performance zoning systems often require sophisticated skills to measure different impacts on wildlife protection and may require additional staffing or consulting services in order to work properly. In addition, the impacts of development on wildlife are often incremental. Under detailed performance zoning ordinances, planners must be able to understand and evaluate complex studies containing technical analyses and projected impacts so as to exercise informed discretion in allocating points and requiring impact mitigation measures. Often, local staff need to know as much about a technical field of planning as the consultants who prepare the studies measuring anticipated impacts. In cases where the incremental impact of each development is small, but the collective impact of all developments is large, performance zoning may be poorly suited to wildlife protection. Instead, it may be simpler for the community to adopt an objective development standard (e.g., a setback or spacing requirement) to minimize the incremental impacts of each construction project. Since the philosophy and results of performance zoning emphasize impacts on a specific species on a specific site, it can be considered as a site-level control.

Subdivision Review Standards

In contrast to zoning regulations, subdivision approval standards address primarily the size and shape of lots that can be made available for development and the amount of infrastructure that must be installed before development can proceed. Although originally designed to protect consumers from the sale of substandard or undevelopable lots and to protect the public from low-quality development, subdivision standards have expanded to include many restrictions aimed at controlling the impacts of development. Many controls that could be included in zoning regulations can also be addressed in subdivision controls, and vice versa.

In order to protect wildlife habitat, for example, subdivision standards could require the use of large lots to limit the number of people living in the area or could prohibit the creation of lots in sensitive areas. In addition, many modern subdivision ordinances impose strict buffering requirements in an attempt to protect undeveloped areas. Subdivision regulations could also include standards requiring that storm drainage be managed to promote riparian vegetation where that is

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Many snakes are collected for live specimens and food, upsetting the ecosystem by removing these key predators.

desired or to avoid disturbing desert vegetation when that is important to the species.

Similarly, lot size and shape regulations could be structured so as to minimize the number of different lots that are laid out along an important drainage or migration corridor because human activity is often proportionate to the number of houses in the area.

While a public policy to restrict land subdivisions in an entire valley or watershed would be a landscape-level tool, the drafting of specific subdivision standards to protect habitat values is a site-level control.

Some state statutes explicitly authorize county governments to require landowners to dedicate a portion of their land as future school and park sites as a condition of development. The U.S. Supreme Court has required that these dedications be roughly proportional to the impacts of the proposed development. Local governments have considerable latitude to designate which land should be designated for future parks and to decide whether the appropriate park for that area should be an active or passive area. Accordingly, cities, towns, and counties can use their subdivision powers to require the dedication of habitat areas as open space to be used for passive activities. This topic and the landmark case of *Dolan v. City of Tigard*, 114 S.Ct. 2309 (1994), which sets constitutional standards for land dedications, are discussed in more detail in Chapter 5.

Sanctuary Regulations

In addition to zoning and subdivision-type controls, many local governments have discovered new and unique tools that will help to protect wildlife habitat. Although most of these solutions could be included in a zoning or subdivision ordinance, they are sometime adopted as a special permit requirement or a general policy of the government.

One increasingly popular tool is the creation of legislatively adopted "sanctuaries" for existing types of land use. Many agricultural areas encounter difficulties when new development locates nearby. The problems begin when relatively low land values attract residential or commercial development. After construction, new residents find that the preexisting agricultural uses emit odors and stir up dust. These issues lead to conflict, often involving expensive litigation, and in many cases the initial users leave the area to seek new locations to avoid such conflicts and expenses. When the original agricultural area served as wildlife habitat, this leaves the habitat open to development. Where local governments wish to retain agricultural and wildlife uses, they can create sanctuaries that prevent the encroachment of incompatible uses. "Right to operate" provisions in such sanctuary zones immunize local farmers or ranchers against nuisance claims, rezonings, or other pressures to require changes in operations that would be detrimental to the farm or ranch, and they might lead it to stop operations.

The Colorado General Assembly has adopted a variation of this protection against nuisance claims by specifying that an agricultural operation cannot be defined as a nuisance. More specifically, "an agricultural operation is not, nor shall it become, a private or public nuisance by any changed conditions in or about the locality of such operation after it has been in operation for more than one year." Local ordinances that define agricultural operations a nuisance or provide for their abatement as a nuisance are void (C.R.S., Sec. 35-3.5-102).

Care should be taken in drafting sanctuary protections, however, to avoid making them so tight that they exclude all other uses. If alternative uses are prohibited, there may be increased pressure to rezone for development rather than move to alternate, less-intensive, permitted uses when market forces render the farming or ranching operation infeasible. Because they are generally adopted as a policy applicable to an entire county or a large area, sanctuary regulations are a good example of a landscape-level tool.

An Overall Growth Management System

Protections for wildlife habitat can also be integrated into overall growth management systems through the use of urban growth boundaries, targeted growth strategies, and capital improvement programs. Again, because these tools generally address growth patterns in an entire jurisdiction, they are good examples of landscape-scale protection tools.

Urban growth boundaries. The use of growth boundaries allows cities to guide new development patterns by directing urban services to such areas and withholding them from others. In particular, communities with urban growth boundaries can ensure that those boundaries do not include sensitive habitat areas. If they do, the city or town may want to rethink where it wants to install infrastructure so as to avoid habitat areas that it wants to protect.

The regional government for the Portland, Oregon, metropolitan area has delineated an urban growth boundary administered by local governments in compliance with state legislation. This program has proven generally successful in confining growth to the areas within the boundary. Within the boundary, development has often bypassed previously "urbanized" areas and located in outlying "urbanizable" areas (defined as available and suitable for urban development upon the extension of urban services), but the program has been fairly effective at containing leapfrog development, preserving more outlying areas for agricultural and other less-intensive uses, and maintaining order in metropolitan growth patterns.

Some communities have established urban growth boundaries even without a statewide mandate. The best known example in Colorado is Boulder, which has delineated boundaries for the extension of urban services and has worked with Boulder County to channel growth to areas adjacent to already developed areas, thus precluding development and costly service extensions in the mountainous areas bordering the city. A number of cities in Larimer County, Colorado, including Loveland and Fort Collins, have drawn urban growth area boundaries.

Targeted growth strategies. Another similar approach is that of designating development areas to which new growth is targeted within a region. Again, a targeted growth system could reduce development in large areas of a county or region where sensitive habitat areas exist. One recent example comes out of the MetroVision 2020 Task Force of the Denver Regional Council of Governments. As an alternative to dispersed development patterns that may result as the region adds a predicted 900,000 people over the next 25 years, the MetroVision 2020 Task Force has recommended consideration of development of satellite cities where growth would be channeled. These satellite cities, which could be existing communities or new planned communities, would be physically separated from the central urban area by open space or undeveloped land. Most of the new growth would be directed to existing satellite communities with the capacity for growth, including Castle Rock, Bennett, Evergreen, Brighton, Erie, Longmont, and Idaho Springs. Other urban growth would be limited to existing cities and already approved master planned communities. In some cases, this would tend to preserve contiguous areas of habitat and/or wildlife corridors between the settlement centers.

Several western U.S. counties have adopted the targeted development approach as part of their overall land-use management system. For example, Larimer County, Colorado, has entered into several intergovernmental agreements with some of its constituent cities that target new development to already built-up areas, such as Fort Collins and Loveland. However, not all municipalities in the county have signed such agreements, and thus some growth has occurred in several smaller, outlying communities with limited infrastructure and services. Even where targeted growth agreements have been signed, they often do not take into account wildlife concerns.

In general, targeted growth arrangements cannot be effective as habitat protection tools unless they involve the cooperation of at least the county government or a regional planning area. Although individual cities and towns can protect limited areas within their borders, efforts to protect nearby areas will always be subject to development permitted by the county or an adjacent city or town.

Capital Improvements Programming. In addition to urban growth boundaries and targeted growth schemes, local governments can incorporate wildlife protection goals into their capital improvements programs and budgets. In many jurisdictions around the country, a strong relationship has been shown between the presence of infrastructure and development of the land. Local governments can effectively discourage the development of habitat areas by not planning for or budgeting for water or sewer lines or roads in the area, and by discouraging the creation of special districts to finance those elements of infrastructure. Since the creation of all water, wastewater, and metropolitan districts is subject to the approval of either the county or city government in which it is located, local governments can prevent the creation of infrastructure financing districts by withholding that approval.

A Density Bonus Program: The Routt County, Colorado, Land Preservation Subdivision Process

In 1995, Routt County, Colorado, enacted a density bonus intended to encourage landowners to submit their property to the county's subdivision procedures instead of opting for an exempt 35-acre tract division. After extended negotiations between county staff, environmental interests, and ranchers, a compromise was reached in which the county created an expedited review procedure for large tract subdivisions. Under the Land Preservation Subdivision process, a landowner voluntarily agrees to submit a proposed subdivision to the county government for review on six issues: preservation of agricultural lands, visual resources, setbacks from natural features, infrastructure, geological hazards, and wildlife habitat. Areas not designated for development must be preserved as open space through development agreements or other techniques, and the landowner is offered an incentive of one additional buildable lot per 100 acres of land preserved from development. In addition, the procedure calls for the county government to complete its review within 12 weeks. The procedure remains optional, however, and those landowners who still wish to pursue 35-acre subdivisions may do so without county involvement.

Coordination with Other Land Development Codes

Wildlife habitat protection does not exist in a vacuum. It must be consistent with, and reflected in, the other local government land-use control systems. In addition to the types of zoning, subdivision, and growth management controls described above, wildlife protection standards must be coordinated with street and access codes, annexation policies, and environmental control systems. Street design codes should be drafted to allow smaller and less disruptive streets near wildlife areas, and to allow alternative

access patterns directing traffic movements to less-sensitive areas. Local annexation policies should reinforce habitat protection by providing that annexation or development agreements must be consistent with wildlife protection plans and regulations, and to discourage the extension of utilities into sensitive areas. Unless all of a city's or county's land-use controls work together to treat habitat areas in a consistent way, they will probably not be effective.

INCENTIVES

Incentives are a second important set of tools for implementing habitat protection. Many local governments that are reluctant to adopt land-use regulations are more willing to adopt incentives. With careful attention, incentives can sometimes be as effective or even more effective than regulations. When crafting an incentive approach to protecting wildlife habitat, however, it is important to ensure that the incentives offered to enhance wildlife do not undermine other important community goals. Once again, habitat protection does not exist in a vacuum, and local government incentive programs need to be integrated as carefully as its regulatory programs.

Density Bonuses

Perhaps the most common form of incentive is development density bonuses. In these programs, the local government offers landowners a chance to construct more residential or commercial development on their land if they will take certain actions to promote wildlife. The required actions can include locating development outside of prime habitat areas, implementing groundwater runoff controls to avoid erosion into streams used by wildlife, planting specific types of vegetative cover that attract (or repel) wildlife, or avoiding glare and traffic movements near wildlife areas or corridors. The amount of additional development density allowed should vary depending on the importance and difficulty of the landowner's actions to promote wildlife, but bonuses are commonly in the range of a 25 to 50 percent. Larger bonuses may create fairly significant development impacts and may raise questions about the rationale behind the base zoning density. Care should be taken to avoid granting incentives that result in additional wildlife impacts that are greater than the benefit gained by the landowner's habitat protection measures.

Clustering

A second form of incentive is cluster zoning, which provides flexibility for developers to construct buildings in clusters while remaining within the constraints of overall average density restrictions. Under cluster zoning, maximum densities are calculated not for individual lots, but for overall development areas. Rather than requiring uniform intervals between building sites, such ordinances often waive minimum lot size and dimension requirements to allow tight clusters of buildings in some areas, with other portions of the parcel set aside for open space or habitat use. Often, the local government imposes a requirement that clustering cannot occur unless most or all of the land that is left undeveloped is protected from future development through the use of a conservation easement or deed restriction. In other cases, the government reserves site plan review authority over the clustered development to ensure that the layout, visibility, and design do not create negative impacts on the area. Cluster zoning concepts are widely used to permit development while setting aside areas for the preservation of sensitive areas, such as forested areas, wildlife habitat, wetlands, agricultural areas, and other such resources. While some cities and counties allow clustering throughout their jurisdiction, others target the tool where it is particularly important to protect sensitive land or habitat.

Cluster provisions have several advantages to both wildlife planners and the public. They provide flexibility for planners and developers to design innovative development layouts that can accommodate development as well as environmental or land preservation objectives. They can also preserve significant tracts of wildlife habitat while still protecting land values. On the down side, the successful administration of cluster ordinances requires a sophisticated planning staff that is able to exercise discretion in determining appropriate and feasible development layouts. In addition, clustering may not be an appropriate tool if all of the parcel is in a sensitive habitat area or if the community needs to encourage shifts of development density between different ownerships, rather than within an ownership. In such cases, a transferable development rights (TDR) system (see below) may be a better approach. Finally, if a substantial number of cluster developments are approved in close proximity to one another, the resulting development may have the same impacts as suburban sprawl and may significantly change the character of an area.

Cluster Development Provisions: The Montgomery County, Pennsylvania, Land Preservation District

One good example of cluster development comes from Montgomery County, Pennsylvania. The intent of the Land Preservation District in Montgomery County is to preserve open space and natural lands on development parcels of 10 acres or more. The regulations permit development of compact residential areas that are carefully located, designed to reduce their intensity, and preserve agricultural lands, so long as a minimum of 75 percent of the site is protected as private open space.

Transferable Development Rights (TDRs)

A third form of development incentive for habitat protection is density transfers, which are usually

implemented through a transferable development rights (TDR) program. Density transfers involve the shifting of permissible development densities from unsuitable development areas to more appropriate sites—in this case from important habitat areas to less important areas. Under this concept, the local government studies and designates appropriate "sending" and "receiving" areas on a map. A participating landowner in a sending area transfers development rights to another landowner in a receiving area, who increases his or her development rights in that area beyond what would otherwise be possible. In general, the price of development rights being transferred is left to the private market, and the local government does not try to affect that price one way or another.

Transferable Development Rights in Montgomery County, Maryland, and the New Jersey Pinelands National Reserve

The Transferable Development Rights (TDR) concept has been applied in a number of jurisdictions. Montgomery County, Maryland, has used a TDR program to protect agricultural lands against strong urban growth pressures. The Montgomery program involves three elements: (1) the identification of a "sending area" that includes the county's best agricultural lands; (2) downzoning in the sending area from five-acre minimum lots to 25-acre minimum lots, with landowners retaining TDRs equal to their original five-acre-lot development rights; and (3) the identification of a "receiving area," in which landowners may augment their development rights with additional rights purchased from the sending area.

One of the most successful TDR programs for natural area protection has been employed in the Pinelands National Reserve in New Jersey. To date, more than 10,000 acres have been preserved, and the TDR market provided by the program was recently held to be an important consideration in rejecting a takings challenge to the Pinelands' strong system of regulatory controls designed to protect existing agricultural lands and open space.

TDR programs can be designed to be voluntary in the sending and receiving areas, mandatory in both areas, or voluntary in one area and mandatory in the other. The effects of the tool will depend greatly on which option is chosen. In addition, the success of the program in protecting wildlife habitat will depend in large part in the careful balancing of opportunities in sending and receiving areas, so that excessive sending areas do not flood the market and restrictive receiving areas do not limit the usability of the credits for sale. Importantly, TDR programs seldom work if the underlying zoning is too generous with development density because neither potential buyers nor potential buyers of transferable rights have any incentive to participate.

TDR systems have several important advantages as land regulation tools to promote wildlife. They help alleviate pressures and incentives to subdivide or develop land by offering some means for landowners to recoup property values while maintaining low-density land uses. In addition, where land-use regulations impose low-density restrictions on development rights, TDRs restore the value of those rights to the landowners, thus providing a shield against takings claims. Because TDR programs usually aim to move densities from one large area of the community to another, they are best considered as a landscape-scale tool.

Grants and Loans

A fourth form of local government incentive to promote the protection of important habitat is the use of grants and loans. Local governments can make grants or loans to support the acquisition or management of important wildlife areas, to promote wildlife education, and complete wildlife inventories. Or the local government can apply to the state and federal governments or to nonprofit foundations and associations for money to fund such grants.

In addition, grant and loan programs can sometimes be used to supplement regulatory tools. At the same time that some communities change their regulations regarding land development, they make financial resources available to help landowners cover the added cost of complying with those regulations.

Grants and loans have several advantages as a habitat protection tool. Their effect can be direct and immediate. Development proposals can be changed, information can be collected, and education efforts can begin. In addition, public loans and grants can often be used as matching funds to obtain additional private investment or financing. A little seed money can go a long way towards a long-term financing solution. They can also make the adoption of new regulations more politically acceptable by giving the public an easy means to comply with them. Revolving loan funds can go further by allowing a fixed amount of government seed money to be used over and over again as the recipients repay the loans.

But there are disadvantages, too. Grant programs can be expensive and must compete for attention with other local government priorities. Loan funds can be less expensive in the long run, but take staff time to administer and enforce. In addition, if they are not defined carefully, grant and loan funds can encourage dependency. Worthy programs can begin to expect regular financial help from the local government, rather than working on a more sustainable system of long-term financing.

Preferential Tax Treatment

A fifth form of incentives to preserve habitat is preferential tax treatment.

Use assessments. Where potential profits motivate landowners to convert low-density land uses to higher intensities or to convert important habitat areas into intensive development areas, preferential tax programs can counter these motives by providing incentives to maintain existing low-intensity uses. One of the most important forms of preferential taxation is current use assessments. Local governments levy real property taxes against the assessed value of property. Under standard practice, tax assessors determine value based upon the "highest and best use" of a property, which reflects the highest potential use of such property.

Current use assessments alter assessment practices by requiring assessments to reflect actual current uses rather than prospective potential uses. Where development pressures create higher property values and tax burdens, current use assessments provide tax relief to landowners who choose to continue agricultural, forestry, rangeland, or other low-density uses that are consistent with continued habitat value.

Another application of the current use assessment concept allows private landowners to contract with government agencies to restrict the use of their properties. Such agreements limit the range of potential highest and best uses, thereby decreasing the assessed value of the properties and providing tax relief to landowners who agree to such restrictions. Often, this can be done through a conservation easement or deed restriction as well as through a development agreement. Because use assessments are granted based on the use of a specific parcel of land, they work as site-level habitat protection.

Tax credits. Another tax incentive approach that has proven to be successful in preserving open space involves offering income tax credits for the value of approved conservation easements. Federal tax deductions are available for donations of qualifying open space or open space easements to nonprofit organizations. This tool is frequently used by private land trusts and is discussed in more detail below.

In general, preferential tax systems present an equitable way to encourage open space or low-density uses by requiring tax assessments to reflect current rather than prospective values. They also help accomplish land conservation goals without the use of regulations. On the other hand, most preferential tax systems cannot delay development pressure indefinitely. Potential profits from the development of habitat land can easily outweigh the benefits of a property tax break. Where there is no recapture provision, preferential taxes may reward land speculators and developers by lowering holding costs until the development market creates sufficient profit incentives for conversion to nonagricultural uses. Finally, such tax systems do create indirect public costs in the form of foregone tax revenues.

Since tax credits for easements depend on the specific parcel of land involved, they are primarily a site-level tool.

ACQUISITION PROGRAMS

One of the most effective ways of preserving wildlife habitat is to buy it. Local ownership often simplifies management decisions and provides a relatively permanent way to protect the habitat. Government acquisition strategies can be used effectively as a supplement to regulations, especially where control of the land is necessary to prohibit essentially all development in sensitive environmental areas or to prohibit general public access for recreational and other purposes. While regulatory protection programs must leave an economic use of the land for the owner, government ownership removes that obstacle because the government is essentially agreeing to use the land for noneconomic purposes. Thus, when communities believe that the only way to protect habitat is to prevent virtually all use of the area, they should seriously consider fee or development rights acquisition programs.

Ownership programs generally fall into two categories. First, some programs seek to buy the land itself. These are often called "fee ownership" programs. The second type of program seeks to buy the rights to develop the land into uses consistent with its role as wildlife habitat and are often called "sellback," "leaseback," or "development rights" programs. Local communities interested in obtaining land or development rights for habitat preservation should also think about incentives that may be available to induce the landowner to donate the land to the community or to a third party who will manage it. Often, such donations can be a way for wealthy landowners to obtain a valuable tax deduction. Among other things, the local government can also agree to name the protected habitat area in honor of the landowner making the donation.

Because acquisition programs focus on the need to acquire specific areas of land and the value of that land, they are often thought of as site-level tools. However, if the community pursues a consistent strategy to acquire lots of land or development rights in a defined habitat area, the result can be very effective landscape-level protection.

Fee Simple Purchase

Ownership of land includes rights of possession, access, exclusion, disposition, and rights to specified uses such as mining, hunting, or development. Where one party owns the entire bundle of these rights, that party owns the land "in fee simple." Acquisition of land in fee simple gives the purchaser full title to and possession of all rights associated with the purchased property, subject only to the constraints imposed by nuisance laws and valid public regulations, including zoning and subdivision. Fee simple ownership provides the simplest and most effective means of implementing habitat control because the government owns the land and controls its development, redevelopment, preservation, and access. Once the government entity assumes fee simple ownership, it has a broad range of options. It may reconvey selected interests in the land, restrict future uses of the land, lease the land, or otherwise control the bundle of property rights in a manner consistent with its habitat objectives.

The late 1980s and early 1990s were good times for local governments to be purchasing open space because the downturn in the economy in many places led to a

buyer's market for undeveloped and partially developed land. The Federal Deposit Insurance Corporation and the Resolution Trust Corporation were actively selling inventories of land obtained through savings and loan foreclosures and collapses. In addition, those banks and saving and loan associations that remained in business were often very interested in selling their inventory of "real estate owned" properties obtained through foreclosures. Although the upswing in the economy in the mid-1990s has dramatically reduced the number of below market sellers, local governments should continue to monitor the activities of banks and the federal government as land sellers and should be ready to take advantage of opportunities to acquire prime habitat parcels.

One drawback of fee purchase programs is that they tend to be expensive. Land itself is often expensive to buy. In addition, the city or county needs to take into account interest on any debt that was issued for the purchase, foregone interest on alternative investments, foregone taxes, and maintenance costs for the land. Managing, maintaining, securing, and enforcing public access restrictions on fee ownership land can be a very expensive proposition. Over a period of years, management costs may actually exceed the original purchase cost of the land. For that reason alone, many jurisdictions decide not to purchase land in fee simple and instead concentrate on controlling the development potential of the land.

A second drawback of fee simple purchase is that it may make it more difficult to prevent public access to the land. Once land is owned by the local government, many citizens assume that it is available for their use as needed. Since public use may seriously compromise the value of wildlife habitat areas, the right of the public to use some areas must be restricted if the land is to serve its purpose. If the nature of the species and habitat involved are such that human presence must be kept to a minimum, it may be more useful to consider the acquisition of easements or development rights to achieve wildlife goals. Such techniques can help control the owner's use of the land in order to protect its habitat value while leaving the basic ownership of the land in the hands of a private party who can exclude the public from the land.

A number of state and local sources may be able to fund acquisitions of land to be used for park or other open space purposes. A second source of purchase capital is local tax revenues.

Five Effective Land Purchase Programs in Colorado

The City of Boulder has the oldest open space program in Colorado and has used a specially earmarked .73 percent sales tax to raise $100 million and buy 25,500 acres of dedicated open space in a greenbelt around the city. The sales tax revenue stream now produces about $15 million each year. Another 8,000 acres of mountain parks in the Boulder foothills have been separately set aside through the parks and recreation department. Some of the Boulder open space land is leased to farmers to maintain the agricultural uses. Other parcels are maintained as natural areas, allowing passive recreational uses, such as walking, bicycling, and horseback riding.

Boulder County implemented a land purchase program in 1975. The program was originally funded through the county general fund and the state lottery funds, and has resulted in the purchase of 16,000 acres of land. Beginning with a budget of about $1 million, the appropriated funds grew to a $2.5 million acquisition budget and a $1 million operating budget in 1993. A new quarter-cent sales tax was approved in 1993 and has been used to fund a $34 million bond issue, two-thirds of which is already committed. Approximately 30,000 acres have been purchased through the Boulder County program. The current strategy is to purchase as many of the identified priority parcels as possible with the bond funds, then gradually move into more of a stewardship and maintenance role.

Jefferson County has had an open space acquisition program in place since 1972. Funded by a one-half percent sales tax that generates $22 million in annual revenue, the county has spent approximately $123 million to acquire 29,500 acres of land. The lands are used for a variety of purposes, including natural areas, buffers, and trail corridors. Open space funds are also distributed to eight cities in the county, with Lakewood receiving more than $13 million and Arvada receiving more than $11 million since 1972.

Douglas County initiated its open space program in November 1994 when it approved a one-sixth percent sales and use tax, part of which is shared with the municipalities within the county. During its first full year of operation, the program raised about $2 million. A nine-member Douglas County Open Space Advisory Committee makes recommendations on expenditures of the open space funds to the county commissioners. Recommendations to date have included a wide variety of projects, including both fee purchases and easement purchases, and have resulted in eight separate transactions protecting about 780 acres of prime open space. Half of the tax revenues are spent on administration, about 12 percent on parks and recreation facilities, and the remainder for open space and trails.

In November 1995, Larimer County voters approved an eight-year, one-quarter percent sales tax for open space acquisition and designated that 55 percent of the resulting revenues go to the cities and the remainder to the county. The sales tax is expected to produce about $6 million per year.

Integration into Park and Open Space Purchase Programs

Many communities already have a program in place for the acquisition of open space for parks and trails. Most often, such programs are included in the city, town, or county's regular capital improvements programming, where they must compete with other pressing needs for public investment. In other cases,

voters have approved a separate tax to fund a free-standing open space acquisition program that does not need to compete for scarce public monies. Where such programs exist, it may be possible to expand them to include the acquisition of important habitat lands merely by amending the list of eligible types of land and criteria for the selection of habitat lands. In many cases, this expansion would be consistent with the intent of the existing program and would not require the creation and funding of an open space program specifically designed for wildlife. In cases where open space purchase programs have been approved through voter referendums, however, great care should be taken to ensure that an expansion of the program is clearly consistent with the referendum approved by the voters.

transaction is to include a reverter clause in the deed providing that title will revert to the government in the event significant provisions are violated.

Boulder County, Colorado, for example, owns more than 1,000 acres of land that is leased back to farmers. Several of the landowners with whom Boulder County is currently negotiating purchases are requesting purchase and leaseback arrangements. Denver has leased much of the land purchased for Denver International Airport back to farmers to keep it in agricultural uses until it is needed for runway or airfield expansions. To the degree that continued agricultural usage is compatible with protection of the desired wildlife species, sellbacks and leasebacks can be effective site-level tools to reduce the costs of habitat acquisition programs.

Purchase and Sellback/Purchase and Leaseback: Some California Examples

The California Coastal Conservancy is charged with assisting in the protection of undeveloped coastal lands. It has a successful program that provides grants to land trust organizations to purchase agricultural and other land and then resell the land with conservation restrictions. Funded by the state, the experience of the program is that agricultural lands purchased at full market value can be resold with conservation restrictions that allow for agricultural and other open space uses at nearly the original purchase price. The cost of the program is thus minimized, and land is kept in productive use.

The California State Parks Department also has a successful purchase and leaseback program for agricultural lands in various areas of the state. In Santa Cruz County, an area with stringent land-use controls, the 2,300-acre Wilder Ranch was purchased by the state. Of the total ranch, 635 acres are leased to 11 farmers for agricultural purposes. The state maintains the remainder of the ranch for a variety of open space and recreational uses. The state parks department believes that the success of this and other similar projects helps dispel the myth of incompatible agricultural and recreational uses.

Sellbacks and Leasebacks

Once the government owns the land, it does not need to retain ownership of all of the "bundle of sticks" in order to protect wildlife habitat. It can use its position as the owner of the land to facilitate the rezoning of the land or to impose negative easements, deed restrictions, or development agreements, and then resell the land to a third party. This is known as a "purchase and sellback" transaction. Alternatively, a city or county government could purchase the property and then lease it to a third party subject to conditions and restrictions as provided in the lease. This is known as a "purchase and leaseback."

Negative easements impose restrictions upon the landowner's property rights but do not grant affirmative rights. The "purchaser" of a negative easement simply imposes a restriction on the land. For example, in the area of wildlife habitat protection, a negative easement retained by a local government when it resells the land might state that the new owner may not develop property, disturb vegetation, or increase or change stormwater flows in any way within a specified distance of a riparian corridor. The government must still monitor the land use, however, to make sure that the restrictions are being observed, or those restrictions could conceivably lose their legal enforceability through neglect. One way to help enforce the terms of a sellback

Purchase "Triggers": Options and Rights of First Refusal

Just as the local government may not need to keep ownership of the entire fee interest in land to achieve its goals, it may not need to purchase the property at all until an alternative use or sale of the land is contemplated. Purchase "triggers" apply the basic concept of purchase options in real estate transactions—they provide a means for a potential purchaser to "tie up" a property without actually buying it. By purchasing an option on property, a potential purchaser reserves the exclusive right to purchase the property within a specified time period or in the event that certain events happen. A related tool is a "right of first refusal," under which the local government entity pays for a first right to purchase a property if the property is to be sold. The buyer of a right of first refusal often does not need to negotiate a price in advance but is obligated to match a bone fide offer submitted by another potential purchaser. This avoids the difficulty of valuing habitat land now but does protect the seller against having to sell at a bargain price when there is a better offer from another potential buyer. Because right of first refusal programs leave the potential purchase price for the land to be determined by a third party, they may create problems for local governments that need predictable costs in order to

meet their budget constraints and funding cycles. To avoid this problem, local governments that want to tie down the price of a future purchase now should instead buy an option or execute a right of first refusal with a clear statement of the agreed price.

A third variation has been employed to protect federal reserve areas and national recreation areas from adverse development on private property inholdings. This is sometimes called a "Sword of Damocles" provision. This system has been used in Idaho's Sawtooth National Recreation Area, where regulations and design controls were imposed on private properties to preserve the natural setting of the area. Under this approach, the government agency devises a comprehensive land-use plan for the area and designates various zones for different uses and developments. As long as the landowner voluntarily agrees to comply with the plan and restrictions, the government's power to condemn is suspended. In Sawtooth, both the local government and U.S. Forest Service are involved in making the system work. However, if a use that is inconsistent with the plan is proposed or undertaken, the power to condemn is triggered, and the land can be brought into public ownership to prevent the incompatible development.

A Sword of Damocles provision could also be implemented under a local government's power to condemn land. If the proposed use of lands for habitat or buffer zones meets the definition of a "public purpose," the local government has the power to purchase the land through the eminent domain process. The government also has authority to agree not to use those powers as long as certain conditions are maintained.

One drawback with purchase triggers involves cost. While purchase in fee simple is costly by itself, the option or right of first refusal adds an additional cost. A local government could wind up paying first for the cost of the option and then again for the full purchase price of the land. Another drawback involves the cost of delay. The triggering events may not occur until development pressures increase, and by then land costs will also have increased commensurately.

Sword of Damocles provisions have similar advantages and drawbacks. They may also lower the market value of a property by discouraging purchasers and create opposition from present property owners. In addition, Sword of Damocles provisions are only as effective as the resolve of the relevant agency to exercise its condemnation powers and the availability of money that resolve to pay compensation awards—may waiver or the funding may fall short due to political or fiscal pressures.

Life Estates

In some cases, a town, city, or county may be able to achieve its wildlife habitat goals through the acquisition of life estates in important lands. Not infrequently, the owners of agricultural or ranch lands would prefer not to develop their lands and would like to see the farm or ranch remain intact as long as possible. However, many of these same owners would like to be able to pass their land on to their children for them to do with as they wish. For that reason, they are unwilling to grant easements or impose deed restrictions or covenants that would bind their children's use and disposition of the land. In those circumstances, and if prime habitat areas or corridors are involved, the local government may want to purchase a life estate in the land and lease the property back to the current owner at roughly the same cost. The terms of the transaction allow the government to control the use of the land during the owner's lifetime but terminate that control at the time of the owner's death. Even though the land could be put to incompatible use some time in the future, the purchase of a life estate can buy time for the local community to consider follow-up steps and/or to raise money for the eventual purchase of the property. Since life estates are negotiated for specific parcels of land, the purchase of a life estate is considered a site-level protection tool.

Easements and Purchases of Development Rights

Easements can be viewed as just a few of the bundle of rights that are included in fee simple ownership. They constitute severable interests in land. The severable nature of easements allows a landowner to convey or reserve specific rights associated with a property apart from the right to posses and use the land in general. By applying the law of easements, local governments can control land development without buying the fee simple interest in the habitat land itself. Easements and development rights programs are essentially programs enabling the local governments to pay landowners to forgo certain land development rights, and documenting the transfer of those development rights to the government.

There are two distinct types of easements. Positive easements grant someone else an affirmative right to use property in a specific manner or to interfere with the owner's otherwise enforceable property rights. A right of access across a neighboring property is a common example of a positive easement. In contrast, negative easements create restrictions upon the landowner's property rights. Negative easements do not grant affirmative rights to someone else, they instead restrict the actions of the owner. Particular restrictions vary according to their objective. In the field of wildlife habitat protection, they generally prevent the owner from doing those things that would disturb the wildlife or their environment. Whenever possible, easement donors should make habitat goals clear in the easement documentation so that the terms of the easement can be enforced if the landowner begins using remaining rights in the property in ways that undermine those habitat goals.

Timing plays a key role in the success of an easement or development rights program. Such programs should begin when development pressures are not so strong as to inflate the values of development rights and when the residual uses of the land remain profitable. Essentially, government should "buy low" so as to maximize its cost savings. Since the governments that purchase development rights usually have no plan to resell them in the future, most of these programs do not create development rights "banks" or TDR programs. The government simply retires the rights to prevent their future use.

Even though this acquisition option seems eminently logical, efforts to purchase easements or development rights face several obstacles that demand careful thought. First, development rights acquisition programs work only when the local government can identify which particular rights need to be purchased to protect the habitat value of the area. When the true need is to prevent all use of the land or to purchase virtually all of the rights to the land, the government should instead consider a fee simple purchase. Purchase of development rights will only be less expensive than a fee simple purchase if the landowner retains a meaningful economic use of the property. A second complication involves the effect of zoning upon valuation. The local government needs to decide whether it is willing to pay for the potential development value of the land even if the property is zoned for agriculture. To refuse to acknowledge the development potential of the land may result in the government offering purchase prices too low to interest sellers. To acknowledge development potential invites criticism that the government should not be paying for speculative values that could only be realized if the government was willing to change its current zoning.

In spite of these drawbacks, however, easements and development rights purchase programs are popular because the land remains in private ownership and subject to local property taxes, and because the costs of the program may be lower than fee purchase programs.

Common terms of conservation easements include bans on subdivision of the land, timbering, destroying vegetation, grazing, construction roads, mining, using insecticides or herbicides, excavation, or altering specific features, and limitations on human access (Sikorowski, Bissel, and Jones 1986).

Purchasing Development Rights in Light of Growth Pressures: King County, Washington

In the Seattle metropolitan area, King County, Washington, has administered a successful purchase of development rights program to preserve agricultural land in the face of metropolitan growth pressures. Drawing upon a $50 million bond issue, the program funds the county's purchase of development rights for properties facing development pressures with priority rankings determined in accordance with the intensity of such pressures. Participation in the program is voluntary for eligible landowners. Purchase prices are calculated as the difference between appraised value at the land's "highest and best use" and the appraised values as farmland. That formula reflects the development potential of the land, regardless of its current zoning. After purchasing the development rights, the county records restrictive covenants on the properties in the land records and limits development rights to 5 percent of the property's nontillable area.

Land Dedications and Impact Fees

Land dedications are conveyances of land from a private owner to a local government, either voluntarily or to offset the anticipated impacts of a proposed development. An increasing number of local governments are imposing land dedication requirements or fees in lieu of dedication as conditions for permit approvals. Many state statutes explicitly authorize governments to impose land dedication requirements or fees-in-lieu for parks and schools, and a large number of home rule municipalities impose similar requirements.

Where new development creates needs for increased public services and infrastructure (schools, roads, recreational facilities, etc.), this practice is intended to ensure that new development "pays its own way" by assuming these costs. Thus, where new development threatens to strain a community's recreational facilities, developers might be required to dedicate a specified number of acres for every 1,000 residents of a residential project. Since increasing development may put increasing pressure on existing habitat in the vicinity, it may also be appropriate to create a land dedication requirement to protect those areas. In the alternative, developers might pay a fee into a dedicated open space fund that would be used to purchase passive open space land and habitat open space land in the general vicinity of the project. Many statutes also give county governments the ability to approve the location of required park land dedications, and many home rule cities have similar provisions.

Taken together, these two powers may allow some communities to implement the acquisition of important habitat areas through dedications or fees in lieu of dedication at the time that land is subdivided or building permits are issued. While courts have generally been sympathetic towards exactions, these programs raise legal issues that are discussed in detail in Chapter 5.

Dedication requirements and fees-in-lieu often are strongly opposed by the development community, which prefers the use of general property taxes, public bond issues, and other traditional government revenue sources to fund infrastructure. Opposition may be particularly strong when the purpose of the requirement is to mitigate an impact on wildlife rather than to construct physical infrastructure to be used by people. The crafting and implementation of these types of exaction programs also require substantial staff

resources. In the initial development of the program, the government entity will have to address potential legal issues by devoting substantial resources to background studies so as to establish a firm legal basis for its program. Even when carefully calculated, impact fees may not cover costs of needed improvements unless set at very high levels that may have adverse impacts on the economic competitiveness of the community and housing affordability, and may not be as cost-effective as tax-exempt forms of financing such as municipal bonds.

The U.S. Supreme Court's ruling in *Dolan v. City of Tigard*, 114 S.Ct. 2309 (1994), indicated that courts will look carefully at land dedication programs for fairness to the landowner. Communities interested in adopting land dedication requirements to promote habitat protection should read the discussion of this important case in Chapter 5.

Instead of imposing a requirement to dedicate land per se, some communities have created impact fee programs. These programs collect pro rata fees from different landowners, pool them, and then use them to purchase open space or habitat lands. Even though a local government may not have authority to require land dedications for purposes other than schools or parks at the subdivision stage, it may have authority to impose a carefully calibrated impact fee to collect funds to be used to purchase areas of habitat directly threatened by the new development. Impact fees are a broader tool than land dedications because they can address development impacts that cannot be addressed through land itself. In addition, since the use of impact fees reduces the need for tax increases to pay for similar services, they are often popular with citizens of the community. Great care should be taken to calculate impact fees so as to be proportional to the anticipated impacts of the development on wildlife habitat in particular.

Where impact fees are used, however, new issues arise. Most importantly, impact fees must be spent so as to benefit the payor within a reasonable period of time after the payment. In general, governments that collect impact fees are expected to use those fees to build facilities that provide some type of service or benefit to the payor. In the context of wildlife habitat protection, this raises some interesting issues, since the "users" of protected wildlife are largely the public who enjoy the many benefits of living in an area where the species is preserved. Although the nearby landowners may enjoy a special benefit by virtue of the fact that buyers will pay more for land near wildlife, it may be hard to show that the benefit is qualitatively different than that enjoyed by the public at large. In addition, impact fees are usually paid at the time the land is developed and often at a late stage in that process. By the time the fees are collected, nearby habitat areas will also be under development pressure, and the price of acquiring the habitat may be very high. For all of these reasons, cities and counties that want to adopt impact fees to pay for wildlife habitat acquisitions should be careful to lay a strong factual and legal foundation for their actions and should be very careful to meet the constitutional standards described in Chapter 5.

Land Trades

Finally, local governments should always consider whether the most cost-effective way to acquire habitat lands may be to trade other lands owned by the government and no longer needed for their original purposes. In the course of time, many towns and counties discover that they have an inventory of land parcels in or near developed areas that the government no longer needs. Instead of selling those parcels on the open market, the government may want to consider a trade for habitat lands further away. In cases where the current owner of the habitat lands is holding it for future development, a potential trade for land nearer to water and sewer lines and market demands may be very attractive.

DEVELOPMENT AGREEMENTS

Often, local governments may find opportunities to protect quality wildlife habitat through negotiations with individual landowners at the time when specific development proposals are brought forward. The most flexible technique for doing so is a development agreement. Some state statutes allow cities and counties to enter into development agreements obligating both the government and the landowner to carry out certain actions in order to "vest" a preferred development plan for a period of time. Development agreements can give the landowner more certainty that the government will not act to delay or deny the development activity for a period longer than is defined in the statute. In return, the local government can ask the landowner to design and operate the proposed development in ways that will protect or even enhance the existing wildlife habitat on the property. Because they are negotiated on a project-by-project basis, development agreements can be an effective site-scale tool for habitat protection.

For example, a development agreement might include provisions requiring the landowner to:

- avoid construction activities in certain areas;
- time construction so as to avoid mating, nesting, and other sensitive times for wildlife in the area;
- phase the development of the site so that earlier low-intensity development helps to buffer wildlife from later, more intensive, development;
- limit the number of vehicles or workers on the site at any one time;
- implement additional dust and noise control measures during construction;
- close access to specific trails or roads during specific times of the year; or
- incorporate vegetation with wildlife food value into site landscaping.

The strength of development agreements is that they can be tailored to the exact needs of the specific land and proposed development. In addition, since they are negotiated contracts, they are not subject to some of the strict constitutional requirements that limit the local government's power to adopt general regulations.

U.S. Fish & Wildlife Service

The pearly mussel is being endangered by pesticides and industrial pollutants.

CONTROL OF PUBLIC INVESTMENTS AND PROJECTS

Another way in which local governments can promote wildlife habitat protection is through careful direction, design, and control of public projects and investments. Local governments spend hundreds of millions of dollars each year on projects like parks, water lines, and highways that have a profound effect on land development and use patterns. Since the 1970s, there has been an increasing realization that the impacts of the governments' own projects on land must be thoroughly analyzed and coordinated with governmental priorities. In order to avoid unintended impacts on wildlife habitat areas, local governments must ensure that information about habitat areas is included in all decisions to construct roads, storm drainage facilities, water facilities, wastewater facilities, public buildings, and public storage yards. In general, the local government should follow the same principles that it imposes on private developers related to design and construction to minimize habitat impacts.

On the positive side, cities and counties should ensure that any available inventory of prime habitat areas is integrated into the decision-making process to purchase land for parks or for other public facilities. Buying a site for a public facility that includes important habitat and then designing, siting, and buffering the public facility to protect that habitat may be a very effective way to achieve two public goals at once. In addition to considering the impacts of its own infrastructure construction on habitat goals, local governments should ensure that special metropolitan districts and other districts within their boundaries are also acting consistently with those goals. In particular, in areas where the local government decides not to extend infrastructure in order to reduce development pressures, it should have clear policies in place prohibiting the creation or continuation of special district activities that would circumvent that goal.

TAXING AND ASSESSMENT DISTRICTS

In cases where the habitat to be protected—and the benefits from that protection—are limited to a specific area in the city or county, it may be appropriate to consider the use of a special taxing district to raise additional funds to buy land or development rights in that area. The state of Iowa has adopted legislation permitting the creation of special conservation districts to levy taxes to acquire land for wildlife reserves and parks.

Even without a specific statute for conservation districts, it may be possible to use existing legislation to achieve the same result. For instance, Colorado's legislation permits the creation of park and recreation districts to acquire and manage parks and open spaces. Park and recreation districts do, however, have some significant drawbacks as a habitat protection tool. They are subject to onerous reporting and control requirements from both state and local governments, and are controlled by a board of directors of property owners within their boundaries. In addition, unless they are carefully designed, they may inadvertently encourage land development within their boundaries. For both reasons, Colorado's local governments proceed cautiously when examining the alternative of tax districts for wildlife purposes. In many cases, it may be preferable to create a government-controlled district (e.g., a general improvement district or a local improvement district) to achieve the same result.

PRIVATE-SECTOR INITIATIVES

Increasingly, the private sector is playing a very important role in the preservation of quality wildlife habitat, and local governments would be well advised to work with the private sector in order to increase effectiveness and leverage resources. Frequently, private-sector partners are not subject to some of the time-consuming procedural requirements that slow down local government. In other cases, they are able to mobilize resources faster than local government. Those factors can make the difference between a successful or unsuccessful project to protect threatened areas (Endicott 1993). In addition, an increasing number of land developers have found that they can realize more profit by including a strong conservation element than with a development project that disregards the importance of the natural environment (Faraca 1986). This attitude also creates the possibility of effective conservation partnerships.

Land Trusts

Private land trusts are nonprofit land-owning and managing organizations, and they are playing an increasingly important role in land conservation throughout the United States. While land trusts have no powers to regulate land, they use a broad array of other preservation strategies and can be valuable partners. For example, where government budgets do not have enough money to acquire critical tracts in a given time frame, land trusts may be able to purchase and hold the property for future government acquisition. In addition, private land trusts can sometimes be good partners in wildlife habitat protection because they can work effectively with private landowners. This is true, in part, because the involvement of a land trust often creates possibilities for tax incentives and, in part, because landowners may be wary of working with the government itself.

Often, the pairing of governmental regulatory powers and land trust financial resources can be beneficial to both groups. Land trusts can also provide significant cost savings in land acquisition efforts. As tax-exempt charitable organizations, land trusts may acquire lands

through charitable donations or bargain sales, which may prove advantageous to the selling landowners because they obtain tax deductions. Landowners can reduce their income and estate tax burdens and keep their property intact to pass on to the next generation for agricultural and other open space purposes. If a land trust then resells such low-cost acquisitions to the government, the trust may be able to recoup its own costs while still helping the government realize considerable savings. In addition to purchases in fee simple, land trusts can also use the development rights acquisition or easement programs, and the sellback and leaseback techniques described above.

Relying on private land trusts to help achieve public habitat objectives does have some potential disadvantages, however. The objectives of the land trust may change over time and may come to differ from the city or county objectives before the government has had time to purchase the land in question. Some land trusts may not have adequate staff and resources to administer significant land holdings or may not manage them as the local government might wish. Finally, some land trusts may permit or deny public access to properties they own or manage when the local government would have preferred just the opposite for wildlife habitat reasons.

Limited Conservation Development

The outright purchase of habitat land or development rights is not the only way in which landowners and private entities can promote habitat protection. Increasingly, developers and nonprofit conservation organizations are promoting the limited development of land in ways that can still protect extensive tracts of open space and wildlife resources. Some of these limited developments have been undertaken by conservation organizations that recoup the cost of sensitive lands and open space they have purchased by allowing limited, carefully sited development on a small portion of a parcel.

Limited conservation development projects have several advantages as habitat protection tools. They can protect land without direct government regulatory involvement, although tax incentives are sometimes necessary. In addition, private land conservation organizations can sometimes react to growth pressures more quickly than governments, since there is no need to follow statutory procedures, hold hearings, or hold elections to raise acquisition funds. One disadvantage is that private cluster development initiatives may tend to protect land on a fragmented basis with no regional vision. For example, the land protected may be the most beautiful but not the most important wildlife habitat, or it may be located so that it is not contiguous with an adjacent habitat area. By working with the sponsoring land trust or nonprofit to include wildlife goals, however, this problem can often be solved.

Industrial Restoration Showcase Projects

The rise in environmental litigation backed by serious penalties under federal environmental protection laws has caught the attention of many large industrial companies and utilities. Some of those organizations are now implementing expensive reclamation and restoration projects, and are using large advertising budgets to let the public know about their efforts. They want America to know that they have restored former hazardous waste sites and other environmental disaster areas to the status of a healthy natural environment. In some cases, habitat protection or restoration has been explicitly emphasized. The creation of new, high-quality habitat is a win-win solution to a cleanup problem, since it also allows the industry to create a reuse that does not require clean up of the land to standards acceptable for human occupation. The reuse plan for the Rocky Mountain Arsenal near Denver took advantage of just such an opportunity. By agreeing to habitat use, the state government and those responsible for the pollution were able to move forward with cleanup efforts faster and enhance what is clearly a premier habitat area.

These industry efforts should be applauded by the public, and towns, cities, and counties should be aware of them and should look for opportunities to work with local industries on restoration of former sites into significant habitat areas. The companies that are participating in restoration projects are providing the technology and resources that help to correct the environmental damage of past decades. Because these efforts are being achieved with today's dollars, advertising is often needed to convince America that there is a justification for the significantly increased costs in utilities, services, and retail products. Local government assistance in spreading the word about these projects can be very valuable to the industries involved.

Projects that restore or enhance environmentally damaged areas enjoy widespread public support, whether they are court-imposed or are a voluntary effort to prevent fines or litigation. Many efforts focus

Power Plants and Striped Bass: Restocking Chesapeake Bay

A good illustration of a utility project that benefits wildlife is the use of heated water discharge from a power plant in the Baltimore area to raise striped bass for later stocking of the Chesapeake Bay (Kraeuter et al. 1986). The striped bass was selected for a pilot aquaculture facility because it is well-adapted to the conditions of the Chesapeake Bay, is an important food and sport fish in the area, and was suffering a severe decline in population. The striped bass is also the Maryland state fish and is looked upon as a symbol of the quality of life in the bay region. The sponsoring utility company received recognition for its efforts to improve the striped bass population, and the project emphasized the company's goals of putting waste resources to a good end and minimizing the impact of power production on the environment.

Limited Conservation Development: Four Success Stories

Mill Hollow is one of the first and most successful efforts at limited conservation development. The project was undertaken by the Philadelphia Natural Lands Trust. The owner of a 70-acre property known as Mill Hollow approached the Trust to assist with the conservation of his property. The land was a large estate with a historic home in an area subject to development pressure near Philadelphia. It contained 40 acres of undisturbed woodland in addition to the main home, several smaller houses, and a barn. The owner wanted to preserve the property, remain on the land, and meet certain financial goals. Working with the owner, the Trust came up with a conservation development plan that called for spinning off the 40-acre woodland and conveying it to the Trust. The remainder of property was then subdivided into six parcels ranging from 1.5 to 15.7 acres. The original plan called for the owner to retain the main residence and the 15.7-acre parcel. The rest of the land was offered as a single parcel for $1.4 million or individual lots with a total price exceeding the $1.4 million figure. In addition to the land donation, the stream valley on the property was subject to a conservation easement and architectural controls were placed on home/building construction. The donated parcel would be managed by the Trust with a percentage of each sale donated to the nonprofit to support property management. One parcel was sold early to cover expenses, and the remainder were then sold to a single buyer for $980,000.

The Evans Ranch is a scenic 3,243-acre parcel located nine miles west of Evergreen, Colorado, at the base of Mount Evans. The property is bordered by the Arapahoe National Forest, Mount Evans Wilderness Area, and the Colorado Elk Management Preserve. The Evans Ranch provides a natural habitat for a large elk herd, mountain lion, mountain goat, black bear and cougar, as well as for many smaller wildlife species. Large areas of the ranch are forested with Colorado blue spruce, Engleman spruce, Douglas fir, ponderosa pine, lodgepole pine, quaking aspen, cottonwood, and willow. The property contains five valleys, each with meadows and a trout stream, surrounded by forested, rocky slopes and ridge lines.

The Evans family heirs wanted to sell the property, which was zoned for two-acre residential lots under the county master plan, but wanted to preserve the ranch through limited development. Colorado Open Lands, a nonprofit conservation organization, purchased the ranch in 1984 for $4.5 million. To recoup the purchase price and preserve the property, the organization divided the ranch into five parcels ranging from 532 to 594 acres, each defined by a valley and the surrounding mountain slopes. A central parcel of 131 acres containing the original homestead was reserved for common use by all five property owners. Each ranch parcel has several restrictions, including a 40-acre homesite envelope and a one-unit development limitation. Each owner has a recreational easement over the other four ranches. In addition, the purchase of a parcel gave each owner a 20 percent interest in the 131-acre parcel (the ranch headquarters) that is organized as a corporation and used as the management entity and security checkpoint for the entire ranch. An annual assessment paid to the ranch headquarters corporation provides capital for the ranch operation and management. The five ranch parcels were priced at $1.6 million each. Three were sold within the first year for $1.5 million, and the other two parcels were sold shortly afterward.

on entire ecosystems and some projects have been instrumental in developing advancements in wildlife biology that can be applied in other situations. Because of this important role, the participation of industries and utility companies should not be overlooked in local and regional wildlife habitat programs (Liu 1990).

INTERGOVERNMENTAL AGREEMENTS

The boundaries of important wildlife habitat areas almost never coincide with the political boundaries of cities, counties, or towns. Effective protection of the habitat will therefore often require significant cooperation between jurisdictions. The most effective way to formalize that cooperation is through the use of intergovernmental agreements (IGAs). Although they are often time consuming to negotiate, execute, and manage, IGAs are usually well worth the effort because they result in a shared value system and a shared control system. The discussion that goes into the creation of those systems helps emphasize the importance of wildlife issues, and the resulting IGAs are often more resistant to change than the policy of a single government. Because they can address an entire county, valley, or transportation corridor, IGAs are usually considered to be a landscape-scale protection tool.

IGAs have several advantages as wildlife protection tools. They are negotiated voluntarily, so that local governments do not feel coerced into participating. Because they are freely negotiated and are only adopted when consensus has been reached, they may be easier to enforce than county or regional plans adopted without strong consensus. IGAs can specifically address a wide variety of growth management issues and can generally strengthen the working relationships between local governments. One disadvantage of IGAs is that they sometimes do not have effective enforcement mechanisms. Local governments are often reluctant to agree to the inclusion of specific enforcement tools that could be used against them and are also reluctant to use the courts to try to enforce the contract against another signatory government.

EDUCATION, CITIZEN INVOLVEMENT, AND TECHNICAL ASSISTANCE

Training and Information Programs

Educational and informational programs are often an overlooked element of successful wildlife habitat protection efforts. Many states have established technical assistance programs within their state agency structures. For instance, Colorado, through its division

Four Success Stories (continued)

Upper Elk River Valley is one of the most interesting and promising private conservation initiatives. The scenic Upper Elk River Valley is about 18 miles north of Steamboat Springs, Colorado. Here, a group of ranchers who own most of the valley have joined together with the assistance of the American Farmland Trust and have developed a compact that sets forth principles to protect the valley and its ranching way of life. The major goal of the compact is to protect the special rural character of this remarkable landscape while maintaining a viable agricultural economy. Rather than traditional patterns of suburban or large-lot 35-acre subdivisions, the compact envisions a very small amount of "protective development" that guides new growth away from the best of the valley's agricultural and forest lands. It allows for limited residential development that has minimal agricultural or visual impact, and offers landowners the ability to sell some land for homes for their families or vacation residences without adversely affecting agricultural and low-impact recreational opportunities.

To implement the plan, several of the valley's ranchers have donated conservation easements to the American Farmland Trust, taking income tax deductions in the process and reducing inheritance taxes in the future. These easements ensure that the ranches will forever stay in agricultural use. Instead of giving up all their rights to develop, they have reserved a few homesites that will be very valuable. When the landowner needs to send a child to college or pay for new equipment, he or she has homesite assets to sell instead of having to break up productive agricultural land.

Phantom Canyon Ranch exemplifies private cluster development initiatives. It is located in Colorado near the Wyoming border. This is a joint project with the Nature Conservancy to preserve the Phantom Canyon and provide homesite and working ranches surrounding the canyon with covenants and restrictions designed to preserve the unique values of the area. The project includes over 16,000 acres, of which 2,715 acres are in the Phantom Canyon Conservation Area. The original project design included four working ranches ranging from 800 to 1,200 acres and 11 subparcels that each include several homesites. The plan designated homesites according to specific criteria relating to privacy and physical characteristics, such as ridgelines, hills and woodlands, wildlife habitat, and other elements. Each designated building site consists of a 100,000-square-foot building envelope that is purchased in fee simple. Purchase of a homesite also includes an undivided acreage equivalent interest in the larger subparcel.

The Phantom Canyon Conservation Area consists of four separate parcels. The central canyon area is a Nature Conservancy Preserve including 1,120 acres. In addition, there is a Nature Conservancy easement on 480 acres preserved as private wild and scenic open space for the exclusive use of the owners of Phantom Canyon Ranches. This parcel provides superb trout fishing and natural beauty. The Canyon Common Land greenbelt area consists of 840 acres, and the Halligan Reservoir common area includes 275 acres.

of local affairs and other agencies, maintains eight regional offices and a core staff that offers local governments advice on issues of land-use and growth management. The division sponsors a series of regional summer workshops that often cover recent developments in land- use planning and law. While impressive in terms of scope and output, this technical assistance program has a very small budget and small staff.

Other institutions in a state, like university extension programs and the local chapter of the American Planning Association, also offer technical assistance, educational workshops, and publications geared to assisting local governments in land-use planning and open space/habitat protection. Nationally, APA's Planning Advisory Service offers ordinances, plans, and other information related to managing development for people and wildlife. Finally, the local chapters of the Urban Land Institute (ULI) and the National Association of Home Builders (NAHB) hold educational workshops and conferences on quality development techniques for their members.

In some jurisdictions, there is also a significant effort to keep private landowners informed of the range of land conservation incentives and other programs available to them to encourage habitat protection. For example, where a plan attempts to prevent undesirable development by maintaining existing agricultural uses, the landowners' understanding of tax relief programs, easement sale or donation options, and conservation reserve and wetlands reserve subsidies furthers the objectives of the plan. Successful public education programs have included manuals summarizing different programs that can help landowners to understand the rules, benefits, and relief offered to promote wildlife goals.

Educational programs are essential to a successful wildlife habitat protection program and can develop significant interest in participation. Programs should make a special effort to involve children and to design learning experiences that complement the development of a broad wildlife and natural resource perspective (Schicker 1986).

Citizen Participation

Another form of effective education is direct citizen involvement in the habitat protection program. Direct citizen involvement can also stretch scarce public funds through the use of volunteer help. Lack of funding and

Intergovernmental Agreements (IGAs): Colorado Examples

There are several good examples of the use of Intergovernmental Agreements (IGAs) to pursue joint planning goals in Colorado. Aspen and Pitkin County have used intergovernmental powers to form a joint planning agency. Similarly, the City of Boulder and Boulder County have used an IGA to preserve open spaces around the city. One of the key aspects of that agreement provides that new development will occur only in those areas where the city and county agree to provide urban services. This application of capital improvement policies in a regional IGA has effectively preserved open areas, including strategic vistas, recreational areas, and entrance corridors around Boulder while directing urban-scale development to the urbanized core of the city. The same tool could be used to protect wildlife habitat areas that are important to more than one government.

In addition, beginning in the early 1980s, the City of Durango and La Plata County executed a series of IGAs related to joint planning activities. The agreements provide for joint review of subdivision requests in designated areas and restrictions on annexation in some areas where joint land-use and development plans have been adopted. The Town of Berthoud and Larimer County in 1994 entered into an interim IGA in which the two jurisdictions agreed to develop a joint land-use plan for the area surrounding Berthoud. Applying some of the basic concepts of the Boulder agreement, Berthoud and Larimer have adopted joint policies seeking to direct the spread of Berthoud's growth to designated growth areas. While this interim agreement does not contain the substance of a joint land-use plan, the agreement designates a joint planning area including and surrounding the town. It also provides a procedural mechanism requiring the county to refer land-use decisions pending in the joint planning area to the town and to justify land-use decisions that are contrary to the town's recommendations. Finally, the agreement makes the IGA mutually enforceable in court.

A recently executed IGA involving Boulder County and the communities of Lafayette and Erie breaks new ground in the protection of open space. The agreement helped settle lawsuits that had been filed by Boulder County and Lafayette challenging the annexation by the Town of Erie of 2,000 acres of property adjacent to the northern border of Lafayette. The agreement establishes strict density limitations on parcels within a 7,000-acre rural preservation zone and basically prohibits density increases beyond current Boulder County zoning. Future annexation requests of any parcel within the rural preservation area must be referred to the other parties for review. Certain other lands are allowed higher densities but are subject to use and design standards.

These and other IGAs aimed at open space preservation could easily be targeted to sensitive habitat areas or wildlife corridors. In fact, since the essence of a wildlife corridor is its continuation over a relatively long distance, IGAs are often critical tools for the preservation of a corridor.

Another IGA is being discussed among communities in Larimer and Weld Counties. This project managed by the City of Fort Collins aims to produce a regional open space plan that will identify open space and natural areas of regional significance that should be protected, as well as trail linkages among communities. Another goal is to evaluate existing growth patterns and development policies in the participating communities and make recommendations for changes that will result in more compact, efficient development and revised delineations for urban growth areas. Participating jurisdictions include Fort Collins, Berthoud, Evans, Greeley, Loveland, Milliken, Wellington, Windsor, Larimer County, and Weld County.

other resources to effectively implement a program is a common shortcoming of an otherwise well-planned habitat or natural resource conservation effort. Data collection and analysis is a necessary element of many programs and is the backbone of successful habitat protection. Involving citizens in the process from the beginning can reduce the administrative and financial burden and increase the public acceptance of conservation planning. Effective citizen participation is necessary to accurately gauge public opinion regarding management and implementation policies and to reduce the gap between the public's interest in wildlife protection and its knowledge of appropriate conservation measures.

Citizen participation should be initiated at the outset of a wildlife habitat protection program. Public forums help to identify common objectives and interest groups that may be able to contribute time and resources later in the process. Forums and informational meetings also develop consensus because citizens become part of the policy development and decision-making process. Forums held early in the process also help to identify special local resources that can contribute to the project.

Implementation strategies and research priorities can also be designed around available community resources. With creative planning, a wide variety of volunteers can each contribute small portions of a large project that is coordinated by the local government. Students, youth groups, and nature groups can be organized to assist in a large-scale inventory of plant and animal communities. Other civic organizations can participate in joint fund-raising efforts, and senior citizens can contribute both time and invaluable experience to a community effort (Jackson 1990).

In designing a citizen participation program, it is important to carefully develop a community strategy and to define specific information needs. The program should be flexible, so that it can be successfully marketed to reach specific target audiences. The substance, length, and extent of a program needs to be tailored to the community structure and also needs to be continually adjusted to respond to differences in desired and actual results.

Resource Inventories

Inventory programs that identify critical environmental and wildlife resources can be invaluable in educating the public and landowners about where development should and should not occur. There are a number of good examples at all levels of government and in the private sector that demonstrate the value of resource inventories.

Many local governments around the nation are undertaking inventories as they prepare comprehensive plans and growth management regulations. In San Diego County, a consortium of 10 separate jurisdictions has undertaken a large Habitat Conservation Program that involves extensive inventory work including computerized mapping of habitat for about 100 of more than 300 species considered sensitive in southern California. Project coordination has involved establishing a common system for classifying vegetation and a consistent model for evaluating habitat to be used by all participating groups. The model classifies habitat as either very high quality, high quality, medium quality, or low quality based on vegetation types, sensitive species, connectivity, and other factors. The most important result of this inventory effort has been the production of a "gap" analysis that identifies gaps in regulatory protection of sensitive habitat. (See Appendix B.)

In Colorado, there is increasing use of inventories in the local land planning process. For example, Teller County has incorporated the Colorado Division of Wildlife maps in a natural resource zoning ordinance that identifies high, moderate, and low areas of potential wildlife impact. Summit County has also worked closely with the Division of Wildlife in a pilot program to produce more detailed wildlife and habitat inventory information upon which to base local development reviews.

The private sector has also been active in producing inventories. Developers are often asked to produce baseline natural resource information as part of the development review process.

Perhaps the most interesting and successful survey of natural resources is one initiated by the Nature Conservancy, a private nonprofit organization that stores and manages information on natural ecological diversity. In this effort, field workers gather data about rare plant and animal species, various types of native plant communities, and aquatic systems in a state. More than 25 states have adopted systems patterned after this program. Some communities have taken the inventories a step farther and have used them to identify sites that are off-limits to development.

ADMINISTRATIVE AND MANAGEMENT ISSUES

Local governments that initiate or expand programs for wildlife habitat protection should recognize that most programs require careful continuing management, enforcement, and monitoring. The very nature of habitat areas often means that they are far away from human activity where violations of the program or deterioration of the habitat will not be easily noticed. If a community is serious about protecting habitat, it must make a commitment to regular monitoring and careful management of the protected areas.

In addition, local governments that intend to initiate or expand a habitat protection program should have a clear understanding of the true costs of the program. Those costs usually fall into three categories: (1) planning, (2) habitat acquisition, and (3) administration, maintenance, and enforcement of habitat plans. Although actual habitat acquisition often accounts for the highest percentage of these costs, initial planning and continuing management are crucial to program success, and it would be unwise to ignore either element or its costs.

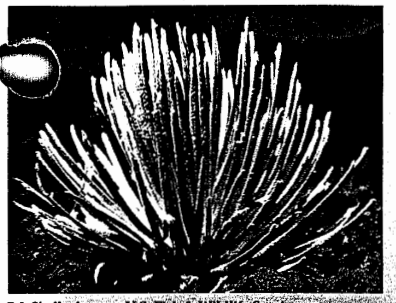
Enforcement and Monitoring

What type of enforcement and monitoring is needed will vary depending on what type of tools are included in a local protection program. Regulatory approaches can often be enforced by making sure that zoning permits, subdivision approvals, and building permits are not granted until project designs are appropriate. Even if these permit programs are working, however, they may provide little protection against careless clearing of the site at the start of development. It is very important that the local government adopt appropriate grading and construction controls, and conduct frequent site visits before and during the site preparation stage. Incentive programs can be monitored by obtaining annual reports from local government departments summarizing how many landowners use the incentives offered. Acquisition programs generally do not need specific enforcement tools, since most acquisitions are voluntary and negotiated. However, a local government that is relying on purchases to protect habitat should arrange for annual reports on the number, terms, and locations of purchases consummated. The same is true for partnerships with private-sector initiatives.

Monitoring of habitat protection programs falls into three categories. First, the local government should monitor the cumulative total of all actions taken during each year. That includes the amount and location of land protected during the year. Second, the local community should conduct at least annual site

Berry Nehr, U.S. Forest Service

The red wolf became extinct in the wild before being reintroduced from captive populations.



R.J. Shallenburger, U.S. Fish & Wildlife Service

The silversword is imperiled by introduced grazers, insects, and low reproduction.

inspections of the protected areas to identify whether the adopted design solutions, buffers, easements, and other safeguards are really protecting the quality of the area. If a local program is successfully incorporating design solutions into new development, convincing landowners to use the incentives, and systematically acquiring critical pieces of land, but the quality of the habitat is still eroding, something must change. Third, the city or county should monitor whether the program is actually achieving its wildlife goals. If the goal was to increase the geographical range of certain species, is that happening? If the goal was to protect a rare species, are its numbers increasing or declining? This will require a close working relationship with state division of wildlife and may involve collecting wildlife and habitat information over time related to:

- how the wildlife are using different parts of the habitat;
- how certain land uses have affected individual wildlife species, individual plant species, individual habitat components of the wildlife community, and entire wildlife communities;
- how natural environmental conditions have caused species or habitat change; and
- how accurate the models used to predict wildlife and habitat models have proven to be (Jones 1995).

Habitat Management and Maintenance

There are two important types of change in wildlife habitat. The first type is the alteration of land that results from developing it for human uses (e.g., the construction of a residential subdivision). Many habitat protection efforts are aimed at modifying this source of change. While such efforts are often a necessary part of protecting habitat, they may not be sufficient because the second type of change in habitat occurs even when human influences are excluded. Even "protected" grasslands are invaded by shrubs. For example, stands of aspen trees gradually change to stands of conifers, and cottonwood groves age and fail to regenerate. If these sorts of "natural" changes degrade habitat for species that the community wants to protect, such changes must be opposed by active management to maintain the habitat.

For example, Waterton Canyon State Park in Colorado offers important year-round habitat for a population of bighorn sheep. The sheep rely on the canyon's grassy areas for feeding because the openness of these areas provides greater security to bighorns than the "closed-in" shrub lands. However, in the absence of fire, grass patches are taken over by shrubs, and eventually the entire canyon would become less suitable for the bighorn population. As a result, active management of the canyon by people is needed to preserve its value for wildlife. Such management includes prescribed burns and the cutting and removal of shrubs.

Planning for habitat protection must anticipate those actions needed to preserve the natural features that made an area desirable to protect in the first place. Local governments should consult with ecologists and wildlife biologists to develop and execute habitat management plans for protected areas. In addition, communities interested in protecting wildlife habitat should not forget to plan and budget for the costs of managing and maintaining habitat after it is acquired or protected.

Management Finance

Enforcement, monitoring, and management of habitat protection programs require staff time and money. Often, the total cost will be only a small fraction of a city or county budget, but it needs to be included in the total anticipated expense of the program. As a practical matter, it is difficult to isolate the cost of incorporating wildlife protection tools into most regulatory approaches because habitat protection issues are reviewed at the same time that roads, utilities, drainage, and other development requirements are reviewed as part of a subdivision or site plan. The same is true for incentive programs because they are often used as part of overall development approvals. On the other hand, it is fairly easy to isolate the ongoing costs of managing land that is acquired or protected.

Cities and counties typically have several sources of revenue available to cover the management costs of habitat protection programs. If the jurisdiction is not large, it may be possible to pay the expenses from the general fund. On the other hand, if the additional costs of reviewing development applications to verify required habitat protections can be isolated, it could be added to the city or county's development review fee structure. Where bond issues are planned to raise money for the purchase of habitat land or development rights or to conduct an educational campaign, the administrative and management costs of the program can be included into the amount of the bond issue. Similarly, if potential tax increases are on the ballot for open space, the administrative costs of the program can be included in the calculation of that tax increase. If donations of land are accepted and the donor receives a tax benefit, the donor can sometimes be required to grant a stewardship endowment to offset the costs of managing the land. Finally, some states have programs that offer funding and technical assistance for habitat improvement.