Chapter 4
Discussion of Local Strategies for Addressing Major Environmental Concerns

Local strategies are major determinants of how transportation improvements and related development will affect Regionally Significant Environmental Resources. Local strategies include regulations, policies, and practices that influence the development process; local regulations and incentives for stormwater management; and local incentives and priorities for conservation.

The consultations included discussion of local strategies for addressing five major environmental impacts identified by state agencies in OKI's earlier consultations. Local agencies were asked how their counties address environmental impacts related to state concerns that:

- forested tracts remain intact,
- stream corridors be conserved,
- roadway runoff be diverted from direct entry into streams,
- streams not yet degraded be protected, and
- the growth of impervious surface be constrained.

The resulting discussion indicates local strategies that are in place or being advanced; it does not account for all strategies used in the region nor used by participating agencies. Based on the consultations, indications are that the major concerns discussed are not effectively addressed at the local level but that some concerns will be better addressed in the future as a result of stormwater management strategies or other local initiatives. Discussion indicates that local governments:

- do not take initiative to conserve forested area,
- are expanding the use of stream buffers that can help conserve stream corridors,
- commonly use curb-and-gutter systems that discharge directly to streams,
- do not distinguish high-quality streams as needing higher levels of protection, and
- allow for reducing impervious surface in the development process but generally do not require or encourage it.

This section summarizes discussion for each of the five environmental concerns. It includes references to strategies being used (in tabular format) and comments on strategy limitations, potential, and alternatives. Discussion provides a basis for considering the transportation plan's potential effect on Regionally Significant Environmental Resources:

- What are the potential effects of the highway system and related development on Regionally Significant Environmental Resources?
- Are additional or alternative local strategies needed to conserve Regionally Significant Environmental Resources?
- What local strategies have the greatest potential to protect Regionally Significant Environmental Resources?

Conservation of Forested Tracts

Basis for Discussion: A shared and major concern among state conservation agencies is that forested tracts – and other large blocks of habitat – be left undivided… that they should not be dissected – it's "Better to avoid forest" all together. How is this issue addressed in your county?

Summary of Comments: The local development process is not used to conserve forested area, although some area is conserved by provisions for conserving other resources, such as flood plains and stream corridors. Local efforts to conserve forested area are primarily those of park and conservation agencies that are related to acquisitions (funds are limited) and promotion of state and federal conservation and tax-reduction programs and good management practices.

Counties do not have strategies that focus on conserving forested areas nor protecting them from adverse impacts. Comments were:

- *How are forested tracts protected? They're not.*
- *There is no protection of forested land at the county level.*
- *Conservation of forestland is not addressed in county regulations.*
- *This issue is not addressed in any of the three counties, unless property is purchased.*
- *Forest is not protected if it's privately owned.*
- *In non-residential development, it's common practice to remove all trees.*
- *[Related to efforts to keep grazing animals off of forested slopes] Land management by the property owner is entirely voluntary, unless cost-sharing is involved. The only regulation of forested area is related to cost-sharing programs.*
- *Regulations to prevent destroying trees in the development process may be considered by some as "a taking," since owners can cut trees on their property, although other restrictions that are regulated might also be protested as "a taking".*

Local agencies are aware of the value of conserving forested area, as indicated by comments:

- *The more that forestland can be kept intact, the better.*
- *Dissecting of large tracts should be a concern.*
- *The quality of the forest should be considered.*
- *Wooded wetlands classified as Category 3 would typically have high levels of biodiversity and might contain or provide habitat for threatened or endangered species.*

Strategies in the development process discussed for contributing to conserving forested or wooded area are presented in Table 2 and listed below, along with comments.

Table 2. Local Forest Protection Strategies

NOTE: Information represents discussion and does not fully represent county strategies; shaded area indicates no discussion.

	4 Ohio counties	3 Kentucky counties	Dearborn County
Development stategies that can protect forested areas			
Flood plain regulations	Butler County		
Regulation of forested wetland	State regulations applied to Ohio counties		
Treeline buffers	Treeline requirements are under development in Warren Co. (5 townships)		Vegetative buffers required between properties
Wellhead regulations	Butler County		
Local efforts and available programs for protecting forested areas			
Acquisition/purchase	Grant through Ohio Water Resources Restoration Sponsor Program	1 of 2 tools for conserving forestland	
Canopy data	Near completion for Hamilton County	Developed for all three counties	
Easements		1 of 2 tools for conserving forestland; primarily held by public agencies or nonprofit organizations	
Tax-benefit programs	Ohio Current Agricultural Use Value / CAUV		Indiana Classified Forest Program

Flood Plain Regulations and **Wellhead Regulations**

- *Much of Butler County's forested area is in flood plains and stream corridors; these forests are indirectly protected by flood plain and wellhead regulations.*

Regulation of Forested Wetlands

- *Clermont County contains forested wetlands classified as Category III wetlands by Ohio EPA (potential habitat of threatened or endangered species, high quality forested wetlands, mature forested riparian wetlands). For projects with impacts, the applicant must show that there is a public need for their project and provide for mitigation.*

Treeline Buffers

- *Warren County is re-writing development code (applicable to five townships) to try to maintain buffers for treelines along roads and around farms (would separate farms from each other and from development).*
- *Dearborn County requires landscaped buffers for yards. Where trees are established along the property line, the developer is encouraged to maintain them rather them remove them and then re-plant new trees.*

Other local efforts or references to state and federal programs for conserving forested area that were mentioned during discussion are included in Table 2 and listed below, with comments.

Acquisition of Forested Area

- *Clermont County Park District obtained a grant through a collaborative effort of county agencies to purchase 67 acres of forest along the East Fork of the Little Miami River. This Forest Reserve can potentially be expanded to conserve a corridor segment with higher ecological value. The grant was from the Ohio Water Resource Restoration Sponsor Program.*
- *Purchase of property is one of the tools for conserving forestland in the Kentucky counties (the other is easements).*

Canopy Data

- *Forest canopy data for SR 536 extension in Campbell County was developed in detail with on-ground field level data.*
- *The new canopy study in Hamilton County will provide information to road planners.*
- *[Boone, Campbell, and Kenton Counties have canopy studies.]*

Easements

- *Conservation of forested area is provided through easements held by Conservation Districts, Park Districts, and Conservancies (also by private landowners, but many of these are for agricultural lands).*
- *Easements provide one option for conserving forestland in the Kentucky counties (the other is purchase of property).*

Tax-Benefit Programs

- *Ohio's Current Agricultural Use Value (CAUV) program provides tax benefits to owners of forested area. It can help conserve forested property, especially in areas without sewers (although there are no regulations).*
- *Indiana's Classified Forest Program provides tax benefits to property owners. The program is popular in Dearborn County, especially in areas with higher taxes. It's promoted by the Historic Hoosier Hills Resource Conservation and Development and the Soil and Water Conservation District.*

Forested locations that were mentioned are as follows.

- *A lot of the forested area tends to correlate with flood plains and river corridors; the buried valley aquifer underlies them.*
- *The county has a lot of wooded wetlands.*
- *The East Fork corridor is heavily wooded, and this is being considered in the Balanced Growth Project.*
- *Protection of wooded corridor along the road is referenced in the SR32 land use plan.*
- *Mt. Airy Forest was bisected by I-74.*
- *There is a section of Colerain Township [where] larger lots and no sewer can help conserve the forested area, although there are not regulations. There are also some CAUV participants in some of this area.*
- *50% of the Laughery Creek watershed is in forest, because of steep slopes.*

Conservation of Stream Corridors

Basis for Discussion: Another prevalent concern is for wildlife corridors and habitat connectivity. From a state view, wildlife movement and migration are critical for genetic diversity and can be critical to species survival. Roads are barriers that reduce mobility and increase wildlife mortality – especially for some species. In developed areas, stream corridors can be critical for habitat and travel. The core concern is that streams and greenspace connectivity allow for wildlife travel. How is this issue addressed in your county?

Summary of Comment:

Development decisions do not typically consider impacts on stream corridors and greenspace connectivity. As development occurs, it's conventional to infill streams or "pipe" them into culverts. In flood plains, development is regulated, but permits can allow for development with or without mitigation. There is, however, increased use of stream buffers to set development back from the stream edge in order to better manage stormwater, which also benefits wildlife.

Local agencies reported that stream corridors are not conserved for their wildlife benefits or may not be conserved at all. Comments were:

- *The state concern is not addressed in the county.*
- *Nothing provides for this in Northern Kentucky.*
- *The need for wildlife corridors is not being addressed or regulated.*
- *The county's watershed plans recommend riparian protection, but protections are not in place.*
- *The need is addressed in the development process on a site-by-site basis rather than as a process to protect a resource.*
- *There is a need for a preservation ordinance that applies to a stream boundary. An example of the need is a 200' stretch of Ohio River frontage with serious erosion problems after it was bull-dozed for a development project. Development corridors can occur without destroying streams.*

The prevalent practice throughout the region's developed area is for streams to be placed in pipes, and that practice is sustained in most local development codes. Countering the conventional practice is an increasing use of stream buffers. The use of stream buffers is likely to increase because of its value for stormwater management. One comment was:

- *To require maintenance of the natural stream channel is to save costs for storm sewers, etc.*

Stream buffers were called "the biggest thing" available at the county level for protecting environmental resources. Their potential was indicated by the comment that, "One intent of Kentucky Dept. of Water requirements for stream buffers is to protect natural channels." Stream buffers help conserve bank stability, water quality, stream flow, and recharge process, which in turn help maintain stream corridor functions for habitat, stormwater conveyance, and flood storage and help conserve forestland and wetlands.

Butler County has the region's most effective stream buffer requirements, but most of the region's other counties have stream buffer requirements recently established, in development, or under consideration. Table 3 indicates the status and requirements for stream buffers by jurisdiction and additional strategies mentioned for their use or potential to conserve stream corridors.

Table 3. Local Stream Corridor Protection Strategies

NOTE: Information represents discussion and does not fully represent county strategies; shaded area indicates no discussion.

Strategy	Butler Co.	Clermont Co.	Hamilton Co.	Warren Co.	Boone Co.	Campbell Co.	Kenton Co.	Dearborn Co.
Stream Buffers Status by county	Required in unincorporated areas via Flood Damage Prevention Regulations	Not required except in Jackson Twp.; under consideration in Balanced Growth Project; recommended in watershed plans	Recently required for members of the county storm water district (all townships and 30 municipalities)	Encouraged by subdivision regulations (apply to five townships); requirements may be proposed for zoning code	Required by the state in General Construction Permit KYR10 administered by the Ky. Division of Water			Required in subdivision reg.s but not for developmnt of individual lots (development via single permits may exceed that of subdivisions)
					Required in subdivision reg.s (Article 3, Section 325) to be consistent with state requirements		▪ Required for headwaters of Banklick Creek ▪ Will be considered in county compr. Plan update	
Width of required buffers	▪ 75' setbacks for streams with 1 or more tributaries ▪ Required setbacks and non-regulated streams are mapped	50' setbacks in Jackson Twp.	10'-50' based on watershed size; 25' for watersheds 100-1200 acres; can be expanded or reduced as provided for in regulations	▪ Based on stream size; to be proposed as 50', 75' or 100' in zoning code ▪Recommended setbacks are mapped in subdiv. reg.s	50' for sediment-impaired waters and 25' for high-quality streams. The buffer begins at top of bank.			
							50' for headwaters of Banklick Creek	
Local flood plain regulations (Comment: Remaining natural flood plains are highest priority for conservatin within stream corridors.)	Contain requirements for stream setbacks; area within setback is to be undisturbed or natural area (helps conserve and expand forest area)				Counties and communities have little control over flood plain development; flood plain managers have limited authority for permitting. State Flood Plain Management regulations define process for obtaining permits for development from the Ky. Division of Water and U.S. Army Corps of Engineers. Development that is allowed may be required to pay money to mitigate impacts or may avoid fees, depending on project impact.			
Maintenance of surface streams / Limitations on stream piping			In Cincinnati, the conventional development practice is for streams to be piped	Works with developers for streams to be maintained (not piped); considers that zoning would be more effective than subdiv. reg.s	KDOW requirements *under General Construction Permits* are intended to protect natural channels.			

Table 3. Local Stream Corridor Protection Strategies

NOTE: Information represents discussion and does not fully represent county strategies; shaded area indicates no discussion.

Strategy	Butler Co.	Clermont Co.	Hamilton Co.	Warren Co.	Boone Co.	Campbell Co.	Kenton Co.	Dearborn Co.
Fewer culverts / greater use of crossings								
Longer bridges (connectivity under bridge allows for wildlife travel)								
Day-lighting of streams in culverts/in pipes			Opportunities related to combined sewer overflow reductions and interstate reconstruction		Opportunities related to combined sewer overflow reductions and interstate reconstruction			
Trails to conserve greenspace in stream corridors				Strong public interest in trail development via surey and local advocacy group				
Acquistions to purchase priority conservation areas in stream corridors		Obtained grant to purchase forested tracts along a major stream (potential to conserve high-quality segment grant from OH Water Resource Restoration Sponsor Program)						Limited funds prevent park district from protecting streams by acquiring property
Easements under agricultural conservation programs								
Project Negotiations				Works with developers for streams to be maintained rather than piped				Conditions to protect streams can affect re-zoning approval

Features in the Butler County stream buffer requirements especially effective for conserving steam corridors are provisions for 75-foot setbacks (set to protect from bank slippage), an undisturbed or natural buffer (conserves forest area and wildlife habitat), and application to streams with one or more tributaries (only First Order streams are excluded). Requirements are contained in the county flood plain ordinance that applies to unincorporated area *(Flood Damage Prevention Regulations,* Section 6). Developers supported the regulations as beneficial to their interests.

The effectiveness of stream buffers as a strategy for conserving streams and wildlife corridors is limited by exclusions to the areas and developments to which it can be applied. Comments were:

- *Protection for smaller streams, for headwaters and other streams without tributaries, is warranted to conserve habitat but would be more difficult to regulate.*
- *It's hard to enforce regulations to keep state roadway projects outside of the buffer area.*
- *The same rules need to apply to individual homeowners as to developers, but it's hard to do by ordinance. The cumulative impact of excusing individual properties from buffer requirements can be larger than the impact of subdivision projects.*
- *It's questionable how the Kentucky ordinance will be applied and what streams will be protected -- there are a lot waivers.*
- *It's difficult to apply stream setbacks to non-residential development.*

There are numerous obstacles to strengthening stream buffer requirements or expanding their use. Comments were:

- *Kentucky counties and communities have little control over development in the flood plain; local flood plain managers have limited authority for permitting. State flood plain management regulations make it relatively easy to obtain permits for development from the Kentucky Division of Water and the U.S. Army Corps of Engineers. The permits allow development to occur but may require the developer to pay money to mitigate impacts, or fees can be avoided, depending on project impact.*
- *Storm water regulations are viewed as "anti-development," and provisions for the riparian buffer are the most contentious.*
- *The riparian buffers required in the stormwater regulations were negotiated as "the middle ground," but the "middle" is not very conservation–oriented. The "middle ground" is affected by concerns that buffers are a "taking away" (a property rights issue).*
- *Riparian buffers would be great, but it's hard to get them into ordinances because they occupy land (perceived as "a taking").*

Strategies other than stream buffers can help conserve the role of stream corridors for use by wildlife. Table 3 lists strategies used or with potential in the OKI Region, based on discussion, and they are listed below with comments. These are strategies for addressing what Indiana's state wildlife plan reports as the number one problem for wildlife in urban areas, which is the degradation of movement or migration, in addition to providing other benefits.

Maintenance of Surface Streams / Limitations on Stream Piping

- *In the development process, the conventional practice is for streams to be piped.*
- *In Ohio, zoning could protect surface streams from piping more effectively than subdivision regulations.*

Fewer Culverts/Greater Use of Crossings and **Longer Bridges**

- *Policy is needed for fewer culverts, for greater use of bridges instead of culverts, and for bridges to be longer so that parcels on each side of a roadway are connected and the stream corridor can continue functions for flooding and wildlife movement.*

Day-Lighting of Streams in Culverts or Pipes

- *I-74 widening will provide opportunity to remove Shepherd Creek in Mt. Airy Forest from a culvert so that wetlands and forested area can be re-connected. This highway segment has the highest number of deer kills in the state.*
- *A major wastewater treatment management agency is considering day-lighting streams it has piped as one option for reducing water in the sewer system, but projects are limited by money and space. These projects should help revitalize neighborhoods and have community buy-in (by providing benefits such as improving parks or providing community assets) and help change blighted conditions (related comment that economic development is not just about new development but also about preserving and restoring the natural system).*

Trails to Conserve Greenspace in Stream Corridors

Trails could help conserve stream corridors. In the park survey, "walking trails" was the most popular response for needed facilities; there is uncertainty about the ability to journalize and establish easements.

Acquisitions to purchase priority conservation areas in stream corridors

- *Clermont County Park District obtained a grant through a collaborative effort of county agencies to purchase 67 forested acres along the East Fork of the Little Miami River. This Forest Reserve can potentially be expanded to conserve a corridor segment with higher ecological value. The grant was from the Ohio Water Resource Restoration Sponsor Program.*
- *Dearborn County Park Department's options to protect streams are limited by lack of money to acquire property (all but four acres of county park land have been donated). Once land is acquired, thought, it does not cost much to maintain it.*

Easements under agricultural conservation programs

- *Agricultural conservation programs focus on blocks of property and not riparian corridors, but it would be less expensive to conserve just the stream frontage if funds were available. Stream frontage is less productive cropland and the least productive real estate area and has the greatest conservation impact, so easements in stream corridors can provide "the biggest bang for the buck."*

Project negotiations

- *In Dearborn County, subdivision of land results in a re-zoning process that allows for conditions to be applied that protect streams. The application for re-zoning has elements for conditional approval, so approval is based on addressing issues. The conditions depend on whether development involves a minor subdivision or a larger subdivision. Larger developments are governed by more rules.*

Diversion of Roadway Runoff from Streams

Basis for Discussion: There was discussion by state agencies of the need for highway projects to avoid infringement on riparian zones. Comments were that the potential for adverse impacts is exacerbated on roadways adjacent to a stream – that "roadways are pathways for salt and contaminants" and that runoff creates "changes to stream temperature and velocity." One concern is that roadway runoff be diverted from direct entry into streams. How is this issue addressed in your county?

Summary of Comments:

Contrary to being diverted from streams and rivers, roadway runoff is commonly discharged to them directly from curb-and-gutter systems and is a source of local stream pollution and stream channel degradation. For existing roads in developed areas and for new roads -- even in rural areas -- curb-and-gutter is standard practice. The environmental impacts and financial costs of managing roadway runoff could be reduced through greater use of alternative practices, but this is a back-burner issue for local agencies. For state and federal highways, state transportation departments are responsible for determining how roadway runoff is managed. The continued use of conventional practices has enormous implications for local streams. Reconstruction and expansion projects provide opportunities for managing stormwater so that environmental impacts are reduced or even repaired (discussed in Section 3).

Runoff impacts on streams are affected by a roadway's proximity to the stream (comment: one reason for developing the stream buffer is to keep roadways outside of the buffer area), but those impacts are dwarfed by the effect of stormwater runoff that's piped directly into streams. Throughout the region, roadway runoff is discharged directly to streams from curb-and-gutter systems (piped systems that convey runoff through storm sewers and discharge to catch basins or directly to streams). Comments were:

- *Most of the runoff from roadways is piped directly into streams, and the issue is generally not addressed in the county, except in some new projects.*
- *Most new roadways are required to have curbs and gutters.*
- *Curb-and-gutter is expensive, but it's the standard requirement for roads in dense areas.*
- *Subdivision regulations require curb-and-gutter – there are no obstacles to this practice.*
- *The major concern is for getting water off the streets. Street runoff goes into streams.*
- *New roadways are supposed to discharge runoff to basins; there are still a lot of roads that don't.*

Roadway runoff damages streams by its content, volume, and velocity. Requirements for pretreatment (residency before runoff enters the stream) reduce but may not prevent stream impairments. Comments were:

- *Roadway runoff changes pH -- which is a significant water quality concern -- in addition to its effects on increased salts, contaminants, stream temperatures, and velocity.*
- *Pre-treatment usually involves retention and settling, which reduces pollutants and temperature impacts but not necessarily impacts from road salt or runoff volumes.*
- *The usual practice is to keep treatment within the existing right-of-way, which reduces treatment's effectiveness. This level of treatment will not enable streams to meet Clean Water*

Act Standards but avoids the expense of purchasing additional right-of-way -- requirements for additional right-of-way or higher levels of treatment could significantly slow project implementation.
- *Some jurisdictions are reducing road salt impacts by "precision salting" or use of salt alternatives, which help address Phase II stormwater requirements.*

Regulations that govern stormwater management practices are continuing to evolve. The federal Phase II NPDES Storm Water Permit Program classifies road-related storm sewer systems as small municipal storm sewer systems (sMS4s) and divides managerial responsibility among local and state agencies. State transportation departments are responsible for managing the stormwater, construction, and operational impacts of their highway systems. Comments were:
- *The MS4 regulations need to be applied equally.*
- *Federal and state highways have a huge impact on stormwater and streams. The Kentucky Transportation Cabinet/KYTC issues its own permits and determines how to dispose of stormwater for new roads built with state and federal funds -- these roads are exempt from local requirements that apply to private developments. Sanitation District No. 1/SD1 is responsible for determining how runoff from other roads is delivered to streams (previously the responsibility of local communities).*
- *Transportation requirements "pay the price" of protecting the Little Miami River from stormwater impacts, in contrast to the lack of requirements for private development, even large scale private projects.*
- *Why do the state and SD1 both have responsibilities for post-construction regulations? The post-construction piece is the problem for water quality. Cities have to have pollution prevention in place, but that's not the case with state and federal projects.*
- *For state transportation departments, the usual focus is to get a road built and not be slowed down by looking at stormwater impacts. If a roadway project impairs stream quality, the costs will be paid when the Total Maximum Daily Load/TMDL is done. To retroactively deal with stormwater impacts is more costly than dealing with impacts on the front end.*
- *Northern Kentucky stormwater requirements are inequitable for private development and public roadway projects (example of a commercial project required to construct a large detention basin vs. a state roadway project that resulted in stormwater damage to residential driveways).*

Table 4 indicates practices used or considered for managing roadway runoff by jurisdiction that were mentioned in the consultation sessions, for which discussion and comments are below.

Table 4. Local Practices for Managing Roadway Runoff

NOTE: Information represents discussion and does not fully represent county strategies; shaded area indicates no discussion.

Strategy	Butler Co.	Clermont Co.	Hamilton Co.	Warren Co.	Boone Co.	Campbell Co.	Kenton Co.	Dearborn Co.
Use of curb-and-gutter	Required for public roads (including subdivisions in rural areas)	Required for all new streets			Required for areas with density >1 unit/acre	Required	Required	Required for areas with density >1 unit/acre
Disposal of discharge from curb-and-gutter		Point of discharge is a problem for areas previously without curb-and-gutter	Discharge is commonly to streams	Allowed to be discharged to streams if pre-treated (retention & settling reduces pollutants & temperature but not road salt or volume impacts)	• For roadways for which SD1 has responsibility for managing runoff (previously the responsibility of local communities), SD1 determines how roadway runoff is delivered to streams (e.g., basins, pre-treatment, ...) • For new roads constructed with state or federal funds, Ky. Transportation Cabinet/KYTC determines how to dispose of stormwater			Discharge is directly to streams except for areas with combined sewers (overflows to streams are being corrected)
Use of alternatives to curb-and-gutter	Waivers can be made for private roads and PUDs		Changes to design manuals under consideration by county stormwater mgmt. agency	Standards in place for constructing rural streets without curb-and-gutter	Alternatives allowed for areas with <2 units/ acre		Alternatives are to be considered in revision of subdivision regulations	
Swales for infiltrating runoff (LID practice)	Not allowed in current regulations	No allowance for bio-swales in unincorpor-ated area	Limited by lack of space in developed areas; dry swales allowed for parking lots					

The widespread use of curb-and-gutter is partly attributed to inappropriate application of state practices to local roads. Comments were:

- *The Ohio Department of Transportation/ODOT requires curb-and-gutter for urban sections.*
- *ODOT codes influence local codes and practices, but county codes apply to unincorporated area. The use of curb-and-gutter for transportation improvements where there was not curb-and-gutter before is an issue of concern (for impact on local streams).*
- *Best management practices allowed for state roadway projects are not necessarily appropriate or enforceable at a local level (such as infiltration trenches to divert runoff from direct entry into streams).*
- *If ODOT funds are used, then things have to be done the ODOT way, even though state standards may be excessive for local infrastructure.*
- *Stormwater from state roadways can be discharged to a roadside swale or ditch, whereas stormwater from local streets in new developments is managed by storm water regulations for subdivisions.*

Alternatives to curb-and-gutter stream discharges were mentioned and their use, potential, and limitations. Comments were:

- *Many roads in rural areas have ditches to drain stormwater runoff, but ditches are not necessarily allowed for new roads in rural areas. (Comments were made about concerns for maintaining ditches and that some property owners fill ditches to make it easier to mow the grass.)*
- *The county really should get the option for swales back into the regulations.*
- *There's the potential use of roadside ditches to provide linear detention.*
- *What about design criteria for road and ditches?*
- *Consideration is being given to adding dry pipes to ditches rather than installing curb-and-gutter, to the use of berms along the larger roads, and to subdivision regulation allowances for dry swales or infiltration in parking lots, but there is nothing on the books.*
- *Roadway runoff from developed property is discharged to a basin. Local streets for new development are managed by storm water regulations for subdivisions.*
- *Efforts are begin made to get detention/retention basins placed on highway ramps, but the state transportation department is resistant because of liability issues. There is also the option to use wetlands for the ramps, but the problem is the need to replace wetlands if they are disturbed by roadway maintenance.*
- *The state constructed two lakes to hold runoff from a U.S. 42 segment that have become amenities for subdivisions. This was a regional alternative to constructing eleven detention basins and would be appropriate for local planning – it's a win-win example.*
- *The county engineer may be willing to make regulatory changes to allow for swales that are currently prevented by road design requirements, but the fire departments fight for design standards with wide streets. Many have a stake in this issue.*

The difficulties of changing from curb-and-gutter stream discharges were discussed. Comments were:

- *We need a different attitude toward road design, with swales and less infrastructure, but this issue is met with great resistance.*
- *Change in developed area is limited by the need for space to discharge the stormwater.*
- *A change from curb-and-gutter would not necessarily work in areas with higher densities.*
- *There would be opposition to the use of alternatives, which are perceived as having higher cost.*
- *Highway Department major concerns are for drainage and maintenance, for which it has experience with curb-and-gutter but not with alternative systems.*
- *Progress is being made to add features that mitigate water quality impacts but not the quantity impacts.*
- *It's hard to apply a non-traditional approach.*
- *There is a need for demonstration projects that increase public education and understanding of options to street-and-gutter.*
- *Efforts are underway to be greener, but progress is slow.*

Local agencies made suggestions for increasing the use of curb-and-gutter alternatives. Suggestions were:

- *Revise subdivision regulations to allow for ditches/rural roads and swales (low-impact-development/green infrastructure).*
- *The regulations should be modified so that curb-and-gutter is not required.*
- *Develop categories of public roads that allow for alternatives to curb-and-gutter, such as a category of public roads in rural areas.*
- *Use ordinances to specify the use of curb-and-gutter in certain situations -- the developer or planning staff could request a waiver.*
- *Context sensitive street design would be key to solution – it matches street features such as storm water management and width to the size and conditions of the area served.*

Protection of the Least Impaired Streams

Basis for Discussion: We heard that "Any relatively un-degraded stream has as much potential conservation value as any other." The concern is that streams not already impaired be protected in the development process. How is this issue addressed in your county?

Summary of Comments:

Local development and stormwater management regulations do not differentiate for stream conditions. Project negotiation may help conserve a stream segment that is unaltered or high quality, but the development process does not account for the environmental value or scarcity of such streams nor the implications of the observation that "It's cheaper to avoid an impact than to mitigate for it." The need to protect the least impaired streams is further obscured by the fact that stream degradation tends to be a cumulative process.

Local development processes do not consider the benefits of protecting streams not already impaired for their environmental value or for long-term financial consequences. Comments were:

- *All streams are treated the same in the development process.*
- *Setback requirements and rules are the same for all local streams regardless of stream quality.*
- *Stream quality is not considered at all; the development process does not account for differences in stream quality.*
- *Streams are protected by a development process applied per site rather than a process to protect a resource.*
- *A project has been proposed – and can be built – that would be the first subdivision to contribute warm water flows in a watershed with a spring fed creek.*

The following comment is contrary to preceding comments, but applies to state requirements for projects that use federal funds rather than to local requirements for project review:

- *For the Little Miami River, everyone weighs in for projects with potential impacts.*

Local agency interest in clean streams reflects diverse perspectives and conflicting priorities. Comments were:

- *Natural flood plains that are still left represent the highest priority for conservation within stream corridors.*
- *Headwater streams are not protected by county provisions; conservation should begin with headwaters.*
- *Riparian corridors that are most impacted should have the highest priority.*
- *Low quality streams also need to be protected.*
- *All streams should have to be protected as high quality. Current state policy allows the less clean streams to be polluted more.*
- *State policy that allows the quality of clean streams to be lowered is in disregard of the financial consequences.*

Constraints on Impervious Surface

Basis for Discussion: The development impact that may be of greatest concern is the growth of impervious surface. There appears to be a direct correlation between water quality and pervious surface. The literature refers to imperviousness above 10% of a watershed as the beginning of species loss and over 25% as degradation -- and it's hard to bring water quality back after there is too much impervious cover. The concern is that impervious surface be limited in the development process. How is this issue addressed in your county?

Summary of Comments:
Local development strategies include options but few incentives for reducing impervious surface. Stormwater management agencies are interested in strategies to reduce impervious surface that adds water to their sewer systems, but areas where stormwater reductions are most needed are areas that are most developed. Efforts to reduce impervious surface in developing areas are limited. Roadway width is a major factor contributing to impervious cover, but there is little agreement on appropriate widths among local agencies with different responsibilities. Parking lot size is another factor that affects impervious cover.

Impervious surface decreases stormwater infiltration and increases stormwater runoff which it affects runoff volumes, velocity, and pollutant content. The stormwater runoff from roads, rooftops, driveways, and parking lots is a major source of stream and habitat degradation. The cost of traditional practices for managing stormwater runoff translates into enormous expenses for the construction, operation, maintenance, and effects of sewer systems (including costs to reduce combined sewer overflows). Options for lowering the costs of stormwater management include greater use of alternative practices (i.e., green infrastructure) and reductions in impervious surface.

The impervious percentages referenced above apply to watersheds, but imperviousness often exceeds 25% of a site. It is the cumulative effect of imperviousness within a watershed that causes stream impairments. The challenge is to develop differently – to both encourage

development and limit impervious surface, as part of the larger challenge to accommodate new development without degrading environmental resources.

Table 5 summarizes strategies by jurisdiction that focus on reducing impervious surface that were mentioned in the consultations. Additional discussion of these strategies is below. Strategies that help reduce impervious surface but are more focused on stormwater management or watershed planning are referenced in Section 5 (i.e., Low-Impact Development/LID and green infrastructure).

Table 5. Local Strategies for Reducing Impervious Cover

NOTE: Information represents discussion and does not fully represent county strategies; shaded area indicates no discussion.

Strategy	Butler Co.	Clermont Co.	Hamilton Co.	Warren Co.	Boone Co.	Campbell Co.	Kenton Co.	Dearborn Co.
Conservation design, cluster development, and Planned Unit Developments /PUDs (include less impervious cover than conventional development)	Allowed by county zoning code (but not incentivized); PUDs are promoted by zoning code	PUDs promoted by subdivision regulations for unincorporated areas		Allowed by zoning for both sewered and unsewered areas - 5 submittals (2 are in litigation) - have provided less open space than intended (about 30% vs. 50% ideal)				Considered in discussions of re-zoning but has not been allowed
Regulatory Restrictions on impervious cover		Some township zoning codes have provisions for controlling impervious surface			Not part of county regulations			Imprevious percentages not addressed in ordinances
Stormwater fees to incentivize less impervious suface			Incorporated into Hamilton County Storm Water District rate structure		Incorporated into Sanitation District No. 1 rate structure for non-residential properties; industrial user bills are credited for less impervious surface			
Limited Parking Spaces in Commercial Areas	Can be required for new commercial development per zoning (6 townships)	incuded inzoning (6 townships)						May be encouraged in commercial areas by county planning department (up to 90% peak)

Alternative Development Patterns / Cluster Development, Conservation Design, and Planned Unit Developments/PUDs

For new development, impervious surface and runoff can be reduced below levels of conventional development by clustering or consolidating structures, preserving open space, and reducing street width. These conditions are permitted in Cluster Development, Conservation Design, and Planned Unit Developments/PUDs (and Low-Impact Development/LID discussed in Section 5). Some counties are considering promoting these alternatives by allowing them "by

right" rather than by negotiation, which would expedite the development process and could encourage their implementation. Comments were:

- *Cluster development would affect stormwater runoff and could be in the county's interest.*
- *PUDs are promoted in the zoning code revisions and some comprehensive plans, but these are policy documents that do not incentivize.*
- *Areas have to be zoned for cluster development, or otherwise it remains just an option.*
- *Conservation developments may not occur unless areas are specifically zoned for them.*

The open space preserved in these alternative developments can be an issue of concern in their creation, both for developers and local governments, related to their maintenance needs and greenspace value. Comments were:

- *Open space management in conservation design developments is a problem, regardless of whether the open space is the responsibility of homeowners or left in a natural state.*
- *A major objection to cluster development is concern about homeowner association management of undeveloped area, but the same concern applies to stormwater retention structures.*
- *The developer has options on who maintains the greenspace, but the county cannot police it except through the zoning inspector.*
- *The type of greenspace conserved – which is not required to have ecological value – and provisions for its maintenance are generally not helpful for conserving resources of environmental significance.*
- *Preferred requirements for greenspace would be a minimum of 50% greenspace and an optimum of 65%.*

Street width is another point of contention in the creation of these alternative developments. Comments were:

- *Developers like allowances for higher density, and builders are promoting the concept. The obstacle has been government allowing for reduction in road size.*
- *The fire departments fight for design standards with wide streets (even in areas where highway widths are narrower than what is required for subdivisions). Fire departments often promote wider streets for access and turns. Many have a stake in this issue.*

Regulatory Restrictions on Impervious Cover

Local agencies alluded to the use of zoning and subdivision regulations to promote practices that reduce impervious cover but did not indicate such applications in their counties, except for allowing for alternative development and variations in parking standards. Comments were:

- *Zoning and subdivision regulations could be used to manage the extent of imperviousness, but zoning would be needed by watersheds instead of townships.*
- *Deerfield Township has done some of this (requirements for "islands", percentage of pervious surface, landscaping in parking lots).*

Stormwater Fees

Stormwater fees are a strategy for reducing stormwater flows to the sewer system by discouraging the use of impervious surface or rewarding the use of permeable materials. Comments were:

- *The storm water district's rate structure is based on impervious surface.*
- *Incentives for industrial users are in place via credit on bill for less impervious surface.*
- *The City of Florence, which has its own stormwater management regulations, offers credits (i.e., lowered stormwater bill) for 25 years to development projects that provide for stormwater retention.*
- *Green infrastructure technologies cost more up front but are less expensive long-term, which benefits the property owner rather than the developer. The developer's interest is related to storm sewer fees.*

Limited Parking Spaces in Commercial Areas

Parking standards (that specify number of spaces) can be applied through zoning regulations or project negotiations to reduce impervious cover. Table 5 indicates the use of parking standards for commercial areas, but standards can also be applied to other types of non-residential uses.