Big Darby Accord

October 6, 2005

Agenda

I. Process Update

II. Implementation
- Programs, Practices and Regulations
- Partnerships

III. Land Use Scenarios
- Pilot Studies
- Land Use Practices
- Modeling
- Best Management Practices

IV. Feedback

I. Process Update

I. Process Update

Background Analysis

- Data Gathering of Existing Conditions
- Stakeholder Interviews

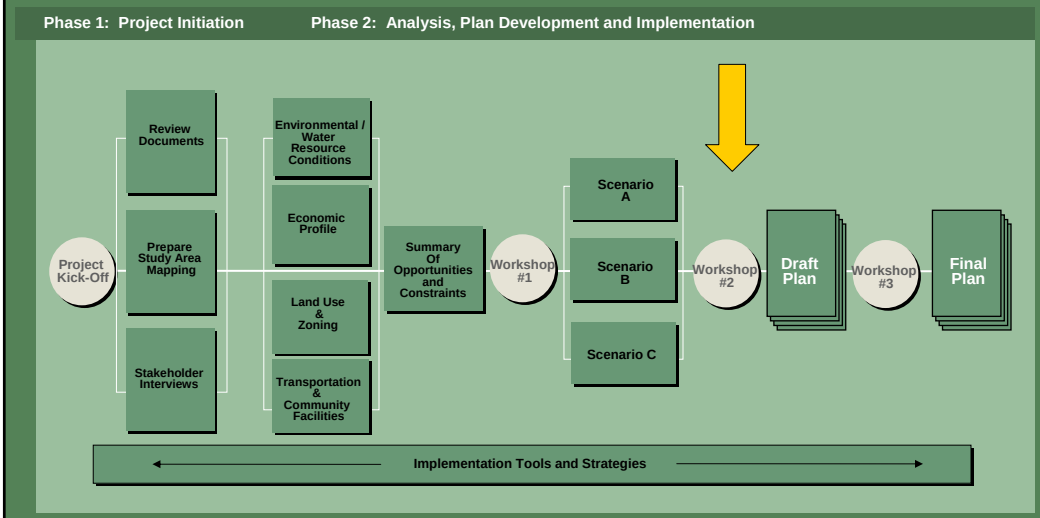
Environmental Analysis

- Natural Resource Conditions
- Identified Sensitive Areas
- Guided Scenario Development
- June 2005 Public Meeting

Implementation

Scenario Development

I. Process Update



I. Process Update

What is the Anticipated Outcome of the Big Darby Accord Land Use Plan?

- Phased Land Use Strategy that is Protective of the Watershed Resources
  - Consistent Development Regulations (Zoning, Stormwater, etc.)
  - Toolkit of Recommended Conservation Techniques and Best Practices for Development
  - Mechanisms for Adaptive Management/Monitoring and Enforcement
- Community Facilities, Utility and Transportation Recommendations Based On the *Preferred Land Use Plan*
- Suggested Programs and Partnerships for Plan Success
- Commitment to Early Implementation Steps Among Accord Members

I. Process Update

Mission Statement

Preserve, protect and improve, when possible, the Big Darby Creek watershed's unique ecosystem by utilizing the best available science, engineering and land use planning practices;

Promote responsible growth by taking measures to provide for adequate public services and facilities and promote a full spectrum of housing choice, as well as adequate educational, recreational and civic opportunities, for citizens of each jurisdiction and for Central Ohio;

Create a partnership that recognizes the identity, aspirations, rights, and duties of all jurisdictions and that develops methods of cooperation among the partners through means which include the cooperative utilization of public services and facilities; and

Capitalize on the results of other efforts by considering local comprehensive plans, as well as the work of the Environmentally Sensitive Development Area External Advisory Group, the Hellbranch Forum, the 21st Century Growth Policy Team and other local planning and zoning efforts, in the development of the plan

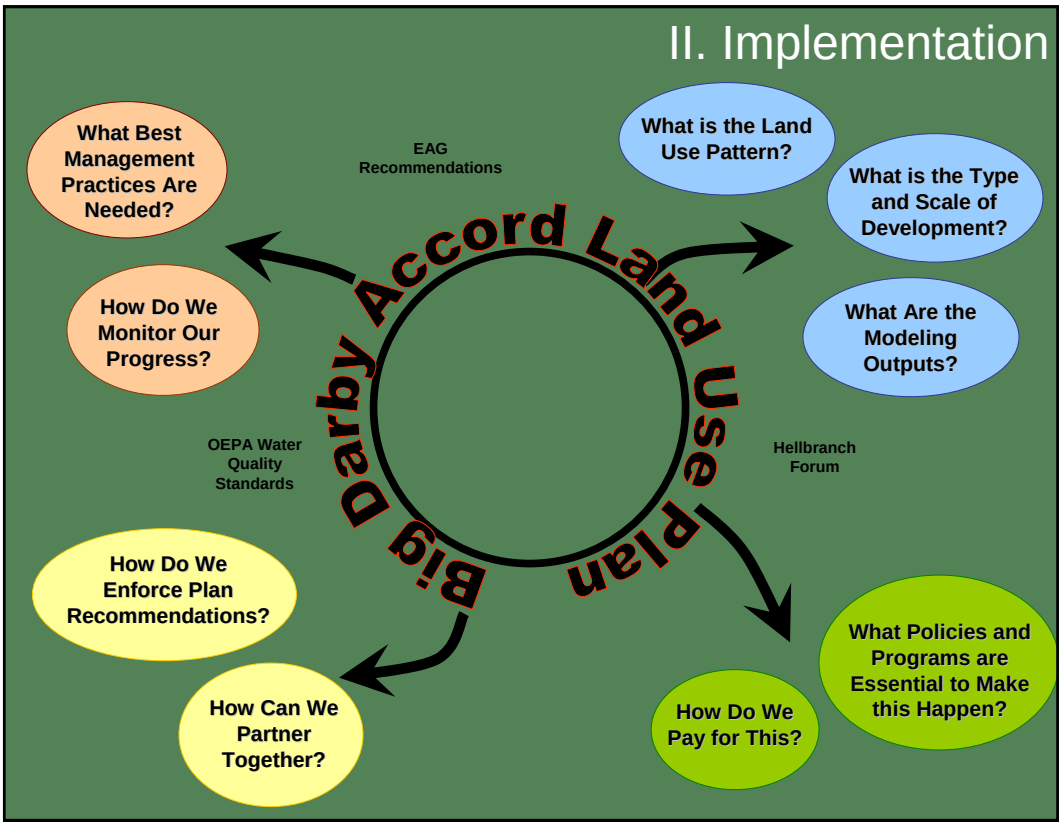
I. Process Update

Tonight We Will:

- Review Implementation and Ideas for Success
- Describe Impacts of Land Use Practices
- Present Land Use Scenarios and Modeling Results
- Ask for Feedback On the Ideas Presented

II. Implementation

II. Implementation



II. Implementation

Excerpt from Mission Statement…

Create a partnership that recognizes the identity, aspirations, rights, and duties of all jurisdictions and that develops methods of cooperation among the partners through means which include the cooperative utilization of public services and facilities

II. Implementation

Create a Partnership:

- To Accomplish Common Goals
- To Ensure Protection of Darby Watershed
- To Implement Plan Policies and Recommendations
- To Provide Consistency in Plan Implementation
- To Provide High Level of Service to Residents

Accord Partnership:

- Comprehensive Enforcement
- Is Organic and Adaptive to Changing Needs
- Can Encourage Cooperative Service Agreements
- Can Address Annexation
- Preserves Autonomy of Jurisdictions
- Can Raise and Spend Money

II. Implementation

Partnership Formation:

- Could Take Many Forms
- Can Start as Agreement and Lead to a More Formal Organization Over Time
- Can Be Advisory or Binding
- Begin by Identifying Areas of Agreement
- Agree to Early Action Steps

II. Implementation

What is Possible Under Ohio Law?

- Examined Statutory Provisions and Legal Options
- Determined Strengths and Weaknesses

- Memorandum of Understanding
- Annexation Agreements
- Community Authorities
- Cooperative Economic Development Agreements (CEDA)
- Joint Economic Development Agreements (JED)
- Regional Council of Governments (RCOG)
- A Combination of The Above

II. Implementation

"Early Action Steps…"

- Develop an Agreement Between Jurisdictions to:
  - Continue to Work Together
  - Revise Local Zoning, Comprehensive Plans
  - Revise Stormwater and Subdivision Regulations
  - Initiate Annexation Agreements
  - Initiate Cooperative Service Agreements
  - Provide Oversight and Review of Development Proposals
- Interim Step for Implementation
- Agreement Would Set Schedule for Key Tasks and Identify Responsibilities

II. Implementation

Potential Long Term Options

- Establish a Formal Partnership or Coordinating Entity
- Work with Local Agencies and Organizations to Create New Programs
  - Address Equity
    - Transfer of Development Rights Program
    - Land/Easement Purchase Program
    - Water Quality Credit Program
  - Monitor Change / Adaptive Management
    - Water Quality Monitoring (pre and post construction)
    - BMP Monitoring
    - Septic Monitoring
  - Protect Resources
    - Restoration Program

II. Implementation

Potential Revenue Sources

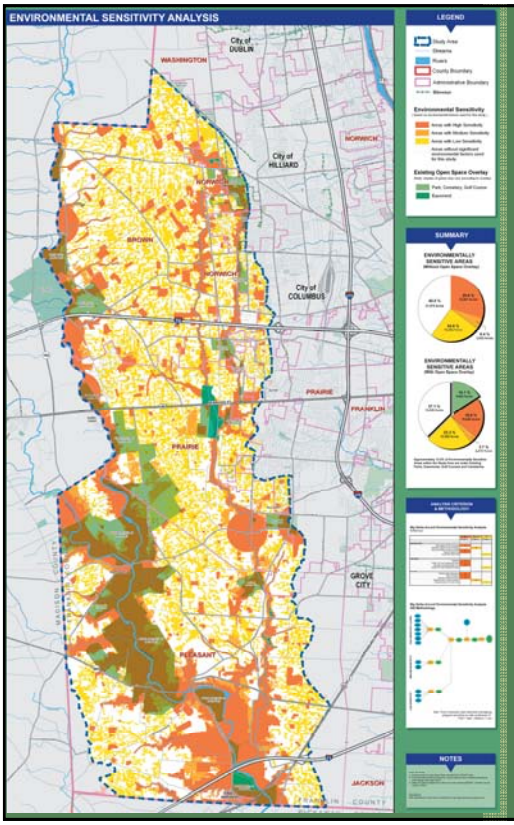
- Leverage Funding Sources to Implement Programs and Plan
  - Dues & Fees
  - Developer Contributions
  - Community Authorities
  - CEDA, TIF, JED
  - Tax Sharing Agreements
  - State and Federal Funding
  - Levies
  - Bonds
  - Others

III. Land Use Scenarios

III. Land Use Test Scenarios

Scenario Development

- Multi-faceted Exercise
- Explores Potential Future States of the Watershed
- Considers Variations in Pattern and Intensity of Land Uses
- Compares Performance of Land Uses in Hydrological Model
- Explores Benefits and Challenges of Different Approaches to Development



III. Land Use Test Scenarios

Approach

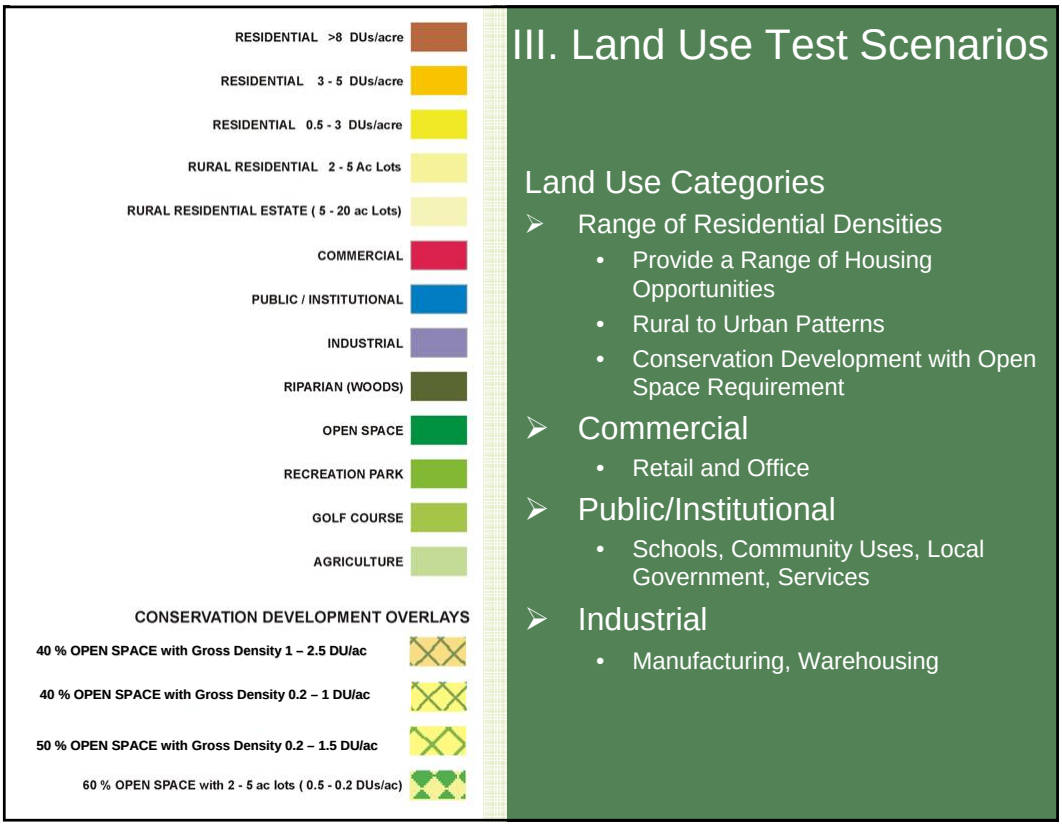
- We Started with a Green Framework (protected areas) which guided the Development Framework
- Green Framework Includes
  - At least 19,000 acres of Environmentally Sensitive Areas Protected including
    - 100-year Floodplain,
    - Wetlands,
    - High-Recharge areas,
    - Stream Buffers
    - and Significant Habitat areas
  - 7,100 acres protected in Existing Parks

III. Land Use Test Scenarios

3 Land Use Scenarios

- Intended as "Build Out"
- Variations in:
  - Uses
  - Location and Pattern of Development
  - Intensity of Development
  - Open Space Network
  - New Roadways

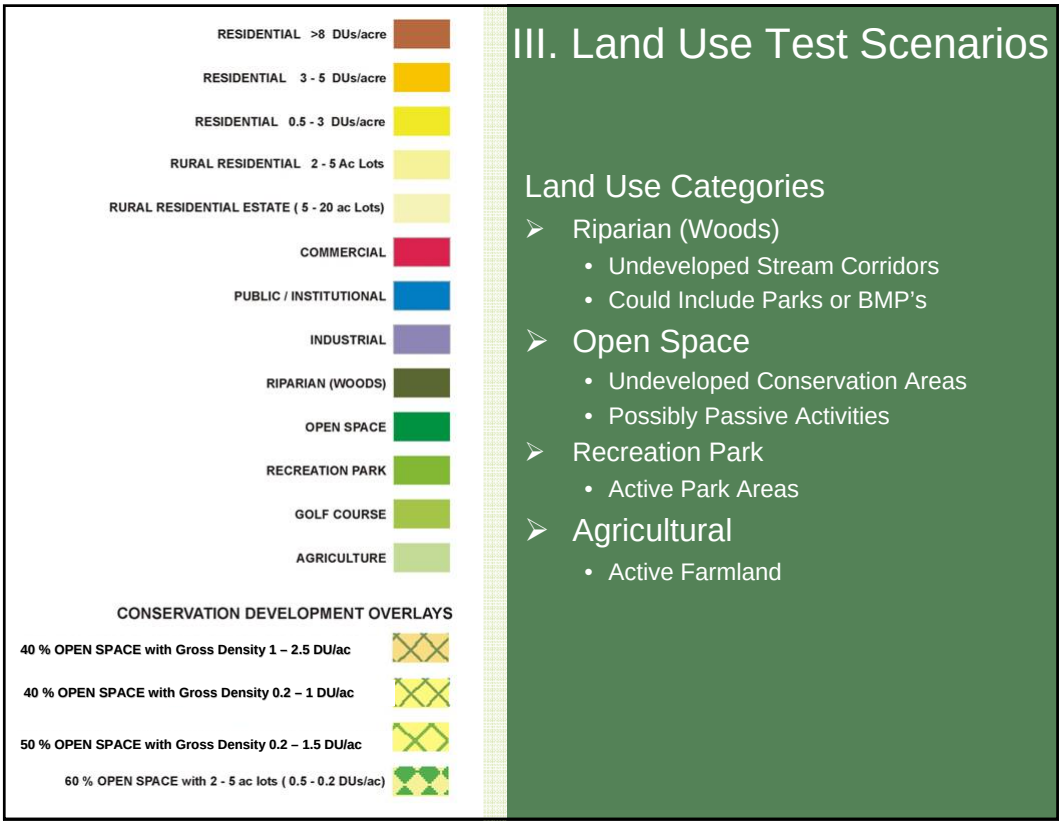
- Future Land Use Should Reflect
  - Protection of Watershed
  - Anticipated Growth of the Region and How That May Influence Development Within the Study Area
    - Franklin County will reach 1.3 Million by 2030
    - Study Area Might Absorb 12% of the County's Growth
    - An Increase from 31,000 to 58,000 or about 87%
  - Long term interests of each jurisdiction



III. Land Use Test Scenarios

Land Use Categories

- Range of Residential Densities
  - Provide a Range of Housing Opportunities
  - Rural to Urban Patterns
  - Conservation Development with Open Space Requirement
- Commercial
  - Retail and Office
- Public/Institutional
  - Schools, Community Uses, Local Government, Services
- Industrial
  - Manufacturing, Warehousing

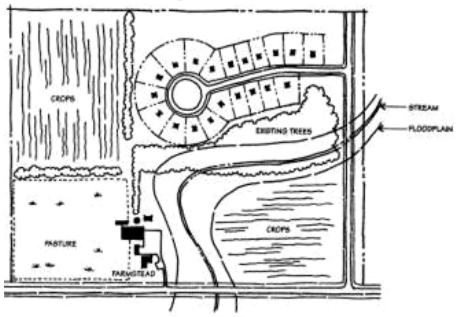


III. Land Use Test Scenarios

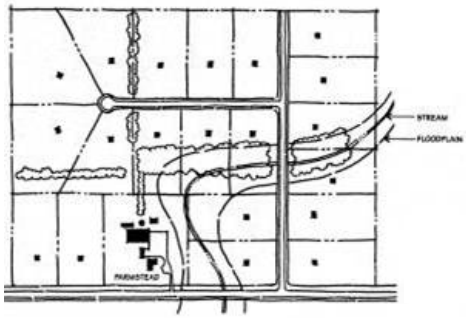
Land Use Categories

- Riparian (Woods)
  - Undeveloped Stream Corridors
  - Could Include Parks or BMP's
- Open Space
  - Undeveloped Conservation Areas
  - Possibly Passive Activities
- Recreation Park
  - Active Park Areas
- Agricultural
  - Active Farmland

Conservation Style



Conventional Style



SEWRPC. 2002. "Model Zoning Ordinance For Rural Cluster Development"

III. Land Use Test Scenarios

Conservation Development

- Common Element in Existing Policies
- Requires Certain Percent of Land as Open Space
- Ranges from 40, 50 and 60% Open Space
- The primary difference Between Conservation and Conventional Subdivisions Involves the Location of Homes
- Net Number of Units On Site Remains the Same

III. Land Use Test Scenarios

Rural Residential Estate

- Single Family, Farmettes
- Very Rural Pattern
- Lots Greater than 5.0 Acres

Rural Residential

- Single Family, Large Lots
- Rural Pattern
- Lots Between 2.0 – 5.0 Acres

III. Land Use Test Scenarios

Low Density Residential

- Single Family
- 0.5 – 3.0 Units per Acre
- $^1/_3$ Acre to 2 Acre Lots


Prairie Township 3.0 DU/AC


South Berwick 2.7 DU/AC

Medium Density Residential

- Single Family
- 3.0 to 5.0 Units per Acre
- $^1/_3$ Acre to $^1/_5$ Acre Lots


Hamilton Meadows 3.65 DU/AC


Upper Albany 4.75 DU/AC

III. Land Use Test Scenarios

Medium - High Density

- Mix of Single and Multi-Family
- 5 to 8 Units per Acre


8.0 DU/AC


Sycamore Woods Gahanna 5.0 DU/AC

Urban High Density

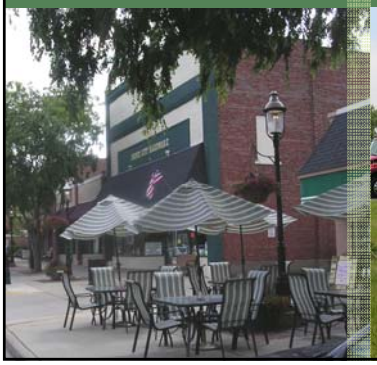
- Multi-Family, Townhouses, Condos, Apartments
- Greater than 8 Units per Acre


German Village 9.5 DU/AC


Delaware Place (infill) 18.0 DU/AC

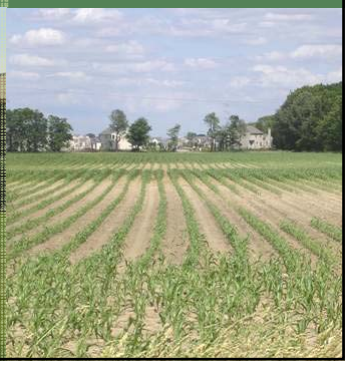
III. Land Use Test Scenarios

Commercial
- Retail and Office Uses and Services
- Support Population
- Neighborhood Scale
- Enhance Tax Base



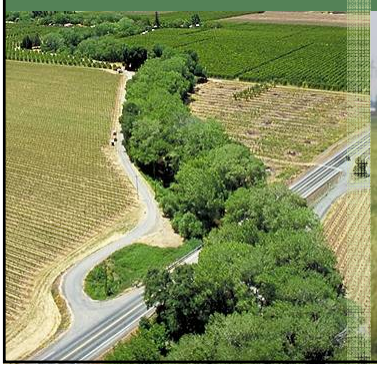
Public/Institutional
- Community Facilities
- Schools, Fire, Police, Recreation, Government Services

Agriculture
- Active Farmland
- Row Crops



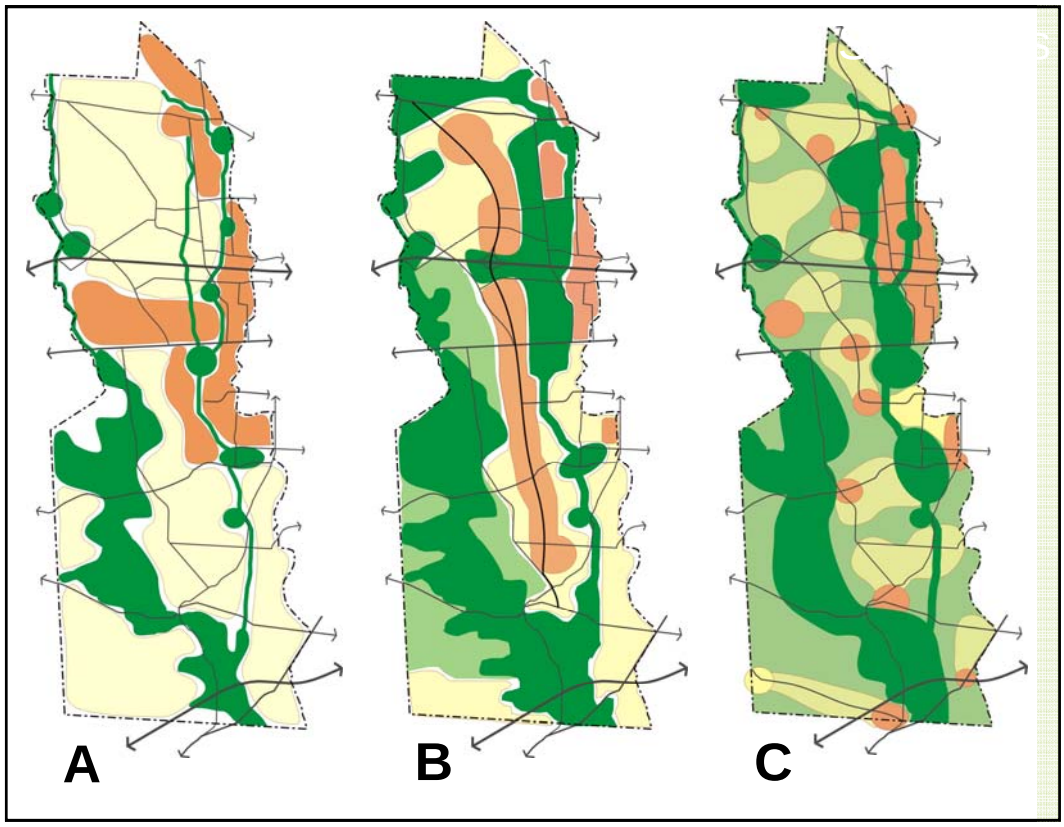
III. Land Use Test Scenarios

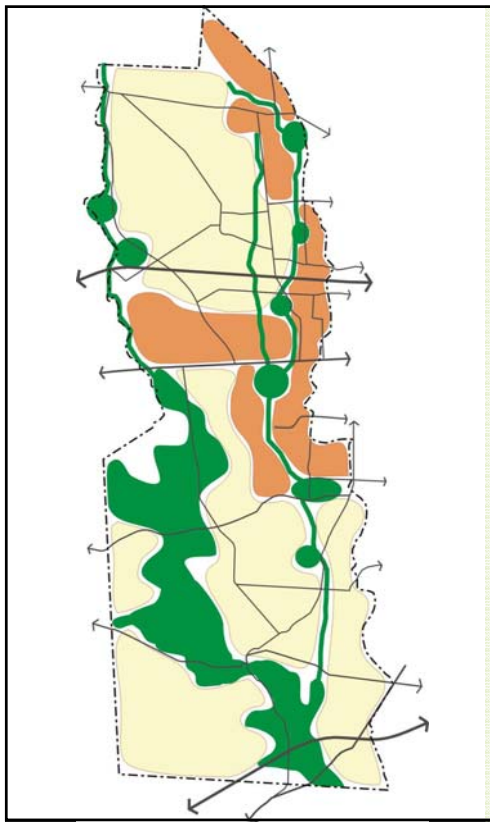
Riparian Woods
- Undeveloped
- Along Stream Corridors
- Public or Private
- Protect Floodplains
- Filters Pollutants



Open Space
- Undeveloped
- Pasture, Prairie, Brush, Woods
- Public or Private
- Multi-functional

Recreation Park
- Developed and Programmed
- Typically Public
- Active Recreation Facilities

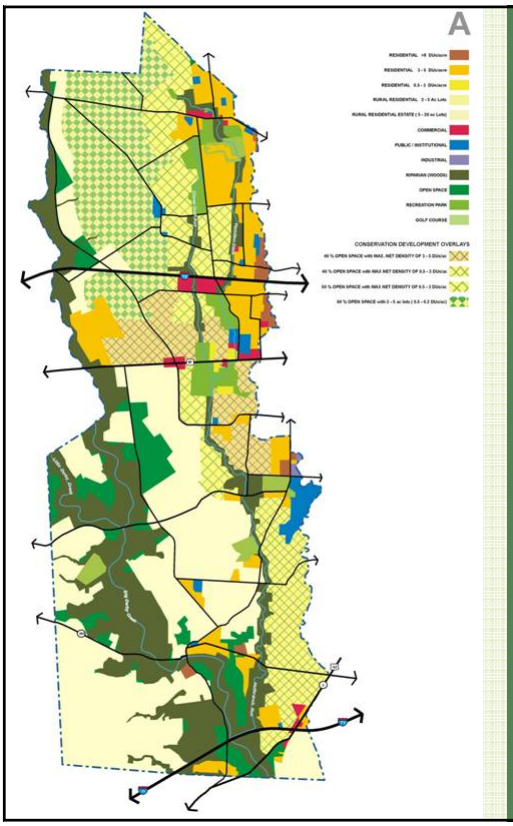




Scenario A

Overall Intent:

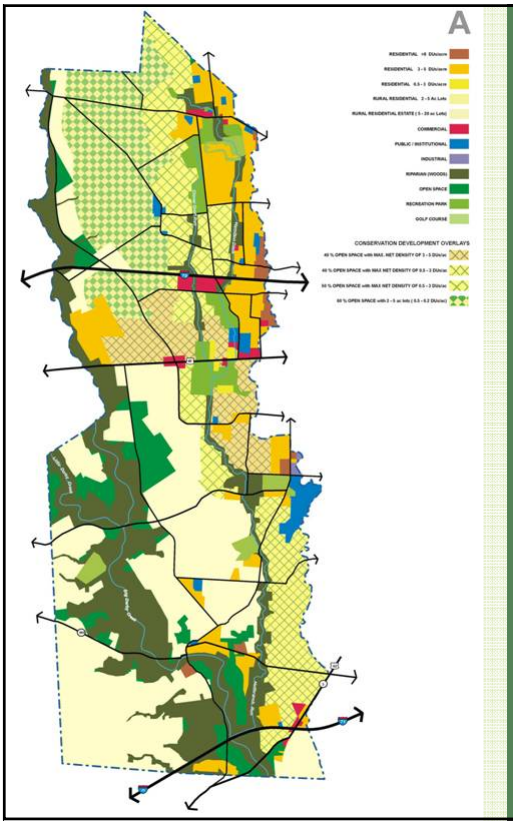
- Mirror Current Policies
- Residential Focus
- Promotes Rural, Mostly Low Density Development
- Most Dense Development in East
  - Near Clover Groff, Hamilton and Hellbranch
  - West Broad Street
- Transition to Lower Density Patterns in West



Scenario A

Important Factors

- 58% (32,000 Acres) Developed
  - Includes only Developed Portion of Conservation Development
  - Half (15,000) is in Rural Estate
  - 3,000 Acres in Open Space
- Significant Amount of Conservation Development (Occupies 17,000 Acres)
- Open Space Achieved Through Conservation Development
  - Linking Open space of Conservation Design Subdivisions Can Create Larger "Environmental corridors"
- If Open Space Within Conservation Dev. is Included in Total Developed Area, 73% of Planning Area is Developed
- 43% Developed Within ¼ Mile of Stream Corridors



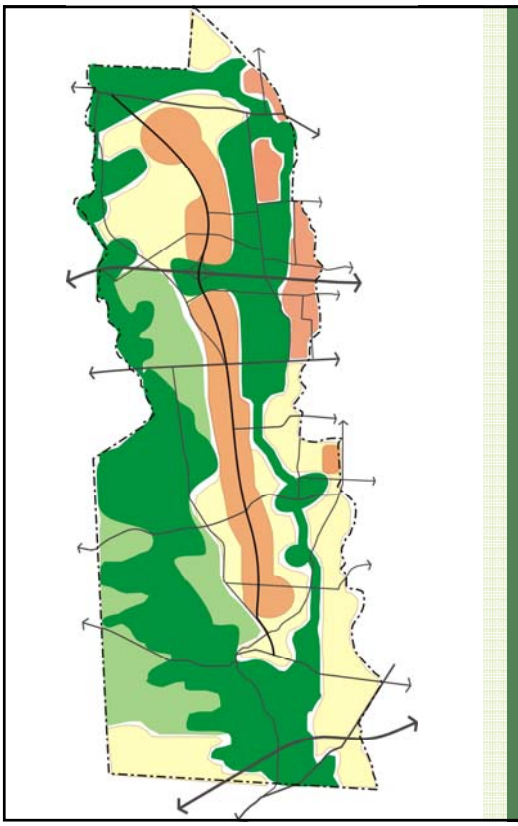
Scenario A

Important Factors

- Landscape Loses Agrarian Character and Promotes Uniform Low Density Pattern
- Growth Corridors Along I-70 and West Broad Street
  - Commercial Centers near Hilliard Rome Road, Amity Street, and I-71/Harrisburg Pike

Utility Considerations

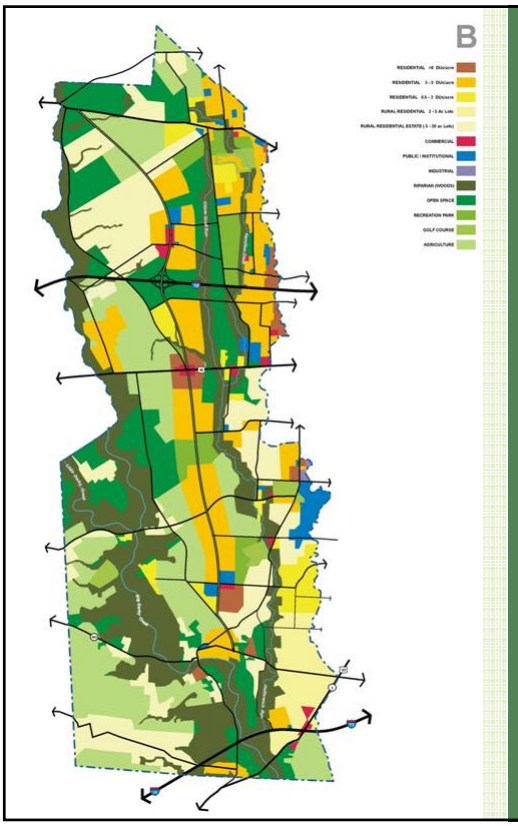
- Rural and Dispersed Pattern is More Difficult to Service With Central Sewer
  - 15,000 Acres of Rural Estate Development
  - Conservation Development Pattern Occupies Significant Area
  - Septic Is Likely to Remain a Significant Part of Planning Area



Scenario B

Overall Intent

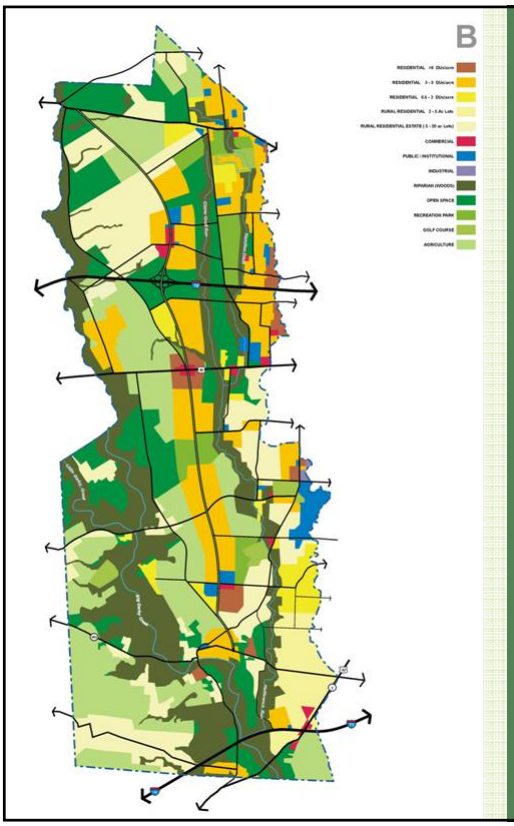
- Development Focused in Central Corridor
  - Less Sensitive Areas
- Corridor is Flanked by Lower Density Residential Development
- Shifts Development Away from Clover Groff and Hamilton Ditches
- New I-70 Interchange
- Supports Agricultural Uses
- Expanded and Connected Park and Open Space Network



Scenario B

Important Factors

- 44% (24,000 Acres) Developed
  - 89 Acres Rural Estate Residential
  - No Conservation Development
  - 8,000 Acres of Medium and High Density Development
- 10,000 Acres in Agriculture
  - Long Term Viability of Agriculture Would Likely Require Incentive Programs
- Almost 8,000 Acres of Consolidated Open Space
  - Program to Guide Density to the Corridor and Preserve Open Space Would Be Needed to Address Equity to Landowners
- 32% Developed Within ¼ Mile of Stream Corridors



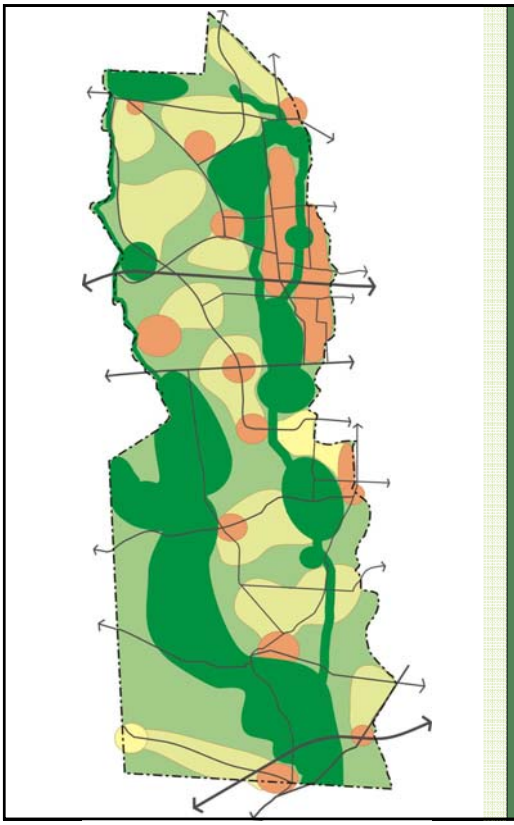
Scenario B

Important Factors

- Centers of Activity with Commercial, Public/Civic and Residential Uses
  - Near Roberts/Walker Road, Along West Broad Street, and Near Kropp Road
- New North-South Parkway and Other Roadway Improvements
  - Creates Opportunities to Concentrate Development Away From Sensitive Areas
  - Would Require Significant Infrastructure Investment and Sensitive Design
- Distinct East/West Divide Between Suburban and Rural Character

Utility Considerations

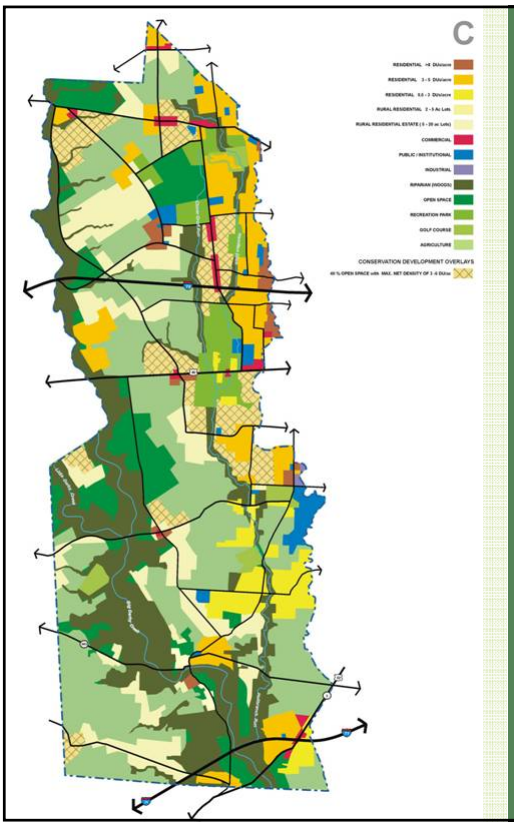
- Concentrated Development Pattern Favors Central Sewer
  - Could Link to Transition Zones and Reach Less Dense Developments



Scenario C

Overall Intent:

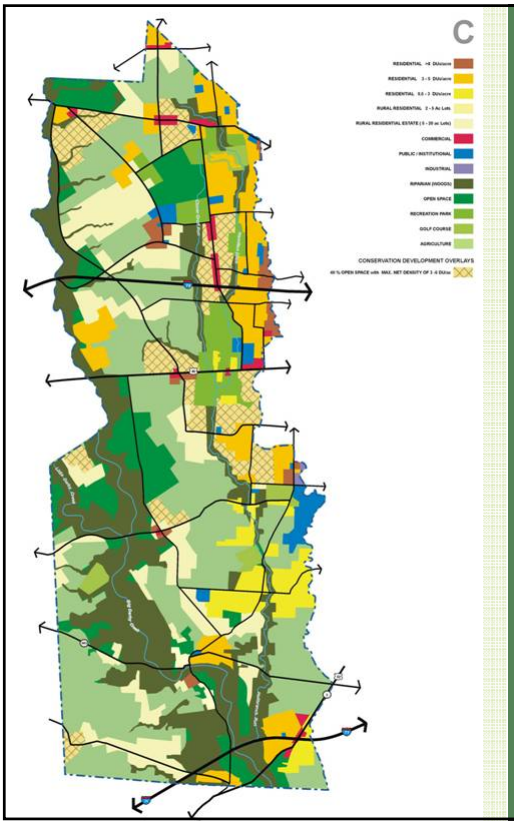
- Concentrated Clusters of Development
- Incorporates Existing Nodes of Development
- Creates Centers of Activity and Preserves Rural Character
- Higher Densities in Focused Nodes with Mix of Uses
- Supports Agriculture as Transition Between Nodes and Parks and Open Spaces



Scenario C

Important Factors

- 36% (20,400 Acres) Developed
  - 6,000 Acres in Rural Estate Residential
  - About 4,000 Acres in Conservation Development
- Development Clusters Surrounded by 16,000 Acres Agriculture
  - Long Term Viability of Agriculture Would Likely Require Incentive Programs
- Almost 5,000 Acres of Open Space in Interconnected Network
  - Program to Preserve Open Space Would Be Needed to Address Equity to Landowners
  - Large Park and Conservation Area Along Clover Groff and Along Hellbranch
- 29% Developed Within ¼ Mile of Stream Corridors



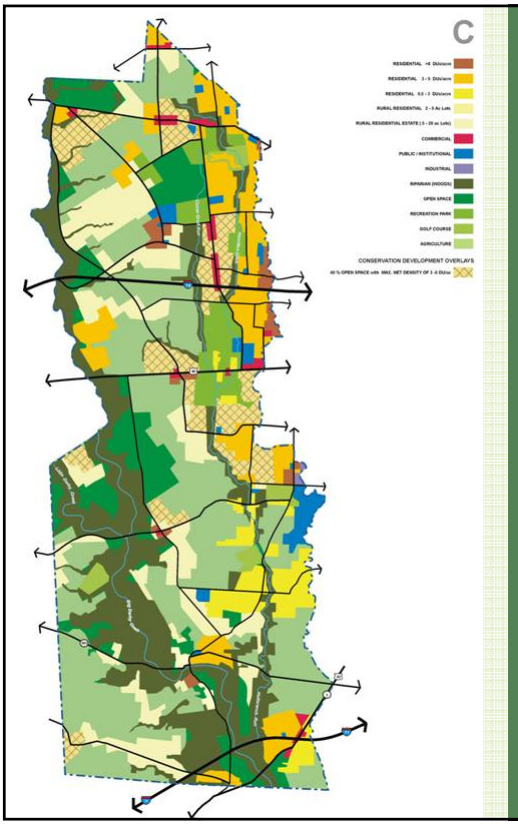
Scenario C

Important Factors

- Creates Sense of Villages Surrounded by Farmland and Rural Development
- Conservation Development Is Promoted Near Stream Corridors

Utility Considerations

- Pockets of Concentrated Development Would Make Centralized Sewer More Feasible
- Rural Densities Would Likely Remain on Septic Systems



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III. Land Use Test Scenarios

Scenario Summary:

	Land Developed	Build Out Housing Units		Build Out Population	
A	32,417	25,930	53,682	66,899	138,501
B	24,442	29,538	52,942	76,207	136,590
C	20,427	27,614	50,351	71,245	129,907

Total Study Area Equals 56,027 acres

Population Projections Determined By Multiplying the Number of Housing Units by Average Household Size of 2.58

Land Developed

- Scenario A: 58% Developed
- Scenario B: 44% Developed
- Scenario C: 36% Developed

Population Growth

- The Number of Units Varies According to Density
- Current Population is About 31,000
- Average Build Out Population of 100,000

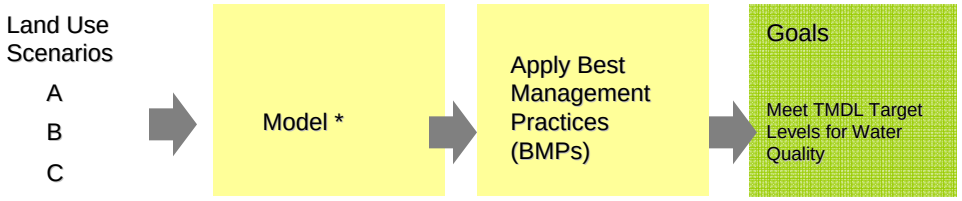
III. Land Use Test Scenarios

Land Use Comparison:

Land Use	Existing	Scenario A	Scenario B	Scenario C
Agriculture	32,872	0	10,277	15,659
Park & Open Space (Includes riparian and cons dev. open space)	8,120	24,272	21,971	20,604
Rural Residential	7,141	17,496	10,196	8,054
Suburban / Urban Residential	4,993	10,923	9,574	8,006
Public	620	781	947	933
Commercial	224	498	337	464
Industrial	42	42	42	42
Other Uses (Major Roads & Transportation etc.)	2,014	2,014	2,682	2,264
Total acres	**56,026**	**56,026**	**56,026**	**56,026**

III. Land Use Test Scenarios

Evaluating Test Scenarios



* Model estimates flow and pollutant level run off from varying land uses

III. Land Use Test Scenarios

Why Model?

- One of Several Evaluation Tools
- To Better Understand Impacts of Land Use Changes on Hydrology and Various Pollutants
- Facilitate selection of suitable BMPs
- Enhance development regulations and processes

Model Components

- In Consultation with OSU
- OEPA Provided Input on Process and Shared TMDL Model Information
- Goal: Meet OEPA Water Quality Goals

III. Land Use Test Scenarios

Ohio EPA

- Biological Assessments
- Habitat/Use Attainment
- TMDL
  - Target Pollutant Loading
  - Stream Baseflow Considerations

EAG Recommendations

- Performance Based Stormwater Criteria
- Stream Buffer Requirements and Preservation
- Conservation Development Recommendations

Hellbranch Watershed Forum

- Policy Recommendations for Riparian Buffer, and Floodplain and Stormwater Management
- Pollutant Loading Analysis
- BMP Characterization

III. Land Use Test Scenarios

MODEL OUTPUT

Depth of Flow and Flow Rate

- Calculation Relating to Volume of Water Flowing to Streams
- Flow relates to Rate or Speed of the Water

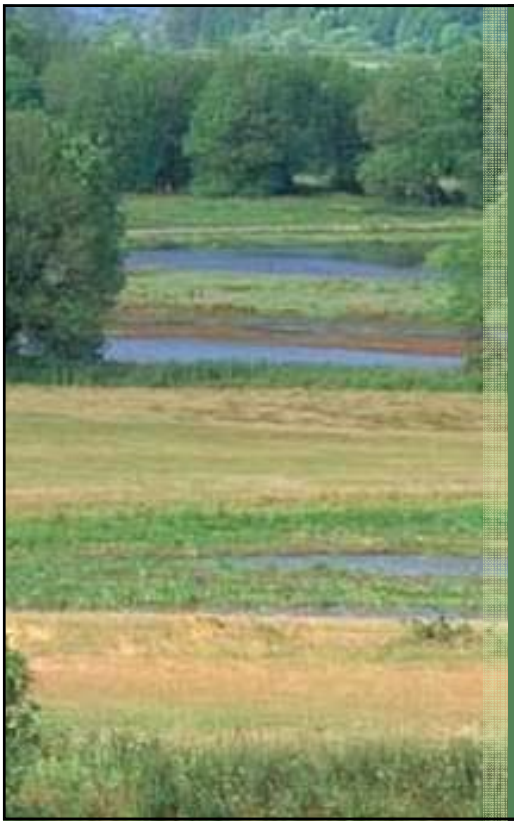
Total Suspended Solids

- Sources Include Erosion of Soil And Wash-off of Dirt and Other Accumulated Solids From Impervious Surfaces
- Turbidity and Deposited Sediment Can Smother Creek-bottom Habitat and Destroy Breeding Areas
- Other Pollutants May Bind to Sediment Particles and be Transported to the Stream

Nutrients

Phosphorous and Nitrogen

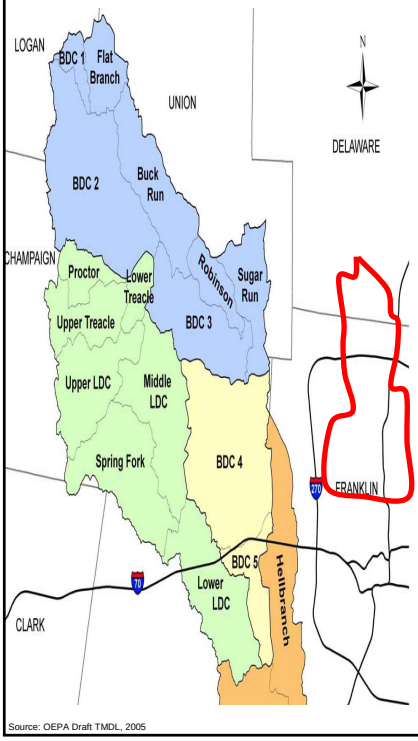
- Primary Components of Lawn, Garden and Crop Fertilizers
- Released During Decomposition of Organic Matter Like Leaves, Grass Clippings, Food and Animal Wastes
- Excessive Concentrations In Streams and Ponds Can Promote Algal Blooms
  - Excessive Algal Growth Affects Dissolved Oxygen Levels
  - Impacts Organisms And Stresses Stream



III. Land Use Test Scenarios

Steps to Modeling

- Understand OEPA (TMDL) Targets
- Test Model on 500 Acre **Pilot Study** Area
- Better Understand How Certain Factors Affect Output
  - Agriculture
  - Open Space
  - Riparian Areas
  - Conservation or Conventional Development



III. Land Use Test Scenarios

Modeling Steps:

1. Prepared Existing Base Land Use
2. Develop Model – *SWAT*
3. Using Base Land Use Calibrate Model to Existing Measured Pollutant Loading in Hellbranch Run
4. Run Scenarios A, B, and C
5. Compare A, B, and C Results with Calibrated Base Land Use
6. Compare A, B, and C Results with Calibrated Base Land Use and TMDL
7. Identify Target Reductions

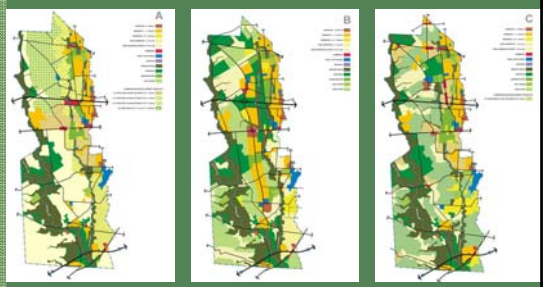
Challenges:

- Extracting TMDL Recommendations to Specific Study Area
  - Portions of TMDL Subwatersheds In Study Area

III. Land Use Test Scenarios

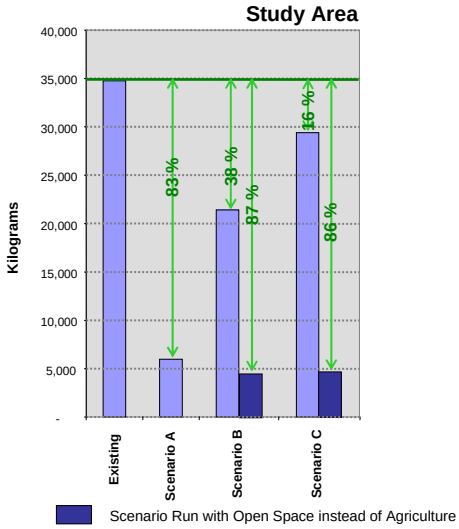
Model Output:

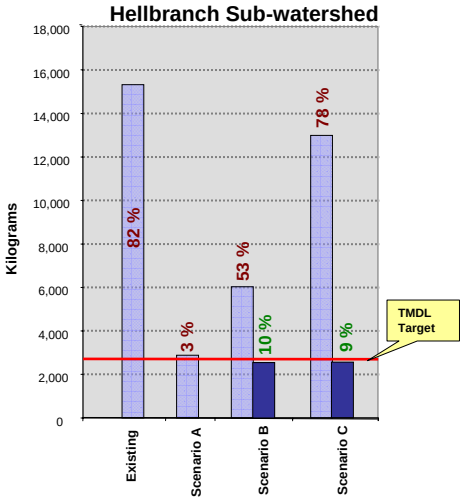
- Values Received
  - Total Suspended Solids
  - Nitrogen
  - Phosphorous
- Compare Scenarios to Baseline for Pollutants and Flow
  - Re-run Scenarios B and C replacing Agriculture with Open Space
- Compare Hellbranch Portion of Study to TMDL
  - Determine Percent Reductions Needed for Hellbranch



III. Land Use Test Scenarios

Total Phosphorous (P) Levels





Scenario Run with Open Space instead of Agriculture

xx % Percent Reduction Achieved

xx % Percent Reduction Required

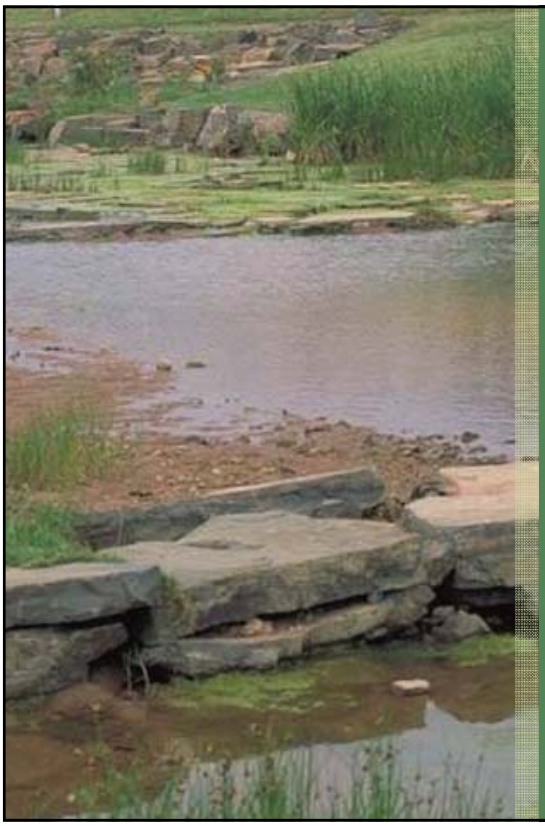
Note: Assumes No BMPs

III. Land Use Test Scenarios

Comparison of Performance Factors

Summary for Hellbranch Run Sub-watershed

Scenario	% Reduction Required to Meet TMDL			Flow (% Reduction to Maintain)	score	Relative Required BMP Level
	N	P	TSS			
Existing	79	82	95	-	256	High
Scenario A	35	3	91	14	143	Medium Low
Scenario B	53	53	95	9	210	Medium
Scenario B with No Ag/Better Ag Practices	27	(10)	91	8	116	Low
Scenario C	72	78	96	15	261	High
Scenario C with No Ag/Better Ag Practices	27	(9)	89	14	121	Low



III. Land Use Scenarios

Summary of Model Output

- All Scenarios Improve Upon Existing Conditions for Nitrogen and Phosphorous
- Total Suspended Solids and Flow Show Varying Levels Among Scenarios
- Open Space Lands Improve Water Quality Output
- Agriculture Has Significant Impact on All Model Results
  - Scenario A (no Ag) Outperforms B and C (with Ag)
  - Modifying Agriculture Practices in B and C Causes B and C to Outperform A
  - Application of Ag BMPs Would Help Reduce Impacts
- BMP Efficiencies Will Further Improve Results

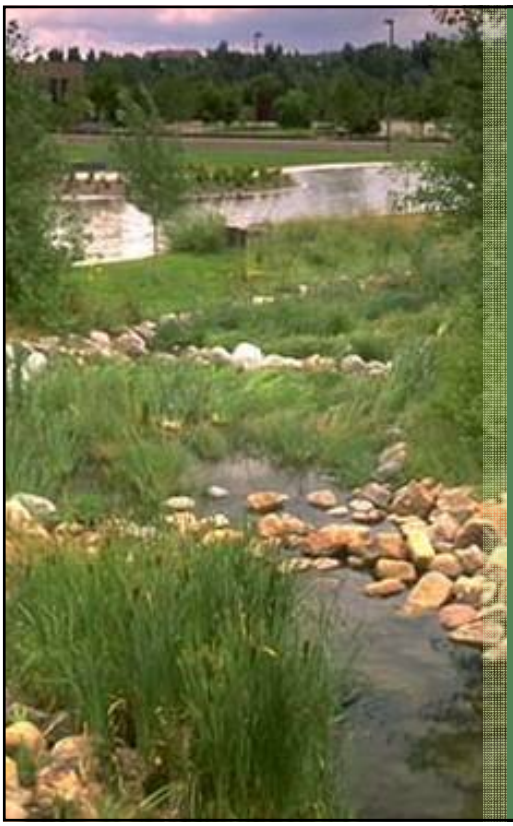
Source: Stream Restoration Guidebook, NC Stream Restoration Institute

Source: ODNR Stormwater Management Practices

III. Land Use Scenarios

Best Management Practices

- Provide Pollutant Removal Benefits, Among Others
- Control Stormwater Run-off
- Can Contribute to Site Design and Quality of Life
- Can Be Applied to New Development and Retrofitted Into Existing Developments
- Vary in Size, Scale, Cost, and Applicability
- Requirements Based on Development Permitting Process



III. Land Use Scenarios

Best Management Practices

- Currently Evaluating BMP Effectiveness
- Development Must Meet the Statewide General Stormwater Permit as a Minimum
- OEPA is Considering a More Stringent Stormwater Permit for Darby Watershed
- Darby Accord Process Will Also Seek Increased Levels of Protection

III. Land Use Scenarios

Example Lot Level BMPs

- Easements
- Filter Strips
- Grassed Waterway or Swale
- Porous Pavement

III. Land Use Scenarios


Riparian Buffers


Bio-retention/Bio-swale

Example Development Level BMPs

(may also apply at watershed or site level)

- Conservation Development
- Site Design (Reduced Impervious Surface)
- Stream Restoration
- Riparian Buffers
- Bio-retention
- Underground Storage
- Infiltration Trench
- Detention Ponds
- Sand Filters
- Sediment Forebay

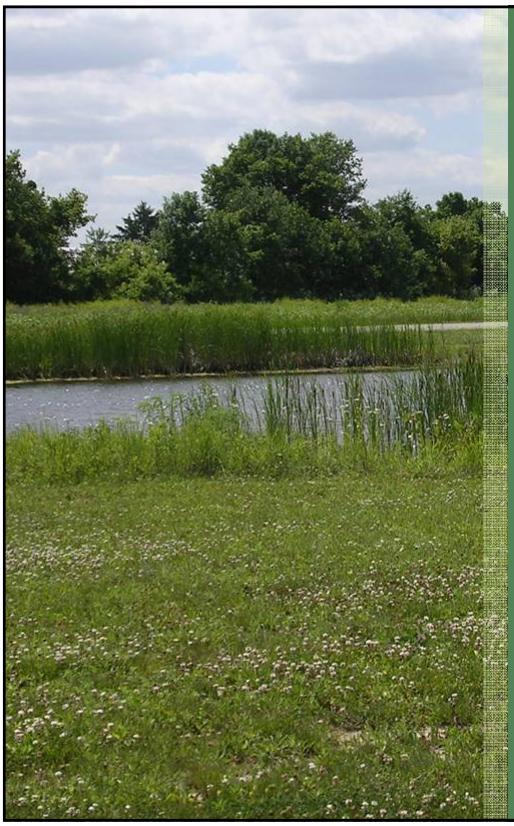
III. Modeling Scenarios

BMP Evaluation

CATEGORIES OF BEST MANAGEMENT PRACTICE	Pollutant Removal Efficiency *			Scale of Use		
	Total Suspended Solids (TSS)	Total Nitrogen (TN)	Total Phosporous (TP)	Watershed-level	Development-level	Lot-level
Stormwater Detention				x	x	x
Dry Basin	60-90%	20-30%	20-40%			
Wet Basin	80-90%	40-80%	30-40			
Stormwater Wetland	70-99%	50-99%	40-99%			
Infiltration Practices					x	x
Bio-retention	75-80%	50%***	65%***			
Sand Filter	75-95%	20-80%	30-70%			
Conservation Practices				x	x	x
Grass Swale	60-80%	40-90%	10-45%			
Riparian Buffer	60 - 80%	40%**	50%**			

As reported by the HWF ("Pollutant Loading Report")
**From Tom Schueler (CWP) documents
*** USEPA Data Source
This List is Not Intended to be Comprehensive

- BMPs Can Provide Significant Pollutant Removal Benefits to Help Achieve TMDL Targets
- Must Consider Issues Related to Function and Sustainment of BMPs
- Function: Detention, Infiltration, Pollutant Removal, Scale, Habitat Impact
- Sustainment: Maintenance, Cost, Safety, Appearance

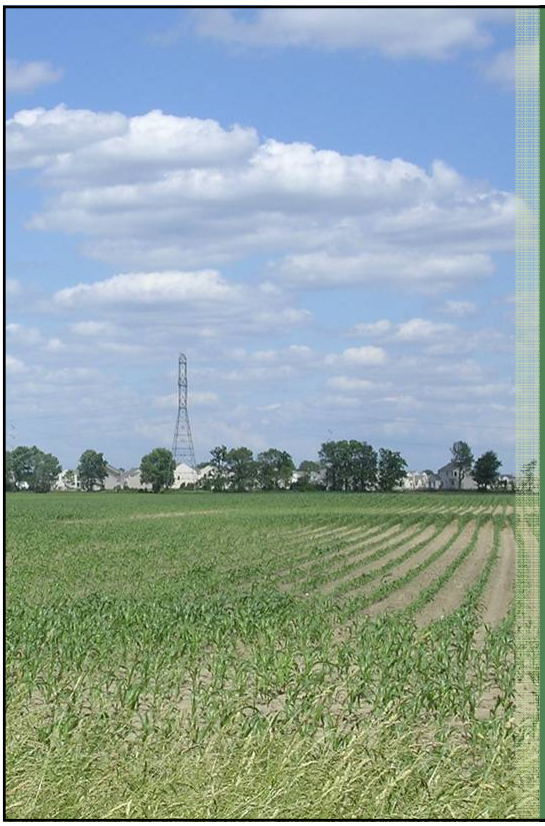


III. Land Use Scenarios

Application of BMPs

- Must Provide Increased Level of Protection
- Need Mechanism to Ensure BMP is Working (pre and post construction)
- Need a Consistent Approach to Monitor Site-Level Water Quality
  - Could Incorporate Stream Monitoring
  - Partnership Between Jurisdictions and Agencies

Conclusion



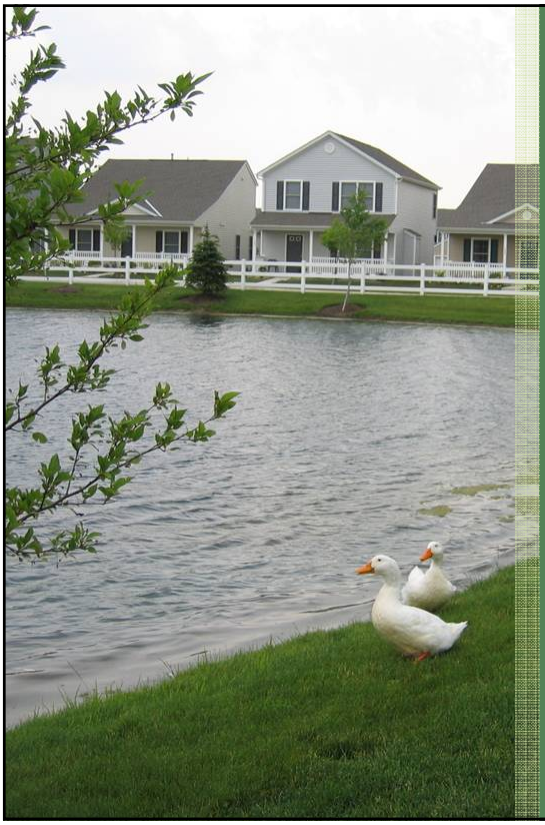
Discussion Topics

Process

- The Big Darby Accord Process is Important (and historic) for Central Ohio
- Balancing Multiple Interests is Challenging
  - 10 Jurisdictions, Private Property Owners, the Environmental Community, and Other Private Interests
- Next Step – Preferred Plan

Land Use / Growth Pressures

- What Proportion of Central Ohio's Growth Should be Accommodated Within the Study Area?
- Development Pressure Continues
- What is the Future of Farming?



Discussion Topics

Land Use Pattern

- Protecting Sensitive Areas is Critical to Watershed Health
- Conservation Style Development (Clustering Development) Helps Protect Water Quality
- Open Space Has Multiple Benefits

Infrastructure

- Multiple, Small Clusters of Development Would Likely Have a Higher Infrastructure Cost Than Fewer Larger Clusters of Development
  - Sewer vs. Septic
  - Roadway Improvements
  - Public Facilities

Discussion Topics

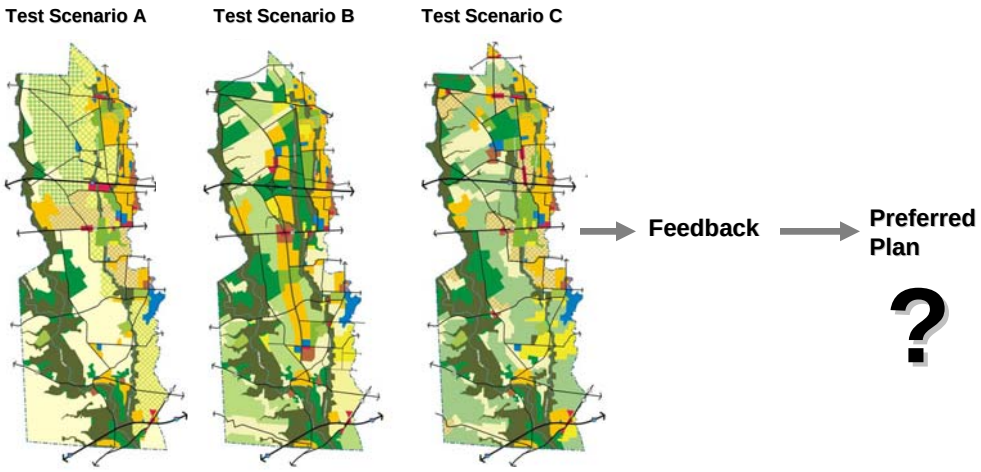
Environmental / Best Management Practices (BMP)

- Stormwater Policies
- Implement BMP Program
- Implement Monitoring Program to Ensure Water Quality Improvement
- Encourage Use of Best Practices for Agriculture Activities
- Address Septic System Issues

Implementation

- Need to Implement Near Term (or Interim) Agreement to Address
  - Development Pressure
  - Next Steps for the Accord
  - Commitments to Changing Policies
  - Financial Requirements
  - Infrastructure Provision

IV. Feedback



IV. Feedback

Small Group Work Sessions

- 45 Minutes to Discuss Information Presented and Provide Feedback
- Feedback Helpful In Formulating Development of Preferred Plan
- Questions to be Answered:
  - What Programs are Critical to Protection of the Watershed While Balancing the Need for Protection?
  - What Do you Like and Dislike about Each Scenario?
- Report Back

www.franklincountyohio.gov/BigDarbyAccord

Additional Input Opportunities:

- Project Phone Line 614.462.5629
- Comment Sheets
- Future Public Meetings