THE GREEN LEAP A

Holistic Approach to Designing and Managing Urban Developments for Biodiversity

Mark Hostetler

Program for Resource Efficient Communities

Dept. of Wildlife Ecology & Conservation

UF UNIVERSITY of FLORIDA

IFAS Extension

Overview

- Phase I: Design (subdivision scale)
- Phase II: Construction
- Phase III: Post-construction

Design


Construction


Post-construction

Phase I: Design

Concept Plan for Woodlands, NC; Design: Principal Lawrence Group

Concept plan for Town of Harmony. Harmony Development Co.

Source: http://www.harmonyfl.com/tc.asp

Use established ecological principles

Circular patches are better than irregular

- Minimizes edge effects (which tend to be damaging to specialist species)

Better → Worse

Use established ecological principles

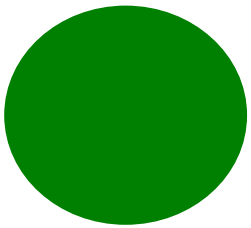
- Large patches are better than small
  - Edge = 1st 300 ft (100m) into a patch
  - 7. 4 acres (3 ha) circular patch is all edge; 89 acres (36 ha) circular patch has equal amounts of edge and interior

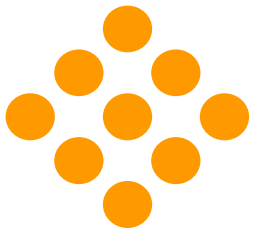
Better → Worse

Use established ecological principles

- One large patch is better than many small
  - Small and fragmented = more edge and thus limited to small species and generalists

Better → Worse



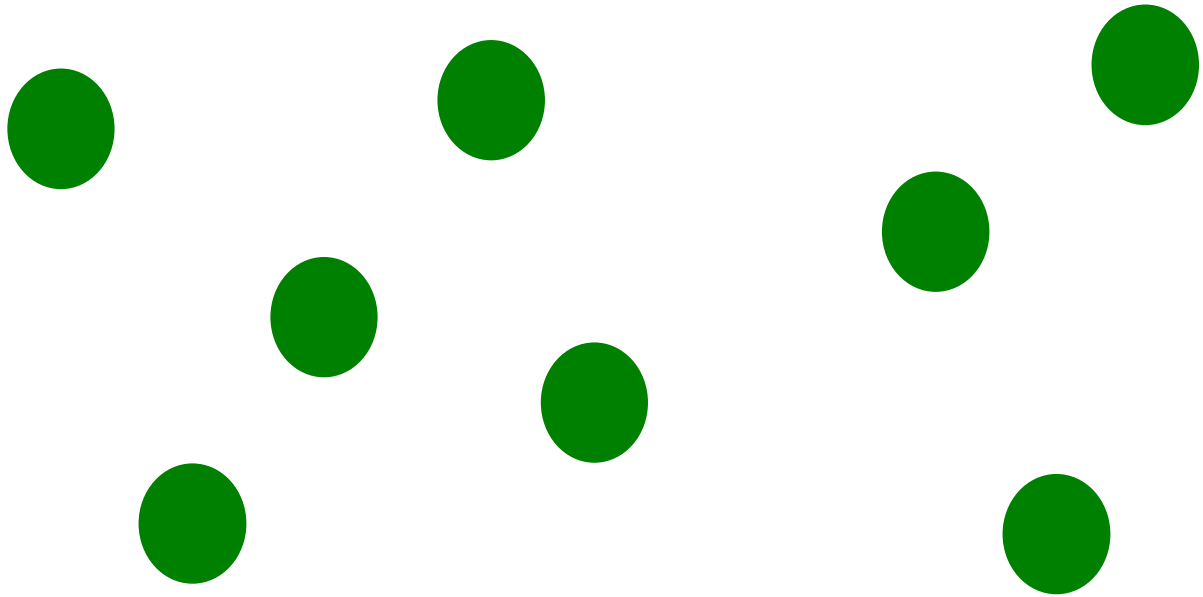


Use established ecological principles

- Patches connected by corridors are better
  - Established and natural is better than new and human-made
  - wide is better than narrow, include both dry and wet areas
  - River corridors should include the entire floodplain and at least one upland bank

Use established ecological principles

- But small patches are also important!



Forest Fragments: Stopover Sites

- Migrants (short and long distance)
- Yes, interior forest species
- Many species use urban forests to refuel

Neotropical Migrants


Yellow Warbler


Yellow-throated vireo


Black throated green warbler

allaboutbirds.cornell.edu

Building for Birds

- Evaluate different development designs
- Bird scores
- Pick optimal designs

Evaluation Tool

Step 1 : General Development Information

In this step, give particulars about the development site for the scenario. Estimate the original amount of early successional forest/shrubland and late successional forest across the entire site. For tree canopy cover in built areas, estimate tree

Read more

Name* Enter your name

Email* Enter your email

location* nearest city state

Scenario* Choose your Scenario

Project Name*

Total Project Area(in acres)*

Step 2 : Forest Fragments as Breeding & Wintering Habitats

Step 3 : Forest Fragments as Stopover Habitat

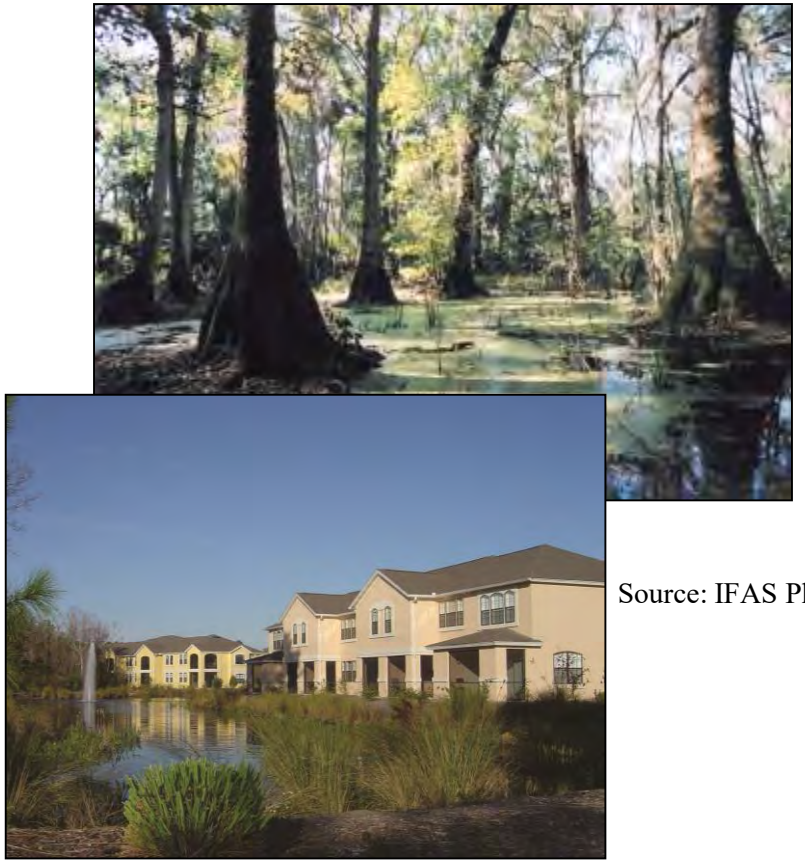
Step 4 : Tree Canopy Cover within the Built Matrix

Step 5 : Calculate Score(Submit)

wec.ifas.ufl.edu/buildingforbirds

Implications – Conserving All Wetlands on a Site

- **Can lead to "fragmented landscape"**
- **Can compromise biodiversity, livability, and transportation issues**
- **May want to design a more compact community and build on dilapidated wetlands**
- **Could use these areas to create enhance stormwater retention areas**



Source: IFAS Photos

Retention pond, Florida Photo: PREC

Phase II: Construction

Goals

- Improve biodiversity on site
- Minimise impacts on nearby habitat

Going native?

- When used on individual lots, helps engage residents to care for nearby natural habitat

Prairie Crossing, IL photo: Victoria Ranney

Lots

Save Money – Over $1000 per lot
(Madera case study)

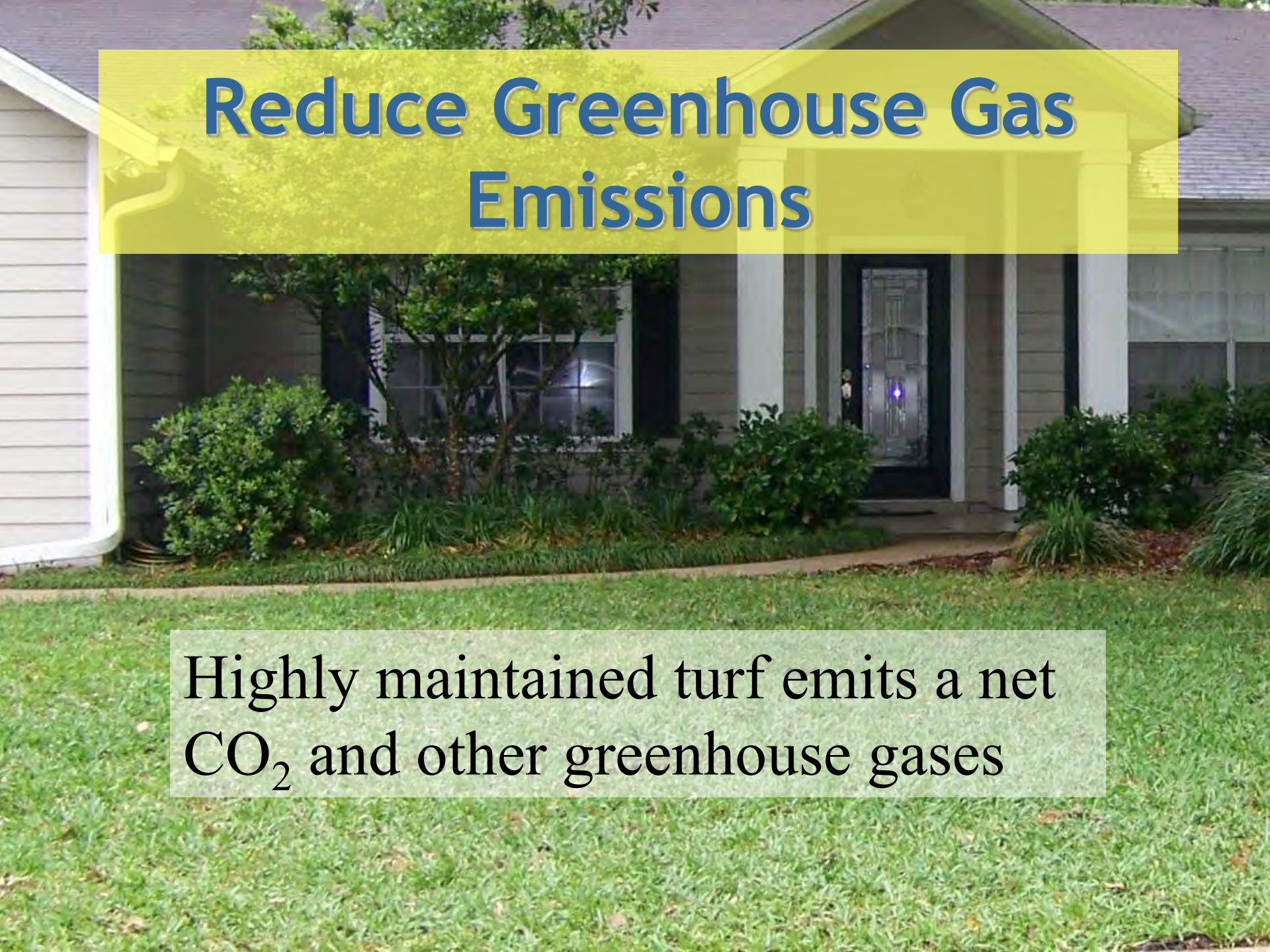
Gainesville, FL PhotoWendy Wilbur

Gainesville, FL PhotoWendy Wilbur

Reduce lawn

- Reducing lawn is an important thing you can do to reduce environmental impact and to increase biodiversity
- Lawn is like green concrete to most indigenous wildlife species
- Instead of turf, add vegetable gardens to increase local produce

Reduce Greenhouse Gas Emissions



Highly maintained turf emits a net CO_2 and other greenhouse gases

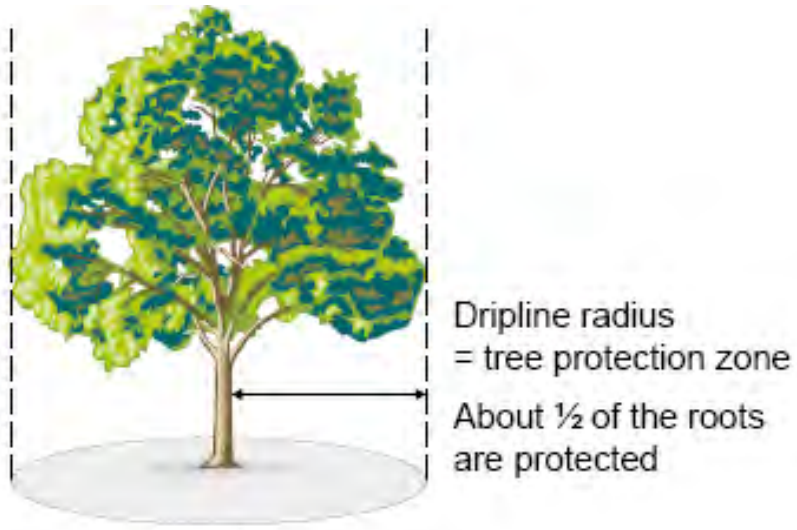
Protect trees and natural areas

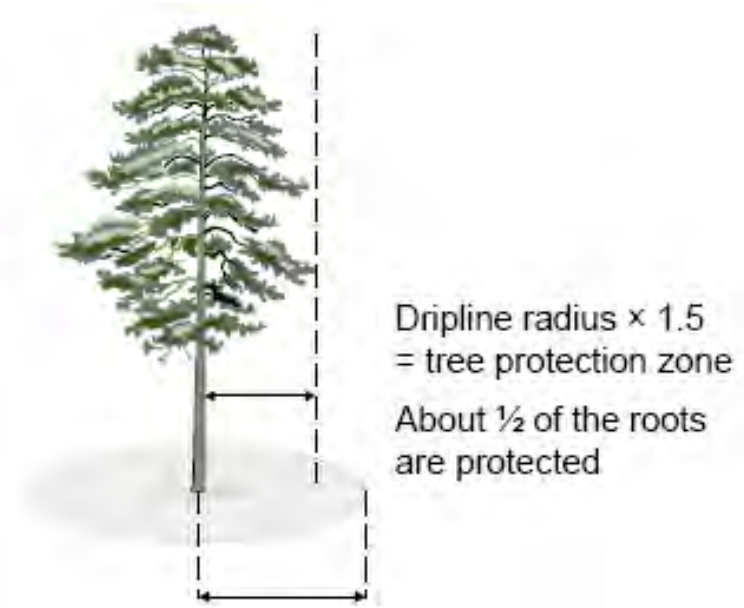
- Improper construction techniques can kill trees and dramatically impact any conserved natural areas

Photo: epublications.bond.edu.au

Protect trees and natural areas

- Proper fencing of driplines





Source: Program for Resource Efficient Communities, Univ. of Florida

Protect trees and natural areas

Source: Program for Resource Efficient Communities, Univ. of Florida

Impacts of lowering or raising the grade

- Lowering removes root mass
- Raising smothers roots

Protect trees and natural areas

- Minimal routes for heavy machinery
- Mulch and water
- Proper pruning and trenching

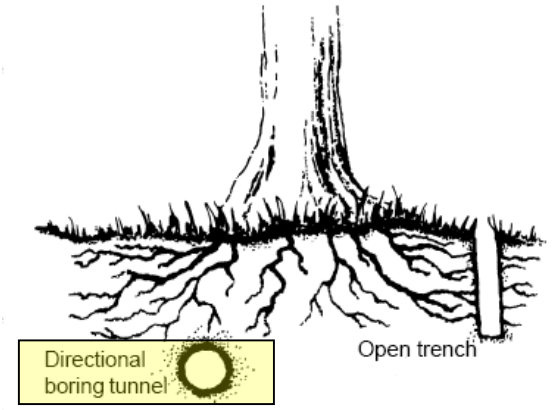


Photo: epublications.bond.edu.au

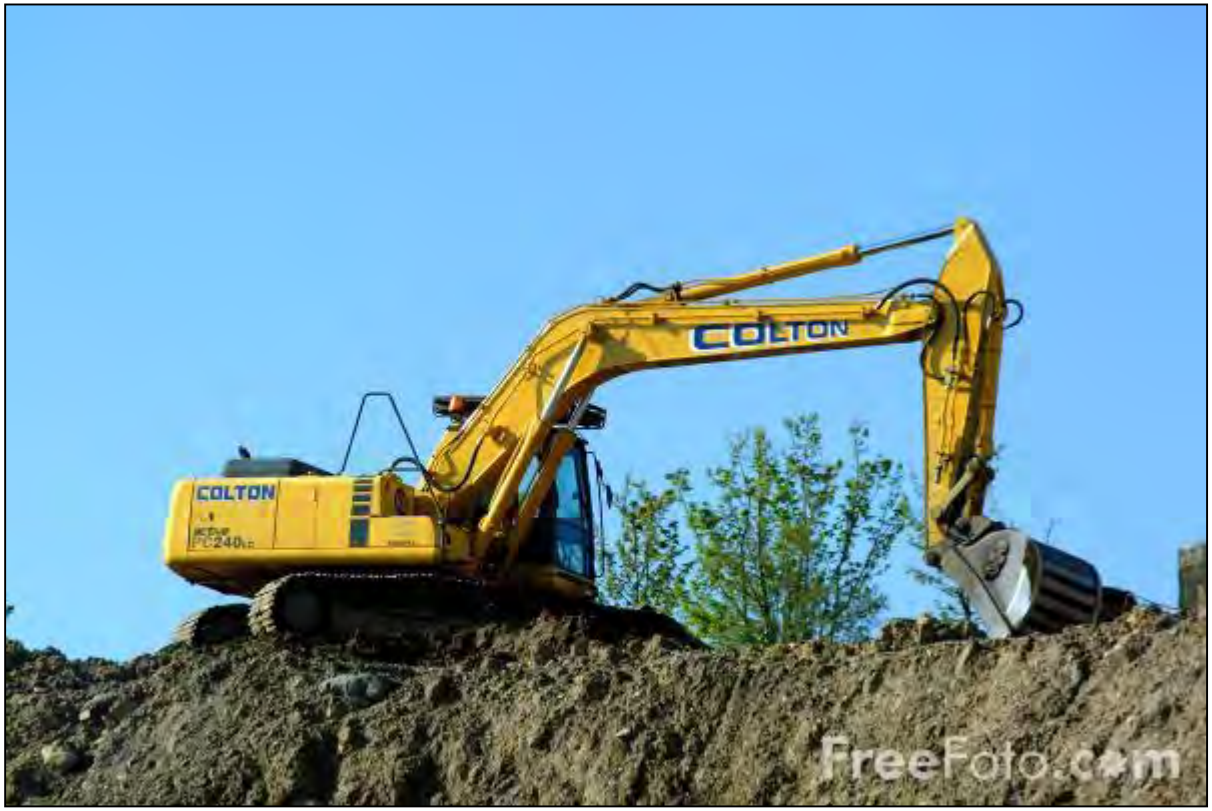
Protect trees and natural areas

- **Make sure buffers are off limits to machinery!**

Photo: Jeannette Hostetler

Protect trees and natural areas

- Identify and remove invasive exotics
- Particularly from earthwork machines



Source: freefoto.com

Protect trees and natural areas

- Stem wall construction!
  - Best thing that can be done
  - This limits fill dirt and grading
  - Protects soil organic matter and biota
  - Subsequent installed landscaping requires less water and fertilizers!

Phase III: Post-construction

Long-term management is critical!

Potential Problems (post-construction)

- Drawing down water table
- Spread of invasive plants and animals
- Improper management of LID features
- ATVs and foot traffic into conserved areas
- Nutrient runoff from lawns an impervious surfaces
- Underground seepage from septic tanks
- Improper management of stormwater systems
- Improper fertilizer and pesticide use
- Impacts of pets
- Feeding wildlife and other human/wildlife conflicts
- Conflicts with nearby agriculture and forestry operations

Phase III: Post-construction

Any design, even if installed properly, can fail if homeowners are not engaged!

Education program

- *Dynamic Educational Signs*
- *A Web site*
- *Covenants & brochure for homeowners*

Dynamic signs

- Water
- Energy
- Wildlife
- Pollinators/Insects
- Native Landscaping
- Natural/Human History & Conservation
- Lacustrine Habitats

Source: Harmony, FL

Dynamic signs

Source: Harmony, FL

Longitudinal study

- Harmony vs. conventional (Results)
  - Sufficient information to apply practices
  - Improved environmental attitudes, knowledge, and behaviors
  - Most residents used the dynamic signs

Source: Harmony, FL

Management of Open Space?

Conducting prescribed burns?

Controls invasive exotics?

Who is responsible for management and who pays for it?

Prescribed Burn at Ichauway (Newton, GA)

Source: http://www.jonesctr.org/conservation/prescribed_fire/graphics/chelcy_torch1.jpg

Management of Open Space?

State, county, city, or private entity?

- State Agency (water management district)
- Park & Recreation, etc.
- Private land management entity
  (e.g., Nature Conservancy or even a land manager)
- Developer
- Homeowner association
- Landscaping company

Securing permanent funding

- Portion of lot sales
- Portion of sale of development rights (e.g., conservation easements)
- Income from hunting leases, forestry, and even agriculture
- Monthly contribution to HOA dues
- Impact fees for development that go to a natural area management entity
- Community Development District

Longleaf Pine Photo: Mark Hostetler

Summary

- **Design**
  - **Conserve compact, connected, large patches of quality habitat**
- **Construction**
  - **Native landscaping, LID, Darksky lighting, earthwork machine management, trained contractors**
- **Post-construction**
  - **Biodiversity conservation and restoration management plan, signage in neighborhood, funding mechanism (HOA dues)**


Department of Wildlife Ecology & Conservation
Mark Hostetler – hostetm@ufl.edu