

AGENDA
Commission for the Environment
December 14, 2015
7:30 p.m.

Richard Whitted Meeting Facility (Room 250)
300 West Tryon Street, Hillsborough

- | <u>Time</u> | <u>Item</u> | <u>Title</u> |
|--------------------|--------------------|---|
| 7:30 | I. | Call to Order |
| 7:32 | II. | Additions or Changes to Agenda |
| 7:35 | III. | Approval of Minutes – November 9 (Attachment 1) |
| 7:40 | IV. | Proposed Rule Changes for Airport Development Michael Harvey (Orange Co. Planning and Inspections) will present a draft amendment to the regulations governing the development of an airport in Orange County. The draft amendment was referred to the CFE, Economic Development Advisory Board, and towns of Hillsborough, Chapel Hill and Carrboro for comments. (Attachment 2) |
| 8:10 | V. | Orange County Stream Buffer Requirements Michael Harvey will brief CFE members on the County's plan to address 2015 legislation that is intended to curtail local governments' ability to protect surface water quality (and riparian habitat) by requiring stream buffers for new and existing development. |
| 8:15 | VI. | CFE News Articles / Outreach The CFE will review/discuss the latest news articles intended to educate/inform the public about issues highlighted in the Orange County State of the Environment. (Attachments 3-4) |
| 8:30 | VII. | CFE Committee Priorities The CFE will review the list of priority issues/projects identified by each committee in early 2015 so that members can consider updating and revising the list in early 2016. (Attachment 5) |
| 8:45 | VIII. | Updates and Information Items Staff and/or CFE members will provide updates on the following items: <ul style="list-style-type: none">➤ CFE Resolution re green building incentives (Attachment 6)➤ Herbicides and pesticides used at County facilities (Attachment 7)➤ Annual Report and Work Plan for 2015-16 (Attachment 8)➤ Impact of 2015 Legislation on County's dev. rules (Attachment 9)➤ County explores new ways to recycle organic waste (Attachment 10)➤ Solar bees effect on Jordan Lake water quality (Attachment 11)➤ State clean energy mandates in jeopardy (Attachment 12)➤ UN Climate Change summit preview (Attachment 13)➤ Short answers to hard questions on climate change (Attachment 14)➤ Top 10 ways to reduce carbon emissions (Attachment 15)➤ Orange Co wins Smart Fleet Leader award (Attachment 16)➤ Duke Forest LOG newsletter - Fall 2015 (Attachment 17) |
| 9:00 | IX. | Adjournment |

Next meeting: January 11 (Chapel Hill)

CFE Meeting Ground Rules (*Adopted 9/12/11*)

1. Keep to agenda topic under discussion
2. Share relevant information
3. One person speaks at a time after recognition by the Chair
4. Everyone is invited to participate in discussions / no one person should dominate discussions
5. Strive to reach consensus first before voting

Activities the CFE expects to carry out in 2016:

- Continue to update the Orange County State of the Environment 2014 report
- Continue to explore ways to improve the County's ability to foster local sustainable energy production and energy efficiency strategies, including developing incentives for increasing energy efficiency in new construction
- Recommend ways to reduce the County's "carbon footprint" and implement the County's Environmental Responsibility Goal
- Continue to help with public outreach and management efforts related to hydrilla in Eno River
- Help initiate the development of a comprehensive conservation plan for Orange Co
- Co-sponsor the annual DEAPR photography contest (*The Nature of Orange*)
- Help plan for and participate in Orange County's annual Earth Day event

Concerns or emerging issues the CFE has identified for 2015:

- The CFE will continue to advocate for an expansion of the County's commercial food waste pickup and composting services to reduce food waste in the solid waste stream
- The CFE remains interested in developing incentives for increasing energy efficiency in new construction
- The CFE will continue to learn more about environmental justice matters and incorporate relevant information and considerations in the SOE 2014 report and its other activities
- The CFE will follow closely the Solid Waste Advisory Group's discussions of how to improve the handling and disposal of Orange County's solid waste, and will advocate for better long-term solutions
- The CFE will continue to advocate for increased efforts to gather information related to water resources in Orange County and will continue to increase public awareness and understanding of water supply sources, related concerns, and what steps can be undertaken to maintain or improve the quantity and quality of Orange County water supply resources
- The CFE will continue to address, as appropriate, the critical environmental issues for Orange County as enumerated on page 3 of the 2014 State of the Environment report, which include potential adverse effects from a) invasive, non-native, plant and animal species; b) reductions in State-led collection of water resources data; c) potential drilling for natural gas in the Deep River basin; d) urban sprawl; and CFE support for e) the responsible deployment of clean and appropriately-sited renewable energy and reductions in energy use to help fight climate change

**Orange County
Commission for the Environment**

DRAFT Meeting Summary

November 9, 2015

Orange County Solid Waste Administration Building, Chapel Hill

PRESENT: Jan Sassaman (Chair), Sheila Thomas-Ambat, May Becker, Peter Cada, Tom Eisenhart, Loren Hintz, David Neal, Bill Newby, Jeanette O'Connor, Rebecca Ray, Gary Saunders, Lydia Wegman

ABSENT: Lynne Gronback, David Welch

STAFF: Rich Shaw, Tom Davis, Brennan Bouma

- I. **Call to Order** – Sassaman called the meeting to order at 7:31 pm.
- II. **Additions or Changes to Agenda** – Shaw asked to present the draft memo on the County's use of herbicides and pesticides at the beginning of the Updates and Information part of the agenda. Sassaman agreed. There were no other changes.
- III. **Minutes** – Sassaman asked if there were any comments about the meeting summary for October 12 meeting. Wegman noted O'Connor's name was misspelled on page 2. Eisenhart motioned approval as amended; seconded by Cada. Approved unanimously.
- IV. **Green Building Incentives** – The CFE continued its discussion of potential incentives for energy-efficient construction. Neal introduced a draft CFE resolution asking the BOCC to develop a green building incentives program that would rebate permitting fees for new commercial and residential construction, modeled after the program adopted by the Town of Chapel Hill for the Ephesus-Fordham planning district.

Neal said he would like to add a "Whereas statement" that recognizes Orange County's efforts to reduce energy usage at its County buildings and facilities. He offered to work on draft language with help from Bouma. Wegman suggested minor edits to the 5th Whereas statement and the final "Resolved statement."

Hintz asked if the CFE would include with the resolution the Ephesus-Fordham district FAQs that was included in the CFE materials. Neal said he would like to include only a summary paragraph that describes the Town of Chapel Hill's pilot project.

Bouma and Neal presented two alternatives for an additional "Whereas statement." CFE members chose the first alternative: "WHEREAS, Orange County is committed to reducing the energy usage of its own buildings and has invested in several successful energy efficiency projects to lower long-term costs and reduce environmental impacts;"

Hintz motioned to approve the resolution as amended and send to the BOCC for consideration and further action; seconded by Eisenhart. Approved unanimously.

Sassaman thanked Neal for drafting the resolution and moving this issue forward.

- V. **Falls Lake Rules** – Davis reported on the Upper Neuse River Basin Association's (UNRBA) ongoing efforts to improve the Falls Lake Nutrient Management Strategy (Falls Lake Rules). He showed a preview of a presentation he planned to make to the BOCC at an upcoming work session.

Davis said stage two of the Falls Lake Rules require local governments, the NCDOT, the agricultural community, and other regulated parties located in the Falls Lake watershed to reduce nitrogen and phosphorus nutrient loading to Falls Lake by 40% and 77%, respectively. He said the UNRBA is working on several projects to address serious technical and financial impediments to meeting these nutrient reduction goals.

Davis provided an overview of the following projects by the UNRBA:

1. Lake and Watershed Water Quality Monitoring
2. BMP Nutrient Credit Development
3. Development of Nutrient Credit Calculation Tool
4. Falls Lake Rules Review

CFE members asked several questions about the projects and the overall objectives of improving the water quality in Falls Lake, which provides drinking water for Raleigh.

- Hintz asked why the nutrient reduction goals were chosen if they are unattainable. Davis said Division of Water Resources staff was rushed to come up with goals, but data was lacking and model assumptions were inappropriate.
- Becker asked if the UNRBA would use a difference model than the one used by the State. Davis said they will use same model, but with more and better data.
- Sassaman asked whether there had been stream sampling performed in advance of enacting the current rules. Davis said DWR relied on whatever data existed previously and on sampling from five gages in western end of Falls Lake.
- Shaw asked if DWR is receptive to getting these data from UNRBA. Davis said they are because they know their initial model was flawed.
- Hintz asked if the CFE inform landowners of the importance of minimizing their use of fertilizers is that helpful to Falls Lake? Davis said it would be helpful to the lake, but local governments would not likely receive credits.
- Davis noted atmospheric deposition is a significant source of nutrients that was not factored into the model or the rules. He said up to 50 percent of the nitrogen entering Chesapeake Bay is from the atmosphere.

Sassaman thanked Davis for sharing this information. There no action required.

- VI. **Annual Report and Work Plan (2015-16)** – Sassaman reminded CFE members that each year the BOCC asks its advisory boards to prepare a report of their activities, accomplishments, new issues, and concerns. He asked Shaw to present the draft report and work plan for 2015-16.

Shaw reviewed the draft report, highlighting the changes from the previous report. He identified several additions to the important accomplishments section and the activities the CFE expects to carry out in 2016. Shaw asked for comments from the members.

- O'Connor suggested adding the CFE's recommendation of developing incentives for energy-efficient construction to the list of accomplishments.
- Hintz suggested adding language to link the news articles to the SOE report

- Becker suggested deleting the reference to the January 2012 memo about the CFE's interest in developing incentives for energy-efficient construction
- Neal suggested adding language that says the CFE will continue to learn more about environmental justice matters and incorporate relevant information and considerations in the CFE's activities in addition to the SOE report.

Wegman motioned to approve the 2015-16 report and work plan as amended; seconded by O'Connor. The motion was approved unanimously.

- VII. **Election of Officers** – Sassaman advised CFE members would elect a new Chair and Vice-Chair for the upcoming year in accordance with the CFE policies and procedures.

Sassaman nominated Wegman for Chair. There were no other nominations. Hintz motioned to close the nominations; second by Saunders. Motion approved unanimously.

Sassaman nominated Gronback for Vice Chair. There were no other nominations. Saunders motioned to close nominations; second by Wegman. Approved unanimously.

- VIII. **Updates and Information Items** –

Herbicides & Pesticides Used at County Facilities – Shaw reminded members the BOCC asked the CFE to consider a list of herbicides and pesticides used by County staff at County buildings/facilities, and for the CFE to provide feedback or recommendations.

Shaw referred CFE members to the draft memo prepared by staff based on the discussion at the October meeting. Hintz noted there was a typo in 3rd paragraph.

Wegman motioned to approve the memo as amended and to send on to the BOCC. Saunders seconded the motion; the motion was approved unanimously.

Collaborative Energy Conservation/Management Projects – Saunders and Bouma reported on the October 28 meeting of the interagency committee working to collaborate on energy conservation and management projects of mutual interest. They reminded CFE members that the group had previously identified five projects of mutual interest. At the recent meeting the group decided to seek specific vendor proposals for two of the five projects: 1) Fleet management opportunities, and 2) Technical evaluation of solar PV opportunities at public facilities/land tracts. Once proposals are complete, each organization can seek approvals from their respective decision makers. The Biogas to energy project at the OWASA wastewater treatment plant is also slated to move forward with OWASA and UNC as the primary collaborators. The purpose and focus of the street lighting coordination project and the joint energy and carbon tracking and reporting project both require further elaboration before proposals can be made.

Information on the following subjects was provided in the meeting package; selected items were discussed: a) Nov 4 public mtg. on food waste diversion, b) BOCC decision on Nov 2016 bond referendum, c) HB 765 rules reform bill, d) Former DENR Secretary comments on legislative changes, e) OWASA biosolids management, f) environmental justice panel discussion (Nov 12), and g) industrial hemp becomes new legal crop in NC

- IX. **Adjournment** – Sassaman adjourned the meeting at 9:07 pm.



ORANGE COUNTY PLANNING DEPARTMENT TO HOST OPEN HOUSE MEETING:

Proposed New Airport Regulations

ORANGE COUNTY, NC (December 3, 2015)—The Director of the Orange County Planning & Inspections Department, in accordance with the provisions of Section 2.8 *Zoning Atlas and Unified Development Ordinance Amendments* of the UDO, has initiated a text amendment to revise existing regulations governing the review and approval of airports.

During the time period the UDO was being developed (2010-11) there were efforts by the State and the University of North Carolina at Chapel Hill to locate a new airport in rural Orange County. These efforts were, ultimately, abandoned.

At that time staff and residents identified a need to revise existing regulations governing the development of airports. Work on this issue was delayed while other priority UDO amendments were pursued.

With this text amendment, staff is proposing to create a new Conditional Zoning District allowing for the development of an airport. This would require the Board of Orange County Commissioners (BOCC) to act on a petition to amend the zoning atlas to create a new airport district.

Staff believes this mechanism will be the most appropriate as it would:

1. Require the applicant to obtain approval of the actual site plan by the BOCC before the project can move forward;
2. Require greater access, and give more voice, to the general public to review and comment on the proposal;
3. Allow a process whereby the County can negotiate and impose conditions to address potential impacts of the project on surrounding property owners; and
4. Give greater flexibility to the BOCC with respect to acting on the petition.

The proposed amendments will also clarify the development of private facilities for local plane enthusiasts. A copy of the proposal can be found online at:

http://orangecountync.gov/departments/planning_and_inspections/index.php under 'News and Updates'.

Planning staff will hold two information sessions to solicit public comment on the property. These sessions will be held at the West Campus Office building at 131 West Margaret Lane in Hillsborough on the following dates:

- **Thursday December 17, from 5:30 p.m. - 7:00 p.m.**
- **Monday December 21, from 5:30 p.m. - 7:00 p.m.**

For more information, please contact the Orange County Planning & Inspections Department at 919.245.2575.

**COMPREHENSIVE PLAN / FUTURE LAND USE MAP
AND
UNIFIED DEVELOPMENT ORDINANCE (UDO)
AMENDMENT OUTLINE**

UDO / Zoning-2015-07

Revision(s) of existing regulations governing the development of airports.

A. AMENDMENT TYPE

Text Amendments

- UDO Text:**
 - UDO General Text Changes
 - UDO Development Standards**
 - UDO Development Approval Processes

Section(s): Section(s):

1. 3.8 *Conditional Use Districts*;
2. 5.2.1 *Table of Permitted Uses – General Use Zoning Districts*;
3. 5.17.5 *General Aviation Airports, STOL, and Heliports*; and
4. *Article 10 Definitions*

B. RATIONALE

1. Purpose/Mission

In accordance with the provisions of Section 2.8 *Zoning Atlas and Unified Development Ordinance Amendments* of the UDO, the Planning Director has initiated a text amendment to revise existing regulations governing the review and approval of airports. This is one of the items in the UDO implementation bridge.

During the development of the UDO, there were efforts by the State and the University of North Carolina at Chapel Hill to locate a new airport in rural Orange County. The State General Assembly created a new airport authority in Orange County for the purpose of developing a new facility intended to take the place of Horace-Williams airport, which was slated to be closed with the development of Carolina North, in the Town of Chapel Hill.

These efforts were, ultimately, abandoned due to local community concerns over the process initiated by the State Legislature and the University. The State rescinded the airport authority and, as of the writing of this document, no additional activity has occurred.

At that time staff identified a need to revise existing regulations governing the development of airports. Work on this issue was delayed while more pressing UDO amendments were pursued.

2. Analysis

As required under Section 2.8.5 of the UDO, the Planning Director is required to: *'cause an analysis to be made of the application and, based upon that analysis, prepare a recommendation for consideration by the Planning Board and the Board of County Commissioners'*.

Airport and other similar facilities are combined into a central land use category, specifically *Airports, General Aviation, Heliports, STOL*, defined within the UDO as follows:

- *"Airport (Heliport: S.T.O.L. Port), Air Carrier:* A public airport served by a certified air carrier. This includes any runways, land areas or other facilities designed or used for landing, taking off, processing passengers or cargo.
- *Airport, Commuter Service (Heliport: S.T.O.L. Port):* A public airport, not served by a certified air carrier, but is served by one or more commuter airlines which enplaned 2500 or more passengers in the preceding calendar year.
- *Airport, General Aviation (Heliport: S.T.O.L. Port):* A public airport serving aviation other than airlines. This includes any runway, land area, or other facility designed or used for the landing and taking off of small aircraft."

Such use(s) are only permitted through the review and approval of a Class A Special Use Permit by the BOCC in the following general use zoning districts:

1. Rural Buffer (RB);
2. Agricultural Residential (AR);
3. Rural Residential (R-1);
4. Light Industrial (I-1);
5. Medium Industrial (I-2); and
6. Heavy Industrial (I-3).

Staff is proposing to create a new Conditional Zoning District allowing for the development of an airport. This would require the BOCC to act on a petition to amend the zoning atlas to create a new airport district. Staff believes this mechanism will be the most appropriate as it would:

- a. Require the applicant to obtain approval of the site plan by the BOCC before the project can move forward;
- b. Allow for the review of the project in a legislative setting rather than the quasi-judicial setting associated with a Special Use Permit;
- c. Allow for a process whereby the County can negotiate with the applicant to address potential impacts of the project on surrounding property owners; and
- d. Give greater flexibility to the BOCC with respect to acting on the petition.

The proposed amendments will also clarify the development of private facilities for local plane enthusiasts.

The amendments are necessary to address previously expressed concerns over the development of an airport in the County, update existing development standards/regulations, and provide the County with greater flexibility in terms of acting on the petition. Additional analysis will be part of the public hearing materials.

3. Comprehensive Plan Linkage (i.e. Principles, Goals and Objectives)

Land Use Goal 2: Land uses that are appropriate to on-site environmental conditions and features and that protect natural resources, cultural resources, and community character.

Land Use Goal 4: Land development regulations, guidelines, techniques and/or incentives that promote the integrated achievement of all Comprehensive Plan goals.

C. PROCESS

1. TIMEFRAME/MILESTONES/DEADLINES

a. BOCC Authorization to Proceed

May 5, 2015

b. Quarterly Public Hearing

February 22, 2016 (NOTE: this date is subject to change)

c. BOCC Updates/Checkpoints

May 5, 2015 – Approval of UDO Amendment Outline Form

Nov 4, 2015 & Jan 6, 2016 (if necessary) – Planning Board Ordinance Review Committee (ORC)

February 22, 2016 (projected date) – Quarterly Public Hearing

May 2016 – Receive Planning Board Recommendation

2. PUBLIC INVOLVEMENT PROGRAM

Mission/Scope: Public Hearing process consistent with NC State Statutes and Orange County ordinance requirements

a. Planning Board Review:

Nov 4, 2015 and Jan 6, 2016 (if necessary) – Ordinance Review Committee

April 6, 2016 – Recommendation

b. Advisory Boards:

Commission for Environment –
December 2015

Economic Development Advisory Board
– November 2015

- c. Local Government Review:
Staff will transmit copies of the proposed text amendments to our planning partners in the Towns of Chapel Hill, Carrboro, and Hillsborough and the City of Durham for their review and comment in December of 2015.

- d. Notice Requirements

Legal advertisement published in accordance with the provisions of the UDO.

- e. Outreach:

General Public: Open House Meetings to review project with interested property owners/residents – Oct 2015 and Jan 2016.
Advertising shall be in local paper and County website.

Other: Submit regulations to the FAA for review/comment November 2015

3. FISCAL IMPACT

Consideration and approval will not create the need for additional funding for the provision of County services. Costs for the required legal advertisement will be paid from FY2015-16 Departmental funds budgeted for this purpose. Existing Planning staff included in the Departmental staffing budget will accomplish the work required to process this amendment.

D. AMENDMENT IMPLICATIONS

The amendment will revise existing, outdated, regulations governing development of an airport.

E. SPECIFIC AMENDMENT LANGUAGE

Please refer to Attachment 2.

Primary Staff Contact:

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| <h1 style="color: red; text-align: center;">AP-CZ AIRPORT GENERAL AVIATION DISTRICT</h1> | | DIMENSIONAL AND RATIO STANDARDS | |
|--|---|---------------------------------|--------------------------|
| | | PURPOSE | Tract size, min. (acres) |
| <p>The purpose of the Airport – General Aviation (AP-CZ) District is to provide for potential development of aviation facilities while addressing the impacts of such development on nearby land uses.</p> <p>The goal of the AP-CZ district is to require that aviation facilities mitigate impacts they cause while protecting nearby existing or identified future land uses rather than requiring that surrounding land uses adjust to an aviation facility.¹</p> | Tract Front Setback from ROW, min. (feet) | No requirement [1] | |
| | Tract Side Setback, min. (feet) | No requirement [1] | |
| APPLICABILITY | Tract Rear Setback, min. (feet) | No requirement [1] | |
| <p>The district shall be located in such a manner as to cause the least impact practical to the character of existing development of surrounding properties, thus insuring the most appropriate use of land in the county.</p> <p>When evaluating an application for this district, emphasis shall be given to the location of the proposed airport district, the relationship of the site and site development plan to adjoining property, and the development itself.</p> | Height, max. (feet) | No requirement [1] | |
| | Tract Floor Area Ratio, max | No requirement [1] | |
| | Required Open Space Ratio, min. | No requirement [1] | |
| <p>DIMENSIONAL STANDARDS NOTES: [1] The AP-CZ district is intended to allow for flexibility in dimensional standards. The overall development will be evaluated to ensure compatibility with surrounding properties and with the policies and objectives of this Ordinance. Specific site design standards shall be incorporated into the Planning Department-approved Site Plan.</p> | Required Livability Space Ratio, min. | No requirement [1] | |
| | Required Recreation Space Ratio, min. | No requirement [1] | |
| | Required Pedestrian / Landscape Ratio, min. | No requirement [1] | |
| AP-CZ DISTRICT SPECIFIC DEVELOPMENT STANDARDS | | | |
| <p>1. Applications for the AP-CZ district shall be accepted only for parcels with direct frontage and access from a State maintained roadway.²</p> <p>2. Potential uses shall be restricted to those listed as permitted for the AP-CZ District in Section 5.2.3.</p> <p>3. All roadways developed within the AP-CZ district shall be designed and constructed to the public road pavement standards as defined by the North Carolina Department of Transportation.³</p> | | | |

¹ Typically when an airport is developed local land use regulations restrict adjacent development to protect the airport operation. From our standpoint what we are attempting to do is require the exact opposite, specifically an airport should not create a significant impact on adjacent property owners use of their property.

² Staff wants to ensure adequate access to a proposed airport facility by requiring frontage on a public road.

³ This is being recommended to ensure roadways can handle heavy equipment and emergency vehicles.

4. All required land area supporting development within the AP-CZ District, including required land use buffers and open space, shall be under the ownership or control of the applicant prior to the submittal of a rezoning petition.⁴
5. Specific uses shall be limited to those approved by the Board of County Commissioners. Additionally, non-residential uses are restricted based on the Watershed Protection Overlay District in which the property is located. Refer to Section 4.2.3 for land use restrictions.
6. Allowable impervious surface area is based on the Watershed Protection Overlay District in which the property is located. Refer to Section 4.2.6 for a breakdown of the allowable impervious surface area.
7. Development within the conditional zoning district shall be subject to all applicable use standards detailed in Articles 5 and all applicable development standards detailed within Article 6 of this Ordinance or provide creative alternatives that meet the intent and spirit of the regulations.
8. The AP-CZ zoning district shall be prohibited within the Rural Buffer land use classification as denoted on the Future Land Use Map of the adopted 2030 Comprehensive Plan.
9. No new development having a significant negative impact on existing roadways, traffic patterns or surface drainage patterns shall be permitted unless an appropriate and viable solution has been approved to mitigate these conditions.

⁴ The purpose of the requirement is to ensure the applicant has total control over the property(s) that will comprise the proposed airport facility. Our goal is to ensure adjacent property owners do not have their development rights limited (i.e. height restrictions) due to the development of an airport.

- ~~(C) In addition to the listing of such uses, the Board of County Commissioners intends that the general standards and the more specific requirements established herein, shall be used by the Board of Adjustment, the Planning Board and the Board of County Commissioners, as appropriate, to direct deliberations upon application or the approval of Special Uses.~~
- ~~(D) It is the express intent of the Board of County Commissioners to delineate the areas of concern connected with each Special Use and to provide standards by which applications for such Special Use shall be evaluated.~~
- ~~(E) **Establishment of Classes of Special Uses; Authority To Approve or Disapprove**~~
~~There are hereby established the following classes of Special Uses which shall be approved or disapproved as shown:~~
- ~~(1) Class A - Approved or disapproved by Board of County Commissioners~~
- ~~(2) Class B - Approved or disapproved by Board of Adjustment~~

5.1.4 Conditional Uses

- (A) The Board of County Commissioners is mindful of its responsibility to protect the public health, safety and general welfare of the residents of Orange County and intends to encourage development within the County consistent with that purpose.
- (B) The Board of County Commissioners also recognizes that certain uses are appropriate for development in Orange County but their location and site development specifics cannot be predetermined or regulated through the use of a general zoning district designation and conventional standards.
- (C) Conditional Uses and Conditional Use Districts are hereby established and shall be reviewed in accordance with the provisions of this Ordinance.
- (D) **Permitted Uses**
- (1) Any use listed as Permitted by Right or by Special Use Permit on the Table of Permitted Uses may be approved as a Conditional Use within a Conditional Use District, unless expressly excluded in Section 5.1.4(E) of this Ordinance.
- (2) Permitted uses are subject to all general and specific standards of approval for that use, as established within this Section.
- (E) **Exclusions**
- (1) Unless otherwise noted in Section 5.2, the following uses shall not be considered or approved as a Conditional Use District within the Commercial-Industrial Transition Activity Node or Economic Development Transition Activity Node land use classifications, as designated by the adopted Comprehensive Plan:
- (a) Airports, General Aviation, ~~Heliports, S.T.O.L.~~
 - ~~(a)(b)~~ Airport, Private Airfield,¹
 - ~~(b)(c)~~ Class II Kennels,
 - ~~(c)(d)~~ Commercial Feeder Operation,
 - ~~(d)(e)~~ Composting Operation with grinding,
 - ~~(e)(f)~~ Crematoria,
 - ~~(f)(g)~~ Extraction of Earth Products,
 - ~~(g)(h)~~ Junkyards,

¹ Staff is modifying existing language to be consistent with proposed new airport classification methodology. It is not our intent to allow these land uses to be approved through the Conditional Use District process.

- ~~(h)~~(i) Landfills (less than 2 acres),
 - ~~(i)~~(j) Landfills (2 acres or more),
 - ~~(j)~~(k) Meat Processing Facility, Regional,
 - ~~(k)~~(l) Military Installations (National Guard & Reserve Armory),
 - ~~(l)~~(m) Residential Hotel (Fraternities, Sororities, and Dormitories),
 - ~~(m)~~(n) Sawmills,
 - ~~(n)~~(o) Stables, Commercial,
 - ~~(o)~~(p) Stockyards / Livestock Markets, and
 - ~~(p)~~(q) Waste Management Facility; Hazardous & Toxic
- (2) For all land use classifications other than the Commercial-Industrial Transition Activity Node or Economic Development Transition Activity Node, the following uses shall not be considered or approved as a Conditional Use District:
- (a) Agricultural Processing Facility
 - ~~(b)~~ Airports, General Aviation, ~~Heliports, S.T.O.L.~~
 - ~~(b)~~(c) Airport, Private Airfield
 - ~~(c)~~(d) Bus Terminals & Garages,
 - ~~(d)~~(e) Class II Kennels,
 - ~~(e)~~(f) Commercial Feeder Operation,
 - ~~(f)~~(g) Composting Operation with grinding,
 - ~~(g)~~(h) Crematoria,
 - ~~(h)~~(i) Drive-In Theaters,
 - ~~(i)~~(j) Extraction of Earth Products,
 - ~~(j)~~(k) Farm Equipment Rental, Sales and Service,
 - ~~(k)~~(l) Feed Mill,
 - ~~(l)~~(m) Funeral Homes,
 - ~~(m)~~(n) Health Services: Over 10,000 square feet,
 - ~~(n)~~(o) Hospitals,
 - ~~(o)~~(p) Hotels & Motels,
 - ~~(p)~~(q) Industrial, Light,
 - ~~(q)~~(r) Industrial, Medium,
 - ~~(r)~~(s) Industrial, Heavy,
 - ~~(s)~~(t) Junkyards,
 - ~~(t)~~(u) Landfills (less than 2 acres),
 - ~~(u)~~(v) Landfills (2 acres or more),
 - ~~(v)~~(w) Meat Processing Facility, Regional,
 - ~~(w)~~(x) Military Installations (National Guard & Reserve Armory),
 - ~~(x)~~(y) Motor Freight Terminals,
 - ~~(y)~~(z) Motor Vehicle Maintenance & Repair (Body Shop),
 - ~~(z)~~(aa) Motor Vehicle Repair Garage,

- (e) Recreational areas, service areas, parking and screening are adequate for the proposed use(s).
- (f) The site is served by direct access to a State maintained road.
- (g) Internal vehicular and pedestrian circulation is adequate for the proposed use(s).

(3) Expiration and Renewals

- (a) This Class A Special Use Permit, if approved, shall be valid for six years, but may be renewed or re-approved by the Board of Commissioners after receiving a report from the Planning Department that the use is, and has been continuously since it was issued, in compliance with provisions of the Special Use Permit. The Orange County Planning Department shall present its report on the compliance of the special use no later than 90 days before the expiration of the Special Use Permit.
- (b) The Board of County Commissioners shall not renew the Special Use Permit if it is determined that the applicant has failed to comply with the conditions of approval. If the Board of County Commissioners does not renew the permit, the permit shall become null and void upon the expiration of the time limit.
- (c) If the Special Use Permit is not renewed or re-approved, then the applicant may submit a new application as if it were a new use.

5.17.5 General Aviation Airports, STOL and Heliports⁴

(A) General Standards

- (1) Unmanned Aircraft Systems (UAS) as defined by the Federal Aviation Administration (FAA) used for commercial purposes shall be subject to the provisions of these regulations.⁵

(B) Standards for Airport – Private Airfield (Class A Special Use Permit)

(1) Submittal Requirements

In addition to the information required in section 2.7, the following shall be submitted as part of the application:

- (a) A notarized statement from the applicant indicating the airfield shall be used only for personal use and not connected with commercial air travel.⁶
- (b) The number and type of aircraft proposed to be stored and used on site.
- (c) The site plan shall denote the location of storage areas for the aircraft as well as fuel storage and aircraft service areas.

⁴ As previously indicated staff is proposing to breakdown airports into 2 categories: Airport - Private Airfield and Airports – General Aviation. Private airfields will be reviewed under the Class A Special Use Permit process while a general aviation airport will be subject to rezoning to the Airport Conditional Zoning (AP-CZ) District

⁵ UAS is the term used by the FAA for drones, models, and radio controlled aircraft. The intent of the standard is to require a property owner using same as part of a commercial operation to obtain the necessary permits.

⁶ Staff is only requiring a private airfield be prohibited from being used to support a commercial air travel operation.

- ~~(a)~~(d) The site plan shall containe Aa configuration diagram depicting the layout of runways, taxiways, ~~approach zones~~Airport Surface Zones, helicopter pads, and overrun areas. These diagrams should also be on aerial photographs that show the area within ~~five~~2⁷ miles of the proposed site.
- ~~(b)~~(e) Isotonic contours or noise contour lines⁸ showing the effects of aircraft operations upon land within one mile of the boundary of the proposed site.
- ~~(c)~~(f) ~~The number and type of aircraft proposed to be stored including also the storage areas for aircraft, fuel and motor vehicles, service areas for aircraft.~~⁹
- ~~(d)~~(g) How on site fire and rescue services shall be provided and a letter from the appropriate agency stating services are available and adequate to protect the proposed facility.
- ~~(e)~~(h) List of land uses located within the final approach zones of the ~~airport~~airfield.
- (i) Hazardous Materials Management Plan, including a description of the program for application, storage, and handling of various chemicals and fuel products including, but not limited to, the following:
- (i) Airplane fuel,
 - (ii) Hydraulic fluid,
 - (iii) Oil,
 - (iv) Lubricants utilized to support aircraft,
 - (v) Pesticides and/or fertilizers, and
 - (vi) Any other hazardous substances;
- A Material Safety Data Sheet listing each substance, its known impacts, physical properties, and protective measures is required as part of the submittal.
- ~~(f)~~(j) Certification that all ~~Federal Aviation Administration (FAA)~~ and State standards and requirements have been met.

(2) Standards of Evaluation

- (a) There shall be a limit of 5 aircraft for the facility all of which shall be owned by the property owner.¹⁰
- ~~(a)~~(b) All F.A.A. and State regulations are met as a condition of approval including, but not limited to, noise level limits.¹¹

⁷ Staff is not requiring the full 5 mile radius for an Airport-Private Airfield as the impacts should not be as great as what we anticipate for an Airport – General Aviation land use.

⁸ In reviewing FAA information on airport development these terms are used interchangeably.

⁹ This provision was moved to subsection(s) (b) and (c) of the proposed amendment.

¹⁰ Staff is recommending this language to avoid the blurring of commercial versus private facilities. What we want to avoid is a private property owner allowing for 'public' use of an airstrip as part of a club, organization, or other similar activity.

¹¹ Noise contour lines are a continuous line on a map representing equal levels of noise exposure. According to the FAA severe noise exposure occurs outside the 55 DNL (day-night average sound level) contour line, the level at which the Federal Aviation Administration (FAA) describes noise exposure as minimal. Noise exposure is regarded as significant above the 65 DNL noise contour line.

- ~~(b)~~(c) The site and its operation will not adversely affect existing adjacent land uses.
- ~~(e)~~(d) Land sufficient to provide approach zones and overrun areas is owned or controlled by the applicant.
- ~~(d)~~(e) Adequate land area is provided for all of the proposed uses, buildings and storage areas.
- ~~(e)~~(f) Screening of buildings, storage and maintenance areas is provided from adjacent residential land.
- ~~(f)~~(g) Letters from appropriate fire and rescue agencies that protective services can be provided at an adequate level.
- ~~(g)~~(h) Access shall be directly onto a State maintained road.
- ~~(h)~~(i) Compatible land uses are located in the final approach areas of the airport.

(C) Standards for Airports – General Aviation (AP-CZ)

(1) Pre-application Submittal Requirements¹²

(a) Letter of Intent: An applicant shall be required to submit to the Planning Department a Letter of Intent indicating the interest in developing an AP-CZ District within the county. As part of this Letter, the applicant shall include the following:

- (i) A map and aerial photo of the subject property including a legal description,
- (ii) Preliminary feasibility studies outlining the rationale for choosing the site in question,
- (iii) A site plan outlining the location of all facilities and required areas as detailed herein, and
- (iv) An environmental assessment completed in accordance with Section 6.16.3 of the Ordinance.

Staff shall inform the County Manager's office in writing within 5 days of the submittal of the letter and outline a preliminary schedule for review of the project.

(b) Initial Neighborhood Information Meeting: Within fourteen days of submitting the Letter of Intent the petitioner shall schedule, at their expense, a Neighborhood Information Meeting (NIM) designed to inform local residents of the proposed project. The location of this meeting shall be a government office, community building, or other similar facility that is located in close proximity to the proposed District.

During this meeting, Planning Staff will outline the process that will be employed to review the formal application, once submitted, and outline the detailed studies and plans that will be part of the review process.

The applicant shall adhere to notification criteria outlined within Section 2.9.2 (D) of this Ordinance.

¹² Given the nature of the development staff believes it would be appropriate to require a the submittal of a notice of intent to inform all parties of a pending application as well as an initial neighborhood meeting so that the general public can comment on the proposed prior to it being submitted. As written there will be 2 neighborhood meetings for the development of an Airport- General Aviation facility with the second meeting occurring prior to the actual public hearing.

The applicant shall also be required to advertise the scheduled initial NIM two (2) weeks prior to the agreed upon date of the meeting in a newspaper of general circulation within the county.

(2) Submittal Requirements:

In addition to the information required herein as well as Section(s) 2.5¹³ and 2.9.2, the following shall be submitted as part of the application:

- (a) The site plan shall contain a configuration diagram depicting the layout of runways, taxiways, overrun areas, and Airport Surface Zones¹⁴. In addition, required information shall be provided on aerial images that show the area within 5 miles of the proposed site.
- (b) An architectural concept plan shall be required demonstrating the proposed building materials, colors, and anticipated design elements of all structures proposed for the District.
- (c) Site Data: A written and graphic site analysis illustrating:
 - (i) Soils,
 - (ii) Depth to water table,
 - (iii) Slope,
 - (iv) Hydrology,
 - (v) Natural areas and habitats of special concern,
 - (vi) Infrastructure and other manmade features,
 - (vii) Historic and archaeological sites, and
 - (viii) A visual analysis of views into and from the site;
- (d) A grading, erosion control, and stormwater management plan.
- (e) A biological inventory which identifies:
 - (i) Habitat diversity,

¹³ All site plans have to demonstrate compliance with development standards contained within Article 6 which includes parking, signage, and lighting. Staff does not believe it necessary to repeat compliance with these individual sections herein.

¹⁴ An airport has several imaginary surfaces and zones that exist primarily to prevent existing or proposed manmade objects, objects of natural growth, or terrain from extending upward into navigable airspace. These include approach surfaces/zones, transitional surfaces/zones, horizontal surfaces/zones, and conical surfaces/zones. The Ordinance requires the applicant to identify, define, and locate each zone as part of the submittal package.

- (ii) Species diversity.
- (iii) Species of special concern such as those designated as threatened or endangered, last known sighting, and candidate species likely to be present which may warrant protection.
- (iv) Specimen trees outstanding in size and/or species, and the status and source of the information compiled in the inventory.

The biological inventory shall be accompanied by an analysis describing habitat integrity, relationships between habitats and to ecological communities off-site, any existing threats to flora and fauna, and potential for habitat enhancement.

- (f) An Environmental Impact Statement prepared in accordance with Section 6.16.4 of the Ordinance.
- (g) A comprehensive groundwater study to determine the appropriateness of the proposed land use(s). Such a study shall detail how much water is anticipated to be consumed, the amount of groundwater withdrawal that is safe and sustainable in the immediate vicinity of the use, and if other wells within the vicinity are expected to be affected by such withdrawals.
- (h) Resources Management and Mitigation Plan including, but not limited to:
 - (i) Construction policies.
 - (ii) Methods for protecting water resources and natural areas.
 - (iii) Pollutant monitoring program.
 - (iv) Restoration and mitigation plan for wetlands and other habitats.
 - (v) State and/or Federal permits as may be required for alteration of wetlands.
 - (vi) Maintenance specifications for on-going site management, including solid waste, and
 - (vii) Water conservation plan.
- (i) Hazardous Materials Management Plan, including a description of the program for application, storage, and handling of various chemicals and fuel products including, but not limited to, the following:
 - (i) Airplane fuel.
 - (ii) Hydrolic fluid.
 - (iii) Oil.
 - (iv) Lubricants utilized to support aircraft.
 - (v) Pesticides and/or fertilizers, and
 - (vi) Any other hazardous substances;

A Material Safety Data Sheet listing each substance, its known impacts, physical properties, and protective measures is required as part of the submittal.
- (j) Isotonic contours or noise contour lines showing the effects of aircraft operations upon land within 5 miles of the boundary of the proposed site.
- (k) An Emergency Management Plan outlining the facilities procedures and responses to an emergency event. This plan shall identify anticipated resources for fighting a fire including water access sites and provide a detailed breakdown of anticipated involvement by outside public safety agencies.

- (l) Type of runway proposed, specifically precision versus non-precision instrument runways.
- (m) Evidence the proposed airport complies with applicable Federal Aviation Administration (FAA) and State regulations.

(3) Standards of Evaluation

- (a) No structure greater than 50 feet in height shall be erected, altered or maintained, and no trees shall be allowed to grow in any Airport Surface Zone created under the AP-CZ district.¹⁵
- (b) A perimeter land use buffer shall be installed or maintained consistent with the Type E land use buffer standard as detailed in Section 6.8.6 of this Ordinance.¹⁶
- (c) A facility with an non-precision instrument runway shall be allowed to operate only from dawn to dusk.

5.17.6 Major Subdivision

(A) Standards for Class A Special Use Permit

(1) Submittal Requirements

In addition to the information required in Section 2.7, the following shall be submitted as part of the application:

- (a) Notification
 - Stamped envelopes addressed to each owner of property within 500 feet of the property proposed for subdivision. The names and addresses of property owners shall be based on the current listing as shown in the Orange County Land Records system.
- (b) Development Schedule
 - A statement, from the applicant, indicating the anticipated development schedule for the build out of the project.
- (c) Water and Wastewater
 - (i) If the proposed lots are to be served by a public water system, proof of water supply and service availability in the form of a certified copy of a resolution to that effect enacted by the governing body of the water system providing the water to serve the lots in the subdivision.
 - (ii) If the proposed lots are to be served by a public sewer system proof of public sewer service availability in the form of a certified copy of a resolution to that effect enacted by the governing body of the sewer system providing the sewer service to the lots in the subdivision.

¹⁵ In reviewing other example Ordinances height limits can range from 50 to 75 feet. Staff selected 50 feet as it is more consistent with existing height limits in other general use zoning districts.

¹⁶ In recommending this standard staff understands there will be concerns over potential conflicts created with the preservation/planting of vegetation and aircraft safety (i.e. approach and take off patterns). Our goal is to require a sufficient land use buffer to shield adjacent property owners from the impacts of an Airport – General Aviation facility and confine runaway areas to the interior portion of the AP-CZ District in an attempt to mitigate noise, vibration, and visual impacts.

Agritourism

A business directly related or incidental to agricultural activities occurring on the bona fide farm on which it is located and conducted for the enjoyment or education of the public.

Airport (Heliport: S.T.O.L. Port), Air Carrier

A public airport served by a certified air carrier. This includes any runways, land areas or other facilities designed or used for landing, taking off, processing passengers or cargo.

Airport, Commuter Service (Heliport: S.T.O.L. Port)

A public airport, not served by a certified air carrier, but is served by one or more commuter airlines which enplaned 2500 or more passengers in the preceding calendar year.

Airport, General Aviation (Heliport: S.T.O.L. Port)

A public airport serving aviation other than airlines. This includes any runway, land area, or other facility designed or used for the landing and taking off of small aircraft.

Airport – General Aviation

A public airport providing service to air passengers and/or leased aircraft for commercial and/or institutional purposes. Development shall include, but not be limited to, runways, landing areas, supporting infrastructure and facilities, Airport Surface Zones, and ancillary non-residential land uses.

Airport – Nonprecision Instrument Runway

A runway having an instrument approach procedure utilizing air navigation facilities with only horizontal guidance, or area type navigation equipment, for which a straight-in nonprecision instrument approach procedure has been approved or planned.

Airport – Precision Instrument Runway

A runway having an instrument approach procedure utilizing an Instrument Landing System (ILS) or a Precision Approach Radar (PAR) or a facility for which a precision approach system has been approved or planned.

Airport – Private Airfield

A private airfield or strip providing service for personal aircraft. Development shall include, but not be limited to, runways, landing areas, Airport Surface Zones, supporting infrastructure and facilities.

Airport Runway

Edges of pavement for the taxiing, takeoff, and landing of aircraft.

Airport Surface Zones

Imaginary surfaces and zones that exist primarily to prevent existing or proposed manmade objects, objects of natural growth, or terrain from extending upward into navigable airspace including:

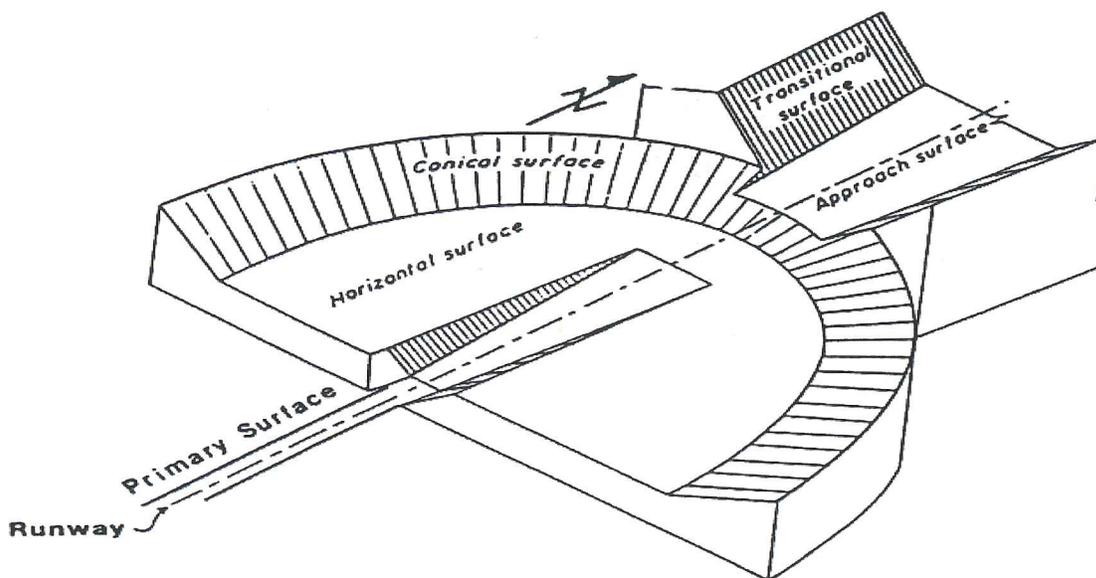
- (A) Approach Surface Zone. A surface longitudinally centered on the extended runway centerline, extending outward and upward from the end of the primary surface and at the same slope as the approach zone height limitation slope. The inner edge approach zone coincides with the width of the primary surface and begins 200 feet from the runway end and is 1,000 feet wide. The approach zone expands outward uniformly to a width of 16,000 feet at a horizontal distance of 50,000 feet from the primary surface. Its centerline is the continuation of the centerline of the runway.
- (B) Conical Surface Zone. A surface extending outward and upward from the periphery of the horizontal surface at a slope of 20:1 for a horizontal distance of 4,000 feet. The conical zone is established on the area that commences at the periphery of the horizontal zone and extends outward there for a distance of 4,000 feet and upward at a slope of 20:1.
- (C) Transitional Surfaces Zone. These surfaces extend outward at right angles (ninety degree angles) to the runway centerline and extend at a slope of 7 feet horizontally for each foot vertically from the sides of the primary and approach surfaces to where they

intersect the horizontal and conical surfaces. The transitional zones are the areas beneath the transitional surfaces.

(D) Horizontal Surfaces. A horizontal plane 150 feet above the established airport elevation, the perimeter of which coincides with the perimeter of the horizontal zone. The horizontal zone is established by swinging arcs of 10,000 feet radii from the center of the end of the primary surface of each runway and connecting the adjacent arcs by drawing lines tangent to those arcs. The horizontal zone does not include the approach and transitional zones.

(E) Primary Surface. A surface longitudinally centered on a runway extending 200 feet beyond each end of said runway. The elevation of any point on the primary surface is the same as the elevation of the nearest point on the runway centerline. The width of the primary surface is 1,000 feet.

A graphic example of the individual Airport Surface Zones is as follows:



Airport Visual Runway

A runway intended solely for the operation of aircraft using visual approach procedures.

Anchoring

The fastening of the mobile home to its mobile home stand in order to prevent upset or damage due to wind, erosion, flooding, or other natural forces.

Appeal

A request from a review of an administrative interpretation of any provision of this Ordinance by the Board of Adjustment.

Applicator

ORANGE COUNTY COMMISSION FOR THE ENVIRONMENT

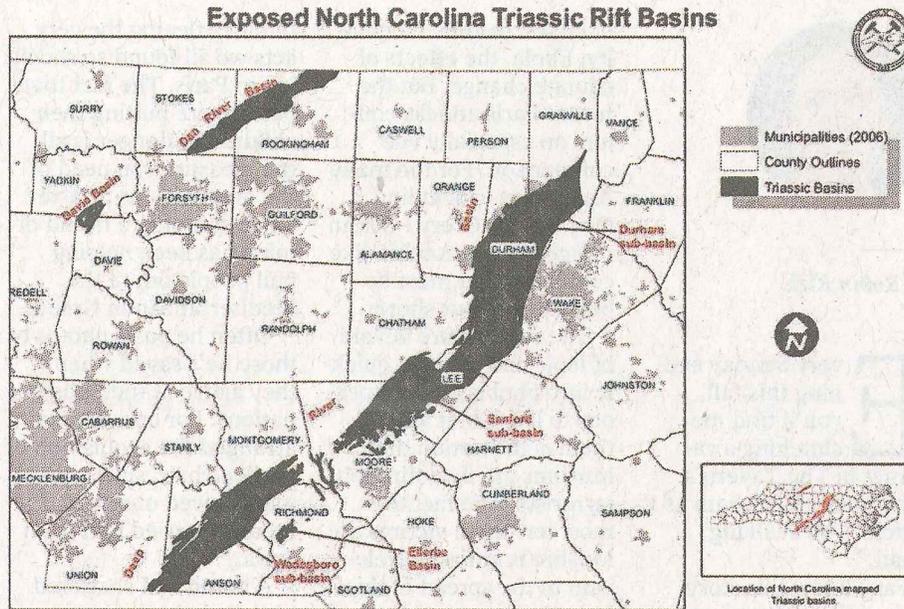
Fracking issues for Orange County

Editor's note: This is another in a series of articles by the Orange County Commission for the Environment, a volunteer advisory board to the Board of County Commissioners. Find more information in the Orange County State of the Environment 2014 report at <http://nando.com/2v2>.

Certain geologic basins in the United States have deposits of organic-rich shale containing reserves of natural gas and oil. Extraction of hydrocarbons has become widespread using horizontal drilling and hydraulic fracturing, or "fracking." In North Carolina, organic-rich shale deposits occur in rocks of Triassic age. (Basins that contain Triassic rocks exposed at the surface are shown here.) Only the Sanford sub-basin has been proven to contain organic shale.

Only a very small portion of southeastern Orange County is underlain by the Triassic-aged Deep River Basin. This basin is composed of three sub-basins; from north to south they are the Durham, Sanford, and Wadesboro sub-basins. The central portion of the Sanford sub-basin contains a roughly 800-foot-thick deposit of organic-rich shale. Limited activity to date identified potentially commercially viable natural gas resources in a 59,000-acre (92-square-mile) portion of the Sanford sub-basin in Lee County and a portion of Chatham County.

In 2011, the N.C. General Assembly directed several state agencies to investigate implications of horizontal drilling and fracking for oil and nat-



Online

Learn more about fracking and North Carolina geology:

- <http://portal.ncdenr.org/web/guest/shale-gas>
- <http://www.newsobserver.com/news/business/article4730470.html>
- <http://www2.epa.gov/hydraulicfracturin>

ural gas production. The resulting North Carolina Oil and Gas Study was published in 2012. In addition, the General Assembly overrode then-Gov. Perdue's veto, thus legalizing fracking for natural gas extraction once regulations governing these activities were developed. Regulations governing horizontal drilling and fracking were developed and as of March 2015 applications for the permits necessary to drill for natural gas in North Carolina have been available. As of September 2015, no drilling unit applications or complete oil or gas well permit applications have been received by the state.

CONCERNS

While direct adverse

effects from fracking are unlikely in Orange County, nationwide shale-gas exploration and exploitation demonstrate that the fracking process involves activities that could result in adverse impact, including the following:

- Possible contamination of surface water and groundwater
- Negative impacts to water supplies
- Wastewater disposal issues
- Negative air quality impacts
- Negative infrastructure impacts
- Detrimental social impacts common to boom and bust economies

If drilling for natural gas from nearby shale deposits occurs, the likely impacts on Orange County

would be indirect, though not insignificant. The water used for fracking that is not recycled would need to be disposed of. This water would likely be trucked to a wastewater treatment plant, possibly in Orange County. Wastewater plants may not be able to test for and remove the contaminants found in return water, leading to the possibility that contaminants could be discharged into local waterways. Increased heavy truck traffic could cause damage to county roadways and bridges.

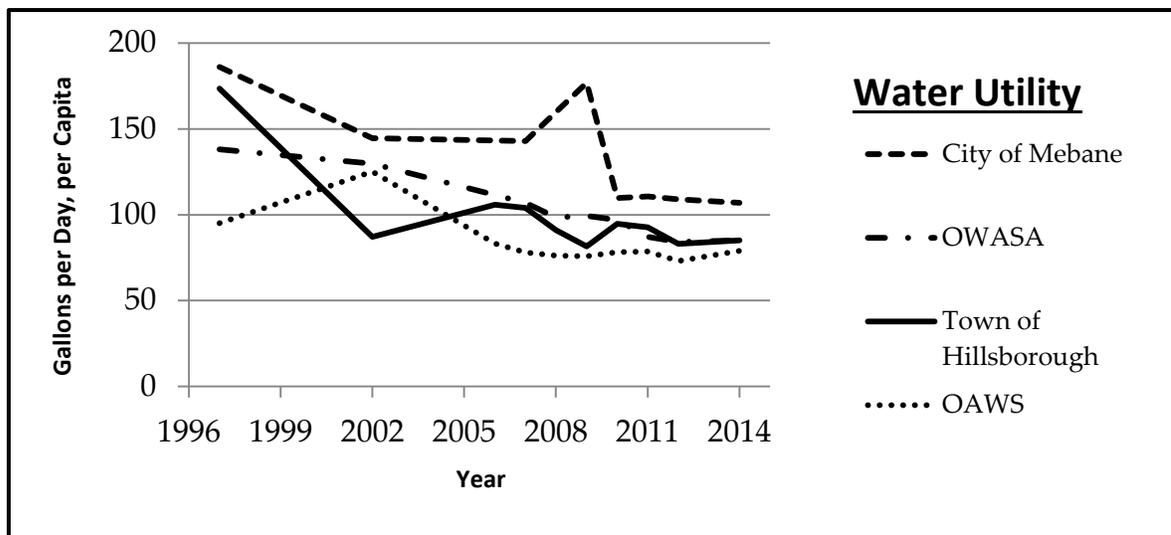
CONCLUSIONS

The low price and large supply of domestic natural gas, as well as the significant amount of gas known to exist in much larger shale deposits elsewhere in the United States, make extraction activities in North Carolina unlikely in the near term. Fracking within Orange County is even more unlikely since Triassic rocks are limited to the southeastern portion of the county. Were drilling to occur in shale deposits some 30 miles south of Chapel Hill, indirect impacts on water supplies and transportation infrastructure could take place in Orange County.

Water in Orange County—Is There Enough?

The word **water** can bring a variety of images to mind, but usually water is a news topic only when there is too little or too much. The myriad ways that water plays a role in our daily lives is not always obvious. One thing we can all agree on is that access to reliable sources of clean water is vital. Clean water is a resource that is renewable but can be limited in availability. Adequate supplies of clean water are necessary for public health, agricultural production, economic growth, and ecosystem health.

As Orange County's population grows, the number of people relying on municipal water supplies will increase as urban areas expand. Surface water (i.e., from rivers and reservoirs) is the primary source of water for our towns, whereas residents of rural areas of the county are completely dependent upon groundwater for their water supply.



The accompanying graph presents water data from the N.C. Division of Water Resources. This information illustrates the average amount of water used per person from 1997 to 2014, with usage reported in gallons per day per person (g/d/p) by the water utilities servicing areas within Orange County: Mebane, Hillsborough, OWASA (Orange Water and Sewer Authority), and OAWS (Orange-Alamance Water System). Usage is calculated by dividing the total average amount of water used daily by the number of people served by the utility. The numbers in the graphic include all residential, commercial, industrial, institutional, and system process uses, as well as unaccounted-for water losses due to leakage or unregistered water meters. These data may not have been verified for all of the years reported.

The graphic illustrates that the per capita demand for water in the areas of Orange County served by utilities has generally decreased markedly since the droughts of 2002 and 2007. Those droughts alerted local residents and other water users to the need for immediate and on-going water conservation. It is thought that this increased awareness led to the decline in the consumption of utility-supplied water that has occurred since 2002.

Outside of the public water service areas, rural residents depend on groundwater, rather than surface water, for their drinking water. Groundwater consumption is difficult to track because of a lack of groundwater usage information. It is expected that the ongoing growth in the number of water supply wells in the county mirrors growth in overall groundwater consumption. However, if the trend in decreasing per capita water consumption observed at local water utilities reflects a similar unmeasured trend amongst groundwater users, the net use of groundwater could also be decreasing. Conversely, the increasing number of residential consumers of groundwater could offset any decrease in per capita residential consumption, resulting in an increase in groundwater consumption. Unfortunately, analysis of trends or determining the amounts of groundwater used is not possible without local consumption data.

To support a healthy environment and sustainable growth, the water resources of Orange County, both surface water and groundwater, must be managed carefully such that these finite resources are not overtaxed or wasted.

What can be done to help manage Orange County's Water Resources?

- Get informed about local sources of water and the importance of conserving all water supplies.
- Perform a water audit of your water consumption and discover if there are easy steps you can take to reduce your use of potable water. Examples include fixing leaks, even minor leaks, taking shorter showers, installing a rain barrel or rain garden, planting drought tolerant plant species, and many others!
- Track local groundwater conditions through Orange Well Net (OWN), a network of groundwater observation wells used to monitor local groundwater conditions:
<http://www.ncwater.org/?page=537&jmp=&countyname=&search=&tl=1&aquifer=&station=&net=orange&inactive=>

CFE Committee Priorities

(as of February 2015)

Air and Energy Resources Committee

(May Becker, Tom Eisenhart, David Neal, Bill Newby, Gary Saunders, Jan Sassaman)

1. GHG Emissions Inventory - Update the County 2005 greenhouse gas emissions inventory. (First determine whether it will be feasible & worthwhile to perform a complete update.)
2. Green Building – Help County implement a rebate on permit fees for green construction.
3. Climate Change - Educate county residents about climate change, alternative energy sources and efficiency, and steps to reduce their (and the county's) carbon footprint.
4. Energy Efficiency - Partner with Piedmont Electric Membership Corp. to take advantage of USDA program for low-interest loans for energy efficient upgrades for its members/owners.
5. RENEW Group – Proceed with the creation of the planned Renewable Energy and Efficiency Work Group (utilizing the current CFE / Air & Energy Committee structure).

Water Resources Committee

(Peter Cada, Donna Lee Jones, Rebecca Ray, Sheila Thomas-Ambat)

1. Invasive Species – Educate the public about invasive species of concern, their extents/ locations, and what steps can be taken to address them.
2. Surface and Ground Water Quality - Increase the collection of data for surface and ground water quality; increase public education so it might lead to more funding for data collection.
3. Water Supply - Increase public education of our water supply, and what steps can be taken to improve/maintain quality and quantity of water supplies into the future.

Land Resources Committee

(Loren Hintz, Jeanette O'Connor, Lydia Wegman, David Welch)

1. Comprehensive Conservation Plan - Initiate development of a comprehensive conservation plan for Orange County, to be used by Lands Legacy program and others to protect natural areas and wildlife habitat. Consider ways to ensure conservation land is distributed equitably throughout the county so that everyone has reasonable access to enjoy these areas.
2. Native Plant Habitats - Renew collaboration with NC Botanical Garden and others to identify significant roadside habitat for native plants; then ask NCDOT and other utilities to eliminate the use of herbicides to manage vegetation in those special roadside habitats.
3. Native Landscaping - Educate the public (homeowners/businesses) on reasons to choosing a diversity of regionally native species for landscaping and other ways to promote biodiversity in the home landscape.
4. 2016 Bond Package - Advocate for including land conservation (i.e., support for Lands Legacy program) as part of the planned bond package for 2016; take the lead in educating the public about why protected space and natural areas are important for Orange County.

ORANGE COUNTY COMMISSION FOR THE ENVIRONMENT

RESOLUTION

Incentive Program for Energy Efficient Construction

WHEREAS, energy efficiency is the lowest cost, cleanest, and most underutilized resource for meeting our energy needs; and

WHEREAS, energy efficiency in new construction enhances comfort and saves money for the occupants of those structures for the life of the structure; and

WHEREAS, there are split incentives between builders and occupants when it comes to investments in energy efficiency in new buildings because those efficiency measures can add costs for builders that result in savings for later occupants; and

WHEREAS, saving money by using less energy would most benefit low-income residents who pay the largest percentage of their incomes on monthly power bills; and

WHEREAS, energy efficiency measures will reduce air pollution and save money for all rate payers by minimizing the need to produce electricity from fossil fuels; and

WHEREAS, state law allows county and city governments to enact incentives for energy efficient construction in the form of rebating permitting fees, but otherwise does not allow local governments to require more energy efficient construction than is already required by the state building code; and

WHEREAS, the Town of Chapel Hill adopted an incentive program for energy efficiency construction, allowing for rebates of permitting fees for energy efficient construction that meets certain objective benchmarks in the Ephesus-Fordham District: and

WHEREAS, Orange County is committed to reducing the energy usage of its own buildings and has invested in several successful energy efficiency projects to lower long-term costs and reduce environmental impacts;

NOW, THEREFORE, BE IT RESOLVED:

That the Orange County Commission for the Environment (CFE) recommends that the Orange County Board of County Commissioners adopt an incentive program that rebates permitting fees, modeled after the program adopted by the Town of Chapel Hill, for new commercial and residential construction and look for creative ways to encourage low or no-cost energy efficiency upgrades to existing buildings, primarily targeted at our lowest-income neighbors to provide them with savings on their utility bills.

This the 9th day of November, 2015.

Jan Sassaman

Jan Sassaman, Chair
Orange County Commission for the Environment

**ORANGE COUNTY
COMMISSION FOR THE ENVIRONMENT**

MEMORANDUM

To: Orange County Board of Commissioners
Bonnie Hammersley, County Manager

From: Commission for the Environment

Date: November 9, 2015

Re: Use of herbicides and pesticides at County-owned facilities

The Orange County Commission for the Environment (CFE) was asked by the BOCC to consider the list of herbicides and pesticides used both inside and outside the County-owned buildings and facilities, and to provide feedback or recommendations to the staff or BOCC.

The CFE received the list at the October 12 meeting and had a thoughtful discussion with David Stancil and members of his DEAPR staff as well as Brennan Bouma from AMS. The CFE also reviewed DEAPR's sustainable landscaping policy, which states that pesticides and herbicides should be used no stronger than directed and only when no alternative exist.

CFE members reviewed the list of herbicides and pesticides used on grounds and playing fields, and asked many questions on how and when chemicals are applied. CFE members learned that the staff maintain a high level of safety and control in the application of these products. They are well-trained and use products according to directions included on the label.

CFE members noted, however, that just because a product is EPA-approved and regulated there may be alternatives that are better for the natural environment. **The CFE recommends DEAPR and AMS staff conduct periodic reviews of their use of herbicides and other chemicals, including an examination of alternatives to potentially harmful substances.**

The CFE is confident with the use of herbicides/pesticides by County staff, but the CFE remains wary about the use of these products by residential users. The CFE will consider developing some sort of guidance targeted toward homeowners in the county—perhaps using this as the subject for one in the series of newspaper articles that the CFE has authored for the *Chapel Hill News* and *News of Orange County*.

The CFE appreciates the opportunity to review this information and have this discussion.

cc: David Stancil, DEAPR Director
Jeff Thompson, AMS Director

NAME OF BOARD/COMMISSION: Commission for the Environment

Report Period: 2015 - 2016

**ORANGE COUNTY ADVISORY BOARDS & COMMISSIONS
ANNUAL REPORT / WORK PLAN FOR THE COUNTY COMMISSIONERS**

The Board of Commissioners welcomes input from various advisory boards and commissions in preparation for its annual planning retreat. Please complete the following information, limited to the front and back of this form. Other background materials may be provided as a supplement to, but not as a substitute for, this form.

Board/Commission Name: Commission for the Environment

Persons to address BOCC at work session and contact information:

| | | | |
|------------|----------------|--------------|---------------------|
| Chair: | Lydia Wegman | 919-886-8775 | lnwegman@gmail.com |
| Vice Chair | Lynne Gronback | 919-219-3219 | lgronback@gmail.com |

Primary County Staff Contacts:

Department of Environment, Agriculture, Parks and Recreation
Rich Shaw (Land Conservation Manager) 245-2514 rshaw@orangecountync.gov
Tom Davis (Water Resources Coordinator) 245-2513 tdavis@orangecountync.gov
Brennan Bouma (Sustainability Coordinator) 245-2626 bbouma@orangecountync.gov

How many times per month does this commission meet, including any special meetings and sub-committee meetings?

One meeting per month (2nd Monday); committees meet as needed during meeting

Brief Statement of Commission's Assigned Charge and Responsibilities.

Purpose: to advise the BOCC on matters affecting the environment, with particular emphasis on environmental protection and enhancement. Other duties include:

- Perform special studies/projects on environmental issues as requested by BOCC
- Recommend environmental initiatives to the BOCC, especially of local importance
- Study changes in environmental science and environmental regulations in the pursuit of the CFE's duties
- Educate the public and local officials on environmental issues

What are your Commission's most important accomplishments?

- Initiated a series of articles on environmental issues featured in SOE report (2015)
- Made recommendations to BOCC on 2016 bond package, the use of herbicides/pesticides at County facilities, and incentives for energy efficient construction (2015)
- Commented to Planning Bd on proposed changes to impervious surface rules (2015)
- Provided ideas for Public Services Announcements (PSAs) for County radio spots (2015)
- Collaborated with other entities on energy conservation and mgmt. projects (2015-16)
- Published the 2014 Orange County State of the Environment report (previous reports were completed in 2000, 2002, 2004, 2009)
- Convened Orange County Environmental Summit (2005, 2009, 2014)
- Made recommendations to BOCC on food waste and solid waste tax district (2014)
- Worked with Orange County Schools to introduce local environmental indicators/status and trends into middle and high school science curriculum (2004, 2009, 2014)
- Hosted a Solid Waste Forum with the Chapel Hill Sustainability Committee (2013)

- Co-sponsored the annual *Nature of Orange* photography contest (2012 - 2015)
- Advocated for ½ cent sales tax referendum for Triangle Region public transit (2012)
- Compiled annotated bibliography of the effects of forestry on water quality (2012)
- Developed sustainable landscaping and forest management policies for the administration of County-owned facilities (2010)
- Assisted County staff in completing the Natural and Cultural Systems Element of the Orange County Comprehensive Plan (2008)

List of Specific Tasks, Events, or Functions Performed or Sponsored Annually.

- Liaisons to Intergovernmental Parks Work Group and Orange Unified Transp. Board
- Review and comment on environmental issues (e.g., fracking, biosolids application, water pollution, air quality, forest mgmt..) and other issues assigned by the BOCC
- Identify priorities for the Lands Legacy Action Plan (natural areas and wildlife habitat)
- Conduct special studies pertaining to Orange County environment (e.g., energy efficiency/sustainability, forestry effects on water quality, herbicides and native flora)
- Develop recommendations on implementation of ground water studies of the 1990s and the integration of ground water and surface water quality and quantity
- Conduct environmental education outreach at events (eg, Last Friday, Earth Evening)

Describe this commission’s activities/accomplishments in carrying out BOCC goals/priorities, if applicable.

BOCC Goal Five: Create, preserve, and protect a natural environment that includes clean water, clean air, wildlife, important natural lands and sustainable energy for present and future generations.

- Presented findings and recommendations to BOCC on selected environmental issues: effects of forest mgmt. on water quality; effects of herbicides on roadside native plant habitat; potential effects of hydraulic fracturing (“fracking”) in Orange County; problems caused by hydrilla in the Eno River (BOCC Priorities #1 and #12)
- Stayed abreast of ongoing and developing env. issues of importance to the County, such as Falls & Jordan Lake nutrient mgmt. rules, reducing commercial food waste in solid waste stream, and permitting of biosolids on farmland (Priorities #12 and #16)
- Provides comments on proposed master plans for future parks/preserves

If your commission played the role of an Element Lead Advisory Board involved in the 2030 Comprehensive Plan preparation process, please indicate your activities/accomplishments as they may relate to the Comprehensive Plan’s goals or objectives. (*Element Lead Advisory Boards include: Planning Board, Commission for the Environment, Historic Preservation Commission, Agriculture Pres. Board, and Parks & Recreation Council*)

The CFE provided extensive input into DEAPR staff development of the *Natural and Cultural Systems Element* of the Comprehensive Plan—specifically the chapters on Air and Energy Resources, Water Resources, and Natural Areas and Wildlife Habitat.

Objective AE-1:

Assess and implement the current countywide greenhouse gas emissions inventory and action plan target reductions.

- The CFE helped to initiate a countywide inventory of greenhouse gas emissions (2005), and continues to advise on ways to reduce the County’s “carbon footprint.”

Objective AE-15:

Foster participation in green energy programs such as installation incentives for solar hot water/solar generation/solar tempering in residential or commercial construction. The County should develop programs that will link citizens and businesses with options for alternative and sustainable energy sources.

- The CFE's Air and Energy Resources Committee has developed proposals that address energy efficiency and renewable power issues, and will pursue further in collaboration with other advisory boards and stakeholders.

Objective NA-3:

Develop a more detailed and consistent methodology for monitoring changes in forest cover throughout the County, and specifically the extent of mature hardwood forest.

- The CFE's State of the Environment report documented significant reductions in mature hardwood forest that occurred from 2003-2008 and since 1988. DEAPR staff will update those data to include forest conversions that occurred 2009 - 2013.

Objective NA-11:

Develop a comprehensive conservation plan for achieving a network of protected open space throughout Orange County, which addresses 1) threats to important natural areas; 2) connectivity between protected areas; 3) coordination with neighboring counties; and 4) sustainable management of critical natural resources.

- The CFE's Land Resources Committee is working with other conservation entities to initiate the development of a comprehensive conservation plan.

Objective NA-16:

Create a system of public and private open space and conservation areas, including parks, nature preserves, and scenic vistas representative of Orange County landscape.

- The CFE advises County's Lands Legacy program in its efforts to protect the most important natural and cultural resource lands through a variety of means.
- The CFE's Land Resources Committee is working with other conservation entities to initiate the development of a comprehensive conservation plan.

Objective WR-5:

Promote and participate in regional efforts to plan for use of water supplies in the region in an equitable manner, including contingency planning for water supplies during droughts. [Also Objectives WR-9, WR-10, and WR-15]

- CFE stays abreast of Jordan Lake Partnership and advises staff as needed
- CFE advocates for full implementation of the Water Resources Initiative to ensure planning for an adequate water supply for current and anticipated future needs

Objective WR-11:

Provide incentives and educational information to landowners to increase protection of watersheds and ground water supplies and their inter-relationships.

- The CFE distributes groundwater and surface water educational materials at Earth Evening and Last Fridays events and as part of its State of the Environment reports

NOTE: The Orange County State of the Environment 2014 identified specific recommendations on ways to help maintain and improve Orange County's environmental quality, many of which address objectives stated in the Orange County Comprehensive Plan.

Identify any activities this commission expects to carry out in 2016 as they relate to established BOCC goals and priorities. If applicable, is there a fiscal impact (i.e., funding, staff time, other resources) associated with these proposed activities (list).

- Continue to update the Orange County State of the Environment 2014 report
- Continue to explore ways to improve the County's ability to foster local sustainable energy production and energy efficiency strategies, including developing incentives for increasing energy efficiency in new construction
- Recommend ways to reduce the County's "carbon footprint" and implement the County's Environmental Responsibility Goal (BOCC Priority #10)
- Continue to help with public outreach and management efforts related to hydrilla in the Eno River
- Help initiate the development of a comprehensive conservation plan for Orange Co (BOCC Priority #1)
- Co-sponsor the annual DEAPR photography contest (*The Nature of Orange*)
- Help plan for and participate in County's annual Earth Evening event

What are the concerns or emerging issues your board has identified for the upcoming year that it plans to address, or wishes to bring to the Commissioners' attention?

- The CFE will continue to advocate for an expansion of the County's commercial food waste pickup and composting services to reduce food waste in the solid waste stream
- The CFE remains interested in developing incentives for increasing energy efficiency in new construction
- The CFE will continue to learn more about environmental justice matters and incorporate relevant information and considerations in the State of the Environment report and its other activities
- The CFE will continue to follow the Solid Waste Advisory Group's discussions of how to improve the handling and disposal of Orange County's solid waste, and will advocate for better long-term solutions
- The CFE will continue to advocate for increased efforts to gather information related to water resources in Orange County and to increase public awareness and understanding of water supply sources, related concerns, and what steps can be undertaken to maintain or improve the quantity and quality of Orange County water supply resources
- The CFE will continue to address, as appropriate, the critical environmental issues for Orange County as enumerated on page 3 of the 2014 State of the Environment report, which include potential adverse effects from a) invasive, non-native, plant and animal species; b) reductions in State-led collection of water resources data; c) potential drilling for natural gas in the Deep River basin; d) urban sprawl; and CFE support for e) the responsible deployment of clean and appropriately-sited renewable energy and reductions in energy use to help fight climate change

**ORANGE COUNTY
BOARD OF COMMISSIONERS**

ACTION AGENDA ITEM ABSTRACT

Meeting Date: November 23, 2015

Action Agenda

Item No. E.1

SUBJECT: Impact of 2015 Legislative Updates on Orange County's Erosion Control/Stormwater Programs, Riparian Buffer and Impervious (Built-Upon Area) Regulations

DEPARTMENT: Planning and Inspections

PUBLIC HEARING: (Y/N)

N

ATTACHMENT(S):

1. Memorandum on SL2015-246 (H44) – Stormwater Impacts
2. Memorandum on SL2015-286 (H765) – Stormwater Impacts
3. Memorandum on SL2015-246 (H44) – Riparian Buffer Impacts
4. Session Law 2015-149 (H634)
5. Session Law 2015-246 (H44)
6. Session Law 2015-286 (H765)
7. Matrix Outlining State and County Riparian Buffer Requirements

INFORMATION CONTACT:

Howard W. Fleming, Jr., PE,
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(919) 245-2586
Michael Harvey, Planner III, (919) 245-2597
Craig Benedict, Planning Director,
(919) 245-2592
James Bryan, Staff Attorney, (919) 245-2319

PURPOSE: To review how legislative changes made in 2015 have or will impact the County's Erosion Control/Stormwater programs and riparian buffer regulations as enforced by the Current Planning division. This abstract provides staff background and information on each individual item with requests for direction and/or identification on identified next steps.

BACKGROUND:

- **Session Law (SL) 2015-149 (H634)** - An act to clarify the definition of built-upon area (BUA) for purposes of stormwater programs.

The basic change per this SL is, for the purposes of implementing stormwater programs, "built-upon area" does not include...a surface of number 57 stone, as designated by the American Society for Testing and Materials, laid at least four inches thick over a geotextile fabric; or a trail as defined in G.S. 113A-85 that is either unpaved or paved as long as the pavement is porous with a hydraulic conductivity greater than 0.001 centimeters per second (1.41 inches per hour)."

Please refer to Attachment 4 for a copy of the legislation.

This only (at this time in our planning opinion) affects the stormwater calculations for runoff retention which would require less storage. This BUA will likely not be widely used.

- **Session Law 2015-246 (H44)** - An act to reform various provisions of the law related to local government including modifications to riparian buffer standards and changes to the enforcement of voluntary State regulations (i.e. stormwater).

A copy of the legislation is contained in Attachment 5.

An analysis on the legislations impact on the County's stormwater program in contained in Attachment 1 and Attachment 3 contains our assessment of its impacts on our riparian buffer program.

This **will** greatly affect the existing stormwater program in the Jordan Lake watershed where we implemented rules in advance of pending state regulations (which have been delayed).

A primary consideration relates to what regulations should be implemented if current ordinances are determined to be non-enforceable?

- **Session Law 2015-286 (H765)** - An act to provide further regulatory relief to the citizens of North Carolina by providing for various administrative reforms, by eliminating certain unnecessary or outdated statutes and regulations and modernizing or simplifying cumbersome or outdated regulations, and by making various other statutory changes.

A copy of the legislation is contained in Attachment 6. An analysis on the legislations impact on the County's stormwater program in contained in Attachment 2.

FINANCIAL IMPACT: Consideration will not create the need for additional funding for the provision of County services; however...

Item A –If we decide to amend the UDO, there would be staff time commitments and a resulting public hearing.

1. Costs for the required legal advertisement will be paid from FY2015-16 Departmental funds budgeted for this purpose.
2. Existing Planning and stormwater staff, included in the Departmental staffing budget, will accomplish the work required to process these amendments.

Item B – We will examine the legal ramifications of other actions

Item C - Staff will proceed with a Riparian buffer study with present cost unknown and unfunded. Approximate cost could be \$40,000 to \$50,000. We will seek cost sharing and collaboration where possible.

Service Impact: Current Planning, Engineering/Stormwater staff, and the County Attorney's office would need to be involved with all of the scenario pathways. It should be noted, however, that some impact to service might result, due to the extensive nature of these regulations, if revised, and the fact they are reviewable by the State for compliance and subject to additional revision until approved.

SOCIAL JUSTICE IMPACT: The following Orange County Social Justice Goal is applicable to this agenda item:

GOAL: ESTABLISH SUSTAINABLE AND EQUITABLE LAND-USE AND ENVIRONMENTAL POLICIES

The fair treatment and meaningful involvement of people of all races, cultures, incomes and educational levels with respect to the development and enforcement of environmental laws, regulations, policies, and decisions. Fair treatment means that no group of people should bear a disproportionate share of the negative environmental consequences resulting from industrial, governmental and commercial operations or policies.

RECOMMENDATION(S): The Manager recommends that the Board receive the information and provide comments:

1. Stormwater Rules: Collaborate with the Attorney's Office and seek guidance from NC DEMLR and DEQ as to what "rules Orange County should default to, if we need to suspend present UDO regulations because of the delayed rules enforcement prohibited by SL 2015-246 (H44).
2. Riparian Buffers: Proceed with study to justify present standards.

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MEMORANDUM

TO: Orange County Board of County Commissioners
FROM: Howard W. Fleming, Jr., PE, Engineering/Stormwater Supervisor
DATE: 11/23/15
PROJECT: GENERAL
SUBJECT: Session Law 2015-246 (HB 44)

The following is the Engineering/Stormwater Division’s analysis of the impacts of subject legislation on the Erosion Control/Stormwater program of Orange County.

ADDED § 153A-145.6. Requiring compliance with voluntary State regulations and rules prohibited. (For full text see Attachment 4)

Based on this new law, it appears that our ability to enforce the Jordan Lake Stormwater regulations for new development is rescinded. This is based on the fact that SL2012-200 (enacted 08/01/12 versus Orange County UDO amendment ordinance 2012-011, adopted 04/17/12) delayed our required implementation to August 10, 2014. Subsequently, SL2013-395 delayed implementation of all Jordan Lake Rules “that begin July 1, 2013, or later” for a period of three years. So, it appears that the requirement for us to implement the Jordan Lake new development stormwater regulations has been delayed until 2017.

Even though the title of 153A-145.6 says “voluntary State regulations”, the text of the first paragraph says:

*“If a State department or agency declares a regulation or rule to be voluntary or the General Assembly delays the effective date of a regulation or rule proposed or adopted by the Environmental Management Commission, or any other board or commission, a county shall **not** require or enforce compliance with the applicable regulation or rule, including any regulation or rule previously or hereafter incorporated as a condition or contractual obligation imposed by, agreed upon, or accepted by the county in any zoning, land use, subdivision, or other developmental approval, including, without limitation, a development permit issuance, development agreement, site-specific development plan, or phased development plan.”*

Since the required implementation has been delayed by the General Assembly until 2017, Engineering/Stormwater Division’s interpretation is that the County “shall not require or force compliance with the” new development rules for Jordan Lake. We recommend consideration and interpretation by the County Attorney’s office.

These are the rules which form the basis of the stormwater regulations for almost half of the County. In the absence of these rules, research will need to be done to determine how the UDO would need to be modified in order to meet the requirements of state law.

Unfortunately, the North Carolina Department of Environment and Natural Resources Energy Mineral and Land Resources (DEMLR) is right in the middle of a comprehensive review of stormwater regulations, which involves significant reorganization, repeals of duplications and amendments. Why is DEMLR doing this?

#1 S.L. 2013-82 requires new rules for Fast-Track permitting. Minimum Design Criteria (MDC) are part of the Fast-Track requirements, so they have to be codified too.

#2 G.S. §150B-21.3A directs state agencies to review and update their rules every 10 years.

#3 It's a good opportunity to update & streamline.

Substantive changes resulting from this that will affect Orange County include:

1. Minimum Design Criteria (MDC) and fast-track permitting
2. Project density
3. Disconnection instead of swales

The recodified comprehensive rules adoption is scheduled for July of 2016.

| | |
|---------------------|--|
| Sep-Dec 2015 | DEMLR develops fiscal note |
| Nov 12, 2015 | WQC approves rule text |
| Jan 14, 2016 | EMC approves rule & fiscal note |
| Jan 15, 2016 | OSBM certifies fiscal note |
| Jan 20, 2016 | DEMLR files rule & fiscal note in Register |
| Feb 17, 2016 | Comment period begins |
| Mar 2016 | Public hearing(s) |
| Apr 17, 2016 | Comment period ends |
| Jul 13, 2016 | EMC adopts rules |

ADDED: § 160A-499.4. and § 153A-457. Notice prior to construction.

Article 21, Chapter 160A and Article 23 of Chapter 153A of the General Statutes were amended to include new sections requiring counties to provide notice prior to construction

- (a) A county shall notify the property owners and adjacent property owners prior to commencement of any construction project by the county.*
- (b) Notice under this section shall be in writing at least 15 days prior to the commencement of construction, except in any of the following instances:*
 - (1) If the construction is a repair of an emergency nature, the notice may be given by any means, including verbally, that the county has for contacting the property owner within a reasonable time prior to, or after, commencement of the repair.*
 - (2) The property owner requests action of the county that requires construction activity.*
 - (3) The property owner consents to less than 15 days' notice.*
 - (4) Notice of the construction project is given in any open meeting of the county prior to the commencement of the construction project.*

The Engineering group believes category (4) will prevail as the primary vehicle for such notifications to occur, thereby ensuring Orange County Compliance.

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MEMORANDUM

TO: Craig Benedict
FROM: Howard W. Fleming, Jr., PE, Engineering/Stormwater Supervisor
DATE: 11/23/15
PROJECT: GENERAL
SUBJECT: Session Law 2015-286 (HB 765)

The following is my analysis of the impacts of subject legislation on the Erosion Control/Stormwater program of Orange County. (For full text of SL 2015-286, see Attachment 5.)

Michael Harvey has reviewed this memorandum in advance of finalization, as it touches upon ordinances enforced by Current Planning. I have incorporated his one comment.

1. The Environmental Review Commission (EMC) is required to study "open and fair competition with respect to materials used in wastewater, stormwater, and other water projects"; whether to require public entities to consider all acceptable piping materials before determining which piping material should be used in the constructing, developing, financing, maintaining, rebuilding, improving, repairing, procuring, or operating of a water, wastewater, or stormwater drainage project. Recommendations are due to the 2016 Regular Session of the 2015 General Assembly, which starts April 25, 2016.

The outcome of this provision cannot be determined at this point in time. **As Orange County Engineering (a division of Planning & Inspections) engages in the development of water, sewer and potentially other infrastructure that would promote development in the Economic Development Districts (EDD's), changes may be expected to Orange County's construction documents for such future projects.**

2. Session Law 2015-286 (HB 765) amends the laws governing isolated wetlands.
 - a) Regulated discharges to **isolated wetlands and isolated waters were modified by this legislation to apply only to Basin Wetlands and Bogs** and no other wetland types and shall not apply to an isolated man-made ditch or pond constructed for stormwater management purposes or any other man-made isolated pond.
 - b) No later than March 1, 2016, the EMC is to establish three zones (Coastal, Piedmont and Mountain) for purposes of regulating impacts to isolated wetlands. Orange County is in the Piedmont. **Our threshold for impacts not requiring mitigation will be less than or equal to one-half acre of isolated wetlands. Mitigation requirements for impacts to isolated wetlands greater than this threshold shall only apply to the amount of impact that exceeds the threshold. The mitigation ratio remains the same (1:1).**
 - c) **Impacts** to isolated wetlands **shall not be combined** with the project impacts to 404 jurisdictional wetlands or streams for the purpose of determining when impact thresholds that trigger a mitigation requirement are met.
 - d) These regulations have a “delayed effective date” per as provided in G.S. 150B-21.3, which is full of entirely confusing language. Most likely, these regulations will become **effective sometime during the 2016 spring session of the General Assembly.**
 - e) The Department of Environment and Natural Resources (DENR) is directed to study a number of issues surrounding "isolated wetlands" and report its findings and recommendations to the EMC on or before November 1, 2014. **The year of this date must be in error, as it predates the ratification date.** The implications are that this study could reverse or amend the very rules discussed above. It almost reads as if the legislators are saying, “please confirm our direction”.
3. EMC development deadline for developing fast-track permitting for stormwater management systems has been pushed back to November 1, 2016. **NC DEQ has staff working on this. Their current direction is paired with the development of the Minimum Design Criteria (MDC), which applies to the Best Management Practice (BMP) Manual. The MDC are currently published and are undergoing public review. We assume there may be some eventual downstream implications for Orange County to implement a clone process.**
4. Apparently effective immediately, as no effective date paragraph was included. **§143-214.7 Stormwater runoff rules and programs is modified** to allow “...any acceptable engineering hydrologic and hydraulic methods.” (Genesis and intent unknown; other related provisions do not apply in Orange County.)

5. **[POTENTIAL ORANGE COUNTY UDO TEXT AMENDMENT REQUIRED]**

Session Law 2015-286 (HB 765) removes the previously allowed latitude of local stormwater management programs to “exceed” the requirements of the model program adopted by the Commission and requires Orange County to submit our current or revised stormwater management program to the Environmental Management Commission (EMC) by March 1, 2016. The EMC will then review and approve, approve with modifications, or disapprove our revised stormwater management program by December 1, 2016.

The EMC reviewed and approved Orange County’s stormwater management program in January of 2012; however, it must be stated that the focus of the EMC at that time was compliance with the Falls Lake Rules. Due to the fact that Orange County is about 45% Falls Lake watershed and 50% Jordan Lake watershed (and about 5% Hyco Creek watershed), our presentation was an overview of our entire UDO regulations, with a focus on how they pertain to the Falls nutrient strategy. **It is hard to predict the outcome of this 2016 review, as the focus appears to be on excessive differences (i.e. where Orange County is more restrictive). These regulations are extremely detailed and it appears Orange County has incorporated most of the nutrient limitations verbatim from both the Falls and Jordan nutrient strategies.** Orange County’s mix of watersheds caused us to be conservative in trying to make the stormwater regulations consistent across the entire county. Other reasons for Orange County’s more restrictive regulations are less obvious to those of us without the benefit of historic context. In discussing this matter with Current Planning, it is our joint opinion that “stormwater program” could and probably will be interpreted in a broad manner. We expect it will encompass built-upon area (BUA) limitations, as defined in the Fresh Surface Water Quality Standards for Class WS-II through IV Waters, 15A NCAC 02B .0214 through .0216.

Using this broad interpretation, **Orange County’s “stormwater program” differences appear to be primarily in the areas of impervious surface (built-upon area) allowances and riparian buffers (both of which are enforced by Current Planning), where Orange County approaches these limitations in a manner different than that outlined in the North Carolina Administrative Code (NCAC). The EMC may find that UDO revisions are required.**

15A NCAC 02B .0262 Jordan Water Supply Nutrient Strategy

15A NCAC 02B.0275 Falls Nutrient Strategy

15A NCAC 02B .0233 Neuse River Basin: Nutrient Sensitive Waters Management Strategy: Protection and Maintenance of Existing Riparian Buffers

15A NCAC 02B .0267 Jordan Water Supply Nutrient Strategy: Protection of Existing Riparian Buffers

15A NCAC 02B .0214 Fresh Surface Water Quality Standards for Class WS-II Waters

15A NCAC 02B .0215 Fresh Surface Water Quality Standards for Class WS-III Waters

15A NCAC 02B .0216 Fresh Surface Water Quality Standards for WS-IV Waters

6. Requires the Environmental Review Commission (ERC), with the assistance of the Department of Environment and Natural Resources (DENR), to perform a comprehensive review of all regulations related to the management of stormwater in the State, and make recommendations as to whether they should be recodified or reorganized in order to clarify State law for the management of stormwater. The reporting timeline for this starts April 25, 2016 and the outcome cannot be determined at this point in time. **No resulting changes are expected to Orange County's stormwater management program; however we welcome clarification!**
7. Excludes cluster mailbox units from calculation of built-upon area for the development for stormwater permitting purposes. This only applies to single-family or duplex developments. For retrofits, local government shall not require a modification to any stormwater permit for that development. Effective immediately but expires on December 31, 2017, or when regulations on cluster box design and placement by the United States Postal Service become effective and those regulations are adopted by local governments, whichever is earlier.
8. By March 1, 2016, DENR is required to report to the ERC the results of a study, including any recommendations as they relate to exempting linear utility projects from "certain" environmental regulations. "Linear utility projects" are defined as electric power lines, water lines, sewage lines, stormwater drainage lines, telephone lines, cable television lines, data transmission lines, communications-related lines, or natural gas pipelines. **The outcome and effects of this legislation on Orange County cannot be determined at this point in time.**
9. §143-214.7C was added and DENR / EMC must amend their rules to be consistent with **not requiring mitigation for impacts to intermittent streams**, except as required by federal law. For purposes of the added section, "intermittent stream" was defined as a well-defined channel that has all of the following characteristics:
 - (1) It contains water for only part of the year, typically during winter and spring when the aquatic bed is below the water table.
 - (2) The flow of water in the intermittent stream may be heavily supplemented by stormwater runoff.
 - (3) It often lacks the biological and hydrological characteristics commonly associated with the conveyance of water.

Apparently effective immediately, this prohibition seems problematic, as intermittent streams are considered "waters of the US" under the Clean Water Act and therefore "jurisdictional", requiring 404 permitting for impacts and the corresponding 401 water quality certification by the State. Orange County is prohibited from issuing a land disturbance permit until what is commonly referred to as the "404/401 permit" is issued.

Except as otherwise provided, all provision of the act are effective when it becomes law.

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MEMORANDUM

TO: Board of County Commissioners
 Bonnie Hamersley, County Manager
 Travis Myren, Deputy County Manager
 John Roberts, County Attorney

FROM: Michael D. Harvey AICP, CFM, CZO – Current Planning Supervisor

DATE: November 12, 2015

SUBJECT: IDENTIFICATION of impacts associated with NC Session Law 2015-246

Session Law 2015-246, ratified on September 23, 2015, potentially has significant impacts on the County's stream buffer program as detailed within Section 6.13 of the Orange County Unified Development Ordinance (UDO).

A summary of these impacts are:

1. Local governments are prohibited from adopting, implementing, and enforcing riparian buffer (i.e. stream buffer) regulations that exceed State requirements. Exceptions to this prohibition include:
 - a. The adoption of more restrictive standards to comply with, or implement, Federal or State law;

STAFF COMMENT: Staff is still researching the implications and meaning of this standard with State officials.

Part of our argument is our current program is consistent with State regulations (i.e. the County only requires only a 50 ft. State designated riparian buffer). We do, however, require more restrictive buffers based on a water features location within an identified Watershed Protection Overlay District and all soil survey streams throughout the County.

From our standpoint existing regulations are connected within our watershed management/protection program and are not

necessarily riparian buffer based. Support for this conclusion is referenced throughout Section 6.13 *Stream Buffers* of the UDO.

We **may have** a defensible opportunity in this exception in this area to preserve our current program.

It needs to be remembered there has been a comingling of watershed management/riparian buffer regulations over the years which complicates this position. We may find ourselves having to modify existing language and re-adopt development standards to ensure proper delineation of our policies to avoid conflict.

- b. Represents a condition of a permit, certificate, or other approval issued by a Federal or State agency;

STAFF COMMENT: Orange County **does not** meet the criteria.

- c. Was enacted prior to August 1, 1997 and meets listed requirements;

STAFF COMMENT: Section 143-214 23(A) (c) of the North Carolina General Statutes requires communities demonstrate the ordinances implementing these regulations included that following, specific, findings to qualify for this exemption:

.... the requirement was imposed for purposes that include the protection of aesthetics, fish and wildlife habitat, and recreational use by maintaining water temperature, healthy tree canopy and understory, and the protection of the natural shoreline through minimization of erosion and potential chemical pollution in addition to the protection of water quality and the prevention of excess nutrient runoff,

and

(ii) the ordinance would permit small or temporary structures within 50 feet of the water body and docks and piers within and along the edge of the water body under certain circumstances.

While we are still researching the adoption of stream buffer regulations, dating back to the mid 1980's, we are unable to verify ordinances adopted by the County implementing this program contained the required language or allowances.

It is our professional opinion we **will not** have sufficient documentation demonstrating we complied with this exemption.

- d. Said regulation(s) are reviewed and approved by the State Environmental Management Commission (EMC) through the review of a scientific study providing documentation on the need for increased/more restrictive standards based on local physical and environmental conditions.

STAFF COMMENT: Staff was informed by the Attorney's office, based on County Commissioner direction, we received authorization to begin developing a Request for Qualifications

(RFQ) to select a firm to complete this required scientific study. The RFQ will be released for peer review/comment by November 23, 2015. As part of this process staff will be reaching out to the Upper Neuse River Basin Association (UNRBA) who may be able to provide assistance.

At this time staff is unsure how much this study will cost but estimates range from approximately \$40,000.00 to \$80,000.00. It should be noted funds for this study **do not** exist within the Planning Department budget.

This study needs to be completed and submitted to the EMC by August of 2016.

The EMC has 90 days to take action on the request and should make a final decision by November of 2016.

It has also been suggested by State staff we submit formal notification by February 1, 2016 of our intention to complete and submit a scientific study for review.

This is the exception we are pursuing to maintain our current standards as written.

2. Local governments shall not treat land within identified riparian buffers area as if the land is: *'the property of the State or any of its subdivisions unless the land or an interest therein has been acquired by the State or its subdivisions by a conveyance or by eminent domain'*.

STAFF COMMENT: Staff believes we **already comply** with this standard.

3. Riparian buffer areas are required to be denoted on subdivision plats.

STAFF COMMENT: Staff believes we **already comply** with this standard.

It should be known, however, State law does not require this area to be surveyed (i.e. established by actual field location/delineation by a surveyor). All the surveyor has to do is denote the approximate required buffer area. **We may have to withdraw the survey requirement.**

4. When riparian buffers are located within designated common areas or open space areas located within a minor/major subdivision each abutting parcel shall be viewed as having an equal interest in that buffer area. The County is required to allow adjacent lots to 'count' this buffer area towards lot size, density, perimeter buffer, and conservation purposes.

STAFF COMMENT: Staff believes we **already comply** with this standard.

5. Staff interprets the Session Law as prohibiting the County from requiring property owners from voluntarily agreeing to more restrictive riparian buffer standards in

order to receive development approval(s). If this interpretation is correct this will impact current regulations governing private road justification as contained within Section 7.8.5 of the UDO.

We may have to modify and lessen our private road justification standard(s) to comply with the law.

Ultimately the County has until **January 1, 2017** to be compliant with applicable State regulations associated with the implementation and enforcement of riparian buffer standards. Having said that the State is requesting formal, written notification from local governments outlining their anticipated course of action (i.e. preparing a scientific study for review by the EMC ; amending ordinances to be consistent with State law ; demonstrating existing regulations already comply, etc.) by **February 1, 2016**.

It should be noted these issues and impacts are different from those being addressed by the Erosion Control/Stormwater division as State law changes with respect to stormwater regulations require local governments to cease and desist enforcement of temporary regulations (i.e. Jordan Lake rules) in its entirety until further and formal rulemaking occurs at the State level. There will be a more immediate impact that will have to be addressed by staff on this topic.

IMPACTS: The impacts of the Session Law are broken down as follows:

a. IMMEDIATE:

- i. Staff will continue the current dialogue with State officials arguing our buffer requirements are connected with our watershed management program and are, therefore, consistent with State law and can continue to be implemented as written.

Clarification of existing language will still be required and staff believes we will be required to re-submit our watershed management program to the State for re-certification.

- ii. Staff will finalize and release for internal peer review the RFQ soliciting a professional firm to complete the required scientific study for presentation to the EMC in the event the State rejects our argument(s) outlined herein.
- iii. Staff will have to complete an assessment of all section(s) of the UDO that will have to be amended to ensure compliance with State law in case we do not prevail with our 2 viable options.

b. INTERMEDIATE/LONG RANGE:

- i. Staff will need to complete an assessment of adopted Comprehensive Plan policies for potential modification to address compliance with new State regulations.
- ii. Staff will need to engage in public outreach to 'educate' local residents on revised buffer regulations.

Staff is available to provide additional feedback and guidance as necessary.

CHAPEL HILL NEWS

New future for organic waste?

A committee wants to remove organics from county's waste stream
Organic waste can become compost or in sufficient amounts biogas
Orange County ahead of curve in exploring organic waste options

BY JULIA SENDOR
Correspondent

CHAPEL HILL

Could Orange County prevent thousands of tons of organic waste from being buried in landfills - and instead convert it into

something of value?

The county's Solid Waste Advisory Group is now exploring that possibility. The group has made reducing solid waste one of its top priorities, said Barry Jacobs, SWAG chairman and Orange County Commis-

sioner. Organic materials removed from the waste stream can be used to produce compost or even biogas, while reducing the overall waste that's landfilled.

"We thought this is a tremendous area of opportunity," Jacobs said.

Waste that's "organic" - anything that was once alive, including textiles and some shoes - now represents about half of all Orange County's solid waste collected, according to a 2010 study.

Food waste, specifically, rep-



➔ MORE INSIDE

What's Carboro Alderman Sammy Slade doing poking around in people's garbage? **page 10A**

resents about a fifth of the total 53,805 tons of waste collected in fiscal year 2013-2014.

Aiming to lower that tonnage, the group contacted food waste collection expert Janine Ralph. A senior environmental planning manager at international engineering firm HDR, Ralph gave a public presentation on food waste recovery options earlier this month.

The county's smaller size limits the options for getting value from its organic waste, Ralph said.

Even through curbside food

waste pick-up, as other municipalities have launched, the county could recover only 3,000-5,000 tons of organic waste - and likely no more than 10,000 tons per year if more yard waste and other organic

SEE WASTE, 10A

FROM PAGE 1A

WASTE

materials such as shoes, textiles and diapers were diverted, Ralph estimated.

In contrast, an organic waste collection program would need to generate at least 25,000 tons per year for infrastructure investments like biogas production to be viable, Ralph said.

Orange County, the towns and university already do several things well: yard waste collection, commercial food waste composting, recycling, and solid waste drop-off centers.

The county kept 17,150 tons of yard waste and food waste from even entering the landfill last year, through programs like leaf collection and commercial food waste collection.

All told, recycling and composting have cut Orange County's per-capita waste 64 percent from the 1991-92 base year used for measuring progress.

Residents visit solid waste drop-off centers an average of 10 times per year, and can drop off their own compostable waste at the Walnut Grove Church Road center.

What does this mean for enhancing organic waste recovery?

Ralph suggested increasing the number of drop-off sites for household food waste, enrolling more businesses and schools in food waste-to-compost programs (a "no-brainer," she said), or even doing a detailed feasibility study of the costs and benefits of curbside organic waste pick-up.

Pooling resources with another entity might also make renewable energy production more feasible, Ralph said.

OWASA Sustainability Manager Pat Davis said he attended the presentation to learn more about biogas production at wastewater treatment plants more feasible. One way is to add food waste fats, oils, and greases - which could be collected curbside.

"One of the possibilities that our board of directors is looking at is how do we beneficially use all of the biogas that we pro-



BO RADER KRT

As the ground begins to thaw next spring, many gardeners will begin preparing soil for planting by adding organic materials like compost.

Did you know?

Orange County operates recycling programs for the commercial sector. Call 919-968-2788 to find out if your business is eligible for the commercial recycling program or organics collection program.

duce at the wastewater treatment plant," Davis said.

TREADING NEW GROUND

With SWAG still formalizing its partnership with the university and UNC Hospitals, Jacobs couldn't predict when SWAG will take its next steps.

But Ralph said SWAG's exploration of organic waste recovery makes Orange County a pioneer - as a relatively low generator of waste, based in the South, and not legally mandated to recover organic waste.

"To be quite frank, to have the community considering what they want to do with diverting food waste and organics ... it's being somewhat ahead of the curve," Ralph said.

"You're treading new ground."

Most U.S. municipal or state organic waste diversion programs are based in larger cities on the west coast or in the Northeast, she said. Many programs are driven by high landfill tipping fees or shortage of landfill space - and North Carolina faces neither of these constraints.

So why explore diverting organic waste? It's still a cost

consideration, as well as as a moral one, Jacobs said.

"For every pound of waste you divert, you don't have to pay for fees for hauling ... it's cheaper, as well as environmentally more sound ... (that's) the closest thing we have to a 'driver,'" Jacobs said.

Jacobs also acknowledged the fraught history of landfills in Orange County. The Orange Regional Landfill, located in the historically black, working-class Rogers-Eubanks neighborhood, opened in 1972, despite community protest, and remained open until 2013, placing Orange County at the center of a debate over environmental racism.

"(That history) affects everything," Jacobs said.

"I think we're highly sensitive to siting issues, and to the broadest possibilities of government responsibility."

Waste-reduction efforts could also help prevent the possibility of ever opening a new Orange County landfill, Jacobs said.

"We're just trying to get as far to the front of waste-reduction technology as possible," he said. "And to do it in a cost-effective way, and an environmentally just way."

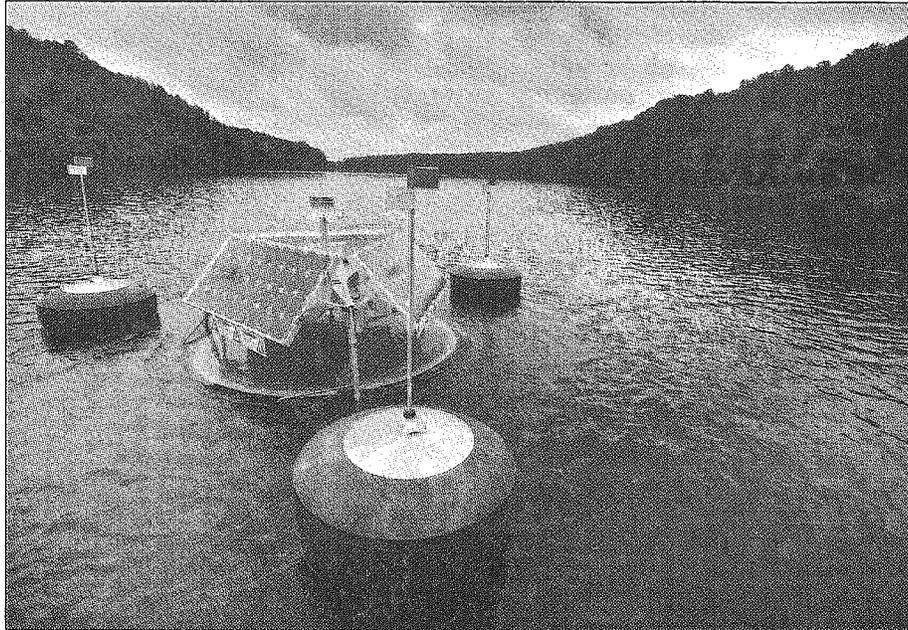
JORDAN LAKE

SolarBees haven't improved water quality

One year after floating devices were deployed, no improvement seen

Regulators say it's too early to know whether the SolarBees are cleaning up pollution

Environmentalists say the state has all the data it needs to prove they don't work



CHUCK LIDDY 2014 NEWS & OBSERVER FILE PHOTO

BY CRAIG JARVIS
cjarvis@newsobserver.com

RALEIGH
Experimental whirling devices floating in Jordan Lake have not significantly improved water quality after a year in operation.

State environmental regulators say the effectiveness of the 36 SolarBees won't be fully known until the end of a four-year pilot program. They say it's too early to draw any conclusions from a preliminary report issued last month.

There is not enough data for a definitive conclusion, Sarah Young, a spokeswoman for the N.C. Department of Environmental Quality, said Tuesday.

Environmentalists say the state already knows as much as it needs to: The devices don't clean up pollution.

"Any sensible decision would be to pull the plug on this experiment now and get serious about restoring water quality in Jordan Lake," Elaine Chiosso of the Haw River Assembly said Tuesday.

Jordan Lake provides drinking water for 300,000 residents in and beyond the Triangle. It has been designated under the federal Clean Water Act as impaired

One of the 36 SolarBee units deployed on Jordan Lake.

because most of the time it exceeds state standards for chlorophyll a, the green pigment in algae and plants.

A number of state and local political officeholders representing communities upstream, which are the sources of most of the pollution, have fought against stringent restrictions that the General Assembly put in place in 2009, suggesting the additional costs that would be imposed on development would be harmful. The legislature has delayed implementation of those restrictions four times, beginning with the Republican takeover of the General Assembly.

It has also caused a split among Republican legislators, with those representing Cary and other downstream communities opposed to the unproven technology now deployed on the lake.

The McCrory administration has said making Jordan Lake healthful for

drinking water, as well as for recreation, is a top priority. Last year, state regulators told legislators that SolarBees would be the most cost-effective option but suggested trying a few new technologies on a small scale to see what works the best.

Legislators went with the SolarBees, which stir algae in the water in an effort to disperse and reduce pollution. The first-year study focused on two arms of Jordan Lake: Morgan Creek and the Haw River.

"These preliminary results indicate that nutrient related water quality conditions did not significantly improve in areas of the lake where SolarBees were deployed," said the report by the state Division of Water Quality, which was sent to the General Assembly on Oct. 1.

The devices had a "subtle" performance record in a pilot project in Cabarrus County in 2007, ac-

ording to a study by UNC Charlotte, which recommended not using them.

In June, state environmental regulators said the SolarBee project was late getting started and so only one summer had been tested; they had hoped to test two full summers. Algae blooms more rapidly in the summer.

Sen. Rick Gunn, a Burlington Republican who supports the experiment, said Tuesday that he agrees with regulators that it's too soon to tell.

"We've made a significant investment that pales in comparison to the hundreds of millions of dollars that existing Jordan Lake rules would cost municipalities," Gunn said. "I think, while we did not see movement yet, one summer is not long enough to see if there's a positive trend."

Environmentalists have said from the beginning that the SolarBees would be ineffective and that the

pilot program would only delay addressing the source of pollution from upstream runoff and old wastewater treatment plants. Advocates said that one year of data was sufficient and that the results were not surprising.

"If this was just a nice little science experiment that didn't have an impact on anyone's life, then it might be fine to say keep doing this for several years," Chiosso said. "Meanwhile, all this pollution keeps going into Jordan Lake without the restrictions the Jordan Lake rules would have provided."

Other environmental groups, like the North Carolina chapter of the Sierra Club, are concerned that a deregulation law enacted this year could have the effect of preventing local governments from enforcing ordinances they have adopted to comply with the Jordan Lake rules. The Haw River passes through eight counties.

This year, the General Assembly extended what was initially a one-year trial through October 2018.

Legislators also gave \$1.5 million from the Clean Water Management Trust Fund to the Department of Environmental Quality to continue the project. The state has already spent \$1.6 million on the SolarBees.

The devices were provided by a company on a no-bid contract. The company says its data shows more success than the state's.

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Clean energy mandates remain battleground

Nov 29, 2015 News + Observer

BY CRAIG JARVIS
cjarvis@newsobserver.com

North Carolina has been home to a thriving solar industry for the past eight years, thanks to a tax break and requiring utilities to develop clean energy.

But opponents of targeted tax credits and government-funded advantages for certain businesses have been chipping away at those benefits - with mixed results.

This year the state legislature did away with a 35 percent tax credit for in-

vestments in renewable energy.

But efforts to get rid of what is known as the "renewable energy portfolio" law, which mandates a certain level of energy production from solar, wind and other renewable sources, have repeatedly

failed.

That debate is expected to return to the General Assembly next year. Once again, the battle will be pitched.

"I like to call it the most important state policy issue you've never heard of," Donald Bryson, state direc-

tor of Americans for Prosperity, said Friday. North Carolina gave a shot in the arm to solar and, to a lesser extent, wind power in 2007 when the legislature set a goal for utilities to produce 12 percent of their electricity from renewable energy sources. The current rate is 6 percent, and would grow to 10 percent in 2018 and cap off at 12.5 percent in 2021.

Rep. Mike Hager, a Republican from Rutherfordton and a former Duke Energy engineer, has crusaded against the portfolio law for the past several years. He has been thwarted by a bipartisan bloc of legislators who point to the jobs and other economic benefits of the growing alternative energy industry.

As he has in the past, Hager worked in this recent session for a freeze on those escalating portfolio rates in two bills. In the final shuffling of legislation, the only provision that survived was the one allowing the tax credit to sunset.

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Hager said Friday that House and Senate mem-

“

WE THINK IT HURTS INNOVATION IN THE ENERGY INDUSTRY.

Donald Bryson, state director of Americans for Prosperity, on the renewable energy mandate

“My cause is, how do we include an energy strategy but still hold the cost on energy?”

The libertarian Americans for Prosperity thinks the same way, and in hopes of building support for another run at eliminating the renewable mandate the organization is sponsoring a series of “Free the Grid” town halls around the state.

Earlier this month it held the first meeting in Wilmington, where Hager and Rep. Chris Millis, a civil engineer and Republican representing Onslow and Pender counties, spoke to a full house. U.S. Rep. David Rouzer also spoke on Environmental Protection Agency regulations.

Town halls are planned in Raleigh, Winston-Salem and Asheville. The group has also launched a campaign of door-to-door, phone and mail efforts.

“We think it hurts innovation in the energy industry,” Bryson said of the mandate. “We’re not opposed to solar. We’re not opposed to wind. We’re not opposed to health insurance - but when Obamacare required people to buy it, it hurt the economy. It’s the same way with REPs (renewable energy portfolios).”

Bryson said it’s a long-range issue for AFP, and that if it isn’t successful next year it will be back at the legislature the following year for the long session.

COSTS OF RENEWABLES

He said the purpose of the 2007 law establishing the portfolio was not about lowering carbon emissions but about boosting the wind industry, which mostly ended up helping the solar industry. That, he said, ended up being more expensive for ratepayers.

“People don’t realize what the renewable portfolio costs us,” Hager said. “Not just a little on the bill every month. It’s an additive effect on all products in stores; distributors, manufacturers have that burden, too. Plus it’s embedded in every state, federal and local government. So it’s inflationary to the final consumer.”

OVER
→

FROM PAGE 1C

ENERGY

“We plan to continue to drive it until we get some satisfaction on energy policy for the state focused on the least cost and not picking winners and losers,” he said.

Supporters of government encouragement for alternative energy point to economic benefits. Last year, the solar tax credit totaled \$126 million and generated \$717 million in spending, according to the N.C. Department of Revenue.

It was disclosed last week that Google is going to become the first customer of a Duke Energy program using energy from a solar farm that will be the second-largest in the state and will be in Rutherford County, which Hager represents.

Duke will buy energy from the farm, and Google will buy energy credits that represent the electricity from its Lenoir data center. The idea is to help customers that use a lot of power, such as Google, meet corporate sustainability goals, The Charlotte Observer reported.

The N.C. Sustainable Energy Association counters AFP’s argument that alternative energy increases costs. The N.C. Utilities Commission says electricity rates overall have increased this year, but the vast majority of that increase is because of new fossil fuel plants and inflation.

The association also argues that there is no free market for energy in North Carolina anyway, regardless of REPs. That’s because there is a highly regulated monopoly, in Duke Energy, and the renewable mandate allows limited competition.

Studies have shown that the energy portfolio has created jobs, many in the state’s poorest areas, said Cassie Gavin, a lawyer with the North Carolina chapter of the Sierra Club. She said clean energy benefits the environment and the economy, and reduces the need for expensive new power plants.

“It’s disappointing that some legislators are apparently still fully committed to crippling North Carolina’s clean energy success story by freezing REPs,” said Molly Diggins, the state director of the Sierra Club.

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U.N. summit could bring first progress in years

Nov 29, 2015 News + Observer

BY JUSTIN CATANOSO
Correspondent

Government leaders from 194 nations, braving threats of further terrorist attacks, gather Monday in Paris for the 21st United Nations climate change summit. Their

Wake Forest professor optimistic about negotiations

goal is to forge a framework that they hope will spare the planet from the kind of catastrophic warming by 2100 that many climate scientists see as inevitable.

Twenty U.N. summits have

preceded Paris. While there have been intermittent successes in many of the meetings, environmentalists argue that elected leaders have failed for two decades to achieve the most fundamental outcome: a binding

agreement to burn less fossil fuels in order to keep the Earth from heating up so fast.

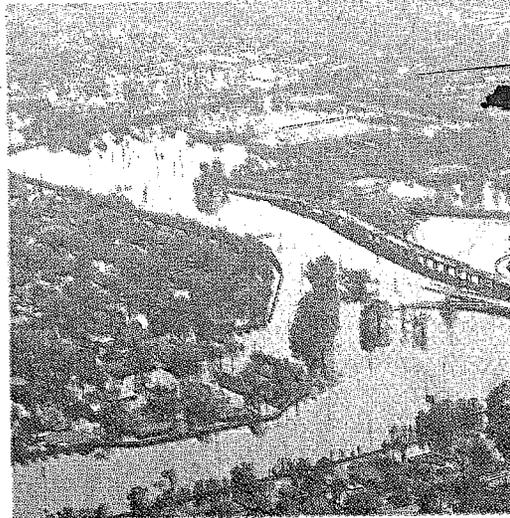
This year has already been declared the hottest on record, as were the previous 14 years. The results are with us now: Rapidly melting Arctic ice caps leading to sea-level rise. Warming oceans leading to dying coral reefs and more frequent storms of greater intensity. Persistent droughts leading to water scarcity not just in poor sub-Saharan Africa but also in wealthy California.

Wake Forest University law professor John Knox is the United Nations' special representative on climate change and human rights. In his role, he travels the world, primarily to poor countries in tropical regions to evaluate the ravages of climate change being experienced.

Knox visited the tiny island country of Maldives in the Indian Ocean. It is being swallowed



Knox



Climatologists say weather is now more unpredictable and erratic. The unprecedented power and destruction of hurricanes Katrina, pictured, and Sandy are possible examples.

FROM PAGE 1A

CLIMATE

by sea-level rise triggered by global warming for which it bears no responsibility. The situation there threatens to upend the lives of 345,000 people.

That's the intersection between climate change and human rights that concerns the United Nations. Knox's written reports recommend what can be done, such as asking industrial countries that are the largest source of greenhouse gas emissions to compensate the Maldives so it can build protective sea walls.

It's a tough sell.

"If you're really concerned about climate change," Knox said, "you don't take two decades to get to a decision. But we've got this issue: We don't have one world

government; having the world divided up into nearly 200 countries makes the problem infinitely harder to deal with."

Remarkably, Knox surveys a grim landscape and insists he is optimistic about the outcome of the Paris negotiations, which run through Dec. 11. Why?

"For the first time ever, the world's three largest leaders in carbon emissions are on board: China, the United States and the European Union (which is counted as one entity)," Knox said. "Those three alone account for 50 percent of all carbon emissions. With that kind of leadership, other nations will fall in line."

Then there is this: Since the high-profile failure of

the 2009 negotiations in Copenhagen, where poor countries felt bullied by powerful nations and bailed out of any accord, an entire strategy was ditched. No longer would the U.N. try to dictate to nearly 200 countries what each should be doing.

The name of the game now? Do what you can.

"Copenhagen was the gravestone for the top-down approach," Knox says. "Instead, more than 150 nations pledged earlier this year to reduce their own carbon emissions to levels they believe they can achieve. Those (pledges) make it extremely likely that the voluntary commitments will be drafted into an accord that nations can agree on. That's never happened before."

DIFFICULT MATH OF CLIMATE CHANGE

The Obama administration does not plan to seek approval for any Paris accord. The president has said he believes he has the authority to impose carbon emission limits through existing legislation and the EPA.

And Knox isn't worried that other countries will renege on their promises. Global urgency about climate change is on the rise, he says.

No wonder. Since 1900 and the full emergence of the industrial age, the burning of gas, oil and coal for energy has enabled enormous prosperity in the First World. It has also caused the planet to warm by about 1 degree Celsius (1.8 degrees Fahrenheit). The geologic record over millions of years shows the Earth has never warmed so fast in such a short time.

Think of the atmosphere as a blanket. Before the 1900s, the blanket's thickness was ideal. It allowed in enough of the sun's heat to warm the Earth, while enabling enough of that heat to reflect off the surface and escape. That lightweight blanket kept temperatures steady and nonthreatening to human activity.

"Without a greenhouse effect," Knox said, "we would have the atmosphere of the moon."

But tons and tons of greenhouse gas emissions over the decades have increased the thickness of that atmospheric blanket. The Earth has warmed. And Mother Nature, who has been tossed off balance, has responded with a vengeance.

Climate scientists say weather today is more unpredictable, more erratic. The unprecedented power of hurricanes Katrina and Sandy are possible U.S. examples. In the Philippines, three of the most ferocious typhoons ever have leveled the island state in the last three years. Alaska is losing its permafrost.

Bangladesh, essentially a country spread across a marsh, may see 150 million people dislocated by sea-level rise.

Lima, Peru, is a desert city of 9 million people where it never rains. It depends on Andean glacier melt for its water. Those glaciers have shrunk by a third.

Climate scientists believe that carbon emissions must be reduced drastically to keep the world from warming another 1 degree Celsius in the next 50-75 years. If we keep burning fossil fuels at the current rate, temperatures are expected to rise an additional 3 to 5 degrees Celsius. Life on

Earth could become unsustainable by the 22nd century, scientists warn.

And here's where Knox's optimism takes a hit: the emissions gap. When calculated, the voluntary global pledges are only half as much as needed to prevent an increase of 1 degree Celsius by 2100.

"Cutting out the use of fossil fuels," Knox said. "There is no other way to fix this problem."

WHAT ABOUT FORESTS?

Others disagree.

Representatives from the nation's leading environmental groups held a news conference Nov. 20 and issued an urgent plea. It's not just about reducing emissions, they say. It's seeing the forests for the trees.

Trees and organic matter thrive on carbon dioxide. It's their oxygen, especially in the dense tropical forests around the belly of the Earth. In Brazil and the Congo, Indonesia and Peru, tropical forests soak in CO₂ and store it in leaves, limbs, trunks and roots. As long as the tree is alive and standing, it holds that carbon as if locked in a vault.

But when trees fall through deforestation, when they are burned or left to rot, the vault opens, and the carbon escapes. Deforestation globally contributes as much to carbon emissions as the entire transportation sector.

"The activities of the land sector collectively account for about 24 percent of global greenhouse gas emissions," said Jason Funk, a climate scientist with the Union of Concerned Scientists in Washington, D.C. "But forests provide sequestration potential equal to about 10 to 14 percent of current gross emissions."

Funk and his colleagues at the Environmental Defense Fund, the World Wildlife Fund, the Nature Conservancy and Conservation International believe Paris negotiators are overlooking a crucial aspect for offsetting the effects of climate change: yes, reduce emissions, but also agree to an aggressive strategy to also reduce deforestation and regrow forests where they have been slashed and burned for ranching, farming and extraction.

"Forests and other ecosystems are the only positive way we have of removing carbon from the atmosphere at scale," said Steve Panfil, a policy adviser with Conservation International in Washington, D.C. "Any agreement in Paris has to take that into account. If we stop deforestation today, the remaining forests could reduce emissions (by pulling gases from the atmosphere) by 30 percent."

But there are other practical reasons to stop destroying nature, Panfil adds. Mangroves blunt the fury of land-bound storms. Rain and cloud forests play a crucial role in the water cycle, which affects weather patterns around the world. Millions of people depend on forests for food security.

"The emissions gap is real, and it's fair to say the land sector has not been

given the importance it deserves in closing the gap," Funk said.

CONTINUED



SKEPTICISM AND OPTIMISM

Meanwhile, somewhere in the Eastern Hemisphere - he wouldn't say where, but not Indonesia, which his Skype handle says - Chris Lang runs a website that lays waste to the arguments of environmentalists and their love of standing forests.

It's just unrealistic, he says.

Lang also is highly critical of U.N. policies that allow industrialized countries to continue to burn fossil fuels at will as long as they pay a tropical country enough money to preserve a stretch of rain forest capable of absorbing all that pollution. It is, at best, a zero-sum gain, Lang says, before becoming cynical, or realistic - depending on your perspective. (For his outspokenness and online prominence, Lang says he fears for his life, hence his secretiveness.)

"The idea that forests are worth more standing than they are being cut down to grow palm oil (Indonesia), drill for oil (Ecuador) or dig for gold (Peru) is not working," Lang said during a Skype interview. "You can always make more money cutting down the trees. And with a carbon trading system, you are not burning any less fossil fuels."

The answer, Lang says, is not even a topic of discussion in Paris. It is not just about reducing carbon emissions, he argues. It should be about keeping coal, oil and gas in the ground, period. Then invest heavily in renewable forms of energy, such as wind, solar, hydroelectric, even nuclear.

"They talk about reducing emissions, but they never talk about stopping the extraction of oil and coal," Lang said. "That's a complicated political discussion. Is Saudi Arabia going to stop drilling for oil? Is West Virginia going to stop digging coal? No. Not without really difficult discussions about what's really needed."

3

Knox, who studied and taught climate policy for 20 years at American University before moving to Wake Forest, takes this all in. He's heard all the arguments, all the skepticism, all the doomsday talk. Still, he remains optimistic about Paris and what comes next.

"This wailing and gnashing of teeth follows a familiar pattern," Knox said. "In the 1970s, when Congress adopted major pollution regulations for the first time, Detroit (automakers) cried that they would be forced out of business. They said meeting the new pollution standards was impossible."

"But then the laws passed, the regulations were adopted, and it turned out, it was possible. And possible to do it far more cheaply than they imagined, which turned out to be better for the economy. Look, if we get halfway there in Paris (with emissions reduction targets), that's a pretty good start. That's something to build on later."

Paris is not the end of the global battle to fight climate change, Knox said.

It's an important pivot point with all nations finally on board. More progress will come. More solutions, too. He's seen it before. Time and again.

Justin Catanoso is director of journalism at Wake Forest University. His reporting is sponsored by the Pulitzer Center for Crisis Reporting in Washington and the Center for Energy Environment and Sustainability at Wake Forest. He will cover the Paris summit; his reporting can be followed at www.justincatanoso.com.

Short Answers to Hard Questions About Climate Change

By Justin Gillis, *New York Times*

November 28, 2015

The issue can be overwhelming. The science is complicated. Predictions about the fate of the planet carry endless caveats and asterisks.

We get it. And so, as the Paris climate talks get underway, we've provided quick answers to often-asked questions about climate change. You can submit your own questions here.

1. How much is the planet heating up?

1.7 degrees is actually a significant amount.

As of this October, the Earth had warmed by about 1.7 degrees Fahrenheit since 1880, when tracking began at a global scale. That figure includes the surface of the ocean. The warming is greater over land, and greater still in the Arctic and parts of Antarctica.

The number may sound low, but as an average over the surface of an entire planet, it is actually high, which explains why much of the land ice on the planet is starting to melt and the oceans are rising at an accelerating pace. The heat accumulating in the Earth because of human emissions is roughly equal to the heat that would be released by 400,000 Hiroshima atomic bombs exploding across the planet every day.

Scientists believe most and probably all of the warming since 1950 was caused by the human release of greenhouse gases. If emissions continue unchecked, they say the global warming could ultimately exceed 8 degrees Fahrenheit, which would transform the planet and undermine its capacity to support a large human population.

2. How much trouble are we in?

For future generations, big trouble.

The risks are much greater over the long run than over the next few decades, but the emissions that create those risks are happening now. Over the coming 25 or 30 years, scientists say, the climate is likely to resemble that of today, although gradually getting warmer. Rainfall will be heavier in many parts of the world, but the periods between rains will most likely grow hotter and therefore drier. The number of hurricanes and typhoons may actually fall, but the ones that do occur will draw energy from a hotter ocean surface, and therefore may be more intense, on average, than those of the past. Coastal flooding will grow more frequent and damaging.

Longer term, if emissions continue to rise unchecked, the risks are profound. Scientists fear climate effects so severe that they might destabilize governments, produce waves of refugees, precipitate the sixth mass extinction of plants and animals in Earth's history, and melt the polar ice caps, causing the seas to rise high enough to flood most of the world's coastal cities.

All of this could take hundreds or even thousands of years to play out, conceivably providing a cushion of time for civilization to adjust, but experts cannot rule out abrupt changes, such as a collapse of agriculture, that would throw society into chaos much sooner. Bolder efforts to limit emissions would reduce these risks, or at least slow the effects, but it is already too late to eliminate the risks entirely.

3. Is there anything I can do?

Fly less, drive less, waste less.

There are lots of simple ways to reduce your own carbon footprint, and most of them will save you money. You can plug leaks in your home insulation to save power, install a smart thermostat, switch to more efficient light bulbs, turn off the lights in any room where you are not using them, drive fewer miles by consolidating trips or taking public transit, waste less food, and eat less meat.

Perhaps the biggest single thing individuals can do on their own is to take fewer airplane trips; just one or two fewer plane rides per year can save as much in emissions as all the other actions combined. If you want to be at the cutting edge, you can look at buying an electric or hybrid car, putting solar panels on your roof, or both.

If you want to offset your emissions, you can buy certificates, with the money going to projects that protect forests, capture greenhouse gases and so forth.

In the end, though, experts do not believe the needed transformation in the energy system can happen without strong state and national policies. So speaking up and exercising your rights as a citizen matters as much as anything else you can do.

4. What's the optimistic scenario?

Several things have to break our way.

In the best case that scientists can imagine, several things happen: Earth turns out to be less sensitive to greenhouse gases than currently believed; plants and animals manage to adapt to the changes that have already become inevitable; human society develops much greater political will to bring emissions under control; and major technological breakthroughs occur that help society both to limit emissions and to adjust to climate change.

The two human-influenced variables are not entirely independent, of course: Technological breakthroughs that make clean energy cheaper than fossil fuels would also make it easier to develop the political will for rapid action.

Scientists say the odds of all these things breaking our way are not very high, unfortunately. The Earth could just as easily turn out to be more sensitive to greenhouse gases than less. Global warming seems to be causing chaos in parts of the natural world already, and that seems likely to get worse, not better. So in the view of the experts, simply banking on a rosy scenario without any real plan would be dangerous. They believe the only way to limit the risks is to limit emissions.

5. What's the worst-case scenario?

There are many.

That is actually hard to say, which is one reason scientists are urging that emissions be cut; they want to limit the possibility of any worst-case scenario coming to pass. Perhaps the greatest fear is a collapse of food production, accompanied by escalating prices and mass starvation. Even with runaway emissions growth, it is unclear how likely this would be, as farmers are able to adjust their crops and farming techniques, to a degree, to adapt to climatic changes. Another possibility would be a disintegration of the polar ice sheets, leading to fast-rising seas that would force people to abandon many of the world's great cities and would lead to the loss of trillions of dollars worth of property and other assets. Scientists also worry about other wild-card scenarios like the predictable cycles of Asian monsoons' becoming less reliable. Billions of people depend on monsoons to provide water for crops, so any disruptions would be catastrophic.

6. Will a tech breakthrough help us?

Even Bill Gates says don't count on it, unless we commit the cash.

As more companies, governments and researchers devote themselves to the problem, the chances of big technological advances are improving. But even many experts who are optimistic about technological solutions warn that current efforts are not enough. For instance, spending on basic energy research is only a quarter to a third of the level that several in-depth reports have recommended. And public spending on agricultural research has stagnated even though climate change poses growing risks to the food supply. People like Bill Gates have argued that crossing our fingers and hoping for technological miracles is not a strategy — we have to spend the money that would make these things more likely to happen.

7. How much will the seas rise?

The real question is not how high, but how fast.

The ocean is rising at a rate of about a foot per century. That causes severe effects on coastlines, forcing governments and property owners to spend tens of billions of dollars fighting erosion. But if that rate continued, it would probably be manageable, experts say.

The risk is that the rate will accelerate markedly. If emissions continue unchecked, then the temperature at the earth's surface could soon resemble a past epoch called the Pliocene, when a great deal of ice melted and the ocean rose something like 80 feet compared to today. A recent study found that burning all the fossil fuels in the ground would fully melt the polar ice sheets, raising the sea level by more than 160 feet over an unknown period.

With all of that said, the crucial issue is probably not how much the oceans are going to rise, but how fast. And on that point, scientists are pretty much flying blind. Their best information comes from studying Earth's history, and it suggests that the rate can on occasion hit a foot per decade, which can probably be thought of as the worst-case scenario. A rate even half that would force rapid retreat from the coasts and, some experts think, throw human society into crisis. Even if the rise is much slower, many of the world's great cities will flood eventually. Studies suggest that big cuts in emissions could slow the rise, buying crucial time for society to adapt to an altered coastline.

8. Are the predictions reliable?

They're not perfect, but they're grounded in solid science.

The idea that Earth is sensitive to greenhouse gases is confirmed by many lines of scientific evidence. For instance, the basic physics suggesting that an increase of carbon dioxide traps more heat was discovered in the 19th century, and has been verified in thousands of laboratory experiments.

Climate science does contain uncertainties, of course. The biggest is the degree to which global warming sets off feedback loops, such as a melting of sea ice that will darken the surface and cause more heat to be absorbed, melting more ice, and so forth. It is not clear exactly how much the feedbacks will intensify the warming; some of them could even partially offset it. This uncertainty means that computer forecasts can give only a range of future climate possibilities, not absolute predictions.

But even if those computer forecasts did not exist, a huge amount of evidence suggests that scientists have the basic story right. The most important evidence comes from the study of past climate conditions, a field known as paleoclimate research. The amount of carbon dioxide in the air has fluctuated naturally in the past, and every time it rises, the Earth warms up, ice melts, and the ocean rises. A hundred miles inland from today's East Coast, seashells can be dug from ancient beaches that are three million years old. These past conditions are not a perfect guide to the future, either, because humans are pumping carbon dioxide into the air far faster than nature has ever done.

9. Why do people question climate change?

Hint: ideology.

Most of the attacks on climate science are coming from libertarians and other political conservatives who do not like the policies that have been proposed to fight global warming. Instead of negotiating over those policies and trying to make them more subject to free-market principles, they have taken the approach of blocking them by trying to undermine the science.

This ideological position has been propped up by money from fossil-fuel interests, which have paid to create organizations, fund conferences and the like. The scientific arguments made by these groups usually involve cherry-picking data, such as focusing on short-term blips in the temperature record or in sea ice, while ignoring the long-term trends.

The most extreme version of climate denialism is to claim that scientists are engaged in a worldwide hoax to fool the public so that the government can gain greater control over people's lives. As the arguments have become more strained, many oil and coal companies have begun to distance themselves publicly from climate denialism, but some are still helping to finance the campaigns of politicians who espouse such views.

10. Is crazy weather tied to climate change?

In some cases, yes.

Scientists have published strong evidence that the warming climate is making heat waves more frequent and intense. It is also causing heavier rainstorms, and coastal flooding is getting worse as the oceans rise because of human emissions. Global warming has intensified droughts in regions like the Middle East, and it may have strengthened the drought in California.

In many other cases, though, the linkage to global warming for particular trends is uncertain or disputed. That is partly from a lack of good historical weather data, but it is also scientifically unclear how certain types of events may be influenced by the changing climate.

Another factor: While the climate is changing, people's perceptions may be changing faster. The Internet has made us all more aware of weather disasters in distant places. On social media, people have a tendency to attribute virtually any disaster to climate change, but in many cases there is no scientific support for doing so.

11. Will anyone benefit from global warming?

In certain ways, yes.

Countries with huge, frozen hinterlands, including Canada and Russia, could see some economic benefits as global warming makes agriculture, mining and the like more possible in those places. It is perhaps no accident that the Russians have always been reluctant to make ambitious climate commitments, and President Vladimir V. Putin has publicly questioned the science of climate change.

However, both of those countries could suffer enormous damage to their natural resources; escalating fires in Russia are already killing millions of acres of forests per year. Moreover, some experts believe countries that view themselves as likely winners from global warming will come to see the matter differently once they are swamped by millions of refugees from less fortunate lands.

12. Is there any reason for hope?

If you share this with 50 friends, maybe.

Scientists have been warning since the 1980s that strong policies were needed to limit emissions. Those warnings were ignored, and greenhouse gases in the atmosphere have since built up to potentially dangerous levels. So the hour is late.

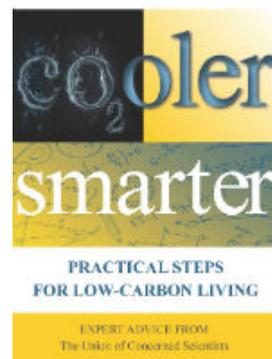
But after 20 years of largely fruitless diplomacy, the governments of the world are finally starting to take the problem seriously. A deal that is likely to be reached in Paris in December will commit nearly every country to some kind of action. Religious leaders like Pope Francis are speaking out. Low-emission technologies, such as electric cars, are improving. Leading corporations are making [bold promises](#) to switch to renewable power and stop forest destruction. Around the world, many states and cities are pledging to go far beyond the goals set by their national governments.

What is still largely missing in all this are the voices of ordinary citizens. Because politicians have a hard time thinking beyond the next election, they tend to tackle hard problems only when the public rises up and demands it.

TOP TEN WAYS TO REDUCE YOUR CARBON EMISSIONS (AND SAVE MONEY AT THE SAME TIME)

From [Cooler Smarter: Practical Steps for Low-Carbon Living](#)
Expert Advice from the Union of Concerned Scientists

1. **Switch to a car with better fuel economy.** Upgrading from a 20 mpg car to a 40 mpg car can save you 4,500 gallons of gasoline over the car's life span. At today's gas prices, that's a total savings of more than \$18,000.
2. **Make your house more air tight.** Even in reasonably tight homes, air leaks may account for 15 to 25 percent of the heat our furnaces generate in winter or that our homes gain in summer. If you pay \$1,100 a year to heat and cool your home, you might be wasting as much as \$275 annually.
3. **Buy and USE a programmable thermostat** for a 15 percent reduction in your heating and cooling emissions and save \$180 a year. During the summer, a setting of 78 degrees Fahrenheit is optimal during the hours you are at home, and 85 degrees when you are away during the day.
4. **Eat less meat, especially beef.** An average family of four that cuts its meat intake in half will avoid roughly three tons of emissions annually.
5. **Use power strips in your home office and home entertainment center** to curb "phantom loads" and save a surprising amount on your electric bill. Keeping your laser printer turned on when not in use could be costing you as much as \$130 annually.
6. **Upgrade your refrigerator and air conditioner**, especially if they are more than five years old. New ones are twice as efficient or more. For fridges: if they're old an upgrade can pay for itself in as little as three years in energy savings alone.
7. **Get an electricity monitor** from your local hardware store or even borrow one from many local libraries to see where the energy hogs are in your home. This can help you save hundreds of dollars annually.
8. **Change those light bulbs.** New LED light bulbs can give the same light for 15 percent the electricity. That adds up to more than \$100 in savings for most families each year.
9. **Wash clothes in cold water.** They get just as clean with today's detergents. But hot water washes use five times the energy—and create five times the emissions. This could save you nearly \$100 a year.
10. **Buy less stuff.** Reduce, re-use, and recycle—it's not just about pollution, but the strategy will lower your emissions too and help combat global warming.



And one more...

11. **Spread the word.** If all Americans reduced their emissions by 20 percent we could shutter 200 of the nation's 600 coal plants, a great step in fighting the worst consequences of climate change.

ORANGE COUNTY WINS SMART FLEET LEADER AWARD

ORANGE COUNTY, NC (November 4, 2015)--Orange County's Fleet Maintenance division wins the Smart Fleet Leader Award for the second year in a row. The presentation took place at the City of Raleigh's new Central Operations Facility.

The 9th Annual Mobile Clean Air Renewable Energy (CARE) awards were presented to individuals, technology providers, and organizations.



This award recognizes the diligent work and careful attention of the County staff involved in purchasing, maintaining and operating our vehicles in the most efficient way possible. A special thanks to those departments who have worked with the County Sustainability Program to install and operate idle reduction and clean alternative fuel technologies: Emergency Services, The Sherriff's Office, and Orange Public Transit.

A total of 26 public and private North Carolina fleets were recognized as NC Smart Fleet members for their fuel efficiency and emissions reduction efforts. NCDOT Chief Engineer Mike Holder recognized the awardees in Raleigh.

The North Carolina Clean Transportation Tour, hosted by the N.C. Clean Energy Technology Center (NCCETC), concluded a three city tour with a final event at the City of Raleigh's new Central Operations Facility on Thursday, October 22.

Nearly 250 attendees were given the opportunity to get behind the wheel of over 15 alternative fuel vehicles at each location. Vehicles ranged in size from neighborhood electric vehicles to natural gas school buses. Some of the vehicles available to participants were the all-electric Tesla Model S, a hybrid Chevy Express, a natural gas Ford Taurus Interceptor, a propane Ford Explorer Interceptor, and a biofuel powered Dodge Charger.

The awards recognize outstanding individuals and organizations for their efforts in reducing transportation-related emissions. Skip Kirkwood, Sam Brake, Alliance AutoGas, City of Charlotte Solid Waste Services, and the City of Charlotte Fire Department were all recipients of a 2015 Mobile CARE award. Find out more about their accomplishments [here](#).

NCDOT Board of Transportation Chairman Ned Curran recognized the awardees in Concord, NCDOT Secretary Nick Tennyson in Winston-Salem, and NCDOT Chief Engineer Mike Holder in Raleigh.

[View photos and presentations](#) from the N.C. Clean Transportation Tour.

THE DUKE FOREST

LOG

A bulletin from the
Office of the Duke Forest

Fall 2015



Management Spotlight

Invasive Plant Species

Non-native invasive plant species (“invasives”) are plants that grow outside of their native range and exhibit rapid rates of growth and spread. These species lack predators and diseases that naturally control them in their home ranges. As a result, invasives compete with native plants for sunlight, water, nutrients, and habitat. When they successfully displace native vegetation, they modify the habitat available for wildlife, including pollinators. Overall, invasives disrupt the ecology of our native ecosystems and represent a unique management challenge.

Invasives come from a variety of sources including the intentional planting of invasive stock by unknowing homeowners, and they thrive in areas that have been disturbed by human activities such as road building and residential development. The Duke Forest, once called an “an island of green in a sea of suburbs,” does not lack for potential sources of invasives, and the disturbances created by active management can lead to their spread. In addition to human activities, natural disturbances such as hurricanes, tornadoes, and wildfires can help establish and spread invasives. Given that human and natural disturbances are both inevitable events, monitoring, treating, and tracking the spread of invasives is an increasingly important part of Duke Forest management.

To support these efforts, the Office of the Duke Forest hired Taylor Whitmire for a year-long Invasive Species Management Internship. Taylor recently graduated from North Carolina State University with a Bachelor of Science in Fisheries, Wildlife, and Conservation Biology and loves being in the woods! Besides being an uncanny attractor of wildlife, particularly snakes, Taylor focuses on increasing the number of acres monitored and treated for invasive species. With the help of staff and volunteers, Taylor targets invasive infestations in natural heritage areas and in areas that are managed for timber production – both important locations for the regeneration of native species and the preservation of healthy, growing tree stands.



Taylor Whitmire, Duke Forest Invasives Species Management Intern, examines recently sprayed Autumn Olive (*Elaeagnus umbellata*) along the historic Old Oxford Road in the Durham Division. Taylor received her Pesticide Applicator License earlier in the year and has worked closely with long time Forest Technician, Mike Burke, to learn safe and effective chemical application techniques. You might also notice their work on the Kudzu patch (*Pueraria montana*) along Erwin Road near Pickett, and the Kudzu and Wisteria creeping into the forest along Whitfield Road, near Gate 25.

Invasive photos: Bugwood.org contributors (clockwise from top left) Ronald F. Billings - TX Forest Service, Chris Evans - River to River CWMA, Jan Samanek - State Phytosanitary Administration, Leslie J. Mehrhoff - University of CT

Trees and shrubs and vines, oh my! Below is a snapshot of some of the worst invasive plant offenders on the Duke Forest, which range from trees to grasses. Clockwise from top left: Chinese Privet (*Ligustrum sinense*), Chinese Wisteria (*Wisteria sinensis*), Tree-of-heaven (*Ailanthus altissima*), and Japanese Stiltgrass (*Microstegium vimineum*). Each of these plants is currently on Taylor's hit list. Privet and wisteria are found in at least two of our registered natural heritage areas. Tree-of-heaven is present in a recent harvest area, and Japanese Stiltgrass is creeping along a new path toward New Hope Creek.

Duke Forest's Least Wanted



THE DUKE FOREST comprises over 7,000 acres of land in Durham, Orange, and Alamance counties and has been managed for research and teaching purposes since 1931. The mission of the Forest is to facilitate research that addresses fundamental and applied questions concerning forested and aquatic ecosystems and to aid in the instruction of students so that they will be informed citizens and effective stewards of our natural resources. In addition to supporting education at local universities, the Forest also participates in community outreach through tours and other events.

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www.dukeforest.duke.edu

Forest Greetings

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From the Director's Desk

I recently had the opportunity to speak at a couple notable events - first, at the fall meeting of the Sarah P. Duke Gardens Board of Advisors and second, at a dinner for the 75th celebration of forestry education at Duke University. Below, I share with you a few excerpts from those remarks that I hope will offer insight into what we're up to here on the Forest. But before diving into that, I want to acknowledge and thank our staff - Beverly, Brad, Jenna, Mike, and Taylor - for their tremendous dedication and commitment to the Duke Forest. They accomplish a dizzying amount of work (evidenced in part by the year-in-review stats on the following pages) that makes it possible for the Office of the Duke Forest to look forward in new and exciting ways.

"TREES AND FLOWERS ARE DELICATE THINGS AND ALWAYS TELL THEIR OWN TALES."

This statement was written in 1916 by Bishop John Kilgo, former president of Trinity College, to then president William Preston Few, under whose leadership Trinity became Duke and the forest was established. At the time, Bishop Kilgo was reflecting on Trinity's expanding landscape, and I believe it's an apt way to frame the ever-evolving story of the Duke Forest. I'll only share an abbreviated tale, but I want to recognize that the trees and flowers of our forest have been telling the tales of humans on the landscape for thousands of years...

As we look to the future, the forest continues to tell its tale, but we're perhaps thinking more of the delicate nature - as Bishop Kilgo said - of its trees and flowers, especially in the face of compounding threats like climate change, invasive species, and urbanization - all of which affect the forest's composition, its health, maybe even the benefits it provides or the ways we're able to use it.

We're thinking a lot about how to best steward its natural resources and maintain the services it provides for the university and the community. Importantly, we're not doing this in isolation. In fact, we're in the middle of a strategic engagement process to learn from students, staff, faculty, and community members about what they envision for the forest's future.

It's an exciting time, flush with unique opportunities to seize and potential new capacities to build. Here are a few that are in the works or ongoing:

Supporting the expansion of the forest as a teaching and research laboratory - The forest offers opportunity for experimentation and observation across a range of new technologies from drones to nanoparticles, and its role in supporting innovation across uncommon disciplines, e.g. arts and humanities, is yet untapped.

Continuing to value the role of the forest as an island of green in a sea of suburbs - The forest protects biodiversity but how will this change in the future as the broader landscape becomes more fragmented? We are convening conversations with local partners to explore this question and collaboratively discover opportunities to maintain habitat connectivity.

Developing restoration projects to bolster forest resiliency - The low-water concrete bridge provides access over New Hope Creek, but it is a partial barrier to water flow and animal movement. With guidance from federal partners, the forest is exploring options to remove it that would improve stream flow and instream habitats.

Implementing new projects to engage Durham Public Schools - A project to overhaul the forest's one and only interpretive trail, the Shepherd Nature Trail, is on the ground right now. During project design, the forest sought input from Durham Public Schools to better understand how the trail could provide a fun and effective field trip.

Offering novel public education and outreach experiences - As a nature destination with a rich legacy of scientific research, the forest is uniquely poised to help connect people with science - to help make scientific understanding more mainstream across a wider audience. In partnership with students, staff, and faculty at Duke, the forest hopes to discover creative ways to do so.

We are pushing forward in these new directions through partnerships at Duke, the Nicholas School, and in the community. Thinking hard about the trees and flowers - their delicate nature - and how the Duke Forest remains a vital and vibrant part of the Duke DNA.



Earle's Blazing Star (Liatris squarrulosa) - A rare fall bloom annually spotted in a registered natural heritage area within the Durham Division of the Duke Forest.

News and Updates

Shepherd Nature Trail Project Underway

The Duke Forest recently received a grant to support a project to overhaul its worn-out, outdated, but one and only interpretive trail. The trail is located off of Highway 751 in the Durham Division of the Duke Forest. Known as the Shepherd Nature Trail, it was developed by the National Civilian Conservation Corps and added to over the years by boy scouts and other students. It was intended to be a self-guided nature trail, but unfortunately, both signage and sections of the trail have fallen into disrepair.

The restoration and enhancement of the Shepherd Nature Trail will provide an opportunity for a wide audience to learn about the natural environment of the NC Piedmont and sustainable forest management. This project will improve the visibility, accessibility, and educational value of the trail through overhauling signage, improving trail conditions, and investing in infrastructure upgrades. Examples include:

- Replacing dense, difficult to read signage with bright, descriptive, and easy to read signs
- Replacing fence railings and bridge treads to improve safety and accessibility
- Rerouting trail sections to prevent erosion, improve accessibility, and minimize tripping hazards
- Building additional picnic tables near the trailhead to accommodate more users

This project is funded through the Duke Forest Improvement Fund and by the Durham County Matching Grants Program for Recreation and Open Space Projects.



The Shepherd Nature Trail now forms a single complete loop and sections that led through steep, eroding areas have been rerouted.



Examples of old, damaged signage and fencing. The Duke Forest is excited to be working with Nicholas School faculty member, Dr. Nicki Cagle, an environmental communications and education expert, on the development of new sign content.

Emerald Ash Borer Confirmed

The shiny green beetle is here! The Emerald Ash Borer (EAB), a non-native insect, was introduced to the U.S. through packing materials in 2002. Its presence was confirmed in North Carolina in 2013 and specifically within Durham and Orange Counties this past summer. The North Carolina Department of Agriculture and Consumer Services has issued a statewide quarantine on ash timber and firewood to prevent accidental movement of EAB to new areas. The EAB attacks all four species of Ash trees native to North Carolina, as well as White Fringetree, and causes death within 5 years. The Duke Forest contains a very small proportion of Ash and presently has no confirmed infestations. For more information and to stay up to date on the impacts of this pest, visit: www.ncforestservice.gov/forest_health/fh_eabfaq.htm

Deer Management Program Continues

We are well into our 8th season of the Duke Forest Deer Herd Reduction Program, which began September 28th and ends December 18th. For safety reasons, the Durham, Korstian, and Blackwood Divisions are closed for all recreation Monday-Friday but open on Saturdays and Sundays. For more information about deer in North Carolina and the deer management assistance program we participate in, visit the website of the NC Wildlife Resources Commission (NCWRC): www.ncwildlife.org. The NCWRC is the state agency responsible for conserving and sustaining the state's fish and wildlife resources through research, scientific management, wise use, and public input.



An adult EAB (Eric R. Day, Virginia Polytechnic Institute and State University, Bugwood.org). Adults lay eggs on the bark of ash trees. When the eggs hatch, the larvae bore into the bark and feed on tissues that transport water and nutrients.

**DON'T MOVE
FIREWOOD.org**

A common cry you'll hear more and more of these days as we worry about the health of our forests in the face of invasive insects like the Emerald Ash Borer and Asian Long-horned Beetle. In the Duke Forest, we provide firewood at our picnic shelters and actually DO NOT ALLOW outside wood to come in. Check out the website for more info.

Year in Review

July 2014 - June 2015

Teaching & Research

The Duke Forest fulfills its primary mission by hosting a wide variety of researchers, educators, and students. Sixteen new research projects began this year, including three wildlife projects. Steve Hall, a consulting ecologist, initiated a survey of moths and butterflies to document their distribution and habitat associations, and to build a [Moths of North Carolina](#) website. Brooke Massa, a biologist with the NC Wildlife Resources Commission, searched for a state species of special concern, the Mole Salamander (*Ambystoma talpoideum*), to better understand its distribution across the Piedmont of North Carolina. Lastly, a volunteer with the NC Museum of Natural Sciences set-up camera traps to collect information for the eMammal project - a citizen-science effort to document mammal distribution and abundance. The forest also hosted its usual array of graduate, undergraduate, and K-12 field trips and class exercises, and for the 2nd year in a row, supported an executive education course, [Timberland Investments for Professionals](#), offered by the Duke Environmental Leadership program (nicholas.duke.edu/del).



The caterpillar of the *Catalpa Sphinx Moth* (*Ceratomia catalpae*) feeding on *Catalpa* tree leaves (Duke Forest, 7/28/15).



The caterpillar of the *White-Blotched Heterocampa Moth* (*Heterocampa umbrata*) prefers oak leaves. The bright pink coloring suggests that it is about to pupate (Duke Forest, 9/7/15).

| AT A GLANCE | | 2014 - 2015 |
|-------------|--|-------------|
| | Number of research projects <i>(16 new projects)</i> | 71 |
| | Number of primary investigators | 56 |
| | Number of research affiliations | 22 |
| | Total research dollars <i>(25 of 71 reporting)</i> | \$3,067,603 |
| | Number of teaching activities | 17 |
| | Number of educators | 15 |
| | Number of class visits | 43 |
| | Number of participating students | 459 |

Engagement & Outreach

Duke Forest staff offer tours, host volunteer events, and participate in group activities to provide opportunities for education and outreach about natural resources and forest management. This year, staff delivered lectures or workshops at several public and professional meetings, including: the North Carolina Invasive Plant Council annual meeting, the Appalachian Society of American Foresters annual meeting, and The Conservation Fund's Equity, Diversity, and Inclusion Convening. We hosted several volunteer events, including two visits from students at UNC's Kenan-Flagler Business School during which students got their hands dirty with trail maintenance and tree planting. Staff also partnered with SEEDS, a local Durham nonprofit focused on sustainable agriculture and organic gardening, by allowing volunteers to collect dead and downed cedar logs for garden fences (www.seedsnc.org), and collaborated with the artist Patrick Dougherty to provide materials – mostly maple saplings – needed for his recent sculpture at the NC Botanical Gardens (sculptureinthegarden.com).

| AT A GLANCE | | 2014 - 2015 |
|-------------|--------------------------------|-------------|
| | Number of tours and activities | 14 |
| | Number of participants | 437 |
| | Total outreach hours | 32 |
| | Number of volunteer events | 5 |
| | Number of participants | 55 |
| | Total volunteer event hours | 15 |



Management & Stewardship

Management of the Duke Forest is guided by a comprehensive plan that promotes the Forest’s academic mission while ensuring the protection of its natural resources. The management of the Forest is certified by the Rainforest Alliance to Forest Stewardship Council® guidelines, a strict set of environmental, social, and economic standards. In the past fiscal year, we executed operations on almost 600 acres, including 422 acres of harvests. Final regeneration cuts accounted for 45% of the harvested acreage and indicate areas in which new stands of pine and hardwood trees will be regrown. Intermediate cuts in the form of commercial thinnings were another 45% and involve stands in which the total density of trees is reduced to promote growth and minimize the incidence of pests and disease. Both harvest types are part of the Duke Forest’s sustainable timber rotation – a model system for the responsible production of the natural fibers we all depend on.

| 2014 - 2015 | | | | |
|---------------------|-----|-----------|-------------------------|----------|
| Harvests | | 422 acres | Stand Improvements | 99 acres |
| Regeneration | | | Pre-commercial thinning | |
| Clear cut | 83 | | Prescribed burning | 31 |
| Selection | 38 | | Site remediation | 4 |
| Seed tree | 26 | | Hardwood control | 1 |
| Shelterwood | 24 | | Invasive control | 1 |
| Patch cutting | 13 | | | |
| Group retention | 8 | | | |
| Intermediate | | | Plantings | |
| Commercial thinning | 188 | | 43 acres | |
| Other harvests | | | Road Maintenance | |
| Salvage harvest | 31 | | 62 miles | |
| Seed tree removal | 11 | | Grading & repair | 5 |
| | | | Mowing | 57 |

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Duke Forest Operations Manager, Jenna Schreiber, oversees a prescribed burn to reduce competition in a Longleaf Pine research stand. Prescribed burns help accomplish a variety of natural resource objectives and are conducted within a narrow window of precisely defined weather conditions.



A creative use of leftover Christmas trees to implement best management practices (BMPs) during a recent harvest. BMPs help protect water quality during forestry operations, and in this example, are helping to prevent runoff from the road from entering a nearby creek.



DUKE FOREST
Teaching & Research Laboratory
ESTABLISHED 1951

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THE DUKE FOREST LOG

Interested in making a tax-deductible contribution to support our efforts? Please do! We rely on the generosity of individuals and corporations to complete special projects like the Shepherd Nature Trail Restoration and to host events like the ones shown below.

Visit our website to give: dukeforest.duke.edu/giving-opportunities

UPCOMING EVENTS

Annual Gathering

Thursday, November 12th, 6 - 8:30 pm



An evening of food and drink to learn about activities on the Duke Forest with a special focus on forest resiliency.

Annual Research Tour

Friday, December 4th, 1 - 4 pm



An afternoon tour around Duke Forest to visit active research sites and learn about some of the topics under study.

All events are free and open to the public. For more information and to register, please visit: www.dukeforest.duke.edu

SAVE THE DATE for our 7th Annual Pine Cone Pacer 5K: April 16, 2016