

# NASA'S LAND-COVER/LAND USE CHANGE PROGRAM: AN UPDATE

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Manager, LCLUC Program

15<sup>th</sup> Anniversary  
Celebration



# LCLUC PROGRAM HISTORY AT A GLANCE

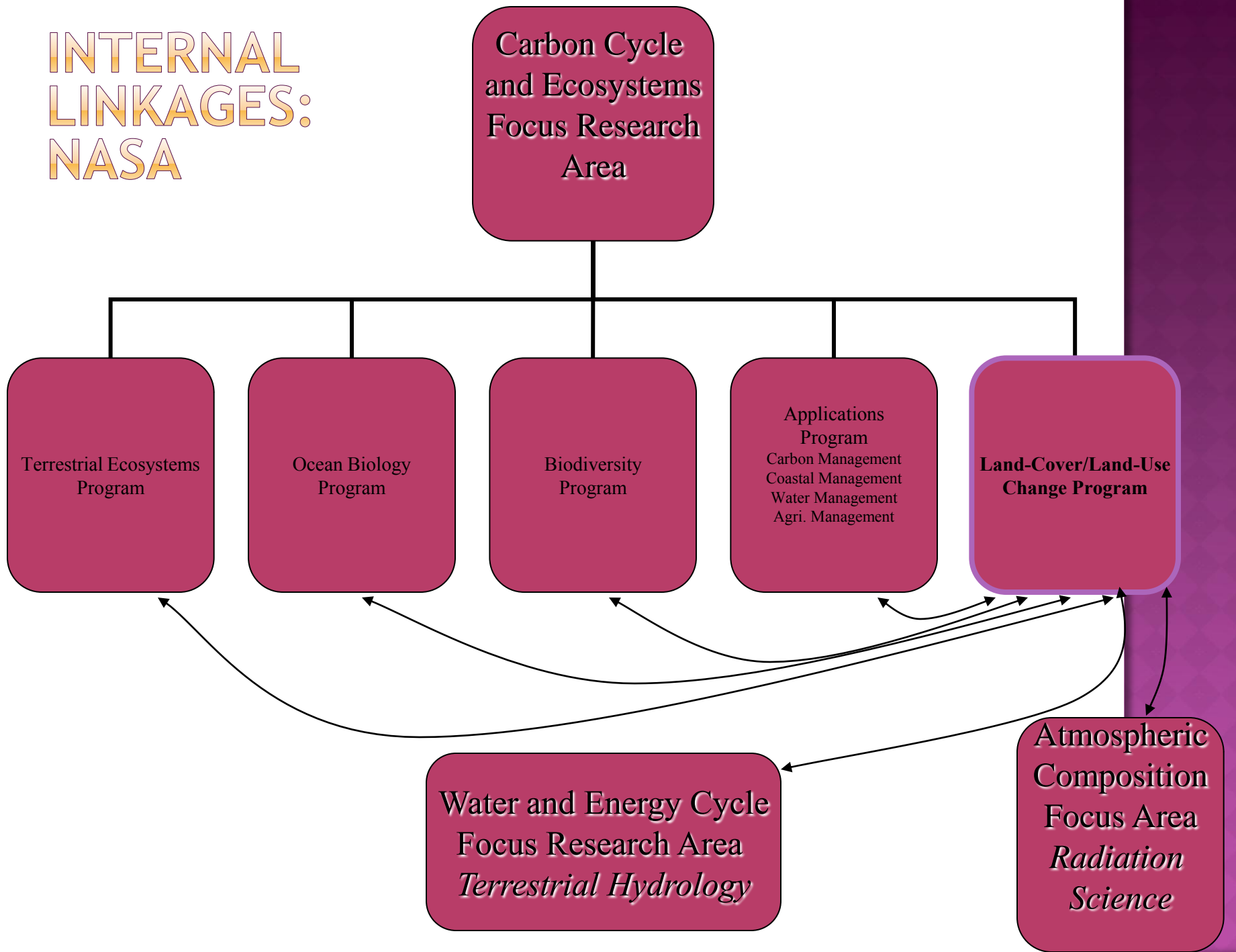
- ◉ LCLUC - 15 years
- ◉ Program growth by “coalescence”
  - Carbon Cycle program
  - Interdisciplinary program
  - Other
- ◉ Program visibility in the international arena
  - IGBP-IHDP/GLP
  - GTOS/GOFC-GOLD
  - GEO/CEOS
- ◉ Budget “stability”: same all 15 years
  - Inflation, cuts, “harvesting” - “I will get by/I will survive...” (Jerry Garcia)
  - Growing demand, community
  - Balancing topics and geography
  - Supporting Landsat activities



Guess: which one is Program Manager  
And which one is Program Scientist?



# INTERNAL LINKAGES: NASA



# EXTERNAL LINKAGES: NATIONAL

- U.S. Global Climate Research Program
  - Participation in and support of the LULCC Interagency Working Group (LUIWG)
  - NASA LCLUC projects results contribute to USGCRP's annual issue of Our Changing Planet
  - NRC review of land use models - NASA LCLUC is one of the two major contributors
- USGS
  - Landsat program (ST meetings, telecons, LDCM, Education/Outreach)
  - Global Land Surveys (leading the project execution, partner funding)
  - LCLUC Support for USGS science projects
  - Episodic contribution to data initiatives (e.g. GLS campaign stations, SPOT 2010 data)



A token of recognition from USGCRP (formerly CCSP) for leadership of the LULCC element during its early years

# EXTERNAL LINKAGES: INTERNATIONAL

## ○ GTOS/GOFC-GOLD

- Fire Implementation Team office at UMD funded by LCLUC
- C. Asia Regional Information Network (CARIN) at Almaty, KZ LCLUC ST meeting
- The GOFC North European (NERIN) formation at Tartu (EST) LCLUC ST meeting

## ○ CEOS/GEO

- International Working Group on Calibration and Validation - membership and Land Product Validation WG Contributions
- Land Surface Imaging (LSI) Constellation Working Group - membership

## ○ IGBP/IHDP

- Global Land Project (GLP) - support of the conference in Arizona
- Northern Eurasia Earth Science Partnership Initiative (NEESPI) - support of Project Scientist, meetings and research projects
- Monsoon Asia Integrated Regional Study (MAIRS) - support of Project Scientist, meetings and research projects

## ○ Partnerships

- ESA Sentinel-2 Program
- ScanEx - Satellite Data Center (Moscow, Russia)





# SUPPORT OF IGBP-IHDP-WCRP REGIONAL PROGRAMS

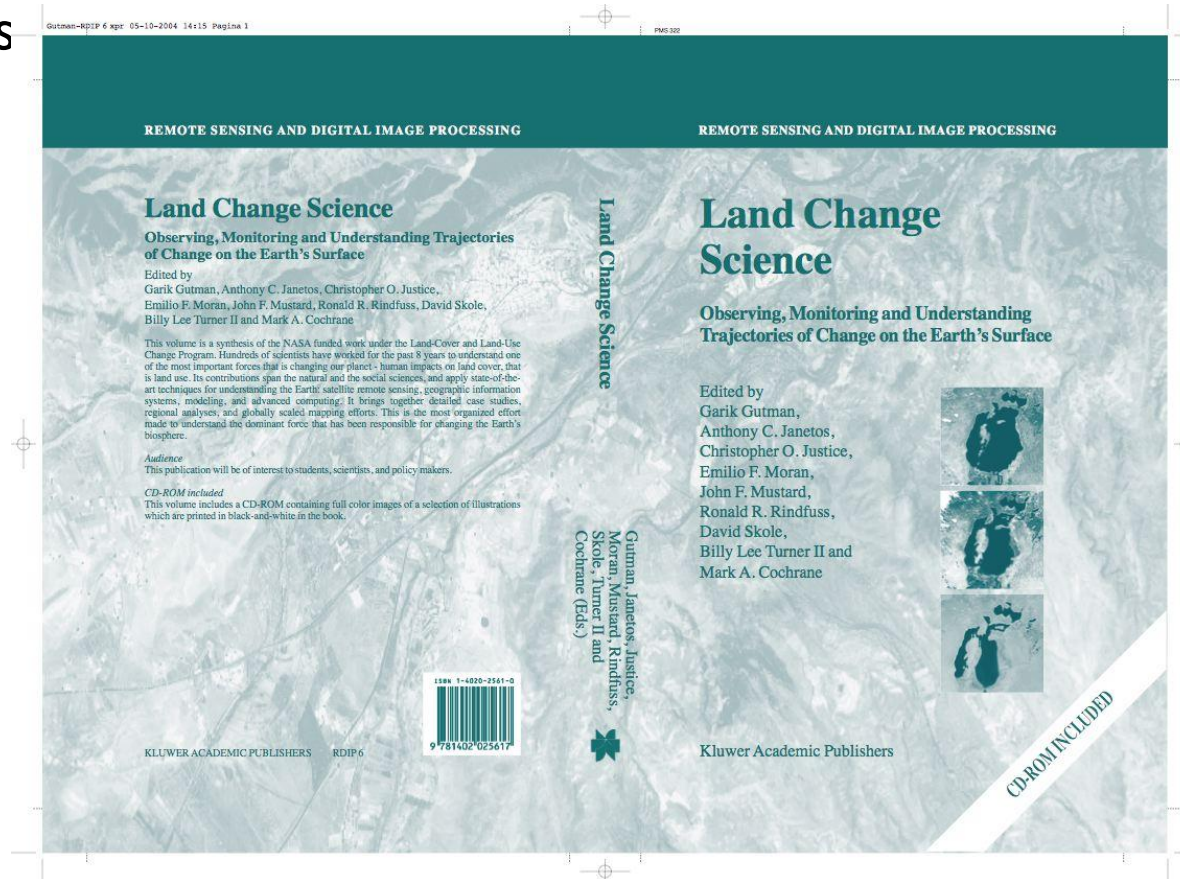
- ▣ **LBA (Amazon)**
  - Numerous publications
  - Synthesis book →
- ▣ **CARPE (Central Africa w. USAID)**
  - Congo image book+data on CD
- ▣ **NEESPI (Northern Eurasia)**
  - “Arctic book” out - a joint effort of US, EU and RAS scientists
  - “Siberia book” in press - a joint effort of →
  - AGU and EGU sessions
  - 3 new LCLUC projects
- ▣ **MAIRS (Monsoon Asia)**
  - 3 new LCLUC projects
  - GOFC-GOLD regional information networks for Central Asia and SE Asia
  - Regional Workshops
  - Drylands special issue in preparation



Thanks to Earth Science management for approving my 4-month stay away from the NASA HQ at iLEAPS Project Office

# THE FIRST SEVEN YEARS

- Mostly case studies in various areas of the world
- Patterns to processes
- Disturbances and feedbacks
- Trajectories and projections
- Some synthesis



The major milestone of the program

# PROGRAM COMPONENTS

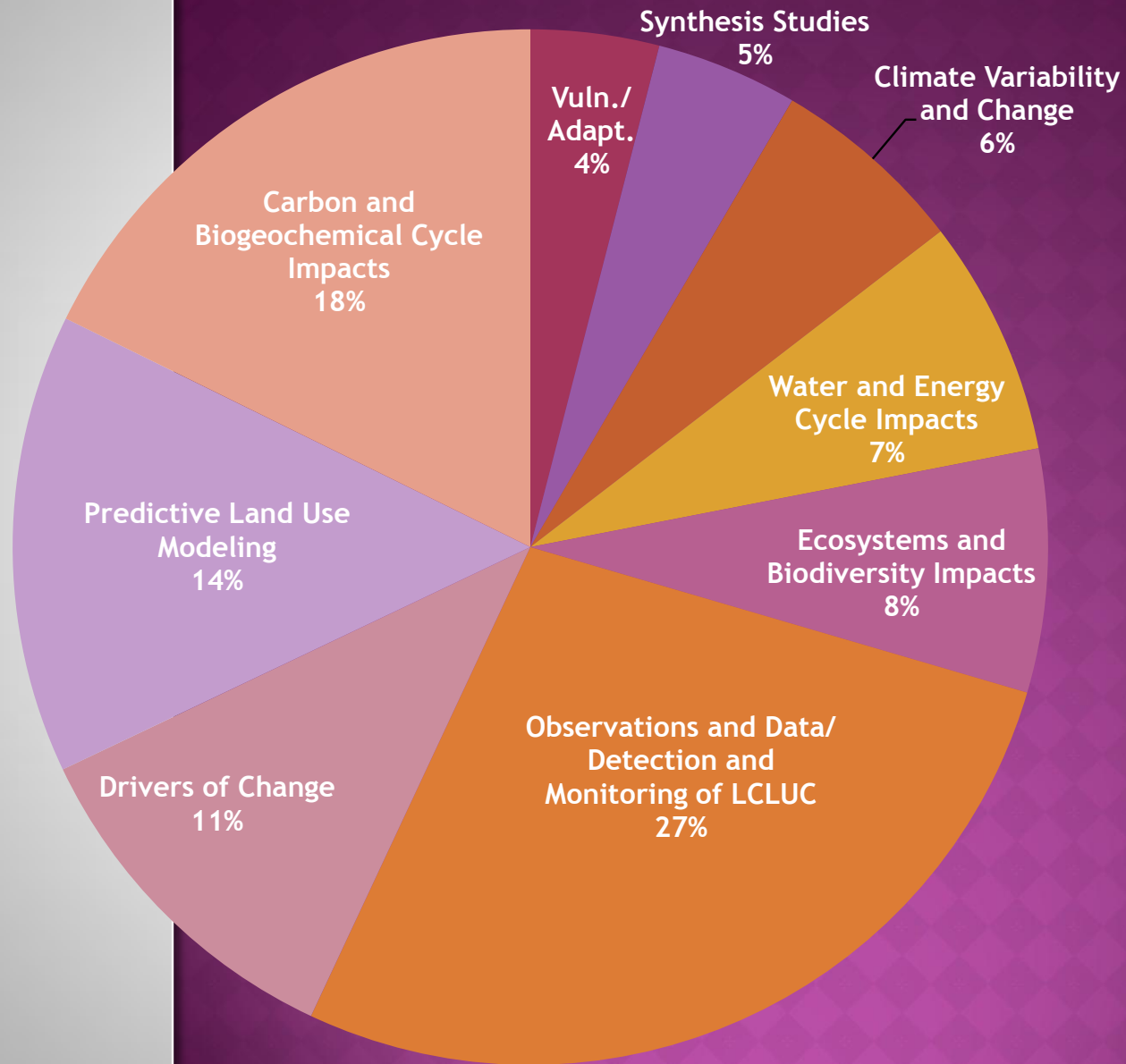
Total ~40-60 projects

- Detection/Monitoring/Observations
- LCLUC Predictive Modeling
- LCLUC impact on
  - Carbon Cycle
  - Water Cycle
  - Climate, Environment, Biodiversity
- Drivers of Change
- Climate impact on LCLUC
- Vulnerability, Impacts and Adaptation
- Synthesis studies





# Program Funding 1997- 2011



# LCLUC GLOBAL EXPANSION

- Northern Eurasia (including Central Asia) and SE Asia - research well developed, expected to produce synthesis studies and tangible products (special issues, books)
- New selections on S. Asia and S. America
- Need more research on Black Sea region/Caucasus, Mediterranean/Middle East, Central and South America (non-Amazon), Russian Far East, East Europe, Africa



# SCIENCE TEAM MEETINGS: REPORTING AND COMMUNICATION

- The Web site: <http://lcluc.hq.nasa.gov>
  - Abstracts and Progress reports
  - Presentations: oral and posters (preferably as ppt files)
  - Project update: 1 slide (bullets + visual)
  - Posters as ppt presentations!
  - Lists of publications and references
  - Project metadata and data set links
  - Announcements, events, job ops, news
  - Forthcoming meetings
  - Outreach (discoveries, journal covers, LCLUCers in the news, books)
- Submit all materials to our web curator LeeAnn King on an ongoing basis to ensure accurate reflection of all the great work you are doing
- Sensitive info -to me by separate e-mail
- PI's are encouraged to host their own websites to showcase their results in more detail and to make their data sets available - provide links (and faces!)





# DIRECT READOUT GROUND STATIONS

Pat Coronado, GSFC



## Land Applications

- Fire detection and Corrected Reflectance science algorithms for the generation of fire perimeter mapping products for strategic fire mapping and resource planning. US Forest Service Remote Sensing Application Center (RSAC), the National Inter-agency Fire Center (NIFC), and the Canadian Forest Service.
- Burn Scar and NDVI algorithm for fire damage assessment by RSAC.
- USDA uses MODIS NDVI/EVI and LST algorithms to operationally and continually monitor drought/crop health on the US sun belt.

- 30 countries have EOS/NPP direct readout capabilities.
- 50% owned by government agencies and organizations
- 35% owned by educational institutions, 15% owned by the commercial sector
- These support an estimated 3000 individual users world-wide
- 100% of DB sites use at least one of NASA's DR algorithms/tools.
- 85% of these ground stations support real-time applications.
- 40% of DB sites have developed additional algorithms for their own applications using locally-generated Level-1 data



# DATA ASPECTS

- ◉ *USGS - Landsat data for free distribution*
- ◉ Landsat-based Global Land Survey orthorectified datasets available
  - GLS for 1975, 1990, 2000, 2005 epochs (1/epoch leaf-on scene)
  - GLS-2010 continues to be collected, products in the end of 2011
- ◉ SPOT coverage for CONUS at USGS for the last year available
- ◉ International cooperation on Landsat-like data
  - ESA Sentinel-2 data are planned to become accessible and free of charge
  - Indian (IRS) and Chinese (CBERS) mid-resolution data accessibility TBD
- ◉ *NASA promotes the free and open sharing of data*
- ◉ **NASA LCLUC program expects its PI's to make their data and products available to the broader community**
- ◉ PI's datasets will be reflected on the LCLUC metadata page
- ◉ NEX portal



# NEW LCLUC DATA INITIATIVE



Rama Nemani,  
NASA Ames

- ◉ NASA's new collaboration facility for the NASA Earth science community
- ◉ NASA Earth Exchange (NEX) web portal - useful tool
  - state-of-the-art supercomputing
  - Earth system modeling
  - remote sensing data from NASA and other agencies
    - All GLS data have been downloaded
  - scientific social networking platform to deliver a complete work environment in which users can
    - explore and analyze large Earth science data sets
    - run modeling codes
    - collaborate on new or existing projects
    - share results within and/or among communities
- ◉ All LCLUC projects are listed on the NEX site -- PI's are encouraged to register

# NEAR-TERM STEPS

## MORE IN MY WRAP-UP ON THE LAST DAY OF THE MEETING

- ▣ Continue LCLUC calls on a regular, annual basis in two steps
  - Step-1 Dec 1, Step-2 June 1
- ▣ Continue improving the solicitation procedure
- ▣ Further Improve the LCLUC website; Facebook site
- ▣ Continue the twice-a-year ST meetings structure
  - ▣ This year an extra meeting - Joint Carbon & Ecosystem Focus Area meeting October 3-7 (LCLUC last 1.5 day)
  - ▣ LCUC international - monsoon area research, Hanoi joint with MAIRS and GOFC-GOLD SE Asia network (Nov 2011)
- ▣ Enhance social science component in LCLUC projects
- ▣ Balance the program thematically and geographically
- ▣ Focus on land use data products to support models
- ▣ Foster data fusion from various sensors





# Enjoy Cherry Blossoms

Thanks to everyone.  
Special thanks to our  
international partners!

## Happy 15<sup>th</sup>, LCLUC!

Sign up for the DC Tour to see the blossoms tomorrow night