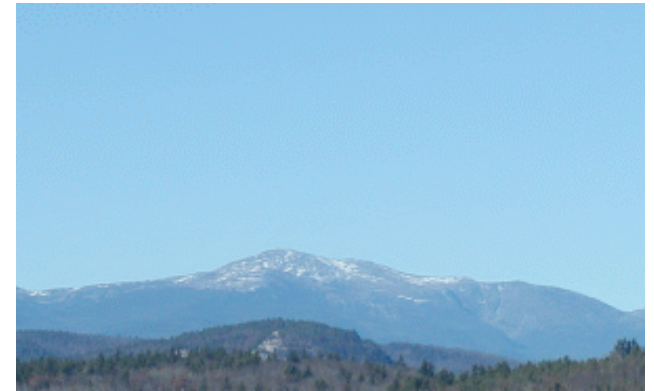


Value of CAMNET: Rural and Urban Visibility Camera Views

George Allen, Senior Scientist
gallen2@nescaum.org



MANE-VU Board Meeting
September 15, 2011 Manchester, VT



Acknowledgments

The following agencies and organizations make CAMNET possible:
State Air Agencies of MA, ME, NY, NJ, MD
Federal Land Managers (NPS, FWS, NFS)

On-site support from a wide range of organizations that host sites:
University of VT-Burlington
Blue Hill Observatory
Conway NH school system
NJ Transit Authority
University of MD, Frostburg

Today's Presentation

- Brief history of Camnet, what is it, relevance to MANE-VU
- Examples of visibility degradation from fine particle pollution
- Specific events (wildfires, plumes)
- How Camnet pictures have been used (research, media)
- Web site hits
- The future of Camnet



Brigantine National Wildlife Refuge, NJ

Brigantine / Atlantic City NJ Sunrise, 11/21/09 6:15 am

Unique - both a Class I protected airshed and an urban scene



CAMNET: Goals and Program History

Purpose:

Raise public awareness about the effects of air pollution on visibility
Document visibility impairment at four Class I areas in the MANE-VU area
All pictures are archived (several million)

What it is:

Network of realtime visibility (high-resolution) cameras
scenic urban and rural locations
updated every 15 minutes
network developed and run by NESCAUM

Air pollution and meteorological data are provided
distinguish natural from man-made causes of poor visibility

Above: looking towards Boston, 7/16/99 7 PM

Visual Range ~ 2 miles in severe regional haze

Similar to visibility conditions near Martha's Vineyard



Camnet History:

Network started summer 1999

Wide 2-camera format introduced in 2004 for some sites

Funding for operating costs provided by MANE-VU


Current Status:

Since 2009, funding has been ad-hoc: participating States, FLMs

This month: overhaul of server, launch of new site design

Blue Hill, MA. NW view 7/4/10 8:30 pm

Camnet Home Page: www.hazecam.net



Camnet

Realtime Air Pollution & Visibility Monitoring

- [CAMNET Home](#)
- [What Causes Poor Visibility?](#)
- [Gallery of Good & Bad Days](#)
- [Realtime Pollution Maps & Forecasts](#)
- [About CAMNET](#)
- [Questions & Comments](#)
- [Links to Related Sites](#)

Live Cameras

- Acadia
- Baltimore
- Bluehill
- Boston
- Brigantine
- Burlington
- Frostburg
- Moosehorn
- Mt. Washington
- Newark/NYC
- All Sites


More Hazecams

Welcome to Camnet

CAMNET brings you live pictures and corresponding air quality conditions from scenic urban and rural vistas in the Northeast. With CAMNET, a project of [NESCAUM](#) you can literally see the effects of air pollution on visibility.

Take a look at one of the featured familiar scenes. Is it as clear as it could be? Or, is pollution obscuring the view?

Visibility Hazecams



- Scenic Camnet Site
- Class I Protected Camnet Site


[What is a Class I Protected Area?](#)

Currently ten sites; six are wide format; four are Class-I protected airsheds

Example of wide-site home-page.

Baltimore, Maryland

• Enhanced Wide-Angle Two Camera Site • Updated every 15 minutes




09/13/2011 4:00 PM

Live Cameras

- Acadia
- Baltimore
- Bluehill
- Boston
- Brigantine
- Burlington
- Frostburg
- Moosehorn
- Mt. Washington
- Newark/NYC
- All Sites

More Hazecams

Today's Archived Photos		Air Pollution			Temperature	Wind	Precipitation
8:00 AM	LOW RES	Low	Medium	High	Current	Speed	1 Hour
	HIGH RES	Not Available			83° F	8 mph	Not Available
3:00 PM	LOW RES	Fine Particles			Humidity	Direction	24 Hours
	HIGH RES				47 %	SSW	Not Available
		Ozone					

- [Health Info](#)
- [View Larger Image](#)
- [Map It](#)

Ideal Image: Northwest View

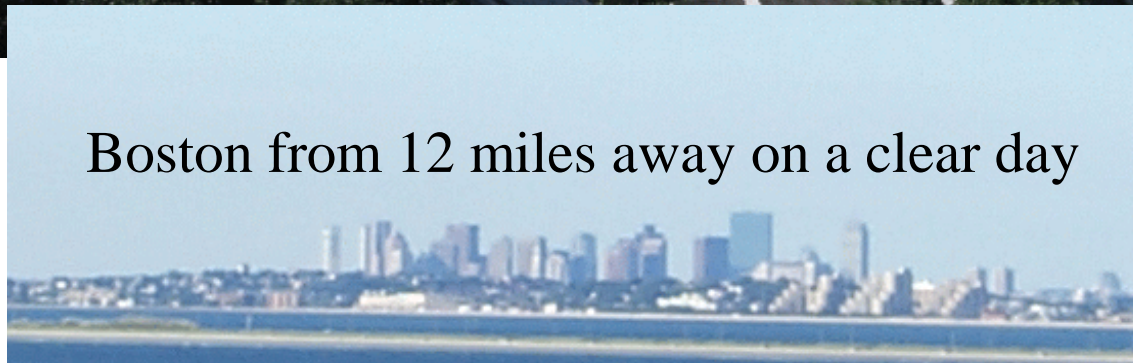
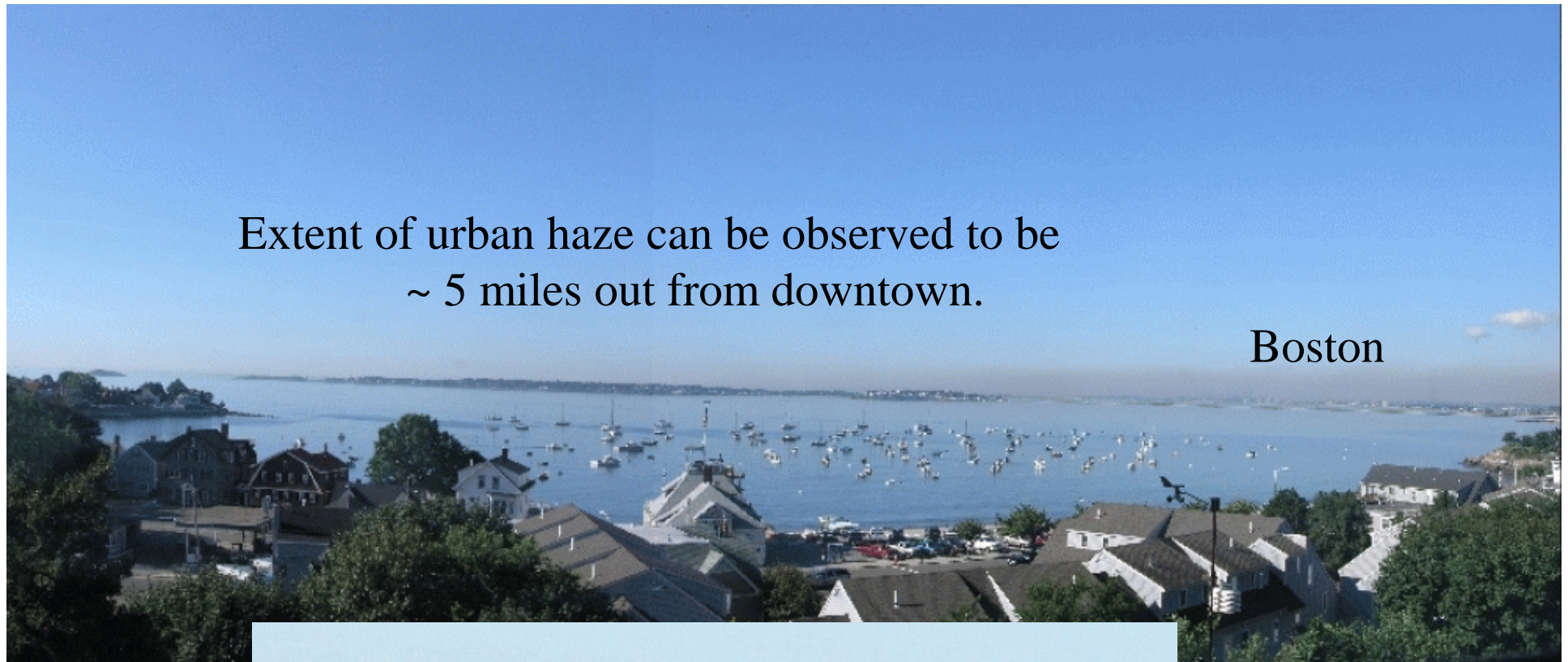
Ideal Image: Northeast View

?

[More Info](#)

Examples of visibility degradation from fine particle pollution

Wide 2-camera format provides much wider scene than single camera:
Boston site, August 24, 2004: layered urban “haze” (outside looking in)





Haze-cam photo of NYC from Newark NJ on a clean day.



Haze-cam photo of NYC from Newark NJ 3/14/08 at 1130am EDT

Estimated visual range is 8 mile (the distance to the NYC skyline).

Measured PM levels are $\sim 25\mu\text{g}/\text{m}^3$ with measured relative humidity of $\sim 65\%$.

Mt. Washington from 20 miles to the south

11/11/2010, 12:00 pm

$\sim 2 \mu\text{g}/\text{m}^3$ PM_{2.5}



Mt. Washington - regional haze

9/2/2010, 10:30 am

$\sim 30 \mu\text{g}/\text{m}^3$ PM_{2.5}



Acadia National Park 2/21/08, 9:00 AM



Acadia National Park: 8/17/09, 4:00pm regional haze



Burlington VT, 10/3/03 10:00 am, clean. 24-h PM_{2.5} = 3 $\mu\text{g}/\text{m}^3$



Burlington VT, 8/12/02 2:00 pm, regional haze event. 24-h PM_{2.5} = 38 µg/m³
Primarily sulfate, some organic carbon aerosol



Burlington VT, 7/6/02 5:00 pm, transport woodsmoke event.

24-h PM_{2.5}=38 $\mu\text{g}/\text{m}^3$. ~ 60 $\mu\text{g}/\text{m}^3$ at time of photo, 90% organic carbon



Boston, 7/12/99 8:15am - Mystic power plant plume and urban inversion.
View from Swampscott, 12 miles NE of downtown



Moosehorn NWR 11/3/10, 10:00 am paper mill plume



3/31/11, 9:00 am



WTC Plume, 9/16/01, 10:00 am

Canmet NYC photos helped document direction and dispersion of plume



NYC skyline, 10/3/01, 10:00 am - regional haze event.

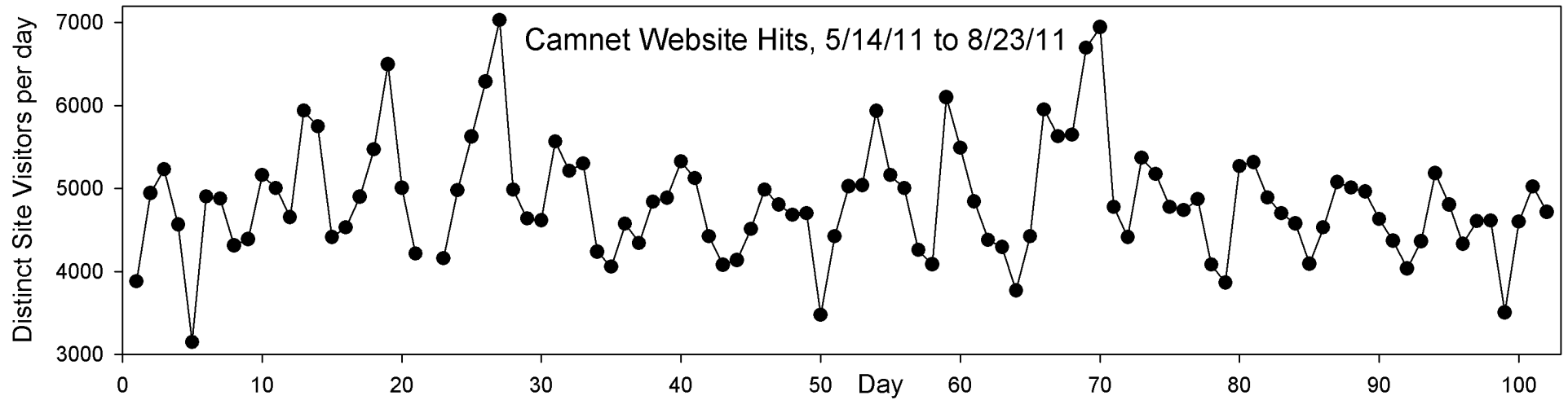


PM was elevated this day - a regional haze event
Some researchers incorrectly attributed it to the WTC plume

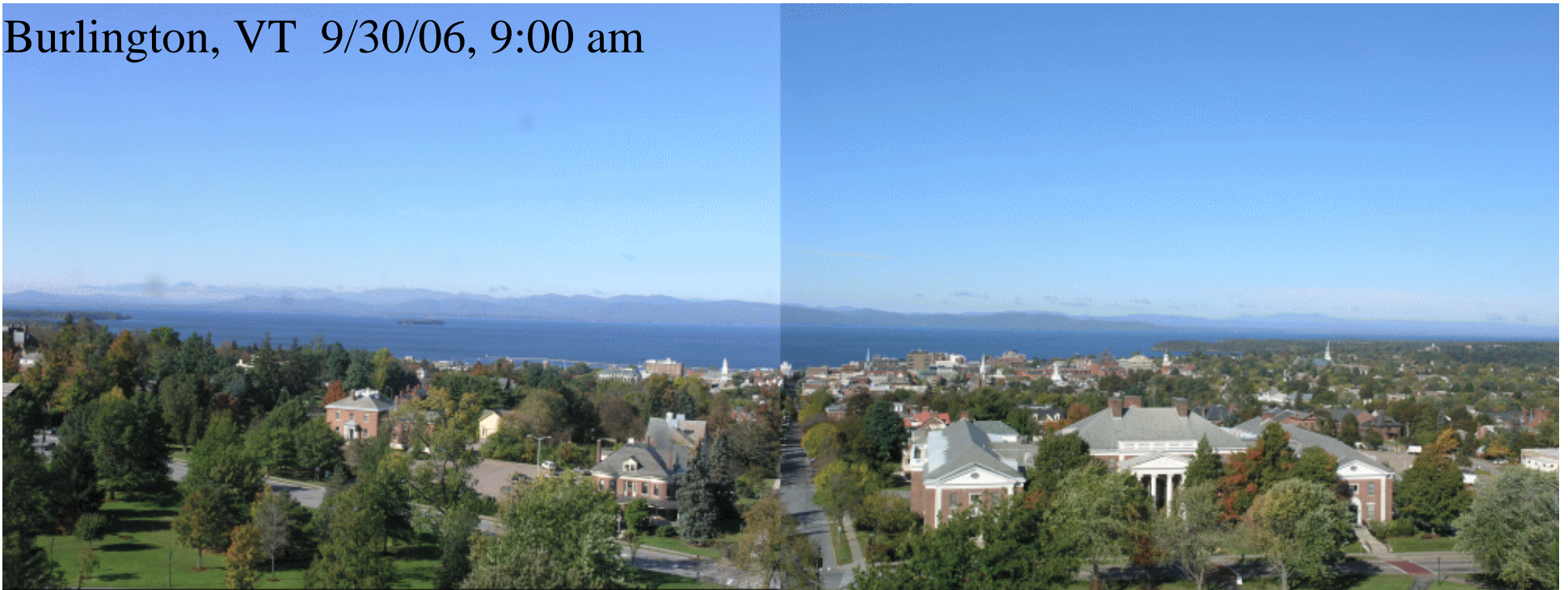
Media use example: NECN weather forecast, 7/16/11.

http://home.comcast.net/~geo.allen/NECN_16July5pm-Burlington-wx.html

Web site hits: number of distinct site visitors per day average ~ 5000 :



Burlington, VT 9/30/06, 9:00 am



The Future of Camnet

Current model:

solicit operating costs from each site “sponsor”
annual basis, \$6,000 per site per year
has worked well since 2009

Going forward:

state agency and FLM budgets are stretched
unclear if agencies will be able to justify non-essential spending

Efficiency of scale:

currently 10 sites: \$60,000 per year funding
per site costs increase if a few sites are lost
network at risk?

Frostburg, MD 6/28/11, 9:00 pm

Questions?

Acadia NP
Cadillac Mt.
from Schoodic

