

## Highlights for this Month

Election of the 2009 club officers and a director will take place at the January 2009 Business Meeting.

NHAS has made its first telescope donation to a lending library as the pilot for our Library Telescope Outreach Program.

Several public sky watches were scheduled, and the weather actually cooperated for some of them.

NHAS member **John Reid** succeeded in observing the rogue tool bag from the International Space Station.

Did you know that YFOS is in a Bortle green (class 4) light pollution zone? If you don't understand what this means, read **Matthew Ota's** article on light pollution.

★ Paul Winalski  
NHAS Secretary 2008

## Election of 2009 NHAS Officers

These nominations for 2009 club officers were made and seconded at the October and November Business Meetings:

President: **Rich DeMidio**

Vice President: **Mike Townsend**

Treasurer: **Ken Charles**

Secretary: **Paul Winalski**

Director: **John Rose**

The election was supposed to take place at the December 2008 Business Meeting, but the meeting was cancelled due to bad weather. Instead, the election will take place at the January 2009 Business Meeting. The floor will be open for further nominations and then the vote will take place.

★ Paul Winalski

## Astro 201: Titan Mount

This class was presented on 28 December by **Gardner Gerry** and **Herb Bubert**. The students were **Jason Paul, Ken Charles, and Bill Steele, and Alan Kaplan**.

Herb started by providing a printed copy of the Titan – Gemini Level 4 Users Manual. He went over the start up procedures and wanted to get started right away in the observatory. After Herb's presentation each of the students took turns starting, aligning on a bright star, then finding an object. Some of us struggled with the clouds but each student was able to complete the tasks and then park the scope successfully. Herb went over how to check and set the slewing speed for the types of observing and how to increase the viewing speed to slewing speed when moving or finding an object.

After the start-up and shut down was demonstrated and practiced by the students, Herb went over how to remove, store and re-mount the C14.

★ Bill Steele

## Educational Outreach

Meeting date: 18 December.

**Matt Amar, Matthew Ota, and Chase McNiss** attended.

The proposed NHAS flyer was the main topic of the meeting and we found a number of changes to make, including fixing the spelling errors. Most importantly we are going to put the flyer on hold until the website can mirror the key points we want to list in the flyer.

Something about the cart before the horse....

We also thought it a good idea to take the membership application completely off of the flyer and recommend that people log onto the website to fill out a membership form there or to attend a meeting. The small space provided creates legibility issues for the treasurer as well as filing issues. A form that can be filled out on line and printed with typed text will be a great help over the handwritten form.

★ Chase McNiss

## Telescope Donated to Public Library

NHAS has donated an Orion StarBlast 4 ½" reflector, with 6mm and 26mm Plössl eyepieces, to the Cook Memorial Library in Tamworth, NH. The telescope is available for circulation in the same way as the library's books.

This is the pilot for a Library Telescope Outreach program, whereby we hope to provide lending libraries with telescopes that can be circulated like a book and enjoyed by the public. Along with the telescope comes a local NHAS member who can periodically clean and adjust the telescope, and who can act as a local astronomical resource to library patrons. We also suggest that local schools find a 6<sup>th</sup> or 7<sup>th</sup> grade student to become an apprentice astronomer and to act as a liaison to local schools.

The program is the brainchild of our Public Observing Coordinator **Marc Stowbridge**. If the pilot in Tamworth is a success, we will extend the program to other public libraries in the state.

Funding for the telescope comes from the educational outreach grant

we received from the New Hampshire Charitable Foundation.

★ Paul Winalski

## Reeds Ferry School Sky Watch, Merrimack NH

This is usually our largest public sky watch, and this year was no exception as 150 third graders, parents, and siblings came to see the night sky on 17 November 2008. NHAS members **John Rose, Mike Townsend, Al Navarro, John Bishop, Bill Steele, Gardner Gerry, Joe Derek, Ken Charles, Matt Amar, and Paul Winalski** set up a total of eleven telescopes and one set of binoculars to show the late fall sky.

The weather had been looking very bad. The early group had to contend with partly cloudy skies, but there were big clear patches and conditions improved as the evening progressed. Transparency wasn't great, but seeing was very good to excellent. The observing field, as always, was soggy, and there was some frost, but not troublesome—I didn't bother with anti-dew equipment and had no trouble.

The Pleiades and Andromeda Galaxy, M57, Perseus Double Cluster, and M13 were all on view.

Our hostess, Cindy Janiak, said that the event was a success, and that, "Everyone at Reeds Ferry School looks forward to the event every year and talks about astronomy night for years afterwards. We all appreciate the effort and time given to the school community." That's what we like to hear!

★ Paul Winalski and Bill Steele

## East Kingston Public Library Sky Watch

NHAS hosted a sky watch for the East Kingston, NH Public Library on 21 November. **Paul Winalski** gave an indoor "What's Up in Tonight's Sky" and that was followed by observing in the library parking lot. All of the lights on the library building were turned off, so we had a darker observing field than we are used to at public sky watches. It was a very successful

event and the library wants to hold another sky watch in the spring.

★ Paul Winalski

My son Mike offered to come to the Sky Watch and we arrived at 18:50 EST. **Mike Townsend** and **John Rose** carpooled and arrived right after me, followed by **Gardner Gerry**. **Ted Blank** was set up with binoculars in front of the main entrance near the curb in a parking space. Paul Winalski was setting up Mr. T at the end of a parking space at the eastern edge or the observing field. **Tim** and **Carlena Mauro** were setting up behind Paul's Saab. John and Mike picked their spots up in front of Ted. Gary Tilden, a former member, was setting up his Takahashi to the west of Ted at the western edge or the observing field.

Jessica Newton and her husband, Matthew, showed up about 19:05 and started unpacking the Orion 4" OTA, mount and the boxes of piece parts. They picked a spot near John and Mike. Mike was a great help to Jessica and Matthew, showing them how to setup the mount without the OTA attached, then getting them to align the finder using a front door light of a house down Maplevale Road. As Mike set up his 4" Vixen I went over to help because they could not find the house light. After working with Matthew I removed the 10 mm (I'm guessing that it shipped with 10 and 25 mm EPs) eyepiece and the Barlow. I kept encouraging Matthew to take out the bigger EP. I explained to them that using the smaller EP is more magnification and meant it would be harder to find objects. About the time Matthew found the 25 mm EP John has his C8 setup and Mike was done setting up. They started working with the Newton's again and it wasn't long after I could hear "I found it", "cool", and "that is awesome!"

Another family showed up with a "department store" refractor. I tried to help her and her three young boys set up the mount and get the scope pointed at a building security light. I found that the battery on the red dot finder was dead and the EP was the highest magnification. I put my

25mm in the .9625 diagonal and they were able find the light then focus on a star. Without a working battery in the finder I had a hard time getting them some viewing instructions. I did encourage them to make sure to use it on the Moon and change the battery in the finder. I went over how to align the finder, the purpose of the finder and to find the larger EP. When they were in the presentation I took back the 25mm; mostly my concern was that the EP was too big for the diagonal.

Here is a list of all of the members, their equipment, and the objects that they planned on showing:

\* Gardner: Stellarvue 80 mm on **Nils Wygant's** Astrostar Atl/Az head. Pleiades and the NGC 457 (Lobster Cluster) open cluster in Cassiopeia.

\* John: Celestron C8. Albireo.

\* Mike: Vixen 4" refractor. Pleiades and double stars, depending on the clouds.

\* Gary Tilden: Takahashi refractor. Albireo.

\* Ted: binoculars. Pleiades, the coat hanger asterism (Brocchi's Cluster). About 19:45 **Ken Charles** showed up and Paul's indoor presentation was over.

\* I set up the Orion SkyQuest XT10i on the Perseus double cluster NGC 869/NGC 884.

\* Tim and Carlena were planning on slewing to a bunch of objects based on the help they were getting from Ken.

\* Ken was going to set up his Binocular table and would show open clusters.

\* About 20:00-ish **Steve Forbes and his son** set up a 102mm/F7. They set up a PC that was synched with the mount and was could slew the mount to the object on the PC. I didn't get an opportunity to ask them about what they were showing.

That makes nine members and one ex-member as experienced operators showing objects to thirty-six public visitors and two staff of the Library.

Ellen Dang, the coordinator, said that she wanted to have another Sky Watch in the Spring and I offered to provide a presentation on buying a telescope.

★ Bill Steele

## Broken Ground Elementary School Sky Watch, Concord NH

This was held on 2 December at the White Farm field near the Project SEE Science Center, which provided a very welcome warm building and refreshments for the astronomers and our 54 guests.

NHAS members participating: **Ed Ting** (who organized the event), **John Bishop, Herb Bubert, Joe Derek, Steve Forbes, Stephen Forbes, Gardner Gerry**, and myself.

Objects that I presented in my 14" reflector: 61 Cygni (Piazzi's Flying Star),  $\gamma$  Arietis, M31/32, M35, M36, M37, M38, the Perseus double cluster, T Lyrae, WZ Cassiopeiae, NGS 457 (Lobster Cluster), NGC 7662 (the Blue Snowball planetary nebula).

★ Paul Winalski

## ISS Tools Bagged

During the last space shuttle mission to the International Space Station, one of the astronauts accidentally dropped a tool bag, it drifted free of the ISS, and could not be recovered. All the major news media reported the story. Less well known is that the highly reflective tool bag can be seen in small earth-bound telescopes. It appears as a satellite of roughly 6<sup>th</sup> to 8<sup>th</sup> magnitude. The Heavens-Above web site carries predictions of visible passes of the tool bag, as it does for the ISS itself and for Iridium flares.

On 29 November Heavens-Above was predicting a pass of the shuttle and ISS low to the north at 5:35 PM, preceded at 5:24 PM by the tool bag. All three objects were following nearly the same trajectory and would pass within a degree just south of  $\alpha$  Ursae Majoris (Dubhe). It thus should be easy to spot with

the TeleVue 85 using a 35mm Panoptic (20X) wide-angle eyepiece with Dubhe kept on the edge of the field of view.

I watched with this setup for four minutes starting at 5:22 PM. There was no sign of the tool bag. I and several neighbors did enjoy watching the shuttle and ISS go by about ten minutes later, though.

According to the following report, I just missed the tool bag—apparently the trajectory predicted at Heavens-Above was correct, but the time was off by a couple of minutes.

★ Paul Winalski

I can confirm seeing all three objects. I was setting up my Orion (Vixen) 102ED, also with a 35mm Panoptic, and also in Merrimack. I put the "tool bag pass" about 17:20-17:21, earlier than expected. I had just set up and put Alpha (Dubhe) at the edge of my FOV. About 30 seconds later, the bag came sailing along, small but absolutely unmistakable. The Shuttle + ISS pass followed. I look forward to trying this again!

★ John Reid

## The Artificial Night Sky Brightness of New Hampshire

Light Pollution (LP) is a subject of concern for every amateur astronomer, whether they are telescope visual users, binocular users, or astroimagers. As our metropolitan population increases and encroaches on rural areas, LP is an ever-growing threat to our pastime, making it more difficult to see the fainter deep sky objects. There are many ways to lessen the impact of LP, but this article is focused on measuring and quantifying the light pollution itself.

In 2001 the Italian Light Pollution Science and Technology Institute (LPST) undertook an intensive study of the light pollution issue by studying and compiling thousands of images from the US Air Force Defense Meteorological Satellite Program database. It was the first worldwide map of sky brightness,

which is the level of light transmitted through the atmosphere. This map (attached at the end of the Newsletter) shows the amount of light being scattered in the air and is a much more accurate quantification of light pollution than the traditional ground brightness photomaps of the past.

In 2002, Russel Sipe of the Orange County Astronomers did an intensive analysis of the project by making a local study of the artificial night sky brightness of Southern California. He used the map of North America, which was available from the Light Pollution Science and Technology Institute. By using the modern software capabilities of Adobe PhotoShop, he was able to make map overlays over the sky brightness image in order to show borders, roads and towns. He presented the information at an OCA Astroimagers meeting and it was quite sobering to see how much light pollution was impacting the various observing sites around California.

By using similar methods, I have been able to make a sky brightness map of New Hampshire showing international, state and county boundaries along with selected towns and major roads. The map is a latitude longitude projection, which matches the original map projection used by the Light Pollution Institute. The map shows the sky brightness with a total scale of seven Bortle light level color codes. The brightest level (> 27 white) is shown in Boston, Providence and Montreal, which are shown as a saturated white. The darkest level is black, which is not visible on this map projection. It is interesting that only the extreme Northeast portion of the state is in a dark Bortle Class 2 "gray" zone.

The following explains the Bortle light pollution scale in detail. It comes from the Sky & Telescope "Dark Sky" web page.

### **Class 1: Excellent dark-sky site - Black**

The zodiacal light, Gegenschein, and zodiacal band (S & T: October 2000, page 116) are all visible - the



zodiacal light to a striking degree, and the zodiacal band spanning the entire sky. Even with direct vision, the galaxy M33 is an obvious naked-eye object. The Scorpius and Sagittarius region of the Milky Way casts obvious diffuse shadows on the ground. To the unaided eye the limiting magnitude is 7.6 to 8.0 (with effort); the presence of Jupiter or Venus in the sky seems to degrade dark adaptation. Airglow (a very faint, naturally occurring glow most evident within about 15 degrees of the horizon) is readily apparent. With a 32-centimeter (12½) scope, stars to magnitude 17.5 can be detected with effort, while a 50-cm (20-inch) instrument used with moderate magnification will reach 19<sup>th</sup> magnitude. If you are observing on a grass-covered field bordered by trees, your telescope, companions, and vehicle are almost totally invisible. This is an observer's Nirvana!

#### **Class 2: Typical truly dark site - Gray**

Airglow may be weakly apparent along the horizon. M33 is rather easily seen with direct vision. The summer Milky Way is highly structured to the unaided eye, and its brightest parts look like veined marble when viewed with ordinary binoculars. The zodiacal light is still bright enough to cast weak shadows just before dawn and after dusk, and its color can be seen as distinctly yellowish when compared with the blue-white of the Milky Way. Any clouds in the sky are visible only as dark holes or voids in the starry background. You can see your telescope and surroundings only vaguely, except where they project against the sky. Many of the Messier globular clusters are distinct naked-eye objects. The limiting naked-eye magnitude is as faint as 7.1 to 7.5, while a 32-cm telescope reaches to magnitude 16 or 17.

#### **Class 3: Rural sky - Blue**

Some indication of light pollution is evident along the horizon. Clouds may appear faintly illuminated in the brightest parts of the sky near the horizon but are dark overhead.

The Milky Way still appears complex, and globular clusters such as M4, M5, M15, and M22 are all distinct naked-eye objects. M33 is easy to see with averted vision. The zodiacal light is striking in spring and autumn (when it extends 60 degrees above the horizon after dusk and before dawn) and its color is at least weakly indicated. Your telescope is vaguely apparent at a distance of 20 or 30 feet. The naked-eye limiting magnitude is 6.6 to 7.0, and a 32-cm reflector will reach to 16<sup>th</sup> magnitude. Long exposure astrophotos might show some light pollution gradient, but visual observing is relatively unimpaired.

#### **Class 4: Rural/ suburban transition - Green/Yellow**

Fairly obvious light-pollution domes are apparent over population centers in several directions. The zodiacal light is clearly evident but doesn't even extend halfway to the zenith at the beginning or end of twilight. The Milky Way well above the horizon is still impressive but lacks all but the most obvious structure. M33 is a difficult averted-vision object and is detectable only when at an altitude higher than 50 degrees. Clouds in the direction of light-pollution sources are illuminated but only slightly so, and are still dark overhead. You can make out your telescope rather clearly at a distance. The maximum naked-eye limiting magnitude is 6.1 to 6.5, and a 32-cm reflector used with moderate magnification will reveal stars of magnitude 15.5. Modest to serious impact to deep sky observing and imaging.

#### **Class 5: Suburban sky - Orange**

Only hints of the zodiacal light are seen on the best spring and autumn nights. The Milky Way is very weak or invisible near the horizon and looks rather washed out overhead. Light sources are evident in most if not all directions. Over most or all of the sky, clouds are quite noticeably brighter than the sky itself. The naked-eye limit is around 5.6 to 6.0, and a 32-cm reflector will reach about magnitude 14.5 to 15.

#### **Class 6: Bright suburban sky - Red**

No trace of the zodiacal light can be seen, even on the best nights. Any indications of the Milky Way are apparent only toward the zenith. The sky within 35 degrees of the horizon glows grayish white. Clouds anywhere in the sky appear fairly bright. You have no trouble seeing eyepieces and telescope accessories on an observing table. M33 is impossible to see without binoculars, and M31 is only modestly apparent to the unaided eye. The naked-eye limit is about 5.5, and a 32-cm telescope used at moderate powers will show stars at magnitude 14.0 to 14.5.

#### **Class 7: Suburban/urban transition - Red**

The entire sky background has a vague, grayish white hue. Strong light sources are evident in all directions. The Milky Way is totally invisible or nearly so. M44 or M31 may be glimpsed with the unaided eye but are very indistinct. Clouds are brilliantly lit. Even in moderate-size telescopes, the brightest Messier objects are pale ghosts of their true selves. The naked-eye limiting magnitude is 5.0 if you really try, and a 32-cm reflector will barely reach 14<sup>th</sup> magnitude. Less than 100 stars visible over 30 degrees elevation.

#### **Class 8: City sky - White**

The sky glows whitish gray or orangish, and you can read newspaper headlines without difficulty. M31 and M44 may be barely glimpsed by an experienced observer on good nights, and only the bright Messier objects are detectable with a modest-size telescope. Some of the stars making up the familiar constellation patterns are difficult to see or are absent entirely. The naked eye can pick out stars down to magnitude 4.5 at best, if you know just where to look, and the stellar limit for a 32-cm reflector is little better than magnitude 13.

#### **Class 9: Inner-city sky - White**

The entire sky is brightly lit, even at the zenith. Many stars making up

familiar constellation figures are invisible, and dim constellations such as Cancer and Pisces are not seen at all. Aside from perhaps the Pleiades, no Messier objects are visible to the unaided eye. The only celestial objects that really provide pleasing telescopic views are the Moon, the planets, and a few of the brightest star clusters (if you can find them). The naked-eye limiting magnitude is 4.0 or less. Less than 20 stars visible over 30 degrees elevation.

If there is enough interest I can make maps of other New England states, and provide a map for the members only area of the NHAS web page showing locations of club observing sites.

References:

Light Pollution Science and Technology Institute (Istituto di Scienza e Tecnologia dell'Inquinamento Luminoso) Italy - <http://www.lightpollution.it/dmsp/index.html>

Sky & Telescope online, "The Bortle Night Sky Scale" - <http://www.skyandtelescope.com/resources/darksky/3304011.html?page=1&c=y>

U.S. Geological Survey, "The National Map Seamless Server" - <http://seamless.usgs.gov/index.php>

★ Matthew Ota

## NHAS November 2008 Business Meeting

### ATM

No report.

### YFOS

No report.

### Membership

Alan Shirey reported that we have two new members. The Astro 201 course on the Titan mount will be given soon by Herb Bubert and/or Gardner Gerry. There is no interest yet in other Astro 101/201 courses.

### Astrophotography

Gardner Gerry reports that there have been no recent meetings and no recent photos posted on the

website. There will be another virtual meeting held soon.

### Radio Astronomy

No report.

### Public Observing

Marc Stowbridge reported that public sky watches have been scheduled for Reeds Ferry, the East Kingston Public Library, and the Auburn Village School.

### Educational Outreach

Rich Schuller and Matt Amar reported that eleven attended the last committee meeting. The committee thinks that a revamp of the website design and content is needed. A website design subcommittee of five members was formed. Matt Marulla has been contacted about the website revamp. The meeting also touched our procedures at public sky watches.

### Webmaster

No report.

### Miscellaneous Business

Wade Walker was thanked for arranging speakers for our business meetings for the past two years.

Should NHAS join the Astronomical League? The cost would be \$10 to NHAS, plus \$5 per NHAS member.

The nomination of Rich DeMidio for 2009 NHAS President was made and seconded. 2009 nominations stand at:

President: Rich DeMidio

Vice President: Mike Townsend

Treasurer: Ken Charles

Secretary: Paul Winalski

Director: John Rose

### Book of the Month

How Apollo Flew to the Moon by David Woods. This covers all of the technical aspects of the flights: navigation, tracking, landing, takeoff, and reentry.

### Teaching Aid of the Month

A transparent umbrella with Polaris on top and constellations drawn on the umbrella. A Lego man on a tennis ball on the stem of the umbrella represents an observer on the Earth.

### Evening Program

A slide show of images from the NHAS website.

★ Paul Winalski

### The Bottom Line

**Starting Balance:** \$6271.99

**Deposits/Credits:** 322.00  
(membership, calendar sales)

**Accounts/Paid:** 303.31

(Rhymes Propane, Larry Lopez [mosquito magnet repair], Chase McNiss [office supplies])

**Net Account Balance:** \$6393.68

**Petty cash drawer:** \$100.00

**Cash Balance:** \$6493.68

**2009 Membership:** 89

**Donations:** \$235.00

(Dave Weaver, John Buonomo,

Rich Schueller)

**Balance of Grant Funds** \$809.70

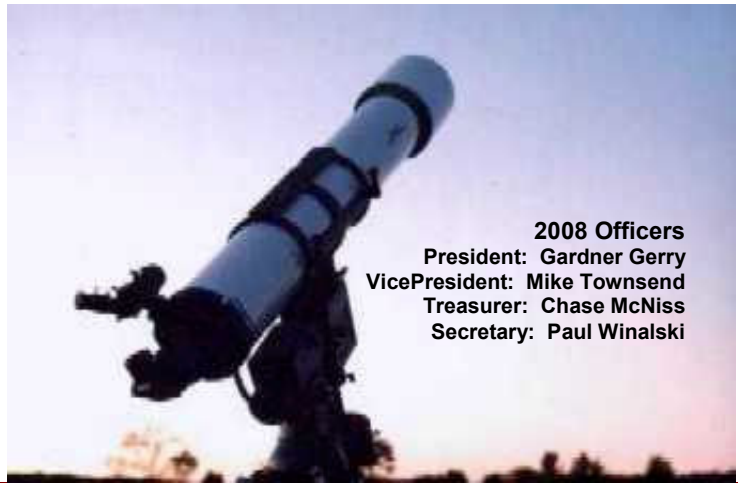
### New Members:

Rick Amidon, Manchester NH

Warner Reed, Atkinson NH

Dan Griffin, Epping NH

★ Chase McNiss



**2008 Officers**  
President: Gardner Gerry  
VicePresident: Mike Townsend  
Treasurer: Chase McNiss  
Secretary: Paul Winalski

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**DEADLINE January 2009 Issue: 5 PM January 13**

E-mail articles to the Editor.

**CHANGE OF ADDRESS** – Notify the Treasurer of changes to postal or e-mail address.

**How to Join N.H.A.S.**

**Write to us:**

NHAS  
P.O. Box 5823  
Manchester, NH 03108-5823  
Attn: Treasurer

**Send E-mail to:**

[info@nhastro.com](mailto:info@nhastro.com)

**Use our web site:**

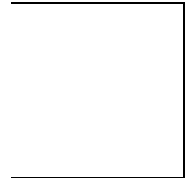
<http://www.nhastro.com/>

**This month's contributors:**

Bill Steele, Chase McNiss, John Reid, Matthew Ota

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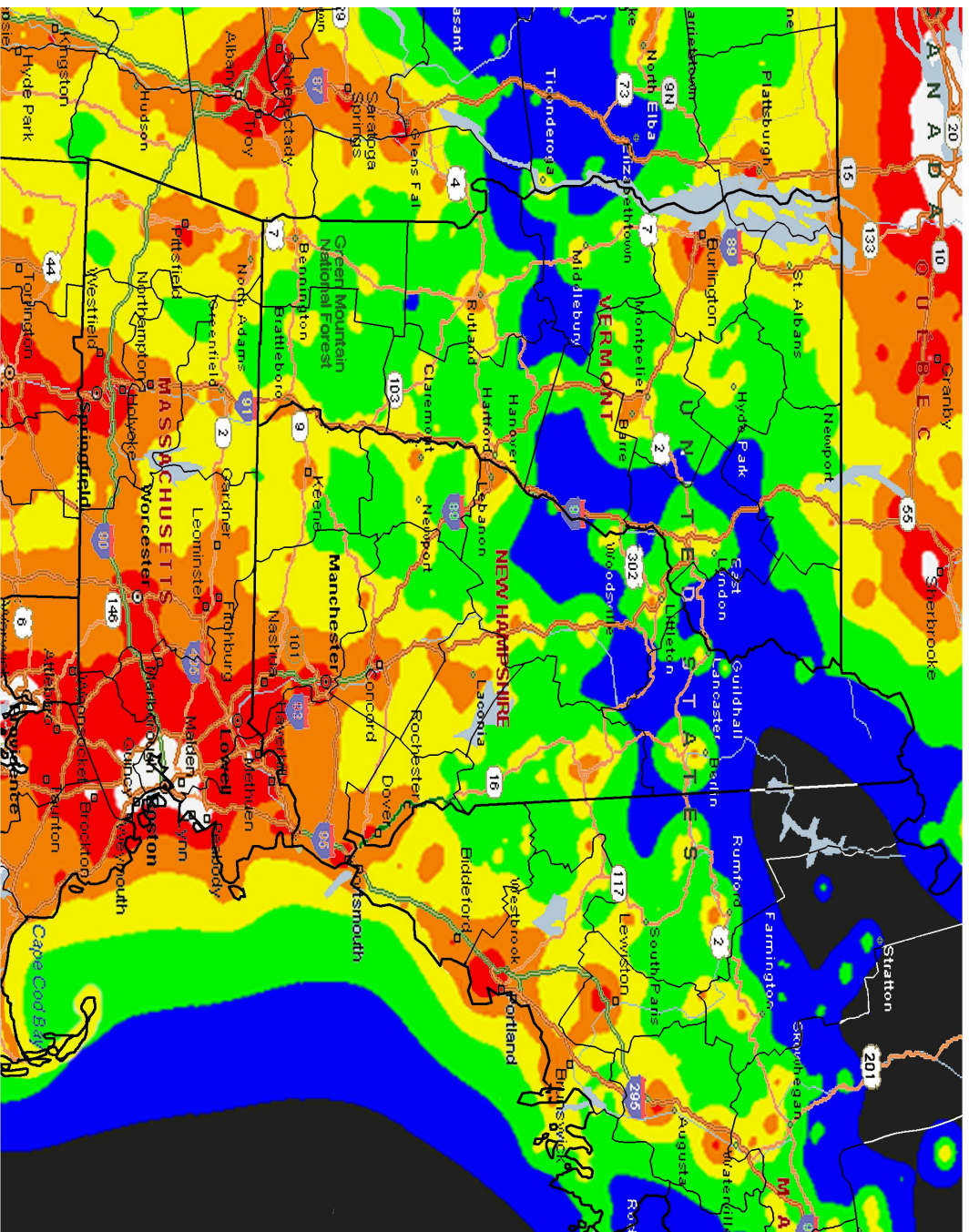


## NHAS Upcoming Events

Event	Date	Time	Location
CMP Public Sky Watch	January 2	7:00 PM	Christa McAuliffe Planetarium
NHAS Business Meeting	January 16	7:30 PM	St. Anselm College
Coffee House Night	January 23	5:00 PM	YFOS



# THE ARTIFICIAL NIGHT SKY BRIGHTNESS OF NEW HAMPSHIRE AND SURROUNDING AREAS



Bottle Scale	1	2	3	4	4.5	5	6,7	8,9
<0.01	0.01 - 0.11	0.11 - 0.33	0.33 - 1.0	1.0 - 3.0	3.0 - 9.0	9.0 - 27.0	>27	

Colors correspond to ratios between the artificial sky brightness and the natural sky brightness

Light pollution gradient map layer ©2000, P. Cinzano, Thiene, Italy All rights reserved

Credit: P. Cinzano, F. Falchi (University of Padova), C. D. Elvidge (NOA National Geophysical Data Center Boulder).

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For more information, go to <http://www.lightpollution.it/dms/>

Map overlay by Matthew Ota