



# Digital Planetariums for Engaging Public Audiences in Global Change Issues

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GSA T115. Climate Literacy

The Worldviews Network is funded by NOAA NA10SEC0080011 and NA10SEC0080017









# Who is the Worldviews Network?



CALIFORNIA  
ACADEMY OF  
SCIENCES



THE MINNESOTA  
PLANETARIUM SOCIETY



DENVER MUSEUM OF  
NATURE & SCIENCE

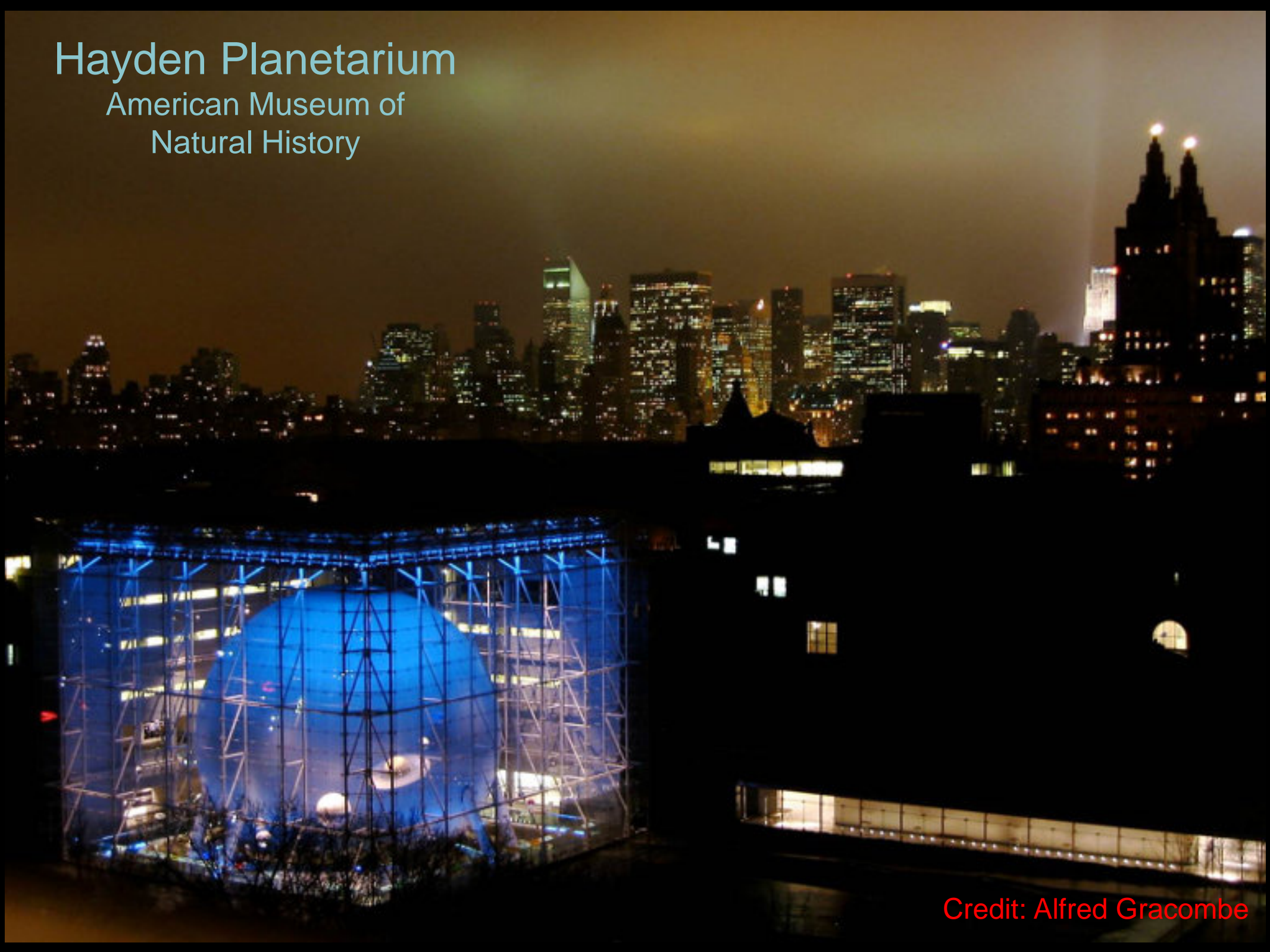


THE JOURNEY  MUSEUM

Funded by NOAA Environmental Literacy Grants NA10SEC0080011 & NA10SEC0080017

# Hayden Planetarium

American Museum of  
Natural History



Credit: Alfred Gracombe

# Morrison Planetarium

California Academy of Sciences



Credit: Paul Grimmer

# Gates Planetarium

Denver Museum of  
Nature & Science

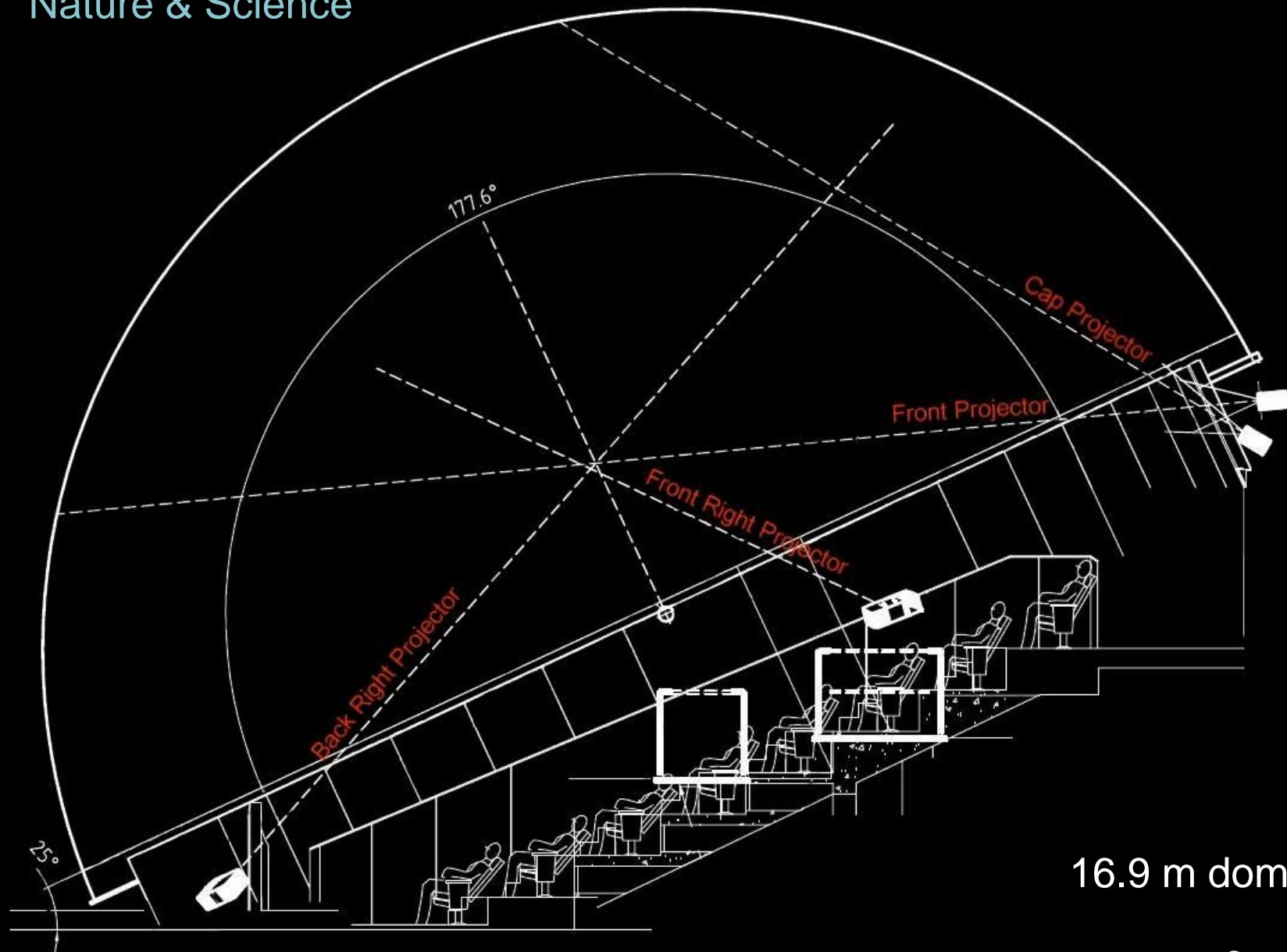
**Charles C. Gates Planetarium**

Credit: Ka Chun Yu



# Gates Planetarium

Denver Museum of  
Nature & Science



16.9 m dome diameter  
25° tilt,  
6 × projectors;  
120 seats



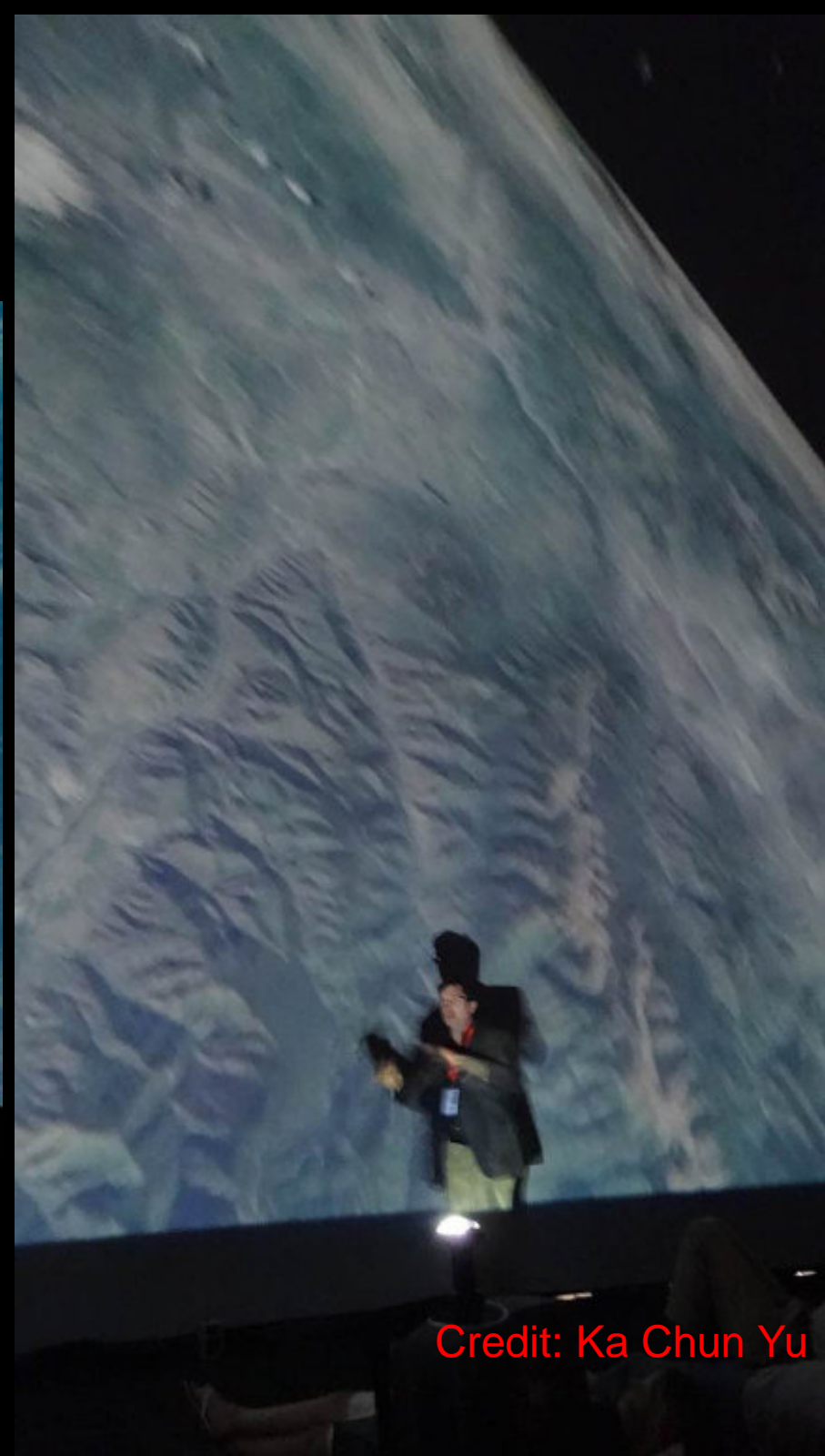


Credit: Dan Neafus

# Maximizing visual impact ...



Credit: Dan Neafus



Credit: Ka Chun Yu

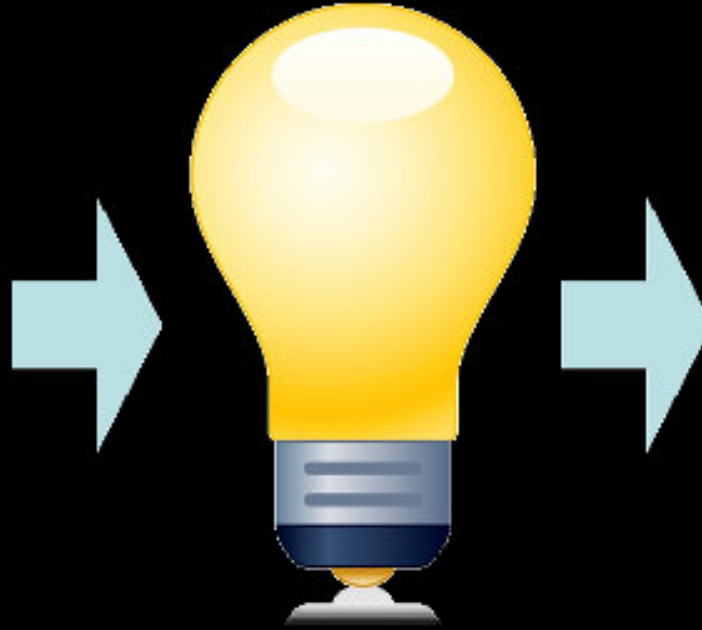
# Bioregional Community Dialogues

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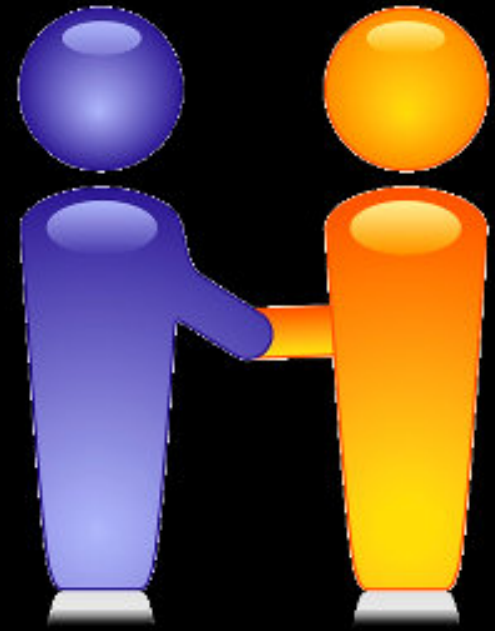
Seeing

Dome  
presentation



Knowing

Systems  
perspective



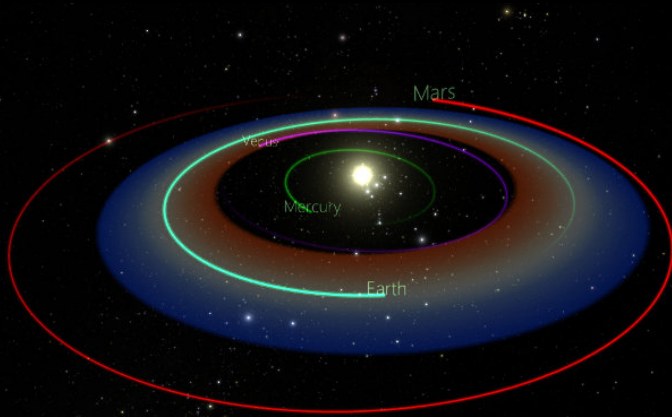
Doing

NGOs, design  
the future

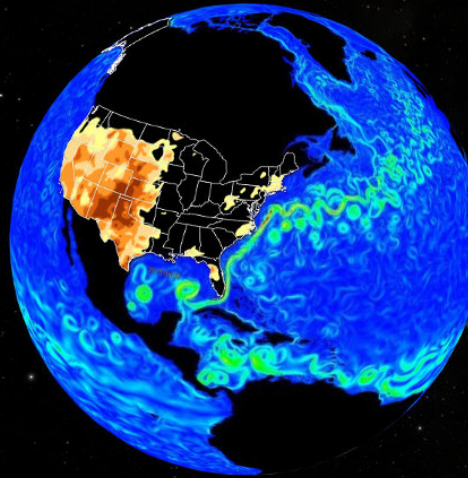


# Seeing: Visual Thinking

## Storytelling at multiple scales



Cosmic



Global



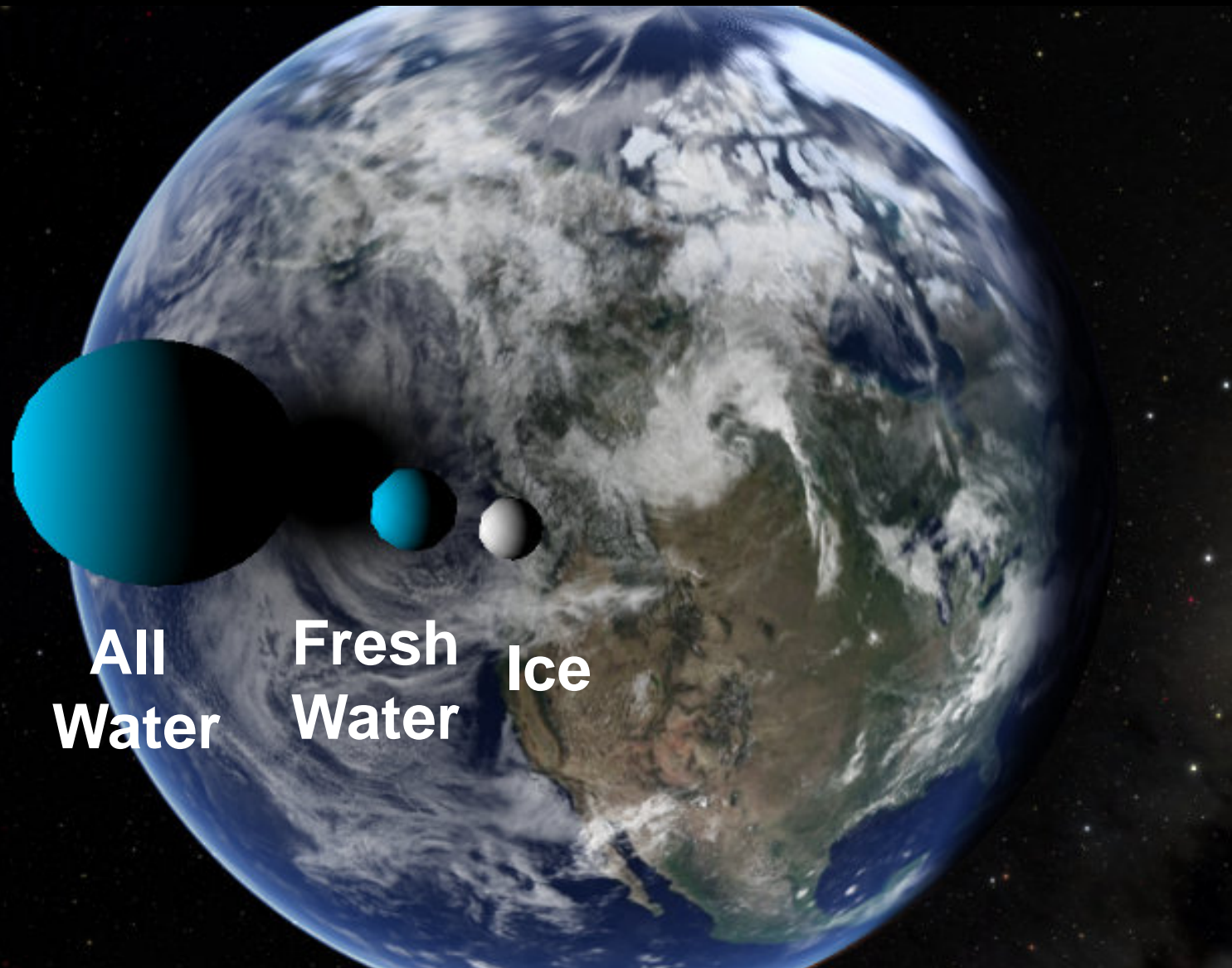
Bioregional



# Seeing: Visual Thinking

Scientific visualization of ecosystems at multiple scales

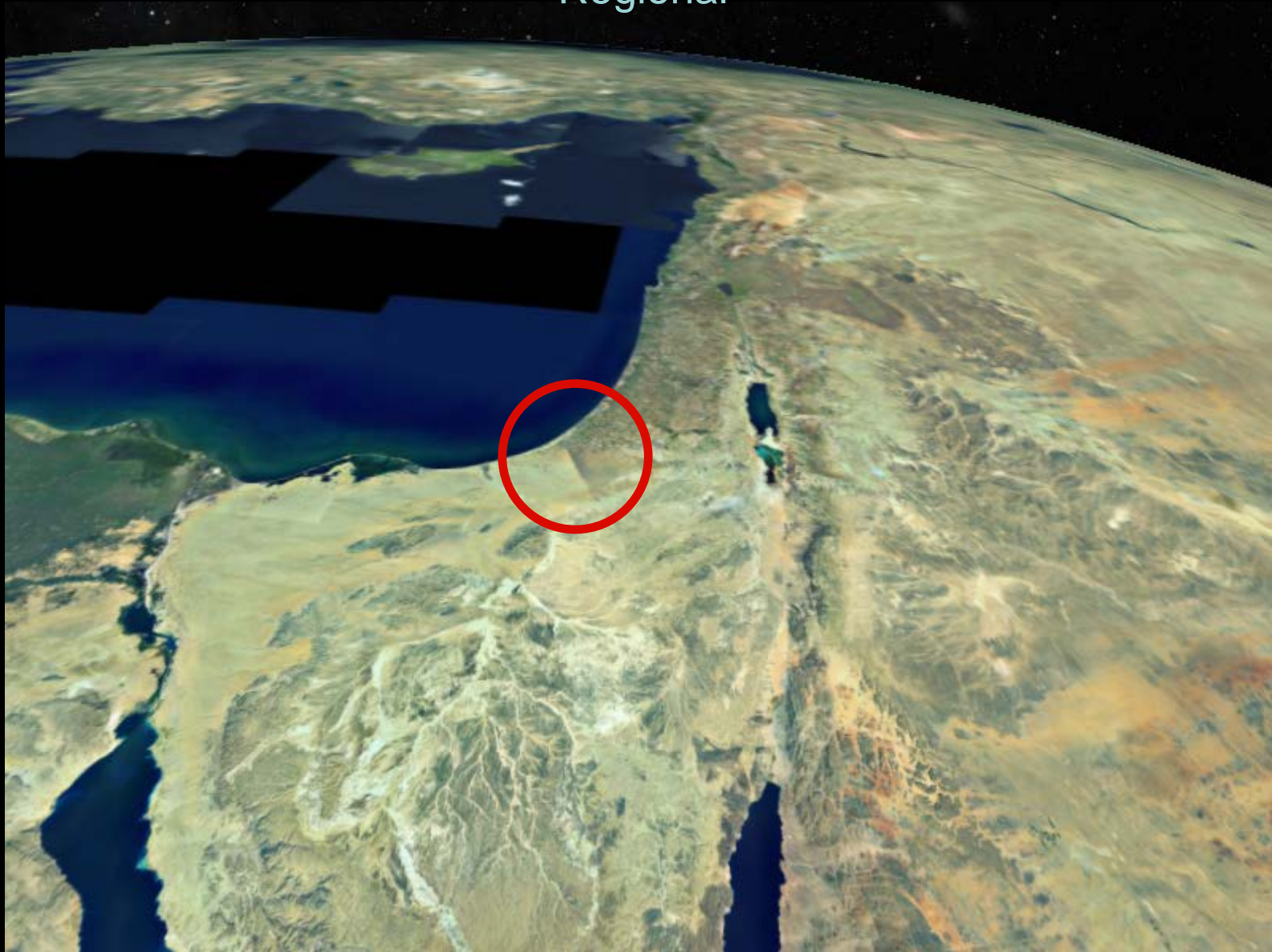
Global



# Seeing: Visual Thinking

Scientific visualization of ecosystems at multiple scales

Regional





# Seeing: Visual Thinking

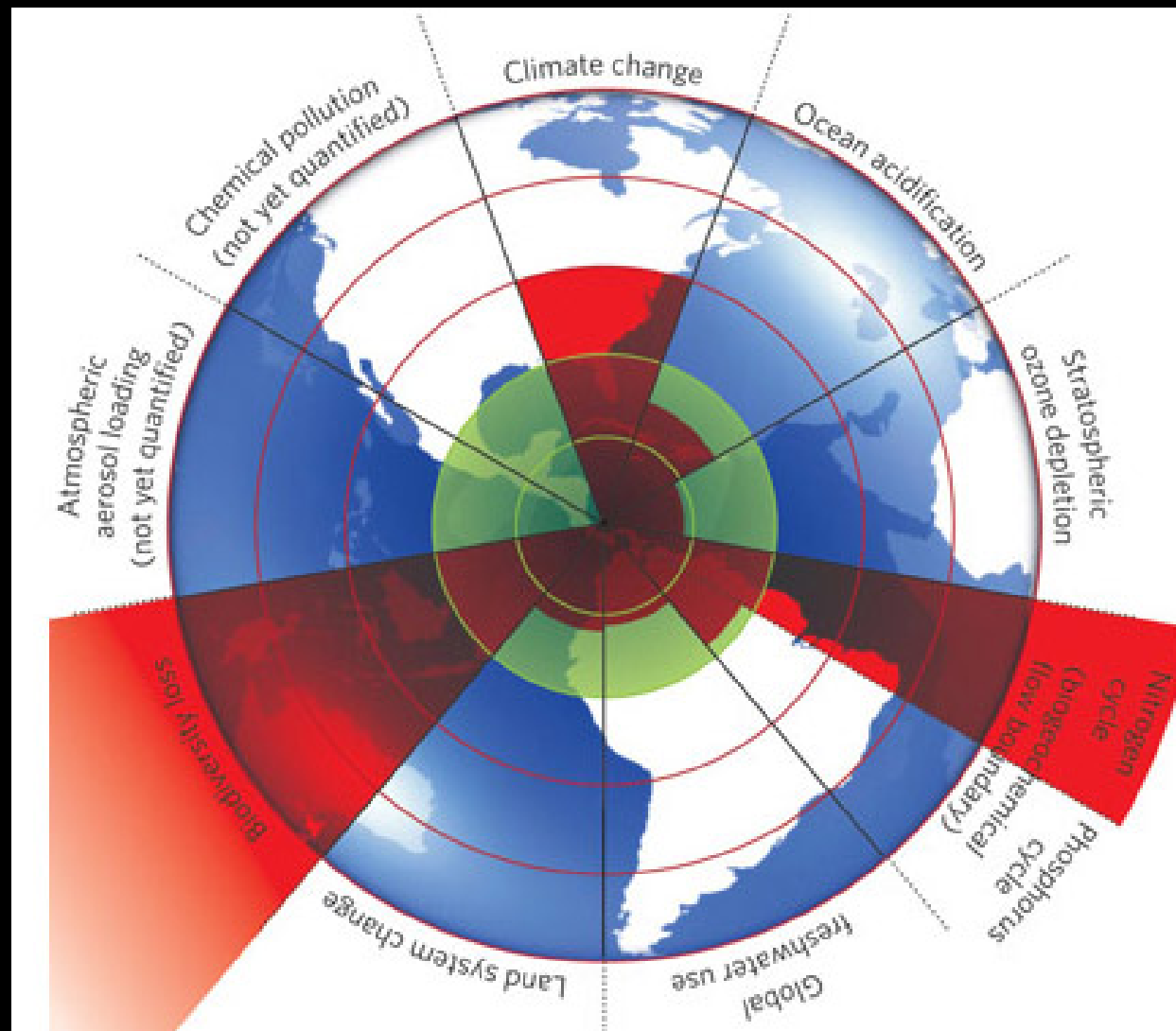
Scientific visualization of ecosystems at multiple scales

Local



# Knowing: Systems Thinking

## Planetary Boundaries



“A Safe Operating Space for Humanity”

Rockstrom et al., Sept 2009, *Nature*, v461, p. 472



# Design Thinking:

## Resilience of coupled human-natural systems

### THE BUCKMINSTER FULLER CHALLENGE

A program of the Buckminster Fuller Institute



#### WELCOME TO IDEA INDEX 1.0

"Hang on Planet Earth, Help is on the Way"

--US Political News, 2010

The Idea Index serves as a tool to educate, network, and help solve problems. As an educational tool, the Index is full of hopeful, exciting ideas and solutions to pressing global problems. As a networking tool, the Index allows site visitors to contact the project leaders, leave a constructive and/or encouraging comment and connect with one another. It presents a fully searchable database of socially-responsible initiatives, in all stages of development, in need of further funding and support. To read a summary of an entry click on its title or featured image below. [More Info](#)

[2012 ENTRIES](#)[2011 ENTRIES](#)[2010 ENTRIES](#)[2009 ENTRIES](#)[2008 ENTRIES](#)[ALL ENTRIES](#)

921 total ideas.



**The Living Building Challenge**

2012 WINNER



**Blue Ventures**

2011 WINNER



**Operation hope - Permanent water and food security for Africa's impoverished millions.**

2010 WINNER

# Encouraging dialogue ...



Credit: Ka Chun Yu

# Highlights from Public Response to Shows

## Self-reported Learning

- 51%: Ecological concepts/facts
- 26%: Human-caused ecological change
- 23%: Human use of resources
- 13%: Approaches/groups working on regional issues

# Highlights from Public Response to Shows

## Top Reactions

- Thinking about complex Earth systems and interrelationships
- Visualizing concepts of time and space
- Sense of how small the Earth is



# Highlights from Public Response to Shows

## Immersive Experience

81% reported some enhanced understanding by ...

- 39%: “gave me perspective...” (connections)
- 32%: “allowed me to see...” (visuals)
- 22%: “made me understand...” (learned info)
- 10%: “It made me feel...” (affective response)

# Affective Outcomes

10% of respondents: dome presentation promoted an affective response

- *Inspiration, caring, personal relationship*

These audience members ranked statements most frequently:

1. *Feeling the need to take care of Earth*
2. *Feeling a sense of the sacred in regards to Earth*
3. *Amazement at the beauty of what was shown*

hopeful

connected  
learn  
questioning  
inspired  
concerned  
worried  
aware  
interested  
informed  
curious  
overwhelmed  
happy  
awe  
small  
educated  
fortunate  
optimistic  
sobered  
careful  
privileged  
hopeless  
positive  
intimate  
good  
amazed  
home  
confused  
possible  
have-technology  
perspective  
understand  
engaged  
old  
insignificant  
immersed  
excited  
seen-before  
fantastic  
devastated  
smart  
solemn  
involved  
huge-scale  
depressed  
comfortable



[www.worldviews.net](http://www.worldviews.net)

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# Summative Evaluation

Retrospectively understand successes, challenges, and ongoing relevance of this approach for:

- **Meaningful Partnerships** between informal science institutions (ISIs) and community organizations
- **ISI Culture Shift**: globally-focused storytelling in real-world, local contexts

# Greatest Value to ISIs

Building collaboration skills and relationships:

- Local people / organizations
- Other institutions / leadership team

The importance of the issue addressed in production

# Challenges to ISIs

## Time Commitment:

- Process wasn't quick or easy
- Required a lot of ISI representative

## Institutional Buy-in or Capacity

- “Under the radar” – fit into existing models
- “Creating new” – targeted support for limited resources





## Resources, Distribution and Outreach

Contact: Rachel Connolly

NOVA/WGBH Boston

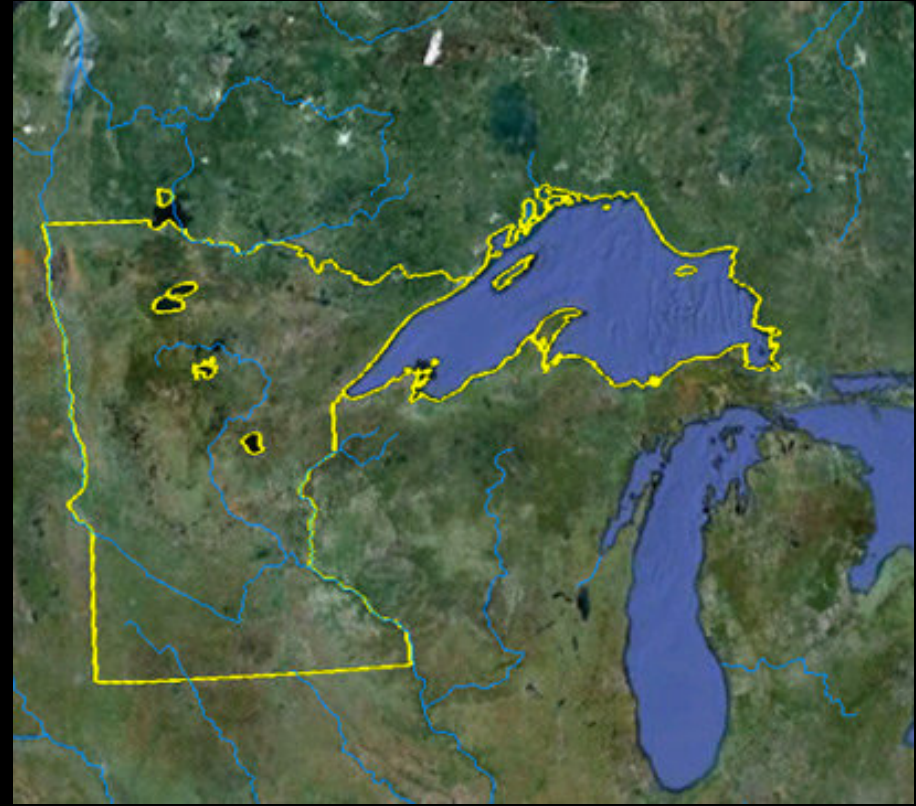
[rachel\\_connolly@wgbh.org](mailto:rachel_connolly@wgbh.org)

# 11 programs available, including:

- ▶ A Global Water Story
- ▶ Valley Oaks: an Ecological Journey through Time
- ▶ The Lake Effect: Creating a Resilient Future
- ▶ Forests, Beetles, and the Cycles of Life
- ▶ The Hidden Ocean: Visualizing the Conditions for Life
- ▶ The Search for Water: Replenishing Watersheds in the Texas Drought

# Programs include:

- ▶ Storyboard and narration
- ▶ Uniview Installer file
- ▶ Alignment with NOAA Climate Literacy framework and NGSS
- ▶ Dedicated Webpage with resources
- ▶ Data Sources



# Complimentary Outreach Program: Worldviews Science Cafes



# Cafe Outreach Model + Bioregional Community Dialogue



# Distribution: [www.worldviews.net](http://www.worldviews.net)



[Events](#) [News](#) [Partners](#) [About](#) [Connect](#)

## Living Maps: From Cosmos to Community

Visualizing the conditions for life, from the edge of the solar system to southern Appalachia.

[more »](#)



## Welcome to the Worldviews Network

We're a collaboration of scientists, artists, and educators using immersive virtual environments and interactive scientific visualizations to expand perspectives on humanity's home in the cosmos. >>>



# Distribution Timeline



Programs begin rollout in December of 2013 on [worldviews.net](http://worldviews.net)



Professional Development offerings beginning in Jan 2014 (Google Hangouts)



Collection of training videos