



# DOWNSTREAM/ UPSTREAM

A Journey Through the Urban Water Cycle

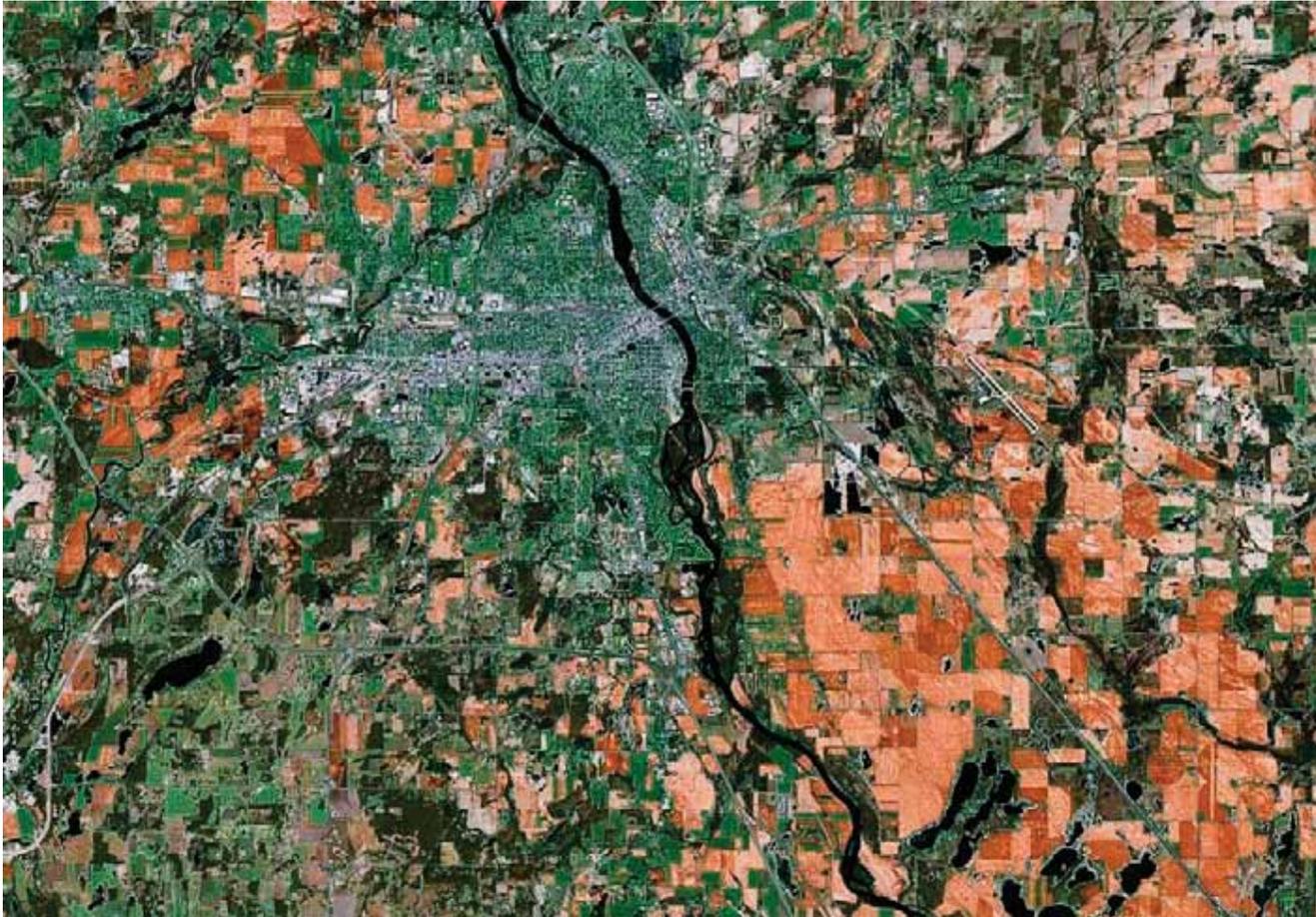
**Mississippi River Forum  
of the National Park Service**

**July 27, 2012**

**St. Cloud, Minnesota**

**Jonee Kulman Brigham, AIA, LEED AP  
Center for Sustainable Building Research, University of Minnesota  
& Full Spring Studio, LLC**

# Midstream



# Outline

- Introduction
- The Systems Journey Model
- **Downstream/Upstream:  
A Journey Through the Urban Water Cycle**
- Outcomes
- Adaptation/Expansion
- Discussion



# Introduction

*need & opportunity*

“As Thomas Berry says, **we must find a new story**, a narrative that includes us in the continuum of Earth’s time and space, reminding us of the destiny we share with all the planet’s life, restoring purpose and meaning to human existence.”

--David Suzuki, *The Sacred Balance, Rediscovering Our Place in Nature*, 1997

**“Paradigms are the sources of systems.”**

--Donella Meadows  
*Thinking in Systems: A Primer*, 2008

# Infrastructure as Barrier



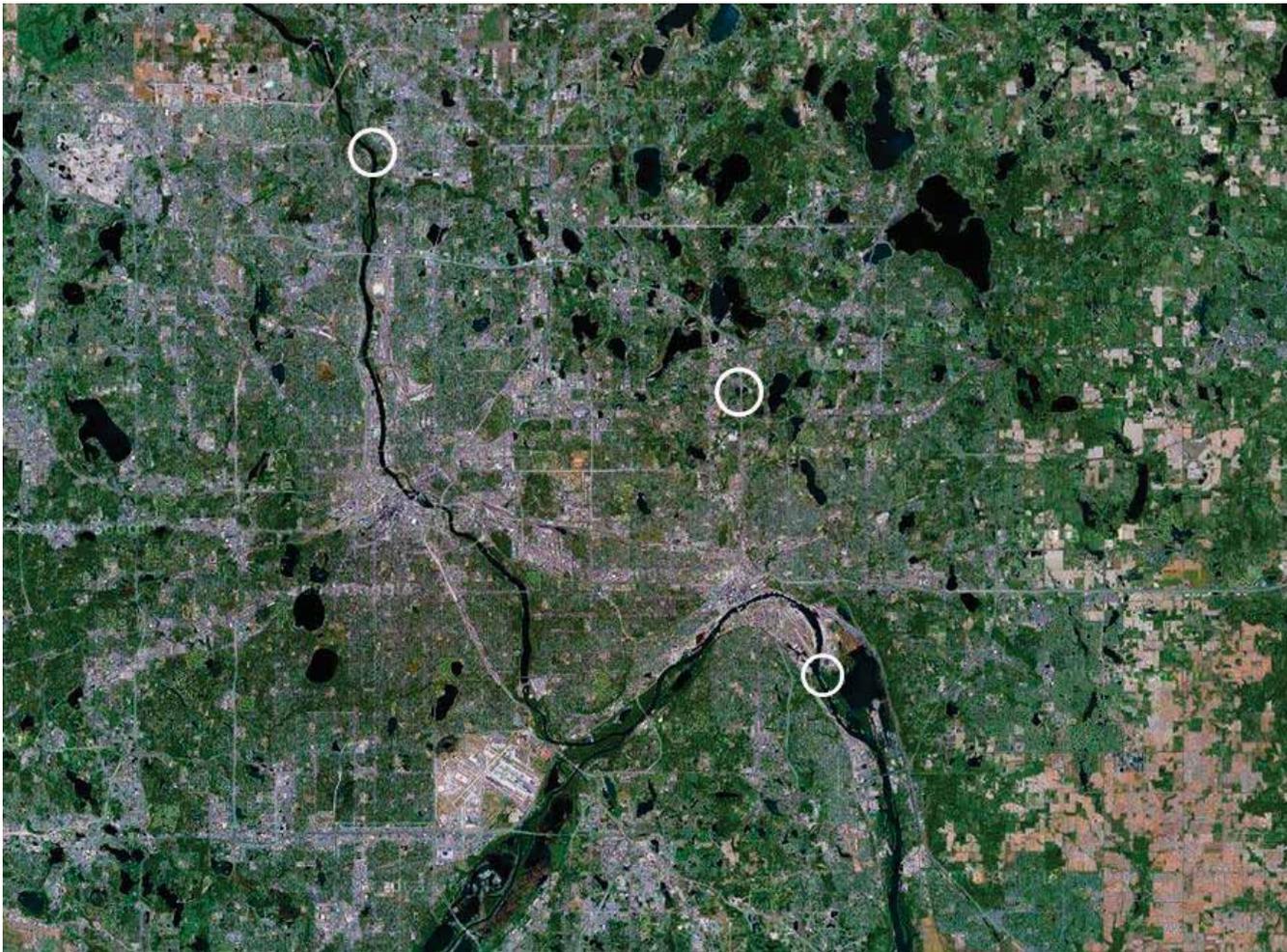
"... it becomes apparent that man has failed to see that now, as in the past, the roots of his being are in the earth; and he has failed to see this because Nature, whose effects on man were formerly immediate, is now **mediated by technology** so that it appears that technology and not Nature is actually responsible for everything. "

--Harold Fromm, Ecocriticism

# Infrastructure as Bridge



# Strategy for New Story



Design an experience to connect participants to Nature and Community by revealing how they are interconnected with the Mississippi through the Infrastructure of the Urban Water Cycle

*...connect  
the dots*

# Systems Journey Model

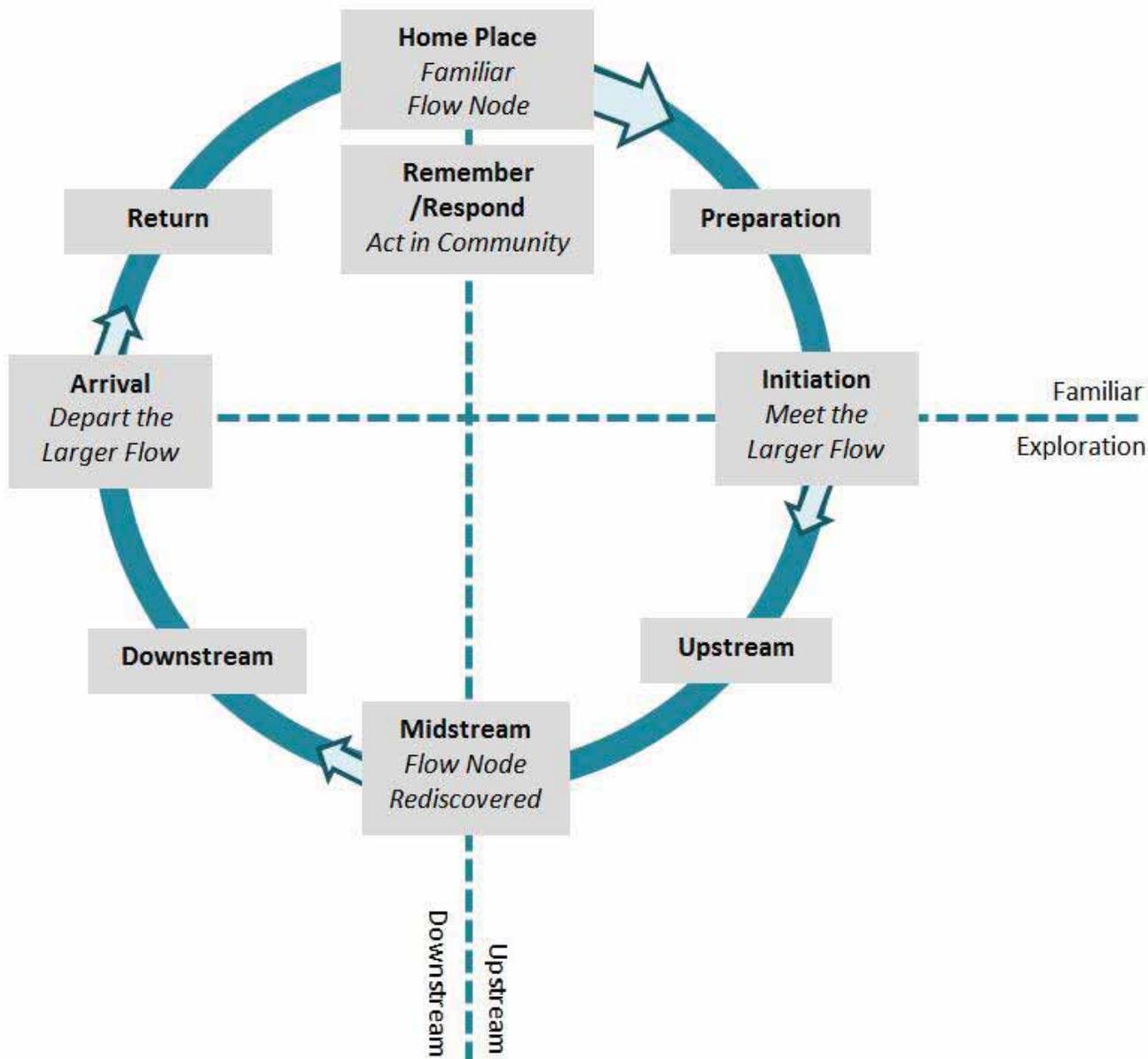
*experiential interconnection  
in environmental education*

# Systems Journey Model

## What is a Systems Journey?

- *a special journey, designed for engagement*
- *starting from a place of personal experience*
- *following a flow of interest*
- *to its source and destination, as far as you can*
- *so that when you return, your view of that place is transformed*
- *by knowing the larger story that runs through it*
- *and the places, and people and natural elements that live in relation to it.*

# Systems Journey



## Design of a Systems Journey

Based on “Hero’s Journey”

- Classic Narrative Structure
- Travel from familiar to explore the unfamiliar and back – on a ‘quest’
- Attaining something (e.g. treasure, insight) to bring back to community

Systems Journey Version:

- Quest: follow a familiar flow upstream and downstream
- to attain understanding of its place in larger human and natural systems
- And return to respond accordingly in community



# DOWNSTREAM/ UPSTREAM

A Journey Through the Urban Water Cycle

# Development Timeline

- Summer 2010  
Downstream/Upstream Concept
- Winter/Spring 2011  
Planning  
Grant for Curriculum Framework based on demonstration project
- Summer 2011  
Downstream/Upstream Implementation
  - May 31 – June 10, 2011, Two –week field based learning unit
  - Summer 2011 – and ongoing Follow up projects
- Fall 2011-Ongoing  
Curriculum Model Development (“Systems Journey”)
- May 12, 2012 – August 8, 2012  
Exhibit at University of Minnesota, Architecture and Landscape  
Architecture Library

# Team/Advisory Group

## Interdisciplinary Team - Advisory Group

### University Participants

- Team Leader: Jonee Kulman Brigham, Research Coordinator Center for Sustainable Building Research, Sustainable Art and Design of Infrastructure in Environmental Education (current graduate study)
- Roslye Ultan, Liberal Studies Senior Faculty: Art History/Visual Culture/Environmental & Public Art/ Curator
- Fred Finley, Associate Professor, Dept. of Curriculum and Instruction / Environmental Education
- Patrick Nunally, Coordinator, Institute on the Environment's River Life program/ River Sustainability & Stories
- Faye Sleeper, Water Resources Center Co-Director /Social aspects of water management, Extension
- Christina Manning, Liberal Studies Faculty /Psychology of Sustainable Behavior
- Christine Baeumler, Associate Professor, Department of Art / Environmental and Community Based Art
- Virajita Singh, Sr. Research Fellow, Center for Sustainable Bldg. Research/ Community Sustainable Design
- Gerald Allen, Liberal Studies Faculty / Architect, Public artist, Creativity Development, Future Studies
- Gail Buhl, Education Program Manager, The Raptor Center, University of Minnesota

### Community Participants

- Linda Henning, Metropolitan Council Waste Water Treatment Plant Environmental Educ. Coordinator
- Sage Passi , Watershed Education Specialist, Ramsey-Washington Metro Watershed District
- Jim Bode, Water Quality Supervisor, St. Paul Regional Water Services
- Bill Dircks, Public Works Superintendent, City of Little Canada Water Department
- April Rust, DNR Coordinator for Project Wet (Water-based environmental education curriculum)
- Jack Becker, Director Forecast Public Art / Public Art Planning Process
- Audrey Robinson Favorito, Educational Media Specialist
- John M. Smith, Environmental Education Specialist, Energy & Sustainability Associate - St. Paul Public Schools
- Beth Wiskus, MA, MT-BC, NMT Board Certified Music Therapist
- Brian Goodspeed, U.S. National Park Ranger - Mississippi National River and Recreation Area

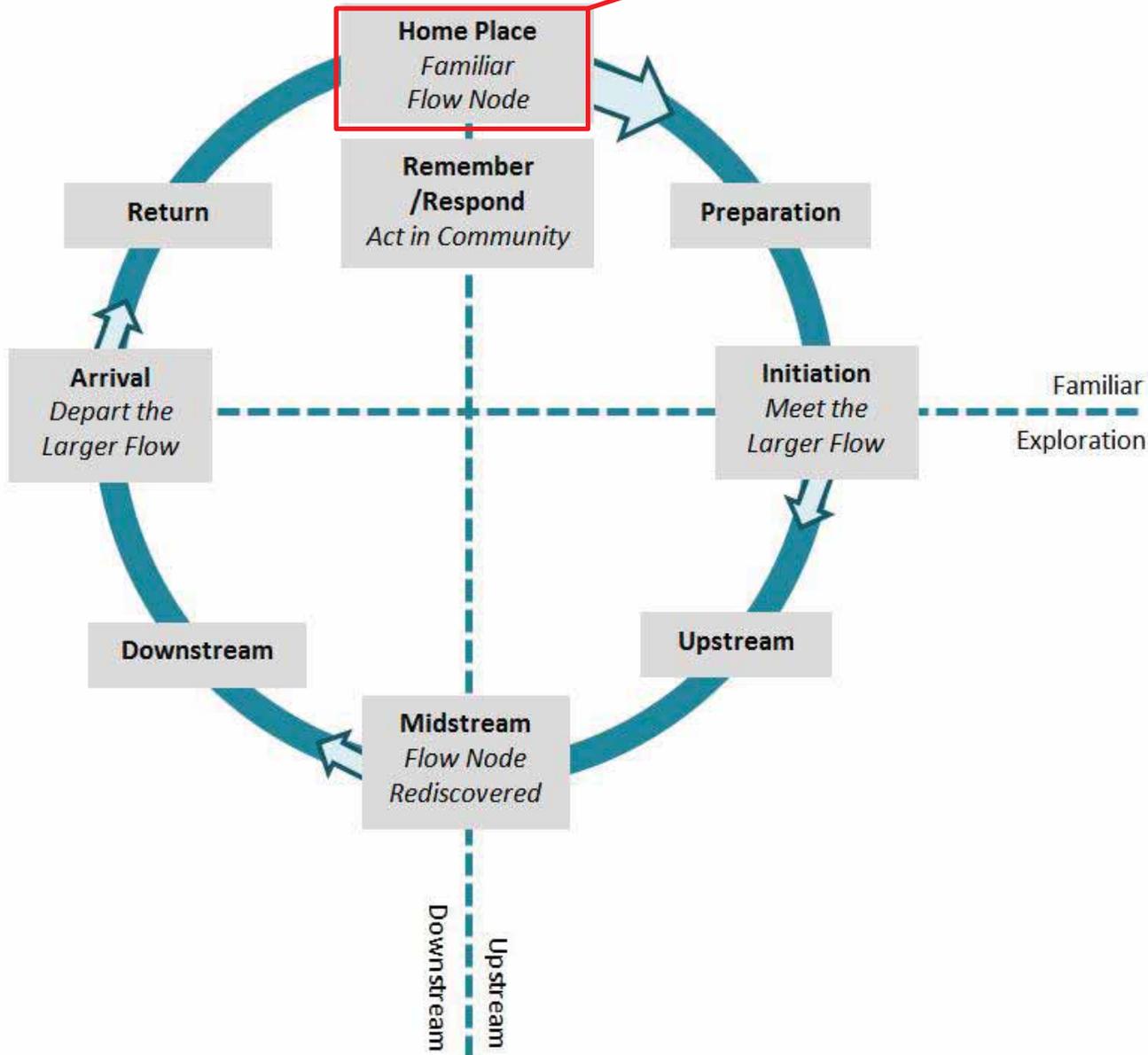
### Project Participants

- Jill Finnegan, Director, Children's Discovery Academy / Early Childhood Curriculum and Instruction
- Marty Welch, Owner, Children's Discovery Academy / Early Childhood Curriculum and Instruction
- Teachers, Especially AmyJane, Julie, Jamie, Katie
- Pre-K and Kindergarten Students



Partial Funding from  
University of Minnesota,  
Institute on the Environment

# Systems Journey



## Starting Place:

“Home Place:”  
Children’s Discovery  
Academy,  
Little Canada, MN

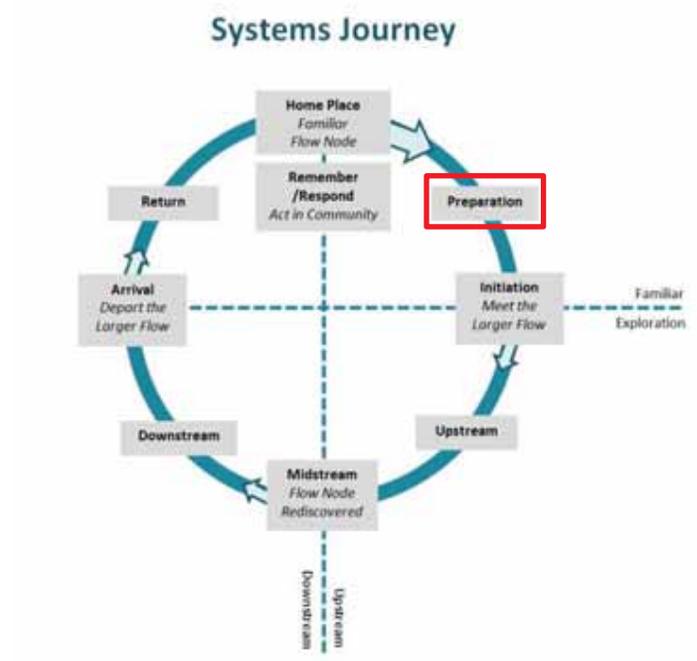
“Familiar Flow Node:”  
Pre-Kindergarten  
Bathroom Sink



## Call to Adventure:

- “Where does the water come from?”
- “Where does the water go?”

# Preparation



# Tuesday, May 31 - Charting the Journey *Quest(ions)*

## Sink Water Story



This is a picture of the sink  
in your school.

Where do you think the  
water comes from?

“The ocean maybe”

Where do you think the  
water goes?

“Across the Mississippi to  
the gulf of Mexico”





## #0 Water from the World

The sky rains.  
The rain flows  
Across the land,  
And to the river.

#1 River Park

#2 St. Paul Water Intake

#3 Sucker Lake

#4 Water Treatment Plant

#5 Water Tower

#6 To... Children's Discovery Academy

#7 Dirty Water Down the Drain

#8 Sewer Lines and Manholes

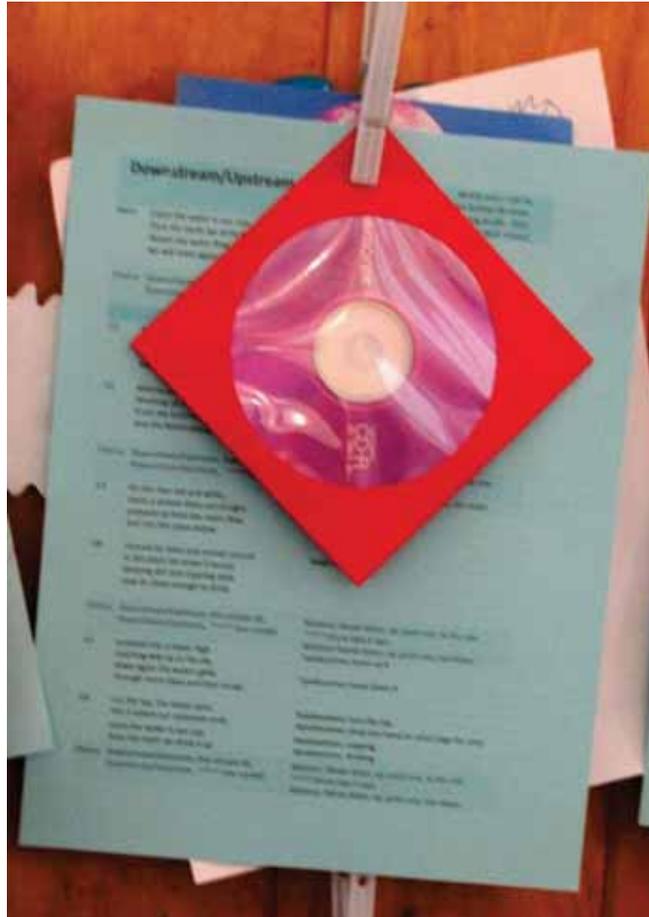
#9 Waste Water Treatment Plant

#10 Riverboat Ride to the Effluent Channel

#11 Water in the world

The river flows to the ocean  
The water evaporates to the sky.  
The sky rains around the world.

# Props: Special Equipment



# Downstream/Upstream Song

Words and music by  
Jonee Kulman Brigham,  
Full Spring Studio, 2011,  
Arranged by Beth Wilkus

Catch the water in our cup  
From the Earth we drink it up  
Watch the water flow away  
We will meet again someday

Downstream/Upstream, One Stream All  
Downstream/Upstream, One \*\*\*\*\* Rainfall

From the sky there comes a storm  
Causing thunderclouds to form  
Lightning flashes like the sun  
Rain falls down on everyone

Making puddles for the toads  
Washing up the dirty roads  
From the land the water flows  
And the Mississippi grows

Downstream/Upstream, One Stream All  
Downstream/Upstream, One \*\*\*\*\* Rainfall

On the river, tall and white  
Starts a stream that's out of sight  
Pumped up from the river's flow  
And into the pipes below

Cleaned by lakes and moved around  
To the plant the water's bound  
Cleaning dirt and cleaning stink  
Now it's clean enough to drink

Downstream/Upstream, One Stream All  
Downstream/Upstream, One \*\*\*\*\* Rainfall

Pumped into a tower high  
Reaching way up to the sky  
Down again the waters glide  
Through more pipes and then inside

Run the tap, the meter spins  
This is where our upstream ends  
Catch the water in our cup  
From the Earth we drink it up

Downstream/Upstream, One Stream All  
Downstream/Upstream, One \*\*\*\*\* Rainfall

Watch the water flow away  
We will meet again someday  
Down the drain and underground  
On a downstream journey bound

Under manholes runs the stream  
Sometimes smelled but never seen  
Using gravity it flows  
To the plant the sewage goes

Downstream/Upstream, One Stream All  
Downstream/Upstream, One \*\*\*\*\* Rainfall

Screen the junk and sink the grit  
Pump the sludge and then burn it  
Feed the bugs and add chlorine  
Take it out and now it's clean

Outfall gates are open wide  
As the water flows outside  
To the river in the sun  
It is safe for everyone

Downstream/Upstream, One Stream All  
Downstream/Upstream, One \*\*\*\*\* Rainfall

Down the river to the sea  
To the ocean wide and free  
Evaporating to the air  
Clouds for people everywhere

From the sky there comes a storm  
Causing thunderclouds to form  
Lightning flashes like the sun  
Rain falls down on everyone

Downstream/Upstream, One Stream All  
Downstream/Upstream, One \*\*\*\*\* Rainfall

Catch the water in our cup,  
From the earth we drink it up  
Watch the water flow away,  
We will meet again someday

Downstream/Upstream, One Stream All,  
Downstream/Upstream, One \*\*\*\*\* Rainfall

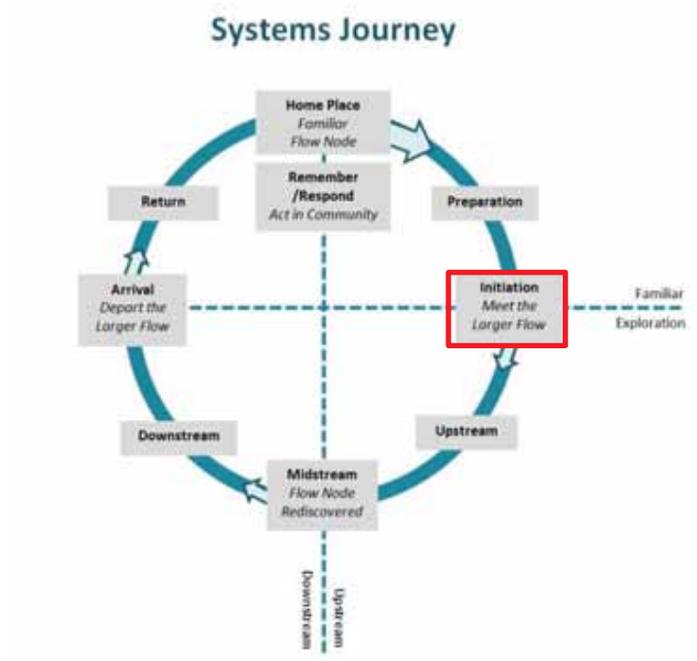


# Wednesday, June 1 - What is Water?





# Initiation



# Thursday, June 2, 2011 - Setting Out



# Story of the Land and Sky

From the sky there comes a storm, Causing thunderclouds to form  
Lightning flashes like the sun, Rain falls down on every one  
Making puddles for the toads, Washing up the dirty roads  
From the land the water flows, and the Mississippi grows.



By Sofia, Pre-K



Children at River Park  
[Jamie Gates]

# Touching the River



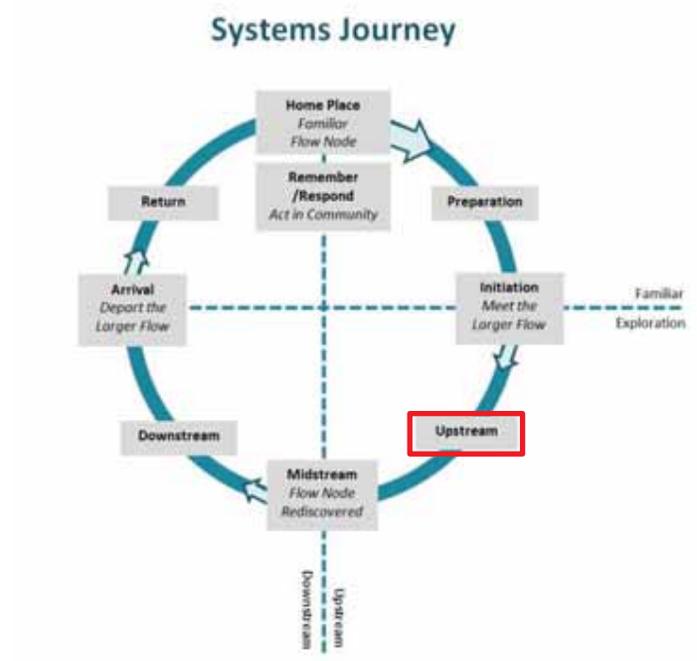


# Crossing the River





# Upstream



## Thursday, June 2 - Sucker Lake



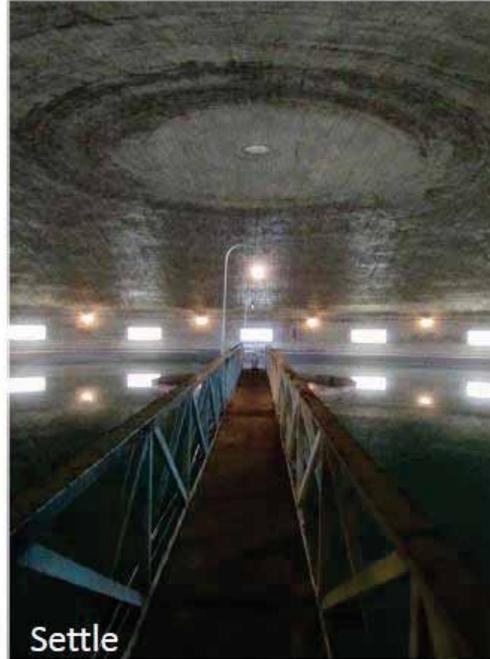
Jim Bode, St. Paul Water Quality Services Supervisor



# Treatment Plant



Soften



Settle



Filter



Water testing photo by Heidi



Pump



Clarifier Room  
St. Paul Regional Water Services,  
McCarrons Treatment Plant

# Friday, June 3 - Water Tower



Bill Dircks,  
Public Works  
Superintendent,  
City of Little Canada



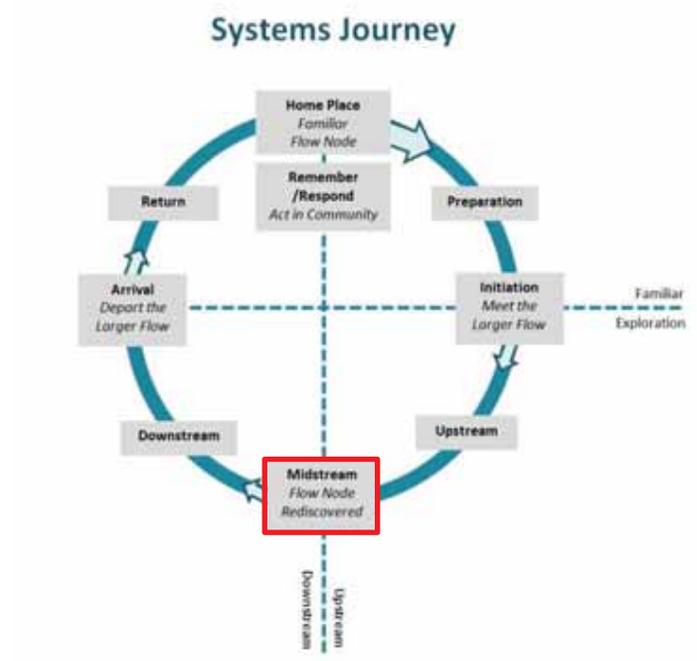
Children at the Water Tower  
[Central Image - Jamie Gates]

# Underground to School





# Midstream





## Friday, June 3 - Upstream Water Release





# Map Marking



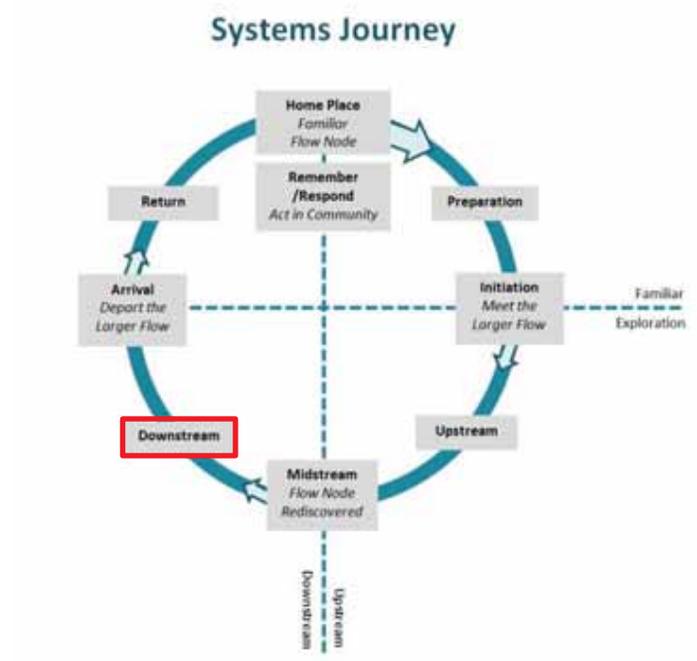
# Monday, June 6 - Measuring Water



# Making Dirty Water



# Downstream



## Tuesday, June 7 - Downstream Water Collection



# Where does water go?



# Follow the Green Line



by Ethan

# Exploring the Sewer

Bill Dircks,  
Public Works  
Superintendent,  
City of Little Canada

by Grace H.





# Wednesday, June 8 - Waste Water Treatment Plant



# Waste Water Treatment Game – Role Playing

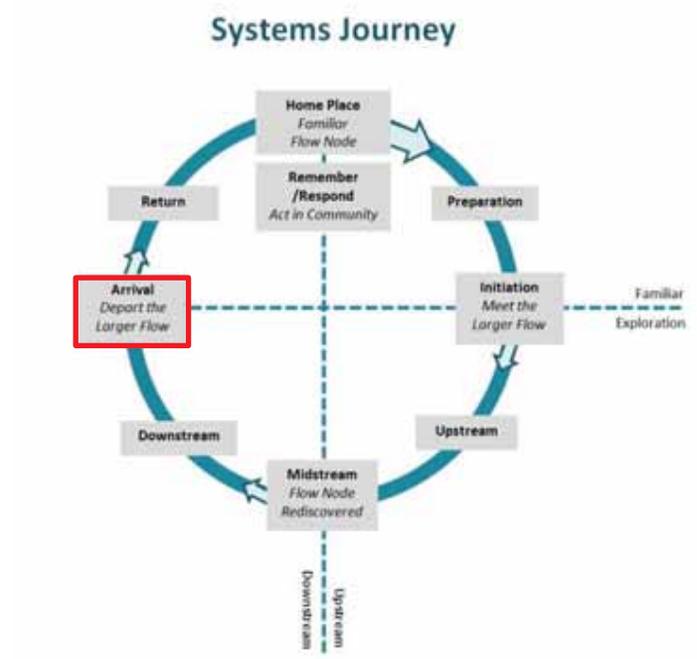
What were you in the water treatment game?

- \_\_\_ junk (carried big things like dolls and cups)
- \_\_\_ grit (carried gravel in a bag)
- \_\_\_ sludge (carried a crumpled newspaper)
- \_\_\_ dirty, germy water (carried bottle of dirty water)
- \_\_\_ bugs (carried plastic bugs to clean the dirty water)
- \_\_\_ chlorine (carried paper towels)
- \_\_\_ clean water (carried your clean water bottle)

*Screen the junk and sink the grit  
Pump the sludge and then burn it  
Feed the bugs and add chlorine  
Take it out and now it's clean*



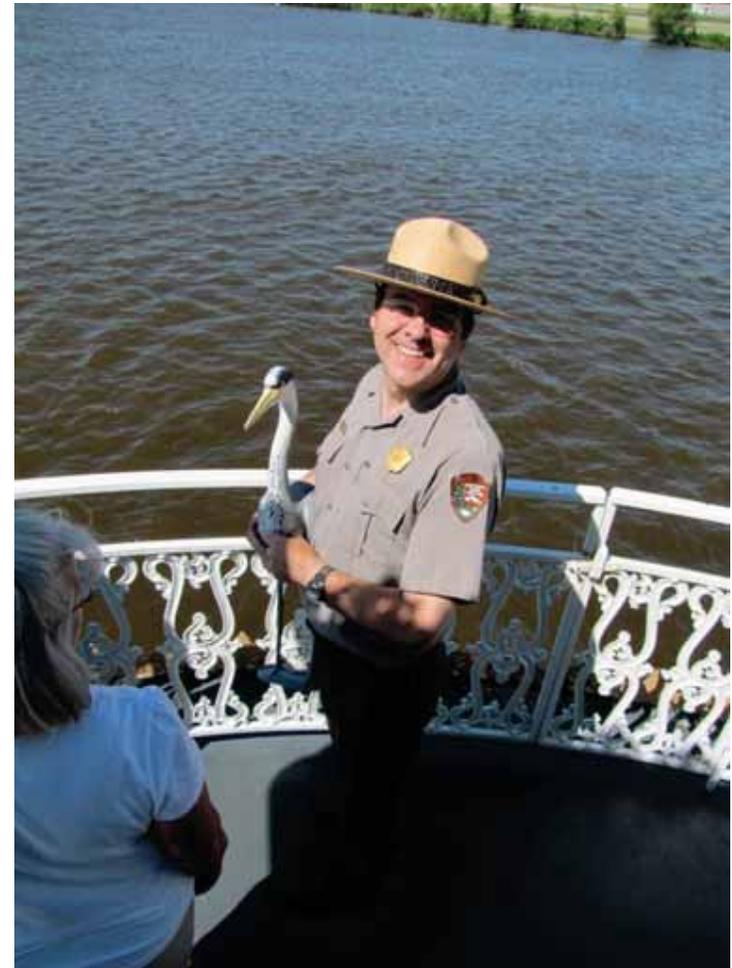
# Arrival



## Wednesday, June 8 - Riverboat Ride



Brian Goodspeed, Park Ranger,  
Mississippi National River and Recreation Area.



# Outflow Channel



*Outfall gates are open wide  
As the water flows outside  
To the river in the sun  
It is safe for everyone*

by Ryan

## Downstream Water Release



*Down the river to the sea  
To the ocean wide and free  
Evaporating to the air  
Clouds for people everywhere*

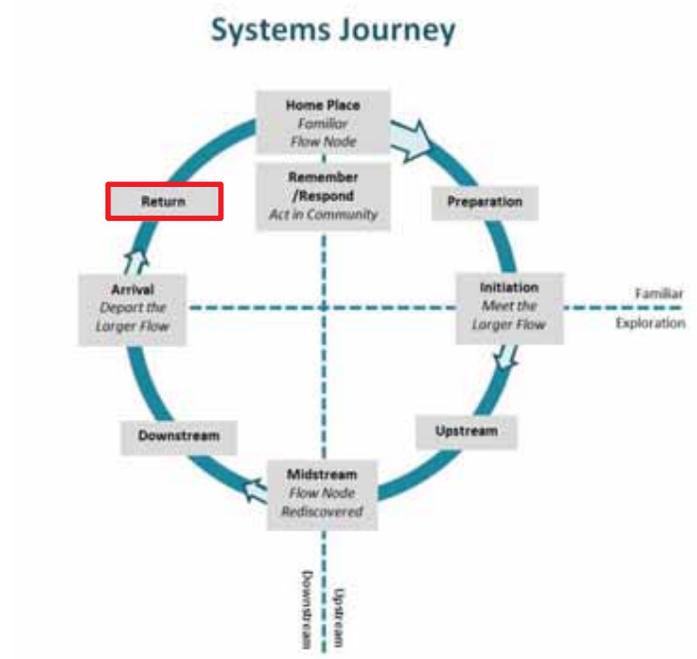




## Encounter with a Mayfly



# Return



# Thursday, June 9

## Fish and Birds

Gail Buhl,  
Education Program Manager,  
Raptor Center



# Friday, June 10 - Water in the World

**#11 Water in the World**

**Fish and Birds**  
The water we use flows downstream to the Mississippi River. Fish swim in the river. Some birds eat the fish. What kind of water do you want to send downstream for the fish and birds?

clean water

Put your picture with an Eagle Here

**People**  
In some places around the world, children do not have clean water near their home. They walk a long way to carry dirty river water back to their family. Can you help them by drawing a sink at their home?

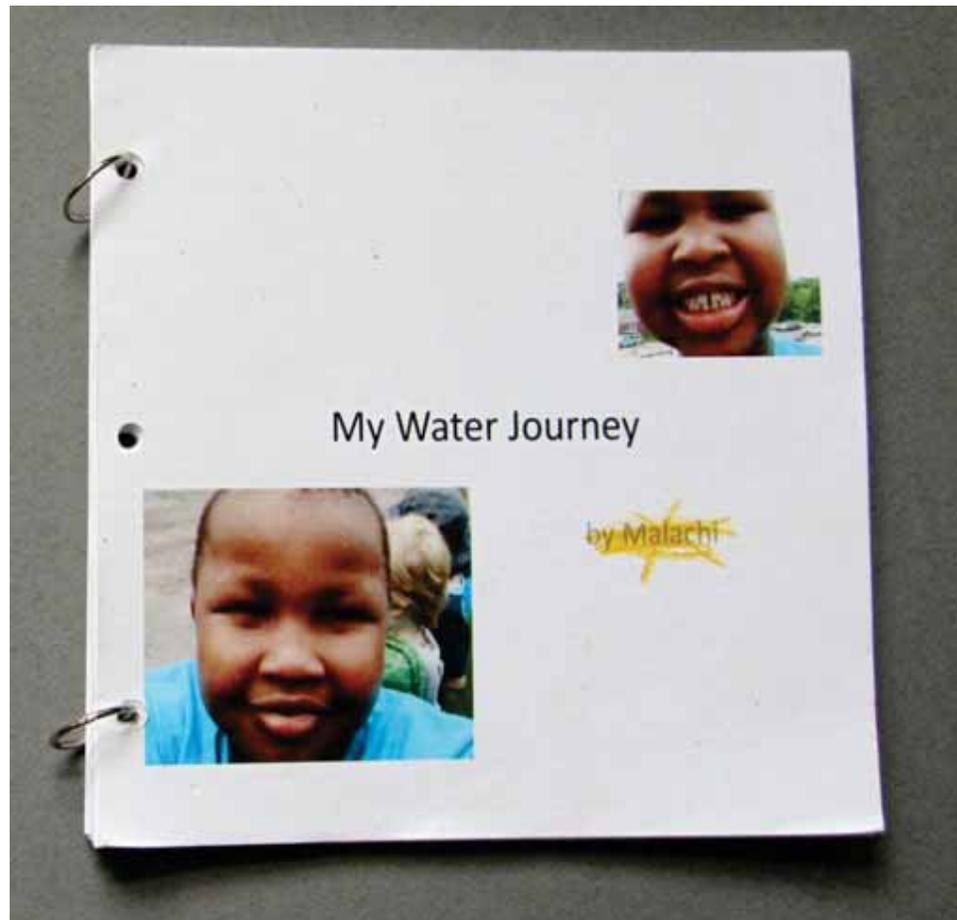
# Final Concert



Beth Wiskus , Music Teacher,  
Special Music, Inc.



# “My Water Journey”





## #0 Water from the World

The sky rains.  
The rain flows  
Across the land,  
And to the river.

#1 River Park

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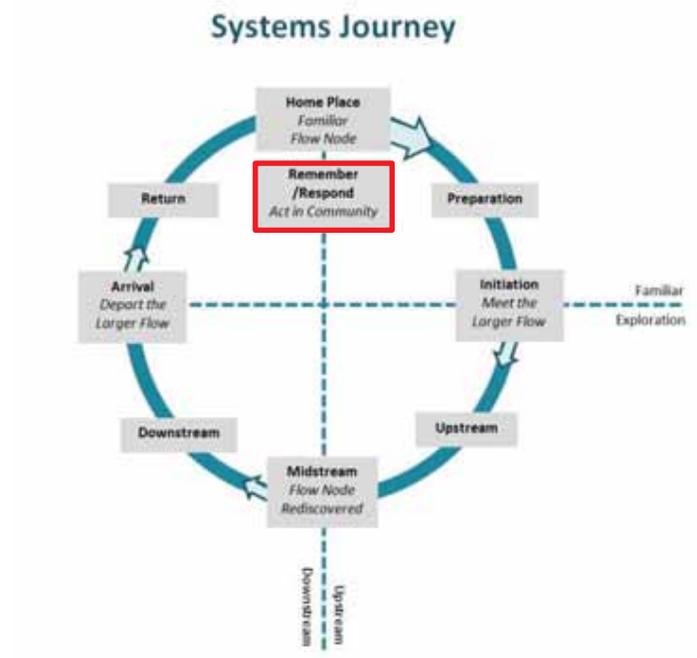
#11 Water in the world

The river flows to the ocean  
The water evaporates to the sky.  
The sky rains around the world.

# #0 Water From the World



# Remember/Respond



# Summer 2011 to Current Watershed Engagement

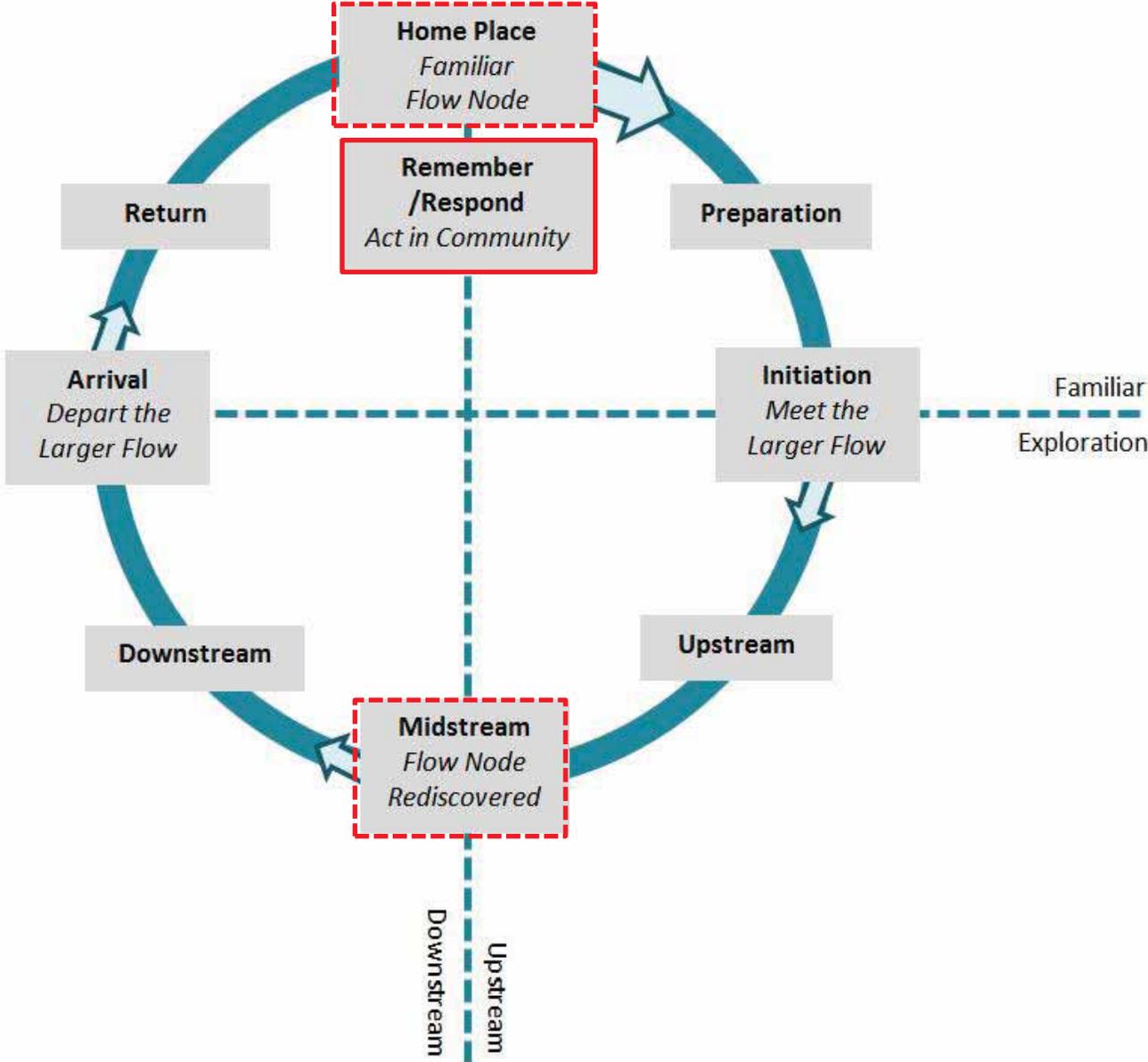




# Discovery Gardens Grant and Water Marks



# Systems Journey



# Outcomes

“When the image is new, the world is new.”

— Gaston Bachelard, *The Poetics of Space: The Classic Look at How We Experience Intimate Places*



“Even a minor event in the life of a child is an event of that child's world and thus a world event”

— Gaston Bachelard



# Products

## Artifacts:

- Mapstories (interactive wall map)
- Individual Treasure Maps
- Children's Water Journey Books
- Water Journey Song, CD, MP3
- Water Marks (participatory site installation)
- Public Blog/Documentation
- Exhibit May 12-July 12, 2012, Architecture and Landscape Architecture Library, U of MN

## Off-shoots:

- Relationship with neighboring Watershed District
- Grants: Native plantings, Raingarden
- Institute on the Environment grant for curriculum development
- Systems Journey Course (Post-Secondary)
- Program Expansion Proposals
- Speaking/Outreach

# Program Evaluation

## Results Analysis in progress

- **Teacher Surveys**
- **Parent Surveys**
- **Children Pre-Post Test**
- **Children Observation**
- **Community Partners Interviews**
- **Analysis of documentation of interaction and children's projects**

Excerpted letter from grandmother of one of child participants:

"...I borrowed his "My Water Journey" book to bring home to show the rest of my family. ... Several times he has mentioned parts of the water journey. We often go to the Science Museum and he loves the Mississippi River exhibits. Much of the knowledge he gained on this Water adventure with his class, he has integrated into the things he sees at the museum and in our conversations."

Teacher:

"They are in love with the Mississippi River and have a great understanding of what it is!"

# Sink Water Story



This is a picture of the sink in your school.

Where do you think the water comes from?

“The ocean maybe”

Where do you think the water goes?

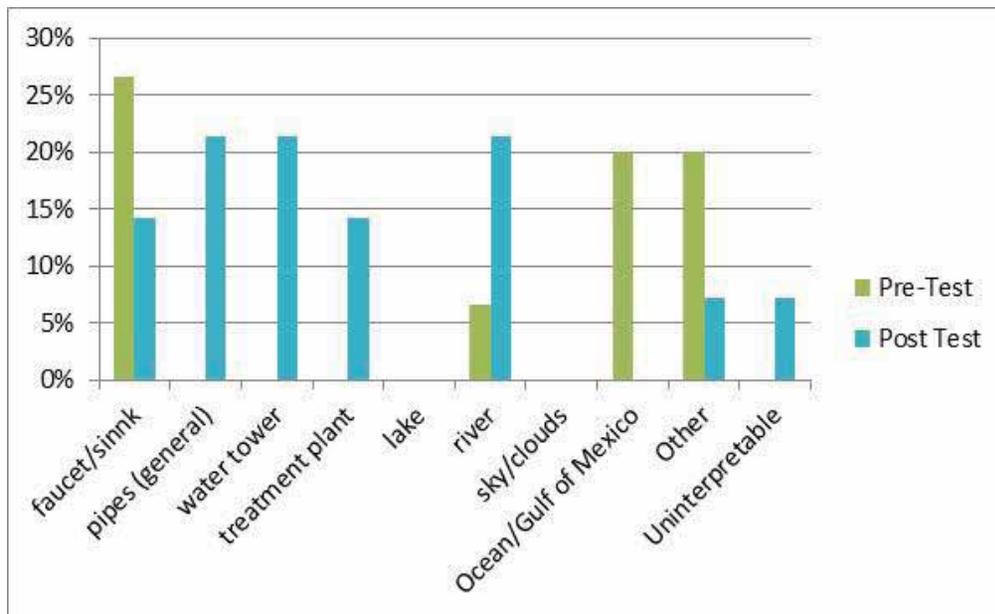
“Across the Mississippi to the gulf of Mexico”



# Sample Preliminary Results



This is a picture of the sink in your school.  
Where do you think the water comes from?



39 project participants, Pre-test sample size was 15, 38% Response Rate  
Post-test sample size was 14, 36% Response Rate

- Mentions of elements from various scales of the water cycle were tallied for each response
- Percentages are number of mentions compared to an “ideal” in which each child mentions an element from every scale of the water cycle
- Notice that top answers shift from sink and global water systems in the Pre-Test (green) to intermediate scales that connect the two in the Post-Test (blue)
- Limitation: Question format may imply a single answer, versus complete story. Thus it is hard to tell how complete a picture they have of the cycle, however it does point out their “first answer.”



Catch the water  
in our cup  
from the Earth  
we drink it up

Watch the water  
flow away  
we will meet  
another day

Downstream/Upstream  
One stream all  
Downstream/Upstream  
One rainfall

## Indicator of Success

“If a child turned on the faucet . . . and thought about that water coming from the river and going to the river, that to me would be the definition of success of this project.”

# Adaptation/Expansion

*“The myth is the public dream  
and the dream is the private myth”*

*--Joseph Campbell, The Power of Myth*

# Adaptation/Expansion

## *Vision/Ideas*

- *Repeat journeys in multiple venues*
- *Create a means of exchange of stories on line – a network of water-journeymen*
- *Make it an annual rite – Water Journey Week when everyone makes their water journey and meets at the River.*
- *Expand from Water to Energy, Air, Earth (Materials)*

# Expanded Vision

## Resources Needed

- Enhanced environments at key points in water infrastructure
  - Tour-friendly environments/railings
  - Interpretive material/display while keeping focus on authentic contact
- Resources for staffing increased tour groups
- Resources for more development of site based educational materials
- Research
- Training
- Documentation/promotion
- Synergize multiple Journeys – website to share stories, and illuminate confluence of flows at central places (treatment plants, power plants, watershed to river, local air quality)

# Contact Information

## Downstream/Upstream and Systems Journey

© Jonee Kulman Brigham

Through graduate work, Master of Liberal Studies; and Full Spring Studio, LLC

Documentation: <http://one-downstream-upstream.blogspot.com>

## For Interest in New Program Development/Research/Pilot Participation

Jonee Kulman Brigham, AIA, LEED AP

Green Schools and Environmental Education

Research Coordinator, Center for Sustainable Building Research

Associate Fellow, Institute on the Environment

**Email: [kulma002@umn.edu](mailto:kulma002@umn.edu) Phone: 651-895-7834**

Center for Sustainable Building Research, [www.csbr.umn.edu](http://www.csbr.umn.edu)

College of Design, University of Minnesota

# Discussion

