Using Spatial Narratives to Promote Coastal Stewardship: Linking Science, Stories, and Placed-Based Learning in the St. Louis River Estuary
Presentation Outline

- The power of story
- About deep maps, spatial narratives and coastal stewardship
- St. Louis River Estuary - the Stories and the Science
- Collaboration, catalyst and impact
The Power of Story

The Moth, StoryCorps, Ex Fabula (in Milwaukee) and other media have helped promote a resurgence of storytelling.

Can stories help build empathy and lead people to find common ground?

http://themoth.org/
http://storycorps.org/
https://www.exfabula.org/
The Power of Story

The Wish: Take StoryCorps global with an app anyone can use.

"...inviting a loved one, a friend or a stranger to record a meaningful interview might just turn out to be one of the most important moments in that person’s life — and in yours“ – Dave Isay

TED Prize

The TED Prize is awarded to an individual with a creative, bold vision to spark global change. By leveraging the TED community’s resources and investing $1 million into a powerful idea, each year the TED Prize supports one wish to inspire the world.

http://ted.com/
A Convergence of TED Prizes?

The Wish (Blue): Protect the Ocean! - Galvanize global support for marine protected areas

The Wish (Green): Allow citizens anywhere to participate in the creation of the City 2.0

Are stories a way to connect and enable the Mission Blue and City 2.0 wishes?
The Science of Story

The why and how of using stories to communicate science by a master storyteller / oceanographer.

http://www.kendallhaven.com/
PrairyErth (A deep map)

- An Epic History of the Tallgrass Prairie Country in eastern Kansas
- Very little use of maps, but through quotes and narrative, promotes a deep understanding of the landscape
Deep Maps and Spatial Narratives

- Published February 2015.
- Arose from a National Endowment of the Humanities-funded collaboration in 2012 to explore topics in the spatial humanities.
- “Deep maps are finely detailed, multimedia depictions of a place and the people, buildings, objects, flora, and fauna that exist within it and which are inseparable from the activities of everyday life. These depictions may encompass the beliefs, desires, hopes, and fears of residents and help show what ties one place to another.”
What is a Spatial Narrative? (a definition for landscape research and design)

The spatial narrative is a conceptual framework to bring the qualitative experience of “place” together with the analytic geo-science of “space.”

- Silbernagel, 2005. Bio-regional patterns and spatial narratives for integrated landscape research and design.
Can “Deep Maps” Promote Stewardship?

The Lakeshore Nature Preserve Interactive Map promotes exploration of a precious and unique campus natural resource.

Can a “deep map” promote preservation and stewardship of campus natural areas and can the idea be applied at the scale of the Great Lakes?

http://www.lakeshorepreserve.wisc.edu/
Spatial Narrative Research Projects

- **Stressor Gradients and Spatial Narratives of the St. Louis River Estuary**
  - PIs: George Host and Janet Silbernagel
  - Funding: Minnesota and Wisconsin Sea Grant (2010-12)

- **Geotools for Fostering Citizen Engagement and Understanding of the Socio-environmental Complexities of Great Lakes Coastal Estuaries**
  - PIs: Janet Silbernagel, Patrick Robinson, David Hart
  - Funding: Wisconsin Sea Grant (2012-14)
Great Lakes Stressors

This map by the Natural Resources Research Institute at the University of Minnesota-Duluth shows a combination of agricultural and urban development stressors by Great Lakes watersheds.

http://gisdata.nrri.umn.edu/glei2/riskmap/
Stressor Gradient of the St. Louis River Watershed

Note that the stressor index is high in the north (Minnesota’s Iron Range), get “diluted” downstream as less stressed watersheds are factored in, and increase again near the estuary due to development in Duluth and Superior.
Stressor Gradient of the St. Louis River Estuary

- Relate stress index to biota and water quality
- What do degraded or “at-risk” sites look like?

Accumulate stressors at the St. Louis River estuary (low value = low stress)

Use the stressor ranking to stratify biological and water quality sampling
Spatial Narrative Project Structure

- **Science**: Improving access to the spectrum of science in the St. Louis River estuary/watershed.
- **Stories**: Engaging people in place-based learning.
- **Quests**: Communicating “contested issues” through issue-based vignettes.

"Quests" is at the top, "Stories" in the middle, and "Science" at the bottom of the pyramid.
SLRE Stories and Science Website

- Stories
- Science
- GeoQuests
- Deep Map

http://www.stlouisriverestuary.org/
Estuary Vignettes

- Fishing
- Shipping
- Wild Rice
- Recreation
- Community
SLRE Stories

- Three stories featured per vignette.
- Provide multiple perspectives on the issue.
- Audio clip with transcript pulled from longer interview.
- Text includes hooks to locations on the deep map.
My dad’s family grew up on Allouez Bay. They were poor so hunting and fishing, gardening and canning, sewing their own clothes was their lifestyle. My dad remembers... he’s a big duck hunter, the rice was great out there, just beautiful and the ducks tasted very good.”

– researcher

The weeds used to be loaded with slime, probably some type of oily substance. You could see where the water line stopped, where the weeds were green. The water cleaned up a great deal

– long-time local ricer

On reaching the mouth of the St. Louis River ...we here saw in plenty the folle avoine, or wild rice...”

- Henry Schoolcraft in 1820
SLRE Science

- Multiple science topics covered in each vignette.
- As with stories, text includes hooks to locations on the deep map.
- Text also includes links to related science articles and external documents.
SLRE GeoQuests

Explore and learn through GeoQuests

GeoQuests combine science, treasure hunting, and technology in the out of doors. We created these quests to bring people to special places around the St. Louis River Estuary, to teach a little bit about the ecology and history of the estuary, and to provide a fun, outdoor activity.

Augmented RealityQuests

The second type of GeoQuest is based on Augmented Reality – players use their mobile phones to "interact" with virtual characters located throughout the estuary, viewing videos, text, or pictures triggered by the phone's built in GPS system. Each of the games has a theme and a mission tied to the stories and science of the estuary.

- **Up River** is a quest to create a meal from resources found in and around the estuary.
- **Barkers Island Quest** takes players around the Whaleback ship, marina, and Lake Superior NERR headquarters on Barker's Island in Superior, WI, in a mission to figure out the origins of Barkers Island and how people and wildlife make use of the island and surrounding estuary.

**GeoQuests**

- GeoQuests combine science, treasure hunting, and technology in the out of doors and teach about the ecology and history of the estuary.
- GeoQuests reinforce the science and stories within the topics.
Augmented Reality Quests

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- **Up River** is a quest to create a meal from resources found in and around the estuary.
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**Play and Create!**

The augmented reality quests are based on an iPhone app called ARIS. Instructions on how to install and play ARIS games can be found at the [ARIS Website](#). Students involved in our previous workshops have not only played the game, they have learned to CREATE THEIR OWN!
Geocaching Quests

We developed two kinds of GeoQuests. The first is based on the popular sport of Geocaching, which involves using Global Positioning System (GPS) devices to find hidden containers. Geocaches can be found all over the world - almost 2,000,000 caches have been hidden and over 5 million people play the game. We have created some special ones for this project – they involve hiking, photography, some sleuthing, and collecting stream and lake water quality data to add to our data library.

Stryking Differences

takes you along Duluth’s Western Waterfront Trail, starting near the bridge at the mouth of Kingsbury Creek and ending at the massive Stryker Bay restoration project.

Chambers Grove

This multi cache visits two historic sites in the upper estuary of the St. Louis River - John Jacob Astor Park, site of an outpost for the American Fur Trading Company and Chamber’s Grove, where the mansion of brownstone quarrier Michael Chambers once

Barker’s Bug Hunt

This is a geocaching-based quest designed to teach about the use of aquatic insects and other macroinvertebrates as indicators of water quality.

These educational geocaches involve hiking, photography, some sleuthing, and collecting stream and lake water quality data.
Teachers and students from six Duluth area schools spent two days in November 2011 testing and creating placed-based games.
• Story layers with icons by vignette.
• Icon click displays text panel with consistent style as the website and links back to appropriate vignette.
• Custom base map, additional layers.
SLRE Website Trajectories

Stories

Deep Map

GeoQuests

Story
Community
Zentner

Map
Fishing
WLSSD

Science

GeoQuest
Up River
Rice’s Pt.

Science
Fishing
Geography

http://www.stlouisriverestuary.org/
A sixth vignette on restoration was added at the request of St. Louis River Area of Concern coordinators to communicate progress and cumulative benefit of restoration.

Funding from the Minnesota PCA to NRRI, Univ. of Minnesota-Duluth in 2014.
Initial development included 2 stories and 9 profiles of restoration projects.

- 21st Avenue West
- 40th Avenue West
- Chambers Grove
- Grassy Point
- Knowlton Creek
- Newton Creek
- Pickle Pond
- Radio Tower Bay
- Wild Rice Restoration
A project funded by the Wisconsin DNR in 2015 from an AOC capacity grant provides:

- updates of the 9 existing restoration project profiles,
- new restoration profiles for Clough Island and Wisconsin Point,
- 3 new story interviews,
- community outreach to develop story maps.
Restoration Story Maps: Wisconsin Point

Wisconsin Point Restoration Projects

Wisconsin and Minnesota Points at the western arm of Lake Superior are touted as one of the longest freshwater barrier beaches in the world. As such, Wisconsin Point is a unique regional ecosystem, as well as an outstanding recreational resource for the City of Superior. Three different types of restoration activities are being implemented to improve Wisconsin Point: restoration of historic wild rice beds in Allouez Bay, management and modification of beaches with hopes of reintroducing Piping Plover, and consolidation of beach access to preserve sensitive dune vegetation.

Restoration of Wild Rice Beds

Wild rice was once plentiful in Allouez Bay but declined likely due to a variety of factors. Amy Plotz with the University of Wisconsin-Green Bay described this decline and efforts to restore wild rice.

Mapping Wild Rice Restoration in Allouez Bay

This interactive map shows areas where wild rice is being grown.

Wisconsin Point Restoration Projects - Story Map Journal
http://arcg.is/1VP9Wq9

A Photo Tour of Shafer Beach - Story Map Tour
http://arcg.is/1ZuaCG1
In April 2016, project organizers asked journalists, storytellers, and citizens to tell one story about the St. Louis River, its communities, its history and its people. They hoped One River, Many Stories would be a powerful demonstration of what happens when all the region’s storytellers focused their attention on one topic. Did it work? Yes, but not in ways they could have imagined…

http://onerivermn.com/
Partner: St. Louis River Summit

St. Louis River Science and Stories LIVE!
River Talk with five of the people with stories featured on the website at the 7th Annual St. Louis River Summit in March 2017 hosted by the Lake Superior National Estuarine Research Reserve

http://lakesuperiorreserve.org/
A presentation on the SLRE Stressor Gradient/Spatial Narrative project at the GeoDesign Summit in January 2011 led to an offer to collaborate with the ESRI Applications Prototype Lab on development of spatial narrative geotools.
Creating place-based narratives...

What if communities could write their own stories?

Goal: design a tool to facilitate citizen-authored spatial narratives.
Wisconsin Geotools Project

- Author: ArcGIS.com backbone
- Surfer: Story map Tour for viewing
- Explorer: Mobile app for observations

http://maps.aqua.wisc.edu/geotools/
Summary

- Linking stories, science and place-based learning enable a deeper understanding of freshwater estuaries.
- Collaborative storytelling about valued environmental resources encourage learning, foster new relationships and inspire innovation in communication and resource management.
- Interactive story maps and timelines are powerful technologies to communicate environmental stories across place and time.
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