

FATHOM; HUDSON RIVER DATA AS MUSIC

Ben Neill

Ramapo College of NJ,
505 Ramapo Valley Road,
Mahwah, NJ, USA
bneill@ramapo.edu

ABSTRACT

Fathom is a multimedia performance piece by composer/performer Ben Neill and vocalist/composer Mimi Goese, commissioned in 2016 by the Beacon Institute for Rivers and Estuaries (BIRE) through a New Music USA grant. In *Fathom*, data sonification is used to translate environmental data patterns into music and imagery that explores the power and soul of the Hudson River. BIRE is a not-for-profit environmental research organization that monitors environmental data in the Hudson River through their REON sensor system. *Fathom* uses the data collected in the REON stations as the basis for an audiovisual performance work that combines electronic and acoustic music with interactive video. It directly translates the chaotic structures of the natural environment into its composition and performance.

1. PROJECT CONCEPT AND BACKGROUND

Fathom is a 40 minute multimedia performance piece created in 2016 by composer/performers Ben Neill and Mimi Goese in collaboration with the Beacon Institute for Rivers and Estuaries (BIRE) of Clarkson University. The work is scored for Neill's self-designed electro-acoustic Mutantrumpet with interactive computer audio and video, Goese's voice, and optional live percussion.

By translating environmental bifurcations into sound and visual material, the instability and fragility of ecosystems whose survival is threatened by global climate change are revealed. The data creates musical structures which evoke improvisatory performances. These structures can be tuned and attenuated in many ways for varied aesthetic results and situations, bringing audiences to greater awareness of the drastic and potentially catastrophic changes in the natural environment. The chaotic systems that are at work in nature are manifested in piece, creating a formal structure based on those processes that is blended with humanistic reflections and responses.

BIRE is a not-for-profit environmental research organization working to expand understanding of rivers and estuaries. One of BIRE's most important projects has been monitoring of environmental data in the Hudson River through their REON system, which streams from multiple sensor arrays. Neill and Goese were commissioned by BIRE to create a musical piece based on this data in 2016, and received a New Music USA grant for its creation.

BIRE suggested that the piece focus on data collected during Hurricane Sandy in order to raise awareness of how climate change and human intervention create cataclysmic changes in the Hudson River. *Fathom* is made up of three sections that

correlate to data collected two weeks prior to, during, and one week following Hurricane Sandy.

2. DATA SONIFICATION PROCESS

The sonification of the REON data was done using several software applications. First, the graphs were captured and reversed in Photoshop to make them readable by MetaSynth, a software instrument that is capable of interpreting images and translating them to electronic sound. A variety of options for scaling and sound quality are available within MetaSynth. The resulting audio recordings are then either used as is, translated into conventional musical notation, or further scaled using the Audio to MIDI and pitch limiting functions in Ableton Live and re-orchestrated. Animations are then created of the graphs in Adobe Premiere. The graphs unfold in tight synchronization with the sonic material, creating an audiovisual object in which both media are generated directly from the data patterns. During the performance the video animations are projected using a video performance program, making the direct connection between the scientific data and the music very clear. The graph animations are then mixed with crowdsourced video of the Hudson River collected from the public through an open call by the artists through their social media, website, and press. As the work unfolds, Neill interacts dynamically with the video with the Mutantrumpet, adding subtle chaotic input to the system.

The structure of *Fathom* begins with the data from the southernmost REON location, moves up the river to the northernmost data collection station, and then back down again. The work progresses from a single direct translation of one environmental factor to layering, manipulation, repetition, and interpretation of data. This progression is a metaphor for the increasing human encroachment on the Hudson River environment.

Goese's lyrics and melodies are woven into the music, telling stories of life, industry and beauty as well as the long history of human intrusion on the Hudson River. *Fathom* was performed in 2019 at the International Computer Music Conference in New York City, and was premiered at the Towne Crier in Beacon, NY, as well as the Woodstock Artists Association and Museum (WAAM) in Woodstock, NY.

Goese and Neill began working together in the mid 2000's on *Persephone*, a music theater work presented at the Brooklyn Academy of Music Next Wave Festival in 2010 and released as *Songs for Persephone* on Ramseur Records in 2011. They have performed together at Big Ears Festival, Etnafest, Italy, Festa en Serralves, Portugal, Moogfest, and Lincoln Center, among others. Goese and Neill strive to bring humanity and emotional connection to the collaborative process, bridging

music, art and science through creative technologies with an emphasis on lyricism, poetry, and accessibility.

3. LINKS TO MEDIA

Video excerpts of premiere performance

<https://youtu.be/loXuVMoGMjk>

Fathom demonstration video

<https://youtu.be/a7jGIDux5Vk>

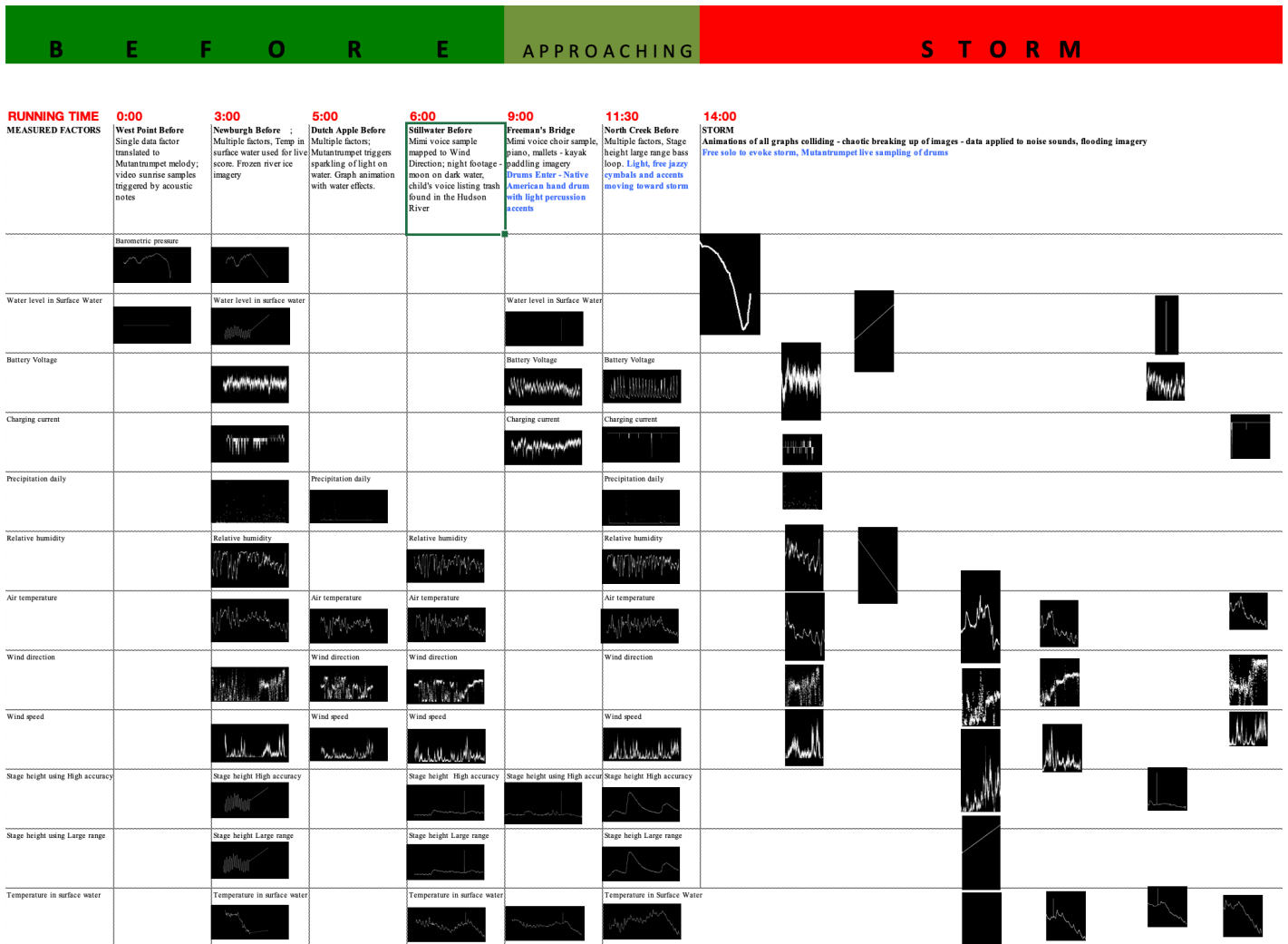


Figure 2: Excerpt from *Fathom* score / diagram