HOURGLASS RIVER
Countdown to another world
by Brian Holmes and Jeremy Bolen

How do complex societies interpret the causes, consequences and possible future transformations of damaged ecosystems? This project develops a cartographic narrative and video image of the Old River Control Structures on the Lower Mississippi River, conceived here as the anthropogenic markers of an ongoing social-ecological process: the pathology of command and control in environmental management. Designed and built by the US Army Corps of Engineers from 1954 to 1963, then reorganized and expanded over the following three decades, Old River Control represents an attempt to hold back geological time. It arrests the natural course of sedimentation that leads a river to abandon its former delta in favor of a shorter, steeper route to the sea. This exemplary case of engineered paralysis becomes the lens through which we examine the land loss crisis on the sediment-starved Louisiana coast, where the ecological regime shift provoked by river management is now being addressed by sophisticated state interventions that enlist biogeochemical forces in the effort to restore some of the land-building dynamics that formerly characterized the Mississippi delta. In this region – a stronghold of the oil and gas industry – the physical contours of the coastline and the livelihoods and dreams of those who inhabit it depend, at least in part, on convergent or divergent interpretations of core processes driving the onset of the Anthropocene.

We are artists, using photography, text, video and GIS cartography to explore the coevolution of technologies and territories, or what ecologists call social-ecological

systems. Our study pursues the idea that through artistic representation, specific sites of technological development can be turned into something like monuments in the field – exemplary sites for public understanding and assessment of the Anthropocene and its mode of production.[1] In this case we propose Old River Control as the anthropogenic marker of a specifically deltaic process: a "sinking system" linking infrastructure, extraction, urbanization and global trade against a background of rapid ecological degradation. Our aim is to artistically express these spatial/functional linkages and make them a focus of public discussion.

OLD RIVER CONTROL

Seen from its terminus in the Gulf of Mexico, the Mississippi River is an outflow of continental sediment to the sea. The sediment-dispersal system consists of an alluvial valley, a deep channel, a delta and a continental shelf, followed by a slope and a series of underwater alluvial fans. On land, sediment deposition has shaped the delta region over the last 7,500 years, creating a series of gradually elongating lobes gathered into six distinct delta complexes, each of which ultimately curtails its own development through the buildup of sand and mud in the mainstem and the subsequent avulsion of the river toward a shorter and deeper path to the sea. Like comparable formations around the world, the alluvial valley and delta of the Mississippi have attracted considerable human settlement due to wildlife and timber abundance, ease of transportation, rich floodplain soils and ready availability of fossil-fuel resources. These natural advantages have typically led to the construction, maintenance and continuing expansion of hydraulic engineering works, designed to facilitate navigation and protect cities and agricultural activities from floods. Delta regions that offer significant subsurface and undersea fossil-fuel resources have been intensively exploited, leading to subsidence caused by the extraction of oil, gas and water. The Mississippi delta exemplifies this pattern, which it helped establish through the development of extensive engineering works in the decades before and after the Second World War. The densely populated and economically significant delta region is now beset by a combination of sediment starvation, land subsidence, marsh degradation, storm surge and rising sea levels due to climate change. The land loss issue, with all its proposed causes and solutions, is fully public and hotly debated, when not agonizingly close to inhabitants' homes during flood stage or hurricane season.

Our investigation begins at the Old River Control Structures (ORCS), designed by the US Army Corps of Engineers in the 1950s and inaugurated in 1963.[2] This isolated site in northern Louisiana marks the beginning of the delta properly speaking, because the river's first distributary splits off here. In colonial times it was the site of a large meander loop known as Turnbull Bend, which swung westward to capture the flow of the Red River, then turned back east to rejoin the axis of the river valley, releasing a small and sluggish distributary called the Atchafalaya along the way. Turnbull Bend – now called "Old River" – was deliberately cut off from the mainstem in 1831 to shorten transit times, inaugurating a series of river cutoffs that culminated in the 1940s.[3] By force of dredging, Old River remained a navigation channel connecting the Mississippi to both the Red and the Atchafalaya; and in the early years the current hesitated here, flowing now into the mainstem, now into the distributary. However, a steady increase in the water volume captured by the Atchafalaya was observed as early as the 1860s after a huge log raft, some ten miles long, was cleared using steam-powered snagboats.[4] The outflow accelerated considerably from the 1930s onward due to dredging of the Upper Atchafalaya, undertaken to provide relief from Mississippi flooding. By the early 1950s, the complete capture of the Mississippi by the cleared and deepened Atchafalaya came to be

1. For a related project, see B. Holmes, J. Bolen and B. Kirkbride, "Born Secret (Cash for Kryptonite): A field guide to the Anthropocene mode of production," *Anthropocene Review* vol. 8, issue 2, 2020.
2. J.F. Barnett, *Beyond Control: The Mississippi River's New Channel to the Gulf of Mexico*. Jackson, MS: University Press of Mississippi, 2017.
3. D. Mander, "The U.S. Army Corps of Engineers and the Mississippi River Cutoff Plan," in *Engineering Earth: The Impacts of Megaengineering Projects*, ed. S. D. Brunn. Berlin: Springer Science & Business Media, 2011.
4. M. Reuss, *Designing the Bayous: The Control of Water in the Atchafalaya Basin, 1800-1995*. College Station, TX: Texas A&M University Press, 2004.

perceived by Army Corps commanders as an imminent threat, one eventually confirmed by Corps' leading scientific authority, the geologist Harold Fisk.[5] The Old River site, located in the bottleneck between the vast floodplains of the Mississippi basin and the sprawling port and petrochemical complex of the delta, then became the object of a strategic intervention that aimed to stabilize the entire system.

In 1954 the Army Corps was mandated by the US Congress to fix the Mississippi's outflow to the Atchafalaya at a rate of thirty percent of total volume for both water and sediment. To do it, the connection of the Mississippi to the Atchafalaya via the lower reach of Old River was closed with a Lock and Dam that allowed continued navigation, while a Low Sill with adjustable gates was built to modulate the river's flow into a newly constructed channel. An additional Overbank Structure performed a similar modulating function under high-water conditions. But this was not enough to fix anything. After the Low Sill was seriously damaged by flood in 1973, a heavily reinforced Auxiliary Structure was constructed to the south in 1986. This was followed in 1990 by the Sydney A. Murray hydroelectric dam with its own dedicated channel, located to the north of the original interventions. The scale of the installation, and its capacity to distribute the river's flow, thus increased significantly. The present ORCS comprises these five elements – lock and dam, low sill, overbank structure, auxiliary and hydroelectric dam – which so far have kept the Mississippi within its historic bed.

Since the near-disaster of 1973, however, a series of alarms has been raised concerning the future viability of the control system, with a recent focus on sediment buildup in the channel just below Old River, and on the corresponding failure to route any significant quantity of sediment through ORCS to the Atchafalaya.[6]

5. H. Fisk, *Geological Investigation of the Atchafalaya Basin and the Problem of Mississippi River Diversion*. Vicksburg: US Army Corps of Engineers, Mississippi River Commission, 1952.
6. B. Wang and Y. J. Xu, "Decadal-scale Riverbed Deformation and Sand Budget of the Last 500 Kilometers of the Mississippi River: Insights into Natural and River Engineering Effects on a Large Alluvial River," *Journal of Geophysical Research: Earth Surface* vol. 123, no. 5 (2018): pp. 874–890.

These are the basic conditions for an avulsion. Earlier studies included detailed portraits of the regional-scale damages that would likely follow the river's change of course, including the siltation and salinization of the port/petrochemical complex of New Orleans, which is a collapse scenario.[7] Geologists, whose research prompted the ORCS intervention in the first place, continue to maintain the long-term inevitability of a delta-switching event.[8] This inevitability casts the engineering structures in a particular light: they were built to suspend sedimentary time. Located at the narrowest point of the Mississippi watershed, at the divide where the river releases its first and largest distributary, ORCS appears as a modified sedimentary clock, a natural "hourglass" turned upside down by human hands during the Great Acceleration of the 1950s and 1960s.

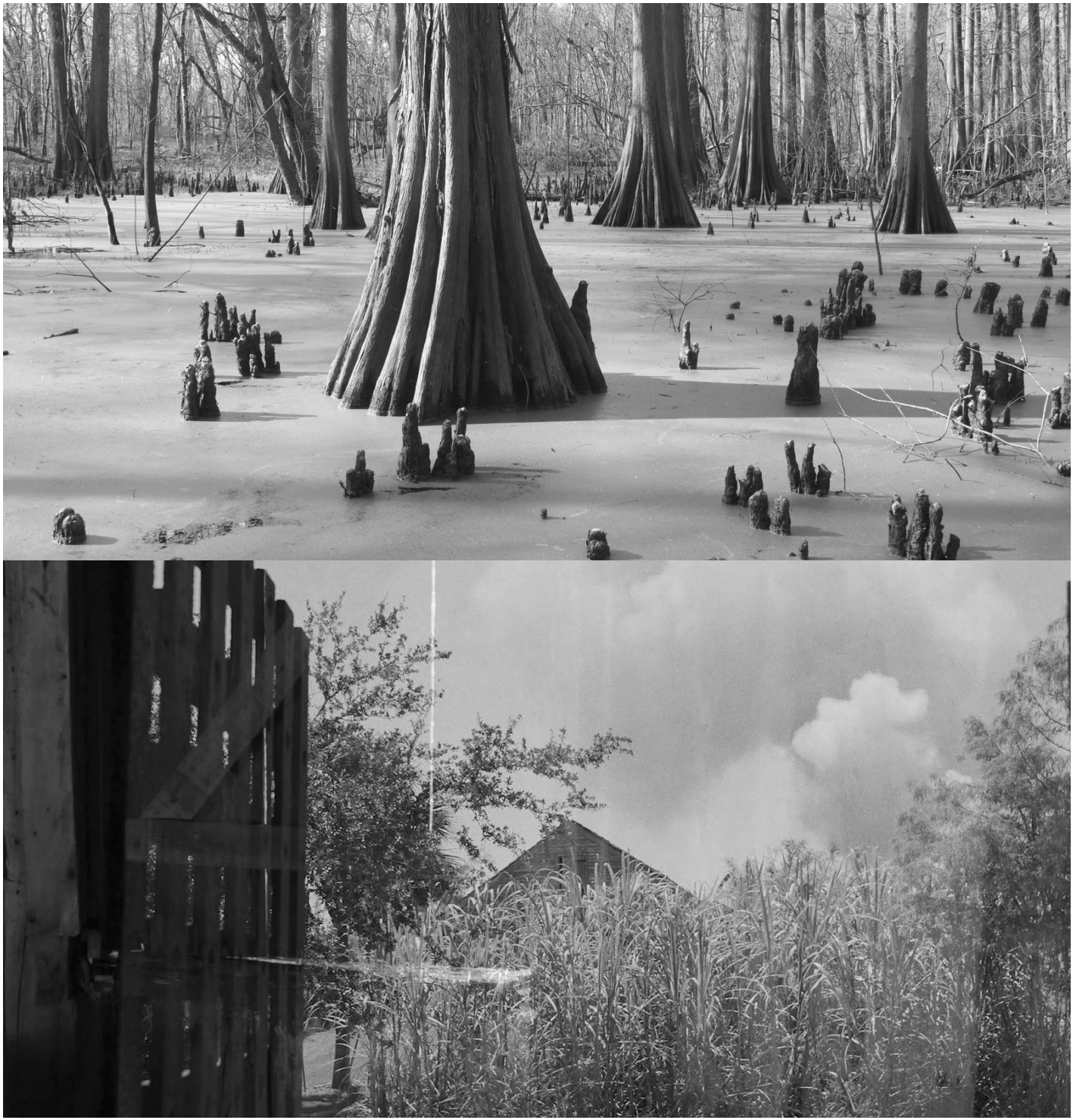
7. R. G. Kazmann and D. B. Johnson, *If the Old River Control Structure Fails?: The Physical and Economic Consequences*. Baton Rouge, LA: Louisiana State University, 1980; J. D. Higby, *Possible Capture of the Mississippi by the Atchafalaya River*. Colorado Water Resources Research Institute, Colorado State University, 1983.
8. S. J. Bentley et al., "The Mississippi River source-to-sink system," 2016; E. L. Chamberlain, T. E. Törnqvist, Z. Shen, et al., "Anatomy of Mississippi Delta growth and its implications for coastal restoration," *Science Advances* vol. 4, no. 4 (2018).

ORCS exemplifies the hydrological version of a far-from-equilibrium condition known to ecologists as "the pathology of command and control in natural resource management."[9] These processes of breakdown occur when single-purpose technocratic interventions into complex non-linear systems set off sharp disturbances in existing patterns, gradually or suddenly exceeding the system's threshold of resiliency. The concept of "ecological regime shift" then designates the point at which formerly stable feedback loops no longer reproduce themselves, clearing the field for others. Such human-induced changes – which can include simple ecological degradation as well as the transition to new, relatively stable but potentially undesirable states – in turn generate crises for decision-makers and, in the really pathological cases, they provoke yet more powerful technological interventions at larger scales. ORCS emerges from exactly this pattern of expansion; yet its builder, the Army Corps, remains confident that further advances in expertise and leaps in scale will resolve future problems. Our project does not predict any outcome, but shifts the gaze downriver, from the designated site of control to the chaotic panorama of the sinking system.

The industrialized area around New Orleans extends north through the petrochemical corridor of Cancer Alley and south to encompass the Bird's Foot Delta, the Port Fourchon oil services complex and the LOOP offshore terminal. Here the pathology of control is expressed in the form of increasingly expansive infrastructure projects, typically designed and financed by state or federal government agencies. Characteristic is the 122 km Mississippi River-Gulf Outlet (MRGO or "Mister Go" in local parlance), dug by the Army Corps from 1956 to 1968 in the context of the grandiose Centroport plan, which sought to bypass the river's final twists and turns by providing a straight shot from the city's Industrial Canal to the Gulf of Mexico. Yet due to the obsolescence of the lock connecting the port complex to the river, the MRGO channel lay almost unused for decades, damaging swamps and marshes with saltwater intrusion and growing ever wider through erosion. Finally this ideal route to the ocean shot the deadly storm surge of Hurricane Katrina directly into the Industrial Canal, unleashing the catastrophe of the Lower Ninth Ward and parts of St. Bernard Parish in 2005.[10] Today the world's largest storm-surge barrier closes the barrel of the abandoned Mister Go, while a gleaming seawall rises around the city.

In an important article, Lewis and Ernstson describe the resentment provoked in populations outside the walls by command and control projects, symbolized historically by the needless dynamiting of a levee in St. Bernard Parish in 1927.[11] That action flooded most of the parish to demonstrate the resolve and maintain the good credit of the New Orleans financial elite, who proved they would do anything to save the city.[12] Such bitter experiences become functioning parts of a social-ecological system, which in this case has been fashioned since inception by relations of colonial expropriation and enslavement.

9. C. S. Holling, "Resilience and Stability of Ecological Systems," *Annual Review of Ecology and Systematics* vol. 4 (1973): pp. 1-23; C. S. Holling and G. K. Meffe, "Command and Control and the Pathology of Natural Resource Management," *Conservation Biology* vol. 10 (1996): pp. 328-337.
10. G. Shaffer et. al., "The MRGO Navigation Project: A Massive Human-Induced Environmental, Economic and Storm Disaster," *Journal of Coastal Research* vol. 54 (2009): pp. 206-224.
11. J. A. Lewis and H. Ernstson, "Contesting the coast: Ecosystems as infrastructure in the Mississippi River Delta," *Progress in Planning* vol. 129 (2019): pp. 1-30.
12. J.M. Barry, *Rising Tide: The Great Mississippi Flood of 1927 and How It Changed America*. Riverside: Simon & Schuster, 2007.



By sinister coincidence, the plantation-turned-penitentiary of Angola sits just across the Mississippi from Old River, intimating profound linkages between the mastery of nature and the domination of human beings. Today, as a vast new set of interventions informed by contemporary ecological science are put into place, the point of this historical reflection is to show how accumulated local resistance to failed megaplans can come to block major experiments in ecological stewardship – or lead to their rearticulation.

The Louisiana Coastal Protection and Restoration Authority's "Coastal Master Plan," financed initially by a $5.787 billion settlement after the BP oil spill, details a variety of structural engineering interventions against land loss and urban flooding, including the building of levees and seawalls and the reinforcement and outright creation of barrier islands. However, the core element of the plan is the installation of "river diversions" to bring sediment-laden freshwater through the levee walls and into the shrinking marshlands. From the ecological point of view, the diversions constitute a highly innovative restoration of the former sediment- and nutrient-bearing flood pulse of the freshwater river, in order to rebuild a land base and revitalize subsisting vegetation.[13]

13. J. W. Day et al., "Large infrequently operated river diversions for Mississippi delta restoration," in *Estuarine, Coastal and Shelf Science*. Basel: Springer International, 2018, p. 183.
14. J. A. Lewis and H. Ernstson, "Contesting the coast," 2019.

Ironically from this perspective, the saltwater intrusion caused by environmentally destructive factors such as sediment starvation and the indiscriminate ripping of tens of thousands of canals through the marshlands has brought a profitable catch of saltwater fish to local fisherman who had not traditionally enjoyed such bounty. Concern over the loss of whatever economically favorable conditions still remain, coupled with longstanding suspicion of hydraulic engineering works, has sparked opposition to freshwater diversions and support for more expensive marsh-creation projects using dredged sediment conveyed by pipeline.[14] Social-ecological systems evolve according to the oscillation between such alternatives.

These dynamics are unfolding as persistent floods and increasingly violent hurricanes continue to strike the Gulf Coast, leaving people outside urban seawalls to contemplate, and begin practicing, very different forms of existence than those permitted by the acceleration of the global modernization process in the 1950s. Every storm seems to herald the coming of another world. To imagine a viable form of society – or even just to perceive the onset of a new geological epoch – one may need to turn away from the architectures of justification that support the present economic and political order. Our aim in this project is to create a kaleidoscopic movement through the multiple facets of a complex interactive system, where what's at stake for human beings "outside the walls" – and in some barely knowable way, for untold other species – is the increasing fragility of the lived environment.

THE ROLE OF INTERPRETATION

A regime shift entails a process of reorganization, whether of an ecosystem considered in isolation, or more pertinently in our time, of a social-ecological system. Reorganization depends on both ecological and social memory. Ecological memory refers to the diversity of organisms, interspecies relations and adaptive strategies present in a given territory, including those that were emergent or residual at the moment when the regime shift began. Social memory refers to the diversity of past experiences that can be accessed by individuals and groups, in relation to the transformations sweeping through the territory. As Berkes, Colding and Folke have written, "Social memory is the arena in which captured experience with change and successful adaptations, embedded in a deeper level

of values, is actualized through community debate and decision-making processes into appropriate strategies for dealing with ongoing change."[15] The operative concept here is *actualization*. How can that be achieved?

Our approach involves the creation of aesthetic artifacts derived from the experience and interpretation of particular social-ecological systems. What we aim for is not the application of a pre-existing interpretative grid, but the convocation of multiple traces and expressions of territorial experience, any one of which may emerge as piercingly significant for a particular individual or group. The critic Roland Barthes identified this piercing significance as the *punctum*, strikingly apparent in photographic images, but knowable only to the person affected, often because of a resonance with particular memories.[16] While scientific research seeks to measure and describe phenomena that are inaccessible to unaided human perception (typically because of issues of scale or complexity), artistic research seeks to lend affective presence to the same largely imperceptible processes, registering the echoes they produce in human sensibility.[17] What we do in this project is to place intrinsically disruptive aesthetic encounters within a carefully articulated scientific frame. When such hybrid artifacts are made available to the public – through exhibitions, online distribution or other modes of presentation – the artwork itself becomes a complex and contradictory experience, able to evoke divergent and conflicting interpretations in contexts where the connection to reality is palpable, but a socially shareable interpretation has not yet been established. In and of themselves, for sure, such experiences offer no guarantee of contributing to appropriate strategies for dealing with ecological change. Yet in a context where the reorganization of social-ecological systems is increasingly blocked by polarizing memes, we think artworks offer a more open and amenable field for debate, dialogue, disagreement and

15. F. Berkes, J. Colding and C. Folke, *Navigating Social-Ecological Systems: Building Resilience for Complexity and Change*. London: Cambridge University Press, 2002.
16. R. Barthes, *Camera lucida: reflections on photography*. New York: Hill and Wang, 1981.
17. N. Barnett and J. Bolen, "and so we may feel echoes," in *[...] Ellipses*, 2020: http://www.ellipses.org.za/project/and-so-we-may-feel-echoes/.

re-evaluation, helping to constitute "Anthropocene public space."[18]

The delta region of Louisiana has already become such a public space writ large, due to the emergence of a major coastal restoration initiative in the wake of an oil disaster. The number of perspectives involved – including Indigenous, Cajun and other populations with close knowledge of the environment – is overwhelming, itself a kaleidoscope. The crucial but still unanswered question is whether large-scale programs of ecological restoration and stewardship can revert processes of ecological regime change, or at least, mitigate some of their consequences, despite the historical disputes that block transformation and perpetuate the suspended temporality of the onrushing Anthropocene. Against this background, our contribution as artists in a scientific frame is to insist on the steering power that collective acts of interpretation – or what have been described as practices of ecological hermeneutics[19] – can exert, for better or worse, within social-ecological systems.

18. Brian Holmes, "Driving the Golden Spike: Aesthetics and Anthropocene Public Space," in *Public Space? Lost and Found*, eds. G. Urbonas, A. Lui, L. Freeman. Cambridge, MA: SA+P Press, 2017.
19. D. Utsler, "Environmental Hermeneutics and Environmental/Eco-Psychology: Explorations in Environmental Identity," in *Interpreting Nature: The Emerging Field of Environmental Hermeneutics*, eds. B. Treanor, M. Drenthen and D. Utsler. New York, NY: Fordham University Press, 2013.

"How does a river tell time? And what kind of clock will it take to mark a new era? This text brings together history and geology to examine the land loss crisis affecting the Mississippi delta. Here, where continental sediments flow into the sea, the colonial drive to master and subdue nature has always been accompanied by the domination of other human beings. As the coastline literally disappears before our eyes, it is long past time to begin studying questions of pathology and healing in social-ecological systems."

– Brian Holmes

https://hourglass.rivertoday.org

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