DESIGN RESEARCH FOR INLAND WATER TERRITORIES

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APPLIED RESEARCH +DESIGN

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Danielle Choi

Unreliable Narrators

During the early 20th century, advanced technologies of civil engineering enforced new material and environmental relationships between Chicago and its hinterland. As the city's wastewater flowed from the Sanitary & Ship Canal into the Illinois River Valley it directly affected riparian vegetation and aquatic fauna. Contemporaneous documentation of these freshwater landscapes, from Chicago to the confluence of the Illinois and Mississippi Rivers, offers a complex narrative of the effects of regional urbanization. The ecologists of the Illinois Natural History Survey were in the early years of systematically documenting the life of the Illinois River into taxonomic records—it was a realm just coming into focus. Jens Jensen, a Chicago-based landscape architect and early conservationist, drew inspiration from what he saw as a disappearing primeval landscape. As early as 1920, Jensen delighted in a "native landscape too rich and grand to permit of its extinction," referring to the astonishing speed of Chicago's growth and the commensurate devastation of greater regional landscapes.[1]

Contemporary landscape architects, adept at synthesizing the material histories of a place, document the marks and depositions of biophysical change in relation to infrastructure, development, design, and planning. These landscape narratives are used to situate design interventions within a sequence of events, patterns, and trajectories. However, this timeline is infrequently positioned within a critical history of cultural, social, and technological ideas—what are the assumptions underlying references and standards, and how are they assigned spatially? The Illinois River Valley can serve as a case study to cross-examine terms used for the practice of historic treatment, such as "preservation," "conservation," and "restoration." These terms, though commonly used, are divergently practiced by designers, historians, and ecologists to describe a specific material response to history. Preservation may be the most inclusive, and thus confusing term, emphasizing stability and intactness. For the National Park Service, preservation might mean prohibiting human access to protect the original material of a structure; for UNESCO, it may concern the systematic documentation and dissemination of a dying language. Conservation, closely allied with rehabilitation, implies a treatment that prolongs extant material integrity and character with interventions made as responses to contemporary conditions of storage and use. In the name of conservation, a historic garden or migratory waterfowl refuge may be subject to repair, spatial or temporal changes to human access, and removal of incompatible elements. Restoration is the most interventionist of the three terms, recalling a specific moment in time or constructing a particular assembly of materials. A garden restoration might replace vegetation

destroyed by a storm, but debates around weathering and vandalism are more fraught. An urban salt marsh "restoration" may be constructed in a place that was previously open water, thus restoring a specific state of species composition and biodiversity, rather than a moment in time.

The discipline of contemporary landscape architecture uses these terms promiscuously as the field finds rich discursive sites for design in past ecological processes, human inhabitation, and acts of design authorship, to name just a few considerations. However, the landscapes inherited by contemporary designers, and the language used to describe their historical trajectories, demand a deeper reading of the embedded political and cultural concerns of their times. Robert Cook, former director of the Arnold Arboretum, writes in his 1996 essay, "Is Landscape Preservation an Oxymoron?":

> In the future, preservation efforts will need to move beyond saving single objects of historical or aesthetic significance to the broader context of urban or rural planning … An expanded preservation mandate must embrace and consult minority populations whose cultural interest in the past may be different than traditional architecture.[2]

Cook's essay convincingly argues for more systems-based thinking across projects of ecological restoration and preservation of designed landscapes. However, over two decades later, public debate is charged by the dangerous yet pervasive notion that there is a consensus around places worthy of historic treatment, and that the question worth debating is *what* to do with them. Here, Cook refers to ethnic minorities, but the same critique of an authentic and universally shared heritage can extend to issues of infrastructure and environmental control.

How can the discourse of historic treatment be used as a framework to ask questions about durability, memory, and value? Landscape historians are well-attuned to the significance of material integrity, as well as exemplars of type and technique, yet there are few frameworks for defining a relational environmental context—with specific material and political thresholds—beyond the local boundaries of a site.[3,4] The role of *interpretation* as an activity of historic treatment can begin to play a more vital role, from one that is descriptive (showing "what happened?") toward something more explicitly disquisitive ("who cared then?" and "who should care now?"). Design histories need not merely reinforce material stability, but they can be a way to use landscapes inherited from the past to ask collective questions about the future.

Drawing upon the theoretical work of self-described "experimental preservationist" Jorge Otero-Pailos, landscapes can be thought of as "not-me creations": they are real things or places, often designed, which become vessels for how we behave as a society, or even a species.[5] Preparing the not-me creation is a two-part process. First, we must acknowledge that landscapes considered historically significant are *created in the present* through the affirmation of communities and the state. The material and cultural stability offered by preservation intentionally represents a specific appraisal of the past. Second, these landscapes, from the modest to the monumental, are unstable; how they are cared for, mended, destroyed, or rebuilt have the potential to become acts of design.[6] As a result of these activities, we may produce a thing or a place that is highly specific—and institutionally as well as disciplinarily unrecognizable. This is distinct from discourses surrounding "cultural landscapes," which rely upon the purification of nature and culture, thus allowing ecological restoration to remain unacknowledged as an "essentially cultural activity."[7,8,9]

Rivers provide rich territory to test these ideas. Just as history does not flow linearly from past to present, a river system is composed of complex biophysical interactions from upstream to downstream, downstream to headwaters, over the banks, and through the air. Different interests will put forth different frameworks for valorizing unreconcilable histories. In the Illinois River Valley, the extant hydrological infrastructure from the early 20th century is still the most impactful and enduring intervention in the life of the watershed. It is accepted as the underlying fact of regional geomorphology and has been entered into local and federal registers of historic

Left: Between 1850 to 1900, as Chicago's population grew from 4,470 to over 1.6 million, low, wet land was cleared and filled for urbanization. Illinois State Archives

Right: The Sanitary & Ship Canal breaches the continental divide, sending Chicago's sewage into the Illinois River and Mississippi River basin. Danielle Choi

preservation as an exemplar of technological and design achievement, thus receiving cultural affirmation of hydrologic control from that era.

The history and historiography of material flows, photographic documentation, and present-day traces in Illinois River Valley landscapes offer different accounts of nature from the early 20th century. In turn, this evidence has been used to support different applications of preservation, conservation, and restoration and their embedded concepts of historical trajectory. A new discourse for the historic treatment of landscapes can be an opportunity for design that is explicit in its underlying political motivations. Interpretation, as a non-neutral activity of historic treatment, can be used to explain how evidence has been mobilized to affirm, resist, or attempt to correct the past.

Industrial Headwaters

In 1900, the opening of the Sanitary & Ship Canal reversed the flow of the Chicago River. The 28-mile long canal separated the source of the city's drinking water (Lake Michigan) from its sewage, breached the subcontinental divide, and established a 336-mile shipping route from the Great Lakes to the Illinois River, then onward to the Mississippi River and the Gulf of Mexico. The untreated wastewater of the entire Chicago metropolitan area followed the same course. These flows included waste from the city's meatpacking industry and the human waste of a population that had increased from 4,500 in 1850 to 1.6 million in 1900. The canal was hailed as a marvel of technology and modern governance, and linked the improved quality of life of Chicagoans to the expansion of global routes of trade and development. Innovations in excavation and hauling equipment—lauded as the "Chicago School of Earth Moving"—would later be deployed in the construction of the Panama Canal, as well as surface mining and railway grading in the American west. Canal boosters argued that the new connection to the Mississippi River, through Illinois's "arid and desert plains," would work in concert with the emerging Panama Canal project to open new global markets and ease a trade deficit with South America.[10]

The opening of the canal had dramatic consequences for the downstream environment. The first descriptions of biological impact came from the narratives of people whose livelihoods depended on the river. Downstate farmers filed a number of claims against the Sanitary District of Chicago, but according to the Sanitary District's records, only 10% of litigated claims were found in favor of the plaintiffs—and losers had to pay all of the court costs.[11] A full-time staff of surveyors, engineers, and photographers were dispatched to the land of every farmer who had filed a claim to prepare detailed condition reports; it was suspected in downstate communities that their purpose was "to sandbag all land owners who start damage suits."[12] The enduring visual record maintained by the Sanitary District presents an official record of quaint and productive rural life, despite vernacular accounts that the effects of Chicago's effluent had ruined thousands of acres of farmland.[13] New technologies of portable photography and visual evidence naturalized power relations of city to hinterland, upstream to downstream.

The Spirit of Truth

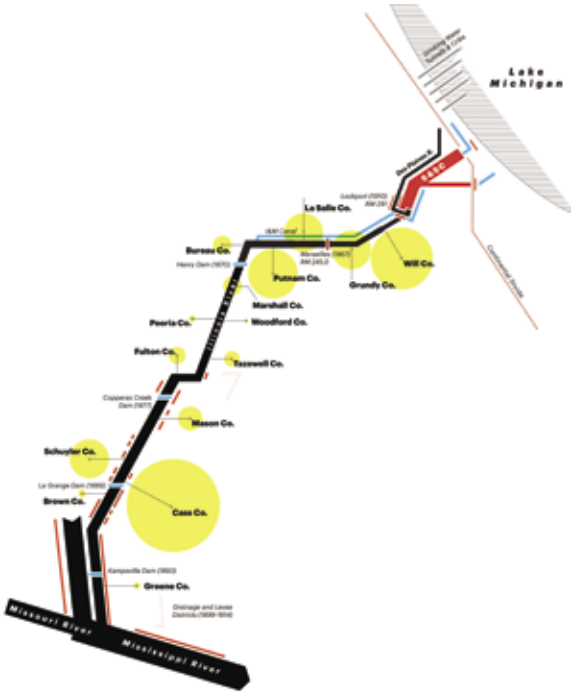
Left: Excavation and hauling techniques developed for the Sanitary and Ship Canal, known as the "Chicago School of Earth Moving" were later used to construct the Panama Canal. Illinois State Archives

Right: Inspectors of the Sanitary District of Chicago used new technologies of portable photography to produce a visual narrative of a quaint and undisturbed pastoral landscape. Illinois State Archives

The political economy of Chicago's urban history is directly tied to the range of its exploitation of the countryside, "two worlds that would remake each other."14 Of these two worlds in mutual flux, landscape theorist Jane Wolff identifies the "tableaus of naturalization" in the design of Chicago's large parks—nature designed and engineered over preexisting, but less-appealing ecologies.[15] Chicago landscape architect Jens Jensen is best known for celebrating the rolling topography and plant assemblies present in the region; in his parks, he transposed and groomed regional ecologies of prairie and slough, woodland and river, island and lake into the civic spaces of the city. In his instrumental work as an early conservationist, Jensen simultaneously called for the protection of landscapes across Illinois, affirming the importance of the references in his allusive urban parks. In the first publication recognizing Jensen and the development of a "prairie style," University of Illinois horticulturalist Wilhelm Miller articulates the primary principles of this body of work: "the 'prairie men' lay most stress [on] conservation, restoration, and repetition … Literal restoration of prairie scenery is impractical in places that are visited by thousands of people daily. But the spirit of truth can be restored to every large city park."[16] These methods for restoring the "spirit of truth" are based in visual and spatial relationships; a close examination of Jensen's built work reveals that they are multivalent in their conceptions of temporal period or ecological state. The idealized prairie scene may replicate a composition of rolling meadows and hawthorn trees, but it is also wholly compatible with the evocation of vanished landscapes, such as Jensen's lush fern and rock gardens for the Garfield Park Conservatory—"to suggest the tropical beauty of prairie-land before the coming of man."[17]

The construction of the Sanitary and Ship Canal offered similar opportunities for the evocation of landscapes from the distant and recent past. Jensen, as superintendent for the Greater West Parks system, imagined the sites of the excavation spoils as backdrops for new urban parks, referring to the *former* Chicago River and the *former* river bed. Explicit in his disinterest of copying European formalism or pastoral American parks of the East Coast, Jensen and the "prairie men" were exploring the design affordances of regional hydrology, soils, flora, and climate at a time when the baseline for all of these was being redefined. The canal infrastructure changed hydrology at a geologic scale, yet it was assimilated by designers as part of the immediate urban context.

In the early 1920s, Jensen assembled a group of prominent Midwestern civic leaders and ecologists to form two of the region's first conservation groups, the Prairie Club and Friends of our Native Landscape (FONL). The latter group issued a 1922 report proposing the first state park system for Illinois, almost entirely set around the state's rivers and featuring scenic geological formations, wooded ravines, and ox-bow lakes. Jensen offered a vision for the state park system that favored riparian landscapes over the prairie scenes that he designed in the city. However, these seemingly romantic affirmations of the past were not based on



Chicago's untreated sewage flowed into the Illinois River Valley; of the number of farmer and landowner claims by county (yellow circles) against the Sanitary District, only a small proportion were settled in favor of claimants. Danielle Choi

aesthetic preference alone but were contingent upon a specific, progressive vision of the future. The inevitability of development for agriculture and urbanization would diminish distinctions among the city, country, and primitive landscape, requiring different concepts of proximity, remoteness, and access. Jensen writes:

> Let us look into the future to the time when every inch of soil that can be cultivated is occupied by human habitation … Then the villages will have grown into towns and the towns into cities, and the agricultural country has almost become a scattered village … Just think what these ribbons of primitive America, these river[side] highways will mean to the future American.[18]

Jensen's closing essay for the report contains more images of country drives than riverside scenes. In this future, rivers can connect city-dwellers to a pre-urbanized America, but are also spatially compatible with a larger trajectory of ceaseless westward expansion. Rivers are sites for the human appreciation of natural abundance, and Jensen and his colleagues regarded the widespread drainages of bottomlands into "wastelands of no benefit to man" as questionable land-use decisions.[19] Jensen's definition of the "preservation of our river courses" is regionally specific. Unlike the vast tracts of western lands that were the subject of debate between strict preservationists and conservationists, the rivers of Illinois were already deeply entangled with multiple economic forces. Their floodplains supported crops and their channels carried these goods upstream. Jensen's vision of preservation, though melancholy, relied upon a vision of the future that was both primitive and populated.

Ecology before Ecosystems

Stephen A. Forbes, the state entomologist of Illinois, was a board member of Jensen's Friends of our Native Landscapes (FONL), though he is not cited as an author in the 1922 state parks report. While Jensen was designing visions of regional nature for city-dwellers, Forbes led foundational studies of the plant and animal life of the Illinois and Mississippi River systems. He is best known today for his 1867 essay, "The Lake as Microcosm," which documented trophic relationships among organisms in the relatively contained environment of a lake. As director of the Illinois Natural History Survey (INHS), Forbes established a biological field station on the Illinois River in the town of Havana in 1894 to study relationships between cycles of river fluctuation and aquatic life, with the dual objective of basic research and economically applicable knowledge to the fish and shellfish industries. Though the term "ecology" had been in use since the mid-twentieth century to describe the interdependence of living things, the work of Forbes and the INHS presaged Arthur Tansley's 1935 term "ecosystem," which described the interrelatedness of energy and matter among biological and non-biological elements in an environment.[20] The work of Forbes's team of researchers would have broad implications for the new discipline of ecology because it documented, in real time, the immense biotic demands of breakneck economic development; the Sanitary & Ship Canal would open in 1900, just six years after the field station opened. As a territory for field research in the western temperate world, the Illinois River was deemed significant for its position on the Eurocentric frontier; most river systems in Europe had been significantly altered by dense human settlement since at least Roman times.[21] Just before the

opening of the canal, the work of the INHS on the Illinois River established a thorough, though likely incomplete baseline for pre-colonial aquatic flora and fauna. Forbes himself makes note of the magnitude and importance of the work of the floating laboratory: "I do not know of a single attempt anywhere in America to develop and disclose the complete biology of a river system except that made by us in Illinois."[22]

The Illinois River Valley was a landscape of human and non-human abundance. In the first two decades of the 20th century, the INHS studies in the Illinois River progressed steadily from discovery, documentation, and quantification to a wider range of environmental inquiries. Articles such as the 1907 "On a New Shovelnose Sturgeon from the Mississippi River" provided detailed descriptions of anatomy, habitat, and feeding habits of previously unclassified species.[23] With a scholarly interest in plankton, Forbes documented organisms that could not be seen with the naked eye and measured their dependence on the physiochemical conditions of river water. However, around 1913, the cumulative effects of the Sanitary & Ship Canal began to be observed in the hinterland reaches of the Illinois River. Changes in dissolved oxygen and water chemistry affected the presence and absence of particular aquatic species (Forbes would go on to develop the concept of biological indicators). The massive amount of water diverted from Lake Michigan caused flooded backwaters, altering distribution of sediment and submersed vegetation.


8 THE PRAIRIE SPIRIT IN LANDSCAPE GARDENING

III—A Free Restoration of Ancient Illinois

A SERIES OF LANDSCAPES UNDER GLASS, SUGGESTING THE BEAUTY OF VANISHED AND DISAPPEARING TYPES OF SCENERY

PARK design is an important part of landscape gardening, and a popular feature in every large park system is a range of greenhouses. The famous Conservatories in Garfield Park, Chicago, have attracted hundreds of thousands of visitors and have been pronounced the "best of the kind in the world." Prior to 1906 the West Side had three small, old-fashioned greenhouses in separate parks. These buildings were visited by few persons and could hardly be said to adorn the scenery. The new landscape gardener proposed to destroy them in favor of one great new structure in which Chicagoans could take real pride. At first the project was resisted, for no locality likes to lose any permanent improvement, but when the plans were explained, the people became enthusiastic.

Instead of the customary potted plants on high benches we are surprised to find these nature-like gardens. The most intelligent visitors are deeply moved by these exquisite scenes and feel that they convey an idea too deep for words. This intuition is correct, for the designer's motive is restoration. His pictures do not pretend to furnish a literal, scientific restoration of any particular geological epoch, such as a museum might have. The idea is poetical—to suggest the tropical beauty of prairie-land before the coming of man. And the reason for this is that we need to see our surroundings from a fresh point of view. We need to realize that modern Illinois contains equally beautiful scenery that we thoughtlessly destroy, but ought to save or restore.

Few communities in Illinois can afford greenhouses large enough for such landscapes under glass, but they all have a great opportunity out-of-doors. Every large park can preserve or re-create one epitome of the scenery and vegetation of Illinois.

Can you not apply the principle of restoration to your own home grounds? These pictures should stimulate your imagination. If you have room for only one bush to symbolize the vanished scenery, may we suggest the prairie rose? See also pages 24, 25.

25. The First Spring in Prairie-Land

This man-made rockwork is so successful that visitors commonly believe that it is a natural spring around which the greenhouse was built.

26. First Cascade in First Prairie River

Perhaps it stepped down then as now, with giant ferns, like the golden polypody arching over the cliffs the falling water.

26a. A Man-Made Cascade in Kentucky

One of the many ways in which the restoration spirit expresses itself out-of-doors. This is forty-two inches high and cost about $40.

27. When Chicago was a Jungle

The first greenhouse contains a long vista like a tunnel lined with palms and ferns. At the end is this fountain, which alternately leaps and dissipates.

28. The First Hint of Stratification, or Repetition of the Prairie Line

Tropical evergreens, like Norfolk Island pines or araucarias, may here sounded the note now echoed by white pines beside Lake Michigan and hemlocks on the prairie. The rocks of this primitive watercourse are horizontally stratified like the St. Peter sandstone of some prairie rivers of today.

Jens Jensen's design for the Garfield Park Conservatory reveals the designer's inventiveness with references from natural history. Wilhelm Miller, The Prairie Spirit in Landscape Gardening, Circular, University of Illinois Urbana-Champaign Agricultural Experiment Station 184 (Urbana, IL: University of Illinois Agricultural Experiment Station, 1915).

The ecological field research of the INHS, once concerned with formalizing scientific knowledge of the frontier, would soon be tied to the city of Chicago by an infrastructural-riparian corridor. The flows of the Illinois River, upstream and downstream, would complicate prior assumptions about the perceived distance and proximity of urban and rural landscapes described in Jensen's state parks report. Forbes writes, "the opening of the Drainage Canal was a revolutionary event in the biological history of the river … These changes are both inevitable and desirable, in view of all the interests involved."[24] However, Robert Richardson, a zoologist and key Forbes collaborator, emerged as a less conciliatory voice within the INHS bulletins. He writes on "the total obliteration" of entire species of mollusks discovered only within the previous decade, and wryly recounts a Peoria musseler who "we thought must have a market for dead shells to justify the otherwise unproductive work that he was doing."[25] Most remarkably, Richardson reassembled the ecological territory of the Illinois River to encompass Chicago's meatpacking industry at its headwaters. The activity of the slaughterhouses ebbed and flowed with the demands of the market and Richardson attempted to describe how their effects on aquatic fauna were tied to both temporal and economic cycles:

> The increase in the Packingtown wastes entering the sanitary canal in the four years 1914–1918 amounted in population equivalent on the basis of the Sanitary District's own figures to more than 523,000 persons, or almost triple the estimated actual increase in human population during the period; or to more than the total 1920 population of the city of Buffalo, New York … During peak weeks of 1916, 1917, and 1918 the weekly rate of killings ran for weeks at a time at more than double the average weekly rate of 1914 … These peaks were in the late fall or early winter, when it is presumed that a large portion of the wastes would settle out to the bottom … ready to

[18]

Near the junction of the north Branch of the Chicago River and the Drainage Canal (former river bed). Spoil banks of the canal are in the background. A few scattered trees are all there are left of the old forest.

[61]

Where Austin Ave. and the Drainage Canal meet. This is the proposed site for a large park. The low lands in the middle ground suggest water. The wall in the background is the spoils of the Drainage Canal.

Jens Jensen's 1910 report, "A Greater West Park System," notes the presence of the Sanitary & Ship Canal. Board of West Chicago Park Commissioners, "A Greater West Park System: After the Plans of Jens Jensen" (Chicago: 1920).

Massive quantities of rock spoils were redistributed for regional construction projects (including sites in the Greater West Park System), but much was left in-situ. Board of West Chicago Park Commissioners, "A Greater West Park System: After the Plans of Jens Jensen" (Chicago: 1920).

be washed out, still to a considerable extent undecomposed, with the first heavy rains of spring. Heavy mortality among the snails was noted at all points all the way from Spring Valley to Havana during and following summer floods in 1917. In August of that year dead snails, acres in extent, were seen floating down the Illinois past Peoria and Havana; and in places were from one to two feet deep.[26]

Richardson's work on the downstream effects of the Sanitary and Ship Canal is significant in this period between "ecology" and "ecosystem" as scientific and philosophical concepts. In earlier accounts of relationships among living organisms and their environment, humans had indeed been considered part of the metabolic narratives of consumption, reproduction, and waste.[27] However, the canal infrastructure presented a significant shift in scale and the role of human intentionality. Richardson used metrics to barely conceal his frustration as conflicts over water quality connected the fate of newly discovered aquatic species of the Illinois River to the spatial distribution of urbanized human populations. The "putrescible" and "thoroughly sick stream" was not merely a result of hungry mouths and full bellies just upriver; rather, the aquatic life of the Illinois River was now tied to the externalities of distant markets, economic development, and profit.[28]

Scales of Preservation

Today, the Sanitary & Ship Canal and Illinois River are managed as a single complex—the Illinois Waterway—by the United States Army Corps of Engineers and the Metropolitan Water Reclamation District of Chicago. In 2004, nine districts around the canal's controlling structures—locks, dams, and channels—were simultaneously placed on the National Register of Historic Places. These structures were attributed to specific architects and engineers and were noted for their individual achievements ("the highest lift lock yet built") and exemplary methods of design, construction, and operation.[29] In 2012, the "Chicago Sanitary and Ship Canal Historic District" was added to the National Register for its critical role in Chicago's growth. The notable achievements of this scale of the project went far beyond the tectonic and stylistic contributions of the individual locks and dams; together the technological achievements of the system had a distinctly modern cast as a complex logistical landscape that expanded prior limitations of size and speed. Rather than design and engineering problems, the real issue facing engineers "has been a constructional problem—a problem of how to dig quickly and cheaply a channel through miles of earth and rock."[30]

Despite the acknowledgement of the vast physical and technological impact of the Sanitary and Ship Canal, the historic status of the *entire district* is affirmed by practices of historic protection

Road in Northern Illinois

The Preservation of Our River Courses and Their Natural Setting

JENS JENSEN

It is well to consider the significance of our heritage of river and stream and prairie, of wooded hills, of bluffs and cliffs and headlands looking down over winding water-courses. Out here on the great plains where a twenty-five foot elevation is called a hill and a three hundred foot ridge is a mountain and such changes in the geography of the country are a rarity, one would naturally think that the appreciation of such diversions from the level prairie as the bluffs and headlands of rivers would be much greater than it actually is. In the real prairie country these picturesque and dramatic expressions are always found in the rivers and glacial lake depressions. Through thousands of years this process of sculpturing out the rock has gradually gone forward. Gorges and canyons, broad valleys flanked by gentle

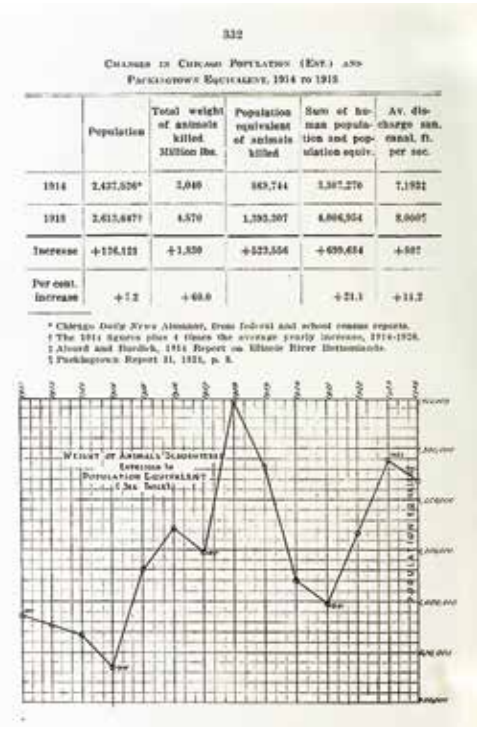
The Friends of Our Native Landscape's 1922 proposed locations for a state park system along rivers; in 2004, the eight dams supporting the Sanitary & Ship Canal were listed on the National Register of Historic Places. Danielle Choi and Melody Stein

Jensen's vision for the "preservation of our river courses" was contingent on human access, and seeks to connect city-dwellers to the hinterland places that they might find the most appealing. Jens Jensen and Friends of Our Native Landscape, *Proposed Park Areas in the State of Illinois: A Report with Recommendations* (Chicago: The Friends of our Native Landscape, 1922).

that are scaled to address a discrete structure or building. The wide-ranging externalities of ecological impact and inventions of regional nature, as contemporaneously documented by the INHS ecologists and Jens Jensen, cannot be adequately captured in a designation whose purpose is to stabilize the accomplishments of an era. In other words, the preservation of hydrological infrastructure requires an exponentially greater reckoning of environmental effects; in turn, public appraisals of historical significance should not shy away from a more critical accounting of the metabolic processes of urbanization. Such counternarratives may not be laudatory nor need they be polemical; even a straightforward "environmental impact statement" of a historically designated project, scaled to the appropriate extent, would only deepen the historical significance of this infrastructural work.

Landscape Forgeries

All along the Illinois River, the canal's historic districts are interwoven with numerous fish and wildlife preserves, areas, and refuges. These open areas (with long histories of hydrological intervention) are diversely managed to control human access and tolerate varying degrees of change. Their definitions of use and status are produced through the application of many different versions of history. Jens Jensen's work offers an aesthetic and emotional accounting of Illinois landscapes at the time of canal construction. Through his designs, Jensen illuminated the landscape's delights to European settlers and city-dwellers *and* proposed what should be protected for future generations (and how). The ecologists of the INHS set out to document a so-called primeval river through its microscopic fauna—and eventually conceived of an ecosystem-based counternarrative to the progressive civic vision of the Sanitary & Ship Canal. The parallel work of the Sanitary District of Chicago, Jensen, and the ecologists of the INHS offer different narratives of a landscape during a particular period of time. All are grounded in the physical conditions of climate, geology, and hydrology, yet they present different "cultures of nature" based on varying lenses of aesthetic sensibility, institutional subjectivity, and disciplinary affiliation.[31]



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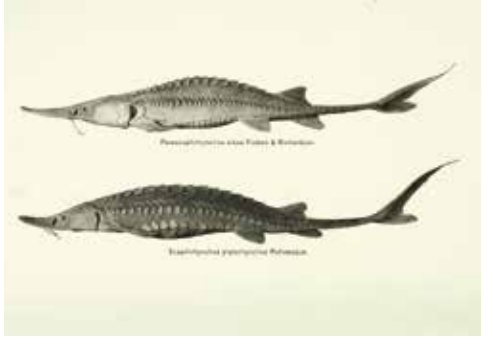
CHANGES IN CHICAGO POPULATION (EST.) AND PACKINGTOWN EQUIVALENT, 1914 TO 1918

	Population	Total weight of animals killed Million lbs.	Population equivalent of animals killed	Sum of human population and population equiv.	Av. discharge san. canal, ft. per sec.
1914	2,437,526*	2,040	869,744	3,307,270	7,1921
1918	2,615,6471	4,570	1,393,307	4,008,954	8,0695
Increase	+178,121	+2,530	+523,554	+699,684	+887
Per cent. increase	+7.2	+60.0		+21.1	+11.2

* Chicago Daily News Almanac, from federal and school census reports.
† The 1914 figures plus 4 times the average yearly increase, 1914-1918.
‡ Alvord and Burdick, 1914 Report on Illinois River Improvements.
§ Packingtown Report II, 1921, p. 8.



Left: INHS biologists observed dramatic changes to aquatic life, including the "almost complete extinction of an abundant and varied mussel fauna" downstream from Chicago's meatpacking industry. Stephen Alfred Forbes and R. E. Richardson, "Some Recent Changes in Illinois River Biology," *Bulletin of the Illinois Natural History* Survey XIII (1919).

Top Right: The Illinois River supported one of the most diverse shellfisheries in North America; river mussels were commonly used for buttons. Danielle Choi, specimens at University of Illinois Biological Field Station - Havana.

Bottom right: The Illinois Natural History Survey catalogued organisms present in the Illinois River – often entering them into the taxonomic record for the first time. R. E. Richardson and Stephen Alfred Forbes, "On a New Shovelnose Sturgeon from the Missis-sippi River," *Bulletin of the Illinois Natural History* Survey VII (1905): 37–44.

In the field of restoration ecology, a present-day "crisis of baselines" has created a provocative debate concerning the interpretation of history; concepts of traditional reference landscapes have been challenged by calls for entirely novel ecosystems or, conversely, re-wilding to evoke deeper pasts.[32] Within such a framework of debate, material histories are not accepted as neutral in their implications for human and non-human life. For aging 20th-century infrastructure, the practices and discourses of historic treatment lack such critical dialogue, and it is not for want of available information on the effects of projects such as the Sanitary & Ship Canal. Because many of these structures are the size of large buildings, their restoration and conservation are treated as such. The cultural stability afforded by this status naturalizes hydrologic control as a part of civilization's progress. This treatment belies the vast territories produced by the physical effects of hydrologic infrastructure, thwarting a more expansive relay of history that is highly contingent on scale.

To experiment with these discourses, landscape designers and researchers should disavow language inherited from historic treatment of durable media (e.g., architecture, sculpture, and painting). Similarly, ecological restoration to historic states should not be over-promised, particularly to the public; it is unlikely that the Chicago and Illinois Rivers will be restored to their original flows.[33] A new and lively discourse about the past will amplify multiple voices, human and non-human, whose accounts are often absent from the historical record. It will encourage discontinuous sites for commemoration—linking the effects of infrastructure to distant sources can give accountability of scale to the historic treatment of landscapes. And within the discipline of landscape architecture, present-day designers should be trusted to intervene, even significantly, on the ecological work of past designers. The evocation of Jensen's "spirit of truth" holds promise in the dialogue from one generation of designers to another, working under dramatically different political and social circumstances. The earnest creation of forgeries, simulations, and counterfeits—terms that center the original artifact, but do not unilaterally valorize it—can be creative correctives to incomplete landscape histories.

The present-day Illinois Waterway is flanked by contradictory adjacencies of nature preserves, active industry, historic hydrologic infrastructure, and ruderal landscapes. Danielle Choi

Notes

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2 Robert E. Cook. "Is Landscape Preservation an Oxymoron?" in *The George Wright Forum* 13, no. 1 (January 1, 1996): 50.
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