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"Make No Little Plans":

Field Trip Guidebook for the American Shore & Beach Preservation Association 2008 National Conference

Chicago
October 15–17, 2008

Michael J. Chrzastowski

Celebrating the 100-year anniversary
of the 1909 publication of
Plan of Chicago

Guidebook 36 2008



Institute for Natural Resource Sustainability
ILLINOIS STATE GEOLOGICAL SURVEY

THE BURNHAM PLAN CENTENNIAL



“Make no little plans; they have no magic to stir men’s blood and probably themselves will not be realized. Make big plans; aim high in hope and work, remembering that a noble, logical diagram once recorded will never die, but long after we are gone will be a living thing, asserting itself with evergrowing insistency. Remember that our sons and daughters are going to do things that would stagger us. Let your watchword be order and your beacon beauty.”

—Daniel Hudson Burnham (1846–1912)

Architect for the 1893 World’s Columbian Exposition held at Chicago
and lead author of the 1909 *Plan of Chicago*.

Dedication

To the memory of Casimir E. “Casey” Chrzastowski (1926–2008)
who in his youth was a volunteer “coffee boy” assisting
the workers who built Chicago’s North Avenue Beach

Cover: From *Plan of Chicago 1909*, Plate XLIV, covering the lakeshore area from Wilmette Harbor south to Calumet Harbor. All of the green areas indicate proposed parkland.

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ILLINOIS

UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

Institute for Natural Resource Sustainability

ILLINOIS STATE GEOLOGICAL SURVEY

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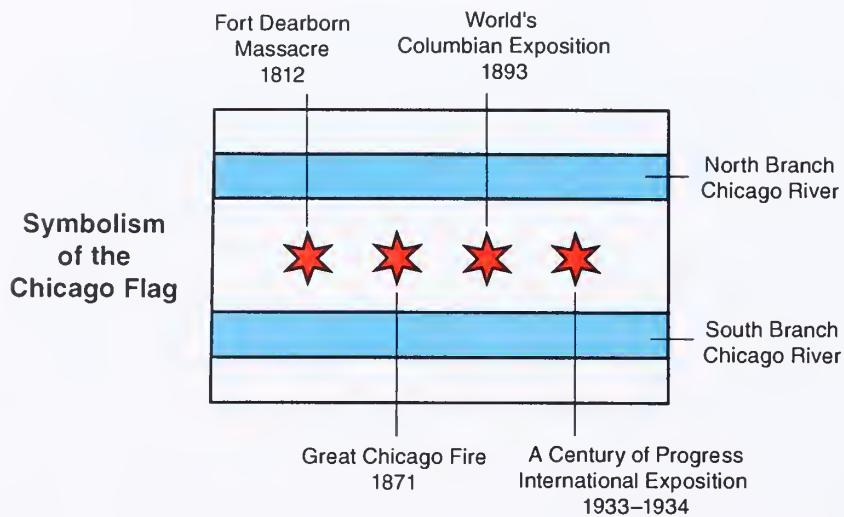
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Chicago Seal



The Seal of Chicago includes commemoration of the city's maritime history.



Origin of the City Name—*CHECAGOU*

Checagou is a Native American word of uncertain etymology. The word likely meant *wild onion* (leek), but possibly *skunk*, or even *strong* or *great*. The word is generally assumed to be a reference to the wild onion that grew near the mouth of the Chicago River across the extensive marsh area that is now the Chicago Loop.

Chicago Motto: *Urbs in Horto* (City in a Garden)



OFFICE OF THE MAYOR

CITY OF CHICAGO

October 15, 2008

RICHARD M. DALEY
MAYOR

GREETINGS

As Mayor and on behalf of the City of Chicago, I am pleased to welcome the members of the American Shore & Beach Preservation Association (ASBPA) to our city for their 2008 annual conference.

This year's conference offers a forum for discussing strategies to maintain sustainable shorelines. Chicago has a long history of preserving the lakefront and the Chicago River and this commitment has made our city more welcoming and livable. I hope you enjoy learning more about our sustainability projects on your guided tour of the Chicago lakefront, hosted by the Illinois State Geological Survey.

While here in Chicago, I invite you to take time to discover what makes our city a great place to live, work and visit. I know you will like what you find. From our great architecture and beautiful Lake Michigan shoreline, to our world-renowned cultural institutions and inviting neighborhoods, Chicago has something for everyone.

Best wishes for an enjoyable and memorable visit.

Sincerely,

A handwritten signature in black ink, appearing to read "Richard M. Daley".

Mayor

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Route Map



Base maps: U.S. Geological Survey 1997a, 1998

Figure 1 Field trip route.

Introduction

Celebrating a Vision

Chicago's lakefront is an achievement in coastal geo-engineering, landscape design, and urban aesthetics. This world-class urban shoreline is unique, diverse, and, most notably, entirely man-made. The story of shaping and modifying the Chicago lakeshore spans nearly 200 years, beginning with efforts by soldiers at Fort Dearborn in the 1820s to improve the connection between the Chicago River and Lake Michigan. Subsequent work

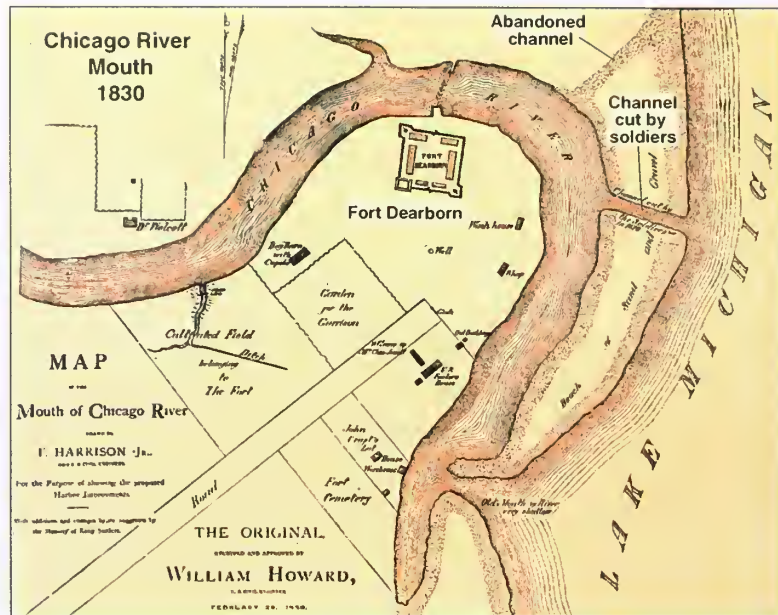
by the U.S. Army Engineers beginning in 1833 straightened and deepened the mouth of the Chicago River, allowing it to serve as the harbor during the city's early history (Andreas 1884, Larson 1979).

Numerous benchmark events occurred during the history of building the Chicago lakeshore. One of the most significant was the 1909 publication of the *Plan of Chicago*. This acclaimed urban planning document addressed a suite of regional planning issues for the growth of Chicago, including transportation, commerce, and recreation. However, the *Plan* is most noted for the vision it presented for the Chicago lakefront. This vision is a legacy that influences Chicago's lakefront planning and design to this day.

The year 2009 marks the centennial anniversary of the publication of *Plan of Chicago*, which will be commemorated by a variety of events in the city. On October 15–17, 2008, the American Shore & Beach Preservation Association (ASBPA) held its annual national conference in Chicago. This gathering of coastal engineers, geologists, planners, and managers was sanctioned by the Burnham Plan Centennial Committee as one of the preview events for the 2009 Centennial. This guidebook was prepared for the lakeshore field trip that was part of the ASBPA conference.

Guidebook Design

This field trip guidebook is designed for use aboard a motor coach. The emphasis on graphics provides a visual reference to accompany the on-bus narrative presented by the field trip leader. Numbered features correspond to sites that are seen and discussed en route as the motor coach progresses along the lakefront. Numbered stops correspond to selected locations where field trip participants will stop for additional discussion and illustrations relating to those sites.



Source: Andreas 1884

Figure 2 The historical Chicago River had a shallow-water mouth.

Sponsorship

This guidebook and the ASBPA field trip were sponsored by Great Lakes Dredge & Dock Company, Oak Brook, Illinois. Great Lakes Dredge & Dock played a major role in construction along the Chicago lakefront during the late 1890s and early twentieth century (Dickenson 1990). Many of the historical photographs of the lakefront construction included in this guidebook were provided courtesy of Great Lakes Dredge & Dock.



Figure 3 October 1931: Workers driving steel sheetpile along the shoreline near Foster Avenue.



Courtesy of Great Lakes Dredge & Dock Company



Courtesy of Great Lakes Dredge & Dock Company

Figure 4 June 1940: Steel sheetpile is being driven offshore for the partially submerged bulkhead at North Avenue Beach.

Figure 5 1929: View south across the recently completed Northerly Island (left) and the shoreline along Burnham Park. The Shedd Aquarium, Field Museum, and Soldier Field appear in the foreground.



Courtesy of Great Lakes Dredge & Dock Company

Background

Overview of *Plan of Chicago*

Plan of Chicago is a 164-page planning document for the twentieth century development of Chicago. The book presented a vision for Chicago and the Chicago region that would make the city a better urban environment to live, work, and play (Smith 2006). The text is accompanied by stunning full-color illustrations that are a visual treat, and portions of some of those illustrations are included in this guidebook. The co-authors, Daniel H. Burnham and Edward H. Bennett, completed this work for the Commercial Club of Chicago in 1909. The book's development, however, occurred over nearly two decades, following Daniel Burnham's leadership role in the 1893 World's Columbian Exposition, which was held at what is now Jackson Park on Chicago's south lakeshore. In recognition of the significance of this career achievement of the senior author, the *Plan* is commonly referred to as "The Burnham Plan."

The *Plan* and the Present Chicago Lakefront

A common belief is that much of today's Chicago lakefront is the result of the Burnham Plan. In reality, similarities are limited. Northerly Island and Burnham Park are the best reflections of *Plan of Chicago*, and yet even they have shoreline designs different from what was proposed. Other areas of similarity (Belmont Harbor, Lincoln Park's South Lagoon, Grant Park, and Jackson Park) were already planned or in existence when the *Plan* was prepared. Credit for much of today's Chicago lakefront properly goes to the designers, architects, and engineers of the Chicago Park District and, prior to the 1934 consolidation, to the precursor South Park and Lincoln (North) Park Commissioners. However, *Plan of Chicago* influenced all subsequent lakefront park development with its unprecedented proposal of a regional, contiguous lakefront park system in public ownership. Most important, the *Plan* proposed using lakefill to make new land and a new shoreline that included promontories, bays, islands, and lagoons.

Daniel Hudson Burnham (1846–1912)

Burnham was born in Henderson, New York, and moved to Chicago as a child. He trained under architect William LeBaron Jenney (1832–1907) and became a colleague of landscape architect Frederick Law Olmstead (1822–1903) who designed both New York's Central Park and Chicago's Jackson Park. The architectural firm of Burnham and Root and later D.H. Burnham and Co. Architects became well-known for Chicago skyscrapers. Burnham worked on urban planning for cities within the U.S. as well as overseas (e.g., Manila), and he was an advocate for the L'Éfant plan for the Mall in Washington, D.C. Daniel Burnham was chief architect for the 1893 World's Columbian Exposition in Chicago (Moore 1921).

Edward H. Bennett (1874–1954)

Born in Wiltshire, England, and professionally trained in Paris, Bennett came to Chicago to work under Daniel Burnham. In 1904, he worked with Burnham on urban planning for San Francisco, and, in 1909, he co-authored the *Plan of Chicago*. Bennett spent the rest of his career working in Chicago. He was involved in planning and building designs for the 1933–1934 Century of Progress Exposition, the second World's Fair held along the Chicago lakeshore. Two Chicago landmarks that Bennett designed are Buckingham Fountain in Grant Park and the Michigan Avenue Bridge spanning the Chicago River (Draper 1982).



Figure 6 Comparison of the Plan of Chicago design for the Chicago, Evanston, and Wilmette lakeshore and this lakeshore today. Of all the islands proposed in the Plan, only Northerly Island (5) was built.

Geologic Framework

Coastal geology and coastal processes played major roles in how the Chicago lakeshore was developed and why it was engineered the way it was. The lakeshore planning presented by Burnham and Bennett was indirectly a response to erosion and sand accretion, which had been an issue since the earliest settlement at Chicago.

The natural setting at Chicago was a smooth shoreline of broad beach backed by low dunes no more than about 10 to 15 feet high. The present landscape in the South Unit of Illinois Beach State Park is an analog for the natural landscape at Chicago.

The Chicago lakeshore historically had a robust net southerly transport of littoral sand, possibly about 100,000 cubic yards per year (Chrzastowski 1990). The natural state, southward deflection of the Chicago River mouth was a direct response to this transport. After jetties were constructed to straighten the river mouth during the 1830s, the process of littoral sand starvation began along the shore south of the river. Sand starvation and shore erosion became serious problems. Shoreline stabilization contributed to the eventual development of Grant Park and Burnham Park.

Historical erosion was only the most recent phase of an erosional trend along the central Chicago lakeshore. During a time of higher lake level, about 3,500 years ago, a 17-mile-long spit (Graceland Spit) extended along the central Chicago lakeshore (Chrzastowski and Thompson 1994). Erosion during the past 2,000 years has removed a major part of the former spit. This erosion was important in determining the location of the Chicago River mouth and, thus, Chicago. Although *Plan of Chicago* proposed lakefilling to make new land, geologic evidence shows that, where filling occurred to form Grant Park, Northerly Island, and Burnham Park, there had been land in the recent geologic past.

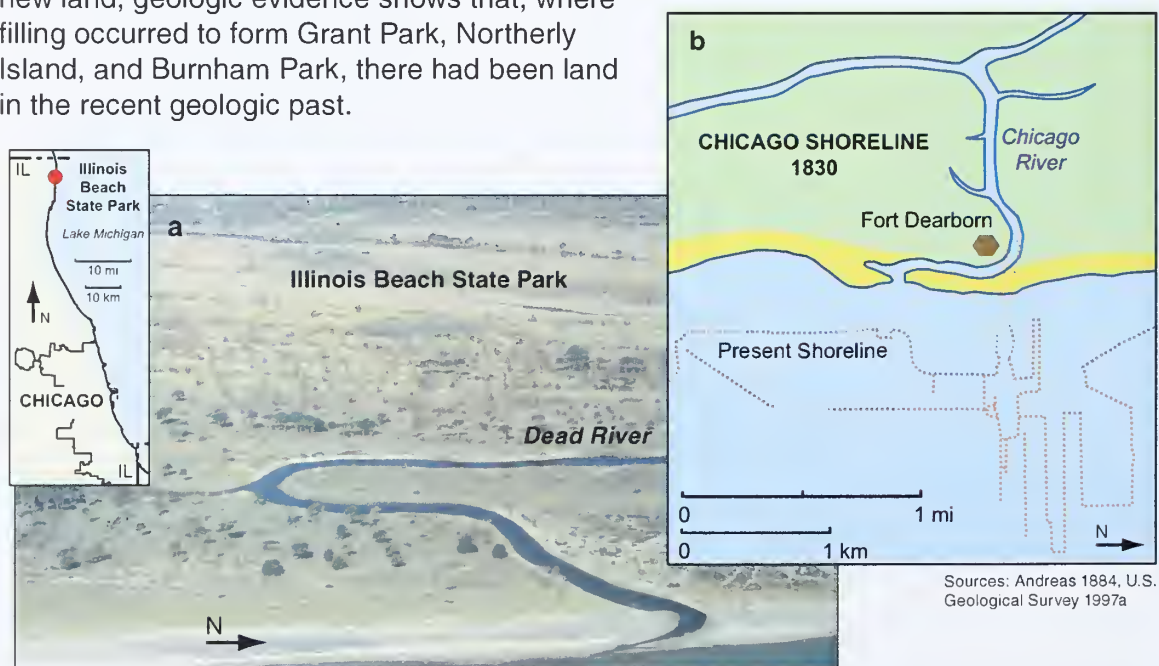
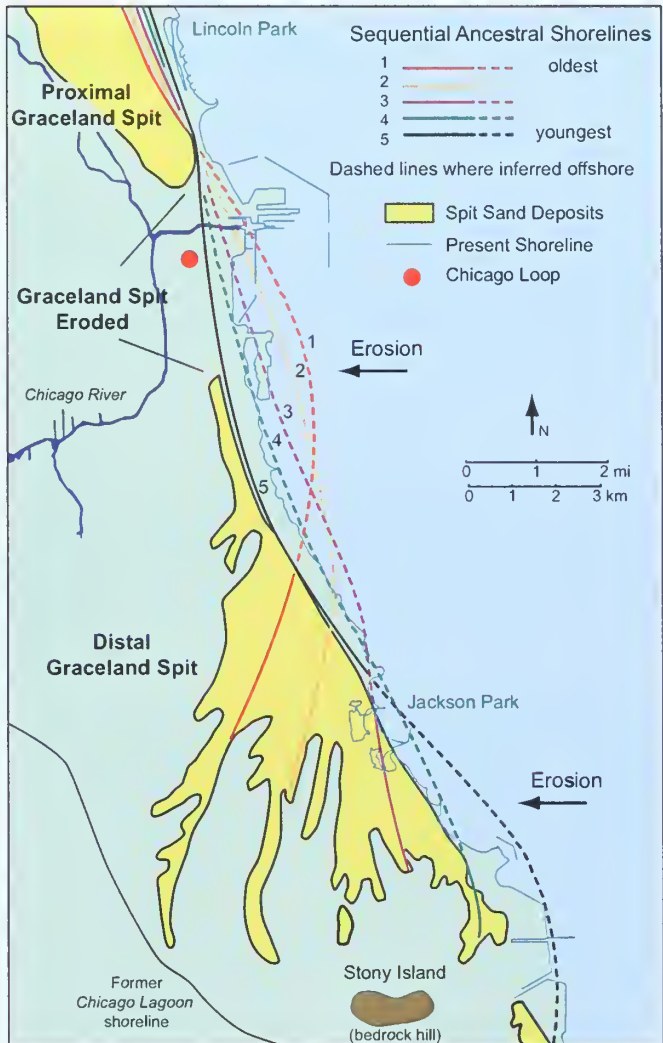


Figure 7 The Lake Michigan shore near the mouth of Dead River at Illinois Beach State Park (a) mimics the natural setting of Chicago. Note the southward deflection of the river mouth is similar to the historical Chicago River (b).

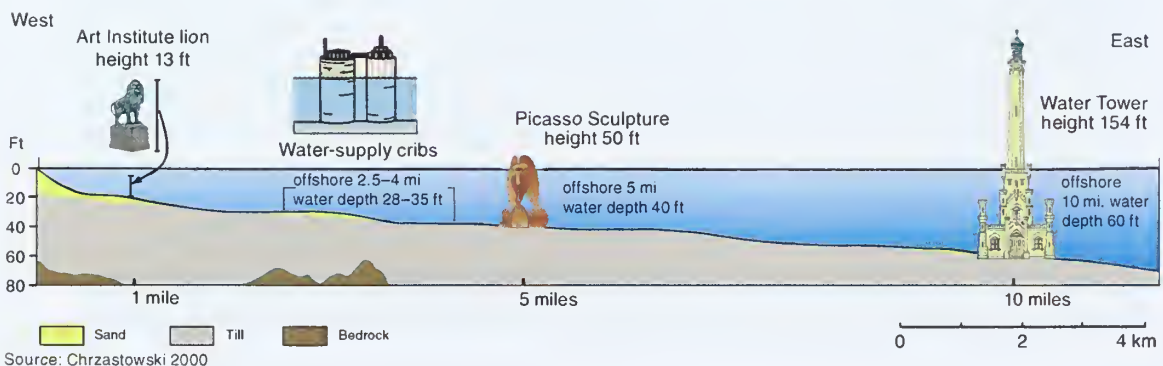


Source: Chrastowski and Thompson 1994

Figure 8 Substantial erosion occurred along the central Chicago lakeshore during the past 2,000 years. Graceland Spit formed when lake levels were higher and much of the present central Chicago area was submerged. Erosion has segmented the remains of Graceland Spit to the north and south of the Chicago Loop.



Source: Chrastowski and Thompson 1994



Source: Chrastowski 2000

Figure 9 Two characteristics of the lake bottom off Chicago are favorable for constructing new land. First, the gradual slope reduces the volume of fill needed to create land. Second, the thick sequence of glacial till provides a firm foundation for holding timbers or steel sheetpile driven into it.

Stop 1 Jackson Park and the 1893 World's Fair

Burnham and Bennett describe in *Plan of Chicago* how the planning and design for the 1893 World's Fair Columbian Exposition provided a foundation for the *Plan*. Lagoons, islands, shoreline configurations, waterway vistas, and shoreline aesthetics were all important in the design for the Exposition grounds, and these similarly became important design elements in the proposed lakefront.

A HISTORIC EVENT In 1893, nearly one in every five people in the United States made the journey to Chicago to attend the World's Columbian Exposition. A total of 27.5 million people visited during the Exposition's 179 days for an average of 150,000 visitors per day (Reardon 2008).

The awe-inspiring grandeur of the Columbian Exposition is preserved in historical photographs of the Exposition (Appelbaum 1980). Many of the buildings were monumental, including the Manufacturers and Liberal Arts Building, which at that time was the largest building on the planet. Visitors had the choice of coming to the fair by rail or by the unique, whaleback-hull, passenger ship, the M.V. *Christopher Columbus*. This distinctly Great Lakes vessel cruised between downtown Chicago and The Pier (Casino Pier) located near the entrance to what is now Jackson Park Outer Harbor.

Although the groin at 63rd Street Beach is commonly called "Casino Pier" (Feature 1), this modern structure has little in common with its namesake. The original Casino Pier (officially named "The Pier") was a massive timber-pile pier 250 feet wide and nearly 1,600 feet long (Chrzastowski 2004). It was commonly called "Casino Pier" because of its association with the The Casino, a building at its landward end. A movable walkway on the pier—foreshadowing modern movable walkways—aided visitors in traversing the pier length to and from where the M.V. *Christopher Columbus* docked.



Source: Frances Benjamin Johnston Collection at the Library of Congress, Prints & Photographs Division

Figure 10 This photograph of the 1893 Columbian Exposition looks northward along the South Canal. The foreground is now part of Jackson Park Inner Harbor (Feature 1). The Electricity Building is in the upper left. The dome of the Illinois Building can be seen in the far distance.



Stop 1

Figure 11 Postcard showing the 362-foot whaleback steamer M.V. Christopher Columbus in the Chicago River in 1905. This ship was the most important of several excursion vessels that brought visitors to the World's Columbian Exposition.



Source: Baillo 2008



Source: M. Chrzastowski, Illinois State Geological Survey, May 2008

Figure 12 Now the home of the Museum of Science and Industry, the World's Columbian Exposition Palace of Fine Arts housed art objects from around the world.

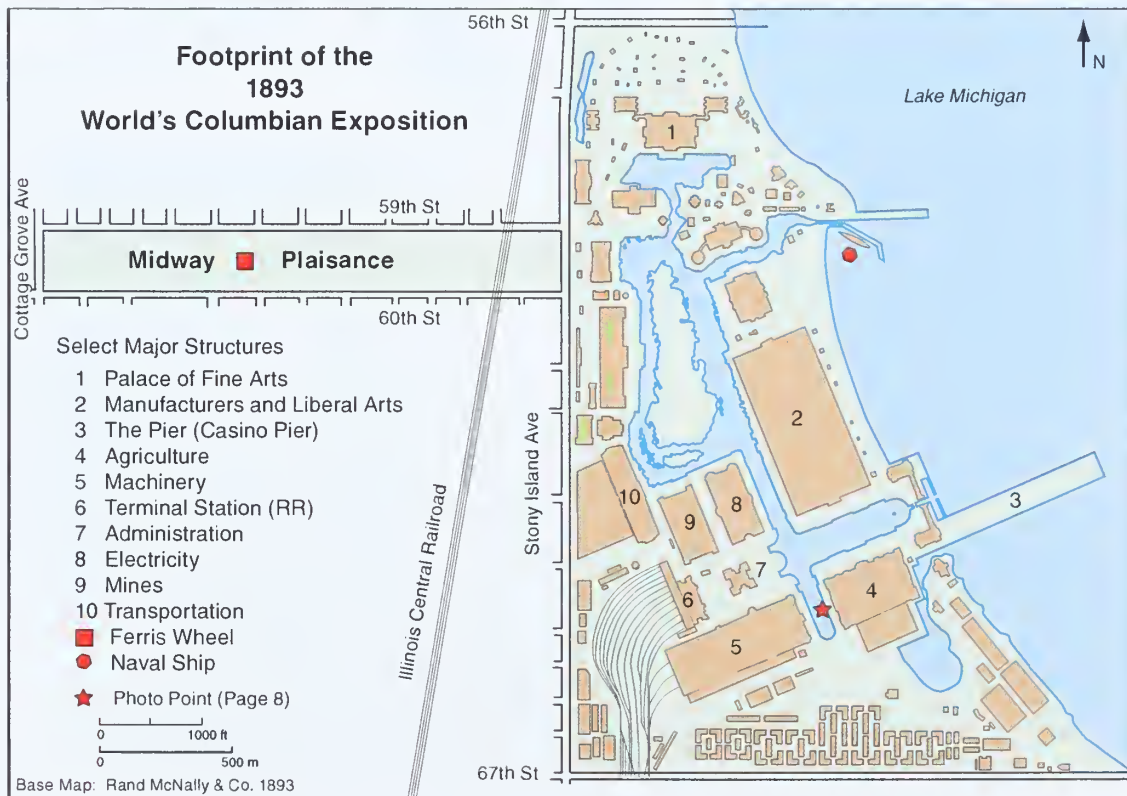


Figure 13 The site of the World's Columbian Exposition, including the amusement area of the Midway Plaisance, covered approximately 600 acres.

1 Jackson Park Harbors and Lagoons

During the late 1860s, local real estate leaders and the South Park Commissioners contracted with the nationally known landscape architects Frederick Law Olmstead (1822–1903) and Calvert Vaux (1824–1895) to design a park for the site. Both architects were well-known for the design of Central Park in New York City.

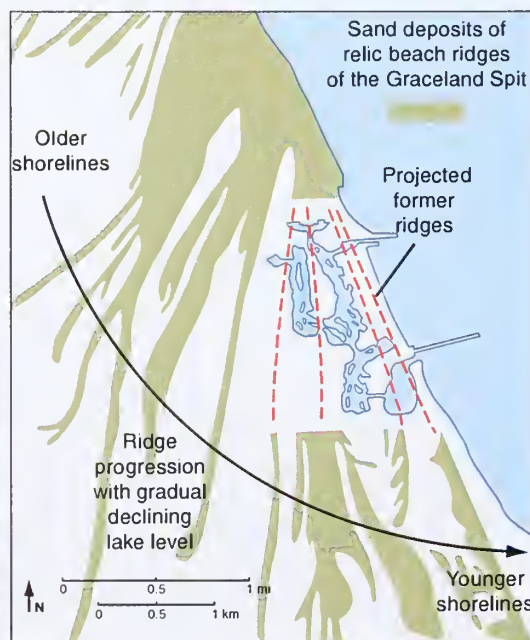
Local geology played a major role in the original designs for Jackson Park (Olmstead and Vaux 1871). This area had a natural washboard topography of sand ridges and swales of distal Graceland Spit that was formed along ancient shorelines of Lake Michigan (page 7). The swales provided low ground that could be dug out to form lagoons; material excavated from the lagoons could be used to enhance high ground marginal to the lagoons. All of the water areas of the park are a result of excavation.

When Jackson Park was chosen as the site for the 1893 Columbian Exposition, the design of the Exposition grounds was influenced by the lagoon and upland topography that had already been constructed. This explains the importance of water features at the Exposition where lagoons were a major element. At the conclusion of the Exposition, work resumed on park development.

Jackson Park Inner and Outer Harbors and the 59th Street Harbor are unique among the small-boat harbors along the Chicago lakefront. These are the only harbor basins that were excavated into the mainland shore. Other small-boat harbors were created during filling into the lake either by leaving voids in the fill area (Montrose and Belmont Harbors: Feature 10), by enclosing a basin by building offshore land (Diversey and Burnham Harbors: Feature 10, Stop 4), or by constructing breakwaters (Monroe Harbor: Feature 7, Stop 3).

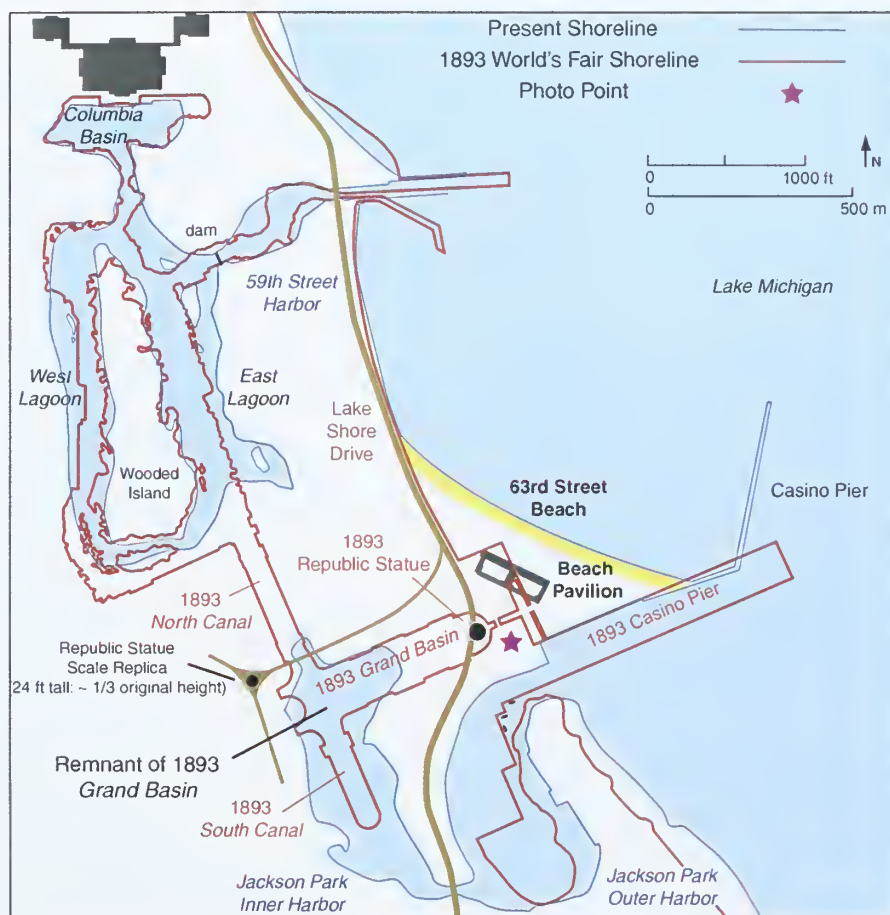


Source: Alden 1902



Source: M. Chrzastowski, Illinois State Geological Survey, 2008

Figure 14 A 1902 geologic map of the Jackson Park area (left) and a highlight of the sand deposits (right) show the sand beach ridges that were shorelines of Lake Michigan at higher lake levels during the past 3,000 years. The ridges and swales influenced the north-south design of the park's lagoons and islands.



Sources: NOAA 2006, Rand McNally & Co. 1893

Figure 15 Comparison of Jackson Park shorelines for the 1893 World's Columbian Exhibition and today. The greatest shoreline change has resulted from excavation of Jackson Park Inner and Outer Harbors. The north end of the Inner Harbor is a remnant of the Grand Basin.



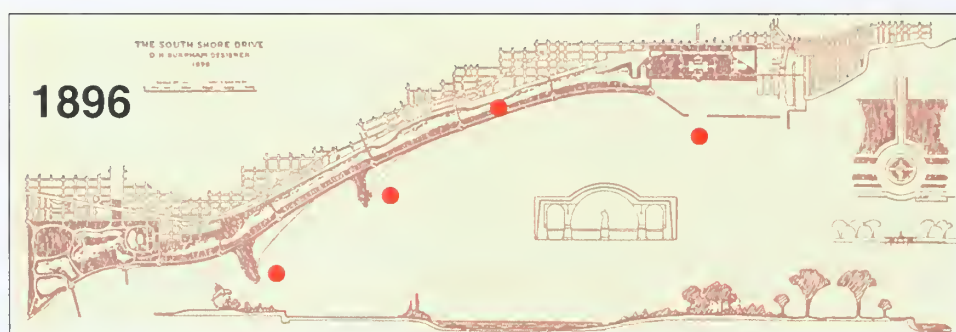
Source: Frances Benjamin Johnston Collection at the Library of Congress, Prints and Photographs Division

Figure 16 This 1893 view is westward across the Grand Basin. The 65-foot tall Statue of the Republic is on the right. The Administration Building and the Court of Honor are in the distance.

2 The South Lakeshore in the Late 1890s

From the mid to late 1800s, the lakeshore south of the Chicago central business district was dominated by the right-of-way of the Illinois Central Railroad. The tracks were a short distance from the shoreline. Over time, shore erosion posed a serious threat. By the late 1800s, for shore protection, the railroad had built numerous groins—the most extensive groin field ever built along the Chicago shoreline. The groins were not very successful, as the lack of littoral sand prevented sand entrapment. Lakeshore modifications near the Chicago River mouth were forming an ever greater barrier to littoral transport.

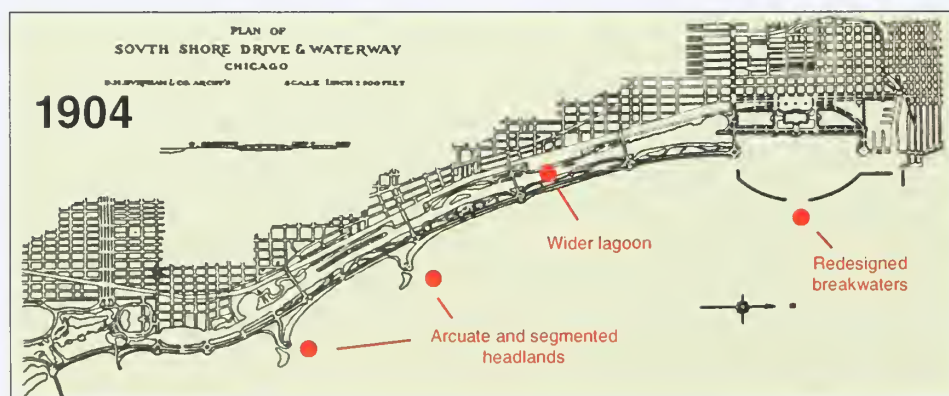
The railroad had an interest in shore protection, and city leaders had even greater interests. Following the 1893 Columbian Exposition, they desired to build parkland along the south lakeshore to provide a parkway link between Grant Park and Jackson Park. The South Park Commissioners contracted with Daniel Burnham for such a park design. His 1896 design proposed parkland and a roadway on an elongate island that was separated from the mainland by a lagoon.



Source: *Plan of Chicago 1909*, Plate VI

Figure 17 Design for South Shore Drive, 1896. Dots are for comparison with Figure 18.

D.H. Burnham and Co., Architects, completed a revised plan in 1904. Most of the original elements were present; however, the shoreline, groins, and breakwaters took on a more curvilinear design. Notably, the lagoon took on greater significance, as indicated by the design titles. The first design in 1896 is titled, *The South Shore Drive*; the revised drawing in 1904 is titled *Plan of South Shore Drive and Waterway*.



Source: *Plan of Chicago 1909*, Plate VII

Figure 18 Design for South Shore Drive, 1904. Dots are for comparison with Figure 17.

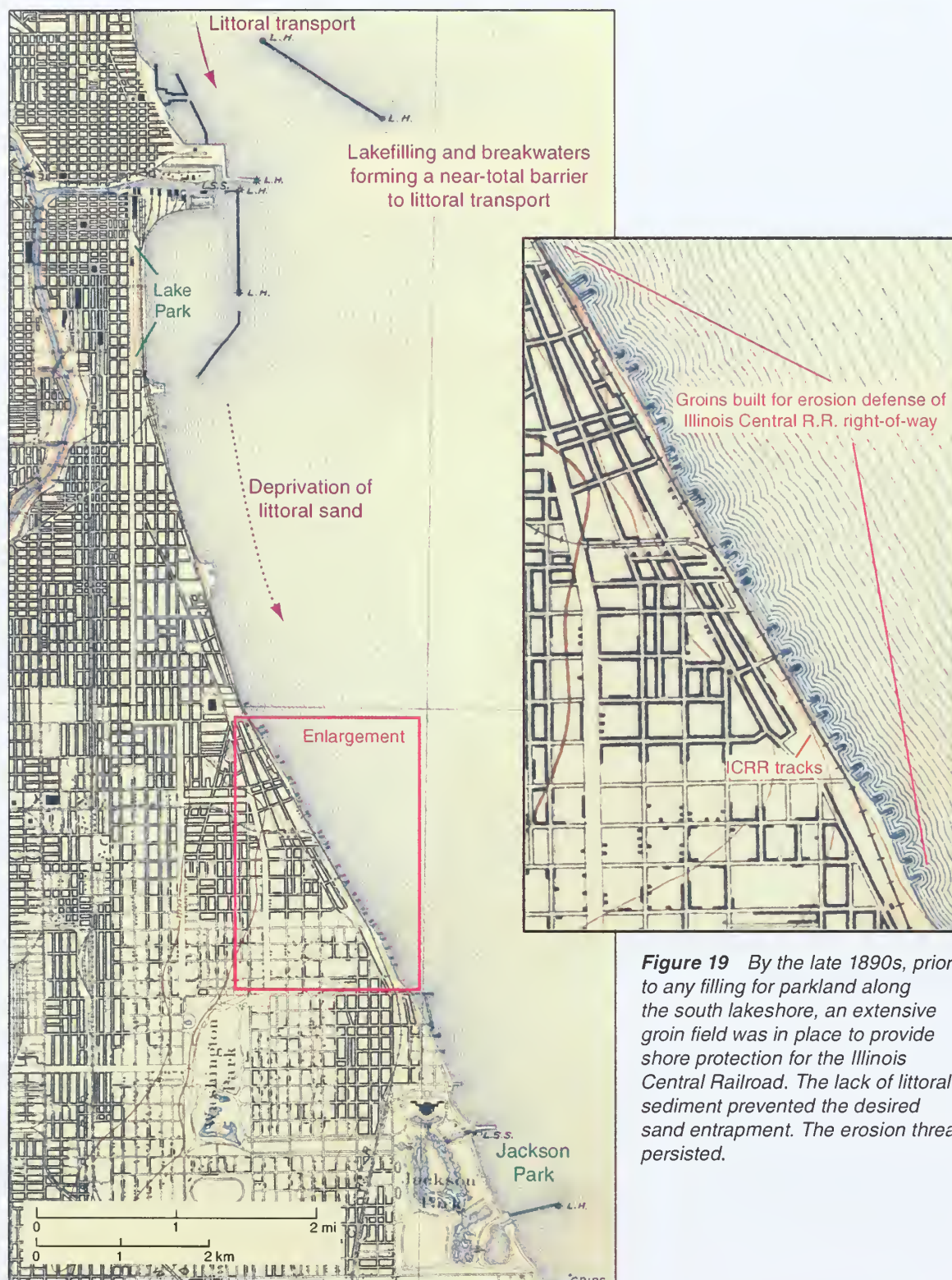


Figure 19 By the late 1890s, prior to any filling for parkland along the south lakeshore, an extensive groin field was in place to provide shore protection for the Illinois Central Railroad. The lack of littoral sediment prevented the desired sand entrapment. The erosion threat persisted.

Source: U.S. Geological Survey 1902 (surveyed in 1889, 1897, and 1899)

3 The South Shore Shoals

The *Plan of Chicago* proposed construction of seven islands of varied size and configuration offshore of Jackson Park. This area of the south lakeshore contains a series of prominent bedrock knobs that form shoals rising above the surrounding lake bottom. South Park Shoal has a least depth of 7 feet below Low Water Datum (LWD) (NOAA 2006) and rises 25 feet above the nearby lake bottom to the north. Clemson Shoal, about 2¼ miles offshore, has a least depth of 18 feet LWD surrounded by water ranging from 32 to 34 feet LWD.

The *Plan of Chicago* proposed taking advantage of the shoals. Using the shoals as a foundation allowed islands to be created with less fill. Comparison of the locations of the proposed islands with the locations of the shoals indicates that the spatial relationship is approximate. The *Plan* was presenting a concept for this island cluster rather than a detailed design.



Source: *Plan of Chicago* 1909, Plate L

Figure 20 Although islands were a common theme for much of *Plan of Chicago*, only the shore to the northeast of Jackson Park included a random cluster of islands.

Morgan Shoal is the shoal closest to shore. At its shallowest point, its depth is 2 feet LWD. Waves can commonly be seen breaking across the shoal even when wave action is minimal.

Morgan Shoal provides a naturally occurring shallow platform that could be used for placing fill to create an island, headland, or peninsula. Although *Plan of Chicago* does not specifically address Morgan Shoal, more recent planning by the Chicago Park District and its architectural and engineering consultants has identified Morgan Shoal as a unique opportunity to create new parkland and beaches (BauerLatoza Studio 2008).

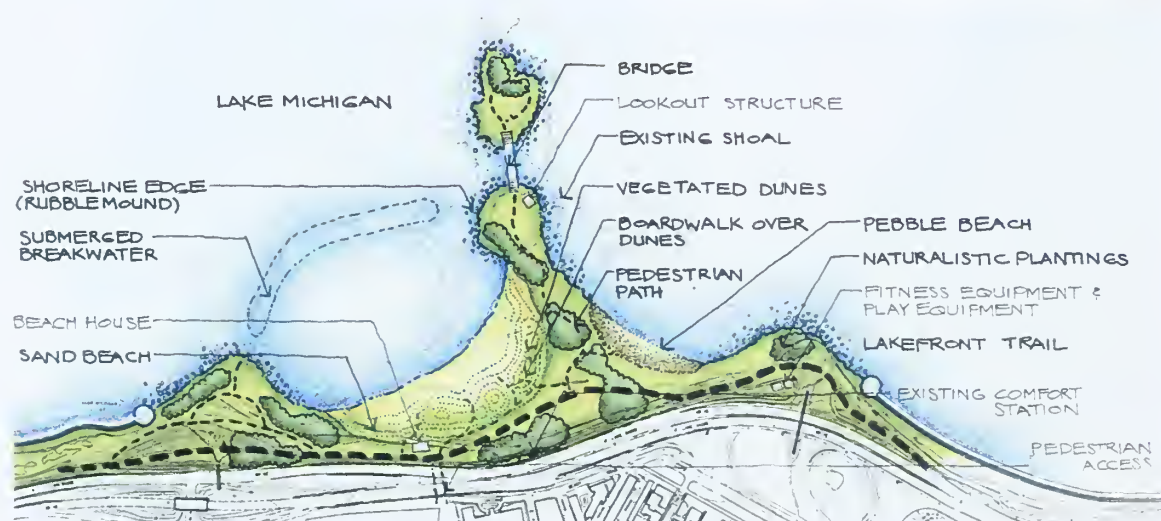
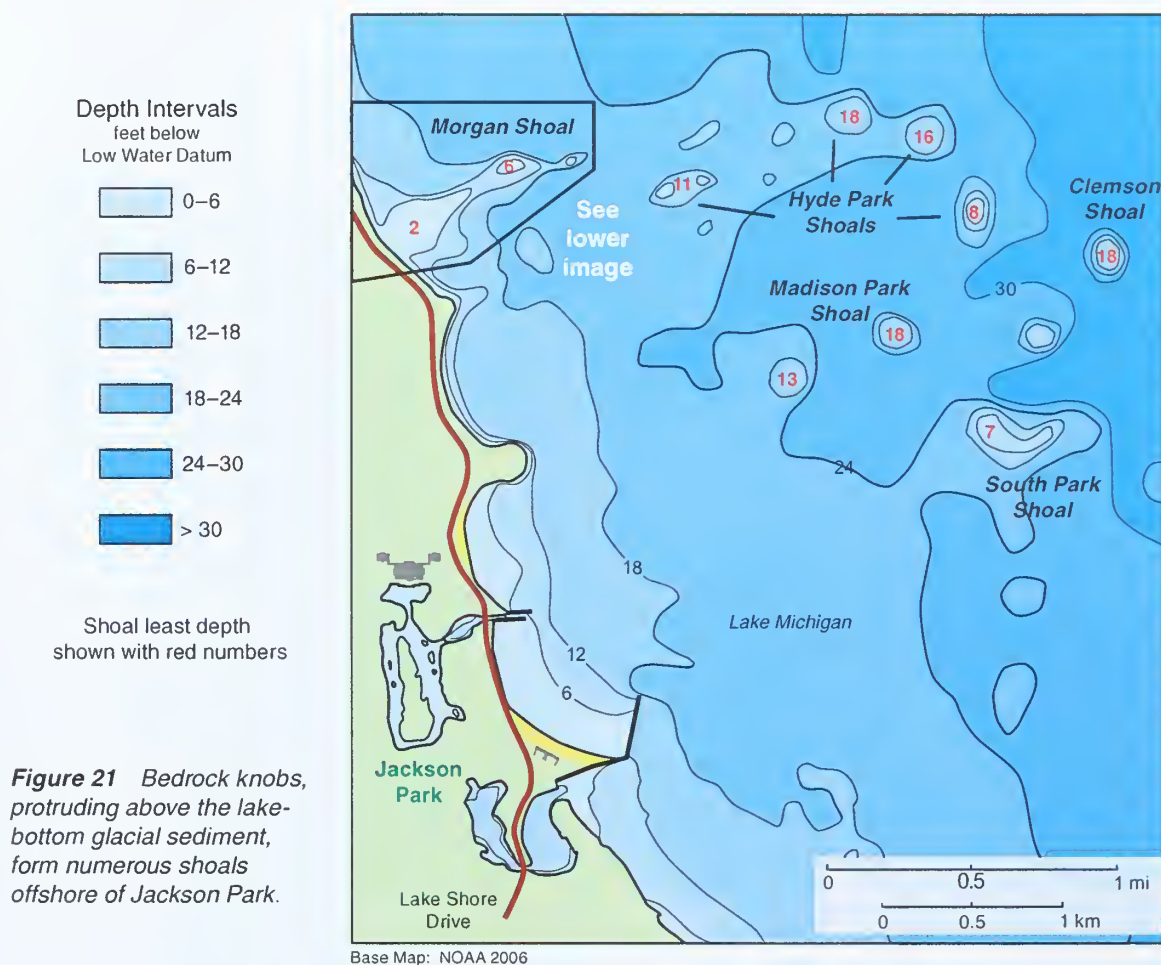


Image courtesy of Chicago Park District and BauerLatoza Studio 2008

Figure 22 The Chicago Park District is considering plans to use Morgan Shoal as a bedrock base on which to develop parkland, beaches, and natural areas. This design is one of those being considered.

4 Plans for a Barrier-Lagoon Lakeshore

The idea of creating islands and lagoons along the south lakeshore dates to the late 1890s and Daniel Burnham's earliest drawings (Feature 2) and is present in the 1909 *Plan of Chicago*. However, subsequent to the publication of the *Plan*, the South Park Commissioners modified the Burnham and Bennett concept by designing a wider lagoon and introducing inlets between a series of islands. Five islands were proposed, and these were originally designated by number, progressing from north to south.

Work began on Island 1 during the late 1920s. World War II was a factor in halting work on Islands 2 through 5. Evidence remains of the intention to build these islands. Elongate depressions exist along the lake bottom aligned along what would have been the axis of the lagoon. The depressions were formed by the excavation of lake-bottom sand and clay to provide deeper water along the lagoon and to gain material for the lakefilling of Burnham Park. These elongate depressions are a few hundred feet offshore, and their maximum depths are generally 10 to 15 feet deeper than the original lake-bottom profile. The lack of sand moving along this shore has prevented infilling.

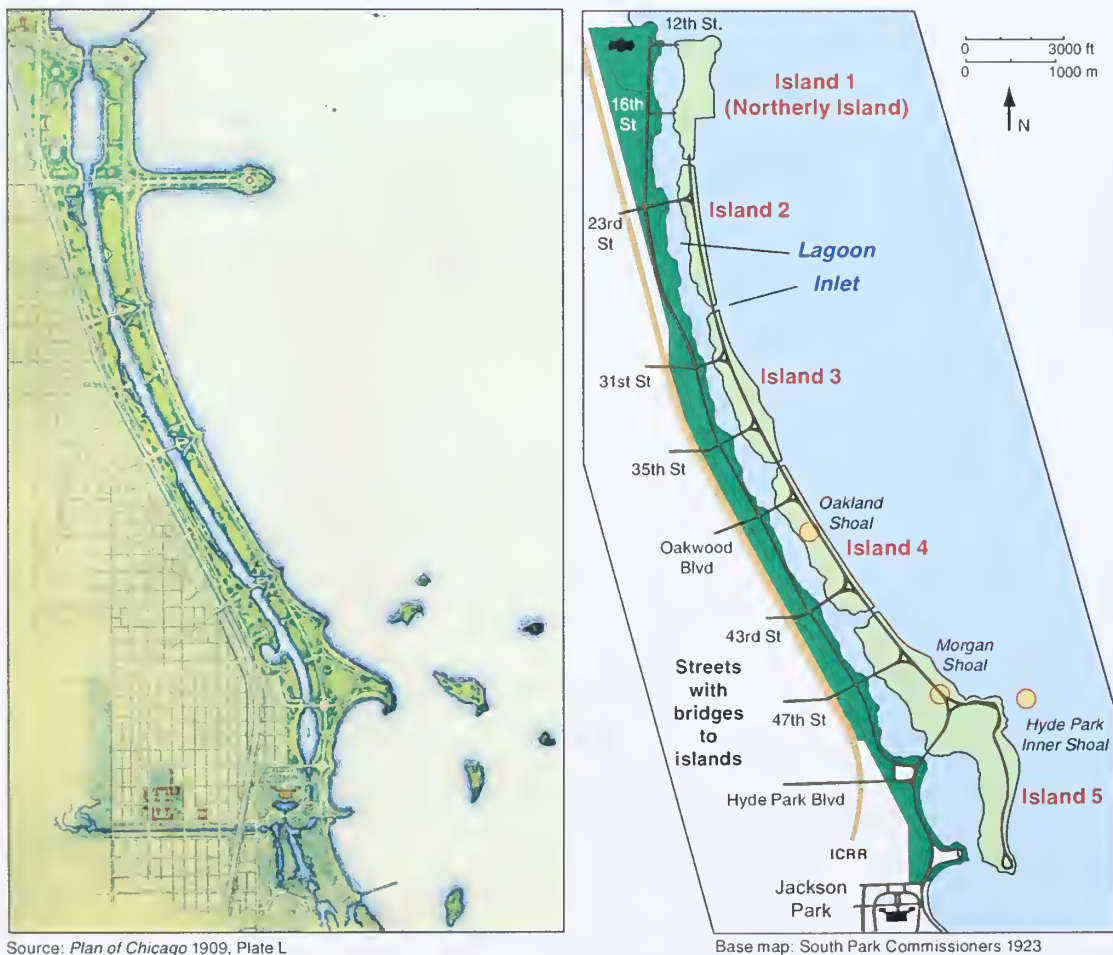
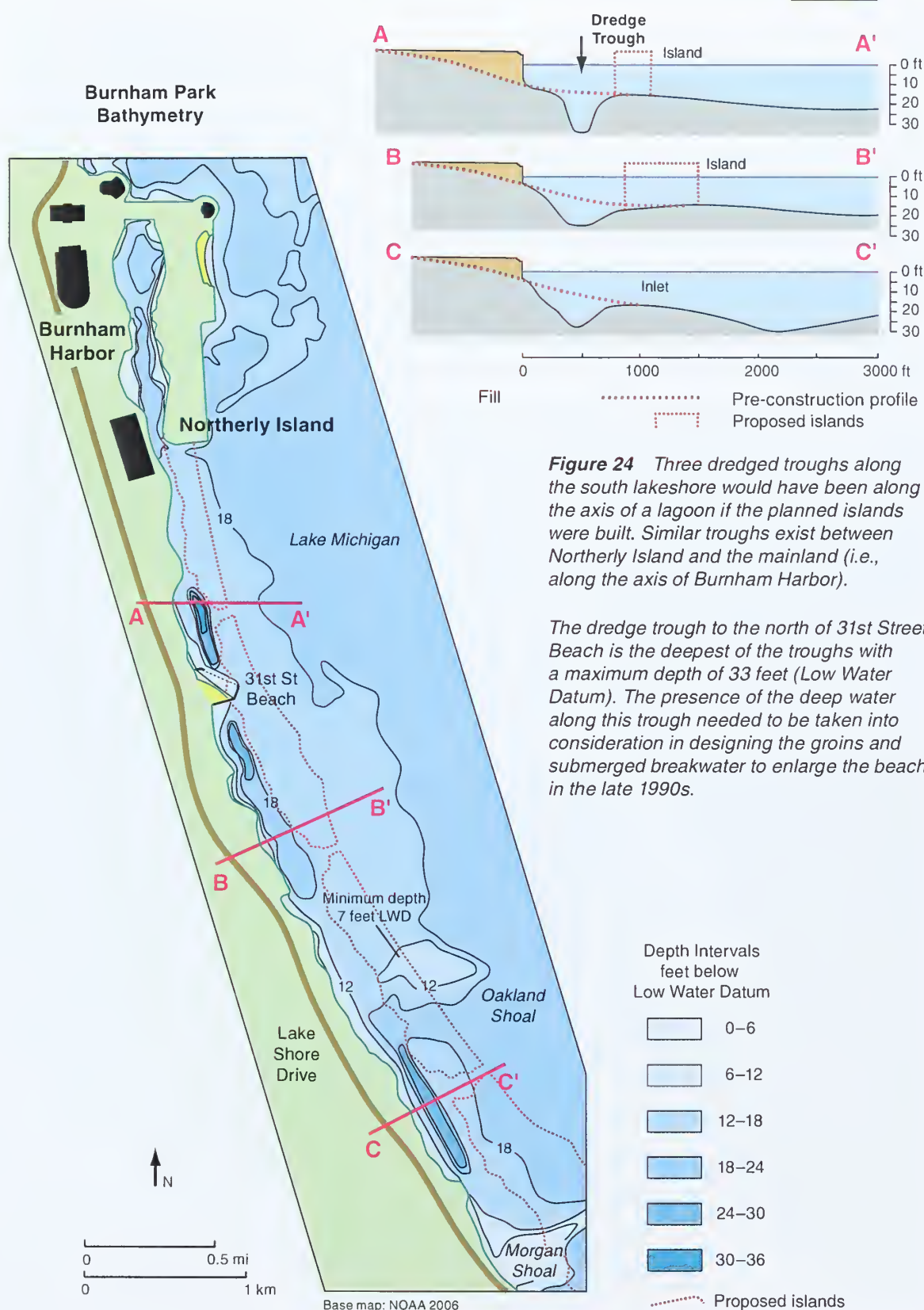


Figure 23 Comparison of the south lakeshore design from *Plan of Chicago* in 1909 (left) and the modified version prepared by the South Park Commissioners in 1923 (right).



5 Building Burnham Park

Burnham Park extends approximately 5 miles along the lakeshore from Roosevelt Road (Museum Campus) on the north to 55th Street (Promontory Point) on the south. Construction was under way in 1919 in what is now the Museum Campus at the north end of the park. The major part of the park was built during the 1920s. In 1927, the park was named in honor of Daniel Burnham.

Thirteen years of legal issues preceded the parkland construction. Those issues included obtaining riparian rights from the Illinois Central Railroad, lawsuits by various property owners, including Pottawatomie Native Americans who had once occupied this shore area, and action by the state legislature allowing the filling into the lake. Legal issues were eventually resolved, and, in April 1920, voters served by the South Park Commissioners approved a \$20 million bond issue for park development (Chicago Park District 1999).

Construction of the parkland involved first building the edge of the lakefill out in the open lake. This edge was essentially a wall to hold the fill behind it and subsequently serve as the revetment to protect the filled land from wave erosion. Parallel rows of timber pilings were driven into the lake bottom to form a crib. The crib was filled with 1- to 50-pound rock and then capped with 4- to 6-ton quarry blocks. Stone was also placed on the lake bottom at the toe of the structure (toe protection) to prevent erosion of the lake bottom from the downward energy of waves impacting the structure.

After the timber cribs were in place, lakefilling occurred between them and the shoreline. Sand fill was brought to the site by hopper-dredge ships that had dredged the lake bottom of southern Lake Michigan. Clay fill was obtained from lake-bottom dredging that occurred lakeward of the timber cribs, forming lake-bottom depressions (described in Feature 4).



Figure 25 This 1929 aerial photograph shows the newly created land at the south end of Burnham Park looking northward from the vicinity of 51st Street. The bright tone of the land corresponds to the exposed fill which has not yet gained vegetation cover.

Photograph courtesy of Great Lakes Dredge and Dock Company

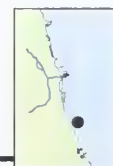
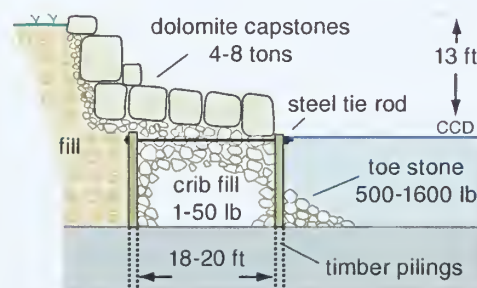


Figure 26 This 1926 topographic map captures the Burnham Park construction in progress. The rock-filled timber cribs built in open water are readily seen where the backfilling has not yet occurred. This map shows the general trend of work progressing from north to south. However, filling along the far northern and far southern ends of the park occurred first.



Type-D Revetment CCD / Chicago City Datum

Source: Chicago Park District 1944

Figure 27 The typical revetment design used in the 1920s construction of Burnham Park consisted of a rock-filled timber crib capped with dolomite quarry blocks.

Source: U.S. Geological Survey 1926

Stop 2 31st Street Beach

When the Burnham Park shoreline was built during the 1920s, the shore was almost exclusively stepped-stone revetment because the mainland shoreline was intended to be the west shore of a lagoon. The exception was a small beach at 31st Street.

The origin of the beach relates to the early stages of planning for the series of islands along Burnham Park. One of the bridges across the lagoon was to be at 31st Street (Feature 4). In 1927, a rock-filled timber crib was built at 31st Street to provide construction access to the future island (Island 3). Clay and sand placed on the north (updrift) side of the groin created a temporary beach (Chrzastowski 2004).

Neither the *Plan of Chicago* nor the plans as modified by the South Park Commissioners called for a beach on the mainland shore at 31st Street. However, soon after the beach was built, this sand area was utilized for recreation during the 1933–1934 Century of Progress World Exposition, which occupied much of northern Burnham Park (Stop 5). The General Motors exhibition building was located near the shore at 31st Street.

After the Exposition, the plan to build the island was abandoned, leaving the beach at 31st Street. For decades, this beach remained the only sand beach along the Burnham Park shore south of Northerly Island, and the beach and groin received minimal maintenance and improvements. Then, during the late 1990s, as part of the reconstruction of the Burnham Park shoreline, the 31st Street Beach was re-engineered. A pocket beach was constructed by extending and re-orienting the original groin, a companion groin was built, and a submerged breakwater was built between the ends of the two groins. The new 31st Street Beach was the first major beach project along Chicago's south lakefront since the 1920s. In 2008, the similar but larger Oakwood Beach was completed near Oakwood Boulevard.



Source: Andreas 1885

Figure 28 This view of Camp Douglas shows it during the peak of its activity during the Civil War. 31st Street Beach is now located near the prominent sailboat in the foreground. Note the shoreline along the Illinois Central Railroad tracks. The railroad was used to bring prisoners to the camp.

Civil War History at 31st Street

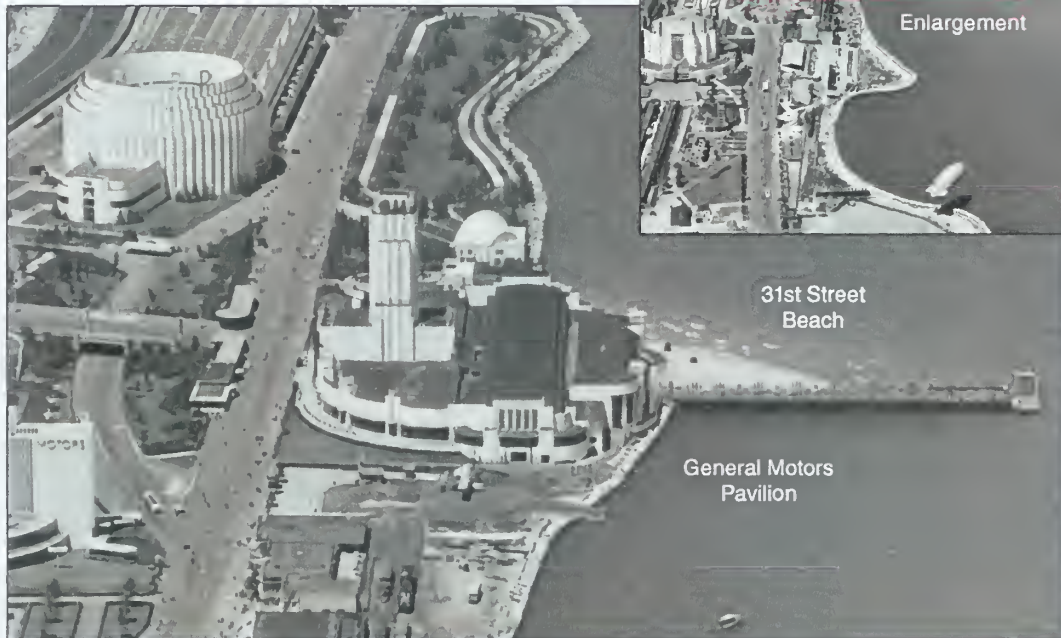
During the Civil War, Camp Douglas, the largest Union Army prison for Confederate soldiers, was located near the lakeshore between 31st and 33rd Streets. Camp Douglas was the Union equivalent to the infamous Confederate prison at Andersonville, Georgia.

At least 6,000 Confederate prisoners died at Camp Douglas due to the harsh conditions (Pucci 2007). Many were buried at the historic Chicago Cemetery, which is now the southern end of Lincoln Park (Feature 10).



Stop 2

Figure 29 This aerial view of the 1933–1934 World's Fair shows the early use of 31st Street Beach adjacent to the General Motors Pavilion. This was one of two beaches along the fairgrounds shoreline. The other beach (12th Street Beach) was on the east side of Northerly Island (Stop 3).



Courtesy of Chicago Park District

Figure 30 The redesigned and expanded 31st Street Beach is now a pocket beach contained by double groins and held at its toe by a submerged, rubble-mound breakwater.



Photograph by M. Chrzastowski, Illinois State Geological Survey, May 2000

Stop 3 Northerly Island and the 1933–1934 World's Fair

Northerly Island and the nearby Burnham Park shoreline were the site of the 1933–1934 international event, “A Century of Progress International Exposition.” The Exposition, the second World’s Fair to be held along the Chicago lakeshore, was a commemoration of both the 100th anniversary of the incorporation of Chicago (1833) and a celebration of the global technological advances over the previous century. Originally planned for one year (1933), the fair’s popularity led to a second year (1934). More than 39 million visitors attended the Exposition despite the ongoing Great Depression (<http://century.lib.uchicago.edu/about.html>).

Northerly Island is one of the few locations along the Chicago lakefront that closely reflects the shoreline designs in *Plan of Chicago*. Present-day Burnham Harbor and the arcuate northeast shoreline are recognizable in the *Plan*, but a major eastward-oriented peninsula was never built. The *Plan* called for a wider lagoon at this location than along the shore to the south. A wide basin was built that resulted in Burnham Harbor, the largest small-boat basin on the Chicago lakefront, with 1,105 moorings.

Although still called Northerly Island, filling along what is now Solidarity Drive transformed the island into an L-shaped peninsula. Submerged culverts beneath the filled connection allow an exchange of water between the northern end of Burnham Park Harbor and the open lake to the north.

Northerly Island is surrounded by lake-bottom depressions caused by dredging for clay fill. Within 150 feet lakeward of the 12th Street Beach submerged bulkhead, water depth reaches as much as 18 feet LWD (NOAA 2006).



Source: *Plan of Chicago* 1909, Plate L

Figure 32 The *Plan of Chicago* includes a prominent peninsula extending lakeward from Cermak Road (22nd Street), which corresponds with the south end of Northerly Island. The peninsula was never built.

Putting an Island to Use

Northerly Island was originally planned to be parkland, but the island has had a long history of non-park use. After serving as a focal point for the Century of Progress Exposition, the island was vacant through the end of World War II. In 1945, the island was briefly considered for the site of the United Nations. Then, in 1946, the island was developed as a lakefront airport (Merrill C. Meigs Airfield). In 2005, the airport use came to an abrupt and controversial end, in part because of post-9/11 security issues. Today, the City of Chicago and Chicago Park District are developing the island as it was originally intended, a lakefront park.



Stop 3



Courtesy of Great Lakes
Dredge & Dock Co.

Figure 34 Northerly Island in June 1934 during A Century of Progress International Exposition. Note the towers of the cable car Sky Ride between the mainland and the island.



Courtesy of Chicago Park District



Courtesy of Great Lakes Dredge & Dock Co.

Figure 35 Hopper-dredge ship delivering sand fill for the southeast addition to the island in the 1950s.

Figure 36 The submerged bulkhead that holds 12th Street Beach is visible in the foreground (orange arrow). Also visible in this 2000 photo is the former Meigs Field runway.



Photograph by M. Chrzastowski, Illinois State Geological Survey, 2000

6 Grant Park

Grant Park is the centerpiece of Chicago's lakefront parks and includes the oldest public land along the lakeshore. In 1836, Illinois state surveyors who were platting land along the route of the proposed Illinois and Michigan Canal made the following map notation along the shore near what is now Michigan Avenue south of Monroe Street (Wille 1972, Holland 2005): *"Public Ground—A Common to Remain Forever Open, Clear and Free of any Buildings, or other Obstruction Whatever."* This map notation set the stage for lakefront parkland that eventually became Grant Park and was critical to a series of historic Illinois Supreme Court cases (Montgomery Ward decisions) concerning buildings in Grant Park. The Chicago Art Institute remains the only building in the park.

When Burnham and Bennett were developing *Plan of Chicago*, preliminary designs for Grant Park had already been completed by the South Park Commissioners. The *Plan* incorporated the existing designs into a grander scheme for the central lakefront that was symmetric and centered on Grant Park. The *Plan* proposed removing the existing federal breakwaters that protect what is now Monroe Harbor and using an arcuate breakwater design. The *Plan* also showed a major building in the center of Grant Park. This site was originally proposed for the Field Museum of Natural History. The museum's location south of Grant Park is a result of the legal effort led by Aaron Montgomery Ward (1844–1913), founder of Montgomery Ward department stores. Ward successfully fought for adherence to the 1836 map notation. The proposed museum site in Grant Park is now the site of Buckingham Fountain.

In its natural setting, the mouth of the Chicago River was located near the intersection of what is now Monroe Street and Columbus Drive. After the river mouth was straightened in the 1830s and the littoral sand supply was disrupted, erosion threatened the shore south of the river along Michigan Avenue. At that time, the Illinois Central Railroad extended no further north than Roosevelt Road, the southern city limit. During the 1850s, to provide shore protection for Michigan Avenue, the city allowed the railroad to extend northward by building tracks on trestles a short distance offshore and building an adjacent breakwater. The gap between Michigan Avenue and the railroad tracks was later filled with debris from the 1871 Chicago Fire (Chrzastowski 1991). This filled land became known as Lake Park. Subsequent filling to the east of the tracks created the land for Grant Park, named after Civil War general and U.S. President, Ulysses S. Grant (1822–1885).



Source: *Plan of Chicago* 1909, Plate L

Figure 37 1909 design for Grant Park and the central lakefront.

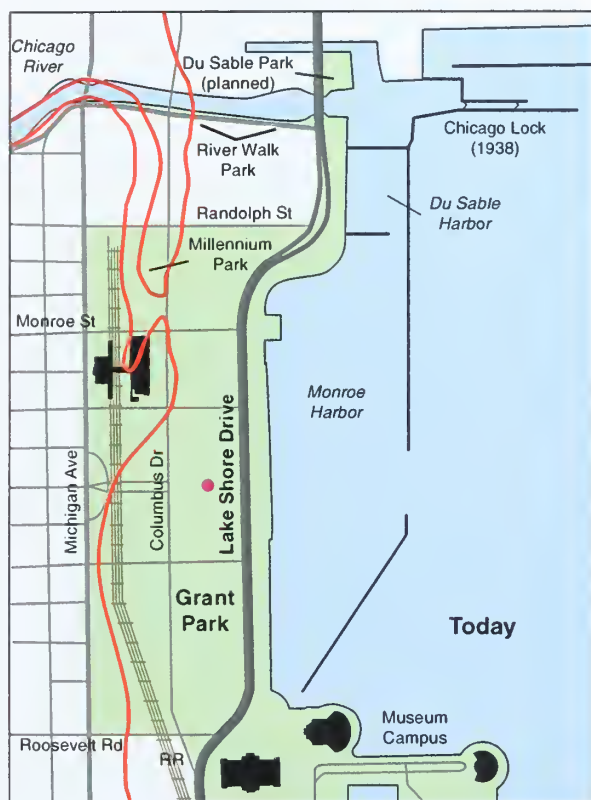
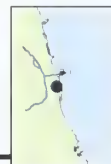


Figure 38 The historical mouth of the Chicago River was located in what is now Grant Park near the intersection of Columbus Drive and Monroe Street.

Construction of the jetties to straighten the Chicago River was done by the U.S. Army Engineers between 1833 and 1844 (Feature 7). This project was the earliest coastal engineering along the Chicago lakeshore and one of the most significant shoreline changes (Larson 1979; Chrzastowski 1998).

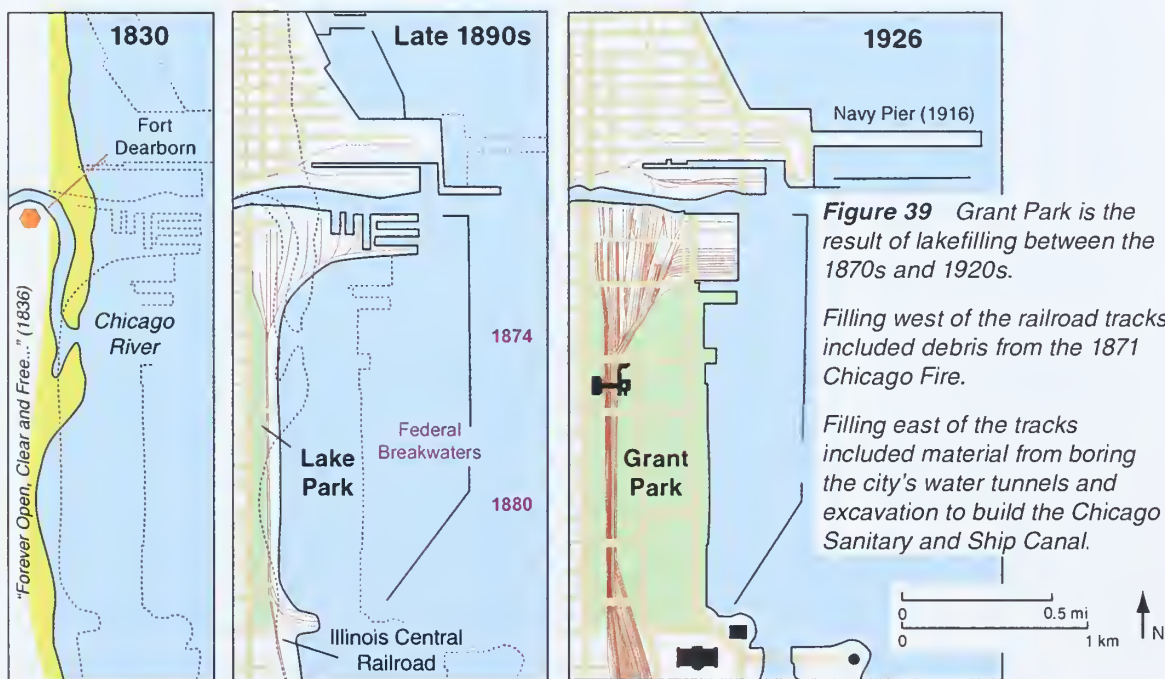
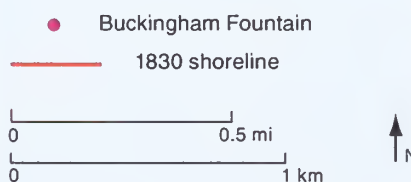


Figure 39 Grant Park is the result of lakefilling between the 1870s and 1920s.

Filling west of the railroad tracks included debris from the 1871 Chicago Fire.

Filling east of the tracks included material from boring the city's water tunnels and excavation to build the Chicago Sanitary and Ship Canal.

Sources: Andreas 1884; U.S. Geological Survey 1902, 1926

7 Chicago River and Chicago Harbor

Chapter 1 of *Plan of Chicago* begins with a woodcut (below) showing beach accretion against the north jetty (North Pier) that was built by the U.S. Army Engineers to straighten the river mouth. The north and south jetties, built 1833 to 1844, were the first engineered structures on the Illinois coast.

Figure 40 This view is south across the sand flats formed by trapping littoral sand against North Pier. In *Plan of Chicago* the date of the scene is given as 1834. The extent of sand accretion suggests a later date (late 1830s or early 1840s).



Source: *Plan of Chicago* 1909, Plate II

The Chicago River served as the original harbor for Chicago in the early to mid 1800s. By the late 1800s, the U.S. Army Engineers began building the breakwaters in Lake Michigan that allowed harbor activities to shift lakeward. *Plan* designs would have required dismantling federal breakwaters that were already in place in 1909.

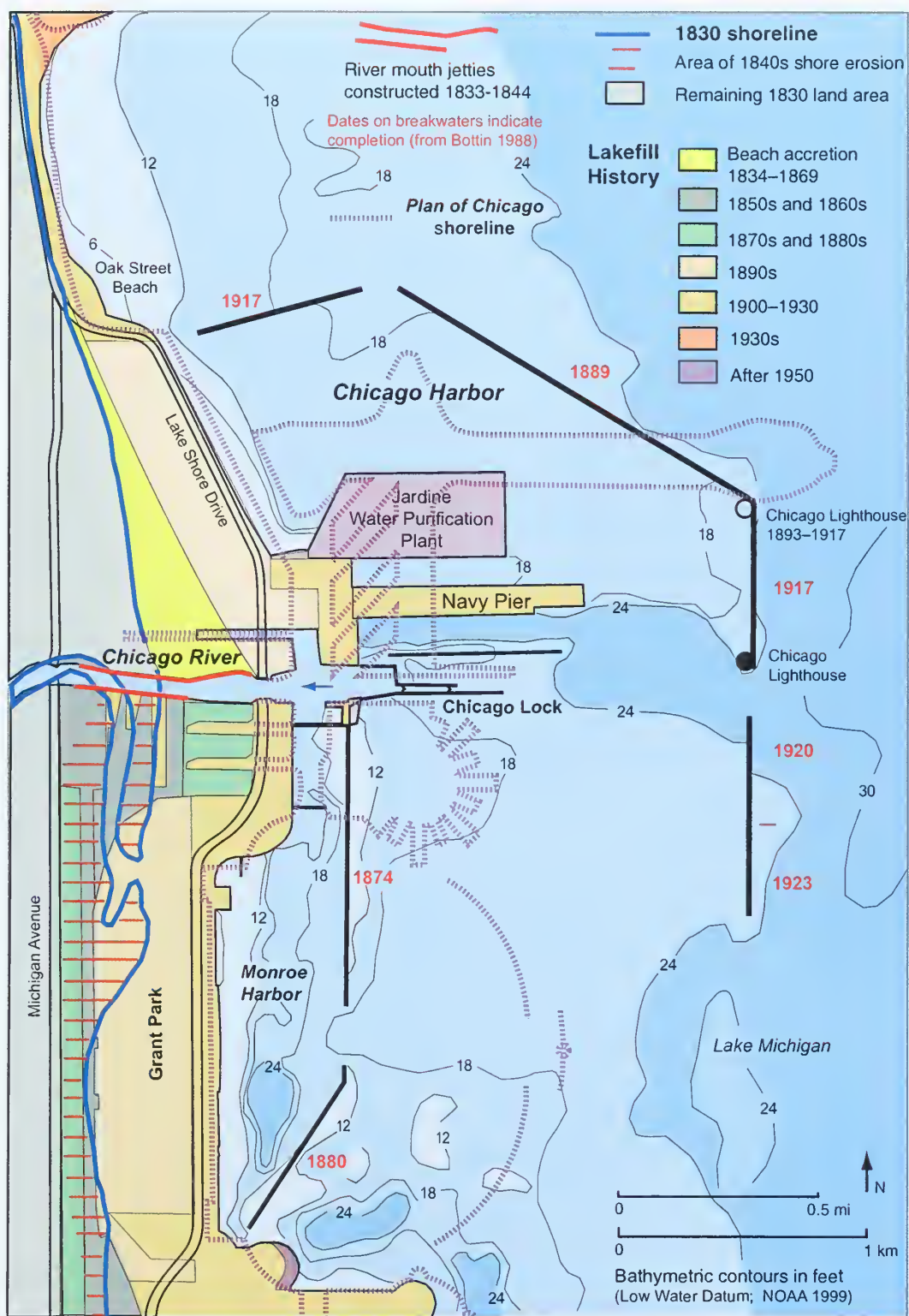
The one feature of the present-day Chicago Harbor that is a reflection of the *Plan* is Navy Pier. This 3,040-foot-long pier, originally named Municipal Pier No. 2, was completed in 1916 for commercial shipping. After a long history of varied uses, Navy Pier is today a public space that has become the number one visitor destination on the Chicago lakefront and in all of Illinois. Navy Pier is an unanticipated fulfillment of the similar peninsular feature proposed in *Plan of Chicago* which was to be parkland. The peninsula proposed by Burnham and Bennett was to be six blocks north of the present Navy Pier (aligned with Chicago Avenue rather than Grand Avenue).

Two present-day features at Chicago Harbor are important infrastructure elements that were not perceived during development of the *Plan*. One is the Chicago Lock built in 1938 to separate waters of the Chicago River from those of Lake Michigan in order to improve the quality of the lake-water supply. Second is the 1950s lakefill for the Jardine Water Purification Plant, the largest water purification plant in the world, Jardine processes on average nearly one billion gallons of water per day (ALGOR Inc. 2004).



Source: *Plan of Chicago* 1909, Plate LXXXVII

Figure 41 The *Plan of Chicago* vision for the Chicago River mouth accommodated the commercial shipping that was still important in the early 1900s.



Sources: NOAA 1999; Chrzastowski 1991, 2005; Plan of Chicago 1909

Figure 42 Historical shoreline changes and bathymetry in the vicinity of the Chicago River mouth and Chicago Harbor.

8 Streeterville and Oak Street Beach

Streeterville, the lakefront neighborhood located north of the Chicago River and east of Michigan Avenue, has had a complex history of shoreline change. A major part of Streeterville is attributed to the sand accretion resulting from the nearly total barrier to littoral drift formed by the jetties at the Chicago River mouth. The extensive sand flats that developed became a “homestead” for Captain George W. Streeter (1837–1921). In 1886, he ran his vessel aground here and left it imbedded in the sand accretion. He subsequently declared ownership of this neglected area of lakeshore. After a colorful history of lawlessness and police raids, Streeter and his associates were vacated, but the neighborhood preserves his name. More land was gained when the area subsequently served as a municipal dump. Lake Shore Drive parallels the bulkhead that was built to enclose the Streeterville area for final filling and grading.

The *Plan of Chicago* essentially shows Streeterville with its current shoreline configuration, which is how it had been platted prior to the *Plan*. Lakeward of Streeterville, the *Plan* proposed a canal, slips for commercial shipping, and an elongate peninsula similar to Navy Pier (Feature 7). The *Plan* makes no suggestion for a beach at Oak Street. Filling for Streeterville formed a shoreline niche at Oak Street that allowed the natural accretion of sand. Additional sand was placed here to build an artificial beach that is now a premier beach on the Chicago lakefront.

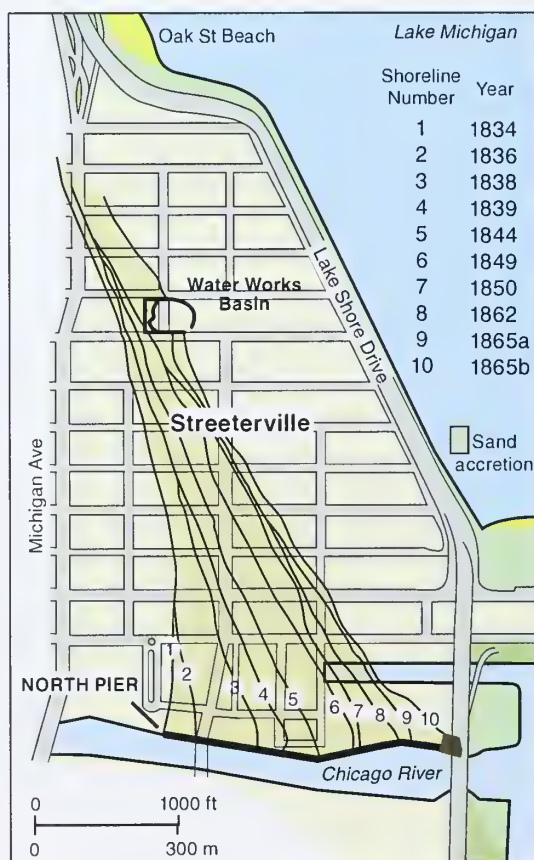


Source: *Plan of Chicago* 1909, Plate L

Figure 43 The Plan of Chicago design for Streeterville and its offshore area.

Figure 44 The water basin along the sand flats was built in 1855 and served as the earliest lakeshore municipal water intake for Chicago. From here water was piped to the Chicago Water Works Pumping Plant and Water Tower one block to the west.

The record of sand accretion against North Pier allows estimating a natural-state littoral transport along the Chicago lakeshore at about 100,000 cubic yards per year (Chrastowski 1990).



Source: Chrastowski 1998



Photograph by M. Chrzastowski, Illinois State Geological Survey, June 2000

Figure 45 This view of Oak Street Beach looking north from the observation deck of the 100-story John Hancock Center shows the convex-lakeward shoreline that is naturally maintained along the beach. This photograph appears on the cover of *Shore & Beach*, v. 73, no. 4, fall 2005.



Source: Chicago Aerial Survey

Figure 46 Oak Street Beach in its early history had a more north-south orientation, as seen in this April 1949 aerial view.



Photograph by M. Chrzastowski, Illinois State Geological Survey, May 2000

Figure 47 This early morning view shows full sun coverage across Oak Street Beach. At times, some or all of the beach is literally in the shadows of the neighboring skyscrapers.

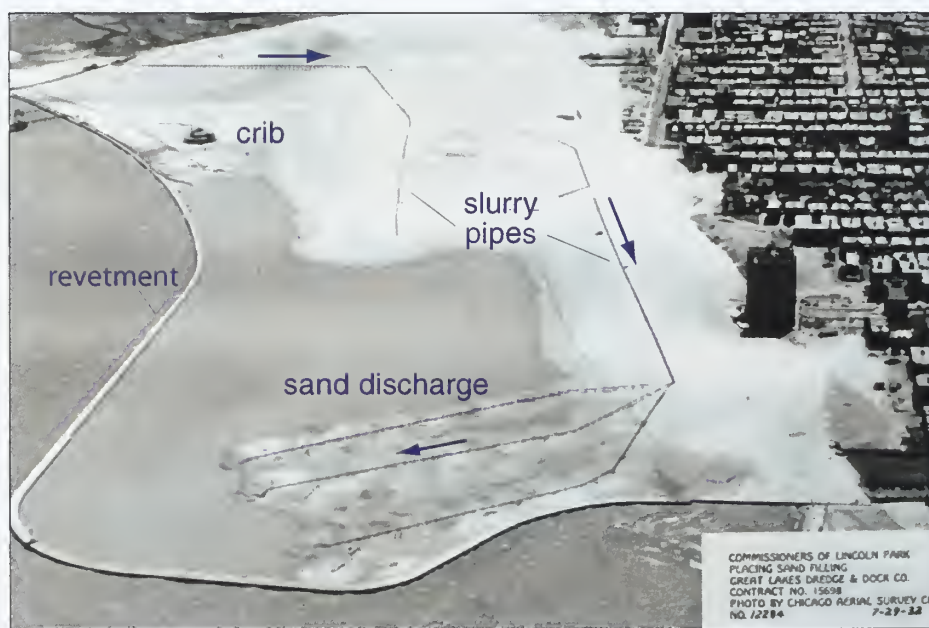
9 The Water-Intake Crib

Creating new land along the lakeshore was a means to build lakeward of the existing infrastructure and thus be free of hindrances and obstructions to the park development. The *Plan of Chicago* does not address the issue of the location of cribs or water-intake basins for municipal water supply, but the history of these structures is important in the history of building the lakefront.

Today Chicago receives municipal water from two offshore cribs: the William Dever Crib, located 2½ miles east of North Avenue Beach in about 30 feet of water, and the 68th Street Crib, located 2 miles east of Jackson Park, also in about 30 feet of water. From the cribs, water is brought by tunnel beneath the lake floor to two water purification plants (Jardine Water Purification Plant and South Shore Water Purification Plant).

In Chicago's early history, water-collection basins and intake cribs were located directly on the shore or in shallow water close to the shore. As the city grew, new cribs were built farther out in deeper water to ensure a cleaner water source away from nearshore sediment and pollution. Lakefilling for northern Lincoln Park provides one example of how filling surrounded the abandoned crib that once served in the nearshore off Lawrence Avenue.

Both the active and abandoned cribs are prominent features on the water horizon. The older cribs, built in the late 1800s, have withstood more than 100 years of wave and ice impact. Since 2001, after 9/11, both the Dever Crib and 68th Street Crib are surrounded by a security zone that restricts boat traffic (NOAA 2006).



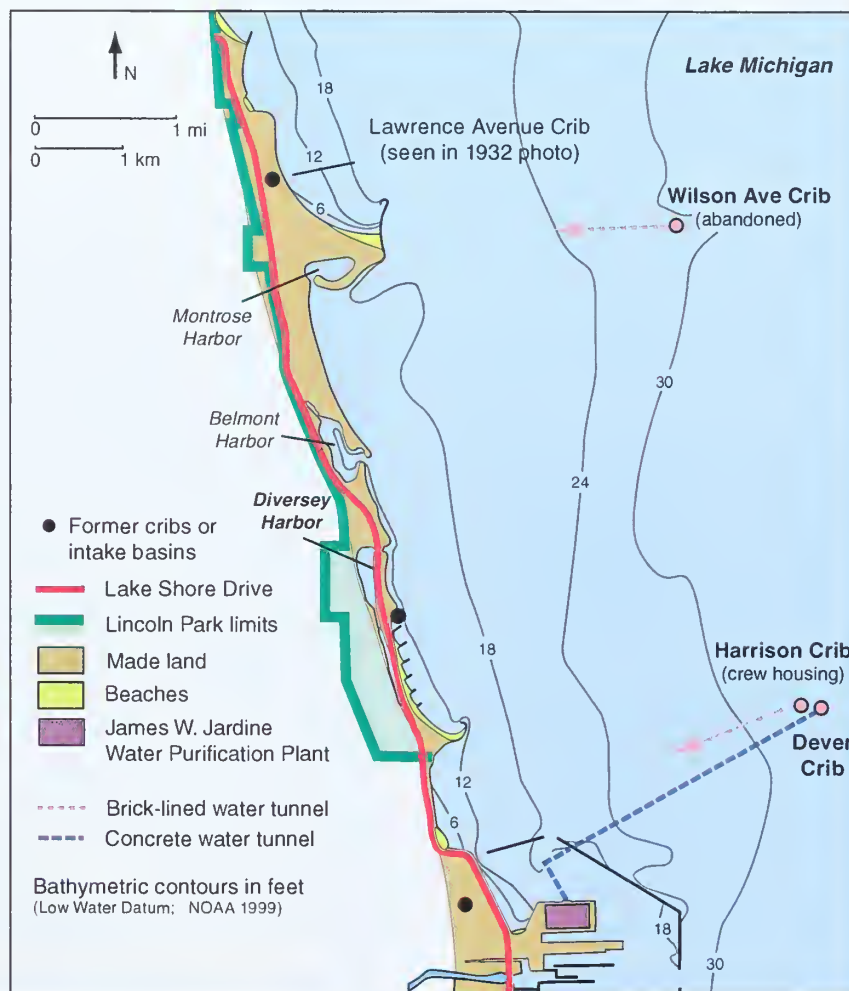
Courtesy of Great Lakes Dredge & Dock Company

Figure 48 The abandoned Lawrence Avenue Crib is seen here in 1932 surrounded by sand fill for the northward expansion of Lincoln Park. Sand fill is being pumped in slurry pipes from a dredge ship (upper left, out of photo) to the fill area. Steel sheet pile is already in place to hold and protect the fill. Construction of the sheet pile wall is shown in a photo on page 3.



Figure 49 Three water-intake cribs are visible offshore of Chicago's north lakefront. Of the three, only Dever Crib is active. It has a bedrock tunnel leading to the Jardine Water Purification Plant. The crib provides the intake point, and the pumping is done from the water plant. Harrison Crib provides housing for a security crew.

The made land of the north lakefront is superimposed on at least three sites where cribs or water intakes were active in the mid to late 1800s.



Photograph by M. Chrzastowski, Illinois State Geological Survey, May 2000

Figure 50 Harrison and Dever Cribs are located about 2½ miles offshore in approximately 30 feet of water.

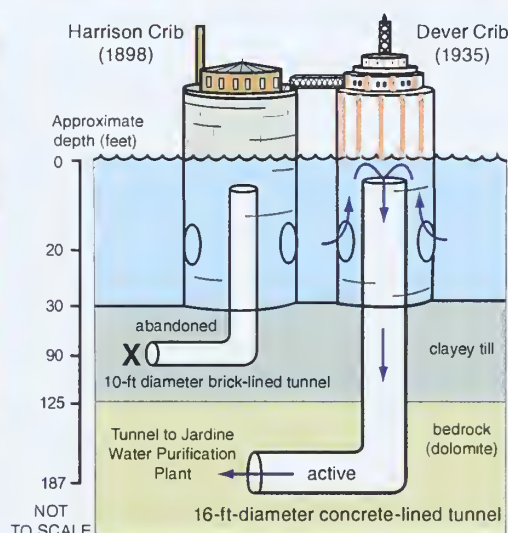


Figure 51 Intake crib schematic.

Stop 4 North Avenue Beach

The *Plan of Chicago* proposed that beaches be built along the new lakefront parkland to the greatest degree possible. However, the *Plan* did not provide specifics as to where these beaches should occur or address the challenge of building beaches at sites that would be deep water along the edge of lakefill. Ironically, although no beach was proposed for the site of North Avenue Beach, that beach is now one of the most heavily used beaches in Chicago. In addition, the history of this beach is more closely related to erosion control rather than to recreation. Two construction phases occurred.

The landward side of North Avenue Beach is a narrow strip of lakefill built in the 1920s. Lake Shore Drive occupies this lakefill strip. In the late 1920s, erosion threatened this land. In the first construction phase of North Avenue Beach, in the early 1930s, a series of nine groins were built to trap and retain littoral sand as shore protection, but the lack of sand in transport left the groin field empty.



Photo courtesy of Great Lakes Dredge & Dock Co.

Figure 52 The North Avenue groin field in 1930.

The second construction phase occurred in the late 1930s. A partially submerged bulkhead was constructed to connect the lakeward ends of the groins, and the southern (downdrift) groin was expanded into a hook-shaped terminal groin (Chrzastowski 2000). Seven beach cells were created. Two of the original nine groins are buried in the wide expanse of fill that accommodates access roads, parking, and the ship-like beach house.

The Deadly 1954 Seiche

A seiche (saysh) is a wind-caused oscillation of the lake surface. It is typically produced by severe thunderstorms rapidly crossing the lake. The result along the shore is a rise and fall of lake level; rise potentially can bring a sudden occurrence of one or more large waves. Small seiches less than one or two feet are common. The most severe seiche on the Chicago lakefront occurred June 26, 1954, when a 10-foot-high wave struck the North Avenue groin. Eight people drowned (Ewing et al. 1954, Recktenwald 1994).

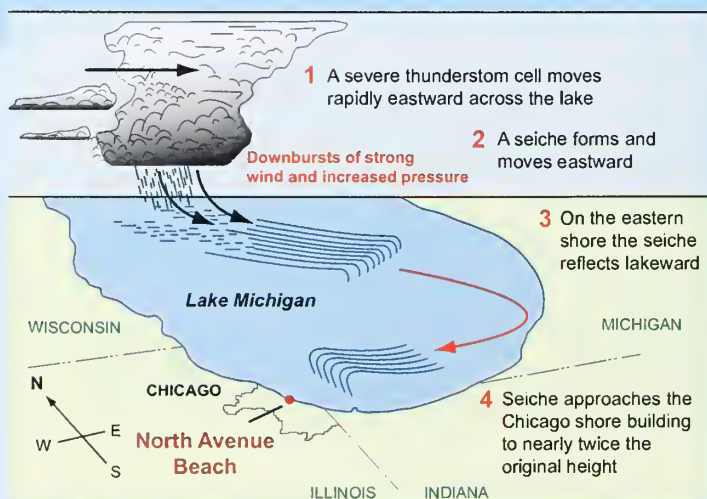
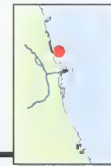
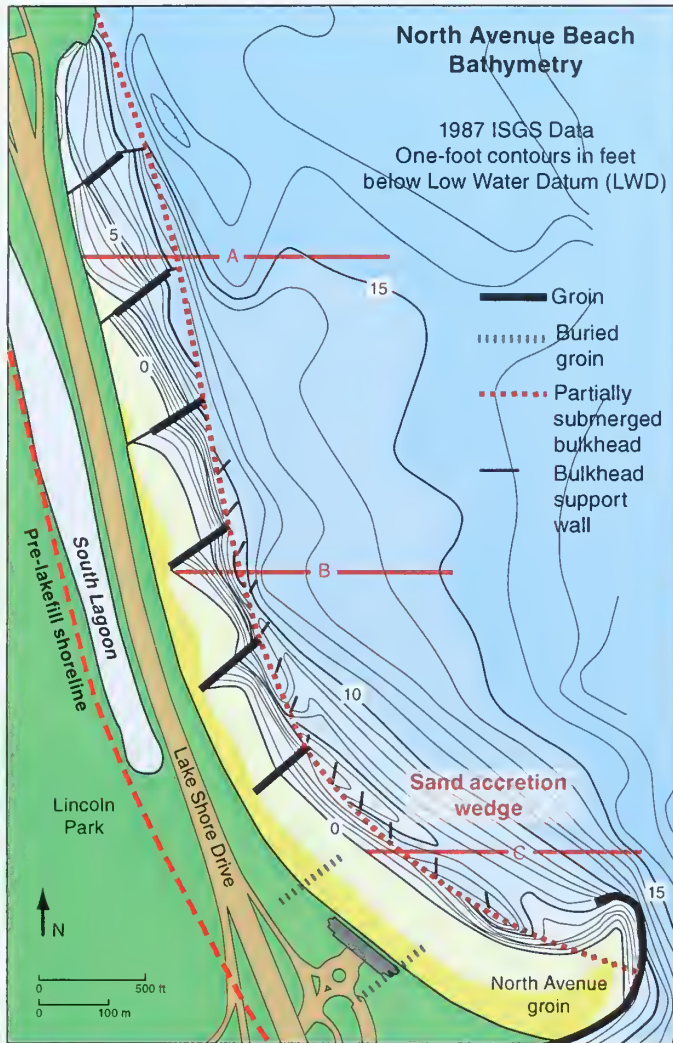


Figure 53 The 1954 seiche.

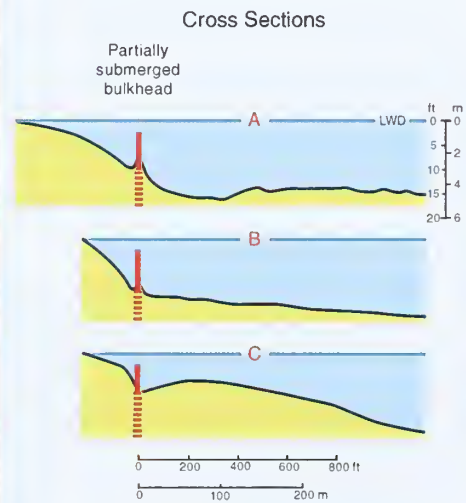


Stop 4



Source: Illinois State Geological Survey

Figure 54 The partially submerged bulkhead at North Avenue Beach perches the beach sand above the deeper water on the lakeward side of the bulkhead. Sand lost from the beach cells and the net southerly transport of sand has resulted in a sand accretion wedge to the north (updrift) of the North Avenue groin.



Photograph by M. Chrastowski, Illinois State Geological Survey, May 2000

Figure 55 What is visible of the partially submerged bulkhead is the series of steel and concrete pilings that form the columns for the underwater wall.

10 Lincoln Park

Lincoln Park dominates the north lakeshore, covering 1,208 acres and extending nearly 5.5 miles northward from North Avenue. The park had its origins during the late 1800s as a small park called Cemetery Park. This park was located adjacent to the city cemetery, which extended along the shore north of North Avenue. Graves were relocated from the cemetery during the late 1860s and 1870s as work began to create an expanded park. The early park was named in honor of Abraham Lincoln in 1865. As land was created by lakefilling, the park grew northward and reached its present northward extent in the 1950s (Chicago Park District and Lincoln Park Steering Committee 1995).

Lakefilling and shoreline design by the Lincoln Park Commissioners were already under way along Lincoln Park by the publication of *Plan of Chicago* in 1909. The *Plan* incorporated the existing park development. A notable aspect of what Burnham and Bennett proposed for the north lakeshore was a lagoon that would essentially be an inland waterway extending from North Avenue northward for 10 miles to Wilmette (guidebook cover). This North Shore lagoon was similar to that proposed for the South Shore (Feature 5), but was narrower and more than twice as long.

Belmont Harbor, Diversey Harbor, and the South Lagoon are Lincoln Park features that correspond to designs in *Plan of Chicago*. The northern appendage of Belmont Harbor corresponds to the lagoon that the *Plan* proposed to extend northward from the harbor.



Figure 56 Lincoln Park had its origins as Cemetery Park at what is now part of Lincoln Park Zoo. Removing the Chicago Cemetery provided land for the southern part of Lincoln Park.



Figure 57 Lincoln Park area and the proposed North Shore Lagoon.



Sources: U.S. Geological Survey 1902, 1932, 1997a

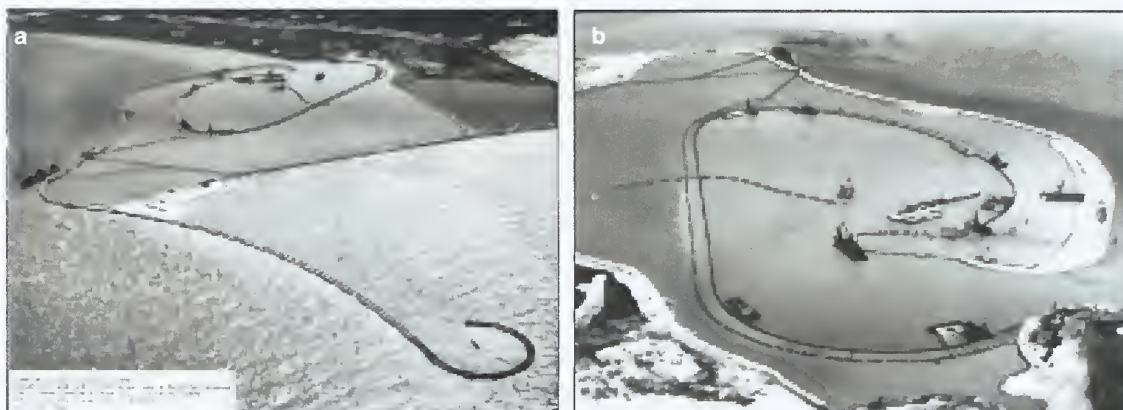
Figure 58 These map comparisons show the northward expansion of Lincoln Park with time. After the initial development of the park along the natural lakeshore in the late 1800s, nearly all subsequent park expansion was accomplished by lake filling. Montrose, Belmont, and Diversey Harbors were each formed by using lake fill to semi-enclose water areas. Asterisks indicate map publication dates; shorelines mapped earlier.

Stop 5 Montrose Point

The most lakeward protrusion of filled parkland along the Chicago lakefront occurs at Montrose Point. Here the shoreline is about three-quarters of a mile lakeward of the pre-fill shoreline and built into water depths up to nearly 20 feet. This coastal promontory includes a small-boat harbor and beach. Construction occurred during the early 1930s.

Nothing in *Plan of Chicago* proposed the shoreline configuration that exists here today. For this part of the lakeshore, the *Plan* proposed a band of parkland extending north-south along the shore, a lagoon parallel to and extending up the North Shore, and an offshore island that was part of the chain of islands that also extended up the North Shore. The present shoreline at Montrose is the result of design work by the Lincoln Park Commissioners and attests to a design independent from *Plan of Chicago*.

The south perimeter of the filled land was built with timber crib stepped revetments similar to those used elsewhere on the lakeshore. However, the large groin at Montrose Point was constructed using steel sheet pile. This groin construction is historic because it is the first recorded use of steel sheet pile for shore structures in Lake Michigan. This new technology allowed the construction of the double walls of this 23-foot-wide, 2,490-foot-long groin to be completed in less than two months, which, for its length, was a record for the time (Young 1931, Chrzastowski 2004).



Courtesy of Great Lakes Dredge & Dock Co., July 23, 1931

Figure 59 Montrose groin from the northeast during its construction (a). Note the hopper-dredge ship on the far left delivering sand for initial beach construction. This companion view (b) from the west shows construction of the crib wall surrounding Montrose Harbor. The dredge in the center of the harbor is using a slurry pipe to transfer clay for filling north of the harbor.

A notable aspect of the groin design is the hook-like configuration at its outer end. This configuration relates to a plan for lakeshore filling that was never completed. Rather than a northward-projecting groin, this structure was designed to serve as a seawall and to define the shoreline along the south side of the entrance to a large bay. A newly constructed island to the north was to define the shoreline along the north side of the bay entrance. World War II was a major reason why this additional construction was never started. Changed priorities following the war precluded the island concept from ever becoming a reality.



Stop 5

Figure 60 Comparison of the Plan of Chicago and the present shoreline in the vicinity of Montrose Avenue shows that in this lakefront area there has been minimal adherence to the Plan. Belmont Harbor is the single common feature.

Note the Plan's proposed lagoon extending along the shore northward from Belmont Harbor. The appendage at the north end of the harbor would have been part of the lagoon.



Source: Plan of Chicago 1909, Plate L



Source: Young 1931

Figure 61 A 1930s master plan for the lakeshore between Montrose and Devon Avenues explains the shape of Montrose groin. This structure would ultimately protect a point of land on the south side of a harbor-lagoon-island complex. The hook at the end of the groin defined the end of this point of land. Three islands were planned for the lakeshore north of Montrose Beach.

Conclusion

The lake front by right belongs to the people Not a foot of its shores should be appropriated by individuals to the exclusion of the people. On the contrary, everything possible should be done to enhance its attractiveness and to develop its natural beauties, thus fitting it for the part it has to play in the life of the whole city. It should be made so alluring that it will become the fixed habit of the people to seek its restful presence at every opportunity.

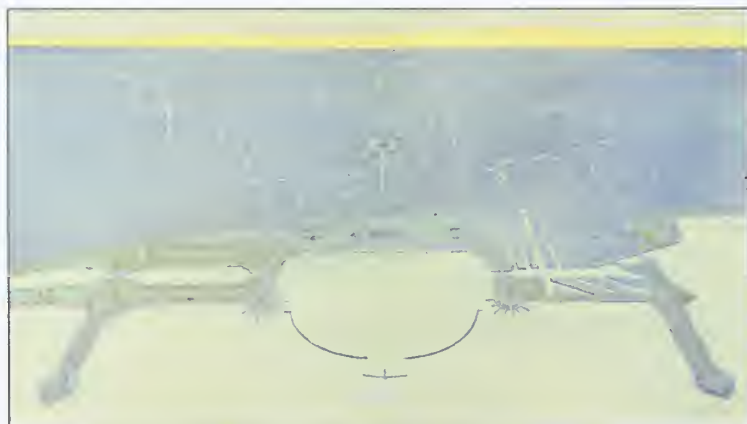
—*Plan of Chicago* 1909, p. 50

As we celebrate the centennial of the publication of *Plan of Chicago*, the challenge presented in the quote by Burnham and Bennett has nearly come true. Of the 27 miles of Chicago lakefront, only 4 miles are without public access.

This field trip guidebook demonstrates that, as the lakefront park system developed through the twentieth century, much of the design proposed in *Plan of Chicago* was altered. However, through all lakefront development subsequent to 1909, the spirit of *Plan of Chicago* has persisted—in achieving lakefront public access as well as lakefront aesthetics, continuity, order, function, and durability. The lasting impact that Daniel Burnham has had on the Chicago lakefront is without question. Notably, of the four major park segments along the lakefront, Burnham Park is named for this architect. The other three are named in honor of U.S. presidents (Lincoln, Grant, and Jackson Parks).

Coastal geology has been a critical factor in the building of the Chicago lakefront. What *Plan of Chicago* proposed for the lakefront was essentially a transformation of this nearly linear and featureless coast to a barrier-lagoon coast, which, interestingly, was what existed along this shore during the time of the Graceland Spit (page 7). The ridge and swale topography at Jackson Park that influenced the designs for the park and Columbian Exposition also was a record of that past coastal setting (page 8).

We can only speculate what Daniel Burnham would think of the present-day Chicago lakefront. The fact that the Chicago lakefront is recognized as the crown jewel of this city would certainly be a pleasant finding. The modern lakefront was the vision that Daniel Burnham gave to Chicago. His vision became the vision of many.



Source: *Plan of Chicago* 1909, Plate LXXXVI

Figure 62 This view looks west across the central harbor and Grant Park. The *Plan of Chicago* gives this part of the lakefront the most formal design. Today, as Burnham envisioned, Grant Park is the centerpiece and most formal of the lakefront parks.

Figure 63 Late 1980s: Example of deteriorated first-generation revetment (timber and stone) at Burnham Park.

In the 1990s, options were considered for remediating the deteriorated timber-crib, stepped revetments along the Chicago lakefront. The least-cost solution would have been to superimpose these structures with riprap and transform them into rubble-mound revetments.



Photograph by M. Chrzastowski, Illinois State Geological Survey



Photograph by M. Chrzastowski, Illinois State Geological Survey

Figure 64 Late 1990s: Example of a second-generation revetment (steel and concrete) near Adler Planetarium.

The decision to build a new generation of stepped revetments using steel sheet pile and formed-in-place concrete preserved lakefront access and aesthetics and preserved the spirit of Plan of Chicago.

Acknowledgments

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Technical review of the draft guidebook was provided by colleagues from outside the ISGS. Appreciation is extended to Charles Shabica (Emeritus Professor, Northeastern Illinois University) and Daniel Injerd (Illinois Department of Natural Resources, Office of Water Resources).

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