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United States Department of the Interior
National Park Service

National Register of Historic Places Multiple Property Documentation Form

This form is for use in documenting multiple property groups relating to one or several historic contexts. See instructions in *Guidelines for Completing National Register Forms* (National Register Bulletin 16). Complete each item by marking "x" in the appropriate box or by entering the requested information. For additional space use continuation sheets (Form 10-900-a). Type all entries.

A. Name of Multiple Property Listing

Cobscook Area Coastal Prehistoric Sites

B. Associated Historic Contexts

The Ceramic Period
Susquehanna Tradition

C. Geographical Data

[redacted]

[X] See continuation sheet

D. Certification

As the designated authority under the National Historic Preservation Act of 1966, as amended, I hereby certify that this documentation form meets the National Register documentation standards and sets forth requirements for the listing of related properties consistent with the National Register criteria. This submission meets the procedural and professional requirements set forth in 36 CFR Part 60 and the Secretary of the Interior's Standards for Planning and Evaluation.

Signature of certifying official — Date: 5/1/90

Maine Historic Preservation Commission
State or Federal agency and bureau

I, hereby, certify that this multiple property documentation form has been approved by the National Register as a basis for evaluating related properties for listing in the National Register.

Signature of the Keeper of the National Register — Date: 6/27/90

[redacted]

These boundaries conform to natural boundaries or ecotones with the exception that the eastern boundary of the Multiple Resource Nomination is formed by the International Border with Canada. All of Passamaquoddy Bay would surely be included in a larger Quoddy Region nomination if it were part of the United States.

E. Statement of Historic Contexts

Discuss each historic context listed in Section B.

Sites or artifacts representative of the full range of New England prehistoric periods have been found in eastern Maine or the Maritimes provinces, within which the Quoddy Region and greater St. Croix River basin lie. The Cobscook Area, including the tidal shoreline from Cutler around Cobscook Bay to Read Beach, is the portion of the Quoddy Region falling within the United States. Paleo-Indian populations were present in the Maritimes by about 11,000 B.P. (Spiess and Wilson 1989). Paleo-Indians moved into the area from the south and west shortly after the retreat of the glacier, probably following large game animals such as caribou, and possibly mammoth and mastodon. Relative sea level during the Paleo-Indian period was much lower than it is today. If there were coastal sites associated with Paleo-Indians they would be well under water today, and probably either badly eroded or buried under postglacial sediments. Early and Middle Archaic (circa 10,000 to 6000 B.P.) populations are poorly represented in the eastern Maine and Maritimes region. As yet there is no evidence for coastal sites of Early or Middle Archaic Periods, but there are lithic artifacts relating to both periods in the interior (Sanger 1986). Again, rising sea levels have probably destroyed the coastal sites of these populations. Late Archaic artifacts of the Maritime Archaic, Laurentian, and Shield Archaic Traditions have all been identified in the eastern Maine and Maritimes region. The Moorehead Phase of the Maritime Archaic Tradition (circa 4200 to 3800 B.P.) is found in the interior St. Croix system at Spednik and West Grand Lakes. The Shield Archaic Tradition is represented in New Brunswick (Deal 1986, Sanger 1986, Tuck 1984).

The Susquehanna Tradition dominates the end of the Late Archaic period (circa 3900 to 3100 B.P.). This tradition is well represented in the eastern Maine and Maritimes region. Susquehanna lithic styles are distinctive, beginning with large, broad points (Atlantic Phase) made almost exclusively of local materials, then eventually evolving to somewhat smaller, narrower points. Much debate centers around who the makers of the Susquehanna Tradition tools were and from where they came (Sanger and Bourque 1986, Spiess 1989, Tuck 1984). Because of rapid coastal erosion which selectively destroys earlier occupations, and because of the relatively late date of the Susquehanna Tradition, material of that age will likely be the earliest material found in uneroded context in coastal sites in the Quoddy Region.

Ceramic period (circa 3000 to 350 B.P.) sites (called Woodland elsewhere in the Northeast) can be recognized by the presence of fired clay ceramics. Differences in ceramic styles form the diagnostic material which determines the sequencing of Ceramic periods. Though particularly useful to the archaeologist as a relatively accurate measure of Ceramic chronology, the use of ceramics does not necessarily indicate much change in the lifestyle of the users (though some increase in sedentism may be implied). Faunal remains indicate Ceramic adaptation to the environment to have been a generalist procurement strategy.

[X] See continuation sheet

Ceramic sites of eastern Maine and the Maritime provinces are largely of Middle and Late Ceramic age, although Vinette-I (Early Ceramic, circa 3000 to 2000 B.P.) pottery sherds have been found at Minister's Island and West Grand Lake. Middle Ceramic (circa 2000 to 1000 B.P.) sites are plentiful in eastern Maine and the Maritime Provinces. Early Middle Ceramic sites contain well fired, grit tempered pottery decorated with toothed tools producing "rocker dentate stamped" and "pseudo-scallop shell" patterns. Ceramics from later in the Middle Ceramic period tend to be more coarse, dentate stamped, often with incised lines or punctates. Late Ceramic (circa 1000 to 500 B.P.) sites often overlie Middle Ceramic and Late Archaic sites. The early Late Ceramic is not uncommon in the Maine - Maritime region. "Cord-wrapped stick" or "cord-wrapped paddle" decorated pottery tempered with either shell or grit has been recovered from a number of sites (Diggity, Portland Point, Mud Lake Stream and Great Spruce Island to name a few). The end of the Late Ceramic period is also represented by Iroquois-like pottery in the Fehrer collection from the interior (Sanger 1986, Tuck 1984).

Archaeological research began early in the Quoddy Region, although relatively little has been done in the Cobscook Area. In 1797, Judge Robert Pagan was able to settle, in favor of the British, a border dispute between Canada and the United States by excavations establishing the settlements of DeMont and Champlain on St.Croix Island. However, nearly a hundred years passed before anyone else took an interest in the archaeology of the region. Most notably, in 1883, George F. Matthews excavated a shell midden and associated dwelling depressions in northern Passamaquoddy Bay near the mouth of the Bocabec river in New Brunswick. His techniques and excellent report, including lifestyle reconstructions, have been largely corroborated by archaeologists today. Little research followed Matthew's work until the 1950's when Douglas Byers began working on sites in Maine and the Maritime provinces. In the 1960's, Richard Pearson tested three sites, Sand Point, Minister's Island and Pagan's Point, for Canada. A radiocarbon date was obtained from each of these sites (Sanger 1986).

In the mid 1960's, David Sanger began a long range project of archaeological survey and excavation in and around Passamaquoddy Bay. From 1967 to 1979 several sites were excavated under Sanger's supervision including Sand Point, Minister's Island, Teacher's Cove, and the Carson site, all in New Brunswick. Survey of the lakes drained by the St. Croix River began in 1967 leading to Michael Deal's excavation of the Mud Lake Stream site in 1983.

Patricia Allen of New Brunswick Historic Resources Administration, surveyed both the U.S. and Canadian side of portions of the St. Croix International Waterway in 198 . Diane Kopec has analyzed the amateur Eddie Brown's collection from the area and visited those sites (Sanger 1986, Kopec 1985).

Like the rest of the Maine - Maritimes region, the Quoddy Region and St. Croix River drainage provide much more data about prehistoric occupations beginning with the Late Archaic period. As previously mentioned, the Moorehead component of the Maritime Archaic Tradition is found in the interior at Spednik and West Grand Lakes, but not on the coast (again, probably due to coastal erosion). Susquehanna occupance is well represented. At the Mud Lake Stream site a Susquehanna Tradition feature has multiple dates of about 4,000 B.P., somewhat earlier than many dates to the south (Deal 1986). In addition to the Mud Lake Stream site, the Susquehanna Tradition is found at other Quoddy Region sites: Diggity, Teacher's Cove, Portland Point, Minister's Island and Moose Island among them (Sanger 1986, Tuck 1984). A soapstone bowl fragment, representative of the late Susquehanna Tradition was recovered at Portland Point (Deal 1986). Interestingly, the Susquehanna sites of the Quoddy Region show a general lack of shellfish, though some of the Susquehanna components do underlie later middens (Sanger 1986).

Little evidence for Early Ceramic (circa 2800 to 2200 B.P.) populations in the Quoddy Region comes from Minister's Island, and from the interior St. Croix River system at West Grand Lake. By 2000 B.P., prehistoric occupation is plentiful as evidenced by many Ceramic shell middens present in the Quoddy Region (Sanger 1986). Sanger, based on his north Quoddy Region work from the mid 1960s through the 1970s, has described a Ceramic tradition lifestyle he calls the Quoddy Tradition (Sanger 1986: 148-153). Sites of the Quoddy Tradition were occupied by people of Middle and Late Ceramic periods (circa 2200 to 350 B.P.). Analysis of site locations, dwellings, fauna, ceramics and lithics all combine to define the tradition. Quoddy Tradition sites should be found on fairly level ground, usually facing south to southeast for protection from prevailing winter winds. They should be positioned near a small-craft-worthy beach for all-tide access to the water, with clam flats and often fresh water nearby. The midden/refuse area of Quoddy Tradition sites are located near the edge of the sea. Semi-subterranean dwellings tend to be toward the back of the site. Homes were apparently wigwam like structures built over an oval shaped depression with beach sand and gravel stratified floors. The houses were the locus of (large amounts of) tool

manufacturing activity, indicating cold weather occupation. Communal sharing of large game may be represented at one site, Sand Point, by the distribution of what could be one moose among three or four dwellings (Sanger 1986). Quoddy Tradition people focused their subsistence pursuits for part, or perhaps most, of the year on marine resources. Within the middens, ring shaped fire hearths are rare. Rather, hearths are present throughout the midden which seems to indicate clam-bake style cooking. Faunal remains indicate a generalized procurement strategy with white-tailed deer, moose, beaver, caribou, and seal representing the major caloric and protein contributions. Fish remains are scarce. Various analyses of faunal remains indicate mostly cold weather residence at the north Quoddy Region sites, but the presence of year round species make occupation at any season possible (Sanger 1986). Anita Crotts' (1984) review of lithic artifacts from several sites in the Quoddy Region indicate that almost 50% are produced from imported material. Lithic artifacts include projectile points, knives and scrapers. Additionally, many bone artifacts including awls, harpoons and beaver-tooth chisels are recorded from the Quoddy Tradition sites (Sanger 1986).

David Black (1986, Bishop and Black 1988) refers to the coastal Ceramic occuptions of the Quoddy Region as the "Maritime" Woodland period. Middle Maritime Woodland faunal remains from the Partridge Island site infer both warm and cold season occupations. The remains also indicate a more intense marine focus than do the faunal assemblages from the northern Quoddy Region mainland sites. A greater diversity of mollusc remains is also reported from Partridge Island.

The climate of the Quoddy Region is similar to that of the greater Bay of Fundy region, of which it forms the western edge. The Quoddy Region is more temperate than its neighboring inland vicinity. Average temperatures range from lows of 17 degrees Fahrenheit in January and February to highs of 65 degrees Fahrenheit in July and August. Precipitation is distributed fairly evenly on the average throughout the year, and humidity generally ranges from 72-85%. Fog is common in spring and summer. Summer winds are usually from the south or southwest at an average of ten knots, while winter winds arrive predominately from the north to northwest and average 20 knots. There are, of course, storms. Low pressure centers travelling up the east coast from the southwest and across the continent from the west, converge in the Quoddy Region, and produce variable weather sometimes accompanied by gale-force winds, most often in winter. During the late summer, tropical storms and hurricanes may pass through. Icing of the

coastline is heaviest in sheltered reaches like Denny's Bay (where site 80.15 is located), and snowfall is heaviest from December to March (Thomas 1983).

Where not controlled by bedrock outcrops, the topography surrounding Cobscook Bay is mostly flat to gently sloping where it is not cut by the steep gullies formed by new streams. The stream systems are generally branching networks. Much of the area's surficial deposits are composed of Presumpscot Formation glacio-marine deposits (silts and clays generally), till, end-moraines and exposed bedrock. The Presumpscot Formation materials were deposited when sea level was higher than at present, circa 13,500 to 12,000 B.P. Till deposits generally conform to the bedrock surfaces that they overlie and were deposited directly by glacial ice. The end-moraine deposits form ridges of varying length, width and depth, which were left at the terminal zone of the Late Wisconsin glacier either by glacial ice or by emergent meltwater streams (Borns 1975).

Bedrock formations in the area are unlike other Appalachian formations. During the Silurian and Devonian epochs up to 7 kilometers thickness of volcanic rock were deposited in the Quoddy Region. The syncline which formed here in the Acadian mountain building episode trends toward the north to northwest, contrary to the prevailing north-eastering Acadian folding of other regions. In the Upper Devonian the region became a downfaulted alluvial basin, unlike any others found to the east of the Appalachians. At this time, coarse conglomerates also containing extrusive volcanics and granitic rocks were deposited. During the Carboniferous the Oak Bay Fault, with a north to northwest trend, offset the older rocks. Later in the Carboniferous, east to northeast striking faults divided the Quoddy Region into separate fault blocks with their own unique lithologies. In the area, Precambrian, Ordovician, Silurian and Devonian age stratified rocks can all be observed (Gates 1984). Some of these rocks have qualities that made them useful, in the last few thousand years, to the prehistoric inhabitants of the region.

The "Surficial Geology" map of the Eastport quadrangle (Borns 1975) shows much exposed bedrock. At least half of the map's area is depicted as having bedrock outcrops. In the Denny's Bay area, within the large Cobscook anticline, bedrock outcrops belong to the Denny's and Edmund's Formations of Middle Silurian age. Bedrock in the immediate vicinity of the Reversing Falls site is of the Edmund's Formation. Diverse marine fauna such as brachiopods, trilobites, gastropods and corals are present and indicate Wenlockian and Ludlovian eco-communities of the latter Silurian

(415 to 405 million years ago). Occasional fossils were recovered in the excavated midden trench. Bedrock is a varied complex of marine volcanics which include basalt flows (these are more common in the Denny's Formation), rhyolite flows and domes of tuff-breccias. Bedded tuffs, fossiliferous shales and siltstones also contribute to the complex. To the north and west (inland) of site 80.15 the Edmund's Formation is overlain by the Upper Silurian age Leighton Formation, composed of gray shales and siltstones. The shales and siltstones are intercalated with basalt and rhyolite flows along with tuff-breccias. All were deposited in shallow water (Gates 1984). Lithic tools made from rhyolites, tuffs, siltsones and black volcanics (basalts?) are all present in Passamaquoddy Bay sites (Crotts 1984).

The Cobscook area is well forested. Vegetation in the Quoddy Region has gone through considerable change during the Postglacial era beginning about 12,000 years B.P. A short period of tundra gave way to forest associations with varying dominance of birch and poplar, spruce, then pine, birch and other hardwoods. There was an increase of hemlock approximately 6600 years ago complimented by a decrease in pine. Hardwoods (beech) were dominant in the forest from about 5100 years B.P. until about 2000 years B.P. when hemlock increased again. Over the last 2,000 years an ongoing increase in the frequency of spruce in the forest has been complimented by diminishing numbers of hemlock (Mott 1974 cited in Hinds 1983). The modern forest in the Cobscook Area is classed as New England's Zone 1, a "spruce-fir-northern hardwoods" forest. Zone 1 is made up of two basic subzones. Denny's Bay falls into the subdivision occurring on lower slopes and fairly well-drained soils. The forest consists mostly of beech, sugar maple, yellow birch, hemlock, red and white spruce, and balsam fir. Ferns and herbaceous plants, bunchberry, Canadian mayflower and sarsparilla are all undergrowth common to this type of forest. Shrubs of blueberry, sheep laurel and mountain laurel are also present (Hinds 1983, Westveld 1956).

The array of terrestrial fauna found in the Quoddy Region is not unusual when compared with the rest of Maine. Today however, the relative seclusion of the Pembroke area offers a desirable habitat for the less human-tolerant species. And in marine fauna, the area offers a much longer species list than do most other coastal areas of Maine, perhaps longer than the list provided by most of the United States' east coast. Terrestrial fauna present in the area include snowshoe hare, various small rodents, gray and flying squirrels, porcupine and beaver. Carnivores include coyote, river otter, skunk, terrestrial mink, black bear, raccoon, bobcat

and lynx among others. Moose and white-tailed deer are the primary large wild herbivores. Caribou, eastern mountain lion, timber wolf and sea mink are locally extinct due to over exploitation and environmental changes.

As mentioned above, the number of marine mammals present in the Quoddy Region is large. Harbor and gray seals are the phocid species present. Both harbor and gray seal populations have,in the past, been subject to bounty hunting, so their populations have been reduced from carrying capacity. Since the mid 1970s, all sea mammals in the United States have been protected by the Marine Mammal Act. Both species do still haul out on breeding grounds on the east side of Grand Manan Island. A total of 17 cetacean species are present in the region. The endangered right and humpback whales are regularly seen in the area along with the far more common minke whale. Harbor porpoise is also commonly seen while the white-sided dolphin is spotted less regularly.

The large number of mammalian marine species reflects high productivity maintained by the extensive vertical mixing caused by the area's large tidal amplitudes. Though lowest of the tidal ranges for the entire Bay of Fundy (maximum range of 16 meters in Minas Basin), the Quoddy Region still averages 5 to 5.5 meter tidal amplitudes, providing considerable mixing (Thomas 1983). This vertical mixing cools the surface water even in summer as it is freshly enriched by the cooler, deep water (Appolonio 1979). Large quantities of herring and mackerel inhabit the waters from late spring through fall, providing food for harbor porpoises and the once common harbor seal. Vertical mixing is also responsible for high populations of phyto- and zooplankton which attract the baleen whales to the Quoddy Region.

The avian faunal list for the Quoddy Region is long. The variety of water birds in the region is higher in the winter, while the converse is true for the land-based birds. The Christmas day list for water birds in the Eastport-Campobello circle (essentially the mouth of Cobscook Bay) lists 27 species including loons, grebes, cormorants, eleven duck species, mergansers, sandpipers, gulls and alcids. Also common in winter are eagles and osprey, while the warmer seasons see herons and king-fisher as well (Christie 1983).

The Cobscook Area is an artificial subset of the larger Quoddy Region, caused by the International border which runs through the Quoddy Region. In defining the site types, periods of significance, and related research topics for the Cobscook Area, we draw upon the much larger body of available research for the Quoddy Region. The dominant site type in the Quoddy Region, and

indeed along the whole coastal zone of Maine, is the shell midden (further defined under FII of this nomination). Sites without appreciable shellfish content in their matrix are non-shell middens. Non-shell middens may be either sites that never had much shell in their matrix, or portions of former shell middens from which the shell-bearing portion has eroded, or from which a thin shell deposit has been dissolved by humic acid or other natural soil processes. Coastal erosion in the Quoddy Region has eliminated almost all sites with components predating the Ceramic Period. Only the Ceramic Period, and its immediate predecessor, the Susquehanna Tradition, are likely cultural affiliations for components at sites in the Cobscook Area coastal zone.

A draft Susquehanna Tradition State Plan study unit (Spiess 1989) contains 11 research significance themes to which Susquehanna Tradition site components can contribute. Because of the extensive erosion in the Quoddy Region, which has eroded portions of many sites and totally eroded others so that they exist only as scatters of lithic material, we will be unlikely able to address more than a few of these themes with extant data. For example, "Culture History" and "Settlement Pattern" are hard to address without the stratified sites and uneroded, large sites or large samples of small sites. "Subsistence Patterns" might be addressed with partially preserved deposits that yielding bone or charred plant remains. "Transportation, Trade and Commerce" can be addressed, in part, by identification of lithic raw materials in debitage and tool samples and their percentage in a given assemblage. Stone is the most likely database to survive the erosion of the region.

A broader range of research topics can be addressed with the larger sample of Ceramic Period material from the Cobscook Area. No State Plan study unit for the Ceramic Period exists yet, so we discuss the relevant research topics in outline only. "Culture History" includes both the topic of internal culture change within the archaeological sequence in the region, and the topic of ethnohistory. Any securely dated component contributes to the understanding of culture change, most valuable in terms of the ceramic chronological framework proposed by Petersen and Sanger (1989). Detailed geographic distribution patterns of certain material culture items (eg. ceramic designs, perhaps decorative styles on bone tools, on gaming pieces, decorative and non-secular objects) can possibly be used to trace population or ethnic boundaries through time. These topics might be of special interest to the Quoddy Region Native American population, primarily the Passamaquoddy tribe. Various aspects of "Settlement Pattern" and "Subsistence" are incorporated into Sanger's definition of the

Quoddy Tradition. Shell middens, with excellent bone and shell preservation, are particularly useful for answering questions concerning diet and season of occupation. Source studies for lithic material contribute to understanding "Transportation, Travel, Trade and Commerce." "Mortuary Patterns" and "Human Biology" require human physical remains, which are so far absent from the archaeological sample.

F. Associated Property Types

I. Name of Property Type Shell midden

II. Description

A shell midden is a habitation site where occupation debris includes the shells of invertebrates in sufficient quantity (1) to be visible throughout a majority of the volume of the site matrix and (2) to neutralize the natural acidity of Maine soil to an extent that vertebrate bone is preserved with relatively little degradation. The invertebrate shell in the matrix may represent as little as a few percent of the volume of the site matrix, may consist of one or mixed species, may be stratified or unstratified, and may occur in a layer as thin as 2-3 centimeters. The habitation debris may be from very short term occupations (a few hours

III. Significance

Two characteristics of shell middens differentiate them from many other sites in Maine. First, they contain substantial quantities of invertebrate shell, which neutralizes soil acidity and preserves vertebrate bone remarkably well. This property provides archaeologists the opportunity to study prehistoric diet and related topics such as season of use. These topics are basic data for much understanding of hunter-gatherer cultural adaptation. Moreover, bone preservation preserved bone tools, which augments the strictly stone-tool and ceramic data base for culture history and stylistic variation. Second, the volume of shell midden matrix is often mostly composed of human-imported material: the shell, or course, and gravel or other fill used to prepare living surfaces.

IV. Registration Requirements

Using the standards in the draft Susquehanna Tradition State Plan Study Unit, the first site in a Multiple Resource nomination area yielding a Susquehanna Tradition component is significant at the local level if that site will yield a reasonable sample of diagnostic artifacts separable from other stone tools through vertical or horizontal stratigraphy. This criterion allows designation as significant a site which will yield some regional data on Susquehanna Tradition tool form, raw material usage, and stylistic detail from stone tools. Further Susquehanna Tradition components in the nomination area are significant only if they will yield a stone tool component separable from other time periods by vertical or horizontal stratigraphy and in association with one or more of the following: features yielding faunal remains and/or floral (charred plant) remains, and/or human biological remains.

Ceramic Period shell middens must minimally contain a component of stone or bone tools and/or ceramics from an identifiable, relatively limited portion of the Ceramic Period, and provide the opportunity for controlled excavation over a substantial area,

[X] See continuation sheet

[X] See continuation sheet for additional property types

G. Summary of Identification and Evaluation Methods

Discuss the methods used in developing the multiple property listing.

Maine archaeologists have now completed reconnaissance survey of roughly 50% of the Maine coastline, locating approximately 3000 prehistoric sites, 95% or more of which are shell middens (Belcher 1989; Bourque 1981, 1982, 1984; Hamilton 1985; Kellogg 1982, 1984, 1985; Spiess and Hedden 1983; Yesner 1979, 1980; and see discussion of research in adjacent New Brunswick in the Historic Context portion of the nomination). Less than 10 sites (0.3%) of that sample do not abut the eroding (sinking) coastline. Thus, the vast majority of coastal sites, both shell middens and non-shell middens, are visible along the eroding coast without extensive shovel testing. Because earlier sites were more likely built on landforms at lower elevation near the (rising) sea, there is a greater bias against the above-water preservation of older sites (Archaic versus Ceramic, early Ceramic versus later Ceramic). Thus, even without much survey in the Quoddy region, we can develop expectations for site preservation, which incidentally will be much worse than on the more slowly sinking central Maine coast.

Professional prehistoric archaeological work in the Quoddy Region has been sporadic at best. There are 56 known sites within

[X] See continuation sheet

H. Major Bibliographical References

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1979 The Gulf of Maine. Courier-Gazette, Rockland.

Borns, Harold W.
1975 Reconnaissance Surficial Geology of the Eastport Quadrangle,Maine. Department of Conservation, Augusta.

Bourque, Bruce J.
1981 Report on Archaeological Survey Activities Conducted by the Maine State Museum in Penobscot Bay, 1980. Report on file, Maine Historic Preservation Commission, Augusta.

1982 Report on Archaeological Survey Activities in Penobscot Bay, 1981. Report on file, Maine Historic Preservation Commission, Augusta.

[X] See continuation sheet

Primary location of additional documentation:

- [X] State historic preservation office
- [ ] Other State agency
- [ ] Federal agency
- [ ] Local government
- [ ] University
- [ ] Other

Specify repository: Maine Historic Preservation Commission

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Associated Property Type: Shell midden

II. Description continued.
to days), perhaps repeated more than once but not necessarily, or from much longer term occupations. The mechanism(s) of formation of shell middens is currently a matter of research and debate (Will 1976, Spiess 1988 and references therein, Belcher 1989), but the physical dumping of "messes" of shell on an occupation surface is the generally accepted overall model.

III. Significance continued.
Because of the high volume of human-imported material, shell middens grow vertically as human occupants create their own cultural stratigraphy. In an environment such as the Maine coast which is highly erosional, this depositional human behavior creates stratigraphic sequences where there would not otherwise be any. Our understanding of culture history benefits as a result. Only in certain fine alluvial sequences along interior rivers is such stratigraphy surpassed, and in those situations there is little bone preservation.

IV Registration Requirements continued.
minimally 5 meters in shortest horizontal dimension (ie. greater than 25 square meters), will be considered significant. Either the site must have been utilized for a limited portion of the Ceramic Period, or there must be good stratigraphic separation within the shell midden. By definition, the shell midden will contain faunal remains (invertebrate shell). The presence of vertebrate faunal remains, features and living surfaces contributes additionally to site significance. Since horizontal and vertical integrity is a key factor in the minimum criteria of site significance, those sites that have been substantially damaged by human action, including looting and unsystematic digging, may not meet the above defined minimum significance criteria.

I. **Name of Property Type: Non-shell-midden**

II. Description

Any prehistoric archaeological site on the coast which contains evidence of prehistoric occupation in the form of lithic material, bone, charred plant material, and/or features, but does not meet the criteria for a shell midden is placed in this category. There is at least one large, intensely occupied site on the central Maine coast, the Goddard site (30.42), which has such a low shell content that the inhabitants were evidently not concerned with shellfish collecting as a subsistence pursuit. A site may also be classed as a non-shell-middens if it at one time contained internal diversity in structure and if the shellbearing portion has eroded away, or if the soil matrix has been eroded or altered such that shell fragments, if once present, have not survived.

III. Significance

Research on the central coast of Maine, in particular at the Goddard site, has demonstrated that non-shell middens may have performed a special function in Late Ceramic subsistence and settlement as a summer gathering place for large numbers of people. However, a systematic search by Dr. Steven Cox for other sites similar to the Goddard site has failed to locate any. Some well preserved shell middens on Maine's central coast and in Passamaquoddy Bay contain areas with little or no shell, often located toward the back of the midden. Black (1986) suggests that there may be seasonal differences in use of one shell midden, meaning that the back/ often non-shell areas may be seasonally differentiable as habitation or use areas. Even if a shallow shell midden has lost its shell content only through in-situ humic acid (and acid rain) solution, horizontal integrity and some features, such as stone lined fire hearths, may survive.

IV. Registration Requirements

Using the standards in the draft Susquehanna Tradition State Plan Study Unit, the first site in a Multiple Resource nomination area yielding a Susquehanna Tradition component is significant at the local level if that site will yield a reasonable sample of diagnostic artifacts separable from other stone tools through vertical or horizontal stratigraphy. This criterion allows

designation as significant a site which will yield some regional data on Susquehanna Tradition tool form, raw material usage, and stylistic detail from stone tools. Further Susquehanna Tradition components in the nomination area are significant only if they will yield a stone tool component separable from other time periods by vertical or horizontal stratigraphy and in association with one or more of the following: features yielding faunal remains and/or floral (charred plant) remains, and/or human biological remains. These standards apply to non-shell middens as well as shell middens.

Ceramic Period non-shell midden sites in the nomination area are significant only if they will yield a stone tool and ceramic component from a limited portion of the Ceramic period, separable from other time periods by vertical or horizontal stratigraphy and in association with one or more of the following: features yielding faunal remains and/or floral (charred plant) remains, and/or human biological remains. Collections from eroded context on a beach are not eligible.

The Moose Island site (80.1) as described by Kingsbury and Hadlock (1951) would be eligible under these criteria at the time it was excavated. The occupation layer is described as a 1-inch thick dark soil layer from which fire-pits extended a foot or more into subsoil. An area of 2100 square feet was excavated in 1947 yielding 12 hearths. There must have been some horizontal concentration of material around these features. Although no ceramics survived in the midden, the site yielded more than a score of points identifiable as Early or Middle Ceramic in style, including varieties of stemmed lanceolate and lobate-stemmed points. There is one possible early Susquehanna Tradition point (Plate I, row 2, third from left), and several widely side-notched points from possible late Susquehanna Tradition (Plate II, bottom center). It is possible that some of the lanceolate points are earlier, from a Moorehead Phase occupation. However, the site was described as rapidly eroding in 1947, at the rate of about 1 foot per year after removal of beach gravel for road building. Moreover, it is not clear what portion of the site was excavated in 1947, but it must have been substantial. We consider it unlikely that much of the site survives, but it may represent a site type of which other examples have been preserved behind barrier gravel beaches.

the geographic area of this Nomination. They are listed in the Maine Archaeological Survey as: 63.2, 63.3, 63.6 through 63.8, 80.1 through 80.22, 80.25 through 80.51, and 80.53.

The first professional work within the area of this management unit was accomplished by Wendell Hadlock on the Moose Island site (80.1) in Eastport (Kingsbury and Hadlock 1951). Hadlock apparently worked with local amateur archaeologists, including Dr. Isaac Kingsbury of Hartford, Connecticut, who had a summer home in Perry, and two local collectors named Knapton. During the early 1950's the first 51 sites listed on what is now designated map Quadrangle 80 were entered into the records of the R. S. Peabody Foundation, Andover, Massachusetts, where Douglas Byers, a colleague of Hadlock's, worked. The R.S. Peabody Foundation excavated at another of these sites (80.39) in the 1950's (unpublished, note on site form). All 51 of these sites had been assigned R.S. Peabody Foundation site numbers when the R. S. Peabody Foundation records were used by Dean Snow to compile the first modern listing of Maine sites (Snow 1969). We know nothing about most of these sites, beyond a probable approximate location. I suspect that many of the site locations were obtained by Hadlock or Byers from the Knapton Brothers as a location at which stone tools could be found eroding onto the beach.

About 1972 David Sanger moved from the National Museum of Canada to the University of Maine at Orono, and turned his attention from the New Brunswick side of Passamaquoddy Bay, to the nearby areas in Maine. On 11 June 1975 he visited sites 63.2, 63.6, and 63.7 near Cutler and reported them to be shell middens 75 meters, 50 m and 50 m long respectively. He also visited site 80.6, without reporting its condition. On 7 July 1980, Arthur Spiess visited sites 80.14 and 80.29. Site 80.14 was confirmed to be a scatter of lithic material (debitage) on a gravel beach. Testpits dug along the edge of the erosion scarp revealed only sterile soil; all evidence of shell fragments, prehistoric artifacts or dark "midden" soil had disappeared. Site 80.29 could not be relocated; ie. there was no longer any evidence of prehistoric occupation on or near the indicated location. On 15 May 1986 Sanger visited sites 80.26 and 80.53. These two shell middens were reported to be 50 by 20- meters and 20 x 5 meters in extent. Site 80.26 is reported to have yielded a complete Ceramic sequence, and some incised pebbles, which are a rare Ceramic period artifact found in a few Passamaquoddy Bay sites (perhaps a gaming piece or shaman's mnemonic device. Then, in 1989, the Maine Historic Preservation Commission conducted a week-long test excavation at site 80.15, the only extensive excavation in the management unit since Kingsbury and Hadlock in 1947. As follow-up work on site

80.15 proceeded, Spiess visited sites 80.18 and 80.36 on 24 and 25 March 1990. No evidence of a site was found at or near the reported location of 80.18, meaning that is has probably been completely eroded. Site 80.36 yielded one chert flake exposed on the erosion scarp, but no shell was visible on the exposed soil. Presumably some of this site is intact, but its shell-bearing portions have been totally eroded.

Thus, including site 80.15, professional archaeologists have visited ten sites in the management unit area in the last 20 years. Three have proven so badly eroded as to be not significant (80.14, 80.18, 80.29). One, 80.36, may be near complete destruction. Five are reported with substantial remaining uneroded dimensions, which means they deserve intensive level testing and may be significant. Based upon this scant information, and what we know of site preservation and erosion in Passamaquoddy Bay, the majority of reported sites in this management unit will be found to be badly eroded, and hence not eligible for listing on the National Register of Historic Places. It is possible that site 80.15 is the largest, and best preserved, prehistoric site in the area of this Multiple Resource nomination.

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link from Two Harbors south to Duluth, connecting it to the nation-wide rail system. By that time, the company had 95.7 miles of track, 26,800 acres of property, thirteen locomotives and 340 cars, extensive shops and loading facilities at Two Harbors, and five open-pit mines at Tower. It ranked as the third-largest iron mining firm in the nation.[15]

The quick success of the company and the purity of its ores attracted the attention of major steel producers. Henry H. Porter, a Chicago railroad magnate with heavy interests in the Illinois Steel Company, headed a syndicate whose participants included John D. and William Rockefeller (Standard Oil Company), Marshall Field (a Chicago merchant), Cyrus McCormick (a farm implement manufacturer), and Jay C. Morse (Union Steel Company). Porter's syndicate acquired 25,000 acres of land to the northeast of Tower's property, hoping to somehow squeeze Tower out. In 1886, they approached Tower with a proposal to purchase the company's D. & I.R. Railroad. Soon afterward they proposed to purchase the entire holdings of the Minnesota Iron Company. When they resorted to more aggressive tactics, the elderly Tower agreed to sell to the syndicate for $8,500,000. Contemporary newspapers described the deal as "the largest transaction in the way of a cash sale that has ever taken place."[16] Porter immediately reorganized the Minnesota Iron Company, mechanizing some of its operations, adopting underground mining, and developing the new Chandler Mine near present-day Ely, where he built a new twenty-one-mile rail spur. The company opened the Pioneer Mine in 1889, the Zenith Mine in 1892, and the Savoy and Sibley Mines in 1899. The Chandler proved to be the most productive of the firm's mines, yielding 7,027,830 tons between 1888 and 1901, which represented 43.9 percent of the Vermilion Range's output. The Vermilion Range was highly successful. From 1892 through 1952, the range produced at least one million tons annually, with the exception of only a few years. 1902 was the peak year, during which the various mines shipped a total of 2,084,054 tons.

The loading facilities at Two Harbors were improved in the early 1890s. The port handled more than a million tons of ore annually. Docks 3 and 4 were built at Two Harbors in 1892 and 1893. Dock 5 was constructed two years later. By 1896, some 2,000 ships called at Two Harbors each year, and the tonnage had reached 2,000,000 tons. Docks 1 and 2 were rebuilt and lengthened in 1903 to

accommodate the demands for more tonnage. The old wooden docks were replaced with three concrete ones in 1907, 1911, and 1916.[17]

The Mesabi Range

Expeditions in the 1830s and 1840s brought back a general knowledge of northern Minnesota's geography, but it was David Dale Owen's survey between 1848 and 1850 that provided the first comprehensive details of the country. In the expedition's first year, the survey team recorded the ores around Vermilion Lake. In 1849, they found thin layers of ore at Gunflint Lake. In a guide to Minnesota published in New York in 1853, J. Wesley Bond wrote: "a mountain extends all the way between the St. Louis River and Pigeon River. It evidently abounds in copper, iron and silver. The terrestrial compass can not be used there, so strong is the attraction of the earth. The needle rears and plunges 'like mad'."[18]

Fur trader James Whitehead reportedly sank a shaft on the Mesabi Range near the present city of Grand Rapids in the early 1850s while representing St. Paul interests, but nothing is known of the enterprise.[19] The Hanchett and Clark surveys of 1864 focused on Vermilion Lake. They referred briefly to "evidences of a deposit of magnetic iron north of Duluth," but did not investigate its extent. Henry Eames found magnetic ores southeast of Vermilion Lake and at the Prairie River (the eastern and western ends of the Mesabi), but he was more interested in copper and gold, and attributed little value to the discovery. It was not until 1875, when Albert Chester investigated the region's minerals for Charlemagne Tower, that the Mesabi was examined again. Chester dismissed its importance because he had seen only the leanest of its ores at the eastern end of the Range. Because of the unfavorable Eames and Chester reports, the Mesabi remained undisturbed for another fifteen years.[20]

Christian Wieland of Beaver Bay, a member of Eames' 1865 expedition, was impressed with what he saw at the eastern end of the Mesabi. He approached Ontonagon and Duluth friends, who formed a syndicate in 1870 to explore the area, and perhaps acquire land. Syndicate member Peter Mitchell searched the area, gathered samples, and dug test pits. In 1872, the group bought up 9,000 acres of land near present Babbitt. In 1875, they incorporated the Duluth & Iron Range Railroad Company to transport the ore they

expected to find, but they failed to follow through on their scheme. Ultimately, the Minnesota Iron Company's Charlemagne Tower gained control of the railroad's charter and its land grants. Syndicate members then formed the Mesaba Iron Company in 1882 to develop their properties, but nothing came of it, and they eventually sold off their lands.[21]

The Lewis Merritt family of Duluth began searching northern Minnesota for minerals in 1888, after one of the family's seven brothers stumbled onto iron deposits near present Mountain Iron. They conducted systematic searches from the Canadian border to Grand Rapids on the Mississippi River, charting surface formations and recording places of magnetic attraction using compasses with dip-needles. Based on their observations, the Merritts acquired mineral lands through purchases and leasing. After four years, they had mapped out 500 square miles of Itasca, Cook, Lake, and St. Louis counties. They began excavating test pits at the most promising locations. On November 16, 1890, the Merritts' crew encountered the first body of soft ore on the Mesabi Range at present Mountain Iron.[22] John E. Merritt recalled the discovery:

> I remember just how beautiful that ore was, glinting blue there under the deep green of the pines. But I am unable to describe to you just what this No. 1 pit meant to us. It was a dream come true, the fulfillment of a hope long deferred, an urge to greater effort, a satisfying fact that nature had yielded to us the great secret she had guarded through all the ages.[23]

Shortly thereafter, the Merritts found ore at Biwabik, McKinley, and other nearby locations, while other parties were making their own discoveries. Frank Hibbing searched farther west and found a rich ore body. He leased several large tracts and incorporated the Lake Superior Iron Company. The holdings of this firm later included the Hull, Rust, Mahoning, Burt, and Sellers Mines, which were eventually combined into the world's largest open-pit mine. The town which later bore Hibbing's name was called the "Iron Capitol of the World." In 1891, Hibbing discovered ore ten miles to the north and east, in what is now Chisholm.

Towns were founded all over the Range as new discoveries brought more mines, more companies, and more men into the region. Mesaba

Station, Mountain Iron, Hibbing, and Biwabik were the first towns. Virginia was laid out in 1892, twenty miles east of Hibbing. It quickly earned the title of "Queen City of the Range." It was later to serve as headquarters for the Virginia & Rainy Lake Lumber Company, which ranked for a time as the world's largest white pine mill. Eveleth was platted in 1893 four miles south of Virginia. Author David Walker observed that:

> In the first three years of the 1890s the major communities and many of the significant Mesabi mines were located through the efforts of hundreds of individuals. Capital had been raised, often within Minnesota, to finance exploration and begin mining operations, and the people who would make the region one of the most ethnically diverse in the United States had begun to arrive.[24]

Faced with the problem of getting their Mesabi ore to market, the Merritts tried to convince existing Duluth railroads to build a branch to the Range, but they were met with disinterest. In February, 1891 the Merritts incorporated the Duluth, Missabe & Northern Railway Company. They worked out an agreement with the Duluth & Winnipeg Railroad to haul their ore from Stony Brook Junction (Brookston) to Duluth, and made plans to lay D.M. & N. tracks from the Junction to the mines, a distance of 48.5 miles. According to the ten-year pact, D. & W. would "furnish and maintain at its own cost ... all necessary terminal facilities on Lake Superior ... including sufficient and suitable docks for the cheap and convenient handling of the iron." A usable portion of the dock was to be available by August 1, 1892. D. & W. chose a dock site in Superior rather than at Duluth.[25]

Before construction of the railroad began, the Merritts signed an agreement to lease their Biwabik property to Sharon (Pennsylvania) steelmaker Peter Kimberly, who agreed to mine at least 300,000 tons of ore annually at a royalty of fifty cents per ton. Three months later, the Missabe Mountain Mine near Virginia was leased to Henry W. Oliver of Pittsburgh. Oliver agreed to mine a minimum of 200,000 tons in 1893, and 400,000 tons thereafter, for a sixty-five cent per ton royalty. He organized the Oliver Iron Mining Company in September, 1892 to undertake the project.[26]

The railroad connections between Allouez Bay and the mines were completed in October 1892. On October 18, a special D.M. & N. train with one ore car made the trip down the gentle grade to Duluth with the first Mesabi ore. The Duluth Evening Herald recorded its lading as "twenty tons of dark brownish purple soft ore ... which assays a trifle better than sixty-five percent iron ... consigned to Leonidas Merritt." On November 11, the first cars crossed onto the new dock at Allouez Bay and dumped 198 tons of ore into the waiting Barge 102. The dock was only partially complete at the time.[27]

By the fall of 1892, the Merritts' Duluth, Missabe & Northern Railroad served almost all the working mines on the Mesabi Range. The Merritts were anxious to bring the greatest benefits of their success to the Duluth side of the harbor, as had always been their intent. Lon and Alfred Merritt sought financial support from Charles Wetmore of New York City, an associate of John D. Rockefeller, and vice-president of the American Steel Barge Company.[28]

Wetmore proposed that the Barge Company assist the Merritts in raising capital in exchange for the exclusive right to transport the Merritt's Mesabi ores for a period of fifteen years. Lon Merritt signed the agreement with Wetmore on December 24, 1892. With new capital, construction of the rail lines and ore docks began early in 1893. The whole complex was ready for use by July of that year. The 2,304-foot dock, largest on the Lakes, received its first ore on July 22.[29]

1893 began as a banner year for the Merritt interests. Their combined enterprises controlled 116.83 miles of rail lines, as well as magnificent new loading facilities, eighteen brand new locomotives, and 1,318 rail cars. During 1893, the D.M. & N. Railroad hauled more than 500,000 tons of ore. The business of the Mesabi grew rapidly, necessitating repeated expansion of port facilities. Additional ore docks were built in 1896, 1899, and 1908 at Duluth, and in 1899 and 1902 at Superior. By the end of 1893, however, the Merritts suffered terrible losses due to the unforeseen financial panic which engulfed the nation.[30]

Business reversals and bank failures touched off the disastrous Panic of 1893, which brought widespread layoffs and plant closures.

The Merritts were badly overextended. Before the rail line and the dock were completed, they found themselves unable to get credit to purchase materials or to meet payrolls. According to one historian: "That they built well is not to be disputed; that they built too well may be argued; that they built too much too quickly soon became apparent."[31]

In December 1892, John D. Rockefeller bought $500,000 worth of D.M. & N. Railroad bonds. In July of the following year, Lon Merritt and Charles Wetmore approached Rockefeller for his direct support of the troubled Mesabi enterprises. An agreement was concluded whereby all of the Merritt-Wetmore properties were combined under the Lake Superior Consolidated Iron Mines. Rockefeller put up $2,000,000 to keep the enterprise in operation. As the depression deepened, the Merritts tried unsuccessfully to raise more money. With creditors pressing them on all sides, the brothers sought a buyer for their shares in the Consolidation, turning reluctantly to Rockefeller in December, 1893. They offered to sell him their stocks at $40 per share. Rockefeller declined. In January, the Merritts lowered their price to $10 per share. Rockefeller bought them out for $900,000.[32]

Rockefeller's aide, Frederick T. Gates, said:

> The Merritts weathered the storm of '93, but in January, 1894, their Minnesota creditors, not Mr. Rockefeller, forced the Merritts to sell their holdings to whomsoever would pay the most money for them. It so happened that Mr. Rockefeller, having some knowledge of the Missabe Range and believing in its future value, was willing to pay more for the Merritt stocks than anyone else. For that reason alone, after offering their stocks widely to capitalists and iron magnates, the Merritts sold their holdings to Mr. Rockefeller.[33]

A more sympathetic author asked:

> When the Merritt brothers, some of them, sold their Consolidated stock to Rockefeller in January, 1894, what did it bring? ...Wasn't it all of $900,000? Yet the value of their ore properties...might be reasonably

estimated at three hundred and thirty-three millions of dollars...[34]

In 1896, Rockefeller leased all of his Lake Superior Consolidated Iron Mines properties to the Carnegie Steel Company. Before that, however, Rockefeller had begun improvements. The rail lines were overhauled and improved, and a second dock was built at Duluth in 1896. By 1899 D.M. & N. was short of dock capacity again, and a third dock, larger than either of the two earlier ones, was built. In 1899, the Great Northern Railroad acquired a line to the Mesabi Range. They also bought the old Duluth & Winnipeg docks on Allouez Bay in Superior. A second large dock was added there that same year. Great Northern became a major Mesabi carrier. Numerous other changes were made to the mines, railroads, and docks between 1896 and 1901, resulting in greater efficiency and economy.[35] Mesabi productivity grew from 436,938 tons in 1893 to 1,994,868 tons in 1896, reaching 3,888,941 tons at the turn of the century. By 1900, tonnage from the Vermilion mines was 4,014,375. Within two years, however, the Mesabi would surpass the Vermilion in output and rank as the world's largest ore producer.

During the early days of the Mesabi's development, its ore was hauled in wooden freighters with consort-barges, or in the novel steel "whalebacks" built at West Superior, Wisconsin. These ships measured about 300 feet in length and could carry approximately 4,000 tons of cargo. Development of the Mesabi Range occurred concurrent with dramatic changes in shipbuilding technology. By the turn of the century most new ships were steel 500-footers. The introduction of larger vessels revolutionized the carrying trades and made it possible to haul bulk cargoes at a fraction of the old rates. This contributed to the primacy of Lake Superior's mines, which by 1900 produced seventy-five percent of America's iron ore.

The methods of handling ore also changed. When the Minnesota ranges first opened up, "gravity-style" loading docks had proven their utility, and were in general use. They superceded older, more labor-intensive methods of loading ships. Unloading (on the lower Lakes) was accomplished with steam-powered Brown hoists during the 1880s and early 1890s, but these required large gangs of dock workers to shovel the ore into the hoist's big buckets. Brown improved on the original designs, adopting a clamshell rig that could remove about ninety percent of the cargo mechanically. In

1899, George H. Hulett introduced a new unloader at Conneaut, Ohio, which could remove almost all the ore quickly and without manual labor. Each Hulett rig could unload more than 1,000 tons per hour.[36] Another economical feature of the Lake Superior iron ore trade was its ability to bring coal through the Lakes from Ohio ports on return trips. This made it possible to underwrite some of the costs of ore transportation. The first coal was shipped to the Head of the Lakes in the late 1870s. By 1887, the tonnage reached 1,000,000 tons annually. In the 1920s, coal receipts topped 12,000,000 tons per year, but then they began a slow decline until stopped entirely in the 1960s. Nevertheless, for many decades the coal market proved profitable for ore shippers.

In 1897, Rockefeller organized the Bessemer Steamship Company to carry ore from the Mesabi (Consolidated) and Vermilion mines in which he held interests. He began to build modern ships of the largest dimension, and contracted to carry Carnegie's ore as well as his own. In 1898, Henry Oliver, in cooperation with Andrew Carnegie, organized the Pittsburgh Steamship Company and built five large steel ore carriers to free them from dependence on Rockefeller's ships. By 1899, their fleet included eleven steamships and two tugs. They also had six more steamers under construction. Rockefeller's shipbuilding program was equally ambitious. In 1899, his Bessemer fleet included ten modern steamers and twelve steel barges. More were also building for that fleet.[37] The rival Minnesota Iron Company, with its holdings on the Vermilion Range, had organized the Minnesota Steamship Company in 1887. By 1899, they owned nine steamers and seven consort-barges, though all were much smaller than the modern Bessemer and Pittsburgh ships. Competition grew between the industrial giants.

The Cuyuna Range

Iron ore was suspected in Aitkin and Crow Wing counties as early as the 1830s. Crow Wing lumberman Cuyler Adams mapped out magnetic deflections to locate iron, in the late 1880s, but he was unable to interest backers due to the relatively low quality of the ore (twenty-thirty percent iron) and the difficulty of transporting it. Adams formed the Orelands Mining Company in 1903. He leased land near Rabbit Lake in 1907 to the Rogers Brown Ore Company, which began mining operations at what became the Kennedy Mine. By the Fall of 1908, there were thirty-four different parties with

interests in the new Range. Land values soared. The Cuyuna Range proved to be sixty-eight miles long, with different ore types than the Vermilion and Mesabi Ranges. Most of the Cuyuna ore was sandy, containing twenty to thirty percent manganese. Most of the ore was buried under glacial drift from a few feet to 150 feet in depth. Unlike the ores of the Vermilion and Mesabi Ranges, Cuyuna ore required washing or concentrating at the mine sites before it could be shipped.

The nearest rail link to the Range was at Deerwood, where the Northern Pacific passed about six miles from the mine. The Soo Line was built from Deerwood to Cuyuna, Crosby, and Ironton in 1910. New ore docks were built on the Bay at Superior in 1913 for Cuyuna ore. Northern Pacific built rail lines into the Cuyuna in 1912. From a single mine, Cuyuna tonnage totalled 147,649 in 1911. By 1920, there were twenty-nine mines on the Cuyuna Range, producing 2,191,528 tons. During World War II the United States was unable to obtain manganese ore from traditional sources in Russia and India. The demand for Cuyuna ore increased sharply during the next decades. Following a record 3,714,000 tons in 1953, Cuyuna production dropped. Mining ceased by 1977. Cuyuna ore was shipped from the Soo Line docks on St. Louis Bay in Superior, and from the Northern Pacific's docks on Superior Bay at the other end of town.

LOADING DOCKS HANDLING MINNESOTA ORES, 1884-1982[39]

TWO HARBORS, MINNESOTA

1884 D & IR Dock 2; Dismantled 1912
1885 D & IR Dock 1; Dismantled 1910
1892 D & IR Dock 3; Dismantled 1915
1893 D & IR Dock 4; Rebuilt 1902, Dismantled 1915
1896 D & IR Dock 5; Dismantled 1915
1908 D & IR Dock 6; Rebuilt 1924, later DM & IR, in use
1912 D & IR Dock 1; Later DM & IR; rebuilt 1978, in use
1916 D & IR Dock 2; Later DM & IR; in use

SUPERIOR, WISCONSIN

1892 D & W Dock 1; Rebuilt 1896, 1906, dismantled 1925
1899 D & W Dock 2; Rebuilt 1909, dismantled 1922
1902 Great Northern Dock 1; Rebuilt 1921, dismantled 1969
1911 Great Northern Dock 4, later BN; In use
1912 Soo Line Dock; Rebuilt 1918, dismantled 1931
1913 NP Dock 1; Rebuilt 1917, 1926, partly dism.1982
1922 Great Northern Dock 2; Rebuilt 1928, in use
1928 Great Northern Dock 3; In use
1978 Burlington Northern Taconite Dock; In use

DULUTH, MINNESOTA

1893 DM & N Dock 1; Dismantled 1913
1896 DM & N Dock 2; Rebuilt 1905, dismantled 1916
1899 DM & N Dock 3; Extended 1905, dismantled 1919
1908 DM & N Dock 4; Dismantled 1927
1918 DM & N Dock 5, later DM & IR; In use
1918 DM & N Dock 6, later DM & IR; Rebuilt 1982, in use
1967 DM & IR Lakehead Taconite Facility; In use

SILVER BAY, MINNESOTA

1956 Reserve Mining Company Taconite Dock, later Cyprus Minerals; in use

TACONITE HARBOR, MINNESOTA

1958 Erie Mining Company Taconite Dock; in use

United States Steel Corporation

At the turn of the century, a few large corporations dominated the American steel business. The top three producers were Carnegie Steel, Federal Steel, and National Steel. Two of these three firms also dominated Minnesota mines.

The Carnegie-Rockefeller Lake Superior Consolidated Iron Mine Company had thirty-four working mines, including eight on the Mesabi Range and four on the Vermilion. The others were on the Marquette, Gogebic, and Menominee Ranges in Michigan. The company also controlled the Duluth, Missabe & Northern Railroad and its loading docks at Duluth. H.H. Porter's Minnesota Iron Company dominated the Vermilion Range and controlled three mines on the Mesabi. It also operated the Duluth & Iron Range Railway along with its facilities at Two Harbors. Minnesota Iron was bought out by Illinois Steel in 1896. It was reorganized as Federal Steel two years later and financed by banker J. Pierpont Morgan.

The twentieth century brought recovery from the 1893 Panic. Markets for iron ore were stimulated, heating up competition between steel makers. J.P. Morgan held investments in several steel companies. He perceived that increased competition would ruin some of them. Therefore, he planned a colossal merger. Morgan bought out Carnegie's holdings for $492,000,000. Then he purchased Rockefeller's Lake Superior Consolidated Iron Mines, the D.M. & N. Railroad and the Bessemer Steamship Company, for $8,500,000 in cash and $80,000,000 in stock in the newly formed consolidation, United States Steel. In exchange for securities in the Corporation, Morgan eventually gained control not only of the Carnegie and Rockefeller operations, but also of Federal Steel, National Steel, American Bridge, American Sheet Steel, American Steel Hoop, American Steel & Wire, American Tin Plate, National Tube, and the Oliver Iron Mining Company. The assets of the Corporation included seventy-eight blast furnaces and rolling mills, vast holdings of iron ore, coal, and limestone, over 1,000 miles of railroad, and a Great Lakes fleet of 112 ships. With the capacity to produce 7,400,000 tons of finished steel annually, the "Steel Trust" controlled three-fifths of the nation's steel business.[40]

One firm which was not bought out by J.P. Morgan was James J. Hill's Great Northern Iron Ore Properties. Hill controlled 39,000 acres of land on the Mesabi Range, valued (in 1907) at $100,000,000. United States Steel regarded Hill as a formidable rival, since his ore holdings were almost as extensive as the Corporation's. U. S. Steel leased Hill's properties in 1907 to gain control over his ore, paying royalties more than twice as high as on other leases.[41] Great Northern became a major iron ore carrier, second only to the D.M. & N.

The two mining railroads, Merritt's Duluth, Missabe & Northern, and Tower's Duluth & Iron Range, were both prosperous at the time of the merger. In 1901, the D.M. & N. controlled seventy-two miles of track between Duluth and Mountain Iron, with another fifty miles of spurs, as well as a sorting yard at Proctor, three large ore docks at Duluth, thirty-seven locomotives, and 3,877 rail cars. The D. & I.R. owned sixty-eight miles of track between Two Harbors and Tower, as well as the twenty-six-mile line to Duluth, a twenty-one-mile link to Ely, and thirty additional miles of track to various Mesabi locations. The company also owned five docks at Two Harbors, seventy locomotives, and 3,635 rail cars.[42] U.S. Steel did not consolidate the two railroads until 1938, though significant improvements were implemented immediately, including laying heavier track in selected sections, and replacing wooden docks with larger ones of concrete and steel. U.S. Steel's Pittsburgh Steamship Company fleet was upgraded with the sale of some of the older and smaller carriers and construction of newer, larger ships. The firm began with 112 ships acquired from eight different predecessors in 1901. Over the next ten years, four vessels were lost, twenty-six were sold, while twenty-one were built or purchased. Between 1911 and 1920 three ships were lost, eighteen sold, and eighteen built or acquired.[43] The fleet never included a wooden ship.

With its enormous capital (authorized at $1,404,000,000) and extensive resources, United States Steel brought a high level of efficiency to the management of its Minnesota mining operations, and to the steel industry in general. Productivity increased dramatically as mining, rail transport, loading, shipping equipment, and milling operations were upgraded.

The Heyday of Minnesota Iron Ore Production

During the 1890s, Minnesota ore production reached 43,000,000 tons. Between 1900 and 1910, tonnage soared to 208,600,000, nearly five times that of the previous decade. From ports on Lake Superior and northern Lake Michigan, iron ore was transported on Great Lakes bulk carriers to Lake Erie ports, as well as to South Chicago, Illinois and Gary, Indiana on Lake Michigan. In 1910, iron ore comprised approximately one half of all bulk cargoes shipped on the Great Lakes.[38] Mesabi tonnage during the 1890s was 13,900,000, while Vermilion Range output totalled 19,500,000 tons. The Cuyuna had not yet come into production. After the turn of the century, Mesabi production surpassed the Vermilion. Vermilion tonnage averaged 8,000,000 tons annually through the 1930s, then climbed during the wartime years to 17,000,000 tons. Mesabi production rose to more than 20,000,000 tons annually during World War I, and again in World War II, though it dropped to a fraction of that figure in the inter-war years. The two World Wars created enormous demands for steel for shipbuilding, munitions, and industrial expansion in the Unites States and Allied nations. During the war years, the Twin Ports expedited methods of cargo handling. In one 72-hour period, seventy-seven vessels loaded at Duluth and Superior docks. Since World War II, demand has remained high, though the supply of ore has decreased. Mesabi output continues at approximately 20,000,000 tons per year. Vermilion production dropped steadily after a 1953 peak. The last Vermilion ore was shipped in 1963. Cuyuna production never attained the levels of the other Minnesota ranges. It averaged 1,000,000 to 3,500,000 tons until mining ended in the mid-1970s. Korean War production in 1953 consumed 21,500,000 tons of Vermilion ore, 28,000,000 tons of Mesabi ore and 3,700,000 tons of Cuyuna ore.[44]

Beneficiation of Ores

The demands of the wartime years led to eventual exhaustion of Lake Superior's richest iron ore reserves by the mid-1950s, although there remained enormous quantities of leaner ores which had not yet been tapped. As early as 1907, a beneficiation plant was built at Trout Lake on the western Mesabi Range for washing and concentrating low-grade sandy ores. In 1913, Professor Edward Davis of the University of Minnesota's Mines Experiment Station began developing techniques to extract iron from the hard taconite

rock which covered much of the northern part of the state. By 1952, there were 68 beneficiation plants in Minnesota for crushing, washing, screening, and otherwise improving the quality of the ore. In 1946, the Reserve Mining Company developed a taconite mine at Babbitt and a processing plant at Silver Bay on the North Shore, utilizing Professor Davis' patented technique. A town was laid out for the company's employees. The plant began shipping concentrated taconite pellets in April 1956. Most of the pellets were shipped out of Duluth-Superior and Two Harbors, but Silver Bay developed quickly as a major shipment point. A second port facility was built north of Silver Bay at Taconite Harbor in 1957.[45] By 1970, only 34,000,000 tons of the 54,000,000 tons of taconite produced in Minnesota passed through the Twin Ports.

In 1965, processed taconite constituted one-fourth of the iron ore consumed in the U.S. and Canada. It soon became impractical to mine or ship the older high-grade ore, because the taconite proved so economical and so uniform. In 1967, taconite shipments surpassed those of natural ores. By 1979, there were eight taconite plants operating or under construction across northern Minnesota. Several of the existing ore docks were being modified to load the new pellets. The supply of processed taconite is expected to satisfy the needs of American industry for many generations to come.

Through 1977, total United States output of iron ore was calculated at 5,400,000,000 tons. Mesabi's output amounted to 3,000,000,000 tons, or fifty-eight percent of the whole.

ASSOCIATED PROPERTIES

Not surprisingly, the iron ore business has resulted in numerous archaeological resources, both on land and in the waters of Lake Superior. From the earliest days of the Vermilion Range's production, accidents have occurred along the North Shore of Lake Superior, although the majority of the ships involved were recovered and returned to service. The tragic storm of November 1905 claimed seventy-eight lives and disabled or destroyed eighteen ships, primarily at the western end of Lake Superior. Several of these ships were never salvaged; at least one was never found.

Most of those craft were iron ore carriers, although nearly all were in ballast at the time of their loss.

The earliest Minnesota wreck connected with iron mining was the sixty-five-foot schooner CHARLEY, owned by the Wielands of Beaver Bay. Although the schooner was not engaged in the ore business, her owners were among the first Minnesota residents to purchase lands for mineral rights. [redacted] The small schooner CRISS GROVER was well known in Lake Superior mining towns as a "powder boat." Although she carried blasting powder regularly, [redacted] 1899. The larger, 200-foot schooner S.P. ELY [redacted]

The steel whaleback steamer THOMAS WILSON sank in a collision [redacted] the wooden freighter HESPER [redacted].

The storm of November 1905 drove several large steel steamers ashore in Minnesota waters. Most were ore-carriers. The steamer MATAAFA [redacted] taking nine men to their deaths. The MATAAFA was salvaged the following spring and survived for another sixty-six years. The 500-foot steamers LAFAYETTE, CRESCENT CITY, and WILLIAM EDENBORN [redacted] MADIERA and MANILA. LAFAYETTE and MADIERA were total losses. [redacted] the other vessels were laboriously salvaged. [redacted] Though engaged in the ore business, the AMBOY carried an upbound cargo of coal when she wrecked.

The last total loss of an ore-trade vessel was the April 28, 1914 foundering of the 240-foot BENJAMIN NOBLE. The NOBLE was not an ore carrier, but she was hauling steel rails for the Great Northern Railroad when she plunged unexpectedly to the bottom. Her entire crew of twenty men went with her. More recent accidents have

involved ore freighters, but none resulted in the total loss of the vessel.[46]

FOOTNOTES

1. Theodore C. Blegen, Minnesota: A History of the State, (Minneapolis: University of Minnesota Press, 1963), p. 360. French explorer Jacques Cartier learned of copper at Keweenaw Point and Isle Royale in the 1530s, and Groseilliers and Allouez questioned Indians about copper locations in 1659 and during the 1660s.

2. Warren Upham, Minnesota Geographic Names: Their Origin and Historic Significance, (St. Paul: Minnesota Historical Society Press reprint edition, 1969), pp. 147, 503.

3. Henry A. Castle, Minnesota: Its Story and Biography, 3 vols. (Chicago: Lewis Publishing Company, 1915), Vol. 1, pp. 601-603; David F. Walker, Iron Frontier: the Discovery and Early Development of Minnesota's Three Ranges, (St. Paul: Minnesota Historical Society Press, 1979), pp. 16-17.

4. Blegen, Minnesota, 361.

5. Blegen, Minnesota, 362.

6. Walter Van Brunt, Duluth and St. Louis County, Minnesota: Their Story and People, 2 vols. (Chicago: American Historical Society, 1921), pp. 344-345.

7. St. Paul Pioneer Press, October 25, 1865; St. Paul Daily Press, December 23, 1867.

8. Walker, Iron Frontier, 27.

9. Blegen, Minnesota, 363-364; Van Brunt, Duluth, 351-358; Walker, Iron Frontier, 27-37.

10. Duluth Daily Tribune, June 12, 1883.

11. Duluth Daily Tribune, June 2, 1883.

12. Frank A. King, The Missabe Road, (San Marino: Golden West Books, 1972), pp. 23-24, 200; Walker, Iron Frontier, 54-55.

13. King, The Missabe Road, 19. Gravity docks evolved on the Hudson River and were adopted on the Great Lakes at Marquette in 1859. They employed an elevated trestle on the dock, where rail cars were dumped, and the bulk cargo was stored in large bins or "pockets." When a ship was properly positioned alongside the dock, the cargo was poured into the vessel's deck hatches through spouts.

14. King, The Missabe Road, 26; Van Brunt, Duluth, 362. The HECLA was a 230-foot wooden freighter, and her consort or tow was the 190-foot schooner-barge IRONTON. From the mid-1860s until the turn of the century, it was common for most steam freighters to tow one, two, or even three barges behind.

15. Walker, Iron Frontier, 59-61, 64.

16. New York Times, May 17, 1887.

17. King, The Missabe Road, 35, 86; Maj. Clinton B. Sears, "Improvement of Rivers and Harbors on Lake Superior," Part 1 in Report of the Chief of Engineers; Annual Reports of the War Department for the Fiscal Year Ending June 30, 1897, (Washington: U. S. Government Printing Office, 1898). pp. 385-393; Walker, Iron Frontier, 70-72.

18. Walker, Iron Frontier, 17. The Owens surveys were conducted by Dr. J.G. Norwood. They appear to be the first to record Mesabi ore.

19. Dwight E. Woodbridge, "The Mesabi Iron Ore Ranges," Engineering and Mining Journal, Vol. 79 (January 14, 1905), p. 122.

20. Van Brunt, Duluth, 354.

21. Castle, Minnesota, 603; Helen Wieland Skillings, We're Standing on Iron: The Story of the Five Wieland Brothers, 1856-1883, (Duluth: St. Louis County Historical Society, 1972), pp. 53-56.

22. Walker, Iron Frontier, 76-87.

23. John E. Merritt, "Speech Made at the 40th Anniversary of the Discovery of Mountain Iron Mine, June 31, 1931," typed copy in Minnesota Historical Society collection, p. 3; Walker, Iron Frontier, 86.

24. Walker, Iron Frontier, 98.

25. Walker, Iron Frontier, 100. The Duluth & Winnipeg was attracted by the Superior Consolidated Land Company, which offered to provide the space on Allouez Bay along with a twelve-mile rail line to the Minnesota state line and a bridge across the St. Louis River. The D & W agreed to build the ore dock themselves in exchange for all of the generous incentives. The resultant dock extended 1,000 feet into the Bay, with one hundred 180-ton pockets and thirty-foot loading chutes.

26. These contracts demonstrated the salability of Merritt ore; they were doubly important because of Oliver's ties with Carnegie and Henry C. Frick, who toured the Mesabi later that year (Duluth Daily News, September 7, 1892).

27. King, The Missabe Road, 49.

28. Van Brunt, Duluth, 401. The American Steel Barge Company was formed by Duluth inventor Capt. Alexander McDougall in 1890 to build and manage his famous "whaleback" ships. Rockefeller was a major shareholder in the firm, and several of his close associates were on the Board.

29. King, The Missabe Road, 52; Walker, Iron Frontier, 117.

30. Van Brunt, Duluth, 402-403; Walker, Iron Frontier, 117ff; David A. Walker and Stephen P. Hall, Duluth-Superior Harbor Cultural Resources Study, (St. Paul: U.S. Army Corps of Engineers St. Paul District, 1976), pp. 76-78.

31. King, The Missabe Road, 55.

32. Walker, Iron Frontier, 170-181. Rockefeller offered the Merritts an option to repurchase 55,000 of the 90,000 Consolidated shares within one year at $10, plus 6 percent interest.

33. Frederick T. Gates, The Truth About Mr. Rockefeller and the Merritts, (New York: The Knickerbocker Press, n.d.) p. 3.

34. Paul De Kruif, Seven Iron Men, (New York: Harcourt, Brace & Company, 1929).

35. King, The Missabe Road, 57-66, 198; see also Walker, Iron Frontier, 131ff, for good description of improvements to mining technology at the turn of the century.

36. A.O. Backert, ed., The A B C of Iron and Steel, (Cleveland: Penton Publishing Company, 1921), pp. 49-57.

37. Castle, Minnesota, 411; Great Lakes Register, 1899, (Cleveland: Great Lakes Register, 1899); Walker and Hall, Duluth-Superior, 78-79.

38. Mills, James Cooke, Our Inland Seas, (Chicago: A.C. McClurg, 1910), 347-8.

39. Compiled from V. G. Erickson, "History of Duluth-Superior Harbor." Typescript prepared for the U.S. Army Corps of Engineers Duluth District in 1940; copy in files of the U. S. Army Corps of Engineers Canal Park Museum, Duluth; also King, The Missabe Road, 21 et passim; Lake Superior Iron Ores: Mining Directory and Statistical Record of the Lake Superior Iron Ore District of the United States and Canada, (Cleveland: Lake Superior Iron Ore Association, 1952), p. 285.

40. Walker, Iron Frontier, 226-230.

41. Blegen, Minnesota, 372; King, The Missabe Road, 198-199; Van Brunt, Duluth, 413. The Hill royalties started at .85 per ton and accelerated to $1.12. U.S. Steel removed more than 26,000,000 tons from the Hill mines before the contract was cancelled in 1915, paying out $45,000,000 in royalties.

42. King, The Missabe Road, 71-75, 200-203.

43. Rev. Edward J. Dowling, "Pittsburgh S.S. Company Freighters: Additions and Removals, 1901-1965," manuscript on file, U.S. Army Corps of Engineers Canal Park Museum, Duluth.

44. Blegen, Minnesota, 374; King, The Missabe Road, 198-199; Lake Superior Iron Ores, 1952:276-277; Walker and Hall, Duluth-Superior, 81-87.

45. Blegen, Minnesota, 375; Lake Superior Iron Ores, 1952:306-309; Walker & Hall, Duluth-Superior, 85-86.

46. Dr. Julius F. Wolff Jr, Lake Superior Shipwrecks, (Duluth: Lake Superior Port Cities, Inc., 1990), pp. 34, 54, 76, 85, 96-97, 104-134, 154.

CONTEXT 4: NORTHERN MINNESOTA LUMBERING (1870-1930s)

Thick forests of pine, fir, spruce, cedar, birch and aspen covered much of what is now northern Minnesota when the first Europeans arrived. Many years would pass before the forests were commercially exploited, despite the thriving lumber market in New England. Minnesota's woods were too far removed from the major markets to tap them until several factors combined around 1890. The westward flow of migration and settlement, the exhaustion of Michigan's forest resources, and the comparative wealth of Minnesota's forests, finally led to the development of the region as the world's greatest producer of forest products, at least for a while.[1]

When the LaPointe Treaty opened northern Minnesota to white settlement in 1854, speculators and investors were initially attracted by rumors of copper and gold deposits. The Sault Locks which were under construction at the lower end of Lake Superior also promoted Lake Superior settlement. Speculators pre-empted claims at convenient locations. Townsites were platted all the way from the Canadian border to the Head of the Lake at present-day Duluth. While some of these settlements did succeed, the rich minerals never materialized, and the Panic of 1857 led to the abandonment of most claims. Some settlements had small sawmills to support local construction needs. Like the townsites, most of the mills shut down and disappeared after just a few years.

At Oneota (Duluth), Superior City, and Beaver Bay, the sawmills found a growing market for their products. In the early 1860s they began shipping lumber to other towns on the Lake, such as LaPointe, Copper Harbor and Marquette. The industry still basically operated on a subsistence level, supplying purely local needs.[2]

During the Civil War period, at least one local mill was shipping lumber to Cleveland. Marquette, Michigan suffered a disastrous fire in June of 1868 which created a large demand for lumber.[3] Construction of the Lake Superior & Mississippi Railroad in 1869 and 1870 also spurred the market.

By 1874 there were three steam sawmills, a planing mill, and a sash factory in Superior, as well as three steam mills and two planing mills in Duluth, and a water-powered mill at Beaver Bay.[4] Southern

needs were supplied by Minnesota pineries around Stillwater, St. Anthony's Falls, St. Croix, and Winona. Settlement of the Red River Valley, and concurrent building of the Northern Pacific Railroad to that region in the early 1870s, created a new market for northern Minnesota lumber. As a result, eleven mills were operating in Duluth and Superior by 1883, grouped largely on Rice's Point and Connors' Point inside the harbor. Construction of the numerous grain elevators in Duluth during the early 1880s required enormous quantities of lumber. Logs were rafted to the mills from the Nemadji and St. Louis Rivers, and from several nearby Lake Superior streams. The cut of the Duluth district for 1886 was 160,000,000 feet of lumber, of which one-third was cut in the mills.[5]

By 1880, Michigan's lumber industry had logged off most of the white pine in the Saginaw, Muskegon, and Manistee valleys of the lower peninsula. Some of the largest operators bought timber lands in the upper peninsula, and in Wisconsin and Minnesota. They moved to Grand Marais, Marquette (Michigan), and Ashland (Wisconsin). By 1890, huge new mills were built in Superior and Duluth. Between 1885 and 1890, the total cut for Twin Ports' mills increased fifteen-fold.[6]

With the arrival in Duluth of such major firms as Mitchell, McClure & Company and Merrill & Ring, some significant changes developed. The bulk of Duluth's shipments were no longer sent to the western markets by rail. They were shipped down the Lakes in steambarges with tows to Chicago, Buffalo, and Tonawanda, New York. The inglorious little steambarges ("lumber hookers") often towing three or four lumber-laden barges across the treacherous lakes at six to eight miles an hour, were ripe for disaster from storms, fogs or collisions.[7]

In 1894, fifteen lumber mills were in operation in Duluth with 3,700 employees. Seventeen mills operated in Superior, employing 4,000 individuals. Duluth's cut that year exceeded 220,000,000 feet of lumber, and Minnesota ranked third in the nation for lumber production.

By the late 1890s, most of the pine lumber along Lake Superior's south shore had already been harvested. The industry turned its attention to the north shore. There, the logging was more difficult

due to the height of the land, the deep gorges, and the frequent rapids and waterfalls. Firms operating on the North Shore built railroads into the woods to get their logs down to the Lake. Then the logs were rafted down to the mills in Duluth. Before long, the north shore was criss-crossed with railroad lines.

Mitchell & McClure began rafting out of Castle Danger in 1890. The Schroeder Lumber Company of Ashland started shipping rafts from Cross River in 1892. Alger, Smith & Company built their headquarters at Knife River in 1898, extending their rail lines almost 100 miles into the woods. They rafted logs from Knife River and Pigeon River to Duluth until 1919. Merrill & Ring organized the Split Rock Lumber Company in 1899 to raft logs from the Split Rock River to Duluth. The estate of Thomas Nestor shipped huge rafts from Gooseberry River to Ashland (Wisconsin) and Baraga (Michigan) from 1900 until 1909.[8] Many logs were brought to the mills entirely by rail, since the Duluth, Missabe & Northern, and the Duluth & Iron Range railroads, had direct links with much of northern Minnesota's woods. In 1902, 150 carloads of logs rolled into Duluth daily on the D. & I.R. alone.

The turn of the century marked the peak of Duluth's lumber industry, For a short time the harbor ranked as the world's greatest lumbering market. In 1899, a record 940,000 tons of forest products (462,000,000 feet) left the port.[9] Mitchell & McClure cut 54,000,000 feet. Merrill & Ring cut 51,000,000. Such an intensive cut rate could not be sustained for long. The industry began a steady decline after 1900 due to depletion of the forests, increased transportation costs, and growing competition from the Pacific coast and southern lumber industries.[10]

Although the industry had begun to decline, the first years of the twentieth century were the busiest ever for the north shore. Duluth's production averaged more than 400,000,000 feet annually until 1906. The north shore district produced a record one billion feet in 1902. The cut declined after that, dropping to 12,000,000 feet by 1924. The total volume of lumber shipped from Duluth between 1891 and 1924 was 7,722,452,000 feet, valued at $129,285,842.[11]

In 1925 only one lumber mill remained in operation in Duluth, although lumber products continued to be shipped out of the harbor

through World War II. Until the 1940s, pulpwood was cut for the paper industry at several north shore locations and rafted from the Gooseberry, Red Cliff, and Pigeon Rivers, Chicago Bay, and Sugar Loaf Landing to various mills. It is still shipped by rail and truck from all over the region.

ASSOCIATED PROPERTIES

There are a number of sites along the Minnesota North Shore where pilings and cribs from old loading docks, rafting sites, log flumes, and dams, may be preserved in Lake Superior's cold waters. Many sites can be seen from the air. Others have been located by sport divers. [redacted]. The HARRIET B. is believed to be relatively intact. The BELLE P. CROSS was among the first of her kind.[12]

FOOTNOTES

1. Theodore C. Blegen, Minnesota: A History of the State, (Minneapolis: University of Minnesota Press, 1963), p. 315; John R. Borchert, Minnesota's Changing Geography, (Minneapolis: University of Minnesota Press, 1959), p. 24; William Gerald Rector, Log Transportation in the Lakes States Lumber Industry, 1840-1918, (Glendale: The Arthur H. Clark Company, 1953), pp. 51-52; Rector indicates that Minnesota had originally within its borders about 31,500,000 acres of timberland, with 5,800,000 acres of pine, 6,300,000 acres of spruce-fir, 6,000,000 acres of coniferous swamps, and the remainder in hardwoods, aspen, and scrub oak.

2. John H. Fritzen, Historic Sites and Place Names of Minnesota's North Shore, (Duluth: St. Louis County Historical Society, 1974), p. 14ff; Helen Wieland Skillings, We're Standing on Iron: the Story of the Five Wieland Brothers, 1856-1883, (Duluth: St. Louis County Historical Society, 1972), p. 14; Walter Van Brunt, Duluth and St. Louis County, Minnesota: Their People and Story, (Chicago: The American Historical Society, 1921), p. 97, 113, 123 et passim.

3. Jessie C. Davis, Beaver Bay: Original North Shore Village, (Duluth: St. Louis County Historical Society, 1968), p. 40.

4. J.H. Disturnell, Sailing on the Great Lakes and Rivers of America, (Philadelphia: J. H. Disturnell, 1874), p. 172; David A. Walker and Stephen P. Hall, Duluth-Superior Harbor Cultural Resources Study, (St. Paul: U. S. Army Corps of Engineers St. Paul District, 1976), p. 57.

5. Blegen, Minnesota, 320; Van Brunt, Duluth, 264.

6. Blegen, Minnesota, 326; J.C. Ryan, "The Duluth Lumber Industry," in Ryck Lydecker and Lawrence J. Sommer, eds., Duluth: Sketches of the Past, A Bicentennial Collection, (Duluth: American Revolution Bicentennial Commission, 1976), p. 167; Walker & Hall, Duluth-Superior, 58; Samuel H. Williamson, "The Growth of the Great Lakes as a Major Transportation Resource, 1870-1911," in Paul Useling, ed., Vol. 2, Research in Economic History, (Greenwich: JAI Press, 1977), pp. 226-227.

7. "Steambarges" were small propeller-driven ships with open decks and powerful engines for towing. Most were 150 feet long or less and carried from 600,000 to 1,000,000 board feet of lumber. Grace Lee Nute, Lake Superior, (Indianapolis: The Bobbs-Merrill Company, 1944), p.206.

8. Fritzen, Historic Sites, 8, 12, 13, 19; Walker & Hall, Duluth-Superior, 62.

9. Minneapolis and Stillwater were the state's biggest lumber producers until about 1890. Ryan, "Duluth Lumber Industry," 168; Walker & Hall, Duluth-Superior, 63.

10. Forest fires on the Iron Range and along the North Shore destroyed large tracts of timber in 1903, 1908, and 1910, speeding up depletion of the pine forests. Rector, Log Transportation, 284ff; Ryan, "Duluth Lumber Industry," 178.

11. Nute, Lake Superior, 201.

12. Elmer Engman, Shipwreck Guide to the Western Half of Lake Superior, (Duluth: Innerspace, 1976) p. 17; Fritzen, Historic Sites, 10; Walker & Hall, Duluth-Superior, 132-134; Dr. Julius F. Wolff Jr., Lake Superior Shipwrecks, (Duluth: Lake Superior Port Cities, 1990), pp. 84, 99, 102-103, 112, 132, 171.

CONTEXT 5: RAILROADS AND AGRICULTURAL DEVELOPMENT (1870-1940)

Though the climate and geography of the Lake Superior region are not conducive to agriculture, some of the world's greatest grain ports are located on Lake Superior's western shores. Duluth-Superior harbor ranked as America's greatest grain shipment port for many decades. It is still among the foremost. The port is only a trans-shipment point. The millions of bushels of grain handled there are grown far to the west in Minnesota, the Dakotas, and Montana.

From Lake Superior, the grain is shipped eastward to Buffalo and Erie. From Buffalo, the grain is moved via the Erie Canal to New York, or to Montreal by way of the Welland Canal and the St. Lawrence River.

When Minnesota's North Shore was opened to white settlement in 1854, a stable farm economy was already developing in the southern part of the state between the Minnesota and Mississippi Rivers. Some looked at the St. Louis River at the Head of the Lake and saw the potential for a great port. With the tide of migration across Illinois, Wisconsin, and Minnesota, they envisioned the movement of rich farm produce from warehouses to fleets of big ships docking at Duluth. The completion of the Sault Locks at the other end of Lake Superior promised to bring the ships of the world to Duluth's waterfront.[1]

The Lake Superior & Mississippi Railroad was chartered at St. Paul in 1857, ostensibly to haul grain from southern Minnesota to the yet undeveloped port of Duluth, then down the Lakes. It was hoped that grain traffic could be attracted away from the rail routes running Minnesota's produce eastward through Chicago and Milwaukee. A land grant to the State of Minnesota in 1864 encouraged construction of a rail link between St. Paul and the Head of the Lakes. William L. Banning of St. Paul, Minnesota attracted Philadelphia financier Jay Cooke to the venture.

In 1866, Cooke invested in timber lands in northern Minnesota. In the next years, his Western Land Association aquired titles to 7,000 town lots around Duluth and 4,000 additional acres in the vicinity. Construction on the railroad began in 1867 at the southern end of the 160-mile line. Cooke erected great storage

elevators in St. Paul and Duluth and committed his resources to diverting grain shipments to the Lakes route through Duluth.[2]

The railroad was completed in August 1870. The "propeller" WINSLOW loaded the first wheat cargo from the railroad within the month. In October, the R.G. COBURN loaded the first wheat cargo from Duluth's newly-completed Elevator A. The port was on its way to wealth and success. Early Duluthian R.S. Munger recalled the exuberance of the day:

> I left St. Paul, where I had been in business, in January 1869, and made the trip over the old military road in two days and three nights... At the time there were fourteen families in Duluth, and all gathered together in a little hamlet at the base of Minnesota Point... The Lake Superior and Mississippi Railroad was building toward Duluth, and I was satisfied that the place had a future. My judgement was verified by events; by the 4th of July, 1869, there were 3,500 people in the place, and still they were coming.[3]

In 1870, while the Lake Superior & Mississippi was still under construction, Cooke persuaded the Northern Pacific Railroad to build a line westward from Duluth to Moorhead. The new line guaranteed stable and permanent prosperity for the harbor and the infant community at the Head of the Lake. Ironically, the effort to attract southern Minnesota grain failed. Within five years, however, the Red River Valley had been settled and was producing the finest wheat in the United States. Duluth was well situated and would soon be properly equipped for transporting the wheat to market. Its modern elevators with great storage capacity could load the largest ships on the Lakes speedily and economically.

In 1878, Canadian-born capitalist James J. Hill and others purchased the bonds of the bankrupt St. Paul & Pacific Railroad. They incorporated as the St. Paul, Minneapolis & Manitoba, and resumed railroad construction which had been halted by the Panic of 1873. By 1878, the St. Paul, Minneapolis & Manitoba had pushed across the Dakotas to Great Falls, Montana. By 1893 it reached Seattle, 1,816 miles from St. Paul. It was renamed the Great Northern Railroad in 1889. One historian summarized the real significance of railroad development:

> The prosperity of railroads, as of the State, hinged on people. They opened lands, built towns, forwarded trade, and strengthened the economy. Railroads eased the conveyance of immigrants, gave jobs, sold land, conveyed goods to trading centers, carried products to markets, and helped people to keep in touch with the world they had left behind.[4]

When the sixteen-foot-deep Weitzel lock was built at Sault Ste. Marie in 1881, channels at Duluth were deepened accordingly. Ships could now be loaded much deeper than before, resulting in greater operational efficiency and a decrease in freight rates. Duluth gained a strong advantage over rival Lake Michigan ports. During the early 1880s, scores of new, larger vessels were constructed at Lakes shipyards to haul grain from Duluth's docks.

By the end of 1885 Duluth had eleven large elevators. Another was under construction across the bay in Superior. Eleven major railroads had connections with the port. American farms in the Red River Valley produced more than 56,000,000 bushels of wheat. More than one-fourth of it passed directly through Duluth-Superior harbor. The Canadian Lakehead ports of Fort William and Port Arthur were begining their ascendancy as well, following completion of the transcontinental Canadian Pacific Railway in 1885. By 1910, the Canadian ports surpassed Duluth-Superior harbor. In more recent years twice as much grain has been shipped from the Canadian ports as from the American ports. In 1891, Duluth operated thirteen elevators, and shipped 20,000,000 bushels of grain, mostly the famous hard spring wheat. Another ten elevators were in operation in Superior.[5]

In 1880, the largest grain carriers on the Great Lakes were under 260 feet in length with the capacity for about 80,000 bushels of grain. Ten years later, 320-foot steel ships with 120,000 bushel capacity were beginning to appear. By the turn of the century, 500-foot steel giants had been developed with the capacity for up to 400,000 bushels. During that twenty-year period, the efficiency of waterborne transportation dramatically increased. Freight rates dropped by fifty percent.[6]

Flour milling developed as a significant part of the harbor's commerce in 1889. By 1895, no fewer than eight mills were

operating in Superior, with two in Duluth. Railroad competition stiffened and tonnage dropped off after 1894. By the 1920s, shipments of flour from Twin Ports mills was negligible.[7]

Grain production diminished somewhat at the turn of the century. By 1909, however, wheat shipments at Duluth-Superior rose to more than 54,000,000 bushels with a value of $55,200,000. Between 1919 and 1935, the United States and Canada (exclusive of Russia and China) shipped one-third of the world's grain. Duluth-Superior harbor handled nearly twenty percent of all the grain that was shipped on the upper Lakes. By World War II, the Twin Ports operated twenty-five elevators with a combined storage capacity of 50,000,000 bushels. Just after the War, grain shipments set a record of 4,100,000 tons that would hold for the next thirty years.

In 1959, the St. Lawrence Seaway expanded U.S. grain markets overseas. Total shipments through the Seaway between 1959 and 1975 averaged 3,000,000 tons annually of which 38.5 percent went to international buyers. Expansion to foreign markets resulted in diversification of U.S. grain shipments. Barley, corn, and oats comprised forty-three percent of the record 9,800,000 tons (396,400,000 bushels) shipped from the Twin Ports in 1973. In 1940 those products had accounted for just four percent of grain shipments. A record 5,300,000 tons of wheat were shipped in 1940, of which 1,500,000 tons were destined for markets abroad, and 2,400,000 tons for Canada.[8]

AVERAGE ANNUAL TWIN PORTS GRAIN SHIPMENTS[9]

1868-1869	338,000	bushels
1870-1879	2,433,000	"
1880-1889	11,239,000	"
1890-1899	45,334,000	"
1900-1909	64,798,000	"
1910-1919	75,695,000	"
1920-1929	110,350,000	"
1930-1939	66,421,000	"
1940-1949	110,365,000	"
1950-1959	111,482,000	"
1960-1969	161,179,000	"
1970-1979	226,408,000	"
1980-1989	213,215,000	"

Presently, fourteen modern grain loading berths with ten different elevator systems operate in the Twin Ports. Annual shipments average 400,000,000 bushels (approximately 10,000,000 tons). Approximately twenty percent of the grain products arrive via trucks, while the remainder is still transported from the prairies by rail. The wheat is still largely produced in the Red River Valley, though the farms no longer grow wheat exclusively, as they did in the post Civil War years. Today, the crops show greater diversification and include sugar beets, potatoes, soybeans, flax and barley. The Twin Ports are expected to remain the grain capital of the American Great Lakes as well as one of the most important ports in the nation.[10]

ASSOCIATED PROPERTIES

Duluth is the only grain port on the Minnesota Lake Superior shore. There are no known terrestrial sites within this context, except at Duluth. No submerged components of historic grain docks are known at Duluth. [redacted] The site has been disturbed by demolition and later use of the area as a scrap-yard. Distinctive yellow bricks easily identify the site. Only one shipwreck in Minnesota waters, the steamer ONOKO, is known to have been carrying grain at the time of its loss. The ONOKO has enormous historical significance beyond its association with the grain trade. The ONOKO was the first iron-built bulk freighter on the Great Lakes. It is prototypical of modern bulk carriers. The wreck of the ONOKO sank [redacted] The ONOKO was built for the grain trade. She reportedly earned a fortune for her owners with her enormous capacity and efficiency. Relatively little is actually known about the technology and methods of the ship's construction.[11]

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CONTEXT 6: NORTH SHORE TOURISM AND RECREATION (1870-1945)

> To the traveller...let me say a few words. Take a bark canoe, which two or three trials will make you at home in, for they are much easier to get the "hang" of than most persons suppose; go to the adjacent islands, run into the caverns and grottos which cannot be reached in any other way. If you are in pursuit of pleasure, whether lady or gentleman, you can find it in the Lake Superior region, provided you can be pleased with grand scenery, water-falls, lakes and mountains...[1]

New York journalist John St.John wrote those words in 1846 after visiting the Head of the Lakes. Travel in those days was not for the timid, but during the next decades, dozens of others would venture forth, encouraging city-dwellers and hay-fever sufferers to discover the unspoiled grandeur of Lake Superior country.

When the Sault Locks were completed in 1855, at least a dozen of the finest steamboats on the Lakes began service to Lake Superior ports carring passengers and freight. In the first year, 149 steamers passed through the locks, carrying 8,295 passengers and 5,690 tons of cargo.[2] Ships like the low-pressure, fast-sailing steamer ILLINOIS, with its "New and splendid upper cabin," made "Grand Pleasure Excursions" from Buffalo, Cleveland, Detroit, Collingwood (Ontario), and Chicago for "all the principal ports and landing places around the Lake on both the American and British coasts." Some lines (after 1870) went all the way down the St.Lawrence River to Montreal.

Besides the scenery, attractions at Duluth and the North Shore included agate hunting, tenting, "authentic Indian ceremonies," hunting, fishing, and carriage-tours. Travellers were offered a variety of gems and minerals, crafts, stereopticon views, and autographed photographs at "bargain prices." Few of the large steamers called at way-ports, but local boats ran up the North Shore, connecting tourists with hunting and fishing camps. Brook trout were caught in great numbers in the streams of the North Shore. A July 1855, Superior newspaper advertised "Mackinaw boats and bark canoes...provided with trusty crews, well acquainted with the North and South Shores and all the fishing points on the Lake," available "for Fishing and Pleasure parties."[3]

During the 1860s, passenger ships arrived at Duluth on an average of three per day. The number increased during the 1880s and 1890s, while the size and capacity of the ships also grew. The Anchor Line built three 235-foot iron passenger liners in 1871 for the Duluth route. Anchor Line steamers INDIA, CHINA, and JAPAN, earned the soubriquet of "the Triplets." A round trip fare in 1880 cost $26. In 1893, James J. Hill's Northern Steamship Company built the 385-foot ocean-style passenger steamers NORTH LAND and NORTH WEST. Fast and luxurious, they were also the Lakes' first ships employed exclusively for passenger service. In 1911, the peak year, 80,000 passengers travelled to Lake Superior. After 1920, the number of passenger cruise ships diminished with the advent of "motor-cars." Very few cruise ships were still in service after World War II. The last of those, the SOUTH AMERICAN, was retired after the 1966 season.[4]

Scores of small coastal steamers, excursion boats, and ferries ran along the North Shore, primarily out of Duluth and Port Arthur, after the mid-1870s. The Duluth Lake Transportation Company operated the steamers MANISTEE and METROPOLIS at the western end of the Lake during the 1870s and 1880s. Holt's Line ran the DOVE and OSSIFRAGE to North Shore communities and Isle Royale. Singer's White Line ran up the shore and to the Apostle Islands with the BON AMI and the MABEL BRADSHAW in the 1890s. Booth's U.S. & Dominion Transportation Company operated several steamers connecting ports all the way to Sault Ste. Marie at the turn of the century. All these lines provided passenger service on the local level.

The North Shore resort industry developed from the small passenger service running out of Duluth. Fisherman Charlie Nelson built a second-story addition on his Lutsen home in 1893 to house his frequent guests: "during the last years of the 1890s many of the visitors began returning as paying guests. Before long the hotel income was rivaling the profits from his commercial fishing."[5]

Ole Brunes of Chicago Bay (Hovland) found himself entertaining so many sports fishermen that it became profitable to offer boarding. He added on to his house and later built small cabins. By the turn of the century, there were cabins at Lutsen, Hovland, and Grand Marais.

Completion of the North Shore highway coincided with the decline of commercial fishing in the late 1920s. All along the shore, impoverished fishermen built cabins and resorts during the late 1920s and early 1930s, as more and more midwestern Americans began touring in private automobiles. Gooseberry Falls State Park was developed by Civilian Conservation Corps personnel in the late 1920s. Split Rock Lighthouse became the nation's most-visited lighthouse. The highway system facilitated access to Boundary Waters sites such as Kabetogama, Namakan, and Kettle Falls, where major resorts have thrived since the 1920s.[6]

Recreational boating followed quickly on the heels of North Shore tourism. Traditionally, canoes and small fishing skiffs (twelve to sixteen feet) have been the most commonly-used boats. Since the 1960s, however, larger powerboats and increasing numbers of sailboats are seen. A recent survey indicates that nearly half the boats employed on Lake Superior are sailboats with an average length of twenty-seven feet. The average powerboat is twenty-four feet long. Thirty-nine percent of the boats in the sample were owned in Duluth-Superior. Fourteen percent were owned in the Twin Cities.[7]

ASSOCIATED PROPERTIES

The only known shipwreck in Minnesota's Lake Superior waters associated with the Tourism and Recreation context is the eighty-five-foot excursion steamer MARY MARTINI, [redacted] The ship was employed for several years as an excursion vessel, but may have been rebuilt for the coasting and fish collection trade by the time of her loss. The MARTINI was the first ship built by Bay City (Michigan) shipbuilder Frank W. Wheeler. Specific vessel associations under this context are unclear at this time. Several other coasting steamers were lost within the geographical limits of this study. They are discussed in the Settlement and Commercial Fishing context.

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INTRODUCTION

PROPERTY TYPES

Four property types have been defined for Lake Superior shipwrecks - **Commercial Sailing Craft (1734-1930), Passenger and Package Freight Steamers (1816-1945), Bulk Freight Steamers (1865-1945), and Small Craft (1854-1945).** Because there are relatively few shipwrecks in Minnesota waters of Lake Superior, most of the shipwrecks of all four property types are probably eligible for the National Register under one or more of the criteria for evaluation even if the structural integrity has been severely impacted. Because shipwrecks are unusual properties and share many attributes, a general discussion of registration requirements (criteria for evaluation and integrity) is presented here preceding specific discussions for each property type.

Criteria for Evaluation

For most Minnesota shipwrecks, eligibility for inclusion on the National Register of Historic Places would be considered under multiple criteria, most commonly combinations of A, C, and D. For example, the wreck of a sailing vessel considered significant under Criterion A through its role in furthering the fur trade, might also be significant under Criterion D if it contained an extensive asssemblage of fur trade-era artifactual material. As variation in vessel construction was most often related to the nature of its intended service, shipwrecks which have significance through participation in broad patterns of trade (Criterion A) might also exhibit design elements and fabrication techniques unique to that class of vessel (Criterion C), and archaeological exploration may answer research questions not answerable through a literature search (Criterion D).

Primary eligibility for shipwreck property types under Criterion A should be established within each individual nomination based upon the contexts established in this document, as well as historical data unique to the shipwreck under consideration. Shipwrecks, by nature, are associated with the events which caused their loss. Though many a vessel has been lost through isolated occurrence, Lake Superior is well-known for massive, disastrous storms which have caused numerous vessel losses and significantly impacted com-

merce and life in the area. A shipwreck might be eligible under Criterion A through its association with a major storm if its loss typified those that resulted from the storm and if it can be shown that the loss of the vessel had a significant impact on socio-economic, maritime, engineering, commercial, and/or safety issues. Such an association should be fully developed within the individual nomination, keeping in mind that it is not the storm itself which has significance, but its impact. It is not necessary for the identity of the vessel to be securely known if the wreck can be directly associated with the historical context cited.

A shipwreck's association with a particular individual is likely to be an uncommon factor with regards to its significance. Primary eligibility under Criterion B might be established for a vessel which was captained by an individual of importance or for a craft (such as a pleasure boat) which was used extensively by an individual of distinction. A shipwreck's association with an important historical figure must be established within each individual nomination. It should be fully developed within the contexts presented in this document and supported by historical data sufficient to demonstrate a clear and direct link between the vessel and the individual. If a vessel was designed by a prominent maritime architect, it is not eligible under Criterion B unless it can be demonstrated the individual spent a significant amount of time on the vessel supervising or overseeing the construction.

Criterion C is one of the most commonly satisfied criteria for establishing significance with regard to shipwrecks. A shipwreck can be eligible under Criterion C if it is a representative example of a craft of its type, either in an overall sense, or with regard to a specific feature or component part, or if it exhibits important evidence of shipbuilding and/or ship repair techniques employed on the vessel. The availability of construction plans for any particular vessel does not necessarily reduce its significance, as deviations from original plans were fairly common during construction, and modifications were frequently made to ship structure and equipage during a vessel's career. A vessel need not retain its original design if the modification itself is significant. In many cases, no plans are available for a vessel. This is particularly true with sailing ships and smaller vessels.

Criterion C might also apply if a vessel or one of its component parts is the product of a particularly important designer,

craftsman, or shipbuilder. A shipwreck's eligibility under Criterion C should be fully developed within each individual nomination within the framework of the contexts presented in this document. Its significance should be established, to the highest degree possible given the availability of supporting data, through an analysis of the vessel's design and construction within the context of the property type.

A shipwreck eligible under Criterion C may also be significant under Criterion D. A distinction is drawn when dealing with shipwrecks between the vessel itself and its artifactual record. Hence, a shipwreck which is the best typical example of its type, may also retain an artifactual assemblage sufficient to satisfy eligibility requirements under Criterion D.

Criterion D is also a commonly satisfied criteria in establishing significance with regard to shipwrecks. Primary eligibility under Criterion D should be fully developed within each individual nomination, and should specifically address the historic and/or archaeological questions which are integral to the site under consideration. Issues which may apply to shipwrecks are the potential for extracting information on site formation processes and the impact of post-depositional activity within the framework of current maritime archaeological theory, the availability of data regarding contemporary shipwreck salvage techniques, and the presence of cultural materials relating to shipboard life, cargoes, etc., among others. The significance of the shipwreck with regard to these questions should be fully developed within the context of current thought and similar or related sites and/or sources of information.

Site Integrity

With regard to the seven aspects of integrity, unless they have been totally salvaged or artificially buried, shipwrecks in Lake Superior inherently retain aspects of location, setting, feeling, and association. Unless a vessel was extensively rebuilt prior to its sinking and that rebuilding lacks integrity in its own right, most shipwrecks retain integrity of materials and workmanship. Depending on the nature of the wreck event and the extent of post-depositional impacts, most Lake Superior shipwrecks also retain integrity of design (i.e., they are recognizable as a vessel of a

particular type). Most Minnesota Lake Superior shipwrecks that are associated with the historic contexts defined in this document appear to retain enough integrity to be eligible for the National Register under Criterion C.

The level of site integrity required to establish eligibility of an individual shipwreck will vary according to the Criterion applied and the particular conditions at that site. Hull integrity and intactness of the artifactual record should be addressed individually for each site, as applicable. A vessel need not be structurally intact in order to retain integrity. Under Criteria A and B, site integrity should be demonstrated to the level required to justify the association with the event, pattern, or individual. Under Criterion C, a shipwreck may be significant even if it is in relatively poor condition if it is the only example of its type. A shipwreck which is significant on the basis of a structural component or design element can be eligible so long as that component or feature is still present.

Similarly, under Criterion D, the level of artifactual material required to establish site integrity will vary according to the specific research questions which apply to the site. Many shipwreck sites have been looted to varying degrees. The lack of a complete artifactual assemblage will not disqualify a site from eligibility if the level of remaining material can be shown within the individual nomination to meet that required with regard to the research questions to be addressed.

Shipwrecks are generally violent and destructive in nature and many shipwrecks have been salvaged or looted, hence some degree of damage is to be expected at all shipwreck sites. The requirement of site integrity can be satisfied if the wreck retains the basic diagnostic elements of the hull (Criterion C) or if such information can be reconstructed through archaeological investigation (Criterion D). Basic diagnostic elements would include the bow and/or stern, elements of the midsection, upper and/or lower hull, fittings, rigging, etc. A shipwreck scattered into many pieces may retain integrity if the individual pieces retain integrity. From a design standpoint, the midships area is the most redundant area of a ship's hull. Variation in hull form is more extensive in the bow and stern areas.

PROPERTY TYPE 1: COMMERCIAL SAILING CRAFT ON LAKE SUPERIOR, 1734-1930

DESCRIPTION

COMMERCIAL SAILING CRAFT on Lake Superior are associated with the following contexts: Exploration/Fur Trade (1650-1840), Settlement and Fishing on Lake Superior (1854-1930), Minnesota's Iron Ore Industry (1880s-1945), Northern Minnesota Lumbering (1870-1930s), Railroads and Agricultural Development (1870-1940), and North Shore Tourism and Recreation (1870-1945). Sailing craft as defined here include all manner of large commercial ships (more than 50 feet in length) propelled by sail, regardless of rig. These include sloops, schooners, brigs and brigantines, barkentines, and unpowered consort-barges.

Sailing vessels are generally classified according to rigging (i.e., number of masts, shape of the sails). **Sloops** are vessels with single masts containing a gaff mainsail and headsails. They were some of the earliest types on the Great Lakes, but were not used extensively for commercial purposes.

Schooners were initially two-masted vessels that had one or two square sails on the foremast and a gaff topsail on the main mast. Later schooners had three and even four masts. Schooners too were an early vessel type on the Great Lakes, and soon became the most popular vessel type, a popularity that was to last throughout the age of commercial sailing on the Great Lakes. They could use a longer and narrower hull than a sloop and were thus faster yet had a good cargo capacity.

Brigs/brigantines are two-masted vessels with square sails on the foremast and a gaf sail with a boom on the mainmast. Most lake brigs contained staysails and jibs on the mainmast in addition to the square sails and staysails on the mainmast with the gaff-top spanker. **Barkentines** are three-masted vessels with square sails on the foremast and gaff sails on the main mast and the mizzen mast. The foremast sails usually consisted of a square foresail, topsail, topgallantsail, and one royal.

Consort-barges classified as commercial sailing vessels are either sailing vessels converted to barges or those built as barges containing masts. Most consort-barges were rigged as schooners.

SIGNIFICANCE

COMMERCIAL SAILING CRAFT on Lake Superior are significant as representatives of specific vessel types as well as sources of information on shipbuilding technology, maritime activity, and shipboard culture. They are significant as the earliest commercial craft used on Lake Superior, excluding the canoes and bateaux of the fur-trading era. Cargoes were carried in sail-powered vessels of various descriptions that were largely unspecialized with regard to their cargo carrying design. They increased in number as the Midwest was populated, farmed, and eventually industrialized. The use of commercial sailing craft on the Great Lakes decreased sharply in the late 19th century with the introduction of steam power, propellers, and metal hulls.

There are relatively few sailing ship era vessels sunk in the Minnesota waters of Lake Superior, as the trades were centered on the other Lakes until the commercial sailing days were nearly done. the arrival of large numbers of commercial ships to the Head of the Lakes dates to 1880. By then the golden era of sail had already past.

Exploration/Fur Trade Context (1650-1840)

Sailing craft on the Great Lakes date to the exploratory ships constructed on Lake Ontario in the seventeenth century. All the first ships on the Lakes were built at Lake Ontario due to the natural barriers posed by the St. Lawrence river rapids and the falls at Niagara. Robert Sieur de La Salle built the seventy-foot "galliot" GRIFFIN above Niagara Falls in 1679, inaugurating navigation on the upper Great Lakes.[1] Louis Denis, Sieur de la Ronde, French commandant at Chequamegon, built a sailing craft on Lake Superior around 1734 to exploit the copper of Keweenaw Point and Isle Royale.[2] By the 1740s, the French had four ships on Lake Ontario. The British had begun shipbuilding there as well, in order to assert their influence over the lucrative and growing fur trade.[3]

All the earliest Lakes' craft were brigs, schooners, or sloops, of traditional European design. They were probably designed in France and England by naval personnel. Between 1756 and 1763 the British and French were involved in the Seven Years War. Shipbuilding during that period followed Admiralty designs. Even so, the fore-and-aft (schooner) rig had begun to demonstrate its suitability for the confined waters and shallow rivers of the Great Lakes. Fore and aft rig vessels were lighter and more easily managed than square-rig ships. Ease of maneuverability was an important consideration in the Lakes, where frequent course changes were necessary to navigate the twisting rivers and in the relatively limited sea-room.[4]

Not long after the French surrendered Canada in 1763, the British built two small schooners at Navy Island on the Niagara River. The HURON and MICHEGON, each of eighty tons, were the first British craft of any description on the upper Great Lakes. The British built two more schooners in 1766. For the next nineteen years, Lakes navigation was restricted to British naval craft. Private enterprise was officially throttled. Merchants and traders were required to ship all their cargoes on government ships manned by the Royal Navy under the title of "Provincial Marine."[5] The British licensed a limited number of privately-owned ships, including a barge and a forty-ton sloop that had been built on Lake Superior in 1772 for an English copper-mining syndicate. In the early 1770s, there were only sixteen vessels on all of the Great Lakes, including five operating on Lake Ontario and nine on Lake Erie. Others would soon follow despite the policies of the British government. By 1778, fur trader John Askins of Michilimackinac was operating the schooners MACKINAC and DePEYSTER on Lake Superior between Grand Portage and the Sault. In the summer of 1786, the forty-ton ATHABASCA was built for the North West Company at Point aux Pins above the Sault. The seventy-five-ton sloop OTTER was completed in 1793.[6]

With the fur trade flourishing in the West and settlement spreading around Lake Ontario, British merchants protested the prohibition against merchant shipping. In 1785, the Governor General of Canada granted permission for the private construction and operation of commercial vessels on the Lakes. Several ships were begun at once, principally for the various fur companies. Unlike the earlier ships built by the French and British, these were designed and built independent of the Navy. Nevertheless, many of the Lakes' ship-

wrights had come from naval services. The influence of that training persisted for many decades. In 1788, Canada passed the Inland Marine Act fully opening commerce on the Lakes for the first time. Between 1788 and the War of 1812, dozens of vessels were built on the Lakes for trading with the Native tribes supplying military posts and western settlements, for transporting fish, salt, and lumber for the New York, Pittsburgh, and Quebec markets, and for the fur trade. Several small ships were built at Point aux Pins on Lake Superior during this era for the North West Company. Between 1802 and 1812 the North West Company built the schooners INVINCIBLE, MINK, PERSEVERANCE, FUR TRADER, DISCOVERY, and RECOVERY (I) at Kaministiquia. They varied from forty to ninety tons.[7]

The American and British Navies fought the War of 1812 on the lower Lakes and on the coast. The conflict on the Lakes centered on massive shipbuilding programs by both belligerents. Though square-rigged ships tended to be faster under the right conditions, they proved to be a disadvantage on the Lakes. Experience also demonstrated that shallow-draft vessels were as safe and efficient as the traditional deep-draft ships.

After the War of 1812, schooners became the vessels-of-choice on the Lakes. Most of the merchantmen between 1800 and 1830 were two-masted schooners of about seventy feet in length and 100 tons register. They carried approximately 150 tons, or 1,500 barrels of cargo with a crew of three or four men. Brigantines combined the best features of both square and fore-and-aft rigs, which became popular in the 1830s and '40s. They required crews of eight to ten men and were not as maneuverable as schooners. As a result, few brigs or brigantines were built after 1850 because they were too expensive to outfit and operate when compared with the simpler schooners. The most practical and profitable rig was the topsail schooner, designed for fast trips with heavy payloads (characteristic of square rig), and maneuverability with limited crew. Topsail schooners had the ability to sail close to windward that was characteristics of fore-and-aft rigged ships. Topsails in one form or another were a carryover from the days of the Baltimore Clippers. They added speed to otherwise sluggish Lakes schooners, especially when running before prevailing westerly winds.[8]

As the rigs of Lakes craft became somewhat standardized in the 1830s and '40s, a similar trend developed with the hulls. Hull form was determined by geographical conditions and by the config-

uration and dimension of navigation locks in places like the Welland Ship Canal. Sturdy ships were built with full shapes and flat bottoms to squeeze through the shallow spots and the locks with as much cargo as possible. They were invariably fitted with "centerboards" to improve their sailing qualities. With straight sides and box-like forms, they resembled canal boats and earlier coastal packets. The ships were the models for twentieth century bulk freighters. The distinctive "canallers" were characterized by their shapes and their dimensions, which conformed to those of the locks themselves. The first Welland Canal, completed in 1832, had locks 100 feet long and sixteen feet wide. The "Second Welland," opened in 1845, had 150-foot by twenty-six-foot locks. Canallers built for the second Welland were probably the first distinctly "Lakes" vessel type. In the early 1860s there were reportedly more than 750 canal schooners on the Lakes out of a total of nearly 1,300 sailing craft. The canallers were the backbone of the Great Lakes fleet.[9]

Other Contexts: Settlement and Fishing on Lake Superior (1854-1930)
Minnesota's Iron Ore Industry (1880s-1945)
Northern Minnesota Lumbering (1870-1930)
Railroads and Agricultural Development (1870-1940)
North Shore Tourism and Recreation (1870-1945)

During the Civil War years, strong markets for grain and lumber resulted in a shipbuilding boom that began in the mid-1850s and lasted until the late 1860s. Several hundred schooners were built. Many of these ships were 150 to 160 feet in length, with almost double the capacity of the canallers. These vessels were permanently three-masted. Though they varied widely in design and rig, they were usually referred to as "upper Lakers" to distinguish them from the canallers and the much smaller "mosquito fleet." Some of the larger craft built in the Civil War era were fitted out as barkentines, with square sails forward and schooner-rigged main and mizzen masts. These speedy ships were well suited to the competitive Buffalo and Lake Michigan grain trade, where several set records for fast passages. According to contemporary newspaper articles, they could make up to fifteen miles an hour for short periods, though they generally averaged less than half that speed. A fifteen day round trip from Buffalo to Milwaukee or Chicago and back was considered good time.[10]

One type of sailing vessel which became popular on the Lakes was the scow schooner. Scows were introduced around 1830. They were shallow craft with flat bottoms and hard chines (square bilges), although they varied in bow and stern configurations. Scows were simply designed and cheaply built. They were popular for the shallowest, poorest ports in the lumber, cordwood, tanbark, sand, or hay trades. A handful of scows were used on Lake Superior, but they were most common on Lake St. Clair, Lake Michigan, and on the Bay of Quinte on Lake Ontario. Some scows survived as late as 1920.[11]

Conventional Lakes sailing craft were built with a single deck. Their "backbone" was formed by a centerline keel assembly, usually built up of several longitudinal timbers running the entire length of the ship. In large schooners (more than 160 feet in length), the keel may have been composed of as many as five or six great oak timbers, each measuring approximately twelve by sixteen inches in cross-section. The transverse frames were also made of white oak, spaced at intervals of twenty-one or twenty-two inches, and measuring about ten inches in moulded depth and twelve inches in sided dimension. The frames tapered up the sides of the ship and were much lighter (smaller in cross-section) near the tops of the vessel. Planking was also usually of oak. It varied from one and a half to five inches in thickness. Some vessels were planked in pine, cypress, or maple. All but the smallest commercial sailing craft were planked on both the interior and exterior. All planking was caulked to make it watertight.[12]

The largest sailing craft were reinforced. Some had large tamarack brackets or "knees" where the deck beams met the sides of the ship. Many had heavy vertical stanchions along the centerline to support the deck down the middle. Still others had transverse "hold beams" across the hull at mid-depth to stiffen the sides. These were particularly common in vessels built for the iron ore trade. After 1880, many builders incorporated iron and steel into the fabric of wooden ships in the form of reinforcing rods and straps, brackets, or plates at critical locations in the hull.[13]

In general, ships grew larger as shipbuilding technology improved through the nineteenth century. The dimensions of Lakes vessels were always limited, however, by the shallow connecting channels and harbors. When the infamous shoals were dredged at the St. Clair Flats in the late 1860s, a whole fleet of large schooners was

built for the grain and iron ore trades, including 200 big three-masters and a few four-masters. The new schooners, 200 feet in length and drawing sixteen feet, were constructed between 1870 and 1874, until a financial Panic ended the temporary boom. Only for a little while longer would the large capacities of the new schooners enable them to compete with the growing fleets of steam-powered freighters.[14]

The introduction of the "consort system" and the advent of larger ships in the 1870s, led to significant reductions in freight rates, increased competition, and reduced profits for vessel owners. Many sailing craft were reduced to barges during the 1880s. By the middle of that decade, the decline of schooners became absolutely precipitous. One newspaper reported:

> "There are upon the Lakes 300 barges, which in earlier times were fine fully-rigged barkentines, brigs, or schooners, ranging from 20 to 40 years of age. Their former semblance has entirely disappeared."[15]

Very few full-rigged sailing vessels were built on the Lakes after 1880. The last large schooner was launched in 1889. Sailing craft built after that date were all rigged with short masts, and were intended as tow-barges. Some of those built after 1890 measured up to 300 feet in length. Some of the old schooners continued under sail into the twentieth century, but few made any money. There were only a handful left after 1920. The schooners OUR SON and LYMAN M. DAVIS lasted into the 1930s. They were the last working survivors of nearly 25,000 of their type.[16]

In Great Lakes shipbuilding, iron and steel came into general use after the popularity of sailing craft had begun to decline. As a result, there were no schooners built of those materials. During the mid-1890s, however, approximately thirty steel tow-barges were built for various fleets as consorts to modern steel freighters.[17] Most of these barges were unpowered versions of the contemporary steam bulk freighters. Some were eventually given engines and converted into typical steamers. The use of tow-barges declined after 1920, though some of these direct descendants of the old schooners survived as late as the 1960s.

Sailing craft recorded lost along the North Shore include the American Fur Company's MADELINE, a forty-five foot fishing vessel [redacted] the STRANGER and CHARLEY, [redacted] the GUIDO PFISTER, [redacted] the "powder boat" CRISS GROVER [redacted] the S.P. ELY [redacted] the tow-barge AMBOY lost at [redacted] and finally, the schooner-barge MADEIRA, a 436-foot steel giant which succumbed to the same [redacted]

Given the violent nature of most shipwreck events and the high-energy conditions found along the Lake Superior shore, wrecks of sailing craft will have suffered damage to varying degrees. Post-depositional activity is another factor affecting the condition of wrecks. The AMBOY, for example, has been reduced to two sections of her heaviest framing.[20] The GUIDO PFISTER was dynamited [redacted] and major portions were removed. The S.P. ELY, though damaged by ice, is reasonably intact for more than half its length.

REGISTRATION REQUIREMENTS

In order to be eligible for the National Register, a **COMMERCIAL SAILING CRAFT** must meet the requirements of significance and integrity as discussed at the beginning of Section F and must be at least fifty years old, in addition to satisfying one or more of the following criteria:

1) Under Criterion A, the vessel must be directly associated with a significant event or pattern of events relating to the historic contexts described under this property type. For example, an exploratory vessel associated with the Exploration/Fur Trade context or one which carried vital provisions to the early settlers under the Settlement and Fishing context. If associated with a particular industry, it must be clearly demonstrated that the vessel played a significant role in the development of that industry. For later periods, primary eligibility under Criterion A could be established through association with important local events such as the founding of a town or an important business. In order to be eligible under Criterion A the identity of the vessel must be established.

2) Under Criterion B, the vessel must be directly associated with a significant person or group relating to the historic contexts described under this property type. The association includes important captains, crew, or owners. For example, a vessel owned and operated by the Wieland family of Beaver Bay may be important to both the Iron Ore Industry and Settlement and Fishing. In order to be eligible under Criterion B the identity of the vessel must be established.

3) Under Criterion C, the vessel must retain enough integrity of design to make it recognizable as a commercial sailing craft. If the vessel is important on the basis of a specific structural component or design element, that component or feature must retain demonstrable integrity. If the name of the vessel is known, it may be significant if it is associated with a prominent designer, builder, or craftsman. There are many different commercial sailing craft types and sub-types, but few good examples have been documented on the Great Lakes so almost any commercial sailing vessel should be eligible under Criterion C if retains minimal integrity. Since schooners are the most common type of commercial sailing craft, non-schooners would be particularly significant vessel types.

4) Under Criterion D, the vessel and/or artifact scatter must clearly exhibit research potential to help understand lifeways, construction and repair techniques, design elements, mechanical operations, or salvage techniques relating to the historic contexts described under this property type. Other valid research questions relate to site formation processes and the impact of post-depositional activities.

FOOTNOTES

1. George A. Cuthbertson, Freshwater: A History and Narrative of the Great Lakes, (New York: Macmillan & Company, 1931), p. 40.

2. Very little is known of this pioneer Lake Superior vessel, but LaRonde's story is a fascinating one. See Grace Lee Nute, Lake Superior, (Indianapolis: The Bobbs-Merrill Company, 1944), pp. 117, 161ff.

3. James P. Barry, Ships of the Great Lakes: 300 Years of Navigation, (Berkeley: Howell-North Books, 1973), p. 17.

4. Fore and aft rigs evolved at different times in Europe and North America. See Howard I. Chapelle, The History of American Sailing Ships, (New York: Bonanza Books, 1935), pp. 219-248; Basil Greenhill, The Merchant Schooners, Vol. I (London: Percival Marshall & Company Ltd, 1952), pp. 24-30; J.B. Mansfield, The History of the Great Lakes, Vol. I (Chicago: J.H. Beers & Company, 1899), p. 155.

5. Cuthbertson, Freshwater, 122-131.

6. Nute, Lake Superior, 117-118.

7. Mansfield, History, 128; Larry Murphy, "Major Vessel Types on Lake Superior: Sail to Steam," in Daniel J. Lenihan, ed., Submerged Cultural Resources Study, Isle Royale National Park, (Santa Fe: U.S. National Park Service Southwest Cultural Resources Center, 1987), p. 44; Nute, Lake Superior, 118-119.

8. Barry, Ships of the Great Lakes, 35; Cuthbertson, Freshwater, 233; David R. MacGregor, Merchant Sailing Ships, 1815-1850, (Annapolis: Naval Institute Press, 1984), p. 62; Murphy, "Major Vessel Types," 44.

9. Barry, Ships of the Great Lakes, 124; Cuthbertson, Freshwater, 234ff; Harlan Hatcher, The Great Lakes, (London: Oxford University Press, 1944), p. 210; Henry Hall, "Report on the Shipbuilding Industry of the United States," Tenth Census of the United States, 1880, Vol. VIII (Washington: Department of the Interior, 1885), p. 166.

10. Cuthbertson, Freshwater, 231-232; Murphy, "Major Vessel Types," 45; Toledo Blade, May 26, 1869.

11. Scow schooners appear to have originated on Lake Champlain in the late 1820s, migrating to Lake Ontario within the next decade. They are best known as a Lakes vessel type. See H. Chesley Inches and Chester J. Partlow, "Great Lakes Driftwood: Schooner-Scows," Inland Seas, Vol. 20, No. 4 (Winter, 1964), pp. 289-294; List of Merchant Vessels of the United States, 1885, (Washington: U.S. Government Printing Office, 1885), p. XXX.

12. Basil Greenhill, The Evolution of the Wooden Ship, (New York: Facts on File Publishing Company, 1988), pp. 98-157; See also Board of Lake Underwriters, Rules Relative to the Construction of Lake Sail and Steam Vessels, (Buffalo: Matthews & Warren, 1866); Rules for the Construction, Inspection, and Characterization of Sail and Steam Vessels, (Buffalo: C.J. Burroughs & Company, 1876); also Henry Hall, Report on the Ship-Building Industry of the United States, U.S. Tenth Census, Vol. 8, No. 1 (Washington: Department of the Interior, 1880).

13. Toni Carrell, Submerged Cultural Resources Site Report: NOQUEBAY, (Santa Fe: U.S. National Park Service Southwest Cultural Resources Center, 1985) pp. 56-65; Charles Desmond, Wooden Shipbuilding, (New York: Rudder Publishing Company, 1919), p. 35.

14. C. Patrick Labadie, Submerged Cultural Resources Study, Pictured Rocks National Lakeshore, (Santa Fe: U.S. National Park Service Southwest Cultural Resources Center, 1989), p. 21; Samuel H. Williamson, "The Growth of the Great Lakes as a Major Transportation Resource, 1870-1911," in Paul Uselding, ed., Research in Economic History, Vol. 2 (Greenwich: JAI Press, 1977), p. 207.

15. Marquette Daily Mining Journal, August 12, 1887.

16. The 265-foot DAVID DOWS was the largest schooner ever built on the Lakes and the only five-master; she was launched in 1881, and soon proved too large to be practical. The CORA A, built at Manitowoc, Wisconsin, in 1889 was the last full-rigged schooner. To measure the decline in sailing craft after 1900, see various numbers of Beesons Marine Directory, (Chicago: Harvey C. Beeson & Company, annual).

17. See Beesons Marine Directory, 1900; Blue Book of American Shipping, 1900, (Cleveland: Penton Publishing Company, 1900).

18. Ashland Daily Press, April 22, 1893; Dr. Julius F. Wolff Jr., Lake Superior Shipwrecks, (Duluth: Lake Superior Port Cities Press, 1990), pp. 25, 34, 43, 76, 85, 113, and 114.

20. Elmer Engman, Shipwreck Guide to the Western Half of Lake Superior, (Duluth: Inner Space Ltd., 1984), pp. 5-7.

PROPERTY TYPE 2: PASSENGER AND PACKAGE FREIGHT STEAMERS, 1816-1945

DESCRIPTION

PASSENGER AND PACKAGE FREIGHT STEAMERS on Lake Superior are associated with the following contexts: Settlement and Fishing on Lake Superior (1854-1930), Minnesota's Iron Ore Industry (1880s-1945), Northern Minnesota Lumbering (1870-1930s), Railroads and Agricultural Development (1870-1940), and North Shore Tourism and Recreation (1870-1945).

Steamships were introduced on the Great Lakes in 1816, making their first appearance on Lake Superior in 1845. The earliest steamers were side-wheelers. There is no evidence of stern-wheelers operated on Lake Superior. Screw-driven "propellers" were introduced in 1840. They were typically configurated with two or more decks. Cargo space was provided below decks in the holds. Passenger accommodations were furnished in enclosed cabins on deck. Steamers without passenger cabins were "package freighters." They had two decks and side-loading gangways. Specialized steamer types developed after 1850, though the basic types continued into the twentieth century.

Steam vessels are generally classified according to propulsion (paddle-wheel or screw propeller):

Side-wheel steamers had two large paddle-wheels mounted port and starboard with engines and boilers amidships. Most early side-wheelers also carried one to three masts.

Screw steamers mounted single or twin screw propellers and machinery aft. Some screw steamers carried masts through the end of the nineteenth century.

SIGNIFICANCE

PASSENGER AND PACKAGE FREIGHT STEAMERS are significant as representatives of specific vessel types, as well as sources of information on shipbuilding technology, marine engineering, maritime activity, and shipboard culture. Screw steamers predominated on Lake Superior, carrying both passengers and freight.

They grew in size throughout the nineteenth century in response to navigational improvements, and developments in marine engineering, particularly the introduction of iron and steel.

Passenger and freight steamers operated successfully in conjunction with the railroads until the early twentieth century. Thereafter, package cargoes decreased as the railroads expanded. The last of the large screw steamers operated as excursion vessels.

Passenger and package freight steamer wrecks in the Minnesota waters of Lake Superior are primarily screw-driven vessels, as paddle-wheel technology had only limited applications on Lake Superior.

Settlement & Fishing on Lake Superior (1854-1930)

Steam navigation began on the Lakes with the construction of the side-wheelers ONTARIO and FRONTENAC in 1817. At 170 feet in length, both were very large for their day. ONTARIO was built at Sacketts Harbor, New York, and FRONTENAC at Ernettstown, near Kingston, Ontario. Both steamers proved successful, although they were slow and required design changes to suit them to the open waters of Lake Ontario. The first steamboat on the upper Lakes was the 338-ton WALK IN THE WATER. She was built at Black Rock (Tonawanda), New York for the Lake Erie Steamboat Company. Her machinery, like that of the ONTARIO and FRONTENAC, was designed by Robert Fulton.[1]

Acceptance of steamboats was slow among Lakes vessel owners. Trade in the 1820s was not yet large enough to justify the large investment required to build steamers, so most vessel owners built and operated sailing craft. After completion of the Erie Canal in 1825, however, the commerce of the region grew. The burgeoning passenger traffic offered sufficient returns to justify the more costly steamboats. In the thirteen years previous to the opening of the Canal, twenty-five steamboats had been constructed. In the four years after completion of the canal, however, sixty new steamboats were built, primarily at Lake Erie ports which connected directly with the Erie Canal. By 1840, there were more than 100 steamers in service on the Lakes. Most were less than eight years old.[2] About forty of these craft operated as ferries or on short local routes out of the larger ports. The remainder, principally

the larger boats, ran from Buffalo to upper Lakes ports or from Niagara and Toronto to lower Lakes or St. Lawrence River destinations.

By the 1840s, the Erie Canal brought tens of thousands of settlers to Buffalo each year in search of passage to the West. Population in cities bordering the upper Lakes reportedly quadrupled in the eight years previous to 1840 as a result of that influx. The passenger and merchandise businesses were booming.[3]

Steamboat technology developed quickly in the 1830s and '40s. The steamers ILLINOIS of 1837 and GREAT WESTERN of 1838 were the largest and finest of their day. The 185-foot GREAT WESTERN was the first steamer on the Lakes to be fitted with a spacious upper cabin:

> The entire hull was occupied by the boilers, with holds for freight and wood. On the main deck aft was the ladies' cabin and staterooms, while on the hurricane deck the main cabin extended almost the entire length of the boat. On this deck there were also a ladies' saloon aft, the dining room next, and the saloon or bar-room forward. Staterooms, sixty in number, were arranged on either side of these cabins, the whole length, with three berths in each, making in all about 300 berths.[4]

Improvements in steamboat machinery resulted in increased speed, efficiency, and safety. Some vessels had crosshead or "square" engines, easily identified by the towering gallows which stood high over the superstructure, with a crosshead moving up and down in a slide. Other ships had horizontal engines, with the machinery entirely contained below decks. The most common arrangement on the Lakes was the vertical or "walking beam" engine. It had a tall A-frame with a crosshead on top which rocked back and forth, attached to the cylinder on one end and the crankshaft on the other. The steamers all burned cordwood for fuel until coal was adopted after the Civil War. Most paddle-wheelers carried one, two, or even three masts until about 1850. These were often fitted with sails and jibs. The later screw steamers, or "propellers," continued to use sails until after 1870. Some screw freighters carried sails until almost 1900.[5]

Steamboats offered fast, efficient, and predictable delivery for passengers and freight. The cost was considerable, however, as steamers were more expensive to build and operate than contemporary sailing craft. The steamer CLEVELAND was built in 1837 for $22,500, but its machinery cost an additional $50,000.[6] A large contemporary schooner cost between $6,000 and $10,000. Because boilers and engines were so costly, they were often re-used, sometimes serving in three or more different hulls before they were worn out and useless. Steamers also required fuel, which cost $80 to $125 per day. They required larger crews than sailing craft, as well. A large steamer carried a crew of up to forty men, while sailing vessels, even square-rigged, seldom needed more than ten or twelve. The differing operating costs resulted in varying freight rates. Therefore, steamboats carried passengers and selected high-value cargoes, while the less valuable commodities were hauled in the more numerous sailing craft.

With the advances in shipbuilding technology during the 1840s came dramatic changes to the steamboat fleet. The first 1,000-ton steamer in the nation was built on the Lakes in 1844; she was the 260-foot EMPIRE. The lavish vessel ushered in the era of "Palace Steamers," which was to last until 1855. Construction of such large craft was possible with the development of new fastenings for wooden hulls, the expanded use of ironwork for strengthening, and the introduction of "hogging-frames" and trusses.[7] The magnificent Palace Steamers of the later 1840s and early 1850s were the most beautifully-appointed craft ever built on the Lakes. In all, there were twenty-five of them. Most were between 1,000 and 1,600 tons.[8] The CITY OF BUFFALO, built in 1857, was the last and largest of them. She measured 350 feet in length and was 2,026 tons burthen. A contemporary journalist described her as follows:

> the grand cabin [is] lighted by skylights and a splendid stained-glass dome. On either hand the doors open into the staterooms. The cabin has an arched ceiling, which together with the panels, are ornamented by gilt mouldings, the white and gold making a very rich appearance. Splendid chandeliers light it by night, the center one being double. The furniture is of the richest rose-wood, with damask and plush upholstering; the carpets are costly brussels, and the whole scene magnificent. The fairy palaces of the imagination were

never so gorgeously furnished, nor could the famous barge of Cleopatra, with its silken sails, rival this noblest of steamers.[9]

Most of the Palace Steamers ran from Buffalo to Detroit or Chicago. Only the smallest could fit through the Sault Locks when they were opened in 1855. The Panic of 1857 ruined the passenger business on the Lakes. The entire fleet of Palace Steamers was withdrawn from service. Few ever operated again. When the country recovered from the depression in 1861 and 1862, most of the ships were no longer worth repairing, and they were too expensive to compete with newer, more efficient craft. The passenger business revived after the Civil War, but it was never again able to sustain ships as luxurious as the Palace Steamers. The steamers built for the post-war passenger trade were more modest in size and furnishings.

Other Contexts: Minnesota's Iron Ore Industry (1880s-1945), Northern Minnesota Lumbering (1870-1930s), Railroading and Agricultural Development (1870-1940)

Though steamboats offered many advantages over their sailing contemporaries, they also had disadvantages. The side-wheelers had enormous engines which took up too much space in the holds to make them efficient cargo-carriers. They had particular difficulty in carrying bulky cargoes inexpensively. Side-wheelers were also so beamy that in order to build them narrow enough to pass through some of the canals, valuable cargo space was sacrificed. The twenty-six-foot-wide Welland Canal could not admit even the smallest class of side-wheelers. All of the freight bound for Oswego, Toronto, Kingston, and Montreal was necessarily carried in schooners. In 1840 and 1841, several Lake Ontario vessel owners began to experiment with steamboat technology to enable them to compete more effectively with Buffalo and the Erie Canal for the trade of the West. They built the first "steam schooners," adopting the efficient new engines recently developed by Swedish inventor John Ericson, with screw propellers.[10]

The first screw-driven commercial craft in America was the sixty-three-foot towboat ROBERT F. STOCKTON, which was built in England in 1838 and sailed across the Atlantic in 1839 to serve on the Delaware & Raritan Canal.[11] The 126-ton screw steamer ERICSON was

built at Brockville, Ontario in 1840. Two similar craft were built at Brockville and Niagara, Ontario in 1841. The 138-ton VANDALIA, built at Oswego, New York in 1841, is credited as the Great Lakes' first propeller steamship. Unlike the pioneer screw-steamers in England, which appear to have been without exception, towing vessels, VANDALIA and her contemporaries on the Lakes were all built to carry passengers and freight through the canals. The VANDALIA, designed to trade through the Welland Ship Canal, was intended to divert some of the lucrative Lake Michigan trade from Buffalo to Lake Ontario ports for her Oswego owners. She demonstrated that "propellers" could pass easily through the narrow locks where side-wheelers could not.[12] The maritime industry was guardedly optimistic, but the ship's owners and investors expressed boundless confidence. The Kingston Gazette & Chronicle said: "These vessels fitted with the Ericsson propellers...will form a new era in the history of navigation."[13]

Another paper expressed the same euphoric optimism: "We are firmly persuaded that this enterprise [construction of VANDALIA] marks an epoch in the progress of the Western trade."[14]

Propellers were soon found to be economical ships. They were cheaper to build and operate than side-wheelers. Their machinery was simpler, cheaper, and more compact, so that it left more space for cargo. Screw steam engines burned about one-fourth the fuel of paddle-wheel steamers, and required only half the engine-room crews. All these factors enabled propellers to offer freight rates somewhere between those of sailing craft and side-wheelers. This meant that they could compete for much of the low-value cargoes that had previously been carried in schooners. Not long after their introduction, propellers were gathering contracts for larger and larger proportions of the flour, grain, and provisions shipped down the Lakes.[15]

The 105-foot propeller INDEPENDENCE was brought to Lake Superior in 1845. It was the first steamer of any kind to sail that body of water. She had been built two years earlier at Chicago, and like several other vessels, she was hauled around the falls at Sault Ste Marie on rollers launched into Lake Superior many years before the Sault Locks were built. Although she made little more than four miles an hour, the INDEPENDENCE operated successfully until her career was ended by a November 1853 boiler explosion at Sault Ste Marie.[16]

The number of propellers on the Lakes grew rapidly. Several companies organized around 1850 to build fleets of screw steamers to carry freight in connection with the Erie Canal, or with the various railroads running to the seaboard from the eastern end of the Lakes. Between 1840 and 1849, eighty-one propellers were built at Lakes shipyards. During the next ten years 133 more were added, and during the 1860s another eighty-eight were built, not including screw tugs.[17] Propellers were revolutionizing the carrying trades.

The first screw steamers resembled the side-wheelers of the 1840s, with passenger cabins above deck and cargo holds below. The propellers had their machinery mounted aft, in the stern, while the paddle-steamers carried their engines and boilers amidships, occupying most of the hold space. The propellers carried both passengers and freight. A few specialized ships, built without cabins, were called "package freighters."[18] At first there were few package freighters. They became more common after 1870. Fifty package boats were built between 1870 and 1910. Another specialized type of screw steamer was the towboat or "tug." The first screw-powered ships in Europe and the United States were tugs. They were not adopted on the Great Lakes and tributary canals until 1850. Two screw tugs were built on the Lakes before 1850. More than 100 were built during the 1850s, and nearly 400 in the 1860s.[19] Package freighters were frequent callers at Duluth's docks between 1880 and 1930. They were operated principally by eastern railroads. Rafting tugs and harbor tugs were also used in considerable numbers around Duluth.

Screw steamers, including passenger propellers and package freighters, grew in size during the nineteenth century, along with deepening channels and improvements in shipbuilding technology. The average size of propellers grew from 141 feet (337 tons) in 1845, to 182 feet (641 tons) in 1862, and 220 feet (1,300 tons) in 1877.[20] Wooden screw steamers, like side-wheelers, required extraordinary means of strengthening their hulls once they grew beyond 150 feet in length. Most large propellers had a series of parallel fore and aft "floor keelsons" and arch-trusses, or "Bishop arches," to give longitudinal strength and rigidity to their hulls. A long wooden chord, or arch, was tied into the vertical frames at the sides of the ship and supported by a series of vertical stanchions. These powerful structural elements towered above the cabins in most propellers and package boats were the hallmark of Lakes craft for many years. The few wooden propellers built after

1880 employed internal reinforcing of iron or steel, dispensing with the clumsy external arches.[21]

Iron was used experimentally to build ships' hulls in Scotland and England before 1800, but it was not readily adopted. The U.S. Navy and the Revenue Service ordered iron vessels in the early 1840s. Some farsighted Canadian shipowners built iron steamers in the United Kingdom during the 1850s and '60s. Despite the advantages of iron hulls, however, Great Lakes shipbuilders did not begin iron shipbuilding until after 1860. The practice was not widely accepted until 1880. The first large commercial vessel built of iron on the Lakes was the propeller MERCHANT, a 200-footer launched in July, 1862 at Buffalo, New York. Other iron steamers came after 1868, when two firms ordered twelve large iron propellers and package freighters within a few years. By 1885, several respected fleets owned iron ships, and there were four fully-equipped iron shipbuilding firms in operation.[22]

Iron proved to be a very practical medium for the construction of ship's hulls. It was far stronger pound-for-pound than the traditional white oak. A structural member made of iron reportedly had only three-eighths the weight and one-eighteenth the volume of its wooden counterpart. Iron hulls were more expensive to build, but they lasted longer than wood, were easier to repair, and were virtually maintenance-free. Mild steel was introduced in the mid-1880s. Though costlier than iron, it was tougher and more resilient. Steel became the standard for shipbuilding after 1885, though some builders continued to use wood until the turn of the century. The last large wooden passenger and package freight steamers were built in 1892.

The development of side-wheel steamers was stemmed by the rapid ascendancy of screw steamers in the various trades. Though they remained popular in the passenger trade for many decades, side-wheelers would never again achieve the numbers of the 1830s and 1840s. Side-wheelers reached their zenith between 1845 and 1857 with the 300-foot Palace Steamers. A few paddle-wheel giants were built on the Lakes after 1900, including the 520-foot twins GREATER DETROIT and GREATER BUFFALO, of 1924, which were the largest side-wheelers ever built. When they entered service, only thirty-seven others were left. After 1950, they were all gone.

Passenger and freight propellers, like package freighters, were most successful when they were operated with the railroad systems stretching east and west from the Lakes. Package freighters numbered 116 in 1890, which was probably their peak. The tonnage of package cargo was reduced as the nation's railroads were extended, and the number of package boats and propellers shrunk in direct proportion. In 1900 there were ninety package freighters. In 1915, anti-trust legislation forced the disposal of most of the package freighters by the railroads which operated them. Many of them never saw service on the Lakes again. Most of the package freighters that were left were requisitioned for coastal service during World War II. Virtually no U.S. package freighters remained on the Lakes after 1940. A couple of Canadian fleets ran package boats until 1980 in specialty trades such as rolled newsprint or barrelled chemicals.[23] In the highly-competitive atmosphere that has prevailed since the 1950s, only the bulk freighters have survived.

North Shore Tourism and Recreation (1870-1945)

After 1880, relatively few large propellers were built. Many of those were exclusively passenger ships, with limited cargo space or no freight capacity at all. Most of the last propellers were "day boats;" excursion steamers with neither overnight accommodations nor cargo space. A dozen passenger propellers survived the opening of America's highway networks in the 1930s, but the last of them succumbed to economic pressures and regulatory requirements and were laid up in the mid-1960s. The Georgian Bay Line steamer SOUTH AMERICAN was the last active representative of its type. She retired at the end of the 1967 season.

There are several passenger-type steamship wrecks in Minnesota waters. The passenger and freight propellers CITY OF WINNIPEG and WINSLOW [redacted]. The CITY OF WINNIPEG was [redacted] The WINSLOW was [redacted]. The much-smaller coastal packets [redacted] ROYALE, LIBERTY, and A. BOOTH [redacted] The ferries STILLMAN WITT, MARY MARTINI, and ODEN also [redacted] The rafting tugs BOB ANDERSON and NIAGARA, and the harbor

tugs R.F. GOODMAN and FAYLING are screw steamers among Minnesota's shipwreck resources.[24]

STILLMAN WITT (1849) was one of the first steamers to operate at the Head of the Lakes.[25] The ODEN (1880) was a crude little pine-built ferry constructed at Fond du Lac. The packets ISLE ROYALE (1979), LIBERTY (1889), and A. BOOTH (1882), were especially important in North Shore history. A. BOOTH is especially notable because of her ties to the firm of the same name, which eventually gained national renown. The two rafting tugs BOB ANDERSONS (1862), and NIAGARA (1872) relate to an important era in Lake Superior history. The ANDERSON lies off Colvill and the NIAGARA off Knife River.

The CITY OF WINNIPEG and the WINSLOW are the two largest passenger-vessel wrecks. The bottoms of both ships are all that remain. The CITY OF WINNIPEG was scuttled [redacted] The remains of the 220 foot WINSLOW [redacted]
The large tug NIAGARA lies broken in two or three major sections on [redacted] A. BOOTH, ISLE ROYALE, and LOTTA BERNARD were lost in relatively deep water. None of the three have been located. FAYLING was scuttled [redacted]

REGISTRATION REQUIREMENTS

In order to be eligible for the National Register, a **PASSENGER AND/OR PACKAGE FREIGHT STEAMER** must meet the requirements of significance and integrity as discussed at the beginning of Section F and must be at least fifty years old, in addition to satisfying one or more of the following criteria.

1) Under Criterion A, the vessel must be directly associated with a significant event or pattern of events relating to the historic contexts described under this property type. For example, a passenger steamer carrying settlers under the Settlement and Fishing context, a package freighter operated in association with

the railroads under the Railroad and Agricultural Development context, or an excursion vessel under the Tourism and Recreation context. If associated with a particular industry, it must be clearly demonstrated that the vessel played a significant role in the development of that industry. In order to be eligible under Criterion A, the identity of the vessel must be established.

2) Under Criterion B, the vessel must be directly associated with a significant person or group relating to the historic contexts described under this property type. The association includes important captains, crews, or owners. For example, a steamer owned and operated by Cooley & Lavaque, or A. Booth & Sons, might be important to Settlement and Fishing on Lake Superior. In order to be eligible under Criterion B the identity of the vessel must be established.

3) Under Criterion C, the vessel must retain sufficient integrity of design to make it recognizable as a passenger and/or package freight steamer. If the vessel is important on the basis of a specific structural component or design element, that component or feature must retain demonstrable integrity. If a vessel is significant on the basis of its machinery, that machinery must be present and retain integrity of parts and assembly to the level predicated by its significance. The transitional development of side-wheel and screw steam technology, coupled with the progression from wood to iron to steel, is well expressed in Great Lakes maritime history. Vessels which exemplify transitional periods in vessel design and engineering would be particularly significant. Since screw steamers were the most common type of passenger and package freight steamer on Lake Superior, paddle-wheel vessels would also have particular significance.

4) Under Criterion D, the vessel and/or artifact scatter must clearly exhibit research potential to help understand lifeways, construction and repair techniques, design elements, mechanical operation, or salvage techniques relating to the historic contexts described under this property type. Other valid research questions relate to site formation processes and the impact of post-depositional activities.

FOOTNOTES

1. J.B. Mansfield, The History of the Great Lakes, Vol. I (Chicago: J.H. Beers & Company, 1899), p.588; John H. Morrison, History of American Steam Navigation, (New York: Stephen Daye Press, 1958), p. 366.

2. C. Patrick Labadie, "Analysis of Sidewheel Steamer Construction on the Great Lakes," unpublished manuscript, 1988, author's collection, Duluth, Minnesota.

3. James P. Barry, Ships of the Great Lakes: 300 Years of Navigation, (Berkeley: Howell-North Books, 1973), pp. 45, 51- 52; Mansfield, History, 634; James C. Mills, Our Inland Seas: Their Shipping and Commerce for Three Centuries, (Chicago: A.C. McClurg & Company, 1910), pp. 103-113; George Rogers Taylor, The Transportation Revolution, 1815-1860, (New York: Harper & Row, 1951), pp. 164-165.

4. Mansfield, History, 399; Mills, Our Inland Seas, 114; Morrison, American Steam Navigation, 369.

5. Early steamboats carried sails largely to assist with propulsion. In later years they were used in case of machinery failure, but also to retard rolling of the ship in heavy seas.

6. Detroit Daily Advertiser, September 21, 1840.

7. Elaborate systems of bracing wooden ships were introduced on the Hudson and the western rivers in the 1830s and 1840s, using iron rods or "hogging chains" with turn-buckles to keep the ends of the hulls from drooping or "hogging" under the concentrated weight of machinery or cargo. Larry Murphy, "Major Vessel Types on Lake Superior: Sail to Steam" in Daniel J. Lenihan, ed., Submerged Cultural Resources Study, Isle Royale National Park, (Santa Fe: U.S. National Park Service Southwest Cultural resources Center, 1987), P. 49; Francis J. Slyker, "Reinforced Wooden Vessels on the Great Lakes," Telescope, Vol. 7, No. 4 (April 1958), pp. 3-7.

8. Labadie, "Sidewheel Steamer Construction," 8-15; Taylor, Transportation Revolution, 60.

9. Buffalo Morning Express, July 25, 1857; Henry Hall, "Report on the Ship-Building Industry of the United States" Tenth Census of the United States, Vol. VIII (Washington, Department of the Interior, 1885), p. 166; an excellent discussion of these craft puts them in a national perspective in Morrison, American Steam Navigation, 372-376.

10. Barry, Ships of the Great Lakes, 52; Harlan Hatcher, The Great Lakes, (New York: Oxford University Press, 1944), p. 121.

11. W.A. Baker and Tre Tryckare, The Engine-Powered Vessel, (New York: Crescent Books, 1965), p. 42; Alexander Crosby Brown, "The Robert F. Stockton and the Introduction of Screw Propulsion," Steamboat Bill of Facts, No. 40-41 (December, 1951), pp. 73-75.

12. Hall, "Ship-Building Industry," 166-167; Richard F. Palmer, "The Vandalia and her Line Mates: Trend Setters," Freshwater, Vol. 3, No. 2 (Winter 1988), pp. 14-20; Richard F. Palmer and Anthony Slosek, "The Vandalia - First Screw Propeller on the Lakes," Inland Seas, Vol. 44, No. 4 (Winter 1988), pp. 236- 252.

13. Kingston Gazette & Chronicle, June 16, 1842.

14. Oswego Palladium, December 1, 1841.

15. Mills, Our Inland Seas, 126-135; Morrison, American Steam Navigation, 372; H.A. Musham, Early Great Lakes Steamboats: The First Propellers, 1841-1845, (Salem: American Neptune Inc., 1957), pp. 89-104.

16. Dana Thomas Bowen, Shipwrecks of the Lakes, (Daytona Beach: Dana T. Bowen, 1952), pp. 23-33; Lewis Marvill, "Narrative of First Steamboat Trip on Lake Superior," Detroit Post & Tribune, March 26, 1882; Musham, Early Great Lakes Steamboats, 101; Ernest H. Rankin, "The Wreck of the Independence," Inland Seas, Vol. 22, No. 1 (Spring 1966), pp. 35-40.

17. Hall, "Ship-Building Industry," 167; C. Patrick Labadie, "Inventory of Screw Steamers Built Upon the Great Lakes, 1840-1880," unpublished manuscript, 1981, author's collection, Duluth, Minnesota.

18. The 135-foot propeller SAMPSON was built without cabins in 1843 to become the first all-freight screw steamer or "package freighter" on the Lakes. She carried about 300 tons of cattle or packaged cargo. Morrison, American Steam Navigation, 371-372.

19. During the late 1830s and early '40s, a few small side-wheelers were used to tow sailing craft upstream in places like the St. Clair, Niagara, or St. Lawrence Rivers. Screw steamers proved to be particularly well adapted to the task; C. Patrick Labadie, "Towboats and the Development of Screw Tugs, 1849-1860," unpublished manuscript, 1985, author's collection, Duluth, Minnesota; T.C. Purdy, "Report on Steam Navigation in the United States," Tenth Census of the United States, 1880, Vol. IV (Washington: Department of the Interior, 1885), p. 670, 20. Hall, "Ship-Building Industry," 167; Labadie, "Inventory of Screw Steamers"; Samuel H. Williamson, "The Growth of the Great Lakes as a Major Transportation Resource, 1870-1911," in Uselding, Paul, ed., Research in Economic History, Vol. 2. (Greenwich: JAI Press, 1977), p. 207.

20. Many older propellers which were originally fitted with large Bishop-arches eventually had them cut down or truncated by using iron or steel straps along the sides to stiffen up the hulls; Hall, "Ship-Building Industry," 168; Murphy, "Major Vessel Types," 55; Slyker, "Reinforced Wooden Vessels," 5-7, and Vol. 7, No. 5 (May 1958), p. 11-14.

21. Erik Heyl, "The Steamship MERCHANT," American Neptune (n.d.), pp. 118-120; J.H. Mansfield, History, 408-413; Joseph R. Oldham, "Shipbuilding and Transportation on the Great American Lakes," Cassier's Magazine, Vol. 12, No. 4 (August, 1897), p. 499.

22. Inland Lloyds Vessel Register, 1890, (Buffalo: Inland Lloyds, 1890); C. Patrick Labadie, "Chronological Register of Great Lakes Package Freighters to 1910," unpublished manuscript, 1990, author's collection, Duluth, Minnesota.

23. Canada Steamship Lines Ltd announced plans early in 1982 to withdraw from service its last five package freighters, bringing to an end the era of these colorful ships; Log Chips, Vol. 10, No. 18 (January 30, 1982).

24. Robert North, personal interview by the author at Duluth, Minnesota, June 19, 1984, notes regarding sinking of FAYLING in ship files at U.S. Army Corps of Engineers Canal Park Museum, Duluth; Dr. Julius F. Wolff Jr., Lake Superior Shipwrecks, (Duluth: Lake Superior Port Cities Inc., 1990), pp. 22, 35, 42, 45, 46, 63-64, 80, 84, 102, 162.

25. "ODEN (1890)" and "STILLMAN WITT (1849)" files, Ship Histories, U.S. Army Corps of Engineers Canal Park Museum, Duluth, MN.

26. Duluth Evening Herald, July 19, 1898.

PROPERTY TYPE 3: BULK FREIGHT STEAMERS ON LAKE SUPERIOR, 1865-1945

DESCRIPTION

BULK FREIGHT STEAMERS in the Minnesota waters of Lake Superior are associated with the following contexts: Minnesota's Iron Ore Industry (1880s-1945), Northern Minnesota Lumbering (1870-1930s), and Railroads and Agricultural Development (1870-1940). Great Lakes bulk freighters are screw steamers designed for the carriage, in bulk, of such cargoes as iron ore, grain, coal, or limestone.

Screw steamers, in general, are single or twin screwed, double-decked vessels with their machinery mounted in the stern and a small raised forecastle at the bow. Nineteenth century bulk freight steamers generally carried three to four masts.

Steambarges were small, single-decked screw steamers with powerful engines and small cabins at the stern. They had raised poop decks. The pilothouse sat aft on the early steambarges. After 1880, it was placed on a raised forecastle with a well-deck between bow and stern. Most carried one to three masts. Steambarges were built for towing two or more laden barges while carrying a modest cargo of their own.

SIGNIFICANCE

BULK FREIGHT STEAMERS on Lake Superior are significant as representatives of specific vessel types as well as sources of information on shipbuilding technology, marine engineering, maritime activity, and shipboard culture.

The first bulk freighters were built around 1865 to carry lumber, but the basic design was adapted for "coarse freight" in 1869. The hybrid which resulted is entirely unique to the Great Lakes. They have played a key role in the development of Minnesota's agricultural and mining industries by providing a cost-effective system of transporting the state's grain and iron ore to lower Lakes markets.

Bulk freight steamers represented in Minnesota's Lake Superior shipwreck population include examples of steamers, steambarges, and

specialized types such as whalebacks, constructed of wood, iron, and steel.

Northern Minnesota Lumbering (1870-1930s)

The 1840s and 1850s were prosperous times for the country, and for the Midwest in part:

> It was about 1850 that the wave of prosperity, which for some years had been on the ascendant sweeping through the Great Lakes country, finally reached its height. At that time the population of Michigan had increased to 397,654, and Wisconsin to 305,391. All the inhabitants of these struggling states rich in natural resources, came by way of the Lakes, and a large proportion were thrifty foreigners. They did not straggle along by twos and threes, but came in droves, and steamboats on westbound trips were so closely packed with humanity that the crews could scarcely get about to attend to their work of navigation.[1]

Unfortunately, the great boom ended in the Panic of 1857, which prostrated the nation's economy for the next several years and ruined most of its financial institutions. The Civil War years marked the slow steady recovery from the terrible effects of the depression.

With the 1860s, commerce shifted in the Great Lakes. Railroads had penetrated the West and cut into the profitable freight businesses. There were still enormous quantities of foodstuffs and raw materials to be transported by ships, but the lucrative package cargo had decreased. At the same time, bulk cargoes such as salt, grain, coal, and lumber were increasing. The most dramatic and far-reaching consequence of the lean years of the late 1850s and early 1860s was the introduction of the "consort system," and the development of specialized bulk freight carriers.

Many of the largest steamers on the Lakes had been built just before the great Panic. They had lain idle for years after 1857. When a practical method was sought for hauling large quantities of cheap cargo, one Buffalo vessel owner seized upon the idea of buying up the old steamboats and converting them into barges. He

purchased the vessels for a fraction of their original value, and used them to haul immense cargoes by towing them down the Lakes. Between 1861 and 1870, dozens of superannuated passenger ships were converted into lumber barges. The new system was so practical that new ships were built from the keel up as barges.[2]

Although the first barges were towed by regular tugs, a new class of specialized steamers evolved in the mid-1860s to accommodate the new consort system. These "steambarges" were small screw steamers with single decks, powerful engines, and small cabins at the stern. They were built for tows of two, three, or more barges laden with cargo, while at the same time hauling a modest cargo of their own:

> A new arrangement is being inaugurated for the transportation of lumber, consisting of the use of propellers especially adapted for the purpose. They have no upper works forward of the engine room, which gives space for additional cargo. Several are now running.[3]

The basic pattern for these efficient craft was reportedly developed in 1848 with a little screw steamer called the PETREL, built to haul lumber.[4] Steambarges were introduced again in 1865 with the construction of the 115-foot TRADER at Marine City on the St. Clair River. They were an immediate success due to the adoption of the consort system and the insatiable demand for lumber products.

Typical steambarges measured 135 feet in length and had a capacity for about 300,000 feet of lumber, though ships of that class could range from sixty-five feet to 200 feet in length, and some could carry more than a million board feet. Steambarges were single-decked like their schooner forebears. Most had raised poop decks. The earliest steambarges had their pilothouses aft. After 1880, most carried them on a raised forecastle, with a well-deck between bow and stern.[5] Most steambarges were fitted with a tall mast near the bow where they spread a single gaff-rigged sail and a jib. The larger boats, built after 1880, often had two, or even three masts. Because they carried working sails, most had center-boards. A prominent feature of the earliest steambarges was the hogging arch, like the bridge-like truss used in larger Lakes propellers. It towered above the rails on either side of the vessel. Some builders substituted hogging-chains or iron rods with a single sampson-post near the after end. It was not until internal bracing

was perfected around 1880 that steambarges could dispense with the very visible external reinforcing. In the older steambarges, the arches so complicated the loading and unloading of lumber that dock gangs were paid a premium to work aboard them.

Steambarges, some of which were called "lumber hookers," or "rabbits," carried their lumber cargoes in the hold and stacked high on deck. Some carried square timber or logs, as well as "deals" (cut lumber), shingles, cedar posts, or railroad ties. The cargo was usually piled on deck to heights of twelve or fourteen feet. The consort barges carried similar loads. Most tows consisted of three or four barges. Some of the more powerful steambarges were known to tow up to eight or nine at a time, from Saginaw Valley ports all the way to Buffalo or Tonawanda, New York. The huge lumber cargoes were loaded and unloaded entirely by hand.[6]

Forty-five steambarges were built before 1870. A number of passenger and freight propellers were also converted for the same use: their cabins were removed and their spar decks cut away to accommodate lumber. More than twenty propellers were rebuilt in this way by 1870. Dozens more were converted into lumber steamers in the next decades. Nearly 600 steambarges were built between 1870 and 1900.[7] The lumber business moved to the Pacific coast around 1910. The use of steambarges on the Lakes declined sharply after that, although they became widespread along the California, Washington, and Oregon coasts. Some steambarges were used to carry salt, coal, sand, and lumber products on the Lakes, but few survived past the 1920s.

Other Contexts: Minnesota's Iron Ore Industry (1880s-1945)
Railroads and Agricultural Development (1870-1940)

The practicality of the consort system extended beyond the lumber trade. Some of the first steambarges occasionally hauled grain and iron ore cargoes when the rates were right. The little steamers and their barges were not entirely suited for those cargoes, however. They were designed to carry much of their lumber cargo on deck, and ore or grain cargoes had to be carried below decks where it could be kept dry. The small deck hatches in steambarges also made unloading difficult.

Captain Elihu M. Peck designed a variant of the steambarge in 1869 to meet the requirements of the iron ore and grain trades. Peck designed a double-decked vessel with plenty of space below decks for dry bulk cargo, fitted with wide deck hatches evenly spaced to match the twenty-four-foot spacing of the loading chutes at Marquette's ore docks. His vessel had a capacity for 1,200 tons of ore and enough power to tow one or two loaded barges. The result was the 210-foot "bulk freighter" ROBERT J. HACKETT.[8] Bulk freighters had their pilothouses mounted forward to maximize visibility. Their machinery, like that of the steambarges, was placed in the stern. Most bulk freighters had three or four tall masts. They carried sails until around 1890.

Bulk freighters were profitable because they carried large quantities of bulk commodities economically. Few bulk freighters measured less than 200 feet in length. These long, narrow shoal-draft steamers were characterized by very heavy longitudinal framing. A huge oak keel ran down the center, flanked on either side by a series of parallel "side keelsons" laid on top of the ship's transverse frames. These side keelsons distinguish wooden bulk freighters from other vessel types because they are one of the most prominent, durable elements of the ship's construction. No other Lakes vessel used these multiple, heavy members, which measured from twelve to eighteen inches square and ran the entire length of the ship. In addition to the heavy keelsons, the wooden bulk freighters were reinforced with iron straps that criss-crossed the frames every six to eight feet, and a heavy band of 3/4-inch iron ran the length of the ship just under the rail.[9]

From the time the R.J. HACKETT was launched in 1869, until shipbuilding was suspended in the Panic of 1873, forty-seven bulk freighters averaging just over 1,000 gross tons were constructed. The V.H. KETCHUM, built in 1874, was the largest in the fleet at 12,661 gross tons. When shipbuilding resumed again in 1880, even larger bulk freighters were launched. One hundred seventy were built during the 1880s alone. Almost without exception, each had at least one consort barge built to run with it, usually of similar dimensions and tonnage. The typical bulk freighter built in 1890 was of 2,200 gross tons, and averaged 260 feet in length. The growth in vessel size was facilitated by improvements to shipping channels and locks.[10]

The next significant event in the evolution of Lakes bulk freighters was the introduction of iron and steel to ship-building. The iron propeller MERCHANT was constructed at Buffalo in 1862. It represented the first attempt by the American Lakes shipping industry to adopt the new technology.[11] Her success led to the construction of several more iron propellers and package freighters during the 1870s. Most had long, profitable careers.

The first bulk freighter built of iron was the "monster" steamer ONOKO, a 287-foot giant, almost thirty feet longer than the largest wooden craft then afloat. The novel craft had double-bottoms with water-ballast tanks, and was designed to carry 3,000 tons of ore on a fourteen-foot draft. She created quite a sensation. It was said that the ONOKO made money when few other craft in the industry could generate profits. She averaged $25,000 to $40,000 annually.[12] For nearly ten years, the ONOKO carried the largest cargoes on the Lakes. The SPOKANE was built of mild steel in 1885. Soon afterward the industry adopted steel for all subsequent vessel construction.

Metal ships offered many advantages over their wooden counterparts. A 200-foot wooden ship required an oaken hull more than eighteen inches thick, while a similar vessel of steel had shell-plating no more than one-half inch thick and only one-eighteenth as heavy. Iron (and later steel) ships had much greater longitudinal strength than wooden ones, which made it possible to build larger hulls. From 1869 to 1902, the largest wooden bulk freighters grew from 210 feet to 310 feet in length. Iron and steel freighters grew from the 287-foot ONOKO in 1882, to the 400-foot VICTORY in 1894, the 500-foot JOHN W. GATES in 1900, and numerous 600-footers by 1906.[13]

After 1894, the shipbuilding industry began producing steel tow-barge consorts for the powerful new steamers. The barges were copies of the steam bulk freighters, often with the same dimensions, though not fitted with boilers or engines. Like their wooden forebears, they were towed up and down the Lakes. Thirty of these barges were constructed between 1894 and 1902, ranging from 350 to more than 500 feet in length. Some steamers towed barges in the grain trade as late as 1965. A few of the big barges were ultimately fitted with engines and converted into powered freighters.

Iron and steel also enabled shipbuilders to make safer, more efficient, and more easily maintained vessels. Metal construction also enabled designers and builders to adopt innovative concepts, such as the famous "whalebacks," which were designed by Duluth's Captain Alexander McDougall. McDougall conceived the idea of building steel ships which were round in cross-section like a length of pipe. They were strong, stable, and simply and cheaply built. With their pointed ends, they were hydrodynamically efficient. McDougall's American Steel Barge Company built forty-one whalebacks between 1888 and 1898. Thirty-nine of them were built in the Twin Ports. There were fifteen steamships (including one passenger whaleback), and twenty-four barges in all.[14] The whalebacks were an interesting and widely-publicized vessel type, but they were not the prototypes for modern bulk freighters, as some recent authors have claimed. Though successful for a time, they were outmoded for the iron ore trade not long after their introduction because newly-perfected unloading machinery required very large deck hatches and such large openings in the whaleback hulls created serious structural problems. Many of the whalebacks operated successfully in the grain and petroleum trades until the 1950s.

Steel ships continued to grow after the turn of the century with improvements in technology and changes in the methods of hull-framing. The earliest iron and steel ships had transverse (crosswise) framing, not unlike wooden ships, but spaced at wider intervals. The arrangement of side keelsons was also similar to that used in wooden bulk freighters. The keelsons were laid from stem to stern on top of the transverse frames. Later steel hulls had combinations of transverse and longitudinal framing. The standard since 1920 has been a system of longitudinal framing on the deck and bottom, with transverse framing in the sides. This system, with its particular emphasis on longitudinal strength, has enabled vessels to grow in size to 640 feet during the Second World War, 730 feet in 1958, and, with the construction of enormous new locks at Sault Ste. Marie, to 1,000 feet by 1973.[15]

While bulk freighters became more numerous in the 1880s and 1890s, other vessel types dwindled and eventually disappeared. Sailing craft were entirely displaced by steamers, except in the lumber trade, where they found a niche in later years as tow barges, though their rigging was cut away and their graceful bowsprits cut short. Steambarges lasted only as long as the lumber trade on the

Lakes. When the forests had been stripped away in Michigan, Wisconsin and Minnesota, and the supply of lumber was gone, the industry moved west. Most of the steambarges were simply abandoned and dismantled. By 1950, virtually every vessel type had gone from the Great Lakes with the exception of the specialized bulk freighter.

Minnesota shipwrecks of the bulk freighter type include the steambarges LOTTA BERNARD (1869), BELLE P. CROSS (1870), and M.C. NEFF (1888), the wooden bulk freighter HESPER (1889), the whaleback THOMAS WILSON (1892), the iron steamer ONOKO (1881), the steel BENJAMIN NOBLE (1909), the consort-barge MADEIRA, and portions of the LAFAYETTE (1900).[16] The LOTTA BERNARD played a role in the pioneer era of local settlement. The BELLE P. CROSS represents the lumber industry of the [redacted] where extensive rafting operations existed. The MADEIRA and LAFAYETTE were engaged in the Minnesota ore trade and were among the losses from the famous 1905 "Matafa" storm. The ONOKO was the prototypical metal-hulled bulk freighter. The THOMAS WILSON is an example of the locally-developed whaleback ships.

LOTTA BERNARD is a rare example of the transitional side-wheel powered steambarges which were only built for a few years. She was five years old at the time of her loss, and never underwent any structural changes. ONOKO was an enormously important vessel which demonstrated the far-sightedness of its designers and builders and ushered in a whole new age of economical transportation.[17] THOMAS WILSON represents a vessel type of regional (Great Lakes) importance and particular local significance. Not only were the whalebacks symbolic of Great Lakes engineering audacity in the 1890s, but they were also one of numerous innovations made possible by the introduction of steel to shipbuilding. Her builder proved that these efficient ships could be built inexpensively by untrained laborers and compete effectively with traditional Lakes freighters. Built in 1870, the steam-barge BELLE P. CROSS is among the earlier of her type, and is one of a handful of steambarges specially designed for the Welland Canal trades. She and several sister-ships were built to trade from Lake Huron to Ogdensburgh, New York by way of the old ("Second") Welland Canal.

REGISTRATION REQUIREMENTS

In order to be eligible for the National Register, a **BULK FREIGHT STEAMER** must meet the requirements of significance and integrity as discussed at the beginning of Section F and must be at least fifty years old, in addition to satisfying one or more of the following criteria:

1) Under Criterion A, the vessel must be directly associated with a significant event or pattern of events relating to the historic contexts described under this property type. Thye earliest lumber barges, for example, might be important under the Northern Minnesota Lumbering context. If associated with a particular industry, it must be clearly demonstrated that the vessel played a significant role in the development of that industry. In order to satisfy primary eligibility under Criterion A, the identity of the vessel must be established.

2) Under Criterion B, the vessel must be directly associated with a significant person or group relating to the historic contexts described under this property type. This association includes important captains, crews, or owners. For example, vessels owned and operated by the Minnesota Steamship Company or the American Steel Barge Company might be important to both the Iron Ore Industry and Railroads and Agricultural Development contexts. In order to be eligible under Criterion B, the identity of the vessel must be established.

3) Under Criterion C, the vessel must retain sufficient integrity of design to make it recognizable as a Great Lakes bulk freighter. If the vessel is important on the basis of a specific structural component or design element, that component or feature must be present and retain demonstrable integrity. If the vessel is significant on the basis of its machinery, that machinery must be present and retain integrity of parts and assembly to the level predicated by its significance. As Great Lakes bulk freighters represent an indiginous phenomenon, vessels of experimental or transitional design, or which embody the developmental phases of the type, are of particular significance.

4) Under Criterion D, the vessel and/or artifact scatter must clearly exhibit research potential to help understand lifeways, construction and repair techniques, design elements, mechanical

operation, or salvage techniques relating to the historic contexts described under this property type. Other valid research questions relate to site formation processes and the impact of post-depositional activities.

FOOTNOTES

1. James C. Mills, Our Inland Seas: Their Shipping and Commerce for Three Centuries, (Chicago: A.C. McClurg & Company, 1910), p. 144.

2. Jerome K. Laurent, "Technological and Economic Aspects of Transportation Developments within the Great Lakes System, 1866-1910," Paper presented to the Workshop in Economic History at University of Wisconsin-Madison, February 25, 1981, text in author's collection, Duluth, Minnesota; J.H. Mansfield, History of the Great Lakes, Vol. I. (Chicago, J.H. Beers & Company, 1899), p. 414.

3. Detroit Free Press, June 26, 1866.

4. Several side-wheel steambarges were built between 1864 and 1870, but they were not suitable for towing, and so had limited utility. LOTTA BERNARD, built at Port Clinton, Ohio in 1869 and lost off the Minnesota North Shore five years later, was such a craft.

5. Gordon P. Bugbee, "Of Rabbits and Bulk Freighters," leaflet published by "Friends of the Dossin Great Lakes Museum," Detroit (n.d.), author's collection, Duluth, Minnesota, pp. 3-4; Henry Hall, "Report on the Ship-Building Industry of the United States," Vol. VIII, Tenth Census of the United States, 1880, (Washington: Department of the Interior, 1885), p. 167.

6. Donald F. Richards, "The Glory Days," pp. 259-273, Telescope, Vol. 16, No. 12 (December, 1967).

7. C. Patrick Labadie, "Preliminary Analysis of Great Lakes Lumber Steamers," unpublished manuscript, 1982, author's collection, Duluth, Minnesota.

8. The side-wheel steamer S. CLEMENT was actually the Lakes' first vessel designed to carry iron ore, but she was not a success; she was built in 1863 and dismantled a few years later. James P. Barry, Ships of the Great Lakes: 300 Years of Navigation, (Berkeley: Howell-North Books, 1973), pp. 107- 109; Bugbee, "Of Rabbits,"; Dwight True, Sixty Years of Shipbuilding, (Ann Arbor: Society of Naval Architects and Marine Engineers, 1956), p. 3.

9. Hall, "Ship-Building Industry," 168; C. Patrick Labadie, Submerged Cultural Resources Study, Pictured Rocks National Lakeshore, (Santa Fe: U.S. National Park Service Southwest Cultural Resources Center, 1989), pp. 98-101, 112-118; Francis J. Slyker, "Reinforced Wooden Vessels on the Great Lakes," Telescope Vol. 7, No. 5 (May, 1958), pp. 11-14; True, Shipbuilding, 30.

10. C. Patrick Labadie, "Nineteenth Century Bulk Freighters on the Great Lakes System," unpublished manuscript, 1984, author's collection, Duluth, Minnesota; Mills, Our Inland Seas, 186.

11. Several iron steamers were built in the United Kingdom and shipped in pieces for assembly in Canada in the 1850s. American vessel-owners were slower to embrace iron for ships. Barry, Ships of the Great Lakes, 110; Mills, Our Inland Seas, 177-180; Joseph R. Oldham, "Shipbuilding and Transportation on the Great American Lakes," p. 499, Cassier's Magazine, Vol. XII, No. 4 (August, 1897); E.B. Williams, "The Great Lakes Iron Ore Carrier," p. 176, Inland Seas, Vol. 18, No. 3 (Fall, 1962).

12. Detroit Free Press, November 23, 1898.

13. True, Shipbuilding, 27; Ralph D. Williams, "Transportation of Ore on the Great Lakes," in A.O. Backert, ed., The A B C of Iron and Steel, (Cleveland: Penton Publishing Co., 1930), p. 41.

14. Edward J. Dowling, "Whaleback Steamships and Barges," unpublished manuscript (n.d.), author's collection, Duluth, Minnesota; Ryck Lydecker, Pigboat...the Story of the Whalebacks, (Duluth: Sweetwater Press, 1973); True, Shipbuilding, 33; John H. Wilterding Jr., McDougall's Dream: the American Whaleback, Green Bay: J.H. Wilterding, 1969.

15. Larry Murphy, "Major Vessel Types on Lake Superior: Sail to Steam," in Daniel J. Lenihan, ed., Submerged Cultural Resources Study, Isle Royale National Park, (Santa Fe: U.S. National Park Service Southwest Cultural Resources Center, 1987), p. 59; Slyker, "Reinforced Wooden Vessels," 11-14; True, Shipbuilding, 17, 35.

16. Dr. Julius F. Wolff Jr., Lake Superior Shipwrecks, (Duluth: Lake Superior Port Cities, 1990), pp. 22, 99, 104, 105, 113-114, 132, 146, 150.

17. Mills, Our Inland Seas, 219-221; Richard J. Wright, Freshwater Whales: A History of the American Shipbuilding Company and its Predecessors, (Akron: Kent State University Press, 1969), pp. 5, 6, 11, 24.

PROPERTY TYPE 4: SMALL CRAFT ON LAKE SUPERIOR, 1854-1945

DESCRIPTION

SMALL CRAFT in the Minnesota waters of Lake Superior are associated with the following contexts: Exploration/Fur Trade (1650-1840), Settlement and Fishing on Lake Superior (1854-1930), and North Shore Tourism and Recreation (1870-1945).

Within this document, small craft includes all types of working or pleasure craft less than fifty feet in length, regardless of vessel type or mode of propulsion:

Canoes included birch canoes, as well as canoes of sturdy canvas.

Rowing Skiffs employed on the open Lake were primarily plank-built and flat-bottomed, of Scandinavian design. Clinker-built, round-bottomed skiffs were popular in the more protected waters.

"Mackinaw Boat" is a term applied loosely to a variety of small craft ranging from sloops to schooners and catketches, of twelve to more than forty feet in length. Carvel-built or clinker-built, they could be double-ended or square-transomed, with lug or gaff rigs. On Lake Superior the most common variety was a clinker-built double-ender of about thirty feet with gaff schooner rig. Most were built of local cedar and pine.

Yachts, both sail and occasionally steam powered, were generally from twenty to thirty feet in length, though some were larger.

Ice Boats were built on skates to ride on the frozen lake.

One-design sailing yachts, twenty to over forty feet in length, and classed according to standardized design and construction, were introduced onto the Lakes for amateur yacht racing.

Steam, and naptha launches were generally open boats with awnings, ranging from twenty to thirty-five feet in length.

Gasoline-powered cabin cruisiers were factory-built and brought to Duluth by rail after the turn of the century.

Gas-boats were locally-built commercial boats mounting gasline engines. They were generally twenty-four foot round-bottomed craft with a square transom stern and an open cockpit.

SIGNIFICANCE

SMALL CRAFT on Lake Superior are significant as representatives of specific vessel types, asd well as sources of information on boatbuilding technology, local commerce, maritime activity, commercial and recreational fishing practices and technology, and maritime culture. They are important to local subsistence, communication, transport, and development patterns.

Various classes of small craft have played important roles in the settlement and exploitation of the North Shore. More recently, small craft have played an integral role in the North Shore's recreation industry.

The decline of commercial fishing resulted in the disposal of many boats during the 1930s and 1940s. There are no known examples of fishing craft predating 1940 in Minnesota. These vernacular craft were of great importance to the region's growth and development, yet little is known about their design, construction, or use. There are no known examples of historic pleasure boats in the Minnesota waters of Lake Superior.

Exploration/Fur Trade (1650-1840)
Settlement and Fishing (1854-1930)

The introduction of small craft into the region was concurrent with the earliest settlement of North Shore locations. Virtually all of the pioneer settlers came to the North Shore in watercraft. Canoes and mackinaw boats carried settlers from Superior City and Duluth. Others arrived in the large steamboats plying Lake Superior from Sault Ste. Marie. In later years (after 1880), when coasting steamers ran up the shore from Duluth, fewer travellers used small craft for long-distance trips. Small boats were employed locally and in commercial fishing. Some birch canoes were used until the nineteenth century on the inland Lakes and the boundary waters. Most people preferred the more sturdy canvas canoes popular in New England since the 1840s, or the traditional strip-built rowing

skiffs.[1]

The term "Mackinaw boat" is loosely applied to a variety of small sailing craft ranging from sloops to schooners and catketches, of twelve feet to more than forty feet in length, and including both lug and gaff rigs. The hull designs of Mackinaws include clinker built and carvel-built craft, both double-enders and square-transommed varieties. There is no precise definition of a "true" Mackinaw. A series of similar sailing craft were used on the East Coast as far back as 1800. In those waters they were called "New England boats," or "No Man's Land Boats."[2]

Variation in Mackinaws is regional, suggesting that the various designs evolved from a common prototype and were adapted to the conditions of specific localities. The Mackinaws of Lake Erie were twelve to eighteen-foot carvel-built cat-ketches, usually rigged with lug sails. Those on Lake Huron were primarily square-transommed boats of twenty-eight or thirty feet, carvel-built, with gaff schooner rig. The Mackinaws of Lake Michigan and the Straits of Mackinac were most often carvel-built double-ended schooners or cat-ketches of eighteen to twenty-four feet. On Georgian Bay and on Lake Superior, the common variety was a clinker built double-ended craft of about thirty feet with gaff schooner rig. These boats were used throughout the nineteenth century. The style used around the Straits, a small carvel-built hull with a simple, cedar-pole, cat-ketch gaff rig is thought to be an example of the original form. Most Mackinaws were built of local cedar and pine.[3]

"Mackinaw boats" have long been identified with the Great Lakes. Though assumed to be products of early French tradition there is little to substantiate that theory. They may have derived from the New England boats mentioned above. Regardless of their origins, builders at Toronto, Detroit, Mackinac, and Georgian Bay ports produced Mackinaw boats for Lake Superior from the 1830s until at least 1880 or 1890. Though some were Frenchmen, most were English or Scotch craftsmen.

Small (twelve to sixteen foot) skiffs were locally built at Duluth and North Shore settlements after 1870. Boat-builders are mentioned at Grand Portage and Grand Marais in the 1880s, and at Hovland, Cross River, Tofte, and Grand Marais in the 1890s. Although there are few descriptions of these boats, surviving photographs show plank-built, flat-bottomed rowing skiffs with

Scandinavian characteristics on the open Lake, and clinker built, round-bottomed boats in the more protected waters. The earliest builders were Frenchmen. After the 1880s, however, most were Norwegian immigrants.[4]

North Shore Tourism and Recreation (1870-1945)

A few yachts, principally sailing boats, are mentioned in Duluth newspapers in the 1880s. Occasional steam yachts were also noted. Most ranged from twenty to thirty feet, though one or two of the more luxurious craft ranged up to sixty or seventy feet in length. Some of the larger yachts made occasional trips to the Apostle Islands, Isle Royale, or Port Arthur, but most sailed on Superior Bay or around Minnesota Point. Some were hired out or advertised for excursions.

The growth of boat clubs in the 1880s and 1890s fostered the development pleasure boating, particularly in the Twin Ports. Extensive clubhouses, warehouses, docks, and bleachers were constructed to accommodate Club members. Frequent regattas and competitions were scheduled. A sizeable flotilla of small craft began to accumulate around Duluth, including rowboats, canoes, sailing boats of various descriptions, and rowing shells. One Duluth man bought rowboats and skiffs by the carload in the 1920s and sold them locally for $65.00 each. Ice-boats were also introduced during this time. None of these craft ventured far from the safety of Superior Bay or the lower St. Louis River.[5]

Standardized "one design" sailboats appeared soon after the turn of the century. Intended for amateur racing, they included a broad range of designs. Many were very modest boats. The one-design classes originated not only to maximize and regulate competition between boats, but also to minimize the cost of designing and building them. The system made boating more affordable to many people. Dozens of sailboat designs resulted from the movement. Some classes were more suitable than others for specific areas. There were few large one-design sailing boats around western Lake Superior, but the less-pretentious twenty-two foot Star-class, twenty-eight and thirty-eight foot Bilgeboard Scows ("Pancakes"), and twenty-one foot Shore Bird sloops were fairly common. Although these boat types originated around 1910, they did not appear in the Twin Ports until the mid-1920s. Similar craft were brought to

nearby inland lakes in the 1930s.[6]

Steam and naphtha launches appeared in the 1890s. Gasoline launches followed not long afterwards. These were open boats with awnings, measuring from twenty to thirty-five feet in length. The Pearson Boat Works was organized at Duluth in 1895 to build small powerboats. It became an important source for such boats for twenty years. Gasoline cabin cruisers made their first appearance around 1900, although there were few around the Head of the Lakes before the mid-1920s. Unlike earlier classes of small craft, most of these boats were factory-built and shipped to Duluth by rail.[7] They were used primarily around Duluth and the Apostle Islands.

Gasoline engines were put into locally-built boats for commercial fishermen on the North Shore and at Isle Royale, where the most popular design was a twenty-four foot round-bottomed craft with square transom stern and an open cockpit; it was usually called a "gas-boat." A.J. Scott started building fishing craft at Grand Marais in the 1890s. Charles Hill began building them at Larsmont around the turn of the century. Hill ultimately constructed nearly 200 boats, many of them gas-boats. His son Reuben continued the tradition into the 1960s.[8]

Aside of a handful of liveries for canoes and small rowing skiffs, there were few boating facilities along the North Shore before 1940, and little pleasure boating. Most of the available boats were rented by resort-operators at Beaver Bay, Hovland, Cross River, Lutsen and Grand Marais. The opening of the North Shore highway in the 1920s and its improvement following World War II brought a dramatic change in the recreational usage of the area. The highway brought a gradual increase in the resort business, and after 1950, with the advent of trailer-boating, there followed a general proliferation of recreational boating and fishing all the way from Duluth to the Canadian border.

No wrecks of historic small craft are presently recorded in Lake Superior, although the remains of one or two have been uncovered in the course of harbor improvements at Duluth in recent years. There are no known examples of mackinaw boats despite their widespread use for at least a century. Numerous small fishing craft have been abandoned at Isle Royale where they may still be seen.[9] Similar vessels would be expected at North Shore commercial fishing locations.

REGISTRATION REQUIREMENTS

In order to be eligible for the National Register, a **SMALL CRAFT** must meet the requirements of significance and integrity as discussed at the beginning of Section F and must be at least fifty years old, in addition to satisfying one or more of the following criteria:

1) Under Criterion A, the vessel must be directly associated with a significant event or pattern of events relating to the historic contexts described under this property type. For example, a boat which carried early settlers or provisions under the Settlement and Fishing context, or a successful racing yacht or excursion vessel under the Tourism and Recreation context. If associated with a particular industry, such as fishing, it must be clearly demonstrated that the vessel played a significant role in the development of that industry. Eligibility might also be established through association with important local events. In order to satisfy eligibility under Criterion A, every effort should be made to establish the identity of the vessel.

2) Under Criterion B, the vessel must be directly associated with a significant person or group relating to the historic contexts described under this property type. the association includes important captains, crews or owners. For example, a yacht that was owned and raced by an individual of distinction under the Tourism and Recreation context or a canoe associated with an early settler under Settlement and Fishing. In order to be eligible under Criterion B the identity/ownership of the craft must be established.

3) Under Criterion C, the vessel must retain sufficient integrity of design to make it recognizable as a small watercraft. There are many different types of small craft, but very few good examples have been documented on the Great Lakes. A craft may be eligible under Criterion C if it is the best typical (or only known) example of a craft of its type, either in an overall sense, or with regard to a specific feature or component part, or if it exhibits important evidence of shipbuilding and/or ship repair techniques employed on the vessel. If the vessel is important on the basis of a specific structural component or design element, that component or feature must retain demonstable integrity. If a vessel is significant on the basis of its machinery, that machinery must be

present and retain integrity of parts and assembly to the level predicated by its significance. The high degree of variation within the numerous types of small craft, coupled with the dearth of documentary and anecdotal supporting data, suggests that most extent examples of Great Lakes small craft that can be associated with specific historic contexts would be of particular significance.

4) Under Criterion D, the vessel and/or artifact scatter must clearly exhibit research potential to help understand lifeways, construction and repair techniques, design elements, mechanical operation, or salvage techniques relating to the historic contexts described under this property type. Other valid research questions relate to site formation processes and the impact of post-depositional activities.

FOOTNOTES

1. Willis H. Raff, Pioneers in the Wilderness: Minnesota's Cook County, Grand Marais, and the Gunflint Trail in the 19th Century, (Grand Marais: Cook County Historical Society, 1981), pp. 4-5, 9, 41.

2. Howard I. Chapelle, American Small Sailing Craft, (New York: W.W. Norton & Company, 1951), pp. 168-177; Rodger C. Swanson, "EDITH JANE: A Search for the Real Mackinaw Boat," Wooden Boat No. 45 (March/April 1982), pp. 100-106.

3. A schooner has two (or more) masts, with the main mast at least as tall as the foremast. A ketch has two masts with the main one shorter than the fore. The latter is referred to as a "cat-ketch" if the foremast is stepped right up in the bow. Paul James Barry, "Mackinaw Boats & Collingwood Skiffs," Yachting, (November, 1940), pp. 35-37, 74- 76; Paul James Barry, "Huron and Haywood Boats," Yachting, (April, 1942), pp. 41-43, 76; Chapelle, Sailing Craft, 177-185; John T. Nevill, "Skeleton of Mackinaw Boat Lies Rotting on Hessel Bay," Telescope, Vol. 4, No. 8 (August, 1955), pp. 3, 5-8.

4. Raff, Pioneers, 30, 41, 83-85, 94, 107.

5. Reuben Hill, Personal interview by the author at Duluth, Minnesota, August 16, 1987; Stanford S. Jacobs, personal interview by the author at Duluth, Minnesota, August 9, 1990; Virgil Swing, "Boat-Building Proves Lifelong Labor of Love," in Duluth News-Tribune & Herald, April 28, 1986.

6. Edwin M. and T.M. Chance, "Bilgeboard Scows," in Edwin J. Schottle, ed., Sailing Craft, Mostly Descriptive of Smaller Pleasure Sail Boats of the Day, (New York: The Macmillan Company, 1937), pp. 483-501; G.W. Elder and Ernest Ratsey, "The International Star Class," in Schottle, 1937:375-380; Jacobs, personal interview, 1990.

7. "Boats for Sale," Rudder, Vol. XVIII, No. 3 (March, 1907), pp. 209-324; Catalogue, Pearson Boat Construction Co., Duluth, Minn., U.S.A., (n.d.), copy in collection of U.S. Army Corps of Engineers Canal Park Museum, Duluth, Minnesota.

8. Toni Carrell, "Vernacular Watercraft," in Daniel J. Lenihan, ed., Submerged Cultural Resources Study, Isle Royale National Park (Santa Fe, U.S. National Park Service Southwest Cultural Resources Center, 1987), pp. 457-473; Hill, personal interview, 1986; Swing, "Boat Building."

9. Carrell, "Vernacular Watercraft," 468-473.

G. Summary of Identification and Evaluation Methods

Discuss the methods used in developing the multiple property listing

[XX] See continuation sheet

H. Major Bibliographical References

[XX] See continuation sheet

Primary location of additional documentation:

- [X] State historic preservation office
- [ ] Other State agency
- [ ] Federal agency
- [ ] Local government
- [ ] University
- [ ] Other

Specify repository: _____

I. Form Prepared By

name/title Charles Patrick Labadie

organization _____ date 30 August 1990

street & number 5103 Beaver Creek Lane telephone 218-729-8842

city or town Hermantown state Minnesota zip code 55811

SUMMARY OF IDENTIFICATION AND EVALUATION METHODS

The preceding Historic Context Statements and Draft Multiple Property Documentation Form for the Shipwreck Sites of the Minnesota Waters of Lake Superior was prepared under contract for the Minnesota Historical Society. It is a part of the preservation planning process delineated in the National Historic Preservation Act of 1966 to identify, evaluate, and protect the nation's historic and archaeological resources.

This document was prepared according to the requirements of The Secretary of the Interior's Standards and Guidelines for Archaeology and Historic Preservation, using the information provided in National Register Bulletins 16 (Guidelines for Completing National Register of Historic Places Forms) and 20 (Nominating Historic Vessels and Shipwrecks to the National Register of Historic Places), and the Minnesota Historical Society's "Supplemental Instructions for the Preparation of National Register Forms." Guidance was generously provided by Dennis Gimmestad, Deputy State Historic Preservation Officer for Minnesota, Britta Bloomberg, Historic Preservation Program Specialist for the Minnesota Historical Society, and Scott Anfinson, Minnesota Historical Society Archaeologist. James P. Delgado, National Park Service Historian and Chief of the National Maritime Initiative in Washington, D.C., and Carol Schull of the National Register of Historic Places both provided much helpful advice. This form was revised by Brina J. Agranat, with Stephen R. James, Jr., and Tim S. Mistovich, of Panamerican Consultants, Inc., under contract to the Minnesota Historical Society based on their own review of the document, as well as comments by the Society and David Cooper, Maritime Archaeologist for the State of Wisconsin.

The basic goals of the project were: (1) to develop those historic contexts which relate to northern Minnesota's maritime archaeological resources so that those contexts could be used as the basis for evaluating shipwreck sites; (2) to differentiate, define and document the evolution of water-craft as historic property types associated with the above contexts; and (3), to develop draft criteria for the nomination of shipwrecks to the National Register of Historic Places. No actual survey of shipwreck sites, nor field investigations were a part of this project.

Implementation of the project was begun with an investigation of requirements for format and content, with a study of the above National Register publications, and a review of previously prepared studies and nomination documents. Several Thematic Group and Multiple Property Forms were consulted. The document's basic outline was developed as a result of these investigations.

Research was begun by identifying the principal bibliographical resources. Records were consulted at the University of Minnesota's Wilson Library in Minneapolis, the James J. Hill Reference Library in St. Paul, Bowling Green University's Institute for Great Lakes Research in Perrysburgh, Ohio, the Northeast Minnesota Historical Center, Duluth Public Library, and the U.S. Army Corps of Engineers Canal Park Museum in Duluth. The computerized Dissertation Abstract Service was also consulted at the University of Minnesota's Duluth campus. Appropriate reference materials were identified for development of the historic contexts, and intensive research was undertaken. Good overviews of major patterns of Minnesota history were provided by Theodore Blegen's Minnesota: A History of the State and Walter Van Brunt's Duluth and St. Louis County, Minnesota. George Quimby's Indian Life in the Upper Great Lakes and Tim Roufs' "Early Indian Life in the Lake Superior Region" were wonderful resources. Harold Innis' Fur Trade in Canada, John Fritzen's Historic Sites and Place Names of Minnesota's North Shore, and David Walker's Iron Frontier were essential. Numerous scholarly articles in Minnesota History also proved helpful. The contexts were developed with a special sensitivity to the maritime aspects while attempting to retain a focus state wide or region wide.

Delineation of property types was relatively simple. Broad categories of ships and small craft were identified and described, and their development was traced in such works as Howard I. Chapelle's classic History of American Sailing Ships, John Morrison's History of American Steam Navigation, and J.B. Mansfield's History of the Great Lakes. Empirical research into the introduction and evolution of various classes of Great Lakes ships was based largely on manuscripts developed by the author from contemporary ship registries, directories, and official U.S. and Canadian government enrollments. Supporting data was gathered during more than thirty years of research on nineteenth century Great Lakes shipbuilding technology. Knowledge of Lake Superior vessels was gained from a survey of the marine columns in regional

newspapers from the 1850s through the first decades of the twentieth century, and from a study of the Ship History files at the Dossin Great Lakes Museum in Detroit, the Institute for Great Lakes Research in Perrysburgh, Ohio, the H.G. Runge Collection at the Milwaukee Public Library, and the U.S. Army Corps of Engineers Canal Park Museum in Duluth.

Registration requirements within each property type discussion were extensively revised by Brina J. Agranat, with Tim S. Mistovich and Stephen R. James of Panamerican Consultants, under contract to the Minnesota Historical Society.

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