# USCG Ice Operations


# USCG 11 Statutory Missions

- Search and Rescue
- Marine Safety
- Ports, Waterways & Coastal Security
- Drug Interdiction
- Migrant Interdiction
- Defense Readiness
- **Ice Operations**
- Aids to Navigation
- Marine Environmental Protection
- Living Marine Resources
- Other Law Enforcement

# Ice Operations

## Polar Operations

Protect U.S. sovereignty.

Assist other governmental and scientific organizations.

Provide assured access to polar operations.

## International Ice Patrol

Monitor and warn mariners of iceberg danger in designated areas of the Atlantic Ocean.

## Domestic Icebreaking

Facilitate commercial navigation and commerce, prevent flooding caused by ice, enable search and rescue in icebound areas.

# Domestic Ice Breaking Order of Priority

## Search and Rescue

Facilitate SAR in icebound areas. D9 Directs Cutter Lake SAR Standby.

## Urgent Response to Vessels

Situations that do not rise to the level of SAR, however, may deteriorate if left unattended.

## Exigent Community Services

Flood mitigation and support of icebound communities in immediate need of food, heating oil, fuel, or medical assistance.

## Facilitation of Navigation

Executive Order 7521

# Directive for Domestic Ice Breaking Operations

**1936 President Franklin D. Roosevelt signed Executive Order 7521 directing the Coast Guard to conduct domestic icebreaking operations in the Great Lakes.**

**“ … assist in keeping open to navigation by means of icebreaking operations, specified channels and harbors in accordance with the reasonable demands of commerce . . .”**

# Types of Icebreaking

**Preventive Icebreaking** (track maintenance) – creating a track by which vessels can transit an ice-covered area.

**Vessel Assistance** – track grooming or preparation completed within 24 hours of a specific transit activity or request.

**Direct Assistance** – directly assisting a vessel that has become beset or escorting a vessel which lacks sufficient power to transit unassisted through an ice-covered area.

# CGD9 Domestic Ice Breaking Phases

Summer Navigation Season: Regular navigation through the warmer months.

Extended Navigation Season: On or about 15 December to 15 January (Vessels lay-up).

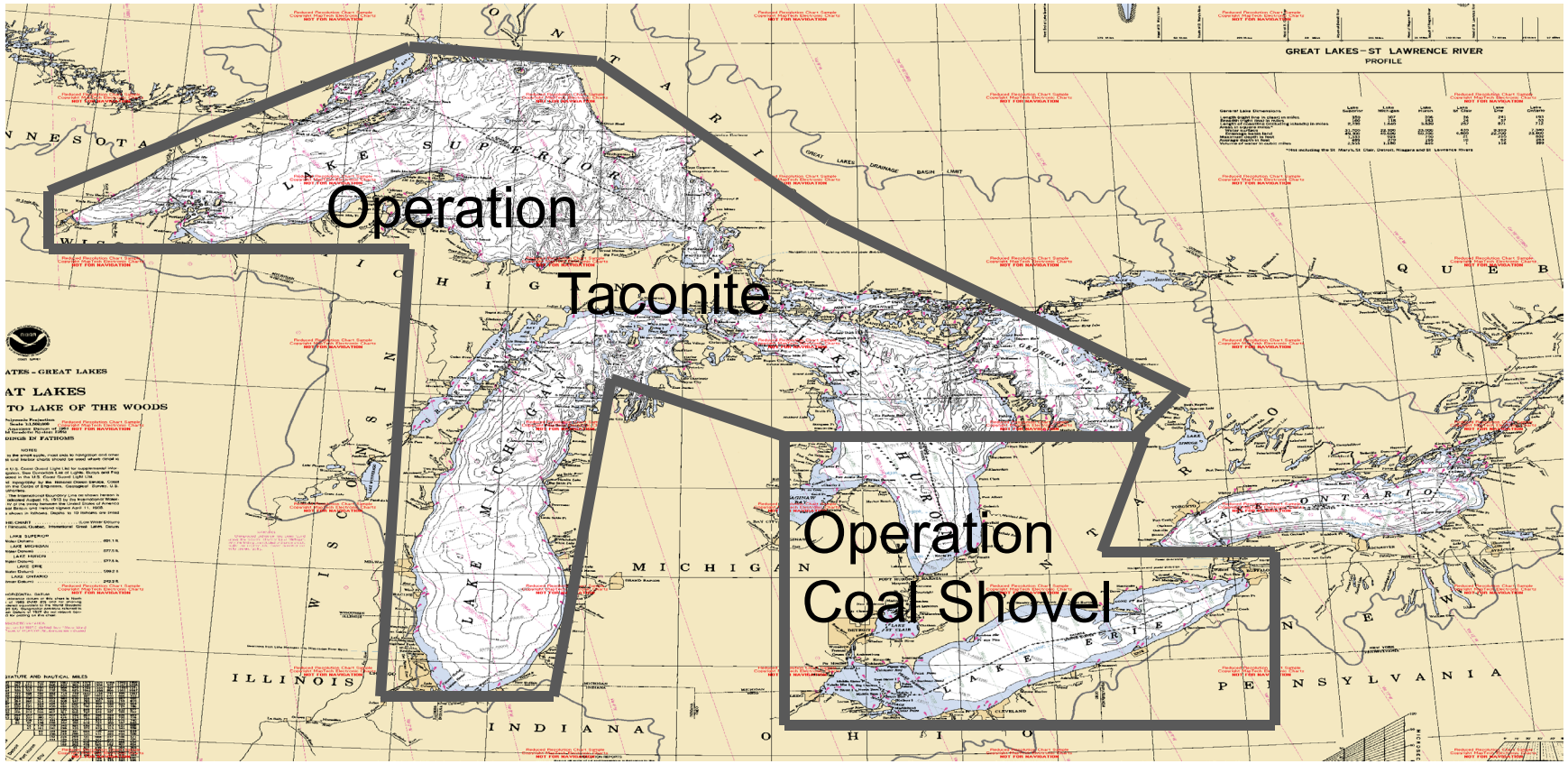
Winter Navigation Season: On or about 20 January to 10 March. Commercial traffic reduces significantly but does not stop.

Spring Breakout: On or about 20 March until ice no longer impedes navigation.

# Economic Impact

- ✓ 25% of the region's commodities are moved during the four-month winter navigation season.
- ✓ Iron ore accounts for 65% of all commodities passing through the Soo Locks. Coal, Limestone, and grain combine for the remaining 35%.
- ✓ 92% of the iron ore mined in the U.S. passes through the Soo Locks.
- ✓ Iron ore passed through the Soo Locks contributes 3.2% of the United States' total GDP.

# Great Lakes Ice Breaking Areas of Responsibility



# Operation Taconite Objectives

- Respond to emergent requests for assistance
- Respond to requests for ferry relief
- Respond to USACE requests for flooding control
- Facilitate the movement of Commercial vessels by minimizing commercial transit times


# 9th District Ice Breakers

1. USCGC SPAR (Duluth)
2. USCGC KATMAI BAY (SSM)
3. USCGC BISCAYNE BAY (St. Ignace)
4. USCGC MACKINAW (Cheboygan)
5. USCGC MOBILE BAY (Sturgeon Bay)
6. USCGC HOLLYHOCK (Port Huron)
7. USCGC BRISTOL BAY (Detroit)
8. USCGC MORRO BAY (Cleveland)
9. USCGC NEAH BAY (Cleveland)

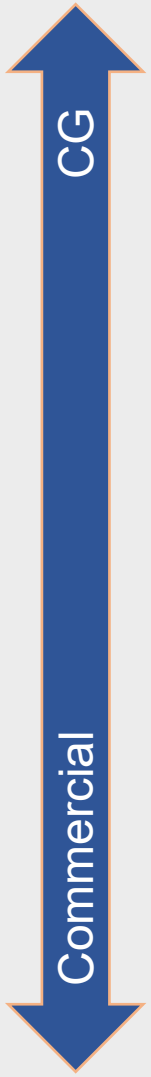

# *USCGC SPAR (WLB-206)*

- Primary asset in Duluth/Superior
- 225ft multi-mission platform capable of performing, aids to navigation, icebreaking, search and rescue, homeland security, law enforcement, and marine environmental protection
- 14" freshwater ice at three knots continuous speed
- 36" packed freshwater ice by ramming

# Air Station Operations Overview

- Ice reconnaissance
- Percentage of coverage
- Unusual formations / activity
- Recreational users
- Hoist operations
- Area familiarization

# Managing Finite Resources




**Tier One** waterways are those "connecting" waters of the Great Lakes, as determined by the CG 9th District.

**Tier Two** waterways are those waters that connect Tier One to Tier Three waterways. This also includes ice covered areas of the open lakes.

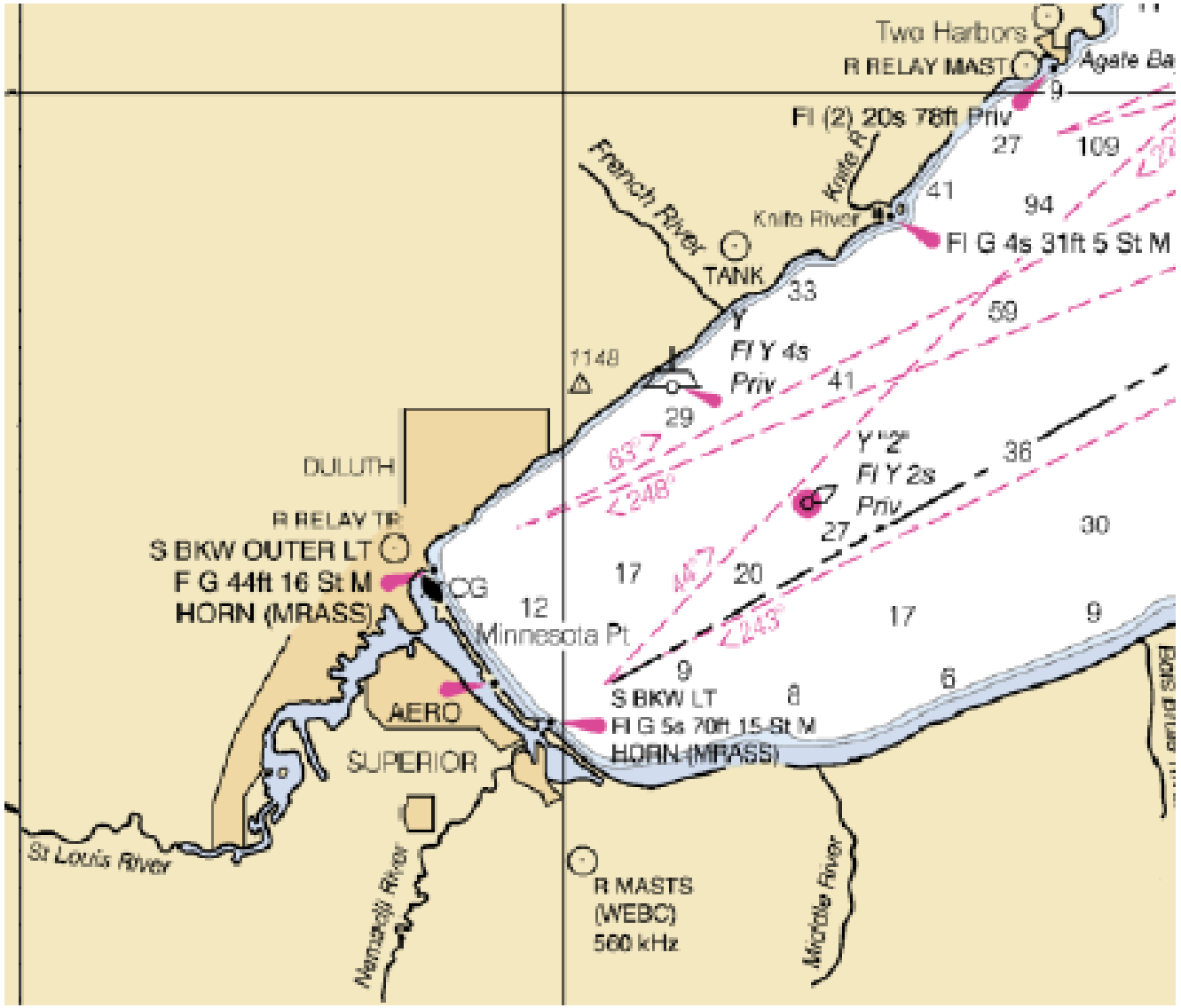
**Tier Three** waterways are the federally maintained channels that connect Tier Two waterways to the various commercial ports.

**Tier Four** waterways are those docks, shipyards, or other wholly private areas.

# Tier One and Two Waterways

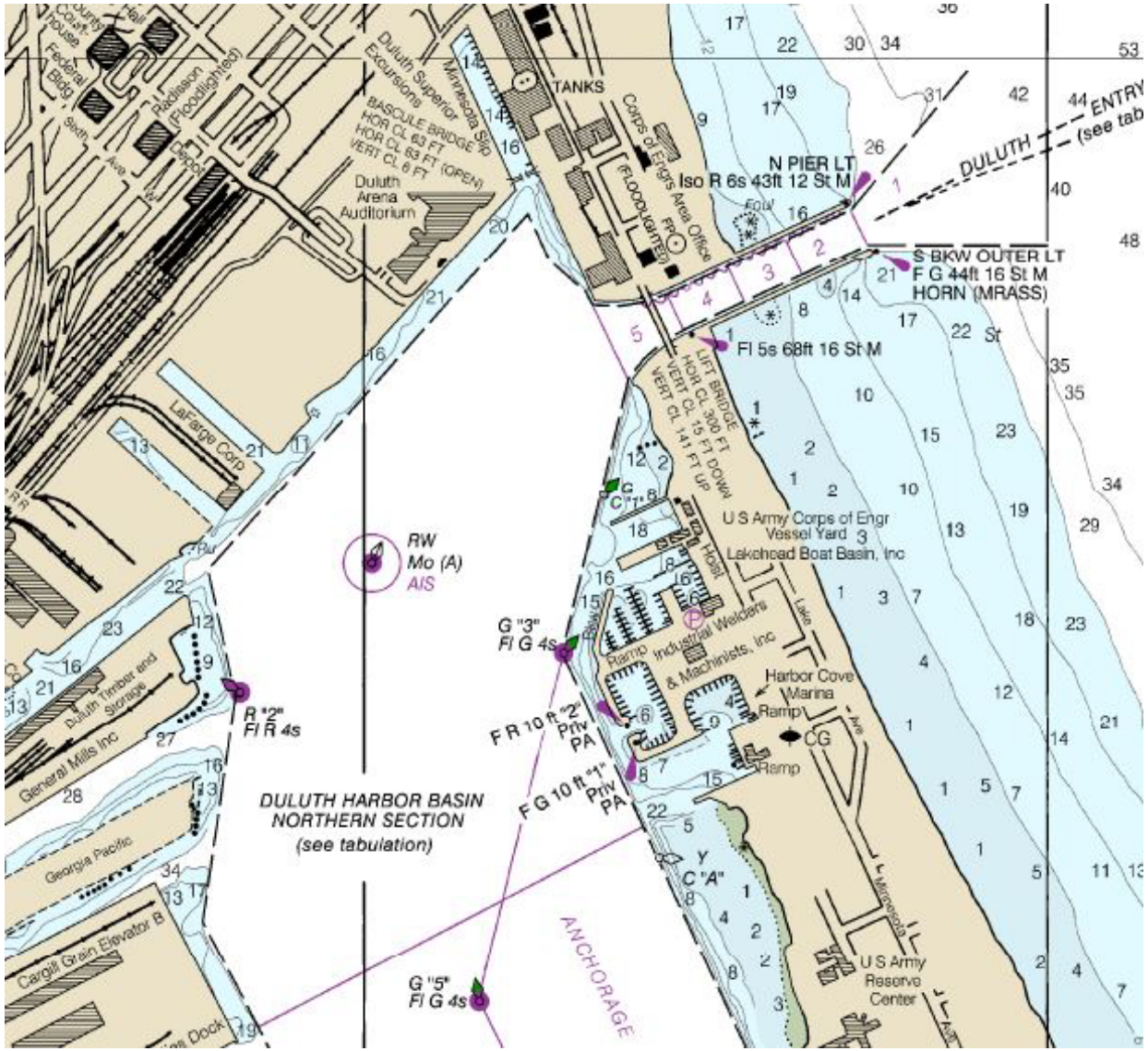
# Duluth/Superior

- Tracks are cut outside the break wall along the LCA's
- Ice can pack in from the lake on unusual wind patterns in the spring
- Ice covered waters of the open lake are designated as tier II waterways



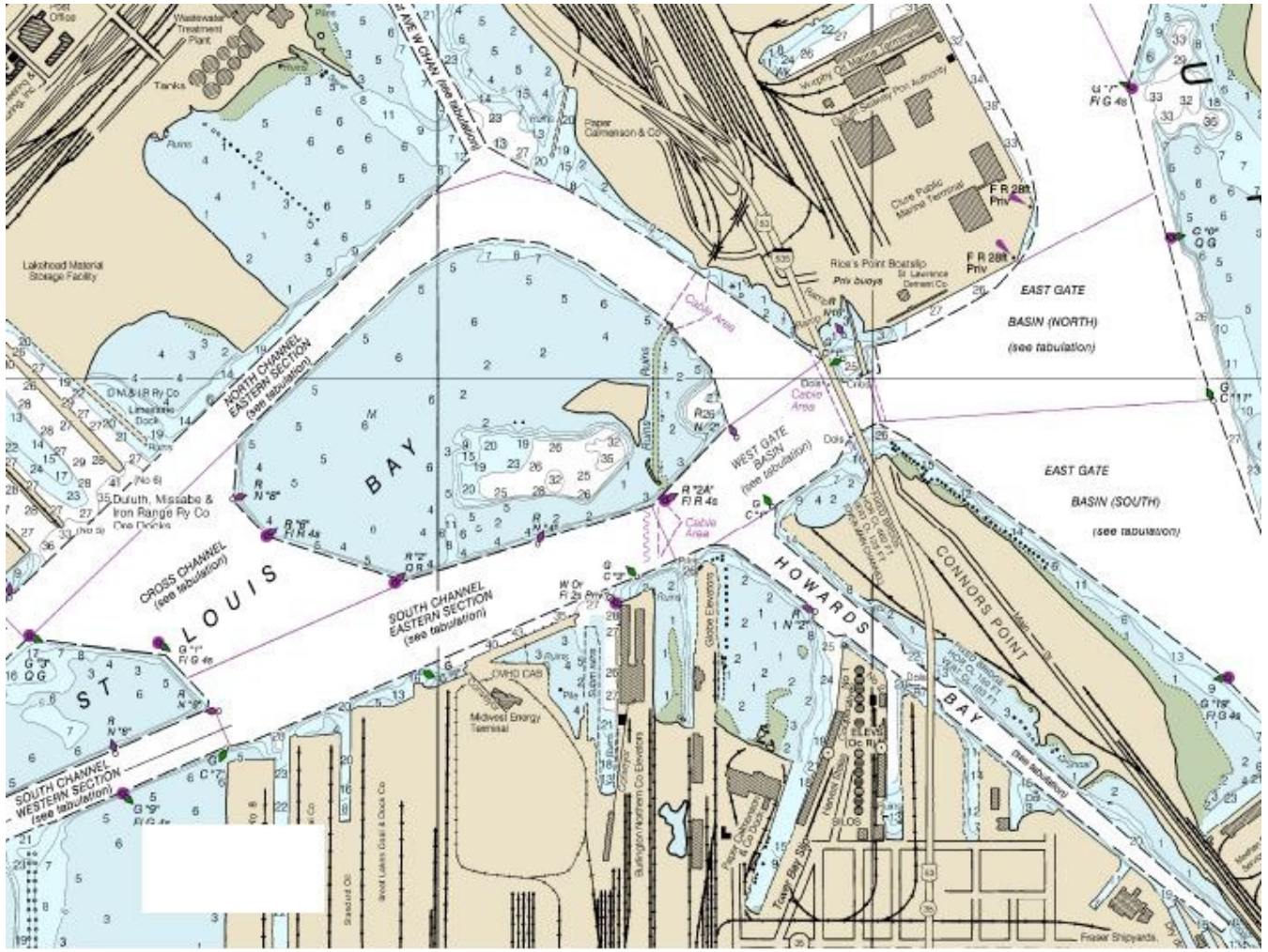
# Duluth Basin

- The Duluth Basin runs from the Duluth Entrance to the East Gate Basin
- During both spring and winter, ice north of buoys "2" and "3" is broken up to allow traffic to make turns in the basin
- During the fall a single track is maintained south of "2" and "3" wide enough for traffic to navigate to the East Gate Basin
- In the spring wider areas of the channel are broken out to allow ice to flush out into the lake.



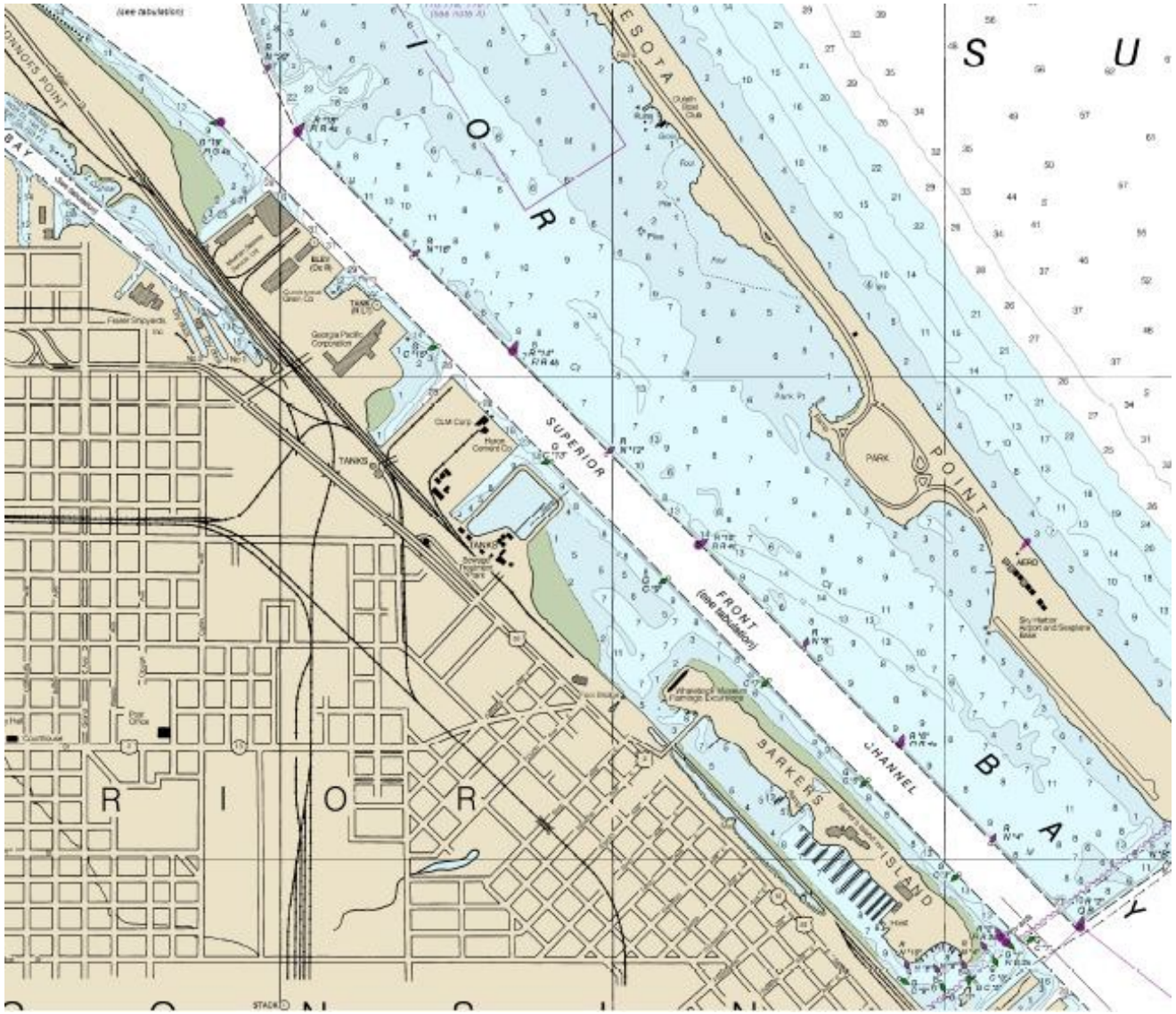
# East Gate/ West Gate Basin/Cross Channel

- East Gate connects the Duluth Basin to the Superior Front Channel in the South as well as the West Gate Basin
- Single tracks are established through the basins and in the North and South Channels
- The Cross Channel requires two sets of tracks
- Initial fracture into Howards Bay (pocket) is conducted in the fall and spring.



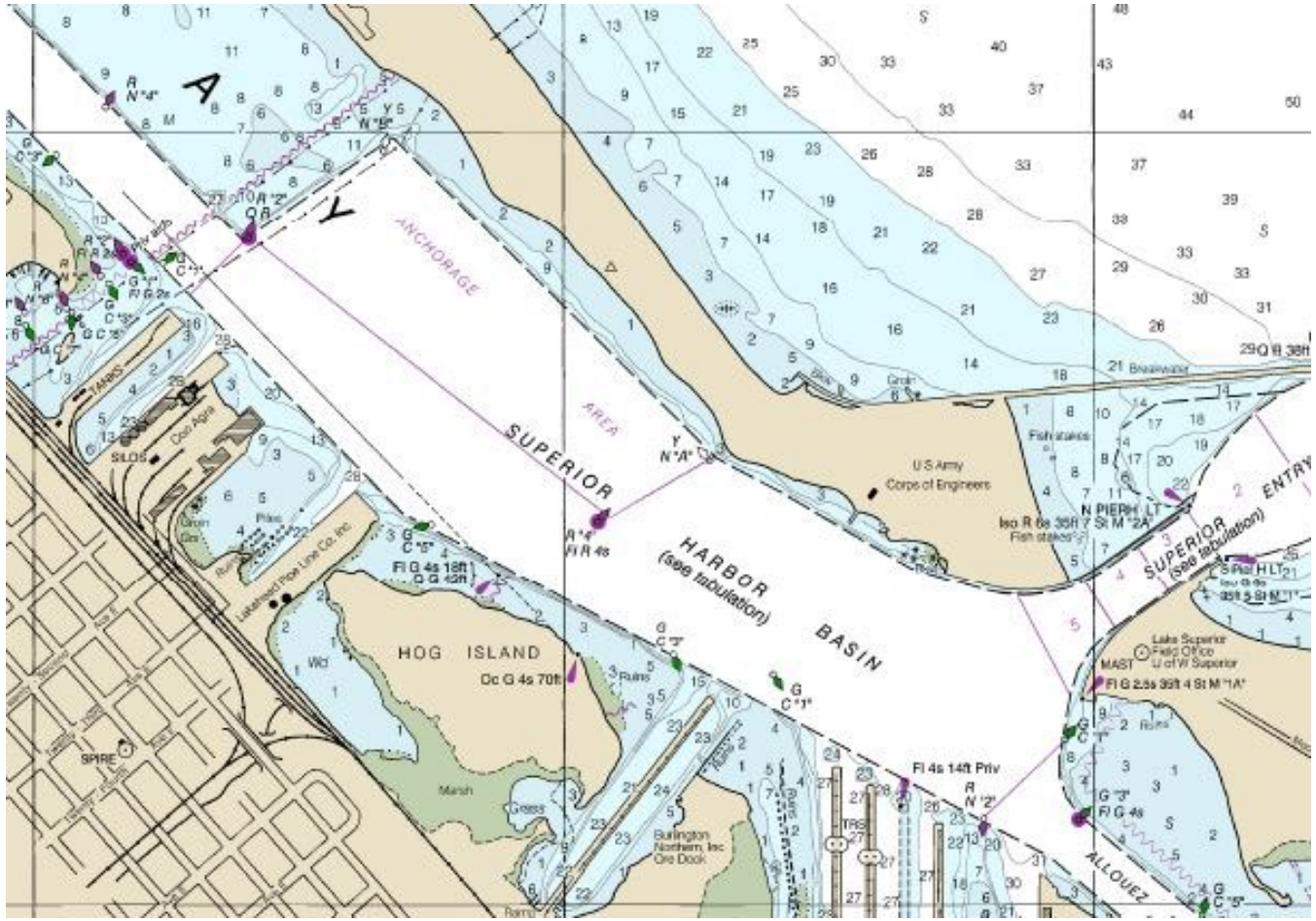
# Superior Front Channel

- The Superior Front Channel runs from the southern end of East Gate to the Superior Basin to the south.
- In the spring, the track should be broken wide enough to allow ice in the channel to flush out of the Superior Entrance

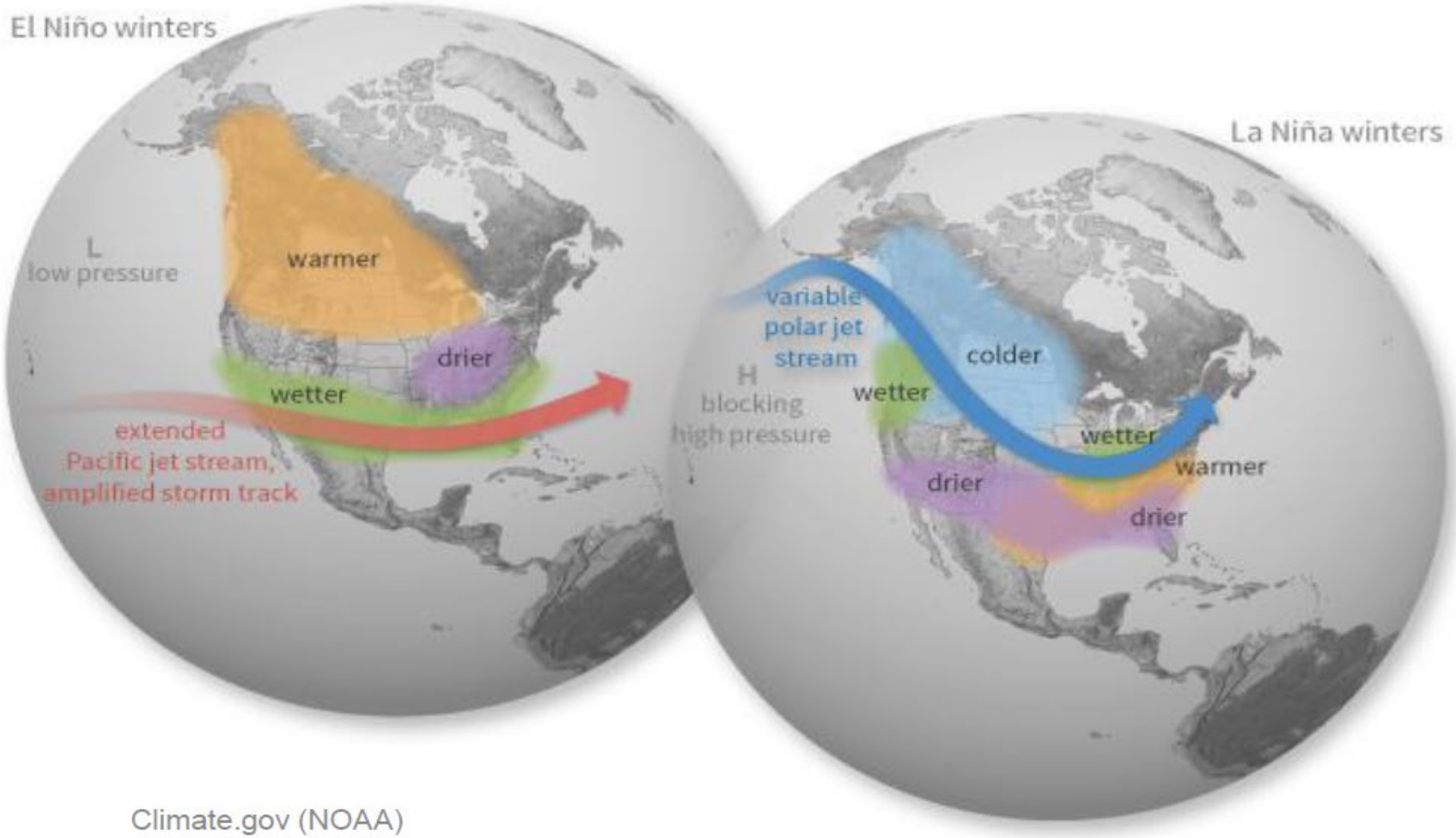


# Superior Basin

- The Superior Basin runs from the southern end of the Superior Front Channel to the Superior Entrance Channel
- During the fall the anchorage north of buoy "4“ is not broken
- In the spring, this anchorage should be broken out as it allows for ice to flush into the lake



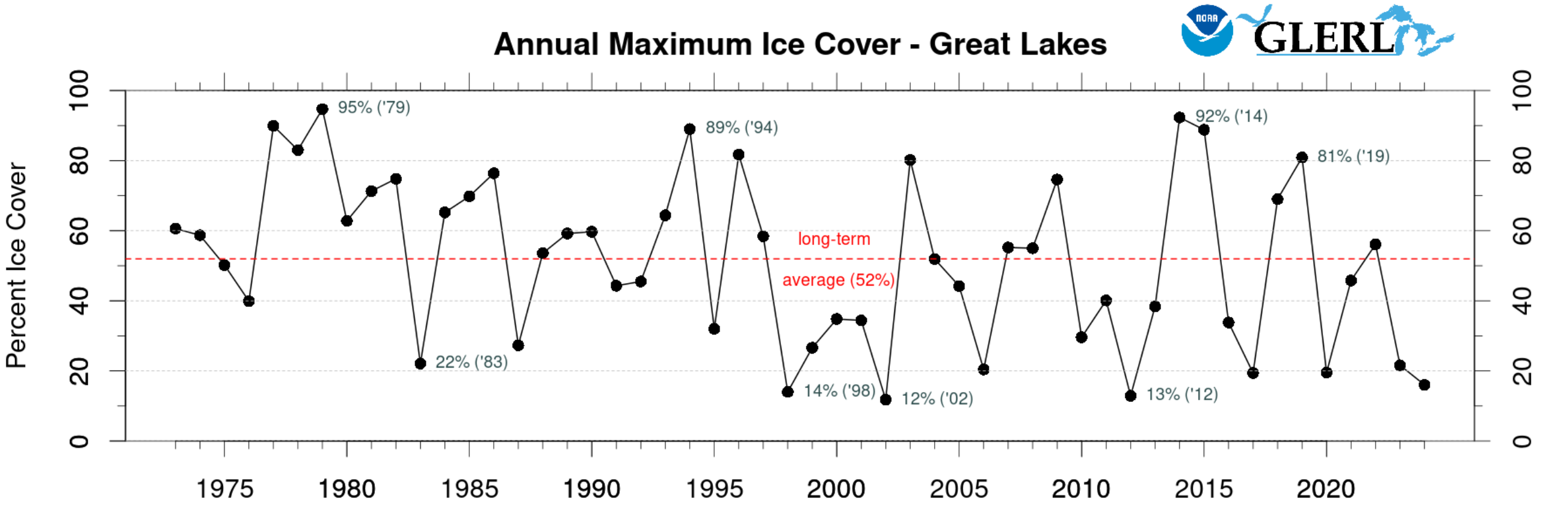
# Typical Wintertime Circulations During El Nino and La Nina

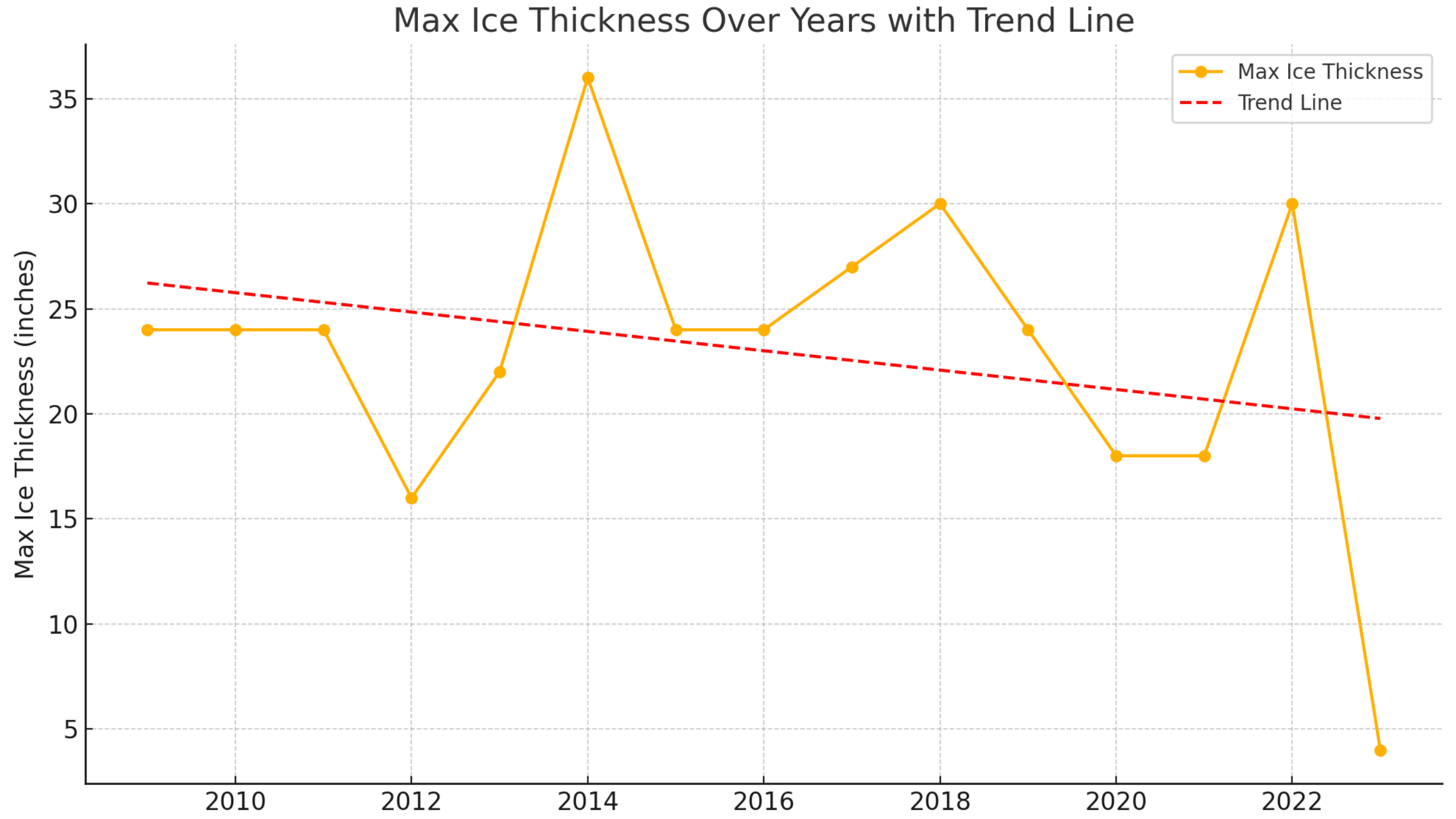


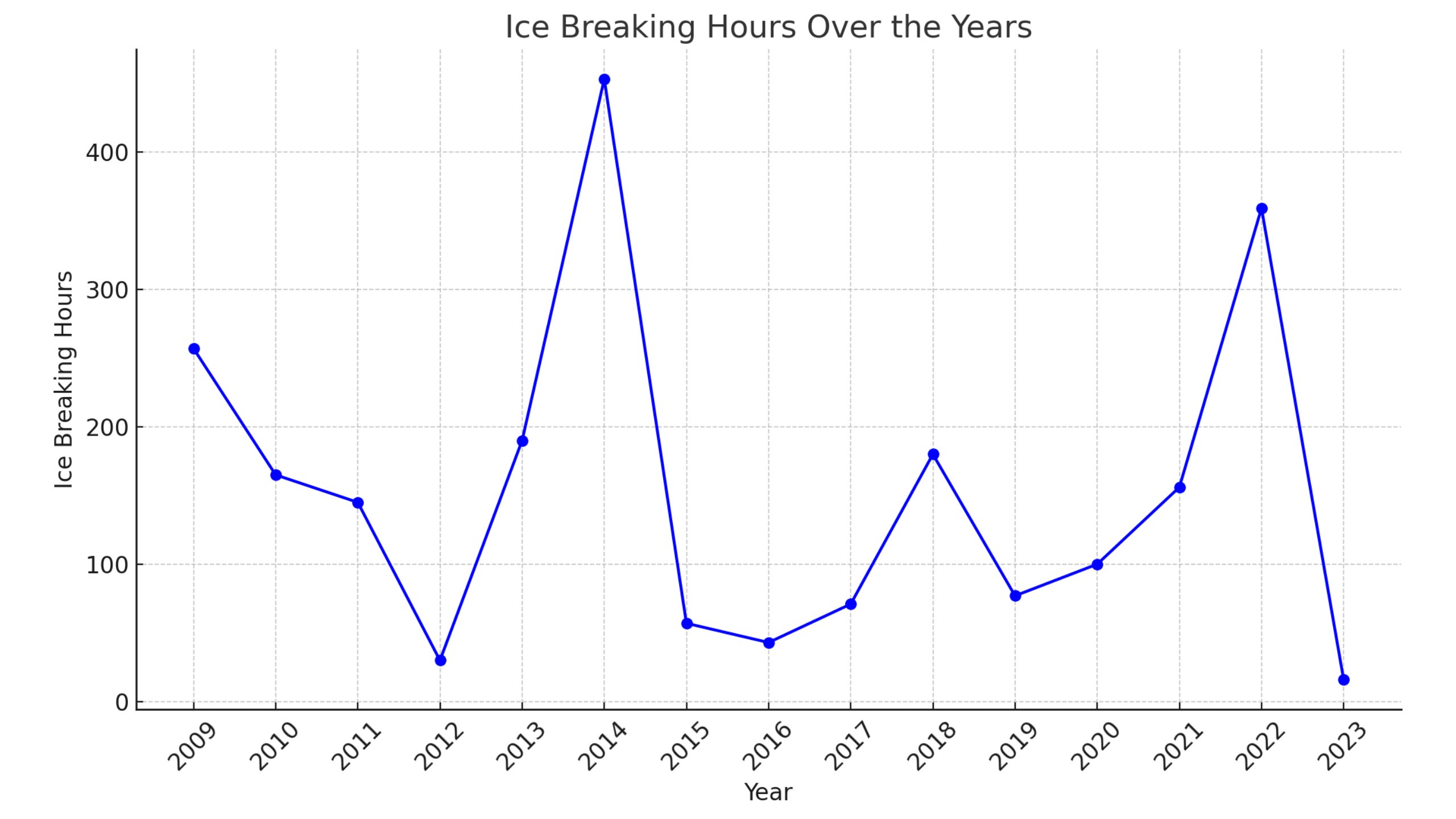

Climate.gov (NOAA)

# Notable Ice Seasons

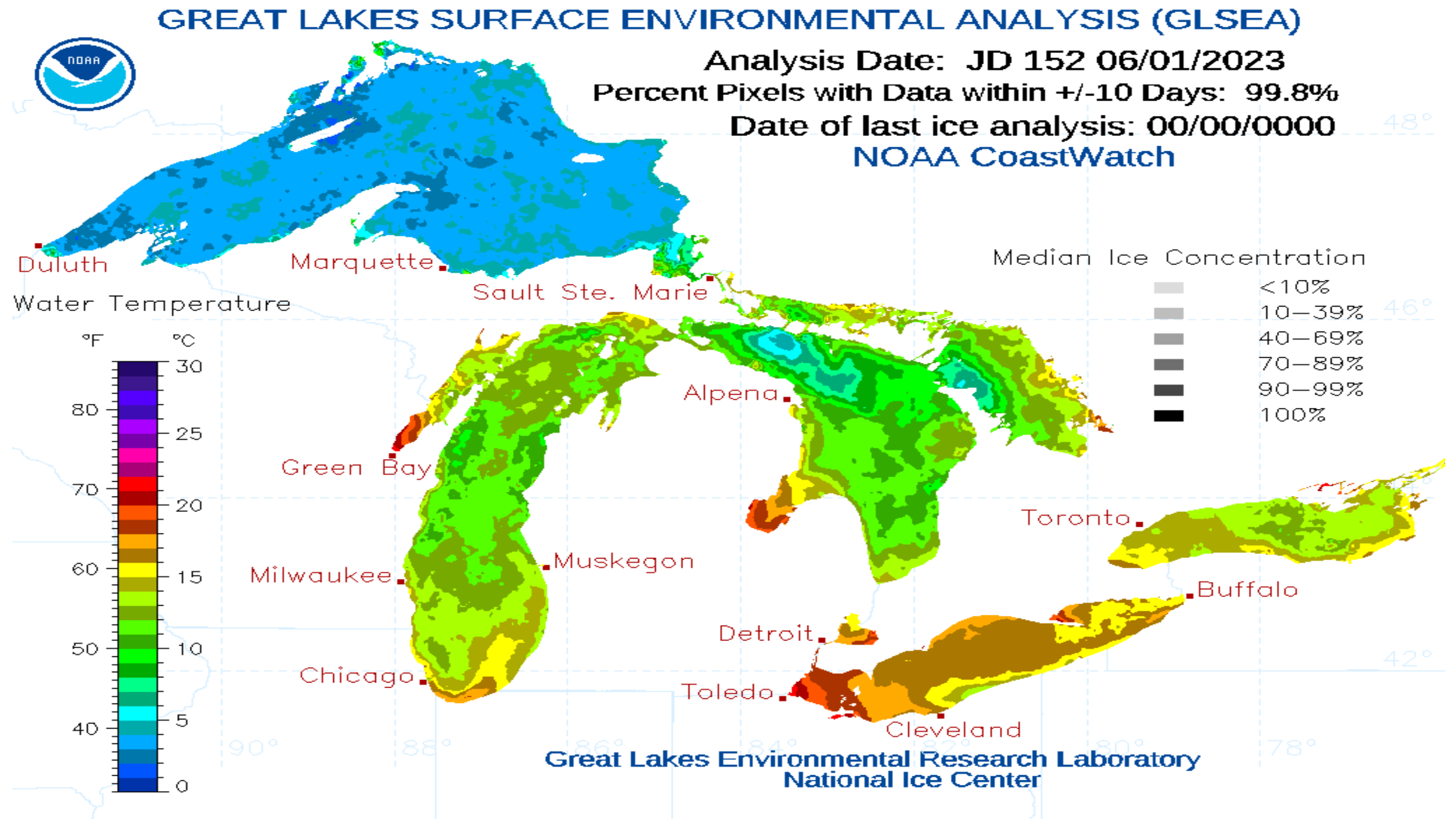



Annual Maximum Ice Cover - Great Lakes
GLERL
Percent Ice Cover
0
20
40
60
80
100
95% ('79)
89% ('94)
92% ('14)
81% ('19)
long-term
average (52%)
22% ('83)
14% ('98)
12% ('02)
13% ('12)
1975
1980
1985
1990
1995
2000
2005
2010
2015
2020


Max Ice Thickness Over Years with Trend Line
Max Ice Thickness
Trend Line
Max Ice Thickness (inches)
35
30
25
20
15
10
5
2010
2012
2014
2016
2018
2020
2022

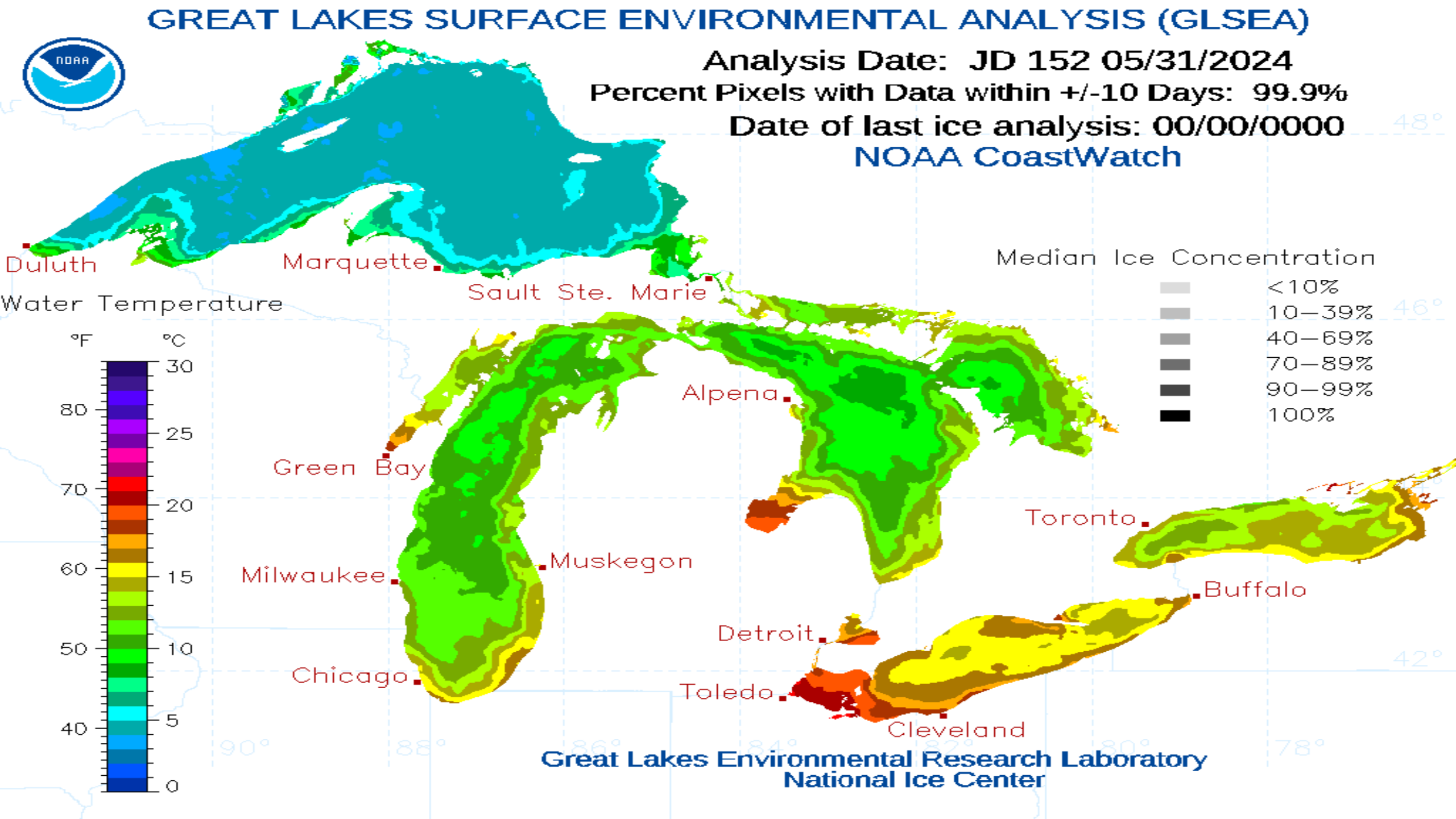

Ice Breaking Hours Over the Years
Ice Breaking Hours
0
100
200
300
400
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020
2021
2022
2023
Year

# GREAT LAKES SURFACE ENVIRONMENTAL ANALYSIS (GLSEA)




Great Lakes Environmental Research Laboratory
National Ice Center

# GREAT LAKES SURFACE ENVIRONMENTAL ANALYSIS (GLSEA)




Great Lakes Environmental Research Laboratory
National Ice Center