#2 NIC— Todd Arbetter, Pablo Clemente-Colón, C. Szorc, Tim Holden, & Ignatius Rigor

Provisional Outlook for 2008 September Minimum

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Overview: This outlook was prepared by assessing conditions captured in the National Ice Center (NIC) sea ice chart for June 22, 2008. Ice regions containing concentrations of multiyear ice (MYI), classified in the chart by the partial amount (1/10, 2/10, etc.), have been combined to represent the extent of MYI in this analysis. All other ice areas are then considered first-year ice (FYI).

The following assumptions were made to produce the outlook:

1) None of the existing ice in Baffin Bay or the Greenland Sea would survive.
2) No areas with of 1/10 or 2/10 MYI concentration would survive.
3) Advection and ice deformation are not considered at this time in the assessment.

The non-surviving ice areas described above were removed graphically from the June ice chart using ArcGIS and the extent of the leftover ice was estimated. When applying this approach analogously to the NIC sea ice chart for June 25, 2007, the remaining ice for September 2007 was estimated at 3.89 million km^2, which is very close to the calculated NIC September chart minimum of 3.98 million km^2.

For 2008, the question still remains on whether the FYI in the central Arctic would survive the summer, and how much. This will depend on the actual warming/melting trend that will be ultimately experienced. Presently, the ice extent retreat is following last year's trend according to the NIC observations. Still, a major contrast with last year is the fact that a much larger extent of FYI is dominating the central Arctic following the MYI boundary crossing of the North Pole very early in the season. This may put us into new territory as there are no previous observations of a potential wide regional melt out at the pole.

In order to assess a range of possible outcomes, a set of 2008 outlooks were produced with various FYI melt scenarios ranging from conservative to extreme. Four cases were considered.

1) Conservative melt: Most of the FYI survives
2) Moderate melt: Less FYI bordering open water areas above Fram Strait and above Lomonosov Ridge survives
3) Aggressive melt: Only FYI packed along the Canadian Arctic Archipelago survives
4) Extreme melt: No FYI survives

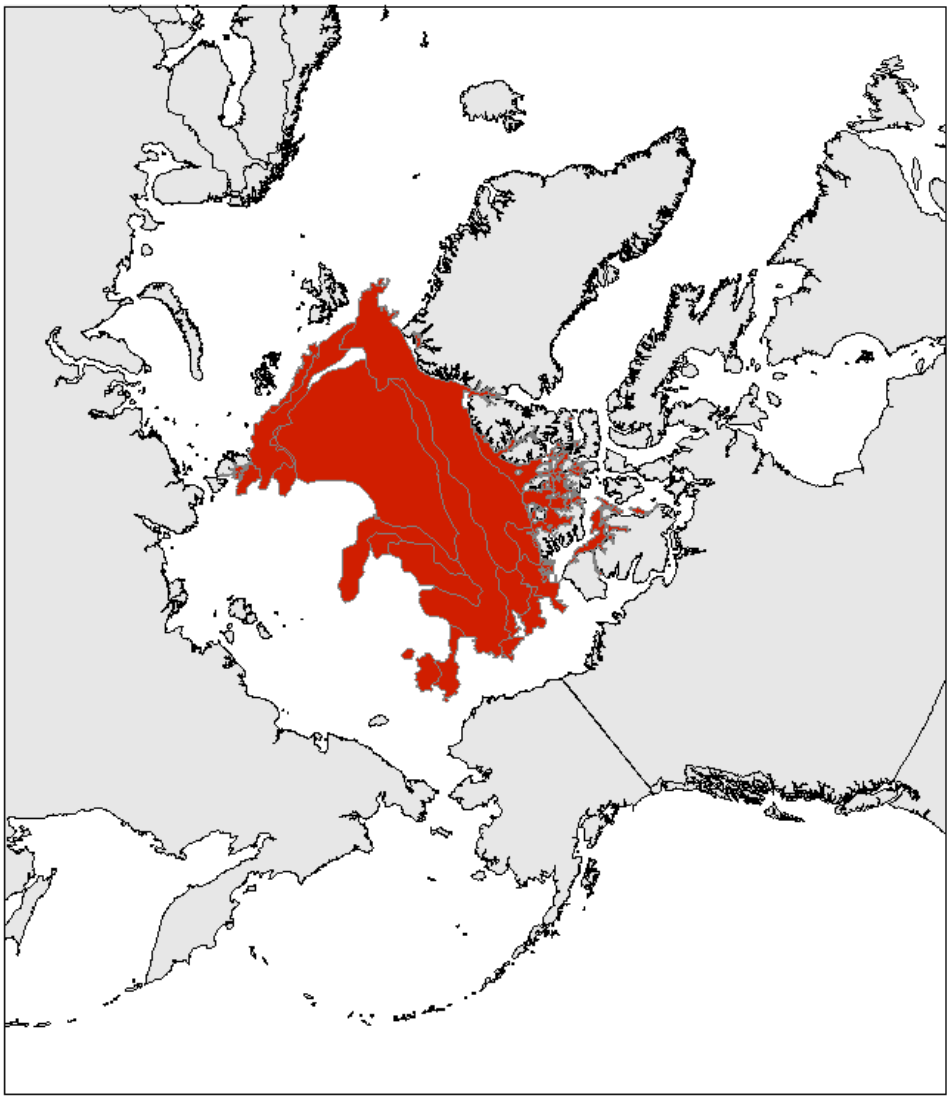
The charts below indicate in red what ice would remain in the Arctic under each scenario. It should be emphasized that this is not a forecast of the ice locations in September. The ice shown here will be advected around the Beaufort Gyre and toward and through Fram Strait. Some floes may filter through the Canadian Arctic Archipelago. Additionally, export through Fram Strait during summer could also reduce the amount of MY ice in the Arctic basin further influence the September estimate.

The 4 outlook scenarios presented next were produced by the NIC Science Team and presented to the Operations Senior Analysts/Forecasters. The opinion of the forecasters was that the most likely scenario was somewhere between Moderate and Aggressive scenarios. The average of these two scenarios gives a 2008 September minimum of 2.65 million km^2. This value is well below last year's record value of 3.98 million km^2.

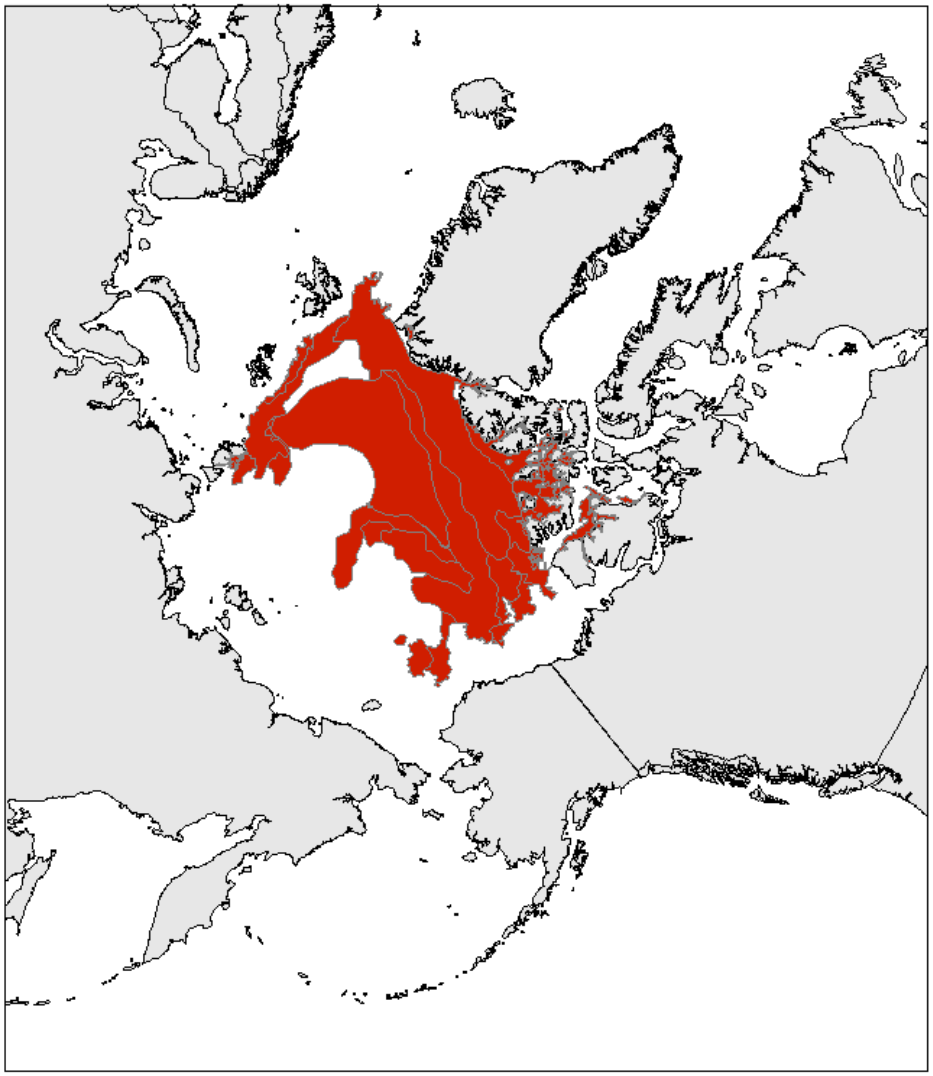
This outlook will be updated two more times throughout the remainder of the 2008 summer season after the third week in July and the third week in August. A long-range forecast of Polar weather patterns for summer 2008 (not considered here) as well as advection considerations will give a clearer indication of the fate of the FYI, and also whether to modify the assumption of surviving MYI.

While the charts should not be considered a spatial forecast, the lack of MYI in the lower Canadian Arctic Archipelago in these scenarios suggests the possibility the Northwest Passage may again become navigable in 2008, particularly the southern (shallow water) route.

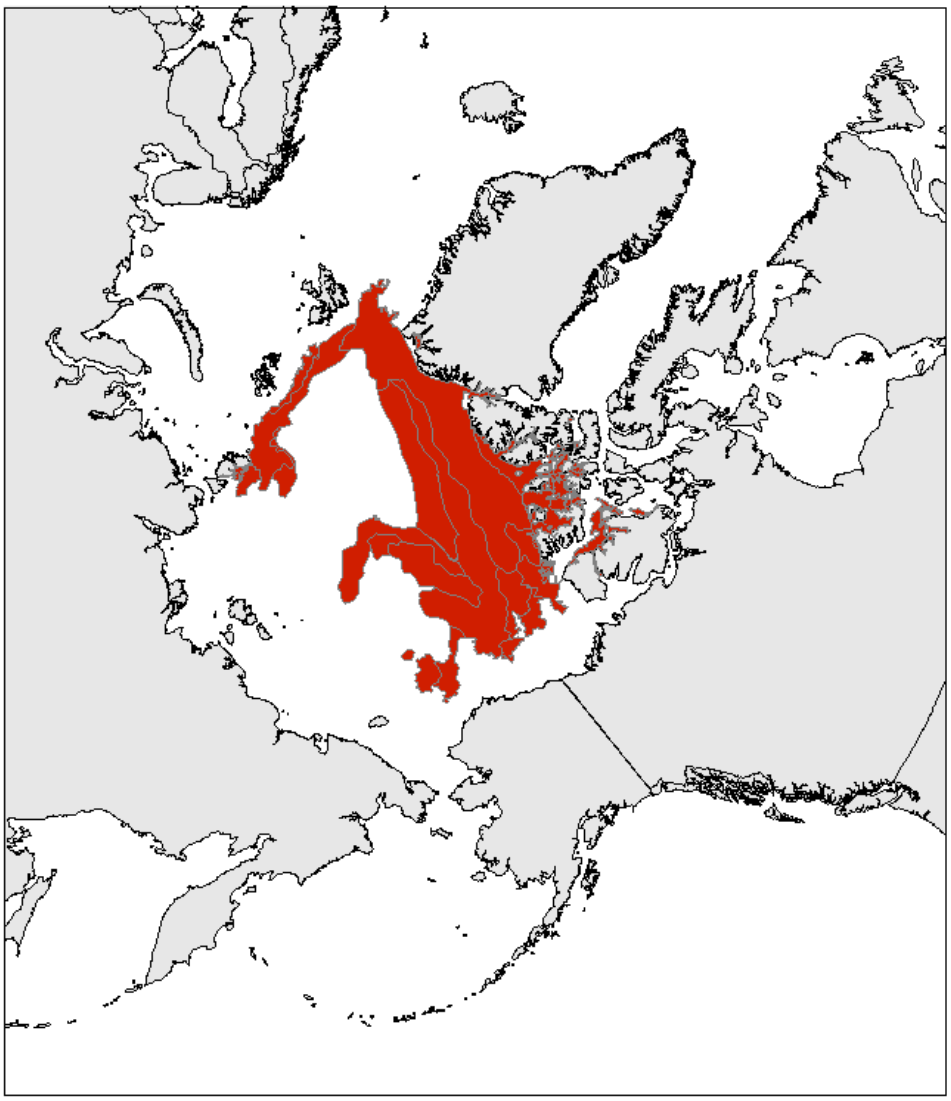
Sea ice conditions for 22 June 2008. First-year ice is shaded light blue, while all ice containing Multi-year ice is shaded green.
The total ice extent is 10.78 million km^2. The extent of multiyear ice (green) is 4.13 million km^2.



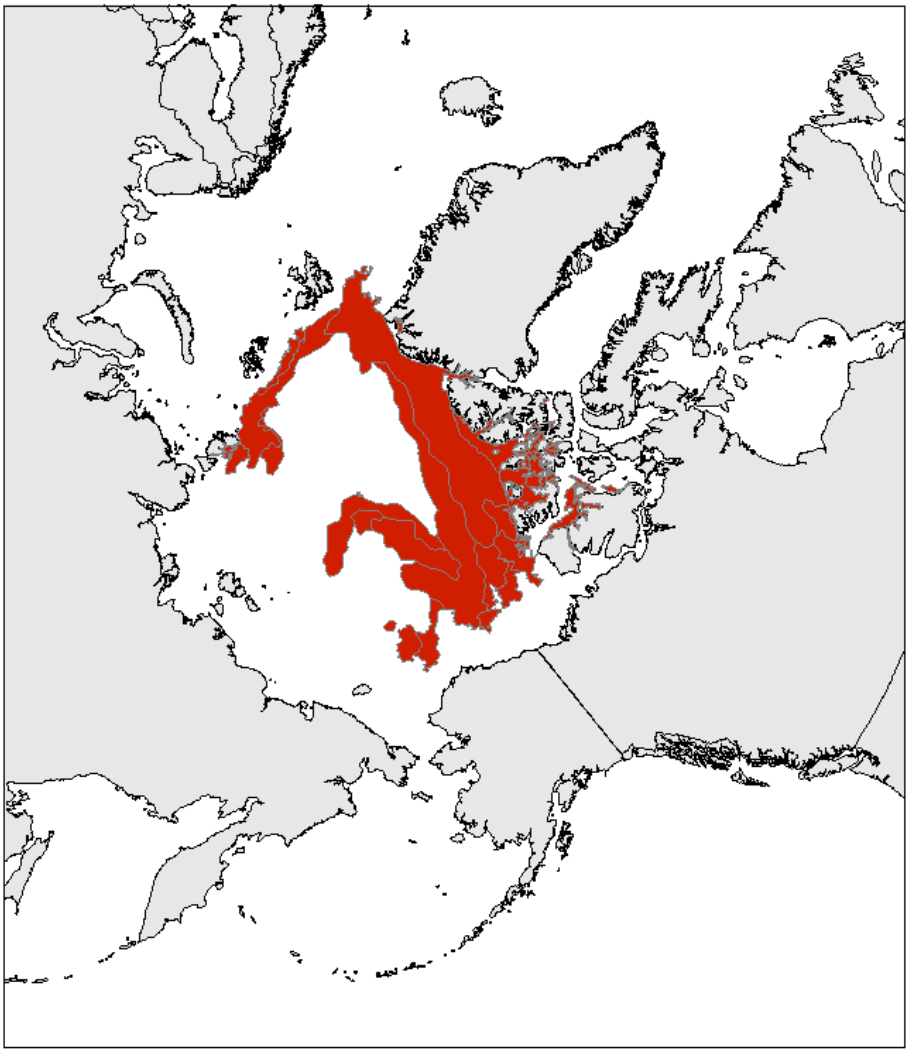
Conservative Scenario:
Minimum September 2008 Ice Extent
3.10 million km^2



Moderate Scenario
Minimum September 2008
Ice Extent
2.89 million km^2



Aggressive scenario
Minimum Sept 2008 Ice Extent
2.42 million km^2



Extreme Scenario
Minimum September 2008 Ice Extent
2.19 million km^2