



# Alaska Center for Climate Assessment and Policy

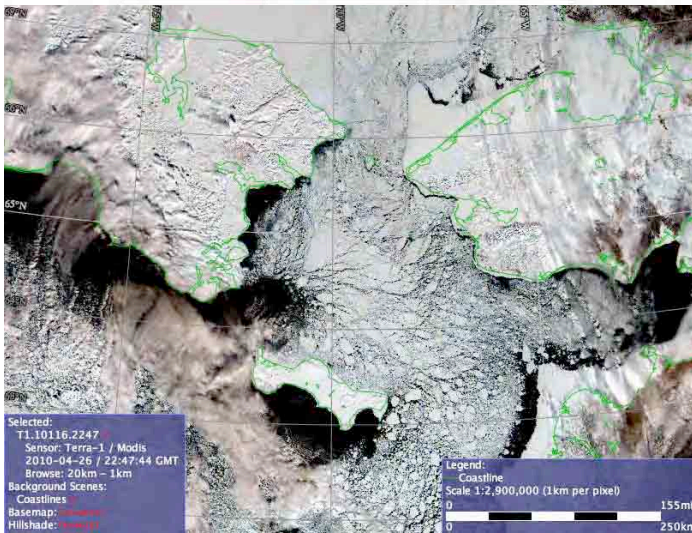
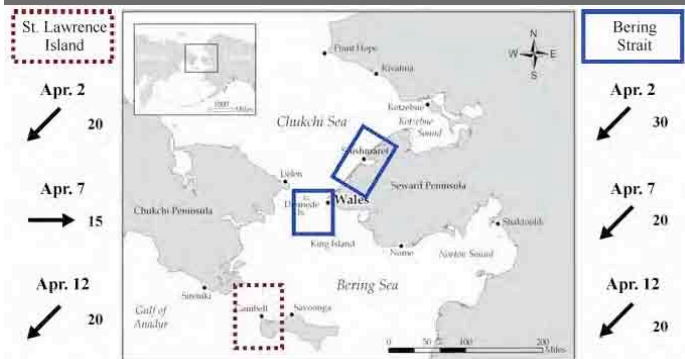
***Welcome to the webinar:***

**Weather forecasts and sea-ice information  
for Bering Straits communities:  
The Sea Ice for Walrus Outlook Project  
June 15, 2010 10 AM (ADT)**

*This webinar will be recorded for internal documentation.*

For more information, please contact ACCAP:  
[accap@uaf.edu](mailto:accap@uaf.edu) <http://www.uaf.edu/accap>

# Weather forecasts and sea-ice information for Bering Straits communities: The Sea Ice for Walrus Outlook Project (SIWO)



*Gary Hufford, Don Moore*

National Weather Service, Anchorage, AK

[Gary.Hufford@noaa.gov](mailto:Gary.Hufford@noaa.gov)

*Vera Metcalf*

Eskimo Walrus Commission, Kawerak, Nome, AK

[VMetcalf@kawerak.org](mailto:VMetcalf@kawerak.org)

*Hajo Eicken*

University of Alaska Fairbanks, Fairbanks, AK

[hajo.eicken@gi.alaska.edu](mailto:hajo.eicken@gi.alaska.edu)

*Jim Overland, Sue Moore, Nancy Soreide*

NOAA Pacific Marine Lab, Seattle, WA

[James.E.Overland@noaa.gov](mailto:James.E.Overland@noaa.gov)

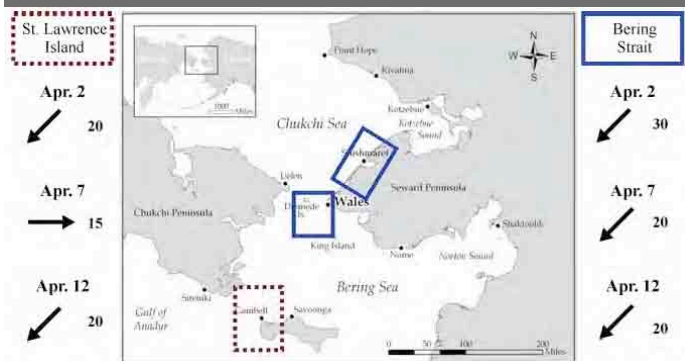
*Helen Wiggins, Ronnie Owens, Kristina Creek*

SEARCH Project Office, ARCUS, Fairbanks, AK

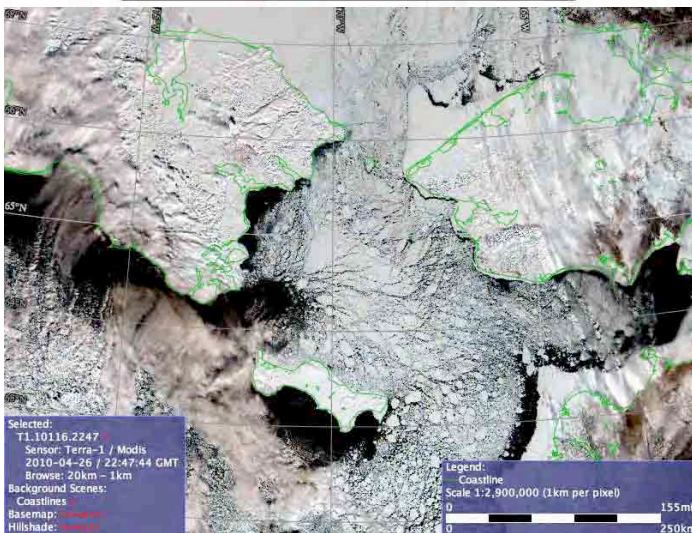
*& numerous contributors from Bering Straits communities*



# Weather forecasts and sea-ice information for Bering Straits communities: The Sea Ice for Walrus Outlook Project (SIWO)



- Introduction: **SEARCH & Sea Ice Outlook**
- SIWO Organization
- Sea Ice & Walrus in the Bering Sea
- SIWO Results
- Conclusions



# Study of Environmental Arctic Change (SEARCH)

**The overall objective of SEARCH is to**

**Understand the nature, extent and future development of the system-scale changes presently seen in the Arctic.**

**SEARCH is built around three basic elements:**

- **Observing Change** - Observing Network well underway
- **Understanding Change** - Modeling & synthesis starting up
- **Responding to Change** - Needs to be implemented still

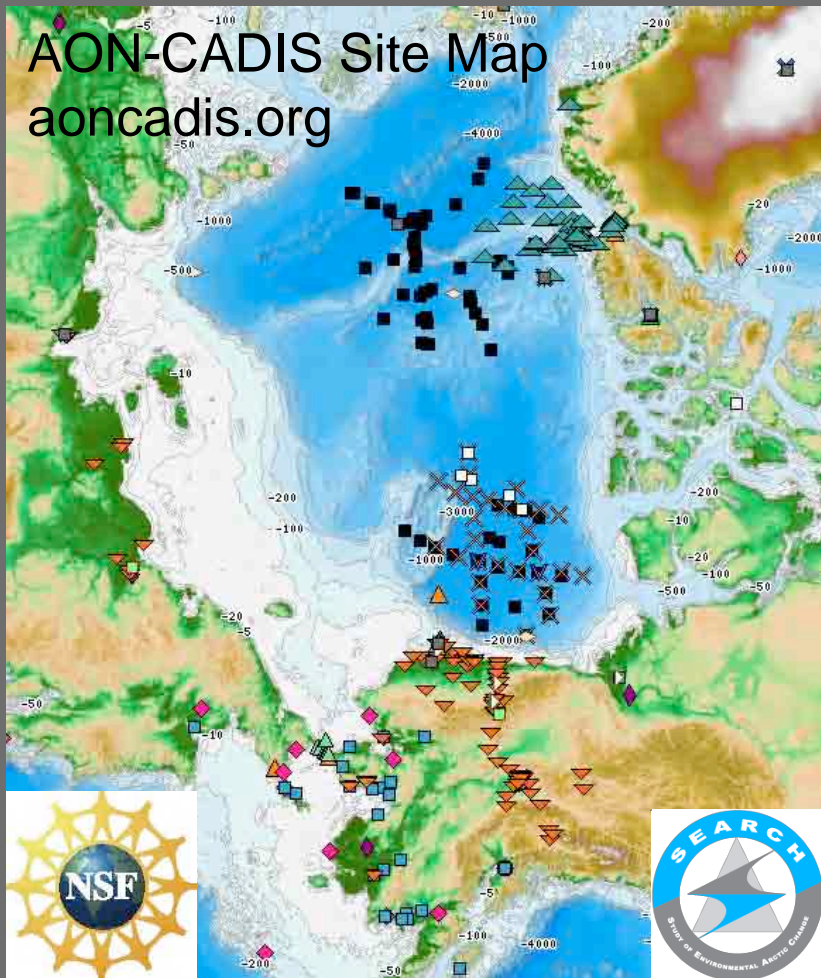


15 June 2010

[www.arcus.org/search/siwo](http://www.arcus.org/search/siwo)

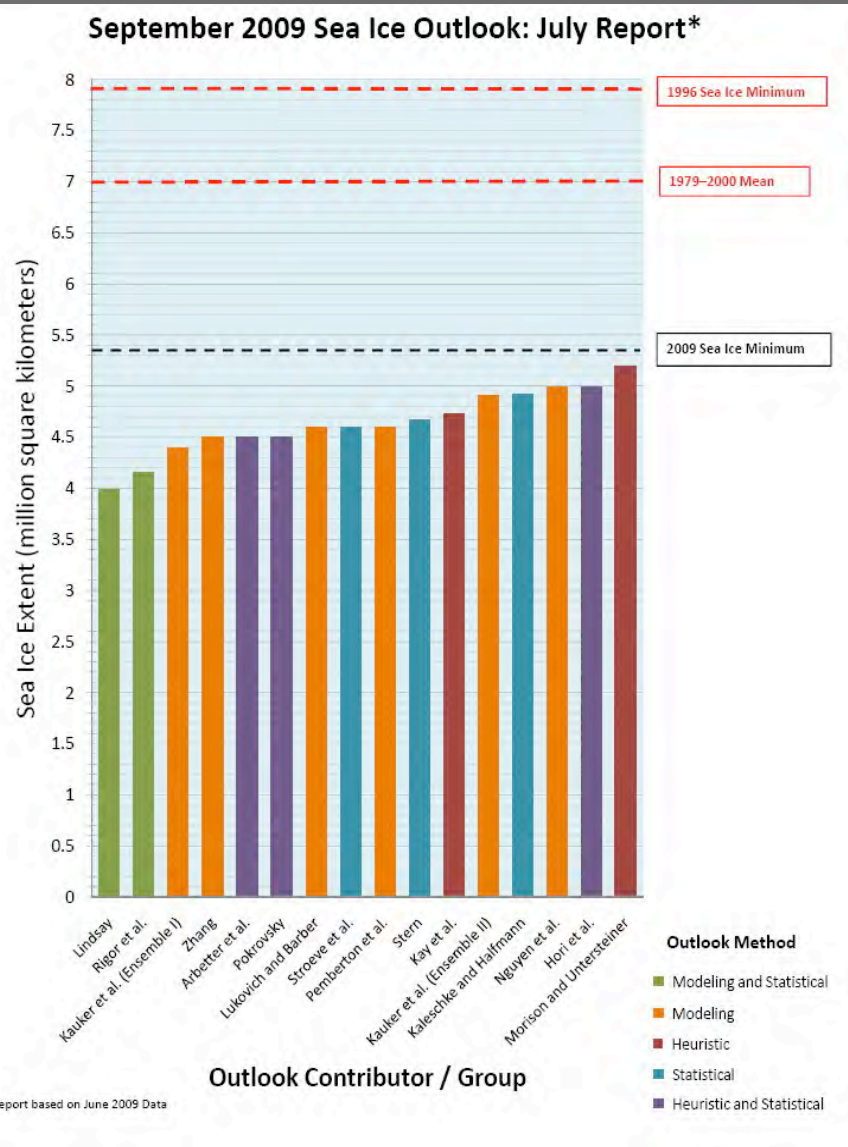
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# Arctic Observing Network (AON)



- Well over 40 long-term projects funded by NSF
- Observation efforts linked to & supported by other agencies
- Observations aimed both at understanding & responding to change
- Data at: [www.aoncadis.org](http://www.aoncadis.org)

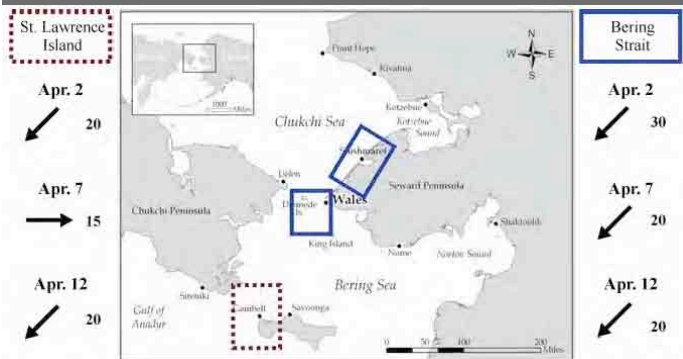
# SEARCH Arctic Sea Ice Outlook as Responding to Change activity



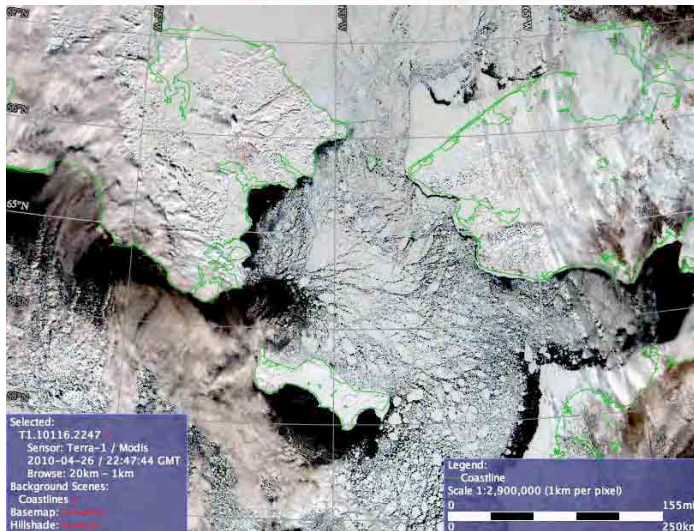
- International effort (led by DAMOCLES & SEARCH programs) to anticipate, track & evaluate Arctic seasonal ice evolution starting in the summer of 2008 with contributions by more than 20 international expert groups
- Regional outlook: Regional ice development important to stakeholders & decision-makers
- [www.arcus.org/search/seaiceoutlook](http://www.arcus.org/search/seaiceoutlook)



# Weather forecasts and sea-ice information for Bering Straits communities: The Sea Ice for Walrus Outlook Project (SIWO)

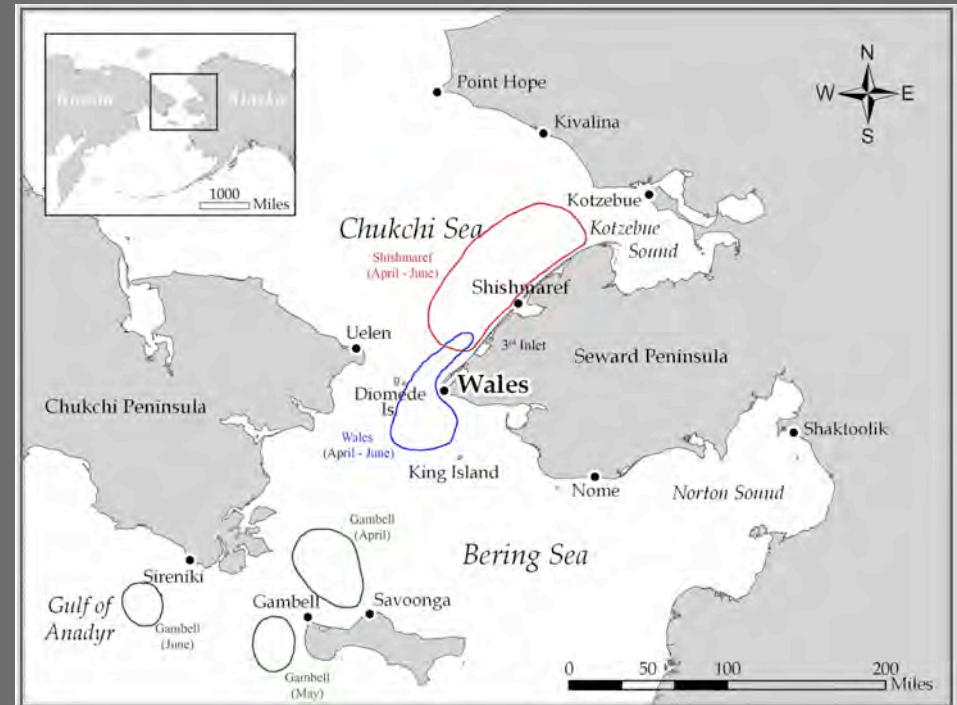


- Introduction: SEARCH & Sea Ice Outlook
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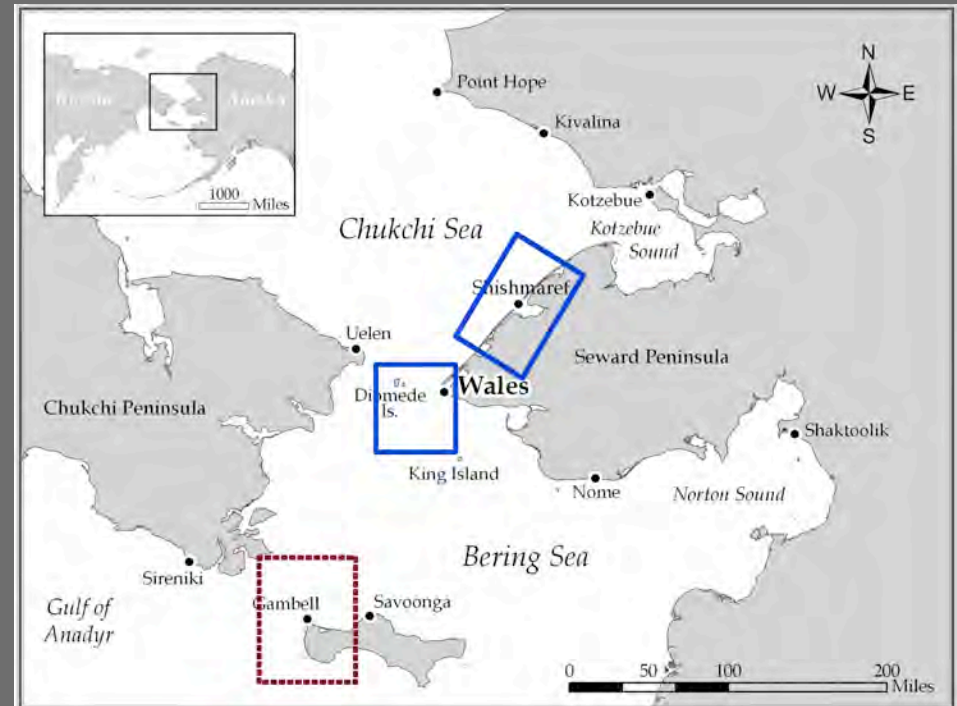
# Sea Ice for Walrus Outlook (SIWO)

- Cooperative effort between NWS, NOAA-PMEL, Eskimo Walrus Commission and UAF
- Community input from Bering Straits communities in January 2010:
  - April through June
  - Regions of interest
  - Important information (weather & ice conditions)



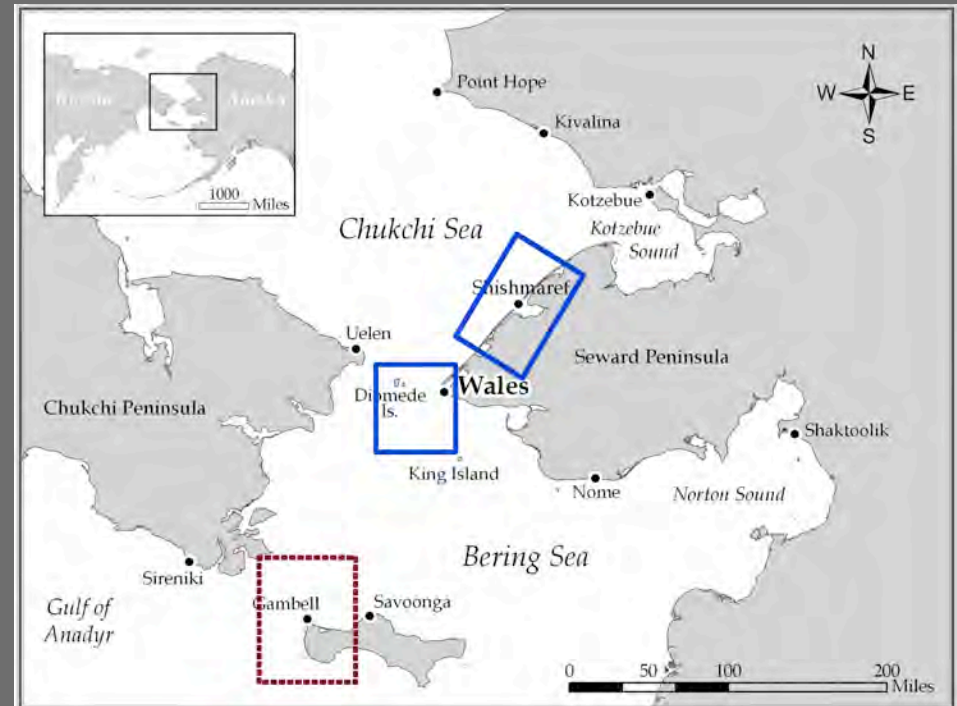
# Sea Ice for Walrus Outlook (SIWO)

- National Weather Service:
  - 10-day forecast based on dedicated high-resolution weather forecasts for northern Bering/southern Chukchi Seas (National Center for Environmental Prediction)
  - Ice forecast based on satellite imagery & model input



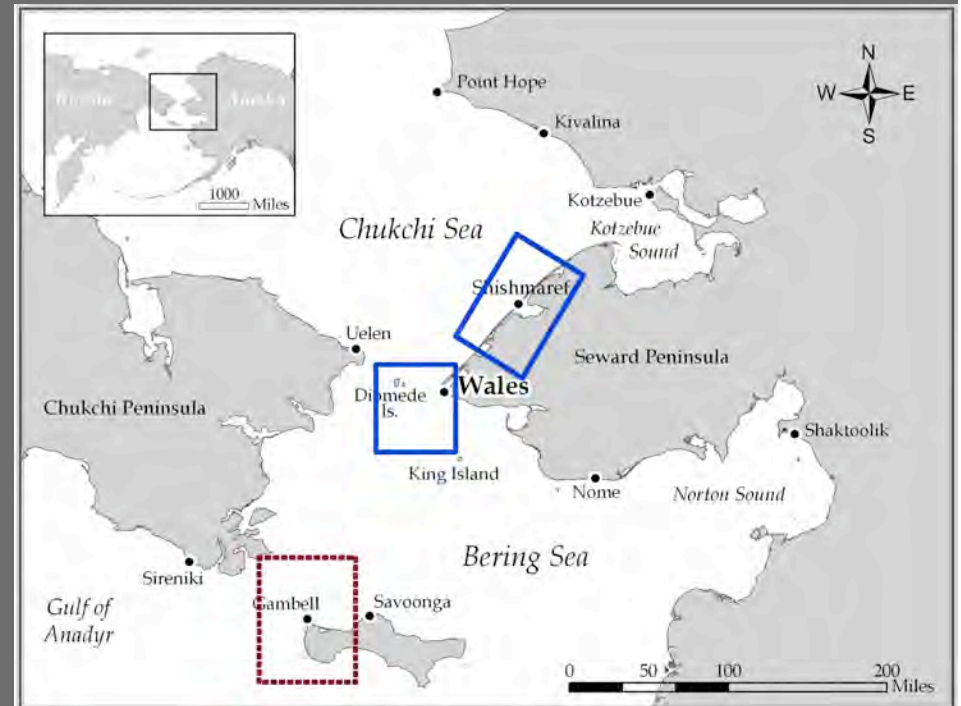
# Sea Ice for Walrus Outlook (SIWO)

- NOAA Pacific Marine Lab:
  - Contribution to forecasts and analysis of large-scale weather patterns
  - Synthesis of forecasts and remote sensing data



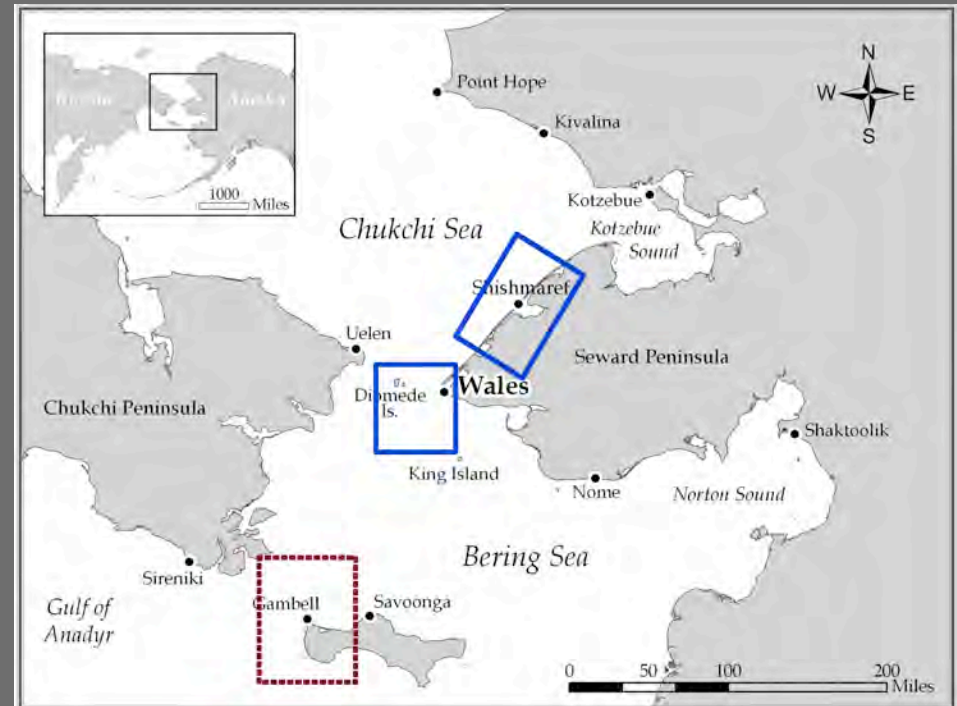
# Sea Ice for Walrus Outlook (SIWO)

- Eskimo Walrus Commission:
  - Identification of ice and weather experts in Bering Sea communities
  - Contact and information flow for local communities
  - Review of products



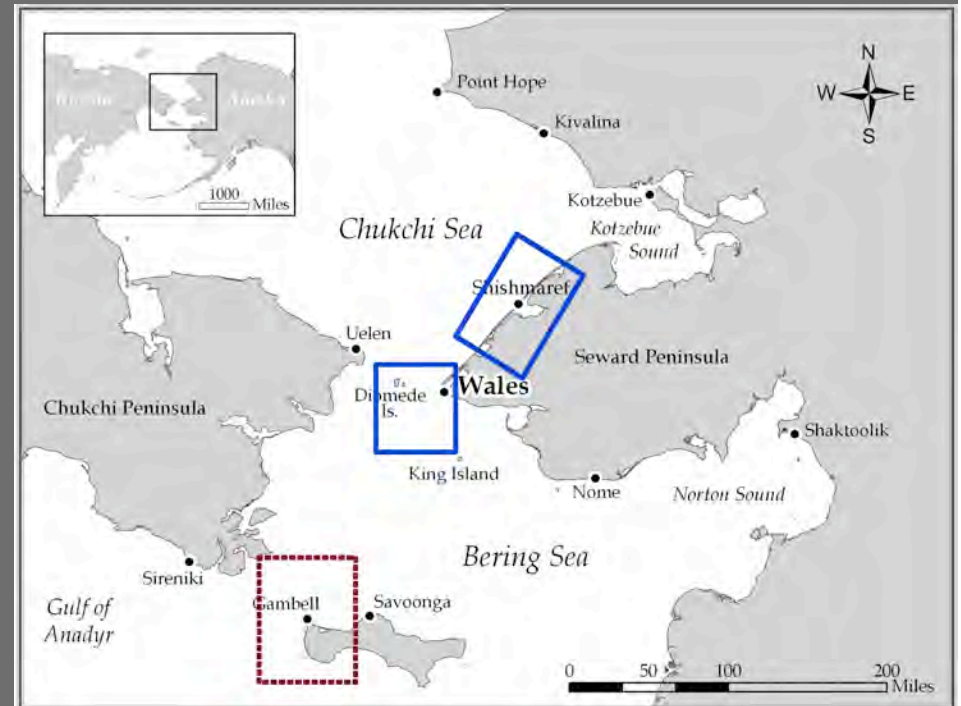
# Sea Ice for Walrus Outlook (SIWO)

- University of Alaska Fairbanks:
  - Analysis of ice patterns based on remote sensing and ground-based observations
  - Coordination of SIZONet local observer network
  - Satellite imagery from Geographic Information Network of Alaska (GINA) & Alaska Satellite Facility (ASF)



# Sea Ice for Walrus Outlook (SIWO)

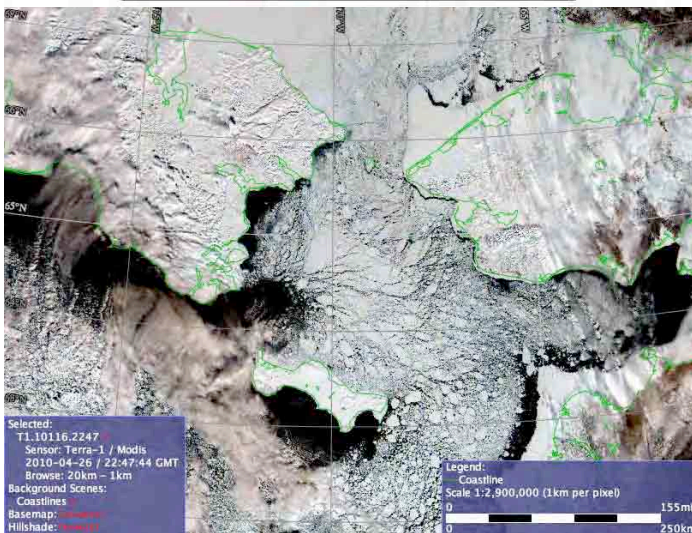
- SEARCH Project Office, ARCUS:
  - Integration of information and products into web site
  - Dissemination of product and contact point for feedback



# Weather forecasts and sea-ice information for Bering Straits communities: The Sea Ice for Walrus Outlook Project (SIWO)



- Introduction: SEARCH & Sea Ice Outlook
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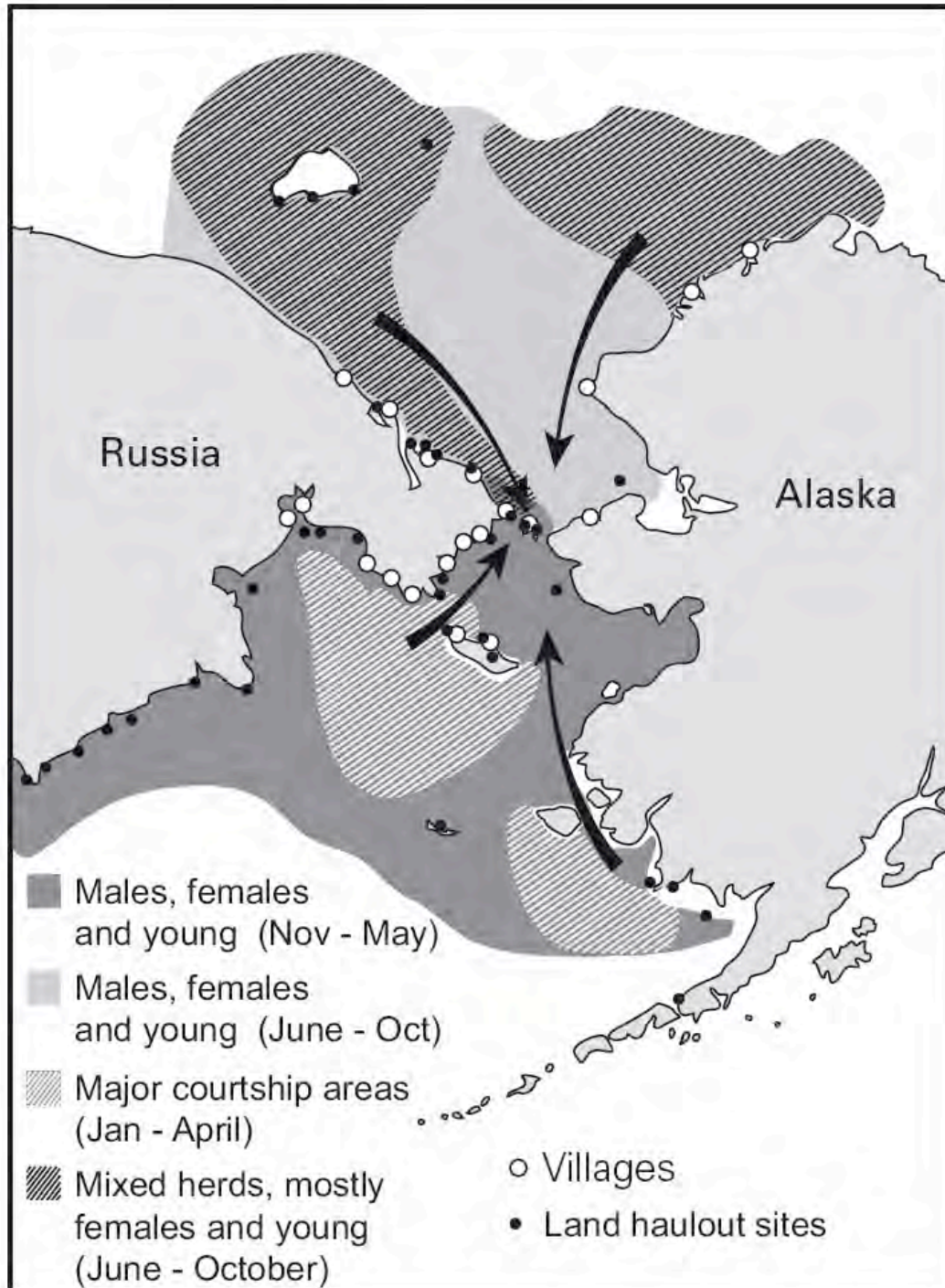


# Use of sea ice as a platform

- Walrus life cycle tied to sea-ice cycle
- Ice floes as diving platforms for feeding over shallow shelf



Photo: Marc Webber, US Fish & Wildlife Service



- Walrus life cycle coupled to sea-ice cycle
- Winter: Spend time along southern margin of seasonal ice
- Spring/Summer: Follow receding ice edge for feeding off drifting ice in waters <100m deep
- Fall: Southward migration ahead of advancing ice



- Use of sea ice as platform by marine mammals (walrus, seals)
- Use of sea ice for access to walrus and ice seals by Bering Straits hunters

Photos: Winton Weyapuk Jr.

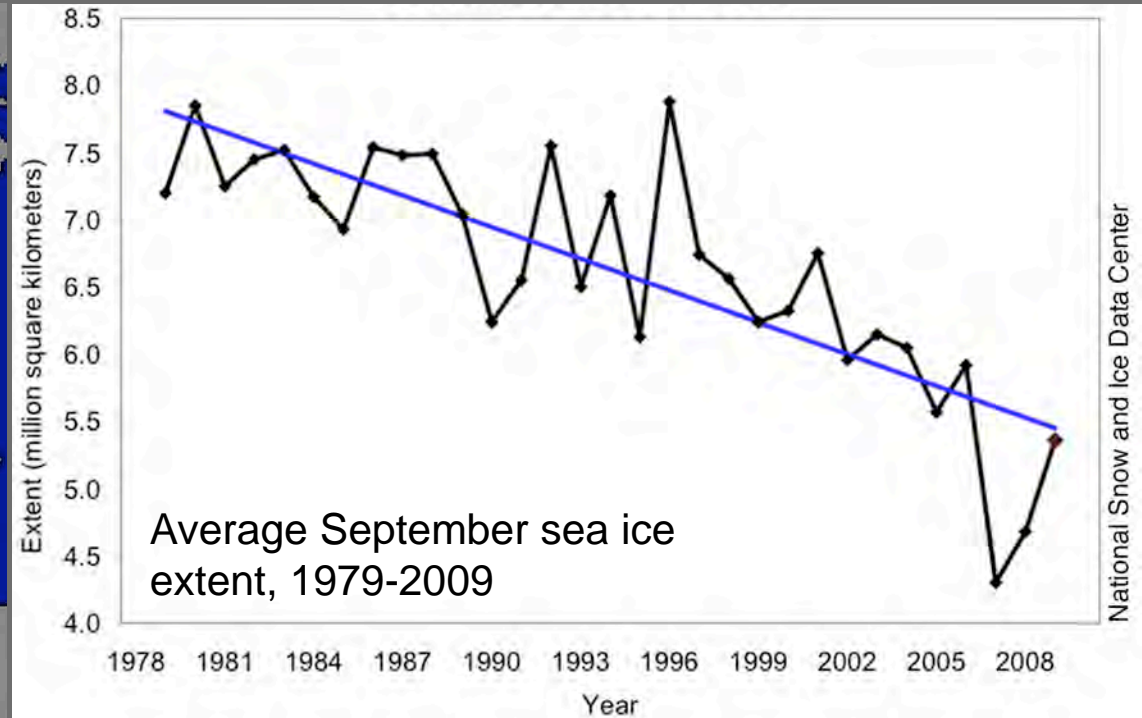
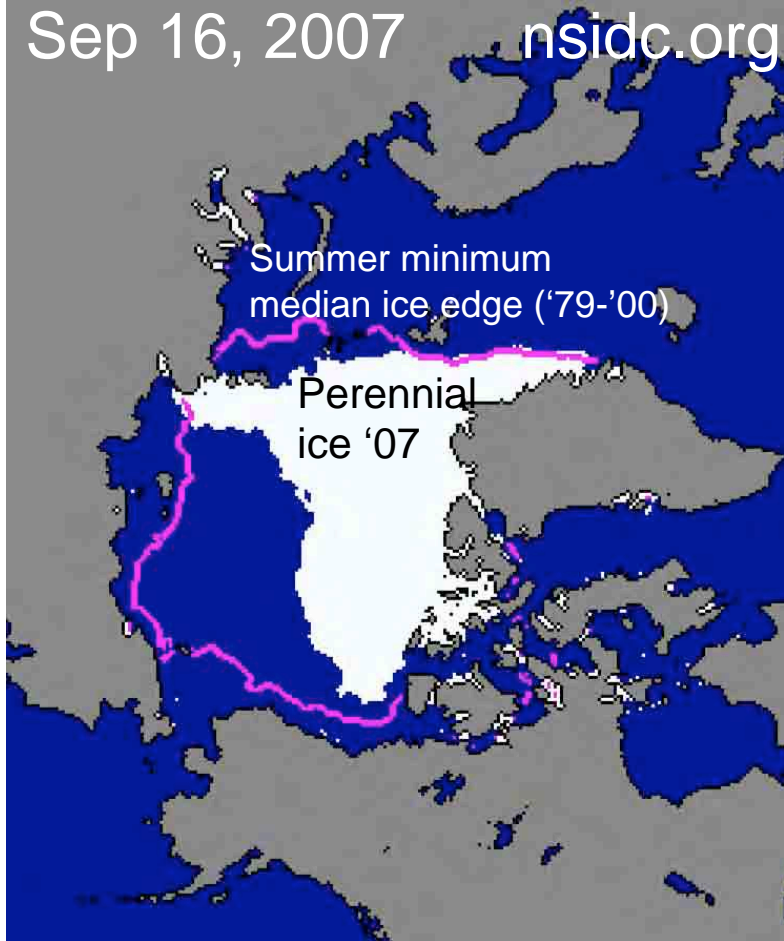
15 June 2010

[www.arcus.org/search/siwo](http://www.arcus.org/search/siwo)

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# Arctic sea-ice coverage

Sep 16, 2007 nsidc.org

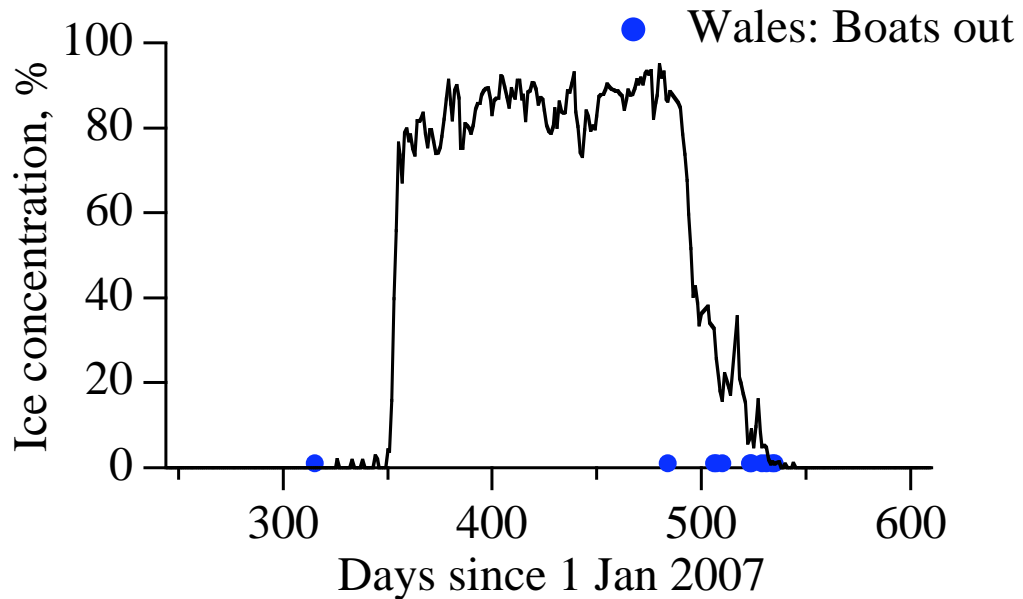


- Winter ice extent decreasing as well but at much slower rate
- More seasonal & less summer ice affect climate & ecosystems
- Increase in activities impacted by ice drives information needs

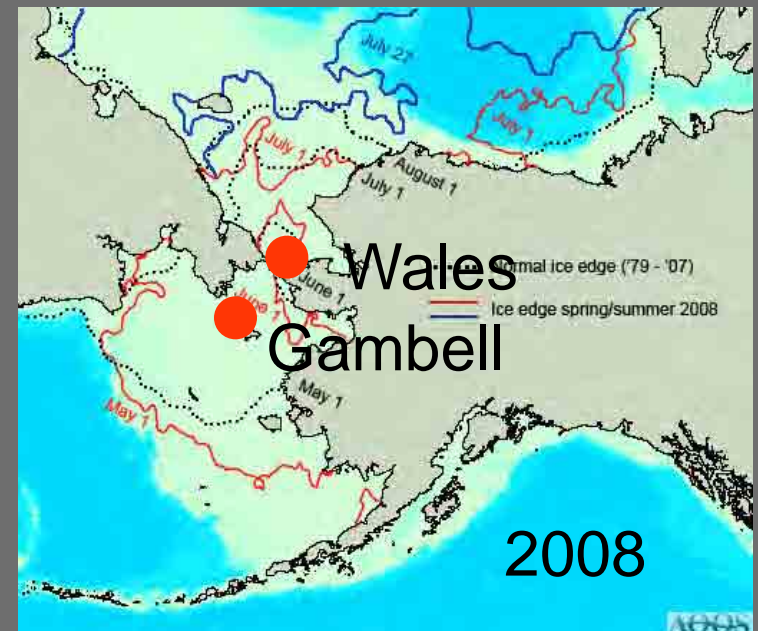
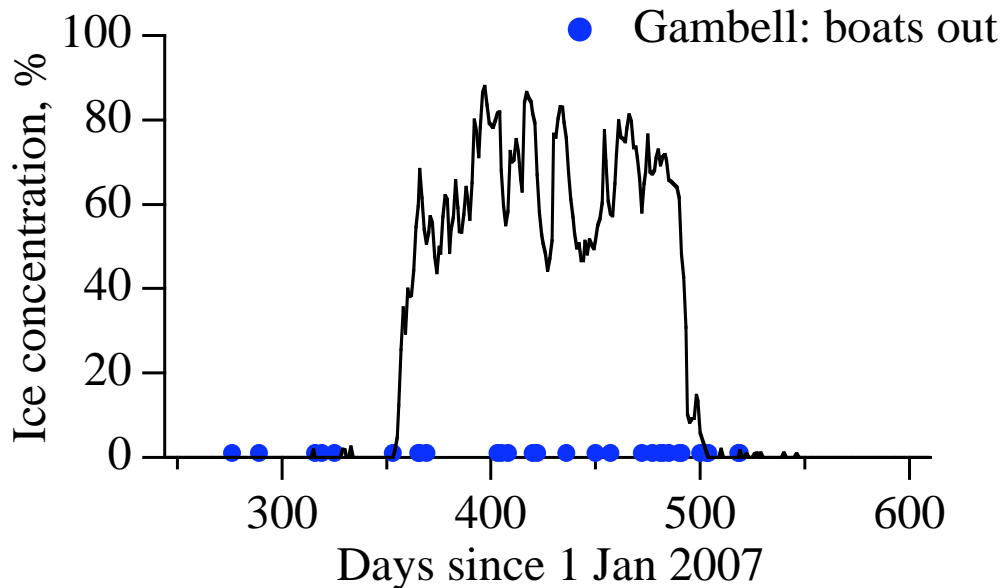
# 2007: Record ice year in Alaska

- April & May 2007: Ice extent above normal
- From June 2007, amount of sea ice at record low through November 2007
- Rapid retreat of sea ice edge
- Thinner, less predictable sea ice

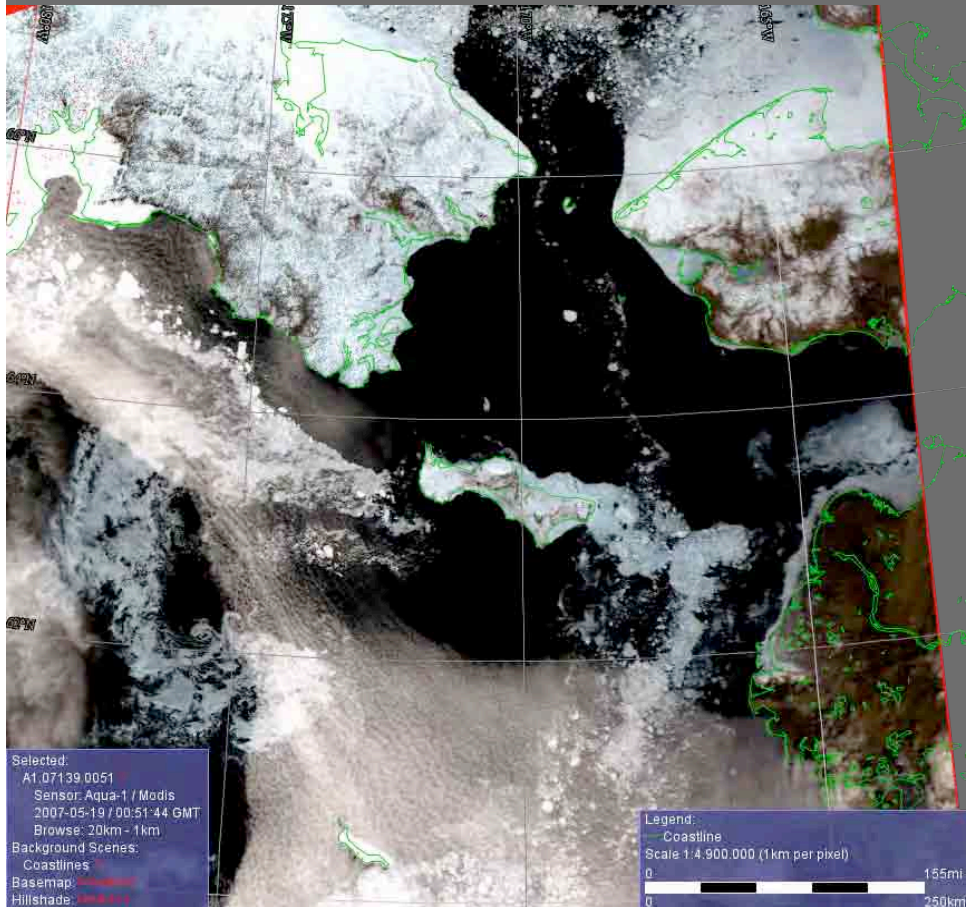




- Observations by ice experts L. Apangalook, W. Weyapuk Jr., and J. Leavitt indicate that access to walrus and bearded seal has increased on St. Lawrence Island and decreased in Bering Strait and Barrow due to changing ice conditions



# Local experts provide insight into ice & walrus behavior



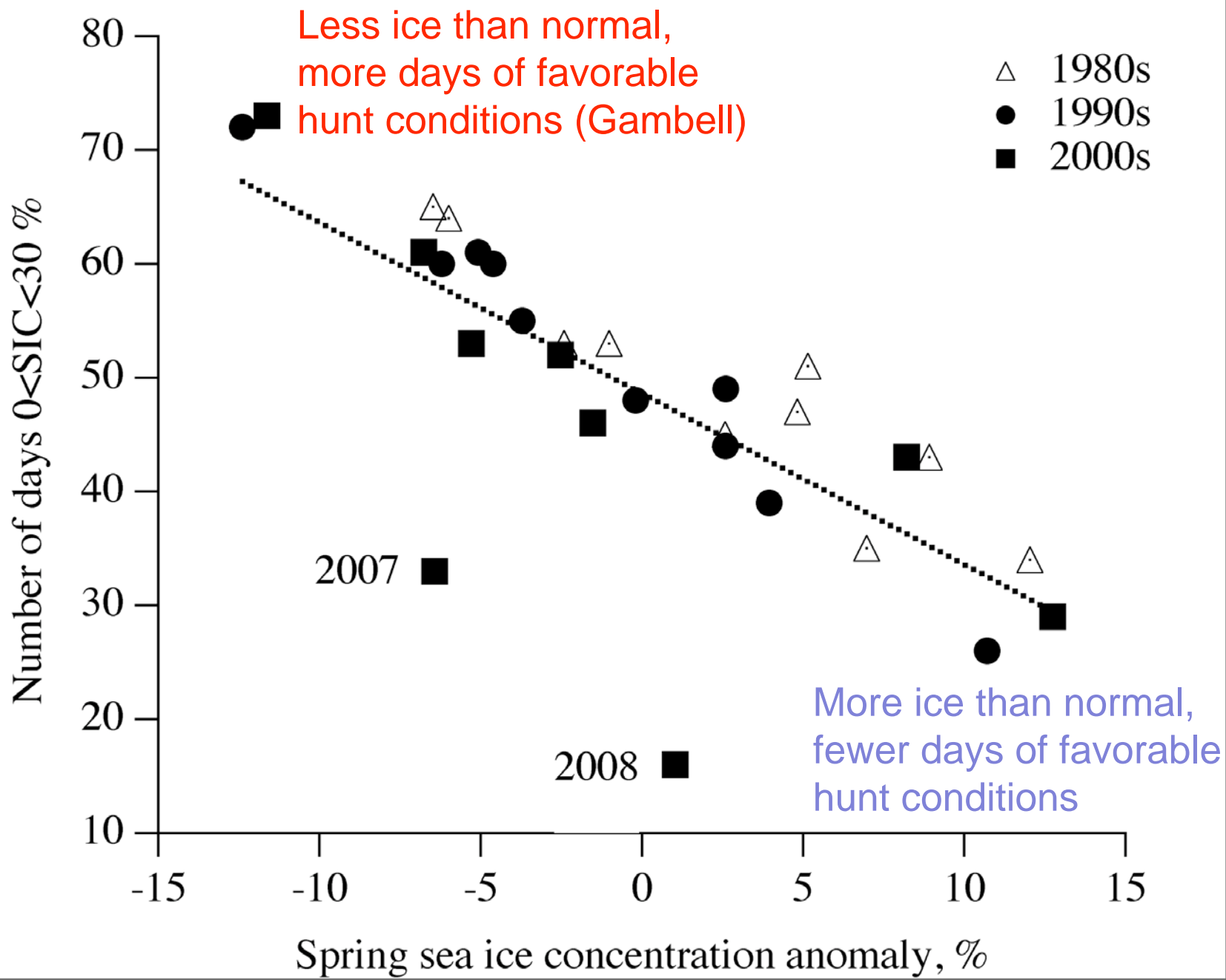
Sea-ice concentration	Wind direction	Wind speed	Visibility	Temperature
10 %	NNE	3 ms <sup>-1</sup>	13 km	0 °C

- *Leonard Apangalook (Gambell), ice log from the 19<sup>th</sup> of May 2007:* Yesterday there were many boats out hunting and got couple walruses. My son on a separate boat went north in the opposite direction 30 miles and got walrus too. The ice spanned almost sixty miles that we covered and appears to be heavier ice but rapidly deteriorating. Walrus and seals all headed in the northerly direction.
- Need for reliable weather & ice information & forecasts

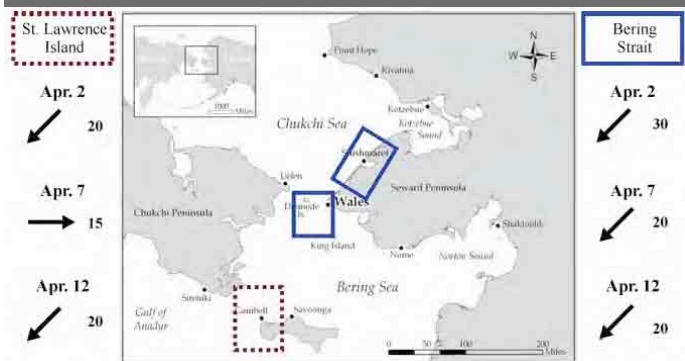
<b>Environmental factor or trend</b>	<b>Savoonga – Favorable spring walrus harvest conditions</b>	<b>Gambell – Favorable spring walrus harvest conditions</b>
<b>Sea-ice concentration</b>	Above 0% and below 30%; hunters need at least a few open leads that are wide enough to launch boats. Also, walrus prefer to rest on the ice, so a certain ice thickness (>60 cm; Fay, 1982) and floe size is necessary	
<b>Wind speed</b>	• 1 to 5 m s <sup>-1</sup> . Higher wind speeds present boating safety hazards.	
<b>Wind direction</b>	ENE, ESE, WSW; these are the main directions when hunting takes place. Northerly winds push ice against the shore and close off access to sea.	NNE, ENE, SSW; northerly winds in Gambell do not have as much influence on the hunt as in Savoonga because Gambell has a beach on the north and west side to launch boats from.
<b>Visibility</b>	>6 km; good visibility is a key factor for safety on the ice and important to spot walrus.	
<b>Air temperature</b>	-5 to +5 °C due mostly to the time of the year (spring break-up); at low wind speeds and low temperatures (<-20 °C) leads tend to freeze (George et al., 2003)	
<b>Cloud cover</b>	Not important for the spring hunt; linked to temperature and indirectly to sea-ice growth or melt and may hence on occasion correlate weakly with hunting success.	
<b>Sea-ice concentration window favorable for spring hunt</b>	1982-84: 100 days 2006-08: 94 days	1982-84: 149 days 2006-08: 92 days
<b>Spring-hunt success</b>	1982-84: 60 walrus/week 2006-08: 96 walrus/week	1982-84: 116 walrus/week 2006-08: 113 walrus/week

## Statistical models of hunting activities in relation to environmental conditions

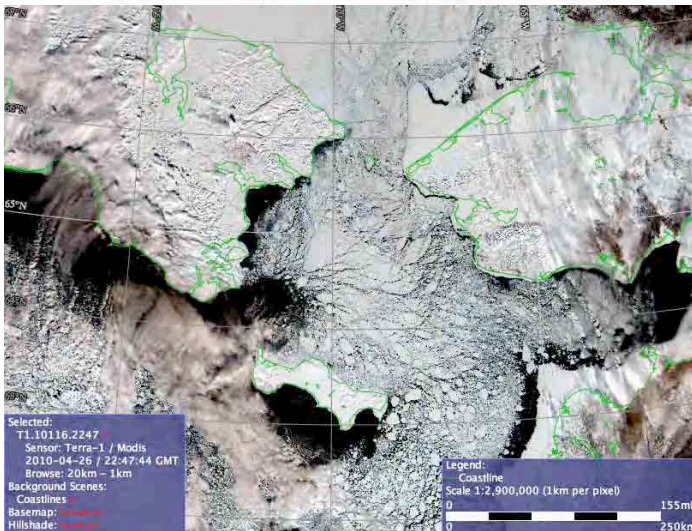
Kapsch et al., 2010



# Weather forecasts and sea-ice information for Bering Straits communities: The Sea Ice for Walrus Outlook Project (SIWO)



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- Sea Ice for Walrus Outlook (SIWO): [www.arcus.org/search/siwo](http://www.arcus.org/search/siwo)



- SEARCH Science
  - Science News
  - Science Questions
  - Data
  - Related Links
- Sea Ice Outlook
  - Background
  - Media Coverage
  - Meetings
  - 2008 Outlook Archive
  - Related Websites
  - Sea Ice for Walrus Outlook
- SEARCH Projects
- Observing/AON
- SEARCH Structure
  - Development of SEARCH
  - Steering Committee
  - Panels
  - SMO
  - IPMC
  - SSC Workspace
- Resources
  - Meetings
  - International SEARCH
  - Contact Information
  - Home

## Sea Ice for Walrus Outlook (SIWO)

[Printer Friendly/Low-Bandwidth Version](#)

### Past SIWO Reports

Friday, 30 April 2010 - Sea Ice for Walrus Outlook

**Latest News:** The latest weekly SIWO report (23 April 2010) is now available - see below!

### Overview

The Sea Ice for Walrus Outlook (SIWO), an activity of the SEARCH Sea Ice Outlook, is a resource for Alaska Native subsistence hunters, coastal communities, and others interested in sea ice and walrus.

The SIWO is updated weekly with information on sea ice conditions relevant to walrus in the Northern Bering Sea and southern Chukchi Sea regions of Alaska. SIWO updates will be released every Friday through late June.

The SIWO webpage includes: (1) An assessment of current ice conditions relevant to distribution and access of walrus, (2) a 10-day outlook of wind conditions, (3) up-to-date satellite imagery for the Bering Strait and St. Lawrence Island, which are two regions of interest to coastal communities engaging in the walrus hunt, (4) written observations of ice development from Alaska Native hunters, sea-ice experts, or NOAA or university researchers, (5) additional data and resources on ice conditions, and (6) additional comments provided by local experts and other contributors.

If you are a local hunter, expert, or a scientist with observations on either the development of sea ice or any other aspect of walrus and sea ice, please send your comments to Helen Wiggins at the Sea Ice Outlook Central Office at ARCUS; your comments will be posted to this page.

This collaboration includes weather and ice forecasters, climate scientists and sea-ice researchers at NOAA, the National Weather Service, and the University of Alaska who are teaming up with Alaska Native sea-ice experts and the Eskimo Walrus Commission. Key contacts are:

- Kristina Creek, Ronnie Owens, Helen Wiggins - Sea Ice Outlook Central Office, ARCUS
- Vera Kingeekuk Metcalf - Eskimo Walrus Commission
- Hajo Eicken - University of Alaska Fairbanks
- Gary Hufford, Don Moore - National Weather Service
- Jim Overland, Nancy Soreide, Tracey Nakamura, Nick Bond - National Oceanic and Atmospheric Administration

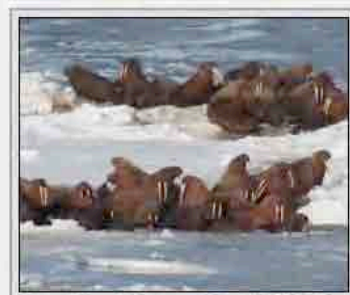
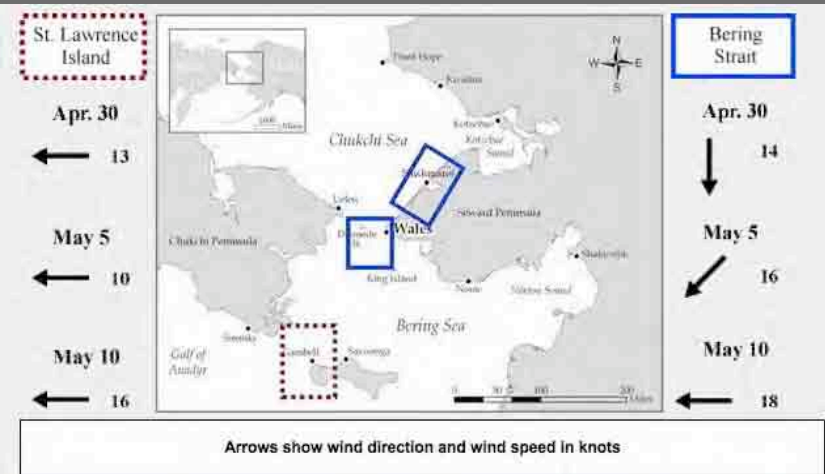


Photo by Maggie Prevenas - PolarTREC/ARCUS



### Remote Sensing Data

#### St. Lawrence Island/Bering Strait:



#### Bering Sea/Southern Chukchi Sea:



#### Archive of Recent Satellite Images Showing More Detail

- St. Lawrence Island
- Bering Strait

The links above take you to a user-friendly archive, through the Geographic Information Network of Alaska (GINA) website, which contains all the available high resolution satellite images for the two regions.

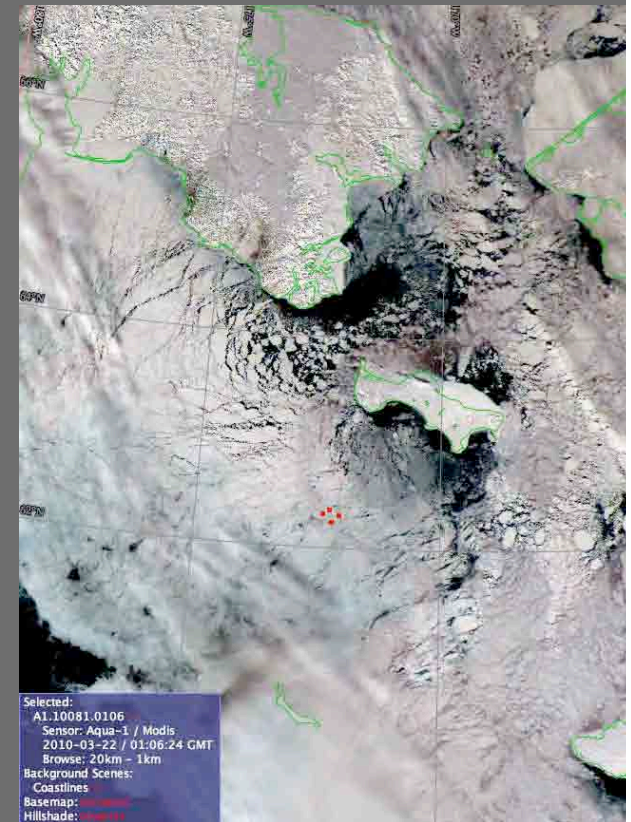
### Additional Information on Ice Conditions

- FZAK80 Sea Ice Advisory
- Sea Ice Analysis
- Five Day Sea Ice Forecast
- Sea Surface Temperatures Analysis
- East Bering Sea (NIC)

# St. Lawrence Island, early April 2010

*2 April 2010 - Paul Siluk Apangalook – Summary of ice development in Gambell*

- Despite the temperatures remaining below zero for longer periods during the month of March, the leads to the northwest remained wide open out to the horizon much of the time with the ice scattered and new ice constantly developing. The sighting of bowheads indicates the leads open all the way to the Siberian coast. Speaking with elders, the reason for that was there wasn't enough thick ice penetrating our area from the north.
- In mid-March, noticeable swells were seen in the ice; big sections of the tuvaq (shorefast ice) broke off at the west beach.

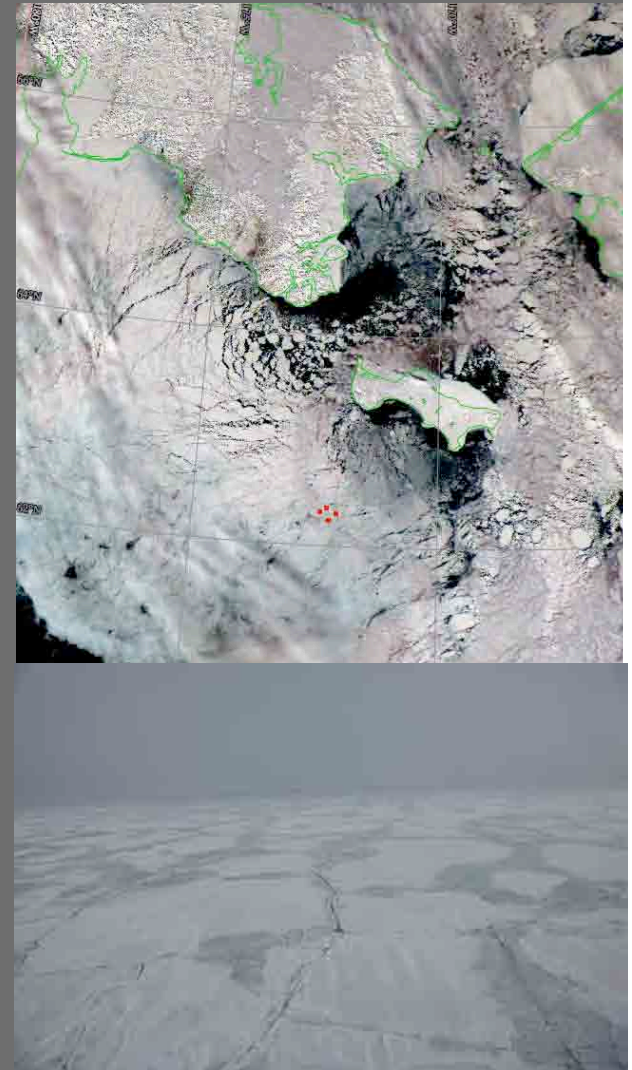


# Bering Sea, March 2010

*Rolf Gradinger – Ship-board observations*

30 March - 1 April 2010: Ice 100 miles southwest of St. Lawrence Island and towards St. Matthew Island mostly first-year pack ice, 2 feet (0.6m) thick with thin snow cover (2in/5cm). No sign of surface melt.

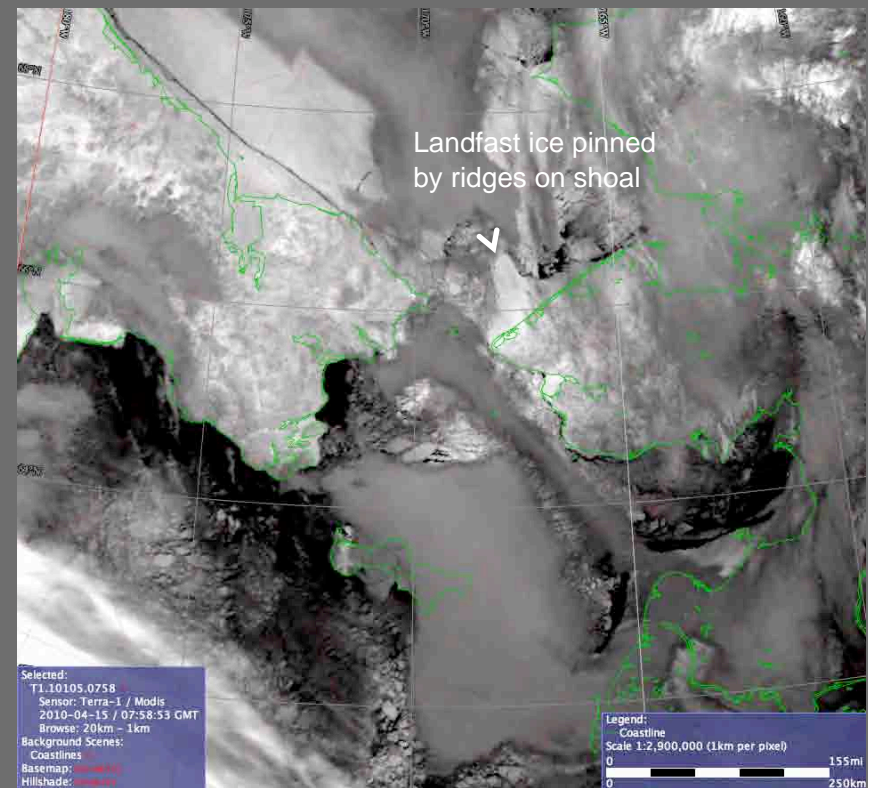
19 March 2010: The ice cover 90 miles (150km) south of St. Lawrence Island consists of vast floes of level ice, about 1.5 feet (0.5m) thick. Floes are broken into small pieces (few tens of feet wide) with flooding of surface along cracks. This pattern and satellite images suggest that break-up was caused by ocean swell coming in from the open Bering Sea, 150 miles (250km) to the South.



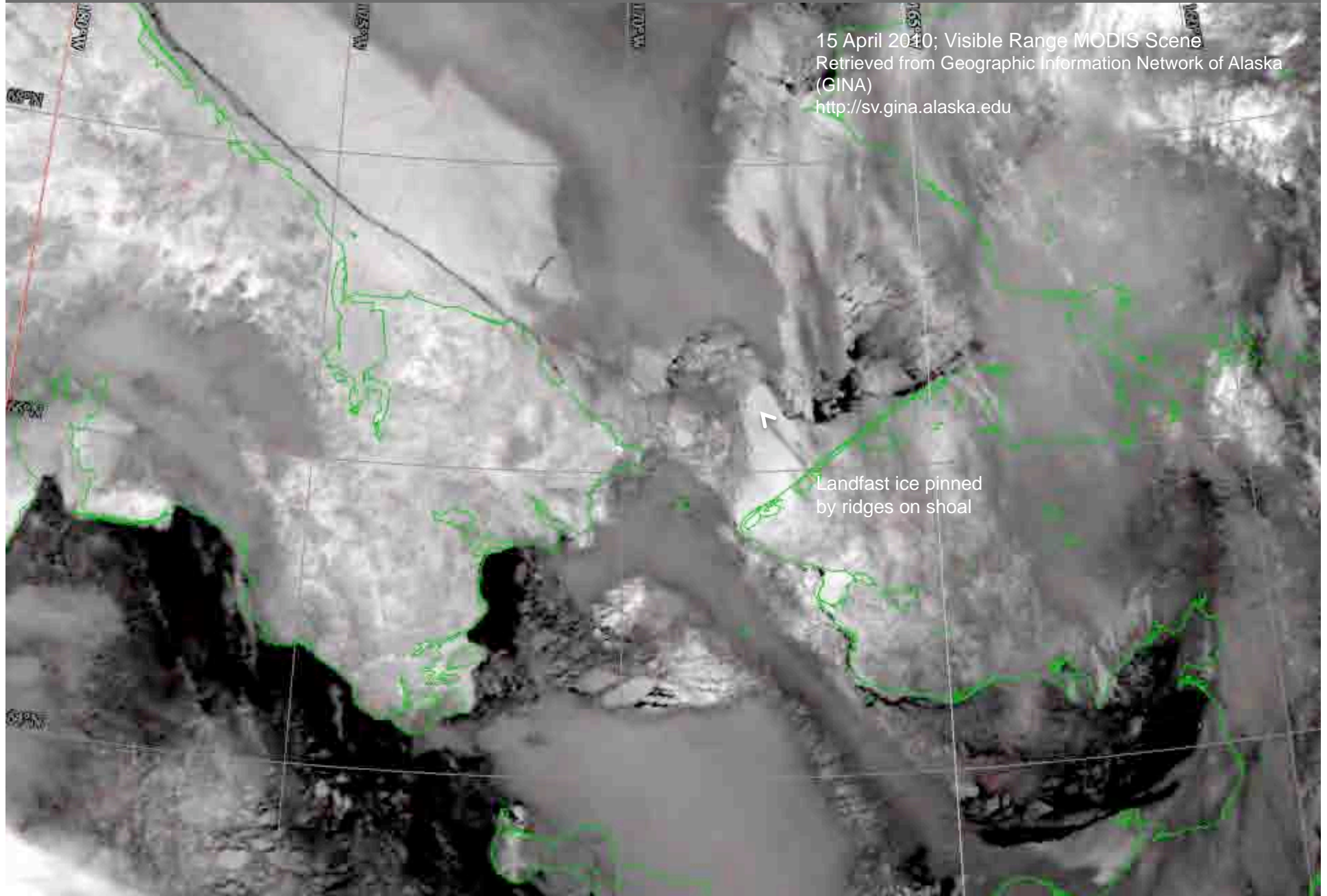
# Bering Straits, April 2010

5 April 2010 - Curtis Nayokpuk, Shishmaref  
I have been watching the "GINA" ice sat. pictures and this year the Wales Shoal shore ice is back! Previous 2-3 years it receded and at one time broke off along the northern shore/beach from Wales to Shishmaref. Looks like it has frozen to historic size/thickness and winter/spring south winds have not chipped away at the shoal ice build up. This means that the migrating sea mammals will be farther out from Shishmaref (direct route from Wales to Pt. Hope) and will require longer or more boat trips to find the walrus and Oogrük this year.

15 April 2010; Visible Range MODIS Scene  
Retrieved from Geographic Information Network of Alaska  
(GINA)  
<http://sv.gina.alaska.edu>

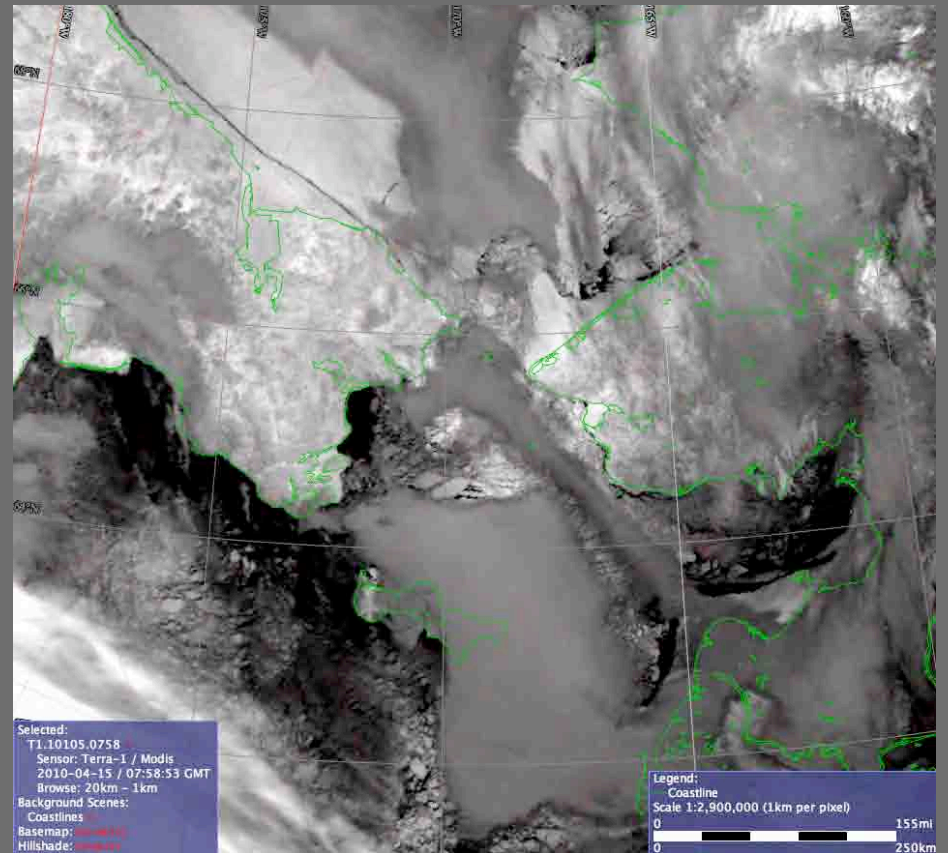
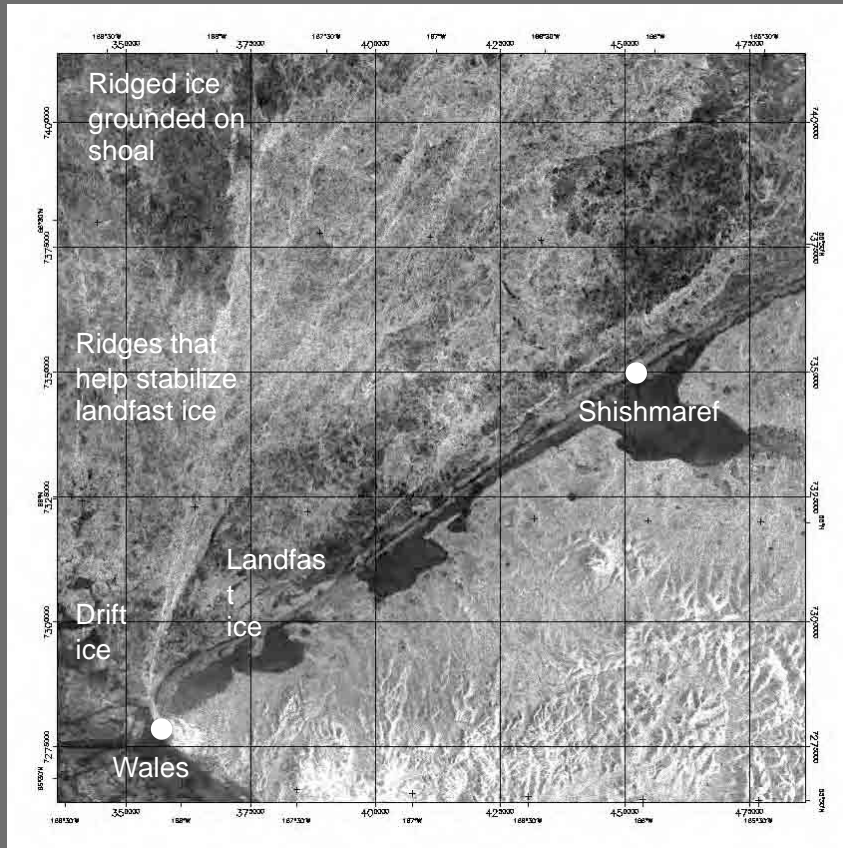


# Bering Straits, April 2010



# Bering Straits, April 2010

1 March 2010; Synthetic Aperture Radar Scene  
ALOS-PALSAR, © Japan Aerospace Exploration Agency  
(JAXA), 2010. ASF - Fairbanks, Alaska: Americas ALOS  
Data Node. Available at: <http://www.asf.alaska.edu/aadn>



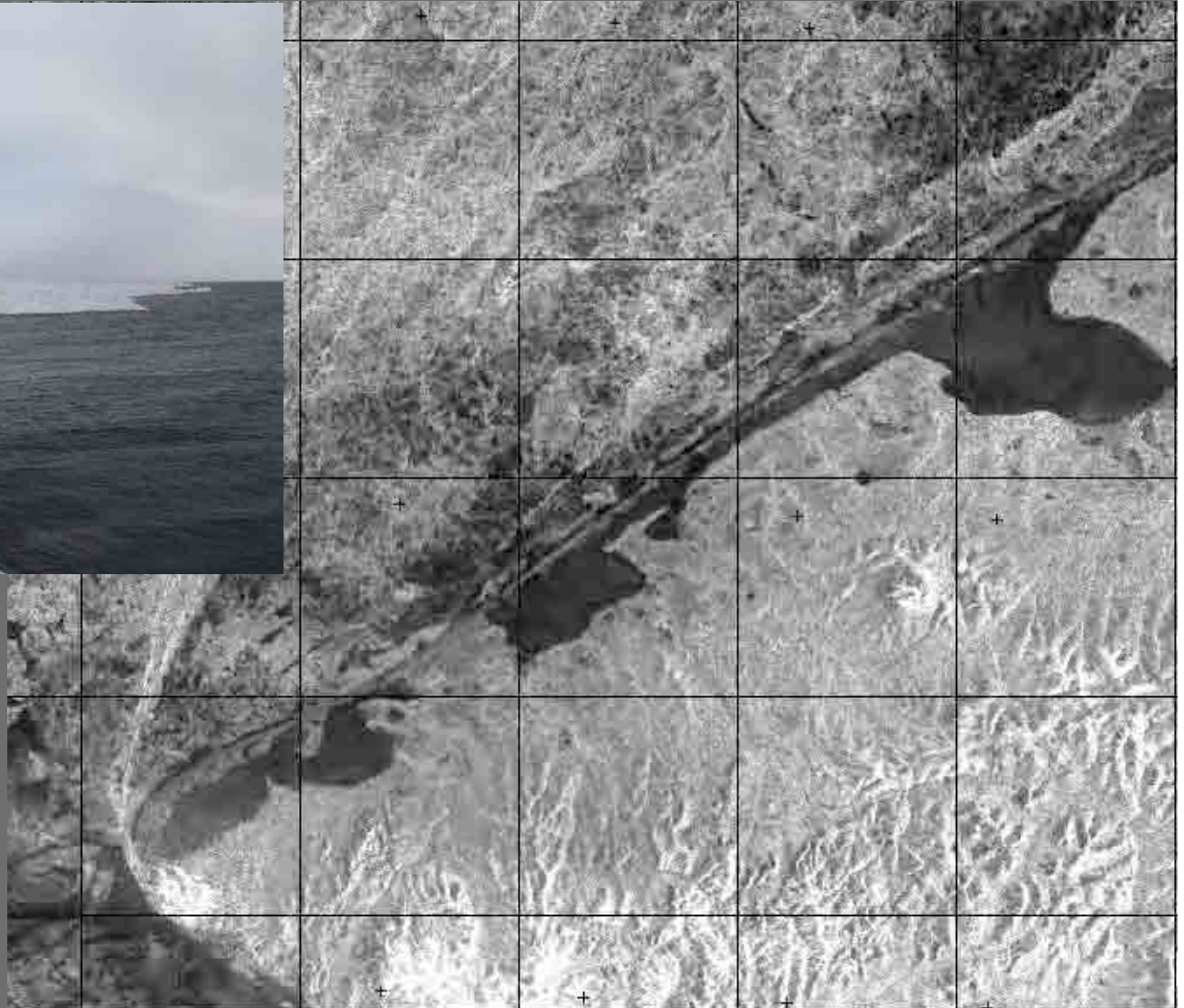
# Bering Straits, April 2010



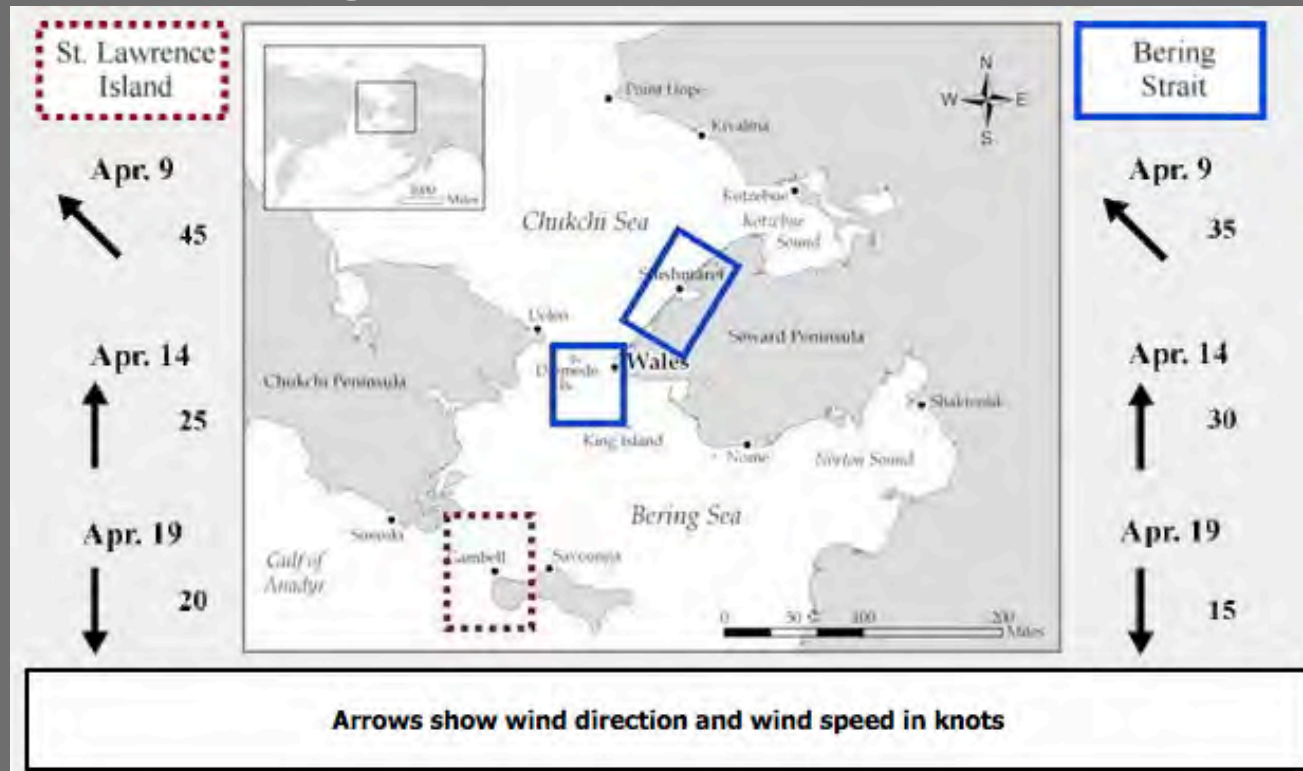
# Bering Straits, April 2010



Wales, Cape Mountain



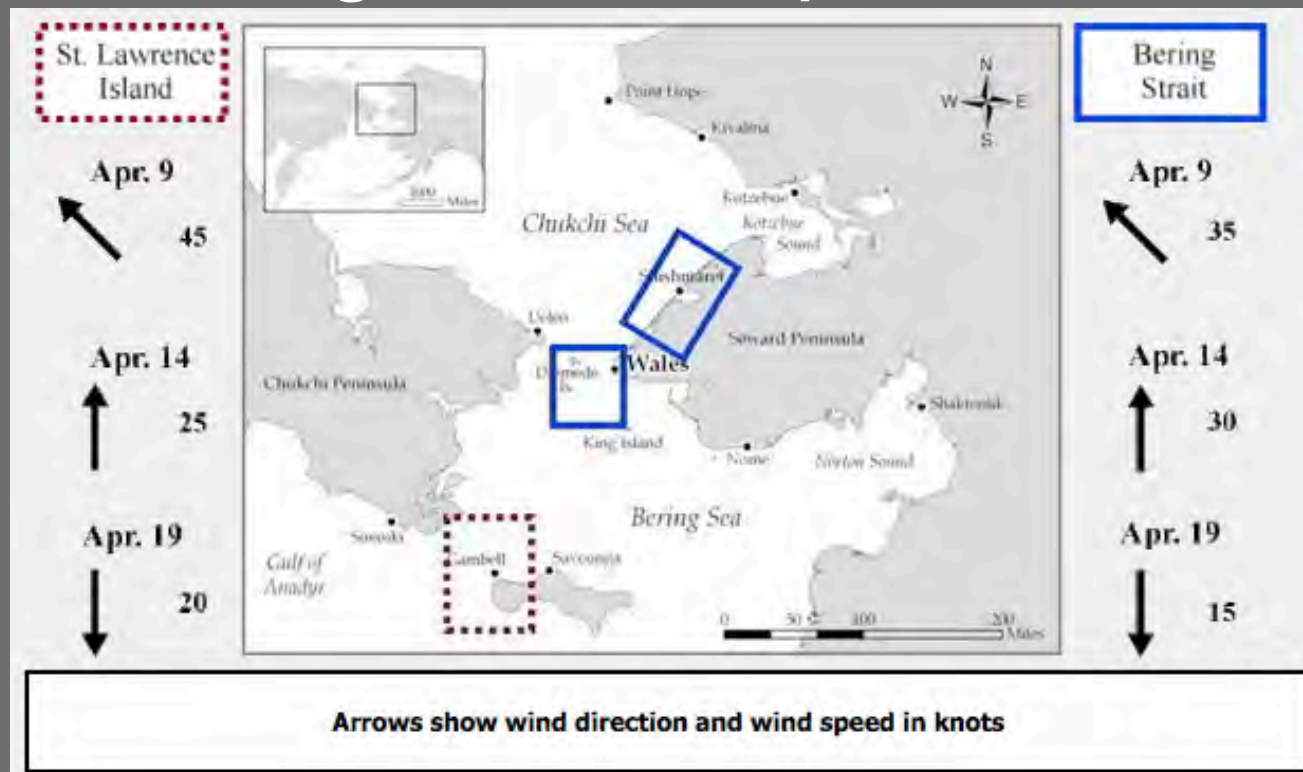
# Bering Straits, April 2010



*9 April 2010 - Winton Weyapuk, Jr. - Summary of Ice Development in Wales*

- For most of the past week, Wales had winds from NE and N, and a lead extended along the shorefast ice for several miles to the North, with young ice and frost smoke. Walrus swimming north were observed in the lead on April 2.

# Bering Straits, April 2010



*15 April 2010 - Winton Weyapuk, Jr. - Summary of Ice Development in Wales*

- On April 11, high tide pushed water up along the beach north of town. For the past couple of days the ice has been drifting slowly through the Strait towards the North.

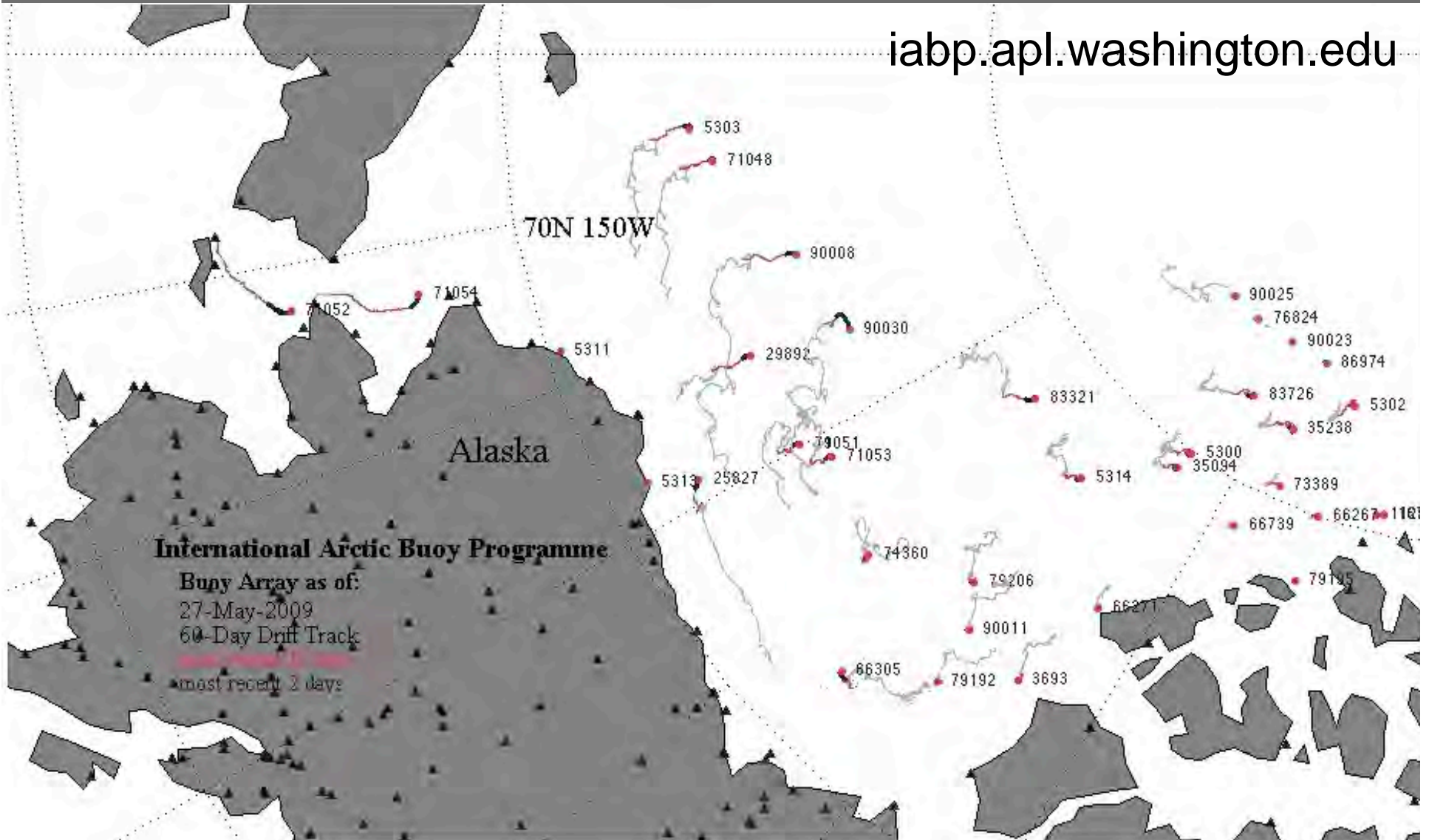
# Ice drift



- Ocean drifters provided by Ignatius Rigor, Int'l Arctic Ocean Buoy Program ([iabp.apl.washington.edu](http://iabp.apl.washington.edu))
- Deployment by Merle Apassingok (Gambell) & Winton Weyapuk Jr. (Wales)
- Improve weather forecasts for the region, indicate ice & surface ocean drift

# Ice drift: 2009 deployments

[iabp.apl.washington.edu](http://iabp.apl.washington.edu)

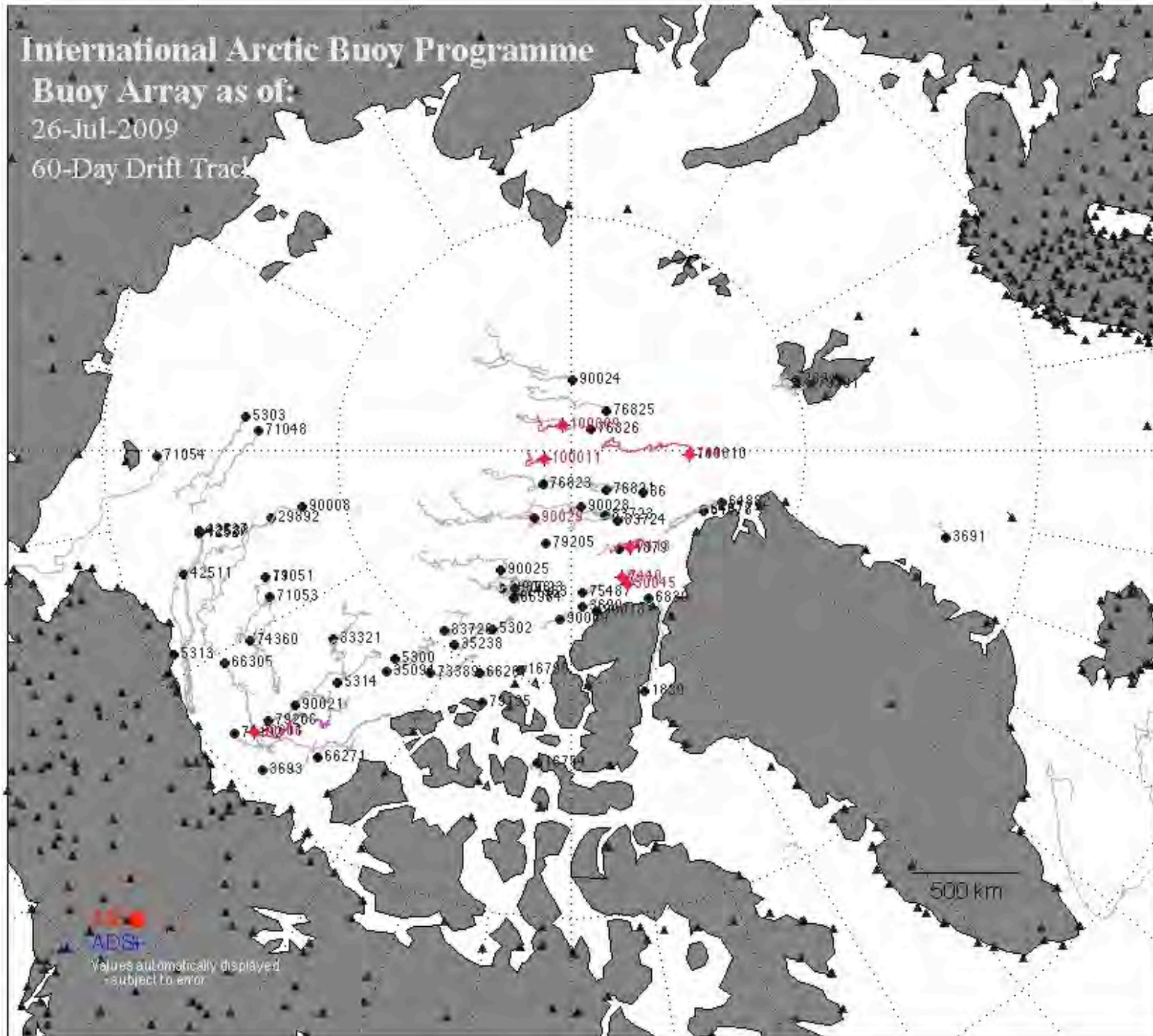


# International Arctic Buoy Programme

Buoy Array as of:

26-Jul-2009

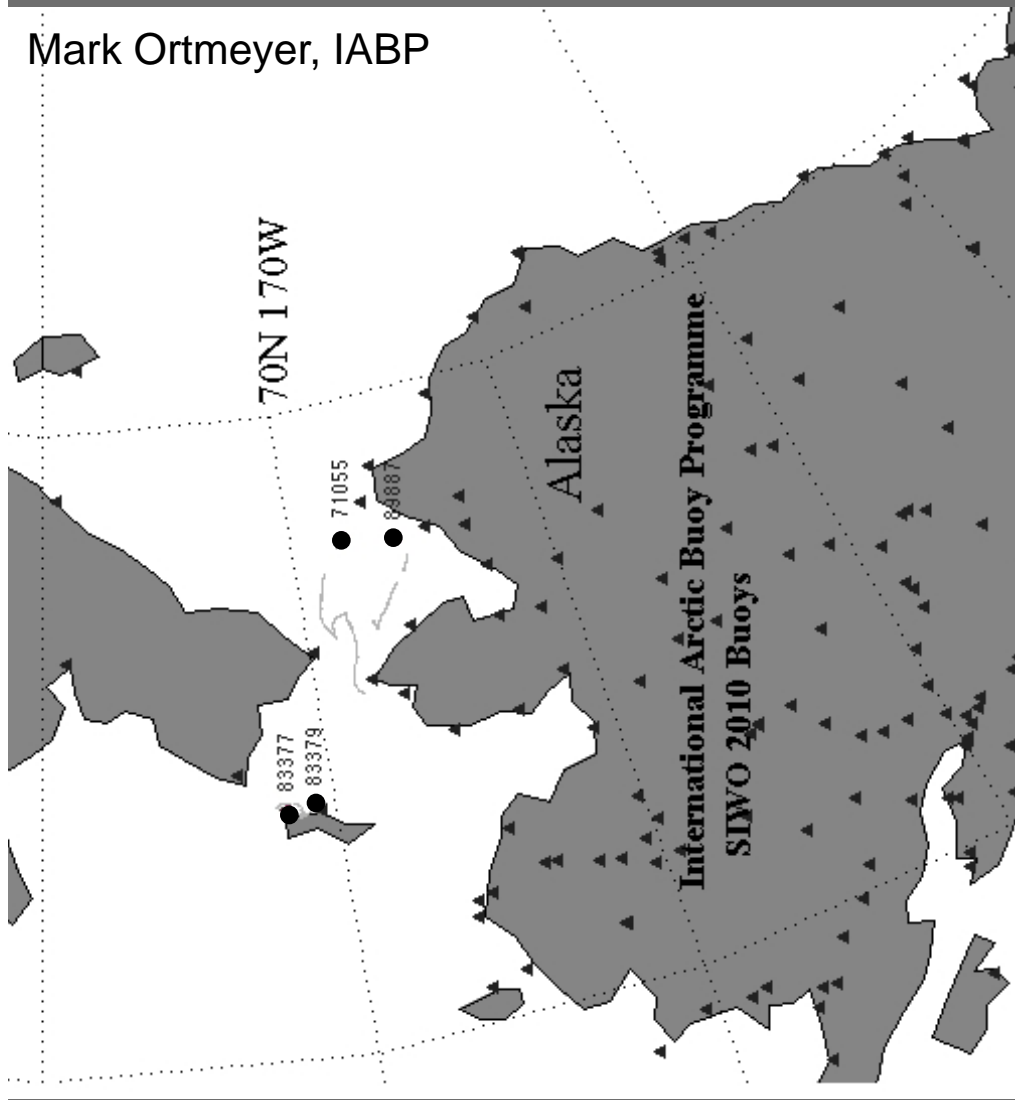
60-Day Drift Track



ADS+  
Values automatically displayed  
-subject to error

# Ice drift: 2010 deployments

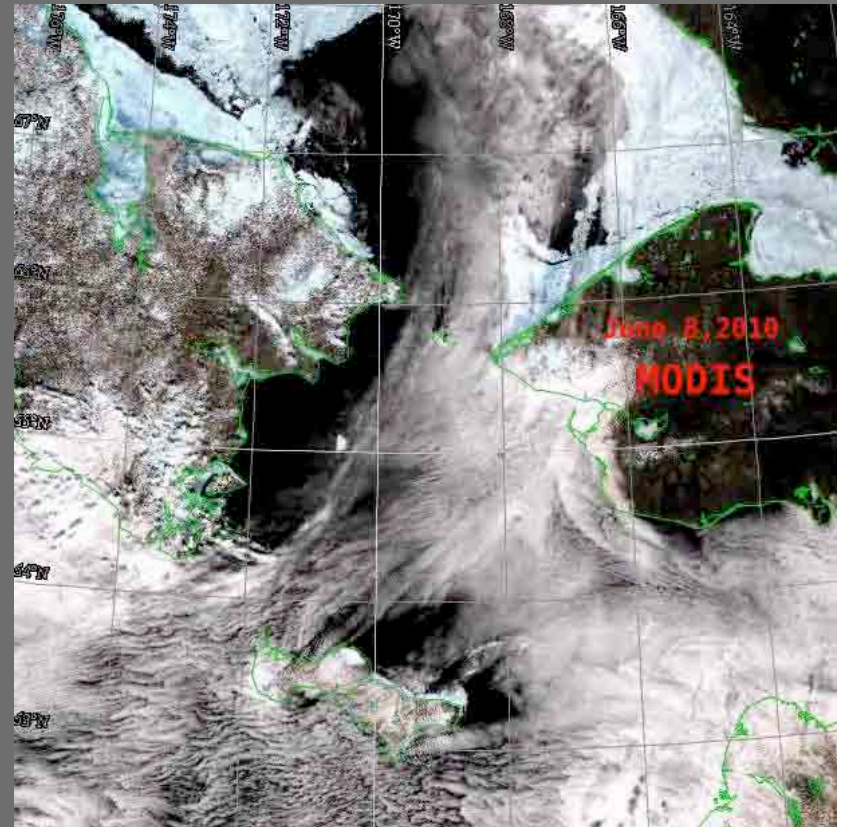
Mark Ortmeyer, IABP



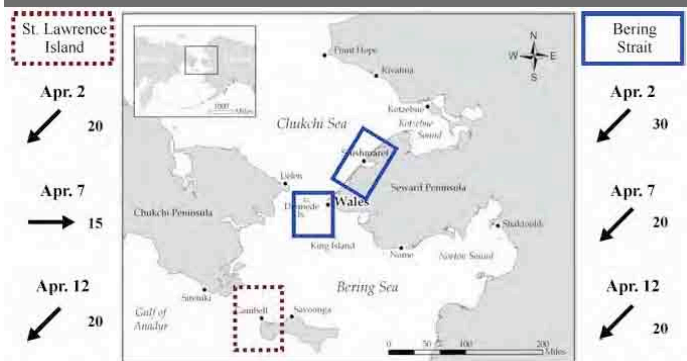
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# Bering Straits, June 2010

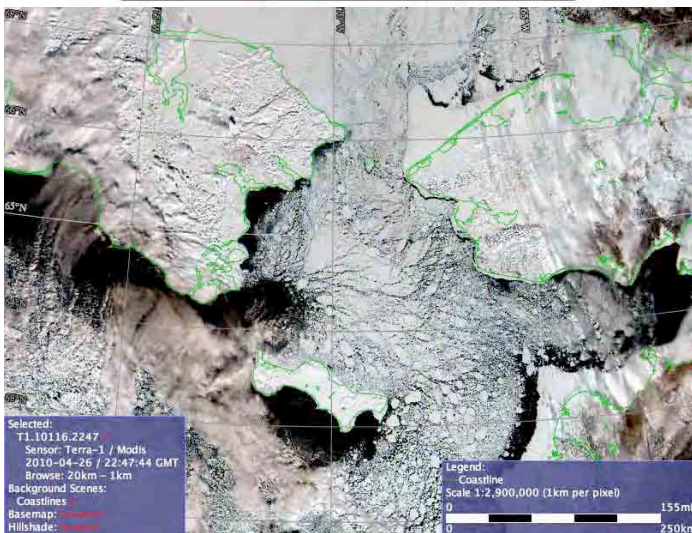
- *10 June 2010 - Curtis Nayokpuk - Comments from Shishmaref*
- Sea ice along the coast of Shishmaref is still stable and used by hunters out to leads north and northeast along shore ice edge. Early spring melt-water on top of sea ice has drained off and travel and hunting will continue along shore ice as conditions permit.
- Boat travel is limited to open sea by a north-south line of pack ice and grounded ice ridges along open areas west of the boat launch. Pending weather and the Wales shoal ice breakup, hunters are waiting to venture further out to hunt walrus.



# Weather forecasts and sea-ice information for Bering Straits communities: The Sea Ice for Walrus Outlook Project (SIWO)



- Introduction: SEARCH & Sea Ice Outlook
- SIWO Organization
- Sea Ice & Walrus in the Bering Sea
- SIWO Results
- **Conclusions**



# Conclusion & next steps

- Joint evaluation of success of effort & lessons learned after end of last outlook through last week of June
- So far good success in bringing together experts from local communities, ice & weather forecasters, university & agency researchers
- SIWO possibly a model of what a “ice services service” or “climate service” might look like
- Please provide feedback and visit Outlook pages:  
[www.arcus.org/search/siwo](http://www.arcus.org/search/siwo) &  
[www.arcus.org/search/seaiceoutlook](http://www.arcus.org/search/seaiceoutlook)
- **Thanks to all contributors!**