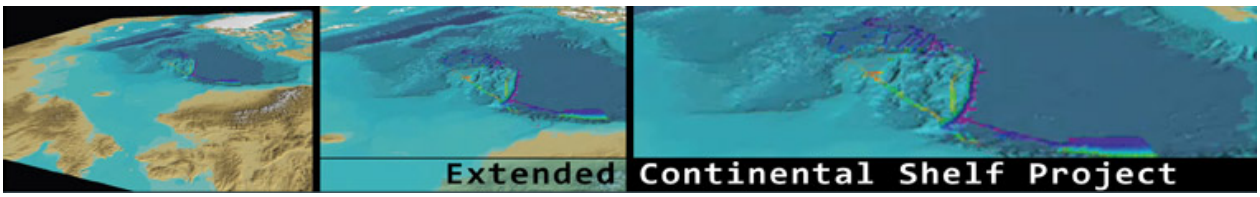
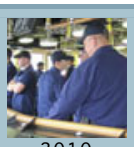
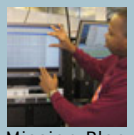
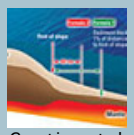


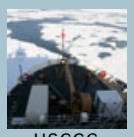
Arctic Seafloor Mapping Project Web Site - arcticseafloormapping.gov

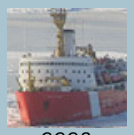

2010 Mission


Mission Plan


Law of the Sea


Continental Shelf


USCGC *Healy*

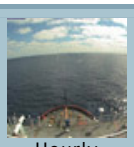

CCGS *Louis S. St-Laurent*


Healy's Science Team

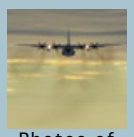

Teachers

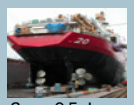
Photo & Video Log

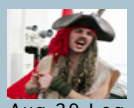
This page contains photos and videos taken during the 2010 Extended Continental Shelf survey. Click on any image to view a larger version and additional information. Click on the leading link to go the referring page.


Hourly Photos from *Healy's* Aloft Conn


USCG Logs


Photos of the Day

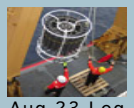

Sep 05 Log

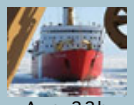

Aug 29 Log

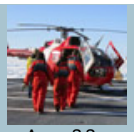

Aug 28 Log


Aug 25 Log


Aug 24 Log

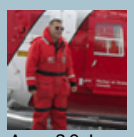

Aug 23 Log


Aug 22b Log

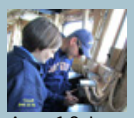


Aug 22a Log

Aug 21 Log

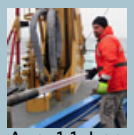


Aug 20 Log

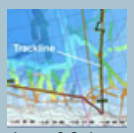


Aug 18 Log

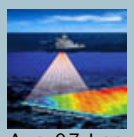
Aug 17 Log



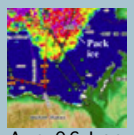
Aug 11 Log



Aug 08 Log

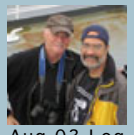


Aug 07 Log



Aug 06 Log

Aug 04 Log



Aug 03 Log

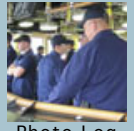
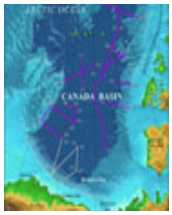


Photo Log

Images

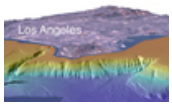


2010 Mission
Planned tracklines for the 2010 U.S.-Canada Extended Continental Shelf survey. Hi-res pdf.
Credit: *USGS*

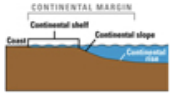
2010 Mission
The Canadian Coast Guard vessel *Louis S. St. Laurent* (left) follows the US Coast Guard vessel *Healy*boundary with another nation).
Credit: Natural Resources Canada

2010 Mission
US Coast Guard icebreaker *Healy* and the Canadian Coast Guard icebreaker *Louis S. St-Laurent* side by side.
Credit: USGS

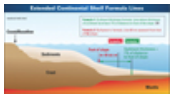
Mission Plan
The Coast Guard Cutter *Healy* (WAGB - 20) is United States' newest and most technologically advanced polar icebreaker.
Credit: USCG



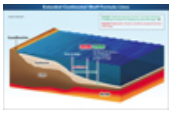
Continental Shelf
The continental shelf off Los Angeles, California, varies in width. **Credit**: ECS



Continental Shelf
General shape of continental shelf, slope, and rise. **Credit**: ECS



Continental Shelf
A country may use the sediment thickness formula or the bathymetric formula to define the outer limits of its continental shelf. **Credit**: ECS

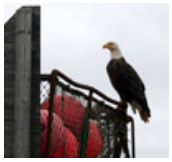


Continental Shelf
A country may use either constraint line to define the outer limits of its continental shelf.
Credit: ECS

USCGC *Healy*
The Coast Guard Cutter*Healy*(WAGB - 20) is United States' newest and most technologically advanced polar icebreaker.
Credit: USCG

CCGS *oLuis S. St-Laurent*
Canadian Coast Guard icebreaker *Louis S. St-Laurent.*
Credit: CCGS

CCGS *Louis S. St-Laurent*
Crew members on board the *Louis S. St. Laurent* lower equipment into the water.
Credit: Natural Resources Canada



Jul 31 Photo of the Day
Bald eagle perched on a crab pot in Dutch Harbor.
Credit: MK2 Chris Schumacher, USCGC *Healy*.

Jul 31 Photo of the Day
Some of *Healy's* crew enjoy a flag football game in Unalaska.
Credit: Jean Dominguez.

Jul 31 Photo of the Day
Nice catch!
Credit: Jean Dominguez.

Jul 31 Photo of the Day
Captain William Rall about to carry the ball in for a touchdown.
Credit: Jean Dominguez.

Aug 01 Photo of the Day
Left to right: Pablo Clemente-Colón, Caroline Singler, Andy, and Jerry Hyman. **Credit**: Helen Gibbons, USGS/ECS Project

Aug 01 Photo of the Day
Nearly at the top of Mount Ballyhoo, with a partial view of Dutch Harbor below. **Credit**: USGS

Aug 01 Photo of the Day
Unalaska is full of bald eagles. Here's one perched on the Russian Orthodox Church of the Holy Ascension, built in 1825. **Credit**: Helen Gibbons, USGS/ECS Project

Aug 01 Photo of the Day
Fireweed in Dutch Harbor. **Credit**: Helen Gibbons, USGS/ECS Project

Aug 03 Log
U.S. Coast Guard Cutter *Healy* is sailing north through the Bering Sea, headed for the Bering Strait. **Credit**: Graphic by Helen Gibbons, USGS/ECS Project

Aug 03 Log
Healy docked in Dutch Harbor. **Credit**: Helen Gibbons, USGS/ECS Project

Aug 03 Log
Russia Orthodox Church of the Holy Ascension, built in 1825 in Unalaska. **Credit**: Helen Gibbons, USGS/ECS Project

Aug 03 Log
Dwarf dogwood, Amaknak Island. **Credit**: Helen Gibbons, USGS/ECS Project

Aug 03 Log
A few of us took a hike up Mount Ballyhoo on Amaknak Island. **Credit**: Helen Gibbons, USGS/ECS Project

Aug 03 Log
Andy Stevenson, U.S. Geological Survey geologist enjoys the view from aft of the bridge as we depart Dutch Harbor. **Credit**: Helen Gibbons, USGS/ECS Project

Aug 03 Log
Many of us gathered aft of the bridge for good views of the departure from Dutch Harbor. **Credit**: Helen Gibbons, USGS/ECS Project

Aug 03 Log
Yours truly, standing on the flying bridge as we sail north from Dutch Harbor on August 2, 2010. **Credit**: Caroline Singler, NOAA Teacher at Sea/ECS Project.

Aug 03 Log
Coast Guard crew on the foc's'le "strike the lines belowdecks" as *Healy* heads for the passage that will take her into the Bering Sea. **Credit**: Helen

Aug 03 Log
Conning officer Nick Custer calls commands to helmsman Dierdre Gray, who repeats and executes each command. **Credit**: Helen

Gibbons, USGS/ECS Project

Gibbons, USGS/ECS Project

Aug 04 Log
Coast Guard celebrates 220 years of service. **Credit**: USCG

Aug 04 Log
Around 0530 I joined ET2 Jeremy Gainey, ENS Nick Custer, and IT1 Miguel Uribarri to help tend the pig. **Credit**: Brian Edwards, USGS/ECS Project.

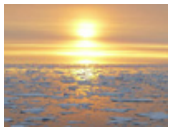
Aug 04 Log
Thirty minutes later Miguel takes a turn. **Credit**: Helen Gibbons, USGS/ECS Project

Aug 04 Log
DISCLAIMER: We're not in the ice yet... **Credit**: ECS

Aug 04 Log
Miguel looks on as Jeremy bastes the roasting pig. **Credit**: Helen Gibbons, USGS/ECS Project

Aug 04 Log
Just a few of the dishes on offer during tonight's "birthday" dinner... **Credit**: Helen Gibbons, USGS/ECS Project

Aug 04 Log
At 1600 hours, Healy entered the Bering Strait. Later this evening, she will cross the Arctic Circle. **Credit**: Graphic modified by Helen Gibbons, USGS/ECS

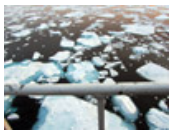


Aug 06 Log
Sea ice sunrise. **Credit**: Helen Gibbons, USGS/ECS Project

Aug 06 Log
Pablo Clemente-Colón (right) and MST1 Josh Miller discuss the ice. **Credit**: Helen Gibbons, USGS/ECS Project

Aug 06 Log
Water flows off a piece of ice pushed aside by *Healy's* hull. **Credit**: Helen Gibbons, USGS/ECS Project

Aug 06 Log
In addition to its deep blue color, a well-defined meltwater-drainage pattern marks this floe as multi-year ice. **Credit**: Helen Gibbons, USGS/ECS Project



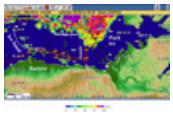
Aug 06 Log
Pieces of multi-year ice off *Healy's* port side. **Credit**: Helen Gibbons, USGS/ECS Project

Aug 06 Log
A piece of thin, dark nilas (top) and thicker "young" ice (below). **Credit**: Helen Gibbons, USGS/ECS Project

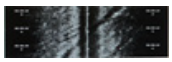
Aug 06 Log
A piece of multi-year ice, its surface browned by algae. **Credit**: Helen Gibbons, USGS/ECS Project

Aug 06 Log
Seen through the mist, a large floe dark with algae looked like a ship in the distance. **Credit**: Helen Gibbons, USGS/ECS Project

Aug 06 Log
SAR image on a monitor on the bridge. MST1 Josh Miller points to the band of ice that *Healy* passed through this morning. **Credit**: Helen Gibbons, USGS/ECS Project

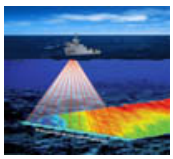


Aug 06 Log
Healy's tracklines overlaid on sea-ice concentration map. **Credit**: *Healy* Map Server/Steve Roberts, National Center for Atmospheric Research.

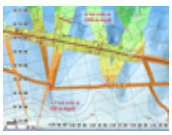


Aug 07 Log
The dark bands cutting diagonally across the image are ice gouges, furrows gouged into the sediment of the seafloor by thick pieces of ice. Click here for a high resolution image. **Credit**: Helen Gibbons, USGS/ECS Project.

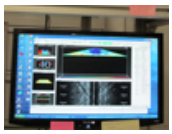
Aug 07 Log
Here is the ship's position at the time we saw the ice gouges. Click here for a high resolution image. **Credit**: *Healy* Map Server/Steve Roberts, National Center for Atmospheric Research.



Aug 07 Log
Ship using multibeam echosounder to map a swath of seafloor. **Credit**: Fisheries and Oceans Canada.



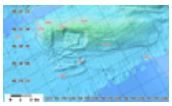
Aug 07 Log
Swaths of multibeam bathymetric data compiled on the ship's Map Server. Click here for a high resolution image. **Credit**: *Healy* Map Server/Steve Roberts, National Center for Atmospheric Research.



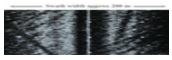
Aug 07 Log
Monitors in the computer lab displaying multibeam data. **Credit:** Helen Gibbons, USGS/ECS Project.

Aug 07 Log
Although Steve likes to call this an alien landing site, the pockmarks are probably the result of hydrocarbon seeps on the seafloor. **Credit**: *Healy* Map Server/Steve Roberts, National Center for Atmospheric Research.

Aug 07 Log
Sand waves on the seafloor along the Alpha-Mendeleev Ridge, about 500 km south of the North Pole. **Credit**: *Healy* Map Server/Steve Roberts, National Center for Atmospheric Research.

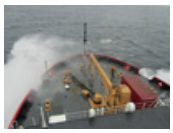


Aug 07 Log
Submarine slumping on the seafloor about 185 km SW of the mouth of the Strait of Juan de Fuca. **Credit**: *Healy* Map Server/Steve Roberts, National Center for Atmospheric Research.



Aug 07 Log
More ice gouges imaged in multibeam backscatter data; lighter areas indicate stronger echoes. The width of the swath is about 180 m. **Credit**: Helen Gibbons, USGS/ECS Project.

Aug 08 Log
We've been running our mapping systems since we left Dutch Harbor, but at about 1800 hrs (Alaska Daylight Time) on August 7, we began our "official" mapping, in the Beaufort Sea off the northwest corner of Canada. **Credit**: Graphic by Helen Gibbons, USGS/ECS Project; modified from map by Natural Resources Canada, 2008, North Circumpolar



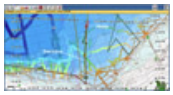
Aug 08 Log
Spray from a wave breaking against *Healy's* bow. **Credit**: Helen Gibbons, USGS/ECS Project.

Aug 08 Log
View from *Healy's* Aloft Conn (a high bridge used for steering during icebreaking) as she pushes into a high concentration of ice at 0007 hrs Alaska Daylight Time on August 8. **Credit:** Photo taken by *Healy's* Aloft Conn camera (hourly shots posted on the Web).

Aug 08 Log
Shot taken by the Aloft Conn cam at 0010 hr shows a patch of dark water and ice fragments in front of *Healy's* bow as she backs up along the track she has just broken to try pushing through on a slightly different route. **Credit:** Photo taken by *Healy's* Aloft Conn camera (hourly shots posted on the Web).

Region, in Atlas of Canada.

Aug 08 Log
Healy breaks ice with the help of an "ice knife" that projects downward from the hull about 55 ft behind her bow. (Photograph of a model of *Healy* displayed near the bridge.) **Credit**: Helen Gibbons, USGS/ECS Project.



Aug 08 Log
The ship's track along the first "line" of our mapping mission. Guess where the ship encountered closely packed ice! **Credit**: *Healy* Map Server/Steve Roberts, National Center for Atmospheric Research.

Aug 08 Log
cebreaking is hard on the multibeam bathymetric data. This image shows a section of bathymetric data collected along our first trackline before we hit the concentrated ice. **Credit**: *Healy* Map Server/Steve Roberts, National Center for Atmospheric Research.

Aug 08 Log
This image shows a section of bathymetric data collected along the same trackline after we ran into the ice. Note the gaps in the data collected in heavy ice. **Credit**: *Healy* Map Server/Steve Roberts, National Center for Atmospheric Research.

Aug 09 Photo of the Day
Polar bear! The fourth to be spotted on the trip, and the first that could be seen easily with the naked eye. **Credit**: Helen Gibbons, USGS/ECS Project

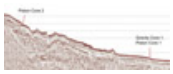
Aug 09 Photo of the Day
A watchstander on the bridge called LTJG Chris Skapin in the Aft Con to find out if the stern was in contact with the ice. **Credit**: Helen Gibbons, USGS/ECS Project

Aug 09 Photo of the Day
The bear made its way slowly toward the ship, jumping across narrow leads and wading into the water to swim across wide ones. **Credit**: Helen Gibbons, USGS/ECS Project

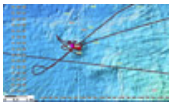
Aug 09 Photo of the Day
Community Observer Ralph Kaleak estimated the bear's length at 6-7 feet and its weight at 400+ pounds. **Credit**: Helen Gibbons, USGS/ECS Project

Aug 11 Log
Chief Scientist Brian Edwards

Aug 11 Log
Coring sites labeled on a screenshot from our Map Server. **Credit**: *Healy* Map Server/Steve Roberts,



Aug 11 Log
This seismic-reflection profile shows a cross-sectional view of the general areas where we collected a gravity core and two piston



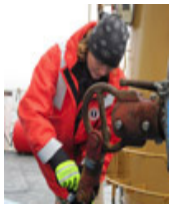
Aug 11 Log
A closer view of the small hill where we collected the first gravity core and piston core. **Credit**: Helen

always has a ready smile, but he had extra reason to be gleeful on August 11. **Credit:** Brian Edwards, USGS/ECS Project.

National Center for Atmospheric Research.

cores. Click here for a high resolution image. **Credit:** Multichannel seismic-reflection data from USGS cruise conducted in 1977.

Gibbons, USGS/ECS Project



Aug 11 Log
My roommate, USGS Engineering Technician Jenny White, begins rigging the gravity corer for our first sampling attempt. **Credit:** Helen Gibbons, USGS/ECS Project

Aug 11 Log
USGS Engineering Technician Pete Dal Ferro slides a plastic core liner into the metal core barrel. **Credit:** Helen Gibbons, USGS/ECS Project

Aug 11 Log
Several of us stand on the flight deck, ready to take photographs as the gravity corer is deployed off *Healy's* stern. **Credit:** Helen Gibbons, USGS/ECS Project

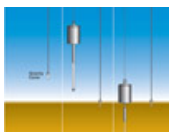
Aug 11 Log
The gravity corer relies on a weight at the top to drive the barrel into the sediment. **Credit:** Helen Gibbons, USGS/ECS Project

Aug 11 Log
Marshal uses hand signals to communicate with MST3 Daniel Purse in the Aft Conn, who winches the corer into the water at about 1430 hrs (Pacific Daylight Time). **Credit:** Helen Gibbons, USGS/ECS Project

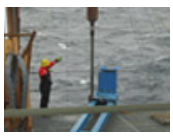
Aug 11 Log
We've got core! The gravity corer is back on deck and Pete is using a vice grip to pull out the core catcher. **Credit:** Helen Gibbons, USGS/ECS Project

Aug 11 Log
Jenny holds a clean core catcher. **Credit:** Helen Gibbons, USGS/ECS Project

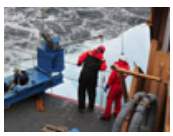
Aug 11 Log
Brian (left) and Andy Stevenson collect a sample of sediment from the core cutter. **Credit:** Helen Gibbons, USGS/ECS Project



Aug 11 Log
Next we deployed a piston corer at the same site. **Credit:** Fritz Heide, Woods Hole Oceanographic



Aug 11 Log
Marshal signals to MST2 Owen Dicks in the Aft Conn as Owen winches the piston corer into the water. **Credit:** Helen



Aug 11 Log
Recovery of the piston corer was complicated by a small group of ice floes that drifted past the ship around 2100 hrs.

Aug 11 Log
The piston corer, which hit bottom at about 2,550-m water depth, came back with gas hydrate in the core cutter at

Institution.

Gibbons, USGS/ECS Project

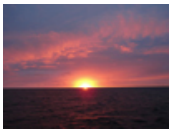
Credit: Helen Gibbons, USGS/ECS Project

the bottom of the core barrel. **Credit**: Helen Gibbons, USGS/ECS Project

Aug 11 Log
Brian pulls the chunk of gas hydrate out of the core cutter. **Credit**: Helen Gibbons, USGS/ECS Project

Aug 11 Log
Andy fits a cutting device onto the plastic core liner of the piston core, which has been pulled partway out of the metal core barrel. **Credit**: Helen Gibbons, USGS/ECS Project

Aug 11 Log
Under Brian's direction, Caroline Singler records information about the first piston core and the sediment samples and core sections into which it was divided. **Credit**: Helen Gibbons, USGS/ECS Project



Aug 11 Log
The sun set at about 0025 hrs on August 12, while we were transiting to our second piston core site. **Credit**: Caroline Singler, NOAA Teacher at Sea.

Aug 11 Log
On the bridge: Officer of the Deck ENS Emily Kehrt (right) and Break-in Officer of the Deck ENS Nick Custer were on watch when we collected our first piston core. **Credit**: Helen Gibbons, USGS/ECS Project

Aug 11 Log
After supervising his crew through each coring run, Captain Bill Rall came down to the deck to view the cores and discuss ways to improve operations. **Credit**: Helen Gibbons, USGS/ECS Project

Aug 11 Log Another success! The second piston core came back on deck at about 0420 hours Pacific Daylight Time on August 12. **Credit**: Helen Gibbons, USGS/ECS Project

Aug 11 Log
Andy and Brian are pretty happy about the day's successful coring! **Credit**: Helen Gibbons, USGS/ECS Project

Aug 14 Photo of the Day
Here is Canadian Coast Guard Ship *Louis S. St-Laurent* (*Louis*) in the

Aug 14 Photo of the Day
The sun comes out just after *Healy* has made a turn onto a new trackline. **Credit**: Helen

Aug 15 Photo of the Day
took this photo shortly after 1300 hrs on August 14. The sun was relatively high in

Aug 15 Photo of the Day
Another fogbow appeared in the late evening. **Credit**: Helen Gibbons, USGS/ECS

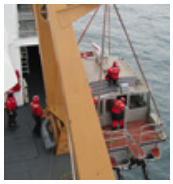
early afternoon, emerging from the thinning fog. **Credit**: Helen Gibbons, USGS/ECS Project

Gibbons, USGS/ECS Project

the sky, and so I could fit the whole bow in one frame. **Credit**: Helen Gibbons, USGS/ECS Project

Project

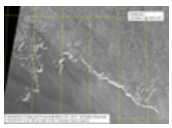
Aug 15 Photo of the Day
...and the right side. **Credit**: Helen Gibbons, USGS/ECS Project



Aug 16 Photo of the Day
The ASB was lowered by crane from *Healy's* 02 deck to a spot level with the 01 deck, where the crew climbed aboard. **Credit**: Helen Gibbons, USGS/ECS Project

Aug 16 Photo of the Day
Which way is forward? This is a view of the bow (lower left), which hinges out and down to form a ramp from the boat onto the beach. **Credit**: Helen Gibbons, USGS/ECS Project

Aug 16 Photo of the Day
Soon the ASB was headed for Barrow, where *Louis's* new crewman was waiting. **Credit**: Helen Gibbons, USGS/ECS Project

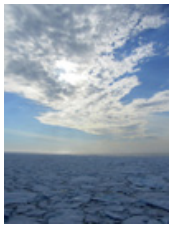


Aug 17 Log Screenshot of SAR (Synthetic Aperture Radar) image from the Radarsat-2 satellite, collected August 17, 2010. **Credit**: Erin Clark, Canadian Ice Service.

Aug 17 Log
Close-packed floes at the edge of the ice pack, photographed at 1121hrs PDT on August 17. **Credit**: Helen Gibbons, USGS/ECS Project.

Aug 17 Log
In close-packed ice at the outer edge of the ice pack, at 1143 hrs, Pacific Daylight Time. **Credit**: Helen Gibbons, USGS/ECS Project.

Aug 17 Log
Farther into the ice pack, at around 1300 hrs, the ice concentration had decreased to about 4 tenths. **Credit**: Helen Gibbons, USGS/ECS Project.



Aug 17 Photo of the Day
Winds have pushed ice floes into a densely packed zone at the outer edge of the ice pack.

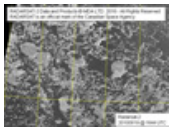
Credit: Helen Gibbons, USGS/ECS Project

Aug 18 Log
Tablet computer used to record sea-ice observations in the program ICEggs.
Credit: Helen Gibbons, USGS/ECS Project

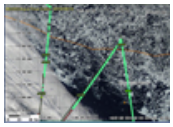
Aug 18 Log
Erin watches as Josh enters ice observations into the ICEggs program used by Erin's agency, Canadian Ice Service.
Credit: Helen Gibbons, USGS/ECS Project

Highly simplified diagram illustrating how flat surfaces, such as new ice or a calm sea surface, reflect most of the microwaves away from the SAR sensor.
Credit: Helen Gibbons, USGS/ECS Project

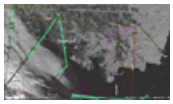
Highly simplified diagram illustrating how irregular surfaces, typical of multi-year ice (bottom), reflect many beams back to the sensor.
Credit: Helen Gibbons, USGS/ECS Project



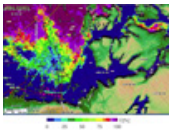
Aug 18 Log
Screenshot of SAR (synthetic aperture radar) image from the Radarsat-2 satellite, collected August 19, 2010.
Credit: Helen Gibbons, USGS/ECS Project



Aug 18 Log
MODIS image collected August 16, 2010. During daylight hours where clouds are thin or absent, these visible-light images provide a good view of the ice.
Credit: Helen Gibbons, USGS/ECS Project

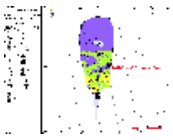


Aug 18 Log
DMSP visible-light image collected at about 0924 hrs (Pacific Daylight Time) on August 16, 2010. **Credit**: Helen Gibbons, USGS/ECS Project



Aug 18 Log
Sea-ice concentration map from the Advanced Microwave Scanning Radiometer-Earth Observing System (AMSR-E) for August 16, 2010. Click here for a high resolution image.
Credit: Helen Gibbons, USGS/ECS Project

Aug 20 Log
Louis's helicopter lifts off from *Healy's* deck at 1343 hrs on Tuesday, August 17,



Aug 20 Log
Ice chart produced by Bruno Barrette during helicopter reconnaissance

Aug 20 Log
Another heli recco: Josh (left) and Erin (walking toward viewer, right) on

during a transfer of personnel. **Credit**: Brian Edwards, USGS.

on August 17, 2010. S. Click here for a high resolution image. **Credit:** Brian Edwards, USGS/ECS Project.

Healy's flight deck after flying a helicopter reconnaissance today (August 20). **Credit:** Brian Edwards, USGS/ECS Project.

Aug 21 Photo of the Day
Every Saturday night, *Healy's* Morale Committee sponsors a Bingo fundraiser. BM2 Gerry "Banana" McCann is tonight's caller. **Credit**: Helen Gibbons, USGS/ECS Project

Aug 21 Photo of the Day
After some prize swapping, ET2 Jeremy Gainey is the proud owner of a Sponge Bob fishing pole. **Credit**: Helen Gibbons, USGS/ECS Project

Aug 21 Photo of the Day
Gainey said he was going to catch a halibut, but he seems to be reeling in SN Beth Hildebrand. **Credit**: Helen Gibbons, USGS/ECS Project

Aug 21 Log
MST1 Lee Brittle (right) steadies the frame of the CTD rosette as MST3 Marshal Chaidez begins detaching the mesh bags containing Styrofoam cups. **Credit**: Helen Gibbons, USGS/ECS Project.

Aug 21 Log
As good as Christmas: Marshal opens the first bag of cups in the Main Lab. **Credit:** Helen Gibbons, USGS/ECS Project.

Aug 21 Log
It worked! Shrunken Styrofoam cups cover the lab table. **Credit**: Helen Gibbons, USGS/ECS Project

Aug 21 Log
Chief scientist Brian Edwards (left) and University of South Florida (USF) research associate Sherwood Liu carefully remove the soggy paper towels from the shrunken cups. **Credit:** Helen Gibbons, USGS/ECS Project.

Aug 21 Log
Soon the cups have been rinsed

Aug 21 Log
We used cups of two different sizes, as illustrated by

Aug 21 Log
Before long, the cups were being

Aug 21 Log
LTJG Chris

in fresh water and laid out to dry. **Credit**: Helen Gibbons, USGS/ECS Project

the unshrunken cups in the back, 16-ounce on the left and 8-ounce on the right. **Credit**: Helen Gibbons, USGS/ECS Project.

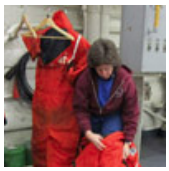
claimed by their happy owners —such as CDR John Reeves... **Credit**: Helen Gibbons, USGS/ECS Project

Skapin... **Credit**: Helen Gibbons, USGS/ECS Project.

Aug 21 Log
...and chief scientist Brian Edwards. **Credit**: Helen Gibbons, USGS/ECS Project

Aug 21 Log
USF graduate student Mark Patsavas sent two cups of the same size (16-oz) to different depth. **Credit**: Helen Gibbons, USGS/ECS Project.

Aug 21 Log
A closeup view of Mark's cups, with full-size cup on the right for scale. **Credit**: Helen Gibbons, USGS/ECS Project.



Aug 22a Log
NOAA Teacher at Sea Caroline Singler puts on an exposure suit. **Credit**: Helen Gibbons, USGS/ECS Project.

Aug 22a Log
Erin (right) helps Holly (facing camera) strap on a personal flotation device. **Credit**: Helen Gibbons, USGS/ECS Project.

Aug 22a Log
Bill's ready to go. **Credit**: Helen Gibbons, USGS/ECS Project.

Aug 22a Log
And so is Caroline. **Credit**: Helen Gibbons, USGS/ECS Project.

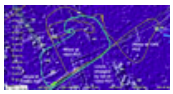
Aug 22a Log
Time to board the helicopter. **Credit**: Helen Gibbons, USGS/ECS Project.

Aug 22a Log
The passengers are strapped in and ready to fly. **Credit**: IT1 Miguel Uribarri, USCG.

Aug 22a Log
They're off! **Credit**: Helen Gibbons, USGS/ECS Project.

Aug 22b Log
Louis is stuck on an ice floe beneath her port bow.
Credit: Brian Edwards, USGS.

Aug 22b Log
So near and yet so far. *Louis* is just a few meters away from clear water, but the ice floe under her port bow won't give way.
Credit: Frame from video by Brian Edwards, USGS.



Aug 22b Log
The afternoon's tracklines record a goofy dance between the ships, as *Healy* tries to help free *Louis* by breaking ice around her.
Credit: Helen Gibbons, USGS/ECS Project.

Aug 22b Log
Louis and *Healy's* dance in the ice brought the ships much nearer to one another than usual, giving people on each ship close-up views of the other.
Credit: Brian Edwards, USGS.

Aug 22b Log
The visitors from *Healy* took advantage of the opportunity to photograph their ship across the ice.
Credit: Caroline Singler, NOAA Teacher at Sea.

Aug 22b Log
Close-up view of *Healy's* main deck; the stern is to the right.
Credit: Caroline Singler, NOAA Teacher at Sea.

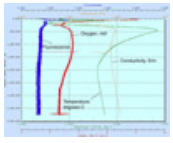
Aug 22b Log
At about 1530 hrs, *Louis's* crew was pulling in the seismic gear.
Credit: Caroline Singler, NOAA Teacher at Sea.

Aug 22b Log
...and then the lead-in cable (yellow) and hydrophone streamer (blue).
Credit: Caroline Singler, NOAA Teacher at Sea.

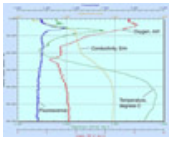
Aug 22b Log
Peter Triezenberg (USGS) and I saw the helicopter from *Louis* return to *Healy* a little after 1600 hrs. **Credit:** Frame from video shot by Peter Triezenberg, USGS.

Aug 23 Log
24-bottle CTD rosette about to be lowered into the water. (From a CTD cast on August 9, 2010.) **Credit:** Helen Gibbons, USGS/ECS Project.

Aug 23 Log Package of CTD electronics and sensors (arrow) is mounted below a ring of water-collecting bottles.
Credit: Helen Gibbons,



Aug 23 Log
Plot of data collected by the CTD package as it was lowered to about 3,750-m water depth on August 21. **Credit:** Dale Chayes, Lamont-Doherty Earth Observatory of

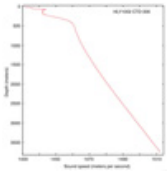


Aug 23 Log
Expanded view of the top 600 m of the water column, in which the trends are more complicated than in deeper water.
Credit: Dale Chayes, Lamont-Doherty Earth

USGS/ECS Project.

Columbia University.

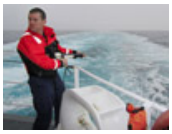
Observatory of Columbia University.



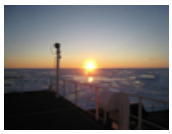
Aug 23 Log
Plot of speed of sound versus water depth calculated from data collected during the August 21 CTD cast. **Credit:** Steve Roberts, National Center for Atmospheric Research.

Aug 23 Log
Expendable bathythermo-graph (XBT) probe (a faulty one that was never launched). **Credit:** Helen Gibbons, USGS/ECS Project.

Aug 23 Log
MST3 Daniel Purse prepares to launch an XBT off *Healy's* stern. **Credit:** Helen Gibbons, USGS/ECS Project.



Aug 23 Log
The probe is in the water and falling toward the seafloor. A thin wire (not visible in this photo) connects the probe to the launcher. **Credit** Helen Gibbons, USGS/ECS Project.



Aug 23 Photo of the Day
This photo was taken at local midnight, just before 0300 PDT on August 23, the first day of our trip on which the sun did not set. **Credit**: Jerry Hyman, National Geospatial-Intelligence Agency.

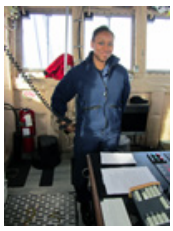
Aug 24 Log*Healy's* decks are numbered from the Main Deck, which is about 15 ft above the waterline and includes the mess, the Main Lab, and the fantail (from which we deploy corers and other instruments). **Credit:** USGS/ECS Project.

Aug 24 Log
It's a steep climb from the bridge to the Aloft Conn, up three vertical ladders (one for each deck). **Credit:** Helen Gibbons, USGS/ECS Project.

Aug 24 Log
ENS Sinks points to a dark area on the radar screen that could be either open water or a smooth ice floe just ahead of the ship. **Credit:** Helen Gibbons, USGS/ECS Project.

Aug 24 Log
The dark area on the radar screen was an ice floe with a flat, smooth surface. **Credit**: Helen

Aug 24 Log
ENS Sinks checks a monitor as he drives *Healy* through the ice. **Credit:** Helen Gibbons,



Aug 24 Log
ENS McNair between radio

Aug 24 Log
Canadian Liaison Captain Michel Bourdeau (Canadian Coast Guard) compares

Gibbons, USGS/ECS Project.

USGS/ECS Project.

communications. In the lower left is a grate she placed over the hole in the deck used to enter the Aloft Conn. **Credit**: Helen Gibbons, USGS/ECS Project.

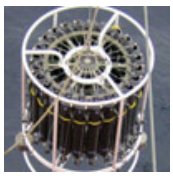
the view out the window with information on the radar screen. **Credit**: Helen Gibbons, USGS/ECS Project.

Aug 24 Log
A fogbow appears as the fog thins. **Credit**: Helen Gibbons, USGS/ECS Project.

Aug 24 Log
Polar bear tracks on an ice floe. **Credit**: Helen Gibbons, USGS/ECS Project.

Aug 24 Log
Helen enjoys the views and the company in the Aloft Conn. **Credit**: ENS Holly McNair, U.S. Coast Guard.

Aug 25 Photo of the Day
Sun dogs. These bright spots on either side of the sun are caused by refraction of sunlight by ice crystals in the atmosphere. **Credit**: Helen Gibbons, USGS/ECS Project.



Aug 25 Log
The rosette we use for deep casts carries 24 12-liter Niskin bottles. The bottles have caps at both ends and are sent down open. **Credit**: Helen Gibbons, USGS/ECS Project.

Aug 25 Log
USGS geochemist Chris DuFore measures the alkalinity of a seawater sample. **Credit**: Helen Gibbons, USGS/ECS Project.

Aug 25 Log
Sherwood Liu checks on the Multiparameter Inorganic Carbon Analyzer, or MICA (the assembly of boxes, tubes, and wires on the floor). **Credit**: Helen Gibbons, USGS/ECS Project.

Aug 25 Log
Mark Patsavas uses a benchtop spectrometer to measure carbonate ion (CO_3^{2-}) concentration in a seawater sample from *Healy's*

Aug 25 Log
Several subsamples of water were collected from each Niskin bottle. **Credit**: Helen Gibbons,

Aug 25 Log
Next, Mark collected two subsamples from each bottle. He will use the benchtop spectrometers onboard *Healy* to

Aug 25 Log
Sherwood collected subsamples of water for measurement of total dissolved inorganic carbon. **Credit**: Helen

flow-through system. **Credit:** Helen Gibbons, USGS/ECS Project.

USGS/ECS Project.

measure the pH of one sample and the CO_3^{2-} concentration of the other. **Credit:** Helen Gibbons, USGS/ECS Project.

Gibbons, USGS/ECS Project.

Aug 25 Log
NOAA Teacher at Sea Caroline Singler collected subsamples for measuring total alkalinity onboard *Healy*. **Credit:** Helen Gibbons, USGS/ECS Project.

Aug 25 Log PolarTREC teacher Bill Schmoker collected water from each of the Niskin bottles and transferred it to small bottles that will be frozen and shipped to the St. Petersburg lab. **Credit:** Helen Gibbons, USGS/ECS Project.

Aug 25 Log
Chris collected the last set of subsamples, which will be frozen and sent to St. Petersburg for analysis of total organic carbon. **Credit:** Helen Gibbons, USGS/ECS Project.

Aug 25 Log
Happy water samplers (left to right): Chris, Bill, Mark, Caroline, and Sherwood. **Credit:** Helen Gibbons, USGS/ECS Project.

Aug 28 Log
Guess what we're cooking! Jerry Hyman spreads olive oil on pizza crusts before baking them for a few minutes. **Credit:** Helen Gibbons, USGS/ECS Project.

Aug 28 Log
Ship's Pizza Technicians (SPTs) Jerry Hyman (right) and Captain Michel Bourdeau (Canadian Coast Guard) man the ovens in what Captain Bourdeau called the "engine room." **Credit:** Helen Gibbons, USGS/ECS Project.

Aug 28 Log
The assembly line: Starting at back right, Erin Clark (Canadian Ice Service) spreads tomato sauce and some crushed garlic on each crust. **Credit:** Helen Gibbons, USGS/ECS Project.

Aug 28 Log
Caroline Singler (NOAA Teacher at Sea) begins mixing the cake batter. **Credit:** Sherwood Liu, University of South Florida.

Aug 29 Log
BM3 Patrick Kimmel announces the

Aug 29 Log
We crossed the

Aug 29 Log
View from the

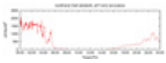
Aug 29 Log
The sun at local midnight, just before 0300

crossing of the Arctic Circle. **Credit:** MK2 Chris Schumacher, U.S. Coast Guard.

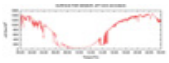
Arctic Circle at about 2030 hours Alaska Daylight Time on August 4, 2010. **Credit:** Helen Gibbons, ECS Project.

bridge as *Healy* crossed the Arctic Circle. **Credit:** Helen Gibbons, ECS Project.

Pacific Daylight Time, on August 23, the first day of our trip on which the sun did not set. **Credit:** Jerry Hyman, National Geospatial-Intelligence Agency.



Aug 29 Log
Photosynthetically active radiation (PAR) data for August 5, 2010 UTC (Universal Coordinated Time; subtract 8 to convert to Alaska Daylight Time). **Credit:** Steve Roberts, National Center for Atmospheric Research.



Aug 29 Log
PAR data for August 23, 2010 UTC. **Credit:** Steve Roberts, National Center for Atmospheric Research.

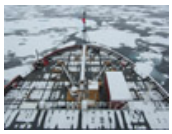
Aug 29 Log
Captain Davey Jones (a.k.a. FS3 Tysin Alley). **Credit:** MK2 Chris Schumacher, U.S. Coast Guard.

Aug 29 Log
Captain Davey Jones (right) and his Wench (a.k.a. SN Beth Hildebrand) train Blue Noses for their Polar Bear initiation. **Credit:** MK2 Chris Schumacher, U.S. Coast Guard.

Aug 29 Log
A few of the new Polar Bears, who have earned the right to wear their red caps above the Arctic Circle. **Credit:** Mark Patsavas, University of South Florida.

Aug 31 Photo of the Day
It's about 0845 hours Pacific Daylight Time at latitude 75°35'N, longitude 140°06'W and a light, wet snow is falling. **Credit:** Helen Gibbons, USGS/ECS Project.

Aug 31 Photo of the Day
A sprinkling of snow remains unmelted on the track beneath the piston corer we are about to deploy. **Credit:** Helen Gibbons, USGS/ECS Project.



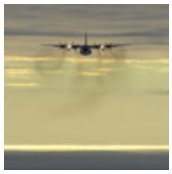
Sep 1 Photo of the Day
The light, wet snow that began yesterday continues to fall. **Credit:** Helen Gibbons, USGS/ECS Project.

Sep 1 Photo of the Day
At around 1115 hours Pacific Daylight Time, as many of us were sitting down to lunch,

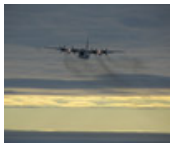
Sep 1 Photo of the Day
...and then settled down to rest on its stomach, folding its front legs under its chest

the bridge announced a polar bear about 600 yards off the port bow.
Credit: Helen Gibbons, USGS/ECS Project.

like a cat.
Credit: Helen Gibbons, USGS/ECS Project.



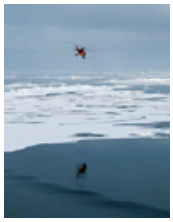
Sep 2 Photo of the Day
A C-130 carrying Vice Admiral Sally Brice-O'Hara, the Vice Commandant of the U.S. Coast Guard, flew around *Healy* twice tonight at about 1845 hrs Pacific Daylight Time.
Credit: Helen Gibbons, USGS/ECS Project.



Sep 2 Photo of the Day
The plane was flying an Arctic Domain Awareness mission along the north coast of Alaska and made the extra hop to greet the *Healy*.
Credit: Helen Gibbons, USGS/ECS Project.

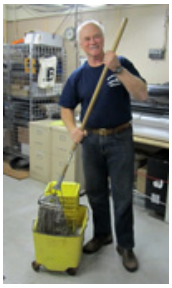
Sep 2 Photo of the Day
The Vice Commandant and Alice Hill—Principal for Deputy Secretary of Homeland Security Jane Holl Lute—spoke with *Healy's* Captain William Rall by radio, sending greetings and words of appreciation to all aboard.
Credit: Helen Gibbons, USGS/ECS Project.

Sep 3 Photo of the Day
This evening, the helicopter from *Louis* made the final transfer of personnel between the two ships.
Credit: Helen Gibbons, USGS/ECS Project.

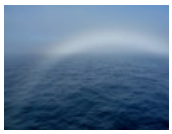


Sep 3 Photo of the Day
Coming over from *Louis* were U.S. Liaison Jon Childs (USGS), Operations Technical Advisor Caryn Panowicz (National Ice Center), and LT Charlene Criss (U.S. Coast Guard).
Credit: Helen Gibbons, USGS/ECS Project.

Sep 4 Photo of the Day
Just after sunset, I saw a faint crescent in the northwest.
Credit: Helen Gibbons, USGS/ECS Project.

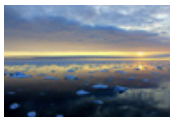


Sep 5 Photo of the Day
Chief Scientist Brian Edwards (USGS) pauses for a photo while swabbing the deck in the Computer Lab.
Credit: Helen Gibbons, USGS/ECS Project.



Sep 5 Log
Fogbow in the northern Bering Sea, August 4, 2010.
Credit: Bill Schmoker, PolarTREC.

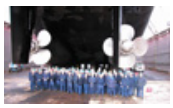
Sep 5 Log
Foggy afternoon at about 80°N latitude, August 24, 2010.
Credit: Joshua Miller, National Ice Center.



Sep 5 Log
Morning on the Beaufort Sea, August 6, 2010, at approximate latitude 72°N.
Credit: Mark Patsavas, University of South Florida

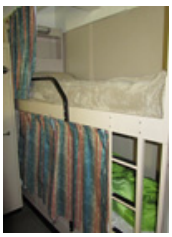
Sep 5 Log
Canadian Coast Guard Ship *Louis S. St-Laurent* following our track in the distance.
Credit: Mark Patsavas, University of South Florida.

Sep 5 Log
The box-like shape of *Healy's* hull contributes to her stability. In this photo of *Healy* in dry dock in 2004, you can see the nearly straight sides of the hull.
Credit: Captain William Rall, U.S. Coast Guard.



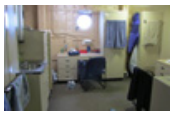
Sep 5 Log
In this view, you can see the hull's virtually flat bottom.
Credit: Captain William Rall, U.S. Coast Guard.

Sep 5 Log
USGS marine technician Jenny White placed this shrunken Styrofoam cup on the edge of a wooden shelf in the ship's Main Lab on August 21 (see log for that day).
Credit: Helen Gibbons, USGS/ECS Project.



Sep 5 Log
Curtains on the bunks block out the midnight sun and make sleeping extra cozy.
Credit: Helen Gibbons, USGS/ECS Project.

Sep 5 Log
View through our porthole on August 8, 2010.
Credit: Helen Gibbons, USGS/ECS Project.



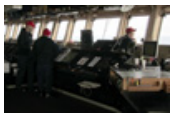
Sep 5 Log
Two roommates sharing cabins that can accommodate three have plenty of space.
Credit: Helen Gibbons, USGS/ECS Project.

Sep 5 Log
Today's lunch was chicken stew with rice, peas, and a biscuit, plus a lovely surprise: fresh grapefruit (not shown).
Credit: Helen Gibbons, USGS/ECS Project.

Sep 5 Log
Even if you never make it to the gym, you'll get exercise going up and down *Healy's* steep ladders.
Credit: Helen Gibbons, USGS/ECS Project.

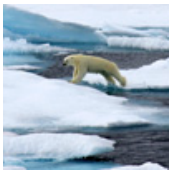
Sep 5 Log
Two gyms onboard can help you counter the effects of the hearty meals.

(That's me on one of the ellipticals.) **Credit:** Caroline Singler, NOAA Teacher at Sea.



Sep 5 Log
The bridge is calm and hushed, almost like a library. **Credit:** Helen Gibbons, USGS/ECS Project.

Sep 5 Log
The expansive view feels serene. The bridge is also a good place to spot... **Credit:** Helen Gibbons, USGS/ECS Project



Sep 5 Log
A polar bear made its way across the ice to check out the ship while we were stopped for sampling on August 9, 2010. **Credit:** Mark Patsavas, University of South Florida.

Sep 5 Log
A ringed seal swam by while we were taking a piston core on August 25, 2010. **Credit:** Bill Schmoker, PolarTREC.

Sep 5 Log
Bill Schmoker (PolarTREC) poles ice floes away from the winch wire while we lower a piston corer on August 25. **Credit:** Helen Gibbons, USGS/ECS Project.

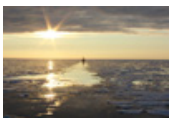
Sep 5 Log
Yup, it's silty. **Credit:** Helen Gibbons, USGS/ECS Project.

Sep 5 Log
Sampling operations got everybody outdoors. **Credit:** Caroline Singler, NOAA Teacher at Sea.

Sep 5 Log
Standing watch in the computer lab, you can see the data coming in from all our mapping systems, listen to radio communications, and watch video feeds. **Credit:** Helen Gibbons, USGS/ECS Project.

Sep 5 Log
Whether you're working indoors or out, the commute is great. **Credit:** Helen Gibbons, USGS/ECS Project.

Sep 5 Log
Excellent leadership makes the work a pleasure. **Credit:** Helen Gibbons, USGS/ECS Project.

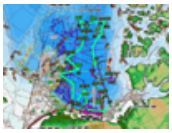


Sep 5 Log
Louis follows our track in the early morning hours of August 22, 2010. **Credit:** Helen Gibbons, USGS/ECS Project.

Sep 5 Log
Canadian Coast Guard Ship *Louis S. St-Laurent* on August 14, 2010. **Credit:** Helen Gibbons,

Sep 5 Log
Captain Davey Jones (a.k.a. FS3 Tysin Alley, right) and his

Sep 5 Log
A week after calling a Bingo game in a banana suit, BM2 Jerry McCann is



Sep 5 Log
The Healy Science Network in general and the Map Surfer (above) in particular offer a

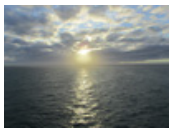
USGS/ECS Project.

Wench (a.k.a SN Beth Hildebrand) train Blue Noses for their Polar Bear initiation. **Credit:** MK2 Chris Schumacher, U.S. Coast Guard.

preparing to drive a Rigid Hull Inflatable to *Louis* to transfer personnel on a day that's too foggy for helicopter operations. **Credit:** Helen Gibbons, USGS/ECS Project.

wealth of data and information. **Credit:** Dale Chayes (Lamont-Doherty Earth Observatory of Columbia University), Steve Roberts ((National Center for Atmospheric Research), and Tom Bolmer (Woods Hole Oceanographic Institution).

Sep 5 Log
I'd love to include individual shots of the more than 100 people aboard *Healy* for this mission, but will make do with this group shot of many members of the science party and Coast Guard crew posing on the flight deck on August 26, 2010. Click image for larger view. **Credit:** ENS Emily Kerht, U.S. Coast Guard.



Sep 6 Photo of the Day
Sunrise over Barrow, Alaska, about 0815 Alaska Daylight Time. Fair weather and calm seas bode well for our helicopter transfers from *Healy* to shore. **Credit**: Helen Gibbons, USGS/ECS Project.

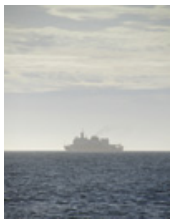
Sep 6 Photo of the Day
Community Observer Ralph Kaleak (Barrow Arctic Science Consortium) in the helicopter. Most of us will travel for a couple of days to get home, but Ralph, who lives in Barrow, will be reunited with his family very soon. **Credit**: Helen Gibbons, USGS/ECS Project.

Sep 6 Photo of the Day
The helicopter is carrying members of the next science party plus gear and fresh food back to *Healy*. It will make many trips back and forth today. **Credit**: Helen Gibbons, USGS/ECS Project.

Sep 6 Photo of the Day
Waiting for an evening flight, we take advantage of the fine weather to explore Barrow. On a bluff overlooking the beach, we enjoy the view of *Healy* at anchor. **Credit**: Helen Gibbons, USGS/ECS Project.

Sep 6 Photo of the Day
A high point was our visit to the Iñupiat Cultural Center. **Credit**: Helen Gibbons, USGS/ECS Project.

Sep 6 Photo of the Day
Back to the beach in the evening; it's hard to believe we're on the Arctic Ocean. **Credit**: Helen Gibbons, USGS/ECS Project.



Sep 6 Photo of the Day
One more view of *Healy*, silhouetted against the evening sky. It's been a fine trip! **Credit**: Helen Gibbons, USGS/ECS Project.