



NCOC N.V. CASPIAN SEAL PROTECTION MEASURES



NCPSA VENTURE KEY ENVIRONMENTAL PROTECTION OBJECTIVES

NCPSA venture applies systematic approach to environmental protection in order to identify and implement timely control over every component of the ecosystem where oil and gas operations are carried out. Works are carried out in the following areas:

- **Detailed and regular assessment and monitoring of environmental components within the construction and operation sites**
- **Baseline biodiversity surveys**
- **Biodiversity monitoring**
- **Impact reduction measures and compliance with all environmental legislation provisions.**



- **Offshore biodiversity surveys**
(since 1993 till present)
- **Onshore biodiversity surveys**
(since 2001 till present)
- **Ornithological surveys**
(since 2000 till present)
- **Sturgeon Monitoring Programme by Tagging (2006 - 2007)**
- **Caspian Seal Monitoring Programme (since 2005 to present)**
- **Geo- and Biodiversity Master Plan for the Northeastern Caspian Sea (since 2009)**
- **Ural Saiga Population Migration Survey Through Satellite Tagging (2015 - 2016).**



CASPIAN SEAL SURVEYS

NCOC and its predecessors in the course of almost 20 years since 1996 undertake Caspian Seal surveys aimed at studying seal behaviour and dense colonies in order to avoid or minimize any possible negative impact on the population. Studies of the Caspian Seal population condition are carried out in winter.

Seal surveys are implemented in order to:

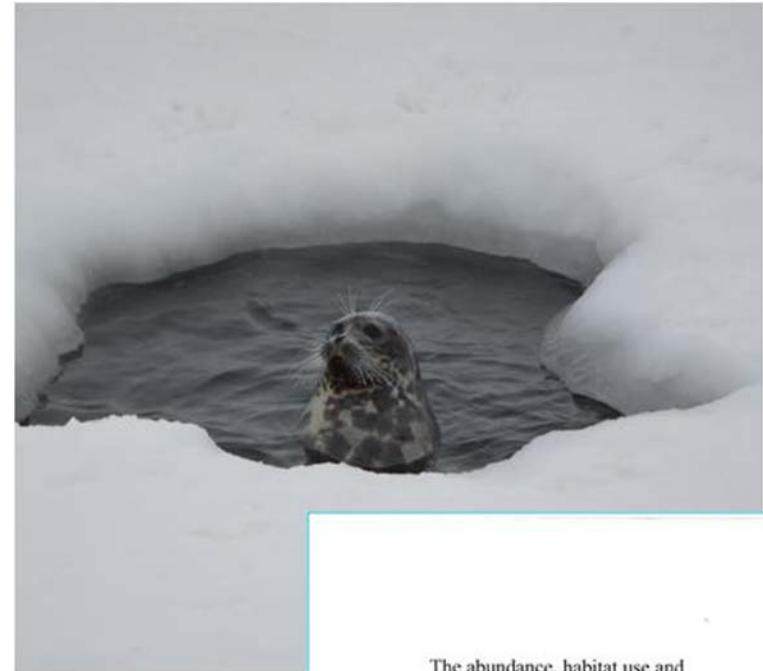
- Identify the location of breeding seal colonies in winter
- Plan vessel navigation to bypass these areas
- Obtain more details on the seal habitat and behaviour.

Aerial surveys are undertaken to identify seal concentrations near the Venture's facilities and plan the vessel routes; the surveys are also conducted for continuous data collection in order to assess the Caspian Seal population in winter from mid-February till early March.

Icebreaker surveys are carried out in winter when seals congregate on ice fields, in order to get quantitative data on sensitivity of seals during breeding season to ship movement; development of measures, which allow the Company to minimize negative impact on the seals, including use of thermal imaging cameras.

The Venture also studies seals migration routes with use of satellite telemetry by tagging.

Assistance is rendered in publication of the survey findings in order to provide data accumulated to the international scientific community.



The abundance, habitat use and
conservation of Caspian seals
(*Pusa caspica*)

Lilia Dmitrieva

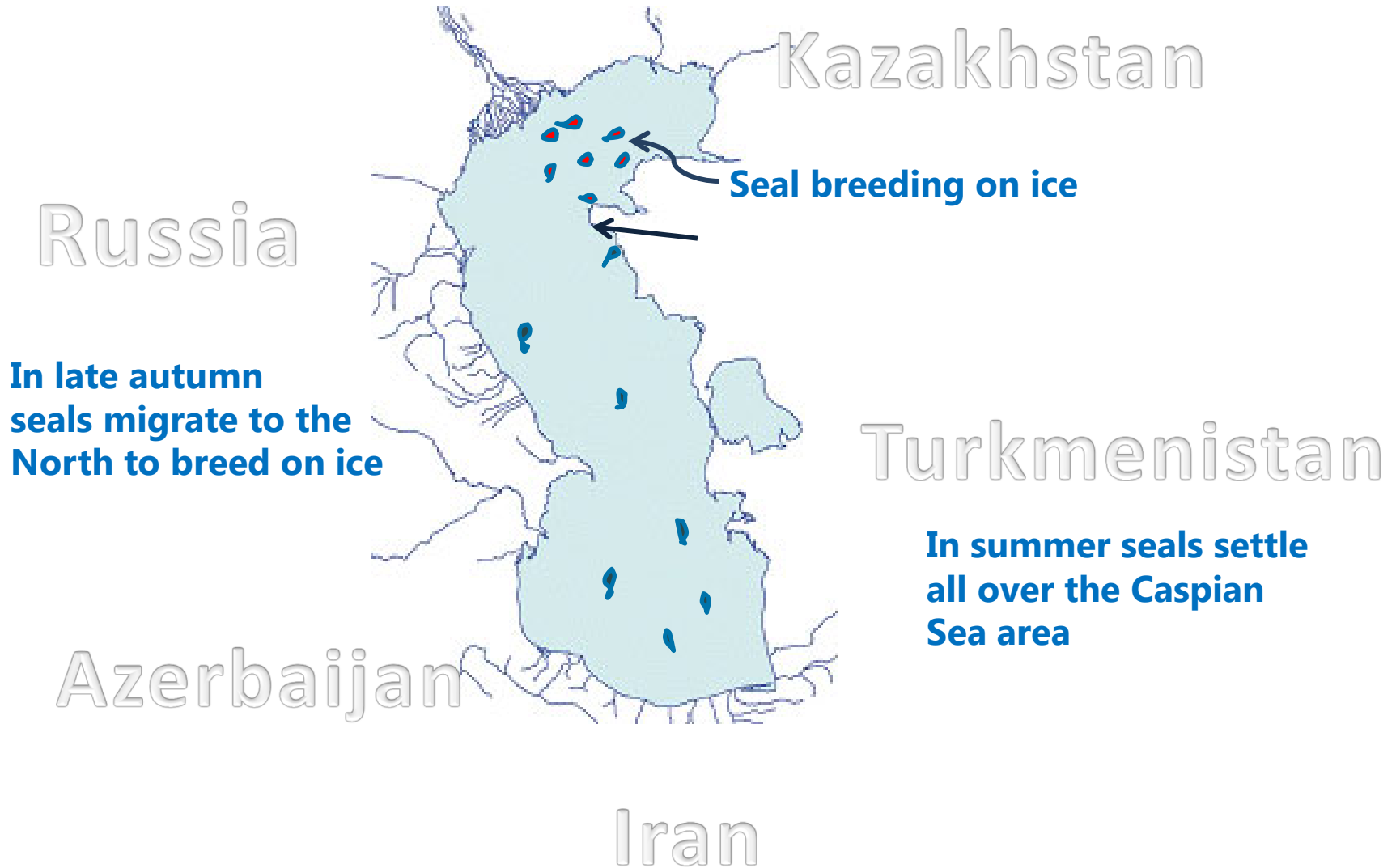
Submitted in accordance with the requirements for the degree of
Doctor of Philosophy

University of Leeds, Faculty of Biological Sciences

September 2013



CASPIAN SEAL IN NATURAL SURROUNDINGS



INSTABILITY OF BIRTH FIGURES IN CASPIAN SEAL POPULATION

Birth rate among Caspian seal population varies greatly from year to year

Number of seal pups for the last winters:

- 2004 - 05: 25,000
- 2005 - 06: 19,000
- 2006 - 07: 7,000
- 2007 - 08: 6,000
- 2008 - 09: 19,000
- 2009 - 10: 7,000
- 2010 - 11: 21,000
- 2011 - 12: 16,000



Variations in the number of seal pups mainly reflect short-term changes in ecological factors of the habitat – food chain, winter conditions, etc.

MAIN REASONS OF DECLINE IN THE CASPIAN SEAL POPULATION

- By-catch of seals in fisheries, accidents in nets
- Depletion of food supplies resulted from immigration of alien *Mnemiopsis Leidy* species
- Decline in fish stock as a result of excess fishing
- Infection episodes
- Seal hunting for fat and fur
- Reduction of ice area as the result of global climate change
- Dislocation of habitat as a result of winter industrial navigation
- Environmental pollution (agriculture, heavy industry)



HISTORIC REASONS OF THE CASPIAN SEAL MASS MORTALITY

- 1955-1956: epizootic outbreak killed 30,000 species of the Caspian Seal (according to A.F. Velegzhanin)
- 1997: 6,000 dead Caspian Seals were found along the Azerbaijan coast line (Ecotox International Group of Researchers determined in numerical terms the levels of organochlorine contaminants and revealed a new strain of canine distemper virus (CDV) in the bodies of dead seals)
- 2000-2001: around 30,000 dead seals were found along the coast lines of Kazakhstan, Turkmenistan, Russia, Azerbaijan and Iran (in this case Ecotox International Group of Researchers diagnosed CDV as the main reason of death).

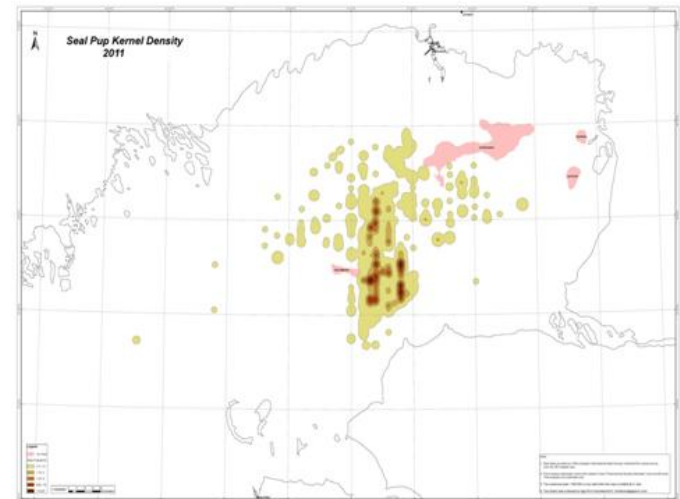
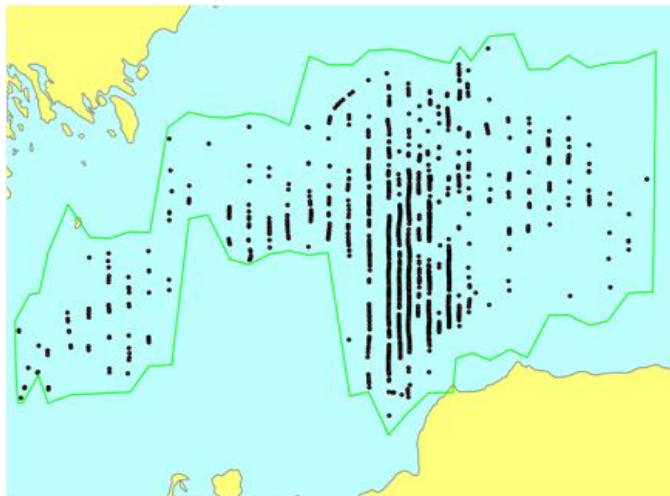
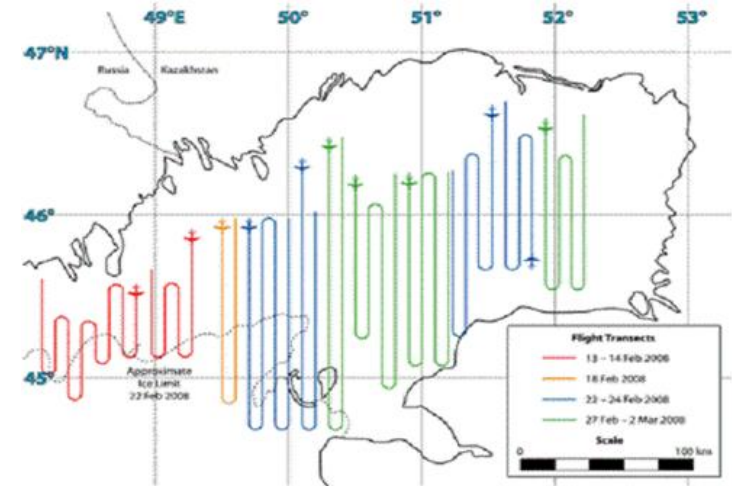


CASPIAN SEAL SURVEYS: AERIAL SURVEYS

Since 2005 an international group of expert researchers on the Caspian Seal survey has conducted studies of the Caspian Seal population.

Winter aerial surveys objectives are as follows:

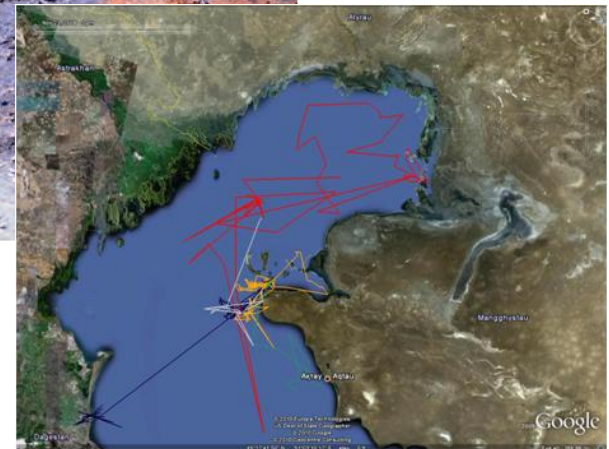
- Locate seal habitat areas
- Assess annual number of newborn pups
- Assess the size and dynamics of seal colony.



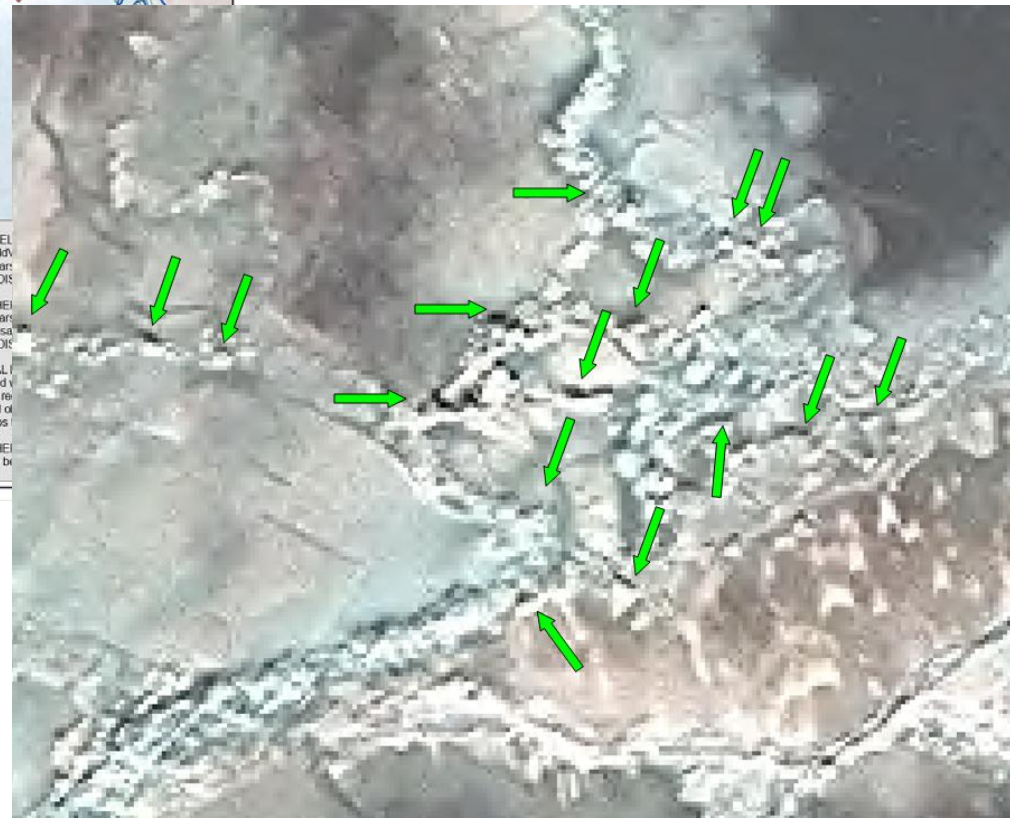
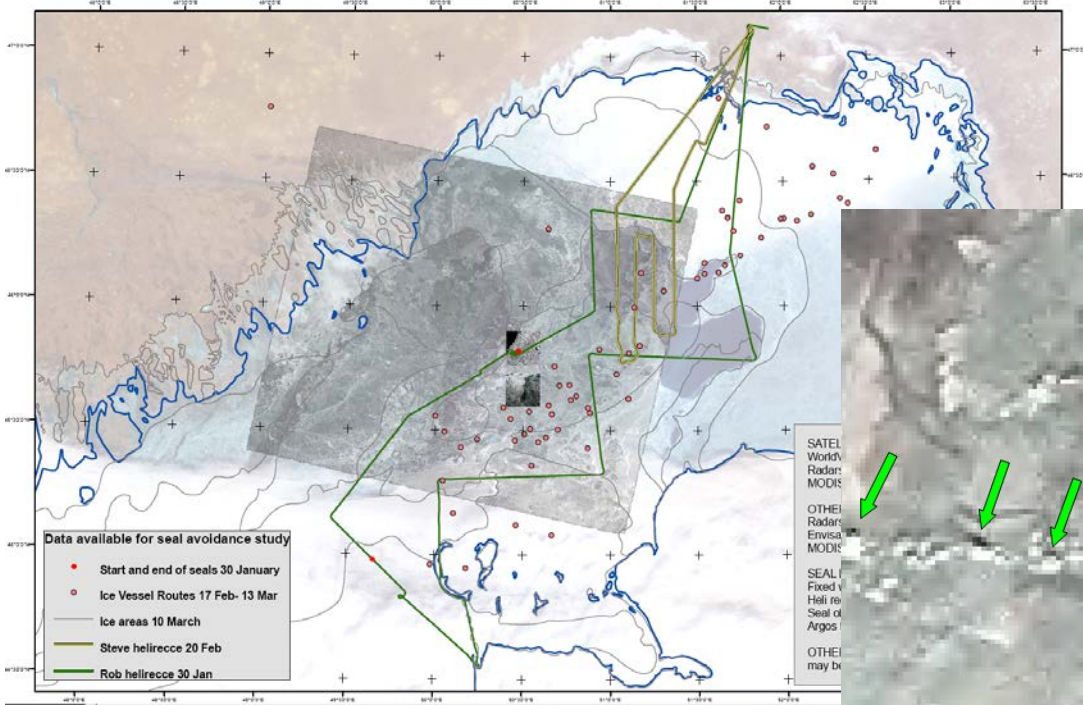
CASPIAN SEAL SURVEYS: SEAL TAGGING AND OTHER

Since 2008 till 2013 an international group of experts on the Caspian Seal survey conducted seals satellite tagging.

- Satellite-aided tracking systems for seal migration routes and feeding areas
- Analysis of fecal masses in order to study seal feeding
- Sampling of inner fluids to assess seal health
- Application of remote sensing (high-resolution satellite images) to account for seal habitat areas on ice



APPLICATION OF REMOTE SENSING TECHNIQUES



Satellite images (2X Worldview high-resolution images; 1X Radarsat) are obtained on a regular basis for up-to-date information on location of seal communities and their pups

Example of Worldview image with 50 cm resolution

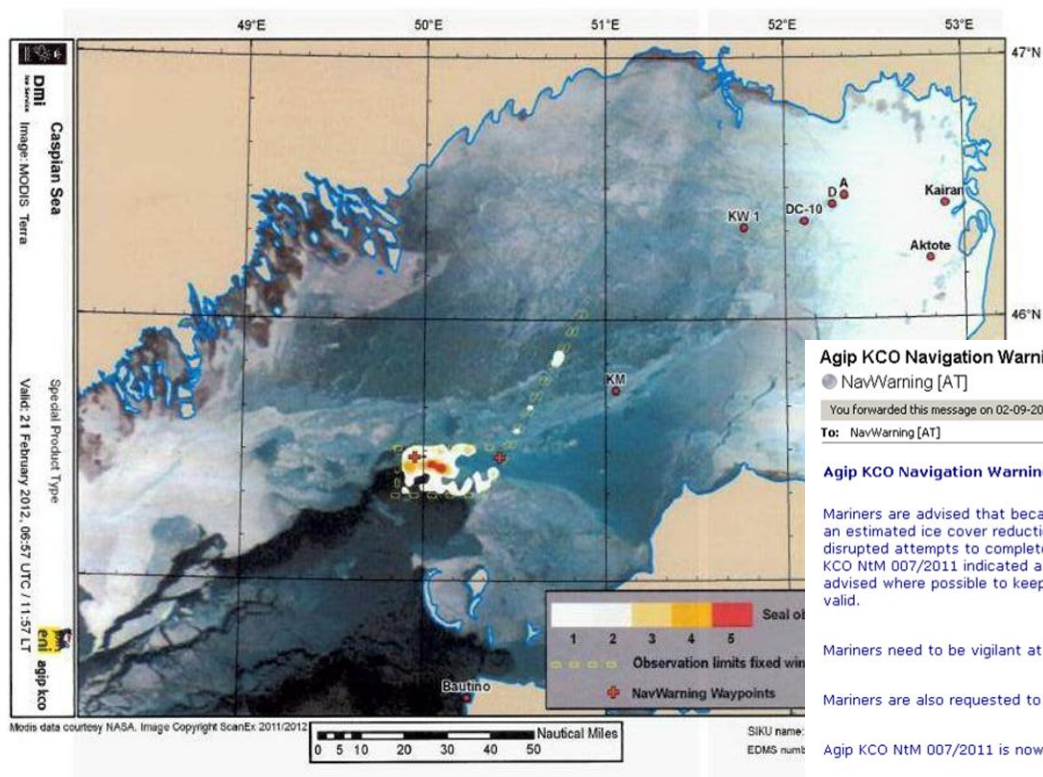
CASPIAN SEAL SURVEYS: ICEBREAKER IMPACT STUDY

Since 2005 the Company carries out icebreaker impact studies

- Identification of seals concentrations on ice
- Study of seals behaviour
- Assessment of impact of icebreaker traffic on seals population
- Training of seals watchers
- Training of ship crews
- Assessment of efficiency of measures aimed at minimizing icebreaker impact on seals population



CASPIAN SEAL PROTECTION MEASURES



Agip KCO Navigation Warning 008/2011

● NavWarning [AT]

You forwarded this message on 02-09-2011 4:58 PM.

To: NavWarning [AT]

Agip KCO Navigation Warning 008/2011 - Seal Cautionary Notification

Mariners are advised that because of recent weather events ice conditions in the North Caspian Sea have changed significantly with an estimated ice cover reduction of approximately 10,000 square kilometers in the overall area. These weather events have also disrupted attempts to complete helicopter reconnaissance of this area which assists with identification of high density seal areas. Agip KCO NtM 007/2011 indicated a line where seal density was greater to the North than to the south of this line and mariners were advised where possible to keep to the south of this line. Due to these recent weather events and ice movement this line is no longer valid.

Mariners need to be vigilant at all times when underway as seals maybe encountered anywhere along the transit route.

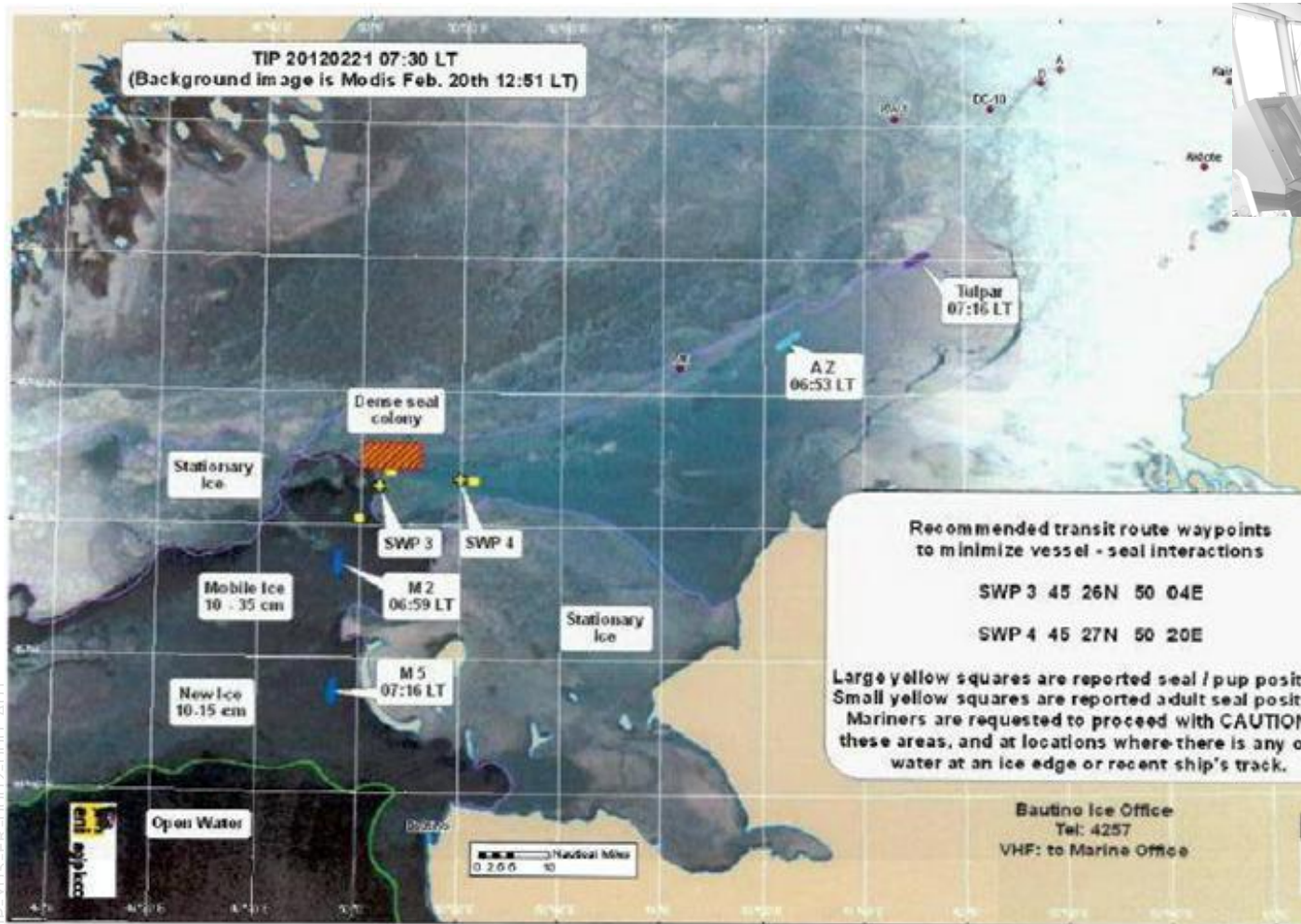
Mariners are also requested to continue with regular reporting of ice conditions and seal observation reports.

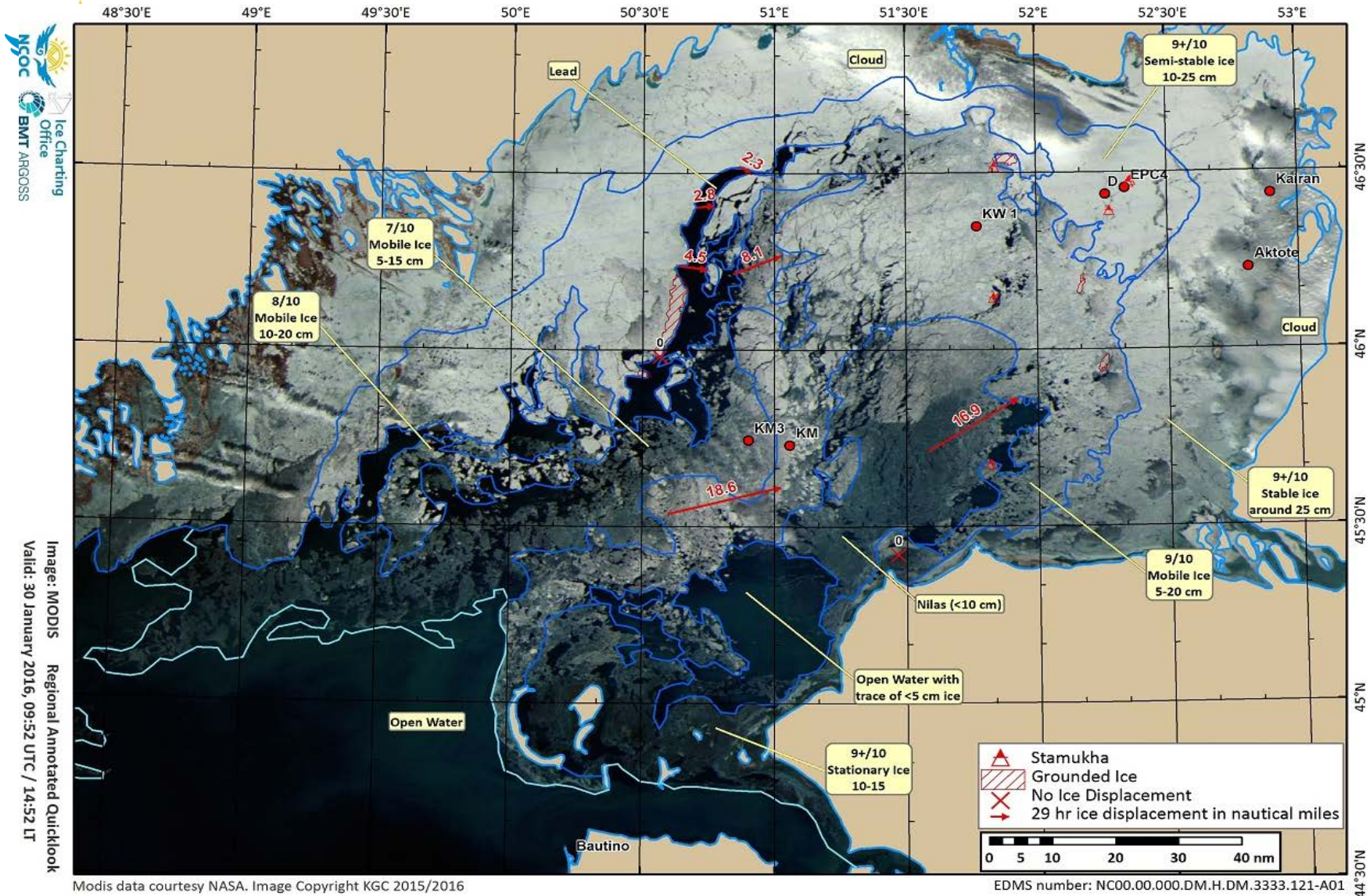
Agip KCO NtM 007/2011 is now duly cancelled

Best Regards
NavWarning Team
AKCO
e-mail NavWarning@agipkco.com

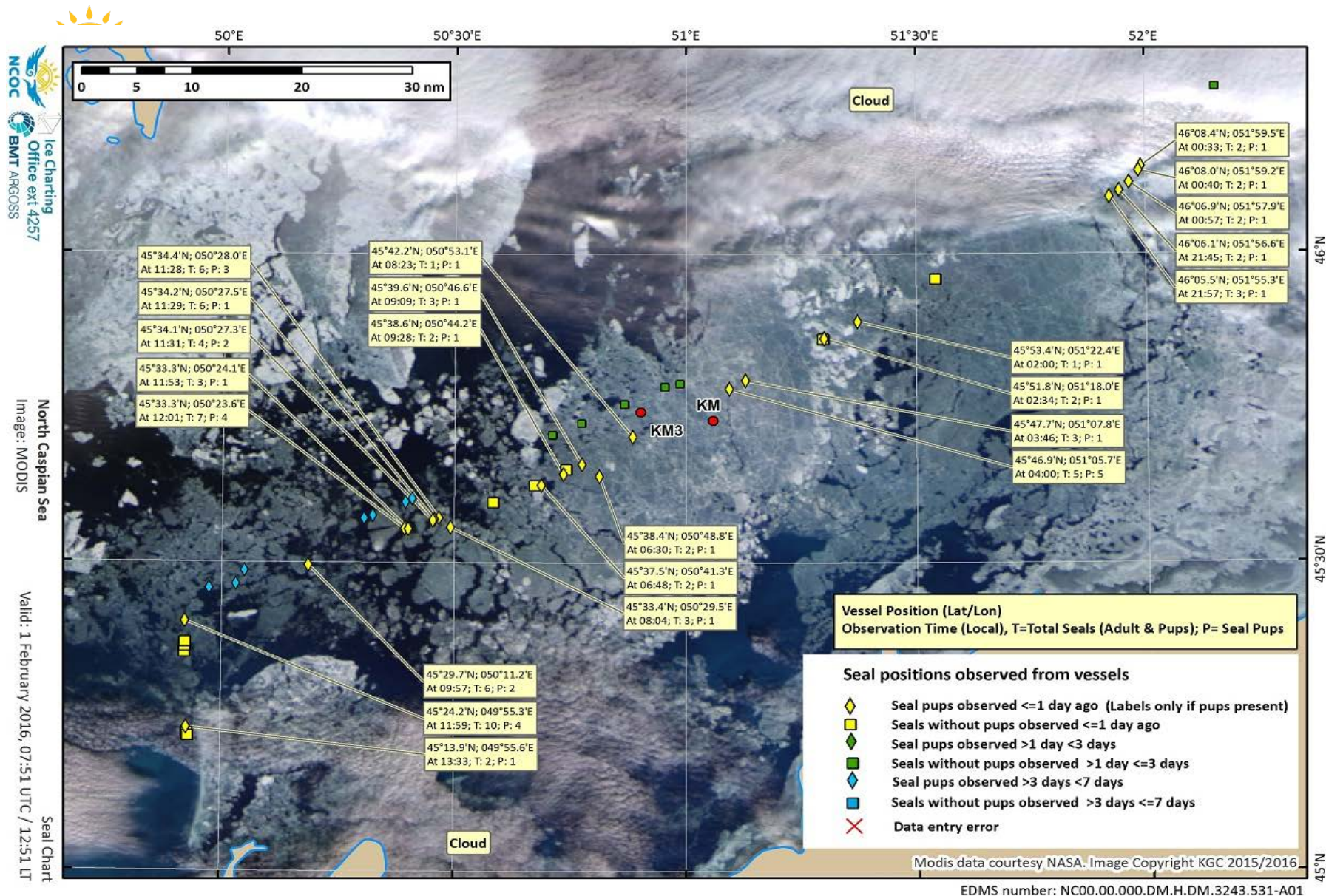
С уважением,
Группа по навигационным предупреждениям
AKCO
e-mail NavWarning@agipkco.com

CASPIAN SEAL PROTECTION MEASURES

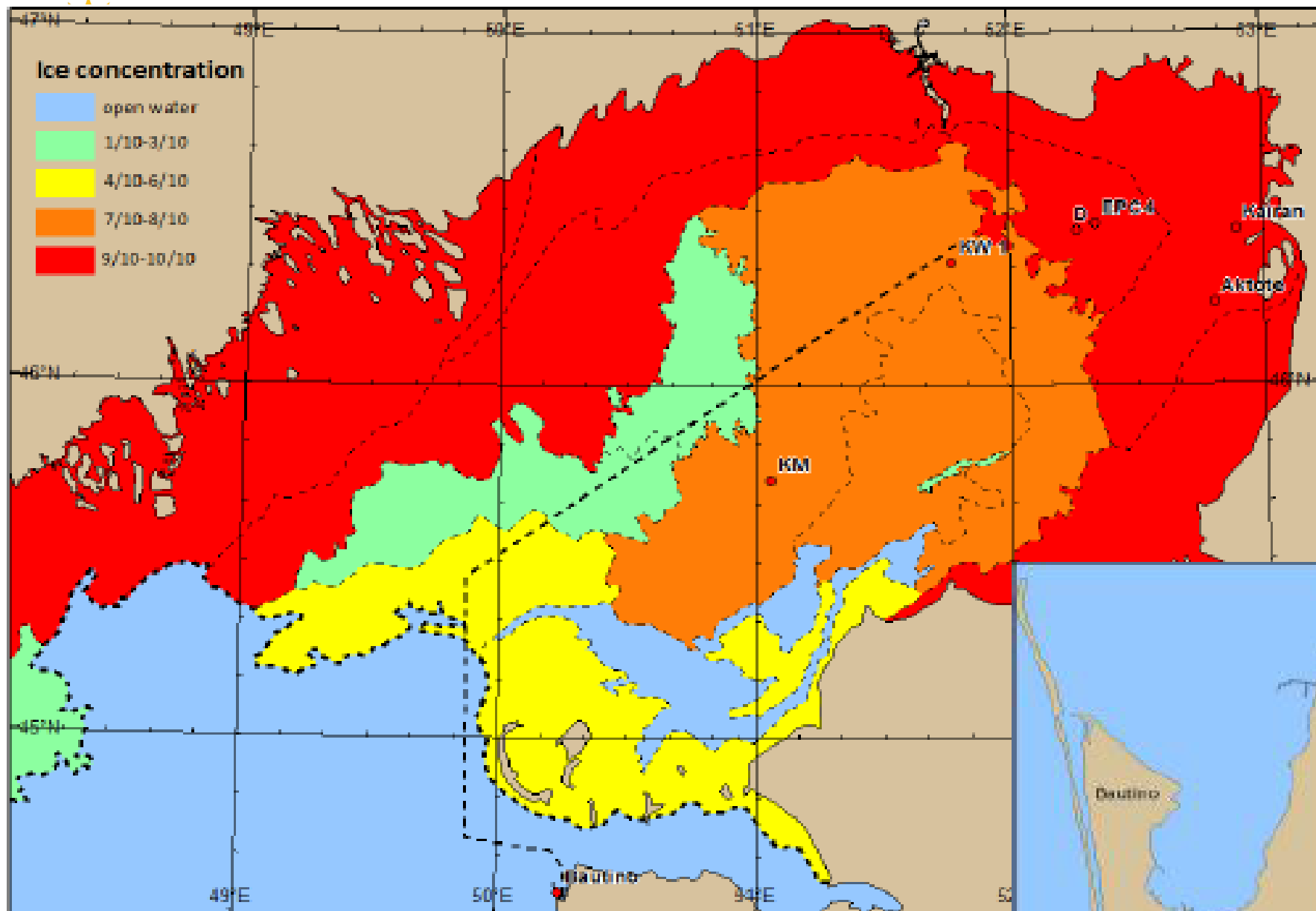




Ice cover status map. Provided daily by the Ice Conditions Team.



Icebreakers choose open water areas for their routes.



Situational map on ice conditions as of February 2, 2016.

CASPIAN SEAL PROTECTION MEASURES: USE OF THERMAL IMAGING TECHNOLOGY



**17"/19" LCD/TFT Professional Monitor
VMC-17LCD-HMPG1, VMC-19LCD-HMPG1**



IR Photo-Camera COEX™ 3000 FT has a unique compact and light design. Fixed camera is designed specially for explosion hazard zones and is used for operation in the most challenging environment in offshore oil and gas fields as well as for tanker fleet.

CASPIAN SEAL PROTECTION MEASURES: TRIAL APPLICATION OF THERMAL IMAGING TECHNOLOGY IN 2012-2013



February 21, 2013, 05-35. COEX™ 3000 FT. IR-image taken by Mangistau-5 Icebreaker (environmental temperature -5C)

IR-camera sensitivity is high, e.g.: seals at the distance of one kilometre are clearly seen on the screen, thus enabling vessels of any configuration to avoid encounters with mammals. With this possibility to detect a seal or their rookery, it is nevertheless highly recommended to enhance the night-time bridge watch by another watcher (sailor).

CASPIAN SEAL PROTECTION MEASURES OF THE COMPANY

1. Implementation and observation of the Marine Manual to avoid impact of navigation on seals.
2. Survey of seal distribution on ice during pupping season through aerial surveys (planes, helicopters), vessel reports, seal watcher reports, ice habitat identification and seal tagging.
3. Planning of icebreaker routes in order to avoid any impact on seal population. Reports received from seal watchers on board of icebreakers, helicopter survey overflights, aerial surveys help to identify breeding grounds and prepare alternate routes.
4. Before winter navigation, trainings and consultations are held with the crews in order to raise their awareness on safe navigation for seals.
5. Training workshops are conducted in order to inform captains and ship crews on biological peculiarities of seals and measures which contribute to minimize impact on the Caspian Sea environment.
6. Instructions by the ice conditions specialists before vessel sailing. Crews are provided with full details on the route and areas of seal density.
7. On-line exchange of information on seal distribution on ice between the vessel crews.
8. Routing of vessels away from potential seal colonies by sending real time navigation warnings to all vessels

NCSPSA VENTURE CASPIAN SEAL PROTECTION MEASURES

- 7. Vessels to be slowed/manoeuvred if seals are identified in proximity or deemed to be at risk**
- 8. Having qualified seal watchers to register seal behaviour and any seals congregations near vessels, issuing warnings to the captain and vessel crew on the proximity of seals and discussing possible seal avoidance techniques**
- 9. Use of IR thermal imaging cameras on icebreakers for early detection of seal colonies en route**



THANK YOU FOR YOUR ATTENTION!