

Tracking red-throated divers through the annual cycle using satellite telemetry

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Study objectives

- Temporal and spatial distribution of wintering divers
- Use of existing SPAs and identification of new important areas
- Seasonal migrations and areas of origin



Bird captures

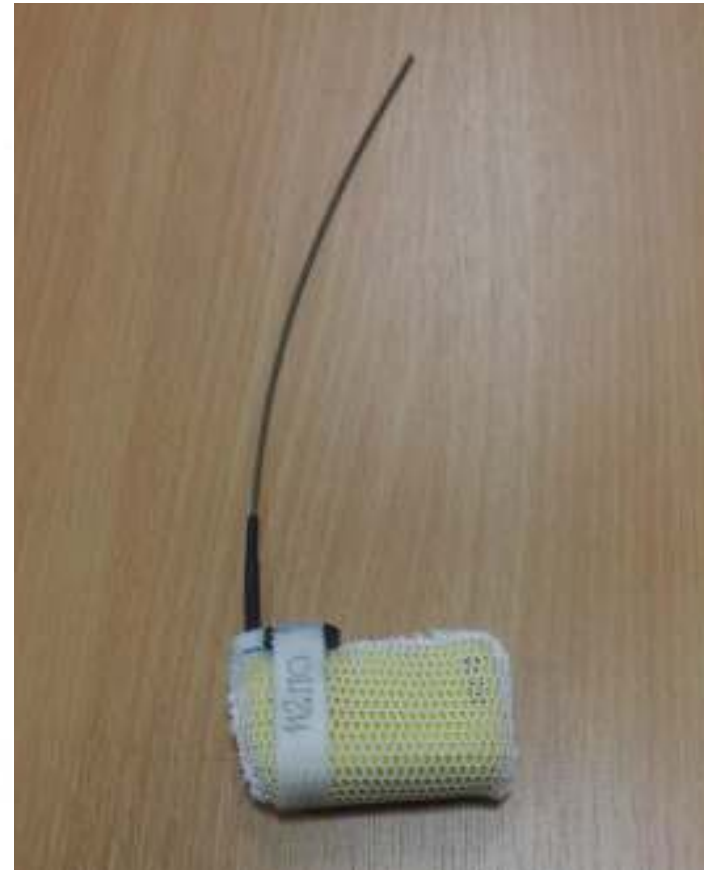
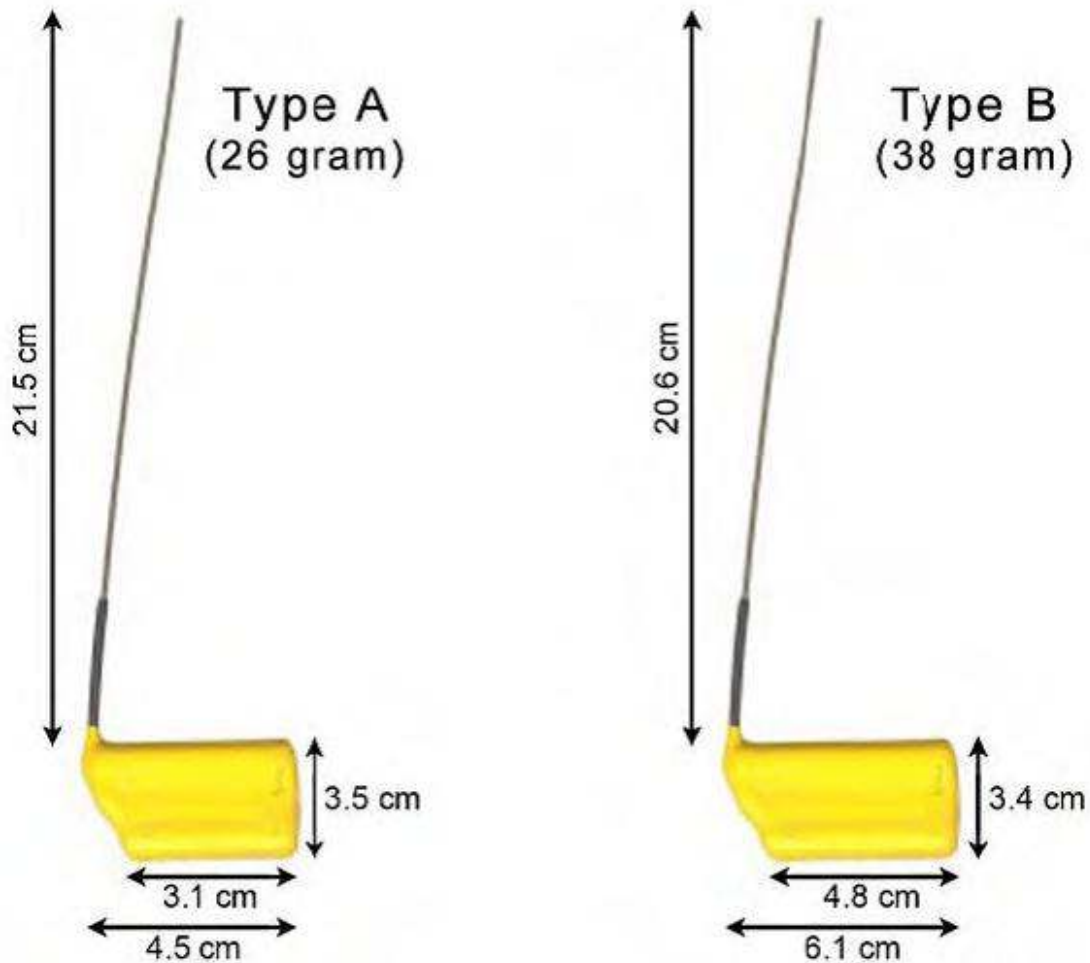


Bird captures



Transmitters

Implantable PTT-100 by Microwave Telemetry, Inc.



Transmitter implanting



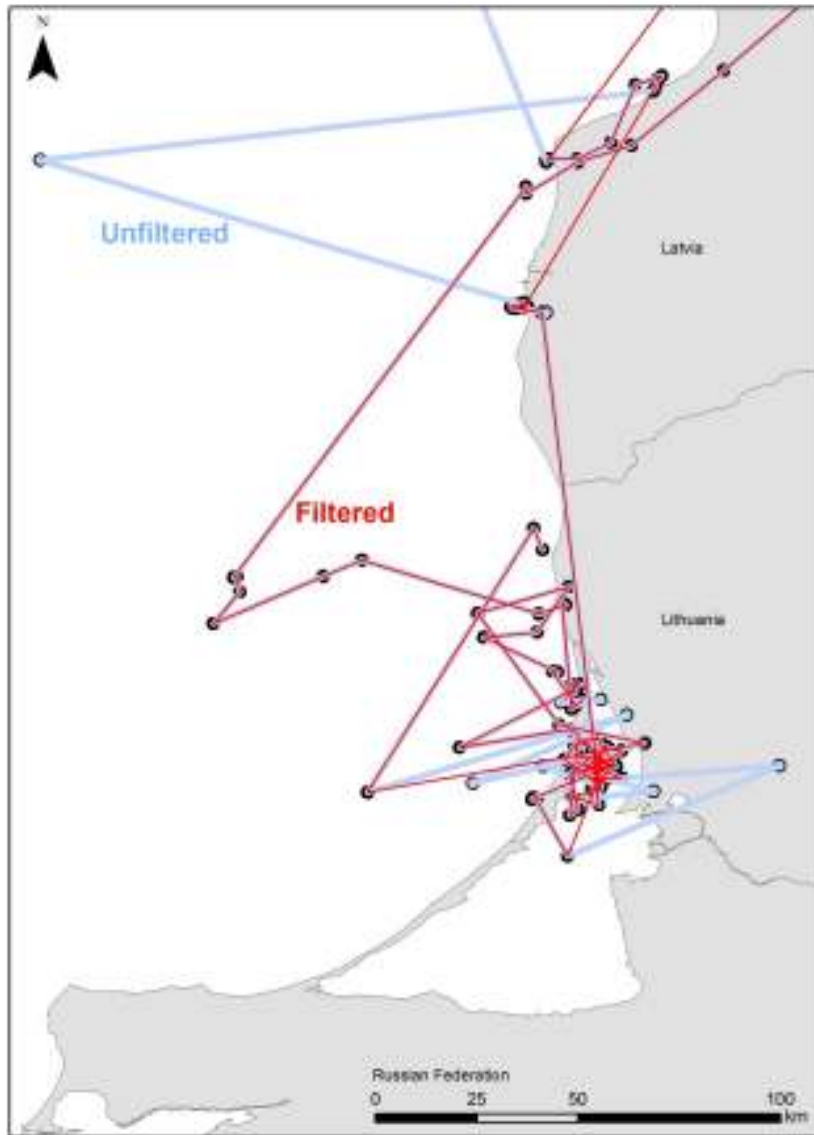
Bird release



Once birds are out - we sit back and relax

The screenshot displays the ArgosWeb web application in Mozilla Firefox. The browser address bar shows the URL `https://argos-system.cls.fr/cwi/Consult/Map/MapMsgData.do`. The interface includes a navigation menu on the left with options like 'Mapping', 'Messages', and 'Account Activity'. The main content area features a 'Data filter' section with dropdown menus for 'Platform' (set to 'All') and 'Time frame' (set to 'For n day(s)'), along with a 'Location class' input field and a 'Search' button. Below the filters is a map of the Arctic region, showing several bird tracking paths in red. The paths are labeled with identification numbers such as 112108, 112103, and 112116. The map includes geographical labels like 'Belkovo', 'Воскресенск', 'Хре Тобой', 'Пильня', 'Бол. Торавэй', 'Мал. Торавэй', 'Шведский', 'Черная', and 'Сындото'. A scale bar at the bottom right of the map indicates 35 km. The map's coordinates are displayed as 'Latitude: 68.48987174916361' and 'Longitude: 61.21860159968272'. The Windows taskbar at the bottom shows various application icons and the system clock indicating 11:49 PM on 09/19/2013. Three beer bottles are placed around the screenshot: one at the bottom left, one on the right side, and one at the bottom right.

Bird survival, data volume, filtering



Number of tagged divers: 9

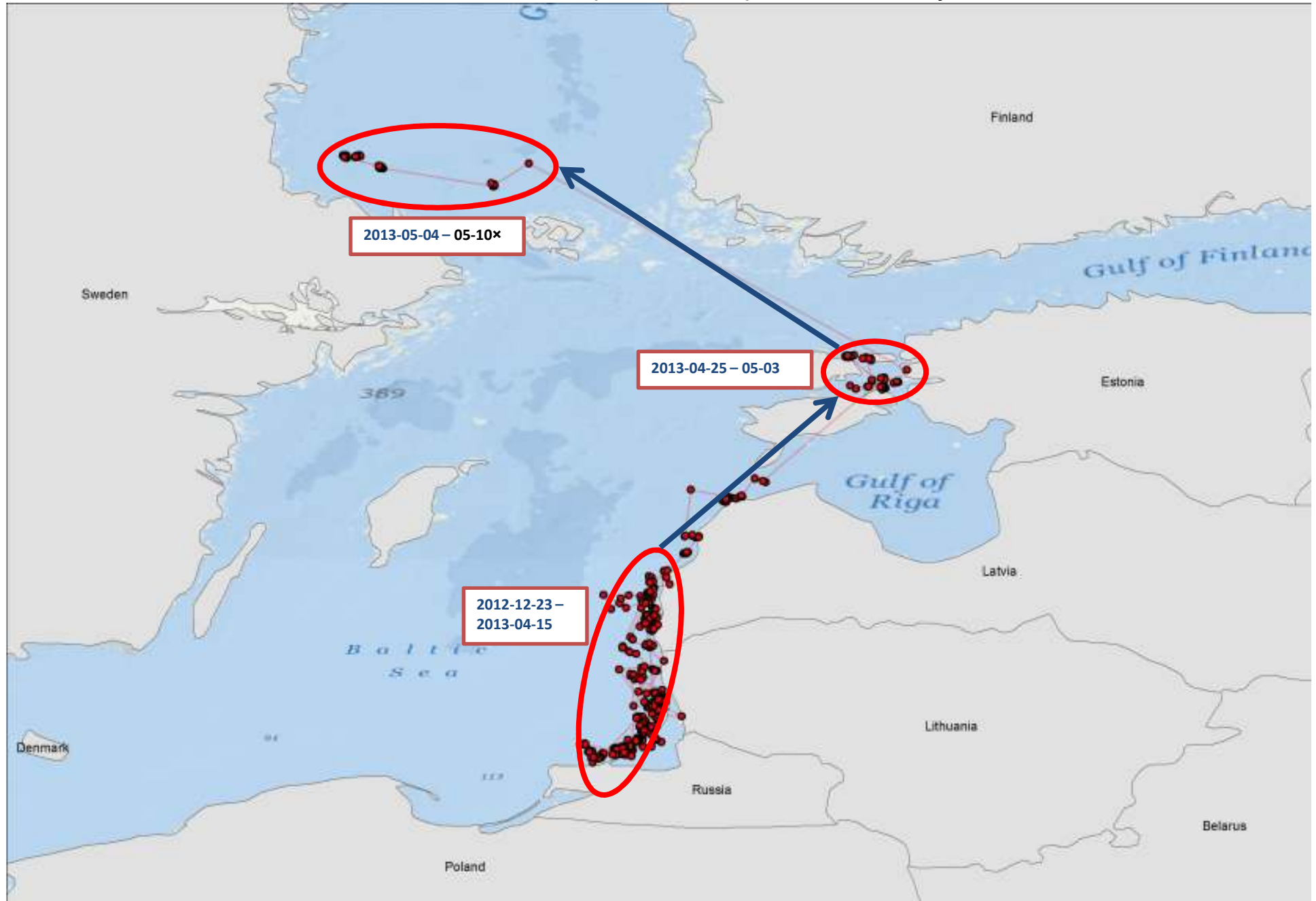
Number of tracked birds: 6

Number of location fixes: 6511

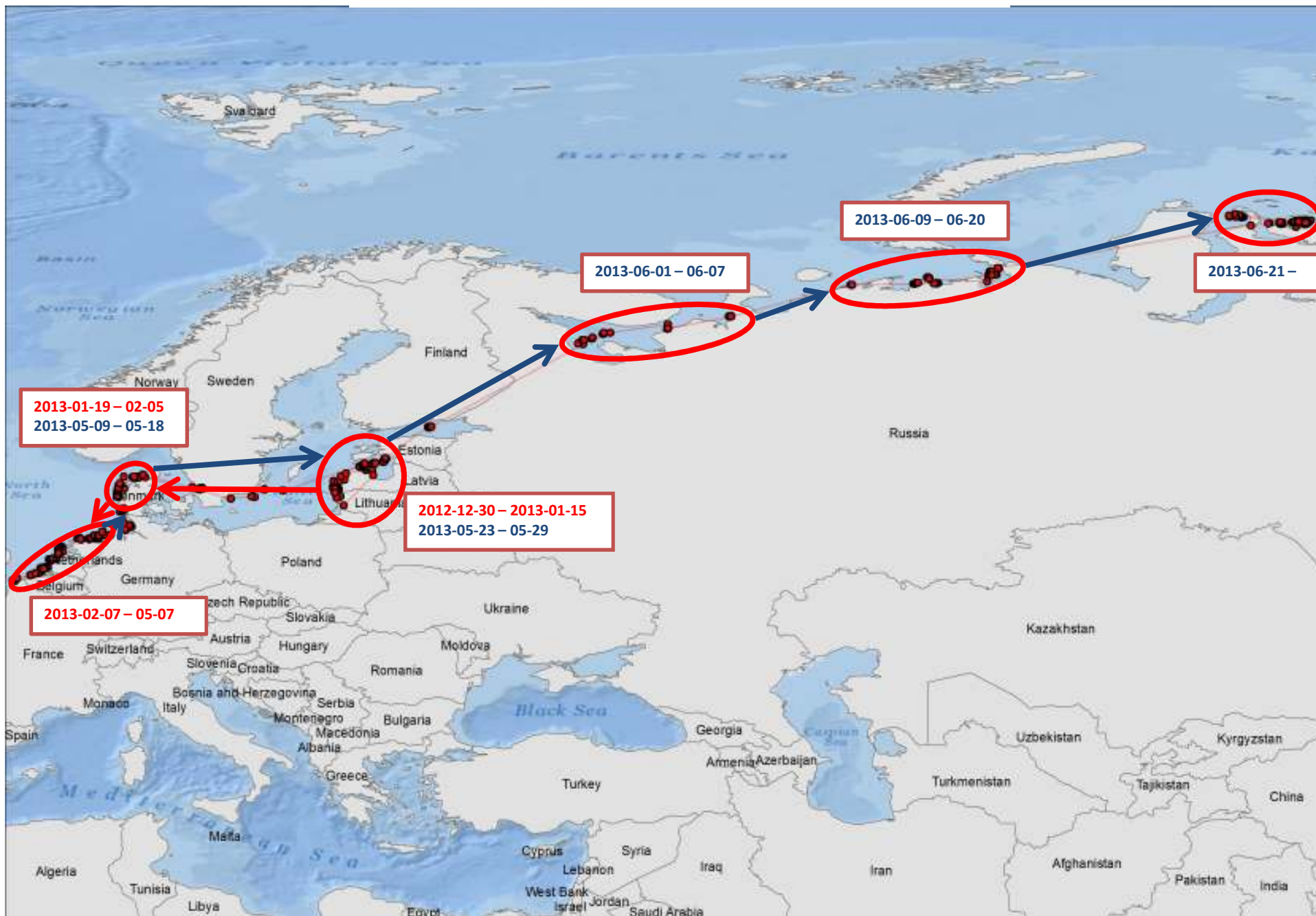
Number of fixes after filtering: 6032

Q class	N	%
Z	3	0 %
B	2417	40 %
A	989	16 %
0	290	5 %
1	518	9 %
2	837	14 %
3	978	16 %

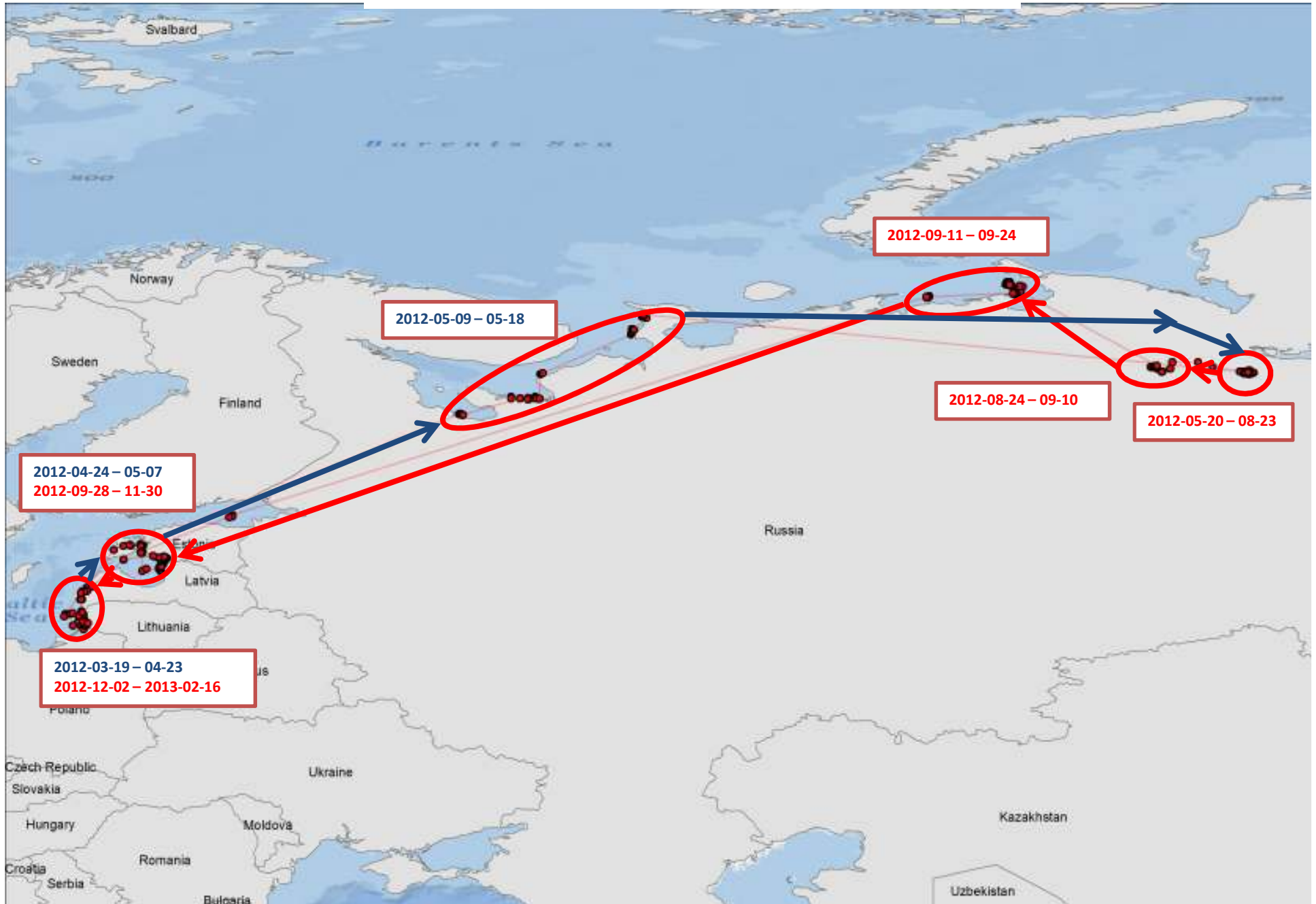
Red-throated Diver (*Gavia stellata*) – ID112100, M 2y



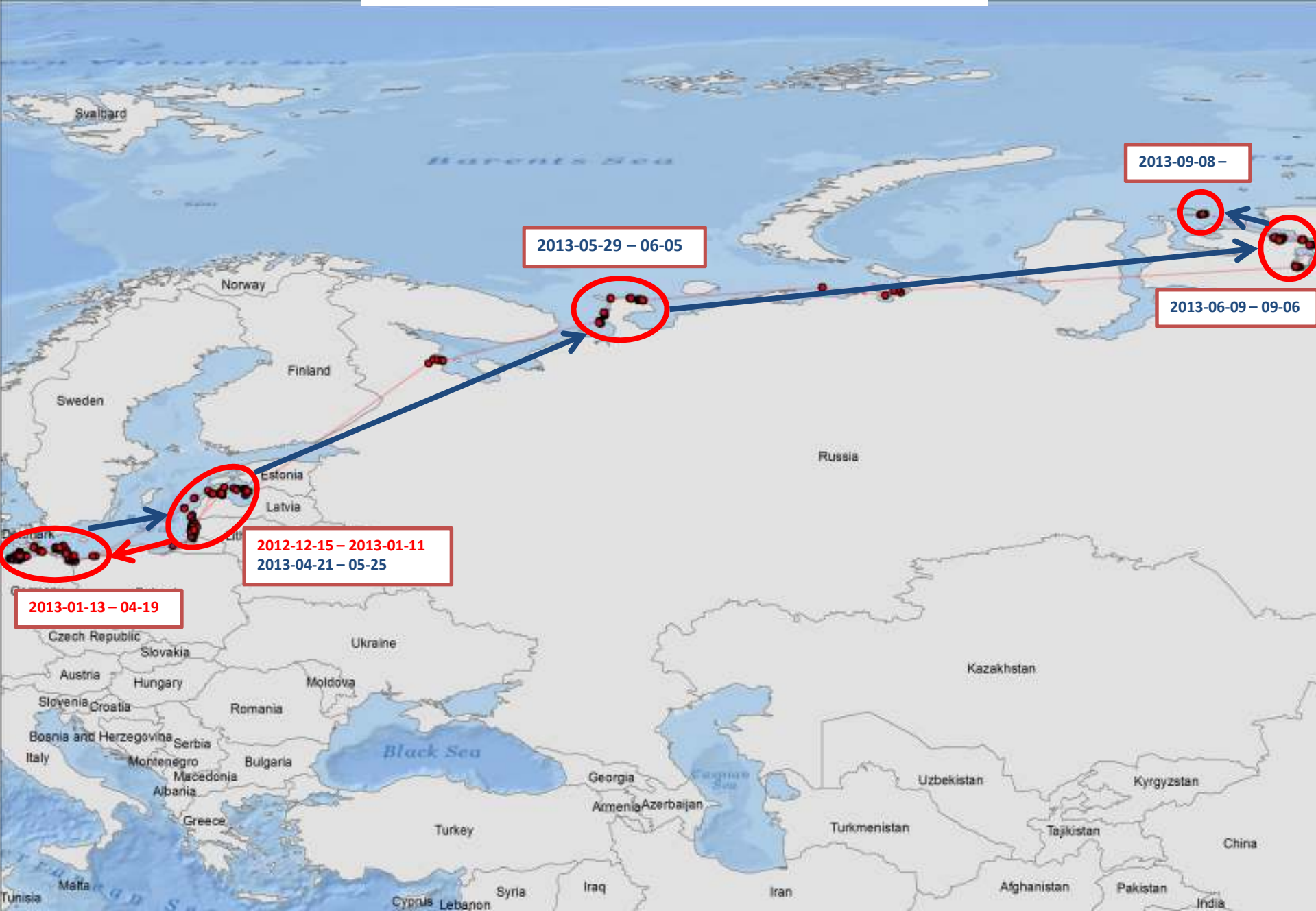
Red-throated Diver (*Gavia stellata*) – ID112110, F 3y+



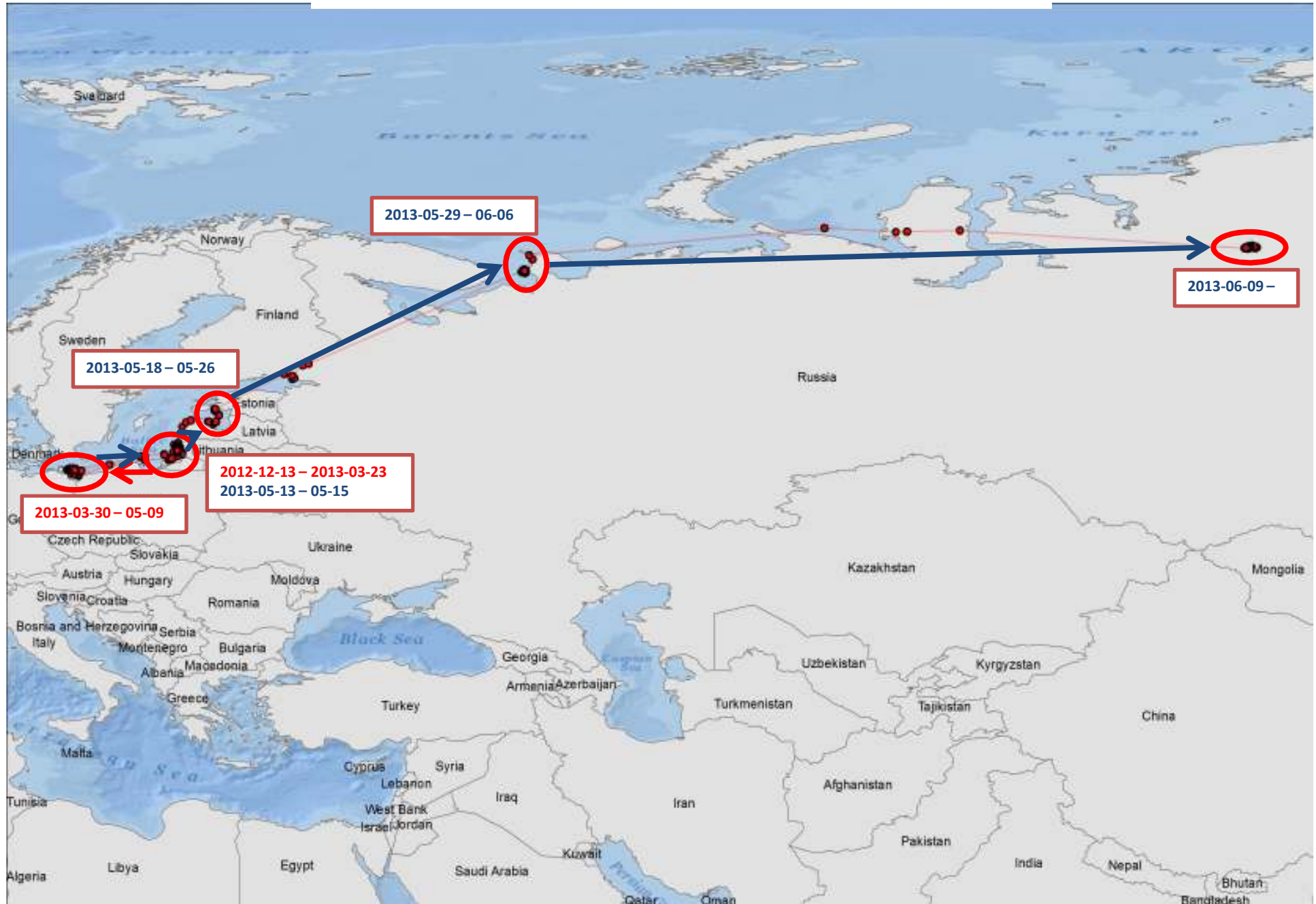
Red-throated Diver (*Gavia stellata*) – ID112113, M 3y+



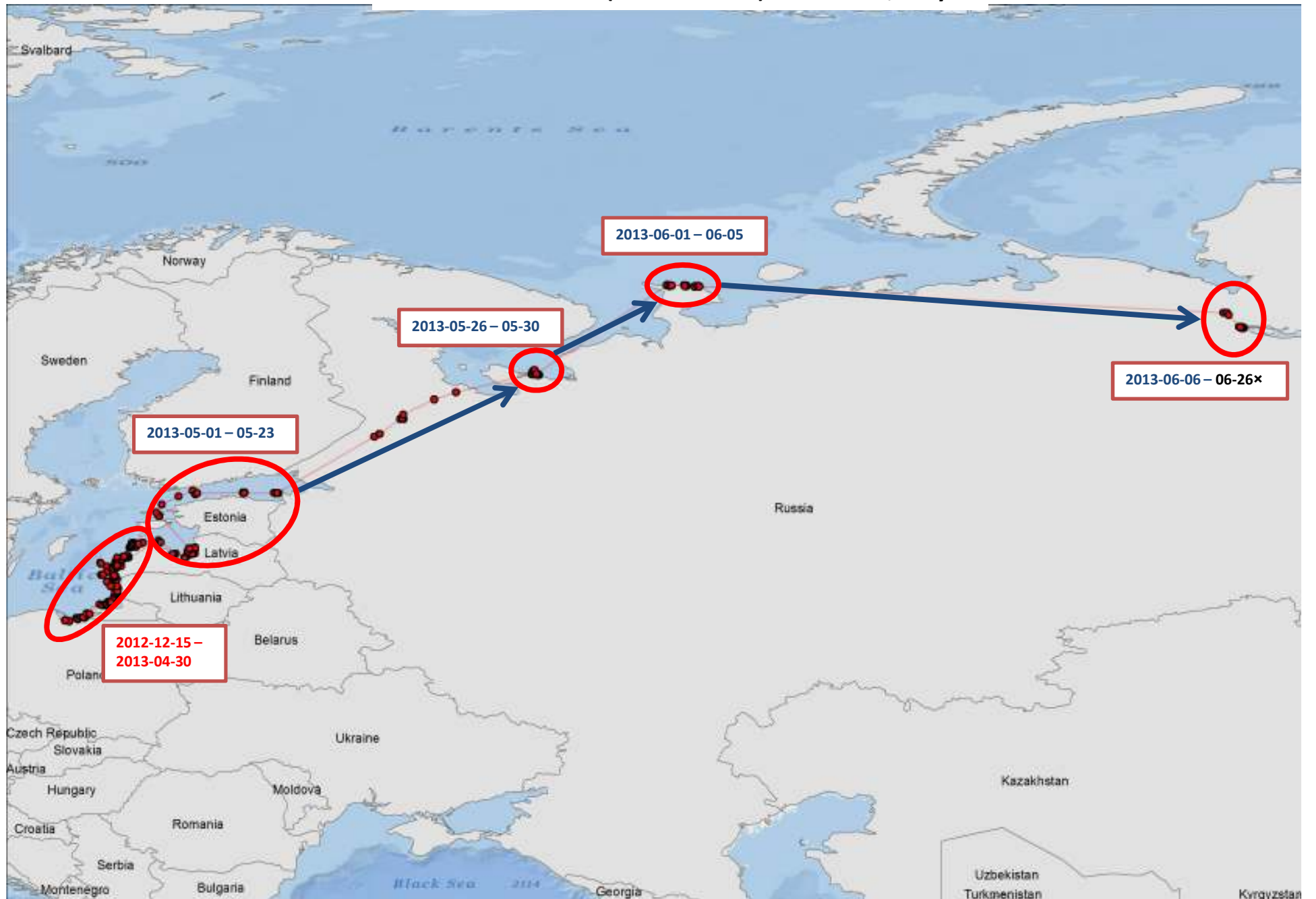
Red-throated Diver (*Gavia stellata*) – ID112114, F 3y+



Red-throated Diver (*Gavia stellata*) – ID112117, F 2y+

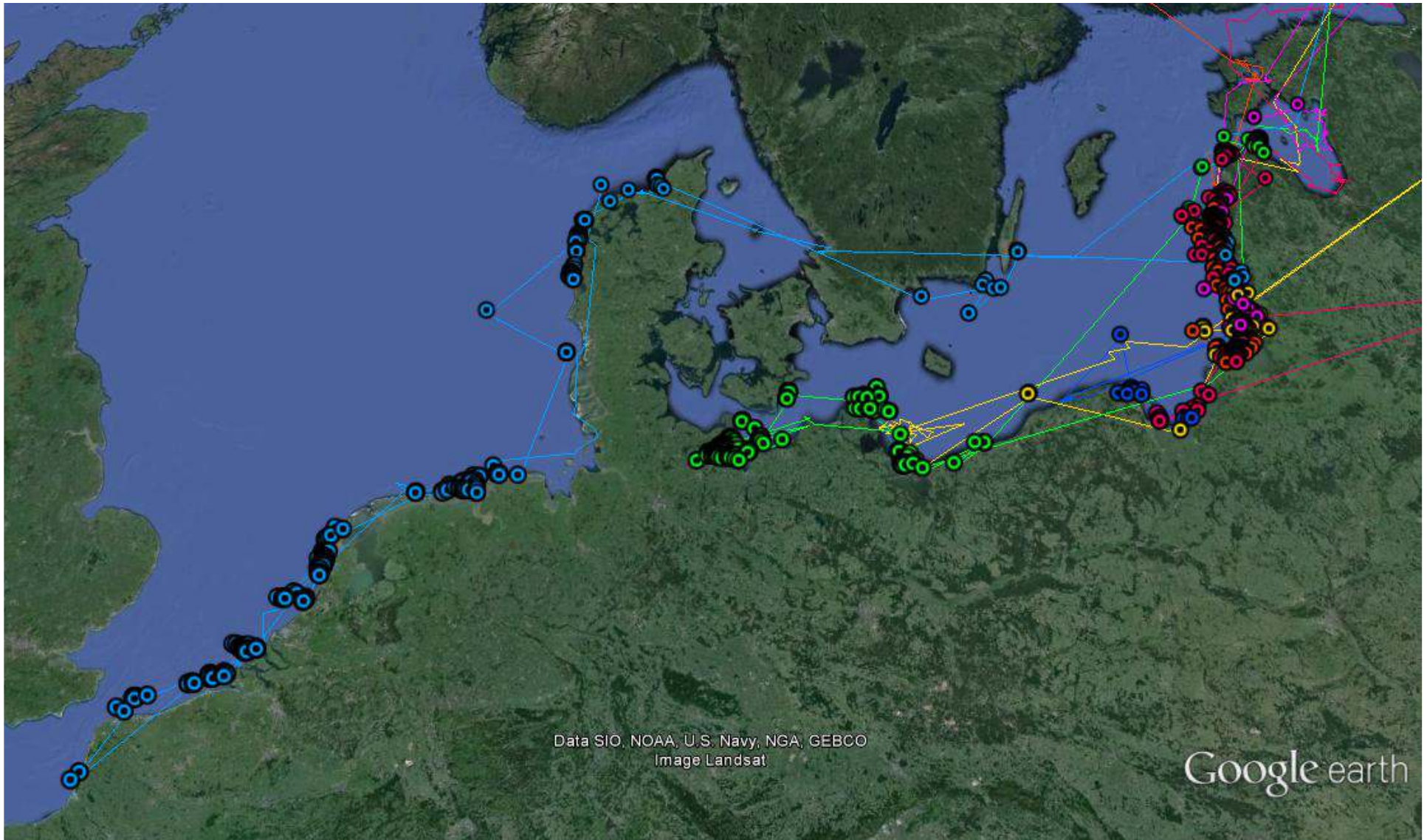


Red-throated Diver (*Gavia stellata*) – ID112118, F 3y+



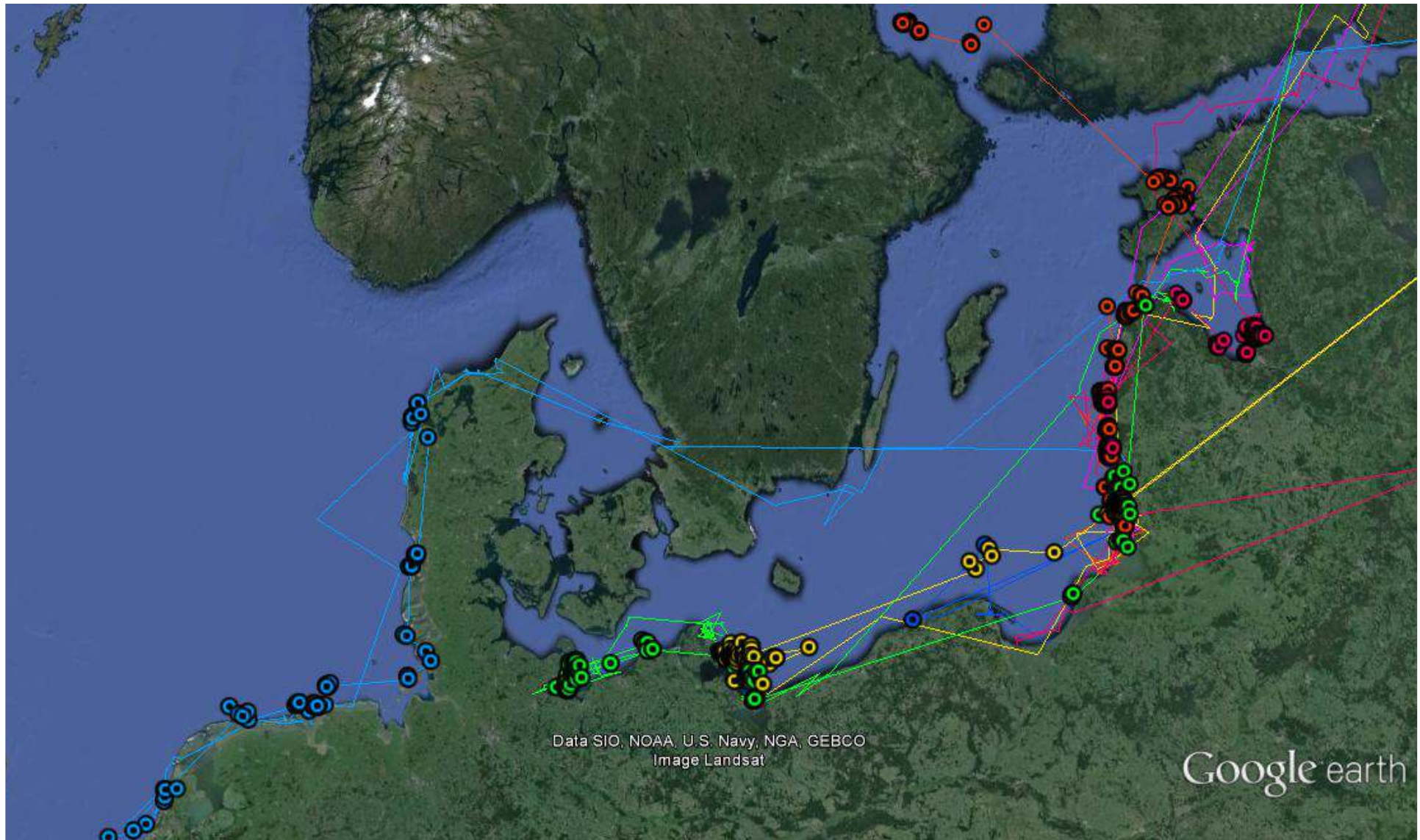
Tracking summary: winter

Nov–March: *move widely, use several wintering sites*



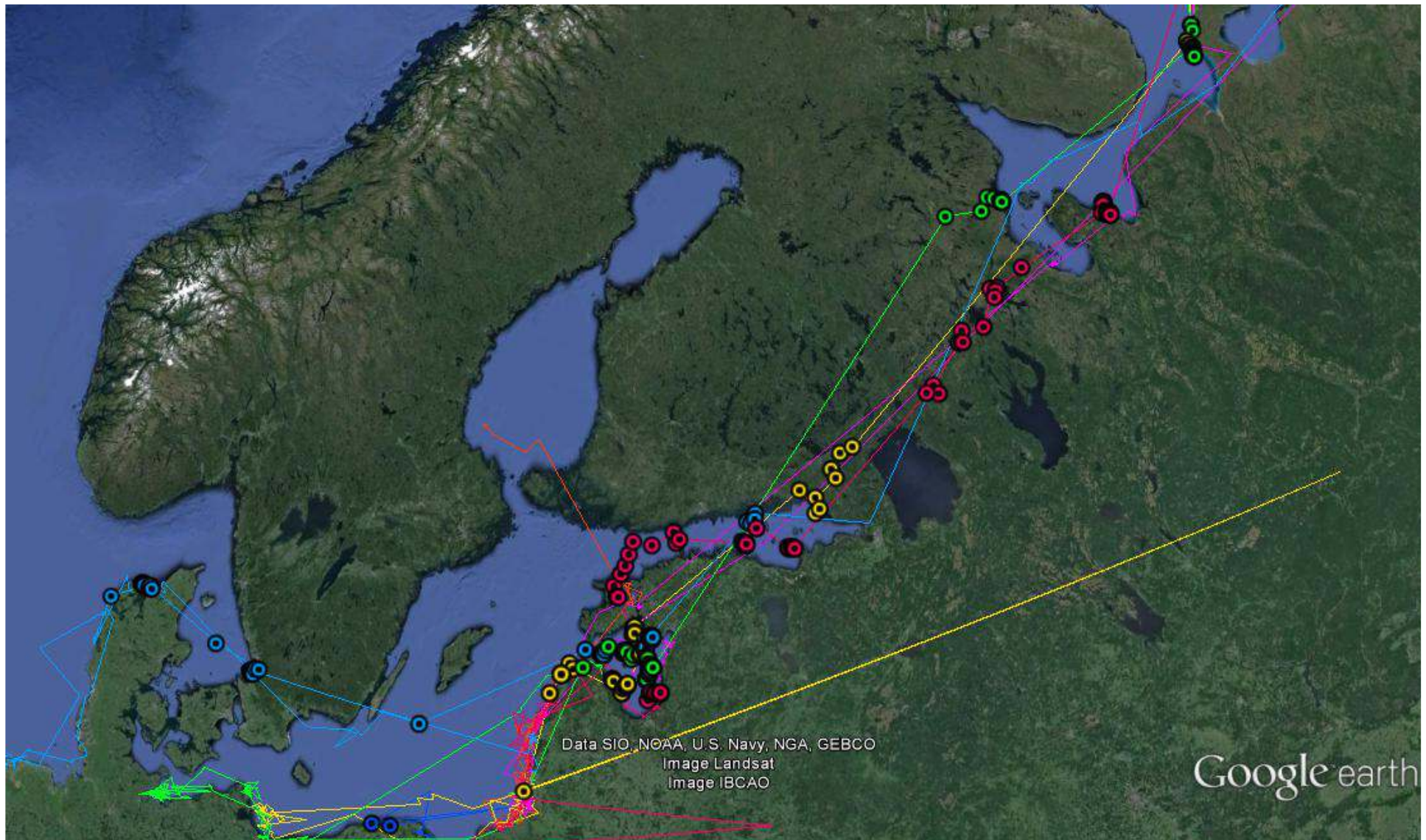
Tracking summary: spring-1

Apr-1–May-15: *still on wintering sites, start crawling NE*



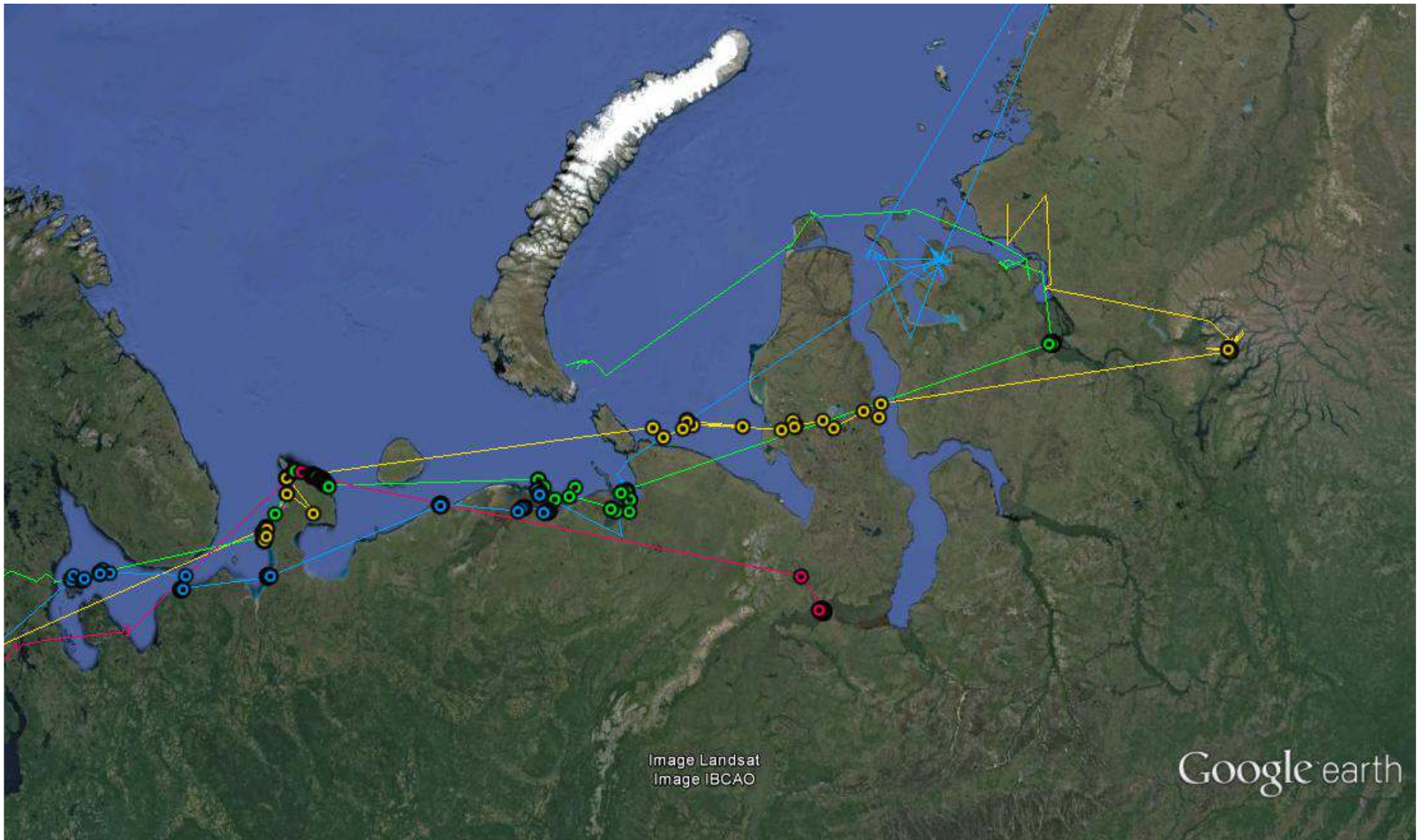
Tracking summary: spring-2

May15-31: *Moving fast northwards*

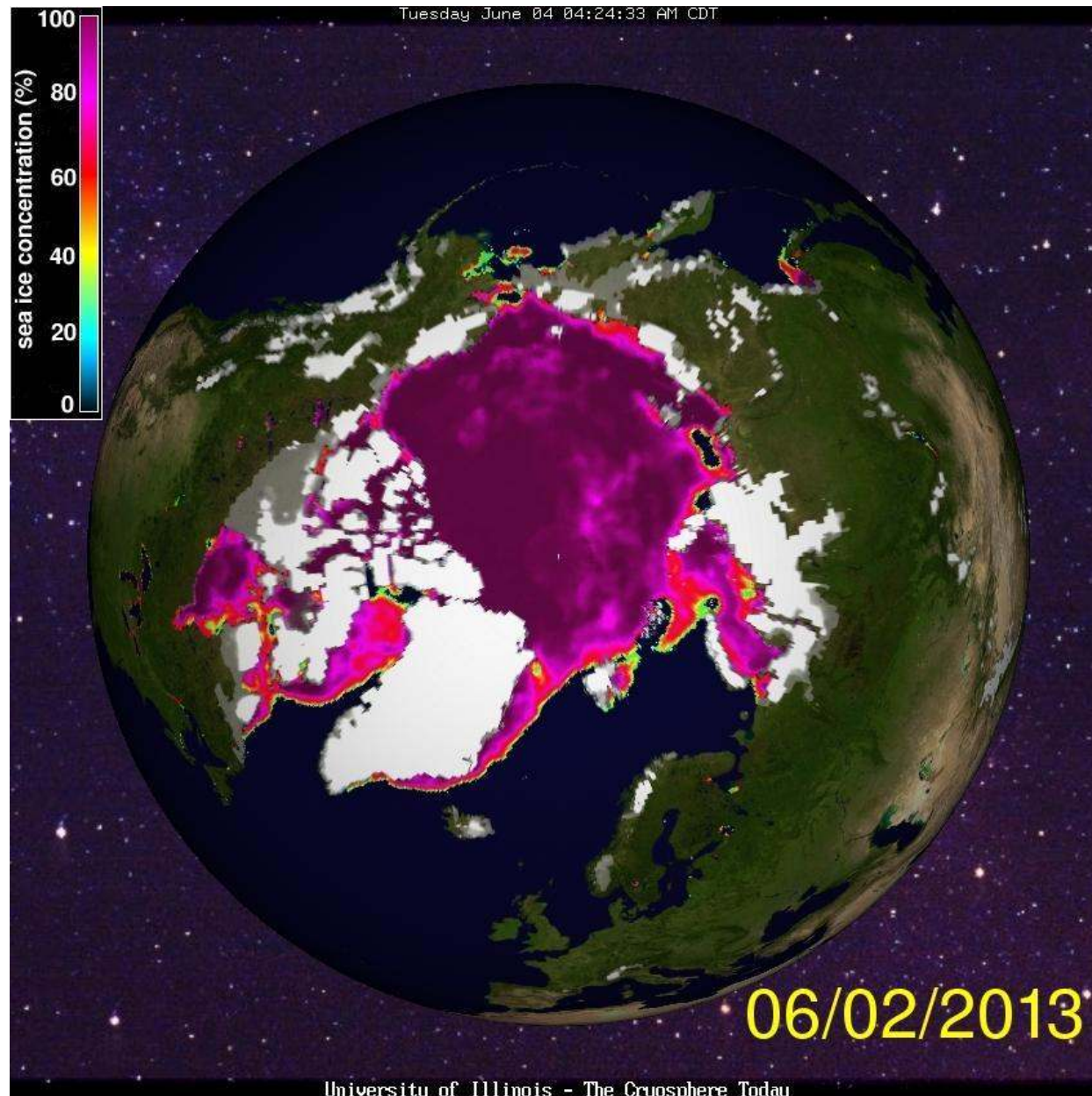


Tracking summary: spring-3

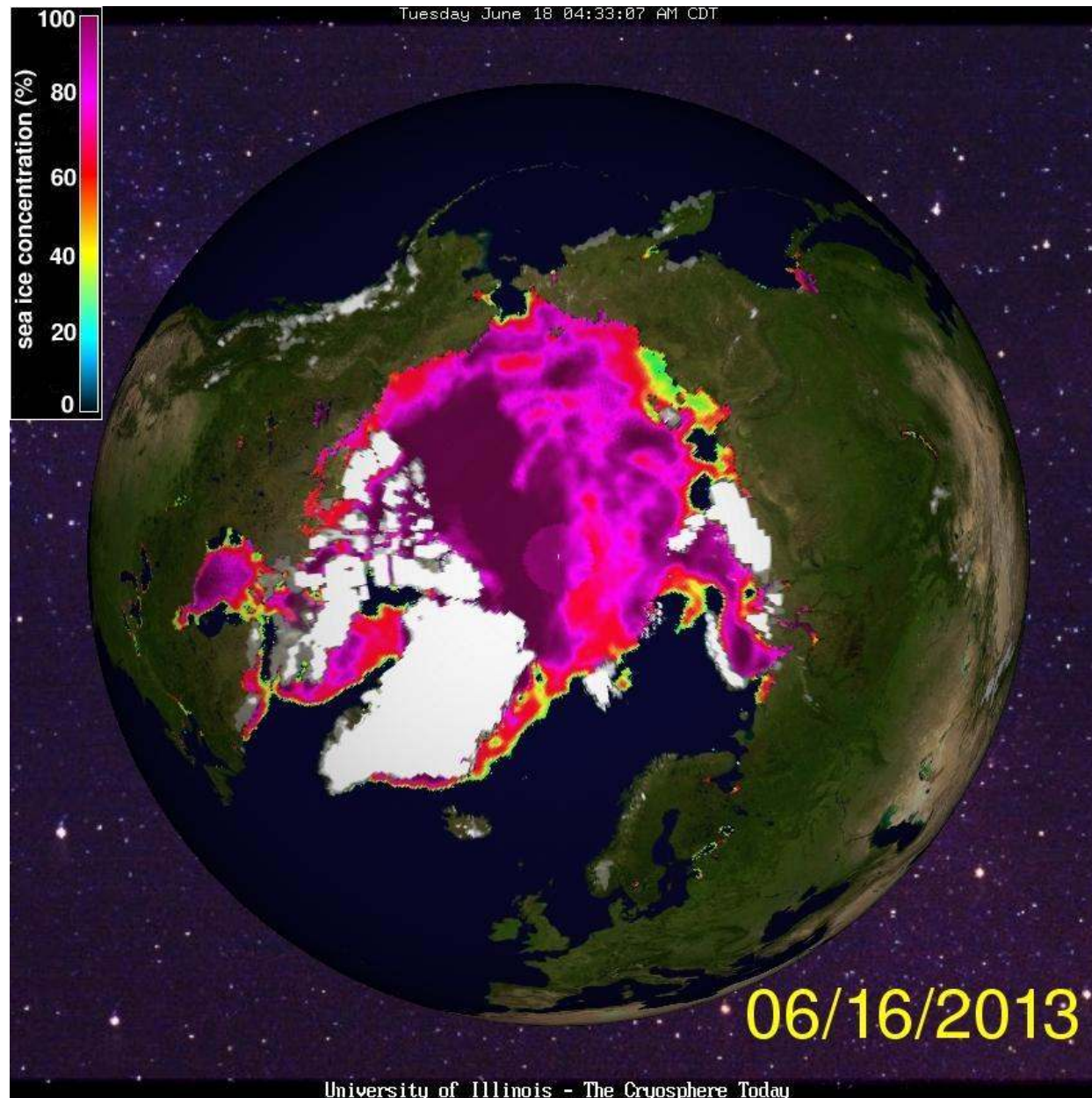
June 1-15: *reaching the Arctic and settling*



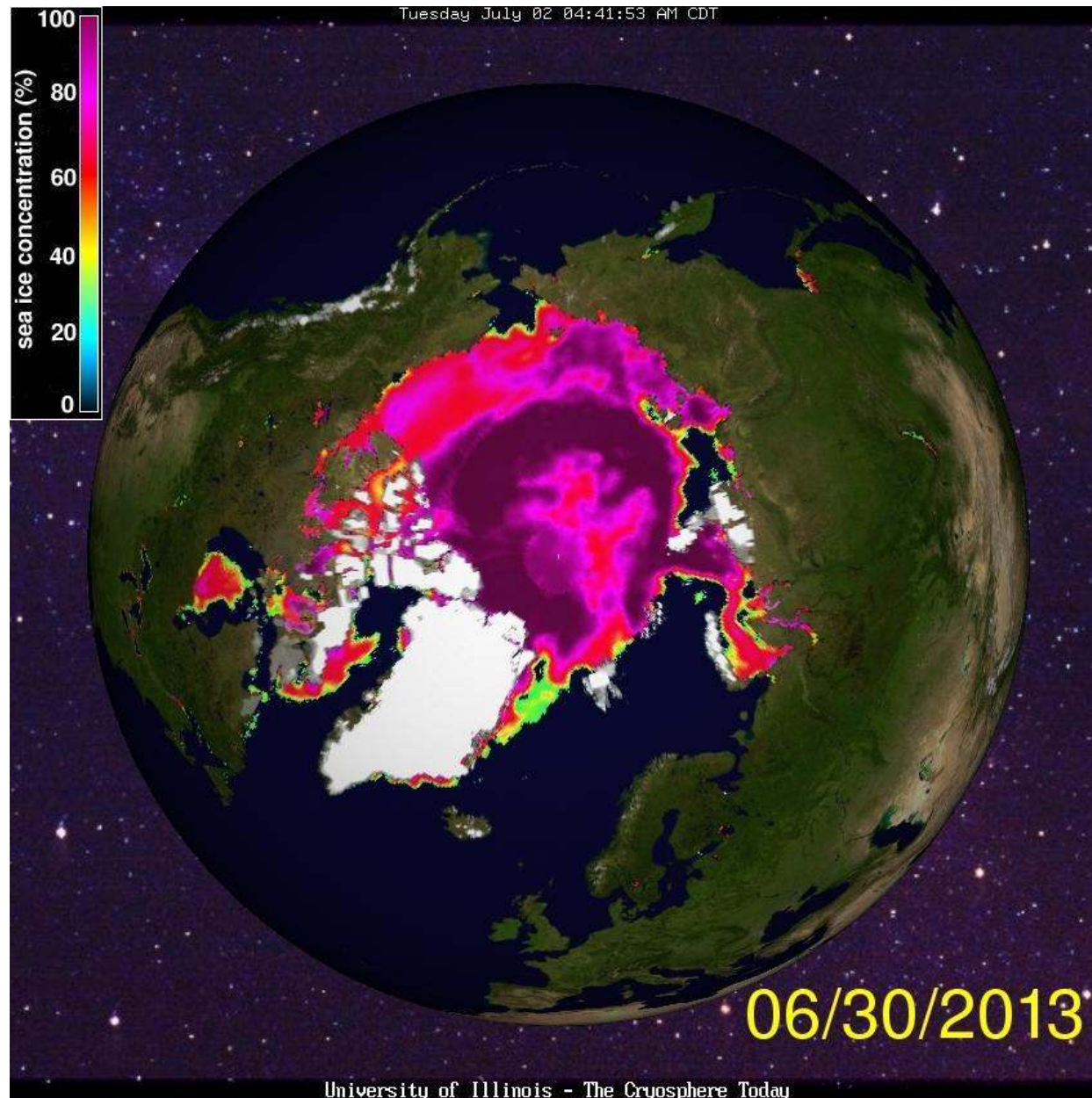
Detour to Arctic ice in 2013



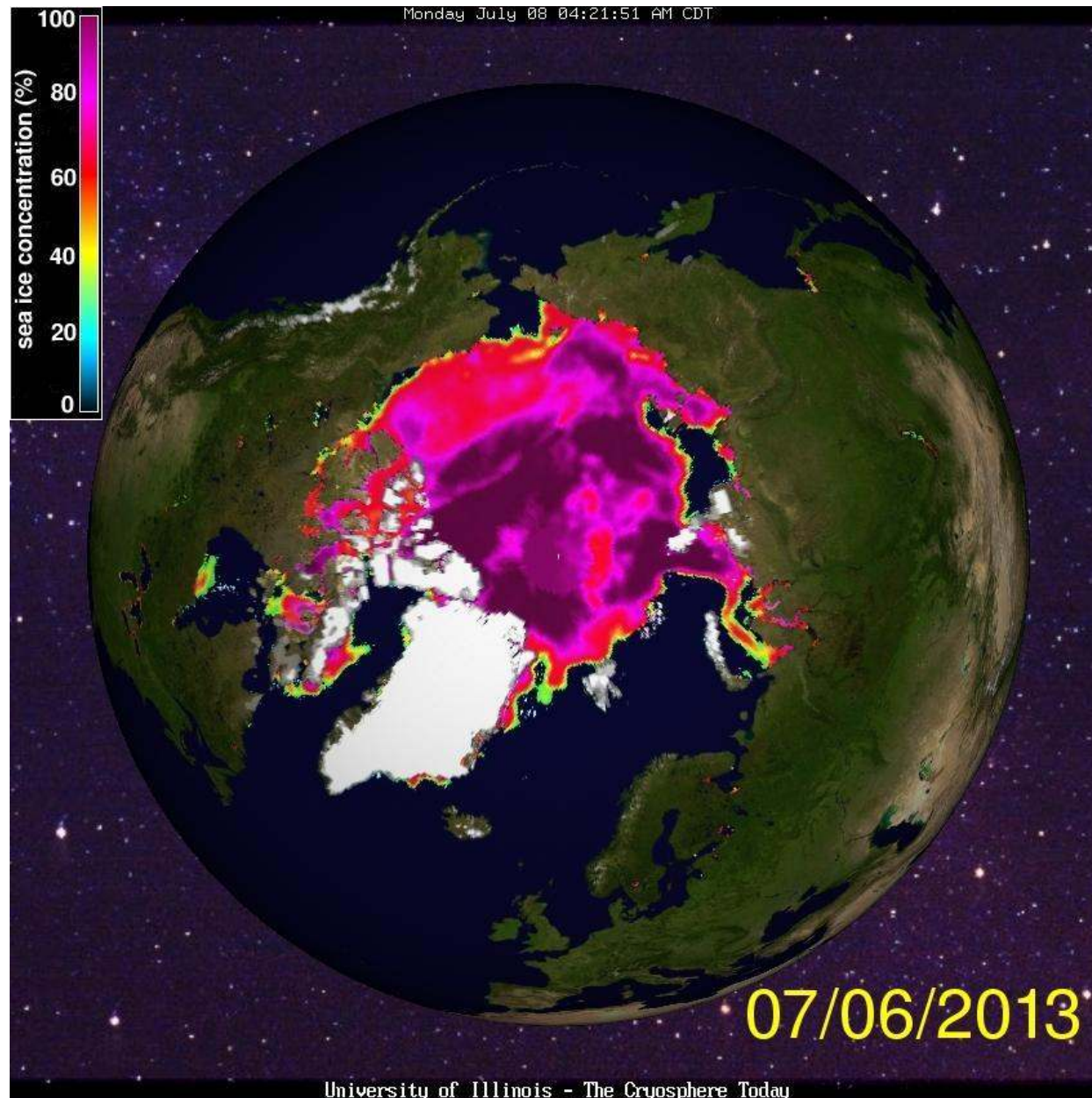
Detour to Arctic ice in 2013



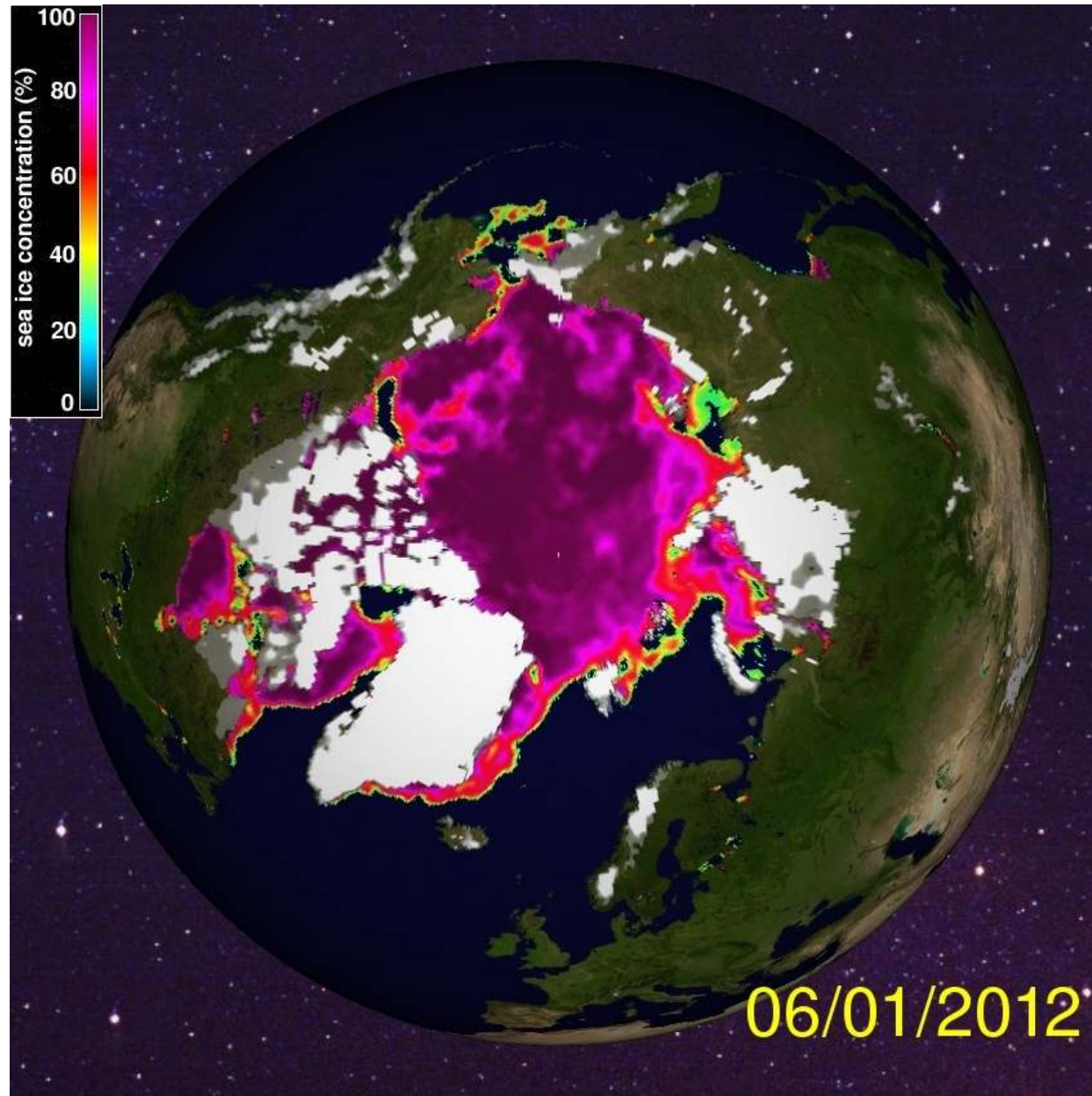
Detour to Arctic ice in 2013



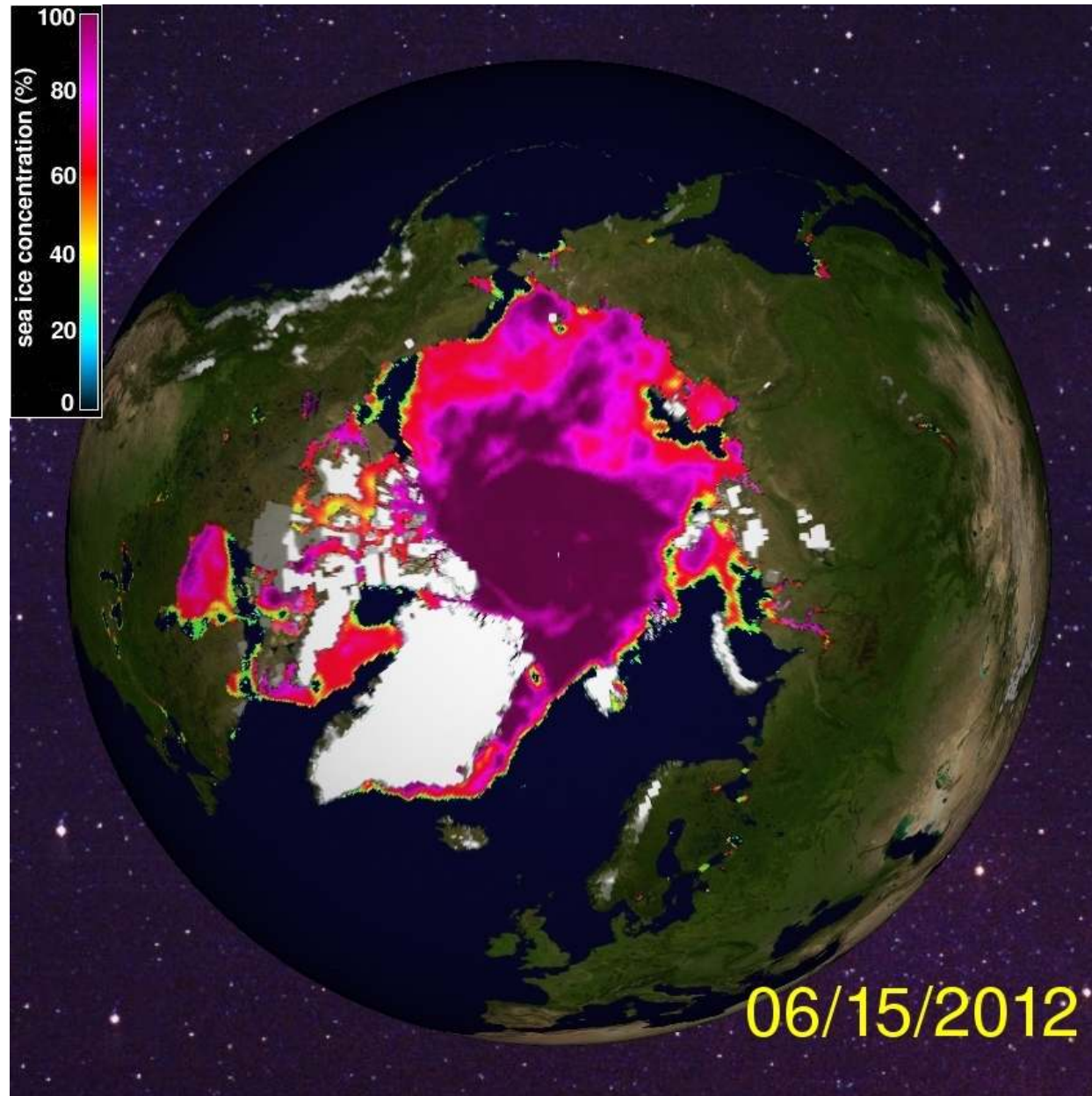
Detour to Arctic ice in 2013



Detour to Arctic ice in 2012

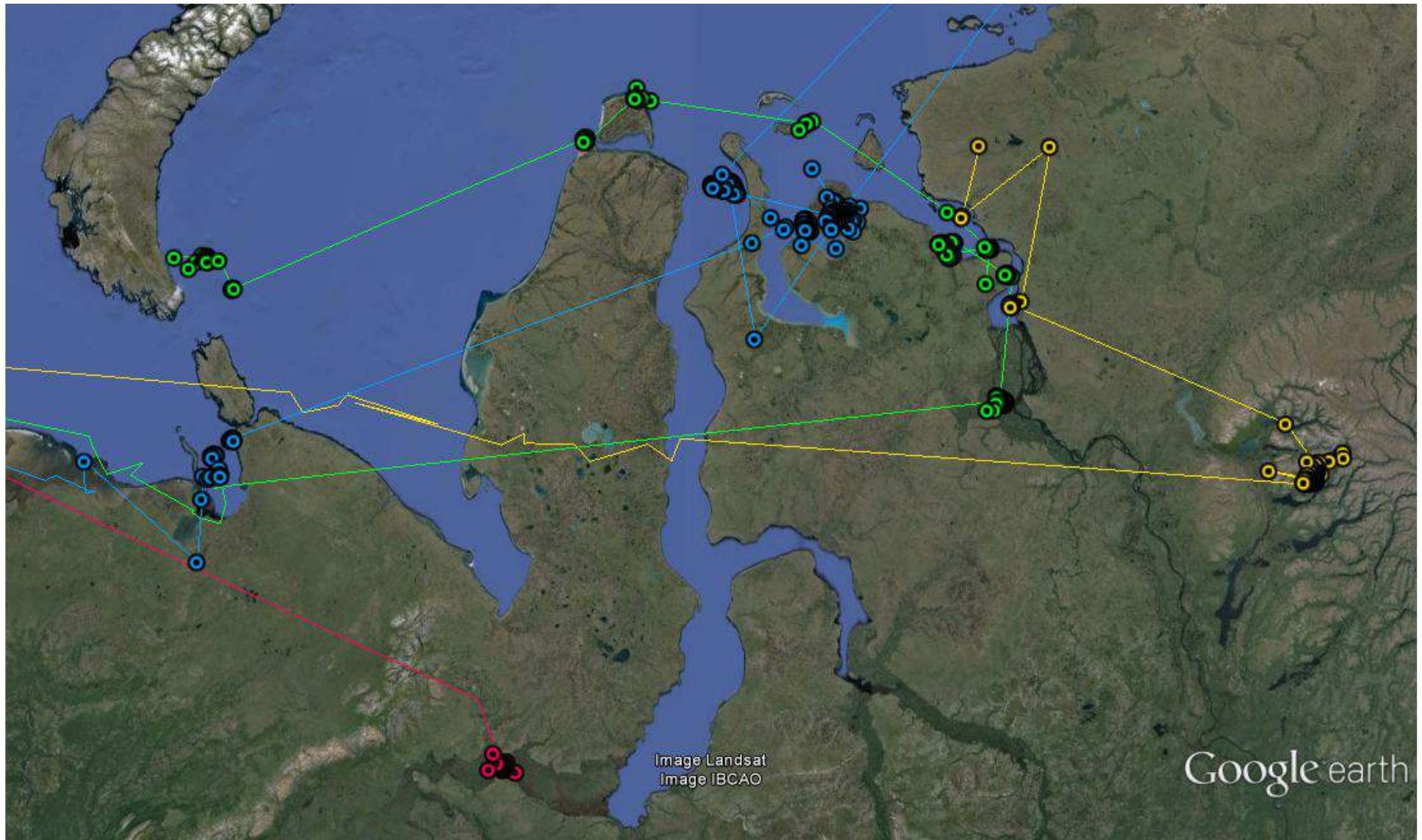


Detour to Arctic ice in 2012



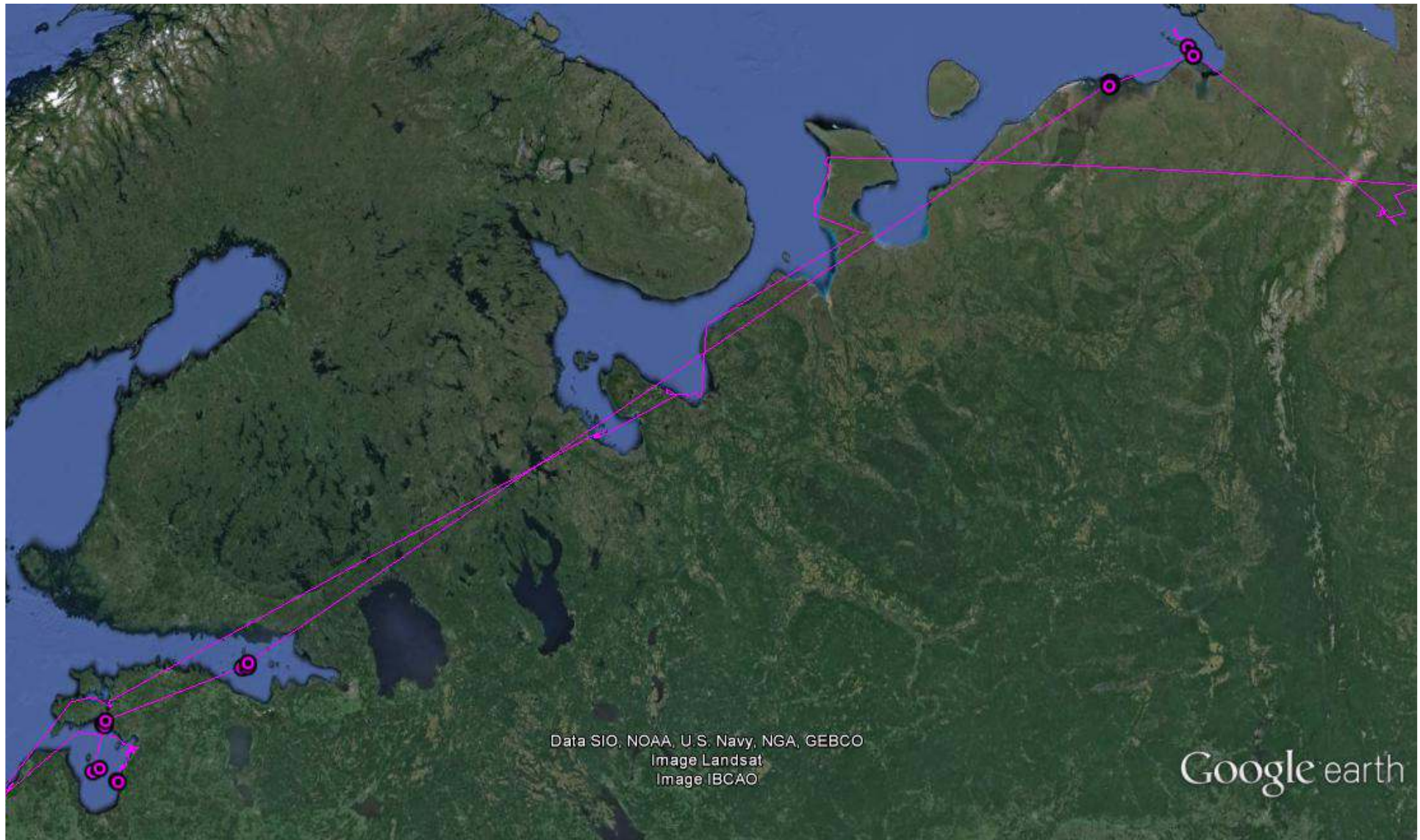
Tracking summary: summer

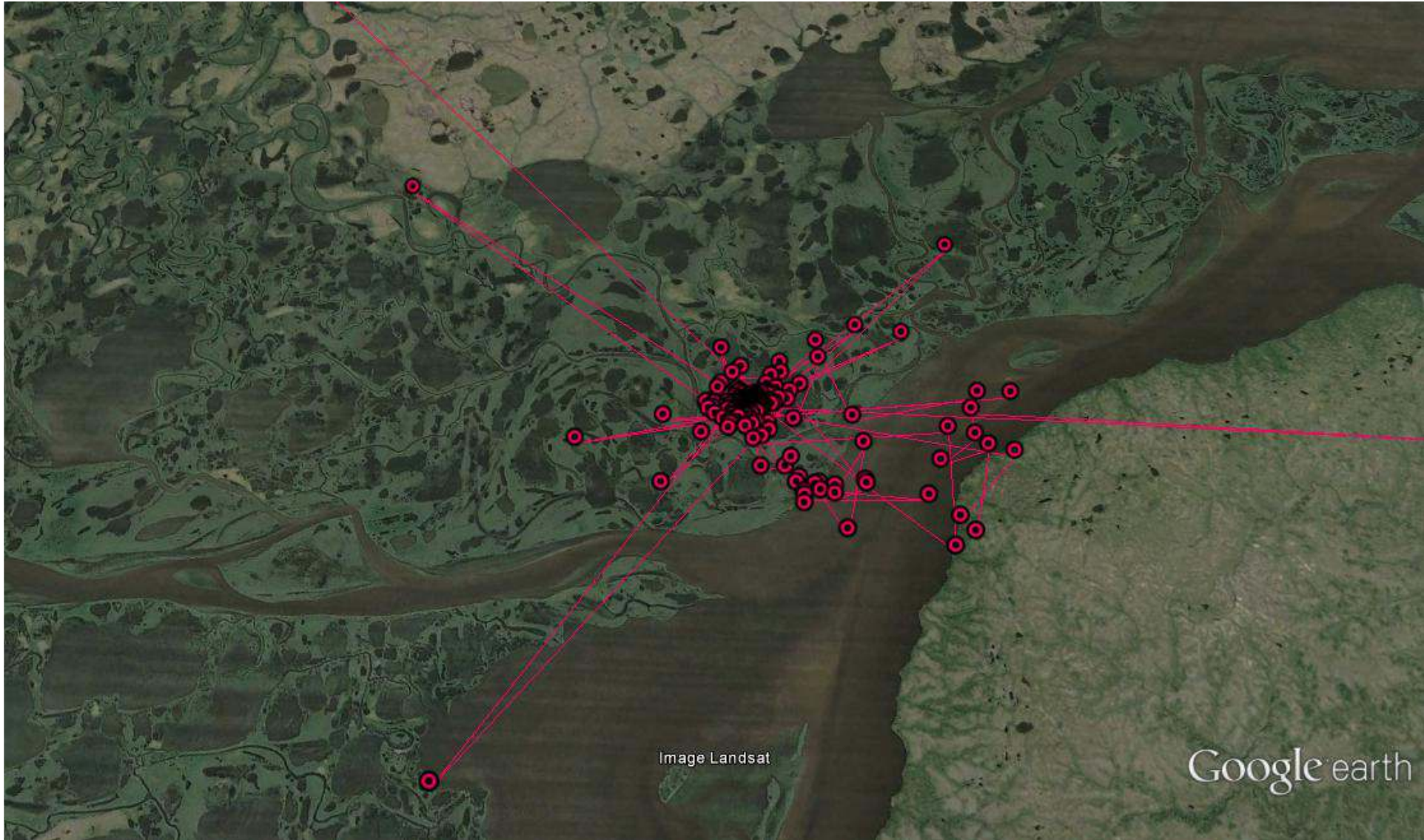
June-15 – Sept-20: *life in the Arctic*

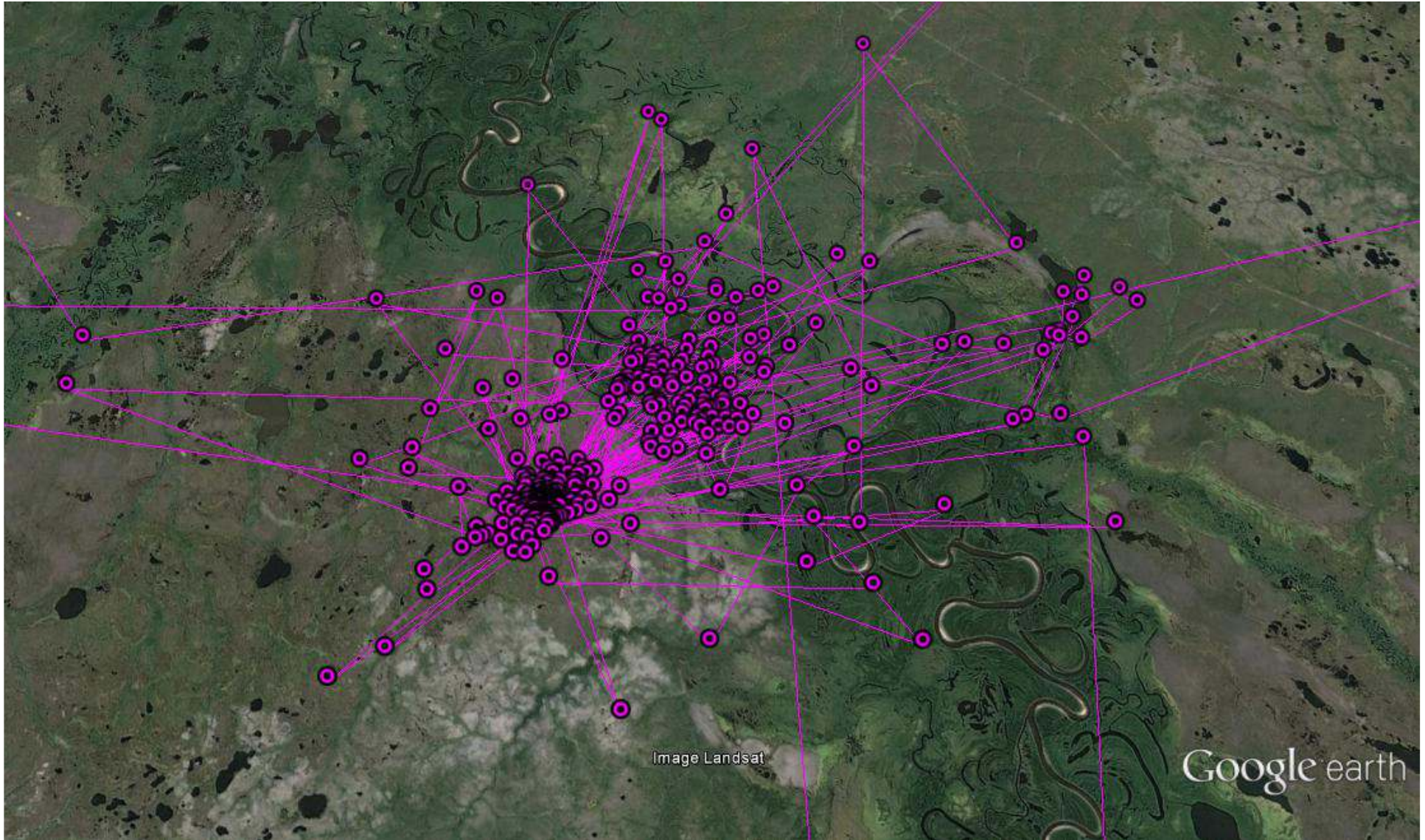


Tracking summary: autumn

Sept-21-30: *returning back to the Baltic*







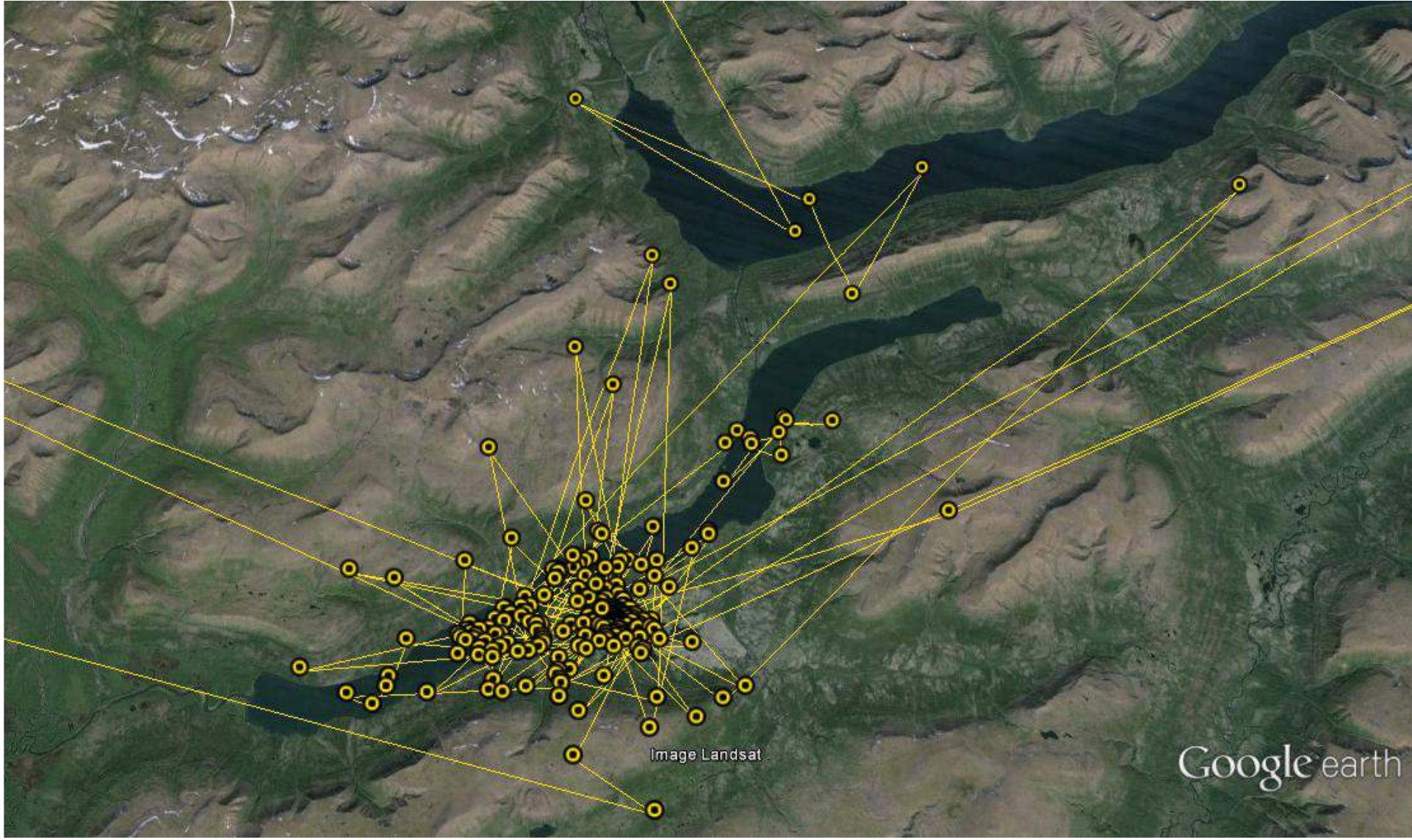


Image Landsat

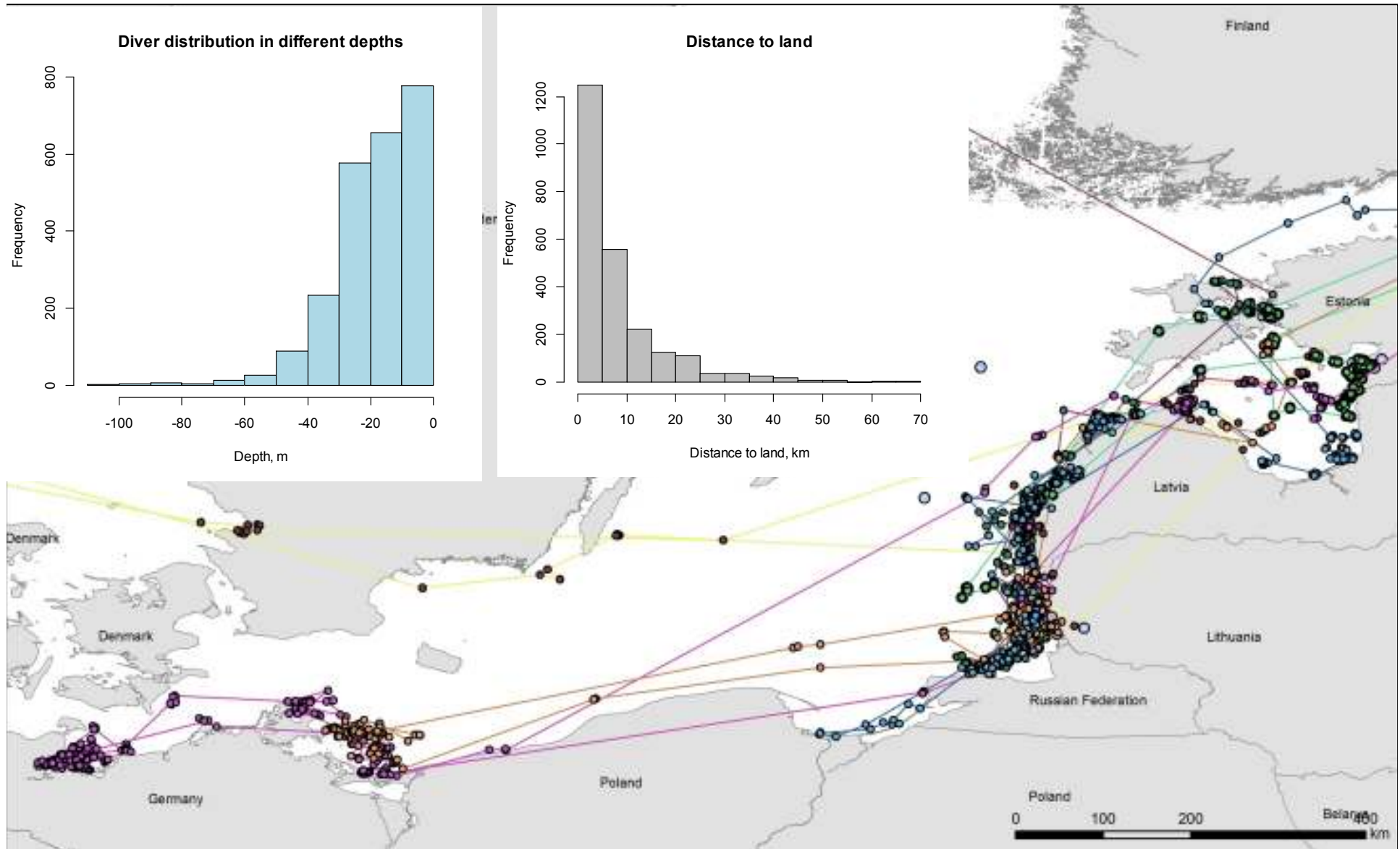
Google earth



Image © 2013 DigitalGlobe

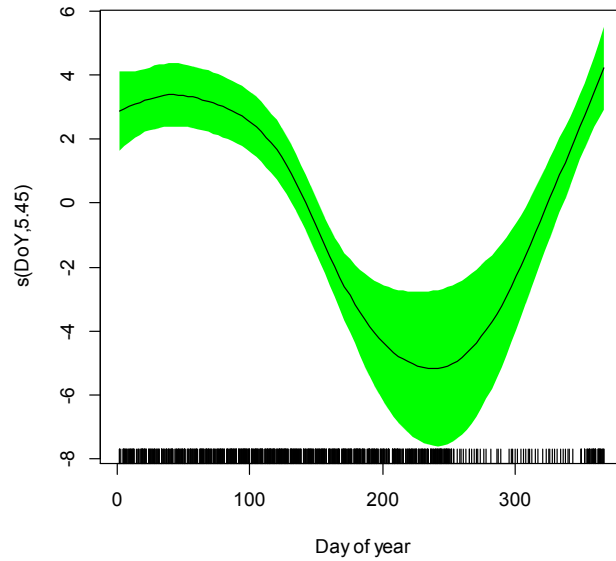
Google earth

Preliminary analyses: habitat characteristics

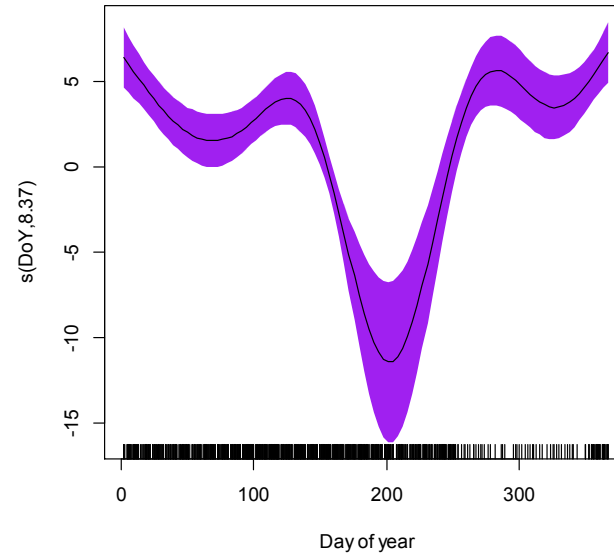


Preliminary analyses: EEZ use

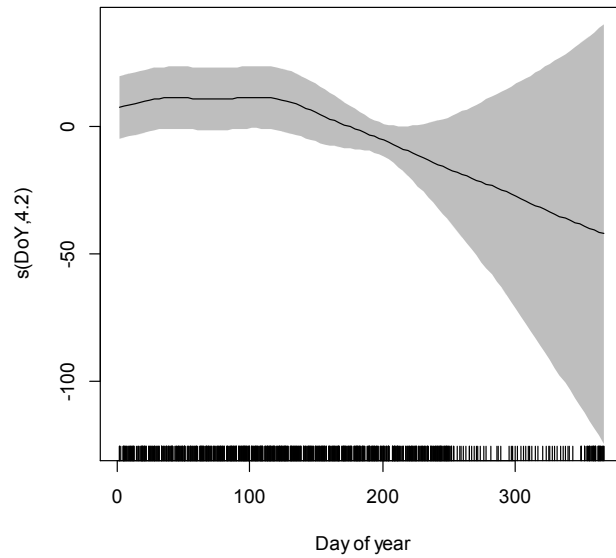
Probability of divers occurring in LT EEZ



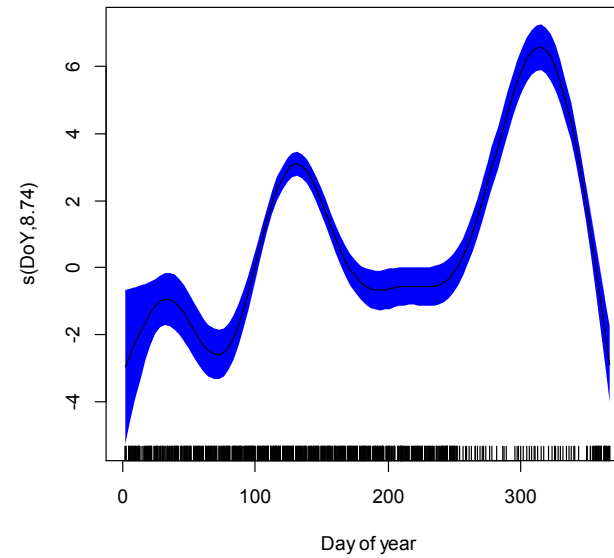
Probability of divers occurring in LV EEZ



Probability of divers occurring in DE EEZ

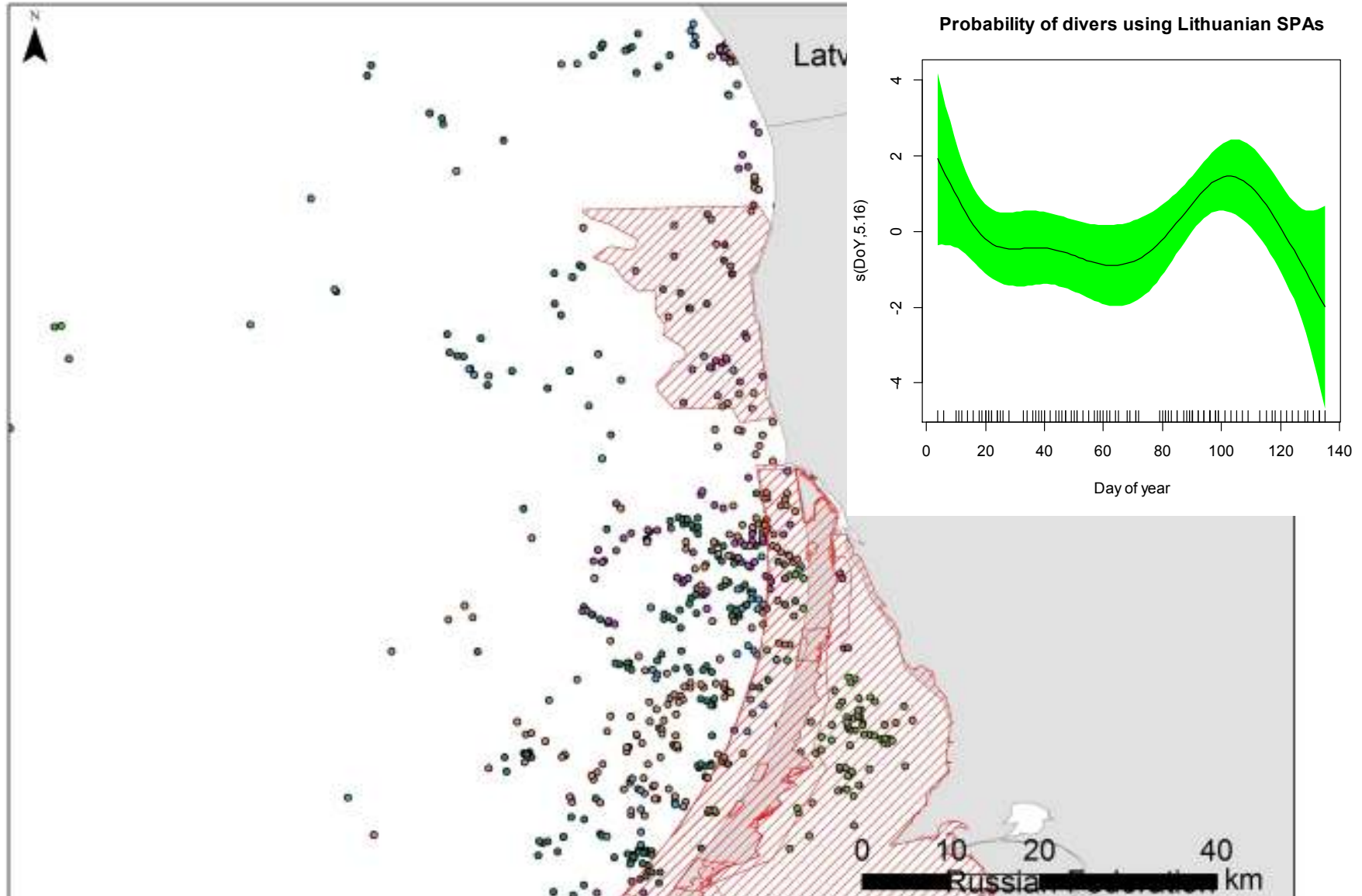


Probability of divers occurring in EE EEZ



Preliminary analyses: occurrence in SPAs

No of position fixes in LT EEZ - 607; within SPAs - 201



Summary

- Using implantable transmitters is a feasible method to study divers
- Satellite telemetry provides reliable data about diver winter distribution and movements, migration routes, staging and breeding areas
- Wintering divers are highly mobile and use multiple sites
- Long-distance seasonal migrations are relatively rapid with only short stopovers
- Tracked divers originated from the Kara Sea region

Thank You !

Bird catching team: Gintaras Riauba, Elmaras Duderis, Armantas Naudžius, Valentinas Pabrinkis, Gediminas Petkus, Vytautas Eigirdas

Boat captains: Remigijus Rimkus ('Buster L'), Anatolijus Šidlauskas ('Toras'), Romas Žeknys ('Romastė')

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Available at: www.movebank.org as 'Seabird telemetry in Lithuania'

The screenshot shows the Movebank website interface. At the top, there is a navigation bar with links for Home, Tracking Data Map, Community, Help, Tools, Env. DATA, and Published Data. Below this is a search bar. On the left side, there is a 'User login' section with fields for Username and Password, and buttons for Login, Create new account, and Request new password. The main content area is divided into two columns. The left column shows search filters and a search result table. The right column shows a map of Europe with a callout box for 'Seabird telemetry in Lithuania'. The search result table lists various studies, including '2000 harbor seals TAFT', 'Adelle Penguins', 'Adelle Penguins 2', 'Aggypus monachus, Gobierno de Extremadura', 'African cuckoos in Nigeria', and 'African elephant Okavango-Jamies Hwange NP'. The map shows the location of Lithuania and surrounding countries like Poland, Belarus, and Latvia.