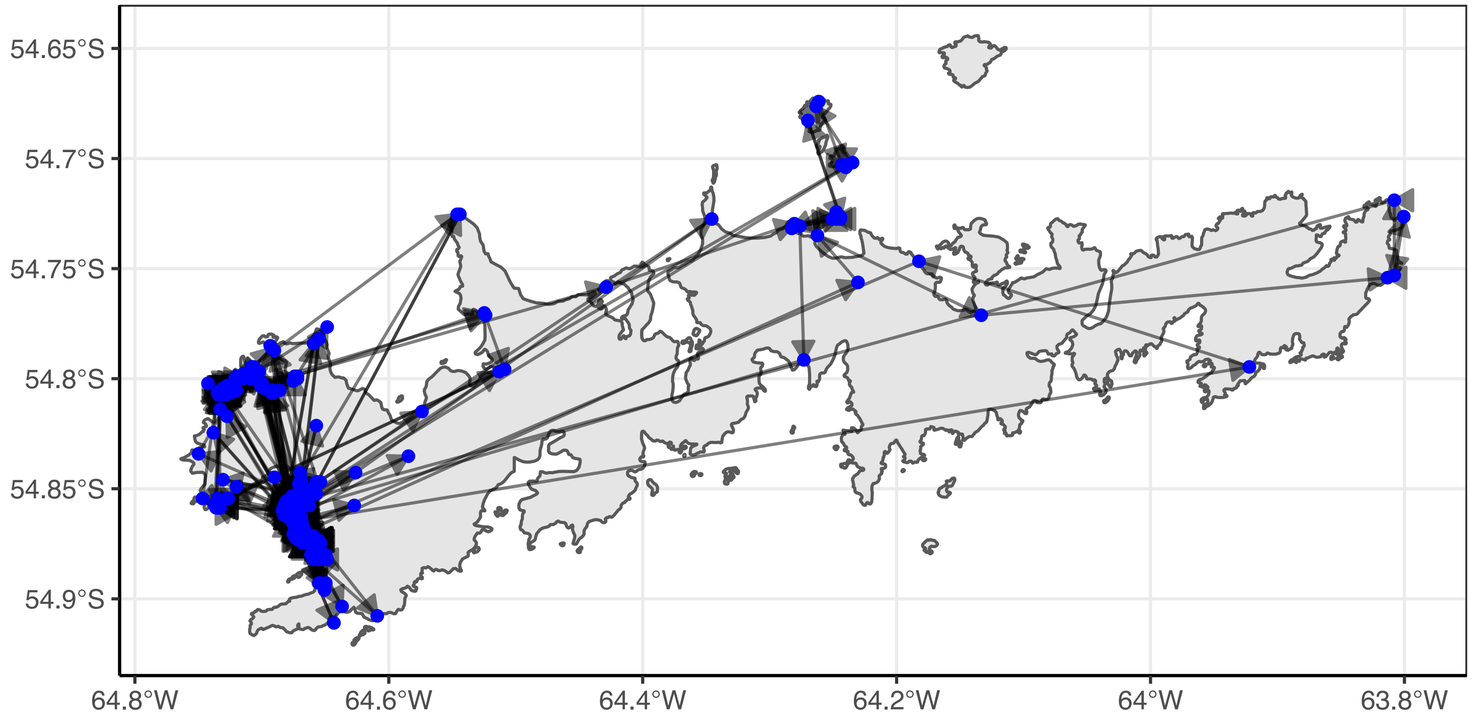
Análisis de redes de movimiento



Diciembre 2020

Teoría de redes aplicada al movimiento de animales

Network theory relies on the notion that **complex interconnected systems** are made up of ***nodes*** connected by ***edges***.

Nodes and edges are assimilated into a network of interconnected nodes from which a number of **quantitative metrics** can be calculated that can **describe both local and global network structure**.

Node-based metrics (local properties) can be used to **describe the influence individual nodes** (*i*) have on the **overall network structure** and are determined from the level of interaction one node has with any other node, either **directly or via intermediaries**.

Jacoby et al. 2012

Tratamiento de datos

Obtención de nodos (sitios) y conexiones (movimientos)

NODOS

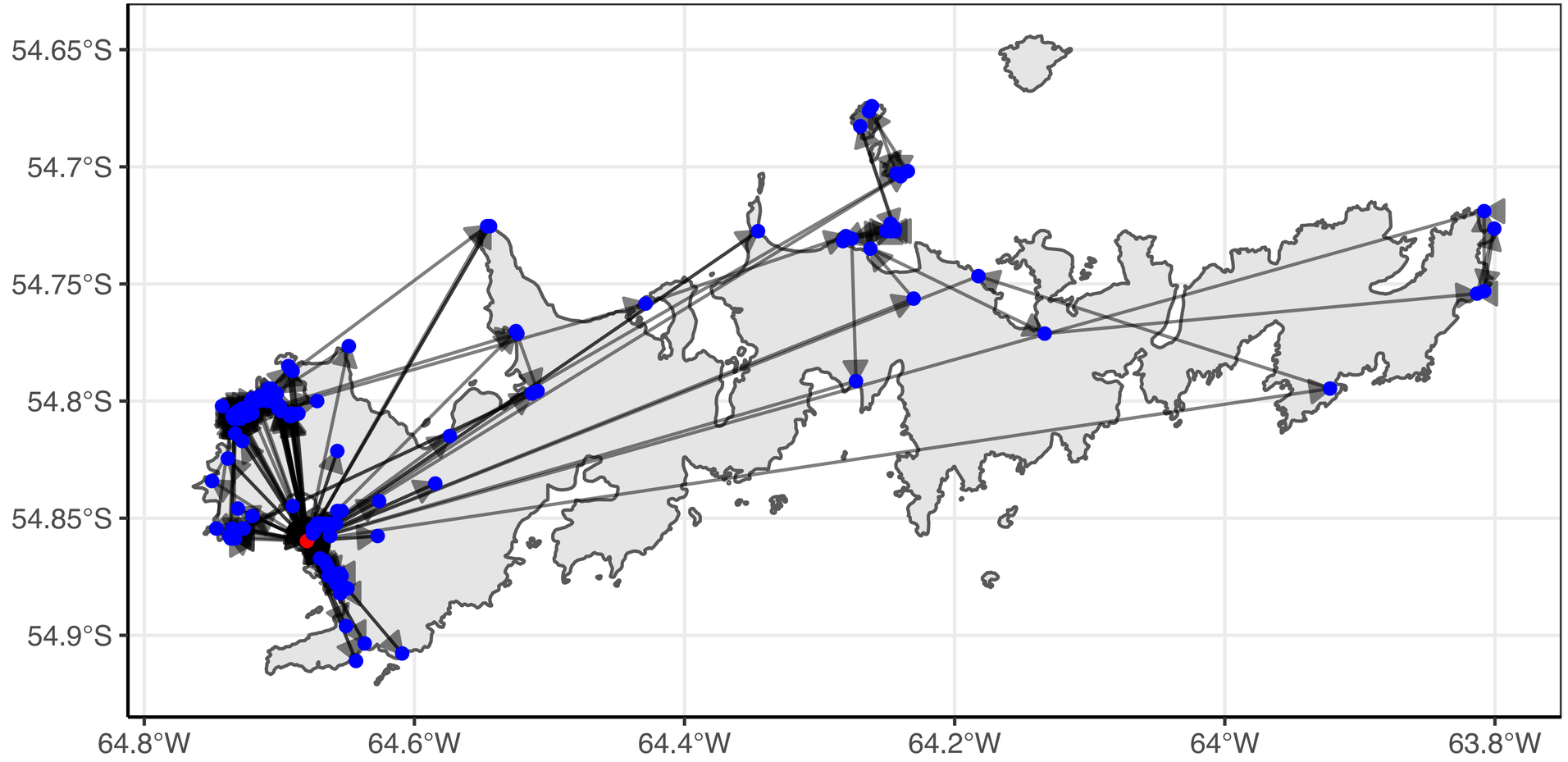
id	who	visita	time	lon	lat	dist	colonia
97	A-B-C-D-E	5	both	-64.67947	-54.859734	1.05	1
131	A	1	day	-64.6752	-54.856533	378.88	0
218	A	1	day	-64.666664	-54.868267	380.08	0
224	E	1	day	-64.6656	-54.853333	404.67	0
228	D	1	night	-64.664536	-54.85227	414.23	0
227	C	1	day	-64.664536	-54.8704	441.51	0
210	D	1	night	-64.6688	-54.85227	445.12	0

CONEXIONES

from	to	id	individuo	date
97	97	1	A	2020-01-16
97	247	20	A	2020-02-01
247	247	21	A	2020-02-02
247	97	22	A	2020-02-03
97	269	25	A	2020-02-06
269	97	26	A	2020-02-07
97	251	30	A	2020-02-10

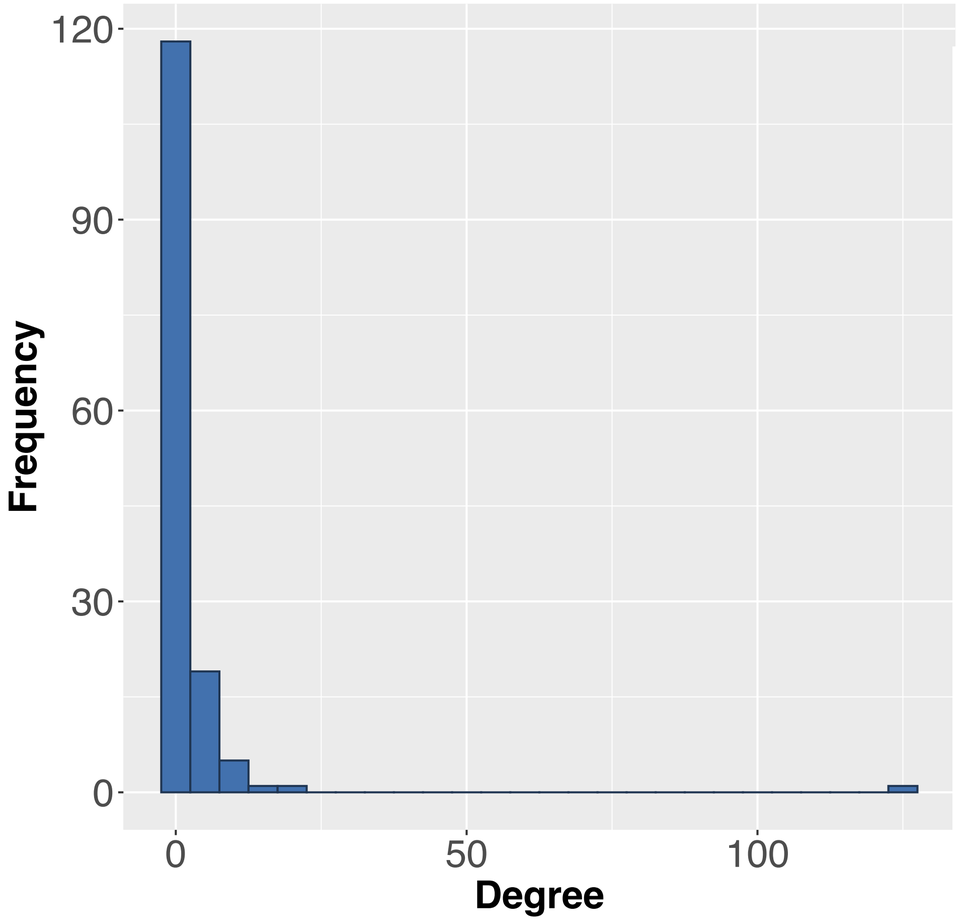
Red de movimiento

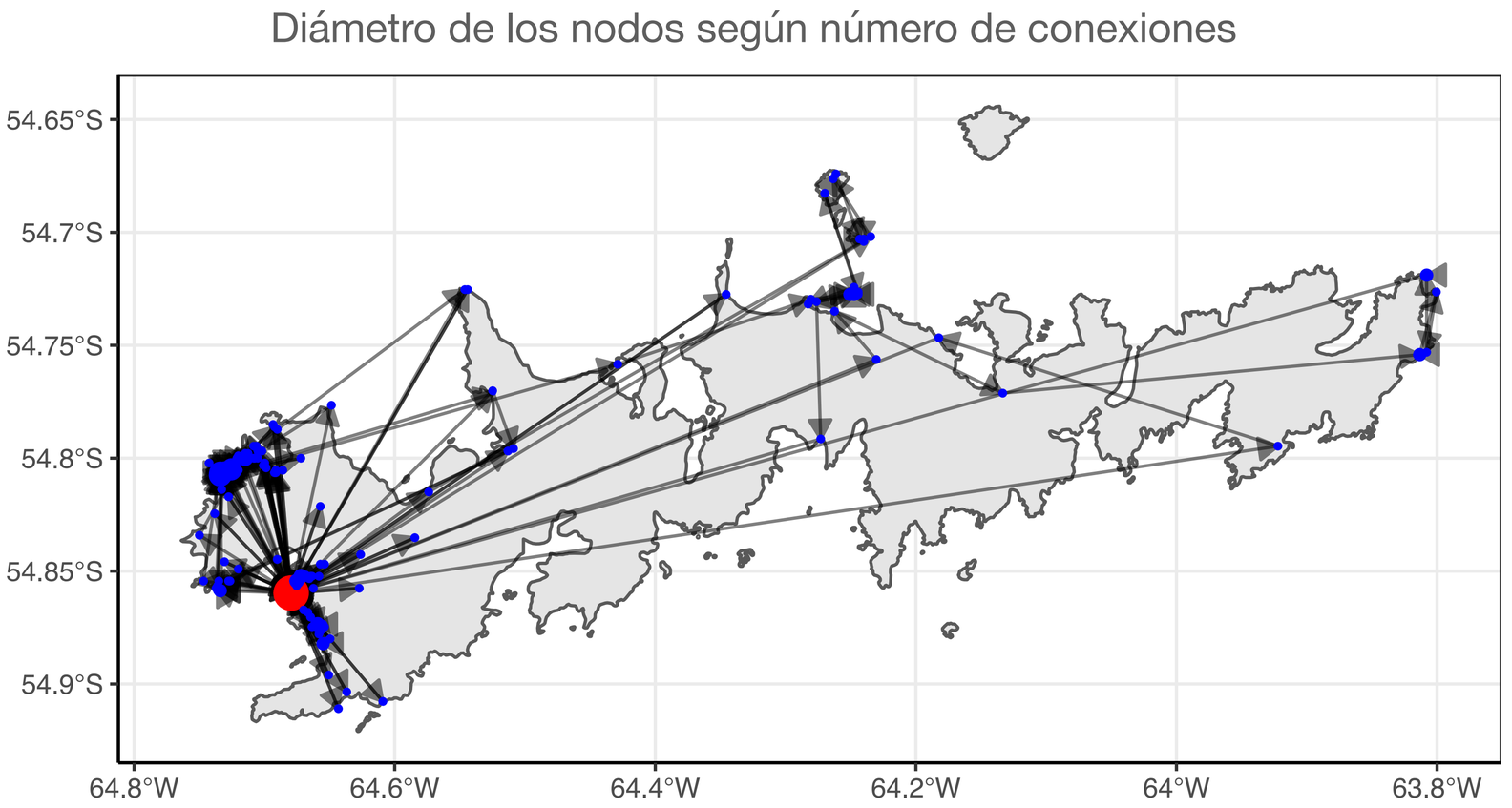
Nodo colonia de pingüinos resaltado en rojo



Concentración de conexiones en pocos sitios

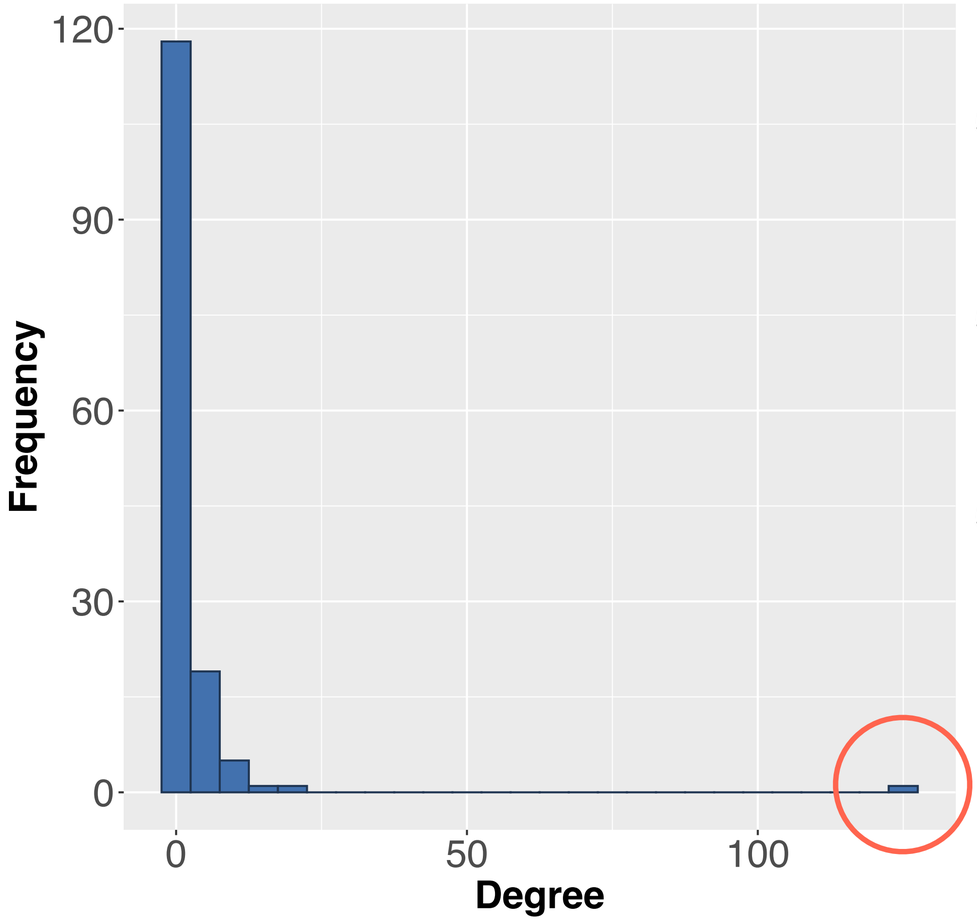
Distribución de grado

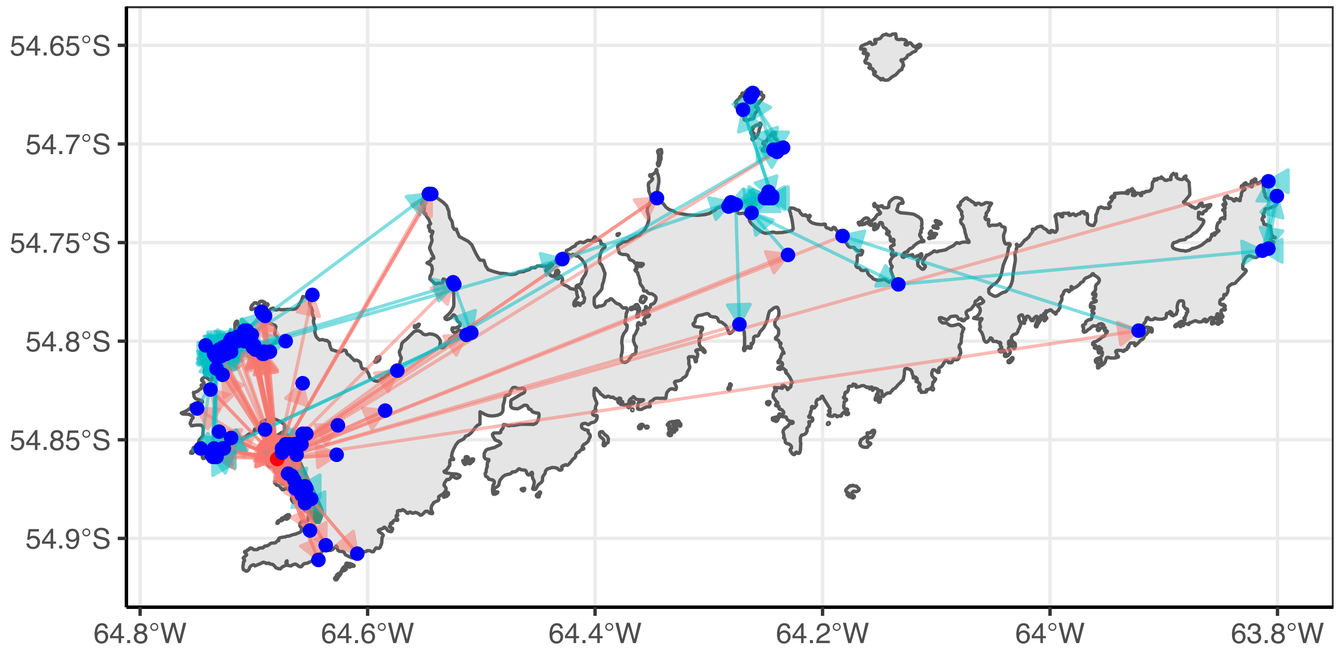




Concentración de conexiones en pocos sitios

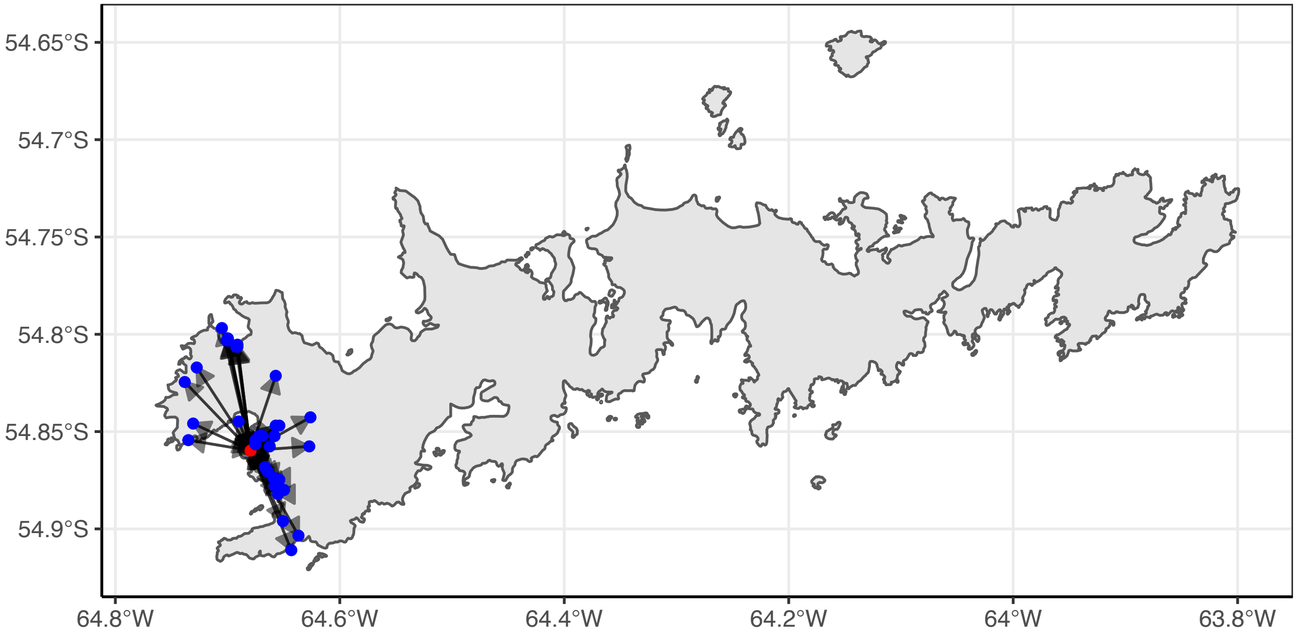
Nodo colonia: 126 conexiones

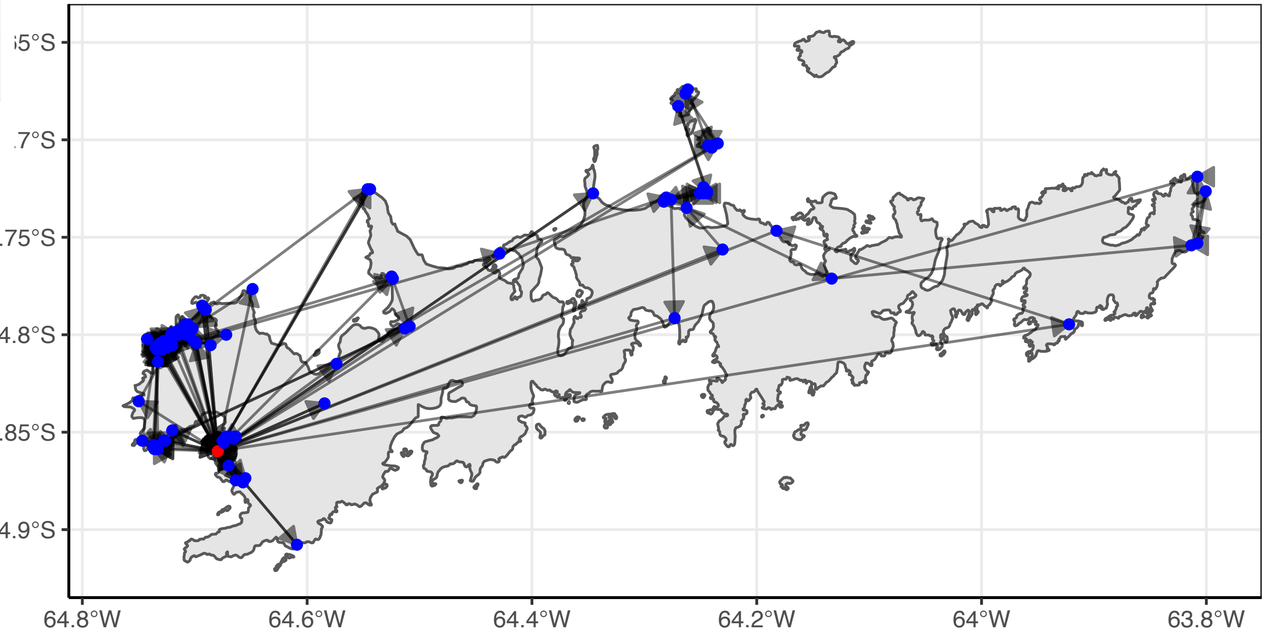




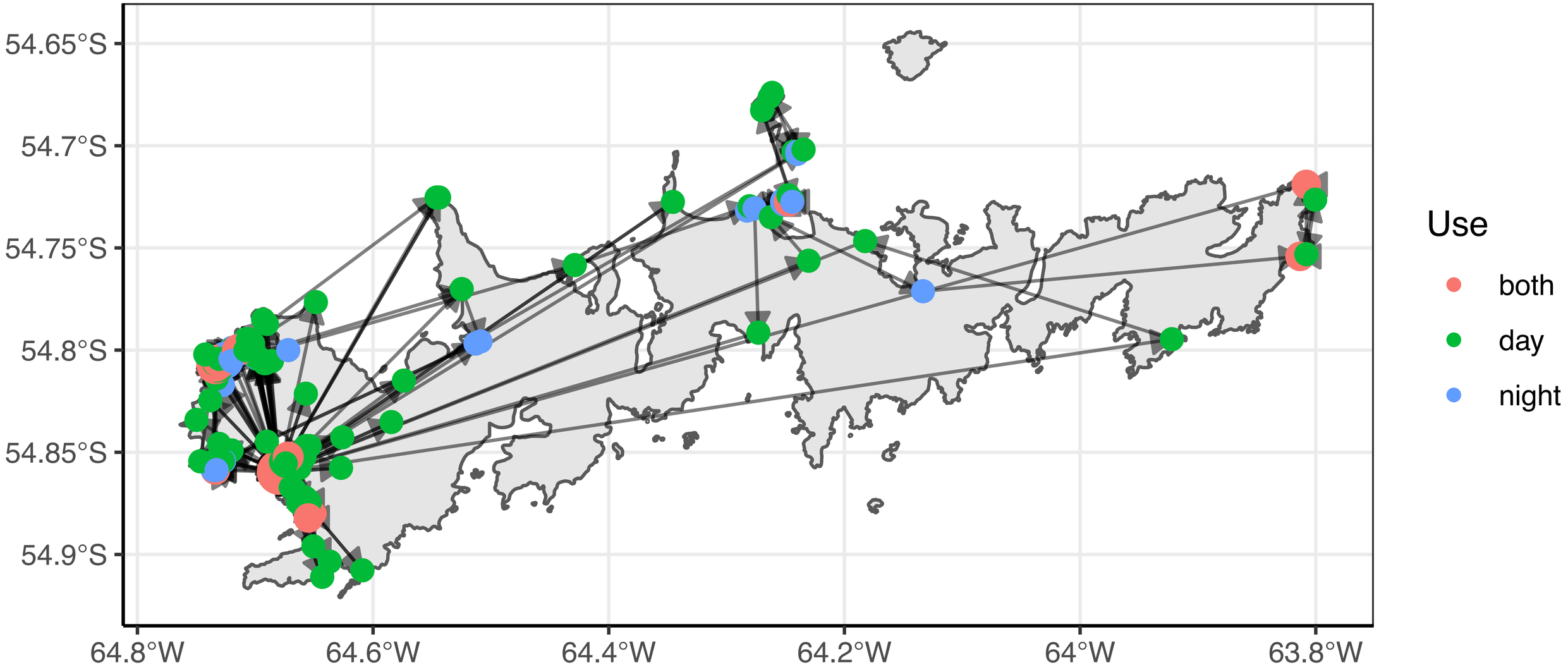
Antes y después de los pingüinos

Partida de los pingüinos 10-03

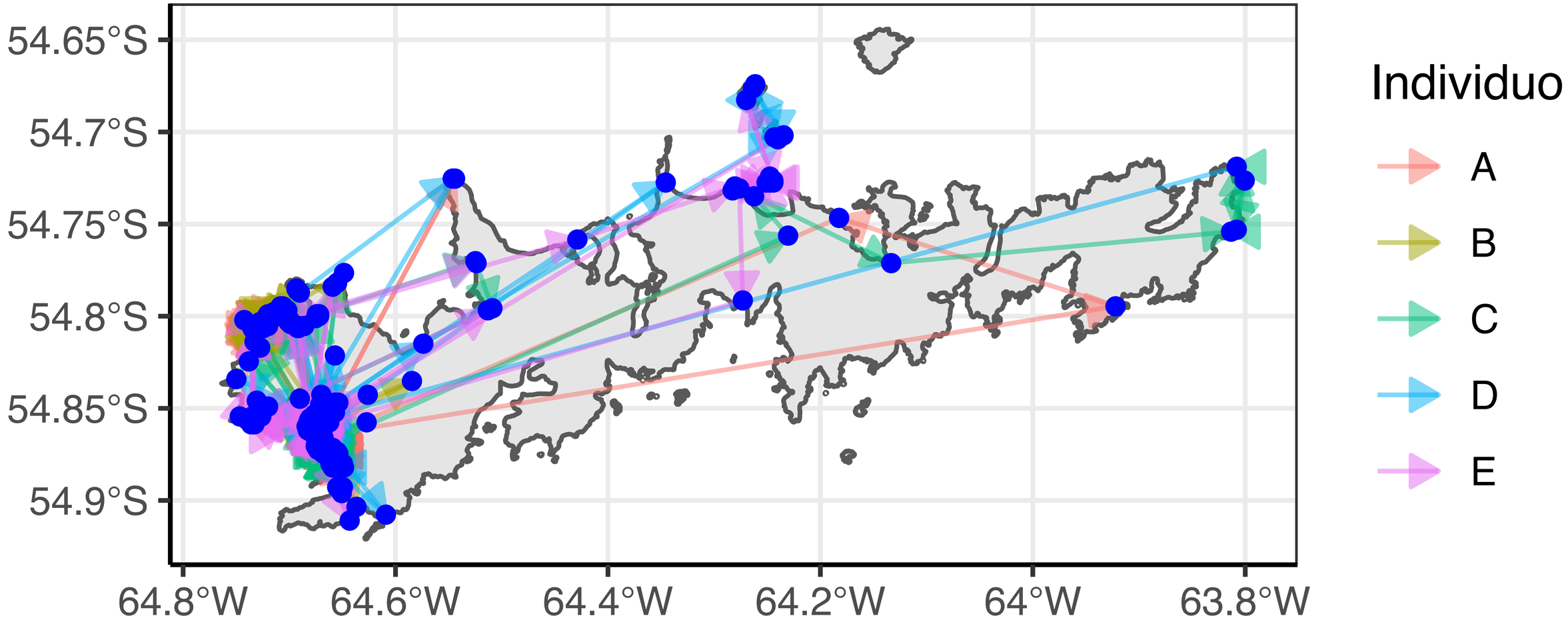




Uso de los sitios y conectividad

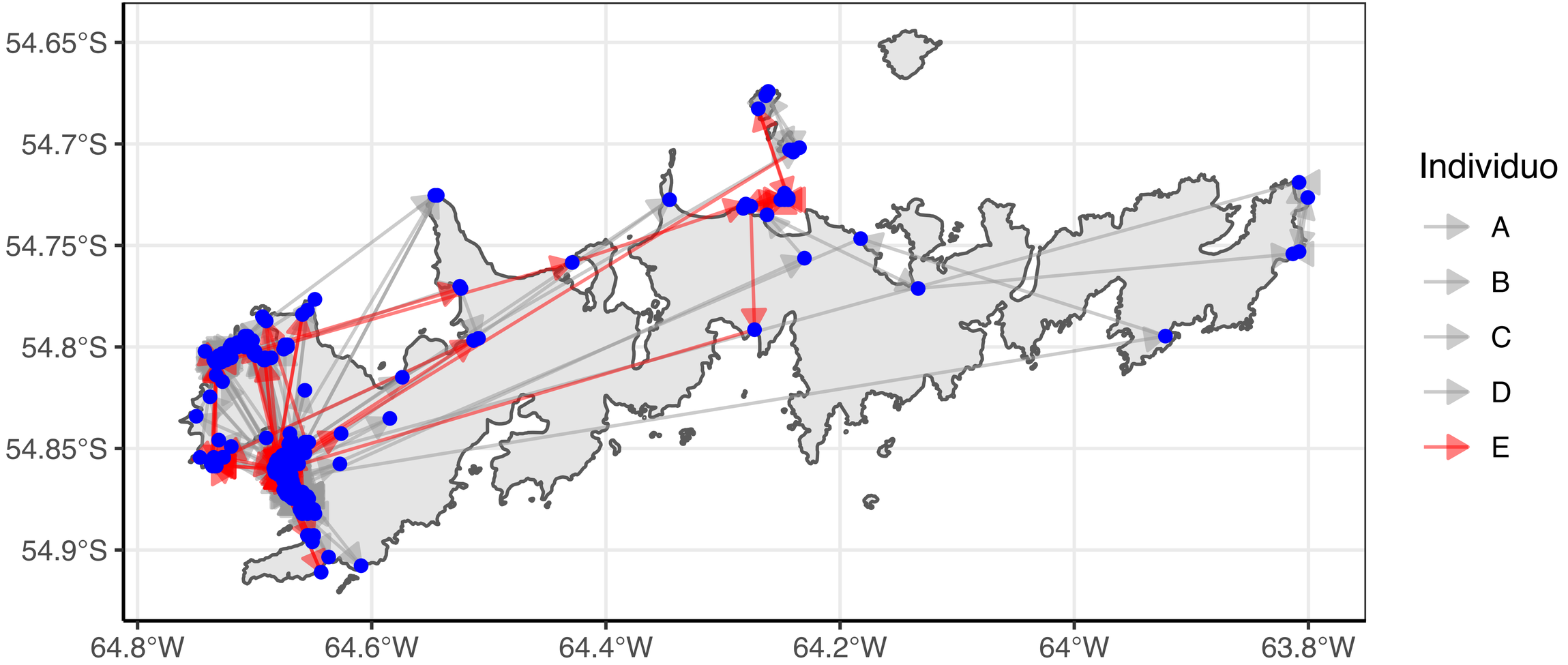


Redes de movimiento de individuos



ACTUALIZAR INFORMACIÓN DE INDIVIDUOS EN LINKS_COLONIA AL COLAPSAR NODO COLONIA (97)

Redes de movimiento de individuos



ACTUALIZAR INFORMACIÓN DE INDIVIDUOS EN LINKS_COLONIA AL COLAPSAR NODO COLONIA (97)

Aporte del análisis de redes

Lo que se podría hacer…

CENTRALITY

Measures of local centrality indicate a nodes' importance directly via its level of connectedness.
1. D*egree centrality* (*k*) gives an indication of the reachability of a node or location.
2. *In-degree* (*k_in*) and *Out-degree* (*k_out*) to explain entry and exit points or gateways to an area of interest or conservation concern.

BETWEENNESS

Measures the number of paths that pass through a specific node, from one node to another via the shortest path length.
Areas of high betweenness might provide access to a limited resource or be important for the social exchange of information and therefore are likely to promote aggregation.

AVERAGE PATH LENGTH

This metric provides a measure of how easily, or indeed likely, an animal moves between locations on average and is useful for comparing networks between individuals or age classes.

EDGE DENSITY

Represents the proportion (or percentage) of actual edges present, out of the total number of edges possible in a given network. This measure is likely to inform analyses of random and non-random space use in animals.