



The Status of the Sea Turtle in Korea



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INDEX

1. INTRODUCTION

2. METHOD

3. RESULTS



INTRODUCTION

Sea Turtles in Korea

Loggerhead Turtle
(*Caretta caretta*)



Green Turtle
(*Chelonia mydas*)



Hawksbill Turtle
(*Eretmochelys imbricate*)



Leatherback Sea Turtle
(*Dermochelys coriacea*)



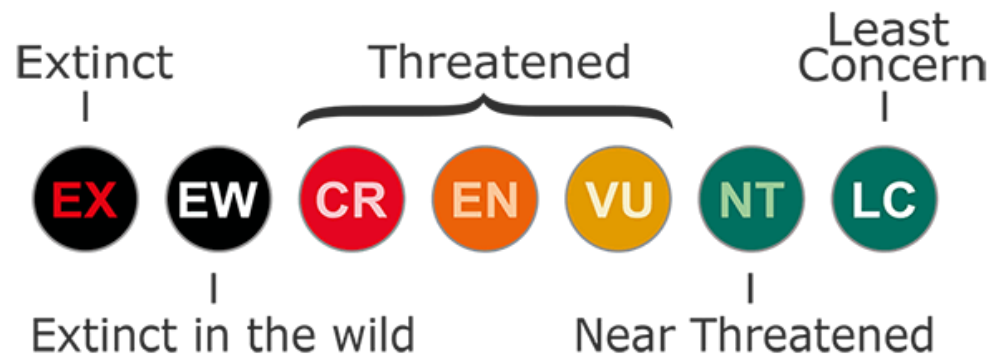
In Korea, total four species have been located Green Turtle (*Chelonia mydas*), Loggerhead Turtle (*Caretta caretta*), Hawksbill Turtle (*Eretmochelys imbricata*) and Leatherback Sea Turtle (*Dermochelys coriacea*).

INTRODUCTION

Purpose

The IUCN Red List classifies all sea turtle species are threatened.

Studying ecological characteristics of sea turtles, such as Habitat features, migration patterns and environmental preference, this research of sea turtles will be helpful to understand sea turtles and save them.



Species	Classification
Loggerhead Turtle	Vulnerable
Green Turtle	Endangered
Kemp's Ridley Sea Turtle	Critically Endangered
Olive Ridley Sea Turtle	Vulnerable
Hawksbill Turtle	Critically Endangered
Flatback Sea Turtle	Data Deficient
Leatherback Sea Turtle	Vulnerable

<https://www.iucnredlist.org/>

METHOD

Radio-tracking

Researching and conserving sea turtles in Korea, 'National Marine Biodiversity Institute of Korea' has been tracking since 2015.

Receiver: ARGOS satellite

Argos tracks any moving station fitted with an Argos transmitter

Transmitter: Wildlife computers SPOT-352A



Taxa: hard-shell turtle

Life: 920 days

Data Products: haulout behavior, temperature

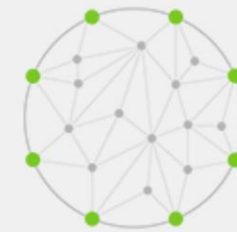
Product standard: 72 x 56 x 22 mm, 129 g



국립해양생물지원관

NATIONAL MARINE BIODIVERSITY INSTITUTE OF KOREA

<http://www.mabik.re.kr/html/kr/>



ARGOS
CONNECTED. PROTECTED.

<https://www.argos-system.org/>



WILDLIFE
COMPUTERS

<https://wildlifecomputers.com/>

METHOD

Analysis of Tracking Data

This tracking is under way and the data used in this presentation is from 15th Oct 2015 to 28th Feb 2020. In case that multiple points were tracked in one individual per day, one point whose error radius is lowest on that day was used as tracking data.

Migration data

Researching how individuals moved and where they head for.

Daily moved distance

The shortest distance from the spot where each individuals were tracked on the previous day to the spot where each individuals were tracked on the following day.

Distribution density

Applying 100 km buffer which is action radius of sea turtles to the spot where individuals were tracked, the density of sea turtles was measured.

Environmental variables

Analyzing various environmental features of the area where individuals were tracked.

METHOD

Environmental variables

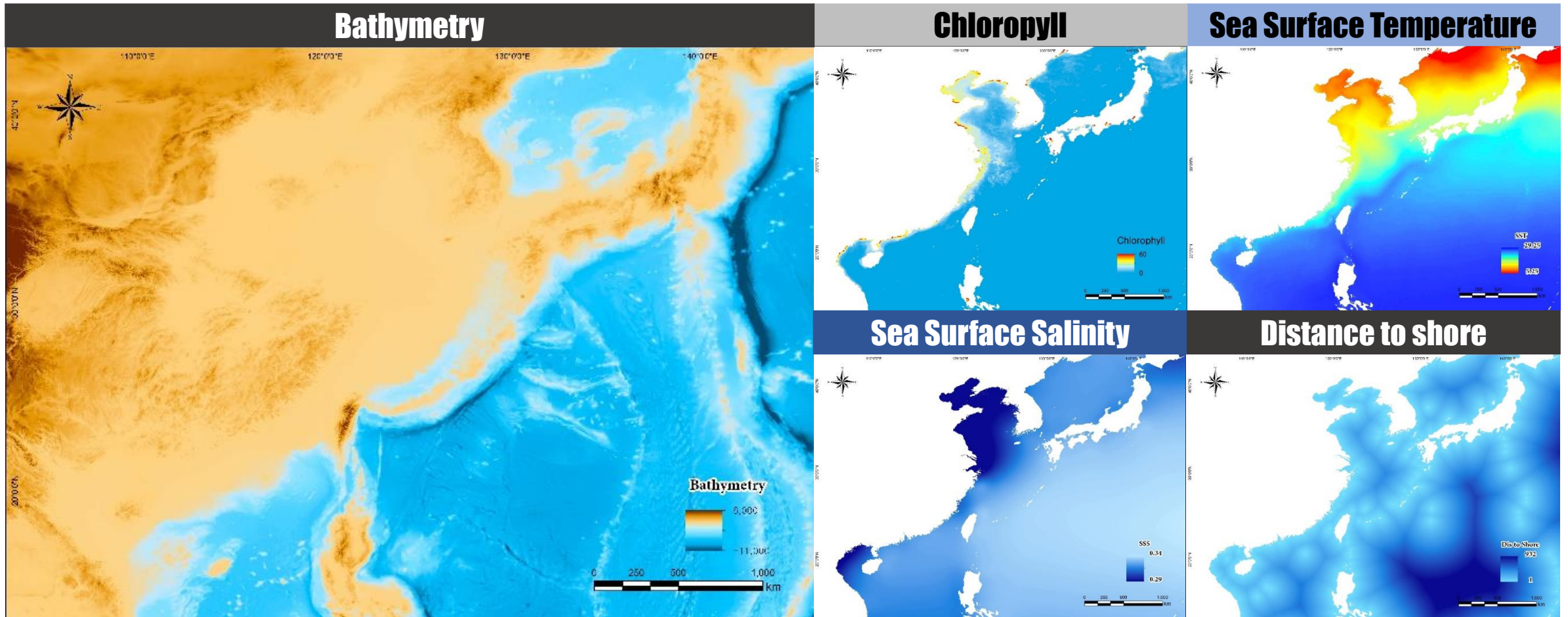
Analyzing Important environmental factors for sea turtles, the result will show how it works to habitat and migration pattern of sea turtles. Each analysis was performed by QGIS v3.4.7.

Bathymetry	Chlorophyll	Sea Surface Temperature (SST)	Sea Surface Salinity (sss)	Distance to Shore (DTS)
Depth of the seafloor Cell size: ~500 m	Chlorophyll value of seaweed in 2019 Cell size: ~4 km	Annual sea surface temperature Cell size: ~1 km	Annual sea surface salinity Cell size: ~1 km	Distance to shore Cell size: ~1 km

Source: Bathymetry (The Naval Oceanographic Office; <https://nrlgodae1.nrlmry.navy.mil/>), Distance to shore, Sea Surface Temperature, Sea Surface Salinity (MARSPEC; <http://www.marspec.org/>), Chlorophyll : (Oceancolor Web; <https://oceancolor.gsfc.nasa.gov/>)

METHOD

Environmental variables



RESULTS

Tracking Sea Turtles

Tracking 23 sea turtles have been performing since 2015. 23 sea turtles are 10 loggerhead turtles, 10 green turtles, and 3 hawksbill turtles.

The research was conducted with 17 individuals (8 loggerhead turtles and 9 green turtles). 2 loggerhead turtles and 1 green turtle who are tracked for short period and low-populated hawksbill turtles are counted out in this research.



A green turtle juvenile (*Chelonia mydas*) installed the transmitter

RESULTS

Individual characteristics

Loggerhead Turtle

ID	Growth	Carapace Length (mm)	Carapace Width (mm)	Body Weight (g)
KOR0001	A	74.0	X	X
KOR0008	A	76.0	71.2	56
KOR0091	A	79.9	78.0	52.6
KOR0092	A	91.3	80.0	85.2
KOR0094	J	44.0	37.0	14.6
KOR0096	J	38.5	34.0	12.7
KOR0108	J	88.0	79.0	77.3
KOR0109	J	52.1	44.1	23.8

Green Turtle

ID	Growth	Carapace Length (mm)	Carapace Width (mm)	Body Weight (g)
KOR-1	A	65.6	65.6	31.8
KOR-2	A	60.0	60.0	22.5
KOR0003	A	95.8	85.0	103.0
KOR0004	A	68.0	61.5	41.4
KOR0009	A	78.8	75.5	58.9
KOR0104	A	77.6	62.8	69.8
KOR0129	A	77.3	62.1	70.9
KOR0098	J	24.8	23.0	2.48
KOR0101	J	27.1	23.4	2.67

Juvenile turtles are not confirmed gender. Succrently, all adult turtles in this research are female.

※ Growth A: adult, J: juvenile

RESULTS

Individual Tracking Data

Loggerhead Turtle

ID	Tracking period	Tracking numbers	Total Moved Distance (km)	Daily Mean Moved Distance (km)
KOR0001	2016.06.18 ~2016.07.23	26	397.4	6.3 ± 4.1
KOR0008	2017.09.28 ~2017.12.24	74	8602.4	50.2 ± 52.9
KOR0091	2018.08.29 ~2018.10.13	46	2649.10	28.0 ± 17.6
KOR0092	2018.10.17 ~2019.09.11	297	14713.1	22.3 ± 18.7
KOR0094	2018.08.30 ~2018.12.23	115	7350.5	30.6 ± 24.1
KOR0096	2018.08.29 ~2018.12.28	121	6061.6	24.9 ± 20.4
KOR0108	2019.06.28 ~2019.10.26	62	2954.52	35.3 ± 34.9
KOR0109	2019.06.29 ~2020.02.28	61	2938.4	18.7 ± 22.3

Green Turtle

ID	Tracking period	Tracking numbers	Total Moved Distance (km)	Daily Mean Moved Distance (km)
KOR-1	2015.10.29 ~2015.12.15	20	1,556.2	36.7 ± 26.3
KOR-2	2015.10.29 ~2016.10.29	303	6,094.5	6.2 ± 11.8
KOR0003	2016.08.12 ~2016.10.17	60	3,816.8	33.6 ± 47.1
KOR0004	2016.09.02 ~2016.10.26	49	3,941.2	30.2 ± 20.3
KOR0009	2017.09.28 ~2018.09.28	348	18,873.2	22.3 ± 20.6
KOR0104	2018.10.07 ~2019.05.01	207	13,698.5	28.5 ± 24.6
KOR0129	2019.08.28 ~2019.10.26	60	5,951.9	50.1 ± 40.6
KOR0098	2018.08.29 ~2018.09.10	13	445.4	31.7 ± 17.9
KOR0101	2018.08.29 ~2018.10.28	60	2,819.7	18.1 ± 13.1

RESULTS

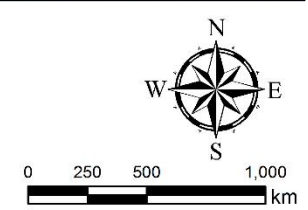
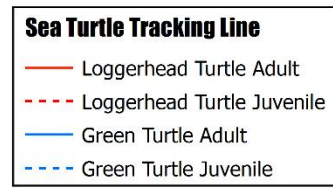
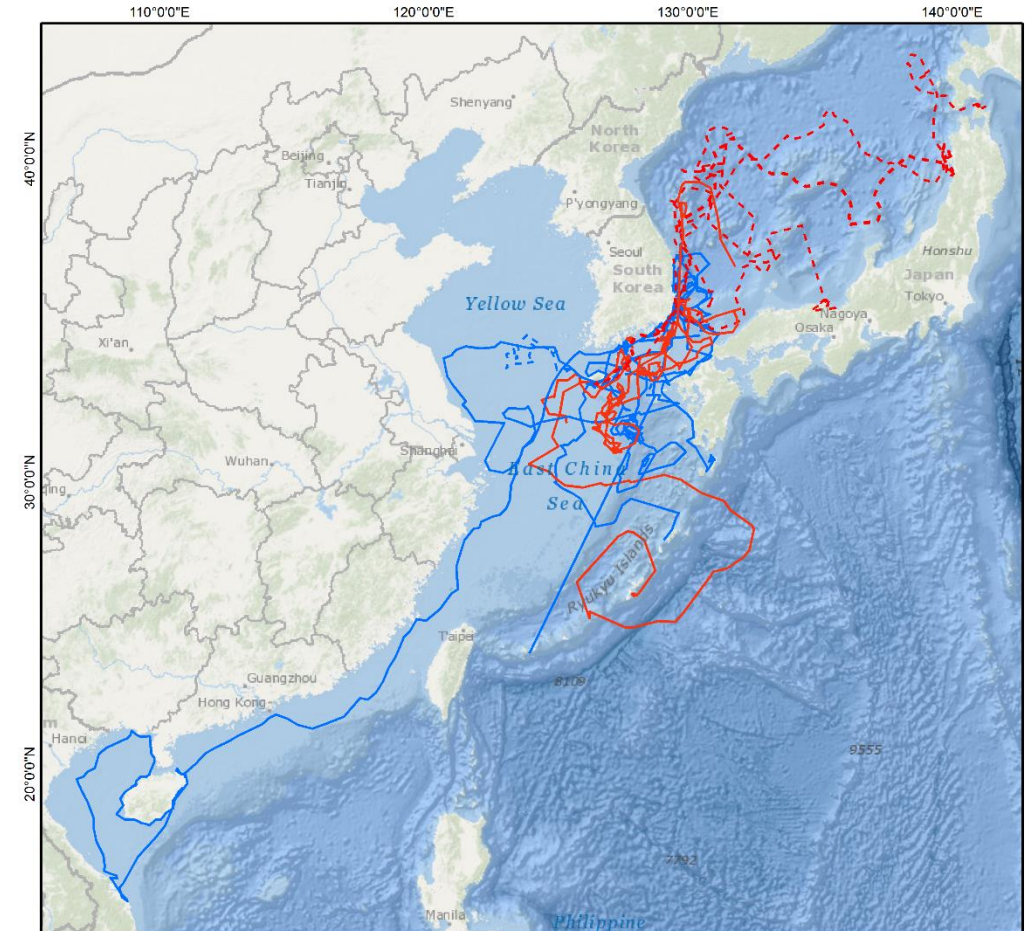
Sea Turtle Tracking Line

Loggerhead Turtle

Adult individuals stayed near Korea. However many juveniles displayed the tendency to head north.

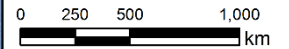
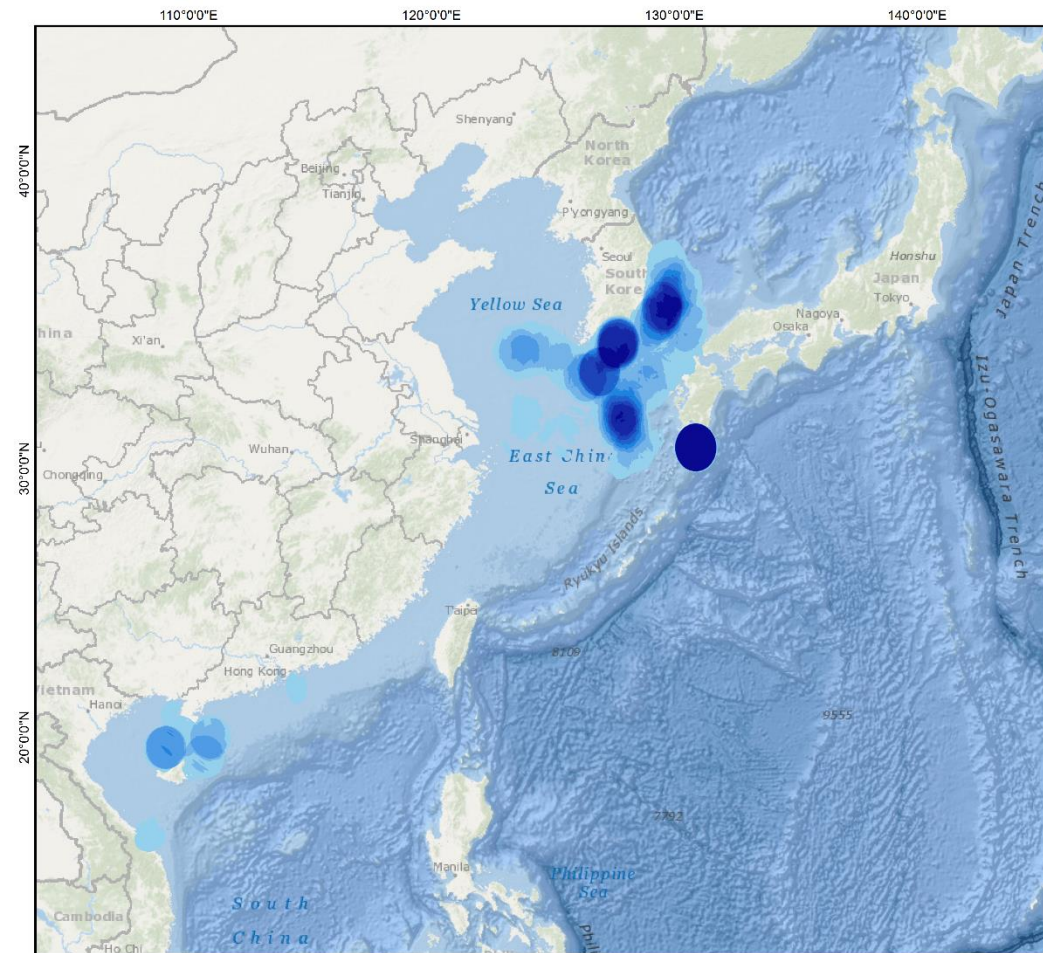
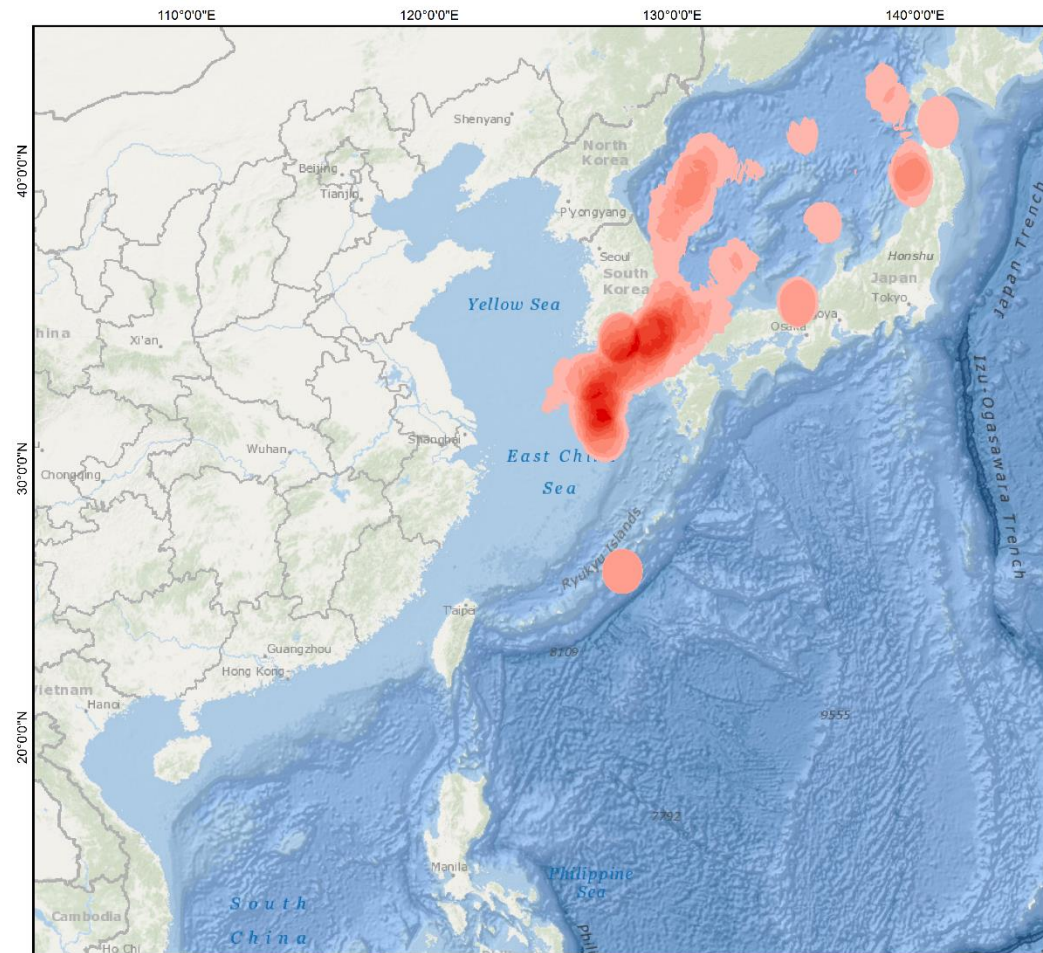
Green Turtle

Green turtles stayed near Korea, except one individual who migrated very long distance.

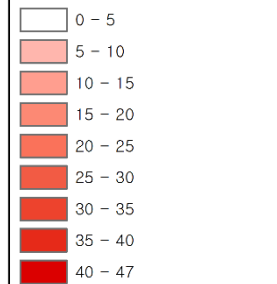


RESULTS

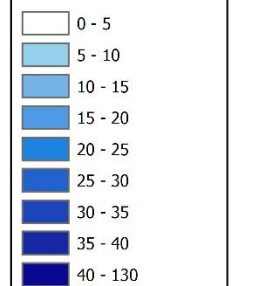
Sea Turtle Density



Loggerhead Turtle Density



Green Turtle Density



RESULTS

Environmental Variables

Loggerhead Turtle

ID	Bathy (m)	Chlor (mg/L)	Annual SST (°C)	Annual SSS (pus)	D to S (km)
KOR0001	-10.2 ±26.3	2.99 ±0.75	16.9 ±3.2	33.6 ±0.0	4.0 ±4.1
KOR0008	-1,079.3 ±1,807.9	0.55 ±0.76	23.7 ±2.1	34.3 ±0.7	89.8 ±95.0
KOR0091	-84.4 ±22.5	1.07 ±0.59	19.2 ±1.1	33.2 ±0.4	58.8 ±54.7
KOR0092	-224.0 ±379.9	0.52 ±0.15	20.2 ±1.6	33.7 ±0.2	81.9 ±55.4
KOR0094	-1,864.2 ±1,526.5	0.63 ±0.28	13.8 ±2.9	33.5 ±3.2	105.4 ±103.2
KOR0096	-1,376.5 ±1,276.9	0.86 ±0.60	15.7 ±1.9	33.7 ±0.1	106.9 ±102.3
KOR0108	-810.9 ±756.7	0.63 ±0.46	17.5 ±1.3	33.8 ±0.1	82.0 ±42.4
KOR0109	-1,163.7 ±1,322.6	0.59 ±0.29	15.2 ±4.3	32.1 ±7.6	89.3 ±84.3

Green Turtle

ID	Bathy (m)	Chlor (mg/L)	Annual SST (°C)	Annual SSS (pus)	D to S (km)
KOR-1	-55.2 ±46.4	0.55 ±0.45	18.3 ±47.4	31.9 ±8.2	11.9 ±16.2
KOR-2	-19.3 ±39.4	0.14 ±0.22	21.0 ±6.3	31.7 ±93.6	2.5 ±3.4
KOR0003	-35.1 ±56.4	0.87 ±0.57	18.7 ±1.2	33.6 ±0.2	8.3 ±16.7
KOR0004	-190.5 ±285.2	0.94 ±0.79	21.0 ±19.6	33.5 ±0.5	127.4 ±103.0
KOR009	-274.1 ±446.2	0.92 ±0.85	19.1 ±3.4	33.3 ±4.0	50.0 ±46.5
KOR0104	-22.4 ±32.6	1.41 ±1.29	21.3 ±8.1	29.5 ±10.8	26.7 ±41.5
KOR0129	-47.6 ±43.4	1.89 ±1.40	17.1 ±4.4	30.6 ±7.2	88.6 ±77.3
KOR0098	-124.3 ±22.7	0.41 ±0.08	20.6 ±0.2	33.6 ±0.3	41.8 ±26.4
KOR0101	-78.3 ±10.9	1.26 ±0.3	17.1 ±0.9	32.3 ±0.4	116.5 ±67.4

※ Bathy: bathymetry, Chlor: chlorophyll, SST: sea surface temperature, SSS: sea surface salinity, D to s: Distance to shore

THANK YOU

Q & A

