

**Report on activity of PICES special research  
project  
“Sea turtle ecology in relation to  
environmental stressors in the North Pacific  
regions”**

Taewon Kim

Department of Ocean Sciences

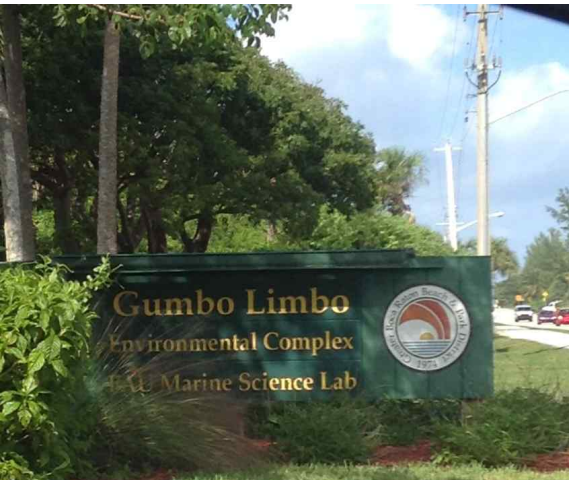
Inha University

Republic of Korea



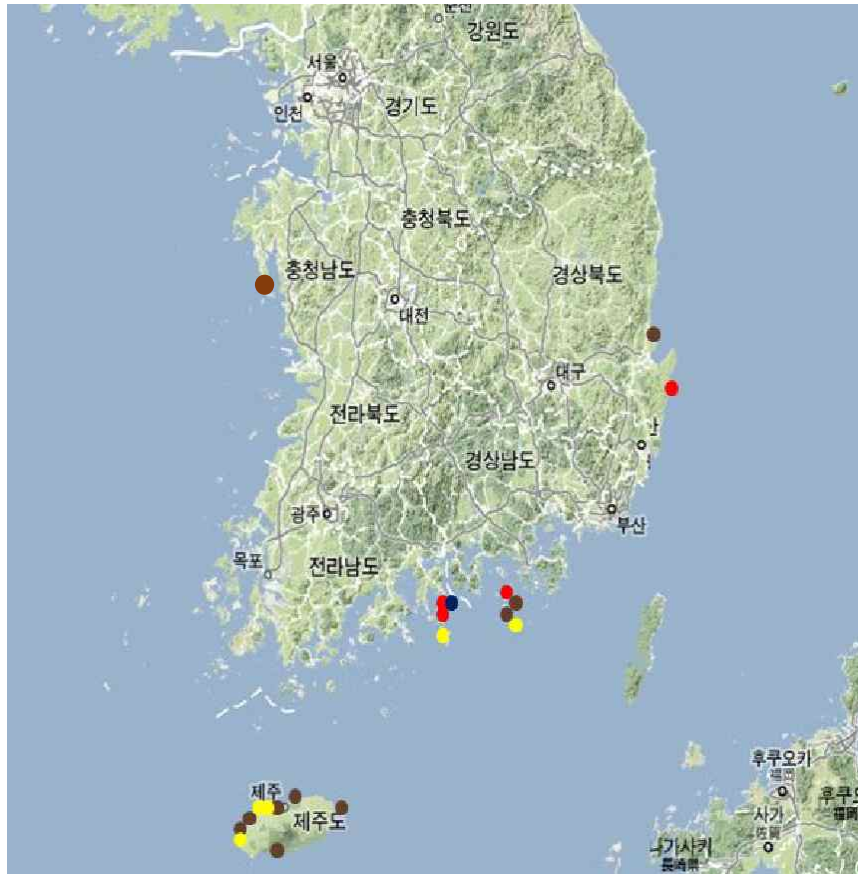
# Background for PICES SEAturtle project

# KIOST Planning task for conservation of Large Marine Animals (2014)



# Sea Turtle Bycatch in Korea

## 국내 바다거북 혼획·좌초 현황



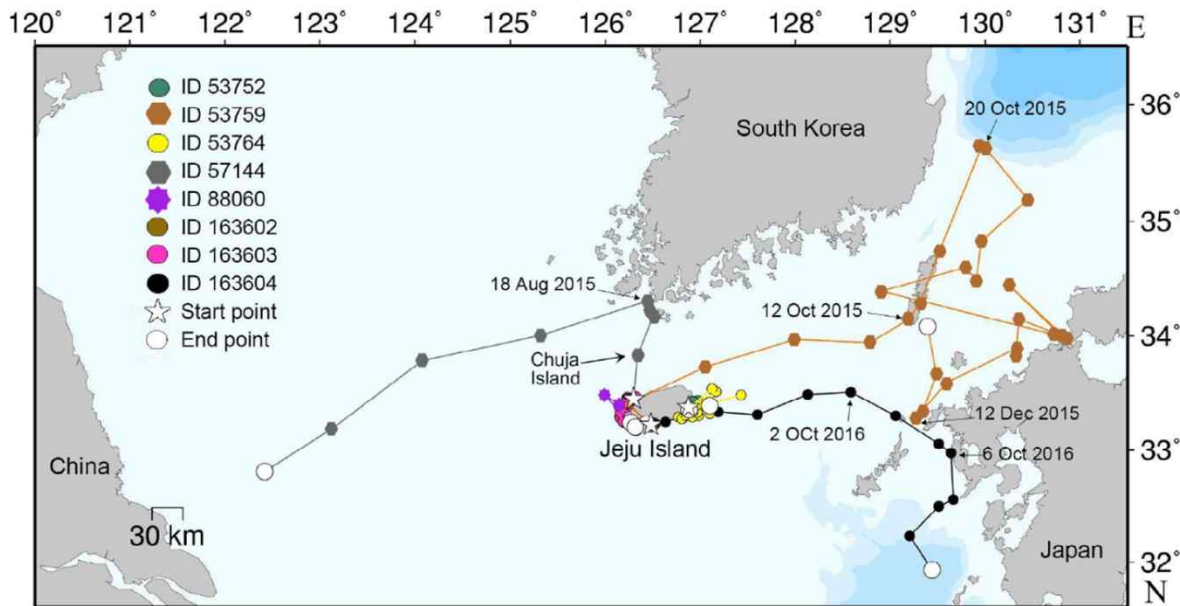
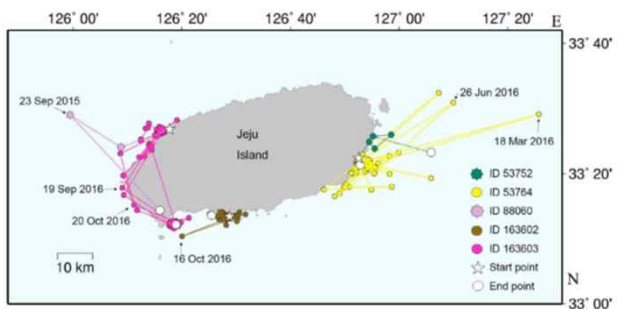
- 붉은바다거북 Loggerhead turtle (4)
- 푸른바다거북 Green Sea turtle (14)
- 장수거북 Leatherback (1)
- 종 미확인 Unidentified (7)



국내 바다거북 혼획·좌초 현황  
(국립수산과학원, 2011)

2011년 제주도 연안  
바다거북 혼획 및 좌초

# Tracking green sea turtles rescued from pound nets in Jeju Island (2015-2017 제주도 푸른바다 거북의 이동경로 추적)



Sea turtle from Kagoshima, Japan (ID 53759)



Jang et al. (2018) Chel Cons Biol

# PICES Special Project

## SEAturtle

# Project Goal and Key Questions

- The overall project goal is to research the sea turtle population found in the North Pacific regions centering on Jeju Island of Korea to enhance the understanding of their habitat use and ecology related to anthropogenic activities. The project key questions are: (a) How the sea turtles found in Jeju Island, Korea, Kyusu Island, Japan, and Hongkong, China are connected to the other identified populations in the North Pacific areas and (b) What are the major environmental stressors to the sea turtles in the North Pacific regions.

# Duration and Funding

- The maximum project lifetime is 4 years: from the starting date of the project in 2018 to November 30, 2022. Funding for Year 1 (FY 2018), with ending November 30, 2019, is set at CAD 75,000. This amount includes a 13% overhead to be retained by PICES and Inha University to coordinate the project. Total funding for four years of this project is CAD 300,000.



# Major Initiatives

- The project is proposed to focus on the following two major initiatives:
  1. Identifying the ecological information of the sea turtle population through the use of advanced tagging technologies, DNA analysis, and stable isotope analysis
  2. Identifying the ecological threats (collect environmental information on the habitat and bycatch/stranding monitoring in Jeju Island) and conducting behavioral experiments (*e.g.*, testing the behavioral response to marine plastic debris) using individuals in the aquarium.



The North Pacific Marine Science Organization

SUMMER 2019

# KICK-OFF meeting for PICES SEAturtle project



*Two day of networking, fostering community and  
identifying opportunities for collaboration*

**AUGUST 26 -27** ▪ 2019 10 am – 4 pm ▪ Jeju International Marine Science  
Center for Research & Education of KIOST, Seminar Room  
2670, Iljudong-ro, Gujwa-eup, Jeju-si, Jeju-do, Republic of Korea

Participants: Taewon Kim, George Balazs (USA), Hideaki Nishizawa (Japan), Connie Ka Yan NG (Hong Kong), Miyeon Kim, Soojin Jang, Jibin Lim, Byeongyong Park, Jeongju Ha



# Member Presentations



- Discussion on Members, collaborators, and partners
- Ongoing SEAturtle project (Trash monitoring and Tagging)
- Connectivity between Asian countries and East Pacific countries: Questionnaire development

# Release of rescued sea turtle with the first PICES iridium tag!



Recorded by Connie Ng

2019.Sept.22

지도에 대한 설명을 입력하세요.

범례

- ??
- 지형지물 1
- ▲ 지형지물 2

2019.09.10 07:00:00  
2019.09.07 13:00:00  
2019.09.06 19:00:00  
2019.09.06 14:00:00  
2019.09.06 10:00:00  
2019.09.06 07:00:00  
2019.09.06 04:00:00  
2019.09.06 00:00:00  
2019.09.05 21:00:00  
2019.09.05 18:00:00  
2019.09.05 13:00:00  
2019.09.05 07:00:00  
2019.09.04 20:00:00  
2019.09.04 08:00:00  
2019.09.02 08:00:00  
2019.09.01 22:00:00  
2019.08.28 19:00:00  
2019.08.28 20:00:00

Google Earth

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Data SIO, NOAA, U.S. Navy, NGA, GEBCO  
©2018 DeLorme  
Image Landsat / Copernicus

100km



# PICES SEAturtle project road map

	Year 1	Year 2	Year 3	Year 4
Tracking Jeju Sea Turtles	3 iridium tags (at least one logger head)	3 iridium tags (at least one logger head)	3 iridium tags (at least one logger head)	3 iridium tags (at least one logger head)
Trash monitoring	Jungmun	Foraging grounds		
Tracking Green Sea Turtles in Japan (Ishigaki)		2 iridium tags	1~2 tags depending on the results	
Sea Turtle monitoring interviews (Questionnaire)	Korea (demonstration, standardization)	N = 15 ~25 Korea Japan Hong Kong Hawaii (?)	USA Canada China (?)	
Meeting	Kick-off meeting (Jeju) PICES business meeting(Canada)	PICES business meeting	PICES business meeting	Wrap-up meeting

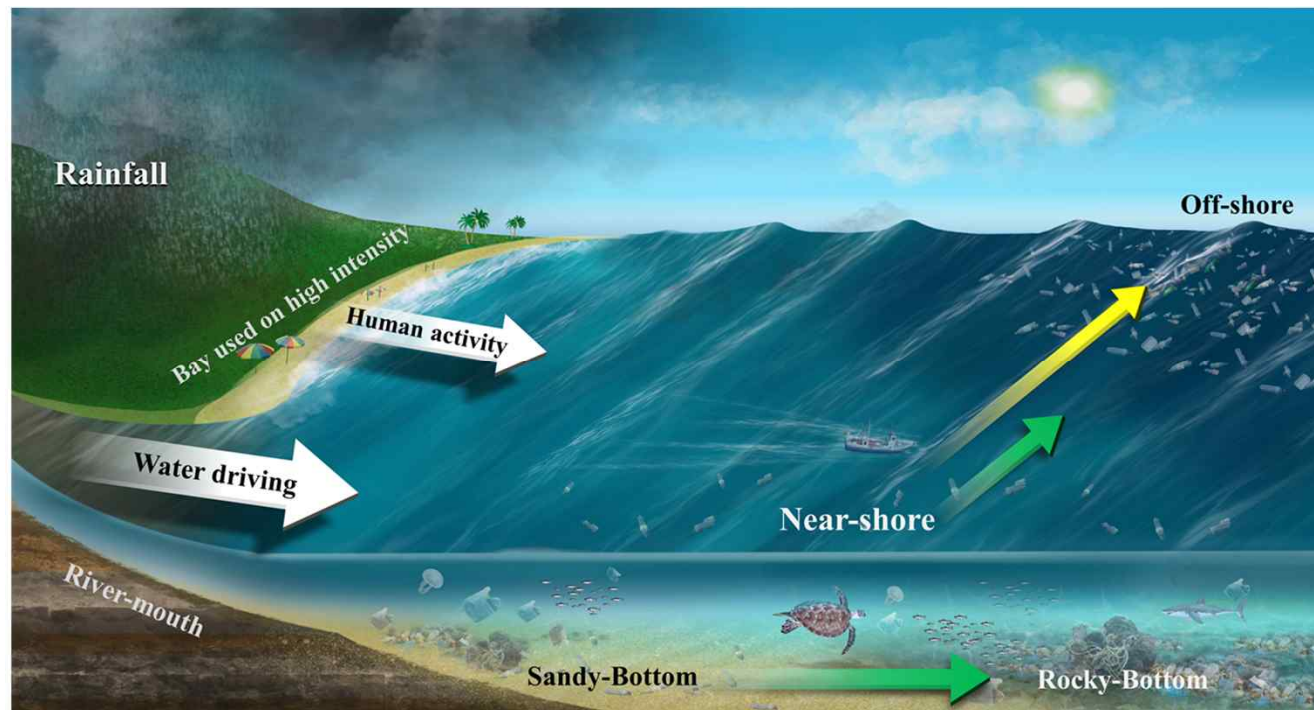


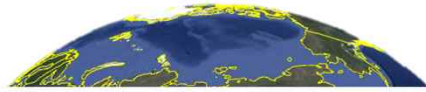
# Loggerhead turtle rescued



# Trash monitoring

- Objective: Monitoring trash as possible risk for sea turtles in the subtidal areas of beach
- Place: Jungmun Saekdal beach, Jeju Island, Korea
- Period: Aug 19- Sep 8, 2019





- In 2017, 83 individuals
- In 2018, 13 individuals
- In 2019, 14 individuals
- were released here.



Joong-Moon Beach

[아시아경제 주상돈 기자] #2018년 8월29일 해양수산부는 멸종 위기에 처해 있는 붉은바다거북을 제주 앞 바다에서 방류했다. 개체 수 회복을 위한 조치였다. 하지만 위치추적기와 개체인식표를 부착한 붉은바다 거북은 부산 연안에 이르러 움직임이 멈췄고 방류 11일 만에 폐사한 상태로 발견됐다. 국립생태원 연구원에서 부검한 결과 몸길이 42cm인 3년생 붉은바다거북 한 마리에게서 10.24g에 달하는 쓰레기가 발견됐다. 뱃속에 쌓인 비닐과 플라스틱 조각 등의 해양 플라스틱 탓에 폐사한 것이다. 거북의 뱃속에서 발견된 쓰레기 종류는 과자·라면 봉지, 비닐, 플라스틱 등 다양하다. 사람들이 무심코 해변에 버린 쓰레기가 바다로 흘러 들어갔고 거북은 그것을 먹어 결국 이 쓰레기들을 삼킨 것이다.

*11 days after, the loggerhead turtle was released, it was found dead because of eating plastics.*



## the Saekdal-Beach in Jeju-Island

Every year, more than 200,000 of people visit here





# Materials & Methods

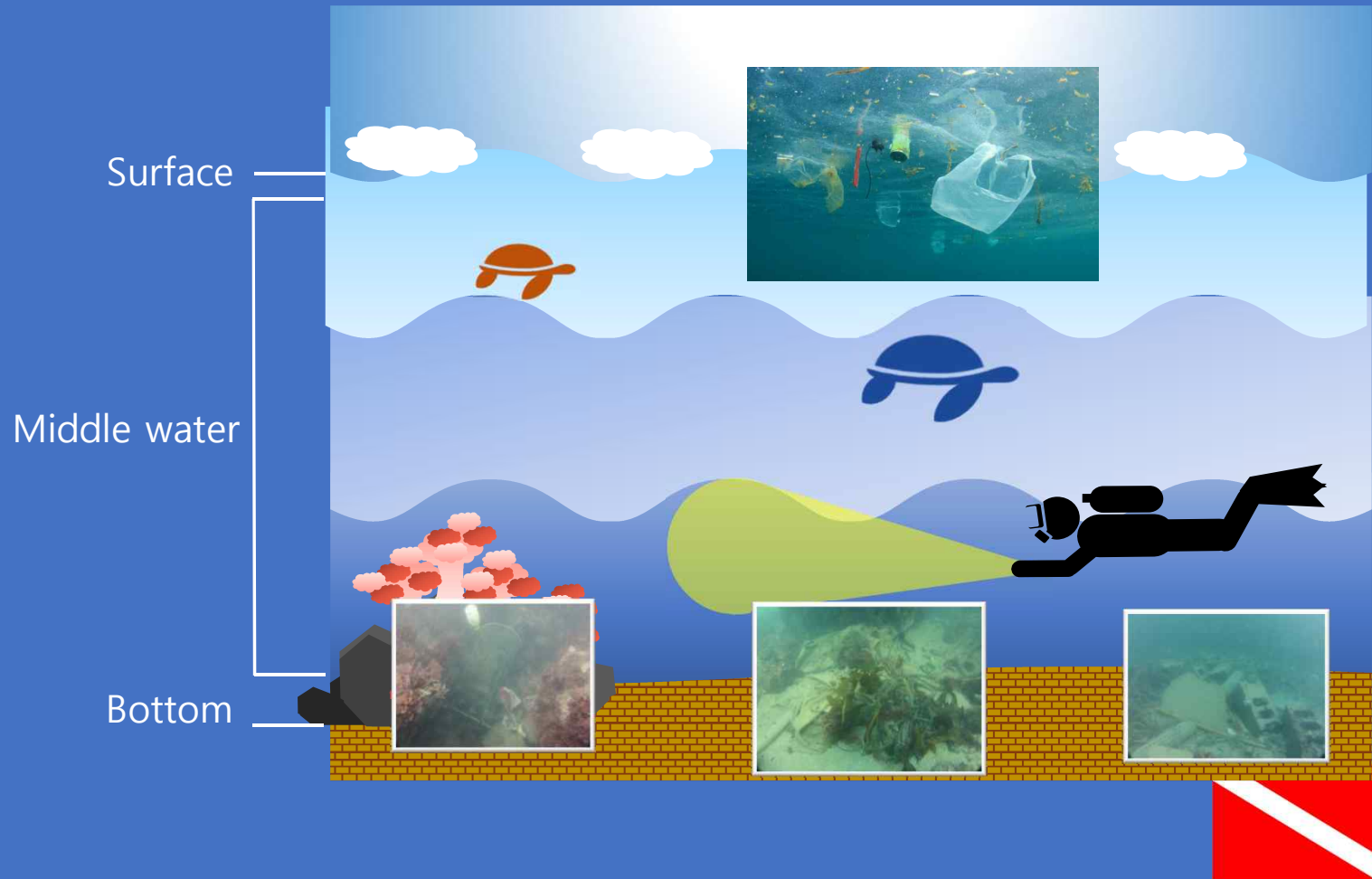
## Dive research



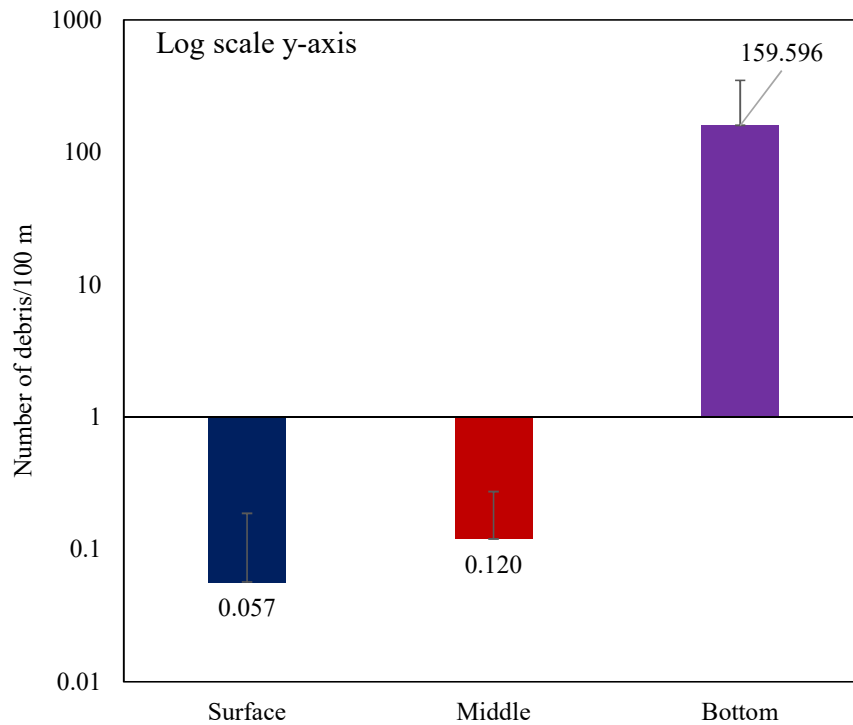
MARINE ZOOLOGY  
LABORATORY

Department of Ocean Science, Inha-University, Republic of Korea

- ✓ Underwater Volunteers NSW (UVNSW) protocol



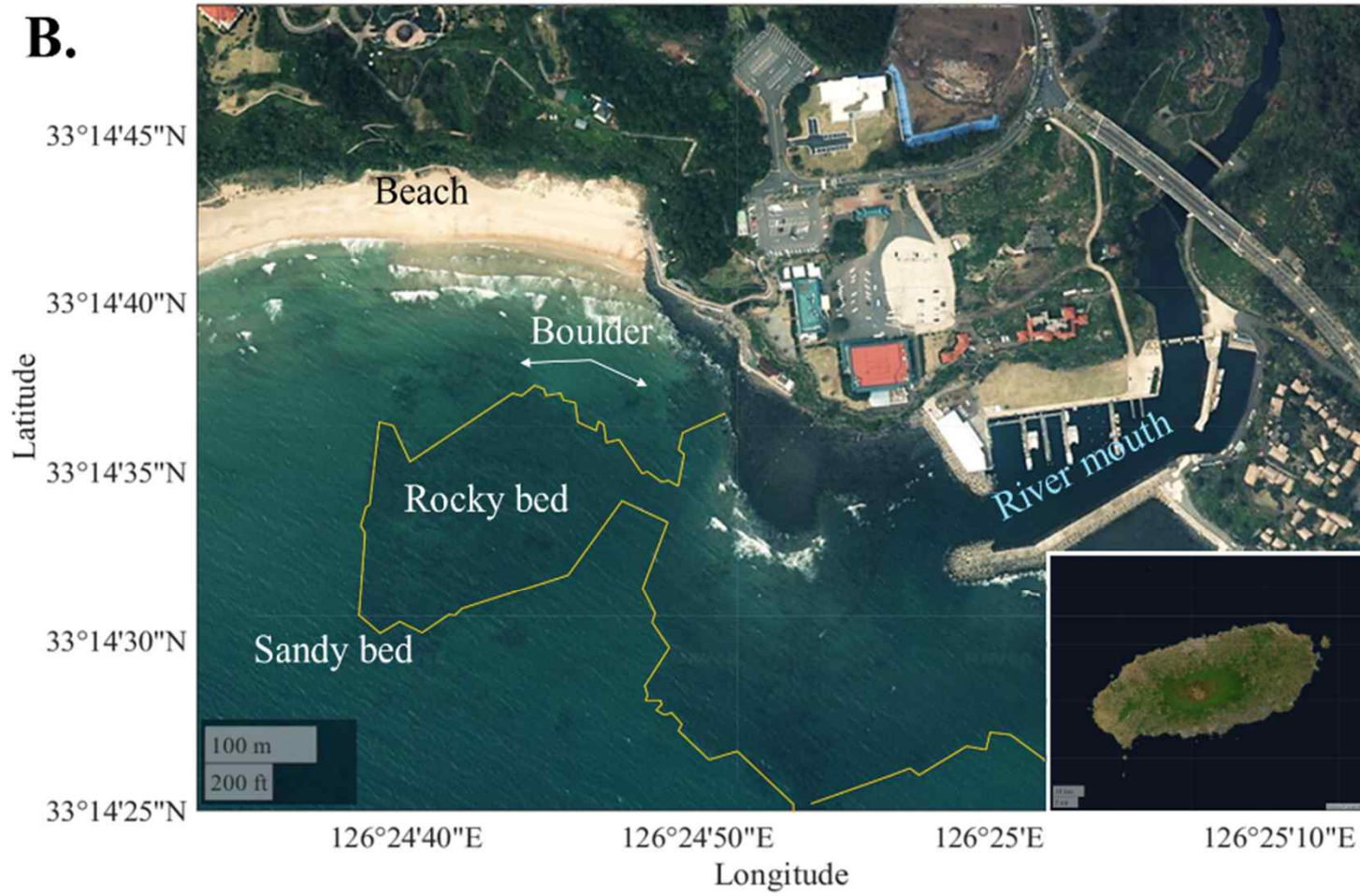
Bottom has extremely more plastic debris than surface and middle part of the water column.



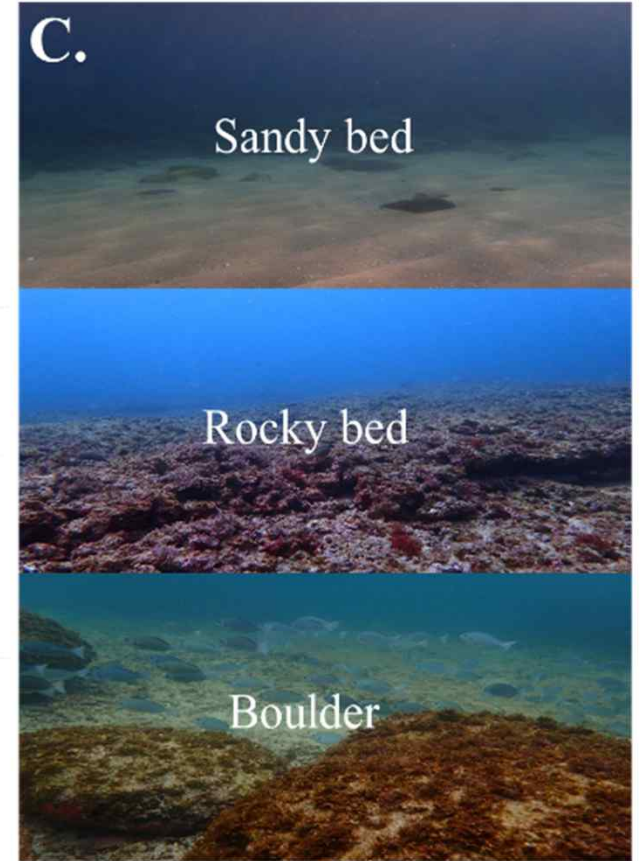
Kruskal Wallice test,  $\chi^2 = 37.593$ ,  $p < 0.0001$ \*



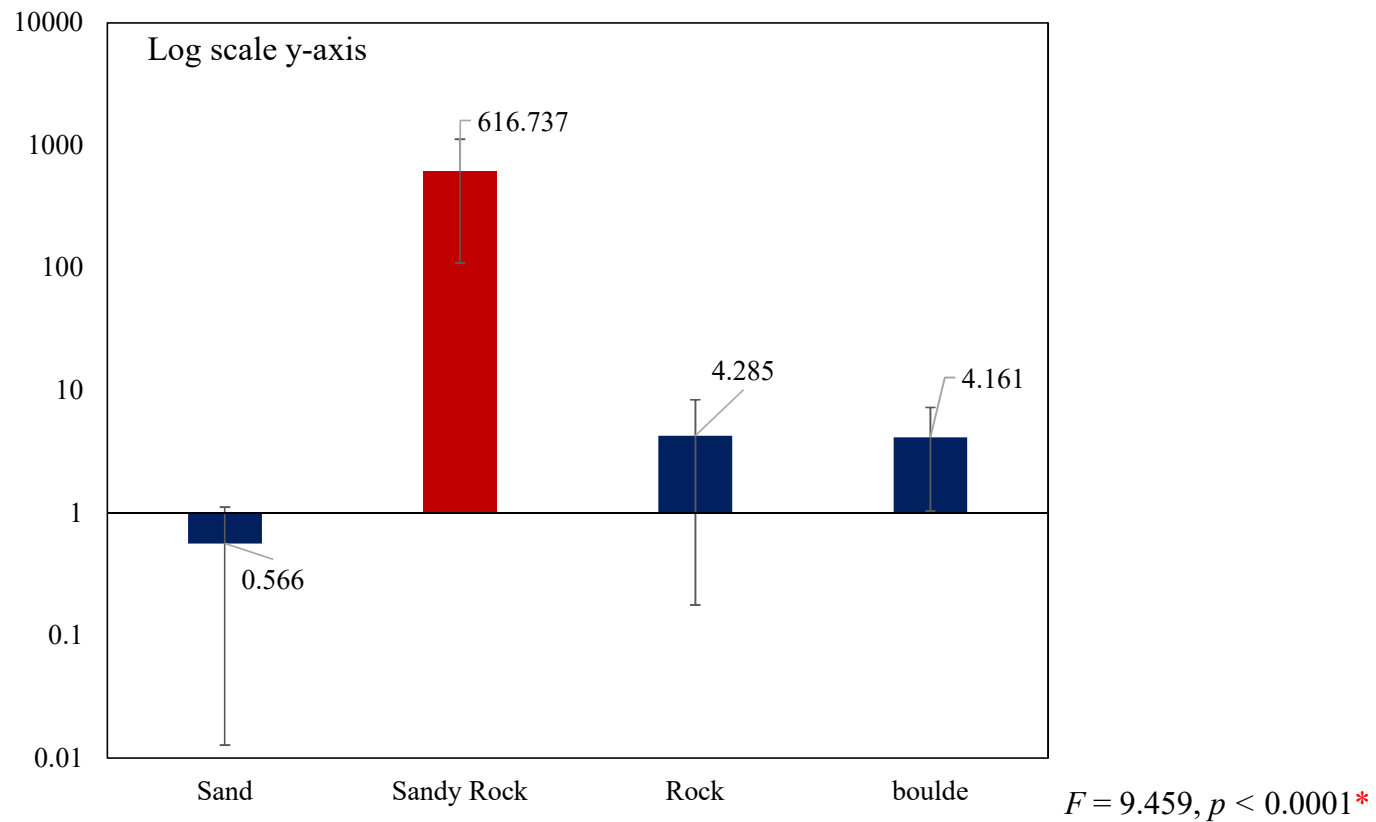
**B.**



**C.**



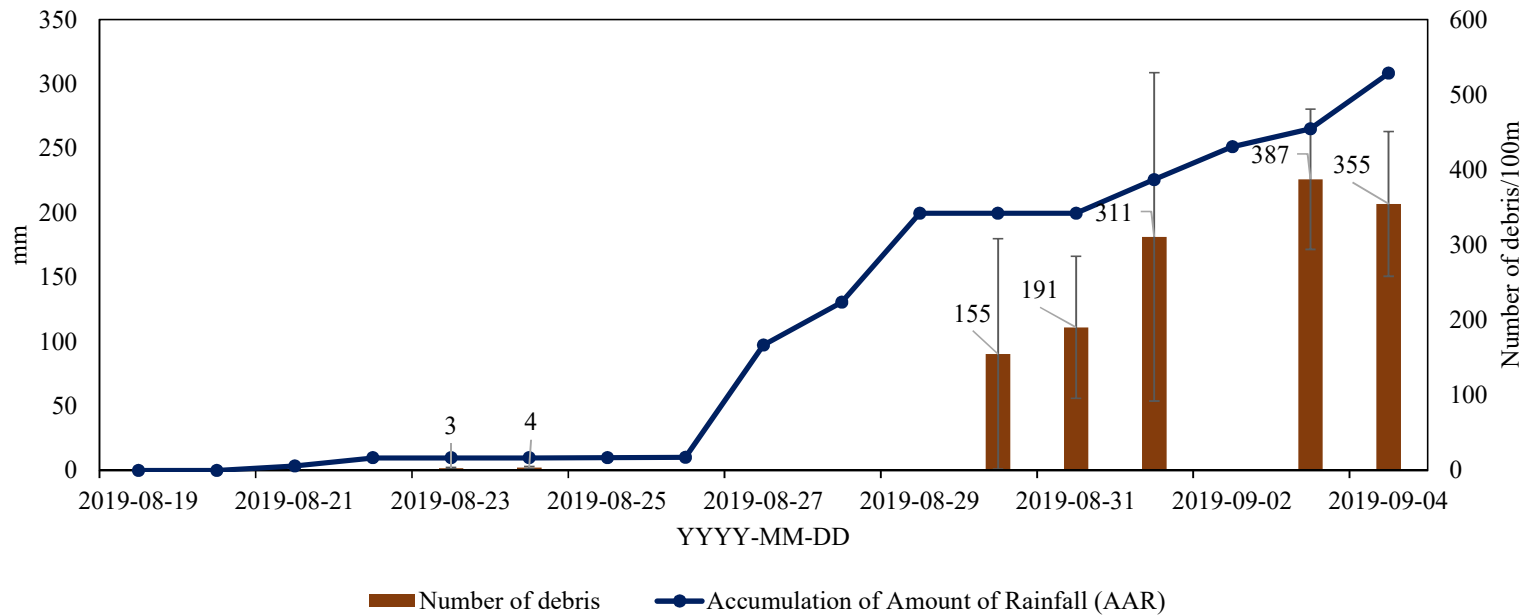
# Sandy Rock bottom has more plastic debris than any other typed bottoms



- ✓ Total Area : 48,541  $m^2$
- ✓ Average  $8.603 \pm 7.625$  fragments /  $m^2$  (maximum 39 fragments/ $m^2$ ) of marine debris ( $\geq 25mm$ ) were discovered.



After the rainfall, amount of debris significantly increased.





**브이라면 (株) 農心개발**

**새상품**

본이라면은 대표(辛香)는 라면의 느끼한 맛을 제거시킨 브이라면용새로 맛을 최급시판에 들어갔다.

본이라면은 『스프』에 야채를 풍부하게 넣고 식물성 팔유를 사용, 느끼한 맛을 완전히 제거시켰다!

고 메이키측은 설명, 또한 면발이 가늘고부드러우며, 소량의 카레가 가미되어 있어, 향긋한 뒷맛을 느낄수 있다고...

農心은 브이라면 생산을 위해 日本에서 최선 식기재를 도입, 安養공장에 설치 했다.

본이라면 소비자가 겨 1팩 20개당 95원.

# Necropsy with WWF Korea (Youngran Lee)





# Aquarium experiment

## |Research facility



◎ Lotte World Aquarium

Lotte World Tower B2F

◎ Captive Sea Turtles

- Hawksbill Sea Turtles ( $N = 8$ )

◎ Experimental hour

Once every week AM 8:30~ 9:30

Oct 24, 15:40-16:00, S7 [Saenich-2]

*Environmental indicators of plastic pollution in the North Pacific*



## The feeding preference for the color of plastic debris in the hawksbill turtle, *Eretmochelys imbricate*

Taewon **Kim**<sup>1</sup>, Seonmyeong Choo<sup>1</sup>, Jibin Im<sup>1</sup>, Soojin Jang<sup>2</sup>,  
<sup>1</sup>Department of Ocean Sciences, Inha University, Incheon, Korea  
<sup>2</sup>Ewha Womans University, Seoul, Republic of Korea



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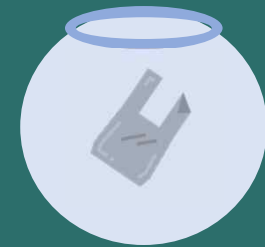


# Can't sea turtles discriminate jellyfish and plastic bags?



Hawksbill turtle

## Visual cue



## Olfactory cue



# SEAturtle Bus. Mtg. with George Shillinger and Nobuaki Suzuki (Oct 19, 2019)



*Our beginnings were feeble, but our end would be grand.*  
Thank you!

