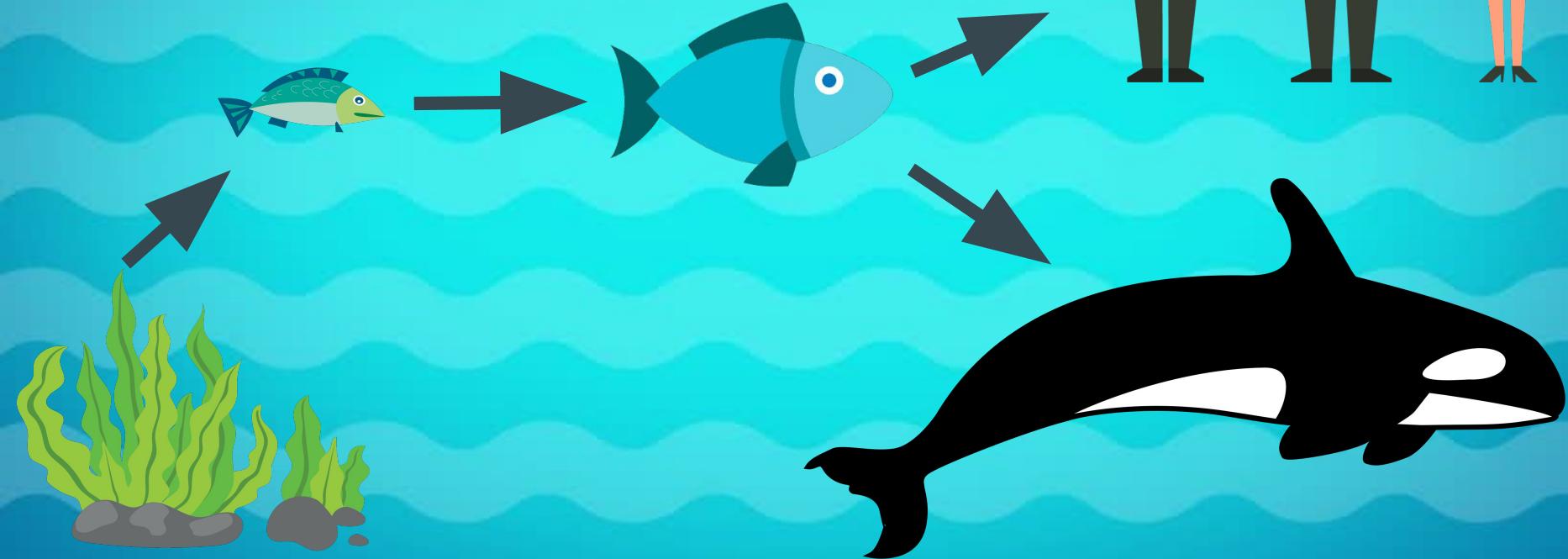


The background of the image is an underwater scene showing several fish swimming in a blue-green ocean. A prominent yellow and orange rockfish is in the center foreground, facing left. Other fish of various sizes and colors are scattered throughout the water.

Why should we care about how many  
fish are in the ocean?

# Food chain





# Money and Jobs

Revenue from fishing industry in US:  
**\$205 billion**





# Fishing for fun!



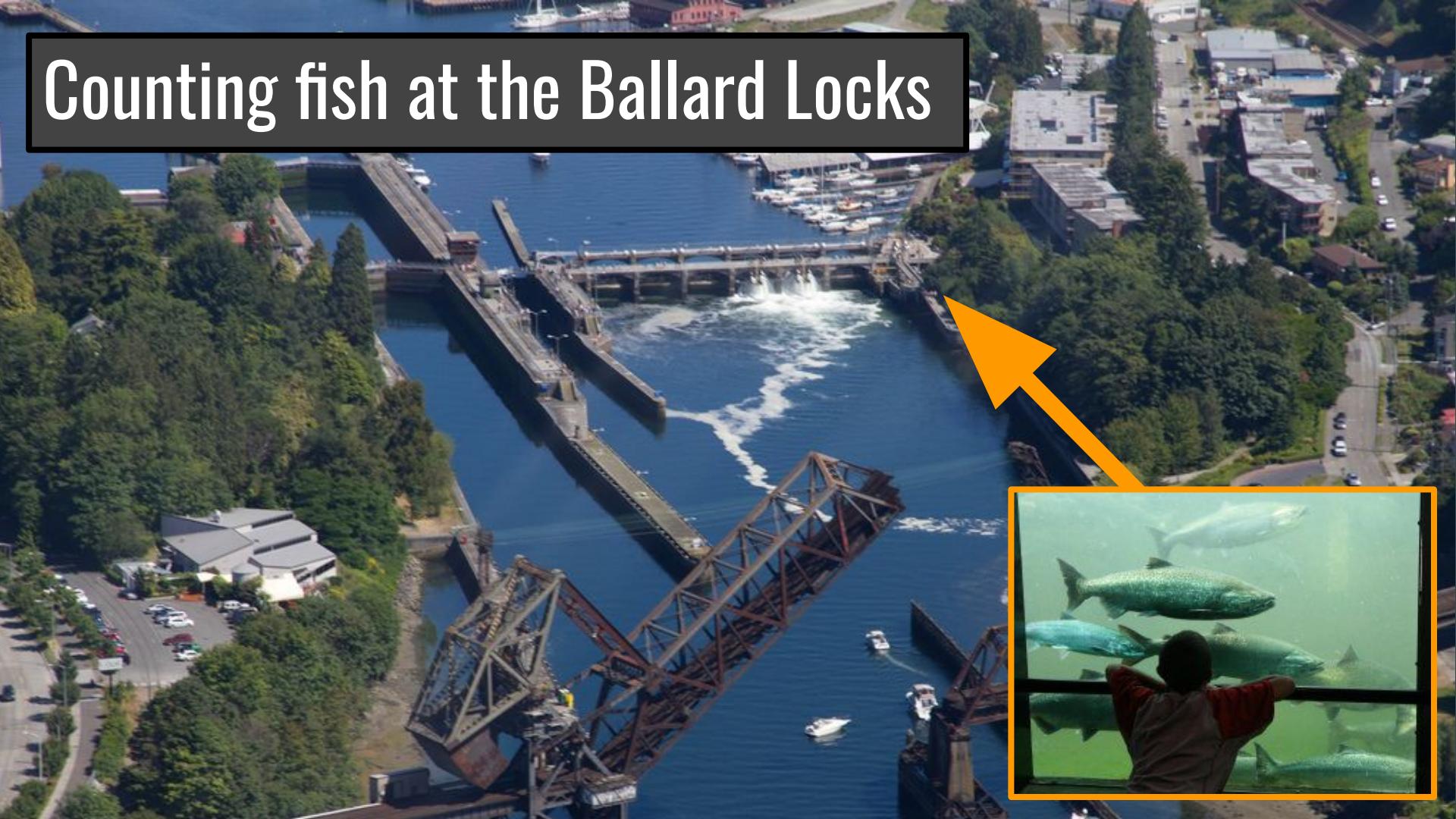
A wide-angle photograph of a river flowing through a forest. In the foreground, numerous salmon are swimming upstream, their bright red bodies contrasting with the blue water. A large pile of fallen logs rests on the left bank. The background features a dense forest of green and yellow autumn trees, with a hill rising behind them under a clear sky.

# How do scientists count fish?

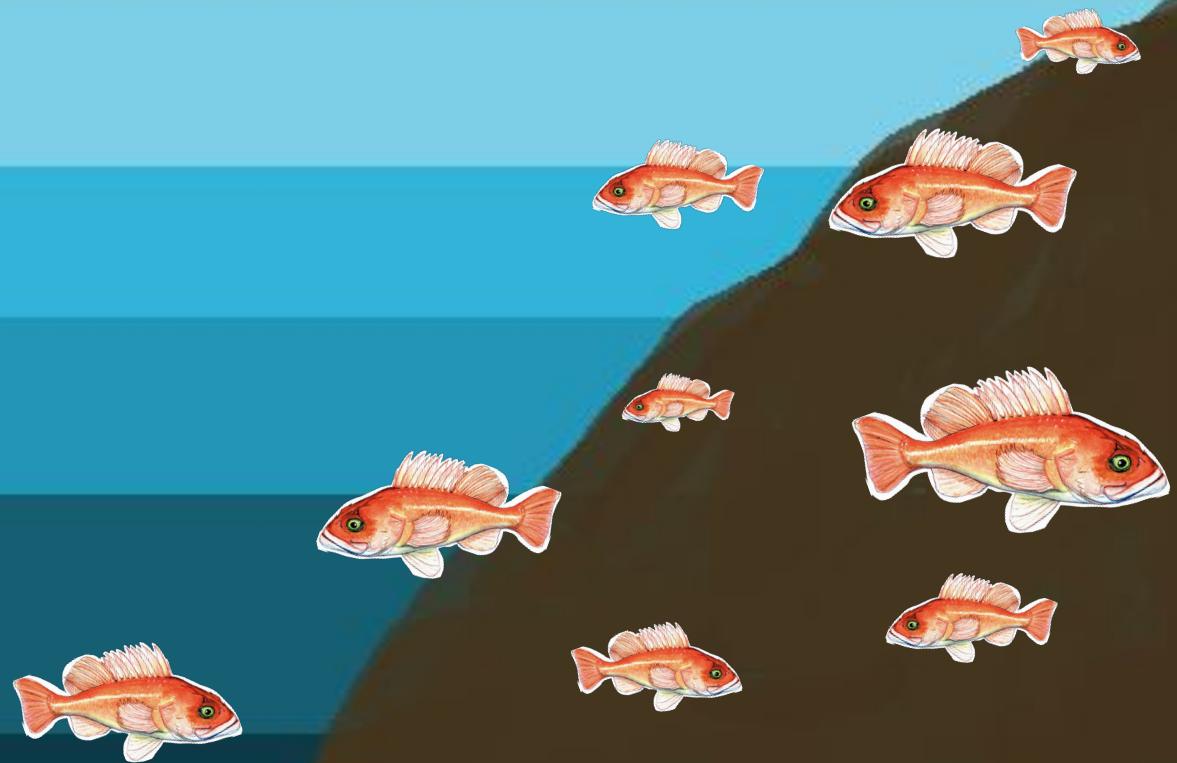
# Ballard Locks



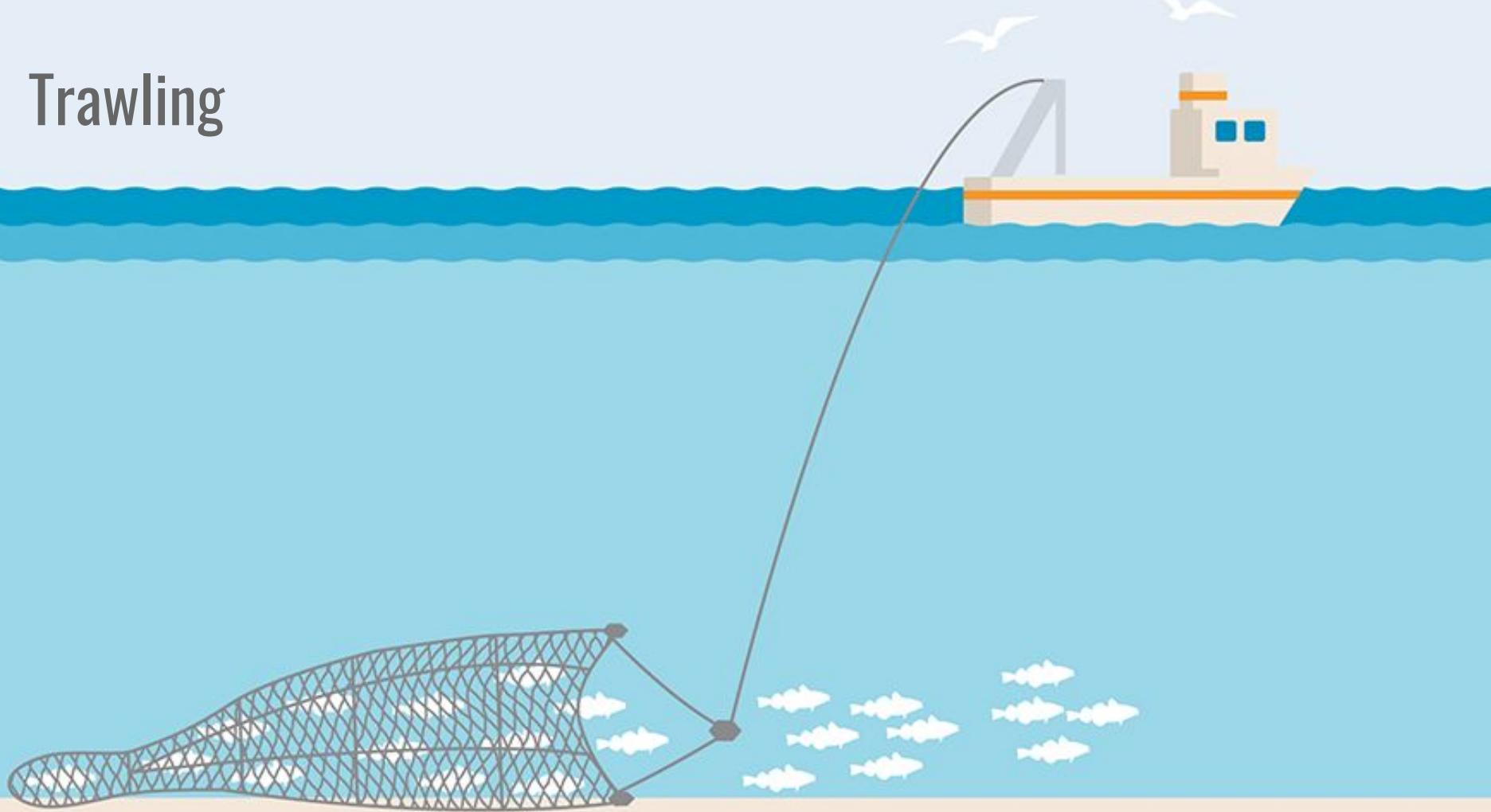
# Counting fish at the Ballard Locks



# How do you count a fish under the sea?



# Trawling



# Scuba



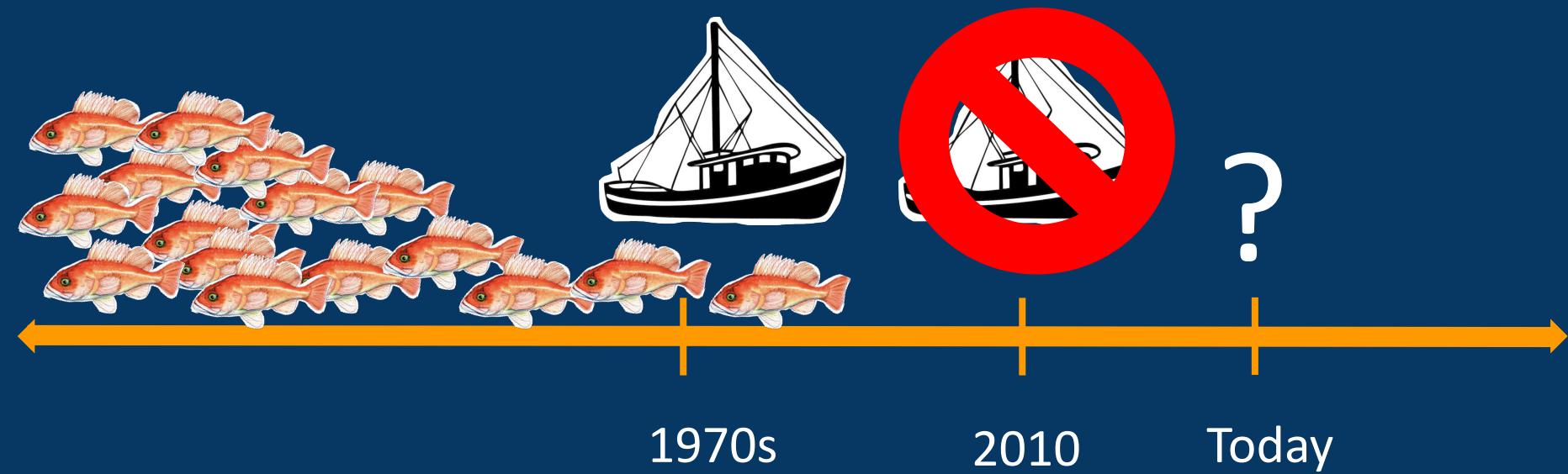
# ROVs: Remotely Operated Vehicle



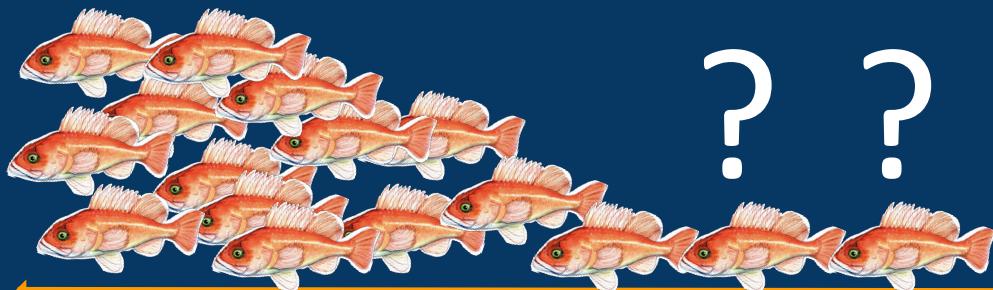
Still Footage from Washington Department of Fish and Wildlife



# Timeline of rockfish in Puget Sound



# How many fish are there?



**Fish scientists needed!!**

Call: 123-456-FISH



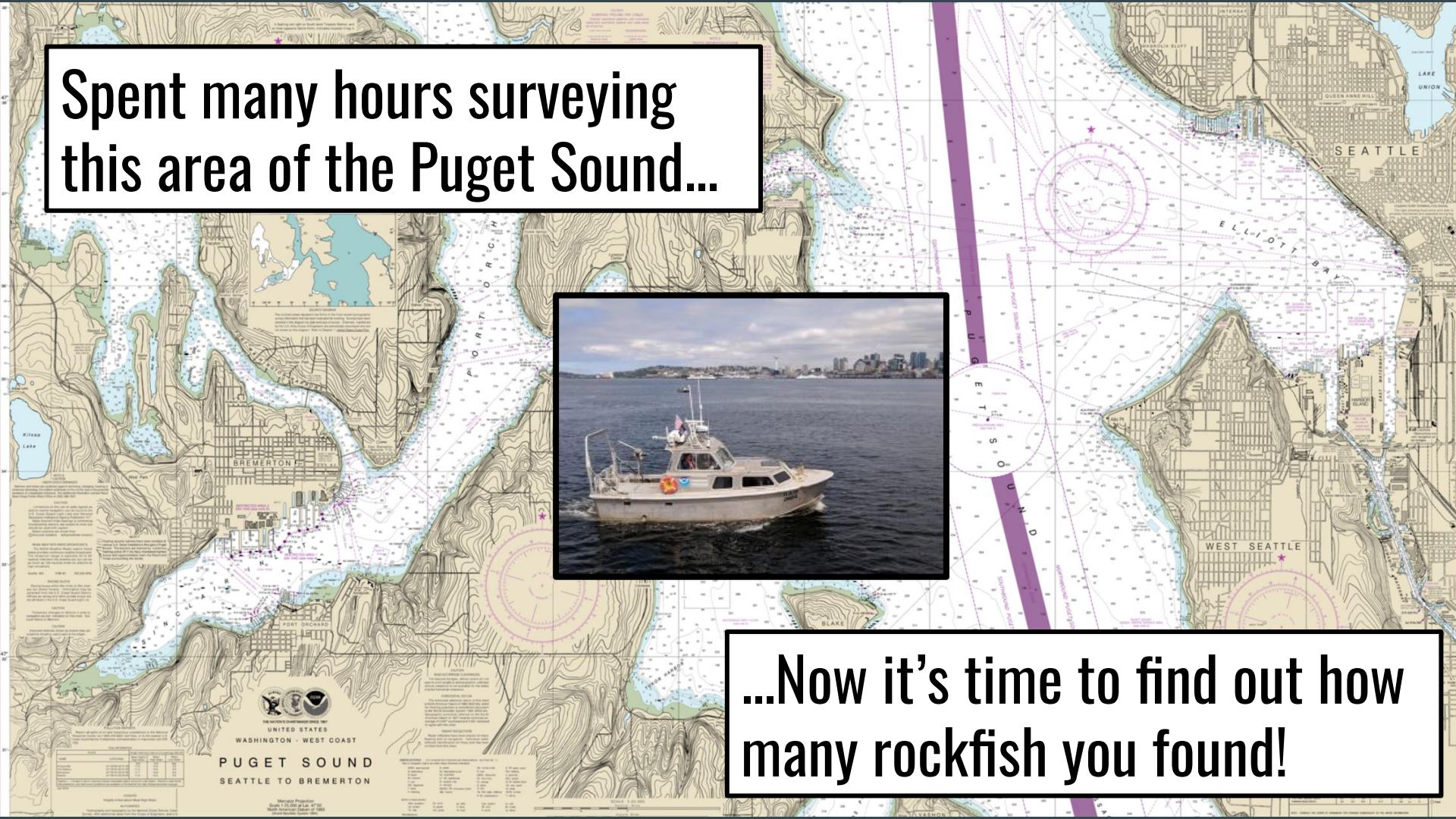
WDFW and NOAA have chosen you to answer:

- How big is the rockfish population in the Puget Sound?
- Which type of habitat do rockfish use?

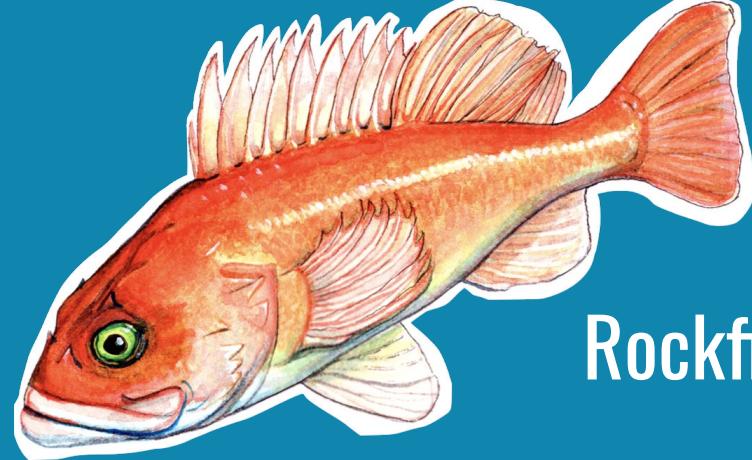


Washington Department of  
**Fish and Wildlife**

Spent many hours surveying  
this area of the Puget Sound...



...Now it's time to find out how  
many rockfish you found!

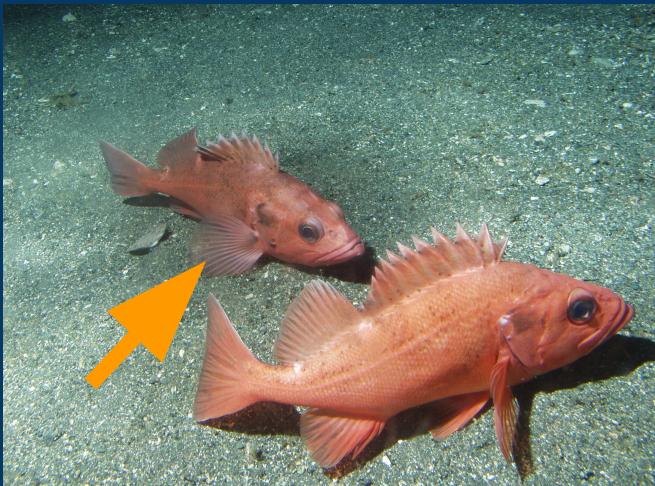
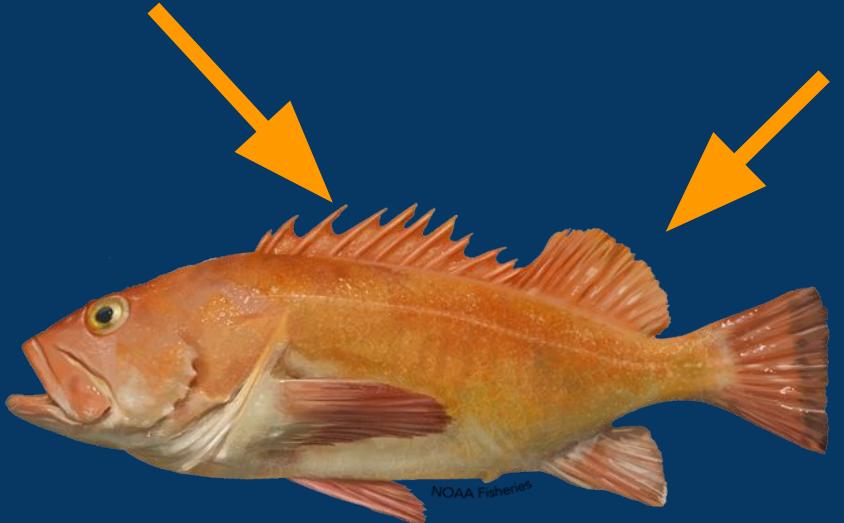


## Rockfish

- 28 species in the Puget Sound
- Can live up to 150 years!



# Rockfish Characteristics



# Rockfish Identification

Circle pictures that show rockfish.



# Rockfish Identification

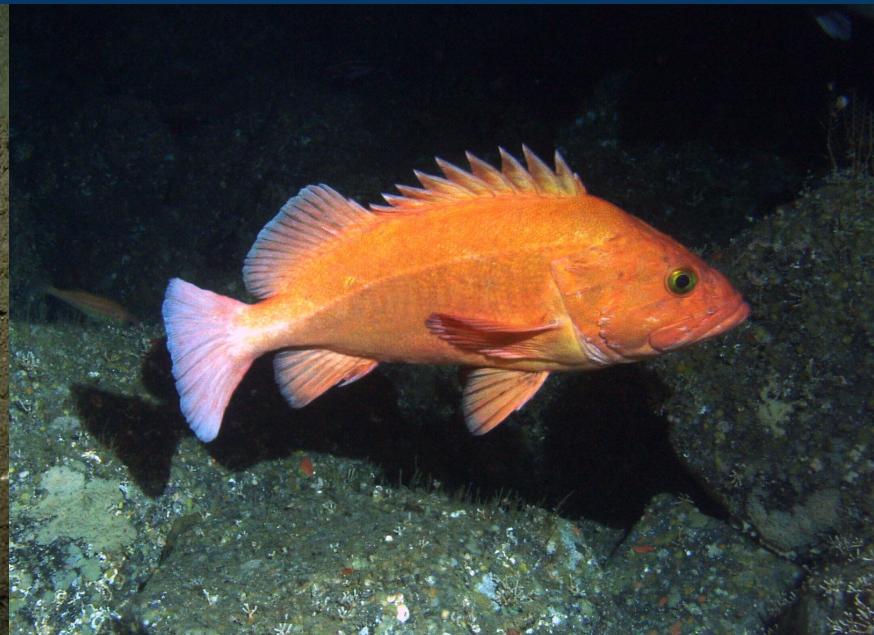
Circle pictures that show rockfish.



# Rockfish hovering video



# Ratfish versus rockfish



3509-18P 122.4m  
-5 -14R -31

APR 15 15  
17:55:55  
H121\_

0,W,-1,00,0.0,0.0,M,,\*,#03,,#120000.0000  
\$GPGLL,175552.77,4745.87795,N,12224.1332

**Low Relief**



**High Relief**



# Low Relief



# High Relief



033 -10P 92, 2m  
+2 +25R -34

JUL 08 15  
12:02:16  
H105

B,W,-1.00,0.0,0.0,M,,,406,,#2C0000.0000  
50PGGR,120204.94,4722.33952,N,12224.1681

130 +4P 74.0m  
+I -17R -33

MAR 11 15  
12:13:11  
H003

9,W,-1,00,0.0,0.0,M,,, \*0C,, \*032249.0077  
\$GPGLL,121309.31,4742.71646,N,12248.9999

3379-11P 76.5m  
-4 -1R -35

DEC 14 15  
15:53:06  
H041

0,W,-1,00,0.0,0.0,M,,, \*08,, \*032223.1998  
\$GPGLL,155258.74,4728.39377,N,12222.5230

Record on your Data Collection Form:

122.4m

Date

Depth

Site Number

0,0,-1,00,0.0,0.0,N,,,#03,,#120000.0000  
\$GPGLL,175552.77,4745.87795,N,12224.1332

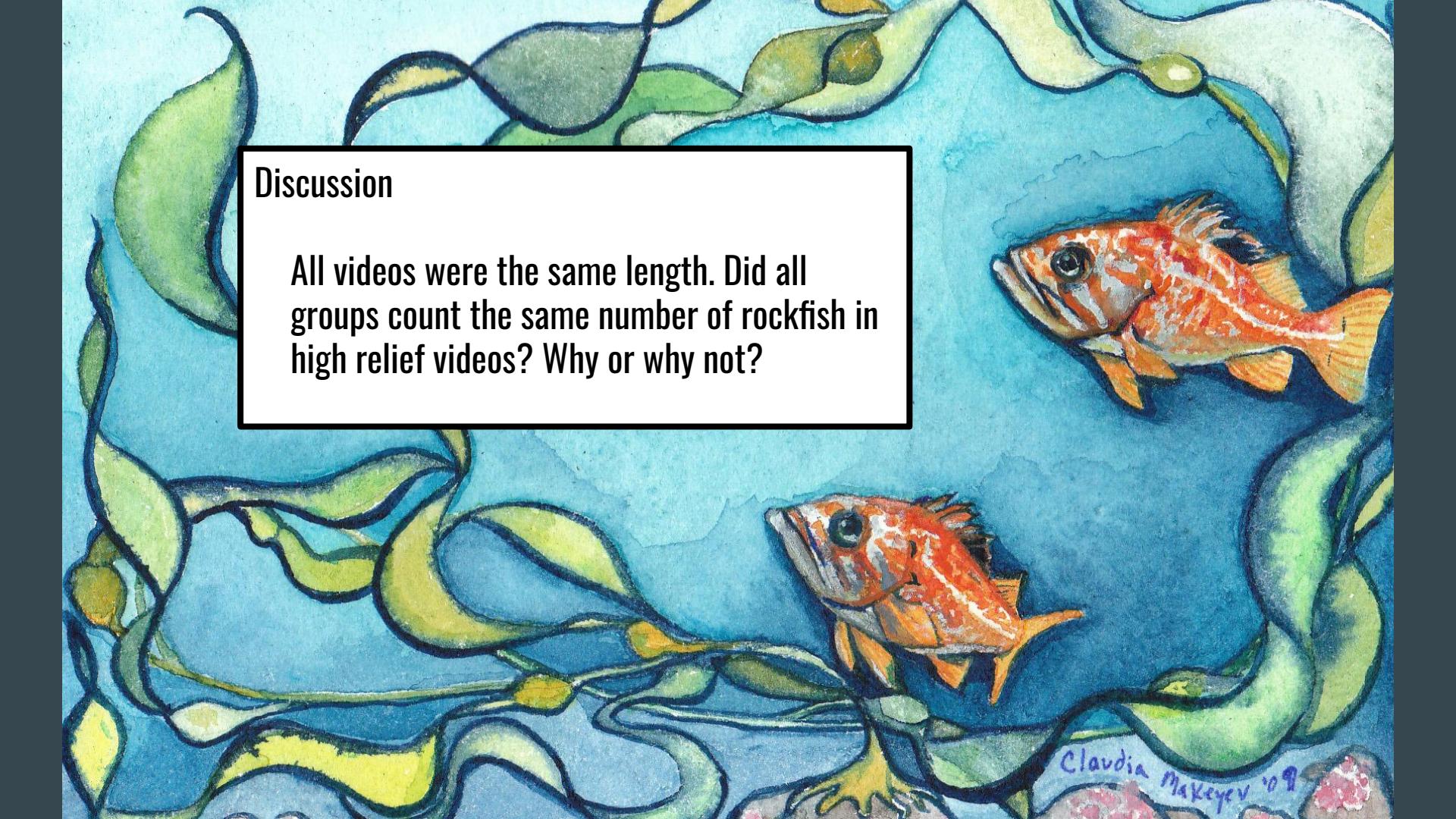


## Discussion

What challenges were there to counting rockfish using the ROV?

## Discussion

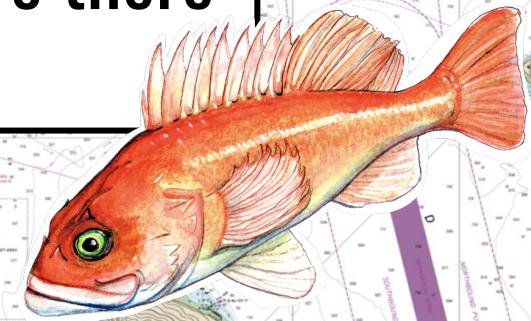
In which habitat type were rockfish most abundant?



## Discussion

All videos were the same length. Did all groups count the same number of rockfish in high relief videos? Why or why not?

# How many rockfish are there in Puget Sound?



# Main takeaways:

- There are many reasons we care about the size of fish populations.
- In Puget Sound, rockfish populations are surveyed with ROVs.
- We can identify rockfish based on appearance.
- We can figure out how large the rockfish population is using ROV video.
- Rockfish prefer high relief habitat.



Thank you!!

Claudia Makayev '09



# Low Relief Habitat Example

220 -30P 75. 9m  
+1 -4R -33

MAR 11 15  
12:18:10  
H003

S, W, -1, 00, 0. 0, 0. 0, M, ., ., \*02, , \*032249. 0077  
\$GPGLL, 121808. 42, 4747. 67939, N, 12249. 0115

# High Relief Habitat Example

