



Modeling Marine Ecosystems With Virtual Reality: Ocean Food Web Module Worksheet #1

Research an Organism

Organism	
Size	
What it eats	
Predators	
Interesting Information	

NOAA's "Find a Species" web site (www.fisheries.noaa.gov/find-species) is one good source of information about marine organisms. However, feel free to use information from any reliable source to fill in the table.



Modeling Marine Ecosystems With Virtual Reality: Ocean Food Web Module Worksheet #2

Gulf of Maine: Cod & Herring Biomass Data

Species	Biomass (metric tons)	Trophic Level*
Atlantic Cod		
Atlantic Herring		

* For trophic level, use relative terms such as “high”, “medium”, “low”, “highest” and “lowest”.

Get biomass data for cod and herring from the graphs within the VES-V simulation software!

Virtual “Dive” Location: Northeast region, Gulf of Maine, sand flats habitat, using the default “Baseline” scenario dataset

Prey/Predator Biomass Ratio: _____
(herring biomass divided by cod biomass)

Hypotheses: Biomass vs. Trophic Level

Fill in the blank in the following statement with “more”, “less” or “the same” to state your hypothesis about the relationship between biomass and trophic level:

A population of organisms with a **higher** trophic level usually has _____ biomass compared to a population with a **lower** trophic level.

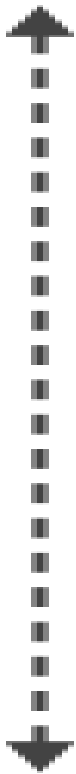


Modeling Marine Ecosystems With Virtual Reality: Ocean Food Web Module Worksheet #3

Hypothesis: Biomass in Monterey Bay

Next to the scale below, write each of the four words “sardine”, “orca”, “sea lion” and “blue whale” at places along the scale that correspond to the relative amount of biomass you expect for each organism. Use your knowledge of the relationship between trophic level and biomass or between organism size and biomass to guide you.

Low Biomass



High Biomass



Modeling Marine Ecosystems With Virtual Reality: Ocean Food Web Module Worksheet #4

Monterey Bay Biomass Data

Species	Biomass in 2044 (metric tons)	Prey/Predator Biomass Ratio	Trophic Level*
Blue Whale			
Orca			
California Sea Lion			
Sardine			

* For trophic level, use relative terms such as “high”, “medium”, “low”, “highest” and “lowest”.

Virtual “Dive” Location:

- West Coast region
- Monterey Bay
- kelp forest habitat
- use the default “Baseline” scenario dataset



Modeling Marine Ecosystems With Virtual Reality: Ocean Food Web Module Worksheet #5

Predator and Prey Biomass Relationships

This worksheet uses data collected previously for worksheets #2 and #4. You do not need to collect any new data to complete this worksheet. Write in your estimates based on the previously collected data.

If the biomass of herring in the Gulf of Maine **increased** by 100,000 tons (from 700,000 up to 800,000), what would you expect to happen to the biomass of cod? Record your estimate in the table below.

Organism	Starting Biomass (metric tons)	New Biomass (metric tons)
Cod	70,000	
Herring	700,000	800,000

If the biomass of sardines along the West Coast **dropped** by 500,000 tons (from 1 million to 500 thousand), what would you expect to happen to the biomass of sea lions? What would you expect to happen to the biomass of orcas? Record your estimates in the table below.

Organism	Starting Biomass (metric tons)	New Biomass (metric tons)
Orca	1,000	
Sea Lion	70,000	
Sardine	1,000,000	500,000



Modeling Marine Ecosystems With Virtual Reality: Ocean Food Web Module Worksheet #6

Mackerel and Predator Biomass Data

- Use data from the coral reef habitat in the Florida Keys in the Gulf of Mexico region. Record the biomass of Spanish mackerel in 1995 and 2012 in the table below.
- Use the **StockAssessments** scenario and dataset. Switch to the StockAssessments scenario from the Baseline scenario (which loads by default) by clicking the green “SCN” (scenario) folder icon in the upper left in VES-V.
- Next, based on your knowledge of the relationship between the biomass of a prey species (such as mackerel) and a predator species, estimate the biomass of the predator in 2012. The biomass of the predator in 1995 was around 15,000 metric tons.
- Finally, record the actual biomass of the predator in 2012 and compare it to your estimate.

	1995 biomass (metric tons)	2012 biomass (metric tons)	Biomass Ratio 2012/1995
Predator, data	15,000		
Predator, estimate	15,000		
Mackerel			

What is the predator species? _____