Herbivores:

Gardeners of the Reef

E ola nā koʻa

Keiki Activity and Coloring Book

‘O ke kahua ma mua, ma hope ke kūkulu.

First the foundation, then the building.
Learn all you can, then practice.

- Mary Kawena Pukui, ‘Ōlelo No‘eau #2459

Hawai‘i Coral Reef Initiative

Holomua Marine Initiative

What are corals?

Life cycle of Coral:

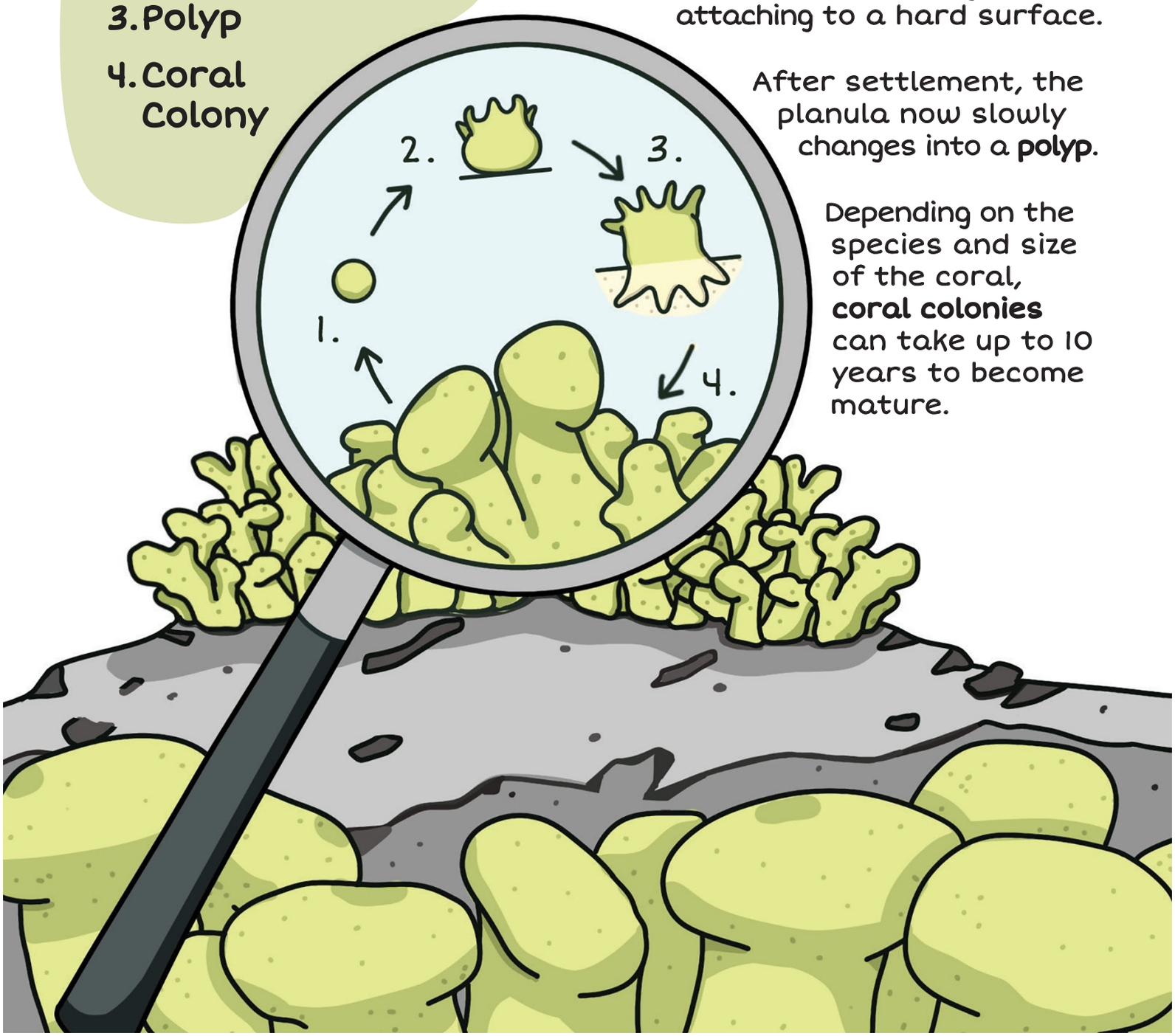
1. Larva
2. Settling
3. Polyp
4. Coral Colony

The first stage of a coral's life is spent as a **larva**, which is known as a planula.

Coral planulae have to find the perfect home for **settling** and attaching to a hard surface.

After settlement, the planula now slowly changes into a **polyp**.

Depending on the species and size of the coral, **coral colonies** can take up to 10 years to become mature.



Crustose Coralline Algae

There is a special type of algae that helps coral reefs grow, called

Crustose Coralline Algae (CCA)

CCA has a hard surface for corals to land and grow. CCA can be pink, red, purple, or green!

How to spot CCA:

Look for firm, pink algae on the corals

With CCA

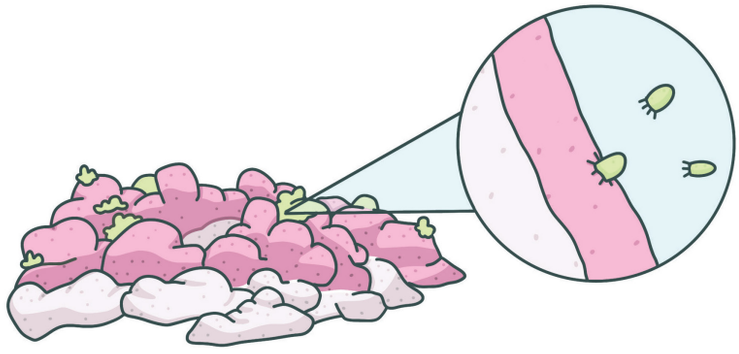
Without CCA

Why is CCA important?

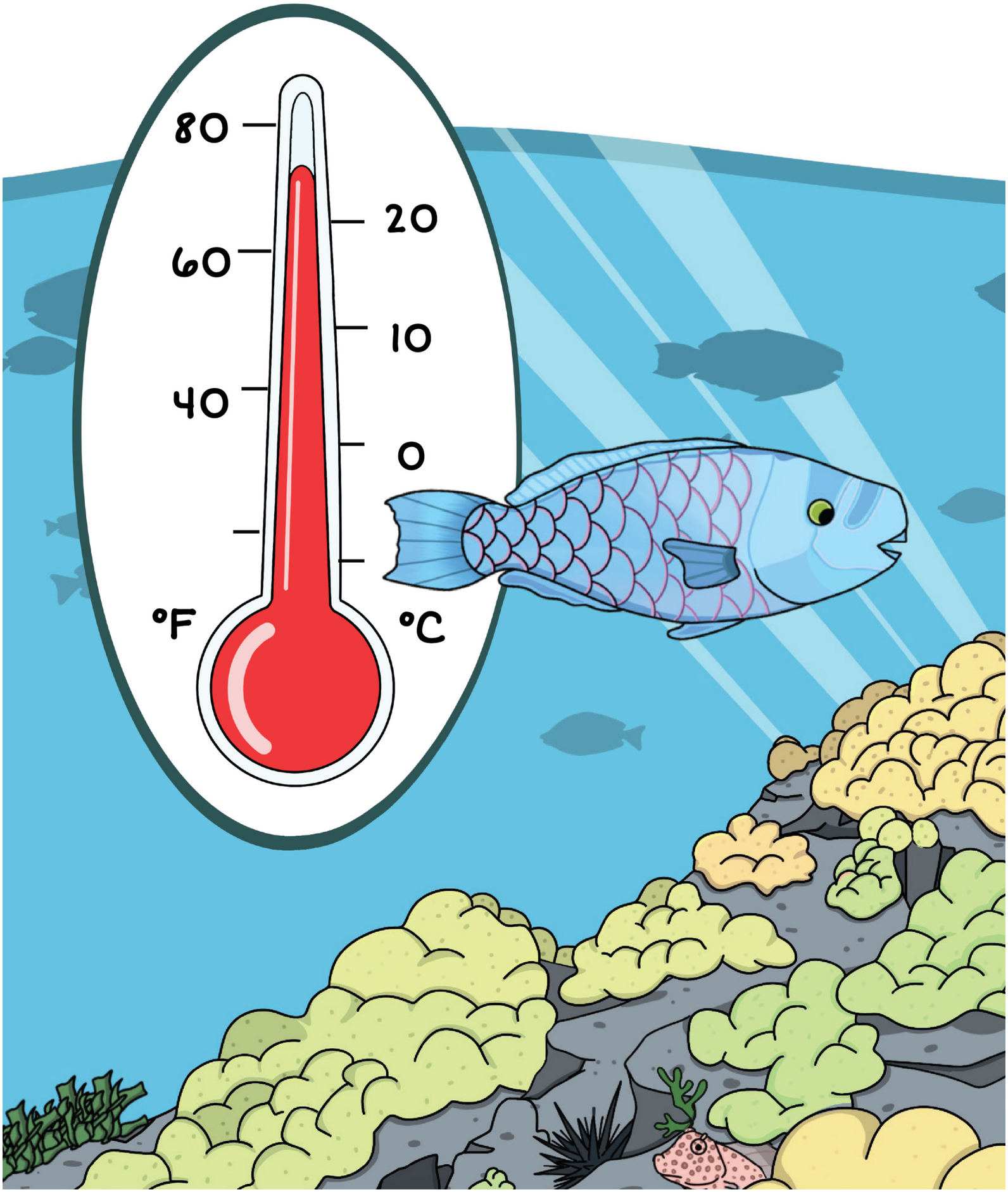
Crustose coralline algae (CCA) attracts coral planulae to settle and grow into polyps.

Without CCA, new corals will have nowhere to settle! CCA also help glue coral reefs together and make it grow bigger and stronger.

Herbivores are important because they keep the surfaces of CCA clean to make room for new corals to grow on it.



Look for the coral planulae attaching to the CCA under the microscope!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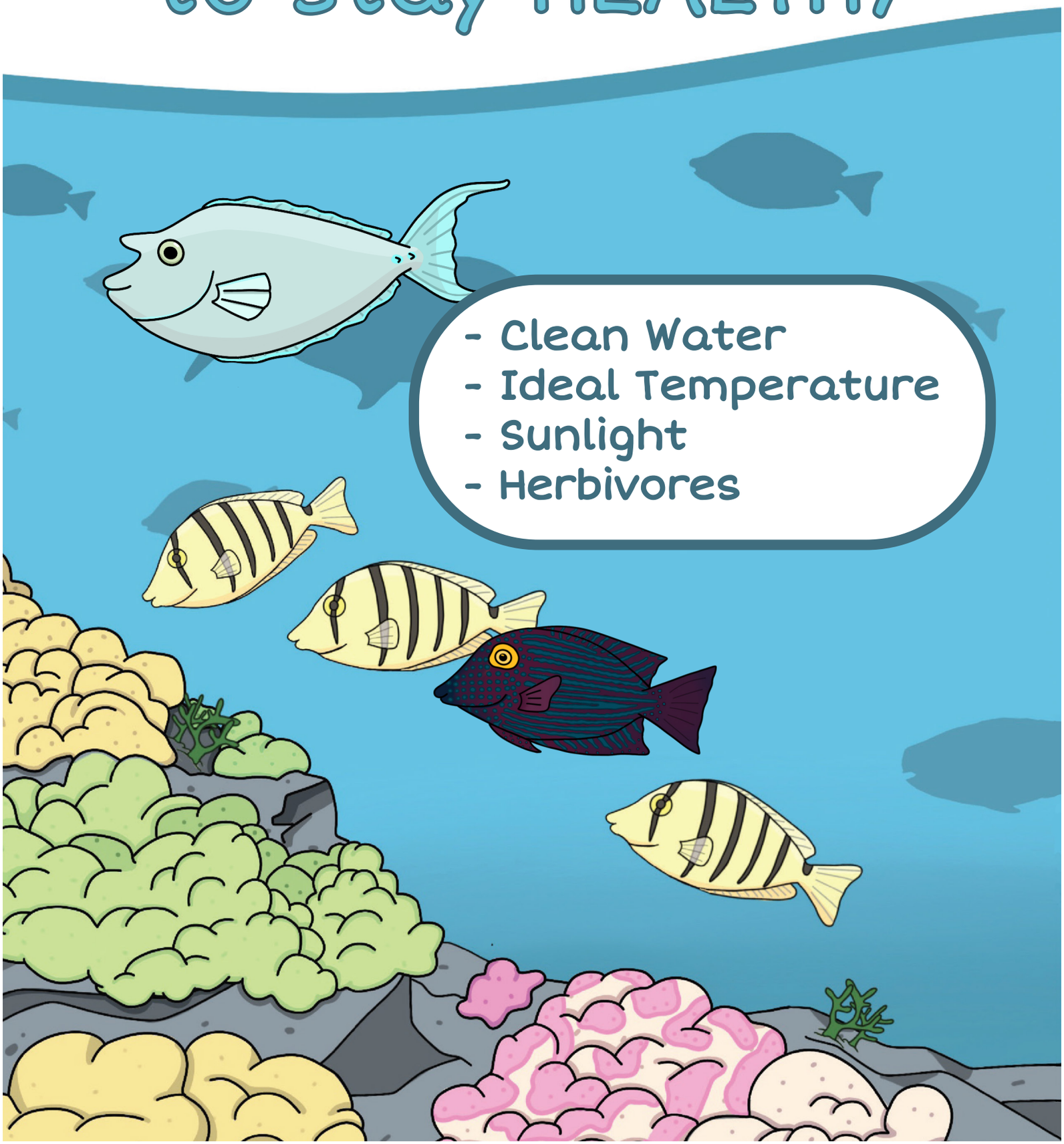
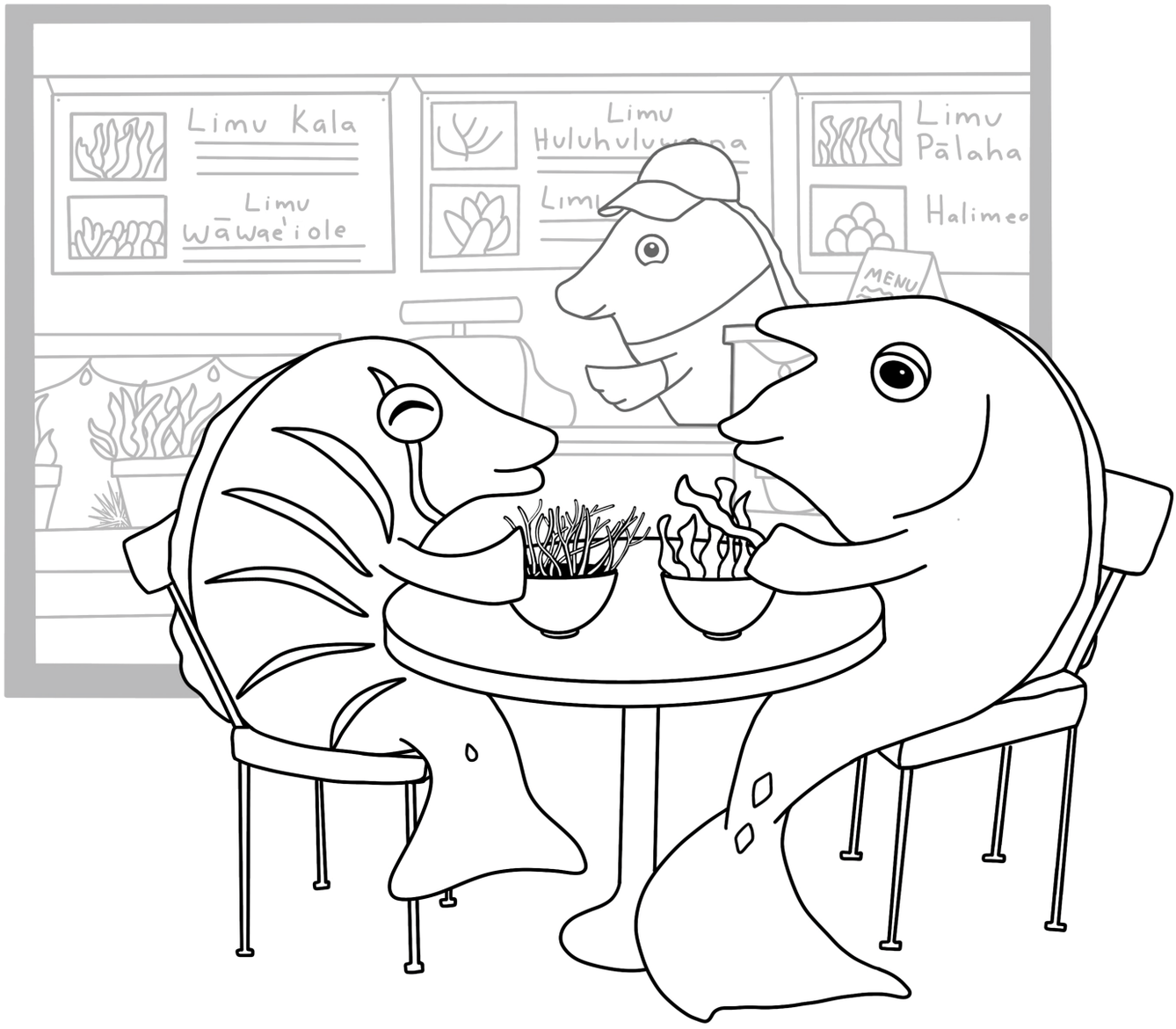
What corals need to stay HEALTHY



HERBIVORES

Herbivores feed on limu or algae, controlling and preventing limu from overgrowing and killing corals.

Herbivores also keep surfaces clean and bare for corals to settle and grow on, which contributes to reef resilience.



Surgeonfish are the most abundant herbivores in Hawaiian coral reefs, and we need healthy populations of herbivores to maintain healthy reefs. There are four types of herbivores:

Grazers

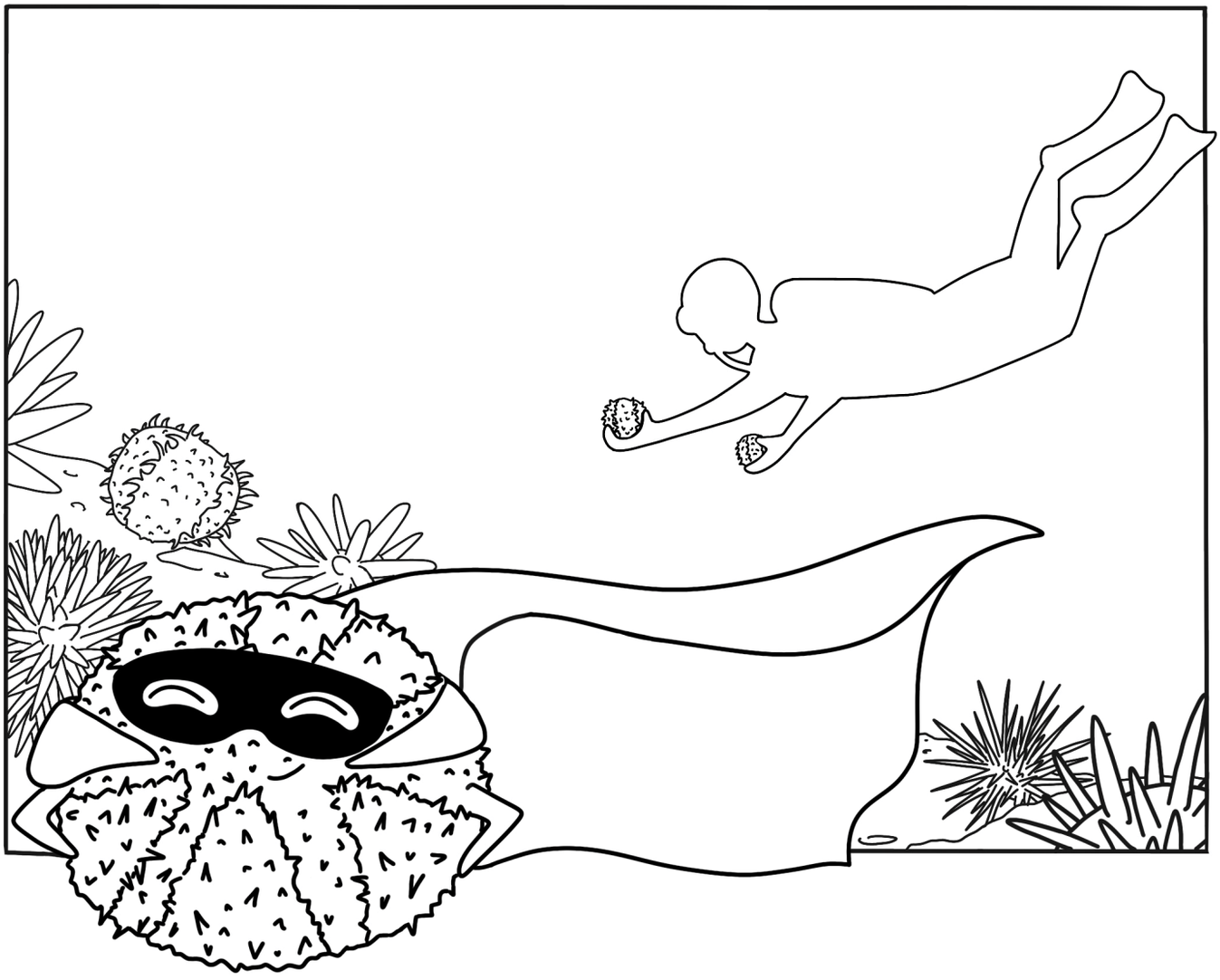
Scrapers

Excavators

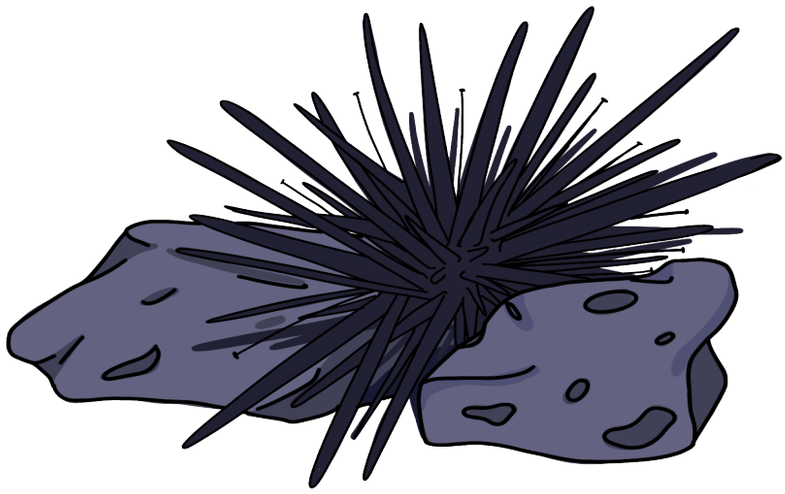
Detritivores

Hawa'e | Wana | 'Ina

Sea Urchin



The superheroes of coral reefs



Hāwa`e, wana, and `ina, also known as sea urchins, are spiky herbivores!

They have spines that can be long or short, and some are sharp and venomous, so be careful not to step on them!

They graze on algae using their hard, beak-like mouth that is made up of 5 plates, scraping rocks and other hard surfaces clean so that coral can settle on them.

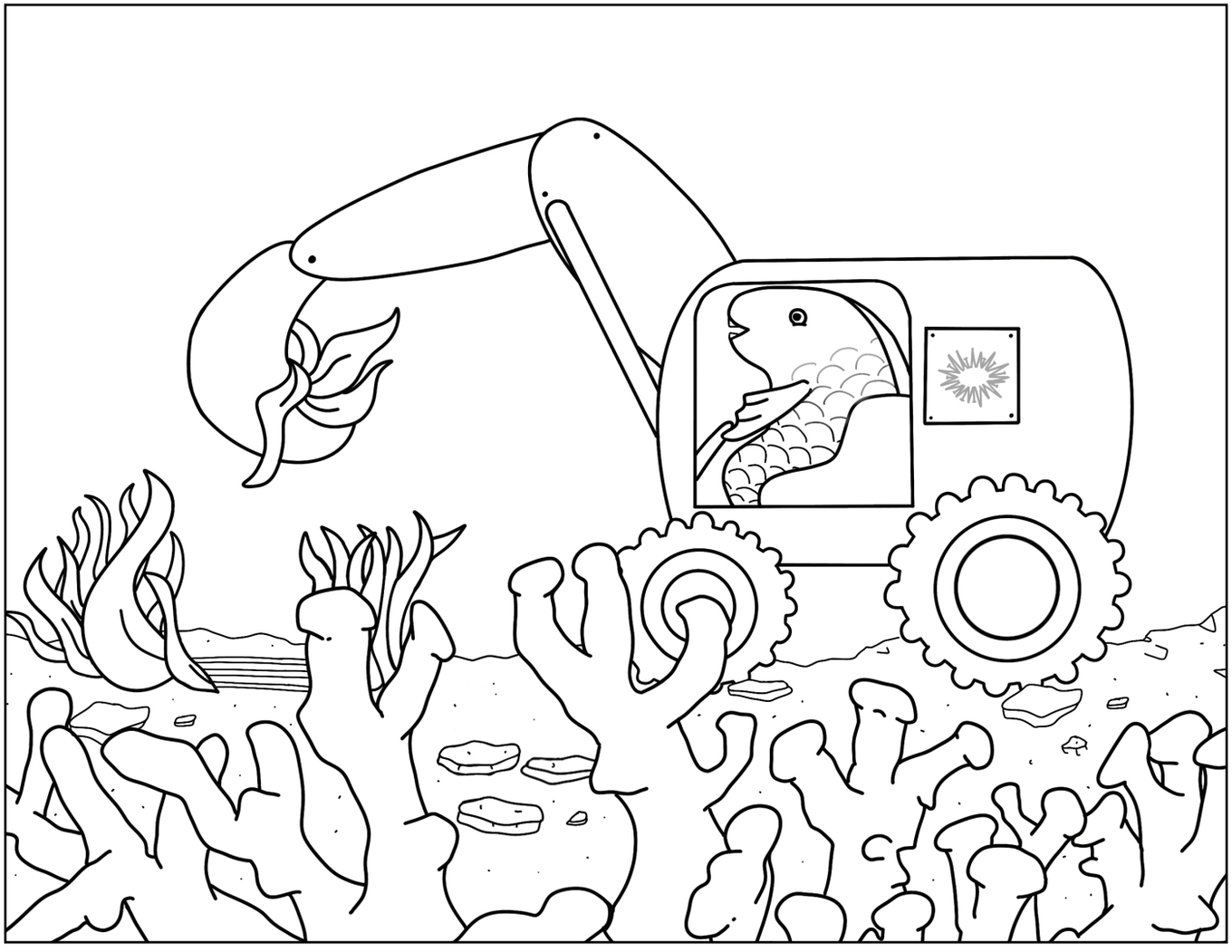
Did you know?

Scientists can actually use hāwa`e to help save coral reefs!

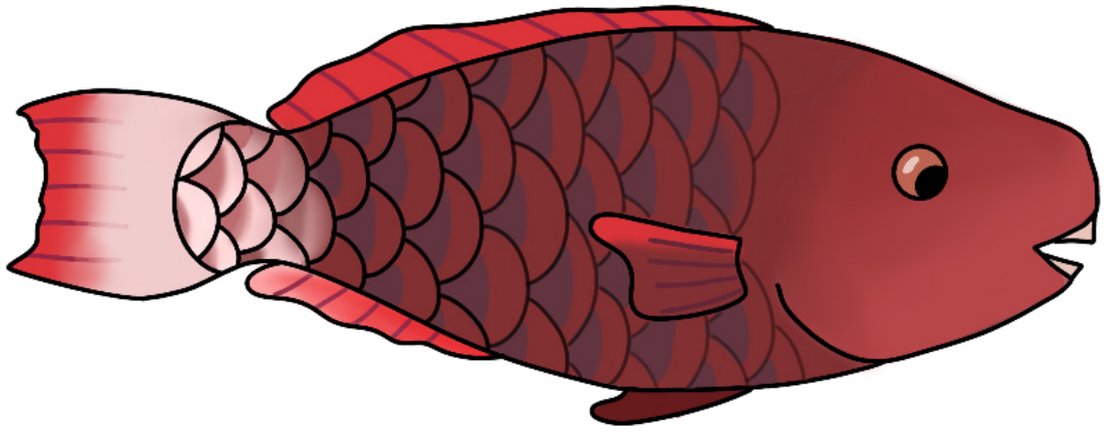
On O`ahu, baby urchins are raised in a laboratory and then planted out onto reefs that are dying and being covered by invasive algae. The baby urchins have a new home, and they help protect the corals by eating all the invasive limu!

Uhu

Parrotfish



The scrapers of coral reefs



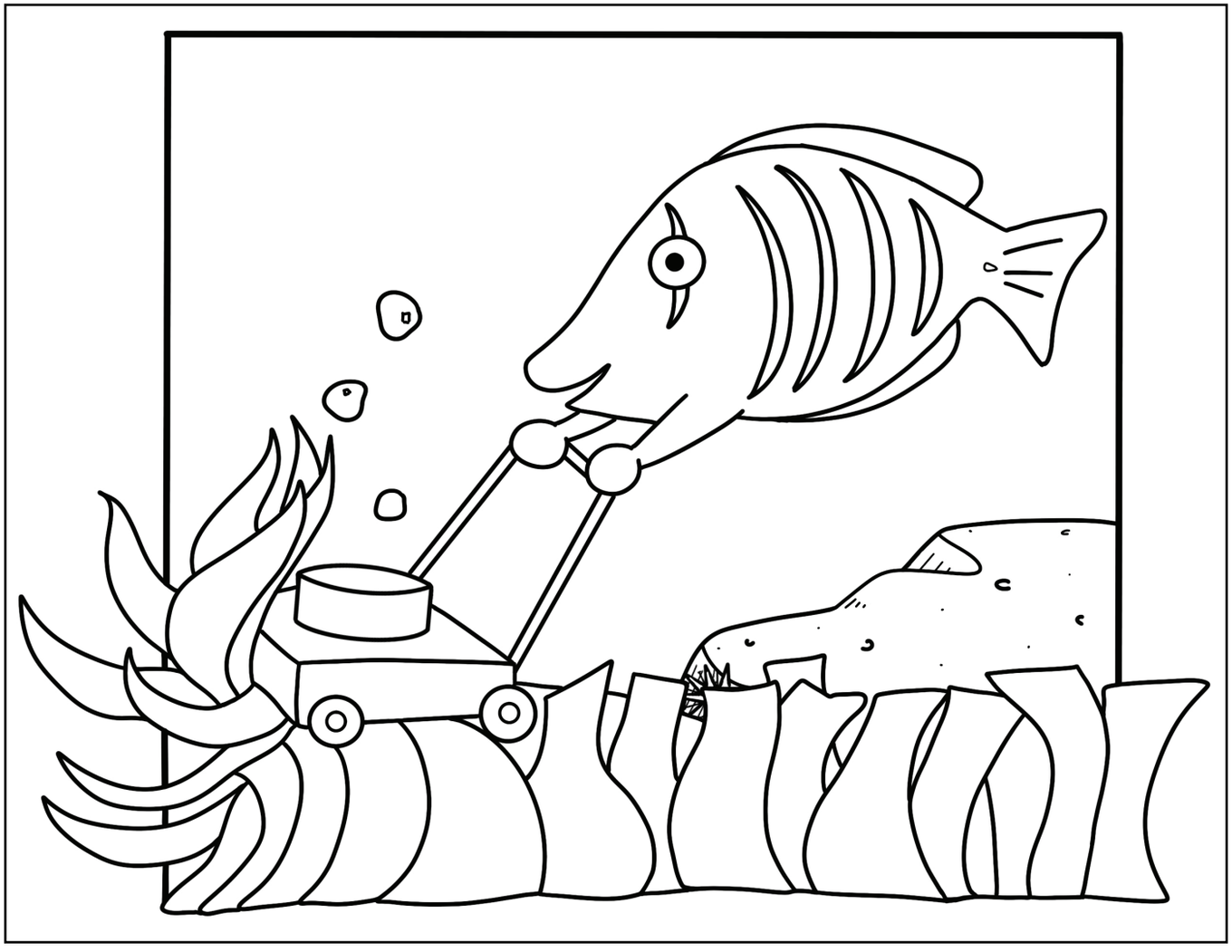
Uhu is the general name for parrotfish.

Large-bodied uhu are excavators and scrapers on the reef. They take big bites off rocks and coral, pulling off top layers of seaweed and exposing new area. This is important so that baby corals have space to start growing.

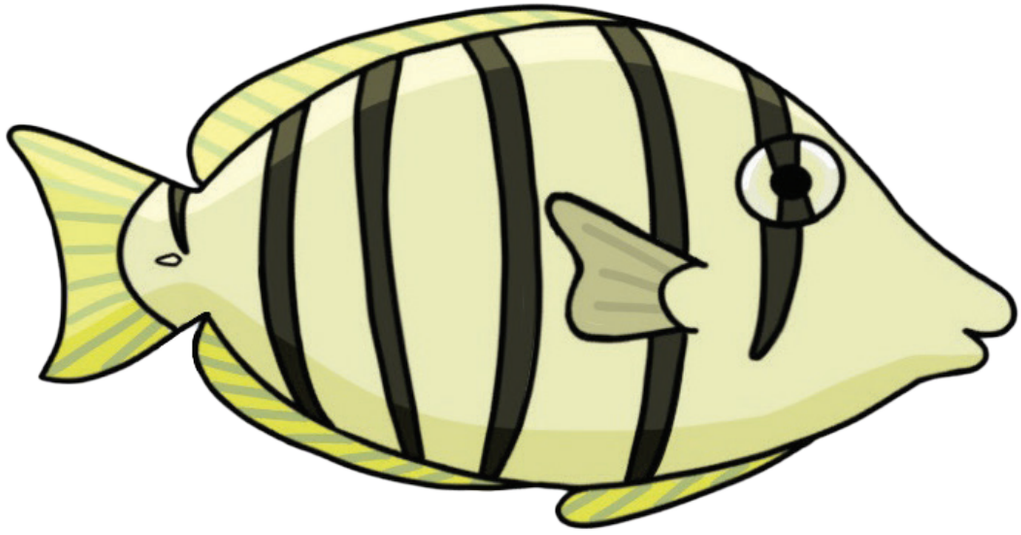
Uhu come in two main colors, which represent the different reproductive life phases: In the first phase, they are often smaller and red/ grey in color. These are mainly females. The large, mostly blue individuals are males.

Manini

Convict Tang



The cleaners of coral reefs



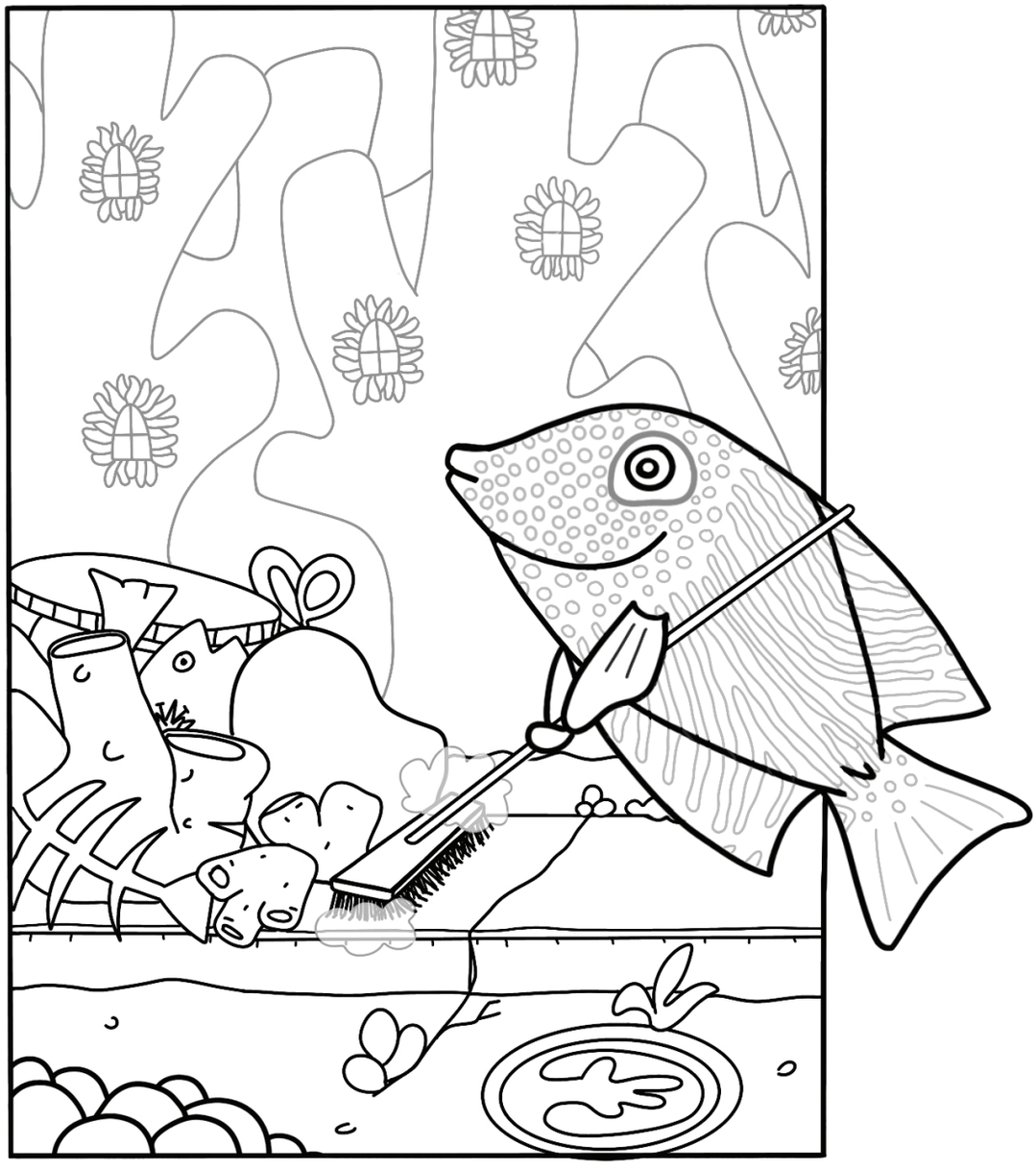
Manini are also known as Convict Tang. In Hawaiian, manini means "small" or "stingy," which refers to a mo`olelo (story) that highlights the small size of the manini as being inadequate for hosting a meal.

Manini are grazers as they feed on low-lying turf seaweeds and keep them cropped down, similar to mowing the lawn. This prevents turf algae from overgrowing space where new corals can grow.

Manini can live up to 4 years or longer and can reach a maximum size of about 12 inches.

Kole

Goldring Surgeonfish



The cleaners of coral reefs

Kole are one of the most common fish to see while snorkeling in coral reefs in Hawai`i.

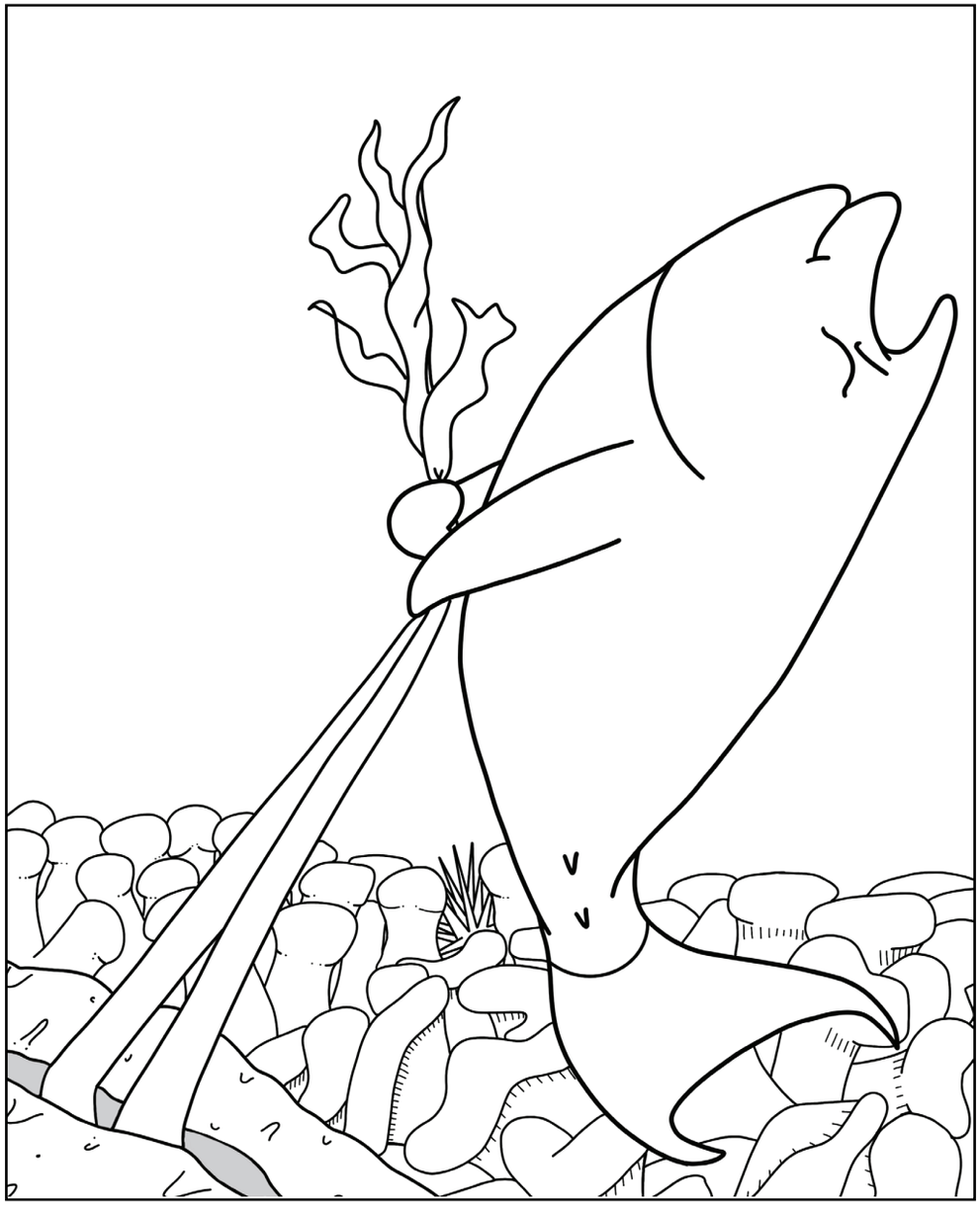
Kole are endemic to Hawai`i, found nowhere else in the world!

Kole are detritivores, meaning they comb through the bits of sand and decomposing material looking for algae to eat. They are important in breaking apart fish waste and preventing it from piling up on the bottom.

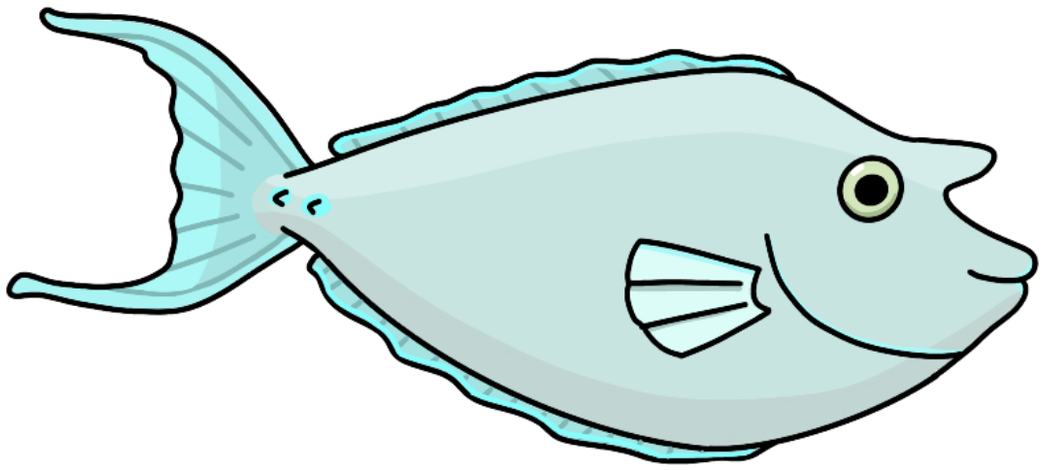
Kole can live up to 18 years and will reach a maximum size of about 7 inches.

Kala

Unicornfish



The browsers of coral reefs



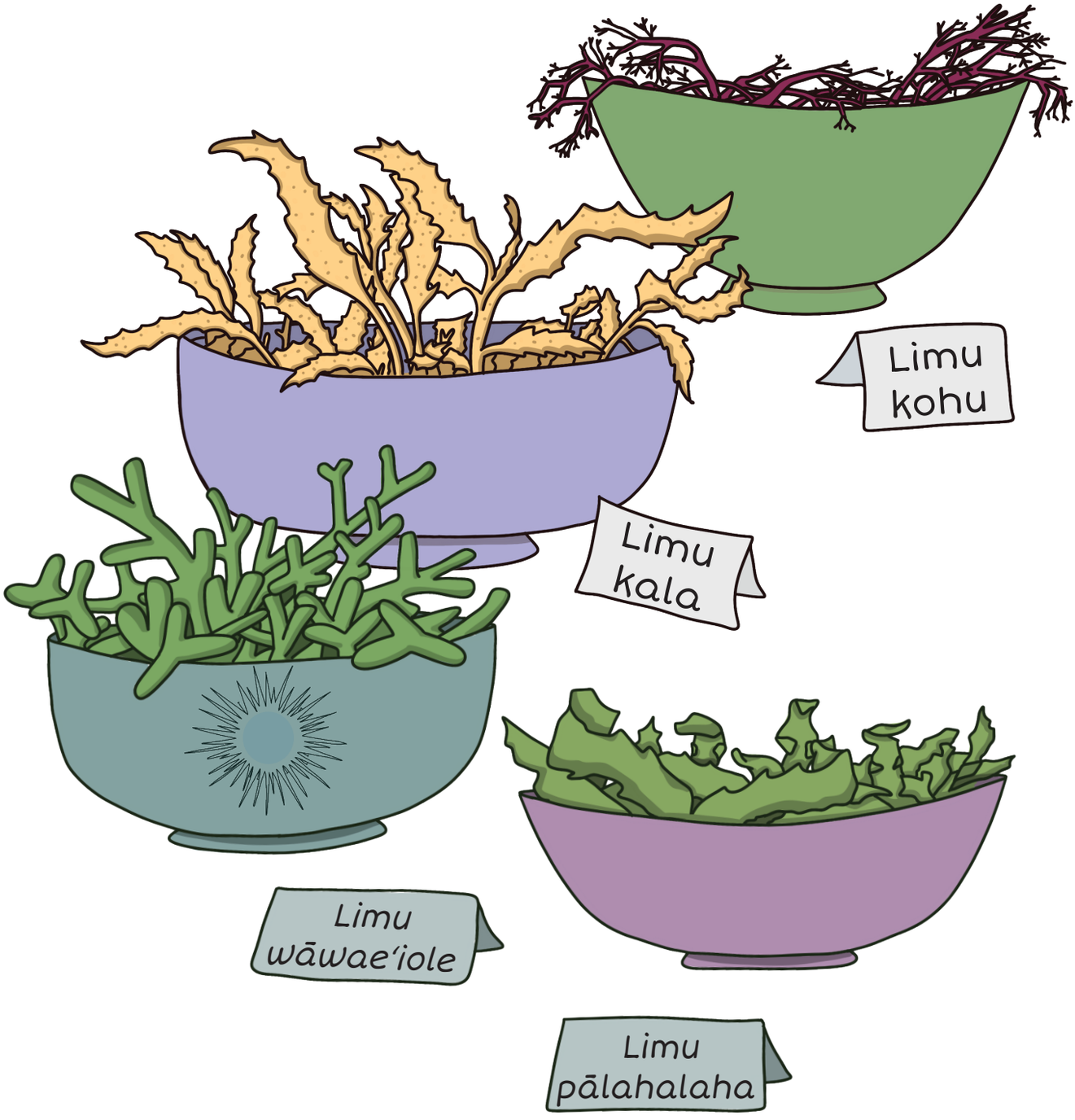
Kala are commonly known as unicornfish.

Kala are often found in schools on shallow reef habitats and rocky shores, but larger adults may be spotted alone.

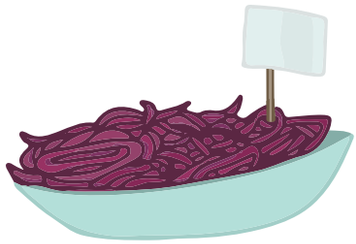
Kala are browsers, weeding leafy seaweeds from the reef. A common snack for kala is limu kala.

Kala can live up to 50 years and will reach a maximum size of about 24 inches.

Limu Favorites



Limu recipe for you!



1 lb Fresh Limu Manauea

Boiling water, as needed

1 Onion, diced

1 clove of garlic, minced

2 tbs rice vinegar
3/4 cup soy sauce
1 tsp sesame oil

1 tsp sugar
1/4 tsp black pepper
chili pepper, to taste

STEP 1: Place limu in colander in your sink, and pour boiling water to blanch the ogo

STEP 2: Quickly run the limu under cold water to avoid overcooking

STEP 3: Cut limu into 2" pieces

STEP 4: Marinate the limu with the remaining ingredients

STEP 5: Refrigerate overnight and serve with poke

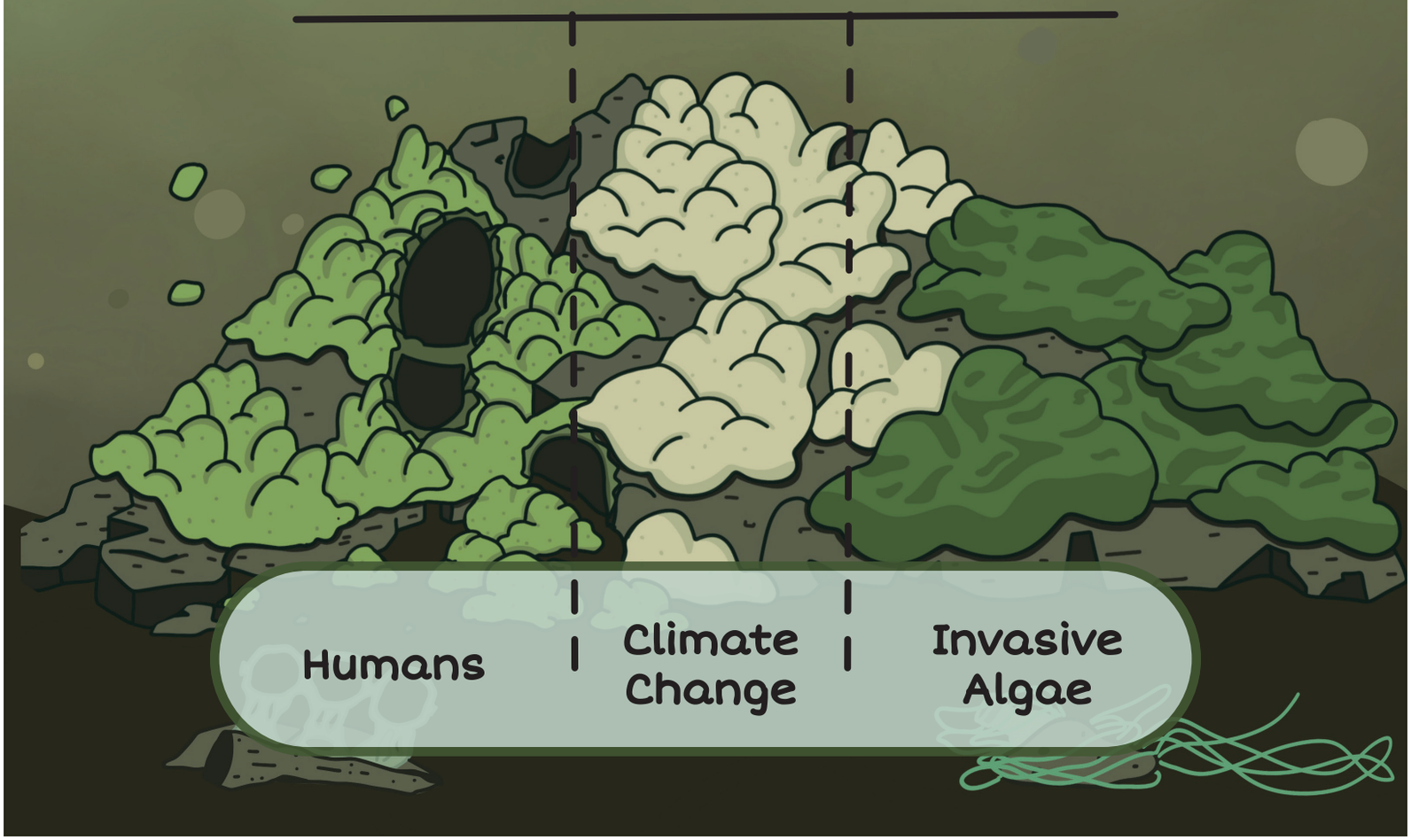
Without Herbivores coral reefs will become

UNHEALTHY

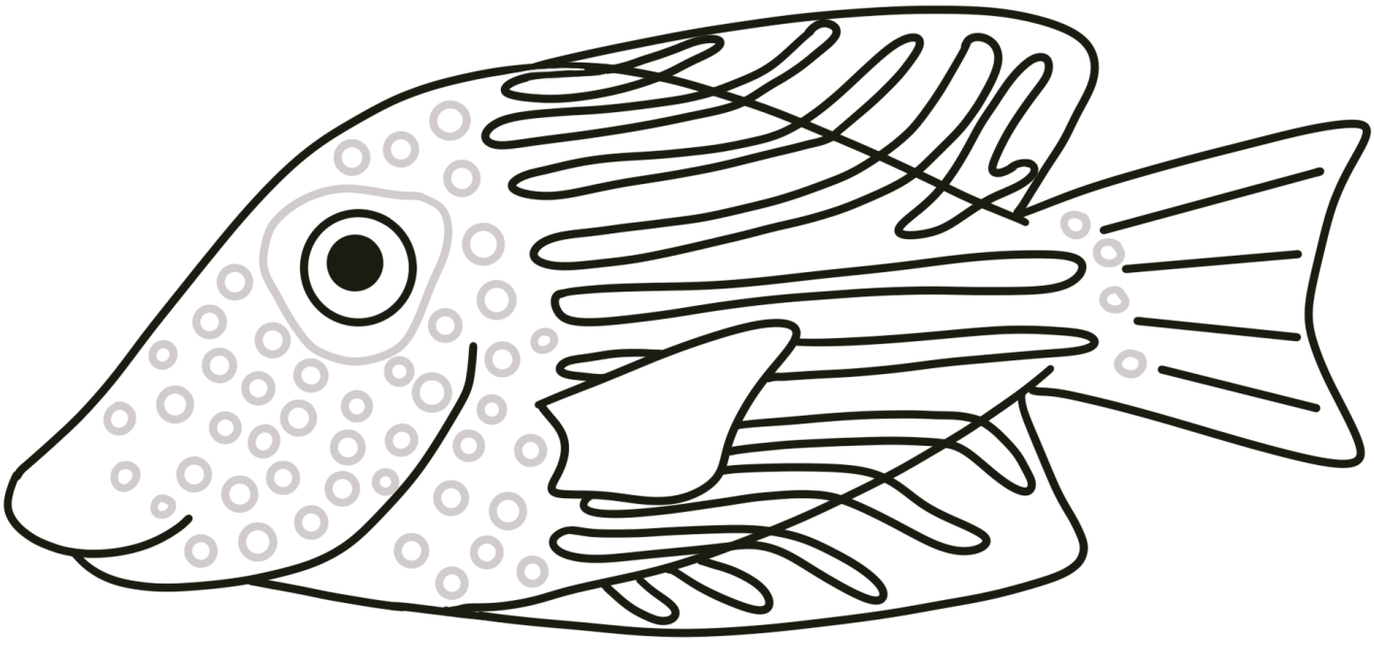
Causes of an Unhealthy Reef:

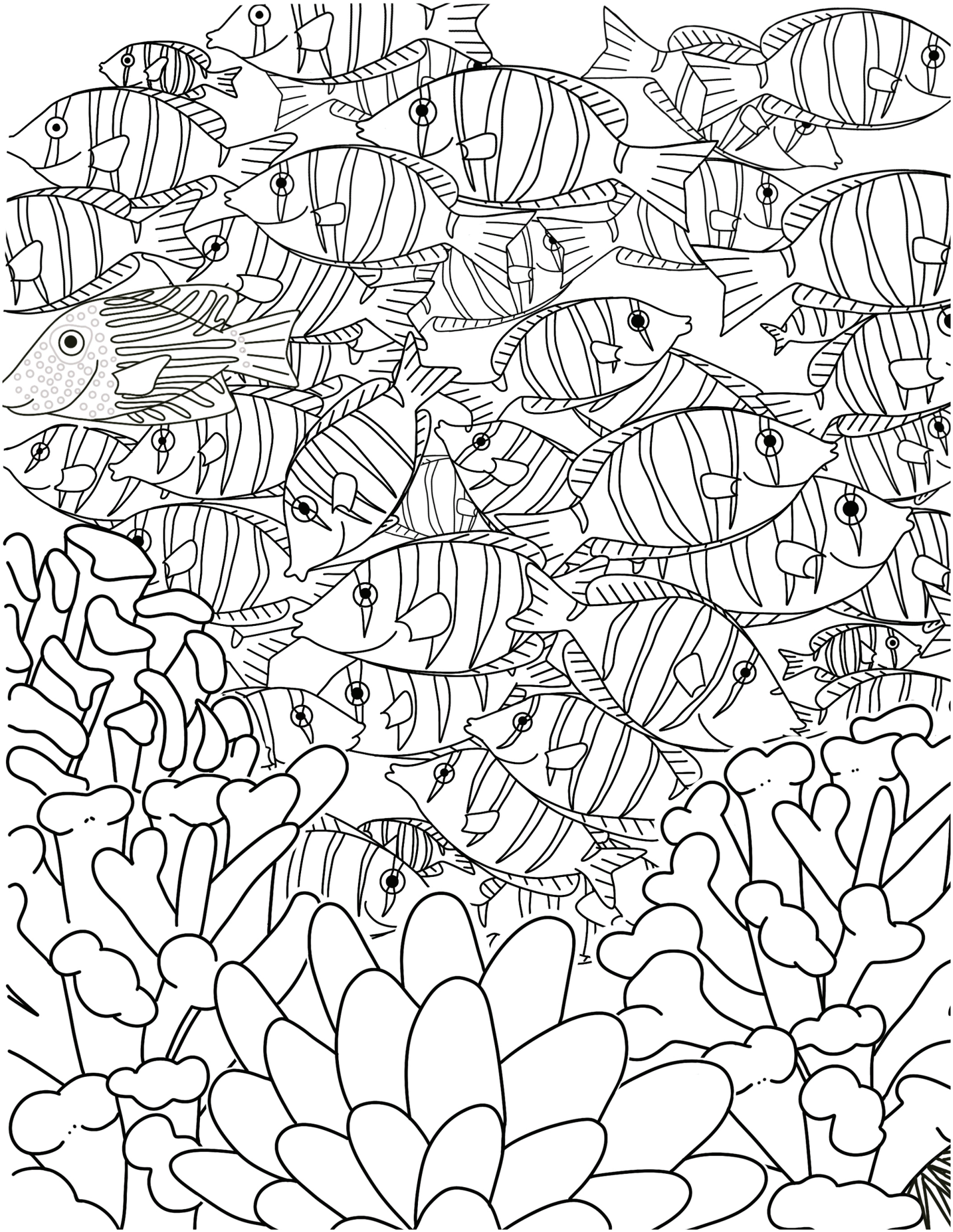
- Dirty Water
- Rubbish
- Warming Oceans
-Overfishing

Other coral bullies:

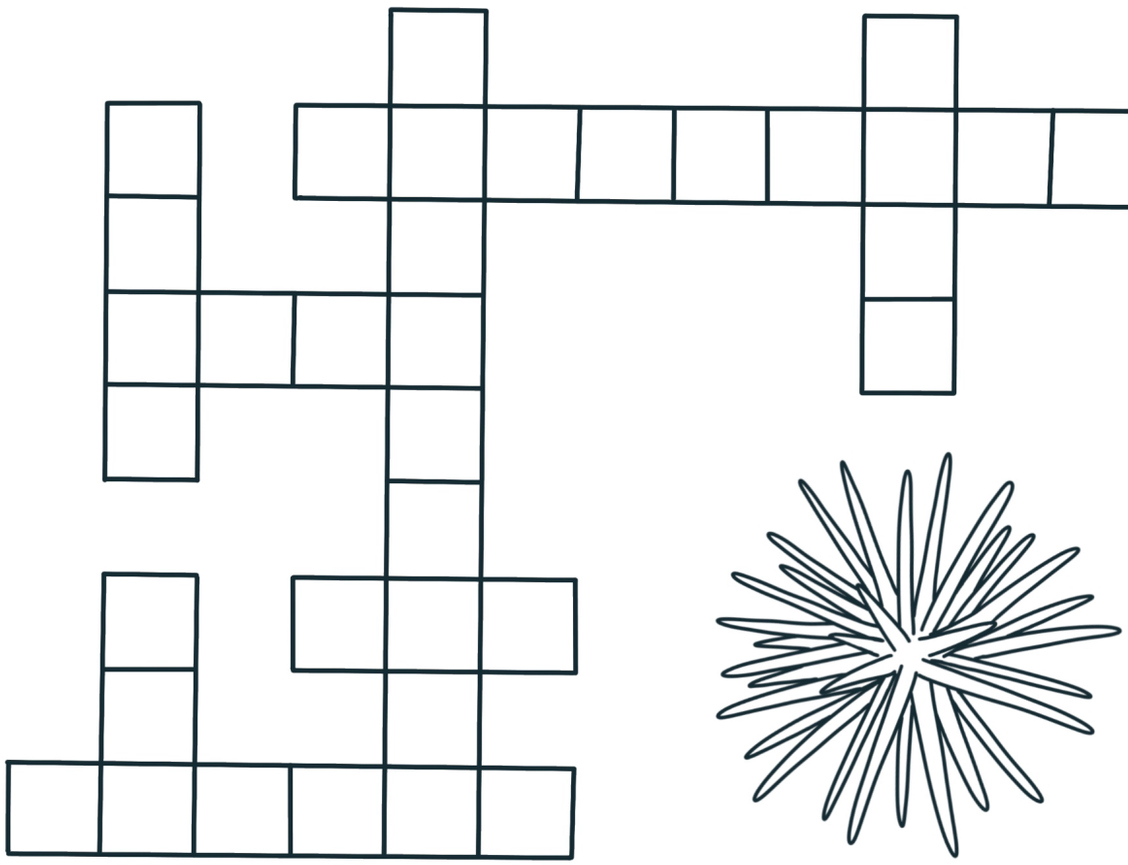


Find the Kole





Crossword Search



DOWN

1. A detritivore
2. A sea creature with many spikes on their body
3. A unicorn of the reef
4. Solid algae that is often pink

ACROSS

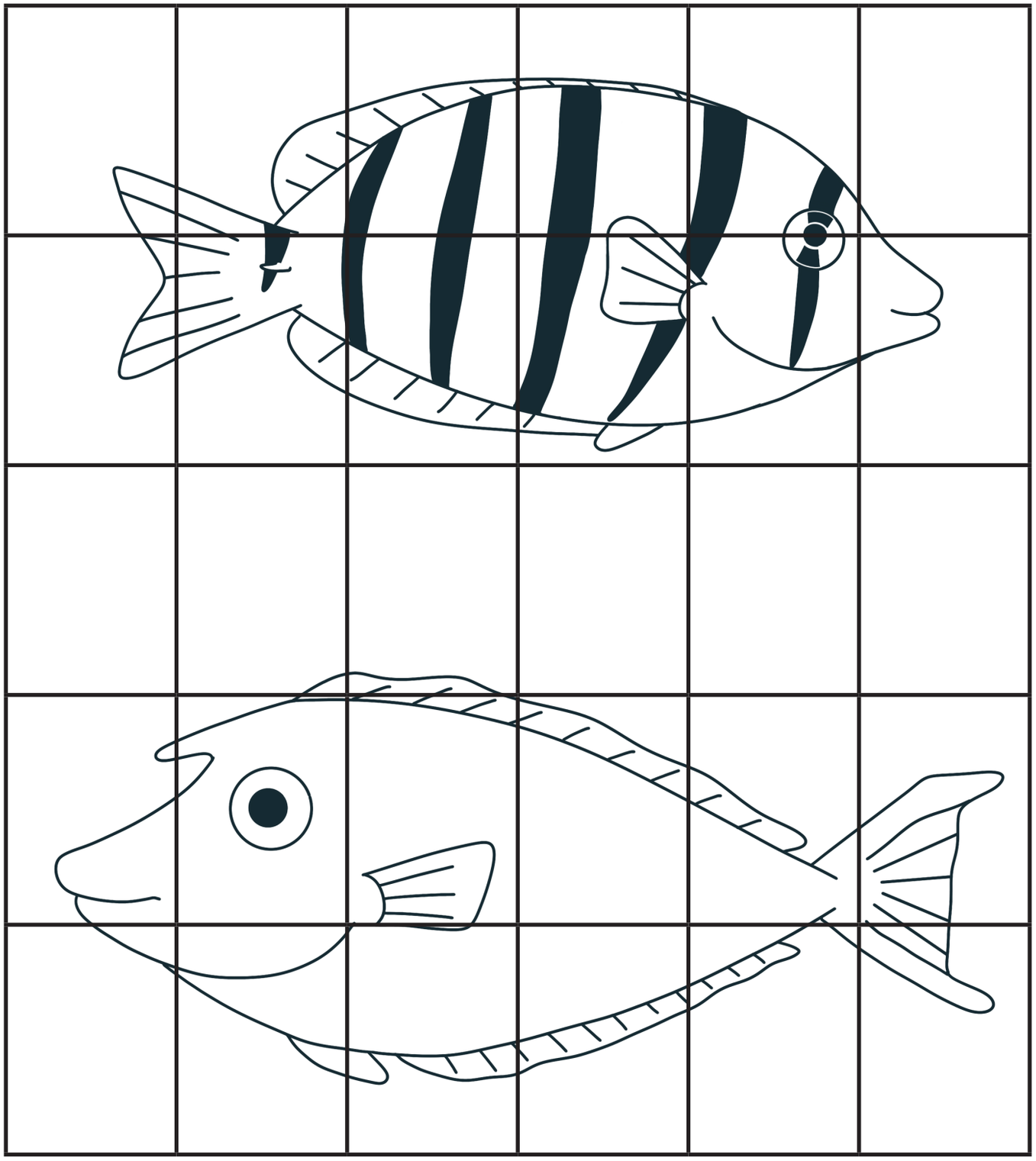
5. Creatures who do not eat meat but eat veggies such as algae
6. Hawaiian word for seaweed
7. Large ____ are known as excavators of the coral reef
8. Convict Tang

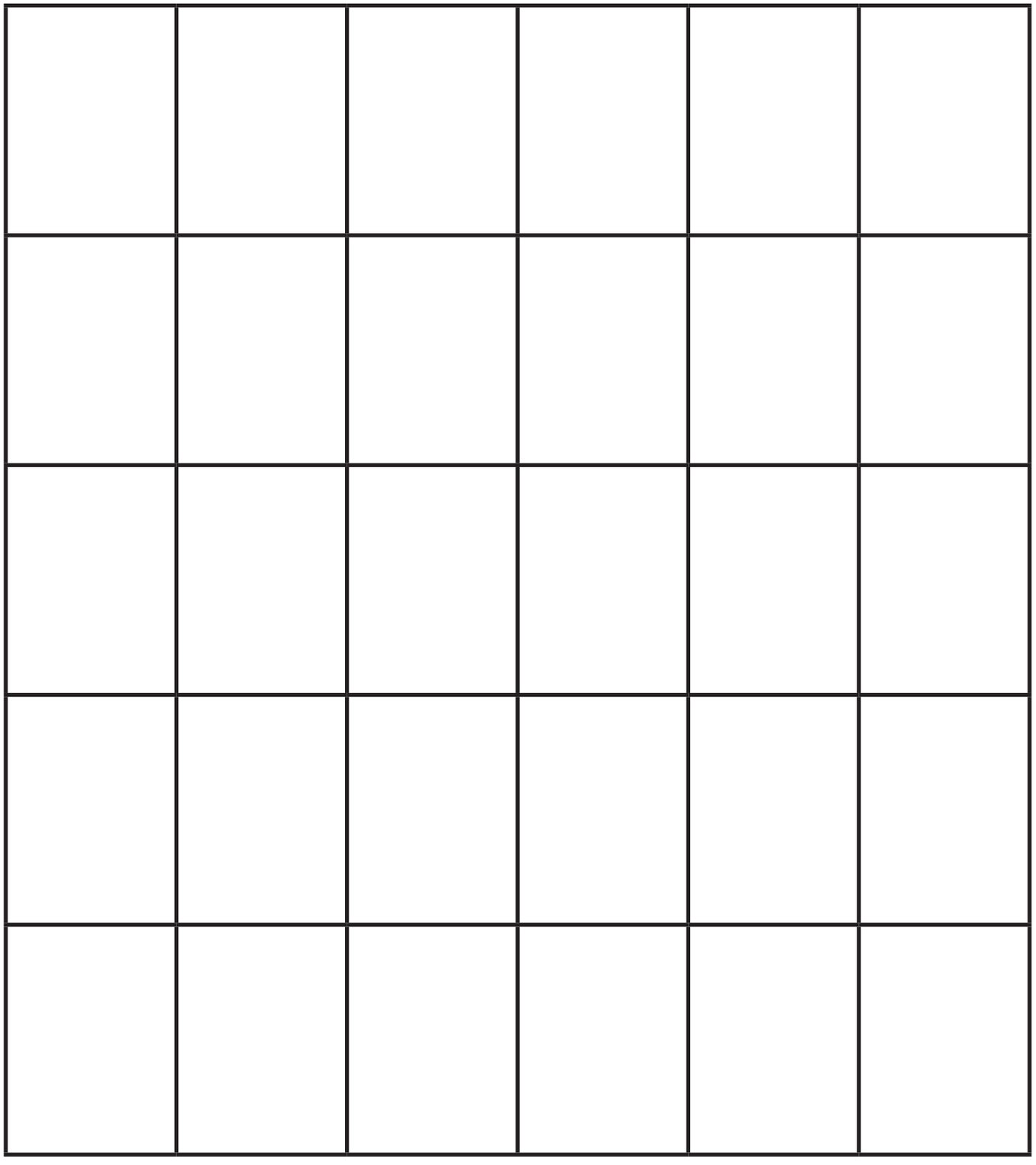
Word Search

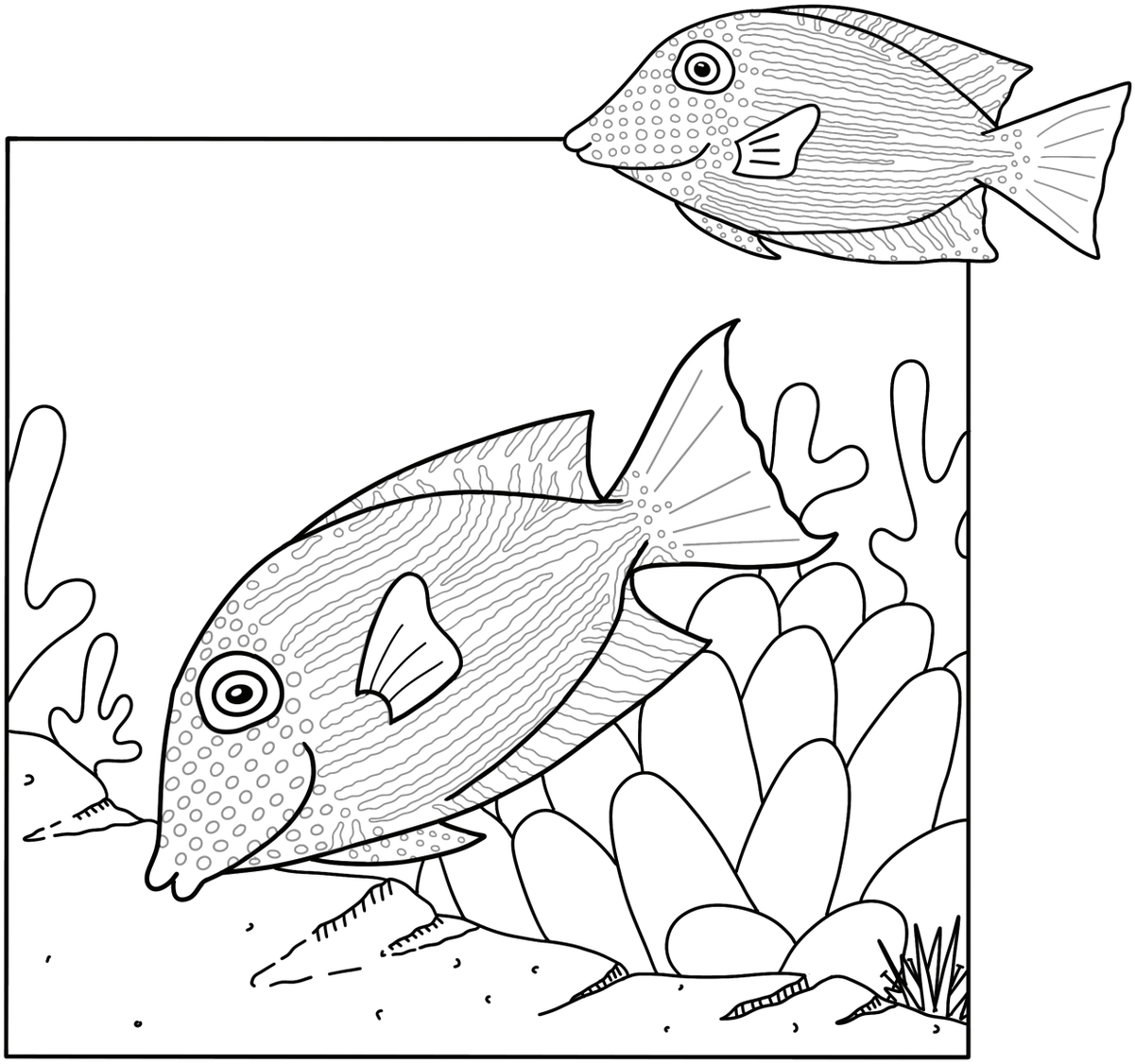
w	a	c	o	s	e	r	l	i	m	u	k	a	l	a	n
e	l	o	o	w	b	t	r	o	u	a	e	n	u	h	u
p	i	r	a	n	e	h	k	y	f	i	s	h	w	e	m
l	o	a	v	a	v	s	c	b	n	j	u	w	r	s	c
i	r	l	e	b	o	i	s	w	u	h	n	a	l	a	k
m	e	r	a	h	y	f	c	o	n	v	i	k	s	e	o
u	h	e	e	f	i	n	o	t	o	e	c	a	e	m	l
k	o	e	h	n	s	o	n	o	t	r	o	l	a	i	e
o	r	f	i	c	h	e	k	r	l	a	r	o	w	l	l
h	r	n	a	c	a	g	a	a	n	i	n	i	e	i	e
u	a	r	c	p	a	r	r	o	w	i	f	g	e	m	a
m	i	r	e	e	l	u	o	u	i	n	i	n	d	e	v
f	n	a	g	r	u	s	c	a	c	a	s	e	c	c	a
a	e	p	a	r	r	o	t	f	i	s	h	u	h	n	c

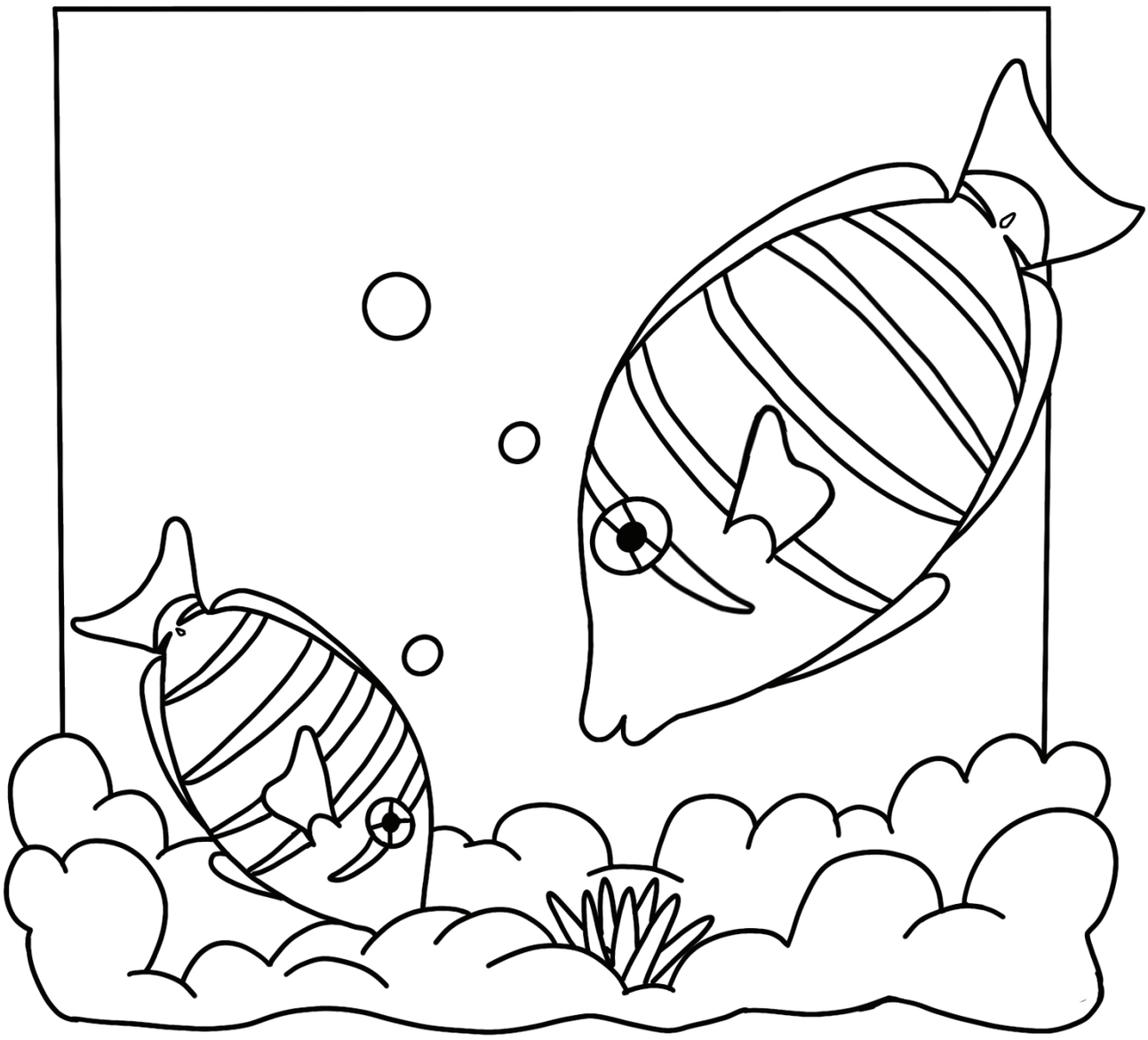
CCA
Convict Tang
Coral Reef
Kala
Kole
Limu kala
Limu kohu
Manini
Parrotfish
Surgeonfish
Uhu
Unicornfish

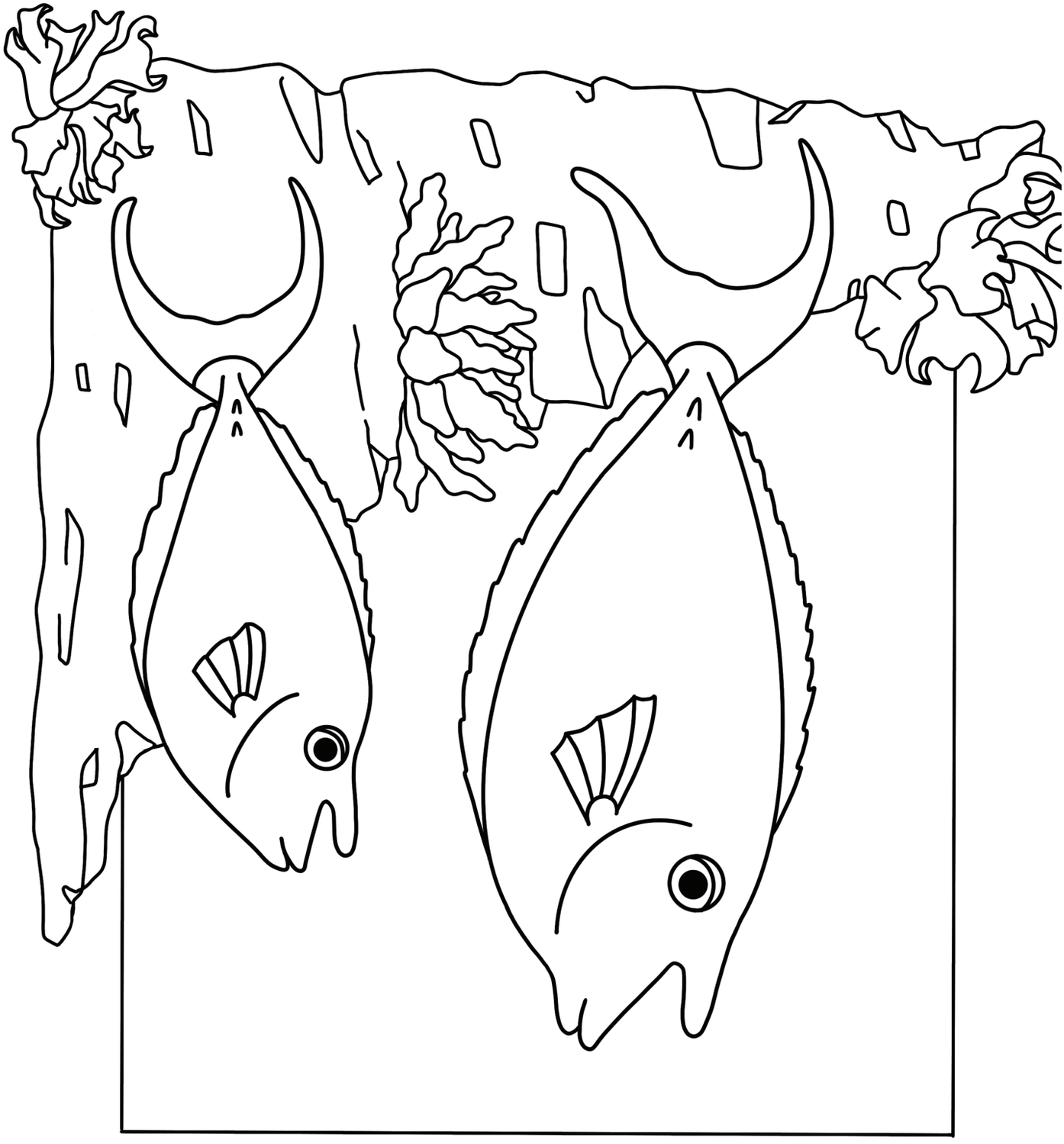
Learn to draw a manini and a kala. Use the lines in the grids on the left side of the page to help you draw these fish on the right side of the page.

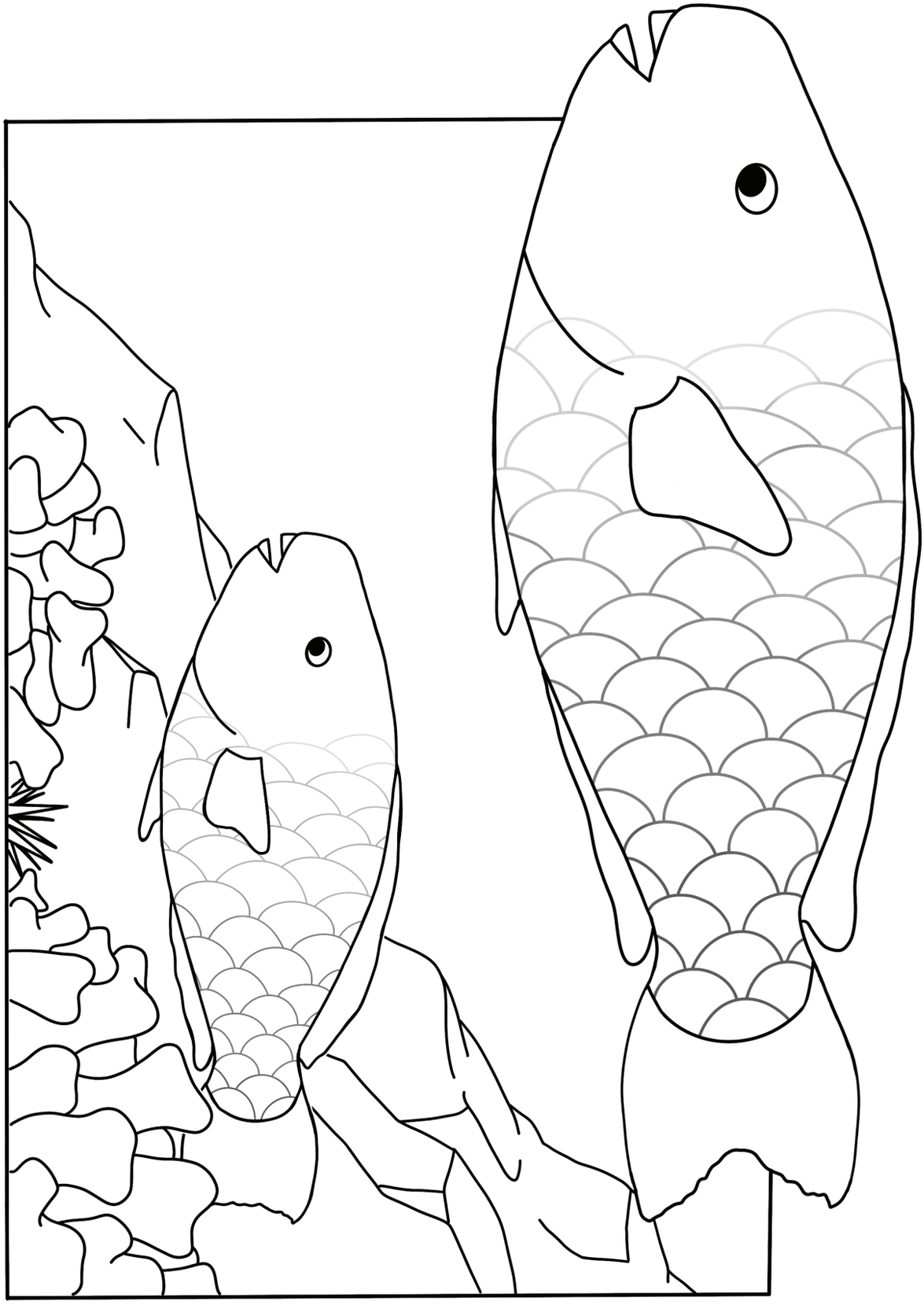


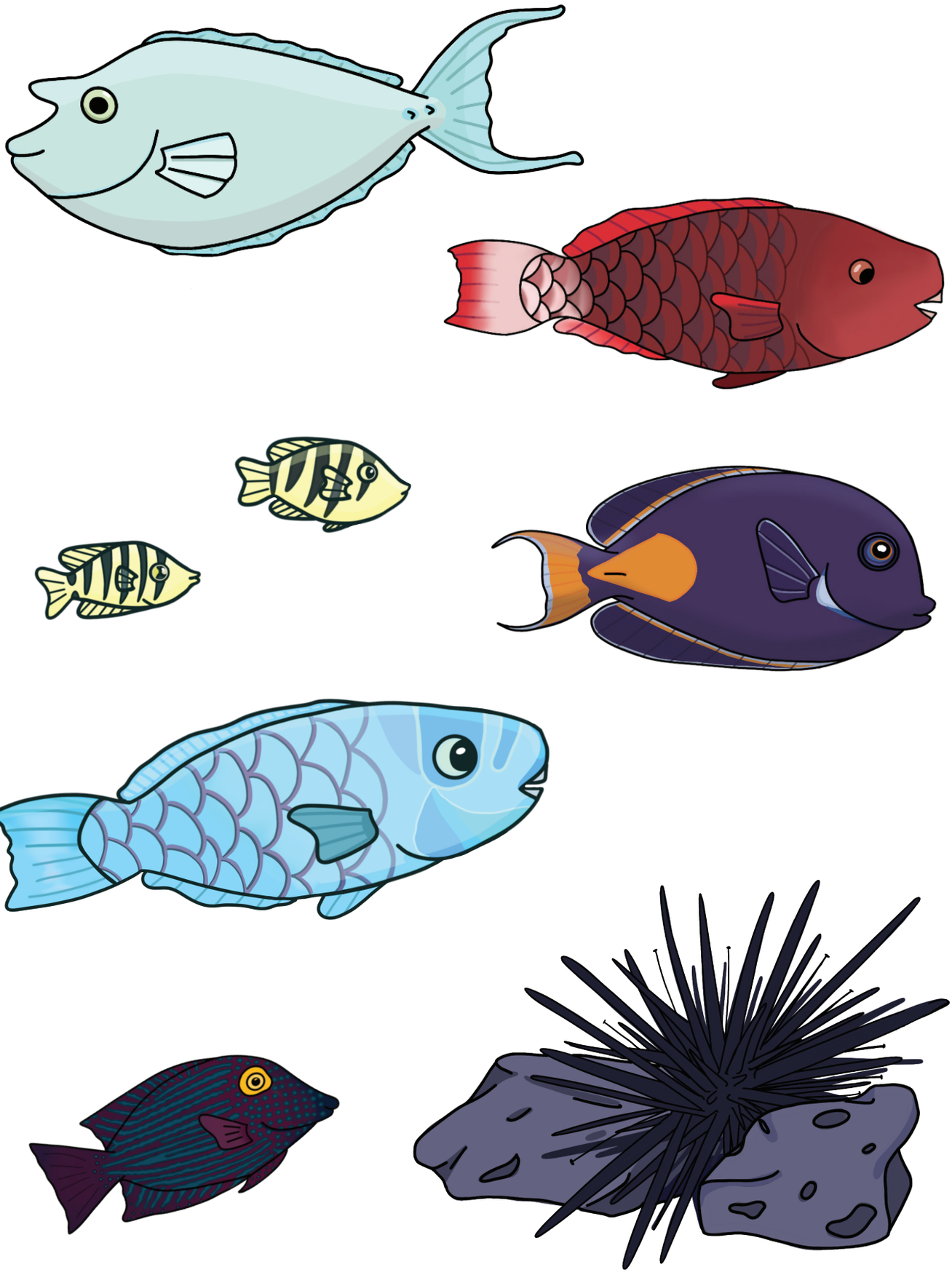












This coloring book is dedicated to our keiki, the next generation of fishers and stewards of our nearshore waters. You are the inspiration for the Holomua Marine Initiative. We are managing our nearshore resources today so that you and all the keiki after you have plenty of fish tomorrow.

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