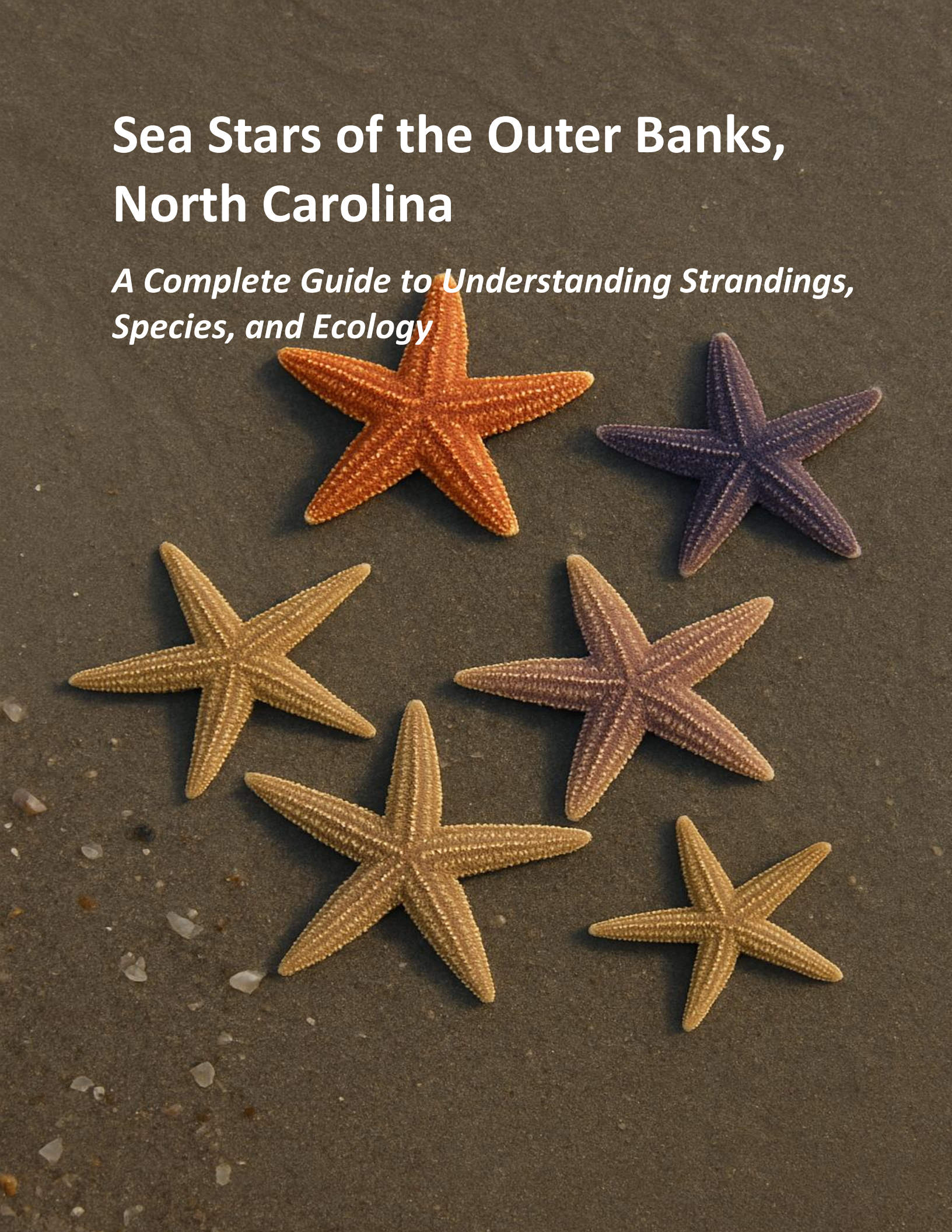
Sea Stars of the Outer Banks, North Carolina

A Complete Guide to Understanding Strandings, Species, and Ecology



Forward

This pamphlet was created by the Outer Banks Coastal Conservation (OBCC), a nonprofit organization whose mission is to foster environmental stewardship and a deeper connection to the Outer Banks of North Carolina through outreach, education, and conservation efforts.

We believe that small stories can spark big change. That is why we have made this book available as a free resource for parents, teachers, and community members.

All materials in this pamphlet may be freely downloaded, shared, printed and used for educational or nonprofit purposes.

To learn more, access additional resources at: www.theobcc.org.

What Is a Sea Star?

Sea stars — often called *starfish*, though they are not fish — are echinoderms, a group of marine animals that also includes sea urchins, sand dollars, and sea cucumbers.

They are known for:

- Radial symmetry (usually 5 arms, but some species have more)
- Tube feet used for crawling and feeding
- A water vascular system (they move using seawater, not muscles alone)
- Regeneration (many can regrow lost arms)
- A tough but flexible skin covered with small spines or bumps

Sea stars are vital members of coastal ecosystems. They help regulate populations of clams, mussels, and small invertebrates, and they contribute to healthy sandy-bottom environments near shore.

Sea Stars Found in the Outer Banks

While dozens of species exist worldwide, only a handful commonly occur along the North Carolina coast. The two most frequently observed — and the ones you may see sometimes washed ashore — are sand-dwelling, shallow-water species.

Lined Sea Star (Luidia clathrata)

The most common species to wash up on Outer Banks beaches.

Features:

- **Usually 5–9 arms (more than a "typical" sea star)**
- **Brownish-tan or gray with darker lines or a net-like pattern**
- **Very fast-moving for a sea star**

Habitat: Lives buried in sand or shallow sandy bottoms — making it highly vulnerable to storms and strong currents.

Common Sea Star (Asterias forbesi)

Less common than Luidia but sometimes found.

Features:

- **Classic 5-armed shape**
- **Orange, yellow, or brown**
- **Spiny texture**

Habitat: Prefers areas with harder substrate but can travel across sandy bottoms in search of food.

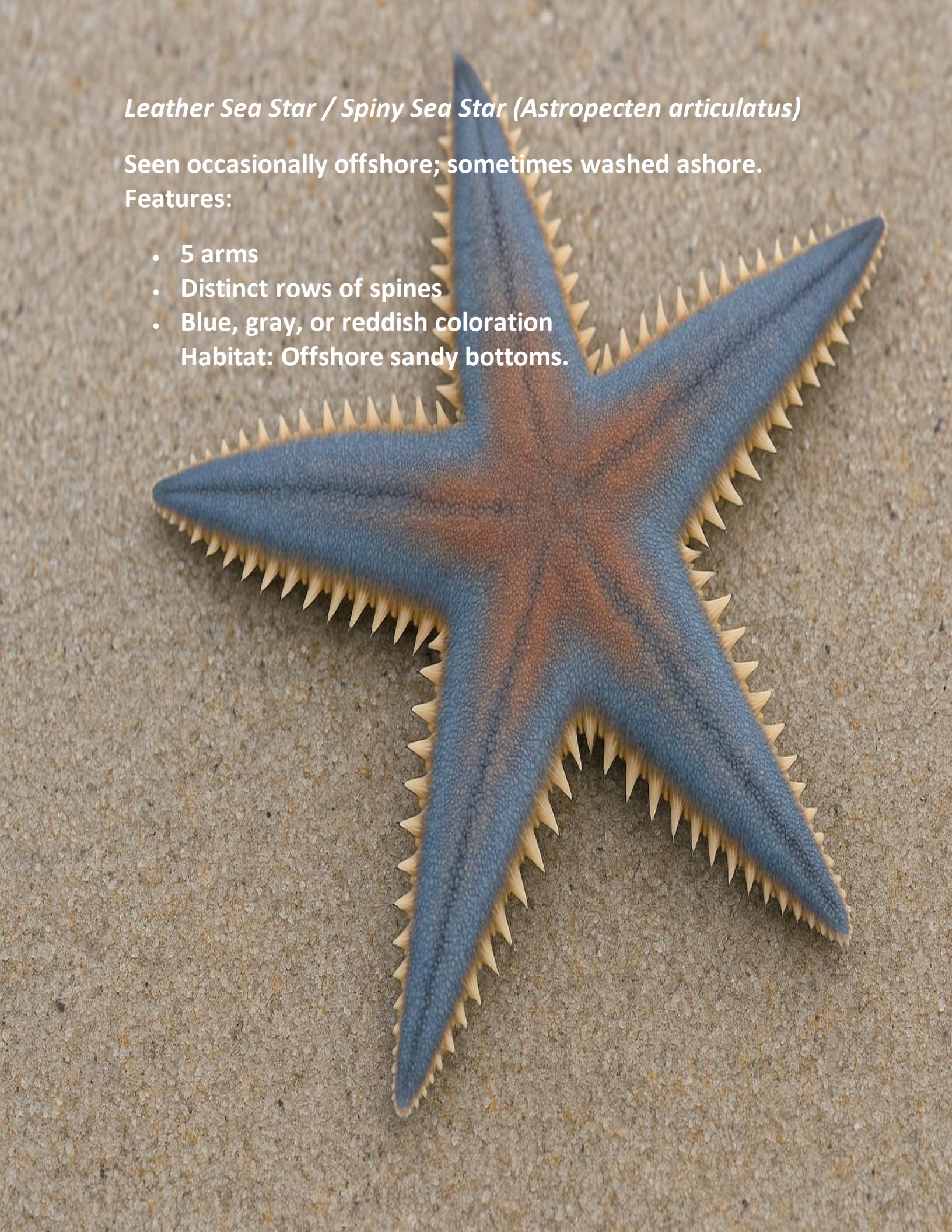
Atlantic Slender Sea Star (Luidia alternata)

Occasionally seen after storms.

Features:

- **Very long, thin arms**
- **Light tan or gray**
- **Fragile appearance**

Habitat: Found on shifting sand flats and offshore bars.

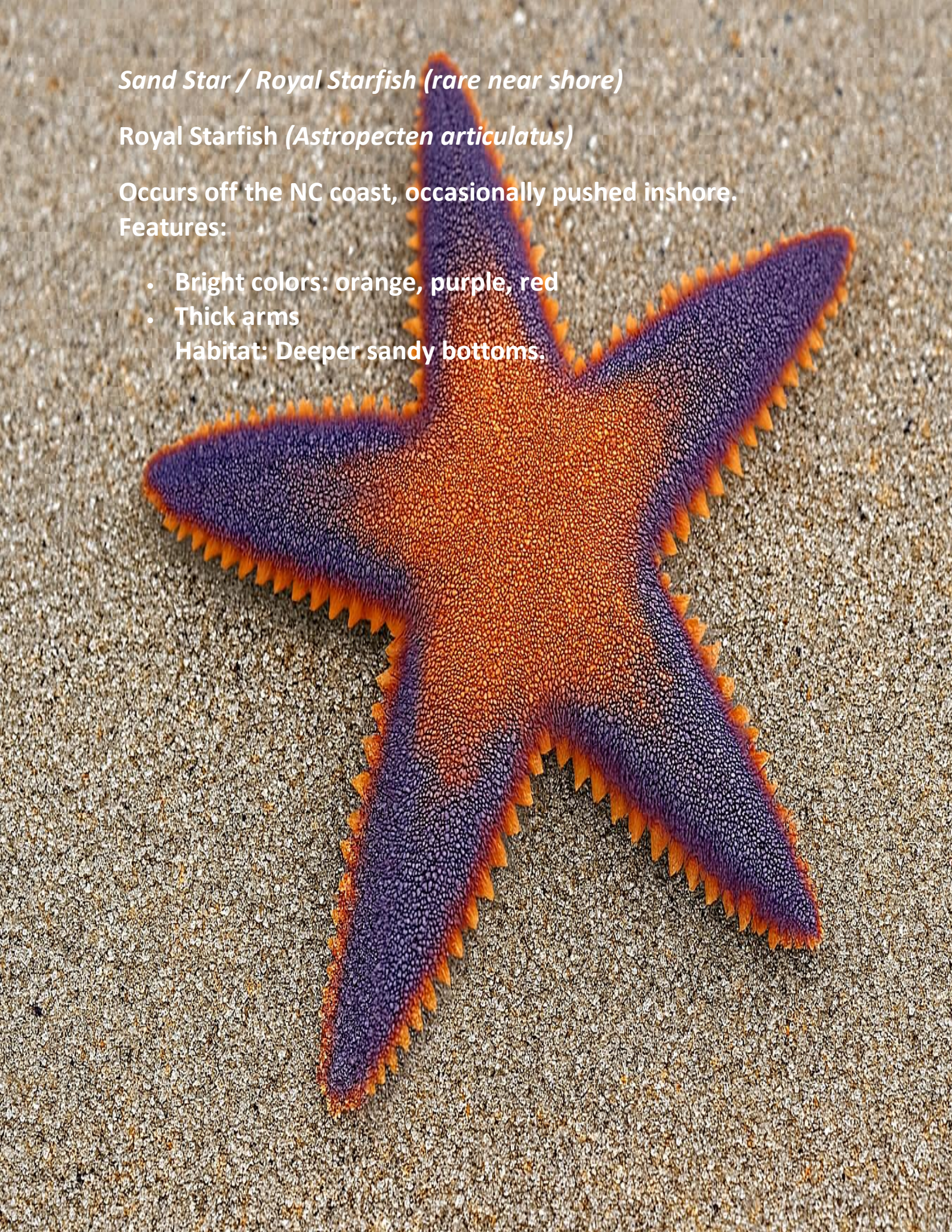


Leather Sea Star / Spiny Sea Star (Astropecten articulatus)

Seen occasionally offshore; sometimes washed ashore.
Features:

- **5 arms**
- **Distinct rows of spines**
- **Blue, gray, or reddish coloration**

Habitat: Offshore sandy bottoms.



Sand Star / Royal Starfish (rare near shore)

Royal Starfish *(Astropecten articulatus)*

Occurs off the NC coast, occasionally pushed inshore.
Features:

- Bright colors: orange, purple, red
- Thick arms

Habitat: Deeper sandy bottoms.

Northern Sea Star (Asterias rubens) (rare in Outer Banks)

Typically found north of Virginia but occasionally drifted south.

Features:

- Five thick arms
- Orange or reddish
- Habitat: Rocky and shell-hash bottoms.

How Sea Stars Live

Understanding sea star anatomy and behavior helps explain why they are so easily displaced onto beaches.

A. Movement

Sea stars use hundreds of tiny tube feet on the underside of each arm. These feet:

- **Grip surfaces**
- **Help them burrow**
- **Sense chemicals in the water**

They move slowly — but enough to hunt or escape predators.

B. Feeding

Sea stars are remarkable predators and scavengers.

Most Outer Banks species feed on:

- **Small clams**
- **Worms**
- **Detritus (organic particles in the sand)**
- **Carrion (dead animals they encounter)**

Some species can even evert their stomachs — pushing their stomach outside their body to digest food externally.

How Sea Stars Live (cont.)

C. Reproduction

Sea stars reproduce in two ways:

1. Regeneration

If an arm is lost, many species can grow a new one — and some can even grow an entire new body from a single arm.

2. Broadcast Spawning

Males and females release eggs and sperm into the water, where fertilization happens. This usually occurs in spring and summer along the Outer Banks.

D. Habitat & Distribution

Along the Outer Banks, sea stars are found in:

- **Sandy bottoms in shallow surf zones**
- **Tidal flats**
- **Near sandbars**
- **Inlets**
- **Soundside shallows (occasionally)**

Because they often live just offshore in mobile sand environments, they are among the first animals displaced when conditions change.

Why Sea Stars Wash Ashore

Mass strandings happen when natural forces overpower their ability to stay in place.

A. Strong Currents & High Surf

Sea stars get rolled and swept ashore when:

- Nor'easters hit
- Tropical storms pass offshore
- Winds produce strong shoreward waves
- Longshore currents strengthen

Their burrowing behavior doesn't protect them during major surf events.

B. Rapid Temperature Drops

As ectothermic animals:

- A sudden cold front
- Upwelling of chilly bottom water
- Wintertime shifts in sound/ocean temperatures can slow sea stars so much they become unable to cling to the sand.

C. Sand Movement & Bottom Disturbance

Shifting sandbars or churned-up bottom sediment moves sea stars like tumbleweeds.

This is especially common on beaches with:

- Steep drop-offs
- Recently renourished sand
- Very mobile offshore bars

D. Large Populations

When conditions are right, huge numbers live just offshore. A single night of rough surf can deposit hundreds or thousands at once.

Are They Alive When You Find Them?

Sometimes — but not always.

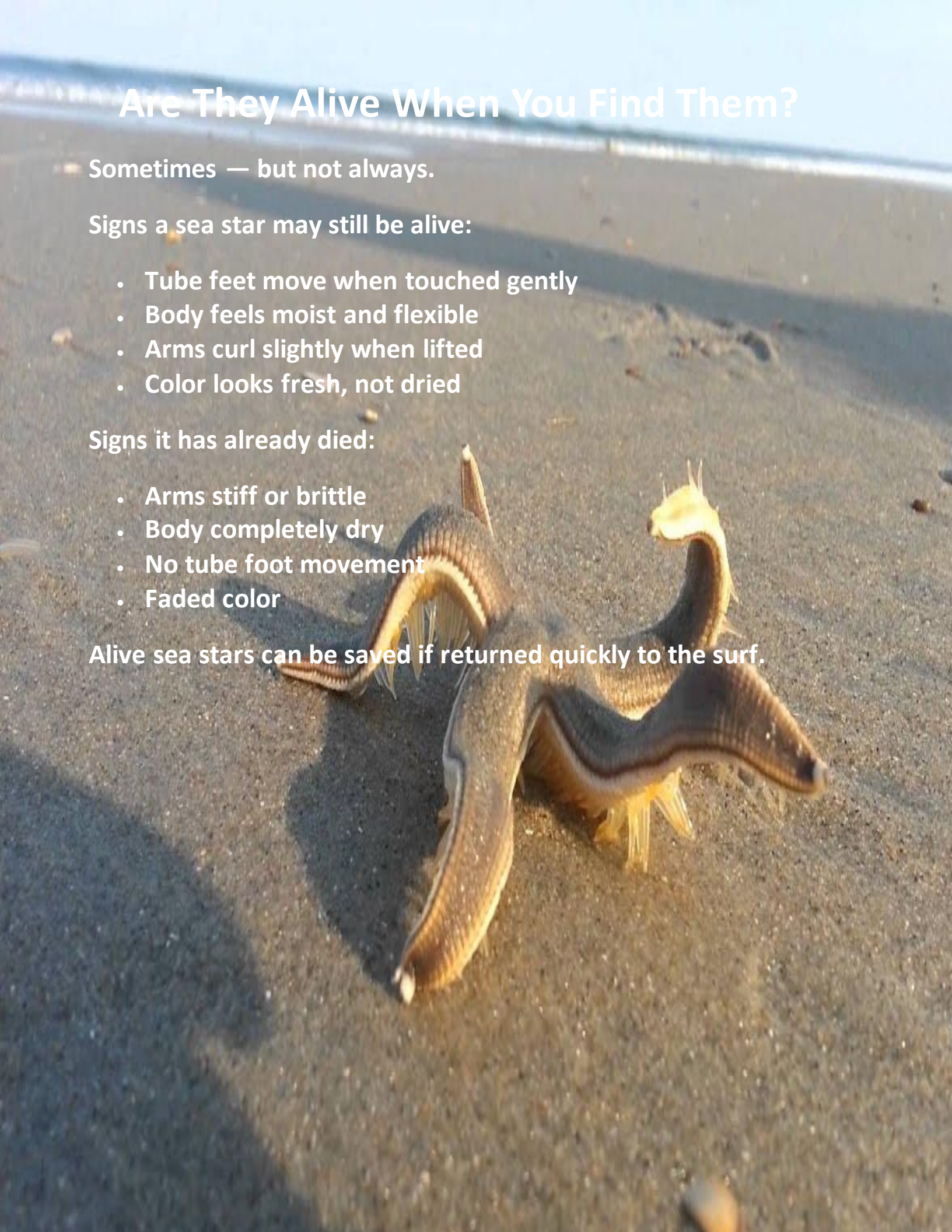
Signs a sea star may still be alive:

- Tube feet move when touched gently
- Body feels moist and flexible
- Arms curl slightly when lifted
- Color looks fresh, not dried

Signs it has already died:

- Arms stiff or brittle
- Body completely dry
- No tube foot movement
- Faded color

Alive sea stars can be saved if returned quickly to the surf.



What To Do If You Find Sea Stars on the Beach

✓ If alive:

- Hold it flat, low, and steady. Move it gently to ankle- or knee-deep water and let the waves take it. Do not throw or drop it.

✓ If unsure:

A quick look at tube feet is enough — avoid handling too much.

✓ If dead:

Leave them. They will naturally return nutrients to the shoreline.

✓ If you see unusual lesions or slime:

Take a photo and report to:

- Cape Hatteras National Seashore Biologists
- NC Division of Marine Fisheries

Many stranded individuals die quickly from:

- Sun exposure
- Desiccation
- Predators
- Stress from surf and temperature changes

Are Strandings Dangerous or Alarming?

In most cases: No.
Sea stars are abundant offshore, and mass wash-ups occur in cycles tied to weather and tides.

But they are excellent indicators of ocean change, helping researchers understand:

- **Temperature swings**
- **Habitat shifts**
- **Storm impacts**
- **Sediment movement**
- **Possible disease outbreaks**

What You *Should Not* Do

✗ Don’t take live sea stars home

Most die quickly outside their habitat and removing them is discouraged by wildlife professionals.

✗ Don’t place them in warm buckets or leave them in the sun

This causes rapid death.

✗ Don’t assume it’s pollution or a disaster

Most mass strandings are natural events, not ecological collapse.

Did You Know?

Sea Stars of the Outer Banks

• **Sea stars aren't fish.**
They're echinoderms — relatives of sand dollars and sea urchins — and they move using seawater instead of muscles.

• **They can regrow arms.**
Some species can even regenerate an entirely new body from a single arm!

• **A sea star can have more than five arms.**
The Lined Sea Star, the most common species on the Outer Banks, can have up to nine.

• **Sea stars "walk" on hundreds of tube feet.**
These tiny suction-like feet help them crawl, sense chemicals, and even hold onto food.

• **They digest food outside their bodies.**
Some sea stars push their stomachs out through their mouths to digest clams and other prey.

• **Storms are the main reason they wash ashore.**
Nor'easters, big waves, and strong currents easily sweep sand-dwelling sea stars to the beach.

• **They are sensitive to temperature changes.**
A sudden cold snap can slow them down, making them more likely to be carried ashore.

• **Sea stars are indicators of coastal change.**
Large strandings can reflect shifts in water temperature, sand movement, or storm activity — helping scientists understand the health of the ocean.

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