

# Juvenile Sea Star Identification Guide

## Updated as of March 27, 2024:

- This guide is an accompaniment to the data form designed to capture evidence of recovery from Sea Star Wasting Syndrome in the form of recruitment (settlement and development of baby sea stars).
- “Juvenile” sea stars, with the exception of *Pycnopodia helianthoides*, are here defined as any individuals 25 mm / 1 inch or less in diameter (i.e. the size of a Quarter or Loonie coin). For smaller species such as *Henricia* and *Leptasterias*, individuals of this size are likely “adults” (of reproductive size), but because true juveniles are quite small and cryptic, they will commonly be over-looked. For *Pycnopodia helianthoides*, one of the larger species, juveniles will now be defined as individuals 50 mm / 2 inches or less in diameter.
- When small, sea stars can be hard to correctly identify. Please take and submit additional photos if ID is <100% certain.
- Thank you for your assistance in the continued Sea Star Wasting Syndrome tracking effort!



Photo: John Pearse

## *Pisaster ochraceus* (ochre sea star)

### Size of juveniles

Up to 1 inch (25 mm) in diameter, or smaller than a Quarter or Loonie coin.

### Range

Alaska to Baja California

### Appearance

Usually 5 arms that are widest where they meet the oral disk and taper at the ends, adult radius up to 250 mm; variable coloration (muted tones of gray, purple/blue, orange/tan, a mixture of the three) that provides more camouflage than the adults' more vivid pigmentation; often display a star shape in the center of their oral disk formed by a grouping of small white spines (lower right photo) (these can also be seen through the epidermis all over the star's aboral surface).

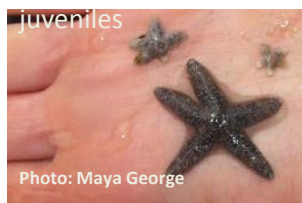
### Habitat

Juveniles are much less conspicuous and they tend to occupy slightly different habitats (small cracks, under loose cobble, inside the mussel matrix, etc.) than the brightly-colored adults.

### Can be confused with

Adults: *Evasterias troschelii*

Juveniles: *Leptasterias* spp. and juvenile *Evasterias troschelii*



## *Evasterias troschelii* (false ochre / mottled star)

### Size of juveniles

Up to 1 inch (25 mm) in diameter, or smaller than a Quarter or Loonie coin.

### Range

Siberia/No. Alaska to Central California

### Appearance (compared with *P. ochraceus* and *Leptasterias* spp.)

Generally 5 arms that are more slender than *P. ochraceus*' and have a constricted appearance where they meet a smaller oral disc, adult radius up to 300 mm; color ranges from orange-brown to blue-gray; star pattern (comprised of white spines) usually absent from the center of the disk's aboral surface. Spines on the side of the arm are in several rows (3 or more) and slant upwards toward aboral surface. If aboral surface is visible, the larger knobby spines of *Evasterias* are connected to each other by a net-like pattern of smaller, sharper spines. *Evasterias*, even when small, have proportionately much longer arms than does *Leptasterias* spp.

### Habitat

Occurs primarily in protected or semi-protected waters, with preference for hard surfaces (pier pilings, docks, rip-rap, jetties, etc.); also found on sand. Juveniles often occur under cobble, within empty shells or in other cryptic habitat. Occasionally co-located with *P. ochraceus*.

### Can be confused with

Adults: *Pisaster ochraceus*

Juveniles: *Leptasterias* spp. and juvenile *Pisaster ochraceus*



## *Pisaster giganteus* (giant-spined / knobby sea star)

### Size of juveniles

Up to 1 inch (25 mm) in diameter, or smaller than a Quarter or Loonie coin.

### Range

British Columbia to Baja California

### Appearance (compared with *P. ochraceus*)

Aboral spines are fewer and longer than those of *P. ochraceus*; they are also evenly spaced (never forming a star pattern), surrounded at their base by blue skin-like material, and are white in adults and pink, violet, or blue in juveniles. Adult radius up to 125 mm.

### Habitat

Found on rocks/pier pilings in low intertidal zone or subtidal (to 88 m); occasionally on sand.

Photos: Dr. Steve Lonhart,  
NOAA MBNMS

adult



juveniles



## *Pisaster brevispinus* (short-spined / giant-pink sea star)

### Size of juveniles

Up to 1 inch (25 mm) in diameter, or smaller than a Quarter or Loonie coin.

### Range

Alaska to San Diego, California

### Appearance

Characteristic pink color in adults and uniform (unmottled) off-white to light-pink color in juveniles (in juvenile photo, pink color is just starting to come through); usually 5, thick arms; short spines and two rows run parallel down center of each ray. Adult radius up to 250 mm.

### Habitat

Occasionally found in the low intertidal zone but more common subtidally (0.5 m to 100 m) on soft bottoms, or on protected rocks/pier pilings.

adult



Photo: Dave Lohse

juveniles

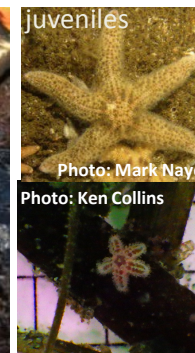


Photo: Mark Nayer

Photo: Ken Collins

Note: Often true juveniles of these 2 genera are closer to 10-15mm in diameter, however, they can be tricky to find and correctly ID at that size.

## *Henricia* spp. (Pacific blood star)

### Size of juveniles

Up to 1 inch (25 mm) in diameter, or smaller than a Quarter or Loonie coin.

### Range

Alaska to Baja California

### Appearance

Adults usually smaller than ~90 mm radius; small disk; usually 5, long arms that taper; body nearly smooth (not overtly spiny); colored tan to orange-red or purple, sometimes with darker colored banding; groups of short spines on aboral surface; huge variety in size and color morphology. Northern species can have white or tan patches on the central disk that can be confused with signs of wasting disease (lower right picture).

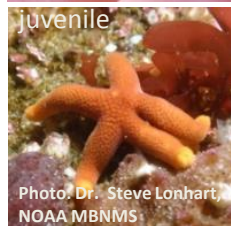
### Habitat

Often found in sponge and bryozoan encrusted areas on or around rocks, caves, and pools in the low intertidal zone.

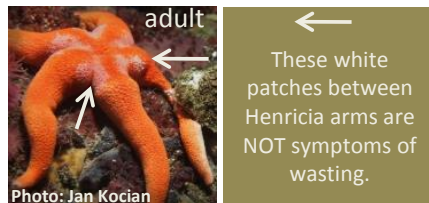


juvenile  
Photo: Natasha Meyers-Cherry

adults  
Photos: Dr. Steve Lonhart, NOAA MBNMS



juvenile  
Photo: Dr. Steve Lonhart, NOAA MBNMS



adult  
Photo: Jan Kocian

←  
These white patches between *Henricia* arms are NOT symptoms of wasting.

## *Leptasterias* spp. (six-rayed star)

### Size of juveniles

Up to 1 inch (25 mm) in diameter, or smaller than a Quarter or Loonie coin.

### Range

Alaska to the Channel Islands, California

### Appearance

Brooding sea star; usually with 6 arms; adult radius up to 52 mm; coloration typically dark (mottled black or brown), sometimes brightly colored red or green. *Leptasterias* usually have 1-2 rows of spines on side of lower portion of arms and spines above this row are scattered. The mottling can take the form of a star pattern in center of aboral disk (see lower left picture) however this is distinct from the star pattern found in *P. ochraceus* where the central star pattern is formed by aboral spines.

### Habitat

Intertidal species; typically found in cracks and crevices, to which its body conforms. Can be patchy in distribution, with individuals often occurring in clusters.

### Can be confused with

Adults and juveniles: juvenile *Pisaster ochraceus* and juvenile *Evasterias troschelii*



juvenile  
Photo: Laura Jurgens

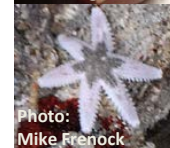
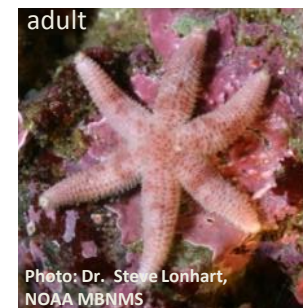


Photo: Mike Frenock



adult  
Photo: Dr. Steve Lonhart, NOAA MBNMS



Brooding adult  
Photo: Melissa Redfield

## *Patiria miniata* (bat star)

### Size of juveniles

Up to 1 inch (25 mm) in diameter, or smaller than a Quarter or Loonie coin.

### Range

Alaska to Baja California

### Appearance

Large disk with short, triangular arms (usually five), adult radius up to 120 mm; color variable, with orange and red (solid/mottled) variants most common—distinguishing features consistent in both juveniles and adults.

### Habitat

Commonly found around rocks covered by surfgrass, algae, sponges, and bryozoans in the low intertidal; found subtidally to 290 m.

## *Dermasterias imbricata* (leather star)

### Size of juveniles

Up to 1 inch (25 mm) in diameter, or smaller than a Quarter or Loonie coin.

### Range

Alaska to San Diego, California

### Appearance

Adult radius to 120 mm; typically has 5 arms; epidermis is smooth, leathery, and slippery; color typically gray with red-orange mottling; individuals often smell of garlic or sulfur.

### Habitat

Common to rocky shores in the low intertidal or shallow subtidal; can be found on pilings and harbor sea walls.



Photos: Dr. Steve Lonhart, NOAA MBNMS

## *Pycnopodia helianthoides*

(sunflower star)

### Size of juveniles

Up to 2 inches (50 mm) in diameter.

### Range

Alaska to San Diego, CA (uncommon south of Monterey County, CA)

### Appearance

Adult radius up to 400 mm+; soft, flexible, large oral disk; beginning with 5 arms, all but the smallest juveniles have 5+ arms and can acquire up to a total of 24 arms as adults—addition of arms is asymmetrical (see upper right photo); aboral surface pink, purple, or brown (uncommonly red, orange, or yellow)

### Habitat

Low intertidal zone of rocky shores; found subtidally to 435 m on rock, sand, and mud.



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## *Orthasterias koehleri*

(northern rainbow star)

### Size of juveniles

Up to 1 inch (25 mm) in diameter, or smaller than a Quarter or Loonie coin.

### Range

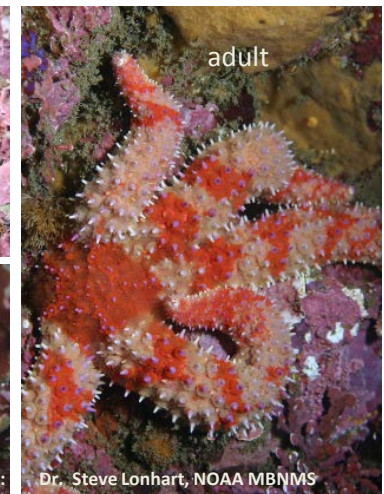
Alaska to Santa Rosa Island (Channel Islands), California

### Appearance

Small oral disk with sharp white-lilac spines on the aboral surface; 5 slim arms with adult radius up to 300 mm; coloration typically involves a dull orange/cream-colored body banded with red.

### Habitat

Uncommonly found in very low intertidal on mud, sand, rock, and kelp; more common subtidally to 250 m.



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Note: All *Solaster* species get combined to *Solaster spp.* due to difficulty differentiating between them.

## *Solaster stimpsoni* (Stimpson's sun star)

### Size of juveniles

Up to 1 inch (25 mm) in diameter, or smaller than a Quarter or Loonie coin.

### Range

Alaska to Humboldt Co.

### Appearance (compared with *Pycnopodia helianthoides*)

*S. stimpsoni*'s slender arms are tapered and can reach a radius of 250 mm; individuals typically have 10 arms; aboral disk color variable (red, orange, yellow, green, or blue), often with a blue-gray mark in central portion of disk that connects with similar colored lines radiating out along the aboral surface of each arm to the tips. *S. stimpsoni* has a smaller oral disk than the sunflower star (*Pycnopodia helianthoides*) and texture of its aboral surface is also rougher due to presence of ossicles bearing spine clusters.

### Habitat

This uncommon species is found primarily on rocks, less preferably on sand, from the very low intertidal to 60 m subtidally.

### Can be confused with

Adults and juveniles: *Solaster dawsoni*, *Solaster paxillatus*, *Solaster endeca*, and *Pycnopodia helianthoides*



## *Solaster dawsoni* (Dawson's sun star)

### Size of juveniles

Up to 1 inch (25 mm) in diameter, or smaller than a Quarter or Loonie coin.

### Range

Alaska to Monterey Co.

### Appearance (compared with *S. stimpsoni*)

*S. dawsoni* can have from 8 to 13 arms (adults most commonly have 12-13) with radii of 250 mm; aboral coloration typically muted (gray, cream, yellow, brown) and infrequently bright (red or orange) with light patches in between the arms. Arms of *S. dawsoni* are typically less narrow than those found in *S. stimpsoni*.

### Habitat

Uncommonly encountered on mud, sand, gravel and rocks from the low intertidal zone to 420 m subtidally.

### Can be confused with

Adults and juveniles: *Solaster stimpsoni*, *Solaster paxillatus*, *Solaster endeca*, and *Pycnopodia helianthoides*



# Juvenile Sea Stars ID Game

## Part 1

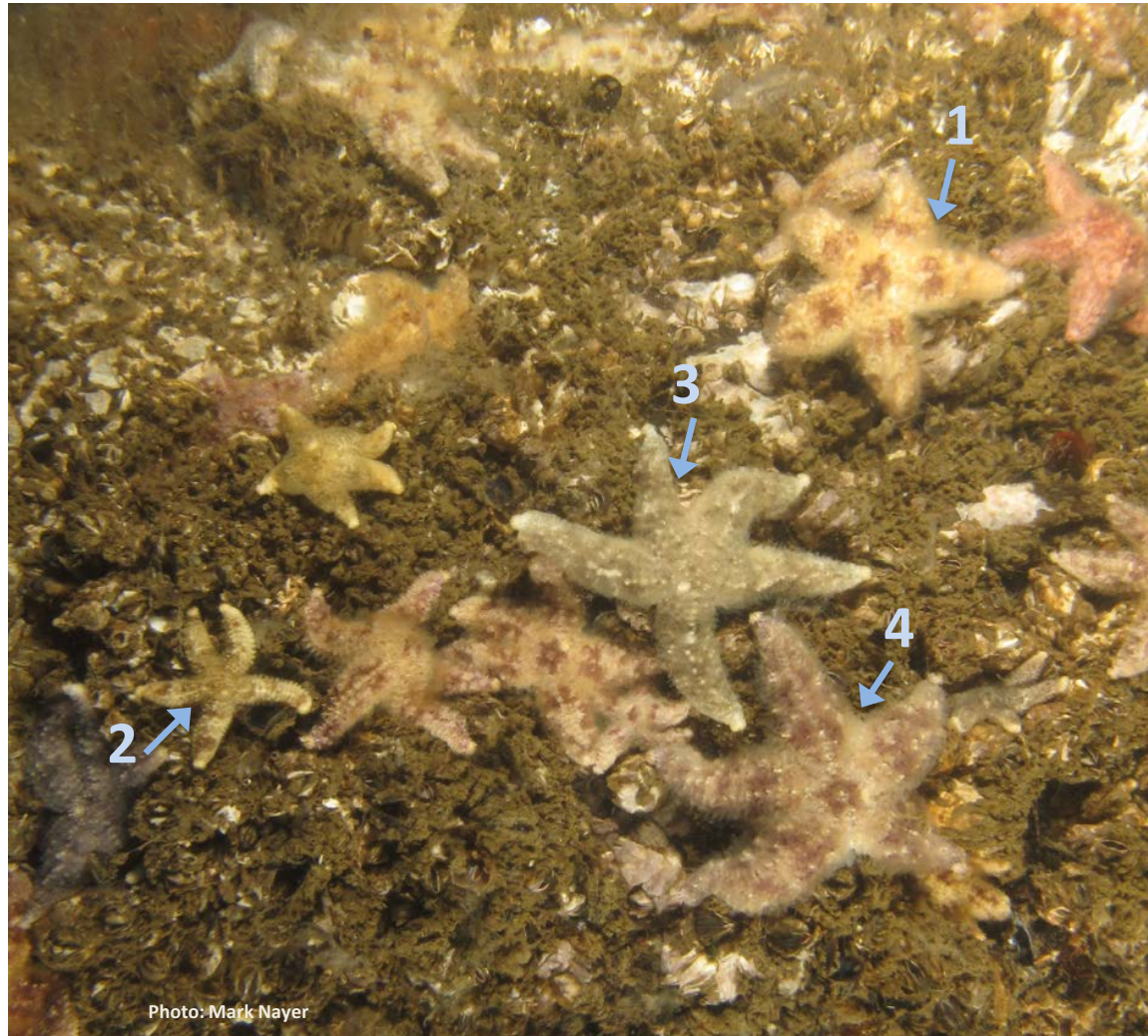
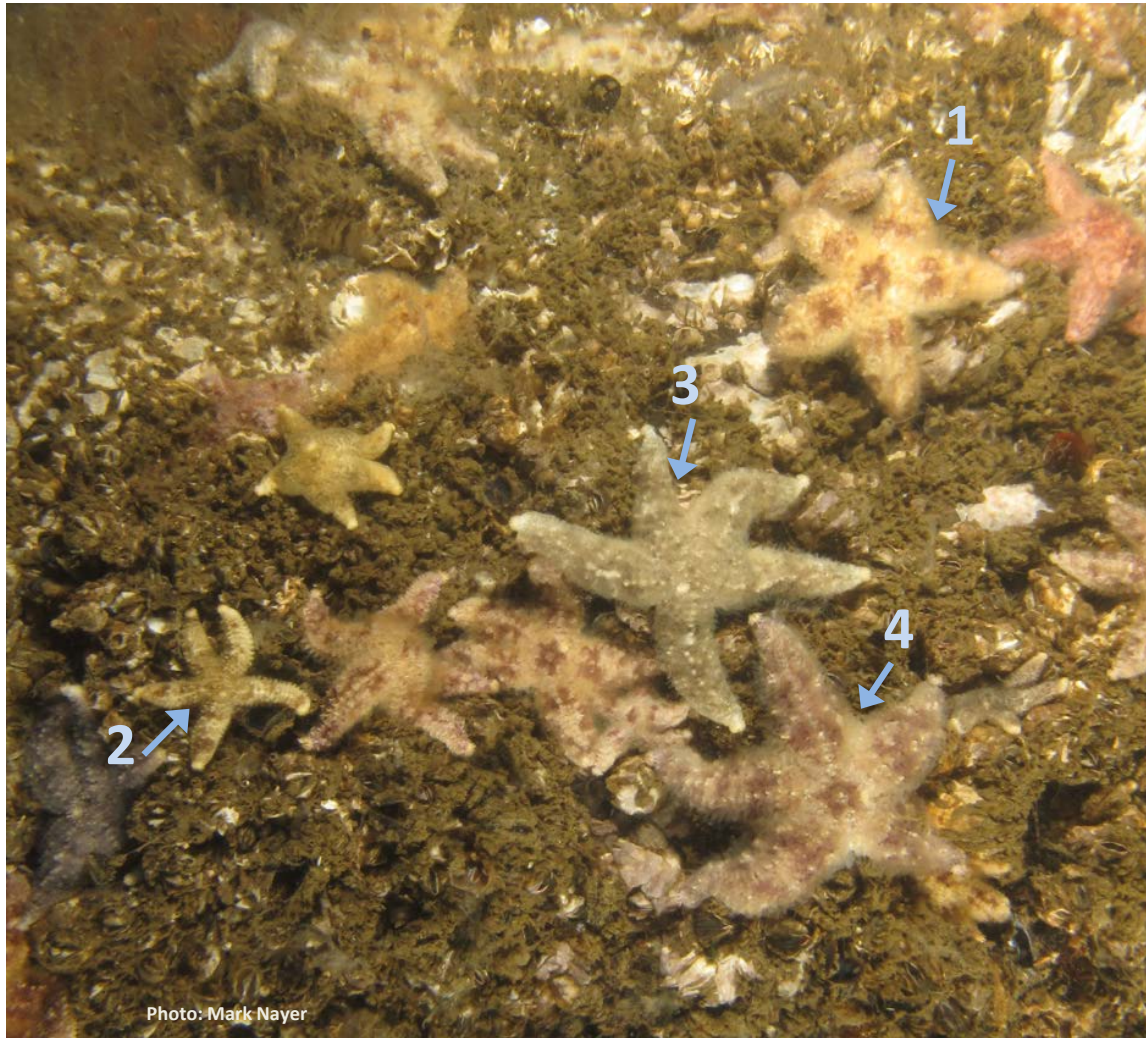


Photo: Mark Nayer



# Juvenile Sea Stars ID Game

## Part 1: key

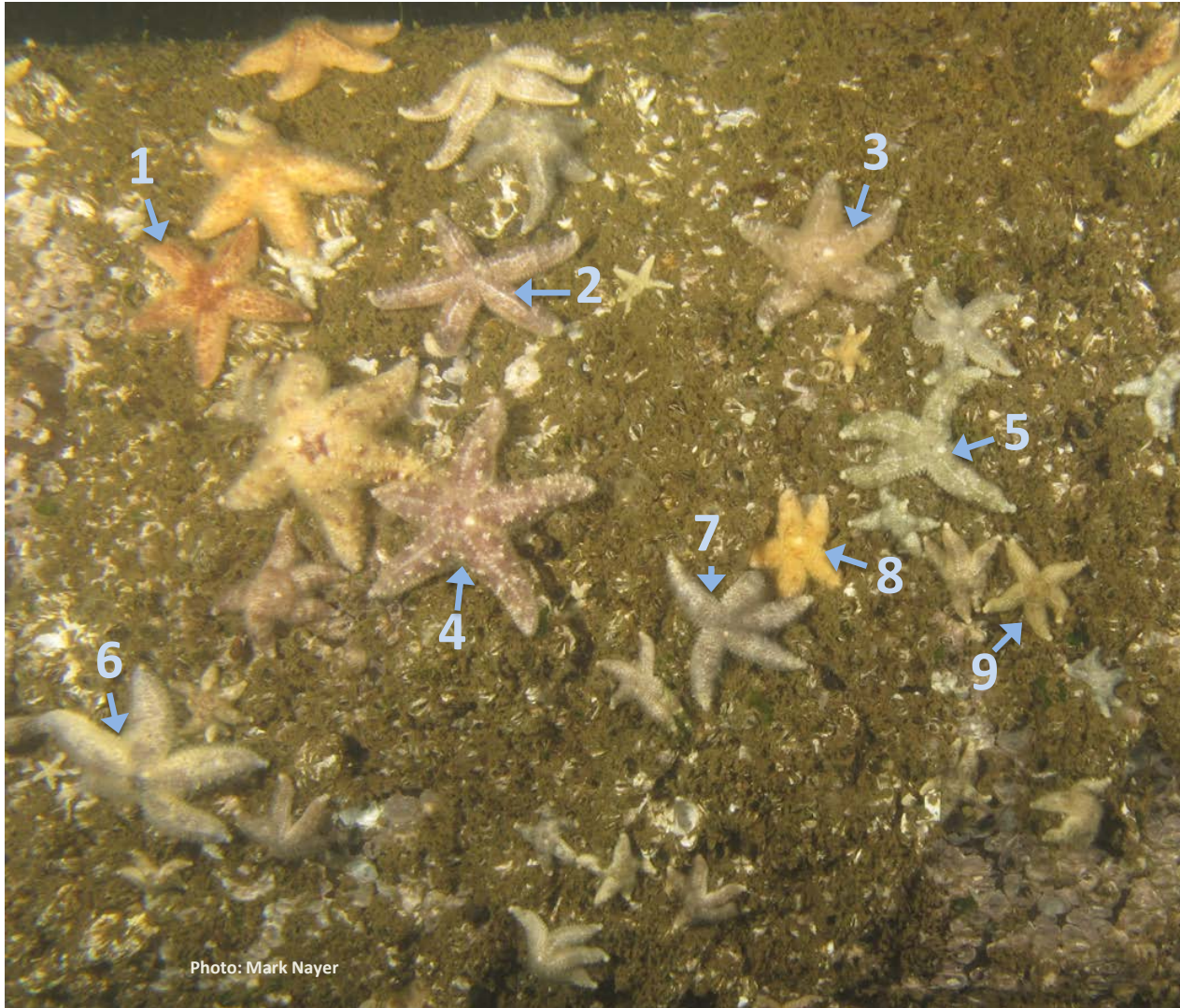


1. *P. ochraceus*
2. *E. troschelii*
3. *E. troschelii*
4. *P. ochraceus*

Photo: Mark Nayer

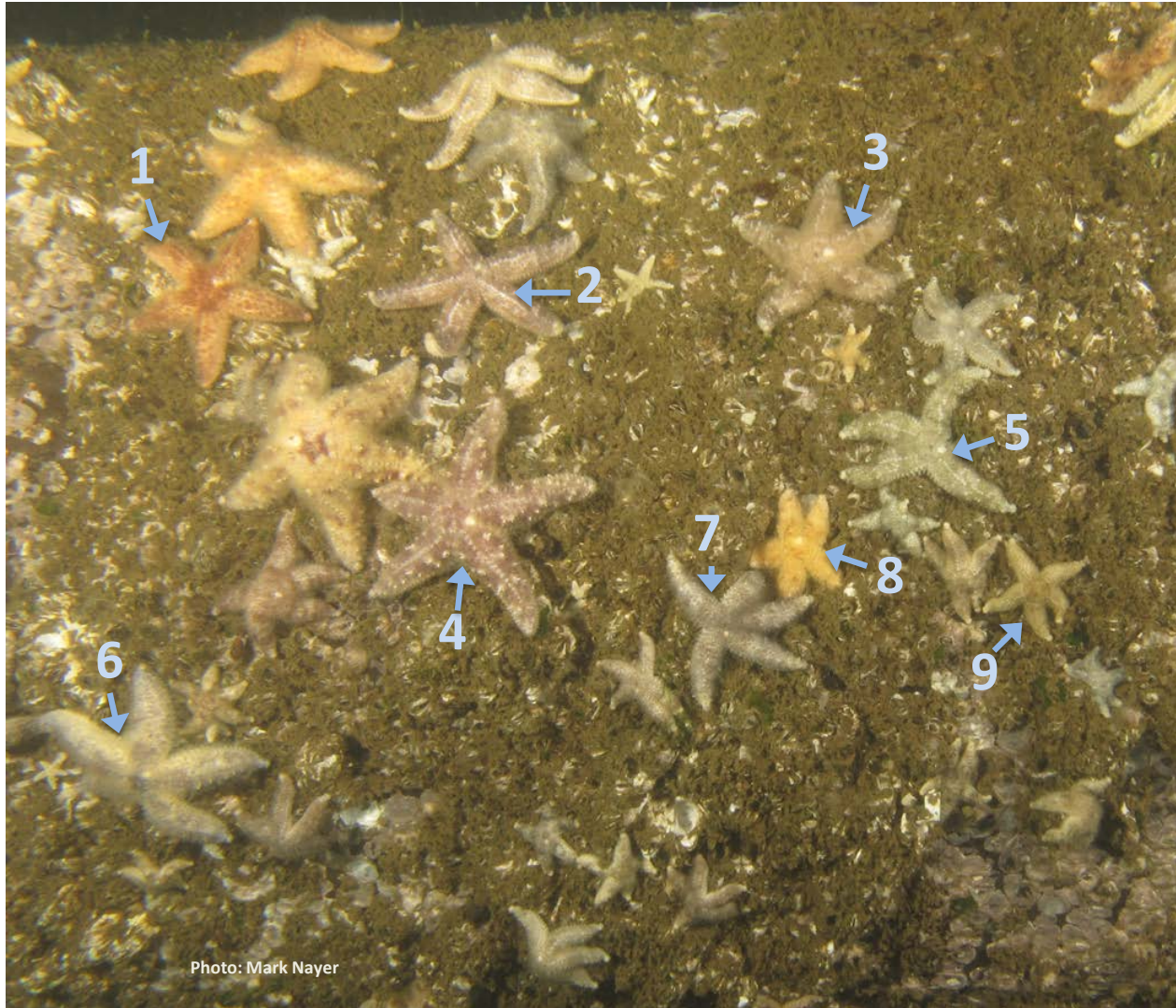
# Juvenile Sea Stars ID Game

## Part 2



# Juvenile Sea Stars ID Game

## Part 2: key



1. *P. ochraceus*
2. *E. troschelii*
3. *P. ochraceus*
4. *P. ochraceus*
5. *E. troschelii*
6. *E. troschelii*
7. *E. troschelii*
8. *P. ochraceus*
9. *E. troschelii*

Photo: Mark Nayer

# Juvenile Sea Stars ID Game

## Part 3

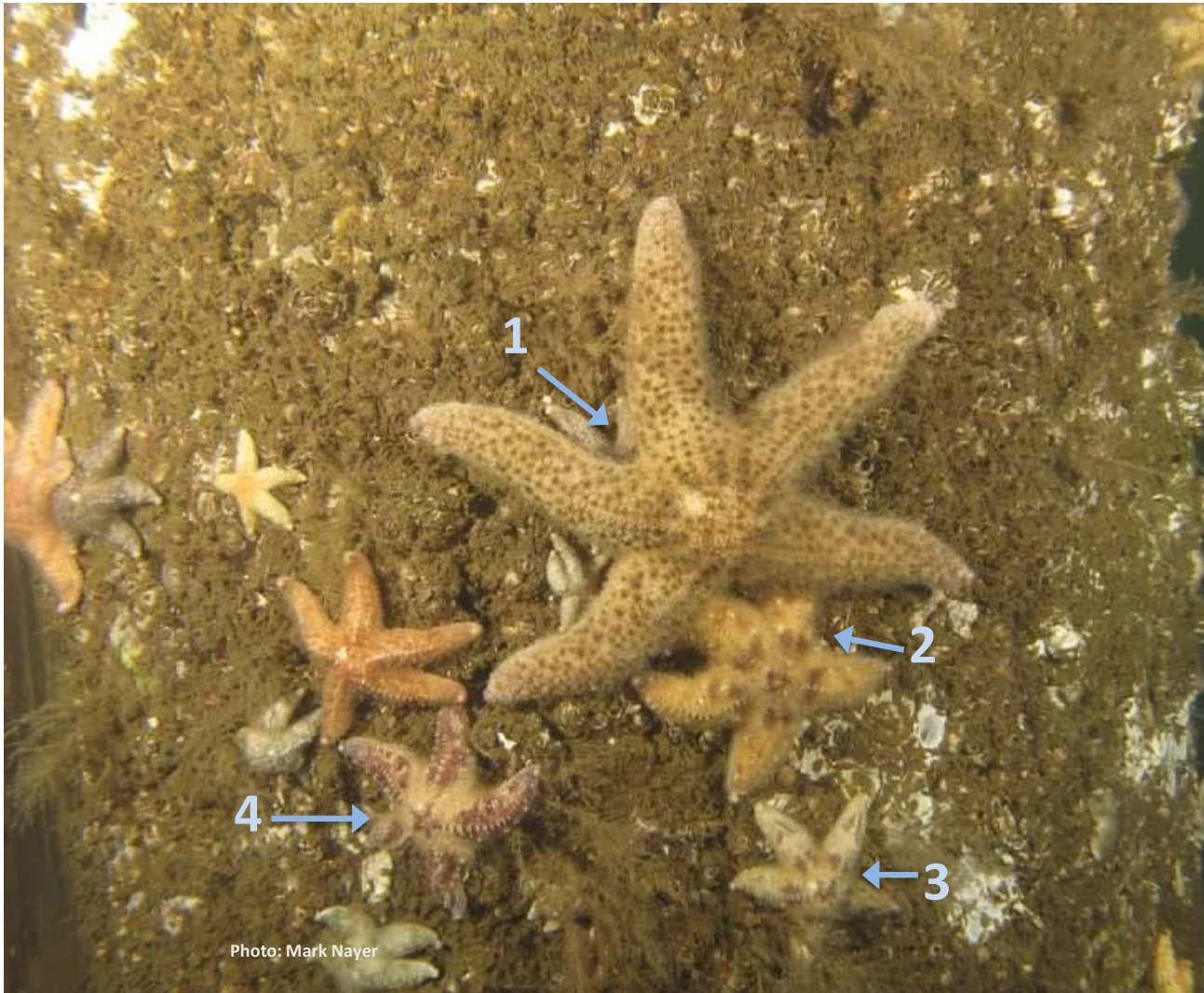


Photo: Mark Nayer

# Juvenile Sea Stars ID Game

## Part 3: key

1. *P. brevispinus*
2. *P. ochraceus*
3. *P. ochraceus*
4. *P. ochraceus*

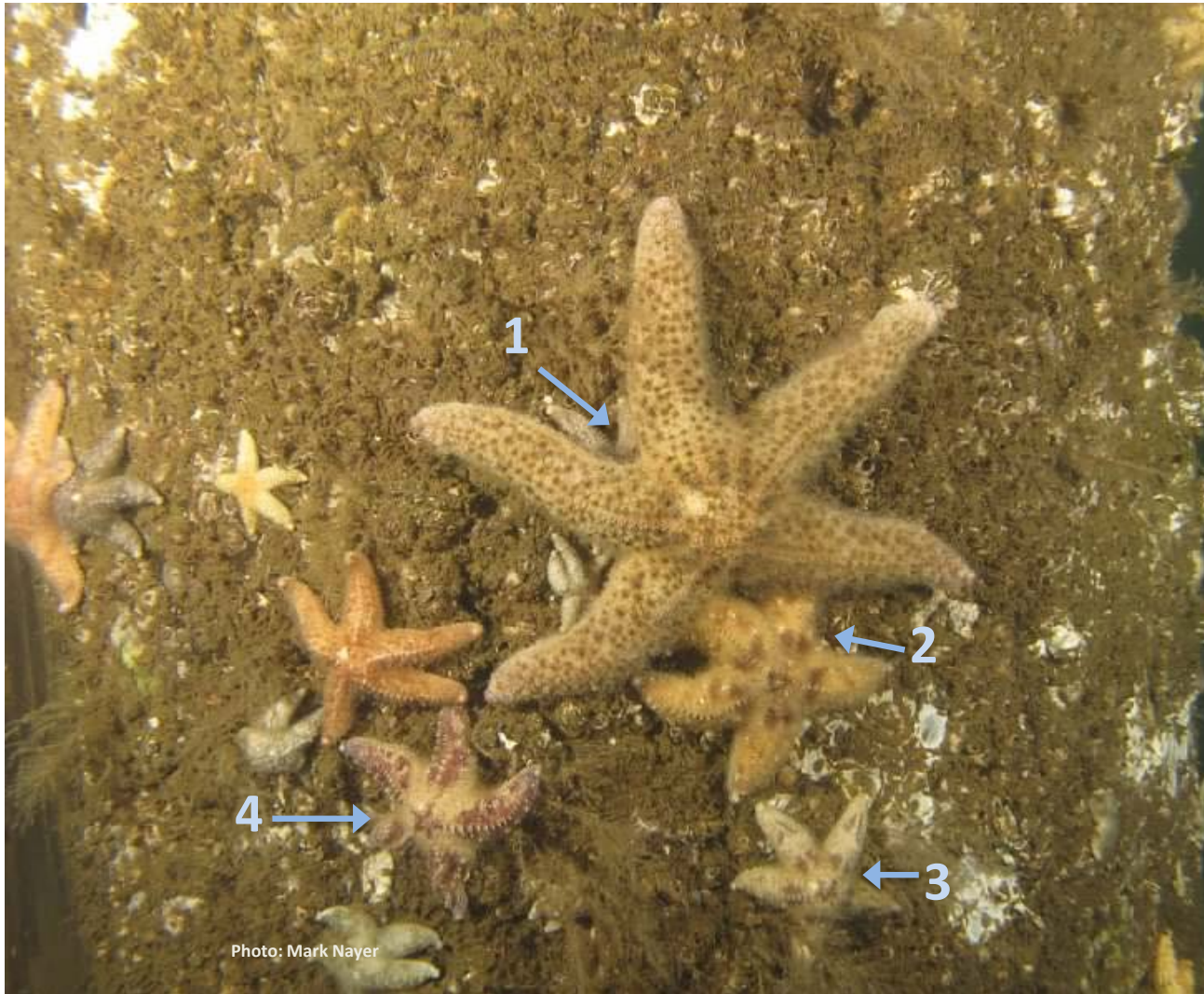


Photo: Mark Nayer

# Acknowledgments

- Majority of guide text from:

Morris, Robert H., Donald P. Abbott, and Eugene C. Haderlie. 1980.  
*Intertidal invertebrates of California*. Stanford, Calif.:  
Stanford University Press, 1980. Print.

&

Lamb, Andy and Bernard P. Hanby. 2005. *Marine Life of the Pacific Northwest: A  
Photographic Encyclopedia of Invertebrates, Seaweeds and Selected  
Fishes*. Madeira Park, BC.: Harbour Publishing, 2005. Print.

- Thanks to Aaron Baldwin for his descriptions of methods for differentiating *Leptasterias* from juvenile *Evasterias* and *Pisaster ochraceus*.

- Much appreciation to Steve Lonhart, John Pearse and Betsy Steele for their insightful edits and comments which have informed this guide.

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