



*Indian Island
2024*

Indian Island 2024

Species diversity has declined over the last 11 years in both terrestrial and marine habitats. Some native species are thriving in the warmer, shallower bay, however, as are invasive kelps, and potentially harmful algal blooms.

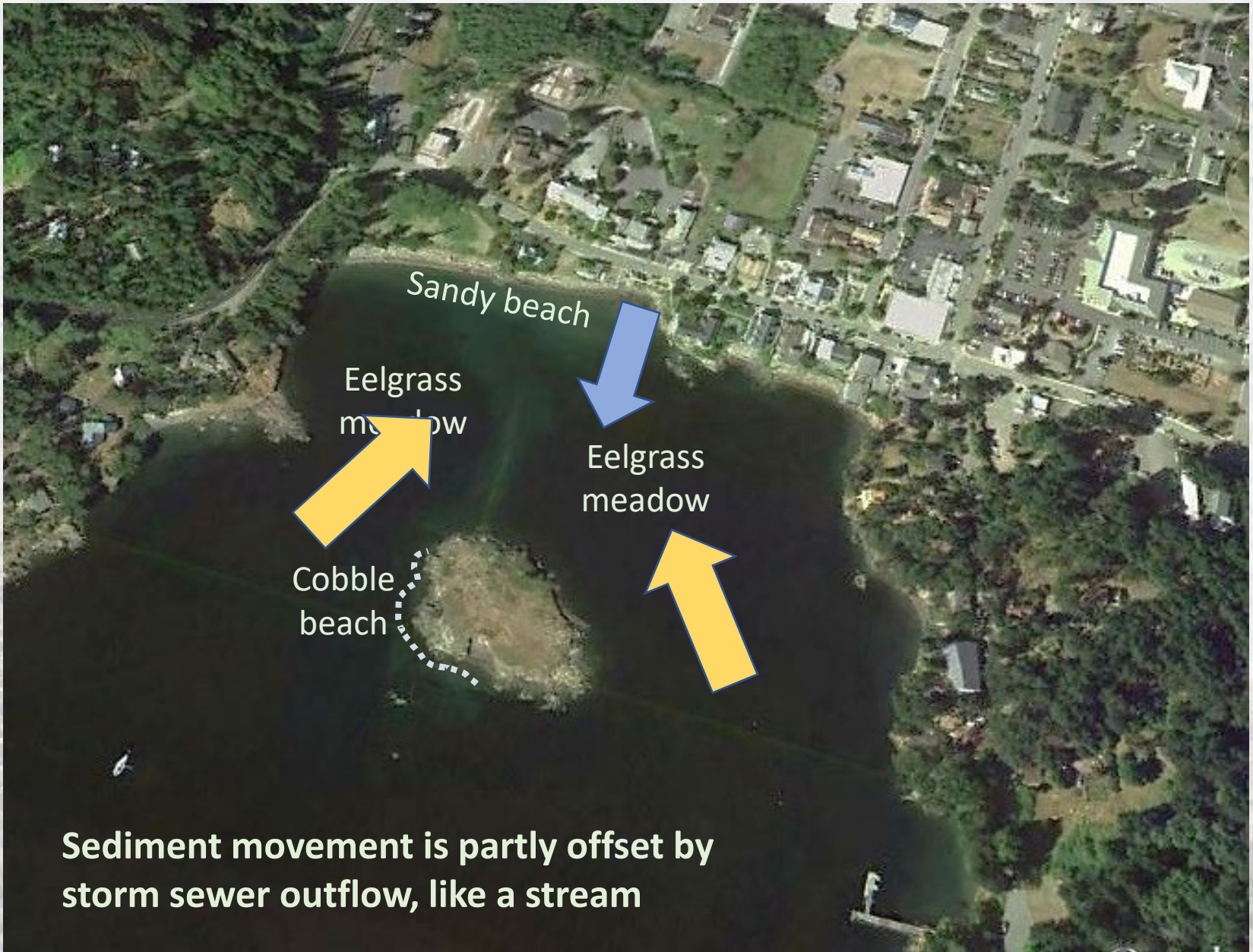
Most of these changes are associated with warming, stormier seas. A growing number of summer visitors has exacerbated the impacts of warming especially in the intertidal zone.



Monitoring since 2009 has focused on three kinds of intertidal habitats



Tides and currents have been pushing fine sediments into the back bay



Sediment movement is partly offset by storm sewer outflow, like a stream



As a result most sediment accumulates on the west side of the bay and beach



An unusual amount of sediment covered much of the west bay in winter 2023-24



Sandy beach

Cobble beach

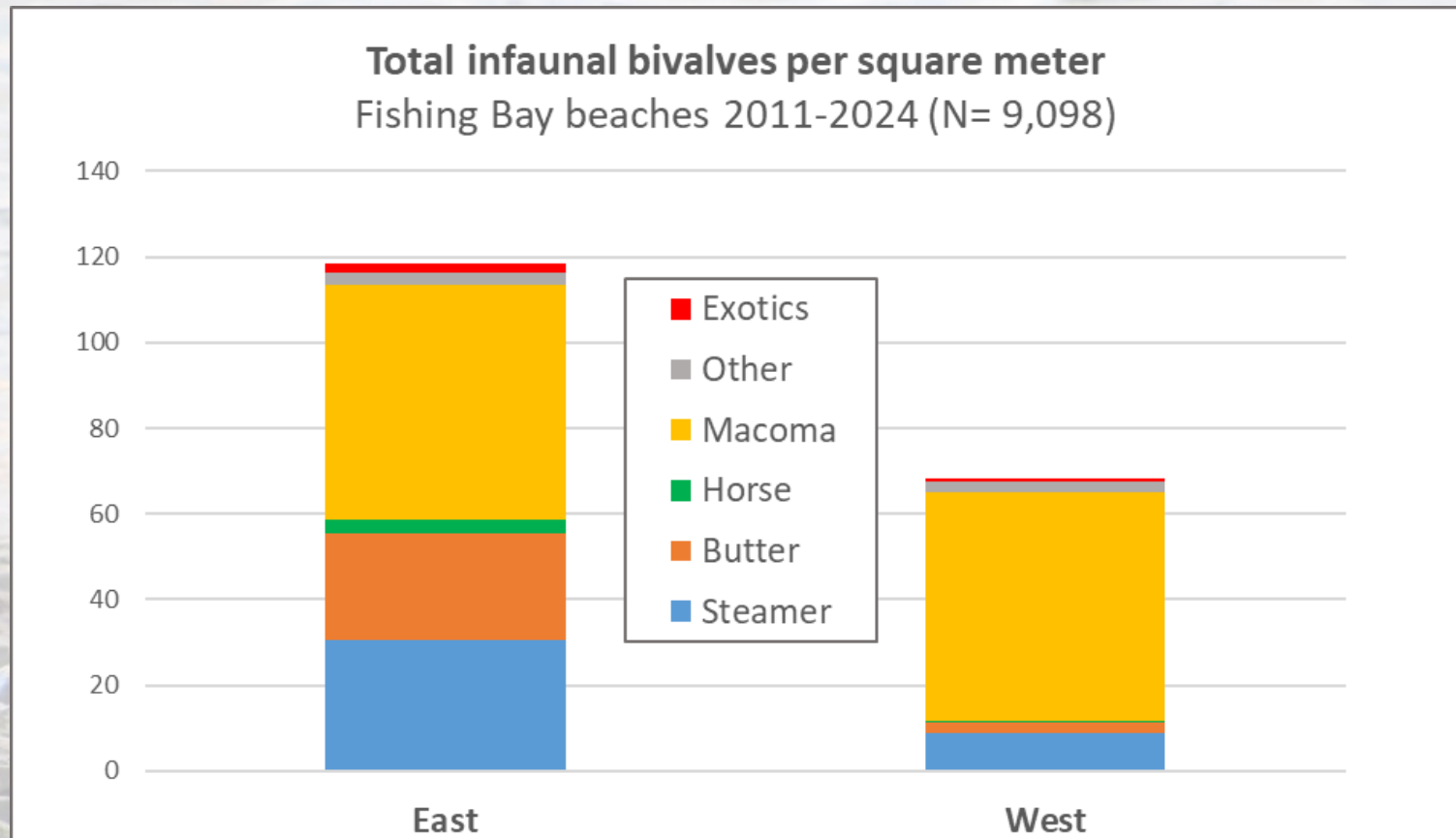
Eelgrass meadow

Above the tides

Sandy beach

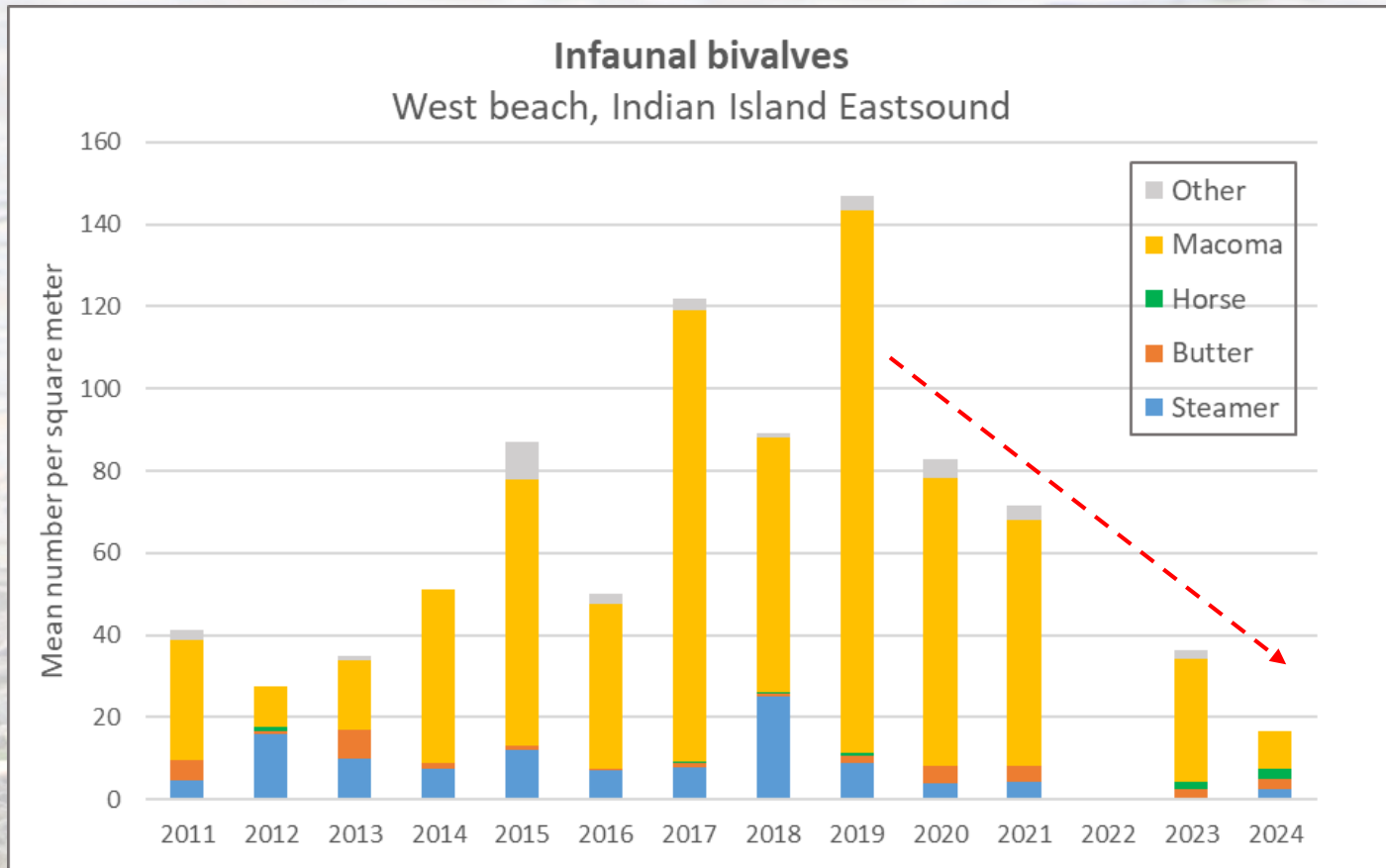


Sandy beach



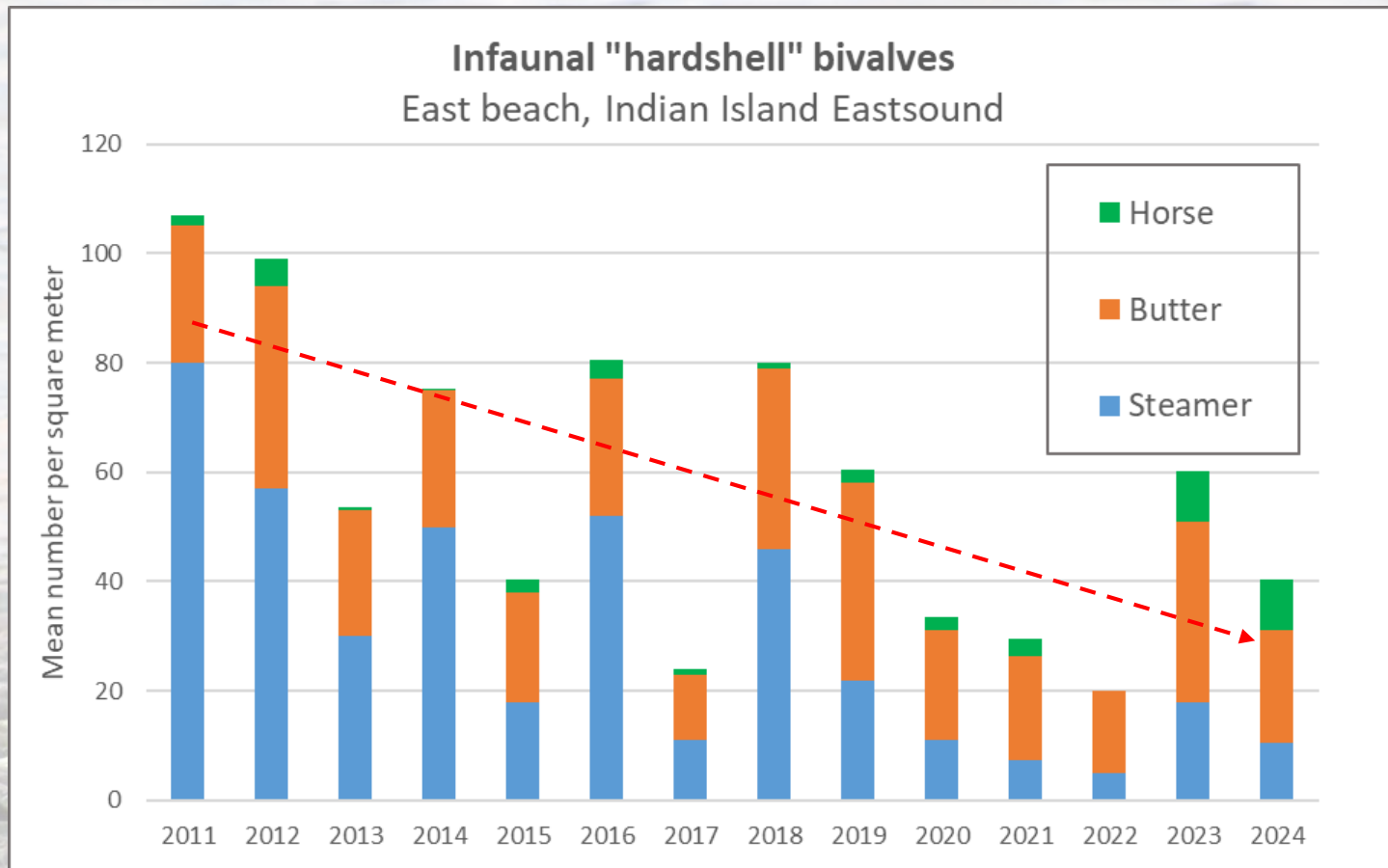
The west end of the beach has been siltier since monitoring began, and had fewer “hardshell” clams

Sandy beach



The west end of the beach has grown much siltier recently, losing even its “softshell” clams

Sandy beach

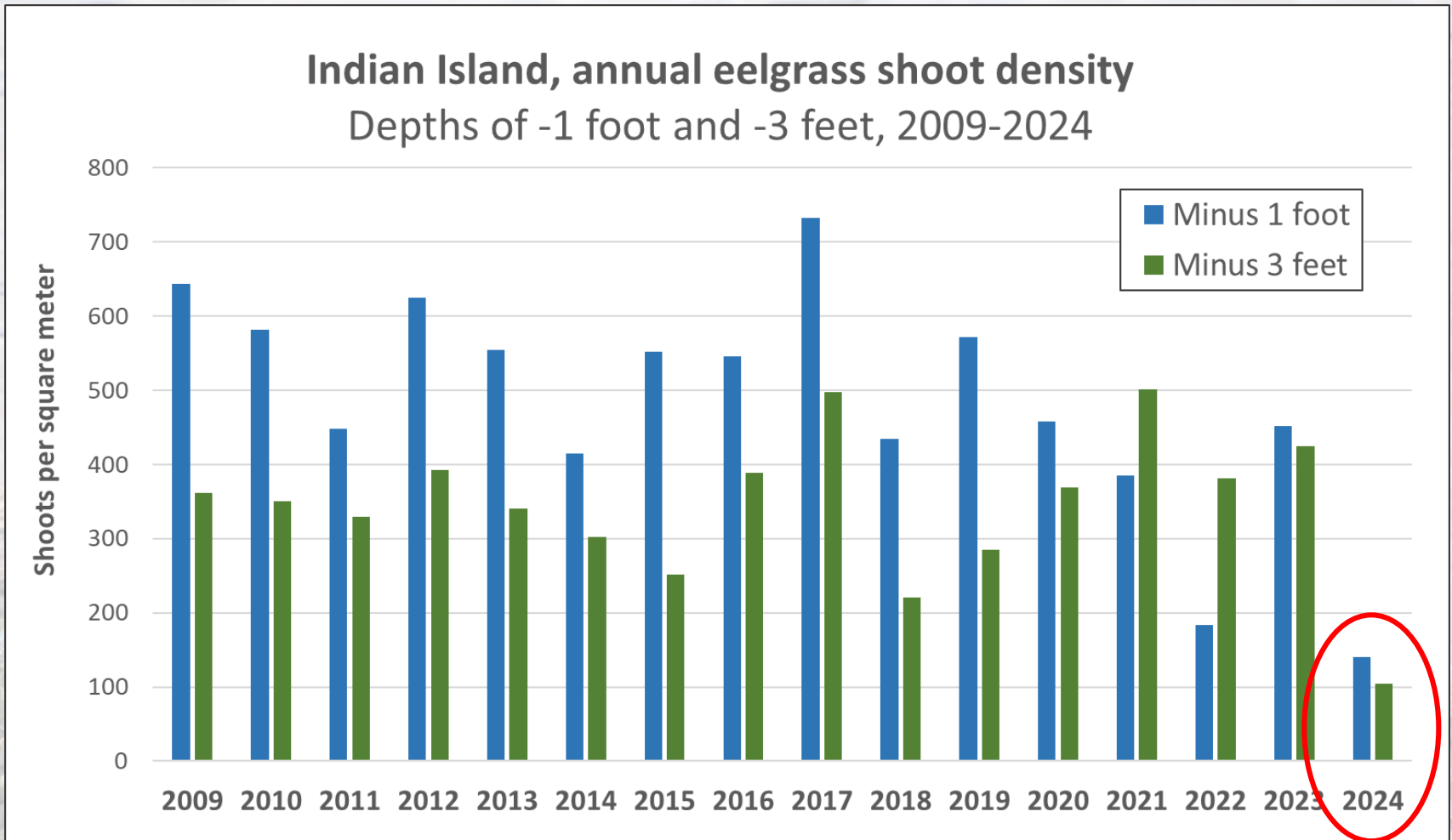


Even the east end of the beach has lost about half of its "hard-shelled" clams since 2011

Eelgrass meadow



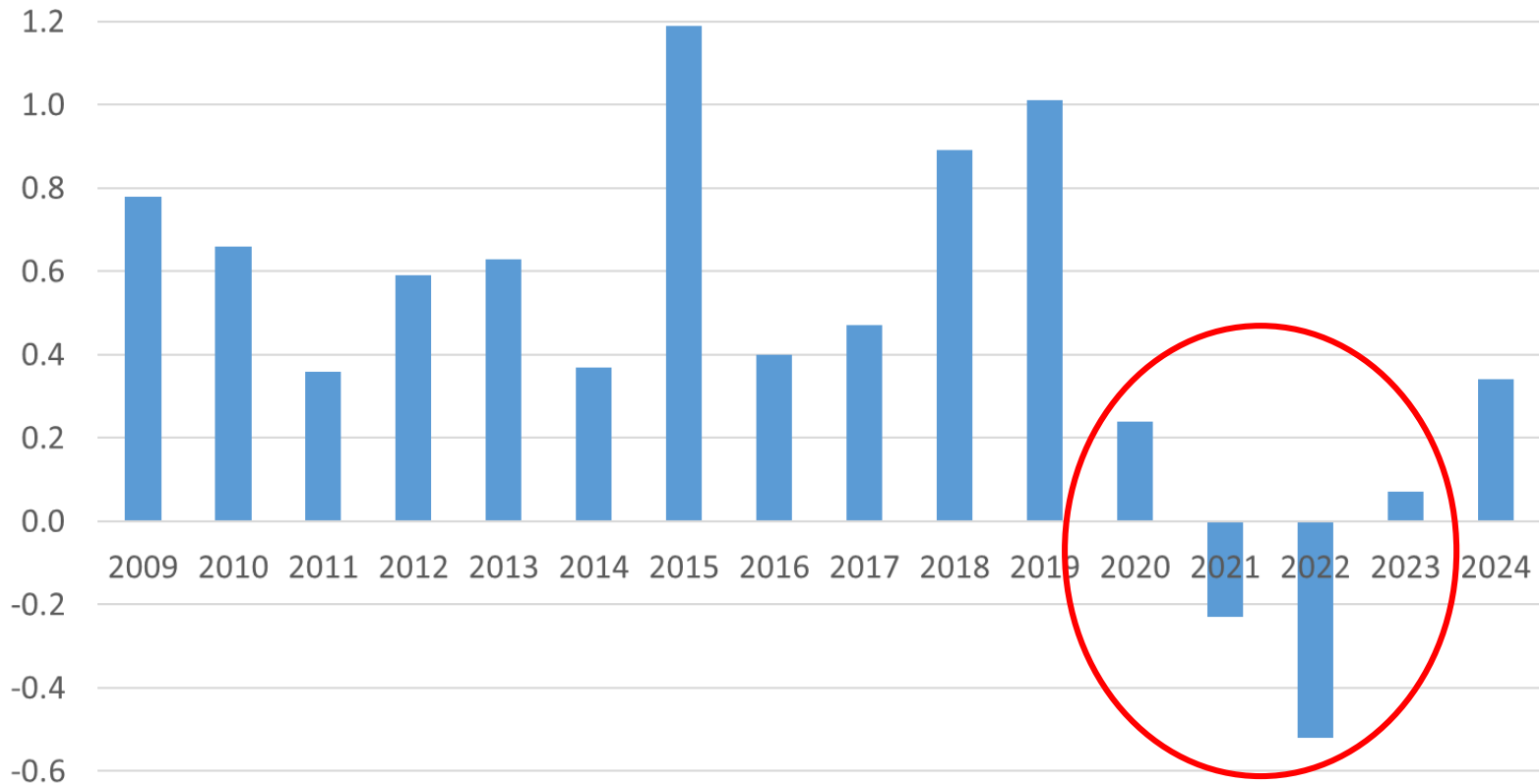
Eelgrass meadow



Relatively stable since 2009, eelgrass density fell sharply in 2024, with much buried in fine sand

Eelgrass meadow

Indian Island, annual eelgrass shoot density
Ratio of density at -1 foot to density at -3 feet

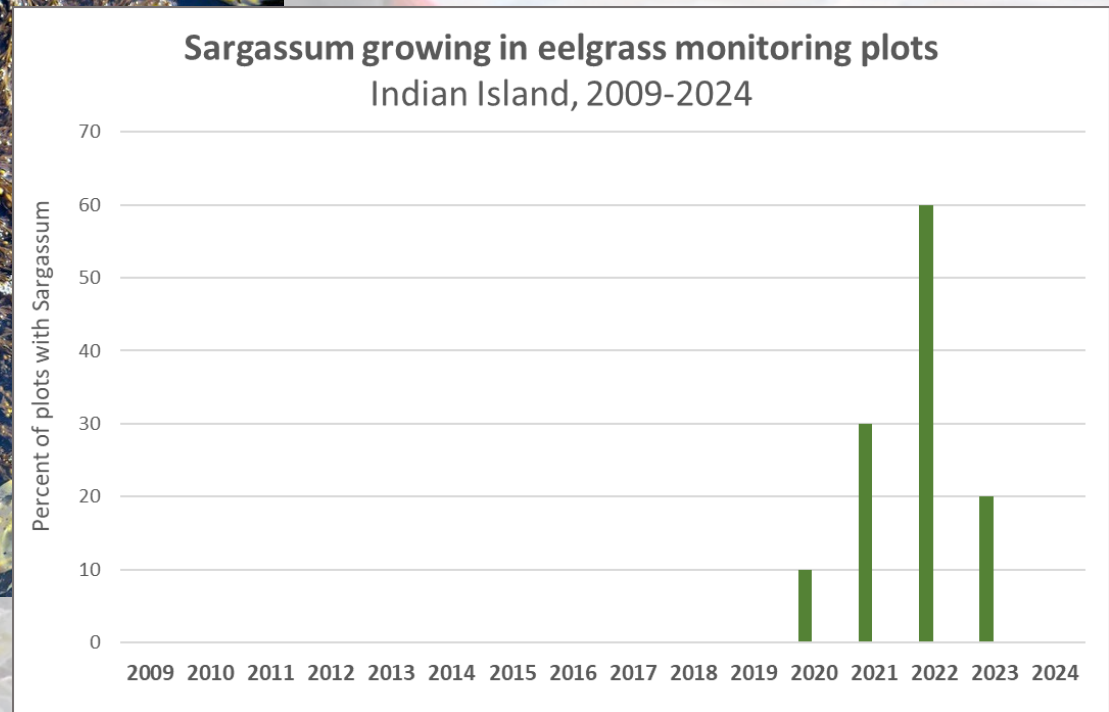
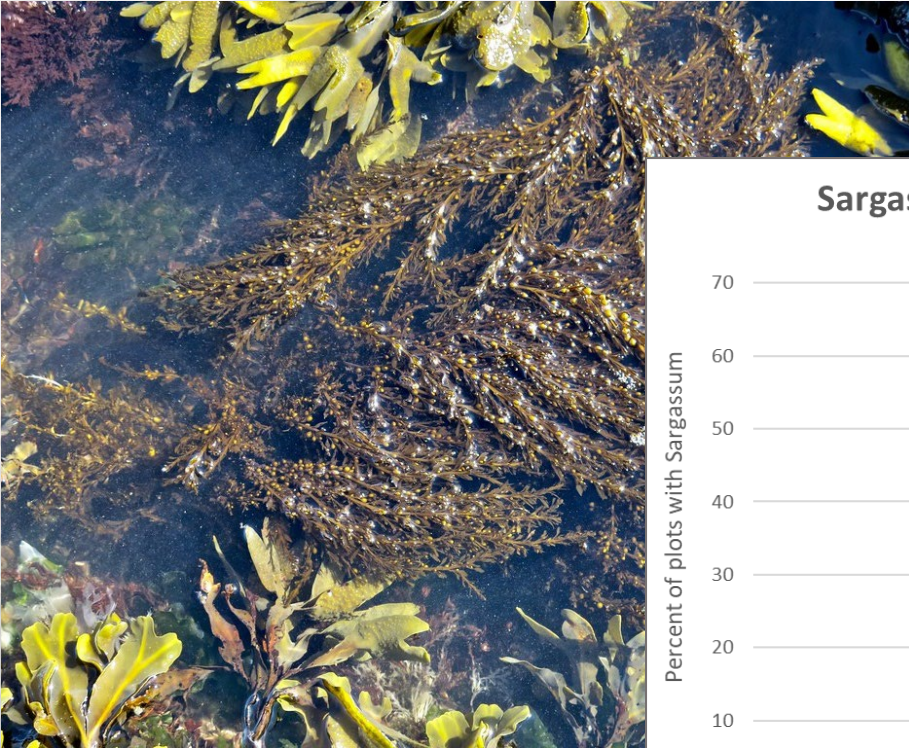


Deeper eelgrass gets less light and is typically less dense. But not in 2020-2023 – due to heat waves?

Eelgrass meadow

Invasive seaweeds: *Sargassum muticum*

First detected in the islands 2003 • first established at Indian Island 2012



Still present, but no longer competing with eelgrass

Eelgrass meadow

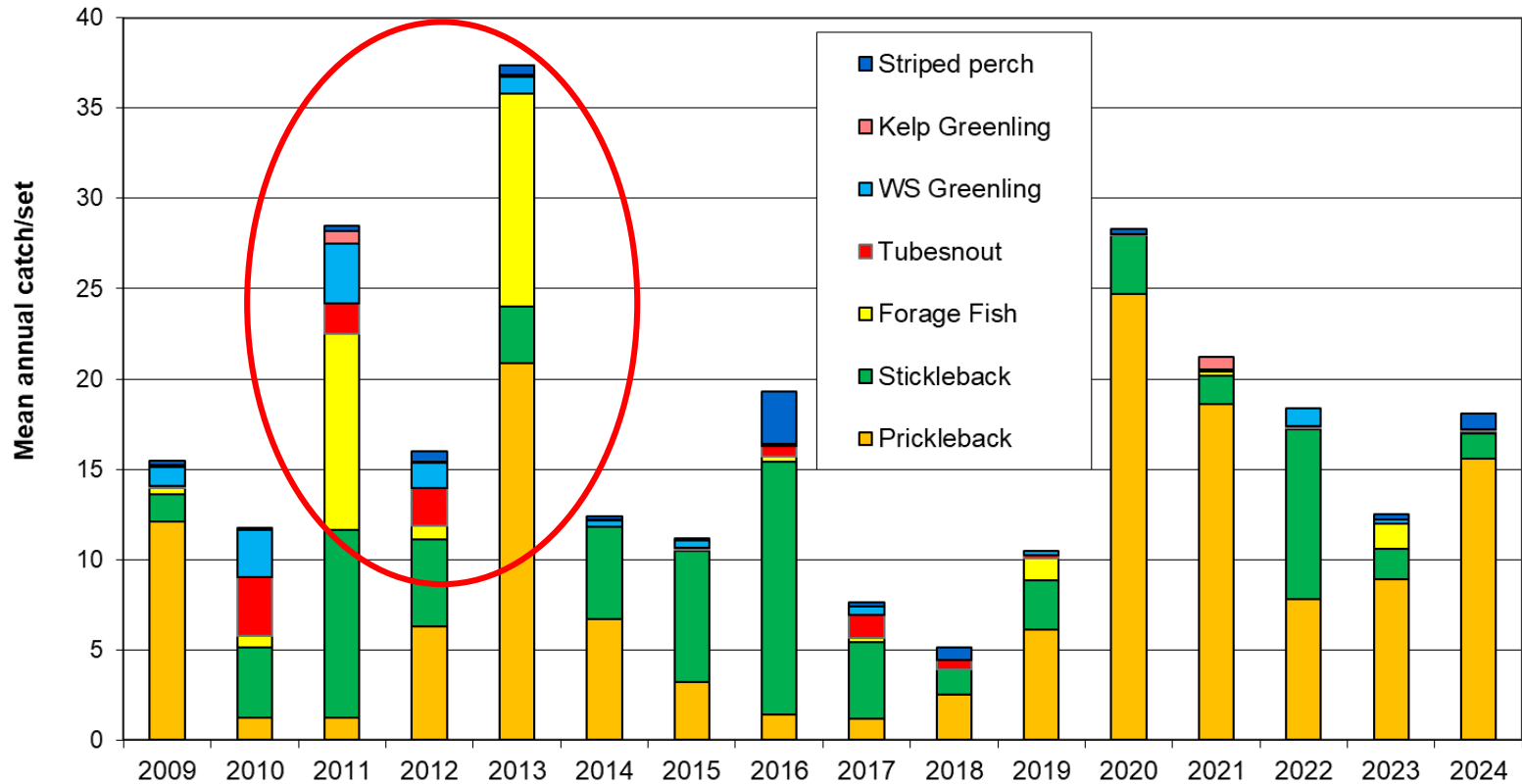


Noctiluca scintillans

***Noctiluca* “tomato soup” (non-toxic) blooms are earlier and more frequent. There were 3 in spring-summer 2024.**

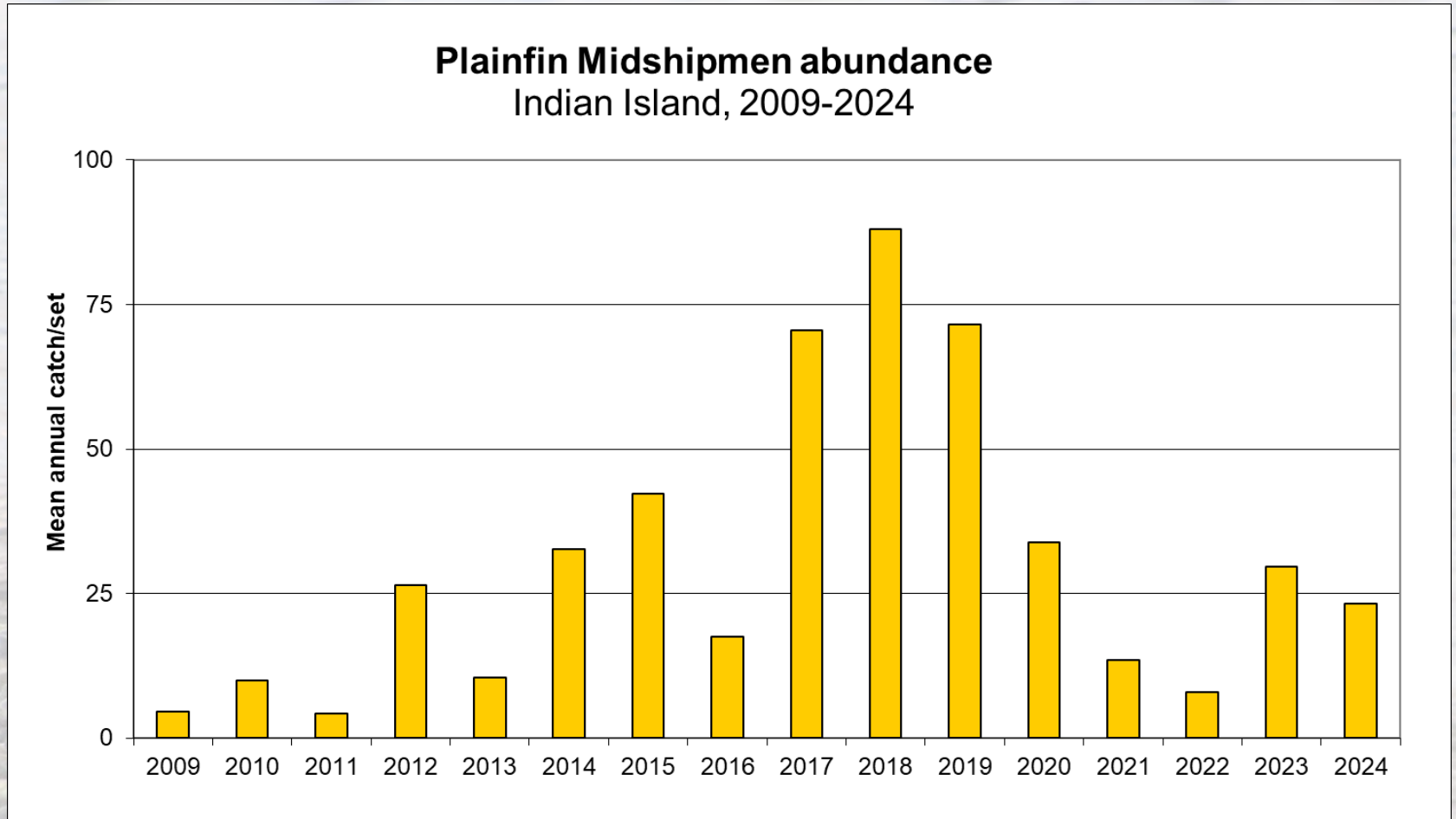
Eelgrass meadow

Fish community diversity and abundance
Indian Island, 2009-2024



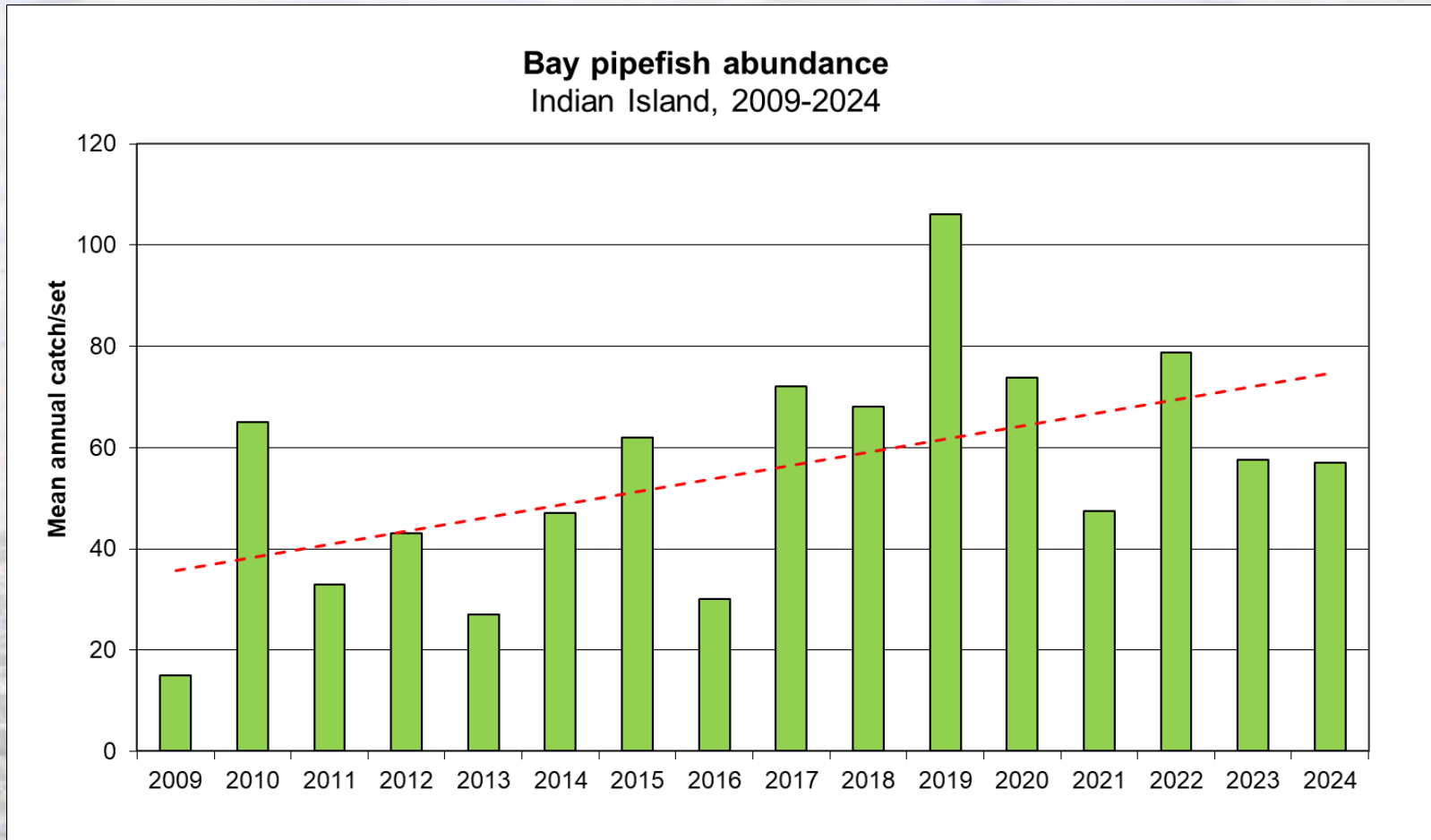
Fish diversity plummeted in 2014. Forage fishes, greenlings and tubesnouts are now quite scarce.

Eelgrass meadow



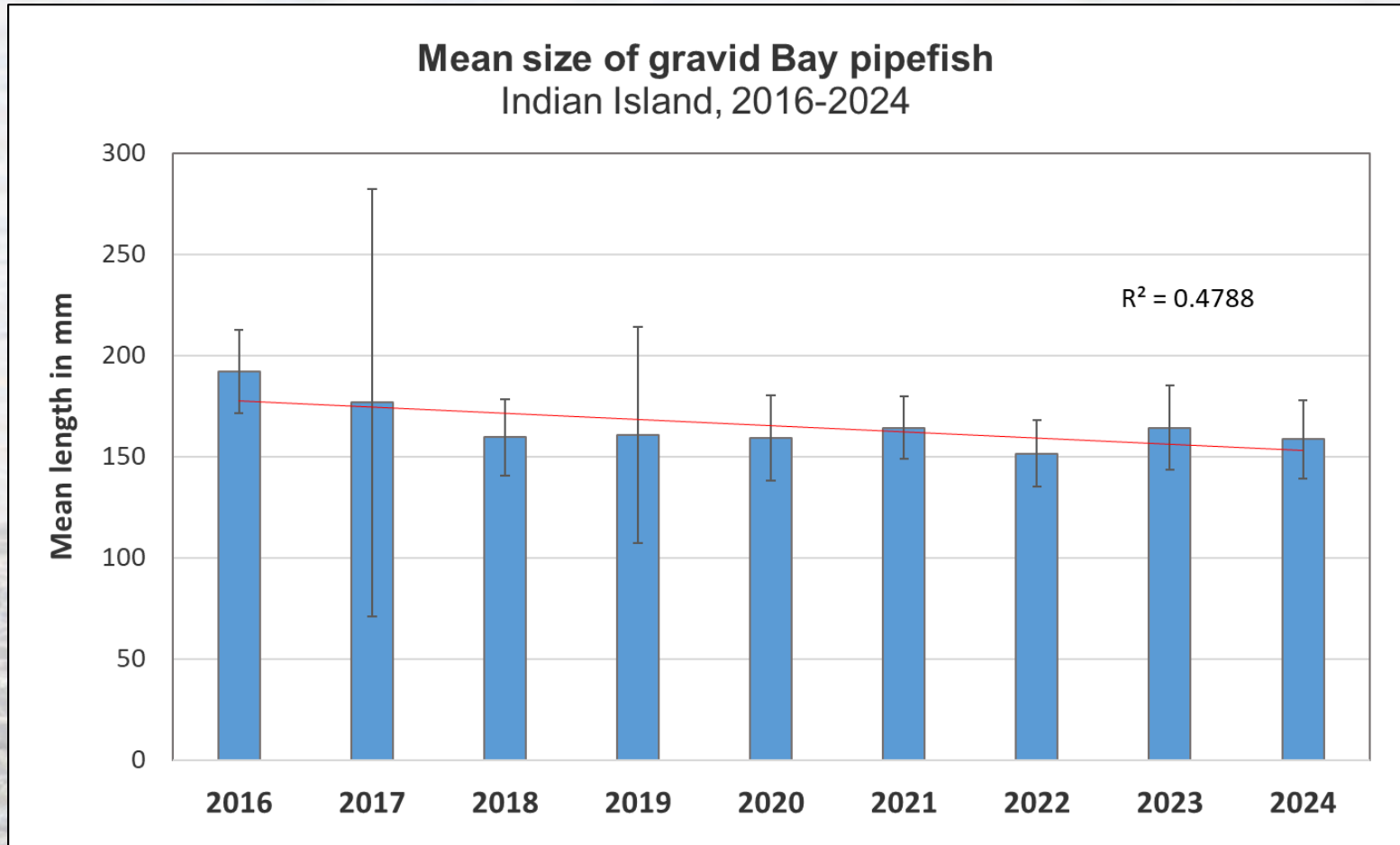
Midshipmen nest in rocky crevices. Their numbers grew until 2018-2019, but then declined.

Eelgrass meadow



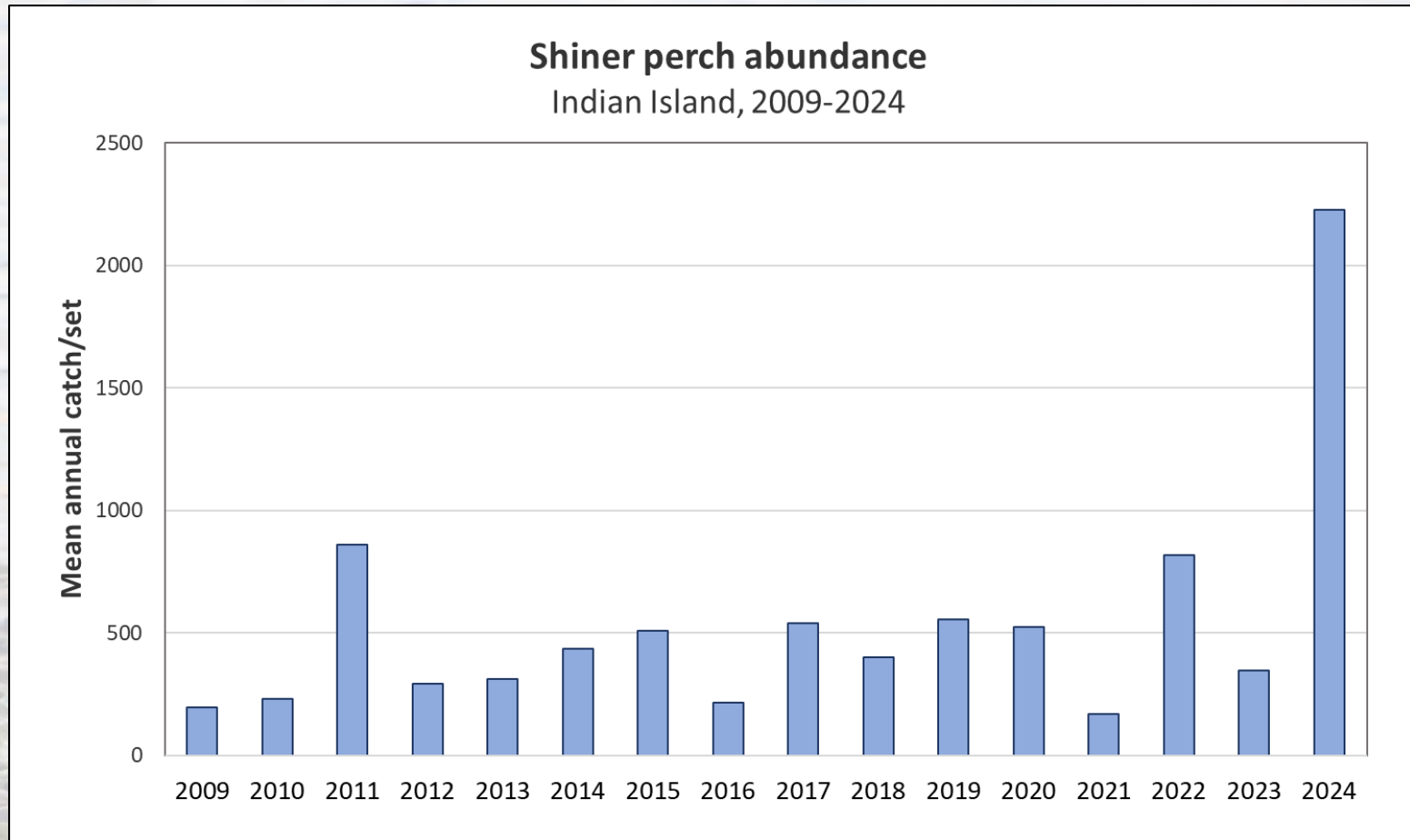
Bay Pipefish mate and brood their eggs in the eelgrass. They seem to be doing well – perhaps increasing a little.

Eelgrass meadow



The average size of gravid male pipefish (carrying eggs) has decreased slightly over the last six years, however.

Eelgrass meadow

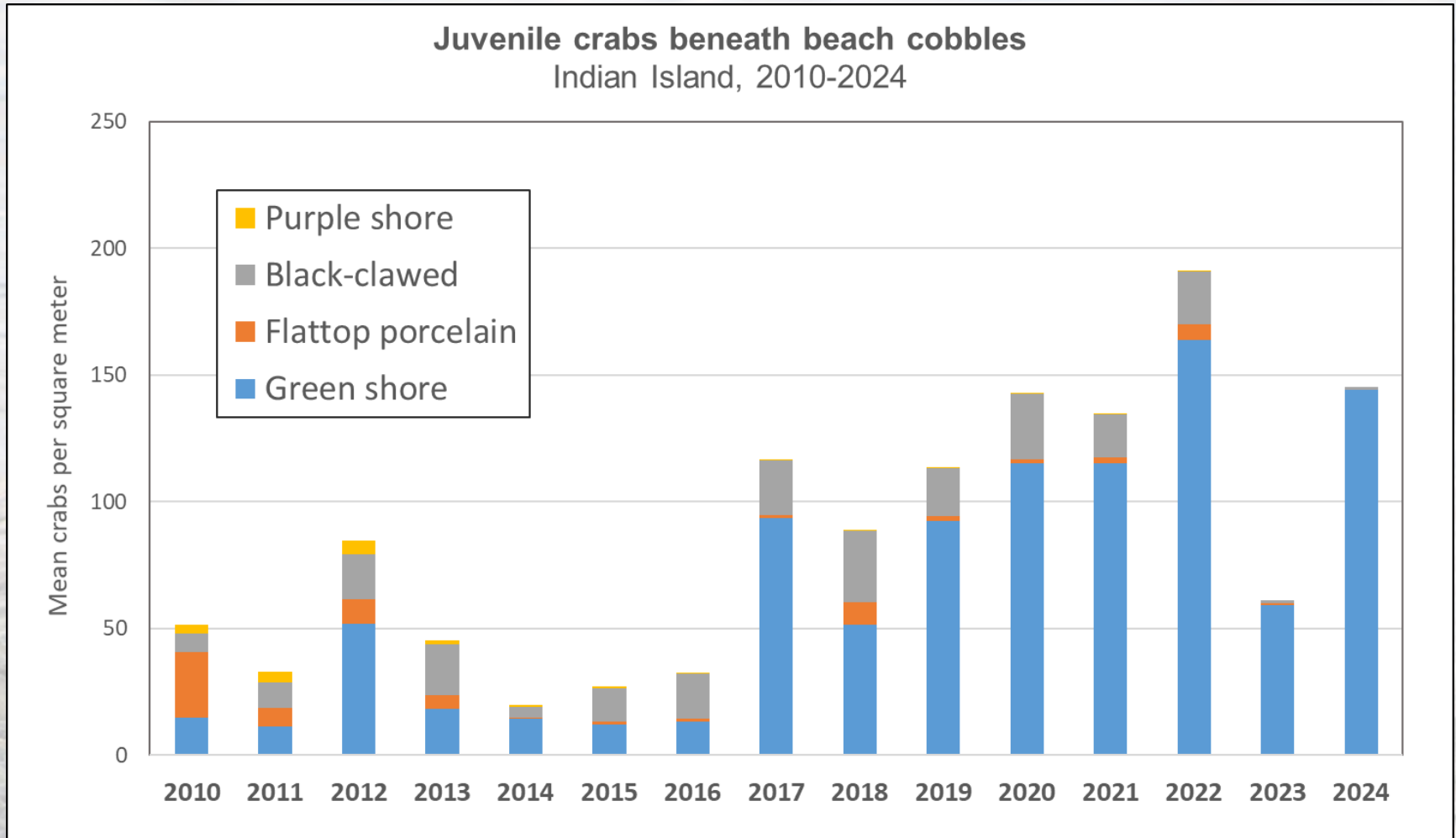


Shiner Perch appeared in unprecedented numbers in 2024. They are adapted to warm shallow waters.

Cobble beach



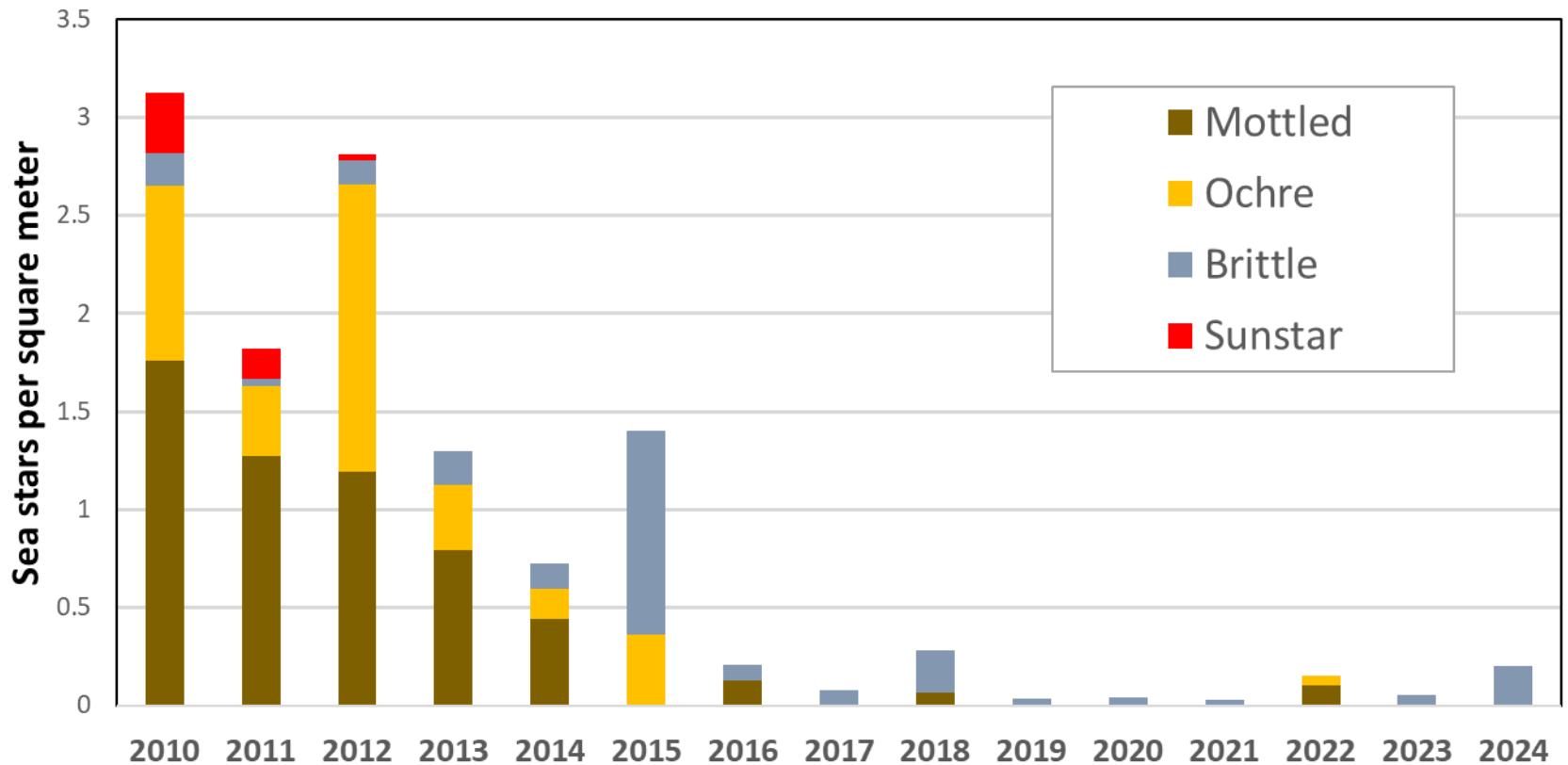
Cobble beach



Green Shore Crabs thrived after the 2014-2015 “Blob” but other intertidal species fell sharply. An effect of trampling?

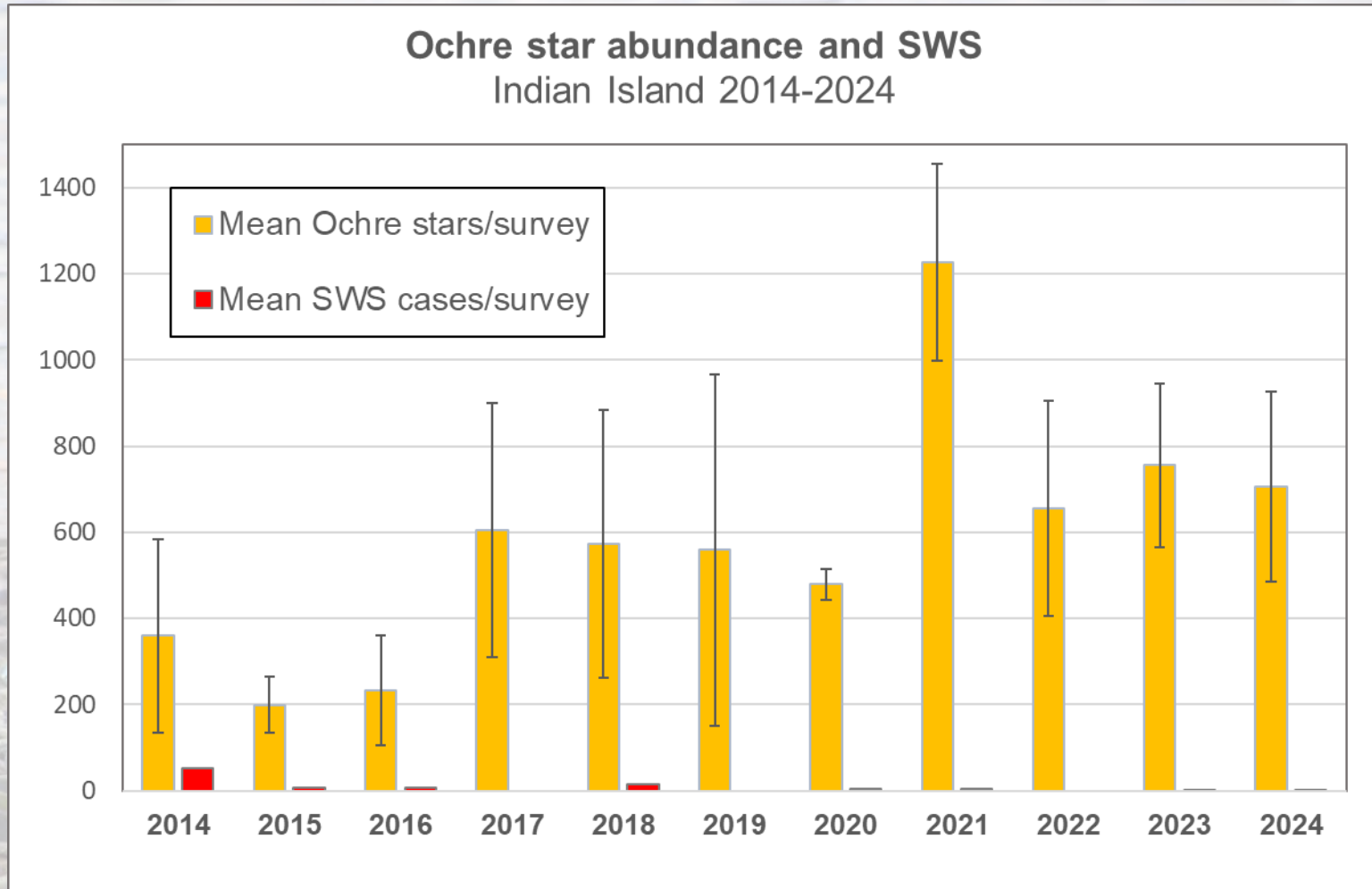
Cobble beach

Seastars beneath beach cobbles
Mean annual per square meter, Indian Island



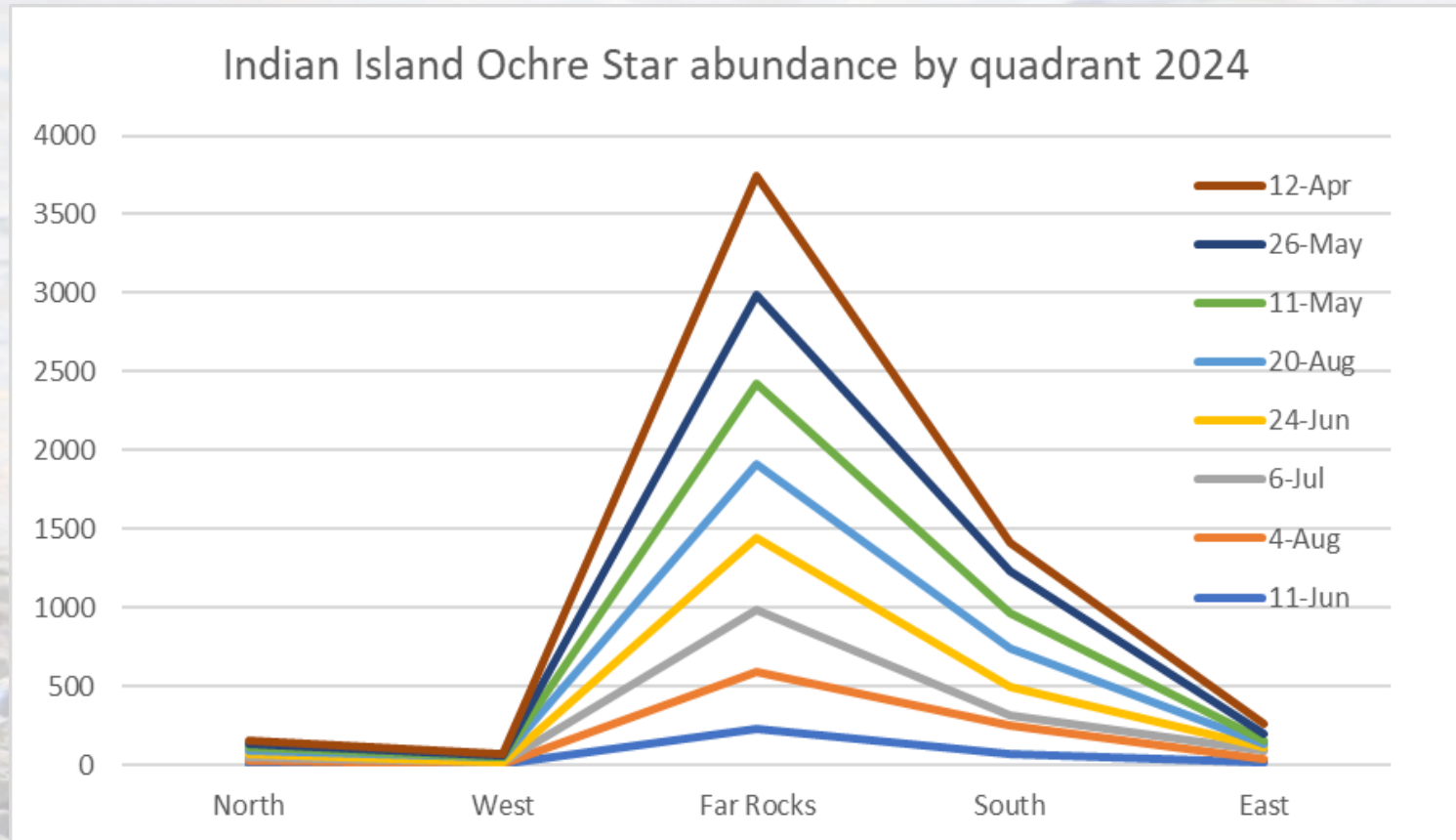
Diverse sea stars were also found under cobbles until 2015

Cobble beach



Ochre Stars rebounded quickly following the 2014 Seastar Wasting epidemic and remain abundant on intertidal rocks

Cobble beach



Ochre Stars mainly congregate on the rocky south end of the island and numbers can vary greatly seasonally

Above the tides



Above the tides



Seasonal trail closures
have restored the native
wildflower meadow.

Black Oystercatchers
nested in 2024 but eggs
failed to hatch

Above the tides

Year	Pair present	Nest occupied	Eggs laid	Eggs hatched	Chicks fledged
2010					1
2011					2
2012					
2013					
2014					
2015					
2016					1
2017					
2018					
2019					
2020					
2021					
2022					
2023					
2024					



Above the tides



Many bird species use Indian Island seasonally for nesting or foraging. At least two ground-nesting species (*) were not observed on Indian Island recently; this may be due to human disturbance of the meadow.

Summer residents

Anna's Hummingbird
Barn Swallow
Canada Goose
Killdeer*
Rough-Winged Swallow
Ruby-Throated Hummingbird
Song Sparrow
Violet-Green Swallow
White-Crowned Sparrow*

Regular summer visitors

Bald Eagle
Belted Kingfisher
Great Blue Heron
Northwestern Crow
Osprey
Raven

Above the tides

Two aquatic mammals have continued to be occasional visitors, and often raid bird nests for eggs and chicks.



River otter
Lontra canadensis

American Mink
Neogale vison

Above the tides



68 Average
233 Highest
Visitors per minus-
tide day since 2018

Human visitors continue to pose a challenge for the conservation of eelgrass, intertidal organisms, birds and wildflower meadows

Thank you!



Robyn Lowe
Youth Stewards

Lili Pritchard 2024

Roan Ontjes DeGroot 2023

Anika Blackman 2022

Justin Krisch-Derr 2020-21

Emma Thoron 2019-20

Alyssa Johns 2018

Raeann Boero 2016-17

Orcas Island Community
Foundation



Russel Barsh, *Director*
Christian Oldham, *Indian Island Coordinator*
Anita Holliday, *community scientist*
Leah Johnson, *science educator*
Alex Assaf, *Kwiah Trustee for Orcas Island*

*And many, many
community volunteers
from 2009 to 2024*

