DATA VISUALIZATION

Digital storytelling at the confluence of science, art, and technology

The big picture – why are we here?

This collective is focused on bringing together a community to build an online data visualization course.

Compiling resources

Building our own resources

Testing assignments while creating art

You will all be recognized and acknowledged for your participation in the conception and construction this course.

Working Group Format & Resources

- Website (working syllabus, compiled resources): https://datavisualization.sites.ucsc.edu/
- Google Group (email listserv for meeting announcements/funding opportunities): https://groups.google.com/u/1/g/data-visualization-collective
- Canvas (modules, assignments, and grading for enrolled & auditing students): https://canvas.ucsc.edu/courses/41815
- Shared Google Drive (workshop slides, files, and data sharing): https://drive.google.com/drive/u/1/folders/0AFCLSgi-duPIUk9PVA

Assignments

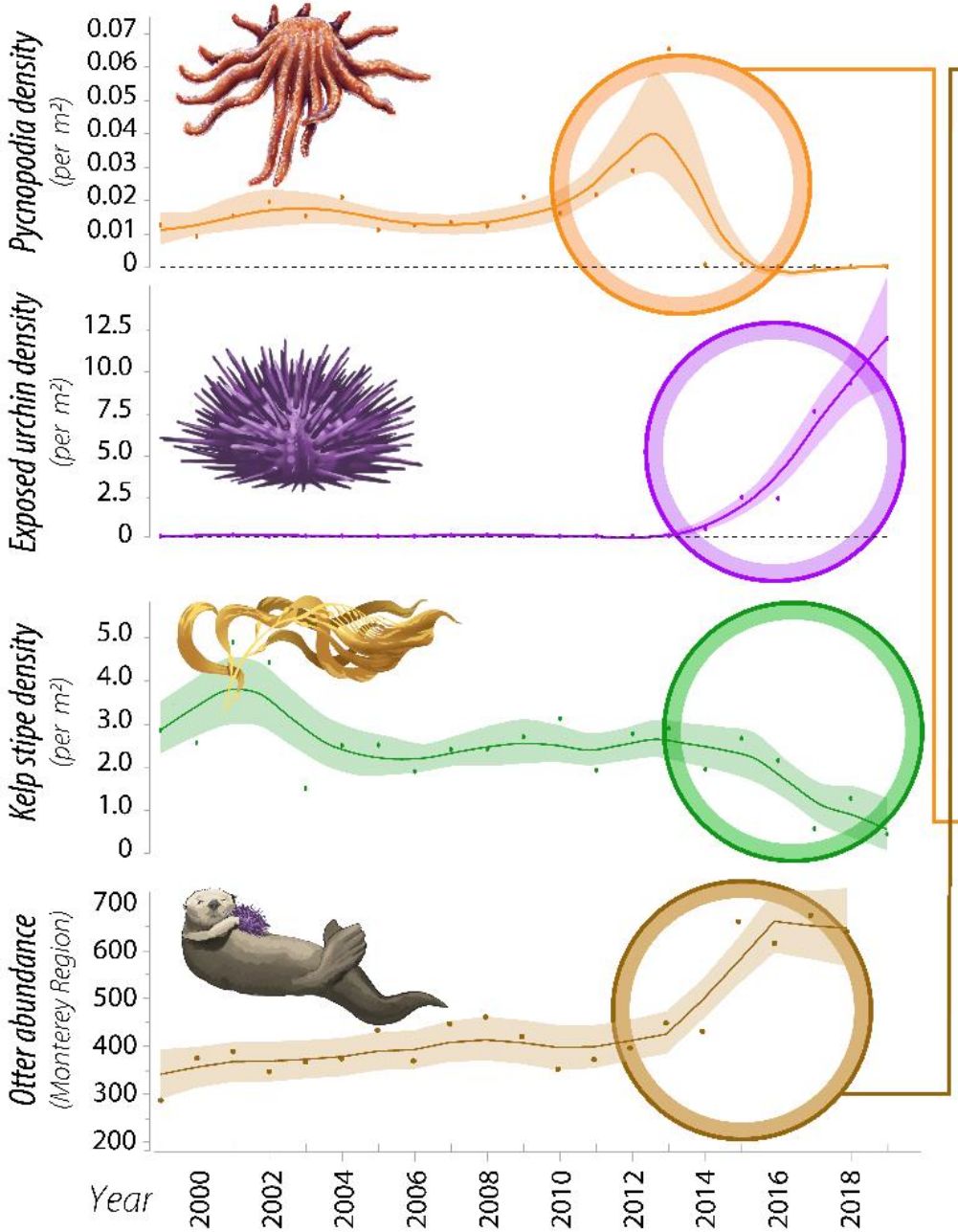
1) **Assignment 1 (15 pts): *Graphical Abstract***. Compositing vector & raster graphics.
2) **Assignment 2 (15 pts): *Animation.*** Visualizing 2D or 3D data.
3) **Assignment 3 (15 pts): *Publication-ready figure***. Design and plot using ggplot in R.
4) **Assignment 4 (15 pts): *Interactive Website.*** (RShiny/p5.js/d3.js/Wordpress)
5) **Final project (40 pts): *Collaboration.*** Collaborate with any scientist at UC Santa Cruz to create a data visualization using a platform of your choice.

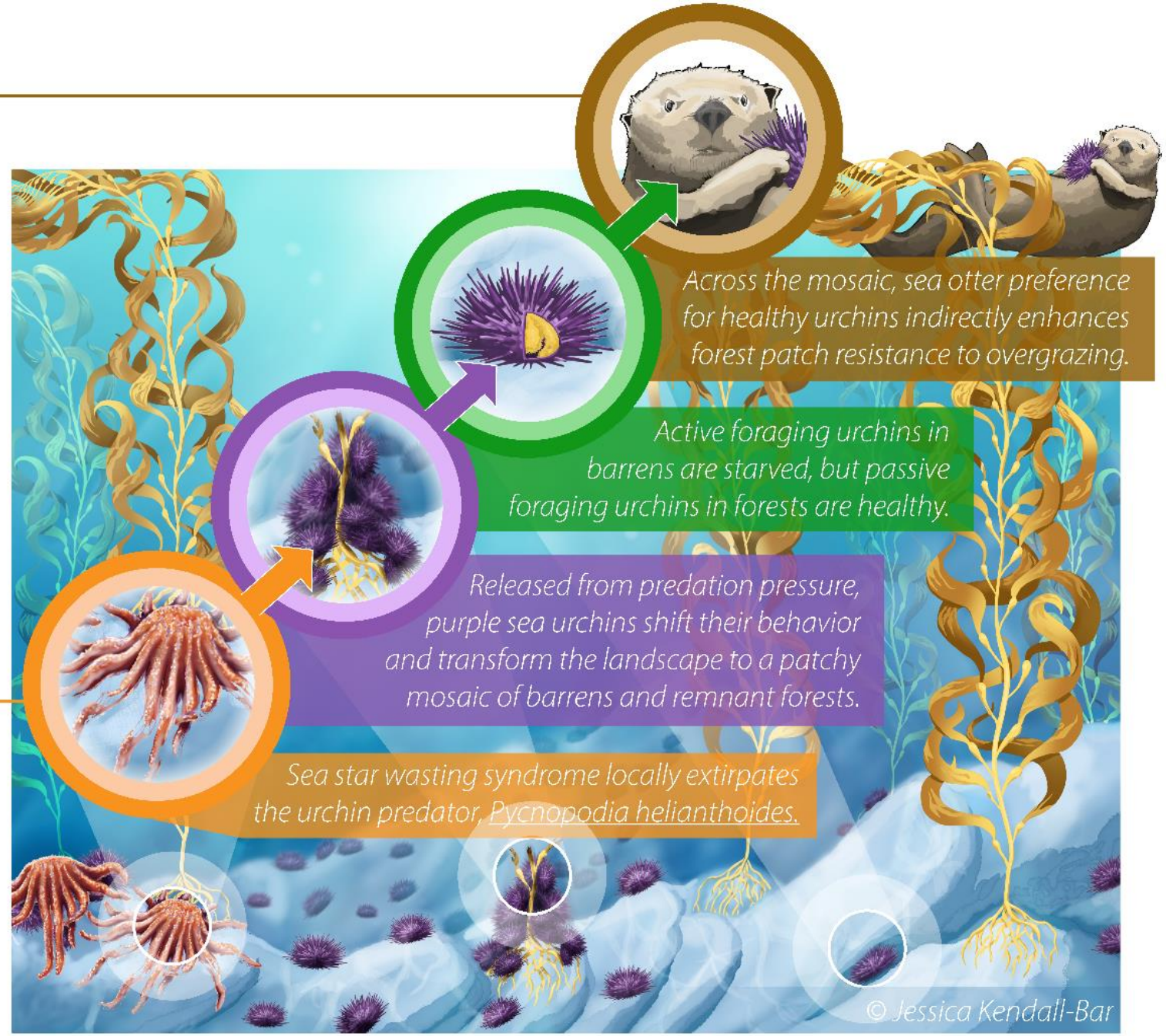
Assignment: Composite vector graphics and raster graphics to tell the story of a scientific paper in a single figure.

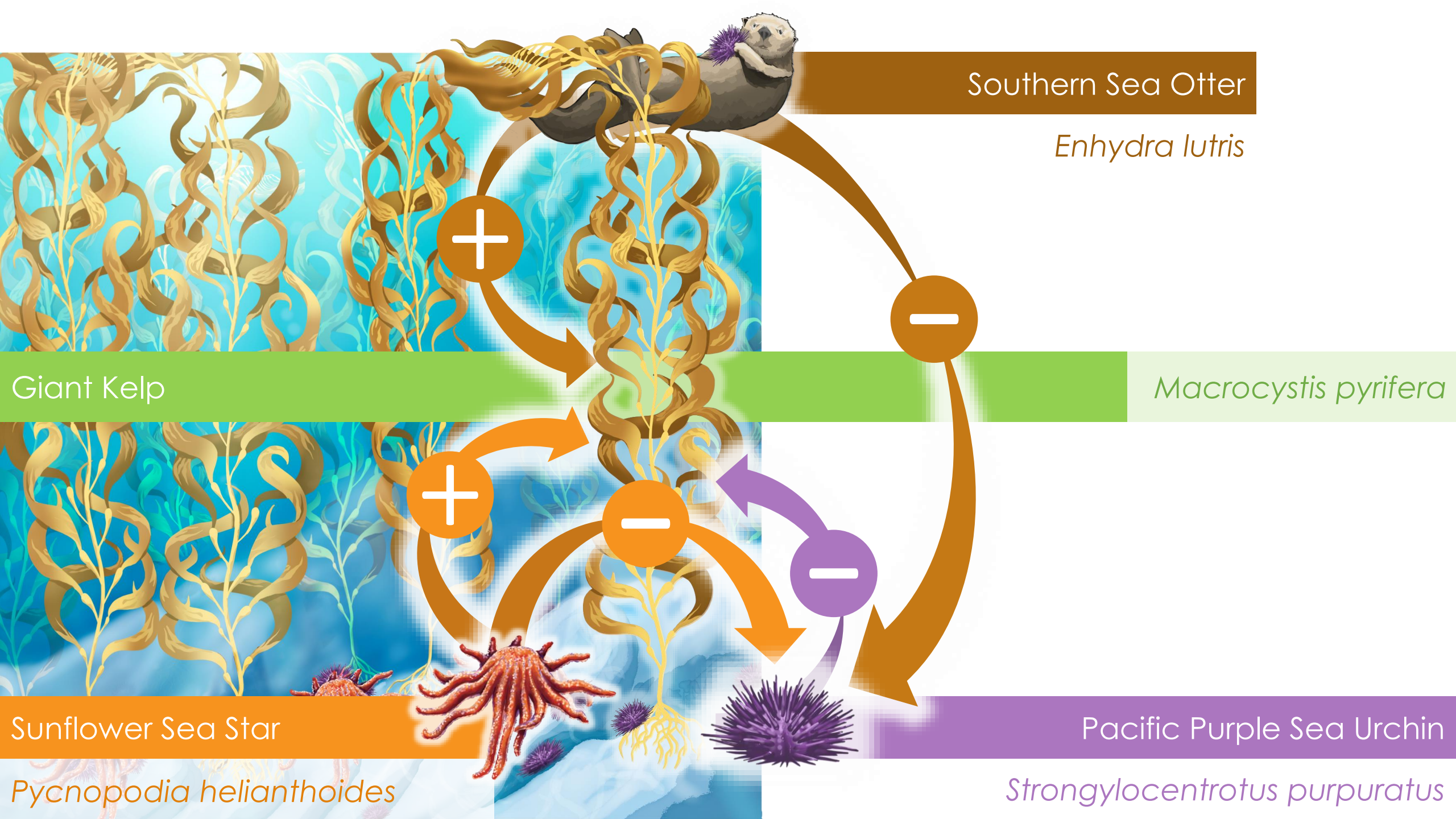
Bonus: animate your graphical abstract in PowerPoint for the scientist to use it in talks!

Examples

Graphical Abstract

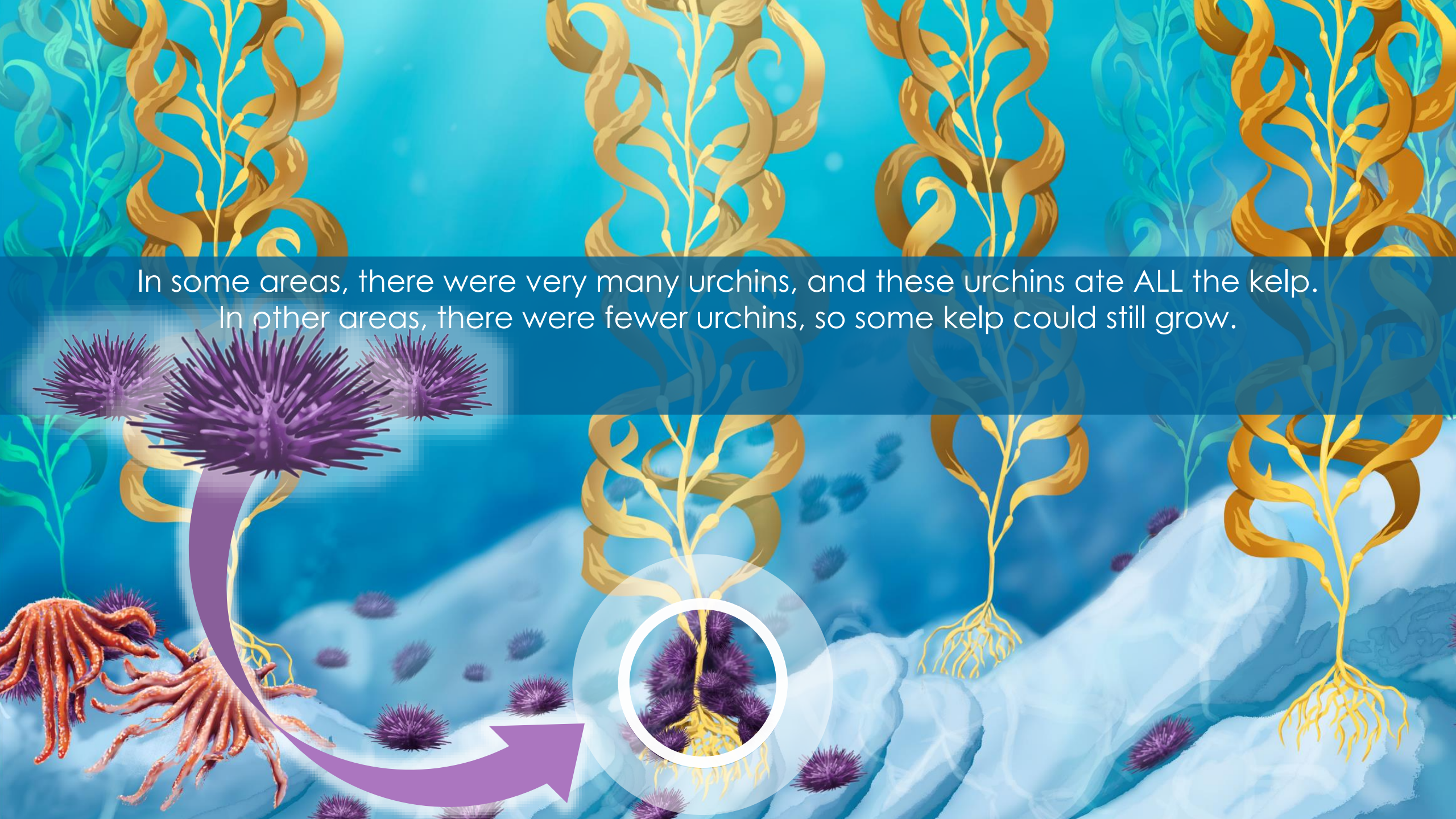

Pycnopodia density
(per m²)
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0
Exposed urchin density
(per m²)
12.5
10.0
7.5
5.0
2.5
0
Kelp stipe density
(per m²)
5.0
4.0
3.0
2.0
1.0
0
Otter abundance
(Monterey Region)
700
600
500
400
300
200
Year
2000
2002
2004
2006
2008
2010
2012
2014
2016
2018

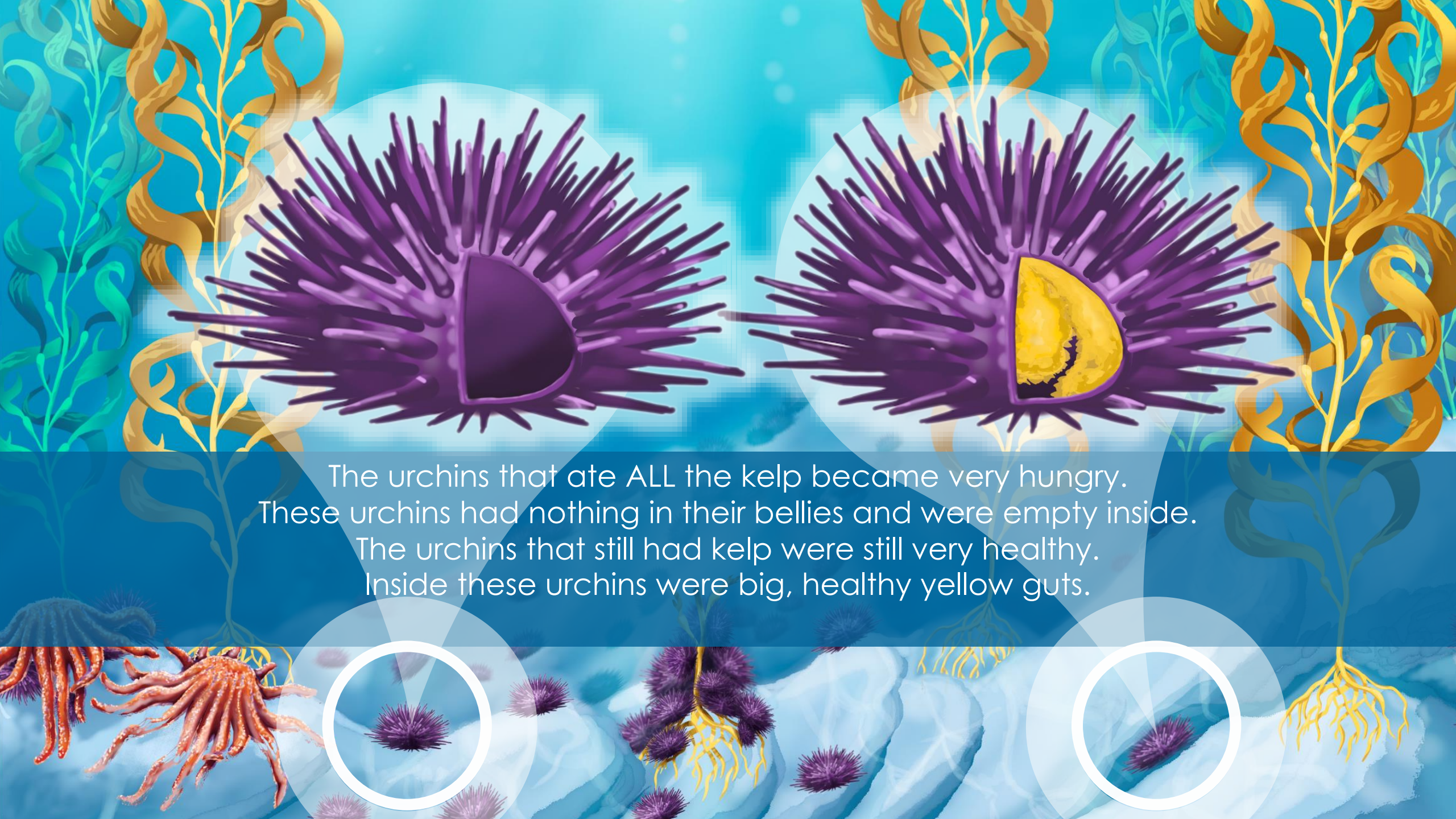

Across the mosaic, sea otter preference for healthy urchins indirectly enhances forest patch resistance to overgrazing.
Active foraging urchins in barrens are starved, but passive foraging urchins in forests are healthy.
Released from predation pressure, purple sea urchins shift their behavior and transform the landscape to a patchy mosaic of barrens and remnant forests.
Sea star wasting syndrome locally extirpates the urchin predator, Pycnopodia helianthoides.
© Jessica Kendall-Bar


Southern Sea Otter
Enhydra lutris
Giant Kelp
Macrocystis pyrifera
Sunflower Sea Star
Pycnopodia helianthoides
Pacific Purple Sea Urchin
Strongylocentrotus purpuratus

There was a sea star disease that caused the sea stars to become sick…


When the sea stars were not there to eat the urchins, there were more and more urchins.


In some areas, there were very many urchins, and these urchins ate ALL the kelp.
In other areas, there were fewer urchins, so some kelp could still grow.



The urchins that ate ALL the kelp became very hungry.
These urchins had nothing in their bellies and were empty inside.
The urchins that still had kelp were still very healthy.
Inside these urchins were big, healthy yellow guts.

Imagine you are a sea otter..
You have the choice between an empty, starving urchin and one full of yummy yellow guts,
what would you choose?

Type your answer in the chat!

Yes!

The otters liked the healthy urchins too!

Assignment: Animate data in 2D or 3D using After Effects or Autodesk Maya.

Examples

Animation

Example: Animating 2D data in After Effects by linking your animation to a CSV file.

Example: Animating 3D motion data in Autodesk Maya by linking your 3D model's position to data in a CSV file.

Assignment: Generate a high-resolution vector graphic plot using ggplot in R.

Bonus: Edit and animate your scientific figure in PowerPoint to be easily understood from across the room.

Examples

Figure for Publication

Comparing activity levels

CAMINO

Daniel Lozano
(CAMINO Intern)

Overall Dynamic Body Acceleration for three young elephant seals

Captive Juvenile

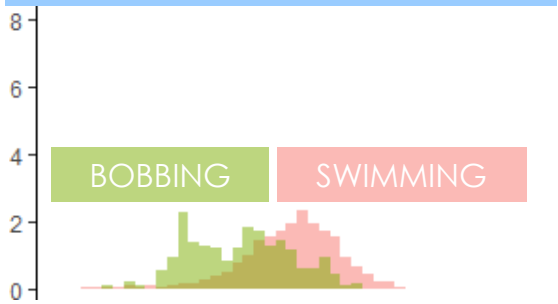
1 million seconds of video data analyzed to develop automated behavioral scoring criteria based on inertial motion and environmental sensor data.

Wild Juvenile

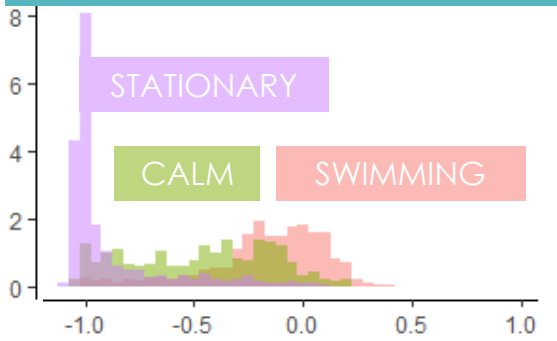
Wild Weanling

Land Behaviors

Surface Behaviors



Underwater Behaviors



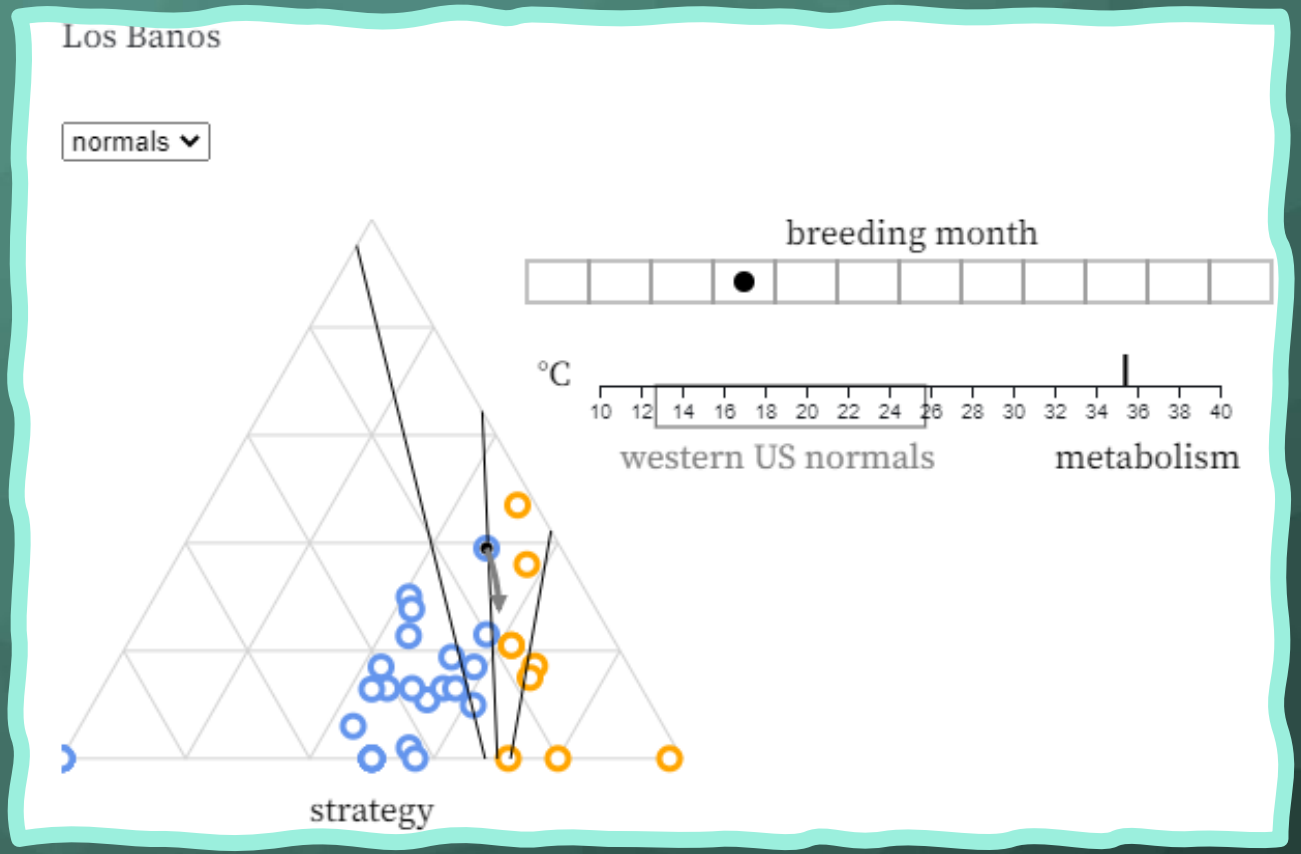
NMFS #23188

Examples

Interactive Webpage

Lizard Mating Game ObservableHQ Notebook built in Python by Jasmine Otto & Barry Sinervo

https://observablehq.com/d/980611b67a385a17



How would you describe yourself?

scientist, artist, and photographer

I liked to make documentary films in high school

Scientist who uses code to run simulations, analyze, and visualize

big-time coder with an artist's background

Engineer/Emerging Tech Enthusiast

I don't much have experience creating art, so I want to explore that area more.

I am a scientist who loves to make art in my free time

my research focuses on measuring the fundamental physical parameters of planets orbiting stars other than the Sun (exoplanets)

super interested and want to learn as much as possible!

technical artist

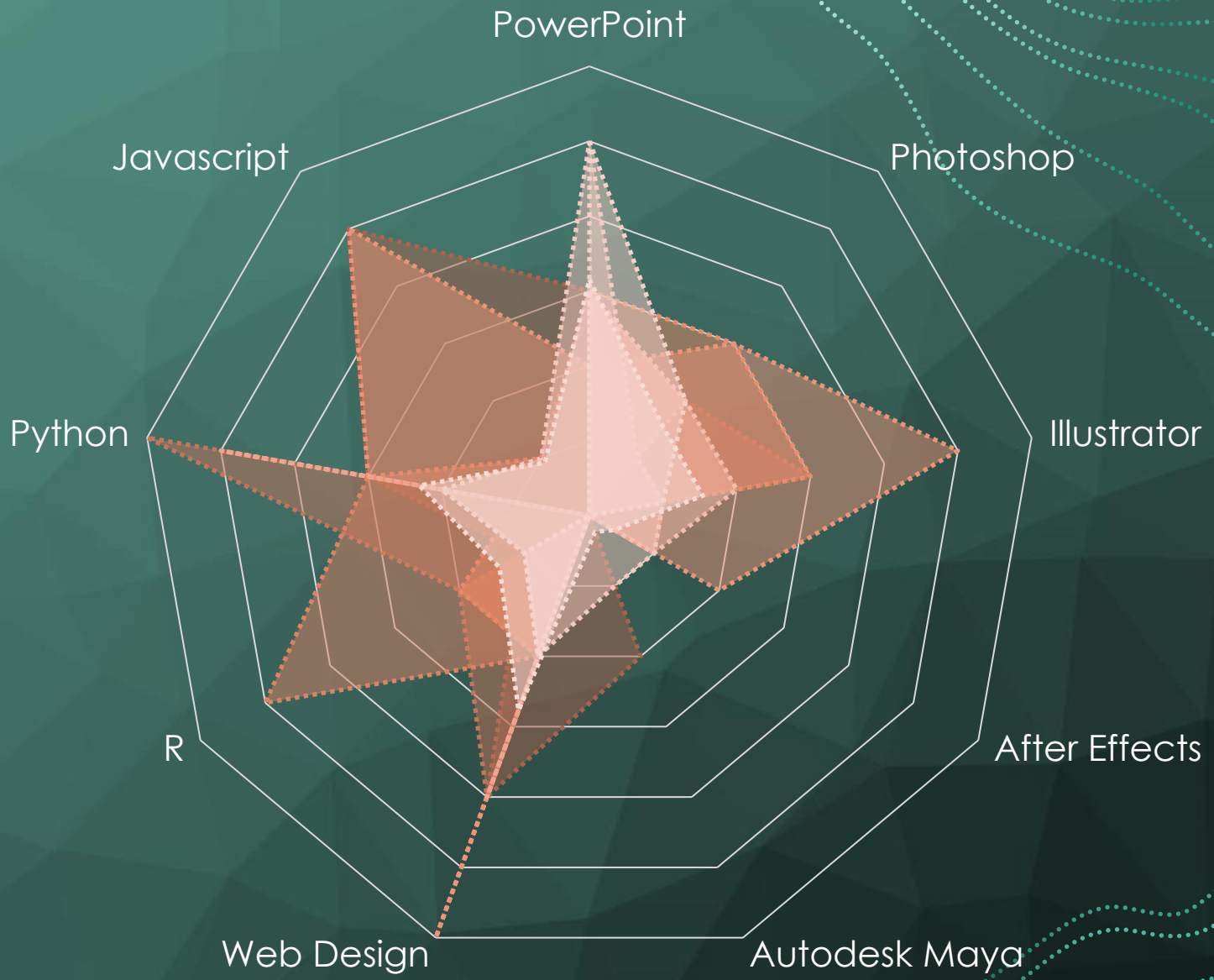
working on a senior thesis on kelp forest ecosystem stability

A compilation of your answers- I loved hearing about what inspires you!

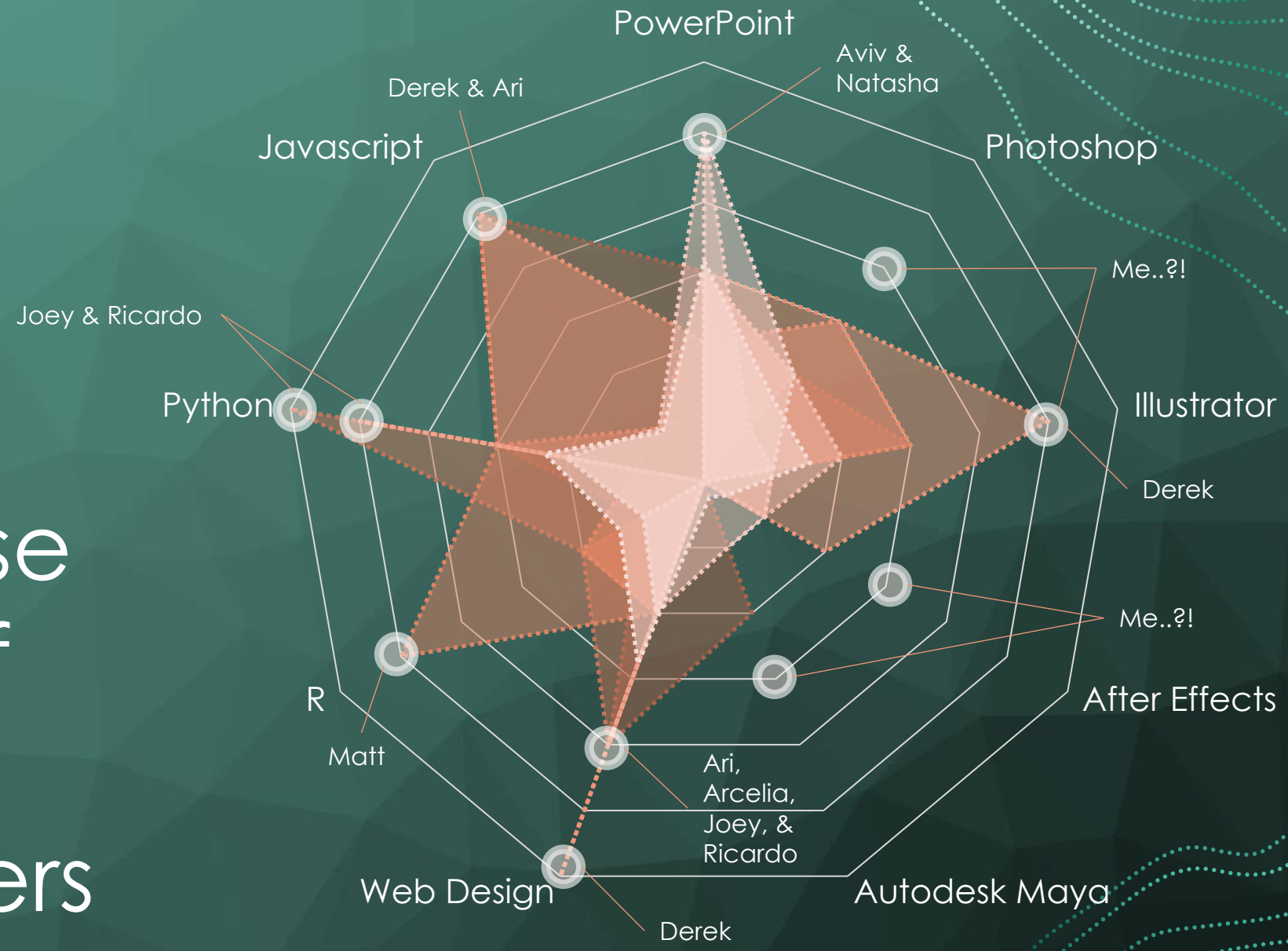
Self-described experience levels of our data visualizers.

Everyone in the outer two rings feels confident teaching others.

A Diverse Crew of Data Visualizers



A Diverse Crew of Data Visualizers



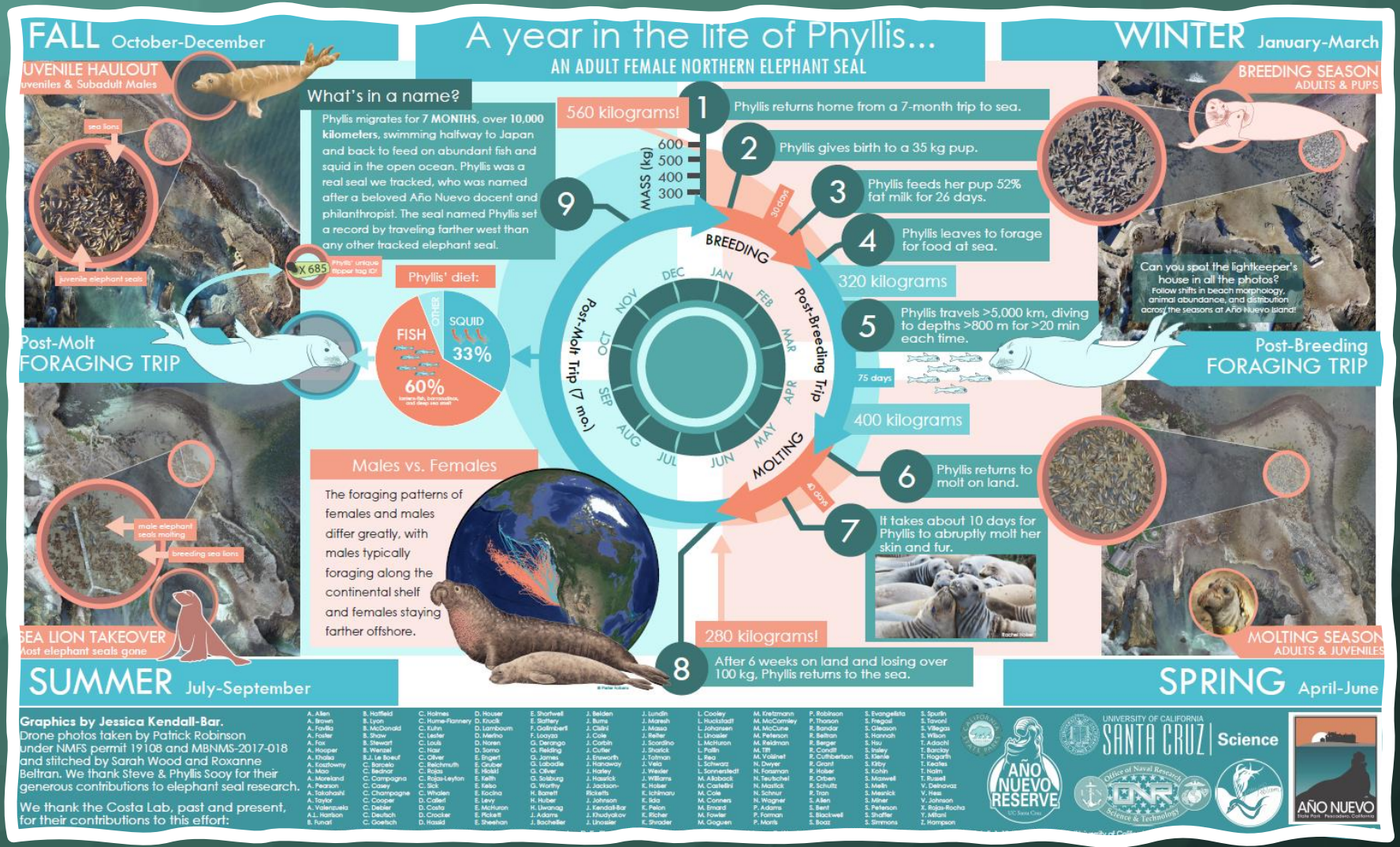
Introductions – Data Visualizers

- Name, pronouns, year, department, undergrad/graduate
- What is your role here?
  - Student interested in learning data visualization for others' data
  - Student interested in learning data visualization for their own data
- If you have data, describe your data.
- If you've done some art, show a project you're proud of.

Introductions – Data Contributors

- Name, pronouns, university affiliation
- Describe your dataset (use visuals if possible)
- Describe your dream data visualization!
  - Can reference https://www.data-to-viz.com/ for vocabulary:

Introductions – Data Contributors



- Jessie with Costa Lab UCSC
- Elephant seal tracking & diving data (timeseries with locations & depths)
- Interactive webpage with map to examine GPS tracks and 2D/3D diving patterns.

Tentative Visualizer – Contributor pairings

We may have to readjust based on folks' availability & schedules.

- Ari Iramanesh – Barry Sinervo & Jasmine Otto
- Derek Gomez – Jessie KB & Costa Lab
- Katie Lewis – Flora Cordoleani
- Megan Penland – Brett Hall / Lucy Ferneyhough
- Arcelia Hermosillo Ruiz – Rosalea Bond
- Samuel Cormier – Dave Herbst
- Jasmine Otto – Mer Pozo Buil

Reach out to your partner via email

Can find each other on the google group page here:
https://groups.google.com/g/data-visualization-collective/members

- Establish the best method for getting in touch (quick questions and longer conversations)
- Agree on a desired meeting frequency
- Set up an initial meeting for next week

Things to do

- Fill out survey: https://forms.gle/KuDXFuXeJPsJBNiw9
- When2Meet (find a time for Winter quarter meetings that fits the most schedules): https://www.when2meet.com/?10636695-uAucB

- For next week:

Meet with collaborators to make sure you have everything you need to move forward: data, next steps, design ideas, reference photos, existing illustrations, graphics, etc.

- Read Chapters 1 & 2 of "Data Visualization" by Claus Wilke
- Watch LinkedIn Learning Design Fundamentals Course (1hr)
- Download Microsoft Office 365 (for PowerPoint) Links to an external site.
- Download Adobe Creative Cloud (sign in with CruzID) & install Photoshop & Illustrator

DATA VISUALIZATION

The confluence of science, art, and technology for digital storytelling.

Join UCSC OpenLab's Data-Driven Design Collective as an independent working group to create clear, concise, and beautiful data-visualizations which combine science, coding, and art to impact diverse audiences.

WINTER QUARTER 2021

Led by Jessica Kendall-Bar in collaboration with Jennifer Parker of UCSC OpenLab.

2-5 credit enrollment. Virtual meetings 3h/week schedule TBA.

Interested students, contact Jessica Kendall-Bar

jkb@ucsc.edu

to enroll for course credit by this Friday, Jan 8th.

jessiekb.com
openlabresearch.com