A man wearing a blue cap and a plaid shirt is holding a fish on a beach. The background shows waves crashing on the shore.

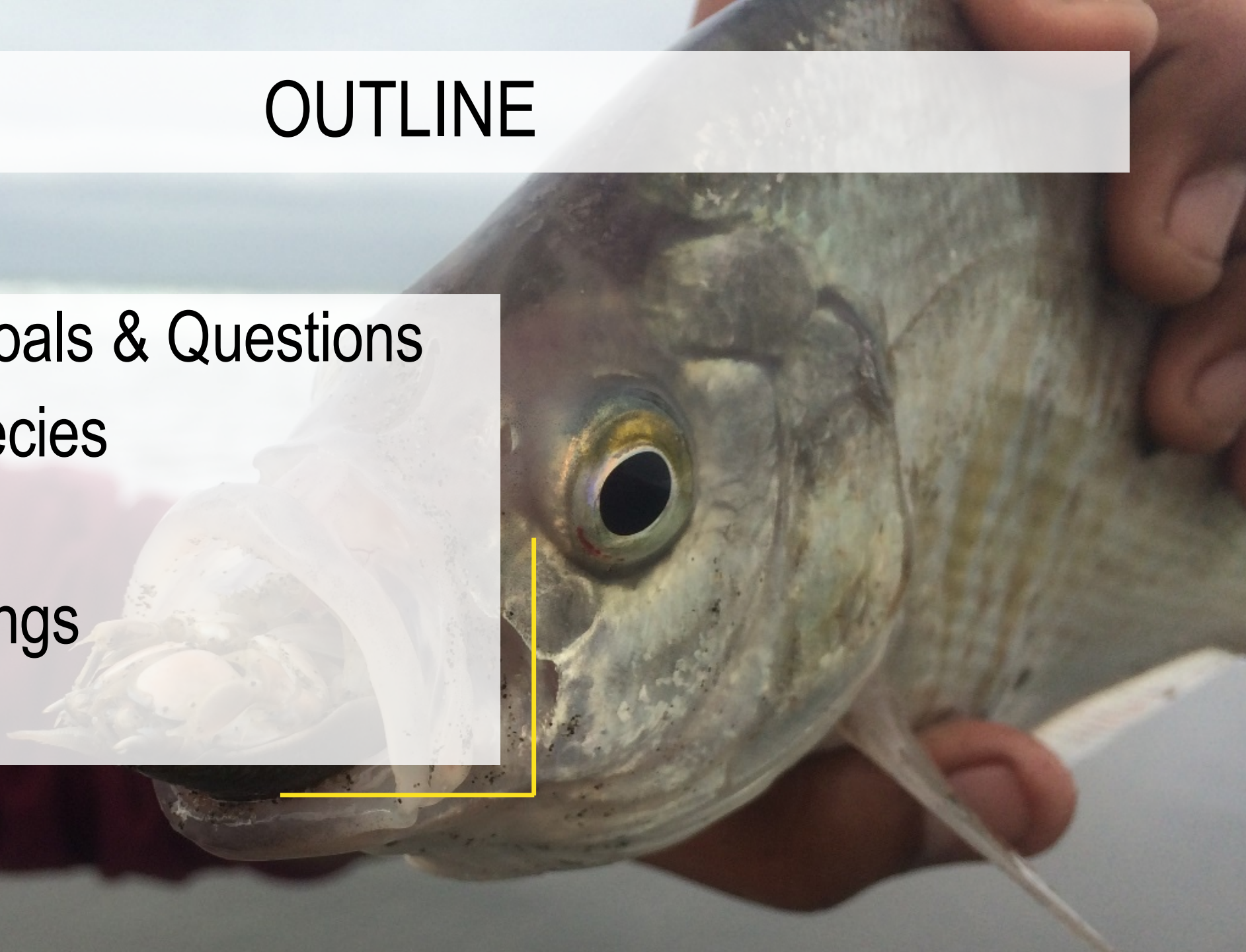
The ecological state of Northern California sandy beach MPAs: Surf zone fishes

Karina Nielsen¹, Jenifer Dugan², Timothy Mulligan³, David Hubbard², Sean Craig³, Rosa Laucci⁴, Megan Wood¹, Drew Barrett³, Helen Mulligan³, **Michelle Succow**³

1- San Francisco State University, 2- UC Santa Barbara, 3- Humboldt State University, 4- Tolowa Dee-Ní Nation

OUTLINE

- Project Goals & Questions
- Focal Species
- Methods
- Key Findings
- Review



PROJECT GOALS

- Provide comprehensive, regional characterization of sandy beach ecosystems
- Provide recommendations for future MPA monitoring





“abundance and diversity of macroinverts, fishes, and birds...physical and biological elements of the ecosystem... activities of people on beaches and adjacent surf zones”



PROJECT QUESTIONS

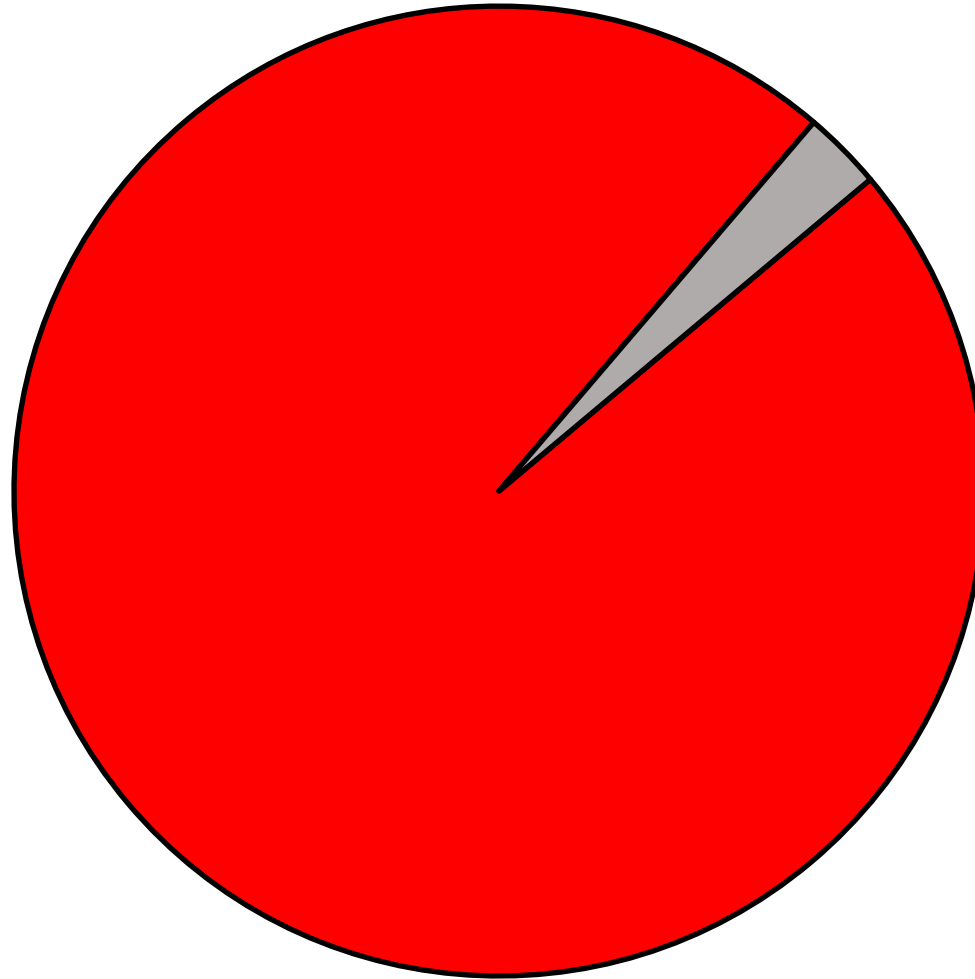
- What are characteristics of NorCal surfperch populations?
- Are our reference sites comparable to our MPA sites?
- Are these a good indicator species for future monitoring?



SPOILER ALERT!

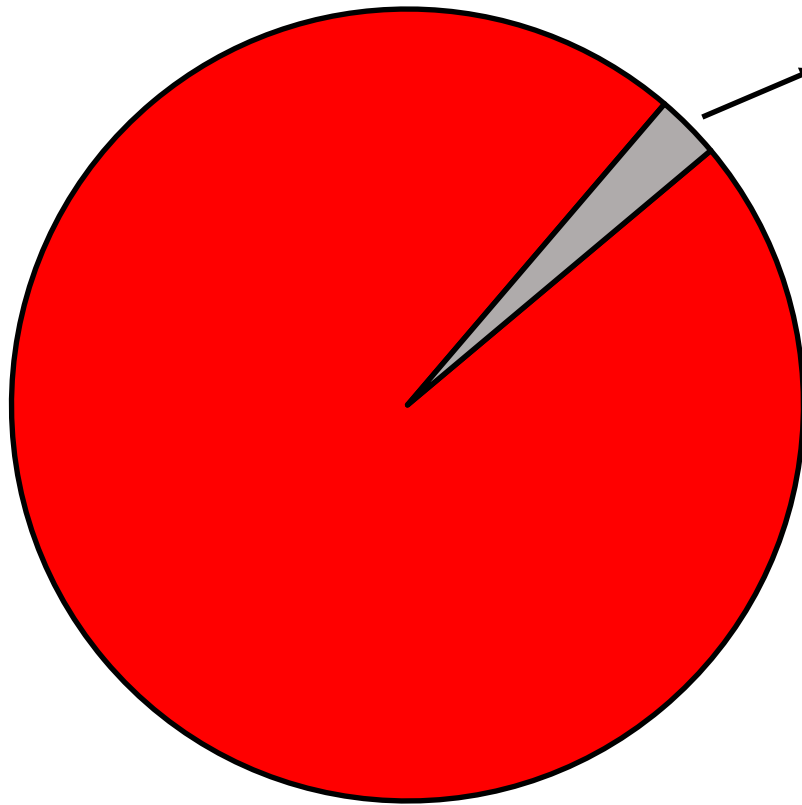
FOCAL SPECIES- SURFPERCH

Total Catch = 909



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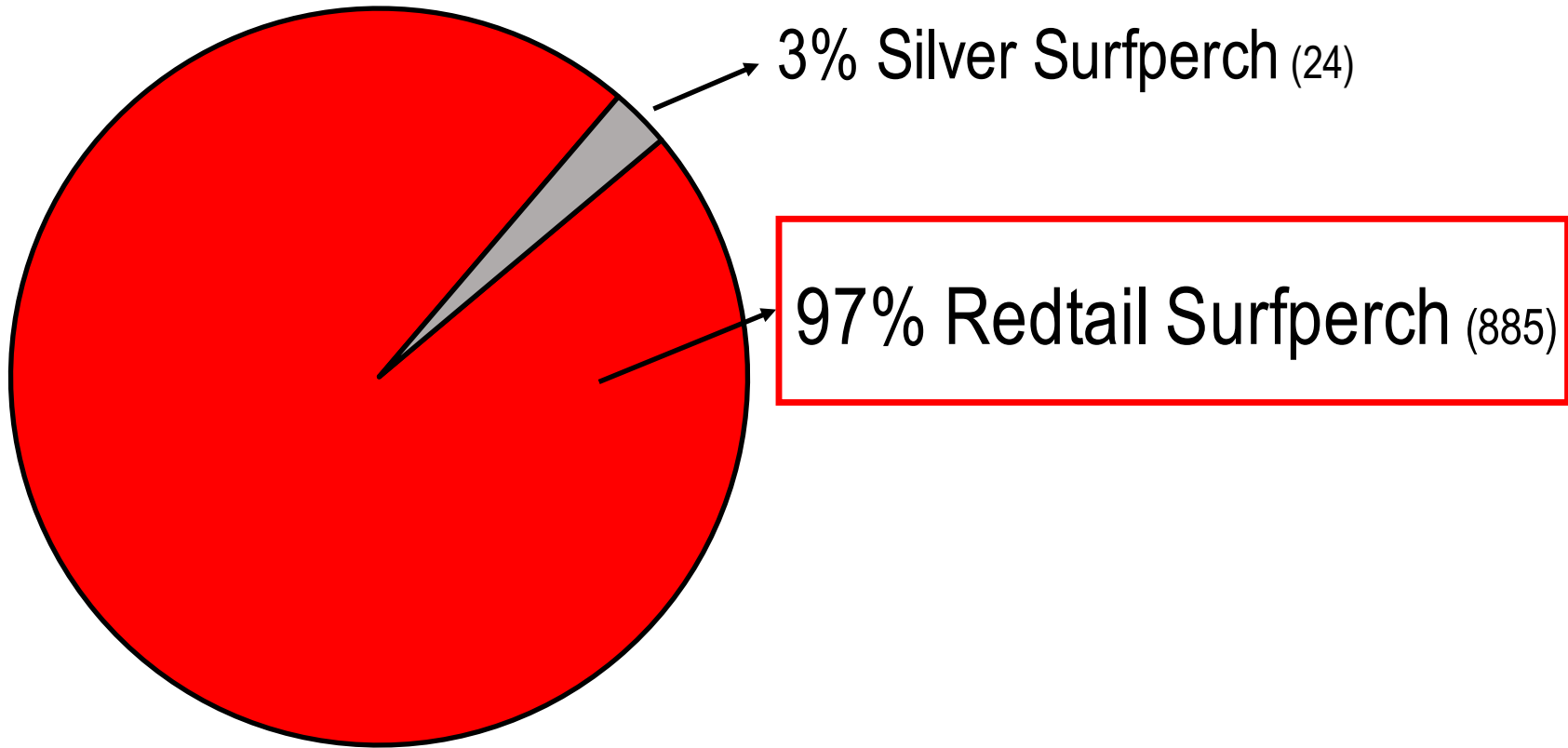


3% Silver Surfperch (24)



FOCAL SPECIES- SURFPERCH

Total Catch = 909



FOCAL SPECIES- REDTAIL SURFPERCH



- *Amphistichus rhodoterus*
- Primary surfperch taken by recreational anglers in Northern California
- Largest landings for commercial fishery is out of Eureka, CA
- Use sandy beaches as forage areas

DATA COLLECTORS



Dr. Tim Mulligan



HSU Volunteers



M.S. Candidate



Drew Barrett



Tolowa Dee-Ní Nation

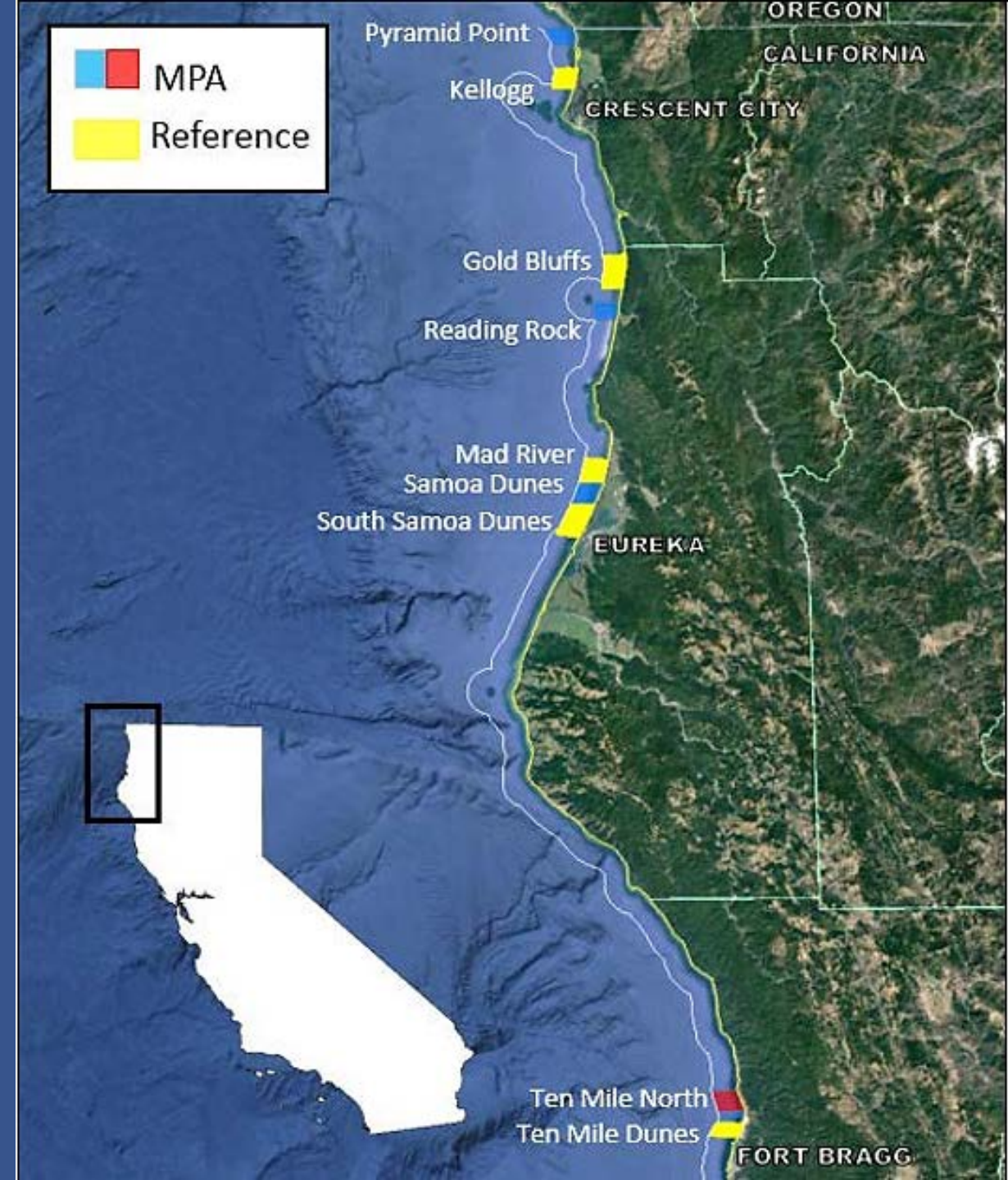


C.D.F.W.



METHODS

- 9 sandy beaches
 - 4 MPAs and 5 reference sites



METHODS

- 9 sandy beaches
 - 4 MPAs and 5 reference sites
- Method: Hook & Line
- 2014: 6 of 9 sites sampled 3 times each
- 2015: 9 sites sampled 3 to 8 times each

2014

Apr	May	Jun	Jul	Aug	Sep	Oct	Nov
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2015

Apr	May	Jun	Jul	Aug	Sep	Oct	Nov
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METHODS

- 9 sandy beaches
 - 4 MPAs and 5 reference sites
- Method: Hook & Line
- 2014: 6 of 9 sites sampled 3 times each
- 2015: 9 sites sampled 3 to 8 times each
- Abundance, length, sex ratio, movement
- Tagged with T-bar tags



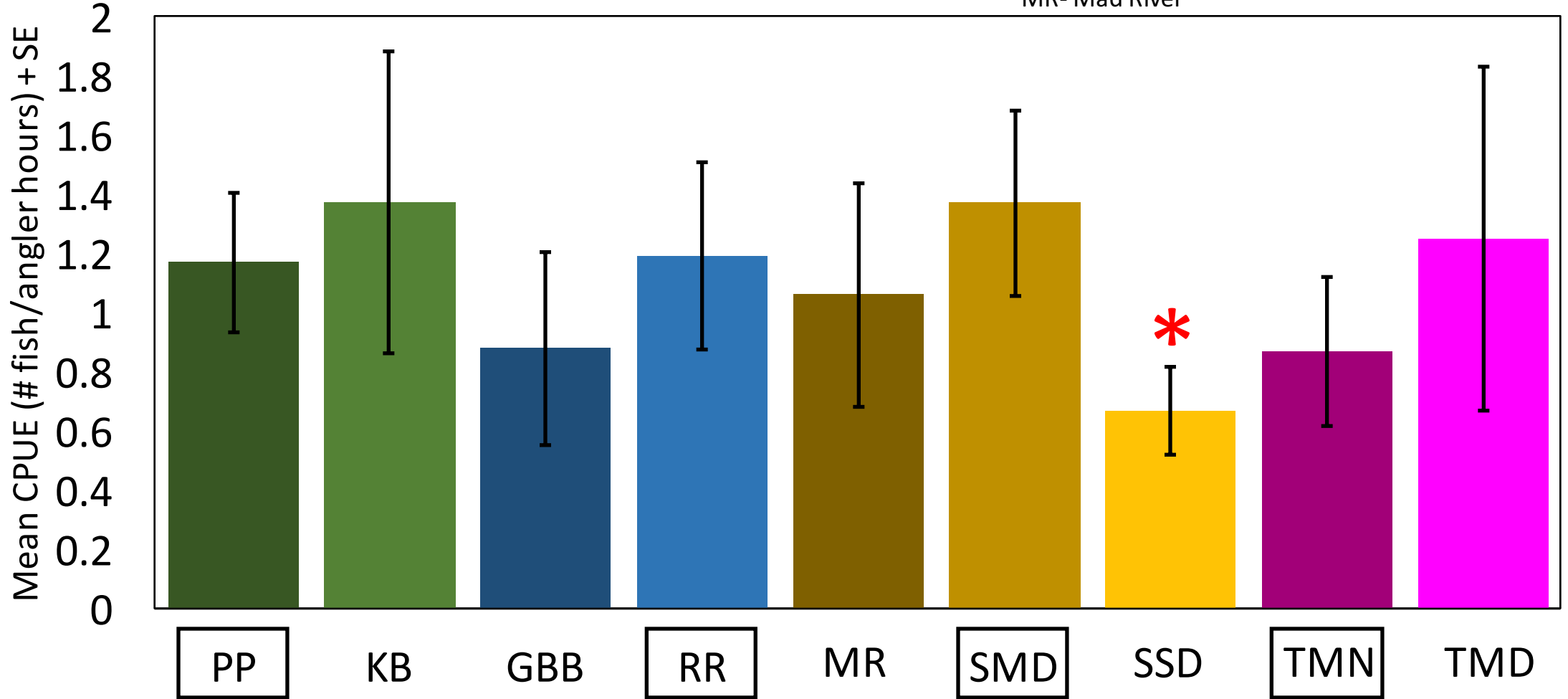
A photograph showing two individuals, a man and a woman, working together outdoors. The man, on the left, is wearing a red sleeveless shirt, a camouflage baseball cap, and sunglasses. He has a tattoo on his left arm. The woman, on the right, is wearing a light blue button-down shirt and a tan baseball cap. They are both looking down at a spiral-bound notebook that is open on a table. The man is holding a red tool, possibly a screwdriver, and appears to be working on something on the table. The notebook has some handwritten notes and a yellow pencil is resting on it. The background is a plain, light-colored surface, possibly a wall or a large piece of paper. A semi-transparent white banner with the text "KEY FINDINGS" is overlaid across the middle of the image.

KEY FINDINGS

RELATIVE ABUNDANCE

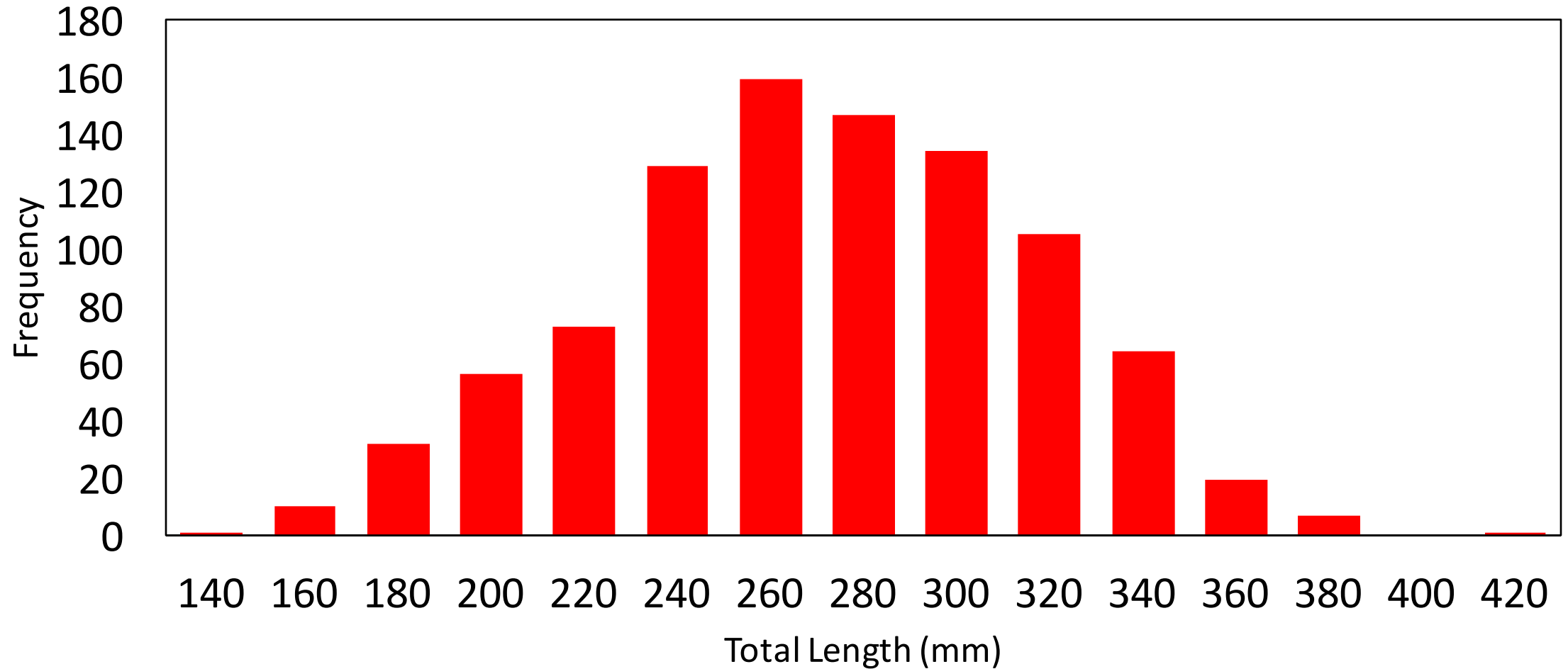
PP- Pyramid Point
KB- Kellogg Beach
GBB- Gold Bluffs Beach
RR- Reading Rock
MR- Mad River

SMD- Samoa Dunes
SSD- South Samoa Dunes
TMN- Ten Mile North
TMD- Ten Mile Dunes



- MPAs and reference sites not significantly different- except for South Samoa Dunes (SSD)

LENGTH FREQUENCY



- Range from 140 to 420 mm, average is 262 mm (10 inches)

MEAN TOTAL LENGTH

PP- Pyramid Point

KB- Kellogg Beach

GBB- Gold Bluffs Beach

RR- Reading Rock

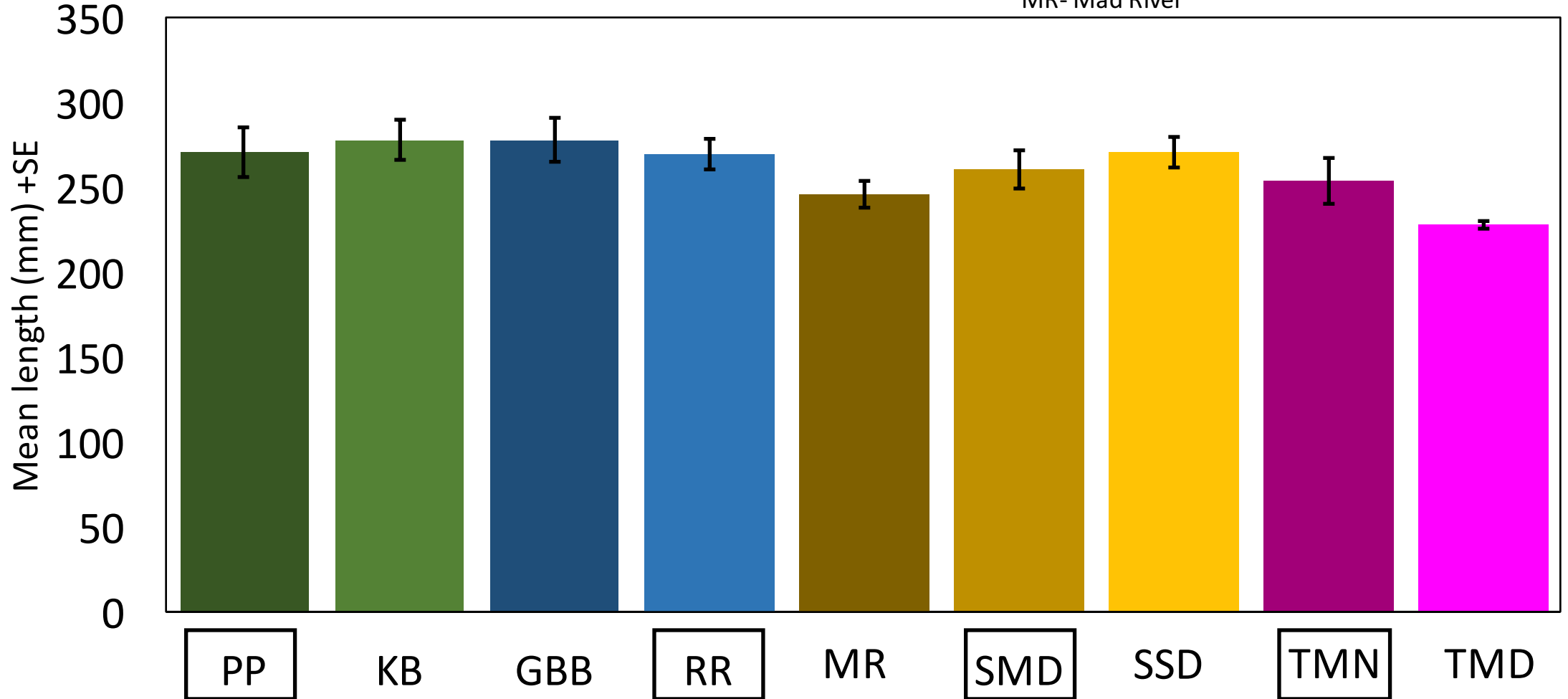
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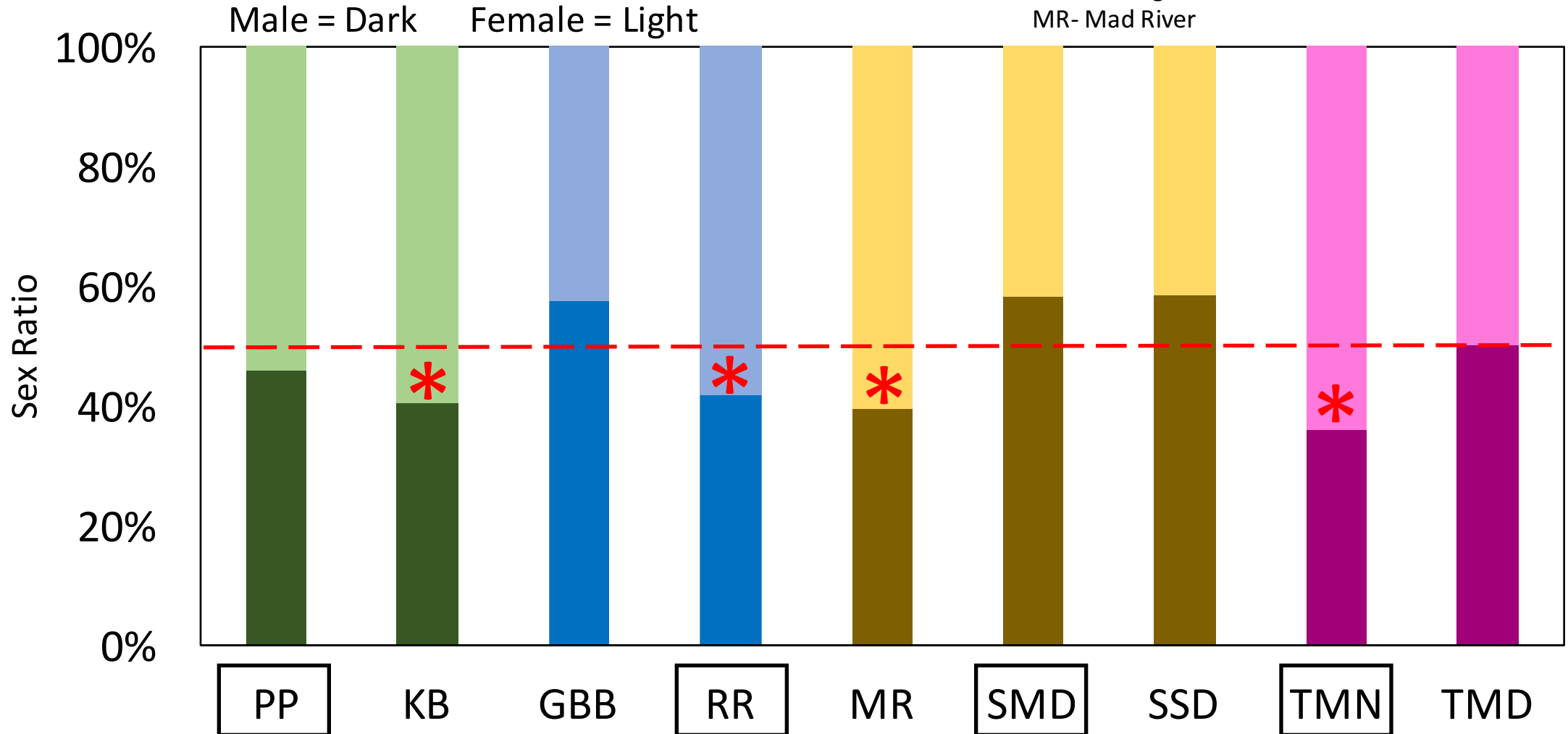
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- Sex ratios nearly balanced (50:50), but MPAs and reference sites are significantly different

MOVEMENT

- 504 tags deployed
- 5 tags returned
- Possible reasons:
 - poor tag retention
 - premature death
 - low reporting of tags
 - restricted access
- **May** indicate movement is relatively local

Site Deployed	Days at Liberty	Distance Travelled
Pyramid Point	13	3 km
Pyramid Point	14	3 km
Reading Rock	311	8 km
Samoa	30	12 km
Samoa	316	18 km

REVIEW: PROJECT QUESTIONS

- What are characteristics of NorCal surfperch populations?
 - Abundance (✓), lengths (✓), sex ratios (✓), movement (?)



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REVIEW: PROJECT QUESTIONS

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 - Abundance (✓), lengths (✓), sex ratios (✓), movement (?)
- Are our reference sites comparable to our MPA sites?
 - Yes! MPAs and reference sites not significantly different (except sex ratios)
- Are these a good indicator species for future monitoring?
 - Yes! Populations similar, maybe low movement, many refuges from fishing mortality

Acknowledgements

Data Collectors

Chad Martel	Franklin Moitoza	Carlton Wei
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Kellan Korcheck	Cori Flannery	Neil Shearer

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