

A close-up photograph of a red snapper's head, showing its large, prominent eye with a dark pupil and orange-yellow iris. The fish's scales are a vibrant red color, and its mouth is slightly open, revealing a white interior. The background is dark and out of focus.

# An Update on Estimating Absolute Abundance of Red Snapper in the Gulf of Mexico

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*Photo by Mike Kittrell*



A close-up photograph of a fish's head, likely a sea bream, with a fine grid pattern overlaid. The fish has reddish-brown scales and a prominent eye. The background is dark.

**Award Period:** August 1, 2017 – July 31, 2019

**Five Milestones:**

1. Data Mining and Habitat Mapping
2. Calibration and Validation
3. Sampling
4. Results
5. Conclusion



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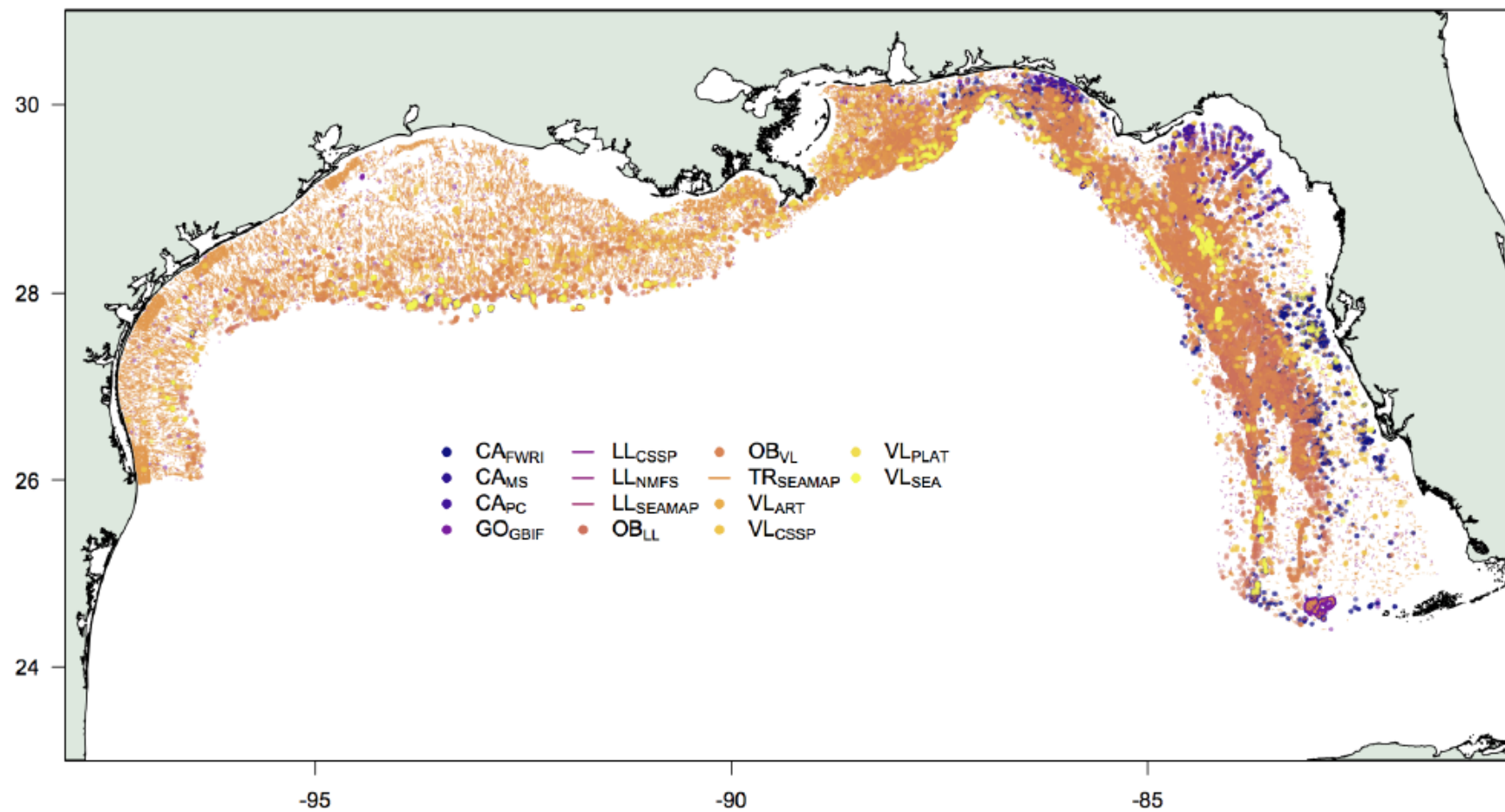


# 1. Data Mining and Habitat Mapping (Ahrens and Siders) - COMPLETED

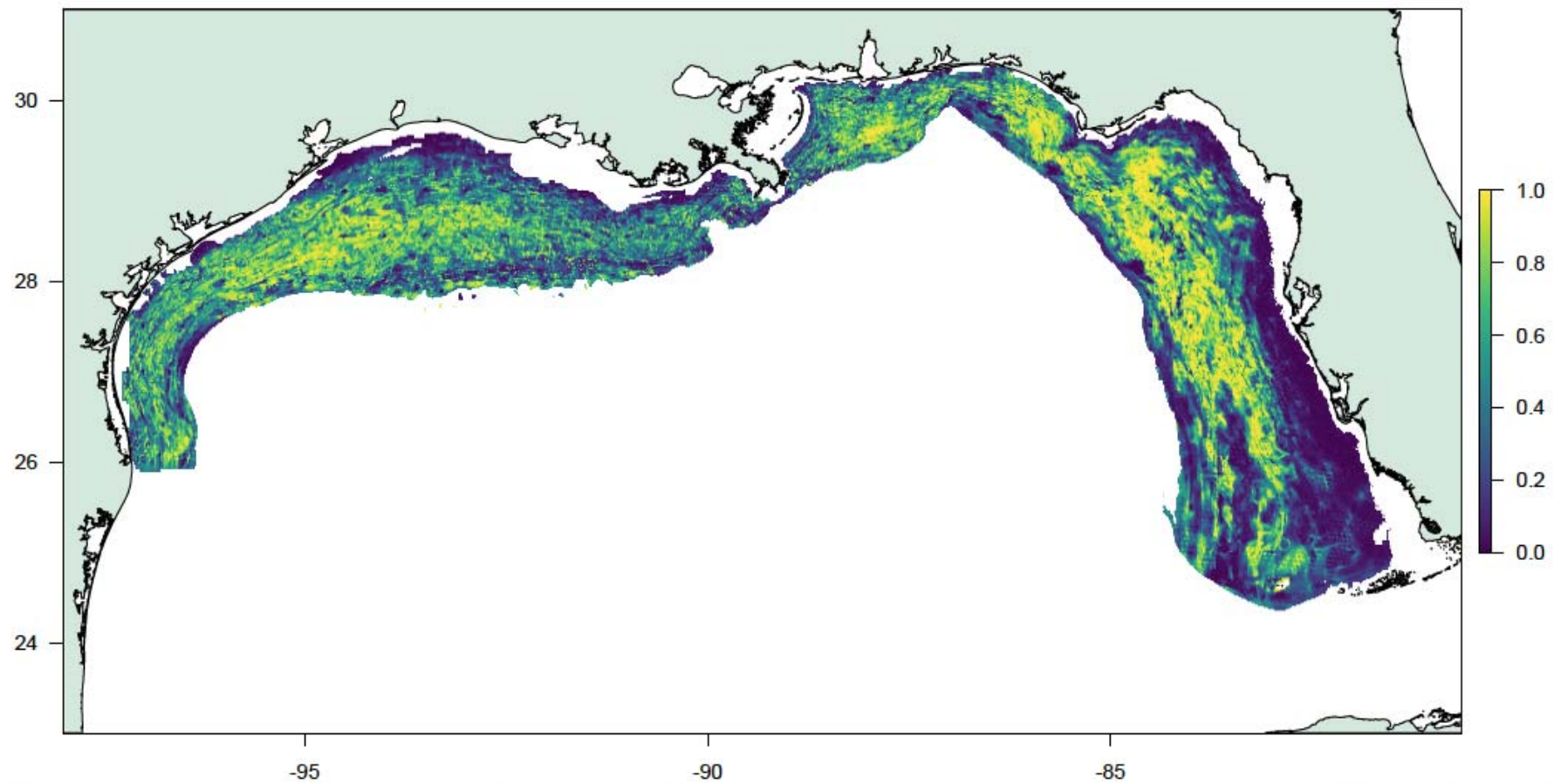
*Goal:* chose stratified random sampling locations

*Accomplished by:* Combining known red snapper locations from fisheries-independent and fisheries-dependent data sources with environmental covariates to predict probability of presence (high, medium, low) using a random forest model. Stratified random sampling locations were then chosen from this prediction grid.

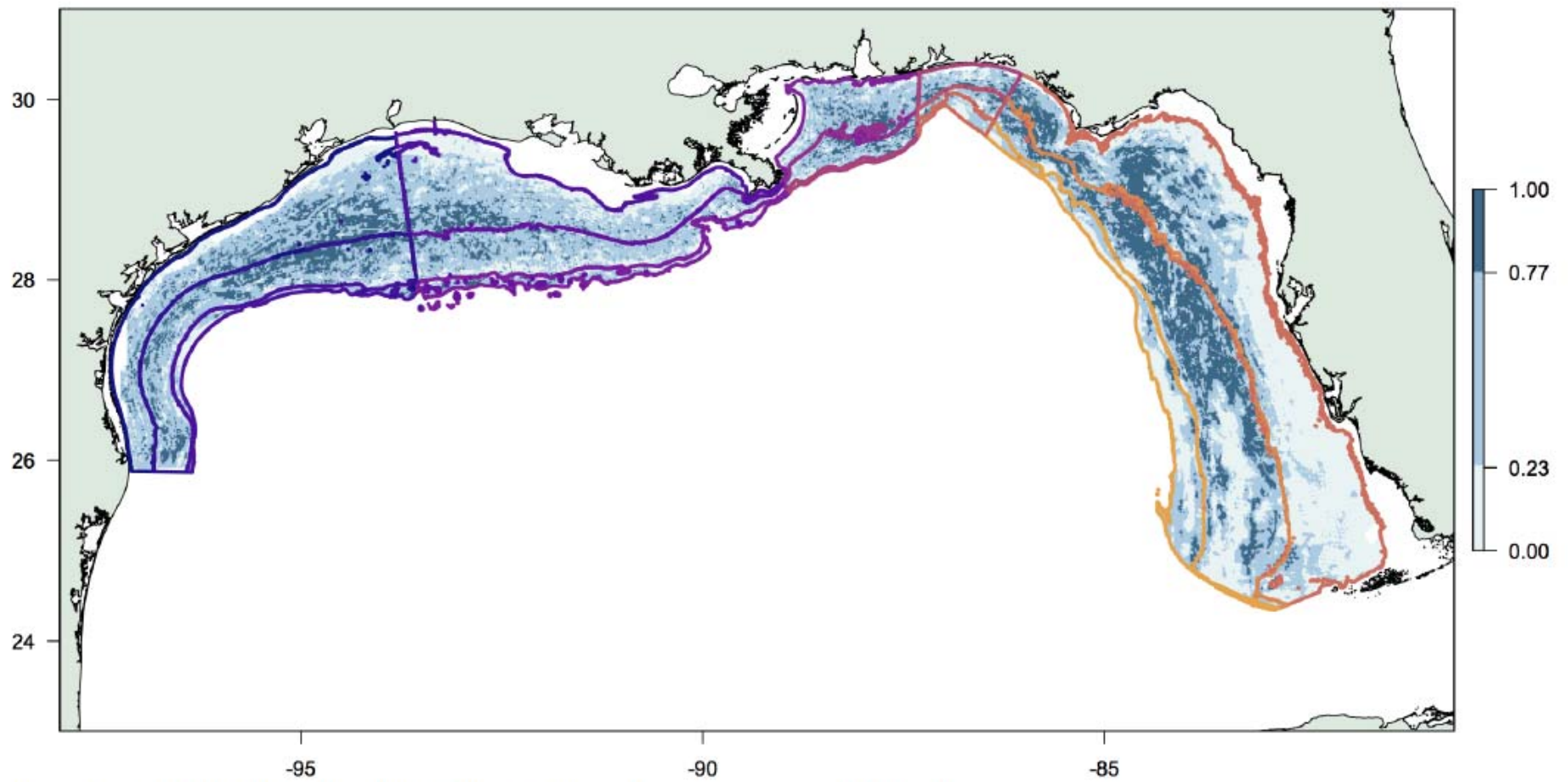




(Above) All sampling gears used as presence-only or presence-absence points in modeling probability of presence

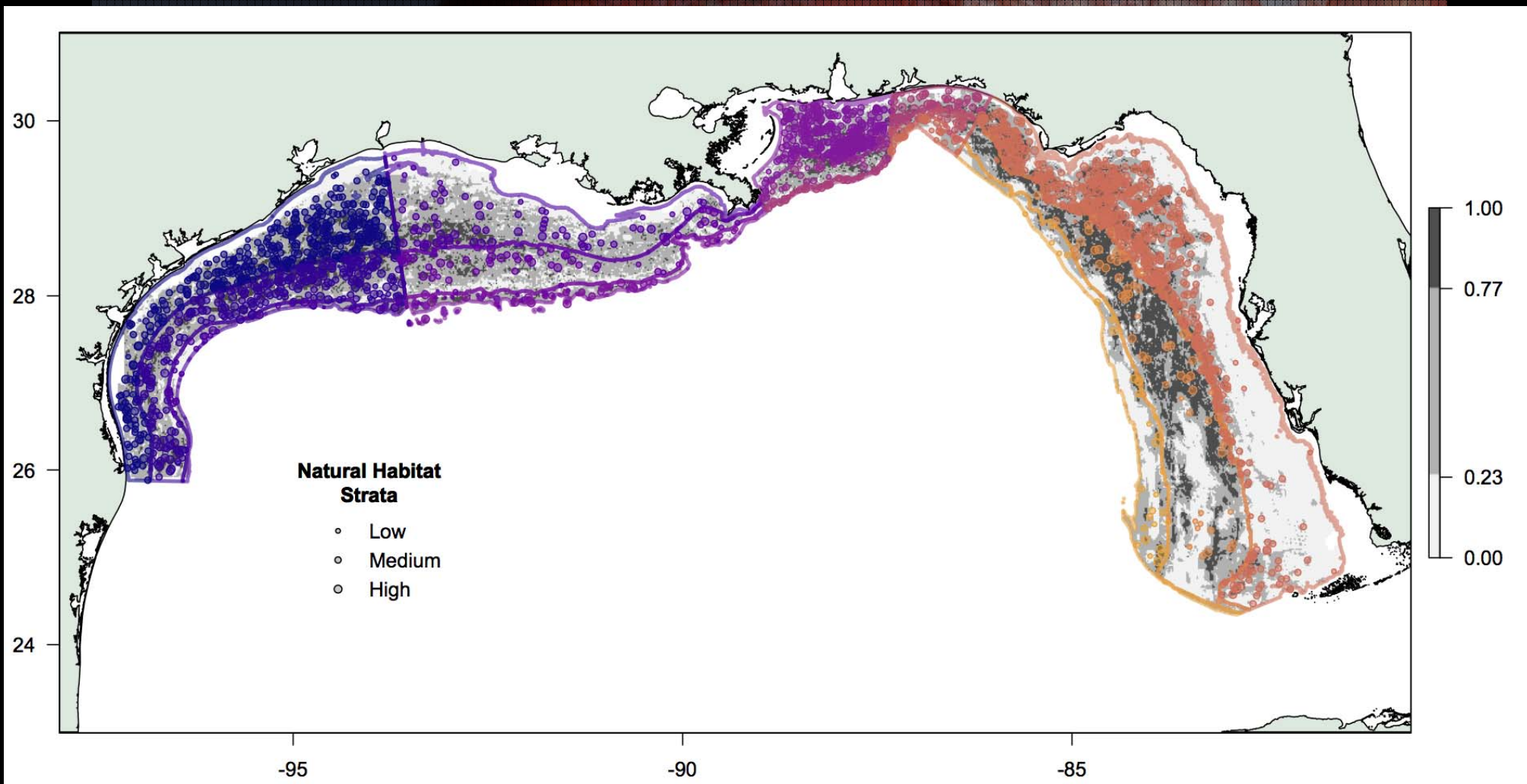


(Above) The predicted probability of presence of Red Snapper from a Random Forest model. Probability of presence is the probability of at least one Red Snapper being located in the cell.

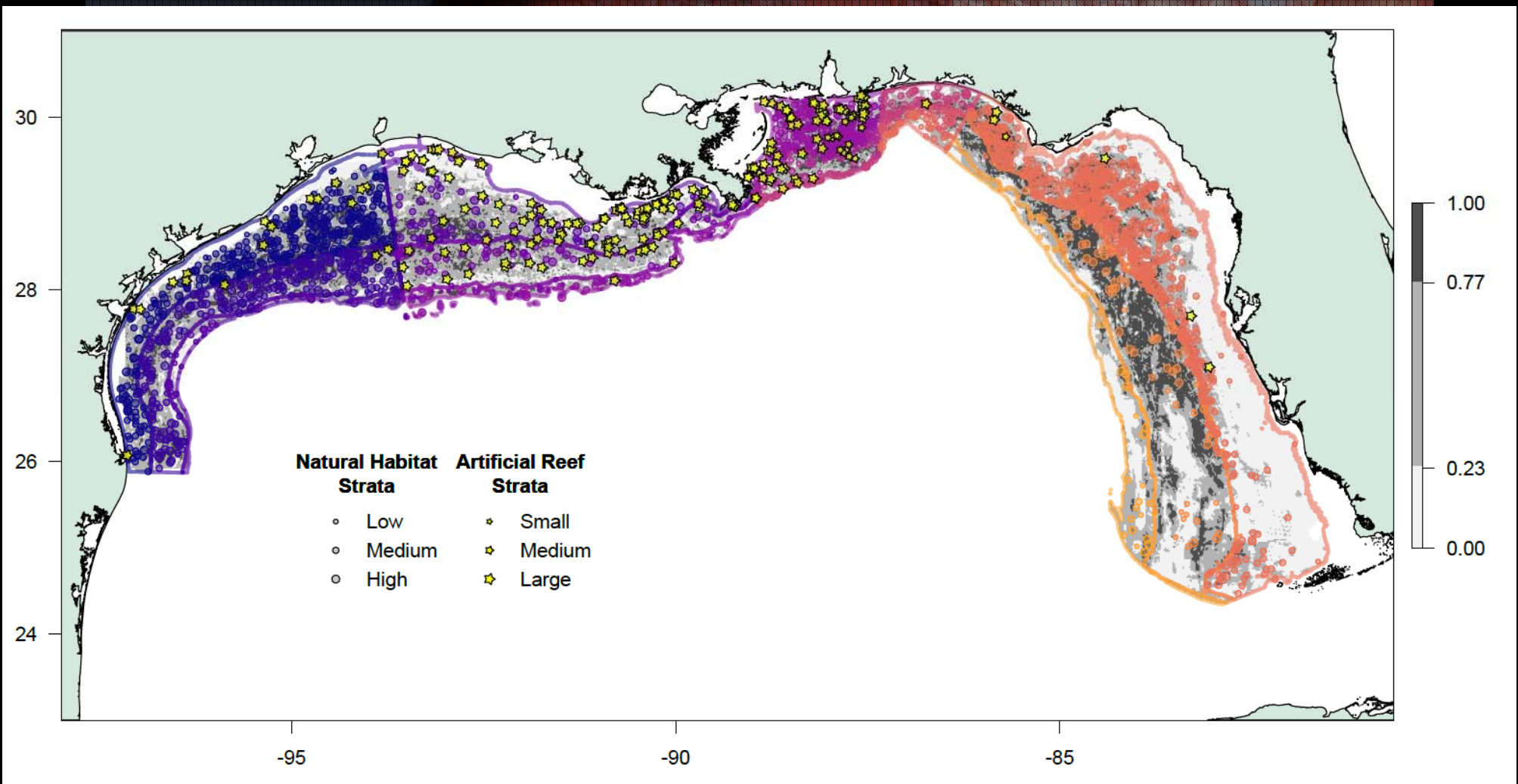


(Above) Applying the high/low threshold to the probability of presence map to create three levels.











A close-up photograph of a fish's head, likely a snapper or similar species, with a prominent eye and scales. The image is overlaid with a dark grid pattern. The text is positioned on the left side of the image.

## 2. Calibration and Validation (All PIs) - ONGOING

*Goal:* Ensure accurate estimates of fish density and abundance

### Direct Count Calibration

*Patterson and Boswell* – completed trials in Florida to calibrate bioacoustics with visual surveys from ROV.

*Murawski and Patterson* – completed eastern GOM cruise which included C-BASS/ROV calibration

*Rooker and Stunz* – completed western GOM cruise to calibrate TARAS/ROV



## Western GOM

*ROV: VideoRay Defender (Stunz, TAMU-CC)*

*Towed Camera: TARAS Phantom (Rooker, TAMUG)*



## Eastern GOM

*ROV: Outland Technologies (Powers, USA)*

*Towed Camera: C-BASS (Murawski, USF)*





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## 2. Calibration and Validation (All PIs) - ONGOING

*Goal:* Ensure accurate estimates of fish density and abundance

### Mark-recapture Tagging

*Patterson* – 900 fish in Florida (2018)

*Catalano, Powers, Drymon* – 750 and 500 fish in Alabama (2016 and 2017, respectively)

*Catalano et al.* – given the EFPs for the 5 Gulf States, the bulk of the Gulf-wide effort will take place in 2019



A close-up photograph of a red snapper fish, showing its eye and scales. The image is overlaid with a dark grid pattern. The text is white and positioned on the left side of the image.

### 3. Sampling (All PIs) - ONGOING

*Goal:* Data collection

Data collected during spring and summer 2018 are currently being analyzed to determine red snapper densities at habitat types surveyed and checked for QA/QC.

**Eastern GOM** (*Patterson, Murawski, Boswell*): multiday cruises completed off Florida, Alabama, Mississippi using ROV, C-BASS and bioacoustics.

**Eastern GOM** (*Powers, Hoenig, Drymon*): vertical longline depletion using Index Removal, bottom longline depletion using C3 in Alabama.





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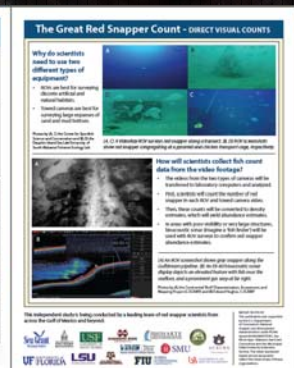
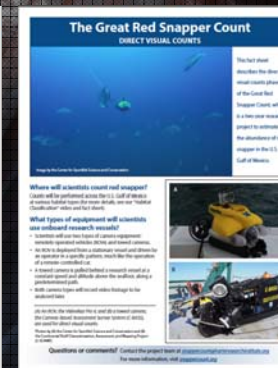
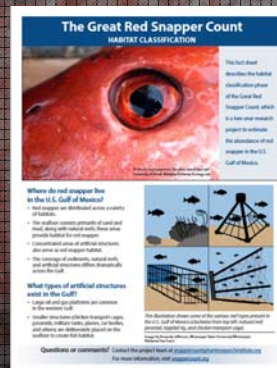
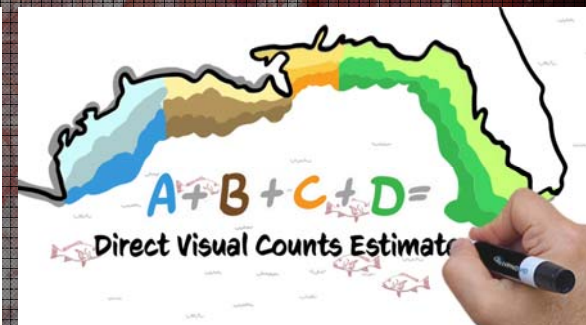
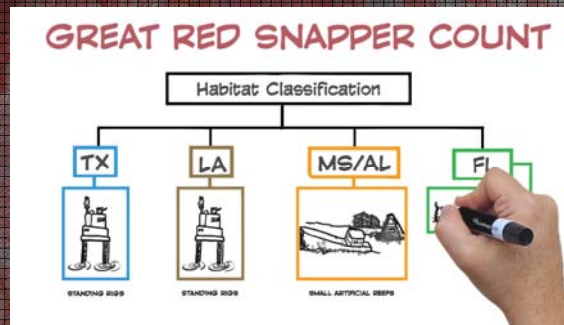
**Western GOM** (*Cowan*): completed bioacoustics cruise off Louisiana.

**Western GOM** (*Rooker, Wells, Stunz*): multiday cruises with TARAS, ROV and bioacoustics off Texas.



# Stakeholder Engagement

June 13<sup>th</sup>: 18 newspapers, 5 Sea Grant Offices, 6 state agencies, 11 universities, 14 key partners, 6 fishing magazines/forums/newsletters







# Moving Forward

2018

*November 15-16:* Regional leadership and Quantitative Team meeting, Texas A&M Corpus Christi

2019

*Spring:* Gulf-wide high reward tagging study (\$250/\$500)  
15,000 Hallprint PDAT dart tags

Sackett DK, Catalano MJ. 2017. Spatial heterogeneity, variable rewards, tag loss and tagging mortality affect the performance of mark-recapture designs to estimate exploitation: an example using Red Snapper in the northern Gulf of Mexico. *North American Journal of Fisheries Management* 37: 558-573.

Sackett DK, Catalano M, Drymon JM, Powers SP. *In Press*. Estimating exploitation rates in the Alabama Red Snapper fishery using a high-reward tag-recapture approach. *Marine and Coastal Fisheries*.



# Discussion/Questions

