



**NOAA  
FISHERIES**



# Tracking crabs with drones: Seasonal movement of red king crabs in Bristol Bay



Leah Zacher (RACE-SAP), Scott Goodman (BSFRF), Madison Heller-Shipley (NRC), Mike Litzow (RACE-SAP)

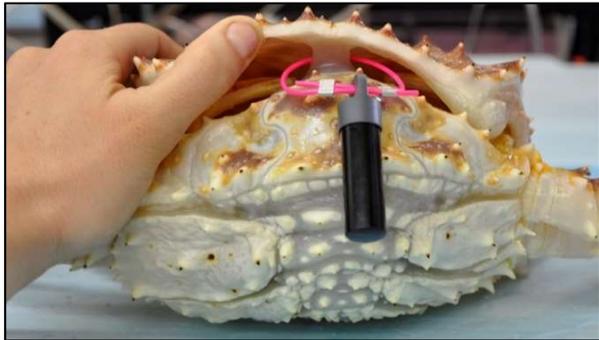


Determine distribution, movement,  
essential habitat use, use of trawl  
closures ALL outside summer surveys

# Technology Used

## Acoustic Tags

- Attached to the isthmus mussel
- Retained through molt
- Send out “ping” every 45 seconds



## Autonomous Surface Drones for relocation

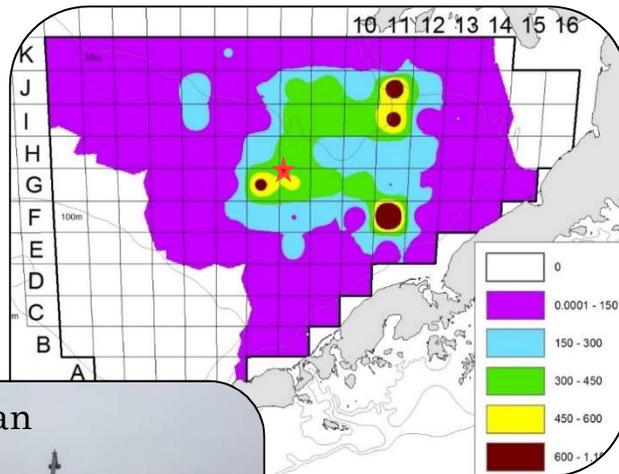
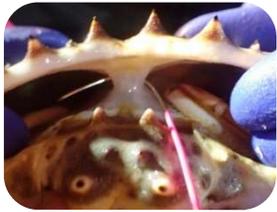
- Acoustic receiver on keel
- Low noise interference (wind propelled)
- Near real-time control of path



# 2019 Recap

## June 2019:

- Tagged 148 mature male BBRKC
- Focus on 1 tagging site (red star)



2019 BBRKC Mature Males

## October 2019:

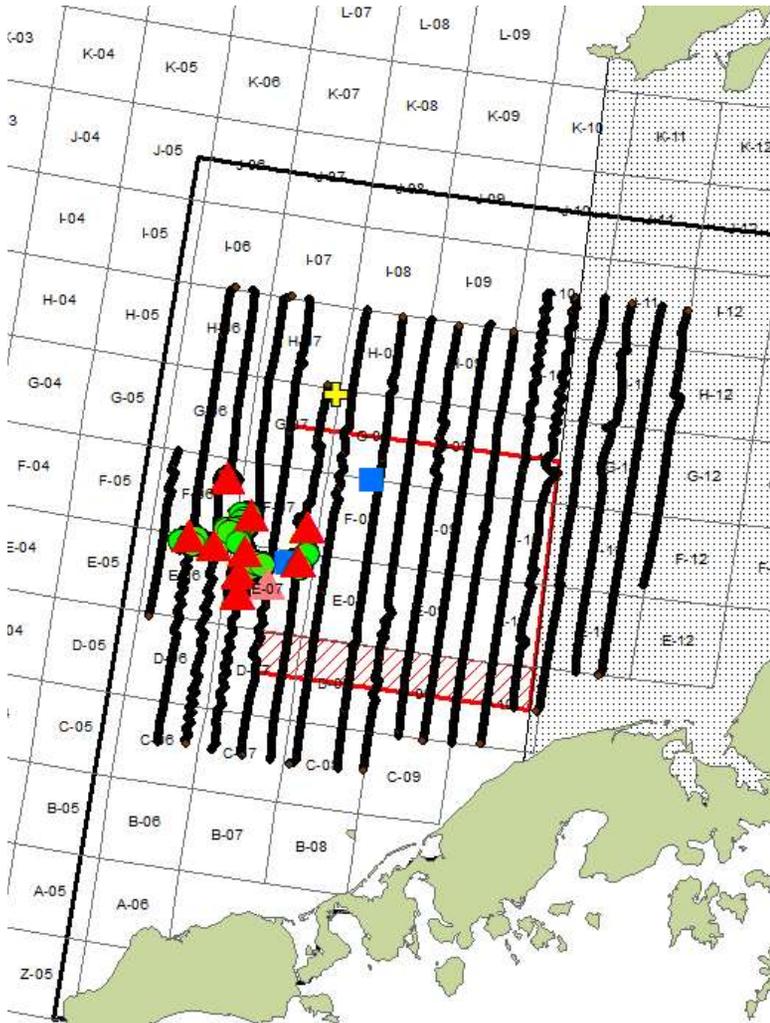
- 30 day relocation effort
- 2 Sairdrones
- 40,000 km<sup>2</sup> search area
- ~400 m detection distance
- ~6.5% of area searched



F/V Royal American



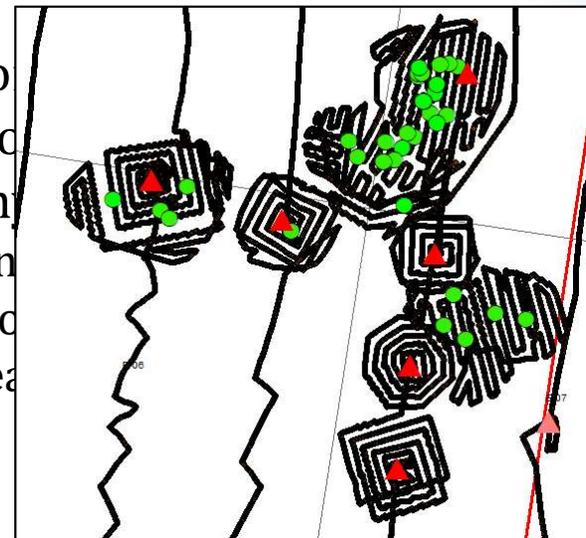
# 2019 Recap



## 148 Crab Tagged

- + Tagging Site (2 crabs here presumed dead)
- ▲ Detection during line transect (10 crabs)
- Detection during intensive search (36 crabs)
- Detection when drone off course (2 crabs)

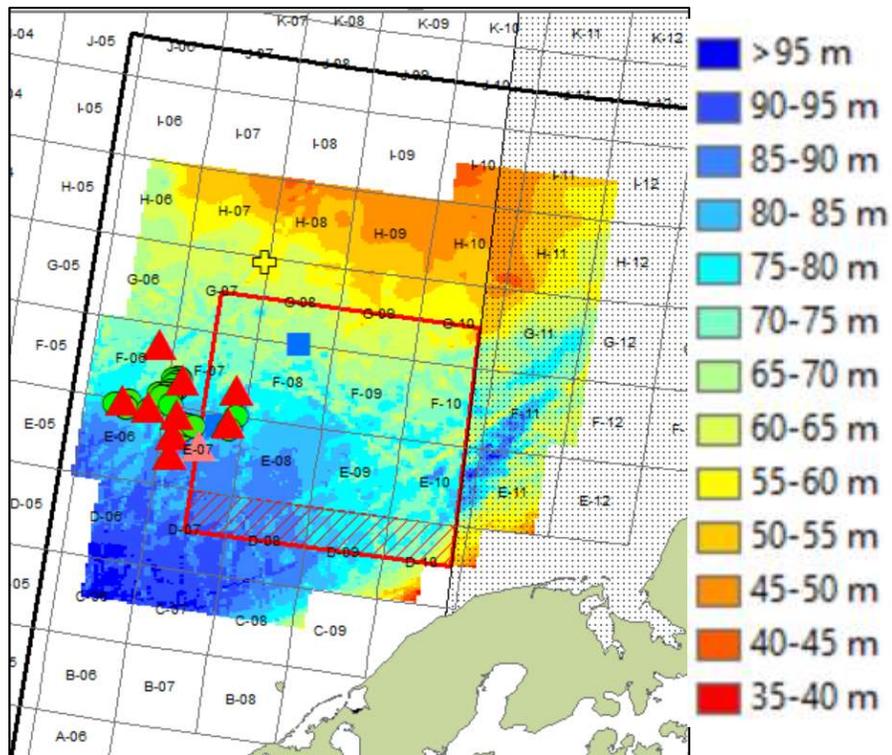
- 34% of
- June to
- Did any
- Un
- wo
- sea



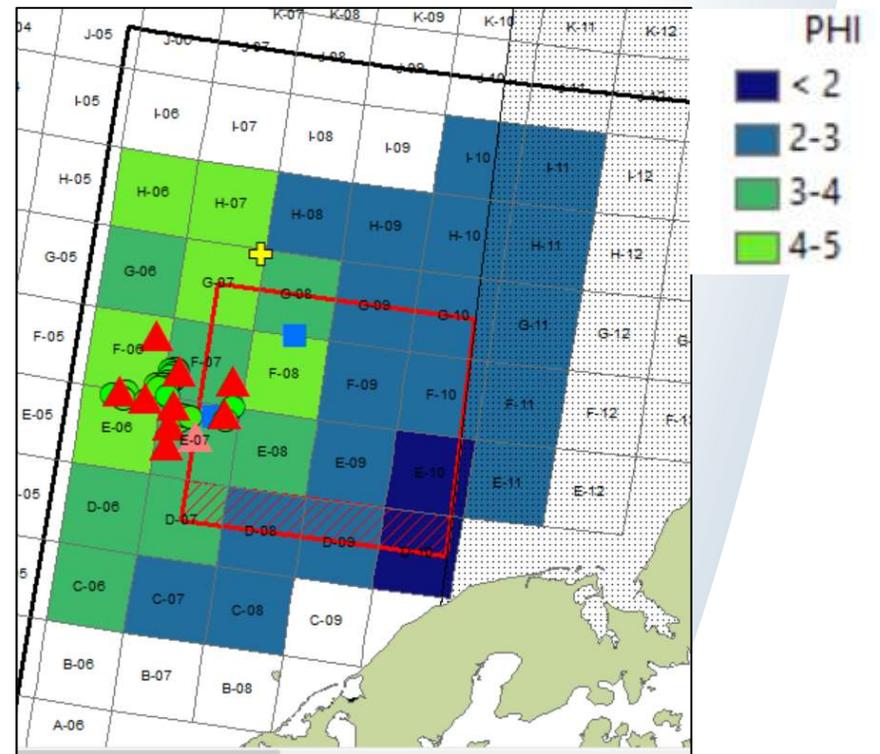
00 km  
area?  
arched  
o in  
25-191)

# 2019 Recap: Habitat Associations

## Depth



## Sediment



# 2020 Season

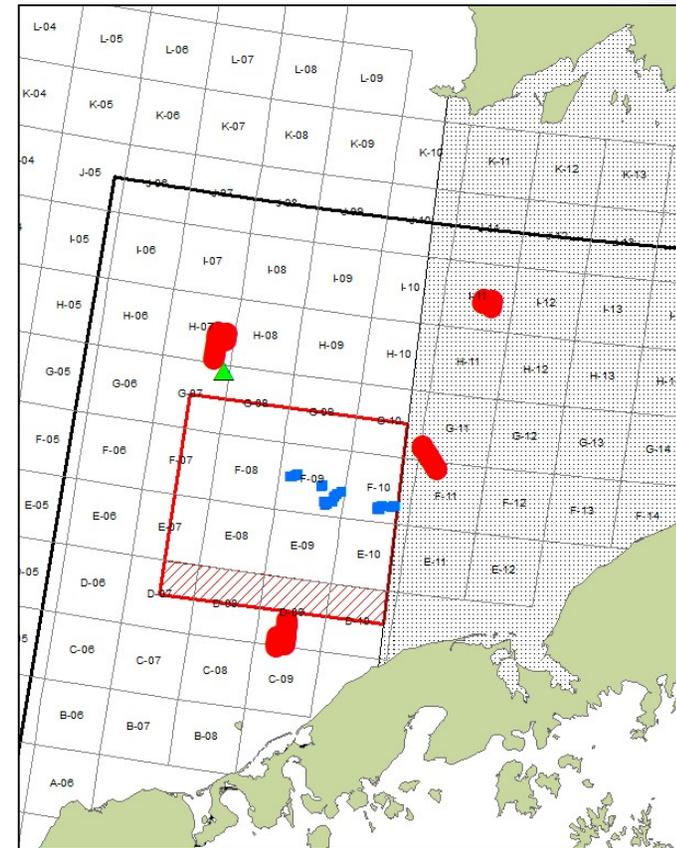
## Tagging

- July 2020
  - Tagged 305 mature **male** BBRKC
  - Focus on 4 tagging sites
- October 2020
  - ADF&G helped tag 50 mature **female** BBRKC during fishery



## Drone Relocation Efforts

- Planned efforts for Spring and Fall 2020 cancelled due to COVID-19

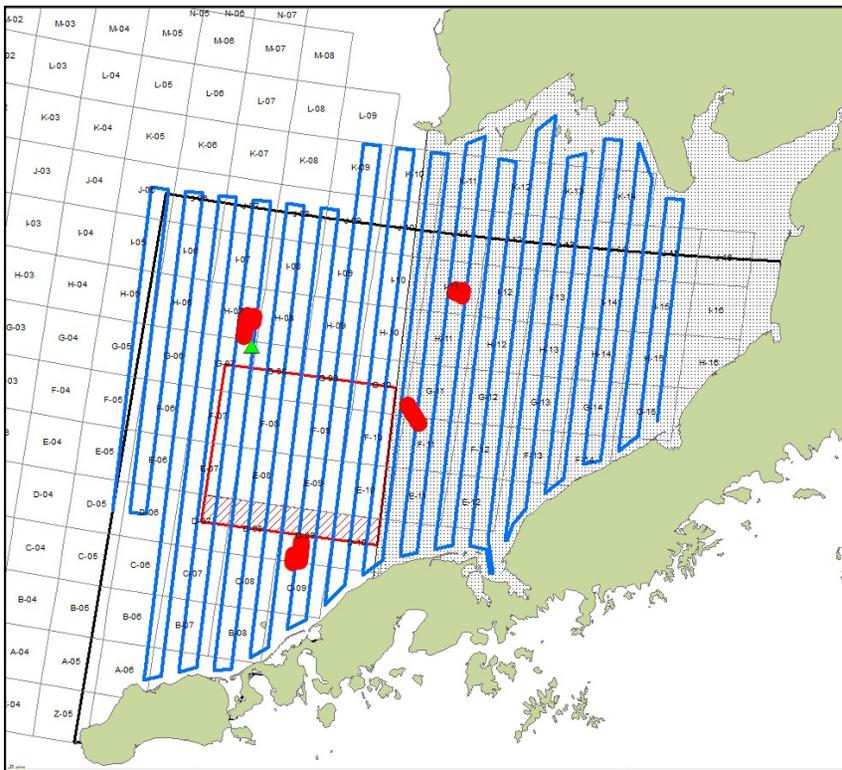


Green Triangle = 2019 male tagging site  
Red Circles = 2020 male tagging site  
Blue Squares = 2020 female tagging site

# 2021/22 Plans

## Spring 2021, Drone Relocation Effort

- April/May
- 2 Saldrones for 43 day deployment
- Expanded search area (~100,000 km<sup>2</sup>)
- No adaptive sampling



## New Tagging/Relocations

- Dependent upon funding decisions
- Summer 2020 Tagging Charter
  - Acoustic Tags
    - Focus on tagging female BBRKC (N = 150)
    - Few additional males to maintain sample size (N = 50)
    - Drone relocation effort in **April/May 2022**
  - Pop-up Satellite Tags
    - Release in **October 2021** (N = 32, equal among sexes)
    - Release in **January 2022** (N = 32, equal among sexes)

# Questions?

