To Whom It May Concern:

The Graduate School of Oceanography's (GSO) Narragansett Bay Fish Trawl Survey is an extensive data collection dating back to 1959 when Charles Fish began the survey. The University is pleased to share these data with others in the interest of furthering unbiased fisheries, management and oceanographic research.

We ask that any use of these data properly cite the University of Rhode Island's Graduate School of Oceanography and Rhode Island Department of Environmental Management in the data collection. Data are provided only for the specific purpose stated in this letter. Please do not distribute data to third parties; instead, refer them to us.

More information on the methods for this survey are available on the website: https://web.uri.edu/gso/research/fish-trawl/

Sincerely,

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IF USING **2017** or **2020** DATA PLEASE READ BELOW:

NOTICE:

2017 Missing Data Replacement

Due to operational issues, only three sampling trips were conducted between Jan 1, 2017 and May 3, 2017. The number and weight of organisms at both stations and surface and bottom temperatures at Whale Rock WERE NOT DIRECTLY OBSERVED and were replaced as follows:

Other than sampling on 1/25/17, 1/30/17, and 2/6/17:

A. The number of organisms caught at <u>each station separately</u> during the entire time period was replaced in one of two ways.

1. For species generally caught in the survey during the beginning of the missing data period but not at the end (March-April), we calculated the mean proportion of the year's total caught during the gap over previous 7 years (p7) after normalizing each year to ensure equal weighting. We then multiplied (1 - p7) by the number caught in 2016 since May 1st to estimate how many individuals we expected to catch during the time period.
2. For species generally caught in the survey during the end of the missing data period but not the beginning, and species caught consistently throughout the gap, we calculated the mean proportion of the year's total caught during the gap over the previous 7 years (p7) after normalizing each year to ensure equal weighting. We then multiplied (1-p7) by the number caught in the remainder of 2017 to estimate how many individuals we expected to catch during the time period.

B. Next we distributed the catch by week in one of two ways:

1. For species generally caught in the survey during the beginning of the missing data period but not the end (March-April), we calculated the mean weekly cumulative sum since May 1 over the previous 7 years after normalizing each year to ensure equal weighting. We then calculated expected weekly catch rounded to the nearest whole fish based on the mean weekly cumulative sum and expected total sum from part A.
2. For species generally caught in the survey during the end of the missing data period but not the beginning, and species caught consistently throughout the gap, we calculated the mean weekly cumulative sum since January 1 over the previous 7 years after normalizing each year to ensure equal weighting. We then calculated expected weekly catch rounded to the nearest whole fish based on the mean weekly cumulative sum and expected total sum from part A.

C. The biomass of each species caught was calculated by multiplying the expected number caught each week by the mean individual weight over the previous 7 years after standardizing each year to ensure equal weighting

D. The water quality data for Fox Island was replaced using data from the GSO weekly Plankton Survey. Surface temperatures at Whale Rock were replaced with observations at NOAA weather buoy NWPR1 located in the East Passage off of Newport. Bottom temperatures at Whale Rock were then estimated with a Generalized Additive Model using a factor for stations and 2 predictors, a spline fit to the day-of-year and a spline fit to surface temperature (in this case the NOAA buoy data). This model explains nearly 98% of the deviance in bottom temperature over the history of the trawl survey.

The following species were likely affected by the gap and were replaced with values as calculated above:

Station	**Species**
FI	WINTER FLOUNDER (Pseudopleuronectes americanus)
FI	SUMMER FLOUNDER (Paralichthys dentatus)
FI	SQUID (Loligo peali)
FI	SPOTTED HAKE (Urophycis regia)
FI	SPONGE (Suberites spp)
FI	SPIDER CRAB (Libinia emarginata)
FI	SMALLMOUTH FLOUNDER (Etropus microstomus)
FI	SILVERSIDE (Menidia menidia)
FI	SILVER HAKE (Merluccius bilinearis)
FI	SAND FLOUNDER (Scophthalmus aquosus)
FI	ROCK CRAB (Cancer irroratus)
FI	MENHADEN (Brevootia tyrannus)
FI	LOBSTER (Homarus americanus)
FI	LITTLE SKATE (Raja erinacea)
FI	HORSESHOE CRAB (Limulus polyphemus)
FI	HERMIT CRABS (Pagurus pollicaris)
FI	CONCH (Busycon canaliculatum & B. carica)
FI	COCKLE
FI	ATLANTIC (SEA) HERRING (Clupea harengus harengus)
FI	ALEWIFE (Alosa pseudoharengus)
WR	WINTER FLOUNDER (Pseudopleuronectes americanus)
WR	TAUTOG (Tautoga onitis)
WR	SUMMER FLOUNDER (Paralichthys dentatus)
WR	STRIPED SEAROBIN (Prionotus evolans)
WR	STRIPED BASS (Morone saxatilis)
WR	SQUIRREL (RED) HAKE (Urophycis chuss)
WR	SQUID (Loligo peali)
WR	SPOTTED HAKE (Urophycis regia)
WR	SPIDER CRAB (Libinia emarginata)

WR	SMALLMOUTH FLOUNDER (Etropus microstomus)
WR	SILVER HAKE (Merluccius bilinearis)
WR	SCUP (Stenotomus chrysops)
WR	SAND FLOUNDER (Scophthalmus aquosus)
WR	ROCK CRAB (Cancer irroratus)
WR	NORTHERN SEAROBIN (Prionotus carolinus)
WR	MENHADEN (Brevootia tyrannus)
WR	LONGHORN SCULPIN (Myoxocephalus octodecimspinosus)
WR	LOBSTER (Homarus americanus)
WR	LITTLE SKATE (Raja erinacea)
WR	JUVENILE SKATE (unidentifiable)
WR	JONAH CRAB (Cancer borealis)
WR	HORSESHOE CRAB (Limulus polyphemus)
WR	HERMIT CRABS (Pagurus pollicaris)
WR	GOOSEFISH (Lophius americanus)
WR	FOURSPOT FLOUNDER (Paralichthys oblongus)
WR	CRAB (Neopanope texana sayi)
WR	BUTTERFISH (Peprilus triancanthus)
WR	BLUE CRAB (Callinectes sapidus)
WR	ATLANTIC (SEA) HERRING (Clupea harengus harengus)
WR	ALEWIFE (Alosa pseudoharengus)

2020 Missing Data Replacement

A large sampling gap occurred between March 17 and May 25, 2020 due to the outbreak of COVID-19. The number and weight of organisms, and the surface and bottom temperatures at both stations WERE NOT DIRECTLY OBSERVED and were replaced as follows:

A. We estimated the total number of organisms caught at <u>each station separately</u> during the entire time period:

1. We calculated the mean proportion of the year's total caught during the gap over the previous 10 years (p10), excluding 2017 which had a similar data gap (see above), after normalizing each year to ensure equal weighting. We then multiplied (1-p10) by the number caught in the remainder of 2020, before and after the data gap, to estimate how many individuals we expected to catch during the time period.

B. Next we distributed the catch by week:

1. We calculated the mean weekly cumulative sum since January 1 over the previous 10 years (excluding 2017) after normalizing each year to ensure equal weighting. We then calculated expected weekly catch rounded to the

nearest whole fish based on the mean weekly cumulative sum and expected total sum from part A.

C. The biomass of each species caught was calculated by multiplying the expected number caught each week by the weekly mean individual weight over the previous 10 years (excluding 2017) after standardizing each year to ensure equal weighting

D. Surface temperatures at the mid-bay (Fox Island) station were replaced using observations at NOAA weather buoy QPTR1 located in the West Passage off Quonset Point. Surface temperatures at the lower bay (Whale Rock) station were replaced using observations at NOAA weather buoy NWPR1 located in the East Passage off Newport. Input values from the buoy data were corrected based on consistent differences between the buoy temps and the recorded Fish Trawl temps for the rest of the year. Bottom temperatures at both stations were then estimated with a Generalized Additive Model using a factor for stations and 2 predictors: a spline fit to the day-of-year and a spline fit to surface temperature (in this case the NOAA buoy data). This model explained nearly 98% of the deviance in bottom temperature over the history of the trawl survey.