

Please provide the following information, and submit to the NOAA DM Plan Repository.

Reference to Master DM Plan (if applicable)

As stated in Section IV, Requirement 1.3, DM Plans may be hierarchical. If this DM Plan inherits provisions from a higher-level DM Plan already submitted to the Repository, then this more-specific Plan only needs to provide information that differs from what was provided in the Master DM Plan.

URL of higher-level DM Plan (if any) as submitted to DM Plan Repository:

1. General Description of Data to be Managed

1.1. Name of the Data, data collection Project, or data-producing Program:

AFSC/RACE/SAP/Swiney: Effects of ocean acidification and increased temperatures on juvenile red king crab

1.2. Summary description of the data:

Multiple stressor studies are needed to better understand the effects of oceanic changes on marine organisms. To determine the effects of near-future ocean acidification and warming temperature on juvenile red king crab (*Paralithodes camtschaticus*) survival, growth, and morphology, we conducted a long-term (184 d) fully crossed experiment with two pHs and three temperatures: ambient pH (~7.99), pH 7.8, ambient temperature, ambient +2 degree C, and ambient +4 degree C, for a total of 6 treatments.

1.3. Is this a one-time data collection, or an ongoing series of measurements?

One-time data collection

1.4. Actual or planned temporal coverage of the data:

2012-08 to 2013-02

1.5. Actual or planned geographic coverage of the data:

W: 170, E: -130, N: 75, S: 50

Alaskan waters

1.6. Type(s) of data:

(e.g., digital numeric data, imagery, photographs, video, audio, database, tabular data, etc.)

Table (digital)

1.7. Data collection method(s):

(e.g., satellite, airplane, unmanned aerial system, radar, weather station, moored buoy, research vessel, autonomous underwater vehicle, animal tagging, manual surveys, enforcement activities, numerical model, etc.)

1.8. If data are from a NOAA Observing System of Record, indicate name of system:

1.8.1. If data are from another observing system, please specify:

2. Point of Contact for this Data Management Plan (author or maintainer)**2.1. Name:****2.2. Title:**

Metadata Contact

2.3. Affiliation or facility:**2.4. E-mail address:****2.5. Phone number:****3. Responsible Party for Data Management**

Program Managers, or their designee, shall be responsible for assuring the proper management of the data produced by their Program. Please indicate the responsible party below.

3.1. Name:

Katherine Swiney

3.2. Title:

Data Steward

4. Resources

Programs must identify resources within their own budget for managing the data they produce.

4.1. Have resources for management of these data been identified?

No

4.2. Approximate percentage of the budget for these data devoted to data management (specify percentage or "unknown"):

Unknown

5. Data Lineage and Quality

NOAA has issued Information Quality Guidelines for ensuring and maximizing the quality, objectivity, utility, and integrity of information which it disseminates.

5.1. Processing workflow of the data from collection or acquisition to making it publicly accessible

(describe or provide URL of description):

Process Steps:

- Seawater was acidified using the same methods described in Long et al. (2013a). Briefly, sand filtered seawater was pumped into the Alaska Fisheries Science

Center's Kodiak Laboratory seawater facility from 15 and 26 m depth intakes in Trident Basin. A tank of pH 5.5 was established by bubbling CO₂ into ambient seawater. This pH 5.5 water was mixed with ambient seawater in the treatment head tanks via peristaltic pumps controlled by Honeywell controllers and Durafet III pH probes. The ambient head tank did not receive any pH 5.5 water. Waters from the treatment head tanks were then supplied to the treatment tubs. To heat the water, a 200W submersible heater was placed in each heated treatment tub. In the coldest months of the experiment, a 100W heater was added to the warmest treatments to maintain the correct temperatures. Temperature and pHF (free scale) were measured daily from three random inserts in each treatment tub (see below for experimental set-up details) using a Durafet III pH probe calibrated with a TRIS buffer, and when the pH deviated from the target pH by more than ± 0.02 pH units, the Honeywell controller set points were adjusted to bring the pH back to the target value. Heater set points were changed manually based upon ambient temperature for each day to maintain target treatment temperatures.

- Weekly water samples from the treatment head tanks were taken, fixed with mercuric chloride, and sent to an analytic laboratory for dissolved inorganic carbon (DIC) and total alkalinity (TA) analysis. Two laboratories which used similar, but slightly different, instruments were used during the course of the study. At the first laboratory, DIC was determined using a CM5014 Coulometer with a CM5130 Acidification Module (UIC Inc., Joliet, IL) using Certified Reference Material from the Dickson Laboratory (Scripps Institute, San Diego, CA) (Dickson et al., 2007). The TA was measured via open cell titration according to the procedure in Dickson et al. (2007). At the second laboratory, DIC and TA were determined using a VINDTA 3C (Marianda, Kiel, Germany) coupled to a 5012 Coulometer (UIC Inc., Joliet, IL) using Certified Reference Material from the Dickson Laboratory (Scripps Institute, San Diego, CA) and the procedures in DOE (1994). Laboratory Study Ethical approval for this research was not required by any federal, state, or international laws because the study was conducted on invertebrates which are not covered under these laws.

- Young-of-the-year were reared in the Kodiak Laboratory from an ovigerous female collected in Bristol Bay, Alaska, June 2011 and shipped live to the laboratory. Thirty young-of-the-year crab were randomly assigned to each of 6 treatments: 1) ambient pH, ambient temperature, 2) ambient pH, ambient +2°C, 3) ambient pH, ambient +4°C, 4) pH 7.8, ambient temperature, 5) pH 7.8, ambient +2°C, and 6) pH 7.8, ambient +4°C. Each treatment was contained in a 53 (L) x 38 (W) x 23 (H) cm tub. Each tub had a flow rate of 600 mL min⁻¹ from the head tank. The young-of-the-year were reared in individual inserts constructed from 40 mm inner diameter PVC pipe with 750 μ m mesh attached to the bottom and the inserts were placed inside the treatment tub. The area of this insert was determined to be optimal for individual rearing of juvenile red king crab of the size used in this study (Swiney et al., 2013b). Inserts were placed on plastic grating to raise them off the bottom of the tub. Water was delivered into each insert from above via a submersible pump connected to a manifold which recirculated water within each tub. A temperature logger that recorded data every 30 minutes was placed into each tub. To acclimate the crab to

the treatment temperatures, each day the temperature in the tubs was increased by 1°C until the desired temperature was obtained. Day 1 of the experiment (August 5, 2012) was marked when all of the treatments reached the correct temperature; the experiment ran for 184 d.

- Throughout the duration of the experiment, crab were fed a gel diet of Gelly Belly (Florida Aqua Farms, Inc., Dade City, FL, USA) enhanced with Cyclop-eeze powder (Argent Laboratories, Redmond, WA, USA), pollock bone powder (US Department of Agriculture, Agricultural Research Service, Kodiak, AK, USA), and astaxanthin (Daly et al., 2012). Crab were fed to excess 3 times per week and old food was removed prior to each feeding. Each insert was checked daily for exuvia and mortalities which were removed for growth and morphometric analysis. Carapaces were carefully removed from all exuvia and mortalities and photographed under a dissecting microscope. Carapace width, carapace length, rostrum base width, orbital spine width, and the first spine length (Figure 1) were measured in mm using Image Pro Plus v. 6.00.260 imaging software (Media Cybernetics, Inc., Bethesda, MD, USA, Long et al., 2013b).

5.1.1. If data at different stages of the workflow, or products derived from these data, are subject to a separate data management plan, provide reference to other plan:

5.2. Quality control procedures employed (describe or provide URL of description):

Data was checked for outliers which were removed.

6. Data Documentation

The EDMC Data Documentation Procedural Directive requires that NOAA data be well documented, specifies the use of ISO 19115 and related standards for documentation of new data, and provides links to resources and tools for metadata creation and validation.

6.1. Does metadata comply with EDMC Data Documentation directive?

No

6.1.1. If metadata are non-existent or non-compliant, please explain:

Missing/invalid information:

- 1.7. Data collection method(s)
- 2.1. Point of Contact Name
- 2.4. Point of Contact Email
- 7.2. Name of organization of facility providing data access

6.2. Name of organization or facility providing metadata hosting:

NMFS Office of Science and Technology

6.2.1. If service is needed for metadata hosting, please indicate:

6.3. URL of metadata folder or data catalog, if known:

identify, appraise and decide what scientific records are to be preserved in a NOAA archive.

8.1. Actual or planned long-term data archive location:

(Specify NCEI-MD, NCEI-CO, NCEI-NC, NCEI-MS, World Data Center (WDC) facility, Other, To Be Determined, Unable to Archive, or No Archiving Intended)

NCEI_MD

8.1.1. If World Data Center or Other, specify:

8.1.2. If To Be Determined, Unable to Archive or No Archiving Intended, explain:

8.2. Data storage facility prior to being sent to an archive facility (if any):

Alaska Fisheries Science Center - Seattle, WA

8.3. Approximate delay between data collection and submission to an archive facility:

Unknown

8.4. How will the data be protected from accidental or malicious modification or deletion prior to receipt by the archive?

Discuss data back-up, disaster recovery/contingency planning, and off-site data storage relevant to the data collection

IT Security and Contingency Plan for the system establishes procedures and applies to the functions, operations, and resources necessary to recover and restore data as hosted in the Western Regional Support Center in Seattle, Washington, following a disruption.

9. Additional Line Office or Staff Office Questions

Line and Staff Offices may extend this template by inserting additional questions in this section.