

*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: Primiparous and multiparous Tanner crab egg extrusion, embryo development and hatching

**1.2. Summary description of the data:**

This study compares timing of egg extrusion, embryo development, timing and duration of eclosion, and incubation periods of Kodiak, Alaska primiparous and multiparous Tanner crabs (*Chionoecetes bairdi*) reared in identical conditions to determine if and how these variables differ between reproductive states. Female reproductive state (primiparous or multiparous) and dates of egg extrusion were recorded, eggs were sampled monthly to determine egg stage and area, and larvae were collected daily during eclosion to determine timing and duration of eclosion.

**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:**

2003-01 to 2004-06

**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:

- Female Tanner crabs were captured in the field November 2002 through May 2003

and brought to the Kodiak Fisheries Research Center (KFRC) laboratory. Females were grouped as either primiparous or multiparous. Females that comprised the multiparous group were collected by commercial crab pots fished in Chiniak Bay, Kodiak, Alaska (57°43.25' N, 152°17.5' W), November, 2002 and delivered to the laboratory. The females collected were ovigerous, hatched their larvae in the laboratory and extruded a new clutch of eggs. Once a female began stripping her pleopods after eclosion, she was paired with a mature male; therefore, the female could either mate or use stored sperm to fertilize a new clutch. It is not known how many previous clutches females in the multiparous group brooded, but they were multiparous because they were collected ovigerous and then extruded a new clutch of eggs in the laboratory. Primiparous females were collected by divers while still pubescent and nearing their terminal molt (as indicated by being in a grasping pair) in Womens Bay, Kodiak, Alaska (57°43.6' N, 152°32.0' W, Fig. 2). Divers searched for pubescent females in mating pairs from November 2002 through May 2003; however, females used in this study were collected between December 2002 and February 2003, except for one female collected in April 2003. The grasping pairs were isolated in underwater cages that were monitored regularly until a female underwent her terminal molt, mated and extruded eggs after which time she was brought into the laboratory. Occasionally, a female underwent her terminal molt in a cage without a male present. When this occurred, the soft shelled female was brought into the laboratory and mated with a male recently collected from the field.

- All females were tagged with an oval 6.5 mm × 20 mm individually numbered plastic Floy tag attached with a cable tie to a fourth walking leg. Data recorded were female reproductive state (primiparous or multiparous), molting and mating dates, dates of egg extrusion and carapace width measured as the greatest straight-line distance across the carapace excluding spines. Mean extrusion dates were calculated as the average date of extrusion within the primiparous and multiparous groups.
- For the duration of the study, crabs were held in a single flow-through tank 0.46 m × 0.46 m × 1.8 m at the KFRC seawater laboratory. Seawater intakes are located at 15 and 26 m depths in Trident Basin approximately 30 m from the laboratory. Both primiparous and multiparous females were held in the same tank to ensure that all crabs in the experiment were exposed to identical conditions. Sand-filtered seawater was used and the tank was chilled from May 2003 through November 2003 to ensure appropriate temperatures. An Onset StowAway TidBiT data logger recorded water temperature in the tank. Crabs were fed ad libitum twice weekly a diet of fish and squid.
- Twenty-four primiparous females and 21 multiparous females were used in this experiment; however, crabs died over the course of the experiment, leaving 14 primiparous and 9 multiparous females at the end. Crabs were sampled on the 15th (± 2) day of every month beginning in January 2003 and ending April 2004, when eclosion occurred. Upon visual examination, all crabs and their eggs appeared healthy when they were sampled. Females died over the course of the experiment, but there was no obvious reason to eliminate the eggs of these females (collected

before death) from the study since the eggs appeared to be healthy and developing normally when collected.

- Monthly sampling was a two-step process in which embryo developmental stages were determined and digital images of eggs were captured. A randomly sampled egg clump was removed from each female with forceps and approximately 20 eggs were immersed in Bouin's solution for 5 minutes to facilitate observation of the external morphology of the embryos (Moriyasu and Lantaigne, 1998). After embryos reached the eyed stage, they were not placed in Bouin's solution. Embryo developmental stages were determined using a compound microscope at a total magnification of 50x and developmental stages followed those of Moriyasu and Lantaigne (1998) for snow crabs, *Chionoecetes opilio* (Fabricius, 1788). Additionally, digital images of 10 fresh eggs from each female were taken with a digital camera attached to a compound microscope at a total magnification of 50x; only fresh eggs were used because preserved eggs swell (Moriyasu and Lantaigne, 1998). Image analysis software (Image Pro Plus Version 4.1 for Windows, Media Cybernetics, Inc. 8484 Georgia Avenue, Suite 200, Silver Spring, Maryland 20910) was used to measure egg area rather than diameter to reduce measurement bias due to the imperfect sphericity of the eggs.

- At the end of April 2004, females were placed in individual containers with flow-through seawater at ambient temperature, and nets (101.5 mm with 350 micron mesh) were placed on the seawater outflow to retain all the larvae. Newly hatched larvae were collected daily from each female as in Stevens and Swiney (2007); the amount of larvae released was determined by measuring volume. Larvae from each net were transferred to a graduated cylinder and seawater was added; after the larvae settled, the volume (mL) of larvae in the cylinder was recorded. For the purposes of analysis in this study, eclosion began when 0.1 mL of larvae were collected and ended when females began stripping their pleopods clean which coincided with the last of the larvae hatching. Mean hatch date was the weighted average of larval output over time calculated by multiplying the daily volume of hatched larvae by day-of-the-year, summing the products over time and dividing by the total volume of larvae released. Incubation period was the number of days between when a female extruded eggs and the last day of hatching.

**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 were error checked and outliers 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:**

<https://www.fisheries.noaa.gov/inport/item/25614>

**6.4. Process for producing and maintaining metadata**

*(describe or provide URL of description):*

Metadata produced and maintained in accordance with the NOAA Data Documentation Procedural Directive:

[https://nosc.noaa.gov/EDMC/DAARWG/docs/EDMC\\_PD-Data\\_Documentation\\_v1.pdf](https://nosc.noaa.gov/EDMC/DAARWG/docs/EDMC_PD-Data_Documentation_v1.pdf)

**7. Data Access**

*NAO 212-15 states that access to environmental data may only be restricted when distribution is explicitly limited by law, regulation, policy (such as those applicable to personally identifiable information or protected critical infrastructure information or proprietary trade information) or by security requirements. The EDMC Data Access Procedural Directive contains specific guidance, recommends the use of open-standard, interoperable, non-proprietary web services, provides information about resources and tools to enable data access, and includes a Waiver to be submitted to justify any approach other than full, unrestricted public access.*

**7.1. Do these data comply with the Data Access directive?**

No

**7.1.1. If the data are not to be made available to the public at all, or with limitations, has a Waiver (Appendix A of Data Access directive) been filed?**

No

**7.1.2. If there are limitations to public data access, describe how data are protected from unauthorized access or disclosure:**

Contact Point Of Contact for data request form.

**7.2. Name of organization of facility providing data access:**

**7.2.1. If data hosting service is needed, please indicate:**

yes

**7.2.2. URL of data access service, if known:**

[https://console.cloud.google.com/storage/browser/nmfs\\_odp\\_afsc/RACE/SAP/Swiney%3B%20Primipa](https://console.cloud.google.com/storage/browser/nmfs_odp_afsc/RACE/SAP/Swiney%3B%20Primipa)

**7.3. Data access methods or services offered:**

unknown

**7.4. Approximate delay between data collection and dissemination:**

unknown

**7.4.1. If delay is longer than latency of automated processing, indicate under what authority data access is delayed:**

No delay

**8. Data Preservation and Protection**

*The NOAA Procedure for Scientific Records Appraisal and Archive Approval describes how to 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.*