

ATTACHMENT D EVOSTC Annual Program Status Summary Form (Revised 11.21.19)

*Please refer to the Reporting Policy for all reporting due dates and requirements.

1. Program Number: *See, Reporting Policy at II. D. 1.*

20120113

2. Program Title: *See, Reporting Policy at II. D. 2.*

Data Management Program

3. Program Lead Name(s): *See, Reporting Policy at II. D. 3.*

Dr. Carol Janzen

4. Time Period Covered by the Summary: *See, Reporting Policy at II. D. 4.*

February 1, 2020 – January 31, 2021

5. Date of Summary: *See, Reporting Policy at II. D. 5.*

March 1, 2021

6. Program Website: *See, Reporting Policy at II. D. 6.*

AOOS Gulf of Alaska Data Portal: <http://portal.aos.org/gulf-of-alaska.php>

7. Overview of Work Performed during the Reporting Period: *See, Reporting Policy at II. D. 7.*

The goal of the Data Management (DM) Program is to provide critical data management support to *Exxon Valdez* Oil Spill Trustee Council's Gulf Watch Alaska (GWA) and Herring Research and Monitoring (HRM) program investigators in order to assist study teams in efficiently meeting their objectives and ensuring data collected or consolidated through the effort is organized, documented, and available for their use and for future use by the larger scientific community. To meet this goal, the data management program leveraged the extensive cyberinfrastructure and data management capacities of both the Alaska Ocean Observing System (AOOS) and its technical partner, Axiom Data Science, utilizing the existing, collaborative relationships with program PIs to ensure continuity in the data collected across efforts. The goals of the program are achieved with the following objectives:

Objective 1. Initiate data management services and oversight for GWA and HRM Program data-related activities.

Objective 2. Continue to standardize and provide access to datasets from the first five-year GWA and HRM efforts for continuity and integration.

Objective 3. Facilitate, monitor, and evaluate regular data submissions and metadata generation in the Research Workspace.

Objective 4. Provide, maintain, and modify technical infrastructure for user groups to access information produced or processed by the GWA and HRM Programs.

Objective 5. Publish and promote data collected by the GWA and HRM Programs, making it available for research, management, and general audiences.

Objective 6. Execute management, user feedback, and internal and external communications related to GWA and HRM data and data products.

Objective 7. Verify data and metadata completeness and final transfer at the term completion.

In 2020, six new EVOSTC Non-Program projects were proposed to be added to this Data Management Program. Two were approved for inclusion in the Data Management FY20 Workplan by the EVOSTC on 11 October 2019 (approved projects shown in bold):

- **Pigeon Guillemot restoration project (2012-2019 legacy data 5-years new data; FY2020-2024); Approved for funding on October 11, 2019 by the EVOSTC**
- Status and trends of Marbled Murrelet, Kittlitz's Murrelet, and Pigeon Guillemot in a changing northern Gulf of Alaska (FY2020-2024); On Hold for further consideration
- Status and recovery of Kittlitz's Murrelet and Marbled Murrelet within the EVOS affected area (FY2020-2024); On Hold for further consideration
- Nesting ecology of the Marbled Murrelet in the Kodiak Archipelago (FY2020-2023); On Hold for further consideration
- Nearshore fish community assemblages associated with different river-estuary settings (FY2020-2022); Withdrawn
- **Gulf Watch Ocean Acidification Monitoring (FY2020-2022); Approved for funding on October 11, 2019 by the EVOSTC**

The final FY20 Data Management Workplan and revised budget include the addition of data management support for these two new Non-Program projects - the Pigeon Guillemot restoration project and the Gulf Watch Ocean Acidification Monitoring project, resulting in a new objective (Objective 8) in FY20 Workplan:

Objective 8. Perform original Data Management Program Objectives 1-7 for newly-funded EVOSTC Non-Program projects. In FY20, this includes the Pigeon Guillemot restoration project and the Gulf Watch Ocean Acidification Monitoring project.

The FY20 Workplan Objectives include 1,3,4,5,6, and 8. Objective 2 is now complete for the existing projects serviced during FY17-20. The DM Program prioritizes data preservation and accessibility to the scientific and resource management communities by supporting data submission and organization, metadata generation, and data transfer among study teams. The data curation process is designed to meet the requirements of the EVOSTC, including the transfer of GWA and HRM Program data to the EVOSTC storage resources at the completion of this funding term. To this end, Axiom data analysts and domain experts review metadata and data structure formats produced from GWA and HRM data collection activities and advise study team members in best practices for short-term and long-term data formats. Axiom software engineers regularly enhance existing web-based tools to improve the discoverability of GWA and HRM project-level data. One such improvement is now the ability to search and filter EVOSTC-funded datasets by space, time, parameter and taxonomy, both privately within the project and externally after the data have been shared with the public.

The following activities sorted by Objective were accomplished during the FY20 period.

OBJECTIVE 1. *Initiate data management services and oversight for EVOSTC GWA and HRM Program data-related activities.*

Beginning in FY20, data management support expanded to include two Non-Program projects. During Q1-Q2, the data scoping meetings were initiated with project PIs. The data inventory of expected and submitted data were updated to include Non-Program projects. Additionally, data management plans for the new projects were completed in collaboration with project PIs during Q3, and new projects were created in the Research Workspace (and shared with the EVOSTC Research Workspace organization) as a central data storage, documentation, and sharing platform. The use of the Research Workspace for the two FY20 Non-Program projects is being managed similar to GWA and HRM projects.

The DM team maintained communications with PIs following the one-on-one data scoping meetings held with individual PIs from both the GWA and the HRM programs during virtual PI meetings held on May

13 and July 22, 2020, and during both the annual fall PI meeting 2020 and January PI meeting prior to AMSS 2021.

OBJECTIVE 3. *Facilitate, monitor, and evaluate regular data submissions and metadata generation in the Workspace.*

Throughout the FY20 period, oversight of timely and organized data, metadata documentation, and other program documents to the Research Workspace occurred using a combination of data management personnel and technical infrastructure. Program-specific metadata templates for the PIs (developed in 2017) include boilerplate information for fields that must contain program-wide metadata (e.g. access constraints, use constraints, and programmatic contact information) and have proven successful at making metadata creation less cumbersome for PIs while providing time saving steps and standardizing the metadata across programs. [Metadata templates](#) are in the Research Workspace.

A regularly updated data submission inventory tracks data and metadata submissions to the Workspace against data that were expected to be generated through the GWA and HRM program terms. The DM Program lead shares the most current data submission inventory status with the GWA and HRM Program leads throughout the year. Data submission updates were provided to the program leads on January 13, February 25, and March 19 (as part of the EVOSTC Annual Reporting), July 24, 2020 (ahead of the August 2020 NOAA Semi-annual report and the FY21 EVOSTC Workplan deadlines), and on November 13, 2020 (ahead of the fall GWA and HRM PI meetings). Data submission status report-outs were also provided to the GWA and HRM project PI's during the summer PI meeting on July 22, 2020, and again on November 17-19, 2020 during the fall PI meetings.

Following data submissions in FY20, Axiom audited the organization of the data by ensuring the types of data submitted were appropriate for long-term preservation and consistent conventions were used for naming files. Additionally, Axiom conducted quality control checks for accuracy and consistency of the metadata. These audits informed a list of issues in the data submissions and associated metadata, which required remedy before the dataset was considered final and ready for publication.

An updated data submission inventory (as of February 17, 2021) of expected and submitted data to the Research Workspace and Gulf of Alaska (GOA) Data Portal can be found in Table 2 (Section 9.d). Figure 2 contains summary statistics of data submissions as February 17, 2021 (Section 9.d). In most cases, projects are meeting or exceeding expectations for data sharing. Some projects are typically delayed annually due to late-in-year sampling schedules, longer sample processing times, and data processing delays, but are compliant and being updated when ready using the Research Workspace. No delays in data processing or submissions occurred for 2019 data due to the COVID-19 health pandemic; however, delays in data processing and field season cancellation are expected for the 2020 field season.

OBJECTIVE 4. *Provide, maintain, and modify technical infrastructure to ensure access to information produced or processed by the GWA and HRM Programs.*

Scheduled and as-necessary maintenance was made to the data management system infrastructure, including the Research Workspace and the GOA Data Portal, to ensure continuous operation and reliability for the GWA and HRM Program PIs.

The Research Workspace continues to serve as an efficient internal file sharing and storage tool, where all data files (including the contextual information, raw data, data not currently public, etc.) are housed, and from which these data files can be made public. The Workspace contains individual PI user and group profiles in which data are submitted and shared among project collaborators. Software engineers at Axiom continue to provide support for the Research Workspace, which includes resolving bugs and

implementing new functionality in response to user feedback. A Java framework update was implemented that affects most of the underlying code in the Research Workspace, which will improve Axiom’s ability to maintain the system and be responsive in delivering future updates.

The DM team continues to improve tools available on the GOA Data Portal, which is a regional subset of AOOS’s statewide Ocean Data Explorer Portal. The updated GOA Portal gives users access to new features as well as a revamped design to get more out of the AOOS data services. The portal offers sophisticated charting abilities, including comparisons between data sources, binning by time, and plotting climatologies and anomalies. During this performance period, additional GWA datasets were ingested and visualized in the GOA Data Portal to provide interactive data exploration.

During January 2021, the University of Alaska, Fairbanks (UAF) glider named “Shackleton” was outfitted with an acoustic receiver to “listen” for acoustically tagged herring in Prince William Sound. Tiral glider surveys, with assistance from HRM field efforts, were conducted in Prince William Sound as part of an AOOS supported program to use gliders for ecosystem assessments for fisheries management (AOOS EAFM Glider Project). The HRM Program, in collaboration with AOOS and UAF, is interested in the feasibility of using such gliders to detect tagged herring, and assisted with these pilot surveys. Real-time data from the glider was streamed to the GOA Data Portal for public access and data download. Future glider surveys will stream data to the Ocean Data Explorer and GOA Data Portals near-real time. The glider data can be found in the data portal at [this link](#) (Figure 1).

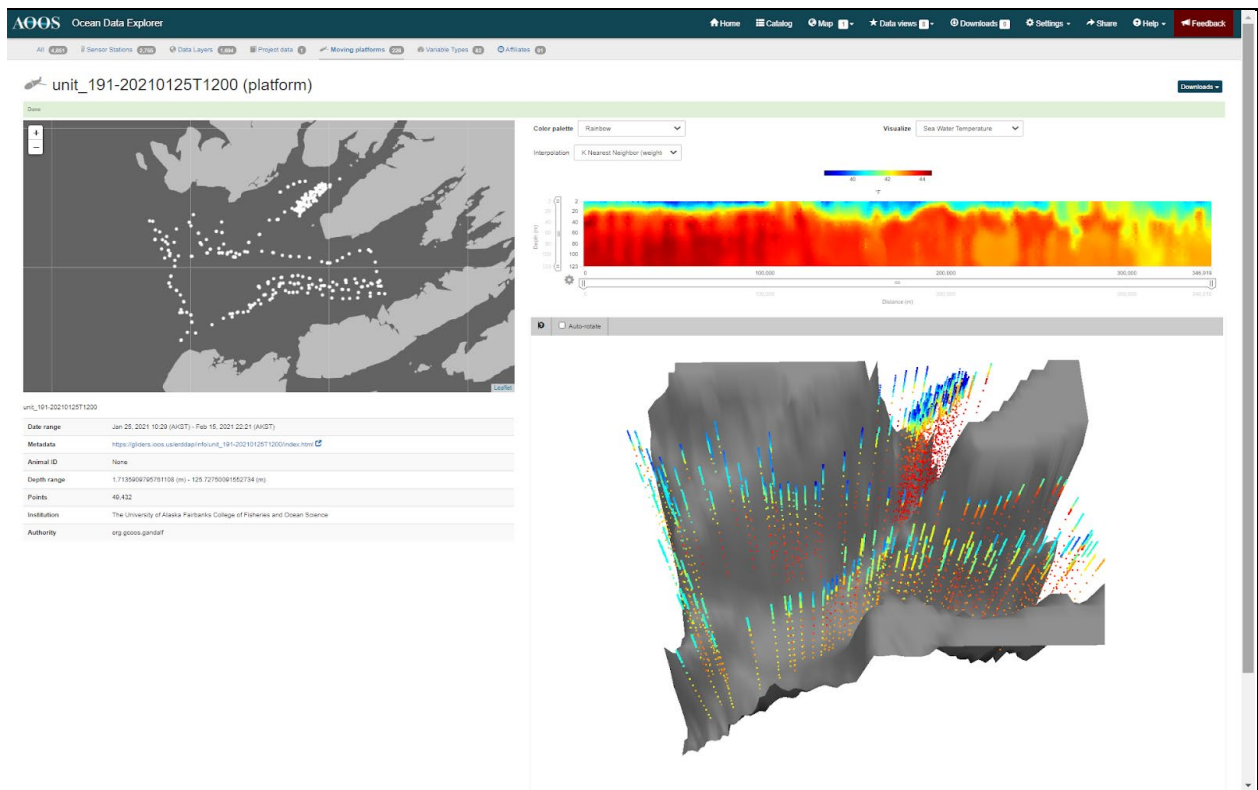


Figure 1. Screenshot of underwater glider (“Shackleton”) real time data feed to the AOOS Data Portal system, including the Ocean Data Explorer and the GOA Data Portals.

OBJECTIVE 5. *Publish and promote data collected by the HRM and GWA Programs, making it available for research, management, and general audiences.*

Once PIs have written metadata and the metadata have been reviewed and approved by DM team members from Axiom, the Research Workspace is used as a gateway to publish data and associated metadata to the GOA Data Portal. Through this portal, the data are publicly-available for discovery by researchers, managers, and general audiences. As data providers, PIs have ultimate control over managing which data and supplemental documents are made publicly available. Within each project in the Research Workspace, PIs elect to publish data folders to the portal using a simple, clearly marked checkbox.

Throughout the performance period, the AOOS web catalog service was maintained to provide continuous public data and metadata access. Final data collections are offset by one-year. Data publication to the GOA Data Portal for FY18 was completed in February 2020. FY19 data are currently being processed and prepared for publication in the winter/spring of 2021.

The DM team participated in the EVOSTC Science Workshop on February 25-26, 2020, presenting on the DM Program and data status for all the GWA and HRM projects. Axiom staff hosted hand-on work stations with Public Advisory Committee (PAC) and Science Panel (SP) members to review and interact with the GOA Data Portal and the Research Workspace.

Throughout the performance period, the AOOS web catalog service was maintained to provide continuous public data and metadata access. Further, seven GWA project datasets were archived to DataONE for long-term preservation during FY20.

- Kuletz, K., Cushing, D., and Labunski, E. (2020). Marine bird survey observation and density data from Northern Gulf of Alaska LTER cruises, 2018. Dataset. <http://doi.org/10.24431/rw1k45w>
- Danielson, S. (2020). Temperature and salinity time series measurements from the GAK1 Mooring in the Northern Gulf of Alaska near Seward, AK, 2017-2019, NGA LTER. Dataset. <http://doi.org/10.24431/rw1k44x>
- Danielson, S., Dobbins, E. (2020). Water columns properties measured by CTD sensors during seasonal cruises in the Gulf of Alaska for the Northern Gulf of Alaska LTER project, 2018 and 2019. Dataset. <http://doi.org/10.24431/rw1k459>
- Strom, S. (2020). Primary production estimates from research cruises for the Northern Gulf of Alaska LTER site, 2018. Dataset. <http://doi.org/10.24431/rw1k45b>
- Strom, S., Fredrickson, K. (2020). Chlorophyll-a concentrations from research cruises for the Northern Gulf of Alaska (NGA) LTER site, 2018. Dataset. <http://doi.org/10.24431/rw1k45f>
- Strom, S., Fredrickson, K. (2020). Dissolved organic carbon concentrations from NGA-LTER research cruises in the Gulf of Alaska, 2018-present. Dataset. <http://doi.org/10.24431/rw1k45c>
- Strom, S., Fredrickson, K. (2020). Particulate carbon concentrations from research cruises for the Northern Gulf of Alaska (NGA) LTER site, 2018-present. Dataset. <http://doi.org/10.24431/rw1k45d>

OBJECTIVE 6. *Execute management, user feedback, and internal and external communications related to GWA and HRM data and data products*

The DM team maintains an inventory of data expected to be generated by EVOSTC GWA and HRM sampling efforts that describes the datasets, indicates the investigator responsible for the data, and notes the status of data and metadata for each project. This inventory allows the DM team to track projects that might have delays and can help remediate any issues directly with the program and project PIs as they arise. DM lead (Janzen) sends quarterly updates of the data submission inventory table to GWA and HRM Program leads for this purpose. The quarterly updates are simply to inform the program leads how

PIs are performing with data submissions, and are not punitive. Data submission updates were provided to the GWA and HRM Program leads on January 13, February 25, and March 19 (as part of the EVOSTC Annual Reporting), July 24, 2020 (ahead of the August 2020 NOAA Semi-annual report and the FY21 EVOSTC Workplan deadlines), and on November 13, 2020 (ahead of the fall GWA and HRM PI meetings). Data submission status report-outs were also provided to the GWA and HRM project PI's during the summer PI meeting on July 22, 2020, and again on November 17-19, 2020 during the fall PI meetings. The DM Program lead did not schedule data submission status calls in the 3rd or 4th Quarter ahead of the December 1 data submission deadline, as none were required. The DM Program lead met in-person with the GWA and HRM leads during the EVOSTC Science Workshop on February 25-26, 2020, after which all meetings became virtual (online) due to COVID-19.

The DM lead prepared a DM update for the EVOSTC Science Director to give to the Science Panel on September 14-15, 2020, and prepared a DM presentation given by Mandy Lindeberg (GWA Program lead) for the PAC and EVOSTC annual meetings held on October 13-14, 2020, respectively. The presentation provided an update on the 2017-20 data management progress for both GWA and HRM Programs and shared a data submission inventory update through October 2020. The DM lead was present during the EVOSTC meeting for Q&A. (The most recent and cumulative data submission inventory table through the end of FY20 is provided Table 2 in Section 9.d.).

To ensure the efficacy of such a system, regular and structured feedback is required from data management system users, i.e., the program leads and PIs. Given the maturity of how data are ingested and curated, the DM team gathered feedback through group discussion, one-on-one meetings and email correspondence and will continue to do so throughout the course of this program. In addition to gathering feedback throughout the year, the DM team maintained regular contact with PIs over email to provide notification of approaching deadlines for data or metadata submission, ask questions related to these submissions, and/or respond to PIs' questions about data management procedures and responsibilities.

OBJECTIVE 8. *Perform original Data Management Program Objectives 1-7 for newly-funded EVOSTC Non-Program projects.*

A project structure was established in the Research Workspace for the two new Non-Program projects. Similar to the GWA and HRM Programs, the Research Workspace is being used as a central data sharing, storage and documentation platform for these project's data and metadata. Project researchers will load both historic datasets and current data products to the Research Workspace for access by project collaborators, the EVOSTC, and ultimately the public (at the end of the project term). Axiom Data Science hired a new data librarian to provide additional data management support to these projects. Adrienne Canino joined Axiom Data Science in February 2020. Adrienne has a Master's Degree in Library and Information Science from Syracuse University. Her career has included leading cross-departmental initiatives in data literacy, research data services, and digital archiving work. Due to the COVID-19 pandemic, there have been delays in scheduling data management kick-off meetings for both Non-Program projects. In absence of in-person communications, Axiom relied on virtual meetings to establish the project data management process with researchers from both projects during Q3-4.

8. Coordination and Collaboration: <i>See, Reporting Policy at II. D. 8.</i>

a) With Long-term Monitoring and Research Programs

1. Within the Program

As the Data Management (DM) Program, we provide all levels of data management support for all the projects under the GWA and HRM Programs funded by the EVOSTC.

The DM Program uses the Alaska Ocean Observing System (AOOS) data management technical infrastructure, which is collaborative by design, using the Research Workspace to give open access across the GWA and HRM Program teams for file sharing and transparency of data progress. Backing this infrastructure is a DM team that is well-coordinated with GWA and HRM Program leads and science teams for timely data submissions and accurate metadata authoring. Successful coordination and collaboration guarantee data and products are available to general science and resource management communities. Through this collaborative work structure, the DM team is positioned to respond to the needs of the GWA and HRM Programs by providing the required technical support and implementing requested modifications to the Research Workspace, improving accessibility and utility to scientists.

During FY20, the data managers maintained regular communications with project PIs, program management, and EVOSTC staff through participation at the annual PI meetings, programmatic virtual/conference calls, and through regular program-wide email correspondence. At the meetings, AOOS and the data management team communicated to all PIs about data submission progress and procedures through presentations and group discussions. Using emails, project PIs were notified of program data inventories and the submission timelines to help encourage compliance.

2. Across Programs

a) Gulf Watch Alaska

Overall coordination of the data management effort is provided by Dr. Janzen (AOOS), the DM Program lead, who is responsible for ensuring coordination between this program and the GWA Program. AOOS time dedicated to the EVOSTC Programs is focused on data management project oversight, annual workplan development and reporting. Coordination across the program projects occurs through email, phone communications, and regularly scheduled in-person meetings. Axiom representatives from the DM team attended the annual PI meeting in November 2020, and Dr. Janzen (AOOS) and Stacey Buckelew (Axiom) joined the regularly scheduled Program Management team virtual/phone meetings to help ensure a seamless response to data management and decision-support needs.

Regular communications are maintained between the Axiom data managers and the GWA Program lead as well as the individual project PIs within the GWA Program. These communications are a continuation of effective working relationships developed with the science teams in the first five-year effort. Regular communications with individual project PIs are through annual one-on-one meetings, and regular email and/or phone conversations. One-on-one virtual meetings were made available to each project and program PI in November 2020 to track project and data submittal progress and provide support for data organization, formatting, and metadata authoring. The data managers also use email to inform individual PIs of their data submission progress using the data submission inventory table. The DM team can then respond to PIs inquiries and/or requests for additional assistance. Depending on the location of individual PIs, this assistance is provided through the most practical communication method (e.g., email, phone correspondence, or scheduled meetings).

b) Herring Research and Monitoring

Overall coordination of the data management effort is provided by Dr. Janzen (AOOS), the DM Program lead, who is responsible for ensuring coordination between this program and the HRM Program. AOOS time dedicated to the EVOSTC Programs is focused on data management project oversight, annual workplan development and reporting. Coordination across the program projects occurs through email, phone communications, and regularly scheduled in-person meetings. Axiom representatives from the DM team attended the annual PI meeting in November 2020, and Dr. Janzen (AOOS) and Stacey Buckelew (Axiom) join the regularly scheduled Program Management team

virtual/phone meetings to help ensure a seamless response to data management and decision-support needs.

Regular communications are maintained between the Axiom data managers and the HRM Program lead as well as the individual project PIs within the HRM Program. These communications are a continuation of effective working relationships developed with the science teams in the first five-year effort. Regular communications with individual project PIs are through annual one-on-one meetings, and regular email and/or phone conversations. One-on-one virtual meetings were made available for each project and program PI in November 2020 to track project and data submittal progress and provide support for data organization, formatting, and metadata authoring. The data managers also use email to inform individual PIs of their data submission progress using the data submission inventory table. The DM team can then respond to PIs inquiries and/or requests for additional assistance. Depending on the location of individual PIs, this assistance is provided through the most practical communication method (e.g., email, phone correspondence, or scheduled meetings).

c) Data Management

This report covers the FY20 Data Management Program for EVOSTC funded GWA and HRM.

d) Lingering Oil

Beginning in FY19, the sole lingering oil project (19170115 Whitehead) was moved to the HRM program and continues to be supported through the Research Workspace.

B. With Individual Projects (not within the EVOSTC-funded Program, but funded by EVOSTC).

The FY20 DM Program provided data management support for the EVOSTC-funded GWA and HRM Programs, which is fully described in this report (described in section 8.A.2.(a) and (b)), and supported two new Non-Program projects added to the DM Program in FY20:

- Pigeon Guillemot restoration project (2012-2019 legacy data 5-years new data; FY2020-2024); Approved for funding on October 11, 2019 by the EVOSTC
- Gulf Watch Ocean Acidification Monitoring (FY2020-2022); Approved for funding on October 11, 2019 by the EVOSTC.

C. With Trustee or Management Agencies

AOOS brings a significant level of leveraged resources, infrastructure, regional data management projects and partnerships to this EVOSTC-funded DM Program. For one, AOOS is a certified Regional Association (RA) under the authority of the Integrated Coastal and Ocean Observation System Act of 2009 (ICOOS Act). The ICOOS Act directs NOAA to certify and integrate RAs into the U.S. Integrated Ocean Observing System (IOOS). Such integration formally establishes the role of the RA within the U.S. IOOS and ensures that the data collected and distributed by the RA are managed according to the best practices, as identified by NOAA. To become certified, applicants must demonstrate they meet the requirements established by the U.S. IOOS's Regulations to Certify and Integrate Regional Information Coordination Entities.

As the AOOS data team, Axiom works to provide data management, visualization and preservation services, including providing access to and facilitating the use of the Research Workspace. The team offers similar services to a number of other programs that receive funding from or are administered or overseen by representatives from the EVOSTC and associated agencies. EVOSTC agencies include: 1) *National Oceanographic and Atmospheric Administration (NOAA)*; 2) *US Department of Agriculture/US Forest Service*; and 3) *the US Department of the Interior (Bureau of Ocean Energy Management, US Fish and Wildlife Service, National Park Service and the US Geological Survey)*. *Three state agencies*

are also represented by the EVOSTC including: 1) Alaska Department of Fish and Game (ADF&G); 2) Alaska Department of Environmental Conservation; and 3) Alaska Department of Law.

The EVOSTC-funded DM Program benefits trustee or management agencies on many levels. For one, all data and final data products produced by the GWA and HRM Programs are (or will be) made accessible and publicly available through the AOOS hosted GOA Data Portal and the DataONE Member Node, both of which are no-cost services that can be accessed by any member of the public. Other programmatic and statewide datasets are also accessible via the AOOS data system of portals, and can be accessed by the same end-user accessing the GWA and HRM datasets. DataONE provides access to data across multiple member repositories, supporting enhanced search and discovery of earth and environmental data. The DM Program also supports two new Non-Program projects described in Section 8.B. Other associated programs affiliated with EVOSTC and affiliated management agencies are given below (Table 1).

Table 1. Associated EVOS Trustee Council Programs and agencies for which AOOS and Axiom coordinate data management as well as other services.

Group Agency	Level and Type of Coordination and How the Project Assisted EVOSTC Trust or Agency Work	Representative
<p>Regional Coastal Ocean Observing System: Alaska Ocean Observing System (AOOS).</p> <p>Integrated Ocean Observing System (IOOS), National Ocean and Atmospheric Administration (NOAA)</p>	<p>Develop the integration of ocean and coastal observing capabilities, in collaboration with Federal and non-Federal partners, to maximize access to data and generation of information products, inform decision making, and promote economic, environmental, and social benefits</p> <p>Through the IOOS grant, AOOS provides partial support on a few GWA supported projects (e.g, Seward Line environmental drivers ship time support). AOOS has invested a significant portion of their IOOS support to host the regions most sophisticated data acquisition system, which hosts the GWA Website and the GOA Data Portal as subsystem. This data system is highly leveraged by other large research and ecosystem based programs (listed here). AOOS supports all the related EVOSTC and management agency projects by providing the backbone and base support to keep this data system operational, and also by providing data management services to all these groups and their projects.</p>	<p>Carl Gouldman, Director, IOOS</p> <p>Dave Easter, Division Chief, IOOS</p>
<p>Integrated Ocean Observing System (IOOS), National Ocean and Atmospheric Administration (NOAA)</p>	<p>Develop community standards for sensor observations; make regional data nationally accessible.</p> <p>This supports all the data management activities for GWA and HRM as well as other projects listed here, and provides data in the correct formats to meet national and international data archival requirements and standards.</p>	<p>Derrick Snowden, Data Management and Coordination (DMAC) System Architect, IOOS</p>

<p>Alaska Ocean Observing System (AOOS) Data Management, (AOOS grants support funded through NOAA's IOOS Program)</p>	<p>Provide data management; cyberinfrastructure support. Works directly with member and non-member organizations to ingest and document new datasets as well as historical data assets that might not be available elsewhere or in a consistent useful format; data visualizations and product development</p> <p>Support data collection, data sharing and acquisition for the entire region of Alaska, including the GOA. These data are provided to the public and all interested users free of charge via the AOOS data system. The AOOS Data System leverages their own data portal system to support other programs listed in this table.</p>	<p>Molly McCammon, Executive Director, AOOS</p>
<p>Central and Northern California Ocean Observing System (CenCOOS) Data Management, NOAA</p>	<p>Provide data management; cyberinfrastructure. Works directly with member and non-member organizations to ingest and document new datasets; visualizations</p> <p>Tools developed for CenCOOS can be leveraged for other projects listed on this table, as well as ingestion capability of new data types. Activities undertaken for CenCOOS can be leveraged across the national IOOS data system and other regions using the AOOS data system platform.</p>	<p>Henry Ruhl, Executive Director, CenCOOS</p>
<p>Southeast Coastal Ocean Observing Regional Association (SeCOORA) Data Management, NOAA</p>	<p>Provide data management; cyberinfrastructure. Works directly with member and non-member organizations to ingest and document new datasets; visualizations</p> <p>Tools developed for SeCOORA can be leveraged for other projects listed on this table. as well as ingestion capability of new data types. Activities undertaken for SeCOORA can be leveraged across the national IOOS data system and other regions using the AOOS data system platform.</p>	<p>Debra Hernandez, Executive Director, SeCOORA</p>
<p>Beluga Sightings Database Visualization, NOAA-National Marine Fisheries Service (NMFS)</p>	<p>Produces visualizations, guidance on building community standards for submitting marine mammal stranding observations.</p> <p>AOOS hosts The Cook Inlet Beluga Whale Ecosystem Portal.</p>	<p>Mandy Migura, Marine Mammal Specialist, NOAA (2018)</p> <p>(Current position, Broad Conservation LLC)</p>
<p>Russian-American Long-term Census of the Arctic (RUSALCA), NOAA</p>	<p>Provides access to Workspace; guidance on data and metadata management; archiving; visualizations in support of mission.</p> <p>RUSALCA was an international consortium effort to coordinate biological, geological, chemical and physical oceanographic sampling strategies to be pursued in the Bering Strait and the Chukchi Sea. The cruise objectives for the United States partner were to</p>	<p>Kathy Crane, Program Manager Arctic Research Program, U.S. Mission Coordinator for RUSALCA, NOAA (2015)</p>

	support the U.S. interagency Study of Environmental Arctic Change (SEARCH) Program, the NOAA Ocean Exploration Program and the Arctic Ocean Census of Marine Life (ArcOcCoML).	(Current position, ArcticLynx LLC, and Univ. of Hawaii SOEST)
Building coupled storm surge and wave operational forecasting capacity for Western Alaska, NOAA-IOOS Program - OTT (Ocean Technology Transition)	Provide data management and outreach support for transitional project that is developing a multi-scale, multi-process integrally coupled wave-surge forecast modeling system, refined and validated with a focus on transition to operations while resolving key issues that presently limit forecast reliability in western Alaska. The system will be designed to fit into the NOAA ESTOFS Pacific Storm Surge Guidance System framework. The specific goal is to enable significant advancement of NOAA's high-fidelity operational surge and wave models, ADCIRC and WAVEWATCH III, within the northern Pacific Ocean, Bering, Chukchi and Arctic Seas.	Joannes Westerink, Civil and Environmental Engineering and Earth Sciences, University of Notre Dame, IN
Core Program, North Pacific Research Board (NPRB)	Provide guidance given on data and metadata best practices; access to and facilitation of the Workspace; organization and archiving of historical projects; Now the data management team for NPRB. NPRB funds are administered through the EVOSTC. Data management from the NPRB Programs is being managed by Axiom Data Science, and is leveraging the Research Workspace and the data system developed by AOOS to make data public and available for sharing, and standardized for long-term, national archival.	Matthew Baker, Science Director, NPRB Jo-Ann Mellish, Program Manager, NPRB
Arctic Integrated Ecological Research Program (AIERP), NPRB	Fully facilitate data and metadata management working directly with PIs, from initial sharing within the group to long-term archiving at NPRB	Danielle Dickson, Program Manager, NPRB
Arctic Marine Biological Observation Network (AMBON), Bureau of Ocean Management (BOEM)	Coordinate all data management activities for AMBON using the Workspace	Katrin Iken, Lead Principal Investigator, Professor, College of Fisheries and Ocean Sciences, University of Alaska, Fairbanks
Arctic Ecosystem Integrated Synthesis (Arctic EIS), BOEM	Provide guidance to program management on data and metadata best practices; access to and facilitation of the Workspace; organization and archiving of completed projects	Franz Mueter, Lead Principal Investigator, Associate Professor, College of Fisheries and Ocean Sciences, University of Alaska, Fairbanks
Marine Arctic Ecosystem Study (MARES), BOEM	Develop data management plans for each sampling effort; access to and facilitation of the Workspace;	Francis Wiese, Lead Project Manager, Stantec

	acquire and ingest into AOOS Arctic Data Portal environmental datasets identified by program PIs as important context for MARES program; facilitate conversion of data into long-term preservation-ready formats; submission of datasets to long-term archives	
Central Beaufort Sea Wave and Hydrodynamic Modeling Study (BOEM)	Provide data management and outreach support for a joint data synthesis and modeling effort between the University of Alaska, Fairbanks (UAF), the University of Alaska Anchorage (UAA), and the U.S. Geological Survey (USGS) Coastal & Marine Geology Program-Pacific Coastal & Marine Science Center (PCMSC). The Alaska Ocean Observing System (AOOS) and the AOOS data management contractor Axiom Data Science are providing data management services and outreach for this project. Through field observations, historical and new, the goal is to adequately document wave and sediment transport conditions within Stefansson Sound/Foggy Island observationally and provide input data assimilation and validation support for project modeling activities.	Jeremy Kasper, Lead Principal Investigator, University of Alaska, Institute of Northern Engineering
Alaska Data Integration working group (ADIwg), U.S. Geological Survey (USGS)	<p>Generate community standards for project data; advise on translation from ADIwg metadata content profile into suite of ISO geospatial metadata of standards</p> <p>The mission of the Arctic LCC is to identify and provide information needed to conserve natural and cultural resources in the face of landscape scale stressors, focusing on climate change, through a multidisciplinary program that supports coordinated actions among management agencies, conservation organizations, communities, and other stakeholders. The conservation goals of the Arctic LCC are: to provide information on, and predict the effects of climate- driven changes and other landscape stressors; determine how climate driven changes affect subsistence users; and provide improved data and information access to managers and policy makers.</p>	Josh Bradley, Data Manager, Arctic Landscape Conservation Cooperative (LLC), US Fish and Wildlife Service

9. Information and Data Transfer: *See, Reporting Policy at II. D. 9.*

a) Publications produced during the reporting period

Not applicable

b) Dates and locations of any conference or workshop presentations where EVOSTC-funded work was presented

None to report in FY20, other than the EVOSTC Science Workshop already discussed.

c) Data and/or information products developed during the reporting period, if applicable

None to report in FY20

d) Data sets and associated metadata that have been uploaded to the Program's Data Portal

The status (as of February 17, 2021) of the 2017, 2018 and 2019 data and provisional 2020 data submissions from GWA and HRM Programs currently available through the Research Workspace and the GOA Data Portal is shown in Table 2. Non-Program projects are included at the bottom of this table starting in FY20. Annual summary statistics for data submissions for 2017-2020 (as of February 17, 2021) are provided in Figure 2.

Table 2. Data Submission Inventory of the 2017-2019 data and the provisional 2020 data from GWA and HRMs Programs available through the Research Workspace and the Gulf of Alaska Data Portal as of February 17, 2021. Non-Program projects are included at the bottom of the table starting in FY20. The numeric codes "2": Obligation to publish data has been met; "1" : Obligation to share data to Workspace has been met; "0.5" : Obligation to share data has been partially met; "0" : No data from this season was shared for the project; "n/a" : The project was not funded during this season; "P": process study with data not expected until end of project. Note that 2020 data are not required to be published until 31 January 2022.

Program	Project	Dataset	2017	2018	2019	2020	Comments
GWA	Environmental drivers: Continuous Plankton Recorders	Plankton data	2	2	2	0	2020 processing delayed
		Temperature data	2	2	2	0	
GWA	Environmental drivers: Gulf of Alaska Mooring (GAK1)	CTD data	2	2	2	n/a	2020: no CTD samples for 2020
		Mooring data	2	2	2	0	
GWA	Environmental Drivers: Oceanographic Conditions in Prince William Sound	Chlorophyll data	2	2	2	0	2020: project delay due to state mandates
		CTD data	2	2	2	2	
		Zooplankton data	2	2	2	0	
GWA	Environmental Drivers: Oceanographic monitoring in Cook Inlet and Kachemak Bay	CTD data	2	2	2	2	
		KBNER meteorological data	2	2	2	0	
		KBNER nutrient data	2	2	2	0	

Program	Project	Dataset	2017	2018	2019	2020	Comments
		KBNERR water quality data	2	2	2	0	
		Zooplankton data	2	2	2	n/a	
GWA	Environmental Drivers: Seward Line	Chlorophyll data	2	2	1	0	Data set to be archived in April 2021 as per LTER requirement
		CTD data	2	2	2	1	
		Nutrient data	2	2	1	0.5	Data set to be archived in April 2021 as per LTER requirement
		Seabird data (Kuletz)	2	2	1	1	Data set to be archived in April 2021 as per LTER requirement
		Zooplankton data	2	2	1	0	2019 zooplankton data still being processed
GWA	Nearshore: Ecological trends in Kachemak Bay	Rocky intertidal community data	2	2	2	0	2020: May cancelled; partial June collection
		Mussel data	2	2	2	0	
		Rocky intertidal data	2	2	2	0	
		Substrate data	2	2	2	0	
		Seagrass data	2	2	2	0	
GWA	Nearshore: Intertidal Systems in Gulf of Alaska	Oystercatcher diet & nest density data	2	2	2	n/a	2020: summer field season cancelled
		Eelgrass data	2	n/a	n/a	n/a	This dataset was not collected after 2017.
		Invertebrate and algae data	2	2	2	n/a	
		Marine birds and mammals data	2	2	2	n/a	
		Water quality data	2	2	2	n/a	

Program	Project	Dataset	2017	2018	2019	2020	Comments
		Sea otter survey data	2	2	2	n/a	
		Sea otter scat data	2	2	2	n/a	
GWA	Pelagic: Fall and Winter seabird abundance	Seabird survey data	2	2	2	n/a	2020: survey scheduled for Oct 2021
GWA	Pelagic: Forage fish distribution, abundance, and body condition	Forage fish count data	2	2	2	n/a	2020: summer field season cancelled
		Forage fish morph data	2	2	2	n/a	2020: summer field season cancelled
		Seabird diet data	2	2	2	n/a	2020: summer field season cancelled
		Hydroacoustic data	2	2	2	n/a	2020: summer field season cancelled
		Water chemistry (CTD & nutrients) data	2	2	2	n/a	2020: summer field season cancelled
		Zooplankton data	2	2	2	n/a	2020: summer field season cancelled
GWA	Pelagic: Humpback whale predation on herring	Fluke id catalog	2	2	2	0	2020: field season delayed
		Energetic/stable isotope data	2	2	2	0	
		Whale survey data	2	2	2	0	
		Porpoise survey data	2	2	2	0	
		CTD data	2	2	2	0	
GWA	Pelagic: Long-term killer whale monitoring	Acoustic catalog	2	2	2	n/a	2020: field collection cancelled due to travel restriction
		Photo catalog	2	2	2	n/a	
		Biopsy data- genetic	n/a	n/a	n/a	n/a	
		Biopsy data-	n/a	n/a	n/a	n/a	

Program	Project	Dataset	2017	2018	2019	2020	Comments
		contaminants					
		Prey genetic sampling	1	1	1	n/a	Data in the Workspace but is not ready for publication.
GWA	Pelagic: Prince William Sound Marine Birds	Summer bird survey data	n/a	2	n/a	n/a	2020: surveys postponed to 2021
Herring	ADFG Surveys: surveys and age, sex, and size collection	aerial biomass observation & routes data	2	2	2	0	
		aerial survey marine bird & mammal observations data	2	2	2	0	
		ASL data	2	2	2	0	
Herring	Adult acoustic biomass surveys	processed acoustic data	2	2	2	1	Due to large volume of acoustic files, they are stored in RW and made available to researchers upon request (they are too large for download via web browser)
		biomass summary	2	2	2	1	
Herring	Aerial surveys of juvenile herring	raw survey data	2	2	2	2	
		age 1 index	2	2	2	2	
Herring	Herring disease program	prevalence summary	2	2	2	0	
		raw lab data	1	1	1	0	P
Herring	Modeling and stock assessment of herring population dynamics in Prince William Sound	age composition	2	2	2	0	
		model codebase	2	2	2	0	
		output data	2	2	2	0	
Herring	Studies of reproductive maturity	lab analysis (weight, length, gonad) database	1	1	n/a	n/a	P; project discontinued 2019
		collection database	1	1	n/a	n/a	P; project discontinued 2019
		scales database	1	1	n/a	n/a	P; project discontinued 2019
		histology database	1	1	n/a	n/a	P; project discontinued 2019
Herring	Annual herring migration cycle	collected fish data	1	1	1	1	P
Herring	Lingering Oil: Immunological compromise of fish	genetic & lab-based experiments	0	0	0	0	P

Program	Project	Dataset	2017	2018	2019	2020	Comments
	NON-PROGRAM PROJECTS						
Non-P	Pigeon Guillemot Restoration	Seabird data	n/a	n/a	n/a	0	New Non-Program project starting in 2020
Non-P	Gulf Watch Ocean Acidification	Water quality data (OA parameters)	n/a	n/a	n/a	0	New Non-Program project starting in 2020

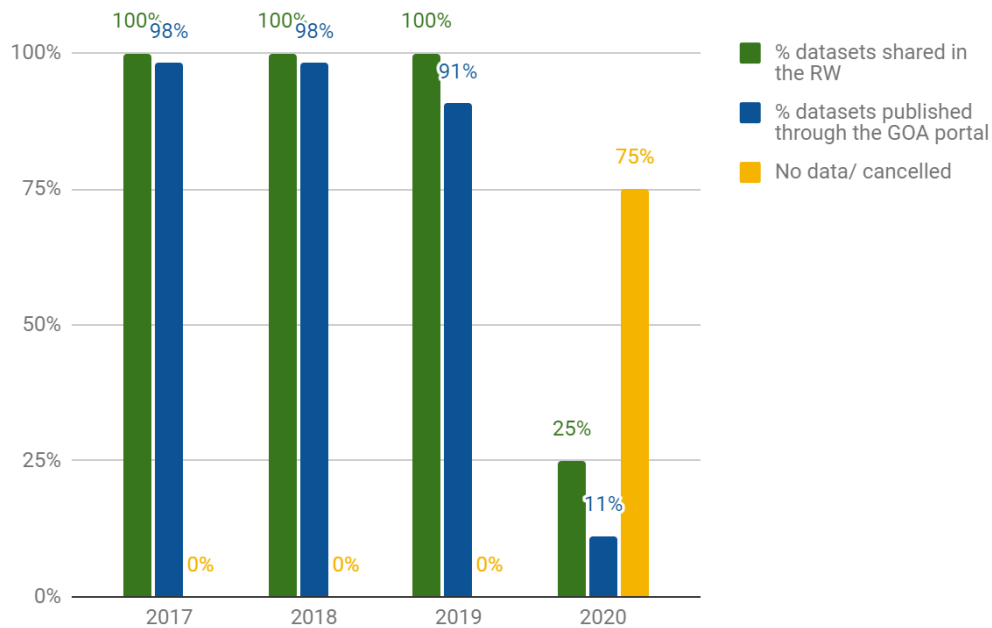


Figure 2. Summary statistics of data submissions by February 17, 2021 (17 projects composing 55 datasets). PIs have until December 1, 2020 to submit 2019 data to the Research Workspace, and December 1, 2021 to submit 2020 data. Some datasets are routinely delayed due to longer sample processing times, data processing times, and late-in-the-year or delayed sampling schedules. Datasets that were not collected in a given year are not included in the metrics below. ‘Process’ datasets (those with a ‘P’ in the ‘Comments’ column of Table 2), do not have an obligation to publish annually to the Gulf of Alaska Data Portal and are also excluded from the percentages. FY20 Non-Program data submissions are not included in this summary graphic, as the first deliverables for those projects are not until December 2021.

10. Response to EVOSTC Review, Recommendations and Comments: See, Reporting Policy at II. D. 10.

Response to Science Panel Comments in 2019 on the FY20 Data Management Program Workplan – September 23, 2019

Comment:

The Science Panel appreciates the data management program services that this program provides. The Panel agrees with the Science Coordinator on the value of having all data from TC-funded science projects managed by this program and would like more information regarding the costs.

Response:

The data management team appreciates the EVOSTC and Science Panel taking the time to share their positive impressions of this proposal, and for commending our efforts to improve the data management services provided in the previous five-year effort. Information related to the costs is provided in the below response to the Science Coordinator comments.

Response to the Science Coordinator Comments in 2019 on the FY120 Data Management Program Workplan – September 23, 2019

Comment:

The Data Management Team continues to provide valuable support to the programs for seamless uploading and sharing of data with PIs and making data publicly available. I appreciate the well-organized proposal, including details of all FY19 program accomplishments. The program is requesting an additional \$71.7K for data management services for up to six non-program projects for FY20. The program is already managing data for the Gulf Watch Alaska and Herring Research and Monitoring programs. Data Management oversight of all TC-funded projects will ensure that data from all TC-funded science projects are consistently maintained, archived and made publicly available through AOOS and DataOne data portals. This will also help facilitate integration between all TC-funded program and non-program projects. However, I have requested the PI provide more detail as to why the cost is slightly higher per project for up to six non-program projects of FY20.

Response:

In the 20120113 Data Management Program workplan under Table 3, the Data Management team provided the following cost estimates data management services for up to six non-program projects.

Yearly Activities & Cost Estimate: (Note: This cost estimate assumes all projects are funded. Data management costs broken out by project are below in a separate table. Cost estimates do not include 9% GA)

Year	Activities	Cost Estimate
Year 1	<ul style="list-style-type: none">● Consolidate legacy data into RW and begin documentation● Create new RW projects & onboard PIs● Complete project data management plans with PIs● Establish metadata templates● Organize projects for data storage in Year 1	\$63,000
Year 2	<ul style="list-style-type: none">● Archive legacy PIGU data● Submission of Year 1 data & metadata● Technical support for using RW● Data standards & metadata QC● Publish final Year 1 data to portal● Annual PI meeting for progress checks	\$48,000
Year 3	<ul style="list-style-type: none">● Submission of Year 2 data & metadata● Data standards & metadata QC● Annual PI meeting for progress checks	\$46,000

	<ul style="list-style-type: none"> ● Publish final Year 2 data to portal ● Archive project data (Nearshore fish project) 	
Year 4	<ul style="list-style-type: none"> ● Submission of Year 3 data & metadata ● Data standards & metadata QC ● Annual PI meeting for progress checks ● Publish final Year 3 data to portal ● Archive project data (Nesting ecology project, Status and recovery of murrelett in K Bay- surveys) 	\$47,000
Year 5	<ul style="list-style-type: none"> ● Submission of Year 4-5 data & metadata ● Metadata QC ● Publish final Year 4-5 data to portal ● Annual PI meeting for progress checks ● Archive project data (PIGU, Seabird status and trends projects, Status and recovery of murrelett in K Bay- habitat) 	\$42,000
Total		\$246,000

These costs are further broken out by project year in Table 4 as follows:

Project	Year 1	Year 2	Year 3	Year 4	Year 5
<i>19110853 Pigeon Guillemot Restoration project (\$285k)</i>	\$18,000	\$12,000	\$8,000	\$8,000	\$18,000
<i>Status and trends of marbled murrelet, Kittlitz's murrelet, and pigeon guillemot in a changing northern Gulf of Alaska (\$836K)</i>	\$9,000	\$8,000	\$8,000	\$8,000	\$18,000
<i>Nesting ecology of the marbled murrelet in the Kodiak Archipelago (\$1.1mil)</i>	\$12,000	\$9,000	\$8,000	\$19,000	n/a

<i>Nearshore fish community assemblages associated with different river-estuary settings (\$191K)</i>	\$9,000	\$8,000	\$11,000	n/a	n/a
<i>Status and recovery of Kittlitz's murrelet and marbled murrelet within the EVOS affected area (\$686k)</i>	\$12,000	\$8,000	\$8,000	\$12,000	\$6,000
<i>Gulf Watch Ocean Acidification Monitoring (\$63k)</i>	\$3,000	\$3,000	\$3,000	n/a	n/a
<i>Total</i>	\$63,000	\$48,000	\$46,000	\$47,000	\$42,000

The data management services cost under the Axiom Data Science FY17-21 subaward for the Gulf Watch Alaska and Herring Research and Monitoring Programs is approximately \$182,000 per year (\$910,000 total across the 5 years). In the FY17-21 work plan for restoration, research and monitoring project draft by the EVOSTC in FY19, there are seven projects generating data in the HRM program and 11 in the GWA program for 18 total projects. On average, the data management service cost per project is \$10,111 per year (see table below).

For the expanded data management services, the cost estimate provided in the FY20 workplan for the Axiom Data Science subcontract was \$63,000 (not including the 9% GA) for up to six non-program projects. On average, the data management service cost per project is \$10,500 per year. It is expected that the cost for data management services will be higher in the first year for some projects due to the additional time required to onboard funded PIs to the Research Workspace, entrain them to the data management procedures consistently used across EVOSTC programs, and to familiarize them with metadata tool and best practices for authoring preservation-quality documentation. Further, some projects, namely the 19110853 Pigeon Guillemot Restoration project, propose methods that require curation of five or more prior years of data in order to update population statuses and trends. At the project onset, some historical data salvage effort will be required to consolidate, organize, standardize, format, and author standards-compliant metadata. The level of work for curating historical data requires effort beyond the routine annual data management workflow.

Over the entire lifecycle of the proposal non-program projects, the total estimated cost for services would be \$246,000. This represents an average per project cost of \$9,849, which is on par with the GWA and HRM program project cost of \$10,111 per year. The actual data management service cost for the non-

program projects will vary based on the actual number that are recommended for funding by the Science Panel. The cost breakout can be seen in the below table.

The cost breakout for data management services for the EVOSTC program and non-program projects on an average cost per project basis.

Name	Total Proposed Cost	Total Number of Funded Projects	Total Project Years*	Average Project Cost
HRM & GWA Programs	\$910,000	18	90	\$10,111
Non-program projects	\$246,000	6	25	\$9,840

*The GWA & HRM projects are anticipated to each be funded over a 5-year duration, as per the FY17-21 workplans. Therefore, the total project years is 18 project * 5 years = 90 project years. The duration of the non-program projects varied across projects from 3 to 5 years. 3 projects proposed a 5-year duration (15), 1 project proposed a 4-year duration (4), and 2 projects proposed a 3-year duration (6), which equals 25 project years.

Though there is additional 5% overhead costs for these new projects not included in the above breakdowns, the PI for the Data Management Program is not requesting additional hours with the addition of any of the proposed non-program projects, further reducing the average per project expense for all projects.

11. Budget: <i>See, Reporting Policy at II. D. 11.</i>

The Data Management program did not require any funding adjustments to the authorized level of funding for FY20. All budget items are either on target or are reporting as underspent as of January 31, 2020.

1. Cumulative totals for Years 1 through 4 represent only the posted expenditures as of the end of Year 4, January 31, 2021. However, not all year-end expenditures for a given year are posted by the program year-end date (January 31), due to program activities that occur during the last months of the program year, and subsequent invoicing to the project that occurs after the years' end.
2. Personnel actual cumulative budget is on track. This line covers program lead Janzen's salary (and fringe and indirect) on the project.
3. Travel expenses are on track.
4. Contractual actual cumulative budget is also on track. In FY20, additional funds were added to the original DM Program budget to service two new Non-Program Projects. The original amount proposed costs for FY20 was \$218,000 and was revised to \$242,000 in FY20 (including the 9% GA). An additional Non-Program project was added in FY21 bringing the total to three Non-Program projects for FY21 in addition to the GWA and HRM projects, and the added costs are also reflected on this revised budget table under FY21, with a revised cost of \$253,600 (including the 9% GA).
5. As of January 31, 2021, the actual cumulative amounts for Contracts are on schedule and reported underspent due to the fact the contracted program services Axiom and the Alaska Sealife Center (ASLC) provides that occur during the last quarter (Q4) of the program year (including the last month of the program year - January) are subsequently invoiced after the program year ends on January 31.

The invoice for the Axiom contractual invoice for the remaining balance of FY20 funding was submitted in February 2021 and is being processed. Attached is the year to date actual expenditures as of January 31, 2021.

**EXXON VALDEZ OIL SPILL TRUSTEE COUNCIL
PROGRAM BUDGET PROPOSAL AND REPORTING FORM**

Budget Category:	Proposed FY 17	Proposed FY 18	Proposed FY 19	Proposed FY 20	Proposed FY 21	TOTAL PROPOSED	ACTUAL CUMULATIVE
Personnel	\$8.1	\$8.4	\$8.6	\$8.9	\$9.2	\$43.1	\$34.6
Travel	\$0.0	\$0.6	\$0.6	\$0.0	\$0.6	\$1.8	\$1.4
Contractual	\$191.9	\$191.1	\$190.8	\$213.2	\$222.9	\$1,009.9	\$721.2
Commodities	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
Equipment	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
Indirect Costs (<i>will vary by proposer</i>)	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
SUBTOTAL	\$200.0	\$200.0	\$200.0	\$222.1	\$232.7	\$1,054.8	\$757.2
General Administration (9% of subtotal)	\$18.0	\$18.0	\$18.0	\$20.0	\$20.9	\$94.9	N/A
PROJECT TOTAL	\$218.0	\$218.0	\$218.0	\$242.0	\$253.6	\$1,149.7	N/A
Other Resources (Cost Share Funds)	\$2.7	\$2.8	\$2.9	\$3.0	\$3.0	\$14.4	N/A
<p>COMMENTS: No funding adjustments to the FY20 authorized level of funding are needed. All projects are on schedule or show as underspent, due largely to the quarterly lag in billing cycles and reporting. e.g., This report out does not include FY20 Q4 contractual expenses for Axiom. Axiom performs a significant portion of their work in the fall and winter months (Q4). All projects are within current expected spending limits and on track within budget at this time. AOOS did not seek additional funding in FY20 with the addition of two Non-Program projects, but Axiom did request an increase to service these two new projects in FY20 as shown, which represents a change from the original proposal budget. AOOS is not seeking additional salary for Janzen for the three Non-Program projects added to the Data Management Program in FY21. However, Axiom is requesting increased funding for data management services of these three Non-Program projects included in the FY21 workplan as shown, which represents a change from the original proposal budget. Other Resources represent in-kind salary match for Carol Janzen from AOOS.</p> <p>This summary page provides an five-year overview of proposed funding and actual cumulative spending. The column titled 'Actual Cumulative' must be</p>							