

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

1. Program Number: See, Reporting Policy at III (C) (1).

15120114-B

2. Project Title: See, Reporting Policy at III (C) (2).

Long term monitoring: Program management component – Administration, Science Review Panel and PI Meeting Logistics, and Outreach and Community Involvement

3. Principal Investigator(s) Names: See, Reporting Policy at III (C) (3).

Molly McCammon, Alaska Ocean Observing System (AOOS) & Katrina Hoffman, Prince William Sound Science Center (PWSSC)

4. Time Period Covered by the Report: See, Reporting Policy at III (C) (4).

February 1, 2015 – January 31, 2016

5. Date of Report: See, Reporting Policy at III (C) (5).

March 1, 2016

6. Project Website (if applicable): See, Reporting Policy at III (C) (6).

www.gulfwatchalaska.org

7. Summary of Work Performed: See, Reporting Policy at III (C) (7).

Program Coordination and Logistics

PWSSC issued and managed sub-award contracts for all non-Trustee Agency Long-term Monitoring (LTM) Year 4 projects. We remunerated sub-awardees based on demonstrated expenses, tracked spending, and initiated our annual audit in December 2015. We continued the contract with Marilyn Sigman (UAF) to support outreach programming and coordination. We provided outreach funding as directed by McCammon and the outreach steering committee. Semi-annual program reports (to NOAA) and the Year 5 *Exxon Valdez* Oil Spill Trustee Council (EVOSTC) work plans that were submitted on time. We held two quarterly Principal Investigator (PI) meetings by phone; the other two were held in person at AMSS and at the annual PI meeting in Anchorage from November 16-18, 2015. PWSSC coordinated logistics and processed expenses for both of the aforementioned in-person meetings. The fall meeting was coordinated in collaboration with the EVOSTC-funded Herring Research and Monitoring program to enable cross-component and cross-program collaboration. We submitted all financial and project reports to NOAA and the EVOSTC as required.

The LTM Program Management Team, consisting of Molly McCammon, Kris Holderied, Katrina Hoffman and Tammy Neher, actively managed the program throughout the reporting year. The PMT met more than once per month, usually via teleconference. Towards the end of the project year and in anticipation of a new management team structure in the proposed FY17-21 proposal, we began including Mandy Lindeberg in PMT meetings. Katrina Hoffman and Molly McCammon presented program updates to the EVOS Trustee Council on November 12, 2015. As needed, PMT teleconferences

included members of the LTM Science Coordinating Committee (Hopcroft; Weingartner; Ballachey; Lindeberg); data management team (Bochenek); and Science Review Team (Bachelder; Holland-Bartels; Klinger; Rice).

Outreach and Community Involvement

A GWA exhibit was installed at the Alaska SeaLife Center, using a design that will allow it to be made available as a traveling exhibit to other locations. The program's online presence was expanded through multiple modes. A virtual field trip featuring the science of each of the project components and the work of individual project scientists for middle school students is now online with instruction for middle school students. This virtual field trip features the four GWA program components, the results and the work and careers of a project scientist for each component, and lesson plans related to the scientific content and concepts. Additionally, films about the response of community members to the spill and stewardship of their local environment. PWSSC conducted three interviews with GWA project scientists, which will be produced and air as *Field Notes* programs in May 2016. GWA Project PIs provided multiple presentations to stakeholder, community, and school groups. The outreach activities of the PIs are compiled in the Information and Data Transfer section below.

Deliverable/Milestone	Status
Subaward contract management & monitoring of spending	Contracts issued to six organizations for nine subaward projects. All spending monitored.
Timely submission of narrative and financial reports	All reporting deadlines to EVOSTC and NOAA met in program year.
Conduct annual audit	Conducted at PWSSC in December 2015
Attend annual PAC meeting	Program management team members attended PAC meeting in September 2015
Administration of travel expenses for annual PI meeting	Fulfilled by PWSSC
Administration of expenses for activities directed by the Outreach and Community Involvement committee	Fulfilled by PWSSC
Conduct annual PI meeting	Coordinated and held in November 2015
Attend AMSS	Robust attendance by GWA PIs & PI meeting held
Implement citizen science	Evaluating potential

monitoring program	
Develop data visualizations for website	Website updates ongoing and visualizations and data accessible through Gulf of Alaska Data Portal.
Conduct Outreach & community involvement activities	Ongoing

8. Coordination/Collaboration: See, Reporting Policy at III (C) (8).

Item 8A) The involvement of the outreach entities active in the GWA region as well as the Program Management Team and Herring Research and Monitoring (HRM) administrative lead ensures that these activities are well coordinated between and among the projects of the GWA Program and the HRM Program.

Item 8B) We do not directly coordinate outreach efforts with other EVOSTC funded projects, but we remain observant for possible synergies. Administration and logistics communicates with the EVOSTC funded HRM program about proposal and reporting requirements.

Item 8C) Trust agencies (NOAA, USFS and DOI) have staff who participate in outreach and community involvement and ensure that GWA activities are coordinated with other outreach activities conducted by their agencies. PWSSC regularly reports to and coordinates with Shawn Carey at NOAA in Juneau for grants management purposes.

9. Information and Data Transfer: See, Reporting Policy at III (C) (9).

- The science news magazine that PWSSC publishes annually, called *Delta Sound Connections*, again had a two-page Gulf Watch Alaska spread in the 2015-16 edition.
- When QA/QC has been completed, GWA data has been pushed to the Gulf of Alaska Data Portal at <http://data.aos.org/maps/search/gulf-of-alaska.php>
- Program information and media continues to be available on the Internet at <http://www.gulfwatchalaska.org/>.

Outreach to public and K-12 audiences:

Bodkin, James. 2015. Gulf Watch Alaska and the nearshore food web. PWSSC, Cordova, AK. November, 2015. 14 participants.

Campbell, Robert. 2015. State of the Sound: Oceanography, surface layer dynamics, and plankton blooms in Prince William Sound. Presentations to the Prince William Sound Science Center (PWSSC) lecture series in Cordova (20 participants), PWSSC pub talk series in Cordova (30 participants), and Prince William Sound Regional Citizen's Advisory Council's Science Night event, Anchorage (70 participants).

Kloecker, Kim. Participant in AMSS Ocean Week- Scientist in the Classroom program. Participated in a 90-minute class at an Anchorage School District school in Eagle River. Made a presentation about major categories of human impacts on the ocean (pollution, marine debris, MPAs, etc.) highlighting areas of GWA monitoring and participated in a teaching activity about the effect of marine debris on wildlife. 80 sixth-graders participated.

Lindeberg, Mandy. Seaweeds, fishes, monitoring and more! PWSSC and Cordova Night Lecture Series. December 7, 2015. 18 participants.

Presentations at Scientific Conferences

PICES, 2015, Seattle, WA

Batten, Sonia. The effects of the anomalous warming on lower trophic levels in the NE Pacific, 2015. Annual PICES Meeting. <https://pices.int/publications/presentations/PICES-2015/2015-S2/S2-1200-Batten.pdf>.

2nd Annual Pacific Anomalies Workshop, January 2016, Seattle, WA

Batten, Sonia. The effects of the anomalous warming on lower trophic levels in the NE Pacific, from Continuous Plankton Recorder sampling. Poster presentation.

Campbell, Rob. Effects of the 2013-2015 warm anomaly in Prince William Sound. Oral presentation.

Danielson, Seth, Tom Weingartner and Russell Hopcroft. 1970 to 2015 thermal and haline anomalies on the Northern Gulf of Alaska Continental Shelf. Oral presentation

Kris Holderied. Oceanographic and ecosystem response to the 2013-2015 Pacific warm anomaly in Kachemak Bay, Alaska. Oral presentation

Alaska Marine Science Symposium, January 2016, Anchorage, AK

Poster presentation abstracts available at

http://www.nprb.org/assets/amss/images/uploads/files/2016_AMSS_Poster_Sessions.pdf

Oral presentation abstracts available at

http://www.nprb.org/assets/amss/images/uploads/files/2016_AMSS_Speaker_Presentation_Abstracts.pdf

Batten, Sonia. The effects of the anomalous warming on lower trophic levels in the Gulf of Alaska from Continuous Plankton Recorder sampling. Oral presentation.

Bishop, Mary Anne, Kathy Kuletz, Jessica Stocking, and Anne Schaefer. Spatial and temporal patterns of winter marine bird distribution in Prince William Sound, AK. Poster presentation.

Campbell, Robert. Surface layer and bloom dynamics in Prince William Sound. Oral presentation.

Coletti, Heather, Dan Esler, Brenda Ballachey, James Bodkin, Thomas Dean, George Esslinger, Katrin Iken, Kimberly Kloecker, Brenda Konar, Mandy Lindeberg, Daniel Monson and Benjamin Weitzman. Updates of key metrics from long-term monitoring of nearshore marine ecosystems in the Gulf of Alaska: Detecting change and understanding cause. Poster presentation.

Coletti, Heather, Grant Hilderbrand, Jim Pfeiffenberger, Carissa Turner, Brenda Ballachey, Liz Bowen, Kaiti Chritz, Katrina Counihan, Joy Erlerbach, Dan Esler, Tuula Hollman, Dave Gustine, Buck Mangipane, Benjamin Weitzman, Charlie Robbins and Tammy Wilson. Changing Tides – The convergence of intertidal invertebrates, bears and people. Poster presentation.

Danielson, Seth, Sonia Batten, Robert Campbell, Angie Doroff, Kris Holderied, Russ Hopcroft, Rick

Thoman and Tom Weingartner Gulf of Alaska 2015 Anomalous Conditions Workshop: Oceanography. Large Whale Unusual Mortality Event workshop, AMSS, January 24.

Doroff, AM, R.Campbell, C. McKinstry. 2016. Zooplankton Assemblages in Lower Cook Inlet and Kachemak Bay, 2012-2014. Poster presentation.

Fugate, Corey, Mandy Lindeberg, Mark Carls and Jacek Maselko, Recent survey confirms persistence of lingering oil 26 years after the *Exxon Valdez* Oil Spill. Poster presentation.

Hoem Neher, Tammy, Molly McCammon, Katrina Hoffman, Kris Holderied, Brenda Ballachey, Russell Hopcroft, Mandy Lindeberg and Tom Weingartner. Gulf Watch Alaska in hot water! Ecological patterns in the Northern Gulf of Alaska under the Pacific 2014-2015 warm anomaly. Oral presentation.

Kuletz, Kathy. Seabird die-off events, 2014-2016: A summary of events. Large Whale Unusual Mortality Event workshop, AMSS, January 24.

Lindeberg, Mandy, Mayumi Arimitsu, Mary Anne Bishop, Dan Cushing, Robb Kaler, Kathy Kuletz, Craig Matkin, John Moran, John Piatt, and Jan Straley. Response of top predators and prey to changes in the marine environment: Gulf of Alaska pelagic monitoring program. Poster presentation.

Moran, John and Jan Straley. Missing herring: Water temperature, relocation, or dinner? Poster presentation.

Olsen, Dan, Craig Matkin, and Russell Andrews. Shifting hot spots: Seasonal and pod-specific habitat use by resident killer whales in the Northern Gulf of Alaska. Poster presentation.

Pister, Benjamin, Brenda Ballachey, Heather Coletti, Thomas Dean, Katrin Iken, Brenda Konar, Mandy Lindeberg and Benjamin Weitzman. Multi-agency efforts to monitor Sea Star Wasting Disease in Alaska: Results and recommendations for future efforts. Poster presentation.

Jan Straley and John Moran. Bird killers of Prince William Sound: A foraging strategy used by humpback whales to detect schooling fish. Poster presentation.

Taylor, Audrey, Mary Anne Bishop, Kristine Sowl, Anne Schaefer, and Luis Verissimo. Black turnstone: Evidence for a population decline or shifting migration patterns? Poster presentation.

Sztukowski, Lisa, Suresh Sethi and Tuula Hollmen. Mesoscale ecosystem processes in the Gulf of Alaska. Poster presentation.

Traiger, Sarah, Brenda Konar, Angela Doroff, and L. McCaslin. 2016. Sea otters versus sea stars as major clam predators: Evidence from foraging pits and shell litter. Poster presentation. Best student poster award from the North Pacific Research Board.

Other Presentations

Esler, Dan. Oil and wildlife don't mix: 25 years of lessons from the *Exxon Valdez* Oil Spill. Seminar at University of Quebec Rimouski, November 2015.

Esler, Dan, Brenda Ballachey, Craig Matkin, Dan Cushing, Robb Kaler, James Bodkin, Dave Monson, George Esslinger, and Kimberly Kloecker. 2016. Long-term data provide perspective on ecosystem recovery following the *Exxon Valdez* Oil Spill. Oil Spill and Ecosystems Conference, Tampa, February 2016.

Marcotte, E. and M. Lytle. 2015. Sea otter diet in Kachemak Bay 2015. In fulfillment of thesis research credits. University of Alaska, Kachemak Bay campus. (Results of research conducted by student interns mentored by Angela Doroff, Aug-Dec 2016)

Neher, Tammy, Molly McCammon, Katrina Hoffman, Kris Holderied, Brenda Ballachey, Russell Hopcroft, Mandy Lindeberg and Tom Weingartner. Gulf Watch Alaska in hot water! Ecological patterns in the Northern Gulf of Alaska under the Pacific 2014-2015 warm anomaly. Gulf of Mexico Research Initiative Oil Spills and Ecosystems conference, Tampa, FL. Oral presentation.

Neher, Tammy, Molly McCammon, Katrina Hoffman, Kris Holderied, Brenda Ballachey, Russell Hopcroft, Mandy Lindeberg and Tom Weingartner. Gulf Watch Alaska: Monitoring Ecological Patterns in the Northern Gulf of Alaska. Coastal Estuarine Research Federation conference, Portland, OR. Oral presentation.

Neher, Tammy, Molly McCammon, Katrina Hoffman, Kris Holderied, Brenda Ballachey, Russell Hopcroft, Mandy Lindeberg and Tom Weingartner. Gulf Watch Alaska: Monitoring Ecological Patterns in the Northern Gulf of Alaska. National American Fisheries Society Conference, Portland, OR. Poster presentation.

Peer Reviewed Publications and Reports:

Ballachey, B.E., J.L. Bodkin, K.A. Kloecker, T.A. Dean, and H.A. Coletti. 2015. Monitoring for Evaluation of Recovery and Restoration of Injured Nearshore Resources. *Exxon Valdez Oil Spill Restoration Project Final Report* (Restoration Project 10100750), U.S. Geological Survey, Alaska Science Center, Anchorage, Alaska.

Ballachey, B.E. and J.L. Bodkin. 2015. Challenges to sea otter recovery and conservation. Chapter 4 in Larson SE, Bodkin JL, VanBlaricom GR., Eds. *Sea Otter Conservation*. Academic Press, Boston. Pp 63-96.

Ballachey, B., J. Bodkin, H. Coletti, T. Dean, D. Esler, G. Esslinger, K. Iken, K. Kloecker, B. Konar, M. Lindeberg, D. Monson, M. Shephard, and B. Weitzman. 2015. Variability within nearshore ecosystems of the Gulf of Alaska. In: *Quantifying temporal and spatial variability across the northern Gulf of Alaska to understand mechanisms of change*. Gulf Watch Alaska Synthesis Report to the Exxon Valdez Oil Spill Trustee Council, Projects 14120114 and 14120120.

Bodkin, J.L. 2015. Historic and Contemporary Status of Sea Otters in the North Pacific. Chapter 3 in Larson SE, Bodkin JL, VanBlaricom GR, Eds. *Sea Otter Conservation*. Academic Press, Boston. Pp 43-61.

Bowen, L., A. K. Miles, B. Ballachey, S. Waters and J. Bodkin. Gene transcript profiling in sea otters post-*Exxon Valdez* oil spill: A tool for marine ecosystem health assessment. In review, *J. Mar. Sci. Eng.*

Coletti, H.A. and T.L. Wilson. 2015. Nearshore marine bird surveys: data synthesis, analysis and recommendations for sampling frequency and intensity to detect population trends. In: *Quantifying temporal and spatial variability across the northern Gulf of Alaska to understand mechanisms of change*. Gulf Watch Alaska Synthesis Report to the Exxon Valdez Oil Spill Trustee Council, Projects 14120114 and 14120120.

Coletti, H.A. and T.L. Wilson. 2015. Nearshore marine bird surveys: data synthesis, analysis and recommendations for sampling frequency and intensity to detect population trends. *Exxon Valdez Oil Spill Restoration Project Final Report* (Restoration Project 12120114-F), National Park Service, Anchorage, Alaska.

Coletti, H.A., J.L. Bodkin, D.H. Monson, B.E. Ballachey and T.A. Dean. In review. Engaging form and function to detect and infer cause of change in an Alaska marine ecosystem. *Ecosphere*.

Esler, D., and B.E. Ballachey. 2015. Long-term monitoring program - evaluating chronic exposure of harlequin ducks and sea otters to lingering Exxon Valdez oil in western Prince William Sound. Exxon Valdez Oil Spill Trustee Council Restoration Project Final Report (Project 14120114-Q), U.S. Geological Survey, Alaska Science Center, Anchorage, Alaska.

Esler, D., B. Ballachey, M. Carls, and M. Lindeberg. 2015. Introduction to lingering oil monitoring. In: Quantifying temporal and spatial variability across the northern Gulf of Alaska to understand mechanisms of change. Gulf Watch Alaska Synthesis Report to the Exxon Valdez Oil Spill Trustee Council, Projects 14120114 and 14120120.

Esler, D., J. Bodkin, B. Ballachey, D. Monson, K. Kloecker, and G. Esslinger. 2015. Timelines and mechanisms of wildlife population recovery following the Exxon Valdez oil spill. In: Quantifying temporal and spatial variability across the northern Gulf of Alaska to understand mechanisms of change. Gulf Watch Alaska Synthesis Report to the Exxon Valdez Oil Spill Trustee Council, Projects 14120114 and 14120120.

Larson, S., J.L. Bodkin, and G.R. VanBlaricom. 2015. Sea Otter Conservation. Academic Press, Boston. 447 p.

Konar, B., K. Iken, H.A. Coletti, T.A. Dean, and D.H. Monson. 2015. Research Summary: Influence of static habitat attributes on local and regional biological variability in rocky intertidal communities of the northern Gulf of Alaska. In: Quantifying temporal and spatial variability across the northern Gulf of Alaska to understand mechanisms of change. Gulf Watch Alaska Synthesis Report to the Exxon Valdez Oil Spill Trustee Council, Projects 14120114 and 14120120.

Konar, B., K. Iken, H. Coletti, D. Monson, and B. Weitzman. In review. Influence of static habitat attributes on local and regional rocky intertidal community structure. *Estuarine Coastal and Shelf Science*

Kuletz, K., and D. Esler. 2015. Spatial and temporal variation in marine birds in the northern Gulf of Alaska: the value of marine bird monitoring as part of Gulf Watch Alaska. In: Quantifying temporal and spatial variability across the northern Gulf of Alaska to understand mechanisms of change. Gulf Watch Alaska Synthesis Report to the Exxon Valdez Oil Spill Trustee Council, Projects 14120114 and 14120120.

Monson, D.H. and L. Bowen. 2015. Evaluating the Status of Individuals and Populations: Advantages of Multiple Approaches and Time Scales. Chapter 6 in Larson SE, Bodkin JL, VanBlaricom GR, Eds. *Sea Otter Conservation*. Academic Press, Boston. Pp 121-158.

Monson D.H., T.A. Dean, M.R. Lindeberg, J.L. Bodkin, H.A. Coletti, D. Esler, K.A. Kloecker, B.P. Weitzman and B.E. Ballachey. 2015. Inter-annual and spatial variation in Pacific blue mussels (*Mytilus trossulus*) in the Gulf of Alaska, 2006-2013. In: Quantifying temporal and spatial variability across the northern Gulf of Alaska to understand mechanisms of change. Gulf Watch Alaska Synthesis Report to the Exxon Valdez Oil Spill Trustee Council, Projects 14120114 and 14120120.

Traiger, Sarah, Brenda Konar, Angela Doroff, and Lauren McCaslin. In review. Sea otters versus sea stars as major clam predators: Evidence from foraging pits and shell litter. *Marine ecology progress series*.

Weitzman, B.P., and G.G. Esslinger. 2015. Aerial Sea Otter Abundance Surveys – Prince William Sound, Alaska, Summer 2014. U.S. Geological Survey Administrative Report.

10. Response to EVOSTC Review, Recommendations and Comments: See, Reporting Policy at III (C) (10).

The program was very operational in Year 4 and there were no major comments or recommendations that required significant changes.

11. Budget: *See, Reporting Policy at III (C) (11).*

Some categories continue to be underspent but PIs McCammon and Hoffman, along with Sigman, have reviewed a plan to appropriately spend down funds. Administrative staffing transitions at PWSSC over the course of the four years of the program have left some positions vacant for longer periods of time than expected (although this is not unusual in a rural community where it can be difficult to find the right candidate to fill a position). This has resulted in some underspent personnel funds. Travel ramped up as PIs presented key findings to scientific audiences at national conferences. Science Review Team members have been traveling to meetings, as well. Major outreach projects have been completed and are in progress, allowing us to catch up on spending in a category that saw lighter activity in the earlier years of the program when there were fewer results to report on. The University of California, the University of Alaska Fairbanks, and SAHFOS have all been more disciplined about invoicing with greater regularity.

12. Key Findings: 3-5 key findings

- Installation of a Gulf Watch Alaska exhibit at the Alaska SeaLife Center that can eventually travel to other locations
- Offering of a virtual field trip for middle school students featuring science from each of the program components and the work of individual project scientists
- Films produced by youth in Tatitlek and Nanwalek and an 8-minute composite video produced by Marie Acemah, SeeStories, have been posted to the GWA website
- Overlapping PI meetings to enable cross-program coordination and collaboration among scientists in both the Gulf Watch Alaska and Herring Research and Monitoring programs.



*We appreciate your prompt submission
and thank you for your participation.*