



Principal Investigators - please use this form to submit your MPA Baseline Program project annual report, including an update on activities completed over the past year and those planned for the upcoming year. This information will be used by the MPA Baseline Program Management Team to track the progress of individual projects, and will be provided to all MPA Baseline Program PIs and co-PIs prior to the Annual PIs workshop to facilitate discussion of project integration. Please submit this form to California Sea Grant when complete (sgreport@ucsd.edu, Subject [Award Number, project number, PI, "Annual Report"].)

Project Information

Project Year 2015 **MLPA Region** North Coast

Project Title & Number Comprehensive Seabird Baseline Monitoring in the MLPA North Coast Study Region [Project # R/MPA-35C]

PI name Rick Golightly **Co-PI name** Daniel Barton

PI Contact Info **Co- PI Contact Info**
(please list additional PIs and contact info in the "Project Personnel" section if necessary)

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Project Goals & Objectives

This project is designed to develop a robust baseline characterization of North Coast Study Region (NCSR) Marine Protected Area (MPA) marine ecosystems by quantifying seabird abundance, distribution, reproduction, diet, and related interannual variance. The project is further designed to provide a repeatable monitoring framework from which to identify initial and long-term response of seabirds and marine ecosystems to the establishment of Marine Protected Area (MPAs). This project is a collaborative three-element endeavor with three specific objectives. *Aerial Photographic Element*: The first objective is to provide a region-wide census of seabird breeding populations for focal species (in 2014) and to determine the extent of interannual variation and relationship to oceanographic forcing over a 19-year time series (1996-2014) using a combination of previously collected data, new data collection, and analysis. *Castle Rock Reproduction and Diet Element*: The second objective is to quantify nesting phenology, reproductive success, chick diet, and foraging effort of the most abundant seabird (common murre) in the NCSR over a nine-year period (2007-2014) using previously collected data and new data collection. *Shore-based element*: The third objective is to determine the distribution of foraging flocks and foraging rates, breeding population size and productivity, roosting distributions, and rates of human disturbance at breeding sites and roosting sites for focal species. Additionally, a citizen science element will provide community engagement and evaluation of the use of citizen scientists in monitoring programs utilizing this design. This baseline characterization depends on the value of seabirds to indicate response of marine ecosystems to management changes and oceanographic conditions, and the value of seabirds as high-trophic level predators and integral components of healthy marine ecosystems.

Summary of Project Activities Completed to Date

Overview of Project Year 2015 Activities, including progress towards meeting goals & objectives

Castle Rock Reproduction and Diet Element

The camera system on Castle Rock operated successfully for the entire 2014 field season. We monitored 86 common murre nest sites for productivity metrics, conducted 34 diet surveys recording approximately 950 fish or other forage, and conducted 4 time budget watches during chick rearing. 23 Brandt's cormorant nests were monitored for reproductive success. The video streamed uninterrupted for public access during the entire season. In September in cooperation with the US Fish and Wildlife Service, the camera and transmitters were removed from the island for annual maintenance. In 2015, we analyzed food deliveries and completed analysis of time budget watches. The video was reviewed to identify fish species (now 100% complete) and construct time budgets (also complete). Reproductive efforts (phenology and success) for both murres and cormorants were summarized (now 100% complete).

Shore-based Element

During the summer field season of 2015, we repeated shore-based monitoring established in 2014 in coordination with our co-PIs and partners from Point Blue Conservation Science. We repeated seabird population transects, foraging observations, and nest monitoring in 5 study areas within the North Coast Study Region: Crescent City, Trinidad Head, Cape Mendocino, Kibesillah, and Mendocino Headlands. Three observers (one technician, one graduate student, and co-PI Barton) surveyed 5 different transects population transects and 10 foraging observation stations weekly from late April through early August, and monitored accessible seabird nests within these study areas for success on a weekly basis. We included and trained an undergraduate intern in monitoring efforts by partnering with an HSU internship program. Surveys were again almost completely conducted on-protocol and covered the intended matched-pair MLPA/reference site design effectively, although periods of heavy fog during the summer occasionally limited survey extent. We reduced monitoring efforts in some unproductive areas, and increased efforts in others to create a repeatable baseline for future monitoring. Crescent City data collection, at one site, started later in the season than intended due to tribal lands access limitations coordinated with our partners at the Tolowa Dee-ni' Nation. All data entry was completed during the reporting period, and precise transect geo-referencing and descriptions were checked and improved to ensure repeatability of any future survey efforts. Point Blue assisted by providing GIS support, methodological assistance and protocols consistent with other MLPA study regions, and we are currently developing data summaries for reporting to the Ocean Science Trust. Following completion of the 2014 and 2015 field seasons, we are coordinating data organization with Point Blue Conservation Science. Humboldt State graduate student Shannon Murphy conducted her thesis research in collaboration seabird/MLPA-related research for the 2015 field season, and will be focusing on studying nest success and nest-site behavior of seabirds as a monitoring metric for MLPA effects. This will include a citizen science component, and we have developed citizen reporting forms so as to ensure data quality and speedy reporting. Additionally Barton has met with Bureau of Land Management personnel to coordinate citizen science in the Trinidad Area, developed a citizen science protocol for use in 2016, coordinated with remaining shore-based monitoring funds per agreement with the Ocean Science Trust and Sea Grant (see highlights, below).

Aerial Photographic Element

During the 2014 field season we conducted a baseline survey of North Coast seabird colonies in cooperation with partners from CU Santa Cruz and the US Fish and Wildlife Service. In 2014 we counted False Klamath, Green, White, Flatiron and several smaller colonies from the 2014 photos. Counting for the entire extent of Castle Rock in 2014 is 40% complete. We completed the analyses of archived aerial photographs of Castle Rock National Wildlife Refuge for all years except 1996-1999. We changed to the counting protocol to ensure that counts or estimates will be available for all years for incorporation into the trend analysis (we established a counting area on the eastern end of the island that can be consistently counted in every year to provide appropriate data for trend analyses; two exceptions were that the 1996 photos were not clear enough for accurate counting and the 2014 count is of both the eastern counting area and the entire extent of the island).

MPA Baseline Program Annual Report

Highlights from project progress so far, such as successes achieved, new collaborations or partnerships, or interesting stories from the past year that may be suitable for a blog post or other media venue

We have worked with California State Parks, the California Department of Fish and Wildlife, the US Fish and Wildlife Service, and the Bureau of Land Management (California Coastal National Monument) to ensure that local, regional, and statewide land managers are aware of this project both through formal channels (i.e. permitting) and less formal discussions and meetings. Additionally, in collaboration with our partners at US Fish and Wildlife Service we obtained resources to continue the reproduction and diet data collection at Castle Rock in 2015 (not funded in the MLPA process). Video from Castle Rock was streamed live and was also available to the public at www.humboldt.edu/castlerockseabirds in 2015. MLPA support has directly contributed to making possible a science-based contribution from both HSU and Point Blue to the newly-funded Seabird Protection Network chapter in this region, which is being created through partnerships between the BLM (CCNM), HSU, Point Blue, and other groups and stakeholders. HSU and Point Blue are both taking the role of science advisors to this chapter, and this partnership was partly made possible through involving HSU and Point Blue in seabird monitoring in the region via MLPA support.

Description of any unforeseen events and substantial challenges, and resulting effects on project activities and progress. Please indicate any issues that may affect other PI's or require coordination with other Baseline partners (e.g., ME, DFG, Sea Grant).

Due to unanticipated large population sizes of common murres at some colonies in recent years, counts of murres have used more resources than budgeted. We adjusted sampling effort to ensure accurate trend analyses for all years that photos are available by defining a consistent year to year count area on the eastern side of Castle Rock. We have coordinated with Sea Grant and the Monitoring Enterprise regarding movement of some funds budgeted for 2015 into the 2016 year to provide for continuing monitoring at the Trinidad Head area, and coordination of citizen data collection activities for cross-validation in 2016. This fortuitously will allow for bridging into the newly funded Seabird Protection Network in this region (see above).

Data status (i.e., paper/raw format or digitized; if digitized, what format?)

From the Castle Rock element, all data is archived in video format and has been converted to a spreadsheet format as described above. From the shore-based element, all data has been entered into excel spreadsheets consistent with other MLPA seabird monitoring projects in other regions, and additionally, all field data notebooks have been scanned for permanent data archival. From the aerial photographic element, all photographs taken in 2014 have been archived and backed up, and progress in counting birds in photographs from 1997-2014 is ongoing, as described above in the summary of completed project activities.

Activities Planned for following Project Year __ (if applicable) – Please describe remaining work and approximate timelines for completing that work, including any anticipated budget variances necessary to complete the project.

Aerial Photographic Element: Field portions of this element are complete. The first objective was to provide a region-wide census of common murre and cormorant breeding populations (in 2014). Secondly, we plan to determine the extent of inter annual variation and relationship to oceanographic forcing over a 18-year time series (1997-2014) using a combination of previously collected data, new data collection, and analysis. Photo counting and data analysis are ongoing and upcoming, with final reporting to occur in late 2016.

Castle Rock Reproduction and Diet Element: Field portions of this element are complete, although this study continues using a different funding source. The objective was to quantify nesting phenology, reproductive success, chick diet, and foraging effort of the most abundant seabird (common murre) in the NCSR over a nine-year period (2007-2014) using previously collected data and new data collection. Data summary and analysis is now complete. Final reporting will occur in late 2016.

Shore-based element: The main field data collection effort for this objective is complete after the 2014 and 2015 field seasons. We determined the distribution of foraging flocks and foraging rates, breeding population size and productivity, roosting distributions, and rates of human disturbance at breeding sites and roosting sites for focal species. Additionally, a citizen science element currently being implemented (including outreach talks, website development, and protocol implementation) will provide community engagement and evaluation of the use of citizen scientists in monitoring programs utilizing this design during 2016, which will dovetail into ongoing efforts by the newly funded and soon-to-be-established Seabird Protection Network in this region. Final reporting will occur for this element in late 2016.

No further variances or deviation from project timelines not previously discussed with Sea Grant are envisioned. The only major deviation – movement of the Trinidad Head area citizen science and cross-validation effort to 2016 – has been communicated to and approved by the Ocean Science Trust and Sea Grant.

Project Personnel – Please indicate additional project personnel involved in your MPA baseline project, including students and volunteers, or additional PI contact information if necessary, as well as the nature of their assistance in the project project.

	<i>Students Supported</i>	<i>Student Volunteers</i>	<i>Nature of Assistance</i>
<i>K-12</i>	<i>0</i>	<i>0</i>	<i>-</i>
<i>Undergraduate</i>	<i>3</i>	<i>1</i>	<i>Field data collection</i>
<i>Masters</i>	<i>8</i>	<i>1</i>	<i>Field data collection/analyses</i>
<i>PhD</i>	<i>0</i>	<i>0</i>	<i>-</i>

Number of other Volunteers not counted above and the nature of their assistance in the project:

N/A (although our upcoming citizen science efforts in 2016 will include additional volunteers!)

Additional PI contact info not listed on first page:

co-PIs

Daniel Robinette, Point Blue Conservation Science
 Jaime Jahncke, Point Blue Conservation Science
 Breck Tyler, University of California – Santa Cruz

Associated Staff

Phil Capitolo, University of California – Santa Cruz
 Julie Howar, Point Blue Conservation Science
 Eric Nelson, U.S. Fish and Wildlife Service
 Ken Griggs, U.S. Fish and Wildlife Service

Cooperating Organizations and Individuals - Please list organizations or individuals (e.g., federal or state agencies, fishermen, etc.) that provided financial, technical or other assistance to your project since its inception, including a description of the nature of their assistance.

Name of Organization or Individual	Sector (City, County, Fed, private, etc.)	Nature of cooperation (If financial, provide dollar amount.)
U.S. Fish and Wildlife Service	Federal	Integral to Castle Rock NWR monitoring (see proposal for details – refuge personnel and support are critical for this portion of the project)
California State Parks	State	Permitting, access, and field housing/camping
California DFW	State	Aircraft use

Project Outputs and Materials: Please provide any other project-relevant information, such as descriptions of attached materials, media coverage your project has received, presentations, publications, images etc.

Castle Rock Reproduction and Diet Element

The camera system on Castle Rock operated successfully for the entire 2014 field season. The video streamed uninterrupted for public access during the entire season. Video from Castle Rock is available to the public at www.humboldt.edu/castlerockseabirds in 2015