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Condition Compliance for Consistency

Determination No.: CD-0006-20

(National Park Service)

September 8, 2022

EXHIBITS

Exhibit 1 – Water Quality Strategy

Exhibit 2 – Post Hearing Letter for CD-0006-20

EXHIBIT 1

**Water Quality Strategy for Management of Ranching
Operations**

for

*General Management Plan Amendment for
Point Reyes National Seashore and
North District Golden Gate National Recreation Area*

Version 2.0

Prepared for the
California Coastal Commission

CD-0006-20

August 2022

Introduction

In September 2020, the National Park Service (NPS) issued the Final Environmental Impact Statement (FEIS) for the *General Management Plan Amendment for Point Reyes National Seashore and North District Golden Gate National Recreation Area* (GMPA). In April 2021, the California Coastal Commission conducted a Federal Consistency Review on the GMPA and issued a Conditional Concurrence on the plan at that time. As provided in the conditions adopted for CD-0006-20, the National Park Service (NPS) has prepared this First Year Version of a Water Quality Strategy for lands within the planning area of the *General Management Plan Amendment for Point Reyes National Seashore and North District Golden Gate National Recreation Area* (GMPA). The Water Quality Strategy has been prepared to address the Commission conditions identified in the May 10, 2021 letter below:

Condition I. The water quality strategy shall include the following parts:

1. Proposed overall strategy and timeline for assessing and improving water quality through installation of ranching-related infrastructure and management practices in areas of the GMPA outside of the Tomales Bay watershed, including Abbott's Lagoon and Drake's Estero and the creeks that drain to these features, but also including watersheds that drain directly to the Pacific Ocean. The strategy should be informed by existing water quality data, and water quality enhancement efforts that have proven successful elsewhere (e.g., the Olema and Lagunitas Creek watersheds) and should prioritize resolution of the most significant water quality's related issues first, where practicable and as indicated by existing information. The timeline should reflect short- and long-term ranch management priorities related to water quality as expressed by the NPS and identified in ranch-specific ROAs. Both the strategy and timeline should be updated on an annual basis to reflect information and analysis provided under items 2 and 3 below.
2. Proposed sampling methodology for collecting quantitative water quality data in areas of the GMPA outside of the Tomales Bay watershed, consistent with the strategy provided in item 1 above. Data collection should be sufficient to enable comparison to existing water quality standards (e.g., concentrations of indicators of bacterial contamination as described in existing policies and programs of the State Water Control Board and RWQCB) and to inform identification of water quality related issues and prioritization of management strategies to address those issues, as described in Item 3 below. The sampling methodology should incorporate guidelines and requirements from state and federal agencies (i.e., RWQCB, State Water Control Board, and/or U.S. Environmental Protection Agency) related to sampling coverage and frequency, sample testing procedures, and reporting of results.
3. A provision for annual NPS reporting of water quality monitoring results and measures taken and planned to address identified water quality issues to the Executive Director. These annual reports should include [a] monitoring results from all previous years, [b] comparison of water quality data with relevant state and federal water quality standards, [c] proposed measures to address identified issues including identification of priority areas for additional ranching or grazing related best practices, and [d] plans (including

responsible entities, funding, timing and schedule) for incorporating such practices into ROAs or implementation through other measures, as appropriate.

4. The annual report to the Executive Director shall also [e] describe the best management practices and ranching measures implemented in the previous year. For example, this reporting should include miles of fencing installed or repaired, number of stream crossings constructed or improved, installation of dairy-related infrastructure or practices to address manure management, and other ranching related measures installed, and their locations and efficacy. This information will help provide details regarding actual implementation of the GMPA.
5. Annual reports shall also [f] include results of continuing or proposed implementation of best management practices and water quality monitoring of ranch lands in the PRNS and GGNRA portions of the Tomales Bay watershed, including Olema and Lagunitas Creeks.

The Commission also adopted the following additional condition (Condition II) during its April 22, 2021 deliberations:

Condition II: The National Park Service will bring its water quality strategy to the Commission within a period of twelve months for public review, as well as Commission review and approval.

Clarification of Intent: Further discussion at the Commission hearing between the Commission and the NPS resulted in the following clarifications. Submission of the first-year version of the strategy will be prior to NPS approval of any leases under the GMPA. The Commission and NPS also agreed that the first-year version of the strategy, which would be the subject of a Commission hearing, will include specific water quality monitoring details with general priorities and objectives to improve water quality; future iterations of the strategy and/or annual reporting to the Executive Director will be more specific on implementing actions.

The GMPA updates management guidance for more than 28,000 acres of NPS lands including approximately 18,000 acres in Point Reyes National Seashore (PRNS) and 10,000 acres in the north district of Golden Gate National Recreation Area (GGNRA). It establishes a 27,500-acre Ranchland zone, which includes lands that have been actively ranched before and after their acquisition by NPS, and where multi-generational ranching activities are considered an appropriate use. Following the initial Commission hearing, the NPS modified the GMPA preferred alternative to further improve water quality outcomes including reduction of authorized dairies from six to five, as well as other changes to reduce intensity of grazing, forage production and diversification in the GMPA area. The GMPA and Record of Decision (ROD) issued in September 2021 outlines the detailed management strategies that NPS will adopt to achieve the desired conditions related to the preservation of park resources in the planning area, including water quality.

Currently, agricultural activities in the GMPA planning area are authorized under interim agricultural lease/special use permits (lease/permits) or Reservations of Use and Occupancy (two

life estates remain in the planning area). The NPS works with nearly 20 families, most who have been operating on the land since before NPS acquisition. Approximately 2,400 animal units (AU) of livestock for beef ranching and 2,425 dairy animals are currently authorized. Seventeen operations include residential uses specific to on-site ranch operations, with a handful of others considered to be grazing only authorizations.

The Water Quality Strategy for the Management of Ranching Operations (Strategy) uses an iterative approach to identify and address management issues. This first-year version prioritizes required short-term management actions, focused inspections and assessment monitoring of ranches, coupled with ongoing water quality monitoring. The program is informed by implementation of watershed enhancement efforts conducted over more than two decades in the Tomales Bay watershed and reflects current conditions of existing operations. This Strategy focuses first on visual assessment and implementation of operational and structural changes, with the water quality monitoring component designed to inform prioritization of where to target further actions, as well as track long-term progress. It expands existing water quality monitoring programs to include the Point Reyes peninsula and identifies water quality triggers to ensure that actions are responsive to monitoring results.

NPS staff have coordinated with the San Francisco Bay Regional Water Quality Control Board (Regional Water Board) to ensure the Strategy is consistent with existing regulatory standards and approaches. NPS will continue to coordinate and collaborate with Regional Water Board staff to ensure that ranchers are responsive to monitoring conditions and findings from regulatory inspections and ongoing monitoring results. The Strategy intends to provide a consistent set of expectations for grazing operations across all watersheds on Point Reyes National Seashore managed lands (e.g. operations outside of Tomales Bay watershed are expected to meet the same conditions as those inside the watershed). Regional Water Board staff have indicated that a new permitting program is being developed for grazing operations which could be applicable to all park grazing allotments as early as summer of 2023.

This Strategy also emphasizes the necessity, responsibility, and requirements of lessees to adequately monitor and maintain their ranch operations and infrastructure to meet the conditions of lease and regulatory permits. While the NPS is not currently pursuing issuance of long-term leases under the GMPA due to ongoing litigation, the NPS has already taken a number of actions under the ranchers' current permits specific to immediate and short-term requirements associated with the ranch operations in the park. This approach is consistent with what is envisioned under the GMPA and is indicative of how NPS would evaluate and implement Ranch Operating Agreements (ROAs) moving forward.

As stated above, there is currently active litigation related to the implementation of the GMPA which means the NPS is not issuing long term leases at this time. In June 2022, the parties to the litigation filed a Joint Status Report with the Court which indicated that they have entered into a confidential mediation process. The parties are conducting bi-weekly settlement/mediation talks and have reserved the week of October 24-28 for in-person intensive discussions which will inform the prospects of settlement moving forward. The NPS is in the process of issuing two-year interim leases for ongoing ranching operations with modifications as discussed in Objective 5 below.

Overview of Current Ranching Operations:

There are currently five dairy and eight cattle grazing operations on the Point Reyes peninsula, with some cattle grazing operations encompassing more than one individual grazing allotment. The distribution of these operations is such that in most cases, only one to two operations may impact conditions in an individual watershed. The small coastal dairy waterways drain primarily to the Pacific Ocean and Drakes Bay; grazed portions of two dairies outside the confined facilities within the developed ranch core drain to Tomales Bay. There are no dairy operations within the Drakes Estero watershed. In the remainder of ranch lands managed by NPS in the Tomales Bay Watershed, there are currently seven active cattle grazing operations, including one seasonal grazing allotment. It is expected that two additional allotments may be seasonally grazed or managed at some level with targeted grazing based on resource objectives.

For the majority of operations, the most intensive impacts occur around the developed ranch core, and at a few dispersed areas of concentration on pastures, including feed bins and water troughs. The nature and intensity of impacts for dairy operations is greater than observed on cattle grazing operations. As such, many of the solutions to address primary pollution source areas on dairy operations are structural (e.g. roofing and covers with roof runoff structures, waste storage facilities), while on cattle grazing operations the solutions to reduce impact may also be operational (e.g. adjustments to the location, timing, duration, and intensity of grazing through changes in stocking rates or animal rotations). Operational solutions often require less capital to adopt and may be readily implemented with existing infrastructure and adjusted as needed more quickly.

Water Quality Strategy Overview, Goals and Objectives

The purpose of this Water Quality Strategy is to provide a framework for assessing, implementing, tracking and monitoring ranching activities on lands managed by Point Reyes National Seashore with the intent of limiting sources of water pollution and improving water quality conditions. It consists of an array of both short-term and long-term prioritized management strategies to improve water quality, along with a water quality monitoring program to assess and respond to conditions and track progress.

This first-year version of the Strategy emphasizes an inspection and assessment element to quickly identify and correct any deficiencies in key ranch structural and operational components that could affect water quality. This will be coupled with updated mandatory requirements for the continued operation of ranches incorporated into ongoing adaptive management and implementation of practices to protect and improve water quality. In addition to expanded ongoing long-term and regulatory water quality monitoring, an initial water quality assessment monitoring component downstream of ranch operations will allow for additional identification of problem areas to target for corrective actions. Long-term and regulatory monitoring will continue to evaluate trends and inform any additional management that may be required to protect and improve water quality.

The Strategy organizes the NPS efforts into three primary elements:

- Element 1 – Inspection, Implementation and Adaptive Management
- Element 2 – Water Quality Monitoring and Assessment

- Element 3 – Annual Reporting

Collectively, these Elements address the conditions identified through the Commission letter of May 10, 2021. Element 1 of this Strategy addresses Parts 1 and 4 of the Commission Condition I. Element 2 of the Strategy lays out the monitoring strategy identified in Part 2 of the Commission Condition I. Element 3 summarizes the reporting approach for each of the programs and is responsive to Parts 3, 4, and 5 of Commission Condition I, including subparts labeled [a] – [f]. In furtherance of Condition II, the NPS submitted a draft Strategy to the Commission for review at the April 2022 hearing. Version 2 of the Strategy has been revised to address comments and concerns raised at that time and is submitted for Commission review.

Each of the elements and objectives identified in the Strategy are at various states of implementation. As identified below, the NPS will continue progressing these efforts over the coming years. Results will specifically shape and inform the development of any long-term permits issued under the GMPA.

Goals and Objectives:

The goal for infrastructure and operations is to ensure water quality Best Management Practices (also referred to as Management Activities) are identified, incorporated and maintained for all ranches. The water quality goals are to protect public health in high recreation areas, meet regulatory requirements, and limit exceedances of established water quality benchmarks in waterways. The following objectives are identified to achieve these goals:

Objective 1: Complete initial inspections of all ranch operations to identify required immediate actions for improvement by November 1, 2022.¹

In Progress - status as of August 2022:

- *Between February and August 2022, Marin County Environmental Health Services (Marin EHS) conducted inspections of septic systems on all 17 ranches with authorized residential use in coordination with NPS.*
- *In February 2022, the Regional Water Board conducted inspections on all dairy operations in the park in coordination with NPS.*
- *Confined Animal Facility Inspections Reports were issued by the Regional Water Board in July 2022 requiring short-term operational action items as well as Corrective Action Plans requiring longer-term structural changes on three dairy operations by November 1, 2022.*

See Element 1 narrative below for additional details related to Objective 1.

¹ November 1, 2022 identified to comply with deadline set by Regional Water Board dairy inspections and complete critical updates before the onset of rains.

Objective 2: Implement a recurring ranch inspection process to track compliance, maintenance, as well as document conditions, including infrastructure and riparian exclusion fencing by April 2023.²

In Progress - status as of August 2022:

- *NPS will conduct annual pre-rain inspections of dairy operations each fall. In fall of 2022, dairies will be inspected in coordination with Regional Water Board staff to ensure short-term action items identified in inspection reports have been completed and annual pre-rain winterization preparations are in place.*
- *In summer/fall 2022, NPS will coordinate with dairy operators to ensure that long-term Corrective Action Plans, including actions, milestones and timelines are prepared and submitted to the Regional Water Board by November 1, 2022 consistent with NPS objectives.*
- *NPS will build on this current model and continue to conduct maintenance inspections of systems and facilities at least annually to ensure compliance with existing permits. Additionally, rancher compliance inspections, repair and reporting (e.g. riparian fencing) as required under updated interim leases (see Objective 5) will ensure the intended benefit of Management Activities is achieved and maintained.*
- *Water quality monitoring results will help inform future inspections and be used to identify potential operational and structural Management Activity needs.*
- *NPS uses Residual Dry Matter (RDM) monitoring to inform stocking and management actions to maintain adequate cover of herbaceous vegetation. RDM compliance monitoring will continue to be conducted annually. RDM mapping conducted in the fall of 2022 will be used to determine if further operational adjustments may be necessary on individual allotments in 2023.*
- *Increased inspections will lead to more timely identification and correction of deficiencies and remediation of actions that are inconsistent with ranch authorizations. Enforcement under the lease permits is described further below.*

See Element 1 narrative below for additional details related to Objective 2.

Objective 3: Conduct initial water quality assessment monitoring of major waterways flowing from ranches to coastal waters in winter and summer of 2022-2023 to document conditions, with additional monitoring and adaptive management actions triggered by results consistently above monitoring benchmarks.

Planned to begin in winter 2022:

- *Short-term Assessment Monitoring is described in detail as Monitoring Program 1 in the Water Quality Monitoring and Assessment section below.*

² April 2023 identified to ensure all information from initial critical infrastructure inspections and additional ranch operator reporting under upcoming interim leases is fully incorporated, while providing enough time so the component can be fully implemented prior to the next rain season.

Objective 4: Continue long-term, regulatory, and beach recreational water quality monitoring, with additional monitoring and adaptive management actions triggered by results consistently above monitoring benchmarks.

In Progress – status as of August 2022:

- *Long-term monthly monitoring efforts have been expanded to reincorporate coastal watershed monitoring stations sampled on the Point Reyes peninsula from 2000 to 2013 (Monitoring Program 2). These efforts were reinitiated in December 2021 and are integrated with ongoing long-term monthly monitoring in the Tomales Bay watershed (Monitoring Program 5).*
- *Recreational beach sampling was conducted at two locations from 2005 to 2013 by NPS and was reinitiated in fall of 2020 in collaboration with the Environmental Action Committee of West Marin (Monitoring Program 4).*
- *Regulatory monitoring consistent with Regional Water Board requirements is ongoing on dairies and in Tomales Bay watershed (Monitoring Program 3 and Monitoring Program 6).*

Details regarding these monitoring programs can be found in Element 2 - Water Quality Monitoring and Assessment below.

Objective 5: Integrate specific GMPA ROD changes and updates to mandatory requirements for continuing ranch operations into current NPS management to ensure expeditious implementation of priority actions to protect water quality and sensitive resources. Primary elements include allotment-specific changes identified in the GMPA ROD, updated requirements for all ranches continuing operations under 2-year Interim Leases, active implementation of improvement projects, and adaptive management on an ongoing basis.

In Progress – status as of August 2022:

- *Interim Leases for all ranch operations have been drafted and are under review by NPS to be executed by September 14, 2022. They incorporate updated terms and conditions to better address water quality and resource protection objectives identified in the ROD.*
- *Specific actions identified in the ROD, including reduction of authorized dairies from 6 to 5, reduced forage production, and closure of one grazing allotment are incorporated into these Interim Leases.*
- *Active implementation of prioritized improvement projects continues. In the last two years, exclusion fencing to protect water quality has been completed on two ranches (over 3,000 linear feet), and livestock watering system extension projects (adding over 5,800 feet of pipeline, 6 troughs and 2 storage tanks) have been completed on two ranches.*
- *NPS and ranch operators continue active engagement in securing funding and planning for additional Management Activities identified through ranch inspections and compliance monitoring. Additional exclusion fencing to protect water quality on two ranches and livestock watering system extensions on two ranches are planned for implementation before the onset of saturating winter rains.*

- *In spring 2022, based on RDM results from the fall of 2021, NPS required five operators with pasture below RDM targets to reduce stocking levels, implement movement of cattle in a more strategic manner, or graze seasonally. NPS and those operators have agreed on mitigation measures for 2022; monitoring will continue to determine if further changes will be needed in 2023.*

See Element 1 narrative below for additional details related to Objective 5.

Objective 6: Complete Ranch Operating Agreements (ROAs) tied to longer-term leases for each ranch operation that incorporate progress and information obtained during implementation of Objectives 1-5 in an iterative process for continued management to improve water quality. Executed leases/ROAs will allow for full implementation of Strategy components through the GMPA. ROAs will identify and track ranch-specific mandatory requirements related to water quality protection.

- *There is currently active litigation related to the implementation of the GMPA which means the NPS is not entering into long term leases at this time. The parties to the litigation have agreed to enter into a confidential mediation process (identified above) which is underway and will continue through this fall.*

Element 1- Inspection, Implementation and Adaptive Management

Objective 1 - Inspection and Assessment of Ranch Operations to Inform Mandatory Upgrades

Following the Commission hearing in 2021, the NPS determined that it was appropriate to make operational considerations and recommended Management Activities mandatory elements of lease/permits issued under the GMPA. The NPS adopted this approach in the GMPA ROD in September 2021. In doing so, the NPS addressed some of the core concerns raised by the Commission, specifically how would the NPS be able to ensure intended improvements would occur. By requiring investment in infrastructure as well as operational changes as a condition of lease/permits, the NPS will be able to progress towards the intended improvement objectives. Shifting these from voluntary guidelines to mandatory conditions will accelerate the implementation of Management Activities and maintenance requirements and will result in meaningful and demonstrable changes. While lease permits have required lessees to monitor operations and conduct cyclic maintenance of utilities and infrastructure, NPS inspections and identification of deficiencies were sporadic in the past. The NPS evaluated what information it needed to inform the making of long-term leases and identified that critical infrastructure inspections are key to both the initial assessments, as well as ongoing performance monitoring for these leased properties. The NPS has taken actions to initiate many aspects of this element to address critical items immediately.

Critical Infrastructure Inspections

In coordination with the Marin County Environmental Health Services, inspections of septic systems on residential and ranch work areas have been conducted on all 17 ranches³ with current residential/worker use. Through this process, inspections were conducted on a total of 42 systems, ranging from a single combined pump system serving all residential units on a ranch, to ranches with up to 5 individual systems. As inspections were completed, the NPS conveyed identified deficiencies and mandatory actions for operators to address and complete on a ranch-by-ranch basis. General items identified during the inspections included the requirement to install sanitary tees and effluent filters in the tanks and fiberglass risers and tank lids as necessary.

Mandatory actions identified through this process ranged from pumping of tanks, repair of pumps and valves, and repair of outlet lines, to installation of new systems including design and permitting of tanks and leach fields. Where systems were identified to have deficient leach fields, operators have been required to cap and pump existing tanks until new systems are designed, permitted, and installed. The NPS completed review and the County has issued permits for 5 new systems on 2 ranches. The NPS is reviewing additional applications for system repair or replacement on additional ranches, which will also require County permitting prior to installation.

By September 2022, all ranches will have been notified of required actions stemming from the inspections. It is the expectation that lessees will complete initial actions within 30 days of notice. Some larger items identified require multiple reviews and permits leading to implementation. NPS anticipates that it will continue working with ranchers to ensure all identified issues are addressed and remediated through the remainder of 2022.

Dairy Inspections

Inspections of dairy facilities and operations by Regional Water Board and NPS staff were completed in February 2022 to determine compliance with the Board's General Waste Discharge Requirements for Confined Animal Facilities (General WDR) ([Order No. R2-2016-0031](#)). Confined Animal Facility Inspection reports were issued in July summarizing the results of inspections and specifying action items for required improvements. Three of the five active dairies were determined to be in compliance with the General WDR; the remaining two are required to complete short-term improvements and long-term Corrective Action Plans on items identified during the inspections to meet the General WDR conditions.

Short-term action items and long-term Corrective Action Plans required for management of infrastructure deficiencies were identified pertaining to the storage capacity of retention ponds on two dairies, and for two livestock crossings above or adjacent to waterways on two dairies. Short-term actions to ensure the complete containment of manure and stormwater contacting manure for retention ponds will include spray irrigating authorized areas during extended dry weather and implementing an emergency contingency plan for extreme weather events (i.e.

³ Last ranch core inspection scheduled for August 16, 2022.

identifying and contracting pump truck operators that are available to visit the ranch to increase retention pond capacity before storm events). For identified crossings, actions will include limiting use by cattle, sandbags or similar means to barricade/reinforce low areas, weekly inspections during the wet season, and pumping or removal of accumulated material.

Additional short-term action items identified in the Inspection reports were in the following categories:

- Closer wet season pasture management in areas where there is erosion or runoff potential
- Closer storm event preparation, inspection, and management for confined or heavy use areas
- Updates to operator regular inspections to include additional areas or infrastructure, or closer documented inspection of several identified risk areas already being inspected
- Conditional identification of Best Management Practices based on continued monitoring

The Regional Water Board required that all short-term actions and longer-term Corrective Action Plans be completed and submitted by November 1, 2022 to help ensure that short-term actions are completed before winter rains. The Corrective Action Plans require structural changes to the two dairy operations where deficiencies were found and necessitate longer-term implementation timelines. Dairy operators will complete the Corrective Action Plans for the four identified infrastructure deficiencies in coordination with NPS to identify mandatory measures and timelines for the operator to undertake. At two facilities, operators must determine what their storage capacity needs are based on expected operations, infrastructure, and evaluation of runoff, and use this information to plan for updates to retention ponds to improve capacity as needed. At two locations, livestock crossings will be evaluated and updated as needed to ensure they do not allow for discharge of contaminated runoff to waterways. Dairy operators will be expected to pursue funding and develop detailed design plans and timelines for implementation in coordination with NPS and other entities (e.g. Natural Resources Conservation Service) within the two-year interim lease timeframe. If the operator is unable to commit to invest the necessary resources to meet this requirement, the dairy operation would cease but could convert to cattle grazing during this interim period.

NPS and Regional Water Board staff will closely review all Corrective Action Plans and this year's Annual Reports for adequacy and confirmation of required follow-up actions. Additionally, follow-up inspections of dairies will be conducted by NPS and Regional Water Board staff in the fall of 2022, prior to the onset of rains, to confirm short-term management measures and winterization practices are in place. Addressed action items will be included in reporting under this Strategy.

In addition to the Corrective Action Plans identified above, over the next two years (during the interim lease period), the NPS will work to identify any additional modernization requirements such as roof covers, heavy use area protection, or separation facilities with the operators. Moving forward, the schedule for implementation of structural modernization requirements would be incorporated into ROAs as appropriate to ensure resource protection outcomes related to water quality are realized as promptly as possible. The NPS will use ongoing inspection and

compliance monitoring to annually document and evaluate implementation of water quality improvement practices, monitoring, Manure and Nutrient Management, and grazing management. This information will be incorporated into ROAs under Objective 6.

Objective 2 - Ongoing Inspection and Compliance Monitoring

NPS will build on the model developed under Objective 1 with scheduled annual inspections of critical infrastructure as appropriate to ensure operational and maintenance compliance with existing permits. Increased inspections will lead to more timely identification and correction of deficiencies and remediation of actions that are inconsistent with ranch authorizations.

Inspections coupled with water quality monitoring results will be used to prioritize operational and structural Management Activities. As identified above, NPS will continue to track progress on critical septic infrastructure projects on a ranch-by-ranch basis.

Annual inspections by the lessee are required as part of lease permits (Objective 5 below), as well as for Regional Water Board dairy General WDR and Grazing Waiver compliance. Lessees are required report results to NPS as well as regulatory agencies. NPS will incorporate reporting and site visits to identified locations as part of annual inspections.

RDM transect monitoring and visual mapping is conducted annually on ranches. NPS staff collect and weigh RDM - the plant material remaining in a field at the end of the season - at longstanding, specific transect locations on all ranch operations annually each fall, before the first rains. RDM values are then calculated in pounds per acre (lbs/acre) based on dry weight. RDM visual mapping in broader categories is also conducted across larger areas of ranches periodically to assess conditions at the ranch scale, or in specific areas of management interest. Maintaining a minimum of 1,200 lbs/acre of RDM has been the target for Point Reyes ranches since monitoring began in 1987. Maintaining this target helps meet a number of land management goals, including protection of soils from erosion and nutrient loss, and maximizing forage production in the next year. The results from this annual compliance monitoring program are used to identify areas where operational adjustments are necessary to meet desired conditions (e.g. changes to stocking rates or grazing regime; see Objective 5 below). Monitoring conducted in the fall of 2022 will be extensive due to ongoing drought conditions, and results will be used to identify compliance with annual RDM standard across all ranches and determine if further operational adjustments may be necessary on individual allotments in 2023.

This ongoing inspection and compliance monitoring component will be fully developed by April 2023, to ensure all information from initial critical infrastructure inspections and additional ranch operator reporting under upcoming interim leases is fully incorporated, while providing enough time so the component can be fully implemented prior to the next rainy season. Inspection and compliance monitoring will include review of required reports covering: Regional Water Board dairy General WDR and Grazing Waiver compliance, maintenance and monitoring actions for septic systems, riparian fence monitoring and maintenance actions, ranch stocking rates, and residual dry matter monitoring results. Focused annual inspections of individual operations will be conducted based on these reviews. All dairy operations will be inspected annually in the fall prior to the onset of rains by NPS in coordination with the Regional Water Board. Field staff will continue to conduct observations during regular ranch visits to inform compliance with conditions.

Enforcement actions will be focused on curing the identified deficiency to improve conditions. While specific requirements to cure the deficiency will be determined on a case-by-case basis, there is a suite of tools or options that would be utilized. The initial NPS response will be a cure letter to the lessee that describes the deficiency, the actions needed to address it, and a timeline for implementation. Depending on the nature of the deficiency, short-term actions may be required in order to minimize potential impacts until the long-term cure can be realized, consistent with the approach of the Regional Water Board dairy Inspection reports. If the deficiency is not corrected according to the cure letter, NPS will follow up with the lessee to determine status. Based on that follow-up, if a suitable explanation or reasonable need for extension is not provided, the leases provide enforcement tools that could be utilized⁴. Depending on the specific lease/permit and the situation, these include restrictions on use, grazing, or animal units in the problem area; fines; issuing citations; initiating enforcement proceedings; or termination of lease permits. Leases also include the provisions for the Lessor's Right to Cure Default⁵. Under this provision, the NPS may act to cure the default on its own, with lessee bearing the expense.

The effectiveness of the Elements of the Strategy will be assessed through data collected and presented in annual reports. If the suite of actions described by the Strategy does not appear to be improving water quality, the NPS will reevaluate whether additional Management Actions, an updated Strategy, or further planning is necessary to achieve desired conditions.

In the future, this component will be wrapped into ROAs under Objective 6.

⁴ Most current lease documents include the following (or similar) Article concerning penalties:

“At the option of Lessor, Lessor may, in lieu of revoking this Lease, assess a penalty of \$100.00 per day for any failure by Lessee to keep and perform any of the Provisions of this Lease. In such case, Lessee shall be given notice in writing of a grace period (from one day to thirty days) to remedy the situation before a penalty will be assessed. Payment of any penalty under this provision shall not excuse Lessee from curing the Default. This provision shall not be construed as preventing Lessor from issuing citations or initiating enforcement proceedings under Applicable Laws.”

⁵ Most current lease documents include the following Article LESSOR'S RIGHT TO CURE DEFAULTS:

“If Lessee shall fail or neglect to do or perform any act or thing provided in this Lease to be done or performed and such failure shall not be cured within the applicable grace period provided in [the Penalty Article] of this Lease, then Lessor may, but shall not be required to, do or perform or cause to be done or performed any other act or thing (entering upon the Premises for such purposes if Lessor shall so elect), and Lessor shall not be or be held liable or in any way responsible for any loss, disturbance, inconvenience, annoyance or damage resulting to Lessee on account thereof, and Lessee shall repay to Lessor upon demand the entire cost and expense thereof, including, without limitation, compensation to the agents, consultants and contractors of Lessor and related expenses. Lessor may act upon shorter notice or no notice at all if necessary in Lessor's judgment to meet an emergency situation or governmental time limitation or to protect Lessor's interest in the Premises. Any act or thing done by Lessor pursuant to this Article shall not be construed as a waiver of any such Default under this Lease by Lessee or as a waiver of any Provision of this Lease.”

Objective 5 – Immediate adjustment to authorizations through issuance of 2-year interim leases, with ongoing and adaptive management actions on ranch operations.

Specific Actions Identified in the GMPA ROD

The actions identified in the GMPA ROD and described below are being enacted through the Interim Leases which go into effect September 15, 2022. These actions directly address concerns raised by the Commission regarding impacts of ranching operations on water quality. As such, while the NPS is not currently pursuing long-term leases, the benefit of these adjustments is realized immediately, without further delay. Individually and collectively these actions will result in direct reduction of impacts to soils, water, vegetation, wildlife and air resources from that presented to the Commission in CD-0006-20.

Reduce Authorized Dairy Operations within Planning Area

Following release of the FEIS and April 2021 Commission hearing, the McClure Dairy at I Ranch notified the NPS that it would cease dairy operations by July 2021. As a result, the NPS made the following adjustments to the GMPA preferred alternative and adopted these changes in the ROD:

- Reduce the number of authorized dairies from six to five, and prohibit replacement of dairy operations if additional dairies close,
- Reduce authorized dairy animals by 22% (690 dairy animals) in the planning area (from 3,115 to 2,425 dairy animals);
- reduce the total acreage affected by Manure and Nutrient Management (manure spreading) from 2,500 acres to 1,800 acres (approximately 28%); and
- remove 552 acres of Forage Production from the planning area (55% reduction in area authorized for forage production in the planning area).

These changes will noticeably reduce water quality impacts in the associated watersheds and benefit coastal water quality resources.

Reduced Cattle Grazing through Rezoning and Expansion of Seasonal Grazing

- The ROD rezoned Allotment 4 from cattle grazing to Scenic Landscape zone to support expanded habitat for the Drakes Beach tule elk herd. Grazing on Allotment 4 will be discontinued by August 15, 2022.
- The ROD converted Martinelli Ranch (Allotment 19, comprising 259 acres adjacent to Tomales Bay) from year-round to seasonal grazing to meet water quality objectives. Grazing was removed from Allotment 19 in 2021. Any future authorizations will only allow seasonal grazing.

No Forage Production on Beef Ranches

The ROD requires the discontinuation of Forage Production on two beef ranches where it has previously been authorized. This action removes silage (Forage Production) from an additional 280 acres. (The GMPA/FEIS preferred alternative would have allowed Forage Production on

approximately 1,000 acres. The modifications adopted in the ROD for the McClure Dairy and these two beef ranches result in forage production on only 168 acres.)

The NPS will work with the operators to convert these Forage Production areas to permanent pasture over a period of 2-4 years. Conversion from cultivation and harvest of silage to natural or seeded grassland that is a result of natural growth and remains unplowed will reduce impacts on soils, water, wildlife, and some vegetation resources on over 832 acres previously permitted for these more intensive forage production activities.

Adjustment to Diversification Activities

One ranch operation is currently authorized for 2,900 chickens, and a different operation has conducted limited crop production in recent years. The interim lease extensions for these ranches will require the phase out of chickens and a prohibition on crop production. These changes will result in reduced impacts on soils, water, vegetation, wildlife, and air resources.

Interim Lease Requirements for Ranch Operations

Delays to implementation of the GMPA actions related to increased inspection and assessment of operations, as well as pending litigation, necessitated the need for the NPS to issue interim leases for a period of two years – September 15, 2022 to September 14, 2024. As underlying leases are anywhere from 10-20 years old, rather than issuing Letters of Authorization to continue operations under previous terms and conditions, the NPS identified a number of conditions to be updated in order to better address water quality and resource protection objectives identified in the GMPA ROD and this Strategy.

The following revisions have been incorporated into the Interim Leases for continued beef and dairy ranching operations in Point Reyes National Seashore and the north district of Golden Gate National Recreation Area:

1. The map exhibit for each operation have been updated to reference current ranching allotments, including location of ranch boundaries, ranch fencing, and riparian protection fencing. These adjustments reflect updates identified to protect resources, consistent with the intent of the GMPA ROD.
2. Underlying lease/permits required ranchers to implement "Best Management Practices" to protect park resources. The GMPA satisfies the environmental review requirements for many typical ranch activities under federal laws such as the National Environmental Policy Act and the Endangered Species Act. The GMPA refers to Best Management Practices as "Management Activities." For consistency and to obtain the compliance benefits of the GMPA, the sections of old lease/permits that referred to Best Management Practices have been revised to refer to Management Activities and to direct that these Management Activities be conducted in accordance with Appendix F of the GMPA. Conducting Management Activities in accordance with Appendix F standardizes requirements and mitigations, and will streamline the process for completing these common activities on the leased premises.
3. The Interim Leases refer to the Biological Opinions that are now in effect for ranch lands in the park. This revision replaces outdated references to biological opinions that are no

longer in effect. The new Biological Opinions impose reporting requirements on the NPS and ranch operations (e.g., riparian fence monitoring and maintenance). As such, the Interim Leases have been updated to identify reporting requirements and a timeline for ranchers to submit information to NPS for their operations. The NPS will consolidate the information from each ranch and provide it to the U.S. Fish and Wildlife Service and National Marine Fisheries Service.

4. In the last several years, the Regional Water Board has adopted updated requirements for beef operations in the Tomales Bay watershed and for dairy operations. Interim Leases for beef ranches in the Tomales Bay watershed now refer to the currently applicable Waiver of Waste Discharge Requirements for these ranch operations and reiterate monitoring and reporting responsibilities to the NPS and Regional Water Board. Interim Leases for dairy operations now refer to the currently applicable General Waste Discharge Requirements for Confined Animal Facilities. In addition, the Interim Leases require ranchers to provide to the NPS copies of plans and reports submitted to the Regional Water Board.
5. For dairy operations, the Interim Leases have been updated to reflect the number of dairy animals that have been in place for many years since park dairies converted to organic production. The number of dairy animals has been updated for consistency with the dairy animals evaluated in the ROD for the GMPA. To support further protection of park resources and water quality, the Interim Leases for dairy operations also include new provisions regarding land application of liquid and solid waste and a new map identifying locations authorized for land application activities. Land application activities or locations were not addressed in previous underlying lease/permits.
6. The Interim leases include new provisions for monthly reporting of livestock distribution and stocking.
7. Consistent with the GMPA, provisions for the raising of livestock other than cattle for personal non-commercial use are removed. The Interim Leases will allow operators to identify limited types of livestock other than cattle that they wish to raise as an accessory use. An accessory use is defined as animals raised for personal, non-commercial, non-diversification uses. Ranchers must identify accessory use animals with the understanding that the animal unit equivalent (AUE) of these accessory animals would be calculated as part of the overall authorized animal units (AU) in the interim lease, not in addition to the authorized AU.
8. For lease/permits where forage production (silage) operations are phased out under the GMPA ROD, the Interim Leases will identify a process to initiate phaseout of silage operations leading to restoration of grassland systems.
9. The section of old lease/permits that discussed issuance of future leases has been revised to refer to the GMPA which outlines the process for issuing long-term ranch leases.

Additional changes related to interim leasing:

- In May 2021, NPS required cessation of operations at Genazzi Ranch (Allotment 20 comprising 436 acres) due to sustained overutilization and failure to meet residual dry matter requirements. Because this allotment has an expansive infestation of invasive thistles, the NPS is monitoring conditions to determine when it may be appropriate to authorize another lessee to conduct grazing within this allotment.
- The Stewart Ranch (Allotment 28 comprising 2,188 acres) ceased grazing operations in summer 2021. The NPS will evaluate measures to maintain grazing on this allotment through grazing authorizations to maintain important grassland habitat and moderate fire risk in the Olema Valley consistent with the GMPA and Succession Policy.
- The interim lease for I Ranch has been converted to a cattle grazing operation with an approximate annual authorization of 200 AU.

Ongoing Adaptive Management of Ranch Operations

Mandatory Drought Adjustments

Residual dry matter monitoring on ranch operations is conducted by NPS on an annual basis to ensure enough vegetative cover remains to support continued range production and prevent erosion. Documented ongoing drought conditions beginning in spring of 2020 through present necessitated extensive actions on the part of ranchers and the park to reduce the potential for impacts to sensitive resources and maintain adequate residual dry matter on grazed lands. NPS has worked with all ranch operations starting in 2020 to develop and implement drought plans and adjustments in response to the onset of extended drought conditions. Actions across the ranches in 2020-2021 included reductions to stocking rates, early sale of animals, increased supplemental feeding, and adjustments to grazing regimes.

Based on the results of RDM surveys in fall 2021, and the continued drought condition in the area in 2022, the NPS identified a number of operations where additional actions on the part of the rancher, either through further reduced stocking or improved distribution and management of the cattle, would be necessary to better achieve the desired RDM condition. As part of the park transmittals of the interim leases, where necessary, the NPS has also identified additional mandatory conditions specific to improving range condition and RDM results for the fall of 2022. NPS continues to work with the specific operators on their drought response plans.

Implementation of Ranch Management Activities for Water Quality Improvement

More than 170 Management Activities intended to improve water quality have been implemented in the GMPA planning area in the last 20 years. This Strategy will continue to identify and correct areas of water quality concern where they have not already been adequately addressed.

Once an area of concern is isolated and identified sufficiently by NPS, either through site inspections (Objectives 1 & 2) or water quality monitoring (Objectives 3 & 4), a site-specific prescription of Management Activities will be developed by NPS in coordination with ranch operators incorporating recommendations or requirements resulting from inspections, and including proposed funding source(s), responsible parties, and timing for implementation. These prescribed Management Activities will be required as mandatory actions for each ranch lease and will ultimately be incorporated into ROA and tracked to document performance. Dairies will also integrate monitoring and assessment information, and Management Activities into required

annual reporting under the Regional Water Board's General WDR for Confined Animal Facilities.

[Appendix F of the GMPA](#)⁶ includes 41 standard Management Activities, many of which are intended to improve water quality. Typical Management Activities that will be implemented to improve water quality conditions based on site-specific evaluation are similar to those implemented in the studies cited below. These include:

- Fencing to protect waterways and riparian areas from the direct influence of cattle.
- Managed Stream Crossings to control the movement of livestock, people, equipment or vehicles when traversing waterways where necessary for access over an intermittent or perennial watercourse to protect water quality, habitat, and species.
- Off-stream Livestock Water Supply, to provide clean drinking water for animals in strategic locations away from sensitive resources.
- Infrastructure improvements on dairies such as:
 - Heavy Use Area Protection, Roof and Covers and Roof Runoff Structures to direct clean rainfall away from confined areas and prevent erosion.
 - Upgraded Waste Storage, Separation, and Transfer facilities to ensure proper management of wastes to prevent discharge.
- Road Upgrade and Decommissioning, Grade Stabilization Structures or Lined Outlets to protect from erosion.
- Upland and Riparian Vegetation Management and Planting to restore, enhance, or create desired plant communities and habitat.
- Targeted Grazing to control of the location, timing, duration, and intensity of cattle grazing, which can be used to achieve water quality protection objectives.

These Management Activities are standard practices recommended and implemented for management of dairy and ranching activities across the region through a range of organizations and programs including the UC Cooperative Extension, Natural Resources Conservation Service, and Marin Resource Conservation District, among others. For these Management Activities, Appendix F includes the associated Natural Resources Conservation Service Practice Standards, technical guidelines which specify the intended purpose, location where the practice may be applied, and minimum quality criteria that must be met during the application or installation of the practice. In addition, mandatory mitigation measures to minimize short term impacts associated with implementation are listed for each Management Activity. In the case that site-specific analysis identifies solutions not covered by GMPA Appendix F, additional planning and review would be required by NPS in coordination with regulatory agencies prior to implementation.

While Management Activities conducted over time have included nearly all the practices identified in Appendix F of the GMPA, the primary projects implemented in the past two years have been focused on riparian exclusion and drought resilience efforts, including expansion of water storage, and livestock watering systems to improve distribution of cattle across the rangelands and control concentration areas. Improved distribution of livestock is important to short- and long-term water quality objectives.

⁶ Appendix F begins on page 129 of linked GMPA Appendix Document.

In 2020-2022, two exclusion fencing projects totaling over 3,000 linear feet were completed to directly benefit water quality by limiting cattle access to sensitive riparian habitat and water bodies. Additionally, two projects to extend livestock watering systems adding over 5,800 feet of pipeline, 6 troughs and 2 water tanks were completed on the ranch lands, providing clean drinking water in uplands away from sensitive resource areas. Planning and implementation of these activities continues as a required component of management effort under the Strategy, with two more exclusion fencing projects and two more livestock watering system extensions anticipated to be completed by November 1, 2022.

Future priority projects will be identified based on findings from inspections, monitoring and reporting as identified in Objective 2 above, and incorporated under Ranch Operating Agreements (see Objective 6) with issuance of longer term permits through the GMPA. It is noted that the GMPA anticipated that with longer term lease permits in place, we would expect the number of projects implemented annually on park ranch lands would increase from the 4 identified this year.

Element 2 - Water Quality Monitoring and Assessment

Water Quality Sampling Methodology

The quantitative monitoring and assessment portion of the Water Quality Strategy involves reinitiating water quality monitoring efforts in coastal watersheds and continuing ongoing, long-term and regulatory monitoring within PRNS and north district GGNRA portions of the Tomales Bay watershed.

Water quality monitoring involves a suite of activities tailored by watershed, regulatory context, and type of ranch operation. Assessment and regulatory monitoring will document conditions and inform management to prioritize and target any areas where improvements may be required, along with observations from inspections under Objectives 1&2. Long-term monitoring will continue to evaluate watershed-scale trends in key constituents over time. The overall water quality monitoring strategy involves continuation of ongoing and well-established local and regional monitoring efforts under key programs and application of these programs to an expanded suite of monitoring stations. Almost all of the programs being built on have been in place for over 15 years and have legacy data for comparison to efforts under this Strategy.

Monitoring Program 1 will initiate six-week fecal indicator bacteria assessment monitoring (six consecutive samples collected once a week for six weeks) in winter and summer below ranch operations utilizing the regulatory framework for evaluation of geometric mean established by the Regional Water Board to determine if water quality benchmarks are being met. These are the bacterial provisions used by the State Water Resources Control Board to evaluate recreational water quality throughout the State, allowing for consistency with other locations. A similar geomean method that has been in place for over 15 years is used for regulatory monitoring throughout the Tomales Bay watershed, which will be continued under Monitoring Program 6. The Regional Water Board established specific benchmarks for the Tomales Bay Total Maximum Daily Load for Pathogens that are different (measures fecal coliform instead of *E. coli*, and uses five-week instead of six-week geomean evaluation) but remain in effect according to State bacterial provisions. Monitoring Program 2 reinitiates long-term monthly sampling on

the Point Reyes peninsula, applying the successful long-term monthly monitoring regime in Tomales Bay watershed conducted by NPS under Monitoring Program 5. Continuing the monthly sampling frequency will allow for consistent evaluation of long-term trends under both programs and information on variability of conditions with samples being collected year-round. Monitoring Program 3 continues regulatory monitoring of water quality during wet season storm events below dairy operations under the Regional Water Board's General Waste Discharge Requirements for Confined Animal Facilities. This allows for responsive corrective actions when indicators exceed benchmarks during runoff from the operations. Monitoring Program 4 continues fecal indicator bacteria sampling at recreational beaches to ensure protection of public health. Each of these programs is described in more detail below.

Importantly, this Strategy includes Element 1 components focused on the structural and operational monitoring, inspection, and enforcement that will lead to increased control of potential source areas and water quality pollution. Water quality monitoring will compliment this effort, allowing for further detection and correction of water quality degradation, while also documenting long-term conditions as additional improvements are made.

Rationale for Sample Station Location

The distribution and location of the ranch operations is such that in most cases only one to two operations may have an effect on water quality results at any specific sampling location. All sample stations are located adjacent to, or downstream of ranch operations, except those established as a reference location (Figure 1; Table 1). Dairies have regulatory and assessment monitoring at major waterways downstream of each operation's developed ranch core. Two coastal watershed dairies have both long-term and assessment stations downstream in at least one location. Major recreational beaches and lagoons downstream of ranching operations have long-term monitoring stations to evaluate public health risk. The two beach sample locations are where creek mouths feed into Drakes Beach (when connected) or Drakes Estero. Two additional sample stations are located at popular coastal lagoons which are fed by major waterways (Abbotts Creek and Kehoe Creek) that drain ranching areas and become connected to the ocean during breach events from storm flows and wave overtopping events (see Figure 1; Table 1). An additional monitoring station outside the influence of ranching activities was established to provide context in an adjacent coastal watershed above its confluence with the Pacific Ocean.

Rationale for Primary Monitoring Parameters

Water quality monitoring is focused on a performance-based approach that will most effectively and efficiently inform the NPS of source areas and thus specific locations or operations to evaluate for additional actions. Fecal indicator bacteria (FIB) have been chosen as the primary monitoring constituent for determining potential impacts from ranching operations. They have been shown to be reliable at indicating contamination from humans and animals such as livestock (e.g. Farnleitner et al. 2010), and the NPS has conducted regular fecal indicator bacteria monitoring in park watersheds since the late 1990s, allowing for comparison to legacy data. FIB is a responsive constituent, and on ranchlands, is generally co-introduced with nutrients and sometimes also with sediment sources. As such, fecal indicator bacteria will allow for source tracking to determine corrective management actions where there is input from these land use activities. As with the Tomales Bay TMDL, the approach is to focus on the FIB first, as most actions to reduce FIB will also result in reductions to nutrients.

FIB monitoring is also the appropriate metric to address public health concerns for waters where recreational activities may occur. *E. coli* is a species of fecal coliform bacteria that is specific to fecal material from humans and other warm-blooded animals. The US Environmental Protection Agency (EPA) recommends *E. coli* as the best indicator of health risk from water contact in recreational waters. Enterococci are a subgroup within the fecal streptococcus group. Enterococci are distinguished by their ability to survive in salt water. EPA recommends enterococci as the best indicator of health risk in salt water used for recreation ([US EPA 2012](#)).

Monitoring for phosphorus is not included in the Strategy because previous monitoring work found that area waters appear to be nitrogen limited (Kratzer et al. 2005; Coopriider and Carson 2006). Nitrogen was not chosen as a primary indicator as monitoring results are more difficult to characterize in terms of determining potential pollution sources from ranching. The relationship between nutrient concentrations and stream discharge can be complex (e.g. Aguilera and Melack 2018), and there is no established aquatic life benchmark related to nitrate for beneficial uses. However, several nutrient indicators will be monitored under this program. Total ammonia nitrogen and unionized ammonia are monitored for dairies under the regulatory General WDR program. Additionally, dissolved oxygen (DO) can provide an indication of excessive algal growth. This metric, coupled with visual algal cover assessment at each sample location, will be utilized to provide trigger points (consistent DO outside the established benchmarks with documented excessive algal cover) at which additional monitoring would be initiated (i.e. nitrogen or chlorophyll a with DO monitoring).

Turbidity will be utilized as the primary indicator for sediment. It has been well established in ongoing monitoring programs and is simple and inexpensive to collect and analyze in order to be responsive to observed conditions.

Water Quality Benchmarks and Thresholds for Additional Actions

Comparison to regulatory benchmarks for surface waters will be informed by beneficial uses based on [Table 2-1](#) of the Regional Board's Water Quality Control Plan (Basin Plan), focused on human health and indicators for ecological health. Marin County waterbodies in the GMPA planning area with REC-1 listed as an existing or potential beneficial use (from Basin Plan Table 2-1) are the following:

Pacific Ocean; Abbotts Lagoon; Drakes Estero; East Schooner Creek; Home Ranch Creek; Tomales Bay; Lagunitas Creek; Olema Creek; Devils Gulch Creek

All of these waterbodies have representative water quality monitoring stations in place through the various programs identified in the Strategy. The water contact recreation (REC1) objective is defined as: "*Uses of water for recreational activities involving body contact with water where ingestion of water is reasonably possible. These uses include, but are not limited to, swimming, wading, water-skiing, skin and scuba diving, surfing, whitewater activities, fishing, and uses of natural hot springs.*" It should be noted that criteria required to protect this use are more stringent than those for more casual water-oriented recreation under the Noncontact Water Recreation (REC2) objective, defined as: "*Uses of water for recreational activities involving proximity to water, but not normally involving contact with water where water ingestion is reasonably possible. These uses include, but are not limited to, picnicking, sunbathing, hiking, beachcombing, camping, boating, tide pool and marine life study, hunting, sightseeing, or*

aesthetic enjoyment in conjunction with the above activities.” As such, this objective may set a higher bar than intended for existing uses of the named water bodies.

Surface water samples will also be evaluated against benchmarks in [Chapter 3](#) of the Regional Water Board’s Basin Plan for dissolved oxygen and pH intended to protect of fish and other aquatic life, or the [California Ocean Plan](#) where applicable for ocean waters. Individual regulatory programs have specific objectives that take precedence over Basin Plan objectives, for example, the Tomales Bay Pathogen Total Maximum Daily Load. The rationale for the use of these and additional nutrient indicators (total ammonia nitrogen and unionized ammonia) is described below. See Table 3 and Table 4 for benchmarks that will be used in this Strategy related to each monitoring constituent. The narrative for each monitoring program describes which benchmarks will be utilized, and when additional monitoring actions are triggered. These benchmarks may be updated over time as regulatory agencies revise requirements.

Ammonia can have toxic effects on aquatic life and is indicative of human or animal waste. The EPA has developed both acute and chronic Aquatic Life Ambient Water Quality Criteria for total ammonia nitrogen in freshwater, which are based on pH and temperature as the fraction of total ammonia that is unionized varies with these parameters. ([US EPA 2013](#)). The General WDR for confined animal facilities sets a total ammonia nitrogen storm event benchmark for single samples at 1 mg/L. The benchmark for unionized ammonia (calculated) is much lower to protect from acute toxicity (Table 4). While the total ammonia nitrogen and unionized ammonia results are not directly tied to beneficial uses, if exceeded, they do require the operator to investigate and determine the reason for the elevated result. These protective benchmarks will be utilized to trigger actions and evaluate nitrogen data collected under the monitoring programs.

Waters that contain large amounts of algae or aquatic vegetation can exhibit swings in dissolved oxygen concentrations. Concentrations can become low (especially at night) or rise above fully saturated levels during daytime. These conditions can harm fish or affect other aquatic life ([US EPA 2021](#)). The Regional Water Board’s Basin Plan provides benchmarks for minimum concentrations of dissolved oxygen in waters designated as cold (≥ 7.0 mg/L) and warm (≥ 5.0 mg/L) water habitat. The Central Coast Regional Water Quality Control Board provided a technical report on interpreting narrative objectives for biostimulatory substances, and determined that 13 mg/L is an appropriate value to screen both warm and cold waters for oxygen supersaturation ([Worcester et al. 2010](#)). These upper and lower benchmarks will be utilized for dissolved oxygen.

Visual/photo monitoring for signs of biostimulatory substances such as nutrients will be conducted during water quality monitoring for all programs based on the Basin Plan narrative objective that *“waters shall not contain biostimulatory substances in concentrations that promote aquatic growths to the extent that such growths cause nuisance or adversely affect beneficial uses”* and *“irregular and extreme levels of chlorophyll a or phytoplankton blooms may indicate exceedance of this objective and require investigation”* (Regional Basin Plan Section 3.3.3 Biostimulatory Substances). If persistent algal blooms are encountered during more than 2 monthly station visits with visual benthic and surface algal cover $>30\%$ (see [SFBRWQCB 2014](#) for evaluation guidelines based on Napa River and Sonoma Creek) , dissolved oxygen shall be measured (if not already being recorded as part of the monitoring program). If DO falls outside of the Table 3 benchmarks with continued presence of algal blooms $>30\%$, synoptic nutrient

monitoring (i.e. total nitrogen or chlorophyll a with DO monitoring) will be conducted at the location as described below.

Synoptic monitoring (based on benchmarks and triggers for action described below for each program): additional grab samples will be taken as soon as possible after review of the results triggering action to attempt to bracket an area of concern, moving upstream from the initial station and sampling at intervals adjacent to varying land uses in order to isolate area(s) where pollutants may be entering the waterway. This will be coupled with inspections of ranch operations to look for suspected pathways, during periods of runoff when possible, depending on the coincidence of the monitoring results with precipitation events.

These indicators will allow the NPS to find persistent signals and be responsive to land use activities in the watersheds. If necessary, other assessment monitoring techniques may be utilized such as microbial source tracking to aid in determining potential pollution sources. This method utilizes genetic markers to detect fecal contamination from sources such as human, canine, ruminant, cattle, horse, and avian. This method could help provide additional information when a likely ranching-related cause cannot be identified with continued persistent *E. coli* signals after synoptic monitoring and inspections during winter runoff (e.g. no areas of direct runoff or stream access upstream from cattle use are able to be isolated), and there are other potential sources present in the watershed (e.g. wildlife, recreational activities). Across the PRNS coastal watersheds, management will be prioritized based on the level and persistence of benchmark exceedances.

Rationale for Ranch Management Activities for Water Quality Improvement

Once an area of concern is isolated and identified sufficiently by NPS, either through site inspections (Objectives 1 & 2) or water quality monitoring (Objectives 3 & 4), a site-specific prescription of Management Activities will be developed by NPS in coordination with ranch operators incorporating recommendations or requirements resulting from inspections, and including proposed funding source(s), responsible parties, and timing for implementation. These prescribed Management Activities will be required as mandatory actions for each ranch lease and will ultimately be incorporated into ROA and tracked to document performance. Dairies will also integrate monitoring and assessment information, and Management Activities from the ROA into required annual reporting under the Regional Water Board's WDR for Confined Animal Facilities.

As described in the Implementation Section above, Appendix F of the GMPA includes 41 standard Management Activities, many of which are intended to improve water quality. Analyses of long-term water quality monitoring data collected at stations under water quality monitoring programs 2, 5 and 6 have been published in multiple articles including:

- Tomales Bay watershed: Long-term trend analysis in the Olema Creek watershed indicates average fecal coliform bacteria concentrations were reduced by 95% over the 19-year period from 1999 to 2017, concurrent with the implementation of 40 Management Activities intended to improve water quality such as Fencing, off-stream Livestock Water Supply, and hardened Stream Crossings ([Lewis et al. 2019](#)). The Regional Water Board report card for Tomales Bay watershed shows reductions in fecal coliform concentrations in Olema Creek ([SFBRWQCB 2016](#)).

- Point Reyes peninsula coastal watersheds: Analysis of water quality data collected from 2000 to 2013 in the Abbots, Kehoe, and Drakes Estero watersheds found that fecal indicator bacteria concentrations (after accounting for variation in rainfall) declined at all 13 water quality stations that were downstream of approximately 30 Management Activities implemented on grazed lands during the monitoring period to improve water quality such as Fencing, off-stream Livestock Water Supply, and infrastructure improvement (roofs, gutters, manure & nutrient management). There was a 54 –99% reduction in fecal indicator bacteria concentrations with a sixfold increase in the frequency of samples meeting regulatory criteria over the 13-year study period ([Voeller et al. 2021](#); [GMPA Appendix L](#)).

These studies indicate that targeted Management Activities such as those listed above can effectively reduce sampled fecal indicator bacteria concentrations, increasing the probability of meeting water quality objectives across varying types of livestock operations. This Strategy will continue to identify and correct areas of water quality concern where they have not already been adequately addressed.

Monitoring Program 1: Short-term Assessment Monitoring

Initial assessment monitoring utilized to identify persistent source areas on ranches to target for corrective action.

- Locations (Figure 1; Table 1): Assessment monitoring stations are located in key waterways below ranch operations at the ranch or watershed scale selected to aid in determining and isolating potential pollutant source areas. The NPS would continue to select specific watersheds or ranches for these efforts on a rotating priority basis dependent on staff capacity. Stations may be added or retired over time based on monitoring results.
- Frequency (Table 1): 6-weekly consecutive sampling events in winter (November-March) and summer (June-September) to compare to the State Water Board’s regulatory bacteria water quality objectives. The frequency of annual assessment monitoring will be reduced if stations are found to consistently meet regulatory benchmarks.
- Parameters (Table 3): grab samples for laboratory analysis of fecal indicator bacteria concentration (*E. coli* or Enterococci dependent on salinity) and collection of general physicochemical water quality parameters (pH, specific conductance, dissolved oxygen, temperature, salinity, and turbidity). Constituents may be added or dropped based on upstream land uses and ability to aid in source identification and tracking. Visual inspections for algae cover (%), disturbances, or other indicators that could impact water quality (e.g. presence of humans or animals) are conducted during each station visit. They are noted and photo documented if they are found to occur.
- Triggers for Action (Table 3): the numeric benchmark for bacteria will be evaluated using the six-week rolling geometric mean defined by the State Water Board’s bacteria provisions ([2019 ISWEBE Bacteria Provisions](#)) for each six week sampling period. Dissolved oxygen and pH will be compared to benchmarks developed by the Regional Water Board (Basin Plan and technical report guidance), and specific conductance will be compared to the Regional Water Board’s Confined Animal Facility benchmark. Stations that do not meet the benchmarks will trigger additional synoptic monitoring as described above.

- e. Corrective actions: where water quality concerns from ranch operations are isolated through assessment monitoring, NPS will evaluate site-specific conditions and require the implementation of appropriate Management Activities (GMPA/FEIS Appendix F) intended to address observed conditions. This strategy has been utilized successfully in the Olema and Lagunitas Creek watersheds and will be effective at targeting source areas for improvement within the Point Reyes peninsula Ranchland zone.
- f. Reporting: results of short-term assessment monitoring and how they inform corrective Management Activities will be reported annually under the Water Quality Strategy.

Monitoring Program 2: Coastal Watershed Monitoring

This program expands the same long-term water quality monitoring framework for successful programs conducted in Olema Creek and Tomales Bay to reinitiate sampling at selected coastal watershed monitoring stations. It utilizes the same standard operating procedures, protocols, and monitoring frequency as the established long-term monthly monitoring under Monitoring Program 5 in Olema Creek. The incorporation of summer and winter geometric mean samples, in line with the Tomales Bay Total Maximum Daily Load (TMDL) monitoring program operated in coordination the Regional Water Board, and statewide bacteria water quality objectives allows for consistency in interpretation and reporting of data for these smaller coastal systems (see Monitoring Program 6 below).

- a. Locations (Figure 1; Table 1): long-term monthly monitoring is conducted at a subset of 7 previously assessed coastal watershed stations and 1 newly established station (PAC4) outside of the ranchlands (see GMPA Appendix L and Voeller et al. 2021 for trend analysis of data collected from 2000-2013). Station DES2 has minimal upstream influence from ranching activities except in the uppermost tributaries which are mostly intermittent and dry in the summer months. PAC4 has no upstream ranching activity and is outside the ranchland zone; these will be considered reference locations to compare to the remaining stations with upstream influence from ranching activities under the monitoring program.
- b. Frequency (Table 1): monthly monitoring to aid in determining long-term trends. Assessment monitoring, consisting of 6-weekly consecutive sampling events (geometric mean sampling) in winter (November-March) and summer (June-September), will also be conducted initially at these locations as described in Monitoring Program 1. Station ABB4 is currently sampled monthly in conjunction with Monitoring Program 4 due to identical laboratory analysis requirements for ocean waters (previous monitoring has indicated salinity is >1 ppt more than 5% of the time).
- c. Parameters (Table 3): grab samples for laboratory analysis of fecal indicator bacteria concentration (*E. coli*) and collection general physicochemical water quality parameters (pH, specific conductance, dissolved oxygen, temperature, salinity, and turbidity). Station ABB4 includes grab samples for bacterial laboratory analysis of *E. coli* and Enterococci concentration (as previous monitoring has indicated salinity is >1 ppt more than 5% of the time). Visual inspections for algae cover (%), disturbances, or other indicators that could impact water quality (e.g. presence of humans or animals) are conducted during each station visit. They are noted and photo documented if they are found to occur.
- d. Triggers for Action (Table 3): If two consecutive monthly samples exceed a given benchmark, or a single non-storm event fecal indicator bacteria sample exceeds 10 times the single sample benchmark in MPN/100ml, additional synoptic monitoring will be

triggered. For each six week sampling period the numeric benchmark for bacteria will be evaluated using the six-week rolling geometric mean defined by the State Water Board's bacteria provisions ([2019 ISWEBE Bacteria Provisions](#)). Dissolved oxygen and pH will be compared to benchmarks developed by the Regional Water Board (Basin Plan and technical report guidance), and specific conductance will be compared to the Regional Water Board's Confined Animal Facility benchmark. If persistent algal blooms with visual benthic and surface algal cover >30% are encountered during more than 2 monthly station visits in conjunction with DO outside the benchmarks, synoptic nutrient monitoring (i.e. total nitrogen or chlorophyll a with DO monitoring) will be conducted. At station ABB4, DO monitoring will be initiated when the algal cover benchmark is exceeded. Stations that do not meet these benchmarks will trigger additional synoptic monitoring as described above.

- e. **Corrective Actions:** where water quality concerns from ranch operations are isolated through monitoring triggered under this program, NPS will evaluate site-specific conditions and require implementation of appropriate Management Activities (GMPA/FEIS Appendix F) intended to address observed conditions. This strategy has been utilized successfully in the Olema and Lagunitas Creek watersheds and will be effective at targeting source areas for improvement within the Point Reyes peninsula Ranchland zone.
- f. **Reporting:** All monitoring results will be reported annually as part of this Water Quality Strategy. Monitoring was reinitiated in December of 2021. See Attachment 1 for summary of current data.

Monitoring Program 3: Regulatory Dairy Monitoring

PRNS dairies fall within Tier 2 (Confined Animal Facilities that utilize liquid waste retention ponds) of the Regional Board's General Waste Discharge Requirements (WDRs) for Confined Animal Facilities (CAFs) (Order No. R2-2016-0031). This Order requires Tier 2 dairies to prepare and implement a Waste Management Plan, a Nutrient Management Plan, a Grazing Management Plan, and follow a Monitoring and Reporting Program.

In addition, regulatory water quality monitoring under the General WDR is required to assess compliance with Regional Water Board water quality objectives and to assess the effectiveness of facility management plans. Sampling results will be used to assess water quality conditions during storm runoff and to make informed decisions regarding management practices. Dairy operations in the park have coordinated sampling by participating in a qualified group monitoring program that meets the standards set forth in the General WDR. Interim lease extensions issued to dairies will require dairy operators to provide NPS copies of Tier 2 plans and to report the results of the required monitoring program under the General WDR to NPS.

Additional protocols and quality assurance procedures are listed in the General WDR for Confined Animal Facilities ([Confined Animal Facilities General WDR Order NO. R2-2016-0031](#)).

- a. **Locations (Figure 1; Table 1):** the 5 dairy operations are required to conduct regulatory monitoring downstream of their facilities to meet the Regional Water Board's General Waste Discharge Requirements for Confined Animal Facilities. Grab samples must be collected from surface waters at the point where the watercourse leaves the lands used for

the operation, or downstream of areas closest to the operation if surface waters flow adjacent but not through the lands used for the operation.

- b. Frequency (Table 1): regulatory surface water sampling shall take place during the winter rainy season (generally October-March) during or directly following 3 storm events after at least 1 inch of rain per 24 hours. Sampling events shall be at least 14 days apart. Assessment monitoring, consisting of 6-weekly consecutive sampling events (geometric mean sampling) in winter and summer, will also be conducted initially at these locations under Monitoring Program 1.
- c. Parameters (Table 3; Table 4): stations are sampled for pH, specific conductance, temperature, total ammonia nitrogen, and unionized ammonia (calculated). Visual observations, such as changes in surface water color or turbidity, must be recorded at the time of surface water sampling and submitted with the Annual Report to the Regional Water Board. Visual inspections for algae cover (%), disturbances, or other indicators that could impact water quality (e.g. presence of humans or animals) are conducted during each station visit. They are noted and photo documented if they are found to occur. Assessment monitoring under Monitoring Program 1 will include grab samples for laboratory analysis of fecal indicator bacteria concentration (*E. coli*) and collection of general physicochemical water quality parameters (pH, specific conductance, dissolved oxygen, temperature, salinity, and turbidity).
- d. Triggers for Action (Table 3; Table 4): The General WDR benchmarks will be used for pH, specific conductance, temperature, total ammonia nitrogen, and unionized ammonia (calculated). In the event downstream, representative grab samples show exceedances above benchmark values, additional grab surface water samples will be collected upstream, or at other representative locations, to bracket and isolate the problem so that the dairy operator can take corrective action. For assessment monitoring, the numeric benchmark for bacteria will be evaluated using the six-week rolling geometric mean defined by the State Water Board's bacteria provisions ([2019 ISWEBE Bacteria Provisions](#)). Dissolved oxygen will be compared to benchmarks developed by the Regional Water Board (Basin Plan and technical report guidance). Stations that do not meet these benchmarks will trigger additional synoptic monitoring as described above.
- e. Corrective Actions: Ranch operators are required under the General WDR to implement corrective actions where water quality concerns are identified. This may entail both short-term action items and long-term planned upgrades to facilities involving the required implementation of appropriate Management Activities (typically those included in GMPA/FEIS Appendix F) intended to address observed conditions. This strategy has been utilized successfully in the Olema and Lagunitas Creek watersheds and will be effective at targeting source areas for improvement within the Point Reyes peninsula Ranchland zone.
- f. Reporting: Results of this monitoring program are reported to the Regional Water Board as set forth in the General WDR. Noncompliance shall be included in the General WDR Annual Report with a description of any corrective measures that were taken. Data reporting to the NPS under this element is added as a required condition in the two-year interim leases, and will be required in future long-term leases issued under the GMPA. Results of this sampling will be incorporated into annual reports under the Water Quality Strategy.

Monitoring Program 4: Recreational Beach Sampling

Recreational beach sampling is conducted at high recreation areas that are influenced by waterways that flow through ranch lands as part of a Statewide monitoring program coordinated through Marin County. This program was reinitiated in 2020 with expanded frequency to include winter sampling. The NPS is working with Environmental Action Committee of West Marin to continue implementation of this program.

- a. Locations (Figure 1; Table 1): recreational beach sampling is conducted at Drakes Beach and Drakes Estero as part of the Marin County Ocean and Bay Water Quality Testing Program ([Ocean and Bay Water Quality Testing Program - Community Development Agency - County of Marin \(marincounty.org\)](#)). Drakes Beach is sampled at the confluence with a coastal drainage below a dairy ranch. Drakes Estero is sampled at the recreational access point where the tidal marsh opens into Schooner Bay of Drakes Estero.
- b. Frequency (Table 1): sampling is conducted weekly April 1 - October 31, and monthly November through March.
- c. Parameters (Table 3): grab samples for laboratory analysis of fecal indicator bacteria concentration (*E. coli* and Enterococci). Visual inspections for algae cover (%), disturbances, or other indicators that could impact water quality (e.g. presence of humans or animals) are conducted during each station visit. They are noted and photo documented if they are found to occur.
- d. Triggers for Action (Table 3): samples are compared to the applicable fecal indicator bacteria benchmarks in Table 3. During weekly sampling, synoptic monitoring will be triggered if the 30-day geometric mean benchmark is exceeded. During monthly sampling, synoptic monitoring will be triggered by two consecutive samples above the single sample benchmark. An attempt will be made to take an additional single sample after one sample result comes in above the benchmark to determine if synoptic monitoring may be necessary. After obtaining any result above benchmarks NPS will immediately post warning signs at the beach location(s) until additional samples return values below the applicable benchmarks. 30-day geometric mean data consistently above the benchmark will inform possible additional actions (e.g. closure or use restriction).
- e. Corrective Actions: where synoptic monitoring indicates water quality concerns originate on ranches, NPS will evaluate site-specific conditions and require the implementation of appropriate Management Activities (GMPA/FEIS Appendix F) intended to address observed conditions. This strategy has been utilized successfully in the Olema and Lagunitas creek watersheds and will be effective at targeting source areas for improvement within the Point Reyes peninsula Ranchland zone. Other sources of pollution identified outside ranches will be evaluated by NPS and addressed as appropriate.
- f. Reporting: results of the weekly sampling are reported on the [Marin County Ocean and Bay Water Quality Testing Program](#) and [State Water Resources Control Board](#) websites. Results will also be incorporated into the annual reporting under the Water Quality Strategy.

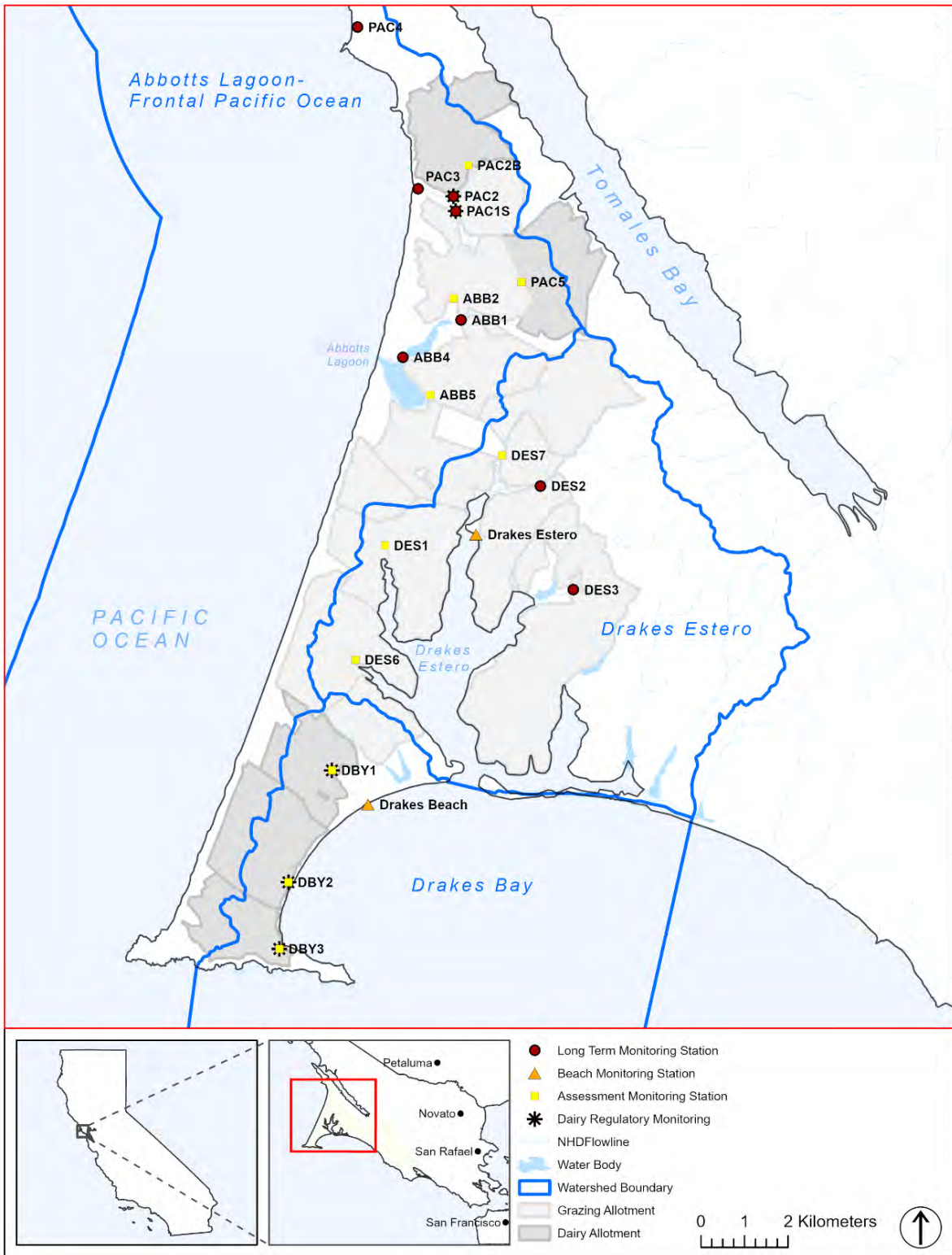


Figure 1: Point Reyes National Seashore coastal watershed long-term, regulatory and assessment water quality monitoring locations.

Table 1. Coastal watershed long-term, regulatory and assessment water quality sampling station descriptions with sampling frequency.

Watershed	Station ID	Description	Monitoring Type	Monitoring Frequency
Abbotts Lagoon	ABB1	Perennial stream mainstem just below tributaries on a beef cattle ranch; a branch of the headwaters is located on a dairy, but the mainstem then flows through an ungrazed area above the monitoring station	● Long-term	Monthly 6-Week (Winter & Summer)
	ABB2	Tributary downstream of former dairy corrals and ungrazed upstream wetlands and pond	* Regulatory (Dairy General WDR) ■ Assessment	Winter (3 Storms) 6-Week (Winter & Summer)
	ABB4*	Abbotts lagoon at trail crossing bridge between lagoon chambers adjacent to Pacific Ocean. This brackish coastal lagoon at the mouth of Abbotts Creek becomes connected to the Pacific Ocean during breach events from storm flows and wave overtopping.	● Long-term	Monthly 6-Week (Winter & Summer)
	ABB5	Tributary from a beef cattle ranch above confluence with Abbotts Lagoon	■ Assessment	6-Week (Winter & Summer)
Kehoe Creek	PAC1S	S. Kehoe Creek mainstem downstream of two dairies and adjacent to a beef cattle ranch, flows north through an ungrazed marsh area	● Long-term * Regulatory (Dairy General WDR)	Monthly 6-Week (Winter & Summer) Winter (3 Storms)

Watershed	Station ID	Description	Monitoring Type	Monitoring Frequency
Kehoe Creek	PAC2	N. Kehoe Creek mainstem downstream of a dairy and a beef cattle operation upstream of culvert under Pierce Point Rd	● Long-term * Regulatory (Dairy General WDR)	Monthly 6-Week (Winter & Summer) Winter (3 Storms)
	PAC2B	Branch of N. Kehoe Creek at culvert under ranch road downstream of ranch building complex	■ Assessment	6-Week (Winter & Summer)
	PAC3	Kehoe Creek lagoon adjacent to Pacific Ocean. This coastal lagoon at the mouth of Kehoe Creek becomes connected to the Pacific Ocean during breach events from storm flows and wave overtopping.	● Long-term	Monthly 6-Week (Winter & Summer)
	PAC4^	McClures Creek above confluence with Pacific Ocean, outside of the ranchland zone	● Long-term	Monthly 6-Week (Winter & Summer)
	PAC5	Upper tributary of S. Kehoe Creek just downstream of dairy ranch boundary	■ Assessment	6-Week (Winter & Summer)
Drakes Estero	DES1	Creamery Bay Creek on beef cattle ranch	■ Assessment	6-Week (Winter & Summer)
	DES2^	E. Schooner Creek upstream of Sir Francis Drake crossing with ranching activities only in the uppermost and predominantly intermittent tributaries	● Long-term	Monthly 6-Week (Winter & Summer)

Watershed	Station ID	Description	Monitoring Type	Monitoring Frequency
Drakes Estero	DES3	Home Ranch Creek below beef cattle ranch complex	● Long-term	Monthly 6-Week (Winter & Summer)
	DES6	Drainage to Drakes Estero on beef cattle ranch	■ Assessment	6-Week (Winter & Summer)
	DES7	W. Schooner Creek at beef cattle ranch boundary	■ Assessment	6-Week (Winter & Summer)
	Drakes Estero*	Drakes Estero at Schooner Bay recreational access point where the tidal marsh opens into Drakes Estero.	▲ Recreational Beach	Weekly (April-October) Monthly (Winter)
Drakes Bay	DBY1	Coastal drainage downstream of dairy ranch building complex.	* Regulatory (Dairy General WDR) ■ Assessment	Winter (3 Storms) 6-Week (Winter & Summer)
	DBY2	Coastal drainage downstream of dairy ranch building complex.	* Regulatory (Dairy General WDR) ■ Assessment	Winter (3 Storms) 6-Week (Winter & Summer)
	DBY3	Coastal drainage downstream of dairy ranch building complex.	* Regulatory (Dairy General WDR) ■ Assessment	Winter (3 Storms) 6-Week (Winter & Summer)
	Drakes Beach*	Pacific Ocean at confluence with coastal drainage below a dairy ranch.	▲ Recreational Beach	Weekly (April-October) Monthly (Winter)

*Beach or lagoon sampling locations with salinity > 1 ppt more than 5% of the time

^Reference station with minimal or no upstream influence from ranching activities

Monitoring Program 5: Tomales Bay Watershed - Long-Term Monthly Monitoring

Long-term monitoring is conducted by the NPS San Francisco Bay Inventory and Monitoring program in Olema and Lagunitas Creek watersheds to determine the range, variability, and trends in water quality parameters for these priority streams as part of a regional NPS monitoring program. Monitoring Program 2 will be conducted in parallel with these efforts which will result in consistency in data for comparison over time.

- a. Locations (Figure 2; Table 2): Long-term sampling is conducted at six stations in the Olema Creek watershed (see Lewis et al. 2019 for trend analysis of FIB data collected from 1999-2017), and three stations in the Lagunitas Creek watershed through the NPS San Francisco Bay Area Network Freshwater Quality Monitoring Protocol (see [Coopriider and Carson 2006](#)) to track long-term trends. Olema Creek station OLM6A has no ranching influence and is considered as a reference location to compare to the remaining stations with upstream ranching activities under this monitoring program. Additional regulatory monitoring at Olema Creek stations is conducted under Monitoring Program 6 below.
- b. Frequency (Table 2): sampling is conducted monthly since establishment of the protocol in 2006 (with some legacy sampling as far back as 1999). Olema Creek watershed monitoring recurs on an annual basis, while the Lagunitas Creek watershed stations are monitored on an alternating cycle, two years on, two years off.
- c. Parameters (Table 3): grab samples for bacterial laboratory analysis of *E. coli* concentration and nitrate, and collection of general physicochemical parameters (pH, specific conductance, dissolved oxygen, temperature, salinity, and turbidity). Visual inspections for algae cover (%), disturbances, or other visual indicators that could impact water quality (e.g. presence of humans or animals) are conducted during each station visit. They are noted and photo documented if they are found to occur.
- d. Triggers for Action (Table 3): If two consecutive monthly samples exceed a given benchmark, or a single non-storm event fecal indicator bacteria sample exceeds 10 times the single sample benchmark in MPN/100ml, additional synoptic monitoring will be triggered. The numeric benchmark for *E. coli* will be evaluated using the statistical threshold value defined by the State Water Board's bacteria provisions ([2019 ISWEBE Bacteria Provisions](#)). Dissolved oxygen and pH will be compared to benchmarks developed by the Regional Water Board (Basin Plan and technical report guidance), and specific conductance will be compared to the Regional Water Board's Confined Animal Facility benchmark. Stations that do not meet these benchmarks will also trigger additional synoptic monitoring described above. If persistent algal blooms with visual benthic and surface algal cover >30% are encountered during more than 2 monthly station visits in conjunction with DO outside the benchmarks and nitrate >1 mg/L, synoptic monitoring will be initiated.
- e. Corrective Actions: where water quality concerns from ranch operations are isolated through monitoring triggered under this program, NPS will evaluate site-specific conditions and require implementation of appropriate Management Activities (GMPA/FEIS Appendix F) intended to address observed conditions. This strategy has been utilized successfully in these watersheds and will continue to be effective at targeting source areas for improvement.

- f. Reporting: results from this ongoing monitoring effort are collected and maintained by NPS (see Water Quality Sampling Protocols section below). Formal reports are typically published biannually through the NPS San Francisco Bay Area Network Inventory and Monitoring Program. Results will be included with the annual reporting under the Water Quality Strategy.

Monitoring Program 6: Olema Creek Watershed - Regulatory Bacterial Water Quality Monitoring

Fecal indicator bacteria monitoring is conducted in the Olema Creek watershed by NPS as part of a larger ongoing monitoring effort in coordination with the Regional Water Board and other stakeholders throughout the Tomales Bay Watershed as part of the [Tomales Bay Pathogen Total Maximum Daily Load \(TMDL\)](#) (Ghodrati and Tuden 2005). Monitoring parameters and frequency are specific to this regulatory document.

- a. Locations (Figure 2; Table 2): regulatory sampling is conducted at six stations in the Olema Creek watershed as part of the Regional Water Board's bacteria water quality objectives under the Tomales Bay Pathogen TMDL. Station OLM6A is a perennial tributary with no upstream cattle use and will be considered as a reference location to compare to the remaining stations with cattle influence within this monitoring program.
- b. Frequency (Table 2): 5 weekly samples are collected in a consecutive series in both winter (November-March) and summer (June-September), with monitoring data under this program stretching back to 2004. The timing of sample collection for each series is decided by the watershed-wide monitoring group coordinated by the Regional Water Board and Tomales Bay Watershed Council.
- c. Parameters (Table 3): grab samples for bacterial laboratory analysis of fecal coliform concentration. Visual inspections for algae cover (%), disturbances, or other visual indicators that could impact water quality (e.g. presence of humans or animals) are conducted during each station visit. They are noted and photo documented if they are found to occur.
- d. Triggers for Action (Table 3): the geomean of five weekly consecutive samples will be compared to the specific benchmark under the [Tomales Bay Pathogen TMDL](#) for each five week sample period. Stations that do not meet the benchmark will trigger additional synoptic monitoring as described above.
- e. Corrective Actions: where water quality concerns from ranch operations are isolated through monitoring triggered under this program, NPS will evaluate site-specific conditions and require implementation of appropriate Management Activities (GMPA/FEIS Appendix F) intended to address observed conditions. This strategy has been utilized successfully in the Olema Creek watershed and will continue to be effective at targeting source areas for improvement.
- g. Reporting: results for this ongoing program are collected and maintained by the Regional Water Board. Results will be included with the annual reporting under the Water Quality Strategy.



Figure 2: Tomales Bay watershed long-term and regulatory water quality monitoring locations.

Table 2: Tomales Bay watershed long-term and regulatory monitoring station descriptions with sampling frequency.

Watershed	Station ID	Description	Monitoring Type	Monitoring Frequency
Olema Creek	OLM1	John West Fork Creek upstream of SR1 and confluence with Olema Creek	● Long-term ✘ Regulatory (Tomales Bay TMDL)	Monthly 5-Week (Winter & Summer)
	OLM6A [^]	Davis-Boucher Creek upstream of Rift Zone Trail with no ranching activity	● Long-term ✘ Regulatory (Tomales Bay TMDL)	Monthly 5-Week (Winter & Summer)
	OLM10B	Olema Creek - Olema Marsh upstream of confluence with Lagunitas Creek	● Long-term ✘ Regulatory (Tomales Bay TMDL)	Monthly 5-Week (Winter & Summer)
	OLM11	Olema Creek downstream of Bear Valley Road bridge	● Long-term ✘ Regulatory (Tomales Bay TMDL)	Monthly 5-Week (Winter & Summer)
	OLM14	Olema Creek downstream of Five Brooks bridge on SR1	● Long-term ✘ Regulatory (Tomales Bay TMDL)	Monthly 5-Week (Winter & Summer)
	OLM18	Olema Creek upstream of Randall Gulch confluence (except during high flow)	● Long-term ✘ Regulatory (Tomales Bay TMDL)	Monthly 5-Week (Winter & Summer)
Lagunitas Creek	LAG1	Bear Valley Creek at Point Reyes headquarters administration	● Long-term	Monthly (rotating 2 years on, 2 years off)
	LAG2	Cheda Creek upstream of Sir Francis Drake Blvd	● Long-term	Monthly (rotating 2 years on, 2 years off)
	LAG3	Devil's Gulch upstream of Sir Francis Drake Blvd	● Long-term	Monthly (rotating 2 years on, 2 years off)

[^]Reference station with no upstream influence from ranching activities

Water Quality Sampling Protocols

All NPS water quality sampling will follow applicable established, peer reviewed NPS San Francisco Bay Area Network Freshwater Quality Monitoring Protocol Standard Operating Procedures (see Coopriider and Carson 2006), including sampling device quality assurance/quality control and operating requirements, and EPA-approved laboratory analysis methods. These protocols guide ongoing water quality monitoring procedures at five national park units in the Bay Area. Monitoring will occur as described in this document with station sampling frequency (Table 1; Table 2) and parameters sampled (see individual Monitoring Programs above; Table 3, Table 4) based on the applicable Monitoring Program(s).

NPS water quality monitoring will continue to follow applicable Standard Operating Procedures established through the NPS San Francisco Bay Area Network Freshwater Quality Monitoring Protocol. The Standard Operating Procedures are working documents that are revised as monitoring activities and associated data are reviewed or technology is updated. Applicable Standard Operating Procedures including Personnel Training and Safety, Equipment and Preparations, Field Methods for Core Parameters, Field and Lab Methods for Bacteria, and Data Management, have been updated regularly through the program, with the last primary updates completed in 2018. Data collected under this protocol is entered into the NPSTORET database which conforms to the National Water Quality Monitoring Council's metadata standards (see [NPS Vital Signs Monitoring](#) 2021). Data is uploaded to the EPA STORET National Data Warehouse, which is automatically transferred to the [Water Quality Portal](#) (National Water Quality Monitoring Council 2022), a national repository of publicly accessible water quality data.

The Equipment and Field Preparations Standard Operating Procedures cover calibration inspection, and maintenance of field sampling equipment. Core parameter Standard Operating Procedures include practices for sampling the water column, measurement instructions, standard data sheets, and equilibration of equipment. Bacteria Standard Operating Procedures include sterile techniques to avoid contaminating grab samples, practices for sampling the water column, details of sample bottle labelling, storage and transport to laboratories, and quality assurance/quality control for field and lab samples. Data Management Standard Operating Procedures include data entry instructions, data verification, and preparing data for export and reporting. Additional quality assurance includes objectives and criteria for measurement data. Data sheets and photo documentation will include observed conditions during the sampling, such as presence of wildlife, flow condition, algae cover, and disturbance.

Protocols and quality assurance procedures specific to Regional Water Board regulatory monitoring will be followed for Monitoring Program 3 - the General WDR for Confined Animal Facilities (Order NO. R2-2016-0031), and Monitoring Program 6 - the [Tomales Bay Pathogen TMDL](#).

Environmental changes over time may require adjustment to Table 1 sampling locations to ensure sampling requirements are met and for stations to be accessed safely by monitoring staff. For example, the long-term monitoring station at PAC1 on South Kehoe Creek was moved upstream to PAC1S as the area became a heavily vegetated marsh system with very little perceivable flow or stream channel. Subsequently, as the marsh expanded upstream, sampling has again been relocated to just downstream of the culvert near the original PAC1.

Specific monitoring constituents may also be dropped if they consistently fall below applicable regulatory benchmarks or laboratory detection limits. For example, nitrate has been monitored at long-term sites in the Olema Creek watershed by NPS since late 2006. Based on internal review of approximately 1,091 samples collected between November 2006 and January 2022, no samples exceeded the Regional Water Board drinking water standard of 10 milligrams per liter, and 1% of samples exceeded 1.0 milligrams per liter (NPS unpublished data). Similarly, Tomales Bay Watershed Council sampling between 2008 and 2012 observed relatively low nutrient levels and no samples with nitrate as N over the drinking water standard (Carson 2013). Nitrate does not have a regulatory numeric benchmark for beneficial uses other than municipal and agricultural supply.

Table 3: Water quality sampling constituents and parameters.

Constituent	Units	Purpose	Method	Benchmark
pH		General water quality	Field; Electronic meter/probe	Basin Plan/CAF WDR: 6.5-8.5 For protection of aquatic life
Specific Conductance	µS/cm	General water quality	Field; Electronic meter/probe	CAF WDR < 2000 Indicator of discharge
Dissolved Oxygen	% mg/L	General water quality	Field; Electronic meter/probe	Basin Plan: ≥ 7.0 mg/L cold water habitat ≥ 5.0 mg/L warm water habitat The median dissolved oxygen concentration for any three consecutive months shall not be less than 80 percent of the dissolved oxygen content at saturation. <13.0 mg/L (Worcester et al. 2010) For protection of aquatic life
Temperature	°C	General water quality	Field; Electronic meter/probe	
Salinity	PPTH	General water quality	Field; Electronic meter/probe	
Turbidity	NTU	Sediment analysis – linked to erosion	Laboratory; Electronic meter/probe	
Nitrate (as N)	mg/L	To characterize contamination from nutrients	Laboratory	
<i>E. coli</i>	MPN/ 100mL	To characterize contamination from potential pathogens (when salinity ≤ 1 ppt)	Laboratory	Basin Plan REC-1 water contact recreation: Geometric Mean <100 for six weekly samples;

Constituent	Units	Purpose	Method	Benchmark
		95% or more of the time)		Statistical threshold value <320 not to be exceeded by more than 10% of samples collected in a calendar month When applicable - Ocean Beaches AB411 – County of Marin Program ⁷ : 30-day Geometric Mean <200 for five weekly samples spaced over a 30-day period Single day sample 400 For protection of human health
Fecal coliform bacteria	MPN/100mL	To characterize contamination from potential pathogen sources in the watersheds covered by the Tomales Bay TMDL	Laboratory	Tomales Bay TMDL: Log mean <200 for five weekly samples spaced over a 30-day period 90 th percentile of 400 not to be exceeded by more than 10% of samples collected in a 30-day period for protection of human health
Enterococci	MPN/100mL	To characterize contamination from potential pathogens (when salinity >1 ppt more than 5% of the time) Ocean water & inland saltwater	Laboratory	Basin Plan REC-1 water contact recreation: Geometric Mean <30 for six weekly samples; Statistical threshold value <110 not to be exceeded by more than 10% of samples collected in a calendar month for human health When applicable - Ocean Beaches AB411 – County of Marin Program ⁸ : 30 Day Geometric Mean <35 for five weekly samples spaced over a 30-day period Single day sample 110
Flow/discharge		To characterize relative significance of sources and loads in tributaries	Field; Flow meter	

⁷ The Marin County Ocean and Bay Water Quality Testing Program has used the Ocean Beaches AB411 benchmarks to assess water quality. The State Water Resources Control Board updated its Bacterial Provisions in 2019. These updated provisions are reflected in Table 3-1 of the San Francisco Bay Regional Water Quality Control Board’s Basin Plan.

⁸ Ibid.

Table 4: Surface water sampling constituents, parameters, and benchmarks for Confined Animal Facilities.

Surface Water Constituents	Method	Benchmarks
pH	On-site; handheld data sonde or comparable	6.5-8.5
Specific Conductance	On-site; handheld data sonde or comparable	< 2000
Temperature	On-site; handheld data sonde or comparable	None
Total Ammonia Nitrogen (NH ₃ + NH ₄ ⁺)	Field test kit or Laboratory	< 1 mg/L and meets calculated unionized ammonia benchmark
Unionized Ammonia (NH ₃)	Calculated	0.025 mg/L

Objective 6 - Future Changes to Ranch Operations Under the GMPA ROD

Complete ROAs tied to longer-term leases for each ranch operation that incorporate progress and information obtained during implementation of Objectives 1-5 in an iterative process for continued management to improve water quality. Executed leases/ROAs will allow for full implementation of Strategy components through the GMPA. ROAs will identify and track ranch-specific mandatory requirements related to water quality protection.

GMPA Zoning Framework

The zoning framework adopted in the GMPA was developed based on an analysis of topography and detailed, sensitive resource information (see Appendix J of the GMPA/FEIS). The zoning framework identified resource criteria for the delineation of the Resource Protection, Range, Pasture, and Ranch Core subzones. Implementation of the GMPA zoning framework will enhance the protection of natural and cultural resources in the GMPA planning area by identifying the most appropriate locations for ranch activities. NPS has begun incorporation of specific subzoning protections through interim leases as described in Element 1 above, for example by planning and implementation of fencing for Resource Protection subzoning that supports water quality protection, as well as identification of compatible areas authorized for land application activities on dairies.

The GMPA zoning framework recognizes the important role of seasonal grazing in landscapes like those found in PRNS and the north district of GGNRA. Conversion of pastures to seasonal grazing reduces impacts on water quality while maintaining important grassland habitat and moderating fire risk. As part of future ROAs, the NPS will evaluate additional grazing pastures within allotments for conversion to seasonal grazing. Additional allotments that are converted to seasonal grazing will be identified in annual reports.

Element 3-Annual Water Quality Strategy Reporting

As part of the Water Quality Strategy, the NPS will prepare and transmit a report by December 31st annually containing information and updates on the elements and objectives as presented in the Strategy. The reporting approach also incorporates the Commission Annual Reporting Conditions identified below:

- [a] monitoring results from all previous years,
- [b] comparison of water quality data with relevant state and federal water quality standards,
- [c] proposed measures to address identified issues including identification of priority areas for additional ranching or grazing related best practices,
- [d] plans (including responsible entities, funding, timing and schedule) for incorporating such practices into ROAs or implementation through other measures, as appropriate,
- [e] describe the best management practices and ranching measures implemented in the previous year, and
- [f] include results of continuing or proposed implementation of best management practices and water quality monitoring of ranch lands in the PRNS and GGNRA portions of the Tomales Bay watershed.

Implementation Report - Element 1

The Element 1 Implementation Report will document actions taken and planned to address identified water quality issues will be prepared to cover the inspection, implementation and adaptive management components of the Water Quality Strategy. This report will provide a summary of annual progress related to the Strategy Objectives 1, 2, 5, and 6, outside of direct water quality monitoring actions and results tied to Objectives 3 and 4 and is responsive to Commission Annual Reporting Conditions [c], [d], [e] and [f]. Documented corrections of immediate improvement actions, implementation, monitoring and maintenance of Management Activities, and compliance with lease/permits and regulatory requirements to protect water quality will be utilized to track progress toward goals. Implementation reports will, include the following information:

1. Progress on specific short-term immediate actions for improvement identified under Objective 1 (e.g. actions taken as a result of dairy inspections, septic inspections, etc.)
2. A list of Management Activities implemented in the previous year (e.g., miles of fencing installed or repaired, number of stream crossings constructed or improved) and a watershed-scale map of all completed project locations.
3. Information from enforcement of lease/permits to protect water quality, including monitoring and maintenance of fencing protecting streams, wetlands, and waterbodies. This section will include results of inspections and monitoring completed under Objective 2, including documentation of maintenance and monitoring for critical infrastructure and Management Activities.
4. Annual certification of completion of regulatory reporting requirements including the General WDR for Confined Animal Facilities and Tomales Bay Grazing Waiver, with lists of reports and inspections completed and any Management Activities completed in response to observed conditions.

5. Additional proposed actions (e.g., number of planned actions on ranches, responsible entities, funding, timing and schedule), referencing relevant water quality results from the monitoring report where applicable (e.g. results from Monitoring Program 1). This section will also include the mandatory improvements identified on ranches and timelines for implementation for dairies and grazing operations.
6. Significant changes to lease/permits, stocking or grazing regimes (e.g. conversion to seasonal grazing).

Water Quality Monitoring and Assessment Report - Element 2

A Water Quality Monitoring and Assessment Report will include a brief background, objectives, identification of monitoring areas, sample regime, sample parameters, results and discussion, notable events, conclusions, and appendices with detailed description of methods and previous Coastal Watershed monitoring results collected under this Strategy consistent with Commission Reporting Conditions [a] and [b]. The documented number of incidences of recreational water illnesses, the number and type of exceedances of water quality benchmarks, and the number of occurrences of triggered synoptic monitoring will be utilized to track progress toward goals. Occurrences of any triggered synoptic monitoring events will be described along with proposed next steps.

Monitoring Program 1 – Short-Term Assessment Monitoring: monitoring results from this program will be integrated into the report as a standalone section describing additional sampling and include the relevant sections from the main report based on the sampling that occurred. Results will be compared to the water quality benchmarks presented in Table 3 and tied to changes in monitoring and recommendations for implementation of site-specific actions.

- The monitoring and reporting results of the Short-Term Assessment Monitoring Program will primarily be utilized to make management recommendations and inform future short-term and long-term actions. The data collected through this monitoring program will not be used to contribute to the evaluation of long-term trends.

Monitoring Program 2 – Coastal Watershed Monitoring: Results from the previous year of Coastal Watershed monitoring will be presented, compared to the water quality benchmarks presented in Table 3, and tied to changes in monitoring and recommendations for implementation of site-specific actions.

- Evaluation of long-term monitoring trends will occur periodically consistent with Monitoring Programs 5 and 6, with an expected minimum of five years of data. Results will be used to inform updates to annual monitoring (e.g. add assessment location, drop monitoring constituent due to lack of detections) and the Water Quality Strategy as appropriate.

Monitoring Program 3 – Dairy Regulatory Monitoring: results from the previous year of dairy monitoring will be compared to the water quality benchmarks presented in Table 4 incorporated as an appendix to the main report.

- The monitoring and reporting results of the Dairy Regulatory Monitoring will primarily be utilized to make short-term management changes and inform future long-term management actions. Any short-term changes implemented as a result of the annual monitoring will also

be reported in this section. The data collected through this monitoring program will not be used to contribute to the evaluation of long-term trends.

Monitoring Program 4 – Beach Recreational Monitoring: monitoring results from this program will be integrated into the report as a standalone section describing additional sampling and include the relevant sections from the main report based on the sampling that occurred. Posting of temporary beach warning health advisories based on results will also be documented in this section.

- Evaluation of long-term monitoring trends will occur periodically consistent with Monitoring Programs 5 and 6, with an expected minimum of five years of data. Results will be used to inform updates to annual monitoring and the Water Quality Strategy as appropriate.

Monitoring Program 5 - Tomales Bay Watershed Monitoring: monitoring reports published by the NPS San Francisco Bay Area Network Inventory and Monitoring Program will be included as an appendix to the main report. Interim Management Actions taken based on monitoring results from this program will be documented in the Implementation Report as described above.

- Evaluation of long-term monitoring trends will occur periodically consistent with the NPS San Francisco Bay Area Network Freshwater Quality Monitoring Protocol, with an expected minimum of five years of data. Results will be used to inform updates to annual monitoring and the Water Quality Strategy as appropriate.

Monitoring Program 6 – Olema Creek Regulatory Monitoring: monitoring results will be compared to the Tomales Bay TMDL water quality benchmark for fecal coliform presented in Table 3 and integrated into the main report as a standalone section.

- Evaluation of long-term monitoring trends will occur periodically consistent with Tomales Bay Watershed TMDL reporting, with an expected minimum of five years of data. Annual monitoring data will primarily be utilized to make short-term management changes and inform future long-term management actions. Any short-term changes implemented as a result of the annual monitoring will also be reported in this section.

References

- Aguilera, R., & Melack, J. M. 2018. Concentration-discharge responses to storm events in coastal California watersheds. *Water Resources Research*, 54, 407–424. Web access (<https://agupubs.onlinelibrary.wiley.com/doi/pdfdirect/10.1002/2017WR021578>)
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Attachment 1: Preliminary Water Quality Monitoring Results – Time Series FIB for Coastal Watershed and Recreational Beach Monitoring Programs

Time series of *E. coli* concentration (MPN/100ml) results from previous sampling efforts (2003-2013), and preliminary data from reinitiated sampling effort (2021-Present) at long-term coastal watershed monitoring stations are presented for the Coastal Water Quality Monitoring Program (Monitoring Program 2). Similarly, preliminary results from Recreational Beach Sampling (Monitoring Program 4) for *E. coli* and Enterococci concentration (MPN/100ml) are included here in the context of previously collected data at the same sampling stations. Applicable benchmarks are indicated for each station with discussion of some of the observed results.

Monitoring Program 2 – Coastal Watersheds

See Voeller et al. 2021 and GMPA Appendix L for analysis of previously collected data. Monthly sampling of coastal stations was reinitiated in winter of 2021 (Figure A-1). Three consecutive monthly samples at PAC2 exceeded the single sample statistical threshold value (STV) for *E. coli*, meeting the trigger criteria described in the Water Quality Strategy for additional monitoring. One additional non-consecutive monthly sample at PAC2 also exceeded the single sample STV. Short-term and long-term corrective actions were identified at the upstream dairy through inspection by NPS and Regional Water Board staff and a subsequent Inspection report issued by the Regional Water Board. Short-term actions to address potential risks to water quality are required to be implemented by the ranch operator before November 1, 2022 and they must submit a longer-term Corrective Action Plan with timelines for implementation to the Regional Water Board by this date. As of August 2022, there is no flow at this sample location. Winter sampling will be conducted according to the Water Quality Strategy.

Two non-consecutive monthly samples at ABB1 exceeded the single sample STV for *E. coli*, one of which met the trigger criteria described in the Water Quality Strategy for additional monitoring (>3,200 MPN/100ml). This threshold was not in place at the time of sampling as the triggers for action in the Water Quality Strategy were still being refined. However, after receiving the result, NPS staff investigated the sample location and upstream area for visual cues that could indicate impacts to water quality and did not find any. The following two monthly samples at ABB1 returned values below the STV, so additional sampling was not initiated.

Two consecutive monthly samples at DES3 exceeded the single sample STV for *E. coli*, which met the trigger criteria described in the Water Quality Strategy for additional monitoring. This threshold was not in place at the time of sampling as the triggers for action in the Water Quality Strategy were still being refined. However, the following monthly sample at DES3 returned a value below the STV, so no additional sampling was initiated.

Two non-consecutive monthly samples at DES2 exceeded the single sample STV for *E. coli*, neither of which met the trigger criteria described in the Water Quality Strategy for additional monitoring. This waterway has no direct influence of grazing or ranching activities, but there is ranching in the upper reaches of tributaries. One monthly sample at PAC1S exceeded the single sample STV for *E. coli*, which does not meet the trigger criteria described in the Water Quality Strategy for additional monitoring.

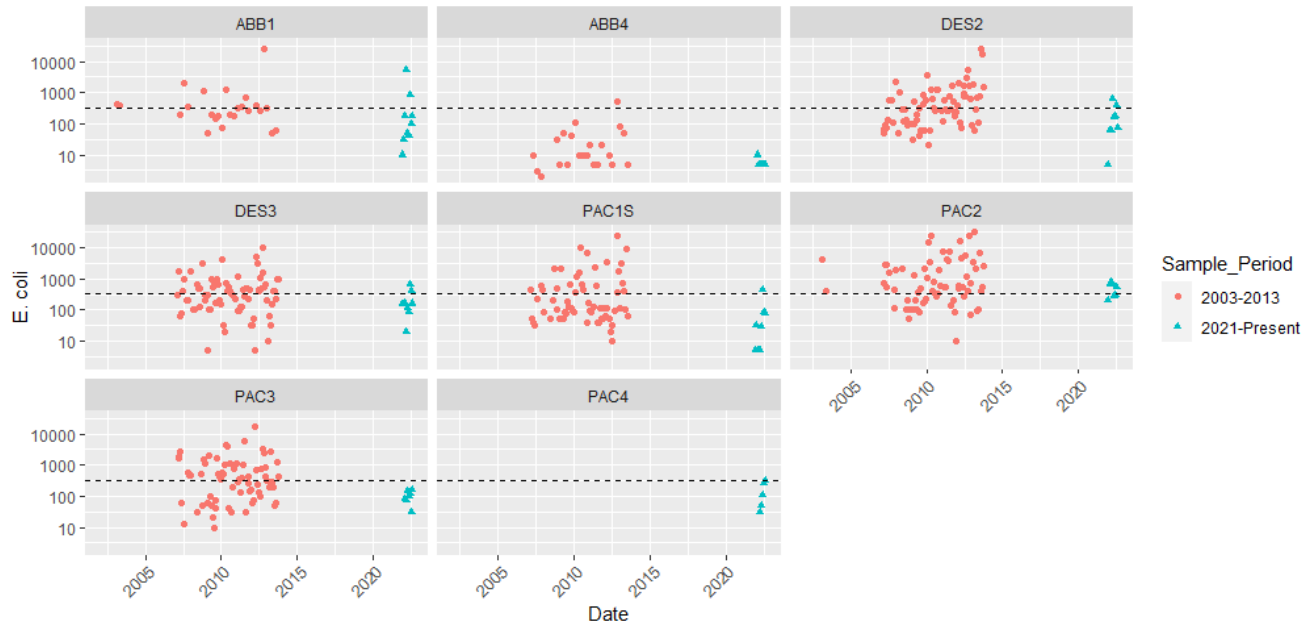


Figure A-1: Time series of *E. coli* concentration (MPN/100ml) sample results from previous sampling efforts (2003-2013), and reinitiated sampling effort (2021-Present) at long-term coastal watershed monitoring stations. The dashed horizontal line represents the statistical threshold value (STV) benchmark for water contact recreation of 320 MPN/100ml set by the State Water Resources Control Board not to be exceeded by more than 10% of samples collected in a calendar month. See Figure 1 for water quality monitoring station locations.

Monitoring Program 4 – Recreational Beaches

Recreational beach sampling (*E. coli* and Enterococci concentration) was conducted from 2006 to 2013 by NPS and was reinitiated in winter of 2020 in partnership with the Environmental Action Committee of West Marin. At Drakes Beach, approximately 1% of samples for Enterococci (2/246) and *E. coli* (3/244) have exceeded benchmark values over the full sample period. At Drakes Estero, approximately 3% of samples for Enterococci (5/187) and 2% of samples for *E. coli* (4/184) have exceeded benchmark values over the full sample period (Figure A-2, Figure A-3).

Since collection was reinitiated in 2020, with expanded monthly winter monitoring, no set of consecutive six-week samples exceeded the *E. coli* or Enterococci geomean benchmark at Drakes Beach or Drakes Estero. At Drakes Beach, one monthly winter sample and one spring sample collected during the weekly series exceeded the STV for *E. coli*, as did one monthly winter sample for Enterococci, which was collected on the tail end of a large atmospheric river (>6" in 24 hours) rain event on October 25, 2021. None of these met the trigger criteria described in the Water Quality Strategy for additional sampling, however, additional samples were collected after the large rain event (sample date: November 1, 2021). These subsequent samples did not exceed the STV for either parameter. No sampling was conducted at Drakes Beach from May to early September in 2021 due to closure of the parking lot area for a Federal Highways construction project to restore the wetland system at the mouth of the drainage that feeds to the sample location.

At Drakes Estero, one set of monthly winter samples collected on the tail end of a large atmospheric river (>6" in 24 hours) rain event on October 25, 2021 exceeded the STV for both *E.coli* and Enterococci. This triggered the collection of additional samples on November 1, 2021, which did not exceed the STV for *E. coli* or Enterococci.

Temporary warning signs were posted to alert the public that the bacterial standards were not met when benchmarks were exceeded following the protocols of Marin County’s Ocean and Bay Water Quality Testing Program pursuant to California Health and Safety Code (HSC § 115915). Postings were removed after subsequent samples fell below benchmarks.

The values for the single samples collected at Drakes Estero around the October 2021 rain event are outliers in the full data set, being by far the highest values recorded over the entire sample period (Figure A-2 and Figure A-3).

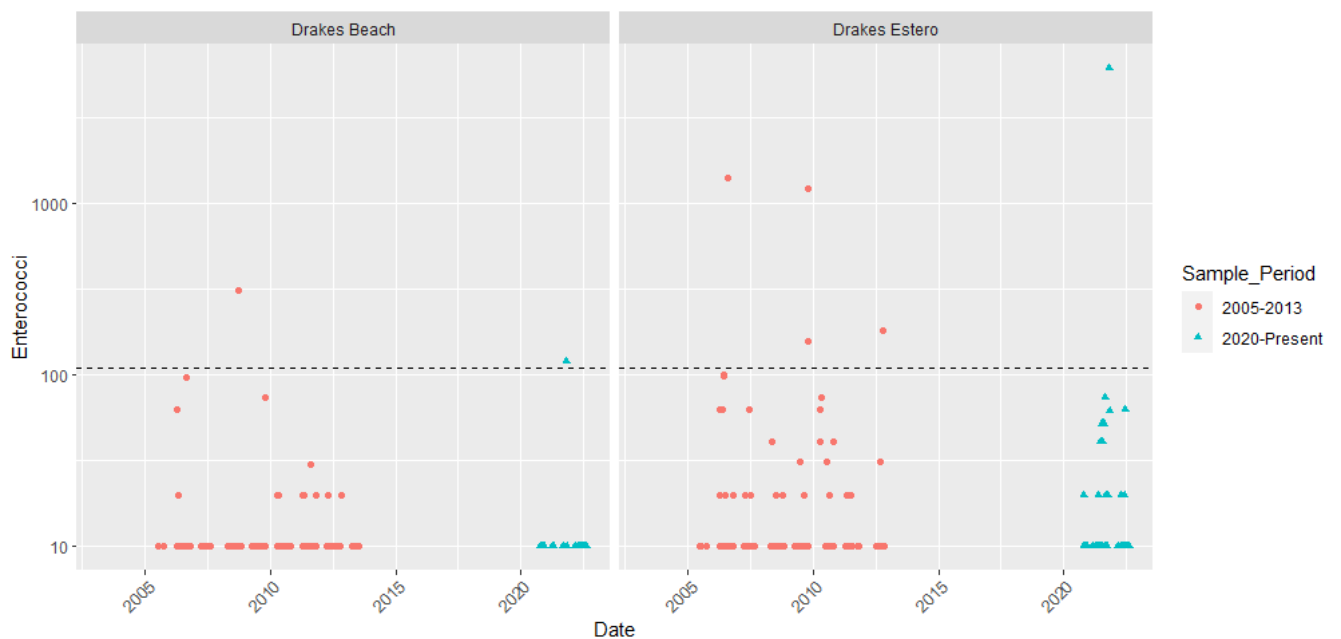


Figure A-2: Time series of Enterococci concentration (MPN/100ml) sample results from previous sampling efforts (2005-2013), and reinitiated sampling effort (2020-Present) at recreational beach monitoring stations. The dashed horizontal line represents the single sample benchmark of 110 MPN/100ml statistical threshold value (STV) not to be exceeded by more than 10% of samples collected in a calendar month from the Regional Water Board’s Basin Plan. See Figure 1 for water quality monitoring station locations.

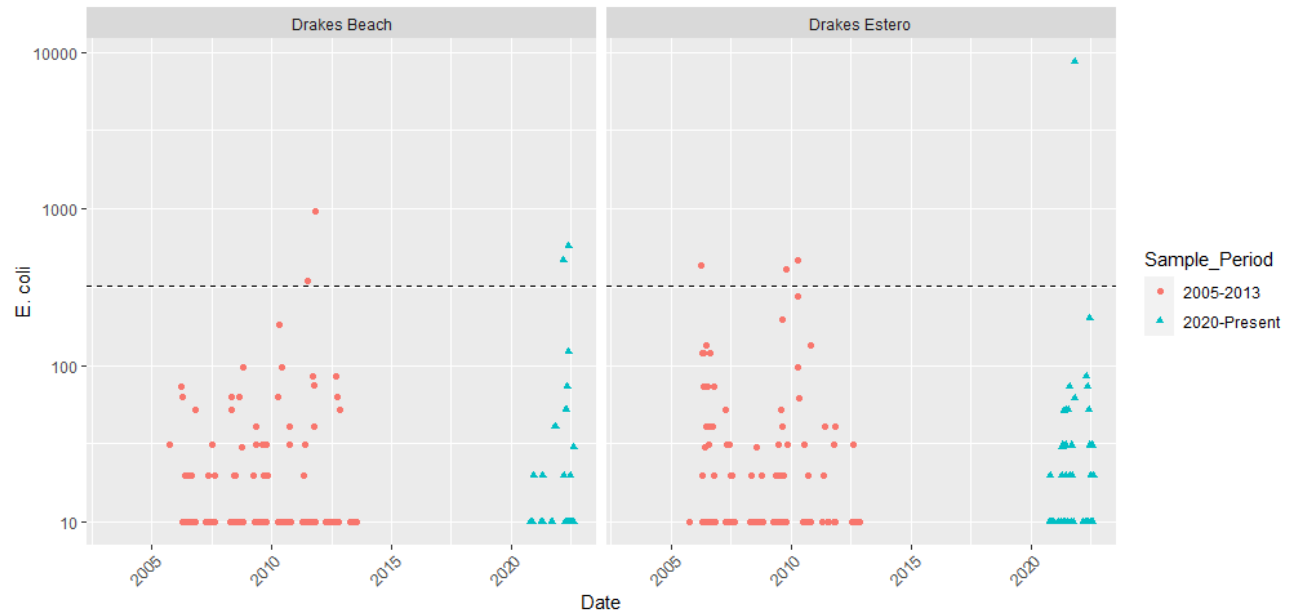


Figure A-3: Time series of *E. coli* concentration (MPN/100ml) sample results from previous sampling efforts (2005-2013), and reinitiated sampling effort (2020-Present) at recreational beach monitoring stations. The dashed horizontal line represents the single sample benchmark of 320 MPN/100ml statistical threshold value (STV) not to be exceeded by more than 10% of samples collected in a calendar month from the Regional Water Board's Basin Plan. See Figure 1 for water quality monitoring station locations.

CALIFORNIA COASTAL COMMISSION

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May 10, 2021

Craig Kenkel
Superintendent
Point Reyes National Seashore
1 Bear Valley Road
Point Reyes Station, CA 94956

Re: **CD-0006-20, National Park Service**, Consistency Determination, 2020 General Management Plan Amendment for Point Reyes National Seashore and the north district of Golden Gate National Recreation Area

Dear Mr. Kenkel:

On April 22, 2021, by a vote of five in favor, four opposed, the California Coastal Commission conditionally concurred with the above-referenced consistency determination submitted by the National Park Service (NPS) for the 2020 General Management Plan Amendment (GMPA) for Point Reyes National Seashore and the north district of Golden Gate National Recreation Area. As specifically described in the NPS consistency determination and Coastal Commission staff report, the NPS requested Commission review of the “detailed elements” of the GMPA: the proposed zoning framework, management of ranch operations, and elk management.

The Commission’s adopted conditions for consistency determination CD-0006-20 provide for the following:

First, that the NPS submit a water quality strategy as follows:

The NPS will provide a water quality strategy for review and approval by the Executive Director before new leases with ranchers are finalized. This strategy shall have an overall purpose of assessing the effect of installed ranching best management practices and management measures on water quality throughout the GMPA planning area and prioritizing further measures to be implemented to reduce ranching impacts on water quality. The water quality strategy shall include the following elements:

1. Proposed overall strategy and timeline for assessing and improving water quality through installation of ranching-related infrastructure and management practices in areas of the GMPA outside of the Tomales Bay watershed, including Abbott’s Lagoon and Drake’s Estero and the creeks that drain to these features, but also including watersheds that drain directly to the Pacific Ocean. The strategy should be informed by existing water quality data, and water quality enhancement efforts that have proven successful elsewhere (e.g., the Olema and Lagunitas Creek watersheds) and should prioritize resolution of the most significant water quality-

related issues first, where practicable and as indicated by existing information. The timeline should reflect short- and long-term ranch management priorities related to water quality as expressed by the NPS and identified in ranch-specific ROAs. Both the strategy and timeline should be updated on an annual basis to reflect information and analysis provided under items 2 and 3 below.

2. Proposed sampling methodology for collecting quantitative water quality data in areas of the GMPA outside of the Tomales Bay watershed, consistent with the strategy provided in item 1 above. Data collection should be sufficient to enable comparison to existing water quality standards (e.g., concentrations of indicators of bacterial contamination as described in existing policies and programs of the State Water Control Board and RWQCB) and to inform identification of water quality-related issues and prioritization of management strategies to address those issues, as described in Item 3 below. The sampling methodology should incorporate guidelines and requirements from state and federal agencies (i.e., RWQCB, State Water Control Board, and/or U.S. Environmental Protection Agency) related to sampling coverage and frequency, sample testing procedures, and reporting of results.
3. A provision for annual NPS reporting of water quality monitoring results and measures taken and planned to address identified water quality issues to the Executive Director. These annual reports should include monitoring results from all previous years, comparison of water quality data with relevant state and federal water quality standards, proposed measures to address identified issues including identification of priority areas for additional ranching or grazing related best practices, and plans (including responsible entities, funding, timing and schedule) for incorporating such practices into ROAs or implementation through other measures, as appropriate.
4. The annual report to the Executive Director shall also describe the best management practices and ranching measures implemented in the previous year. For example, this reporting should include miles of fencing installed or repaired, number of stream crossings constructed or improved, installation of dairy-related infrastructure or practices to address manure management, and other ranching-related measures installed, and their locations and efficacy. This information will help provide details regarding actual implementation of the GMPA.
5. Annual reports shall also include results of continuing or proposed implementation of best management practices and water quality monitoring of ranch lands in the PRNS and GGNRA portions of the Tomales Bay watershed, including Olema and Lagunitas Creeks.

The Commission also adopted the following conditions during its deliberations:

1. Condition: The National Park Service will bring its water quality strategy to the Commission within a period of twelve months for public review, as well as Commission review and approval.

Clarification of Intent: Further discussion at the Commission hearing between the Commission and the NPS resulted in the following clarifications. Submission of the first-year version of the strategy will be prior to NPS approval of any leases under the GMPA. The Commission and NPS also agreed that the first year version of the strategy, which would be the subject of a Commission hearing, will include specific water quality monitoring details with general priorities and objectives to improve water quality; future iterations of the strategy and/or annual reporting to the Executive Director will be more specific on implementing actions.

2. Condition: The National Park Service will return to the Commission in five years so that the Commission can hear from them in regard to the progress that has been made on protection of coastal resources, including a report on the status of elk herd management, and make appropriate advisory comments and allow the public to be heard on these issues.
3. Condition: The National Park Service will come back to the Commission with a Climate Action Plan to address ranching activities at the same time that it brings its water quality strategy to the Commission.

Clarification of Intent: Further discussion at the Commission hearing between the Commission and the Park Service clarified the scope and content of the plan as follows. First, the plan should be more properly characterized as a climate action strategy in that it would identify actions that could be conducted in response to local (Marin County) and/or state (CA Air Resources Board) climate-related requirements, delineate current conditions, and put forth a strategy about how to move forward toward reducing greenhouse gas emissions from ranching operations in the GMPA area. Second, the NPS further described that this strategy would consider how climate change initiatives from the Administration and Department of the Interior, to the extent that such initiatives are developed and pertinent, distill down to the level of Point Reyes National Seashore and the north district of Golden Gate National Recreation Area, and then discuss with leaseholders opportunities to innovate or adapt ranch operations. Third, the NPS will make a presentation on the climate action strategy at the same time (i.e., one year after initial Commission concurrence) as the hearing on the water quality strategy. Finally, the NPS and the Commission recognized that there are fewer climate-related metrics than there are for water quality.

Also, not formally adopted as a condition, there was NPS agreement to provide the Executive Director with an annual report describing the status of free-ranging elk herds in the GMPA planning area, the effects of drought, and the results of elk management in the GMPA planning area.


The Commission determined that, only as conditioned, could the GMPA be found consistent to the maximum extent practicable with the enforceable policies of the California Coastal Management Program.

The Commission notes that as provided in 15 CFR § 930.4(b), should the NPS not agree with the Commission's condition of concurrence, then all parties shall treat this conditional concurrence as an objection.

The link to the CCC staff recommendation and related documents, which we have sent you previously and are posted on our website, can be found at:
<https://www.coastal.ca.gov/meetings/agenda/#/2021/4>.

If you have any questions, please feel free to call me at (415) 396-9708.

Sincerely,

DocuSigned by:

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Kate Huckelbridge
Deputy Director
Energy, Ocean Resources, and Federal Consistency Division

cc: Coastal Commission, North Central District Office
Office for Coastal Management (OCM) (David Kaiser, Kerry Kehoe)