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Attorneys for Plaintiffs
DRAKES BAY OYSTER COMPANY and KEVIN LUNNY

IN THE UNITED STATES DISTRICT COURT
FOR THE NORTHERN DISTRICT OF CALIFORNIA

DRAKES BAY OYSTER COMPANY,
17171 Sir Francis Drake Blvd
Inverness, CA 94937, and

KEVIN LUNNY,
17171 Sir Francis Drake Blvd
Inverness, CA 94937

Plaintiffs,

v.

KENNETH L. SALAZAR,
in his official capacity as Secretary, U.S. Department of the Interior,
1849 C Street, NW, Washington, D.C., 20240;
U.S. DEPARTMENT OF THE INTERIOR
1849 C Street, NW, Washington, D.C., 20240;
U.S. NATIONAL PARK SERVICE
1849 C Street, NW, Washington, D.C. 20240;
JONATHAN JARVIS,
in his official capacity as Director, U.S. National Park Service,
1849 C Street, NW, Washington, D.C. 20240;
and
DOES 1-100,

Defendants.

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Case No. _____

COMPLAINT FOR DECLARATORY AND INJUNCTIVE RELIEF

(**Administrative Procedure Act Case**)

Date:
Time:
Court:

INTRODUCTION

1. This civil action challenges Defendant Secretary of Interior Kenneth Salazar's decision to deny Plaintiffs Drakes Bay Oyster Company (DBOC) and Kevin Lunny a Special Use Permit (SUP) for the continued use of land and facilities on the shores of Drakes Estero in Point Reyes National Seashore. If allowed to stand, Secretary Salazar's decision will terminate 31 full-time jobs, deprive 15 employees of affordable housing, hijack a property right of the State of California, and permanently tear the fabric of a rural community. Secretary Salazar's decision was a final agency action in violation of the National Environmental Policy Act of 1969 (NEPA), as amended, 42 U.S.C. §§ 4321 *et seq.*; the Data Quality Act (DQA), 44 U.S.C. § 3516 Note; the Administrative Procedure Act (APA), 5 U.S.C. §§ 701-706; and the United States Constitution.

2. DBOC, a small, environmentally sustainable, family-owned oyster farm with thirty-one full-time employees, is located on the shores of Drakes Estero, in the Point Reyes National Seashore. Mr. Kevin Lunny and his wife Nancy Lunny are owners of DBOC, and Mr. Lunny serves as DBOC's President. DBOC carries on a cultural and historical legacy of cultivating oysters in Drakes Estero, where oysters have been continuously cultivated for approximately eighty years. DBOC currently produces approximately 40% of the oysters cultivated in the State of California, and is the last remaining shellfish cannery in the state. Fifteen people (DBOC employees and their families) live in affordable housing on the farm.

3. DBOC and Mr. and Mrs. Lunny purchased the farm from the Johnson Oyster Company (JOC) in December 2004. In the transaction, JOC transferred to DBOC and Mr. Lunny a renewable Reservation of Use and Occupancy (RUO) with the National Park Service (NPS) for a 1.5 acre area where onshore operations are conducted, and two State water bottom leases with the California Fish and Game Commission (CFGC) to cultivate oysters in approximately 1,060 acres of Drakes Estero. The RUO had an expiration date of November 30, 2012, with a renewal clause that grants NPS the right to issue a SUP at the end of the RUO.

4. In 2005, Point Reyes National Seashore Superintendent Donald Neubacher notified Mr. Lunny that the RUO would not be renewed upon its expiration because the NPS

lacked jurisdiction to issue a SUP, in contradiction of ¶ 11 of the RUO, which expressly contemplated that NPS could issue a SUP upon the expiration of the RUO.

5. In 2009, in answer to NPS's claim that it lacked jurisdiction to grant a new SUP to DBOC upon the expiration of the RUO, Congress enacted Section 124 of the Department of the Interior, Environment, and Related Agencies Appropriations Act of 2010 (hereinafter "Section 124"), Pub. L. No. 111-88, § 124, 123 Stat. 2904, 2932 (2009), which authorized the Secretary of the Interior to issue DBOC a new SUP "with the same terms and conditions … for a period of 10 years from November 30, 2012." Before modifying any of the terms and conditions, Section 124 directed the Secretary to "take into consideration recommendations of the National Academy of Sciences Report pertaining to shellfish mariculture in Point Reyes National Seashore."

6. Section 124 was promulgated in 2009, providing nearly three years for NPS and DOI to prepare a NEPA-compliant environmental impact statement to enable the Secretary to make the well-informed decision NEPA requires.

7. Because the decision whether to issue DBOC a SUP constitutes a major federal action under 42 U.S.C. § 4332(2)(C), 40 C.F.R. § 1508.18, and 43 C.F.R. § 46.100(a), Defendants were required to comply with NEPA and prepare a NEPA-compliant environmental impact statement to enable the Secretary to make an informed, reasoned decision whether to extend DBOC's SUP for an additional ten years. NPS initiated the NEPA environmental impact statement process in September 2010.

8. NPS, with the assistance of a government contractor, Vanasse Hangen Brustlin, Inc. (VHB), prepared and publicly released a NEPA-mandated draft environmental impact statement, *Draft Environmental Impact Statement: Drakes Bay Oyster Company Special Use Permit* (hereinafter "DEIS") in September 2011. NPS released a NEPA-mandated final environmental impact statement, *Final Environmental Impact Statement: Drakes Bay Oyster Company Special Use Permit* (hereinafter "FEIS") late on November 20, 2012. Neither of these documents complied with NEPA's substantive and procedural requirements.

9. In complete disregard for NEPA's public notice and comment process for FEIS documents, NPS never provided written notice to interested parties that the FEIS had been released; did not publish a Notice of Availability (NOA) for the FEIS in the Federal Register; and did not submit the FEIS to the U.S. Environmental Protection Agency (EPA). Accordingly, EPA never published a NOA for the FEIS to trigger an official public notice and comment process on the FEIS. NPS did not offer any explanation why it began the NEPA process and subsequently did not comply with NEPA's procedural requirements.

10. Various NPS employees have represented that it is the intention of the Service to evict the Lunnys and convert Drakes Estero to a wilderness area in reliance on the Wilderness Act of 1964 and Point Reyes Wilderness Act of 1976 without regard to the express intent of Congress as expressed in Section 124, thereby demonstrating that the conclusions in the DEIS and FEIS were tainted by the biases of these NPS employees.

11. Despite NPS's failure to even minimally observe public notice and comment procedures on a FEIS, on November 29, 2012, the Secretary issued a memorandum of decision informing DBOC that it would not be issued another SUP. The Secretary stated that he was "informed" by the DEIS and FEIS and found them "helpful to me in making my decision." In fact, the DEIS and FEIS are the only environmental or scientific reports cited in the memorandum of decision. The NAS report explicitly referenced in Section 124 is not cited.

12. The Secretary did not issue a NEPA-compliant Record of Decision (ROD) and did not affirm that his decision was based on a NEPA-compliant FEIS or DEIS.

13. Despite maintaining that the NEPA process would inform his decision whether to issue DBOC a 10-year SUP for the 789-day period of NEPA review—from scoping, the beginning of the NEPA process, in September 2010 to the Secretary's decision on November 29, 2012—the Secretary asserted for the first time in the November 29, 2012, memorandum that his decision and NPS's actions regarding the DBOC SUP are not subject to any substantive or procedural legal requirements, including those prescribed by NEPA, on the basis of a clause in Section 124 that the Secretary was authorized to issue a SUP to DBOC, "notwithstanding any other provision of law … ."

14. In his November 29, 2012, memorandum, the Secretary directed NPS to notify DBOC that its existing RUO and SUP would expire one day later—on November 30, 2012—and require DBOC to remove all of its personal property, including shellfish and racks, from Drakes Estero within 90 days. The Secretary's memorandum of decision prohibits DBOC from engaging in any "commercial activities ... in the waters of Drakes Estero after November 30, 2012," in contravention of DBOC's State water bottom leases. The memorandum of decision also prohibits DBOC from engaging in even "limited commercial activities onshore" during this 90-day period except "to the extent authorized in writing by NPS." The Secretary's memorandum of decision also directed NPS to publish in the Federal Register a notice announcing the conversion of Drakes Estero from potential to designated wilderness.

15. The memorandum of decision will cause immediate irreparable pecuniary and nonmonetary harm to DBOC, Mr. and Mrs. Lunny, and DBOC's employees, including but not limited to a substantial risk of lost customers and business reputation, risk of damage to unique DBOC property, and stress and emotional harm to Mr. and Mrs. Lunny and DBOC's employees as a result of the job losses that will occur if DBOC is forced to abruptly cease all operations and remove all personal property, shellfish and oyster racks, and structures, and to relinquish its valid State water bottom leases in Drakes Estero.

16. Plaintiffs seek declaratory and permanent injunctive relief preventing Defendants and all persons and entities acting in active concert or participation with Defendants from taking any action to implement the decision to deny DBOC the 10-year SUP contemplated by Section 124 or otherwise authorize or commence activities that would cause harm to DBOC pending compliance with NEPA, APA, DQA, the United States Constitution, and other legal requirements.

17. Plaintiffs also seek a temporary restraining order (TRO) and preliminary injunctive relief during the pendency of this litigation to prevent irreparable nonmonetary harm to DBOC, Mr. and Mrs. Lunny, and DBOC's thirty-one full-time employees.

18. Plaintiffs request that the memorandum of decision, DEIS, and FEIS be vacated.

19. Plaintiffs further request that this Court order the issuance to DBOC of the 10-year SUP contemplated by Section 124 or, in the alternative, remand the matter and allow DBOC to continue its mariculture operations, so long as DBOC makes "annual payments to the United States based on the fair market value of the use of" the onshore RUO and SUP areas, as contemplated by Section 124, until Defendants prepare and publish a NEPA-compliant FEIS and a neutral decisionmaker is able to make an informed, reasoned, decision in compliance with federal law as to whether to issue DBOC a SUP.

JURISDICTION, VENUE, AND RELIEF

20. This action arises under the APA, 5 U.S.C. §§ 701-706, NEPA, 42 U.S.C. §§ 4321 *et seq.*, DQA, 44 U.S.C. § 3516 Note, and the Due Process Clause and Takings Clause of the Fifth Amendment to the U.S. Constitution, U.S. CONST. amend. V. This Court has jurisdiction under 28 U.S.C. § 1331 and 5 U.S.C. §§ 701-706.

21. The Secretary's decision to deny DBOC a 10-year SUP and publication of the FEIS are final agency actions that are reviewable pursuant to 5 U.S.C. § 704. Plaintiffs timely submitted comments on the DEIS and FEIS and otherwise fully participated in the agency decisionmaking process regarding whether to issue DBOC a 10-year SUP, thereby exhausting all administrative remedies. Plaintiffs timely submitted a Complaint About Information Quality regarding the DEIS's contents pursuant to the DQA and Director's Order #11B and timely submitted an administrative appeal of NPS's response to the Complaint About Information Quality, thereby exhausting all administrative remedies.

22. Venue properly lies in this Court under 28 U.S.C. § 1391(e), as the Defendants are officers and employees of the United States, a substantial part of the events and omissions giving rise to the Plaintiffs' claims occurred in this judicial district, and the property that is the subject of this action is situated in this judicial district.

23. This Court is empowered to grant declaratory relief in this action pursuant to the Declaratory Judgment Act, 28 U.S.C §§ 2201-2202, 5 U.S.C. § 702, and Fed. R. Civ. P. 57.

24. This Court is empowered to issue a TRO and grant preliminary and permanent injunctive relief in this action pursuant to 28 U.S.C. § 2202, 5 U.S.C. §§ 705, 706, and Fed. R. Civ. P. 65.

25. This Court is empowered to order the Secretary to grant DBOC the 10-year SUP authorized by Section 124 of the 2010 DOI Appropriations Act pursuant to 5 U.S.C. § 706(1), which authorizes this Court to "compel agency action unlawfully withheld."

26. This Court is empowered to vacate the Secretary's memorandum of decision denying DBOC a 10-year SUP, and the DEIS and FEIS that informed the Secretary's decision, under 5 U.S.C. § 706(2), which authorizes this Court to "hold unlawful and set aside agency action, findings, and conclusions."

27. This Court may allow Plaintiff to recover reasonable costs it incurs in connection with this action pursuant to 28 U.S.C. § 2412 and reasonable attorneys' fees pursuant to the Equal Access to Justice Act, 28 U.S.C. § 2412.

INTRADISTRICT ASSIGNMENT

28. Pursuant to Civil L.R. 3-5(b) and Civil L.R. 3-2(c)-(d), there is a basis for assigning this civil action to the San Francisco Division, as a substantial part of the events and omissions giving rise to Plaintiff's claims occurred in Marin County, California, and DBOC's principal place of business located in Marin County, California.

PARTIES

29. Plaintiff DBOC is a family-owned, environmentally conscious, sustainable oyster farm. DBOC is located in Drakes Estero, which is part of the Point Reyes National Seashore. DBOC has thirty-one full time employees and produces approximately 40 percent of the oysters harvested in California. DBOC continues a more than eighty-year-old tradition of oyster cultivation in Drakes Estero and is a cultural and historical part of Drakes Estero and the Point Reyes National Seashore.

30. Plaintiff Kevin Lunny is an owner of DBOC and is its President. He is a third-generation rancher and resident in Point Reyes National Seashore.

31. Defendant Kenneth L. Salazar is the Secretary of the U.S. Department of Interior (DOI), an Executive Branch agency of the United States. He is named as a defendant in his official capacity.

32. Defendant U.S. Department of the Interior (DOI) is an Executive Branch department of the United States, an "agency" within the meaning of 5 U.S.C. § 701(b), charged with managing the public lands and resources in accordance and in compliance with federal laws and regulations.

33. Defendant U.S. National Park Service is an Executive Branch agency of the United States DOI. NPS is responsible for the content of the DEIS and FEIS and for implementing and enforcing the Secretary's decision to deny DBOC a 10-year SUP.

34. Defendant Jonathan Jarvis is the Director of the NPS. He is named as a defendant in his official capacity.

35. Does 1-100 are NPS employees and other federal employees, whose identities are not yet known, who knowingly or recklessly provided, presented, gave, or are otherwise responsible for false and deliberately misleading information, misrepresented data, misstatements, material omissions, and other material inaccuracies in the DEIS and/or FEIS, or otherwise acted in bad faith in the environmental review process.

FACTS

Background

36. Since 1934, the State of California has continuously leased the water bottoms of Drakes Estero for the purpose of cultivating shellfish.

37. In 1965, the State of California conveyed the water bottoms of Drakes Estero to the United States but reserved the right to fish, including the right to lease the State water bottoms for aquaculture. In an exchange of letters in March 1966, the Director of the California Department of Fish and Game (CDFG) confirmed with the Superintendent of Point Reyes National Seashore and the NPS Pacific Regional Office that the State's conveyance reserved the right to lease the water bottoms for aquaculture, as described below in the Director's letter:

> Upon reviewing this matter it becomes apparent that the legislation transferring the submerged lands at Point Reyes to the Federal Government specifically reserved the fishing rights to the State. (AB 1024 (Bagley) Ch. 983, Stats. of 1965.
>
> It thus appears that all State laws and regulations pertaining to shellfish cultivation remain in effect and are applicable to the operations of the Johnson Oyster Company. This would include annual rental, privilege taxes, planting requirements, etc. – in short all current sections of the Fish and Game Code, and of Title 14, California Administrative Code, which relate to shellfish cultivation.

38. The April 1974 Environmental Impact Statement for the proposed Point Reyes Wilderness Area confirms the contemporaneous interpretation of the rights retained by the State in 1965. It provides that "[c]ontrol of the lease from the California Department of Fish and Game, with presumed renewal indefinitely, is within the rights reserved by the State on these submerged lands."

39. JOC held valid State water bottom leases in Drakes Estero from the 1950s until December 2004 to cultivate oysters. In 2004, the CFGC granted JOC an extension of its two State water bottom leases in Drakes Estero for twenty-five (25) years, until 2029.

40. Effective November 30, 1972, JOC granted fee title to 1.5 acres on the shores of Drakes Estero where the oyster farm was located to the United States in exchange for a forty (40) year RUO, ending November 30, 2012. The RUO contained a renewal clause, which provided that a SUP could issue at the end of the RUO period. This RUO was transferred to DBOC and Mr. Lunny in December 2004.

Disputed Analysis of DBOC Impact

41. Between 2007 and 2012, NPS scientists made public claims to elected officials that DBOC's operations were causing harm to the environment at Drakes Estero, specifically to harbor seals in Drakes Estero. These claims were criticized as being without scientific merit by numerous commentators, including but not limited to Dr. Corey Goodman, Ph.D., an independent scientist and elected member of the National Academy of Sciences, and Dr. Roberto Anima, of the U.S. Geologic Service (USGS).

42. These criticisms resulted in the official withdrawal of a 2007 NPS report, *Drakes Estero: A Sheltered Wilderness Estuary*, from the NPS website.

43. Between 2007 and 2010, the NPS operated a secret camera program in Drakes Estero that ultimately took over 300,000 digital photographs.

44. After the program came to light in 2010, complaints were filed over the NPS's failure to disclose the secret camera program. In 2011, Gavin Frost, of the Office of the Solicitor of the Department of the Interior, issued his report (hereinafter the "Frost Report") concluding that NPS employees committed scientific errors and appeared to have acted improperly, including "blurring the line between exploration and advocacy through research" and withholding relevant, material, and necessary research and data from DBOC and the National Academy of Sciences. The Frost Report found five NPS officials and scientists guilty of violating the NPS Code of Scientific and Scholarly Conduct, and concluded that "NPS, as an organization and through its employees, made mistakes which may have contributed to an erosion of public confidence."

45. In 2007, the National Academy of Sciences was directed to study NPS science at Drakes Estero, pursuant to an agreement reached between Sen. Dianne Feinstein, DBOC, and Mary A. Bomar, then-Director of the NPS.

46. The National Academy of Sciences, Ocean Studies Board, National Research Council, published two reports, entitled *Shellfish Mariculture in Drakes Estero, Point Reyes National Seashore, California* (2009) (hereinafter "2009 NAS Report"), and *Ecosystem Concepts for Sustainable Bivalve Mariculture* (2010), relevant in assessing DBOC's continued presence in Drakes Estero.

47. The 2009 NAS Report concluded that "that there is a lack of strong scientific evidence that shellfish farming has major adverse ecological effects on Drakes Estero at the current (2008–2009) levels of production and under current (2008–2009) operational practices." The 2009 NAS Report also stated that NPS had "in some instances selectively presented, overinterpreted, or misrepresented the available scientific information on DBOC operations."

48. In July 2010, DBOC applied for a SUP from NPS consistent with the terms found in Article 11 of the RUO, and Section 124.

49. During a September 2010 meeting held in NPS's Oakland, California, regional headquarters regarding DBOC's SUP application, NPS Staff provided DBOC with a document entitled "Agenda for Meeting Between Drake's Bay Oyster Company and the National Park Service Regarding EIS for Special Use Permit Application by DBOC" and a document entitled, "Point Reyes National Seashore Drakes Bay Oyster Company Special Use Permit Environmental Impact Statement, Draft Schedule of Major Milestones, September 2010" (hereinafter "Draft NEPA Schedule"). A copy of the Draft NEPA Schedule is lodged with this Complaint as Exhibit A and incorporated by reference herein.

50. The Draft NEPA Schedule's agenda items included "Scope and Timing of NEPA Process for DBOC's permit application," "Points of Contact during NEPA process," and "Composition of NPS NEPA Team."

51. The Draft NEPA Schedule indicated that the NEPA-required "publication of notice of intent (NOI) in [the] Federal Register" and NEPA-required public meetings would occur within thirty days and provided a "Target Completion Date" of October 2010.

52. The Draft NEPA Schedule stated that the NEPA-mandated publication of a NOA of the DEIS would be published in the Federal Register, a sixty-day public review of the DEIS would occur, and that public meetings would be held by a "Target Completion Date" of "August-September 2011."

53. The Draft NEPA Schedule stated that a NOA of the FEIS would be published in the Federal Register by a "Target Completion Date" of June 2012 and that a 30-day waiting period would occur prior to the Secretary's decision whether to issue DBOC a SUP.

54. The Draft NEPA Schedule stated that July 2012 was the "Target Completion Date" by which the Secretary was to issue a record of decision (ROD) regarding whether to issue DBOC a SUP, and that a NOA of that ROD would be published in the Federal Register.

55. On October 22, 2010, NPS published a Notice of Intent to prepare an Environmental Impact Statement for the Drakes Bay Oyster Company Special Use Permit, Point Reyes National Seashore in the Federal Register stating that "[p]ursuant to the National Environmental Policy Act of 1969, 42 U.S.C. 4332(2)(C), the National Park Service is preparing

an Environmental Impact Statement (EIS) for the Drakes Bay Oyster Company Special Use Permit, Point Reyes National Seashore, California." 75 Fed. Reg. 65,373.

56. NPS's October 2010 Public Scoping Handout regarding the NEPA-required environmental impact statement concerning the DBOC SUP decision stated that NPS was beginning to prepare an environmental impact statement on this issue "in accordance with the National Environmental Policy Act (NEPA)."

57. The October 2010 Public Scoping Handout stated that "[o]n behalf of the Secretary [of the Interior], the NPS will use the NEPA process" and that "[t]he results of the NEPA process will be used to inform the decision of whether a new special use permit should be issued to DBOC for a period of 10 years."

58. As required by NEPA, NPS and a government contractor, VHB, prepared the DEIS, which was released for public comment in September 2011. Public comment on the DEIS closed on December 9, 2011.

59. The DEIS outlines four "alternatives." Under "Alternative A," denominated the "no action" alternative, DBOC would not be issued a 10-year SUP and would be forced to close and remove its buildings and structures in late 2012. The DEIS concludes that Alternative A is the "environmentally preferred alternative" based upon the agency's claims that continued DBOC operations will have long-term "major" and "moderate" adverse impacts on the environment in Drakes Estero. Alternatives B, C, and D were the "action" alternatives that contemplated granting a SUP to DBOC under a variety of operating conditions. The DEIS assessed DBOC's impact on the following categories: "wetlands," "eelgrass," "bethnic fauna," "fish," "harbor seals," "birds and bird habitat," "coastal flood zones," "water quality," "soundscapes," "wilderness," "visitor experience and recreation," "socioeconomic resources," and "NPS operations." In the DEIS, NPS claimed that renewing DBOC's SUP would have "major" long-term adverse impacts on Drakes Estero's environment for two of those fourteen categories: "soundscapes" and "wilderness." The DEIS also claimed that DBOC would have "moderate" long-term adverse impacts on Drakes Estero's "birds and bird habitat," "harbor seals," and "visitor and recreation experience."

60. The DEIS stated that after the public comment period, "[a] final version of this document will then be released, and a 30-day no-action period will follow. Following the 30-day period, the alternative or actions constituting the approved plan will be documented in a record of decision that will be signed by the Regional Director of the Pacific West Region." This 30-day no-action period and ROD are both procedurally required by NEPA.

61. During the DEIS public comment period, NPS received scores of public comments pointing out substantial procedural and substantive problems with the DEIS, including comments submitted by DBOC and a professional consulting firm, ENVIRON International.

62. Among other things, DBOC's comment letter informed NPS that the DEIS uses an incorrect environmental baseline for the "action" alternatives in violation of NEPA. Specifically, NEPA requires that the "action" alternatives be analyzed with a baseline drawn from existing conditions, but the DEIS's Alternatives B, C, and D used an imaginary "expected future conditions" state that was undefined, could not be measured, and did not include the existing oyster farm.

63. DBOC's comment letter also explained that the DEIS failed to define the proposed action as required by NEPA, and failed to comply with NEPA's requirement to adequately assess reasonable mitigation measures.

64. ENVIRON International's December 9, 2011, comment letter described in substantial detail why the DEIS's Soundscape environmental analysis was inadequate. (hereinafter "ENVIRON Comment"). For example, ENVIRON criticized NPS's failure to actually measure sound generated by DBOC's boats and equipment. ENVIRON submitted the noise measurements that it took onsite at DBOC and its analysis of that data, which found that the DEIS exaggerated the amount of noise generated by DBOC's boats and equipment and consistently underestimated the background noise level at Drakes Estero.

65. The National Marine Fisheries Service (NMFS), the federal agency tasked with protecting marine mammals, commented on the inadequacy of the DEIS's analysis of DBOC's relationship with Drakes Estero. NMFS stated that "the harbor seal population in Drakes Estero appears stable and healthy"; "there is no indication of negative impacts to fish species of concern

to NMFS, including ESA-listed salmonids and their critical habitat"; "[w]e have no records to indicate that DBOC is impacting eelgrass to the degree that eelgrass is not healthy or not providing adequate habitat values to the estero."

66. In response to the substantial criticism of the validity of the science underlying the DEIS, in December 2011 Congress directed the National Academy of Sciences "to assess the data, analysis, and conclusions in the DEIS in order to ensure there is a solid scientific foundation for the Final Environmental Impact Statement expected in mid-2012." Conference Report, Consolidated Appropriations Act, 2012 (Dec. 2012), Pub. L. No. 112-74.

67. Instead of immediately asking the National Academy of Sciences to perform the Congressionally-mandated review of the DEIS, NPS commissioned Atkins North America, Inc., to conduct a confidential peer review of the DEIS. In March 2012, DOI released a report by Atkins North America, Inc., entitled "Final Report on Peer Review of the Science Used in the National Park Service's Draft Environmental Impact Statement: Drakes Bay Oyster Company Special Use Permit" (hereinafter "Atkins Peer Review Report").

68. The Atkins Peer Review Report essentially endorsed some of the DEIS's conclusions, but it did so based on a misunderstanding of the basic nature of the data the DEIS relied on to reach its conclusions regarding DBOC's impact on Drakes Estero's environment.

69. After the Atkins Peer Review Report was released, Dr. Corey Goodman learned that the "soundscape" analysis in the DEIS not only did not rely on actual measurements of DBOC noise generation but also misrepresented data and contained gross inaccuracies, which were concealed using misleading short-form citations in the DEIS.

70. Dr. Goodman also discovered that the peer reviewer who drafted the Soundscape section of the Atkins Peer Review Report had been deceived by these short-form citations into believing that NPS had actually measured sound levels of DBOC's two small oyster boats and equipment, when in fact NPS used proxies instead of taking onsite noise measurements.

71. Dr. Goodman discovered flaws of similar magnitude in the "harbor seals," "wilderness," "eelgrass," "birds and bird habitat," and "special-status species" analysis.

72. In April 2012, Dr. Goodman filed a formal misconduct complaint with DOI Acting Inspector General Mary Kendall, which remains pending as of the filing of this Complaint.

73. In May 2012, NPS finally requested that the National Academy of Sciences begin the Congressionally-mandated review of the DEIS.

DBOC's and Dr. Corey Goodman's Data Quality Act Complaint

74. On August 7, 2012, pursuant to the DQA and NPS's Director's Order #11B, Cause of Action, a nonprofit 501(c)(3), submitted a Complaint About Information Quality to NPS on behalf of Mr. and Mrs. Lunny and Dr. Goodman detailing the reasons why many of the DEIS's claims are demonstrably incorrect and proposing specific corrections.

75. The Complaint About Information Quality identified to NPS conclusions and analysis in the DEIS that were not accurate; not timely and based on the most current information available; not objective and unbiased in presentation and substance; not highly transparent about data, sources, and methods; not reproducible by qualified third parties; not generated using site-specific data and on-site measurements, where required by NEPA, binding NPS policy, and other applicable law; not based on reliable data and sound and well-accepted scientific practices for data collection and analysis; and not based on the best available science and supporting studies.

76. The Complaint About Information Quality noted that NPS's information-quality guidelines in Director's Order #11B require that all information that NPS disseminates to the public in agency publications must meet all of these criteria, and that NPS's information-quality guidelines incorporate by reference DOI's information-quality guidelines, NPS Director's Order #12 and DO-12 Handbook, NPS's 2006 Management Policies, DOI and CEQ NEPA regulations, and many other sources of minimum information-quality standards.

77. The Complaint About Information Quality stated that, although doing so would have been inexpensive, simple, and accurate, NPS did not take on-site measurements of noise generated by DBOC's equipment.

78. The Complaint About Information Quality stated that the DEIS inappropriately relied on scientifically unsupportable proxies for DBOC's oyster boats. The DEIS used 1995 sound measurements from loud, fast, high-horsepower racing and police patrol boats and 70 HP jet skis operating at full throttle measured from two feet away as "representative" of noise generated by DBOC's slow-moving oyster skiffs measured from a distance of fifty feet.

79. As stated in the Complaint About Information Quality, the DEIS inappropriately used data from a 2006 study measuring sound generated by heavy highway construction equipment such as jackhammers, concrete mixers, and drill rig trucks, claiming that it was "representative" of noise generated by DBOC's onshore equipment.

80. As stated in the Complaint About Information Quality, actual on-site measurements of sound generated by DBOC boats and equipment taken by ENVIRON International in 2011 and reported to NPS reveal that the DEIS's conclusions concerning DBOC's noise profile are substantially exaggerated; and 2009 recordings of DBOC's oyster boats captured by a government microphone can be matched with GPS data from DBOC's oyster boats and NPS's own photographs of DBOC's oyster boats to independently confirm the accuracy of the ENVIRON data.

81. As stated in the Complaint About Information Quality, the DEIS also used an inappropriate and nonstandard baseline for the ambient noise in Drakes Estero, thus overstating the relative amount of noise added to the environment by DBOC.

82. As stated in the Complaint About Information Quality, the DEIS used the foregoing inaccurate, misrepresented ambient sound level data and inappropriate and overstated "representative" sound levels for DBOC's boats and equipment to dramatically overstate the distance at which sound from DBOC's boats and equipment can be detected.

83. As stated in the Complaint About Information Quality, the DEIS's conclusion that DBOC's mariculture operations have a "major" long-term adverse impact on Drakes Estero's "soundscape" were based on misrepresented and inaccurate data.

84. As stated in the Complaint About Information Quality, the conclusion that DBOC causes "major" adverse impacts on Drakes Estero's "wilderness" was driven not only by

inaccurate soundscape data in the DEIS but also by on the use of vague, subjective, unbounded "Impact Intensity" definitions—allegedly used to scientifically measure DBOC's impact on Drakes Estero's "wilderness"—which are identical to or indistinguishable from those that federal courts have repeatedly rejected on the basis that they violate NEPA or are arbitrary and capricious.

85. The Complaint About Information Quality informed NPS that the DEIS analysis ignored highly credible, probative data that the government had in its possession or was actually aware of, such as actual on-site measurements of DBOC's noise-generating activities, over 300,000 high-resolution photographs of harbor seals that were secretly taken between 2007 and 2010 by sophisticated cameras NPS installed and GPS data that is critical to analyzing the location, speed, noise generation, and frequency of DBOC boat trips.

86. The Complaint About Information Quality informed NPS that the peer reviewer responsible for assessing the adequacy of the DEIS's "soundscape" analysis for the Atkins Peer Review Report, Dr. Christopher Clark, when informed of the origin of the data claimed to be representative of DBOC noise-generating activities, responded that he was unaware that NPS had not actually taken on-site measurements of DBOC's boats, 12-volt plastic oyster tumbler, and other mariculture-related equipment and essentially retracted his conclusion regarding the adequacy of the DEIS's soundscape analysis.

87. Because the DEIS constitutes information disseminated to the public via agency publication, applicable law required NPS to make corrections to the DEIS to conform to minimum information quality standards set forth in Director's Order #11B and other binding sources of minimum information-quality standards.

88. On October 3, 2012, NPS responded to the Complaint About Information Quality, as required by Director's Order #11B and the DQA. In its decision letter, NPS stated that it considered the Complaint About Information Quality "as a matter of discretion," and was not required to treat the Complaint About Information Quality as a comment on the DEIS as described in Director's Order #11B.

89. On October 16, 2012, Cause of Action submitted an Administrative Appeal Letter to NPS pursuant to Director's Order #11B, thereby exhausting administrative remedies.

The National Academy of Science's Review of the DEIS

90. In response to NPS's May 2012 request, the National Research Council of the National Academy of Sciences organized a panel to assess the NPS science as presented in the DEIS. The NAS panel released its report on August 30, 2012, entitled *Scientific Review of the Draft Environmental Impact Statement Drakes Bay Oyster Company Special Use Permit* (hereinafter "NAS DEIS Review"), which, although limited in scope, was highly critical of the DEIS.

91. In the NAS DEIS Review, NRC determined that many of the DEIS's Impact Level conclusions are highly or moderately uncertain, exaggerated, or based on insufficient information.

92. The NAS DEIS Review echoed concerns raised by DBOC's and ENVIRON's comment letters, and the Complaint About Information Quality, expressly concluding that DBOC's "adverse impact" on Drakes Estero's "soundscape," "harbor seals," and many other resource categories could be minor, negligible, or beneficial, even though the DEIS claimed that they were "moderate" or, in the case of "soundscape," "major" adverse impacts.

93. The NAS DEIS Review also echoed DBOC's comment regarding the inappropriate baseline used for the "action" alternatives, stating that NPS should "segregate impact assessments for alternative A from alternatives B, C, and D and indicate that the assessments are not comparable due to use of different baselines" and that the FEIS should be revised to "include additional mitigation options."

94. The NAS DEIS Review's Suggestions for DEIS Revisions, at a minimum, required major revisions to the DEIS's conclusions, methodology, and data:

> The committee provides the following high priority suggestions for revising the final EIS: (1) use definitions of impact intensities that demonstrably scale with their magnitude (e.g. , minor, moderate, major), and fully reflect the range of both adverse and beneficial impacts including a category for negligible impacts; (2) provide a discussion of the levels of uncertainty for the impact intensities (e.g., Table 8.1); (3) specify all assumptions used in assessing impact and in scaling the

> intensity of impact; (4) describe potential alternate conclusions as appropriate (e.g., Table 8.1); (5) segregate impact assessments for alternative A from alternatives B, C, and D and indicate that the assessments are not comparable due to use of different baselines; (6) use all relevant and available information, especially for soundscapes and water quality (from research in Drakes Estero and in other comparable systems) and; (7) include additional mitigation options as possible permit conditions for the action alternatives to reduce impacts, e.g. , an option to discontinue the culture of Manila clams would address some concerns about the establishment of that nonindigenous species in Drakes Estero; impacts of many DBOC practices (i.e., boat use, culture techniques, marine debris, soundscape disturbance) could potentially be reduced by the implementation of appropriate mitigation measures.

95. The NAS DEIS Review, which emphasized the high to moderate levels of uncertainty regarding the DEIS's conclusions, the inadequacy of the information and data it relied on, and the fundamental flaws with the DEIS's methodology, confirms that the DEIS was so inadequate as to preclude meaningfully analysis.

NPS's FEIS

96. Based on the NAS DEIS Review and other public comments, including those submitted by DBOC, ENVIRON International, and Mr. and Mrs. Lunny, NPS knew or should have known that, under 40 C.F.R. § 1502.9(a), it was required by NEPA to revise and recirculate a new Draft EIS for public review. Instead, NPS elected to publish the FEIS.

97. NPS was required by 40 C.F.R. § 1506.9, 40 C.F.R. § 1506.10(b)(2), and NPS's DO-12 Handbook, to submit the FEIS to EPA and provide at least a thirty-day notice-and-comment period from the time when EPA publishes a NOA for the FEIS in the Federal Register before a federal agency may issue a record of decision relying or based on a FEIS.

98. NPS posted the 800-page FEIS on the Internet late on Tuesday, November 20, 2012. The FEIS was posted the evening before Secretary Salazar's Wednesday, November 21, 2012, visit to DBOC to tour the farm and meet with Mr. and Mrs. Lunny, community leaders, and employees; one day before the Thanksgiving long holiday weekend; and only four business days before Secretary Salazar issued his memorandum of decision on November 29, 2012.

99. The FEIS stated that "[t]he NEPA process will be used to inform the decision of whether a new [SUP] should be issued to DBOC for a period of 10 years."

100. The Plaintiffs had scant opportunity to review the technical and substantive data and analysis presented in the FEIS before Secretary Salazar issued his memorandum of decision on November 29, 2012. Furthermore, by letter on November 26, 2012, DBOC requested certain new technical materials relied upon in the FEIS that were not included in the Appendix. NPS did not respond to this request.

101. The FEIS did not acknowledge the Complaint About Information Quality and its specific proposed corrections.

102. The FEIS dismissed ENVIRON's on-site measurements of noise generated by DBOC's small oyster boats and equipment without explaining how or why NPS believed ENVIRON's Report was deficient. NPS did not take any of its own onsite noise measurements as mandated by NPS Policies 2006 and 40 C.F.R. § 1502.22(b).

103. On November 27, 2012, ENVIRON prepared a new report analyzing the FEIS's Soundscapes analysis (hereinafter "ENVIRON FEIS Noise Report"). It concludes that the FEIS continues to use inappropriate proxies for DBOC's onshore equipment, including a metal concrete mixer for the plastic oyster tumbler. The ENVIRON FEIS Noise Report stated that the NPS comparison of the oyster tumbler to a concrete mixer was "ludicrous" and a comparison that "would be laughable were it not so dishonest." Furthermore, the ENVIRON FEIS Noise Report found that a new NPS noise analysis presented in Appendix I of the FEIS that claimed to "unambiguously" detect boat noise in Drakes Estero "reflect[s] so many false positives (i.e., incorrect identification of DBOC boats when none were present) and false negatives (i.e., failing to identify DBOC boats when they were present) that all of the boat noise data presented in FEIS Appendix I lack scientific validity." A copy of the ENVIRON FEIS Noise Report is lodged with this Complaint as Exhibit B and incorporated by reference herein.

104. The September 2011 DEIS cited a 2011 published paper by NPS scientists Dr. Ben Becker, Mr. David Press, and Dr. Sarah Allen for the claim that DBOC caused a spatial displacement of harbor seals out of Drakes Estero. In November 2011, after the DEIS was released, the Marine Mammal Commission (MMC) released a report that concluded that while the data are "scant and have been stretched to the limit," that the MMC review provided "some

support for the conclusion that harbor seal habitat-use patterns and mariculture activities in Drakes Estero are at least correlated."

105. The FEIS quoted this MMC report as supporting the NPS correlation presented by Becker et al., 2011. The FEIS failed to explain that the conclusion from the MMC report quoted in the FEIS had come under scientific criticism, that NPS had done further analysis (at the request of the MMC), and that based upon the further NPS analysis, on June 17, 2012, the MMC Executive Director Dr. Tim Ragen wrote: "Given the uncertainty associated with the analyses, the results are not proof of a correlation...."

106. Point Reyes National Seashore Superintendent Cicely Muldoon was provided a copy of Dr. Ragen's letter on June 18, 2012, yet the FEIS failed to cite this letter, and failed to correctly note that the 2011 MMC Report no longer supported the NPS correlation.

107. The FEIS presented an entirely new analysis performed by the United States Geologic Service (USGS) of over 165,000 digital photographs from 2008, by Lellis, W.A., C.J. Blakeslee, L.K. Allen, B.F. Molnia, S.D. Price, S. Bristol, and B. Stewart, entitled "Assessment of Photographs from Wildlife Monitoring Cameras in Drakes Estero, Point Reyes National Seashore, California: U.S. Geological Survey Open-File Report" (2012) (hereinafter "USGS Seal Photo Report"). A copy of the USGS Seal Photo Report is lodged with this Complaint as Exhibit C and incorporated by reference herein.

108. The USGS Seal Photo Report, publicly released on November 26, 2012, did not attribute any harbor seal disturbances to DBOC's oyster boats, and did not find any causal connection between DBOC's use of its oyster boats and harbor seal flushing events (in which seals quickly rush into the water). Instead, the report found that of the two flushing events identified where a DBOC boat was visible, in one there was no visible connection between the stimulus and seals flushing, since seals flushed into the water "just after boat leaves the area." Furthermore, for the second event, the report noted that while "[m]inor flushing [occurred] before boat arrival, [the] cause [is] unknown."

109. In contrast to conclusions in the USGS Seal Photo Report, the FEIS misrepresented the analysis, falsely stating that "[t]wo flushing disturbance events were

attributed to [DBOC] boat traffic at nearby sandbars" by the USGS assessment. Thus, where the USGS review found some association (or correlation), the FEIS claimed that the USGS review found attribution (or causation).

110. The FEIS retained the DEIS's conclusions regarding DBOC's impact on Drakes Estero's environment.

111. The FEIS continued to use vague, unbounded Impact Intensity definitions in the "wilderness" resource category to support its conclusion that DBOC causes a "major" long-term adverse impact to Drakes Estero's wilderness.

112. The FEIS included no changes to any of the DEIS's conclusions regarding DBOC's impact on Drakes Estero's environment in response to the NAS DEIS Review and did not acknowledge that the NAS had concluded that many of the DEIS's claims regarding "moderate" or "major" long-term adverse impacts on Drakes Estero's environment were highly uncertain and likely exaggerated.

113. Even though an oyster farm has been continuously operating in Drakes Estero for eight decades, the FEIS used undefined "expected future conditions" in which no oyster farm was present as the baseline for its "action" alternatives, Alternative B, C, and D, in violation of 43 C.F.R. § 46.30. In the FEIS's Appendix, NPS claimed that it was authorized to use this baseline by 43 C.F.R. § 46.30(2), even though § 46.30(2) makes clear that a "no action" alternative can only be a "no project" alternative "in cases where a *new* project is proposed for implementation."

114. The FEIS acknowledged that denying DBOC's SUP would result in adverse impacts on "visitor experience and recreation" for some visitors and local and regional socioeconomic resources and "could result in long-term major adverse impacts on California's shellfish market."

115. The FEIS did not inform decisionmakers and the public of the reasonable alternatives which would avoid or minimize adverse impacts, even though NPS was informed by the NRC DEIS Review and DBOC's comment of its obligation to do so.

116. The FEIS failed to meaningfully discuss the NAS DEIS Review's criticisms and alternate conclusions.

117. The FEIS's failed to discuss the Complaint About Information Quality and the NAS DEIS Review.

118. The FEIS did not stress areas of controversy (including issues raised by agencies and the public).

119. The FEIS failed to include NPS sound level measurements of DBOC's mariculture operations despite the fact that complete soundscape data is essential to a reasoned choice among alternatives and the costs of obtaining it would not have been exorbitant.

120. The FEIS did not make clear that there was incomplete or inaccurate information regarding DBOC's impact on the environment in Drakes Estero.

121. The FEIS failed to provide an adequate cost-benefit analysis.

122. The FEIS did not identify a preferred alternative, and instead merely identified an "environmentally preferred alternative."

The Secretary's Decision

123. On November 27, 2012, DBOC notified Secretary Salazar that he could not rely on the FEIS because it violated NEPA, and also provided him with Dr. Goodman's and ENVIRON's preliminary analysis of the FEIS's soundscape analysis explaining some of the ways in which the FEIS violated NEPA.

124. The Secretary has not issued a NEPA-required ROD memorializing his decision whether to grant DBOC a SUP and the reasons for that decision; no NOA of a ROD in this matter has been published in the Federal Register.

125. On November 29, 2012, the Secretary issued a memorandum of decision that noted that the DEIS and FEIS "informed" him and were "helpful to [him] in making [his] decision." The memorandum of decision claims that the Secretary's decision was not based on data asserted to be flawed in DBOC's November 27, 2012, letter.

126. The memorandum of decision directed NPS to allow DBOC's existing RUO and SUP to expire; to publish a notice in the Federal Register to convert Drakes Estero from "potential wilderness" to "wilderness"; and to allow DBOC ninety days to terminate its operations.

127. The November 29, 2012, memorandum expressly interpreted Section 124 to exempt the Secretary's decision from all NEPA and other legal requirements: "Sec. 124 does not require me (or the NPS) to prepare a DEIS or an [sic] FEIS or otherwise to comply with the National Environmental Policy Act of 1969 (NEPA) or any other law. ... Sec. 124 expressly exempts my decision from any substantive or procedural legal requirements."

128. In contrast to the Secretary's memorandum, the DEIS published in September 2011 stated that "[a]lthough the Secretary's authority under Section 124 is 'notwithstanding any other provision of law,' the Department has determined that it is appropriate to prepare an EIS and otherwise follow the procedures of NEPA." When the FEIS was published on November 20, 2012, however, the sentence quoted above was amended as follows (underlining indicating addition / strikeout indicating deletion): "[a]lthough the Secretary's authority under ~~s~~Section 124 is 'notwithstanding any other provision of law,' the Department has determined that it is ~~appropriate~~ helpful to ~~prepare an EIS and otherwise~~ generally follow the procedures of NEPA."

129. The November 29, 2012, memorandum does not discuss the 2009 NAS Report's assessment of the relationship between DBOC's mariculture operations and Drakes Estero's environment, as contemplated by Section 124.

130. The Secretary did not issue a NEPA-compliant ROD, as required by 40 C.FR. § 1505.2, and did not discuss his analysis of the environmental impact of adopting the various alternatives and other required matters. The Secretary did not assert that his decision was based on a NEPA-compliant FEIS or DEIS.

131. Instead, the Secretary stated that his decision was "based on the incompatibility of commercial activities in wilderness" and suggested that the legislative purpose of the Wilderness Act of 1964 and Point Reyes Wilderness Act of 1976 trumped the congressional intent and language in Section 124.

132. The Secretary's memorandum stated that Section 124, which was enacted in 2009, "in no way overrides the intent of Congress as expressed in the 1976 [Point Reyes Wilderness Act] to establish wilderness at the estero. With that in mind, my decision effectuates that [1976] Congressional intent."

133. The Secretary's memorandum, interpreting and relying on the 1976 Point Reyes Wilderness Act, reasoned that denying DBOC a SUP "honors Congress's direction to 'steadily continue to remove all obstacles to the eventual conversion of the[] lands and waters [in the Point Reyes National Sea Shore] to wilderness status."

134. The Secretary's selective application of NPS policies and the 1964 Wilderness Act and 1976 Point Reyes Wilderness Act as binding precedent to his decision, while excusing compliance with NEPA, demonstrates the arbitrary and capricious nature of the Secretary's decision and violated the plain language of NEPA and Section 124.

The Secretary's Decision Attempts to Seize the State's Retained Water Bottoms

135. DBOC holds two water bottom leases from the State of California, issued by the CFGC in 2004 and managed by the CDFG.

136. DBOC's State water bottom leases—M-438-01 and M-438-02—are valid through 2029.

137. As explained above, California conveyed fee title to the water bottoms in Drakes Estero in 1965, but retained the rights to lease the water bottoms in Drakes Estero for aquaculture.

138. California has continuously exercised its right to lease the water bottoms in Drakes Estero for aquaculture operations since 1965, including reissuing leases in 1979 and 2004. The CFGC has the authority to regulate aspects of these operations, including stocking, disease control, and transportation of aquatic organisms. The CFGC collects from DBOC both an annual lease fee, based on the number of acres in the lease, and a privilege use tax, based on the number of gallons of shucked oyster meats produced each month. The State has continually leased the water bottom in Drakes Estero to DBOC for as long as DBOC has been cultivating oysters in the bay.

139. In 2008, NPS issued a separate SUP to DBOC and Mr. Lunny covering approximately 3.4 acres of onshore area, and purporting to cover the State water bottom lease areas.

140. The Secretary's November 29, 2012, memorandum's directing that DBOC must cease all oyster farming 90 days after November 30, 2012, would deprive DBOC of all future use and enjoyment of its water bottom leases and completely prevent DBOC from benefiting from them in any manner.

141. The memorandum of decision directs the NPS to convert Drakes Estero from "potential wilderness" to "wilderness" by publishing a notice in the Federal Register in an attempt to deprive DBOC of its right to cultivate shellfish in Drakes Estero particularly, and to deprive the State of California from exercising its retained property rights generally.

142. DBOC currently has between 8 million and 10 million oysters in the waters of Drakes Estero in various stages of development, the last of which will not be ready to harvest for another two years. Those oysters currently have a market value of about $0.50 each.

CAUSES OF ACTION

COUNT 1: VIOLATION OF NEPA AND THE APA

143. Plaintiff repeats and incorporates by reference the allegations contained in paragraphs 1-142.

144. Because the DEIS was "so inadequate as to preclude meaningful analysis," NPS's failure to "prepare and circulate a revised" DEIS to allow the public a meaningful opportunity to comment on it prior to preparing and releasing the FEIS violates 40 C.F.R. § 1502.9(a).

145. The FEIS's length, content, and format violate 40 C.F.R. § 1502.1, 40 C.F.R. § 1502.2(c), 40 C.F.R. § 1502.15, and 40 C.F.R. § 1502.7.

146. The FEIS's characterization of Alternative A (denial of permit) as the "no action" alternative violates 43 C.F.R. § 46.30, and its use of an "expected future conditions" environmental baseline for the "action" Alternatives B, C, and D violates NEPA.

147. NPS did not objectively and rigorously consider and meaningfully evaluate all reasonable alternatives in violation of 40 C.F.R. § 1502.14(a).

148. The FEIS violates NEPA because it does not contain a "full and fair" discussion of environmental impacts as required by 40 C.F.R. § 1502.1.

149. In violation of 40 C.F.R. § 1502.1, the FEIS did not "inform decisionmakers and the public of the reasonable alternatives which would avoid or minimize adverse impacts."

150. The FEIS does not contain a summary that stresses "areas of controversy (including issues raised by agencies and the public)," as required by 40 C.F.R. § 1502.12.

151. In violation of 40 C.F.R. § 1502.2, the FEIS failed to use data that was essential to a reasoned choice among alternatives.

152. In violation of 40 C.F.R. § 1502.9(b), the FEIS failed to "respond to comments" and "discuss at appropriate points in the final statement any responsible opposing view which was not adequately discussed in the draft statement and shall indicate the agency's response to the issues raised."

153. In violation of 40 C.F.R. § 1506.10(b)(2) and 40 C.F.R. § 1506.9, NPS did not submit the FEIS to EPA, EPA did not publish a NOA for the FEIS in the Federal Register and no public comment and notice period was initiated, much less completed, at least thirty days prior to the Secretary's November 29, 2012, decision, depriving the public of a meaningful opportunity to comment on the FEIS.

154. The FEIS did not adequately analyze and discuss potential mitigation measures, in violation of 43 C.F.R. § 46.130; 40 C.F.R. § 1502.16(h).

155. The FEIS did not include adequate cost-benefit analysis as required by 40 C.F.R. § 1502.2 and did not make clear that it was based on incomplete, inaccurate, or unavailable information, in violation of 40 C.F.R. § 1502.22; 43 C.F.R. § 46.125.

156. NPS failed to ensure the scientific integrity of discussions and analysis in the FEIS, in violation of 40 C.F.R. § 1502.24.

157. Secretary Salazar did not issue a ROD that complies with 40 C.F.R. § 1505.2, in violation of NEPA.

158. Secretary Salazar's decision to interpret Section 124 as relieving him of his NEPA and other substantive and procedural legal obligations violated NEPA's plain language and was arbitrary and capricious and otherwise unlawful under 5 U.S.C. § 706(2).

159. Defendants' noncompliance with NEPA is reviewable under the APA. 5 U.S.C. §§ 704, 706(2).

160. Defendants' failure to comply with NEPA requirements established by the NEPA statute and Council of Environmental Quality (CEQ), DOI, and NPS regulations implementing NEPA, as well as other sources of binding NEPA standards, including but not limited to Director's Order #12, NPS's DO-12 Handbook, and NPS's 2006 Management Policies was arbitrary and capricious; in excess of statutory authority, jurisdiction, or limitations and short of statutory right; an abuse of discretion; and otherwise not in accordance with law. 5 U.S.C. § 706(2).

161. The Secretary's unreasoned, arbitrary decision to suddenly reverse course—after maintaining for the 789-day period between the scoping in September 2010 and November 29, 2012, that the NEPA process would inform his decision whether to issue DBOC a SUP—and claim for the first time in the November 29, 2012, decision memorandum that his decision whether to issue a SUP was not subject to NEPA or any other substantive or procedural requirements was arbitrary and capricious and an abuse of discretion.

162. The DEIS and FEIS were issued by Defendants and used and relied upon by Defendant Salazar and other decisionmakers in violation of NEPA.

163. The Secretary's November 29, 2012, decision to deny DBOC a 10-year SUP was made in violation of NEPA.

COUNT 2: VIOLATION OF DQA AND THE APA

164. Plaintiff repeats and incorporates by reference the allegations contained in paragraphs 1-163.

165. The DEIS, FEIS, and Atkins Peer Review Report are "information" that was "disseminated" by NPS, within the meaning of the DQA, Director's Order #11B, DOI's Information Quality Guidelines, the Office of Management and Budget's (OMB) Information

Quality Guidelines, and subject to binding minimum information-quality standards established therein.

166. Defendants' failure to correct the FEIS to reflect the proposed corrections outlined in the Complaint About Information Quality violated the DQA, Director's Order #11B, and other binding minimum standards for information-quality, including but not limited to DOI's Information Quality Guidelines; Director's Order #47; Director's Order #12; NPS's DO-12 Handbook; NPS's 2006 Management Policies; and all other applicable laws, regulations, and binding policies and procedures.

167. NPS failure to treat the Complaint About Information Quality as a comment on the DEIS to which it was obligated to respond violated Director's Order #11B.

168. NPS failed to ensure that information it disseminated to the public met the accuracy, transparency, objectivity, reliability, timeliness, and other minimum information-quality standards established by the DQA, Director's Order #11B, OMB Information Quality Guidelines, and other sources of binding minimum information-quality standards.

169. NPS's failure to comply with the DQA, Director's Order #11B, and related binding information-quality-related standards was arbitrary and capricious; in excess of statutory authority, jurisdiction, or limitations and short of statutory right; an abuse of discretion; and otherwise not in accordance with law. 5 U.S.C. § 706(2).

COUNT 3: VIOLATION OF THE APA

170. Plaintiff repeats and incorporates by reference the allegations contained in paragraphs 1-169.

171. The Secretary's decision denying DBOC a SUP was in excess of his statutory jurisdiction in violation of 5 U.S.C. § 706(2)(C), because he had no authority to order NPS to publish a notice in the Federal Register converting Drakes Estero from "potential wilderness" to "wilderness."

172. The Secretary's failure to consider NAS reports regarding DBOC and mariculture in Drakes Estero as contemplated by Section 124 was arbitrary and capricious, in excess of statutory authority, and otherwise unlawful under 5 U.S.C. § 706(2).

173. The Secretary's selective application of some federal laws, such as the 1965 Wilderness Act and the 1976 Point Reyes Wilderness Act, while waiving others, such as NEPA, was arbitrary, capricious, and otherwise not in accordance with law.

174. The Secretary's decision was arbitrary and capricious and contrary to Section 124's plain language because it was made in reliance on the 1964 Wilderness Act, the 1976 Point Reyes Wilderness Act, and/or NPS Wilderness Policies, all of which Congress intended to and did supersede by including the "notwithstanding any other provision of law" clause in Section 124.

175. The Secretary's decision to deny DBOC a SUP was arbitrary and capricious; in excess of statutory authority, jurisdiction, or limitations and short of statutory right; an abuse of discretion; without observance of procedure required by law, and otherwise not in accordance with law. 5 U.S.C. § 706(2).

COUNT 4: VIOLATION OF THE DUE PROCESS CLAUSE OF THE FIFTH AMENDMENT

176. Plaintiff repeats and incorporates by reference the allegations contained in paragraphs 1-175.

177. The Secretary's decision to deny DBOC a SUP expressly authorized by Section 124 deprived DBOC of a property interest protected by the Due Process Clause of the Fifth Amendment to the U.S. Constitution.

178. DBOC was not afforded a constitutionally adequate hearing to present its case for extension of the SUP.

179. Defendants failed to comply with the procedural requirements of NEPA, the APA, the DQA, and other applicable federal law that would have given DBOC a meaningful opportunity to respond to the FEIS, explain why the FEIS was flawed, and present evidence negating the FEIS's claims.

180. Because the Secretary's decision was made in reliance upon these procedurally deficient and unlawful processes, DBOC was directly and proximately deprived of its property

absent procedural due process of law, in violation of the Fifth Amendment to the U.S. Constitution.

181. Because the Secretary's decision was made in reliance upon an arbitrary and capricious interpretation of the 1976 Point Reyes Wilderness Act, the 1972 Grant Deed and RUO held by DBOC, and/or the flawed and inadequate data in the DEIS and FEIS, DBOC was directly and proximately deprived of its property absent substantive due process of law, in violation of the Fifth Amendment to the U.S. Constitution.

COUNT 5: VIOLATION OF THE TAKINGS CLAUSE OF THE FIFTH AMENDMENT

182. Plaintiff repeats and incorporates by reference the allegations contained in paragraphs 1-181.

183. The Secretary's November 29, 2012, memorandum directing NPS to order DBOC to cease all "commercial shellfish activities … in the waters of Drakes Estero after November 30, 2012" deprived DBOC of all economically beneficial use of its personal property (immature oysters in Drakes Bay) without just compensation.

184. The Secretary's November 29, 2012, memorandum directing NPS to order DBOC to cease all "commercial shellfish activities … in the waters of Drakes Estero after November 30, 2012" deprived DBOC of economically beneficial use of the valid State water-bottom leases without just compensation.

185. The Secretary's November 29, 2021, memorandum caused a regulatory and physical taking of DBOC's property without just compensation in violation of the Takings Clause of the Fifth Amendment to the U.S. Constitution.

COUNT 6: UNLAWFUL INTERFERENCE WITH AGENCY FUNCTIONS

186. Plaintiff repeats and incorporates by reference the allegations contained in paragraphs 1-185.

187. NPS employees are prohibited from "[t]hreatening, resisting, intimidating, or intentionally interfering with a government employee or agent engaged in an official duty, or on account of the performance of an official duty." 36 C.F.R. § 2.32(a)(1).

188. NPS employees are prohibited from "[k]nowingly giving a false or fictitious report or other false information … on an application for a permit." 36 C.F.R. § 2.32(a)(3)(ii).

189. NPS employees are prohibited from "[k]nowingly giving a false report for the purpose of misleading a government employee or agent in the conduct of official duties, or making a false report that causes a response by the United States to a fictitious event." 36 C.F.R. § 2.32(a)(4).

190. On information and belief, Does 1-100, as yet unknown NPS employees, intentionally interfered with government employees and agents engaged in their official duties, knowingly gave false and fictitious information on an application for a permit, and knowingly gave false reports for the purpose of misleading government employees and agents engaging in the conduct of official duties, and made false reports causing responses by the United States to fictitious events, in violation of 36 C.F.R. § 2.32(a) and the APA. 5 U.S.C. § 702(2)(A)..

REQUESTED RELIEF

WHEREFORE, Plaintiffs respectfully request that this Court:

1. Issue a declaratory judgment with the following:

A. Declaration that Secretary Salazar's November 29, 2012, decision is null and void, of no effect, as:

i. unconstitutional under the Fifth Amendment;

ii. arbitrary and capricious, an abuse of discretion, or otherwise not in accordance with law in violation of the APA;

iii. contrary to constitutional right, power, privilege, or immunity in violation of the APA;

iv. in excess of statutory jurisdiction, authority, or limitations, or short of statutory right in violation of the APA.

C. Declaration that issuance of the DEIS and FEIS violated NEPA and the DQA.

D. Declaration that the State of California retained the right to lease the State water bottoms in Drakes Estero when it conveyed them to the U.S. in 1965, and that DBOC's State water bottom leases are valid.

2. Set aside and hold unlawful Secretary Salazar's November 29, 2012, decision.

3. Order Secretary Salazar or his successor to direct NPS to issue DBOC a 10-year SUP.

4. Alternatively, remand this matter to the NPS and issue an order to NPS to prepare a new draft environmental impact statement subject to the NEPA-required public comment period and a new final environmental impact statement that complies with all NEPA and other applicable substantive and procedural requirements to enable a new, neutral decisionmaker to issue a NEPA-compliant ROD, allowing DBOC to continue to operate consistent with the terms of the RUO and SUP that expired on November 30, 2012.

5. Permanently enjoin Defendants and all persons and entities in active concert or participation with Defendants from relying on the DEIS or FEIS in any decisionmaking process.

6. Permanently enjoin Defendants and all persons and entities in active concert or participation with Defendants from relying on a DEIS or FEIS unless it is issued in accordance with all procedural and substantive due process requirements of NEPA and the APA.

7. Permanently enjoin NPS from evicting DBOC or its employees until NPS considers the DBOC application for a SUP in accordance with due process.

8. Permanently enjoin all NPS employees and contractors involved in the previous NEPA process from participating in the NEPA process, including VHB.

9. Permanently enjoin NPS from publishing a notice in the Federal Register converting Drakes Estero from "potential wilderness" to "wilderness."

10. Issue a TRO and a preliminary injunction preventing NPS from enforcing or implementing the Secretary's decision until this Court decides the merits of this lawsuit.

11. Award Plaintiffs their costs and reasonable attorneys' fees incurred in this action; and

12. Grant all other such relief as the Court may deem just and proper.

DATED: December 3, 2012

Respectfully submitted,

Amber D. Abbasi [CSBN 240956]
Cause of Action
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Phone: 202.400.4232
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DATED: December 3, 2012

Respectfully submitted,

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EXHIBIT A

AGENDA FOR MEETING BETWEEN DRAKE'S BAY OYSTER COMPANY AND THE NATIONAL PARK SERVICE REGARDING EIS FOR SPECIAL USE PERMIT APPLICATION BY DBOC

DATE: SEPTEMBER 22, 2010
LOCATION: NPS REGIONAL OFFICE
1111 JACKSON STREET, OAKLAND
6TH FLOOR CONFERENCE ROOM
TIME: 9:00 to 12:00

1. Scope and Timing of NEPA Process for DBOC's permit application
2. Statement of Principles and Possible MOU
3. Points of Contact during NEPA process
4. Composition of NPS NEPA Team
5. Discussion of NPS's preliminary list of references for EIS: (a copy of this list was sent to DBOC's attorneys on September 17, 2010)
6. Discussion regarding possible use of U.S. Institute for Environmental Conflict Resolution
7. Site visits, scope and process for archeological and historic resources survey work
8. Special Use Permit: process and path forward until existing SUP expires

Point Reyes National Seashore Drakes Bay Oyster Company Special Use Permit Environmental Impact Statement
Draft Schedule of Major Milestones
September 2010

Milestone	Target Completion Date
Public Scoping (30 days) • Publication of notice of intent (NOI) in Federal Register • Public Meetings approximately 15 days after NOI is published	October 2010
Preparation of DEIS	November 2010- July 2011
Public Review of DEIS • Publication of notice of availability (NOA) in Federal Register • Public review of Draft EIS (60 day review) • Public meetings approximately 30 days after NOA is published	August-September 2011
Preparation of FEIS	October 2011-May 2012
FEIS Released to Public • Publication of NOA of Final EIS in Federal Register • 30-day waiting period	June 2012
ROD signed • Publication of NOA of ROD in Federal Register	July 2012

EXHIBIT B

ENVIRON

November 27, 2012

MEMORANDUM

To: Kevin Lunny
CC: Ryan Waterman

From: Richard Steffel

ENVIRON Project No: 30-31180A

Project Name: Drakes Bay Oyster Company Special Use Permit

Subject: National Park Service FEIS – Review and Comments

This memo provides my *preliminary* comments on the soundscape impact analysis sections of the Final EIS for the Drakes Bay Oyster Company (DBOC) Special Use Permit produced by the National Park Service. As you know, the FEIS was issued last week just prior to the Thanksgiving holiday, and I did not become involved with the latest review until Saturday 11/24. So the time to review and respond to this massive document has been rushed, and given the short time frame during which decisions regarding granting of this permit will be made, my intent with this memo is to point out immediately apparent flaws and errors in the FEIS analysis of soundscape impacts. I think DBOC should reserve the right to submit additional comments as time allows.

SUMMARY

The soundscape impact analysis remains fundamentally flawed. It does not offer sufficiently coherent and correct information upon which to base informed decisions regarding noise impacts from the DBOC facility. The FEIS appears to be based more on pursuing a specific, preconceived result than in factually considering noise generated by the DBOC operations and transmission of such noise to other locations. In my opinion, the noise impact assessment is not useful in evaluating the actual noise implications of the facility, and greatly overstates the potential for noise impacts.

Based on my reviews of the DEIS and FEIS for this project, I do not believe the NPS conclusions that DBOC noise sources are presently, and will continue to cause major noise impacts to visitors or wildlife within the Drakes Estero are supported by the evidence presented in the FEIS. My qualifications for offering the opinions in this memo are included in Attachment 2 of this memo.

INTRODUCTION

ENVIRON submitted comments on the Draft EIS noise assessment for this facility one year ago and noted a number of flaws with the original approach. Most if not all of these comments were substantiated in a subsequent review conducted by National Academy of Sciences. But instead of taking steps to remedy these flaws, NPS has spent time and money developing an equally invalid, slanted, and incomplete assessment. I refer to these comments and nearly total lack of response from NPS in the remainder of this memo.

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In addition to the specific comments on the FEIS related to issues raised in ENVIRON comments on the DEIS, I have also worked with and reviewed the summary documentation provided by Dr. Corey Goodman regarding his further analysis of sound level measurement sonograms presented in Appendix I of the FEIS. I concur with his conclusions, and have attached his documentation to this memo (Attachment 1). The final section of this memo briefly reviews and discusses his findings.

Background/Ambient Noise Conditions Still Misrepresented

In the original analysis reported in the DEIS the NPS applied a heretofore unknown noise metric they called "lowest daily ambient level" along with the median (L_{50}) metric from a single measurement location to represent existing ambient noise levels throughout the study area. In comments, ENVIRON suggested using the sound-energy-average noise metric (L_{eq}) as being a better representation of existing conditions.

In the FEIS NPS has discontinued using "lowest daily ambient level" and instead switched to using the L_{90} metric along with the L_{50} metric as two indicators of existing conditions. But there is no basis whatsoever for using the L_{90} as a metric for assessing impacts from transient sources because 90% of the time sound levels are higher than this level. Consequently, the vast majority of the time natural sound sources like wind can cause sound levels to exceed this level, and the FEIS indicates *average* daily wind speeds in the area exceed 10 mph more than 30% of the time (p 260). It is therefore inappropriate to suggest that levels in excess of this L_{90} level somehow represent a major noise impact to area users. And it is only by applying this inappropriate metric that NPS is "able" to generate results that comprise "major" noise impacts from DBOC.

DBOC Source Noise Levels are Still Grossly Exaggerated

The noise analysis reported in the DEIS relied on gross exaggerations of DBOC source noise levels based on misuse of data from measurements of other sources. In preparing comments on the DEIS, in order to provide a contrasting data set, ENVIRON measured noise levels from the *specific* sources operating at the DBOC facility. These source noise measurements were intended to provide reasonable representations of typical noise levels from this equipment for comparison with the levels used by NPS, and these objective data clearly indicated that NPS was very likely grossly overstating DBOC noise. Based on these measurements, ENVIRON comments strongly suggested that the analysis needed to be corrected for the FEIS using actual source noise measurements as is standard practice in these sorts of analyses.

I have conducted hundreds of noise impact assessments involving a variety of sources. Standard good practice for evaluating environmental noise dictates use of specific representations of sources of interest. This is especially true in instances where the sources already exist in the location of

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interest (i.e., as opposed to a new source in a new location) and are easy to measure. So NPS's continued refusal to complete this essential first step in characterizing the noise sources of interest is a mystery to me, because under NEPA requirements, it is NPS's responsibility to conduct an adequate assessment of potential environmental impacts. It is not DBOC's responsibility to conduct or to sponsor a separate analysis that involves definitive source noise measurements. So I believe NPS's repeated, unsupported criticisms regarding the quality and utility of the ENVIRON sound level measurements are simply a disappointing attempt to cast doubt where none exists.

In lieu of taking actual sound level measurements of the specific equipment whose noise it is attempting to assess, NPS instead opted to criticize but then essentially substantiate and then use the ENVIRON sound level measurement data representing DBOC equipment. At the same time NPS has continued to use an exaggerated range of possible equipment noise levels based on false comparisons with unrepresentative equipment. The two most blatant examples are discussed below.

Oyster Tumbler Noise

The oyster tumbler is a simple device used to sort oysters by size. It is comprised of an approximately 10' long *plastic* cylinder about 18" in diameter that is turned slowly by a low-power electric motor. A direct measurement of this source working at maximum capacity resulted in a 2-minute L_{eq} sound level of just less than 50 dBA (at 50 feet). NPS used this value in the FEIS noise analysis to represent the "low-end" of the range of noise levels from this equipment.

To offset this low value, NPS selected an "upper-range" sound level of 75 dBA based on noise from a portable metal concrete mixer filled with gravel and rock. But the oyster tumbler cylinder is plastic ***not*** metal as stated in the FEIS, and is by no means comparable to a metal concrete mixer filled with gravel and rock. This comparison and the suggested 25-dBA range in levels from this device is ludicrous, and would be laughable were it not so dishonest. Therefore in my opinion, all reference to and use of this supposed upper-end sound level for the oyster tumbler should be ignored by any responsible officials considering this issue.

Pneumatic Drill Noise

ENVIRON measured an L_{eq} level of 67 dBA (at 50 feet) from a single pneumatic drill operating in a normal fashion for this setting and site-specific use (i.e., separating oyster shells from the growth medium). This level is in no way comparable to the 80-dBA level used by NPS to represent the upper-range level for noise from this source. NPS rationale that "the lowest value in other references agrees with the peak [i.e., Fast L_{max}, 1/8 second] level reported by ENVIRON" does not justify use of this much higher level as any sort of reasonable representation of this source over the

entire duration of its use. Application of this "upper range" level for this device is deceptive, and should be ignored by any responsible officials considering this issue.

Similarly, the NPS use of artificially inflated source noise levels for the DBOC front-end loader and for both DBOC boats is at best misleading and at worst deceptive.

NPS Simplistic Analysis is Insufficient and Inadequate

ENVIRON comments on the DEIS regarding the overly simplistic noise impact assessment methodology noted the following:

> The noise impact assessment presented in the DEIS does not constitute use of "best science available to determine impacts" as required by Director's Order #47 (No. 7 Defining Impacts on Park Soundscapes) ("Soundscape Preservation and Noise Management," Director's Order #47, Washington, DC: National Park Service, December 2000; cited in Volpe, 2011 to define soundscape).
>
> The noise analysis did not consider the duration of noise exposure from the intermittently operated sources related to DBOC operation, but simply assumed that roughly estimated hours of operation of various activities equated to hours of exposure at all possible locations. So there was no consideration of variability of noise from DBOC sources and especially mobile sources (i.e., small motor boats and the front end loader). This overly simplistic approach may have grossly overstated DBOC-related noise impacts, and given the severity of the resulting conclusions, this simple approach cannot be justified . . . An adequate analysis will require use a noise model to simulate DBOC sound source activities at specific locations over the course of a day . . . NPS should provide a comprehensive and accurate noise impact assessment using a noise model that employs standard accepted calculational practices.

NPS response to these comments was as follows: "It is very unlikely that more detailed knowledge of the timing and location of equipment usage would substantially alter the analysis or conclusions presented in the Final EIS." This response is unsupported by any rationale or discussion, and I totally disagree with this conclusion.

Knowing the locations and the timing of operating equipment and factoring in easily applicable noise control measures provided by enclosures and other obstructions to noise transmission (e.g., large piles of oyster shells) as would be possible with actual noise modeling could have, and I believe would have, led the NPS to completely opposite conclusions regarding noise impacts from all DBOC operations. But instead of correcting the flawed analysis for the FEIS, NPS doubled down on the simplistic and inadequate approach of equating estimated hours of operations as indicative of noise exposure at *all* locations, using totally uncontrolled sound levels unobstructed by any form of terrain or other landforms. The FEIS assessment is, therefore, not credible or complete, and it should not be used as the basis for decision making in this matter.

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Consider, for example, the simple tabulation described below regarding the duration of exposure to boat noise that includes an actual estimate of time of exposure as part of the equation.

DBOC Boat Noise Exposure Tabulation

Because the motorboats are moving point sources, any one specific location would be exposed to noise from the motorboats for much less than the *total* time the motorboats are in operation. Using the sound levels of a motorboat as identified in the FEIS, and the distance and speed at which the motorboat is expected to travel, ENVIRON estimated the percentage of time during a day when sound levels from a motorboat could exceed a certain level (i.e., 41 or 34 dBA). These estimates consider distance attenuation only (i.e., they do not factor in intervening topography or atmospheric attenuation), so they would be representative of sound levels experienced by a kayaker within about 50 feet of the boat path.

The length of the motorboat path from the DBOC to the southernmost point of the work area is approximately 2.5 miles. The total travel time for this path, assuming a 12 mph travel speed, is approximately 12.5 minutes. The table below indicates estimated cumulative noise exposure in terms of the amount of time boat noise levels exceed either 41 dBA (upper section of table) or 34 dBA (lower section).

Using the lower bound sound level for a motorboat of 62 dBA at 50 feet, as presented in FEIS Table 3-3 (page 257), motorboat sound levels could be 41 dBA or higher when the boat is within 561 feet of a specific kayak. With a motorboat traveling 12 mph, this would expose a kayaker at a fixed location near the motorboat path to sound levels at or above 41 dBA for a total of 64 seconds per trip (assuming full exposure when the boat is both coming towards and moving away from the fixed receiving location). Using these assumptions, ENVIRON considered the percentage of time that a kayaker in a specific location near the motorboat travel path might be exposed to motorboat levels exceeding 41 or 34 dBA for varying numbers of trips. These are presented in Table 1.

These data clearly show that even using the upper bound of boat noise suggested in the FEIS (which I believe overstates DBOC boat noise), cumulative exposure of any single point along the boat's travel path is far less than even the *moderate* impact threshold of 5% of a 24-hour day based on the 41-dBA threshold, and never rises to the level of a major impact (>10% of a 24-hour day). Using the lower 34-dBA threshold, only the upper bound noise level in conjunction with 12 trips per day rise to the level of a *moderate* impact under NPS criteria stated in the FEIS.

DBOC boat noise levels at locations farther from the motorboat travel path and/or shielded from motorboat noise by any sorts of landforms would experience motorboat noise at lower levels and for less time. In addition, any boat actually producing 74 dBA at 50 feet would be traveling faster than 12 mph, so the cumulative exposure time would be *less* than indicated in the table above.

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Table 1. Example Cumulative Noise Tabulation Considering Duration of Events

Source Noise "Range"	Base Level at 50 ft (dBA)	Distance to 41 dBA (feet)	Time per trip > than 41 dBA (seconds)	1 round trips (2 trips)		2 round trips (4 trips)		6 round trips (12 trips)	
				% of 8-hr day	% of 24-hr day	% of 8-hr day	% of 24-hr day	% of 8-hr day	% of 24-hr day
Lower Bound	62	561	128	0.4	0.1	0.9	0.3	2.7	0.9
Upper Bound	74	2,233	508	1.8	0.6	3.5	1.2	10.6	3.5
Source Noise "Range"	Base Level at 50 ft (dBA)	Distance to 34 dBA (feet)	Time per trip > than 34 dBA (seconds)	% of 8-hr day	% of 24-hr day	% of 8-hr day	% of 24-hr day	% of 8-hr day	% of 24-hr day
Lower Bound	62	1,256	143	1.0	0.3	2.0	0.7	5.9	2.0
Upper Bound	74	5,000	568	3.9	1.3	7.9	2.6	23.7	7.9

This example tabulation refutes the entire basis of the NPS impact assessment for DBOC boats based on the assumption of cumulative time. The NPS analysis was overly simplistic and conceptually fatally flawed, as indicated in ENVIRON comments on the DEIS. The NPS soundscape impact assessment presented in the FEIS should not, therefore, be used as the basis for decision making in this matter.

LACK OF CONSIDERATION OF MITIGATION

In the DEIS NPS found indications of significant noise impacts and yet did absolutely nothing to consider possible means of mitigating these purported impacts. In commenting on this lack ENVIRON noted the following:

> The NPS approach that did not consider possible control measures to reduce or eliminate identified noise impacts is not consistent with Director's Order #47 (No. 6 Establishing Soundscape Preservation Objectives) (a) which says . . . "the soundscape management goal [in the event of authorized noise sources] would be to reduce the noise to the level consistent with the best technology available – to mitigate the noise impact, but not adversely affect the authorized activity." The DEIS noise assessment ignored this directive and concluded that the only possible means of controlling noise was the total elimination of the DBOC noise sources. This is an inappropriate approach.
>
> Excluding any consideration of means for reducing DBOC noise is also inconsistent with Director's Order #47 (No. 8 Constructive Engagement) which says that in addressing noise that has been found to be "inappropriate" that "Superintendents must work constructively and cooperatively with those responsible for inappropriate sources of noise in parks . . ." Such a

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> cooperative effort to identify and, if needed, to reduce facility-related noise, has never been seriously attempted as mandated by this order. Cooperative discussion with DBOC should be included as part of the revamped noise impact assessment [included in the FEIS].

The analysis presented in the FEIS is similarly lacking and therefore incomplete because there was no attempt whatsoever to consider the possible means for reducing noise from DBOC sources. The FEIS response to comments regarding consideration of possible noise control measures says "under alternative D, NPS would work with DBOC under alternative D to ensure that onshore sound-generating equipment would be housed within new buildings constructed or otherwise enclosed to the extent practicable" (F-89). But the "consideration" of possible noise controls ends there, and there is no further thought nor any quantitative evaluation of the implications of readily available means for reducing DBOC source noise that could eliminate some or all projected noise impacts. Thus, the FEIS noise impact analysis is neither reasonable nor complete, and is therefore insufficient for making an informed decision.

NPS DBOC Boat Noise Culpability Analysis is Incorrect

As indicated previously, in addition to the specific comments on the FEIS, I also worked with and reviewed the summary documentation provided by Dr. Corey Goodman regarding his further analysis of sound level measurement sonograms presented in Appendix I of the FEIS. I concur with his conclusions, and have attached his documentation to this memo. His primary conclusions are summarized below.

Appendix I of the FEIS is fundamentally flawed. Although NPS claimed in the FEIS based on review of sound level measurements to have "unambiguously" detected boat noise throughout Drakes Estero, to have counted minutes of boat noise, and to have estimated the levels of boat noise, all these NPS claims are inaccurate and invalid. As explained in Attachment 1 of this memo, NPS results reflect so many false positives (i.e., incorrect identification of DBOC boats when none were present) and false negatives (i.e., failing to identify DBOC boats when they were present) that all of the boat noise data presented in FEIS Appendix I lack scientific validity.

FEIS Appendix I should be disregarded and the statements concerning it in FEIS Chapter 4 should be retracted and revised. NPS does not have any records of boat noise greater than 10% of the day on any day, and NPS has no basis for concluding that DBOC noise generators have a major adverse impact on wildlife and visitor experience to Drake Estero. There is, in fact, no evidence supporting the conclusion that DBOC source noise comprises a major adverse impact on wildlife or visitor experience.

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Attachment 1
NPS DBOC Boat Noise Culpability Analysis Review
By
Dr. Corey S. Goodman

November 27, 2012

From: Dr. Corey S. Goodman

To: Kevin Lunny, Drakes Bay Oyster Company, and

Richard Steffel, Air Quality and Environmental Noise, ENVIRON

Re: Analysis of Appendix I and its implications for the soundscape section of the NPS final Environmental Impact Statement for Drakes Estero

The NPS final Environmental Impact Statement (FEIS) for Drakes Estero was released on Wednesday November 21 coincident with Secretary Salazar's visit to the oyster farm. Given the lack of a formal comment process, the Thanksgiving holiday weekend, and my travel schedule, this analysis has been done on very short notice. Please consider it a 'snap shot" analysis of one part of one of the 14 categories of potential harm cited by NPS. I have focused on Appendix I and it's implications on the Soundscape section in Chapter 4. This should thus be considered a preliminary and partial analysis.

Of the 14 categories examined, the NPS FEIS contains a finding of two major adverse impacts: Soundscape and Wilderness (which in part relies on Soundscape). In the draft EIS (DEIS), the finding of a major adverse impact of noise was based in large part upon incorrect representations for noise generators (e.g., a jet ski for the DBOC oyster boat and a cement truck for the DBOC oyster tumbler) and an incorrect measure of ambient noise ("lowest daily ambient level," a number and term not found in the Volpe Report, other EIS documents, or the literature in general).

In the FEIS, most of these incorrect numbers from the DEIS were removed, yet the claim of a major adverse impact remains. Thus, I now explore how the major adverse impact remains the same, when the numbers that drove the major impact were withdrawn by NPS. New numbers were added to replace those incorrect numbers. To better understand how the new numbers drive the same level of impact, I first review the NEPA (NPS) definition of the major impact in the Soundscape section of this FEIS.

Definition of Major Adverse Impact of Noise

The definition of a major impact is (page 445):

> *"Human-caused noise would be at a level (greater than 41 dBA) that requires elevated vocal effort for communication between people separated by 16 feet, and the natural soundscape is interfered with more than 10 percent of the time."*

On page 444, the percentage of time during a year (using a 24 hour day) is considered relative to the 10-year SUP term. In other words, a finding of major impact requires a chronic 10 percent interference of the natural soundscape, in this case, over 10 years. The impact is considered on "Wildlife and Wildlife Habitat" (defined as in Drakes Estero and along its shores) and on "Visitor Experience and Recreation" (defined as in Drakes Estero and along the trails surrounding Drakes Estero). Thus, the finding requires that the oyster boats and onshore equipment provide sufficient noise at any one location (particularly in Drakes Estero) to disturb wildlife (e.g., harbor seals or birds) or visitor

experience (e.g., kayakers and hikers) more than 10 percent of the time.

In summary, to find a major adverse impact of noise requires finding that DBOC boats and equipment would be expected to cause significant noise at any one location for 10 percent of the time on a 24-hour basis over the next 10 years. In the FEIS, NPS concludes that DBOC boats and equipment meet this definition, and thus are sufficient for a finding of a major adverse impact of noise on wildlife and visitors.

How does NPS derive the numbers to support this claim of a major impact of noise? On page 443, NPS writes:

> *"The duration of human-caused noise as a result of DBOC activities was estimated using information provided by DBOC as presented in table 3-3. ... In the estero, boats operate approximately 8 hours per day, 6 days per week, making a total of 12 round trips per day (DBOC [Lunny], pers. Comm., 2011h)."*

NPS goes on to write that according to DBOC, the boats generate 2 hours of noise per day. When taken together with the noise of onshore equipment (e.g., the oyster tumbler), NPS calculates that there are four to eight hours of noise generation per day, six days per week, resulting "in 24 to 48 hours of DBOC noise generation each week."

Such a calculation, however, assumes that both the oyster boats and the onshore equipment (e.g., the oyster tumbler) can be heard by wildlife and visitors at the same location for 10 percent of each day over 10 years. Such a claim assumes a large distance over which the noise from the boats and the onshore equipment can be heard.

This is the most likely explanation for why NPS insists on continuing to claim, for example, that the oyster tumbler (which can only be heard over several hundred feet) can be heard for 2.4 miles (in the DEIS) and now for 1.85 miles (in the FEIS). To reach 10%, NPS needed the noise from the onshore equipment to extend far out into the estero to overlap with the boat noise, which in reality it does not.

FEIS Claims Regarding Frequency and Duration of DBOC Boat Trips

The FEIS statement that Mr. Lunny informed NPS that DBOC boats make 12 round trips per day is a misquote of what Mr. Lunny told NPS and VHB in his interview. Moreover, this misquote has been pointed out to NPS multiple times in response to the draft EIS. Mr. Lunny's statement of 12 round trips per day was in response to the question of what was the maximum number of boat trips that ever took place in a single day since he has owned DBOC, not what is the average or mean number of boat trips per day.

On August 7, 2012, Cause of Action, on behalf of Kevin and Nancy Lunny and myself, filed a Data Quality Act petition with NPS. Among many issues addressed in that DQA petition, Cause of Action clarified this point and asked NPS to revise this statement in the FEIS. However, NPS did not make the correction.

Throughout the FEIS, NPS continues to claim that DBOC boats take (see Table 3-3) "approximately 12 40-minute trips/day" even though NPS had been informed that this is inaccurate according to GPS records and boat log records. NPS was told this was incorrect but did not correct it.

ON Page 25-26 of the DQA, Cause of Action wrote:

"7.1.3 Claims Regarding Frequency and Duration of DBOC Boat Trips

Statements to be Corrected:

• Statement in Table 3-3 that DBOC's 20 HP and 40 HP oyster boats make "[u]p to 12 40-minute trips/day."

• Recommended Correction: Table 3-3 should be corrected to state: "On average, one 40-minute trip/day."

• Statement that DBOC oyster boats "operate for up to 8 hours per day, 6 days per week, year round."

• Recommended Correction: The DEIS should be revised to state: "DBOC boats typically operate for 1-2 hours per day (and often only 30-40 minutes) out near sandbars OB and UEN. Moreover, the work is seasonal."

Cause of Action went on to write:

"These claims are not accurate and are not based on the most current information available, as required by NPS's information-quality guidelines. GPS data measuring speed, location, time, and direction of DBOC boat trips starting in 2009 irrefutably demonstrate that these statements are exaggerated and misleading: neither of DBOC's small oyster skiffs has made twelve (12) 40-minute trips on any one day. NPS was aware of and had access to three kinds of data regarding DBOC boat trips that pertained directly to the DEIS's analysis: (1) DBOC logs of boat trips; (2) DBOC GPS records of boat trips; and (3) NPS time- and date-stamped photographs and detailed logs of DBOC boat trips. None of those records, which were collected over a several-year period, show "up to 12 40-minute boat trips/day." Instead, with respect to boat trips to tend the oyster bags at sandbars OB and UEN, the DBOC logs, DBOC GPS data, and NPS photographic data show an average of one trip per day (six days per week); at times, two trips in a single day; and, on very rare occasions, as many as three trips in a single day."

Two additional comments will help to clarify the Cause of Action petition. First, since the estero is a very large body of water with many inlets and fingers, and the oyster boats can only be heard over a small fraction of that distance, our focus was on the area which is the focus of most of the wildlife (i.e., harbor seals and bird) and Park visitors (i.e., kayakers) – the area around sandbars OB and UEN. Second, it is important to note that there are many days as well with zero trips, not including Sundays and Mondays, which almost always are days with zero trips (DBOC oyster workers typically work a 5 day week from Tuesday to Saturday).

Importance of Appendix I to Soundscape section of FEIS Chapter 4

In addition to this incorrect information on the frequency and duration of boat trips per day, the Soundscape section of Chapter 4 of the FEIS relies on Appendix I for the data supporting the finding of a major adverse impact of DBOC noise generators on wildlife and Park visitors.

NPS describes Appendix I as follows:

> *"As described in Appendix I, an intensive review of 52 days of Volpe recordings taken at the PORE004 station revealed that the duration of unambiguous boat noise exceeded 2.5 hours in the reception range of microphone PORE004 on one day and in terms of all potential DBOC noise, 11 days exceeded 10 percent of the day (2.4 hours). However, these findings underestimate noise exposure in Drakes Estero for the following reasons ..."*

[Note: there is an error in this description. Appendix I contains a review of 51, not 52, days of Volpe recordings – 28 days during summer 2009 and 23 days during winter 2010.]

Below I provide a preliminary analysis of Appendix I. I reserve the right in the future to come back with additional critiques of both the Soundscape section in specific, and the FEIS in general.

Analysis of Appendix I: "Supporting Soundscape-Related Data"

According to Appendix I (page I-1):

> *"NPS comprehensively reanalyzed the PORE004 data to identify all noise events that might associated with DBOC operations and measured the events that could be unambiguously identified as boat noise. Noise events were detected as visible events in spectrographic images generated from the data. Experienced researchers listened to each event using headphones to confirm the identity of the noise source."*

A word common to and conspicuous in both the Appendix I and Chapter 4 (page 443) of the FEIS is "unambiguous" (or "unambiguously" as used in Appendix I). NPS claims that their researchers have conducted an intensive review listening using headphones to the two months (51 days) of audio recordings from microphone PORE004 and have "unambiguously" detected 192 boat noise events.

Two questions arise from this statement:

First, who did this work (i.e., name, title, affiliation) and when did they do it? Appendix I has no authors and no date.

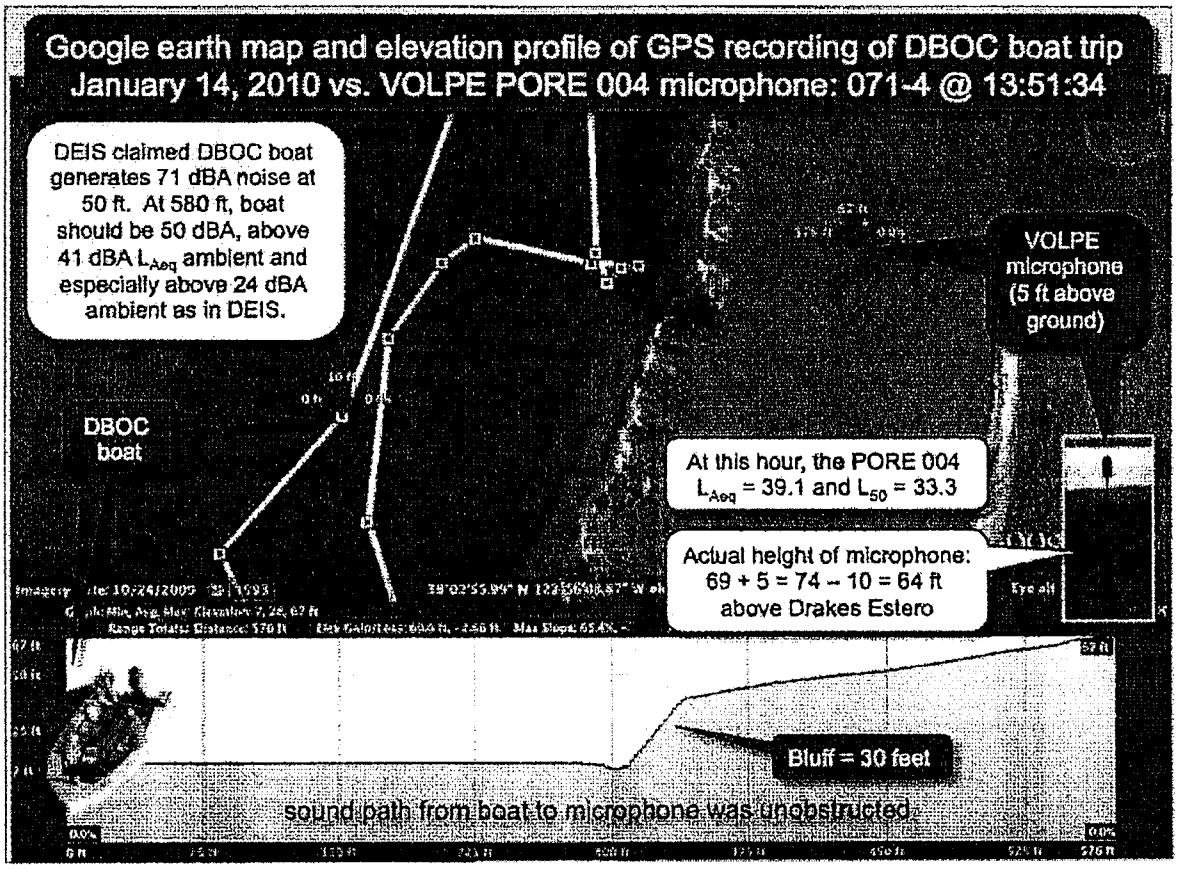
Second, how did they do this? What leads NPS to "unambiguously" conclude that their researchers identified DBOC boat noise with complete accuracy?

Dr. Goodman's April 24, 2012 Report and Filing

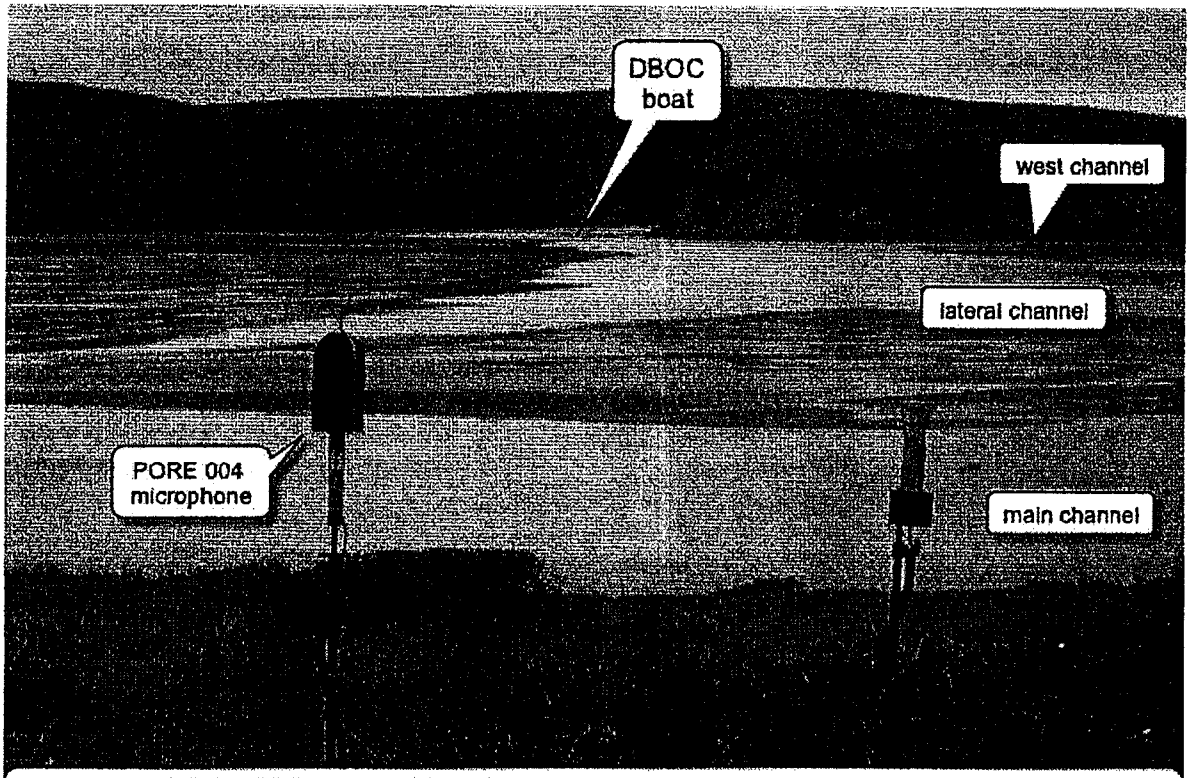
The original DEIS stated that the PORE004 NPS-FAA microphone did not pick up DBOC boat noise because the bluff along the shore of Drakes Estero blocked the sound path. In my filing with Department of the Interior Inspector General Mary Kendall on April 24, 2012 (cited in Appendix I as Goodman, 2012, and listed in the Chapter 5 references), in the Part 4 PDF ("*4. Concealed key acoustic data in Chapters 3 and 4 that contradicted the DEIS*"), I summarized some of my findings on this issue as follows on page 7:

- *Concerning the directive to monitor "noise-generating human activities" from DBOC, NPS failed. No data from DBOC were presented in DEIS.*
- *If DEIS was correct in its numbers, then microphone PORE 004 should have recorded daily DBOC boat trips out west channel to oyster bags on OB and UEN.*
- *VOLPE 2011 report said nothing about DBOC boats.*
- *DEIS simply stated that the bluff below the microphone likely blocked the sound path from boats to microphone.*
- *As shown here, that was incorrect. The sound path was unobstructed.*

The unobstructed sound path from DBOC boats to microphone was shown using Google earth map and elevation profiles of GPS recordings of boat locations and the microphone location [e.g., pages 28 and 31 as examples of the unobstructed sound path from boat to microphone on January 14, 2010 when the boat was in the main channel (page 28 from my April 24, 2012 report, see below) and lateral channel (page 31)].



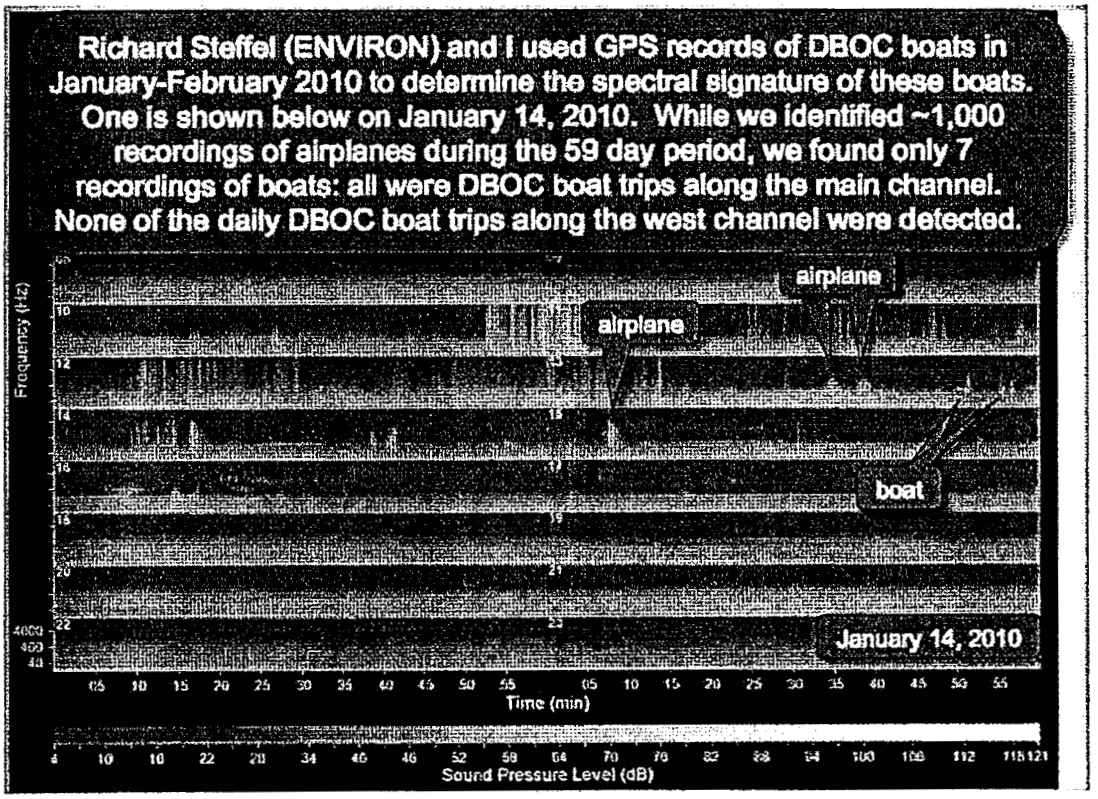
One month later, I received from NPS a set of photographs taken by FAA scientists at the site of the PORE004 microphone. These photos show the unobstructed view of a DBOC boat in the west end of the lateral channel from the microphone. Thus, there was no ambiguity about this issue: the bluff did not block the sound path (see photo below).

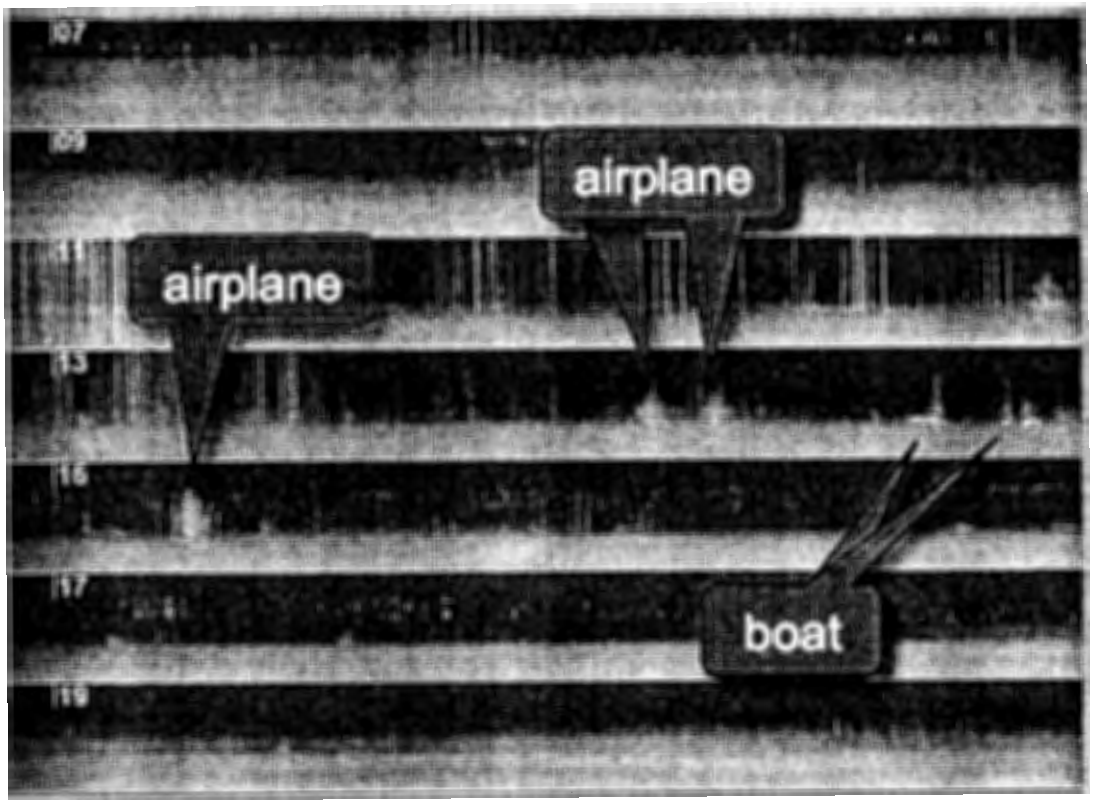


In contrast to the EIS, the sound path from DBOC boats to the PORE 004 microphone was unobstructed. The microphone should have recorded the boats but did not.

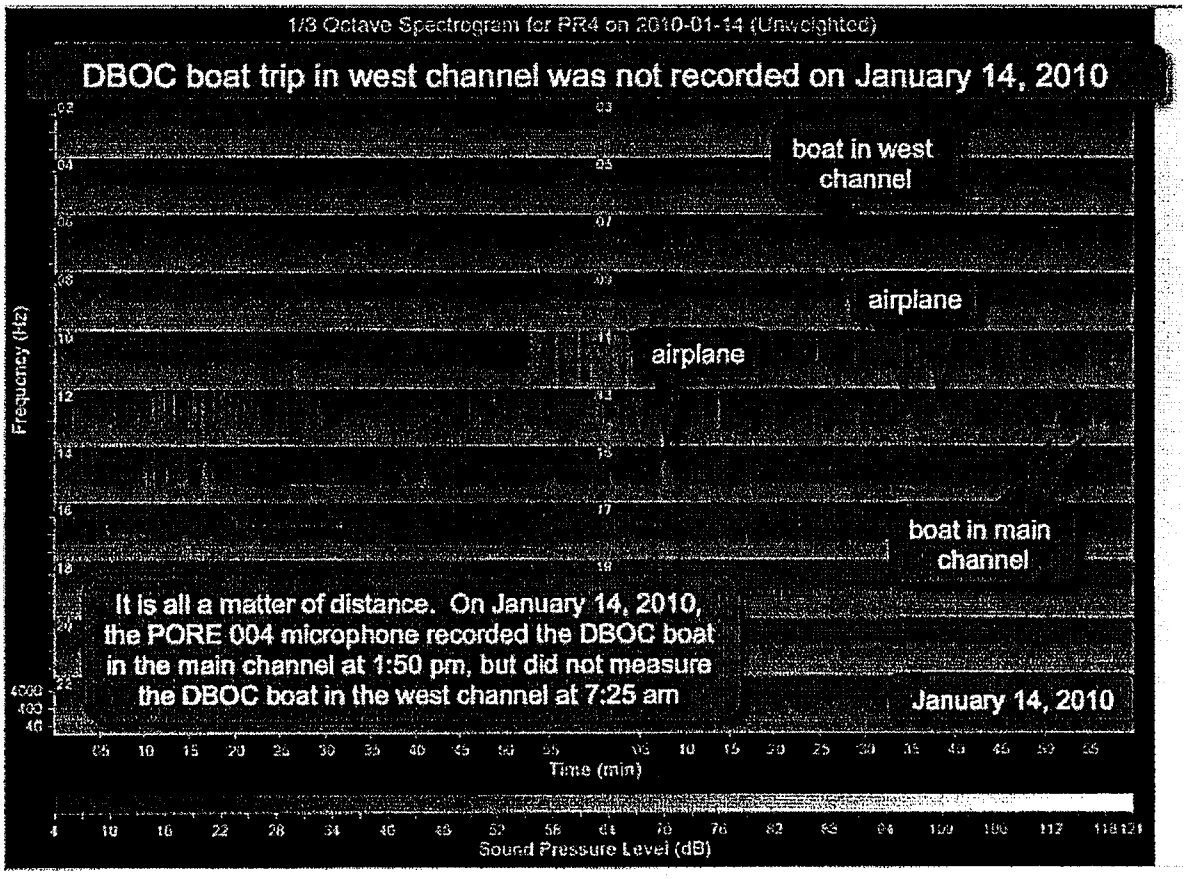
In my April 24, 2012 report, I went on to show that when the oyster boat made its weekly trip down the main channel (typically on Tuesdays) to collect samples for the public health department, it travelled within approximately 500 feet of the microphone and was clearly observed in the noise level plots and in the spectral sonograms as a distinctive spectral signature that was easy to visually show in the spectrograms [e.g., examples shown on pages 35 and 37 (January 14, 2010, see below), 38 (January 15, 2010), and 39 (February 2, 2010) of my April 24, 2012 Part 4 PDF to Inspector General Kendall.]

I showed that there was a very good relationship (using linear regression analysis) between boat speed (as measured using GPS) and sound level (as measure from the PORE004 recordings) of the oyster boats in the main channel, with an adjusted R squared of 0.41 and a P value of 0.00000083, with an intercept of 11 mph = 60 dBA at 50 feet.


Richard Steffel (ENVIRON) and I used GPS records of DBOC boats in January-February 2010 to determine the spectral signature of these boats. One is shown below on January 14, 2010. While we identified ~1,000 recordings of airplanes during the 59 day period, we found only 7 recordings of boats: all were DBOC boat trips along the main channel. None of the daily DBOC boat trips along the west channel were detected.
airplane
airplane
boat
January 14, 2010
Frequency (kHz)
Time (min)
Sound Pressure Level (dB)

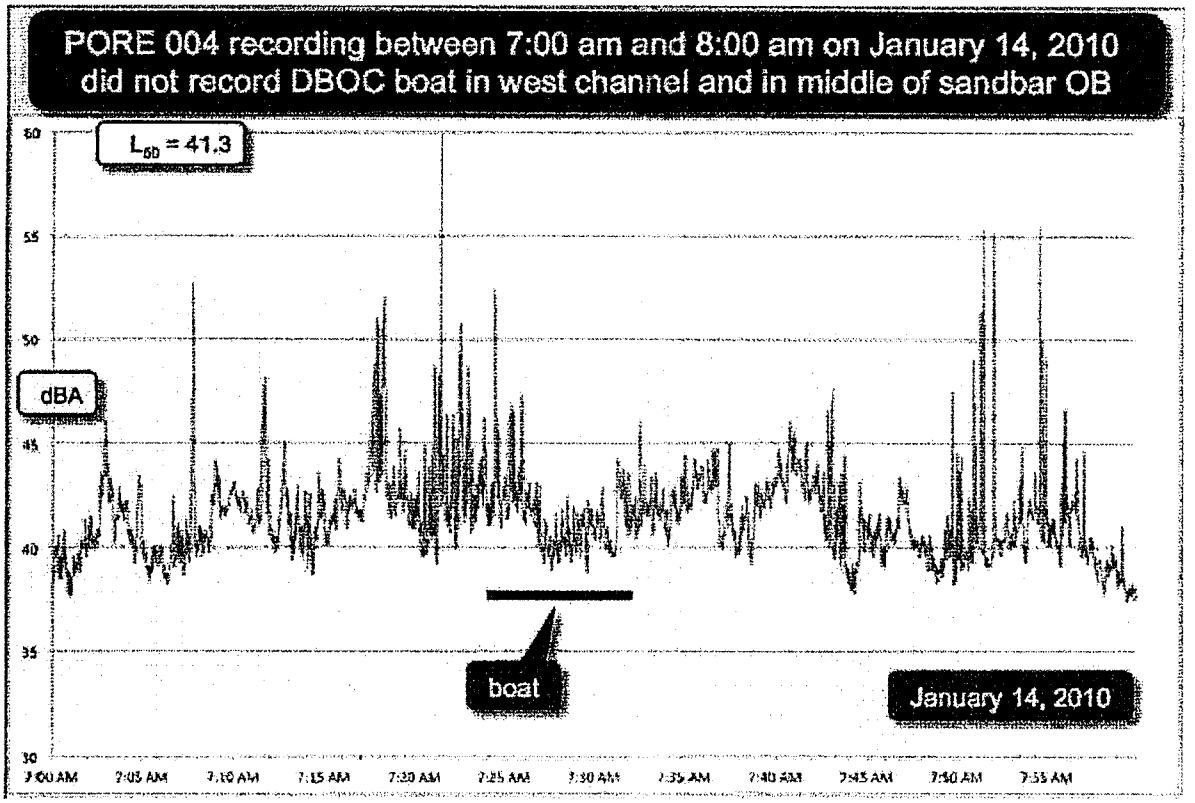

airplane
airplane
boat

In contrast, when the oyster boat was in the west channel or west end of the lateral channel (e.g., page 62 in my April 24, 2012 report, showing data from January 14, 2010), at a distance of around 3000 feet or more from the microphone, I was unable to detect it as a distinctive signature in the spectrograms (e.g., page 63, see below) or in the volume recording above ambient noise (e.g., page 64, see below). Several other examples were shown using GPS records or photographs from the NPS secret cameras to show that the microphone did not record either a unique spectral signature or a distinctive volume level when the oyster boat was in the west end of the lateral channel.



These data and analyses led to the conclusion that when the oyster boat was around 400-500 feet from the microphone, it was detected in both the volume level and the spectral sonogram, whereas when it was 3000 or more feet from the microphone, it was not readily apparent in either recording above ambient noise.

These results were consistent with the ENVIRON report of the oyster boat generating around 60 dBA at 50 feet, and were inconsistent with the DEIS suggesting the boat generated 71 dBA at 50 feet. Note that the FEIS now suggests that the oyster boat can generate over 80 dBA (described and analyzed below).



From this analysis, I concluded (page 88 of my April 24, 2012 report) that:

1) *NPS failed to follow Management Policies 2006 and Director's Order #47*
2) *DEIS overestimated DBOC boat noise (misused NOISE UNLIMITED 1995 report)*
3) *DEIS underestimated ambient noise level (misused VOLPE 2011 report)*
4) *DEIS exaggerated distance over which DBOC boats heard (to incredible distances), concluding DBOC boats could be heard all across estero thus disturbing wildlife*
5) *NPS placed microphone at Drakes Estero to record DBOC human-generated noises*
6) *NPS secret camera and NPS/VOLPE microphone overlapped for 2 weeks in July 2009*
7) *VOLPE 2011 report said nothing about recording DBOC boats or equipment*
8) *DEIS dismissed VOLPE data saying bluff blocked sound path from boat to microphone*
9) *Google earth elevations show sound path from boats to microphone unobstructed*
10) *ENVIRON 2011 report measured boat noise and found it much lower than in DEIS*
11) *Our analysis of VOLPE data shows DBOC boats have distinctive spectral signature*

12) *Our analysis of VOLPE data show 7 DBOC boats recorded in 59 days; all boat recordings were from main channel near microphone (often on Tuesdays)*

13) *50+ nearly daily boat trips along west channel were not recorded (too far away)*

14) *~ 1,000 aircraft overflights were recorded*

15) *DBOC boats are closer in noise generated to ENVIRON report than to DEIS*

16) *Ambient levels are closer to ENVIRON and VOLPE reports than to DEIS*

17) *DBOC boats heard for 400-800 feet depending on boat speed and ambient noise level*

18) *NPS deceived the public and peer-reviewers in the DEIS with false representations*

19) *NPS had access to data from microphone that showed the DEIS was incorrect*

20) *DEIS dismissed data from microphones just as dismissed data from secret cameras*

Appendix I and the NPS Analysis of the Volpe PORE004 Data

As is apparent in Chapter 4 of the FEIS and Appendix I, NPS researchers reversed their conclusion and now accept that the bluff did not block the sound path. NPS reanalyzed the Volpe data from the PORE004 microphone and now present entirely new analyses and conclusions not found in the DEIS.

Interestingly, NPS derived different conclusions than in my April 24, 2012 report. It is important, as described below, to determine the origin of our differences. Did NPS get it right? Or did they make mistakes? Below I show that their analysis is fundamentally flawed.

In the FEIS, NPS concluded:

> *"Noise events were detected as visible events in spectrographic images ..."*

NPS wrote that they determined a distinctive spectral signature for this boat noise, and that they unambiguously detected boat noise while the boat was in the west end of the lateral channel. NPS claimed to unambiguously record:

- 112 boat noise events in the 28-day summer 2009 recordings,
- 80 boat noise events in the 23-day winter 2010 recordings, coming to a
- total of 192 unambiguous boat noise recordings.

Nowhere in Appendix I does NPS provide a list and dates and times of the 192 boat noise recordings. These critical data are missing from Appendix I. It is important to compare the NPS observations with the DBOC GPS data and boat logs to determine the accuracy of the NPS analyses and claims.

NPS claimed to show the distinctive spectral signature with four events (marked by yellow arrows) in Figure I-1 for PORE004 data from July 30, 2009.

[Note: the figure title has a typographical error. As shown in the spectral sonogram, the date is July 30, 2009, not July 30, 2007. The Volpe recordings at microphone PORE004

were taken in the summer of 2009 and winter of 2010, not during 2007.]

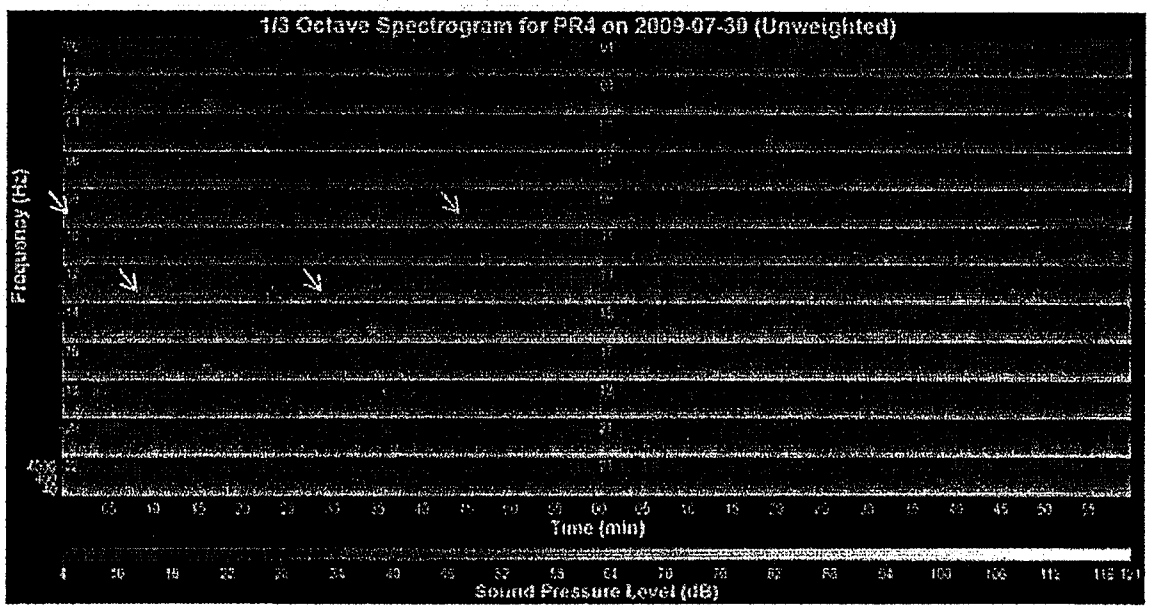
In Appendix I, NPS writes that the "noise events were detected as visible events in spectrographic images generated from the data." The problem is that it is impossible to see what the authors are describing at the four yellow arrows in Figure I-1. There is no distinctive spectral signature.

Appendix I Does Not Show the Spectral Signature for Boat Trips

The entire analysis in Appendix I is predicated on the ability of NPS researchers to "unambiguously" determine boat noise events, as shown in Figure I-1. There are two problems with Figure I-1. First, I cannot see the spectral signature. Nothing distinctive can be seen at the four yellow arrows. Second, NPS already knew about the precise time of DBOC boat trips on July 30, 2009 from my April 24, 2012 report (pages 80-83, see page 80 below) making use of the NPS detailed logs from the photographs from the NPS secret cameras.

NPS Appendix I Figure I-1

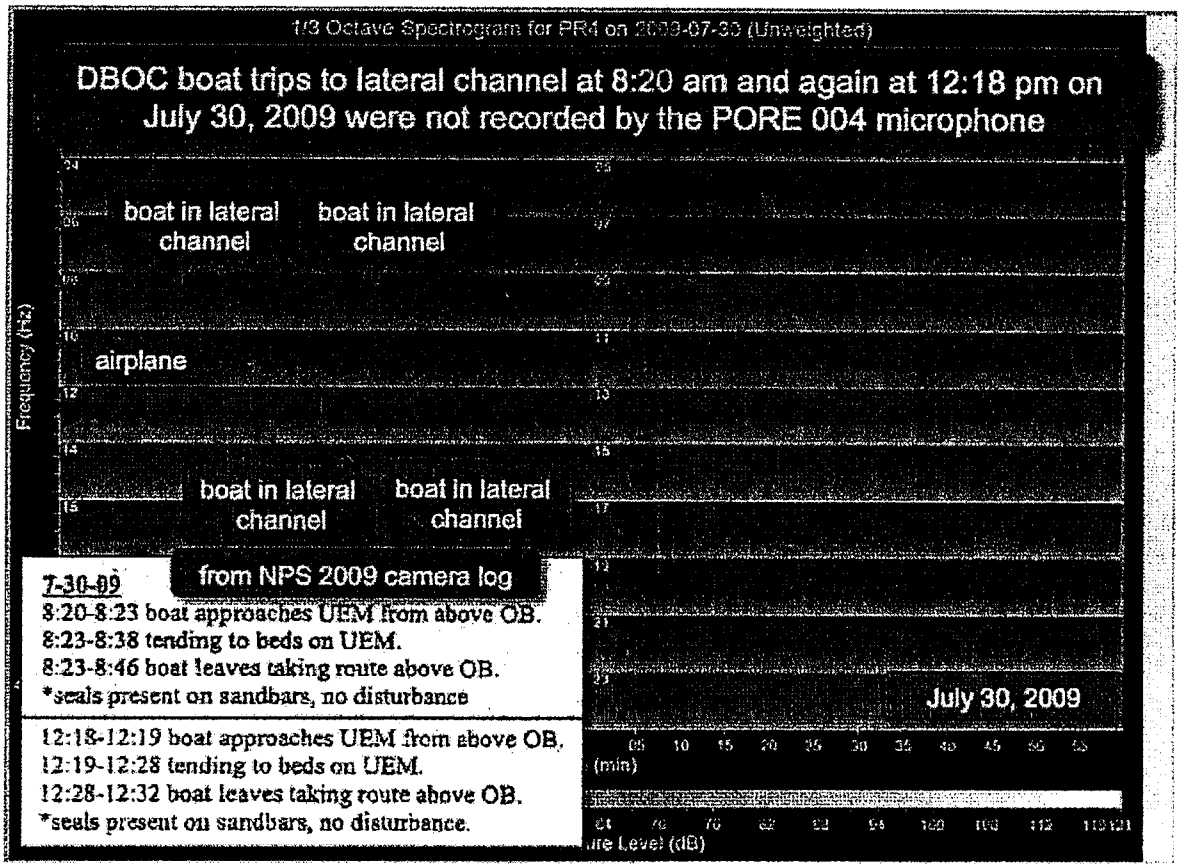
FIGURE I-1. 24-HOUR, ONE-THIRD OCTAVE SPECTOGRAM FOR PORE004 DATA ON JULY 30, 2007



Note: Yellow arrows indicate instances of motorboat noise. These arrows are superimposed over raw data collected for the Volpe 2011 study. This spectrogram displays 24 hours of one-second, 1/3rd octave sound level measurements, with two hours presented in each row. The frequency axis within each row is logarithmic, due to the 1/3rd octave structure of the data; the frequency limits are 12.5 Hz to 20 kHz. The color scaling is also logarithmic, expressed in decibels (dB).

The NPS did not show, and now needs to show, the spectral signature of the unambiguous boat noise events they detected. In addition, NPS needs to show the spectral signature of boat noise events for several days (e.g., in January 2010) for which NPS does not already know the precise time and date of DBOC boat trips (from the detailed logs of the photograph from the NPS secret cameras). In other words, NPS needs to demonstrate that they can indeed unambiguously detect boat trips in the microphone recording.

What is shown in Figure I-1 leads me to be skeptical that this is possible. Nowhere in Appendix I are any data presented to verify that NPS can use a distinctive spectral signature to "unambiguously" detect boat trips.



NPS researchers, having recorded 192 boat noise events in summer 2009 and winter 2010 (using a spectral signature not shown in Appendix I), go on to extract data on "minutes of boat noise" per day during that two month period of recordings, as shown in Table I-1 (see below).

Table I-1 and the Observation of Minutes of Boat Noise Per Day

Table I-1 contains the most important data in Appendix I. If correct, this table shows that on one day (January 27, 2010), DBOC boat noise exceeded 10 percent of the day (i.e., 160.3 minutes or 2.67 hours or 11% of the day). This Table contains the boat noise observations that NPS claims were unambiguously recorded by experienced researchers.

With help from Mr. Lunny, I used four sources of DBOC data to validate or refute the observations in Table I-1. NPS was previously notified on multiple occasions of the existence of these sources of data, and did not request them to verify their own analyses. Moreover, these same sources of DBOC data were used extensively in my April 24,

2012 report on file as a reference in the FEIS (Goodman, 2012).

The four DBOC sources of data are:

(1) GPS recordings of boat location and speed,

(2) Boat logs of each boat trip,

(3) Electronic time clock records, and

(4) Payroll records.

Our analysis reveals, as described below, that the boat noise observations are incorrect and inaccurate – and thus misleading. NPS researchers made no effort to communicate with Mr. Lunny or me about their analysis of boat noise events. We do not know to what the NPS researchers were listening, but according to the GPS and boat log data, it was not noise from DBOC boats. NPS erred in claiming that this analysis was unambiguous.

NPS Appendix I Table I-1

TABLE I-1. BOAT NOISE OBSERVATIONS AS EXTRACTED FROM DATA RECORDED BY PORE004

Date	Minutes of Boat Noise	Minutes of Noise*	Day of the Week	Comment	Date	Minutes of Boat Noise	Minutes of Noise*	Day of the Week	Comment
7/17/2009	2.33	2.33	Fri	<7 hours data	8/14/2009	–	–	Fri	too windy
7/18/2009	33.15	41.55	Sat	S, NW wind	8/15/2009	2.68	109.68	Sat	<19 hours data
7/19/2009	22.43	22.43	Sun	S, NW wind	1/9/2010	0.00	34.03	Sat	<11 hours data
7/20/2009	4.88	4.88	Mon	NW wind	1/10/2010	0.00	36.02	Sun	E wind
7/21/2009	3.95	3.95	Tue	NW wind	1/11/2010	0.00	43.90	Mon	E, SE wind
7/22/2009	0.92	0.92	Wed	NW wind	1/12/2010	0.00	0.30	Tue	SE wind
7/23/2009	26.28	86.10	Thu	W, NW wind	1/13/2010	36.75	38.08	Wed	SW, W wind
7/24/2009	40.45	57.50	Fri	W, NW wind	1/14/2010	73.02	90.15	Thu	Variable wind
7/25/2009	1.80	1.80	Sat	S, NW wind	1/15/2010	43.92	153.92	Fri	E wind
7/26/2009	19.23	79.95	Sun	S, NW wind	1/16/2010	0.00	51.30	Sat	E, SE wind
7/27/2009	12.63	12.63	Mon	S, NW wind	1/17/2010	0.00	4.45	Sun	S, SE wind
7/28/2009	22.87	160.67	Tue	W wind	1/18/2010	0.00	2.50	Mon	S, SE wind
7/29/2009	11.28	145.78	Wed	S, W wind	1/19/2010	4.03	11.22	Tue	S, SE wind
7/30/2009	61.92	127.85	Thu	W, NW wind	1/20/2010	0.00	2.40	Wed	S, SE wind
7/31/2009	26.27	58.47	Fri	NW wind	1/21/2010	–	–	Thu	no data
8/1/2009	38.97	74.93	Sat	W, NW wind	1/22/2010	–	–	Fri	no data
8/2/2009	84.77	170.22	Sun	W, NW wind	1/23/2010	0.00	–	Sat	8 hours data
8/3/2009	12.17	267.72	Mon	NW wind	1/26/2010	6.47	9.38	Sun	E, NE wind
8/4/2009	31.20	505.37	Tue	S, NW wind	1/27/2010	160.30	160.30	Wed	W, NW wind
8/5/2009	23.18	113.62	Wed	W, NW wind	1/28/2010	91.57	91.57	Thu	Variable wind
8/6/2009	19.27	177.25	Thu	W wind	1/29/2010	13.65	71.85	Fri	E, SE wind
8/7/2009	0.00	2.18	Fri	NW wind	1/30/2010	21.25	21.25	Sat	Variable wind
8/8/2009	0.00	385.38	Sat	S, NW wind	1/31/2010	0.00	5.25	Sun	Variable wind
8/9/2009	42.38	197.18	Sun	NW wind	2/1/2010	8.98	8.98	Mon	E, SE wind
8/10/2009	0.00	242.78	Mon	S wind	2/2/2010	20.02	20.02	Tue	E, SE wind
8/11/2009	8.05	21.58	Tue	S, NW wind	2/3/2010	5.25	50.20	Wed	E, SE wind
8/12/2009	6.93	6.93	Wed	NW wind	2/4/2010	–	–	Thu	too windy
8/13/2009	–	–	Thu	too windy	2/5/2010	0.00	45.12	Fri	E, SE wind

* The aggregate noise figure excludes aircraft and terrestrial vehicular traffic, but it may include some noise sources that are not associated with DBOC operations.

Note: No data is available for January 24-25, 2010 due to the system being offline or malfunctioning.

January 27, 2010: NPS Claims to Observe 160 Minutes of Boat Noise

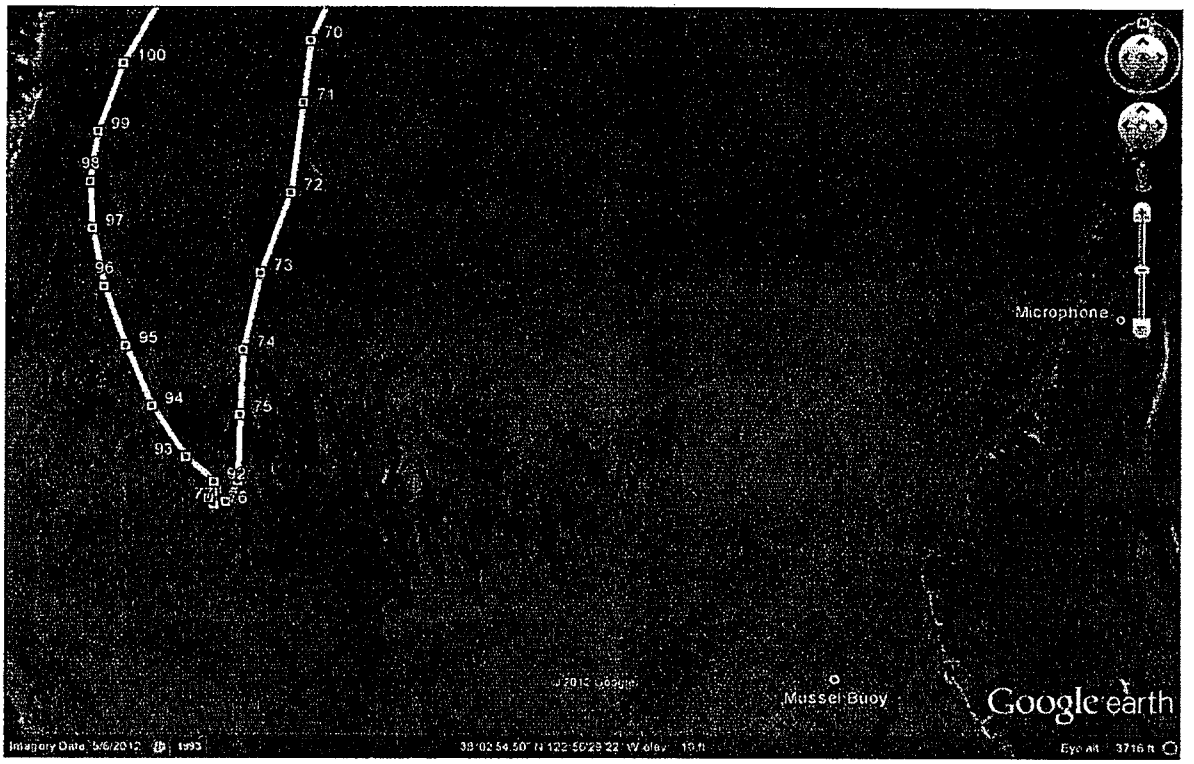
Let's begin by examining January 27, 2010, the day with over 2.5 hours of boat noise. Both the GPS recordings and the boat logs reveal only one DBOC boat trip on January 27, 2010. The boat log records that Jorge Mata left the dock at 8:30 am and returned at 10 am (approximate times).

A typical boat trip (with a single destintion) would involve 15-20 minutes with the engine running to travel out to the OB/UEN sandbars. The engine would then be turned off while the workers tended to the oyster bags. The engine would then be turned back on, and the engine would run for another 15-20 minutes as the boat returned to the boat dock at the onshore facility.

The GPS records show the boat leaving the dock at 9:14 am that morning, travelling at 7 mph. The boat reached the northern edge of sandbar OB (point 68) at 9:52 am (still travelling at 7 mph). The oyster boat reached its stopping point at UEN (point 77) at 9:57 am. The boat left sandbar UEN (point 92) at 10:08 am (3 mph), finished crossing OB in the west channel (point 100) at 10:11 am (6 mph), and made it back to the onshore boat dock (point 155) at 10:44 am).

The total boat trip time was 90 minutes. The engine was running for 79 minutes. It was a relatively long boat trip because the boat speed never exceeded 7 mph. A typical boat trip will have the engine running for around 30-40 minutes, and the boat will travel at a speed of 12-13 mph.

DBOC GPS Record for January 27, 2010



In Appendix I, NPS claims to be able to "unambiguously" determine boat noise and minutes of boat noise. In both Appendix I and Chapter 4 (page 443), NPS asserts that on one day (January 27, 2010), the DBOC oyster boats were making noise on Drakes Estero for 160.3 minutes, when the GPS records and boat logs show that there was only one boat trip, and the engine was running for only 79, not 160 minutes. Clearly, something was recorded as boat noise that was not. The method is not unambiguous. TNPS data shown in Table I-1 are a lot worse than reporting 79 minutes as 160 minutes.

NPS Claims to Observe Boat Noise on Sundays and Mondays

In Table I-1 in Appendix I, NPS reports on boat noise on 7 Sundays:

Date		minutes of boat noise	total minutes of noise
7/19/2009	Sunday	22.43	22.43
7/26/2009	Sunday	19.23	79.95
8/2/2009	Sunday	84.77	170.22
8/9/2009	Sunday	42.38	197.18
1/10/2010	Sunday	0	36.02
1/17/2010	Sunday	0	4.45
1/24/2010	Sunday	system not operational	
1/31/2010	Sunday	0	5.25

Interestingly, on the four Sundays during the summer, NPS reports on 19 to 84 minutes of boat noise, whereas for the three Sundays during the winter, NPS reports on zero minutes of boat noise. In fact, there was zero DBOC boat noise on all of those Sundays.

In Table I-1 in Appendix I, NPS reports on boat noise on 7 Mondays:

Date		minutes of boat noise	total minutes of noise
7/20/2009	Monday	4.88	4.88
7/27/2009	Monday	12.63	12.63
8/3/2009	Monday	12.17	267.72
8/10/2009	Monday	0	242.78
1/11/2010	Monday	0	43.90
1/18/2010	Monday	0	2.50
1/25/2010	Monday	system not operational	
2/1/2010	Monday	8.98	8.98

The problem for NPS is that DBOC oyster boats rarely operate on Sundays or Mondays (as NPS has been previously informed). DBOC oyster workers typically work a five day week from Tuesday to Saturday. The GPS records, boat logs, electronic time clock records, and payroll records (all available upon request to NPS) show that DBOC oyster workers and oyster boats were not operating on any of these seven Sundays, and were not operating on six of these seven Mondays. Four DBOC oyster workers were working on February 1, 2010, and made one boat trip to Home Bay from 8 to 10 am, a location far from the PORE004 microphone and unlikely to be detected at that microphone.

In other words, the recording of 84.77 minutes of boat noise on Sunday August 2, 2009 (the 3rd highest record of boat noise after January 27, 2010 with 160.30 minutes of boat noise – discussed above as inaccurate – and January 28, 2010 with 91.57 minutes) is not correct.

There was no boat trip on that day, and no boat noise. Whatever the experienced NPS researchers were listening to on the audio recording, we are certain that it was not DBOC boat noise. Clearly, NPS erred when they said they could "unambiguously" detect boat noise on the PORE004 recordings.

NPS Claims to Observe Total DBOC Noise on Sundays and Mondays

There is one additional major problem with the data found in Table I-1 (as shown above for Sundays and Mondays), and how NPS interpreted these data in Appendix I and then on page 443 in Chapter 4 of the FEIS. The NPS researchers measure "minutes of noise" that includes both boats (although we now know that they were in fact unable to properly detect boats outside the main channel, in agreement with my April 24, 2012 report) and other unknown sources of noise.

The column "minutes of noise" represents boats and unknown noise. The NPS researchers in the text of Appendix I attribute much of this unknown noise to DBOC, based upon no factual evidence – unseen analyses, undisclosed criteria, and no identified evidence. Such a conclusion would assume that the onshore DBOC

equipment, such as the oyster tumbler, can be heard many thousands of feet away at the PORE004 microphone, when in fact the sound from the oyster tumbler travels for three hundred feet at most.

By the time these numbers are described on page 443 of Chapter 4 in the FEIS, NPS writes as if they assumed all of it came from DBOC noise generators, without a shred of evidence. This is likely to be completely wrong, as described below.

The NPS researchers in Appendix I wrote:

> *"An impact is considered major in the impact analysis of this EIS if human-caused noise impacts the soundscape for more than 10 percent of a 24-hour day, or 144 minutes. Boat noise within the reception range of PORE004 exceeded this value at PORE004 on one winter day (January 27, 2010); aggregate noise exceeded this value on eleven days."*

By "aggregate noise," the writers mean the "minutes of noise" that includes boat noise and other unknown noise. There is no reason to think that DBOC onshore equipment (e,g., the oyster tumbler) can be heard at PORE004. The onshore DBOC equipment has nothing to do with the noise recorded at PORE004. Rather, one of the major PRNS hiking trials is very close to the microphone location, and I have heard numerous hikers and human conversations in the recordings as well as birds and insects. The dominant noise, of course, is nature – the wind.

NPS described Appendix I on page 443 of Chapter 4 in the FEIS as follows:

> *"As described in Appendix I, an intensive review of 52 days of Volpe recordings taken at the PORE004 station revealed that the duration of unambiguous boat noise exceeded 2.5 hours in the reception range of microphone PORE004 on one day and in terms of all potential DBOC noise, 11 days exceeded 10 percent of the day (2.4 hours). However, these findings underestimate noise exposure in Drakes Estero for the following reasons ..."*

What started as "minutes of noise" in Table I-1 became "aggregate noise" in the text without defining the difference or identifying the criteria. NPS neither explained nor disclosed how conclusions were reached in Appendix I (with implication that the aggregate noise was largely due to DBOC). This conclusion in Appendix I transformed into "all potential DBOC noise" on page 443 of the FEIS. Based on DBOC actual data, there is no reason to believe that most if any of this noise is due to DBOC. NPS provides no evidence to support that contention.

One strong argument against the NPS claim that this noise identified in the Volpe recordings emanates from DBOC equipment comes from the day of the week – claims of large amounts of noise are made for Sundays and Mondays when neither the oyster boats nor the onshore oyster equipment were operational.

A high number is recorded on certain Sundays and Mondays when DBOC GPS records, boat log records, electronic time clock records, and payroll records show the oyster workers were not working. For example, NPS claims to observe 84.77 minutes of boat noise and 170.22 minutes of total noise on August 2, 2009, and 42.38 minutes of boat noise and 197.78 minutes of total noise on August 9, 2009. Both of these are simply wrong. DBOC oyster workers were not working on either of those two Sundays, and

none of the oyster equipment was operational on those days.

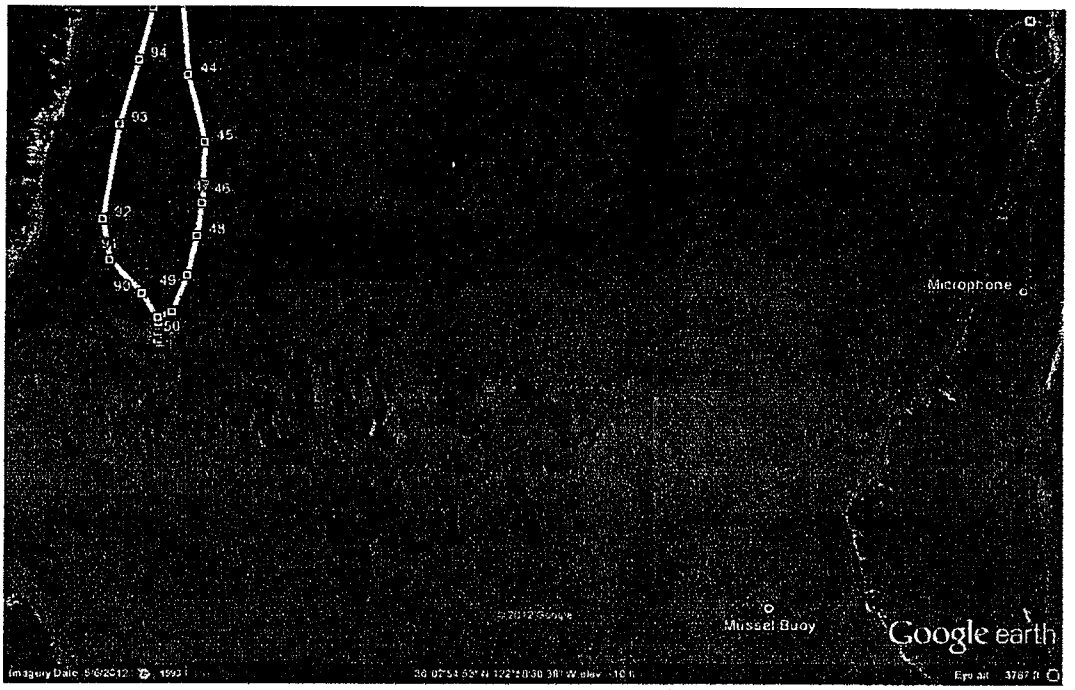
Similarly, NPS claims an extraordinary number of total DBOC minutes of noise on two Mondays – 267.72 minutes on August 3, 2009 and 242.78 minutes on August 10, 2009 – when DBOC oyster workers were not working on either Monday, and no oyster equipment was operation. These numbers are simply wrong.

In contrast to what they conclude in Appendix I, NPS researchers are unable to detect either oyster boat noise or oyster equipment noise at PORE004.

Appendix I Contains False Negatives as well as False Positives

Having identified numerous false positives (four Sundays – 7/19/2009; 7/26/2009; 8/2/2009; 8/9/2009 and three Mondays – 7/20/2009; 7/27/2009; and 8/3/2009) and one dramatic over scoring (1/27/2010), we wondered if there were also false negatives – i.e., if NPS researchers were unable to detect boat noise on days that it clearly should have been recorded (if in fact their spectral signature and ability to detect boat noise is as unambiguous as they claim). For this analysis, we picked January 12, 2010. We have not had the time to be exhaustive in checking on every date and time.

For January 12, 2010, Table I-1 lists zero minutes of boat noise. January 12 was a Tuesday. Tuesday is the day in which DBOC (by mandate) sends a boat down the main channel to collect samples for the public health department. According to the boat logs, there were three DBOC boat trips on that day, one from 8 to 9:15 am down the main channel (and thus within 400-500 feet of the microphone) to collect the public health department sample, and two others to a number of oyster beds, including bed 15 on sandbar UEN at the west end of the lateral channel. Below is shown (on the top) the GPS data for one boat trip to the west end of the lateral channel between 8:20 am and 9:30 am, and (on the bottom) part of the GPS data for the other boat trip to the west end of the lateral channel from 10:45 am to 11:30 am.



On the top GPS recording from January 12, 2010 (previous page), the journey started at 8:22 am. The boat made a number of excursions and stops along the way, ultimately stopping at sandbar UEN (point 127) at 8:55 am. The boat left UEN (point 156) at 9:05 am and made it back to the boat dock (point 259) at 9:33 am.

On the bottom GPS recording from January 12, 2010 (top of this page), the boat left the dock at 10:46 am, reached the north end of sandbar OB (point 44) at 11:01 am (10 mph), and stopped at sandbar UEN (point 53) at 11:04 am. The boat then resumed its journey (point 90) at 11:16 am, travelled at a speed of 10-12 mph, and returned to the boat dock (point 139) at 11:30 am.

Thus, the PORE004 microphone certainly should have recorded the boat trip down the main channel within 400-500 feet of the microphone, but the NPS researchers did not observe this boat noise event. Moreover, if the NPS researchers are correct in their ability to "unambiguously" record noise from boat trips to sandbars OB and UEN, then they should have recorded the other two boat trips to the west end of the lateral channel on that day, but they did not.

In summary, Table I-1, the major finding in Appendix I, contains numerous major errors and is thus incorrect and invalid. Table I-1 contains false positives, false negatives, and over scoring of boat trips. There are very few if any numbers in this table that coincide with the GPS and boat log data (the actual data).

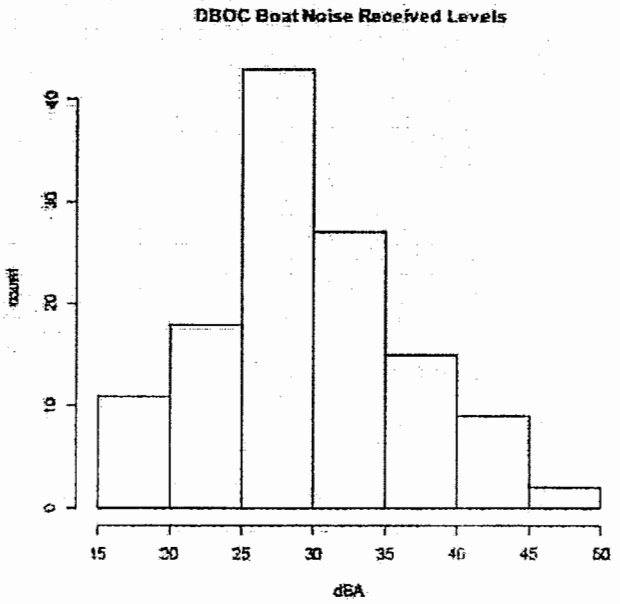
I conclude that the only thing unambiguous about the NPS analysis is that they were clearly not able to detect boat noise in the PORE004 recordings. The only exception appears to be the boat trips in the main channel within 400-500 feet of the microphone as previously documented in my April 24, 2012 filing. Note that NPS researchers did miss one Tuesday boat trip in the main channel – on January 12, 2010 – that I did not highlight in my April 24, 2012 report.

Boat Noise Levels

NPS next goes on to plot the DBOC boat noise levels in Figure I-2 (see below) based upon 125 of these 192 incorrect boat noise events. As a result, all of these data can be ignored because there is no reliability to the boat noise events. Nevertheless, below I consider Figure I-2.

NPS Appendix I Figure I-2

FIGURE I-2. DBOC BOAT NOISE RECEIVED LEVELS



The problem with the histogram in Figure I-2 is that it looks very much like the histogram of the distribution of L_{50} daily noise measurements, with the overall L50 of around 34 dBA. If anything, the sound level distribution of these so-called boat noise events is lower than the distribution of daily L_{50} levels. If the noise level of the boat events is less than the noise level of the wind (the major driver of the daily L_{50}), then it is impossible to understand how this is a soundscape problem and how NPS can make sensible measurements of boat noise.

Finally, the NPS uses these measurements to claim to determine the sound level of the DBOC boats at a distance of 50 feet (based upon the measurement of volume at the distance determined by GPS data presented in my April 24, 2012 report). These incorrect estimates of maximal DBOC boat noise drive the "upper bound" NPS claims of DBOC boat noise in Table 4-2 in Chapter 4 of the FEIS.

Here I will focus on just one of these noise events – on January 14, 2010 – that is used to claim that the oyster boat can have an L_{eq} of 78.9 dBA and a L_{max} of 82.9 dBA. The NPS authors point out:

"The most distant noise event yielded the highest source level."

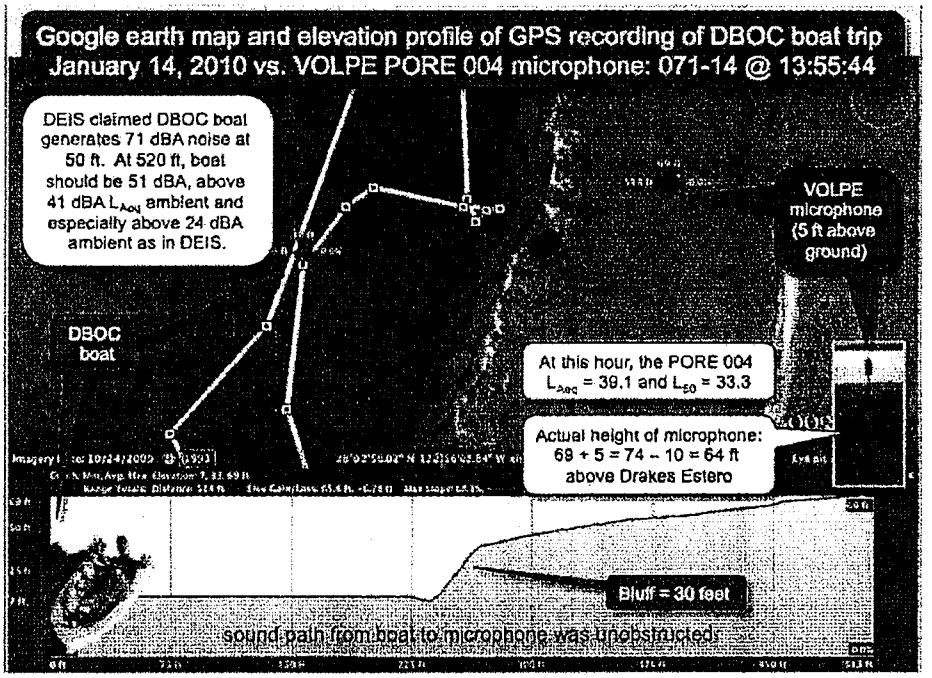
This anomaly – that the most distant event that took place near the oyster bags was calculated by NPS to be louder than the boat travelling faster in the main channel -- should have been a tip off to the NPS researchers that something was wrong with their methodology. Why should the most distant event – when the boat is going slowly at the west end of the lateral channel – be the one with the highest source level compared to the nearby events – when the boat is going more quickly in the main channel – that have lower estimated source levels? The answer is that the NPS researchers made a fundamental error.

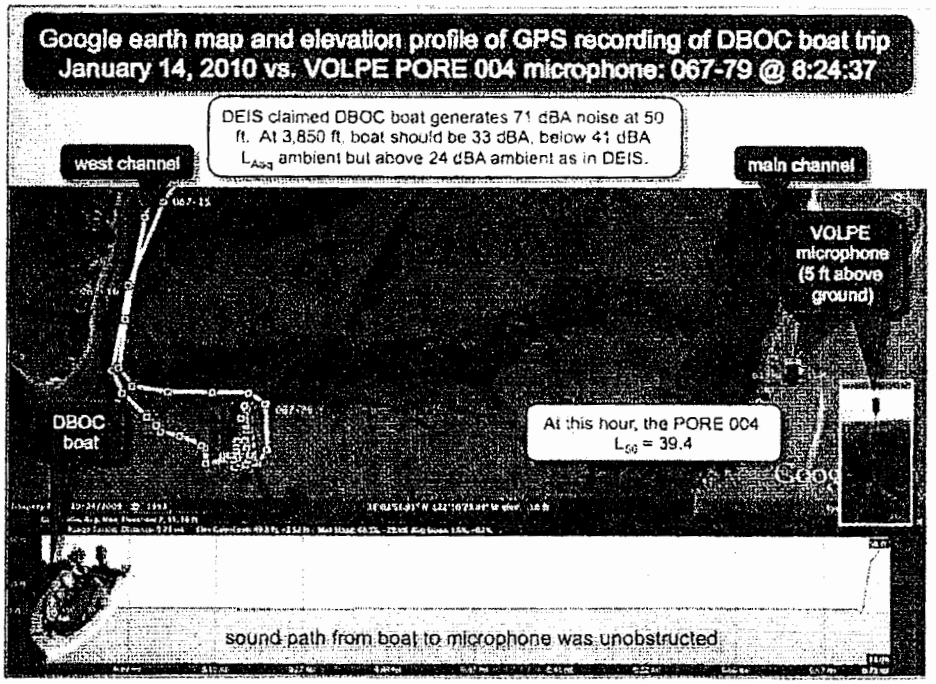
NPS Appendix I Table I-2

TABLE I-2. CALCULATION OF NOISE EVENTS ON JANUARY 14, JANUARY 15, AND FEBRUARY 2, 2010

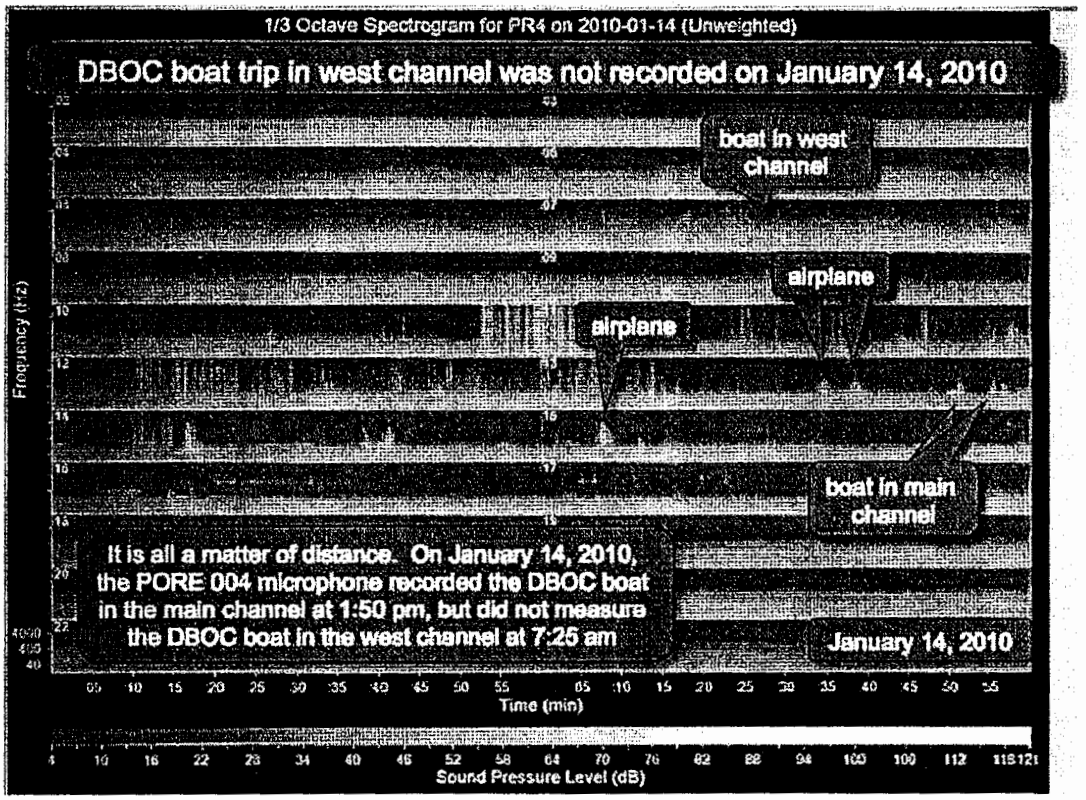
Channel	Date	Time	Distance (feet)	Speed (mph)	Event Duration (seconds)	Event L_{eq} (dBA)	Event L_{max} (dBA)	Spreading Loss (dBA)	Absorption Loss (dBA)	Estimated Source Leq (dBA @ 50 feet)	Estimated Source Lmax (dBA @ 50 feet)
west	1/14/2010	7:31:50	3182	13	518	38.6	43.4	35.4	0.9	78.9	82.9
main	1/14/2010	13:51:34	580	18	138	45.0	47.6	21.3	0.2	70.5	73.1
main	1/14/2010	13:55:44	520	6	178	41.6	50.3	20.3	0.2	66.1	74.8
main	1/15/2010	10:48:00	488	13	482	40.2	51.8	19.8	0.1	64.1	75.7
main	1/29/2010	11:30:00	580	16	283	41.6	59.6	21.3	0.2	67.1	85.1
main	2/2/2010	13:40:00	437	13	1201	34.1	48.7	18.8	0.1	57.1	71.7

On January 14, 2010, there were two boat trips: one out the main channel that I reported (in my April 24, 2012 report) was picked up on microphone PORE004, and one out to the west end of the lateral channel that I reported was not picked up by PORE004. Below are GPS recordings from those two trips, respectively.

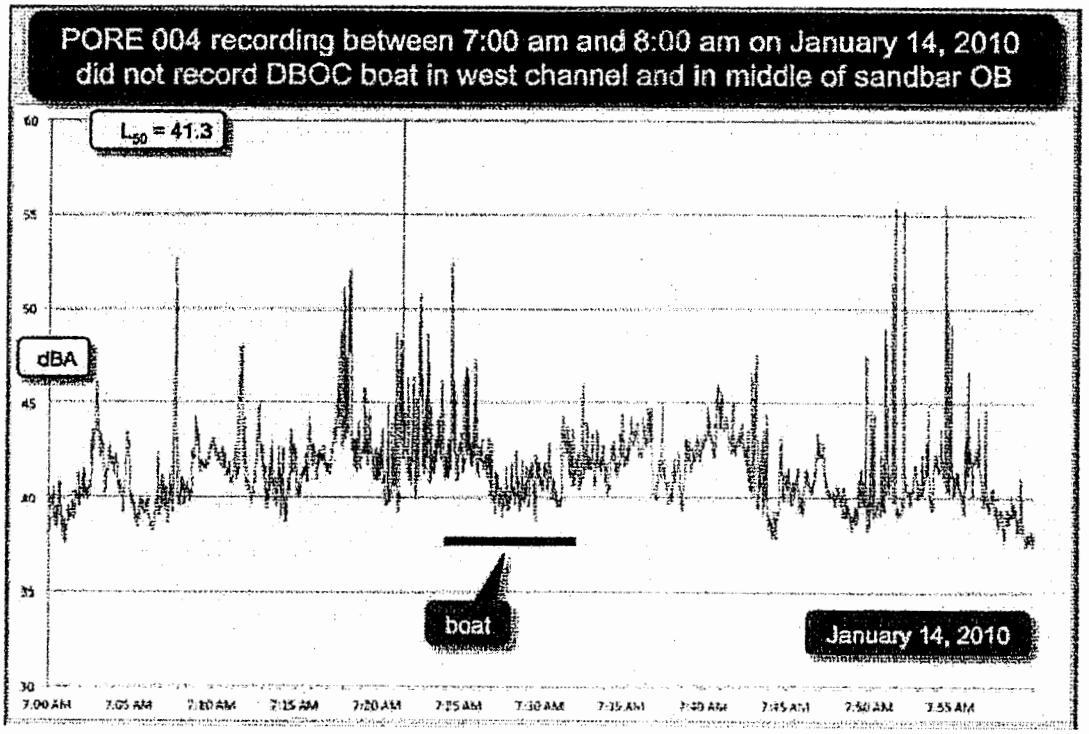




I showed in my April 24, 2012 report that the PORE004 microphone picked up the noise from the boat when it travelled in the main channel very close to the microphone, but not when it travelled in the west end of the lateral channel, much further from the microphone (i.e., over 3,000 feet away).



I showed that the noise from the boat in the west end of the lateral channel was not detected above the ambient noise, almost entirely due to the wind (see page 64 from my April 24, 2012 report below).



The L_{50} for January 14, 2010 was 41.3 dBA. When the boat was in the west end of the lateral channel, the noise level was the same as background, around 40-42 dBA (shown in figure above from my April 24, 2012 report).

In Table I-2, the NPS claims that this boat noise had an L_{eq} of 38.6 and an L_{max} of 43.4. The problem is that these numbers are within the L_{50} of the noise produced by the wind on that day. There is no measurable boat noise – the sound level recorded can all be attributed to the wind and gusts of wind.

Thus, when NPS calculates the "estimated source L_{eq}" and the "estimated source L_{max}" what they are really measuring is the value of the wind, assuming that all of the wind noise came from a point source at the location of the boat some 3000 feet away. If something at the boat location produced enough noise to be as loud as the wind at the microphone, then it would indeed be 78.9 dBA in volume (if accurate, the boat would have been going at more than 20 mph, something that never happens in the west end of the lateral channel). However, that wasn't the boat. That was likely the wind, and thus a fictitious estimate. The figure above from the Volpe data makes that clear.

Preliminary Conclusions

As written at the beginning of this report, this should be considered a preliminary and partial analysis of the Soundscape section of the FEIS with particular emphasis on Appendix I. Given the lack of a formal comment process, the Thanksgiving holiday weekend, and my travel schedule, this analysis has been done on very short notice. Nevertheless, this preliminary analysis leads to some clear conclusion.

Appendix I is fundamentally flawed. NPS researchers claim to be able to "unambiguously" detect boat noise throughout Drakes Estero, to measure minutes of boat noise, and to estimate the level of boat noise. They also claim to be able to measure all DBOC noise from both boats and onshore equipment at microphone PORE004.

All of these NPS claims are inaccurate and invalid. As shown here, NPS cannot determine boat noise other than when the boat is in the main channel, as I already provided in my analysis on April 24, 2012. The NPS analysis has so many false positives and false negatives as to have no scientific validity. The NPS analysis of the level of sound from the boat noise is also invalid. The DBOC boats simply do not produce more than 80 dBA of noise at 50 feet. The NPS calculations are incorrect, as shown above for one example. The assumptions used in calculating the NPS estimates are wrong.

Appendix I should be disregarded and the statements concerning it in Chapter 4 should be retracted and revised. Appendix I is a poor quality analysis. NPS does not have any records of boat noise greater than 10% of the day on any day. NPS has no basis for concluding that DBOC noise generators have a major adverse impact on wildlife and visitor experience to Drake Estero.

In short, NPS has no evidence for a major adverse impact of DBOC noise on wildlife and visitor experience.

In the end, NPS should have done what NPS Management Policies 2006 and Director's Order #47 instructed them to do – NPS should have made direct measurements of noise levels of the oyster boats, oyster tumbler, and other DBOC equipment, but they did not. NEPA regulations are even more stringent on insisting that NPS gather the appropriate data. Even though the real measurements would have taken only a few hours to collect, and numerous commenters asked NPS to do so, in the final EIS, NPS wrote: "NPS did not obtain noise measurements of operational DBOC equipment."

Not making direct measurements was the fundamental flaw of the soundscape analysis in this FEIS. NPS was told of this mistake after the DEIS, but instead of making the direct measurements, they produced Appendix I. Appendix I is a very poor piece of scientific analysis that no doubt cost considerable time and effort at taxpayer expense. For all of the work that went into Appendix I, it is relatively worthless.

What is unambiguous about Appendix I is that it is incorrect and invalid. The methods employed do not allow NPS researchers to "unambiguously" measure DBOC boat events and boat noise levels. The methods do not allow NPS to measure total DBOC noise. All of these measurements are invalid. NPS should have come to the oyster farm and made the direct measurements. It would have taken less time, cost less taxpayer money, followed NPS policies and NEPA guidelines, and generated much better data.

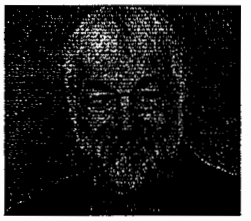
ENVIRON

Attachment 2
Brief Resume for Richard Steffel

Richard Steffel

Principal

Lynnwood, Washington
+1 425 412 1808
rsteffel@environcorp.com



Richard Steffel has over 30 years of experience evaluating environmental impacts and mitigation measures related to mobile and area air pollution sources. His experience includes transportation and general conformity assessments under state and federal air quality rules. Additionally, he has 23 years' experience conducting and managing a variety of environmental noise compliance, impact and mitigation assessments. He has conducted air quality and environmental noise studies for numerous new and modified commercial and industrial facilities, many of which have included reviews and documentation required by State and Federal Environmental Policy Acts (e.g., SEPA, CEQA, and NEPA).

Expertise

Air Quality & Environmental Noise Impact & Mitigation Assessment

Air Quality Conformity

Environmental Noise Compliance Evaluation & Assistance

Credentials

MS, Environmental Studies, University of Montana

BA, Anthropology, Georgia State University

MARINE NOISE EXPERIENCE HIGHLIGHTS

- Puyallup Tribal Terminal, SSA Marine, Port of Tacoma, WA. Principal in charge, project manager, and senior reviewer for the air quality and environmental noise impact and mitigation assessments for the modification and expansion to develop a 4-berth container terminal in the Port of Tacoma, WA. The environmental noise ossessment included measurements of existing conditions in the project vicinity, source noise measurements of expected terminal operations equipment, and noise modeling using CadnaA to consider off-site sound levels related to facility operations.
- Weyerhaeuser Port of Olympia Log-Export Facility, Weyerhaeuser Company, Olympia, WA. Project manager and principal investigator for the oir quality and environmentol noise impact and mitigation studies for a log export facility. The noise study included measurements of ambient levels in the project vicinity, equipment source noise measurements in and around an operational log-handling facility, and calculations to assess both compliance with local noise limits and the potential for impacts due to changes in noise levels.
- Rail/Barge Satellite Transfer Facility, Port of Everett, Everett/Mukilteo, WA. Project manager and principal investigator for the air and noise studies for the EIS considering establishment of a barge-to-rail transfer facility for oversized containers. Studies considered three candidate sites. Noise analysis included ambient measurements in the vicinity, special consideration of rail travel and horn noise, impact and mitigation modeling, and subsequent testimony during the shoreline permitting process for the facility. Subsequent work included development of noise management plan for implementotion during construction of the facility, and sound level measurements to assess pile-driving noise levels at nearby eagle nest and perch locations.
- Pier 1 Redevelopment Project, Port of Anacortes, Anacortes, WA. Project manoger and principal investigotor for the air quality and noise impact and mitigation evaluations for the EIS for the proposed redevelopment and expansion of an existing shipyard on the industrial waterfront. Noise analysis included ambient and compliance measurements in neighborhoods near the facility, source measurements of shipyard noise sources (e.g., cranes, welding, etc.), and impact and mitigation modeling to assess the noise implications of the proposed facility expansion.
- Terminal-5 Noise Mitigation, Port of Seattle, Seattle, WA. Principal in charge, PM, and principal investigator in evaluation of means to reduce or eliminate community noise complaints related to container-handling equipment in industrial site overlooked by residentiol uses. Involved source noise measurements and equipment changes.

EXHIBIT C

USGS
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Assessment of Photographs from Wildlife Monitoring Cameras in Drakes Estero, Point Reyes National Seashore, California

By William A. Lellis, Carrie J. Blakeslee, Laurie K. Allen, Bruce F. Molnia, Susan D. Price, Sky Bristol, and Brent Stewart

Open-File Report 2012–1249

U.S. Department of the Interior
U.S. Geological Survey

U.S. Department of the Interior
KEN SALAZAR, Secretary

U.S. Geological Survey
Marcia K. McNutt, Director

U.S. Geological Survey, Reston, Virginia: 2012

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Assessment of Photographs from Wildlife Monitoring Cameras in Drakes Estero, Point Reyes National Seashore, California

By William A. Lellis,[1] Carrie J. Blakeslee,[1] Laurie K. Allen,[1] Bruce F. Molnia,[1] Susan D. Price,[1] Sky Bristol,[1] and Brent Stewart[2]

Background

Between 2007 and 2010, National Park Service (NPS) staff at the Point Reyes National Seashore, California, collected over 300,000 photographic images of Drakes Estero from remotely operated wildlife monitoring cameras. The purpose of the systems was to obtain photographic data to help understand possible relationships between anthropogenic activities and Pacific harbor seal (*Phoca vitulina richardsi*) behavior and distribution.

The value of the NPS photographs for use in assessing the frequency and impacts of seal disturbance and displacement in Drakes Estero has been debated. In September 2011, the NPS determined that the photographs did not provide meaningful information for development of a Draft Environmental Impact Statement (DEIS) for the Drakes Bay Oyster Company Special Use Permit. Limitations of the photographs included lack of study design, poor photographic quality, inadequate field of view, incomplete estuary coverage, camera obstructions, and weather limitations.

The Marine Mammal Commission (MMC) reviewed the scientific data underpinning the Drakes Bay Oyster Company DEIS in November 2011 and recommended further analysis of the NPS photographs for use in characterizing rates and consequences of seal disturbance (Marine Mammal Commission, 2011). In response to that recommendation, the NPS asked the U.S. Geological Survey (USGS) to conduct an independent review of the photographs and render an opinion on the utility of the remote camera data for informing the environmental impact analyses included in the DEIS.

In consultation with the NPS, we selected the 2008 photographic dataset for detailed evaluation because it covers a full harbor seal breeding season (March 1 to June 30), provides two fields of view (two cameras were deployed), and represents a time period when cameras were most consistently deployed and maintained. The NPS requested that the photographs be evaluated in absence of other data or information pertaining to seal and human activity in the estuary and that we focus on the extent to which the photographs could be used in understanding the relationship between human activity (including commercial oyster production) and harbor seal disturbance and distribution in the estuary.

Photograph Analysis

The NPS provided 333,042 digital photographs of the Drakes Estero taken by remote cameras between 2007 and 2010. These same photographs are available to the public on the Point Reyes

[1] U.S. Geological Survey
[2] Hubbs-Seaworld Research Institute, San Diego, Calif.

National Seashore Reading Room Web site (NPS Reading Room, 2012; Web address listed in References Cited). Included in the collection were 165,282 photographs taken in 2008 from two sites within Drakes Estero: 100,457 from a site referred to as the Upper Estero Far (UEF) and 64,825 from a site referred to as the Oyster Bar (OB). These photographs were taken between March 14 and June 23, 2008, at an interval of one per minute during daylight hours (approximately 720 photographs per day at each site). Some of these photographs were duplicates.

Our initial plan was to analyze a random subsample of 10 percent of all 2008 photographs and assess each individual photograph for quality and information that could be used to study seal disturbance and displacement. Such information would include photograph clarity and resolution, obstructions, field of view, light, weather conditions, stage of tide, presence and number of seals, human activity, nonhuman activity, and evidence of seal disturbance. Seal disturbance was classified as head alert (increased vigilance), flushing on land (change in position), or flushing into water (abandon site). (See Marine Mammal Commission (2011, p. 13-16) for additional discussion.)

Initial review of a portion of the intended subsample indicated that many photographs were of no obvious value to understanding seal behavior during haulout because of inadequate light, inadequate observing conditions due to weather (fog, rain, wind), obstructions (plants), too wide a field of view, misdirection of camera, wrong tidal stage (no exposed sand bars for haulout), and (or) no seals within camera view (fig. 1). A smaller portion of the photographs contained potentially useful information such as exposed sandbars, presence of hauled out seals, and (or) potentially disturbing stimuli such as boats, people, birds, or other unidentified objects in the water, sky, or on land.

Within the photographs that contained hauled out seals, the distance of the camera from the seals was often too great, the angle of the camera too low to the water, and resolution of the photographs too low to allow an accurate count of the number of individual seals within groups hauled out on the sand. Nor was it possible, in most cases, to distinguish any behaviors among individual seals, such as head alerts, that could definitively be ascribed to increased vigilance in response to a stimulus. These same limitations also prevented determination of any distinguishing features that would allow for identification of specific boats or people, or activities in which they were engaged. Attempts to improve resolution through photographic enhancements were unsuccessful.

Video Analysis

Our initial approach of analyzing a random subsample of all photographs had two significant limitations. The first was that information contained within each photograph lacked the context of how it fit into events that occurred immediately before and after that moment in time. This lack of sequential information effectively prevented determination of seal flushing (change in number of seals over time) or the reasonable establishment of cause and effect between seal behavior and human or nonhuman activity. The second limitation was that examination of individual photographs was extremely time consuming and yielded little usable information for the given effort. As such, we changed our approach to animation of photographs into daily videos to allow more rapid screening and to add sequential context to each photograph.

To make the videos, we retrieved the 2008 photographs from the Point Reyes National Seashore Reading Room Web site using a utility that can copy a site's pages, images, movies, and other files. Each image on the Web site was dated and time-stamped. Although the NPS cameras were programmed to take one photograph every minute for 12 hours (720 photographs per day), camera malfunction, battery failure, changes in camera programming, or other technical issues resulted in some days containing more or less than 720 photographs. Missing photographs for specific dates and times were verified as nonexistent with Point Reyes staff.

After retrieval, we added the file name to each image as a watermark and imported the files into Apple iPhoto for production. The interval between frames (that is, photographs) was set to 1 second with no transition effects, in order to create a time-lapse style video. No photographs were edited from their original form or deleted during production. Videos were exported as MPEG4 files, which retained each photograph's original resolution. All videos can be downloaded from the USGS Applied Earth Systems Web site (Web address listed in References Cited).

Each video was reviewed by at least two observers working together to identify and record data of possible interest in an analysis of seal disturbance, including time of day when the sand bars appeared and disappeared, time of day when seals hauled onto or left a sandbar, human activity when seals were present, nonhuman activity when seals were present, and any abrupt changes in the size or location of a group or the number of seals hauled out on a sand bar. Within each video, human activity was recorded only during times when seals were hauled onto sandbars (that is, boat traffic was not recorded during high tide or when seals were not present on the sand bars).

In total, we produced 191 videos from the 2008 photographic collection (103 UEF, 88 OB). No hauled out seals were detected in any of the UEF videos, because of low resolution and wide field of camera view, so we conducted no further analyses of those pictures. Within the OB videos, we identified 75 different events (appendix 1) in which human activity was visible in the photographs while seals were hauled out, or there was an unusual amount of nonhuman stimuli (birds), or there was a sudden change in the number or position of hauled seals. Human activity during seal haulout included boats (44 events, 34 of which had people visible on the sand bars while the boat was stationary), camera maintenance (21 events), and kayaks (2 events). We detected camera service by either a change in camera angle or a reset in the image number during a daily photograph sequence.

Photographic sequences of each event, plus the 10 photographs before the start of each event and the 10 photographs after the end of each event (3,140 photographs total) were analyzed for incidence and cause of seal disturbance. Ten of the 75 events were classified as containing behaviors indicative of disturbance in the form of flushing (table 1, figs. 2-11, appendix 1). Two flushing events were associated with the presence of a kayak, two were associated with birds landing in the area, two were associated with boat activity, and four occurred when no obvious stimuli were visible within the field of view of the camera.

Scientific Value

Using the analysis we conducted of the 2008 Drakes Estero photographs as a representative sample of all 4 years of monitoring, we considered the scientific value of these photographs without other supporting information for use in analyses to determine the impacts of human and nonhuman activities on seal habitat, displacement, or disturbance.

Habitat

Fitness is defined as a measure of an individual seal's ability to survive and reproduce and is influenced by many factors, including suitable haulout habitat for resting, molting, and reproduction, particularly for females and pups during the spring breeding season (Marine Mammal Commission 2011, p. 13). Suitable haulout sites provide quick access to deep water for shelter, protection from storm events and predators, and minimization of disturbance and harassment. In that regard, monitoring cameras can provide site-specific information on habitat persistence over time; physical impact of weather, storms, and waves; occupancy rate; frequency and severity of harassment from predators such as coyotes and elephant seals; frequency and severity of disturbance from human and nonhuman

sources; and a general sense of degree of comfort seals have with a site (degree to which they maintain a resting position during haulout).

The 2008 Drakes Estero photographs can provide information on habitat persistence and use at the OB site. The photographs have adequate resolution, time and date-stamping, field of view, and span of operation to determine daily timing and duration of sand bar exposure, storm damage and wave conditions, frequency and timing of site usage, and how weather and tidal cycles affect site occupation. Data on sand bar exposure could be related to local tidal gages to develop predictive models of daily habitat timing and availability within the estuary.

Limitations of the 2008 photographs for habitat monitoring include lack of information during darkness, limited information during low visibility conditions such as fog, inconsistent or limited ability to count animals or estimate age for use in occupancy estimates, lack of information on concurrent use of other haulout sites, and inadequate resolution to identify specific predators on land or in the water (see 3/31/08 and 5/1/08 in appendix 1). Habitat monitoring could be improved by installation of high-definition cameras, multiple cameras with different focal lengths and field of view, and cameras capable of detecting animals during darkness.

Displacement

Displacement is defined as the avoidance of an otherwise preferred haulout site based on experience or perception of a possible threat (Marine Mammal Commission, 2011, p. 15). The 2008 OB monitoring camera provides a view of an area that simultaneously contains both hauled seals in the foreground and human activity in the form of boat traffic in water and foot traffic on submerged and exposed sandbars in the background. No seals were observed to be hauled out at any time in the area of human traffic in the photographs examined during this analysis. Thus, two questions on seal displacement can be raised for this site: are seals being completely displaced from the distant sandbars due to direct human activity and are seals being partially displaced from the closer sandbars due to indirect human activity? Answering these questions requires accurate counts of hauled seals over time and distance and a means of comparing occupancy rates during periods of human activity and no human activity.

Wildlife monitoring cameras can be used to study displacement by providing data on seal abundance and distribution over time in the presence and absence of human activity. The resolution of the 2008 OB photographs, however, is too low to provide consistently accurate counts of individual seals for this purpose. In addition, resolution diminishes with distance from the camera, thus creating an inherent bias to detect more seals in the foreground (site of haulout) than in the background (site of human activity). Monitoring to study seal displacement could be improved by installation of higher resolution cameras with greater image capture rate to increase accuracy of seal counts and by installation of cameras at multiple locations or with different focal lengths to remove distance sampling bias. Implementation of a statistically valid experimental design that controls human activity relative to variations in seal haulout activity over season, tide, and weather would also improve accuracy of displacement studies.

Disturbance

Disturbance is defined as an event or stimulus that alters a seal's behavior or use of estuary habitat for resting, molting, or reproduction (Marine Mammal Commission, 2011, p. 13). Disturbed seals may show a continuum of responses to disturbance, including vocalizations, increased vigilance such as raised head (head alert), change in position on land (flush toward water), flush into water and return, and flush into water and not return (abandon site).

The 2008 OB photographs lack sound, so they do not provide any information on vocalizations. Within some photographs, there is enough resolution to detect changes in head position in individual seals (see OB-05-15-08 IMG_ 1599-1601). However, the ability to detect change is inconsistent across photographs and position of seals within the photographs, so for practical purposes the resolution is too coarse in the 2008 OB photographs to document the more subtle indicators of seal disturbance. The photographs can be used to document the more coarse indicators of disturbance, including flush toward water (see OB-06-11-2008 IMG_1155-1158), flush into water and return (see OB-04-13-2008 IMG_2190-2219), and abandon site (see OB-03-31-2008 IMG_0018-0050). Documentation of disturbance events would be greatly enhanced with increased resolution and multiple camera angles.

Within the 2008 OB videos, we identified 10 incidents of seal disturbance that involved a flushing event (table 1, figs. 2-11, appendix 1). This does not include all incidents of disturbance, because we could not include vocalizations, nor could we consistently detect head alerts and other postural changes indicating increased vigilance. It is also possible that we missed incidents of flushing, particularly those involving changes in position on land within large groups of seals at distances farthest from the camera.

Correlation of these flushing events with specific stimuli was difficult due to lack of associated sound, coarse resolution, and limited field of view on land, water, and air. Three types of stimuli that could be directly connected, or at least associated with a flushing level of disturbance in the OB seals are kayaks passing in proximity (see OB-04-13-2008 IMG_2186-2200 and OB-04-13-2008 IMG_2218-2224), seabirds landing among or close to the seals or passing nearby (see OB-04-14-2008 IMG_0354-0359 and OB-04-23-2008 IMG_1315-1322), and boat traffic at nearby sandbars (see OB-05-15-2008 IMG_1590-1605 and OB-06-11-2008 IMG_1153-1163). However, there are numerous incidents of increased seabird activity in the photographs with no indication of flushing-level disturbance to seals. We recorded 40 incidents of boat visits to the adjacent sandbar (many with related foot traffic) that did not seem to cause a flushing-level disturbance in the hauled seals, and at times there are multiple sources of potential disturbance stimuli occurring simultaneously. We found no evidence that activities related to maintenance of the remote camera system directly caused any flushing-level disturbances in the seals, although the relationship between camera maintenance and bird movement could not be ascertained by these photographs.

Conclusions

Based on our analysis of 165,282 photographs taken in 2008 from two remote cameras within Drakes Estero, we conclude that the protocols used by the NPS camera monitoring program did provide some data that could be used to document gross haulout patterns of seals and some instances of reactions to potential stimuli in the Drakes Estero. Data are limited to seal use of the Oyster Bar site related to time, tide, and weather and to some coarse detection of disturbance as measured by flushing of seals from resting positions toward or into the water. The length of time that seals abandoned the haulout sites after flushing could also be quantified in these photographs.

Camera focus was generally too poor and image resolution was too low to allow accurate counting or aging of seals or to provide enough anatomical detail to quantify postures associated with increased vigilance to potentially disturbing stimuli. The methods and equipment used did not allow discrimination between visual and auditory elements of potentially disturbing stimuli, and the field of view was too narrow to discriminate causation from correlation between seals and observed visual stimuli for most disturbance events. A wide-angle camera system with higher image resolution capabilities, or a network of linked high-resolution cameras coupled with audio recording systems would help determine whether movements or subtle changes in the behavior and posture of harbor seals

is directly caused by human disturbance. The systems would also provide better opportunities for recording normal haulout patterns and behaviors.

Direct monitoring by on-site observers would allow better documentation and evaluation of seal behaviors and the variables that influence them, provided that the observers themselves do not create additional potential for seal disturbance, such as flushing of birds into the seal haulout area. A video and audio monitoring system that could broadcast continuously by radio frequency, cellular telephone, or satellite to a remote site would reduce the chances that operation of photographic equipment could confound the observations. That system would need to resolve the same issues of focus, field of view, angle, and resolution that have limited the utility of the time-lapse camera system used in 2008.

The first order limitation of all these methods is that they only document the brief response or non-response of harbor seals to a single potentially correlative stimulus. Larger scale questions on the significance of disturbance events to seal behavior within Drakes Estero, or the relationship of localized seal disturbances to overall population structure and viability, require rigorous investigation and hypothesis testing. If hypothesis testing and discrimination of causation from correlation is the intent of further effort at Point Reyes, then development of a more rigorous and comprehensive study design to incorporate several behavioral and environmental monitoring methods is needed.

References Cited

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National Park Service Reading Room, 2012, Photographs—Drakes Estero wildlife monitoring cameras – 2008: Web site accessed September 2012 at *http://www.nps.gov/pore/parkmgmt/planning_reading_room_photographs_wmc_de_2008.htm*.

Table 1. Flushing events of Drakes Estero seals identified in 2008 National Park Service photographs. Videos can be retrieved from the USGS Web site (*https://my.usgs.gov/confluence/display/aesir/PRNS+Time+Lapse+Videos*), and image files can be retrieved from the NPS Reading Room Web site (*http://www.nps.gov/pore/parkmgmt/planning_reading_room_photographs_wmc_de_2008.htm*).
[m4v is a MPEG4 file; min, minute]

Date	Video File Name	Time	NPS Web site Folder	Image File Name	Notes
03/31/08	OB-03-31-2008-Large.m4v	1:57 p.m.	March 31-April 2	IMG_0026	Unidentified black object appears in single image (IMG_0023) 3 min prior to all seals flushing into the water; seals do not return to haulout site for the remainder of the tide.
04/13/08	OB-04-13-2008-Large.m4v	12:04 p.m.	April 10-April 14	IMG_2195	Kayak becomes visible in vicinity of seals at 11:55 a.m. (IMG_2186); 9 min later all seals flush into the water as kayak passes haulout site; seals return to site 6 min after flushing (IMG_2201.)
04/13/08	OB-04-13-2008-Large.m4v	12:32 p.m.	April 10-April 14	IMG_2223	Kayak becomes visible in vicinity of seals at 12:28 p.m. (IMG_2219); 4 min later all but 2 seals flush into the water.
04/14/08	OB-04-14-2008-Large.m4v	6:20 p.m.	April 14-April 17	IMG_0355	Unidentified birds land on sandbar at 6:19 PM (IMG_0354); 1 min later some seals flush into the water; some seals remain on sandbar
04/23/08	OB-04-23-2008_Large.m4v	1:14 p.m.	April 23-April 25	IMG_1319	Boat becomes visible at 1:09 p.m. (IMG_1314); people walk on sandbar; bird activity near seals increase; 5 min after boat becomes visible birds land on sandbar and some seals flush into the water; some seals remained hauled out during event.
05/06/08	OB-05-06-2008_Large.m4v	10:19 a.m.	May 5-May 7	IMG_0675	Boat becomes visible at approximately 8:57 a.m. (IMG_0593); many seals flush around 80 min later; some seals return within 10 min; boat remained on sand bar > 7 hours.
05/15/08	OB-05-15-2008_Large.m4v	2:07 p.m.	May 13 - May 15	IMG_1603	Boat becomes visible at 1:55 p.m. (IMG_1591); people walk on sandbar; boat leaves area at 2:06 p.m. (IMG_1602); some seals flush into water 1 min later.
05/31/08	OB-05-31-2008-Large.m4v	7:32 a.m.	May 29-June 2	IMG_0951	All but one seal flush into water; no visible human activity.
06/02/08	OB-06-02-2008-Large.m4v	7:11 a.m.	May 29-June 2	IMG_2370	All seals flush into water; no visible human activity; some seals returned to site approximately 1 hour later (IMG_2438)
06/11/08	OB-06-11-2008-Large.m4v	11:25 a.m.	June 9-June 12	IMG_1157	A portion of hauled seals flush toward water at 11:25 a.m., 3 min prior to boat arrival (IMG_1160); people seen walking on sandbar; seals remained hauled out during event.

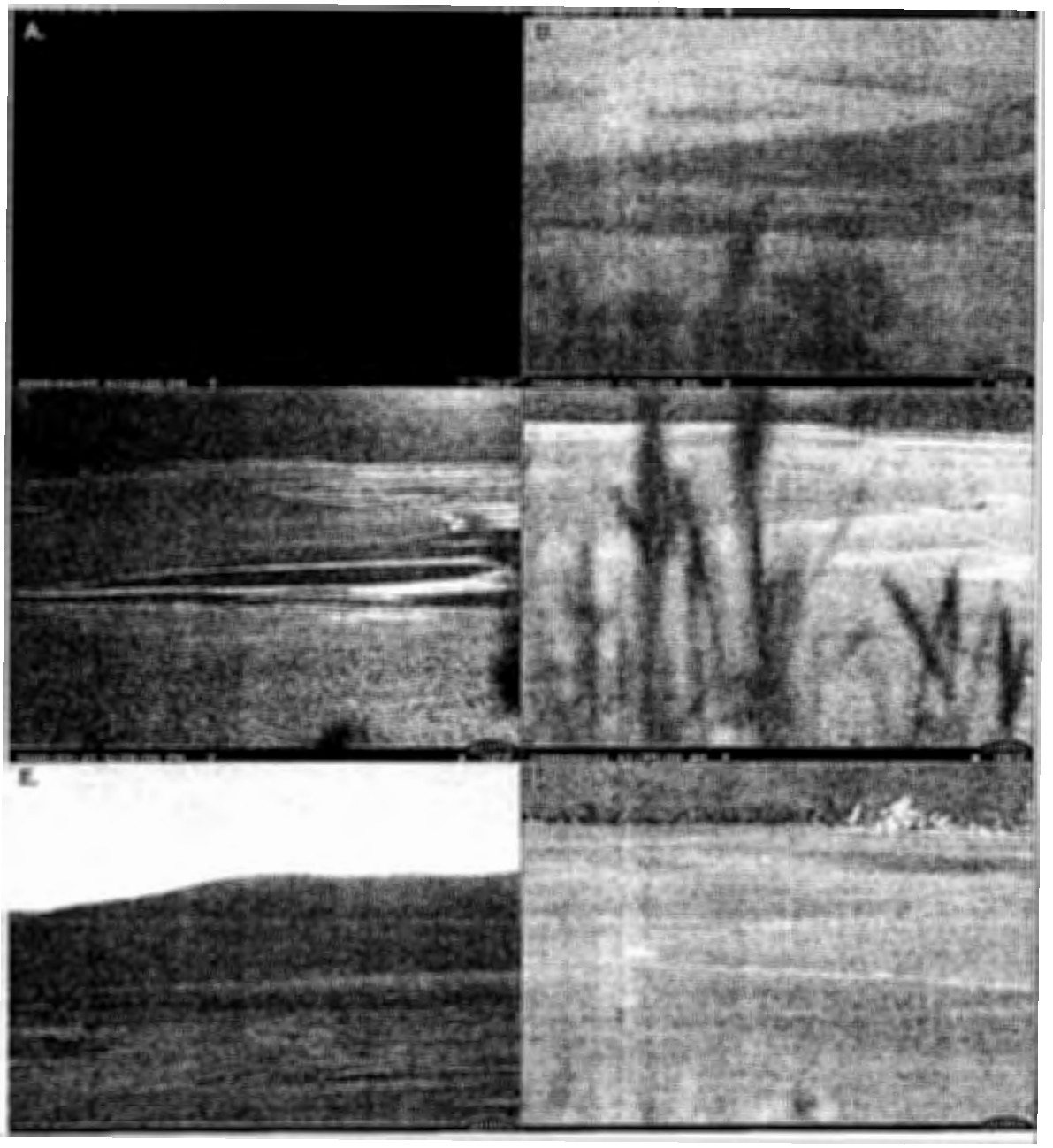

Figure 1. Sample of photographs from Point Reyes monitoring cameras, 2008, showing different conditions in the estuary. A, Nighttime. B, Foggy. C, Windy. D, Calm, with grass obstruction, E, Exposed sandbars, no seals. F, Exposed sandbars with seals hauled out.

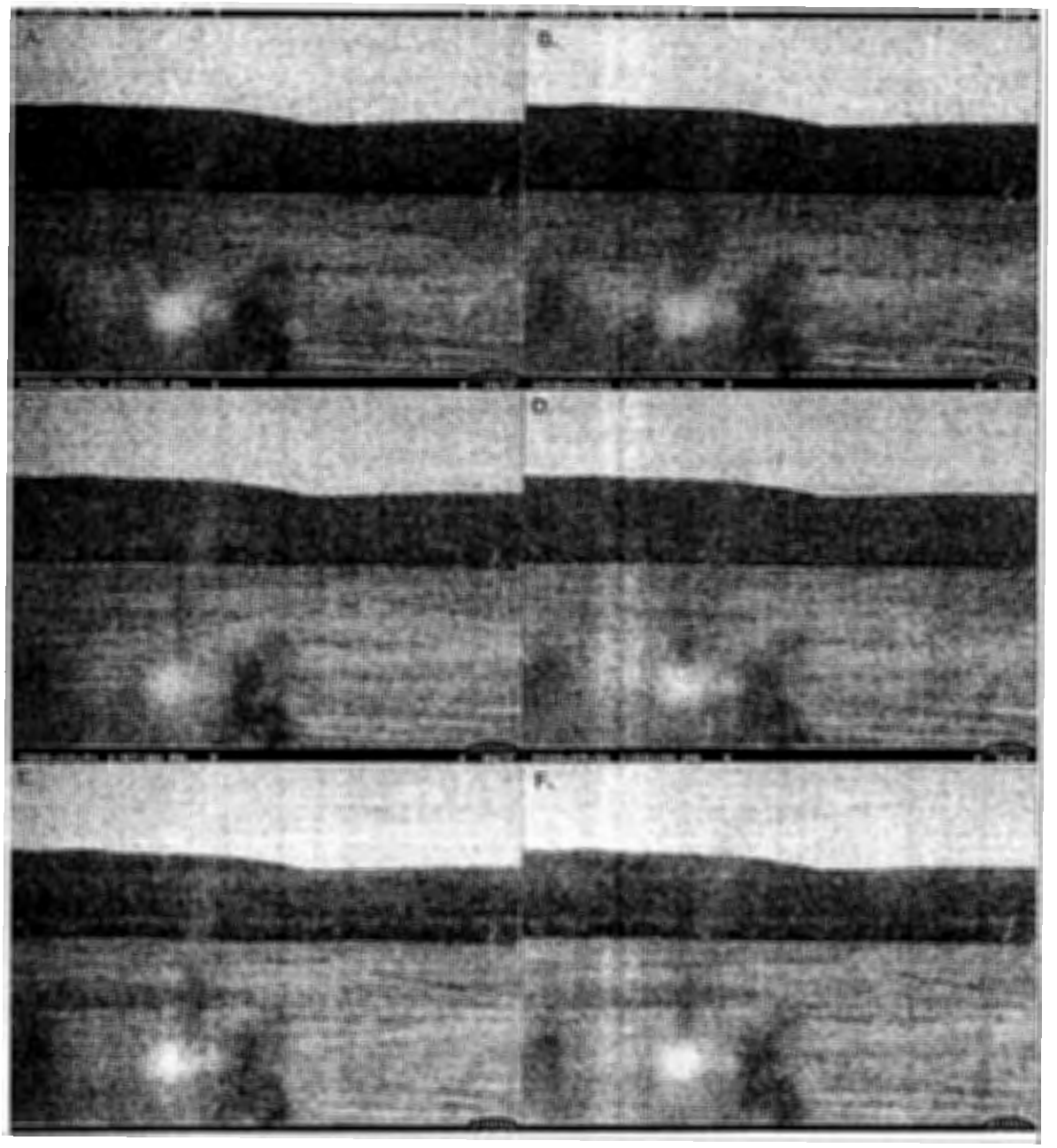

Figure 2. A series of photographs of a seal flushing event on March 31, 2008, at the Oyster Bar site within Drakes Estero. A, Seals hauled out onshore (lower right corner). B, Seals hauled out onshore with the appearance of an unidentified black object on the shore opposite to the seals. C, Black object is gone and seals remained hauled out. D, Seals remained hauled out. E, All seals flush from the haulout site. F, No seals evident. Photographs were taken at 1-minute intervals.

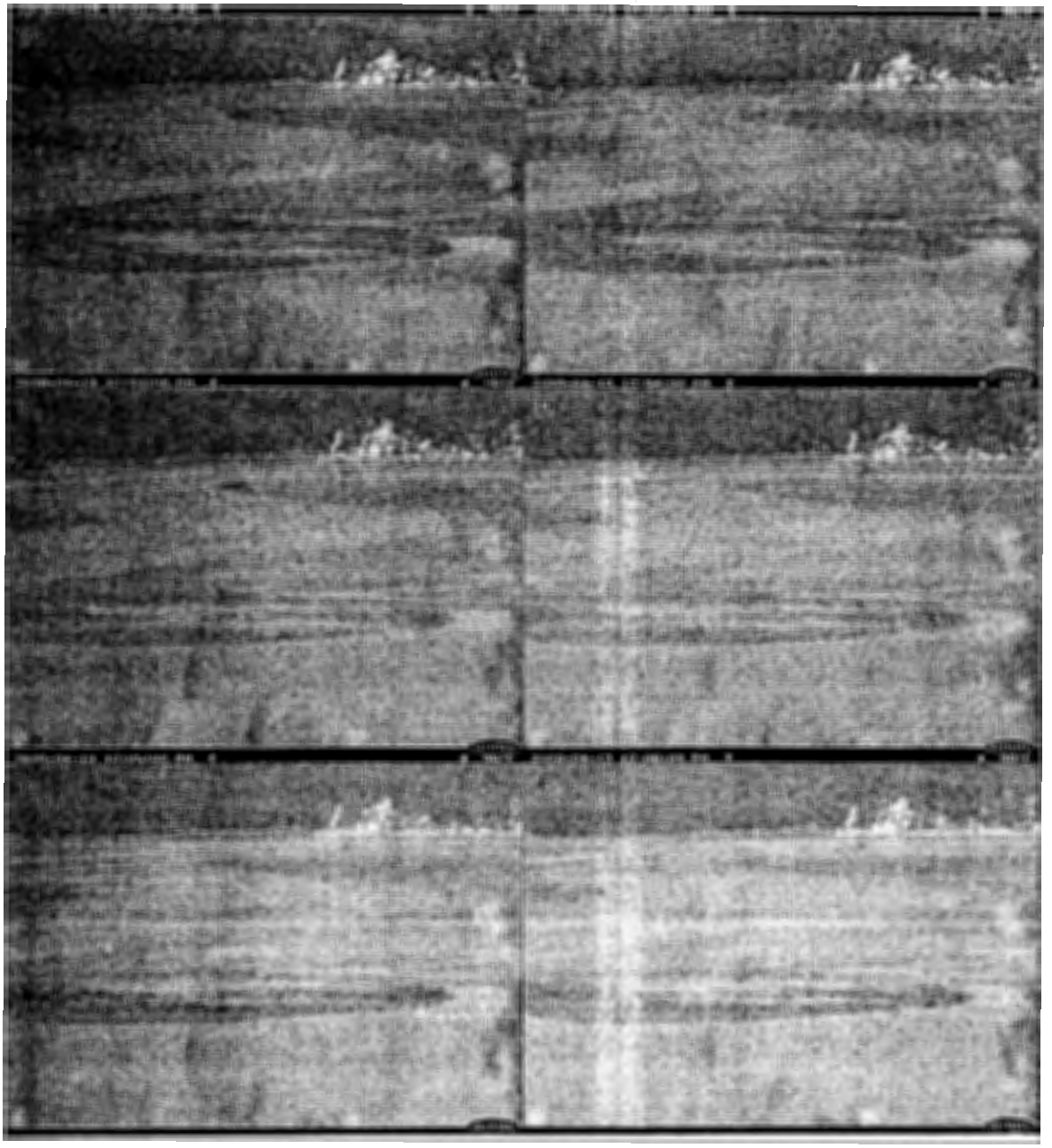

Figure 3. A series of photographs of a seal flushing event on April 13, 2008, beginning at12:01 p.m.at the Oyster Bar site within Drakes Estero. A, Seals hauled out along shore as a kayaker approaches. B, Seals remained hauled out as kayaker comes closer. C, Kayaker continues to approach hauled out seals without movement of seals. D, Some seals begin flushing from shore in the presence of the kayaker. E, All seals have flushed and kayaker remains in view. F, All seals remained flushed as kayaker leaves haulout site. Photographs were taken at 1-minute intervals.

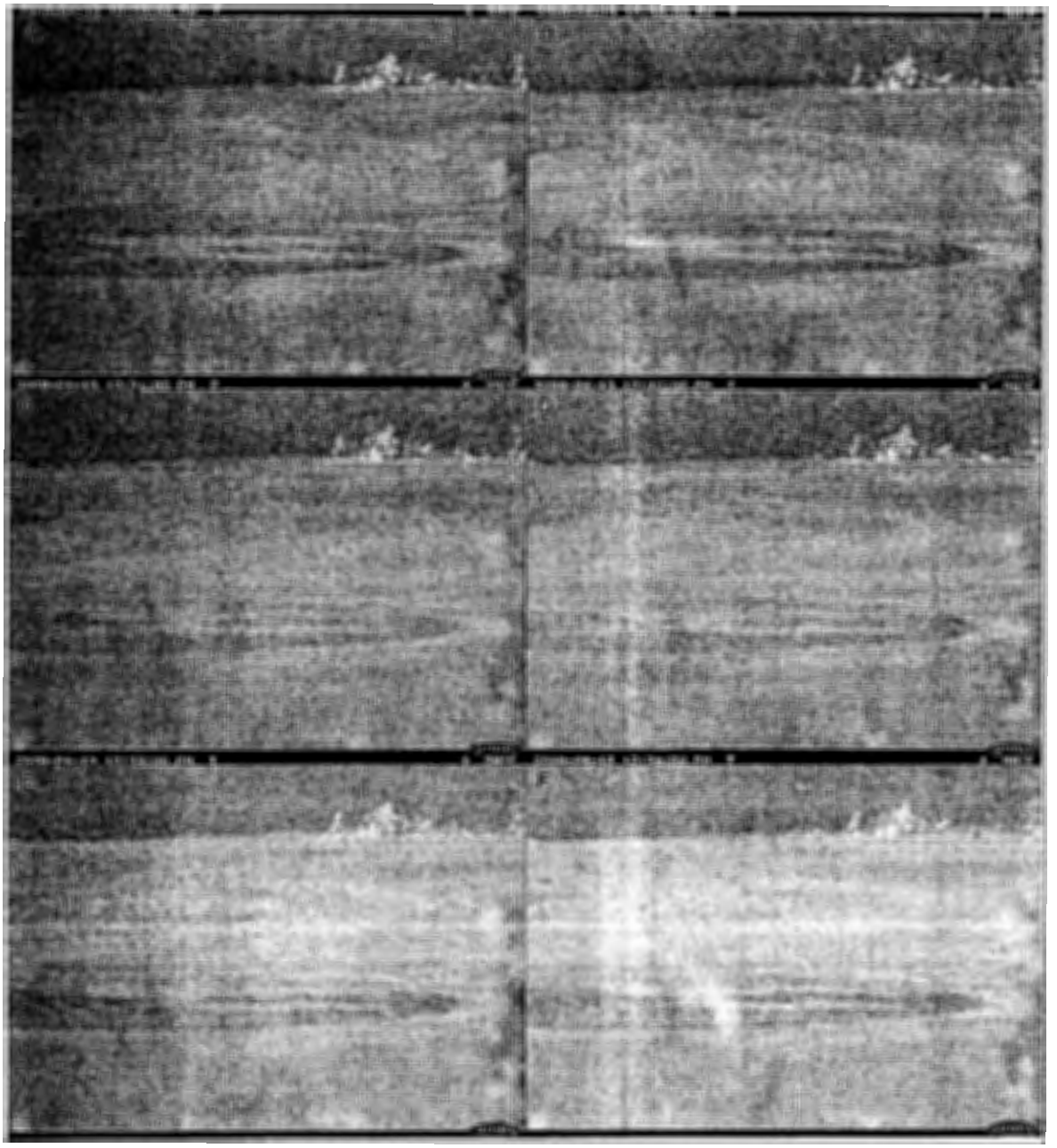

Figure 4. A series of photographs of a seal flushing event on April 13, 2008, beginning at 12:29 p.m. at the Oyster Bar site within Drakes Estero. A, Seals hauled out along shore as a kayaker approaches. B, Some seals begin to leave hauled out area as kayaker comes closer. C, Kayaker is no longer in view and seals continue to move. D, More seals have flushed into the water, with a few remaining seals hauled out. E, A few seals remain on shore. F, Some seals begin to return to haulout site. Photographs were taken at 1-minute intervals.

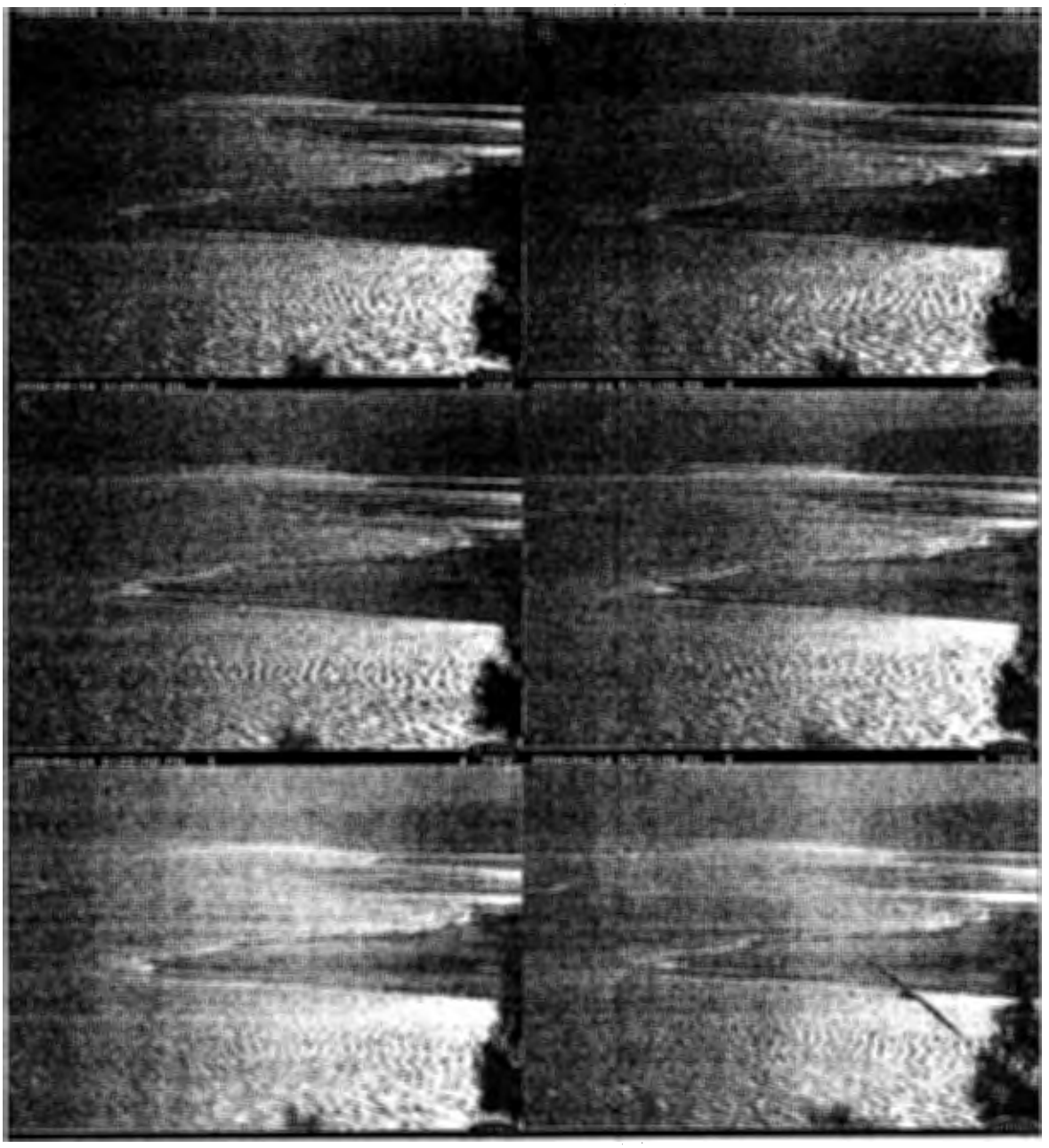

Figure 5. A series of photographs of a seal flushing event on April 14, 2008, at the Oyster Bar site within Drakes Estero. A, Seals hauled out along the shore. B, Seals still hauled out along the shore. C, Unidentified birds begin to land on sandbar near some hauled-out seals. D, A group of seals near the birds flush into the water. E, Birds remain on shore where some seals are still hauled out. F, Bird and seal activity does not appear to change. Photographs were taken at 1-minute intervals.

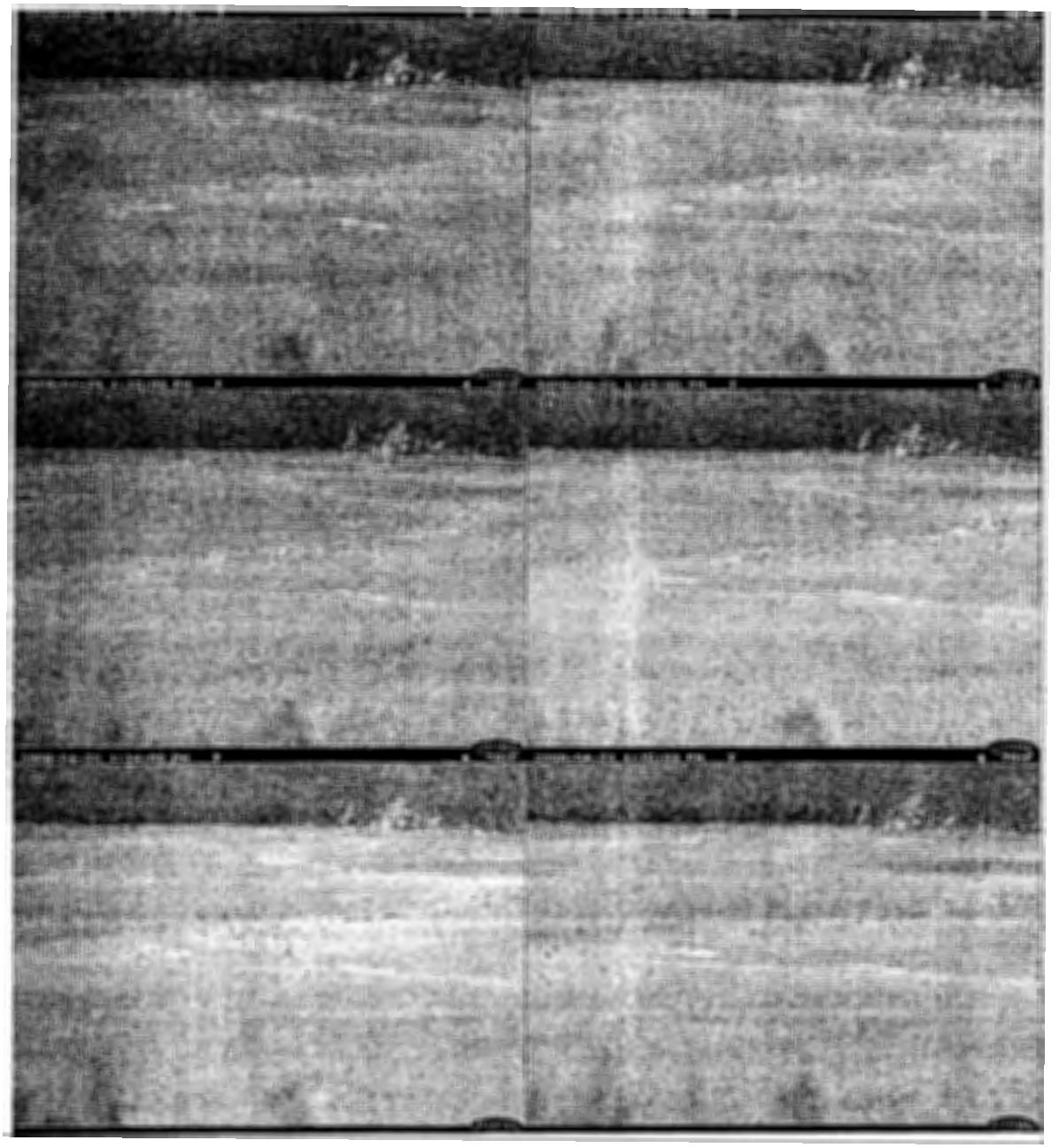

Figure 6. A series of photographs of a seal flushing event on April 23, 2008, at the Oyster Bar site within Drakes Estero. A, Seals hauled out along the shore while a boat with people associated with it is docked on the opposite channel (far upper left corner). B, Boat, people, and seal activity do not appear to change. C, Bird activity near the seals increases. D, Some birds land on the haulout site near the seals. E, Some seals begin to flush from the haulout site as birds continue to be active near and on the shore. F, More seals flush from the haulout site as bird activity continues (boat and people remain on opposite shore). Photographs were taken at 1-minute intervals.

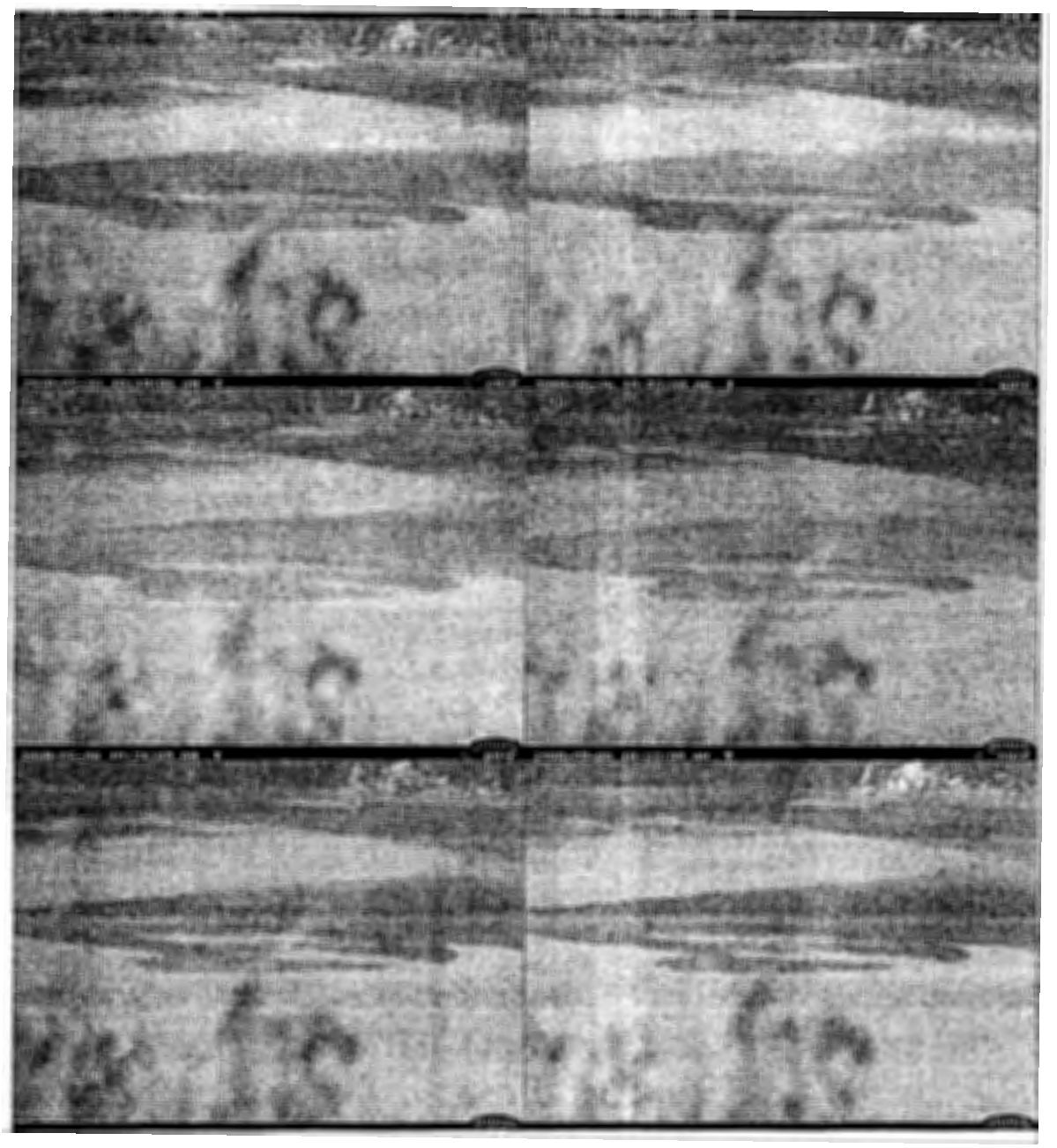

Figure 7. A series of photographs of a seal flushing event on May 6, 2008, at the Oyster Bar site within Drakes Estero. A, Seals hauled out along the shore while a boat is present along opposite shore (boat arrived approximately 80 minutes prior to photograph). B, Seal and boat activity do not change. C, About a third of the seals flush from the haulout site. D–F, Seal and boat activity do not change. (No people were visible within the camera view during the flushing event.) Photographs were taken at 1-minute intervals.

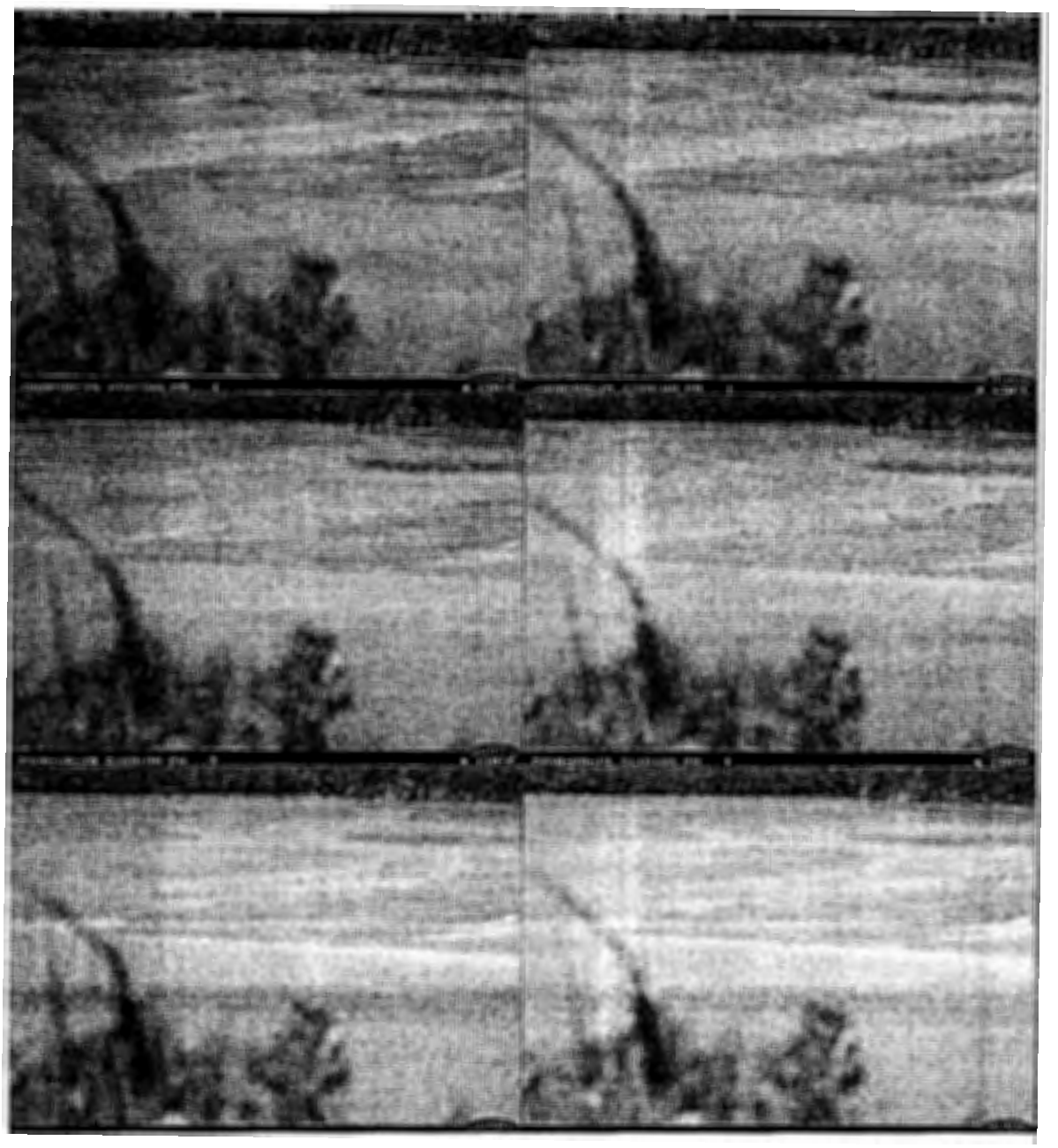

Figure 8. A series of photographs of a seal flushing event on May 15, 2008, at the Oyster Bar site within Drakes Estero. A, Seals hauled out along the shore and a boat docked along the far back channel (upper right corner). B, Slight increase in seal activity; boat remains along the far back channel. C, Some seals flush into the water with their heads visible; the boat has left the channel. D, Some seals remain in water, moving around. E, Seals begin to return to shore. F, Most of the seals have returned to the haulout site. Photographs were taken at 1-minute intervals.

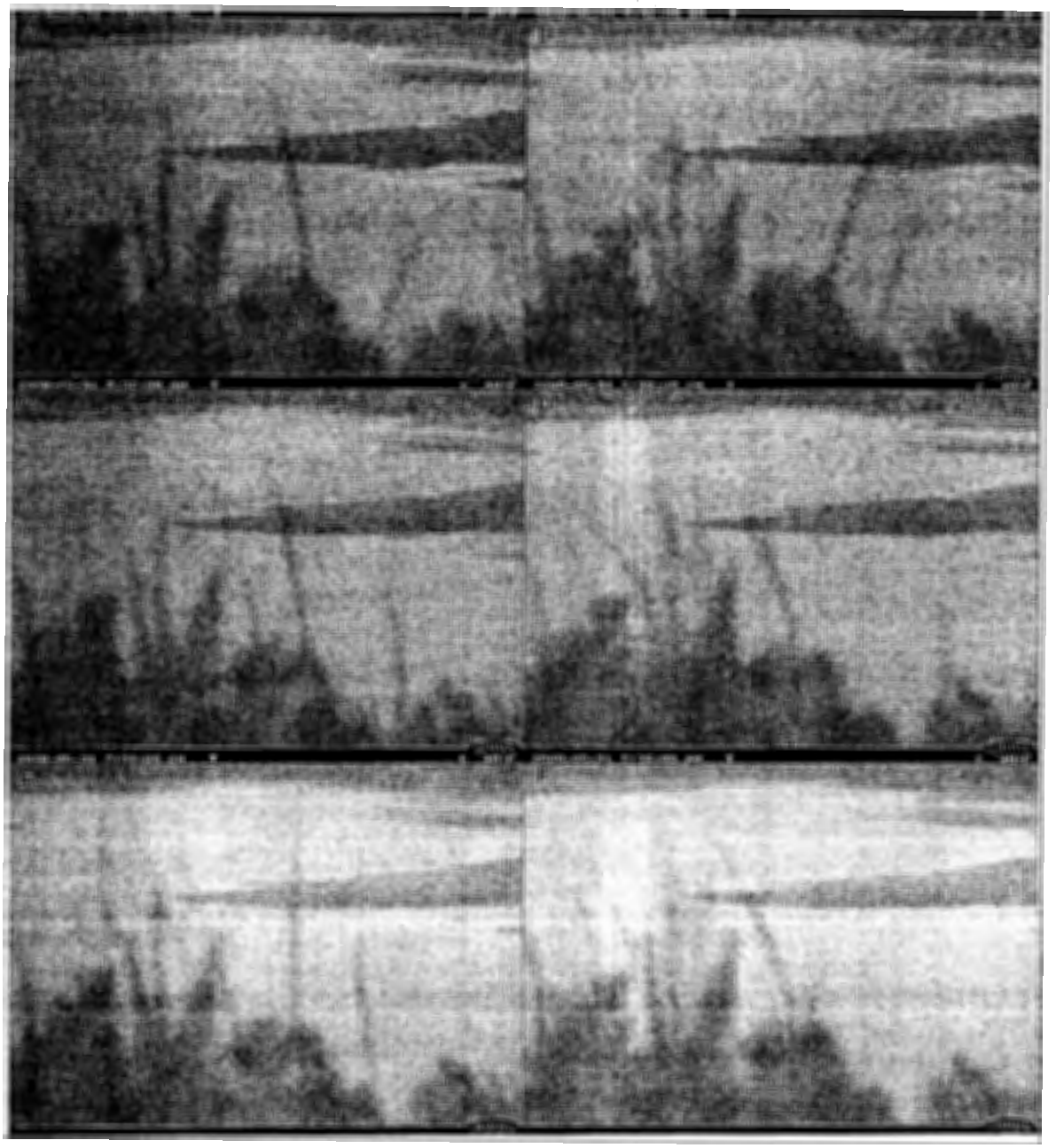

Figure 9. A series of photographs of a seal flushing event on May 31, 2008, at the Oyster Bar site within Drakes Estero. A, Seals hauled out along the shore while the tide is rising. B, Seals becoming slightly inundated by the tide but remain hauled out. C, All seals but one flush from the shore, with no visible stimuli present. D, A single seal remains hauled out on the shore. E–F, No change in seal activity. Photographs were taken at 1-minute intervals.

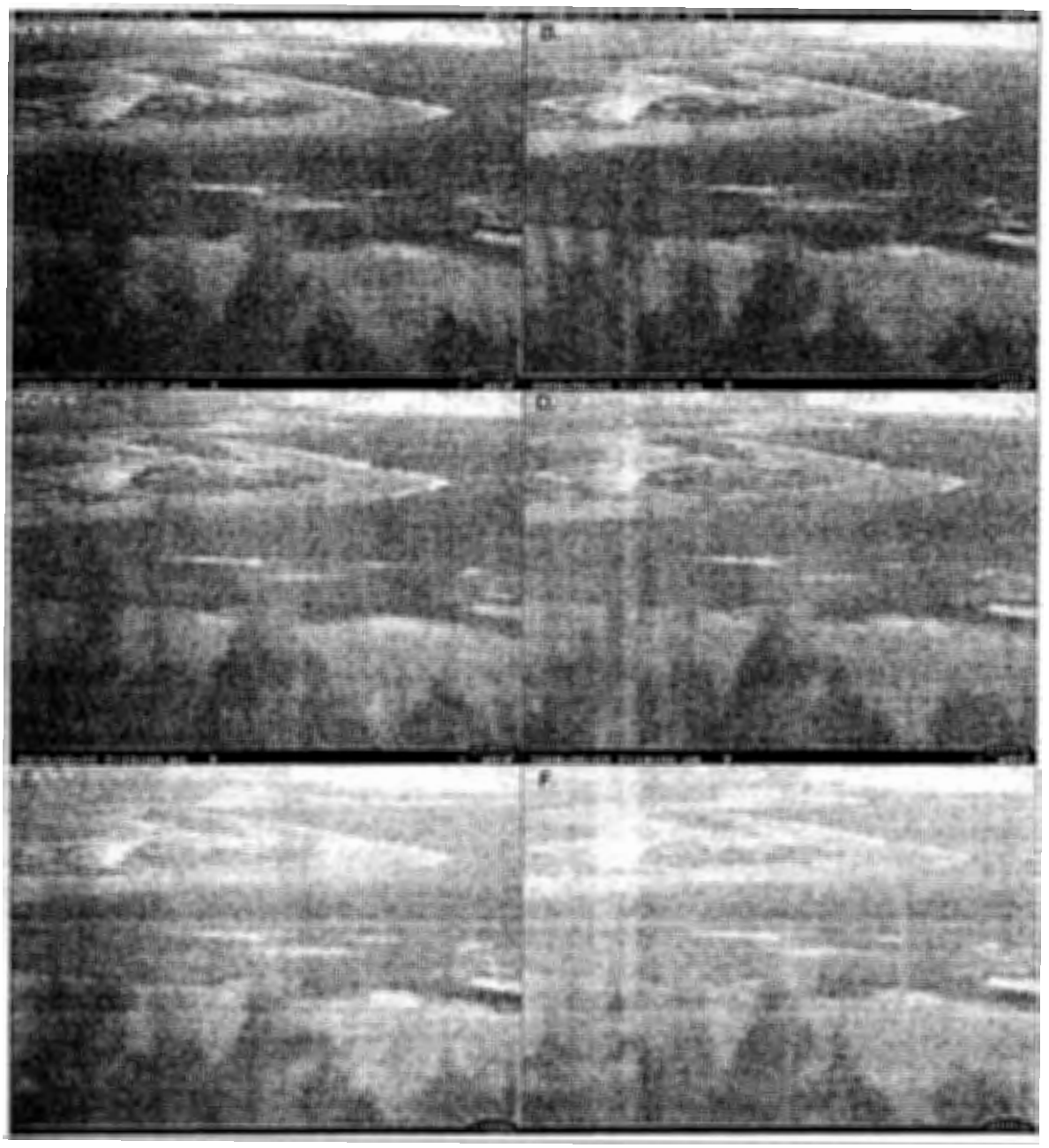

Figure 10. A series of photographs of a seal flushing event on June 2, 2008, at the Oyster Bar site within Drakes Estero. A, Seals hauled out along the shore. B, No change in seal activity. C, All seals flush from haulout site, with no visible stimuli. D, No seals present on shore. E–F, No change in activity. Photographs were taken at 1-minute intervals.

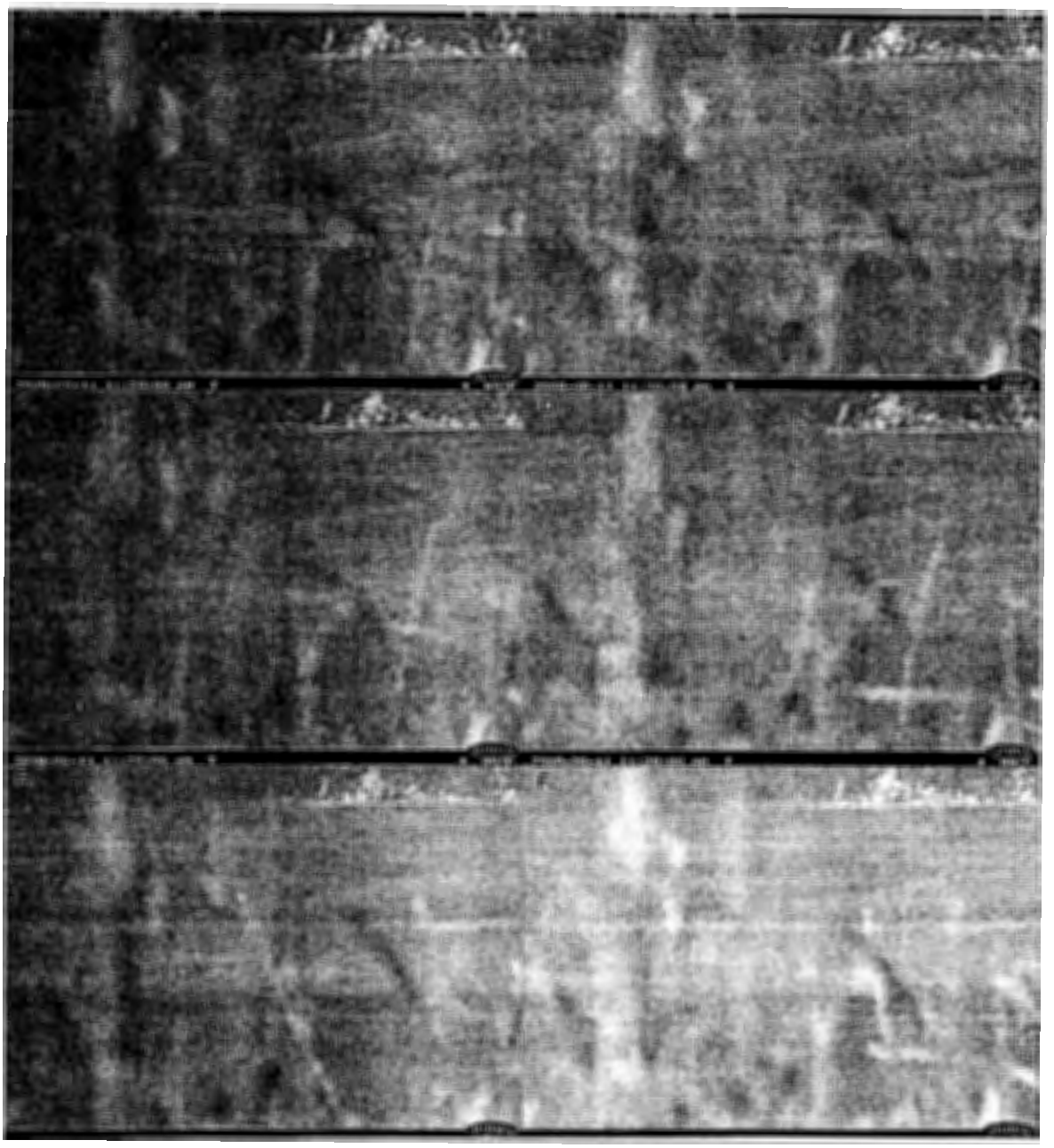

Figure 11. A series of photographs of a seal flushing event on June 11, 2008, at the Oyster Bar site within Drakes Estero. A, Seals hauled out along the shore. B, Not change in seal activity. C, A sudden, brief movement of seals toward the water's edge. D, Seals remain near water's edge. E, No change in seal activity. F, Boat enters frame landing on the shore opposite to the hauled out seals; seal activity does not change. Photographs were taken at 1-minute intervals.

Appendix 1. Summary analysis of 3,140 photographs from 75 potential disturbance events to hauled out harbor seals in Drakes Estero.

Date	Stimulus	Number of Photos Reviewed	Evidence of Seals Flushing	Connection Between Stimulus and Seal Flushing	Boat	Camera Serviced	Kayak	Birds	Unknown	Flushing Events	Comments
03/26/08	camera serviced	93	no			1				0	Camera service; poor camera focus; no evidence of disturbance to seals
03/27/08	boat	40	no		1					0	Boat visits area; people walking; poor camera focus; no evidence of disturbance to seals
03/27/08	boat	21	no		1					0	Boat visits area; no people; no evidence of disturbance to seals
03/27/08	camera serviced	36	no			1				0	Camera serviced; seals in camera view before servicing; no seals in changed camera view after servicing; no evidence of disturbance to seals
03/31/08	boat	89	no		1					0	Boat visits area; people walking; poor visibility; no evidence of disturbance to seals
03/31/08	camera serviced	23	no			1				0	Camera serviced; seals partially obscured by camera angle; poor camera focus; no evidence of disturbance to seals
03/31/08	black object	24	yes	Black object on opposite bank?					1	1	Black object on shore 3 minutes prior to flushing; small group (<10) of seals all flush; no evidence of human stimuli; many gulls and seabirds in area
04/05/08	birds	21	no					1		0	Lots of gulls and seabirds present; poor camera focus; no evidence of disturbance to seals
04/05/08	boat	53	no		1					0	Boat visits area; people walking; poor camera focus; water rising and seals correlatively leaving; no evidence of disturbance to seals
04/07/08	camera serviced	24	no			1				0	Camera serviced and moved; poor camera focus and resolution; no evidence of disturbance to seals
04/08/08	boat	25	no		1					0	Boat present; no people walking; high tide; seals partially submerged and leaving as water rises; no evidence of disturbance to seals
04/10/08	boat	181	no		1					0	Boat visits area; people walking; gulls and other seabirds present; low tide; no evidence of disturbance to seals
04/10/08	camera serviced	22	no			1				0	Camera serviced and moved; no evidence of disturbance to seals
04/10/08	boat	53	no		1					0	Boat visits area; people walking; no evidence of disturbance to seals
04/11/08	boat	31	no		1					0	Boat visits area; no people walking; poor visibility; fog and plants obscure view; seals hauling out as tide falls; no evidence of disturbance to seals
04/11/08	boat	36	no		1					0	Boat visits area; people walking; no evidence of disturbance to seals
04/12/08	boat	24	no		1					0	Boat visits area; no people walking; high tide; seals partially submerged; no evidence of disturbance to seals

Date	Stimulus	Number of Photos Reviewed	Evidence of Seals Flushing	Connection Between Stimulus and Seal Flushing	Boat	Camera Serviced	Kayak	Birds	Unknown	Flushing Events	Comments
04/12/08	boat	35	no		1					0	Boat visits area; no people walking; high tide; seals mostly submerged; no evidence of disturbance to seals
04/12/08	boat	30	no		1					0	Boat visits area; people walking; high tide; haulout habitat being exposed and seals starting to haul out; no evidence of disturbance to seals
04/12/08	boat	85	no		1					0	Boat visits area; people walking; very poor camera focus and resolution; no evidence of disturbance to seals
04/13/08	kayak	32	yes	yes			1			1	Kayak visits area; poor focus and camera resolution; small group of seals present; gulls and other seabirds present; kayak approaches group to within 100 meters or less; all seals flush; seals start hauling out within 10 minutes after kayak disappears
04/13/08	kayak	24	yes	yes			1			1	Kayak visits area; kayak approaches within 100 meters of small group of seals; all but 2 seals flush into water
04/14/08	camera serviced	21	no			1				0	Camera moved; no evidence of disturbance to seals
04/14/08	birds	22	yes	Birds landing?				1		1	Birds arrive in area; poor camera focus and visibility; a few seals in small group flush into water when birds arrive from area off camera; no evidence of human presence in the estuary
04/16/08	boat	32	no		1					0	Boat visits area; no people walking; high tide; poor camera focus and resolution; the few seals present are partially submerged; no evidence of disturbance to seals
04/16/08	boat	29	no		1					0	Boat visits area; no people walking; high water; poor camera focus; no evidence of disturbance to seals
04/17/08	camera serviced	21	no			1				0	Camera serviced; poor visibility; fog; tide just falling; gulls and seabirds present; seals are partially submerged; no evidence of disturbance to seals
04/23/08	boat/birds	37	yes	Not clear, boat present but flushing seems related to birds landing	1			1		1	Boat visits area; people walking; lots of gulls and other seabirds present; seabirds flying toward seals and boat beyond; 1/4 to 1/3 of seals flush into water; seabirds continue arriving from near camera; seals seem to be responding to birds
04/23/08	boat	36	no		1					0	Boat visits area; people walking; tide rising; seals partially submerged; no evidence of disturbance to seals

Date	Stimulus	Number of Photos Reviewed	Evidence of Seals Flushing	Connection Between Stimulus and Seal Flushing	Boat	Camera Serviced	Kayak	Birds	Unknown	Flushing Events	Comments
04/24/08	boat	36	no		1					0	Boat visits area; people walking; tide rising; poor camera focus and resolution; some seals leaving as water submerges them; no evidence of disturbance to seals
04/25/08	camera serviced	27	no			1				0	Camera serviced and moved; very poor camera focus and resolution; no evidence of disturbance to seals
04/26/08	boat	52	no		1					0	Boat visits area; people walking; poor camera focus and resolution; no evidence of disturbance to seals
04/26/08	boat	42	no		1					0	Boat visits area; people walking; no evidence of disturbance to seals
04/29/08	boat	27	no		1					0	Boat visits area; people walking; no evidence of disturbance to seals
04/29/08	camera serviced	21	no			1				0	Camera serviced and moved; no evidence of disturbance to seals
04/30/08	boat	37	no		1					0	Boat visits area; people walking; tide high and falling; a few seals present are partially submerged; no evidence of disturbance to seals
05/01/08	boat	78	no		1					0	Boat visits area; no people walking; high tide; no haulout habitat available; a few seals partially submerged; no evidence of disturbance to seals
05/01/08	black object	21	no						1	0	Unknown dark object in water; gulls and other seabirds present; no evidence of disturbance to seals
05/01/08	camera serviced	21	no			1				0	Camera serviced; very poor camera focus and resolution; low tide; gulls and other seabirds present; no evidence of disturbance to seals
05/02/08	boat	41	no		1					0	Boat visits area; people walking; very poor focus and resolution; tide falling; no evidence of disturbance to seals
05/03/08	boat	37	no		1					0	Boat visits area; people walking; light fog; poor camera focus; tide rising; seals partially submerged; no evidence of disturbance to seals
05/03/08	boat	45	no		1					0	Boat visits area; people walking; tide high and falling; few seals present partially submerged; no evidence of disturbance to seals
05/03/08	birds	21	no					1		0	Birds swimming in group along shoreline; lots of gulls and seabirds roosting and on water; no evidence of disturbance to seals
05/05/08	boat/camera	63	no		1	1				0	Boat visits area; people walking; camera maintenance; tide high and rising; very poor camera focus; no evidence of disturbance to seals
05/05/08	boat	94	no		1					0	Boat visits area; people walking; high tide; very poor camera focus; no evidence of disturbance to seals

Date	Stimulus	Number of Photos Reviewed	Evidence of Seals Flushing	Connection Between Stimulus and Seal Flushing	Boat	Camera Serviced	Kayak	Birds	Unknown	Flushing Events	Comments
05/06/08	boat	195	yes	1/3 of seals flushed, cause not clear, likely not related to boat	1					1	Boat visits area; people walking; low tide; 1/3 of seals hauled out flush; begin hauling out again within 10 minutes; not clear if human stimuli related to seal flushing; gulls and other seabirds roosting and in water
05/06/08	boat	23	no		1					0	Boat visits area; people walking; poor camera focus; a few seals present are partially submerged; no evidence of disturbance to seals
05/07/08	boat	254	no		1					0	Boat visits area; people walking; very low tide; poor camera focus; large number of roosting seabirds; no evidence of disturbance to seals
05/13/08	camera serviced	12	no			1				0	Camera serviced; mid-tide; poor camera focus; no evidence of disturbance to seals
05/13/08	boat	68	no		1					0	Boat visits area; no people walking; tide falling; poor camera focus; lots of birds flying and flushing from near camera side; no evidence of disturbance to seals
05/15/08	boat	31	yes		1					1	Boat visits area; people walking; very poor camera focus; some seals flush into water just after boat leaves the area
05/15/08	camera serviced	21	no			1				0	Camera serviced; extremely poor camera focus; no evidence of disturbance to seals
05/19/08	camera serviced	23	no			1				0	Camera serviced; poor camera focus; no evidence of disturbance to seals
05/22/08	camera serviced	23	no			1				0	Camera serviced; no evidence of disturbance to seals
05/22/08	boat	40	no		1					0	Boat visits area; people walking; water rising; no evidence of disturbance to seals
05/23/08	boat	57	no		1					0	Boat visits area; no people walking; poor camera focus; gulls and seabirds scattered and mobile; no evidence of disturbance to seals
05/23/08	camera serviced	62	no			1				0	Camera serviced and moved; high tide; very poor camera focus; seals mostly submerged; no evidence of disturbances to seals
05/27/08	camera serviced	22	no			1				0	Camera serviced and moved; very poor camera focus; lots of gulls and other seabirds roosting and rafting; no evidence of disturbance to seals
05/27/08	boat	35	no		1					0	Boat visits area; people walking; extremely poor camera focus and resolution; tide rising; no evidence of disturbance to seals
05/29/08	boat	15	no		1					0	Boat visits area; people walking; exceptionally poor camera focus; tide low slack; no evidence of disturbance to seals

Date	Stimulus	Number of Photos Reviewed	Evidence of Seals Flushing	Connection Between Stimulus and Seal Flushing	Boat	Camera Serviced	Kayak	Birds	Unknown	Flushing Events	Comments
05/29/08	camera serviced	10	no			1				0	Camera serviced; very poor camera focus; tide rising; no evidence of disturbance to seals
05/30/08	boat	26	no		1					0	Boat visits area; people walking; tide rising; poor camera focus; no evidence of disturbance to seals
05/31/08	unknown	21	yes	Not clear, no obvious stimulus apparent in slide sequence					1	1	Tide rising; small number of seals flush (~10); being submerged but no signs of stimulus; roosting birds nearby are undisturbed
06/02/08	unknown	21	yes	Not clear, no obvious stimulus apparent in slide sequence					1	1	Low tide; very poor camera focus; 2 small groups of seals all flush into water; no signs of stimuli to disturbance; lots of seabirds rafting and roosting
06/02/08	camera serviced	21	no			1				0	Camera serviced and moved; very poor camera focus; no evidence of disturbance to seals
06/03/08	boat	39	no		1					0	Boat visits area; people walking; very foggy and no visibility to some clearing; tide rising and submerging seals; no evidence of disturbance to seals
06/04/08	boat	38	no		1					0	Boat visits area; people walking; strong winds; seals mostly submerged and departing as tide rises; no evidence of disturbance to seals
06/05/08	boat	47	no		1					0	Boat visits area; people walking; very poor camera focus; no evidence of disturbance to seals
06/05/08	camera serviced	21	no			1				0	Camera serviced; no evidence of disturbance to seals
06/06/08	boat	49	no		1					0	Boat visits area; people walking; high tide; slack to slowly rising with high winds; very poor camera focus; no evidence of disturbance to seals
06/11/08	boat	34	yes	Minor flushing before boat arrival, cause unknown	1					1	Boat visits area; people walking; very poor camera focus; rafting birds scattered; brief movement of seals toward water's edge several minutes before boat arrives but none seen to enter water; no obvious disturbance to seals
06/12/08	boat	46	no		1					0	Boat visits area; people walking; poor camera focus; high tide; few seals mostly submerged; no evidence of disturbance to seals
06/12/08	camera serviced	23	no			1				0	Camera serviced; very poor camera focus; high tide with few seals present, mostly submerged; no evidence of disturbance to seals
	Total	**3,140**			**44**	**21**	**2**	**4**	**4**	**10**	