

CALIFORNIA COASTAL COMMISSION

NORTH COAST AREA

45 FREMONT, SUITE 2000

SAN FRANCISCO, CA 94105-2219

(415) 904-5260



W 18c

Filed:	August 5, 1996
49th Day:	September 23, 1996
180th Day:	February 1, 1997
Staff:	Robert Merrill
Staff Report:	August 28, 1996
Hearing Date:	September 11, 1996
Commission Action:	

STAFF REPORT: REGULAR CALENDAR

APPLICATION NO.: 1-96-09

APPLICANT: SONOMA COUNTY WATER AGENCY

PROJECT LOCATION: At the mouth of the Russian River, near Jenner, Marin County.

PROJECT DESCRIPTION: Periodically breach by bulldozer the sand bar at the mouth of the Russian River near Jenner for flood control and habitat protection purposes when high water reaches an elevation between 4.5-7 feet above sea level (RSM-E).

LOCAL APPROVALS RECEIVED: No local approvals required. In addition, the Sonoma County Water Agency determined the project was categorically exempt from the need to prepare an EIR.

OTHER APPROVALS REQUIRED: U.S. Army Corps of Engineers Section 404 permit; California Dept. of Parks & Recreation Temporary Use Permit; State Lands Commission Public Agency Lease Permit; California Department of Fish & Game Streambed Alteration Agreement.

SUBSTANTIVE FILE DOCUMENTS: (1) A series of Emergency Coastal Development Permits issued by the Executive Director to the Sonoma County Department of Public Works and the Sonoma County Water Agency for breaching the Russian River sand bar since the late 1980s; (2) Russian River Estuary Study 1992-1993, prepared for Sonoma County and Coastal Conservancy by Phillip Williams and Associates, Ltd, Jennifer L. Nielsen, and Theo Light; and (3) Sonoma County Local Coastal Program.

STAFF NOTE

1. Standard of Review

The proposed project is located within the Commission's retained jurisdiction and the standard of review that the Commission must apply to the project is the Coastal Act.

SUMMARY OF STAFF RECOMMENDATION:

Staff recommends that the Commission approve the proposed long term breaching program for the sand bar at the mouth of the Russian River with conditions. A comprehensive management plan based on a year-long series of hydrological and biological field monitoring has demonstrated that the estuarine habitat has adapted to the breaching that has been ongoing at the site for many years and would not be compromised by continued breaching at water levels ranging from 4.5 to 7 feet above sea level. Breaching at these levels will minimize flood hazards consistent with Section 30253 of the Coastal Act. To avoid secondary impacts to pinnipeds that use the area near the breach site as a haulout area, staff recommends a special condition requiring the submittal of a breach area closure plan during the breaching. Other proposed conditions require the submittal of other necessary governmental approvals, limit the term of the breaching program to five years to allow for a reconsideration of the breaching program by the Commission if circumstances change, require assumption of risk, and require the County to perform monitoring of estuarine conditions during the course of the program as proposed by the County and recommended by the management plan. As conditioned, staff believes the project is fully consistent with the habitat protection and flood hazard policies of the Coastal Act.

STAFF RECOMMENDATION:

The staff recommends that the Commission adopt the following resolution:

I. Approval with Conditions.

The Commission hereby grants a permit, subject to the conditions below, for the proposed development on the grounds that the development will be in conformity with the provisions of Chapter 3 of the California Coastal Act of 1976, will be in conformity with the provisions of the certified Sonoma County Local Coastal Program, is located between the sea and the first public road nearest the shoreline and is in conformance with the public access and public recreation policies of Chapter 3 of the Coastal Act, and will not have any significant adverse impacts on the environment within the meaning of the California Environmental Quality Act.

II. Standard Conditions. See attached.

III. Special Conditions

1. Legal Ability To Develop.

PRIOR TO ISSUANCE OF THE PERMIT, and subject to the review and approval of the Executive Director, the applicant shall submit written evidence of its legal ability to develop the land as conditioned herein. Such evidence shall include an approved Public Agency Lease from the State Lands Commission and an approved Temporary Use Permit for the project from the California Department of Parks and Recreation.

2. Dept. of Fish and Game Streambed Alteration Agreement.

PRIOR TO ISSUANCE OF THE PERMIT, the applicant shall submit to the Executive Director a copy of an approved streambed alteration agreement from the California Department of Fish and Game.

3. Plan for Restricting Access to Breach Site

PRIOR TO ISSUANCE OF THE PERMIT, the applicant shall submit for the review and approval of the Executive Director a breach site closure plan designed to restrict public access to the breaching site during the times of breaching. The plan shall restrict access for the general public to all areas within 750 feet of the breaching location during the breaching operation and for 24 hours afterwards. The plan shall not close any beach area significantly greater than the area within 750 feet of the breach site nor close the breach site for any period of time significantly in excess of 24 hours. Any barriers used to close off the breach site must be removed within 36 hours of the breaching. The submitted plan shall identify the method of closure, describe the procedures to be followed to close and reopen the breach area to public access, indicate the duration of closure, and contain a site plan or other exhibits as necessary to adequately describe the closure proposal. Development shall occur consistent with the approved plan. Any proposed changes to the approved plan must be reported to the Executive Director. Any changes to the approved breaching plan which the Executive Director determines to be significant shall require a permit amendment approved by the Commission.

4. Monitoring.

PRIOR TO ISSUANCE OF THE PERMIT, the applicant shall submit a hydrologic and biologic monitoring plan for the review and approval of the Executive Director that provides for monitoring hydrological and biological characteristics of the estuary as recommended on pages 179-181 of the 1992-1993 Russian River Estuary Study for at least the period of time between the first breaching performed pursuant to this authorization and December 31, 2000. The plan shall be designed to corroborate the the recommendations for the breaching program contained in the 1992-1993 Russian River Estuary Study and to

facilitate future adaptations and refinements of the breaching program. The plan shall provide for monitoring of the following:

- A. Periodic or continuous water surface elevations;
- B. Periodic water quality parameters to ensure that good water quality within the estuary is maintained;
- C. Spring and fall otter trawl sampling in the lower estuary to determine the distribution and abundance of fish and macro invertebrates;
- D. Late spring and early summer deep water beach seine samples, taken in the lower estuary to test for entrapment of salmonid smolts during closed estuary conditions;
- E. Behavioral observations (3) of pinniped activity during breaches under restricted public access to test the hypothesis that human activity deters pinniped landings on the beach post breaching;
- F. Plankton tows at the mouth of Willow Creek three hours past breaching (2/year) to monitor outflow levels of mysid shrimp and juvenile fishes.

The submitted plan shall identify the monitoring techniques to be followed, monitoring locations, the schedule for monitoring, and the persons who will perform the monitoring, and the manner in which the results will be provided to the Coastal Commission. Monitoring shall occur consistent with the approved plan. All proposed changes to the approved plan shall be reported to the Executive Director. Any changes to the approved plan which the Executive Director determines to be significant shall require a permit amendment.

5. Assumption of Risk, Waiver of Liability and Indemnification Agreement

PRIOR TO THE ISSUANCE OF THE COASTAL DEVELOPMENT PERMIT, the applicant shall submit a signed agreement in a form and content acceptable to the Executive Director, which shall provide that: (a) the applicant understands that the site may be subject to extraordinary hazard including flooding, wave action, and erosion and the applicant hereby assumes the liability from such hazards; (b) the applicant unconditionally waives any future claims of liability against the California Coastal Commission, its successors in interest, advisors, officers, agents, and employees for any damage from such hazards or arising out of any work performed in connection with the permitted project; (c) the applicant agrees to indemnify and hold harmless the California Coastal Commission, its successors in interest, advisors, officers, agents and employees against any and all claims, demands, damages, costs, and expenses of liability (including without limitation attorneys' fees and costs of suit) arising out of the design, construction, operation, maintenance, existence or failure of the permitted project, including without limitation any and all

1-96-09

SONOMA COUNTY WATER AGENCY

Page 5

claims made by any individual or entity or arising out of any work performed in connection with the permitted project; and (d) the applicant agrees that any adverse impacts to property caused by the permitted project shall be fully the responsibility of the applicant.

6. U.S. Army Corps of Engineers Review.

PRIOR TO THE COMMENCEMENT OF CONSTRUCTION, the applicant shall submit to the Executive Director a copy of a U.S. Army Corps of Engineers permit or letter of permission for the project authorized herein.

7. Duration of the Permit.

This authorization for breaching activity expires on December 31, 2001. The applicants must apply for a new permit for any proposed breaching activity beyond that date.

IV. Findings and Declarations.

The Commission hereby finds and declares as follows:

1. Background

The proposed project is to perform a long term breaching program of the sand bar at the mouth of the Russian River near Jenner, in Sonoma County (see Exhibits 1-5).

Like many coastal estuaries and lagoons along the California coast, the Russian River estuary is subject to frequent closure by the formation of a barrier beach across the mouth of the estuary. The barrier beach is created by the on-shore movement of sediment originally discharged from the river to the ocean during peak precipitation and runoff events, and transported back to the mouth of the river by long, low-energy waves that reach the shore during low precipitation, minimum runoff periods. The closure of the estuary temporarily eliminates tidal exchange and creates ponding of the river, which results in a gradual increase of the water level in the estuary. The rise in water level eventually can lead to the flooding of building foundations, residential yards, and agricultural lands. The flooding also has been known to jeopardize existing wells in the area.

If left to its own accord, the estuary would eventually breach the barrier beach naturally when water levels reach a height where it can overtop the crest of the barrier beach. However, for many years, artificial breachings have been performed to alleviate the flooding. No one knows precisely how long artificial breaches have been performed, but according to John Schrad of the Sonoma County Department of Roads, his department has been breaching the barrier beach artificial at least since living memory. Over the last year, the breaching task has been transferred to the Sonoma County Water Agency.

The breaching activity is performed by a bulldozer that excavates a wide cut in the barrier beach. The bulldozer excavates through the dry sand to a point close enough to the ponded water in the estuary where the hydrostatic pressure of the ponded water will break through the remainder of the sand and rush out to sea. In the process, the discharging water widens and deepens the opening in the barrier beach.

As the breaching is a form of grading, the activity is a development as defined in the Coastal Act and requires a coastal development permit. However, the County did not apply for a coastal development permit until the late 1980s, when the Executive Director issued the first of a series of emergency permits (averaging approximately five a year) to allow the breaching of the river once the river reached the seven foot elevation and prevent anticipated flooding that would result if the barrier beach were not breached. The Executive Director has continued to issue emergency permits to this date.

Concerns have been raised that the artificial breaching may be having adverse effects on the estuarine ecology. Because of such concerns, the emergency permits granted by the Executive Director have contained a special condition requiring the County to conduct an environmental review of a long term breaching program before applying for a regular permit to authorize a long term breaching program.

The County eventually applied for a grant from the Coastal Conservancy to provide funding for the creation of a management plan. In 1991, the County received the grant and initiated a study to identify and adverse impacts associated with artificial breaching and to develop a management plan for the Russian River Estuary. The study was launched under the direction of the Russian River Estuary Inter-agency Task Force, a committee of representatives of various regulatory and management agencies with jurisdiction over the estuary. The majority of the study was prepared by two separate consultants: hydrology and flooding by Phil Williams and Associates Ltd. under the direction of Peter Goodwin and the biology and limnology by Jennifer Nielsen, a biologist with the U.S. Forest Service. A six month field monitoring program by the consultants was initiated in 1992, and later extended for another six months into 1993. The resulting report, Russian River Estuary Study 1992-1993 (Estuary Study) outlined a breaching program which became the basis of the Sonoma County Water Agency's coastal development permit application to the Commission (see excerpts in Exhibit 5).

2. Site Description

The Russian River drains a large area of Sonoma and Mendocino County before discharging to the ocean at Jenner (see Exhibit 2). The estuarine portion of the river extends approximately 6 to 7 miles upstream to a point between Duncans Mills and Austin Creek. Tidal action has on occasion occurred as far as 10 miles upstream. The rural lands surrounding the estuary are minimally developed with the exception of the settlements of Jenner, Bridgehaven, and

Duncan's Mills. Some agricultural lands exist within the floodplain which is constricted by the canyon the river has carved through the Coast Range. The partially forested canyon creates a very scenic landscape, culminating in the dramatic headlands at the mouth of the river where sea cliffs rise 50 to 200 feet high and offshore rocky pinnacles emerge from the ocean floor. The river turns northward near the mouth where it is flanked by a long barrier beach that extends north from Goat Rock, about 4,000 feet to the south.

Overall, the Russian River estuary and the freshwater marsh on Willow Creek, a tributary that enters the river about a mile upstream from the mouth, provide habitat and food for a substantially diverse fauna and flora. Estuaries provide particularly rich habitat, as the mixing of salt and freshwater concentrates nutrients. A variety of habitat types line the banks of the river including (1) freshwater marshlands, (2) coastal terrace prairies, (3) redwood forests, (4) Douglas fir forests, (5) North Coast riparian scrub, (6) freshwater seep, and (7) red alder riparian scrub. The marsh, riparian, and seep habitats are considered to be environmentally sensitive. However, despite the varied habitat types, the Estuary Study did not identify any threatened and endangered plant or animal species present within the estuary.

Most of the land area along the south side of the estuary is part of the Sonoma Coast State Beaches. The park area also extends northward up the coast for several miles.

3. Proposed Development.

The specific development proposed in Coastal Development Permit Application No. 1-96-09 is to breach the sand bar when high water reaches elevations ranging between 4.5 and 7 feet above sea level in accordance with the recommendations of the Estuary Study. The barrier beach will continue to be breached by bulldozer. Breaching at 7 feet avoids the flooding of houses, and also has the benefit of preventing the withdrawal of anoxic water from the Willow Creek Marshes, an important tributary of the estuary that is rich in habitat. The lower range of 4.5 feet is proposed as breaching at elevations lower than 4.5 does not result in the formation of as large an outlet channel. Consequently, more frequent breaching would be required.

The channel created by the bulldozer will be excavated approximately 100 feet long, 25 feet wide, and 6 feet deep. The excavated sand will be placed on adjoining portions of the sand bar.

The project description also includes the installation of a tide gauge at Jenner for use in monitoring water levels. An automated tide recorder linked by phone to County offices may also be installed in association with the gauge to provide early warning of rising river levels.

Finally, the project description also includes the performance of biological and water quality monitoring recommended in the Estuary study.

4. Protection of Estuarine Habitat Values

The proposed project involves development within an important coastal estuary, the lower Russian River. As such, a number of Coastal Act policies addressing the protection of estuarine habitat values apply to the project.

Coastal Act Sections 30230 and 30231 require in applicable part that the biological productivity of coastal waters, wetlands, and estuaries be maintained, enhanced, and where feasible, restored.

Coastal Act Section 30240 requires in applicable part that environmentally sensitive habitat areas be protected against any significant disruption of habitat values.

One policy concerning the protection of wetland habitat that often applies to development project located in or around estuaries is Coastal Act Section 30233. Coastal Act Section 30233 allows the diking, filling, or dredging of open coastal waters and wetlands under certain specified conditions. However, the act of breaching the sand bar under the proposed project does not trigger an analysis under Section 30233 for the following reasons. First, the proposed breaching does not involve the placement of any pipeline or other constructed device into a wetland or open coastal water area. Second, the proposed breaching involves the parting of dry sand to form a channel to a depth that is approximately at the level of the river and does not involve any diking or dredging of any wetlands or open coastal waters. Finally, the proposed breaching does not involve any filling of any wetlands or open coastal waters since the definition of "fill" per Section 30108.4 of the Coastal Act means in applicable part: "Earth or any other substance or material...placed in a submerged area."

A. Overall Impact to Estuary

The estuary and the freshwater marsh on Willow Creek provide habitat and food for a substantially diverse fauna and flora which appears to have adapted to the limnological shifts occurring with periodic closure of the river mouth. The year-long monitoring effort of the 1992-1993 Russian River Estuary Study demonstrated that breaching of the sand bar on a regular basis does facilitate a viable estuarine ecosystem. The study indicates that the ecosystem appears to be adapted to the shifts in salinity and water temperature caused by breaching, and during the monitoring period, no serious effects to the biota were observed as a result of water quality problems. The Estuary Study concludes that the data collected by the study suggests minimum impacts to the aquatic estuarine community during and immediately after breaching events.

Although the consultants who prepared the Estuary Study are confident in the conclusion that the a viable estuarine ecosystem can be maintained despite a regular program of breaching, the report notes that the the conclusions are based on existing hydrological conditions of the estuary and the limited 12 month period of detailed monitoring. The report recommends that biological

1-96-09

SONOMA COUNTY WATER AGENCY

Page 9

and hydrological monitoring be undertaken to confirm the viability of the management plan and to facilitate future adaptations and refinements to the plan for the benefit of the ecosystem. The Sonoma County Water Agency has stated in the project description for the application that "biological and water quality monitoring will be performed during the breaching events as recommended in the Estuary Study." To ensure that the monitoring is carried out as proposed, Special Condition No. 4 requires the applicant to submit a monitoring plan for the review and approval of the Executive Director that provides for monitoring hydrological and biological characteristics of the estuary as recommended by the Estuary Study for at least the period of time between the first breaching performed pursuant to this authorization and December 31, 2000. These characteristics, as specified in the special condition and in the Estuary Study, include the following:

- A. Periodic or continuous water surface elevations;
- B. Periodic water quality parameters to ensure that good water quality within the estuary is maintained;
- C. Spring and fall otter trawl sampling in the lower estuary to determine the distribution and abundance of fish and macro invertebrates;
- D. Late spring and early summer deep water beach seine samples, taken in the lower estuary to test for entrapment of salmonid smolts during closed estuary conditions;
- E. Behavioral observations (3) of pinniped activity during breaches under restricted public access to test the hypothesis that human activity deters pinniped landings on the beach post breaching; and
- F. Plankton tows at the mouth of Willow Creek three hours past breaching (2/year) to monitor outflow levels of mysid shrimp and juvenile fishes.

A river system is a dynamic environment. For example, erosion, storm-induced flooding, and seismic events can cause changes to the course of a river which in turn can lead to changes in the habitat areas that line the river. In addition, the influence of man can cause changes to the river, particularly in a river system such as the Russian River that has already been dammed on its upper reaches and is also the receptacle for treated waste water from various communities along its course. Such changes to the river system may warrant changes to the breaching program to maximize its effectiveness in either avoiding flooding or maintaining a viable estuarine habitat. Therefore, to enable the Commission to review the consistency of the breaching program in light of new information and changed circumstances that may develop over the future years, the Commission attaches Special Condition No. 7, which states that the permit shall expire on December 31, 2001.

The following sections discuss some of the findings of the Estuary Study with regard to particular elements of the estuarine habitat that lead to the overall conclusion that the breaching program supports a viable estuarine ecosystem.

B. Seal Haulout

Pinnipeds consistently use the area at the mouth of the Russian River for hauling out, sometimes numbering in the hundreds. The vast majority of the pinnipeds are harbor seals and a few individuals are California sea lions. The Estuary Study monitored the effects of artificial breaching between 1992 and 1993 and found that breaching had minimal negative effects on haulout use. The study noted that the harbor seals' use of the haulout increases as the season progresses, whether or not the breaching occurs. The breaching does not affect foraging by the pinnipeds as they normally forage in the ocean rather than within the river system and the major components of their diet are not found in the river system. Although breaching produces a high level of disturbance, the site is heavily disturbed on a regular basis even when breaching is not occurring. The study states that breaching may even provide some benefits to the harbor seals by allowing easy access to the preferred haulout areas as opposed to having to lumber across the sand spit.

The estuary study did note two cautions with respect to the effects of breaching on the pinnipeds. First, the study suggests that attempts to breach during the pupping period in April and May could produce unacceptable levels of disturbance that would endanger pups by causing mother-pup separation or pup abandonment. However, the Estuary Study does not go so far as to recommend avoidance of breaching during these months. The study does recommend however, that public access to the breach area be curtailed on the day of breaching. Even though the breaching itself has little direct effect on the seals, there is a secondary effect that is more significant. The study found that the presence of numerous spectators to the breaching, drawn to the site to watch the dramatic break through of river water to the ocean, often deterred and delayed the return of the pinnipeds to the haulout site after a breaching event. On the three breaching days observed during the study, researchers noted that the seals left the haulout site when the bulldozer arrived at the beach to perform the breaching and attempted to move back to the haulout site after the bulldozer left the beach. However, despite the seals persistence in attempting to return to the haulout area by moving over the sand spit, the researchers noted that the seals consistently turned back after encountering the spectators. Therefore, to avoid this impact on seal haulout use, the Commission attaches Special Condition No. 3 which requires that the applicant prepare and implement a breach area closure plan approved by the Executive Director for closing the area around the breach site to public access for safety purposes.

C. Fisheries

Researchers for the Estuary Study captured 24 species of fish during the study period. The most common fish collected in the near-shore areas of the estuary

1-96-09

SONOMA COUNTY WATER AGENCY

Page 11

throughout the year were Sacramento suckers, prickly sculpin, and three-spine sticklebacks. Starry flounder and English Sole were the most common deep bottom fish collected during the survey. Various marine species were found to utilize the estuary at different times of the year. These species included Juvenile staghorn sculpin, Pacific herring, northern anchovy, juvenile rockfish and larval surfsmelt. The marine fish tended to be found only in the bay directly adjacent to the mouth where tidal activity periodically renewed the salt water habitats. Freshwater species tended to move down into the estuary during the summer and return to upstream habitat in the fall. No threatened or endangered fish species were found, including the Tidewater Goby.

The Estuary Study states that the only evidence of direct impact to the fish community during an artificial breach occurred during one particular breach in November of 1992, when the standing wave created by the breach swept hundreds of juvenile surfsmelt from the estuary into the ocean. The long-term effect this event had on the juvenile surfsmelt is unclear.

The Estuary Study noted that during the survey year, the Russian River remained open from late November through May, the time when most salmonid adults would be migrating up river to spawn. In most years, this is the case as high river flows during and just after the rainy season serve to keep the river channel open. The study does caution that should breaching in the late fall become necessary when the adult salmon are ready to run up river, consideration should be given to whether there are adequate up river holding-pool habitats for the salmon to hold in. The study notes that pools deep enough to attract adult salmon may remain hyper saline at depth until the first large storm of the winter, providing no holding habitat for these fish in the estuary and lower river, which would cause their death. However, as noted previously, pool habitat would only be a concern during unusual years with low river outflow during the normal rainy season. The overall impact of the breaching on salmon and fish species in general was not thought to be significant.

D. Conclusion on Consistency with Sections 30231, 30240, and 30230.

As noted previously, the ecosystem appears to be adapted to the shifts in salinity and water temperature associated with the breaching program, and during the monitoring period, no serious effects to the biota were observed. The only troublesome impact noted was the indirect impact of the breaching on pinniped use of the haulout area on the estuary near the breaching site. The presence of large numbers of spectators to the breaching had the effect of delaying and inhibiting the return of pinnipeds. As conditioned to require the submittal of a breach area closure plan, this impact will be avoided with the breaching program authorized herein. Therefore, the Commission finds that the project will maintain the biological productivity and quality of the Russian River estuary in a manner consistent with Sections 30230, 30231, and 30240 of the Coastal Act.

5. Hazards

Section 30253 of the Coastal Act provides in applicable part that new Development shall:

(1) Minimize risks to life and property in areas of high geologic, flood, and fire hazard.

(2) Assure stability and structural integrity, and neither create nor contribute significantly to erosion, geologic instability, or destruction of the site or surrounding area or in any way require the construction of protective devices that would substantially alter natural landforms along bluffs and cliffs.

A significant purpose of the breaching program is to minimize the risks of flooding in a manner that is consistent with Section 30253 of the Coastal Act. If artificial breaching were not authorized, and the river was left to naturally breach the sand bar on its own accord, the flooding hazard would be greatly increased. The height of the barrier beach is dependent upon the prevailing wave conditions and is typically in the range from +6.0 to +15 feet NGVD. Thus, natural breaching would occur within this range, and under worst case conditions, may not occur until water levels rise to +15 feet NGVD. Minimal to moderate flooding problems occur when river water levels rise to between 7 and 9 feet. According to the Estuary Study, these problems include potential increases in bank erosion, loss of vegetation, loss of use of parking areas, pasture land, stairs, decks and beaches. At higher levels, greater impacts occur. At 10 feet NGVD, flooding of homes begins. The Estuary Study indicates that about 15 residences in and around Jenner and Bridgeport are situated at or somewhat below the +10-foot level. There have been reports of flooding of basements and lower levels of homes when water levels have risen to the +10 or greater level. In addition, high water that occurs when the mouth remains closed for an extended period has reportedly lead to the contamination of the infiltration well used by the Rancho Del Paradiso Water Company to serve 61 homes on Freezeout Road in Duncan's Mills. Thus, the risks of flooding from not breaching are far greater than breaching the sand bar artificially as proposed. The Estuary Study identified no significant flooding hazards associated with breaching the sand bar at the +4.5 to +7.0 elevation proposed in the application.

A significant hazard is associated with the breaching itself. The breaching creates a hazard for those who venture too near the breach site as the water from the river rapidly discharges through the breach with terrific force. According to the Estuary Study, breaching of the barrier beach can create standing waves in excess of 10 feet high with velocities in excess of 20 feet per second for short periods. The velocities are greater when the difference between the water level in the lagoon and ocean are large. The Estuary Study recommends that the beach be closed to the public at a distance of at least 750 feet on either side of the breach for public safety reasons. Consequently, the Commission has attached Special Condition No. 3, which

requires that the applicant prepare and implement a breach area closure plan approved by the Executive Director for closing the area around the breach site to public access for safety purposes.

The Commission finds that the proposed project as conditioned, is consistent with Section 30253 of the Coastal Act as it serves to minimize risks to life and property in an area of high flood hazard.

The experience of the Commission in evaluating the consistency of proposed developments with the policies of the Coastal Act for development in areas subject to problems associated with geologic instability, flood, wave, or erosion hazard has been that development occurs despite periodic episodes of heavy storm damage, flooding, and other such occurrences. Special Condition No. 5, providing for the applicants' assumption of risk, waiver of liability and indemnification of the Commission is generally imposed on applicants proposing projects in areas subject to high risks of flood, wave, and erosion hazard.

In this case, the act of breaching the sand bar (particularly during storm events) is dangerous. In addition, the failure of the applicants to provide a timely breach can cause flooding of additional property above 7 feet NGVD and result in other health and safety hazards. Hazardous conditions could also occur and include storm wave, wave runup, flood and erosion hazards. Thus, the act of breaching, and the failure to provide a timely breaching, presents certain risks and hazards that cannot be completely eliminated. Therefore, though the applicants may decide that the benefits of project outweigh the risk of harm which may occur from the identified hazards, the Commission should not be held liable for the applicants' decision to breach the sand bar as approved under this permit, or the applicants' failure to breach in a timely manner. Therefore, as conditioned, the applicants agree that they are aware of and appreciate the nature of the hazards on the site which may adversely affect the stability of development and the safety of individuals, that they assume all risks of failure, and that they waive any potential claim of liability against the Commission for any damage or economic harm suffered as a result of their decision to develop.

Specifically, Special Condition No. 5 requires the applicant to submit a written agreement, prior to the issuance of the coastal development permit in a form and content acceptable to the Executive Director, which provides (1) that the applicant understands that the site may be subject to extraordinary hazard from storm waves, wave runup, erosion and/or flooding and the applicants assume the liability from such hazards; (2) provides that the applicant unconditionally waives any claim of liability on the part of the Commission and agree to indemnify and hold harmless the Commission, its officers, agents and employees relative to the Commission's approval of the project for any damage due to natural hazards or any damage arising out of the design, construction, operation, maintenance, or existence or failure of the permitted project. Only as conditioned can the Commission find the proposed development consistent with the Coastal Act.

6. Public Access

Coastal Act Section 30211 requires in applicable part that new development not interfere with the public's right of access to the sea where acquired through use. Coastal Act Section 30212 also requires in applicable part that new development provide public access from the nearest public roadway to the shoreline except where adequate access exists nearby, or where the provision of public access would be inconsistent with public safety. In applying Section 30212, the Commission is limited by the need to show that any denial of a permit application based on these sections, or any decision to grant a permit subject to special conditions requiring public access, is necessary to offset a project's adverse impact on existing or potential public access.

The breaching site is located between the first public road and the sea. Therefore, the Commission must consider whether requiring public access is appropriate in this case.

The proposed breaching activity does not require the provision of any new public access under Section 30212(a)(2) as adequate public access exists nearby, to and along adjacent beaches, and to the waters of the river. The sand spit is part of Goat Rock State Beach, one of the Sonoma Coast State Beaches that extend literally for miles both north and south of the mouth of the Russian River.

Although the project need not provide additional public access area to be consistent with Section 30212, the project will have impacts on existing public access that must be mitigated. The project will interfere with public access along the sand spit at the mouth of the river during the times when breaching will occur. As discussed previously, the breaching creates a hazard for those who venture too near the breach site as the water from the river rapidly discharges through the breach with terrific force. Recognizing this hazard, the Commission has attached Special Condition No. 3, which requires that the applicant prepare and implement a breach area closure plan approved by the Executive Director for closing the area around the breach site to public access for safety purposes. Thus, each breaching event will result in the temporary closure of a substantial portion of a beach for public access purposes. To ensure that the closure of the breach site is done in a manner that minimizes the disruption of public access use of the beach, Special Condition No. 3 has been limited to require that the amount of beach area to be closed is kept as close as possible to the first 750 feet of area north and south of the breach site, that the closure last no longer than 24 hours, and that any barriers used to close the breach site to public use be removed within 36 hours of the breaching activity. As conditioned, the proposed breaching activity will have no significant or lasting adverse impacts on public access or recreational beach use.

Furthermore, breaching the sand bar when the river water elevation is between 4.5 feet to 7.0 feet NGVD as proposed, rather than at higher elevations when the sand bar would breach naturally, will shorten the period of time that boat

docks and other public access and recreational facilities and locations scattered around the estuary will be unusable due to high water conditions. The Estuary Study notes that the Monte Rio Park and Recreation District and others complain about the loss of use of beaches during inundation and permanent loss of beach due to beach erosion following inundation. Recreational fishing opportunities are also reduced when the mouth is closed for extended periods during spawning season when anadromous fish are unable to enter the river. The Commission therefore finds that breaching the sand bar as proposed will have a net beneficial effect on public access and, as conditioned, is consistent with the public access and recreational policies of the Coastal Act.

7. Legal Entitlement to Use the Property for the Proposed Development

Section 30601.5 of the Coastal Act states:

Where the applicant for a coastal development permit is not the owner of a fee interest in the property on which a proposed development is to be located, but can demonstrate a legal right, interest, or other entitlement to use the property for the proposed development, the Commission shall not require the holder or owner of any superior interest in the property to join the applicant as co-applicant. All holders or owners of any other interests of record in the affected property shall be notified in writing of the permit application and invited to join as co-applicant. In addition, prior to the issuance of a coastal development permit, the applicant shall demonstrate the authority to comply with all conditions of approval.

Thus Section 30601.5 of the Coastal Act provides that if an applicant is not the owner of a fee interest in property, the applicant must demonstrate a legal right, interest, or entitlement to use the property in the manner proposed. Therefore, if there are any questions with regard to ownership of the property, the applicant is required to provide evidence that they have the legal right to use the property for the purpose for which it is proposed.

The breaching site is on state owned lands administered by the State Lands Commission. The State Lands Commission has granted emergency authorization to the County and the Sonoma County Water Agency in the past to breach the sand bar on its property. The staff of the State Land Commission is currently considering an application that was submitted by the Sonoma County Water Agency for a Public Agency Lease Permit to authorize breaching on a long-term basis. The application has not yet been scheduled for action by the State Lands Commission itself.

The lands that must be traversed by the bulldozer used to perform the breaching are part of the Sonoma Coast State Beaches, managed by the Department of Parks and Recreation. In a letter to the Coastal Commission staff dated July 31, 1996, the District Superintendent of the Russian River/Mendocino District of the Department of Parks and Recreation, Robert R.

La Belle states that, "this is to inform you that this office is now in the process of preparing a Temporary Use Permit that will protect State Park resources while allowing Sonoma County Water Agency to access State Park lands to periodically breach the sand bar at the mouth of the Russian River."

Although there is no known reason at this time to believe that the State Lands Commission and the Department of Parks and Recreation will not grant the necessary permissions to the applicant, the applicant has not yet obtained final permissions to the use the land for this purpose. Therefore, the Commission attaches Special Condition No. 1 to ensure that no development proceeds unless the applicant satisfies his burden to establish his legal ability to develop the site as conditioned herein or receives permission from the owner(s) to develop the site as conditioned herein.

8. Department of Fish & Game Review.

The project requires a streambed alteration agreement from the Department of Fish and Game. The applicant has not yet received the agreement. Therefore, to ensure that the project reviewed by the the Department of Fish and Game is the same project that was reviewed under this permit by the Commission, the Commission attaches Special Condition No. 2 which requires that the applicant submit to the Executive Director a copy of an approved streambed alteration agreement from the Department prior to issuance of the permit.

9. U.S. Army Corps of Engineers Review

The project requires review and approval by the U.S. Army Corps of Engineers. Pursuant to the Federal Coastal Zone Management Act, any permit issued by a federal agency for activities that affect the coastal zone must be consistent with the coastal zone management program for that state. Under agreements between the Coastal Commission and the U.S. Army Corps of Engineers, the Corps will not issue a permit until the Coastal Commission approves a federal consistency certification for the project or approves a permit. To ensure that the project ultimately approved by the Corps is the same as the project authorized herein, the Commission attaches Special Condition No. 6 which requires the permittee to submit to the Executive Director evidence of U.S. Army Corps of Engineers approval of the project prior to the commencement of construction.

10. Sonoma County LCP

The proposed project is located within the Commission's retained coastal development permit jurisdiction. Therefore, the standard of review that the Commission is applying in its consideration of the application is the Coastal Act and not the certified Local Coastal Program. Nonetheless, the project is also consistent with Sonoma County's Local Coastal Program.

Attachment G of the Coastal Administrative Manual contains a couple of environmental resource management recommendations applicable to the proposed

project. Recommendation No. 1 states in applicable part that breaching sand bars should be prohibited except for maintenance of tidal flow to ensure continued biological productivity and in particular cases to prevent flooding. As a major purpose of the proposed project is to prevent flooding, the proposed project is consistent with Recommendation No. 1.

Recommendation No. 72 states that recreational activities near harbor seal hauling out grounds shall be limited to passive recreation to ensure continued viability of these habitats. As noted previously, the presence of the public as spectators to watch the breaching events is adversely affecting use of the area near the breaching site by harbor seals and sea lions, more so than the actual breaching itself. The Estuary Study indicates that with past breaching events, after the bulldozer that cuts the channel through the sand spit leaves the beach, seals have attempted to move back to the haulout sites. However, the seals were consistently turned back after encountering the spectators who had gathered along the cut margins and at the edge of the water to view the breaching. As conditioned by Special Condition No. 3 to close the area within 750 feet of the breaching site to public access for a 24 hour period commencing with the breaching event, the project is consistent with Recommendation No. 72.

The Commission therefore finds that the project, as conditioned, is consistent with the County's LCP.

11. California Environmental Quality Act (CEQA)

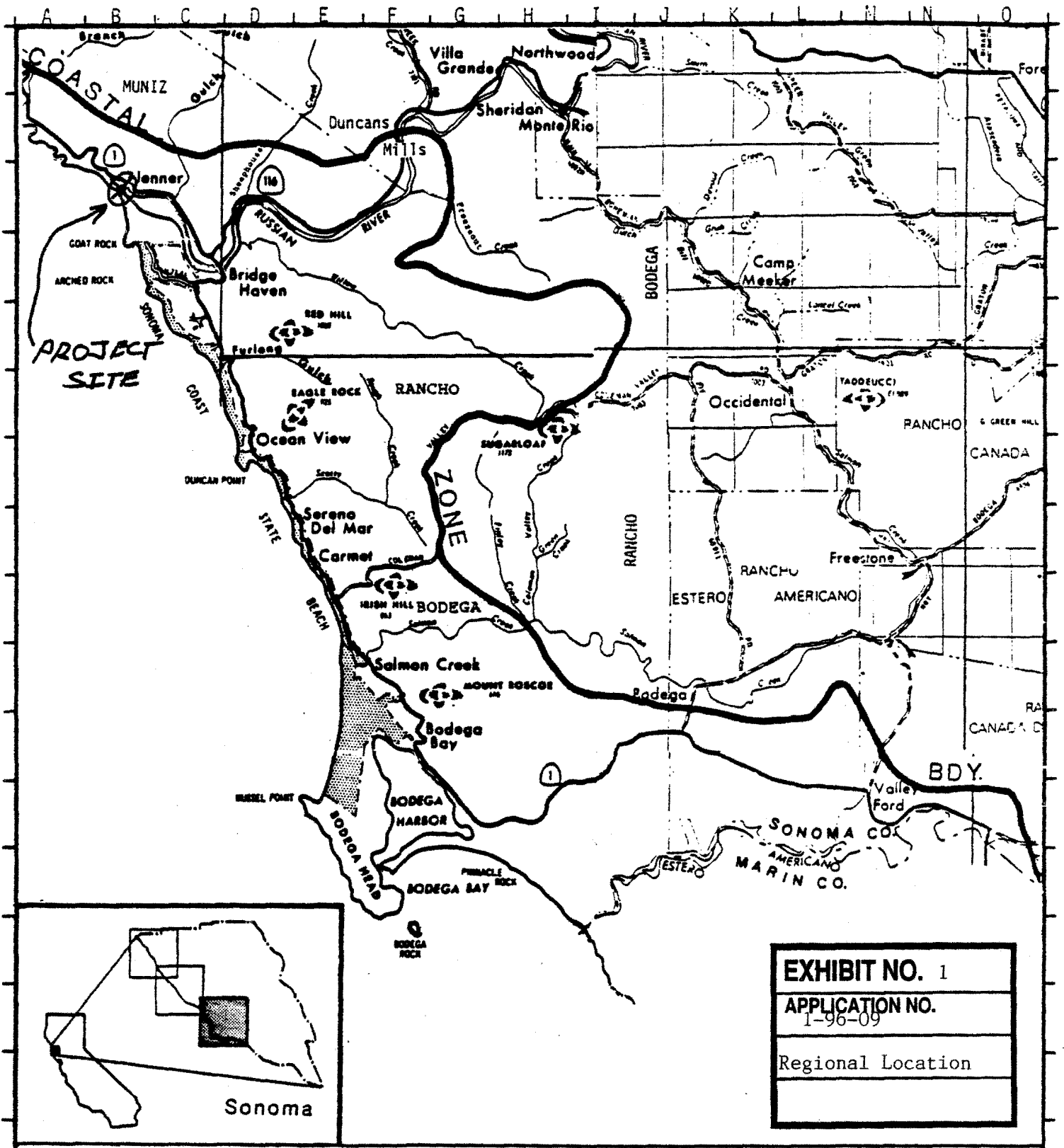
Section 13096 of the Commission's administrative regulations requires Commission approval of Coastal Development Permit applications to be supported by a finding showing the application, as conditioned by any conditions of approval, to be consistent with any applicable requirements of the California Environmental Quality Act (CEQA). Section 21080.5(d)(2)(i) of CEQA prohibits a proposed development from being approved if there are feasible alternatives or feasible mitigation measures available which would substantially lessen any significant adverse impact which the activity may have on the environment. As discussed above, the project has been mitigated to avoid or minimize impacts to coastal resources, specifically to protect the harbor seal haul out areas in the vicinity of the breaching site and the use of the sand bar for public access purposes. The project, as conditioned, will not have a significant adverse effect on the environment, within the meaning of CEQA.

For purposes of the California Environmental Quality Act's environmental review process, the lead agency for the project is the Sonoma County Water Agency. The Water Agency determined that the proposed project is categorically exempt from the need to prepare an Environmental Impact Report.

ATTACHMENT A

Standard Conditions

1. Notice of Receipt and Acknowledgment. The permit is not valid and development shall not commence until a copy of the permit, signed by the permittee or authorized agent, acknowledging receipt of the permit and acceptance of the terms and conditions, is returned to the Commission office.
2. Expiration. If development has not commenced, the permit will expire two years from the date on which the Commission voted on the application. Development shall be pursued in a diligent manner and completed in a reasonable period of time. Application for extension of the permit must be made prior to the expiration date.
3. Compliance. All development must occur in strict compliance with the proposal as set forth in the application for permit, subject to any special conditions set forth below. Any deviation from the approved plans must be reviewed and approved by the staff and may require Commission approval.
4. Interpretation. Any questions of intent of interpretation of any condition will be resolved by the Executive Director or the Commission.
5. Inspections. The Commission staff shall be allowed to inspect the site and the development during construction, subject to 24-hour advance notice.
6. Assignment. The permit may be assigned to any qualified person, provided assignee files with the Commission an affidavit accepting all terms and conditions of the permit.
7. Terms and Conditions Run with the Land. These terms and conditions shall be perpetual, and it is the intention of the Commission and the permittee to bind all future owners and possessors of the subject property to the terms and conditions.



 California Coastal Commission

LOCATION MAP



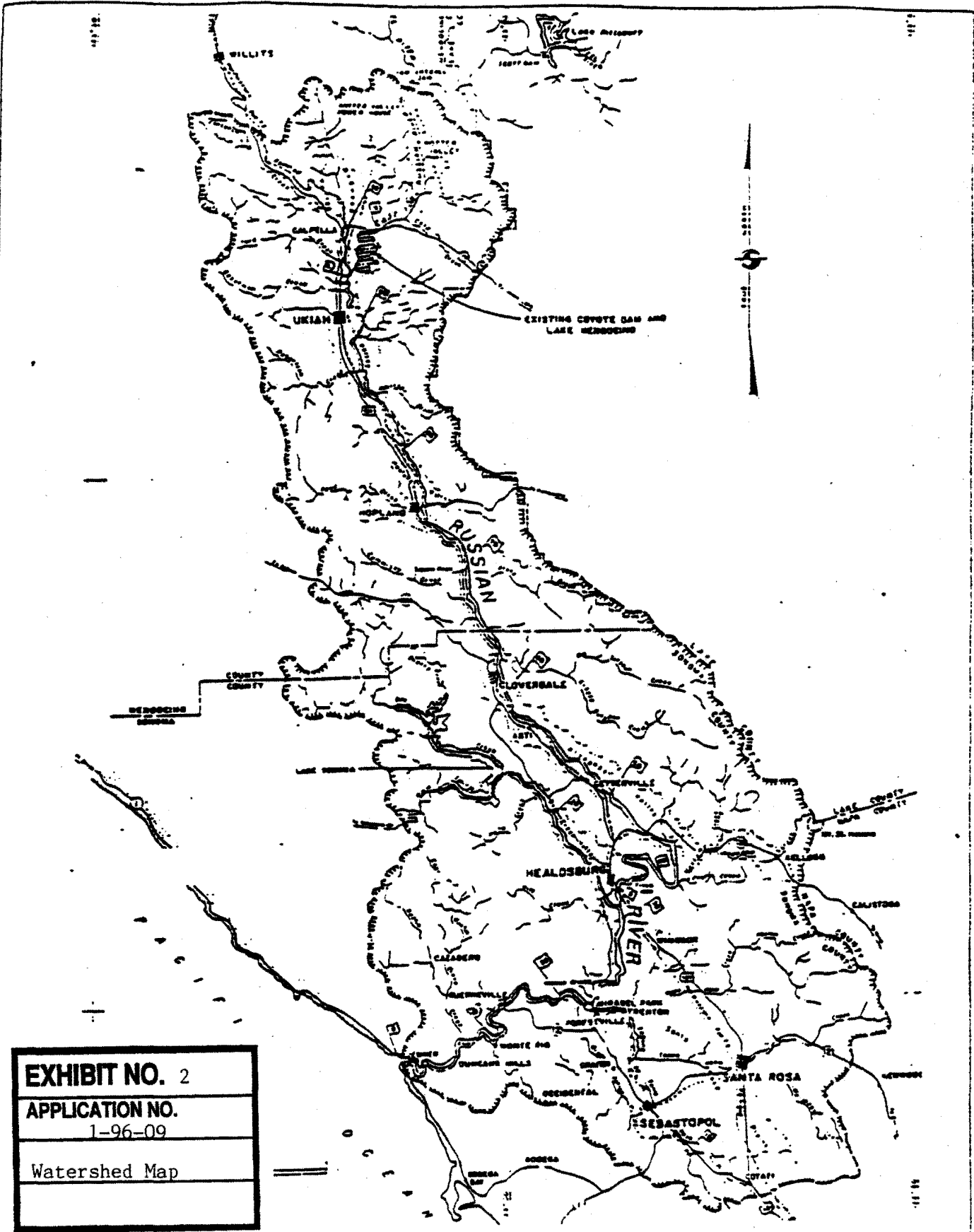


EXHIBIT NO. 2
APPLICATION NO.
 1-96-09
 Watershed Map



Philip Williams & Associates, Ltd.
 Consultants in Hydrology

Watershed Map of the Russian River Estuary
 Source: US Army Corps of Engineers, 1965

Figure
 3.8

SECTION IV. (6) REQUIRED ATTACHMENT

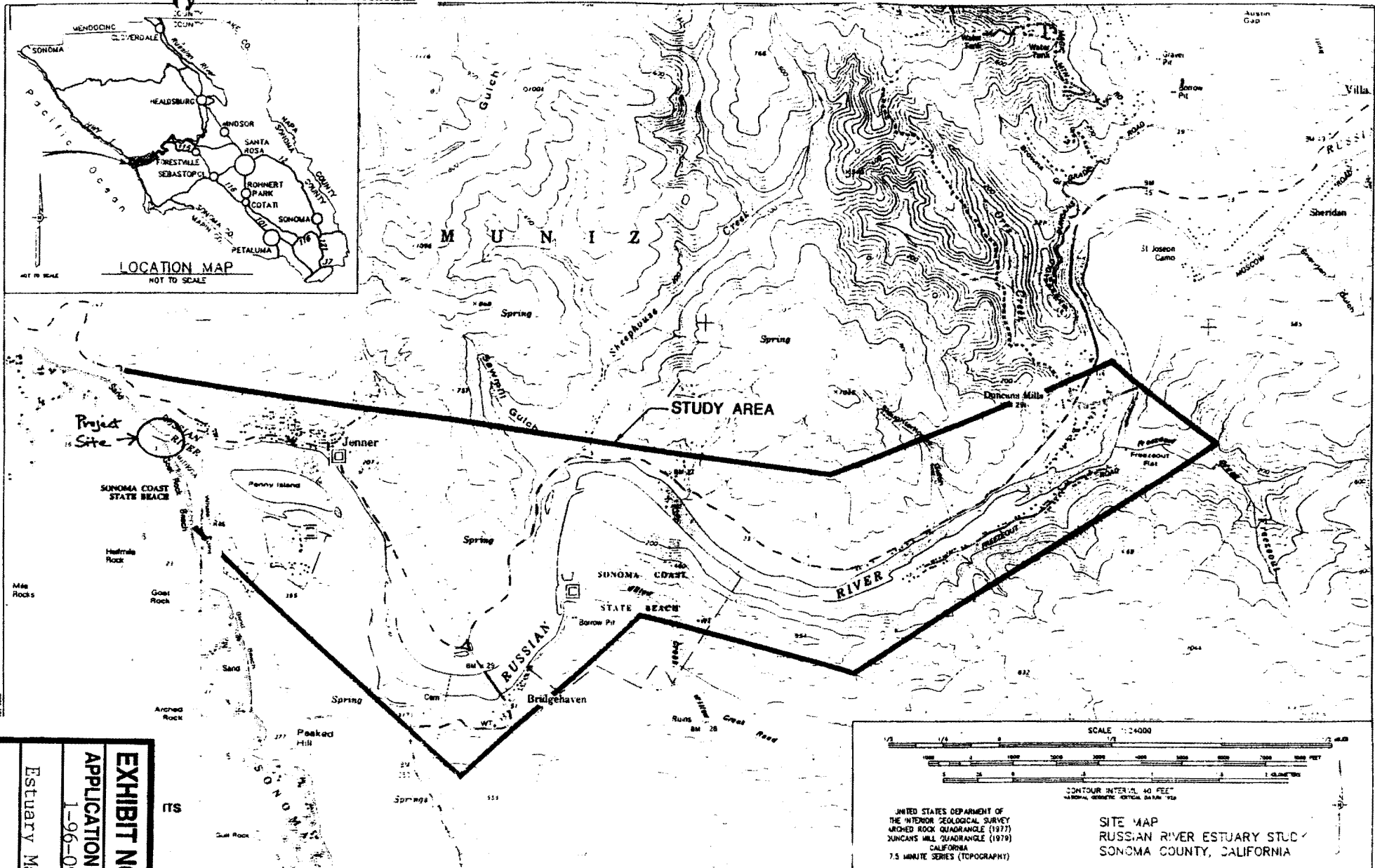
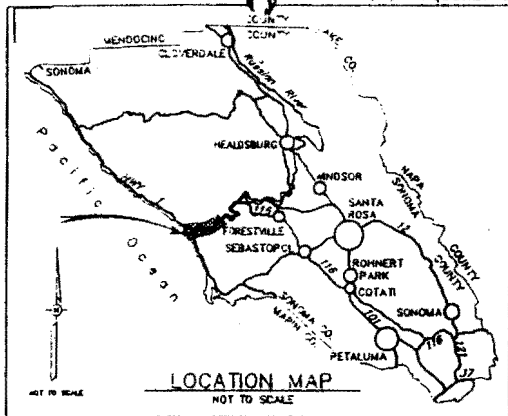
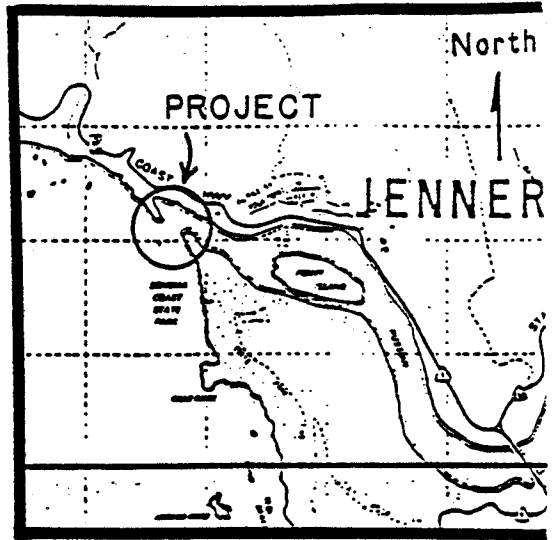


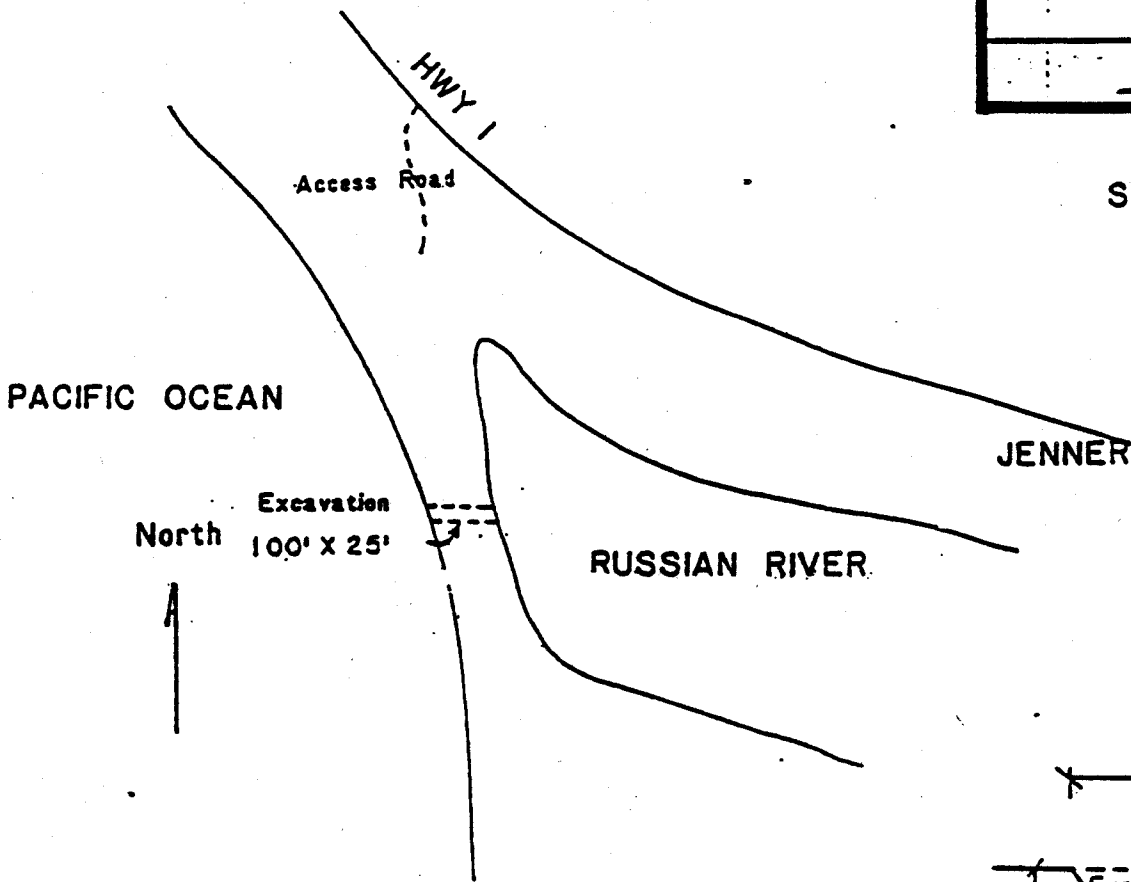
EXHIBIT NO. 3
APPLICATION NO.
1-96-09
Estuary Map

UNITED STATES DEPARTMENT OF THE INTERIOR GEOLOGICAL SURVEY
ARCHED ROCK QUADRANGLE (1977)
JUNCAS MIL QUADRANGLE (1979)
CALIFORNIA
7.5 MINUTE SERIES (TOPOGRAPHY)

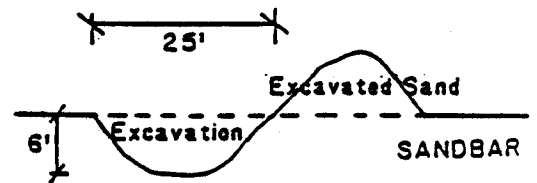
SITE MAP
RUSSIAN RIVER ESTUARY STUDY
SONOMA COUNTY, CALIFORNIA



VICINITY MAP
Scale: 1" = 4400'



PLAN VIEW
No Scale



TYPICAL SECTION
No Scale

EXHIBIT NO. 4
APPLICATION NO. 1-96-09
Site Plan

PROPOSED SANDBAR EXCAVATION
AT: JENNER IN: RUSSIAN RIVER
COUNTY: SONOMA STATE: CALIFORNIA

Russian River Estuary Study 1992-1993

prepared for

Department of Planning
Sonoma County
Melanie Heckel, Project Manager

and

California State Coastal Conservancy
Julia McIver, Grant Manager

Under the direction of the Russian
River Estuary Interagency Task Force*

Hydrological Aspects of an Estuary
Management Plan

prepared by

Peter Goodwin, Ph.D., P.E. and C. Kelly Cuffe, M.S.

Philip Williams and Associates, Ltd.
Consultants in Hydrology
Pier 35, The Embarcadero
San Francisco, CA 94133

Limnological and Biological Aspects
of an Estuary Management Plan

prepared by

Jennifer L. Nielsen** and Theo Light

** Research Fisheries Scientist
USDA U.S. Forest Services
Pacific Southwest Research Station
800 Buchanan St.
Albany, CA 94710

EXHIBIT NO. 5

APPLICATION NO.

1-96-09

Excerpts from
Estuary Study

(1 of 8)

I. CONCLUSIONS AND RECOMMENDATIONS

A. Hydrology and Flooding

The purpose of this study is to develop a management plan for the Russian River Estuary that represents the optimum solution for the entire estuarine ecosystem, whilst preventing local flooding during periods of closure of the mouth of the estuary. An adaptive management plan is recommended that allows the precise timing of breaching of the barrier beach to be determined by ecological needs. There is flexibility in the plan to allow for future adjustments if more data becomes available on the biological functioning of the estuary, or if it is possible to secure greater releases from the reservoirs at critical periods.

The main elements of the management plan are:

- The barrier beach should be breached in the range +4.5 to +7.0 feet NGVD.
- Timing of artificial breaches is important during the spring and fall to assure the passage of aquatic invertebrates. During periods of prolonged estuary closure, additional artificial breaching in the range +4.5 to +7.5 feet NGVD may be warranted if the biological monitoring demonstrates a need.
- Adequate warnings and public control should be exercised during the artificial breaching to assure public safety. Closing sections of the beach adjacent to the breach will also benefit the pinniped population.
- It is recommended that an automated tide gage is installed at the Visitor Center. This recorder will be linked by a telephone line to the County Offices allowing projections of the rise in water level to be made in the office. Observations and calls from residents will alert the County to high elevations in the estuary in the event of an equipment malfunction. This is the current management practice. However, the ability of the County to project water levels will enable the optimum time for breaching to be determined for ecological reasons and practical constraints such as working around weekends and holidays.

EXHIBIT NO. 5
APPLICATION NO. 1-96-09
Excerpts from Estuary Study
(2 of 8)

- This automated tide recorder and PC could be developed into an interpretative exhibit in the Visitor Center describing the biological and physical characteristics of the Russian River Estuary.
- The simple computer model developed herein can be used with the automated tide recorder or visual observations to predict when artificial breaching will be required and the optimum time.
- Supplemental reservoir releases could be used to prolong the periods of open entrance conditions if water is available at specific times of the years (for example, during reservoir drawdown for flood control purposes or release of hatchery fish). Agency coordination on these management opportunities are recommended.
- Monitoring is recommended and input solicited from the resource agencies to judge the performance of the management plan. Specifically, this monitoring should include:
 - Biological monitoring plan outlined by Nielsen (1993).
 - River discharge measurements at Monte Rio, to verify that the losses predicted by the computer model between the Guerneville Gage and the upstream boundary of the model. A correlation between flows at Guerneville and Monte Rio can be established.
 - Periodic visual observations of the County Gage at the Jenner Visitors Center to validate the expected frequency of breaching predicted by the model.

B. Limnology and Biology

1. Limnological and biological data presented in this report suggest minimum impacts to the aquatic estuarine community during and immediately after the artificial breaching of the sand bar at the mouth of the Russian River during the summer of 1992 and spring of 1993.
2. Changes in the distribution and abundance of critical aquatic habitat based on temperature, salinity and dissolved oxygen due to tidal influence, stratification during

EXHIBIT NO. 5
APPLICATION NO. 1-96-09
Excerpts from Estuary Study
(3 of 8)

closure and channel geomorphology at the time of breaching did appear to influence the distribution and abundance of aquatic species throughout the estuary. These changes, however, did not have critical short-term impacts on the biological community as a whole.

3. The lack of historic biological data does not allow a comparison of the aquatic diversity found in the estuary today and the assemblage endemic to the system in years past. Anecdotal reference to abundance of certain fish and invertebrates species in the Russian River (coho, chinook and pink salmon, striped bass, tidewater gobies, shad, dungeness crabs) not found at all or found to be lacking abundance in this study, suggest possible long-term impacts of management within the basin, not necessarily attributable to the artificial breaching of the mouth.
4. The unusual nature of the climatic conditions during this study, with a wet winter breaking the seven-year drought cycle, is a problem when projecting our results on to the broader issue of artificial breaching over longer temporal scales. We suggest limited biological and limnological monitoring continue in the estuary to add verification to our conclusions.
5. Overall the Russian River estuary and the freshwater marsh on Willow Creek provide habitat and food for a substantially diverse fauna and flora which appear adapted to the limnological shifts occurring with periodic closure of the river mouth. The role of Willow Creek marsh in sustaining the productivity and viability of the estuary should not be overlooked and the natural biological function of this marsh should be protected throughout time.
6. Public access should be curtailed during breaching events. Breaching creates unpredictable hazardous conditions for spectators at the river mouth, increasing public safety concerns and liability for regulatory agencies. Restricted access during breaching lowers disturbance levels for harbor seals and allows expedient re-haul.
7. Correlation between the timing of smolt releases at Warm Springs hatchery and artificial breaching during spring will prevent impoundment of out migrating salmon which become prey for local pinniped populations when delayed in their movement to the ocean.

EXHIBIT NO. 5
APPLICATION NO. 1-96-09
Excerpts from Estuary Study
(4 of 8)

XV. PREFERRED ALTERNATIVE

The results of the biological study indicate that the current management plan does facilitate a viable estuarine ecosystem. The ecosystem appears to be adapted to the shifts in salinity and water temperature. During the monitoring period, no serious effects to the biota were observed as a result of water quality problems.

These conclusions (Nielsen, 1993) are based on existing hydrological conditions of the estuary and the limited 12 month period of detailed monitoring. It should be noted that this period coincided with the end of an extended drought period and may not be representative of *normal* conditions in the estuary. However, the results of the monitoring study have shown in which ways management of the estuary can be refined.

Elements Required for Implementation of Management Plan

- **Breaching.** The barrier beach will continue to be breached by bulldozer. The modified criteria for breaching are described below (p. 179 and 180).
- **Tide Staff.** A tide staff should be installed next to the County Gage at Jenner, relative to NGVD. In the past, water surface elevations have been read from this gage and it is useful to maintain the original gage. The new gage should be clearly distinguishable from the old gage, for example it should be a different color and should be clearly marked in 10ths of a foot.
- **Automated Tide Recorder.** An automated tide recorder should be installed at the Jenner Gage. The water levels will be recorded on a personal computer (PC) located in the Visitors Center. The tide recorder and PC will be linked by telephone to the Department of Roads or other entity designated by the County. Current and recent water surface elevations in the estuary will be able to be displayed remotely in the County Offices. The simple mass balance model developed in this study can be used in projecting the rate of water level rise. This will reduce the number of trips required by County personnel when determining the most appropriate time to breach the barrier beach and will allow adequate preparation for scheduling breaching of the barrier.

Calls from concerned local residents will still provide a safeguard in the event of tide recorder malfunction.

- **Use of Recorder as an Interpretative Tool.** As an option, the PC used to transmit data to the County could be developed as an interpretative exhibit. A brief animation describing the physical

EXHIBIT NO. 5
APPLICATION NO. 1-96-09
Excerpts from Estuary Study
(5 of 8)

and biological characteristics of the estuary could be developed. This educational display might include: a graph of the recent water surface elevations of the past 24 hours, past week, and past month; scanned aerial photographs of the estuary; scanned historical photographs; presentation of the biological monitoring; description of the physical processes in the Russian River Estuary; and narrative text.

- Monitoring. Biological and hydrological monitoring will be undertaken to confirm the viability of the management plan and to facilitate future adaptations and refinements to the plan for the benefit of the ecosystem.

Critical Elevations

The maximum elevation was selected based on the following criteria:

- discharge of anoxic water from Willow Creek Marsh into the estuary;
- flooding of property;
- high flushing velocities caused by high water elevations in the estuary prior to breaching. High velocity flows associated with breaching remove aquatic invertebrates, particularly juvenile fish unable to cope with these currents;
- danger posed by the high velocity flows during and immediately following breaching to County personnel and recreational users of the beach.

Residents call the County when the County Gage reaches 7.0 feet (6.8 feet NGVD) and the County staff will normally breach within a few days. This results in a current practice of breaching between 7.0 and 10.0 feet NGVD. At elevations exceeding 8.5 feet, the withdrawal of anoxic water from Willow Creek Marshes is observed. Therefore, to prevent this withdrawal from occurring and to limit the removal of aquatic invertebrates, it is recommended that the preferred maximum elevation in the management plan be set at 7.0 feet NGVD.

There is no preferred minimum elevation for breaching, although the development of an inlet channel at elevations less than 4.5 feet NGVD is limited and would require more frequent bulldozer activity.

The recommended range of water levels in the estuary during closure is therefore 4.5 - 7.0 feet NGVD.

In the event of intensive wave action on the beach, making breaching hazardous, the water level in the estuary may be allowed to reach 8.5 feet NGVD.

Timing of Breaching

Biological monitoring is recommended to provide further insight regarding the precise timing of breaching and to determine during a particular year when breaches should be undertaken to facilitate fish passage. The most significant time for biological considerations is spring and fall when fish and aquatic invertebrate passage is required. Monitoring during these broad time spans would aid in evaluating their extent.

The timing of some breaches where possible should be coordinated with the release of hatchery fish. The precise time of travel from Warm Springs hatchery to the estuary should be determined by the California Department of Fish and Game (refer to Monitoring Program below).

Monitoring Program

The monitoring program should be continued for 3-5 years following the implementation of the management plan to corroborate the recommendations of this twelve month study.

Hydrologic Monitoring

- The recommended automated tide recorder at the Visitor Center will allow continuous monitoring of the water surface elevations.
- If the model is to be used to project the rate of rise in the lagoon, additional calibration measurements of the river discharge just above the limit of tidal flows should be taken to establish a correlation between inflows to the estuary and the flows recorded at the gaging station at Guerneville.
- Periodic monitoring of water quality parameters should be undertaken to ensure that good water quality within the estuary is maintained.

EXHIBIT NO. 5
APPLICATION NO. 1-96-09
Excerpts from Estuary Study
(7 of 8)

Biologic Monitoring

- Seasonal (spring and fall) otter trawl sampling in the lower estuary to determine the distribution and abundance of fish and macro invertebrates.
- Seasonal (late spring and early summer) deep water beach seine samples, taken in the lower estuary to test for entrapment of salmonid smolts during closed estuary conditions.
- Behavioral observations (3) of pinniped activity during breaches under restricted public access to test the hypothesis that human activity deters pinniped landings on the beach post breaching.
- Plankton tows at the mouth of Willow Creek three hours post breaching (2/year) to monitor outflow levels of mysid shrimp and juvenile fishes.

Other Considerations

- Supplemental freshwater releases will prolong the opening of the estuary. Supplemental releases timed to coincide with hatchery releases or returning fish are worthy of consideration if additional water is determined to be available when drawing down the upstream reservoirs for flood control purposes.
- Assisted closures were not considered to be necessary in this plan.
- Pinnipeds did not appear to be affected adversely by the breaching process or by the presence of a bulldozer. However, people present on the beach while observing the breaching process prevented the pinnipeds from returning to the beach, which may affect their restive requirements.
- The beach should be closed a distance of at least 750 feet on either side of the breach for public safety reasons. This public access restriction may allow pinnipeds to return to the beach during the breaching process.
- Future and current studies on the flow releases from reservoirs and treated effluent discharges into the Russian River should consider the effect of breaching frequency, tidal exchange, and water quality within the estuary.

EXHIBIT NO. 5
APPLICATION NO. 1-96-09
Excerpts from Estuary Study
(8 of 8)