RUSSIAN RIVER
ESTUARY STUDY
1992-1993
Russian River Estuary Study 1992-1993

prepared for

Department of Planning
Sonoma County
Melanie Heckel, Project Manager

and

California State Coastal Conservancy
Julia McLver, Grant Manager

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

Hydrological Aspects of an Estuary Management Plan

prepared by

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Consultants in Hydrology
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San Francisco, CA 94133

Limnological and Biological Aspects of an Estuary Management Plan

prepared by

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Pacific Southwest Research Station
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Albany, CA 94710
Social Impacts of an Estuary
Management Plan

prepared by

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Planner IV
Sonoma County Planning Department

with assistance from the
Russian River Estuary County Task Force***

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Bob Merrill, California Coastal Commission
Jennifer Vick, U.S. Army Corps of Engineers
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Mike Treinen, Environmental Health
Randy Poole/Bob Morrison, Water Agency
Melanie Heckel, Planning Department
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GLOSSARY OF TERMS
<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Actual Tidal Prism</td>
<td>as potential tidal prism, but based on tide levels in the lagoon or estuary (i.e. accounts for the damping effects of the tidal inlet channel)</td>
</tr>
<tr>
<td>Barrier Beach</td>
<td>the sand bar which is formed at the entrance of an estuary, preventing tidal exchange</td>
</tr>
<tr>
<td>Diurnal Tidal Prism</td>
<td>the volume of water stored in a lagoon or estuary between MHHW and MLLW</td>
</tr>
<tr>
<td>Estuary</td>
<td>a semienclosed coastal body of water which has a free connection with the open ocean and within which ocean water is measurably diluted with fresh water derived from land drainage (Pritchard, 1967)</td>
</tr>
<tr>
<td>Inlet Channel</td>
<td>the channel which crosses the barrier beach and connects the ocean to the Russian River Estuary</td>
</tr>
<tr>
<td>Lagoon</td>
<td>an enclosed coastal body of water with no or periodic connection to the open ocean which is recharged by fresh water from land drainage</td>
</tr>
<tr>
<td>Mean Tidal Prism</td>
<td>the volume of water stored in a lagoon or estuary between MHW and MLW</td>
</tr>
<tr>
<td>MHHW</td>
<td>Mean Higher High Water</td>
</tr>
<tr>
<td>MHW</td>
<td>Mean High Water</td>
</tr>
<tr>
<td>MLLW</td>
<td>Mean Lower Low Water</td>
</tr>
<tr>
<td>MLW</td>
<td>Mean Low Water</td>
</tr>
<tr>
<td>NGVD</td>
<td>National Geodetic Vertical Datum</td>
</tr>
<tr>
<td>Potential Tidal Prism</td>
<td>the volume of water stored in a lagoon (estuary) between MHW and MLW (Mean potential tidal prism) or MHHW and MLLW (potential diurnal tidal prism) based on tide elevations in the ocean.</td>
</tr>
</tbody>
</table>
APPENDIX II

LIST OF AGENCIES / ORGANIZATIONS
CONTACTED DURING THIS STUDY
LIST OF AGENCIES/ORGANIZATIONS
CONTACTED DURING THIS STUDY

R. Morrison  Sonoma County Water Agency
J. Mortenson  Bodega Bay Resident
Eric Mayes  Department of Public Works, Sonoma County
Jim Johnson  Department of Public Works, Sonoma County
Bill Cox  Department of Fish & Game

National Marine Fisheries
Patricia Kirk  National Oceanographic Data Center

NOAA
John Shrad  Department of Public Works, Road Maintenance Division, Sonoma County
Jim Flugum  Sonoma County Water Agency
APPENDIX III

CROSS-SECTIONS OF THE RUSSIAN RIVER ESTUARY

Note: all elevations shown in Appendix III are to NGVD
RUSSIAN RIVER ESTUARY STUDY BATHYMETRIC CROSS-SECTIONS

DATUM ELEV
-20.00

GROUP RUSHNRVR
SECTION 2
DATUM ELEV
-10.00

GROUP RUSNRVR
SECTION 3
RUSSIAN RIVER ESTUARY STUDY BATHYMETRIC CROSS-SECTIONS

DATUM ELEV
-10.00

GROUP RUSNRVR
SECTION 4
RUSSIAN RIVER ESTUARY STUDY BATHYMETRIC CROSS-SECTIONS
RUSSIAN RIVER ESTUARY STUDY BATHYMETRIC CROSS-SECTIONS

Figure 10: Bathymetric cross-sections for the Russian River Estuary.
RUSSIAN RIVER ESTUARY STUDY BATHYMETRIC CROSS SECTIONS

**GROUP**  RUSNRVR

**SECTION**  II

**DATUM ELEV**

-10.00

0.00  100.00  200.00

0.00  5.00  10.00

-5.00  0.00
DATUM ELEV
-20.00

GROUP        RUSNRVR
SECTION      12
RUSSIAN RIVER ESTUARY STUDY BATHYMETRIC CROSS-SECTIONS

Figure
RUSSIAN RIVER ESTUARY STUDY BATHYMETRIC CROSS-SECTIONS

DATUM ELEV
-10.00

GROUP RUSNRVR
SECTION 21

Figure
RUSSIAN RIVER ESTUARY STUDY BATHYMETRIC CROSS-SECTIONS

**DATUM ELEV**

\[
\begin{array}{c}
\text{GROUP} \\
\text{RUSNRVR} \\
\text{SECTION 25}
\end{array}
\]

\[
\begin{array}{ccc}
-10.00 & \text{GROUP} & -10.00 \\
0.00 & RUSNRVR & 10.00 \\
5.00 & \text{SECTION 25} & 5.00 \\
0.00 & 100.00 & 0.00 \\
10.00 & 100.00 & -5.00 \\
-5.00 & 100.00 & 0.00 \\
\end{array}
\]
DATUM ELEV
-20.00

GROUP RUSNRVR
SECTION 26
Figure
RUSSIAN RIVER ESTUARY STUDY

BATHYMETRIC CROSS SECTIONS

Figure
RUSSIAN RIVER ESTUARY STUDY BATHYMETRIC CROSS-SECTIONS

DATUM ELEV
-10.00

GROUP RUSNRVR
SECTION 29
emplacement of water level recorder at Jenner Visitor Center
April 17, 1992
MAY, 1992

WATER LEVELS - RUSSIAN RIVER ESTUARY JENNER VISITOR CENTER (MAY, 1992)
WATER LEVELS - RUSSIAN RIVER ESTUARY
JENNER VISITOR CENTER (JUNE, 1992)
JULY, 1992

WATER LEVELS - RUSSIAN RIVER ESTUARY
JENNER VISITOR CENTER (JULY, 1992)
Figure

WATER LEVELS - RUSSIAN RIVER ESTUARY
JENNER VISITOR CENTER (AUGUST, 1992)
WATER LEVELS - RUSSIAN RIVER ESTUARY
JENNER VISITOR CENTER (SEPTEMBER, 1992)
OCTOBER, 1992

WATER LEVELS - RUSSIAN RIVER ESTUARY
JENNER VISITOR CENTER (OCTOBER, 1992)
WATER LEVELS - RUSSIAN RIVER ESTUARY
JENNER VISITOR CENTER (NOVEMBER, 1992)
JANUARY, 1993

WATER LEVELS - RUSSIAN RIVER ESTUARY
JENNER VISITOR CENTER (JANUARY, 1993)
WATER LEVELS - RUSSIAN RIVER ESTUARY
JENNER VISITOR CENTER (FEBRUARY, 1993)
APPENDIX V

HISTORIC BEACH PROFILES AT THE RUSSIAN RIVER ESTUARY

Figure 21

Range Lines Nos. 1, 2, and 3 of Beach Profiles Near the Mouth of the Russian River

(34, Fig. A-23)
Figure 22

Range Lines Nos. 4 and 5 of Beach Profiles Near the Mouth of the Russian River

(34, Fig. A-24)
APPENDIX VI-A

ESTUARY OPENINGS MARCH 1988 to FEBRUARY 1992

Source: Schrad, 1992

Note: Elevations shown in Appendix VI-A are relative to the County Gage mounted near the Visitor's Center. 0.0 feet on this County Gage is approximately +0.16 feet NGVD.
<table>
<thead>
<tr>
<th>DATE</th>
<th>DEPTH</th>
<th>TIME</th>
<th>EMPLOYEES INVOLVED</th>
<th>AUTHORITY</th>
<th>NOTIFICATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>03/24/88</td>
<td>7'+/−</td>
<td>?</td>
<td>ALBRITTON, DON-F001 T</td>
<td>RD. MAINT.</td>
<td>NO</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>JOHNSON, JIM-J013/G227</td>
<td></td>
<td></td>
</tr>
<tr>
<td>03/25/88</td>
<td>7'+/−</td>
<td>?</td>
<td>ALBRITTON, GARY-E254</td>
<td>RD. MAINT.</td>
<td>NO</td>
</tr>
<tr>
<td>04/06/88</td>
<td>7'+/−</td>
<td>?</td>
<td>ALBRITTON, DON-F001 T</td>
<td>RD. MAINT.</td>
<td>NO</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>PETERS, DAVE-J001/G226</td>
<td></td>
<td></td>
</tr>
<tr>
<td>04/15/88</td>
<td>7'+/−</td>
<td>?</td>
<td>ALBRITTON, DON-F001/J001</td>
<td>RD. MAINT.</td>
<td>NO</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>JOHNSON, JIM-J001</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>PETERS, DAVE-E368</td>
<td></td>
<td></td>
</tr>
<tr>
<td>04/17/88</td>
<td>7'+/−</td>
<td>?</td>
<td>ALBRITTON, DON-F001 T</td>
<td>RD. MAINT.</td>
<td>NO</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>JOHNSON, JIM-E402</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>PETERS, DAVE-J001/G226</td>
<td></td>
<td></td>
</tr>
<tr>
<td>05/17/88</td>
<td>7'</td>
<td>8:00 A.M</td>
<td>ALBRITTON, DON-F001 T</td>
<td>H. LAMBERT</td>
<td>05/16/88 -</td>
</tr>
<tr>
<td></td>
<td></td>
<td>8:00 A.M</td>
<td>PETERS, DAVE-G226</td>
<td></td>
<td>F&amp;G</td>
</tr>
<tr>
<td>06/29/88</td>
<td>7'</td>
<td>8:30 A.M</td>
<td>ALBRITTON, DON-F001 T</td>
<td>RD. MAINT.</td>
<td>06/28/88 -</td>
</tr>
<tr>
<td></td>
<td></td>
<td>8:30 A.M</td>
<td>PETERS, DAVE-J001/G226</td>
<td></td>
<td>F&amp;G-YOUNT.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>8:30 A.M</td>
<td>JOHNSON, JIM-E402</td>
<td></td>
<td>F&amp;G-COX</td>
</tr>
<tr>
<td>Q9/10/88</td>
<td>9'4&quot;</td>
<td>8:00 A.M</td>
<td>PETERS, DAVE-F001 T</td>
<td>DON HEAD</td>
<td>NO</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>JOHNSON, JIM-J001/E402</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>DERRICK, RON-E254</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11/12/88</td>
<td>7'1&quot;</td>
<td>8:00 A.M</td>
<td>ALBRITTON, DON-F001 T</td>
<td>DON HEAD</td>
<td>CALLS MADE</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>PETERS, DAVE-J001/G226</td>
<td></td>
<td>BY TIM MAYER</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>JOHNSON, JIM-E402</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12/13/88</td>
<td>7'+&quot;</td>
<td>8:30 A.M</td>
<td>ALBRITTON, DON-F001 T</td>
<td>DON HEAD</td>
<td>CALLS MADE</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>PETERS, DAVE-J001/G226</td>
<td></td>
<td>BY TIM MAYER</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>JOHNSON, JIM-E402</td>
<td></td>
<td>12/12/88</td>
</tr>
</tbody>
</table>
## 1989 River Mouth Openings

<table>
<thead>
<tr>
<th>Date</th>
<th>Depth</th>
<th>Time</th>
<th>Employees Involved</th>
<th>Authority</th>
<th>Notification</th>
</tr>
</thead>
<tbody>
<tr>
<td>06/06/89</td>
<td>8'</td>
<td>8:00 A.M</td>
<td>ALBRITTON, DON-F020 T</td>
<td>RD. MAINT.</td>
<td>LIST CALLED BY VELLUTINI</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>JOHNSON, JIM-E402</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>PETERS, DAVE-J001</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10/19/89</td>
<td>7'</td>
<td>9:30 A.M</td>
<td>ALBRITTON, DON-F001 T</td>
<td>RD. MAINT.</td>
<td>LIST CALLED BY SCHRAD</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>PETERS, DAVE-J001/G226/G226</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>OSBORNE, MIKE - PHOTOS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11/09/89</td>
<td>9'</td>
<td>2:00 P.M</td>
<td>ALBRITTON, DON-F001 T</td>
<td>RD. MAINT.</td>
<td>LIST CALLED BY SCHRAD</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>JOHNSON, JIM-E402/J001</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12/12/89</td>
<td>9'</td>
<td>1:30 P.M</td>
<td>ALBRITTON, DON-F001 T</td>
<td>RD. MAINT.</td>
<td>LIST CALLED BY SCHRAD</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>JOHNSON, JIM-E402</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>PETERS, DAVE G226/J001</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

## 1990 River Mouth Openings

<table>
<thead>
<tr>
<th>Date</th>
<th>Depth</th>
<th>Time</th>
<th>Employees Involved</th>
<th>Authority</th>
<th>Notification</th>
</tr>
</thead>
<tbody>
<tr>
<td>04/14/90</td>
<td>8.5'</td>
<td>9:00 AM</td>
<td>DON ALBRITTON-F001 T</td>
<td>RD. MAINT.</td>
<td>LIST CALLED BY SCHRAD</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>DAVE PETERS- J001/E323</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>JIM JOHNSON-E402</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>JAY ELDREDGE- E395</td>
<td></td>
<td></td>
</tr>
<tr>
<td>05/04/90</td>
<td>7.5'</td>
<td>1:00 PM</td>
<td>DON ALBRITTON-F001 T</td>
<td>RD. MAINT.</td>
<td>LIST CALLED BY SCHRAD</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>DAVE PETERS-J001/E332</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>JIM JOHNSON-E402</td>
<td></td>
<td></td>
</tr>
<tr>
<td>05/25/90</td>
<td>9.2'</td>
<td>8:00 AM</td>
<td>DON ALBRITTON-F001 T</td>
<td>RD. MAINT.</td>
<td>LIST CALLED BY SCHRAD</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>DAVE PETERS-J001/E322</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>JIM JOHNSON-E402</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10/11/90</td>
<td>7'</td>
<td>8:30 AM</td>
<td>DON ALBRITTON-F001 T</td>
<td>RD. MAINT.</td>
<td>LIST CALLED BY SCHRAD</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>JIM JOHNSON-J001/E402</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11/02/90</td>
<td>8'</td>
<td>11:00 AM</td>
<td>DON ALBRITTON</td>
<td>RD. MAINT.</td>
<td>LIST CALLED BY RUSSELL</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>ERIC BOSS-F001 T</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>JIM JOHNSON-J001/E402</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DATE</td>
<td>DEPTH</td>
<td>TIME</td>
<td>EMPLOYEES INVOLVED</td>
<td>AUTHORITY</td>
<td>NOTIFICATION</td>
</tr>
<tr>
<td>-----------</td>
<td>-------</td>
<td>----------</td>
<td>-------------------------------</td>
<td>---------------</td>
<td>-------------------------------</td>
</tr>
<tr>
<td>01/18/91</td>
<td>6'2&quot;</td>
<td>11:30 AM</td>
<td>JOHNSON, JIM-J001/E402</td>
<td>RD. MAINT</td>
<td>LIST CALLED BY SCHRAD</td>
</tr>
<tr>
<td></td>
<td></td>
<td>TO 3:30 PM</td>
<td>ESPOSTI, JOHN-F020</td>
<td></td>
<td></td>
</tr>
<tr>
<td>01/18/91</td>
<td>*****</td>
<td></td>
<td>ATTEMPT UNSUCCESSFUL- TRY AGAIN</td>
<td></td>
<td>ON 01/23/91*</td>
</tr>
<tr>
<td>01/23/91</td>
<td>7'2&quot;</td>
<td>11:30 AM</td>
<td>JOHNSON, JIM-J001/E402</td>
<td>RD. MAINT.</td>
<td>RE-CALLED COASTAL COMM. ONLY</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>ESPOSTI, JOHN-F020</td>
<td></td>
<td></td>
</tr>
<tr>
<td>02/15/91</td>
<td>7'2&quot;</td>
<td>1:30 PM</td>
<td>JOHNSON, JIM-E402</td>
<td>ED WALKER</td>
<td>LIST CALLED BY ESPOSTI</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>ESPOSTI, JOHN-F020</td>
<td></td>
<td></td>
</tr>
<tr>
<td>03/01/91</td>
<td>8'</td>
<td>2:30 PM</td>
<td>JOHNSON, JIM-E402/J001</td>
<td>RD. MAINT</td>
<td>LIST CALLED BY SCHRAD</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>ESPOSTI, JOHN-F020</td>
<td></td>
<td></td>
</tr>
<tr>
<td>06/07/91</td>
<td>7'</td>
<td>4:00 PM</td>
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APPENDIX VI-B

APPENDIX VII

SIGNIFICANT WAVE HEIGHTS AT BODEGA STATION
JANUARY 1992 - MAY 1993
1992 SIGNIFICANT WAVE HEIGHTS MEASURED AT BODEGA STATION (NBDC # 46013; 38.2N/124.0W). MAR12-JUNE23 CALCULATED FROM SAN FRANCISCO STATION OBSERVATIONS.
1992 SIGNIFICANT WAVE HEIGHTS MEASURED AT BODEGA STATION (NBDC # 46013; 38.2N/124.0W)
1993 SIGNIFICANT WAVE HEIGHTS MEASURED AT BODEGA STATION (NBDC # 46013; 38.2N/J24.0W)
APPENDIX VIII

MINIMUM STREAMFLOW REQUIREMENTS IN THE
RUSSIAN RIVER

Source: State Water Resources Control Board Decision 1610, April 1986
APPENDIX IX
SURVEY FORM SENT TO POTENTIALLY AFFECTED PROPERTY OWNERS
Re: Opening of the Mouth of the Russian River

1. Is your property affected by flooding when the River mouth is closed? _____ Yes _____ No

2. What type of property is affected?
   __ Residential
   __ Agricultural
   __ Commercial

3. RESIDENTIAL
   a. Is your yard flooded? _____ Yes _____ No
   b. What is the use of this land and percentage of parcel affected?

   c. Do you have a boat dock that would be damaged by flooding? _____ Yes _____ No
   d. Are any accessory buildings flooded? _____ Yes _____ No If so, what is the accessory building
      square footage affected?
   e. Would your residence flood if the River mouth is closed? _____ Yes _____ No Do you know at what
      height of the River (measured at the Jenner gauge) that your residence floods?
      ______ 8 feet
      ______ 9 feet
      ______ 10 feet
      ______ Other
   f. What is the use of the area of your residence that would be flooded?
      _____ Foundation / sq. ft. _______
      _____ Basement / sq. ft. _______
      _____ Living Area / sq. ft. _______
   g. What is the use of the living area affected and square footage?

4. AGRICULTURAL
   a. How much land in terms of acreage is affected by flooding when the mouth is closed?

   b. What is the use of the land affected?
c. At what height of the river is your agricultural land substantially affected? (measured at the Jenner gauge.)

____ 7½ feet
____ 8 feet
____ 9 feet
____ 10 feet
____ Other

d. How does the flooding affect your agricultural operation?

5. COMMERCIAL
   a. What is the commercial use of your property?

   b. What is the use of any outdoor area affected?

   ___ Parking Lot
   ___ Landscaping
   ___ Other, describe: _______________________________________________________

   c. At what River height (measured at the Jenner gauge), is your property substantially affected by flooding?

   ___ 8 feet
   ___ 9 feet
   ___ 10 feet
   ___ Other

   d. What is the use of the structure that would be affected?

   ___ Foundation / sq. ft.
   ___ Basement / sq. ft.
   ___ Storage / sq. ft.
   ___ Office/sq. ft.
   ___ Public Area / sq. ft.
   ___ Other / sq. ft.

   e. Describe how your commercial operation would be affected if the River mouth remained closed and flooding occurred?

6. Other Comments:

   _______________________________________________________
   _______________________________________________________