PERMANENT MOORAGES AND TEMPORARY TIE-UP FACILITIES IN THE PORTLAND/VANCOUVER METROPOLITAN AREA: MEETING THE NEEDS OF THE LARGER RECREATIONAL BOAT
Permanent Moorages and Temporary Tie-Up Facilities in the Portland/Vancouver Metropolitan Area: Meeting the Needs of the Larger Recreational Boat

by

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PERMANENT MOORAGES AND TEMPORARY TIE-UP FACILITIES
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LARGER RECREATIONAL BOAT

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OREGON STATE MARINE BOARD
NORTHWEST MARINE TRADE ASSOCIATION
PORT OF VANCOUVER
Acknowledgments

Several sources were invaluable in the preparation of this study: all those members of the marine industry of the Portland/Vancouver metropolitan area interviewed who gave far more of their valuable time than was even hoped for; the Rafters Yacht Club who provided so much assistance in evaluating the sites discussed in Section II (combined with the "inside story" on various sites that only those who have known the River can provide); Mr. Dan Stack, Assistant Director of the Oregon State Marine Board who always had the answers to my long lists of questions; and especially Mr. Ed Condon, Extension Oceanographer at Oregon State University, whose advice, assistance and critical review from the time this study was only an idea is sincerely appreciated.
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Introduction

Every three years, the Oregon State Marine Board conducts a survey of boating in the state, primarily to determine the counties in which boating takes place for the purpose of distributing funds for use in providing boating facilities, education and law enforcement. The opportunity is usually taken to survey boaters for additional information at the same time--how often they go boating, types of boating activities engaged in, improvements in facilities needed, etc.

One such survey divided its sampling into two separate groups--boats less than 21 feet in length and boats 21 feet or longer (65). The differences are significant:

<table>
<thead>
<tr>
<th></th>
<th>Less than 21 feet</th>
<th>21 feet or over</th>
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<tr>
<td>Typical motor</td>
<td>35 h.p. outboard</td>
<td>100 h.p. inboard</td>
</tr>
<tr>
<td>How reach rivers</td>
<td>Trailered (76.7%)</td>
<td>Moored in river (91.6%)</td>
</tr>
<tr>
<td>Top county of use</td>
<td>Deschutes</td>
<td>Multnomah</td>
</tr>
<tr>
<td>Predominant activity</td>
<td>Fishing</td>
<td>Cruising/sightseeing</td>
</tr>
<tr>
<td>Most needed facilities</td>
<td>1. More ramps</td>
<td>1. Overnight moorage facilities</td>
</tr>
<tr>
<td></td>
<td>2. Improvement of ramps</td>
<td>2. More piers &amp; docks</td>
</tr>
<tr>
<td></td>
<td>3. Camping areas near launch</td>
<td>3. Breakwaters to shelter moorage areas</td>
</tr>
<tr>
<td></td>
<td>4. Sanitary facilities</td>
<td>4. Improved piers and docks</td>
</tr>
<tr>
<td></td>
<td>5. More parking space at ramps</td>
<td>5. Camping areas near moorage</td>
</tr>
</tbody>
</table>

Clearly, two distinct groups are boating on the waters of the state. It is the needs of this group of larger boats with which this study is concerned.

i.
Scope of Study

This study is composed of two parts. Section I deals with developed moorages and marinas—where they are, what services are offered in each, and how well the existing supply of permanent moorages serves the boating public. Section II examines the need for temporary "harbors of refuge" in the area, what criteria should be used in designating areas for such development, and exactly where such development should take place.

In keeping with this report's orientation toward the boater, the inventory of present marinas in the area and their services is a major feature of Section I. The discussion that follows this inventory is designed merely to encourage a comprehensive examination of a problem that manifested itself during the course of this study, i.e., the true shortage of covered moorage facilities in the Portland/Vancouver metropolitan area. The primary concern of Section II is the designation of specific sites that have been considered for development into harbors of refuge, and discussion of the factors that caused these specific sites to be selected.

At the outset of this study, it was agreed that facilities for large boats, permanent as well as temporary, would be examined on both sides of the Columbia River from Bonneville to St. Helens and on up the Willamette River as far as Wilsonville. It was learned, however, that a similar moorage study was being undertaken within the boundaries of the Columbia River Estuary Study Taskforce, i.e., from the mouth of
the Columbia River to approximately mile 42 near the town of Clatskanie. Rather than to leave a gap in areas covered, especially in collection of baseline data on permanent facilities, it was agreed to extend the western boundary of this project to the edge of the CREST study area, the eastern edge of Wahkiakum County, Washington, in order to maintain an unbroken inventory.

The scope of the study was limited by time constraints. Designed as a summer project through the internship provision of Oregon State University's Marine Resource Management program, the time spent was to be limited to the three-month period between late June and late September, 1977. Many more areas of the state deserve similar study of both permanent and temporary facilities. The area from Cascade Locks east to the Washington State border is becoming especially popular with large boat recreationalists, as is, to a lesser degree, the Willamette upriver from Wilsonville. Hopefully, such areas could be examined in the near future for similar facilities.

Summary of Findings and Conclusions

Considerable amount of detailed data is found in Sections I and II. The most pertinent information contained in these pages, however, is summarized below.

--There are 58 moorages in the area--commercial, public and private--that provide 5440 in-the-water berths for vessels of all sizes. There is open space for 3261 boats while 2179 spaces are
covered.

--Twenty-four marinas inventoried offer overnight moorage to transient boats. Most of these marinas are located outside the metropolitan area.

--Two marinas have the capability to pump out boat holding tanks. Four more pump-out stations are planned for the near future. Due to the limited number of boats that are expected to require holding tanks to comply with future Coast Guard regulations, however, substantial pressure for additional such facilities is not expected to become evident.

--Over half of all marinas surveyed offer gasoline for sale. Three offer diesel fuel as well, while ten sell pre-mixed outboard fuel.

--The average fee charged per foot of boat per month in the area is $0.87 for open facilities and $1.21 for covered moorage. However, due to the construction of several new high-quality moorages that cater primarily to the fast-growing interest in sailboats, the average fee charged for open moorage in the metropolitan area of the Columbia River is $1.26 per foot per month.

--The similarity between open and covered slip fees is seen as the primary reason why most recently-constructed moorage in the area is open and why most plans for future moorage construction involve open slips as well.

--From the four major indicators of moorage demand (waiting
lists, present occupancy rates, perspective of the industry, and projected large-boat ownership trends), it is conceivable that several thousand additional slips will be needed in the next decade. The source of this additional moorage, public or private, is uncertain. The possibility exists that alternate types of boat storage will have to be found.

--Using such criteria as compliance with regional comprehensive plans, boater popularity, placement within a "harbor of refuge" network, conflict with other river users, avoidance of duplication of existing state and local plans, and overall cost of development, eleven sites on the Columbia River, Multnomah Channel and Willamette River qualify for State Marine Board development into temporary tie-up sites for large recreational boats. Another twelve sites that were candidates for this type of development were found to be deficient when subjected to one or more of the above criteria, but worthy of re-evaluation at a later date. Six sites that had been mentioned as potential sites by local boaters were eliminated from further consideration.

Recommendations

Several recommendations that have resulted from this study are contained in the following pages. These recommendations are restated here for convenience.
The needs of large boat operators should be separately addressed by all agencies that have a role and responsibility in planning and providing for boating facilities. Examples of such a distinction would be the inclusion of large-boat temporary tie-up sites in the Parks and Recreation Branch of the Department of Transportation's Statewide Comprehensive Outdoor Recreation Plan, the separation of questionnaires sent to small and large boat owners by the Oregon State Marine Board in their triennial survey, and the consideration of facilities specifically for the large boat by such agencies as the Bureau of Outdoor Recreation and the U.S. Army Corps of Engineers.

The data compiled on permanent moorages in the area should be printed and made available to local boaters as well as operators of transient vessels from other areas for the purpose of defining marinas offering overnight moorage and various other services. This data should also be made available to planning agencies for the purposes of comparison with similar inventories in the future.

Effort should be made to inventory those permanent moorages on the Columbia River as far east as the Washington state line which, when combined with the CREST inventory to the west of this study area, would comprise a comprehensive survey of the entire River in both Washington and Oregon, thus presenting a much more complete profile of this segment of the marine industry.

Participation by all public and private interests is urged
in the development of a comprehensive management plan for all phases of water activity in the area of this study. Participants should include all parties from both the states of Washington and Oregon with any concern whatsoever in the future of the Columbia and Willamette Rivers. Only by such inclusive participation can the issue of provision for future recreational moorage be permanently solved.

-- Installation of temporary tie-up facilities at the eleven sites designated "Priority A" should commence without delay. "Priority B" sites should be diligently reexamined in following years for changes in the circumstances that currently prevent their development. The addition of potential sites to this latter category should be strongly encouraged, including those sites located between the eastern edge of this study area and the Washington state border in the state of Oregon, and sites in the state of Washington itself.

-- Cooperation by agencies in the state of Oregon currently involved with the State Marine Board in the joint development of facilities for the larger boat must be improved. Such extra cooperative effort is vital to the completion of these much-needed facilities.

-- Although Washington State's extensive "harbors of refuge" network in the Puget Sound is enviable by any standards, more attention should be paid to development of such facilities on the state's southern border. The anticipated growth of Clark County alone merits this increase in attention. As in the case of development
on the Oregon side of the Columbia, it would be important to coordinate this development with such bodies as the Washington State Departments of Game, Fisheries and Natural Resources as well as the Washington Public Ports Association.

-- Once a substantial number of harbors of refuge are developed, annotated maps of current and planned sites should be printed and made available to all area and out-of-area boaters for assistance in planning overnight cruises as well as providing the locations of these harbors for emergency purposes. Such information should also be included in Oregon's Outdoor Recreation Supply Bulletin of the State-wide Comprehensive Outdoor Recreation Plan and in Washington State's State-wide Comprehensive Outdoor Recreation and Open Space Plan.

-- Finally, it must be noted that this study is only a beginning. It is only a small start in the filling of a sizable need for further analysis of permanent moorage demand in the Portland/Vancouver metropolitan area. This study was designed to serve as a foundation for further studies of detailed market feasibility analysis. Not to take such a logical next step would be to disregard a major contribution of this study to this need.
SECTION I: PERMANENT MOORAGE FACILITIES
Supply of Permanent Moorage Facilities

Several studies in the past have addressed the subject of moorage for recreational vessels in the Portland/Vancouver area. Most of these studies merely listed facilities available for use by boaters (7, 11, 18, 22, 27, 58, 59, 63, 67, 71, 73, 74, 105), while other inventories were part of demand analyses for comparable sites being investigated for possible development (21, 46, 75, 78, 79). Such studies of supply are a necessity to provide a firm foundation upon which additional demand can be assessed. But beyond the value of supply studies to demand analyses, the investment in a comprehensive inventory of facilities, if published and distributed, can be easily justified for three major reasons (24):

1. To provide data to those local groups and associations which have formed to defend their interest in recreational boating—data which are vital to their need to quantify market areas, slip shortages, economic impacts, etc., and data vital to the consideration of the needs of these groups by those in decision-making roles in Salem, Olympia, and Washington, D.C.

2. To provide a base against which similar inventories in the future can be compared to better establish trends in numbers and services within the marina industry. Such understanding of trends is indispensable to such bodies as the Corps of Engineers, the Division of State Lands, the Oregon State Marine Board, and others in any planning efforts that affect the area.

3. To furnish the boater with a complete listing of marina facilities in the area. With the present scarcity of available
slips for rent, this knowledge is perhaps most useful in planning temporary reprovisioning and overnight tie-up stops in journeys up and down the Columbia and Willamette Rivers. The listing of facilities and services contained in the following pages is more complete and covers a greater geographical area than any studies performed to date in the Portland/Vancouver area.

For these reasons alone, the effort to compile such a "baseline" supply inventory can be well justified.

**Inventory of Present Moorages**

The following list includes all moorages within fifty miles of the junction of the Columbia and Willamette Rivers, including the Multnomah Channel. This covers an area slightly beyond Bonneville Dam to the east, to the town of Clatskanie to the west, and up the Willamette River to beyond the town of Wilsonville. This area comprises the counties of Columbia, Multnomah, and Clackamas. The decision to cover such an expanded area was based upon the number of boaters from the Vancouver area that are presently mooring their vessels at the Port of Kalama Marina and the closeness by freeway (one hour) of the Cascade Locks Marine Park, as well as the expected growth of the entire area.

Only listed are those moorages whose primary purpose is to rent wet slips or dock space to boaters. Those who cater exclusively to houseboat space rentals are not included, regardless of the ability of houseboat space renters to tie up small craft alongside. If, however, a moorage that may cater to houseboats also has slips or dock space
available for rental to non-houseboat vessels, such a facility is inventoried. Boat dealers or private riparian land owners who maintain docks for their own use, not available for rental, are not included, whether such land owners hold considerable riparian acreage or are merely part of a condominium complex. Private yacht clubs which maintain separate facilities for their members are listed to reflect a more accurate total of moorage space available in the Portland/Vancouver area, regardless of conditions for the use of such moorage. The full addresses of the sites included in this supply inventory are listed in Appendix I-A. Moorages whose names have been changed in the past few months are also indicated. The questionnaire used in obtaining the following data is shown in Appendix I-B.
<table>
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<tr>
<th>LOCATION</th>
<th>LOT No.</th>
<th>SPACE</th>
<th>WIDTH</th>
<th>DEPTH</th>
<th>TOLL</th>
<th>EQUIPMENT</th>
<th>DRY DOCK</th>
<th>OUTRIG</th>
<th>WATER</th>
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<td>PIONEER MARINA</td>
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<td>COM'L</td>
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<tr>
<td>DANIEL'S DOCK</td>
<td>108.9-OR</td>
<td>COM'L</td>
<td>15</td>
<td>-105</td>
<td>-12</td>
<td>5</td>
<td>1.40(7)</td>
<td>1.40(7)</td>
<td>-</td>
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</tr>
<tr>
<td>DONALDSON MARINA</td>
<td>108.9-OR</td>
<td>COM'L</td>
<td>98</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>1.40(7)</td>
<td>1.40(7)</td>
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<tr>
<td>ROSE CITY YACHT CLUB</td>
<td>109.0-OR</td>
<td>PRIV</td>
<td>83</td>
<td>12</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>BART'S WHARF</td>
<td>109.1-OR</td>
<td>COM'L</td>
<td>15</td>
<td>8</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>PORTAGE MARINA</td>
<td>110.2-OR</td>
<td>COM'L</td>
<td>19</td>
<td>17</td>
<td>-</td>
<td>1</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>LIESEY POINT MAROGE</td>
<td>111.0-OR</td>
<td>COM'L</td>
<td>12</td>
<td>73</td>
<td>16</td>
<td>12</td>
<td>1.15(7)(9)</td>
<td>1.30(7)(9)</td>
<td>N/C</td>
<td>-</td>
</tr>
<tr>
<td>GENTRY'S LANDING</td>
<td>115.4-OR</td>
<td>COM'L</td>
<td>6</td>
<td>-20</td>
<td>-</td>
<td>1.00(6)</td>
<td>1.35(7)(9)</td>
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<tr>
<td>BILL'S MAROGE</td>
<td>117.8-OR</td>
<td>COM'L</td>
<td>-85</td>
<td>35</td>
<td>1</td>
<td>-</td>
<td>1.50(7)</td>
<td>-</td>
<td>-</td>
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<tr>
<td>DUCK'S MAROGE</td>
<td>117.9-OR</td>
<td>COM'L</td>
<td>7</td>
<td>12</td>
<td>23</td>
<td>1</td>
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<td>BIG EDDY MARINA</td>
<td>118.0-OR</td>
<td>COM'L</td>
<td>80</td>
<td>15</td>
<td>1</td>
<td>1</td>
<td>-</td>
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<td>SUNDIAL MAROGE</td>
<td>120.0-OR</td>
<td>COM'L</td>
<td>35</td>
<td>-</td>
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<tr>
<td>PORT OF CAMAS-MASHOUGA</td>
<td>121.0-OR</td>
<td>COM'L</td>
<td>54</td>
<td>207</td>
<td>-</td>
<td>0.50(9)</td>
<td>1.00(7)(9)</td>
<td>2.00</td>
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<td>COVERT'S LANDING</td>
<td>140.2-OR</td>
<td>COM'L</td>
<td>7</td>
<td>-</td>
<td>-</td>
<td>0.90(6)(9)</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
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<tr>
<td>CASCAD LOCKS MARINE PK</td>
<td>158.0-OR</td>
<td>PORT</td>
<td>68</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>1.50(7)</td>
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</table>

**Notes:**
- $15/mo/min
- $1.60 if 35'+
<table>
<thead>
<tr>
<th>MARINA WEST MOORAGE</th>
<th>STANDARD MOORAGE</th>
<th>THE ANCHORAGE</th>
<th>SPORTCRAFT LANDING</th>
<th>OREGON CITY MARINA</th>
<th>BOONE'S FERRY MARINA</th>
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</thead>
<tbody>
<tr>
<td>BAYPORT MARINA</td>
<td>COM'L</td>
<td>-</td>
<td>110</td>
<td>0.90(6)</td>
<td>N/C</td>
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<tr>
<td>COWICHAN MARINA</td>
<td>COM'L</td>
<td>-</td>
<td>0.90(6)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BROWN'S LANDING</td>
<td>COM'L</td>
<td>-</td>
<td>10.00(6)</td>
<td>1.00(7)(9)</td>
<td></td>
</tr>
<tr>
<td>ROCKY POINT MOORAGE</td>
<td>COM'L</td>
<td>-</td>
<td>80</td>
<td>0.50(6)</td>
<td></td>
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<tr>
<td>HAPPY ROCK MOORAGE</td>
<td>COM'L</td>
<td>-</td>
<td>12</td>
<td>0.10(6)</td>
<td></td>
</tr>
<tr>
<td>PARKER MOORAGE</td>
<td>COM'L</td>
<td>-</td>
<td>20</td>
<td>1.50(8)</td>
<td></td>
</tr>
<tr>
<td>BRIDGEVIEW MOORAGE</td>
<td>COM'L</td>
<td>-</td>
<td>60</td>
<td>0.75(6)</td>
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<tr>
<td>LARSON'S MOORAGE</td>
<td>COM'L</td>
<td>-</td>
<td>30</td>
<td>1.40(7)</td>
<td></td>
</tr>
<tr>
<td>HUTCHISON MOORAGE</td>
<td>COM'L</td>
<td>-</td>
<td>300</td>
<td>1.50(6)(9)</td>
<td></td>
</tr>
<tr>
<td>CREUZ'S MOORAGE</td>
<td>COM'L</td>
<td>-</td>
<td>5</td>
<td>1.10(6)</td>
<td></td>
</tr>
<tr>
<td>FRED'S MARINA</td>
<td>COM'L</td>
<td>-</td>
<td>0.75(6)</td>
<td>2.00(9)(9)</td>
<td></td>
</tr>
</tbody>
</table>

(1) Cowitz River
(2) Lewis River
(3) Lake River
(4) No. Portland Harbor
(5) Scappose Bay

(6) Fee per foot of boat per month
(7) Fee per foot of slip per month
(8) Fee per foot of boat or slip per month, whichever greater
(9) Fee approximate—slips priced on individual basis
(10) Ownership by public agency (county, city or port)
(11) No charge for ramp, but fee for parking on adjacent land
(12) Moat
(13) Dry dock
(14) Marine railway
(15) Trailer (ramp)
(16) Seasonal
Discussion of Services

RIVER MILE--All mileage indicated is in statute miles (statute miles X 1.15076 = nautical miles). Columbia River mileage is measured from the mouth of the river; Multnomah Channel mileage is measured from the entrance of this channel to the Columbia; Willamette River mileage is measured from mid-point in the main channel of the Columbia at the point of intersection with the Willamette.

OWNERSHIP--The majority of marinas visited were owned and operated as a "commercial" venture, i.e., a sole proprietorship or partnership operating the business for the purpose of earning a livelihood. "Private" ownership refers to facilities restricted to a select few, usually by membership, and not available to the public, as in the case of all yacht clubs shown. One facility was owned by a city and operated privately, while another was owned by a port district and operated privately. Two additional marinas were owned and operated by port districts.

NUMBER OF OPEN SLIPS--Determined by actual count or on the basis of information supplied by moorage owners/operators, this figure reflects the number of individual, in-the-water, uncovered moorage spaces adjacent to finger walkways on at least one side that are available for rent to boaters. If low water conditions caused shoaling in an area of open slips that precluded their use on a temporary basis only, i.e., an area where maintenance dredging was underway or immediately planned, these slips were included in the figure shown. If the area of these slips had fallen into such
disrepair that they were no longer usable or had suffered shoaling to the point where they are unusable at any water level and for which no dredging was planned, such slips were not counted in the total number of slips available for rent.

NUMBER OF SPACES ALONG DOCK--In lieu of individual separate moorage stalls, many marinas provide uncovered in-the-water space parallel to a dock or docks. The figure reported reflects the number of vessels of the size most common to the marina that could be accomodated if all space in the water parallel to the dock(s) was filled without "rafting out", i.e., securing to another boat which in turn is secured to a dock.

Whether in individual slips or moored parallel to docks, 60% of all wet moorage in the study area is of the open variety.

NUMBER OF COVERED SLIPS--Using the same criteria outlined in NUMBER OF OPEN SLIPS, this category includes those stalls with overhead cover, as well as those slips whose lessees have attached canvas covers to the entrance of their stalls.

While it can be reported here that 40% of all wet moorage in the study area is covered, a full discussion of all moorage space is found in following pages.

NUMBER OF BOATHOUSES--Usually constructed of galvanized metal and owned by the boatowner rather than the marina owner, these structures provide fully enclosed shelter to vessels that can be propelled into them through entrance doors that are then closed behind. These structures require a wider berth than other slips. Of the 607
boathouses existing in the moorages visited, over half were located in private yacht clubs.

**NUMBER OF HOUSEBOATS**—Although some BOATHOUSES also include living areas of lavish proportions, existence of a boatwell determined the primary description. If no provisions are made for enclosure of a vessel within (regardless of moorage facilities immediately adjacent), those floating structures within a marina whose sole purpose is the provision of living accommodations are termed HOUSEBOATS for the purpose of this study. The 348 houseboats counted in this marina survey represent only a fraction of the total houseboats reported to be in the Portland/Vancouver metropolitan area.

**MOORAGE FEE**—That fee charged by the marina to the boatowner for the use of the moorage space. In all moorages sampled, this fee is based on length of vessel or length of slip as footnoted in the data, although charge for moorage space on a square footage basis is becoming a frequent practice in other areas of the country as a larger percentage of slips in marinas are adjusted in size to accommodate beamier newer vessels (23). An "information not available" response is a result either of refusal by the person interviewed to divulge moorage fees, the inability to reach the owner/operator of the facility, or the fact that fees are arbitrarily determined on an individual basis so randomly that averaging of all fees in the marina would be more misleading than informative.

An example of moorage fees that are reported even though they are average fees is as follows:
<table>
<thead>
<tr>
<th>Slip length</th>
<th>Fixed fee/month</th>
<th>Cost per foot per month (computed)</th>
</tr>
</thead>
<tbody>
<tr>
<td>18'</td>
<td>$24.00</td>
<td>$1.33</td>
</tr>
<tr>
<td>22'</td>
<td>29.00</td>
<td>1.31</td>
</tr>
<tr>
<td>24'</td>
<td>31.00</td>
<td>1.29</td>
</tr>
<tr>
<td>28'</td>
<td>38.00</td>
<td>1.35</td>
</tr>
<tr>
<td>35'</td>
<td>46.00</td>
<td>1.31</td>
</tr>
<tr>
<td>40'</td>
<td>52.00</td>
<td>1.30</td>
</tr>
</tbody>
</table>

In spite of the fact that these slips are priced on an individual basis, the computed fee per foot of slip per month so closely approximates $1.30 that this is the figure reported and appropriately footnoted.

Moorage fees reported in this study are discussed separately in pages that follow.

OVERNIGHT FACILITIES AND FEES—Whether or not a marina actually solicits boaters in need of overnight tie-up facilities, and regardless of availability of such facilities because of 100% occupancy of dock space by permanent moorage renters, if provisions do exist for this service, it is so listed. These facilities, offered by 24 marinas most often at greater distances from the Portland/Vancouver metropolitan area, can provide tremendous assistance to the boater in need of a "harbor of refuge" from unexpected winds or weather while on journeys far from the boater's home dock in addition to providing a secure moorage in an area with novel facilities on shore. (See following section on "harbors of refuge" and temporary tie-up facilities.) Minimum fees are listed for this temporary moorage, although in several cases, greater fees are assessed for larger vessels.
WATER AVAILABLE—This service is listed if a boater has access to fresh water at the dock. Water was found to be available at over 75% of all public moorages surveyed.

ELECTRICITY AVAILABLE—While no charges were found for water, costs for electricity provided by the marina owner are most often passed on by a fee that is either fixed or determined by usage and billed to the slip renter accordingly. Many boat owners deal directly with the appropriate power company through the installation of separate meters, while some marina operators merely allow a limited amount of electricity use (e.g., one 50-watt bulb to help preserve dryness) without charge. If electricity is available at all to the dock area, it is shown as such without additional comment. Such is the case in 72% of the moorages surveyed.

RESTROOMS—Sanitary facilities that are available to management only are not listed. Non-public facilities for moorage lessees are included, however, whether flush-type or pit-type. Few marinas restrict the public from the usage of such facilities. Approximately 60% of all moorages in the area provide restrooms of some type.

SHOWERS—Only one marina, the Port of Cascade Locks, was found to offer showers to boaters, making available two shower stalls for men and four for women on a 24-hour basis without charge.

EQUIPMENT LOCKERS—Storage for tools, equipment and supplies used by boaters is shown in this listing whether located in the dock area or on land within the moorage complex, and whether or not a charge exists for its use (often $1.00/month). Eight moorages offer this
service at present. Several new sailboat-oriented marinas offer equipment lockers to every slip renter without additional charge.

**HOLDING TANK PUMP-OUT FACILITIES AND FEES**—Recent EPA and Coast Guard regulations have dictated the need for approved marine sanitation devices (MSD's) on all vessels built after January 30, 1977, and by January 30, 1980, on all existing vessels as well. Boaters on the waters of the Columbia and Willamette Rivers have the option of treating sewage chemically and/or physically and then discharging overboard (Types I and II), or retaining sewage onboard for later pumping-out into shore-based facilities (Type III). The lowest cost for the boater is the installation of a holding tank onboard the vessel. Many areas of the country, however, are experiencing severe problems with the lack of shore-based stations able to pump out vessels so equipped. Although this may be a problem in some local areas as more and more holding tanks appear in new and existing vessels, in general, it appears that it will be only a minor problem in the study area. Two pump-out stations were found in this survey—one "self-serve" coin-operated system and one manually operated by dock personnel. Four more stations are planned for the immediate future, while two more marina operators interviewed indicated that installation of such facilities was a possibility (not indicated on inventory sheets).

It is estimated that as high as 90% of all boaters in the study area are not equipped with marine heads at all and utilize the "Porti-potti" type of portable head (106), which, theoretically at
least, qualifies as a Type III "no-discharge" type. This figure compares with a nationwide USCG survey on this subject which shows a full 95% of the 8.3 million recreational boats in the United States employing either a portable unit or nothing at all (99). Although in all probability the contents of many of these "honey-bucket-MSD's" in use in the area of this study are merely emptied into the river when out of sight of onlookers, what is important is that the users of these units are not expected to be affected by the 1980 date that will affect boaters who presently have a "flow-through" marine head.

Of the remaining 10% of boaters in the area who do have marine heads, no data exist as to the type and number of MSD's in use. Considering the fact that only about a dozen boaters in a summer weekend use the holding tank pump-out station currently available in the Portland area (106), and that many new boats will still utilize the portable units, and that new pump-out facilities will be available prior to the January 30, 1980, date, it is probable that no major crisis will exist in this particular area.

The $0.25 self-serve unit listed in the study is considered a service to boaters by its operator while the unit in the middle of the Portland/Vancouver metropolitan area that is operated by dock personnel for $2.50, utilizing a sewer system owned by the corporation of which the marina is a part, is considered actually a revenue-producer.
LAUNCH RAMP AND FEES—Approximately 70 launch ramps are reported to exist within the geographical area of this study (11, 18, 22, 27, 58, 59, 63, 67, 73). This figure includes the 30 ramps that are listed within, or immediately adjacent to, the moorages surveyed. Ramps are conspicuously absent from marinas in the Portland/Vancouver metropolitan area, presumably because high land values in the area demand investment in shoreline facilities that provide a greater return than launch ramps, which are often supplied by local governments at no cost to the public. As it is, 15 of the 30 ramps existing in conjunction with the moorages surveyed are owned by a public body (county, city, or port district). Those moorage operators located adjacent to a publicly owned ramp frequently charge for parking of boat trailers on their land. Since it is possible for a trailerboater to launch without utilizing these parking facilities, such parking fees are not listed as an actual LAUNCH RAMP FEE.

BOAT RENTALS—Only five marinas presently rent boats and motors. Other operators have engaged in rentals in the past but have ceased primarily for insurance reasons and the lack of revenue for the amount of labor required.

DRY BOAT STORAGE—With this study’s emphasis on the larger, non-trailerable boat, dry boat storage facilities were noted only in passing—twelve facilities in the area offer such storage, covered or open, at their moorage or on land immediately adjacent. With the growth of recreational boating in the area, and lack of facilities under
construction to keep pace with this expansion, dry storage facilities may become an increasingly important solution to the problem in the future. There is obviously a market for the trailerboater who chooses to rent dry storage space for his boat for varying lengths of time away from the water. But of primary issue in this study are the needs of the boater who prefers not to store his vessel in this fashion.

FUEL SALES--Over half of all moorages surveyed offer gasoline for sale, a practice that many operators feel is more common than necessary in the area. Although fewer gas pumps would probably serve the needs of area boaters equally well, moorage operators who do operate fuel pumps regard such sales as a major producer of revenue. Diesel fuel is sold by only three marinas, while outboard motor pre-mixed fuel is offered at ten fuel docks.

BOAT SALES--Several moorages, especially in urban areas, rely on the sale of new boats for a major source of income, operating the moorage itself as an ancillary service. Still others reserve the whole of their moorage solely for the ability to offer moorage space to purchasers of their craft. The latter moorages are not included in the listing of facilities because of this exclusionary although legitimate practice.

ENGINE SALES AND REPAIRS--This category refers almost exclusively to the sale and repair of outboard units. Only one of the 14 moorages that sell outboard motors fails to also repair them, although this one does plan to provide this service in the near future. Seventeen
moorages engage in outboard engine repair. In smaller marinas, repair is often performed by the owner-operator and/or family. Larger marinas are able to support an outside labor force.

HULL REPAIR--Six out of the seven moorages engaging in hull repair also offer haul-out service of various types on site or immediately adjacent. The seventh deals solely in small trailerable vessels.

HAUL-OUT FACILITIES--Facilities to remove boats from the water are available at 13 sites in the area. Several such haul-out facilities in or adjacent to marinas are operated on a concession arrangement with the marina owner. One dry dock is located within a private yacht club. The capacities listed for haul-out facilities that utilize launch ramps were determined by the largest vessel that the marina operator had ever hauled out.

PARTS, ACCESSORIES, OIL, ETC.--Ranging from full chandleries to sales restricted to outboard oil and dockline, this service tends to be offered by moorages away from the Portland/Vancouver metropolitan area more frequently than "home base" moorages, where boaters originate their journeys and presumably purchase their supplies from "discount houses" and large boat supply stores near their home. Seventeen of all the marinas surveyed offer some degree of parts and accessories sales.

FISHING GEAR AND BAIT--Of the 14 marinas that offer fishing gear for sale, two carry such supplies only during fishing seasons; 13 marinas carry bait, although three offer bait only on a seasonal basis.
ICE--Ten facilities were found to offer ice for sale. Again, they are primarily those marinas out of the Portland/Vancouver area.

GROCERIES, SNACKS, BEVERAGES--As expected, much variation was found in the range of these sundry items offered in marinas that, once again, tended to be farther away from the urban area. Some offered no more than a soft drink machine, while others stocked a convenience store of hundreds of items.

RESTAURANT/COFFEE SHOP--Three marinas offer small coffee shops as part of their services, while two additional moorages feature excellent restaurants that cater to skippers who can reach the restaurant by river and dine in view of their boats.

HOTEL/MOTEL, CAMPING--Three facilities offer nearby overnight motel accommodations for the boater. The six moorages shown as offering camping do so only as an adjunct to the moorage itself--such facilities are geared entirely to the land-based traveler.

Distribution of Moorage by Size and Slip Fees--Comparison of Data with Other Studies

As mentioned earlier, no previous study exists that can be used exactly for comparison of this baseline data. Data that do exist are usually given merely in total berths available within the Council of Government, State Administrative District, Standard Metropolitan Statistical Area, or other geographical district of
interest to the compiling body, impossible to separate into the
three counties covered in this study; or data were compiled only on
the basis of representative sampling of facilities that were similar
to the particular development site under consideration in the studies.
In this latter group of studies, two recent surveys can be used as
partial aids to compare some results of this work—the Kalama Marina
Feasibility Study (75), and the Vancouver Marina Study (79). All
facilities listed on the following pages refer to in-the-water moorage
although the Vancouver study did survey dry storage as well (not
included on table).
<table>
<thead>
<tr>
<th></th>
<th>Present Study</th>
<th>Kalama Study</th>
<th>Vancouver Study</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Marinas Surveyed:</td>
<td>58</td>
<td>Not shown</td>
<td>18</td>
</tr>
<tr>
<td>Total Berths Inventoried:</td>
<td>5440</td>
<td>2004</td>
<td>1722</td>
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Covered Berths Inventoried:

<table>
<thead>
<tr>
<th>Size Distribution (Covered):</th>
<th>Present Study</th>
<th>Kalama Study</th>
<th>Vancouver Study</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than 20'</td>
<td>20%</td>
<td>12%</td>
<td></td>
</tr>
<tr>
<td>20' to 25'</td>
<td>26</td>
<td>21</td>
<td>approx. 31% (to 24')</td>
</tr>
<tr>
<td>25' to 30'</td>
<td>36</td>
<td>48</td>
<td>approx. 30 (24'-28')</td>
</tr>
<tr>
<td>30' to 35'</td>
<td>10</td>
<td>14</td>
<td>approx. 26 (29'-32')</td>
</tr>
<tr>
<td>35' to 40'</td>
<td>5</td>
<td>3</td>
<td>approx. 9 (33'-39')</td>
</tr>
<tr>
<td>More than 40'</td>
<td>3</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
</tr>
</tbody>
</table>

Approximate Average Slip Fees (Covered):

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<th>Present Study</th>
<th>Kalama Study</th>
<th>Vancouver Study</th>
</tr>
</thead>
<tbody>
<tr>
<td>$1.21/ft/mo</td>
<td>$1.18/ft/mo</td>
<td>$1.00/ft/mo</td>
</tr>
<tr>
<td>Size Distribution (Open)</td>
<td>Present Study</td>
<td>Kalama Study</td>
</tr>
<tr>
<td>--------------------------</td>
<td>---------------</td>
<td>--------------</td>
</tr>
<tr>
<td>Less than 20'</td>
<td>48%</td>
<td>57%</td>
</tr>
<tr>
<td>20' to 25'</td>
<td>22</td>
<td>36</td>
</tr>
<tr>
<td>25' to 30'</td>
<td>16</td>
<td>4</td>
</tr>
<tr>
<td>30' to 35'</td>
<td>7</td>
<td>2</td>
</tr>
<tr>
<td>35' to 40'</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>More than 40'</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>100%</td>
<td>100%</td>
</tr>
</tbody>
</table>

Approximate Average Slip Fees (Open): $0.87/ft/mo • $0.99/ft/mo
Metropolitan Area Only (See text): $0.89/ft/mo
Columbia River Metropolitan Area Only: $1.26/ft/mo
"Metropolitan area" refers to the Columbia River from Mile 90 to Mile 125, the Multnomah Channel within 12 miles of its junction with the Willamette, and the Willamette River only as far as Mile 20. This distinction is drawn to illustrate the direct relationship between open slip fees and proximity to the Portland/Vancouver metropolitan area. This results primarily from the recent development of many high-quality open slips designed for sailboats for which moorage owners are charging $1.50/ft/mo, raising the average rental fee for all open slips in the metropolitan area. Such relationship is not evident in the case of covered facilities, where no new development has taken place for several years.

Also of interest is the inverse relationship between the size of vessel moored and distance from the metropolitan area—the length of boat moored decreases with the greater distance from the urban area. This will most likely change in the future as these "small boat moorages" become enveloped in the spread of urban pressure—the growing scarcity of moorage for larger boats whose owners are willing and capable of spending greater amounts on moorage than the owners of smaller vessels (perhaps driving these smaller boats up onto trailers or into dry storage) as well as the general trend towards large-boat use farther and farther away from the busy waters of the urban area. At the present, however, it can be assumed that, among other reasons for this inverse relationship, larger boats are capable of cruising under their own power from the metropolitan area to the recreation areas while owners of smaller boats find it preferable to drive their cars to their vessels which are moored.
closer to these recreation spots in order to avoid all-day, slow-speed boating prior to reaching these fishing/cruising/water-skiing areas.

Since moorage space parallel to open docks can be, and often is, utilized by vessels of extremely varied lengths, parallel dock space is not included in this breakdown of size distribution in open facilities, although listed earlier in the summary of open moorages available in the area. If this parallel dock space was included in the Kalama study, this would explain the discrepancy in percentage distribution of open moorage between the two studies.

Insufficient data exist in these studies to compare current slip fees with those charged in earlier years. In the course of conducting the interviews for this study, it was learned that some moorage owners in the Portland area have been raising moorage fees by approximately 25% per year while many other owners have not raised their fees for many years and do not intend to do so. In any event, slip fees in the area fall far short of the average fees charged in the Seattle metropolitan area—the $1.56 fee per foot per month for open moorage and especially the $2.23 average fee charged for covered moorage (89). Casual inquiries as to why rates are not higher resulted in the following answer in the majority of cases: "Boaters in this area are too used to low fees—they wouldn't stand for much higher fees!" As to queries on the similarity of open and covered slip fees, a frequent response was, "Sailboaters are willing to pay as much for open slips as covered slips now
"Regardless of the curious lack of sound business reasoning in the first answer, the latter response may explain why so many of the most recently constructed slips in the area have been of the open variety:

- Jantzen Beach Moorage Annex: 148 open slips
- Sundance Moorage: 133 open slips
- Harbor 1 Moorage: 50 open slips

The fact that some boaters are apparently willing to pay as much for open moorage as covered is undoubtedly the reason why so many of the plans in existence for new moorage are also for open slips.

### Plans for Construction of New Facilities

The following are firm plans in existence that deal with in-the-water moorage for recreational vessels:

<table>
<thead>
<tr>
<th>River mile</th>
<th>Facility</th>
<th>Planned moorage</th>
<th>Date of construction</th>
</tr>
</thead>
<tbody>
<tr>
<td>14.0 (Mult. Chnl.)</td>
<td>Big Oak Marina</td>
<td>70 covered</td>
<td>1977</td>
</tr>
<tr>
<td>15.2 (Mult. Chnl.)</td>
<td>Happy Rock</td>
<td>uncertain</td>
<td>1977</td>
</tr>
<tr>
<td>107.1 (Col.-OR)</td>
<td>Jantzen Beach Moorage Annex</td>
<td>148 open (in addition to 148 opened in 1977)</td>
<td>1978</td>
</tr>
<tr>
<td>107.5 (Col.-OR)</td>
<td>Columbia Way West Moorage</td>
<td>24 open</td>
<td>1978</td>
</tr>
<tr>
<td>River mile</td>
<td>Facility</td>
<td>Planned moorage</td>
<td>Date of construction</td>
</tr>
<tr>
<td>-------------------</td>
<td>-------------------------</td>
<td>----------------</td>
<td>----------------------</td>
</tr>
<tr>
<td>107.5 (Col.- OR)</td>
<td>McCuddy's</td>
<td>200 open</td>
<td>1978</td>
</tr>
<tr>
<td></td>
<td>Tomahawk Island</td>
<td></td>
<td></td>
</tr>
<tr>
<td>115.0 (Col.- WA)</td>
<td>Steamboat Park</td>
<td>104 covered</td>
<td>uncertain</td>
</tr>
<tr>
<td></td>
<td></td>
<td>7 open</td>
<td></td>
</tr>
<tr>
<td>25.5 (Willamette)</td>
<td>Sportcraft Landing Addn.</td>
<td>30 covered</td>
<td>1977</td>
</tr>
<tr>
<td>38.8 (Willamette)</td>
<td>Boone's Ferry Addn.</td>
<td>50 open</td>
<td>1978</td>
</tr>
</tbody>
</table>

There are also plans, much less definite, for development of Ross Island by the City of Portland for use solely as an area of non-motorized boating (76); and some moorage facilities will probably be included in the City's "Waterfront Park" south of the Hawthorne Bridge (20).

The tendency toward construction of open moorage can also be attributed to the growth in popularity of sailboating. Whether this growth is due to the desire to engage in more "natural" forms of recreation (wind power vs. gasoline power), a response to the current energy crisis, the increase in local dealer promotion, the current rise in popularity of sailing to "far-away places" (in full-keel cruisers or in armchairs), or perhaps a combination of these factors, the growth was already noted in 1973 in the Vancouver Marina Facilities Survey: "Inputs indicate that more sailboats have been sold this year than any previous year. There is a high demand for open slips for sailboats, but the demand has not yet been measured."
By all indications in 1977, this growth in the popularity of sailing has not yet reached its peak.

**Demand for Additional Permanent Moorage Facilities**

In September 1977, the City and Port of Seattle-sponsored "Seacrest Marina Programmatic Feasibility Study" was completed and published. Four factors were listed as reliable indicators of demand for additional moorage facilities: waitlists for moorage space; occupancy rates at present moorages; the perspective of all segments of the boating industry; and the projected increase in large-boat ownership.

The issue of waitlists was dealt with in one section of the questionnaire used in obtaining supply data for this study (see Appendix B). If all interviewees would have been able to supply a definite number of names of people from whom they had accepted a sizeable deposit, the assessment of demand for additional moorage space would be a simple task. As it is, duplication of names, failure of those whose names are listed to notify the moorage operator if and when space is found elsewhere, and most importantly, the lack of turnover in slip tenants all result in waitlists not being kept to any extent. Nearly all marina operators interviewed stated that if a moorage opening did occur, they would be able to fill it quickly with the small list of "definites" whose names they did retain, or by merely waiting for the next telephone inquiry out of the average of two dozen calls a week that many reported receiving.
As for the occupancy factor, with the exception of those marinas that have recently added new open slips and a handful of small rural moorages that cater to seasonal fluctuations of boats, all facilities visited indicated occupancy of 100%. Many are even able to screen moorage applicants for possible conflicts of personality!

At the outset of this study, it was expected that the perspective of the boating industry would be split—present moorage owners as vehemently opposed to the suggestion of additional moorage facilities as new boat dealers would be vehemently in favor of same. Such was not the case. The entire boating community is in agreement that although the growth of open slips may, temporarily at least, be keeping pace with the popularity of sailboats in the area, supply of covered slips to meet the equally fast-growing rate of larger (35'+) powerboat ownership simply does not exist. In addition, those occupied slips which do exist were constructed prior to the latest generation of vessels which often possess a high "flying bridge," creating a demand, when such accessories as radar are installed, for slips to house them that are at least 15-1/2--16-1/2 feet from the water surface. For whatever reason, the rate of purchase of these large, tall boats has grown beyond what any dealer would have thought possible even a year ago. The position of the industry operating under this handicap of moorage shortage was well stated in a Texas Sea Grant study in 1975:

Without dockage, the whole marine industry suffers, for this is a base upon which all producers of boats, tackle,
equipment, bait and other ancillary marine products are at least partially dependent. Hence restriction of further marine development is likely to make itself felt at least partially throughout the marine recreation industries. (23)

The fourth component of moorage demand, the expected growth in the number of boats in the area, is in turn dependent on projections of population growth and ownership per capita of this population.
The Pacific Northwest River Basins Commission states that population is "... the main determinant of any outdoor recreation demand—the full impact of the other primary variables is dependent on the level of present and projected populations. The urbanization in the (Willamette) basin is expected to continue, thereby compounding the demand in and near the cities." (74) Examining this factor, population growth for the area of study can be projected to the year 1990 as follows (100, 101):

<table>
<thead>
<tr>
<th>County</th>
<th>1970</th>
<th>1980</th>
<th>1990</th>
</tr>
</thead>
<tbody>
<tr>
<td>Multnomah</td>
<td>554,668</td>
<td>568,300</td>
<td>592,400</td>
</tr>
<tr>
<td>Clackamas</td>
<td>166,088</td>
<td>230,700</td>
<td>291,000</td>
</tr>
<tr>
<td>Washington</td>
<td>157,920</td>
<td>223,700</td>
<td>288,800</td>
</tr>
<tr>
<td>Columbia</td>
<td>28,790</td>
<td>35,350</td>
<td>41,700</td>
</tr>
<tr>
<td>Clark (WA)</td>
<td>128,454</td>
<td>168,500</td>
<td>208,600</td>
</tr>
<tr>
<td><strong>Totals</strong></td>
<td><strong>1,035,920</strong></td>
<td><strong>1,226,550</strong></td>
<td><strong>1,422,500</strong></td>
</tr>
<tr>
<td><strong>Growth over 1970</strong></td>
<td><strong>+190,630</strong></td>
<td><strong>+386,580</strong></td>
<td></td>
</tr>
</tbody>
</table>

If pleasure boat registration in Oregon (Clark County figures were requested from U.S. Coast Guard Headquarters but unfortunately not received) remains at 48.3 boats per thousand population (68)—and it is rising—approximately 9200 boats will have been added to
the area between 1970 and 1980, and another 9500 by the year 1990. If 80% is subtracted from these figures for the approximate number of trailerboats which would not be expected to need permanent wet moorage, approximately 3700 large boats remain that will have been added to the area's marinas since 1970 or will need to find wet moorage by 1990.

Additional Components of Moorage Demand

Statisticians would build in per capita income growth factors (undoubtedly predicting larger boats still), leisure time considerations, and all the other factors that bear on the problem of determining the need for additional moorage facilities, not the least of which would be the deteriorating condition of many moorages in the area. Just as important is what has been termed the "Substitution Factor"—no one knows how many people may want to buy, say, a 35' powerboat but perceive that they would probably be unable to find covered moorage for it, so they purchase a comparably-priced motor home instead (82). Nor has the growth in pleasure boats registered per thousand population in the area been discussed in any depth. "Such a marked increase in pleasure boat registration relative to population increase poses a challenge to the public agencies serving the boating population of the State," remarked OSU's Department of Geography in 1976 (68).

Considering all these components of moorage demand, the question, "Can demand for additional moorage be expected to increase at the
present rate?" can only be answered, "There is no reason to suspect it will not."

The Future--What Paths Lie Ahead?

Where can the boating industry look for solutions to this evolving problem of moorage scarcity? More specifically, with so few covered slips planned in the Portland/Vancouver area to meet the explosion in larger powerboat ownership, what is the prognosis for the need for additional covered moorage?

Three scenarios can be painted to address this question: additional covered slips will have to be built by the private sector; additional covered slips will have to be built by the public sector; and no additional covered moorage can be expected to be built.

Construction of Moorage by Private Industry

The possibility of additional construction of covered slips by private industry is, of course, a question of economics. No private businessman can be expected to invest funds in covered moorage that will return no more than what can be expected from a much smaller investment in open slips. It was noted earlier in this report that very little difference exists in fees paid for covered slips and those paid for open slips, while the Seattle-area renter of a covered slip can expect to pay well over 40% more for the extra protection from the elements. Considering the small percentage of cost that boat moorage contributes to the total investment of boat
ownership, the low rates charged for moorage of any type in the area is puzzling. It is safe to say that the low rates charged for covered slips in the Portland/Vancouver area is the prime reason behind the current scarcity. Until this disparity is eliminated, little hope exists for increased construction of covered moorage with private funds, with or without revenue-producing shore-based ancillary facilities (restaurants, motels, chandleries, etc.).

Public Development of Moorage

The second possibility in the search for more covered slips, as well as the inevitable future shortages of open moorage, lies with the public sector—in this area, the Port and/or City of Portland and/or Vancouver. It has been said, probably correctly, that "The City of Portland, Oregon, is possibly the only large city in the country with major waterways not having a major marine and recreation center." (87) More will be said in the following section on "Harbors of Refuge" of the "responsibilities" of the public sector in the provision of recreational opportunities; but with the dismal projection for privately-financed additional covered moorage, marina development by public agencies, with their revenue-bonding capabilities and present ownership of prime riparian land, can be seen as a very real solution to the problem.

No serious studies exist by Multnomah or Clark Counties, the City of Portland, or the Port of Vancouver on the possibilities of marina development. A 1968 study done for the Port of Portland,
however, did propose the development of a large marina basin by the Port,

...an opportunity to create revenue property for the Port of Portland, to allow for marina expansion, to provide marina support facilities in a controlled area, to provide moorage protection and safety, to utilize water area which already exists in the South Channel, and to provide for future marina moorage and support commercial facilities. (78)

This marina was proposed to allow for the intended northern expansion of Portland International Airport and for the need to relocate the watercraft in the area that would have been displaced as a result.

The study justified the development of a marina as follows:

In addition to river navigation, the (Columbia) river is an important source of economic benefit from fishing, recreation and its tangent activities in the marina basin complex. Recreation and tourism combine in the Northwest to provide a firm and predictable source of income. As urban growth dominates the Columbia River basin at Portland-Vancouver, there must be developed more recreation and sight-seeing points of interest... Since marinas are presently in use along the Columbia, it may be assumed that this use is dominant and its recreational value has been recognized, with allowances made for future population growth. (78)

The fact that this proposed marina was stillborn can probably be attributed more to objections over the airport expansion scheme of which it was a part than to the proposed marina itself (3).

More recently, the City of Vancouver Parks and Recreation Department initiated a marina study in 1973, with an eye toward the development of their Vancouver Marine Park in the east end of the city of Vancouver. The study stated that even in 1973, "...there are probably several hundred applicants from both the Washington side and the Oregon side (of the Columbia) waiting for covered slips...", and recommended the construction of a 500+ slip complex. This plan
also never became reality (79).

The question of marina location north of the Columbia vs. south of the Columbia could provide sufficient subject matter for a study of its own. On one hand, much objection can be heard from Oregon boaters (where the majority of area boaters reside) who would protest the time needed to cross the I-5 bridge, especially congested at the same time that mid-week afternoon races are in preparation (although the new I-205 bridge may alleviate this congestion to some degree) and the Washington State personal property tax that does not apply in Oregon. On the other hand, Mr. Kip Steele of First Priority Corporation, sub-contractor of the aforementioned "Seacrest Marina Programmatic Feasibility Study" states that "The western part of the United States is a very mobile society. We don't mind driving to a marina that will supply us something." (89)

Regardless of exact location, the public bodies mentioned in the area may indeed be forsaking an excellent source of revenue. Captain W. H. Buxton, Superintendent of the Port of Seattle's 1500-open-slip Shilshole Bay Marina until very recently, stated that Shilshole showed a profit in 1976 with revenue of over a million dollars (12). The most recent month for which figures are available, July 1977, produced a profit of $50,000 before administrative overhead and depreciation (44). This kind of profitability resulted in the decision of the Port and City of Seattle to participate in the Seacrest Study mentioned which recommended a 425 to 915-boat facility to be located in West Seattle at a cost of from 9.5 to 13 million
dollars. This proposed facility would also feature all open slips in accordance with Seattle's Shoreline Master Program.

It may well be that there exists a basic difference in emphasis on marine recreation within the management of the Port and City of Seattle on one hand and that of the Ports and Cities of Portland and Vancouver on the other. But purely as a source of substantial revenue, marina development by these local bodies should certainly be investigated.

In lieu of marina development and operation by local port districts, cities or counties, a practical compromise would be the development of a marina by a city or port district which would then be leased back to a private firm for operation, a firm which could have been involved in the development process from the start. As one study puts it, "This brings private enterprise motivation and managerial expertise together with public sector low interest capital charges. The lease should be fixed at a level which enables the public agency to repay the debt charges incurred." (23) This arrangement is also a perfect response to the concern of private operators who begrudge the ability of a public body to operate without the need to show a large profit from marina operation as well as their exemption from the payment of property taxes. These advantages were in fact used by the management of Shilshole Bay Marina in the 1960's to keep rates far below market to aid in the filling of their initial over-supply of slips. For this reason, all discussions of marina development by public bodies now include reference to the gradual construc-
tion of slips as the market dictates their need.

The Possibility of No Additional Moorage Development

The third scenario in the discussion of the need for additional covered moorage, simply stated, is that no additional slips will be constructed. Undoubtedly the least palatable to those within the industry—boat and accessory dealers, providers of marine services and boat purchasers themselves—the possibility exists that one or more of the following factors will prevent the growth of new covered facilities: if slip fees for covered moorage in the Portland/Vancouver area remain at the present level or increase at a rate less than what is necessary to encourage private investment; if public agencies in the area continue to ignore the income-producing potential of recreational boating in favor of retaining a narrower-based dependence on non-recreational (and slower-growing) interests; or if the Oregon Division of State Lands, now in the process of developing a waterway structures building code, chooses to restrict the development of the aesthetically less-pleasing covered slips within the Portland metropolitan area as has Washington's Division of Marine Land Management. Should any of these or other unforeseen factors cause this third scenario to become reality, other answers to the question of covered moorage will have to be found.

On the East Coast, which has been living with this "moorage crunch" for years and where protection from the elements is similarly valued by boaters, covered moorages are rarely seen. Instead, the
vast majority of boats are stored on dry land on cradles, covered with tarps, for the duration of the winter. Outside storage appears to be favored by owners of wood boats because of the tendency of the moist air to retard the shrinking of planks, while storage in large indoor sheds is better suited to rust-prone metal vessels and fiberglass boats whose gel coat finishes are susceptible to fading. "Refitting" takes place in the spring prior to launching back into open wet slips for the boating season. A winter "dry land marina" for large boats, complete with travel-lift, storage yard and shed, perhaps combined with repair facilities, would at least be worthy of an in-depth examination as an alternative to wet covered moorage.

With weather conditions in this area admittedly less severe than those on the northern Atlantic Coast of the U.S., the combination of a wet open slip and a secure, custom-made boat cover may provide another alternative to some boaters.

There are undoubtedly other options available to the large-boat owner as alternatives to wet moorage, compromise solutions at best to the problem, but worthy of serious investigation. What is important to realize is that this third scenario--the chance of no new development of covered moorages in the urban area--is a distinct possibility.

Resolving the Stalemate

The question of covered moorage is not being answered or even addressed at present. All sides in the question are "doing business
as usual"—in their own direction with little, if any, effort to answer this question. None of the three scenarios mentioned above has a chance of evolving under the conditions at present.

In August of 1973, the "Lower Willamette River Management Plan" was published (88). This "policy and management guidelines" manual was developed by the "Lower Willamette River Study Team" which was composed of professionals representing all proprietary interests within the area at that time: Port of Portland, State Water Resources Board, Department of Environmental Quality, Willamette River Parks System Committee, Army Corps of Engineers, City of Portland, Division of State Lands, Department of Transportation, State Game Commission and the Fish Commission of Oregon. It has been stated that "...The Plan is of major significance in the state's waterway resource planning efforts..."(64) and is in fact still in use as a comprehensive guideline to the development of this section of the Willamette River. Taking only eight months from initial assembly of participants to final draft, its greatest attribute is that all parties with vested interests in the area had the opportunity to contribute their positions on where, when, what type, and how much development should take place in the area. Once decisions such as these were made and published, mapped-out and agreed upon by all, continual strife over case-by-case development was eliminated.

The need is not for more studies to continually re-emphasize the need for additional moorage facilities. The need is not even
for studies that concentrate on the planning of all water-related recreational development. What is needed are cartographic guidelines to the development of the entire urban area covered by this present study, a la the impressive "Lower Willamette River Management Plan", addressing all phases of water-dependent and water-connected activities in the Portland/Vancouver area, an area whose mood is dominated by water, with, once again, input from all parties, public and private, from both the states of Washington and Oregon, individual and group, who have any interest at all in this area. The need is to, as this above plan states, "... initiate a similar study and plan for adjacent water areas--Multnomah Channel, Columbia River, Willamette River upstream, etc... ", which should include the same color-coded maps of allowable uses for this entire area, agreed-upon, once again, by all interested elements. These same, usually conflicting interests, if moving at all, are on collision courses--courses whose destination is the same limited resource. The result of such an effort would be the orderly development of all activities that depend upon or are connected with the Columbia and Willamette Rivers: transportation, manufacturing, sand and gravel extraction, public access... and moorage facilities.

Nor should there be any fear that the obvious need for additional wet moorage facilities would go unrecognized in such a process. More and more planning groups of all types are finally tending to agree with the following statement made at the recent National Conference on Marine Recreation:
This could be a crucial time for boating. Already boating is being viewed with disfavor in some parts--as non-essential, as a befouling sport, as a rich man's plaything. And there may be some small justification for such feelings. But if we are to operate here on the premise that recreation, in its myriad forms, is an essential part of life, providing the regenerative periods necessary to cope with contemporary life-pressures, then we must consider boating (which includes fishing, sailing, water skiing, camping, picnicking, diving, racing) an essential part of the management plan of our aquatic resources. In the overall framework of marine recreation, the boat is more often than not the means to the end rather than the end in itself. Thus, provision must be made for boating facilities. (2)
APPENDICES

SECTION I
APPENDIX I-A

List of Marinas within Study Area

The Anchorage Restaurant & Marina
Foot of SE Marion
Portland, OR 97202
503 234-9648

Associated Yacht Brokers
1441 N Marine Drive
Portland, OR 97217
503 285-0266

Bart's Wharf
3839 NE Marine Drive
Portland, OR 97211
503 288-6161

Bayport Marina
Rt. 3, Box 3884
Warren, OR 97053
503 397-1656

Beebe's Point Moorage
Box 65
Woodland, WA 98674
206 225-4827

Big Eddy Marina
19609 NE Marine Drive
Portland, OR 97230
503 666-3515

Big Oak Marina
P.O.Box 176
Scappoose, OR 97056
503 543-7456

Bill's Moorage
18525 NE Marine Drive
Portland, OR 97230
503 665-3705
Bisonett Marina
577 NE Bridgeton Road
Portland, OR 97211
503 285-1373

Boones Ferry Marina (nee Wright's Wilsonville Marina)
Rt. 2, Box 545
Aurora, OR 97202
503 678-5433

Bridgeview Moorage
Rt. 1, Box 540
Portland, OR 97231
503 286-3789

Brown's Landing
Dike Road
Scappoose, OR 97056
503 543-6526

Cliff's Marina
3333 NE Marine Drive
Portland, OR 97211
503 281-7581

Columbia Corinthian Marina
3335 NE Marine Drive
Portland, OR 97211
503 288-3988

Coon Island Moorage
Box 477
Scappoose, OR 97056
503 543-2655

Covert's Landing
Star Rt., Box 40
Bonneville, OR 97008
503 374-8577

Daniel's Dock
3417 NE Marine Drive
Portland, OR 97211
503 284-8521
Donaldson Marina
3501 NE Marine Drive
Portland, OR 97211
503 288-6169

Duck's Moorage
18601 NE Marine Drive
Portland, OR 97230
503 666-2686

Felida Moorage
4911 NW 122nd Street
Vancouver, WA 98665
206 693-9830

Fred's Moorage
Rt. 1, Box 12
Portland, OR 97231
503 286-5537

Gentry's Landing
17317 SE Evergreen Highway
Camas, WA 98607
206 892-8442

Goble RV Park & Moorage (nee Snap's Landing)
Box 44
Goble, OR 97048

Greg's Moorage
Rt. 1, Box 14
Portland, OR 97231
503 286-9901

Happy Rock Moorage
South Columbia River Highway
Scappoose, OR 97056
503 543-7464

Harbor 1 Moorage
3307 NE Marine Drive
Portland, OR 97211
503 285-0266
Hutchison Moorage (nee Hageman's Moorage)
Rt. 1, Box 17
Portland, OR 97231
503 286-0241

Jantzen Beach Moorage
Interstate 5 at Jantzen Beach
Portland, OR 97217
503 283-2444

Jolly Roger Marina
P.O. Box Q
Rainer, OR 97048
503 556-3351

Kerry West Marina
P.O. Box 724
Clatskanie, OR 97016
503 728-3512

Larson's Moorage
Rt. 1, Box 100
Portland, OR 97231
503 286-1223

Leeward Isle Marina
10612 NW Lower River Road
Vancouver, WA 98660
206 694-7311

Lieser Point Moorage
2004 SE Lieser Road
Vancouver, WA 98661
206 694-6331

Marina West Moorage
7570 SW Miles Place
Portland, OR 97201
503 246-2050

McCuddy Moorage
2915 NE Marine Drive
Portland, OR 97211
503 287-6555
North Portland Harbor Moorage
3939 N. Suttle Road
Portland, OR 97217

Offshore Yachts
3409 NE Marine Drive
Portland, OR 97211
503 281-6077

Oregon City Marina
18649 S. Highway 99E
Oregon City, OR 97045
503 656-4276

Parker Moorage
Rt. 1, Box 261
Portland, OR 97231
503 621-3520

Pekin Ferry Moorage
34115 NW Pekin Ferry Road
Ridgefield, WA 98642
206 887-3773

Pioneer Moorage
333 State Highway 832
Kelso, WA 98626
206 636-2190

Port of Camas-Washougal
54 2nd Street
Washougal, WA 98671
206 835-2196

Port of Cascade Locks Marine Park
Cascade Locks, OR 97014
503 374-8619

Port of Kalama Marina
P.O.Box 7
Kalama, WA 98625
206 673-2325

Portage Marine
4141 NE Marine Drive
Portland, OR 97211
503 288-6306
Ridgefield Marina
5 Mill Street
Ridgefield, WA 98642
206 887-8021

Rocky Point Moorage
So. Columbia River Hwy.
Scappoose, OR 97056
503 543-2424

St. Helens Marina (nee M&H, Roland's)
P.O.Box 1054
St. Helens, OR 97051
503 397-4162

Sauvie Island Marine Park
Rt. 1, Box 415
Portland, OR 97231
503 621-3670

Sportcraft Landing
1707 Clackamette Drive
Oregon City, OR 97045
503 656-6484

Standard Moorage
7720 SW Macadam
Portland, OR 97201

Sundance Moorage
570 NE Tomahawk Island Drive
Portland, OR 97217
503 283-3216

Sundial Moorage
Rt. 2, Box 19 D
Troutdale, OR 97060
503 665-9876

Tomahawk Island Marina
300 NE Tomahawk Island Drive
Portland, OR 97217
503 289-5511
Questionnaire Utilized in Inventory

The following questionnaire was used in the process of inventorying the marinas in the area of this study. Much additional data were obtained for which there were no printed spaces. This information, scribbled in margins and on the reverse side of the following form, was as valuable as the answers to the printed questions themselves.
<table>
<thead>
<tr>
<th>FOOTAGE ON RIVER</th>
<th>LAND AREA</th>
<th>WATER AREA</th>
<th>DATE OF CONSTRUCTION</th>
<th>MAJOR IMPROVEMENTS/DATE</th>
<th>LIMITING DEPTH/HEIGHT</th>
<th>DREDGING NEEDED?</th>
<th>FREQ</th>
<th>OWN DREDGE?</th>
<th>PLANNED IMPROVEMENTS/DATE</th>
<th>PERMITS HELD?</th>
<th>SLIPS AVAIL:</th>
<th>OPEN</th>
<th>COVERED</th>
<th>ENCLOSED</th>
<th>OCCUPANCY</th>
<th>%TRAILERABLE(est.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>15-20ft</td>
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<td>op cov encl</td>
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<td>20-25ft</td>
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<tr>
<td>30-35ft</td>
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<td></td>
</tr>
</tbody>
</table>

TOTAL: + + + (Total excluding MB's)

%with fresh water %with electricity
%with dockside lockers other storage facilities
#liveaboards #commercial #houseboats :

OVERNIGHT MOORAGE FACILITIES

Occupancy Rate charged

BASIS OF SLIP FEES(Boat length, slip length, area)

SLIP FEES(On-season/off; annual/monthly/daily)

Special rates: Yacht clubs/#boats Commercial

Houseboats

Plans to increase rates Sub-leasing allowed

WAITLIST: #boats Deposit? Months wait for newest on list

DEMAND BY SIZE DEMAND BY TYPE(Sail,power)

COMMENTS (Authenticity, duplicates, trends)

LAUNCH RAMP(Paved/unpaved) #LANES Fee Ownership

ARKING AREA: Auto spaces with trailers w/o trailers
<table>
<thead>
<tr>
<th>FACILITIES:</th>
<th>D-Dockside</th>
<th>S-On shore in moorage area</th>
<th>N-Nearby (miles)</th>
</tr>
</thead>
<tbody>
<tr>
<td>FUEL SALES</td>
<td>Type (Gas, Diesel, propane, OB mix)</td>
<td>HRS</td>
<td></td>
</tr>
<tr>
<td>BOAT SALES</td>
<td>(New/used)</td>
<td>OUTBOARDS (New/used)</td>
<td>INBOARDS</td>
</tr>
<tr>
<td>REPAIR SVC</td>
<td>(Hull/Out/Inboard)</td>
<td>HRS AVAIL (On-season/off)</td>
<td></td>
</tr>
<tr>
<td>HAUL-OUT FACILITIES</td>
<td>(Type)</td>
<td>CAPACITY</td>
<td>DRY DOCK</td>
</tr>
<tr>
<td>SALE OF ACCESSORIES</td>
<td>(Repair parts/other)</td>
<td>SAIL LOFT</td>
<td></td>
</tr>
<tr>
<td>BOAT SALES</td>
<td>(New/used)</td>
<td>OUTBOARDS</td>
<td>INBOARDS</td>
</tr>
<tr>
<td>GROCERIES</td>
<td>SHACKS</td>
<td>BEVERAGES</td>
<td>ICE</td>
</tr>
<tr>
<td>RESTAURANT</td>
<td>LOADING CARTS</td>
<td>RUBBISH CONTAINERS</td>
<td>CLUB HOUSE</td>
</tr>
<tr>
<td>SHOWERS</td>
<td>(Public/private)</td>
<td>RESTROOMS (Public/boat owners/mgmt)</td>
<td></td>
</tr>
<tr>
<td>PIT TOILETS</td>
<td>PICNIC TABLES</td>
<td>CAMPING FACILITIES</td>
<td></td>
</tr>
<tr>
<td>HOTEL/MOTEL</td>
<td>SECURITY (Type)</td>
<td>HOURS</td>
<td></td>
</tr>
<tr>
<td>SAR/ASSISTANCE FACILITIES</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>VHF AVAIL</td>
<td>(Channel monitored)</td>
<td>CB AVAIL</td>
<td>(Channel monitored)</td>
</tr>
<tr>
<td>DRY STORAGE FACILITIES:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ON PREMISES</td>
<td>(Open/covered)</td>
<td>Size</td>
<td></td>
</tr>
<tr>
<td>MILES AWAY</td>
<td>(Open/cvr'd)</td>
<td>Size</td>
<td></td>
</tr>
<tr>
<td>MITES AWAY</td>
<td>OPEN/COVERED</td>
<td>Size</td>
<td></td>
</tr>
<tr>
<td>PUMP-OUT FACILITIES:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HOLDING TANK</td>
<td>(Tended/self-serve)</td>
<td>FEE (Transient/renter)</td>
<td></td>
</tr>
<tr>
<td>DISPOSITION OF WASTES</td>
<td>(Sewer district, septic tank, etc.)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BILGE WATER FACILITIES</td>
<td>USED OIL FACILITIES</td>
<td></td>
<td></td>
</tr>
<tr>
<td>NUMBER OF TOTAL PERSONNEL</td>
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<td>NON-FAMILY</td>
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<tr>
<td>MANAGEMENT ON PREMISES</td>
<td>(Days/hours)</td>
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<tr>
<td>CONTACT</td>
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<tr>
<td>Comments</td>
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</table>
LIST OF SOURCES CONSULTED
LIST OF SOURCES CONSULTED


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SECTION II: TEMPORARY TIE-UP FACILITIES
The Needs of the Larger Boat

The waters of the Columbia and Willamette Rivers seem to favor the use of small, trailerable boats. Over seventy ramps now exist in the area of this study from which these boats can be launched, often without charge. As the sun goes down, these vessels are back on their trailers headed for home after a day of fishing, waterskiing or perhaps a small sailboat race in protected waters not far from their favorite ramps. About eighty percent of all boaters in Oregon fall into this "trailerboating" category (68), which justifies the attention and investment that has been expended on this segment of Oregon boaters. (Without a state registration system, it's difficult to quote similar figures for the state of Washington, but there is no reason to suspect a proportion vastly dissimilar.)

However, there is another sizeable group of boaters with vessels too large to benefit by the investments that have been made in launching ramps over the years. Paying proportionately higher registration fees for boats of greater length, these boaters see a minute percentage of their fees returned to them in the form of useful marine facilities as intended by legislature in the 1960's. Nowhere is the need greater than in the Portland/Vancouver metropolitan area. Not only does the Multnomah/Clackamas/Washington tri-county boat population represent over 30% of all boats registered in Oregon (68), but the area can also claim over half-again as high a proportion of large vessels (over 20') as the state-wide proportion—12.9% vs. 8.3% (68).
As easy as it is to establish the needs of the trailerboater, i.e., access to the water in the form of launching ramps, it is equally obvious that the boater with the larger craft, traveling greater distances from his home moorage for greater lengths of time, is in need of "harbors of refuge"--facilities where moorage protected from wind and waves can be sought to escape a sudden storm, to effect emergency repairs, or perhaps just enjoy an afternoon or evening in the company of other boaters with similarly large crafts, away from users of the rivers whose activities conflict with those of these "cruising boaters." In short, the need is for secure temporary tie-up facilities in a variety of settings throughout the area which are designed to fulfill these needs which have been so well met in Washington State through their network of marine parks (11), but which have for various reasons placed second to those of the trailerboaters in Oregon.

At present, only one such facility exists in the area--J. J. Collins Marine Park at Coon Island in the Multnomah Channel. Completed in the early 1970's, this site features a 300' floating dock securely attached to pilings with a gangway to the shore. A lightly developed island (picnic tables and trails), it is accessible only by boat. This facility has proven to be tremendously popular with cruising boaters in the area. On any good weekend, the dock is jammed with pleasure boaters, often rafted together to wring maximum use out of every inch of dock space. All other temporary sites have been of the "undeveloped" type--perhaps a sheltered backwater
here, or a log raft there, where a boater could tie-up for the night—with one eye kept open.

Recent developments have added even more pressure to the already tight situation: the number of log rafts have begun to diminish with increasing charges by the Division of State Lands for leases of state-owned submerged or submersible lands over which the log rafts have been stored; and the drastically low water on the rivers during this season has altered several popular deep-draft sites into areas now suitable only for shallow-draft "day cruisers" (4).

The Search for Temporary Tie-up Sites

Concern for lack of this type of temporary tie-up facility has been expressed for the past several years by Portland area yacht clubs as well as individual boaters. During this time, various sites have been identified as potential candidates for development into "harbors of refuge," ranging forty miles either side of the junction of the Columbia and Willamette Rivers and over twenty miles up the Willamette. This list, compiled and refined by the staff of the State Marine Board, was entrusted to the Rafters Yacht Club of Portland in early 1976 for their inspection and recommendations. This service-oriented club, whose bylaws state as an objective ". . .to give assistance to the general boating public. . . ," performs several public-service functions related to boating every year. Their thorough inspections of the Marine Board's potential development sites, combined with their recommendations based on physical criteria, were an extraordinary
service to the Board.

As the sample "Site Evaluation Form" in Appendix II-A shows, the potential sites were described in full, with water depths, wind and wave protection, accessibility from the river, available area for moorage, and possible conflicts with other river activities all noted and recorded, as well as suggestions by the inspecting group for optimum development (location of pilings, docks, etc.). Each evaluation was concluded with a rating of the site in terms of these primarily physical parameters—a rating of one on a scale of ten denoting an "excellent" site, while a rating of ten would indicate a "not suitable" site. It was an impressive effort by a dedicated organization.

Of the list of sites that had been proposed over the years by boating interests in the area, one favored moorage in the Multnomah Channel has recently been purchased with the intent to develop it into a commercial marina (see "Big Oak Marina" in the preceding section), and two other sites had over the years become too shallow to approach for inspection (the south side of Sand Island near Latourell Falls and the mouth of the Sandy River), sites favored at one time that had fallen victim to the shifting sands of the Columbia. The majority of sites that remain as candidates for development as temporary tie-up sites were all rated "suitable for development" after physical inspection. In view of the fact that the Marine Board, even with funding assistance from the Bureau of Outdoor Recreation's Land and Water Conservation Fund, can hardly be said to possess an unlimited budget, some process of establishing priority
is clearly required.

Criteria for Site Selection

In addition to the existence of local plans which affect some of the potential sites, discussed individually later in this report, various regional comprehensive plans address uses of the Columbia and Willamette River system as a whole. Examination of these plans reveal no objections to the type of facilities under discussion.

The Columbia Region Association of Governments (the regional planning body for the cities and counties of the area under study) states, for example:

Interest in pleasure boating has continued to grow rapidly. There is a mounting need for facilities to keep pace. Private moorages and marina facilities meet much of this need. There is nevertheless a public responsibility to augment them. . . ." (18)

The Willamette River Greenway Plan, which includes the Multnomah Channel, gives priority to such essentially non-developed use of land for recreational activities along the Greenway (83, 77). The Pacific Northwest River Basins Commission foresees the number of pleasure boats in its area of jurisdiction increasing from 423,000 in 1970 to 2,210,000 in 2000, becoming a major recreational activity of its region that must be provided for (70). The Lower Willamette River Management Plan says:

The river is a unique and popular recreational opportunity; therefore, recreational water dependent uses should be maintained, developed, and enhanced. Recreational uses shall be given top priority from the Ross Island Bridge upstream." (88)
With lack of opposition to recreational facilities on a **regional** basis, the door is open to establish criteria by which **individual** sites may be evaluated.

The criteria that must be applied to the remaining sites fall into the following six general categories:

1. **Would the site be popular with the cruisers themselves?** Would it be sufficiently utilized to justify its development? Or would it lack the various qualities that make a facility popular?

2. **With the need for the Marine Board to place **safety** of Oregon boaters near the top of its list of considerations, could the site be seen as part of a well-placed system of "harbors of refuge" throughout the area? Or would a cruising boater in sudden need of secure moorage from an unexpected storm or wind find that all such facilities are crowded within one area that happens to be a popular destination for social afternoon gatherings?**

3. **How much of a hazard would the site present to commercial users of the rivers? Is it located at a particularly dangerous turn or narrow section of the river?**

4. **How expensive will the site be to develop? Would the investment in one prime location be more wisely distributed on, say, three nearby areas of comparable qualities?**

5. **What plans does the State of Washington have for the area (in the case of the Columbia River sites) within the immediate vicinity of the site? Would a different site, located in an area lacking any such facilities, be a better choice for facilities**
development than one immediately across the river from a planned Washington State site that promises to congest the area to its capacity while other areas lack any such facilities? What plans do local agencies have that would conflict with, or encourage development at a particular site?

6. Are the landowners adjacent to the site known to oppose the development of such a facility? Might they have other plans for the site? Or might they be simply against any development of the area for personal reasons?

**Boater Popularity**

The fact that the list of potential sites was compiled by cruising boaters themselves allows some measure of comfort in applying the first criterion. Areas have proven their popularity (or unpopularity) in the past and most are popular cruising destinations and harbors of refuge at the present. One location may be more economical than another to develop, but if the demand by boaters for that other site is sufficiently great, other factors may be offset. A separate study to determine the qualities sought by the cruising boater in his selection of temporary tie-up areas would undoubtedly be interesting, although probably not qualified to be an item of top priority. As it is, a "mini-study" was undertaken in the course of this investigation to reinforce the recommendations of the boaters who had compiled the initial list of potential sites. A dozen boaters were interviewed while either cruising (e.g., at Coon Island Marine
Park) or in preparing to cruise (e.g., at several Marine Drive moorages). The form used is presented in Appendix II-B. Due to the trivial sampling size, tabulated results are also relegated to this same appendix. It is interesting to note, however, the priority assigned by these boaters to criteria they apply in evaluating the desirability of temporary overnight moorages:

<table>
<thead>
<tr>
<th>MOST IMPORTANT</th>
<th>LEAST IMPORTANT</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Protection from wakes and wind (or absence of same)</td>
<td>8. Ability to rendezvous with shore-based friends</td>
</tr>
<tr>
<td>2. Absence of noise from land (traffic or industrial)</td>
<td></td>
</tr>
<tr>
<td>3. Closeness to Portland metropolitan area</td>
<td></td>
</tr>
<tr>
<td>4. Access to areas of interest on shore (parks, activities)</td>
<td></td>
</tr>
<tr>
<td>5. Attractiveness of area</td>
<td></td>
</tr>
<tr>
<td>6. Nearness to fuel and supplies</td>
<td></td>
</tr>
<tr>
<td>7. Access to restrooms on land</td>
<td></td>
</tr>
</tbody>
</table>

Regardless of the small number of boaters contacted, the above list warrants consideration in the evaluation of individual sites.

Harbor of Refuge

The second criterion, the need to consider the most efficient placement of harbors of refuge within a system of similar moorages, is contrary to the high priority that cruising boaters attach to facilities located close to the Portland metropolitan area. However,
the increase in the number of boaters who frequently cruise to such distant destinations as Astoria and Cascade Locks has been dramatic over the past few years, and with it, the need for overnight tie-up facilities along the way. Such needs were noted as early as 1964 in a study for the Area Redevelopment Administration:

Establishment of a chain of small boat harbors on the Oregon coast and up the Columbia River would provide safety and interesting and attractive destinations for small boat cruising. Completion of the facilities proposed in this study will not complete such a chain, but will noticeably improve the situation. (21)

Applying this criterion, a potential site located in an area of the River far removed from any other "harbor of refuge" would be a good candidate for development, while the development of several sites in close proximity to one another would be inefficient. In addition to location, of course, the ability of a harbor of refuge to offer protection from wind, waves and wakes is an equally important consideration.

Conflict with commercial users of the rivers is a significant criterion. The network of marine parks that dot Puget Sound can be developed and enlarged without being overly concerned with commercial traffic congestion. Such is not the case on the Columbia and Willamette Rivers. In discussions with the commercial river transportation industry, several proposed sites were identified as being located in areas where ships are negotiating difficult maneuvers or are forced to parallel the shoreline close to the suggested site (32, 33, 47). When the lack of maneuverability of these commercial
vessels is added to the difficulty in spotting small pleasure craft from the bridge of such large ships, it is easy to see how any increase in the number of pleasure boaters in certain areas is viewed with alarm by ship and towboat interests. All present and proposed sites deserve to be examined for the purpose of eliminating this kind of conflict. Using this criterion, a potential site in the Columbia River east of the I-5 bridge, beyond which ocean-going vessels rarely travel can be said to have priority over one which is located to the west of the bridge, all other factors being equal. A site in the Willamette, similarly, would be favored if located upstream of the congestion of Portland Harbor. Fortunately, the application of this criterion can be mollified somewhat in view of the greater knowledge and experience (and subsequent respect for the large commercial vessel) that the average larger-boat cruising skipper, the intended user of this type of facility, possesses. In addition, the number of users of each developed site is small compared to the development of a water-skiing area or an improvement to a particular fish habitat. Conflict with non-commercial users (recreational fishermen, water-skiiers, etc.) is more difficult to avoid and certainly another factor in individual site evaluation.

Cost of Developing Sites

It would be delightful if economics did not have to be as important a factor in evaluating a potential site as it must necessarily be. But since funds are limited, the criterion of "greatest
benefit for least cost" must be applied. A site which takes a small investment, initial as well as ongoing, would have to be rated higher than a more costly site, all other factors being equal. Similarly, a site which can serve the needs of twenty-five boaters is preferable to one which can provide moorage for five. Few potential sites exist that do not require some dredging in the moorage area or at the area entrance. Indeed, dredging is likely to consume a major part of each dollar in developing many of the proposed facilities. It is therefore of foremost concern that should major dredging be needed to develop a site, ongoing dredging to maintain the site must be held to an absolute minimum. Sites expected to require continual maintenance dredging must be assigned a lower priority for development and should be re-examined in the future for changing patterns of shoaling. Judging by the heavy use of picnic tables at Coon Island Marine Park, as well as by the fourth-place ranking in the "mini-survey of boater preference," demand exists for shore-based facilities (tables, trails, picnic areas, etc.). Funds can be saved by considering shore facilities planned or in existence now near potential moorage sites. Such consideration is encouraged in area comprehensive plans, an example being The Willamette River Greenway Plan's suggestion that "...Facilities...should be consolidated into common facilities...to make more efficient use of River frontage...." (83) The sharing of expenses with city, county or other public body through the joint development of a moorage site would be encouraged by this criterion. Several such sites exist,
as detailed in the discussion of individual sites which follow.

Washington State Development Plans

In addition to its complex of marine parks in the Puget Sound area, and the popular Beacon Rock State Park just west of Bonneville Dam, the State of Washington now owns Reed Island east of Camas-Washougal and has purchased Fisher Island, just downstream from the city of Longview. Funds to develop primitive camping facilities on Reed Island, presently undeveloped, are included in the state's 1977-79 budget (10). Optimum development plans for the island include auto access, RV camping, launch areas, utilities, an airstrip and restrooms, in addition to moorage areas and tie-up facilities. No funds have been appropriated for development of Fisher Island, although the Washington State Parks and Recreation Commission is "...extremely desirous of developing (it)..." (10) Use of this type of planned development information as criteria in the evaluation of Oregon's facilities is yet another step in the evolution of the "harbors of refuge" network for the entire region. Several sites are affected by formal or informal plans of local governments. Such plans are discussed individually in the specific site evaluations that follow.

Opposition by Adjacent Landowners

The possibility of opposition by the adjacent landowners to the development of temporary tie-up facilities on land next to
their own is perhaps the most sensitive of all criteria applied in the evaluation of potential sites. Preliminary contact with some riparian owners resulted in assurance of full cooperation or at least expressions of approval of such development. In other cases, attempts to contact the adjacent landowners to solicit their positions failed entirely or resulted in negative responses. A third category of responses can be described as "undecided," i.e., a position that can only be determined by pursuit through official channels. In all cases, contact with riparian owners was casual and designed merely to informally explore their positions regarding potential development.

Suggested Sites for Development

The combination of all preceding criteria must subjectively be used to evaluate each potential site. No computer could successfully assign weighted values to such criteria nor supply data that is based on such unknowns as riparian landowner attitudes. Nor is there really any need to arrive at a listing of potential sites in perfect computerized order of priority. The sites which follow that are designated as "PRIORITY A" should all be developed as quickly as possible. Delay brings increased costs. Few new sites, if any, will be "created" on the River in future years to add to the list from which to choose.

Sites that are designated "PRIORITY B" should be re-evaluated in the following biennium for a possible shift in priority--up to
"PRIORITY A" or down to "PRIORITY C." It is to this list ("B") that potential sites should be added upon the suggestion of recreation planners and boaters themselves. Indeed, such nominations should be actively encouraged from this latter group. No one else knows the River as well as they do. The list should be expanded by enlarging the geographical area of study west to the mouth of the Columbia, east to the Washington state line and up the Willamette River to Eugene. The need for such facilities certainly exists in these areas.

Sites that were considered at one time, favored by boaters in the past, and included on the list of the Marine Board but do not at all meet the foregoing criteria are designated "PRIORITY C." No possibility for their development can be foreseen.
The following sites in all three priority categories are listed by statute river mile. Numbers are keyed to the chart on the following page. They are not an indication of priority of development.

"PRIORITY A"--SITES FOR IMMEDIATE DEVELOPMENT

<table>
<thead>
<tr>
<th>River mile</th>
<th>Description of site</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 72.9 (Columbia)</td>
<td>&quot;COFFIN ROCK&quot;</td>
</tr>
<tr>
<td>2 94.5 (Columbia)</td>
<td>&quot;WILLOW POINT SLOUGH&quot;</td>
</tr>
<tr>
<td>3 101.8 (Columbia)</td>
<td>&quot;KELLY POINT NORTH&quot;</td>
</tr>
<tr>
<td>4 113.0 (Columbia)</td>
<td>&quot;THE SLOT&quot; (GOVERNMENT ISLAND)</td>
</tr>
<tr>
<td>5 128.2 (Columbia)</td>
<td>&quot;ROOSTER ROCK&quot;</td>
</tr>
<tr>
<td>6 6.5 (Multnomah Ch.)</td>
<td>&quot;MOUTH OF GILBERT RIVER&quot;</td>
</tr>
<tr>
<td>7 8.2 (Multnomah Ch.)</td>
<td>&quot;COON ISLAND MARINE PARK--PHASE II&quot;</td>
</tr>
<tr>
<td>8 0.8 (Willamette)</td>
<td>&quot;ENTRANCE TO COLUMBIA SLOUGH&quot;</td>
</tr>
<tr>
<td>9 17.1 (Willamette)</td>
<td>&quot;WILLAMETTE PARK&quot;</td>
</tr>
<tr>
<td>10 22.0 (Willamette)</td>
<td>&quot;ROCKY ISLAND&quot;</td>
</tr>
<tr>
<td>11 23.3 (Willamette)</td>
<td>&quot;CEDAR ISLAND LAGOON&quot;</td>
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"PRIORITY B"--SITES FOR LATER RE-EVALUATION

<table>
<thead>
<tr>
<th>River mile</th>
<th>Description of site</th>
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</thead>
<tbody>
<tr>
<td>60.5 (Columbia)</td>
<td>&quot;LOWER END OF WALKER ISLAND&quot;</td>
</tr>
<tr>
<td>61.0 (Columbia)</td>
<td>&quot;PIRATES COVE&quot;</td>
</tr>
<tr>
<td>75.0 (Columbia)</td>
<td>&quot;SANDY ISLAND&quot;</td>
</tr>
<tr>
<td>79.7 (Columbia)</td>
<td>&quot;GOAT ISLAND&quot;</td>
</tr>
<tr>
<td>115.0 (Columbia)</td>
<td>&quot;GOVERNMENT ISLAND--NORTH&quot;</td>
</tr>
<tr>
<td>117.4 (Columbia)</td>
<td>&quot;MCGUIRE ISLAND--SOUTH&quot;</td>
</tr>
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</table>
"PRIORITY B"--SITES FOR LATER RE-EVALUATION (contd.)

<table>
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<tr>
<td>118.5 (Columbia)</td>
<td>&quot;CROWN Z PROPERTY&quot;</td>
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<td>124.1 (Columbia)</td>
<td>&quot;GARY ISLAND&quot;</td>
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<td>131.6 (Columbia)</td>
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<td>133.3 (Columbia)</td>
<td>&quot;DALTON POINT&quot;</td>
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<tr>
<td>135.3 (Columbia)</td>
<td>&quot;FASHION REEF&quot;</td>
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<tr>
<td>8.3 (Multnomah Ch.)</td>
<td>&quot;COON ISLAND MARINE PARK--PHASE III&quot;</td>
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"PRIORITY C"--SITES ELIMINATED FROM CONSIDERATION

<table>
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<td>120.6 (Columbia)</td>
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<td>130.6 (Columbia)</td>
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<td>14.4 (Multnomah Ch.)</td>
<td>&quot;AUCKLAND'S MOORAGE&quot;</td>
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<td>16.8 (Multnomah Ch.)</td>
<td>&quot;ROCKY POINT SOUTH&quot;</td>
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<td>19.0 (Multnomah Ch.)</td>
<td>&quot;BYBEE-HOWELL HOUSE&quot;</td>
</tr>
<tr>
<td>0.4 (Willamette)</td>
<td>&quot;KELLY POINT WEST&quot;</td>
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</tbody>
</table>
RIVER MILE: 72.9 (Columbia)

SITE: "COFFIN ROCK"

OWNERSHIP OF ADJACENT LAND: Portland General Electric
121 S.W. Salmon Street
Portland, OR 97204
Contact: James H. Goggin
Director, Community Relations

PROPOSED FACILITIES: 10' x 150' float attached to four pilings (to be driven) or partially utilizing existing dolphins; 200' shear boom log raft attached to five additional pilings (to be driven) parallel to float and approximately 50' away, both structures oriented SW-NE.

POSITIVE FEATURES OF SITE: Lovely wooded site; no initial dredging required nor maintenance dredging anticipated; extensive recreational facilities on shore; adjacent landowner cooperative.

NEGATIVE FEATURES OF SITE: Additional investment needed in wave/wake attenuation facilities.

NOTES: PGE at one time had planned extensive development of this site with a two-lane launching ramp, toilets and a dock of its own to encourage public use in the area of its Trojan Nuclear Plant, with the hope of promoting public acceptance of the controversial facility.

Because of the economic difficulties that have recently confronted the power industry and forced budget cutbacks at PGE, it was decided...
"Coffin Rock" Site

Existing Dolphin

Proposed Dock

Existing Dolphin

Proposed Shear Zone

"Coffin Rock"
to scrap the project indefinitely (29). All partners in the facility (PGE, Pacific Power and Light Co., and Eugene Water and Electric Board) felt that the spending of funds on this type of project, funds that would obviously have to be recovered in increased rates to all power users, would create more ill will than good (29).

Although excellent launching ramps can be found in Goble, 1-1/2 miles south, and Rainier, 5 miles north, much use could have been made of such temporary tie-up facilities in the area for the cruising boater, especially in light of the excellent facilities that already exist on shore. The State of Oregon Fish and Wildlife Department is currently constructing facilities for fish-rearing in the vicinity of this site.

The Nuclear Regulatory Commission must be consulted on the matter of overnight public presence within one-half mile of this type of facility (the adjacent recreation area is open only from 10:00 A.M. to 8:00 P.M.), but PGE feels that this possible problem would not apply to boaters who would remain in their craft on the river overnight.

Communication with Columbia River Pilots reveals a history of claims by recreational boaters of wake and suction disturbance from passing ships (32). The combination of "Coffin Rock" itself between the main channel of the Columbia and this site plus a floating "mini-breakwater." however, should provide excellent protection to the facility. See Appendix II-C for a discussion of wake/wave attenuation
devices most suitable for this site.

PGE officials prefer referring to this site as the "Trojan Site" rather than the "Coffin Rock Site."

RECOMMENDATION: Development of facilities as indicated as soon as possible.
RIVER MILE: 94.5 (Columbia)

SITE: "WILLOW POINT SLOUGH"

OWNERSHIP OF ADJACENT LAND: State of Oregon Fish & Wildlife Department
506 S.W. Mill
Portland, OR 97204

Raymond Barrett
d/b/a Sauvie Island Marine Park
Rt. 1, Box 415
Portland, OR 97231

PROPOSED FACILITIES: Considerable initial dredging to deepen entrance channel and the area of proposed site.

POSITIVE FEATURES OF SITE: Excellent location as harbor of refuge on the Columbia River; perfect protection within the site as well; capable of serving the needs of an unlimited number of boaters; maintenance dredging responsibility of adjacent landowner at entrance to site (Barrett); no conflict with other river users.

NEGATIVE FEATURES OF SITE: Considerable initial investment in dredging required; expected objection from adjacent landowner (F & W); water quality marginal at present.

NOTES: Situation of site as harbor of refuge alone is sufficient to develop this site. Its location on the main stem of the Columbia mid-way between the junction with the Willamette River and St. Helens puts it in a vital position to offer shelter from the elements where no other site exists. The marina within the slough offers fuel, water and supplies. Operator of this marina is
willing to contract with the Marine Board or other agency to maintain depth of channel at mouth of slough in return for initial dredging of slough. Slough itself is not expected to require maintenance dredging. Operator of marina has plans to develop extensive recreational facilities on the adjacent shore within the next year at which time the possibility of shore access can be explored.

The other owner of the land adjacent to the site (F & W) expressed concern in casual conversation for wood duck activity in the area and feels that allowing overnight use by boaters will require the endorsement of similar use by land-based recreationalists (52). The area is presently closed from 10:00 P.M. to 4:00 A.M., but tents, trailers and campers remain overnight in spite of this closure, against the wishes of management. More formal communication could probably resolve this issue by pointing out the marine-related development that already exists in this area and the plans by Sauvie Island Marine Park to extend their marina farther into the slough area in the near future. It might also be valuable to draw the attention of the area management to the decision not to develop the mouth of the Gilbert River in deference to the waterfowl in that area, an area presently devoid of any major development.

The peninsula to the east of the slough was an island prior to the decision of the U.S. Army Corps of Engineers to
close the southern end of the waterway with dredge spoils. The resulting lack of circulation has diminished the quality of water in the slough to the point where no conflicts with fishermen presently exist.

Although large-ship wake and suction damage has resulted in a suit being filed by the owner of the marina near the entrance to the slough, little if any water movement from river traffic is detectable in the area of the proposed site.

Installation of pilings, while an asset to this site, should be considered as a "phase two" proposal in view of the delicate nature of F & W concern.

The area is in Columbia County.

RECOMMENDATION: Development of site as indicated as soon as possible.
Priority: A

RIVER MILE: 101.8 (Columbia)

SITE: "KELLY POINT NORTH"

OWNERSHIP OF ADJACENT LAND: Port of Portland
Box 3529
Portland, OR 97208

PROPOSED FACILITIES: 10' x 600' dock attached to 13 pilings (to be driven) along south shore of river parallel to bank of Kelly Point Park but far enough offshore to allow use of inside of dock (approximately 50'); additional 10' x 150' dock fastened perpendicular to western end of this dock with ramp extending to shore from the southern end (pilings to be driven as needed); shear-boom/log raft/mini-breakwater (see Appendix II-C) attached to additional pilings approximately 100' offshore.

POSITIVE FEATURES OF SITE: Extremely convenient to Portland-area boaters; shore access to well-developed Kelly Point Park; capable of serving the needs of over 50 boaters; future expansion possible; no initial or maintenance dredging needed.

NEGATIVE FEATURES OF SITE: Additional investment in wave/wake attenuation facilities needed; uncertain position of adjacent landowner on recreational development in area.

NOTES: This site was the first choice by far of all sites mentioned by large-boat cruisers contacted in the area during the course of this study due primarily to its convenience and nature of the adjacent shoreline. The total lack of dredging needed should
justify the additional floating facilities required for wave/wake protection at this site. Although the Columbia is approximately 1000 yards wide at this point, large commercial vessels occasionally pass close to this site as they approach the Port of Portland's Terminal Six. The Port intends to eventually expand the operations of this terminal in a westerly direction, adding to this particular conflict (38). The proposed wave/wake attenuation facilities, however, would provide almost complete protection for cruisers in its lee and commercial vessels, in turn, could be assured that all users of this facility would remain behind the shearboom/raft. Should the proposed Terminal Six expansion encroach on the use of this facility in the future, the investment in floating dock facilities could be utilized in another location whereas a similar claim for investment in dredging cannot be made.

No opposition is present from other ocean-going commercial traffic nor from the City of Portland into whose ownership Kelly Point Park is eventually planned to be transferred.

RECOMMENDATION: Development of facilities as indicated as soon as possible.
RIVER MILE: 113.0
SITE: "THE SLOT" (GOVERNMENT ISLAND)
OWNERSHIP OF ADJACENT LAND: State of Oregon
PROPOSED FACILITIES: Minimum dredging as needed at entrance to site.
POSITIVE FEATURES OF SITE: Immensely popular site with local boaters; good protection from wind and wake; capable of serving needs of unlimited number of boaters; no investment in facilities needed inside area.
NEGATIVE FEATURES OF SITE: Major modification of area inevitable with construction of bridge for Interstate 205 over site; maintenance dredging probable in future.
NOTES: Dredging of bar at entrance to this site with markers as needed would allow continued usage of much of this popular area with minimum investment. Even with the addition of the I-205 bridge, sufficient anchorage area will remain to justify this minor expense.

This site should be re-examined for additional facilities needed upon completion of bridge. Possible investment at that time could include mooring buoys, anchored multi-vessel floats, additional dredging, and/or relocation of present anchorage area farther downstream (84).

RECOMMENDATION: Limit investment to dredging as needed for safe entrance to area; re-examine upon completion of bridge construction for additional facilities need.
RIVER MILE: 128.2 (Columbia)

SITE: "ROOSTER ROCK LAGOON"

OWNERSHIP OF ADJACENT LAND: State of Oregon Parks & Recreation Division
3553 S.E. 82nd
Portland, OR 97206
Contact: Frank Stiles, Supt.

PROPOSED FACILITIES: Maintenance-dredge approach to site and site itself; drive six pilings approximately 35' apart parallel with north shore of lagoon east of present launching ramp; attach camels between pilings to stage off vessels from shore with eyebolts sunk in camels approximately 10' apart for belaying purposes; post "SLOW--NO WAKE" markers in entrance channel to retard erosion of banks.

POSITIVE FEATURES OF SITE: Excellent location as harbor of refuge; fine wind, wave and wake protection; extensive on-shore facilities in Rooster Rock State Park, including stove shelters, restrooms, swimming areas and concessions; management of adjacent lands eager to accommodate.

NEGATIVE FEATURES OF SITE: Some maintenance dredging probable at entrance to channel every six or seven years; number of vessels limited in area; noise from adjacent highway.

NOTES: Last dredged in 1970, the entrance to this site is in need of maintenance dredging at this time to serve the needs of the trailerboaters who use the launch ramp presently located in the
Rooster Rock Lagoon Site

Map after Pattern Sketch
lagoon. As a result of additional weekend impoundment of water behind Bonneville Dam for higher-demand weekday electrical generation, trailerboaters are often unable to re-enter the lagoon on Sunday afternoons where their cars and trailers had been left the previous Saturday morning at a higher water level. Realizing the need to dredge this site to alleviate the problem for operators of these smaller boats, very little extra investment would turn this site into a fine harbor of refuge for the larger boat. Although park management would restrict boaters to their vessels in the lagoon overnight, day use of the well-maintained park would be welcomed (91). Loading and unloading of passengers from the larger boats could be easily accomplished at the dock that abuts the present launch ramp.

Excessive speed in the channel between this lagoon and the river has caused severe erosion of the banks, hastening the shoaling of the channel over the past several years. Markers posted for "SLOW--NO WAKE" combined with explanations to boaters on the reasons behind such restrictions would help cut down on maintenance dredging in the future.

At present, water quality is sufficiently marginal to preclude conflict with fishermen in the lagoon or channel. RECOMMENDATION: Development of facilities as indicated as soon as possible.
RIVER MILE: 6.5 (Multnomah Channel)

SITE: "MOUTH OF GILBERT RIVER"

OWNERSHIP OF ADJACENT LAND: State of Oregon Fish & Wildlife Department
506 S.W. Mill
Portland, OR 97204

PROPOSED FACILITIES: Minor dredging at entrance to Gilbert River; removal of deadheads as needed in entrance area.

POSITIVE FEATURES OF SITE: Lovely, well-protected area capable of serving the needs of an unlimited number of boaters; minimum initial and maintenance dredging in entrance area; no dredging needed past entrance; no investment in facilities.

NEGATIVE FEATURES OF SITE: Conflict with warm-water fishermen during summer months; probable objection to use by adjacent landowner.

NOTES: Any Marine Board encouragement of use by large cruising boaters would meet with strenuous protests from the Department of Fish & Wildlife as this site is a prime waterfowl area, closed to the public from around October 1 to mid-January for use by 30-40 thousand waterfowl (52). Dredging and deadhead removal in the mouth of the river should be undertaken purely as a matter of safety for boaters who presently use the area without Marine Board approval or encouragement. The moorage potential allowed by the length and depth of this river, however, warrants attempts to override objections to this minimal work. Major development in this site should be forsaken in favor of improvements in the
Willow Point Slough area (see "WILLOW POINT SLOUGH" site proposal) which is also adjacent to Fish & Wildlife land but which already has experienced commercial development.

RECOMMENDATION: Dredging and dead-head removal at entrance to river as soon as possible; no development inside river.
RIVER MILE: 8.2 (Multnomah Channel)

SITE: "COON ISLAND MARINE PARK" (Phase II)

OWNERSHIP OF ADJACENT LAND: Columbia County
County Courthouse
St. Helens, OR 97051

PROPOSED FACILITIES: 300' of additional dock added to northern end of existing dock, driving pilings as needed; place rip-rap against shore of island at base of present gangway to halt erosion.

POSITIVE FEATURES OF SITE: Good record of usage by boaters over past five years; no maintenance dredging has been needed; some facilities already in existence on island.

NEGATIVE FEATURES OF SITE: Proximity of dock to other Channel users; some lack of wake protection on outside of present dock.

NOTES: It is difficult to single out any other potential site where so many facilities can be offered to so many additional boaters for such a small additional investment. Utilizing facilities that already exist (ramp to island, picnic tables, etc.), 300' of additional dock would double this popular area's capacity to serve the needs of the cruising boater while reducing the traffic-congesting multi-boat rafting for which this site is famous during summer months. In addition, the inside of the proposed dock extension would add to the area available to vessels seeking a harbor of refuge at all times of the year. The area on the inside of the dock is reportedly a fine device for attenuating waves and wakes common to the area.

Unusual currents in the area have severely undermined the bank
to which the gangway now extends. Placement of rip-rap here would be good protection of present as well as future facilities.

RECOMMENDATION: Immediate placement of rip-rap on island at base of gangway and addition of dock as indicated as soon as possible.
Priority: A

RIVER MILE: 0.8 (Willamette)

SITE: "ENTRANCE TO COLUMBIA SLOUGH"

OWNERSHIP OF ADJACENT LAND: Port of Portland
Box 3529
Portland, OR 97208

PROPOSED FACILITIES: 10' x 600' dock attached to 13 pilings (to be driven) along northern bank of slough with ramp leading to shore. Dock to extend into slough not more than 1000'.

POSITIVE FEATURES OF SITE: Good protection from elements; extremely convenient to Portland-area boaters; shore access to well-developed Kelly Point Park; capable of serving the needs of over 20 boaters; minimal initial dredging; minimal maintenance dredging.

NEGATIVE FEATURES OF SITE: Conflict with commercial traffic at entrance (no conflict within site); position of landowner on recreational development in area uncertain.

NOTES: Probably no other proposed site has such a history of controversy surrounding it. Long a favored area with local boaters, studies in the past have proposed either the use of the entire slough as a navigable waterway (19, 93) or blocking the entrance to the slough at a point approximately 1000' from its mouth for flood control purposes (95, 96). Presently, discussions are continuing between the U.S. Army Corps of Engineers and the City of Portland. The Corps has contracted with an independent consultant to study the situation and report to the Corps in November, 1977. Pressure remains for a Local Improvement
"Entrance to Columbia Slough" Site
District control and approval of the original 1950 plan which authorized a 7-1/2-mile long, 100' wide, 10' deep waterway (36). In any event, if the slough is blocked at the entrance, the "drainage structure" would be placed 1000-1320' up into the slough from the junction with the Willamette (36) and thus not affect the proposed placement of facilities. If the slough is opened up for navigation (considered far less likely to happen by most sources), the proposed structure would be well out of the way of traffic using the slough. The possibility of minor wake-dampening facilities could be investigated if necessary at that time.

No local plan exists that opposes the suggested development of this site. The esteemed Lower Willamette River Management Plan sets forth the following guidelines for the zone in which this site is located:

General guidelines: Public recreational boat dock just inside slough; encourage additional vegetation along riverbank; preserve thin line of vegetation on south side of the slough; new structures approved as part of public recreational boat dock. (88)

The position taken by the Port of Portland on potential development on the site has been mixed. In 1972, the Port was amenable to an almost identical proposal, agreeing with various recreational boating interests which had indicated that ". . . a facility for boat tie-up at the mouth of the (Columbia) Slough would be a welcome addition to the (Kelly Point) park development." (5)
In 1973, two representatives of the Port participated in the Lower Willamette Study Team, authors of the above quote from the Plan. Most recent, albeit casual, conversations with Port management have resulted in a response of "unlikely" to the informal proposal of marine facilities at this site (111).

CRAG outlines the responsibilities of all sectors, including port districts, in assisting the development of this type of recreational facility in the following quote from *The Urban Outdoors*:

> All levels of government, and the private sector, share responsibility for meeting recreation needs. . . . The two port districts in the Portland/Vancouver urban region primarily have transportation-related responsibilities. Their control or ownership of key shoreline or lowland areas, however, puts them in a position to give important support to other public agencies more specifically assigned park and open-space duties.

> Port districts may participate directly when providing river access, moorages, marinas, and airports as well as commercial needs. Indirectly, through their land-development function, they are also in a position to insist on site-design practices preserving or enhancing greenway qualities along waterways. (18)

This site is one of two potential sites that are controlled by the Port of Portland (see "KELLY POINT NORTH" site). It is conceivable that this two-parcel proposal would compel the Port to allow one site (of their choosing). The sacrifice of either one of these two fine sites could be tolerated if temporary tie-up facilities adjacent to Kelly Point Park could finally become reality.
Although use of the shore of the Willamette River immediately north of the entrance to this slough ("Kelly Point West") constitutes a major hazard to commercial shipping interests, no objection is raised to development well within the slough (33).
Priority: A

RIVER MILE: 17.1 (Willamette)

SITE: "WILLAMETTE PARK"

OWNERSHIP OF ADJACENT LAND: City of Portland, Bureau of Parks
1107 S.W. Fourth Avenue
Portland, OR 97204
Contact: Timothy R. Nolan,
Project Coordinator

PROPOSED FACILITIES: 10' x 175' dock attached to six pilings (to be driven) arched to follow the west bank of the river at the south end of Willamette Park approximately 20' offshore; gangway attached to northern end leading to shore.

POSITIVE FEATURES OF SITE: Excellent shore-based facilities; good wave and wake protection; expected financial cooperation by City of Portland.

NEGATIVE FEATURES OF SITE: Much trailerboating and waterskiing activities in area; probable initial dredging needed in possibly rocky soil; area limited as to number of boaters accommodated.

NOTES: Although this site abuts a pleasant park with good recreational facilities, the presence of other recreational traffic, the need for initial dredging, and limited space would cause a lower priority were it not for the intention of the City of Portland to install a dock at this site. Coordination with the City and subsequent sharing of expenses thus improves the economic consideration of this site.

The lack of neighborhood park and recreation facilities in this area of Portland has brought pressure on the City to provide
additional facilities in present park areas such as Willamette Park. Plans call for installation of a "fishing dock" at this site with a gangway to shore. The combination of this need with that of the cruising boater would be an economical solution for all parties.

The Lower Willamette River Management Plan has designated this area as one with potential for marinas and moorages and one in which water-skiing is to be discouraged (88).

RECOMMENDATION: Coordination with the City of Portland for installation of facilities at this site as soon as possible.
Priority: A

RIVER MILE: 22.0 (Willamette)

SITE: "ROCKY ISLAND"

OWNERSHIP OF ADJACENT LAND:

ISLAND: Clackamas County
Courthouse
8th & Main
Oregon City, OR 97045

MAINLAND: Society of Sisters of the Holy Names of Jesus and Mary
Marylhurst College
Marylhurst, OR 97036

PROPOSED FACILITIES: Drive six pilings close to mainland shore approximately 35' apart, arched to follow shoreline; attach camels between pilings to stage off vessels from shore with eye-bolts sunk in camels approximately every 10' for belaying purposes; place red and white vertically striped buoy over shallows at downstream end of moorage area near island (circular "CONTROLLED AREA" marker already in place on island entrance to area).

POSITIVE FEATURES OF SITE: Excellent wind, wave and wake protection; no dredging needed; little commercial traffic.

NEGATIVE FEATURES OF SITE: Limited number of vessels accommodated; some water-skiing in area at present.

NOTES: Although the site is limited in the number of vessels that can be accommodated, cost of development is proportionately small. Most water-skiiers use the main channel of the Willamette in this area (north of Rocky Island).

RECOMMENDATION: Development as indicated as soon as possible.
RIVER MILE: 23.3 (Willamette)

SITE: "CEDAR ISLAND LAGOON"

OWNERSHIP OF ADJACENT LAND: Willamette-Western Corp.
Foot of N. Portsmouth
Portland, OR 97203
Contact: W. T. Moore, Special Assistant to the President

PROPOSED FACILITIES: Minor dredging at entrance to lagoon; drive ten pilings approximately 50' apart parallel with southwest shore of lagoon inside Cedar Island; attach camels between pilings to stave off vessels from shore; sink eyebolts in camels approximately every 10' for belaying purposes.

POSITIVE FEATURES OF SITE: Excellent wind, wave, and wake protection; little if any dredging at entrance only; little commercial traffic; restrooms being built on shore.

NEGATIVE FEATURES OF SITE: Possible cancellation of approval for use of area by island owner in the future.

NOTES: Corporate owner of island reserves the right to resume dredging in this lagoon at some future time but is amenable to pursuing the lease of the lagoon as a temporary tie-up site (48). Owner may offer special arrangement for any dredging needed for navigation purposes.

The island was included in a now-defunct plan for a three-phase, $300,000 marina proposed by Clackamas County Department of Parks in 1973 which included the following statement:
Operations and natural conditions at the lower end of (Cedar) Island have created a protected bay providing relatively slack water away from the main stream. This may well be the most ideal location for providing a marina-type facility in this area of the river. (109)

The plans for the area progressed no further than the popular launch ramp and parking area located at nearby Cedar Island Park immediately adjacent to the island on the mainland. Clackamas County is planning to install restrooms at this facility. Upon completion, the site will be turned over to the City of West Linn for management (43). The City of West Linn has no plans to develop the site any further.

RECOMMENDATION: Development of facilities as indicated as soon as possible.
RIVER MILE: 60.5 (Columbia)

SITE: "LOWER END OF WALKER ISLAND"

OWNERSHIP OF ADJACENT LAND: Smith Tug & Barge
611 A East
Rainier, OR 97046

PROPOSED FACILITIES: None at this time.

POSITIVE FEATURES OF SITE: Located on opposite side of Walker Island from main channel; approximately midway between Portland area and Astoria; shore access possible.

NEGATIVE FEATURES OF SITE: Initial dredging of access and site itself necessary; area presently in extensive use as log storage site; limited number of vessels that could be accommodated.

NOTES: Site similar to "PIRATES COVE" site on mainland shore which offers more protection from wind and waves and would thus be preferable. Shore access at site in question, however, would be added benefit. Development of facilities at Fisher Island (two miles downriver) by the State of Washington that could provide similar facilities for boaters in the area should also be monitored.

RECOMMENDATION: Re-evaluate need for temporary tie-up facilities in this area in next biennium.
RIVER MILE: 61.0 (Columbia)

SITE: "PIRATES COVE"

OWNERSHIP OF ADJACENT LAND: Smith Tug & Barge
611 A East
Rainier, OR 97046

PROPOSED FACILITIES: None at this time.

POSITIVE FEATURES OF SITE: Lovely wooded site; good distance from main channel; popular site in present undeveloped state with one area yacht club; water depth appears adequate.

NEGATIVE FEATURES OF SITE: Area presently in extensive use as log storage site; periodic railroad noise; limited number of vessels that could be accommodated; shear rock bank precludes possibility of shore access.

NOTES: Occasional removal of log rafts (by owner) and use of site by one Portland area yacht club depends on personal relationship with adjacent landowner with whom communication could be initiated to pursue the possibility of permanent development during next biennium. Development of facilities at Fisher Island (two miles downriver) by the State of Washington that could provide similar facilities for boaters in the area should also be monitored.

RECOMMENDATION: Explore attitude of adjacent landowner through formal channels, monitor development at Fisher Island and re-examine need for temporary tie-up facilities in this area in next biennium.
RIVER MILE: 75.0 (Columbia)

SITE: "SANDY ISLAND" (NEAR GOBLE)

OWNERSHIP OF ADJACENT LAND: Roland E. Brusco, et al
110 S.E. Caruthers St.
Portland, OR 97214

PROPOSED FACILITIES: None at this time.

POSITIVE FEATURES OF SITE: Secluded site; well protected; ample to serve the needs of many boaters.

NEGATIVE FEATURES OF SITE: Extensive initial dredging required and extensive maintenance probable; attitude of adjacent landowner unable to determine.

NOTES: Were this site closer to Portland/Vancouver, it might be sufficiently popular to justify the extra investment needed to develop it into a good harbor of refuge. At this distance from the urban area plus the costs of extensive dredging--initial as well as maintenance--this site would not be as wise a development as the PRIORITY A "COFFIN ROCK" site approximately two miles downriver. At present, the site is too shallow for rowboats to enter. The new Port of Kalama Marina, immediately adjacent to this site on the Washington shore, is capable of serving the need for a harbor of refuge in this immediate area.

RECOMMENDATION: Re-examine this site next biennium for changes in sedimentation, re-evaluating if "COFFIN ROCK" site not developed.
RIVER MILE: 79.7 (Columbia)

SITE: "GOAT ISLAND"

OWNERSHIP OF ADJACENT LAND: Mrs. Diane Kem
Rt. 2, Box 2014
Deer Island, OR 97051

Tidelands leased to Smith Tug & Barge

PROPOSED FACILITIES: None at this time.

POSITIVE FEATURES OF SITE: Good placement in river for harbor of refuge; sandy beach adjacent for recreation; receptive attitude of adjacent landowner.

NEGATIVE FEATURES OF SITE: Initial dredging required with all indication of continual maintenance dredging; conflict with fishermen; room for limited number of vessels; area presently on yearly lease for log storage.

NOTES: Periodic dredging of the Upper Martin Island Bar by the U.S. Army Corps of Engineers from July, 1971 to October, 1974 helped to turn Goat Island into an actual peninsula (94). The blocking of the waterway that separates Goat Island from Deer Island has caused drastic siltation of the area immediately upstream from the site in question. The combination of lack of current flow around the west side of Goat Island and the continued placement of dredge spoils on the east side of the island (subject to inevitable removal and deposition farther downstream) is probably the cause for the continuing shoaling of this site, and the subsequent necessity of frequent dredging to maintain
proper draft should the site be developed. Considering the limited number of vessels that the site, if developed, could support (six or seven), investment in this site would be better spent elsewhere.

RECOMMENDATION: Re-examine site in next biennium for shoaling trends and possible development.
Priority: B

RIVER MILE: 85.4 (Columbia)

SITE: ST. HELENS CITY PARK

OWNERSHIP OF ADJACENT LAND: City of St. Helens
                                          St. Helens, OR 97051

PROPOSED FACILITIES: None at this time.

POSITIVE FEATURES OF SITE: Present on-shore development of facilities; sandy beaches for recreation; probability of local financial cooperation.

NEGATIVE FEATURES OF SITE: Fairly exposed to wind, wave, and wake action; congested area of river; shoaling of area north of island.

NOTES: Located on the north tip of the island immediately adjacent to the City of St. Helens (locally termed "Sand Island"), the Parks & Recreation Department has cleared brush, installed picnic tables, and plans to install sanitary facilities. Depending on the treatment of these present facilities by the public, i.e., the possibility of vandalism, the City will most likely encourage further development of this site through the addition of a floating dock attached to pilings with a gangway for shore access.

RECOMMENDATION: Monitor developments with the department for possible budgeting in the next biennium.
RIVER MILE: 115.0 (Columbia)

SITE: "GOVERNMENT ISLAND NORTH" (OPPOSITE FISHER'S LANDING)

OWNERSHIP OF ADJACENT LAND:

PROPOSED FACILITIES: None at this time.

POSITIVE FEATURES OF SITE: Tree-lined site capable of serving the needs of an unlimited number of boaters; stable water depth.

NEGATIVE FEATURES OF SITE: Near main channel of Columbia, possible conflict with commercial traffic; water depth marginal; no protection from waves, wakes and winds without extensive additional protective facilities; attitude of adjacent landowner unknown.

NOTES: Winds in the area of this site are reported to be intense, especially during the winter months. Wave attenuation devices would be required on three sides for protection. Similar protective facilities at other proposed sites ("COFFIN ROCK," "KELLY POINT NORTH") could be less substantial due to greater initial natural protection. These other proposed sites also offer shore-based facilities.

RECOMMENDATION: Re-examine need for temporary tie-up facilities at this site in next biennium; monitor developments at nearby anchorage area near the I-205 bridge (see "THE SLOT" proposed site).
RIVER MILE: 117.4 (Columbia)

SITE: "MCGUIRE ISLAND--SOUTH"

OWNERSHIP OF ADJACENT LAND:

PROPOSED FACILITIES: None at this time.

POSITIVE FEATURES OF SITE: Good protection on north side; depth of water sufficient at site.

NEGATIVE FEATURES OF SITE: Extensive initial dredging to provide access to site; probability of extensive dredging to maintain access; use restricted by size to limited number of vessels.

NOTES: As with other sites in this area south of Government Island, shoaling has become so pervasive that it is conceivable that over a mile of dredging would be needed to reach this site with any measure of safety. In addition, there is no certainty that such extensive dredging would not be needed on a continuous basis.

RECOMMENDATION: Re-examine this site next biennium for trends in shoaling patterns.
RIVER MILE: 118.5 (Columbia)

SITE: "CROWN Z PROPERTY"

OWNERSHIP OF ADJACENT LAND: Crown Zellerbach Co.
1500 S.W. First Avenue
Portland, OR 97201

PROPOSED FACILITIES: None at this time.

POSITIVE FEATURES OF SITE: Unlimited number of vessels possible; good depth of water.

NEGATIVE FEATURES OF SITE: Additional investment in wave/wake attenuation facilities needed; fairly close to channel with tug and barge traffic; adjacent landowner unwilling to terminate lease with party now engaged in log dump business at site.

NOTES: This four-acre, industrially-zoned site is presently leased to a party for a public log dump and raft storage. Although the property owner is willing to continue discussions with Multnomah County (initiated almost two years ago) on the use of land immediately to the west of this site, no desire exists at present to conclude the agreement with the lessee in the area of this specific site.

Earlier discussions between the property owner and Multnomah County related to the possibility of developing this land to the west as a launch ramp and parking area and, eventually, a waterfront park with related marine facilities. Such a development, which could include moorage for the large non-trailerable boat, would provide excellent protected anchorage...
behind this sheltering peninsula as well as offer easy access to shore facilities. Supervision of this site could be provided by the staff of the nearby Blue Lake County Park. The continuance of these discussions should be urged as a matter of top priority in efforts to establish a harbor of refuge in this area.

In conversation with the corporate owner of this property, two sites on the Columbia where land is also owned by Crown Zellerbach were offered as potential temporary tie-up areas with their approval: the south bank of North Portland Harbor in front of Crown Zellerbach's Ink Division plant (2985 North Marine Drive); and the area on the south bank of the Columbia in line with the east end of Government Island between the Ducks and Big Eddy marinas (42). The former area has few qualities that would make it a popular tie-up site (in an industrial area; no facilities on shore; and too close to North Portland Harbor moorages to qualify as a good "harbor of refuge") while the latter area rates higher in appearance and protection, and is worthy of further investigation. At present, the entire area south of Government Island is suffering from shoaling in this year of record lows in water levels in the Columbia (see "MCGUIRE ISLAND--SOUTH" site).

RECOMMENDATION: Investigate above site when water levels allow; encourage Multnomah County to move with haste to secure peninsula to west of "CROWN Z PROPERTY" site for marine-oriented facilities. Immediate action would benefit all concerned while delay may cause landowner to exercise other options for the area.
Priority: B

RIVER MILE: 124.1 (Columbia)

SITE: "GARY ISLAND"

OWNERSHIP OF ADJACENT LAND: State of Oregon

PROPOSED FACILITIES: None at this time.

POSITIVE FEATURES OF SITE: Ability to make greater use of ongoing investment in dredging planned for entrance to site in connection with development on neighboring island (Flag Island).

NEGATIVE FEATURES OF SITE: Possible congestion of area.

NOTES: Although the area behind these two islands may become severely congested with water-skiing boaters, the addition of dock facilities at Gary Island would make for better utilization of the investment in site preparation now planned for Flag Island, considering the fact that the same entrance channel, already earmarked for dredging, is shared. This site should be examined once use patterns are established upon completion of facilities on Flag Island. Planned placement of dredge spoils on the shore of Gary Island should be made with the possibility of developing this area in the future.

RECOMMENDATION: Direct placement of dredge spoils from the passage between Gary and Flag Islands with an eye toward the development of Gary Island in a manner similar to Flag Island; examine area for possible addition of this nature once presently-planned development is complete and area can be evaluated for possible overcongestion.
RIVER MILE: 131.6 (Columbia)

SITE: "SAND ISLAND NORTH"

OWNERSHIP OF ADJACENT LAND: State of Oregon

PROPOSED FACILITIES: None at this time.

POSITIVE FEATURES OF SITE: Much potential for development of entire island as a unit; good distance from main channel of Columbia.

NEGATIVE FEATURES: Very little protection from winds, waves and wakes without extensive additional facilities; probable increase in shoaling over next few years.

NOTES: Winds in area of this site are reported to be intense especially during winter months. Protection devices required on north and east sides of site. At present, facilities proposed for "ROOSTER ROCK LAGOON" site three miles downstream present greater possibilities.

RECOMMENDATIONS: Re-examine site once facilities at Flag Island are complete to assess demand for additional facilities in this area.
RIVER MILE: 133.3 (Columbia)

SITE: "DALTON POINT"

OWNERSHIP OF ADJACENT LAND: State of Oregon, Division of Highways

PROPOSED FACILITIES: None at this time.

POSITIVE FEATURES OF SITE: Adjacent to Dalton Point Launch Ramp with picnic tables, pit toilets, etc.; better protection from wind, wave and wake action than most sites in area; good distance from main channel; well placed on river for "harbor of refuge" development.

NEGATIVE FEATURES OF SITE: Some initial dredging required; lacking complete protection from elements; number of vessels limited at site; some conflict with trailer-boaters using launch ramp on shore; some traffic noise.

NOTES: Similar in some respects to "FASHION REEF" site, but less potential conflict with commercial traffic. Access to shore facilities and better protection from elements also make this site preferable. A need for a harbor of refuge in this area of the river would be met in this site.

RECOMMENDATION: Re-evaluate this site as soon as possible in the next biennium, utilizing floating mini-breakwater (see Appendix II-C)
RIVER MILE: 135.3 (Columbia)
SITE: "FASHION REEF"

OWNERSHIP OF ADJACENT LAND: State of Oregon, Parks & Recreation

PROPOSED FACILITIES: None at this time.

POSITIVE FEATURES OF SITE: Adjacent to Benson State Park (access undeterminable); well-placed on river as a harbor of refuge site.

NEGATIVE FEATURES OF SITE: Some initial dredging required; protection from wind, waves and wakes lacking without additional attenuation devices; number of vessels limited at site; traffic noise from highway; considerable conflict with tug and barge traffic executing difficult maneuvers in area.

NOTES: Consultation with commercial transportation interests (47) revealed site in question is located in area where tug and barge skippers are forced to execute sharp turn in narrow channel in frequently fast-flowing current. Nearness of site to this area, lack of protection from elements, hazard of nearby reef, and difficulty in reaching shore facilities make this site less desirable than the nearby "DALTON POINT" site downriver approximately 1-1/2 miles. Excellent facilities can presently be found at Beacon Rock State Park (Washington State), approximately six miles from this site.

RECOMMENDATION: Re-examine need for temporary tie-up facilities at this site in next biennium.
RIVER MILE: 8.3 (Multnomah Channel)

SITE: "COON ISLAND MARINE PARK" (Phase III)

OWNERSHIP OF ADJACENT LAND: Columbia County

PROPOSED FACILITIES: None at this time.

POSITIVE & NEGATIVE FEATURES OF SITE: See "COON ISLAND MARINE PARK" (Phase II)

NOTES: With the proven popularity of this site, consideration should be given to an additional dock and gangway to shore located up the channel (south) from existing and proposed facilities, on same side of the island, to obtain maximum utilization of present investment in on-shore facilities.

RECOMMENDATION: Examine need for additional facilities at this site in next biennium.
APPENDICES

SECTION II
Site Evaluation Form for Physical Suitability

The following form was developed by the State Marine Board for use by the Rafters Yacht Club in their physical evaluation of potential sites for temporary tie-up facilities. As mentioned in the text of this study, much credit is due this organization for their efforts in surveying the sites by boat and reporting their findings to the Board.
SITE EVALUATION FORM

CHART NO. _________________________ AREA NO. _________________________

DATE OF EVALUATION _________________________ FINAL PRIORITY NO. (State) _________________________

DATUM PLANE OF WATER ON DATE OF SURVEY _________________________

SITE LOCATION: LATITUDE __________ Longitude __________

PRONIEMNT NEARBY LANDMARKS: _________________________

DESCRIPTION OF SITE: TREES __________ WIND EXPOSURE __________

PRIMARY ORIENTATION _________________________

WIDTH OF WATERWAY (draw sketch of site & attach to report form, existing structures, pilings, dolphins, docks, floats. Photograph site if possible, upstream, downstream & shore line.)

1. HARDER OF REFUGE
   a. Wind, wave and wake protection; existing conditions;

   b. Wind conditions at site at time of inspection;

2. ACCESSIBILITY FROM RIVER TO SITE
   a. Channel dredging required?

   b. Channel widening required?

   c. Note any existing hazards

3. DEPTH OF WATER AT SITE
   a. Depth at time of survey?

   b. Dredging necessary?
4. MOORAGE POTENTIAL
   a. Number of 20 to 32 foot boats that can be accommodated?
   b. Recommended number of pilings required?
   c. Spacing of piling?
   d. Pattern of spacing?
   e. Cable installation for bow mooring?
   f. True bearing of required piling and/or cables?
   g. Float or other structure needed to make mooring possible?
   h. Size of float needed & general description thereof
   i. Fuel or supplies available nearby?
   j. On shore recreational facilities nearby?
   k. Noise problems?

5. CONFLICT WITH OTHER TRAFFIC
   a. Distance from nearest edge of channel?
   b. Tugs
c. Ocean going vessels
   d. Normal travel routes, etc.

6. CONFLICT WITH OTHER ACTIVITIES
   Water skiers, hunters, fishermen, etc.
   Commercial activities; log rafts, pole yards, saw mills, etc.

7. OWNERSHIP OF ADJACENT LANDS
   Any occupied dwellings nearby?
   Any occupied businesses operating nearby?

8. DISTANCE FROM PORTLAND METRO AREA
   From Broadway bridge
EVALUATOR'S RECOMMENDATIONS:

Rate this site on a scale from 1 to 10

1 = Excellent
5 = Suitable
10 = Not suitable

RATING

COMMENTS:

AREA #1 WILLAMETTE RIVER
CHART #6171 #6172 #6155

AREA #2 MULTNOMAH CHANNEL
CHART #6154

AREA #3 DOWNSTREAM FROM KELLEY POINT LIGHT (Columbia river)
CHART #6153 #6154

AREA #4 UPSTREAM FROM KELLEY POINT LIGHT (Columbia river)
CHART #6156 #6157 #6154
APPENDIX II-B

Survey of Boater Preferences in Temporary Tie-Up Sites

Why cruising boaters choose the sites they do for overnight moorage would undoubtedly be an interesting investigation. The small study undertaken in the course of this paper was designed as much to test possible questions for such a future investigation as it was to actually provide data upon which decisions should be made. Even though the sample size approached insignificance, the following results report the findings of this brief survey.

The questionnaire was verbally introduced to 12 boaters who were cruising or preparing to cruise in the Portland/Vancouver metropolitan area. Respondents, operators of nine powerboats from 26' to 34' (mean 29.7') and three sailboats from 25' to 31' (mean 27') were then handed the questionnaire and asked to indicate those factors that influence their decision in the selection of overnight tie-up spots, describing each criterion on a scale of 1 to 5 for "not important" to "extremely important", respectively.

Mean values for each criterion, ranked in order of popularity, are listed on the following page.
<table>
<thead>
<tr>
<th>Feature</th>
<th>Mean Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Protection from wakes and wind (or absence of same)</td>
<td>5.00</td>
</tr>
<tr>
<td>Absence of noise from land (traffic or industrial)</td>
<td>4.08</td>
</tr>
<tr>
<td>Closeness to Portland metropolitan area</td>
<td>3.33</td>
</tr>
<tr>
<td>Access to areas of interest on shore (parks, activities)</td>
<td>3.25</td>
</tr>
<tr>
<td>Attractiveness of area</td>
<td>2.92</td>
</tr>
<tr>
<td>Nearness to fuel/supplies</td>
<td>2.08</td>
</tr>
<tr>
<td>Access to restrooms on land</td>
<td>1.67</td>
</tr>
<tr>
<td>Ability to rendezvous with shore-based friends</td>
<td>1.33</td>
</tr>
</tbody>
</table>

In addition, one interviewee mentioned "Away from waterskiers" as a criterion in selecting a temporary tie-up spot, assigning it an "extremely important" rating.

The actual questionnaire utilized in this "mini-survey" is shown on the following page.
August, 1977

Dear Cruising Boater:

Please indicate which of the following criteria you would use in evaluating the desirability of temporary overnight moorages or "harbors of refuge". Assume you would have pilings and/or floating docks to which to tie-up, but that the facility would not be connected with any developed marina.

Please circle the number that best describes your feelings:

| Closeness to Portland metropolitan area | 1 | 2 | 3 | 4 | 5 |
| Attractiveness of area | 1 | 2 | 3 | 4 | 5 |
| Protection from wakes and wind (or absence of same) | 1 | 2 | 3 | 4 | 5 |
| Absence of noise from land (traffic or industrial) | 1 | 2 | 3 | 4 | 5 |
| Access to areas of interest on shore (parks, activities) | 1 | 2 | 3 | 4 | 5 |
| Access to restrooms on land | 1 | 2 | 3 | 4 | 5 |
| Ability to rendezvous with shore-based friends | 1 | 2 | 3 | 4 | 5 |
| Nearness to fuel/supplies | 1 | 2 | 3 | 4 | 5 |

Type of boat cruised:
- Power ______ Length ______
- Fixed-keel sail ______ Length ______
- Centerboard sail ______ Length ______

THANK YOU!
APPENDIX II-C

Floating Breakwaters for Temporary Tie-up Sites

Any discussion of new moorage facilities in the coastal zone must include plans to protect moored craft from the severe and often destructive action of ocean waves. Fortunately, large and expensive breakwaters are not needed in the Columbia and Willamette Rivers, far removed from this kind of wave action.

Although not forced to confront the problem of ocean waves, several sites along the Columbia recommended for development as harbors of refuge are in areas that are susceptible to wave action from other sources—small, choppy waves that result from winds (usually easterly or westerly) in the area, and waves caused by wakes not only from large-displacement ships on their way to and from the open sea, but from smaller vessels passing close to the proposed sites as well. These waves from ships' wakes can be especially damaging, given the shallow depth and narrowness of the river. It is protection from these kinds of waves that must be sought if the sites are truly to be called "harbors of refuge."

Even if solid breakwaters of rubble, timber, piling or fill were required as wave attenuation devices for these sites, it is doubtful that installation could be justified. Solid breakwaters recently constructed in the Pacific Northwest have cost from $2.26 per linear foot at Dungeness to $5.18 per linear foot at Shilshole.
Bay and $6.66 per linear foot at Point Roberts (41). Although these breakwaters were admittedly constructed in water depths of up to 30 feet, their greater overall length in turn would have brought costs down. This kind of expense for temporary tie-up sites would far exceed the benefit derived from such periodic use by so few boaters.

Nor is the complete suppression of oncoming waves, the primary advantage of fixed breakwaters, imperative for safe moorage at these sites—substantial motion reduction of vessels moored at the sites is sufficient. In the area of this study, such a requirement could be met through the use of floating breakwaters.

In addition to lower cost, floating breakwaters are portable, allowing their easy removal if necessary for any reason (which, in turn, would tend to overcome objections to the creation of these protected harbors of refuge), and they are not likely to cause any shoaling in their lee, whereas solid breakwaters tend to cause sand and silt carried in the river to settle out when reaching the protected area downstream, leading to shoaling and the need to provide for maintenance dredging. Inspection of river areas downstream from Corps of Engineers training pile dikes bears out suspicion of this latter possibility.

Most literature on the subject of floating breakwaters recommends that floating breakwaters be considered only if the location of the breakwater is not subjected to waves greater than three feet in height or with a period greater than four seconds, conditions rarely,
if ever, exceeded in the study area. The effectiveness of a floating breakwater in this range is usually quantified by use of a "transmission coefficient" which is the ratio of transmitted wave height to incident wave height, i.e.,

\[ C_t = \frac{H_t}{H_i} \] (41).

A floating breakwater that reduces a two-foot wave \((H_i = 24\text{"})\) to six inches inside the moorage area \((H_t = 6\text{"})\) would thus have a "transmission coefficient" of .25 \((6\text{"}/24\text{"})\), or reciprocally, an effectiveness of 75%.

Hundreds of exotic designs for floating breakwaters exist, all engineered for the particular height, frequency and period of waves expected in the area for which designed. In the area of this study, an area of wind chop and ship wakes instead of long-period ocean waves, one type of floating breakwater appears to be ideal—the common log raft.

Relying on its width instead of vertical wall to attenuate wave energy, the transmission coefficient of a log raft of a width approaching (or exceeding) twice the length of the incident wave approaches 0.2, about as low as can be expected for any floating breakwater (41). The following graph plots this transmission coefficient for all ratios of beam width of a log raft, "W", to length of incident wave, "L":
It is the beam of the raft that is the controlling dimension, the primary element of the breakwater that acts to reduce the transmitted wave energy by suppressing the vertical barrier to wave transmission (41). It is remarkably effective in suppressing those types of waves found in the area of this study.

Utilization of a log raft, tethered to dolphins far enough offshore to allow use of the moorage area by the expected number of vessels, would be as economical as it is protective. A tug and barge firm that must lease submerged lands from the State Land Board for use as log raft stations elsewhere would undoubtedly be delighted to provide a log raft for such a purpose, helping to fill the needs of the State Marine Board while being allowed complementary storage of one of the firm's log rafts (assuming approval of the State Land Board).

In short, the sites recommended for development into harbors of refuge that require wave attenuating devices could well find good
protection at minimum cost in the form of either one- or two-log rafts (''shear booms'') for wind chop, and regular commercial log rafts for larger wave/wake conditions. Increased log-rafting site rental costs have caused the decline of log rafts on the River, which has resulted in fewer unofficial tie-up spots for the cruising boater. Perhaps this "Resource of the River" should be brought back to serve these needs once again.
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LIST OF SOURCES CONSULTED


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