



MARINA DEL REY SLIP SIZING STUDY MARINA DEL REY, CALIFORNIA

**PREPARED FOR
DEPARTMENT OF BEACHES AND HARBORS
COUNTY OF LOS ANGELES**

**PREPARED BY
NOBLE CONSULTANTS, INC.
2201 DUPONT DRIVE, SUITE 620
IRVINE, CA 92612**

MARCH 11, 2009



March 11, 2009

Mr. Santos H. Kreimann
Director
County of Los Angeles
Department of Beaches and Harbors
13837 Fiji Way
Marina del Rey, CA. 90292

Re: **Final Draft Report**
Marina del Rey Slip Sizing Study
Marina del Rey, California
For the Department of Beaches and Harbors

Dear Santos:

Noble Consultants, Inc. (NCI) is pleased to submit one bound hard copy and one electronic copy of our Final Draft Report for the above referenced project.

We appreciate the opportunity to have performed this study and prepared this report for the Department of Beaches and Harbors.

Sincerely,

NOBLE CONSULTANTS, INC.

A handwritten signature in black ink, appearing to read "Ronald M. Noble".

Ronald M. Noble, P.E.
President

A handwritten signature in black ink, appearing to read "Wenkai Qin".

Wenkai Qin, Ph.D., P.E.
Senior Engineer

RMN/ njm

FINAL DRAFT REPORT
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I EXECUTIVE SUMMARY

This study reviews the boat berth slip distributions for 21 individual marinas within Marina del Rey that were originally constructed between 1964 and 1972. In addition to these marinas there are additional boat berths within Marina del Rey for commercial use (i.e. Parcels 1, 55, 56 and 61) and for temporary, transient, boating lessons/training, and government use (i.e. Parcels EE, 48, 62 and 77) that are not included within this study. Since the 21 marinas were originally constructed forty or so years ago some of these marinas have either already been replaced or in addition have been reconfigured and replaced. Numerous other marinas are now in the process of receiving approvals to be reconfigured and replaced.

The purpose of this study was to evaluate boat berth slip distribution criteria for the marinas undergoing reconfiguration and replacement in order to balance the recreational boating needs and demands for all of Marina del Rey, and in order to adequately support the Marina del Rey boating activities for the next 40 years. This study therefore reviews the changes in boat berth distributions for the Marina del Rey individual marinas; compares these distributions to other California marinas; discusses the already reconfigured marinas and the proposed marina reconfigurations within Marina del Rey; reviews the Marina del Rey slip demand, California Department of Boating and Waterways (DBAW) marina design guideline, and the change in vessel beam widths versus vessel length since the 1960s; and provides recommendations for the continued reconfiguration of Marina del Rey marinas.

The main findings of this study include the following:

- Most of the 21 marinas constructed from 1962 to 1972 within Marina del Rey did not meet the DBAW slip clear width criteria.
- Both the power boat's and sail boat's beam width versus their length have increased since the 1960's.
- Marina del Rey's highest slip vacancy rate is for slips sizes of 35 feet in length and less.
- More boats in the 30 feet length and less category are moving to dry boat storage.
- The existing Marina del Rey boat berth slip distribution and average slip length for the 21 marinas is less than a majority of the other California marinas.
- Even when including the current proposed marina reconfigurations the resulting boat berth slip distribution and average slip length for the 21 marinas is less than a majority of the other California marinas.
- In order to upgrade the slip sizes and meet the current DBAW criteria there will be some reduction in the total number of slips.

- The total number of wet berths (slips) and dry storage (stacked, un-stacked & mast-up) can be maintained at an adequate level within all of Marina del Rey for the coming years with proper planning and management.

Based on the above findings and the detailed backup presented within this study the following is recommended:

- The following two different boat berth slip length distributions are recommended; the first distribution is for all marinas combined in Marina del Rey and the second distribution is for the maximum case for an individual reconfigured marina where additional boat berth slips of 30 feet or less in length are not justified, therefore resulting in a higher percentage of slips in the 31 feet to 50 feet length.

Recommended MDR Boat Slip Size Distributions

Berth Length (feet)	Combined Percentage for all MDR Marinas	Maximum Case Percentage for Individual Marina
≤ 30'	30%	0%
31' – 35'	20%	30%
36' – 40'	19%	25%
41' – 45'	10%	20%
46' – 50'	10%	14%
> 50'	11%	11%
Total	100%	100%

- The average Marina del Rey slip length for all marinas combined and for the maximum case individual reconfigured marina should not exceed 40 feet and 44 feet, respectively unless there is justification.
- The above slip length distributions and average slip lengths should not be considered absolute since there may be some marinas that have sufficient reason to exceed these recommendations.
- A minimum slip length of 30 feet is recommended for reconfigured marinas.
- The available open water area for additional wet slips should be utilized where appropriate, such as the funnel concept that still maintains adequate boat navigation, and the available landside area for dry storage should be utilized to insure a sufficient total number of boat berthing and storage.

- Reconfigured marina dock layouts and dimensions should meet the minimum requirements for both the DBAW marina berthing guidelines and the County's Marina del Rey's design criteria.
- The minimum slip clear widths for reconfigured marinas should be based on 50 percent for power boats and 50 percent for sail boats unless there is sufficient justification to do otherwise. Reconfigured marinas should be based on single boat berthing without utilizing double boat berthing unless there is sufficient justification.
- Reconfigured marinas should provide accessible boating facilities in accordance with the current DBAW marina berthing guidelines and the County guidelines, whichever is more stringent.
- The use of dry boat storage should be maximized throughout Marina del Rey.

II INTRODUCTION

Marina del Rey was formally dedicated in 1965. The harbor complex encompasses over 800 acres of upland development and over water facilities that serve a variety of landside and water related uses including providing berthing for over 5,000 boats. Over the past 40 years the harbor has evolved into an indispensable social, environmental and economic asset for Los Angeles County, and has become a role model for other urban marinas throughout the world. As the Marina heads into the next century, the County wishes to review and implement how the existing facilities, accommodations, and access can be improved and enhanced. Recently the Department held a “brain storming” meeting with key members of the Marina del Rey waterfront community to begin the planning process to arrive at how best to improve facilities, recreational opportunities, and water accessibility for all users and interests. The Department’s goals and objectives are to formulate a new marina master plan that optimally balances public and private interests, economic benefits, and recreational needs.

The purpose of this assignment was to perform a study and prepare a report of the current existing percentage of boat berth slip lengths which includes the average slip length, and the slip clear width dimensions, and forecasts the required increase in these dimensions for the marina boat docks being replaced in order to meet the current and future boating size demands to support boating activities for the next 40 years within Marina del Rey.

III DATA UTILIZED

The data utilized throughout this study came from numerous sources as summarized below:

- a. Marina del Rey initial marina slip counts—from Williams-Kuebelbeck and Associates, Inc. (W&K 1975)
- b. Marina del Rey marina slip counts for 1999, 2008, and proposed from County of Los Angeles, Department of Beaches and Harbors (DBH) files and marina plans.
- c. Marina del Rey marina slip length distributions for 1999, 2008 and proposed from DBH and Noble Consultants, Inc. (NCI) files
- d. Other California and Honolulu marina slip counts and slip length distributions from DBH and NCI files, from W&K 2001 and 2004, and from other sources.
- e. Marina del Rey marina slip widths versus slip lengths from Marina del Rey marina Dock Masters and from DBH and NCI files
- f. Marina del Rey marina slip vacancies from DBH files
- g. California Department of Boating and Waterways (DBAW) Marina Design Guidelines, Vessel Registrations, Boat Industry Vessel Length versus Beam, Boat Sales, etc. from publications within NCI files and from internet searches.

IV CHANGES IN BOAT BERTH DISTRIBUTIONS FOR MARINA DEL REY MARINAS

From 1964 through 1972 approximately 21 recreational boating marinas were constructed within Marina del Rey during its initial development. The parcel number and marina name including year built and initial number of slips is shown in Table 1. The location of these parcel numbers within Marina del Rey is shown in Figure 1. During the ensuing years there have been some modifications of boundaries in a few of the parcels resulting in changes of the total number of slips (Parcels 44, 45 and 47) along with some changes in the lessee of the parcels. In addition, there have been some minor changes in total number of slips due to some slip reconfigurations during routine maintenance repairs, and some significant changes in total number of slips due to slip additions to both the Del Rey Yacht Club (Parcel 30) and the California Yacht Club (Parcel 132), and to more recent marina slip reconfigurations (Parcels 12, 13, 111 and 112) during dock replacement of aging facilities.

The above-referenced changes are reflected in the total number of slips shown for each Parcel from initial construction through years 1999 and 2008 in Table 1. The year 1999 is the first year that the Department of Beaches and Harbors initiated the counting and tracking of all marina slips minus the end tie and inside tie slips. However, the marina slip numbers and overall Marina del Rey slip number shown for initial construction is typically inflated since both end ties and inside ties were usually included within the slip count which has not been done for the 1999, 2008 and proposed slip totals. For instance after 56 slips were added to the Del Rey Yacht Club in 1982 the 1999 slip count became 287 implying that the initial constructed count should have been 231 slips not the shown 281 slips. Also, after 75 slips were added to the California Yacht Club in 1985 the 1999 slip count became 253 slips implying that the initial constructed count should have been 178 not the shown 245 slips. It is therefore estimated that the initial total slip number of 5,794 shown in Table 1 should be reduced by approximately ten percent to 5,215 in order to remove the counted end tie and inside tie slips when comparing to the total number of slips shown in Table 1 for 1999, 2008 and proposed.

The last column in Table 1 includes changes in the total number of slips for proposed marina replacements/reconfigurations for projects that have been approved (Parcel 15), and for projects that are currently in the approval process (Parcels 8, 10, 21, 42/43, 44, 45/47, and 125).

Table 2 presents the average slip length for each of the Marina del Rey marinas showing changes from 1999 to 2008, and to the currently proposed new marinas. This table shows that the average slip length for all of the marinas shown within the table increases from 32.5 feet to 33.9 feet from 1999 to 2008 and to 36.4 feet when including the new proposed marina reconfigurations, while the total number of slips decreased from 5,223 in 1999 to 4,731 in 2008 and to 4,255 when including the new proposed marina reconfigurations. The main reason for this decrease in total number of slips and increase

in the average slip length is the overall reduction of boat berth slip lengths of 35 feet or less and the increase of boat berth slip lengths of 36 feet or more as shown in the Marina del Rey slip length distributions in Table 3 for 1999, 2008 and proposed. This slight shift to larger berth slip lengths is due to the marketplace as will be further discussed in this report.

Table 3 also includes the Marina del Rey dry boat storage for the parcel locations which have a significant number of dry storage. There is also some additional dry boat storage located throughout Marina del Rey such as in Parcels 30 and 132 that are not included within this table. This table shows that there currently exists 817 dry boat storage with an increase to 1088 when including the new proposed projects, which is an increase of 271 dry boat storage. A vast majority of the dry boat storage is for boats of 35 feet or less in length.

If the existing wet boat storage (marina berths) is added to the existing dry boat storage and then compared to the “proposed” wet and dry boat storage, the total boat storage changes from an existing total of 5,548 boats to a proposed total of 5,343 boats as shown in Table 3. This amounts to only a 3.7% reduction. Figure 2 presents the average slip length in bar graph format for 1999, 2008 and proposed for all the marinas shown in Table 2 for easy comparison between the marinas and years.

The distribution of the individual slip lengths for all of these marinas within Marina del Rey have been plotted as the cumulative distribution of these individual slip sizes for comparison, and are presented within Appendix A. Figure A-1 presents the marina distributions for the year 1999 for all the marinas in which the distribution is smaller (larger amount of shorter length slips) than the distribution for all Marina del Rey marinas when combined. Figure A-2 presents the cumulative distribution for 1999 for all the marinas in which the distribution is larger (larger amount of longer length slips) than the distribution for all Marina del Rey marinas when combined. Figure A-3 and Figure A-4 present these distributions for the year 2008, while Figure A-5 and Figure A-6 present these distributions when including the new proposed marinas.

Table 4 presents a summary of these slip length distributions for the slip length in which 50 percent of the slips do not exceed this slip length and for the slip length in which 80 percent of the slips do not exceed this slip length for comparison of each marina. Figure A-7 in Appendix A presents the slip size distribution for the combined Marina del Rey marinas in bar graph format for 1999, 2008 and proposed.

Table 1. Marina Del Rey Waterfront Slip Count

Parcel No	Marina Name	Year Built	Reconfiguration &/or Replacement	Total Number of Slips		
				Initial ⁵	1999	2008
7	Tahiti Marina	1964	No	232	214	214
8	The Bay Club Apts & Marina	1966	Proposed	251	231	207
10	Neptune Marina	1964	Proposed	203	184	161
12	Deauville Marina	1966	Completed 2008	465	430	216
13	Villa del Mar Marina	1964	Completed 1989	297	186	186
15	Bar Harbor Marina	1968	Proposed	253	215	225
18	Dolphin Marina	1968	Completed 1999	462	424	424
20	Panay Way Marina	1964	Completed 2006	157	145	149
21	Holiday Harbor Marina	1968	Proposed	218	183	92
28	Mariners Bay	1966	No	407	369	369
30	Del Rey Yacht Club	1964	Completed 1982 ³	281	287	287
41	Catalina Yacht Anchorage	1964	No	160	148	148
42/43	Marina del Rey Hotel	1964	Proposed	399	349	277
44 ¹	Pier 44	1966	Proposed	472	232	143
45/47 ²	Burton Chace Park	1972	Proposed	201	332	188
53	The Boatyard	1964	No	113	103	103
54	Windward Yacht Center	1966	Completed 1997	0 ⁶	53	53
111	Marina Harbor Apts. & Anchorage	1964	Completed 2006	271	248	112
112	Marina Harbor Apts. & Anchorage	1970	Completed 2004	369	315	175
125	Marina City Club	1969	Proposed	338	316	273
132	California Yacht Club	1966	Completed 1985 ⁴	245	253	253
MDR Overall				5,794 ⁷	5,223	4,731

Note: ¹ The new Parcel 44 is only a portion of the original Parcel 44. The initial slip count was for the original Parcel 44.

² The new Parcel 45 is a portion of the original Parcel 44. The initial slip count was only for the original Baja Parcel 47.

³ 56 additional slips were constructed in 1982.

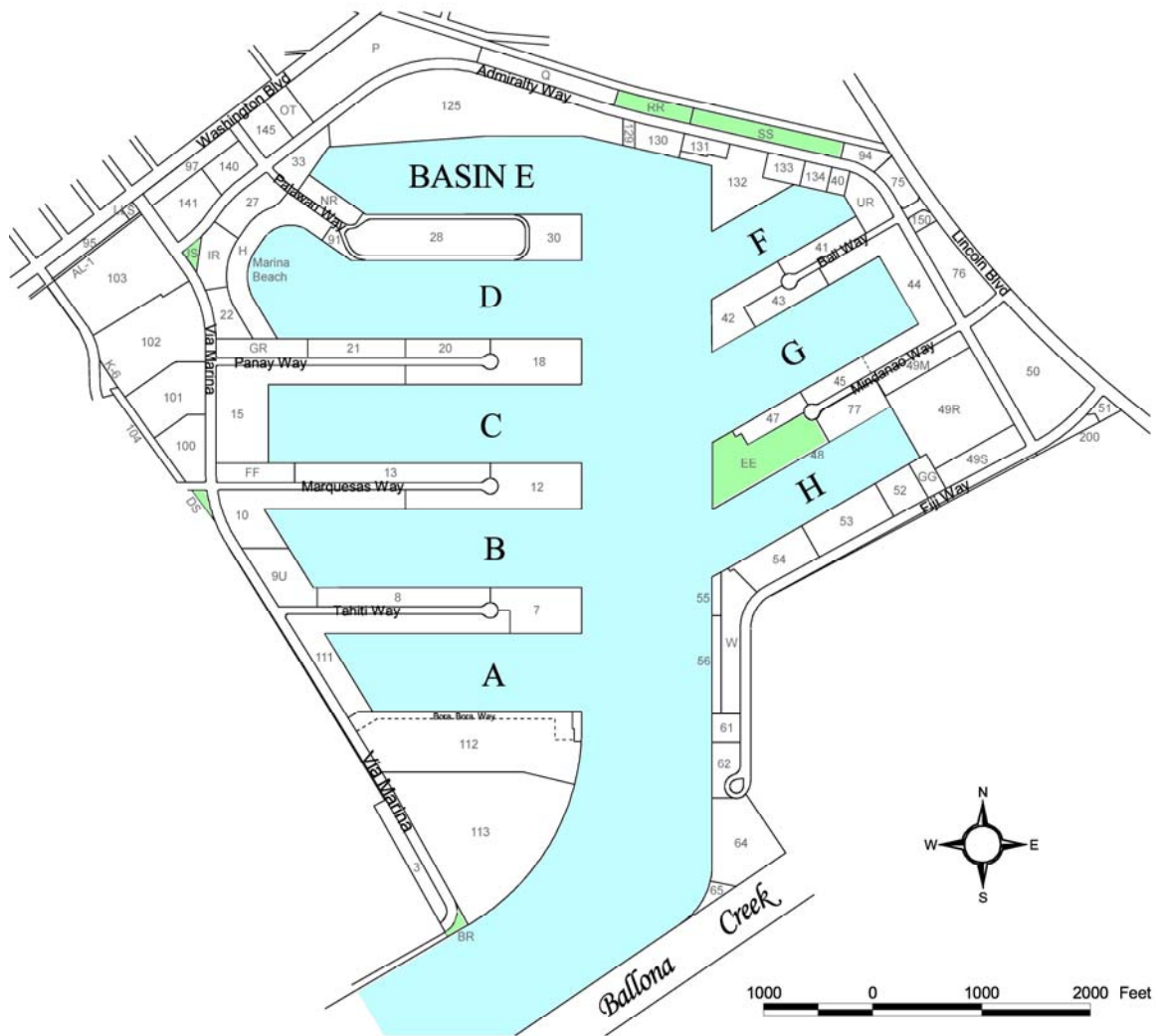
⁴ 75 additional slips were constructed in 1985.

⁵ The method of slip counting was different from the slip counting conducted in 1999 and thereafter.

The difference between the initial slip count and the 1999 slip count does not reflect the real change in slip numbers since the initial slip count also counted end ties and inside ties as slips which were not included in the 1999, 2008 and proposed slip counts.

⁶ Assumed there were no slips when initially constructed.

⁷ Based on note 5 it is estimated that this "total number of slips" would be reduced by approximately 10% to 5,215 when deleting end ties and inside ties as slips in order to compare to the 1999, 2008 and proposed numbers.



Map March 2007 by Chris Sellers, Los Angeles County Department of Beaches and Harbors
 Modified by NCI (2009) to Include Parcel 45.

Figure 1. MDR Parcel Location Map

Table 2. Average Slip Length Summary for MDR Marinas

Parcel No	Marina Name	Reconfiguration &/or Replacement	Total Number of Slips			Average Berth Length (ft)		
			1999	2008	Proposed	1999	2008	Proposed
7	Tahiti Marina	No	214	214	214	36.1	36.1	36.1
8	The Bay Club Apts & Marina	Proposed	231	231	207	34.6	34.6	34.7
10	Neptune Marina	Proposed	184	184	161	29.3	29.3	31.8
12	Deauville Marina	Completed 2008	430	216	216	31.6	45.4	45.4
13	Villa del Mar Marina	Completed 1989	186	186	186	41.8	41.8	41.8
15	Bar Harbor Marina	Proposed	215	215	225	32.0	32.0	29.3
18	Dolphin Marina	Completed 1999	424	424	424	32.1	32.1	32.1
20	Panay Way Marina	Completed 2006	145	149	149	30.2	30.3	30.3
21	Holiday Harbor Marina	Proposed	183	183	92	25.2	25.2	36.4
28	Mariners Bay	No	369	369	369	33.9	33.9	33.9
30	Del Rey Yacht Club	Completed 1982	287	287	287	39.2	39.2	39.2
41	Catalina Yacht Anchorage	No	148	148	148	26.3	26.3	26.3
42/43	Marina del Rey Hotel	Proposed	349	349	277	31.4	31.4	43.6
44	Pier 44	Proposed	232	232	143	27.0	27.0	34.7
45/47	County	Proposed	332	332	188	27.3	27.3	37.0
53	The Boatyard	No	103	103	103	30.9	30.9	30.9
54	Windward Yacht Center	Completed 1997	53	53	53	44.0	44.0	44.0
111	Marina Harbor Apts. & Anchorage	Completed 2006	248	112	112	30.8	45.5	45.5
112	Marina Harbor Apts. & Anchorage	Completed 2004	315	175	175	29.1	36.5	36.5
125	Marina City Club	Proposed	316	316	273	35.5	35.5	39.4
132	California Yacht Club	Completed 1985	253	253	253	39.4	39.4	39.4
MDR Overall			5,223	4,731	4,255	32.5	33.9	36.4

Table 3. MDR Slip Length Distributions and Wet/Dry Boat Storage

MDR Waterfront Slip Length Distributions

Berth Length	Slip Count		
	1999	2008	Proposed
20' or Less	156	158	75
21'-25'	1,406	1,073	665
26'-30'	1,403	1,183	902
31'-35'	1,011	891	857
36'-40'	624	671	799
41'-45'	230	252	357
46'-50'	197	223	265
51'-55'	59	77	90
56'-60'	98	123	139
61'-65'	21	29	39
66'-70'	4	26	35
71' -75'	2	2	4
76'-80'	6	19	20
81' or Larger	6	4	8
Total	5,223	4,731	4,255

MDR Dry Boat Storage

Parcel No	Dry Storage Count	
	Existing	Proposed
30	52	52
44	111	234
47	27	27
52/GG		349
77	201	0
132	122	122
Mast-up	304	304
Total	817	1,088

MDR Total Wet and Dry Boat Storage

Storage Type	Total Boat Storage	
	Existing	Proposed
Wet Storage	4,731	4,255
Dry Storage	817	1,088
Total	5,548	5,343

Table 4. Slip Length (in Feet) Distribution Summary for MDR Marinas

Parcel No	Marina Name	Reconfiguration &/or Replacement	50% of Slips Not Exceeding			80% of Slips Not Exceeding		
			1999	2008	Future	1999	2008	Future
7	Tahiti Marina	No	34	34	34	40	40	40
8	The Bay Club Apts & Marina	Proposed	35	35	35	40	40	40
10	Neptune Marina	Proposed	28	28	30	32	32	34
12	Deauville Marina	Completed 2008	30	45	45	35	50	50
13	Villa del Mar Marina	Completed 1989	40	40	40	50	50	50
15	Bar Harbor Marina	Proposed	30	30	25	40	40	35
18	Dolphin Marina	Completed 1999	30	30	30	40	40	40
20	Panay Way Marina	Completed 2006	30	30	30	35	35	35
21	Holiday Harbor Marina	Proposed	25	25	35	30	30	40
28	Mariners Bay	No	33	33	33	40	40	40
30	Del Rey Yacht Club	Completed 1982	35	35	35	50	50	50
41	Catalina Yacht Anchorage	No	25	25	25	35	35	35
42/43	Marina del Rey Hotel	Proposed	30	30	42	35	35	50
44	Pier 44	Proposed	24	24	35	34	34	38
45/47	County	Proposed	25	25	36	30	30	40
53	The Boatyard	No	30	30	30	35	35	35
54	Windward Yacht Center	Completed 1997	40	40	40	51	51	51
111	Marina Harbor Apts. & Anchorage	Completed 2006	30	40	40	35	70	70
112	Marina Harbor Apts. & Anchorage	Completed 2004	25	25	25	30	60	60
125	Marina City Club	Proposed	35	35	35	40	40	45
132	California Yacht Club	Completed 1985	40	40	40	45	45	45
MDR Overall			30	30	35	40	40	44

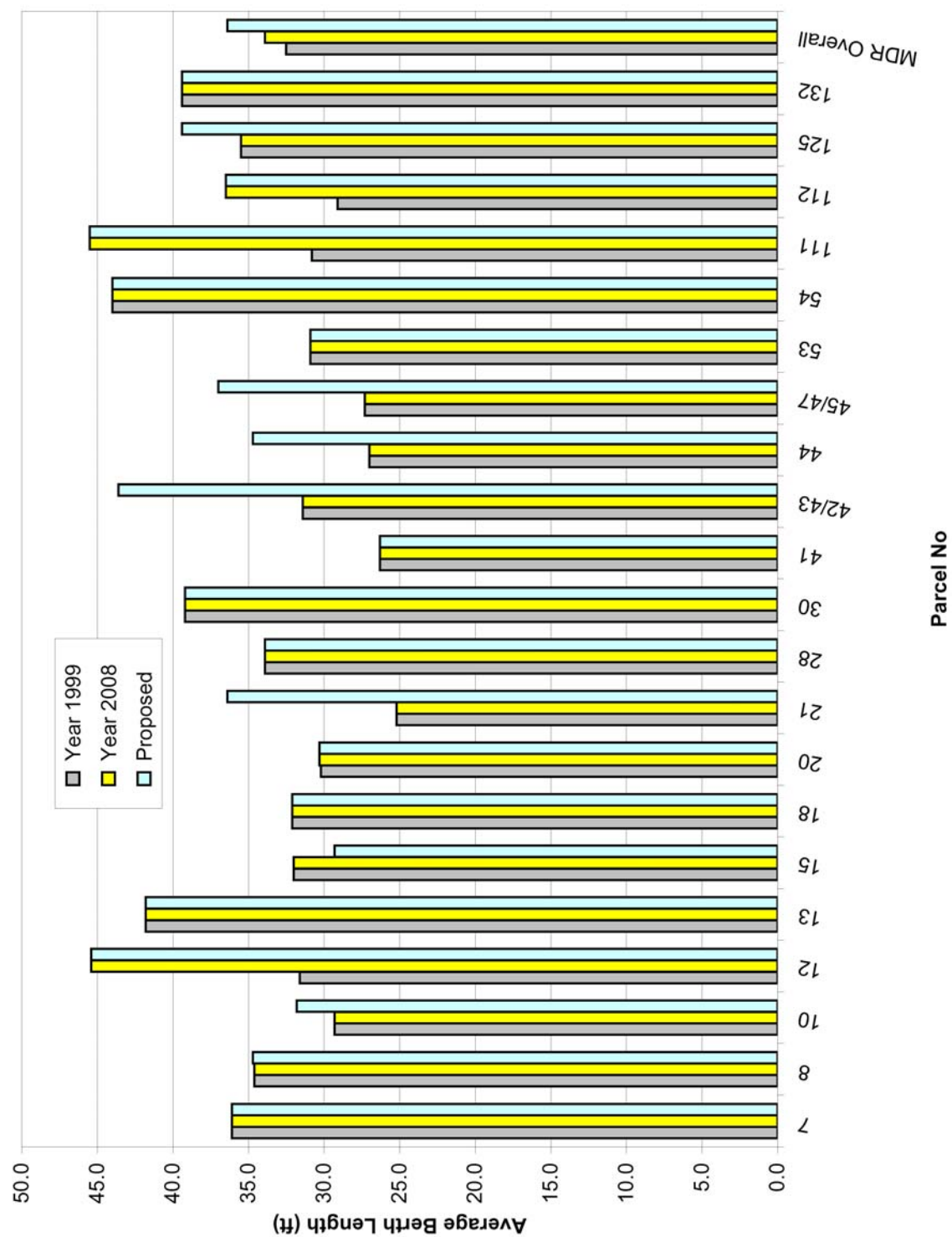


Figure 2. Average Slip Length Summary for MDR Marinas

V COMPARISON OF MARINA DEL REY BOAT BERTH DISTRIBUTIONS TO OTHER MARINAS

In order to gauge how the existing Marina del Rey combined marinas (2008) and the proposed Marina del Rey combined marinas (proposed), when including the currently proposed reconfigurations, compare to other marinas, information on boat berth slip distributions was obtained for 21 other southern and northern California marinas, as well as for 2 Honolulu marinas. Table 5 (two pages) lists 15 other southern California marinas, 6 other northern California marinas, and 2 other Honolulu marinas. It provides the marinas total number of slips and average slip length for the original constructed marina, with date of construction when known, and for the reconstructed marina, if it was either reconstructed or is proposed for reconstruction, with its date when known. This table illustrates that the Marina del Rey combined marinas for both the existing condition (2008) and the proposed condition (proposed) fall within the middle of the listed other marinas with 12 of the 23 other marinas having a larger average slip length for the proposed reconfigured condition.

Table 5 also shows that when taking the total slips and average slip length for the 13 other marinas which list both before and after (or existing and proposed) reconfiguration that the before slip count of 8,903 with an average slip length of 33.5 feet changes to an after slip count of 8,293 with an average slip length of 38.0 feet. When comparing this to the existing and proposed Marina del Rey numbers Table 6 shows that Marina del Rey's proposed average slip length is 36.4 feet while the 13 other marinas after reconfiguration average slip length is 38.0 feet, a 7.4 percent increase in average slip length for Marina del Rey versus a 13.4 percent increase for the 13 other marinas.

Table 7 presents the berth length distributions for 22 of the other marinas listed in Table 5. There was insufficient data to include the Peter's Landing Marina in Huntington Beach, for evaluating its berth length distribution. For the other 22 marinas only the newest marina configuration was used (either existing when not reconfigured or the reconfigured or currently proposed reconfigured). This table presents berth lengths in five foot increments from 30 feet to 70 feet with the 30 feet increment including all berths of 30 feet or less and the 70 feet increment including all berths more than 70 feet in length. This table clearly shows that both the Marina del Rey existing condition (2008) and proposed condition almost always have a lower distribution, or in some instances equal distribution, for all berth lengths of 41 feet or larger when compared to the average berth length distribution for all of the listed other marinas. The Marina del Rey proposed distribution for berth lengths of 31 feet to 40 feet are about equal to the average distribution, whereas even the Marina del Rey proposed distribution for berth lengths equal to or less than 30 feet in length is still 5 percent above the average distribution (38.5% vs. 33.6%). This table illustrates that even when Marina del Rey incorporates all of the current eight proposed marina reconfigurations that the entire Marina del Rey berth length distribution is less than (smaller berth lengths) the average berth length distribution shown in Table 7.

Appendix B presents the distribution of the individual slip lengths for all of the other marinas listed in Table 7 as compared to the distribution for the Marina del Rey combined marinas for both the existing (2008) condition and the proposed condition. Figure B-1 through Figure B-5 are plots of the cumulative distributions of the individual slip sizes for Marina del Rey versus these other marinas listed in Table 7. As an example Figure B-6 presents a bar graph of the slip length distribution for the Marina del Rey existing (2008) combined marinas versus the Sunroad Marina in San Diego Bay. This bar graph clearly illustrates that Marina del Rey currently has a significantly higher percentage of smaller size slips than the Sunroad Marina.

Table 5. Comparison of Average Slip Length for MDR and Other Marinas

Marinas	Total Slips	Average Slip Length (Feet)
Marina del Rey		
2008	4,731	33.9
Proposed	4,255	36.4
Average of 13 Other Marinas with Reconstructed Slips		
Before	8,903	33.6
After	8,293	38.0
1. Sunroad Marina, San Diego ¹		
1987	527	42.2
2. CYM-Chula Vista, San Diego ²		
1990	354	36.1
3. Cabrillo Isle Marina, San Diego ²		
1976	406	38.0
2005	404	39.4
4. Dana Point Marina, Dana Point		
1969 ³	1,467	33.0
Proposed ¹	1,285	33.4
5. Sunset Aquatic Park, Huntington Beach ³		
Before Reconfiguration	252	30.5
After Reconfiguration	237	32.8
6. Peter's Landing Marina, Huntington Beach ³		
Before Reconfiguration	300	39.0
After Reconfiguration	286	40.5
7. Long Beach Downtown Marinas, Long Beach ²		
Before Reconfiguration	1,769	35.9
After Reconfiguration	1,679	36.7
8. Alamitos Bay Marina, Long Beach ²		
Existing	1,997	31.5
Proposed	1,647	35.8
9. Cabrillo Marina, San Pedro ²		
Mid 1980's	882	35.6
10. Cabrillo Way Marina, San Pedro		
Existing ³	625	34.3
Proposed ²	697	45.6
11. Port Royal, Redondo Beach ²		
1960	336	29.8

Source: ¹ Noble Consultants, Inc. (NCI), Construction Drawings.

² County of Los Angeles, Department of Beaches and Harbors.
(NCI calculated from data received from various marina developers.)

³ Williams-Kuebelbeck & Associates (2004) Study.

⁴ Berthing Study, California Association of Harbor Masters and Port Captains,
March 2006, excerpt on San Francisco Marina facilities.

Table 5. Comparison of Average Slip Length for MDR and Other Marinas (Cont.)

Marinas	Total Slips	Average Slip Length (Feet)
Marina del Rey		
2008	4,731	33.9
Proposed	4,255	36.4
Average of 13 Other Marinas with Reconstructed Slips		
Before	8,903	33.6
After	8,293	38.0
12. Anacapa Isle Marina, Oxnard ²		
1974	504	30.2
1987	389	33.4
13. Bahia Marina, Oxnard ²		
1973	70	38.0
2009	82	52.8
14. Peninsula Marina, Oxnard ²		
1970	341	33.7
2009	292	47.3
15. Ventura Isle Marina, Ventura ²		
1973	625	31.5
1992	519	38.8
16. Treasure Isle Marina, San Francisco ²		
1950	105	31.5
2009	403	41.8
17. Ballena Isle Marina, Alameda ²		
1974	442	34.5
2010	373	43.8
18. Pier 39, San Francisco ⁴		
Existing	299	41.4
19. San Francisco Marina, San Francisco ⁴		
Existing	657	30.4
20. South Beach Harbor, San Francisco ⁴		
Existing	757	34.9
21. Martinez Marina, Martinez ²		
1968	340	32.6
22. Ko Olina Marina, Honolulu ²		
2002	336	45.4
23. Iroquois Point, Honolulu ²		
1970	34	32.4

Source: ¹ Noble Consultants, Inc. (NCI), Construction Drawings.

² County of Los Angeles, Department of Beaches and Harbors.
(NCI calculated from data received from various marina developers.)

³ Williams-Kuebelbeck & Associates (2004) Study.

⁴ Berthing Study, California Association of Harbor Masters and Port Captains,
March 2006, excerpt on San Francisco Marina facilities.

Table 6. Marina del Rey Slips vs. 13 Other Marina Slips

Marina	Marina del Rey	13 Other Marinas
Before Total Slips	4,731	8,903
After Total Slips	4,255	8,293
Percentage Reduction	-10.1%	-6.9%
Before Average Slip Length	33.9'	33.6'
After Average Slip Length	36.4'	38.0'
Percentage Increase	+7.4%	+13.4%

Table 7. Berth Length Distributions for MDR and Other Marinas

Marinas		Slip Length										
		<=30'	31'-35'	36'-40'	41'-45'	46'-50'	51'-55'	56'-60'	61'-65'	66'-70'	>70'	Total
Marina del Rey	2008	51.0%	18.8%	14.2%	5.3%	4.7%	1.6%	2.6%	0.6%	0.5%	0.5%	100%
Marina del Rey	Proposed	38.6%	20.1%	18.8%	8.4%	6.2%	2.1%	3.3%	0.9%	0.8%	0.7%	100%
Sunroad Marina, San Diego	1987	8.3%	17.5%	24.3%	27.3%	17.3%	3.8%	0.0%	1.5%	0.0%	0.0%	100%
CYM-Chula Vista, San Diego	1990	31.1%	33.9%	12.4%	12.1%	5.1%	4.5%	0.0%	0.6%	0.0%	0.3%	100%
Cabrillo Isle Marina, San Diego	2005	17.6%	42.8%	11.1%	10.9%	10.4%	0.0%	1.2%	0.5%	1.5%	4.0%	100%
Dana Point Marina, Dana Point	Proposed1	59.6%	15.6%	13.0%	4.1%	1.5%	1.6%	2.6%	1.1%	0.8%	0.3%	100%
Sunset Aquatic Park, Huntington Beach	After Reconfig.	46.8%	43.9%	3.0%	2.1%	4.2%	0.0%	0.0%	0.0%	0.0%	0.0%	100%
Long Beach Downtown Marinas, Long Beach	After Reconfig.	33.1%	26.7%	24.2%	9.2%	4.6%	0.0%	2.1%	0.0%	0.0%	0.0%	100%
Alamitos Bay Marina, Long Beach	Proposed	39.3%	19.1%	23.1%	5.9%	8.3%	0.2%	2.2%	0.0%	0.8%	0.9%	100%
Cabrillo Marina, San Pedro	Mid 1980's	57.9%	0.0%	31.9%	0.0%	6.5%	0.0%	2.7%	0.0%	0.8%	0.2%	100%
Cabrillo Way Marina, San Pedro	Proposed	18.8%	13.6%	15.5%	17.5%	11.0%	8.5%	6.3%	0.0%	4.3%	4.4%	100%
Port Royal, Redondo Beach	1960	81.5%	7.7%	8.0%	0.0%	0.0%	1.5%	0.0%	0.6%	0.3%	0.3%	100%
Anacapa Isle Marina, Oxnard	1987	52.9%	22.1%	7.7%	7.5%	6.7%	0.0%	3.1%	0.0%	0.0%	0.0%	100%
Bahia Marina, Oxnard	2009	0.0%	0.0%	19.5%	24.4%	24.4%	1.2%	22.0%	1.2%	1.2%	6.0%	100%
Peninsula Marina, Oxnard	2009	2.7%	13.4%	21.2%	18.2%	15.8%	12.7%	7.5%	4.5%	2.1%	2.0%	100%
Ventura Isle Marina, Ventura	1992	30.4%	19.5%	18.1%	12.7%	10.4%	4.0%	3.5%	1.2%	0.2%	0.0%	100%
Treasure Isle Marina, San Francisco	2009	25.8%	15.6%	15.9%	15.4%	11.7%	0.0%	9.9%	0.0%	5.7%	0.0%	100%
Ballena Isle Marina, Alameda	2010	0.8%	29.2%	22.8%	0.0%	36.5%	0.0%	8.3%	0.0%	1.3%	1.1%	100%
Pier 39, San Francisco	Existing	0.7%	0.0%	66.6%	8.0%	21.4%	0.0%	2.3%	0.0%	0.0%	1.0%	100%
San Francisco Marina, San Francisco	Existing	63.7%	13.7%	11.4%	3.8%	2.6%	0.0%	4.0%	0.0%	0.0%	0.9%	100%
South Beach Harbor, San Francisco	Existing	32.8%	26.4%	13.2%	13.2%	13.2%	0.0%	0.5%	0.0%	0.3%	0.4%	100%
Martinez Marina, Martinez	1968	45.1%	34.4%	13.8%	6.8%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100%
Ko Olina Marina, Honolulu	2002	20.5%	11.3%	17.0%	9.5%	20.5%	1.8%	8.9%	3.0%	4.5%	3.0%	100%
Iroquois Point, Honolulu	1970	47.1%	35.3%	17.6%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100%
Average		33.6%	20.0%	18.5%	9.3%	10.1%	1.8%	3.9%	0.7%	1.0%	1.1%	100%

VI MARINA DEL REY RECONFIGURED MARINAS AND PROPOSED MARINA RECONFIGURATIONS

Both the Del Rey Yacht Club (Parcel 30) and the California Yacht Club (Parcel 132) were reconfigured with additional rows of boat berth slips added into the main channel prior to 1999 as shown in Table 1. Also the Villa del Mar Marina (Parcel 13), the Dolphin Marina (Parcel 18) and the Windward Yacht Center (Parcel 54) were reconfigured either prior to or by 1999. The following four marinas were reconfigured after the year 1999:

- Parcel 12: Deauville Marina (completed 2008)
- Parcel 20: Panay Way Marina (completed 2006)
- Parcel 111: Marina Harbor Apts. & Anchorage (completed 2006)
- Parcel 112: Marina Harbor Apts. & Anchorage (completed 2004)

Figure C-1 in Appendix C presents the distribution of the individual slip lengths for these four marinas for both before their reconfiguration (1999) and after their reconfiguration (2008) as compared to the distribution for the Marina del Rey combined marinas for the existing (2008) condition. Figure C-2 through Figure C-5 present the slip size distribution for Parcels 12, 20, 111 and 112, respectively in bar graph format for 1999 (prior to reconfiguration) versus 2008 (after reconfiguration).

The current Marina del Rey marinas proposed for reconfiguration consist of the following eight marinas (see Table 1):

- Parcel 8: The Bay Club Apts. & Marina (231 slips to 207 slips)
- Parcel 10: Neptune Marina (184 slips to 161 slips)
- Parcel 15: Bar Harbor Marina (215 slips to 225 slips)
- Parcel 21: Holiday Harbor Marina (183 slips to 92 slips)
- Parcel 42/43: Marina del Rey Hotel (349 slips to 277 slips)
- Parcel 44: Pier 44 (232 slips to 143 slips)
- Parcel 45/47: Burton Chace Park (332 slips to 188 slips)
- Parcel 125: Marina City Club (316 slips to 273 slips)

Of the above eight proposed marina reconfigurations Parcel 15 has already received final approval while the other seven are in various stages of the approval process.

Figure C-6 and Figure C-7 present the distribution of the individual slip lengths for the current eight proposed marina reconfigurations for both their existing (2008) configuration and their proposed reconfiguration as compared to the distribution for the Marina del Rey combined marinas for the existing (2008) condition. Figure C-8 through Figure C-15 present the slip size distribution for these eight marinas, respectively in bar graph format for 2008 (existing configuration) versus proposed (proposed reconfiguration).

Table 8 presents the berth length distributions for the 7 reconfigured marinas since 1989 and the proposed 8 marinas to be reconfigured as shown in Table 1. The Del Rey Yacht Club (Parcel 30) and the California Yacht Club (Parcel 132) were not included since both of these facilities received permission to add additional slips into the main channel versus being reconfigured, and these additional slips were added prior to 1989. Table 8 presents berth lengths in five foot increments from 30 feet to 70 feet with the 30 feet increment including all berths of 30 feet or less and the 70 feet increment including all berths of more than 70 feet in length. This table also includes the berth length distributions for all of the listed 15 reconfigured and proposed reconfigured marinas when combined (Averaged-bottom row of table) as well as for all of the marinas listed in Table 1 for Marina del Rey for both the existing condition (2008) and the proposed reconfigured condition (Proposed) (top 2 rows of table). It shows that the averaged berth length distribution for the listed 15 reconfigured and proposed reconfigured marinas is almost the same as for the proposed condition for all of the Marina del Rey marinas.

Table 8. Berth Length Distributions for Reconfigured and Proposed Reconfigured MDR Marinas

Parcel No	Marina Name	Reconfiguration &/or Replacement	Slip Length										Total
			<=30'	31'-35'	36'-40'	41'-45'	46'-50'	51'-55'	56'-60'	61'-65'	66'-70'	>70'	
Overall	Marina del Rey	2008	51.0%	18.8%	14.2%	5.3%	4.7%	1.6%	2.6%	0.6%	0.5%	0.5%	100%
Overall	Marina del Rey	Proposed	38.5%	20.2%	18.8%	8.4%	6.2%	2.1%	3.3%	0.9%	0.8%	0.7%	100%
8	Bay Club Apts & Marina	Proposed	29.5%	40.6%	18.8%	7.2%	3.4%	0.0%	0.5%	0.0%	0.0%	0.0%	100%
10	Neptune Marina	Proposed	58.4%	28.0%	13.7%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100%
12	Deauville Marina	Completed 2008	0.0%	13.9%	24.5%	26.9%	20.4%	8.3%	3.2%	0.0%	2.8%	0.0%	100%
13	Villa del Mar Marina	Completed 1989	0.0%	17.7%	39.2%	19.4%	19.4%	0.0%	0.0%	4.3%	0.0%	0.0%	100%
15	Bar Harbor Marina	Proposed	68.4%	26.7%	4.9%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100%
18	Dolphin Marina	Completed 1999	62.7%	9.7%	9.2%	6.1%	4.2%	2.6%	5.2%	0.2%	0.0%	0.0%	100%
20	Panay Way Marina	Completed 2006	71.8%	15.4%	1.3%	11.4%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100%
21	Holiday Harbor Marina	Proposed	28.3%	30.4%	22.8%	8.7%	9.8%	0.0%	0.0%	0.0%	0.0%	0.0%	100%
42/43	Marina del Rey Hotel	Proposed	0.7%	29.2%	19.5%	23.8%	14.4%	1.4%	3.6%	3.6%	3.6%	0.0%	100%
44	Pier 44	Proposed	47.6%	14.7%	27.3%	0.0%	7.7%	0.0%	1.4%	0.0%	0.0%	1.4%	100%
45/47	Burton Chace Park	Proposed	33.5%	2.1%	51.6%	10.1%	0.5%	0.0%	0.0%	0.5%	0.0%	1.6%	100%
54	Windward Yacht Center	Completed 1997	7.5%	0.0%	43.4%	13.2%	9.4%	18.9%	7.5%	0.0%	0.0%	0.0%	100%
111	Marina Harbor Anchorage	Completed 2006	42.9%	0.9%	15.2%	0.0%	7.1%	0.0%	10.7%	0.0%	13.4%	9.8%	100%
112	Marina Harbor Anchorage	Completed 2004	58.3%	6.3%	12.6%	0.0%	0.0%	0.0%	12.0%	5.7%	1.7%	3.4%	100%
125	Marina City Club	Proposed	30.8%	22.0%	14.7%	12.8%	6.6%	7.3%	4.4%	0.0%	0.0%	1.5%	100%
Averaged for Reconfigured and Proposed Reconfigured			37.5%	18.1%	19.2%	10.0%	6.8%	2.2%	3.2%	1.0%	1.2%	0.9%	100%

VII BOAT BERTH SLIP DEMAND

Marina del Rey marina slip vacancy rates were analyzed from data provided by the Los Angeles County Department of Beaches and Harbors (DBH) for those months and years in which we had a complete data set consisting of both slip vacancy count and total available number of slips, both for each slip length category. Then if necessary this data was adjusted to account for the redevelopment of marina parcels during the month in question. Sufficient data was provided to evaluate slip vacancy rates for the years 2003 through 2008. However since each year was based on a different number of months of the required data, each year is plotted as a single vacancy rate based on the average of the available months for each year. Figure 3 presents the results of the analyzed vacancy rates from 2003 through 2008 for the following four slip length categories:

- 18 feet to 25 feet
- 26 feet to 35 feet
- 36 feet to 50 feet
- Over 50 feet

This figure shows that boat slip lengths in the 36 feet to 50 feet and in the over 50 feet categories have the lowest vacancy rates which are in the one-half to two percent vacancy rate range, while slip lengths of 18 feet to 25 feet have the highest vacancy rates which are in the four to eight percent range, and slip lengths of 26 feet to 35 feet are in the two to four percent vacancy rate range. In addition, other reports such as the Williams-Kuebelbeck (2004) report, “Marina del Rey-Boat Slip Sizing and Pricing Study Update” have reported that based on interviews with southern California marina owners and managers the major portion of vacancies are in the smaller slip sizes of under 30 feet in length, and that when analyzing slip vacancy rates for Marina del Rey from 2001 through 2003 the majority of vacancies were in slip lengths of 35 feet and under as market trends had indicated in prior analysis, and which is supported in Figure 3.

The reduction of boat berth slip lengths of 30 feet and less during the replacement and reconfiguration of marinas within Marina del Rey is being offset with the proposed increase from 817 to 1088 in dry boat storage spaces as shown in Table 3. In addition, there is a portion of these smaller boats that are now being stored on trailers offsite of Marina del Rey that will be launched from boat launch ramp facilities when used.

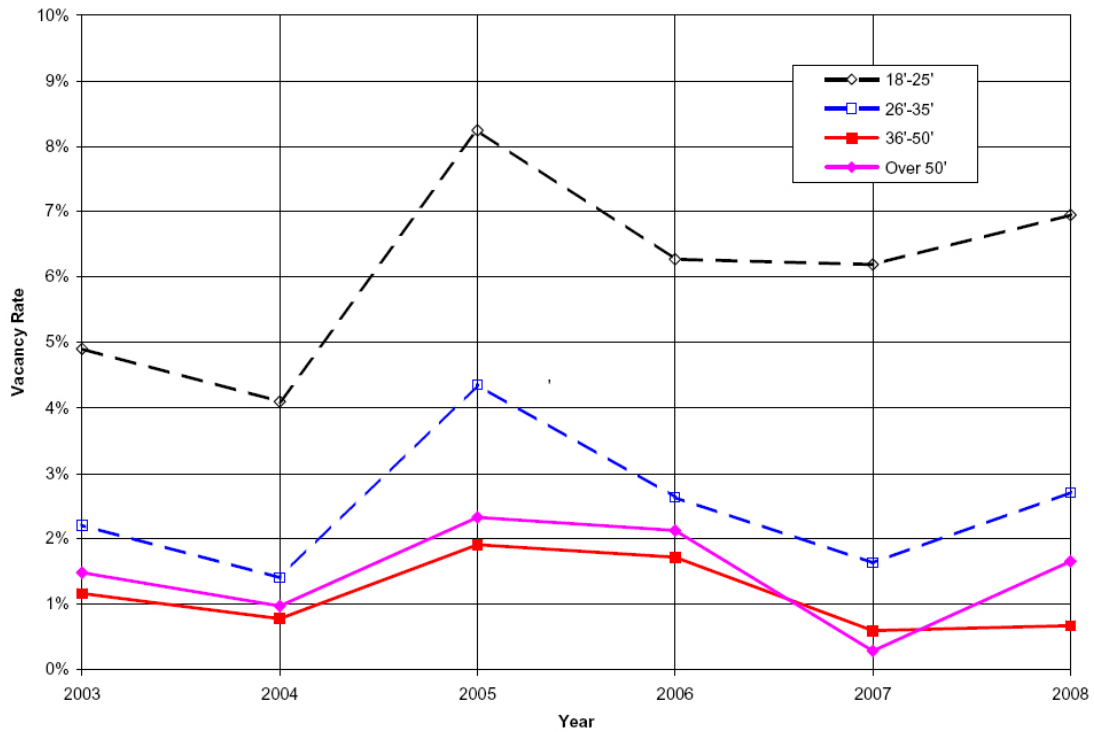


Figure 3. Marina del Rey Slip Vacancy Rates

Also, the national boat registration, which includes documented U.S. Coast Guard vessels, was available from the “2007 Recreational Boating Statistical Abstract” published by the National Marine Manufacturers Association for vessel length categories for the years 1996 through 2007.

Table 9 presents these vessel registrations for the following vessel length categories:

- Under 16 feet
- 16 feet to less than 26 feet
- 26 feet to less than 40 feet
- 40 feet and larger

In Table 10 we used 1996 as the base year and then calculated the percentage change for each year and vessel length category as compared to the 1996 base year. Review of the percentage changes in vessel registration for the year 2007 illustrates that the largest percentage changes occurred for vessels of 26 feet to less than 40 feet and for 40 feet and larger. Even though the vessel length category did not sub-divide the 26 feet to less than 40 feet and the 40 feet and larger categories, review of this table would suggest that the larger size vessels have the higher percentage increase in vessel registrations.

Table 9. Boat Registration Number Change by Size Categories

Year	Under 16'	16' to less than 26'	26' to less than 40'	40' and larger	Total
2007	5,098,637	6,233,126	555,708	79,156	11,966,627
2006	5,068,951	6,174,973	482,536	75,959	11,802,419
2005	5,221,276	6,221,554	478,869	77,029	11,998,728
2004	5,279,622	6,054,768	469,159	75,234	11,878,783
2003	5,376,481	6,004,243	458,356	69,081	11,908,161
2002	5,440,271	5,910,367	500,388	67,662	11,918,688
2001	5,708,068	5,868,223	446,186	67,516	12,089,993
2000	5,447,271	5,679,180	428,083	64,235	11,618,769
1999	5,636,128	5,678,516	418,018	58,407	11,791,069
1998	5,665,230	5,514,957	401,086	56,139	11,637,412
1997	5,767,114	5,380,784	388,471	54,794	11,591,163
1996	5,073,753	5,006,527	317,082	47,039	10,444,401

Table 10. Boat Registration Number Change by Size Categories

Year	Under 16'	16' to less than 26'	26' to less than 40'	40' and larger	Total
2007	0.5%	24.5%	75.3%	68.3%	14.6%
2006	-0.1%	23.3%	52.2%	61.5%	13.0%
2005	2.9%	24.3%	51.0%	63.8%	14.9%
2004	4.1%	20.9%	48.0%	59.9%	13.7%
2003	6.0%	19.9%	44.6%	46.9%	14.0%
2002	7.2%	18.1%	57.8%	43.8%	14.1%
2001	12.5%	17.2%	40.7%	43.5%	15.8%
2000	7.4%	13.4%	35.0%	36.6%	11.2%
1999	11.1%	13.4%	31.8%	24.2%	12.9%
1998	11.7%	10.2%	26.5%	19.3%	11.4%
1997	13.7%	7.5%	22.5%	16.5%	11.0%
1996	0.0%	0.0%	0.0%	0.0%	0.0%

VIII CALIFORNIA DEPARTMENT OF BOATING AND WATERWAYS' MARINA DESIGN GUIDELINES

The first marina dock guidelines published by the California Department of Boating and Waterways (DBAW) that presented dimensional layout criteria for floating dock marinas was the January 1980 “Layout and Design Guidelines for Small Craft Berthing Facilities”. DBAW republished this guideline over the years without including a new date. Then in July 2005 DBAW completely replaced this guideline with the currently available guidelines which is posted on their website and is titled, “Layout and Design Guidelines for Marina Berthing Facilities”. Figure 4 plots the DBAW clear width criteria based on single berth slips for berth lengths from 20 feet to 80 feet, for both the 1980 and 2005 guidelines, and for both power boats and sail boats. This figure indicates that there has been no change in the DBAW criteria from 1980 to 2005 since the minor differences in the figure are simply numerical rounding differences in the equations now used in the 2005 guidelines.

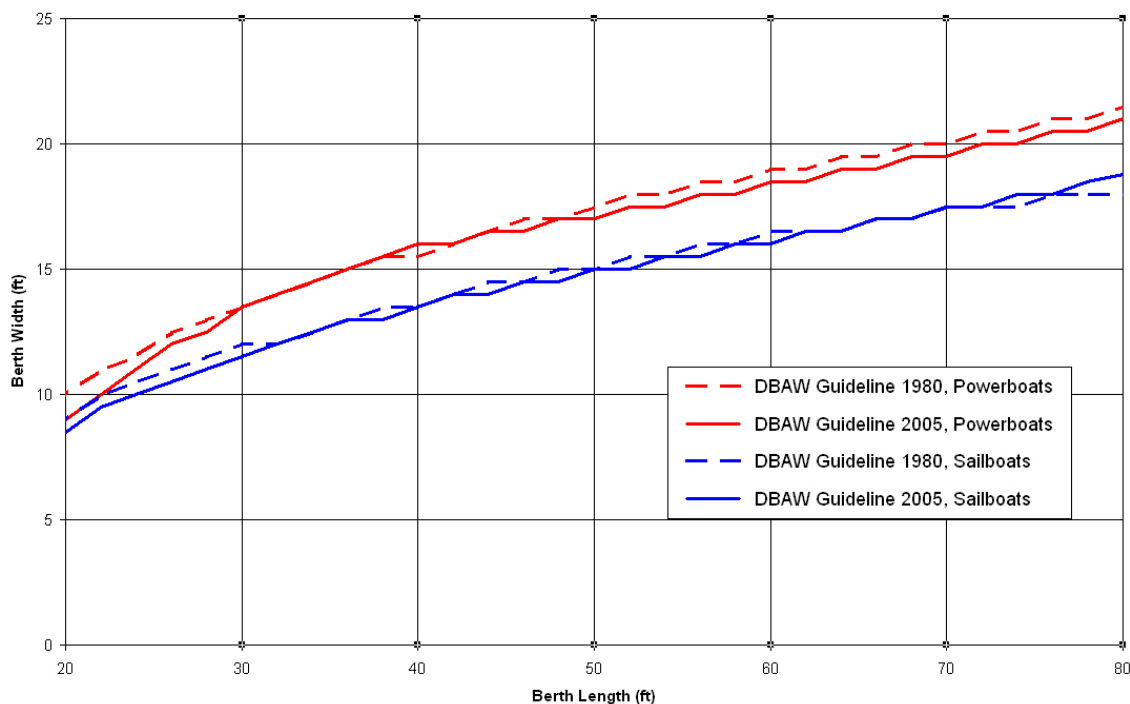


Figure 4. DBAW Slip Clear Width Guidelines Based on Single Berths

Table 11 tabulates other dock dimensional criteria for the 1980 and 2005 DBAW guidelines. This table presents the minimum finger dock width criteria and the fairway width criteria for boat maneuvering during berthing between adjacent dock headwalks containing boat berths. Again, this table shows no change between the two guidelines other than the 2005 guidelines increases the minimum width criteria for the longer finger

docks specified in the 2005 guidelines, and the 2005 guidelines also now includes criteria pertaining to ADAAG 15.2 and ADA-ABA 1003 “Accessible Boating Facilities”.

Table 11. DBAW Guidelines for Dock Fingerfloat Widths and Fairway Widths

Marina Dock Fingerfloat Widths

DBAW Guidelines 1980		DBAW Guidelines 2005	
Length	Min. Width	Length	Min. Width
Up to 20'	2.5'	Below 20'	2.5'
21'-35'	3.0'	20' - 35'	3.0'
36'-60'	4.0'	36' - 59'	4.0'
61' & up	5.0'	60' - 79'	5.0'
		80' & Over	6.0'
		120' & Over	8.0'
		Accessible Fingerfloats	5.0'

Marina Fairway Widths

DBAW Guidelines 1980		DBAW Guidelines 2005	
w/o Side Ties	w/ Side Ties	w/o Side Ties	w/ Side Ties
$1.75 L_b$	$1.50L_{bb}$	$1.75 L_b$	$1.50L_{bb}$

L_b = length of longest berth perpendicular to the fairway

L_{bb} = length of longest boat side-tied parallel to the fairway

Prior to the DBAW January 1980 guidelines numerous other marina and small craft harbor technical references were available that contained various recommendations. Several of these references have been included in the reference section of this report. In the review of marinas dating back to the late 1950s and early 1960s the marina dock layout criteria varied depending on the site conditions, local market, developer and engineer. In numerous cases the criteria was less than that presented by DBAW while in other cases the criteria was similar to that presented by DBAW.

Detailed data was obtained from both the Marina del Rey dock masters and the Department of Beaches and Harbors pertaining to the existing slip clear widths versus slip lengths for single berthed and double berthed boats, for many of the Marina del Rey marinas. This data for the single berthed boats was plotted and is presented in Figure 5 and Figure 6. Figure 5 presents those marina parcels and the Sunroad Marina in San Diego that generally but not always meets the DBAW criteria for power boats, while Figure 6 presents those marina parcels that generally are between the DBAW power and sail boat criteria, but in many cases are even under the sail boat criteria.

Review of Figure 6 shows that the marinas not meeting the DBAW slip clear width criteria for power boats, and in many cases not even for sail boats, were for marinas constructed in the 1960s/1970s that have not been reconstructed. Parcel 18 (Dolphin Marina) and Parcel 20 (Panway Marina) were only reconstructed in 1999 and 2006 without being reconfigured, and Parcel 132 (California Yacht Club) only included the added slips in 1985 within the main channel. Figure 5 shows that two of the marinas constructed in the 1960s generally meet the DBAW power boat criteria, but not always. These two figures illustrate that many of the existing marina boat berth slips currently do not meet 50 percent of the power boat and 50 percent of the sail boat slip clear width criteria. Therefore, when upcoming marinas are reconfigured in order to meet this criteria it will result in the loss of some slips even before increasing the average length of the slip.

Figure 7 presents the available number of boat berths per acre of available water area per average berth slip length when meeting the DBAW criteria for slip clear width, fairway width, finger dock width and main walkway width. This is based on meeting 50 percent power boat slips clear width criteria and 50 percent sail boat slip clear width criteria. When utilizing this curve for the existing average berth length of 33.9 feet for Marina del Rey (see Table 2 for 2008) and comparing it to the proposed average berth length of 36.4 feet for Marina del Rey it shows that there would be a reduction from 40 berths per acre to 34 berths per acre, or a 15 percent reduction in boat berths. Table 2 shows a reduction in total number of slips from 4,731 to 4,255, which is a 10 percent reduction in boat berths. Therefore, a reduction in the total number of slips is necessary in order to increase the average slip length and to meet the DBAW marina berthing guidelines.

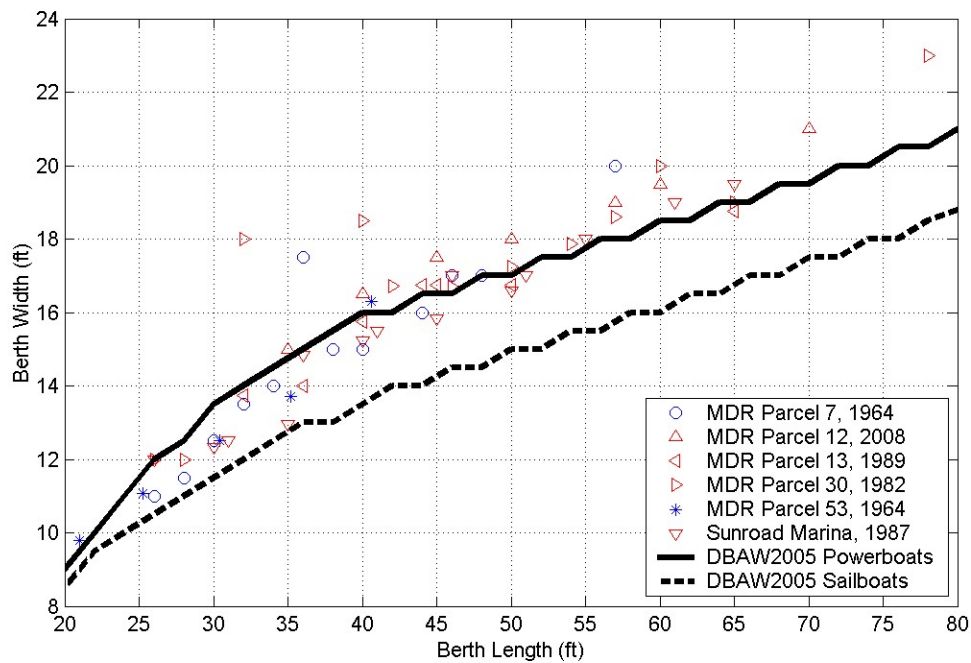


Figure 5. Slip Widths for MDR Parcels Similar to DBAW Powerboat Criteria

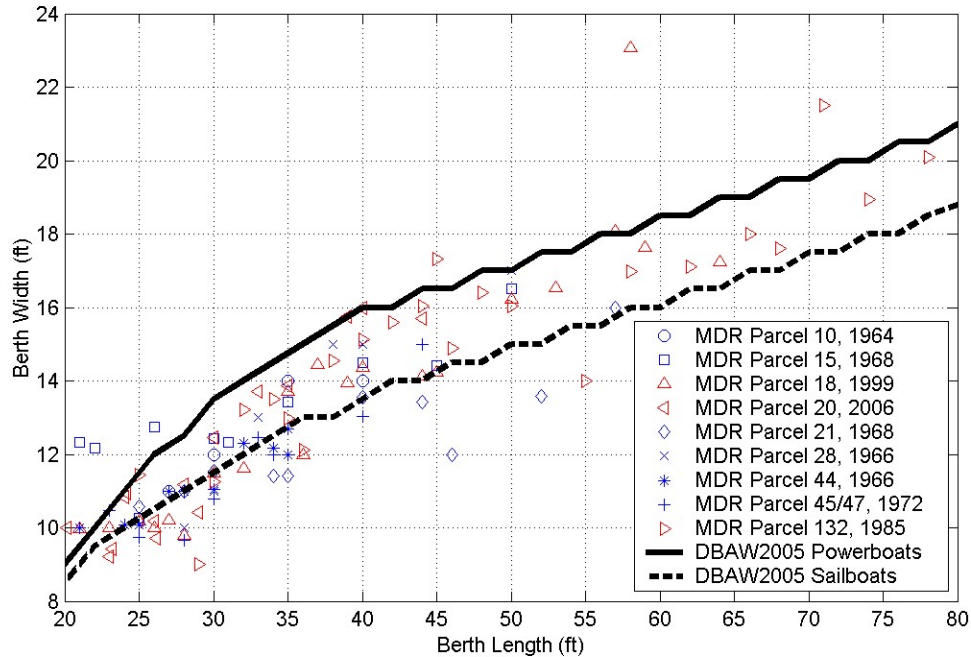


Figure 6. Slip Widths for MDR Parcels Narrower than DBAW Powerboat Criteria

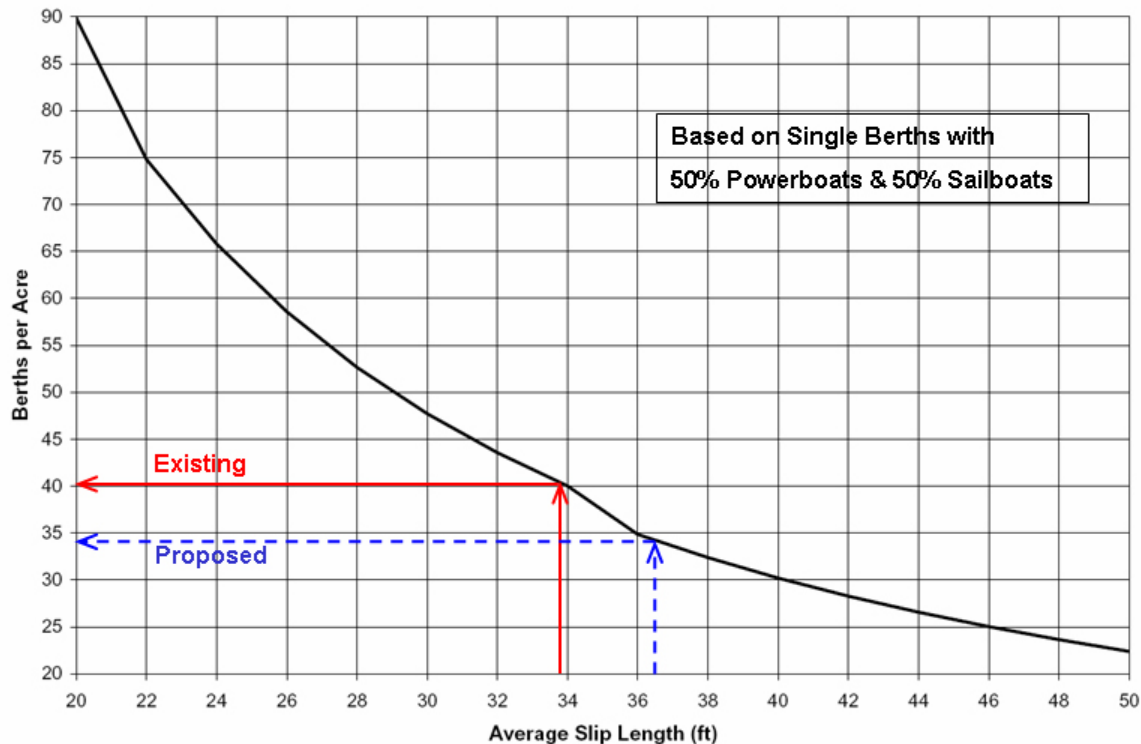


Figure 7. Boat Berths per Acre vs. Slip Length

IX BOAT INDUSTRY VESSEL LENGTH VERSUS BEAM

Numerous boating manufacturers references were reviewed for both power and sail boats from 1960 through 2008 in order to obtain data on vessel length versus vessel beam. References included various past boating magazines, journals and publications, boating data within Noble Consultants files, and numerous internet searches. This data has been plotted in Figure 8 and in Figure 9, and includes a best fit curve line for the 1960's data, the 1983 data and the 2000's data in Figure 8 for power boats, and includes a best fit curve line for the 1960's data and 2000's data in Figure 9 for sail boats. Figure 8 shows that the beam width for vessels steadily increases, on average, for power boats of 48 feet and longer when comparing today's vessel with the 1960's vessel, and for power boats of 40 feet and longer when comparing today's vessel with the 1983's vessel. This average beam width increase is almost four feet for an 80 feet long vessel and is a one foot increase for a 55 feet long vessel when comparing today's vessel with the 1960's vessel. When comparing sail boats, Figure 9 shows an average beam width increase of one to two feet for all vessel lengths shown (25 feet to 65 feet).

These two figures clearly show that boat beams have increased by an average of about two feet for sail boats berthed at Marina del Rey and up to four feet for power boats since

the 1960's. Therefore, all presently proposed and future proposed reconfigured Marina del Rey marinas should conform to the DBAW slip clear width guidelines for both power boats and sail boats. This will result in a reduction of the total number of slips for the reconfigured slips for marinas not currently meeting the DBAW criteria.

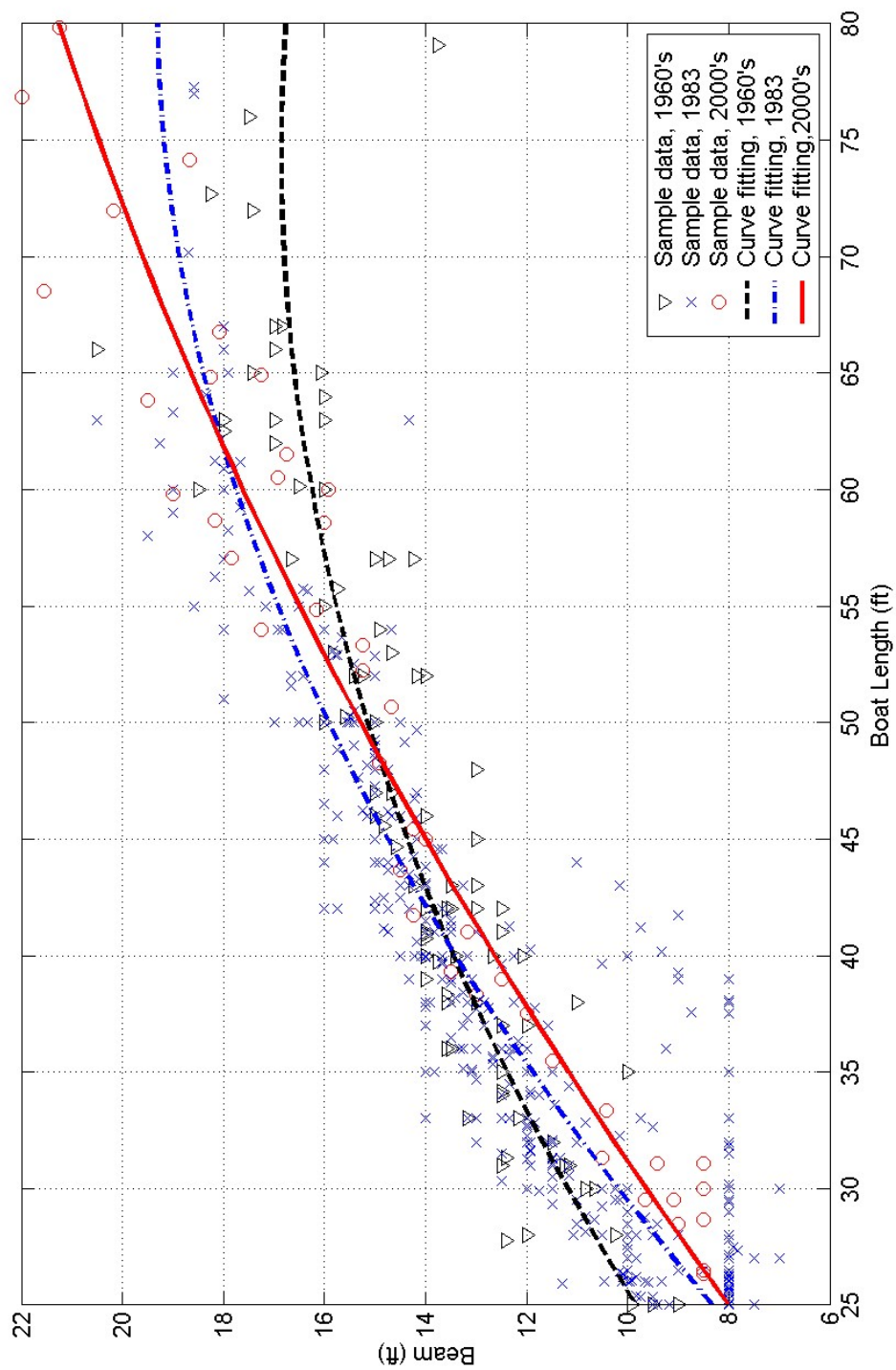


Figure 8. Boat Beam vs. Boat Length Variation for Power Boats 1960-2008

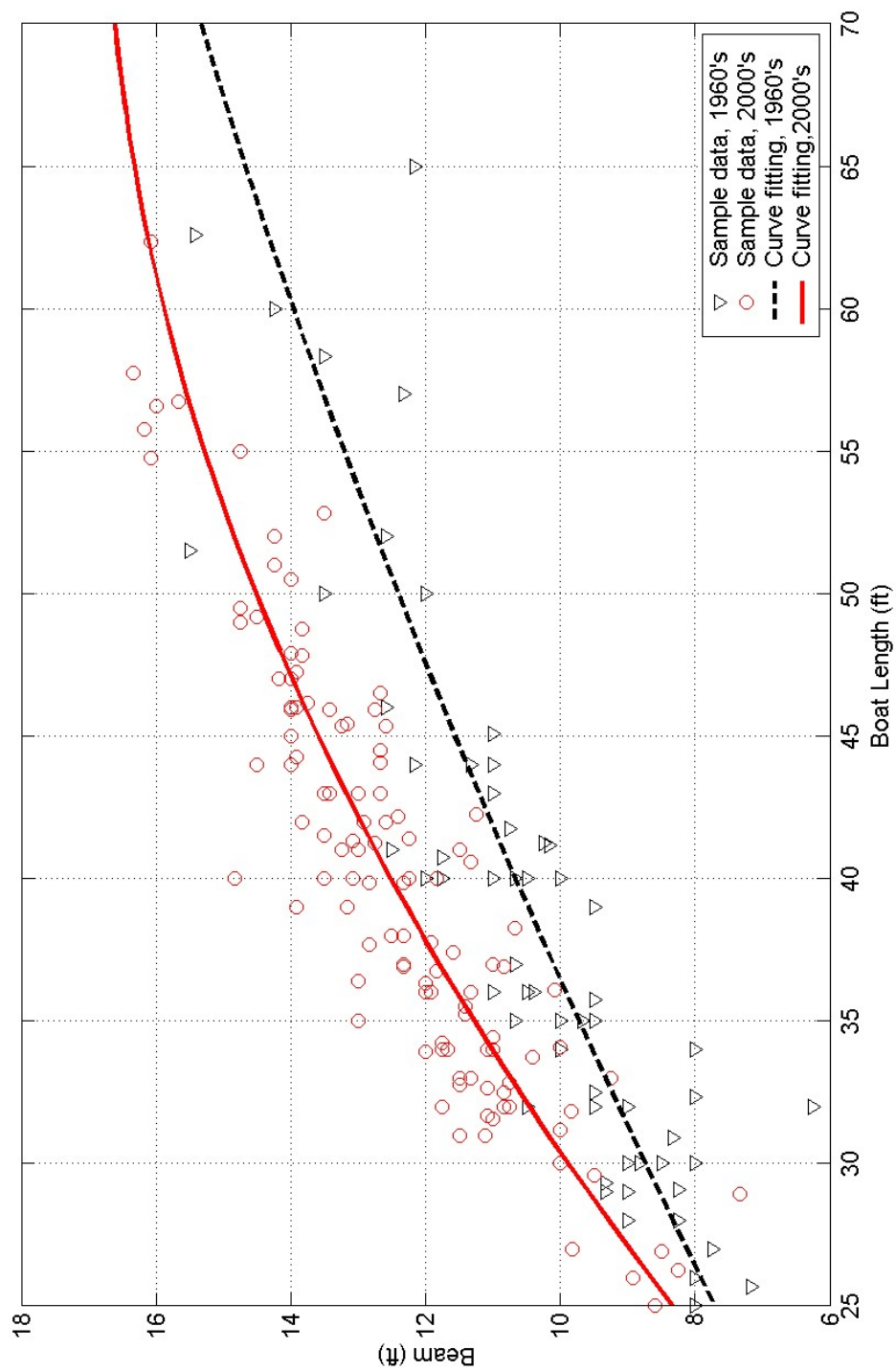


Figure 9. Boat Beam vs. Boat Length Variation for Sail Boats 1960-2008

X RECOMMENDED BOAT BERTH DISTRIBUTION FOR MARINA DEL REY MARINA RECONFIGURATIONS

In order to have consistent guidelines for the marinas within Marina del Rey that are being replaced and reconfigured, due to their age and in order to better accommodate the current market demand for berth sizes and support boating activities for the next 40 years, recommendations are presented to support the Department of Beaches and Harbors in the review and approval process. These recommendations pertain to slip size distribution, minimum size of slip, total slip count, floating dock layout dimensions, distribution of slip clear widths to accommodate sail boats versus power boats, accessible boating criteria, and dry boat storage.

Boat Berth Slip Length Distribution

Two recommended boat berth slip length distributions are shown in Table 12. The first distribution is recommended for all marinas combined in Marina del Rey that are listed in Table 1. Therefore, as individual marinas are reconfigured the individual reconfigured marina boat slip size distribution when added to all other marina boat slip size distributions should not exceed the recommended slip size distribution shown in Table 12 for all Marina del Rey marinas combined. In addition, the average marina slip length for all marinas combined should not exceed 40 feet unless there is justification.

The second distribution shown in Table 12 is recommended as the maximum case boat slip size distribution for an individual reconfigured marina. This distribution is recommended in order to accommodate those reconfigured marinas where additional boat berth slips of 30 feet or less in length are not justified, therefore resulting in a higher percentage of slips in the 31 feet to 50 feet length. The average slip length for this distribution should not exceed 44 feet unless there is justification.

The above slip length distributions and average slip lengths should not be considered absolute since there may be some marinas that have sufficient reason to exceed these recommendations while others are below these recommendations. The individual marinas being reconfigured need to consider their physical and financial conditions relevant to their parcel location and shape, along with market demand, in addition to conforming with the overall Marina del Rey guidelines. When the current proposed eight marina reconfigurations are added to the other existing Marina del Rey marinas (Proposed condition shown in Table 7), the combined slip length distribution and average slip length are both below the above recommendations. This is also true when combining only the 15 reconfigured and proposed reconfigured marinas shown in Table 8.

Table 12. Recommended MDR Boat Slip Size Distributions

Berth Length (feet)	Combined Percentage for all MDR Marinas	Maximum Case Percentage for Individual Marina
≤ 30'	30%	0%
31' – 35'	20%	30%
36' – 40'	19%	25%
41' – 45'	10%	20%
46' – 50'	10%	14%
> 50'	11%	11%
Total	100%	100%

Minimum Slip Size

It is recommended that the minimum slip length be 30 feet. In addition, it is recommended that only single boat berths be utilized since double boat berths are normally only used for slip lengths of 30 feet and less, and are not considered preferable in today's market. There is not sufficient justification to include slips below this length due to reduced market demand, the availability of additional dry boat storage, and the economic cost to construct floating docks. In addition, review of Table 3 show there are currently 2,414 slips in Marina del Rey that are 30 feet or less in length which is 51.0 percent of all slips as shown in Table 7. There are actually additional slips of 30 feet or less in length within Marina del Rey such as in Parcels EE and 48 that are not included within the marinas considered (see Table 1) in this report. Even when using the "proposed condition" shown in Table 3 there are still 1,642 slips of 30 feet in length or less which is still 38.6 percent of all slips (see Table 7).

Total Slip Count

For the marinas considered in this report (see Table 1) the total wet berth slip count is 4,731, with 817 dry boat storage for a total of 5,548 boats as shown in Table 3. Even with the reduction of wet berth slips from 4,731 to 4,255 slips for the "proposed condition" the total wet berth and dry boat storage only reduces from 5,548 to 5,343 boats, a 3.7% reduction, as shown in Table 3. The reduction of the smaller size wet berths, are significantly counted for in the increase of dry boat storage space. For the future it is recommended that this total wet berth plus dry boat storage remain above the 5,000 boat level by as much as possible by either adding additional dry boat storage and/or providing additional wet berth slips by utilizing currently under utilized waterfront space, such as consideration of the "funnel concept" within the main channel and better

utilization of Parcels 55 and 56. It would seem feasible to maintain a total of 5,500 boats (wet berths plus dry boat storage); say 4,400 wet berths plus 1,100 dry boat storage.

Wet boat slips not included within these numbers include 47 existing slips for Parcels EE, 48 and 77, the existing slips in Parcel 1 (Fuel Dock), plus the commercial slips in Parcels 55 and 56. There may also be others not within Marina del Rey not mentioned in this report. In addition, if end tie and inside tie slips are included within the total number of slips this could increase the total slips by up to 10 percent. The proposed reconfiguration of Parcel 45/47 and its reduction in total slips will partially be offset by the proposed reconfiguration of Parcels EE, 48 and 77 as part of this project. This will provide for improved slip utilization in these parcels and will also include a marine boat center and large floating dock facility for small sail and row boats well under 30 feet in length for the proposed reconfiguration of Parcel 77. This has not been accounted for in this report. In addition, the approved reconfiguration and replacement of Parcel 1, the fuel dock, will include an additional approximate 13 boat berths.

Floating Dock Layout Dimensions

It is recommended that the July 2005 DBAW, “Layout and Design Guidelines for Marina Berthing Facilities” be followed for marina dock layout and dimensioning. In addition, the current County guidelines for Marina del Rey should be met. Therefore, reconfigured marinas that currently don’t meet the minimum DBAW criteria and County criteria where applicable, for slip clear widths, finger widths, main walkway widths, fairway widths and ADA criteria will result in fewer slips even when the slip size distribution is not increased.

Distribution of Slip Clear Widths

In order to access what the existing distribution of power boats versus sail boats is within Marina del Rey, Google Earth was utilized to view the berthed boats at the time of the aerial photograph for Parcels 7, 18, 42, 45 and 47. It was assumed that these five parcels would provide a reasonable assessment of the distribution between power and sail boats within Marina del Rey. Table 13 tabulates the results of this assessment.

Based on the above results it is recommended that the marina slip clear width requirements be based on 50 percent power boats and 50 percent sail boats unless there is sufficient justification to do otherwise.

Accessible Boating Facilities Criteria

The July 2005 DBAW, “Layout and Design Guidelines for Marina Berthing Facilities” includes Appendix B which is titled, “ADAAG 15.2/ADA-ABA 1003 Accessible Boating Facilities”. It is recommended that the proposed reconfigured marinas within Marina del Rey abide by these criteria or by County ADA requirements where more stringent, for accessible route (gangways), accessible boat slips, minimum number of boat slips,

distribution of boat slips, minimum finger dock and main dock widths, and other criteria as appropriate.

Table 13. Distribution of Power Boats vs. Sail Boats For Marina del Rey Marinas

Parcel No.	Power Boats (%)	Sail Boats (%)
7	115 (55%)	94 (45%)
18	165 (45%)	119 (55%)
42	92 (45%)	113 (55%)
45	37 (32%)	77 (68%)
47	57 (33%)	114 (67%)
Totals	466 (47.4%)	517 (52.6%)

Currently, we are aware of the following ADA gangways in Marina del Rey:

- Parcel 12 : One ADA Gangway
- Parcel 18 : One ADA Gangway
- Parcel 20: One ADA Gangway
- Parcel EE: One ADA Gangway
- Parcel 48: Two ADA Gangways
- Parcel 111: Three ADA Gangways
- Parcel 112 : Three ADA Gangways

The only current existing ADA designated slips that we are aware of within Marina del Rey marinas, is for the reconfigured marinas at Parcels 111 and 112, in which the approved plans show 14 ADA slips for 319 total slips, which would exceed the referenced DBAW requirement. The specified DBAW requirement is shown in Table 14, however the County criteria may be more stringent.

Where the number of boat slips is not identified, each 40 feet of boat slip edge provided along the perimeter of the pier shall be counted as one boat slip. Boat slips shall be dispersed throughout the various types of boat slips provided.

Currently we believe that the proposed reconfiguration of the Cabrillo Way Marina in San Pedro by the Port of Los Angeles will meet all DBAW ADA requirements for accessibility of its boating facility. As other marinas are reconfigured and replaced they will undoubtedly need to meet the latest ADA accessibility requirements.

Dry Boat Storage

The existing and proposed dry boat storage is shown in Table 3. Parcel 52/GG will include a very modern, state of the art, dry stack storage facility for approximately 349 boats, with approximately 32 mast-up spaces, plus 4 boat launch elevators and one boat

launch crane, and new floating docks with ADA access for use by the facility operator and its clientele. This dry stack boat facility will replace the mast-up and power boat dry storage at Parcel 77 that will be eliminated. However, the proposed marine center and large floating dock for small sail boats, row boats and boating lessons will be a benefit to the recreational public for the use of small size boats. Additionally, the redevelopment of Parcel 44 will include a dry stack boat facility for 234 boats. Also, not included within this table is dry boat storage at the Del Rey Yacht Club and the California Yacht Club. It is recommended that the County continue to encourage and support the improvement of dry boat storages where suitable. This will accommodate the loss of smaller wet berth slips during the reconfiguration and replacement of marinas.

Table 14. ADA Boat Slips

Total Number of Boat Slips Provided in Facility	Minimum Number of Required Accessible Boat Slips
1 to 25	1
26 to 50	2
51 to 100	3
101 to 150	4
151 to 300	5
301 to 400	6
401 to 500	7
501 to 600	8
601 to 700	9
701 to 800	10
801 to 900	11
901 to 1000	12
1001 and over	12, plus 1 for each 100 or fraction thereof over 1000

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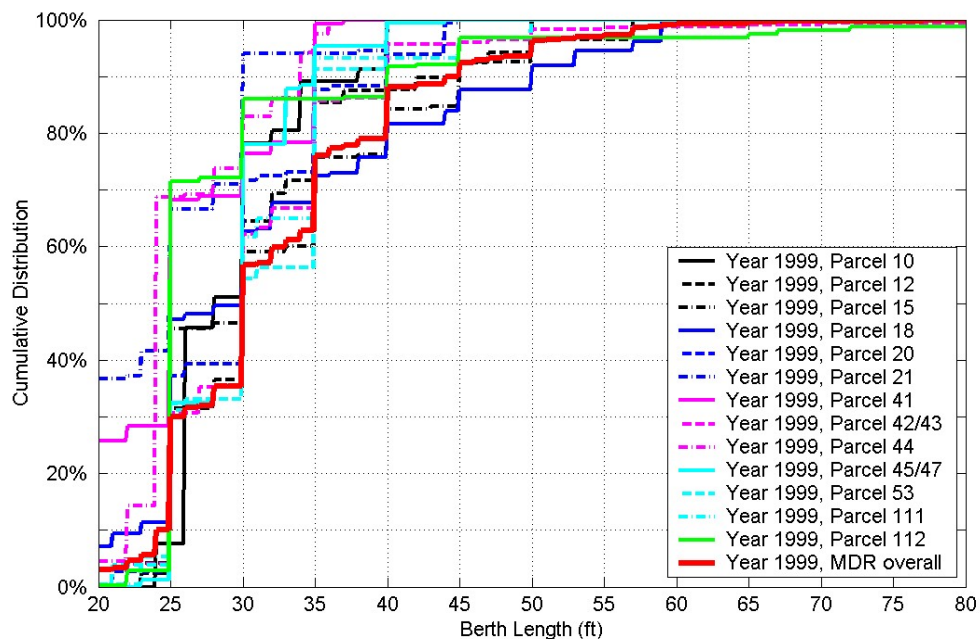
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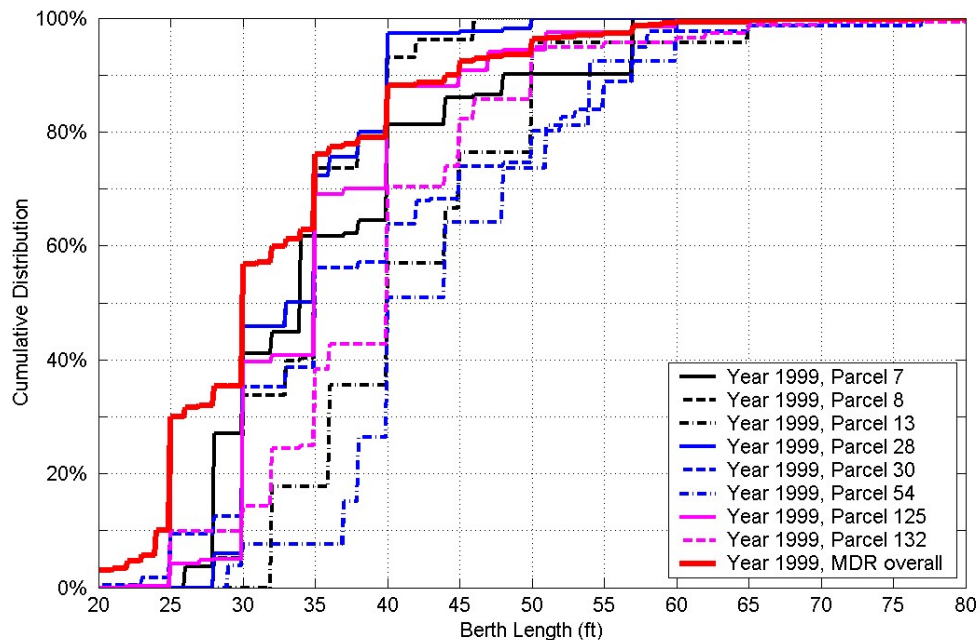
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XII APPENDIX A: MARINA DEL REY SLIP SIZE DISTRIBUTIONS

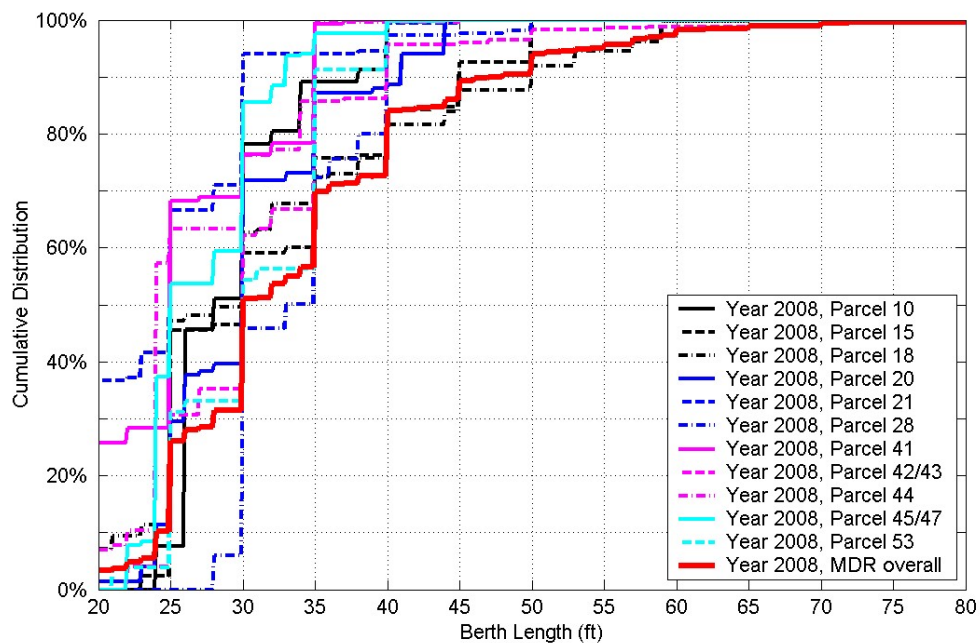
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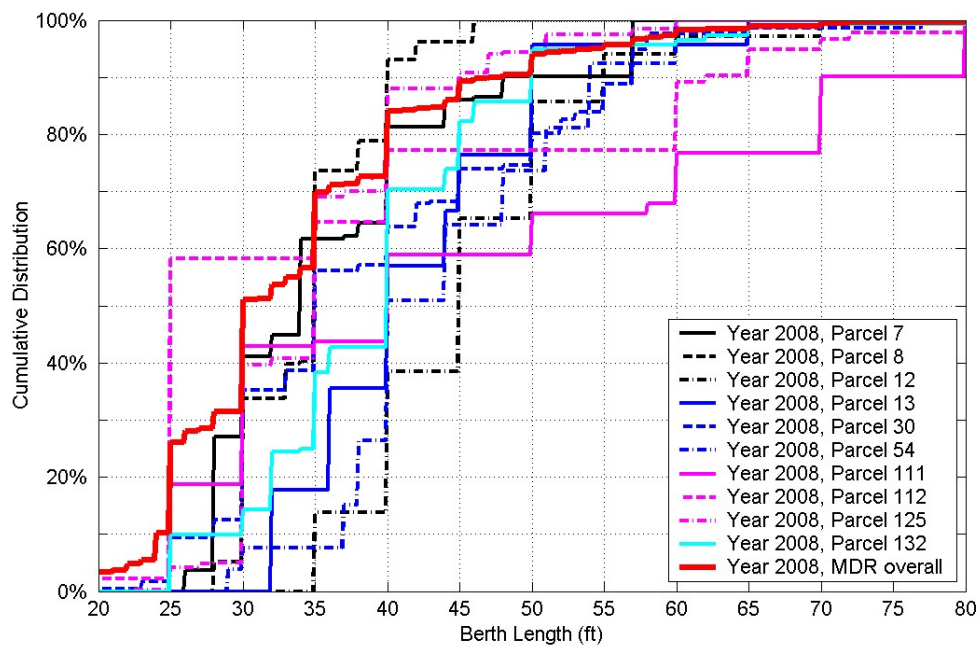
**Figure A-1. Cumulative Distribution of Slip Length for MDR Marinas
(with Smaller Slips, 1999)**



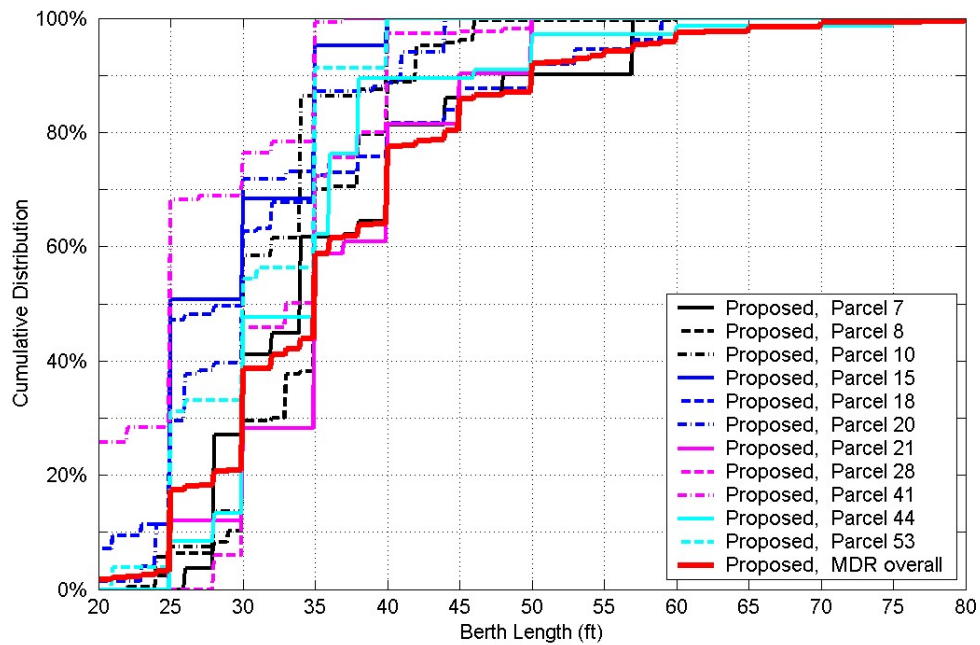
**Figure A-2. Cumulative Distribution of Slip Length for MDR Marinas
(with Larger Slips, 1999)**



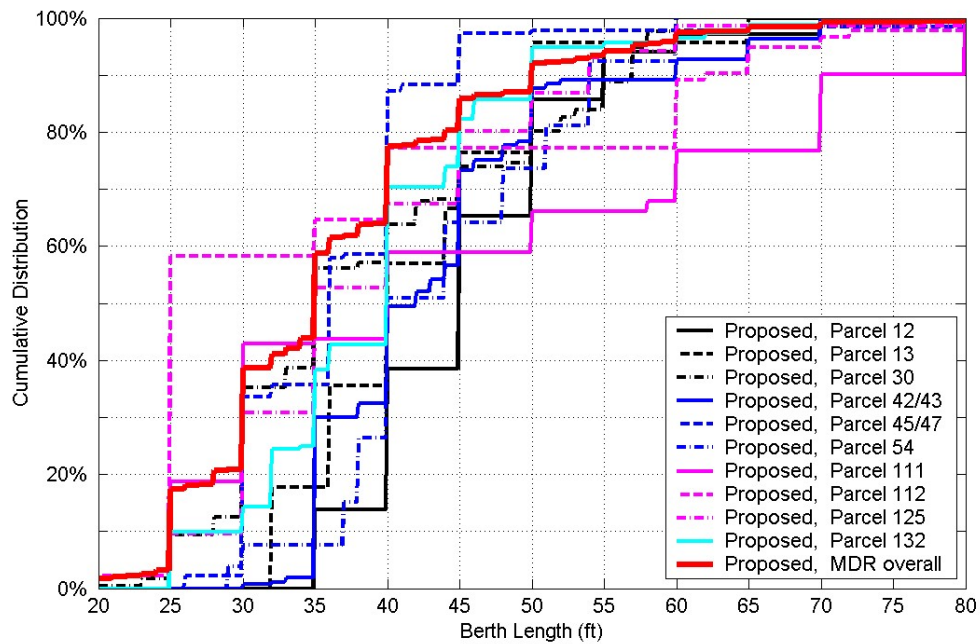
**Figure A-3. Cumulative Distribution of Slip Length for MDR Marinas
(with Smaller Slips, 2008)**



**Figure A-4. Cumulative Distribution of Slip Length for MDR Marinas
(with Larger Slips, 2008)**



**Figure A-5. Cumulative Distribution of Slip Length for MDR Marinas
(with Smaller Slips, Proposed)**



**Figure A-6. Cumulative Distribution of Slip Length for MDR Marinas
(with Larger Slips, Proposed)**

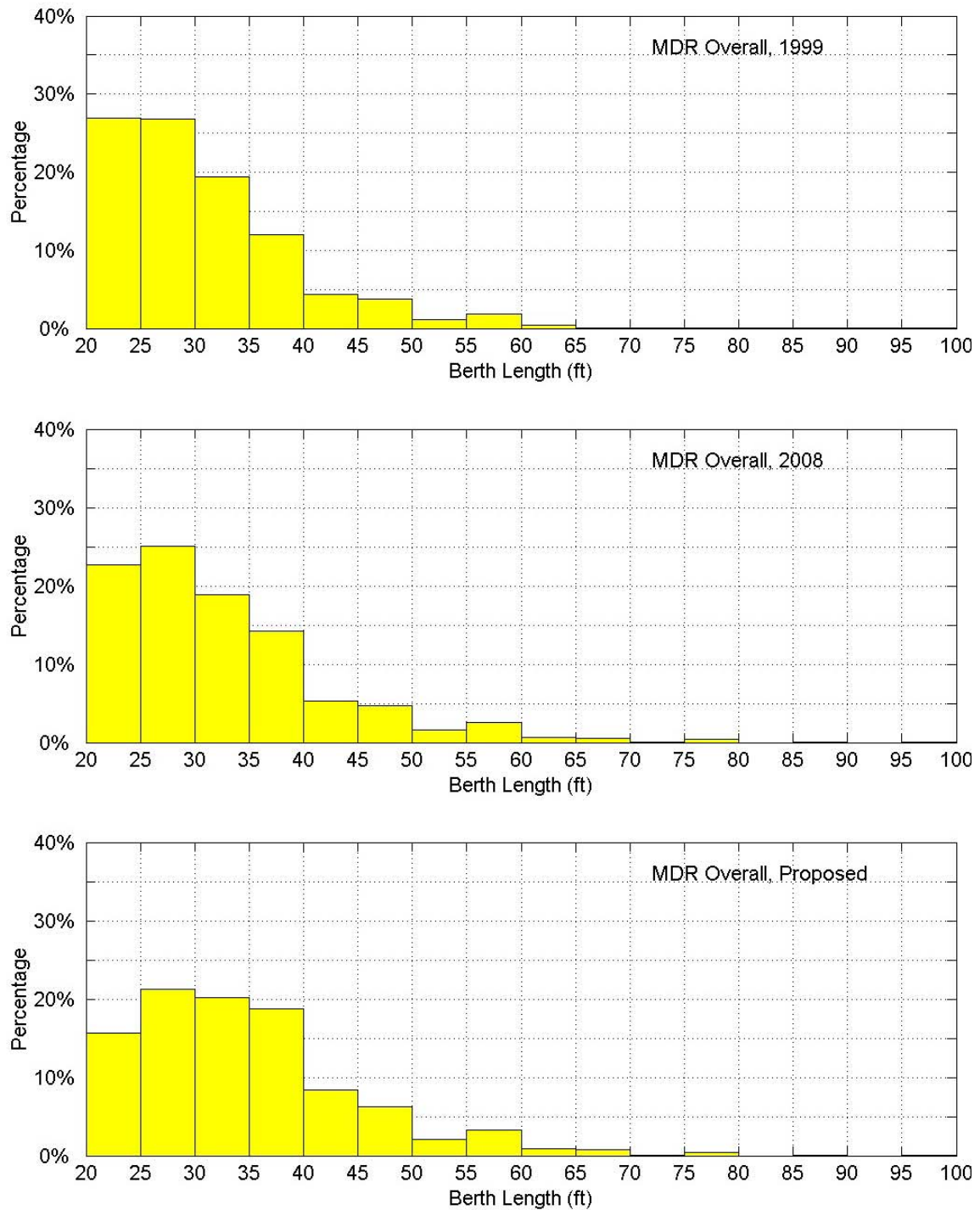
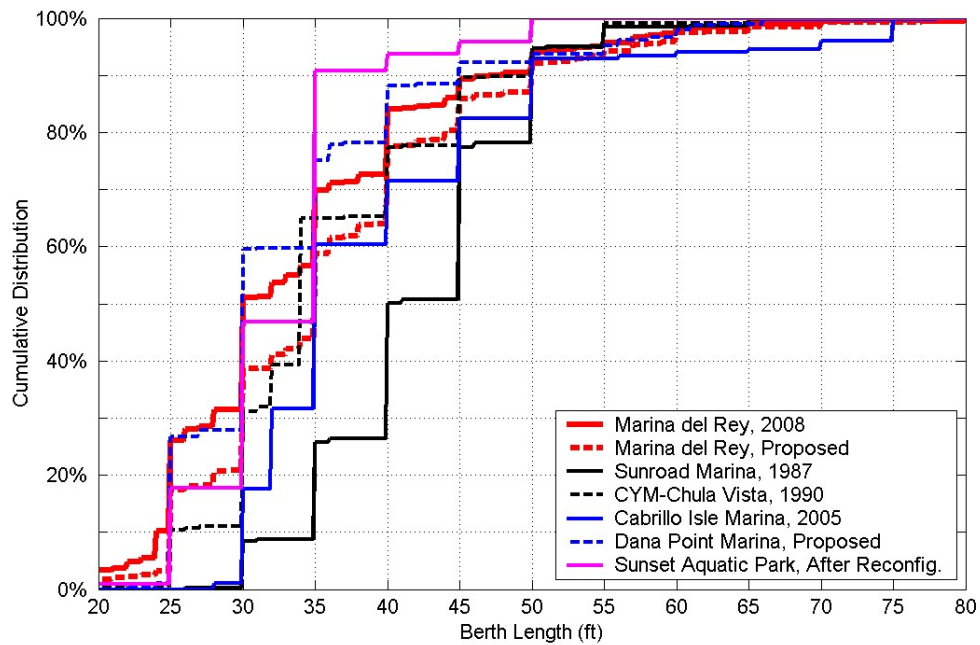


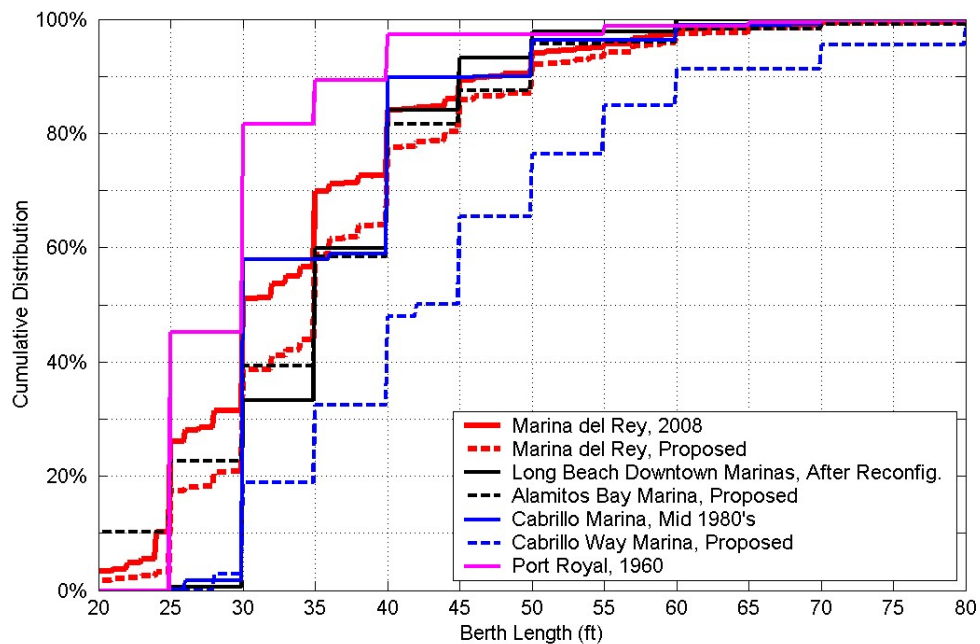
Figure A-7. Slip Size Distribution of MDR between 1999, 2008 and Proposed

XIII APPENDIX B: OTHER MARINA SLIP SIZE DISTRIBUTIONS

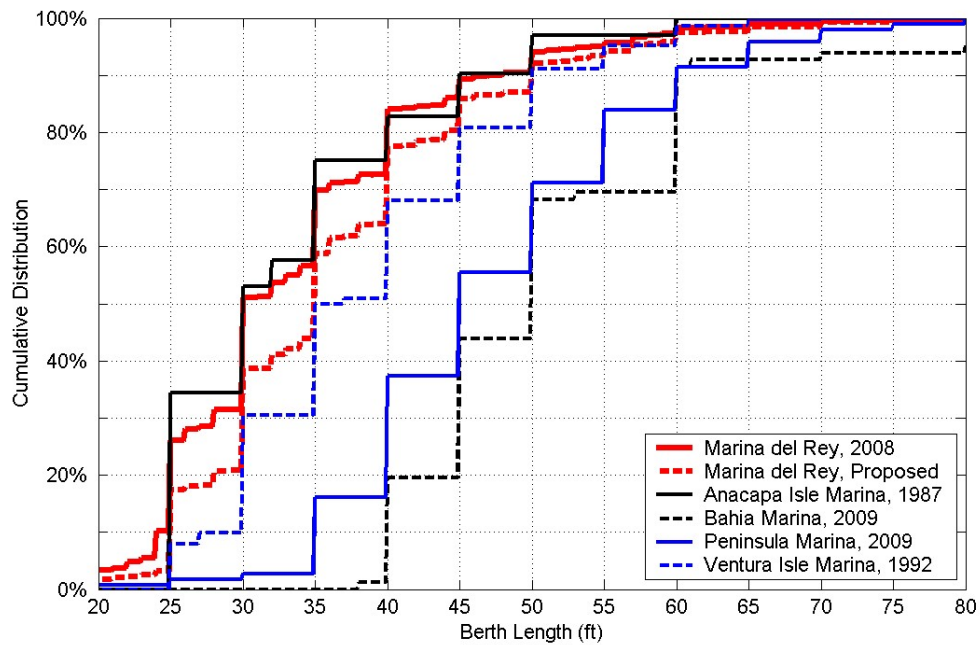
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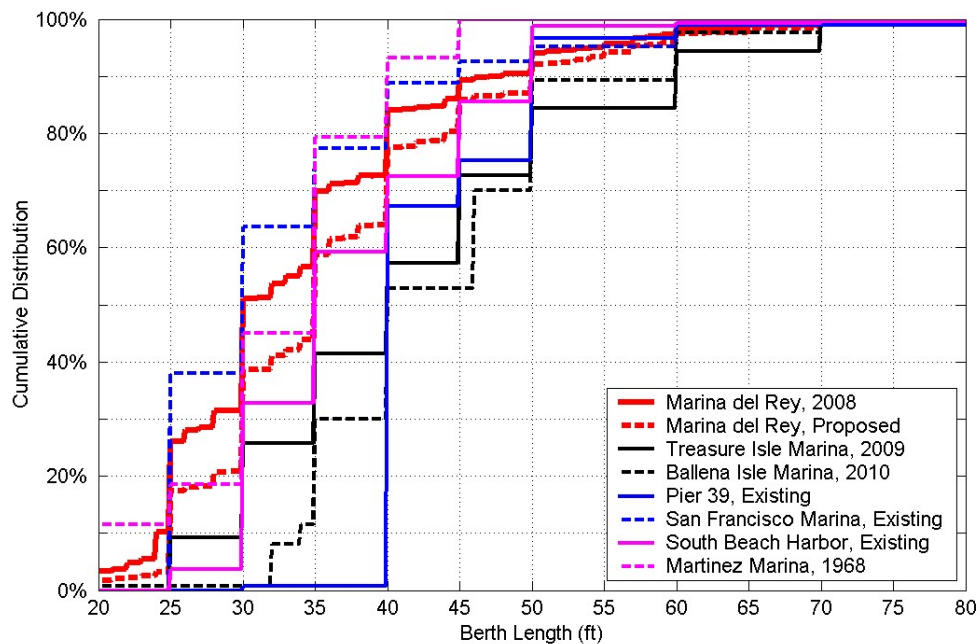
**Figure B-1. Cumulative Distributions of Berth Lengths for MDR vs. Other Marinas
– San Diego and Orange Counties**



**Figure B-2. Cumulative Distributions of Berth Lengths for MDR vs. Other Marinas
– Los Angeles County**



**Figure B-3. Cumulative Distributions of Berth Lengths for MDR vs. Other Marinas
– Ventura County**



**Figure B-4. Cumulative Distributions of Berth Lengths for MDR vs. Other Marinas
– San Francisco Bay**

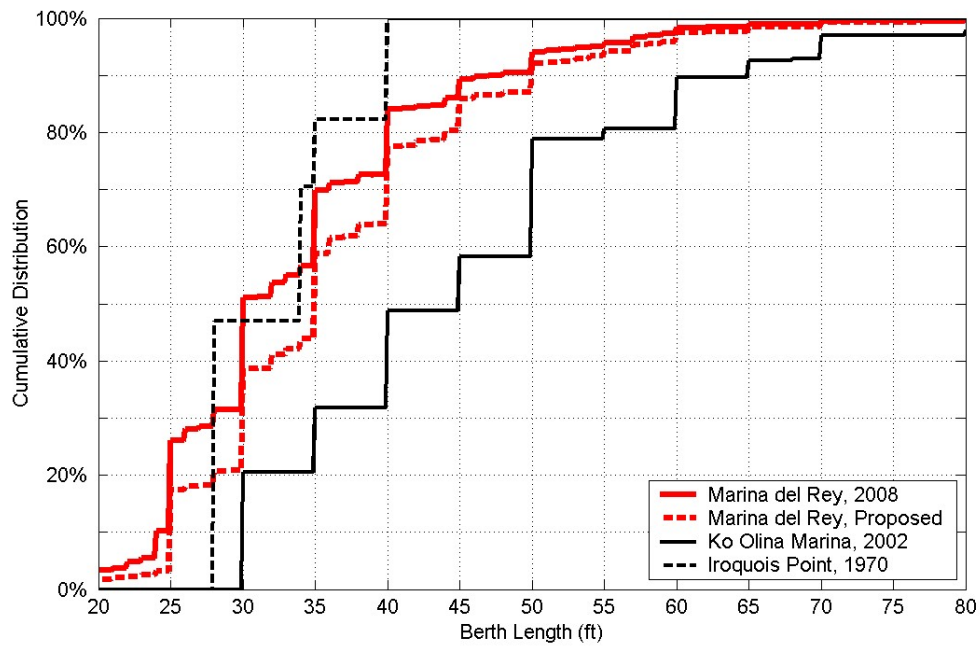


Figure B-5. Cumulative Distributions of Berth Lengths for MDR vs. Other Marinas

– Honolulu

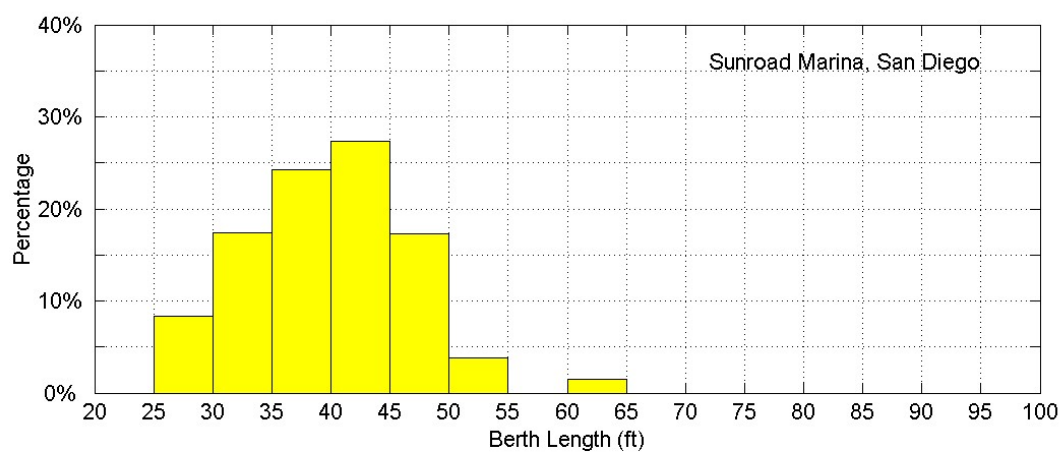
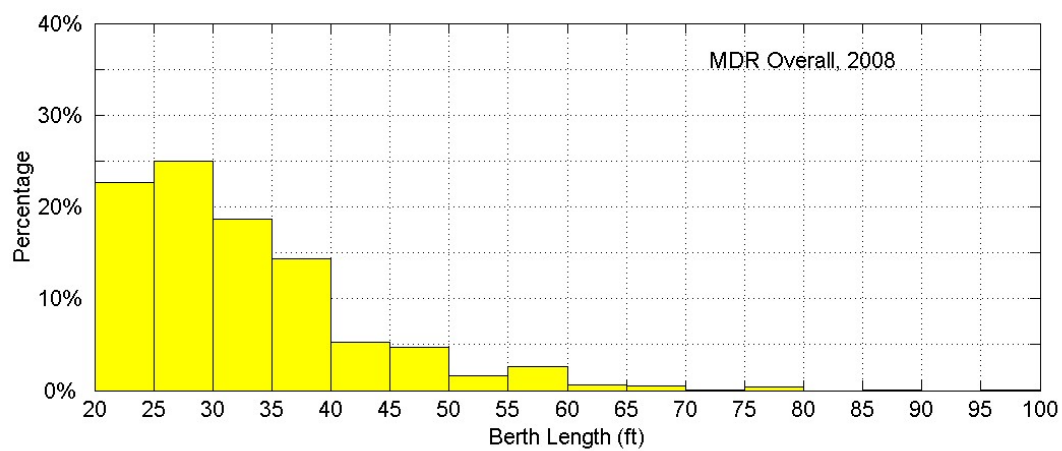
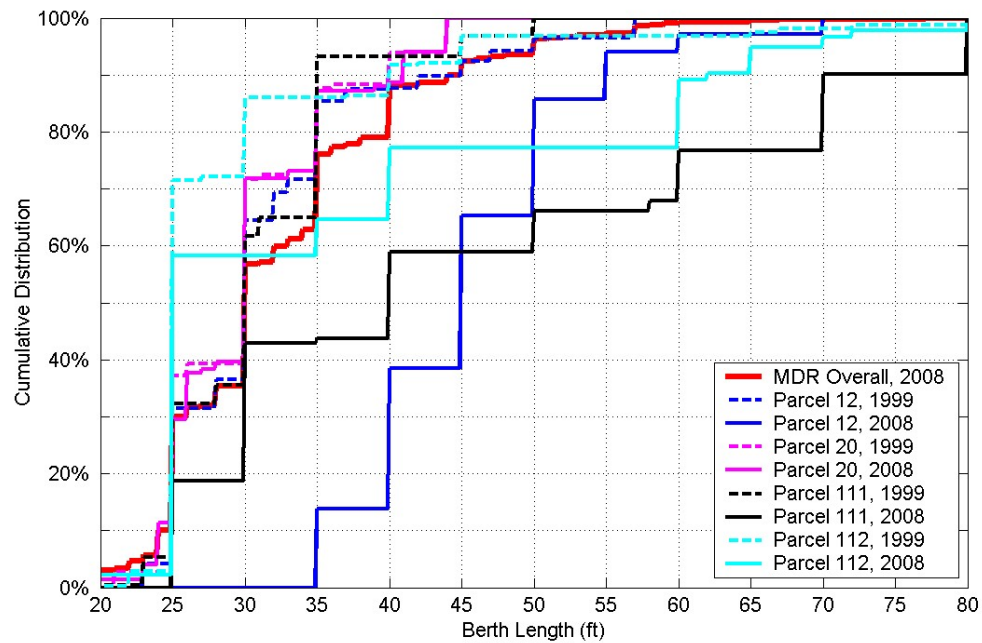


Figure B-6. Slip Length Distribution between MDR and Sunroad Marina

**XIV APPENDIX C: MARINA DEL REY RECONFIGURED AND PROPOSED
SLIP SIZE DISTRIBUTIONS**

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**Figure C-1. Cumulative Distributions of Slip Lengths for MDR Marinas:
Before and After Reconfiguration**

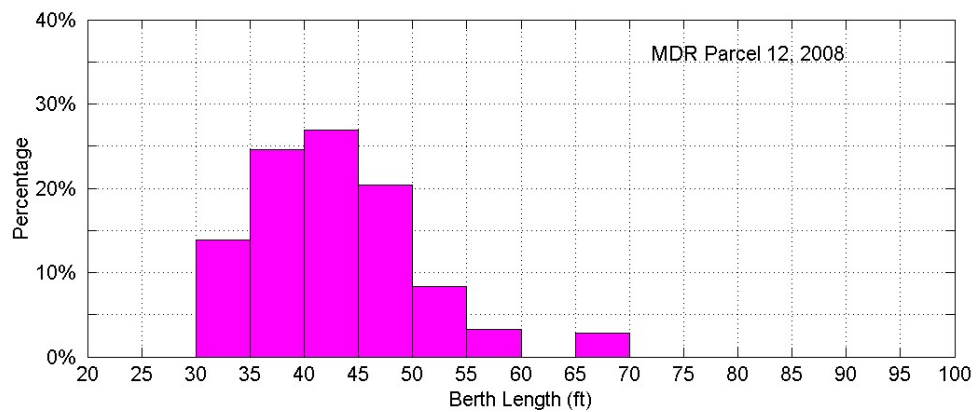
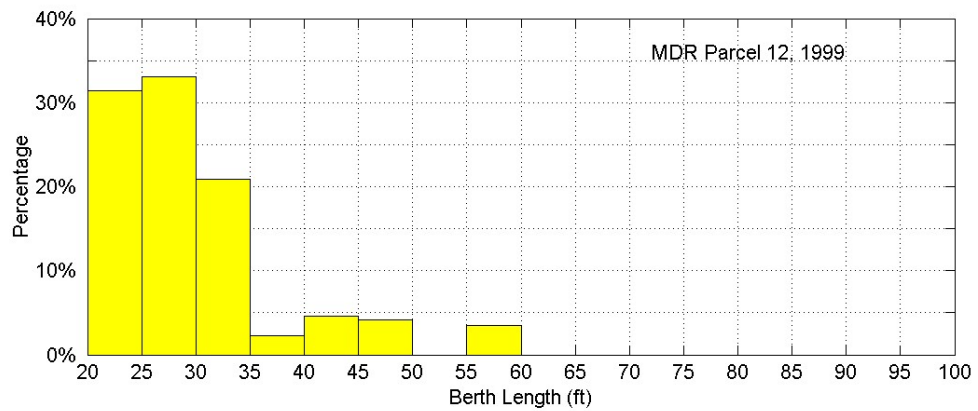


Figure C-2. Slip Length Distribution of MDR Parcel 12 for 1999 and 2008

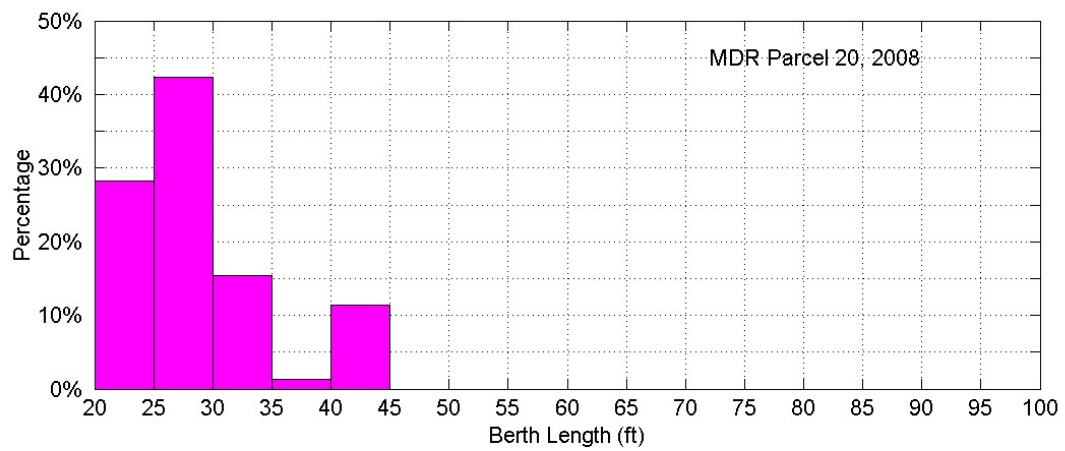
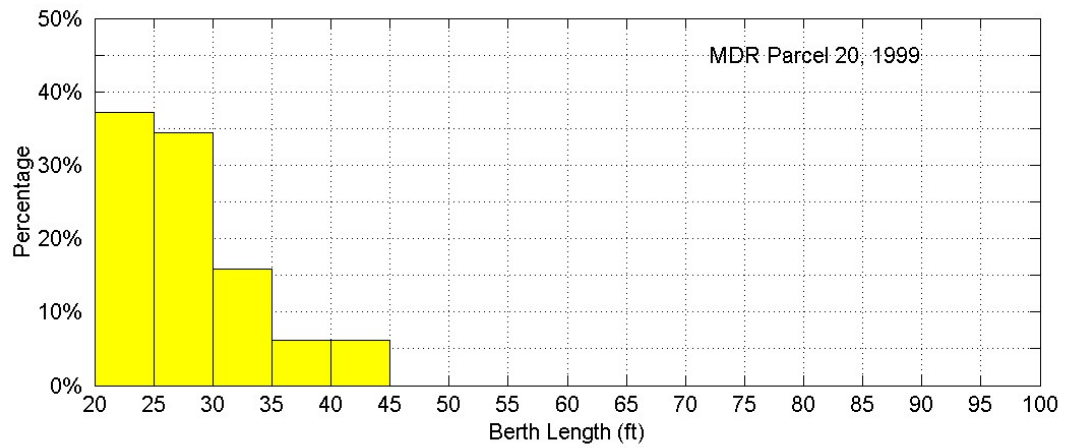


Figure C-3. Slip Length Distribution of MDR Parcel 20 for 1999 and 2008

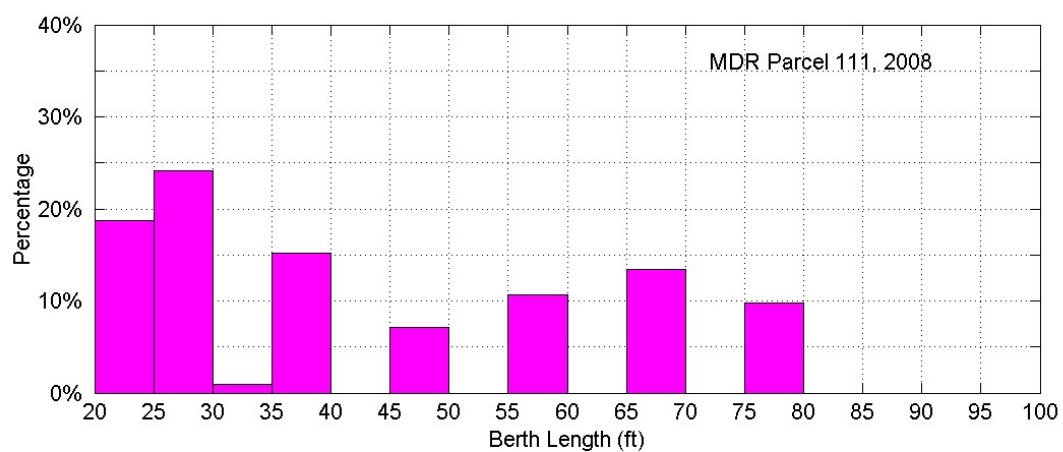
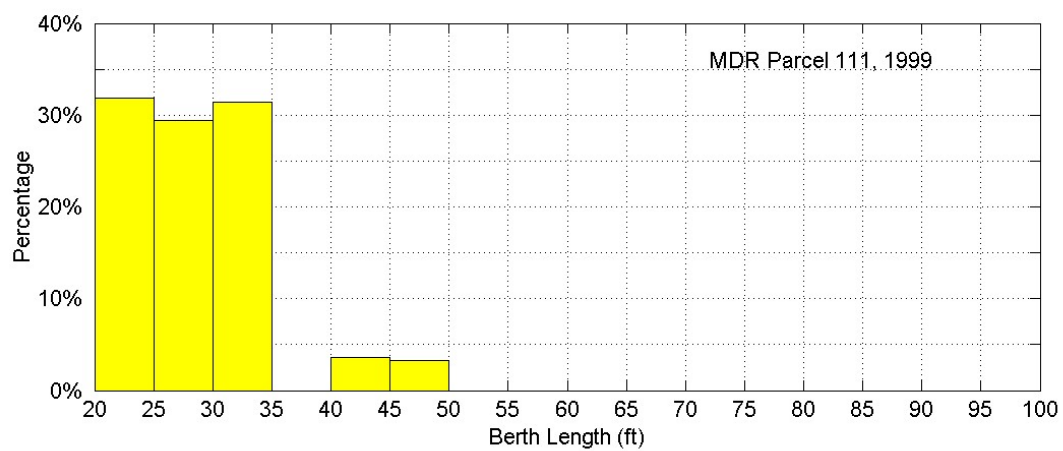


Figure C-4. Slip Length Distribution of MDR Parcel 111 for 1999 and 2008

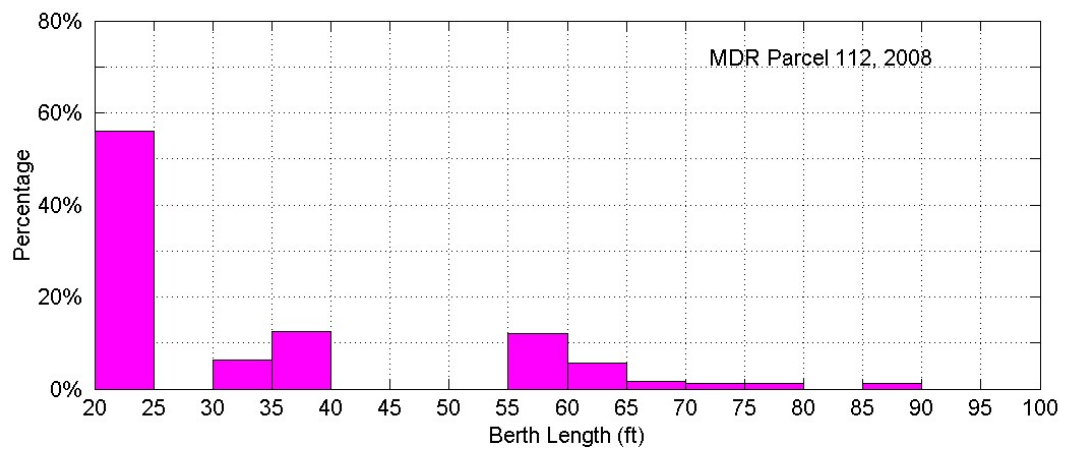
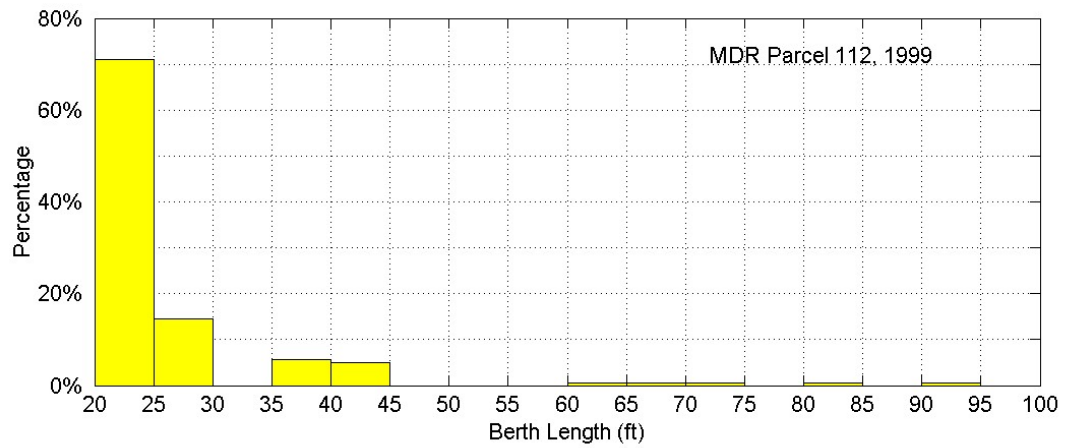
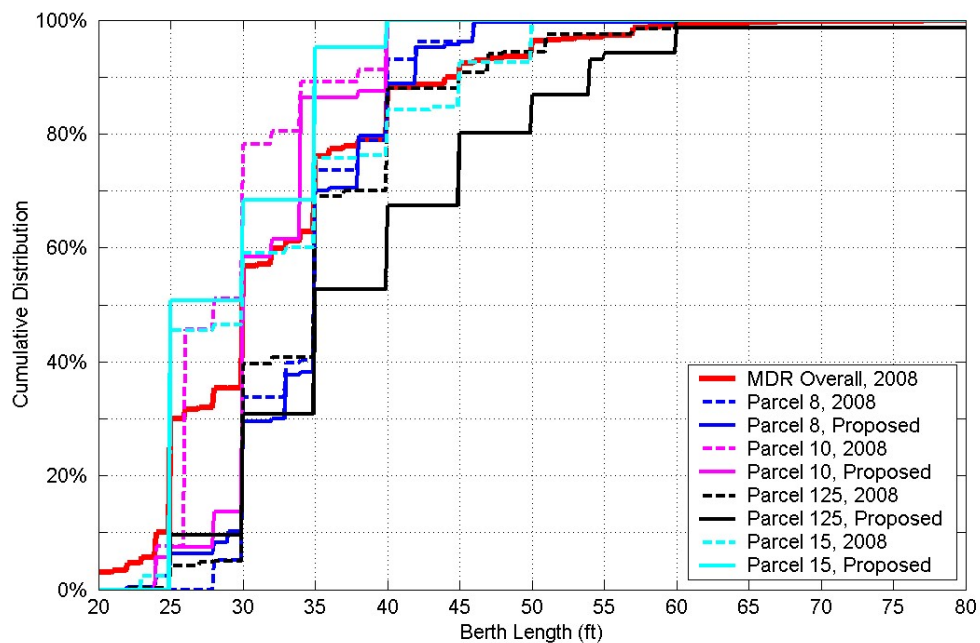
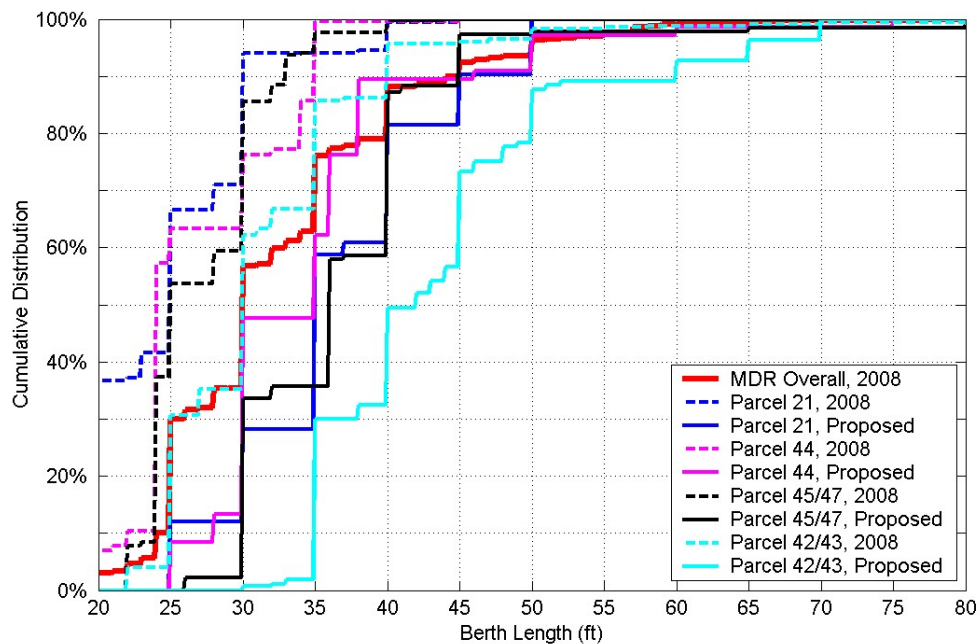


Figure C-5. Slip Length Distribution of MDR Parcel 112 for 1999 and 2008



**Figure C-6. Cumulative Distributions of Slip Lengths for MDR Marinas:
Existing vs. Proposed**



**Figure C-7. Cumulative Distributions of Slip Lengths for MDR Marinas:
Existing vs. Proposed**

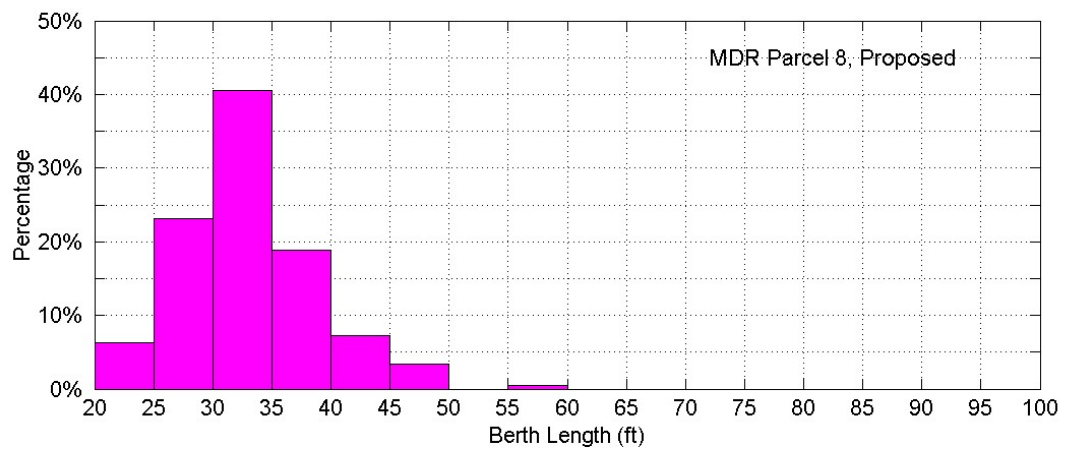
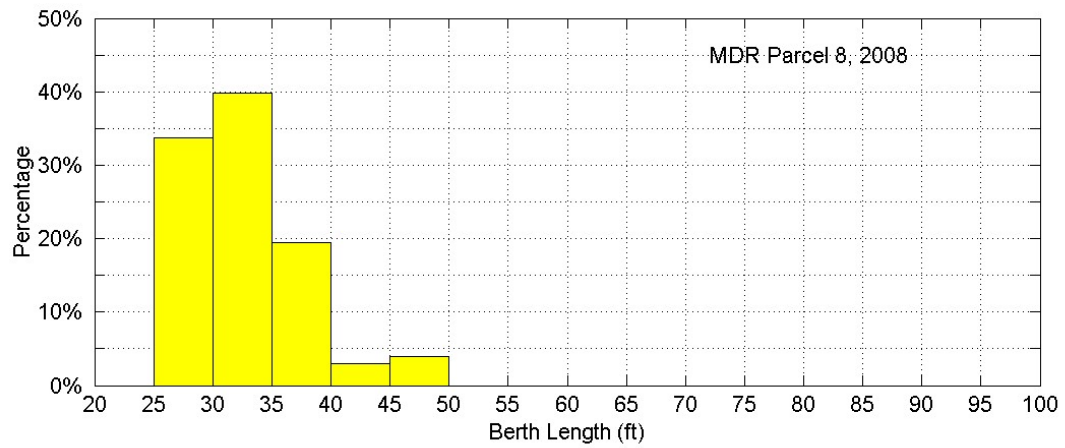


Figure C-8. Slip Length Distribution of MDR Parcel 8: Existing vs. Proposed

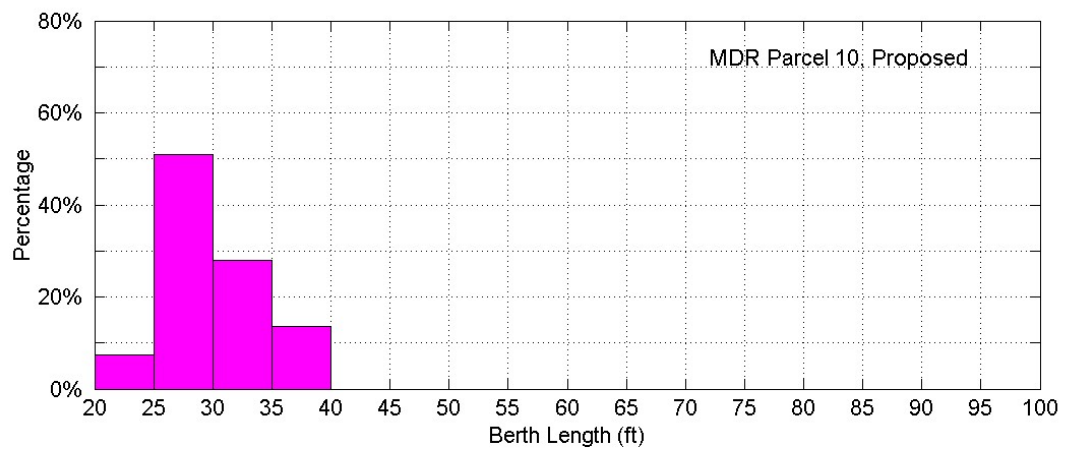
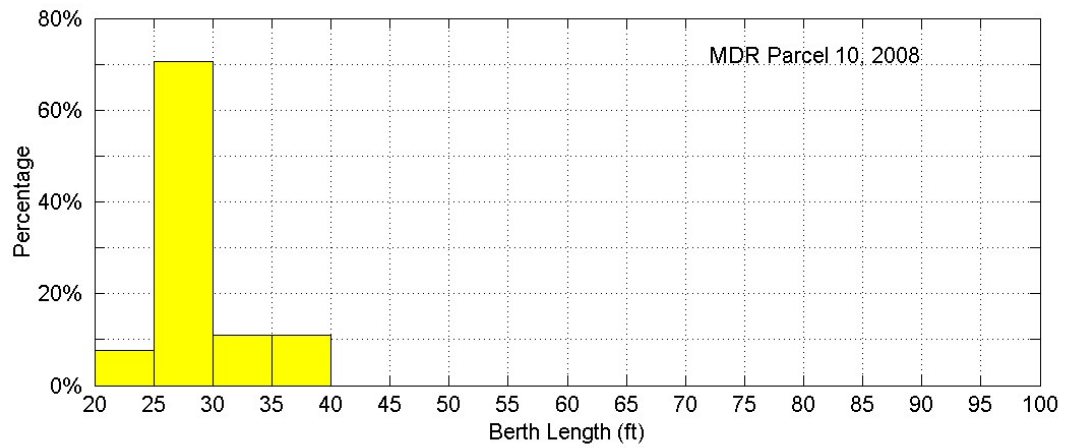


Figure C-9. Slip Length Distribution of MDR Parcel 10: Existing vs. Proposed

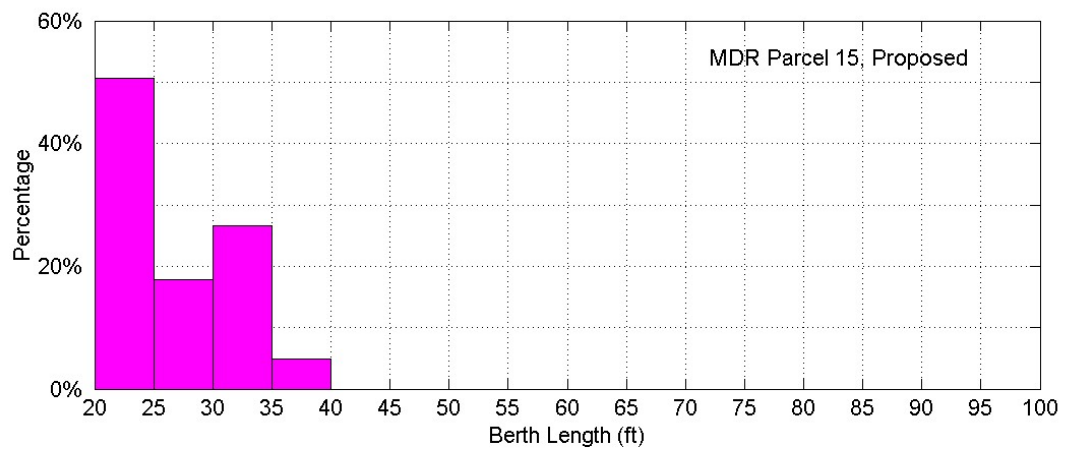
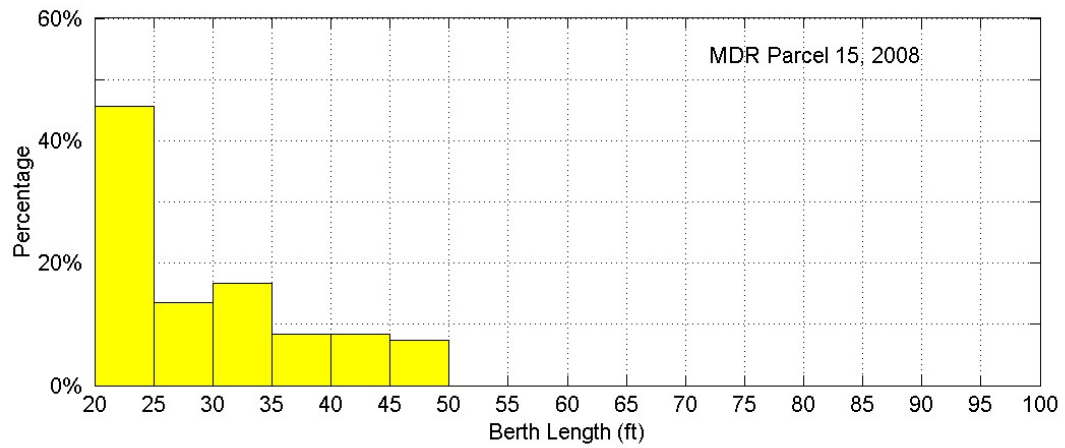


Figure C-10. Slip Length Distribution of MDR Parcel 15: Existing vs. Proposed

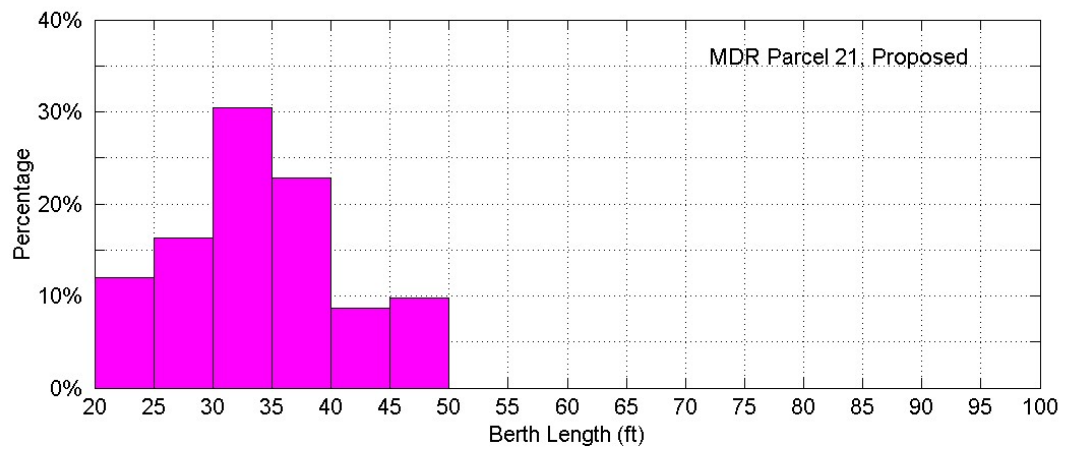
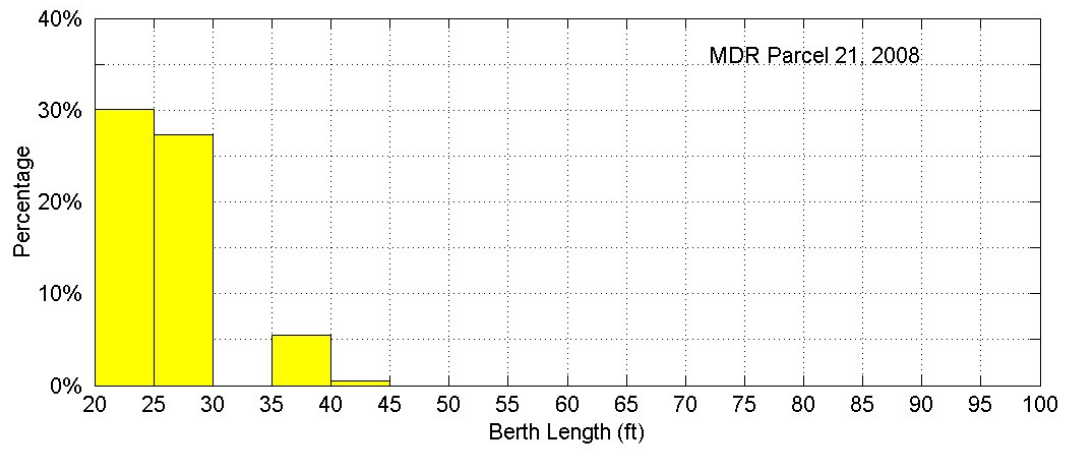


Figure C-11. Slip Length Distribution of MDR Parcel 21: Existing vs. Proposed

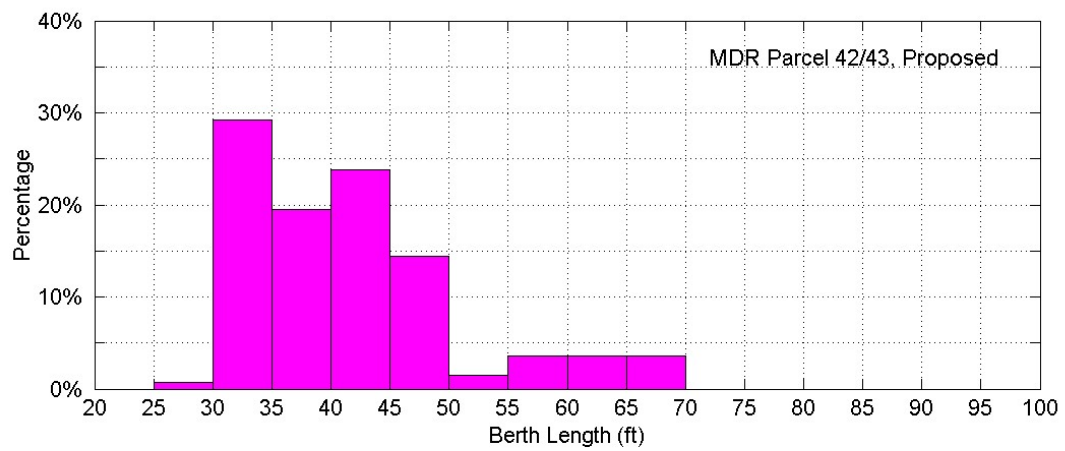
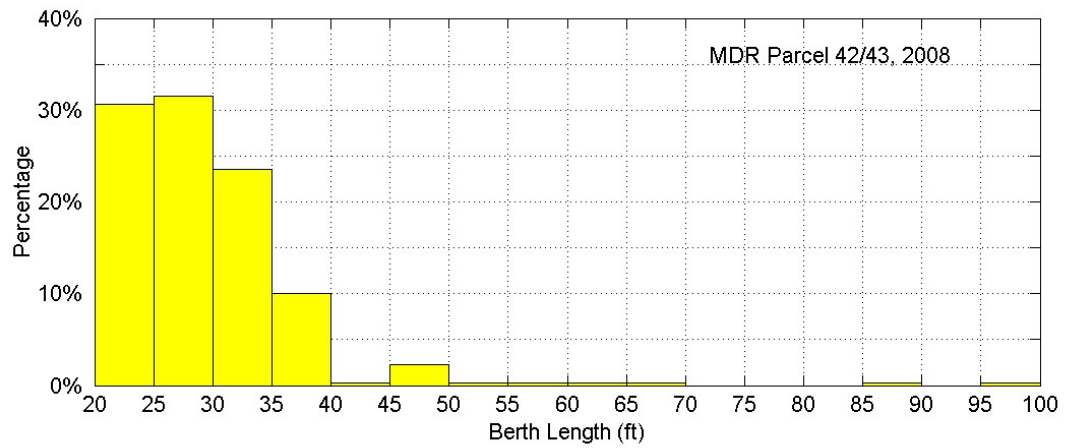


Figure C-12. Slip Length Distribution of MDR Parcel 42/43: Existing vs. Proposed

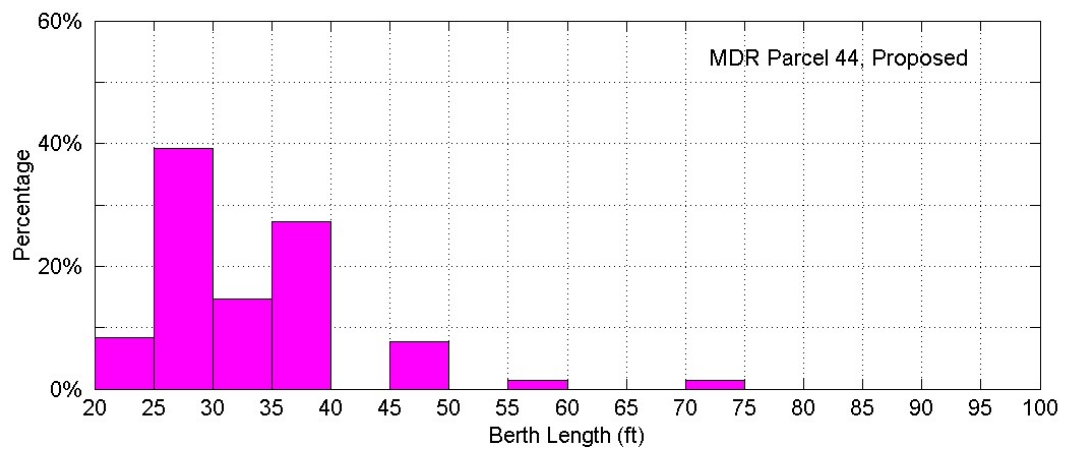
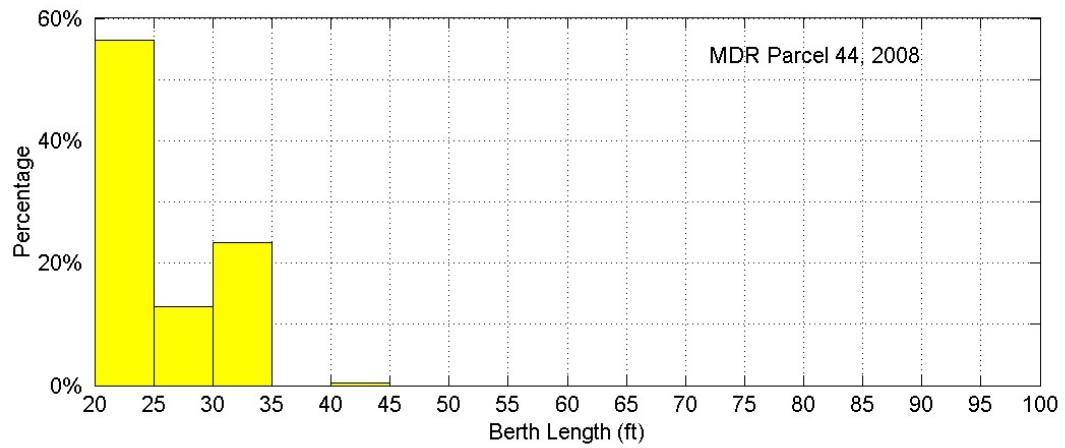


Figure C-13. Slip Length Distribution of MDR Parcel 44: Existing vs. Proposed

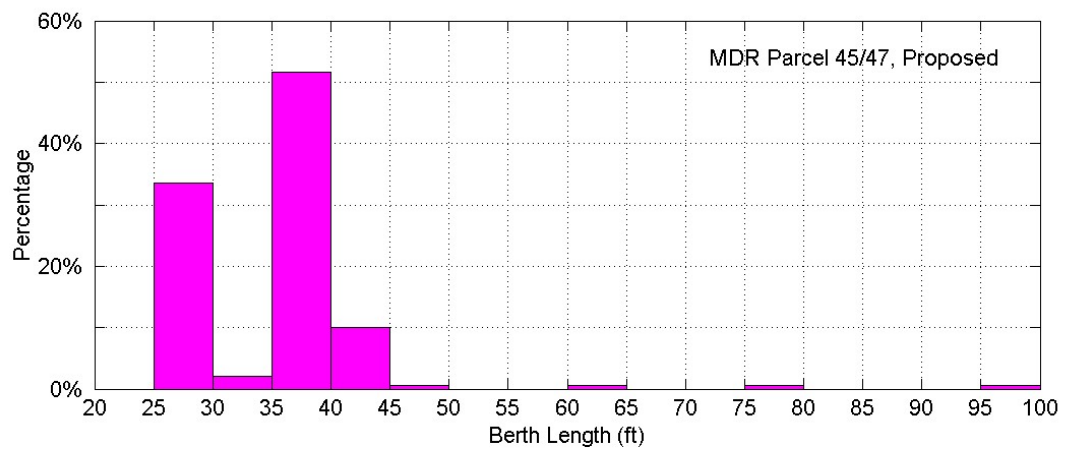
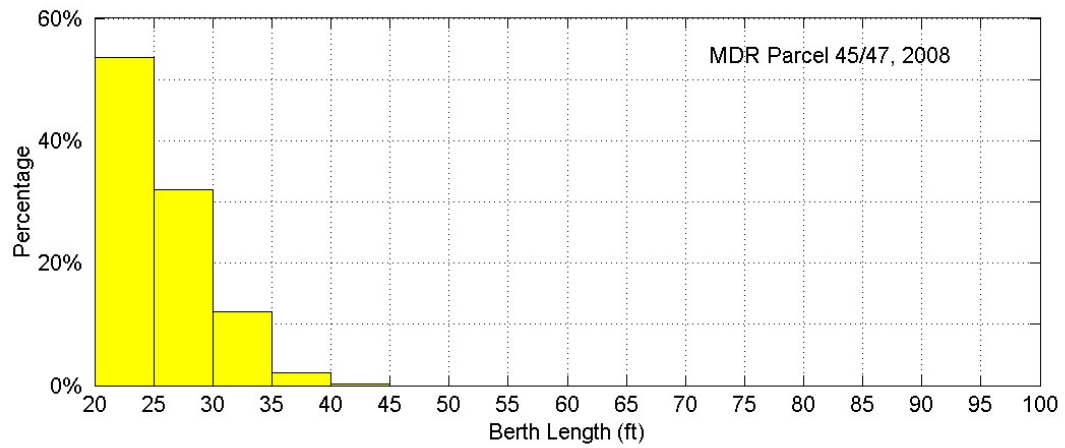


Figure C-14. Slip Length Distribution of MDR Parcel 45/47: Existing vs. Proposed

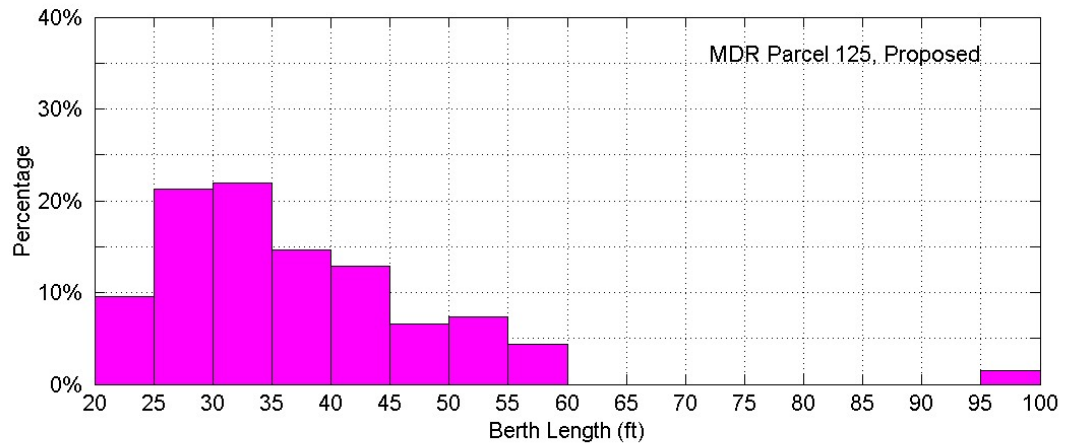
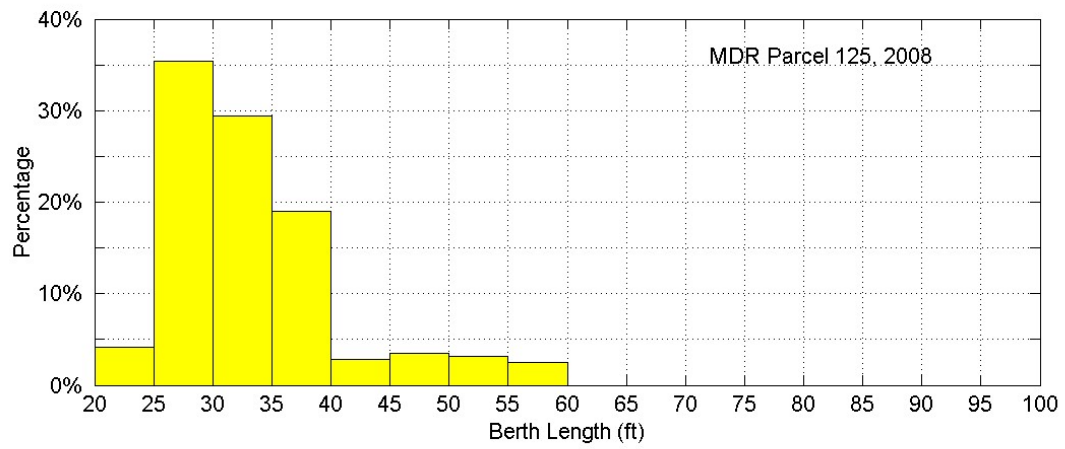


Figure C-15. Slip Length Distribution of MDR Parcel 125: Existing vs. Proposed