White Seabass Fishery Management Plan

Table of Contents

Executive Summary ......................................................................................... i

List of Tables ................................................................................................... vii

List of Figures ................................................................................................... ix

List of Appendices ........................................................................................... ix

Conversion Table ............................................................................................... xi

Chapter 1. Background and Description ......................................................... 1-1
  1.1 Purpose and Need for Action ................................................................. 1-1
    1.1.1 Location and General Characteristics of the Project Area ............ 1-2
    1.1.2 Problem Statement ......................................................................... 1-2
  1.2 The Marine Life Management Act ......................................................... 1-2
    1.2.1 Goals and Objectives .................................................................... 1-2
    1.2.2 Process of Plan Review ................................................................. 1-4
    1.2.3 Process for Plan Amendment ......................................................... 1-4
  1.3 Specific Goals and Objectives of the White Seabass Fishery Management Plan ........................................................................................................ 1-4
    1.3.1 Constituent Involvement .................................................................. 1-5
      1.3.1.1 Public Consultation for Definition of Plan Goals and Objectives ................................................................. 1-5
      1.3.1.2 Public Consultation for Selection of Preferred Management Alternative ......................................................... 1-6
  1.4 Authority and Responsibility .................................................................... 1-6
    1.4.1 California Environmental Quality Act (CEQA) ............................ 1-7
      1.4.1.1 Functional Equivalent ............................................................... 1-7
      1.4.1.2 Use of the Environmental Document ...................................... 1-8
    1.4.2 Federal Law ................................................................................. 1-8
  1.5 Current Management of White Seabass ................................................... 1-8
    1.5.1 Legislative Responsibilities ............................................................ 1-8
    1.5.2 Fish and Game Commission Responsibilities ................................ 1-9
      1.5.2.1 Recreational Fisheries ............................................................. 1-9
      1.5.2.2 Commercial Fisheries .............................................................. 1-9
      1.5.2.3 Rulemaking Process under the Administrative Procedures Act (APA) ................................................................. 1-9
Chapter 2. Description of Stocks ......................................... 2-1
  2.1 Species Description ..................................................... 2-1
  2.2 Distribution, Genetic Stock Structure, and Migration ............ 2-1
  2.3 Age and Growth .......................................................... 2-2
  2.4 Reproduction, Fecundity and Seasonality ........................ 2-3
  2.5 Natural Mortality ......................................................... 2-4
  2.6 Parasites and Disease .................................................. 2-5
  2.7 Predator/Prey Relationships .......................................... 2-6
  2.8 Competition ............................................................... 2-6
  2.9 Critical Habitat ........................................................... 2-6
  2.10 Status of the Stocks .................................................... 2-6

Chapter 3. Description of the Fishery .................................... 3-1
  3.1 Areas and Stocks Involved ............................................. 3-1
  3.2 History of Exploitation .................................................. 3-1
    3.2.1 Description of User Groups ..................................... 3-4
    3.2.2 Fishing Catch and Effort ......................................... 3-7
  3.3 Social and Economic Characteristics of the Fishery ............ 3-15
    3.3.1 Recreational Sector ................................................ 3-16
    3.3.2 Commercial Sector .................................................. 3-19
  3.4 Non-consumptive Use .................................................... 3-24
  3.5 Analysis of Impacts ...................................................... 3-24

Chapter 4. History of Conservation and Management Measures ........... 4-1
  4.1 Regulatory History in California ...................................... 4-1
  4.2 Regulatory History Specific to White Seabass fisheries .......... 4-1
    4.2.1 Commercial Fishery ................................................ 4-1
    4.2.2 Recreational Fishery .............................................. 4-2
  4.3 Additional Conservation Measures for White Seabass Stocks ...... 4-4

Chapter 5. Fishery Management Program .................................. 5-1
  5.1 Potential Management Measures ...................................... 5-1
  5.2 Definition of Maximum Sustainable Yield and Optimum Yield .... 5-4
  5.3 General Fishery Management Plan Framework ....................... 5-5
    5.3.1 Plan Amendment ...................................................... 5-5
    5.3.2 Framework Actions ................................................. 5-6
    5.3.3 Routine Management Measures .................................... 5-7
  5.4 White Seabass FMP Framework ......................................... 5-8
    5.4.1 Points of Concern Process ....................................... 5-8
    5.4.2 Socioeconomic Process ............................................. 5-9
    5.4.3 Allocation Criteria .................................................. 5-11
    5.4.4 Harvest Control Rules ............................................. 5-11
5.5 Trigger Mechanisms ........................................5-12
5.6 Management Alternatives .....................................5-13
  5.6.1 Alternative A - Status Quo ..............................5-14
  5.6.2 Alternative B - OY Proxies Based on National Standard Guidelines 5-14
    5.6.2.1 Alternative B1: OY=0.8125 x MSY ..............5-14
    5.6.2.2 Alternative B2 (Preferred): OY=0.75 x MSY ....5-15
  5.6.3 Alternative C - OY Proxies Based on Recent Catch Levels ....5-15
    5.6.3.1 Alternative C1: Based on 1996-2000 Catch Data ....5-15
    5.6.3.2 Alternative C2: Based on 1988-1989 and 1993-2000 Catch Data ....5-15
    5.6.3.3 Alternative C3: Based on 1983-1989 and 1993-2000 Catch Data ....5-16
  5.6.4 Alternative D - OY Proxy Based on 1947-1957 Catch Data ....5-16
5.7 Default MSY/OY Control Rule ................................5-17
5.8 Trigger Mechanisms for Proposed Alternatives ................5-18
5.9 Annual Review of Management Measures .......................5-19
5.10 Reporting and Record Keeping Requirements ................5-19

Chapter 6. Analysis of Proposed Management Alternatives .......6-1
  6.1 Alternative A - Status Quo ................................6-1
    6.1.1 Effects on White Seabass ............................6-1
    6.1.2 Effects on Non-Target Species .......................6-2
      6.1.2.1 Effects on Non-Target Finfish ...................6-3
      6.1.2.2 Effects on Invertebrates .......................6-4
      6.1.2.3 Effects on Seabirds ............................6-5
      6.1.2.4 Effects on Marine Mammals ......................6-7
      6.1.2.5 Effects on Marine Turtles .....................6-9
      6.1.2.6 Ecological interactions ........................6-10
    6.1.3 Habitat Impacts ......................................6-11
      6.1.3.1 Effects of Consumptive Use on Environment ....6-11
      6.1.3.2 Effects of Non-consumptive Use on Environment 6-11
    6.1.4 Economic Implications ................................6-11
    6.1.5 Social Implications ...................................6-12
  6.2 Alternative B - OY Proxies Based on National Standard Guidelines 6-12
    6.2.1 Effects on White Seabass ............................6-12
    6.2.2 Effects on Non-Target Species ........................6-13
      6.2.2.1 Effects on Non-Target Finfish ...................6-13
      6.2.2.2 Effects on Invertebrates .......................6-13
      6.2.2.3 Effects on Seabirds ............................6-14
      6.2.2.4 Effects on Marine Mammals .....................6-14
      6.2.2.5 Effects on Marine Turtles .....................6-14
      6.2.2.6 Ecological Interactions ........................6-14
Chapter 7. Fishery Research Protocols ............................................. 7-1
  7.1 Essential Fishery Information .................................................. 7-1
    7.1.1 Grouping Essential Fishery Information .................................. 7-2
  7.2 Past and Ongoing Monitoring of the Commercial and Recreational Fishery .................................................. 7-5
    7.2.1 Past Fishery-Dependent Monitoring ........................................... 7-6
    7.2.2 Problems with Past and Ongoing Fishery-Dependent Monitoring 7-7
    7.2.3 Past Fishery Independent-Research .............................................. 7-8
    7.2.4 Problems with Past and Ongoing Fishery Independent-Research 7-8
  7.3 Current Knowledge of Essential Fishery Information ............................................. 7-9
  7.4 Research Needed to Obtain Essential Fishery Information .................. 7-10
    7.4.1 Short-Term Research Goals and Needs ........................................... 7-10
    7.4.2 Long-Term Research Goals and Needs ............................................ 7-12
  7.5 Resources and Time Needed to Fill Essential Fishery Information Gaps 7-14
  7.6 Steps to Monitor the Fishery and Obtain Essential Fishery Information ........ 7-14

Chapter 8. Implementation Requirements .............................................. 8-1
  8.1 Enforcement ................................................................................. 8-1
  8.2 Ongoing and Future Research .................................................. 8-2
  8.4 Administrative Management ...................................................... 8-5
    8.4.1 Coordination of the White Seabass Fishery Management Plan 8-5
    8.4.2 Annual Meetings ........................................................................ 8-6
    8.4.3 Publication of White Seabass Amendments ...................................... 8-6

Chapter 9. Other Ecological Concerns .................................................. 9-1
  9.1 Environmental Variability ...................................................... 9-1
  9.2 Water Quality ............................................................................. 9-2
    9.2.1 Municipal Discharge ................................................................. 9-2
    9.2.2 Dredge and Non-dredge Material Disposal ..................................... 9-3
    9.2.3 Coastal Shipyards and Industrial Pollutants .................................... 9-4
    9.2.4 Fuel Use .................................................................................. 9-6
  9.3 Air Quality ................................................................................... 9-6
  9.4 Importance of Habitat Loss, Degradation, and Modification ................. 9-7
    9.4.1 Coastal Development and Land Use .............................................. 9-7
    9.4.2 Gear Use In the Marine Environment ............................................. 9-8
    9.4.3 Noise Effects in the Marine Environment ....................................... 9-9

Literature Cited .................................................................................. L-1

Personal Communications .................................................................. L-15

List of Preparers .............................................................................. P-1
List of Tables

Table 2-1. Mean total length and weight at age for white seabass. .......................... 2-3
Table 2-2. Estimates of white seabass natural mortality (M). .................................. 2-4
Table 3-1. Total white seabass take in U.S. and Mexico by U.S. commercial and recreational industries from 1936-2000 .................................................. 3-2
Table 3-2. Total California landings (pounds) of white seabass by gear type from 1981-2000 ................................................................. 3-5
Table 3-3. Number of vessels landing white seabass by principle landing gear from 1981-2000. .............................................................. 3-6
Table 3-4. Number of fish businesses receiving white seabass by principle landing area from 1981-2000 ........................................... 3-8
Table 3-5. Number of fish markets receiving white seabass by pounds received from 1981-2000. ............................................. 3-8
Table 3-6. 1989 participation in white seabass fishing and projected future participation in response to enhancement of catch rates by county of residence. 3-16
Table 3-7. Total annual trip expenditures for saltwater anglers in southern California by fishing mode and resident status for 2000 .......................... 3-17
Table 3-8. Southern California participation estimates for the saltwater recreational fishery by area of residence, 1993-2000 ................................... 3-18
Table 3-9. Average annual market price (per pound) for white seabass from 1981-2000 ................................................................. 3-21
Table 3-10. Examples of annual operating costs by primary gear type. .................. 3-22
Table 3-11. Estimated socioeconomic impact of recreational diving from boats in CINMS reserve area and surrounding waters during 1997. .... 3-24
Table 4-1. Summary of White Seabass Regulations from 1931 to the Present. (Modified from Vojkovich and Reed 1983). ................................. 4-3
Table 4-2. Revenue generated through the purchase of the ocean enhancement stamp, 1992-2000. ................................................................. 4-5
Table 5-1. Proposed alternatives (harvest control rules) for management of the white seabass resource. ...................................................... 5-16
Table 6-1. Observed incidental catch of finfish in the white seabass gill net fishery from 1983-1989 (Vojkovich et al. 1990). ............................... 6-4
Table 6-2. Observed incidental catch of invertebrates in the white seabass gill net fishery from 1983-1989 (Vojkovich et al. 1990). ..................... 6-5
Table 6-3. Pinniped interactions with recreational anglers targeting white seabass in 1999. Interviewed anglers reported pinnipeds within 100 yards of their fishing area. ........................................... 6-8
Table 6-4. Reduction estimates of white seabass catch and resulting take using various controls or regulations. ........................................ 6-16
Table 6-5. Number of years for the white seabass stock to become overfished when management is by one alternative (Y) while stock status suits another alternative (X). ........................................... 6-21
Table 6-6. Summary of potential effects of proposed alternatives on white seabass fishery management plan (WSFMP) and Marine Life Management Act (MLMA) objectives .............................................................. 6-24
Table 8-1. Enforcement costs in 2000. .............................................................. 8-2
Table 8-2. Estimated cost of collection and maintenance of statistical (landing receipt, CPFV and commercial logbook) data. ........................................ 8-3
Table 8-3. Estimated cost of fishery dependent biological sampling. ................. 8-3
Table 8-4. Cost of fishery independent data collection. ..................................... 8-4
Table 8-5. Administrative cost of coordination for the WSFMP. ...................... 8-6
Table 8-6. Costs associated with the annual White Seabass Advisory Panel Meeting (seven panelists). ................................................................. 8-6
Table 8-7. Publication costs for White Seabass FMP amendments and notices. . 8-7
Table 9-1. South Coast vessel emissions (tons per day) - 2000. ...................... 9-7

List of Figures

Figure 3-1. Commercial Passenger Fishing Vessel (CPFV) landings of white seabass in U.S. and Mexican waters .............................................................. 3-9
Figure 3-2. Total sport take of white seabass (WSB), in thousands of fish, compared to percentage of trips they are targeted. ........................................... 3-9
Figure 3-3. Catch-per unit-effort (CPUE) of white seabass (WSB) aboard Commercial Passenger Fishing Vessels (CPFVs) targeting white seabass from 1995-1999. ........................................... 3-10
Figure 3-4. Recreational catch of white seabass (thousands of fish) by fishing mode from 1980-2000. ................................................................. 3-10
Figure 3-5. Length of white seabass kept by different fishing modes from 1980-2000. ................................................................. 3-11
Figure 3-6. Regulation changes and total white seabass commercial catch from U.S. and Mexican waters taken by California fishermen from 1936-2001. . 3-14
Figure 3-7. Set gill net and drift gill net effort and pounds landed from 1982-2000. 3-14
Figure 3-8. Commercial catch-per-unit-effort (CPUE) of white seabass from 1982-2000. ................................................................. 3-15
Figure 3-9. Recreational fishing trips (saltwater) taken in southern California from 1993-1999. ................................................................. 3-15
Figure 3-10. Annual household incomes of marine anglers in California in 2000 . 3-18
Figure 3-11. Age groups of marine anglers in California in 2000. .................... 3-19
Figure 3-12. Percentage of white seabass revenue by port area from 1981-2000. ................................................................. 3-19
Figure 3-13. Annual white seabass commercial landings and ex-vessel revenue for California from 1981-2000. ................................................................. 3-20
Figure 3-14. White seabass revenue by gear type from 1982-2000. ................ 3-21
Figure 3-15. Estimated number of white seabass kept and released by
anglers who use private/rental boats. ..............................3-25
Figure 5-1. Default MSY/OY control rule (modified from Restrepo et al. 1998). . . . 5-18

List of Appendices

Appendix A. Glossary of Terms and Abbreviations .......................... A-1
Appendix B. Regulations Specific to the Take of White Seabass ............ A-11
Appendix C. Additional Regulations .......................................... A-13
Appendix D. Risk Assessment of Proposed Management Alternatives for the
White Seabass Fishery .................................................. A-23
Appendix E. Peer Review ..................................................... A-26
Appendix F. Public Input ...................................................... A-27
Appendix G. Methods and Data Sets ......................................... A-50
Appendix H. Location in the Fishery Management Plan of Each Requirement of the
Marine Life Management Act ........................................ A-53
Appendix I. Location in the Fishery Management Plan of Each Requirement of the
California Environmental Quality Act .................................. A-55
## Conversion Table

### Metric to U.S. Customary

<table>
<thead>
<tr>
<th>Metric to Convert</th>
<th>Unit</th>
<th>Conversion Factor</th>
<th>Unit</th>
<th>Conversion Factor</th>
</tr>
</thead>
<tbody>
<tr>
<td>distance</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>millimeters (mm)</td>
<td></td>
<td>0.03937</td>
<td>inches (in.)</td>
<td></td>
</tr>
<tr>
<td>centimeters (cm)</td>
<td></td>
<td>0.3937</td>
<td>inches</td>
<td></td>
</tr>
<tr>
<td>meters (m)</td>
<td></td>
<td>3.281</td>
<td>feet (ft)</td>
<td></td>
</tr>
<tr>
<td>kilometers (km)</td>
<td></td>
<td>0.6214</td>
<td>miles (mi)</td>
<td></td>
</tr>
<tr>
<td>area</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>square meters (m²)</td>
<td></td>
<td>10.76</td>
<td>square feet (ft²)</td>
<td></td>
</tr>
<tr>
<td>square kilometers (km²)</td>
<td></td>
<td>0.3861</td>
<td>square miles (mi²)</td>
<td></td>
</tr>
<tr>
<td>hectares (ha)</td>
<td></td>
<td>2.471</td>
<td>acres</td>
<td></td>
</tr>
<tr>
<td>weight</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>milligrams (mg)</td>
<td></td>
<td>0.00003527</td>
<td>ounces (oz)</td>
<td></td>
</tr>
<tr>
<td>grams (g)</td>
<td></td>
<td>0.03527</td>
<td>ounces</td>
<td></td>
</tr>
<tr>
<td>kilograms (kg)</td>
<td></td>
<td>2.205</td>
<td>pounds (lb)</td>
<td></td>
</tr>
<tr>
<td>metric tons (t)</td>
<td></td>
<td>2205.0</td>
<td>pounds</td>
<td></td>
</tr>
<tr>
<td>metric tons</td>
<td></td>
<td>1.102</td>
<td>short tons (ton)</td>
<td></td>
</tr>
<tr>
<td>temperature and heat</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Celsius degrees (°C)</td>
<td></td>
<td>1.8(°C) + 32</td>
<td>Fahrenheit degrees (°F)</td>
<td></td>
</tr>
<tr>
<td>kilocalories (kcal)</td>
<td></td>
<td>3.968</td>
<td>British thermal units (BTU)</td>
<td></td>
</tr>
</tbody>
</table>

### U.S. Customary to Metric

<table>
<thead>
<tr>
<th>Customary to Convert</th>
<th>Unit</th>
<th>Conversion Factor</th>
<th>Metric</th>
</tr>
</thead>
<tbody>
<tr>
<td>distance</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>inches</td>
<td></td>
<td>25.40</td>
<td>millimeters</td>
</tr>
<tr>
<td>inches</td>
<td></td>
<td>2.54</td>
<td>centimeters</td>
</tr>
<tr>
<td>feet</td>
<td></td>
<td>0.3048</td>
<td>meters</td>
</tr>
<tr>
<td>fathoms</td>
<td></td>
<td>1.829</td>
<td>meters</td>
</tr>
<tr>
<td>miles</td>
<td></td>
<td>1.609</td>
<td>kilometers</td>
</tr>
<tr>
<td>nautical miles (nmi)</td>
<td></td>
<td>1.852</td>
<td>kilometers</td>
</tr>
<tr>
<td>area</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>square feet</td>
<td></td>
<td>0.0929</td>
<td>square meters</td>
</tr>
<tr>
<td>square miles</td>
<td></td>
<td>2.590</td>
<td>square kilometers</td>
</tr>
<tr>
<td>acres</td>
<td></td>
<td>0.4047</td>
<td>hectares</td>
</tr>
<tr>
<td>weight</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ounces</td>
<td></td>
<td>28.35</td>
<td>grams</td>
</tr>
<tr>
<td>pounds</td>
<td></td>
<td>0.4536</td>
<td>kilograms</td>
</tr>
<tr>
<td>short tons</td>
<td></td>
<td>0.9072</td>
<td>metric tons</td>
</tr>
<tr>
<td>temperature and heat</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>British thermal units (BTU)</td>
<td></td>
<td>0.2520</td>
<td>kilocalories</td>
</tr>
<tr>
<td>Fahrenheit degrees</td>
<td></td>
<td>0.5556(°F - 32)</td>
<td>Celsius degrees</td>
</tr>
</tbody>
</table>