

# Oil Spills and Shoreline Real Estate Markets



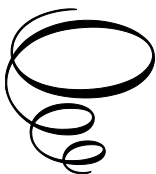
# Oil Spills and Shoreline Real Estate Markets:

*The American Experience*

By

Richard J. Roddewig, Charles T. Brigden,  
Anne S. Baxendale and Margo E. La Clair

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By Richard J. Roddewig, Charles T. Brigden, Anne S. Baxendale  
and Margo E. La Clair

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# TABLE OF CONTENTS

|   |       |
|---|-------|
| Preface .....   | xv    |
| Foreword .....  | xviii |
| Acknowledgments .....   | xix   |
| List of Figures.....  | xxiii |
| Prologue.....   | xli   |
| The <i>Torrey Canyon</i> Oil Spill: Precursor to the American Experience  |       |
| Aground on Seven Stones Reef .....  | xli   |
| “A problem no country in the world has had to face before”.....   | xlili |
| An “eminently fair and satisfactory” Settlement.....  | xlvi  |
| America Stirs but Is “not prepared . . . to deal with a major<br>crisis such as the <i>Torrey Canyon</i> disaster”.....   | xlvii |
| <br>  |       |
| <b>Part One: From the 1860s to the 1970s: Oil Spills, Offshore Drilling,<br/>and the American Environmental Awakening</b> |       |
| <br>  |       |
| Chapter One.....  | 2     |
| American Oil Spills: A Brief History  |       |
| Oil Creek, Drake’s Well, and the First Oil Spills.....  | 2     |
| Spindletop, Blowouts, and the “Era of the Gusher”.....  | 5     |
| Changing Methods for Transporting Crude Oil.....  | 9     |
| The Link Between Spill Size, Type of Oil, Cleanup Process,<br>and Shoreline Market Impacts.....                           | 13    |
| The Largest American Shoreline Spills and the Spills Studied<br>in this Book .....  | 17    |
| <br>  |       |
| Chapter Two .....   | 22    |
| The 1969 Santa Barbara and West Falmouth Oil Spills<br>and the American Environmental Awakening                           |       |
| Prelude to the Morning of an Environmental Awakening .....  | 22    |
| “California Dreamin’” . . . Before the Awakening.....   | 24    |
| History of Tourism and Oil Drilling in Santa Barbara County .....   | 25    |

|  |    |
|--|----|
| The Santa Barbara Channel Union Oil Platform A Well Blowout .....  | 27 |
| The Santa Barbara Oil Spill Response and Cleanup .....   | 30 |
| Cape Code in the 1960s at the Date of the <i>Florida</i> Barge Spill .....   | 32 |
| Buzzards Bay and the Cape Cod Canal Oil Barge Route.....   | 33 |
| The <i>Florida</i> Barge Spill and Response and Cleanup Activities.....  | 33 |
| Environmental Impacts and Physical Persistence of<br>the <i>Florida</i> Barge Oil .....  | 34 |
| Implications of the Differences between the Santa Barbara<br>and West Falmouth Spills of 1969 .....                                  | 40 |
| Chapter Three .....  | 41 |
| The 1969 Santa Barbara and West Falmouth Spills and Early Efforts<br>to Understand and Quantify Shoreline Real Estate Market Effects |    |
| Introduction: The Interplay between Oil Spills, Media Coverage,<br>Litigation, and Shoreline Real Estate Markets .....               | 41 |
| Media Coverage of the Santa Barbara<br>“Ecological ‘Shot Heard Round the World’” .....   | 44 |
| Santa Barbara Well Blowout Litigation Related to Economic<br>and Real Estate Market Impacts .....                                    | 45 |
| Measuring the Damages in the Santa Barbara Well<br>Blowout Property Damage Cases.....  | 47 |
| The Real Estate Market Impact from the 1969<br>Santa Barbara Oil Spill: A Summary .....  | 56 |
| Reported Settlements in the Santa Barbara Property Damage Cases..  | 56 |
| Media Coverage of the West Falmouth, Massachusetts<br><i>Florida</i> Barge Spill.....  | 59 |
| The Property Damage Litigation Silence Following the<br><i>Florida</i> Barge Spill.....  | 60 |
| The <i>Florida</i> Barge Spill and the Wild Harbor Real Estate Market .....  | 62 |
| Wild Harbor Estates Development History as It Relates<br>to the <i>Florida</i> Barge Spill.....                                      | 64 |
| Conclusions from the Wild Harbor Estates Shoreline Market Analysis ...   | 68 |
| Wild Harbor Estates Compared to the Adjacent<br>Unoiled Seascape Development .....   | 70 |
| Oil Spill Shoreline Market Impact Lessons Learned from the 1969<br>Santa Barbara and West Falmouth Oil Spills .....                  | 72 |
| Chapter Four .....   | 75 |
| The Santa Barbara Well Blowout Aftermath: “Get Oil Out!”<br>and the Public Policy Response   |    |

|  |    |
|--|----|
| Offshore Oil Drilling in California and Public Opposition<br>before 1969: A Brief History.....   | 75 |
| Initial Nixon Administration Response to the Santa<br>Barbara Spill.....   | 79 |
| “Get Oil Out!” and the Santa Barbara Protests to End Oil Drilling in<br>the Santa Barbara Channel .....  | 80 |
| The Santa Barbara Oil Spill: Impetus for First Earth Day and National<br>Environmental Policy.....   | 85 |
| The <i>Torrey Canyon</i> Spill, the National Oil Spill Contingency Planning<br>Process, the Santa Barbara Well Blowout, and the Water Quality<br>Improvement Act of 1970 ..... | 88 |

## **Part Two: The 1980s: Testing Effectiveness of Post-Santa Barbara Policy Changes and Cleanup Methods**

|   |     |
|---|-----|
| Chapter Five .....  | 94  |
| The <i>Arco Anchorage</i> and <i>Nestucca</i> Spills: Testing Effectiveness<br>of Oil Spill Response and Cleanup Methods Post-Santa Barbara |     |
| OPEC, the Prudhoe Bay Oil Field, and the Trans-Alaska Pipeline.....   | 94  |
| Puget Sound Refineries and Olympic Peninsula Oil Spills Fuel<br>Concerns about Alaskan Oil Tanker Traffic.....                              | 97  |
| The 1985 <i>Arco Anchorage</i> Grounding in Port Angeles, Washington.....   | 101 |
| Media Coverage of the Spreading <i>Arco Anchorage</i> Oil<br>and Extent of Shoreline Oiling .....   | 102 |
| <i>Arco Anchorage</i> Spill Response and Cleanup.....   | 105 |
| Natural Resource and Environmental Impacts from<br>the <i>Arco Anchorage</i> Spill .....  | 109 |
| The Olympic Peninsula Gets Oiled Again: The 1988 <i>Nestucca</i><br>and <i>Ocean Service</i> Collision Near Grays Harbor.....               | 111 |
| Movement of <i>Nestucca</i> Oil and Extent of Shoreline Oiling.....   | 112 |
| <i>Nestucca</i> Spill Response and Cleanup .....  | 114 |
| Natural Resource and Environmental Impacts from the <i>Nestucca</i> Spill .   | 117 |
| From the Christmas 1988 <i>Nestucca</i> Spill to the Good Friday 1989<br><i>Exxon Valdez</i> Spill: “Canadian Outrage Gets Results” .....   | 118 |
| Policy Response to the <i>Nestucca</i> Spill Collides with the <i>Exxon Valdez</i> .  | 120 |
| Chapter Six .....   | 122 |
| The 1985 <i>Arco Anchorage</i> Spill and the Northern Olympic Peninsula<br>Shoreline Real Estate Market                                     |     |
| The Northern Olympic Peninsula, Port Angeles, Sequim,<br>and the “Banana Belt” .....  | 122 |

|   |         |
|---|---------|
| Media Coverage of the <i>Arco Anchorage</i> Spill and Cleanup .....   | 125     |
| Oiled Shoreline Locations and Potential Areas Where Land<br>Home Prices Might Have Been Impacted .....  | 126     |
| The Effect of the <i>Arco Anchorage</i> Spill on Land Prices<br>at Observatory Point on Freshwater Bay.....   | 128     |
| Dungeness Spit Oiling and Cleanup and the Mains Farm Subdivision...   | 138     |
| Mains Farm Matched Pairs Analysis .....   | 141     |
| Comparison of Observatory Point and Mains Farm Results<br>with Washington State and Clallam County Data .....   | 145     |
| Shoreline Market Impacts from the 1985 <i>Arco Anchorage</i> Spill:<br>Final Thoughts .....   | 150     |
| Addenda.....  | 152     |
| <br>Chapter Seven.....  | <br>153 |
| The 1988 <i>Nestucca</i> Barge Spill and the Ocean Shores Real Estate Market<br>Aberdeen, Hoquiam, Ocean Shores, Grays Harbor,<br>and the Southwest Olympic Peninsula ..... | 153     |
| The Ocean Shores Development Pattern on the Eve<br>of the <i>Nestucca</i> Barge Oil Spill .....   | 155     |
| Media Coverage of the <i>Nestucca</i> Spill and Cleanup.....  | 156     |
| Ocean Shores Sales Volume and Prices Before and After<br>the <i>Nestucca</i> Spill and Cleanup.....   | 157     |
| The Effect of the <i>Nestucca</i> Oil Spill and Cleanup on the<br>Ocean Shores Real Estate Market: A Final Summary.....   | 165     |
| Addenda: Ocean Shores Plat Maps .....   | 166     |
| <br><b>Part Three: The 1990s: <i>Exxon Valdez</i> Changes the Stakes and the Game</b>   |         |
| <br>Chapter Eight.....  | <br>176 |
| The <i>Exxon Valdez</i> Spill . . . “The World Was Awakened<br>to a Crisis of Mythical Proportions”<br>Bligh Reef, Good Friday, 1989.....                                   | 176     |
| Oil Washes Up on More than 1,100 Miles of Alaskan Shoreline .....   | 179     |
| The <i>Exxon Valdez</i> Spill Shoreline Cleanup: 1989 to 1992 .....   | 180     |
| Variations in Shoreline Oiling in Prince William Sound and<br>on the Kenai Peninsula and Kodiak Island.....   | 186     |
| Media Coverage of the <i>Exxon Valdez</i> Spill: Reporting on a<br>“Crisis of Mythical Proportions” .....   | 188     |
| Natural Resource Damage Assessments and Persistence<br>of the <i>Exxon Valdez</i> Oil.....  | 194     |

|   |     |
|---|-----|
| Chapter Nine.....   | 199 |
| The <i>Exxon Valdez</i> Spill Property Damage Litigation: If Oil Spills<br>in the Wilderness, Does the Real Estate Market Hear It?  |     |
| Prince William Sound, Kenai Peninsula, and Kodiak Island Land<br>Ownership Pattern in 1989.....   | 199 |
| The Commercial Fishing and Tourism/Recreation Based Economy of<br>Prince William Sound, the Kenai Peninsula, and Kodiak Island.....   | 205 |
| Land Damage Claims Litigation Following the <i>Exxon Valdez</i> Spill.  | 206 |
| The Fundamental Disagreements Between the Experts on<br>Appropriate Methods for Measuring Damages to Real<br>Property Due to an Oil Spill.....                                      | 207 |
| The Trial Court Limits the Damages Analysis to Directly<br>Oiled Shorelines.....  | 209 |
| Key Questions Left Open by the Court: Were the Damages<br>Temporary or Permanent? How Far Inland Did Damages<br>to Property Values Extend?.....                                     | 210 |
| What is the Highest and Best Use of Wilderness Land?.....   | 212 |
| How Should “Temporary Impairment” to Use of Property<br>Be Measured?.....   | 213 |
| How Should Pre-Spill Market Value of Wilderness Land<br>Be Measured?.....   | 214 |
| Was the Southcentral Alaska Real Estate Market Adversely<br>Affected by the <i>Exxon Valdez</i> Spill?.....   | 214 |
| Was the Kodiak Island Borough Real Estate Market Impacted<br>by the <i>Exxon Valdez</i> Oil Spill?.....   | 217 |
| The Jury Verdict on the Property Damage Claims .....  | 218 |
| Implications of the <i>Exxon Valdez</i> Property Damage Litigation<br>for the Real Estate Appraisal Process.....  | 219 |
| Chapter Ten .....   | 220 |
| The Appraisal Profession and Oil Spill Impact Analysis . . .<br>Before and after the <i>Exxon Valdez</i> Spill  |     |
| The Real Estate Appraisal Profession in the 1980s and the<br>Challenges in Contaminated Property Assignments .....  | 220 |
| Standards of Professional Appraisal Practice and Contaminated<br>Property Valuation as of the Date of the <i>Exxon Valdez</i> Spill .....   | 226 |
| <i>Appraisal Journal</i> Articles and Educational Materials Authored<br>by the <i>Exxon Valdez</i> Trial Experts between the Spill Date<br>and the 1994 Property Damages Trial..... | 230 |

|   |     |
|---|-----|
| Wilderness Land, the Natural Land Value Concept, and Highest and Best Use: The Debate between the Experts in the <i>Exxon Valdez</i> Property Damage Litigation ..... | 242 |
| The Appraisal Profession Addresses “Natural Land Value” and “Non-Economic Highest and Best Use” Concepts in the Aftermath of the <i>Exxon Valdez</i> Litigation.....  | 246 |
| The Appraisal Profession from <i>Exxon Valdez</i> to <i>Deepwater Horizon</i> : Emergence of a Consensus on How to Appraise Contaminated Properties .....             | 248 |
| Chapter Eleven .....  | 258 |
| Oil Spill Policy Changes Caused by the <i>Exxon Valdez</i> Spill  |     |
| March 1989 . . . A New Regulatory Era Begins.....   | 258 |
| The May 1989 <i>Report to the President</i> by the National Response Team.....  | 259 |
| The 1975 Attorney General Report and Stalled Legislative Initiatives...   | 264 |
| The Oil Pollution Act of 1990: Key Changes to Oil Spill Cost Liabilities, Contingency Planning Requirements, and Spill Response Funding .....                         | 266 |
| Increased Tanker Safety Requirements Mandated by the Oil Pollution Act of 1990 .....  | 269 |
| The Effect of the Oil Pollution Act of 1990 in Reducing Tanker and Barge Oil Spills .....   | 270 |
| <b>Part Four: The Early 2000s: The <i>Deepwater Horizon</i> Blowout and Enbridge Pipeline Spills</b>  |     |
| Chapter Twelve .....  | 276 |
| The 2010 Oil Spills: The <i>Deepwater Horizon</i> Well Blowout and the Enbridge Line 6B Pipeline Rupture  |     |
| Prelude to the <i>Deepwater Horizon</i> Disaster.....   | 276 |
| “The Well from Hell” Encounters “a little bit of a problem”.....  | 278 |
| Coffer Domes, Top Kills, Junk Shots, Top Hats, Bullheading, Static Kills, and Bottom Kills: Efforts to Control or Capture the Spewing Oil and Cap the Well.....       | 280 |
| Initial Spill Response and NOAA Tracking and Forecasting of the Growing and Spreading Oil Spill .....   | 282 |
| Protection and Cleanup Measures in the Marshes and on the Barrier Islands of Louisiana .....  | 287 |
| Mississippi, Alabama, and Florida Panhandle Oiling and Shoreline Cleanup .....  | 291 |

|  |     |
|--|-----|
| “The Worst Environmental Disaster American Has Ever Faced”:<br>Natural Resource Damage and Persistence of the<br><i>Deepwater Horizon</i> Oil .....  | 297 |
| Lost in the <i>Deepwater Horizon</i> ’s Wake: The Enbridge Pipeline<br>Crude Oil Spill into the Kalamazoo River .....  | 300 |
| Initial Enbridge Response and Oil Flow Control Efforts.....  | 302 |
| The Four-Year Cleanup .....  | 306 |
| Natural Resource Damage and Persistence of the Line 6B Oil Spill.....  | 315 |
| Implications of the Differences between the <i>Deepwater Horizon</i><br>and Enbridge Line 6B Shoreline Ownership Patterns for Spill<br>Effects on Shoreline Property Markets.....  | 316 |
| Chapter Thirteen.....  | 317 |
| The Enbridge Line 6b and <i>Deepwater Horizon</i> Property Damage<br>Compensation Measures Used to Avoid Litigation<br>Introduction: Resolving Property Damage Claims through<br>Value Assurance Programs, Outright Purchases,<br>and Settlement Formulas.....                               | 317 |
| The Enbridge Line 6B Class Action Litigation.....  | 318 |
| The Enbridge Voluntary Buyout Program .....  | 319 |
| Using the Enbridge Home Purchase Program to Understand<br>the Effect of the Line 6B Spill and Cleanup on the Shoreline<br>Property Market .....  | 323 |
| The <i>Deepwater Horizon</i> Property Damage Litigation and the Gulf<br>Coast Claims Facility .....  | 334 |
| The Criticism of the Gulf Coast Claims Facility Process and<br>the Agreement on a Comprehensive Settlement Program<br>to End the Property Damage Litigation.....   | 337 |
| How Accurate Were the Property Damage Compensation Formulas<br>in the <i>Deepwater Horizon</i> Settlement Program?.....  | 341 |
| Chapter Fourteen .....   | 342 |
| <i>Deepwater Horizon</i> : Media Coverage, Gulf Coast Tourism, and Effect<br>of the Oil Spill on the Gulf Coast Shoreline Condominium Market<br>“I never thought things could be worse than 2004-05”:<br>Hurricanes, Coastal Ownership Patterns, Tourism,<br>and the “Redneck Riviera” ..... | 342 |
| Effect of Media Coverage of the Oil Spill on Alabama<br>and Florida Panhandle Tourism .....  | 349 |
| Alabama Shoreline Cleanup, Public Perceptions, and<br>Tourism Marketing Efforts.....   | 356 |

|  |                 |
|--|-----------------|
| The Alabama Gulf Front Condominium Market.....   | 365             |
| Prior Published Studies of the Effect of the <i>Deepwater Horizon</i><br>Oil Spill on the Alabama Gulf Coast Real Estate Market .....  | 367             |
| Shortcomings of the Prior Studies and Remaining Questions Related to<br>the Oil Spill and the Alabama Shoreline Condominium Market. 369  |                 |
| Shoreline Condominium Markets Selected for Comparative<br>Analysis and Types of Analyses Conducted .....   | 374             |
| Scatter Plot and “Best Fit” Trend Line Comparative Analysis .....  | 377             |
| Sale/Resale (Repeat Sales) “Paired Sales” Comparative Analysis ...   | 379             |
| Quarterly Sale Price Change Comparative Analysis.....  | 381             |
| Quarterly Sales Volume Comparative Analysis.....   | 386             |
| Multi-Variable Hedonic Regression Model Analysis .....   | 390             |
| Conclusions from the <i>Deepwater Horizon</i> Oil Spill<br>Condominium Market Analyses.....  | 398             |
| Addenda: The Regression Model.....   | 400             |
| <br>Chapter Fifteen .....  | <br>407         |
| Oil Spill Policy Changes Following <i>Deepwater Horizon</i><br>Another Oil Spill, Another Presidential Commission . . .<br>but a Somewhat Different Focus: The 2011 <i>Deepwater Horizon</i><br>Report to President Obama..... | <br><br><br>407 |
| 2011 Report Recommendations for Restoration and<br>Enhancement of the Gulf Coast Environment.....  | 411             |
| 2011 Report Recommendations to Improve Offshore<br>Drilling Operational Safety .....   | 413             |
| 2011 Report Recommendations for Improving Oil Spill<br>Response and Design of Blowout Prevention and Spill<br>Containment Equipment.....   | 415             |
| 2011 Report Recommendations Related to Health of Cleanup<br>Workers and Affected Communities and Assuring the Safety<br>of Seafood Harvested from the Gulf .....   | 416             |
| 2011 Report Recommendations to Increase Liability and<br>Responsibility for Response Costs and to Improve<br>the Claims Payment Process.....   | 417             |
| Implementation of the Recommendations of the<br><i>Deepwater Horizon</i> Commission .....  | 419             |
| Obama Administration Increases in the Liability Cap<br>and Oil Spill Liability Trust Fund .....  | 419             |
| Obama Administration Implementation of <i>Deepwater Horizon</i><br>Commission Safety and Well Control Recommendations,   |                 |

|   |     |
|---|-----|
| Trump Administration Retrenchment . . . and Biden Administration Reinstatement .....  | 420 |
| The Government Giveth and the Government Taketh Away: Political Push and Pull in Offshore Leasing Policy in the Aftermath of the <i>Deepwater Horizon</i> Blowout ..... | 428 |
| Gulf Coast Restoration and Enhancement Following <i>Deepwater Horizon</i> : Building on the Legacy of the <i>Exxon Valdez</i> Restoration Process .....                 | 437 |
| Pipeline Safety Issues Not Addressed in the 2011 <i>Report to the President</i> by the <i>Deepwater Horizon</i> Commission .....  | 446 |

**Part Five: From 2015 to the 2020s and Beyond: Santa Barbara Again and Lessons Learned from 50 Years of Shoreline Real Estate Market Analysis**

|  |     |
|--|-----|
| Chapter Sixteen .....  | 448 |
| Santa Barbara . . . Oiled Again! The 2015 Refugio Beach Pipeline Rupture Offshore Santa Barbara Oil and Onshore Santa Barbara Pipelines... | 448 |
| The Line 901 Pipeline Rupture and the Source Site Cleanup Process ....   | 451 |
| Extent of the 2015 Shoreline Oiling.....   | 453 |
| Environmental Impacts and Natural Resource Damage.....   | 457 |
| The Shoreline Property “Loss of Use” Litigation . . . Echoes of 1969 ....  | 458 |
| Testing the Impact of the 2015 Line 901 Spill on Home Prices in The Mesa Neighborhood in Santa Barbara .....                               | 461 |
| Measuring the Effect of the Line 901 Spill on the Rental Market ....   | 468 |
| Conclusions from the Home Price and Market Rent Analysis.....  | 474 |
| The 1969 and 2015 Santa Barbara Oil Spill Shoreline Market Impacts Compared .....  | 476 |
| Oil Spill Shoreline Impact Market Analysis and Statistical Regression Modeling.....  | 478 |
| The 2015 Line 901 Spill and Limitations of Regression Modeling in Estimating Property-by-Property Damages in Oil Spill Litigation ...      | 482 |
| Testing the Reliability of a Regression Model to Predict Loss of Use in Santa Barbara and Ventura Counties .....                           | 485 |
| Oil Spills and Shoreline Real Estate Markets: Lessons from the Santa Barbara Spills.....   | 494 |
| Santa Barbara Offshore Oil Rigs and the Future of the Line 901 Pipeline .....  | 496 |

Chapter Seventeen ..... 504

Oil Spills and Shoreline Real Estate Markets: Lessons from  
Fifty Years of the American Experience

    Introduction: The Interplay among Oil Spill Factors  
        that Affect Shoreline Real Estate Markets ..... 504

    Lessons Learned from the History of the American Public’s  
        Concerns about Environmental Effects of Oil Spills..... 505

    Lessons Learned from Media Coverage of American Oil Spills ..... 508

    Lessons Learned from the Relationships between the Size and  
        Type of Oil Spill, the Cleanup Response, the Natural  
        Resources Affected, and the Shoreline Property Market..... 511

    Lessons Learned from the Differences in Types of Shorelines  
        and Markets Impacted ..... 513

    Lessons Learned from the History of American Policy Changes  
        After a Spill ..... 517

    Lessons Learned from Oil Spill Property Damage Litigation..... 521

    Oil Spills and Shoreline Real Estate Markets:  
        The Uncertain Future ..... 525

References ..... 526

About the Authors ..... 571

## PREFACE

The idea for this book dates to the mid-1990s following the conclusion of the *Exxon Valdez* property damage trial in Anchorage in the Summer of 1994. The *Exxon Valdez* spill in April of 1989 – and the resulting property damage litigation that followed – was the crucible in which the real estate appraisal profession first developed methods for analyzing the impact of an oil spill on the value of wilderness shoreline. The scarcity of transactions on the Kenai Peninsula shoreline in Prince William Sound and on the islands in the Sound meant other sources of information about oil spill impacts on real estate markets needed to be found. As a result, the real estate appraisal team working for Exxon began a four-year research project to identify other major oil spills in North American waters and determine if sales data was available that could be analyzed to understand the effect each spill on the shoreline real estate market.

The Exxon appraisal team hoped the oil spill research would answer a series of questions. Were shoreline markets affected by those other spills? If so, how were shoreline prices, rents or values affected? Were effects temporary or permanent? If impacts were temporary, how long did they last and what caused the market to recover? What was the relationship between the shoreline cleanup process and shoreline property prices, rents and values? How could those other spills help understand what was happening along the Alaskan shoreline in the years following the *Exxon Valdez* spill?

The World Wide Web did not become publicly available until April of 1993, so traditional research sites such as library collections were explored to identify spills in locations where there might be plentiful sales data that could answer those questions. The Exxon research team visited the locations of the spills, searched local newspaper and library collections to identify the shorelines affected by each spill, and inspected the shorelines. Many dead ends were encountered. Some well publicized spills that initially looked promising as research targets did not pan out. For example, the oil from the *Argo Merchant* spill on Nantucket Shoals off the coast of Martha's Vineyard in 1976 never reached any shoreline. The *World Prodigy* oil tanker went aground in Narragansett Bay off the coast of Rhode Island in June of 1989 just a few months after the *Exxon Valdez* spill. However, the spill involved lighter No. 2 Fuel oil, much of which quickly evaporated. Oil that did come ashore was cleaned up within three days. A vacation home

development near one of the public beaches oiled by the *World Prodigy* spill was perched at a high elevation above a rocky shoreline. Interviews with local realtors and town officials indicated that the short duration of the spill and cleanup and the location and type of shoreline development meant the beach oiling had no impact on local prices, rents or values.

The initial research ruled out other spills on the list for a variety of similar reasons. Research into some of those spills indicated the amount of oil spilled was so small that it required no cleanup or could be cleaned up in a few days. Some spills were in locations where there was no real estate sales database (for example, no printed books of multiple listing service sales transactions) that could be researched and analyzed without tedious property-by-property deed transfer research. Other spills reached only publicly owned shorelines so there were no sales to be researched.

Eventually, the research uncovered oil spills that could be investigated to understand their effects on shoreline real estate markets. The Exxon research team then prepared “case studies” examining those spills and their impacts. That oil spill “case study” research done for the *Exxon Valdez* litigation forms the basis of much of the first ten chapters of this book.

One of the case studies analyzed the 1969 Santa Barbara Union Oil Platform A blowout, a seminal event in American history due to its location and duration and the resulting publicity, litigation, and environmental policy changes it caused. The special research collection at the University of California Santa Barbara was an unexpected but invaluable resource in understanding the effect of that spill on the Santa Barbara shoreline property market. The collection included research by real estate appraisers and economists who studied the shoreline market effects of that spill. The *Florida* barge spill off the coast of Massachusetts was also selected given its 1969 date (same as the Santa Barbara Union Oil Platform A blowout) and the multi-decade study of the persistence of the oil from that spill in the tidal marsh shoreline of Wild Harbor Estates as discussed in Chapters Two and Three. Eventually, the *Arco Anchorage* and *Nestucca* spills in Washington state in 1985 and 1988 discussed in Chapters Five, Six and Seven were discovered to also be research targets as well.

Other questions were also addressed during the research into those spills discussed in Parts One, Two, and Three. Is there a connection between natural resource damage caused by an oil spill and any effect of an oil spill on a shoreline property market? What about the type of cleanup? Or the intensity of the media coverage? Do the answers to those questions interplay with each other to affect the shoreline real estate market?

Part Four and Part Five analyze shoreline market impacts from three important post-*Exxon Valdez* spills – the 2010 *Deepwater Horizon* and

Enbridge Line 6B spills and the 2015 Line 901 pipeline spill that once again resulted in a spill that oiled the Santa Barbara, California coastline.

This book, however, focuses on more than simply the effect of oil spills on shoreline property markets. It also focuses on two other important topics. The first is the public policy response to the worst oil spills. Chapters Four, Eleven and Fifteen cover that topic. The public policy research and discussion provide an understanding of how legislative and regulatory enactments may have reduced the number, type, intensity, location or duration of oil spills, and, if so, the implications of those policy changes for shoreline property markets potentially affected by oil exploration and transportation.

The other important topic also discussed is how litigation involving property damage claims resulting from oil spills has been crucial to the development of generally accepted methods for analyzing the effect of environmental contamination on prices, rents, and values. Those methods emerged during the years when the *Exxon Valdez* property damage litigation was proceeding in Alaska. Chapter Ten discusses the development of those methods and their relation to the *Exxon Valdez* property damage litigation. The connection between oil spill litigation and the development of generally accepted appraisal methods is also covered in Chapter Three discussing the litigation following the 1969 Santa Barbara oil spill and in Chapters Thirteen, Fourteen and Sixteen discussing the property damage litigation following the Enbridge Line 6B, *Deepwater Horizon*, and the 2015 Santa Barbara Line 901 spills, the most recent oil spill discussed in this book.

For us, as members of the Complex Real Estate Analysis and Litigation Support (CREALS) team at JLL Valuation & Advisory Services, LLC, documenting and sharing our research related to the critical role that oil spills have played in the evolution of the generally recognized techniques for appraising properties affected by environmental issues is the most important purpose of this book. We hope this book will be useful to other valuation professionals, real estate economists, lawyers, and public officials in the United States and the rest of the world when faced with the difficult task of fairly and accurately analyzing the effect of a future oil spill on a shoreline property market.

Chicago, Illinois

February 2026

Richard J. Roddewig, JD, MAI, CRE, FRICS

Charles T. Brigden, MAI, CRE, FRICS

Anne S. Baxendale

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## FOREWORD

This groundbreaking book chronicles the 150-year history of the American experience handling the spills and leaks that inevitably accompany crude oil exploration, production, refining, and transportation. Written by four members of the Complex Real Estate Analysis and Litigation Support group at JLL Valuation & Advisory, LLC, the book traces the evolution of American reaction to oil spills from the earliest days of exploration in Pennsylvania, Texas, and California to the most recent deepwater exploration in the Gulf of Mexico.

The chapters weave together the following five major topics that arise from an in-depth discussion of eight major American oil spills: (1) how oil spills inevitably occur despite good intentions and safety standards; (2) how news media coverage (including, for example, photos of oiled birds being cleaned with Dawn dishwashing detergent) and the public reaction to that coverage can determine how shoreline property markets react; (3) how the type and length of the shoreline cleanup process can determine the length of any temporary effect of an oil spill on shoreline property prices; (4) how property damage litigation following the largest spills in American history has led to the development of the generally accepted real estate valuation techniques used to understand the effect of an spill on prices and values along an affected shoreline; and (5) the interplay between all those topics and the federal, state, and local regulatory response to spills.

Among the spills covered in depth are the 1969 Union Oil Platform A blowout off the coast of California, the 1989 *Exxon Valdez* tanker spill in Alaska, and the 2020 *Deepwater Horizon* well blowout in the Gulf of Mexico. Also covered in depth are two lesser-known but equally significant pipeline ruptures in Michigan in 2010 and in Santa Barbara in 2015.

The final chapter includes “lessons learned” from 50 years of oil spill disasters and a warning. The lessons listed apply to oil spills anywhere in the world. As a result, the importance of the book is not limited to an American audience. The final chapter warns that “future oil spill accidents are unavoidable.” When the inevitable next major oil spill occurs, this book will be the essential guide in understanding shoreline market effects.

Professor Rebel Cole  
Lynn Eminent Scholar Chaired Professor of Finance  
Florida Atlantic University College of Business, February 2026

## ACKNOWLEDGMENTS

The oil spill research for this book began in 1990 and would never have happened but for the confidence that Jim Frey and Jim Stevens of Exxon. They had the confidence to retain a small four-person real estate and land use planning research firm in Chicago to figure out the impact of the *Exxon Valdez* oil spill on 1,300 miles of Alaskan wilderness shoreline. The Conservation Fund, an organization with which Exxon had been working on conservation related projects, had recommended Clarion Associates in Chicago because of its experience in the valuation of conservation and timber land.

The research team at Clarion working on the *Exxon Valdez* spill was headed by Gary Papke, who spent four years running GIS models on an “incredibly powerful” (for 1990) Sun Microsystems computer with an “astonishing” 1.0 gigabyte of RAM! Cheryl Inghram, Brad White, David Lyon, Lisa Graham, Janet Stearns, Tom Kabat, and Bob McElroy as well as Nicole Smith, Clarion’s office manager during the final years of the *Exxon Valdez* research, were among those who worked on the *Exxon Valdez* assignment. They, together with the firm’s President Richard Roddewig, gathered the real estate market impact data related to the 1969 Santa Barbara Union Platform A blowout, the *Florida* Barge spill in Massachusetts, the *Nestucca* and *Arco Anchorage* spills in Washington state, as well as the data associated with the effect of the *Exxon Valdez* spill itself on the real estate market in Prince William Sound and on Kodiak Island.

Jim Frey and Warren Dold at Exxon were taken off their usual duties at Exxon to work on the litigation related to the real estate market impacts of the *Exxon Valdez* spill. Their dedication in searching for the answers to tough questions about oil spill impacts in the wilderness and the free rein they gave the Clarion team to undertake the assignment diligently during the four years of that research project are fond memories. Three attorneys at the former Seattle law firm of Bogle & Gates (Jim Grant, Erik Lied, and David Bateman) shared their insights into how to relate the results of our oil spill case study research to the ownership patterns in Prince William Sound and on Kodiak Island. Randy Oppenheimer of the Los Angeles office of the O’Melveny & Myers law firm helped translate Clarion’s research results into graphs and charts for presentation at trial.

Two other real estate appraisers were also critical to our Alaska research. Local Anchorage real estate appraiser Steve McSwain tutored the Clarion

research team on the unusual characteristics of the Alaskan property market. Don Dorchester, former national President of the Appraisal Institute who was also working for Exxon on the Alaska assignment as an appraisal expert, needs recognition for his role in developing methodologies for quantifying damages due to temporary impacts on prices and values. Helicopter flights with Steve and Don to inspect oiled beaches in Prince William Sound were not just adventures but also opportunities to share thoughts and concepts on how to analyze the effect of the *Exxon Valdez* spill on wilderness shoreline real estate values.

During the research in Alaska, much was learned about the fate and effects of oil in the natural environment from Professors Ed Gilfillan and David Page, environmental scientists at Bowdoin College. Their knowledge about the effect of other oil spills around North America was also helpful in selecting the oil spill case studies included in Parts One and Two of this book.

By the 2010 date of the *Deepwater Horizon* oil spill in the Gulf of Mexico and the Enbridge pipeline spill in Michigan, the research conducted in the *Exxon Valdez* litigation, the articles published in *The Appraisal Journal*, and the courses developed for the Appraisal Institute by staff members at Clarion Associates had made that firm one of the most experienced in the United States in how to properly apply generally accepted real estate valuation methods to contaminated property appraisal assignments. As a result, attorneys for BP and Enbridge retained the firm to assist in figuring out the effects of both of those oil spills on the real estate market along their affected shorelines. Charlie Bridgen headed the Clarion research team on both those assignments, assisted by Gary Papke and Annie Baxendale. Other Clarion team members who worked on the research related to those oil spills to be recognized include Christine Lehmann, Hannah Brown, Craig Van Pelt, Jim Frey (who joined Clarion Associates and headed its Houston office after he retired from Exxon), and Doug Koske, who succeeded Nicole Smith as the Clarion Business Manager and kept the computer system and office humming nicely for almost twenty years.

As with the *Exxon Valdez* related chapters in this book, the research presented in the chapters chronicling the 2010 *Deepwater Horizon* and Enbridge pipeline spills emerged from litigation to determine shoreline property market impacts. Among the attorneys we worked with us on those assignments were Don Haycraft (an Adjunct Professor at Loyola University New Orleans College of Law), Wendy Bloom (Senior Attorney at the Environmental Law & Policy Center in Chicago and formerly a Partner at Kirkland & Ellis), Maureen Brown (a Partner at Covington & Burling LLP

in Washington, D.C.), Kathy Lang (formerly a Partner in the Detroit office of Dickinson Wright), and Lee Khachaturian (also with the Detroit office of Dickinson Wright during our Kalamazoo River research).

Core members of the Clarion team who worked on the *Exxon Valdez*, *Deepwater Horizon*, and Enbridge pipeline spill assignments, joined JLL Valuation & Advisory, LLC, in 2017. There they have continued their work on assignments to determine the effects of various types of environmental issues on prices and values. They have been joined by other professional appraisers and economists, including Professor Thomas Hamilton, PhD, MAI, CRE, FRICS, CCIM, and former Director of the Real Estate Program at Roosevelt University. He needs recognition for his patient discussions with the co-authors concerning the ins and outs of statistical regression modeling. Also to be recognized is another eminent real estate and finance scholar, Professor Rebel Cole of Florida Atlantic University (and formerly of DePaul University in Chicago) who also, over the past decade, has worked with the co-authors on assignments involving statistical modeling. Both Tom Hamilton and Rebel Cole looked over our shoulders to assure that our regression modeling was properly handled in our chapter on the *Deepwater Horizon* shoreline market impact. Rebel also graciously agreed to provide the Foreword to the book.

Donna O'Loughlin and Nancy Bannon were Managing Editors of *The Appraisal Journal* during the years between the mid-1980s and the early 2000s when the appraisal profession, as detailed in Chapter Ten, was first developing the techniques for analyzing the impact of oil spills and other types of contamination on property values. They deserve kudos for their dedication in assuring that ground-breaking research and advances in appraisal methods were included in the pages of their journal. Stephanie (Tep) Shea-Joyce, the recently retired long-time book editor for the Appraisal Institute, also needs to be recognized for supporting projects such as the compilation of articles from *The Appraisal Journal* in the two volumes of the Appraisal Institute's books entitled *Valuing Contaminated Properties: An Appraisal Institute Anthology* published in 2002 and 2014. Recognition also needs to be given to Bill McGrath of Davis McGrath LLC who provided valuable advice related to copyright issues.

We especially thank our peer reviewers, Professor David Callies and Richard Marchitelli, MAI, CRE, for their time spent reading our manuscript. David Callies is Professor of Law Emeritus at the William S. Richardson School of Law at the University of Hawaii. He is an internationally recognized land use law expert, past chair of the American Bar Association Section of State and Local Government Law, and author of 20 books (including *Preserving Paradise: Why Regulation Won't Work* published by

the University of Hawaii Press in 1994), and hundreds of scholarly articles. Richard Marchitelli is Senior Managing Director and Litigation Support Practice Leader at Newmark Valuation & Advisory, an international real estate firm with 165 offices around the world. He was the 2025 Chair of the Body of Knowledge Committee of the Appraisal Institute and former Editor-in-Chief of *The Appraisal Journal*. An award-winning author, Richard is a contributor to the 9th through 15th editions of *The Appraisal of Real Estate* and the 1st through 7th editions of *The Dictionary of Real Estate Appraisal*. The thoughtful editorial and substantive comments of David and Richard provided a better focus to our chapters on public policy issues and appraisal profession standards of practice.

The management team at JLL Valuation & Advisory Services, LLC, must also be recognized for their support for this book. Mark Wynne Smith, Global Head of Value and Risk Advisory, Mike Ellis, CEO of the U.S. Value and Risk Advisory practice, and Bennett Johnson, former US COO, all encouraged us in our efforts to organize our years of research into a coherent format and get it published in an international forum.

Finally, the publications team at Cambridge Scholars Publishing, especially Adam Rummens and Sophie Edminson, needs to be recognized. We thank them for their diligence in handling our inquiries related to formatting preferences. They patiently put up with the inevitable delays that accompanied completion of our manuscript for this book.

# LIST OF FIGURES

## Prologue

**Figure P-1** The photo is captioned “The sinking of the Torrey Canyon.” Last accessed February 9, 2026. <https://www.gettyimages.com/detail/news-photo/on-18th-march-1967-the-oil-tanker-torrey-canyon-on-route-news-photo/888812458?adppopup=true>. The photo is credited to George Greenwell/Mirrorpix/Getty.

**Figure P-2** The photo is captioned “Torrey Canyon Oil Spill.” Last accessed February 9, 2026. <https://www.gettyimages.com/detail/news-photo/volunteers-try-to-disperse-the-oil-on-the-beach-at-marazion-news-photo/537165875?adppopup=true>. The photo is credited to William Lovelande/Daily Express/Hulton Archive/Getty Images.

**Figure P-3** The photo is captioned “Berkshire Firemen Help With the Torrey Canyon Clean Up. 1967.” Last accessed February 9, 2026. <https://www.gettyimages.com/detail/news-photo/at-beautiful-holywell-bay-sub-officer-dickie-bird-and-his-news-photo/2155376360?adppopup=true>. The photo is credited to Tony Mardell/Mirrorpix via Getty Images.

**Figure P-4** The photo is captioned “Oil Sick-Torrey Canyon.” Last accessed February 9, 2026. <https://www.gettyimages.com/detail/news-photo/volunteers-children-clean-up-oil-slick-on-april-17-1967-on-news-photo/151326801?adppopup=true>. The photo is credited to AFP via Getty Images.

**Figure P-5** The photo is captioned “Sinking of Oil Tanker Torrey Canyon, The Black Tide Reached Brittany.” Last accessed February 9, 2026. <https://www.gettyimages.com/detail/news-photo/sinking-of-oil-tanker-torrey-canyon-the-black-tide-reached-news-photo/166684575?adppopup=true>. The photo is credited to Phillippe Le Tellier/Paris Match via Getty Images.

## Chapter One

**Figure 1-1** Wikimedia Commons. “A view of the Lucas Gusher at the Spindletop oil field near Beaumont, Texas.” Accessed January 13, 2025. [https://commons.wikimedia.org/wiki/File:Lucas\\_Gusher\\_3.jpg](https://commons.wikimedia.org/wiki/File:Lucas_Gusher_3.jpg). Date of

the photo is indicated as March 3, 1903. Original source of the photo is indicated as “Sunset (March 1903), p. 384.” The author is indicated as Francis J. Trost.

**Figure 1-2** Wikimedia Commons. “Lakeview Gusher #1, Maricopa, Kern County” and the date as “April 1910.” Accessed January 13, 2025. <https://web.archive.org/web/20061019100520/http://www.sjgs.com/lakeview.html> The author is unknown. The source of the photo is indicated as the San Joaquin Geological Society.

**Figure 1-3** Wikimedia Commons. “Lakeview Gusher #1, column to a gurgling pool. Maricopa, Kern County.” Accessed January 13, 2025. <https://web.archive.org/web/20060923032645/www.sjgs.com/lakeview/bubble.jpg>. The date of the photo is indicated as “April 1910.” The author is unknown. The source of the photo is given as the San Joaquin Geological Society.

**Figure 1-4** Wikimedia Commons. “Lakeview #1 gusher and oil lake, probably summer of 1910, when the well was flowing at around 90,000 barrels a day.” Accessed January 13, 2025. <http://www.sjvgeology.org/history/lakeview/lakeview09.jpg>.

Date of the photo is indicated as “circa 1910.” The author is unknown. Source of the photo is indicated as the San Joaquin Geological Society.

**Figure 1-5** Wikimedia Commons. “A map of all current U.S. oil and gas pipelines.” Accessed January 13, 2025. [https://commons.wikimedia.org/wiki/File:Oil\\_and\\_gas\\_pipelines.png](https://commons.wikimedia.org/wiki/File:Oil_and_gas_pipelines.png). Date of the map indicated as “May 1996.” The author is indicated as the U.S. Energy Information Administration and the source as <https://www.eia.gov/state/maps.php>.

**Figure 1-6** U.S. Energy Information Administration. *Much of the country’s refinery capacity is concentrated along the Gulf Coast.* July 19, 2012. <https://www.eia.gov/todayinenergy/detail.php?id=7170>.

**Figure 1-7** Wikimedia Commons. “US Crude Oil Production and Imports by year in millions of barrels per day.” Source of the graph is indicated as US Energy Information Administration. Accessed January 13, 2025. [https://commons.wikimedia.org/wiki/File:US\\_Crude\\_Oil\\_Production\\_and\\_Imports.svg](https://commons.wikimedia.org/wiki/File:US_Crude_Oil_Production_and_Imports.svg).

**Figure 1-8** Wikimedia Commons. “The Lac-Mégantic derailment site following the accident.” Accessed March 14, 2025. Date of the photo indicated as April 3, 2017. The author is indicated as National Transportation Safety Board and the source as The Lac-Mégantic Derailment. August 19, 2014.

[https://commons.wikimedia.org/wiki/File:The\\_Lac-M%C3%A9gantic\\_derailment\\_%2832970112334%29.jpg](https://commons.wikimedia.org/wiki/File:The_Lac-M%C3%A9gantic_derailment_%2832970112334%29.jpg).

**Figure 1-9** Wikimedia Commons. Accessed January 14, 2024. <https://response.restoration.noaa.gov/oil-and-chemical-spills/oil-spills/largest-oil-spills-affecting-us-waters-1969.html>. Date of the photo is indicated as “16 April 2015.” The author is indicated as NOAA and the source as <https://response.restoration.noaa.gov/oil-and-chemical-spills/oil-spills/largest-oil-spills-affecting-us-waters-1969.html>.

## Chapter Two

**Figure 2-1** U.S. Energy Information Administration. *Petroleum & Other Liquids*. Accessed January 12, 2025. <https://www.eia.gov/dnav/pet/hist/leafhandler.ashx?n=pet&s=mcrfps2&f=m>.

**Figure 2-2** D.D. Teoli Jr. A.C. “Oil Wells at Summerland Beach, CA Santa Barbara area 1921.” Accessed March 14, 2025. <https://archive.org/details/summerland-ca-santa-barbara-1921-rppc-d-d-teoli-jr.-a.-c.-1>. Selection from the Daniel D. Teoli Jr. eBay Archive and “Contributed to the Internet Archive in Honor and Memory of Mike Wallace & Arthur Edeson.”

**Figure 2-3** National Oceanic and Atmospheric Administration. “Aerial view of oil rising to the ocean surface (upper left) near the drilling rig, during the Santa Barbara oil spill off the California coast in 1969.” Source indicated as U.S. Geological Survey. Accessed March 14, 2025. <https://response.restoration.noaa.gov/about/media/natural-seeps-historic-legacy-what-sets-apart-latest-santa-barbara-oil-spill.html>.

**Figure 2-4** Wikimedia Commons. “Extent of 1969 Santa Barbara, California oil spill.” Accessed January 13, 2025. <https://commons.wikimedia.org/wiki/File:Oil1969extent.jpg>.

**Figure 2-5** Christine Larson, AP Science Writer. “California Spill Came 52 Years After Historic Oil Disaster.” October 4, 2021. Also found in the Lompoc Record. [https://lompocrecord.com/lifestyles/photos-1969-santa-barbara-oil-spill-impetus-of-modern-environmental-movement-in-u-s/collection\\_6a524a02-a62e-574a-872d-2dd1581ced97.html#5](https://lompocrecord.com/lifestyles/photos-1969-santa-barbara-oil-spill-impetus-of-modern-environmental-movement-in-u-s/collection_6a524a02-a62e-574a-872d-2dd1581ced97.html#5). It was also found in the Santa Ynez Valley News. [https://syvnews.com/lifestyles/photos-1969-santa-barbara-oil-spill-impetus-of-modern-environmental-movement-in-u-s/collection\\_d74c182b-914b-50a4-ba6b-3a9982341fc6.html#1](https://syvnews.com/lifestyles/photos-1969-santa-barbara-oil-spill-impetus-of-modern-environmental-movement-in-u-s/collection_d74c182b-914b-50a4-ba6b-3a9982341fc6.html#1). Television news outlets include *CBS 12 News*, Monday October 4, 2021. <https://cbs12.com/news/nation-world/california-spill-came-52-years-after-historic-oil-disaster>.

An *ABC News* outlet also indicated as a source.

<https://abc3340.com/news/nation-world/california-spill-came-52-years-after-historic-oil-disaster>.

**Figure 2-6** Wikimedia Commons. The date is indicated as “between circa 1930 and 1945.” The source is indicated as the Boston Public Library Tichnor Brothers collection #61291. The author is The Mayflower Sales Co., Provincetown, Mass., Tichnor Bros. Inc., Boston, Mass. Accessed January 13, 2025.

<https://commons.wiki->

[media.org/wiki/File:Cape\\_Cod\\_Auto\\_Map\\_\(61291\).jpg](https://commons.wikimedia.org/wiki/File:Cape_Cod_Auto_Map_(61291).jpg).

**Figure 2-7** David Hentz. “Fifty Years Later, the West Falmouth Oil Spill Yields Lasting Contribution to Remediation Efforts.” Woods Hole Oceanographic Institution. September 20, 2019.

<https://www.whoi.edu/news-insights/content/fifty-years-later-the-west-falmouth-oil-spill/>.

**Figure 2-8** Micah Fink, “50 Years After the Spill,” *Marine Defenders*. Accessed January 13, 2025. <https://www.marinedefenders.org/chris-reddy-marine-defender.html>. Woods Hole Oceanographic Institution.

**Figure 2-9** Robert C. Hunt, Jr. Postcard Collection at the Falmouth Public Library. “Air View New Silver Beach, Wild Harbor and Nyes Neck, North Falmouth, Mass., on Cape Cod.” Digital Commonwealth Massachusetts Collections Online. Postcard date range: 1900-1999. Accessed March 18, 2025. <https://www.digitalcommonwealth.org/search/commonwealth:1257fd09v>.

**Figure 2-10** Micah Fink. “50 Years After the Spill.” *Marine Defenders*. Accessed January 13, 2025. <https://www.marinedefenders.org/chris-reddy-marine-defender.html>. Woods Hole Oceanographic Institution.

**Figure 2-11** Micah Fink. “50 Years After the Spill.” *Marine Defenders*. Accessed January 13, 2025. <https://www.marinedefenders.org/chris-reddy-marine-defender.html>. Woods Hole Oceanographic Institution.

### Chapter Three

**Figure 3-1** “‘Santa Barbara Oil Spill’ 1969: California.” *The Pop History Dig*. Accessed January 11, 2025. <https://pophistorydig.com/topics/tag/los-angeles-times-oil-spill-reporting/>.

**Figure 3-2** “Location of Seascape, Nyes Neck and Wild Harbor Estates.” The source is Google Maps as modified by Anne S. Baxendale of JLL Valuation & Advisory Services, LLC. Google Maps accessed January 2025. <https://www.google.com/maps/place/Wild+Harbor+River/>.

### Chapter Four

**Figure 4-1** U.S. Library of Congress Prints and Photographs Division. *California, Santa Barbara. Pumping oil out of the Pacific Ocean at*

*Summerland digital file from b&w film copy neg.* Date of the photo is indicated as ca. 1920. Accessed January 9, 2025. <https://ww.loc.gov/resource/cph.3a14994/>.

**Figure 4-2** National Archives Catalog. *President Richard Nixon Visiting Ledbetter Park in Santa Barbara, California following a Catastrophic Oil Spill.* Date of the photo is indicated as March 21, 1969. Accessed January 9, 2025. <https://catalog.archives.gov/id/66394135>.

**Figure 4-3** Lila Thulin. “How an Oil Spill Inspired the First Earth Day.” *Smithsonian Magazine*, April 22, 2019. Accessed January 13, 2025. <https://www.smithsonianmag.com/history/how-oil-spill-50-years-ago-inspired-first-earth-day-180972007/>. Photo credit: “Bruce Cox / *Los Angeles Times* via Getty Images.”

**Figure 4-4** University of Michigan Library Digital Collections and the Bentley Historical Library: Bentley Image Bank. Accessed January 15, 2025. <https://quod.lib.umich.edu/b/bhl/x-bl005631/bl005631>.

## Chapter Five

**Figure 5-1** Wikimedia Commons. “US Crude Oil Production and Imports by year in millions of barrels per day.” [https://commons.wikimedia.org/wiki/File:US\\_Crude\\_Oil\\_Production\\_and\\_Imports.svg](https://commons.wikimedia.org/wiki/File:US_Crude_Oil_Production_and_Imports.svg). The source is indicated as U.S. Energy Information Agency. Accessed January 16, 2025.

**Figure 5-2** U.S. Department of Commerce National Oceanic and Atmospheric Administration Office of National Marine Sanctuaries. *Olympic Coast National Marine Sanctuary Condition Report 2008*, Figure 15, 17. [https://nmsolympiccoast.blob.core.windows.net/olympiccoastprod/media/archive/library/docs/conditionreport\\_ocnms.pdf](https://nmsolympiccoast.blob.core.windows.net/olympiccoastprod/media/archive/library/docs/conditionreport_ocnms.pdf). Accessed January 13, 2025.

**Figure 5-3** National Park Service. *Olympic National Park: Getting Around*. <https://www.nps.gov/olym/planyourvisit/gettingaround.htm>. Accessed January 13, 2025.

**Figure 5-4** Microfilmed newspaper collection, North Olympic Library System. *Peninsula Daily News* formerly known as *The Daily News* in 1985.

**Figure 5-5** Wikimedia Commons. “Ediz Hook and Log Rafts.” Accessed January 13, 2025. [https://commons.wikimedia.org/wiki/File:EDIZ\\_HOOK\\_AND\\_LOG\\_RAFTS\\_-\\_NARA\\_-\\_552170.jpg](https://commons.wikimedia.org/wiki/File:EDIZ_HOOK_AND_LOG_RAFTS_-_NARA_-_552170.jpg). Date of photo indicated as June 1973. Source indicated as EPA, Archives and Records Administration.

**Figure 5-6** Tom Callis. “Giant oil spill in Port Angeles 25 years ago provides lessons now.” *Peninsula Daily News*, Sunday, December 19, 2010.

**Figure 5-7** Map credit: Mark Nowlin of *The Seattle Times*. Story credit: Dan Hammock. “How should the new Maritime Washington National Heritage Area operate? Public will get a say.” *The Seattle Times*, December 29, 2020. Updated December 31, 2020.

<https://www.seattletimes.com/nation-world/how-should-the-new-maritime-washington-national-heritage-area-operate-public-will-get-a-say/>.

**Figure 5-8** Ty Keltner. *The Nestucca: How a Devastating Event Shaped Today’s Oil Spill Responses*. Washington Department of Ecology, December 23, 2020. Accessed January 13, 2025.

<https://ecology.wa.gov/blog/december-2020/the-nestucca>.

## Chapter Six

**Figure 6-1** Port of Port Angeles. *Welcome To Port of Port Angeles*. Accessed January 13, 2025. <https://portofpa.com>.

**Figure 6-2** “Crews Battle 21-mile slick.” *Tacoma News Tribune*.

**Figure 6-3** Paul Gottlieb. “New Nippon Paper Construction Changing Port Angeles’ Skyline.” *Peninsula Daily News*, October 14, 2012. Photo credit: “Keith Thorpe/Peninsula Daily News.” Accessed January 15, 2025. <https://www.peninsuladailynews.com/news/new-nippon-paper-construction-changing-port-angeles-skyline/>.

**Figure 6-4** Map source is Google Earth Pro as modified by Anne S. Baxendale and Margo E. La Clair of JLL Valuation & Advisory Services, LLC. Accessed January 2025. Data sources indicated as follows: “SIO, NOAA, U.S. Navy, NGA, GEBCO Image © 2024 TeraMetrics Image © 2024 Airbus.” Date of image: 6/10/2024.

**Figure 6-5** Map source is ESRI ArcGIS Map as modified by Anne S. Baxendale and Margo E. La Clair of JLL Valuation & Advisory Services, LLC. Accessed January 2025. Data sources indicated as follows: Esri, NASA, USGS, FEMA, Esri Community Maps Contributors, WA State Parks GIS, HERE, Garmin, SafeGraph, GeoTechnologies, Inc., Bureau of Land Management, EPA, NPS.

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**Figure 6-7** Map source is ESRI ArcGIS Map as modified by Anne S. Baxendale and Margo E. La Clair of JLL Valuation & Advisory Services, LLC. Accessed January 2025. Data includes: Esri, NASA, USGS, FEMA, Esri

Community Maps Contributors, WA State Parks GIS, HERE, Garmin, SafeGraph, GeoTechnologies, Inc., Bureau of Land Management, EPA, NPS.

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**Figure 6-9** Map source is ESRI ArcGIS Map as modified by Anne S. Baxendale and Margo E. La Clair of JLL Valuation & Advisory Services, LLC. Accessed January 2025. Data sources indicated as follows: Esri, NASA, USGS, FEMA, Esri Community Maps Contributors, WA State Parks GIS, HERE, Garmin, SafeGraph, GeoTechnologies, Inc., Bureau of Land Management, EPA, NPS.

**Figure 6-10** Wikimedia Commons. “Dungeness Spit, in Dungeness National Wildlife Refuge, Washington State, USA.” Accessed March 15, 2025. [https://commons.wikimedia.org/wiki/File:Dungeness\\_Spit\\_NWR.jpg](https://commons.wikimedia.org/wiki/File:Dungeness_Spit_NWR.jpg). Date of the photo is indicated as June 1, 2008.

**Figure 6-11** U.S. Fish & Wildlife Service. *Dungeness NWR Map*. Accessed March 15, 2025. <https://www.fws.gov/media/dungeness-nwr-map>.

**Figure 6-12** Google satellite image: “Imagery © CNES/Airbus/Maxar Technologies, U.S. Geological Survey, USDA Farm Service Agency, Map data © 2021.” The boundary line of the Mains Farm neighborhood was added by Anne S. Baxendale and Margo E. La Clair of JLL Valuation & Advisory Services, LLC.

## Chapter Seven

**Figure 7-1** Wikimedia Commons. “Map of Washington (state). Accessed March 15, 2025. Source of the map is indicated as the *National Atlas* and the date as August 15, 2006. [https://commons.wikimedia.org/wiki/File:Map\\_of\\_Washington\\_NA.png](https://commons.wikimedia.org/wiki/File:Map_of_Washington_NA.png).

**Figure 7-2** Wikimedia Commons. “Map of Grays Harbor.” Accessed March 15, 2025. <https://commons.wikimedia.org/wiki/File:GraysHarbor.png>. Date of the map indicated as October 15, 2007.

**Figure 7-3** Collin Johnson. “Ocean Shores: Cheap, Dog-Friendly, 4/20-Friendly, Low-Key Fun AF.” *Respect My Region*, May 17, 2018. Accessed January 15, 2025. <https://www.respectmyregion.com/ocean-shores-4-20-friendly/>.

**Figure 7-4** Recreation by Margo E. La Clair of JLL Valuation & Advisory Services, LLC, of a graph in the report submitted by Clarion Associates,

Inc., in *Exxon Valdez Oil Spill Litigation*, Case No. 3AN-89-2533 CIV., filed April 19, 1994. Ocean Shores sales transaction data were available for download from the Grays Harbor County Assessor’s Office computerized database at the time of collection.

**Figure 7-5** Recreation by Margo E. La Clair of JLL Valuation & Advisory Services, LLC, of a graph in the report submitted by Clarion Associates, Inc., in *Exxon Valdez Oil Spill Litigation*, Case No. 3AN-89-2533 CIV., filed April 19, 1994. Ocean Shores sales transaction data were available for download from the Grays Harbor County Assessor’s Office computerized database at the time of collection.

**Figure 7-6** Recreation by Margo E. La Clair of JLL Valuation & Advisory Services, LLC, of a graph in the report submitted by Clarion Associates, Inc., in *Exxon Valdez Oil Spill Litigation*, Case No. 3AN-89-2533 CIV., filed April 19, 1994. Ocean Shores sales transaction data were available for download from the Grays Harbor County Assessor’s Office computerized database at the time of collection.

**Figure 7-7 A – Figure 7.7.I.** Map source is ESRI, HERE, Ga mn in, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, Geo-Base, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong) as modified by Margo E. La Clair of JLL Valuation & Advisory Services, LLC.

## Chapter Eight

**Figure 8-1** Valdez Convention & Visitor’s Bureau, Inc. *Discover Valdez*. Accessed January 15, 2025. <https://www.valdezalaska.org/discover/glaciers/columbia-glacier/>.

**Figure 8-2** Nuka Research and Planning Group, LLC, and Prince William Sound Regional Citizens Advisory Council. “Map of Prince William Sound Escort System.” Accessed March 15, 2025. [https://www.pwsrca.org/wp-content/uploads/tanker\\_escorting\\_briefing\\_booklet.pdf](https://www.pwsrca.org/wp-content/uploads/tanker_escorting_briefing_booklet.pdf).

**Figure 8-3** U.S. Coast Guard and *Exxon Valdez* Oil Spill Trustee Council. *Map of the Exxon Valdez Oil Spill*. Accessed March 5, 2025. <https://evostc.state.ak.us/oil-spill-facts/spill-map/>.

**Figure 8-4** National Oceanic and Atmospheric Administration (NOAA). Accessed March 4, 2025. [https://celebrating200years.noaa.gov/transformations/spill\\_response/image2.html](https://celebrating200years.noaa.gov/transformations/spill_response/image2.html).

**Figure 8-5** National Archives Catalog. Date of photo is May 11, 1989. <https://catalog.archives.gov/id/6440608>.

**Figure 8-6** Wikimedia Commons. “Kenai Fjords coast.” Accessed March 15, 2025. [https://en.wikipedia.org/wiki/Kenai\\_Fjords\\_National\\_Park#/media/File:Kenai\\_Fjords\\_coast.jpg](https://en.wikipedia.org/wiki/Kenai_Fjords_National_Park#/media/File:Kenai_Fjords_coast.jpg). Date of photo is August 27, 2005.