EXHIBIT B

ORDINANCE NO. 1649

City of Des Moines Shoreline Master Program Errata

Page	Section	Correction
2	1.1	Change "Des Moines Zoning Code (18.90 DMMC)" to "Des Moines Municipal Code (16.20 DMMC)"
	1.4	"Chapter 18.86" should read "Chapter 16.10"
	1.4	"DMMC 18.86" should read "DMMC 16.10" (two entries)
8	1.5	"DMMC 18.86" should read "DMMC 16.10" (two entries)
64	6.1.2(2(a)	"DMMC 18.86" should read "DMMC 16.10"
66	6.1.4(1)	"DMMC 18.86" should read "DMMC 16.10" (two entries)
	6.1.4(2)	"DMMC 18.86" should read "DMMC 16.10"
	6.1.4(4)	"DMMC 18.86" should read "DMMC 16.10"
	6.1.4(5)	"DMMC 18.86" should read "DMMC 16.10"
77	6.3.2(1)	"DMMC 18.48" should read "DMMC 18.15"
	6.3.2(1)(a)	Change "18.48.030" to "18.15.050"
	6.3.2(1)(b)	Change "18.48.040" to "18.15.060"
	6.3.2(1)(c)	Change "18.48.050" to "18.15.070"
80	6.3.6(2)	"DMMC 18.42" should read "DMMC 18.200"
102	7.4.7	"DMMC 17.40.070" should read "DMMC 18.20.130"
108	7.5.6	"DMMC 17.40.070" should read "DMMC 18.20.130"
113	Chapter 8	Change "Des Moines Zoning Code (18.04 DMMC)" to "Des Moines Municipal Code (DMMC 16.01)"
132	Wetland	Change "Washington State Wetlands Identification and Delineation Manual (Ecology Publication No. 96-94, March 1997)"

to "approved federal wetland delineation manual and applicable regional supplements"

"Chapter 18.86 DMMC" should read "Chapter 16.10 DMMC"

LEGAL NOTICE

SUMMARY OF ADOPTED ORDINANCE

CITY OF DES MOINES

ORDINANCE NO. 1649, Adopted May 12, 2016.

DESCRIPTION OF MAIN POINTS OF THE ORDINANCE:

This Ordinance amends the City of Des Moines development regulations relating to the protection and regulation of environmentally critical areas to ensure compliance with the Washington State Growth Management Act (chapter 36.70A RCW); amends chapter 16.10 DMMC to add definitions and update document references, wetland habitat scores, and wetlands mitigation requirements, and amends chapter 16.20 DMMC to add an errata sheet; and finds that the revised development regulations meet the statutory requirements of RCW 36.70A.130(1).

The full text of the Ordinance will be mailed without cost upon request.

Bonnie Wilkins, CMC
City Clerk

Published: May 17, 2016

CITY OF DES MOINES
SHORELINE MASTER PROGRAM

Department of Ecology approval effective November 1, 2010

Adopted January 27, 2011 by City of Des Moines Ordinance No. 1502

Printed on recycled paper with a minimum 20% post-consumer content

Cover photo courtesy of Carmen Scott

CITY OF DES MOINES
SHORELINE MASTER PROGRAM

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PLANNING, BUILDING AND PUBLIC WORKS

Grant Fredricks, Director

Department of Ecology approval effective November 1, 2010

Adopted January 27, 2011 by City of Des Moines Ordinance No. 1502

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PREFACE

The Shoreline Management Act (SMA) was adopted by Washington State in 1971. The SMA is intended to "prevent the inherent harm in uncoordinated and piecemeal development of the state's shorelines." It establishes statewide policy to provide for management of the shorelines by planning for and fostering all reasonable and appropriate uses in an environmentally responsible manner.

The SMA is administered through a cooperative program between local governments and the Department of Ecology (Ecology), whereby local communities prepare a Shoreline Master Program (SMP) that is adopted under guidelines established by Ecology. The SMP serves to regulate development along shorelines of the state and establish a comprehensive vision of how the shoreline area will be used and developed over time.

The City's SMP was originally adopted in 1972. The SMP was updated and adopted in 1988. Under new shoreline master program guidelines adopted by Ecology in 2004, cities within King County are required to update their local shoreline master programs. The current draft SMP was developed in 2004-2005 as an update of the existing SMP. It incorporates shorelines annexed by the City since 1988 and reflects recent changes in State requirements and community preference. The program refers to the City's Comprehensive Plan, Zoning Code and other development plans and ordinances for which this SMP has relevance.

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CHAPTER 1 – INTRODUCTION

1.1 Purpose and Responsibility

Washington's Shoreline Management Act (SMA) (Chapter 90.58 RCW, the Shoreline Management Act of 1971) was passed by the State Legislature in 1971 and adopted by the public in a referendum. The Act was created in response to a growing concern among residents of the state that serious and permanent damage was being done to shorelines by unplanned and uncoordinated development. The goal of the Act was "to prevent the inherent harm in an uncoordinated and piecemeal development of the state's shorelines." While protecting shoreline resources by regulating development, the Act is also intended to provide for appropriate shoreline growth by encouraging land uses that enhance and conserve shorelines functions and values.

The SMA established a cooperative program of shoreline management between local government and the state. Local governments have the primary responsibility for initiating the planning and administration of the local Shoreline Master Program (SMP). The Department of Ecology is responsible for supporting and assisting local governments and insuring compliance with the SMA and its provisions, primarily WAC Sections 173-26 – *State Master Program Approval/Amendment Procedures and Master Program Guidelines* and 173-27- *Shoreline Management Permit and Enforcement Procedures.*

The SMP is a comprehensive use plan for local shoreline areas that includes desired goals and policies consistent with SMA policy (RCW 90.58.020); maps, diagrams and charts or other descriptive material and text; use and development regulations; and administrative procedures for the shoreline permitting process. The Ecology SMP guidelines (WAC 173-26) establish general goals and policies, and standards and criteria for regulations. The SMP is based on State guidelines, but tailored to the specific conditions and needs of individual communities. The SMP is also meant to be a comprehensive vision of how the shoreline area will be used and developed over time.

The City of Des Moines ("City") first adopted an SMP in 1972 and updated it in 1987 (adopted under Ordinance No. 715). In 1996 the City of Des Moines (Ordinance No. 1176) amended the City's Comprehensive Plan to include the Woodmont/Redondo annexation area (i.e., from Saltwater State Park south to the current city boundary adjacent to the City of Federal Way). On January 17, 2004, Ecology adopted new SMP guidelines (WAC 173-26), which required revision of several provisions contained in the 1988 City of Des Moines SMP.

According to Substitute Senate Bill (SSB) 6012, passed by the 2003 Washington State Legislature, cities within King County were required to amend their local SMPs consistent with Ecology's revised guidelines. The required update process also provided the City with an opportunity to incorporate the changes in the City's physical shoreline conditions (including annexations) and integrate current technical and scientific information into the SMP.

The current SMP was adopted locally on October 15, 1987 by Ordinance No. 715 and adopted by Ecology on March 1, 1988. The goals and policies contained therein were incorporated into

the Greater Des Moines Comprehensive Plan by reference. Development regulations contained in the SMP have been adopted by reference as part of the Des Moines Zoning Code (18.90 DMMC).

1.2 Key Shoreline Concepts and Terms

The Washington Shoreline Management Act (SMA) has three broad, overarching policies:

- **Preferred shoreline uses**: "uses shall be preferred which are consistent with control of pollution and prevention of damage to the natural environment, or are unique to or dependent upon use of the states' shorelines...."

- **Promote public access**: "the public's opportunity to enjoy the physical and aesthetic qualities of natural shorelines of the state shall be preserved to the greatest extent feasible consistent with the overall best interest of the state and the people generally."

- **Protect shoreline natural resources**, including "...the land and its vegetation and wildlife, and the water of the state and their aquatic life...."

1.2.1 Preferred Uses

In establishing preferred uses of the state's shorelines, the SMA defines "water-dependent," "water-related," and "water-enjoyment" uses. These terms are officially defined in Chapter 8 of the SMP. General descriptions and examples are included here.

- "**Water-dependent use**" means a use that requires direct access to the water to accomplish its primary function. In other words, a use or portion of a use, which cannot exist in a location that is not adjacent to the water and which is dependent on the water by reason of the intrinsic nature of its operations. Examples include commercial fishing, marinas, aquaculture, shipbuilding, and ferry terminals.

- "**Water-related use**" means a use that does not require direct access to the water, but provides goods or services associated with water dependent uses. In other words, a use or portion of a use which is not intrinsically dependent on a waterfront location but whose economic viability is dependent upon a waterfront location. Examples include boat supply and repair services, and kayak rentals.

- "**Water-enjoyment use**" means a use that does not require access to the water, but is enhanced by a waterfront location. This includes uses that facilitate public access to the shoreline as a primary characteristic of the use; or uses that provide for recreational use or aesthetic enjoyment of the shoreline for a substantial number of people. The use must be open to the general public and the shoreline-oriented space within the project must be devoted to the specific aspects of the use that fosters shoreline enjoyment. Examples include restaurants and aquariums.

- "**Water-oriented use**" means a use that is water-dependent, water-related, or water-enjoyment, or a combination of such uses.

1.2.2 Public Access

In preserving and promoting public access, the SMA and state shoreline guidelines (WAC 173-26) recognize that shorelines of the state are a resource to be used and enjoyed by all citizens of Washington State. While balancing the rights of privacy and private property, the SMA promotes public access as a "preferred use" in terms of water-oriented recreation, and requires public access amenities to be incorporated into certain waterfront development. In this context, public access can mean many things, including physical access to the water and beach, public access to piers and docks, or development of overlooks providing visual access to the shoreline.

1.2.3 No Net Loss of Ecological Functions

The state shoreline guidelines (WAC 173-26), updated and adopted in 2003, emphasize the protection and restoration of shoreline natural resources. The guidelines refer to the protection of shoreline ecological processes (such as hydrology and sediment transport) and shoreline ecological functions (provided by water quality, vegetation, and habitat). A major concept in the protection of ecological functions is termed "no net loss."

- **"No Net Loss"** – means the maintenance of the aggregate total of the City's shoreline ecological functions. The no net loss standard requires that the impacts of each shoreline development and/or use, whether permitted or exempt, be identified and mitigated such that there are no resulting adverse impacts on ecological functions or processes. The concept of "net" as used herein, recognizes that any development has potential or actual, short-term or long-term impacts and that by applying appropriate development standards and mitigation measures (including avoiding impacts), implementing the SMP will not diminish the shoreline resources and values as they currently exist.

1.3 Shoreline Jurisdiction

Concepts and terms related to the City's shoreline jurisdiction are specific to those described in RCW 90.58.030, WAC 173-26-020, WAC 173-27-030, and WAC 173-22-030. Definitions and significant terms related to the Shoreline Management Act and the City's SMP are included within Chapter 8 of this document.

Under the SMA, the shoreline jurisdiction includes all water areas of the state, the lands underlying them, and areas that are 200 feet landward of the ordinary high water mark (OHWM) of waters that have been designated as "shorelines of statewide significance" or "shorelines of the state." These designations were established in 1971, and are described in RCW 90.58.030. Generally, "shorelines of statewide significance" include portions of Puget Sound and other marine waterbodies, rivers west of the Cascade Range that have a mean annual flow of 1,000 cubic feet per second (cfs) or greater, rivers east of the Cascade Range that have a mean annual flow of 200 cfs or greater, and freshwater lakes with a surface area of 1,000 acres or more. "Shorelines of the state" are generally described as all marine shorelines and shorelines of all other streams or rivers having a mean annual flow of 20 cfs or greater and lakes with a surface area greater than 20 acres.

Shorelines within Des Moines include those portions of Puget Sound lying within the city limits and all lands extending landward 200 feet in all directions as measured on a horizontal plane

from the ordinary high water mark together with any associated wetlands, river deltas, and floodways associated with tidal waters that are subject to the provisions of this chapter and whose locations have been designated by the Department of Ecology. There is hereby made a part of this Master Program a map, Figure 1-1, illustrating the shoreline designations and the *approximate* location of the upland extent of the shoreline jurisdiction in Des Moines.

The Des Moines shoreline jurisdiction also applies to the area waterward of the OHWM to the middle of Puget Sound, an offshore boundary shared with King County, as RCW 35.21.160 extends jurisdiction to the middle of water bodies, such as bays, sounds, lakes and rivers. The actual seaward and landward extent of shoreline jurisdiction will be determined on a case-by-case basis. Given that the Shoreline Designation Map is an integral part of this Master Program, no part of the map may be altered or revised unless a Master Program amendment has been approved by the City Council and the Washington State Department of Ecology (RCW 90.58.090).

Associated wetlands, deltas and floodways that are included in the shoreline jurisdiction are those that influence or are influenced by the regulated waters of Puget Sound. In general, a wetland is “associated” if all or a portion of the wetland falls within that area that is 200 feet from the ordinary high water mark. A wetland outside of this area may also be associated if it is in proximity to the shoreline and there is a demonstrated influence between the wetland and the shoreline. Such influence can include hydraulic continuity, such as a surface or groundwater connection. The deltas or subestuaries occurring in the City’s shoreline jurisdiction include Des Moines Creek, Massey Creek, McSorley Creek, Woodmont Creek, Redondo Creek and Cold Creek.

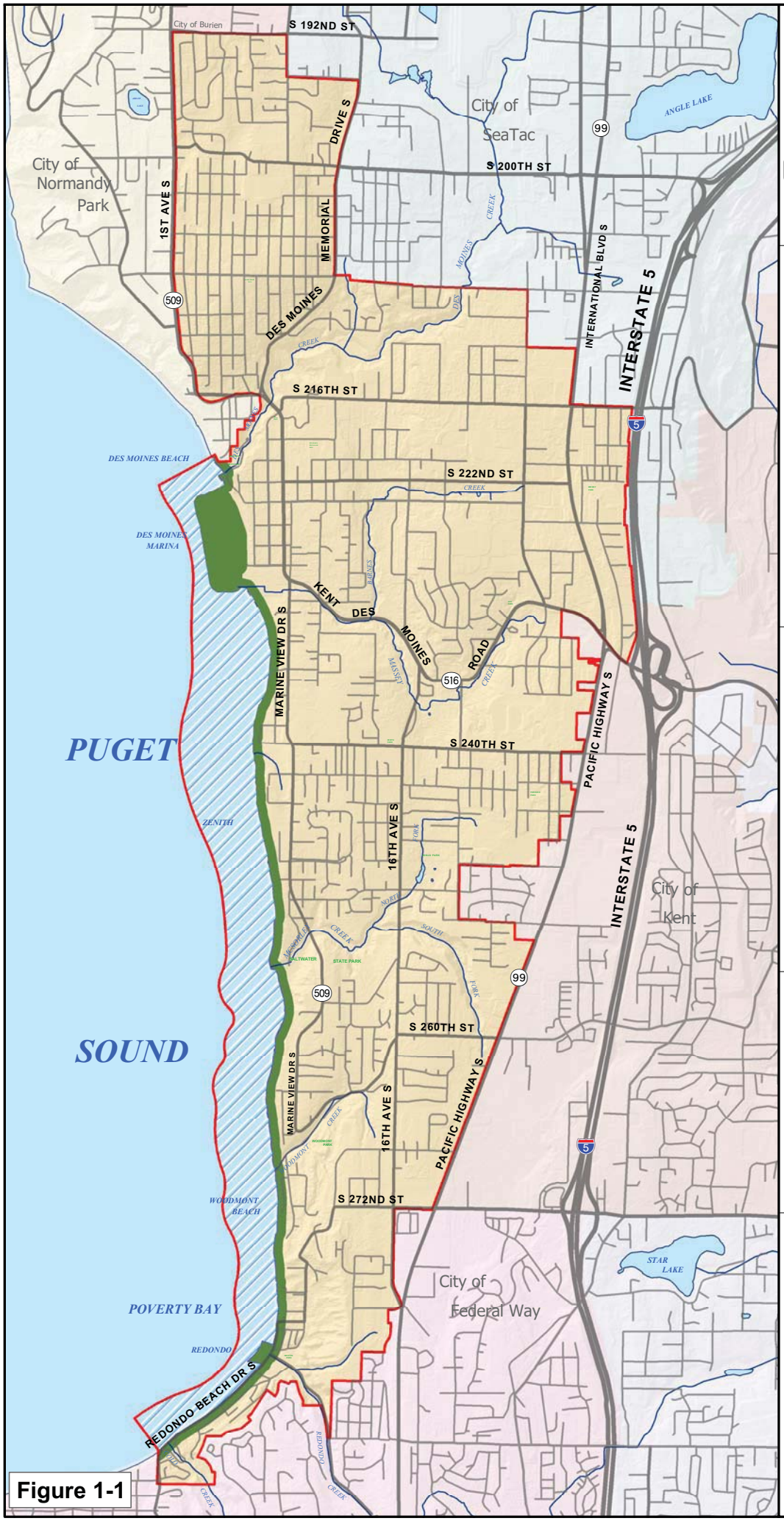


Figure 1-1

City of Des Moines

Shoreline Master Plan

Shoreline Jurisdiction

SMP Jurisdiction

- SMP Tideland Jurisdiction
- SMP Upland Jurisdiction

Des Moines City Limits

Streams

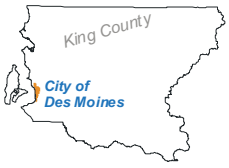
Jurisdictions

- Normandy Park
- Burien
- SeaTac
- Kent
- Federal Way
- Unincorporated King County

CITY OF DES MOINES
SHORELINE MASTER PLAN MAP SERIES

This map series is intended for general planning purposes related to the City of Des Moines Shoreline Master Plan.

These maps include the best available science to locate, illustrate and categorize shoreline areas. However, due to scale, the maps are not precise delineations of every area and are not a substitute for site-specific analysis. These maps are a composition of various sources of information in both paper and electronic format. They were created from available public records and existing map sources. Where available, scientific delineations and field surveys were digitized at the original scale and merged into the GIS database.



500 250 0 500 1,000 1,500 2,000 2,500
Scale In Feet

N W E S

Community Development
21630 11th Ave S, Suite D
Des Moines, WA 98198-6398
PHONE: (206) 870-7576 * FAX: (206) 870-6544
WEB: http://www.desmoineswa.gov

File: 1-1.SMP_Jurisdiction.mxd - Mar. 2006
Product of City of Des Moines GIS

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1.4 Critical Areas in Shorelines

The term "critical areas" refers to those areas designated as "environmentally critical areas" by Chapter 18.86 of the Des Moines Municipal Code (DMMC) under the authority of the Washington Growth Management Act (GMA) (RCW 36.70A). Designated environmentally critical areas in Des Moines include wetlands; streams; geologically hazardous areas; ravine sidewalls and bluffs; hillsides of 15 percent slope or greater; critical aquifer recharge areas; fish and wildlife habitat conservation areas; and areas of special flood hazard.

In 2003 the state legislature passed ESSB 1933, which amended both the SMA and GMA to integrate provisions for critical areas management into local shoreline master programs. For those critical areas physically located in shoreline jurisdiction, local governments were required to "provide a level of protection of critical areas at least equal to that provided by the local government's critical areas ordinances" in their updated SMPs.

Since 2003, there has been significant confusion about critical areas and shorelines due to ambiguous language in ESHB 1933. The 2003 law included a clear intent for critical areas in shoreline jurisdiction to be protected solely by Shoreline Master Programs (SMPs) adopted under the state Shoreline Management Act (SMA), rather than by critical areas ordinances (CAOs) adopted under the Growth Management Act (GMA). However, the 2003 law was not abundantly clear on when a local SMP would take over from the CAO. That ambiguity unfortunately led to differing, and sometimes contrary, legal interpretations.

On March 18, 2010, Governor Chris Gregoire signed Substitute House Bill 1653. The bill clarifies that, with certain exceptions, critical area regulations adopted under the Growth Management Act apply within Shoreline areas. These regulations apply until Ecology approves either a comprehensive new SMP that meets Ecology's guidelines, or a SMP amendment specifically related to critical areas.

Therefore, once adopted, critical areas within shoreline areas are regulated by this program. This program incorporates many of the substantive requirements in DMMC 18.86 directly. However, it is important to note that there remain procedural differences between DMMC 18.86 and the SMP. Please refer to Chapter 3 for SMP policies related to critical areas; Chapter 6 for regulations related to critical areas; and Chapter 7 for administrative procedures related to critical areas.

1.5 Compliance in Des Moines and Relationship with Other Plans

The SMA set forth in some detail three tasks to be fulfilled by local governments:

1. Administration of a shoreline permit system for proposed substantial development on shorelands of designated water bodies;
2. Compilation of a comprehensive inventory that includes a survey of natural characteristics, present land uses, and patterns of property ownership; and
3. Development of a master program to provide an objective guide for regulating the use of shorelines.

Uses and developments regulated by this Program may also be subject to other provisions of the DMMC, the City of Des Moines Comprehensive Plan, the Washington State Environmental Policy Act (RCW 43.21C and WAC 197-11), and other local, state and federal laws. Project

proponents are responsible for complying with all applicable laws prior to commencing any use, development or activity. Where this Program makes reference to any RCW, WAC, or other state or federal law or regulation the most recent amendment or current edition shall apply. In the event this Program conflicts with other applicable County policies or regulations, all regulations shall apply and unless otherwise stated, the more restrictive provisions shall prevail.

The Des Moines SMP refers to the City's Comprehensive Plan, Zoning Code and other development plans and ordinances for which this SMP has relevance. Des Moines' SMP is to be considered an overlay of the Zoning Code, Title 18, Des Moines Municipal Code. Overlay zones are a set of zoning requirements that are described in the Zoning Code, are mapped and subsequently imposed in addition to those regulations of the underlying zoning classification. Development within the overlay zone must conform to the requirements of both zones. In case of conflict, the stricter requirement applies.

In October of 1972, the City established a permit system in compliance with the first requirement of the SMA. Under this system, a permit must be obtained from the City for any proposed substantial development within the Des Moines shoreline jurisdiction. "Development" is defined in Chapter 8, consistent with RCW 90.58.030(3)(d). "Substantial development" is defined in Chapter 8, consistent with RCW 90.58.030(3)(e). Substantial development means any development of which the fair market value exceeds five thousand seven hundred eighteen dollars ($5,718), or any development that would interfere with the normal public use of the water or shorelines. The definition of substantial development addresses how increases to the $5,718 threshold will be determined by changes in the consumer price index.

In compliance with the second requirement of the Act, the City completed in March 2005 a comprehensive inventory of natural characteristics, functions and values of resources, existing land use, and ownership patterns along the City's shorelines (Appendix A).

Therefore, once this Shoreline Master Program is adopted, the City's critical area regulations will not apply to property located within the jurisdiction governed by this program. This program directly incorporates many of the substantive requirements for critical areas found in DMMC 18.86. However, it is important to note that there remain procedural differences between DMMC 18.86 and the SMP. Please refer to Chapter 3 for SMP policies related to critical areas; Chapter 6 for regulations related to critical areas; and Chapter 7 for administrative procedures related to critical areas.

1.6 Public Outreach

The SMP update utilized a variety of public outreach activities. A public open house was held in November 2004 to review preliminary findings from the shoreline inventory and characterization work and solicit input and feedback from the public. A second open house was held in April 2005 to review and solicit input on updated general goals and policies and proposed shoreline environment designations. During the fall of 2005, additional outreach activities included articles in the City newsletter and the *Des Moines News*. A presentation on the SMP update project was given at a Saturday workshop hosted by the Highline Community College Marine Science and Technology Center in Redondo. From November 2004 through November 2005, five public meetings were held with the Des Moines Planning Agency to work through updated

elements of the SMP. The Agency reviewed and discussed recommended changes for each element (e.g., general goals and policies, shoreline environment designations, development standards and regulations, etc.) and provided policy direction to staff. On November 21, 2005, the Planning Agency held a public hearing on the updated draft SMP and voted to forward this version to the City Council.

At four different meetings in January and February 2006, the Des Moines City Council conducted a segmented public hearing to review the Planning Agency Recommended Draft of the SMP. On February 23, the City Council closed the public hearing and voted to forward the draft SMP to the Department of Ecology after incorporating specific modifications. .

1.7 Document Organization

The SMP establishes long-term planning goals and policies, specific development standards and use regulations, and permitting and administrative procedures. As such, the SMP is a stand-alone document that is linked to other city planning documents and to the Des Moines Municipal Code. Figure 1-2 graphically illustrates these links. The organization of the SMP and the purpose for each chapter is explained below.

- Chapter 1. Introduction: provides background and overview.
- Chapter 2. Shoreline Inventory and Characterization Summary: provides a summary of key findings from the inventory and characterization report, which is included in its entirety as Appendix A of the SMP.
- Chapter 3. Master Program Goals and Policies: provides general and specific SMP goals and policies for shoreline use elements. This chapter will be replicated as Chapter 14 of the Des Moines Comprehensive Plan.
- Chapter 4. Restoration Planning: establishes long-term restoration goals, provides an overview of regional Puget Sound restoration plans and programs, and discusses specific restoration opportunities in Des Moines.
- Chapter 5. Shoreline Environment Designations: establishes management policies for specific areas within the shoreline jurisdiction. The management policies will be replicated in Chapter 14 of the Des Moines Comprehensive Plan. Specific development standards and use regulations for each shoreline environment are included in Chapter 6 of the SMP and are linked to the City's Zoning Code (DMMC Title 18).
- Chapter 6. Development Standards and Use Regulations: establishes specific standards (e.g., setbacks, height limits, etc.) and use regulations (e.g., allowance of piers and docks, marinas, recreational development, etc.) for each shoreline environment. The standards and use regulations are linked to the City's Zoning Code (DMMC Title 18).
- Chapter 7. Administrative Procedures: provides procedures and process for permit applications associated with shoreline development. As land use review procedures, this chapter is linked to the City's Zoning Code (DMMC Title 18).
- Chapter 8. Definitions: provides definitions for terms used throughout the SMP. Terms in bold typeface indicate that a definition is included in Chapter 8.

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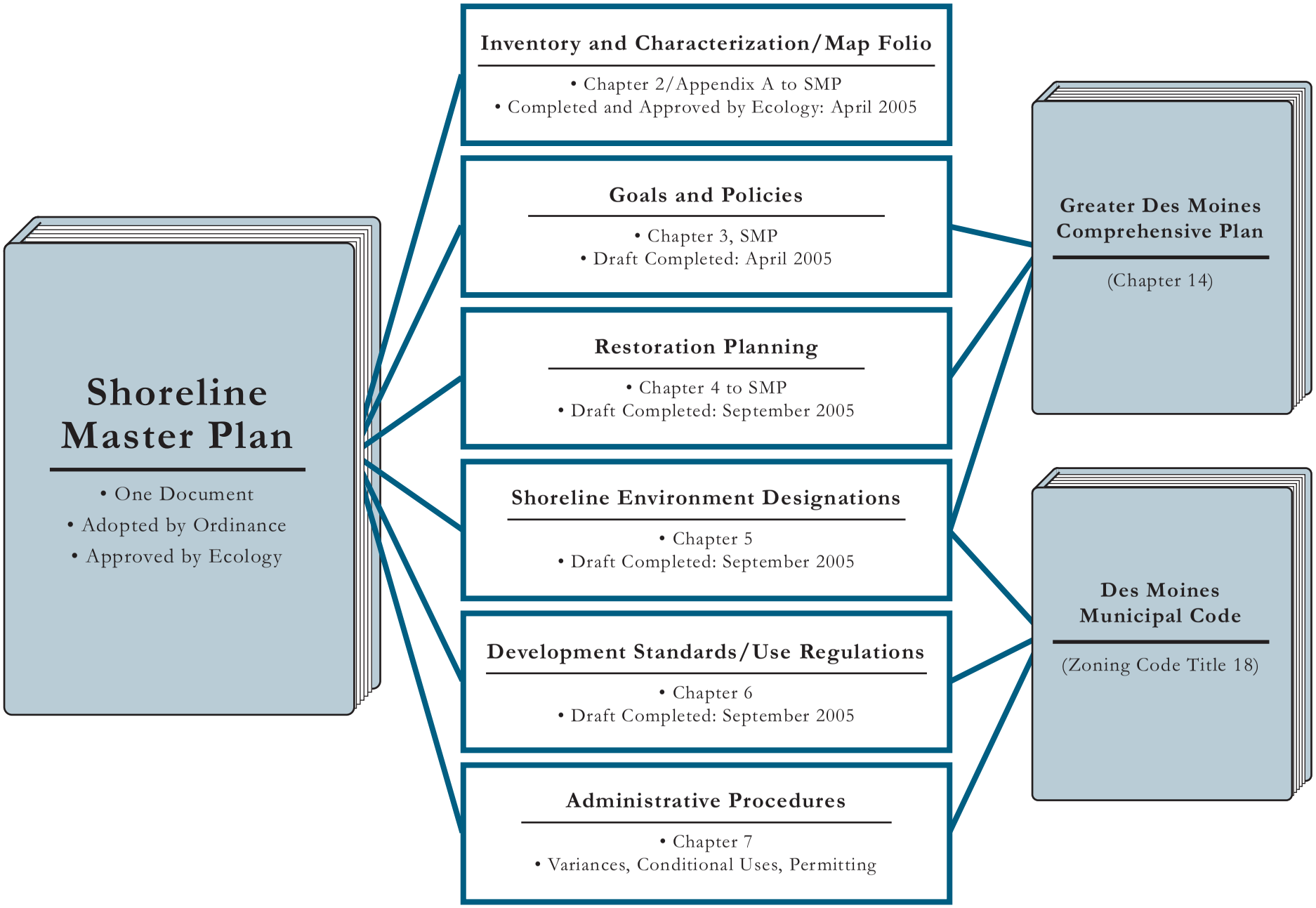
FIGURE 1-2


Shoreline Master Plan
• One Document
• Adopted by Ordinance
• Approved by Ecology
Inventory and Characterization/Map Folio
• Chapter 2/Appendix A to SMP
• Completed and Approved by Ecology: April 2005
Goals and Policies
• Chapter 3, SMP
• Draft Completed: April 2005
Restoration Planning
• Chapter 4 to SMP
• Draft Completed: September 2005
Shoreline Environment Designations
• Chapter 5
• Draft Completed: September 2005
Development Standards/Use Regulations
• Chapter 6
• Draft Completed: September 2005
Administrative Procedures
• Chapter 7
• Variances, Conditional Uses, Permitting
Greater Des Moines Comprehensive Plan
(Chapter 14)
Des Moines Municipal Code
(Zoning Code Title 18)

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CHAPTER 2 – SHORELINE INVENTORY AND CHARACTERIZATION – SUMMARY OF FINDINGS

2.1 Background and Purpose

Cities and counties updating their SMP are required to prepare an inventory and characterization of the shoreline resources in their jurisdiction. As part of the City's SMP update, an inventory and characterization report and map folio was prepared in the fall of 2004 and finalized in the spring of 2005, following Des Moines Planning Agency and Ecology review. The complete report is incorporated as Appendix A of this SMP.

The purpose of the study was to conduct a baseline inventory of conditions in the shoreline jurisdiction of the City of Des Moines. The inventory and characterization provides a basis for updating the City's SMP to comply with the SMA, Revised Code of Washington (RCW) 90.58 and its implementing guidelines, Washington Administrative Code (WAC) 173-26.

The characterization identifies existing conditions, evaluates functions and values of resources in the shoreline jurisdiction, and explores opportunities for conservation and restoration of ecological functions. The findings are intended to provide a framework for updates to the City's shoreline environment designations, and shoreline management goals, policies, and development regulations. Key findings of the inventory and characterization are summarized below.

2.2 Physical & Biological

The City of Des Moines is located in the central portion of Puget Sound in the Puget Lowland ecoregion. The Des Moines area watershed includes Des Moines Creek, Massey Creek, McSorley Creek, Woodmont Creek, Redondo Creek, and Cold Creek drainage basins. This watershed is controlled by a maritime climate, lakes and local closed depressions occupied by wetlands and bogs with short streams flowing directly to Puget Sound. Land use in the watershed includes medium to high density residential and commercial development. Large areas of native vegetation are found within steep sloped ravines along streams. Surface and groundwater movement are controlled by wetlands and considerable impervious surface. This impervious surface increases peak stormwater flow. Steep receding bluffs are located along much of the Des Moines shoreline, with sediments accumulating at the base of the bluffs protecting the bluffs from further erosion and reducing bluff recession. As these sediments enter the intertidal zone, they are subject ot transport by waves and water currents to downdrift beaches. Net-shore drift north of Woodmont is northerly and south of Woodmont is southwesterly and a transition zone occurs near Saltwater State Park. Just north of the Des Moines marina, there is also a short shoreline section with net-shore drift to the south.

Bluffs, beaches, and the mouths of several freshwater streams characterize the City's shoreline. Approximately 75 percent of the City's shoreline has been modified with riprap, concrete or wooden bulkheads, including the marina. These structures ultimately limit the amount of sediment transported from upland areas to the beach, and are known to cause erosion and loss of some habitats such as sand and fine gravel beaches. Currents naturally move sediments across the beach and alongshore in continual cycles, but these structures cut off the natural supply and distribution of sediments, causing a change in sediment composition within the nearshore area,

and overall loss in upper beach area. Fish and wildlife that utilize the shoreline depend on these nearshore processes to maintain their habitats and ultimately their populations.

2.3 Habitat and Species

City shorelines provide important nearshore habitats, such as eelgrass meadows and kelp forests, that support a variety of marine fishes, birds, and invertebrates.. Of special interest are areas that provide habitat for species listed under the Federal Endangered Species Act, "priority" species and habitats listed by Washington State Department of Fish and Wildlife, and species of local importance, including bull trout (threatened), Chinook salmon (threatened), coho salmon, as well as pigeon guillemot, mergansers, coromants, grebes, belted kingfishers, bald eagles, and great blue heron nest sites. Forage fish, such as surf smelt and sand lance (prey for salmonids), also spawn on local beaches.

2.4 Land Use and Public Access

The major land uses along the Des Moines shoreline are single-family homes, parks, and public marina/waterfront facilities. The City's most common shoreline use is single-family residential, which occupies 57 percent of the shoreline (approximately 2.7 miles total). Parks and public, water-oriented facilities occupy 25 percent of the shoreline (approximately 1.2 miles total). These uses include the Des Moines Beach Park, the Des Moines Marina and fishing pier, the S. 239th Street Access, Salt Water State Park, and Redondo Beach Park and commercial area. These areas provide opportunities for boating, fishing, and beach recreation.

2.5 Conclusions

The Puget Sound shoreline in the City of Des Moines is characteristic of urbanized waterfront development elsewhere in the region. Public access to the shoreline, recreational opportunities, and water-oriented uses such as boating and fishing abound in Des Moines. In this regard, goals of the SMA related to public use and enjoyment of the State's shorelines have been met well in the City. However, the natural structure and functions occurring at the shoreline have been significantly altered through structural development of bulkheads and riprap revetments along much of the city's shoreline.

These changes have altered the natural net-shore drift direction and the availability and local distribution of beach sediment. Additionally, development on a watershed scale has affected the shoreline by increasing impervious area in uplands, resulting in increased peak flow velocities and volumes, impaired water quality, and erosion in streams that discharge to Puget Sound. Detailed discussion of altered or degraded shoreline ecological functions in Des Moines is contained in Appendix A, Shoreline Inventory and Characterization.

2.6 Opportunities

Opportunities for site-specific habitat enhancement or restoration of shoreline ecological functions are focused on stream mouths in public parks. Several stream mouths have been piped in culverts or extensively modified by fill and riprap. Replacing riprap with soft-shore, or "bio-engineered" alternatives for bank stabilization (and removing fill in places), along with use of native marine riparian plantings, would promote restoration of subestuaries and benefit fish and

wildlife. These site-specific projects would likely have a marginal effect on restoring ecosystem wide processes, particularly nearshore coastal processes, since so much of the city's shoreline is structurally modified, but would still be important and valuable efforts toward habitat enhancement and restoration of impaired ecological functions. Detailed discussion of site-specific habitat enhancement and restoration opportunities are in Chapter 4 – Restoration Planning. The description of each opportunity includes discussion of how degraded shoreline ecological functions would be improved.

Programmatic opportunities include coordination with the City's surface water management program, public education and outreach to provide technical guidance for shoreline homeowners, and the possibility for community-based restoration on private property. Opportunities for enhancing public awareness and education could include installation of informational kiosks at public parks and waterfront use areas such as the marina and the Redondo boat launch. The City could also coordinate with King County, the Water Resource Inventory Area (WRIA) 9 forum, and other regional or Puget Sound-wide planning efforts to implement nearshore restoration policies and actions.

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CHAPTER 3 – MASTER PROGRAM GOALS AND POLICIES

3.1 Master Program Goals

The City of Des Moines, by establishing the SMP, intends to control and regulate future development as it affects the shoreline area. The private sector's right to develop must not infringe upon the public's right to enjoy and utilize the shorelines of Puget Sound without trespassing on private uplands or tidelands. Development and redevelopment in the shoreline area should occur in a manner that maintains a balance between competing uses, does not impair shoreline ecological processes and functions, and results in the overall improvement of natural resources in the shoreline. An over-arching goal of the master program is to ensure that future use and development of the City's shoreline results in no net loss of shoreline ecological functions.

Recognizing that all of the City's shorelines waterward of the line of extreme low tide are designated as shorelines of statewide significance (RCW 90.58.030(e)(iii), these shorelines are of value to the entire state and should be protected and managed according to the following priorities established by the SMA (RCW 90.58.020):

1. Recognize and protect the statewide interest over local interest;
2. Preserve and enhance the natural character of the shoreline;
3. Result in long-term over short-term benefit;
4. Protect the resources and ecology of Puget Sound shorelines;
5. Increase public access to publicly owned areas of the shorelines; and
6. Increase recreational opportunities for the public in the shoreline.

3.2 General Goals and Policies for Master Program Elements

The SMA of 1971 (RCW 90.58) and implementing guidelines (WAC 173-26, as amended) identify several land and water use elements to be addressed in the development of area-wide shoreline goals and policies. They include: Shoreline Use; Public access; Recreation; Circulation; Economic Development; Archaeological and Historic Resources; Critical Areas; Conservation and Restoration. Master programs are also encouraged to include any other elements that, because of present uses or future needs, are deemed appropriate to effectuate the policy of the Act. Therefore, because of the predominantly residential nature of Des Moines, a Residential Element has been incorporated.

The SMA also provides that the City should ensure that policies, regulations, plans and ordinances developed and administered on lands adjacent to the shoreline be implemented in a manner consistent with the goals, policies and regulations of the master program (RCW 90.58.340). The following comprehensive set of shoreline goals and policies provide the foundation and framework on which the balance of the SMP has been developed, commensurate with the intent and objectives of the SMA.

3.2.1 Shoreline Use Element

Purpose and Intent: This element deals with the distribution, location and extent of: (1) the use of shorelines and adjacent areas for housing, commerce, transportation, public buildings, utilities, education and natural resources; (2) the use of the water for recreation and transportation; and (3) the use of the water, shoreline and uplands for other categories of land and water uses and activities not specified in this SMP.

GOAL

A. Preserve or develop shorelines in a manner that assures a balance of shoreline uses with minimal adverse effect on the quality of life, water and the environment. Recognize that land use and water management activities on adjacent uplands affect the quality of the City's shorelines.

POLICIES

1. Encourage intensive uses that are unique to or dependent upon a shoreline location to locate in developments in or adjacent to the Marina.
2. Protect the natural topography of undeveloped portions of the shoreline to prevent damage to the natural environment and public health.
3. Encourage nonresidential uses or activities that are not water-oriented uses to locate or relocate away from the shoreline.
4. Minimize sprawl and inefficient use of shoreline areas by locating new commercial development where other commercial development already exists, limiting non-water-oriented uses to locations away from the shoreline.
5. Design shoreline structures to be visually compatible with the shoreline character.
6. Locate shoreline structures to minimize view obstruction.
7. Consider the goals, objectives and policies in this SMP in land use and water management actions on adjacent uplands and associated wetlands or streams where such use or development may have an adverse effect on designated shorelines.

GOAL

B. Ensure that land uses within the shoreline will be compatible with adjacent land use and protect existing shoreline habitats and ecological systems.

POLICIES

1. Protect unique and fragile areas of the shoreline from upland or adjacent uses or activities that may have an adverse effect on the shoreline environment.
2. Prohibit any proposed shoreline or adjacent land use development that would have a significant adverse impact on the water quality of Des Moines, Massey, McSorley, Woodmont, Redondo, or Cold Creeks.
3. Formal plats and short subdivisions located in or adjacent to the shoreline shall comply with

SMP goals and policies.

4. No new construction that significantly reduces the flood storage capacity of the streambed or increases flood hazards to upstream properties or otherwise endangers public safety should be allowed within the limits of the one hundred-year (100-year) flood plain unless reasonable flood and ecological protection is provided

GOAL

C. Preserve the character of existing single-family residential areas.

POLICIES

1. Single-family residential areas should be protected from encroachment by commercial or multifamily residential uses.
2. Residential densities should not exceed the carrying capacity of Des Moines shorelines.
3. Multifamily residential developments should be designed to adequately buffer single-family areas.
4. Residential construction should not adversely impact shoreline features or shoreline ecological functions.
5. All residential use and development should be properly managed to avoid impacts to ecological functions and prevent cumulative impacts associated with shoreline armoring, over-water structures, storm water runoff, introduction of pollutants, and vegetation clearing.
6. Creation of new residential lots through land division should be designed, configured and developed to ensure that no net loss of ecological functions and processes occurs from the plat or subdivision, even when all lots are fully built-out.
7. Whenever possible, non-regulatory methods to protect, enhance, and restore shoreline ecological functions should be encouraged for residential development.
8. Permit applications for single-family residences and accessory structures in the shoreline jurisdiction should be reviewed for compliance with the SMP, although a Substantial Development Permit may not be required.

3.2.2 Public Access Element

Purpose and Intent: This is an element making provisions for public access to shorelines of the state, while protecting private property rights and public safety, and identifying the need and opportunities for providing public access to shorelines of the state.

GOAL

A. Increase public access to shoreline areas. Public access includes the ability of the general public to reach, touch, and enjoy the water's edge. It also includes the ability to travel on the waters of the state and view the water and shoreline from adjacent locations.

POLICIES

1. Public access to the City's shoreline should be addressed in the City's Comprehensive Parks and Recreation Plan.
2. Public access improvements should not result in a net loss of shoreline ecological functions.
3. Priority for access acquisition should consider resource desirability, availability and proximity of population.
4. Shoreline development by public entities, including local governments, state agencies, and public utility districts should include improvements or amenities to enhance or provide public access as part of each development project.
5. Where appropriate, utility and transportation rights of-way on the shoreline should be made available for public access and use.
6. Publicly owned street ends that abut the shoreline should be retained.
7. The Marina should be examined for its potential to provide additional public access improvements to the Des Moines shoreline.
8. Where appropriate, shoreline recreational facilities and other public access points should be connected by trails, bicycle pathways and other access links.
9. Public pedestrian easements and access points should be of a nature and scale that will be compatible with the abutting and adjacent land use as well as natural features, including aquatic life.
10. Appropriate signs should be used to designate developed, publicly owned shorelines.
11. Within the shoreline environment, pedestrian and non-motorized access should be encouraged.
12. Access development should respect and protect ecological and aesthetic values in the shorelines of the state.
13. Major public access improvements should be designed to meet Americans with Disabilities Act (ADA) standards, while maintaining existing shoreline habitats and ecological systems.
14. Public access to and along the water's edge should be available within publicly owned shorelines that are tolerant of human activity where municipal liability is an acceptable risk. None of the above policies should be construed to take precedence over the City's obligation to provide for the public safety, to maintain publicly owned properties or to protect the assets of the City from unacceptable municipal liability.

GOAL

B. Public access development should respect rights of shoreline property owners.

POLICIES

1. Shoreline access and ancillary facilities should be designed and developed in consideration of adjacent private properties.

GOAL

C. Public access should be maintained and operated to provide for the public health, safety, enjoyment of the users and minimize liability risks to the City.

POLICIES

1. Shoreline access areas should be planned to include ancillary facilities such as parking and sanitation, when appropriate.
2. Public access should be policed and improved consistent with intensity of use.
3. The provision to restrict access as to nature, time, number of people and area may be appropriate for public pedestrian easements and other public access areas where there are spawning grounds, fragile aquatic life habitats or potential hazard for pedestrian safety.
4. Facilities above and below-water in public shoreline access areas should be properly maintained and operated.

GOAL

D. Protect the public's opportunity to enjoy the physical and aesthetic qualities of shorelines of the state, including views of the water.

POLICIES

1. Viewpoints, lookouts and vistas of shorelines and wetlands should be publicly accessible, where possible, and when private properties are adequately protected.
2. New developments should minimize visual and physical obstruction of the water from shoreline roads and upland owners.
3. Provisions such as maximum height limits, setbacks, and maintenance of view corridors should be adopted to minimize the impacts to existing views from public property or substantial numbers of residences.

3.2.3 Recreation Element

Purpose and Intent: This is an element for the preservation and expansion of water-oriented recreational opportunities through programs of acquisition/developments, and various means of less-than-fee acquisition. Water-oriented recreational uses are permitted in the shoreline area when consistent with the goals, policies and regulations of this SMP.

GOAL

A. Provide water dependent and shoreline-oriented recreation opportunities for City residents and maximize public recreational opportunities of the shoreline area.

POLICIES

1. Provide recreational opportunities on the publicly owned shoreline that attract people of all ages, health, family status and financial ability.

2. Encourage the cooperation of all appropriate levels of government in the planning, designing and financing of future recreational facilities.
3. Examine potential additional recreational, historical and educational opportunities afforded by the Marina and identified in the shoreline inventory and characterization.
4. Effective interpretation should be provided at public recreation facilities to raise the quality of visitor experiences and to provide an understanding of the resource.
5. Shoreline recreational use and development should enhance environmental qualities with minimal adverse effect on the natural resources.
6. Shoreline recreational areas should be sited and designed to facilitate adequate monitoring of activity and maintenance.
7. Bicycle path planning should be taken into consideration as opportunities for shoreline views.
8. The recreation corridor along the shoreline, including the Marina, the Yacht Club, Des Moines Beach Park, Saltwater State Park, the Redondo area and sea wall and other public recreation properties as may be added in the future, should be maintained in as-good-as-new condition.
9. Whenever possible, natural materials should be used in developing shoreline recreational areas.
10. The development of recreational acquisition plans should give emphasis to the acquisition of prime recreation lands prior to their being preempted for other uses.
11. The siting of all recreational developments shall enhance the area concerned and protect neighboring uses.
12. The design of recreational facilities should emphasize structural forms that harmonize with the topography, reinforce use areas, and minimize damage to natural resources and shoreline ecological functions.

3.2.4 Circulation Element

Purpose and Intent: This is an element for assessing the location and extent of existing and proposed major thoroughfares, transportation routes, terminals and other public facilities, and correlating those facilities with the shoreline use elements.

GOAL

A. Limit circulation systems in shoreline areas to those which are water- oriented.

POLICIES

1. Motor vehicle traffic in the shoreline area should be confined to existing two-lane roadways.
2. Motorized vehicles should be prohibited on all beaches of the shoreline, except for residential service access allowed by existing easement.
3. Non-water related parking facilities should be prohibited from locating in the shoreline area.

4. Encourage development of trails and other forms of non-motorized access to the shoreline.

3.2.5 Economic Development Element

Purpose and Intent: This is an element for the location and design of water-oriented commercial and industrial facilities, such as transportation, port, tourist and other developments dependent upon shoreline locations.

GOAL

A. Provide long-range benefit to human economic pursuits while assuring compatibility with the environmental and physical conditions of the designated shoreline.

POLICIES

1. Priority should be given to water-oriented developments.
2. Priority shall be given to those water-oriented commercial developments that would provide an opportunity for substantial numbers of people to enjoy the shorelines.
3. Over-the-water, non-water dependent structures on the shorelines should be prohibited.
4. Shoreline developments should be designed to accommodate or enhance scenic views and amenities of the Des Moines waterfront.
5. Economic developments within the shoreline should be compatible with the Des Moines Revitalization and Economic Development Plan.

3.2.6 Archeological and Historic Resources Element

Purpose and Intent: This is an element for the protection and restoration of buildings, sites, and areas having historic, cultural, educational or scientific values, including unknown archaeological resources that may be located in the shoreline area.

GOAL

A. Preserve, protect, and restore buildings, sites, and areas of the shoreline that have historical, archeological, or cultural value.

POLICIES

1. Within the shoreline jurisdiction all buildings and shoreline sites having archeological, historic, or cultural significance, as determined by the City, the State Department of Archeology and Historic Preservation, and any affected Indian Tribe, should be preserved.
2. Work on development and construction projects that encounter new and significant archaeological, historical, scientific, or cultural discoveries should be suspended until such discoveries can be fully evaluated.
3. Shoreline use regulations should encourage the restoration, development and interpretation of historical, cultural and educational building or shoreline areas.
4. Encourage the preservation of historic buildings within its shoreline jurisdiction.

3.2.7 Critical Areas Element

Purpose and Intent: This is an element which provides for protection of areas designated by the City as environmentally critical areas that are physically located in the shoreline jurisdiction. Critical areas are those lands especially vulnerable to development because of fragile biophysical characteristics and/or important resource values. Critical areas within shoreline jurisdiction are governed by the Shoreline Management Act (RCW 90.58) through this Program.

GOAL

A. Manage designated critical areas (i.e., wetlands, bluffs and geologic hazard areas, fish and wildlife conservation areas, flood hazard areas, aquifer recharge areas, and streams) that are located within the City's shoreline jurisdiction to protect existing ecological functions and ecosystem-wide processes and, where possible, restore degraded ecological functions and ecosystem-wide processes to ensure no net loss of ecological functions.

POLICIES

1. Provide a level of protection to critical areas within the shoreline area that is at least equal to that which is provided by the City's critical areas regulations.
2. Regulate development in a way that protects the public from damages due to flooding, landslides, subsidence, and erosion and prevents adverse impacts to ground and surface water quality, wetlands, tidelands, streams, stream corridors, and fish and wildlife habitat.
3. Integrate the full spectrum of planning and regulatory measures, including the comprehensive plan, inter-local watershed plans, and City of Des Moines critical area regulations to protect and restore critical areas within shoreline jurisdiction.
4. Pursue activities in critical areas that restore degraded ecological functions and ecosystem-wide processes

3.2.7.1 Wetlands

Purpose and Intent: This is a sub-element to recognize the important functions wetlands provide in the nearshore ecosystem, particularly when associated with subestuaries of streams entering Puget Sound.

GOAL

A. Preserve, protect and/or restore wetlands within and associated with the City's shorelines to achieve no net loss of wetland area and wetland ecological functions.

POLICIES

1. Wherever possible, the City should restore wetland functions on publicly owned lands by limiting development and removing streamside riprap that prevents maintenance of estuarine wetlands and connections with interior riparian wetlands.
2. Regulate wetlands associated with shorelines of the state in a manner that is at least as protective as those in the City's critical areas regulations to ensure no net loss of wetland area

and functions. Regulate development of private upland property to maintain sufficient volumes of surface and subsurface drainage into wetland areas associated with the shoreline, to sustain existing vegetation and wildlife habitat and ecological functions consistent with the King County, Washington "Surface Water Design Manual," and RCW 90.58.

3.2.7.2 Bluffs and Geologically Hazardous Areas

Purpose and Intent: This is a sub-element to recognize the important ecological functions that marine bluffs provide on Puget Sound shorelines. This sub-element also addresses the need to protect human life and property from incompatible development in or near geologically hazardous areas such as bluffs, erosion and landslide hazard areas.

GOAL

A. Avoid foreseeable risk from geological hazards to people and improvements, recognizing that erosion of marine bluffs is a natural dynamic of shoreline ecological processes.

POLICIES

1. Apply regulations to geologically hazardous areas within the shoreline that are at least as protective as those in the City's critical areas regulations to protect against increased threat of geological hazard to adjacent properties and adverse impacts to other critical areas.
2. New development or the creation of new lots that would cause foreseeable risk from geological conditions during the life of the development should not be allowed.
3. New development that would require structural shoreline stabilization over the life of the development should not be allowed. Exceptions may be made for the limited instances where stabilization is necessary to protect allowed uses where no alternative locations or designs are available and no net loss of ecological functions will result.

3.2.7.3 Nearshore Habitats (Fish and Wildlife Habitat Conservation Areas)

Purpose and Intent: This is a sub-element to recognize that the shoreline and nearshore environment provide important habitat functions. Eelgrass and kelp beds and forage fish spawning areas are of particular importance in maintaining habitat functions and are considered "critical saltwater habitats." These areas and others are designated by Des Moines as fish and wildlife habitat conservation areas.

GOAL

A. Protect existing nearshore habitats and restore degraded nearshore habitats. These nearshore habitats require a higher level of protection due to the important ecological functions they provide. As ecological functions of marine shorelands can affect the viability of critical saltwater habitats, effective protection and restoration of critical habitats should integrate management of shorelands and submerged areas.

POLICIES

1. The City, in conjunction with state resource agencies, affected Indian tribes, should identify and classify saltwater habitats, seasonal ranges, and habitat elements with which federal-

listed and state-listed endangered, threatened, and priority species have a primary association and which, if altered, may reduce the likelihood that a species will maintain its population and reproduce over the long term.

2. Avoid or discourage the placement of docks, bulkheads, bridges, fill, floats, jetties, utility crossings, and other human-made structures that intrude into or over identified nearshore habitat having a primary association with federal-listed and state-listed endangered, threatened, and priority species. Construction of improvements which provide improved public access and use in areas where the natural shoreline has been altered and ecological functions degraded shall be considered on a case by case basis.
3. Limit development and shoreline modifications that would result in interference with the process of natural erosion of feeder bluffs.

GOAL

B. Integrate management of shorelands as well as submerged areas with other programs and regulations to achieve effective protection and restoration of nearshore habitats.

POLICIES

1. The City should guide its open space planning efforts toward establishing a system of fish and wildlife habitats with connections between larger habitat blocks and open spaces. These should include where possible riparian and estuarine ecosystems, especially salt marsh habitats and upland ecological functions important to critical saltwater habitats.
2. Adequate buffer zones should be established to separate incompatible uses from critical saltwater habitat areas.
3. Protect existing and restore degraded near-shore habitat, lost salmonid habitat, sediment inflow and transport regimens.
4. Correct activities that cause excessive sediment input from mass wasting.

3.2.7.4 Flood Hazard Reduction

Purpose and Intent: This is a sub-element to recognize the need to avoid creating flood hazard for life and property and to preserve ecological functions provided by frequently flooded areas.

GOAL

A. Protect the City from losses and damage created by flooding; while maintaining water quality, fish and wildlife habitat, recreation, and other beneficial uses and ecological functions.

POLICIES

1. The City should manage flood protection through the City's Stormwater Management Plan, Comprehensive Plan, and frequently flooded areas regulations to avoid development that creates flood risks and to maintain ecological functions such as flood storage.

2. Work with other cities, King County, and state and federal agencies, to seek regional solutions to flooding problems.
3. Control stormwater runoff in a manner, which utilizes natural detention, retention, and recharge techniques to the maximum extent possible.
4. Discourage development in the floodplain of any stream that would individually or cumulatively result in an increase to risk of flood damage.
5. Structural flood hazard reduction measures should be avoided whenever possible. When necessary, they should be accomplished in a manner that improves shoreline ecological functions, or at a minimum assures no net loss of ecological functions and ecosystem-wide processes.
6. Limit development and shoreline modifications along streams that would result in interference with the process of channel migration, provided that such migration would not cause significant adverse impacts to existing developments or public improvements.
7. Plan for and facilitate returning stream corridors to more natural hydrologic conditions.
8. When evaluating alternate flood control measures, consider the removal or relocation of structures in flood-prone areas.

3.2.7.5 Critical Aquifer Recharge Areas

Purpose and Intent: This is a sub-element to protect water quality for drinking water supplies in areas susceptible to groundwater contamination and therefore designated by Des Moines as critical aquifer recharge areas.

GOAL

A. Protect Critical Aquifer Recharge Areas from contamination or adverse effects to the recharging of the aquifer.

POLICIES

1. Manage critical aquifer recharge areas in the shoreline with development standards that limit the type of use and activities where infiltration of runoff may affect groundwater recharge or contaminate aquifers.
2. Water reuse projects for reclaimed water must be in accordance with the adopted water or sewer comprehensive plans that have been approved by the state Departments of Ecology and Health.
3. Location and construction specifications of storage tanks proposed for critical aquifer recharge areas must be constructed to prevent releases of hazardous substances or wastes to ground, ground waters, or surface waters.

3.2.7.6 Subestuaries

Purpose and Intent: This is a sub-element to recognize the important ecological functions provided by subestuaries in the greater nearshore environment. While freshwater streams that

enter Puget Sound in Des Moines are not shorelines of the state, the mouths of these streams form subestuaries within the City's shoreline jurisdiction along the marine shorelines.

GOAL

A. Protect and restore the ecological functions of subestuaries within shoreline jurisdiction, and their continuity and connectivity, by regulating development on surrounding lands on either side of the stream channel and/or near the stream mouth.

POLICIES

1. Development standards along stream portions lying within shoreline jurisdiction shall be regulated by this Program and be at least as protective as the City's critical areas regulations in order to achieve no net loss of ecological functions.

3.2.8 Conservation and Restoration Element

Purpose and Intent: This is an element for the preservation of the natural shoreline resources, considering such characteristics as scenic vistas, parkways, water quality, vegetation, beaches and other valuable natural or aesthetic features. This element also promotes and encourages restoration of shoreline functions and ecological processes that have been impaired as a result of past development activities.

3.2.8.1 Shoreline Stabilization

Purpose and Intent: This is a sub-element for balancing protection of existing development with conservation and restoration of coastal processes and beach resources.

GOALS

A. Where necessary to protect existing or planned development, encourage shoreline stabilization designs that minimize alterations and adverse effects to natural coastal processes and ensure no net loss of ecological function

POLICIES

1. Where protection of existing structures within shoreline jurisdiction is needed, contiguous property owners needing stabilization should be encouraged to participate.
2. Shoreline stabilization activities that may necessitate new or increased shoreline stabilization on the same or other affected properties where there has been no previous need for protection should be discouraged.
3. New development and shoreline dependent uses should be encouraged to locate so new shoreline stabilization measures are not needed.
4. Structural solutions to reduce shoreline damage should be allowed only after it is demonstrated that nonstructural solutions are not practical.
5. Whenever shoreline stabilization is needed, natural berms and vegetation should be favored over structural means.

6. Naturalistic shoreline protection measures should be encouraged for bluff and shore stabilization, such as creation of beaches that absorb and dissipate wave energy.
7. Breakwater construction should be considered only in marine shoreline environments where the need to protect existing or planned development from high wave action is essential.

3.2.8.2 Water Quality

Purpose and Intent: This is a sub-element for the preservation and improvement of water quality in waterbodies that influence the City's shoreline resources.

GOAL

A. Prevent further deterioration of water quality and storm water quantity that would result in a net loss of shoreline ecological functions, significant impact to aesthetic qualities, or recreational opportunities, and improve water quality in the City's marine waters and streams.

POLICIES

1. Minimize the discharge of pollutants from the Marina and boats into the waters of Puget Sound through the protection of critical aquifer recharge areas and surface waters from contamination using the federal Environmental Protection Agency water quality criteria for freshwater bodies and the state Department of Ecology water quality standards for surface waters of the state.
2. Encourage the implementation of capital improvement projects in Des Moines identified by the Comprehensive Stormwater Management Program.
3. Minimize the likelihood of toxic spills and react appropriately when such spills occur.
4. Require redesign or modification of facilities contributing to pollution through toxic spills, to guard against future spills and reduce the risk of accidental spills.
5. Expand the City's water quality monitoring program implemented through its Surface Water Management Program.
6. Work with county and state programs to develop clean-up plans for those waterbodies in the City that have exceeded state water quality standards.

3.2.8.3 Vegetation Conservation

Purpose and Intent: This is a sub-element to recognize and protect the variety of functions provided by native vegetation in the nearshore environment. In addition to protecting life and property by reducing the hazard of slope failures or accelerated erosion, ecological functions include habitat formation and preservation and bank or bluff stability.

GOAL

A. Protect plant and animal species and their habitats, to enhance shoreline uses. Vegetation along the City's shorelines and associated waterbodies should also be restored.

POLICIES

1. Preserve natural vegetation by controlling plant clearing and earth grading within the shoreline jurisdiction for new and redevelopment activities consistent with safe construction practices and in a manner that ensures shoreline ecological functions, ecosystems, and natural soil systems are not compromised.
2. Promote vegetation restoration, and the control of invasive weeds and nonnative species to avoid adverse impacts to soil hydrology, and to reduce the hazard of slope failures or accelerated erosion.
3. Encourage restoration or enhancement of native shoreline vegetation through incentives and non-regulatory programs to insure the conservation of the ecological functions provided by shoreline vegetation.

3.2.8.4 Restoration

Purpose and Intent: This is a sub-element to promote actions that restore shoreline habitat and ecological functions or processes that have been lost or impaired as a result of past development and actions.

GOAL

A. Restore shoreline habitats and seasonal ranges that support listed endangered and threatened species, as well as other anadromous fisheries.

POLICIES

1. Coordinate stream mouth restoration projects with upstream projects targeted to reduce localized flooding and improve fish passage such as culvert replacement.
2. Encourage voluntary restoration projects in degraded shoreline environments.
3. Monitor and adaptively manage restoration projects.
4. Create incentives that will make it economically or otherwise attractive for development proposals to integrate shoreline ecological restoration into development projects.
5. Establish and regulate uses located at or near stream estuaries in a manner that promotes City objectives for restoration.

GOAL

B. Restore and enhance shoreline habitats and processes on public lands.

POLICIES

1. Prioritize enhancement and restoration efforts at stream mouths, particularly in public parks.

2. Work with owners of other publicly-owned land to encourage restoration and enhancement projects, including funding strategies.
3. Work with the public and other interested parties to prioritize restoration opportunities identified in Shoreline Inventory and Characterization Report.
4. Develop a program to implement restoration projects, including funding strategies.

GOAL

C. Develop regional solutions with others to resolve the challenge of protecting shoreline ecological functions while also protecting shoreline developments.

POLICIES

1. Work with the State, King County, Watershed Resource Inventory Area (WRIA) 9 Steering Committee, and other governmental and non-governmental organizations to explore how local governments can best address the needs for preserving ecological processes and shoreline functions.

GOAL

D. Provide ample opportunity for the public to learn about the ecological aspects and community values of the City's shorelines.

POLICIES

1. Explore opportunities with other educational organizations and agencies to develop an on-going program of shoreline education for all ages.
2. Identify areas where kiosks and interpretative signs can enhance the educational experience of users of the shoreline and develop strategies to fund these projects.
3. Develop strategies to fund these projects.

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CHAPTER 4 – RESTORATION PLANNING: ASSESSMENT, LONG-TERM GOALS AND OPPORTUNITIES

4.1 Introduction

The SMA (RCW 90.58) requires a balance of potentially conflicting goals with respect to how the state's shorelines should be used, developed and managed. For example, the need to provide places for water-dependent intensive uses such as ports, marinas, and recreation must be balanced with environmental protection of the shorelines as a natural resource.

Traditionally, enhancement or other improvements to shoreline ecological functions have either been voluntary or in the form of mitigation for impacts resulting from development. The current guidelines for updating local SMPs address this deficiency by requiring local SMPs to develop goals, policies, and actions to proactively pursue and promote restoration of the shoreline environment. The governing principles of the guidelines (WAC 173-26-186) state:

> *Through numerous references to and emphasis on the maintenance, protection, restoration, and preservation of "fragile" shoreline "natural resources," "public health," "the land and its vegetation and wildlife," "the waters and their aquatic life," "ecology," and "environment," the Act makes protection of the shoreline environment an essential statewide policy goal consistent with the other policy goals of the Act* (WAC 173-26-186(8)); and
>
> *For counties and cities containing any shorelines with impaired ecological functions, master programs shall include goals and policies that provide for restoration of such impaired ecological functions* (WAC 173-26-186(8)(c)). (emphasis added)

The guidelines to prepare or amend SMPs further states:

> *The goal of this effort is master programs which include planning elements that, when implemented, serve to improve the overall condition of habitat and resources within the shoreline area of each city and county*. (WAC 173-26-201(c)).

The guidelines define "restoration" or "ecological restoration" as "…the reestablishment or upgrading of impaired ecological shoreline processes or functions…Restoration does not imply a requirement for returning the shoreline area to aboriginal or pre-European settlement conditions" (WAC 173-26-020(27)).

In terms of shoreline management planning under the current guidelines, "restoration" is focused on areas where shoreline ecological functions have been degraded from past development activities. In this context, restoration is narrowly defined but can be broadly implemented through a combination of programmatic measures (e.g., surface water management; water quality improvement; public education) and site-specific projects (e.g., restoration of sub-estuaries/stream mouth deltas). The guidelines state that:

> *…master program provisions shall identify existing policies and programs that contribute to planned restoration goals and identify any additional policies and programs that local government will implement to achieve its goals. These master program elements regarding restoration should make real and meaningful use of established or funded nonregulatory policies and programs that contribute to restoration of ecological functions, and should appropriately consider the direct or indirect effects of other regulatory or nonregulatory programs under other local, state, and federal laws, as well as any restoration effects that may flow indirectly from shoreline development regulations and mitigation standards* (WAC 173-26-186(8)(c)).

It is important to note that the guidelines do not state that local programs should or could require individual permittees to restore past damages to an ecosystem as a condition of a permit for new development (Ecology, 2004). However, the City does have the opportunity to add conditions to Shoreline Substantial Development, Conditional Use, and Variance permits to assure consistency with the SMA and local SMP regulations and policies. Likewise, the Department of Ecology may place conditions on Shoreline Conditional Use and Variance permits consistent with the City's SMP and the SMA. In cases where shoreline development will have unavoidable impacts requiring mitigation, the mitigation design could be informed by and coordinated with the overall SMP restoration planning objectives.

The SMA guidelines provide a framework for shoreline restoration planning as part of a local jurisdiction's SMP. This framework (WAC 173-26-201(2)(f)) includes the following:

- Through development of the shoreline inventory and characterization, identify degraded areas, impaired ecological functions, and sites with potential for ecological restoration;
- Establish overall goals and priorities for restoration of degraded areas and impaired ecological functions;
- Identify existing and ongoing projects and programs that are currently being implemented which are designed to contribute to local restoration goals (such as capital improvement programs (CIPs) and watershed planning efforts (WRIA habitat/recovery plans);
- Identify additional projects and programs needed to achieve local restoration goals, and implementation strategies including identifying prospective funding sources for those projects and programs;
- Identify timelines and benchmarks for implementing restoration projects and programs and achieving local restoration goals; and
- Provide for mechanisms or strategies to ensure that restoration projects and programs will be implemented according to plans and to appropriately review the effectiveness of the projects and programs in meeting the overall restoration goals (e.g., monitoring of restoration project sites).

The following sections of this report discuss these subjects as they relate to the Des Moines SMP.

4.2 Restoration Planning

Shoreline restoration planning begins with the identification of "degraded areas" or areas with "impaired ecological functions." The City's *Shoreline Inventory and Characterization* (Adolfson, 2005) examined nearshore and ecosystem-wide processes that maintain shoreline ecological functions; identified impaired ecological functions; and identified programmatic and site-specific opportunities for restoration and/or enhancement. Key findings of the inventory and characterization are summarized in Chapter 2. The complete report is included as Appendix A.

4.3 Restoration Goals and Policies

The guidelines provide that local SMPs shall include "goals, policies and actions for restoration of impaired shoreline ecological functions." Under the guidelines, restoration planning has a purpose distinct from development regulations and mitigation standards. "The guidelines expressly focus restoration requirements on the use of master program policies, as opposed to development regulations" (Ecology, 2004). "Master program provisions should be designed to achieve overall improvements in shoreline ecological functions over time, when compared to the status upon adoption of the master program" (WAC 173-26-201(2)(f)).

The current Des Moines SMP (adopted in 1988) does not contain specific goals and policies related to restoration of shoreline habitat and ecological functions. The existing SMP does contain policies related to protection of water quality and conservation of shoreline vegetation and wildlife habitat. In updating the City's SMP goals and policies, a new element, "Conservation and Restoration" was drafted to retain important conservation goals and policies and include new goals and policies specifically addressing restoration of shoreline ecological functions that have been impaired as a result of past development activities. The conservation and restoration goals and policies are included in Chapter 3.

4.4 Existing Plans and Programs

A number of regional and Puget Sound-wide planning efforts have been developed over several years to address water resource management, water quality, and salmon habitat recovery. These plans and programs provide a framework of goals, policies, and in some cases, funding mechanisms. These plans and programs have informed development of Des Moines' restoration goals and policies. Des Moines shoreline restoration planning goals, policies, and actions should be integrated, or at a minimum, be consistent with this broader framework of conservation and restoration work in Puget Sound.

4.4.1 Puget Sound Action Team: 2005-2007 Puget Sound Conservation and Recovery Plan

The Puget Sound Action Team partnership (Action Team) defines, coordinates and implements Washington State's environmental agenda for Puget Sound. The legislature created the Puget Sound Action Team in 1996 as the State's partnership for Puget Sound. The Action Team includes directors from 10 state agencies and representatives from tribal, federal and local governments with direct responsibilities and authorities for conservation and restoration of Puget Sound.

Every two years the PSAT partnership develops a plan to guide their work. The 2005-2007 plan provides a total of $182 million dollars funded through state agency budgets to address eight priority areas:

- Clean up contaminated sites and sediments;
- Reduce continuing toxic contamination and prevent future contamination;
- Reduce the harm from stormwater runoff;
- Prevent nutrient and pathogen pollution caused by human and animal wastes;
- Hood Canal: a geographic priority for 2005-2007;
- Protect shorelines and other critical areas that provide important ecological functions;
- Restore degraded nearshore and freshwater habitats; and
- Conserve and recover orca, salmon, forage fish, and groundfish (PSAT, 2005).

4.4.2 Puget Sound Nearshore Project (PSNP)

The Puget Sound Nearshore Project (PNSP) (also referred to as the Puget Sound Nearshore Ecosystem Restoration Project (PSNERP)) is a large-scale, multi-agency initiative to address habitat restoration needs in the Puget Sound basin. Nearshore Project goals are to identify significant ecosystem problems, evaluate potential solutions, and restore and preserve critical nearshore habitat. The PSRP represents a partnership between the U.S. Army Corps of Engineers (Corps), state and federal government organizations, Indian tribes, industries and environmental organizations.

A General Investigation Reconnaissance Study conducted by the U.S. Army Corps of Engineers in 2000 (USACOE, 2000) identified a direct link between healthy nearshore habitat and the physical condition of the shoreline. The study identified several actions that would be central in restoring nearshore processes to a more natural state:

- Providing marshes, mudflats, and beaches with essential sand and gravel materials;
- Removing, moving and modifying artificial structures (bulkheads, riprap, dikes, tide gates, etc.);
- Using alternative measures to protect shorelines from erosion and flooding; and
- Restoring estuaries and nearshore habitat such as eelgrass beds and kelp beds (USACOE, 2000; PSNP, 2002).

The PSNERP also provides outreach and guidance materials related to nearshore ecosystem restoration principals, concepts, and methods of implementation.

4.4.3 Shared Strategy for Puget Sound: Draft Puget Sound Salmon Recovery Plan

Shared Strategy for Puget Sound (Shared Strategy) is a collaborative effort to protect and restore salmon runs across Puget Sound that was initiated as a result of Endangered Species Act (ESA) listings of salmonid species in the Puget Sound region. Shared Strategy engages local citizens, tribes, technical experts and policy makers to build a practical, cost-effective recovery plan endorsed by the people living and working in the watersheds of Puget Sound.

Shared Strategy has developed a draft salmon recovery plan (Shared Strategy, 2005) that provides a blueprint for salmon recovery strategies throughout Puget Sound and incorporates by reference local watershed plans for salmon recovery.

4.4.4 Water Resource Inventory Area (WRIA) 9 Forum: Salmon Habitat Plan

Des Moines is located in the Green/Duwamish and Central Puget Sound Watershed (WRIA 9) and is a participating local agency in WRIA 9 watershed planning. After several years of planning and scientific study, WRIA 9 recently completed the Salmon Habitat Plan (WRIA 9, 2005). The Plan is both broad in scope and specific in recommendations for protection, enhancement, and restoration of habitat in the marine nearshore subwatershed, including Puget Sound in the City of Des Moines. The Plan includes recommended policies, programs, and projects. Key nearshore policies most directly relevant to the City of Des Moines include:

- Encourage nearshore property owners to continue the replacement of creosote pilings and structures with non-creosote alternatives as well as the removal of obsolete / abandoned facilities that contain significant amounts of creosoted wood; and
- Actively feed beaches, where appropriate, with sediment where there is a lack of sediment due to interrupted supply from bulkheads or other forms of shoreline armoring (WRIA 9, 2005).

4.4.5 City of Des Moines Surface Water Management Program

The City's Surface Water Management Program is guided by the *Comprehensive Stormwater Management Plan* (adopted in 1991), a draft updated Comprehensive Plan (1998), and regional multi-jurisdiction basin plans such as the *Des Moines Creek Basin Plan* (1997). The City's Surface Water Capital Improvement Program identifies, funds, and implements site-specific projects intended to provide flood control or alleviation, improve and enhance riparian habitat, replace culverts to improve fish passage, and improve water quality from stormwater runoff. While the City's Surface Water Management Program is focused on freshwater resources in the City (none of which are regulated under the City's SMP), capital projects to improve habitat and stream flow will affect downstream resources that are in the City's shoreline jurisdiction (i.e., stream mouths discharging to Puget Sound).

4.5 Restoration Opportunities

When identifying, evaluating, and prioritizing opportunities for restoration, the concept of "restoration" in the context of SMP planning should be linked to two key concepts:

1. Restoration or enhancement should support the overarching goal that local SMPs "serve to improve the overall condition of habitat and resources within the shoreline area"; and
2. Restoration should be designed to address areas where shoreline ecological functions have been impaired as a result of past development activities.

Both programmatic and site-specific opportunities for shoreline restoration or enhancement exist in Des Moines. Opportunities have been identified by both regional plans (e.g., WRIA 9 Salmon Habitat Plan and related studies) and the City's *Shoreline Inventory and Characterization* (Adolfson, 2005).

4.5.1 Programmatic Opportunities

The WRIA 9 Salmon Habitat Plan recommends development of several programs relevant to the City of Des Moines SMP update. The programs would be developed by King County in coordination with local jurisdictions and could be implemented at the local level by the County or by the City of Des Moines. These include:

- *Promote Habitat Restoration on Private Property by Offering a "Toolbox" of Nearshore Habitat Project Designs.* This program would promote voluntary restoration on private property by creating a "toolbox" of model habitat design and shoreline restoration actions. Types of actions could include removal of unneeded shoreline armoring and/or derelict structures, and rehabilitation of marine riparian vegetation. The program would provide technical assistance to landowners and would seek to develop incentives to encourage voluntary restoration projects on private property.
- *Create a Soft Armoring Technical Assistance and Cost-Share Program*. This program would promote voluntary replacement of traditional "hard" shoreline armoring (concrete/riprap/wooden bulkheads) with "soft-shore" armoring techniques where appropriate and feasible. Specific designs would vary from site to site depending on the site's unique characteristics. A number of case studies and example designs are provided in *Alternative Bank Protection Methods for Puget Sound Shorelines* (Ecology, 2000). An area in Des Moines that would most directly benefit from this type of program is the Woodmont Neighborhood. Much of the shoreline in this neighborhood is privately owned with a majority being developed single-family residential areas and local streets. However, public education or incentives for shoreline bulkhead removal could help restore natural shoreline processes in this formerly important reach of feeder bluff (Adolfson, 2005), as well as at other sites.
- *Citizen Volunteer Forage Fish Monitoring Program*. This program would offer an opportunity for citizens to work with biologists and participate in data gathering to better identify and monitor forage fish spawning areas.

- *An Incentive Program to Encourage Multiple Family/Neighborhood Use of Docks and Boat Ramps*. This program would be focused on new development or redevelopment in areas where private docks, piers, and boat ramps are located very close to one another. This program is less relevant to the City of Des Moines' shoreline, since boat launch and moorage facilities are already concentrated at community locations such as the Des Moines Marina and the Redondo Boat Launch. Nonetheless, the City may consider policies in its SMP consistent with this concept.

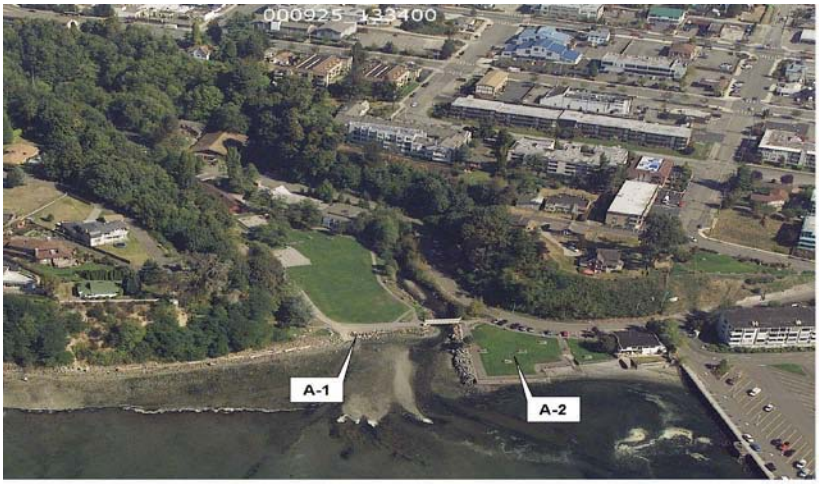
In addition to, and consistent with, these programmatic opportunities the City's *Shoreline Inventory and Characterization* (Adolfson, 2005) identified programmatic opportunities in the form of public information and awareness:

- *Information kiosks at the Des Moines waterfront.* Informational kiosks could also be erected at shoreline public access locations in the City of Des Moines. The kiosks would serve to educate the public on the importance of the nearshore area and coastal processes, what they can do to help preserve or improve what remains, and what wildlife viewing opportunities exist. A good example of this type of kiosk is located in Des Moines Beach Park.
- *Technical assistance and public outreach for riparian planting enhancement or rehabilitation.* This program could be developed in concert with the "toolbox" program described above as part of the WRIA 9 Salmon Habitat Plan. The program could develop specific technical assistance for appropriate plantings in both marine riparian zones and along freshwater streams that discharge to Puget Sound in the City of Des Moines.

4.5.2 Site-Specific Opportunities

The City's *Shoreline Inventory and Characterization* (Adolfson, 2005) evaluated and described how shoreline ecological functions have been impaired in the City of Des Moines and identified several site-specific opportunities for restoration or enhancement. Additional site-specific opportunities have been identified through WRIA 9 planning efforts (Coastal Geologic Services, Inc., 2005). These are described below for neighborhoods and specific shoreline waterfront properties.

- *Des Moines Beach Park.* Restoration could include the removal of the riprap revetment from the mouth of Des Moines Creek and possibly north towards the northern city boundary (labeled A-1 on photo). The artificial no-bank park shoreline could be pulled back a bit with riprap and replaced with



alternative "soft shore protection" techniques. Such "biotechnical" or "bioengineering" techniques could include imported gravel and sand, anchored drift logs or other large woody debris and be combined with marine riparian plantings along the shoreline and on the north side of Des Moines Creek. This would improve subestuary and delta functions, increase habitat quantity and quality for both terrestrial and aquatic animals using the shoreline, and expand beach recreation. Opportunities on the south side of the stream mouth (labeled A-2 on photo) could include the removal of the existing rock revetment and concrete bulkhead on the north side and the former boat ramp. The bulkhead could be replaced with soft shore protection techniques and marine riparian plantings. This would require removal of some fill material from the site and moving the existing path landward. A pocket beach could be created that would be largely in the shelter of the marina breakwater and would provide a new recreation beach. This would improve the subestuary and delta as well as provide additional aquatic (including forage fish spawning habitat) and terrestrial wildlife habitat, and beach recreation. Removal of the failing revetment north towards the City limits is another possible action that would allow sediment to migrate from upland areas to the shoreline and improve beach habitats.

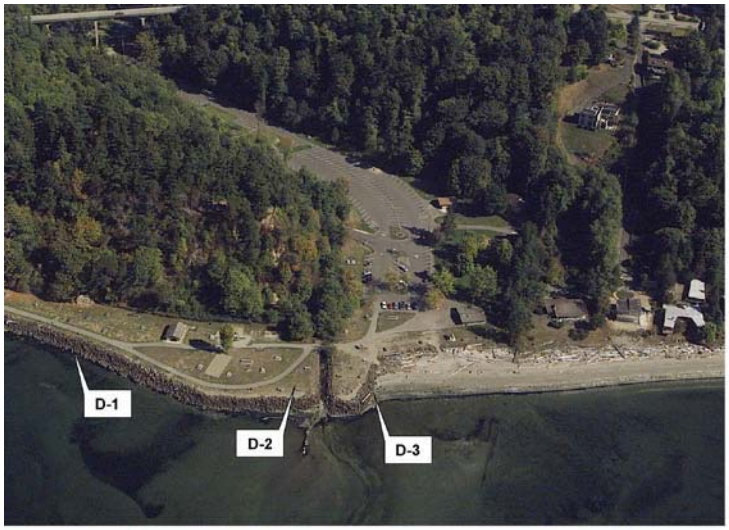
- *Des Moines Marina.* Redevelopment of the marina is planned and described in the *Marina Master Plan* (City of Des Moines, 2001). Opportunities during redevelopment over the years are related to improvement of water quality in the marina, including development or refinement of operational Best Management Practices (BMPs) for handling of and storage of fuels, and other contaminants associated with boating. The replacement of the timber seawall with non-creosote materials (steel sheet pile structure) has been identified in the master plan.

- *Zenith Neighborhood / Massey Creek.* Opportunities include the removal of riprap from the mouth of Massey Creek on the south bank (the north bank is currently part of the Des Moines Marina breakwater) (labeled C-1 on photo). The riprap could be replaced with soft shore protection

techniques (possibly with some rock to remain) combined with marine riparian plantings along the shoreline and on the south bank of Massey Creek. With net shore-drift to the north in this area, the beach should continue to accrete such that erosion is not a threat here. Stream flow would need to be quantified to allow analysis of the expected amount of stream mouth closure as compared to salmon return periods. The removal of riprap would provide improvements to the subestuary and delta, and riparian plantings would increase habitat quantity and quality for both terrestrial and aquatic animals using the shoreline. The creation of a much larger estuary to provide additional habitat benefits would likely require purchasing the property and possibly removing the building immediately south of the creek. Riprap and fill could be removed from the south bank (and possibly riprap from the north bank) landward of the marine shore to enlarge the estuary. This site was also identified in the *WRIA 9 Salmon Habitat Plan* as *Project NS-13: Massey Creek Pocket Estuary Restoration in Des Moines.* Identification in this regional plan increases the likelihood of funding and implementation.

One failed bulkhead is present approximately at South 245th Street in the Zenith neighborhood (not shown on photo). The wooden soldier pile wall is over a portion of the intertidal beach (Coastal Geologic Services, Inc. 2005) and is no longer functioning to protect the bluff from erosion. Simple pile removal would help restore natural beach conditions and bluff processes. Some of these may be creosoted piles, so additional water quality benefits could be achieved.

- *Saltwater State Park.* Opportunities at Saltwater State Park could include the removal of the riprap armoring from the mouth of McSorley Creek north to the northern park boundary (D-1 and D-2 on photo). The riprap could be replaced with soft shore armoring techniques and beach nourishment materials combined with marine riparian plantings along the shoreline. This would provide additional forage fish spawning areas, and increase recreational opportunities and may allow sediment to migrate from upland areas to the shoreline. The removal of riprap and return of the area to more natural beach conditions would require the removal of substantial amounts of fill material landward of the existing riprap wall and the removal and replacement of the paved walkway. Partial restoration could occur where the riprap revetment is removed from the stream to north of the restroom, with some rock and soft shore protection placed landward of the restroom. Opportunities at the park could also include the complete removal of riprap and fill in the lower reach of McSorley Creek and along both sides of the channel at the mouth of the stream. Retention of some type of structure or existing riprap on the south side of the stream channel would maintain the stream in or near its



present condition, but removal of the riprap would allow for a more dynamic and functioning stream delta. This would increase the size and quality of the subestuary and delta and fish access to the stream, as well as provide additional aquatic and terrestrial wildlife habitat.

South of the stream mouth, opportunities could include the removal of riprap and replacement with soft shore protection (labeled D-3 on photo). Net-shore drift currently moves sediments northward. The existing riprap causes accretional deposits of sediments at the existing swimming beach to the south. A complete removal of the riprap armoring without any replacement structure may cause the existing beach to erode. The presence of the riprap wall, which extends the mouth of McSorley Creek into Puget Sound, causes some of the stream sediment to be deposited in the lower intertidal area, instead of entering directly onto the beach to the north. The placement of soft shore protection in place of the riprap would likely not produce accretional deposits at current rates associated with the riprap, but the soft-shore armoring would help to maintain the existing beach. The park is owned and maintained by the Washington State Department of Parks and Recreation. This site was also identified in the *WRIA 9 Salmon Habitat Plan* as *Project NS-15: McSorley Creek Pocket Estuary Restoration in Des Moines.* Identification in this regional plan increases the likelihood of funding and implementation.

- *Woodmont / Redondo North Neighborhoods.* Several failed bulkheads are present approximately 2,000 feet south of the southern boundary of Saltwater State Park. These include a cluster of three wooden soldier pile walls in the intertidal beach (Coastal Geologic Services, 2005) that are no longer protecting the bluff from erosion. Simple pile removal would help restore natural beach conditions and bluff processes. Some of these may be creosoted piles, so additional water quality benefits could be achieved. The Woodmont Creek subestuary and delta have been severely impaired by shoreline armoring and shoreline development. Woodmont Creek is culverted beneath residential areas and roadways for a distance of approximately 500 feet from the mouth. This is likely a fish passage barrier to anadromous salmonids. Removal of the culverts and other barriers could provide a longer-term goal for restoration of the stream, but access to houses is a significant problem to overcome for this type of project.

- *Redondo South Neighborhood.* Restoration/enhancement opportunities are limited due to the existing large seawall that extends along much of the shoreline. However, opportunities do exist for public education targeted at private landowners along Cold Creek. Cold Creek, north of Redondo Beach Drive South, flows through a residential area, where it has been channelized (G-1 on photo).

The lower reach of the stream contains no structure and has little riparian cover. An opportunity exists to educate landowners on the benefits to salmonids and other fish from adequate riparian habitats associated with the streams where they live, and to try to implement a stream restoration project. Landowners could be given the chance to improve habitat in an organized way and to have salmon spawn in their backyards. Removal or pullback of riprap, riparian plantings, and installation of large woody debris (LWD) would be the basis of a stream restoration project. The existing box culvert at the mouth of the stream could be further investigated, but this culvert appears to allow fish access from the beach under the road at high tide. The National Oceanic and Atmospheric Administration (NOAA) Community Based Restoration Program would be an ideal fit for funding this type of project.

As mentioned above, the City's *Surface Water Management 2005-2007 Capital Improvement Program* identifies and funds several site-specific projects. While these projects are not located along the marine shoreline, their implementation will improve habitat and flow regimes in key streams that discharge to Puget Sound. As such, they are worth noting in the context of shoreline restoration planning. Key projects include:

- *Des Moines Creek Basin Projects (2004-2006)*. Habitat improvements include removal of fish passage obstructions and stream restoration (e.g., creation of spawning pools; placement of anchored large woody debris and boulders; and installation of bio-engineered riparian vegetation to stabilize banks and provide shade).
- *Marine View Drive Bridge Replacement (2006)*. Includes improvements to enable fish passage to upper portions of Des Moines Creek.
- *Lower Massey Creek Channel Modifications (2007-2008).* Involves widening the stream channel to alleviate flooding and to restore fish habitat (via addition of spawning gravel, creation of eddy pools, riparian enhancement for shade, etc.).
- *McSorley Creek Basin Plan (2007).* While not site-specific, development of this comprehensive basin plan could consider and prioritize potential stream mouth restoration at Saltwater State Park, where McSorley Creek discharges to Puget Sound.

4.6 Funding and Partnership Opportunities

Funding opportunities for restoration projects include both grants and legislative funds administered by state agencies. For potential projects in Des Moines, the greatest likelihood to obtain funding would result from strategic partnering with King County and state and federal agencies. Targeting funding requests to sediment supply for nearshore habitats such as forage fish spawning enhancement or pocket estuary enhancement would fit well into the science and restoration plans/goals of the organizations listed below. A few of the programs and organizations most relevant to Des Moines are described below.

4.6.1 Puget Sound Action Team

The state legislature has appropriated a total of $182,347,323 for state agencies and university education programs for implementing the *2005-2007 Puget Sound Conservation and Recovery Plan* (PSAT, 2005). Funding is allocated by both priority area (e.g., habitat restoration (13

percent), stormwater (29 percent)) and state agency (e.g., Ecology, WDFW, WSU Extension, etc.). The habitat restoration funds would be the best fit for opportunities in Des Moines.

4.6.2 Puget Sound Nearshore Project/Partnership

The U.S. Army Corps of Engineers and the Washington State Department of Fish and Wildlife entered into a 50/50 cost share agreement in 2002 to initiate a general investigation study. In coordination with several other agencies and organizations, the project has allowed engineers and scientists to begin to assess and identify restoration goals, work towards protection actions, and develop criteria to set priorities and develop projects in the Puget Sound nearshore environment (PSNP, 2002). To date, these efforts have resulted in technical studies and technical reports providing guidance for development of restoration projects (PSNP, 2004a, 2004b), but not on-the-ground projects.

4.6.3 Salmon Recovery Funding Board

With the listing of salmonid species under the Endangered Species Act in 1999, the Legislature created the Salmon Recovery Funding Board (SRFB). Composed of citizens appointed by the Governor and five state agency directors, the Board provides grant funds to protect or restore salmon habitat and assist related activities. It works closely with local watershed groups and has helped finance over 500 projects. The Salmon Recovery Funding Board awarded $7.1 million during the first five funding cycles for salmon habitat protection, restoration, and assessment projects in the Green/Duwamish and Central Puget Sound Watershed (WRIA 9). These grants build on other funding sources such as the King County Conservation District and Waterways 2000. The two site-specific opportunities in Des Moines (pocket estuary restoration at the mouths of Massey and McSorely Creeks; described above) that have been identified in the WRIA 9 Salmon Habitat Plan are good candidates and have the greatest likelihood of receiving SRFB funding.

4.6.4 King County Conservation District

The King Conservation District (KCD) is a non-regulatory natural resources assistance agency founded in 1949. The Conservation District is authorized by the State of Washington and guided by the Washington State Conservation Commission. The District promotes conservation through demonstration projects, educational events, technical assistance, and, in some cases, providing or pointing the way to funds that may be available for projects. The WRIA 9 Forum allocates approximately $634,000 in King Conservation District funds annually to support habitat protection and restoration projects, stewardship projects and programs, and essential technical assessments. The money comes from a county-wide $5 per parcel assessment that funds the activities of the King Conservation District as well as projects through other watershed forums in King County. Beginning in 2005, the highest priority for WRIA 9 KCD funding includes projects and programs that are informed by the watershed Habitat Plan and the Strategic Assessment, such as the pocket estuary restoration projects at the mouths of Massey and McSorely Creeks in Des Moines.

4.6.5 NOAA Community-Based Restoration Program

The NOAA National Marine Fisheries Service manages the Community-Based Restoration Program (CRP), begun in 1996. The Program promotes local efforts to conduct meaningful, on-the-ground restoration of marine, estuarine and riparian habitat. The Program provides seed money and technical expertise to address important fishery habitat concerns. Projects are developed by individual and civic organizations. NOAA solicits proposals for locally-driven habitat restoration projects and works closely with communities to aid their development and implementation. Successful projects result from significant local support, including citizens' hands-on involvement to implement the restoration projects. Following development of a restoration project, the "host" community subsequently monitors and maintains the site. This model promotes stewardship and a heightened appreciation for the environment. The small scale of the some of the stream mouths in Des Moines makes this a good potential source of funding for restoration projects outlined in this document.

4.6.6 Des Moines Surface Water Management CIP

The Des Moines Surface Water Management Capital Improvement Program funds projects through a combination of CIP funds and grants and/or funding partners for multi-jurisdiction projects such as development of comprehensive basin plans. While the Surface Water Management Program is focused on freshwater resources, the City could consider adding a Puget Sound nearshore restoration component to its capital program, focused on opportunities at stream mouths. Funding sources would include grants and partnership opportunities.

4.6.7 Other Possible Funding Sources

- Aquatic Lands Enhancement Account – Washington Department of Natural Resources
- City Fish Passage Barrier, Stormwater and Habitat Restoration Grant Program - Washington Department of Transportation
- Five-Star Restoration Program - Environmental Protection Agency
- FMC Corporation Bird and Habitat Conservation Fund - FMC Corporation and The National Fish and Wildlife Foundation
- Habitat Conservation - U.S. Fish and Wildlife Service Coastal Program
- Matching Aid to Restore States Habitat (MARSH) - Ducks Unlimited
- Non-point Source Implementation Grant (319) Program - Environmental Protection Agency, Washington State Department of Ecology
- Pacific Grassroots Salmon Initiative - National Fish and Wildlife Foundation
- Puget Sound Program - U.S. Fish and Wildlife Service
- Puget Sound Wetland Restoration Program - Washington State Department of Ecology
- Regional Fisheries Enhancement Groups - Washington State Department of Fish and Wildlife

- Salmon Recovery Funding Board - Interagency Committee for Outdoor Recreation
- Section 204: Environmental Restoration Projects in Connection with Dredging - U.S. Army Corps of Engineers
- Section 206: Aquatic Ecosystem Restoration Program - U.S. Army Corps of Engineers
- Transportation Equity Act for the 21st Century (TEA-21) - Washington Department of Transportation
- Washington State Ecosystems Conservation Program - U.S. Fish and Wildlife Service
- Wetland Protection, Restoration, and Stewardship Discretionary Funding - Environmental Protection Agency

4.7 Implementation and Monitoring

The Puget Sound Nearshore Project/Partnership (PNSP) is working to develop an approach to nearshore ecosystem recovery. The approach is fundamentally based on strategic principles and concepts to guide ecosystem recovery in Puget Sound. These concepts are described in guidance publications prepared by PSNP (2004a; 2004b; 2003). The strategic principles and concepts are organized into five sections, briefly summarized below:

- **Purpose and Need**. Potential restoration projects should be consistent with overarching goals and objectives. For example, the PSNP mission is to "protect and restore the functions and natural processes of Puget Sound nearshore ecosystems in support of the natural resources and beneficial uses of Puget Sound and the Puget Sound Basin."
- **Fundamental assumptions and concepts**. This includes a fundamental understanding of nearshore ecosystems and their properties, including physical and chemical factors, ecosystem structure, and biological communities. There is also a need to recognize the importance of landscape ecology and the role of population ecology in the ecosystem.
- **Restoration Principles**. Restoration planning should be strategic and restoration design should be based on carefully developed goals and objectives. Follow-through, or monitoring, should be employed, including development of performance criteria and use of adaptive management in project development.
- **Adaptive Management Principles**. Adaptive management is a process that uses research and monitoring to allow projects to proceed, despite inherent uncertainty and risk regarding its consequences. Adaptive management is best accomplished at a regional or watershed scale, but can be used at a project level to increase knowledge about nearshore ecosystems and how they respond to restoration actions.
- **Monitoring Principles**. Three types of monitoring are defined: implementation, effectiveness, and validation. Monitoring should be driven by specific questions, goals, and objectives and should be used as the basis for determining if restoration goals are being met. Monitoring should be long-term, interdisciplinary, and interinstitutional. Another component of monitoring is information management; data should be well documented and available to others.

The WRIA 9 Salmon Habitat Plan (WRIA 9, 2005) notes that the prioritization and implementation of marine nearshore projects in 2006 and beyond should consider findings from two key studies currently underway and scheduled to be completed this fall and winter:

- *Inventory and Assessment of Current and Historic Beach Feeding Sources/Erosion and Accretion Areas for WRIAs 8 and 9* (Johannessen and MacLennan, 2005); and
- *Habitat Prioritization in Marine Nearshore Areas in Support of Juvenile Salmonid Growth and Survival in WRIA 9*.

Both of these studies include the Puget Sound shoreline in Des Moines.

A recent restoration project illustrates a type of project that could be designed and implemented in Des Moines. The following project description is summarized from the WRIA 9 website, hosted by King County Department of Natural Resources and Parks: (http://dnr.metrokc.gov/wrias/9/SRFB-seahurst-park-bulkhead-construction.htm).

> The Seahurst Park Bulkhead Removal and Beach Restoration Project was constructed between November 2004 and February 2005 at Seahurst Park in the City of Burien. The park provides nearly one mile of Puget Sound shoreline, habitat for rearing salmonids, including Chinook salmon. The park contained a sea-wall or bulkhead, constructed in the 1970s. Since that time, beach elevations in Seahurst Park have dropped three to four feet due to wave scouring and the disconnection of the beach from primary sediment sources. These changes had significantly degraded habitat quality for salmon and the organisms they depend on, particularly forage fish. Led by the City of Burien and supported by the WRIA 9 Forum, a $100,000 seawall removal assessment was prepared, funded by SRFB and the City of Burien. Following this feasibility study, the bulkhead removal and beach restoration project was developed. Led by the City of Burien and the U.S. Army Corps of Engineers, funding commitments included $190,500 funded by SRFB, a $190,500 match by the City of Burien, and $707,000 from the U.S. Army Corps of Engineers. Implementation of the project included removal of about 1,400 feet of failing shoreline armoring and beach nourishment (importing sediment) in the southern portion of the park. Through reconnecting the sediment supply, the beach will be naturally replenished. The project goal is to restore self-sustaining nearshore habitat and ecological processes to avoid the need for on-going human intervention. A series of pre-project monitoring reports were prepared to document baseline conditions for topics such as beach topography, eelgrass, benthic invertebrates, and forage fish use. Monitoring at Seahurst Park was mostly funded by grants. The monitoring reports also established post-restoration monitoring to quantify and evaluate the benefits from the project.

Before and after photos from the project (compliments of Jim Johannessen, Coastal Geologic Services):

Like the Seahurst Park project, monitoring and evaluation of restoration activities is typically associated with individual projects. Funding individual site-specific projects should include provisions for long-term monitoring. However, the City could also consider development of a comprehensive monitoring and evaluation strategy for its updated SMP. In keeping with the overall goal that the updated master program "improve the overall condition of habitat and resources within the shoreline area," the City could prepare an evaluation every 2 or 3 years that would document development, mitigation, restoration, and voluntary activities that had an affect on the shoreline. This type of periodic "system-wide" evaluation would serve to monitor conditions over time and provide some measure of performance in the context of master program restoration and protection goals and objectives.

4.8 References

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CHAPTER 5 – SHORELINE ENVIRONMENT DESIGNATIONS

In order to plan and effectively manage shoreline resources and to provide a uniform basis for applying policies and use regulations within distinctively different shoreline areas, a system of categorizing shoreline areas is required by the SMA. Shoreline environment designations are based on shoreline ecological functions, existing development patterns, potential for restoration, and community aspirations. Des Moines' shoreline is divided into four shoreline environments: “high-intensity,” “urban conservancy,” “shoreline residential,” and “aquatic” environments as depicted on Figure 5-1.

Uses are encouraged in each environment that enhance the character of that environment. Development and performance standards regulate use activities in accordance with the purpose and management policies expressed for each shoreline environment. Additionally, in accordance with Ecology guidelines (WAC 173-26-211(3)), the shoreline environment designations and their respective management policies and regulations should be consistent or compatible with the Greater Des Moines Comprehensive Plan. The shoreline environment designations established by the SMP are consistent and compatible with land use designations adjacent to Puget Sound, and the conservation and environmental protection policies contained in the comprehensive plan.

Each shoreline environment designation type includes:

1. A purpose that clarifies the meaning and intent of the designation;
2. General management policies designed to regulate uses and development consistent with the character of the environment;
3. Designation criteria for determining the appropriate application of the environment designation to the shoreline; and
4. A general description of the boundaries where the environment designation is applied.

The purpose and general management policies of each designation have been used to inform the regulations that determine allowed and prohibited shoreline modifications and uses within each environment designation. The Shoreline Master Program Permitted Use Table (Table 6-1) identifies allowable modifications and uses in each of the four shoreline environments. In the case that inconsistencies exist between general management policies included within this chapter and Table 6-1, the table will govern.

Any areas within the City’s shoreline jurisdiction that have not been mapped and designated shall be designated Urban Conservancy and will be managed and regulated under the identified goals, policies, and regulations of the Urban Conservancy designation.

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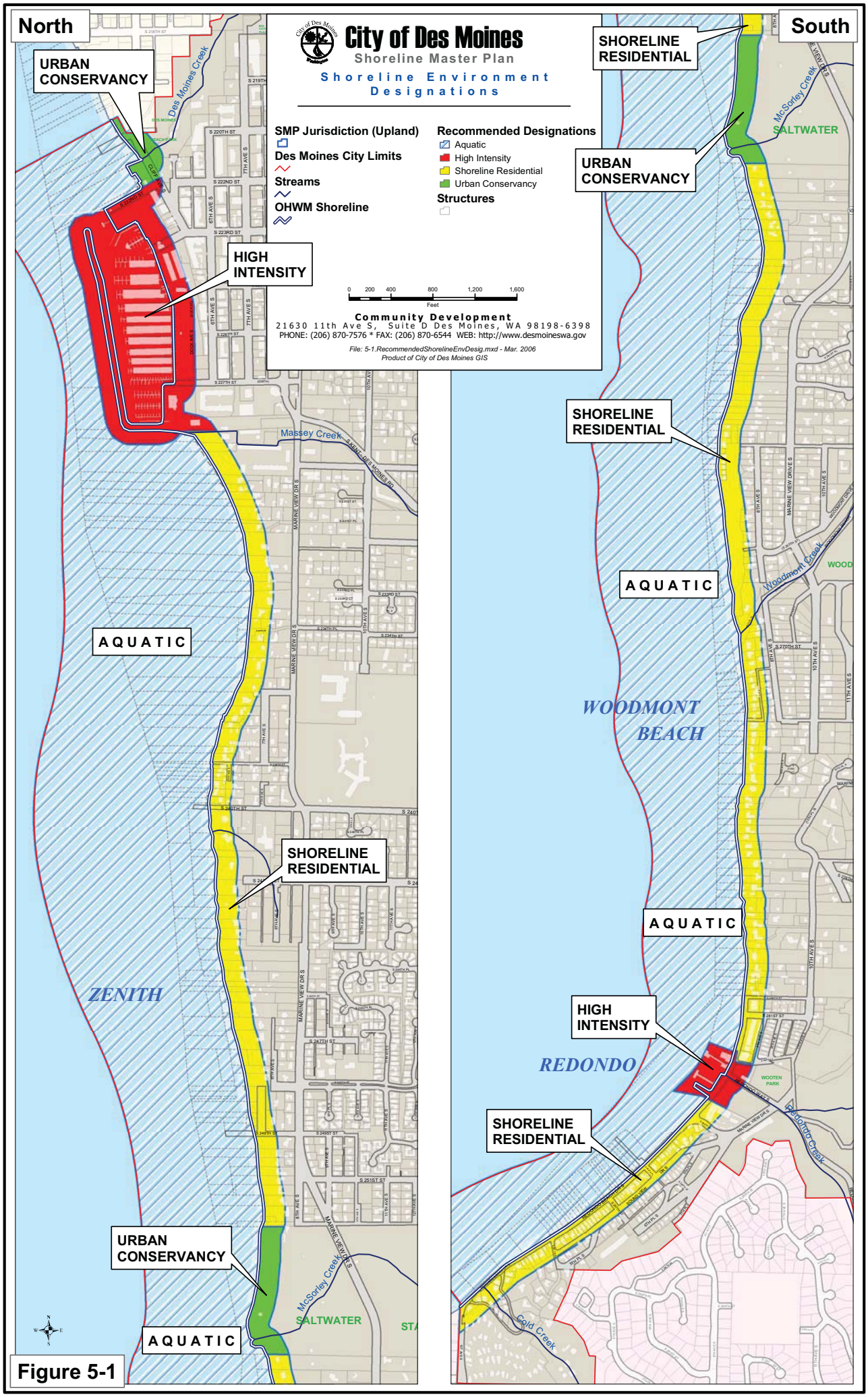
North
South
City of Des Moines
Shoreline Master Plan
Shoreline Environment Designations
SMP Jurisdiction (Upland)
Des Moines City Limits
Streams
OHWM Shoreline
Recommended Designations
Aquatic
High Intensity
Shoreline Residential
Urban Conservancy
Structures
0 200 400 800 1,200 1,600
Feet
Community Development
21630 11th Ave S, Suite D Des Moines, WA 98198-6398
PHONE: (206) 870-7576 * FAX: (206) 870-6544 WEB: http://www.desmoineswa.gov
File: 5-1.RecommendedShorelineEnvDesig.mxd - Mar. 2006
Product of City of Des Moines GIS
URBAN CONSERVANCY
HIGH INTENSITY
AQUATIC
SHORELINE RESIDENTIAL
ZENITH
URBAN CONSERVANCY
AQUATIC
Des Moines Creek
Massey Creek
McSorley Creek
SALTWATER
SHORELINE RESIDENTIAL
URBAN CONSERVANCY
SHORELINE RESIDENTIAL
AQUATIC
WOODMONT BEACH
AQUATIC
HIGH INTENSITY
REDONDO
SHORELINE RESIDENTIAL
Woodmont Creek
Redondo Creek
Cold Creek
WOOTEN PARK
MARINE VIEW DR S
S 216TH ST
S 220TH ST
S 222ND ST
S 223RD ST
S 227TH ST
S 240TH ST
S 247TH ST
S 251ST ST
S 270TH ST
S 281ST ST
6TH AVE S
7TH AVE S
8TH AVE S
10TH AVE S
11TH AVE S

Figure 5-1

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5.1 High-Intensity Environment

5.1.1 Purpose

The purpose of the "high-intensity" environment is to provide for high-intensity water-oriented commercial and transportation uses while protecting existing ecological functions. Opportunities to restore or enhance degraded ecological functions should be identified and implemented during redevelopment of high-intensity areas. "High intensity" areas should maintain open space along the shoreline and the natural character of the shoreline to the extent possible, to make these areas vibrant parts of the City. An additional purpose is to provide appropriate public access and recreational uses.

5.1.2 Management Policies

1. Full utilization of existing urban areas should be achieved before further expansion is allowed. Consideration should be given to the potential for displacement of nonwater-oriented uses with water-oriented uses when analyzing full utilization of urban waterfronts and before considering expansion of such areas.
2. In regulating uses within "high-intensity" designated areas, first priority should be given to water-dependent uses. Second priority should be given to water-related and water-enjoyment uses. Non-water-oriented uses should not be allowed except as part of mixed-use developments. Non-water-oriented uses may also be allowed in limited situations where they do not conflict with or limit opportunities for water-oriented uses, as demonstrated through a shoreline use analysis or special area planning process, as described in WAC 173-26-200 (3)(d).
3. Create development standards for setbacks, buffers, shoreline stabilization, vegetation conservation and enhancement, critical areas protection, and water quality to assure no net loss of shoreline ecological functions, and contribute to the restoration of ecological functions over time in areas where ecological degradation has occurred.
4. Redevelopment and renewal of substandard high intensity areas should be encouraged in order to accommodate future users and make maximum use of the shoreline.
5. Aesthetic considerations should be actively promoted by means of sign control regulations, architectural design standards, planned unit development standards, landscaping requirements and other such means.
6. The City should encourage new development or redevelopment plans to include environmental cleanup, restoration components, or otherwise result in the overall improvement of shoreline conditions. At a minimum, development plans should result in no net loss of shoreline ecological functions.
7. To enhance the waterfront and ensure maximum public use, commercial facilities in the "high intensity" areas should be designed to permit pedestrian waterfront activities consistent with public safety and security.
8. Emphasis should be given to developing visual and physical access to the shoreline in "high intensity" areas.

5.1.3 Designation Criteria

High-intensity environments are shoreline areas that currently support high-intensity uses related to commerce, transportation or navigation; or are suitable and planned for high-intensity water-oriented uses.

5.1.4 Boundary Description

1. The limits of shoreline jurisdiction between South 222nd Street and Massey Creek as shown on Figure 5-1, representing the official Des Moines SMP map. This area includes the Des Moines Marina and other water-dependent development.
2. The limits of shoreline jurisdiction between South 282nd Street and South 283rd Street as shown on Figure 5-1, representing the official Des Moines SMP map. This area includes the Redondo Boat Launch, the Highline Community College Marine Science and Technology Center, and other water-oriented development.

5.2 Urban Conservancy Environment

5.2.1 Purpose

The purpose of the "urban conservancy" environment is to protect and restore ecological functions in urban and developed settings, while allowing a variety of compatible uses. This environment applies to publicly owned areas in the shoreline jurisdiction, including Des Moines Beach Park and Saltwater State Park. These public lands may offer conservation and/or restoration opportunities, such as conserving and enhancing nearshore and stream channel habitat. An additional purpose is to provide appropriate public access and recreational uses.

5.2.2 Management Policies

1. The primary allowed uses should preserve the natural character of the area or promote preservation of open space, flood plain or sensitive lands either directly or over the long term.
2. Water-dependent uses should be given highest priority. Water-oriented uses should be given priority over non-water-oriented uses.
3. Create development standards for setbacks, buffers, shoreline stabilization, vegetation conservation and enhancement, critical areas protection, and water quality to assure no net loss of shoreline ecological functions, and contribute to the restoration of ecological functions over time in areas where ecological degradation has occurred.
4. Activities and uses that would substantially degrade or permanently deplete the physical or biological resources of the area should be prohibited.
5. Uses that result in restoration of ecological functions should be allowed if the use is otherwise compatible with the environment and the setting. New development should be restricted to that which is compatible with the natural and biological limitations of the land and water and will not require extensive alteration of the land/water interface.

6. Activities or uses that would strip the shoreline of vegetative cover, cause or contribute to substantial erosion or sedimentation, or adversely effect aquatic life should be prohibited.
7. Boardwalks and other similar improvements intended to promote public use of waterfront areas and water dependent or water related recreational activities that are compatible with the urban conservancy environment should be encouraged on publicly owned property.
8. Public access and public recreation objectives should be implemented whenever feasible and significant ecological impacts can be mitigated.
9. Development that would be a hazard to public health and safety should not be allowed.
10. Public access opportunities to publicly owned shorelines and/or water bodies should be encouraged without having at any time to trespass upon private upland or tideland properties.
11. Commercial development should not be allowed.
12. Residential development should not be allowed.
13. Access, utilities and public services should be available and adequate to serve existing needs and allowed planned future development.
14. In areas with poorly draining soils, developments should not be allowed unless connected to a sewer line.
15. Shoreline developments that have a risk of adversely disrupting the shoreline or beach profile or contributing to the accumulation of water-borne drift should be discouraged.
16. Adequate surface water controls that will effectively reduce pollutants from surface water runoff should be encouraged.

5.2.3 Designation Criteria

Areas designated as “urban conservancy” should be those areas that are generally not suited for high-intensity water-dependant uses, that that lie in incorporated municipalities or urban growth areas, and that meet any of the following characteristics:

1. They are suitable for a mix of water-related or water-dependant uses, with other uses that allow a substantial number of people to enjoy the shoreline;
2. They are open space, flood plain or other sensitive areas that should not be more intensively developed;
3. They have potential for ecological restoration;
4. They retain important ecological functions, even though partially developed; or
5. They have the potential for development that is compatible with ecological restoration.

5.2.4 Boundary Description

The limits of shoreline jurisdiction within Des Moines Beach Park and Saltwater State Park as shown on Figure 5-1, representing the official Des Moines SMP map.

5.3 Shoreline Residential Environment

5.3.1 Purpose

The purpose of the "shoreline residential" environment is to accommodate residential development and associated structures that are consistent with the SMA and the protection and restoration of ecological functions.

5.3.2 Management Policies

1. Densities or minimum frontage width standards in the "Shoreline Residential" environment should be set to protect shoreline ecological functions, taking into account the environmental limitations and sensitivity of the shoreline area, the level of infrastructure and services available, and other comprehensive planning considerations.
2. Create development standards for setbacks, buffers, shoreline stabilization, vegetation conservation and enhancement, critical areas protection, and water quality to assure no net loss of shoreline ecological functions, and contribute to the restoration of ecological functions over time in areas where ecological degradation has occurred.
3. Multifamily and multi-lot residential and recreational developments should provide public access and joint use for community recreational facilities.
4. Access, utilities, and public services should be available and adequate to serve existing needs and/or planned future development.
5. Construction of structural shoreline stabilization should be allowed, provided it is designed so it will not result in eventual damage to neighboring properties or ecological functions. New developments should be designed to preclude the need for such works and should be compatible with shoreline characteristics and limitations.

5.3.3 Designation Criteria

The "Shoreline Residential" environment designation is appropriate for those areas of the City's shoreline that are predominantly single-family or multifamily residential development or are planned and platted for residential development.

5.3.4 Boundary Description

1. The limits of shoreline jurisdiction from the south bank of Massey Creek to the northern limits of Saltwater State Park as shown on Figure 5-1, representing the official Des Moines SMP map. This area generally coincides with the Zenith neighborhood.
2. The limits of shoreline jurisdiction from the southern limits of Saltwater State Park to South 282nd Street as shown on Figure 5-1, representing the official Des Moines SMP map. This area generally coincides with the Woodmont neighborhood.
3. The limits of shoreline jurisdiction from South 283rd Street to the southern city limits as shown on Figure 5-1, representing the official Des Moines SMP map. This area generally coincides with the Redondo neighborhood.

5.4 Aquatic Environment

5.4.1 Purpose

The purpose of the "aquatic" environment is to protect, restore, and manage the unique characteristics and resources of the areas waterward of the ordinary high-water mark.

5.4.2 Management Policies

1. Allow new or expansion of existing overwater structures for water dependent, public access, transportation, or ecological restoration only and only when abutting or associated with upland areas designated High Intensity.
2. The size of new over-water structures should be limited to the minimum necessary to support the structure's intended use.
3. Shoreline uses and modifications should be designed and managed to prevent degradation of water quality and alteration of natural hydrographic conditions.
4. In order to reduce the impacts of shoreline development and increase effective use of water resources, multiple uses of over-water facilities should be encouraged.
5. All developments and uses on navigable waters or their beds should be located and designed to minimize interference with surface navigation, to consider impacts to public views, and to allow for the safe, unobstructed passage of fish and wildlife, particularly those species dependent on migration.
6. Uses that adversely impact the ecological functions of critical saltwater and freshwater habitats should not be allowed except where necessary to achieve the objectives of RCW 90.58.020, and then only when their impacts are mitigated according to the sequence described in WAC 173-26-201 (2)(e) as necessary to assure no net loss of ecological functions.

5.4.3 Designation Criteria

The "aquatic" environment designation is appropriate for all lands waterward of the marine ordinary high-water mark in the City of Des Moines, with the exception of areas inside the Des Moines Marina breakwater and areas associated with the Redondo High-Intensity waterfront.

5.4.4 Boundary Description

All intertidal or subtidal lands within the City of Des Moines city limits, waterward of the ordinary high-water mark, with the exception of areas inside the Des Moines Marina breakwater and areas associated with the Redondo High-Intensity waterfront as shown on Figure 5-1, representing the official Des Moines SMP map.

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CHAPTER 6 – DEVELOPMENT STANDARDS AND USE REGULATIONS

Shoreline uses and activities are specific common uses and types of development that typically locate in the shoreline area. Use regulations are implementation tools intended to carry out the policies of this SMP and the SMA. They represent the major criteria to be used in evaluating proposed developments and alterations to the shoreline environment with their ultimate influence, to a large extent, dependent on how well they are enforced.

The following general development standards and use regulations represent the criteria upon which evaluations of and approvals for proposed shoreline developments shall be based. Use regulations are to be used in conjunction with the policies for SMP elements and the applicable environmental designation.

Shoreline uses and activities not specifically identified, and for which policies and specific regulations have not been developed, shall be evaluated on a case-by-case basis and are required to: (1) meet the intent of the goals and objectives of this SMP; (2) comply with the SMA of 1971 as amended; (3) be consistent with management policies and character of the shoreline environment in which they propose to locate; and (4) secure a Shoreline Conditional Use Permit.

Table 6-1 lists SMP permitted uses and Table 6-2 lists SMP shoreline modifications within each shoreline environment designation. In the case that inconsistencies exist between the tables and the general management policies included within Chapters 3 and 5, the regulations in this chapter shall govern.

Any shoreline planning areas within the City that have not been mapped and designated within Figure 5-1 shall be designated Urban Conservancy and will be managed and regulated under the identified goals, policies, and regulations of the Urban Conservancy designation.

The following tables indicate the allowable uses and shoreline modifications, where there is a conflict between the chart and the written provisions in Chapters 4, 5, or 6 of this master program, the written provisions shall apply. The tables are coded according to the following legend:

P = May be permitted
C = May be permitted as a conditional use only
X = Prohibited; the use is not eligible for a variance or conditional use permit

Table 6-1 Shoreline Master Program Permitted Use Table **SHORELINE USE**	**High-Intensity**	**Urban Conservancy**	**Shoreline Residential**	**Aquatic**
Agriculture	X	X	X	X
Commercial Aquaculture	X	X	X	X
Boating facilities				
Public marinas and launch ramps	P	X	X	P*
Private marinas and launch ramps	C	X	X	P*
Commercial:				
Water-dependent	P	X	X	C*
Water-related, water-enjoyment	P	X	X	X
Non-water-oriented	C	X	X	X
Parking (accessory)	P	P	P	X
Parking (primary, including paid)	X	X	X	X
Recreation:				
Water-dependent	P	P	P	P
Water-enjoyment	P	P	P	P
Non-water-oriented	C	X	P	X
Single-family residential	X	X	P	X
Multifamily residential	X	X	P	X
Outdoor Advertising and Signs	P	X	X	X
Solid Waste Disposal	X	X	X	X
Transportation	P	P	P	C
Utilities (primary)	P	P	P	C

Table 6-2 Shoreline Master Program Shoreline Modifications Table

SHORELINE MODIFICATIONS	High-Intensity	Urban Conservancy	Shoreline Residential	Aquatic
Shoreline stabilization*:				
Beach restoration/enhancement	P	P	P	P
Bioengineering	P	P	P	C
Revetments	P	C	C	C
Bulkheads	P	P	P	X
Jetties and Groins	X	X	X	X
Breakwater	C	X	X	X
Dredging	C	C	C	C
Hazardous waste cleanup	P	P	P	P
Fill	C	C	C	C
Piers and Docks	C	X	X	C*
Land Clearing and Grading	P	P	P	X
Instream Structures	C	C	C	C

** The use or shoreline modification may be allowed in the Aquatic Environment if, and only if, permitted in the adjacent upland environment.*

6.1 General Shoreline Development and Performance Standards

The following general development and performance standards apply to all uses and activities in all shoreline environments.

6.1.1 Building height, marine buffers, and building setbacks.

1. In all shoreline environments development must comply with applicable buffers and setbacks established by this chapter of the SMP;
2. Pursuant to Section 6.1.3 of this Chapter, buffers for designated critical areas physically located in shoreline jurisdiction shall apply to uses and development located in shoreline jurisdiction. A minimum buffer of 115 feet from the marine ordinary high water mark (OHWM) shall be maintained in designated Urban Conservancy and Shoreline Residential environments.
3. A minimum building setback of 10 feet from the landward edge of buffer must be maintained in all shoreline environments.
4. The maximum building height in all shoreline environments for all uses shall not exceed the height requirement of the underlying zone; except that is no case shall building height exceed 35 feet above average grade level on the property.
5. Adjustment of buffers or setbacks may be allowed pursuant to Sections 6.1.4(3) and 6.1. 4(4) of this Chapter upon obtaining a variance permit that can provide relief from the dimensional requirements of this program. A variance may only be granted when all of the criteria listed at WAC 173-27-170 are met. A variance is intended to allow only a minimum degree of variation from setback or other standards, just enough to afford relief and to allow a reasonable use of a property. Based upon the shoreline inventory and characterization, minimum necessary standards must assure no net loss of shoreline ecological functions.

6.1.2 Vegetation Conservation

1. Land within shoreline and critical buffer areas extending from marine ordinary high water mark, as described in Section 6.1.1(2), shall be considered vegetation conservation areas. Native shoreline vegetation that has not been otherwise disturbed by legal means shall be preserved to the maximum extent feasible within the vegetation conservation area consistent with safe construction practices, and other provisions of this chapter. Native trees and shrubs shall be preserved to maintain and provide shoreline ecological functions such as habitat, shade, and slope stabilization.
2. The following minimum standards for shoreline and critical area vegetation conservation shall apply:
   a. In the event buffers for more than one designated critical area per DMMC 18.86 are applicable, the most protective standards for vegetation conservation shall apply;
   b. No more than 15 percent of the area with native shoreline vegetation shall be cleared within the vegetation conservation area;

c. All native trees in the vegetation conservation area over 20 inches in diameter at breast height shall be retained. Trees determined by the City to be hazardous or diseased may be removed. Replacement of non-native vegetation with native species shall be done in a manner that will not leave soil bare or vulnerable to erosion.

d. The Shoreline Administrator may allow removal of vegetation exceeding that described above where an applicant agrees to replacement plantings that are demonstrated to provide greater benefit to shoreline ecological functions than would be provided by strict application of this section, based upon the findings from the 2005 Shoreline Inventory and Characterization.

6.1.3 Environmental Impact Mitigation

1. All shoreline development and uses shall occur in a manner that results in no net loss of shoreline ecological functions, through the location and design of all allowed development and uses. In cases where impacts to shoreline ecological functions from allowed development and uses are unavoidable, those impacts shall be mitigated, according to the provisions of this section, to ensure no net loss of shoreline ecological functions.
2. To the extent Washington's State Environmental Policy Act of 1971 (SEPA), Chapter 43.21C RCW, is applicable, the analysis of environmental impacts from proposed shoreline uses or developments shall be conducted consistent with the rules implementing SEPA (DMMC 16.04 and WAC 197-11).
3. Where required, mitigation measures shall be applied in the following sequence of steps listed in order of priority.
   a. Avoiding the impact altogether by not taking a certain action or parts of an action;
   b. Minimizing impacts by limiting the degree or magnitude of the action and its implementation by using appropriate technology or by taking affirmative steps to avoid or reduce impacts;
   c. Rectifying the impact by repairing, rehabilitating, or restoring the affected environment;
   d. Reducing or eliminating the impact over time by preservation and maintenance operations;
   e. Compensating for the impact by replacing, enhancing, or providing substitute resources or environments; and
   f. Monitoring the impact and the compensation projects and taking appropriate corrective measures.
4. In determining appropriate mitigation measures applicable to shoreline development, lower priority measures shall be applied only where higher priority measures are determined to be infeasible or inapplicable.
5. Required mitigation shall not be in excess of that necessary to assure that proposed uses or development will result in no net loss of shoreline ecological functions.
6. Mitigation actions shall not have a significant adverse impact on other shoreline functions fostered by the policies of the Shoreline Management Act.

7. When compensatory measures are appropriate pursuant to the priority of mitigation sequencing above, preferential consideration shall be given to measures that replace the impacted functions directly and in the immediate vicinity of the impact. However, alternative compensatory mitigation within the watershed that addresses limiting factors or identified critical needs for shoreline resource conservation based on watershed or comprehensive resource management plans applicable to the area of impact may be authorized. Authorization of compensatory mitigation measures may require appropriate safeguards, terms or conditions as necessary to ensure no net loss of ecological functions.

6.1.4 Critical Areas Development and Performance Standards

1. Subject to the exceptions listed below in this section of the SMP, the provisions of the Des Moines Critical Areas Regulations (DMMC 18.86, dated March 8, 2007, Ordinance No. 1400) shall apply to any use, alteration, or development where designated critical areas are physically located within the shoreline jurisdiction, in addition to a shoreline permit or written statement of exemption. Designated critical areas (per the DMMC for Critical Areas, DMMC 18.86) located in the shoreline include streams and wetlands, geologically hazardous areas (which include; erosion, landslide, and seismic hazard areas), ravine sidewalls and bluffs, fish and wildlife conservation areas, areas of special flood hazard, and aquifer recharge areas.
2. A minimum buffer of one hundred fifteen (115) feet from the marine ordinary high water mark (OHWM), or the stream OHWM when said stream is located within shoreline jurisdiction, shall be maintained in designated Urban Conservancy and Shoreline Residential environments. Alterations shall be prohibited in the buffer except as provided for in this Program. In the event buffers for more than one designated critical area per DMMC 18.86 are applicable, all buffers shall apply.
3. Where a legally established and constructed use or structure exists that interrupts the buffer (e.g., a road or structure that lies within the width of buffer from marine ordinary high water mark), and the isolated part of the buffer does not provide effective biological, geological, or hydrological buffer functions relating to the nearshore environment, then proposed actions in the isolated portion of the buffer may be permitted as long as they do not increase the degree of nonconformity, subject to the following conditions:
   a. Proposed actions shall not result in a net loss of shoreline ecological functions.
   b. In no cases shall development encroach further waterward from the waterward-most point of the legally established, nonconforming use or structure.
   c. In no cases shall new development be allowed within thirty (30) feet of the marine ordinary high water mark.
4. In the event an applicant wishes to adjust standards and provisions for designated critical areas per the Reasonable Use Exception provisions of DMMC 18.86, such application shall be processed as a Shoreline Variance Permit, per the provisions of the SMP and WAC 173-27.
5. In the event development or performance standards in the Critical Areas Regulations (DMMC 18.86) are inconsistent with standards and requirements in the SMP, the SMP shall govern.

6.1.5 Water Quality, Stormwater, and Nonpoint Pollution

1. Shoreline development and use shall incorporate measures to protect and maintain surface and ground water quantity and quality in accordance with all applicable laws.
2. Shoreline development shall be designed in conformance with the City's Surface Water Management Program.
3. All materials that may come in contact with water shall be composed of non-toxic materials, such as untreated wood, concrete, approved plastic composites or steel, that will not adversely affect water quality or aquatic plants or animals. Materials used for decking or other structural components shall be approved by applicable state agencies for contact with water to avoid discharge of pollutants from wave splash, rain, or runoff. Wood treated with creosote, copper chromium arsenic or pentachlorophenol is prohibited in shoreline water bodies.
4. Within the City's shoreline jurisdiction, solid and liquid wastes and untreated effluents shall not be allowed to enter any groundwater or surface water or to be discharged onto shorelands. The release of oil, chemicals or hazardous materials onto shorelands or into the water is prohibited.
5. The City shall determine if surface water pollution has occurred or is occurring within the shoreline jurisdiction by:
   a. Utilizing the federal Environmental Protection Agency quality criteria for freshwater bodies and the state Department of Ecology water quality standards for surface waters of the state listed in chapter 173-201A WAC; or
   b. Requesting investigations by other agencies having regulatory authority regarding surface water pollution.
   c. The City reserves the right to pursue other appropriate civil actions under state and federal law, including a citizen suit under the federal Clean Water Act. [Ord. 1400 § 46, 2007.]
6. When the City or the investigating agency determines surface water quality pollution has occurred within shoreline jurisdiction, notice shall be provided to the alleged source of pollutants identifying the specific surface water quality problem and requesting that the problem be remedied. The City may pursue city, state and/or federal enforcement actions when any surface water pollution is verified. [Ord. 1400 § 44, 2007.]

6.1.6 Archaeological, Historic, and Cultural Resources

1. If any archeological artifacts are uncovered during excavations in the shoreline, work must stop and the City of Des Moines, affected Indian Tribes, and the State Department of Archeology and Historic Preservation must be notified.
2. Permits issued in areas known or highly suspected to contain archeological artifacts and data shall have provisions providing for a site inspection and evaluation by an archeologist in coordination with affected Indian Tribes prior to initiation of disturbance and for monitoring of potentially disruptive activities. Cost for inspection and evaluation of the site will be the responsibility of the applicant. Significant archeological data or artifacts shall be recovered before work begins or resumes on a project.

6.1.7 Public Access

1. Public access shall be incorporated into all development proposals on public lands, all public and private commercial and industrial uses/developments, and all residential subdivisions of greater than four (4) lots when the following conditions exist:
   a. The development would generate demand for one or more forms of public shoreline access; and/or
   b. The development would eliminate, restrict, or otherwise impair existing legal access opportunities or rights.
2. Public access shall not be required in areas where the applicant demonstrates that one or more of the following provisions apply:
   a. Unavoidable health or safety hazards to the public exist that cannot be prevented by any practical means;
   b. Inherent security requirements of the use cannot be satisfied through the application of alternative design features or other solutions;
   c. The cost of providing the access, easement, alternative amenity, or mitigating the impacts of public access is unreasonably disproportionate to the total long term cost of the proposed development;
   d. Significant environmental impacts would result from the public access that cannot be mitigated; and/or
   e. Significant undue and unavoidable conflict between any access provisions and the proposed use and/or adjacent uses would occur and cannot be mitigated.
3. Public access shall consist of a dedication of land or a physical improvement in the form of a walkway, trail, bikeway, corridor, viewpoint, park, or other area serving as a means of view and/or physical approach to shorelines of the state and may include interpretive centers and displays.
4. Public access locations shall be clearly marked with visible signage.
5. Public access provided by shoreline street ends, public utilities, and rights-of-way shall not be diminished (RCW 36.87.130).
6. Requirements or conditions for public access shall be consistent with all relevant constitutional and other legal limitations on regulation of private property.

6.2 Shoreline Modifications

Shoreline modifications are generally related to construction of a physical element such as a dike, breakwater, dredged basin, or fill, but they can include other actions such as clearing, grading, application of chemicals, or significant vegetation removal. Shoreline modifications usually are undertaken in support of or in preparation for shoreline use. Given that protecting ecological functions is a primary goal of the Shoreline Management Act, the City should take active measures to ensure that shoreline modifications individually and cumulatively do not result in a net loss of ecological functions. This includes reducing the adverse effects of shoreline modifications and, as much as possible, limiting shoreline modifications in number and extent.

Shoreline modifications should be limited to those modifications appropriate to the specific type of shoreline and environmental conditions for which they are proposed.

If shoreline modification is approved, all feasible measures to protect shoreline ecological functions and processes should be incorporated. The City should plan for the enhancement of impaired ecological functions wherever feasible and appropriate while accommodating permitted uses.

6.2.1 Bulkheads and Shoreline Stabilization

Bulkheads, riprap, seawalls, or other shoreline stabilization structures are erected parallel to and near the ordinary high water mark for the purpose of protecting adjacent upland structures from the erosive action of waves or currents. While shoreline stabilization structures may protect the uplands, they do not protect the adjacent beaches, and in many cases are actually detrimental to the beaches by speeding up the erosion of the sand in front of the structures. Hard shore armoring refers to traditional designs for shoreline stabilization, including constructed steel, timber, rock, concrete, or boulder riprap. Soft shore armoring refers to alternative bank protection methods such as bioengineering or biotechnical bank stabilization, which may include use of anchored drift logs, vegetation plantings, and import of beach sediment and/or gravel (also referred to as beach nourishment).

The Shoreline Administrator may approve bulkheads or other shoreline stabilization proposals when he/she determines that naturally occurring movement of the shoreline threatens existing structures, public improvements, unique natural resources, or the only feasible access to property and that the proposed stabilization complies with the criteria and standards in this section.

1. New development will be located and designed to avoid the need for future shoreline stabilization to the extent feasible. New development that would require shoreline stabilization which causes significant impacts to adjacent or down-current properties and shoreline areas shall not be allowed. Subdivision of land must be regulated to assure that the lots created will not require shoreline stabilization in order for reasonable development to occur. New development on steep slopes or bluffs shall be set back sufficiently to ensure that shoreline stabilization is unlikely to be necessary during the life of the structure, as demonstrated by a geotechnical analysis.
2. New hard shore armoring stabilization measures shall not be allowed except when necessity is demonstrated in the following manner:
    a. To protect existing primary structures: New or enlarged structural shoreline stabilization measures for an existing primary structure, including residences, should not be allowed unless there is conclusive evidence, documented by a geotechnical analysis, that the structure is in danger from shoreline erosion caused by tidal action, currents, or waves. Normal sloughing, erosion of steep bluffs, or shoreline erosion itself, without a scientific or geotechnical analysis, is not demonstration of need. The geotechnical analysis should evaluate on-site drainage issues and address drainage problems away from the shoreline edge before considering hard shore armoring techniques for shoreline stabilization.
    b. In support of new nonwater-dependent development, including single-family residences, when all of the conditions below apply:

i. The erosion is not being caused by upland conditions, such as the loss of vegetation and drainage.

ii. Nonstructural measures, such as placing the development further from the shoreline, planting vegetation, or installing on-site drainage improvements, are not feasible or not sufficient.

iii. The need to protect primary structures from damage due to erosion is demonstrated through a geotechnical report. The damage must be caused by natural processes, such as tidal action, currents, and waves.

c. In support of water-dependent development when all of the conditions below apply:

i. The erosion is not being caused by upland conditions, such as the loss of vegetation and drainage.

ii. Nonstructural measures, planting vegetation, or installing on-site drainage improvements, are not feasible or not sufficient.

iii. The need to protect primary structures from damage due to erosion is demonstrated through a geotechnical report.

d. To protect projects for the restoration of ecological functions or hazardous substance remediation projects pursuant to chapter 70.105D RCW when nonstructural measures, planting vegetation, or installing on-site drainage improvements, are not feasible or not sufficient.

3. An existing shoreline stabilization structure may be replaced with a similar structure if there is a demonstrated need to protect principal uses or structures from erosion caused by currents, tidal action, or waves. Approved replacement structures are subject to the following provisions:

a. The replacement structure shall be designed, located, sized, and constructed to assure no net loss of ecological functions.

b. Replacement walls or bulkheads shall not encroach waterward of the ordinary high-water mark or existing structure unless the residence was occupied prior to January 1, 1992, and there are overriding safety or environmental concerns. In such cases, the replacement structure shall abut the existing shoreline stabilization structure.

c. Where a net loss of ecological functions associated with critical saltwater habitats would occur by leaving the existing structure, remove it as part of the replacement measure.

d. Soft shore stabilization measures that provide restoration of shoreline ecological functions may be permitted waterward of the ordinary high-water mark.

e. For purposes of this section, standards on shoreline stabilization measures, "replacement" means the construction of a new structure to perform a shoreline stabilization function of an existing structure which can no longer adequately serve its purpose. Additions to or increases in size of existing shoreline stabilization measures shall be considered new structures.

4. Geotechnical reports pursuant to this section that address the need to prevent potential damage to a primary structure shall address the necessity for shoreline stabilization by estimating time frames and rates of erosion and report on the urgency associated with the specific situation. As a general matter, hard armoring solutions should not be authorized

except when a report confirms that there is a significant possibility that a primary structure will be damaged within three years as a result of shoreline erosion in the absence of such hard armoring measures, or where waiting until the need for armoring is so great that it would foreclose on the opportunity to utilize measures that avoid or minimize impacts to ecological functions. Where the geotechnical report confirms a need to prevent potential damage to a primary structure, but the need is not as immediate as the three years, that report may still be used to justify more immediate authorization to protect against erosion using soft shore stabilization measures.

5. When any shoreline stabilization measures are demonstrated to be necessary, pursuant to above provisions, the City's 2005 Shoreline Inventory and Characterization shall be used to assist in the implementation of the following additional standards:
   a. Limit the size of stabilization measures to the minimum necessary. Use measures designed to assure no net loss of shoreline ecological functions. Soft shore stabilization approaches that absorb and dissipate wave energy shall be used unless demonstrated not to be sufficient to protect primary structures, dwellings, and businesses.
   b. Ensure that publicly financed or subsidized shoreline erosion control measures do not restrict appropriate public access to the shoreline except where such access is determined to be infeasible because of incompatible uses, safety, security, or harm to ecological functions. When feasible, incorporate ecological restoration and public access improvements to the project.
   c. Mitigate new erosion control measures, including replacement structures, on feeder bluffs or other actions that affect beach sediment-producing areas to avoid and, if that is not possible, to minimize adverse impacts to natural sediment transport processes.
   d. All new or replacement shoreline stabilization and flood protection measures shall be designed and constructed so that down-current banks will not be adversely affected. Shoreline stabilization measures, including riprap, shall be designed and constructed in a manner consistent with the Department of Fish and Wildlife, Corps of Engineers and/or other engineering and design specifications deemed appropriate by the Shoreline Administrator.
   e. Bulkheads shall be permitted only where they provide protection to upland areas or facilities, not for the indirect purpose of creating land by filling behind the bulkhead.
   f. Adequate toe protection shall be provided to ensure bulkhead stability.
   g. Bulkheads shall be designed to permit the passage of surface or ground water without causing ponding or saturation.
   h. To receive permit approval for bulkhead construction, the applicant shall agree to grant adjacent property owners the right to tie in adjacent bulkheads.
6. Shoreline vegetation shall be protected and restored along or near marine and freshwater shorelines to protect and restore the ecological functions and ecosystem-wide processes and to protect human safety and property.
7. Cut-and-fill slopes and backfill areas shall be revegetated with native grasses, shrubs and/or trees.

8. Shoreline protection activities that may necessitate new or increased shoreline protection on the same or other affected properties where there has been no previous need for protection is prohibited.

9. Shoreline modification may be allowed for environmental restoration or if the City determines that there will be a net increase in desired shoreline ecological functions.

6.2.2 Breakwaters

A boulder riprap breakwater is present at the Des Moines Marina and a floating breakwater is present at the Redondo boat launch.

1. Expansion of existing hard breakwaters shall be considered only in the High-Intensity shoreline environment and shall require a Shoreline Conditional Use Permit.
2. New floating breakwaters shall be considered only in the High-Intensity shoreline environment and shall require a Shoreline Conditional Use Permit.
3. New or expanded breakwaters shall be allowed only to support water-dependent uses, public access, shoreline stabilization or other specific public purposes consistent with the provisions of this SMP.
4. All new or expanded breakwaters shall be designed and constructed so that down-current banks will not be adversely affected. Breakwaters shall be designed and constructed in a manner consistent with the Department of Fish and Wildlife, Corps of Engineers and/or other engineering and design specifications deemed appropriate by the Shoreline Administrator.
5. If existing breakwaters need to be rebuilt, replacement breakwaters shall be designed to minimize adverse effects to critical areas and provide mitigation for unavoidable impacts per the provisions of this SMP for environmental impact mitigation (Section 6.1.3).

6.2.3 Piers and Docks

1. New piers and docks or expansion of existing piers and docks may be allowed in High-Intensity environments and Aquatic environments when associated with water-dependent uses and/or public access in areas designated High-Intensity, subject to a Shoreline Conditional Use Permit.
2. New piers and docks are prohibited in the Urban Conservancy and Shoreline Residential environments.
3. Repair, maintenance, rehabilitation, or replacement of existing piers and docks shall be allowed within the High-Intensity shoreline environment given adherence to the following standards:
    a. A permit to construct a pier or dock must be obtained from the Corps of Engineers.
    b. Pier and dock construction shall be restricted to the minimum size necessary to meet the needs of the proposed use.
    c. Replacement of piers, docks and other moorages shall only be authorized after demonstrating that:

i. Piers and docks shall be designed and constructed to avoid, or if that is not possible, to minimize and mitigate the impacts to ecological functions, critical areas resources such as eelgrass beds and fish habitats and processes such as currents and littoral drift, in accordance with guidance provided by WAC 13-26-221(2)(c) (iii) and (iv). Impact minimization shall include the use of construction materials approved by applicable state agencies.

ii. The effect such structures have on navigation, water circulation, recreational and commercial boating, sediment movement and littoral drift and shoreline access have been minimized or mitigated.

d. Open pile pier construction shall be required where there is significant littoral drift, where scenic values will not be impaired and where minimal alteration to the shoreline and minimal damage to aquatic resource can be assured.

e. Floating pier construction shall be required in those areas where scenic values are high.

f. Piers or docks that are abandoned or structurally unsafe shall be abated.

6.2.4 Jetties and Groins

1. Jetties and groins are prohibited in all shoreline environments.

6.2.5 Dredging

1. Dredging activities, including disposal of dredge material, in any shoreline environment require a Conditional Use Permit and must comply with all federal and state regulations.
2. Dredging activities are allowed in the Shoreline Residential and Urban Conservancy shoreline environments only where necessary to protect public safety.
3. Dredging activities are allowed in the High-Intensity environment where necessary for navigation. Dredging for navigational purposes should be allowed where necessary for assuring safe and efficient accommodation of existing navigational uses and then only when significant ecological impacts are minimized and when mitigation is provided. Maintenance dredging of established navigation channels and basins should be restricted to maintaining previously dredged and/or existing authorized location, depth, and width.
4. Dredging of bottom materials for the single purpose of obtaining fill material is prohibited.
5. Dredging and excavation in critical areas is prohibited.
6. Where allowed, dredging operations must be scheduled so as to not damage shoreline ecological functions or processes.
7. When dredge spoils have suitable organic and physical properties, dredging operators shall recycle dredged material into areas of the City suitable for those materials. Disposal of dredge material on shorelands shall be discouraged.

6.2.6 Fill

1. Fill activities shall only be allowed in association with allowed (permitted) water dependent use developments. Fill associated with non-water dependent uses shall be prohibited.

2. Fill needed to support the following water dependent uses may be allowed in all shoreline environments through a Shoreline Conditional Use Permit:
   a. Public access;
   b. Expansion, alteration, or repair of transportation facilities currently located with in the shoreline;
   c. Mitigation actions;
   d. Environmental, ecological, or watershed restoration projects;
   e. Beach nourishment or enhancement projects; and
   f. Soft shore bank stabilization projects.
3. Permitted fill activities must comply with the following standards:
   a. Demonstration that alternatives to fill are not feasible;
   b. Demonstration that fill materials shall be of such quality that it will not adversely affect water quality;
   c. Demonstration that fill shall be deposited so as to minimize disruption of normal surface and ground water passage. Earth material which has no more than a minor amount of organic material and has no rock or similar irreducible material with a maximum dimension greater than eight inches shall be used;
   d. Demonstration that fill shall allow surface water penetration into the ground water supply, where such conditions exist prior to the fill; and
   e. Demonstration that landfill timing will minimize damage to water quality and aquatic life.
4. Fill, except for beach nourishment, shall be prohibited in areas of high shoreline erosion potential.
5. For allowed fill activities, the ground surface shall be prepared to receive fill by removing any unsuitable materials such as oversized rock, concrete slabs, tree stumps, brush, etc.
6. Fill activities shall be designed to blend physically and visually with existing topography whenever possible. Perimeter banks shall be sloped no steeper than 1 foot vertical for every 3 feet horizontal unless a specific engineering or geotechnical analysis has been provided and the Shoreline Administrator determines that the fill blends with existing topography.
7. Fill located waterward of the ordinary high water mark, except for beach nourishment, shall be allowed only after full consideration is given to total water surface reduction, impediment to water flow and circulation, reduction of water quality and destruction of habitat.
8. Fill within the one hundred-year (100-year) flood plain requires demonstration that landfill will not reduce the flood plain water storage capacity or in any way increase flood hazard so as to endanger public safety.
9. An erosion and sediment control (ESC) plan shall be provided for all proposed fill activities.
10. Fills shall be located, designed, and constructed to protect shoreline ecological functions and ecosystem-wide processes, including channel migration within stream subestuaries.

11. Fills waterward of the ordinary high water mark (OHWM) for any use except ecological restoration shall require a conditional use permit.

6.2.7 Land Clearing and Grading

1. Land clearing and grading activities shall only be allowed in association with an allowed (permitted) shoreline development, subject to the Vegetation Conservation provisions of this SMP (Section 6.1.2).
2. Land clearing and grading activities shall adhere to the following provisions:
   a. Slope. No slope of cut or fill surfaces shall be steeper than 2:1 unless approved by the Shoreline Administrator;
   b. Erosion/Sedimentation Control. All land clearing and grading shall be accomplished in a manner that minimizes erosion. All disturbed areas, including faces of cuts and fill slopes, shall be prepared and maintained to control erosion/sedimentation in accordance with the specifications of the surface water design manual. Prior to undertaking any land clearing or grading, the applicant shall submit for approval by the Shoreline Administrator, an erosion / sedimentation control (ESC) plan. The ESC plan shall set forth the specific measures from the surface water design manual to be utilized by the proposed project during (from beginning until the end) and following the construction. All land clearing and grading shall be consistent with the approved ESC plan;
   c. Excavations to Water-producing Depth. All excavations must be made to a water-producing depth or grade to permit natural drainage. The excavations made to a water-producing depth shall be reclaimed in the following manner:
      i. Depth of the excavation must not be less than two feet measured below the low water mark.
      ii. All banks shall be sloped to the water line no steeper than 2:1.
      iii. In no event shall the term “water producing depth” be construed to allow stagnant or standing water to collect or remain in the excavations.
   d. Bench Terrace. Benches at least 10 feet in width shall be back sloped and shall be established at no more than 10-foot vertical intervals to control surface drainage and debris. Swales or ditches on benches shall have a maximum gradient of one percent;
   e. Drainage. Provisions shall be made to prevent surface water or seepage from damaging the cut face of excavations or the sloping face of a fill and to carry surface waters that are or might be concentrated as a result of a fill or excavation to a natural watercourse or other means as approved by the code official. All development activities shall make provisions for drainage pursuant to the requirements of the surface water design manual.
3. All land clearing and grading practices in shoreline areas shall be conducted t so there is no net loss of shoreline ecological functions.
4. Tree brush and vine removal in steep slope and fragile areas shall be prohibited except as a measure to protect public safety. Nondestructive pruning for tree maintenance or view or aesthetic purposes is not affected by this regulation.

5. All cut fill and side cast slopes shall be planted or seeded with appropriate ground cover or otherwise treated to prevent erosion of the slope.
6. All ruts and erodible soil conditions caused by brush cutting or any land clearing and grading operations should prevent the invasion of water or planted with appropriate ground cover.
7. Whenever seeding, planting or other soil stabilizing measures are specified as part of a shoreline development proposal, it shall be performed as soon as practical.

6.2.8 Instream Structures

Instream structures are those placed by humans within a stream or river channel waterward of the ordinary high water mark (OHWM) that either causes or has the potential to cause water impoundment or the diversion, obstruction, or modification of flow. This may include those for hydroelectric generation, irrigation, water supply, flood control, transportation, utility service transmission, fish habitat enhancement, or other purpose. Only those instream structures that are with the City's shoreline jurisdiction are regulated by the provisions of this Program.

1. Instream structures may be permitted in all shoreline environments as a conditional use.
2. In-stream structures shall provide for the protection and preservation, of ecosystem-wide processes, ecological functions, and cultural resources, including, but not limited to, fish and fish passage, wildlife and water resources, hydrogeological processes, and shoreline critical areas.
3. The location and planning of instream structures shall give due consideration to the full range of public interests, watershed functions and processes, and environmental concerns, with special emphasis on protecting and restoring priority habitats and species.
4. Instream structures shall be designed, located, and constructed in such a manner as to avoid extensive topographical alteration and preserve natural scenic vistas.
5. Instream structures that divert water shall return flow to the stream in as short a distance as possible.
6. All instream structures shall be designed to allow the natural transport of bedload materials.
7. Instream structures and their support facilities shall be designed to minimize removal of vegetation.

6.3 Shoreline Uses

Shoreline uses refers to specific common uses and types of development to the extent they occur within shoreline jurisdiction. While shoreline modifications refer to specific structures, actions, or alterations that generally support a specific use (e.g., dredging to accommodate a marina), shoreline uses are the primary use of land that is within shoreline jurisdiction (e.g., residential, recreation, commercial, etc.). All uses and development must be consistent with the provisions of the environment designation in which they are located (see Table 6-1) and the general regulations of this master program.

6.3.1 Prohibited Uses

The following uses are prohibited in all shoreline environments:

1. Agricultural activities;
2. Forest management practices;
3. Ports and related industry;
4. Mining;
5. Commercial aquaculture;
6. Solid waste disposal facilities; and
7. Billboards.

6.3.2 Non-Conforming Uses and Developments

1. Provisions contained in the following sections of the Des Moines Zoning Code for Nonconforming Buildings and Uses (DMMC 18.48) are hereby incorporated into this SMP as though fully set forth herein:
   a. 18.48.030. Effect of removal or destruction of nonconforming buildings (last revised 1999, Ordinance #1240);
   b. 18.48.040. Reconstruction of buildings partially destroyed or damaged (last revised 1999, Ordinance #1237); and
   c. 18.48.050. Structural alteration or enlargement of nonconforming buildings (last revised 1964, Ordinance #175).
2. All references to zones or zoning classifications in the aforementioned sections shall be construed as referring to shoreline environment designations established by this SMP. In addition to the provisions incorporated by reference, all other provisions in this section shall also apply.
3. Uses and developments that were legally established and are nonconforming with regard to the use regulations of the master program may continue as legal nonconforming uses. Such uses shall not be enlarged or expanded, except that nonconforming single-family residences that are located landward of the ordinary high water mark may be enlarged or expanded in conformance with applicable bulk and dimensional standards by the addition of space to the main structure or by the addition of normal appurtenances as defined in WAC 173-27-040 (2)(g) upon approval of a Conditional Use Permit.
4. A use which is listed as a conditional use but which existed prior to adoption of the master program or any relevant amendment and for which a Conditional Use Permit has not been obtained shall be considered a nonconforming use.
5. A structure for which a variance has been issued shall be considered a legal nonconforming structure and the requirements of this section shall apply as they apply to preexisting nonconformities.

6. A structure which is being or has been used for a nonconforming use may be used for a different nonconforming use only upon the approval of a Conditional Use Permit. A Conditional Use Permit may be approved only upon a finding that:
   a. No reasonable alternative conforming use is practical; and
   b. The proposed use will be at least as consistent with the policies and provisions of the SMP and as compatible with the uses in the area as the preexisting use.
   c. In addition such conditions may be attached to the permit as are deemed necessary to assure compliance with the above findings, the requirements of the master program and the SMA and to assure that the use will not become a nuisance or a hazard.
7. A nonconforming structure which is moved any distance must be brought into conformance with the SMP and the SMA.
8. If a nonconforming use is discontinued for twelve consecutive months or for twelve months during any two-year period, the nonconforming rights shall expire and any subsequent use shall be conforming. A use authorized through a conditional use permit pursuant to subsection (6) of this section shall be considered a conforming use for purposes of this section.
9. An undeveloped lot, tract, parcel, site, or division of land located landward of the ordinary high water mark which was established in accordance with local and state subdivision requirements prior to the effective date of the Act or the applicable master program but which does not conform to the present lot size standards may be developed if permitted by other land use regulations of the local government and so long as such development conforms to all other requirements of the applicable master program and the Act.

6.3.3 Aquaculture

1. Commercial aquaculture is prohibited in all shoreline environments.
2. Noncommercial fishing, clamming, and taking of other marine resources within the shoreline of the City of Des Moines shall be allowed only in accordance with rules and regulations established by the Washington State Department of Fish and Wildlife, the Washington State Department of Health, The U.S. Department of Fish and Wildlife, and the National Marine Fisheries Service.

6.3.4 Commercial Development

Uses and activities associated with commercial development that are identified as separate use activities in this program, such as Marinas, Piers and Docks, Signs, Utilities, etc., are subject to the regulations established for those uses in addition to the standards for commercial development.

1. Commercial development is prohibited in the Urban Conservancy, Shoreline Residential, and Aquatic shoreline environments.
2. Water dependent and water-oriented commercial development is only allowed in the High-Intensity and Aquatic shoreline environments, if permitted in the adjacent shoreline environment.

3. Non water-oriented commercial development is allowed in the High-Intensity environments provided it is compatible and complimentary to water-oriented uses and does not displace or diminish opportunities for water-oriented uses.
4. Parking facilities shall be placed inland away from the immediate water's edge and shoreline recreational areas, except as approved by a variance.
5. New commercial development shall not block public scenic views.
6. New commercial development shall provide for public access to the shoreline.
7. Removal of trees or natural vegetation shall be prohibited unless for public safety, scenic consideration, or public access and only where such removal will not cause degradation to shoreline ecological processes or functions.

6.3.5 Marinas / Boating Facilities

1. The following standards or use regulations are directed toward the City's Marina, the Redondo Boat Launch, and potential future marina or boat launch developments or expansions on Des Moines' shoreline. The City of Des Moines Marina and Des Moines Yacht Club are conforming water-dependent uses which will require normal maintenance and repair, including occasional replacement of elements. All marina development is prohibited in the shoreline residential and Urban Conservancy shoreline environments.
2. New public marina development or expansion of existing public marina facilities shall be allowed only in the High-Intensity shoreline environments.
3. New public or private marina development shall plan and provide for public access to shorelines of the state to include a variety of shoreline access opportunities and circulation for pedestrians (including disabled persons), bicycles, and vehicles between shoreline access points consistent with other comprehensive plan elements.
4. New private marina development or expansion of existing private marina facilities shall be allowed only in the High-Intensity shoreline environments through a Shoreline Conditional Use Permit.
5. Living aboard moored or anchored vessels outside of the Des Moines Marina is prohibited. The number of allowed live-aboard vessels in the Des Moines Marina shall be limited to 20 or less at any one time.
6. Marinas shall be aesthetically compatible with adjacent areas.
7. In addition to the provisions below, all activities, uses, and development in marinas shall comply with DMMC 15.04, Harbor Code, and the Des Moines Marina Rule Book, as revised to meet health, safety, and welfare requirements.
    a. All fuels and chemicals at marinas shall be kept, stored, handled and used in a manner that minimizes accidental spillage.
    b. Adequate and satisfactory means for handling accidental fuel and chemical spills must be provided.
    c. Parking facilities for marina users shall be located as far inland as possible.
    d. Parking areas that serve marinas shall conform to the regulations for transportation facilities in this master program.

e. Vehicular access to marinas shall be confined to that which supports a water dependent or water related use.
f. Land and water access to marinas shall be planned to minimize traffic congestion and to minimize pedestrian/vehicle conflicts.
g. Boats shall be dry stored whenever possible to retain shoreline for other shoreline dependent uses.
h. Shallow water embayments with poor flushing action should not be considered for overnight or long term moorage facilities.

6.3.6 Outdoor Advertising and Signs

1. Outdoor advertising is prohibited in the Shoreline Residential, Urban Conservancy, and Aquatic shoreline environments. Public information signs are allowed for educational purposes and when required by law or necessary for public safety and circulation.
2. Outdoor advertising, when permitted by the Zoning Ordinance, Chapter 18.42, shall be permitted within the High-Intensity shoreline environment only when the standards of this section are met.
3. Illuminated signs shall require a Conditional Use Permit.
4. Signs extending above rooflines are prohibited.
5. Flashing or animated signs are prohibited.
6. Signs, when permitted, shall be designed, constructed, and placed in a manner that does not impair views of the shoreline or impair views upland from the water. Vistas and viewpoints shall be free from unnecessary signs.
7. Warning signs shall be installed by the City or by other appropriate entities where hazardous conditions exist on public properties.
8. Signs in shoreline areas shall be maintained in a state of security, safety and repair.

6.3.7 Recreational Development

Recreational development is permitted in all shoreline environments, except aquatic, when the following standards are met:

1. Parking areas shall be located inland away from the immediate water's edge and recreational beaches. Access shall be provided by walkways or other nonmotorized methods.
2. Recreational developments shall not create significant adverse effects on residential uses of private property, the environmental quality or natural resources of the shoreline area.
3. Valuable shoreline resources and fragile or unique areas such as estuaries and accretion beaches shall be used only for non-intensive and nonstructural recreation activities.
4. All permanent recreational structures and facilities shall be located outside the one hundred-year (100-year) flood plain, although the City may grant exceptions for non-intensive accessory uses (e.g., picnic tables, play areas, etc.).

5. Accessory use facilities such as restrooms, recreation halls and gymnasiums, commercial services, access roads and parking areas shall be located inland from shoreline areas unless it can be shown that such facilities are shoreline dependent. These areas shall be linked to the shoreline by walkways.
6. In approving shoreline recreational developments, the City shall ensure that the development will maintain, enhance or restore desirable shoreline features, including unique and fragile areas, scenic views and aesthetic values. To this end, the City of Des Moines may adjust and/or prescribe project dimensions, location of project components on the site, intensity of use, screening, parking requirements and setbacks as deemed appropriate to achieve the intent of this program.
7. Proposals for recreational development shall include a landscape plan in which native, self-sustaining vegetation is preferred.
8. The removal of on-site native vegetation shall be limited to the minimum necessary for the development of picnic areas, selected view or other permitted structures or facilities.

6.3.8 Residential Development

Residential use is not water-dependent but is a preferred use of the shorelines when such development is planned and carried out in a manner that protects shoreline functions and processes consistent with the no net loss provisions of this Program. Uses, structures, and alterations to the natural environment associated with residential development that are identified as separate use activities or shoreline modifications in this program (such as piers and docks; bulkheads; utilities; fill; and clearing and grading) are subject to the regulations established for those uses in addition to any special conditions relating to residential areas established in this section.

1. Residential development in the Urban Conservancy, High-Intensity, and Aquatic shoreline environments is prohibited.
2. Residential development in the Shoreline Residential environment, when permitted by the Zoning Code, shall be permitted within the shoreline area only when the standards of this section are met.
3. Residential development over water, including floating homes, is prohibited.
4. New residential development will be located and designed to avoid the need for future shoreline stabilization to the extent feasible. Plats and subdivision of land must be designed, configured, and developed in a manner that assures that no net loss of ecological functions results from the plat or subdivision at full build-out of all lots, and prevent the need for new shoreline stabilization or flood hazard reduction measures that would cause significant impacts to other properties or public improvements or a net loss of shoreline ecological functions.. New development on steep slopes or bluffs shall be set back sufficiently to ensure that shoreline stabilization is unlikely to be necessary during the life of the structure, as demonstrated by a geotechnical analysis.
5. Residential development shall retain and protect the natural vegetation of the shoreline area, or restore and enhance natural vegetation according to the Vegetation Conservation and Land Clearing and Grading provisions of the SMP.

6. Minimum building setbacks and buffers from bluffs, the OHWM, and stream banks shall be governed by the provisions of the Critical Areas Ordinance as adopted in the SMP (Section 6.1.3) as well as other provisions of the SMP.
7. Residential development plans submitted for approval shall contain provisions for protection of ground water supplies, erosion control, landscaping and maintenance of the natural shoreline integrity and ecological functions.
8. The established velocity, quantity and quality of storm water discharge shall be considered in terms of the sensitivity of the proposed receiving environment. The disposal mode selected shall minimize changes in infiltration, runoff and ground water recharge.
9. To the extent that all reasonable use allowed under current zoning is not precluded, residential development shall not be located or designed such that new structural shore defense or flood protection works are necessary.
10. Residential development is prohibited within the 100-year flood plain except when it can be demonstrated that the storage capacity of the flood plain will not be significantly reduced, flood hazards to upstream properties will not be increased or public safety is otherwise endangered.
11. Accretion beaches shall not be developed.

6.3.9 Transportation Facilities

1. Transportation facility construction shall be permitted within the High-Intensity, Urban Conservancy, and Shoreline Residential environments according to the standards of this Program. Transportation and parking plans and projects shall be consistent with the public access and environmental protection provisions of this program.
2. Water dependent transportation facility construction (e.g., ferry terminals) shall be permitted within the aquatic environment, according to the standards of this section and subject to a Shoreline Conditional Use Permit.
3. Circulation system planning shall include systems for pedestrians, bicycles, and public transportation where appropriate.
4. All transportation facilities in shoreline areas shall be constructed and maintained to cause the least possible adverse impacts on the land and water environments, shall respect the natural character of the shoreline, and make every effort to preserve wildlife, aquatic life and their habitats.
5. Transportation facilities shall not adversely impact existing or planned water-dependent uses by impairing access to the shoreline.
6. New or expanded surface transportation facilities not related to and necessary for the support of shoreline activities shall be located outside the shoreline jurisdiction if possible, or set back from the ordinary high water mark far enough to make protective measures such as riprap or other bank stabilization, landfill, bulkheads, groins, jetties or substantial site regrade unnecessary.

7. Parking facilities in shorelines are not a preferred use and shall be allowed only as necessary to support an authorized use. Such parking facilities shall avoid or minimize any environmental or visual impacts.
8. Transportation and utility facilities shall be required to make joint use of rights-of-way and to consolidate crossing of water bodies.
9. No vehicles shall be allowed on Des Moines' beach areas except for residential or service access to legally established uses or developments where alternative access is unavailable.
10. Fills for transportation facility development shall not be permitted in water bodies or associated wetlands and beaches except when all structural or upland alternatives have proven unfeasible and the transportation facilities are necessary to support uses consistent with this program.
11. Transportation facilities that are allowed to cross over water bodies and associated wetlands shall utilize elevated, open pile or pier structures whenever feasible. All bridges shall be built high enough to allow the passage of debris and anticipated high water flows.
12. All roads shall be adequately set back from water bodies and shall provide buffer areas of compatible, self-sustaining native vegetation. Shoreline scenic drives and viewpoints may provide breaks in the vegetative buffer to allow open views of the water.
13. The City shall give preference to mechanical means for roadside brush control rather than the use of herbicides on City roads in shoreline areas. If herbicides are used, they shall be applied so that chemicals do not enter water bodies.
14. Pedestrian shoreline transportation facilities, such as footpaths and boardwalks, where permitted shall meet all standards of this section and shall be planned and developed in a way to minimize impact on the natural shoreline environment.
15. Transportation facilities shall not be permitted to locate:
    a. In hazardous areas such as steep slopes or in areas with soils subject to severe erosion or landslide hazards, or
    b. In front of feeder bluffs, over driftways, or on accretion beaches.

6.3.10 Utilities

These provisions apply to services and facilities that produce, convey, store, or process power, gas, sewage, communications, waste, and similar services and functions. On-site utility features serving a primary use, such as a water, sewer or gas line to a residence are “accessory utilities” and shall be considered a part of the primary use.

1. Utilities are permitted within the High-Intensity, Urban Conservancy and Shoreline Residential environments when the standards of this section are met.
2. Utility work in the aquatic environment requires a Shoreline Conditional Use Permit.
3. Whenever feasible, all transmission lines for power, gas, sewage, communications, oil, water, etc., shall be located outside shoreline jurisdiction if possible. Where transmission lines must be located in the shoreline jurisdiction they shall be located underground.

4. Utilities shall be designed, located and installed in such a way as to preserve the natural landscape and minimize conflicts with present and planned land and shoreline uses while meeting the needs of future populations in areas planned to accommodate growth. Utility production and processing facilities, such as power plants and sewage treatment plants, or parts of those facilities that are nonwater-oriented shall not be allowed in shoreline jurisdiction unless it can be demonstrated that no other feasible option is available.
5. Utilities should be located in existing rights of way and corridors whenever possible.

6.3.11 Unclassified Uses

Uses that are not classified or set forth herein may only be authorized as conditional uses provided the applicant can demonstrate that the criteria set forth in Section 7.4.3 of the SMP are met. Unclassified uses approved as conditional uses should also remain consistent with the policies of the Des Moines SMP and RCW 90.58.020.

CHAPTER 7 – ADMINISTRATIVE PROCEDURES

7.1 Shoreline Permit Requirements

The SMA (RCW 90.58.140(3)) requires that local governments establish a program for the administration and enforcement of the shoreline permit system. All proposed uses and development occurring within shoreline jurisdiction must conform to chapter 90.58 RCW, the Shoreline Management Act, and this Program. The purpose of this chapter is to describe that program and provide guidance for obtaining development permits for activities in the City's shoreline jurisdiction. References to the "Shoreline Administrator" means the City Manager or his or her designee in the Planning, Building, and Public Works Department, responsible for administering the Des Moines SMP.

Within the City of Des Moines all non-exempt substantial development undertaken on shorelines of the state must first obtain a Shoreline Substantial Development, Shoreline Conditional Use, or Variance Permit from the City. Substantial development means any development of which the total cost or fair market value exceeds five thousand seven-hundred and eighteen dollars ($5,718) or as may be adjusted for inflation under the provisions of RCW 90.58.030 or any development which materially interferes with the normal public use of the water or shorelines of the state, except those exempted developments set forth in WAC 173-27-040.

The shoreline activities that are exempt from permit requirements are listed in the first section of this chapter. The following sections describe the process for obtaining a Shoreline Substantial Development, Shoreline Conditional Use, or Variance Permit. For each permit type the criteria, application requirements and decision process are presented. Figure 7-1 provides an overview of the City's Shoreline Permit process.

The City's shoreline administrative procedures should be consistent with all provisions, criteria, application requirements, public notice requirements, and local or state review procedures set forth in WAC 173-27, Shoreline Management Permit and Enforcement Procedures. In the event of any inconsistencies between this SMP and WAC 173-27, the WAC shall govern.

7.2 Exemptions from Substantial Development Permit Requirements

Certain development activities are exempt from the requirement to secure a Shoreline Substantial Development Permit. State law requires that exemptions be construed narrowly. Exemption from the Substantial Development Permit process does not constitute exemption from compliance with the policies and use regulations of the SMA (RCW 90.58); the provisions of this master program; or other applicable city, state or federal permit requirements.

A development activity or use that is listed as a conditional use pursuant to this master program or is an unclassified use, must obtain a Conditional Use Permit even if the development is exempt from a Shoreline Substantial Development Permit. When a development or use is proposed that does not comply with the bulk, dimensional and performance standards of the master program, such development or use can only be authorized by approval of a variance, consistent with WAC 173-27-040(1)(b).

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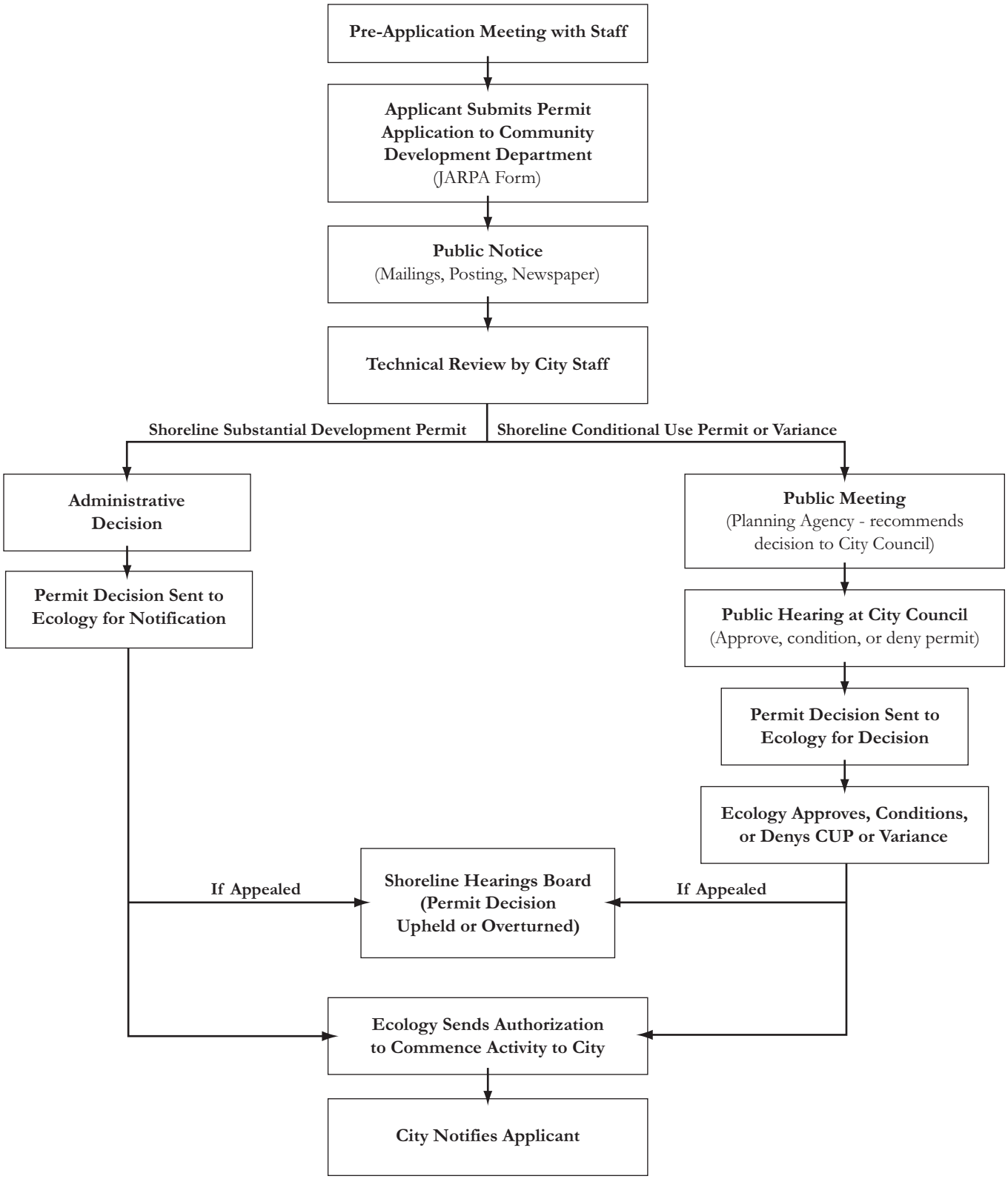
FIGURE 7-1

Shoreline Permit Process

(For Substantial Development Permit (SDP);
Shoreline Conditional Use Permit (CUP); or Shoreline Variance)



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If any part of a proposed development is not eligible for exemption, then a substantial development permit is required for the entire proposed development project, per WAC 173-27-040(d). Local government may attach conditions to the approval of exempted developments and/or uses as necessary to assure consistency of the project with the SMA and Des Moines SMP, per WAC 173-27-040(e).

The following shall not require Substantial Development Permits:

1. Any development of which the total cost or fair market value, whichever is higher, does not exceed five thousand seven-hundred and eighteen dollars ($5,718), if such development does not materially interfere with the normal public use of the water or shorelines of the state and does not result in a net loss of ecological functions. For purposes of determining whether or not a permit is required, the total cost or fair market value shall be based on the value of development that is occurring on shorelines of the state as defined in RCW 90.58.030 (2)(c). The total cost or fair market value of the development shall include the fair market value of any donated, contributed or found labor, equipment or materials.
2. Normal maintenance or repair of existing structures or developments, including damage by accident, fire or elements. “Normal maintenance” includes those usual acts to prevent a decline, lapse, or cessation from a lawfully established condition. "Normal repair" means to restore a development to a state comparable to its original condition, including, but not limited to its size, shape, configuration, location and external appearance, except where repair involves total replacement which is not common practice or causes substantial adverse effects to the shoreline resource or environment. Normal repair must occur within a reasonable period after decay or partial destruction. If decay or partial destruction occurs to an extent of fifty percent (50%) or greater of the replacement cost of the original development, repair or replacement must be addressed within one year

   Reconstruction conditions for nonconforming structures, including single-family residences, destroyed by catastrophe or disaster such as fire, explosion, earthquake, flooding, etc., may be reconstructed as existed prior to the catastrophic event, excluding reconstruction necessitated by a criminal act involving the property owner, with building height and shoreline setbacks not to exceed pre-existing setbacks and restrictions. Furthermore, when any new building is proposed in addition to reconstruction, the new building area shall conform to the provisions of this Program and conform to the requirements of Des Moines Municipal Building Code and this Program. Replacement may include total replacement of buildings and structures when supported by a statement from the Building Official that complete replacement is common practice and the replacement does not cause substantial adverse effects to shoreline resources or the environment.
3. Construction of a normal protective bulkhead common to single family residences. A “normal protective” bulkhead includes those structural and non-structural developments installed at or new, and parallel to the ordinary high water mark for the sole purpose of protecting an existing single family residence and appurtenant structures from loss or damage by erosion. A normal protective bulkhead is not exempt if constructed for the purpose of creating dry land. When a vertical or near vertical wall is being constructed or reconstructed, not more than one cubic yard of fill per one foot of wall may be used as backfill. When an existing bulkhead is being repaired by construction of a vertical wall fronting the existing wall, it shall be constructed no further waterward of the existing bulkhead than is necessary

for construction of new footings. When a bulkhead has deteriorated such that an ordinary high water mark has been established by the presence and action of water landward of the bulkhead then the replacement bulkhead must be located at or near the actual ordinary high water mark. Alternative bank stabilization projects may also be considered a normal protective bulkhead when any structural elements are consistent with the above requirements and when the project has been approved by the Department of Fish and Wildlife.

4. Emergency construction necessary to protect property from damage by the elements. An "emergency" is an unanticipated and imminent threat to public health, safety, or the environment which requires immediate action within a time too short to allow full compliance with this chapter. Emergency construction does not include development of new permanent protective structures where none previously existed, except where new protective structures are deemed by the administrator to be the appropriate means to address the emergency situation. Upon abatement of the emergency situation the new structure shall be removed or any permit be obtained which would have been required, absent an emergency, pursuant to chapter 90.58 RCW, or the Des Moines SMP. All emergency construction shall be consistent with the policies of chapter 90.58 RCW and the Des Moines SMP. As a general matter, flooding or other seasonal events that can be anticipated and may occur but that are not imminent are not an emergency.
5. Construction or modification, by or under the authority of the Coast Guard, of navigational aids such as channel markers and anchor buoys.
6. Construction on shorelands by an owner, lessee or contract purchaser of a single family residence for his/her own use or for the use of his/her family, which residence does not exceed a height of thirty (30) feet above average grade level and which meets all requirements of the state agencies having jurisdiction and the City. "Single-family residence" means a detached dwelling designed for and occupied by one family, including those structures and developments within a contiguous ownership which are a normal appurtenance. An "appurtenance" is necessarily connected to the use and enjoyment of a single-family residence and is located landward of the ordinary high water mark and the perimeter of a wetland. On a statewide basis, normal appurtenances include a garage; deck; driveway; utilities; and fences. Construction of a single-family residence may include grading which does not exceed two hundred fifty (250) cubic yards, and which does not involve placement of fill in any wetland or waterward of the ordinary high water mark. Construction authorized under this exemption shall be located landward of the ordinary high water mark.
7. The marking of property lines or corners on state owned lands, when such marking does not significantly interfere with normal public use of the surface of the water.
8. Any project with a certification from the Governor pursuant to chapter 80.50 RCW.
9. Site exploration and investigation activities that are prerequisite to preparation of an application for development authorization under this chapter, if:
    a. The activity does not interfere with the normal public use of the surface waters;
    b. The activity will have no significant adverse impact on the environment including but not limited to fish, wildlife, fish or wildlife habitat, water quality, and aesthetic values;

c. The activity does not involve the installation of any structure, and upon completion of the activity the vegetation and land configuration of the site are restored to conditions existing before the activity;

d. A private entity seeking development authorization under this section first posts a performance bond or provides other evidence of financial responsibility to ensure that the site is restored to preexisting conditions; and

e. The activity is not subject to the permit requirements of RCW 90.58.550 (oil or natural gas exploration in marine waters).

10. The process of removing or controlling aquatic noxious weeds, as defined in RCW 17.26.020, through the use of an herbicide or other treatment methods applicable to weed control that are recommended by a final environmental impact statement published by the Department of Agriculture or Ecology jointly with other state agencies under chapter 43.21C RCW.

11. Watershed restoration projects as defined herein. The Shoreline Administrator shall review watershed restoration projects for consistency with the this master program in an expeditious manner and shall issue a decision along with any conditions within forty-five days of receiving all materials necessary to review the request for exemption from the applicant. No fee may be charged for accepting and processing requests for exemption for watershed restoration projects as used in this section.

    "Watershed restoration project" means a public or private project authorized by the sponsor of a watershed restoration plan that implements the plan or a part of the plan and consists of one or more of the following activities:

    a. A project that involves less than ten miles of streamreach, in which less than twenty-five cubic yards of sand, gravel, or soil is removed, imported, disturbed or discharged, and in which no existing vegetation is removed except as minimally necessary to facilitate additional plantings;

    b. A project for the restoration of an eroded or unstable stream bank that employs the principles of bioengineering, including limited use of rock as a stabilization only at the toe of the bank, and with primary emphasis on using native vegetation to control the erosive forces of flowing water; or

    c. A project primarily designed to improve fish and wildlife habitat, remove or reduce impediments to migration of fish, or enhance the fishery resource available for use by all of the citizens of the state, provided that any structure, other than a bridge or culvert or instream habitat enhancement structure associated with the project, is less than two hundred square feet in floor area and is located above the ordinary high water mark of the stream.

    "Watershed restoration plan" means a plan, developed or sponsored by the department of fish and wildlife, the department of ecology, the department of natural resources, the department of transportation, a federally recognized Indian tribe acting within and pursuant to its authority, a city, a county, or a conservation district that provides a general program and implementation measures or actions for the preservation, restoration, re-creation, or enhancement of the natural resources, character, and ecology of a stream, stream segment, drainage area, or watershed for

which agency and public review has been conducted pursuant to chapter 43.21C RCW, the State Environmental Policy Act.

12. A public or private project, the primary purpose of which is to improve fish or wildlife habitat or fish passage, when all of the following apply:
    a. The project has been approved in writing by the Washington State Department of Fish and Wildlife (WDFW) as necessary for the improvement of the habitat or passage and appropriately designed and sited to accomplish the intended purpose;
    b. The project has received hydraulic project approval by WDFW pursuant to chapter 77-55 RCW; and
    c. The Shoreline Administrator has determined that the project is consistent with this master program.
13. Hazardous substance remedial actions. The procedural requirements of chapter 90.58 RCW shall not apply to a project for which a consent decree, order or agreed order has been issued pursuant to chapter 70.105D RCW or to Ecology when it conducts a remedial action under chapter 70.105D RCW. Ecology shall, in consultation with the City, assure that such projects comply with the substantive requirements of chapter 90.58 RCW, chapter 173–26 WAC and this master program.

7.2.1 Statement of Exemption

Applicants for other permits or approvals must obtain a written "Statement of Exemption" verifying the proposed development is not subject to securing a Shoreline Substantial Development Permit. According to State guidelines the burden of proof that a development or use is exempt from the permit process is on the applicant. If any part of the development is not eligible for exemption, then a Substantial Development Permit is required for the entire proposed development.

The statement of exemption offers an applicant an itemization of SMP and other requirements applicable to the proposed project in conjunction with other permit processes. In the case of development subject to a building permit, but exempt from the shoreline permit process, the Building Official or other permit authorizing official, through consultation with the Shoreline Administrator, shall attach shoreline management terms and conditions to Building Permits and other permit approvals pursuant to RCW 90.58.140. For example, the approval of a Building Permit for a single-family residence can be conditioned on the basis of SMP policy and use regulations.

Where shoreline development proposals are subject to review, approval, and permitting by a federal or state agency, the Shoreline Administrator shall prepare a statement of exemption, addressed to the applicant, the federal or state permitting agency, and Ecology.

The letter shall indicate the specific exemption provision from WAC 173-27-040 that is being applied to the development and provide a summary of the analysis demonstrating consistency of the project with the Des Moines SMP and the SMA.

7.3 Shoreline Substantial Development Permit Procedures

7.3.1 General Provisions

Development means a use consisting of the construction or exterior alteration of structures; dredging; drilling; dumping; filling; removal of any sand, gravel, or minerals; bulkheading; driving of piling; placing of obstructions; or any project of a permanent or temporary nature which interferes with the normal public use of the surface of the waters overlying lands subject to this chapter at any state of water level. Substantial development means any development of which the total cost or fair market value exceeds five thousand seven hundred and eighteen dollars ($5,718) or any development which materially-interferes with the normal public use of the water or shorelines of the state, except those exempted developments set forth in the preceding section, consistent with WAC 173-27-040.

Issuance of a Shoreline Substantial Development Permit is classified as Type II land use action, an administrative decision made by the Shoreline Administrator. Public notice of application is required and Ecology is notified of the permit decision. Shoreline Substantial Development Permits do not require public hearings or City Council decisions. Each permit for a substantial development, conditional use or variance issued by local government shall contain a provision that construction pursuant to the permit shall not begin and is not authorized until twenty-one days from the date of filing as defined in RCW 90.58.140(6) and WAC 173-27-1301, or until all review proceedings initiated within twenty-one days from the date of such filing have been terminated; except as provided in the SMA (RCW90.58.140(5.b) for Shoreline Hearings board appeals.

7.3.2 Criteria

A Substantial Development Permit shall be granted by the Shoreline Administrator only when the development proposed is consistent with the following:

1. Goals, objectives, policies and use regulations of the Des Moines SMP;
2. Des Moines Comprehensive Plan and Municipal Code; and
3. The policies, guidelines, and regulations of the SMA (RCW 90.58, WAC 173-26 and WAC 173-27).

The Shoreline Administrator may attach conditions to the approval of permits as necessary to assure consistency of the proposal with the above criteria.

7.3.3 Application

The owner of the subject property or the authorized agent(s) of the owner is encouraged to have a pre-application meeting with the Shoreline Administrator and/or his or her staff to determine the need for a Substantial Development Permit. If needed, the applicant may apply for a Substantial Development Permit by submitting to the Shoreline Administrator a Shoreline Substantial Development Permit application using the Joint Aquatic Resource Permit Application (JARPA) form provided by the City and accompanied by applicable fees, and any other information requested by the Shoreline Administrator. A completed application for a

Substantial Development Permit shall, at a minimum, contain the following information and diagrams:

1. Completed JARPA form.
2. Completed intake form from WAC 173-27-990, Appendix A – Shoreline Management Act Permit Data Sheet and Transmittal Letter, included at the end of this chapter.
3. The name, address and phone number of the applicant. The applicant should be the owner of the property or the primary proponent of the project and not the representative of the owner or primary proponent.
4. The name, address and phone number of the applicant's representative if other than the applicant.
5. The name, address and phone number of the property owner, if other than the applicant.
6. Location of the property. This shall, at a minimum, include the property address and identification of the section, township and range to the nearest quarter, quarter section or latitude and longitude to the nearest minute. All applications for projects located in open water areas away from land shall provide a longitude and latitude location.
7. Identification of the name of the shoreline (water body) that the site of the proposal is associated with. This should be the water body from which jurisdiction of the act over the project is derived (e.g. Puget Sound).
8. A general description of the proposed project that includes the proposed use or uses and the activities necessary to accomplish the project.
9. A general description of the property as it now exists including its physical characteristics and improvements and structures.
10. A general description of the vicinity of the proposed project including identification of the adjacent uses, structures and improvements, intensity of development and physical characteristics.
11. A site development plan consisting of maps and elevation drawings, drawn to an appropriate scale to depict clearly all required information, photographs and text which shall include:
    a. The boundary of the parcel(s) of land upon which the development is proposed.
    b. The ordinary high water mark of all water bodies located adjacent to or within the boundary of the project. This may be an approximate location provided, that for any development where a determination of consistency with the applicable regulations requires a precise location of the ordinary high water mark the mark shall be located precisely and the biological and hydrological basis for the location as indicated on the plans shall be included in the development plan. Where the ordinary high water mark is neither adjacent to or within the boundary of the project, the plan shall indicate the distance and direction to the nearest ordinary high water mark of a shoreline.
    c. Existing and proposed land contours. The contours shall be at intervals sufficient to accurately determine the existing character of the property and the extent of proposed change to the land that is necessary for the development. Areas within the boundary that will not be altered by the development may be indicated as such and contours approximated for that area.

d. A delineation of all wetland areas that will be altered or used as a part of the development.

e. A general indication of the character of vegetation found on the site.

f. The dimensions and locations of all existing and proposed structures and improvements including but not limited to; buildings, paved or graveled areas, roads, utilities, septic tanks and drainfields, material stockpiles or surcharge, and stormwater management facilities.

g. Where applicable, a landscaping plan for the project.

h. Where applicable, plans for development of areas on or off the site as mitigation for impacts associated with the proposed project shall be included and contain information consistent with the requirements of this section.

i. Quantity, source and composition of any fill material that is placed on the site whether temporary or permanent.

j. Quantity, composition and destination of any excavated or dredged material.

k. A vicinity map showing the relationship of the property and proposed development or use to roads, utilities, existing developments and uses on adjacent properties.

l. Where applicable, a depiction of the impacts to views from existing residential uses and public areas.

12. Copy of completed SEPA environmental checklist, declaration of non-significance or environmental impact statement, if required. Note that if the environmental review has not occurred prior to application for a Shoreline Permit, the time period for application review may be extended.

13. The names, addresses and legal description for each parcel of property within three hundred (300) feet of the exterior boundary of the subject property as shown by the records of the King County Assessor.

14. Other information, plans, data and diagrams as required by the Shoreline Administrator.

7.3.4 Public Notice

Applicants are responsible for the following public notices as part of any Substantial Development Permit application. If compliance with SEPA is required for the proposal, public notice requirements under SEPA may be satisfied concurrently as part of the Substantial Development Permit process.

1. Notification by regular mail no less than twenty (20) days prior to issuance of permit to all owners of property lying within 300 feet of the exterior boundaries of where substantial development is taking place or activities supporting the proposed improvement. The form of such notice shall be provided by the City and the content shall be approved by the Shoreline Administrator prior to mailing.

2. Posting of a thirty-two (32) square foot sign at the subject property, presenting the following information:

a. Type of permit applied for;

b. Brief description of proposed use;

c. Address of subject property;

d. Applicant's name;

3. Publication of public notice in a newspaper with local distribution no less than once a week for two consecutive weeks, with the last publication date no less than thirty (30) days prior to issuance of permit.

4. An affidavit that the notice has been properly published, posted and deposited in the U. S. mail pursuant to the above requirements shall be submitted to the Shoreline Administrator at least thirty (30) days in advance of the issuance of permit.

7.3.5 Technical Review Shoreline Administrator

For all submitted applications for Shoreline Substantial Development Permits, the Shoreline Administrator shall make a decision on the permit application based on the information provided in the application.

Upon a finding of compliance with the criteria listed in this section, the Shoreline Administrator shall issue the permit, or issue the permit with conditions. Should the Shoreline Administrator find that any application does not substantially comply with the criteria listed in this section, they may deny such application or attach any terms or conditions that are deemed suitable and reasonable given the purpose and objectives of this SMP.

7.3.6 Washington State Department of Ecology Notification

Ecology shall be notified within eight (8) days of any Shoreline Substantial Development Permit decisions made by the Shoreline Administrator. The Shoreline Administrator shall file the following with the Department of Ecology and the Attorney General:

1. A copy of the complete application pursuant to WAC 173-27-180;

2. Findings and conclusions that establish the basis for the decision including but not limited to identification of shoreline environment designation, applicable master program policies and regulations and the consistency of the project with review criteria for Substantial Development Permits;

3. The final decision of the local government;

4. The permit intake form (Appendix A to WAC 173-27-990, included at the end of this chapter);

5. Where applicable, local government shall also file the applicable documents required by chapter 43.21C RCW, the State Environmental Policy Act, or in lieu thereof, a statement summarizing the actions and dates of such actions taken under chapter 43.21C RCW; and

6. Affidavit of public notice.

7. When the project has been modified in the course of the local review process, plans or text shall be provided to the department that clearly indicate the final approved plan.

8. “Date of filing” of a local government final decision involving approval or denial of a substantial development permit is the date of actual receipt by the department of a local government's final decision on the permit. The department shall provide a written notice to the local government and the applicant of the "date of filing."

7.3.7 Appeals

All appeals of any final permit decision are governed by the procedures established in RCW 90.58.180, RCW 90.58.140(6), and WAC 481-03, the rules and procedures of the Shorelines Hearing Board. All appeals of any final permit decision must be made to the Shorelines Hearing Board within twenty-one (21) days after the City’s final decision concerning the substantial development permit or formal approval to revisions of the permit.

7.3.8 Revisions to Shoreline Substantial Development Permits

A permit revision is required whenever an applicant proposes substantive changes to the design, terms or conditions of a project from that which was approved in the permit. When a revision of a Shoreline Substantial Development is sought, the applicant shall submit detailed plans and text describing the proposed changes in the permit and demonstrating compliance with the following minimum standards pursuant to WAC 173-27-100.

If the proposed changes are determined by the Shoreline Administrator to be within the scope and intent of the original permit, and are consistent with the SMA (RCW 90.58), the Guidelines in WAC 173-26, and this SMP, the revision shall be approved. "Within the scope and intent of the original permit" means the following:

1. No additional over water construction will be involved.
2. Lot coverage and height may be increased a maximum of ten percent (10%) from the provisions of the original permit: Provided, that revisions involving new structures not shown on the original site plan shall require a new permit, and: Provided, further that any revisions authorized under this subsection shall not exceed height, lot coverage, setback or any other requirements of this SMP for the area in which the project is located.
3. Landscaping may be added to a project without necessitating an application for a new permit. Provided, that the landscaping is consistent with conditions (if any) attached to the original permit and is consistent with this SMP for the area in which the project is located.
4. The use authorized pursuant to the original permit is not changed.
5. No additional adverse environmental impact will be caused by the project revision.

If the revision or the sum of the revision and any previously approved revisions violate the terms of one or more of the provisions itemized above, the applicant shall apply for a new Shoreline Substantial Development in the manner provided herein.

The revised permit shall become effective immediately. Within eight (8) days of the date of final action the revised site plan, text and the approved revision shall be submitted to Ecology and the Attorney General for the completion of their files. A notice of revision approval shall be forwarded to persons who have notified the Shoreline Administrator of their desire to receive a

copy of the action on a permit. Formal revisions to permits are subject to the twenty-one (21) day appeal process described above.

7.4 Shoreline Conditional Use Permit Procedures

7.4.1 General Provisions

The purpose of a Shoreline Conditional Use Permit is to allow case-by-case review of uses which may have a greater potential for impacts without project-specific conditions, while providing flexibility in varying the application of the use regulations of this SMP in a manner consistent with the policies of RCW 90.58.020. A Shoreline Conditional Use Permit is classified as a Type IV land use decision, requiring administrative, planning agency, and city council review and approval. In authorizing a Shoreline Conditional Use Permit, special conditions may be attached to the permit by the City Council or Ecology to prevent undesirable effects of the proposed use. Ecology is the final reviewing authority for Shoreline Conditional Use Permits pursuant to WAC 173-27.

7.4.2 Unclassified Uses

Uses that are not classified or set forth herein may only be authorized as conditional uses provided the applicant can demonstrate that the criteria set forth for conditional uses are met. Unclassified uses approved as conditional uses should also remain consistent with the policies of RCW 90.58.020 and should not produce substantial adverse effects on the shoreline environment.

7.4.3 Criteria

Pursuant to WAC 173-27-160, the criteria below shall constitute the minimum criteria for review and approval of a Shoreline Conditional Use Permit. Uses classified as conditional uses, and not uses prohibited by the regulations of this SMP, may be authorized provided that the applicant can demonstrate all of the following:

1. That the proposed use will be consistent with the policies of RCW 90.58.020, the policies of this SMP, the City of Des Moines Comprehensive Plan and other applicable plans, programs and/or regulations;
2. That the proposed use will not interfere with the normal public use of public shorelines;
3. That the proposed use of the site and design of the project will be compatible with other permitted uses within the area and with uses planned for the area under the comprehensive plan and shoreline master program;
4. That the proposed use will cause no significant adverse effects to the shoreline, will not result in a net loss of ecological functions, and will not be incompatible with the environment designation or zoning classification in which it is to be located;
5. That the public interest suffers no substantial detrimental effect; and
6. That the proposed use is in the best interest of the public's health, safety, morals or welfare.
7. That consideration of cumulative impacts of additional requests for like actions in the area. For example, if conditional use permits were granted for other developments in the area

where similar circumstances exist, the total of the conditional uses shall also remain consistent with the policies of RCW 90.58.020 and shall not produce substantial adverse effects to the shoreline environment. Other uses which are not classified or set forth in this Program may be authorized as conditional uses provided the applicant can demonstrate consistency with the requirements of this section and the requirements for conditional uses contained in this Program. Uses which are specifically prohibited by this Program may not be authorized pursuant to this section.

The Shoreline Administrator may attach conditions to the approval of permits as necessary to assure consistency of the proposal with the above criteria.

7.4.4 Application

The owner of the subject property or the authorized agent(s) of the owner is encouraged to have a pre-application meeting with the Shoreline Administrator and/or his or her staff to determine the need for a Shoreline Conditional Use Permit. If needed, the applicant may apply for a permit by submitting to the Shoreline Administrator a Shoreline Conditional Use Permit application using the Joint Aquatic Resource Permit Application (JARPA) form provided by the City and accompanied by applicable fees, and any other information requested by the Shoreline Administrator. A completed application for a Shoreline Conditional Use Permit shall, at a minimum, contain the following information and diagrams:

1. Completed JARPA form.
2. Completed intake form from WAC 173-27-990, Appendix A – Shoreline Management Act Permit Data Sheet and Transmittal Letter, included at the end of this chapter.
3. The name, address and phone number of the applicant. The applicant should be the owner of the property or the primary proponent of the project and not the representative of the owner or primary proponent.
4. The name, address and phone number of the applicant's representative if other than the applicant.
5. The name, address and phone number of the property owner, if other than the applicant.
6. Location of the property. This shall, at a minimum, include the property address and identification of the section, township and range to the nearest quarter, quarter section or latitude and longitude to the nearest minute. All applications for projects located in open water areas away from land shall provide a longitude and latitude location.
7. Identification of the name of the shoreline (water body) that the site of the proposal is associated with. This should be the water body from which jurisdiction of the act over the project is derived (e.g., Puget Sound).
8. A general description of the proposed project that includes the proposed use or uses and the activities necessary to accomplish the project.
9. A general description of the property as it now exists including its physical characteristics and improvements and structures.

10. A general description of the vicinity of the proposed project including identification of the adjacent uses, structures and improvements, intensity of development and physical characteristics.
11. A site development plan consisting of maps and elevation drawings, drawn to an appropriate scale to depict clearly all required information, photographs and text which shall include:
    a. The boundary of the parcel(s) of land upon which the development is proposed.
    b. The ordinary high water mark of all water bodies located adjacent to or within the boundary of the project. This may be an approximate location provided, that for any development where a determination of consistency with the applicable regulations requires a precise location of the ordinary high water mark the mark shall be located precisely and the biological and hydrological basis for the location as indicated on the plans shall be included in the development plan. Where the ordinary high water mark is neither adjacent to or within the boundary of the project, the plan shall indicate the distance and direction to the nearest ordinary high water mark of a shoreline.
    c. Existing and proposed land contours. The contours shall be at intervals sufficient to accurately determine the existing character of the property and the extent of proposed change to the land that is necessary for the development. Areas within the boundary that will not be altered by the development may be indicated as such and contours approximated for that area.
    d. A delineation of all wetland areas that will be altered or used as a part of the development.
    e. A general indication of the character of vegetation found on the site.
    f. The dimensions and locations of all existing and proposed structures and improvements including but not limited to; buildings, paved or graveled areas, roads, utilities, septic tanks and drainfields, material stockpiles or surcharge, and stormwater management facilities.
    g. Where applicable, a landscaping plan for the project.
    h. Where applicable, plans for development of areas on or off the site as mitigation for impacts associated with the proposed project shall be included and contain information consistent with the requirements of this section.
    i. Quantity, source and composition of any fill material that is placed on the site whether temporary or permanent.
    j. Quantity, composition and destination of any excavated or dredged material.
    k. A vicinity map showing the relationship of the property and proposed development or use to roads, utilities, existing developments and uses on adjacent properties.
    l. Where applicable, a depiction of the impacts to views from existing residential uses and public areas.
12. Copy of completed environmental checklist, declaration of non-significance or environmental impact statement as is appropriate. Note that if the environmental review has not occurred prior to application for a Shoreline Permit, the time period for application review may be extended.

13. The names, addresses and legal description for each parcel of property within three hundred (300) feet of the exterior boundary of the subject property as shown by the records of the King County Assessor.
14. Other information, plans, data and diagrams as required by the Shoreline Administrator. All site plans and maps shall be drawn to scale and shall clearly indicate scale on the lower right-hand corner and be attached to the application.

7.4.5 Public Notice

Applicants are responsible for the following public notices as part of any Shoreline Conditional Use application. Public notice requirements under SEPA may be satisfied concurrently as part of the Shoreline Conditional Use Permit process.

1. Notification by regular mail no less than twenty (20) days prior to the public hearing to all owners of property lying within 300 feet of the exterior boundaries of the property being developed or supporting the proposed improvement. The form of such notice shall be provided by the City and the content shall be approved by the Shoreline Administrator prior to mailing.
2. Posting of a thirty-two (32) square foot sign at the subject property, presenting the following information:
   a. Type of permit applied for;
   b. Brief description of proposed use;
   c. Address of subject property;
   d. Applicant's name;
   e. Public hearing time and date; and
   f. Invitation to express views on proposal at the public hearing or in writing to the Shoreline Administrator one week prior to the public hearing date (date to be specified).
3. Publication of public notice in a newspaper with local distribution no less than once a week for two consecutive weeks, with the last publication date no less than thirty (30) days prior to the public hearing date.
4. An affidavit that the notice has been properly published, posted and deposited in the U. S. mail pursuant to the, above requirements shall be submitted to the Shoreline Administrator at least thirty (30) days in advance of the public hearing.

7.4.6 Public Meeting

A public meeting shall be held by the Planning Agency regarding an application for a Shoreline Conditional Use Permit. The public meeting should be held at the earliest possible date after the thirty (30) day public comment period has ended. The Planning Agency shall determine the application's compliance with the review criteria for Conditional Uses in addition to any other criteria to be met specified by the Municipal Code or statute, and recommend the permit application be forwarded to City Council for review and approval.

7.4.7 Public Hearing and City Council Decision

The City Council shall be the decision-making authority for any Shoreline Conditional Use Permit.

The City Council shall hold a public hearing on each proposed Shoreline Conditional Use Permit application. No later than the first regular public meeting after receiving the recommendation of the planning agency permit application, the City Council shall set by motion the date of the hearing. The Shoreline Administrator shall prepare and distribute public notice of the hearing as set forth in DMMC 17.40.070.

The City Council shall determine the application's compliance with the review criteria for Shoreline Conditional Use Permits, in addition to any other criteria to be met specified by the Municipal Code or statute. Upon a finding of compliance with these criteria the City Council shall instruct the Shoreline Administrator to prepare written findings of fact and statement of reasons in support of the determination and to forward the recommendation to Ecology for review and approval. The recommendation may include issuing the permit, issuing the permit with conditions, or denial of the application.

7.4.8 Washington State Department of Ecology Review

Within eight (8) days of the City's Council's final decision the Shoreline Administrator shall file the following with Ecology. The Shoreline Administrator shall file the following with the Department of Ecology and the Attorney General:

1. A copy of the complete application pursuant to WAC 173-27-180;
2. Findings and conclusions that establish the basis for the decision including but not limited to identification of shoreline environment designation, applicable master program policies and regulations and the consistency of the project with review criteria for Substantial Development Permits.
3. The final decision of the local government;
4. The permit data sheet (Appendix A to WAC 173-27-990, included at the end of this chapter); and
5. The local government shall also file the applicable documents required by chapter 43.21C RCW, the State Environmental Policy Act, or in lieu thereof, a statement summarizing the actions and dates of such actions taken under chapter 43.21C RCW.
6. Affidavit of public notice.

When the project has been modified in the course of the local review process, plans or text shall be provided to the department that clearly indicate the final approved plan.

"Date of filing" involving approval or denial of a variance or conditional use permit, is the date of transmittal of the department's final decision on the variance or conditional use permit to local government and the applicant. The department shall provide a written notice to the local government and the applicant of the "date of filing."

Ecology shall review the complete file submitted by the City on Shoreline Conditional Use Permits and any other information submitted or available that is relevant to the application. Ecology shall base its determination to approve, approve with conditions or deny a Conditional Use Permit or variance on consistency with the policy and provisions of the SMA and the criteria in WAC 173-27-160 and 173-27-170.

Ecology shall render and transmit to the City and the applicant its final decision approving, approving with conditions, or disapproving the permit within thirty days of the date of submittal by the City. The Shoreline Administrator will notify those interested persons having requested notification of such decision.

Construction pursuant to a Shoreline Conditional Use Permit shall not begin and is not authorized until twenty-one (21) days after Ecology issues its final decision, per RCW 90.58.140(6), RCW 90.58.140(10), and RCW 90.58.180.

7.4.9 Appeals

All appeals of any final permit decision are governed by the procedures established in RCW 90.58.180, RCW 90.58.140(6,10), and WAC 481.03, the rules and procedures of the Shorelines Hearing Board. All appeals of any final permit decision must be made to the Shorelines Hearing Board within twenty-one (21) days after Ecology issues its final decision concerning the substantial development permit.

7.4.10 Revisions to Shoreline Conditional Use Permits

A permit revision is required whenever an applicant proposes substantive changes to the design, terms or conditions of a project from that which was approved in the permit. When a revision of a Shoreline Conditional Use Permit is sought, the applicant shall submit detailed plans and text describing the proposed changes in the permit and demonstrating compliance with the following minimum standards pursuant to WAC 173-27-100.

If the proposed changes are determined by the Shoreline Administrator to be within the scope and intent of the original permit, and are consistent with the SMA (RCW 90.58), the Guidelines in WAC 173-26, and this SMP, the revision shall be approved. "Within the scope and intent of the original permit" means the following:

1. No additional over water construction will be involved.
2. Lot coverage and height may be increased a maximum of ten percent (10%) from the provisions of the original permit: Provided, that revisions involving new structures not shown on the original site plan shall require a new permit, and: Provided, further that any revisions authorized under this subsection shall not exceed height, lot coverage, setback or any other requirements of this SMP for the area in which the project is located.
3. Landscaping may be added to a project without necessitating an application for a new permit. Provided, that the landscaping is consistent with conditions (if any) attached to the original permit and is consistent with this SMP for the area in which the project is located.
4. The use authorized pursuant to the original permit is not changed.

5. No additional adverse environmental impact will be caused by the project revision.

If the revision or the sum of the revision and any previously approved revisions violate the terms of one or more of the provisions itemized above, the applicant shall apply for a new Shoreline Conditional Use Permit in the manner provided herein.

The City shall submit the revision to Ecology for approval, approval with conditions, or denial, and shall indicate that the revision is being submitted under the requirements of WAC 173-27-100. The department shall render and transmit to the City and the applicant its final decision within fifteen days of the date of Ecology's receipt of the submittal from the City. The City shall notify parties of record of the department's final decision.

The revised permit is effective upon final action by Ecology. A notice of revision approval shall be forwarded to persons who have notified the Shoreline Administrator of their desire to receive a copy of the action on a permit. Formal revisions to permits are subject to the twenty-one (21) day appeal process described above.

7.5 Variance Permit Procedures

7.5.1 General Provisions

The purpose of a Variance Permit is strictly limited to granting relief from specific bulk, dimensional or performance standards set forth in this SMP, and where there are extraordinary or unique circumstances relating to the physical character or configuration of property such that the strict implementation of the SMP would impose unnecessary hardships on the applicant or thwart the SMA policies as stated in RCW 90.58.020. Requests for allowing uses different than those specifically identified as allowed in the shoreline environment cannot be considered in the variance process.

Construction pursuant to this permit shall not begin nor can construction be authorized except as provided in WAC 173-27. In all instances, extraordinary circumstances shall be shown and the public interest shall suffer no substantial detrimental effect. Ecology is the final approving authority for Variance Permits.

7.5.2 Criteria

Pursuant to WAC 173-27-210, the criteria below shall constitute the minimum criteria for review and approval of a Shoreline Variance Permit. Variance Permits for development that will be located landward of the ordinary high water mark (per RCW 90.58.030(2)(b) definition), except those areas designated as marshes, bogs or swamps pursuant to WAC 173-22, may be authorized provided the applicant can demonstrate all of the following:

1. That the strict application of the bulk, dimensional or performance standards set forth in this Program precludes, or significantly interferes with, reasonable use of the property;
2. That the hardship described above is specifically related to the property, and is the result of unique conditions such as irregular lot shape, size, or natural features and not, for example, from deed restrictions or the applicant's own actions;

3. That the design of the project will be compatible with other permitted activities within the area and with uses planned for the area under the comprehensive plan and shoreline master program and will not cause adverse impacts to the shoreline environment.;
4. That the variance authorized does not constitute a grant of special privilege not enjoyed by other properties in the area, and will be the minimum necessary to afford relief; and
5. That the public interest will suffer no substantial detrimental effect.
6. Variance Permits for development that will be located either waterward of the ordinary high water mark or within marshes, bogs or swamps as designated in WAC 173-22, may be authorized provided the applicant can demonstrate all the criteria stated above as well as the following:
    a. That the strict application of the bulk, dimensional or performance standards set forth in this Program precludes all reasonable use of the property., and
    b. That the public rights of navigation and use of the shorelines will not be adversely affected by the granting of the variance.

In the granting of all Variance Permits, consideration shall be given to the cumulative impact of additional requests for like actions in the area. For example, if variances were granted to other developments in the area where similar circumstances exist, the total of the variances should also remain consistent with the policies of RCW 90.58 and should not produce substantial adverse effects to the shoreline environment or result in a net loss of ecological functions. Variances from the use regulations of this SMP are prohibited.

7.5.3 Application

The owner of the subject property or the authorized agent(s) of the owner is encouraged to have a pre-application meeting with the Shoreline Administrator and/or his or her staff to determine the need for a shoreline variance. If needed, the applicant may apply for a Shoreline Variance Permit by submitting to the Shoreline Administrator a Variance Permit application using the Joint Aquatic Resource Permit Application (JARPA) form provided by the City and accompanied by applicable fees, and any other information requested by the Shoreline Administrator. A completed application for a Shoreline Variance Permit shall, at a minimum, contain the following information and diagrams:

1. Completed JARPA form.
2. Completed intake form from WAC 173-27-990, Appendix A – Shoreline Management Act Permit Data Sheet and Transmittal Letter, included at the end of this chapter.
3. The name, address and phone number of the applicant. The applicant should be the owner of the property or the primary proponent of the project and not the representative of the owner or primary proponent.
4. The name, address and phone number of the applicant's representative if other than the applicant.
5. The name, address and phone number of the property owner, if other than the applicant.
6. Location of the property. This shall, at a minimum, include the property address and identification of the section, township and range to the nearest quarter, quarter section or

latitude and longitude to the nearest minute. All applications for projects located in open water areas away from land shall provide a longitude and latitude location.

7. Identification of the name of the shoreline (water body) that the site of the proposal is associated with. This should be the water body from which jurisdiction of the act over the project is derived (e.g., Puget Sound).
8. A general description of the proposed project that includes the proposed use or uses and the activities necessary to accomplish the project.
9. A general description of the property as it now exists including its physical characteristics and improvements and structures.
10. A general description of the vicinity of the proposed project including identification of the adjacent uses, structures and improvements, intensity of development and physical characteristics.
11. A site development plan consisting of maps and elevation drawings, drawn to an appropriate scale to depict clearly all required information, photographs and text which shall include:
    a. The boundary of the parcel(s) of land upon which the development is proposed.
    b. The ordinary high water mark of all water bodies located adjacent to or within the boundary of the project. This may be an approximate location provided, that for any development where a determination of consistency with the applicable regulations requires a precise location of the ordinary high water mark the mark shall be located precisely and the biological and hydrological basis for the location as indicated on the plans shall be included in the development plan. Where the ordinary high water mark is neither adjacent to or within the boundary of the project, the plan shall indicate the distance and direction to the nearest ordinary high water mark of a shoreline.
    c. Existing and proposed land contours. The contours shall be at intervals sufficient to accurately determine the existing character of the property and the extent of proposed change to the land that is necessary for the development. Areas within the boundary that will not be altered by the development may be indicated as such and contours approximated for that area.
    d. A delineation of all wetland areas that will be altered or used as a part of the development.
    e. A general indication of the character of vegetation found on the site.
    f. The dimensions and locations of all existing and proposed structures and improvements including but not limited to; buildings, paved or graveled areas, roads, utilities, septic tanks and drainfields, material stockpiles or surcharge, and stormwater management facilities.
    g. Where applicable, a landscaping plan for the project.
    h. Where applicable, plans for development of areas on or off the site as mitigation for impacts associated with the proposed project shall be included and contain information consistent with the requirements of this section.
    i. Quantity, source and composition of any fill material that is placed on the site whether temporary or permanent.

j. Quantity, composition and destination of any excavated or dredged material.

k. A vicinity map showing the relationship of the property and proposed development or use to roads, utilities, existing developments and uses on adjacent properties.

l. Where applicable, a depiction of the impacts to views from existing residential uses and public areas.

12. Copy of completed environmental checklist, declaration of non-significance or environmental impact statement as is appropriate. Note that if the environmental review has not occurred prior to application for a Shoreline Permit, the time period for application review may be extended.

13. The names, addresses and legal description for each parcel of property within three hundred (300) feet of the exterior boundary of the subject property as shown by the records of the King County Assessor.

14. Other information, plans, data and diagrams as required by the Shoreline Administrator.

All site plans and maps shall be drawn to scale and shall clearly indicate scale on the lower right-hand corner and be attached to the application.

7.5.4 Public Notice

Applicants are responsible for the following public notices as part of any Variance Permit application. Public notice requirements under SEPA may be satisfied concurrently as part of the Shoreline Variance Permit process:

1. Notification by regular mail no less than twenty (20) days prior to the public hearing to all owners of property lying within 300 feet of the exterior boundaries of the property being developed or supporting the proposed improvement. The form of such notice shall be provided by the City and the content shall be approved by the Shoreline Administrator prior to mailing.

2. Posting of a thirty-two (32) square foot sign at the subject property, presenting the following information:

   a. Type of permit applied for;

   b. Brief description of proposed use;

   c. Address of subject property;

   d. Applicant's name;

   e. Public hearing time and date; and

   f. Invitation to express views on proposal at the public hearing or in writing to the Shoreline Administrator one week prior to the public hearing date (date to be specified).

3. Publication of public notice in a newspaper with local distribution no less than once a week for two consecutive weeks, with the last publication date no less than thirty (30) days prior to the public hearing date.

4. An affidavit that the notice has been properly published, posted and deposited in the U. S. mail pursuant to the, above requirements shall be submitted to the Shoreline Administrator at least thirty (30) days in advance of the public hearing.

7.5.5 Public Meeting

A public meeting shall be held by the Planning Agency regarding an application for a Shoreline Variance Permit. The public meeting should be held at the earliest possible date after the thirty (30) day public comment period has ended. The Planning Agency shall determine the application's compliance with the review criteria for shoreline variances in addition to any other criteria to be met specified by the Municipal Code or statute, and recommend the Variance Permit application be forwarded to City Council for review and approval.

7.5.6 Public Hearing and City Council Decision

The City Council shall be the decision-making authority for any Shoreline Variance Permit.

The City Council shall hold a public hearing on each proposed shoreline variance. No later than the first regular public meeting after receiving the recommendation of the planning agency permit application, the city council shall set by motion the date of the hearing. The Shoreline Administrator shall prepare and distribute public notice of the hearing as set forth in DMMC 17.40.070.

The City Council shall determine the application's compliance with the review criteria for Shoreline Variance Permits, in addition to any other criteria to be met specified by the Municipal Code or statute. Upon a finding of compliance with these criteria the City Council shall instruct the Shoreline Administrator to prepare written findings of fact and statement of reasons in support of the determination and to forward the recommendation to Ecology for review and approval. The recommendation may include approving the Variance Permit, approving the Variance Permit with conditions, or denial of the application.

7.5.7 Washington State Department of Ecology Review

Within eight (8) days of the City's Council's final decision the Shoreline Administrator shall file the following with Ecology and the Attorney General:

1. A copy of the complete application pursuant to WAC 173-27-180;
2. Findings and conclusions that establish the basis for the decision including but not limited to identification of shoreline environment designation, applicable master program policies and regulations and the consistency of the project with review criteria for Substantial Development Permits.
3. The final decision of the local government;
4. The permit data sheet (Appendix A to WAC 173-27-990, included at the end of this chapter); and
5. The local government shall also file the applicable documents required by chapter 43.21C RCW, the State Environmental Policy Act, or in lieu thereof, a statement summarizing the

actions and dates of such actions taken under chapter 43.21C RCW.

6. Affidavit of public notice.

Ecology shall review the complete file submitted by the City on Variance Permits and any other information submitted or available that is relevant to the application. Ecology shall base its determination to approve, approve with conditions or deny a Conditional Use Permit or variance on consistency with the policy and provisions of the SMA and the criteria in WAC 173-27-160 and 173-27-170.

Ecology shall render and transmit to the City and the applicant its final decision approving, approving with conditions, or disapproving the permit within thirty days of the date of submittal by the City. The Shoreline Administrator will notify those interested persons having requested notification of such decision.

Construction pursuant to a Shoreline Variance Permit shall not begin and is not authorized until twenty-one (21) days after Ecology issues its final decision, per RCW 90.58.140(6), RCW 90.58.140(10), and RCW 90.58.180.

7.5.8 Appeals

All appeals of any final permit decision are governed by the procedures established in RCW 90.58.180 and WAC 481-03, the rules and procedures of the Shorelines Hearing Board. All appeals of any final permit decision must be made to the Shorelines Hearing Board within twenty-one (21) days after Ecology issues its final decision concerning the substantial development permit.

7.5.9 Revisions to Shoreline Variance Permits

A permit revision is required whenever an applicant proposes substantive changes to the design, terms or conditions of a project from that which was approved in the permit. When a revision of a Shoreline Variance Permit is sought, the applicant shall submit detailed plans and text describing the proposed changes in the permit and demonstrating compliance with the following minimum standards pursuant to WAC 173-27.

If the proposed changes are determined by the Shoreline Administrator to be within the scope and intent of the original permit, and are consistent with the SMA (RCW 90.58), the Guidelines in WAC 173-26, and this SMP, the revision shall be approved. "Within the scope and intent of the original permit" means the following:

1. No additional over water construction will be involved.
2. Lot coverage and height may be increased a maximum of ten percent (10%) from the provisions of the original permit: Provided, that revisions involving new structures not shown on the original site plan shall require a new permit, and: Provided, further that any revisions authorized under this subsection shall not exceed height, lot coverage, setback or any other requirements of this SMP for the area in which the project is located.

3. Landscaping may be added to a project without necessitating an application for a new permit. Provided, that the landscaping is consistent with conditions (if any) attached to the original permit and is consistent with this SMP for the area in which the project is located.
4. The use authorized pursuant to the original permit is not changed.
5. No additional adverse environmental impact will be caused by the project revision.

If the revision or the sum of the revision and any previously approved revisions violate the terms of one or more of the provisions itemized above, the applicant shall apply for a new Shoreline Variance Permit in the manner provided herein.

The City shall submit the revision to Ecology for approval, approval with conditions, or denial, and shall indicate that the revision is being submitted under the requirements of WAC 173-27-100. The department shall render and transmit to the City and the applicant its final decision within fifteen days of the date of Ecology's receipt of the submittal from the City. The City shall notify parties of record of the department's final decision.

The revised permit is effective upon final action by Ecology. A notice of revision approval shall be forwarded to persons who have notified the Shoreline Administrator of their desire to receive a copy of the action on a permit. Formal revisions to permits are subject to the twenty-one (21) day appeal process described above.

Shoreline Management Act

Permit Data Sheet and Transmittal Letter

(WAC 173-27-990)

From: (local government)

To: (appropriate Ecology office)

Date of Transmittal:

Date of Receipt: (provided by Ecology)

Type of Permit: (Indicate all that apply)

Substantial Development ; Conditional Use ; Variance ; Revision ; Other .

Local Government Decision: Approval ; Conditional Approval ; Denial :

Applicant Information:

Name:

Address:

Phone(s):

Applicant's Representative: (if primary contact)

Name:

Address:

Phone(s):

Is the applicant the property owner? yes no

Location of the Property: (Section Township and Range to the nearest 1/4, 1/4 Section or latitude and longitude, and a street address where available)

Water Body Name:

Shoreline of Statewide Significance: Yes No .

Environment Designation:

Description of the Project: (Summary of the intended use or project purpose)

Notice of Application Date:

Final Decision Date:

By: (Local Government Primary Contact on this Application)

Phone No:

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CHAPTER 8 – DEFINITIONS

In addition to definitions contained in the Des Moines Zoning Code (DMMC 18.04), the following definitions shall apply for purposes of administering the Des Moines SMP.

Abut (abutting, abuts) [3]**.** To touch at one end or side, to lie adjacent to, be next to, or to border upon. Abut is synonymous with adjacent and adjoining.

Accessory[3]**.** A use, a building or structure, part of a building or other structure, which is subordinate to and the use of which is incidental to that of the main building, structure, or use on the same lot, including a private garage. If an accessory building is attached to the main building by a common wall or roof, such accessory building shall be considered a part of the main building.

Accessory living quarters (ALQ) [3]**.** Provides complete independent living facilities including provisions for living, sleeping, cooking, and sanitation within a detached structure or within part of the primary dwelling unit.

Act[1]**.** The Washington State SMA, chapter 90.58 RCW.

Accretion beach[4]**.** Beach area that shows a net accumulation of beach sediment over time, as a result of natural coastal geologic processes or as a result of the effects of shoreline modifications on natural processes.

Adjacent[3]. To abut

Agricultural activities[1]**.** Agricultural uses and practices for economic use, including, but not limited to: Producing, breeding, or increasing agricultural products; rotating and changing agricultural crops; allowing land used for agricultural activities to lie fallow in which it is plowed and tilled but left unseeded; allowing land used for agricultural activities to lie dormant as a result of adverse agricultural market conditions; allowing land used for agricultural activities to lie dormant because the land is enrolled in a local, state, or federal conservation program, or the land is subject to a conservation easement; conducting agricultural operations; maintaining, repairing, and replacing agricultural equipment; maintaining, repairing, and replacing agricultural facilities, provided that the replacement facility is no closer to the shoreline than the original facility; and maintaining agricultural lands under production or cultivation.

Alley[3]. A public thoroughfare or way which affords only a secondary means of access to abutting property.

Amendment[1]**.** A revision, update, addition, deletion, and/or reenactment to the Des Moines SMP.

Approval[1]**.** An official action by the City of Des Moines agreeing to submit a proposed SMP or amendments to the Department of Ecology for review and official action pursuant to the SMA.

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Area of special flood hazard[3]**.** The land within a flood plain subject to a one percent or greater chance of flooding in any given year. These areas include, but are not limited to, streams, rivers, lakes, coastal areas, and wetlands.

Apartment[3]. A room, or a suite of two or more rooms in a multiple dwelling or in any other building not a single-family dwelling or a duplex dwelling occupied or suitable for occupancy as a dwelling unit for one family.

Apartment hotel[3]. A building containing dwelling units and six or more hotel rooms or suites.

Apartment house[3]. A building or a portion of a building, designed for occupancy by three or more families living separately from each other and containing three or more dwelling units.

Appeal, closed record[1]. As defined by RCW 36.70B.020(1), a "closed record appeal" means an appeal of a land use action following an open record public hearing on a proposed land use action. Such an appeal is on the record established during the open record pre-decision public hearing with no new evidence or information allowed. During a closed record appeal, only appeal argument is allowed.

Appeal, open record[3]. An appeal related to an open record public hearing held prior to a decision on a proposed land use action . An open record hearing may be held on an appeal, to be known as an "open record appeal hearing" if no open record pre-decision hearing has been held on the land use action.

Aquifer[3]. A consolidated or unconsolidated ground water-bearing geologic formation or formations that contain enough saturated permeable material to yield significant quantities of water to wells.

Bank[2]**.** A steep rise or slope at the edge of a body of water or water course.

Beach nourishment[2]**.** The artificial replenishing of a beach by delivery of materials dredged or excavated elsewhere.

Berm[2]**.** A ledge or shoulder consisting of mounded earth or rock.

Bluff[3]**.** A steep slope which abuts and rises from Puget Sound. Bluffs contain slopes predominantly in excess of 40 percent, although portions may be less than 40 percent. The toe of the bluff is the beach of Puget Sound. The top of a bluff is typically a distinct line where the slope abruptly levels out. Where there is no distinct break in slope, the slope is either the line of vegetation separating the unvegetated slope from the vegetated uplands plateau or, when the bluff is vegetated, the point where the bluff slope diminishes to less than 15 percent.

Boathouse, private[3]. An accessory building, or portion of building, which provides shelter and enclosure for a boat or boats owned and operated only by the occupants of the premises.

Boathouse Public[3]**.** A boathouse other than a private boathouse, used for the care, repair, or storage of boats, or where such boats are kept for remuneration, hire, or sale.

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Boating Facilities[4]. A facility or structure providing access in and out of the water for vessels, such as marinas, launching ramps, rails, or lift station. For purposes of the Shoreline Master Program, boating facilities excludes docks serving four or fewer single-family residences

Breakwater[2]**.** Protective structures usually built off-shore to protect harbor areas, moorages, navigation, beaches and bluffs from wave action. Breakwater designs may be fixed (e.g., rubble mound or rigid wall), open-pile or floating.

Buffer[3]**.** Either an area adjacent to hillsides which provides the margin of safety through protection of slope stability, attenuation of surface water flows and landslide, seismic, and erosion hazards reasonably necessary to minimize risk to the public from loss of life, well-being, or property damage resulting from natural disasters; or an area adjacent to a stream or wetland which is an integral part of the stream or wetland ecosystem, providing shade; input of organic debris and coarse sediments; room for variation in stream or wetland boundaries; habitat for wildlife; impeding the volume and rate of runoff; reducing the amount of sediment, nutrients, and toxic materials entering the stream or wetland; and protection from harmful intrusion to protect the public from losses suffered when the functions and values of stream and wetland resources are degraded.

Building[3]**.** Any structure having a roof, but excluding all forms of vehicles even though immobilized. When a use is required to be within a building, or where special authority granted pursuant to this title requires that a use shall be within an entirely enclosed building, then the term "building" means one so designed and constructed that all exterior walls of the structure shall be solid from the ground to the roof line, and shall contain no openings except for windows and doors which are designed so that they may be closed.

Building department[3]**.** The city manager or his authorized representative

Building height[3]**.** The vertical distance from the average grade level to the highest point of the coping of a flat roof, or to the deck line of a mansard roof, or to the height of the highest gable of a pitch or hip roof.

Building, main[3]. The principal building or other structure on a lot or building site designed or used to accommodate the primary use to which the premises are devoted. Where a permissible use involves more than one building or structure designed or used for the primary purpose, as in the case of group houses, each such permissible building or other structure on a lot or building site as defined by this title shall be construed as comprising a main building or structure.

Building setback line[3]. A line beyond which the footprint or foundation of a building shall not extend.

Building site[3]. A parcel of land assigned to a use, to a main building, or to a main building and its accessory buildings, together with all yards and open spaces required by this title, whether the area so devoted is comprised of one lot, a combination of lots, or combination of lots and fractions of lots.

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Bulkhead[2]**.** A wall, seawall, embankment or other structure erected parallel to the shoreline that retains or prevents sliding or erosion of land or protects land from wave action.

Bungalow court[3]. A group of three or more detached one-story, one-family, or duplex dwellings located upon a single lot or building site, together with all open spaces required by this title.

Business or commerce[3]**.** The purchase, sale, offering for sale, or other transaction involving the handling or disposition of any article, service, substance, or commodity for livelihood or profit; or the management or occupancy of the office buildings, offices, recreational, or amusement enterprises; or the maintenance and use of buildings, offices, structures, or premises by professions and trades or persons rendering services.

Camp, public[3]**.** Any area or tract of land used or designed to accommodate two or more camping parties, including cabins, tents, camping trailers, or other camping outfits.

Carrying Capacity[2]**.** The ability of a natural or man-made system to absorb population growth or physical development without significant degradation or breakdown.

Channel bottom[3]**.** The submerged portion of the stream cross-section which is totally an aquatic environment. The channel bottom may be seasonally dry.

Channel migration zone (CMZ) [1]. The area along a river within which the channel(s) can be reasonably predicted to migrate over time as a result of natural and normally occurring hydrological and related processes when considered with the characteristics of the river and its surroundings.

Clearing[3]**.** The destruction and removal of vegetation by burning, mechanical, or chemical methods.

Coastal Zone Atlas of Washington[3]. A document prepared by the Washington State Department of Ecology (publication No. DOE 77-21-6) to assist local governments in making land and water use decisions for the shoreline areas and marine aquatic areas under their jurisdiction. The document contains the following coastal surveys: geology, slope stability, flooding, sand and gravel resources, critical faunal and floral areas, coastal drift sector inventory, and land cover/land use.

Commercial and recreational shellfish areas[3]. Areas that include all public and private tidelands or bedlands suitable for shellfish harvest, including shellfish protection districts established pursuant to chapter 90.72 RCW.

Compensation[3]. The replacement, enhancement, or creation of an undevelopable environmentally critical area equivalent in functions, values, and size to those being altered or lost from development.

Conditional use[1]**.** A use, development, or substantial development which is classified as a shoreline conditional use or is not classified within the SMP.

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Conforming use[3]. An activity the nature and type of which is permitted in the zone in which the property on which it is established is located.

Creation (establishment), wetlands[3]**.** The manipulation of the physical, chemical, or biological characteristics present to develop a wetland on an upland or deepwater site where a wetland did not previously exist. "Establishment" results in a gain in wetland acres. Activities typically involve excavation of upland soils to elevations that will produce a wetland hydroperiod, create hydric soils, and support the growth of hydrophytic plant species.

Critical areas[3]**.** Any of those areas of the city which are subject to natural hazards or those landform features which in their natural state carry, hold, or purify water; support unique, fragile, or valuable natural resources including fish, wildlife, and other organisms and their habitat; provide flood protection; provide shoreline stabilization; provide ground water recharge; maintain stream flow; stabilize slope and shoreline bluffs; stabilize soil; and control erosion. Critical areas include the following landform features: hillsides, bluffs, erosion hazard areas, landslide hazard areas, seismic hazard areas, wetlands, streams, areas of special flood hazard, critical aquifer recharge areas, fish and wildlife habitat conservation areas, and the protective buffers necessary to protect the public health, safety, and welfare.

DMMC[2]. Des Moines Municipal Code.

Development[1]**.** A use consisting of the construction or exterior alteration of structures; dredging; drilling; dumping; filling; removal of any sand, gravel, or minerals; bulk heading; driving of piling; placing of obstructions; or any project of a permanent or temporary nature which interferes with the normal public use of the surface of the waters overlying lands subject to the act at any stage of water level.

Development regulations[1]**.** The controls placed on development or land uses by the City of Des Moines, including, but not limited to, zoning ordinances, critical areas ordinances, all portions of the SMP other than goals and policies approved or adopted under chapter 90.58 RCW, planned unit development ordinances, subdivision ordinances, and binding site plan ordinances together with any amendments thereto.

Drainage facility[3]. The system of collecting, conveying, and storing surface and storm water runoff. Drainage facilities shall include but not be limited to all surface and storm water runoff conveyance and containment facilities including streams, pipelines, channels, ditches, wetlands, closed depressions, infiltration facilities, retention/detention facilities, erosion/sedimentation control facilities, and other drainage structures and appurtenances, both natural and manmade.

Dredging[2]**.** The removal of earth from the bottom of a stream, bay or other water body for the purposes of deepening and/or maintaining a navigational channel or to obtain use of the bottom materials for landfill.

Drift cell[1]**.** Also referred to as "drift sector," or "littoral cell", meaning a particular reach of marine shore in which littoral drift may occur without significant interruption and which contains any natural sources of such drift and also accretion shore forms created by such drift.

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Dwelling[3]. A building designed exclusively for residential purposes, including one-family, duplex, townhouse, and multiple dwellings, which is constructed in accordance with the city buildings and construction code of Des Moines Municipal Code, but not including hotels or motel units having no kitchens.

Ecological functions[1]**.** Also referred to as "shoreline functions," meaning the work performed or role played by the physical, chemical, and biological processes that contribute to the maintenance of the aquatic and terrestrial environments that constitute the shoreline's natural ecosystem.

Ecosystem-wide processes[1]. The suite of naturally occurring physical and geologic processes of erosion, transport, and deposition; and specific chemical processes that shape landforms within a specific shoreline ecosystem and determine both the types of habitat and the associated ecological functions.

Enhancement, wetlands[3]**.** The manipulation of the physical, chemical, or biological characteristics of a wetland site to heighten, intensify, or improve specific function(s) or to change the growth stage or composition of the vegetation present. Enhancement is undertaken for specified purposes such as water quality improvement, floodwater retention, or wildlife habitat. Enhancement results in a change in some wetland functions and can lead to a decline in other wetland functions, but does not result in a gain in wetland acres. Activities typically consist of planting vegetation, controlling nonnative or invasive species, modifying site elevations or the proportion of open water to influence hydroperiods, or some combination of these activities.

Environmentally sensitive areas[3]**.** Any of those areas of the city which are subject to natural hazards or those landform features which in their natural state carry, hold, or purify water; support unique, fragile, or valuable natural resources including fish, wildlife, and other organisms and their habitat; provide flood protection; provide shoreline stabilization; provide ground water recharge; maintain stream flow; stabilize slope and shoreline bluffs; stabilize soil; and control erosion. Environmentally sensitive areas include the following landform features: hillsides, wetlands, streams, areas of special flood hazard, critical aquifer recharge areas, fish and wildlife habitat conservation areas, and the protective buffers necessary to protect the public health, safety, and welfare, each as defined in this chapter.

Erosion hazard areas[3]**.** Areas designated by the "King County Sensitive Areas Map Folio" which, according to the United States Department of Agriculture Soil Conservation Service Soil Survey, King County Area Washington issued November 1973, have severe to very severe erosion hazard potential. These soil map units include Alderwood gravely sandy loam (AgD), Alderwood-Kitsap soil (AkF), Kitsap silt loam (KpD), and Coastal beaches (Cb).

Essential public facilities[3]. Public facilities that are typically difficult to site, such as airports, state education facilities, and state or regional transportation facilities as defined in RCW 47.06.140, state and local correctional facilities, solid waste handling facilities, and in-patient facilities including substance abuse facilities, mental health facilities, group homes, and secure community transition facilities as defined in RCW 71.09.020.

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Exempt developments[1]. Those development activities set forth in Chapter 7 of the Des Moines SMP which are not required to obtain a Substantial Development Permit but which must otherwise comply with applicable provisions of the act and the SMP.

Extreme low tide[1]**.** The lowest line on the land reached by a receding tide.

Fair market value[1]**.** The open market bid price for conducting the work, using the equipment and facilities, and purchase of the goods, services and materials necessary to accomplish the development. This would normally equate to the cost of hiring a contractor to undertake the development from start to finish, including the cost of labor, materials, equipment and facility usage, transportation and contractor overhead and profit. The fair market value of the development shall include the fair market value of any donated, contributed or found labor, equipment or materials.

Feasible[1]**.** An action, such as a development project, mitigation, or preservation requirement, that meets all of the following conditions: (a) the action can be accomplished with technologies and methods that have been used in the past in similar circumstances, or studies or tests have demonstrated in similar circumstances that such approaches are currently available and likely to achieve the intended results; (b) the action provides a reasonable likelihood of achieving its intended purpose; and (c) the action does not physically preclude achieving the project's primary intended legal use.

Federally designated endangered and threatened species[3]. Those fish and wildlife species identified by the U.S. Fish and Wildlife Service and the National Marine Fisheries Service that are in danger of extinction or threatened to become endangered. The U.S. Fish and Wildlife Service and the National Marine Fisheries Service should be consulted for current listing status.

Fill[1]**.** The addition of soil, sand, rock, gravel, sediment, earth retaining structure, or other material to an area waterward of the OHWM, in wetlands, or on shorelands in a manner that raises the elevation or creates dry land.

Fish and wildlife habitat conservation area[3]. Land management for maintaining species in suitable habitats within their natural geographic distribution so that isolated subpopulations are not created. Fish and wildlife habitat conservation areas include:

1. Areas with which endangered, threatened, and sensitive species have a primary association;
2. Habitats and species of local importance;
3. All public and private tidelands or bedlands suitable for commercial or recreational shellfish harvest;
4. Kelp and eelgrass beds identified by the Washington Department of Natural Resources;
5. Herring and smelt spawning areas as outlined in chapter 220-110 WAC and the Puget Sound Environmental Atlas as presently constituted or as may be subsequently amended;
6. Naturally occurring ponds under 20 acres and their submerged aquatic beds that provide

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fish or wildlife habitat;

7. Waters of the state as defined in Title 222 WAC;
8. Lakes, ponds, streams, and rivers planted with game fish by a governmental or tribal entity; and
9. State natural area preserves and natural resource conservation areas as defined, established, and managed by the Washington Department of Natural Resources.

Flood plain[1]**.** Synonymous with one hundred-year flood plain, meaning that land area susceptible to inundation with a one percent chance of being equaled or exceeded in any given year. The limit of this area shall be based upon flood ordinance regulation maps or a reasonable method which meets the objectives of the act.

Forest management practices[2]**.** Those methods used for the protection, production and cutting of timber or bush.

Geologically hazardous areas[4]**.** Erosion hazard areas, landslide hazard areas, or seismic hazard areas as defined by the SMP.

Geologically unstable[4]**.** The relative instability of a shoreform or land form for development purposes over the long term or the intended life of any proposed structure. Soil, slope, ground or surface water, other geologic conditions, vegetation and effects of development are common factors that contribute to instability. Areas characterized by banks or bluffs composed of unconsolidated alluvial or glacial deposits (till and drift material), or bluffs composed of unconsolidated alluvial or glacial deposits (till and drift material), severely fractured bedrock, active and substantial erosion, substantially deformed trees and shrubs, or active or inactive earth slides are likely to be considered geologically unstable.

Geotechnical report[1]**.** Also referred to as a "geotechnical analysis," meaning a scientific study or evaluation conducted by a qualified expert that includes a description of the ground and surface hydrology and geology, the affected land form and its susceptibility to mass wasting, erosion, and other geologic hazards or processes, conclusions and recommendations regarding the effect of the proposed development on geologic conditions, the adequacy of the site to be developed, the impacts of the proposed development, alternative approaches to the proposed development, and measures to mitigate potential site-specific and cumulative geological and hydrological impacts of the proposed development, including the potential adverse impacts to adjacent and down-current properties. Geotechnical reports shall conform to accepted technical standards and must be prepared by qualified professional engineers or geologists who have professional expertise about the regional and local shoreline geology and processes.

Grade, average level[3]**.** The average of the finished ground level at the center of all exterior walls of a building. In case walls are parallel to and within five feet of a sidewalk, the sidewalk shall be considered the finished ground level.

Grading[1]**.** The movement or redistribution of the soil, sand, rock, gravel, sediment, or other material on a site in a manner that alters the natural contour of the land.

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Groins[2]**.** Wall-like structures built seaward from the shore to build or preserve an accretion beach by trapping littoral sand drift on the updraft side.

Ground water[3]**.** All water that exists beneath the land surface or beneath the bed of any stream, lake or reservoir, or other body of surface water within the boundaries of the state, whatever may be the geological formation of structure in which such water stands or flows, percolates, or otherwise moves (RCW 90.44).

Growth Management Act (GMA) [1]**.** The State of Washington Growth Management Act, (RCW 36.70A).

Guidelines[1]**.** Those standards adopted to implement the policy of this chapter for regulation of use of the shorelines of the state prior to adoption of master programs. Such standards shall also provide criteria to local governments and the department in developing master programs.

Habitat[4]**.** The place or type of site where a plant or animal naturally or normally lives and grows.

Habitat of local importance[4]. A seasonal range or habitat element with which a given species has a primary association, and which, if altered, may reduce the likelihood that the species will maintain and reproduce over the long-term. Such areas may include areas of high relative density or species richness, breeding habitat, winter range, and movement corridors, and areas of limited availability or high vulnerability to alteration, such as bluffs, talus, and wetlands.

Hazardous substance[3]**.** Any solid, liquid, gas, or sludge, including any material, substance, product, commodity, or waste, regardless of quantity, that exhibits any characteristics or criteria of hazardous waste as described in WAC 173-303-090, 173-303-101, 173-303-102, or 173-303-103.

Hazardous waste[3]. Any dangerous waste or extremely hazardous waste. Moderate risk waste is not a hazardous waste.

Height[1]**.** Distance measured from average grade level to the highest point of a structure, provided that television antennas, chimneys, and similar appurtenances shall not be used in calculating height, except where such appurtenances obstruct the view of the shoreline of a substantial number of residences on areas adjoining such shorelines. Provided further that temporary construction equipment is excluded in this calculation.

Hillsides[3]. Geological features of the landscape having slopes of 15 percent and greater. To differentiate between levels of hillside protection and the application of development standards, the city categorizes hillsides into four groups: hillsides of at least 15 percent but less than 25 percent; hillsides of at least 25 percent but less than 40 percent; hillsides of 40 percent slope and greater; and hillsides which are ravine sidewalls or bluffs.

Historic Properties Survey: City of Des Moines[3]**.** The Historic Properties Survey: City of Des Moines as prepared on October 14, 1994 for the city of Des Moines. A copy of this survey is

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maintained on file in the office of the city clerk and in the office of the community development director and is available for public inspection.

Hotel[3]**.** A building in which there are six or more guest rooms where lodging with or without meals is provided for compensation, and where no provision is made for cooking in any individual room or suite, and in which building may be included one apartment for use of the resident manager, but shall not include jails, hospitals, asylums, sanitariums, orphanages, prisons, detention homes, and similar buildings where human beings are housed or detained under legal restraint.

Hydraulic Project approval (HPA) [3]**.** A permit issued by the State Department of Fish and Wildlife for modifications to waters of the state in accordance with Chapter 75.20 RCW.

Impervious surface[4]**.** A hard surface area that either prevents or retards the entry of water into the soil mantle. Common impervious surfaces include, but are not limited to, roof tops, walkways, patios, driveways, parking lots, or storage areas, concrete or asphalt paving, gravel roads, packed earthen materials and other surfaces.

In-stream structure[1]. A structure placed by humans within a stream or river waterward of the ordinary high-water mark that either causes or has the potential to cause water impoundment or the diversion, obstruction, or modification of water flow. In-stream structures may include those for flood control, transportation, utility service transmission, fish habitat enhancement, or other purpose.

Jetties[2]**.** Structures generally built singly or in pairs perpendicular to the shore at harbor entrances or river mouths to prevent the shoaling or accretion of littoral sand drift. Jetties also protect channels and inlets from storm waves and cross currents.

King County Sensitive Areas Map Folio[2]. A series of maps prepared by King County delineating Class III landslide hazard areas, Class III seismic hazard areas, erosion hazard areas, wetlands, anadromous fish-bearing waters, 100-year flood plains, and water types. A copy of this folio and unscreened maps of Area No. 5 are stored at the city department of community development.

King County Wetland Inventory Notebook[2]. A study conducted by the King County planning division in 1983 to inventory wetlands county-wide. The results of the wetlands inventory are summarized in a three-volume notebook. The notebook shows the location of wetlands mapped in the inventory and identifies each with a two-digit number which links it to collected data. Each wetland is assigned one of three wetland ratings determined by examining the scores of selected inventory tasks, specific data, and percentile rankings for various categories.

Landslide[3]**.** An episodic downslope movement of a mass of soil or rock that includes but is not limited to rockfalls, slumps, mudflows, and earthflows.

Landslide hazard area[3]**.** Those areas of the city potentially subject to landslides based on a combination of geologic, topographic, and hydrologic factors. They include areas susceptible

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because of any combination of bedrock, soil, slope (gradient), slope aspect, structure, hydrology, or other factors. Examples of these may include, but are not limited to, the following:

1. Areas of historic failures, such as:
   a. Those areas delineated by the U.S. Department of Agriculture's Natural Resources Conservation Service as having a "severe" limitation for building site development;
   b. Those areas mapped by the Washington State Department of Ecology (Coastal Zone Atlas) or the Washington State Department of Natural Resources (slope stability mapping) as unstable (U or class 3), unstable old slides (UOS or class 4), or unstable recent slides (URS or class 5); or
   c. Areas designated as quaternary slumps, earthflows, mudflows, lahars, or landslides on maps published by the U.S. Geological Survey or Washington State Department of Natural Resources;
2. Any area with a combination of:
   a. Slopes greater than 15 percent;
   b. Impermeable soils (usually silt and clay) frequently interbedded with granular permeable soils (usually sand and gravel); and
   c. Springs or ground water seepage.
3. Any area which has shown movement during the Holocene epoch (from 10,000 years ago to present) or which is underlain by mass wastage debris of that age.
4. Any area potentially unstable as a result of rapid stream incision, stream bank erosion, or undercutting by wave action.
5. Any area designated as Class III landslide hazard area by the "Map Showing Relative Slope Stability in Part of West-Central King County, Washington, Map I-852-A, U.S., Geological Survey Miscellaneous Geologic Investigations" as presently constituted or as may be subsequently amended;
6. Slopes that are parallel or subparallel to planes of weakness (such as bedding planes, joint systems, and fault planes) in subsurface materials;
7. Slopes having gradients steeper than 80 percent subject to rock fall during seismic shaking;
8. Areas located in a canyon or on an active alluvial fan, presently or potentially subject to inundation by debris flows or catastrophic flooding; and
9. Any area with a slope of 40 percent or steeper and with a vertical relief of 10 or more feet except areas composed of consolidated rock. A slope is delineated by establishing its toe and top and is measured by averaging the inclination over at least 10 feet of vertical relief.

Large-scale[2]**.** The construction of four (4) dwelling units or more, construction of four thousand (4,000) square feet of commercial space, or other "actions" as defined by WAC 197-11, State Environmental Policy Act Rules.

Littoral drift[2]. Sediments moved in an indefinite zone extending from the shoreline to just beyond the breaker zone by waves and currents.

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Lot[2]. A building site that is described by reference to a recorded plat, by metes and bounds, or by section, township, and range which has direct legal access to a street or has access to a street over an easement approved by the city.

Lower bank[3]. The intermittently submerged portion of the stream cross-section which extends from the ordinary high water line to the water's edge during the summer low flow period.

Marina[2]. Facility for land/water transfer that provides launching, storage, moorage supplies and service for pleasure boats, as well as parking areas for automobiles.

Marine[1]. Pertaining to tidally influenced waters, including Puget Sound and the bays, estuaries and inlets associated therewith.

Mining[2]. The removal of naturally occurring materials from the earth for economic use.

Mitigation3. The use of any combination or all of the following actions:

1. Avoiding impacts to environmentally critical areas by not taking a certain action or parts of an action;
2. Minimizing impacts by limiting the degree or magnitude of the action and its implementation, by using appropriate technology, or by taking affirmative steps to avoid or reduce impacts;
3. Rectifying the impact by repairing, rehabilitating, or restoring the affected environmentally critical area;
4. Reducing or eliminating the impact over time by preservation and maintenance operations during the life of the development proposal;
5. Compensating for the impact by replacing or enhancing environmentally critical areas, or providing substitute resources; and
6. Monitoring the impact and taking appropriate corrective measures.

Monitoring[3]. The collection and analysis of data by various methods for the purposes of understanding and documenting changes in natural ecosystems and features, and includes gathering baseline data, evaluating the impacts of development proposals on the biological, hydrologic, and geologic elements of such systems, and assessing the performance of mitigation measures.

Native vegetation[3]. Plant species which are indigenous to the area in question.

Nearshore[1]**.** References to nearshore environment or nearshore habitat refer generally to an area along the Puget Sound shoreline that extends from the top of bluffs or upland area immediately adjacent to the beach to the point where sunlight penetrates the Sound's water.

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Nonconforming building[3]. A building, or portion thereof, which was lawfully erected or altered and maintained but which, because of the application of this Program to it, no longer conforms to the regulations of the zone in which it is located as defined by this Program.

Nonconforming use or development[1]**.** A shoreline use or development which was lawfully constructed or established prior to the effective date of the act or the applicable SMP, or amendments thereto, but which does not conform to present regulations or standards of the SMP.

Nonwater-oriented uses[1]**.** Those uses that are not water-dependent, water related or water enjoyment.

Normal Maintenance[2]. Those usual acts to prevent a decline, lapse-or cessation from a lawfully established condition.

Normal Repair[2]. To restore a development to a state comparable to its original condition within a reasonable time period after decay or partial destruction except where repair involves total replacement which is not common practice or causes substantial adverse effects to the shoreline resource or environment.

Ordinary High Water Mark (OHWM) [2]**.** The mark on all tidal waters and streams that will be found by examining the beds and banks and ascertaining where the presence and action of waters are so common and usual and so long continued in all ordinary years as to mark upon the soil a character distinct from that of the abutting upland, in respect to vegetation, as that condition existed on June 1, 1971, as it may naturally change thereafter, or as it may change thereafter in accordance with permits issued by a local government or the Department of Ecology. In any area where the ordinary high water mark cannot be found, the ordinary high water mark adjoining saltwater shall be the line of mean higher high tide.

Overlay Zone[2]**.** A set of zoning requirements described in the Zoning Code, mapped, and subsequently imposed in addition to those of the underlying district.

Party of record[4]**.** All persons, agencies or organizations who have submitted written comments in response to a notice of application; made oral comments in a formal public hearing conducted on the application; or notified local government of their desire to receive a copy of the final decision on a permit and who have provided an address for delivery of such notice by mail.

Permit[1]**.** Any shoreline substantial development, shoreline variance, shoreline conditional use permit, or revision authorized under chapter 90.58 RCW.

Pier[2]. A structure built out over the water and supported by pillars or piles used as a landing place, viewing or other recreational platform.

Ports and related industry[2.] Facilities constructed for the purpose of commercially transporting, loading and unloading goods or for commercial storage, excluding recreational boating facilities and ancillary uses.

KEY: 1. RCW or WAC 2. 1988 SMP Glossary 3. City Zoning Code 4. New Definition

Priority habitat[1]**.** A habitat type with unique or significant value to one or more species. An area classified and mapped as priority habitat must have one or more of the following attributes: comparatively high fish or wildlife density; comparatively high fish or wildlife species diversity; fish spawning habitat; important wildlife habitat; important fish or wildlife seasonal range; important fish or wildlife movement corridor; rearing and foraging habitat; important marine mammal haul-out; refugia habitat; limited availability; high vulnerability to habitat alteration; unique or dependent species; or shellfish bed. A priority habitat may be described by a unique vegetation type or by a dominant plant species that is of primary importance to fish and wildlife (such as oak woodlands or eelgrass meadows). A priority habitat may also be described by a successional stage (such as, old growth and mature forests). Alternatively, a priority habitat may consist of a specific habitat element (such as a consolidated marine/estuarine shoreline, talus slopes, caves, snags) of key value to fish and wildlife. A priority habitat may contain priority and/or nonpriority fish and wildlife.

Priority species[1]**.** Species requiring protective measures and/or management guidelines to ensure their persistence at genetically viable population levels. Priority species are those that meet any of the criteria listed below.

1. *Criterion 1*. State-listed or state proposed species. State-listed species are those native fish and wildlife species legally designated as endangered (WAC 232-12-014), threatened (WAC 232-12-011), or sensitive (WAC 232-12-011). State proposed species are those fish and wildlife species that will be reviewed by the department of fish and wildlife (POL-M-6001) for possible listing as endangered, threatened, or sensitive according to the process and criteria defined in WAC 232-12-297.
2. *Criterion 2*. Vulnerable aggregations. Vulnerable aggregations include those species or groups of animals susceptible to significant population declines, within a specific area or statewide, by virtue of their inclination to congregate. Examples include heron colonies, seabird concentrations, and marine mammal congregations.
3. *Criterion 3*. Species of recreational, commercial, and/or tribal importance. Native and nonnative fish, shellfish, and wildlife species of recreational or commercial importance and recognized species used for tribal ceremonial and subsistence purposes that are vulnerable to habitat loss or degradation.
4. *Criterion 4*. Species listed under the federal Endangered Species Act as either proposed, threatened, or endangered.

Provisions[1]**.** Policies, regulations, standards, guideline criteria or environment designations of the Des Moines SMP.

Public Access[2]**.** The public's ability to get to and use the State's public waters, the water/land interface and associated public shoreline area.

Public Hearing[3]. A hearing, conducted by either the hearing examiner or the city council, that creates a record through testimony and the submission of evidence and information under procedures prescribed by law. An open record public hearing held prior to a decision on a proposed land use action is to be known as an “open record pre-decision hearing.” An open

KEY: 1. RCW or WAC 2. 1988 SMP Glossary 3. City Zoning Code 4. New Definition

record hearing may be held on an appeal, to be known as an "open record appeal hearing" if no open record pre-decision hearing has been held on the land use action.

Public interest[1]**.** The interest shared by the citizens of the state or community at large in the affairs of government, or some interest by which their rights or liabilities are affected including, but not limited to, an effect on public property or on health, safety, or general welfare resulting from a use or development.

Public utility[3]**.** A private business organization such as a public service corporation performing some public service and subject to special governmental regulations, or a governmental agency performing similar public services, the services by either of which are paid for directly by the recipients thereof. Such services shall include, but are not limited to, water supply, electric power, gas, and transportation for persons and freight.

Qualified professional[3]. A person with experience and training in the pertinent scientific discipline, and who is a qualified scientific expert with expertise appropriate for the relevant environmentally critical area subject in accordance with WAC 365-195-905(4). A qualified professional must have obtained a B.S. or B.A. or equivalent degree in biology, engineering, environmental studies, fisheries, geomorphology, or related field, and two years of related work experience.

1. A qualified professional for habitats must have a degree in biology and professional experience related to the subject species.
2. A qualified professional for wetlands must have a degree in biology, must have taken a wetlands delineation course approved by the Army Corps of Engineers, and must have professional experience.
3. A qualified professional for a geological hazard must be a professional engineer or geologist, licensed in the state of Washington.
4. A "qualified professional for critical aquifer recharge areas" means a hydrogeologist, geologist, engineer, or other scientist with experience in preparing hydrogeologic assessments.

RCW[2]**.** Revised Code of Washington state statute.

Recreational development[4]**.** Development that serves commercial or noncommercial recreational uses on public or private land.

Residence[3]**.** A building or structure, or portion thereof, which is designed for and used to provide a place of abode for human beings, but not including hotels or motel units having no kitchens. The term "residence" includes the term "residential" as referring to the type of or intended use of a building or structure.

Restoration[1]**.** In the context of "ecological restoration," the reestablishment or upgrading of impaired ecological shoreline processes or functions. This may be accomplished through measures including, but not limited to, revegetation, removal of intrusive shoreline structures and

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removal or treatment of toxic materials. Restoration does not imply a requirement for returning the shoreline area to aboriginal or pre-European settlement conditions.

Revetment[4]. A sloped wall constructed of riprap or other suitable material placed on stream banks or other shorelines to retard bank erosion and minimize lateral stream movement.

Riprap[2]**.** A layer, facing or protective mound of stones randomly placed to prevent erosion, scour or sloughing of a structure or embankment; also, the stone so used.

SMP[1]**.** Shoreline Master Program. The comprehensive use plan for shorelines of the state, and the use regulations together with maps, diagrams, charts, or other descriptive material and text, a statement of desired goals, and standards developed in accordance with the policies enunciated in RCW 90.58.020.

SMA[1]. Shoreline Management Act.

Seismic hazard area[3]**.** Those areas subject to severe risk of earthquake damage as a result of seismically induced settlement or soil liquefaction. These conditions occur in areas underlain by cohesionless soils of low density usually in association with a shallow ground water table. Known seismic hazard areas are mapped in the "King County Sensitive Areas Map Folio."

Shall[1]. A mandate; the action must be done.

Shorelands[1]**.** Also referred to as "shoreland areas," meaning those lands extending landward for two hundred feet in all directions as measured on a horizontal plane from the ordinary high water mark; floodways and contiguous floodplain areas landward two hundred feet from such floodways; and all wetlands and river deltas associated with the streams, lakes, and tidal waters which are subject to the provisions of this chapter; the same to be designated as to location by the department of ecology.

Shoreline administrator[1]**.** The shoreline administrator shall be the City Manager or his or her designee and is responsible for administering the Des Moines SMP.

Shoreline jurisdiction[1]**.** All "shorelines of the state" and "shorelands" as defined in the Des Moines SMP and RCW 90.58.030.

Shoreline master program[1] **(**SMP**).** The comprehensive use plan for a described area, and the use regulations together with maps, diagrams, charts, or other descriptive material and text, a statement of desired goals, and standards developed in accordance with the policies enunciated in RCW 90.58.020.

Shoreline modifications[1]**.** Those actions that modify the physical configuration or qualities of the shoreline area, usually through the construction of a physical element such as a dike, breakwater, pier, weir, dredged basin, fill, bulkhead, or other shoreline structure. They can include other actions, such as clearing, grading, or application of chemicals.

KEY: 1. RCW or WAC 2. 1988 SMP Glossary 3. City Zoning Code 4. New Definition

Shorelines[1]**.** All of the water areas of the state, including reservoirs, and their associated shorelands, together with the lands underlying them; except (i) shorelines of statewide significance; (ii) shorelines on segments of streams upstream of a point where the mean annual flow is twenty cubic feet per second or less and the wetlands associated with such upstream segments; and (iii) shorelines on lakes less than twenty acres in size and wetlands associated with such small lakes.

Shorelines of Statewide Significance[2]**.** Those areas of Puget Sound in the City of Des Moines lying seaward from the line of extreme low tide.

Shorelines of the state[1]**.** The total of all "shorelines" and "shorelines of statewide significance" within the City of Des Moines.

Should[1]**.** Indicates the particular action is required unless there is a demonstrated, compelling reason, based on policy of the SMA and the Des Moines SMP, against taking the action.

Significant vegetation removal[1]**.** The removal or alteration of trees, shrubs, and/or ground cover by clearing, grading, cutting, burning, chemical means, or other activity that causes significant ecological impacts to functions provided by such vegetation. The removal of invasive or noxious weeds does not constitute significant vegetation removal. Tree pruning, not including tree topping where it does not affect ecological functions, does not constitute significant vegetation removal.

Special environmental study[3]**.** A technical report prepared by a qualified professional. Special environmental studies are intended to evaluate past and present environmental conditions of certain properties, potential environmental impacts associated with certain development proposals, and as appropriate, recommend mitigation measures that can be expected to lessen the severity of identified adverse environmental impacts. The content and scope of required special environmental studies shall be as specified by the community development director.

Stream corridor[3]**.** A perennial, intermittent, or ephemeral stream including its channel bottom, lower and upper banks, area beyond the top of the upper bank which influences the stream and is influenced by the presence of water, and the vegetation inhabiting this area. This area is known as the "riparian zone" which is an area transitional between aquatic and terrestrial (upland) ecosystems having distinct vegetation and soil characteristics. Riparian zones are most commonly recognized by bottomland, flood plain, and streambank vegetation. In developed watersheds, portions of the stream corridor may currently be in a partially culverted or channelized condition by artificial conveyance systems.

Streambed[2]**.** The channel of a river or other watercourse and adjacent land areas that are inundated with flood waters during a 100-year flood.

Structure[1]**.** A permanent or temporary edifice or building, or any piece of work artificially built or composed of parts joined together in some definite manner, whether installed on, above, or below the surface of the ground or water, except for vessels.

KEY: 1. RCW or WAC 2. 1988 SMP Glossary 3. City Zoning Code 4. New Definition

Substantial development[1]**.** Any development of which the total cost or fair market value exceeds five thousand seven hundred eighteen dollars, or any development which materially interferes with the normal public use of the water or shorelines of the state. The dollar threshold established in this subsection (3)(e) must be adjusted for inflation by the office of financial management every five years, beginning July 1, 2007, based upon changes in the consumer price index during that time period. "Consumer price index" means, for any calendar year, that year's annual average consumer price index, Seattle, Washington area, for urban wage earners and clerical workers, all items, compiled by the bureau of labor and statistics, United States department of labor. The office of financial management must calculate the new dollar threshold and transmit it to the office of the code reviser for publication in the Washington State Register at least one month before the new dollar threshold is to take effect.

Substantially degrade[1]**.** To cause significant ecological impact.

Topography[1]**.** The natural or existing topography of the lot, parcel, or tract of real property immediately prior to any site preparation or grading, including excavation or filling.

Transmit[1]**.** To send from one person or place to another by mail or hand delivery. The date of transmittal for mailed items is the date that the document is certified for mailing or, for hand-delivered items, is the date of receipt at the destination.

Transportation facilities[2]**.** Physical constructs that form the means of conveying people, goods and services, including roads, highways, bridges, bikeways, trails, sidewalks, ferry terminals, other passenger terminals and other related facilities.

Unclassified Uses[3]**.** A use possessing characteristics of such unique and special form as to make impractical its being made automatically and consistently permissible in any defined shoreline environment designation as set forth in this Program.

Upper bank[3]**.** That portion of the topographic cross-section of a stream which extends from the break in the general slope of the surrounding land to the normal high water line.

Use[3]**.** The nature of the occupancy, the type of activity, or the character and form of improvements to which land is devoted or may be devoted.

Variance[1]**.** A means to grant relief from the specific bulk, dimensional or performance standards set forth in the applicable SMP and not a means to vary a use of a shoreline.

Vessel[1]**.** Includes ships, boats, barges, or any other floating craft which are designed and used for navigation and do not interfere with the normal public use of the water.

WAC[2]. Washington Administrative Code. Rules and regulations imposed by various State departments with legislative approval that have the force of State law.

Water-dependent use[1]**.** A use or portion of a use which cannot exist in a location that is not adjacent to the water and which is dependent on the water by reason of the intrinsic nature of its operations.

KEY: 1. RCW or WAC 2. 1988 SMP Glossary 3. City Zoning Code 4. New Definition

Water-enjoyment use[1]**.** A recreational use or other use that facilitates public access to the shoreline as a primary characteristic of the use; or a use that provides for recreational use or aesthetic enjoyment of the shoreline for a substantial number of people as a general characteristic of the use and which through location, design, and operation ensures the public's ability to enjoy the physical and aesthetic qualities of the shoreline. In order to qualify as a water-enjoyment use, the use must be open to the general public and the shoreline-oriented space within the project must be devoted to the specific aspects of the use that fosters shoreline enjoyment.

Water-oriented use[1]**.** A use that is water-dependent, water-related, or water-enjoyment, or a combination of such uses.

Water-related use[1]. A use or portion of a use which is not intrinsically dependent on a waterfront location but whose economic viability is dependent upon a waterfront location because:

1. The use has a functional requirement for a waterfront location such as the arrival or shipment of materials by water or the need for large quantities of water; or

2. The use provides a necessary service supportive of the water-dependent uses and the proximity of the use to its customers makes its services less expensive and/or more convenient.

Water quality[1]**.** The physical characteristics of water within shoreline jurisdiction, including water quantity, hydrological, physical, chemical, aesthetic, recreation-related, and biological characteristics. Where used in this SMP, the term "water quantity" refers only to development and uses regulated under this chapter and affecting water quantity, such as impermeable surfaces and storm water handling practices. Water quantity, for purposes of this chapter, does not mean the withdrawal of ground water or diversion of surface water pursuant to RCW 90.03.250 through 90.03.340.

Watershed restoration projects[1]**.** A public or private project authorized by the sponsor of a watershed restoration plan that implements the plan or a part of the plan and consists of one or more of the following activities:

1. A project for the restoration of an eroded or unstable stream bank that employs the principles of bioengineering, including limited use of rock as a stabilization only at the toe of the bank, and with primary emphasis on using native vegetation to control the erosive forces of flowing water; or
2. A project primarily designed to improve fish and wildlife habitat, remove or reduce impediments to migration of fish, or enhance the fishery resource available for use by all of the citizens of the state, provided that any structure, other than a bridge or culvert or instream habitat enhancement structure associated with the project, is less than two hundred square feet in floor area and is located above the ordinary high water mark of the stream; or

3. A project that involves less than ten miles of streamreach, in which less than twenty-five cubic yards of sand, gravel, or soil is removed, imported, disturbed or discharged, and in which no existing vegetation is removed except as minimally necessary to facilitate additional plantings.

Watershed restoration plan[1]**.** A plan, developed or sponsored by the department of fish and wildlife, the department of ecology, the department of natural resources, the department of transportation, a federally recognized Indian tribe acting within and pursuant to its authority, a city, a county, or a conservation district that provides a general program and implementation measures or actions for the preservation, restoration, recreation, or enhancement of the natural resources, character, and ecology of a stream, stream segment, drainage area, or watershed for which agency and public review has been conducted pursuant to chapter 43.21C RCW, the State Environmental Policy Act.

Wetland[3]. An area inundated or saturated by ground or surface water at a frequency and duration sufficient to support, and that under normal circumstances does support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas (Army Corps of Engineers Regulation 33 CFR 323.2(c)). Wetlands and the boundaries of wetlands are those identified using the methodologies outlined in the "Washington State Wetlands Identification and Delineation Manual (Ecology Publication No. 96-94, March 1997)." Wetlands include ponds, but do not include those artificial wetlands intentionally created from nonwetland sites, including, but not limited to, irrigation and drainage ditches, grass-lined swales, canals, detention/retention facilities, farm ponds, and landscape amenities or those wetlands created after July 1, 1990, that were unintentionally created as a result of the construction of a road, street, or highway. However, wetlands shall include those artificial wetlands intentionally created from nonwetland areas created to mitigate conversion of wetlands pursuant to chapter 18.86 DMMC.

To differentiate between levels of wetland protection and the application of development standards, wetlands shall be rated according to the "Washington State Wetland Rating System for Western Washington," (Ecology Publication No. 04-06-025, August 2004) or as revised by the Department of Ecology. Wetland rating categories shall be applied as the wetland exists at the time of the adoption of this chapter or as it exists at the time of an associated permit application. Wetland rating categories shall not change due to illegal modifications.

1. Category I. Category I wetlands represent a unique or rare wetland type, are more sensitive to disturbance than most wetlands, are relatively undisturbed and contain some ecological attributes that are impossible to replace within a human lifetime, or provide a very high level of functions. Category I wetlands are:

    a. Mature forested wetlands larger than one acre; or

    b. Wetlands that perform many functions well.

2. Category II. Category II wetlands are difficult, though not impossible, to replace, and provide high levels of some functions. These wetlands occur more commonly than

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Category I wetlands, but they still need a relatively high level of protection. Category II wetlands are:

a. Wetlands identified by the Washington State Department of Natural Resources as containing "sensitive" plant species;

b. Wetlands with a moderately high level of functions.

3. Category III. Generally, wetlands in this category may have been disturbed in some way and are often less diverse or more isolated from other natural resources in the landscape than Category II wetlands. Category III wetlands are wetlands with a moderate level of functions.

4. Category IV. Category IV wetlands have the lowest levels of functions and are often heavily disturbed. These are wetlands that should be replaceable, and in some cases may be improved. However, experience has shown that replacement cannot be guaranteed in any specific case. These wetlands may provide some important functions, and should be protected to some degree.

Zoning Code[2]. Title 18, Des Moines Municipal Code.

Replace with tab
Appendix A -
Inventory

City of Des Moines

Shoreline Inventory and Characterization

March 2005

Prepared For:

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INTRODUCTION

Background and Purpose

The purpose of this study is to conduct a baseline inventory of conditions in the shoreline jurisdiction of the City of Des Moines (City), Washington. This inventory and characterization provides a basis for updating the City's Shoreline Master Program to comply with the Shoreline Management Act (SMA), Revised Code of Washington (RCW) 90.58 and its implementing guidelines, Washington Administrative Code (WAC) 173-26. This characterization will help the City identify existing conditions, evaluate functions and values of resources in its shoreline jurisdiction, and explore opportunities for conservation and restoration of ecological functions. These findings will help provide a framework for future updates to the City's shoreline environment designations and shoreline management policies and regulations.

Shoreline Jurisdiction and Study Area Boundary

Under the SMA, the shoreline jurisdiction includes areas that are 200 feet landward of the ordinary high water mark (OHWM) of waters that have been designated as "shorelines of statewide significance" or "shorelines of the state." These designations were established in 1972, and are described in WAC 173-18. Generally, "shorelines of statewide significance" include portions of Puget Sound and other marine waterbodies, rivers west of the Cascade Range that have a mean annual flow of 1,000 cubic feet per second (cfs) or greater, rivers east of the Cascade Range that have a mean annual flow of 200 cfs or greater, and freshwater lakes with a surface area of 1,000 acres or more. "Shorelines of the state" are generally described as all marine shorelines and shorelines of all other streams or rivers having a mean annual flow of 20 cfs or greater and lakes with a surface area greater than 20 acres.

This characterization includes those marine shorelines within the city limits of the City of Des Moines. This includes approximately 4.8 miles along Puget Sound within the City limits, between the City of Normandy Park to the north, and the City of Federal Way to the south (Figure 1). There are no "shorelines of the state" associated with rivers or streams in the City. The portions of Puget Sound within the city limits are defined as "shorelines of statewide significance" waterward of the line of extreme low tide (RCW 90.58.030(2)(e)(iii)). Under the SMA, the shoreline area to be regulated under the City's Shoreline Master Program must include marine waters and shorelands, defined as the upland area within 200 feet of the OHWM, as well as any associated wetlands (RCW 90.58.030). "Associated wetlands," means those wetlands that are in proximity to and either influence or are influenced by tidal waters or a lake or stream subject to the SMA (WAC 173-22-030 (1)). These are typically identified as wetlands that physically extend into the shoreline jurisdiction, or wetlands that are functionally related to the shoreline jurisdiction through surface water connection and/or other factors. Intertidal wetlands have been mapped throughout the City limits along Puget Sound. The specific language from the RCW describes the limits of shoreline jurisdiction as follows:

> *Those lands extending landward for two hundred feet in all directions as measured on a horizontal plane from the ordinary high water mark; floodways and contiguous floodplain areas landward two hundred feet from such floodways; and all associated wetlands and river deltas* (RCW 90.58.030(2)(f)).

For purposes of this report, this area is shown on Figure 2 as the approximate shoreline jurisdiction.

Methodology

A number of City of Des Moines, King County, state, and federal agency data sources and technical reports were reviewed to compile this inventory and characterization, including but not limited to the following:

- Greater Des Moines Comprehensive Plan (2001; 2004);
- City of Des Moines Comprehensive Stormwater Management Plan (1991; 1998);
- Comprehensive Marina Master Plan (2001);
- Washington State ShoreZone Inventory (2001);
- Marine Shoreline Inventory Report (WRIA 9) (2001);
- Coastal Zone Atlas of Washington, King County (1979);
- The Catalog of Washington Streams and Salmon Utilization, Volume 1, Puget Sound Region (1975); and
- Washington State Department of Fish and Wildlife Priority Habitats and Species, Streamnet, and Marine Resource Species information (2004).

A number of sources were also reviewed to characterize overall watershed and Puget Sound nearshore conditions and to assess the ecological function of Des Moines' shorelines in an ecosystem-wide context. Watershed- and Puget Sound-level condition sources reviewed for this report include:

- Reconnaissance Assessment of the State of the Nearshore Report: Including Vashon and Maury Islands (WRIAs 8 and 9) (2001);
- Occurrence and Quality of Ground Water in Southwestern King County, Washington (1995);
- Geology and Ground-Water Resources of Southwestern King County, Washington (1969);
- Soil Survey of King County Area, Washington (1979);
- Washington Trout Water Type Survey Results, South King County (2004);
- Habitat Limiting Factors and Reconnaissance Assessment Report, Green/Duwamish and Central Puget Sound Watersheds (WRIA 9 and Vashon Island) (2000); and
- Coastal Bluffs and Sea Cliffs on Puget Sound, Washington (2004).

Historic and current mapping and aerial photographs of the study area were consulted, and staff biologists, geologists, and planners conducted a reconnaissance field survey of the City's shoreline jurisdiction at existing public access locations. Historic mapping and aerial photography integrated with GIS data included:

- Topographic "T-sheet" Coastal Mapping; U.S. Coastal Survey, 1876-1877;
- Vertical aerial photography by U.S. Army Map Service, 1942;
- Vertical and oblique aerial photography by Department of Ecology, 1977;
- Oblique aerial photography by Department of Ecology, 2000; and
- Vertical aerial orthophotography by U.S.G.S, 2002.

Sources of information on cultural and historic resources included the Des Moines Historical Society website and consultation with the King County Historic Preservation Program and the Washington Office of Archaeology and Historic Preservation.

Report Organization

This report is divided into seven main sections. After Section 1.0, which provides background and introductory information, Section 2.0 discusses the regulatory context for shoreline planning. Section 3.0 is a general characterization of watershed conditions and ecosystem-wide processes affecting the shoreline. Section 4.0 focuses on existing land use and built environment conditions in the shoreline jurisdiction, while Section 5.0 describes nearshore processes and the natural and altered physical conditions along the shoreline. Section 6.0 describes the biological resources and habitat conditions in the shoreline jurisdiction. Finally, Section 7.0 summarizes conditions for each segment, and identifies and discusses potential opportunity areas for protection, enhancement, restoration, and enhanced public access.

Also accompanying this report are several figures that identify the City's approximate shoreline jurisdiction; identify shoreline planning segments; and document various biological, land use, and physical elements at watershed, city-wide, and nearshore environment scales. Figures are referred to throughout the document and are contained in Appendix A, Map Folio.

Shoreline Planning Segments

For the purposes of this study, the City's shoreline jurisdiction was organized into seven distinct segments (A through G) based primarily on existing land uses and zoning designations, and more broadly on the physical distinction along the shoreline and level of ecological functions provided by each segment. Shoreline Planning Segments are described in Table 1 and depicted on Figure 2.

Table 1. Shoreline Planning Segments

Segment	General Boundaries	Approximate Length (feet)	Approximate Percentage of City's Shoreline Jurisdiction
A	**Des Moines Beach Park:** from the northern city limits to the Des Moines Marina, including the mouth of Des Moines Creek	859	3%
B	**Des Moines Marina**	3000 (length does not include separate length around breakwater)	12%
C	**Zenith:** from the marina south to Saltwater State Park, including the mouth of Massey Creek	8412	33%
D	**Saltwater State Park:** includes the mouth of McSorley Creek	1241	5%
E	**Woodmont / Redondo North:** from Saltwater State Park to the Redondo Marina, including the mouth of Woodmont Creek	8656	34%
F	**Redondo Boat Launch / Beach Park:** includes the mouth of Redondo Creek	520	2%
G	**Redondo South:** from Wooten Park to the southern city limits, including the mouth of Cold Creek	3096	12%

CURRENT REGULATORY FRAMEWORK SUMMARY[1]

City of Des Moines Regulations

Current Shoreline Management Act Compliance

The Shoreline Management Act is implemented through the development of local Shoreline Master Programs (SMPs). The City of Des Moines adopted regulations contained in Ordinance No. 715 (October 15, 1987) as its Shoreline Master Program. Goals and policies are incorporated into the Greater Des Moines Comprehensive Plan by reference. Development regulations contained in the SMP are adopted by reference as part of the Des Moines Zoning Code (18.90 DMMC).

Local SMPs establish a system to classify shoreline areas into specific "environment designations." The purpose of shoreline environment designations is to provide a uniform basis for applying policies and use regulations within distinctly different shoreline areas. Generally, environment designations should be based on existing and planned development patterns, biological and physical capabilities and limitations of the shoreline, and a community's vision or objectives for its future development. During development of its first SMP in 1988, the City evaluated the natural and built characteristics of its shoreline jurisdiction and developed two shoreline environment designations:

- Conservancy (from the northern city limits to the marina, and from approximately South 230th Street to the southern city limits at Saltwater State Park); and
- Urban (the marina and adjacent multi-family developments).

City of Des Moines Ordinance No. 1176 (1996) amends the City's SMP to include the Woodmont/Redondo annexation area (i.e., from Saltwater State Park south to the current city boundary adjacent to the City of Federal Way). The ordinance recognizes the King County Shoreline Master Program environment designation of "Urban" for the annexed shoreline area of Woodmont and Redondo.

According to Substitute Senate Bill (SSB) 6012, passed by the 2003 Washington State Legislature, cities within King County are required to amend their local shoreline master programs consistent with Ecology's revised guidelines. With the assistance of a grant administered by the Department of Ecology (SMP Grant No. G0400332), the City is conducting a comprehensive SMP update, consistent with the current guidelines. This baseline inventory and analysis will inform development of the goals and policies and will provide a basis for the update of shoreline environment designations during the comprehensive SMP update process, anticipated to occur through June 2005.

[1] This discussion of regulatory requirements is not intended to be a complete list of all permits or approvals necessary for work within the City's shoreline jurisdiction or other areas within the City. Other portions of local code and state and federal regulations may apply to development projects within the City. The permits and approvals necessary for construction may vary from parcel to parcel regardless of shoreline jurisdiction and may vary depending on the type and intensity of the work proposed. Prior to any construction an applicant should contact the City and the applicable state and federal agencies to determine actual permit requirements.

Comprehensive Plan, Zoning and Other City Regulations

Greater Des Moines Comprehensive Plan – The City's existing Comprehensive Plan was last amended in 2004. The City is currently updating the Comprehensive Plan, as required under the Growth Management Act. The Comprehensive Plan establishes goals and policies that define the community's vision for the physical, economic, and social development of the City for the next 20 years. The Comprehensive Plan land use designations near the Puget Sound shoreline include Park, Single Family, Multifamily, Commercial, and Public Facility / Utility. City land use designations are relevant to this shoreline characterization as they establish the general land use patterns and vision of growth the City has adopted for areas both inside and outside the shoreline jurisdiction. The City's Shoreline Master Program goals and policies are adopted by reference as one element of the Comprehensive Plan.

City of Des Moines Municipal Code, Title 18: Zoning – Title 18 of the Des Moines Municipal Code establishes zoning designations. Zoning designations near the Puget Sound shoreline include Downtown Commercial, Single Family Residential, and Multifamily Residential. Park and open space areas are typically designated as Residential - Suburban Estates.

City of Des Moines Municipal Code, Chapter 18.86: Environmentally Sensitive Areas – Chapter 18.86 of the Des Moines Municipal Code establishes development standards, construction techniques, and permitted uses in environmentally sensitive areas and/or their buffers (i.e., geologic hazard areas, fish and wildlife conservation areas, wetlands, flood hazard areas, aquifer recharge areas, and stream areas) to protect these areas from adverse impacts. The City is in the process of updating its Environmentally Sensitive Areas code. To date, updated mapping has been compiled and is incorporated into the map folio of this report. Timing for completion of the code update is uncertain. Designated environmentally sensitive areas are found throughout the City's shoreline jurisdiction, particularly streams, flood hazard areas, and geologic hazard areas. Sensitive areas are discussed in the nearshore physical and biological sections of this report.

City of Des Moines *Comprehensive Stormwater Management Plan* – The City's Surface Water Management Program utilizes both the adopted *Comprehensive Stormwater Management Plan* (1991) and a draft updated plan (1998) to guide stormwater management in the city. The City has adopted the King County Surface Water Design Manual for controlling stormwater runoff from new development.

State and Federal Regulations

A number of state and federal agencies may have jurisdiction over land or natural elements in the City's shoreline jurisdiction. Local development proposals most commonly trigger requirements for state or federal permits when they impact wetlands or streams; potentially affect fish and wildlife listed under the federal Endangered Species Act (ESA); result in over five acres of clearing and grading; or affect the floodplain or floodway. As with local requirements, state and federal regulations may apply throughout the City, but regulated resources are common within the City's shoreline jurisdiction. The state and federal regulations affecting shoreline-related resources include, but are not limited to:

Endangered Species Act: The federal ESA addresses the protection and recovery of federally listed species. The ESA is jointly administered by the National Oceanic and Atmospheric Administration (NOAA) Fisheries (formerly referred to as the National Marine Fisheries Service), and the United States Fish and Wildlife Service (USFWS).

Clean Water Act (CWA): The federal CWA requires states to set standards for the protection of water quality for various parameters, and it regulates excavation and dredging in waters of the U.S., including wetlands. Certain activities affecting wetlands in the City's shoreline jurisdiction or work in the adjacent rivers may require a permit from the U.S. Army Corps of Engineers and/or Washington State Department of Ecology under Section 404 and Section 401 of the CWA, respectively.

Hydraulic Project Approval (HPA): The Washington Department of Fish and Wildlife (WDFW) regulates activities that use, divert, obstruct, or change the natural flow of the beds or banks of waters of the state and may affect fish habitat. Projects in the shoreline jurisdiction requiring construction below the ordinary high water mark of Puget Sound or streams in the city could require an HPA from WDFW. Projects creating new impervious surface that could substantially increase stormwater runoff to waters of the state may also require approval.

National Pollutant Discharge Elimination System (NPDES): Ecology regulates activities that result in wastewater discharges to surface water from industrial facilities or municipal wastewater treatment plants. NPDES permits are also required for stormwater discharges from industrial facilities, construction sites of five or more acres, and municipal stormwater systems that serve populations of 100,000 or more.

WATERSHED CHARACTERIZATION

Ecosystem Wide Processes

The City of Des Moines is located in the central portion of the Puget Lowland, a distinct geographic area, or ecoregion, based on topography, climate, land use, geology, soils, and naturally occurring vegetation. The Puget Lowland ecoregion is an elongate topographic and structural depression bordered by the Cascade Mountains on the east and the Olympic Mountains on the west. The distinct topography, geology, and soils of the Puget Lowland are the result of numerous glacial incursions into the Lowland from British Columbia during the Pleistocene Epoch (2 million years ago to about 10,000 years). This lowland is characterized by a series of ridges with the long axis trending in the north-south direction separate by deeply cut ravines and broad valleys. In general, the ground surface elevation is within 500 feet of sea level. The climate of the Puget Lowland is characterized by dry summers and mild, wet winters, with annual precipitation between 25 and >60 inches. Prior to the arrival of European populations, dense coniferous forests covered the Lowland. Vegetation in the Puget Lowland is dominated by Douglas-fir forests with western hemlock and redcedar as the primary late-successional species. Oregon white oak, Pacific madrone, big leaf maple, and red alder forests are frequent component of the landscape. In the southern Puget Sound region grassland habitats are often associates with oak habitats (WDNR, 2003). Other special habitats within the ecoregion include wetlands, riparian areas, bogs and estuaries. Characteristic wildlife includes a rich diversity of birds (200 species), mammals and fish species. The City of Des Moines is characteristic of the ecoregion's landscape, biota, and urban alteration. The City is located on the Puget Sound shoreline and contains characteristic areas of coniferous forest, and riparian and wetlands habitat, particularly associated with several small streams that flow from east to west through the City. The City is also characterized by substantial development and urbanization throughout the City's boundaries.

To understand shoreline processes and functions within the regulated shoreline jurisdiction, it is useful to understand the natural, ecosystem-wide processes that contribute to the conditions found along the shoreline and affect the natural, ecological functions occurring in the nearshore environment[2]. Alterations that affect the larger area may affect the natural shoreline processes. As water flow drives many ecological processes, a useful area for evaluation, smaller than the ecoregion, is the watershed. For purposes of this report, the Des Moines area watershed is defined as those stream basins that flow directly to Puget Sound and discharge in the shoreline jurisdiction of the City of Des Moines. These include Des Moines Creek, Massey Creek, McSorley Creek, Woodmont Creek, Redondo Creek, and Cold Creek drainage basins (Figure 3). Surface and groundwater flow in the watershed is naturally controlled by climate, topography, vegetation, soils, and geologic conditions, but is also altered by land use activities.

[2] The Puget Sound "nearshore" is generally considered to be an area that runs from the top of bluffs on the land across the beach to the point where light penetrates the Sound's water.

Climate

The Puget Lowland has a maritime climate with cool winters, dry summers, and a distinct rainy season. Precipitation in the Lowland varies considerably because of mountain effects. The Des Moines area watershed receives between 35 and 40 inches of rain per year on average, with 75 percent of the precipitation falling from October to March (Woodward et al., 1995). Winds are generally from the southwest during the rainy season and from the northwest during the dry summer months.

Topography

The Des Moines area watershed is located on the western portion of the Des Moines Plain, a broad northerly-trending upland area located between the Duwamish-Green River valley and Puget Sound. The upland plateau area has relatively low relief and largely lies 300 to 400 feet above sea level. The upland area is bounded to the east and west by steep bluffs (Figure 4).

The watershed comprises the western two thirds of the Des Moines Plain. The upland ground surface has local closed depressions occupied by lakes and poorly drained areas occupied by wetlands and peat bogs. Streams draining the watershed are relatively short and flow directly to Puget Sound.

Vegetation

As the watershed is largely covered with medium to high density, residential and commercial development, much of the natural land cover has been altered (Figures 6a and 6b). Large areas of native vegetation within the watershed are generally restricted to steep slopes along streams. Stream valleys that have not been significantly developed have been incorporated into parks or other government property. Other areas of native vegetation include larger institutional properties. Native vegetation in undeveloped areas include trees, such as Douglas fir, Western red cedar, Western hemlock, Pacific madrone, big leaf maple, and alder. Such trees remain in residential areas but have been thinned considerably to accommodate housing. Common understory plants in undeveloped areas include salal, ferns, Indian plum, Oregon grape, elderberry, oceanspray, and salmonberry.

Geology and Soils

The geology of the Des Moines vicinity is well documented by Waldron (1961 and 1962). More recent geologic mapping of the area has been conducted by the University of Washington's Pacific Northwest Center for Geologic Mapping Studies (Booth and Waldron, and Booth et al., in press). The geology along the shoreline is also documented in the Coastal Zone Atlas of King County (Washington State Department of Ecology [Ecology], 1979). Soils are shown on Figure 3, surficial geologic units on Figure 4.

The Des Moines Plain is underlain by a complex sequence of glacial and nonglacial deposits that overlie Tertiary bedrock. The depth to bedrock in the vicinity of the project area is approximately 1,000 to 1,500 feet (Jones, 1996). The area has been glaciated six or more times in the past 2 million years. Each glacial advance may have deposited a sequence of fine-grained lacustrine deposits, outwash sand and gravel, and till. Each of these deposits may have been

partially to completely eroded in places by subsequent glaciations or erosion during interglacial periods.

The most recent incursion of glacial ice into the central portion of the Lowland is called the Vashon Stade of the Fraser glaciation, which receded from the area about 13,500 years ago. Since then, present-day geologic processes, such as erosion and deposition by streams and landsliding, have modified the ground surface and further complicated the geology. In addition, fill has been placed across much of the area for constructions of roads, businesses and Sea-Tac airport.

Most soils exposed at the ground surface within the study area were deposited by the last glacial episode (Waldron, 1961 and 1962). Lodgment till mantles much of the upland area of Des Moines (Figure 4) but is generally absent along the steeper portions of the bluff at the edges of the upland. Lodgment till is an unsorted mixture of sand, gravel, silt, and clay deposited at the base of a glacier and has been compacted to a very dense state by the great weight of the overriding ice. Lodgment till has very low permeability and typically acts as an aquitard, restricting the downward flow of groundwater and reducing recharge of deeper aquifers.

Recessional outwash and recessional lacustrine (lake) deposits of variable thickness commonly overlie the till. These sediments were deposited in topographic lows in the till surface where meltwater streams drained from the receding glacier, such as along the headwater areas of Des Moines and McSorely Creeks (Figure 4). Recent peat and muck deposits have accumulated on top of these poorly drained recessional lacustrine deposits or on top of recessional outwash deposits, where downward percolation of groundwater is impeded by the presence of till at shallow depths beneath the outwash. These areas of peat and muck deposits are also sites of the larger wetlands within the watershed (Figure 3).

Underlying the till are thick deposits of sand and gravel separated by finer grained layers of clay and silt or tight, well-graded soils, such as till. These layers comprise several aquifers and aquitards within the subsurface and control subsurface water movement to the shoreline.

Surface and Groundwater

The Des Moines watershed lies within the South King County Groundwater Management Area (GWMA). Groundwater and hydrology of the watershed is well described in Luzier (1969) and Woodward et al. (1995). Additional analysis and groundwater protection planning are being conducted under King County's Groundwater Management Program.

The upland surface has several small lakes and numerous streams that flow short distances from the upland area to the shoreline (Figure 5). Precipitation falling within the watershed is conveyed directly to lakes and streams by surface runoff or travels in the subsurface as groundwater flow. Small amounts of rainfall soak into the ground, but during heavy rainfall, the ground quickly becomes saturated, inhibiting further infiltration. Water that is unable to infiltrate travels down slope across the ground surface as stormwater runoff. Surface runoff may erode soil, which is conveyed to streams and eventually to the shoreline of Puget Sound.

Poorly drained areas of the upland plateau are the sites of former or existing wetlands. Wetlands regulate the flow of water within a watershed by storing water during precipitation events, slowing the conveyance of water from the upland to the shoreline, and increasing infiltration.

Development has reduced the number and area of wetlands in the upland plateau, causing higher volumes and peak rates of stormwater runoff.

Impermeable surface such as pavement, rooftops, or compacted ground increase stormwater runoff. Conversely, vegetation promotes infiltration by intercepting rainfall, effectively spreading precipitation events over longer periods of time and reducing peak flows and associated sediment transport. Vegetation also reduces erosion by holding soil in place and reducing splash erosion.

Water that infiltrates into the ground generally flows downward until impeded by less permeable soils and then flows laterally to a body of water or to a slope face where it may emerge as springs or seeps on the hillside. A portion of the groundwater, however, will percolate downward through lower-permeability soils to underlying more permeable soils or aquifers. Because of the complex stratigraphy of the soils in Puget Sound, several aquifers exist within the subsurface. For the uppermost aquifer beneath the till, groundwater flow is radially outward from two groundwater highs that lie beneath the upland plateau. One groundwater high is located just east of Sea-Tac airport; the other is located east of Redondo (Woodward et al., 1995).

Coastal Processes

The coastal zone is a dynamic environment, and human actions can easily alter the natural system. Therefore, it is important for communities to understand potential impacts of land use. General coastal processes are well summarized in the *Coast of Puget Sound* by Downing (1983) and by Shipman (2004). Steep, gradually receding bluffs commonly back the shoreline along Des Moines. Over time, the bluffs erode and recede landward providing sediment to the shore. Prior to construction of bulkheads and other structures that were intended to protect property from wave and tidal action, intermittent landslides occurred along bluff shores, although natural bluff recession rates were generally quite slow in most of Puget Sound. Sediment that accumulates at the base of the bluff helps to protect the bluff from further erosion and reduces the recession rate. Sediment from eroded bluffs may enter the intertidal zone within the nearshore, where it is subject to transport by waves and water currents.

Prevailing winds and waves cause littoral drift, which is the movement of loose sediment along the shore, primarily within the intertidal zone. Sediment that is sufficiently small, typically sand, is suspended for short durations by wave action and is transported along the shore parallel to the beach. Gravel is transported by rolling (saltation) as a result of storm waves, and plays an important role in beach stability. The direction of drift transport is generally in the direction of prevailing winds, which may differ in the summer and winter. The predominant, or net-shore drift direction is the most important consideration for coastal processes. Net-shore drift north of the Woodmont neighborhood is northerly and south of Woodmont the predominant net-shore drift is southwesterly. A mapped transition zone is located near Saltwater State Park (Ecology, 2000). There is a short section of shoreline with net-shore drift to the south just north of the Des Moines marina.

Where natural net-shore drift is blocked, beach processes are altered. Transported sand and gravel accumulates on the updrift side of shore obstructions (the side opposite the net-shore drift direction) and is depleted on the downdrift side of obstructions by blocking the transport of drift

material. Such obstructions include human-built structures such as bulkheads, breakwaters, groins, docks, and boat ramps. In areas where the beach is depleted, erosion accelerates.

Owners of property adjacent to the shore commonly construct rock or concrete bulkheads to protect the bank or bluff from erosion. Such measures can increase beach depletion as wave energy is reflected rather than absorbed. The shoreline processes and conditions along Des Moines are summarized in the *Net-shore Drift of King County* (Chrzastowski, 1982) which updated the coastal drift section of the *Coastal Zone Atlas of King County* (Ecology, 1979) and are currently being reevaluated by Johannessen and others (personal communications) in work underway for WRIA 9 and WRIA 8. Specific conditions in Des Moines are discussed in the section of this report titled Nearshore Physical Characterization.

Historic Land Use Development

The Des Moines area was traditionally used by Native Americans for salmon fishing and clamming in the streams and shoreline before European settlement. Europeans began to arrive in the early 19th century, first as explorers and later as settlers. The first homestead claim certificate in the Des Moines area was granted to John Moore in 1872. In 1889 the plat of the Town of Des Moines was recorded (Des Moines Historical Society, 2004).

Land use in the area has always focused on the shoreline. By the early 20th century the Puget Sound had become a busy waterway as Seattle and Tacoma grew as port cities. The Sound provided transportation for recreation, food, and natural resources. During World War I, Des Moines became a destination for summer visitors, many of whom built large homes. Also at this time an existing dock was enlarged to accommodate a ferry that made runs between Vashon Island and Des Moines. Food and recreation continued to be the main attractions in the 1920's and 1930's. Des Moines Beach Park and Salt Water Park were developed during this time (Des Moines Historical Society, 2004).

During and after World War II the population of Des Moines boomed. The City was officially incorporated in 1959. Commercial development in the upland areas was further spurred first when Highway 99 (Pacific Highway South) was built in the 1920's, and then when Interstate-5 and its associated interchanges were built in the 1960's. Development in recreation continued as well. In the 1970's the City built the Marina and fishing pier.

Development along the Des Moines shoreline has historically been dominated by single-family housing. Today the City is highly developed, predominantly by single-family homes, with multi-family, and commercial areas located in the Downtown/Marina area, along Pacific Highway, I-5, and arterial streets such as the Kent-Des Moines Highway (City of Des Moines, 2002). Figures 6a and 6b show the current city limits and surrounding area in 1942 and 2002 respectively. The air photos illustrate two important points in characterizing the Puget Sound shoreline in Des Moines. First, development at the water's edge has been in place for decades (see the downtown Des Moines, Zenith, Woodmont, and Redondo areas in 1942). Second, upland development throughout the Des Moines area watershed has removed vegetation and increased impervious surface area. These conditions are characteristic of western King County and the Puget Sound shoreline. The City's development and urbanization have resulted in increased stormwater runoff and peak flows with associated flooding and increased pollutant loads in streams. These conditions affect fish and wildlife habitat and natural stream morphology. The City is expected

to experience continued economic and population growth in the coming decade and these issues will continue to require attention (City of Des Moines, 2002).

Major Land and Shoreline Uses

Generalized existing land use, according to King County assessor codes, is shown on Figure 7. Single-family housing is the most dominant land use within the City's shoreline jurisdiction, representing approximately 57 percent of the City's shoreline. Another nine percent of the shoreline is vacant but zoned for single-family residential development. The second major shoreline use in Des Moines is described as public facilities, which includes the Des Moines Marina near downtown, and the beach, boat launch, and Highline Community College Marine Science and Technology Center in the Redondo neighborhood. Public facilities comprise approximately 16 percent of the Des Moines shoreline. Commercial properties are located adjacent to the Des Moines Marina and the Redondo beach and boat launch areas. Parks make up the third largest shoreline use in the City of Des Moines, including Des Moines Beach Park and Saltwater State Park, which represent approximately nine percent of the City's shoreline. Multi-family residential development near the south end of the Des Moines Marina and in the Redondo neighborhood comprise the remaining area (approximately five percent) along the shoreline.

Water Quality

Section 303(d) of the Federal Clean Water Act requires Washington State to periodically prepare a list of all surface waters in the State for which beneficial uses of the water, such as drinking, recreation, aquatic habitat, and industrial use are impaired by pollutants. The Washington Department of Ecology maintains a 303(d) list, composed of waterbodies where tested pollutants have exceeded thresholds established by the state surface water quality standards (WAC 173-201A). Streams that do not appear on the 303(d) list may fall short of that pollutant threshold, but may not be free of pollutants. In addition, not all streams are tested as part of this process. Therefore absence from the 303(d) list may not necessarily indicate that the waterbody is not impaired. The 1998 303(d) list was the last one submitted to and approved by EPA. A preliminary draft of Washington State's 2002/2003 303(d) list is currently available for public review (January 15 through March 15, 2004). Although not yet approved, the listings have been included below.

Several of the streams that discharge into the Puget Sound through the Des Moines shoreline jurisdiction are included on Washington State's 303(d) list. Some are listed for multiple pollutants. Table 2 shows the waterbodies listed in both the 1998 approved 303(d) list and the proposed 2002/2003 list, as well as the pollutants that impair their use and the medium for which they were tested.

Table 2. 303(d) List of Waterbodies in Des Moines, WA

Waterbody Name	Parameter	Year	Medium
Puget Sound (S-Central, East Passage)	Fecal Coliform	98' 02'	water
	Ammonia-N	98'	water
	pH	98'	water
	2,4-Dimethylphenol	02'	sediment
	2-Methylphenol	02'	sediment
	Benzyl Alcohol	02'	sediment
Des Moines Creek	Fecal Coliform	98', 02'	water
Massey Creek	No impairment reported		
McSorely Creek	Fecal Coliform	98', 02'	water
Woodmont Creek	No impairment reported		
Redondo Creek	Fecal Coliform	98', 02'	water
Cold Creek	No impairment reported		

In 1994 the City of Des Moines implemented a water quality-monitoring program. The objectives of the program were to evaluate water quality in three streams over a five-year period at upstream and downstream locations. The data were to be used to assess the effects of a program of stormwater management and non-point source pollution control implemented under the *City of Des Moines Comprehensive Stormwater Management Plan* (Parametrix, 1991). The monitoring continues to be ongoing. Water quality monitoring also occurs at the Highline Community College Marine Science and Technology Center, located in the Redondo waterfront area.

NEARSHORE LAND USE PATTERNS

The City of Des Moines is located in southwest King County. Des Moines is highly developed and has a well established pattern of land use. The City is bounded by approximately 4 miles of Puget Sound shoreline to the west and Pacific Highway South and Interstate-5 (I-5) to the east. The cities of Normandy Park and SeaTac form Des Moines' northwest and northeast borders respectively, the City of Kent is to the east and the City of Federal Way is to the South. The City's shoreline jurisdiction is composed of a variety of natural and human-modified landscape features that include natural and modified beaches, concrete, wood and rock bulkheads, roads, and the marina facility.

Existing Land Use

The City of Des Moines is predominantly developed as single-family residential, with multi-family and commercial developments located in limited areas. The City has a diversity of housing types. Slightly less than half of the housing units are single family; approximately the same proportions of units are apartments, condominiums, and retirement and group homes. Mobile homes comprise the remainder of the housing units (City of Des Moines, 2002). Existing land use is shown in Figure 7.

Single family residential development is the dominant land use, it occupies approximately 53 percent of the land area in the City of Des Moines. Multi-family development occupies seven percent and mobile homes occupy one percent. Commercial developments (including services, retail sales, and light industrial uses) occupy approximately six percent of the City's land area and are located primarily in the Downtown/Marina area, and along major transportation corridors including Pacific Highway South and Kent-Des Moines Road. Public Facilities (including the Marina, Redondo Beach area, and Schools) occupy seven percent of the City's land area. Vacant lands occupy approximately 18 percent of the City (City of Des Moines, 2002).

Several of Des Moines' neighborhoods are located along the Puget Sound shoreline. They include Downtown, Zenith, Woodmont West, and Redondo. The Downtown Neighborhood's shoreline includes both the Marina and Des Moines Beach Park. The majority of lands along the shoreline in both the Zenith and Woodmont West neighborhoods are occupied single-family development. The small number of multi-family developments and commercial developments along the Puget Sound shore are all located in the Redondo Neighborhood to the south and surrounding the Marina in the north. Public access to the shoreline in the City includes Des Moines Beach Park, north of the Marina, the Des Moines Marina, Saltwater State Park and the Redondo neighborhood.

The Des Moines Marina is the largest single facility/structure within the City's shoreline jurisdiction. The marina was built in 1970 and consists of permanent and temporary moorings, a public boat launch, restrooms and showers, a fishing pier, a fueling facility, and commercial areas and services. The Marina occupies approximately a half-mile of the Puget Sound shoreline. The upland shoreline of the Marina consists of a timber pile seawall. The pilings in the seawall are each attached to concrete weights buried under the pavement about 30 feet behind the wall. The Marina is sheltered by a rubble rock breakwater structure, approximately 2,000 feet long. The commercial facilities at the Marina include a boat repair yard, boat sales,

restaurant, and the Des Moines Chamber of Commerce (business promotion office). According to the Marina Master Plan (2002), commercial development in the marina will increase in the course of implementing that plan.

Comprehensive Plan / Zoning Designations

Comprehensive Plan

According to the City of Des Moines Comprehensive Plan Map (2004), the City's shoreline jurisdiction is largely comprised of properties designated as low to medium-density residential (1–6 dwelling units per acre). Parks and Public Facilities/Utilities designations comprise the second largest portion of the shoreline. Small areas designated as commercial and multi-family, located in the Downtown and Redondo neighborhoods, comprise the remainder.

General goals and policies established in the City of Des Moines Comprehensive Plan (2002) relate to the preservation of existing residential neighborhood character, protection of environmental resources, and the promotion of economic development. The Comprehensive Plan seeks to balance these social, environmental, and economic goals through land use and zoning regulations, critical areas regulations using best available science, and development regulations. The Comprehensive Plan also seeks to protect surface water quality, shoreline and nearshore habitats, and aquatic, marine, and upland habitats by managing these resources using a watershed approach (City of Des Moines, 2004).

The City's existing Shoreline Master Program goals and policies are included as an element of the City's current Comprehensive Plan. These goals and policies encourage water-oriented uses and existing residential uses in balance with protection of the Puget Sound shoreline's natural resources (City of Des Moines, 1991). This document also establishes shoreline environment designations as either Urban Environment (UE) or Conservancy Environment (CE), depending on the land use and intensity of development (City of Des Moines, 1988). The existing shoreline environment designations are shown in Table 3 and on Figure 8. The City of Des Moines has grown since adoption of the 1988 Shoreline Master Program, therefore some areas of the current shoreline were not originally classified. The City adopted the King County SMP shoreline environment designation "Urban Environment" for areas annexed since 1988 (specifically, areas south of and including Saltwater State Park, Segments D-G).

Zoning Designations

Zoning designations in the City of Des Moines generally follow land use designations as discussed above under Comprehensive Plan Designation (Figure 9). Within the City's shoreline jurisdiction, Residential: Single Family (RS-15,000, RS-9,600, and RS-7,200) predominates. Areas in the shoreline jurisdiction that are not zoned Single Family include the Des Moines Marina, which is zoned Downtown Commercial (D-C) and a small number of properties in the Redondo Neighborhood, which are zoned Residential: Multi Family (RM-2,400, RM-1,800, and RM-900) and Community Commercial (C-C) (City of Des Moines, 2004). Table 3 identifies the relative percentages of existing land uses and zoning areas in each planning segment, based on current zoning maps.

Table 3 also identifies the estimated impervious area for each shoreline segment. This information is summarized from the marine shoreline inventory completed for WRIA 9 (Anchor Environmental, 2004). For that study, aerial photo interpretation was conducted to estimate the amount of impervious area within 200 feet of the shoreline. Segments were then designated as having High, Medium, or Low impervious area, where High represents greater than 75 percent impervious area; Medium represents between 10 and 75 percent; and Low represents less than 10 percent. This information was reorganized to estimate impervious area for each shoreline planning segment in Des Moines. For each segment, the percentage of the segment length classified as High, Medium, or Low is shown.

Table 3. Land Use, Zoning, and Shoreline Environments

Shoreline Segment	Existing Land Use (Figure 7)		Comp. Plan Land Use Designation		Zoning (Figure 9)		Estimated Impervious Surface*		Existing Shoreline Designation (Figure 8)
A	PARK SFR VAC	74.8% 16.6% 8.6%	MF36 PARK	7.8% 92.2%	R-SE RM-900	91.9% 8.1%	Low Med High	0% 100% 0%	Conservancy
B	COM MFR PARK PF SFR VAC	12.1% 2.0% 10.1% 53.8% 1.7% 20.3%	COM MF18 MF36 PARK PF	10.0% 5.5% 2.1% 0.4% 82.0%	D-C R-SE RM-1800 RM-900 RM-900A	92.0% 0.4% 5.5% 0.7% 1.4%	Low Med High	0% 0% 100%	Urban
C	MFR SFR VAC	6.7% 88.0% 5.3%	MF18 SF3 SF6	8.4% 87.4% 4.3%	RM-1800 RS-15000 RS-7200	8.4% 87.4% 4.3%	Low Med High	25% 67% 8%	Conservancy
D	PARK	100.0%	PARK	100.0%	R-SE	100.0%	Low Med	25% 75%	Urban
E	MFR SFR VAC	5.9% 87.4% 6.7%	MF18 MF24 MF48 PARK SF4 SF6	0.3% 0.8% 0.7% 4.3% 16.7% 77%	RM-1800 RM-2400 RM-900 RS-7200 RS-9600	0.8% 3.0% 0.8% 78.7% 16.7%	Low Med High	29% 65% 6%	Urban
F	COM PF VAC	13.3% 69.2% 17.5%	COM PARK	30.8% 62.8%	C-C R-SE RM-900	30.2% 67.9% 1.9%	Low Med High	0% 0% 100%	Urban
G	MFR MH SFR VAC	13.0% 4.4% 78.7% 3.9%	MF24 SF4 SF6	7.9% 29.2% 62.9%	RM-1800 RS-7200 RS-9600	7.9% 62.5% 29.5%	Low Med High	0% 76% 24%	Urban

Table 3 Key

Existing Land Use	Comp. Plan Land Use Designation	Zoning
COM: Commercial	Comprehensive Plan Designations:	Zoning Designations:
MFR: Multifamily Residential	COM: Commercial	C-C: Commercial
MH: Mobile Home	MF18: Multifamily (18 du/ac)	D-C: Downtown Commercial
PARK: Park	MF24: Multifamily (24 du/ac)	RM-900: Multifamily (900 sq.ft. lot area/du)
PF: Public Facility	MF36: Multifamily (36 du/ac)	RM-1800: Multifamily (1,800 sq.ft. lot area/du)
SFR: Single Family Residential	MF48: Multifamily (48 du/ac)	RM-2400: Multifamily (2,400 sq.ft. lot area/du)
VAC: Vacant	PARK: Park	R-SE: Residential – Suburban Estates
	PF: Public Facility/Utility	RS-7200: (Single Family Residential (7,200 sq.ft. min lot size)
	SF3: Single Family (3 du/ac)	RS-9600: (Single Family Residential (9,600 sq.ft. min lot size)
	SF4: Single Family (4 du/ac)	RS-15000: (Single Family Residential (15,000 sq.ft. min lot size)
	SF6: Single Family (6 du/ac)	

* Impervious surface categories - High = >75% or greater, Med = 10% – 75%, Low = <10% (Anchor Environmental, 2004)

Roads and Transportation Facilities

As described above the majority of the City's shoreline is occupied by low density single family development. Public shoreline access is available only at Des Moines Beach Park, the Des Moines Marina, Saltwater State Park and in the Redondo neighborhood. Limited shoreline access and uniformity in shoreline land use (single family) created a land use pattern with relatively few roads in the City's shoreline jurisdiction. Most of the roads that provide access to the shoreline are located outside the City's shoreline jurisdiction. The exceptions are Redondo Beach Drive South, and Sound View Drive South, which run along the shoreline in zone F and G, Redondo Way South, which enters the shoreline from the east in Segment F, and Cliff Avenue South, which accesses the Marina and Des Moines Beach Park in Segments A and B. All other streets in the City's shoreline jurisdiction are local streets.

North of Des Moines Beach Park are several homes located on the Puget Sound Shoreline in the City of Normandy Park. These homes owners access their property by driving along the beach from Des Moines Beach Park, a distance of approximately 2,000 feet. The beach access is a concrete ramp located in Des Moines Beach Park that allows cars on to the beach.

As defined by the City of Des Moines Comprehensive Transportation Plan (2001), Redondo Beach Drive South and Redondo Way South are classified as Collector Arterials and are the only major roadways within the City's shoreline jurisdiction (Segment F and G). However, several larger roadways influence the shoreline area by providing access, but are outside of the City's shoreline jurisdiction. East of the Marina (Segment B) 7th Avenue South and Marine View Drive South are signalized three lane roadways that run from South 216th South to South 227th Street, where 7th Avenue South ends. Both are classified as Minor Arterials. Marine View Drive South becomes a two-lane roadway, classified as a Collector Arterial, at its intersection with Kent-Des Moines Road. Also in Segment B, South 222nd Street and South 223rd Street are both two-lane streets that run east/west from 24th Avenue South to the Des Moines Marina. Marine View Drive South continues south, through Segments C, D, and E, to a terminus at Woodmount Drive South (City of Des Moines, 2001).

A system of sidewalks, marked asphalt paths, and on street bicycle lanes exist within the City of Des Moines. These features exist primarily in the vicinity if the Marina and Downtown neighborhood. Particularly along Marine View Drive South, 216th Avenue South, 222nd Avenue South, and 7th Ave South. Redondo Beach Drive South also has existing sidewalks for pedestrian and bicycle use (City of Des Moines, 2001). Transit services in the City of Des Moines are provided by King County Metro. The only transit route in the Des Moines shoreline vicinity is Route 130 that provides service along Marine View Drive South (City of Des Moines, 2001).

Wastewater and Stormwater Utilities

The Midway Sewer District (MSD), Southwest Suburban Sewer District (SSSD), and the Lakehaven Utility Districts (LUD) provide for the collection, treatment, and disposal of wastewater for the City of Des Moines.

The SSSD covers a northern portion of the City in the North Hill neighborhood, extending from the northern boundary with Burien, the western boundary with Normandy Park, and the southern boundary at approximately South 208th Street. The SSSD does not have any facilities (pump stations, treatment plants etc.) within the City of Des Moines (City of Des Moines, 1995). Sewer lines convey effluent north to a treatment plant in Normandy Park and an outfall located west of Sea-Tac Airport.

The MSD covers the majority of the City of Des Moines. Wastewater collected in the MSD is treated at the Des Moines Creek Wastewater Treatment Plant, located in the Central Des Moines neighborhood between South 212th Street and South 216th Street, and then conveyed to an outfall located north of the Des Moines Marina. MSD wastewater facilities located in the City include the treatment facility as well as 13 pump stations. Five of the pump stations are in the vicinity of the shoreline (MSD, 2000).

The LUD covers a southern portion of the City, in both the Redondo and Woodmont West neighborhoods, generally south of Woodmont Drive South, and west of 16th Avenue South and extending south to the City boundary with Federal Way. The LUD also covers a portion of the Shoreline north of Woodmont Drive South to approximately South 260th Street. The Lokota and Redondo treatment plants provide secondary treatment of effluent. The Redondo Treatment Plant is located in the Redondo Neighborhood. Four pump stations and an outfall are also located along Redondo Beach, in the City's shoreline (City of Des Moines, 1995).

The City of Des Moines has jurisdiction over the storm and surface water management system located within the city boundaries, within and outside of roadways. Stormwater utilities generally consist of a mix of open ditches and channels, pipes, vaults and open retention/detention facilities, and outfalls to streams or Puget Sound.

Other utilities in the shoreline jurisdiction include electric power, gas, and cable. Puget Sound Energy owns and operates a power cable connection to Vashon Island. The cable runs underground through the north end of the Marina and underwater to the Island. According to City staff, Comcast Corporation is currently seeking permits to run a cable to Vashon in approximately the same location as the Puget Sound Energy power line.

Existing and Potential Public Access Sites

Approximately 25 percent of the City's shoreline is available for public access and use, the remainder being residential development. Figure 10 shows the locations of all the shoreline public access sites within the City's shoreline Jurisdiction. Existing parks, open space, and public facilities in the City's shoreline jurisdiction include the following:

- **Des Moines Beach Park** – This 19.6 acre Community Park is located directly north of the City of Des Moines Marina. The mouth of Des Moines Creek is located in the park. The park provides access to the Puget Sound waterfront and 2.7 acres of tidelands. The park also contains a picnic shelter, meadows, historic and recreation buildings, play equipment, parking and access to the Des Moines Creek trailhead (City of Des Moines, 2003).
- **Des Moines Marina and Fishing Pier –** The Marina and fishing pier occupy 13 acres along the City's northern Puget Sound shoreline. The marina offers boat moorage, a boat ramp, boat repair, restaurants, shops, walkways, parking/storage, a fishing pier, restrooms, benches and picnic tables (City of Des Moines, 2003).
- **South 239th Street Access –** This 0.1 acre mini-park offers access to the Puget Sound shoreline at the end of South 239th Street. Its amenities include a picnic table, stairway and ladder for beach access (City of Des Moines, 2003).
- **Saltwater State Park** – Saltwater State Park is an 88-acre marine camping park with 1,445 feet of shoreline on Puget Sound. The park provides two kitchen shelters without electricity, plus 147 unsheltered picnic tables. Most picnic sites are near the beach or along McSorley Creek. The park also has an underwater, artificial reef on Puget Sound. The area is often used for scuba diving and fishing (City of Des Moines, 2003).
- **Redondo Beach Park –** This 2.79 acre waterfront park provides access to the Puget Sound shoreline as well as a fishing pier, boardwalk, walking path, and boat moorage and launch. The park's other amenities include restrooms, picnic areas, scenic views, and parking (City of Des Moines, 2003).
- **Highline Community College Marine Science and Technology Center** - Located at the Redondo waterfront, this facility is occasionally open to the public for lectures, facility tours, guided experiments and interpretive displays intended to engage and educate the public about Puget Sound marine ecology and water quality.

Opportunities for enhanced or expanded public access to the shoreline in Des Moines is limited. The City and State park resources and the public piers, marina, and boat launches offer access to the shoreline and Puget Sound throughout the City. Most other areas are developed residential or commercial properties. The City could explore developing additional street-end overlooks or beach access points similar to the South 239th Street Access. Undeveloped street-end right of ways are located at South 240th Street and South 249th Street.

Historical/Cultural Resources

The Historical/Cultural Element of the 1988 Des Moines Shoreline Master Program provides a general goal and policy to retain and protect shoreline features having historic, cultural, scientific, or education value and to encourage development and interpretation of those sites

(City of Des Moines, 1988). The Des Moines Comprehensive Plan also addresses historic preservation. The Plan establishes goals to insure that historic properties and archeological sites are protected from undue adverse impacts associated with incompatible land uses, transportation facilities and detrimental noise levels. Policies in the Comprehensive Plan define characteristics, which enable the identification of historic and archeological sites, and direct the City to preserve and protect these sites from incompatible land uses (City of Des Moines, 2004).

The King County Historic Preservation Program (KCHPP) maintains a list of King County and local landmarks. There are four historical building in the shoreline vicinity. The Van Gasken House (built in 1889) is located on South 222nd Street in the Downtown neighborhood. The FW Morse Summer House (1905) WD Cotter Summer House (1905), and the Lumber Mill Office (1900) are all located along Redondo Beach Drive South in the Redondo Neighborhood (KCHPP, 2004). Three recorded archaeological sites are located in the vicinity of the shoreline in the city. These sites, and the traditional use of the area by Native Americans for fishing and clamming suggest that there is a high probability for archaeological resources in the city's shoreline jurisdiction (KCHPP, 2004).

Washington State's Office of Archeological and Historic Preservation (OAHP) maintains the Washington State Inventory of Cultural Resources. A request for information on listed historic or archeological sites in the State's database has been made and will be reported at a later date.

NEARSHORE PHYSICAL CHARACTERIZATION

Nearshore Processes

Substrate composition in coastal areas is a dynamic result of sediment source, beach, or shoreline stability, and the predominant (or net-shore) drift direction. Critical to the shoreline environment is sediment supply. Streams entering the jurisdiction deposit sediment at the shoreline. Sediment is also supplied to the nearshore environment as shoreline bluffs erode. These feeder bluffs provide a constant supply of material (Ecology, 1979). Once in the nearshore, sediment is available for transport by shore drift (i.e., currents running parallel to the shoreline move sediment). Shoreline modifications can alter the natural processes affecting sediment transport.

The Washington Department of Natural Resources (WDNR) ShoreZone Inventory (2001) characterizes shoreline sediment as stable, erosional (areas where sediment is eroding or being depleted), or accretionary (areas where sediment is accumulating). ShoreZone identifies coastal sediment sources as fluvial, alongshore, and backshore. Fluvial sources are streams or rivers that deliver sediment to the nearshore. Alongshore source refers to sediment being transported parallel to the beach by net-shore drift. Backshore sources are onshore sources derived by mass wasting, such as eroding "feeder" bluffs or banks, but excluding fluvial sources. The Washington Digital Coastal Zone Atlas (Ecology, 2000) maps net-shore drift direction and areas without appreciable drift (which include highly modified, protected harbor shorelines), based on the work of Chrzastowski (1982) and others (Figure 11). Net-shore drift, as mapped by Chrzastowski (1982), is generally northward, at and north of Saltwater State Park (Segments C and D) and southward, south of Saltwater State Park (Segments E, F, and G), with a transition zone occurring just south of Saltwater State Park (northern portion of Segment E). Chrzastowski also places a short drift reversal (to the south) on the north side of the Des Moines Marina (Segment A) with the drift transition centered approximately 750 feet north of the marina. Table 4 summarizes the approximate intertidal beach width, primary sediment sources, shoretype, and netshore drift direction.

Table 4. Shoreline Sediment Sources And Mobility

Shoreline Segment	Approximate Intertidal Width (ft.) (1)	Estimated Sediment Source (2)	Shoretype(3)	Netshore Drift Direction (2 and 4)
A	83	Fluvial (all of segment, at Des Moines Creek)	Accretional	South
B	2 – 40	Not determined at marina	Modified	No appreciable drift
C	30 – 80	Backshore and Alongshore	Accretional and Modified	North
D	72	Fluvial (all of segment, at McSorley Creek)	Modified	North
E	30 – 80	Alongshore (most of segment); Fluvial (at Woodmont and McSorley Creeks	Mostly modified; accretional at Woodmont, Redondo, and McSorley creeks; transport and feeder bluff and transport south of McSorley Creek	Transitional/ South

Shoreline Segment	Approximate Intertidal Width (ft.) (1)	Estimated Sediment Source (2)	Shoretype(3)	Netshore Drift Direction (2 and 4)
F	42	Fluvial (all of segment, at Redondo Creek)	Accretional	South
G	20 – 80	Alongshore (most of segment); Fluvial at Cold Creek	Mostly stable; accretional at Cold Creek	Southwest

Source: (1) Washington Department of Natural Resources (WDNR), 2001; (2) Digital Coastal Zone Atlas, Ecology, 2000; (3) CGS, in prep; (4) Chrzastowski, 1982.

Geologic Units

The City is located on a broad upland plateau generally lying between 300 and 400 feet in elevation, and bounded to the east and west by steep bluffs (Figure 4). The City extends from the upland plateau on the east to the shoreline on the west. The steep bluff to the west and the shoreline at its base comprise the City's shoreline jurisdiction.

A sequence of glacial and nonglacial deposits underlies the ground surface in the vicinity of the jurisdiction. Waldron (1961 and 1962) mapped the Des Moines and Poverty Bay quadrangles, which includes the City jurisdiction. The geology shown on Figure 4 was obtained from King County's surficial geology GIS data (King County, 2002). The geology of these quadrangles has recently been remapped, and revised geologic maps are to be published soon (Booth and Waldron, and Booth et al., in press). The steep shoreline bluffs and stream valley walls within the jurisdiction segments A through E are generally mapped as fine and course Pre-Fraser deposits (Figure 4), i.e., they were deposited during glacial or interglacial times preceding the most recent glaciation. More gently sloped areas above and landward of these steep shoreline slopes are mostly mapped as till of the Fraser glaciation. Mass wasting deposits and recent landslide deposits are present in segment E, south of Woodmont Creek, and in segments F and G (Figure 11). Mass wasting is a generic term for transportation of sediment downslope by gravity, and includes slow displacement processes, such as soil creep, and rapid displacement processes, such as landslides or mudflows. Mass wasting deposits are commonly mapped where broad areas of soils on steep slopes have undergone movement downslope but where discrete landslides cannot readily be mapped because of coalescing deposition from numerous landslides over time. Other recent deposits include beach at the base of the shoreline bluff and younger alluvium on the base of ravines entering the jurisdiction and in stream deltas.

Soils

Soils in all segments include coastal beach, which are flanked by steep bluffs of Alderwood and Kitsap soils with very steep slopes in segments A, C, D, and E (Figure 3). Alderwood soils generally form in till while Kitsap soils form in fine-grained lacustrine deposits. More gently sloped ground above the steep bluffs in these segments are mapped as Alderwood gravelly sandy loam with slopes from 0 to 15 percent. Alderwood soils on slopes of 6 to 15 percent are also mapped in segment F where no steep bluff exists.

Most of segment E south of Woodmont Creek is mapped as Kitsap silt loam on 15 to 30 percent slopes. A steep bluff is absent along this portion of the segment and the hillside along and above the jurisdiction is mapped geologically as mass wasting deposits. This portion of the bluff is a

large landslide complex, mapped as an Unstable Old Slide on the Coastal Zone Atlas, that may have failed during one or more large earthquakes (AGRA, 1997, and Shannon & Wilson, 1998). This large landslide complex periodically reactivates, most recently in January 1997.

Where not coastal beach, most of segments G and F are mapped as urban land. Smaller areas of urban land are also designated in segment A, along Des Moines Creek. The mouth of Massey Creek in segments B and C is mapped as Pilchuck loamy fine sand, which forms on alluvial terraces. Indianola loamy fine sand on slopes of 4 to 15 percent generally forms on deposits of outwash sand. These soils were mapped in very small areas in segments A, B, and G.

Seismic Hazard Areas

Seismic hazard areas are defined in Chapter 18.04.557 of the Des Moines Municipal Code (DMMC) as those areas subject to severe risk of earthquake damage as a result of seismically induced settlement or soil liquefaction. These conditions occur in areas underlain by cohesionless soils of low density, usually in association with a shallow groundwater table. No seismic hazard areas are identified within the shoreline jurisdiction in the King County Sensitive Areas Map Folio (King County, 1990). However, Washington Department of Natural Resources maps areas of liquefaction susceptibility in all segments except Segment F, often associated with the lower reaches and stream mouths of Des Moines, Massey, McSorley, Woodmont, and Cold Creeks (Figure 12).

Landslide Hazard Areas

Landslide hazard areas are defined in Chapter 18.04.363 of DMMC as those areas of the city subject to a severe risk of landslide. They are defined as any area with a combination of slopes greater than 15 percent, impermeable soils, and springs or groundwater seepage; any area showing movement during the last 10,000 years; or any potentially unstable area as a result of stream incision.

Landslide hazard area information for the City's shoreline jurisdiction was taken from the King County Sensitive Areas Map Folio (King County, 1990) and is shown on Figure 10. Designated landslide hazard areas include the shore bluff in segment D, segment E excluding the flatter slopes at the southern end of the segment in the community of Redondo, and the steep slopes on either side of Cold Creek in segment G. The extent of designated landslide hazard areas may not correspond exactly with the mapped extent of mass wasting deposits or with the slope stability and landslide area designations indicated on the Coastal Zone Atlas (Figure 11).

Erosion Hazard Areas

Erosion hazard areas are defined in Chapter 18.04.262 of DMMC as those areas underlain by soils identified by the U.S. Department of Agriculture Soil Conservation Service as having "severe" or "very severe" erosion hazard potential. Such areas designated on King County GIS maps (King County, 2002) include all coastal bluffs and steep slopes within the jurisdiction, which includes all shoreline segments. These areas are shown on Figure 12.

Shoreline Slope Stability

The Department of Ecology Coastal Zone Atlas (Ecology, 1979) characterizes the slope stability of the entire shoreline along Puget Sound. Although the City does not regulate shoreline development based on slope stability characterization, the maps provide an additional source of documented landslide areas and stability. This mapping should not be considered comprehensive and does not include landslides that have occurred since the late 1970s.

In the Coastal Zone Atlas, slope stability is defined in terms of six separate categories: stable, intermediate, unstable, unstable recent landslide, unstable old landslide, and modified. Table 5 describes these slope stability categories. These designated areas are shown on Figure 11.

Table 5. Ecology Slope Stability Map Designations

Slope Stability Designation	Definition
Stable	Generally rise less than 15 percent in grade, except in areas of low groundwater concentration or competent bedrock. Include rolling uplands and lowlands underlain by stable material (i.e., unweathered till and/or peat deposits) with no significant slope.
Intermediate	Generally steeper than 15 percent except in areas where weaker material and/or abundant material exist. These areas include slopes of sand and gravel, till, or thin soils over bedrock with no known failures.
Unstable	Slopes that are considered unstable due to geology, groundwater, slope, and/or erosional factors which include areas of landslide and talus too small or obscure to be mapped.
Unstable Recent Landslide	Recent or historically active landslide areas (based on surveys conducted in the late 1970s).
Unstable Old Landslide	Post-glacial but prehistoric landslide areas.
Modified	Slopes that are highly modified by human activity and include areas of significant excavation or filling. Response of the slope to a combination of human activity and natural processes may be unpredictable.

Aquifer Recharge Areas

Critical aquifer recharge areas are defined in WAC 365-190-030 as geographic areas "where an aquifer that is a source of drinking water is vulnerable to contamination that would affect the potability of the water." Areas of high susceptibility are those areas that are most susceptible to groundwater contamination and have high beneficial use, such as sole source aquifers and municipal wells. Critical aquifer recharge areas and areas of high susceptibility within the watershed are indicated on Figure 5. A substantial portion of the jurisdiction is designated as areas of high susceptibility; however, only Segments A and B lie within an aquifer protection zone. The areas of Segments A and B designated as having high susceptibility are restricted to the top of the steep shore bluff in Segment A and the southern end of Segment B.

Streams

The DMMC (18.04.587) defines a "Stream" as:

> *an area where surface waters flow sufficiently to produce a defined channel or bed. A defined channel or bed is indicated by hydraulically sorted sediments or the removal of vegetative litter or loosely rooted vegetation by the action of moving water. Stream channels or beds show clear evidence of the passage of water and include, but are not limited to, bedrock channels, gravel beds, sand and silt beds, and defined channel swales. The channel or bed need not contain water year-round. This definition is not meant to include irrigation ditches, canals, storm or surface water runoff devices, or other entirely artificial watercourses unless they are used by salmonids or used to convey streams naturally occurring prior to construction. Swales, which are shallow drainage conveyances with relatively gentle side slopes and generally with flow depths less than one foot, shall be considered streams when hydrologic and hydraulic analyses done pursuant to a development proposal predict formation of a defined channel after development.*

Streams provide valuable wildlife corridors, a source of fluvial sediments to the marine shoreline (moved along the shoreline by currents), and support a range of fish species. The City of Des Moines is located in Water Resource Inventory Area (WRIA) 9, the Duwamish-Green River and Central Puget Sound Watershed. Information on stream conditions was drawn in particular from the following documents: *Habitat Limiting Factors and Reconnaissance Assessment Report, Green/Duwamish and Central Puget Sound Watersheds (WRIA 9 and Vashon Island)* (Kerwin and Nelson, 2000), *A Catalog of Washington Streams and Salmon Utilization - Volume I, Puget Sound Region* (Williams et al., 1975). Shoreline Segment B does not contain streams. Des Moines Creek, which originates from groundwater seeps near the Sea–Tac International Airport, discharges to Puget Sound in Segment A. Massey Creek and an unnamed creek discharge to Puget Sound and are located within Segment C. McSorley Creek discharges to Puget Sound and is located within Segment D. Woodmont Creek discharges to Puget Sound and is located within Segment E. Redondo Creek discharges to Puget Sound and is located within Segment F. Cold Creek discharges to Puget Sound and is located within Segment G. Streams are depicted on Figures 5 and 13.

Three of the streams are currently listed on the state Department of Ecology's 1998 and proposed 2002 303(d) list, which lists streams that do not meet water quality standards for one or more parameters (Ecology Website, 2004). These include McSorley (previously known as Cold Springs Creek) in Segment E, Des Moines Creek in Segment A, and Redondo Creek in Segment F. All three streams currently do not meet water quality standards for fecal coliform and a Total Maximum Daily Load (TMDL) analysis is required for each stream.

Hydrology of Des Moines Creek, Massey Creek, and McSorely Creek (North Fork) is characterized in the *Five-Year Project Report, City of Des Moines Water Quality Monitoring Program* (Herrera, 2001). Base and storm flow data on other streams is not available. The report documents sampling results over a five-year period, from 1994-1999. Discharge rates for base flow sampled events ranged from less than 0.1 cfs (Massey Creek) during summer to 9 cfs (Des Moines Creek) during spring. There were no substantial differences between monitoring years in discharge rates observed for base flow sampling (Herrera, 2001).

Flood Hazard Areas

Flood hazard areas are not defined in the DMMC. However, they are typically defined as those areas that are determined to be at risk of having a one percent or greater chance of experiencing a flood in any one year. These areas are typically identified on the Federal Emergency Management Agency (FEMA) flood insurance rate maps as the 100-year floodplain.

All coastal beaches within the City's jurisdiction are included within the 100-year floodplain (King County, 2002). Low areas along the corridors of the Des Moines and Massey Creeks within the jurisdiction are also designated as lying within the 100-year floodplain. The King County Sensitive Areas Map Folio (King County, 1990) shows the beach areas within the jurisdiction and the low area at the mouth of McSorley Creek as lying within the 100-year floodplain. Frequently flooded areas are indicated on Figure 13.

Shoreline Modifications

Shoreline modification refers to structural changes to the shorelines' natural bank. Examples include shoreline armoring (bulkheads, rip-rap, etc.), overwater structures (dock and piers), or dredging and filling. The following assessment of the extent of shoreline modification is primarily based on review of 2001 oblique and 2002 vertical aerial photos. . A field visit on October 6, 2004 was also used to verify the reported shoreline modifications in areas that were accessible.

Dredging

The City does not maintain a regular schedule for dredging the Des Moines Marina. Dredging has occurred twice in the past 25 years. In 1983 approximately 6,912 cubic yards of material was removed from the marina and disposed at an approved site in Commencement Bay. In 1994, approximately 5,616 cubic yards were removed and disposed at an approved site in Commencement Bay (Dusenbury, personal communication, 2005).

Shoreline Armoring

The term shoreline armoring often refers to bulkheads and seawalls. However it can also, more broadly, include the placement of structures in the nearshore in an attempt to intercept wave energy and/or control the movement of sediment (KCDNR, 2001). Shoreline armoring is typically used to protect upland property from wave induced erosion, to retain or stabilize unstable banks, or to create areas of calm water, stabilize entrances to harbors, or establish moorage for vessels. However, shoreline armoring also has the adverse effects on the nearshore physical processes necessary to maintain native species habitats and shoreline functions. These effects include the loss of beach areas, impoundment of sediment, modification of groundwater regimes, lowering of beach elevations, redirection of wave energy, alteration of substrate, and loss of riparian vegetation and associated functions (KCDNR, 2001; MacDonald et al, 1994).

The increase in population in the Puget Sound area in recent years has resulted in the armoring of more than 29 percent of the Puget Sound's shoreline. According to the Washington State Department of Natural Resources ShoreZone Inventory (2001), approximately 64 percent of WRIA 9 (this includes the Green/Duwamish river systems) is armored and 87 percent of the

shoreline has been armored or otherwise modified from historic conditions. These figures are consistent with the level of armoring within the City of Des Moines. Approximately 75 percent of the City's shoreline has been modified by riprap, concrete bulkhead, or wooden bulkhead. Table 6 displays the predominant types of shoreline armoring and approximate percentage of shoreline armored in each of the shoreline planning segments, based on review of 2001 oblique aerial photos and limited field reconnaissance.

Table 6. Shoreline Armoring by Segment

	Segment Length (ft.)	Modified Shoreline*		Description of Armoring**
Segment		Length	Percent	
A	859	859	100%	Rip-rap boulders at north end of park and surrounding mouth of Des Moines Creek. Concrete bulk-head and retaining wall, and unused concrete boat ramp at south end of park.
B	7,931	7,931	100%	Concrete bulkhead and retaining wall for the parking lot at the Marina. Marina breakwater is boulder rip-rap.
C	8,412	4,247	50%	Majority of segment is contiguous concrete bulkheads associated with residential development, interspersed with boulder rip-rap bulkheads and few wooden bulkheads. South of S. 240th Street, areas at base of bluff have unmaintained boulder bulkheads that have begun to wash-out.
D	1,241	885	71%	North end and majority of park has boulder rip-rap with concrete acting as bulkhead and retaining wall for filled area. Both sides of McSorely Creek mouth is armored with boulder rip-rap. South of creek beach is unarmored.
E	8,656	6,689	77%	North end of segment has development on top of bluff and limited bulkheading at the base of bluff. Areas with development at base of bluff have fill areas with lawn and associated concrete and boulder retaining walls/bulkheads. Concrete bulkheading to support road near mouth of Woodmont Creek. South of creek is predominantly concrete bulkheads for residential properties.
F	521	506	97%	Contiguous concrete bulkhead throughout associated with roads, boat launch, and over water structures at Redondo.
G	3,096	2,903	94%	Contiguous concrete bulkhead throughout associated with Redondo Beach Dr. and boardwalk.
Total	30,716	24,019	75%	

* Based on WDNR ShoreZone Inventory; ** Based on review of 2001 oblique aerial photography and field reconnaissance.

Docks, Piers, and Over-Water Structures

Overwater structures include floating docks, covered moorage, piers, or marinas. Overwater structures are typically located in the nearshore. They change the levels of light, shoreline energy regimes, substrate type and stability, and water quality (Nightingale and Simenstad, 2001). These changes result in alterations in the abundance and diversity of species in the

nearshore. Overwater structures, such as piers and breakwaters, can also alter wave energy and sediment dynamics that affect plant propagation, fish foraging, spawning and migration, and shellfish settlement and rearing. Additionally construction materials associated with overwater structures can leach contaminants into the nearshore environment. Along with these direct effects, a number of indirect effects result from some overwater structures as well. Covered moorages and boathouse are associated with cleaning, pesticide, herbicide, paint, petroleum, and other maintenance products entering the water (Nightingale and Simenstad, 2001). The water quality within the Marina is affected by boat engine exhaust, fuel spills, sewage discharge, and contaminated stormwater runoff coming from adjacent parking lots (KCDNR, 2001).

According to the Washington State Department of Natural Resources ShoreZone Inventory (2001), there are 191 docks and piers in all of WRIA 9 and 81 docks and piers along the mainland shoreline (excludes Elliot Bay and Vashon/Maury). Within the City of Des Moines, the most significant overwater structures are associated with the Des Moines Marina (Segment B). The Marina covers approximately 8,600 feet of the shoreline and includes an approximately 650–foot long fishing pier; docks; and covered and uncovered slips. The Redondo area (Segment F) has several overwater structures as well, including a restaurant on pilings, a pier and research facility, a public fishing pier, and a boat launch with associated loading pier.

NEARSHORE BIOLOGICAL CHARACTERIZATION

Wetlands

Wetlands near the Puget Sound shoreline typically include tidal marshes and tidally influenced estuaries. Tidal marshes include salt and freshwater habitats that experience tidal inundation (KCDNR, 2001). Several wetlands have been mapped by various sources in the City's shoreline jurisdiction. According to the 1987 National Wetlands Inventory (NWI), the entire area of the City's shoreline jurisdiction in the city limits is designated as "estuarine intertidal regularly flooded unconsolidated shore" wetland or "estuarine intertidal regularly flooded aquatic bed" wetland (USDI, 1987a and 1987b) with the exception of Segment B, which contains the built out marina. The King County Sensitive Areas Map Folio (King County, 1990) also identifies Class 1 intertidal wetlands encompassing all of Segments C through G within the City's shoreline jurisdiction (Figure 13). Neither indicates the presence of tidal wetlands associated with the streams that occur within the City's shoreline jurisdiction. This is likely due to the presence of riprap along the stream channels extending from the mouth upstream for a majority of the streams, thus cutting off potential connections with interior wetlands. Seasonal palustrine emergent wetlands are associated with Des Moines Creek within the lower portion of Des Moines Creek (Segment A). Hydric soils are mapped along portions of Segments A, most of Segments C and D, and portions of Segment E (NRCS, 1973).

Much of the nearshore area within the City's shoreline jurisdiction is heavily developed (Segments B, C, E, F, and G), and the presence of the Marina (Segment B), moderate to steep cliffs (Segments C, D, and E), residential and commercial development, and shoreline armoring along most of segments A, C, D, E, F, and G have eliminated historical wetlands or prevent connections between interior wetlands and the nearshore area.

Critical Fish and Wildlife Areas

Critical fish and wildlife habitat areas are those areas identified as being of critical importance in the maintenance and preservation of fish, wildlife and natural vegetation. Critical fish and wildlife habitat areas are defined in Chapter 18.04.287 (DMMC) as follows:

> *Fish and wildlife habitat conservation areas include: areas with which endangered, threatened, and sensitive species have a primary association; habitats and species of local importance; all public, and private tidelands or bedlands suitable for commercial or recreational shellfish harvest; kelp and eelgrass beds identified by the washington Department of Natural resources; Herring and smelt spawning areas as outlined in Chapter 220-110 WAC and the Puget Sound Environmental Atlas as presently constituted or as may be subsequently amended; Naturally occuring ponds under 20 acres and their submerged aquatic beds that provide fish or wildlife habitats; Waters of the state as defined in Title 222 WAC; Lakes, ponds, streams, and rivers planted with game fish by a govermental or tribal entity; and State natural area preserves and natural resource conservation areas as defined, established, and managed by the Washington Department of Natural Resources.*

Mapped critical fish and wildlife habitats are shown on Figure 14. Critical fish and wildlife habitats in the City's shoreline jurisdiction are characterized throughout the following sections describing the nearshore biological characterization.

Marine Riparian Zones

Marine riparian vegetation is defined as vegetation overhanging the intertidal zone (KCDNR, 2001). Marine riparian zones function by protecting water quality; providing wildlife habitat; regulating microclimate; providing shade, nutrient and sources of food; stabilizing banks; and providing large woody debris (Anchor Environmental and People for Puget Sound, 2002).

Marine riparian zones were examined through limited field reconnaissance and review of 2001 oblique aerial photos (Ecology, 2001). The existing marina, residential and commercial development, and shoreline armoring have impacted the marine riparian zones of all the city shoreline segments. Marine riparian zones within the City's shoreline jurisdiction are typically associated with the high, steep bluff areas of segments C, D, and E where development is less desirable. The longest contiguous stretch of intact marine riparian vegetation is found in Segment C, between S. 240th Street and Saltwater State Park (Segment D). Marine riparian zones are absent from all of segments A, B, F, and G due to shoreline armoring including concrete and wooden bulkheads, rip-rap seawalls, marinas, and boat ramps (WDNR, 2001) (Table A-3, Appendix A).

Banks and Bluffs

Banks and bluffs are part of the marine riparian zone and are generally the primary source of sediment to adjacent beaches (Downing, 1983), provide habitat to bluff-dwelling animals, rooting area for riparian vegetation, and a source of groundwater seepage to marine waters (KCDNR, 2001). Shoreline development and armoring, vegetation clearing, over-water structures, dredging, and changes in hydrology, among others, adversely impact the natural functions of bluffs.

The ShoreZone Inventory (WDNR, 2001) maps high, steep bluffs capped by till in Segments C and D and moderate height, inclined bluffs capped by till in Segment E (Table A-4, Appendix A).

Beaches and Backshore

Beaches are generally steeper than tidal flats and are often comprised of boulder, cobble, sand and silt areas that form a great majority of Puget Sound's shoreline (KCDNR, 2001). Backshore areas are immediately landward of beaches and are zones inundated by storm-driven tides. Beaches provide habitat for numerous organisms, including cutthroat trout, piscivorous birds (grebes, herons, and mergansers), and shorebirds (Dethier, 1990 in KCDNR, 2001). A typical profile of an undisturbed shoreline in Central Puget Sound would include an upper backshore or storm berm area that collects logs, algae, and other debris during storms (KCDNR, 2001). The intertidal portion of the beach is typically relatively steep and composed of a mixture of cobbles and gravel in a sand matrix (KCDNR, 2001). Sediment abundance throughout the shoreline segments is characterized as a mixture of "moderate" to "abundant" (Table A-1, Appendix A). Sediment stability within the shoreline segments is identified as both accretional and stable

(Table 4). Accretional areas are described portions of Segments A, D, E, F, and G. Stable sediments are documented in all of Segments B and C and within portions of Segments D, E, F, and G (WDNR, 2001). Shoreline activities that may impact beaches and backshores (KCDNR, 2001) include:

- Unnatural erosion or deposition of sediment;
- Harvesting of shellfish and other marine life;
- Fecal and chemical contamination;
- Physical disturbances from shoreline armoring, marina construction, and upland development practices;
- Shading from overwater structures; and
- Loss of emergent and riparian vegetation to monoculture marshes.

The WDNR ShoreZone Inventory utilized the British Columbia ShoreZone Mapping System, which classifies the shoreline into homogeneous stretches (or units) based on key physical controlling factors (WDNR, 2001). Table 7 summarizes the general beach or shoreline substrate composition, based on the British Columbia classification, for each shoreline planning segment (WDNR, 2001). A more detailed characterization for each segment, based on WDNR ShoreZone data, is found in Tables A-1 and A-4, Appendix A.

Table 7. ShoreZone Classification (WDNR, 2001)

Segment	British Columbia Classification*
A	• Sand and gravel flat or fan
B	• Man-made, permeable
C	• Man-made, permeable • Sand and gravel flat or fan
D	• Sand and gravel flat or fan
E	• Sand and gravel flat or fan
F	• Sand and gravel flat or fan
G	• Sand and gravel flat or fan • Sand and gravel beach, narrow

*British Columbia Physical Mapping System (Howes et al., 1994 *in* WDNR, 2001)

Flats

Flats generally include gently sloping sandy or muddy intertidal or shallow subtidal areas (KCDNR, 2001), and are used by juvenile salmonids, shorebirds, and shellfish, among other species. Flats are generally located at the mouths of streams where sediment transported downstream is deposited, and in areas of low wave and current energy where longshore waves and currents deposit sediment (KCDNR, 2001). Sand and gravel flats are mapped in all of Segments A, D, E, and F and portions of C and G (in the vicinity of the Des Moines, McSorley,

Woodmont, Redondo, and Cold Creek outlets). Shoreline activities that may impact tidal flats (KCDNR, 2001) include:

- Coastal Bluffs and Sea Cliffs on Puget Sound, Washington (2004);
- Unnatural erosion or deposition of sediment;
- Harvesting of shellfish and other marine life;
- Fecal and chemical contamination from on-site septic systems, lawn chemicals, and stormwater;
- Physical disturbances from shoreline armoring, marina construction, and upland development practices;
- Shading from overwater structures; and
- Loss of emergent and riparian vegetation.

Subestuaries (Stream Mouths and Deltas)

Subestuaries are those areas of river and stream mouths that experience tidal inundation, including their deltas and any associated marshes (KCDNR, 2001). Deltas are formed by downstream sediment transport. This is an area where the stream or river broadens and fresh and saltwater mix. Subestuaries function to attenuate flooding, provide juvenile salmonid feeding and rearing habitat, acts as a transition area for migrating adult salmonids, support eelgrass beds (depending on salinity), and provide refuge, feeding, and production areas to a wide variety of birds, fish, mammals, and invertebrates (KCDNR, 2001). Subestuaries, especially those rich in organic matter, can support numerous and diverse marine and estuarine invertebrates such as polychaete worms and amphipods. These organisms near the base of the food web can be key to overall ecosystem productivity and habitat value for fish, birds, and mammals (Robohm, personal communication, 2005).

Subestuaries occur in all Segments within the City's shoreline jurisdiction with the exception of Segment B (marina), and are associated with the stream mouths of Des Moines Creek (Segment A), Massey Creek (Segment C), McSorley Creek (Segment D), Woodmont Creek (Segment E), Redondo Creek (Segment F), and Cold Creek (Segment G).

The growth of deltas and quality of habitat provided by the subestuaries is a factor of annual rainfall and the rate at which sediment is transported and deposited at the mouths of streams. High peak flows that occur as a result of increased impervious surface within the stream basin likely transport sediment further out into Puget Sound where depths are greater resulting in sediment accumulation beyond the stream mouth.

Shoreline activities which may impact subestuaries include:

- Physical disturbances from shoreline armoring;
- Physical disturbances from dredging and filling; and
- Changes in hydrology due to increased impervious surface within stream basins; and

- Nonpoint pollutant runoff from impervious surfaces and residential lawns near the shoreline.

Eelgrass Meadows

The importance of eelgrass has been described in various sources, including the *Reconnaissance Assessment of the State of the Nearshore Environment* (KCDNR, 2001). Eelgrass beds are found in intertidal areas and provide feeding and rearing habitat for a large number of marine organisms. Eelgrass beds have been documented in Puget Sound in the City's shoreline jurisdiction, in Segment A, E, F, and G (WDNR, 2001 and KCDNR, 2001). Densities are considered patchy and not continuous (Figure 14). Shoreline activities that may impact eelgrass (KCDNR, 2001) include:

- Clam harvesting;
- Propeller scour and wash;
- Physical disturbances from shoreline armoring;
- Shading from overwater structures; and
- Physical disturbances from dredging and filling.

Kelp Forests

The function of kelp has been described in *Reconnaissance Assessment of the State of the Nearshore Environment* (KCDNR, 2001). Kelp provides habitat for many fish species, including rockfish and salmonids, potential spawning substrate for herring, and buffers to shoreline from waves and currents, among other functions. Kelp distribution is largely dependent upon the type of substrate. Kelp prefers a rocky substratum for attachment. In areas where there is a coarsening of substrate in the low intertidal and shallow subtidal zones, there is a more likely occurrence of kelp. A change in kelp distribution may indicate the coarsening of shallow subtidal sediments (such as that caused by erosion related to a seawall) or an increase in nutrient loading (such as from sewage effluent). Kelp forests are not currently mapped within the City of Des Moines shoreline jurisdiction. KCDNR (2001) indicates that it is likely that kelp distribution has changed over time based on maps produced by the USDA in 1911-1912 and for the Coastal Zone Atlas during the mid-1970's (Thom and Hallum, 1990). Kelp was reported as occurring along a greater length of shoreline within all reaches of WRIA 9, which would include the City of Des Moines shoreline (KCDNR, 2001). KCDNR also noted data gaps in general knowledge of kelp and its biology, its role in nearshore ecological processes, lack of historical or recent studies, and lack of distribution data.

Shoreline activities that may impact kelp densities (KCDNR, 2001) include:

- Physical disturbances from shoreline armoring, marina construction, and harvesting;
- Shading from overwater structures;
- Beach nourishment; and
- Nutrient loading.

Priority Habitats and Species

The Washington Department of Fish and Wildlife (WDFW) maintains priority habitat and species information for Washington state, including the status of species as threatened or endangered. The City of Des Moines occurs within the WDFW Region 4. Priority habitats within Region 4 include consolidated marine/estuarine shorelines, cliffs, caves, snags, riparian areas, old-growth/mature forests, and urban open spaces. The following sections discuss some of the priority species and species of local importance that occur within the City's shoreline jurisdiction.

Shellfish

Geoduck clams are documented in subtidal areas adjacent to shoreline Segments A, B, C, D, the northern one-half of Segment E, and G (Figure 14). Segment F is the only segment not showing the presence of geoduck clams (KCDNR, 2001). WDFW (2004) Marine Resource Species (MRS) data does not indicate the use of Segment F or G by geoducks. Intertidal hardshell clams are documented as occurring along the shorelines of Segment A, B, and the northern one-half of Segment C (WDFW, 2004 and KCDNR, 2001). Dungeness crabs are not documented as occurring within any of the shoreline segments (KCDNR, 2001). The King County 1996/1997 Beach Assessment (KCDNR Website, 2004) performed at Saltwater State Park in Segment D documented shellfish use of these beach areas. Assessments of the Saltwater State Park shoreline (Segment D) resulted in the identification of 42 species of invertebrates, including native littleneck, macoma, manila, butter, horse, softshell, cockle, and geoduck clams; purple and green shore crabs, black-clawed crabs, red rock crabs, and graceful crabs; Sitka shrimp, and tubeworm hermit crabs. Macoma clams comprised nearly 40 percent of the population, but only accounted for three percent of the biomass. Conversely, horse and softshell clams only accounted for two percent of the population, but accounted for 28 percent of the biomass.

In general, shellfish populations are relatively low in all shoreline segments. Population data analyzed by KCDNR (2001) indicates the following shellfish densities throughout the City's shoreline jurisdiction: butter clams ($<10/m^2$), native littlenecks ($6\text{-}17/m^2$), manila clams ($\leq 10/m^2$), Geoducks ($1\text{-}2/m^2$), few Dungeness crabs (abundance decreases as you move south of Seattle), and no Olympic oysters or northern abalone. It should be noted that there is a data gap concerning the collection of population data, and this relates primarily to the differences in sampling methodology and lack of recent quantitative population studies within WRIA 9.

In July 2004 the Washington State Department of Health closed all of the Puget Sound shoreline in King County, including Saltwater State Park (Segment D) and Des Moines Beach Park (Segment A), to recreational shellfish harvesting for all species due to a pollution advisory and the presence of biotoxins in particular shellfish species. The Department of Health conducts an ongoing assessment of pollution and conditions related to shellfish harvesting. The latest update was in November of 2004, which maintained the closure of King County beaches to shellfish harvesting (Cox, F., Washington Department of Health, personal communication). Both beachparks in Des Moines are also closed for recreational swimming due to the pollution advisory. No portion of the City's shoreline is currently used for commercial shellfish harvesting.

Salmonids

The *Habitat Limiting Factors and Reconnaissance Assessment Report, Green/Duwamish and Central Puget Sound Watersheds (WRIA 9 and Vashon Island)* (Kerwin and Nelson, 2000), *A Catalog of Washington Streams and Salmon Utilization - Volume I, Puget Sound Region* (Williams et al., 1975), and *Water Type Survey Results South King County May/June, 2003* (Washington Trout, 2004) identify the known presence of salmon in local streams. Des Moines Creek (Segment A) has documented salmonid use including Chinook salmon (listed as threatened under the ESA), chum salmon, coho salmon (Federal candidate species), coastal cutthroat trout, pink salmon, and steelhead (Figure 14). Segment B contains no streams. Massey Creek (Segment C) contains Chinook salmon, coho salmon, and coastal cutthroats. The unnamed creek in Segment C is not known to support any salmonid populations due to the elevation of the discharge point into Puget Sound. McSorley Creek (Segment D) has documented use by chum salmon, coho salmon, and coastal cutthroats. One possible juvenile sockeye was also documented in the creek (Washington Trout, 2004). Woodmont Creek (Segment E) has documented cutthroat trout. Redondo Creek (Segment F) has the habitat to support coho salmon and cutthroat trout although none have been observed (Kerwin and Nelson, 2000). Cold Creek (Segment G) has cutthroat trout and is reported by local residents as containing coho and chum salmon (Kerwin and Nelson, 2000). WDFW PHS and Streamnet data (2004) indicate that the only use of streams in the City's shoreline jurisdiction occurs in Des Moines Creek (Segment A) and McSorley Creek (Segment D) including, coho and cutthroat trout use of Des Moines Creek and coho use of McSorley Creek.

Nearshore habitat is an important environment for juvenile salmonids, where the shallow water depth obstructs the presence of larger, predator species (Kerwin and Nelson, 2000). All shoreline segments within the City's shoreline jurisdiction are known or expected to contain juvenile salmonids including bull trout (federally listed), Chinook, chum, coho, cutthroat, pink, and sockeye based on the knowledge of species life histories (KCDNR, 2001).

Forage Fish

Forage fish include species that as adults breed prolifically and are small enough to be prey for larger species. They are often non-game fish. Four primary sources were referenced in compiling information on potential forage fish spawning areas within the City's shoreline jurisdiction: Marine Resource Species (MRS) data maintained by WDFW (2004), the *Habitat Limiting Factors and Reconnaissance Assessment Report, Green/Duwamish and Central Puget Sound Watersheds (WRIA 9 and Vashon Island)* (Kerwin and Nelson, 2000), and the *Reconnaissance Assessment of the State of the Nearshore Environment* (KCDNR, 2001).

The five forage fish species most likely to occur in the City's shoreline jurisdiction include surf smelt, sand lance, Pacific herring, longfin smelt, and eulachon (Kerwin and Nelson 2000 and King County DNR, 2001) (Figure 14). Different species utilize different parts of the intertidal and subtidal zones, with sand lance and surf smelt spawning primarily in the substrate of the upper intertidal zone, and Pacific herring spawning primarily on intertidal or subtidal vegetation (Lemberg et al., 1997). Information on the five potential forage fish species within the City's jurisdiction is summarized in Table 8.

Table 8. Forage Fish Species

Species	Documented Presence	Spawning Timing	Preferred Spawning Substrate	Spawning Location
Pacific herring	None (nearest is Quartermaster Harbor on Vashon I.)	Quartermaster Harbor stock spawn January through mid-April	Eelgrass	Upper high tide limits to depths of 40 feet (typically between 0 and –10 tidal elevation)
Sand lance	Segment F & G	November 1 to February 15	Fine sand, mixed sand and gravel, or gravel up to 3cm	From + 5 tidal elevation to higher high water line (from bays and inlets to current-swept beaches)
Eulachon	None	Late winter/early spring	Unknown	Freshwater streams
Longfin smelt	None	Winter	Sand with aquatic vegetation	Freshwater streams
Surf smelt	Segments C, D, E, F, and G	South Puget Sound stocks are fall-winter spawners (September to March)	Mix of coarse sand and fine gravel (1-7mm)	Upper intertidal

Sources: (Kerwin, 2001; O'Toole, 1995; KCDNR, 2001; Lemberg et al., 1997)

Information on documented forage fish spawning activity was available from the WDFW (2004). No Pacific herring, eulachon, or longfin smelt spawning areas are currently documented in any of the shoreline inventory segments (WDFW, 2004). However, it is fair to assume that they all utilize the nearshore areas for feeding and migration. King County DNR (2001), WDFW (2004), and Kerwin and Nelson (2000) document surf smelt spawning areas in a small stretch of Segment C, between the unnamed creek and McSorley Creek; in Segment D near the mouth of McSorley Creek; and from the lower portion of Segment E (south of the Woodmont Creek mouth) extending through Segments F and into portions of Segment G. A sand lance spawning area is mapped along the shoreline from the mouth of Redondo Creek (Segment F) and throughout all of Redondo Beach (Segment G) (Kerwin and Nelson, 2000; WDFW, 2004; and KCDNR, 2001).

Nearshore modifications impact potential forage fish habitat in the following ways:

- Development impacts the shoreline, particularly marinas and boat ramps, which bury spawning habitat, introduce the potential for repeated disturbance, and potentially alter nearshore hydrology;
- Sewer outfalls introduce pollutants and nutrients to the nearshore;
- Overwater structures shade intertidal vegetation and may alter nearshore hydrology;
- Riprap revetments and bulkheads impound sediment in bluffs such that fine-grained spawning beach sediment is not replenished (ongoing net-shore drift decreases spawning habitat); and
- Riprap revetments and vertical bulkheads alter nearshore hydrology and may increase wave energy on intertidal areas.

The sand lance's habit of spawning in the upper intertidal zone of protected sand-gravel beaches throughout the increasingly populated Puget Sound basin makes it vulnerable to the cumulative effects of various types of shoreline development. The WAC Hydraulic Code Rules for the control and permitting of in-water construction activities in Washington State include consideration of sand lance spawning habitat protection.

Shorebirds and Upland Birds

Adjacent to the open waters of Puget Sound, the upland terrestrial environment provides habitat for birds, amphibians, reptiles, and insects. A variety of shorebirds utilize the nearshore environment for wintering and breeding. Seventy-five species of birds are associated with marine nearshore environments in Washington (O'Neil et al., 2001). The Washington Department of Fish and Wildlife Priority Habitat and Species (PHS) maps (2004) indicate the presence of blue heron (Status-State Monitor) nesting colony near the mouth of Des Moines Creek in Des Moines Beach Park (Segment A) (Figure 14).

WDFW PHS data from 2001 also indicates the presence of pigeon guillemots (7 breeding individuals) in Saltwater State Park. WDFW personnel collected seabird colony data for the Des Moines area shoreline from 1999 to 2003 and have identified the use of cliff areas in Segments C, D, and E as containing a low of eight breeding pigeon guillemot adults in 2000 and 2003 to a high of 17 in 2002 (Evanson, personal communication, 2004) (Figure 14).

Bird populations were surveyed twice in January 1995 at Saltwater State Park and fourteen species were identified including six species of diving birds (cormorants, mergansers, and grebes) and five species of surface feeders (KCDNRP, 2004). Adolfson biologists observed several bird species during an October 6, 2004 site visit including: American widgeons, American crows, several gull species, bald eagle, belted kingfisher, great blue heron, mallards, mergansers (Segment A), cormorants (Segments B and E), surf scoters (Segment C), rock doves (Segment F), and killdeer (Segment G).

The PHS maps also indicate a breeding occurrence of bald eagles (federally and state listed as threatened species) is located within one mile of the Puget Sound shoreline in the vicinity of the southern Des Moines city limits. The territory for nesting eagles likely extends into shoreline Segments G. It is likely that bald eagles utilize all shoreline segments for foraging.

SEGMENT SUMMARIES, ASSESSMENT, AND OPPORTUNITY AREAS

The following section summarizes the shoreline characterization for each planning segment, addresses whether ecological functions have been impaired, and discusses opportunity areas within each segment. The shoreline segments are shown in Figure 2 and opportunity areas are shown in Figure 15.

"Opportunity areas" are those areas in the shoreline jurisdiction that may be appropriate for protection and/or restoration, including elements such as wetlands, habitat, riparian (streamside) vegetation, and riverbanks/shoreline modified by riprap or bulkheads. The City could explore opportunities for protection, restoration, or increased public access through a variety of ways, including regulatory and non-regulatory methods. The City maintains the greatest flexibility for implementing protection or restoration efforts in publicly owned land. Funding sources such as Salmon Recovery Funding Board (SRFB) grants are available for such projects. Restoration opportunities on privately owned land may be pursued through the development of an incentive-based redevelopment program, and/or a public education program. Other opportunities throughout the City include stormwater utility capital improvement projects (CIPs), such as culvert replacements and daylighting creeks, planned to occur upstream and outside of the shoreline jurisdiction. These types of projects will affect conditions in the shoreline, and may have beneficial effects on habitat and natural shoreline functions.

Segment A - Des Moines Beach Park

Table 9 below summarizes the shoreline characterization for Segment A.

Table 9. Shoreline Segment "A" Summary

Land Use / Transportation	Stream Discharges	Public Shoreline Access	Hazard Areas	Habitat / Habitat Potential
Park: 75%, Single-Family Res.: 17%, Vacant: 9%; Park access, foot paths, beach/auto access	Des Moines Creek	Des Moines Beach Park	Erosion, Flood	Wetlands, Stream, Fish and Wildlife Areas (Salmonids, shorebirds and piscivorous birds, heron rookery, shellfish, eelgrass)

Shoreline functions within Segment A have been impacted by the following activities:

- Shoreline armoring including riprap (includes mouth of Des Moines Creek) and concrete bulkheads;
- Removal of marine riparian vegetation;
- Increased impervious surface within the Des Moines Creek basin at a watershed scale; and
- Changes to the direction of net-shore-drift caused by the Marina (Segment B).

Effects upon the nearshore environment include:

- Sediment supply to nearshore areas cut off by riprap and concrete bulkheads;
- Marine riparian vegetation provides wildlife habitat, microclimates (shade/prey), source of large woody debris, bank stability, improvements to water quality;
- Subestuaries and deltas depend upon rainfall to bring sediments from upstream to the nearshore area. High flow rates and volumes resulting from increased runoff from impervious surface can alter the formation and function of these features; and
- Net-shore drift is the long-term direction of sediment transport along the shoreline. The construction of the Des Moines Marina (Segment B) has altered this natural process.

Opportunities to improve shoreline functions within Segment A are identified as areas A-1 and A-2 (Figure 15).

Opportunity Area A-1 and A-2

Opportunities in area A-1 could include the removal of the failing riprap revetment from the mouth of Des Moines Creek north to the northern City boundary and the removal of riprap from the mouth of Des Moines Creek. The artificial shoreline could be pulled back a bit with riprap replaced with alternative "soft shore protection" techniques. Such "biotechnical" or "bioengineering" techniques could include imported gravel and sand, anchored drift logs or other large woody debris and , combined with marine riparian plantings along the shoreline and on the north side of Des Moines Creek. This would allow sediment to migrate from upland areas to the shoreline, improve subestuary and delta functions, and increase habitat quantity and quality for both terrestrial and aquatic animals using the shoreline, as well as expanded beach recreation.

Opportunities in area A-2 could include the removal of the existing concrete bulkhead and former boat ramp. The bulkhead could be replaced with soft shore protection techniques and marine riparian plantings, but this would require removal of some fill material that is currently at the site. A pocket beach could be created that would be largely in the shelter of the marina breakwater. This would improve the subestuary and delta as well as provide additional aquatic (including forage fish spawning habitat) and terrestrial wildlife habitat.

Prior to implementing changes to the nearshore area, upstream CIP's related to stormwater detention and treatment need to be completed. The lower portions of Des Moines Creek experiences flooding during major storm events, and construction of restoration projects prior to flood control projects could prove costly to repair. It should also be noted that some Normandy Park residents to the north can only access their homes via the beach area in Segment A. Plans would have to maintain access for these residents.

Segment B - Des Moines Marina

Table 10 below summarizes the shoreline characterization for Segment B.

Table 10. Shoreline Segment "B" Summary

Land Use / Transportation	Stream Discharges	Public Shoreline Access	Hazard Areas	Habitat / Habitat Potential
Public Facility: 54%, Vacant: 20%, Commercial: 12% Park: 10%; Marina Access, parking, and circulation	None	Des Moines Marina & fishing Pier	Erosion	Fish & Wildlife Areas (Salmonids, piscivorous birds, shellfish)

All shoreline functions have been impaired by the construction of the marina, pier, breakwater, and associated facilities. Due to complete development of Segment B, there are no feasible opportunities for improving natural shoreline functions within this segment. Other opportunities are related more to improving pedestrian access to water-oriented uses that the marina provides. Informational kiosks could also be erected to educate the public on the importance of the nearshore area and coastal processes, what they can do to help preserve or improve what remains, and wildlife viewing opportunities that exist. These projects could be coordinated with projects in the Marina Master Plan that require mitigation. Additional opportunities are related to improvement of water quality in the marina, including development or refinement of operation Best Management Practices (BMPs) for handling of and storage of fuels, and other contaminants associated with boating.

Segment C - Zenith

Table 11 below summarizes the shoreline characterization for Segment C.

Table 11. Shoreline Segment "C" Summary

Land Use / Transportation	Stream Discharges	Public Shoreline Access	Hazard Areas	Habitat / Habitat Potential
Single-Family Res.: 88%, Multi-Family: 7%; Local streets	Streams: Massey Creek and unnamed creek near S. 239th Street	S. 239th Street Access	Erosion, Flood	Wetlands, Streams, Banks/Bluffs, Fish & Wildlife Areas (Forage Fish, Salmonids, seabird nesting, shorebirds and piscivorous birds, shellfish)

Shoreline functions within Segment C have been impacted by the following activities:

- Shoreline armoring including riprap (includes mouth of Massey Creek), concrete and wooden bulkheads;
- Removal/loss of marine riparian vegetation; and
- Increased impervious surface within the Massey Creek basin.

Effects upon the nearshore environment include:

- Sediment supply to nearshore areas cut off by riprap and concrete and wooden bulkheads;
- Marine riparian vegetation provides wildlife habitat, microclimates (shade/prey), source of large woody debris, bank stability, improvements to water quality; and
- Subestuaries and deltas depend upon rainfall to bring sediments from upstream to the nearshore area. High flow rates and volumes resulting from increased runoff from impervious surface can alter the formation and function of these features.

Opportunities to improve shoreline functions within Segment C are identified as areas C-1 and C-2 (Figure 15).

Opportunity Area C-1

Opportunities in area C-1 could include the removal of riprap from the mouth of Massey Creek on the south bank (the north bank is currently part of the Des Moines Marina breakwater). The riprap could be replaced with soft shore protection techniques combined with marine riparian plantings along the shoreline and on the south side of Massey Creek. The breakwater on the south side of the boat ramp area is already riprapped and would not likely require any additional protection measures. With net shore-drift to the north in Segment C, the beach should continue to accrete such that erosion is not a threat here. Stream flow would need to be quantified to allow analysis of the expected amount of creek mouth closure as compared to salmon return periods.

The removal of riprap would provide improvements to the subestuary and delta, and riparian plantings would increase habitat quantity and quality for both terrestrial and aquatic animals using the shoreline. The creation of a much larger estuary to provide additional habitat benefits would likely require purchasing the property and removing the building immediately south of the creek.

Prior to implementing changes to the nearshore area, upstream CIP's related to stormwater detention and treatment need to be completed. The lower portions of Massey Creek experiences flooding during major storm events, and construction of restoration projects prior to flood control projects could prove costly to repair. Implementing improvements to this area may be constrained by the fact that the land is privately owned.

Opportunity Area C-2

Opportunity area C-2 (not shown on Figure 15) is located at the existing South 239th public access area. It appears there is limited opportunity to improve natural shoreline functions due to the existing residential development, associated bulkheads, and presence of steep bluffs. However, the existing access area provides a walkway down to the waters edge, where the public can view the shoreline area. This would be an excellent opportunity to provide interpretive signs (wildlife education) or other Puget Sound shoreline educational materials.

The City could explore developing additional street-end overlooks or beach access points similar to the South 239th Street Access. Undeveloped street-end right of ways in Segment C are located at South 240th Street and South 249th Street.

Opportunity Area C-3

One failed bulkhead is present approximately at South 245th Street. (not shown on Figure 15). The wooden soldier pile wall is over a portion of the intertidal beach (CGS, in prep.) and is no longer functioning to protect the bluff from erosion. Simple pile removal would help restore natural beach conditions and bluff processes. Some of these may be creosoted piles, so additional water quality benefits could be reaped.

Segment D - Saltwater State Park

Table 12 below summarizes the shoreline characterization for Segment D.

Table 12. Shoreline Segment "D" Summary

Land Use / Transportation	Stream Discharges	Public Shoreline Access	Hazard Areas	Habitat / Habitat Potential
Park: 100%; Park access, foot paths	Stream: McSorley Creek	Salt Water State Park	Landslide, Erosion, Flood	Wetlands, Streams, Banks/Bluffs, Fish & Wildlife Areas (Forage Fish: McSorley Creek Mouth, Salmonids, seabird nesting, shorebirds and piscivorous birds, shellfish)

Shoreline functions within Segment D (Saltwater State Park) have been impacted by the following activities:

- Shoreline armoring (includes mouth of McSorley Creek);
- Removal of marine riparian vegetation; and
- Increased impervious surface within the McSorley basin.

Effects upon the nearshore environment include:

- Sediment supply to nearshore areas from upland areas is cut off by riprap armoring;

- Riprap revetments and vertical bulkheads alter nearshore hydrology and may increase wave energy on intertidal areas and increase the net shore-drift rate; and
- Subestuaries and deltas depend upon rainfall to bring sediments from upstream to the nearshore area. High flow rates and volumes resulting from increased runoff from impervious surface can alter the formation and function of these features.

Opportunities to improve shoreline functions within Segment D are identified as areas D-1, D-2, and D-3 (Figure 15).

Opportunity Area D-1

Opportunities in area D-1 could include the removal of the riprap armoring from the mouth of McSorley Creek north to the northern park boundary. This land is not owned by the City, but is a State operated park. The riprap could be replaced with soft shore armoring techniques and beach nourishment materials combined with marine riparian plantings along the shoreline. This would allow sediment to migrate from upland areas to the shoreline, provide additional forage fish spawning areas, and increase recreational opportunities. The removal of riprap and return of the area to more natural beach conditions would require the removal of some fill material behind the existing riprap wall and require the removal and replacement of the paved walkway. A similar project is scheduled to start at the southern portion of Seahurst Park in Burien in late fall 2004.

Opportunity Area D-2

Opportunities in area D-2 could include the complete removal of riprap in the lower reach of McSorley Creek and at the mouth of the creek, north of the channel, and excavation of some upland fill on the north side of the channel. Retention of some type structure or existing riprap on the south side of the creek channel would maintain the creek in or near its present condition, but removal of the riprap would allow for a more dynamic and functioning creek delta. This would increase the size and quality of the subestuary and delta and fish access to the creek, as well as provide additional aquatic and terrestrial wildlife habitat. This land is not owned by the City, but is a State operated park.

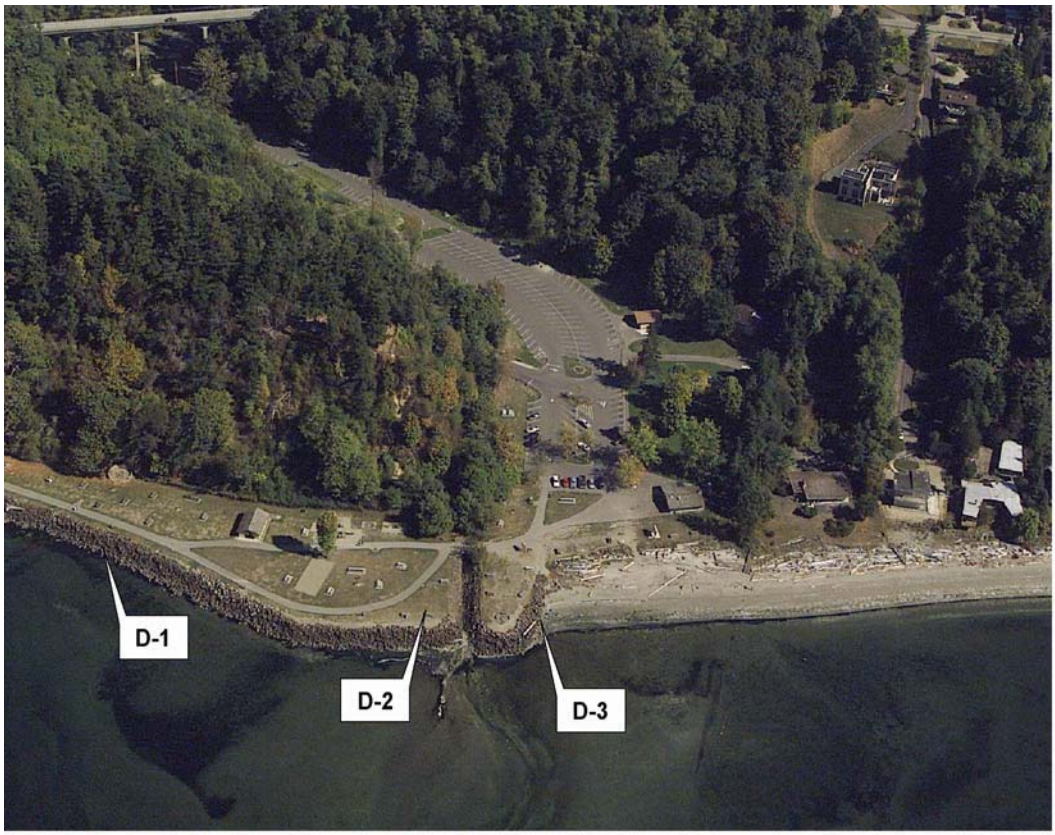
Prior to implementing changes to the nearshore area, upstream CIP's related to stormwater detention and treatment need to be completed. The lower portions of Des Moines Creek experiences flooding during major storm events, and construction of restoration projects prior to flood control projects could prove costly to repair.

Opportunity Area D-3

Opportunities in area D-3 could include the removal of riprap from the south side of McSorley Creek's mouth and replacement with soft shore protection. This land is not owned by the City, but is a State operated park. The existing riprap armoring at the mouth of McSorley Creek causes accretional deposits of sediments at the existing swimming beach to the south. A complete removal of the riprap armoring without any replacement structure may cause the existing beach to disappear. Net-shore drift currently moves sediments northward. The presence of the riprap wall, which extends the mouth of McSorley Creek into Puget Sound, causes some of these sediments to be deposited south of the wall instead of proceeding further north. The

placement of soft shore protection in place of the riprap will likely not produce accretional deposits at current rates associated with the riprap, but the soft-shore armoring would help to maintain the existing beach.

Prior to implementing changes to the nearshore area, upstream CIP's related to stormwater detention and treatment need to be completed. The lower portions of McSorley Creek may experience flooding during major storm events, and construction of restoration projects prior to completion of flood control projects could prove costly to repair.



Segment E - Woodmont / Redondo North

Table 13 below summarizes the shoreline characterization for Segment E.

Table 13. Shoreline Segment "E" Summary

Land Use / Transportation	Stream Discharges	Public Shoreline Access	Hazard Areas	Habitat / Habitat Potential
Single-Family Res.: 87%, Multi-Family: 6%; Local streets	Stream: Woodmont Creek	None	Landslide, Erosion	Wetlands, Streams, Banks/Bluffs, Fish & Wildlife Areas (Forage Fish, Salmonids, seabird nesting, shorebirds and piscivorous birds, shellfish, eelgrass)

Segment E provides few opportunities for restoration/enhancement of shoreline functions. Much of the shoreline in Segment E is privately owned with a majority being developed single-family residential areas and local streets. However, public education to promote the installation of native vegetation plantings versus manicured lawns along the shoreline portion of the private properties would be of value in restoring some shoreline function. Similarly, education or incentive for shoreline bulkhead removal in Segment E would help restore natural shoreline processes for significant lengths of the City shore in this formerly important reach of feeder bluff (CGS, in prep.)

Several failed bulkheads are present approximately 2,000 feet south of the southern boundary of Saltwater Stare Park. These include a cluster of three wooden soldier pile walls in the intertidal beach (CGS, in prep.) that are no longer protecting the bluff from erosion. Simple pile removal would help restore natural beach conditions and bluff processes. Some of these may be creosoted piles, so additional water quality benefits could be reaped.

The Woodmont Creek subestuary and delta have been severely impaired by shoreline armoring and shoreline development. Woodmont Creek is culverted beneath residential areas and roadways for a distance of approximately 500 feet from the mouth. This is likely a fish passage barrier to anadromous salmonids. Removal of the culverts and other barriers could be a good longer-term goal for restoration of the creek, but access to houses is a significant problem to overcome for this type of project.

Segment F - Redondo Boat Launch / Beach Park

Table 14 below summarizes the shoreline characterization for Segment F.

Table 14. Shoreline Segment "F" Summary

Land Use / Transportation	Stream Discharges	Public Shoreline Access	Hazard Areas	Habitat / Habitat Potential
Public Facility: 70%, Commercial: 13%, Vacant: 18%; Redondo Way S., Redondo Beach Drive S., and parking lot	Stream: Redondo Creek	Redondo Beach & Boat Launch	Erosion	Wetlands, Subestuary, Fish and Wildlife Areas (Forage Fish, Salmonids, shorebirds and piscivorous birds, shellfish, eelgrass)

Segment F provides few, if any, restoration/enhancement opportunities. A concrete bulkhead, piers, and other over-water structures have reduced shoreline functions within this segment. The migration of sediments to the nearshore area have been completely halted from the bank and decreased from the creek and the continued formation of the subestuary/delta for Redondo Creek has been impaired by culverting the outlet and the presence of concrete bulkheads. Opportunity areas within this segment are more oriented toward access and education (Figure 15 - Area F-1). There appears to be limited access to portions of beach north of Salty's Restaurant and it seems that access could be improved to this area. The public pier would also be an excellent opportunity to provide an educational kiosk, providing educational materials about the Puget Sound shoreline, its wildlife, coastal processes, its recreational opportunities, and how to protect and preserve this natural resource.

F-1

Segment G - Redondo South

Table 15 below summarizes the shoreline characterization for Segment G.

Table 15. Shoreline Segment "G" Summary

Land Use / Transportation	Stream Discharges	Public Shoreline Access	Hazard Areas	Habitat / Habitat Potential
Single-Family Res.: 79%, Multi-Family: 13%, Mobile Home: 4%; Redondo Beach Drive S., Sound View Drive S., and local streets	Stream: Cold Creek	Redondo Sea Wall & Beaches	Landslide, Erosion	Wetlands, Subestuary, Fish and wildlife Areas (Forage Fish, Salmonids,

Segment G provides for limited restoration/enhancement opportunities due to the existing seawall extending along much of the segment's length. However, opportunities do exist for public education targeted at private landowners along Cold Creek. Cold Creek, north of Redondo Beach Drive South (Figure 15 -Area G-1), travels through a residential area, has been channelized, and contains no structure and little riparian cover. An opportunity exists to educate landowners on the benefits to salmonids and other fish from adequate riparian habitats associated with the streams where they live, and to try to implement a creek restoration project. Landowners would be given the chance to improve habitat in an organized way and to have salmon spawn in their backyards. Removal or pullback of riprap, riparian plantings, and installation of large woody debris (LWD) would be the basis of a creek restoration project. The existing box culvert at the mouth of the creek should be further investigated, but seems to allow fish access from the beach under the road at high tide. The NOAA Community Based Restoration Program would be an ideal fit for funding this type of project.

Public access is fairly good in this area with a walkway extending almost the entire length of the seawall, however beach access appears to be nonexistent. Private beach access only appears to be available at the south end.

G-1

DATA GAPS AND RECOMMENDATIONS

The following items have been identified as data gaps or additional information that would enhance the shoreline inventory and characterization. Where possible, recommendations are provided to address data gaps as the City moves forward with the comprehensive update of its Shoreline Master Program.

- Additional information and analysis on stream sediment regimes for the City's larger streams (Des Moines, Redondo, Massey and McSorley) would provide a base level of information for understanding past and current sediment regimes and would better inform shoreline management and restoration options.
- More information and analysis on range of stream flow variability, including the timing, magnitude and spatial distribution for peak high and low flows for the city's larger creeks (Des Moines, Redondo, Massey and McSorley Creeks) would provide a base level of information for understanding past and current flow regimes. Data collected under the City's water quality monitoring program is a good start, but has only been collected on Des Moines, Massey, and the North Fork of McSorely Creek.
- Improved mapping of the extent and location of beaches, backshore, flats, and sub-estuaries would better inform the evaluation of site-specific restoration opportunities.
- Mapping of marine riparian zones has not been completed. Mapping of eelgrass beds is available, but not at a detailed scale. Improved mapping would better inform the overall management of habitat areas in the City.
- A more detailed inventory and description of vegetation types and species composition found in marine riparian zones and subestuaries would better inform the overall management of habitat areas in the City. This could be accomplished by additional field reconnaissance.

CONCLUSIONS

The Puget Sound shoreline in the City of Des Moines is characteristic of urbanized waterfront development elsewhere in the region. Public access to the shoreline, recreational opportunities, and water-oriented uses such as boating and fishing abound in Des Moines. In this regard, goals of the Shoreline Management Act related to public use and enjoyment of the state's shorelines have been met well in the City. However, the natural structure and functions occurring at the shoreline have been significantly altered through structural development of bulkheads and rip-rap revetments throughout most of the city's shoreline. These changes have altered the natural net-shore drift direction and the availability and distribution of beach sediment locally. Additionally, development on a watershed scale has affected the shoreline by increasing impervious area in uplands, resulting in increased peak flow velocities and volumes, impaired water quality, and erosion in streams that discharge to Puget Sound. Site-specific opportunities to protect, enhance, or restore shoreline functions appear to be concentrated at stream mouths, with many of those occurring in public parks. The type of opportunities at these locations would likely benefit habitat for salmonids, particularly when coordinated with upstream projects targeted to reduce localized flooding and improve fish passage such as culvert replacement projects. These site-specific projects would likely have a marginal effect on restoring ecosystem wide processes, particularly nearshore coastal processes, since so much of the city's shoreline is structurally modified, but would still be important and valuable efforts toward habitat enhancement and restoration of impaired ecological functions.

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MAP FOLIO

<u>City-wide maps:</u>

Figure 1. City of Des Moines - Overview

Figure 2. Shoreline Jurisdiction and Planning Segments

<u>Watershed Scale maps:</u>

Figure 3. Soils and Potential Wetlands

Figure 4. Surficial Geology and Topography

Figure 5. Surface Water and Aquifer Recharge Areas

Figure 6. Land Use Change - 1942-2002

<u>Reach Scale maps:</u>

Figure 7. Generalized Existing Land Use

Figure 8. Existing Shoreline Environment Designations

Figure 9. Zoning Designations

Figure 10. Public Access

Figure 11. Nearshore Processes

Figure 12. Geologically Hazardous Areas

Figure 13. Streams, Wetlands, and Frequently Flooded Areas

Figure 14. Fish, Shellfish, and Wildlife Habitat Areas

Figure 15. Opportunity Areas

Figure 1

City of Des Moines
Washington

City of Des Moines

Shoreline Master Plan

Overview

Streams

Des Moines City Limits

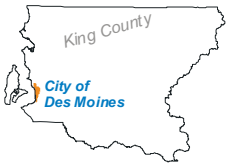
Jurisdictions

- Normandy Park
- Burien
- SeaTac
- Kent
- Federal Way
- Unincorporated King County

CITY OF DES MOINES SHORELINE MASTER PLAN MAP SERIES

This map series is intended for general planning purposes related to the City of Des Moines Shoreline Master Plan.

These maps include the best available science to locate, illustrate and categorize shoreline areas. However, due to scale, the maps are not precise delineations of every area and are not a substitute for site-specific analysis. These maps are a composition of various sources of information in both paper and electronic format. They were created from available public records and existing map sources. Where available, scientific delineations and field surveys were digitized at the original scale and merged into the GIS database.



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Scale In Feet

N W E S

Community Development
21630 11th Ave S, Suite D
Des Moines, WA 98198-6398
PHONE: (206) 870-7576 * FAX: (206) 870-6544
WEB: http://www.desmoineswa.gov

File: 1.Overview.mxd - Mar. 2005
Product of City of Des Moines GIS

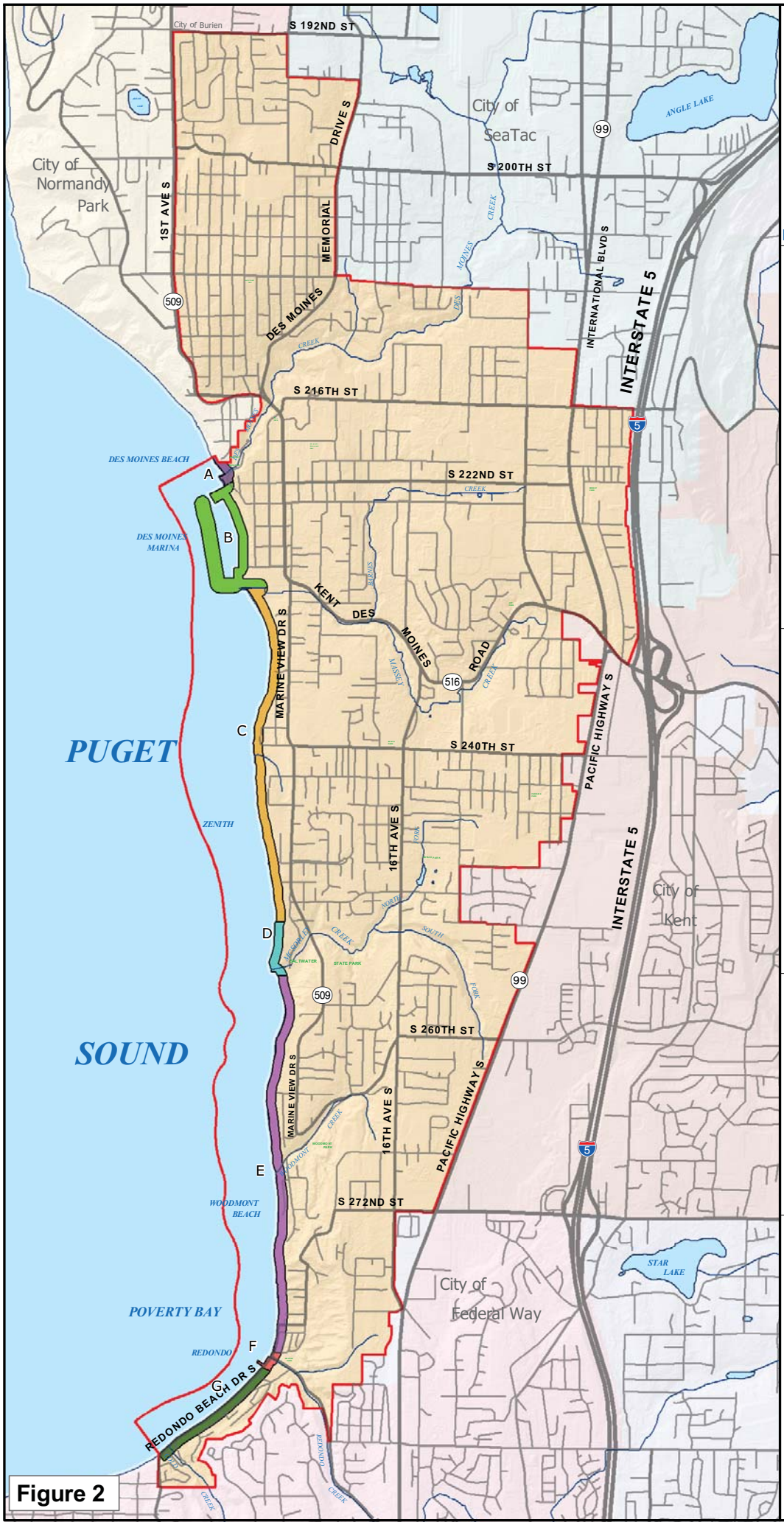

Figure 2

City of Des Moines
Washington

City of Des Moines

Shoreline Master Plan

Shoreline Jurisdiction & Planning Segments

Des Moines City Limits

Streams

SMP Jurisdiction

- A
- B
- C
- D
- E
- F
- G

Jurisdictions

- Normandy Park
- Burien
- SeaTac
- Kent
- Federal Way
- Unincorporated King County

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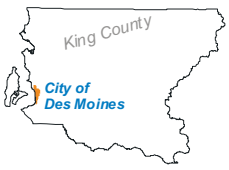

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Scale In Feet

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Des Moines, WA 98198-6398
PHONE: (206) 870-7576 * FAX: (206) 870-6544
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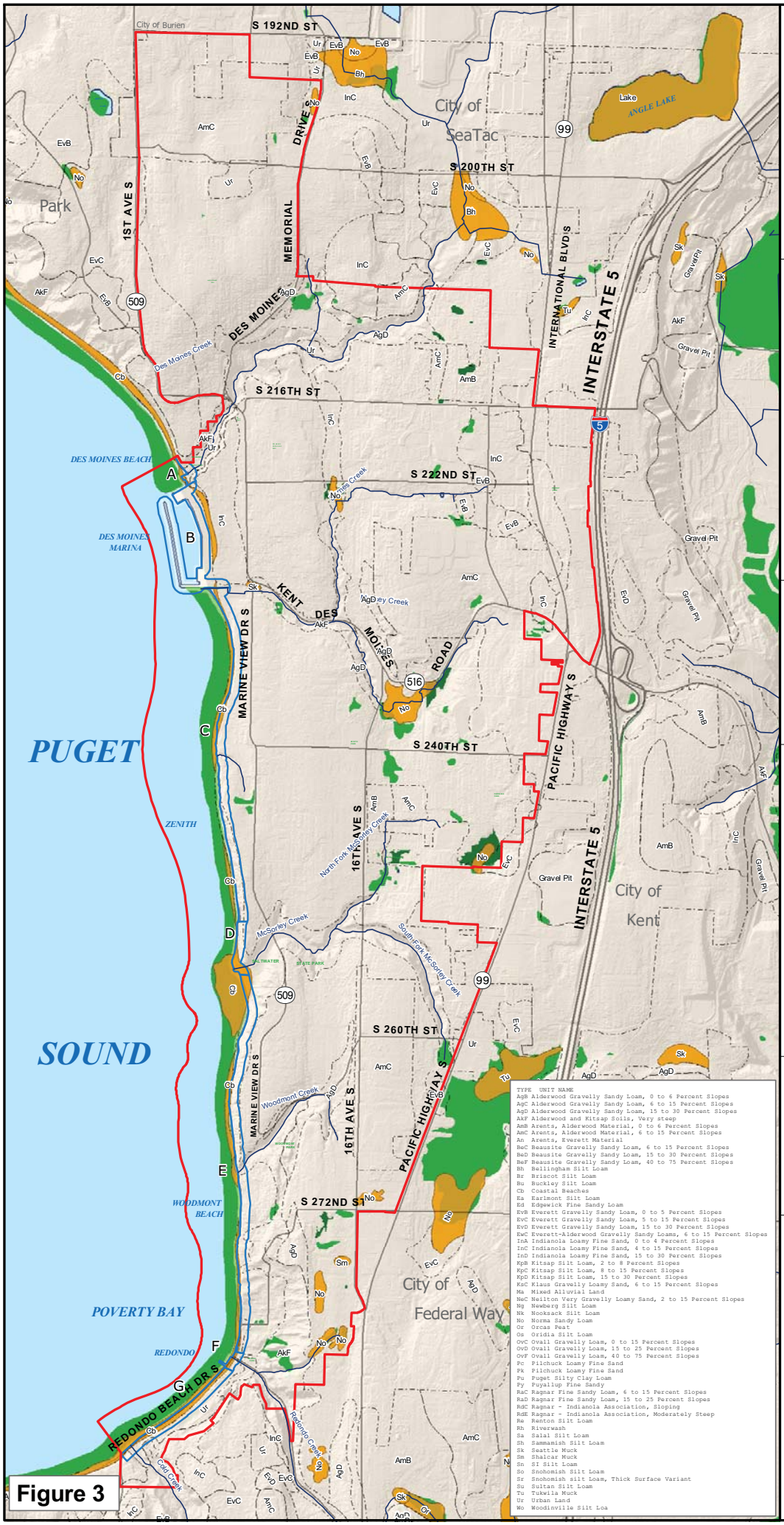

TYPE	UNIT NAME
AgB	Alderwood Gravelly Sandy Loam, 0 to 6 Percent Slopes
AgC	Alderwood Gravelly Sandy Loam, 6 to 15 Percent Slopes
AgD	Alderwood Gravelly Sandy Loam, 15 to 30 Percent Slopes
AkF	Alderwood and Kitsap Soils, Very steep
AmB	Arents, Alderwood Material, 0 to 6 Percent Slopes
AmC	Arents, Alderwood Material, 6 to 15 Percent Slopes
Ah	Arents, Everett Material
BeC	Beausite Gravelly Sandy Loam, 6 to 15 Percent Slopes
BeD	Beausite Gravelly Sandy Loam, 15 to 30 Percent Slopes
BeF	Beausite Gravelly Sandy Loam, 40 to 75 Percent Slopes
Bh	Bellingham Silt Loam
Br	Briscot Silt Loam
Bu	Buckley Silt Loam
Cb	Coastal Beaches
Ea	Earlmont Silt Loam
Ed	Edgewick Fine Sandy Loam
EvB	Everett Gravelly Sandy Loam, 0 to 5 Percent Slopes
EvC	Everett Gravelly Sandy Loam, 5 to 15 Percent Slopes
EvD	Everett Gravelly Sandy Loam, 15 to 30 Percent Slopes
EwC	Everett-Alderwood Gravelly Sandy Loams, 6 to 15 Percent Slopes
InA	Indianola Loamy Fine Sand, 0 to 4 Percent Slopes
InC	Indianola Loamy Fine Sand, 4 to 15 Percent Slopes
InD	Indianola Loamy Fine Sand, 15 to 30 Percent Slopes
KpB	Kitsap Silt Loam, 2 to 8 Percent Slopes
KpC	Kitsap Silt Loam, 8 to 15 Percent Slopes
KpD	Kitsap Silt Loam, 15 to 30 Percent Slopes
KsC	Klaus Gravelly Loamy Sand, 6 to 15 Percent Slopes
Ma	Mixed Alluvial Land
NeC	Neilton Very Gravelly Loamy Sand, 2 to 15 Percent Slopes
Ng	Newberg Silt Loam
Nk	Nooksack Silt Loam
No	Norma Sandy Loam
Or	Orcas Peat
Os	Oridia Silt Loam
OvC	Ovall Gravelly Loam, 0 to 15 Percent Slopes
OvD	Ovall Gravelly Loam, 15 to 25 Percent Slopes
OvF	Ovall Gravelly Loam, 40 to 75 Percent Slopes
Pc	Pilchuck Loamy Fine Sand
Pk	Pilchuck Loamy Fine Sand
Pu	Puget Silty Clay Loam
Py	Puyallup Fine Sandy
RaC	Ragnar Fine Sandy Loam, 6 to 15 Percent Slopes
RaD	Ragnar Fine Sandy Loam, 15 to 25 Percent Slopes
RdC	Ragnar - Indianola Association, Sloping
RdE	Ragnar - Indianola Association, Moderately Steep
Re	Renton Silt Loam
Rh	Riverwash
Sa	Salal Silt Loam
Sh	Sammamish Silt Loam
Sk	Seattle Muck
Sm	Shalcar Muck
Sn	SI Silt Loam
So	Snohomish Silt Loam
Sr	Snohomish silt Loam, Thick Surface Variant
Su	Sultan Silt Loam
Tu	Tukwila Muck
Ur	Urban Land
Wo	Woodinville Silt Loa

City of Des Moines

Shoreline Master Plan

Soils & Potential Wetlands

NRCS Soils

Hydric Soils (Soil Survey)

Wetlands Status

- Delineation
- Potential Wetland / Not Field Surveyed

SMP Jurisdiction (Upland)

Des Moines City Limits

Streams

CITY OF DES MOINES SHORELINE MASTER PLAN MAP SERIES

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PRIMARY MAP SOURCES AND ORIGINAL SCALES:

PAPER MAP SOURCES

NRCS (SCS) 1973 Soil Survey 1:24,000 (1"=2,000')

National Wetland Inventory 1:24,000 (1"=2,000')

King County Area Hydric Soils List

Digitized Assessor's tax maps 1:1200 (1"=100')

1987 & 1990 King County Sensitive Areas Map Folio 1:24,000 (1"=2,000')

City of Des Moines Surface Water Management maps 1:1200

ELECTRONIC GIS LAYERS

King County GIS Data CD #3 September 2002 (No Scale)

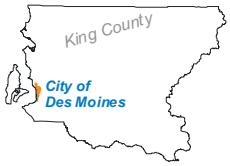
City of Kent GIS Wetland Data January 2003 (No Scale)

Washington State DOT Des Moines Creek GIS Data June 2001 (No Scale)

Slope derived from USGS 10m Digital Elevation Models (No Scale)

Triathlon, Inc. Orthophotography May 2002 6" resolution (1"=600')

Triathlon, Inc. Topography - 2 foot contour interval May 2002 (1"=600')

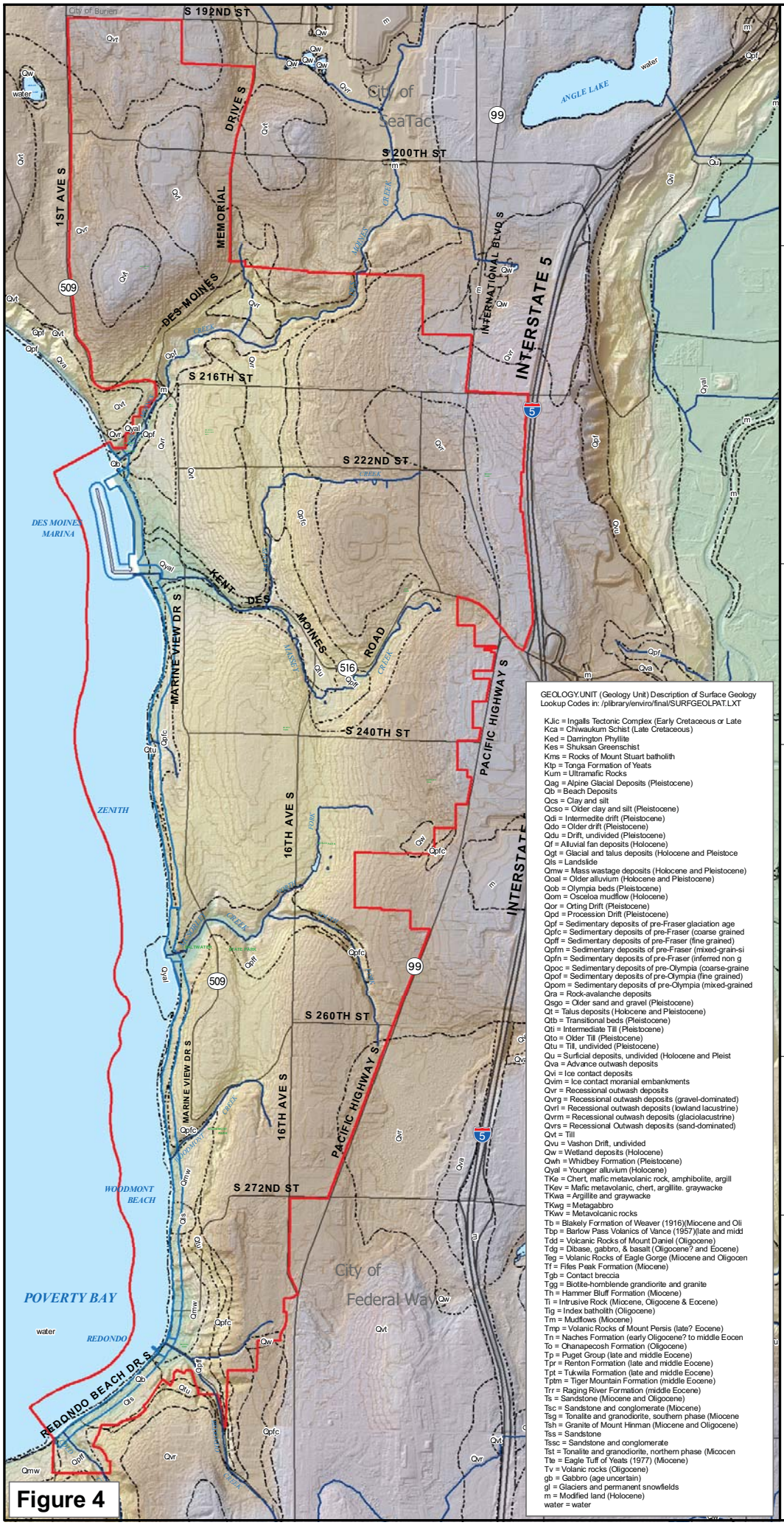


500 250 0 500 1,000 1,500 2,000 2,500
Scale In Feet

N W E S

Community Development
21630 11th Ave S, Suite D
Des Moines, WA 98198-6398
PHONE: (206) 870-7576 * FAX: (206) 870-6544
WEB: http://www.desmoineswa.gov

File: 3_Soils.mxd - Mar. 2005
Product of City of Des Moines GIS



GEOLOGY.UNIT (Geology Unit) Description of Surface Geology
Lookup Codes in: /plibrary/enviro/final/SURFGEOLPAT.LXT

KJic = Ingalls Tectonic Complex (Early Cretaceous or Late
Kca = Chiwaukum Schist (Late Cretaceous)
Ked = Darrington Phyllite
Kes = Shuksan Greenschist
Kms = Rocks of Mount Stuart batholith
Ktp = Tonga Formation of Yeats
Kum = Ultramafic Rocks
Qag = Alpine Glacial Deposits (Pleistocene)
Qb = Beach Deposits
Qcs = Clay and silt
Qcso = Older clay and silt (Pleistocene)
Qdi = Intermedite drift (Pleistocene)
Qdo = Older drift (Pleistocene)
Qdu = Drift, undivided (Pleistocene)
Qf = Alluvial fan deposits (Holocene)
Qgt = Glacial and talus deposits (Holocene and Pleistoce
Qls = Landslide
Qmw = Mass wastage deposits (Holocene and Pleistocene)
Qoal = Older alluvium (Holocene and Pleistocene)
Qob = Olympia beds (Pleistocene)
Qom = Osceloa mudflow (Holocene)
Qor = Orting Drift (Pleistocene)
Qpd = Procession Drift (Pleistocene)
Qpf = Sedimentary deposits of pre-Fraser glaciation age
Qpfc = Sedimentary deposits of pre-Fraser (coarse grained
Qpff = Sedimentary deposits of pre-Fraser (fine grained)
Qpfm = Sedimentary deposits of pre-Fraser (mixed-grain-si
Qpfn = Sedimentary deposits of pre-Fraser (inferred non g
Qpoc = Sedimentary deposits of pre-Olympia (coarse-graine
Qpof = Sedimentary deposits of pre-Olympia (fine grained)
Qpom = Sedimentary deposits of pre-Olympia (mixed-grained
Qra = Rock-avalanche deposits
Qsgo = Older sand and gravel (Pleistocene)
Qt = Talus deposits (Holocene and Pleistocene)
Qtb = Transitional beds (Pleistocene)
Qti = Intermediate Till (Pleistocene)
Qto = Older Till (Pleistocene)
Qtu = Till, undivided (Pleistocene)
Qu = Surficial deposits, undivided (Holocene and Pleist
Qva = Advance outwash deposits
Qvi = Ice contact deposits
Qvim = Ice contact moranial embankments
Qvr = Recessional outwash deposits
Qvrg = Recessional outwash deposits (gravel-dominated)
Qvrl = Recessional outwash deposits (lowland lacustrine)
Qvrm = Recessional outwash deposits (glaciolacustrine)
Qvrs = Recessional Outwash deposits (sand-dominated)
Qvt = Till
Qvu = Vashon Drift, undivided
Qw = Wetland deposits (Holocene)
Qwh = Whidbey Formation (Pleistocene)
Qyal = Younger alluvium (Holocene)
TKe = Chert, mafic metavolanic rock, amphibolite, argill
TKev = Mafic metavolanic, chert, argillite. graywacke
TKwa = Argillite and graywacke
TKwg = Metagabbro
TKwv = Metavolcanic rocks
Tb = Blakely Formation of Weaver (1916)(Miocene and Oli
Tbp = Barlow Pass Volanics of Vance (1957)(late and midd
Tdd = Volcanic Rocks of Mount Daniel (Oligocene)
Tdg = Dibase, gabbro, & basalt (Oligocene? and Eocene)
Teg = Volanic Rocks of Eagle Gorge (Miocene and Oligocen
Tf = Files Peak Formation (Miocene)
Tgb = Contact breccia
Tgg = Biotite-hornblende grandiorite and granite
Th = Hammer Bluff Formation (Miocene)
Ti = Intrusive Rock (Miocene, Oligocene & Eocene)
Tig = Index batholith (Oligocene)
Tm = Mudflows (Miocene)
Tmp = Volanic Rocks of Mount Persis (late? Eocene)
Tn = Naches Formation (early Oligocene? to middle Eocen
To = Ohanapecosh Formation (Oligocene)
Tp = Puget Group (late and middle Eocene)
Tpr = Renton Formation (late and middle Eocene)
Tpt = Tukwila Formation (late and middle Eocene)
Tptm = Tiger Mountain Formation (middle Eocene)
Trr = Raging River Formation (middle Eocene)
Ts = Sandstone (Miocene and Oligocene)
Tsc = Sandstone and conglomerate (Miocene)
Tsg = Tonalite and granodiorite, southern phase (Miocene
Tsh = Granite of Mount Hinman (Miocene and Oligocene)
Tss = Sandstone
Tssc = Sandstone and conglomerate
Tst = Tonalite and granodiorite, northern phase (Micocen
Tte = Eagle Tuff of Yeats (1977) (Miocene)
Tv = Volanic rocks (Oligocene)
gb = Gabbro (age uncertain)
gl = Glaciers and permanent snowfields
m = Modified land (Holocene)
water = water

Figure 4

City of Des Moines

Shoreline Master Plan

Surficial Geology & Topography

Surficial Geology

10 ft Interval Contours

Des Moines City Limits

Streams

CITY OF DES MOINES SHORELINE MASTER PLAN MAP SERIES

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PRIMARY MAP SOURCES AND ORIGINAL SCALES:

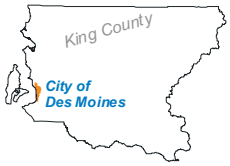
PAPER MAP SOURCES

Geologic Map of King County, Washington: U.S. Geological Survey Miscellaneous Field Investigation, scale 1:100,000 (Booth, et al.)

ELECTRONIC GIS LAYERS

King County GIS Data CD #3 September 2002 (No Scale)

Triathlon, Inc. Topography - 2 foot contour interval May 2002 (1"=600')



500 250 0 500 1,000 1,500 2,000 2,500
Scale In Feet

N W E S

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Des Moines, WA 98198-6398
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WEB: http://www.desmoineswa.gov

File: 4.Geology_Topography.mxd - Mar. 2005
Product of City of Des Moines GIS

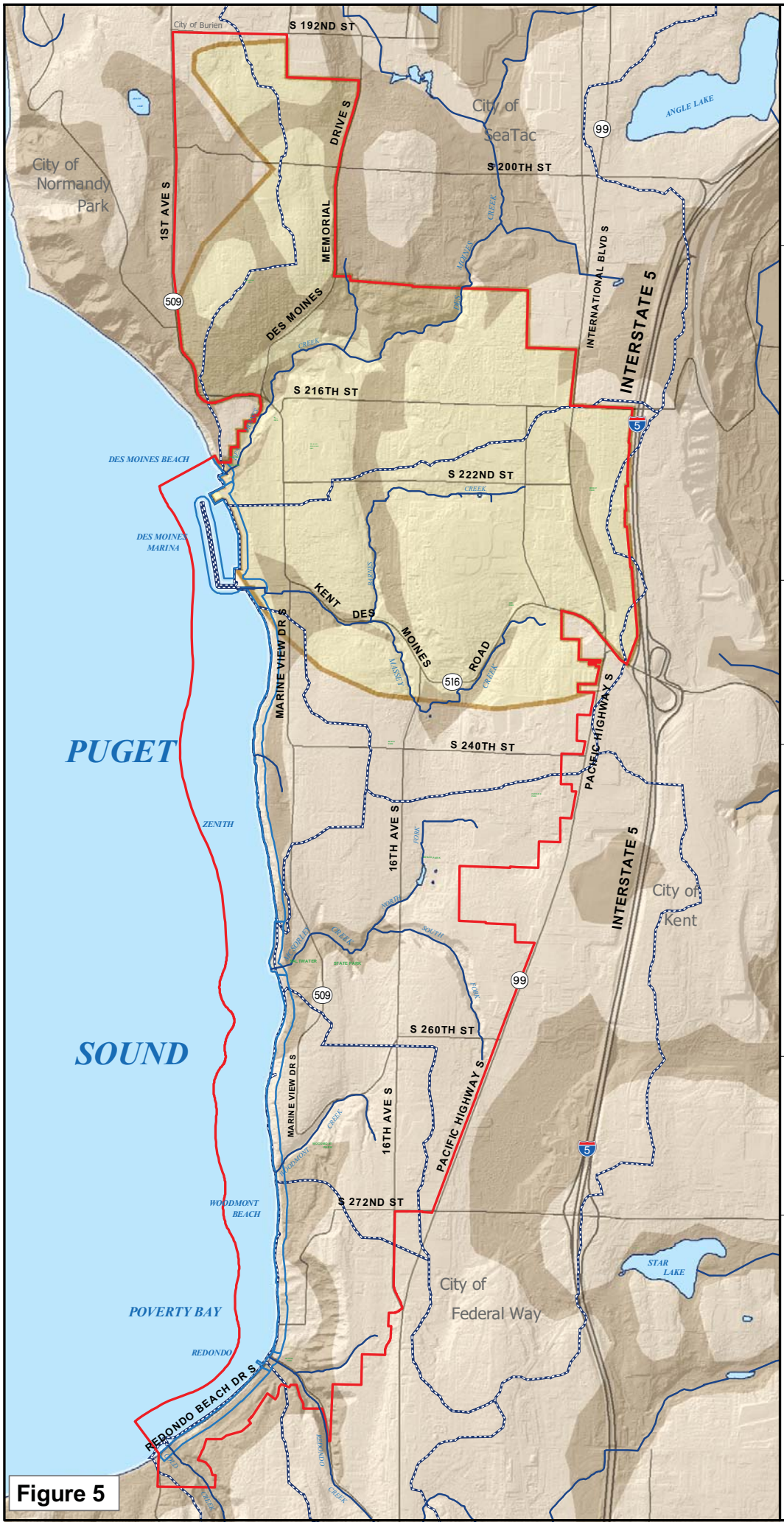

Figure 5

City of Des Moines

Shoreline Master Plan

Surface Water & Aquifer Recharge Areas

Areas of High Susceptibility

Area of Protection

SMP Jurisdiction (Upland)

Des Moines City Limits

Streams

CITY OF DES MOINES SHORELINE MASTER PLAN MAP SERIES

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PAPER MAP SOURCES

King Co. Water District 54 Wellhead Protection Plan

Highline Water District Wellhead Protection Plan

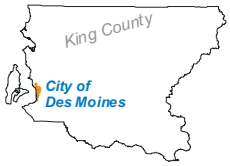
Digitized Assessor's tax maps 1:1200 (1"=100')

1987 & 1990 King County Sensitive Areas Map Folio 1:24,000 (1"=2,000')

ELECTRONIC GIS LAYERS

King County GIS Data CD #3, September 2002

King County GIS LiDAR Data, September 2002



500 250 0 500 1,000 1,500 2,000 2,500
Scale In Feet

N W E S

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WEB: http://www.desmoineswa.gov

File: 5.SurfWater_CARA.mxd - Mar. 2005
Product of City of Des Moines GIS

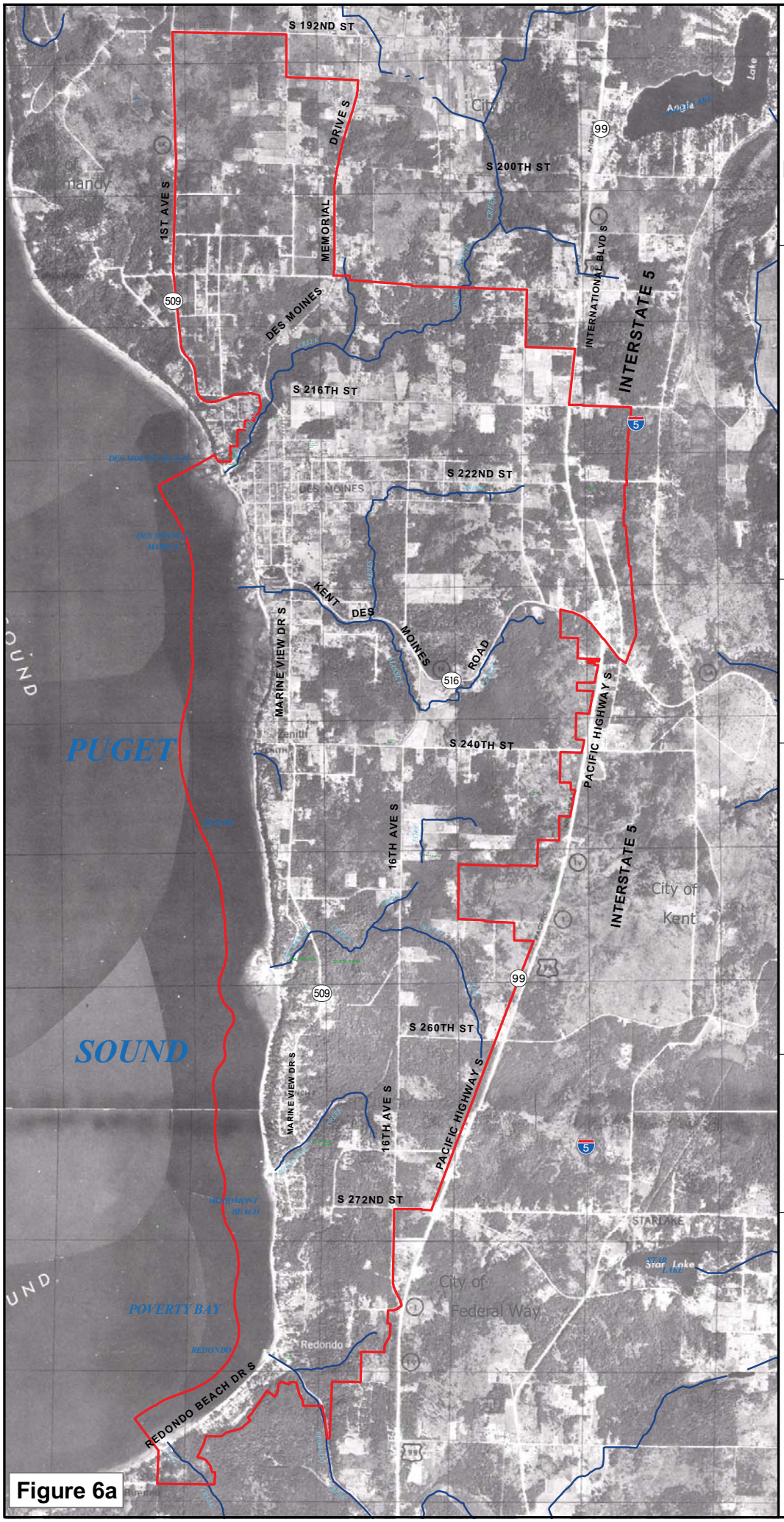

Figure 6a

City of Des Moines
Washington

City of Des Moines

Shoreline Master Plan

1942 Orthophoto (Land Use)

Des Moines City Limits

Streams

CITY OF DES MOINES SHORELINE MASTER PLAN MAP SERIES

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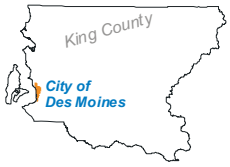
PRIMARY MAP SOURCES AND ORIGINAL SCALES:

ELECTRONIC GIS LAYERS

1942 Aerial Photo, Department of Ecology



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Scale In Feet

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W E
S

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Des Moines, WA 98198-6398
PHONE: (206) 870-7576 * FAX: (206) 870-6544
WEB: http://www.desmoineswa.gov

File: 6a.LandUse1942.mxd - Mar. 2005
Product of City of Des Moines GIS

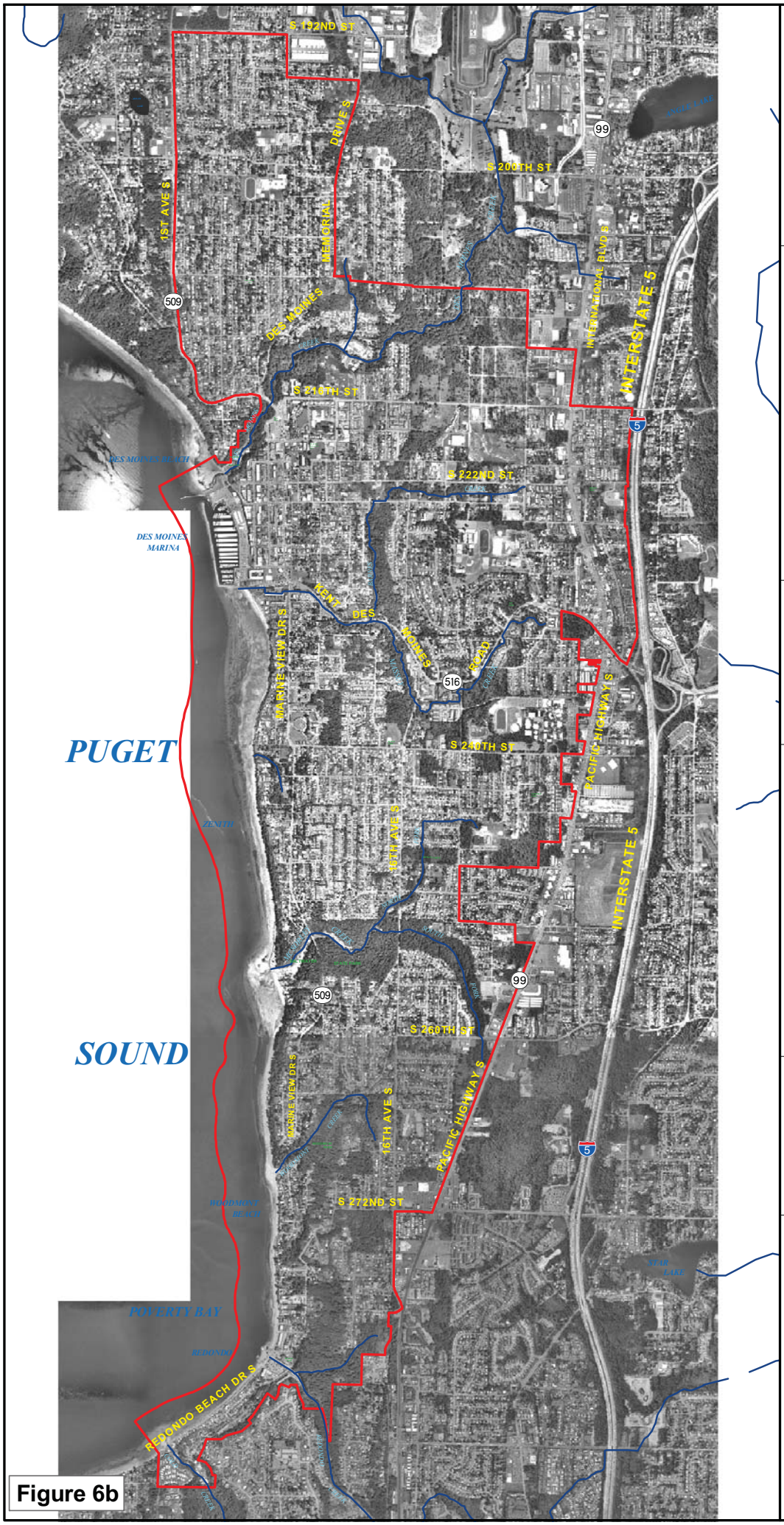

Figure 6b

City of Des Moines

Shoreline Master Plan

2002 Orthophoto (Land Use)

Des Moines City Limits

Streams

CITY OF DES MOINES SHORELINE MASTER PLAN MAP SERIES

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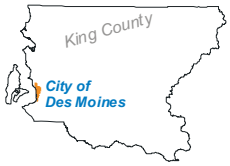
ELECTRONIC GIS LAYERS

Triathlon, Inc. Orthophotography May 2002 6" resolution (1"=600')



500 250 0 500 1,000 1,500 2,000 2,500

Scale In Feet

N W E S

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Des Moines, WA 98198-6398
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WEB: http://www.desmoineswa.gov

File: 6b.LandUse2002.mxd - Mar. 2005
Product of City of Des Moines GIS

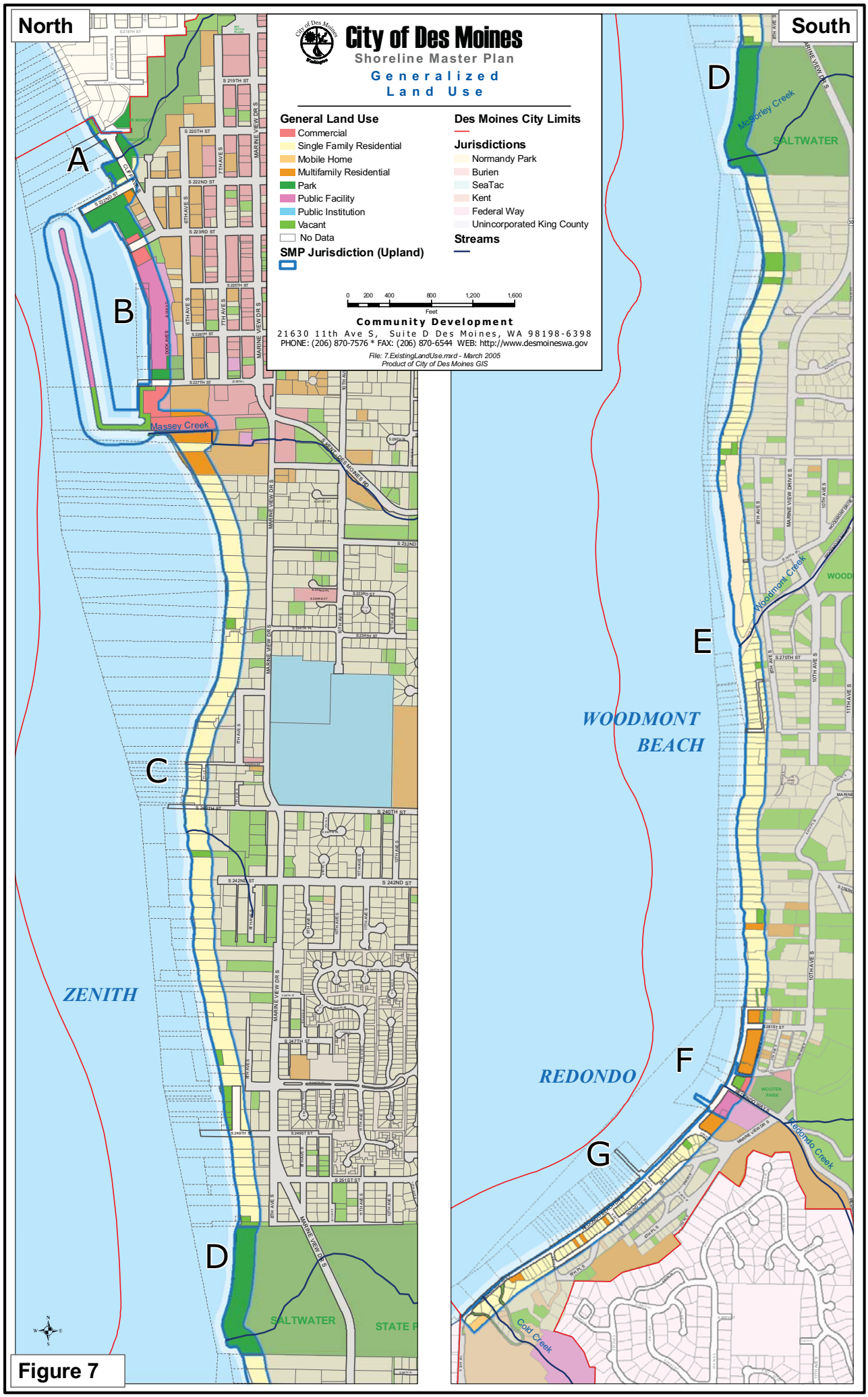
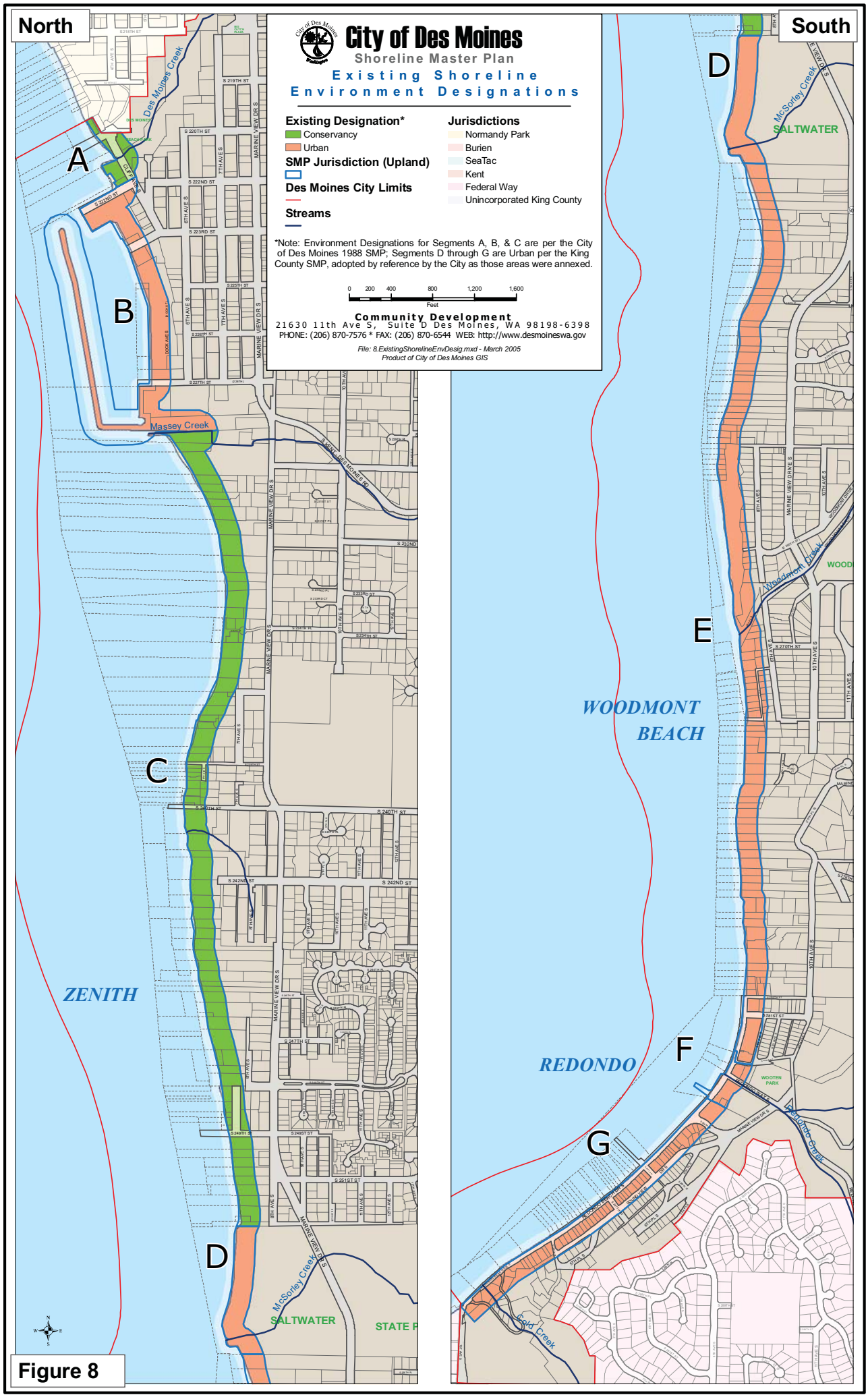

North
South
City of Des Moines
Shoreline Master Plan
Generalized Land Use
General Land Use
Commercial
Single Family Residential
Mobile Home
Multifamily Residential
Park
Public Facility
Public Institution
Vacant
No Data
SMP Jurisdiction (Upland)
Des Moines City Limits
Jurisdictions
Normandy Park
Burien
SeaTac
Kent
Federal Way
Unincorporated King County
Streams
0 200 400 800 1,200 1,600
Feet
Community Development
21630 11th Ave S, Suite D Des Moines, WA 98198-6398
PHONE: (206) 870-7576 * FAX: (206) 870-6544 WEB: http://www.desmoineswa.gov
File: 7.ExistingLandUse.mxd - March 2005
Product of City of Des Moines GIS
A
B
C
D
E
F
G
Massey Creek
McSorley Creek
Woodmont Creek
Redondo Creek
Cold Creek
SALTWATER
ZENITH
WOODMONT BEACH
REDONDO
MARINE VIEW DR S
S 216TH ST
S 219TH ST
S 220TH ST
S 222ND ST
S 223RD ST
S 225TH ST
S 226TH ST
S 227TH ST
S 232ND
S 233RD ST
S 234TH ST
S 240TH ST
S 242ND ST
S 247TH ST
S 249TH ST
S 251ST ST
S 270TH ST
S 281ST ST
6TH AVE S
7TH AVE S
8TH AVE S
10TH AVE S
11TH AVE S
WOODMONT BLVD
WOODMONT DR S
WOODMONT PL S
WOOTEN PARK

Figure 7


North
South
City of Des Moines
Shoreline Master Plan
Existing Shoreline Environment Designations
Existing Designation*
Conservancy
Urban
SMP Jurisdiction (Upland)
Des Moines City Limits
Streams
Jurisdictions
Normandy Park
Burien
SeaTac
Kent
Federal Way
Unincorporated King County
*Note: Environment Designations for Segments A, B, & C are per the City of Des Moines 1988 SMP; Segments D through G are Urban per the King County SMP, adopted by reference by the City as those areas were annexed.
0 200 400 800 1,200 1,600
Feet
Community Development
21630 11th Ave S, Suite D Des Moines, WA 98198-6398
PHONE: (206) 870-7576 * FAX: (206) 870-6544 WEB: http://www.desmoineswa.gov
File: 8.ExistingShorelineEnvDesig.mxd - March 2005
Product of City of Des Moines GIS
A
B
C
D
E
F
G
Des Moines Creek
Massey Creek
McSorley Creek
Woodmont Creek
Redondo Creek
Cold Creek
ZENITH
WOODMONT BEACH
REDONDO
SALTWATER
STATE P
WOODMONT
WOOTEN PARK
MARINE VIEW DR S
S 216TH ST
S 219TH ST
S 220TH ST
S 222ND ST
S 223RD ST
S 224ND ST
S 225TH ST
S 226TH ST
S 227TH ST
S 232ND
S 233RD ST
S 234TH ST
S 240TH ST
S 242ND ST
S 247TH ST
S 249TH ST
S 251ST ST
S 270TH ST
S 281ST ST
6TH AVE S
7TH AVE S
8TH AVE S
9TH AVE S
10TH AVE S
11TH AVE S
DES MOINES BEACH PK
S 216TH ST
S 222ND ST
S 224ND ST
S 232ND
S 242ND ST
S 249TH ST
S 251ST ST
S 281ST ST
MARINE VIEW DR S
9TH AVE S
10TH AVE S
11TH AVE S
WOODMONT
WOOTEN PARK
Figure 8

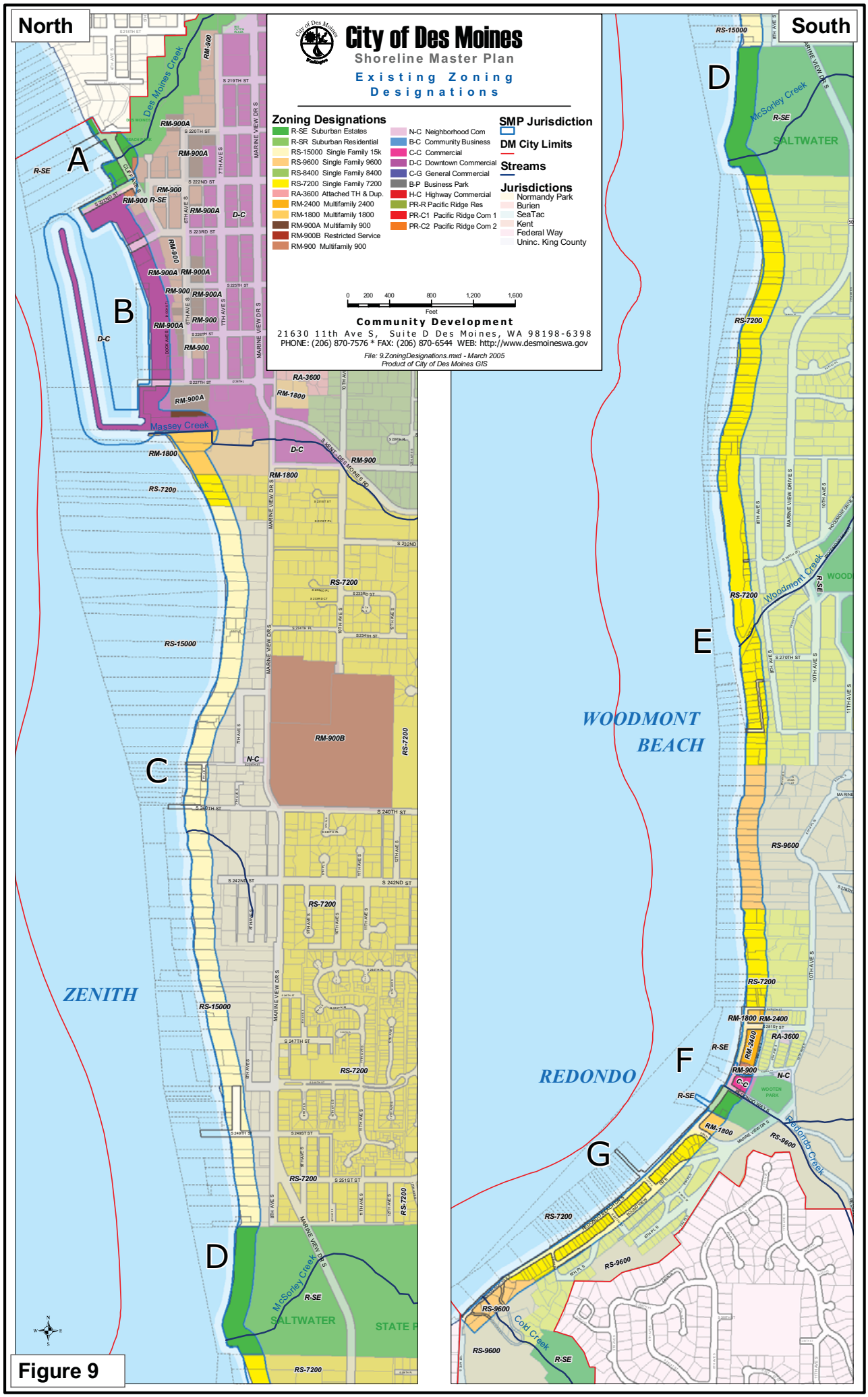

North
South
City of Des Moines
Shoreline Master Plan
Existing Zoning Designations
Zoning Designations
R-SE Suburban Estates
R-SR Suburban Residential
RS-15000 Single Family 15k
RS-9600 Single Family 9600
RS-8400 Single Family 8400
RS-7200 Single Family 7200
RA-3600 Attached TH & Dup.
RM-2400 Multifamily 2400
RM-1800 Multifamily 1800
RM-900A Multifamily 900
RM-900B Restricted Service
RM-900 Multifamily 900
N-C Neighborhood Com
B-C Community Business
C-C Commercial
D-C Downtown Commercial
C-G General Commercial
B-P Business Park
H-C Highway Commercial
PR-R Pacific Ridge Res
PR-C1 Pacific Ridge Com 1
PR-C2 Pacific Ridge Com 2
SMP Jurisdiction
DM City Limits
Streams
Jurisdictions
Normandy Park
Burien
SeaTac
Kent
Federal Way
Uninc. King County
0 200 400 800 1,200 1,600
Feet
Community Development
21630 11th Ave S, Suite D Des Moines, WA 98198-6398
PHONE: (206) 870-7576 * FAX: (206) 870-6544 WEB: http://www.desmoineswa.gov
File: 9.ZoningDesignations.mxd - March 2005
Product of City of Des Moines GIS
A
B
C
D
E
F
G
Des Moines Creek
Massey Creek
McSorley Creek
Woodmont Creek
Redondo Creek
Cold Creek
ZENITH
WOODMONT BEACH
REDONDO
SALTWATER
STATE P
WOOD
WOOTEN PARK
MARINE VIEW DR S
S 240TH ST
S 242ND ST
S 247TH ST
S 251ST ST
S 270TH ST
RM-900B
RS-7200
RS-15000
RS-9600
RM-1800
RM-2400
RA-3600
RM-900A
RM-900
D-C
N-C
R-SE

Figure 9

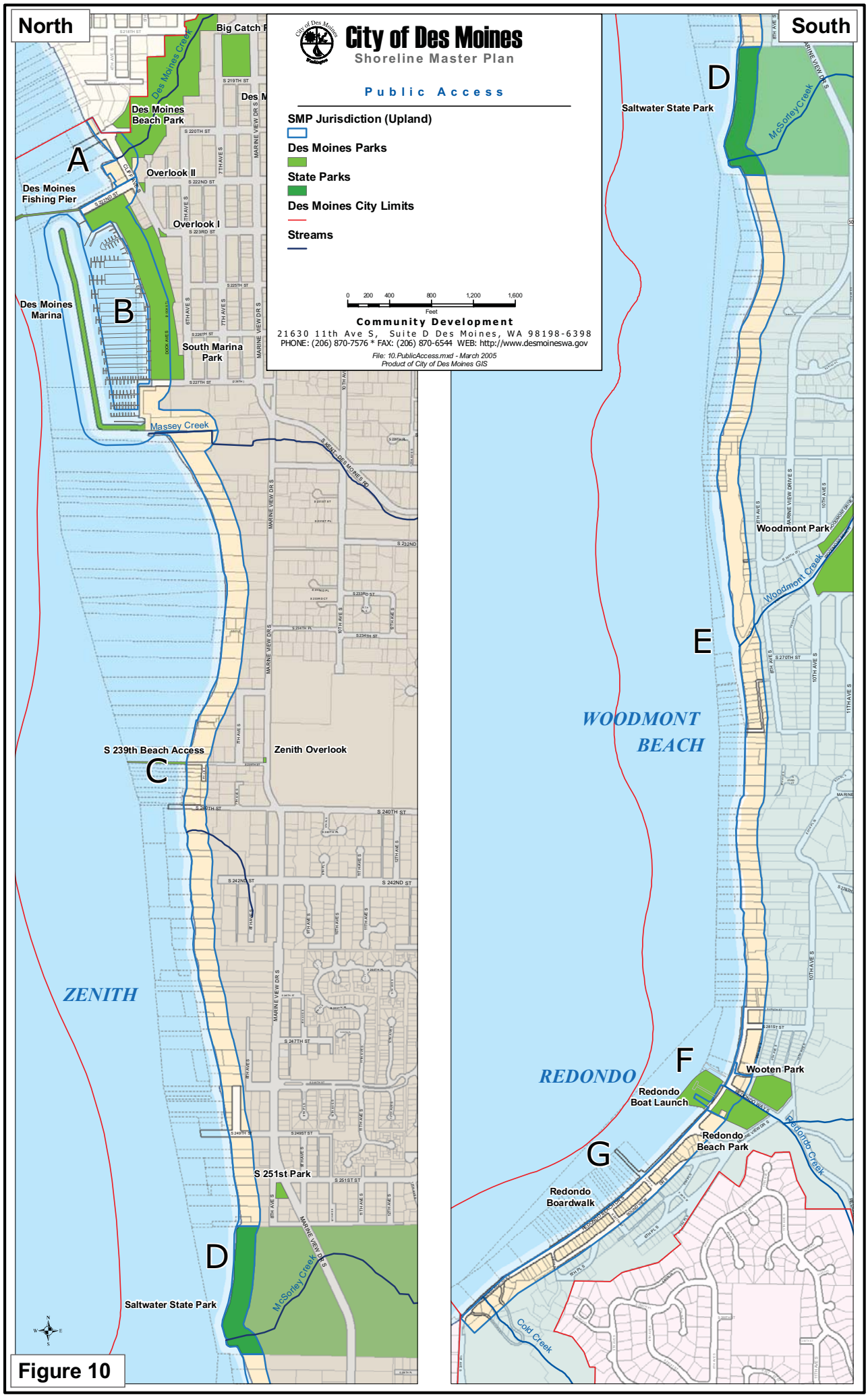

North
South
City of Des Moines
Shoreline Master Plan
Public Access
SMP Jurisdiction (Upland)
Des Moines Parks
State Parks
Des Moines City Limits
Streams
0 200 400 800 1,200 1,600
Feet
Community Development
21630 11th Ave S, Suite D Des Moines, WA 98198-6398
PHONE: (206) 870-7576 * FAX: (206) 870-6544 WEB: http://www.desmoineswa.gov
File: 10.PublicAccess.mxd - March 2005
Product of City of Des Moines GIS
A
B
C
D
E
F
G
Des Moines Beach Park
Overlook II
Overlook I
Des Moines Fishing Pier
Des Moines Marina
South Marina Park
Massey Creek
Des Moines Creek
S 239th Beach Access
Zenith Overlook
ZENITH
S 251st Park
Saltwater State Park
McSorley Creek
WOODMONT BEACH
Woodmont Park
Woodmont Creek
REDONDO
Wooten Park
Redondo Boat Launch
Redondo Beach Park
Redondo Creek
Redondo Boardwalk
Cold Creek

Figure 10

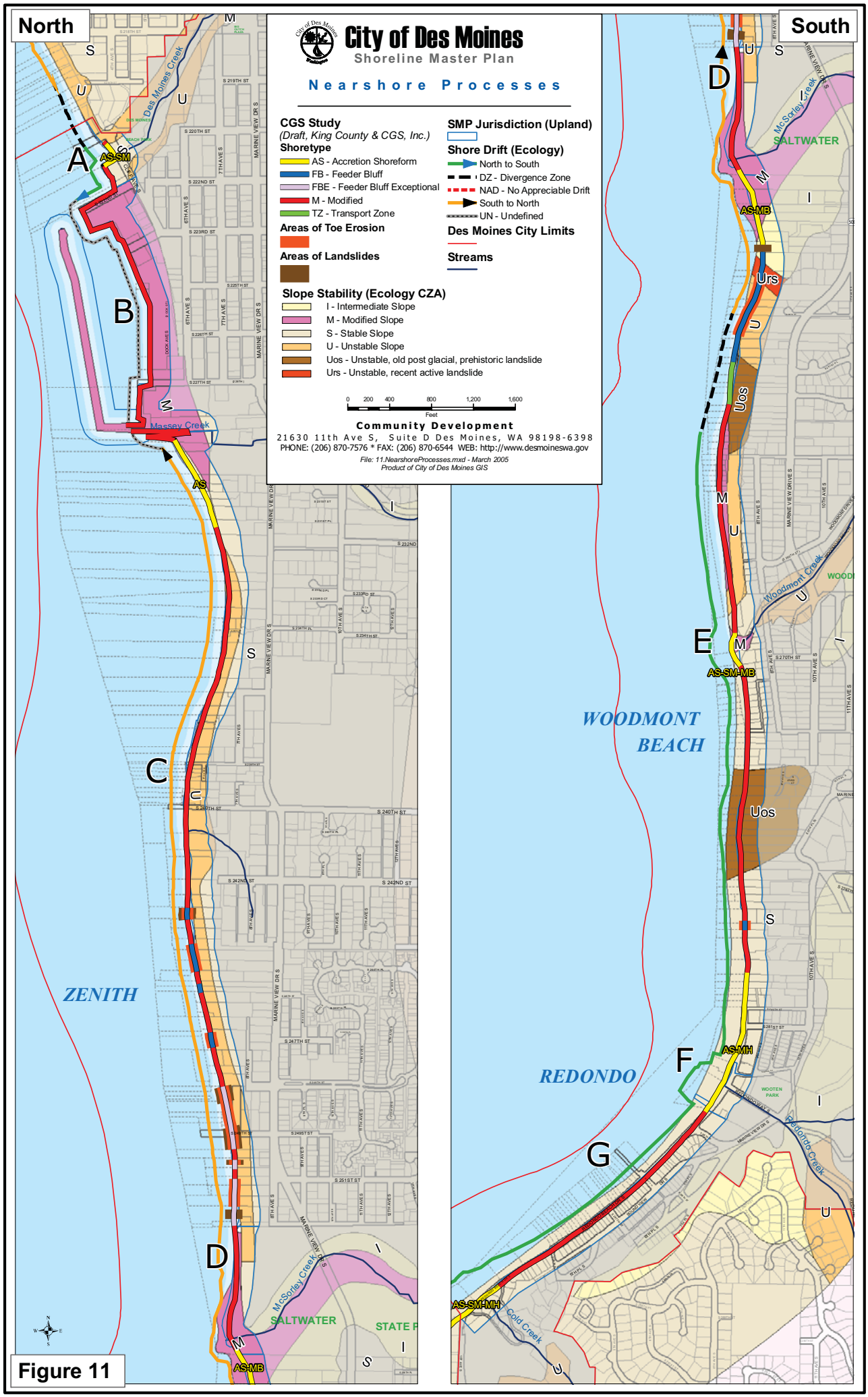

North
South
City of Des Moines
Shoreline Master Plan
Nearshore Processes
CGS Study
(Draft, King County & CGS, Inc.)
Shoretype
AS - Accretion Shoreform
FB - Feeder Bluff
FBE - Feeder Bluff Exceptional
M - Modified
TZ - Transport Zone
Areas of Toe Erosion
Areas of Landslides
Slope Stability (Ecology CZA)
I - Intermediate Slope
M - Modified Slope
S - Stable Slope
U - Unstable Slope
Uos - Unstable, old post glacial, prehistoric landslide
Urs - Unstable, recent active landslide
SMP Jurisdiction (Upland)
Shore Drift (Ecology)
North to South
DZ - Divergence Zone
NAD - No Appreciable Drift
South to North
UN - Undefined
Des Moines City Limits
Streams
0 200 400 800 1,200 1,600
Feet
Community Development
21630 11th Ave S, Suite D Des Moines, WA 98198-6398
PHONE: (206) 870-7576 * FAX: (206) 870-6544 WEB: http://www.desmoineswa.gov
File: 11.NearshoreProcesses.mxd - March 2005
Product of City of Des Moines GIS
Des Moines Creek
Massey Creek
McSorley Creek
Woodmont Creek
Redondo Creek
Cold Creek
SALTWATER
ZENITH
WOODMONT BEACH
REDONDO
A
B
C
D
E
F
G
AS-SM
AS
AS-MB
Urs
Uos
AS-SM-MB
AS-MH
AS-SM-MH

Figure 11

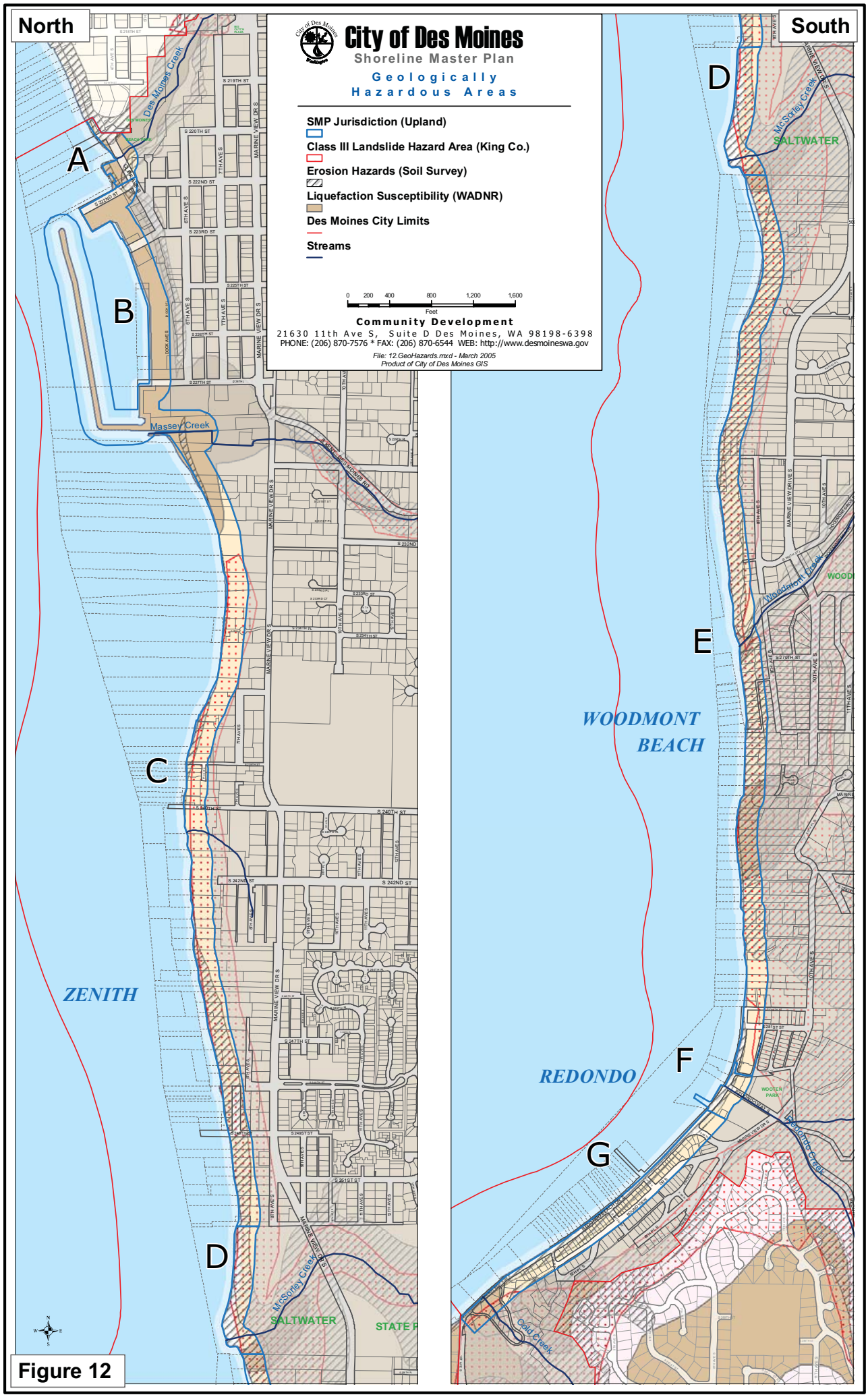

North
South
City of Des Moines
Shoreline Master Plan
Geologically Hazardous Areas
SMP Jurisdiction (Upland)
Class III Landslide Hazard Area (King Co.)
Erosion Hazards (Soil Survey)
Liquefaction Susceptibility (WADNR)
Des Moines City Limits
Streams
0 200 400 800 1,200 1,600
Feet
Community Development
21630 11th Ave S, Suite D Des Moines, WA 98198-6398
PHONE: (206) 870-7576 * FAX: (206) 870-6544 WEB: http://www.desmoineswa.gov
File: 12.GeoHazards.mxd - March 2005
Product of City of Des Moines GIS
A
B
C
D
E
F
G
Des Moines Creek
Massey Creek
McSorley Creek
Woodmont Creek
Redondo Creek
Gold Creek
SALTWATER
STATE P
WOODMONT BEACH
ZENITH
REDONDO
WOOTEN PARK
MARINE VIEW DR S
S 240TH ST
S 242ND ST
S 251ST ST

Figure 12

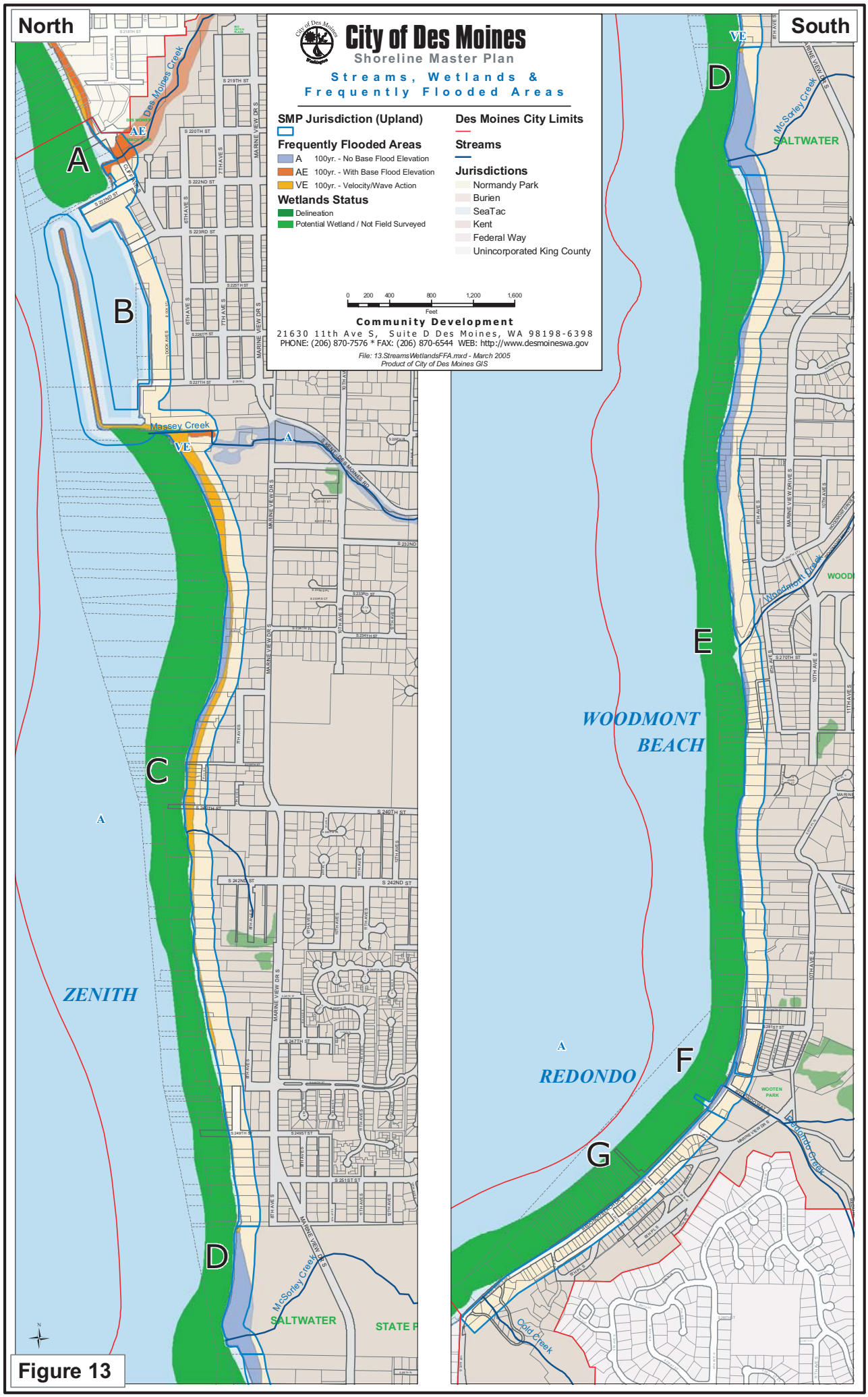
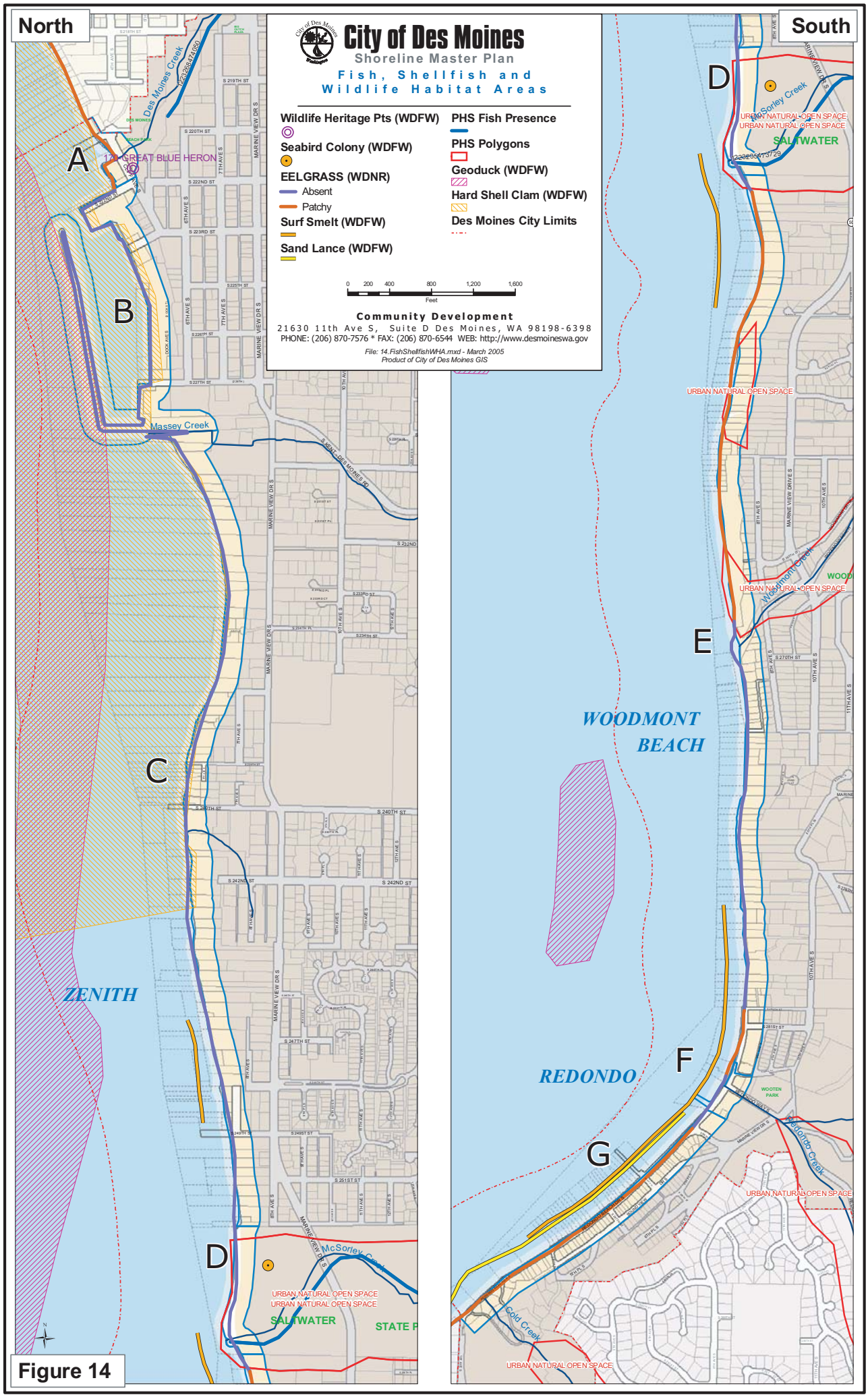

North
South
City of Des Moines
Shoreline Master Plan
Streams, Wetlands & Frequently Flooded Areas
SMP Jurisdiction (Upland)
Frequently Flooded Areas
A 100yr. - No Base Flood Elevation
AE 100yr. - With Base Flood Elevation
VE 100yr. - Velocity/Wave Action
Wetlands Status
Delineation
Potential Wetland / Not Field Surveyed
Des Moines City Limits
Streams
Jurisdictions
Normandy Park
Burien
SeaTac
Kent
Federal Way
Unincorporated King County
0 200 400 800 1,200 1,600
Feet
Community Development
21630 11th Ave S, Suite D Des Moines, WA 98198-6398
PHONE: (206) 870-7576 * FAX: (206) 870-6544 WEB: http://www.desmoineswa.gov
File: 13.StreamsWetlandsFFA.mxd - March 2005
Product of City of Des Moines GIS
A
B
C
D
E
F
G
Des Moines Creek
Massey Creek
McSorley Creek
Woodmont Creek
Redondo Creek
Cold Creek
SALTWATER
STATE P
WOODMONT BEACH
REDONDO
ZENITH
WOOTEN PARK
MARINE VIEW DR S
S 216TH ST
S 219TH ST
S 220TH ST
S 222ND ST
S 223RD ST
S 224ND ST
S 225TH ST
S 226TH ST
S 227TH ST
S 232ND
S 234TH ST
S 240TH ST
S 242ND ST
S 247TH ST
S 249TH ST
S 251ST ST
S 270TH ST
S 281ST ST
6TH AVE S
7TH AVE S
8TH AVE S
9TH AVE S
10TH AVE S
11TH AVE S
LOOK AVE S
S 200TH PLACE

Figure 13


City of Des Moines
Shoreline Master Plan
Fish, Shellfish and Wildlife Habitat Areas
Wildlife Heritage Pts (WDFW)
Seabird Colony (WDFW)
EELGRASS (WDNR)
Absent
Patchy
Surf Smelt (WDFW)
Sand Lance (WDFW)
PHS Fish Presence
PHS Polygons
Geoduck (WDFW)
Hard Shell Clam (WDFW)
Des Moines City Limits
0 200 400 800 1,200 1,600
Feet
Community Development
21630 11th Ave S, Suite D Des Moines, WA 98198-6398
PHONE: (206) 870-7576 * FAX: (206) 870-6544 WEB: http://www.desmoineswa.gov
File: 14.FishShellfishWHA.mxd - March 2005
Product of City of Des Moines GIS
North
South
A
B
C
D
E
F
G
Des Moines Creek
Massey Creek
McSorley Creek
Woodmont Creek
Redondo Creek
Cold Creek
GREAT BLUE HERON
ZENITH
WOODMONT BEACH
REDONDO
SALTWATER
URBAN NATURAL OPEN SPACE
MARINE VIEW DR S
S 240TH ST
S 242ND ST
S 247TH ST
S 251ST ST
S 270TH ST
Figure 14

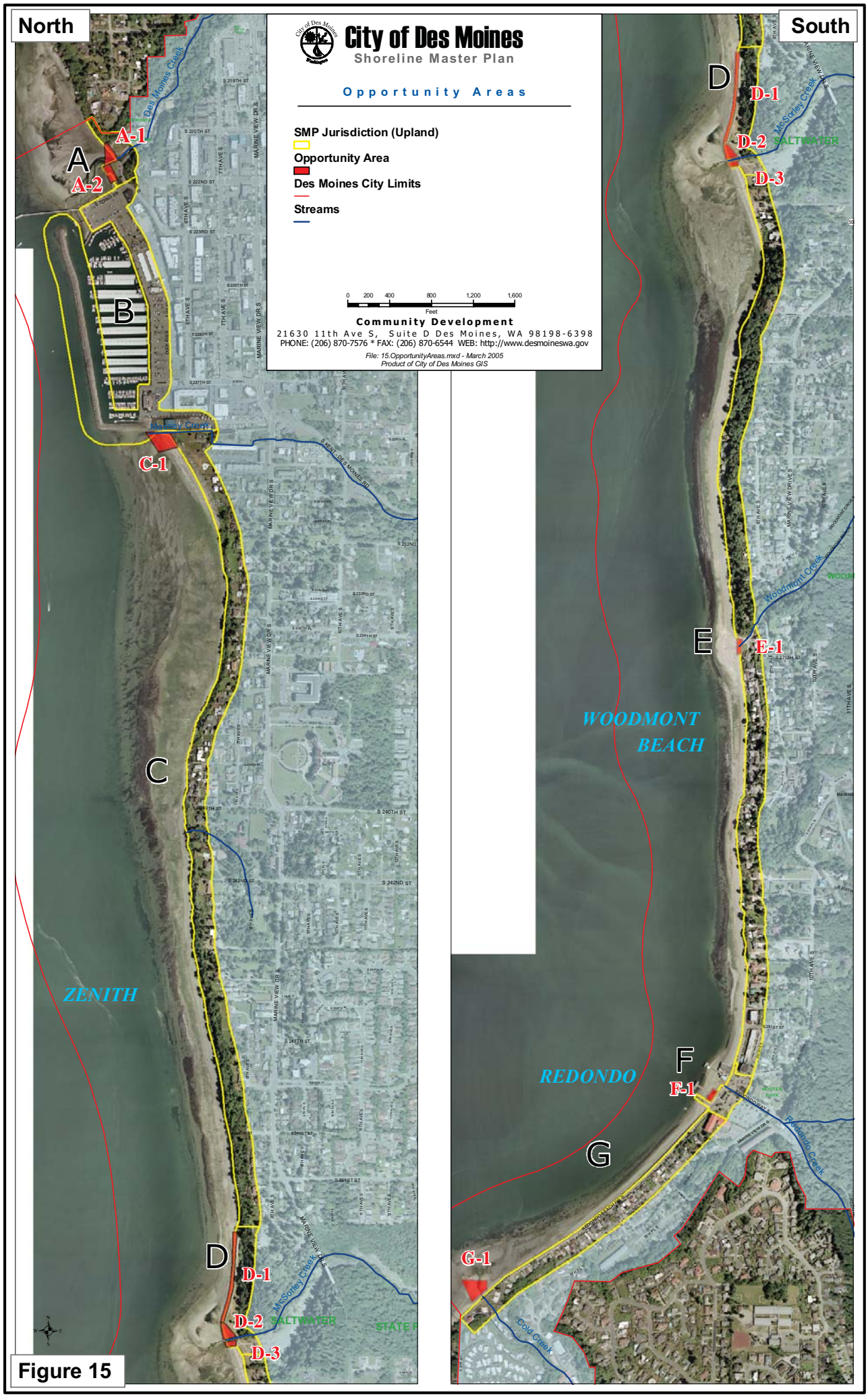

North
South
City of Des Moines
Shoreline Master Plan
Opportunity Areas
SMP Jurisdiction (Upland)
Opportunity Area
Des Moines City Limits
Streams
0 200 400 800 1,200 1,600
Feet
Community Development
21630 11th Ave S, Suite D Des Moines, WA 98198-6398
PHONE: (206) 870-7576 * FAX: (206) 870-6544 WEB: http://www.desmoineswa.gov
File: 15.OpportunityAreas.mxd - March 2005
Product of City of Des Moines GIS
A
A-1
A-2
B
C
C-1
D
D-1
D-2
D-3
E
E-1
F
G
G-1
Des Moines Creek
McSorley Creek
Woodmont Creek
Redondo Creek
Cold Creek
SALTWATER
ZENITH
WOODMONT BEACH
REDONDO
MARINE VIEW DR S
S 240TH ST
S 242ND ST
S 251ST ST
S 270TH ST

Figure 15

APPENDIX A – WDNR SHOREZONE INVENTORY SUMMARY TABLES BY SHORELINE PLANNING SEGMENT

The following shoreline characterization information has been compiled from the Washington Department of Natural Resources *ShoreZone Inventory* GIS database (WDNR, 2001). Each table is organized by shoreline planning segment and the ShoreZone Units falling within each shoreline planning segment. The length of each unit shown in the tables indicates the length of the ShoreZone unit occurring within that shoreline planning segment. Some ShoreZone units cross shoreline planning segment boundaries and/or extend beyond the study area for this shoreline characterization.

Table A-1. Beach Sediment Characterization (WDNR, 2001)

Planning Segment	WDNR ShoreZone Unit ID	Length of ShoreZone Unit within Segment	Estimated Sediment Source	Sediment Abundance	*Dominant Sediment Transport Direction	Stability
A	2620	859.1	Fluvial	Abundant	Northwest	Accretional
B	2624	2783.3	Could not determine	Scarce	Undetermined	Stable
B	2621	580.7	Fluvial	Moderate	Undetermined	Stable
B	2623	2223.0	Could not determine	Scarce	Undetermined	Stable
B	2622	2343.9	Could not determine	Scarce	Undetermined	Stable
C	2624	734.0	Could not determine	Scarce	Undetermined	Stable
C	2627	3003.7	Backshore	Moderate	Undetermined	Stable
C	2625	1161.1	Alongshore	Moderate	Undetermined	Stable
C	2626	3513.2	Alongshore	Moderate	Undetermined	Stable
D	2627	356.3	Backshore	Moderate	Undetermined	Stable
D	2628	884.8	Fluvial	Abundant	Undetermined	Accretional
E	2628	194.0	Fluvial	Abundant	Undetermined	Accretional
E	2633	514.6	Alongshore	Moderate	Undetermined	Stable
E	2629	946.4	Fluvial	Abundant	Undetermined	Accretional
E	2630	3231.5	Alongshore	Moderate	Undetermined	Stable
E	2631	615.7	Fluvial	Abundant	Undetermined	Accretional
E	2632	3153.6	Alongshore	Moderate	Undetermined	Stable
F	2633	143.7	Alongshore	Moderate	Undetermined	Stable
F	2634	376.9	Fluvial	Abundant	Undetermined	Accretional
G	2634	221.0	Fluvial	Abundant	Undetermined	Accretional
G	2635	1907.2	Alongshore	Moderate	Undetermined	Stable
G	2636	967.8	Fluvial	Abundant	Southwest	Accretional

* Washington Coastal Atlas (2003) documents “net shore drift” from south to north in all planning segments

Table A-2. Shoreline Modifications (WDNR, 2001)

Planning Segment	WDNR ShoreZone Unit ID	Length of ShoreZone Unit within Segment (feet)	Total % Modified	Primary Type of Modification	% Primary Modification	Secondary Type of Modification	% Secondary Modification	Tertiary Type of Modification	% Tert. Modification	# Boat Ramps	# Piers/Docks
A	2620	859.1	0		0		0		0	0	0
B	2624	2783.3	100	Riprap	100		0		0	0	0
B	2621	580.7	100	Riprap	100		0		0	0	1
B	2623	2223.0	100	Riprap	100		0		0	0	0
B	2622	2343.9	100	Riprap	100		0		0	1	0
C	2624	734.0	100	Riprap	100		0		0	0	0
C	2627	3003.7	0		0		0		0	0	0
C	2625	1161.1	0		0		0		0	0	0
C	2626	3513.2	80	Riprap	60	Wooden Bulkhead	20		0	0	0
D	2627	356.3	0		0		0		0	0	0
D	2628	884.8	100	Riprap	100		0		0	0	0
E	2628	194.0	100	Riprap	100		0		0	0	0
E	2633	514.6	90	Concrete Bulkhead	90		0		0	0	0
E	2629	946.4	0		0		0		0	0	0
E	2630	3231.5	70	Riprap	70		0		0	3	0
E	2631	615.7	100	Riprap	60	Wooden Bulkhead	20	Concrete Bulkhead	20	1	0
E	2632	3153.6	100	Concrete Bulkhead	70	Riprap	30		0	0	0
F	2633	143.7	90	Concrete Bulkhead	90		0		0	0	0
F	2634	376.9	100	Concrete Bulkhead	50	Wooden Bulkhead	50		0	1	2
G	2634	221.0	100	Concrete Bulkhead	50	Wooden Bulkhead	50		0	1	2
G	2635	1907.2	100	Concrete Bulkhead	100		0		0	0	0
G	2636	967.8	80	Concrete Bulkhead	70	Wooden Bulkhead	10		0	0	2

Table A-3. Marine Riparian Zones (WDNR 2001)

Planning Segment	WDNR ShoreZone Unit ID	Length of ShoreZone Unit within Segment (feet)	Estimated % with Riparian Vegetation	Estimated Length of Riparian Vegetation	Estimated Intertidal Zone Width (ft)
A	2620	859.1	0	0	83
B	2624	2783.3	0	0	2
B	2621	580.7	0	0	2
B	2623	2223.0	0	0	2
B	2622	2343.9	0	0	40
C	2624	734.0	0	0	2
C	2627	3003.7	75	2519.98	30
C	2625	1161.1	0	0	80
C	2626	3513.2	20	702.64	45
D	2627	356.3	75	2519.98	30
D	2628	884.8	0	0	72
E	2628	194.0	0	0	72
E	2633	514.6	0	0	32
E	2629	946.4	20	189.29	80
E	2630	3231.5	30	969.44	32
E	2631	615.7	0	0	42
E	2632	3153.6	0	0	32
F	2633	143.7	0	0	32
F	2634	376.9	0	0	42
G	2634	221.0	0	0	42
G	2635	1907.2	0	0	20
G	2636	967.8	0	0	80

Table A-4. Beach Type and Composition (WDNR, 2001)

Planning Segment	WDNR ShoreZone Unit ID	Length of ShoreZone Unit within Segment (feet)	Shoreline Type (BC classification)	Supratidal-Upper Component	Intertidal-Upper Component	Intertidal-Lower Component	Intertidal-Lowest Component	Subtidal
A	2620	859.1	Sand and gravel flat or fan	Beach Berm (Pebble, Sand)	BEACH FACE (PEBBLE, SAND)	DELTA FAN WITH CHANNEL AND BARS (PEBBLE, SAND); DELTA FAN WITH CHANNEL AND BARS (VENEER OF SHELL OVERLYING PEBBLE, SAND)		
B	2624	2783.3	Manmade, permeable	BREAKWATER (RIPRAP)	BREAKWATER (RIPRAP); BEACH FACE (SAND)			BREAKWATER (RIPRAP)
B	2621	580.7	Manmade permeable	SEAWALL (RIPRAP)	SEAWALL (RIPRAP)			
B	2623	2223.0	Manmade permeable	BREAKWATER (RIPRAP)	BREAKWATER			BREAKWATER (RIPRAP)
B	2622	2343.9	Manmade permeable	SEAWALL (RIPRAP, WOOD)	SEAWALL, MARINA (RIPRAP, WOOD)			
C	2624	734.0	Manmade permeable	BREAKWATER (RIPRAP)	BREAKWATER (RIPRAP); BEACH FACE (SAND)			BREAKWATER (RIPRAP)
C	2627	3003.7	Sand and gravel flat or fan	HIGH STEEP CLIFF (TILL)	BEACH FACE (PEBBLE, SAND)	BEACH WITH LOW TIDE TERRACE (SAND,TILL)		
C	2625	1161.1	Sand and gravel flat or fan	BEACH BERM (LOGS OVERLYING PEBBLE, SAND)	BEACH FACE (PEBBLE, SAND)	BEACH WITH LOW TIDE TERRACE (VENEER OF SHELL OVERLYING SAND, PEBBLE)		
C	2626	3513.2	Sand and gravel flat or fan	SEAWALL (RIPRAP, WOOD); HIGH STEEP CLIFF (TILL)	BEACH FACE (PEBBLE, SAND)	BEACH WITH LOW TIDE TERRACE (VENEER OF PEBBLE, COBBLE OVERLYING SAND)		
D	2627	356.3	Sand and gravel flat or fan	HIGH STEEP CLIFF (TILL)	BEACH FACE (PEBBLE, SAND)	BEACH WITH LOW TIDE TERRACE (SAND,TILL)		
D	2628	884.8	Sand and gravel flat or fan	Seawall (Riprap)	Seawall (Riprap)	DELTA WITH CHANNEL AND BARS (VENEER OF COBBLE, BOULDER OVERLYING SAND)		
E	2628	194.0	Sand and gravel flat or fan	SEAWALL (RIPRAP	Seawall (Riprap)	DELTA WITH CHANNEL AND BARS (VENEER OF COBBLE, BOULDER OVERLYING SAND)		
E	2633	514.6	Sand and gravel flat or fan	SEAWALL (CONCRETE, WOOD); BEACH BERM (SAND)	BEACH FACE (VENEER OF PEBBLE OVERLYING SAND); SEAWALL (WOOD)	BEACH FACE (VENEER OF PEBBLE OVERLYING SAND)		
E	2629	946.4	Sand and gravel flat or fan	BEACH BERM (LOGS OVERLYING PEBBLE, SAND)	DELTA WITH CHANNELS AND BARS (PEBBLE, SAND, COBBLE)	DELTA WITH CHANNELS AND BARS (SAND)		
E	2630	3231.5	Sand and gravel flat or fan	SEAWALL (RIPRAP);	BEACH FACE (PEBBLE, COBBLE, SAND); SEAWALL	BEACH WITH LOW TIDE TERRACE (PEBBLE, COBBLE, SAND)		

Planning Segment	WDNR ShoreZone Unit ID	Length of ShoreZone Unit within Segment (feet)	Shoreline Type (BC classification)	Supratidal-Upper Component	Intertidal-Upper Component	Intertidal-Lower Component	Intertidal-Lowest Component	Subtidal
				BEACH BERM (LOGS OVERLYING PEBBLE, SAND, COBBLE); INCLINED CLIFF OF MODERATE HEIGHT (TILL); BOAT RAMP (CONCRETE)	(RIPRAP); BOAT RAMP (CONCRETE)			
E	2631	615.7	Sand and gravel flat or fan	SEAWALL (RIPRAP, WOOD, CONCRETE); BOAT RAMP (CONCRETE)	SEAWALL (RIPRAP, WOOD, CONCRETE); BOAT RAMP (CONCRETE)	DELTA WITH CHANNEL AND BARS (PEBBLE, SAND)		
E	2632	3153.6	Sand and gravel flat or fan	SEWALL (CONCRETE, RIPRAP)	SEAWALL (CONCRETE, RIPRAP)	BEACH FACE (VENEER OF PEBBLE, COBBLE OVERLYING SAND)		
F	2633	143.7	Sand and gravel flat or fan	SEAWALL (CONCRETE, WOOD); BEACH BERM (SAND)	BEACH FACE (VENEER OF PEBBLE OVERLYING SAND); SEAWALL (WOOD)	BEACH FACE (VENEER OF PEBBLE OVERLYING SAND)		WHARF, BOAT RAMP (WOOD, CONCRETE)
F	2634	376.9	Sand and gravel flat or fan	SEAWALL, WHARF, BOATRAMP (CONCRETE, WOOD)	SEAWALL, WHARF, BOAT RAMP (CONCRETE, WOOD, RIPRAP)	BEACH FACE (PEBBLE, SAND		WHARF, BOAT RAMP (WOOD, CONCRETE)
G	2634	221.0	Sand and gravel flat or fan	SEAWALL, WHARF, BOATRAMP (CONCRETE, WOOD)	SEAWALL, WHARF, BOAT RAMP (CONCRETE, WOOD, RIPRAP)	BEACH FACE (PEBBLE, SAND)		
G	2635	1907.2	Sand and gravel beach, narrow	SEAWALL (CONCRETE, WOOD)	SEAWALL (CONCRETE, WOOD); BEACH FACE (PEBBLE, SAND)	BEACH WITH LOW TIDE TERRACE (VENEER OF BOULDER, COBBLE OVERLYING PEBBLE, SAND)		
G	2636	967.8	Sand and gravel flat or fan	SEAWALL, WHARF (CONCRETE, WOOD); BEACH BERM (PEBBLE, SAND); BRAIDED RIVER CHANNEL (SAND, PEBBLE)	DELTA WITH CHANNELS AND BARS (PEBBLE, SAND); WHARF (WOOD)	DELTA FAN WITH CHANNEL AND BARS (PEBBLE, SAND); BRAIDED RIVER CHANNEL (SAND, GRAVEL)		

Table A-5. Biological Assemblages (WDNR, 2001)

Planning Segment	WDNR ShoreZone Unit ID	Length of ShoreZone Unit within Segment (feet)	Summary of Biological Assemblages
A	2620	859.1	Barnacles (BAR), Green Algae (ULV), Eelgrass (Zos)
B	2624	2783.3	Lichen (VER), Rockweed (FUC), Barnacles (BAR), Green Algae (ULV)
B	2621	580.7	Rockweed (FUC), Barnacles (BAR), Green Algae (ULV)
B	2623	2223.0	Barnacles (BAR), Green Algae (ULV)
B	2622	2343.9	Barnacles (BAR), Green Algae (ULV)
C	2624	734.0	Lichen (VER), Rockweed (FUC), Barnacles (BAR), Green Algae (ULV
C	2627	3003.7	Mussels (BMU), Green Algae (ULV), Sargassum (SAR)
C	2625	1161.1	Barnacles (BAR), Green Algae (ULV), Red Algae (GCA)
C	2626	3513.2	Barnacles (BAR), Green Algae (ULV), Sargassum (SAR)
D	2627	356.3	Mussels (BMU), Green Algae (ULV), Sargassum (SAR)
D	2628	884.8	Barnacles (BAR), Green Algae (ULV)
E	2628	194.0	Barnacles (BAR), Green Algae (ULV)
E	2633	514.6	Barnacles (BAR), Green Algae (ULV), Eelgrass (Zos)
E	2629	946.4	Barnacles (BAR), Green Algae (ULV), Eelgrass (Zos)
E	2630	3231.5	Barnacles (BAR), Green Algae (ULV), Sargassum (SAR), Eelgrass (Zos)
E	2631	615.7	Barnacles (BAR), Green Algae (ULV), Sargassum (SAR)
E	2632	3153.6	Rockweed (FUC), Barnacles (BAR), Green Algae (ULV), Sargassum (SAR)
F	2633	143.7	Barnacles (BAR), Green Algae (ULV), Eelgrass (Zos)
F	2634	376.9	Barnacles (BAR), Green Algae (ULV)
G	2634	221.0	Barnacles (BAR), Green Algae (ULV)
G	2635	1907.2	Barnacles (BAR), Green Algae (ULV), Sargassum (SAR), Eelgrass (Zos)
G	2636	967.8	Barnacles (BAR), Green Algae (ULV), Eelgrass (Zos)