City of Cannon Beach
Prepared by: CREST

FOREDUNE MANAGEMENT PLAN

Photo Credit: Google Earth
Preface

This document is a draft foredune management plan for the City of Cannon Beach, Oregon. This strategy was written based on a consideration of the factors affecting the stability of the shoreline and includes sand management recommendations within each portion of the City's foredune area. This document was prepared for adoption in the Sand Dune Construction section of the City of Cannon Beach Comprehensive Plan and Chapter 17.42 of the City of Cannon Beach Municipal Code.

Other documents that have been, or will be, prepared to address the requirements in Statewide Planning Goal 18: Beaches and Dunes (Implementation Requirement 7) and City of Cannon Beach Municipal Code (Chapter 17.42). These other documents include a Background Report and an Implementing Ordinance which formally outlines the procedures for carrying out prescribed management practices. Together, these materials constitute an overall plan for management of the foredune area fronting Cannon Beach. These documents provide an update and replacement to the 1997 Rosenfeld plan to manage foredunes near Ecola Creek and the 1994 Marra plan to manage foredunes along the Presidential Streets.

Review and comment on a draft of this document will be requested from representatives of the Oregon Department of Land Conservation and Development and the Oregon Parks and Recreation Department. The technical background report which informed this plan was prepared by Jonathan Allan, Laura Gabel, and Fletcher O'Brien of the Oregon Department of Geology and Mineral Industries (DOGAMI) in 2017.

This document is a framework for foredune management in Cannon Beach consistent with Statewide Planning Goal 18. It is not a specific site plan for grading projects or grading individual management unit subareas.

This plan and its implementation do not constitute a guarantee or assurance that erosion, flooding, tsunamis, and sand inundation will not impact property owners and the City. Damages related to ocean wave erosion, flooding, tsunamis, and sand accumulation is borne by the property owners and is an inherent risk of having property located in a changing environment adjacent to the Pacific Ocean.
INTRODUCTION
This is a preliminary draft for updating the City of Cannon Beach’s Foredune Management Plan.

Over the past few decades sand has accumulated north of Haystack Rock causing substantial accretion of the dunes on the North end of town. Wind-blown sand and view degradation have impacted residents as a result.

Although the shoreline fronting Cannon Beach has experienced sand accretion over the past decades, portions of the management area have been shown to be susceptible to episodic wave-induced erosion and flooding. Specifically, Tolovana North and South have experienced erosion. As a generalization, within city limits, areas North of Haystack Rock have experienced sand accretion, and areas South of Haystack Rock have experienced erosion between 1997 and 2016.

Goals

The overall goals to be balanced by the foredune management plan are:

1. To ensure the dunes sustain an adequate sand volume in order to withstand the erosional effects of extreme weather and to minimize any potential for wave overtopping and inundation (flooding) of backshore;

2. To maintain weak points in the dune system by repairing areas subject to localized blowouts from wind or waves in order to prevent the dune buffer from weakening and potentially being breached during a storm;

3. To maintain valuable habitat for a wide range of plants and animals, including in some cases rare species; and

4. To maintain dunes at a particular height via dune scraping in order to retain views of the ocean and to minimize sand blowing inland among properties where it can become an expensive nuisance.

Overall Objective

The overall objective is to maintain and stabilize the existing foredune and encourage sand deposition on the seaward portion of the foredune with the goal to maintain existing foredune widths. Making sand available seaward of the foredune makes sand available for along-shore transport to promote better sand distribution.

View and Preventative Grading

Despite a lack of recent events demonstrating so, Cannon Beach’s beach is susceptible to erosion. Erosion events like those documented in the background report will likely occur from
time to time, in between more regular periods of accretion. The grading recommendations in this plan will not increase the risk of erosion or flooding enabled by erosion.

In between major erosion events, which in most parts of town may occur every several decades, large volumes of sand may accumulate in Cannon Beach’s fordunes. Introduced European Beach Grass has colonized the fordunes, increasing the rate of sand accumulation. Windblown sand reaches through the fordune and inundates private properties and public streets.

Within Cannon Beach sand has accumulated such that views of the wet sand beach are impacted. Although future iterations of the Foredune Management Plan may be focused on building up eroded fordunes, this plan is focused on measures to temporarily reduce view impacts without sacrificing the erosion and flood hazard mitigation benefits provided by the fordune.

**STRATEGY**

This strategy for this plan includes limited fordune grading in areas where growth in the height of the fordune area has continued on a regular basis. In eroded fordune areas, provisions are made for nourishment through bypassing or backpassing. This plan also allows for the selective removal of vegetation in order to reduce wildfire risk, improve views of the beach and waves, and reduce concealed places where illegal activities occur.

The planning area is divided into four management units based on the prior management unit boundaries specified in the 1997 plan. These boundaries separate areas with distinct fordune, development, and recreation conditions. Unique strategies are proposed within each management unit to achieve the flood and erosion prevention, view, and recreational objectives in each area; specifically grading is proposed in two of the management units (Presidential Streets and Breaker’s Point), while vegetative stabilization is promoted in the other two units. The strategies proposed in this plan are implemented through Comprehensive Plan Amendments and Zoning Ordinances.

FEMA Flood Insurance Rate Maps (FIRM) for Cannon Beach were last updated in 2010 (Effective Date September 17, 2010). In 2017 Oregon DOGAMI drafted “Beach and Shoreline Dynamics in the Cannon Beach Littoral Cell; Implications for Dune Management.” These Base Flood Elevations (BFEs) along with the DOGAMI report provided the basis for this plan.

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2FEMA Flood Insurance Study 41007CV001A (2010).

**DESIRED FOREDUNE CONFIGURATION**

Foredunes lowered by grading must maintain a minimum elevation of the FEMA BFE+4 feet to comply with Statewide Planning Goal 18. Foredune width is measured seaward from the Statutory Vegetation Line. Foredune width should not decrease with grading activity.

Where the existing foredune width would be reduced by grading, any sand graded from the dune should be moved seaward, and placed on the foreslope of the dune. Where the existing foredune width would not be reduced by grading, sand graded from the dune may be moved seaward or along the shore to the foredune of other dunes that have an eroding foredune.

Sand that is graded from the foredune crest to the foreslope should be placed at a gradient not exceeding 2:1 (H:V) and preferably at a gentler gradient (5:1 or less). Alternatively, sand may be graded back toward the statutory vegetation line to fill areas of the interdunal trough. This grading should minimize impacts to vegetation by minimizing transport distances and fill relatively small areas higher, rather than filling large areas lower.

Grading is not proposed in the Haystack Rock and Downtown management areas. These areas are vulnerable to wave overtopping and erosion compared to other management areas in the City.

**METHODS OF SAND REMOVAL**

There are two methods of sand removal recommended in Cannon Beach. The first method is commonly used in Oregon and other coastal areas. It involves using a bulldozer to move dune sand seaward and placing the sand along the seaward face of the dune. Once the sand is placed in this location the wind moves the sand within the littoral cell. As described in the 2017 Background Report, the optimal time of year for this method is May through July. As described below this poses some challenges within the City.

The second method is to remove the sand from one dune and transport it to another area that lacks sand. An example provided in the 2017 background report is that sand could be removed from Chapman Point and transported to Tolovana South. This method would entail placing sand in trucks and driving it down the beach. There is more flexibility regarding the time of year this work could be conducted. Although this method is less preferred to allowing nature to move the sand, it does offer an approach to help the City address some logistical issues associated with the first method.

Utilizing a combination of these approaches could be a useful option for areas within the City. Physically transporting the sand to another location would decrease the amount of sand that would be re-distributed in multiple dune grading cycles while helping an area in need of sand. Combining these approaches could also minimize the negative consequences of conducting these activities at a less desirable time of year. This hybrid approach could be conducted during late Spring or early Fall to accommodate some logistical concerns within the City.

With either method it is important that offshore disposal or transport of sand out of the littoral cell is not recommended and should not occur.
TIMING OF SAND REMOVAL
Timing of grading poses a challenge for the City of Cannon Beach. The 2017 Background Report recommended time for grading was determined to be late spring through mid-summer, specifically May through July. The challenge associated with this time frame is that these months are peak tourist season in the City. Thousands of people flock to the City’s beaches during this time, making it difficult and potentially undesirable to conduct foordune grading at this time.

The City has mentioned late spring or fall as desired times of the year for this work to happen. In September northerly winds (which drive the sand to the south) are typically less strong, which reduces their potential to transport the sand. Based on these considerations, dune grading should occur late April through early May. If trucking sand off-site, activity may occur early April through early August.

VEGETATION PLANTING AFTER GRADING
Areas disturbed by grading or other sand removal should be revegetated. Appropriate signage should be placed to discourage beach users from entering and disturbing planted areas while the plants are getting established.

A first planting in the area should consist of beachgrass. There are three species of beachgrass. European Beachgrass (*Ammophila arenaria*) currently dominates the dunes throughout Cannon Beach; the City is interested in exploring alternatives.

European Beachgrass traps sand and forms tall and narrow dunes. Whereas, native American beachgrass (*Elymus mollis*) creates shorter and wider dunes.\(^4\) These grasses should be used together to stabilize foredunes post grading.

Secondary planting in the backslope to encourage fire resistant vegetation may include Salal Evergreen Huckleberry, Purple Beach Pea, Seashore Lupine, and Tree Lupine. Secondary species should be planted directly in the beachgrass. For additional information regarding vegetation maintenance refer to Carlson, et al., 1991.\(^5\) No state listed noxious weeds should be used to revegetate foredunes.

Vegetation planting specifications are included at the end of this document and should be followed.

MAINTENANCE
Maintenance will include additional plantings or fertilizer application in areas where plantings performed poorly, grading or sand removal occured to maintain access routes, foreshore shaping, and maintenance grading of the foordune crest. Maintenance activities to be carried


out during the first two years of the implementation of this plan will generally consist of regular
repair planting and fertilization. Monitoring and maintenance of dune and vegetation
management projects are generally the responsibility of and are required of the applicant as a
condition of permit approval.

A detailed maintenance program can be found at the end of this document and should be
followed.

**MONITORING**

Monitoring is required for all dune grading or sand removal projects. Monitoring should include
inspections, photographic documentation, and profile surveys. At a minimum, profiles should be
measured prior to grading, after grading has occurred, and after the graded areas have been
subjected to a winter season. Affected areas should be inspected at least annually for a period
of five years after grading or sand removal. A brief assessment of whether the intended
outcomes of grading were accomplished and sustained should be made after the winter season
measurement and after the five year inspection. These should include a comparison of the
foredune design profiled contained in this plan, the permitted foredune design profile, and the
foredune profile after the winter season.

As the permitting and regulatory authority, the City will maintain and monitor the effectiveness of
this plan. Two years after adopting this plan, the City will complete a preliminary evaluation of
the extent to which the plan objectives have been achieved (existing profile elevations/volumes
versus design profile elevations/volumes, percent vegetation cover and degree of foredune
stabilization, extent of access to public facilities, extent of ocean views from residential areas,
etc.). Ten years after adopting this plan, the City will update the evaluation, complete a review
and update of the background report, and revise the Foredune Management Plan as necessary.

**ADDITIONAL PLANNING AND PERMITTING REQUIRED**

This plan provides the general guidelines and conceptual approach to foredune grading and
management in Cannon Beach. It does not provide specific designs for specific areas within the
planning area, nor does it consist of a permit for actual grading projects.

Designs for individual management sub-areas that include minimum contiguous beach lengths
of 400 feet must be prepared for grading projects based on survey profiles measured
specifically for the project. Designs should consider the existing and proposed foredune
configurations in nearby management units. Adjoining projects should be designed to
complement each other in terms of erosion and flood protection, public access, and ocean
views.

Grading projects will require permits from Oregon Parks and Recreation Department (OPRD)
and a Conditional Use Permit (CUP) from the City of Cannon Beach that will be reviewed by the
City’s Planning Commission. Written permission from all property owners must be obtained by
any permit applicant seeking to grade on private property. Additionally, for the City permit, up to
two thousand five hundred cubic yards will be permitted to be graded with each permit.
Additional grading will require additional permits. A need must be demonstrated to justify additional permits.

Dune management activities generally will not be funded by the City. This means that property owners must pay for a range of activities associated with dune grading, including: the creation of subarea plans, obtaining permits for individual grading projects, hiring consultants to design grading projects, monitoring grading projects, and maintaining grading projects. Property owners desiring to grade may consider a variety of options to collectively finance grading activities including development of a taxing district or local improvement district.

Organized parties may begin implementing this plan immediately after it is adopted, however, it may take time for the landowners and others who want to carry out the grading project to organize themselves in a way that provides for collective decision-making and financing for applying for permits, paying for grading, and managing the grading contractors and consultants.

LIMITATIONS
The set of recommendations that constitute the proposed foredune management strategy area based on a consideration of past and present conditions. Should events occur which alter existing conditions, such as erosion, recommendations contained in this document may need to be modified. Further, as additional information on site conditions is developed, recommendations contained in this document may need to be modified. CREST is excluded from responsibility for any adverse effects that result from subsequent implement of this plan.

MANAGEMENT UNIT STRATEGIES

Haystack Rock
Harrison Street to Haystack Rock

This dynamic shoreline extends from Harrison Street south to Haystack Rock and has experienced sand deposition and erosion. The management unit is zoned as Open Space (OS) and falls within the Oceanfront Overlay Zone. There is no development within these zones in the management area; however, development surrounds the management to the east and the beach is highly utilized. The current BFE in this unit is 28 feet and is subject to change with updated FEMA maps.

Prioritized Management Objectives

1. To maintain or enhance ocean erosion/flood protective functions of the foredune area; and
2. To maintain or enhance public access to established facilities and to recreational uses associated with the open sand beach.

Conceptual Alternatives
The objectives and recommendations reflect those found in the 1997 plan. New conceptual alternatives aren't considered for this area. However, pursuing alternatives that call for more grading in other management units may reinforce flood and erosion protection functions of this unit by making more sand available seaward of the foredune for along-shore transport to this area.

**Recommended Management Strategies**

This management unit should be actively managed for receiving and retaining sand. The range of management activities prescribed for this management unit is described below.

- Removal- No removal of any kind is allowed in this management unit.
- Grading- Grading, other than that associated with nourishment, is not allowed in this management unit.
- Nourishment- Unless it can be demonstrated that this area is losing sand to erosion, it should not be a top priority spot for sand nourishment.
- Stabilization- Selective vegetative stabilization within this management unit is to follow the Vegetation Planting Specifications found at the end of this document.

**Desired Foredune Configuration**

A desired foredune configuration is not proposed for this management unit, because grading and removal are not permitted here. This is not a priority area for beach nourishment.

**Presidential Streets**

**Ecola Creek to Harrison Street**

The dynamic shoreline extends from Taft Street down to Harrison Street. Recently this area has experienced sand accretion. This management unit is zoned as Open Space (OS) and falls within the Oceanfront Overlay Zone. There is no development within these zones; however, residential development surrounds the management unit to the east and beach is highly utilized in this area. The current BFE in this unit is 25, 27, or 28 feet and is subject to change with updated FEMA maps. Current FEMA maps should be consulted when dune designs are created.

This sub-unit is located between the Haystack Management Unit and the Downtown Management Unit. The scope and timing of the sand management measures outlined above are intended to minimize adverse impacts to these adjacent areas. Monitoring and maintenance will help to insure that impacts to adjacent properties are minimal.

There are three sub-units within this management unit. The existing sub-units and the proposed sub-units can be seen in Figure 1. Each sub-unit has their own management objectives and strategies.

**Management Objectives for All Sub-Units**

1. To maintain or enhance ocean erosion/flood protective functions of the foredune area;
2. To maintain or enhance ocean views and correspondingly minimize inundation brought about by excessive accumulation of wind-blown sand; and
3. To maintain or enhance public access to established facilities and recreational uses associated with the open sand beach.

**Conceptual Alternatives**

The objectives and recommendations reflect those of the Marra Report. With the exception of changing the boundaries of sub-units one and two, new conceptual alternatives aren't considered for this area. However, pursuing alternatives that call for more grading in other management units may reinforce flood and erosion protection functions in this unit, by making more sand available seaward of the foredune for along-shore transport to this area.

**Recommended Management Strategies**

This management unit should be actively managed for receiving and retaining sand. The range of management activities prescribed within this foredune management unit is described below.

**Area I: Jackson Street to Harrison Street**

The management objectives listed above apply to each sub-unit. The priority management objectives in this sub-unit are:

1. Maintain or enhance ocean flood/erosion protective functions of the natural foredune area; and
2. Maintain or enhance access to recreational uses associated with the open sand beach.

Other than maintenance or enhancement of existing vegetation cover, little modification is permitted in this sub-unit. Sand removal of any kind is allowed in this area. Grading, other than that associated with nourishment, is not allowed in this area. Until proven otherwise, this is not a priority area for nourishment. Any vegetative stabilization should follow the Vegetation Specifications at the end of this document.

**Area II: Washington Street to South of Jackson Street**

The priority management objectives in this sub-unit are:

1. Minimize inundation brought about by excessive accumulation of wind-blown sand and correspondingly maintain or enhance ocean views;
2. Maintain or enhance existing stormwater drainage; and

The removal of sand from the foredune area is prohibited. Grading the foredune is permitted down to BFE+4 feet NAVD88. The lower foreslope will extend about 200 feet out seaward from the secondary foredune crest and down to an elevation of about 9 feet NAVD88. Grading should be carried out according to the strategies outlined at the beginning of this document.
Due to high sand accumulation, regrading may be warranted in this area on a regular basis. Regrading should follow the guidelines outlined at the beginning of this document.

After grading occurs, vegetative stabilization should occur according to the guidelines outlined at the end of this document. With the exception of a 35 foot wide unvegetated buffer strip located directly west of the ‘fence line’, planting of sand-stilling grasses should be carried out across the entire graded foredune area. Planting should occur immediately following grading.

**Area III: Ecola Creek to Washington Street**

The priority management objectives in this sub-unit are:

1. Minimize inundation brought about by excessive accumulation of wind-blown sand and correspondingly maintain or enhance ocean views; and
2. Maintain or enhance access to recreational uses associated with the open sand beach.

The removal of sand from the foredune area is prohibited. Grading the foredune is permitted down to BFE+4 feet NAVD88. The lower foreshore will extend about 250 feet out seaward from the secondary foredune crest and down to an elevation of about 8 feet NAVD88. Grading should be carried out according to the strategies outlined at the beginning of this document.

Due to high sand accumulation, regrading may be warranted in this area on a regular basis. Regrading should follow the guidelines outlined at the beginning of this document.

After grading occurs, vegetative stabilization should occur according to the guidelines outlined at the end of this document. With the exception of a 35 foot wide unvegetated buffer strip located directly west of the ‘fence line’, planting of sand-stilling grasses should be carried out across the entire graded foredune area. Planting should occur immediately following grading.

**Downtown**

**3rd Street to Taft**

This dynamic shoreline extends from 3rd Street to Taft Street and has experienced sand deposition and erosion. The management unit is zoned as Open Space (OS) and falls within the Oceanfront Overlay Zone. There is no development within these zones in the management area; however, residential and commercial development surrounds the management to the east and the beach is highly utilized. The current BFE in this unit is 21, 22, 23, 29, 28, 31 feet and is subject to change with updated FEMA maps. Current FEMA maps should be consulted when grading projects are designed.

**Prioritized Management Objectives**

1. To maintain or enhance ocean erosion/flood protective functions of the foredune area; and
2. To maintain or enhance public access to established facilities and to recreational uses associated with the open sand beach.

Conceptual Alternatives

The objectives and recommendations reflect those found in the 1997 plan. New conceptual alternatives aren’t considered for this area. However, pursuing alternatives that call for more grading in other management units may reinforce flood and erosion protection functions of this unit by making more sand available seaward of the foredune for along-shore transport to this area.

Recommended Management Strategies

This management unit should be actively managed for receiving and retaining sand. The range of management activities prescribed for this management unit are described below.

- Removal- No removal of any kind is allowed in this management unit.
- Grading- Grading, other than that associated with nourishment, is not allowed in this management unit.
- Nourishment- Unless it can be demonstrated that this area is losing sand to erosion, it should not be a top priority spot for sand nourishment.
- Stabilization- Selective vegetative stabilization within this management unit is to follow the Vegetation Planting Specifications found at the end of this document.

Desired Foredune Configuration

A desired foredune configuration is not proposed for this management unit, because grading and removal are not permitted here. This is not a priority area for dune nourishment.

Chapman Beach (Breaker’s Point)
9th Street to Ecola Creek

This section of shoreline has experienced the highest amount of sand accretion within Cannon Beach. This management unit is zoned as Open Space (OS) and falls within the Oceanfront Overlay Zone. Residential development surrounds this management unit. The current BFE is 29 and 31 feet and is subject to change with updated FEMA maps. Current FEMA maps should be consulted when dune grading projects are designed.

Prioritized Management Objectives

1. To maintain or enhance ocean erosion/flood protective functions of the foredune area;
2. To maintain or enhance ocean views and correspondingly minimize inundation brought about by excessive accumulation of wind-blown sand; and
3. To maintain or enhance public access to established facilities and recreational uses associated with the open sand beach.

Conceptual Alternatives
The objectives and recommendations reflect those found in the Rosenfeld Report. New conceptual alternatives aren’t considered for this area. However, pursuing alternatives that call for more grading in other management units may reinforce flood and erosion protection functions of this unit by making more sand available seaward of the foredune for along-shore transport to this area.

**Recommended Management Strategies**

The removal of sand from the foredune area is prohibited. Grading down to the BFE+4 feet NAVD88 is permitted. The lower foreslope will extend about 200 feet out seaward from the secondary foredune crest and down to an elevation of about 9 feet NAVD88. Grading should be carried out according to the strategies outlined at the beginning of this document.

Due to high sand accumulation, regrading may be warranted in this area on a regular basis. Rergrading should follow the guidelines outlined at the beginning of this document.

After grading occurs, vegetative stabilization should occur according to the guidelines outlined at the end of this document. With the exception of a 35 foot wide unvegetated buffer strip located directly west of the ‘fence line’, planting of sand-stilling grasses should be carried out across the entire graded foredune area. Planting should occur immediately following grading.

This sub-unit is the most northern management unit. If current trends continue, this area will continue to accumulate sand. The scope and timing of the sand management measures outlined above are intended to minimize adverse impacts to these adjacent areas. Monitoring and maintenance will help to insure that impacts to adjacent properties are minimal.

**MAINTENANCE PROGRAM**

This Maintenance Program identifies actions that can be or are required to be carried out to maintain the outcomes of dune grading and vegetation management processes. Regular maintenance will generally involve repair planting and fertilization, planting of secondary species in some areas, and limited mowing and pruning. Maintenance may also involve foreslope shaping. Provisions for access management are also included as part of general maintenance measures.

**Maintenance Planting After Grading**

Planted areas should be appropriately supplemented with fertilizer or other soil amendments, such as compost or biochar, to promote a sufficient survival rate. A qualified professional shall ensure that the planting plan is sufficient.

After the initial planting, any areas on the foreslope, crest of the foredunes, and other exposed areas with less than 30% vegetative cover should be replanted with beachgrass at high densities to the specifications found at the end of this document. The backslope of foredunes, and other less exposed areas with less than 60% vegetative cover should be replanted to the specifications found at the end of this document.
Secondary plantings may be established in backslope/interdune areas. This should be done when initial stabilizing vegetation (dunegrass) is well established (generally after two years). Plants appropriate for secondary stabilization include salal, evergreen huckleberry, shore pine, purple beach pea, seashore lupine, and tree lupine. After secondary planting, further succession should occur naturally since beachgrass tends to thin out and die where it is cut off from sand accretion.

**Beachgrass Maintenance for Views or to Accumulate Interdune Sand**

Mowing of beachgrass can be an appropriate management tool to maintain views across the crest or to promote sand deposition in low areas. However, because mowing of beach grass can result in a significant reduction in the trapping efficiency of the plant cover, it should only be carried out following consideration of its potential impacts. If mowing is to be carried out, it should be kept to a minimum and done between March and October.

A weed eater type of machine should be used to as evenly as possible cut beach grass down to an elevation of six to eight inches above ground. Mowing can also be done by hand. Mowed grass should be scattered in unmowed low-spots to promote sand capture in the foredune area. Grasses should be at least 60% mature. Unmowed beachgrass cover should be maintained so as to assume continued capture of sand on the foreslopes.

**Maintenance Foreslope Shaping**

Grading, limited principally to redistribution of sand presently in the foreslope area, is an appropriate maintenance measure when:

1. The crest and foreslope are so dissected and irregular that they significantly impede proper growth of the foredune. In this instance, shaping will involve evening of crest height as well as evening of the foreslope to an angle not to exceed 2:1 (H:V).
2. The foreslope is scarped in response to wave undercutting. In this instance, shaping will involve grading a portion of the crest just large enough to fill in the foreslope to an angle not to exceed 2:1 (H:V).
3. The foreslope is being nourished with sand from outside the management unit. In this instance, shaping will involve filling in the foreslope to an angle not to exceed 2:1 (H:V).

In all instances, foreslope shaping should be carried out so as to minimize disturbance (i.e. moving as little sand as possible and tapering shaped areas into unshaped areas). Vegetated areas that are not seriously damaged or buried in more than three feet of sand should be immediately fertilized. Areas graded more than three feet in height or buried in more than three feet of sand should be immediately replanted and fertilized.

**Maintenance Remedial Grading**

Remedial grading refers to the clearing of sand necessary to maintain the function of an allowed use. Removal of sand that has against exterior walls, doors, or windows that blocks access to a residential or commercial structure or may cause damage to these structures qualifies as
remedial grading. In this regard, recommendations for remedial grading around residential or commercial structures are as follows:

1. Rear yard sand may be removed to the level of the top sill of the foundation within 20 feet of the structure. From the 10-foot line, the graded area should slope upward to the elevation of the fronting foredune. This slope should not exceed 2:1 (H:V).
2. Side yard sand that is landward of the structure may be removed to the top of the sill of the foundations, provided grading in this area does not create a slope in excess of 2:1 (H:V) with adjacent properties.
3. Where the front yard is seaward of the structure, sand may be removed to the level of the top sill of the foundation within 20 feet of the structure. From the 10-foot line, the graded area should slope upward of the elevation of the fronting foredune. This slope should not exceed 2:1 (H:V).
4. Grading should not lower the front yard below the level of adjacent streets or roads, except to clear sidewalks or driveways.⁶

Areas graded more than three feet in height should be immediately replanted and fertilized. All graded sand must remain within the management area. Preferably, graded sand should be used to fill low dune areas within individual management units. However, graded sand may also be used to nourish identified management units as needed.

Fire-resistant species are the preferred stabilizing vegetation within twenty-five feet of existing dwellings or structures. Fire-resistant vegetation should only be planted when the foreslope and crest of the dune are adequately stabilized to prevent significant accumulation of windblown sand.

Access Management

Plants used for stabilization are vulnerable to trampling. It may be difficult to completely restrict pedestrian traffic in planted areas completely restricted. Access management should emphasize resident and visitor education and encourage voluntary avoidance of planted areas. Informational signs should identify sensitive foredune areas and direct recreational users away from these areas. Smaller signs encouraging pedestrians to stay out of planted areas should be placed around the boundary of planted areas.

MONITORING PROGRAM

This monitoring program is intended to evaluate the achievement of the overall objectives of this plan, referred to here as “Plan Monitoring”. It also includes the basic monitoring requirements for grading project proponents, referred to here as “Project Monitoring”. Plan Monitoring will be based on the information provided by the Project Monitoring and is meant to supplement the project.

Plan Monitoring

The City should complete Plan Monitoring Reporting after the second and fifth year following adoption and approval of the Management Strategy. The Plan Monitoring report should include the following:

1. References to or contents of the project designs, permits, and project monitoring data and reports for any grading projects that occurred during the time period;
2. Management Unit Project Monitoring Reports that were supposed to be submitted by project proponents, but were not submitted;
3. A brief evaluation for each management unit on how the Overall Management Objectives and management unit objectives were achieved; and
4. Insights on how Foredune Management Plans and their implementation should be improved in the future.

Management Unit Project Monitoring

Grading project proponents are responsible for Management Unit Project Monitoring. Measurements, photography, and inspections are to occur shortly after grading, and then annually in the spring. Monitoring shall be completed by a qualified professional with experience working on Pacific Northwest beaches. Monitoring should last for a period of five years and the following information should be submitted to the City:

1. Annual profile and dune crest elevation measurements;
2. Annual photographic documentation and an overall inspection of the managed sub-area; and
3. Annual summary report accompanied by monitoring observations and data, submitted to the City of Cannon Beach Planning Department.

If there is no significant in the measured profile two years after grading, then the profile measurement frequency can be decreased accordingly, however, the site should at least be visited and inspected annually for the five year period.

VEGETATION PLANTING SPECIFICATIONS

European Beach grass currently dominates the dunes in Cannon Beach. This grass has been shown to build tall and narrow dunes. The City is interested in an alternate dune shape. A lower and wider dune provides storm protection, while maintaining ocean views to a greater degree. Research demonstrates that the two types of American Beachgrass create shorter and wider dunes compared to European Beachgrass. The tradeoff is that these grasses have a lower rate of sand capture compared to European Beachgrass.

The American Beachgrass that is native to Oregon (\textit{Elymus mollis}) has demonstrated a lower transplant survival rate compared to European Beachgrass. Projects aim for a survival rate of

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approximately 98%. For this reason, European Beachgrass and American Beachgrass should be co-planted.

The City encourages dune grading projects to explore the potential of using native plants to stabilize the dunes. Native beachgrass and native dune prairie grasses are permitted to be used in revegetation plans. The applicant for a dune grading project will be required to use recommendations from a qualified professional to demonstrate that there will not be any adverse impacts to neighboring properties as a result of using this vegetation. The following descriptions apply to establishing beach grass; other vegetation should be reviewed by a qualified professional before permits are approved.

**Planting Stock**

For initial dune stabilization, *Elymus mollis* should be the majority of the grass used for the replanting. The applicant will be required to ensure the quality of the planting stock.

**Preparation and Storage**

The plants should be thoroughly cleaned by shaking sand and silt from the roots. Dead stalk and trash should be removed from the culms by stripping. The underground stems should be broken back so that one or two nodes remain. The grass culms should be sorted and tied into bundles that weigh approximately ten pounds; tops should be cut back so that the overall length of the planting stalk measures approximately 20 inches.

The planting stock should be planted within eight hours of removal from the nursery or heeling-in beds. The heeling-in beds should be a well-drained damp trench with roots (nodes) covered to a depth of at least eight inches. Stock should not be held in the heeling-in beds for a period exceeding 14 days. The supply of stock at the planting site must be kept in a cool shady place or otherwise protected against damage from excessive drying. Cold storage at 34-38°F for periods of up to two months is also acceptable.

The planting stock should be handled and transported by any method that does not damage the planting stock or area.

**Planting**

1. The grass is planted in hills with an average of 3 live culms (stems) per hill with no fewer than 2 live culms in up to 10% of the hills.
2. The spacing between hills should average 12 x 12 inches in areas recommended for high density planting and 18 x18 inches for low density plantings.
3. The grass should be planted to a depth of 12 inches, with sand compacted to exclude air from the roots (nodes). The top of the plant should be upright and extend approximately eight inches above the ground.

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4. No planting should be done on any area until the moisture is within 3 inches of the ground surface. Nor should any planting be done when the temperature exceeds 60°F or when freezing conditions prevail.

5. Plants should be kept in water immediately prior to planting to maintain root moisture and proper temperature. Plants should be watered after planting and fertilizing.

6. All areas planted should be fertilized with coarse particle ammonium sulfate commercial fertilizer (21-0-0), applied at a rate of 200 lbs./acre (one pound of available nitrogen per 1,000 ft²). Fertilizer should be applied when the wind is calm and the rain is steady; irrigation may be substituted for rain. Application of fertilizer depends on timing of planting, the above factors, and how long it has been since the grass was planted. Compost and biochar are available alternatives.

7. Any area with pre-existing beachgrass graded more than 3 feet deep or any area with less than 30% cover should also be re-planted.

<table>
<thead>
<tr>
<th>Beach Grass Density Stocking</th>
<th>Culms Per Hill</th>
<th>Spacing</th>
<th>Plants per 1,000 sq. ft.</th>
<th>Plants per acre</th>
</tr>
</thead>
<tbody>
<tr>
<td>High Density</td>
<td>3</td>
<td>12&quot;x12&quot;</td>
<td>3,004</td>
<td>130,680</td>
</tr>
<tr>
<td>Low Density</td>
<td>3</td>
<td>18&quot;x18&quot;</td>
<td>1,335</td>
<td>68,080</td>
</tr>
</tbody>
</table>

Note: Always order 3% more to offset heavy planting

**Maintenance**

Maintenance is required on beach grass for about the first two years; after that only periodic maintenance is required. If a large blow-out develops, the most effective maintenance procedure is to replant with American Beach Grass and then spread brush on the steep edges. Re-fertilizing any weak areas can bring back sufficient cover if the plant root systems have not been uncovered. Planted areas should be given an annual application of 200 lbs/acre of 21-0-0 fertilizer or be supplemented with compost and/or biochar.

**Transplanting Beach Grass as Clumps**

Transplanted clumps of beachgrass salvaged from foredune areas that are lowered for view grading can survive and grow adequately, and can be less costly than more traditional plantings. The process involves removing large clumps of beach grass from areas that are to be graded. The clumps are “heeled-in” on site in moist, protected areas while the grading occurs. When the graded area is ready to plant the large clumps are divided into 6"-8" clumps and transplanted to a depth of approximately a foot. Planted clumps should be spaced 18 inches apart for high density plantings and 24 inches apart for low density plantings. No published specifications regarding this process were found. Prior to implementing this method a qualified landscaper should be retained to refine the process, prepare more detailed specifications, and supervise its implementation.

**Secondary Stabilization**
Plantings of secondary stabilizing vegetation which is more fire resistant is appropriate in wellvegetated areas between the foredune crest and homes but not on the foredune crest or foreslope. Detail guidelines for planting secondary vegetation can be found in the Soil Conservation Service’s publication Stabilizing Coastal Sand Dunes in the Pacific Northwest. Plants capable of growing taller than six feet should be avoided so that they not impact views. Below is a sample of possible species:

- Salal (Gaultheria shallon)
- Evergreen Huckleberry (Vacciniumovatum)
- Purple Beach Pea (Lathyrus japonicas)
- Seashore Lupine (Lupinuslittoralis)
- Tree Lupine (Lupinusarboreas)

Other species may be considered. Preference is given to native vegetation.

Conditions

1. Secondary stabilization should only be done when initial stabilizing vegetation (European beachgrass) is well established.
2. Secondary plantings should occur directly in existing stands of beachgrass. Beachgrass should not be destroyed or removed prior to planting, so that it can continue to stabilize the area as secondary plants are establishing themselves. Succession should occur without destruction since beachgrass tends to thin out and die where it is cut off from sand accretion.

REFERENCES


FEMA Flood Insurance Study 41007CV001A (2010).


APPENDIX:
OREGON STATEWIDE PLANNING GOAL 18: BEACHES AND DUNES

Oregon’s Statewide Planning Goals & Guidelines

GOAL 18: BEACHES AND DUNES
OAR 680-015-0010(3)

To conserve, protect, where appropriate develop, and where appropriate restore the resources and benefits of coastal beach and dune areas; and

To reduce the hazard to human life and property from natural or man-induced actions associated with these areas.

Coastal comprehensive plans and implementing actions shall provide for diverse and appropriate use of beach and dune areas consistent with their ecological, recreational, aesthetic, water resource, and economic values, and consistent with the natural limitations of beaches, dunes, and dune vegetation for development.

INVENTORY REQUIREMENTS
Inventories shall be conducted to provide information necessary for identifying and designating beach and dune uses and policies. Inventories shall describe the stability, movement, groundwater resource, hazards and values of the beach and dune areas in sufficient detail to establish a sound basis for planning and management. For beach and dune areas adjacent to coastal waters, inventories shall also address the inventory requirements of the Coastal Shorelands Goal.

COMPREHENSIVE PLAN REQUIREMENTS
Based upon the inventory, comprehensive plans for coastal areas shall:

1. Identify beach and dune areas; and
2. Establish policies and uses for these areas consistent with the provisions of this goal.

IDENTIFICATION OF BEACHES AND DUNES
Coastal areas subject to this goal shall include beaches, active dune forms, recently stabilized dune forms, older stabilized dune forms and interdune forms.

USES
Uses shall be based on the capabilities and limitations of beach and dune areas to sustain different levels of use or development, and the need to protect areas of critical environmental concern, areas having scenic, scientific, or biological importance, and significant wildlife habitat as identified through application of Goals 5 and 17.

IMPLEMENTATION REQUIREMENTS
1. Local governments and state and federal agencies shall base decisions on plans, ordinances and land use actions in beach and dune areas, other than older stabilized dunes, on specific findings that shall include at least:
   (a) The type of use proposed and the adverse effects it might have on the site and adjacent areas;
   (b) Temporary and permanent stabilization programs and the planned
maintenance of new and existing vegetation;
(c) Methods for protecting the surrounding area from any adverse effects of the development; and
(d) Hazards to life, public and private property, and the natural environment which may be caused by the proposed use.

2. Local governments and state and federal agencies shall prohibit residential developments and commercial and industrial buildings on beaches, active foredunes, on other foredunes which are conditionally stable and that are subject to ocean undercutting or wave overtopping, and on interdune areas (deflation plains) that are subject to ocean flooding. Other development in these areas shall be permitted only if the findings required in (1) above are presented and it is demonstrated that the proposed development:
(a) is adequately protected from any geologic hazards, wind erosion, undercutting, ocean flooding and storm waves; or is of minimal value; and
(b) is designed to minimize adverse environmental effects.

3. Local governments and state and federal agencies shall regulate actions in beach and dune areas to minimize the resulting erosion. Such actions include, but are not limited to, the destruction of desirable vegetation (including inadvertent destruction by moisture loss or root damage), the exposure of stable and conditionally stable areas to erosion, and construction of shore structures which modify current or wave patterns leading to beach erosion.

4. Local, state and federal plans, implementing actions and permit reviews shall protect the groundwater from drawdown which would lead to loss of stabilizing vegetation, loss of water quality, or intrusion of salt water into water supplies. Building permits for single family dwellings are exempt from this requirement if appropriate findings are provided in the comprehensive plan or at the time of subdivision approval.

5. Permits for beachfront protective structures shall be issued only where development existed on January 1, 1977. Local comprehensive plans shall identify areas where development existed on January 1, 1977. For the purposes of this requirement and implementation Requirement 7 "development" means houses, commercial and industrial buildings, and vacant subdivision lots which are physically improved through construction of streets and provision of utilities to the lot and includes areas where an exception to (2) above has been approved. The criteria for review of all shore and beachfront protective structures shall provide that:
(a) visual impacts are minimized;
(b) necessary access to the beach is maintained;
(c) negative impacts on adjacent property are minimized; and
(d) long-term or recurring costs to the public are avoided.

6. Foredunes shall be breached only to replenish sand supply in interdune areas, or on a temporary basis in an emergency (e.g., fire control, cleaning up oil spills, draining farm lands, and alleviating flood hazards), and only if the breaching and restoration after breaching is consistent with sound principles of conservation.

7. Grading or sand movement necessary to maintain views or to prevent sand inundation may be allowed for structures in foredune areas only if
the area is committed to development or is within an acknowledged urban growth boundary and only as part of an overall plan for managing foredune grading. A foredune grading plan shall include the following elements based on consideration of factors affecting the stability of the shoreline to be managed including sources of sand, ocean flooding, and patterns of accretion and erosion (including wind erosion), and effects of beachfront protective structures and jetties. The plan shall:

(a) Cover an entire beach and foredune area subject to an accretion problem, including adjacent areas potentially affected by changes in flooding, erosion, or accretion as a result of dune grading;

(b) Specify minimum dune height and width requirements to be maintained for protection from flooding and erosion. The minimum height for flood protection is 4 feet above the 100 year flood elevation;

(c) Identify and set priorities for low and narrow dune areas which need to be built up;

(d) Prescribe standards for redistribution of sand and temporary and permanent stabilization measures including the timing of these activities; and

(e) Prohibit removal of sand from the beach-foredune system.

The Commission shall, by January 1, 1987, evaluate plans and actions which implement this requirement and determine whether or not they have interfered with maintaining the integrity of beach and dune areas and minimize flooding and erosion problems. If the Commission determines that these measures have interfered it shall initiate Goal amendment proceedings to revise or repeal these requirements.

GUIDELINES FOR GOAL 18

The requirements of the Beaches and Dunes Goal should be addressed with the same consideration applied to previously adopted goals and guidelines. The planning process described in the Land Use Planning Goal (Goal 2), including the exceptions provisions described in Goal 2, applies to beaches and dune areas and implementation of the Beaches and Dunes Goal.

Beaches and dunes, especially interdune areas (deflation plains) provide many unique or exceptional resources which should be addressed in the inventories and planning requirements of other goals, especially the Goals for Open Space, Scenic and Historic Areas and Natural Resources; and Recreational Needs. Habitat provided by these areas for coastal and migratory species is of special importance.

A. INVENTORY

Local government should begin the beach and dune inventory with a review of Beaches and Dunes of the Oregon Coast, USDA Soil Conservation Service and OCCDC, March 1975, and determine what additional information is necessary to identify and describe:

1. The geologic nature and stability of the beach and dune landforms;

2. Patterns of erosion, accretion, and migration;

3. Storm and ocean flood hazards;
4. Existing and projected use, development and economic activity on the beach and dune landforms; and
5. Areas of significant biological importance.

B. EXAMPLES OF MINIMAL DEVELOPMENT
Examples of development activity which are of minimal value and suitable for development of conditionally stable dunes and deflation plains include beach and dune boardwalks, fences which do not affect sand erosion or migration, and temporary open-sided shelters.

C. EVALUATING BEACH AND DUNE PLANS AND ACTIONS
Local government should adopt strict controls for carrying out the Implementation Requirements of this goal. The controls could include:
1. Requirement of a site investigation report financed by the developer;
2. Posting of performance bonds to assure that adverse effects can be corrected; and
3. Requirement of re-establishing vegetation within a specific time.

D. SAND BY-PASS
In developing structures that might excessively reduce the sand supply or interrupt the longshore transport or littoral drift, the developer should investigate, and where possible, provide methods of sand by-pass.

E. PUBLIC ACCESS
Where appropriate, local government should require new developments to dedicate easements for public access to public beaches.

dunes and associated waters. Access into or through dune areas, particularly conditionally stable dunes and dune complexes, should be controlled or designed to maintain the stability of the area, protect scenic values and avoid fire hazards.

F. DUNE STABILIZATION
Dune stabilization programs should be allowed only when in conformance with the comprehensive plan, and only after assessment of their potential impact.

G. OFF-ROAD VEHICLES
Appropriate levels of government should designate specific areas for the recreational use of off-road vehicles (ORVs). This use should be restricted to limit damage to natural resources and avoid conflict with other activities, including other recreational use.

H. FOREDUNE GRADING PLANS
Plans which allow foredune grading should be based on clear consideration of the fragility and ever-changing nature of the foredune and its importance for protection from flooding and erosion. Foredune grading needs to be planned for on an area-wide basis because the geologic processes of flooding, erosion, sand movement, wind patterns, and littoral drift affect entire stretches of shoreline. Dune grading cannot be carried out effectively on a lot-by-lot basis because of these area-wide processes and the off-site effects of changes to the dunes.
Plans should also address in detail the findings specified in Implementation Requirement (1) of this Goal with special emphasis placed on the following:
• Identification of appropriate measures for stabilization of graded areas and areas of deposition, including use of fire-resistant vegetation;
• Avoiding or minimizing grading or deposition which could adversely affect surrounding properties by changing wind, ocean erosion, or flooding patterns;
• Identifying appropriate sites for public and emergency access to the beach.
Cannon Beach Foredune Management Comprehensive Plan Policies

Deletions are shown as strike-through; new text is shown as italics.

Sand Dune Construction Policies
1. The City shall prohibit residential development and commercial and industrial buildings on beaches, active foredunes, on other foredunes which are conditionally stable and are subject to ocean undercutting or wave overtopping, and on interdune areas (deflation plains) that are subject to ocean flooding. Permitted uses in these areas shall be those which are of very low intensity (such as raised wooden walkways), uses which do not cause the removal of sand or vegetation, and which could be easily removed in the event of ocean flooding, erosion or other hazard.

2. Before a building permit is issued for construction involving the removal of vegetation in areas with sand soils, a satisfactory wind erosion prevention plan will be submitted which provides for temporary and permanent sand stabilization and maintenance of new and existing vegetation. The vegetation program shall return the area to its original level of stability.

3. Removal of vegetation during construction in any sand area shall be kept to the minimum required for building placement or other valid purpose. Removal of vegetation should not occur more than 30 days prior to construction. Permanent revegetation shall be started on the site as soon as practical after construction, final grading or utility placement. Storage of sand or other materials should not suffocate vegetation.

4. Site specific investigations by a registered geologist shall be required prior to issuance of building permits in open sand areas, on hillsides in sand areas regardless of the type of dune or its present stability, and on those conditionally stable dunes not subject to ocean hazard, but which in the view of the Building Official have potential for wind erosion or other damage. Site reports shall be paid for by the developer and the City may submit the reports to State and Federal agencies for evaluation.

5. The developer or party initiating action in sand areas shall be responsible for preventing adverse impacts from wind erosion on adjacent property, City streets, or utilities. Where necessary, the City may cause such impacts to be corrected at the expense of the developer.

6–6. Wells in dune areas shall not be permitted, in order to prevent the drawdown of groundwater and possible destruction of vegetation.

7. The City, through its Zoning Ordinance, shall regulate sand movement or alteration and vegetation control on City-owned lands not identified in the Dune Classification System (the ADDO Zone).

6. Foredune Management: Foredunes shall be breached only on a temporary basis in an emergency, e.g. fire control, cleaning up oil spills, and alleviating flood hazard. Restoration after breaching shall
reestablish, to the maximum extent feasible, the contours and vegetative cover existing on the site prior to the breaching.

7. Foredune Management: Grading or sand movement necessary to maintain views or to prevent sand inundation may be allowed for structures in foredune areas only if the area is committed to development or is within an acknowledged urban growth boundary; and only as part of an overall plan for managing foredune grading. The City’s foredune management plan allows grading to maintain views in the Presidential Streets sand management area, and in the Breakers Point sand management area, as shown on the maps with these names.

10. Foredune Management: A foredune grading plan shall include the following elements based on consideration of factors affecting the stability of the shoreline to be managed including sources of sand, ocean flooding, and patterns of accretion and erosion (including wind erosion), and effects of beachfront protective structures and jetties. The plan shall:
   a. Cover an entire beach and foredune area subject to an accretion problem, including adjacent areas potentially affected by changes in flooding, erosion, or accretion as a result of dune grading;
   b. Specify minimum dune height and width requirements to be maintained for protection from flooding and erosion. The minimum height for flood protection is 4 feet above the 100 year flood elevation; Comprehensive Plan
   c. Identify and set priorities for low and narrow dune areas which need to be built up;
   d. Prescribe standards for redistribution of sand and temporary and permanent stabilization measures including the timing of these activities, and
   e. Prohibit removal of sand from the beach-foredune system. Before construction can begin, the foredune grading plan must be adopted as an amendment to the Comprehensive Plan.

11. Foredune Management: Maintaining a stable, vegetated dune system is essential in those areas where coastal properties have been built either on or immediately landward of the dune.

12. Foredune Management: The City’s foredune management program seeks a balance between preserving the height and volume of dunes in order to provide protection to properties located on or behind the dune, while enabling residents to maintain their views of the ocean.

13. Foredune Management: Due to our uncertainty in the processes that enable and contribute toward dune formation, including their periodic destruction, managing a dynamic dune system at a range of spatial and temporal scales requires an adaptive management approach that is based on sound scientific knowledge of coastal dune processes and grounded by systematic, accurate monitoring.

14. Foredune management is founded on four important objectives. First, to ensure the dunes sustain an adequate sand volume in order to withstand the erosional effects of an extreme storm(s) and to minimize any potential for wave overtopping and inundation (flooding) of backshore. Second, to maintain weak points in the dune system (e.g. adjacent to trails), by repairing areas subject to localized blowouts from wind or waves in order to prevent the dune buffer from weakening and potentially being

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breached during a storm. Third, to maintain valuable habitat for a wide range of plants and animals, including in some cases rare species. Fourth, to maintain dunes at a particular height via dune scraping in order to retain views of the ocean and to minimize sand blowing inland among properties where it can become an expensive nuisance. A balance must be struck between these competing objectives.

15. Foredune Management: To ensure that an adequate sand volume remains to withstand erosional effects of extreme storms and to minimize any potential for wave overtopping and inundation of the backshore, foredune grading shall not be allowed below the base flood elevation on the current adopted FEMA Flood Insurance Rate Map, plus a four-foot vertical safety factor.

16. Foredune Management: Graded sand must be retained within the littoral system. Priorities for sand disposal are (a) place sand along the seaward face of the dune and out on the beach in late spring/summer, specifically May through July; (b) physically remove the sand from one location and transport it to another area that is currently starved of sand; (c) a combination of approaches such as pushing some of the sand seaward at Chapman Point, while also relocating some of the sand to Tolovana South.

17. Foredune Management: Revegetation of graded areas is mandatory. The can be accomplished with (a) the non-native American dune grass (A. breviligulata); or (b) the PNW native dune grass (E. mollis); or (c) some combination of both A. breviligulata and E. mollis.

18. Foredune Management: Because of uncertainty in the forces that both sustain and erode beaches and dunes on the Oregon coast, especially over longer time scales (10 to 30 years), an adaptive management approach based on a sound knowledge of beach and dune processes, guided by systematic monitoring and evaluation of the system as a whole, is essential. The Planning Commission shall evaluate its dune management program every ten years, and make changes to the management regime in response to the results of monitoring and other available information.
Cannon Beach Foredune Management Zoning Ordinance Amendments

Chapter 17.42 Oceanfront Management Overlay (OM) Zone

17.42.010 Purpose. (NO PROPOSED CHANGES)

The intent of the oceanfront management overlay (OM) zone is to regulate uses and activities in the affected areas in order to: ensure that development is consistent with the natural limitations of the oceanshore; to ensure that identified recreational, aesthetic, wildlife habitat and other resources are protected; to conserve, protect, where appropriate develop, and where appropriate restore the resources and benefits of beach and dune areas; and to reduce the hazards to property and human life resulting from both natural events and development activities.

17.42.020 General provisions. (NO PROPOSED CHANGES)

A. Zone Boundaries.

1. The OM zone includes the following areas: beaches; active dunes; foredunes, including active foredunes and conditionally stable foredunes which are subject to ocean undercutting and wave overtopping; conditionally stable dunes; interdune areas that are subject to ocean flooding; deflation plains; younger and older stabilized dunes; conditionally stable open sand areas; and lots abutting the oceanshore. The boundaries of the overlay zone shall be those shown on the map titled “Oceanfront Management Overlay Zone, City of Cannon Beach.” If the city has reason to believe that a site, presently not covered by the OM zone, exhibits characteristics that warrant its inclusion in the OM zone, the city shall hire an appropriate expert to undertake a site investigation to determine whether the area contains one or more of the land forms which are contained in the OM zone. If, as the result of the site investigation, it is determined that the site includes land forms covered by the OM zone, the site shall be subject to the requirements of the OM zone.

2. The map titled “Active dune and conditionally stabilized dunes, Cannon Beach, May 1993” is adopted by reference and incorporated into this zone. This map shall form the basis for identifying what constitute active dunes and conditionally stable dunes.

B. Relationship to the Underlying Zone. Uses and activities within the OM zone are subject to the provisions and standards of the underlying zone and this chapter. Where the provisions of this zone and the underlying zone conflict, the provisions of this zone shall apply.

C. Warning and Disclaimer of Liability. The degree of protection from the effects of erosion or accretion required by this section is considered reasonable for regulatory purposes. This does not imply that development permitted in the OM zone will be free from the effects of erosion or accretion. These provisions shall not create a liability on the part of the city or any officer, employee, or official thereof.

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for any damages due to erosion or accretion that results from reliance on the provisions of this section or any administrative decision made thereunder. (Ord. 94-08 § 10)

17.42.030 Uses and activities permitted. (NO PROPOSED CHANGES)

A. For lots that consist of the beach, active dunes, or other foredunes which are conditionally stable and that are subject to wave overtopping or ocean undercutting, or interdune areas that are subject to ocean flooding the following uses and activities are permitted subject to provisions of Section 17.92.010, Development permits:

1. Remedial dune grading, subject to the provisions of Section 17.42.060(A)(4);
2. Foredune breaching, subject to the provisions of Section 17.42.060(A)(2);
3. Maintenance and repair of an existing shoreline stabilization structure, subject to the provisions of Section 17.80.230(K);
4. Maintenance and repair of existing streets, sewer or water lines, and drainage improvements other than storm water outfalls;
5. Private beach access improvements, including stairs, subject to the provisions of Section 17.42.060(A)(7);
6. Trimming of stabilizing vegetation, subject to the provisions of Section 17.42.060(A)(6).
7. Maintenance foredune grading, subject to the provisions of Section 17.42.060(11).

B. For lots that consist of the beach, active dunes, or other foredunes which are conditionally stable and that are subject to wave overtopping or ocean undercutting, or interdune areas that are subject to ocean flooding the following uses and activities are subject to the provision of Chapter 17.44, Design Review:

1. Public beach access improvements, including stairs, subject to the provisions of Section 17.42.060(A)(7);
2. Stormwater outfalls.

C. For lots that consist of the beach, active dunes, or other foredunes which are conditionally stable and that are subject to wave overtopping or ocean undercutting, or interdune areas that are subject to ocean flooding the following uses and activities are subject to the provision of Chapter 17.80, Conditional Uses:

1. Shoreline stabilization, subject to the provisions of Section 17.80.230;
2. Nonstructural shoreline stabilization program, subject to the provisions of Section 17.42.060(A)(5);
3. Foredune grading, subject to the provisions of Section 17.42.060(A)(3).

D. For lots that do not consist of a beach, active dunes, or other foredunes which are conditionally stable and that are subject to wave overtopping or ocean undercutting, or interdune areas that are subject to ocean flooding: in addition to the uses permitted in the underlying zone, the following uses and activities are permitted subject to provisions of Section 17.92.010, Development permits:

1. Private beach access improvements, subject to the provisions of Section 17.42.060(A)(7);
2. Maintenance and repair to existing shoreline stabilization structure, subject to the provisions of Section 17.80.230(K);

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3. Dune grading.

   E. For lots that do not consist of a beach, active dunes, or other foredunes which are conditionally stable and that are subject to wave overtopping or ocean undercutting, or interdune areas that are subject to ocean flooding: in addition to the uses permitted in the underlying zone, the following uses and activities are permitted subject to provision of Chapter 17.44, Design Review:

      1. Public beach access improvements, subject to the provisions of Section 17.42.060(A)(7);
      2. Stormwater outfalls.

   F. For lots that do not consist of a beach, active dunes, or other foredunes which are conditionally stable and that are subject to wave overtopping or ocean undercutting, or interdune areas that are subject to ocean flooding: in addition to the uses permitted in the underlying zone, the following uses and activities are permitted subject to provision of Chapter 17.80, Conditional Uses:

      1. Shoreline stabilization, subject to the provisions of Section 17.80.230;
      2. Non-structural shoreline stabilization program, subject to the provisions of Section 17.42.060(A)(5). (Ord. 07-3 § 3; Ord. 94-08 § 10)

**17.42.040 Uses and activities prohibited. (NO PROPOSED CHANGES)**

   A. Residential development and commercial and industrial buildings shall be prohibited on beaches, active dunes, or other foredunes which are conditionally stable and that are subject to wave overtopping or ocean undercutting, or interdune areas that are subject to ocean flooding. The location of these areas on a parcel of land shall be determined in accordance with Section 17.42.050(B)(3).

   B. Removal of sand from the beach, active dunes, or conditionally stable dunes subject to wave overtopping or ocean undercutting.

   C. Removal of stabilizing vegetation, except as part of a foredune grading plan provided for by Section 17.42.060(A)(3), or a nonstructural shoreline stabilization program provided for by Section 17.42.060(A)(5), or as provided for by Section 17.52.030. (Ord. 94-08 § 10)

**17.42.050 General standards. (NO CHANGES PROPOSED)**

   A. The uses and activities permitted in all areas contained in the OM zone are subject to the following:

      1. Flood Hazard Overlay Zone, Chapter 17.38;
      2. Geologic hazard areas requirements, Chapter 17.50;
      3. Maintenance of beach access in conformance with Section 17.90.030;
      4. All construction proposed west of the Oregon Coordinate Line shall obtain permits as required by the Oregon Parks and Recreation Department;
      5. All construction proposed west of the line of vegetation shall obtain permits as required under the Oregon Removal-Fill Law;
      6. Oceanfront Setback. For all lots abutting the oceanshore, the ocean yard shall be determined by the oceanfront setback line.

3

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a. The location of the oceanfront setback line for a given lot depends on the location of buildings on lots abutting the oceanshore in the vicinity of the proposed building site and upon the location and orientation of the Oregon Coordinate Line.

b. For the purpose of determining the oceanfront setback line, the term “building” refers to the residential or commercial structures on a lot. The term “building” does not include accessory structures.

c. The oceanfront setback line for a parcel is determined as follows:
   i. Determine the affected buildings; the affected buildings are those located one hundred feet north and one hundred feet south of the parcel’s side lot lines.
   ii. Determine the setback from the Oregon Coordinate Line for each building identified in subsection (A)(6)(c)(i) of this section.
   iii. Calculate the average of the setbacks of each of the buildings identified in subsection (A)(6)(c)(ii) of this section.

d. If there are no buildings identified by subsection (A)(6)(c)(i) of this section, then the oceanfront setback line shall be determined by buildings that are located two hundred feet north and two hundred feet south of the parcel’s side lot lines.

e. Where a building identified by either subsection (A)(6)(c)(i) of this section or subsection (A)(6)(d) of this section extends beyond one hundred feet of the lot in question, only that portion of the building within one hundred feet of the lot in question is used to calculate the oceanfront setback.

f. The setback from the Oregon Coordinate Line is measured from the most oceanward point of a building which is thirty inches or higher above the grade at the point being measured. Projections into yards, which conform to Section 17.90.070, shall not be incorporated into the required measurements.

g. The oceanfront setback line shall be parallel with the Oregon Coordinate Line and measurements from buildings shall be perpendicular to the Oregon Coordinate Line.

h. The minimum ocean yard setback shall be fifteen feet.

i. Notwithstanding the above provisions, the building official may require a greater oceanfront setback where information in a geologic site investigation report indicates a greater setback is required to protect the building from erosion hazard.

j. As part of the approval of a subdivision, the city may approve the oceanfront setback for the lots contained in the subdivision. At the time of building construction, the oceanfront setback for such a lot shall be the setback established by the approved subdivision and not the oceanfront setback as it would be determined by subsections (A)(6)(a) through (j) of this section. Before granting a building permit, the building official shall receive assurance satisfactory to such official that the location of the oceanfront setback for said lot has been specified at the required location on the plat or has been incorporated into the deed restriction against the lot.

B. The uses and activities permitted in beach and dune areas contained in the OM zone are subject to the following additional standards:

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1. For uses and activities located in beach and dune areas, other than older stabilized dunes, findings shall address the following:

a. The adverse effects the proposed development might have on the site and adjacent areas;

b. Temporary and permanent stabilization proposed and the planned maintenance of new and existing vegetation;

c. Methods for protecting the surrounding area from any adverse effects of the development; and

d. Hazards to life, public and private property, and the natural environment which may be caused by the proposed use.

2. For uses and activities located on beaches, active dunes, on other foredunes which are conditionally stable and that are subject to ocean undercutting or wave overtopping, and on interdune areas that are subject to ocean flooding, findings shall address the following:

a. The standards of subsection (B)(1) of this section;

b. The development is adequately protected from any geologic hazards, wind erosion, undercutting, ocean flooding and storm waves; or is of minimal value; and

c. The development is designed to minimize adverse environmental effects.

3. Determination of Building Line. For residential or commercial buildings proposed for lots that may consist of the beach, an active dune, or other foredunes which are conditionally stable and that are subject to wave overtopping or ocean undercutting, or interdune areas that are subject to ocean flooding the geologic site investigation required by Chapter 17.50 shall include a determination of where these features are located on the lot. The map titled “Active and conditionally stable dunes, Cannon Beach, May 1993” shall be used as the basis for locating the active dune area. The “Flood Insurance Study, City of Cannon Beach, Oregon, March 1978” and the “Active and conditionally stable dunes, Cannon Beach, May 1993” shall be used as the basis for locating the conditionally stable foredunes that are subject to wave overtopping and interdune areas subject to ocean flooding. Conditionally stable foredunes subject to ocean undercutting shall be determined as part of the site investigation report.

4. Conformance with the dune construction standards of Chapter 17.52. (Ord. 95-1 § 1; Ord. 94-08 § 10)

17.42.060 Specific standards. (PROPOSED CHANGES SECTIONS 3, 4, 5, AND 11)

A. The uses and activities permitted in all areas contained in the OM zone are subject to the following specific standards:

1. Shoreline stabilization subject to the standards of Chapter 17.80.230.

2. Foredune Breaching.

a. The breaching is required to replenish sand supply in interdune areas, or is undertaken on a temporary basis for emergency purposes such as fire control or the alleviation of flood hazard.

b. There are no other reasonable alternatives to alleviate the emergency.

c. The breaching does not endanger existing development.

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d. The area affected by the breaching is restored according to an approved restoration plan prepared by a registered geologist, or other qualified individual approved by the city. At a minimum, foredunes shall be restored to a dune profile which provides flood protection equivalent to that prior to breaching. The restoration plan shall also include appropriate revegetation.

3. Foredune Grading. Grading or sand movement necessary to maintain views or to prevent sand inundation, may be allowed for structures in dune areas only if the area is committed to development and only as part of an overall plan for managing foredune grading. A foredune management plan shall include the following elements based on consideration of factors affecting the stability of the shoreline to be managed including sources of sand, ocean flooding, and patterns of accretion and erosion (including wind erosion), and effects of beachfront protective structures and jetties. The plan shall:
   
   a. Address where grading activities are permitted within the shoreline covered by the littoral cell;
   b. Specify minimum dune height and width requirements to be maintained for protection from flooding and erosion. The minimum height for flood protection is 4 feet above the 100 year flood elevation and dune width should not be reduced;
   c. Identify areas of accretion and erosion;
   d. Prescribe standards for redistribution of sand and temporary and permanent stabilization measures, including the timing of these activities; and
   e. Prohibit removal of sand from the littoral cell.

f. Foredune grading plans may be submitted to the soil and water district for their comments.

g. The foredune grading plan must be adopted as an amendment to the comprehensive plan before construction can begin.

4. Remedial Dune Grading.

   a. The remedial grading of dune areas is permitted in the following cases:

      i. Clearing of sand which is inundating houses or commercial buildings and their associated improvements. Sand may be graded up to twenty feet from a building's foundation subject to the following conditions:

         (A) The area to be graded constitutes open sand dunes or the back slope of a foredune;
         (B) There is no modification to the crest of a foredune;
         (C) At a minimum, the area graded shall maintain the one hundred year flood elevation as established by the city's Flood Insurance Rate Map (FIRM); and
         (D) No grading shall occur west of the Oregon Coordinate Line, except for the placement of material removed from the structure in question;

      ii. Excavation necessary for the purpose of placing a beachfront protective structure;
      iii. Clearing of sand which is inundating a public street and is interfering with vehicular or pedestrian traffic;
      iv. Excavation of sand necessary to alleviate stormwater build-up;

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v. Minor reshaping of the forward portion of a dune necessary to provide an even slope for the planting of stabilizing vegetation.

b. As a condition of the issuance of a development permit, the city may require the preparation of a vegetation planting program by a qualified individual. The purpose of the program is to minimize the need for additional remedial grading in the future.

c. Where feasible, all graded sand shall be placed on the beach or foreslope portion of the adjoining dune. Where not feasible, the sand shall be placed at an erosion prone location approved by the city. In no event shall sand be removed from the littoral cell.

5. Nonstructural Shoreline Stabilization Program.

a. The program is prepared by a qualified individual approved by the city. The program shall be based on an analysis of the area subject to accretion and/or erosion. The area selected for management shall be found, based on the analysis, to be of sufficient size to successfully achieve the program objectives.

b. The program shall include specifications on how identified activities are to be undertaken. The specifications should address such elements as: the proposed type of vegetation to be planted or removed; the distribution, required fertilization and maintenance of vegetation to be planted; the location of any sand fences; and the timing of the elements of the proposed program.

c. Fire-resistant species are the preferred stabilizing vegetation within twenty-five feet of existing dwellings or structures. Fire-resistant vegetation should only be planted when the foreslope and crest of the dune are adequately stabilized to prevent significant accumulation of windblown sand.

d. Where the placement of sand fences is proposed, evidence shall be provided that the planting of vegetation alone will not achieve the stated purpose. Fencing may be permitted on a temporary basis to protect vegetation that is being planted as part of the program, or to control the effects of pedestrian beach access on adjacent areas.

e. The affected property owners shall establish a mechanism that provides for the on-going management of the proposed program.

f. The impact of the program shall be monitored. For multiyear programs, an annual report detailing the effects of the program during the previous year shall be presented to the planning commission. The report shall include recommendations for program modification. For a one-year program, a final report detailing the effects of the program shall be presented to the planning commission. Annual reports for grading activity should be submitted to the City annually for a period of five years post grading.

g. Areas that accrete as the result of a stabilization program will not form the basis for reestablishing the location of the building line specified by Section 17.42.050(B) (3).

6. Trimming of Stabilizing Vegetation.

a. Mowing should occur between March and October.

b. Mowing shall be done by hand or with a weed eater type machine. Grass should be cut as evenly as possible leaving six to eight inches of grass remaining above ground.

c. Mowed grass shall be left in place as a mulch, unless determined to be a fire hazard by the Fire Marshal.

d. If an area is mowed more than once, application of 21-0-0 ammonium sulfate fertilizer may be required.
e. The foreslope area of the dune, the portion of the dune facing the beach, should not be mowed.

f. Use of herbicides to control or eliminate vegetation is not permitted.

7. Beach Access.
   a. The city may require the planting of stabilizing vegetation, fencing or signage in order to minimize the potential for wind erosion that may be caused by the use of the beach access on adjacent areas.

8. Groundwater Protection. The proposed development will not result in the drawdown of the groundwater supply in a manner that would lead to:
   (a) the loss of stabilizing vegetation;
   (b) the loss of water quality;
   (c) salt water intrusion into the water supply; or
   (d) significant lowering of interdune water level. Building permits for single-family dwellings are exempt from this requirement if appropriate findings are provided at the time of subdivision approval.

9. Public Access Provision. A development (e.g., subdivision or planned development) that includes ten or more dwelling units, shall provide common beach access trails or walkways open to the general public. At a minimum, there shall be one beach access for each four hundred feet of beach frontage. This requirement is in addition to access provided by existing street-ends.

10. Structures in the Ocean Yard. The following structures are permitted in an ocean yard:
   a. Fences subject to the provisions of Section 17.54.020(C);
   b. Decks subject to the provisions of Section 17.90.070(E);
   c. Beach access stairs subject to Section 17.42.030(A)(5) and 17.42.030(D)(1).

   a. Maintenance foredune grading is defined as the affected area was previously graded pursuant to an approved foredune grading plan.
   b. An annual monitoring report demonstrates the overall stability of the area proposed for grading and should be submitted annually for five years post grading.
   c. The cumulative volume of proposed grading, within an approved foredune grading management area, for which a conditional use permit was obtained, does not exceed two thousand five hundred cubic yards. (Example: In year one a permit is issued to grade seven hundred fifty cubic yards of material; one thousand seven hundred fifty cubic yards of potential additional volume remain for maintenance grading. In year two a permit is issued to grade one thousand cubic yards of material; seven hundred fifty cubic yards of potential additional volume remain for maintenance grading. In year three it is proposed that one thousand two hundred fifty cubic yards of material be graded. This grading cannot be accomplished by means of a permit for maintenance grading because the cumulative grading would be three thousand cubic yards, exceeding the maximum of two thousand five hundred cubic yards. A conditional use permit for foredune grading would be required to implement this additional one thousand two hundred fifty cubic yards of grading).
   d. The proposed sand deposition area will not impact views from adjoining property.
   e. The grading is conducted pursuant to the standards of Section 17.42.060 3(b) and (e).
f. The cross-sectional area of the dune area, as measured perpendicular to the shoreline and above the one hundred-year stillwater flood elevation and seaward of the dune crest, is at least five hundred forty square feet.

g. The graded area shall be contoured to avoid large expanses of flat surfaced area.

h. The area is replanted in conformance with the standards in the approved foredune grading plan.

i. Any necessary permits are obtained from the Oregon Parks and Recreation Department.

j. Notification to adjoining property owners shall be those within two hundred fifty feet of the exterior boundary of the subject property, rather than the one hundred feet specified in Section 17.92.010(C)(2)(d).

k. The planning commission shall be informed of development permits for maintenance grading that are issued. (Ord. 07-3 § 4; Ord. 94-08 § 10)
This is to notify you that the City of Cannon Beach has proposed a land use regulation that may affect the permissible uses of your property and other properties.

On January 25, 2017, at 6:00 PM, the Cannon Beach Planning Commission will hold a public hearing at City Hall, 163 East Gower Street, regarding the adoption of Ordinance Number 18-01. The City has determined that adoption of this ordinance may affect the permissible uses of your property, and other properties in the affected zone, and may change the value of your property.

Ordinance Number 18-01 is available for inspection at the Cannon Beach City Hall located at 163 East Gower Street. The proposed ordinance may also be inspected on the City’s website at http://www.ci.cannon-beach.or.us/planning. A copy of proposed Ordinance Number 18-01 is available for purchase at a cost of $0.25 per page.

Proposed Ordinance Number 18-01 concerns a revised foredune management plan, and revisions to the City comprehensive plan policies addressing foredune management, and implementing measures in the Zoning Ordinance, Municipal Code Chapter 17.42.

For additional information concerning Ordinance Number 18-01, you may call the Cannon Beach City Planning Department at 503 436 8040.

Mark Barnes
Planning Director