

# GEOGRAPHY BULLETIN

## Edition 52, 2020

Oregon Dunes Image Bank  
An ecosystem at Risk  
A changing Environment

Created by L Chaffer for GTANSW & ACT Edition 52, Special Edition, 2020 ( Revised 2021)



# OREGON DUNES : AN ECOSYSTEM AT RISK



One of these images of the Oregon Dunes represents a threat to the survival of the ecosystem. Which image would you choose and why?

Created by Lorraine Chaffer 2020

# ECOSYSTEMS at RISK

*‘Our hike through the Oregon Dunes was a lesson in how man can screw up nature, wrecking perfectly functioning ecosystems, probably beyond repair.’*

Judy Nichols - [Hiking the Oregon Dunes: A lesson in ecosystem destruction](#) (2019)

*‘There are few places where humanity’s hand is as evident as it is on the dunes ecosystem. We have a responsibility to preserve what is left and restore what we can so the amazing natural processes and unique plants and wildlife of the dunes can thrive there once more’.*

## [Restoring Oregon Dunes](#)

Chandra LeGue, Oregon Dunes Restoration Collaborative

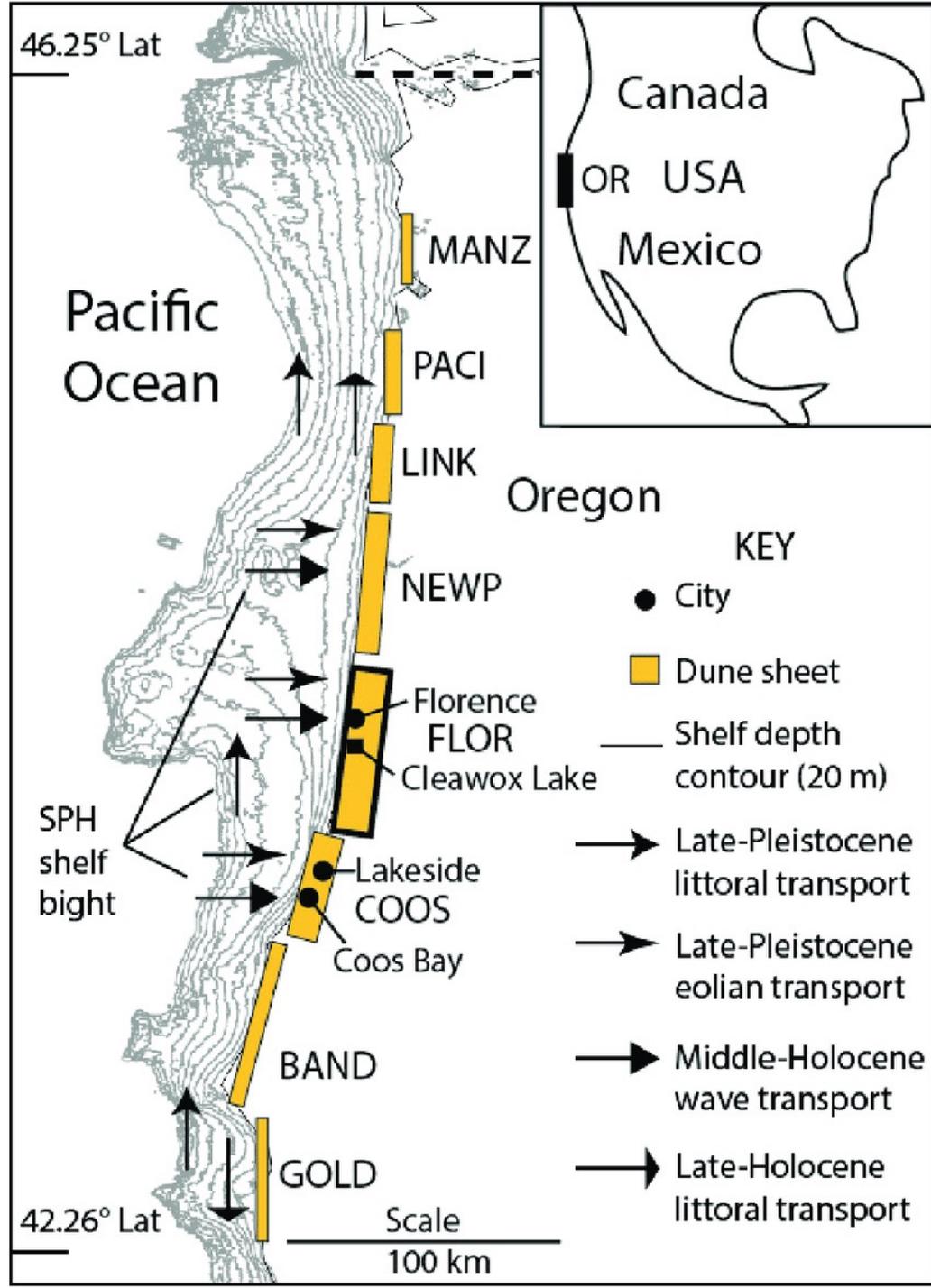
# AN INTRODUCTION

[Watch this short video clip](#) for a 'big picture' summary of change over time to the Oregon Dunes and attempts to protect this unique ecosystem.



Where is Oregon?

What features of the Oregon Coast suit dune development?

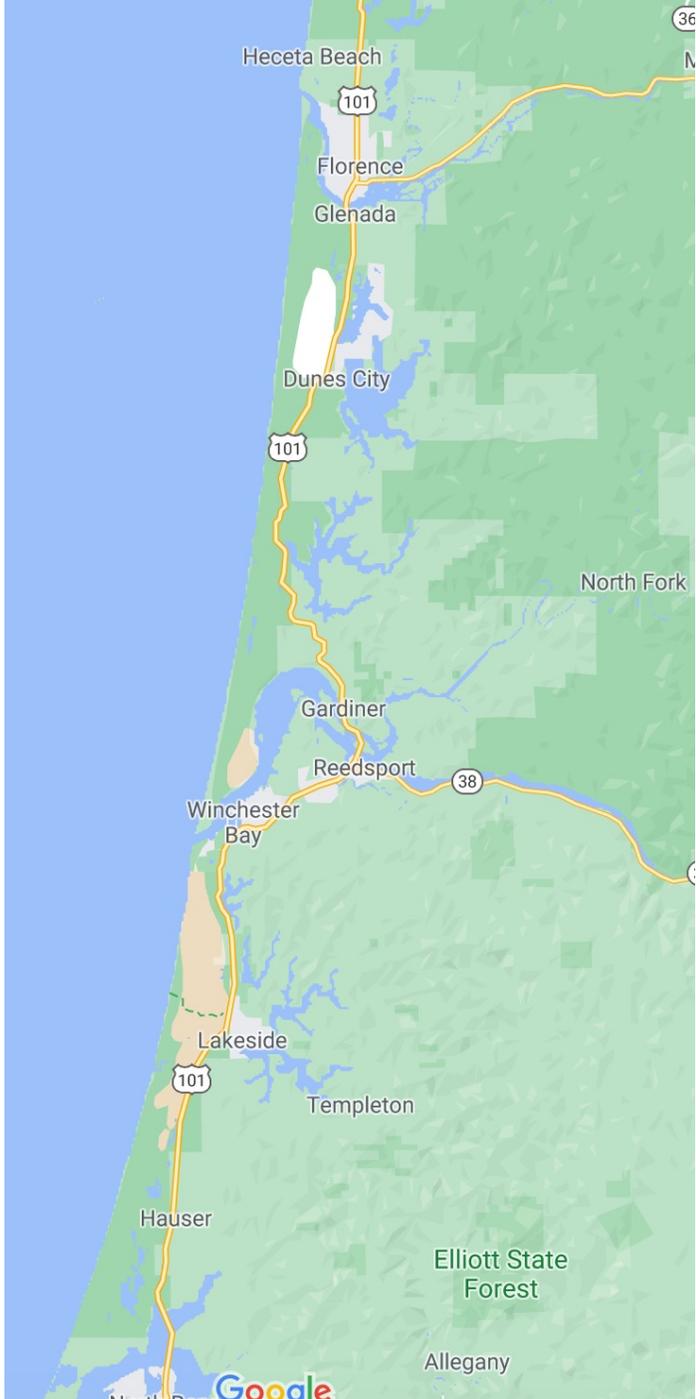
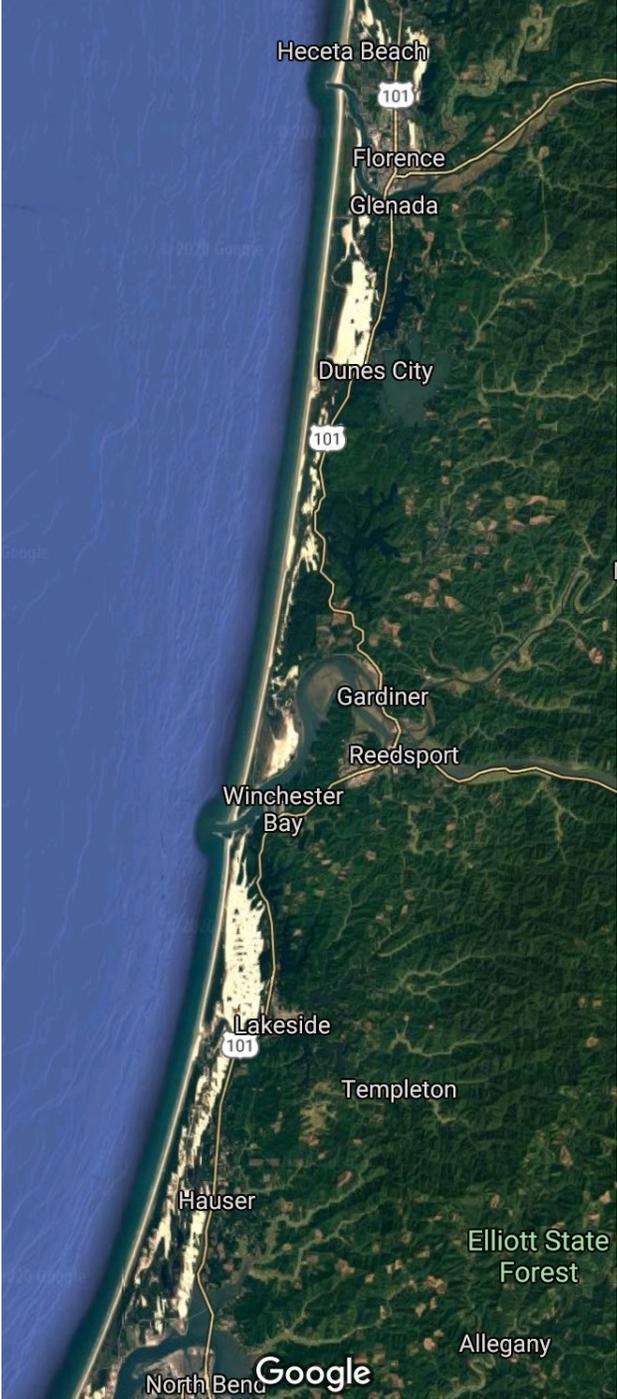


# Spatial Patterns



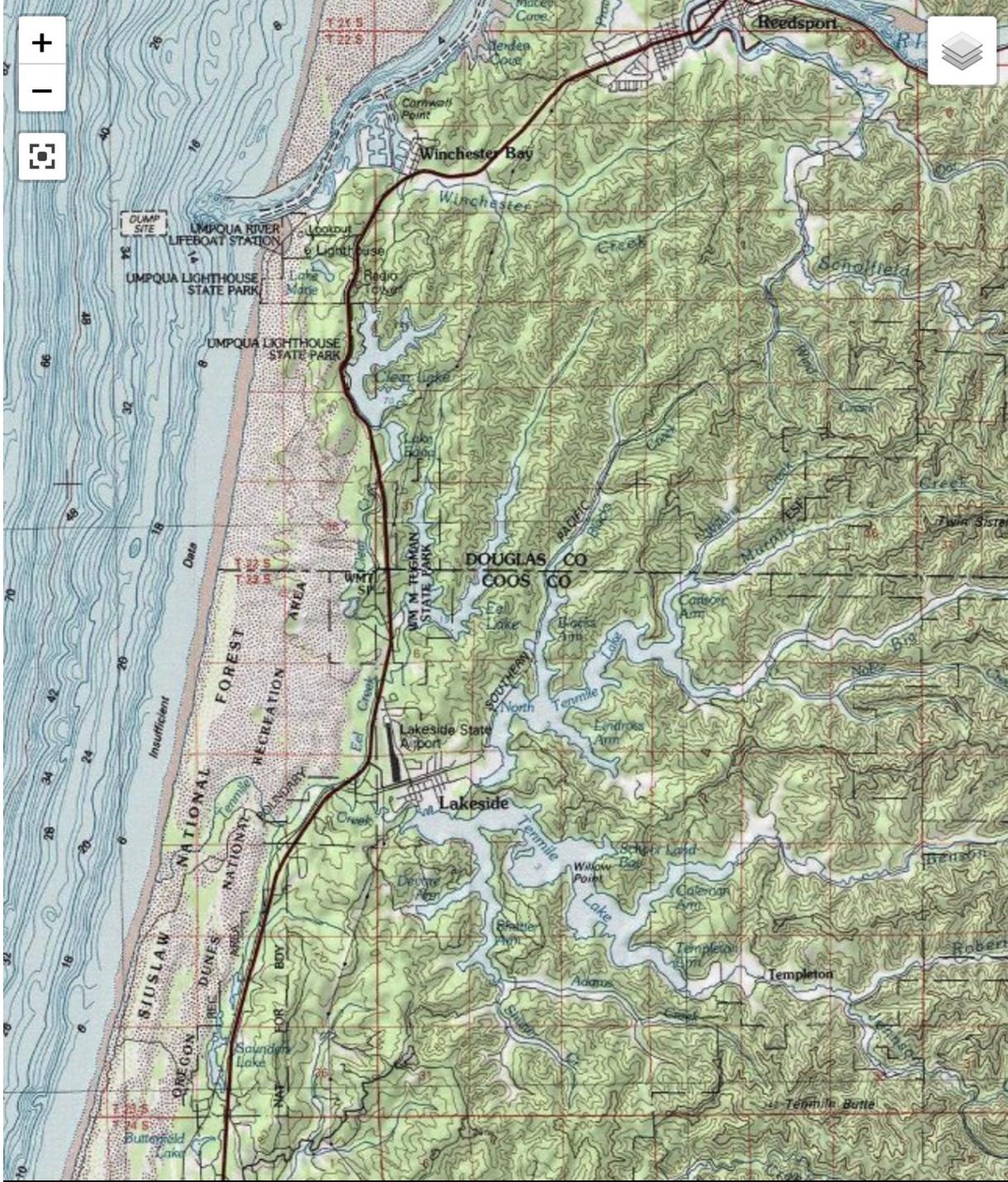
Source:  
<https://www.mercurynews.com/2016/11/17/an-oregon-coast-getaway-waves-gems-and-plenty-of-charm/>

Created by Lorraine Chaffer 2021



# Visit Oregon Dunes on Google Earth : A section of Oregon Dunes National Recreation Area





## DESCRIBE THE CHARACTERISTICS OF THE OREGON DUNES ECOSYSTEM



# Can you explain the features of the Oregon Dunes in this illustration?

## Structure of a functioning dune system

The dunes ecosystem is directly tied to the shape of the landscape. Today that shape is dramatically altered, and it is no longer considered a functional system. With every passing year, the dunes look less like they used to.



**Wrack Line** – Line of debris left on the beach by high tides. Snowy plover forage for small insects here and nest in the open sand above it.



**Foredune** – Low hummocks of sand parallel to the ocean with scattered driftwood and vegetation. Once European beachgrass is established, hummocks become long ridge up to 25 feet high, impeding movement of sand behind it and altering entire system.



**Deflation Plain** – Area behind foredune where wind has scoured away sand to the water table. Temporary ponds may form. Once ephemeral, deflation plains here have grown broad, more permanent, and eventually fill in with vegetation as foredune height increases and inputs of new sand cease.



**Transverse Dunes** – Wave-like ridges created by the dry winds of summer, these dunes rise about six feet and change with shifting winds.



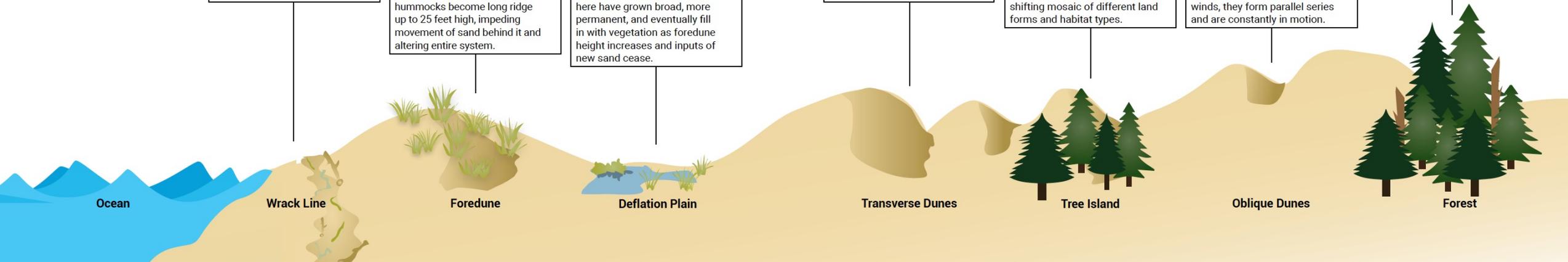
**Tree Island** – Isolated remnants of coastal forest that have been almost entirely buried by blowing sand. They are proof that in the past this landscape was an ever-shifting mosaic of different land forms and habitat types.



**Oblique Dunes** – Historically the largest of the dunes formations, these dunes can average 80 to 190 feet high and be a mile long. Most often created by winter winds, they form parallel series and are constantly in motion.



**Forest** – Evidence of ancient dunes can be found deep beneath the soil here at the edge of the Coast Range mountains.





## Secrets of the Oregon Dunes

22 Jun · 🌐

It takes three ingredients to "cook up" an Oregon dune:

1. Lots of sand along the coastline.
2. A vehicle to carry the sand inland (in our case, wind).
3. A flat coastline so sand can move inland.

Because we have wind all along our coast, most areas where the coastline is flat have dunes. This video shows how easily our strong summer wind moves dry sand inland in a south-southeasterly direction.

The sound in this video has been reduced by 80% for your listening comfort. The video was filmed June 16, 2021, near Florence, Oregon





## Secrets of the Oregon Dunes

23 May · 🌐

The majority of sand in the Oregon Dunes National Recreation Area (ODNRA) comes from the Cascade Mountain Range by way of the Umpqua River (which is in the center of the ODNRA). It is deposited into the ocean and then blown inland from beaches by coastal winds.

Scientists know this by comparing samples of sand (see yesterday's post) to the minerals found in the Cascade Mountains. Studies done at the mouths of rivers indicate the bulk of sand along this stretch of our coast was carried here by the Umpqua River.

Minor sand contributions do come from the Coast Range via other rivers such as the Siuslaw and Coos.



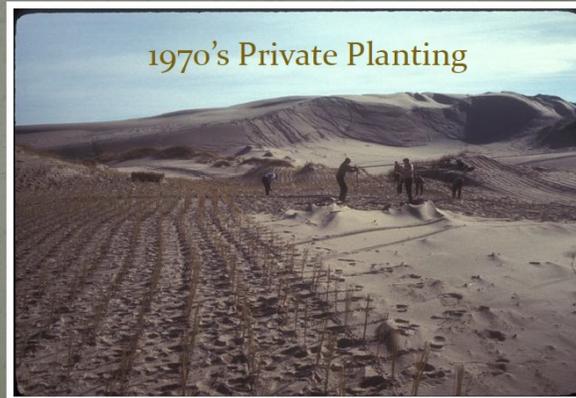
1930's CCC Planting



1948? Mechanical Planting



1970's Private Planting



## Introducing beach grass

- Planting began in late 1800's
- Attempt to protect infrastructure from moving sand
- Dunes not valued for recreation or landscape at that time
- 1930's-1950 large-scale government plantings
- Private plantings continue today

U.S. Forest Service 1986





## Secrets of the Oregon Dunes's post



This photos shows how hummocks are spreading across open sand due to invasive European beachgrass. The grass permanently stabilizes sand with dense thick blades and mat-like rhizomes. As the dunes become stabilized, plant succession occurs (grasslands changing to wetland/shrub la... [See more](#)



This area of the dunes is relatively free of European beachgrass and shows how native grasses create temporary hummocks, allowing seasonal ponds to form. Native plants do not permanently trap and hold sand. Sand moves around and through them. Some native plants rely on moving sand to thrive. As European beachgrass spreads, many of our native plants and grasses are lost in its wake.



1952



2006

**Invasive Plant Removal- Oregon Dunes**



Dunes-5019-WEB



A view of the Oregon Dunes. Vegetation is taking over just past the water line.



*A bird's eye view*  
THE DUNES OVER TIME

Aerial photos from 1941 to 1997 clearly illustrate the changes to the dunes that visitors can see from the popular Oregon Dunes Day Use Site along Highway 101. What decades ago was mostly open sand with an isolated tree island and some sparse vegetation has now become a thick swath of shrubby deflation plain. The tree island is now nearly connected to this new sea of vegetation.



## *Native plant species and communities in decline*

### PINK SAND VERBENA



Only growing on open sand, this once common wildflower is a federal species of concern and hard to find on the dunes.

### GREY BEACH PEA



Adapted for life on the sand, this woolly-leaved legume is increasingly uncommon on the dunes.

### SEASHORE BLUEGRASS - SAND FESCUE



Together, these plants grow only on unstabilized sand. Only a few sites remain in the dunes where this pair is found together.

### SHORE PINE - BEARBERRY



The individual species are common, yet grow together only on the dunes. Without blowing sand, once transient woodlands now mature into forests, and young woodland communities like this disappear.

## *Dunes invaders – non-native plant species*

### EUROPEAN BEACHGRASS



Infamous for its ability to spread, take advantage of limited resources, and crowd out other species, this was originally planted to stabilize the sand to protect built infrastructure. It has drastically altered the dunes landscape. Due to its deep and spreading root system, removal requires years of effort and maintenance.

### SCOTCH / SCOT'S BROOM



Its beauty when flowering belies its presence on the dunes as a seed-factory menace. Widespread and well-adapted to the dunes, it's a tough competitor with native species. Many volunteer hours have gone into pulling this weed.

### GORSE



With yellow blooms similar to scotch broom, gorse was introduced a century ago and is now widespread. Its seeds can live in the sand for several decades before germinating. The plant itself can re-sprout when cut, making it a tough one to remove.

### Wildlife of the dunes

Some of these native species have suffered as a result of habitat loss. From bears to beetles, the dunes support many fascinating animals.

#### SIUSLAW HAIRY-NECKED TIGER BEETLE



This fast-moving predatory beetle that inhabits sandy areas where freshwater flows into the ocean once ranged from

California to Washington. Habitat loss has drastically decreased their numbers.

#### INSULAR BLUE BUTTERFLY



Relying on beach clover for food and shelter, this delicate butterfly is declining, along with its host plant, due to the loss of open sand.

#### WESTERN SNOWY PLOVER



Threatened throughout its range, this small shorebird has been impacted by the loss of open sand and disturbance by people.

Restoration of the dunes is critical to the recovery of this species.

#### HUMBOLDT MARTEN



Recently found to be inhabiting shrubby areas of the dunes, this typically forest dwelling animal eats small mammals and

berries. A lucky visitor may find them warming in the sun following a storm.

#### BLACK BEAR



Not what most people would expect to see lumbering across a sand dune, black bears find berries, nuts, small mammals,

and other tasty treats among the shrublands of the dunes.

#### PORCUPINE



Typically considered a forest dweller, but now rare in many parts of Oregon, it is a special experience to find a porcupine

waddling across the sand in search of salty, succulent dunes plants.

### Moving in

Human-caused changes to the dunes have made the landscape more attractive to some animals than before. Adaptable and impressive animals in their own right, they are unwittingly impacting the ecology of the dunes.

#### CROWS, JAYS, RAVENS



Collectively called corvids, these birds are smart, resourceful scavengers. Attracted to food scraps left by people, they often

turn their attention to eggs and chicks of snowy plovers and other native birds.

#### OPOSSUMS, RACCOONS



Opossums were introduced a century ago. Along with raccoons, they are savvy scavengers who will feast upon many

things they come across, including fruit, nuts, carrion, birds, and eggs.

#### COYOTES



Always a resident of the dunes, the number of these adaptable hunters is increasing as they find more prey among the European

beachgrass. Plover and marten are a delicacy for these wily animals as well.



## Vanishing Sand ... Expanding Wetland

Just 50 years ago, the South, left area, was bare, open sand.

Today, a living, self-replenishing barrier of dunes, the beach.

This deflation plain wetland is the result of a hardy plant called European beachgrass. Beachgrass was planted along the coast in the early 1900s to stabilize blowing sands. A tall foredune formed along the shore as the beachgrass's long, slender leaves and tangled root network captured and held sand blowing inland. Behind this sandy ridge, the relentless wind scoured the earth down to the ground-water level. The resulting narrow trough – the deflation plain – expands eastward each year.

Like many wetlands, the deflation plain holds varying amounts of

water depending on the season. In the summer, there may be just enough water to saturate the soils. But after winter rains replenish the water table, only the tallest shrubs can be seen.



European beachgrass  
*Ammophila arenaria*

Winter water level

Summer water level



## ... Expanding Wetland

and.

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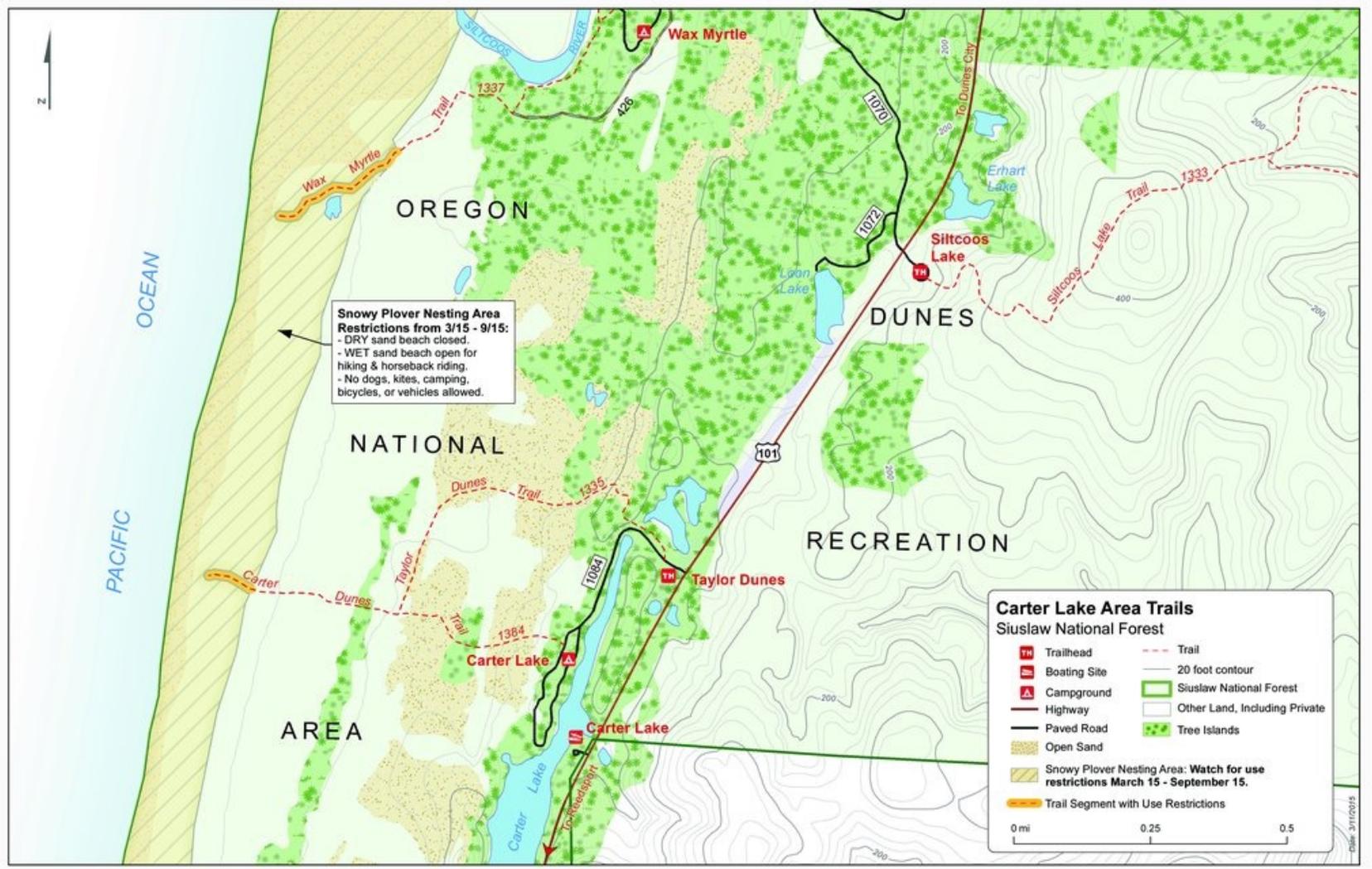
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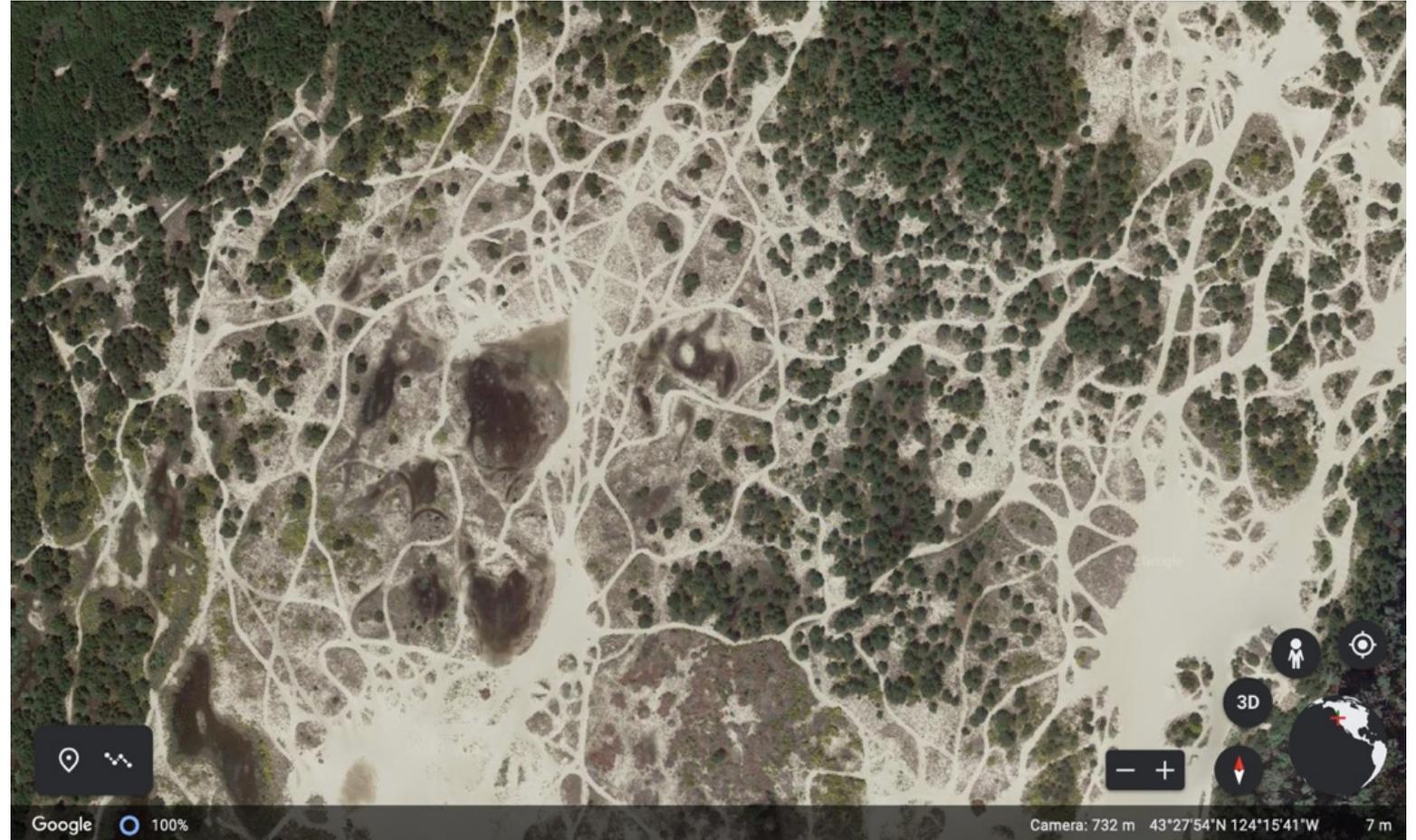


European beachgrass  
*Ammophila arenaria*





CREATE CAPTIONS  
FOR EACH OF THE  
FOLLOWING  
PHOTOGRAPHS



# VEHICLE REGULATIONS

CAUTION! LOOSE SAND AHEAD!



FLAG REQUIRED



NO ALCOHOL on SAND



OPEN to RIDING

8 am - 10 pm



ATV PERMIT



STAY on OPEN SAND & ROUTES



NOISE LIMIT: 93dB



CAMP by PERMIT



RESPECT CLOSURES



VIOLATORS SUBJECT TO CITATION  
Refer to the Oregon Dunes OHV Guide & Map for more information.

# OREGON DUNES NATIONAL RECREATION AREA

North OHV Riding Area: South Jetty to Siltcoos



siuslaw NATIONAL FOREST





# SAVE THE DUNES OREGON

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### The three goals of the dunes restoration strategy

1

#### PRESERVE THE BEST

Maintain and protect existing areas known to be in a healthy, natural condition. Examples may include areas that have functioning open sand, viable native plant communities, or resilient wildlife habitat.

2

#### RESTORE SITE-SPECIFIC CONDITIONS AND PROCESSES

Restore and maintain smaller areas to improve natural conditions at a local level. Site-specific locations may include a beach selected for its value to a population of nesting snowy plover, a scenic stretch of trail, or a specific dune formation that has critical value to the bigger landscape.

3

#### RESTORE LANDSCAPE-SCALE NATURAL PROCESSES

Create and maintain areas where there is a high likelihood that restoration of natural processes and a natural landscape pattern will be successful. Natural processes and patterns include sand movement and deposition and the resulting shifting mosaic of open sand, dune formations, plant communities, and tree islands.



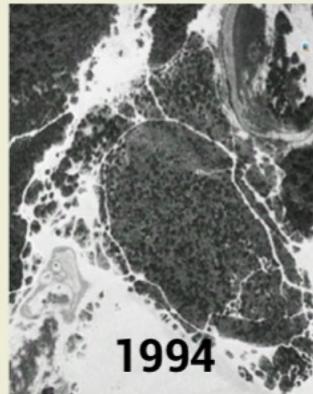




### *Restoration Test Case*

#### REWINDING THE CLOCK TO ESTABLISH MORE OPEN SAND AT SPINREEL BEACH

Through a combination of bulldozing European beachgrass, hand-pulling Scotch broom and young shore pine, and prescribed burning, 30 acres of open sand were momentarily regained. Without ongoing maintenance, however, by 2012 regrowth of beachgrass was already evident.





RESTORING OREGON'S DU

