

A close-up photograph of a bald eagle and its chick in a nest. The adult eagle is perched above the chick, both looking towards the right. They are surrounded by the intricate web of branches and twigs that make up their nest. The background is a dark, out-of-focus green.

# THE BALD EAGLES OF OLYMPIC NATIONAL PARK

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**GSS 313.31**

# OLYMPIC NATIONAL PARK DEMOGRAPHICS

- **Olympic National Park** is in Washington State on the Olympic Peninsula, which is in the southwestern region. The park has a plethora of vastly differing ecosystems; from the 70 miles of desolate, wild coastline to dense rainforests. There are even glacier-capped mountains for the adrenaline junkies! The contrasting habitats are likely due to the drastic changes in elevation and precipitation across the park. The park is so diverse it is said to possess around 1,500 plant species and myriad beautiful animals ("Olympic...").
- For my project I will be focusing on the species ***Haliaeetus leucocephalus***, or otherwise known as the Bald Eagle.



Source: <https://www.myolympicpark.com/park/autumn>

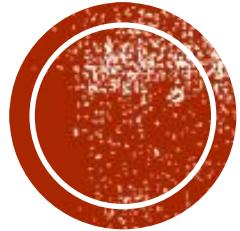
# **HALIAEETUS LEUCOCEPHALUS; THE BALD EAGLE**



Source:

<https://www.jonathanguillot.com/blog/bald-eagle-haliaeetus-leucocephalus>

- **Diet:** They eat predominantly fish, but will also devour small birds and mammals
  - **Behavior:** typically monogamous
  - **Lifespan:** 15 to 20 years in the wild
  - **Perception:** Great binocular vision with a reduced sense of smell.
  - **Communication:** high-pitched tweets and wing flaps
  - **Cite:** (Siciliano)
- 
- **Purpose**
    - The purpose of this project is to expand biological conservation knowledge, increase environmentally-conscious decisions, and overall widen a love for the solitude found in nature.



- Do bald eagles live in a specific type of habitat or do they roam free?
- Are bald eagles at any risk of extinction due to human overconsumption or drastic environmental change?
- If not, where are the ideal locations within the Olympic National Park to birdwatch these formidable flyers?
- How do populations of eagles compare outside of the protection of the park?

# BALD EAGLE RESEARCH QUESTIONS

# COORDINATE SYSTEM

- NAD 1983 UTM Zone 10N
- I chose this coordinate system because it covers around 2/3<sup>rds</sup> of the state of Washington, which encompasses the Olympic Peninsula and a decent amount of Olympic National Parks offshore waters. I believe it will be important for me to preserve direction and shape throughout my project because I want to identify data on habitat stability, species occurrences, and elevation.



# WORKFLOW DIAGRAM

Base map

Bald  
Eagle  
Observed  
Locations

Manipulated the eagle data using the **XY Table to Point** tool

Adjusted CS to NAD 1983 UTM Zone 10N using the **Project** Tool for all layers

Ensured all other layers were in the correct CS using the **Project** tool

Reduced eagle data within park boundary using the **Project** tool

Risk of Extinction

Manipulated the black bear data using the **XY Table to Point** tool

Ensured all other layers were in the correct CS using the **Project** tool

Risk of Extinction

Reduced black bear data to within the park using the **Clip** tool

Illustrated black bear distance to eagles using the **Buffer** tool

Birdwatching

Adjusted the elevation layer using the **Project** tool

Reduce the eagle observed location data using the **Clip** tool

Birdwatching

Created an identical map in three dimensions using the **2D-3D link**

Utilized the **Raster to Float** tool for more versatility in elevation data

Utilized the **Select Layer by Attributes tool** to highlight habitat elevation

Habitat Stability

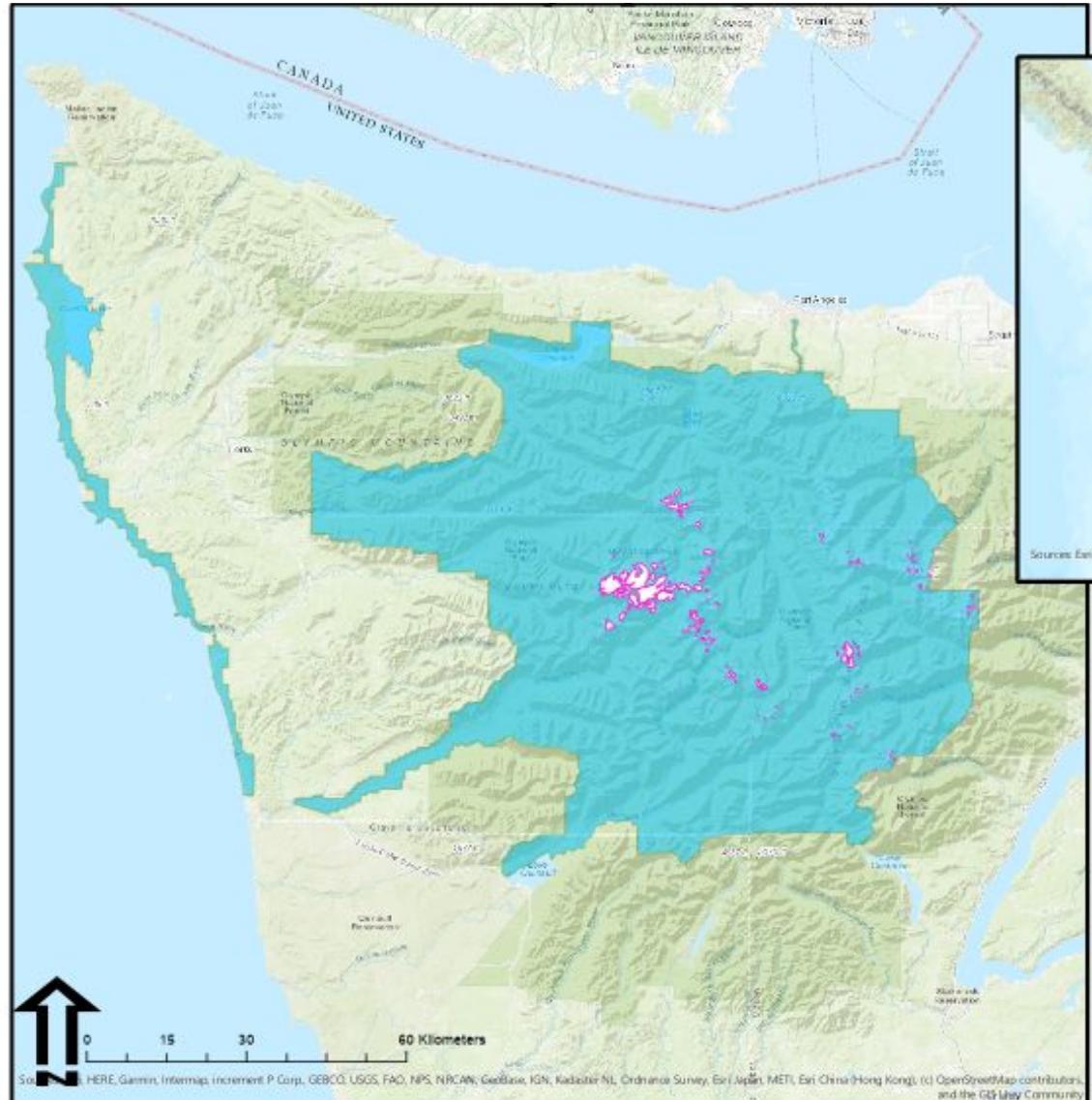
Ensured all other layers were in the correct CS using the **Project** tool

Utilized the **Select Layer by Location tool** (2x) to compare oil spill distance to eagles inside and outside of the park

Habitat Stability

Utilized the **Make Feature Layer** tool to illustrate eagle's exposed to potentially toxic water.

# BASE MAP WITH GLACIERS



Author: Evan Lassiter

Date: 7/19/20



Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCan, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community

## Legend

■ Glaciers

■ Olympic National Park

Coordinate System: NAD 1983 UTM Zone 10N

Projection: Lambert Conformal Conic

Datum: NAD 1983

Units: Meters

...

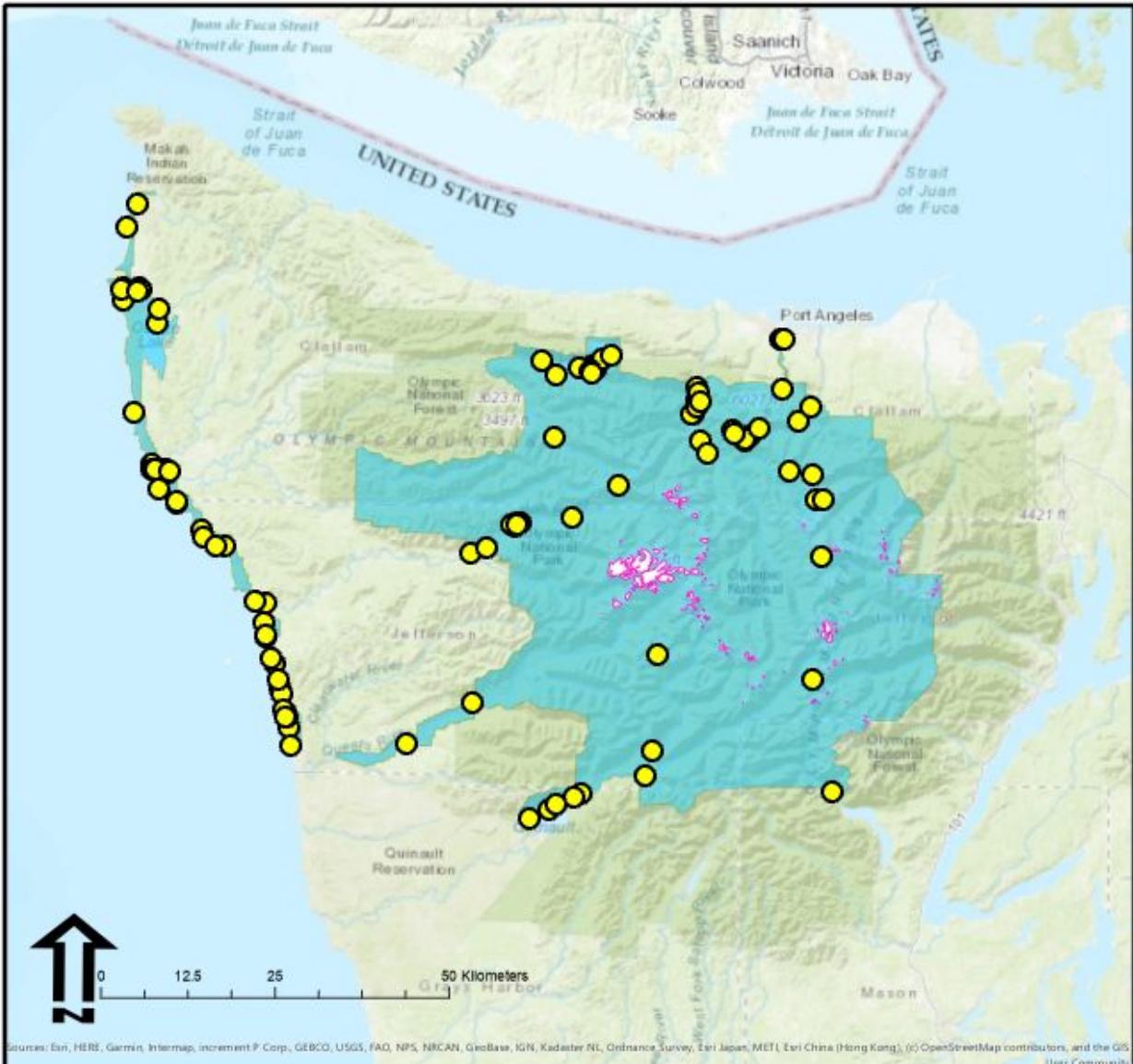
## Sources:

1. Mastering ArcGIS 1<sup>st</sup> Edition (2020)  
[E-book] Maribeth Price. McGraw-Hill Higher Education. Dubuque, Iowa.

**Figure 1:** Base map showing the park boundary and the state of Washington



# TABULAR DATA MAP: BALD EAGLE OBSERVED LOCATIONS



## Coordinate System:

NAD 1983 UTM

Zone 10N

Projection: Lambert  
Conformal Conic

Datum: NAD 1983

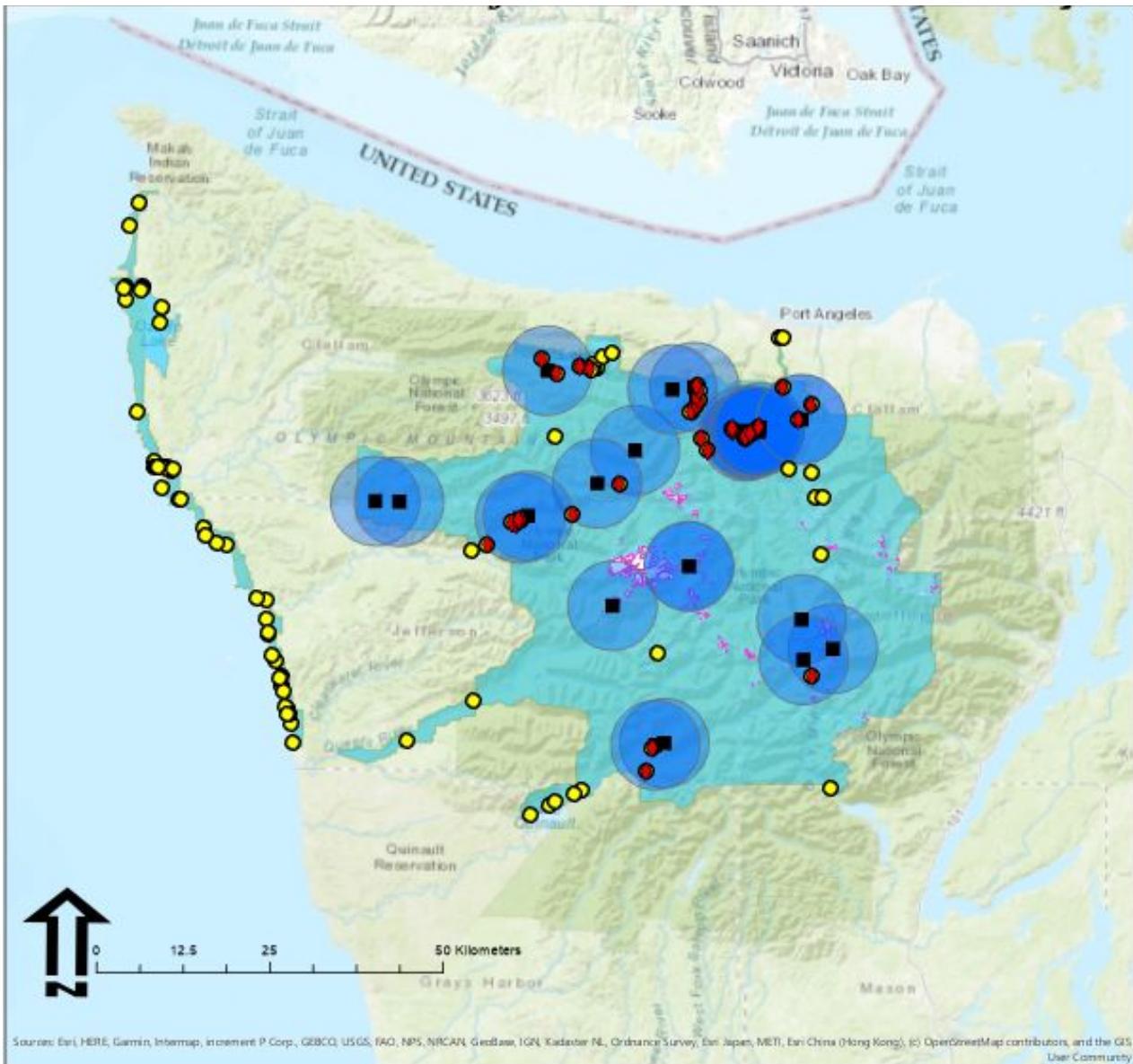
Units: Meters

## Legend

- BaldEagleSpottings\_Olymp
- Glaciers
- Olympic National Park

**Figure 2:** Thematic map using tabular data to show sightings of bald eagles

# THEMATIC MAP #2 – RISK OF EXTINCTION



## Legend

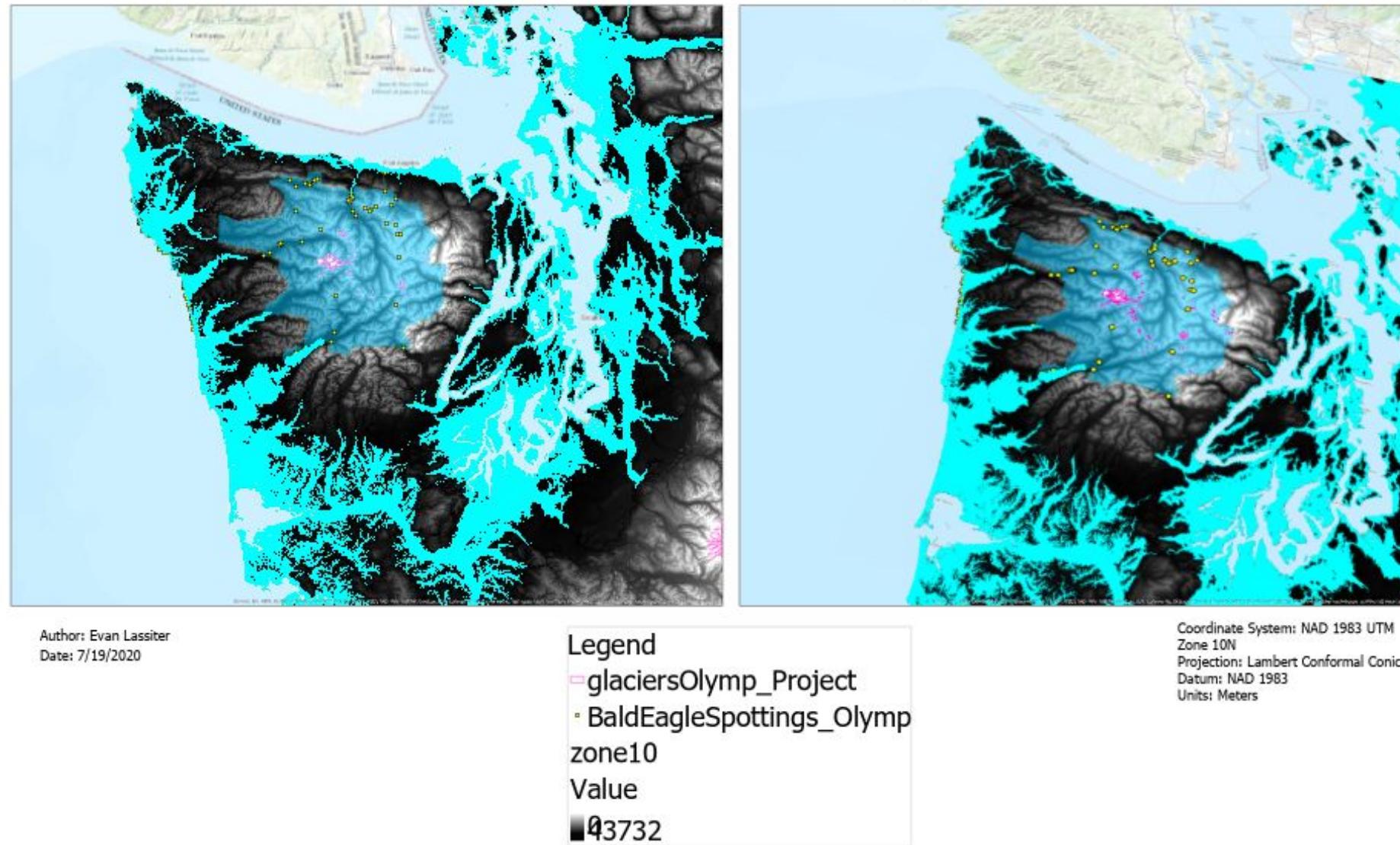
- BlackBears\_Olymp
- BaldEagleSpottings\_Olymp
- BlackBears\_Olymp\_Buffer
- Glaciers
- Olympic National Park
- BlackBears\_Climb

## Sources:

- Mastering ArcGIS 1<sup>st</sup> Edition (2020) [E-book]  
Maribeth Price. McGraw-Hill Higher Education.  
Dubuque, Iowa.
- Haliaeetus leucocephalus* (2019) [standalone table].  
Gbif. Gbif.org.  
[https://www.gbif.org/occurrence/search?taxon\\_key=2480446](https://www.gbif.org/occurrence/search?taxon_key=2480446) [Accessed 6 July 2020].
- Ursus americanus* Pallas (1780) [shapefile].  
<https://www.gbif.org/dataset/96ca66b4-f762-11e1-a439-00145eb45e9a> [Accessed 19 July 2020].

**Figure 3:** Thematic map of potential nest invaders; The Black Bear

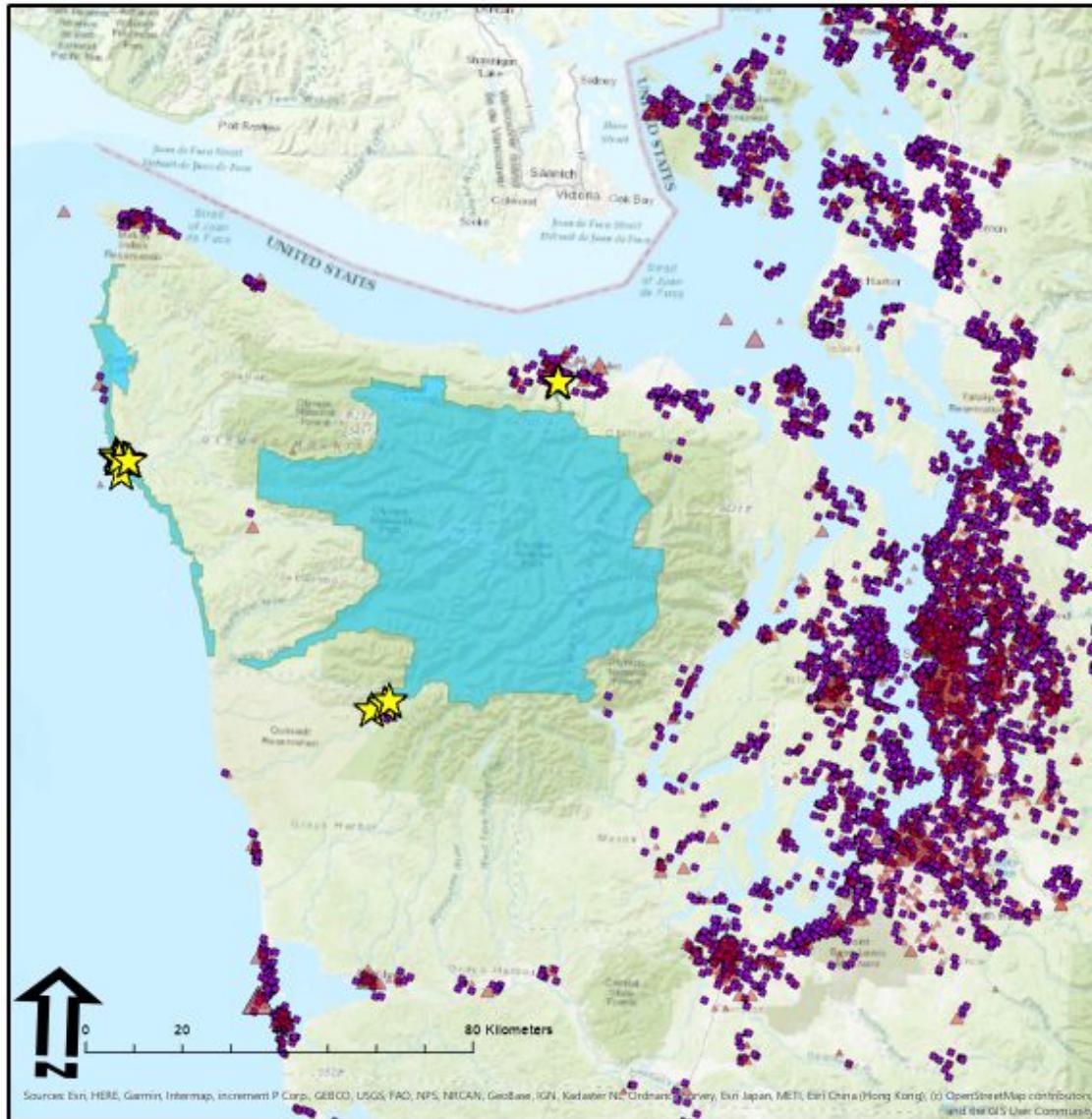
# THEMATIC MAP #3 – BIRDWATCHING



- Sources:
1. Mastering ArcGIS 1<sup>st</sup> Edition (2020) [E-book] Maribeth Price. McGraw-Hill Higher Education. Dubuque, Iowa.
  2. Haliaeetus leucocephalus (2019) [standalone table]. Gbif. Gbif.org.  
[https://www.gbif.org/occurrence/search?taxon\\_key=2480446](https://www.gbif.org/occurrence/search?taxon_key=2480446) [Accessed 6 July 2020].
  3. Washington 10-meter Data (2001) [raster shapefile]. USGS.  
<http://gis.ess.washington.edu/data/raster/tenmeter/> [Accessed 19 July 2020].

**Figure 4:** 2D and 3D maps of Olympic National Parks elevation for easy birdwatching

# THEMATIC MAP #4 – HABITAT STABILITY



## Legend

- ★ BaldEagleSpotting\_Olymp Diet Risk
- Oil Spills in Water
- Quantity\_t
  - ▲ ≤10
  - ▲ ≤100
  - ▲ ≤1000
  - ▲ >1000
- BaldEagleSpotting\_Puget Diet Risk
- Olympic National Park

## Sources:

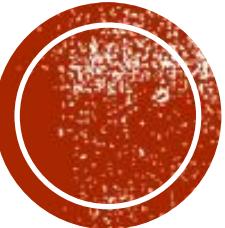
- Mastering ArcGIS 1<sup>st</sup> Edition (2020) [E-book] Maribeth Price. McGraw-Hill Higher Education. Dubuque, Iowa.
- Haliaeetus leucocephalus (2019) [standalone table]. Gbif. Gbif.org. [https://www.gbif.org/occurrence/search?taxon\\_key=2480446](https://www.gbif.org/occurrence/search?taxon_key=2480446) [Accessed 6 July 2020].

**Figure 5:** Thematic map showing comparative water quality between the Olympic National Park and the Puget Sound

# DATA SOURCES

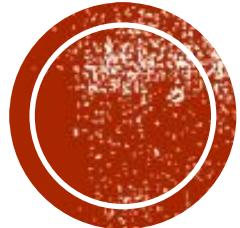
Data Title	Source	Existing Coordinate System	Why you need this data	Data Type
Bald Eagle Observed Locations	Global Diversity Information Facility <a href="https://www.gbif.org/occurrence/search?taxon_key=2480446">https://www.gbif.org/occurrence/search?taxon_key=2480446</a>	NAD 1983 UTM Zone 10N	To illustrate where Bald Eagle habitats are common in the Olympic National Park	Shapefile
Glaciers	ArcGIS Pro. Esri.com	NAD 1983 UTM Zone 10N	Depicts a unique niche native to the park and aids in answering research question	Shapefile
Olympic National Park Boarders	ArcGIS Pro. Esri.com	NAD 1983 UTM Zone 10N	To represent the parameters of my research project	Shapefile
Black bear Observed Locations	Global Diversity Information Facility <a href="https://www.gbif.org/occurrence/download/0019226-200613084148143">https://www.gbif.org/occurrence/download/0019226-200613084148143</a>	NAD 1983 UTM Zone 10N	To represent an invader of bald eagle nests	Shapefile
U.S. States (Generalized)	ArcGIS Pro. Esri.com	NAD 1983 UTM Zone 10N	To highlight the state of Washington for my inset map	Shapefile
Oil Spills	ArcGIS Pro. Esri.com	NAD 1983 UTM Zone 10N	To depicts potentially toxic waters	Shapefile





- The selected species (bald eagle) is considered the Least Concern (LC) by the IUCN Red List.
  - Therefore, no precise migration data at the level of the individual is available.
- The Olympic National Park boundary creates a small population of bald eagles studied comparative to their global range.

# LIMITATIONS



- More data, whether recreational or paid, in geospatial analysis for biological conservation of species, ornithology, and apex predator tracking.
- Working with national parks that we're progressively established to conserve the endemic, endangered species within them would provide incredibly precise data. This is because the land they are occupying is likely the only area they exist in and is intended to protect them.
- Geospatial analysis to track, target, and prevent future poaching incidents.

# FUTURE WORK

# METADATA



# METADATA:

Type File Geodatabase Feature Class



**Tags** polygon, area, population, households, demographics, society, boundaries, farming, United States, U.S. States, States, 2002, 2010, 2012, 1992, 2011, 2013, 2014

## Summary

U.S. States (Generalized) provides 2010 U.S. Census demographic information and generalized state boundaries to improve draw performance and be used effectively at a national level.

## Description

U.S. States (Generalized) represents the 50 states and the District of Columbia of the United States.

## Credits

ESRI Data and Maps (ESRI, Inc., Redlands, CA)

## Use limitations

See Resource Constraints > legal constraints.

## Extent

West -180.000000 East 180.000000  
North 79.259527 South 8.995616

## Scale Range

Maximum (zoomed in) 1:500,000  
Minimum (zoomed out) 1:50,000,000

## zone10

Type Raster Dataset

Tags elevation, raster, Olympic Peninsula, Washington, UTM

## Summary

A generalized digital elevation model of the Pacific Northwest suitable for use in GIS and other small scale mapping.

## Description

A raster dataset that illustrates the drastic elevation changes using a ten-meter grid.

## Credits

Washington 10-meter Data (2001) [downloaded file] USGS. Usgs.gov.  
<http://gis.ess.washington.edu/data/raster/tenmeter/>. 7/18/2020.

## Use limitations

There are no access and use limitations for this item.

## Extent

West -124.908436 East -119.809950  
North 49.038575 South 45.461224

## Scale Range

Maximum (zoomed in) 1:5,000  
Minimum (zoomed out) 1:150,000,000

*You are currently using the Item Description metadata style. Change your metadata style in the Options dialog box to see additional metadata content.*



# CITATIONS

- Guillot, Jonathan. "Bald Eagle (*Haliaeetus Leucocephalus*) - Jonathan Guillot - Wildlife Photographer." *Jonathan Guillot*, Jonathan Guillot, 24 June 2012, [www.jonathanguillot.com/blog/bald-eagle-haliaeetus-leucocephalus](http://www.jonathanguillot.com/blog/bald-eagle-haliaeetus-leucocephalus). Accessed July 10, 2020.
- Kwak-Hefferan, Elisabeth. "Autumn in Olympic National Park." *My Olympic Park*, 4 Sept. 2019, [www.myolympicpark.com/park/autumn](http://www.myolympicpark.com/park/autumn). Accessed July 10, 2020.
- "Olympic National Park (U.S. National Park Service)." *National Parks Service*, U.S. Department of the Interior, 3 Oct. 2019, [www.nps.gov/olym/index.htm](http://www.nps.gov/olym/index.htm). Accessed July 10, 2020
- Siciliano Martina, L. 2013. "Haliaeetus leucocephalus" (On-line), Animal Diversity Web. Accessed July 09, 2020 at [https://animaldiversity.org/accounts/Haliaeetus\\_leucocephalus/](https://animaldiversity.org/accounts/Haliaeetus_leucocephalus/)

