# Fish Abundance in Humboldt County

*By: Kayla Morris, Devin Eastman, Anthony T. Sammartano, and Jesse Kellogg*

## Introduction:

Through this project decided to determine the abundance of different varieties of salmon in Humboldt County and their relation towards the surrounding vegetation of the area. We would like to know if there is any kind of correlation between how many salmon are spotted in an area and if they prefer certain vegetation types over others.

This information would be extremely useful for determining the most efficient methods and areas to protect the salmon population present and to allow the populations to grow once more. We are using a variety of datasets to find this information, which includes Steelhead trout and Coho and Chinook salmon populations in fisheries within Humboldt County.

## Methods:

We are using ArcMap software from Esri Inc., to upload our datasets and see any initial correlations between different vegetation types that tend to inhabit areas closest to streams. This data was obtained from the California Department of Fish and Wildlife which included multiple types of vegetation covers near streams; they included wetlands, water, agriculture, conifer forest, barren areas, urban areas, shrub, herbaceous, hardwood woodlands, and hardwood forest. After looking at this data, we then buffered the areas around the streams to take away the areas that are too far away to have any effects on the salmon habitats. After creating the buffer we then looked at the Attribute Table for the salmon abundance and referenced them to the vegetation that occurred around those stretches of the rivers.

While the vegetation cover may have errors due to the fact that in reality there isn't a clear cut off point for the different vegetation covers in the area and there actually is a large amount of crossover, the errors won't play too big of a role in skewing our data of salmon abundance.

## Results:

Our results for this analysis of salmon abundance in relation to vegetative habitat, showed several key results. For one, most Chinook and Coho salmon populations shared similar areas of high abundance in relation to their separate vegetation types. The main vegetation areas that support high populations of these fish focused mainly along the Mad, Trinity, and Eel rivers.

Steelhead trout also existed in this areas since it is closely related to these salmonoid species. However, since Steelhead can be both an anadromous and freshwater species, more isolated vegetation areas showed relatively high populations, where Coho and Chinook did not. Because of this we made the connection that Steelhead, because of their ability to live in more vegetation habitats, were the most abundant fish species that we analyzed for this project.

It seemed that Chinook and Coho species were somewhat limited to larger waterways that support more abundant forest and herbaceous vegetation areas. Steelhead appeared not to be as limited by

these factors because of the relatively larger population distributions in relation to the other two species.
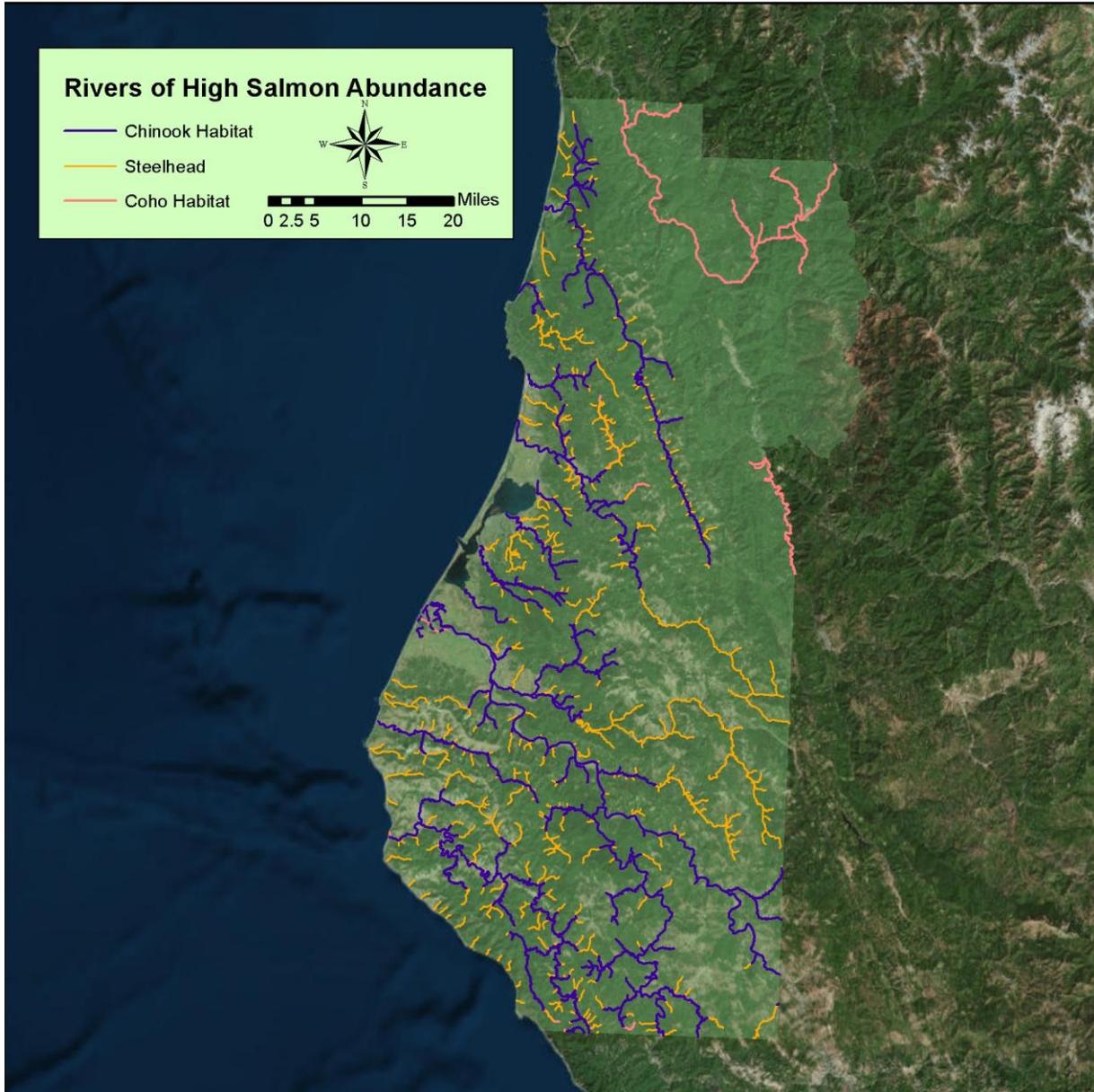


**Figure 1: Humboldt County including Coho, Chinook, and Steelhead populations in high abundance.**
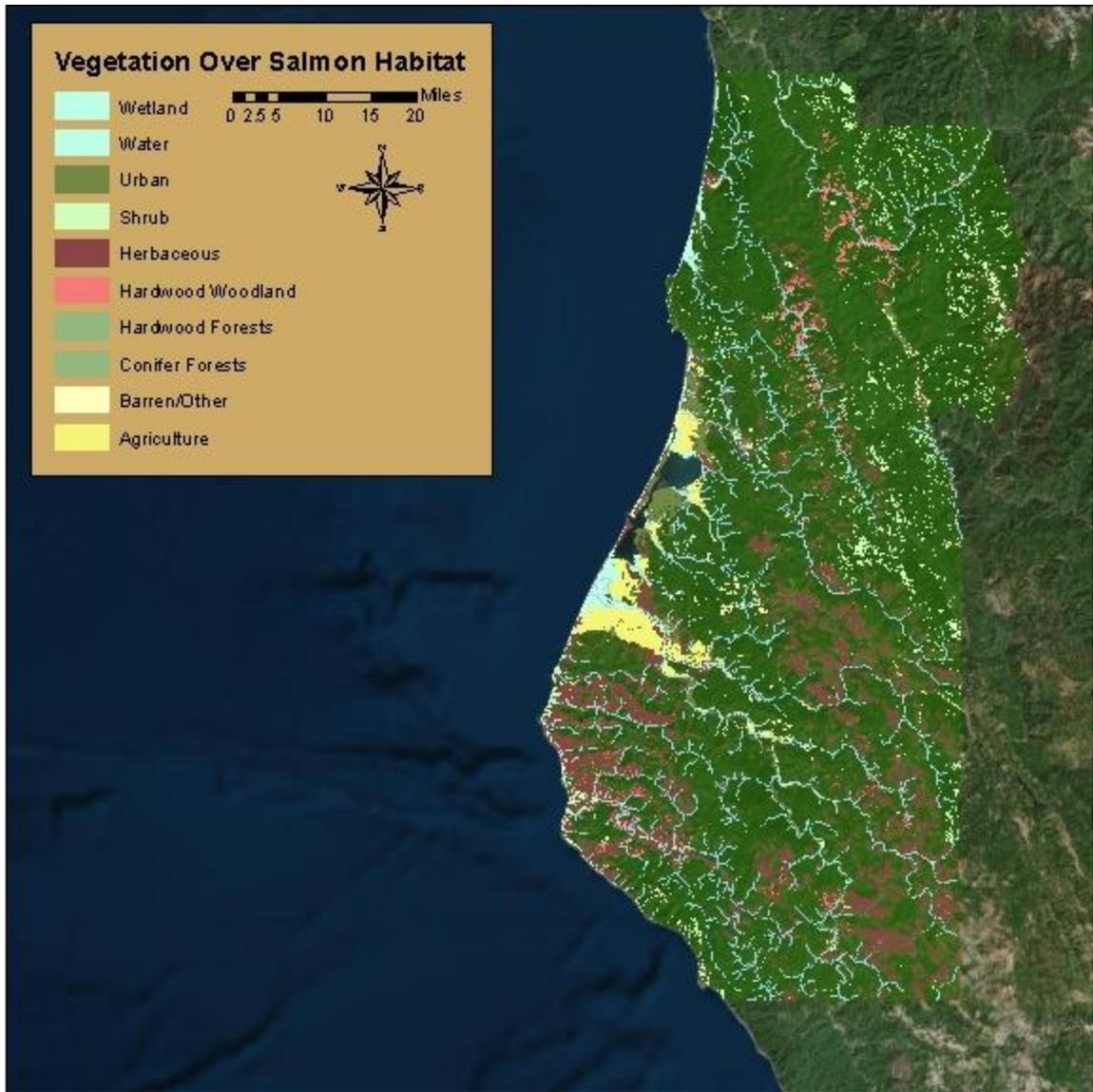
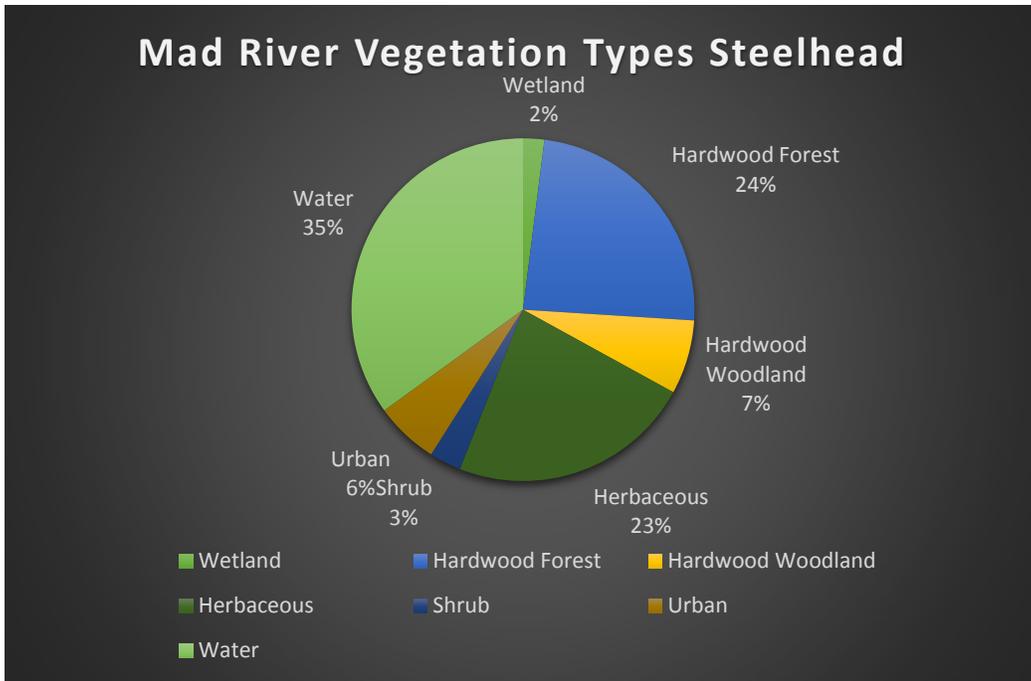**Figure 2: Humboldt County including species-specific vegetation over salmon habitat.**

**Figure 3: Percentages of the various vegetation types along the Mad River with regards to the Steelhead populations**
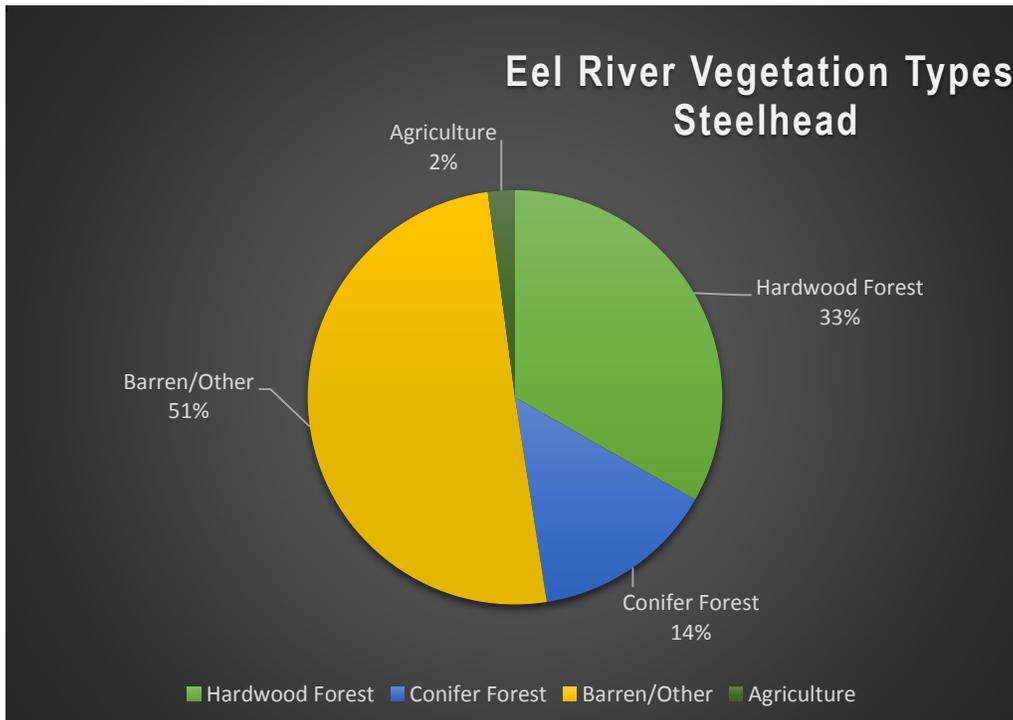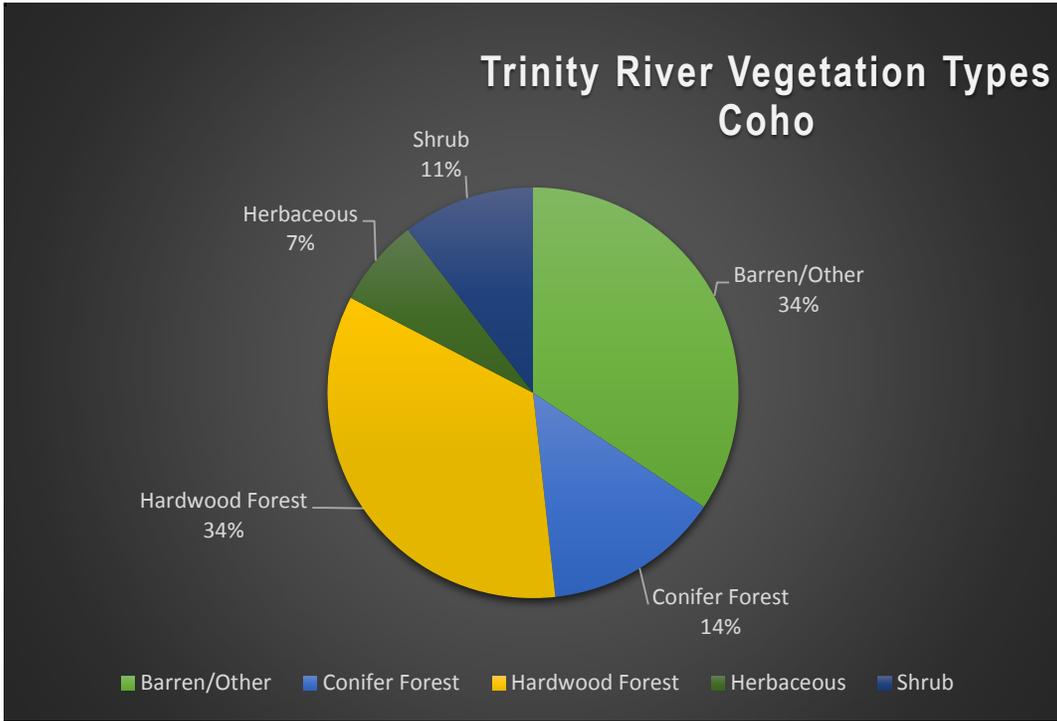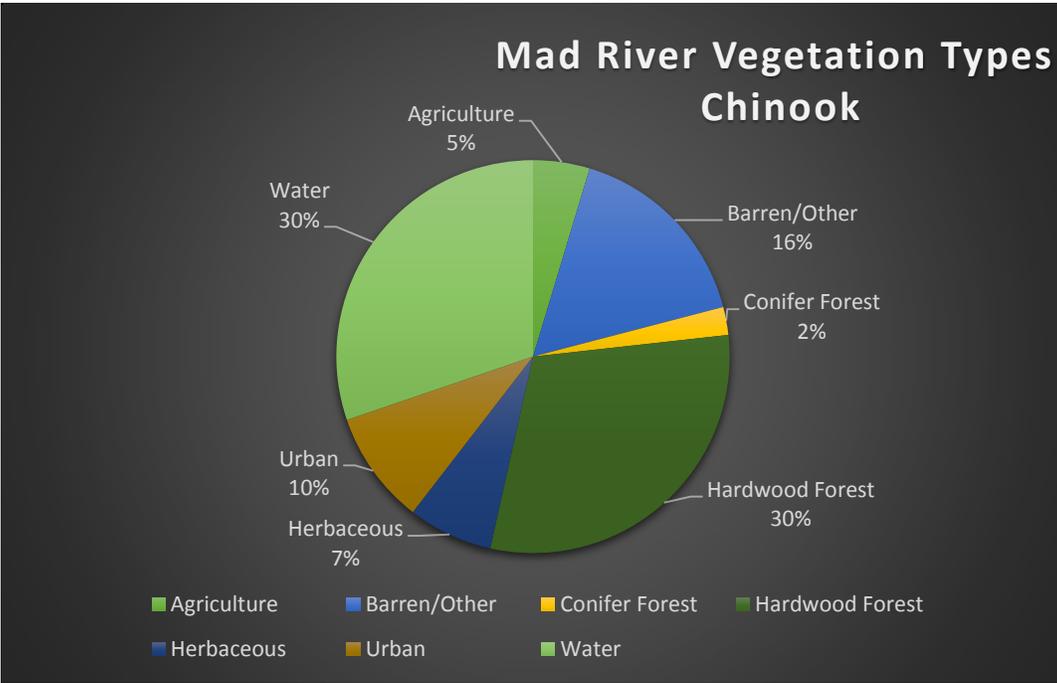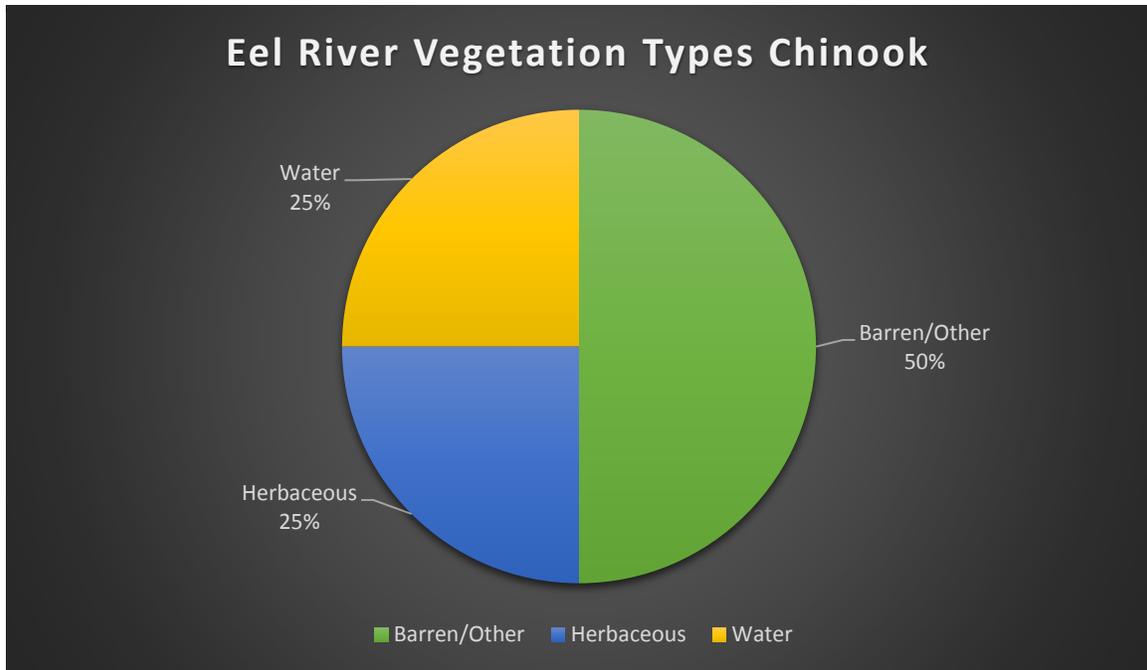


**Figure 4: Percentages of the various vegetation types along the Eel River with regards to the Steelhead populations**

**Figure 5: Percentages of the various vegetation types along the Trinity River with regards to the Coho populations**



**Figure 6: Percentages of the various vegetation types along the Mad River with regards to the Chinook populations**

**Figure 7: Percentages of the various vegetation types along the Eel River with regards to the Chinook populations**

## Conclusions:

In our project we set out to determine the abundance of different varieties of salmon in Humboldt County and their relation towards the surrounding vegetation of the area. We tried to find any kind of correlation between how many salmon are spotted in an area and if they prefer certain vegetation types over others; this information would be extremely useful for determining the most efficient methods and areas to protect the salmon population present and to allow the populations to grow once more. The results of our project showed that in fact there was a correlation between the abundance of a specific species and the area's general vegetation type. As stated in our results, we found that Coho and Chinook salmon were in high abundance in areas that supported generally herbaceous and forested that were surrounding larger waterways. Steelhead also inhabited these areas, in addition to other habitat types. Therefore, Steelhead were much more abundant than either of the other salmonoid species because of their ability to live in a various amount of vegetation types.

## Acknowledgements:

## Bibliography/Sources:

Stillwater Sciences. "Coho Salmon Watershed Distribution for Northern California." *Geoportal*. California Department of Technology, 7 Aug. 2007. Web. 20 Nov. 2014.

URS Corporation. "Critical Habitat for Chinook and Coho Salmon." *Geoportal*. California Department of Technology, 2007. Web. 20 Nov. 2014.

California Department of Fish and Wildlife. "Riparian Areas of California." *Biogeographic Data Branch GIS*. Cal Dept. Fish and Wildlife, 20 Apr. 2010. Web. 20 Nov. 2014.