

Identifying Critical Chinook and Steelhead Habitat within the Road-Effect Zone in Humboldt County, California

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Abstract

This report identifies the critical habitat of the threatened evolutionary significant units (ESUs) of coastal California Chinook salmon and northern California coastal steelhead that are potentially at risk of greater degradation due to proximity to roads. This information may be helpful in prioritizing restoration efforts.

Introduction

Within California are multiple distinct evolutionary significant units (ESU) of both steelhead and Chinook (NOAA 2012). In this report we focus on the ESUs of coastal California Chinook and northern California coastal steelhead. Both of these ESUs are currently listed as threatened under the Endangered Species Act (ESA). This listing indicates that the ESUs are at risk of becoming endangered (at risk of becoming extinct) in the foreseeable future (U.S. Fish and Wildlife Service). Because these species are threatened, we want to protect their critical habitat. Critical habitat is determined to be specific areas that contain features (physical or biological) that are within the geographic range of the threatened species or outside of that range if determined by the agency to be essential for conservation of the species in question (NOAA).

Within Humboldt County, California, there is an extensive network of rivers and streams that may be potentially affected by roads. Areas along roads are more susceptible to erosion, sudden changes in the hydrograph, increased pollution, and the spread of invasive plants and animals. By identifying the areas where steelhead and Chinook salmon habitat may be compromised by roads we can prioritize our restoration efforts. In this report we use geospatial analysis to identify areas where roads may be affecting critical habitat of steelhead trout and Chinook salmon.

Methods

We conducted our geospatial analysis in ArcMap 10.1 from Esri, Inc. We used a shapefile of USA state boundaries. We imported two shapefile layers (Humboldt County boundary and Humboldt County roads) from the Humboldt County GIS website and two shapefile layers (coastal California Chinook critical habitat and northern California coastal steelhead critical habitat) from the National Oceanic and Atmospheric Administration (NOAA) West Coast Fisheries GIS website. We also used a national elevation dataset (NED) raster of Humboldt County, California, from the U.S. Geographical Survey (USGS) website. We projected all of our layers into North American Datum 1983, Universal Transverse Mercator Zone 10 North

After we added all the layers we clipped the Chinook and steelhead critical habitat layers to fit only the Humboldt County boundary. We then created a 400 meter buffer around all of the roads. The reason we chose 400 meters is because it is an average of multiple road-effect zones for streams (Forman and Deblinger 2000). We then clipped the shapefiles again, creating a new layer of just the critical habitat that falls within the 400 meter road buffer.

Results

70% of Chinook salmon critical habitat is and 60% of the steelhead critical habitat falls within the road-effect zone (Table 1).

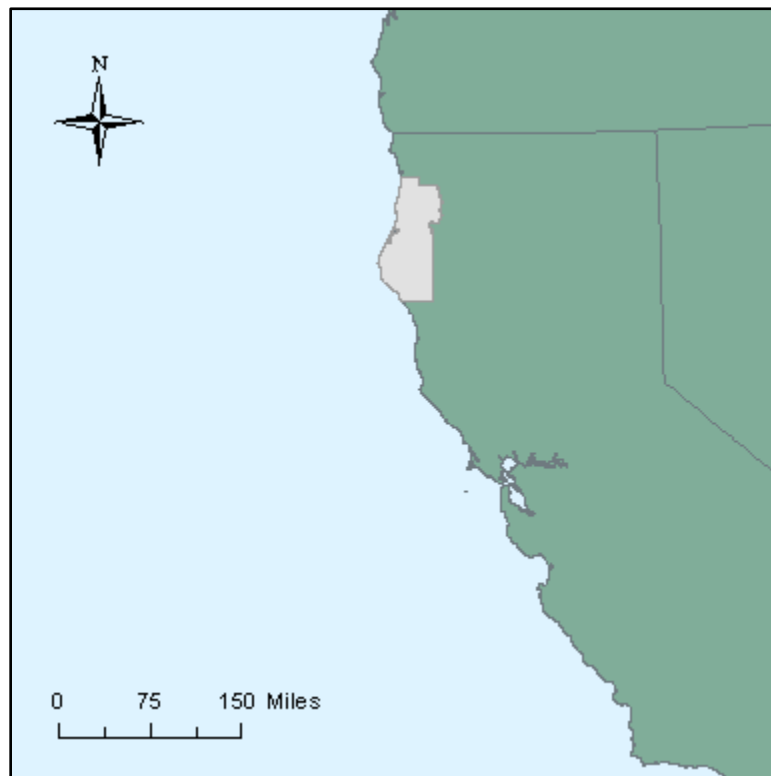


Figure1. Location of Humboldt County, California.

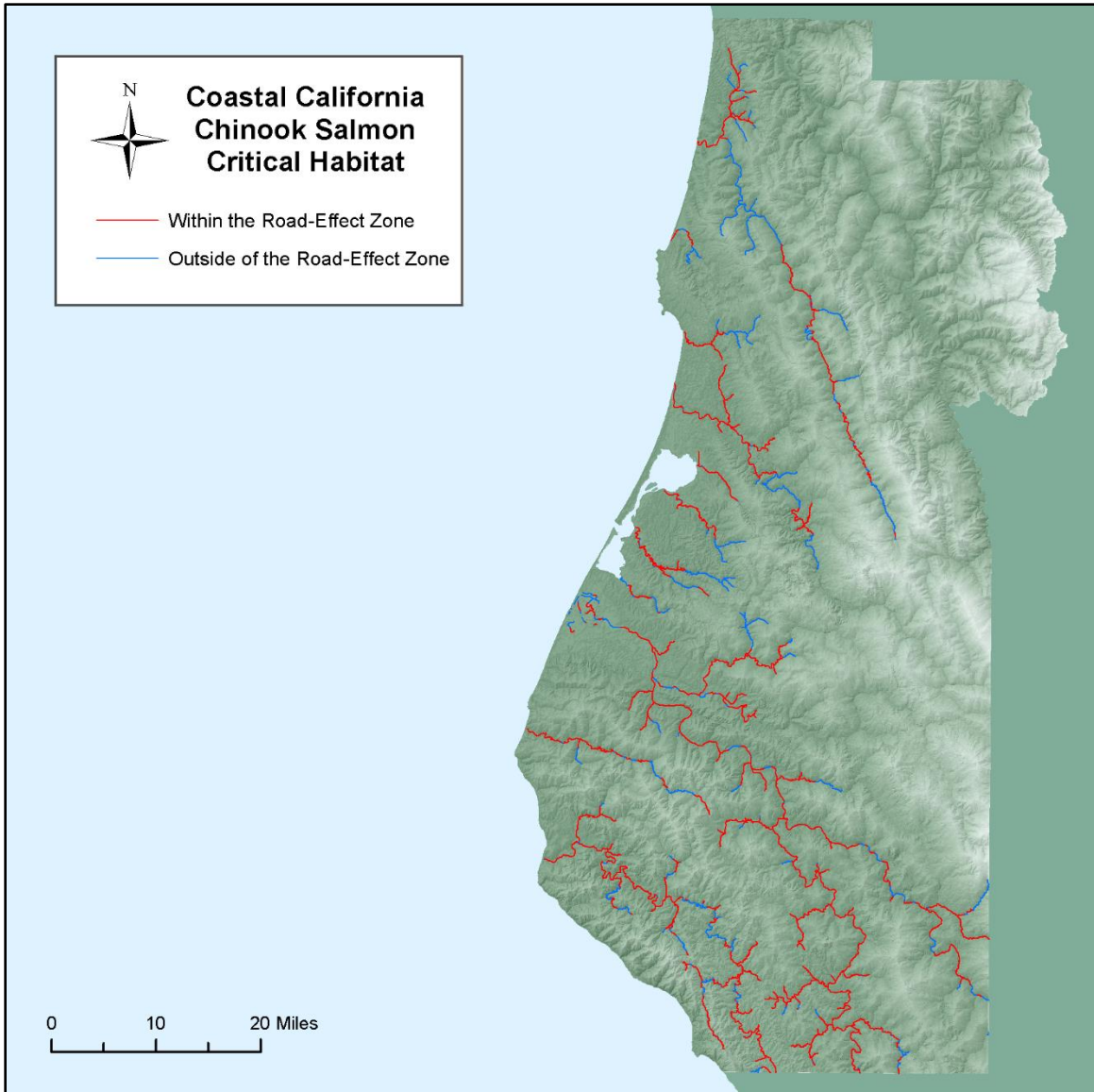


Figure 2. Coastal California Chinook salmon critical habitat within the road-effect zone in Humboldt County, California.

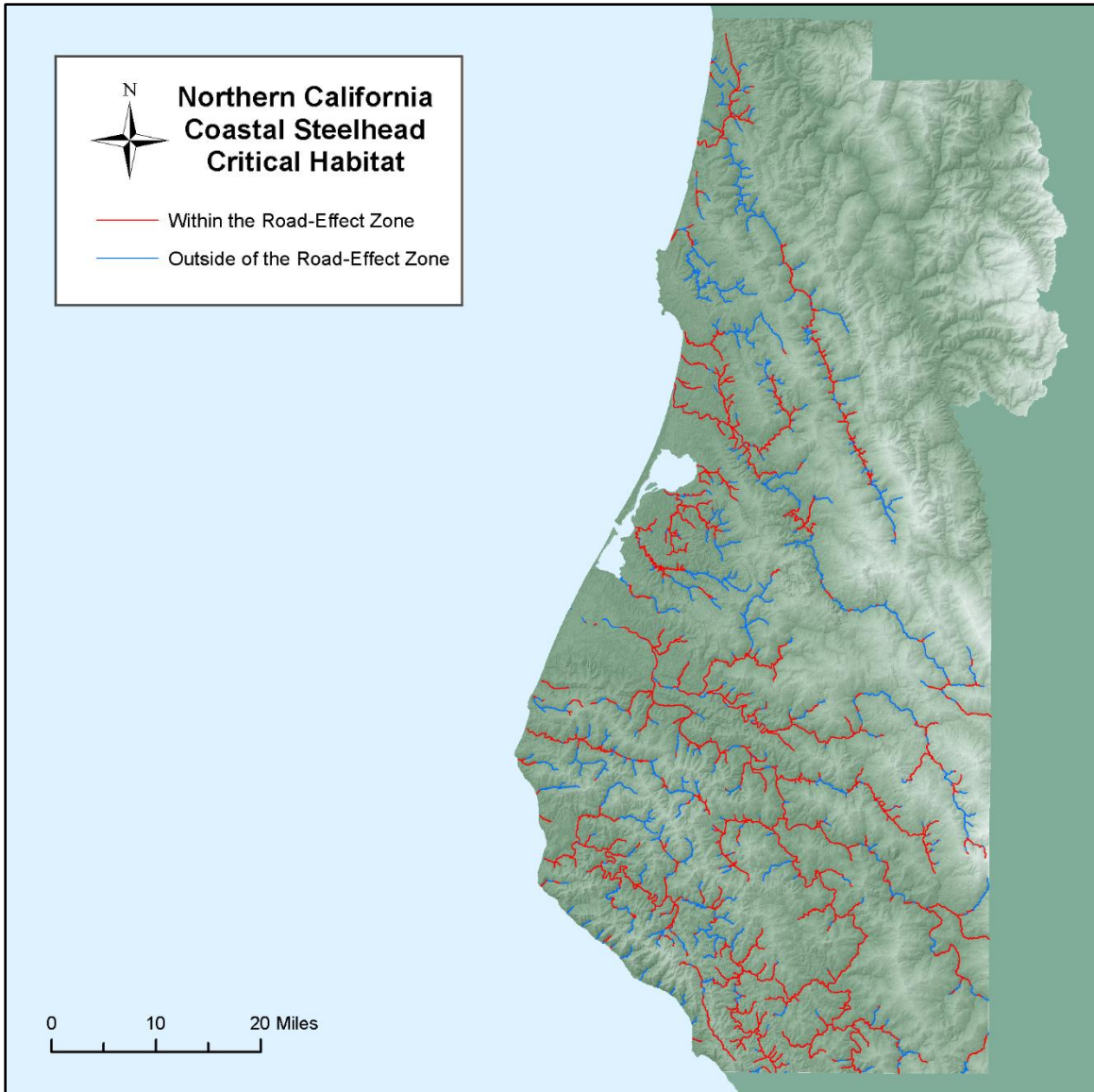


Figure 3. Northern California coastal steelhead critical habitat within the road-effect zone in Humboldt County, California.

Table 1. Length of critical habitat within and outside of the road-effect zone in Humboldt County, California.

| | Outside of the Road-Effect Zone | Within the Road-Effect Zone | Total Length |
|------------------|--|------------------------------------|---------------------|
| Chinook | 356468 meters | 832243 meters | 1188711 meters |
| Steelhead | 851145 meters | 1285779 meters | 2136925 meters |

Conclusions

Using geographic information system (GIS) tools, we were able to find potentially degraded critical habitat for two very important salmonid species in Humboldt County, CA. This is a great starting point; now that we have identified where these areas are we can begin creating a restoration strategy and choosing restoration methods.

Acknowledgements

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References

Forman, R. T. T. and R. D. Deblinger. (2000). The Ecological Road-Effect Zone of a Massachusetts (U.S.A.) Suburban Highway. *Conservation Biology*, 14: 36–46.

[FWS] U.S. Fish and Wildlife Service. n.d. *ESA Basics: 40 Years of Conserving Endangered Species*.

[NOAA] National Oceanic and Atmospheric Administration West Coast Fisheries. n.d. *West Coast Salmon & Steelhead Listings*.

[NOAA 2012] National Oceanic and Atmospheric Administration. 2012. *California Coastal Chinook Salmon: Status, Data, and Feasibility of Alternative Fishery Management Strategies*. NOAA Technical Memorandum NMFS. Written by O'Farrell, M.R., W.H. Satterthwaite, and B.C. Spence.