

Jessi Roberts

From: Cliff Strong
Sent: Wednesday, October 02, 2013 11:26 AM
To: John Thompson
Subject: FW: Channel Migration Zone (CMZ) information for CAO updates

Categories: CAR Update

John, here's what Commerce GMS sent in response to my question, though I don't think it gets to your real question of where does one draw the exact boundary.

Thanks,

Cliff Strong

Senior Planner
Whatcom County Planning & Development Services

cstrong@co.whatcom.wa.us

360.676.6907

www.co.whatcom.wa.us/pds

From: Peters, Doug (COM) [<mailto:doug.peters@commerce.wa.gov>]
Sent: Tuesday, October 01, 2013 10:49 AM
To: Cliff Strong
Cc: Nwankwo, Ike (COM); Harper, Kim (ECY); Colin Hume
Subject: Channel Migration Zone (CMZ) information for CAO updates

Cliff,

I got your phone message and am sending along the basic information on this subject.

The current (Ch. 365-190 WAC) and original [Minimum Guidelines](#) were prepared to assist local governments comply with and implement the Growth Management Act, including the requirement to designate critical areas. Geologically hazardous areas include landslide hazard risks posed by potential stream channel migration [see [WAC 365-190-120](#) Section 6 (f)].

As the Pacific Northwest has relatively young surface geology, streams that flow from steep mountainous areas onto relatively level floodplains have high probabilities of moving their locations. While this is a normal ecosystem process, it can also be affected by human alterations of the stream channel and surrounding floodplain. The net result of channel migration is a complex channel system with braided channels, isolated sloughs and oxbows, undercut bluffs, and subsequent recruitment of sediment and large woody debris. These ecosystem processes help provide stream complexity and will likely continue for the foreseeable future. Where streams may move to at any time cannot always be determined, but scientific work has been performed to develop predictive models and assemble risk-based scenarios of potential stream channel migration areas or "zones" (CMZ.) CMZ is defined in the SMA as "areas within which a river channel can be expected to migrate over time due to hydrologically and geomorphologically related processes."

As part of the federal government response to flood risk assessments, the EPA funded recent mapping of CMZ for major streams in the Puget Sound area, including the Nooksack River system in Whatcom County. Those mapping products were provided to Washington counties as part of their Shoreline Master Program development under the SMA. This work was provided under the Floodplain Management provisions of the Flood Control Assistance Account Program (FCAAP.) Determining potential CMZ locations and assessing risks is also an important component of addressing the National Flood Insurance Program requirements to comply with the NOAA Fisheries Bi-Op (which is short for Biological Opinion.)

As you know, the SMA jurisdictional area is quite limited in geography as compared to the GMA jurisdiction, so the provided CMZ maps and information should also be of use to the County for purposes of completing the required CAO update. The GMA and its implementing guidance do not explicitly require mapping all CMZ, but maps may be used as a general guide to locate potential CMZ risk areas. The GMA requires that all geologic hazardous areas be classified and designated.

As part of the currently funded National Estuary Program grant to Ecology and Commerce for Watershed Protection and Restoration, we have funded additional CMZ mapping and research in the Puget Sound area. The Department of Ecology is in the last phases of this recent work, and should have a detailed report on the results by the middle of 2014. That report will compare the current planning methodology results with those of more detailed studies being performed by King and Snohomish Counties, in order to determine the level of confidence in using this planning methodology. It will also include a CMZ screening tool, which should help with risk assessment. The end result will also include updated guidance posted on the website by Ecology.

Currently, the recommended planning methodology for CMZ risk assessment is posted on the Ecology website at <http://www.ecy.wa.gov/programs/sea/sma/cma/index.html>

The primary CMZ contact is shown below at the Dept. of Ecology.

Patricia Olson	Hydrogeologist (Rivers, Ordinary High Water Mark, Channel Migration Zones)	360.407.7540
--------------------------------	--	--------------

If you have additional questions please contact me.

Doug Peters
Watershed Planner
Growth Management Services
Local Government & Infrastructure Division
Washington Department of Commerce
360.725.3046

Jessi Roberts

From: Cliff Strong
Sent: Monday, January 04, 2016 12:09 PM
To: Chris Elder
Subject: RE: Roosevelt elk question

We actually deleted all the species of local importance, as they're already on the WDFW lists, or not on any lists and no one could understand why they were listed in the CAO.

Thanks,

Cliff Strong
Senior Planner
Whatcom County Planning & Development Services

cstrong@co.whatcom.wa.us
360.778.5942
www.co.whatcom.wa.us/pds

From: Chris Elder
Sent: Monday, January 04, 2016 11:40 AM
To: Cliff Strong
Subject: Fw: Roosevelt elk question

Cliff ~ I was looking at the existing Critical Areas Ordinance, Appendix D, Table D-2 where Roosevelt Elk are listed as one of our Priority Species. I had read that Roosevelt Elk were eliminated from Whatcom County back in the 30s/40s and it sounds like during their re-introduction we have a mixed genes herd with some Roosevelt Elk genes and some Rocky Mountain Elk genes. I'm not sure whether you got into that level of detail with the CATAC, but I'll look at the species lists in 16.16 and confirm that the appendix D lists are accurate. Thanks, see below for more elk info. -Chris

Chris Elder
Whatcom County
PDR Outreach Coordinator
(360)778-5932

From: Yarborough, Fenner F (DFW) <Richard.Yarborough@dfw.wa.gov>
Sent: Monday, January 4, 2016 11:23 AM
To: Chris Elder; Ingram, Joel W (DFW)
Subject: RE: Roosevelt elk question

That's a great question and it comes up a lot.
Here is the section from a document I wrote that explains it pretty well.
Basically it's a mix of genes but most likely Rocky Mtn. Elk, feel free to cut and paste it if you need for a document.

Genetics

The genetic origins of the North Cascades elk herd had been unclear for decades. Although generally believed to be the result of successful augmentations in 1946 and 1948 of both Rocky Mountain and Roosevelt elk, the North Cascades elk herd currently occupies habitat speculated to have been included in the northern-most range extension of the native Roosevelt elk subspecies.

In 2001 the WDFW began collecting samples for genetic analysis from elk in Washington, including the North Cascades elk herd. One objective of this research was to provide elk managers with information on the genetic identity and phylogeographic relationships of the North Cascades herd. Results from this work (K. Warheit, WDFW, unpublished data) can be summarized as follows:

The North Cascades herd appears to have closer genetic affinities to Rocky Mountain elk, primarily descendants of Yellowstone elk, than to Roosevelt elk (Table 3). For individual North Cascades elk (N= 22) where genetic determinations could be made, 91 percent (N= 20) were determined to have a higher affinity with other Washington populations considered to be Rocky Mountain baseline populations, whereas only two individuals were assigned to be genetically more related to Roosevelt populations. However, on the whole, North Cascades elk appear genetically distinct from the other Rocky Mountain elk herds in Washington. These genetic differences may be the result of mutations or genetic drift in the North Cascades herd with its small population. While private alleles (alleles present in only one herd) do not themselves suggest that genetic drift is not a factor, the fact that a private allele exists at one microsatellite locus in the North Cascades herd suggests that other factors may explain the genetic differences between the North Cascades herd and other Rocky Mountain herds. The private allele is present in three of 27 individuals, or nearly 6% of the sampled alleles at this locus. One possible factor may be what is called founder effect. Perhaps the microsatellite allele frequencies from the Yellowstone elk populations that founded the North Cascades herd differed from those that founded the other Rocky Mountain herds in Washington. Alternatively, elk present in the current North Cascades herd may be descendent, in part, from a remnant population that existed prior to the original translocation.

Cooperative augmentation efforts (WDFW/Tribal) during the period 2003-2005 resulted in a total of 98 elk captured in the MSH area, transported, and released into the North Cascades elk range. Genetic analysis of the captured MSH elk (Table 4) indicates that 47% of the sampled animals were assigned as the Roosevelt subspecies and 53% were assigned as belonging to the Rocky Mountain subspecies.

Table 4. Genetic assignment of individual elk from the North Cascades and the MSH elk herds.

Herd	Total	Total Assigned ¹	Assignment Proportions	
			Roosevelt ²	Rocky Mountain ³
North Cascades	27	22	0.09	0.91
MSH	113	97	0.47	0.53

¹ Some individuals could not be assigned to either genetic group due to genetic similarities.

² Roosevelt baseline populations included Olympic, Willapa, and MSH, in part.

³ Rocky Mountain baseline populations included Blue Mountains, Colockum, Hanford, North Rainier, South Rainier, Selkirk Mountains, MSH, in part, Yakima, and Yakama Nation.

Historic Distribution

Although generally regarded as a "reintroduced" population, the North Cascades elk herd currently occupies habitats historically used by the native Roosevelt elk (*Cervus elaphus roosevelti*) in western Washington. Genetically, the North Cascades herd is considered to be a mixture of the Rocky Mountain subspecies (*C. e. nelsoni*) and Roosevelt elk but predominantly Rocky Mountain elk. It is known that Roosevelt elk were included in early releases. The first attempt at reintroducing elk into the area occurred on March 12, 1912 when 46 elk from Yellowstone National Park were released in the central Skagit River drainage near Birdsvew (Table 2). Reportedly these animals were later eliminated by poaching.

Table 2. History of elk releases in the North Cascades elk herd area

Date	Release site	Elk	Origin	Results	By
------	--------------	-----	--------	---------	----

Date	Release site	Elk	Origin	Results	By
1912	Birdsview, Skagit County	46	Gardiner, Montana (Yellowstone National Park)	Failed after 10 years	Skagit County
1946	S. Fork Nooksack River	15	9 from King County (6 believed to be Roosevelt elk from the Olympic Peninsula)/6 from Yakima County	Successful	Washington Game Department
1948	S. Fork Nooksack River	8	Yakima County	Successful	Washington Game Department
Oct. 2003	S. Fork Nooksack River	43	Mt. St. Helens	Successful	WDFW and Point Elliot Treaty Tribes
Sept. 2004	S. Fork Nooksack River	4	Mt. St. Helens	Successful	Point Elliot Treaty Tribes
March 2005	S. Fork Nooksack River	10	Mt. St. Helens	Successful	Point Elliot Treaty Tribes
Sept. 2005	S. Fork Nooksack River	2	Mt. St. Helens	Successful	Point Elliot Treaty Tribes
Oct. 2005	S. Fork Nooksack River	39	Mt. St. Helens	Successful	WDFW and Point Elliot Treaty Tribes

In 1946 a second release of 15 elk was made, and they began to expand throughout the drainages of the Middle and South forks of the Nooksack River and the north Skagit River. Eight additional elk from the Yakima area were released in the same general area in 1948 (Adkins 1978). These releases into the North Cascades elk herd area resulted in the mixing of Roosevelt and Rocky Mountain elk on what is considered historical Roosevelt elk (*C. e. roosevelti*) range. Five successful augmentations by WDFW and the tribes (2003-2005) added an additional 98 animals to the North Cascades herd. All adult animals from these recent releases were radio collared and monitored to assess survival and distribution.

From: Chris Elder [<mailto:CElder@co.whatcom.wa.us>]
Sent: Monday, January 04, 2016 11:18 AM
To: Ingram, Joel W (DFW); Yarborough, Fenner F (DFW)
Subject: Roosevelt elk question

Happy New Year ~ I was looking at Whatcom County's Critical Areas PHS list of species(based on 2004 data I believe) and it has Roosevelt Elk listed as a Priority Species known or suspected to live in the County.

From what I read I though the Roosevelt Elk went extinct back in the 1930's or 40's and Rocky Mountain Elk were re-introduced into the South Fork Valley area. Do you guys know whether we have any actual Roosevelt Elk left or whether what we have is actually the Rocky Mountain Elk? Judging by the WDFW PHS webpage, whichever elk it is is still listed as a priority species, correct? thanks, Chris

Chris Elder
Whatcom County
PDR Outreach Coordinator
(360)778-5932