Informing Opinion with Science

By Dr. Deanna Herrera

I became interested in the impacts of trails on animal habitats, and whether there are differences in the types of trails being built and managed in our region, because of the growth of recreation in our area and the infrastructure required to facilitate it. I am a firm believer in grounding opinions in science and facts, rather than on my own personal wishes to follow my recreational pursuits. This isn't always easy to do because as a psychologist, I know that people tend to select information that confirms their previously held biases and this confirmation bias does not exclude me. To lower the impact of my own personal proclivities, I set out to research trails and increases in recreation on wild environments. Not surprisingly, the information I found is complicated, but nonetheless, very important to wade through in order to develop a well-considered opinion on the matter of increasing recreational opportunities in the area.

A review of the science literature in the field of conservation and ecology has helped me understand the complexity of human and animal habitat interactions, as these relate to trails. Please allow me to share what I found out:

On one hand, bringing more humans to the area to learn about ecosystems and gain an appreciation of delicate environments is a boon to environmental conservation. Researchers note, "Visitor guidance is an effective conservation measure to reduce the negative impacts of recreationists" (Botsch, 2018).

Educational opportunities are critical to maintaining clean and wild areas. The Bioregional Center plays an important role in providing information that allows individuals to develop meaningful relationships with the environment, and to spend time in nature

with fewer impacting behaviors. As an appreciation for nature grows, individuals are moved to become stewards of the natural environments they share with other life forms.

Recent psychological findings reveal that people who are exposed to environments that evoke feelings of awe and wonder (that create a sense of "oneness"), will feel a greater sense of personal responsibility for caring for the environment (Zhao et al,. 2008). Interestingly, more "selfish feelings", such as happiness and joy, that serve the individual, will not incite more care or responsibility for the environment. The beauty of the Mount Shasta area can certainly stimulate feelings of awe and wonder, and providing opportunities for individuals to have these internal experiences, could create more caring for the ecosystems they see themselves as being a part of. And what better way to promote these experiences than getting people out on trails?

On the other hand, science tells us that increased recreation and trails do impact ecosystem habitats, whether they be for hiking, biking, OHV, or equestrian usage. Obviously, motorized vehicles create the most disturbances, while walking creates the least. The research is clear that as trails broaden, so do their negative impacts. What has emerged from the literature, is that trails can negatively impact wildlife in two ways, as follows:

1) Firstly, a contiguous trail fragments traveling patterns of insects, mammals and reptiles, when these habitats are disturbed.
2) Secondly, trails bring more humans to forested areas, and some wildlife are extremely sensitive to the presence of humans.

Trails have fewer negative effects in forests with lower levels of recreation usage. One study which examined bird populations discovered that, in some avian species, proximity to trails decreased bird presence in areas of high recreation usage, but in areas of low

recreation usage, bird populations only slightly decreased. This study found that avian disturbance caused by recreation activities (walking) reduced forest bird density by 13% and species variability by 4%. That this reduction was due to the interaction of trails and human presence. This study supported findings of an experiment that showed when humans walked off trails, the bird community in the area was negatively impacted relative to the number of people present (Botcsh, 2008).

Of course, there are variations in different species and the relative impacts they incur, due to trail development and human usage. Some species are more averse to human presence than are others. It is not always the construction or existence of trails that cause the habitat loss, but often the humans using those trails. Their mere presence reduces the density of many species, especially highly sensitive ones. However, foraging birds are impacted by trail construction, while other birds are impacted by sounds.

I chose to provide the bird studies as examples of habitat disturbance because I was surprised by how sensitive birds are to human activity, including walking, which intuitively seems like a very low-impact activity. Moreover, I discovered that birds are important indicators for overall forest health (Blakely and Brayton, 2016) because they are more visible, and indicate the presence of other animals.

Educating myself as a soft scientist is important to my understanding of ecosystems and can inform my decisions in important ways, and this particular research has given me good data to create new opinions about trail development and recreation. Once a trail is built and more humans are using the trail, there are immediate pronounced and negative impacts on the presence and diversity of many species. Educational mitigation strategies require time to engage and cannot completely address or undo these negative impacts. When considering the value of increasing trails to serve the purpose of increasing

recreational activities in the area, it is important to have a deeper understanding of impacts on biodiversity, and whether these costs are worth the value of increases in human interaction with sites designated for trail building, especially as other human-caused impacts, like the introduction of invasive species and climatic changes, increasingly destabilize forest systems. As researchers note:

> "In summary, … trails and roads can considerably affect bird community composition and abundance, not only by modifying habitat along trails, but mainly through their use by recreationists. "
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> (Botsch, et al., 2018)

Balancing the joys of being in the forest, wanting to share this wonder with others, and caring for the forest in a meaningful way, includes careful planning and management that is based in science. Conducting proper studies on how trails might impact a given area takes time and can be costly. This is compounded by the fact that how a trail effects one species, might not apply to others, and differing negative impacts could vary across regions dramatically.

One study crystalizes the fact that,

> "…prevention of trail construction in undeveloped natural habitats would reduce human access, and thus disturbance, most efficiently."
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> (Botsch, et al., 2018)

It appears that trails and increased recreation interact in complex ways that have their individual and combined effects on animal life in ways that vary. Current research has allowed me to shed my subjective outlook as a habitual trail user, and to take a more objective view. During this time of the degradation of natural environments that support

animal life, renaturation of unused trails (including harvesting roads) (Miller and Hobbs, 2000), and rehabilitating existing trails, is a better and more conservative use of money, energy, and time than creating new ones in a region with hundreds of miles of existing trails. If trails must be constructed, then builders should take into account and apply the requirements of many species to thrive in any given area (Andren, 1994, Reed et al., 1996; Forman and Alexander, 1998; Rodriguez-Prieto et al., 2014). If this is not possible, then the undisturbed wild areas should be left free of trails as "quiet zones" where animals and birds can continue to populate in peace (Taylor and Knight, 2003; George and Crooks, 2006; Reed and Merenlender, 2008). Enriching myself with newfound information has been exciting, and my hope is to inspire you to explore the research, including peer-reviewed scientific articles, before forming opinions on a variety of matters that impact the bioregion we love. Research articles are easy to find on Google Scholar.

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