Ecologist will use computer maps to track Refuge landcape and wildlife

by Lee O'Brien

We were on a ferry christened with the same name as the largest lake on the Kenai Peninsula: The Tustumena. A crew member had told us that the seas can be a bit "chippy" crossing the Gulf of Alaska. My wife had spent six weeks living and working on a 125 ft sailboat, so she knew what she was in for. I had never been on the open ocean. I thought, "How bad could it be?" The swirling started in my head and slowly worked its way down to my stomach. Sitting down didn't make things better. Lying down was the only way to keep hold of your lunch. So, we spent the better part of two days with a view of the ceiling over our bunks. We arrived in Seward to dark and freezing rain. My first time in Alaska.

Growing up in Missouri, my family had a farm in the Ozarks where I learned to hunt, fish, canoe and appreciate the outdoors. Since then, I spent the last 25 years living in various places in the western U.S., where I became acquainted with many different landscape types from open grasslands to desert shrublands and montane forests to alpine tundra. But I had never experienced anything like Alaska. Everything seems bigger here. The lakes are bigger. The rivers are bigger. The fish are bigger. The animals are bigger. Fishing for trout and bow hunting for elk seem now like child's play when I see the size of the moose here and the salmon mounts around town. And realizing that you can as likely be the hunted as the hunter brings a sense of awe and humility in the face of the wildness of this place.

I came here as a landscape ecologist and new geographic information systems (GIS) manager for the Kenai National Wildlife Refuge. One of my idols, Aldo Leopold, wrote, "The key to intelligent tinkering is keeping all the pieces." What I do in my work is to try to keep track of all the "pieces" of a landscape… how many there are… where they are… what condition they are in. That way when things change, there exists a map of how things were put together and how they functioned.

Landscape ecology involves looking across large areas and trying to understand why things are where they are and what their role is in the systems that produce and sustain landscapes. Why are ptarmigan found in upland tundra and not in lowland fens? Why do redpolls stay here for the winter while tree swallows head for Mexico? And what processes cause the patterns that we see? There are often fascinating interactions between the players in landscapes. Spruce bark beetles kill trees, which burn, allowing alders and willows to establish. Moose change their patterns and move into burned areas; bears may follow and distribute berry seeds which eventually grow into shrubs that bring in waxwings, while martens move away to areas of denser forest, fully recovered from earlier fires. So, bark beetles can determine where waxwings, moose and martens live, and the condition of forests in Mexico can control the number of mosquitoes on the Peninsula, by affecting how successfully tree swallows over-winter. Studying the changing patterns and the interactions among the pieces in landscapes can teach us what impacts tinkering may have.

GIS is a computer map tool used to keep track of where things are and how they change over time on the landscape. By monitoring how things have changed in the past and how rapidly things are currently changing, predictions can be made about how the landscape will look in the future. GIS can be used to explore different scenarios that occur when different pieces are tinkered with. This is useful when management decisions have to be made that will affect the future state of the refuge and its biota. Do you let a fire burn or put it out? Do you let dead trees stand or cut them down? Do put a road in here or over there or nowhere? What effects will increasing development have on the borders of the refuge? If wetlands begin to dry up, what ripple effect will that have throughout the landscape?

I have used GIS to monitor the home ranges of kit foxes in the California Central Valley, and to determine the best areas to reintroduce black-footed ferrets in Utah. I have used GIS to simulate trapping small mammals in different size grids to determine how many traps and how long you'd have to trap to

find out how many and what species live in an area. The trapping grids were then tested on the ground in Yellowstone. I used GIS to model the habitats of all the land animals in Colorado (over 1000). And most recently, I was the Colorado State Coordinator on a five-year project that covered five states in the Southwest, mapping the vegetation and habitats of all species occurring there. These computer maps were then used to determine which areas may be sensitive or contain rare "pieces" of the landscape that should be taken into account when planning for different land uses ("tinkering").

I have also just completed a master's degree thesis which assesses the accuracy of predictions made by GIS simulations. It is important for users of this type of information to know how reliable the predictions may be.

Although I'm new to Alaska and the Fish & Wildlife Service, I hope to bring some of my experience to bear on keeping the Kenai National Wildlife Refuge healthy and productive for generations to come.

Lee O'Brien has a Bachelor of Science degree in wildlife biology from Colorado State University and in two weeks will defend his Master of Science thesis in landscape ecology. He moved here with his wife, Barbara, at the end of November as a wildlife biologist/GIS specialist at the Kenai National Wildlife Refuge. Barbara is pursuing a career as a science writer. Lee also has a 14-year-old daughter who visits from Colorado during her school breaks and thinks Alaska is "pretty cool." Previous Refuge Notebook columns can be viewed on the Web at http://www.fws.gov/refuge/kenai/.