

For each population of ESA-protected spring/summer chinook and steelhead in Idaho, we have produced three map figures: spawning and spawning potential, limiting factors, and threats. While these figures were developed using the best sources of spatial data of which we are aware, we would welcome any corrections or additional data.

### **1. Spawning and Spawning Potential**

The spawning maps compare documented spawning distribution to each stream's intrinsic potential for spawning and rearing. Spawning data come from the Idaho Department of Fish and Game via StreamNet, whereas intrinsic potential values result from models developed by NOAA's Northwest Fisheries Science Center. The models use stream gradient, stream width, and soils to determine the intrinsic potential of each stream reach for supporting either chinook or steelhead spawning and rearing. This comparison therefore identifies unoccupied streams with potential to be occupied. However, both the model and the current spawning distribution data may not accurately represent presence or absence of spawning or spawning potential for all streams.

#### *Data*

Idaho Department of Fish and Game, StreamNet. 2005. IDFG Anadromous Fish Distribution, vector data. Available through StreamNet: <http://www.streamnet.org/>

National Marine Fisheries Service (NOAA), NW Fisheries Science Center. Unpublished. Intrinsic potential for spawning and rearing, vector data. NMFS: Seattle, WA.

### **2. Limiting Factors**

The limiting factors maps display two primary data sets on reach-scale limiting factors for chinook and steelhead: Idaho Department of Fish and Game's delineation of habitat constraints for every stream in the Salmon and Clearwater Basins occupied by anadromous fish (some streams have no constraints); and Idaho Department of Environmental Quality's 2002 303(d) list of impairment causes for water bodies not supporting salmonid spawning. Both data sets rely on in-stream measurements as well as professional judgment. The IDFG data shows only one limiting factor for each stream; important secondary limiting factors are therefore not represented. The IDEQ data is most accurate for subbasins in which IDEQ has completed a subbasin assessment and determined TMDLs, and the department has done this for all subbasins with salmon and steelhead except for Lolo Creek, Potlatch Creek, and the Middle Fork Salmon.

The limiting factors maps also show hatchery release points and blocked fish passage. We have shown hatchery release points regardless of whether the hatchery fish are a limiting factor for the wild population, and in most cases they are not. The blocked fish passage sites are a compilation of data from the Forest Service, StreamNet, and Idaho Department of Lands, but other blocked passage sites not identified here certainly exist.

#### *Data*

Idaho Department of Environmental Quality. 2006. 2002-2003 305(b) Integrated Report, vector data. Available through Inside Idaho: <http://inside.uidaho.edu/geodata/find.htm>

Idaho Department of Fish and Game. 1989. Habitat Quality for Smolt Density Model, vector data. Available through StreamNet: <http://www.streamnet.org/>

Idaho Department of Lands. 2005. Cumulative Watershed Effects (CWE) Culverts, vector data. IDL: Coeur d'Alene, ID.

StreamNet. 2005. Barriers to fish passage, vector data. Available through StreamNet: <http://www.streamnet.org/>

StreamNet. 2005. Survey of culverts (2003) on Boise, Payette, and Sawtooth National Forests, vector data. Available through StreamNet: <http://www.streamnet.org/>

StreamNet. 2005. Survey of culverts (2003) on Salmon-Challis National Forest, vector data. Available through StreamNet: <http://www.streamnet.org/>

### **3. Threats**

Various land-use activities and conditions may threaten salmon and steelhead habitat in Idaho by causing in-stream limiting factors. For example, high road density may increase the delivery of sediment to streams. The threats maps therefore show the two most significant threats to habitat for each population, including road density, intensive forest management, grazing, and severe fire risk. Documentation and modeling of these conditions comes from the Interior Columbia Basin Ecosystem Management Project (ICBEMP) and is represented at the subwatershed scale. The coarse scale of this data means that in a subwatershed shown with high road density, not every stream in that subwatershed is necessarily threatened by roads.

For populations where low in-stream flow affects habitat, we also show the locations of all irrigation diversions. In many cases low flow downstream from water diversions is a direct limiting factor and the diversions are not merely a threat. However, for ease of display, we show diversions and low flows here with threats.

#### *Data*

Interior Columbia Basin Ecosystem Management Project (ICBEMP). 2001. Current Disturbance and Activity Levels, vector data. USDA Forest Service. Available at <http://www.icbemp.gov/spatial/landchar/>.

Interior Columbia Basin Ecosystem Management Project (ICBEMP). 2001. Current severe fire effects risk, vector data. USDA Forest Service. Available at <http://www.icbemp.gov/spatial/landchar/>.

Interior Columbia Basin Ecosystem Management Project (ICBEMP). 2001. Road density (predicted), vector data. USDA Forest Service. Available at <http://www.icbemp.gov/spatial/landchar/>.

Idaho Department of Water Resources. 2006. Water rights, place of use (POUs), vector data. Available online, accessed 9-15-05: [http://www.idwr.idaho.gov/gisdata/gis\\_data.htm](http://www.idwr.idaho.gov/gisdata/gis_data.htm)