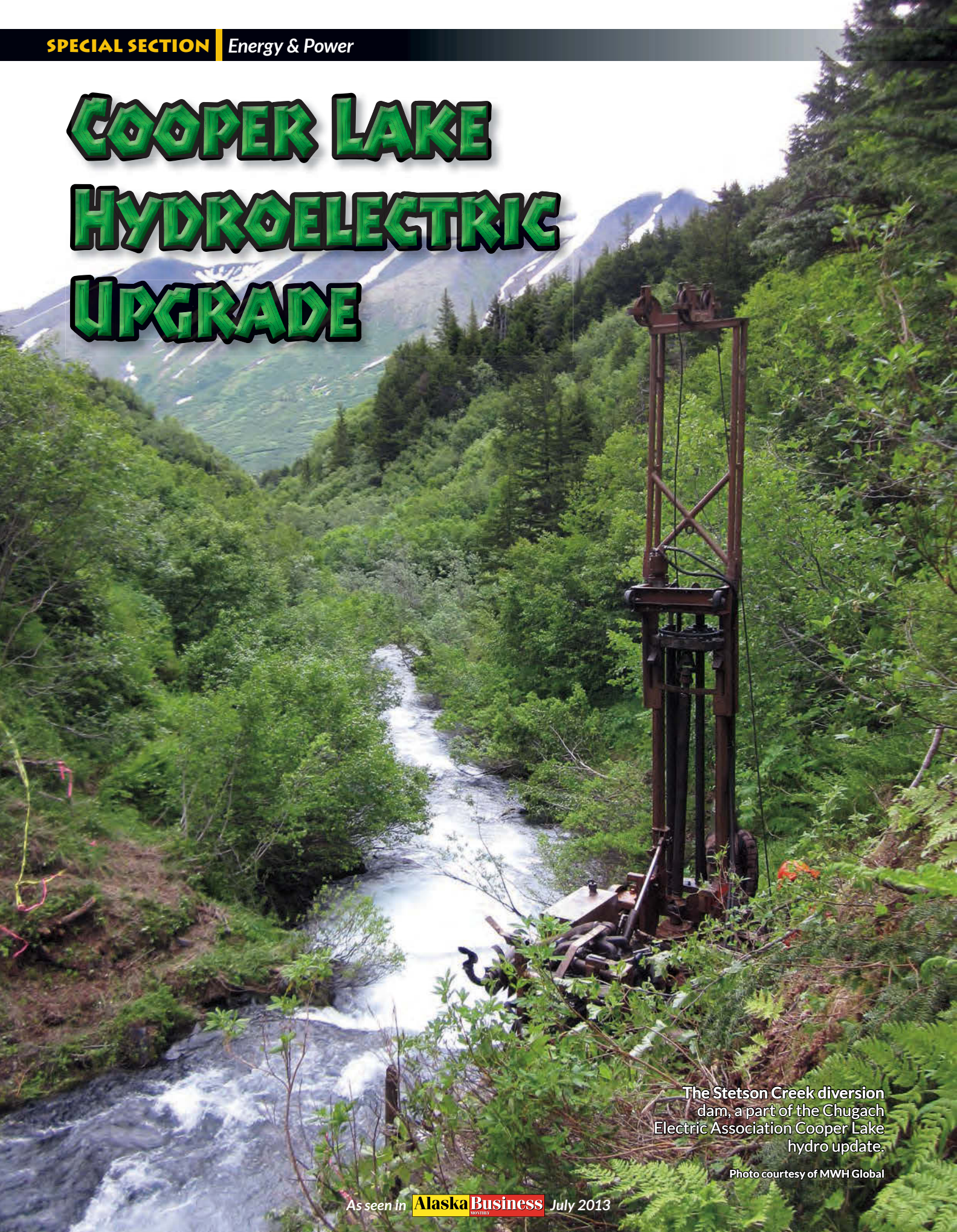


# COOPER LAKE HYDROELECTRIC UPGRADE



The Stetson Creek diversion dam, a part of the Chugach Electric Association Cooper Lake hydro update.

Photo courtesy of MWH Global



# Restoring stream habitat, improving aquatic conditions

By Rindi White

**A**nearly \$22 million project to restore salmon habitat on the Kenai Peninsula will get underway this summer at Cooper Lake, near Cooper Landing. It's an effort to restore lost stream habitat and improve aquatic conditions linked to the Chugach Electric Association's Cooper Lake Hydroelectric project.

Chugach, with assistance from the state, is paying for the project. The work includes installing a diversion dam at nearby Stetson Creek, routing cool creek water into the lake, and draining off some of the warmer lake water into Cooper Creek, all with the goal of making salmon spawning conditions more ideal.

The work is a condition the Federal Electric Regulatory Commission (FERC) required when it granted Chugach a new fifty-year license for its Cooper Lake hydroelectric project in 2007.

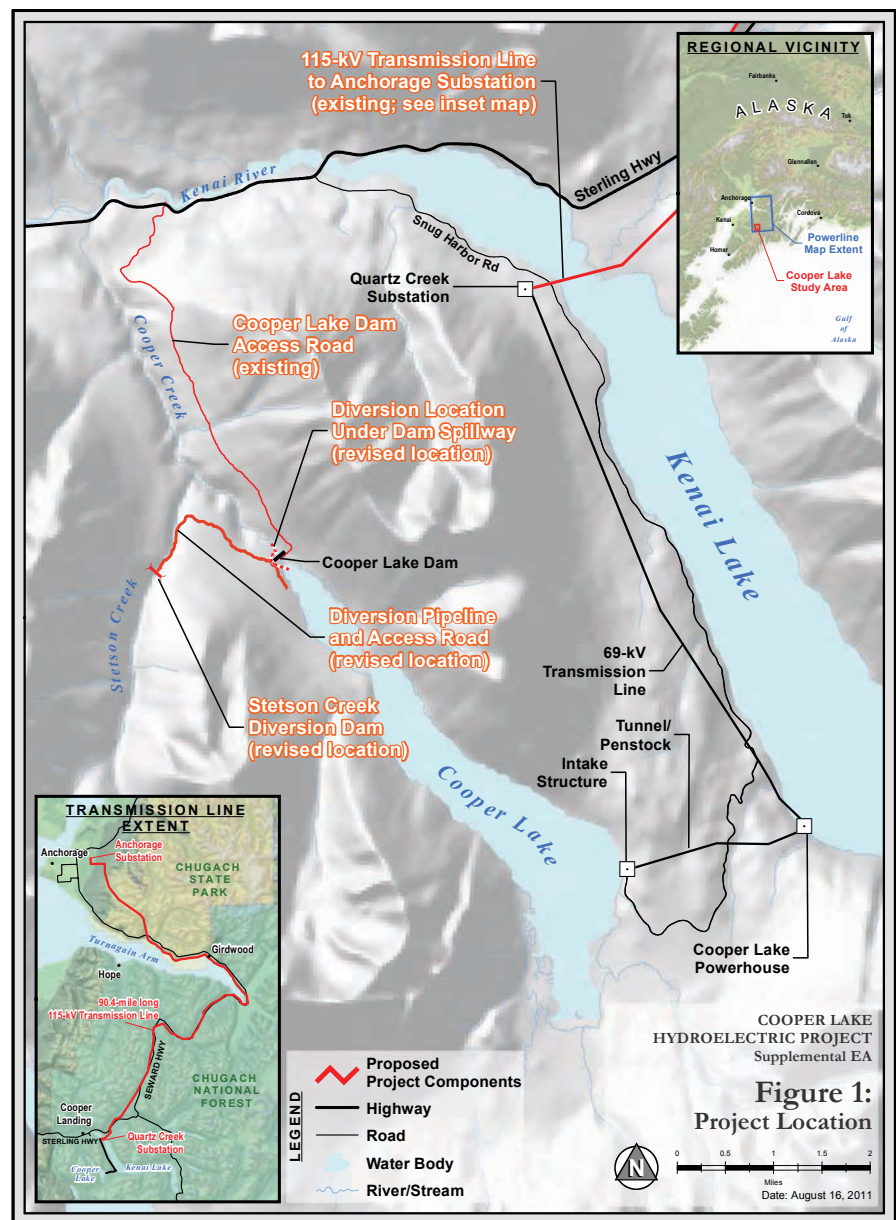
## Adding Salmon to the Kenai River

Chugach spokesman Phil Steyer says when the electric utility went through its relicensing process about ten years ago, resource agencies stated they wanted a three- to five-degree increase in water temperature in the lower part of Cooper Creek.

Chugach placed a dam in the original Cooper Creek drainage in the late 1950s, Steyer explains. The water that flows into the creek now is natural seepage along the creek path and water from Stetson Creek, which drains from high in the mountains, he says. In order to warm the water downstream, the cool mountainous Stetson Creek water will be diverted to Cooper Lake and warmer water from the lake will be allowed to spill out into the creek drainage.

"The two things have the net effect of raising the water temperature at the mouth of Cooper Creek," Steyer says.

What will the project mean in terms of habitat restoration? How many new salmon will be swimming in Cooper



Creek or other nearby streams as a result of the project?

Hard to say, Steyer says. Chugach's original license predates statehood.

"Just finding good empirical data from the 1950s is difficult," he says.

A 2004 report on the potential aquatic habitat benefits conducted by engineering firm HDR for Chugach stated Cooper Creek will likely see "a shift in fish population presence and interaction, an increase in total biomass, and an increase in genetic diversity."

The report states that both resident and migratory rainbow trout populations will likely develop in area drainages and coho and chinook salmon will likely more frequently use the area for spawning, and it could spell more salmon in the nearby Kenai River.

"Chinook and coho fry would utilize the available habitat for rearing before outmigrating to the Kenai River," the report states.

Ultimately, Steyer says, Chugach is doing the work because it's a condition of license renewal. But the project has a side benefit of increasing the amount of energy Chugach will get out of the Cooper Lake project by about 10 percent. More water is coming into the lake than is being diverted out, he explains, so Chugach will have more available water to generate electricity.

"As we looked at the value of that extra water over a fifty-year license, we concluded the value was enough to pay for a \$12 million project, so we agreed," Steyer says.

The project cost was originally estimated at \$12 million. But with further study,



A field worker measuring rock characteristics at the Stetson Creek diversion dam.

the project cost kept rising and is now nearly double that initial estimate. That's why Chugach sought a legislative grant to help cover the extra cost, Steyer says.

The utility successfully obtained a \$5.8 million legislative grant in 2012 and a \$576,000 grant from the state's Renewable Energy Fund. The project won legislative support in part because it helps Alaska achieve the goal of producing 50 percent of the power in the state using renewable energy, Steyer says.

### Enhancing an Important Piece of the Energy Picture

Cooper Lake isn't a huge project, but it's key toward the utility's ability to provide economical power to its members, Steyer says.

The hydroelectric project provides about 20 MW of power and produces about 4 percent of the power the company sells each year.

Licensed in 1957, the Cooper Lake Hydroelectric project sits on state land a few miles from Cooper Landing. The dam is a rock-fill structure spanning Cooper Creek at the outlet of Cooper Lake, according to information from Chugach Electric.

Cooper Lake predates the project, but the dam caused the lake to expand to about 2,600 acres. A tunnel, conduit,

and penstock extend about two miles east of the lake, to the Cooper Lake powerhouse on Kenai Lake. The powerhouse holds two turbines, each rated at 9.69 MW.

According to Chugach, water from Cooper Lake is diverted through the penstock and tunnel to the powerhouse and discharged into Kenai Lake.

Those details will stay the same, Chugach Electric project engineer Peter Poray says. The salmon habitat restoration project will build a second dam on Stetson Creek, channel the water into a thirty-six-inch high-density plastic pipeline, and send it two miles south in a slow curve around the mountainside to Cooper Lake. The pipeline is going to be buried in an access road leading to Stetson Creek, Poray says. On the Cooper Lake end of the project, a thirty-inch pipe will be installed in the Cooper Lake dam to allow water to drain from the lake into Cooper Creek.

"The goal this year is to set up the staging area ... and build an access road from Cooper Lake up to Stetson Creek," Poray says. "They'll be cutting into the rock spillway ... and starting to build the high-density pipeline up to Stetson."

Because the work is being done in the mountains, Poray says it's likely the construction season will be cut short by

snowfall. There was still between three and five feet of snow in the area in mid-May, he says.

In 2014 the construction contractor, Twin Peaks Construction from Anchor Point, will finish laying the pipeline, start and finish building the diversion dam at Stetson Creek, and finish any other operating systems needed to transport the water from the lake to Cooper Creek.

### MWH Global Lends Field Expertise

MWH Global is the construction manager on the project and has assisted Chugach throughout the relicensing effort. Project Manager Heather Williams says the Stetson Creek project is challenging because of the short construction season and some of the physical features the project encompasses. A canyon near Stetson Creek will make construction of the road and pipeline a challenge, and the rock-fill dam on Cooper Lake, where the siphon outworks is to be placed, is a known bedrock area that might pose problems when drilling for the outworks.

"We'll have to be careful how that proceeds," she says. "The challenge is that the dam is there and we need to make sure anything done does not damage the existing dam."

To address the short construction season, Williams says the construction crew was in the field in the spring to clear trees.

"They're waiting to do the rest of the mobilization when things dry out more," she said in May.

MWH is no stranger to dams and water-related projects. Alaska Regional Manager Chris Brown says the company prides itself on assisting with FERC relicensing on dams throughout the Pacific Northwest.

"In the Pacific Northwest, generally speaking, there haven't been a lot of new dams constructed in the last [several] years," Brown says. "So a lot of the work is rehabilitation and upgrades to existing facilities as part of the FERC relicensing."

Although MWH assisted with Chugach's relicensing effort, the diversion dam project is a little different than what the company typically works on, Brown says.

MWH Global, based in Broomfield,





Colorado, is a wet infrastructure company, Brown says. That means the company engineers anything having to do with water—hydroelectric power projects, pipelines, water treatment facilities, and more.

“We do a lot of water treatment in Anchorage, we do a lot for oil companies,” he says. The company has been in Anchorage for more than thirty-five years, serving a variety of markets. The Anchorage crew is part of a much larger company, which has 180 offices in thirty-five countries and currently operates on six continents, according to its website.

MWH is assisting the state with licensing and engineering feasibility for the Susitna-Watana Hydroelectric Dam project, a project that Williams is also managing. ⚙️

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Photo courtesy of MWH Global

Field workers performing a geotech investigation at Cooper Lake hydro project.