

Cascadia

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Department of Geology & Mineral Industries

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What do rocks, fish, and water have in common?

Mined land reclamation

By James Roddey

It seems almost every week we read in the newspaper of conflicts between mine operators and local citizens, environmentalists, or local governments. We know mining in Oregon generates deep public concerns. It also creates very important public benefits.

The vast majority of mine sites in this state produce sand and gravel or quarry rock. Population growth has greatly increased demand for these raw materials, but a variety of newly understood concerns involving the environment (i.e., water quality and endangered salmon) have affected the location and operation of many mine sites.

Geologists who once concentrated solely on the extraction of rocks and minerals now know that the benefits of a strong mined land reclamation program can play an important role in addressing the public's environmental concerns. For example, sand and gravel mining within floodplains now requires more stringent environmental regulations to protect adjacent wetlands and wildlife habitat, and as the size of new and existing mine sites increases, groundwater is more frequently encountered, which also requires monitoring and protection.

The department has overseen mined land reclamation in the state for decades, but few could foresee concerns for water and fish becoming part of our everyday responsibilities. Now when we talk about aggregate production, endangered salmon and aquifer protection—rocks, fish, and water—we're using the new buzzwords for today's geologists.



A fish alcove, connecting a floodplain gravel pit to the Applegate River, is one way mine operators are helping protect endangered salmon when flooding occurs.

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Over recent years, the Mined Land Reclamation Program (MLR) at the Oregon Department of Geology and Mineral Industries (DOGAMI) has become the lead state agency for mine regulation in Oregon. MLR regulates mines in all but one county, in cooperation with other state, federal, and local agencies, to ensure the protection of the environment and future beneficial use of mined lands. Recently, MLR has also assumed responsibility for regulation of DOGAMI's oil, gas, and geothermal programs.

Today, as water related issues take center stage in Oregon, the number one issue for MLR is floodplain mining and its relationship to off-site resources, including the potential for habitat restoration. How MLR encourages responsible, innovative, and, when possible, voluntary reclamation in an environment of intense citizen and media scrutiny is an interesting story that offers lessons on cooperation and success.

Turn the page and learn more about the regulation of mineral and natural gas resources in Oregon and how MLR encourages reclamation above and beyond regulatory standards.

Special thanks to the staff at MLR for their help with this issue of *Cascadia*.



Creating new habitat from what once was a gravel quarry site benefits both wildlife and the people who come to use this new park near Canby.



Through the eyes of the State Geologist

by John D. Beaulieu,
Oregon State Geologist

Oregonians use about 50,000,000 tons of aggregate each year. Supplying the equivalent of a pile of sand and stone six feet on a side and six feet high each year for every man, woman, and child in the state is an imposing challenge to the producers and regulators that must oversee their efforts.

The Mined Land Reclamation Act took effect in 1972. In the early days of the statewide Mined Land Reclamation (MLR) regulatory program in Oregon, the prevailing stereotype was one of little mines scattered across the landscape and destined for reclamation as scattered fish ponds, shooting ranges, or even areas of eventual urban development. In the first few years less than 200 pits were regulated statewide. Today, the state's need for stone means there are over 800 sites regulated at the state level.

Issues associated with mining have expanded as well, from the original concerns of aesthetics and road noise to now include wildlife issues, environmental factors, slope stability, ground water interactions, and land values.

To meet these diverse issues, staff expertise at MLR now includes specialties in groundwater, soils, geology, range science, and others. And partnering with other state and federal agencies expands our capabilities.

Permitting of mines is staged with local governments, with cities and counties making the land use decisions. MLR oversees the environmental concerns and the successful transition to the second beneficial use

of the mined land as planned in the permitting process.

In recent years, floodplain mining and its relationship to the Oregon Plan for Salmon and Watersheds has become another important challenge at MLR. How well this challenge is met ultimately may dictate the state of our environment. It will certainly, in part, dictate the cost of stone and aggregate. With proper technical skill and management we believe society can optimize the outcome. This conviction is the basis of the successes and discussions presented in this issue of *Cascadia*.

Regulating mineral resources

In recent years, the annual output value of Oregon's mines and natural gas wells has averaged over \$240 million. The bright spots in Oregon's mineral resources are continuing natural gas production and the expansion of industrial minerals production.

Studies show new mines and processing plants may offer year-round employment and stable tax bases in parts of rural Oregon that historically have depended on seasonal industries such as agriculture, tourism, and forestry. Changing market patterns in the western United States and many Pacific Rim nations, coupled with Oregon's favorable geology, suggest major opportunities

for rural economic diversification and development.

Every Oregon community benefits directly from reliable supplies of sand and gravel, crushed rock, and other building materials. Because the removal of these mineral resources can affect the environment, they must be regulated.

Mineral, natural gas, and geothermal exploration and production in Oregon are overseen by the MLR program in cooperation with other state, federal, and local agencies to ensure the protection of the environment and future beneficial use of mined lands.

The program is fee-based statewide (except Columbia County and some tribal lands) with authority to regulate all non-riverbed and underground mining. The MLR program also implements the federal Clean Water Act General Stormwater Permit and the state Water Pollution Control Facility Permit (WPCF) at aggregate mine sites.

MLR is staffed with 9 employees and is based in Albany. The program currently has 816 active reclamation permits and 201 Stormwater and WPCF permits. The MLR staff conducted 1,825 site inspections in the years 1997-99 and over the last two years, opened 84 sites and closed 60. Currently, thousands of acres statewide are under reclamation bond and thousands more have been reclaimed to a variety of uses since the program began in 1972.



MLR Best Management Practices workshops are important in encouraging the best possible use of environmentally sound mining practices.



A graphic example of what proper reclamation can accomplish is seen in these before and after photos of a gold mine operation in Baker County.

In Oregon, the eligibility for a parcel of land to be mined rests with a land-use authority, most commonly a county, who establishes the secondary beneficial use to which the land must be reclaimed. The MLR permit has two main functions. It insures that when mining occurs, off-site impacts are minimized and that the site is mined in a way that guarantees the reclamation of the site will be completed.

The program has an effective field and aerial photo inspection program that is critical to maintaining compliance and a positive working relationship with the mining community. MLR also uses two important non-regulatory tools, the Best

Management Practices Manual and the annual awards program. These help encourage the best possible use of environmentally sound mining practices.

The mining industry in Oregon provides the raw materials for road building and maintenance as well as construction. A sometimes delicate balancing act, the MLR program regulates Oregon's mineral resources to the benefit of both the industry and the public to minimize the impacts of mining and optimize the opportunities for reclamation.

Thousands of acres in Oregon have been reclaimed to a variety of uses since the program began in 1972.

 **Learn more about MLR at www.OregonGeology.com**



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Saving salmon and habitat with the Oregon Plan



One of the most ambitious environmental programs in Oregon in the past decade has been the Oregon Plan for Salmon and Watersheds. It represents an unprecedented undertaking on the part of the state to restore salmon and trout resources through locally-driven, voluntary efforts. The goal of the Oregon Plan is to restore populations and fisheries to productive and sustainable levels that will provide substantial environmental, cultural, and economic benefits.

Oregon's mining industry, while just one small part of the salmon protection effort, is shouldering a bigger responsibility these days through

heightened awareness of the need to improve fish habitat. MLR is involved as well, handing out "Fish Report Cards" to commercial rock quarry operators as an incentive to have them become active participants in the plan.

Since 1996, MLR has met with all the major mine producers in the Oregon Plan area, who hold a total of 152 permits. These sites range in size from one to 50+ acres. Sediment discharged into streams or wetlands is the biggest concern.

MLR reclamationists have helped

operators develop new strategies for storm water control and have given each site a storm water inspection checklist — the Fish Report Card. The checklist identifies a number of measures to improve storm water runoff.

MLR has also told operators that DOGAMI will more closely monitor sites within the Oregon Plan area, and that copies of the Fish Report Cards are being sent to the local office of the Oregon Department of Fish and Wildlife and to the mine site landowner. MLR is using this information to also help prioritize future inspections.

These steps and other voluntary efforts being made by many mine site operators are just the beginning in helping make the Oregon Plan an integral part of the ongoing mining philosophy in Oregon.

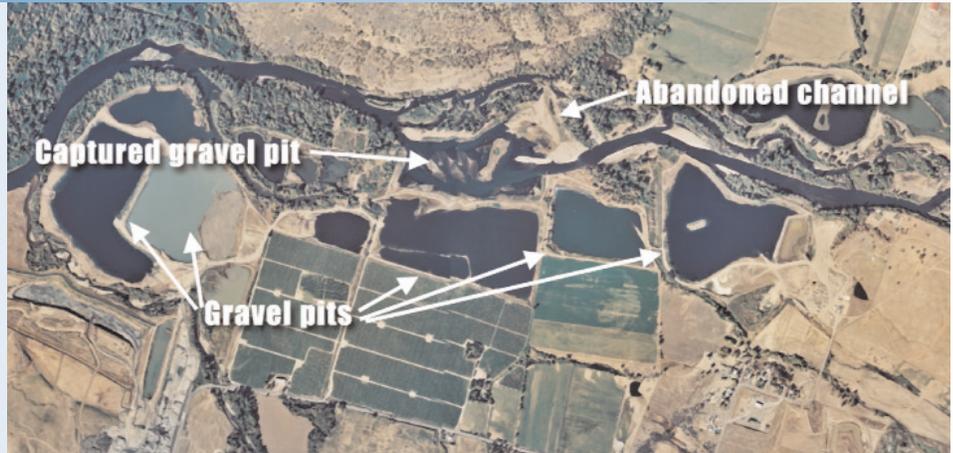
An Oregon Plan case study

Partnering for fish

During the New Year's Day storm in 1997, a flood roared down the Rogue River in Jackson County, overrunning a huge 15-foot-deep, state-owned gravel pit near Table Rock. The capture of this pit actually changed the course of the river, drying up the original channel and critical riparian habitat and causing 95,000 tons/year of sediment to be added to the river.

This new channel also put the river much nearer even larger gravel pits. If these pits flood, it could have disastrous impacts on fish, including the destruction of spawning habitat for Chinook salmon and summer Steelhead.

With the heart of the Oregon Plan in mind, a diverse grass-roots group of local landowners and local, state, and federal agencies have come together to develop a far reaching management plan to protect floodplain stability and preserve fish habitat. From local farmers and mine operators, to conservation groups and even high school volunteers, the stakeholders have developed a carefully conceived plan designed to look at the whole river system now and into the future. Working with the river's natural



This aerial photo of the Rogue River near Table Rock shows where the New Year's Day Flood in 1997 changed the course of the river.

propensity to change, the project's goal is to stabilize the new channel, but make the abandoned channel available for floodwaters at higher river stages. In this way, the river will not be confined, but will have the ability to move north into the old channel thereby minimizing the potential for future movement into nearby gravel pits.

This partnership exemplifies the vision of the Oregon Plan, showing how changes to land management practices can benefit watersheds while serving as an example to other mineral producers operating floodplain sites in Western Oregon.

 Learn more about The Oregon Plan at <http://www.oregon-plan.org>

Rewarding outstanding behavior

What makes an award winner in the mining industry? Is it the amount of land mined or the amount of profit?

In Talent, Oregon, mine operator Howard DeYoung worked with the city parks department and local Kiwanis volunteers to turn 12 acres of his mine site into a city park, complete with ponds, asphalt trails, bike paths and benches. The ponds developed by DeYoung serve as habitat for migrating and resident waterfowl, numerous species of songbirds and warm water fish species. The area is open to the public for fishing. For this outstanding cooperative effort in reclaiming mined land, in 2000 DeYoung received the Outstanding Voluntary Reclamation Award from the MLR program.

Since 1981 the annual Mined Land Reclamation Awards presented by MLR have recognized mine operators who have demonstrated outstanding achievements in the field of mine reclamation in Oregon.

Today the MLR Awards recognize mining companies and individuals who lead by example in a number of categories, including outstanding reclamation, outstanding operators, good neighbors, reclamation planning and work by government agencies. The Oregon Plan Award and



This former mine site in Talent is now a city park that attracts migrating waterfowl and songbirds.

Reclamationist of the Year are also special categories awarded each year.

"The operators chosen are recognized by these annual awards because they go above and beyond the standards required by the law in their reclamation efforts," says Gary Lynch, MLR Supervisor for DOGAMI. "They show a deep commitment to the environment and the communities where they are based."

Indeed, a look at award winners over the past few years shows an impressive commitment to the environment. A \$1.15 million donation of land for salmon habitat restoration by Parker Northwest Paving Company, helping endangered salmon during flood events by Morse Brothers, Inc. and salmon habitat enhancement by

Copeland Sand and Gravel, Inc. point to the voluntary commitments the Oregon Plan encourages.

"Another example is our government award winner," notes Ben Mundie, who oversees the awards program for MLR. "Who would imagine, when camping at beautiful Barton Park, that the land was once a mine site operated by Clackamas County since the 1950s."

Many of the award winners are companies and government agencies that have embraced reclamation as an integral part of being a good and environmentally conscious corporate citizen.

"The mine operators appreciate the recognition because they know the selection committee includes even environmental groups," says Mundie.

2001 Award Winners

Helping endangered salmon during flood events, reclaiming historically mined out areas and the control of waste water at mine sites were some of the highlights of this year's Reclamation Awards.

The Outstanding Operator Award was given to Pendleton Ready-Mix for establishing a positive role in the community and ensuring their operation did not create adverse off-site impacts.

The Oregon Plan Award was awarded to Morse Brothers, Inc. for showing that floodplain mining can coexist with a wildlife habitat restoration program along the Willamette River system.

Outstanding Reclamation Awards went to Cascade Pumice Company for reclaiming lands that were exempt from reclamation and to Paul Mathews for restoring a historically mined area to a beneficial use of higher value than before his mine operation began.

(continued on page 6)



This campground at Barton Park in Clackamas County was once a gravel quarry.

(continued from page 5)

The Outstanding Government Agency Award went to Clackamas County for the extra effort in planning and development of a quarry site to protect adjacent natural resources.

Bill Murphy of Garrett Construction was named Reclamationist of the Year for his many years of dedicated reclamation efforts.

 **Learn more about MLR Award winners at: www.OregonGeology.com**

Field notes

Fifty participants from federal and state natural resource agencies and private geologic and engineering consulting firms came together in early September for a two day workshop on the geology of the Grande Ronde Valley. Sponsored by the DOGAMI Baker City Field Office, the discussions centered around how geologic data can be used in a geographic information system (GIS). Other topics included the importance of geologic controls on groundwater and surface water, and how the underlying geology can control an area's forest productivity and general vegetation. Two extensive field trips helped participants relate the workshop information to the landscape of the Grande Ronde Valley.

 **Learn more about upcoming workshops at www.OregonGeology.com**



Workshop participants learned how geologic data can be put to practical use.

Protecting water quality

Regulating storm water and mine dewatering at MLR

Almost four years ago, the Department of Environmental Quality (DEQ) delegated its industrial storm water permitting program for aggregate mining to DOGAMI. Regulating storm water runoff at mine sites is important because mining activities can discharge industrial pollutants into nearby sewer systems and other water bodies including creeks and rivers.

When MLR took over the storm water permitting program in 1998, the compliance rate for reporting from mine sites was a discouraging 10 percent. This year, MLR received sampling reports from 94 percent of permitted sites.

Another success is the number of mine operators able to manage their storm water so runoff does not leave the site. MLR is also working with operators that have discharge permits to modify their operations to retain all storm water on-site, eliminating the need for a storm water permit.

Dewatering and groundwater protection

Another water quality concern at mine sites is dewatering, an essential part of resource extraction at many of the aggregate operations. MLR classifies dewatering generally as the withdrawal of ground water for use at a mine site that causes a decline in the water table.



Settling ponds capture stormwater runoff at this quarry near Dallas.

The MLR program regulates dewatering practices at mine sites to minimize off-site impacts to natural resources. In the 1970s and early 1980s reclamation plans did not take into account dewatering practices. Today, not only is dewatering considered a part of a operating permit, but discharging water used at the mine site (like storm water) requires an additional permit. If more than 5,000 gallons per day of ground water are used, yet another permit is required.

A wide range of baseline data and monitoring is required by mine operators who use wells to dewater, including the effect on off-site wells. Operators also have to be aware of the potential for off-site sources of contamination that could be drawn into the mine area by pumping ground water and how they handle hazardous materials.

MLR's goal is to provide mine operators with assistance and advice on these issues. In doing so MLR can help mine operators protect their sites while ensuring ground water, underground aquifers and nearby streams are kept safe.

 **To learn more on the DOGAMI/DEQ storm water program or the mine dewatering permitting process, contact MLR's Ben Mundie (Ben.A.Mundie@state.or.us) or Nancy Collins (Nancy.E.Collins@state.or.us), at (541) 967-2039.**

Publications of interest available now from

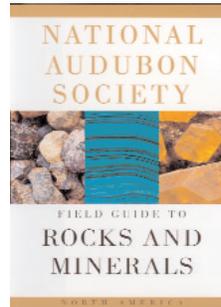


Open File Report O-96-2. Best Management Practices for Reclaiming Surface Mines in Washington and Oregon, by David Norman, Peter Wampler, Allen Throop, Frank Schnitzer, and Jaretta Roloff, 1997, 115 pages. \$8

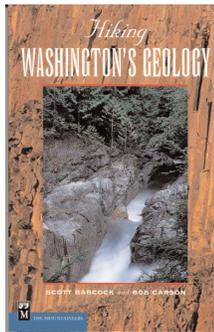
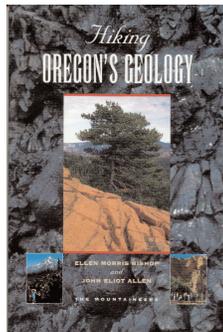
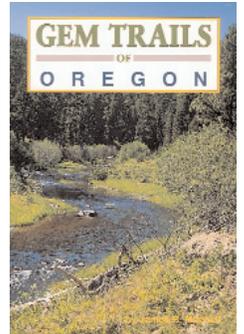
Compiled and written by DOGAMI-MLR and the Washington Division of Geology and Earth Resources, this manual provides information on planning a mine from start-up to final reclamation, incorporating water and erosion control during operation and reclamation, soil salvage and replacement, and land shaping and revegetation.

wealth of background information in both books gets you ready to "read the rocks". The hikes are described with maps, photos and easy to follow text. \$16.95 each.

National Audubon Society Field Guide to Rocks and Minerals. With 794 full-color photos, descriptions, guidelines for collecting and a mineralogical glossary. 850 pages. \$19



Gem Trails of Oregon, by James Mitchell. Detailed maps and descriptive text with black and white photos leads collectors to more than 80 of the best sites for finding gems, minerals, and fossils. A new insert of color photos aids with specimen identification. 193 pages. \$10.95



Take a tour of Oregon's and Washington's most scenic and geologically interesting places. A

Gold Mining in Oregon, edited by Bert Webber. DOGAMI published Bulletin No. 61 — Gold and Silver in Oregon, by Howard Brooks and Len Ramp — in 1968 because a historical study was needed, not only for general reference, but for entrepreneurs who might want to investigate the gold mining business. The bulletin has been out of print for years, but its text is incomparable. This present book includes that text as well as updated and added material. 332 pages. \$29.95

How to pan for gold - This 4 page flyer is available for free from Nature of the Northwest or as a free PDF file at <http://www.OregonGeology.com/learn-more/howtopanforgold.pdf>

A complete list of DOGAMI publications can be found online at: www.OregonGeology.com.

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Places to see



Yaquina Head Outstanding Natural Area — (<http://www.or.blm.gov/salem/html/yaquina>)

Administered by the Bureau of Land Management (BLM), Yaquina Head Outstanding Natural Area is located on a narrow point of land jutting into the Pacific Ocean at the north end of Newport, Oregon. This headland provides visitors with one of the most accessible wildlife and ocean viewing locations on the Pacific Coast. The historic Yaquina Head Lighthouse, Oregon's tallest lighthouse, is also located on the headland. The Yaquina Head Interpretive Center (above top right) is sited on reclaimed land that once was used as a basalt quarry (above bottom right).

Learn more about Oregon's geology and the Oregon coast by going online at www.OregonGeology.com.

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