

DRAFT MONITORING PLAN
October 22, 2003

DESCHUTES GROUND WATER MITIGATION RULES
DESCHUTES MITIGATION BANK AND MITIGATION CREDIT RULES

Under the Deschutes Ground Water Mitigation Rules and the Mitigation Bank and Mitigation Credit Rules, the Department and Commission are required to evaluate the effectiveness of mitigation and identify whether scenic waterway flows and instream water right flows continue to be met on an equivalent or more frequent basis. To monitor mitigation and its effects on stream flows, the Department intends to develop a monitoring plan that includes both a mitigation database tracking element and a statistical streamflow monitoring element. The Department sought input from the Oregon Department of Fish and Wildlife, Department of Environmental Quality, Division of State Lands and Oregon Parks and Recreation Department in the development of this plan.

DATABASE TRACKING ELEMENT

The mitigation rules identify several mitigation elements that require tracking and evaluation by the Department for reporting purposes. These include the mitigation banking program in general, the effectiveness of instream leases and time limited transfers, allocation of conserved water projects and the zones of impact. Most of these elements can be tracked, monitored, and evaluated using a database designed to allow the generation of reports for statistical analysis.

- I. The mitigation rules establish a 200 cubic feet per second (cfs) cap on new ground water appropriations. The rules also require review of the program by the Commission by January 1, 2008 or when 150 cfs of new ground water appropriations have been approved by final order, whichever comes first. Tracking of the total rate associated with pending applications and applications approved by final order may be done utilizing a database.

The cap is triggered when the maximum limit (of 150 cfs and then 200 cfs) for final orders approving ground water permit applications has been issued.

- II. Monitoring the effectiveness of mitigation may be done using a database to track new ground water applications, existing conditioned ground water rights, and the associated mitigation projects. The database may be used to generate reports that:
 - A. Evaluate the basin as a whole and for each zone of impact.
 - B. Evaluate where mitigation is provided. Reports could be generated to examine the location of mitigation relative to existing instream water rights, other out of stream uses and other activities, including enhanced regulatory activities. Examination of these various elements can be included here and/or in other sections of this monitoring plan. Reports could also include an examination of which streams are

impacted by ground water use and where mitigation was actually provided. For example, under Division 9 a proposed well was found to impact Indian Ford Creek. As a result, mitigation was required in the Squaw Creek Zone of Impact. For analysis purposes, the database may also track where in the zone of impact mitigation was actually provided.

- C. Evaluate the types of mitigation provided and its effectiveness. Sources and location of mitigation can be tracked by project type, stream source, reach and amount. The Department can track the effectiveness of various mitigation types by reviewing mitigation bank annual reports, other mitigation project activity, and other Department activities in the basin such as regulation. Reports to examine the effectiveness of mitigation would include special attention to instream leases, time-limited transfers and allocations of conserved water as well as performance-dependent mitigation projects, such as storage releases and aquifer recharge. This would also include any projects that are approved as "other" mitigation projects not specifically named in the administrative rules.

The Department may also consider tracking restoration project activity in the Ground Water Study Area. This would differentiate between the impacts restoration projects are having on the basin and mitigation projects.

Regarding allocations of conserved water, the Department may want to consider evaluating the change in timing or location of water use. Water diverted from the Deschutes River may seep from canals and discharge into the Crooked River. The Department may want to consider the impacts of this change on the resource and evaluate the overall program and management of basin as whole. A link between database evaluation and streamflow modeling evaluation can be made here.

- D. Track and evaluate the impacts of existing conditioned ground water permits and certificates, including any mitigation provided by conditioned ground water right holders. To fully consider the effectiveness of mitigation, conditioned ground water rights that provide mitigation will be included as well as those that have not yet provided mitigation. The use and impacts of these existing conditioned groundwater uses will also be accounted for in the statistical streamflow monitoring tool described below.

III. Desired outcome of tracking, monitoring and evaluation.

The purpose of tracking and monitoring existing conditioned ground water rights, new ground water uses and mitigation, by zone of impact, in the Deschutes Ground Water Study Area is to assure that mitigation obligations are being met and maintained. Tracking and monitoring is also intended to assure that balance between consumptive use in each zone of impact and mitigation is being maintained and to identify any areas where additional evaluation may be necessary. The database may also be used as a tool for helping determining how streamflows are responding in areas where the streamflow monitoring model cannot be applied.

YEARLY STREAMFLOW MONITORING ELEMENT

In addition to using a database and a streamflow model to monitor the effectiveness of the mitigation program, yearly real-time streamflow records may be tracked at appropriate gaging stations or other measurement locations. In the short term, streamflow data may not provide information on how the system is responding, given changes in climatic conditions and other variables. However, this data may prove useful over the long-term as the Department continues to track and monitor mitigation in the basin to identify trends over a longer period of time.

STREAMFLOW MODELING ELEMENT

Monitoring of streamflows in the Deschutes Basin will be done primarily utilizing an "evaluation model" based upon historic streamflows developed by Rick Cooper, WRD Hydrologist.

Under the Deschutes Ground Water Mitigation Rules, the Commission is required to evaluate mitigation activity in the Deschutes Basin to determine whether scenic waterway flows and instream water right flows continue to be met on at least an equivalent or more frequent basis than at present. Evaluation of ground water use and mitigation is required, by rule, annually and by the Commission before January 1, 2008 or when 150 cfs of new ground water use has been approved by final order, whichever comes first. Under the mitigation rules, monitoring of ground water use, mitigation and streamflows must be based upon historic streamflows rather than real time monitoring. While current streamflow records may be used to observe trends over a long period, they would not be effective in determining the effects of ground water use and mitigation on a short-term basis. It is impossible to correct real time data for effects of year-to-year changes in weather (or other variables) with sufficient accuracy. In addition, it may be years before the effects of mitigation activities and ground water use reach their peaks. Because we cannot monitor the effects of mitigation and ground water use in real time over the short term, we will need to model the effects numerically. Modeling is a standard practice in hydrology where direct measurements are not available or cannot be used or will not answer the questions at hand.

- I. To meet streamflow monitoring requirements, an "evaluation model" based on historic streamflows will be developed to monitor the effects of mitigation activity on streamflows in the Deschutes Basin. The "evaluation model" is being constructed using a base period of flows in the Deschutes River Basin from 1966 to 1995 as measured at the Madras gaging station on the Deschutes River. This base period represents river flows during a time period before the Scenic Waterway Act was amended to include consideration of ground water impacts and before ground water permits were issued with the scenic waterway regulation condition. New and existing ground water uses can be added to the model along with mitigation to reflect how scenic waterway and instream water right flows are responding.

- II. The "evaluation model" model has the potential to be used in two different ways.
 - A. The model can be used to run "what if" scenarios. Mitigation scenarios could be input into the model. Staff can use the outcome to observe whether streamflows at the gage would continue to be met on an equivalent or more frequent basis given different ground water use and mitigation scenarios.
 - B. The "evaluation model" can also be used to keep running tabs on how the system is responding as mitigation is established. As mitigation projects and new ground water use come online, information about those uses and projects can be entered into the model.
- III. The Department may also consider using the "evaluation model" at other, limited, gaged locations in the Ground Water Study Area based upon the locations of other scenic waterway reaches, instream water right reaches, and local zones of impact.

The Department will conduct additional comparisons between instream water right and scenic waterway reaches, the zones of impact, and the locations of available gaging stations to determine whether the following additional gaging stations and available data could be used to model the effects of mitigation in the basin and demonstrate whether streamflows continue to be met on an equivalent or more frequent basis.

Existing gaging stations for potential use in the evaluation model include:

- a. Deschutes River at the mouth (Gage 1410300)
- b. Deschutes River below Pelton Dam (Gage 14092500)
- c. Metolius River at Lake Billy Chinook (Gage 14091500)
- d. Crooked River at Lake Billy Chinook (Gage 14087400)
- e. Deschutes River at Lake Billy Chinook (Gage 14076500)
- f. Deschutes River downstream of Bend (Gage 14070500)
- g. Deschutes River upstream of Bend (Gage 14070500)
- h. Deschutes River above Arnold Canal (Gage 14070500 + 6 canals)
- i. Little Deschutes River at mouth (Gage 14063000)
- j. Deschutes River below Fall River (Gage 14056500 + 14057500)
- k. Deschutes River below Wickiup Dam (Gage 14056500)