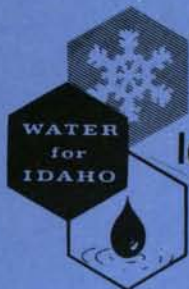


Research Technical Completion Report

**GROUND WATER MANAGEMENT
UNDER THE
APPROPRIATION DOCTRINE
PART I**

by
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Department of Geology
and
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Graduate Assistant



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July, 1986

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The research on which this report is based was financed in part by the United States Department of the Interior as authorized by the Water Research and Development Act of 1978 (P.L. 95-467).

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14-08-0001-G1014

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Submitted to: U.S. Geological Survey
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INTRODUCTION

Solutions to water resource problems dealing with conjunctive use of surface water and ground water generally have been developed on either a local or statewide basis. Little information transfer has occurred from one state to another in the identification and solution of these kinds of problems. Creative management solutions applied in the Odessa area of Washington or the Tucson Basin of Arizona may be applicable to the Raft River Basin in Idaho. This research project encompasses a staged analysis of ground water-surface water conjunctive management in western states that operate under the appropriation doctrine. These states include Idaho, Washington, Oregon, Montana, Wyoming, Utah, Nevada, Arizona, Colorado, and New Mexico.

The classification and analysis of ground water-surface water problems in all of these states and their integration into a single document is a very important step in seeking innovative solutions to water resource management problems. Similarly, the compilation and integration of management plans and activities are equally important in the preparation of a document that will be an important guideline for ground water management under the appropriation doctrine in the western United States.

This report presents a brief summary of the results gained in the first year of effort on this research project. Research has included analyzing management tools and management practices for ground water resource development in Idaho, Montana, Washington, and Oregon. Work has focused on the management alternatives presented in the legal codes of the various states, the ways in which the management guidelines have applied in the areas of ground water development, and identification of

attitudes toward ground water management within the state water management agencies. Continued research will focus on comparison of historic management activities in these and other western states for areas that are hydrogeologically similar.

REVIEW OF GROUND WATER MANAGEMENT ACTIVITIES

The material presented in this section is taken from the legal codes of the four states and discussions with state water administration individuals. These individuals are Norm Young of the Idaho Department of Water Resources, Ted Olson of the Washington Department of Ecology, Fred Lisner and Larry Jebousek of the Oregon Department of Water Resources and Richard Brasch of the Montana Department of Natural Resources.

Idaho

Legal Guidelines

Idaho follows the appropriation doctrine with respect to ground water with a mandatory permit system for the development of ground water rights. The permit system dates from 1963. Constitutional rights may be established for ground water uses initiated without a permit prior to 1963. State management of ground water resources can occur under one of several guidelines included in the Idaho Code. The Idaho Department of Water Resources (IDWR), the primary water administration agency within the state, can deny an application for a ground water permit if there is an insufficient water supply or if there would be interference with a more senior surface water or ground water user. Historically, ground water applications generally have been approved unless the applicant seeks to develop ground water resources in a recognized area of ground water problems.

There are two mechanisms for the state to recognize ground water problems areas. An area can be declared as a critical ground water area if the IDWR judges that there is not sufficient ground water for a reasonably safe supply for users based upon existing uses and valid but

undeveloped permits. Essentially this is a notice that all future applications for ground water development in a given area will be denied. The code was recently amended to allow the declaration of ground water management areas. This declaration is an indication that an area is approaching the conditions of a critical area. New permits may be issued but the applicant must prove that unappropriated water is available. The declaration of a ground water management area essentially has had an identical result as the declaration of a critical ground water area.

The Idaho code includes two basic tools for the management of ground water in areas where water level decline has resulted from the pumpage of valid permit and/or license holders. The two guidelines may be designated as the recharge limit and the pumping water level limit. The code notes that pumpage may not exceed the "reasonably anticipated average rate of future natural recharge." This limit suggests that the Idaho code invisions development of the resource up to a point where pumpage is equal to recharge to the basin. The second guideline protects ground water users with respect to the maintenance of "reasonable ground water pumping levels." Since both the recharge limit and the pumping water level limit pertain to administration of valid licensed rights, application of these tools must be preceded by an adjudication of rights. A court adjudication simply specifies the characteristic of each water right in the area including place of diversion, amount of diversion, and period of diversion.

Management Practices

Idaho ranks fourth in the nation in pumpage of ground water. Most of this ground water pumpage occurs in the southern portion of the state

in the Snake River Plain or its tributary valleys. Most of this region is semi-arid with precipitation less than 10 inches per year.

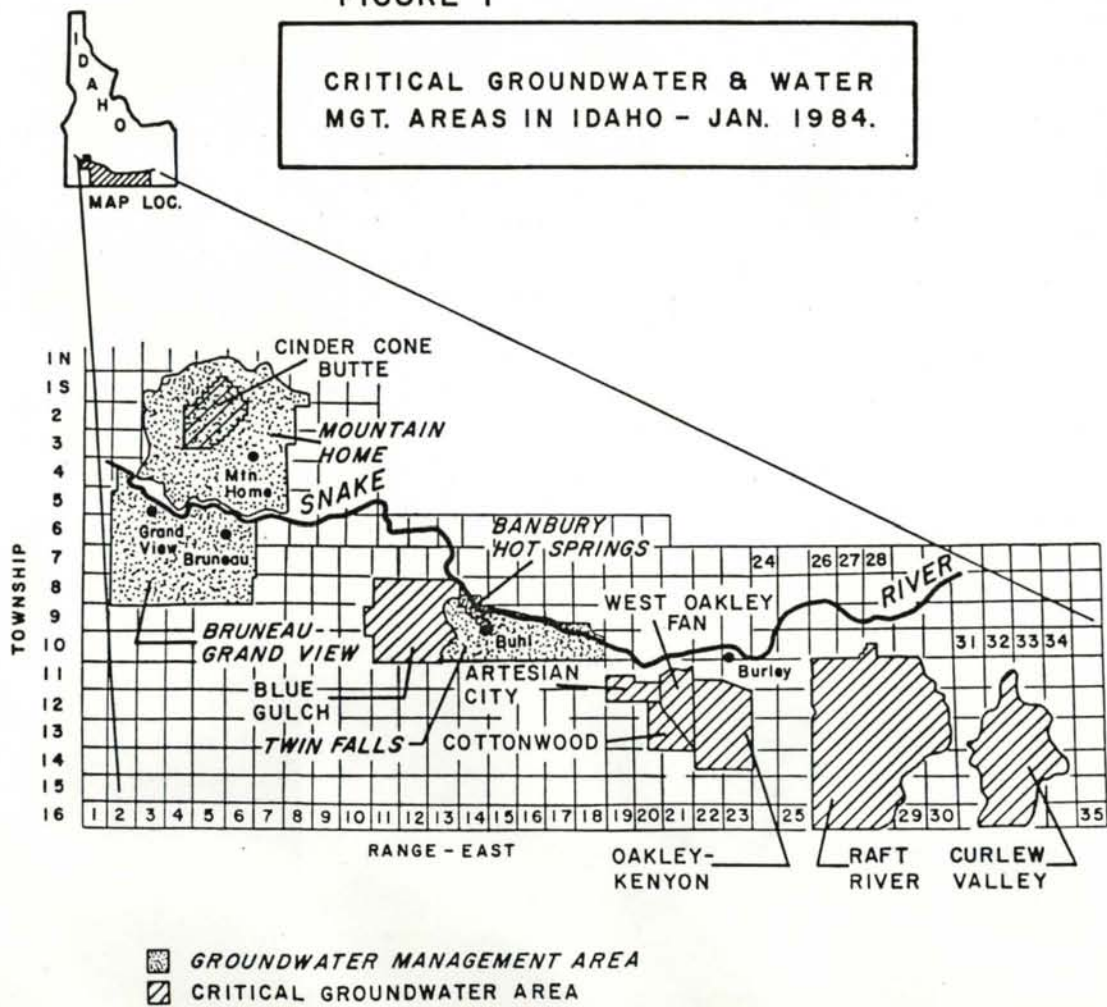
Areas where ground water problems have been officially recognized are located along the southern border of the Snake River Plain (fig. 1). Eight critical ground water areas are presently in existence. Seven of these are in the drainage of the Snake River (Raft River, Oakley-Kenyon, West Oakley Fan, Cottonwood, Artesian City, Blue Gulch, and Cinder Cone Butte). The other (Curlew Valley) is in the Great Basin. In addition, three designated ground water management areas also are located in southern Idaho. These are the Twin Falls, Burneau-Grand View, and Mountain Home areas.

Most of the designated critical ground water and ground water management areas are not hydrologic basins; rather, they represent portions of larger basins where water level decline has occurred. The Curlew Valley critical area is a relatively isolated basin in the southeast corner of the state. The Raft River critical area includes a drainage basin except for the headwaters area, which is in Utah. The Oakley-Kenyon, West Oakley Fan, and Artesian City critical areas are part of a single ground water resource system tributary to the Snake River and the Snake River Plain aquifer. The boundaries of these areas have no hydrologic significance. The Cottonwood area is adjacent to the West Oakley Fan and Artesian City areas, but is a geologically separate aquifer system.

Ground water management activities have proceeded beyond the declaration of a critical ground water area or a ground water management area only in the Cottonwood area. This area includes a small number of users and was the subject of an Idaho Supreme Court decision. The court

FIGURE 1

CRITICAL GROUNDWATER & WATER
MGT. AREAS IN IDAHO - JAN. 1984.



adjudicated the basin and then reduced the quantity of pumpage within the basin to equal a presumed recharge rate.

The Idaho Department of Water Resources attempted to initiate an adjudication in the Blue Gulch critical ground water area as a first step to application of either the recharge or pumping lift limitation. This effort met with local opposition. Despite continually declining ground water levels in this area, local individuals were unanimous in their opposition to state adjudication of rights and initiation of a ground water management program which would include the elimination of some pumpage. The IDWR did not proceed to initiate an adjudication.

Ground water management in the southern portion of Idaho has been influenced by the decision of the Idaho Supreme Court on the Swan Falls case and the subsequent Swan Falls agreement between the state and the Idaho Power Company. The Swan Falls case concerns the flow of the Snake River at several small dam sites in southern Idaho, mostly downstream from the designated critical ground water areas. Conflicts created by the Swan Falls Supreme Court decision have held up processing of both ground water and surface water applications in most of the Snake River Basin in southern Idaho. Presently there is a great deal of uncertainty as to how the ground water rights in the Snake Plain Aquifer and the tributary valleys, including the designated critical ground water areas and the ground water management areas, will be integrated with the rights on the Snake River.

Montana

Legal Guidelines

The appropriation doctrine accompanied development of Montana's mining and ranching industries. Appropriative rights form the core of Montana's water management policy. The state also subscribes to the public trust doctrine in its application of appropriative rights. All water belongs to the state, and water rights are considered "usufructuary."

Montana's management philosophy is applied to ground water through four management goals:

1) The adjudication of water rights:

85-2-101 (4) ... to recognize and confirm all existing rights to the use of any waters for any useful or beneficial purpose.

2) The administration of water rights:

85-2-101 (2) ...provide for the administration, control, and regulation of water rights and establish a system of centralized records of all water rights ... this system ... is essential for the documentation, protection, preservation, and future beneficial use and development of Montana's water.

3) The conservation of water:

85-2-101 (3) It is the policy of this state ... to encourage the wise use of the state's water resources by making them available for appropriation ... and to provide for the wise utilization, development, and conservation of the waters of the state for the maximum benefit of its people with the least possible degradation of the natural aquatic ecosystems ...

4) The prevention of waste:

85-2-505 Waste and contamination of groundwater prohibited.
(1) No groundwater may be wasted ... both flowing and nonflowing wells shall be so constructed and maintained as to prevent the waste, contamination, or pollution of groundwater ...

The goal of water rights administration in Montana is formal certification of each water right. Water rights established prior to

1973 are permitted through the adjudication process. All appropriations made after 1973 must be submitted for permitting to the Department of Natural Resources and Conservation (DNRC).

Management Practices

The primary responsibility for water rights administration falls on the DNRC. Recent legislation (House Bill 859, 1985) shifts some of the permit hearings administration to district courts. The administration of ground water rights can be summarized as follows:

- 1) 80-90% of ground water permit applications are for less than 100 gpm. These applications are approved and the rights certified.
- 2) Objections are common when they are solicited for the larger applications.
- 3) Applications are evaluated primarily with respect to objections filed. If objections are found to be invalid, then the application is approved.
- 4) Two hydrologists are employed full time evaluating objections. Funds are not usually available for technical investigations, and so the "availability of unappropriated waters in the source of supply" is a functionally ignored criteria.
- 5) Objections usually focus on adverse hydrologic effects to senior appropriators (usually water level decline). Evaluation of these objections converges on Montana's definition of "priority:"

Priority of appropriation does not include the right to prevent changes by later appropriators in the condition of water occurrence, such as the increase or decrease of streamflow or the lowering of a watertable, artesian pressure, or water level, if the prior appropriator can reasonably exercise his water right under changed conditions (85-2-401).

- 6) With the exception of permit applications, priorities are enforced through private litigation (including resolution of surface-ground water conflicts).

The primary ground water conservation activity in Montana involves establishment of Controlled Ground Water Areas (CGWA's). The designation and administration of CGWA's is by the board of the DNRC. CGWA designations may be proposed by the DNRC, or by a petition signed by one-fourth of the appropriators in the area. Establishment of a CGWA is based on the following criteria (85-2-506):

- 1) Ground water withdrawals in excess of aquifer recharge within the proposed area.
- 2) Excessive ground water withdrawals are very likely to occur in the near future.
- 3) Significant disputes regarding priority of rights, amounts of ground water in use by appropriators, or priority of type of use are in progress within the ground water area.
- 4) Ground water levels or pressures in the area are declining or have declined excessively.
- 5) Excessive ground water withdrawals would cause contaminant migration and a degradation of ground water quality within the ground water area.

Establishment of a CGWA or temporary CGWA (two years) is determined at a hearing administered by the DNRC board. The board has broad powers in creating the CGWA. These powers include (85-2-507):

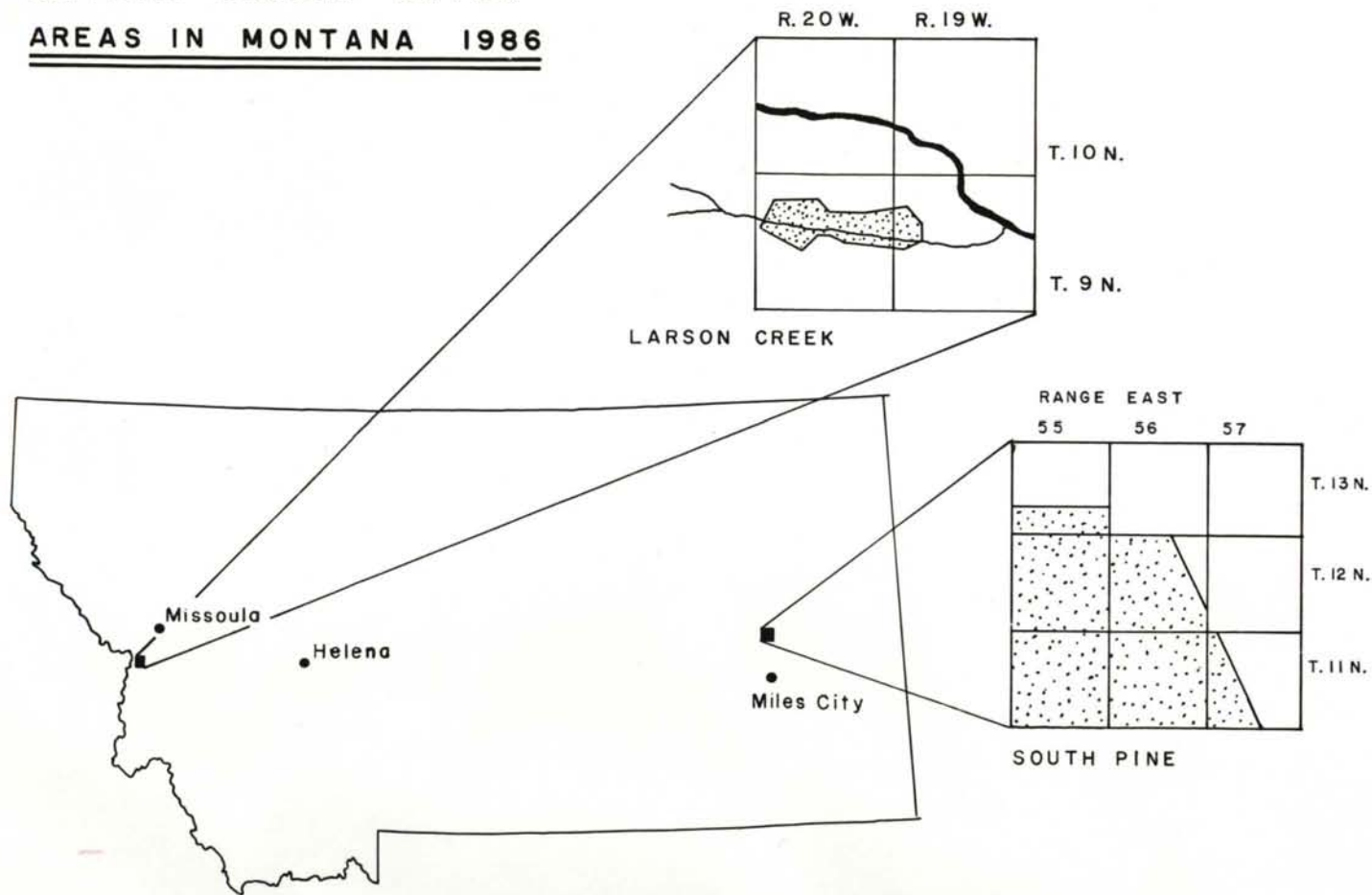
- 1) Establishing the CGWA boundary, which consists of both the surface description and the aquifer(s) included.
- 2) Closing the CGWA to all further ground water appropriations.

- 3) Establishing a permissible total withdrawal within the area and reapportioning individual withdrawals based on priority.
- 4) Reassigning withdrawal preference without reference to relative priorities, and assigning priority to domestic and livestock uses.
- 5) Reducing the withdrawal of ground water by any appropriator or well in the CGWA.
- 6) Requiring and specifying a system of rotation of use of ground water in the controlled area.
- 7) Any additional requirements necessary.
- 8) Enforcing the CGWA order through an injunction in a district court.

Two CGWA's are currently designated in Montana. The boundaries of both Larson Creek and South Pine CGWA's were established on a non-hydrologic basis (fig. 2). Both areas were designated because of significant water rights disputes and water level declines. "Withdrawals in excess of recharge" have not been an actively used criteria in creation of CGWA's to date. Both areas were created through local petitioning efforts. The DNRC currently maintains an internal policy of not petitioning the DNRC board for CGWA designations.

The DNRC board has exercised its administrative options with restraint. The Larson Creek order placed a moratorium on additional appropriations within 263 feet of existing wells. The South Pine order originally limited oil company water withdrawals because they were causing water level declines of several hundred feet. Eventually Shell Oil was required (by a revised order) to pay the additional pumping costs incurred by other appropriators.

FIGURE 2
CRITICAL GROUND WATER
AREAS IN MONTANA 1986



Washington

Legal Guidelines

The ground water management philosophy in Washington is based on the doctrines of appropriation and public trust. The public trust doctrine is strengthened by the stated policy of "reducing wasteful practices to the maximum extent practicable (90.03.005)," and by a policy of "protecting instream and natural values (90.03.005)." The public trust doctrine is tempered by the valid existence of pre-1917 riparian rights (90.03.010).

The ground water statutes of Washington are based on four primary management goals:

1) The adjudication of ground water rights:

(90.03.110) ...govern and apply to the adjudication and determination of such ground water body and to the ownership thereof... (90.44.220) ...the interest of the public will be subserved by a determination of the rights thereto...

2) The administration of ground water rights:

(90.44.130) As between appropriators of public ground water, the prior appropriator shall as against subsequent appropriators from the same ground water body be entitled to the preferred use of such ground water to the extent of his appropriation and beneficial use... Water resources shall have jurisdiction over the withdrawals of ground water and shall administer the ground water rights under the principle just set forth...

3) The conservation of the ground water resource:

(90.44.130) ...the jurisdiction to limit withdrawals by appropriators of ground water so as to enforce the maintenance of a safe sustaining yield from the ground water body...

4) The prevention of waste:

(90.44.110) No public ground waters that have been withdrawn shall be wasted...

New ground water appropriators are required to obtain a permit from

the state to establish their water right. Small water users are exempt from this law. The approval of the permit rests on the decision of the Water Resources Division supervisor. The supervisor is required to reject the proposals for:

...the development or withdrawal of public ground waters beyond the capacity of the underground bed or formation in the given basin, district or locality to yield such water within a reasonable or feasible pumping lift in case of pumping developments, or within a reasonable or feasible reduction of pressure in the case of artesian developments (90.44.070).

The supervisor is also required to ascertain any potential impairment of senior rights. Particular attention must be given to senior surface rights (90.44.030).

Washington state administers ground water areas and depth zones for the purpose of conserving the ground water resource. The stated goal of this program is "to limit withdrawals by appropriators of ground water so as to enforce the maintenance of a safe sustaining yield from the ground water body," (90.44.130).

The supervisor of water resources has the power to designate ground water areas. The areas may be proposed by the supervisor, or by a petition of fifty or one-fourth (whichever is less) users within a proposed area. Ground water area boundaries may be designated in three ways. Ground water areas are designated so as to "enclose a single and distinct body of public ground water," (90.44.130). Sub-area designations include portions of a distinct ground water body. Zones are designated with respect to depth beneath a ground water area or sub area. Once a ground water area has been designated the priorities to appropriate are reestablished and administered separately from the rest of the state.

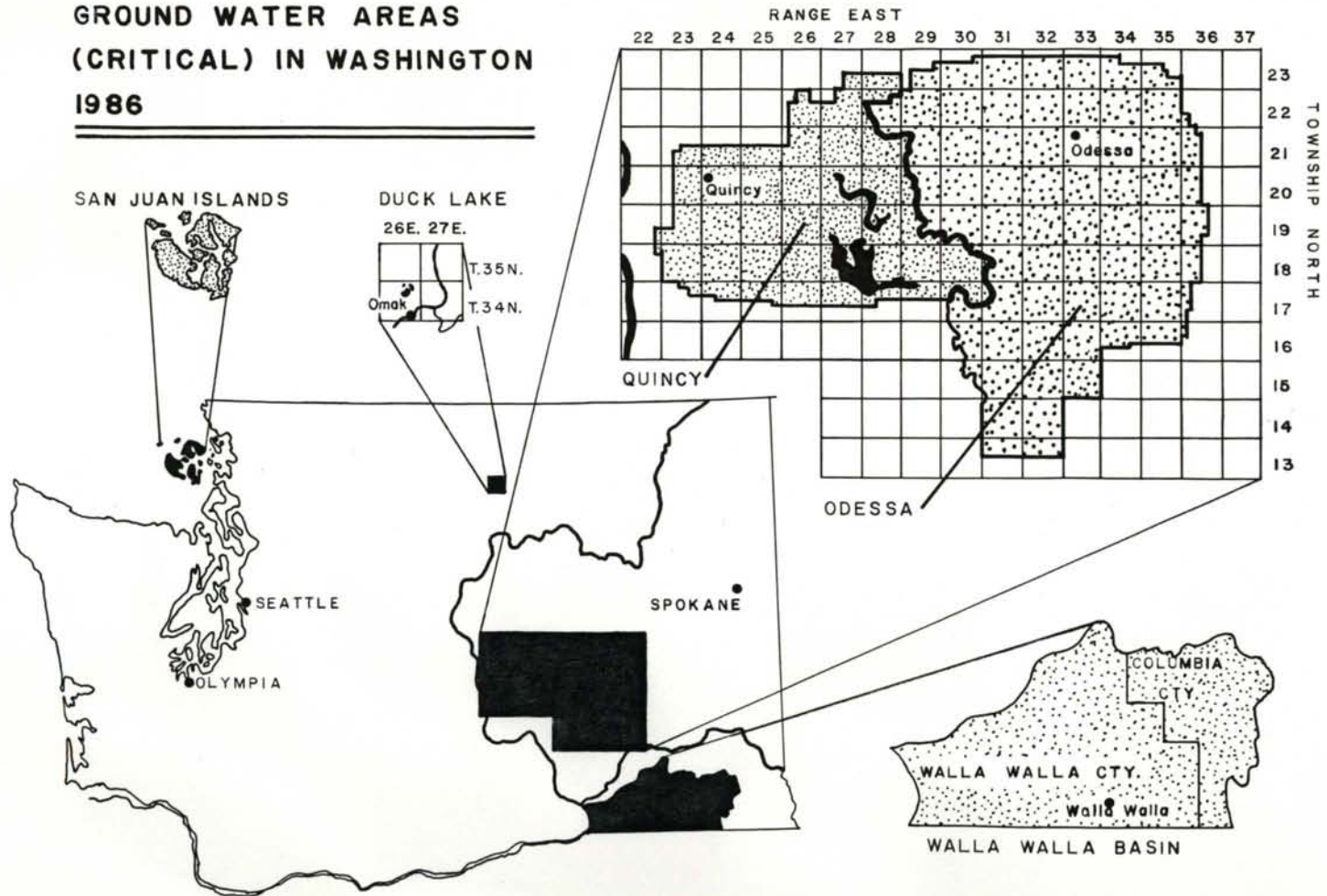
Management Practices

Ground water management activities have occurred in five areas in Washington: Odessa Subarea, Quincy Subarea, Walla Walla Basin, Duck Lake Subarea, and San Juan Islands (fig. 3). These areas may be grouped into two broad groups, subareas and basins. A subarea is a portion of a larger basin. The Odessa Subarea is a portion of the Columbia River Basin that has undergone considerable water level decline. The issue in the Quincy and Duck Lake Subareas is state versus federal ownership of water associated with the Columbia Basin Project. The Walla Walla Basin is a surface water-ground water and basin yield problem area. The San Juan Islands have a problem of too many domestic wells. The management activities in the Odessa Subarea and the Walla Walla Basin are representative of ground water administration in Washington.

The Odessa area was withdrawn for new permits in 1967 for a 5-year period because of declining water levels. Management regulations were issued in 1974 based on controlling the rate of water level decline to no more than 30 feet in three years. Management is guided by a computer model of the system. No consideration is given to impacts outside of the subarea such as decreased streamflow. A 30-year life is projected for the ground water resource in the area.

A management plan was issued for the Walla Walla Basin in 1977. Ground water pumpage is controlled based upon the perceived impact on the Walla Walla and Touchet Rivers. The shallow sediments are open for ground water development with the above restriction. The deep basalt aquifers are reserved for municipal users.

FIGURE 3
GROUND WATER AREAS
(CRITICAL) IN WASHINGTON
1986



Oregon

Legal Guidelines

Ground water rights in Oregon are based on the appropriation doctrine and the public trust doctrine. The appropriation doctrine is evident in the use of water right priority dates (537.250), beneficial use requirements (537.160), land appertenance requirements (537.705), and abandonment through non-use criteria (537.450). The public trust doctrine is observable in the public ownership of all waters (537.110), as held in trust by the state of Oregon (536.310).

Oregon applies the doctrines of appropriation and public trust to ground water through four management goals:

1) The adjudication of ground water rights:

537.525 (1) Provision be made for the final determination of relative rights to appropriate ground water everywhere within this state...

2) The administration of ground water rights:

537.525 (2), (3), (4), (5) Rights to appropriate ground water and priority thereof be acknowledged and protected... Beneficial use without waste, within the capacity of available sources, be the basis measure and extent of the right to appropriate ground water... All claims to rights to appropriate ground water be made a matter of public record ... Adequate and safe supplies of ground water for human consumption be assured, while conserving maximum supplies of ground water for agricultural, commercial, industrial, recreational and other beneficial uses.

3) The conservation of the ground water resource:

537.525 (7), (8), (9) Reasonably stable ground water levels be determined and maintained... Depletion of ground water supplies below economic levels, impairment of natural quality of ground water by pollution and wasteful practices... be prevented or controlled.. wasteful use of ground water, impairment of or interference with existing rights to appropriate surface water, declining ground water levels, interference among wells, overdrawing of ground water supplies... controlled use of the ground water concerned be authorized and imposed...

4) The prevention of waste:

537.525 (10) Location, construction, depth, capacity, yield, and other characteristics of and matters in connection with wells be controlled...

Oregon ground water rights are adjudicated when the necessity arises. Adjudications may be initiated by the Director of the Department of Water Resources (Department) or by petitions to him (537.670). The proceedings are conducted for an entire "ground water reservoir," which may include multiple overlying aquifers (537.675). Before an adjudication is complete, the Department is required to identify, name, and hydrologically define all aquifers within the ground water reservoir (537.665).

The Oregon Ground Water Act of 1955 reformed water rights administration. The act established a two tier system of water right permits. Appropriations established prior to August 3, 1955 are recognized as valid water rights. These appropriators are required to register with the Department. They are issued a certificate of registration (537.585-537.610). The second type of permit applies to new or modified appropriations. New water users must apply for permits prior to constructing their well.

Prior appropriators may file protests against an application to appropriate. In such cases a hearing may be held by the Department to determine the proper course of action (537.622). Certificates of permit are granted to new appropriators. Certificates of permit and certificates of registration are both subject to adjudicatory modification (537.635 and 537.610).

The Water Resources Commission consists of seven members who are appointed by the Governor to staggered four year terms (536.022). The

Commission evaluates applications for new and modified appropriations. Three criteria must be evaluated: well interference, interference with existing rights, and wasteful use.

The Commission utilizes three steps to establish whether undue well interference will occur:

- 1) Can hydraulic connection be established between the wells?
- 2) Can the senior appropriator continue to exercise his right?
- 3) If not, does the well construction of the senior appropriator contribute to the problem?

In the view of the Department, well interference is not "undue" if the senior appropriator has failed to fully develop the aquifer (e.g., poor well construction, partial penetration).

The interference with existing surface rights is a vigorously examined criteria. Applications are screened for this purpose by plotting proposed wells on a map of surface appropriators. Potentially affected parties are notified. This practice reflects the fact that many senior appropriators are surface water users. The "wasteful use" criteria has only been applied infrequently.

Proceedings to establish Critical Ground Water Areas (CGWA's) are initiated by the Water Resources Commission. An area is nominated by the Commission when there is reason to believe that (537.730):

- 1) Ground water levels have declined excessively.
- 2) Two or more wells interfere substantially with one another.
- 3) Water wells are interfering with production of geothermal resources.
- 4) The available ground water supply is being, or is about to be overdrawn.
- 5) The ground water has been or is expected to become polluted.

When a CGWA is designed the Commission may introduce a variety of corrective measures. These corrective measures may include (537.735):

- 1) Closing the area to further appropriation of ground water.
- 2) Determining the permissible total withdrawal from the area, and apportioning that withdrawal based on priority.
- 3) According to preference, without reference to relative priorities, to withdrawals of water used for residential and livestock purposes.
- 4) Reducing the permissible withdrawal of water by any one or more appropriators or wells.
- 5) Requiring the sealing of a well responsible for introducing pollutants to the water supply.
- 6) Requiring and specifying a system of rotation of use of ground water.

The administration of CGWA programs was the responsibility of the Department Director until 1985. These duties have been shifted to the Water Resources Commission under current law.

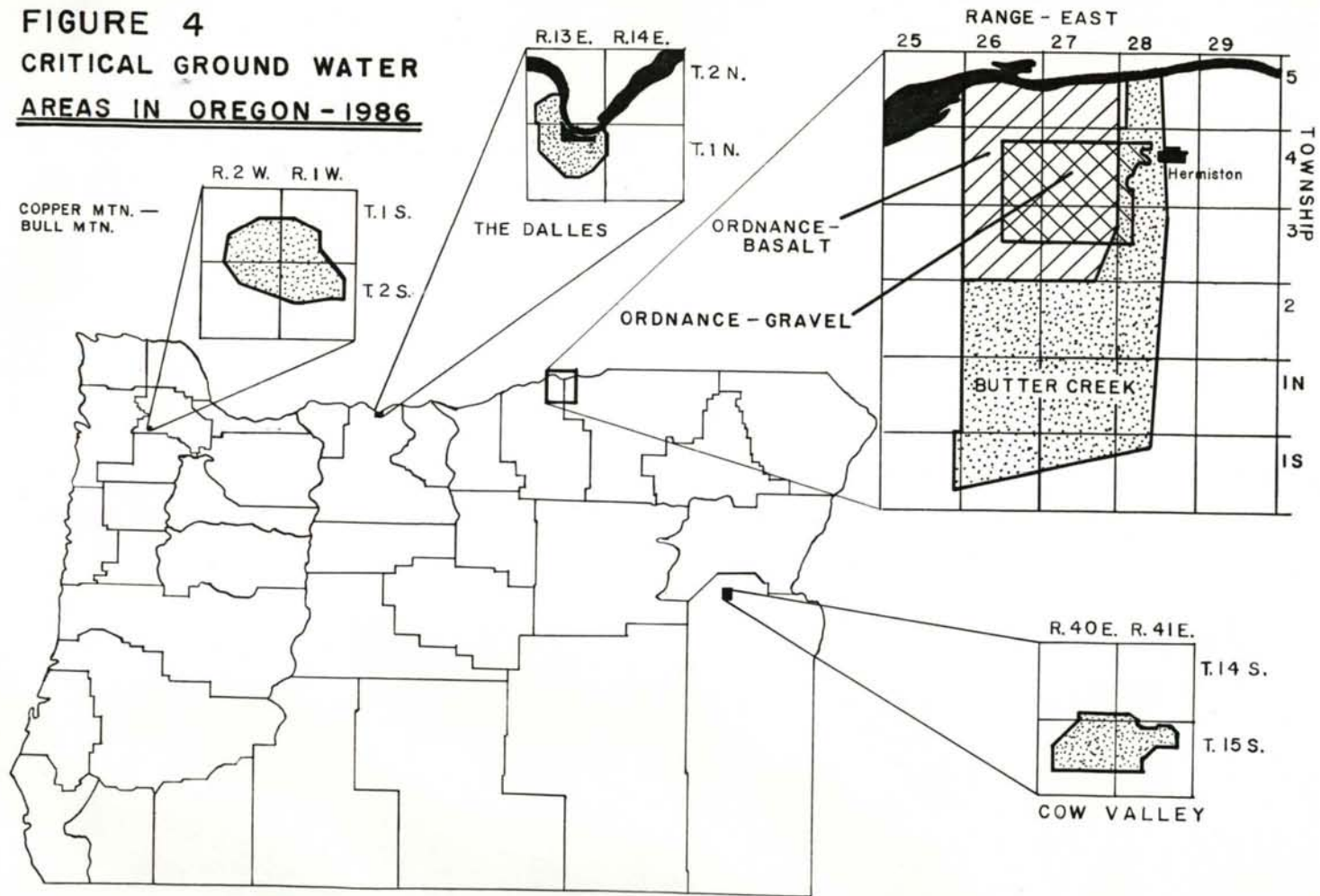
Management Practices

Objections to proposed ground water appropriations are uncommon. They occur for less than 1% of the applications. In cases where hearings are necessary, the Department Hearings Officer presides.

Protests occur more commonly after the permit is exercised. Frequently the protests involve well interference problems. The Department responds to these problems by sending personnel out into the field. The Department workers attempt to work out a cooperative agreement with the respective users. Frequently they are successful.

Five critical ground water areas have been established in Oregon (fig. 4), and three additional areas are currently pending hearings and

FIGURE 4
CRITICAL GROUND WATER
AREAS IN OREGON - 1986



designation. Four of the critical areas are located in the extreme northern portion of the state (Ordance, Butter Creek, The Dalles, and Cooper-Bull Mountain). The fifth area (Cow Valley) is located in southeastern Oregon. Both the Ordance and Butter Creek areas have experienced continually declining ground water levels in a basalt aquifer. A majority of water use in these areas is for irrigation. The Dalles area was designated because of overdraft from competing municipal and agricultural uses. The Cooper-Bull Mountain area was created because of increased municipal water use by Portland suburbs (Tigard, Aloha-Huber, and Beaverton). The Cow Valley area was designated in response to irrigation overdraft in an arid portion of the state (Malheur County).

The primary objective of the Department has been preserving senior rights when applying CGWA corrective measures. In every case to date, the area has been closed to further appropriations. Additionally, the usage of junior appropriators has been limited and in some cases eliminated.

The Department has also attempted to use measures which perpetuate use of the resource. Hydrologic considerations have dictated the CGWA boundaries. Total withdrawal limits have been established to prevent overdraft, and are enforced by limits on time of use and total pumpage.

One small ground water basin in western Oregon has been adjudicated to date. The director initiated adjudication of this shallow system. Determination of the lowest permissible water level was based on balancing recharge with withdrawals to prevent stock depletion. A total reservoir withdrawal was established in acre-feet per year.

The conjunctive adjudication of surface and ground water rights is possible under Oregon statutes but will probably never occur. Over 70%

of all surface water rights have already been adjudicated in Oregon.
Ground water adjudication has barely begun.

DISCUSSION OF RESULTS

Research completed to date allows identification of a range of applications of the appropriation doctrine to ground water. Designation of an area as critical is common to the states investigated. A difference exists between whether the state or local individuals initiate the designation process. All states note the importance of adjudication of rights in the ground water management process. Adjudications have been completed only for several areas. The Cottonwood area of Idaho is the only area where application of the recharge limitation has followed adjudication of rights.

Most of the state water resource administrators indicated a reluctance to declare an area critical or initiate an adjudication without some local input or support. The Blue Gulch area of Idaho is an example where a state initiated adjudication was stopped because of local opposition. The Butter Creek area in Oregon has been declared critical by the state three times only to have the order repealed because of suits filed against the State Department of Water Resources.

Ground water management is a topic of major concern in Idaho, Oregon, and Washington. Bills pertaining to management questions have been proposed in all three state legislatures. The problems being addressed in the individual states are controlled by the hydrologic aspects of ground water pumpage areas. For example, surface water-ground water conjunctive use is a dominant topic in Idaho because of stream depletion questions with respect to the Snake River at Swan Falls.

CONTINUING RESEARCH EFFORTS

Work during the second year of effort will focus on continued analysis of data obtained from Idaho, Oregon, Washington, and Montana plus expansion of the project to include Colorado, Arizona and New Mexico. Emphasis will be placed on legislative activities with respect to ground water management in Idaho. Research efforts during the first and second years will form the basis for the M.S. thesis in hydrology by Elliot Bruhl.