

Chapter 4

Management of Ground Water Resources

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Ground water is an important resource in the Yakima River Basin. It is used for municipal water supply, agricultural irrigation, domestic water supply, stock watering, industry and other uses (see Chapter 2). All except two of the Basin's cities and towns rely exclusively on ground water for public water supply. Ground water and surface water resources may be interconnected in some locations, which gives rise to management challenges. This chapter identifies alternatives for managing the ground water resources of the Yakima Basin, and evaluates these alternatives using criteria similar to those used for surface water alternatives in Chapter 3a.

This chapter does not discuss ground water quality. For information on management of ground water quality, see Chapter 6 of this watershed plan. This chapter does not discuss Aquifer Storage and Recovery (ASR). However, ASR is discussed in Section 3. It is covered under Chapter 3 because it involves diverting surface water for storage in an aquifer. Therefore, it can be considered as a surface water management strategy.

As discussed in the Watershed Assessment, the U.S. Bureau of Reclamation (USBR), Washington State Department of Ecology (Ecology), and the Yakima Nation signed a Memorandum of Agreement (MOA) to fund and oversee a study of the ground water resources of the Yakima River Basin. The U.S. Geological Survey (USGS) has been contracted to perform the lead role in conducting the study, which is intended to gather additional data on hydrogeologic characteristics of the Yakima Basin, and to develop a numerical model of interactions between aquifers, and between ground water and surface water. The USGS study is expected to be completed in approximately 2007. The information provided by this modeling effort is expected to assist in making ground water management decisions in the Yakima Basin.

As discussed in the Watershed Assessment, available data is inadequate to understand important relationships among aquifers, and between ground water and surface water. It is anticipated that completion of the USGS modeling study will substantially improve the current understanding and predictive capabilities with respect to impacts from proposed uses of ground water. The Watershed Planning Unit recognizes that detailed planning for ground water would be premature pending completion of the study. Therefore, the alternatives presented in this chapter are general in nature. Moreover, evaluation of these alternatives is necessarily qualitative, since quantitative data is lacking at this time. The purpose of the discussion of ground water management alternatives presented in this chapter is to lay the conceptual foundation for future decision-making, that will

occur after the USGS modeling effort is complete. For this reason, the discussion of ground water management alternatives presented in Chapter 4 is less detailed than the discussion of surface water management alternatives found in Chapter 3 of this Watershed Plan.

Chapter 2.5 of this Watershed Plan provides a brief summary of information on ground water resources of the Basin. Further technical information is provided in Section 4 of the Watershed Assessment document (YRB Planning Unit, 2001). Additional information is provided in a technical memorandum titled "Issues Related to Management of Ground Water Supplies" (EES, 2002b). These materials are considered to be an integral part of this plan document, by reference.

Chapter 1.4 listed the seven substantive goals defined by the Yakima Basin Watershed Planning Unit. Five of these goals are related to management of ground water supplies. These five goals are:

- Improve the reliability of surface water supply for irrigation use;
- Provide for growth in municipal, rural domestic and industrial demand;
- Improve instream flows for all uses with emphasis on improving fish habitat;
- Protect, improve and sustain ground water quantity and pumping levels of aquifers for the benefit of current and future use; and,
- Maintain economic prosperity by providing an adequate water supply for all uses;

The evaluation of ground water management alternatives presented in this chapter discusses application to all five of these goals.

4.1 Key Ground Water Management Issues

A number of interrelated issues must be considered when discussing ground water management strategies in the Yakima Basin. Key ground water management issues in the Yakima Basin were identified in the technical memorandum referenced above (EES 2002b) and are summarized as follows:

- Inadequate Data on Local/Regional Ground Water Systems.*** Key data gaps exist with respect to ground water rights, extent of use from different aquifers, exempt wells, unauthorized withdrawals, and areas with long-term declines in water levels. However, it should be noted that the USGS study discussed above and Ecology's amended water measurement rule are anticipated to improve the availability of certain types of ground water data over time¹.

¹ It should be noted that the USGS study will not address all of the data gaps identified by the Planning Unit, with regard to water rights and uses.

- ❑ ***Availability of New Ground Water Rights.*** No new ground water rights have been issued for a number of years, and Ecology has imposed a temporary restriction on issuance of new rights pending completion of the USGS study described above.
- ❑ ***Ground Water/Surface Water Exchange.*** The relationships between surface and ground water, and the time periods involved in their interaction, are important in managing water resources in the Yakima Basin. Pumping ground water from some aquifers at particular locations may reduce flows in nearby surface waters. This reduction in flow may affect fish and other aquatic resources or potentially impair senior water rights. In other cases, pumping ground waters may have little effect on surface waters or may have effects that are delayed in time for locations far from the well. These effects can be very difficult to quantify.
- ❑ ***Potential Declines in Ground Water Levels Due to Effects of Agricultural Water-Use Efficiency Measures.*** Management of surface waters can affect ground water supplies. Where surface water is diverted and applied to irrigated lands, the resulting infiltration often provides an important mechanism for local recharge and elevated water tables. Where water-use efficiency measures are implemented, ground water recharge may be reduced, and aquifer levels lowered. These effects can cause problems for local ground water users, particularly those reliant on shallow wells. This can also dry up wetlands that are important for fish and wildlife.
- ❑ ***Potential Long-Term Declines in Water Levels Due to Withdrawals.*** Many areas of the eastern Washington have experienced long-term declines in water levels due to the effects of ground water withdrawals. Similar overdraft might also be occurring in the Yakima Basin. Although USGS and Ecology have collected data in some areas, long-term water level monitoring data is not currently available on a basin-wide basis to determine long-term trends in ground water levels.
- ❑ ***Inadequate Legal/Policy Framework for Aquifer Storage and Recovery.*** Artificial recharge is being used as a water-resource management technique in various locations in the U.S. However, no full-scale artificial recharge projects are currently under way in the State of Washington. This is partially due to the policy issues involved (e.g., level of treatment required, use of water by other users, water rights needed).
- ❑ ***Unaccounted for Water Use by Exempt Wells.*** Certain types of ground water use are exempted from the requirement to obtain a water right for withdrawal of ground water². Approximately 40 percent of the Yakima Basin population relies upon individual household wells for their domestic water supply (see Table 2-1), most of which are “exempt wells.” Exempt wells represent an

² For further information on exempt wells, see the Watershed Assessment document, Section 4.3.3.

unaccounted-for withdrawal of water from the basin which could potentially adversely impact other nearby water resources.

- ❑ ***Relationship with Surface Water Supplies.*** Some irrigators and cities use ground water as a backup source of supply, in dry years when surface water deliveries are inadequate to meet their needs. Solutions that improve surface reliability may reduce this need for ground water (also see Chapter 3). If new surface water supplies are not developed, then ground water becomes a more critical resource for the Basin.
- ❑ ***Unauthorized Withdrawals of Ground Water.*** Illegal uses of ground water (e.g., water use without a valid permit from Ecology, violation of the conditions of a water right, or water use from an “exempt well” that exceeds conditions of the exemption) may also be occurring in the basin. These unauthorized withdrawals could adversely impact other nearby water resources. Enforcement against illegal water uses could potentially free up water for other purposes that are legally authorized.
- ❑ ***Proliferation of Small Public Water Systems.*** As development occurs within urban growth areas, new homes may be served by small public water systems or may hook up to a larger municipal system. Proliferation of small systems can make it harder to manage withdrawals to protect the ground water resource, and may also make achievement of public health standards more challenging.

4.2 Applicable Ground Water Management Actions

Potential ground water management actions were reviewed in the Technical Memorandum titled “Issues Related to Management of Ground Water Supplies“ (EES 2002b). These actions were identified through review of ground water management programs in other areas (Odessa Ground Water Management Subarea, Washington; Palouse Basin Aquifer, Washington/Idaho; and Edwards Aquifer, Texas). The following is a brief summary of potential actions that could be implemented to achieve the objectives discussed above. Some combination of these actions can be incorporated in any of the action alternatives discussed later, in Section 4.3.

- ❑ ***Establish a Data System to Assess Water Level Trends and Ground Water Usage Patterns.*** Sound data is the basis of an effective ground water management program. Establishment of a data system should include elements such as selecting aquifers for data collection; identifying suitable wells for monitoring, collecting data; establishing parameters of interest with regard to water usage; determining frequency of data collection; linkage to available ground water models; and establishing a framework and protocol for data verification, storage, access, and analysis. This system can be tailored for use with the ground water model under development by USGS. Water usage

data reported to Ecology under Chapter 173-173 WAC, as recently amended, can be used as well.

- ❑ ***Develop Long-Term Criteria for Managing Ground Water Levels.*** As part of a comprehensive program to manage ground water, criteria can be developed to serve as targets and/or triggers for management actions in response to potential declines in water levels or production capacity identified as part of ongoing and future monitoring.
- ❑ ***Implement Water Use Efficiency Measures.*** Implementation of water-use efficiency measures for agricultural, municipal, domestic and industrial uses can contribute to effective management of withdrawals. For further information, see related technical memoranda produced for the watershed planning unit (EES EES 2002b and 2002c; MWG 2002d) and Guide to Watershed Planning and Management, Addendum No. 1 (EES 2001).
- ❑ ***Conjunctive Use with Surface Water Resources.*** Ground and surface waters are both used in many areas, often in combination to meet the demand of individual or group users. Managing these resources conjunctively can be used as a tool to optimize overall surface water/ground water system effects.
- ❑ ***Limitations on New Allocations.*** In areas where new allocations of ground water would cause undesired effects, these allocations could be issued with stringent conditions attached, or prohibited altogether.
- ❑ ***Water Rights Transfers Among Willing Parties.*** Water rights can be transferred on a voluntary basis through lease, sale, or other arrangements to achieve multiple benefits. Benefits are highly dependent on the specific conditions of each transfer. Transfers from ground to surface water, or vice versa, may also offer benefits in some locales.
- ❑ ***Retire Ground Water Rights on a Voluntary Basis or through Relinquishment.*** Where ground water is no longer used or needed, associated water rights can be retired, providing greater certainty to remaining users. Ground water rights could be retired through voluntary transfers or through the relinquishment provision in the State Water Code (Chapter 90.14 RCW).
- ❑ ***Public Education and Outreach.*** Ground water occurrence and movement within the larger hydraulic cycle is not generally well understood by the public or by some water users. Improved understanding could aid in achieving desired outcomes and improve support for ground water actions.

All of these measures have potential applications in the Yakima River Basin. However, at this time, a detailed ground water management plan is not specified, pending completion of the USGS study as described in the outset of this section.

4.3 Ground Water Management Alternatives

This section identifies alternatives for managing the ground water resources of the Yakima Basin, and evaluates these alternatives using criteria similar to those used for surface water alternatives in Chapter 3a. The ground water alternatives are identified as:

- Alternative II-1: Utilize Ground Water as a Key Resource in Meeting Water Supply Needs;
- Alternative II-2: Limit New Ground Water Development to Selected Uses;
- Alternative II-3: Prohibit New Withdrawals of Ground Water; and,
- Alternative II-4: No Action

It is important to remember these alternatives are being developed here at a general, conceptual level. Full analysis of these options will be deferred to coordinate with the completion of the USGS study of the Basin's ground water resources. However, the basis for future management options is being presented here as a means for establishing a preliminary assessment of future decision tradeoffs. The range of possible options at this time extends from expanded use to prohibition of any new use. Potential future details of these options are discussed as part of the individual alternatives outlined below.

Alternative II-1: Utilize Ground Water as a Key Resource in Meeting Water Supply Needs

Under this alternative, ground water would be viewed as a key resource to assist in meeting the Yakima Basin's water requirements for agriculture, stock watering, municipal supply, commercial and industrial needs, individual household supply, and/or other uses. Existing ground water supplies would continue to be used under the conditions of applicable water rights. In addition, new supplies would be developed to assist in meeting new or growing demands related to all purposes of use.

Management techniques would be used to manage water levels and prevent long-term declines in water levels. This includes data collection and management, attention to water-use efficiency by all users, enforcement action against unauthorized uses, use of voluntary water rights transfers, and avoidance of pumping practices that would deplete aquifers over the long term. Where applicable, surface and ground water supplies may be used conjunctively to enhance reliability and minimize impacts on stream flows.

Exempt wells as defined in the State Ground Water Code (Chapter 90.44 RCW) would continue to be installed as one means of providing ground water for users

that qualify for the exemption. This element of alternative II-1 is similar to the “No-Action” Alternative described below.

Due to Ecology’s obligations under the ground water MOA, this alternative could not be fully developed or implemented until the USGS study is completed. At this time, Ecology has prohibited issuance of new water rights until that time.

Alternative II-2: Limit New Ground Water Development to Selected Uses

Under this alternative issuance of new water rights for ground water withdrawals would be more limited than under Alternative II-1. In those areas or aquifers where further ground water development must be limited due to factors such as declining water levels or impacts on surface stream flows, proposed ground water uses would be subject to more stringent conditions in terms of issuing new water rights. A formal set of criteria will be developed for issuance of new water rights in these aquifers. These criteria may be different from one area to another, depending on local circumstances in different parts of the Yakima Basin. The criteria will take into account factors in different areas, as appropriate, such as the quantity of water needed for different types of uses; the quality of water needed; and the availability of alternate supplies (e.g. surface water – see Section 3).

In areas where supplies needed for agricultural irrigation can be met from surface water sources such as the Yakima Irrigation Project, the Planning Unit identifies a preference for ensuring that other uses, including but not limited to municipal, industrial, and domestic uses, can be met from ground water. This is because water needed for these purposes must be of high quality; treatment to meet state and federal drinking water standards is typically more costly for surface water than for ground water; and the quantities required are typically small in comparison with agricultural needs. Agricultural uses, due to the large quantities of water needed, should generally be met by surface water supplies where possible. However, this preference will need to be subjected to further analysis and review prior to implementation; and the full range of potential uses should be considered.³ In addition, the specific mechanisms for defining which aquifers should be subject to this limitation will need to be developed. It should be noted that this preference is closely linked to the alternatives discussed in Section 3. If water supplies for agricultural irrigation can be made more reliable through storage enhancement, then irrigation users can meet their needs from surface water supplies, rather than developing backup ground water supplies.

Conditions for water users in tributary subbasins without access to Yakima Irrigation Project Water are different, and this alternative acknowledges this difference. The criteria that may be applied in these areas will need to be developed

³ For example, the Watershed Assessment identified stock watering, dairies, protection of crops from frost, and environmental uses as other existing uses of ground water in the Yakima Basin at this time. See Section 4.2 of Watershed Assessment.

locally, to fit local needs and circumstances. In general, municipal supplies will not be the focus in these areas, since the main municipal centers of the Yakima Basin are located along the mainstem Yakima River rather than the tributaries. Without access to water from the mainstem, ground water remains a critical resource to meet the needs of agricultural irrigation in these areas, both as a primary and supplemental source of supply. The Planning Unit does not define any preferences or criteria for these areas at this time, but recommends that criteria for managing issuance of new ground water rights be developed locally, to allow for new development of ground water while protecting the resource.

As with the other alternatives, existing ground water uses would continue under the conditions of applicable water rights. Voluntary transfers may be pursued to “retire” some existing rights, where this would either protect ground water levels from declining or could serve as a means for improving stream flows in waters that are hydraulically connected to an aquifer.

It should be noted that the State Water Code at Chapter 90.03.290 already restricts ground water permits to those meeting four tests (water must be available, there must be no detriment or injury to existing rights, water use must be beneficial, and the water use must be in the public interest). Alternative II-2 would impose additional restrictions on issuance of new ground water rights in the Yakima Basin. The most likely means of implementing this approach would be adoption of rules by the Department of Ecology defining the criteria for issuance of new ground water rights. However, the Planning Unit does not envision a “blanket rule” that would treat the entire Yakima Basin as a single unit. Instead, any rules adopted to implement this alternative should specifically identify the areas where differing criteria will apply within the Basin, since this alternative indicates that criteria will be different for areas with access to Yakima Irrigation Project water; compared with subbasin tributaries.

Due to Ecology’s obligations under the ground water MOA, this alternative could not be fully developed or implemented until the USGS study is completed.

Like Alternative II-1, management techniques would be used to manage ground water levels and prevent long-term declines in water levels. This includes data collection and management, attention to water use efficiency by all users, enforcement action against unauthorized uses, use of voluntary water rights transfers, and avoidance of pumping practices that would deplete aquifers over the long-term. Where applicable, surface and ground water supplies may be used conjunctively to enhance reliability and minimize impacts on stream flows.

Within urban growth areas, this alternative also includes a preference for reducing reliance on individual household wells (“exempt wells”) or small public water systems for domestic water supply, by providing access to larger public water system supplies as new development occurs. The purpose of this is to improve the ability to manage the ground water resource. However, in order to supply these

needs, the larger public water systems will need adequate water rights and sources of supply, either from ground water or surface water.

Within Urban Growth Nodes, or other areas of rural residential concentration, water supply for new development should be consolidated where feasible to avoid installation of new individual household wells for domestic uses. The methods for regulating such consolidated systems by local governments should be standardized. A system of approving and regulating small community systems should be developed and implemented by local governments. The purpose of consolidating supply and streamlining small system approval is to more easily monitor withdrawals and subsequent uses from aquifers.

Alternative II-3: Prohibit New Withdrawals of Ground Water

Under this alternative, development of new ground water supplies in the Basin would be prohibited (perhaps with an exemption for emergency situations based on stringent criteria to be defined). Existing ground water uses would continue under the conditions of applicable water rights, but voluntary transfers may be pursued to “retire” some existing rights. New or growing demands for water would either go unmet, or would be met by surface water supplies.

As with Alternative II-2, this alternative includes reducing reliance on exempt wells, particularly with regard to new urban and suburban development, by providing access to alternate public water system supplies. However, in order to do this, public water systems will need adequate water rights and sources of supply, either from ground or surface water (see surface water alternatives in Chapter 3a).

With respect to issuance of new water rights, this alternative is similar to the current “moratorium” on issuance of new water rights under the ground water MOA. However, unlike the MOA, this situation would extend the moratorium permanently. Since it is not inconsistent with the MOA, it could be implemented prior to completion of the USGS study.

This alternative would also involve management techniques to prevent ground water decline, as for Alternatives II-1 and II-2. This includes data collection and management, attention to efficiency, and other activities, as discussed previously.

Alternative II-4: No Action

The No Action Alternative describes a condition in which existing activities, programs, and trends in the Yakima Basin continue in the absence of Alternatives II-1, II-2 and II-3. With regard to ground water supplies, this will include the temporary moratorium on issuance of new ground water rights, as per the ground water MOA. Under the No-Action alternative there is uncertainty as to what will happen with ground water rights after the USGS study is completed, since future actions depend on results of the study.

As with Alternative II-1, the No-Action alternative will assume that some water users, including new residential developments, will rely on exempt wells for their water supply, consistent with recent practices and trends in the Basin.

The No-Action alternative will assume that no new activity will occur to prevent declines in aquifer levels, since these activities are not in place at this time, and there are no new initiatives under way to address ground water decline.

4.4 Alternatives Evaluation

The four ground water management alternatives described in Section 4.3 were evaluated by the Planning Unit. Because of the many uncertainties surrounding ground water at this time, this evaluation is general and qualitative in nature. The eight criteria used in this comparison are identical to those used in the review of surface water management alternatives (see Table 3-7 in Chapter 3).

The evaluation according to these criteria is contained in the tables in Appendix 4-A. There is one table for each of the criteria listed. Table 4-1 summarizes the results of the evaluation. For further detail, refer to the Appendix.

4.5 Recommended Alternative(s)

The Planning Unit recommends Alternative II-2 as the preferred alternative. However, the Planning Unit notes that Alternative II-2 alone cannot meet the Planning Unit's objectives with regard to water supply and economic prosperity. Therefore, this recommendation is made with the recognition that enhancement of surface water storage is also needed (See Chapter 3).

The primary criterion used in selecting Alternative II-2 was "Overall Effectiveness" (see Table 4-1 and Appendix 4-A). Many members of the Planning Unit feel that it would be unacceptable to prohibit new uses of ground water in the Basin (Alternative II-3), given the many needs for water supply. At the same time, the Planning Unit recognizes that ground water resources must be carefully managed to avoid depletion, and to minimize potential impacts on stream flows in those areas where hydraulic continuity is significant. Alternative II-1 could potentially cause undesirable impacts to both ground and surface water resources that are not consistent with the Planning Unit's objectives. The preferred Alternative II-2 strikes an appropriate balance between the need for water supply and the need to protect the Basin's ground water resources for long-term, sustainable uses.

**Table 4-1
Alternatives Evaluation Summary**

Evaluation Criteria	Alternative II-1 Key Resource	Alternative II-2 Selected Uses	Alternative II- 3 Prohibit New Withdrawals	Alternative II-4 No Action
Effectiveness⁽¹⁾ Overall Effectiveness	Effective in meeting municipal, domestic and industrial needs. Can contribute to improving reliability of irrigation. May have negative impacts on stream flow in some areas. Declines in water levels may occur.	Main benefits for municipal, domestic and industrial. Could offer limited benefits to reliability for irrigation in some locales. Criteria could be designed to protect both stream flows and ground water levels.	Would limit growth and development in water-short communities, compromising economic opportunities. No improvement in reliability. Could help protect stream flows, where hydraulic continuity is significant. Would help limit declines in water levels.	Depends on whether future decisions permit new use of ground water.
Cost-Effectiveness	Financial costs generally borne by each water user. Cost effectiveness of overall ground water management program cannot be determined at this time.	Similar considerations as Alternative II-1.	Financial cost low or zero; but cost of lost economic opportunities is high.	Depends on future decisions.
Flexibility Over Time	Use of ground water in conjunction with surface water could improve flexibility.	Improved flexibility primarily for municipal, domestic and industrial users.	Little flexibility, since new uses of ground water prohibited.	Depends on future decisions.
Environmental Impacts	Increased ground water use could impact regional aquifer systems and local base flows at some places and times. Could potentially impact stream temperatures at some places and times.	Criteria used for this alternative could be designed to minimize impacts.	Status quo, since new withdrawals would not be permitted.	Effects depend on future decisions.
Feasibility⁽²⁾ Legal Authority	Ecology has authority to issue permits. Federal F&W agencies may have authority to override. Yakama Nation may have legal standing.	Rule-making by Ecology may be needed to apply this alternative.	Rule-making by Ecology may be needed to close Basin to further appropriations.	Ecology has authority to continue regulation of ground water withdrawals, subject to terms of MOA with USBR and YN.
Approvals/Permits	Permit applications handled case by case, by Ecology.	Same as Alternative II-1.	No new permits would be issued.	Permitting depends on future decisions.
Cost and Funding Sources	Cost usually borne by individual user. Generally not prohibitive. Cost of improved management and data may be significant.	Similar to Alternative II-1. May be costs associated with legal challenges.	No capital or operational costs. May be costs associated with legal challenges.	Depends on future decisions.
Integration with Related Programs	Compatible with existing programs to administer water rights. Improved data and management may require additional staffing.	Generally, same as Alternative II-1.	Compatible with water rights program and fish recovery programs. May not be compatible with local land use and economic development programs.	Depends on future decisions.

Notes:

(1) Qualitative ranking of perceived effectiveness from 1 to 10, with 10 being the most effective. See Tables 1 through 5 for discussion of qualitative rankings.

(2) Qualitative ranking of perceived feasibility from 1 to 10, with 10 being the most feasible. See Tables 6 through 11 for discussion of qualitative rankings.

The Planning Unit also emphasizes the need for improved data and regional scale management of ground water resources. Modern, scientific management of this resource requires sustained collection of high-quality data on water levels in different aquifers, as well as information on water usage. In addition, it is important that individual water users use ground water as efficiently as possible.

At this time, Alternative II-2 has been developed only at a conceptual level, for purposes of guiding policy decisions. Considerable work remains to be done before this Alternative is ready for implementation. In particular:

- ❑ A framework is needed for analyzing particular aquifers to determine whether they are susceptible to depletion and whether they are hydraulically connected to the Basin's surface waters. For those aquifers that do not have either of these conditions, new development of ground water should be allowed greater latitude, than for aquifers that do have these conditions.
- ❑ Criteria for prioritizing water uses will need further development. The Planning Unit has expressed a general preference to reserve water for certain uses, but provisions must be made to ensure other, valid uses are provided for in some way (e.g. through access to surface water, and sufficient storage capacity to meet surface water needs).
- ❑ Specific procedures will need to be developed for Ecology to process permit applications for use of ground water, consistent with this Alternative. This may include adoption of a rule to implement this Alternative.
- ❑ A framework to provide for long-term data collection and management is needed, to improve the ability to monitor and manage the ground water resource.

4.6 Implementation Considerations for Ground Water Management

4.6.1 Available Administrative Programs

Existing ground water management programs that could be used to implement the recommended alternative in the Yakima Basin were identified in the Technical Memorandum titled "Issues Related to Management of Ground Water Supplies" (EES 2002b). These programs were identified by reviewing existing State programs and case studies for the Odessa Ground Water Management Subarea, Palouse Basin Aquifer, and Edwards Aquifer.

The Planning Unit recommends the following approach for managing ground water resources in the Yakima Basin:

1. Continue to rely upon Ecology's water resources program, which is currently the only administrative system in place for managing ground water allocations and related quantity issues in the Yakima River Basin. Rule-making may be needed to implement the preferred alternative

discussed above. However, the USGS study should be completed (i.e., in 2007), and further details of the management program developed, prior to rule-making.

2. With regard to continued uses of water under existing ground water rights, rely upon ground water management decisions made by individual members of the water user community, within the framework of State water law. If appropriate, provide new voluntary forums for assisting water users make decisions and identify alternative approaches to meeting their needs.
3. Use agreements among local governments and State agencies to adopt and implement an independent ground water management program (as done for the Palouse Basin Aquifer – see technical memorandum). The watershed planning framework under Chapter 90.82 RCW would provide an appropriate foundation for this approach, if coupled with agreements among local governments and State agencies.

With regard to water use efficiency measures, the Planning Unit recognizes that state law regarding relinquishment of water rights (Chapter 90.14 RCW) can provide a disincentive to public and private water users considering efficiency measures. The Planning Unit urges the Legislature as well as public and private water users in the Yakima Basin work to find a solution to this issue.

4.6.2 Implementation Roles and Responsibilities

Under the preferred alternative, Ecology would process applications for new water rights, in the context of a new rule to be adopted to implement Alternative II-2. Other activities would involve establishment of an improved ground water management framework, with improved water level monitoring capabilities, and coordination of pumping practices affecting aquifers subject to depletion, or streamflows in areas where aquifers are hydraulically connected to surface waters. The Coordinating Agency discussed in Chapter 8 could provide an effective means of developing this data collection and management framework, including partnerships with Ecology, USGS, or other organizations as appropriate. Promotion of water-use efficiency measures by municipal users, self-supplied industries, and agricultural users could also be coordinated by the Coordination Agency.

4.6.3 Potential Sources of Funding

The degree to which any new program can be implemented will depend largely on the amount of funding available. The implementing agency should initiate attempts to obtain long-term sources of funding immediately. Potential sources of funding for ground water management include:

- Federal grants from EPA and United States Department of Agriculture
- Cooperative agreements with federal agencies (e.g., USGS) in which the federal government funds a portion of the project
- Washington State funding programs, such as Public Works Trust Fund, State Revolving Fund for Drinking Water, etc.
- New fees applied to water users in various categories, as appropriate (e.g. customers of public water systems; agricultural users of ground water; industrial users; owners of individual household wells, etc.)
- Property tax or other local taxes
- Water rate surcharges adopted by public water systems benefiting from program
- Other state or local appropriations

Where funding is derived from targeted fees or taxes, care must be taken to ensure that principles of fairness and equity are addressed, and that the public supports these activities.

4.6.4 Implementation Priorities

It is recognized that funding may not be available to implement all actions included in the recommended alternative(s). In addition, full implementation of the recommended alternative will not be possible until completion of the ground water MOA study conducted by USGS. However, a number of independent actions could be pursued independently in the interim, in a scaled-back program. The actions could be prioritized by the Planning Unit based on relative importance, cost, and staffing availability. Potential interim actions include:

- Cooperative agreements
- Improved data collection (e.g., water levels)
- Voluntary transfers of water rights
- Water use efficiency measures
- Public education and outreach

For further information on implementation of this Watershed Plan, see Chapter 8.