DEPARTMENT OF
ECOLOGY
State of Washington

Finding Rural Domestic Water Solutions While Protecting Instream Resources

To achieve our mission to support sustainable water resource management to meet the present and future water needs of people and the natural environment, in partnership with Washington communities.

Revised August 2016
Publication no. 15-11-007

Publication and Contact Information

This report is available on the Department of Ecology's website at
https://fortress.wa.gov/ecy/publications/SummaryPages/1511007.html

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An October 2016 Washington State Supreme Court case impacts permit-exempt well use, which may affect some of the information provided in this publication.

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Water Resources Program
Washington State Department of Ecology
Olympia, Washington

Table of Contents

Executive Summary

Since the adoption of the Water Resources Act of 1971, the Department of Ecology (Ecology) has attempted to develop water management frameworks that provide reliable future water supplies for community needs while protecting instream flows. The Supreme Court ruling in *Swinomish v. Ecology* in late 2013 determined that Ecology's approach in balancing competing uses of water was not consistent with the law. Since then, Ecology has been assessing how it can best meet its competing water resource management mandates and comply with restrictions identified by the court.

Over the past two years, Ecology led discussions with representatives from Tribal governments and stakeholders to develop and assess potential solutions to the agency's current challenges. This document describes the ideas and summarizes the feedback the agency received. The statements expressing support or concern under Stakeholder feedback are not Ecology opinions. Ideas reviewed in this document apply only to water rights administered by the state.

Stakeholders suggested the following options as potential approaches for instream flow rulemaking that could rely on existing statutory authorities:

- Continue to establish reserves of water for rural domestic users in new or amended instream flow rules without making an Overriding Consideration of the Public Interest (OCPI) determination.
- Establish mitigation banks associated with new instream flow rules.
- Require use of cisterns or other storage devices to satisfy closure periods.
- Use of conservation by existing users to make water available for new users.
- Broaden mitigation options to consider the full hydrologic cycle and benefits to instream resources (i.e., use of low impact development; habitat improvement projects).
- Rely on local governments to integrate land use planning and protecting water resources.

Our analysis concludes that it would be challenging to successfully amend existing instream flow rules, adopt new rules, and implement these rules in most basins in our state using only the options identified under existing authorities.

Participants also presented options that would require changes to statute. Some participants supported specific concepts that they believed would balance both instream and out-of-stream uses and users' needs. Other workgroup participants expressed concern that these ideas could negatively impact instream resources. Concepts discussed included:

- Broaden mitigation options, by clarifying authority for out-of-kind mitigation associated with permit-exempt uses and rulemaking.
- Legislative directive to create reserves for rural domestic uses using a new or modified "OCPI" tool at the time instream flows are set.

- Create statutory priority for domestic water use over other out-of-stream uses.

There was no consensus about the best approach to protect stream flows while providing water for future rural community needs. In fact, the broad set of interests involved with these discussions revealed quite distinct overall goals. These differences reflect the nature of water resource management conflicts and the challenge ahead.

Overall, stakeholders voiced the least support for a new or modified "OCPI" authority or creating a domestic water use priority in statute. Based on the stakeholder meetings so far, further discussions about broadening mitigation options could lead to a solution that enables Ecology to protect instream resources while providing water for rural community needs.

Ecology will also continue to facilitate discussions for concepts that were introduced by stakeholders but not fully discussed. One idea relates to how impairment to instream flows is determined. The other was about Ecology's technical approach to setting instream flows and the relationship to natural flows.

Continued stakeholder discussion and refinements may reveal options to successfully manage water resources with broad stakeholder support. Ecology staff will facilitate ongoing dialog and provide analysis and input to help find solutions to rural water conflicts.

2016 Update

Several changes have been made to this report.

The first is an addendum that describes the ideas and summarizes the feedback the agency received during additional stakeholder meetings held in 2015. These meetings continued discussions on topics that were not fully explored before the first iteration of this report was issued in February 2015. Concepts discussed included:

- Defining impairment in statute
- Values-based instream flow protection
- Further conversations on how conservation might provide water supply options in rural areas

Ecology has also removed the appendix containing the comment letters received on the November 2014 draft of this report (formerly in Appendix C). These comments remain available on Ecology's webpage: http://www.ecy.wa.gov/programs/wr/wrac/rwss-leg.html.

Ecology replaced the former Appendix C content with the full Ecology report: Mitigation Options for the Impacts of New Permit-Exempt Groundwater Withdrawals. Ecology prepared the mitigation report after legislation was introduced in 2015 that would have required Ecology to prepare a report evaluating options for mitigating the impacts of permit-exempt groundwater withdrawals on base flows and minimum instream flows (SB 5965). The legislation failed to pass, however, Ecology saw value in preparing the report. The draft of the mitigation report was issued as a stand-alone report. However, Ecology decided that mitigation is a subset of the overall issue of rural water supply and decided to issue the final as an appendix to this report.

Background

Since the adoption of the Water Resources Act of 1971 (chapter 90.54 RCW), Ecology has attempted to meet its mandate and adopt water management structures in rule that provide a reliable future water supply for community needs while protecting instream resources and values. Case law over the past twenty years has increased the difficulty in creating rules that balance the needs of competing uses and users.

The methods we use to establish minimum instream flows set flow levels that create the best habitat for fish (generally salmonids). These preferred stream flows are frequently not met year round due to natural hydrologic variability, especially in smaller streams and rivers in which flows drop significantly in the summer.

Stream flows vary, even in the summer. In some years, we have a particularly wet period in summer or early fall. In those years, higher flows will be present for a period of time, which will benefit fish populations. Protecting those higher flows, and protecting the resulting fish habitat, has been proven to improve salmonid survival. Those higher flows are important to protecting habitat essential for maintaining viable and sustaining wild fish populations. Protecting existing fish habitat is key for the protection and eventual recovery of threatened and endangered species. Retaining flows necessary to provide for the preservation of fish resources is also a requirement of Chapter 90.54 RCW, the Water Resources Act of 1971.

If studies indicate the preferred stream flows are above the higher range of the natural flows for a given stream or river, Ecology and WDFW's standard procedure is to adjust the instream flow recommendations down to flow levels that occur at realistic intervals. Ecology uses the 10 percent exceedance level for setting instream flows, which means that flows are met about 10 percent of the time. Therefore, to protect beneficial occasional high summer flows, the flow recommendations are frequently higher than the typical stream flows measured in summer.

In addition, there are existing appropriations—water that is already being used by out-of-stream users (domestic, commercial, municipal, agriculture, and so on). Combining natural hydrologic limitations with existing uses makes the water availability challenge clear. In the end, based on Ecology's current approach for setting instream flows, water is often not available for new appropriation for year-round uses, even for uses exempt from permitting under law.

In October 2013, the Supreme Court's ruling in the *Swinomish v. Ecology* decision included a finding that Ecology erred in using the Overriding Consideration of Public Interest (OCPI) test to justify creating reserves of water for new private domestic wells users while adopted instream flows were not always met. Prior to the Swinomish decision, Ecology had relied on an OCPI finding to establish reserves of water for future rural uses, because we could not legally make a finding of year-round water availability.

Without reservations that provide some limited access to water for new users, adopting instream flow rules may preclude rural development where mitigation for stream flow impacts is not

available.[1] This has led to a development moratorium for many property owners in the Skagit watershed who cannot fully mitigate all water use impacts. It also leaves some who have already developed their property in an uncertain legal status.

The Court's decision was sufficiently broad to question applying OCPI to justify reservations for rural domestic uses of water in future rules. A new approach is needed to enable Ecology to meet its statutory water resource management obligations to meet the present and future water needs of people and the natural environment, in partnership with Washington communities. With this goal in mind, Ecology began to evaluate potential approaches by engaging with Tribes and stakeholders, understanding their values and objectives, and trying to identify common ground among diverse interests.

Overview of Stakeholder Feedback Process

Ecology led discussions with representatives from Tribal governments and stakeholders to develop and assess ideas to resolve water management challenges we face today. Discussions began in early 2014 at the monthly Water Resources Advisory Committee (WRAC) meetings.

Ecology held more focused stakeholder meetings on June 16, July 21, and September 15, 2014 to further discuss ideas generated by WRAC.[2] In addition, a technical workshop was held on August 27, 2014 to discuss the science of instream flow setting, and rulemaking approaches in more detail.

Between 40 and 60 people took part in each meeting, including representatives from:

- Local, state, and Tribal governments;
- Utilities;
- Well drilling operations and groundwater protection advocate groups;
- Environmental interests;
- Realtor organizations; and
- Other business interests.

Ecology asked participants for ideas that would provide durable statewide solutions. The group then discussed the suggestions, while we recorded their feedback.

This document describes the ideas and summarizes the feedback Ecology received. Stakeholder feedback statements expressing support or concern of particular ideas are not the opinions of

[1] Note that while mitigating all new water use throughout a watershed is challenging and may not be possible in many watersheds in Washington, it is possible in certain circumstances. The recently adopted Spokane River rule allows for such a case. In Spokane, the watershed is mostly served by public water systems with adequate water rights for future development. Ecology was able to mitigate future permit-exempt uses in the Spokane River rule.
[2] Additional meetings held in 2015 are documented in the 2016 Addendum.

Ecology, but reflect the input Ecology received. Ideas reviewed in this document apply only to water rights administered by the state.

Options Possible under Existing Statutory Authority

Some stakeholders clearly believe that Ecology has the existing authority it needs to meet its mission and statutory mandates for water resource management. Through discussions at WRAC and during the workgroup process, participants identified several strategies that Ecology could implement under current legal authorities. The information that follows is a synopsis of ideas generated from these discussions.

Continue to establish reserves in instream flow rules

Ecology has authority under RCW 90.54.050 to establish reserves of water for future beneficial use. A reserve can set aside available water for new rural water supply for a period of time, until the reserve is fully allocated. When that occurs no new water is available from the reserve.

Ecology could establish reserves where the reserves can satisfy the four-part test.[3] The challenge with this approach can be assessed for instream flow rules currently being developed, such as the Cowlitz (WRIA 25), Grays-Elochoman (WRIA 26), and Middle Snake (WRIA 35). In these rules, there are large areas of each basin in which we could not make a finding of water availability to establish those reserves (see Background discussion in Section 1.0 for more explanation). So, adopting instream flow rules with reserves using existing authority would likely result in large areas of the basin being undevelopable or requiring the use of cisterns (as described below, in Section 2.3). To successfully implement this approach, local support from landowners, local governments, and other stakeholders would be necessary.

Invoke OCPI and establish reserves for water

As done in recent rules, Ecology could invoke OCPI to establish reserves because water is not available for appropriation. The rationale behind the determination is that the Water Resources Act (Chapter 90.54) requires that water be made available for both instream and out-of-stream uses. The public benefits for the community from a limited amount of rural residential development would provide a net benefit that would justify allowing a limited impact the to the stream flows.

The key issue is how would establishing reserves using OCPI square with the Swinomish ruling? In Swinomish, the Supreme Court criticized Ecology for establishing reservations that:

[3] Any new appropriation of water must meet the "four part test": water must be available for appropriation; water must be for a beneficial use; water use must not impair existing users; and, the use must not prove detrimental to the public welfare.

- Do not pass the four-part test and that impair previously established flows, which represent water rights;
- Aggregate multiple uses and find public interests that outweigh benefits to instream flows; and
- Aggregate private uses (private homeowners using domestic permit-exempt wells) to satisfy meeting the public interest test.

The Supreme Court also stated that OCPI is a very narrow exception that cannot be used for wide-ranging appropriations of water. This experience makes Ecology reluctant to accept similar risks going forward and invoke OCPI in future instream flows. Invoking OCPI under current authority to justify unmitigated impacts would foster further uncertainty and litigation.

Due to the Swinomish decision, there was a general consensus among participants that this option would not represent a good strategy going forward.

Use maximum net benefits analysis

One suggestion was to establish reserves in new and amended rules based on a maximum net benefits analysis. RCW 90.54.020 states the fundamentals for water resource management in Washington. Subsection (2) states, "Allocation of waters among potential uses and users shall be based generally on the securing of the maximum net benefits for the people of the state. Maximum net benefits shall constitute total benefits less costs including opportunities lost."

The basic challenge to this approach is that it requires a finding that water is available. RCW 90.54.020(2) applies to "allocation for uses and users." Water cannot be allocated, and the maximum net benefits analysis employed, if water is not available. The challenge of determining water availability is discussed above [see Background on page 1 and OCPI on page 3]. Instream flows are set based on scientific understanding of fisheries habitat protection standards, as well as other factors (i.e. aesthetics, recreations, etc.).

Maximum net benefits must be employed for flows that exceed the minimum flows. But that situation is different than the current challenge, which is not having water available even when minimum flows are set. Because of this distinction, maximum net benefits analysis is not appropriate to justify setting flows below minimum instream flows.

Stakeholder feedback

Support (Pros)

- Existing law supports setting base flows and then using maximum net benefits analysis to balance flow in excess of base flow with water for future rural domestic needs.

Concerns (Cons)

- Legal uncertainty about the intent and approach.
- Difficult to value instream versus out of stream uses of water this way.

- Legal challenge is likely if Ecology employs a maximum net benefits analysis to set flows below scientifically determined minimums.

Establish mitigation (water) banks associated with new instream flow rules

Mitigation (water) banks can be an effective tool for managing and redistributing water for rural domestic needs. Ecology has been specifically authorized to use the Trust Water Right Program for water banking purposes. A full analysis of water banking and the Trust Water Rights Program can be found on Ecology's website at:

https://fortress.wa.gov/ecy/publications/summarypages/0411011.html

Where in-kind mitigation is available, requiring all new water uses to be fully mitigated is an effective water resource management strategy and one that is already working well in several areas of the state. Where available, it provides an effective and durable solution for rural community water supply needs.

The most significant challenge that limits the effectiveness of water banks is that senior water rights are not always available throughout a watershed. This geographic limitation can leave significant portions of a basin without mitigation options. The lack of available water for mitigation purposes throughout the watershed is the most significant challenge in developing mitigation strategies in the Skagit River watershed.

Ecology has authority in its permitting role to approve mitigation that is water-for-water, in-time, and in-place. Ecology's authority to approve more flexible mitigation approaches is currently under dispute[4].

Allowing more flexible mitigation approaches associated with new instream flow rules could broaden the geographic scope of available mitigation. Ecology maintains our legal authority to do so. However, based on the current legal challenges, it is likely that these alternate water banking structures would be in dispute immediately upon rule adoption. In this type of situation, water users would be left with significant uncertainty until the legal dispute is resolved.

In addition, criticisms have been publicly expressed that water banks:

- Provide water that is expensive.
- Provide inconsistent pricing structures among various water banks.
- Need improved transparency.
- Should be operated by public entities, instead of private or non-profit corporations.
- Should not receive public funding to subsidize water for new development.

[4] http://www.eluho.wa.gov/Global/RenderPDF?source=casedocument&id=1626

To enable water banks to better address current rural residential development challenges, Ecology could address some governance issues through its choice of partners and negotiated agreement conditions. Still, these changes would most likely be subtle. Another approach would be to adopt water banking rules that could clarify roles and expectations, and may improve the effectiveness of water banks in providing for rural domestic water for new uses.

Creating a watershed-wide requirement for all new uses to be mitigated with water-for-water mitigation, in-time and in-place, as a condition in all new instream flow rules, would cause significant challenges. Most watersheds would not have mitigation water available throughout the entire watershed. In those areas without mitigation water available, property owners would either face restrictions preventing development, or would have to rely on other water supply options, such as using cisterns (see page 6). The key challenge to successful implementation of this approach is having sufficient local support from landowners, local governments, and other stakeholders.

Stakeholder Feedback

Support (Pros)

- Mitigation needs to be in-kind always. Once no more mitigation is available, then there needs to be a development moratorium.

Concerns (Cons)

- In-kind mitigation does not always protect instream resources because the problems may be caused by other types of habitat degradation or fish passage barriers.

Additional Comments/Considerations

- Adopt rules like the Columbia River rule, which allows flexible mitigation if agreement can be reached by a broad group of stakeholders. Stakeholders questioned if this could be a model for future rules.
- During watershed planning, diverse interests worked together to develop options to address resource protection and management. Stakeholders question if these negotiations could provide opportunities to heighten the effectiveness of mitigation banks.

Require use of cisterns or other storage devices to satisfy closure periods

The use of cisterns and other storage devices can mitigate for water consumption during closure periods and times when instream flows are not met.

Many adopted instream flow rules include closure periods from 60 to 180 days, or include minimum instream flows that are frequently not met in the summer and early fall. Ecology could adopt flow rules that require all new domestic users to cease use from their wells during the low flow period and rely on a cistern. After the seasonal closure period, well use could resume. This

approach is analogous to Ecology's approach in basins in which watermasters must interrupt some water rights holders during drought years.

To be effective, conjunctive use of cisterns and wells must consider the well's proximity and the aquifer's degree of interconnectedness with the stream, as well as the duration of the low-flow period. Each permit-exempt well within a basin has individual values for these hydraulic properties. For example, a well far away from a stream and in an aquifer that has less direct connection to a stream would have a different influence than a shallow well close to a stream drawing from an alluvial aquifer. This high degree of variability lends uncertainty to the effectiveness of seasonal well-use restrictions.

If Ecology adopted a rule requiring well owners to fill their cistern during higher flow periods and cease well pumping during a period of the summer, this would result in increased well pumping at some times of the year, and no well use at other times. Without understanding the degree of hydrologic connection and timing of impacts, this approach may not result in stream flow protection. To ensure stream flow protection, analytical work accounting for the hydrogeologic variability, conducted with a high level of certainty, would be needed. Also this approach would be challenging, if not impossible, to enforce.

Cisterns may also be filled by trucked water or catching water from rooftops. In general, the use of trucked water, or collection of rainwater from rooftops may be useful in some specific areas where other solutions are not available.

The most likely scenario for the use of cisterns would be for those portions of watersheds in which mitigation is not available. In essence, this alternative water supply approach would be supplemental to the primary strategy of developing mitigation options for new rural domestic water users. Even as a supplementary option to mitigation banks, reliance on cisterns, trucked water, and collection of rainwater for domestic supply have significant implementation, technical, and cost considerations.

The key challenge to the successful use of cisterns in areas where mitigation is not available is having sufficient local support from landowners, local governments, and other stakeholders. In general, the more broadly reliant Ecology would be on cisterns to implement an instream flow rule, the bigger the challenge. The most likely success in using cisterns for rainwater collection or trucked water strategies would be as a very limited secondary water supply strategy, or to provide interim solutions until permanent water supply solutions were available.

Stakeholder feedback

Support (Pros)

- Communities in some areas of the state already rely upon cisterns during low flow periods. These examples can provide important lessons for broader use of this management tool.
- Cisterns provide a source of water to develop a property in regions where new appropriations are not available.

Concerns (Cons)

- Using cistern storage for drinking water increases public health risks. Also rooftop rainwater collection may present an even greater risk due to environmental contaminants compared to other water sources.
- Depending on the specific location (distance to stream) and the regional geology, seasonal well closures may not eliminate the impact during the low flow period.
- Concern that cumulative impacts to streams would result from using cisterns that relied on pumping during high flows or rainwater catchment. In addition, winter flows serve an important function.
- This approach could result in costly management and oversight. Concern that Ecology could not effectively regulate under this approach.
- It can be costly to install cisterns. Additional costs occur to treat water from roof water collection systems to make it drinkable.

Additional Comments/Considerations

- Trucking water is an inefficient method of water delivery. Promoting trucking of water may run counter to climate change goals and improving efficiency of utilities.

Use conservation to make water available for new users

Opportunities to conserve water are diverse and readily available because of new technologies and more efficient irrigation methods. Many public water utilities have developed active conservation programs, such as using rate structures and other incentives to use more efficient technologies.

The benefits of conservation are obvious for the water right holder. For example, a public water utility can stretch an existing water right to serve more customers if all customers each use a little less water. Irrigation conservation efforts can result in water being available to expand irrigated acreage.

Water saved through efficiencies can also be used to restore stream flows in adjacent stream reaches. Washington State has funded irrigation conservation efforts that have improved stream flow conditions in impaired stream reaches.

Stakeholders suggested that the state could provide funding for conservation by existing water rights holders, and as a condition of providing this funding, the state would receive a portion of the conserved water. This water could then be reallocated for new rural domestic uses. This strategy would not require any changes to state laws, but would need legislative funding. Potentially, this approach could be incorporated into overall mitigation banking strategies, as a potential source of water that would supply mitigation banks, supplemental to purchasing senior water rights.

The greatest challenge for this approach is that of geographic availability of potentially conserved water from senior water rights holders. Many areas of a watershed could not be served from conserved water from an existing right holder because the supply and demand are not necessarily close to one another. Further, Ecology cannot compel existing water right holders to take part in conservation measures, so the agency cannot count on conserved water being available in any particular location. Relying on conservation would be best used as part of a larger comprehensive mitigation strategy to provide water for new rural domestic uses.

Relying solely on conservation by existing users to create available water for new users would, at best, only work in portions of watersheds. Water availability for new rural domestic users in the remainder of the watershed would require use of other tools, including purchasing water rights and relying on use of cisterns (see page 6). In general, this tool would best be used as a supplemental water supply to mitigation banking relying on purchases of senior water rights from existing water right holders.

Stakeholder feedback

Support (pros)

- Conservation, such as fixing leaking systems, could provide water for rural domestic uses.
- Regulatory enforcement against waste to promote irrigation efficiencies could create more water for rural domestic use.
- A question was asked if Ecology could fund conservation, and use the water saved somewhere else. Conservation could be an incentive, instead of enforcement issue.

Concerns (cons)

- Water re-use allows existing systems to stretch their existing water supplies. Stakeholders questioned if water reuse would address rural water needs. Others commented that it probably would not meet supply needs throughout a watershed.
- Stakeholders asked if conserved water would be leased to the trust program. Or, would conserved water be spread to irrigate new acreage. Other questions were asked if conserved water would be temporarily put into trust or sold. This redistribution can be contentious.
- Public funds should not be used to make water available for specific individuals.

Other comments/considerations

- Conservation creates additional water availability only if crop use reduces consumptive water use (i.e., switching from one crop to another). However when this occurs, typically the conserved water is put to use on additional acres. Stakeholders questioned how the switch from spreading to domestic use could be incentivized.
- Municipal water system conservation does not solve water needs for rural domestic uses. Municipal systems use conserved water to support urban growth. Expansion of municipal water systems to serve rural development is expensive, and a complex and contentious growth management issue.

Consider the full hydrologic cycle and benefits to instream resources to broaden mitigation options

Our current strategy for managing water resources includes protecting stream flows by regulating the consumptive use of new water withdrawals. This approach does not address the hydrologic impacts to stream flows resulting from land cover changes. Overall, we may achieve better protection of instream resources by managing all the hydrologic changes associated with rural development instead of focusing solely on regulating new individual water withdrawals.

Ecology hydrogeologists have estimated the consumptive use of water used from rural domestic users on both a county-wide and statewide basis[5]. Cumulatively about 0.9 percent of the total consumptive water use in Washington State is from permit-exempt wells. This compares to about 4.6 percent of the state's total consumptive water use associated with public water systems. These numbers reflect a roughly proportionate relationship to the number of people being served by these different sources of water. Department of Health estimates that roughly a million people in Washington are served by individual or Group B[6] water systems. The remaining 85 percent of the state's population is served by Group A public water systems.

Although on a statewide basis, the amount of consumptive water use by permit-exempt wells may be small, there are specific watersheds where cumulative impacts could be a significant impact on streams. Conditions that contribute to more significant stream flow impacts include where watersheds are small, wells are drilled close to streams, wells are drilled into aquifers with more direct hydrological connection, or there is a considerable amount of outdoor watering creating higher consumptive water use per household.

Instead of relying on "bucket-for-bucket" mitigation, practices that minimize the impacts to the hydrologic cycle from land cover changes could offset the consumptive water use impact of new water withdrawals. Actions to offset impacts of new rural domestic water use could include a combination of actions currently considered under mitigation strategies (aquifer storage and recovery (ASR) projects and water banking), combined with actions that fall into the definition of "out-of-kind mitigation." Out-of-kind mitigation in this context would include land development practices (specific zoning densities, forest practices), Low Impact Development (LID), habitat restoration, and stormwater Best Management Practices tailored to a specific watershed.

While this approach could provide for improved protection for instream resources, there are some challenges because of current technical and statutory limitations:

- Even if instream flow scientists, natural resource managers, and other water use stakeholders agreed on the level of instream resource protection and water supply benefits, Ecology may have to rely on OCPI to justify approval of small stream flow impacts.

[5] Culhane and Nazy, 2015, https://fortress.wa.gov/ecy/publications/SummaryPages/1511006.html

[6] Group B water systems have less than 15 connections, where Group A systems have 15 or more.

- Adopting this approach statewide would entail working in significantly different settings (physical, demographic, governmental, etc.); no single approach is likely to be scalable.
- LID is not appropriate in areas with poor infiltration rates, in areas prone to flooding, or areas within geologically hazard areas that might be prone to landslides.

Stakeholder feedback

Support (pros)

- Ecology's current authority to allow additional flexibility for mitigation, such as is used in the Columbia River Rule[7] could be used in new or amended instream flow rules coupled with specific projects with local oversight.
- This approach could be an incentive to amend instream flow rules and improve implementation. Potentially, Ecology could set a threshold of impact to instream flows and alleviate administrative burden.
- Would need to include a process to assess appropriate mitigation (involving state, Tribal, local biologists).

Concerns (cons)

- Several stakeholders commented that there is no clear authority for out-of-kind mitigation options. By definition, out-of-kind mitigation causes impairment.
- Out-of-kind mitigation does not protect instream resources where low flow is the problem.
- Stakeholders questioned if instream resources can more effectively be improved by looking at the goals of mitigation more broadly. Others asked if it is possible under existing authorities. This issue is subject to litigation under current authority.
- A regional approach or its statewide application is not workable in light of the Swinomish decision and finding a new paradigm.

Rely on local governments through better integration of land use planning

In the Kittitas decision in 2012, the Washington Supreme Court clarified that counties have a role to protect water resources through their land use decisions. The Court held that local governments have a responsibility to consider legal, as well as physical, availability of water when making land use decisions.

To reduce impacts on stream flows, counties could reduce rural density through zoning and require development practices to minimize impacts on instream resources and stream flows. However, these types of restrictions do not remove the fundamental challenge of finding water availability in tandem with new instream flow rules.

[7] See Columbia River Rule, chapter 173-563 WAC

Another suggestion was to limit all development until existing public water supplies can provide service to meet new rural domestic needs. However, extending public water system service is not always practical due to cost. Concerns have also been raised if extending public water systems throughout rural areas is consistent with the goals of the Growth Management Act. Any change to that public policy would have to be a statutory change, and is discussed further in the next section.

Local governments rely on Ecology rules in making determinations of water availability. Integration of land use planning and water resource management will improve the decision-making framework. Ecology is working directly with the Washington Association of Counties to update outdated guidance for making permitting decisions in light of the Kittitas decision. However, simply updating a guidance document does not change the underlying limitations of water availability, and the requirements that Ecology meet the goals of the Water Resources Act of 1971.

Stakeholder feedback

Support (pros)

- No specific supporting comments were recorded.

Concerns (cons)

- Stakeholders questioned if local jurisdictions have the capacity to handle this responsibility at this time.

Other comments/considerations

- Prohibiting new development in an area is another tool in the toolbox. Local jurisdictions need solid justification to say no to development when minimum instream flows are not being met.
- Ecology needs to support local governments with:
    - Technical expertise
    - Hydrogeologic data

Summary of options relying on existing authorities

The following options were presented by stakeholders as potential approaches for instream flow rulemaking that could rely on existing statutory authorities:

- Continue to establish reserves for rural water users in new or amended instream flow rules without making an Overriding Consideration of the Public Interest determination.
- Establish mitigation banks associated with new instream flow rules.
- Require use of cisterns or other storage devices to satisfy closure periods.

- Use conservation to make water available for new users.

- Broaden mitigation options to consider the full hydrologic cycle and benefits to instream resources (i.e., Low Impact Development, habitat improvement projects, etc.).

- Rely on local governments for integration of land use planning and protecting water resource.

It would be challenging to successfully amend existing instream flow rules, adopt new instream flow rules, and implement these rules in most basins in our state using only these options under existing authorities.

If an instream flow rule were adopted with a reservation that relied on an OCPI finding, the current situation in the Skagit could be repeated, resulting in significant hardship on landowners. A reservation without the OCPI determination could only be established if water availability can be found. Water is typically not available during at least part of the year due to existing uses and natural hydrology.

Mitigation banking options work where mitigation water is available. However, if mitigation is not available throughout a watershed, some areas are left with limited water supply solutions, or would be reliant on alternative water supplies. This is one of the current challenges in the Skagit River basin.

Use of cisterns or other storage devices may be appropriate for localized areas of concern where specific problems exist. Ecology's experience is that there are many barriers to relying on this approach as the primary source of water over large areas of watersheds.

Use of conservation is an important tool for existing water rights holders to make the best and highest use of their available water. However, its use for providing water for rural domestic users has geographic limitations, similar to obtaining existing water rights for mitigation banking.

Attempting to rely on broader mitigation options under existing authorities will likely continue litigation, uncertainty, and risk for future water users.

Linking water supply to local land use planning that accounts for physical and legal availability of water can lead to more certainty for landowners and local governments. However, local governments will face the same challenges as Ecology in finding water availability when streams typically do not meet minimum instream flows for at least a portion of the year.

There was limited discussion about the role of expanding public water systems to provide options for rural landowners. Further discussion and evaluation of this concept may reveal potential solutions.

Options Possible with New Statutory Authority

Stakeholders also presented options that would require changes to statute. Some stakeholders expressed concern that these ideas would negatively impact instream resources. Other stakeholders supported specific concepts that they believed would balance both instream and out-of-stream uses and users' needs.

Ecology conducted a comparative analysis of other Western States' approaches to managing small withdrawals (permit-exempt wells). Our goal for the analysis was to promote discussion among stakeholders and assist in evaluating different legislative options. See Appendix A for a summary table of this comparative analysis.

Provide clear authority for Ecology to use OCPI or similar tool

In the Swinomish decision, the Washington Supreme Court ruled that Ecology erred in how the agency used OCPI in the Skagit River Rule, chapter 173-503 WAC. The Court also stated that the Legislature could clarify its intent on the appropriate use of OCPI in the context of instream flow rulemaking. Such legislation could provide clear access to water for people using permit-exempt wells by clarifying the policy directive for the appropriate use of OCPI.

Public interest tests are found elsewhere in water resource statutes. These examples can be used as precedent to begin to describe appropriate application of OCPI.

- Under the water code, Ecology must avoid "detriment to the public interest" when rendering decisions upon applications. RCW 90.03.290
- Watershed planning and establishment of minimum instream flows is an expression of the public interest under chapter 90.82 RCW through local participation in planning and implementation efforts. RCW 90.82.130(4)

The Legislature could clarify that it intends for Ecology to use OCPI to establish reserves of water for rural domestic uses associated with adopting instream flow protection rules. The Legislature could provide some direction for when OCPI can be invoked, such as for certain community needs, or on the basis of other social or economic benefits. This action would basically codify Ecology's approach used prior to the Swinomish decision.

Stakeholder feedback

Support (pros)

- Identify sideboards to fulfill court directives and ensure its limited application. Suggestions included no application solely for economic benefit or new development, only applies to emergency situations and for a limited duration, and only applies to out-of-stream uses with no impacts to instream uses. This list may be more appropriate in guidance instead of statute.

Concerns (cons)

- Using a watershed plan as an expression of public interest is questionable. Planning efforts across the state do not have consistent representation.

- OCPI requires a working definition of de minimis use and perspectives range significantly on an appropriate definition.
- Case law (Swinomish and Postema) have limited applications of OCPI and created widespread sensitivity about the topic; many participants agreed that this precedent is correct based on the language of the water code.
- Only applicable in limited situations and therefore most appropriate within a permitting context.
- Revisions to statute may bring separation of power concerns.
- OCPI cannot be used exclusively for economic development.

Other comments/considerations

- Could reduce the amount of permit-exempt water use allowed in the groundwater permit-exemption to allow for OCPI-authorized new uses.
- Changing statute to allow for another type of OCPI tool does not address the fundamental issue, which is how the impairment standard established in Postema has led to a backlog of permit applications.

Broaden mitigation options

Legislation could expand authority and scope for water banks to address challenges under current authority. As described in Establishing mitigation banks associated with new instream flow rules on page 5, one significant challenge for water banks is the limited geographic scope of available mitigation. A number of options could improve the geographic availability of mitigation for rural domestic water supply needs:

- New legislation could clarify authority for mitigation banking to include a credit system for more flexible mitigation approaches. Mitigation credits could be based on improvements to aquatic habitat, hydrologic improvements (such as floodplain reconnection), or other recognized and relevant ecosystem benefits to instream resources.

- The mitigation approach could establish a system for purchasing mitigation credits without requiring that it occur at the same time as the building permit is issued. This approach would allow more regional planning and implementation of habitat projects and programs on an appropriate scale (typically on a watershed or regional scale).

- A "front loaded payment" approach could provide stable funding for acquisition of senior water rights. It could also provide funding for other habitat restoration activities if fisheries biologists determine that would result in greater benefit to instream resources.

The cost of water that Ecology has purchased (such as to mitigate for new uses or to restore flows) has ranged from $500 per acre-foot (AF) to $3,000 per AF, with an average cost of about

$1,400 per AF. This cost is within the typical valuation range for domestic or agricultural use water, which is reported to cost up to $4,500 per AF Nationwide.[8]

Typically, one-to-three domestic residences can be built with one acre-foot of water, depending on the location and expected outdoor water use needs. These water purchase costs exclude transaction or administrative costs, however, which can be several times the actual cost of the water purchased.

The cost disparity among various water banks has been a concern expressed by the public. With the cost for mitigation credits for one home in some areas exceeding $10,000, broader mitigation approaches may increase overall expense and add to the public concern about the cost. Cost comes into play especially when broader mitigation approaches are considered because these approaches can be expensive for the benefits gained. It remains to be seen if out-of-kind mitigation can provide available water as cost-effectively as purchasing senior water rights.

Stakeholder Feedback

Support (pros)

- Protect senior water rights – give credit for water quality benefits and conservation.
- This would be a proactive approach to get out in front of future development; provides flexibility for time and place with local review process.
- Pooling the risk in low density rural areas makes sense.
- Tier structure for mitigation requirements. Require in-kind mitigation first, and only if that does not work then allow out-of-kind mitigation, with an in-lieu fee, then indoor use only if needed.

Concerns (cons)

- In favor of in-kind, in-time and in-place; without water, there is no functionality from out-of-kind mitigation.
- Developing mitigation requires a plan and a lot of work around it.
- Generally like current mitigation authority and how it applies on a case-by-case basis.
- Mitigation makes sense in the valley (larger river alluvium) but maybe not in smaller tributaries.
- Concerned about out-of-kind mitigation because there is too much discretion to allow it. There will be pressure from the development community to allow the least cost alternative and that is simply not adequate.
- Would need information about each stream for out-of-kind mitigation to make sense.

[8] http://water.epa.gov/action/importanceofwater/upload/Importance-of-Water-Synthesis-Report.pdf

Other comments/considerations

- Require a fee upfront prior to development in lieu of specific mitigation so that projects can be disconnected from the individual home scale
- Stakeholders had questions about developing appropriate sideboards:
    - What are the goals to achieve via mitigation?
    - Once the right parties have reached an agreement on the appropriateness of mitigation, how can project longevity be assured?
    - When is out-of-kind mitigation no longer suitable in a basin because of lack of water?
    - How can those that make the financial investment get legal certainty?

Give domestic water use a statutory priority over other out-of-stream uses

Twelve of 17 western states, all which follow the prior appropriation doctrine for water resource management, have some sort of priority for domestic uses over other uses (See Appendix A). Washington State law, on the other hand, is unclear and seems to identify all beneficial uses as equal, provided that new allocations maximize the net economic benefits.[9]

To prioritize domestic water uses, the Legislature could amend current water code to clarify that diversionary beneficial uses are not all equal. Establishing this priority could ensure rural domestic water supply needs, potentially at the expense of other out-of-stream users. As stated earlier, any such action would only apply to state managed water rights, and would not apply to federal and Tribal reserved rights.

The key question about this idea would be how to ensure constitutional protections for senior water right holders, who have a legal property interest. Legislation elevating permit-exempt domestic uses over other beneficial uses would have to be clarifying legislation to alleviate constitutional concerns.

[9] For example, RCW 90.54.020(1) states

> (1) Uses of water for domestic, stock watering, industrial, commercial, agricultural, irrigation, hydroelectric power production, mining, fish and wildlife maintenance and enhancement, recreational, and thermal power production purposes, and preservation of environmental and aesthetic values, and all other uses compatible with the enjoyment of the public waters of the state, are declared to be beneficial.

While this provision states that all uses are beneficial, RCW 90.54.020(5) seems to suggest that domestic uses may have a higher priority:

> (5) Adequate and safe supplies of water shall be preserved and protected in potable condition to satisfy human domestic needs.

Another important factor is to define domestic use. "Domestic use" can be characterized as primarily the "in-house" use of water for cooking, cleaning, and sanitation. However, "domestic use" may also be interpreted to include irrigation of a small yard or garden, as is described in the statutory exemption from water rights permitting (up to ½ acre of non-commercial lawn or garden). In-house domestic uses have much less impact on instream resources than outdoor uses do. Overall, the applicability of a domestic priority is an important distinction, and would have to be clearly stated in any legislative proposal.

Stakeholder Feedback

Support (pros)

- In times of water shortage, domestic priority is very applicable; it can provide real solutions at the sub-basin level when coupled with storage and other mitigation strategies.
- Cannot run water lines from public water systems up to all areas where building is occurring in rural areas. The state must prioritize fisheries or domestic use.

Concerns (cons)

- Stakeholders questioned how this approach would fit with the prior appropriation doctrine and protection of senior water right interests.
- Resembles permit-exempt well statute and expansion of its application will cause opposition from certain stakeholders. Yet a lot of administrative resources are spent upon the regulation of a relatively small use.
- Stakeholders questioned how enforcement would work considering potential wide scale distributive nature of this use.
- Encourages growth outside of water service areas.
- A lot of work around a definition will be required, including identifying:
    - Where it should exist.
    - Why domestic uses should be prioritized over others.
    - How it could mesh with land use planning.
    - Defining which specific uses constitute domestic use.
- Consider impacts to stream flows due to climate change.
- Compensation would be required for senior users and instream impacts for domestic priority. Would also have to consider how to compensate for tribal interest.

Other comments/considerations

- RCW 90.54 may support a domestic priority; however it is impossible to implement when instream flows are set too high and in the aftermath of the Postema[10] decision, impairment

[10] In the *Postema* decision, the Washington Supreme Court determined that impairment can be determined if there is a modeled hydrogeologic connection between groundwater and surface waters. The decision can be read at Ecology's website: http://www.ecy.wa.gov/programs/wr/caselaw/images/pdf/postema.pdf

can be established with minimal evidence. This approach would also require widespread recognition of the de minimis nature of permit-exempt wells.

- Political will to implement may not exist since the majority of the population lives in urban centers.

Summary of options requiring new legislative authorities

- Broaden mitigation options, by clarifying authority for out-of-kind mitigation associated with permit-exempt uses and rulemaking.

- Legislative directive to create reserves for rural domestic uses using a new or modified "OCPI" authority at the time instream flows are set.

- Create statutory priority for domestic water use over other out-of-stream uses.

There was no consensus among stakeholders about the best approach to protect stream flows while providing water for future rural domestic uses. In fact, the broad set of stakeholders involved with these discussions revealed quite distinct overall goals. These differences reflect the nature of water resource management conflicts and the challenge ahead.

Overall, participants voiced the least support for a new or modified "OCPI" authority or creating a domestic water use priority in statute. Based on the workgroup meetings so far, further discussions about broadening mitigation options could lead to a solution that enables Ecology to meet its mission.

Options needing further stakeholder discussion

Two ideas were presented by stakeholders during the series of stakeholder workshops. However, the concepts were introduced late in the discussion as a part of other topics, with very little opportunity for stakeholder dialog. The ideas are described below:

- A statutory change could clarify the definition of impairment to instream flows, to provide authority for Ecology to adopt rules that would protect beneficial uses associated with instream resources and values.

- Ecology could re-evaluate the methodology and approaches used to determine recommended instream flow levels, with a consideration to natural flows.

Based on feedback on the final draft report received in January, 2015, we have not included a descriptions or analyses of these two ideas at this time. Ecology supports continuing discussion of all ideas that may provide a framework for continuation of its instream flow protection program, supporting the agency's mission. We will continue to facilitate the dialog between stakeholders about all potential options to resolve rural water conflicts. Dialog between

stakeholders will better refine the issues, options, and provide opportunity for feedback and comment.

Ecology would like to thank all the participants of the water resources stakeholder workgroup who provided their time, expertise, ideas, and perspectives.

2016 Addendum

Additional Stakeholder Input

When the draft of this report was issued in November 2014 a number of stakeholders expressed concern that some ideas that came late to the process were mentioned in the draft report, but had not been fully discussed.

In 2015 Ecology continued holding stakeholder meetings to discuss the initial report and have further conversations on water management solutions. Meetings were held on January 5, July 30, September 30, October 26, and December 9, 2015. Generally approximately the same number of people, representing the same range of stakeholder interests as the earlier meetings, attended these meetings.

This document describes the ideas and summarizes the feedback Ecology received.

Values-based Instream Flow Setting

A participant proposed a values-based approach to setting instream flows as an alternative to Ecology's current numeric level methodology in existing regulations. This approach would emphasize protecting the functions and values of rivers, streams, and lakes. It was argued that this approach would avoid the inflexible legal impairment standard and make it possible for new users to obtain water as long as instream values are protected.

Stakeholder feedback

Support (pros)

- With a values-based instream flow standard, qualitative protection could allow focusing of mitigation to benefit habitat.
- The Postema decision addresses instream values such as temperature, water quality, and riparian habitat.
- A consultation process like that in the Columbia basin could be used to make values-based decisions.

Concerns (cons)

- A hard number is needed for regulation. A values-based standard is too "mushy."
- The current system of numeric instream flow levels are designed to protect instream values.
- It is very difficult to craft a system that is scientifically valid, with a common currency that appropriately measures instream values.

- How is it possible to ensure effectiveness of measures designed to protect instream values (such as tree planting) in perpetuity?

Other comments/considerations

- The State Supreme Court decision in Foster does not allow mitigation of impairment to instream flow water rights through providing ecological benefit. Although the idea was presented earlier as possible under existing law, the Foster decision squarely impedes that possibility.

Defining impairment in statute

A statutory change could clarify the definition of impairment to instream flows, to provide authority for Ecology to adopt rules that would protect beneficial uses associated with instream resources and values.

Since the Supreme Court decision in *Postema,* in 2000, any new use of groundwater that is hydraulically connected to surface waters with established instream flows has been almost assumed to be a cause of impairment. In *Postema* the court held that withdrawals of groundwater in continuity with surface waters are not allowed to have an effect on closed surface water bodies. Although the Court held that hydraulic continuity alone with surface waters with regulatory flows is not sufficient to establish impairment of instream flows, the court indicated that there is no differentiation between *de minimis* and significant impairment, and that no impairment is allowed. The Court also held that if a withdrawal would impair surface water flows that an application must be denied.

Currently there is no specific definition of what constitutes impairment of a surface water right in the context of Ecology deciding whether to authorize a new use. In 1997 the Legislature considered bills that would have defined impairment to surface water rights from groundwater withdrawals. One version passed but was vetoed by the governor; a second version did not pass.[11] There is a definition of impairment to a groundwater right in RCW 90.44.070, with further clarification in WAC 173-150-040 and -050.

Support (pros)

- Defining impairment to instream flows would establish a limit to impacts to instream flows that could result from new out of stream water use before instream values are impaired. This could allow some flexibility for new out-of-stream uses and ensure protection of instream values.

- Defining impairment would go beyond the idea that there is no distinction between de minimis impacts and significant impacts.

[11] 1997 Legislature HB 2050, and ESHB 2050

- In watersheds without established instream flows there is no limit on impacts to stream flows from new permit-exempt withdrawals. If impairment were defined, new instream flow rules could put protections in place and establish limits on impacts from new uses.

Concerns (cons)

- It would be very difficult to define impairment in the water code in a manner that ensures that instream values are fully protected.

- Maximum Net Benefit would need to be considered in a definition of impairment.

- Would a distinct impairment standard just for instream flows be necessary?

Other comments/considerations

- Defining impairment would affect water users other than rural domestic water supply. Developing a definition of impairment would need to involve other water users, such as municipalities and agricultural users.

- There is no definition of impairment in the Supreme Court decision in *Postema*.

Conservation

In 2015 the stakeholder group continued the conversation about conservation and looked specifically at the example of irrigation efficiencies in the Walla Walla basin.

In the Walla Walla considerable effort and substantial funds went into an irrigation efficiency program to improve stream flows. Conservation through irrigation efficiencies was viewed as a preferable option over the sale of water rights to avoid de-watering agriculture in the area.

In the Walla Walla, the presentation described that stakeholders believed the water savings were small in relation to the amount spent on the program. It was argued that from a public policy perspective outright purchase of water for instream flows is more efficient, because of cost.

Different aspects of the value of water were discussed. The agricultural community tends to undervalue water when transactions occur between farmers. However, it is given a higher value if it is being sold to the state for instream flows, or to a municipality. In addition, water has a high emotional value to the farming community. These attitudes towards water can affect willingness to conserve if the saved water will go to other users.

In the Yakima basin on-farm irrigation systems are efficient, but the canal systems of the irrigation districts with long travel times were not sophisticated enough to translate those efficiencies into reduced diversions. This led to the need to improve the delivery system and three re-regulating reservoirs. In the Yakima basin conservation helps make water available for junior water users, but doesn't provide any water for new uses.

Support (pros)

- Given how much water is used by agriculture, even a relatively small percentage savings translates into quite a bit of conserved water.

- Is there any way the state could compel conservation? Would this require legislation?

Concerns (cons)

- There is tension between conservation and possible relinquishment.

- Getting communities to make progress on conservation programs that could potentially benefit instream flows or other users requires collaboration and trust among local stakeholders. In some areas, such as Skagit, trust is lacking, hindering progress.

- Applying conservation can't result in adverse impacts to instream flows, this limits its use as a tool for rural water supply.

- Given the recent State Supreme Court decision in Foster, what are the implications of going from seasonal use to year round use if new domestic users are using saved water from conservation of agricultural use.

Other comments/considerations

- Funding strategies for conservation are needed.

- Whether conserved water is available for use depends on a water budget analysis of the fate of the wasted and/or inefficient use of the water.

- Excess water that goes into the ground from flood irrigation doesn't count as conservation if you change to a more efficient irrigation system. Only reduction of excess evaporation counts as conservation; for example reducing evaporation from the arc of the sprinkler or open ditches.

- Some water savings could come from reducing waste, however, this is not the same as conservation. Since waste is not allowed under the water code maybe the state should enforce against waste. For example California is doing more to alleviate waste through Governor Brown's executive order.

- A lot of "waste" is already being used by others in the basin.

- Both enforcement and incentives are useful for conservation programs. For example, in the municipal sector conservation tools include the municipal water law that mandates conservation, and tiered water use rates that create incentives for conservation.

- In the municipal sector conserved water is mandated to go to meet new growth. It might be possible for some PUD's to supply new users in rural areas, however, this is highly localized. PUD's must respond to petitions. If a customer accepts the cost and a PUD can supply

water, then they are obligated to do so. It is very speculative to look to PUD's to supply water in rural areas. It is typically very expensive, and pipelines generate distrust, generally neighbors don't want them.

- Exempt wells are a very efficient way to supply water in rural areas. The 5,000 gallon per day exemption is not a reflection of actual water use, however, because these uses are not often metered actual use is unknown.

- There is an economic impact to the community from restricting new home construction, millions in lost economic activity. There is new technology for conserving home water use.

- We need more information about the uses for permit-exempt wells, i.e. percentages of single domestic, group domestic, or industrial use. It was speculated that more than 90 % of wells are for single domestic use.

- The indoor component of rural domestic water use is not the only use of water for permit-exempt wells. Outdoor use, in particular watering large lawns, is very consumptive and a greater concern.

Final thoughts

At the December 9, 2015 Rural Water Supply meeting, the final meeting hosted by Ecology, Tom Loranger, Water Resources Program Manager, asked the group for any advice they could offer on the State's water management challenges. Here are suggestions from that conversation:

- Ecology should consider holding a workshop with key legislators and legislative committee staff to get the legislature involved in problem solving and creating water law that makes sense. The workshop should provide a comprehensive description of the overall water management situation in the state, and involve key stakeholders and other state agencies such as Departments of Health and Fish and Wildlife. The legislature need to understand the implications of the *Foster* decision.

- Ecology and policy makers need to focus on a fundamental recognition of where we are headed in the next 20 to 30 years, in particular the challenge of climate change. If Ecology is bringing people together to address overall water management then start with that discussion.

- Strategies are needed to accommodate new uses from population increases we know are coming. Decisions on pending water right applications will be challenging in light of the *Foster* decision. How are municipalities going to meet future demand with interruptible water rights?

- The state needs to consider whether we need to accommodate new uses in locations that are out of water.

- Water management in the state isn't just about politics; it's a real scarcity issue. The state must address the misperception that Western Washington has ample water.

- It is vital that the Legislature understand the importance of Tribes and their treaty rights.

Appendices

Appendix A. Comparative Analysis of Western States' Approaches to Managing Small Domestic Withdrawals

Throughout the west, 15 of 17 states allow development of wells in rural areas without a permit where alternative sources of potable water are not available. Commonly referred to as "exempt wells" or "permit-exempt wells," these small scale uses are free from the administrative obligations associated with a traditional water right. To manage the potential cumulative impacts of permit-exempt wells, states have enacted a variety of limitations. Common approaches include designating regional control areas where states invoke more intensive management strategies including prohibitions on exempt well development and other restrictions specific to a region as determined by the state engineer. A few states also restrict the types of uses that are allowed from exempt wells.

In addition, 12 of 17 western states recognize a domestic priority alongside the exemption. Some jurisdictions tie these considerations inextricably to one another via statutory directive. In other states, policy development has led to collaborative management of these exceptions. A few states openly acknowledge that the domestic priority has rarely been invoked due in part to the practicality of the mechanisms by which to invoke it, i.e. condemnation or drought declaration. The chart below provides additional details on how western states approach management of permit-exempt wells and domestic use priority.

State	Is single domestic use exempted from water rights permitting?	Is domestic use a priority in statute or state constitution?
AK	Yes. Limited to 5,000 GPD. But, exempt use is subject to appropriation and can be curtailed to "supply water to lawful appropriators…or to protect the public interest"	Yes (for public water supplies). Public water supply preference when competing applications are received.
AZ	Yes. Limited to 35 GPM. But, cannot be used for subdivision in a protected groundwater region.	Yes.
CA	Yes. But, counties may create limits for exempt wells.	Yes (for municipal supplies), "permit by a municipality… shall be considered first in right, irrespective of whether it is first in time" -- California Water Code §1460
CO	Yes. Limited to 15 GPM / 21,000 GPD, and limited to in house and domestic animal use only. State law was changed in 1972 to provide an exemption for single domestic use for every lot of record at the time the law passed. The law states that exempt wells are outside the prior appropriations system. Within designated groundwater basins, a minimum lot size of 35 acres or larger is required, or cluster developments cannot exceed one acre-foot/year use per 35 acres to be exempt from permitting. *Also,* if the state engineer finds that a proposed subdivision's water supply will cause "material injury" to existing wells or water rights, the development may proceed regardless. The county's board of commissioners must approve it and the developer must provide prospective buyers with notice of the state engineer's findings.	Yes. In times of scarcity, domestic uses are prioritized; not necessarily applicable to new uses/users.

State	Is single domestic use exempted from water rights permitting?	Is domestic use a priority in statute or state constitution?
ID	Yes. Limited to 13,000 GPD for single domestic use. IDWR has issued moratorium orders that prohibit further consumptive uses of water. However, in an effort to avoid numerous individual domestic wells in a subdivision, IDWR does exempt subdivisions from the moratorium in cases where each unit served by a community well satisfies the exemption requirement. (Personal Communication, IDWR)	Yes.
KS	Yes	Applies to conflicting uses
MT	Yes. Limited to 35 gpm or 10 acre-feet/year, and limited to single domestic use. But, all wells in controlled groundwater areas require a permit.	No.
ND	Yes.	Yes.
NE	Yes. Limited to 50 GPM. Local jurisdictions (a natural resource district) may require single domestic users to obtain a permit for a well that could be in hydraulic continuity to surface water.	Yes.
NM	No. Although state engineer may not deny issuing a permit for single domestic use (under state law). Limited to 2 acre-feet/year. State engineer may choose to include additional restrictions on domestic wells in Critical Management Areas.	Yes.
NV	Yes. Limited to 2 acre-feet/year, and single domestic use only.	No, but Nevada's ground water code contains a legislative declaration that it is the policy of the state "to recognize the importance of domestic wells as appurtenances to private homes and to create a protectable interest in such wells and to protect their supply of water from unreasonable adverse effects."
OK	Yes. Limited to domestic use plus irrigation not to exceed 3 acres.	No, except for domestic users with rights established prior 1963.

State	Is single domestic use exempted from water rights permitting?	Is domestic use a priority in statute or state constitution?
OR	Yes. Limited to 15,000 GPD.	Yes. In times of scarcity, domestic uses are prioritized; not necessarily applicable to new uses/users.
SD	Yes.	Domestic is "the highest use…take[s] precedence over all appropriated rights…exercised…consistent with the public interest"
TX	Law of capture. Property owner is entitled to any water below their property, regardless of impact to others.	N/A. Yes, for surface water, but moot issue for domestic groundwater users.
UT	No.	Yes. In times of scarcity, domestic uses are prioritized; not necessarily applicable to new uses/users.
WY	No. State engineer may deny based on determination that approval is not in the public interest. Notwithstanding a finding of lack of water by the state engineer, county commissioners may approve a subdivision even without water availability. The developer must provide notice to prospective buyers of findings.	Yes.

Appendix B. Meeting Notes: Feedback on Final Draft Report

Rural Water Workgroup
January 5, 2015 – 1:00 to 4:00pm

We started the meeting with welcome, opening statements by Ecology, and introductions. Discussed the draft report, overview/background and then discussed each section with the group for their feedback and comments.

Section 2.0 – Analysis of options that could be implemented under existing statutory authority

Comments

- Cite RCW 90.54.020 in first sentence in background
- Goal not "mandate" (referring to 90.54.020 and its interpretation)
- Swinomish decision clarifies law, not cause of current problem
- Is there a duel responsibility? Ecology is required to reach "balance" between instream and out of stream uses.
- "Optimal flows" aren't always met, depending on natural conditions or out of stream appropriations.
- Expand flow determination discussion, methodology is controversial.

Section 2.1 – Continue to establish reserves for rural water users in instream flow rules

Comments

- Use multi-strategy approach analysis of how they fit together.
- Necessity drives creation of water bank and use of cisterns. Don't discount their broad application.
- Parts of the state are actively using these methods.
- Tone down public health concerns as other states rely on cisterns.
- Individual wells can also have health concerns.
- New well construction regulations are more protective

Section 2.2 – Establish mitigation (water) banks associated with new instream flow rules

Comments

- Water banks don't need joint Instream Flow Rule; once a water bank is established an instream flow rule isn't needed.

Section 2.4 – Use of conservation to make water available for new users

Comments

- Active conservation can make water available for new uses.
- Must reduce consumptive use.
- Explain funding strategy better for conservation.
- Muni water law has restrictions requires conservation. Not same in rural areas.

Section 2.5 - Broaden mitigation options to include consideration of the full hydrologic cycle and benefits to instream resources.

Comments

- If flows are significant factor for species, out-of-kind mitigation doesn't help/work.
- Ecology's authority to allow out-of-kind mitigation is in current litigation.
- By definition, out-of-kind mitigation causes impairment.

Section 2.6 – Rely on local governments through better integration of land use planning

Comments

- Counties are obligated under GMA to protect water resources.

Section 2.7– Summary of options that would rely on existing authorities

Comments

- Trucking and piping water needs more consideration.
- Legislature may need to take other actions (such as providing funding).

Section 3.1 – Provide clear authority for Ecology to use OCPI or similar tool

Comments

- OCPI – No feedback

Section 3.2 – Broaden Mitigation Options

Comments

- Broadening mitigation options statutory priority – states that use this are not what we should strive for.

Section 3.3 – Determining that domestic water use is a statutory priority over other out of stream uses

Comments

- Clarify whether domestic use is in-house use only or includes outdoor water use (residential irrigation)

Section 3.4 - Define "impairment"

- Postema case and challenge not adequately discussed.
- Would have broader effect than rural domestic supply.
- Complex issue, not well defined.
- Want the entire section removed until fully discussed.

Next Steps: comments from participants

- Explore "impairment" definition further.
- Plan group to develop legislative proposal.
- New legislation not needed – use existing authority.
- Cistern discussion – trucking water, rainwater collection and conjunctive use of wells.

Dave Christensen concluded the discussion stating that Ecology will include comments from this meeting as an appendix, take additional written comments, and decide how to finalize the report.

Permit exempt well report –Ecology's hydrogeologist, Tom Culhane discussed the report and answered the groups questions.

Comments

- Drillers reporting inaccurately characterized.
- Statement that exempt use averages 4.8% of total water use- need to clarify/ as stated it is not accurate.
- Include a pie graph – Could include examples showing different sub-basins.

Appendix C: Mitigation Options for the Impacts of New Permit-Exempt Groundwater Withdrawals

Ecology's report on the full range of mitigation options that could be available for offsetting the impacts of permit-exempt groundwater withdrawals is attached as an appendix to this report.

DEPARTMENT OF
ECOLOGY
State of Washington

Mitigation Options for the Impacts of New Permit-Exempt Groundwater Withdrawals

August 2016

Table of Contents

Lists of Figures and Tables

Figures

Tables

Executive Summary

In 2015, the Senate Agriculture and Natural Resources Committee of the Washington State Legislature introduced SB 5965 that would have required Ecology to prepare a report evaluating options for mitigating the impacts of permit-exempt groundwater withdrawals on base flows and minimum instream flows. The Legislature failed to pass SB 5965 during the 2015 session. However, Ecology saw value in promoting a greater shared understanding of water resources mitigation among state policy makers.

As the importance of managing water supplies for instream and out-of-stream needs intensifies, mitigation is an important tool to prevent the impacts of new water uses on senior instream flow water rights, including the impacts of permit-exempt withdrawals.

Mitigation for permit-exempt withdrawals presents some unique challenges:

- Permit-exempt withdrawals are individually small impacts with the potential for cumulative impacts in certain circumstances (for example a high density of wells near a small fish-bearing tributary).

- New permit-exempt withdrawals are typically dispersed throughout a watershed including parts of the watershed without senior water rights available for mitigation water.

- Due to the dispersed nature of the withdrawals, Ecology's experience has shown that no single mitigation technique will successfully mitigate new permit-exempt withdrawals. A range of mitigation techniques is needed for varied circumstances, even in the same watershed.

- These withdrawals are exempt from the water right permitting system, and therefore are not typically managed by Ecology. Intensive management measures for individual homes scattered across a watershed are difficult, time consuming, and expensive to administer.

The majority of Ecology's experience with mitigation of permit-exempt withdrawals has been with water banking. Water banks provide mitigation for new permit uses in Walla Walla, Yakima, Dungeness, and Spokane basins. Ecology is concerned that recent State Supreme Court decisions may make water banking for mitigation much more challenging.

State Supreme Court decisions have set strict requirements for protecting instream flows from all junior water users, including permit-exempt withdrawals:

- Instream flows established by rule must be protected from any impairment; there is no differentiation between *de minimis* or significant impairment.

- Mitigation of the legal injury (or impairment) to the senior water right cannot be done through providing ecological benefit, such as targeting a critical time of year for flow restoration, or providing out-of-kind mitigation to aquatic habitat.

The effect of the Court's decisions is that, going forward, where the impact from permit-exempt withdrawals cannot be avoided, mitigation to offset impacts must be "perfect," water-for-water, in place and in time. This will restrict future mitigation opportunities.

Other mitigation strategies that avoid impacts to instream flows remain available. These strategies include rainwater collection, hauling water, and public water supplies. With rainwater and hauling water, reliability and public health concerns must be addressed. With expanding public water supplies other concerns relating to cost, land use, and moving water from one basin to another must be considered. Interagency coordination and collaboration among Ecology, local government, State and local departments of health, and resource managers will be needed to address supply, public health and safety, and administrative practicality.

Ecology believes that watershed approaches that integrate a range of tools, including avoiding impacts, water-for-water mitigation, and enhancing the ecological benefits of existing flows, could be beneficial for rural communities and for protecting and enhancing instream resources. The key to success of these tools is having sufficient flexibility to apply and manage on the appropriate watershed scale that the impacts occur. Importantly, there are significant legal and administrative obstacles that would have to be overcome before watershed scale approaches could be implemented.

Just as there are limits to water availability, there are limits to mitigation. It may not always be possible or practical to mitigate all potential impacts of new permit-exempt uses. As demand for water increases because of a growing population, and the impacts of climate change affect stream flows, the need to protect instream resources and carefully manage new water use becomes more important and more challenging.

This report evaluates a range of options for mitigating the impacts of permit-exempt groundwater withdrawals on instream flows, including approaches to mitigation that have not been applied but might be potential solutions in some situations. This report also discusses mitigation for permit-exempt withdrawals in the Yakima Basin where there are no instream flows adopted under state law. The Yakama Nation holds adjudicated Time Immemorial Treaty Water Rights for instream flow to maintain fish and other aquatic life in the basin, and the 1994 Yakima River Basin Water Enhancement Project Act established target flows for the lower river under federal law. Mitigation is necessary to prevent impairment of senior instream and irrigation water rights.

This report includes:

- Background information about instream flow protection, permit-exempt withdrawals, what is meant by mitigation, and the legal authority for mitigating permit-exempt groundwater withdrawals.

- Information about mitigation needs for permit-exempt withdrawals, and how mitigation is evaluated.

- The options available for mitigating the impacts of permit-exempt groundwater withdrawals on instream flows.

- A description of mitigation measures that have been used by Ecology.

- A description of mitigation and alternative water supply options that are available or being developed for the Skagit River basin.

- Information on the effects of permit-exempt withdrawals on instream flows.

- A review of instream flow setting methodology.

Background

Legislative interest and purpose for this report

The Department of Ecology is responsible for managing the use of the state's waters in a manner consistent with water resource policy set forth in Chapter 90.54 RCW, the Water Resources Act of 1971. The Act states the intent of water resource management strategies are to supply water in sufficient quantities to satisfy three water resource objectives:

(1) Residential, commercial, and industrial needs;

(2) Productive fish populations; and

(3) Productive agriculture.[12]

To meet the multiple competing needs of water, Ecology's practice since 2005 had been to use Overriding Consideration of the Public Interest (OCPI) as justification for reserving water for new out-of-stream uses that would impair adopted instream flows. On October 8, 2015 the Washington State Supreme court ruled in *Foster v. Department of Ecology* that Ecology may not use its Overriding Consideration of the Public Interest (OCPI) authority in RCW 90.54.020(3)(a) to issue permanent water rights that impair regulatory instream flows.[13]

The decision in *Foster* builds on the 2013 State Supreme Court ruling in *Swinomish* Indian Tribal Community v. Department of Ecology. The Supreme Court ruled in *Swinomish* that Ecology's approach relying on OCPI for allocating new uses of water that would result in any impairment of instream flows was not consistent with the law. Since then, Ecology has been assessing how it can best meet its competing water resource management mandates and stay within the restrictions identified by the court. While neither ruling directly restricts Ecology's authority to adopt instream flow protection levels in a rule, they do affect the management of new water uses subsequent to rule adoption. Ecology has found the greatest challenge with new permit-exempt groundwater withdrawals because they:

- Have the potential to impair instream flows, even if each individual use is very small;
- Are exempt from the water right permitting system, and therefore are not managed individually, and;
- There are thousands of permit-exempt withdrawals across the state since they are the most common source of water supply for domestic use in rural areas.

Mitigation is one way to manage the impacts of new permit-exempt withdrawals to prevent impairment of regulatory instream flows.

[12] RCW 90.54.005

[13] On October 28, 2015, the City of Yelm and Ecology filed motions for reconsideration of the Court's decision in *Foster v. Department of Ecology*.

In 2015, the Senate Agriculture and Natural Resources Committee of the Washington State Legislature introduced SB 5965 that would have required Ecology to prepare a report evaluating options for mitigating the impacts of permit-exempt groundwater withdrawals on base flows and minimum instream flows. The proposed legislation called for:

- A description of mitigation techniques the Department of Ecology has employed in the last ten years to mitigate the impacts of permit-exempt groundwater withdrawals on base flows and minimum instream flows, including a discussion of out-of-kind mitigation techniques, and addressing the location, cost, and legal authority for each type of mitigation technique. (SB 5965 Sec 2 (1) (c), (d))

- An assessment of the effectiveness of each type of mitigation technique, including out-of-kind mitigation techniques, which may be available to the Department of Ecology to mitigate the impacts of permit-exempt groundwater withdrawals on base flows and minimum instream flows. (SB 5965 Sec 2 (1)(f))

- A survey of in-kind streamflow enhancement strategies, other than regulation of permit-exempt groundwater withdrawals, that would improve streamflow levels in a cost-effective manner. (SB 5965 Sec 2 (1) (e))

- An evaluation of all mitigation options that may be available for permit-exempt groundwater withdrawals in the areas covered under the instream resources protection program for the lower and upper Skagit river basin, water resource inventory areas 3 and 4, and a discussion of the advantages and disadvantages of employing each type of mitigation technique in those areas.[14] (SB 5965 Sec 2 (1) (g))

- An examination of scientific methodologies for establishing base flows and minimum instream flows, including a discussion of methodologies regularly used by the Department of Ecology. (SB 5965 Sec 2 (1) (a))

- An analysis of whether requiring mitigation for new permit-exempt groundwater withdrawals would in fact result in meeting base flows or minimum instream flows. (SB 5965 Sec 2 (1) (b))

- Recommendations for legislative action to ensure reasonable mitigation options, including out-of-kind mitigation techniques, will be available to landowners who are required to mitigate the impacts of permit-exempt groundwater withdrawals on base flows and minimum instream flows. (SB 5965 Sec 2 (1) (h))

The House of Representatives Agriculture and Natural Resources Committee, proposed additional topics to include in the report: a broader discussion of alternative water supply options for new rural water use that do not rely on mitigation; and an analysis of the impacts of permit-

[14] For more information about water resources management in the Skagit watershed see Ecology's webpage at http://www.ecy.wa.gov/programs/wr/instream-flows/173503-ov.html (link doesn't work)

exempt withdrawals on tributary streams. The Legislature failed to pass SB 5965 during the 2015 session. However, Ecology saw value in promoting a greater shared understanding of water resources mitigation among state policy makers.

This report evaluates a range of options for mitigating the impacts of permit-exempt groundwater withdrawals on instream flows, including approaches to mitigation that have not been applied but might be potential solutions in some situations. This report also discusses mitigation for permit-exempt withdrawals in the Yakima Basin where Ecology has not adopted instream flows but mitigation is necessary to prevent impairment of senior water rights, including adjudicated Yakama Nation treaty reserved water rights. Ecology acknowledges that some of the mitigation techniques described in this report are not viable under the *Foster* decision.

Consistent with the intent of SB 5965, this report focuses on water resources mitigation for permit-exempt withdrawals. Limited attention is devoted to discussing mitigation associated with the water right permitting process. Refer to Ecology Water Resources Policy 2035 for more information on mitigation requirements associated with permitting.

Instream Flow Protection in Washington State

Stream flow protection has been part of Washington State Law for over 65 years. The state's Water Flow Policy, adopted in 1949, states: "It is the policy of this state that a flow of water sufficient to support game fish and food fish populations be maintained at all times in the streams of this state." (RCW 77.57.020, formerly RCW 75.20 050)

Ecology's program to protect stream flows by adopting instream flows in rules began in the 1970s after the enactment of the Minimum Water Flows and Levels Act, Chapter 90.22 RCW, in 1967, and the Water Resources Act of 1971, Chapter 90.54 RCW. An instream flow is a protected stream flow level. Although it has no effect on existing water users or put water back into the stream, new water uses can be regulated when stream flows fall below the adopted instream flow level.

Further expression of the state's interest in managing water resources to balance instream resource protection and future out-of-stream water use came with the 1997 enactment of the Watershed Planning Act (WPA), Chapter 90.82 RCW. Through the WPA, the state funded local planning units in developing Watershed Management Plans to ensure the wise use of the state's water resources, "by protecting existing water rights, by protecting instream flows for fish, and by providing for the economic wellbeing of the state's citizenry and communities."[15]

The in-stream resources that are designated for protection in state statutes[16] include fish, game, wildlife, scenic, aesthetic and other environmental values, navigational values, birds, and recreational values. Ecology has typically relied on assessment of fish habitat to determine instream flow levels that will protect fish and the other instream resources designated for protection.

[15] RCW 90.82.010
[16] RCW 90.54.020(3)(a) and RCW 90.22.010

Ecology has adopted 23 water resource management rules establishing instream flows, and in some cases closures, for rivers and streams in 26 watersheds. In addition, rules have been adopted establishing instream flows for the main stem of the Columbia and Spokane rivers. Instream flows adopted into rule since 2001 specify that instream flow restrictions apply to all new uses of water—including permit-exempt groundwater withdrawals that are in hydraulic continuity with the surface water body.

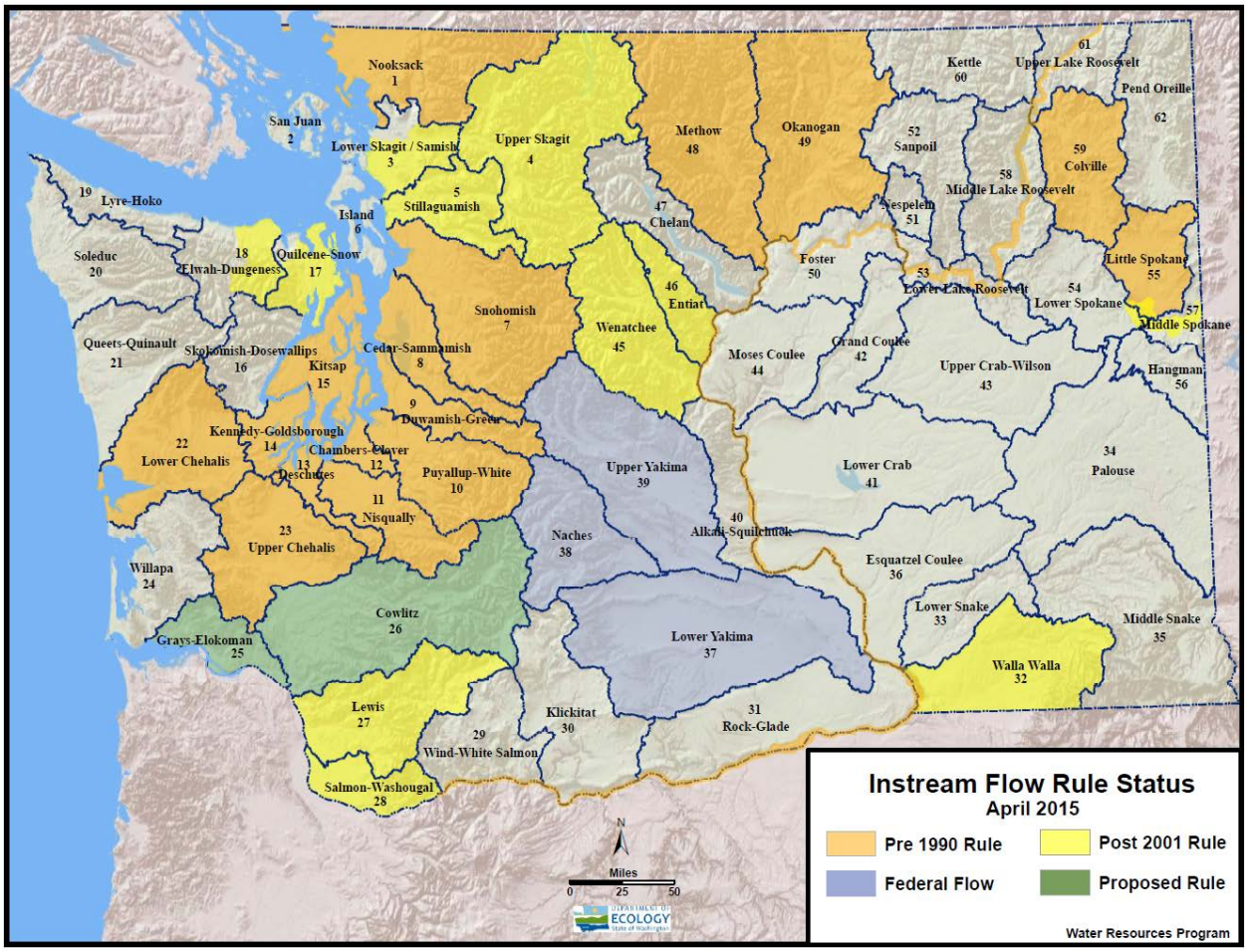

Figure 1. Instream flow rule status in Washington State

Permit-exempt withdrawals of groundwater

RCW 90.44.050 allows groundwater to be used in limited quantities without first obtaining a water right permit from Ecology. The purpose of this groundwater exemption is to minimize the administrative burden on prospective water users and on Ecology for these small water uses. While permit-exempt wells are exempt from the requirement to obtain a permit before using water, the uses are still subject to the priority system established for water rights in our state. The exceptions to the permit requirement are for withdrawals of groundwater for:

- Providing water for a single or group domestic use (limited to 5,000 gallons per day).
- Watering up to one-half acre of non-commercial lawn or garden.
- Providing water for livestock.
- Providing water for industrial purposes, including irrigation (limited to 5,000 gallons per day but no acreage limit).

Numerous studies in this state have shown that most groundwater is connected to some extent to surface water. The interconnection between groundwater (aquifers) and surface water sources is known as hydraulic continuity. Hydraulically connected groundwater and surface water cannot be considered as independent resources. A withdrawal from one will have some effect on the other.

The groundwater statute, Chapter 90.44 RCW acknowledges interconnection between groundwater and surface water with the following provision:

RCW 90.44.030 – Chapter not to affect surface water rights:

The rights to appropriate the surface waters of the state and the rights acquired by the appropriation and use of surface waters shall not be affected or impaired by any of the provisions of this supplementary chapter and, to the extent that any underground water is part of or tributary to the source of any surface stream or lake, or that the withdrawal of groundwater may affect the flow of any spring, water course, lake, or other body of surface water, the right of an appropriator and owner of surface water shall be superior to any subsequent right hereby authorized to be acquired in or to groundwater.

What is mitigation?

Ecology's Water Resources Program policy on evaluating mitigation plans for new water right permits (POL-2035) defines mitigation as:

Measures that offset adverse impacts on a water source to eliminate impairment and/or detriment to the public interest.

A broader definition that applies generally to mitigation of environmental impacts is found in the regulations of the U.S. Council on Environmental Quality (CEQ). The CEQ regulations for implementing NEPA at 40 CFR Section 1508.20 state that mitigation includes:

(a) Avoiding the impact altogether by not taking a certain action or parts of an action.

(b) Minimizing impacts by limiting the degree or magnitude of the action and its implementation.

(c) Rectifying the impact by repairing, rehabilitating, or restoring the affected environment.

(d) Reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action.

(e) Compensating for the impact by replacing or providing substitute resources or environments.

In the context of mitigating impacts to water resources from new uses of water, the Courts have helped shape Ecology's perspective on mitigation:

Postema v. Pollution Control Hearings Board, et al (2000)
The Washington State Supreme Court ruled that new withdrawals of groundwater must have no effect on closed surface water bodies, and that Ecology may use new information and scientific methodology to determine if a withdrawal will impair regulatory instream flows. Although the Court held that hydraulic continuity alone with surface waters with regulatory flows is not sufficient to establish impairment of that right, the Court did hold that if a withdrawal would impair surface water flows that an application must be denied. The court also indicated that there is no differentiation between *de minimis* or significant impairment, and that no impairment is allowed. This decision has largely driven the need to mitigate for new permit-exempt groundwater withdrawals when those uses impair instream flows.

Swinomish v. Ecology
The Supreme Court also affirmed that "a minimum flow set by rule is an existing water right that may not be impaired by subsequent withdrawal or diversion of water from a river or stream." In this decision the court also stated that Ecology could not rely on OCPI for allocating new uses of water that would result in any impairment of instream flows.

Foster v. Ecology and City of Yelm
Under the recent Supreme Court decision in *Foster* some of the mitigation strategies described in this report may no longer be viable options. In the *Foster* decision the court held that mitigation of the legal injury (or impairment) to the senior instream flow water right cannot be done through providing ecological benefit, such as out-of-kind mitigation to aquatic habitat. In addition the court held that OCPI authority may only be used to authorize temporary, and not permanent, withdrawals of water.[17]

Policy 2035 lists the types of mitigation plans developed in support of water right permit applications that Ecology has formerly considered acceptable for mitigating impacts to water resources. From the policy:

- Mitigation plans may be submitted to propose compensatory mitigation within a watershed under Chapter 90.74 RCW.[18]

[17] On October 28, 2015, the City of Yelm and Ecology filed motions for reconsideration of the court's decision in *Foster v. Department of Ecology*.

[18] Chapter 90.74 defines "Compensatory mitigation" as the restoration, creation, enhancement, or preservation of uplands, wetlands, or other aquatic resources for the purposes of compensating for unavoidable adverse impacts that remain after all appropriate and practicable avoidance and minimization has been achieved. "Compensatory mitigation" includes mitigation that:

(a) Occurs at the same time as, or in advance of, a project's planned environmental impacts;

- Ecology must consider both the benefits and costs, including environmental effects, of any water impoundment or other water resource management technique that is included as a part of the application under RCW 90.03.255 or RCW 90.44.055.

- Water rights deposited in the trust water program can be used to mitigate for water resource impacts under RCW 90.42.100(2)(a).

A body of administrative decisions that both affirms and limits Ecology's authority to accept mitigation plans in support of water right permit applications are also listed in Policy 2035:

- PCHB 05-137 Squaxin Island Tribe v. Miller Land & Timber;
- PCHB 97-146 OHA v. DOE and Battle Mt Gold Company;
- PCHB NO. 03-155 Burke and Coe v. DOE and Mountainstar Resort Development LLC;
- PCHB NO. 01-160 Airport Communities Coalition v. Ecology & Port of Seattle;
- PCHB NO. 02-037 Pacific Land Partners LLC v. DOE;
- PCHB 03-030 Yakama Nation v. DOE;
- PCHB 96-102 Manke Lumber Co v DOE.

SB 5965 requested an analysis of whether requiring mitigation for new permit-exempt groundwater withdrawals would in fact result in meeting base flows or minimum instream flows.[19] Mitigation does not guarantee that an instream flow set in rule will always be met. This is because when an instream flow rule is established, it is understood that the adopted instream flow will not be met at all times. The objective of establishing instream flows is to identify and protect the full range of stream flows that are protective of fish habitat, including higher flows that occur less frequently.

Impacts of Permit-Exempt Withdrawals on Instream Flows

Effects of permit-exempt wells on instream flows at state-wide and tributary scales
Ecology estimates that 15 percent of the state's population, or about 1 million people, currently rely on water supplied from permit-exempt wells. Culhane and Nazy (2015) investigated several aspects of permit-exempt domestic wells in Washington. Based on their report:

Statewide about 2,500 new permit-exempt domestic wells were drilled each year during the period between January 1, 2008 and September 4, 2014.

Relying most notably on Ecology's well construction database and 2005 U.S. Geological Survey (USGS) consumptive water use estimates (Lane, 2009), Ecology estimates that statewide, during the irrigation season, permit-exempt wells account for about 0.9 percent of the overall

(b) Is located in a site either on, near, or distant from the project's impacts; and
(c) Provides either the same or different biological functions and values as the functions and values impacted by the project.

[19] SB 5965 Section 2 (1)(b)

consumptive water use. However, according to Ecology's estimates, most consumptive water use is due to agricultural irrigation. Public water supply systems only account for about 4.6 percent of consumptive water use statewide.

To better understand the degree to which exempt wells are concentrated within certain subbasins, additional analyses were performed using a Geographic Information System (GIS).[20] Based on this analysis it is estimated that during the period investigated, about 80 percent of the new permit-exempt wells were concentrated within about 20 percent of the state. This GIS analysis only looked at wells drilled between January 1, 2008 and September 4, 2014 and does not account for the density of wells drilled prior to 2008. The results are depicted in Figure 2 below.

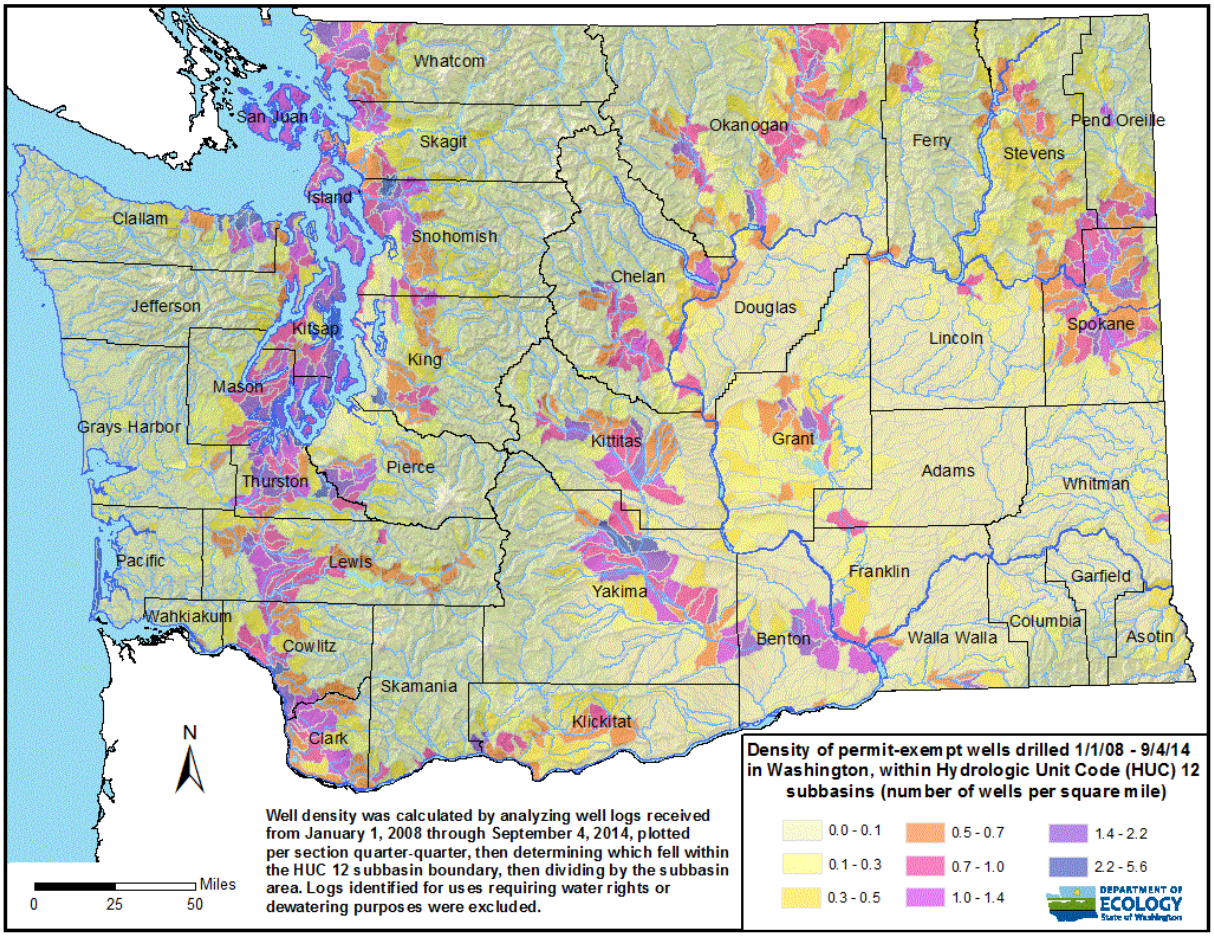

Figure 2. Density of permit-exempt domestic wells within USGS HUC 12 subbasins drilled between January 1, 2008 and September 4, 2014

[20] During this analysis a point coverage of new exempt wells drilled January 1, 2008 through September 4, 2014 was overlain with polygons representing USGS hydrologic unit code (HUC) 12 subbasins. For subbasins located entirely within the state, the areas of the HUC 12 subbasins ranged from about 10 to 140 square miles, with an average of about 35 square miles and a standard deviation of about 14 square miles. The well count for each subbasin was divided by the subbasin area (or the portion of the area within Washington) to calculate the approximate well density.

Although well density is a useful metric for evaluating permit-exempt well use, the amount of outdoor water use from wells is more significant as outdoor use has a much higher consumptive component than indoor uses. Culhane and Nazy estimated the amount of outdoor water consumptive use. However, due to the source data used, their estimates were at best county-wide averages. Moreover, the effect of groundwater pumping on surface water involves many factors. To understand how exempt well consumptive water use translates into impacts on streams at a local scale, other potential considerations include:

- **Well density/total withdrawal rates relative to stream size**
  This recognizes that on a local scale any impact to a small stream is proportionally much greater than that same impact to a large stream.

- **Timing/seasonality of withdrawals with respect to streamflow**
  During summer months groundwater use is generally greatest and tributary streamflow is generally least.

- **Geologic and hydrogeologic considerations**
  Many hydrogeologic factors affect how groundwater pumping affects streamflow and in some areas there can be a significant lag between the timing of a groundwater withdrawal and when it affects surface water.

- **Distribution of wells and well depths within the subbasin**
  The distance between a well and an affected stream, both horizontally and vertically, significantly affects the timing of well impacts. In addition, withdrawals at higher elevations generally impact longer stream reaches than lower elevation withdrawals.

- **Differences in indoor and outdoor consumptive water use**
  Indoor water use tends to be only about 10 percent consumptive (due to on-site septic systems), and outdoor water use tends to be about 80 to 90 percent consumptive (due to evapotranspiration).

- **Hydrologic changes associated with changes in land cover**
  Construction associated with exempt well development can have significant effects on streamflow, due to increased stormwater runoff and less groundwater recharge due to increased impervious surfaces.

A number of previous studies in Washington have evaluated some of these factors and produced varied results dependent on the circumstances in a particular watershed.

Spokane County Water Resources Investigation

In 2010, Spokane County Water Resources, in conjunction with Tetra Tech and Camp Dresser & McKee Inc., developed a county-wide water demand forecast model (Spokane County Water Resources, 2011 and 2013). This tool is based on water billing and production data, characteristics of permit-exempt well water uses, demographic and socioeconomic data,

agricultural and industrial data, and weather data. The model is capable of forecasting demand for numerous water use sectors, at various spatial scales and time horizons.

One important finding of Spokane County's investigation was that while the permit-exempt well residential sector represents only about seven to eight percent of total water demand, the impacts can be significant at the subbasin level. This is due to several streams within Spokane County having summer low flows near 1 cubic feet per second (cfs). For example, in the California – Lower Rock Creek subbasin, the forecasted increase in summer withdrawal was between 57 and 255 percent of stream flow.

Dungeness Watershed

To evaluate the effects of groundwater withdrawals on particular streams, some type of groundwater model is typically needed. If only one groundwater withdrawal is being analyzed, a simple analytical program may suffice. However, to analyze multiple withdrawals when complex hydrogeology is involved something like a three-dimensional, finite difference groundwater model is usually required. In the case of the Dungeness Watershed in Clallam County, Ecology hired Pacific Groundwater Group (PGG) to construct a 7-layer, transient MODFLOW model that represents groundwater movement in unconsolidated hydrogeologic units within the watershed.

Using the Dungeness groundwater model, Ecology performed numerous, separate model runs, with theoretical wells placed in the three major aquifers at varying locations. The results were then plotted on maps to show zones where well pumping would be expected to impact the Dungeness River. The study found, as shown in the following figures, that wells even 7 or 8 miles away can produce small impacts on the Dungeness River.

Results of predicted impacts to all the smaller streams within the basin were also calculated. For example, the impacts to McDonald Creek resulting from pumping in the shallow aquifer are shown below.

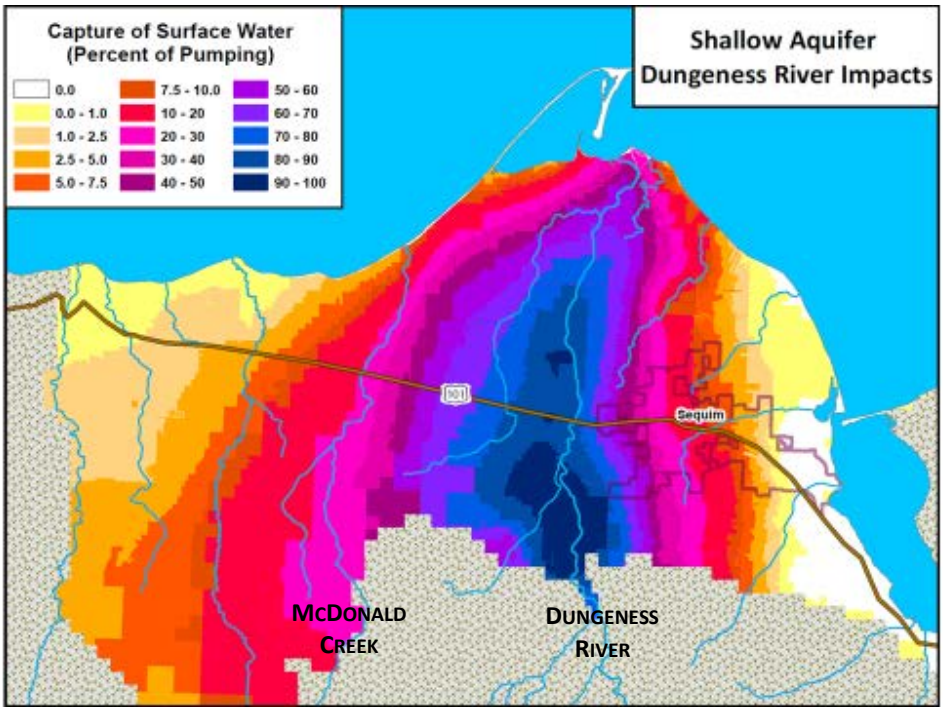

Figure 3. Potential impacts on the Dungeness River due to withdrawals from the Shallow Aquifer

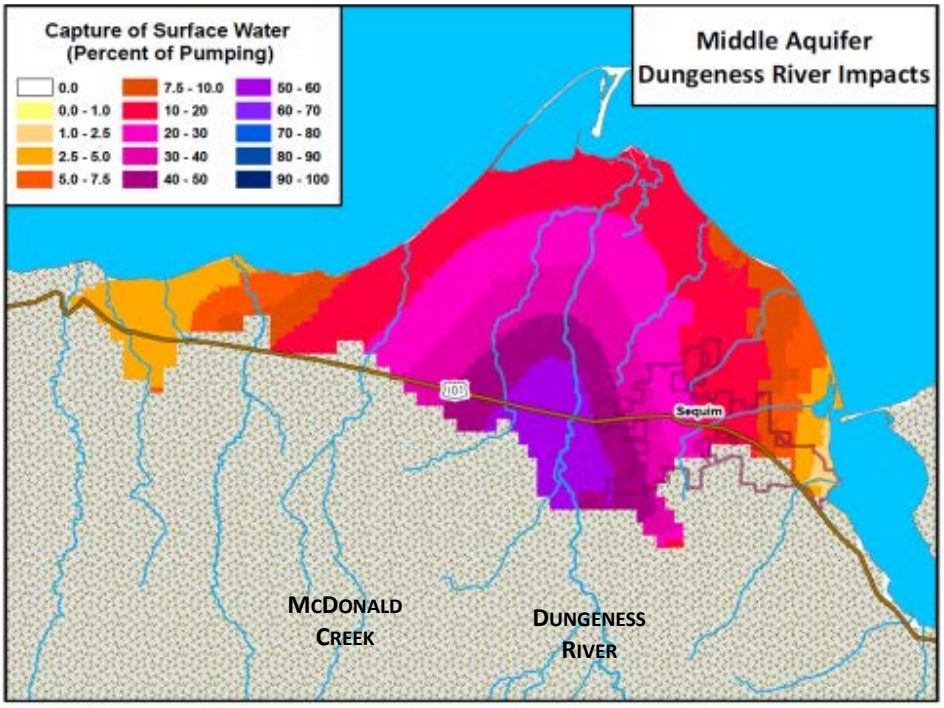

Figure 4. Potential impacts to the Dungeness River due to withdrawals from the Middle Aquifer

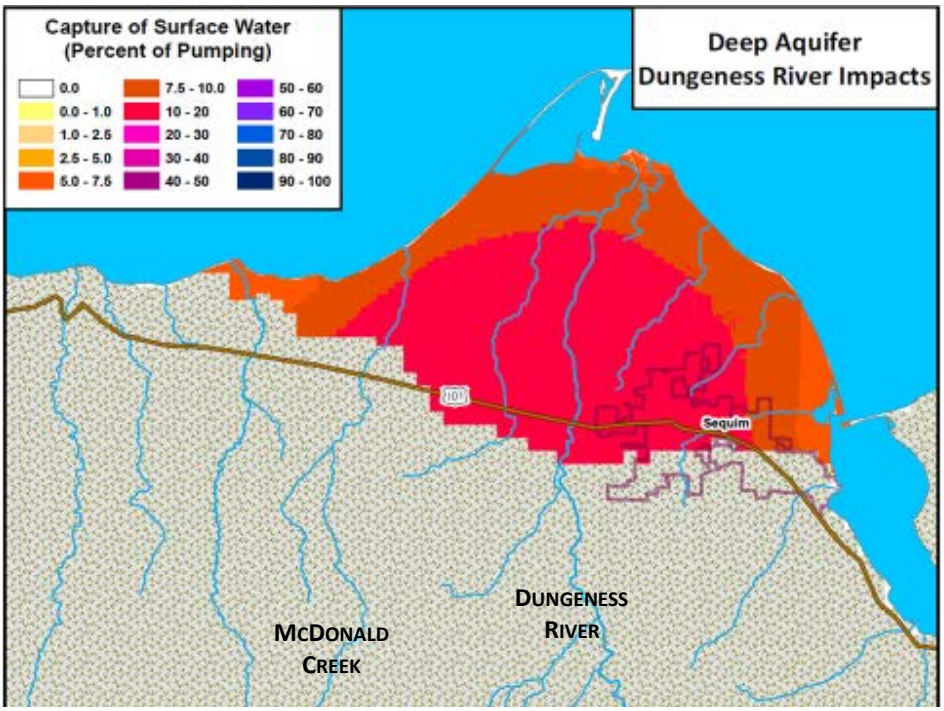

Figure 5. Potential impacts on the Dungeness River due to withdrawals from the Deep Aquifer

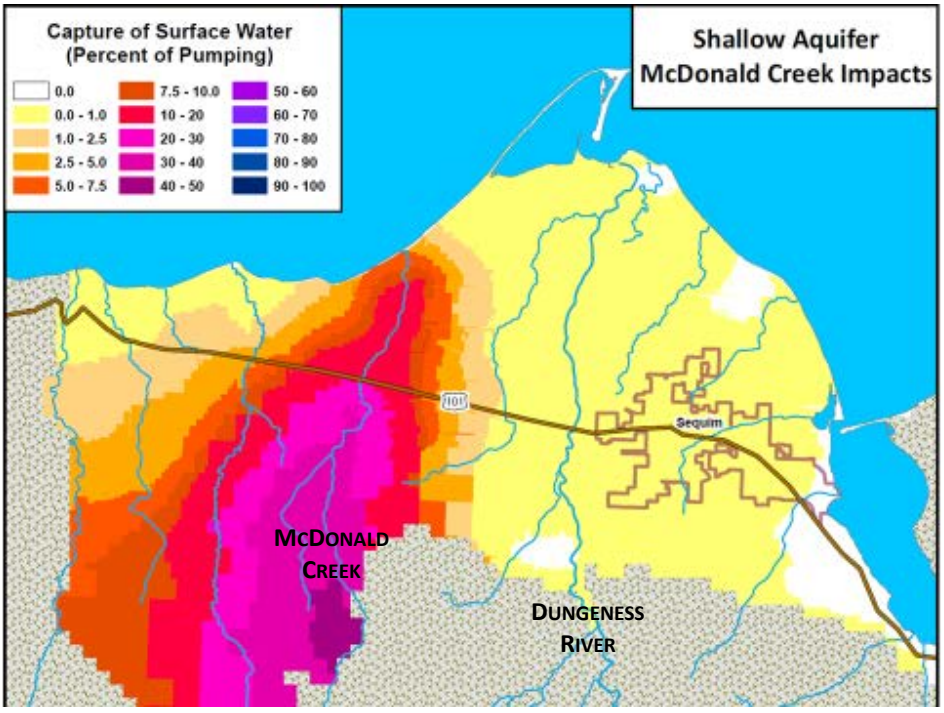

Figure 6. Potential impacts on McDonald Creek due to withdrawals from the Shallow Aquifer

Johns Creek and Goldsborough Creek Watersheds

Golder Associates (working for Ecology) and Keta Waters (working for the Squaxin Island Tribe) jointly developed a steady state, groundwater-flow model for the Johns Creek and

Goldsborough Creek watersheds in Mason County. Golder Associates used this model to assess eight groundwater management scenarios to investigate the effects of future permit-exempt groundwater withdrawals on surface water in the Johns Creek watershed. The results indicate that instead of reducing stream flows, groundwater withdrawals will primarily decrease groundwater discharge to Oakland Bay. The percent change in streamflow modeled within reaches of Johns Creek ranged from a gain of 0.09 percent to a loss of 0.15 percent, with the slight increases of stream flows in the upper watershed due to the redistribution of water from septic return flows.

Landscape Effects from Exempt Well Development[21]

New permit-exempt well use, especially for domestic use, is almost always connected to a development project: construction of one or more houses, together with driveways, access roads, accessory buildings, and so on. In addition to the impact on stream flows that might be caused by the withdrawal and use of groundwater, this landscape alteration also impacts stream flows.

Regardless of the hydrologic and geologic setting, streams are impacted by development of their watersheds. As development occurs, land is cleared and impervious surfaces such as roads, parking lots, rooftops, and sidewalks are added. Roads are cut through slopes and low spots are filled. Natural soil structure is lost due to grading and compaction during construction. Drainage patterns are irrevocably altered. Maintained landscapes that have much higher runoff characteristics often replace the natural vegetation. The accumulation of these changes results in changes in the natural hydrology, including:

- Increasing the peak volumetric flow rates of runoff,
- Increasing the total volume of runoff,
- Decreasing the time it takes for runoff to reach a natural receiving water,
- Increasing stream velocities,
- Reducing groundwater recharge,
- Increasing the frequency and duration of high stream flows,
- Increasing inundation of wetlands during and after wet weather, and
- Reducing stream flows and wetland water levels during the dry season.

Figure 1.1 from the Stormwater Management Manual for Western Washington 2012, illustrates some of these hydrologic changes (shown here in Figure 7). As a consequence of these changes

[21] This section presents information contained in the Stormwater Management Manuals for Eastern Washington (2004) and Western Washington (2012), published by Department of Ecology, Water Quality Program.

in hydrology, stream channels may experience both increased flooding and reduced base flows. Natural riffles, pools, gravel bars, and other areas may be altered or destroyed. Increased channel erosion, loss of hydraulic complexity, degradation of habitat, and changes in the composition of species present in receiving waters may follow.

As peak flows and velocities are increased, so too is channel erosion – widening, deepening, or both. The consequence, particularly for widening, is that the same flow provides less habitat than before widening. Consequently, even if the volume of water remains the same during summer low flow, the amount or quality of habitat can be reduced.

There is a large and robust body of research into the effects of land development on streams, much of it focused on streams in Puget Sound. The hydrologic and biological changes in streams resulting from removal of native vegetation, increases in impervious surfaces, and alteration of natural drainage patterns are well documented and significant (May et al 1996).[22]

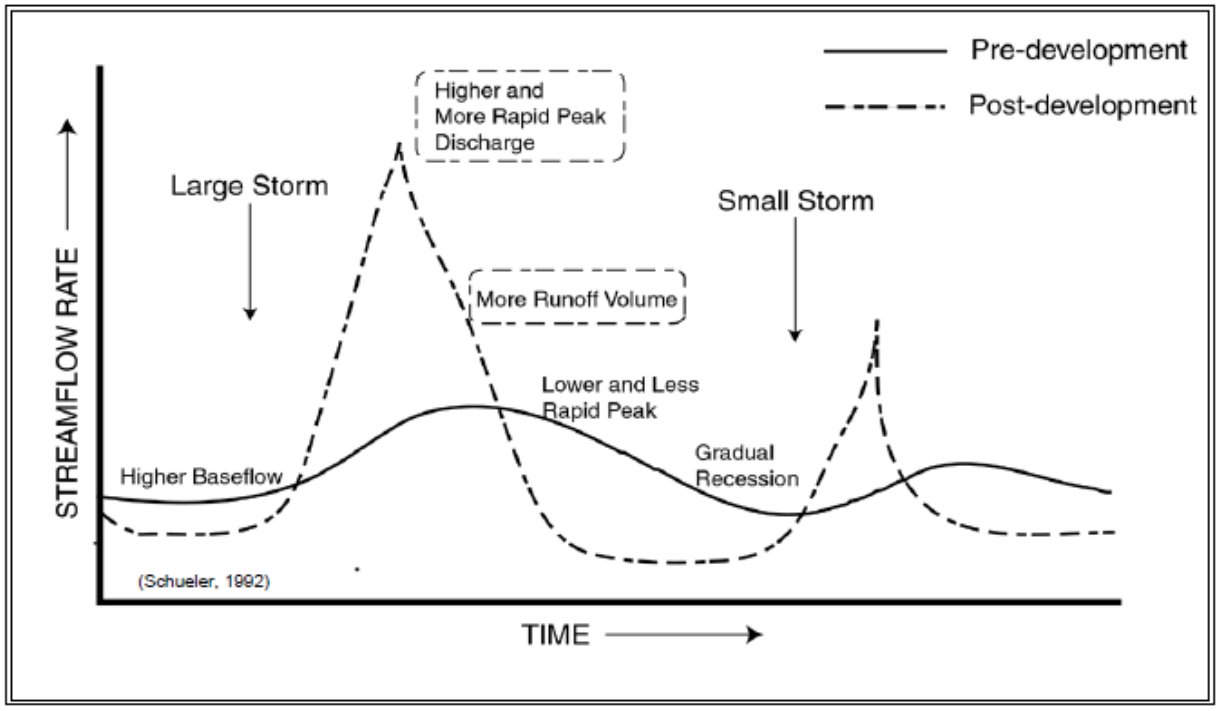

Figure 7. Changes in hydrology after development

[22] Water quality impacts from land development are also well documented, and significant, but are outside the scope of this report.

Mitigation of Permit-Exempt Withdrawals

Why is mitigation needed for new permit-exempt withdrawals?

Mitigation of a new permit-exempt withdrawal of water is necessary when water is not legally available to supply new appropriations of water. There are three situations that can restrict the legal availability of groundwater that is in hydraulic continuity with surface water: closure of a source to new withdrawals; instream flows adopted by rule that must be protected; or impairment of existing water rights for out-of-stream uses.

Closures

Closures are established through adoption of a rule, and may be included in rules that also establish instream flows. Closures in a rule specify application to surface water, groundwater, or both. However, a closure of surface water also affects groundwater in hydraulic continuity with the surface water body. The closure in a rule will also specify whether it is a year-round or a seasonal closure.

Closures are based on findings that water is not available for new appropriations and that new uses from that source would be detrimental to the public welfare. Water may not be available because the source is fully, or over, appropriated and that further uses from that source would be detrimental to the public welfare. A closure is not an appropriation under the state water code. Ecology's authority to close water bodies to new appropriations is discussed in detail in the *Postema* decision.

A Surface Water Source Limitation (SWSL) is an administrative request by the Director of the Washington State Department of Fish and Wildlife (WDFW) under the authority of RCW 77.57.020 to condition or deny a water right application.[23] Many rules implement closures originally identified in SWSLs.

Instream Flows

Instream flows adopted by rule constitute appropriations within the meaning of the state water code with priority dates as of the effective dates of their establishment (RCW 90.03.345). As a result, instream flows are legally entitled to protection from impairment by new junior water uses. New uses of water that are established after an instream flow is set can be regulated (interrupted) when instream flow levels in the stream are not met.

For most streams with adopted instream flows, water is generally available in the winter or spring when flows tend to exceed instream flow levels. Water is generally not available in the late summer or fall when stream flows are typically below instream flow levels.

[23] WDFW also has a small streams policy (Policy 5204) stating that WDFW will discourage diversions from very small streams, with a mean annual flow of less than 5 cfs.

Impairment of existing water rights

A right to use water is determined by its priority date relative to other rights from the same source. Under the prior appropriation doctrine, a person who established a water right first has a senior water right. This gives them the right to withdraw all their water before the next person in line, who holds a right "junior" to their senior right. In any river basin, the water use of junior water right holders can be interrupted if a water source is insufficient to meet all the water demands on it. When water supply is short, withdrawing water out of priority would impair the senior right.

All new appropriations, including new permit-exempt withdrawals, are vulnerable to being curtailed in favor of senior water rights unless the use is mitigated or some other compensation method acceptable to the senior water right user is negotiated. Although Ecology has not adopted instream flows in the Yakima basin, mitigation of permit-exempt well withdrawals is required to avoid impairment to adjudicated senior water rights.[24]

What actions and associated impacts must be mitigated?

To authorize a building permit or subdivision, local government must have assurance that adequate water is both legally and physically available (RCW 19.27.097 and RCW 58.17.110). As most permitting activity is associated with new residences, mitigation of permit-exempt groundwater withdrawals typically focuses on addressing the need for domestic water use. The extent of mitigation needed depends on several factors:

- The type of the proposed use and whether it requires a dependable year-round water supply, such as for domestic use; or a seasonal water supply, such as for irrigation.

- The consumptive use impact of the groundwater withdrawal on the surface water body. This impact varies depending on the type of water use, the location, and the extent of hydraulic continuity.

- The limitation on the surface water body, such as a seasonal or year-round closure, instream flow levels that are typically met during the winter months but not during the dry season, or senior water rights that have been curtailed in the past.

In river basins where a new appropriation of water is not legally available to support a proposed permit-exempt withdrawal, the impact of the proposed use on surface waters must be sufficiently mitigated to prevent a detrimental impact on senior water rights, including adopted instream flows.

[24] For more information about mitigation in the Yakima Basin, see page 32.

How is mitigation effectiveness determined?

To evaluate mitigation proposals, it is necessary to have enough information about the intended water use, the proposed mitigation, and any measures needed to ensure the effectiveness of the proposed mitigation. The impacts of a new water use on instream flows, and the effectiveness of actions to mitigate that impact, are very site specific. Mitigation must take into account the magnitude, location, and timing of the impact, as well as the hydrogeology of the basin.

When evaluating a water right permit application, an applicant may submit a mitigation plan for Ecology consideration as part of the water right permitting process. A written mitigation plan is not always required for mitigation of permit-exempt withdrawals, however, the information that must be considered to determine effectiveness is essentially the same.

A mitigation plan describes a structured approach for implementing, monitoring, and maintaining the mitigation for as long as the water is withdrawn. A mitigation plan may address impacts for an individual withdrawal or for multiple withdrawals in a subbasin. Mitigation plans may be developed by project applicants or any other person or entity that has interest and expertise in water resource management.

The necessary elements of a mitigation plan are established in some water resource management rules. Ecology's policy on the review of mitigation plans for water right permits (POL-2035) also includes a list of information needed in a mitigation plan. A typical mitigation plan includes:

- Identification of the source of supply for the proposed use and the proposed mitigation water, if applicable.
- Analysis of the consumptive quantity of water that will be depleted from the source.
- Identification of water rights, including instream flows, which would be affected by the proposed withdrawal.
- Evaluation of the reliability of the mitigation based on a detailed hydrological analysis, analytical model (including habitat assessment), or numerical model.
- Measuring and monitoring plan to ensure compliance, including a quality assurance/quality control plan.
- Financial and other assurances that the mitigation will remain in place for the full duration of the new water use (often in perpetuity) is a mandatory requirement.
- Contingency measures or an adaptive management plan that will be followed if the mitigation is determined to be inadequate after implementation.

Developing mitigation for permit-exempt withdrawals should include consultation with Tribes and Washington State Department of Fish and Wildlife (WDFW). Other entities with technical

expertise and local knowledge may also need to take part in developing proposed mitigation such as: local government, public utilities, agricultural water users, environmental interests, the local business community, and salmon recovery lead entities.

Mitigation Techniques that May be Available to Mitigate the Impacts of Permit-Exempt Withdrawals[25]

This report uses the CEQ definition of mitigation as a framework for organizing and discussing various mitigation approaches:

Avoiding impacts through other water supply options

The CEQ definition of mitigation calls for avoiding an impact "by not taking a certain action or parts of an action." This report assumes that avoiding impacts by prohibiting all new development that could impact instream flows is outside the scope of this report. There may be limited situations where local government land use decisions result in prohibitions on new development in certain areas. However, it is generally assumed that some level of new development will occur in rural portions of basins with adopted instream flows, where reliance on permit-exempt groundwater withdrawals is the norm. Typically this means it is necessary to avoid the legal impairment to senior instream flow water rights through some other form of mitigation.

It is also sometimes possible to avoid the physical impact of new permit-exempt water use on instream flows by locating a new permit-exempt withdrawal where there is no hydraulic continuity between the water source and the stream. Where this is possible, a site-specific analysis to confirm the lack of connection is necessary.

Avoiding legal impairment to instream flows may be possible in some situations by relying on water supply options other than drilling a well. These include: alternative water supply such as rainwater collection or hauling water (or a combination of rainwater and hauled water); extending public water supply infrastructure (provided the water supplier has the capacity to provide additional connections); conservation; and condemnation. Ecology views these as water supply options and not a form of mitigation, but they do avoid the legal impact of a permit-exempt withdrawal on senior instream flow water rights.

Rainwater collection or trucked water: There are many considerations that affect the feasibility of rainwater collection or hauling water for a particular location including: cost, safety and reliability of potable water, precipitation patterns, or the distance to the source of water. Ecology has found that property owners prefer wells over alternative water supply options, especially in areas where groundwater is physically available. From a public health perspective, groundwater is generally assumed to be the safest and most reliable source of potable water.

[25] SB 5965 Section 2 (1)(f)

However, appropriate treatment can improve the safety of alternative water supply options such as rainwater collection or hauling water.

Extending public water supply: Municipal water supply is another option that can be available in some locations. Exercise of municipal water rights has similar physical impacts to stream flows. However, where these rights are senior to the adopted instream flows they do not cause legal impairment of instream flows and maintain overall water supply within existing allocations. The cost of installing pipelines, the potential of encouraging higher density development in these areas, and the impacts of moving water outside of the source basin are all important considerations for extending public water supply into rural areas.

Conservation: Conservation could make water available for new users under limited circumstances. The greatest challenge is the geographic availability of potentially conserved water from senior water rights holders. Many areas of a watershed could not be served from conserved water from an existing right holder because the supply and demand are not necessarily close to one another. Further, Ecology cannot compel existing water right holders to take part in conservation measures, so the agency cannot count on conserved water being available in any particular location. Relying on conservation would be best used as part of a larger comprehensive mitigation strategy.

Condemnation: Condemnation of existing water rights is a legal option authorized under RCW 90.03.040. Governments and individuals may obtain new water through a condemnation action if they can demonstrate to a court that their use "will serve a public purpose, is necessary for the public interest and the Condemned Property and Water Rights are necessary for this purpose." The entity seeking to condemn the water right must make the case that the new use will result in a transfer from an inferior to superior use, and if successful must compensate the original owner. Condemnation has been used infrequently.

Alternative water supply options are discussed in more detail the section of this report on Skagit Basin water supply options, starting on page 36.

Minimizing impact

If statutory authority were available to restrict the quantity of water authorized for permit-exempt withdrawals it would be possible to minimize impacts. For example, irrigation of ½ acre of non-commercial lawn or garden can use from 2,000 to 4,500 gallons per day in the month of July, depending on location and what plants are grown. Most of that water use is consumptive, meaning it does not return to the aquifer. Reducing outdoor water use, or limiting new uses to indoor domestic use could minimize the impacts of new residential water use.

Ecology has allowed minimizing impacts as a means of mitigation in one situation. The Water Resources Management rule for the Methow River Basin, Chapter 173-548 WAC, was amended in 1991 to close certain streams and lakes to further consumptive appropriations. The closure provision applies to new water right permits and to permit-exempt groundwater withdrawals.

The rule allows approval of groundwater withdrawals if the withdrawal is determined not to be hydraulically connected with the closed surface waters. New permit-exempt wells are allowed if they are cased and sealed 10 feet into the underlying granite bedrock, avoiding withdrawal from the gravel aquifer that is in direct hydraulic continuity with the closed surface water bodies. Mitigation is provided by minimizing the impact of permit-exempt withdrawals.

More recent Supreme Court decisions in *Swinomish* and *Foster* have established restrictions that mean this option to minimize impacts may no longer be viable in the development of future rules. However, minimizing impacts is important as part of a suite of mitigation actions.

Rectifying the impact by repairing, rehabilitating, or restoring degraded environment

More than a century of land development, logging, farming, hydropower production, and other activities has resulted in many significant impacts to rivers and streams in Washington State. In many places rivers have been channelized, impounded, or disconnected from their floodplains. Riparian vegetation has been eliminated or greatly reduced. In developed basins, land clearing and construction of impervious surfaces have lowered base flows as a result of reduced groundwater recharge and increased surface water runoff. Land development has also degraded or destroyed instream habitat features such as riffles, pools, and gravel bars due to increased peak runoff rates. Ecology has increasingly looked to projects that rectify past impacts and provide benefits to instream resources as mitigation or supplemental mitigation for new uses.

In the Yakima Basin, water banks provide mitigation to offset impacts to senior instream and irrigation water rights. However, there are no adopted instream flows in the Yakima basin. Mitigation must offset impact the consumptive water impacts of the new use, and also adverse changes in stream flow wherever it occurs. The mitigation banks fully offset consumptive use impacts through retirement of pre-1905 water rights and fallowing of irrigated land. In each case, the water right retired by the bank does not effectively offset all of the adverse flow-related impacts to fish habitat that would be expected from development of the new groundwater uses.

Additional projects provide in-kind mitigation that augment flow in tributary streams. These projects rely on instream habitat enhancement or restoration to improve stream flow. One project improved fish passage conditions at the mouth of Tillman Creek by augmenting instream flow with water imported from an adjacent non fish-bearing stream. The Teanaway project is a floodplain restoration project that is intended to improve base flow after the end of the mitigation season, providing in-kind, in-time and in-place mitigation. These projects are profiled in Attachment A.

Reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action.

Ecology does not have a mechanism to reduce the impact of permit-exempt withdrawals once they are authorized.

Compensating for the impact by replacing or providing substitute resources or environments.

Most mitigation techniques that have proven effective to avoid impairment to existing water rights involve replacement or substitute resources. This section first describes the concepts of mitigation as being “in-kind,” “in-place,” “in-time,” “out-of-kind,” “out-of-place,” or “out-of-time;” followed by examples.

In-kind, in-time, and in-place mitigation.
"In-kind" mitigation or "water-for-water" mitigation refers to offsetting the adverse impacts of a new withdrawal with an equal quantity of suitable quality water. "In-place" mitigation refers to measures whose benefits occur at the same location as the adverse impacts of a proposal. "In-time" mitigation refers to mitigation that occurs at the same time as the impacts of a proposal on a water source.

Out-of-time or out-of-place mitigation
"Out-of-time" or "out-of-place" mitigation refers to offsetting the impacts of a new withdrawal with water which benefits the impaired stream at a different time period or a different location than the impacts of the new use of water. These approaches to mitigation could benefit instream resources in situations where a critical low-flow time period or a specific stream reach have been identified as limiting to fish populations. However, the recent Supreme Court decision in *Foster* has clearly stated these approaches are not allowable mitigation options.

Out-of-kind mitigation
"Out-of-kind mitigation" refers to mitigating for a new water use by providing improvements that enhance the ecological benefits of existing flows to offset impacts, rather than physically replacing the water lost through the new proposed use. SB 5965 defined out-of-kind mitigation as “techniques that seek to manage broader hydrologic impacts that may be associated with rural development rather than focusing on regulating the consumptive impact of new groundwater withdrawals. Out-of-kind mitigation techniques may include, but are not limited to, land development practices, habitat restoration, and best management practices.”

In the *Foster* decision, the court held that impairment to the senior (instream flow) water right cannot be mitigated by providing ecological benefit, such as out-of-kind mitigation to enhance or restore aquatic habitat. Ecology has not applied out-of-kind mitigation to offset impacts to regulatory instream flows from permit-exempt withdrawals.

Mitigation Techniques

Water for water (in-kind) mitigation

The most direct mitigation is water for water, from the same source, and for the same time frame as the proposed use (often in perpetuity). Such water-for-water mitigation is water budget neutral: the same amount of water remains in the stream and there is no impairment of the

instream flow. However, it is seldom the case that a source of water available for mitigation precisely matches the timing or location of the impacts of the proposed new use of water. If the estimated volume, timing, or location of the adverse impact is uncertain, water-for-water mitigation that replaces more than the estimated impact may be necessary.

There are a number of ways that water for water mitigation can be provided:

- Placing senior water rights in the State Trust Water Program
- Permanent lease agreements
- Shallow aquifer recharge
- Storage for release during low flow
- Reclaimed water or return flows
- Pumped flow augmentation

Placing senior water rights in the State Trust Water Program
The Trust Water Rights Program (TWRP), is a mechanism for holding and protecting water rights, which are then available for other uses. To mitigate impacts to instream flows the water for mitigation must be a water right that is senior to the instream flow (the effective date of the rule). The water source and the timing of use of the senior water right must also be taken into consideration to ensure the new use is offset by the senior water right.

Permanent lease agreements
Mitigation water can be acquired through permanent lease agreements with senior water right holders. Typically leasing agreements are with holders of senior agricultural water rights, with farmers fallowing fields to make a water available for new uses. In some situations groups of farmers that hold rights through an irrigation district or company rotate fallowing among fields held by different farmers to make a portion of the group's water rights available for other uses. Split-season leases are another approach, with farmers forgoing a second crop and leasing water for part of a growing season.

Shallow Aquifer Recharge (SAR)
Shallow aquifer recharge (SAR) projects can mitigate new permit exempt uses. These projects increase surface infiltration and store water in shallow groundwater aquifers, and then discharge water back to the stream during low flow periods.

In shallow aquifer recharge (SAR), surface water is diverted when it is available to recharge groundwater. SAR can also be accomplished using reclaimed wastewater from municipal wastewater treatment facilities. The recharge method varies, and may involve spreading the water on land, transmitting through existing leaky conveyances like unused earthen irrigation districts, or can take the form of new wetland creation, historic wetland restoration, or enhancement of an existing wetland.

SAR projects can be effective for addressing seasonal low flow problems common to stream systems that have experienced significant alteration in land cover due to urbanization, flood plain constriction, or forest practices.

Storage for release during low flow
In some watersheds water availability is a seasonal issue. Water is generally available above instream flow levels during the rainy period and not available during the late summer and early fall when instream flows are not met. Similar to SAR projects, it can be possible to mitigate for new uses by storing water that is available during the high-flow season and releasing it to provide offsets for new permit-exempt uses during the low-flow season.

Reclaimed water or return flows
Reclaimed water or return flows (wastewater or storm water) can provide mitigation in limited circumstances, generally when the original discharge is to marine waters. The effectiveness of this type of mitigation depends on the artificial maintenance of stream flows, assurances of long-term active maintenance and operation for the duration of the water use, and further assurance that the water is of appropriate quality for augmentation purposes. Therefore, it is allowed only where the water budget is well-defined, the risk of failure is very low, and there are sufficient control measures to ensure compliance for as long as the new water is withdrawn. Reclaimed wastewater or stormwater releases can be considered for mitigation where properly permitted and where control measures are in place to protect water quality.

Pumped flow augmentation
Pumped flow augmentation, which involves pumping an aquifer to augment stream flow, has been allowed as mitigation in a few situations in connection with new water right permits. Pumped flow augmentation is an approach that has significant barriers to successful implementation for mitigating permit-exempt wells. First, because pumping the augmentation water itself typically also reduces streamflow, it is difficult to achieve a true offset. Second, as this type of mitigation depends on a very artificial means of stream flow maintenance, and requires long-term active maintenance and operation, there are significant risks that this augmentation will not occur for the duration of the withdrawal.

Since pumped flow augmentation must not threaten the sustainable yield of the aquifer or impair other water rights it is more likely to be considered as a seasonal, rather than continuous, form of mitigation.

Water banking

Water banking is not a mitigation technique, but it is an important way to make mitigation available for permit-exempt uses. Water banks are a mechanism to facilitate the legal transfer and market exchange of surface water, groundwater, and water storage rights that makes water available for new uses. Authority to use water banking to mitigate for new water uses is found in the trust water rights statute, Chapter 90.42 RCW. The water banking provisions of RCW 90.42.100 through .103, enable water right holders with rights senior to the instream flows to place those rights into trust for banking purposes. Then new water users may purchase portions

of the senior water rights to offset a proposed new use. Water banks can also engage in a range of mitigation activities, such as SAR and aquatic habitat restoration, as supplemental mitigation to ensure impacts resulting from the Bank's customers are offset. The common goal of a water bank is to allow the market to move water to where it is needed most.

Many banks pool water supplies from willing sellers and make them available as mitigation credits to willing buyers. This type of mitigation has been successfully used to offset the impacts of permit-exempt well use on instream flows in several areas of the state. Water banks make it possible for new permit-exempt well users to purchase small amounts of water that would not otherwise be marketed by senior water right holders interested in selling only a large amount of water at one time.

The biggest drawback with water banks is that mitigation credits purchased from banks are geographically limited as to where they can successfully mitigate for a new use of water from a well. The *Foster* decision has clarified that the mitigation provided by the banked water must be aligned in time and place with the impacts from the proposed new water use.

Watershed approaches to mitigation

Watershed approaches are another potential strategy for mitigating the impacts of permit-exempt well withdrawals that Ecology is open to considering, but has not been implemented anywhere in the state. A comprehensive watershed strategy could integrate a suite of actions potentially including water for water mitigation, stormwater management, and land development practices. Aquatic habitat projects to supplement water-for-water mitigation could also be included. Aquatic habitat projects such as in-channel habitat restoration, riparian corridor restoration, and reconnecting the historic floodplain could improve the quality of habitat to offset small decreases in the quantity of flow.

The basis of a watershed mitigation strategy is to assess and prioritize actions that will provide the greatest basin benefits while successfully mitigating impacts. Diverse natural conditions, historic development, and patterns of water use require unique solutions for each basin. Watershed approaches require significant investments. However a successful approach provides opportunities to mitigate for widely dispersed impacts.

To develop a watershed strategy, analysis is needed on the scale of future impacts, instream resource protection and restoration priorities, mitigation options, and limits on the amount of new consumptive water use allowable if supplemental out-of-kind mitigation is considered. However, watershed approaches that involve anything other than water-for-water mitigation to offset future impacts of new uses in-place and in-time are not viable under the *Foster* Supreme Court decision.

A watershed approach to mitigation will require that an ongoing management framework is established that protects and enhances instream resources and watershed functions, and that ensures that adequate instream flows are maintained. Important elements include:

- A decision making process that includes state, local, and Tribal governments; affected senior water right holders; and state and Tribal fisheries managers.

- An independent technical review board with expertise in stream ecology, fish ecology, fish population dynamics, hydrology, and hydrogeology.

- Identification of an entity, with the authority to own or manage land, which will take on the responsibility for ongoing operation of the mitigation and restoration program.

- Necessary funding to accomplish needed mitigation and restoration projects, and to sustain on-going operation and management.

A watershed approach to providing mitigation could have some benefits:

- A watershed approach to mitigation would result in solutions tailored to the needs of the basin and could provide flexibility to target areas where mitigation would be most valuable, as opposed to mitigating each exemption one by one.

- Combinations of mitigation strategies are often necessary to fully mitigate for new uses.

- New well uses are typically dispersed throughout a watershed making it necessary to match mitigation with impacts across a large area. In addition, small tributary stream systems can be more sensitive to the impacts of new well withdrawals but have limited senior water rights available as sources of mitigation.

- This could reduce the local government and Ecology workload associated with requests for technical advice and rule interpretation for individual homeowners.

- There is an economy of scale, making mitigation more practical for groups than individual small users.

A watershed approach to providing mitigation also has limitations or challenges that must be addressed:

- Identifying suitable mitigation projects is often challenging (land acquisition, prioritizing, coordination), requires collaboration among diverse partners and a funding mechanism, and can take a lot of time.

- Ecology has no authority to acquire and manage property, so must partner with a land conservation group or a state agency that can acquire and manage property (DNR or WDFW, for example).

- Managing watershed level mitigation requires a willing organization with the appropriate capacity to manage the resources to achieve the expected outcomes.

- The long term success of mitigation projects must be guaranteed.

The state has not yet developed clear benchmarks to determine success in this sort of approach.

Watershed approaches could encompass stormwater management best management practices such as Low Impact Development (LID). These practices could provide mitigation by reducing the hydrologic changes to streams resulting from land development. However, these practices are not generally considered as mitigation for new permit-exempt withdrawals.

There is a Pollution Control Hearings Board (PCHB) summary judgment order considering whether a water right could be issued based on the infiltration of runoff from human-made impervious surfaces installed by the water user. The PCHB found the answer was no. "Absent the impermeable surfaces, the water would naturally recharge the system and benefit the base flows of streams. No credit is merited nor authorized under the Water Code for returning to nature, what originally belonged to it. That water, similar to the water allegedly gained from deforestation, belongs to the public and is subject to the right of prior appropriators."

Even if stormwater best management practices are not allowable as mitigation,[26] reducing impacts to streams could help lessen the overall mitigation burden. Also, the summary judgment order in the Black Diamond PCHB case did not address restoration actions that reduce impacts from existing land development in a basin. It might be possible that restoration actions addressing impacts that predated the instream flow rule, and that also benefit stream flows could provide benefits as part of a watershed mitigation strategy.

Aquatic habitat restoration could also be included as an out-of-kind component to a watershed mitigation strategy to address places in the watershed where in-kind flow enhancement is not available.

SB 5965 called for a survey of in-kind flow enhancement strategies other than regulation of permit-exempt groundwater withdrawals.[27] Some stakeholders have suggested that it would be advantageous to protect instream flows from the impacts of permit exempt withdrawals through some form of watershed-wide activities that focused on protecting or improving stream flows and habitat values, rather than relying on direct regulation of permit-exempt withdrawals. The objective appears to be to provide adequate mitigation with less regulatory or administrative burden for property owners and local governments. Some ideas have been suggested but nothing specific has ever been advanced.

One suggestion was to "decouple" the mitigation of exempt wells from a one-to-one permit process. The proposal was never fully described but seemed to suggest eliminating such things as assuring mitigation of an individual site and water banks, and instead relying on "watershed level" mitigation to address the impacts of exempt withdrawals.

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[26] PCHB summary judgment order on statewide threshold issues, 1/16/1996. Black Diamond Assoc., Northeast Sammamish Water & Sewer District, and St. Andrews One. King County Superior Court Nos. 97-2-01097-7KNT, 96-2-20613-0KNT, 97-2-17943-2KNT, 97-2-17946-1KNT, 97-2-17932-7KNT, 97-2-17309-4KNT, 97-2-17936-0KNT PCHB Nos. 96-90, 96-56, 96-57, 96-72 to 74, 96-54, 96-94, and 96-53.

[27] SB 5965 Section 2 (1)(e)

A similar concept was considered in the Dungeness watershed during rule development. Local stakeholders, concerned with the potential complexity and costs to individuals of the still-in-development Dungeness Water Exchange, suggested that a "bulk water" restoration of flows could more than offset the impacts of future permit-exempt well use and eliminate the need for individuals to purchase mitigation. In response to this and other local concerns, Ecology decided to "pause" the rule development process to allow local stakeholders time to explore alternative water management strategies for the Dungeness. Rule development was put on hold in late 2010.

In February 2011, an Agreement in Principle (AIP) listing water management goals was signed by Clallam County, the Sequim-Dungeness Water Users Association, and Ecology. The Jamestown S'Klallam Tribe conveyed their support via a letter from Tribal Chairman Ron Allen. To work on goals listed in the AIP, the Local Leaders Water Management Work Group (LLWG) formed and met regularly through 2011. In addition to AIP signers, the City of Sequim, Clallam County PUD, and the Clallam Conservation District, as well as some members of the public took part in the discussions. The LLWG issued a final report in March of 2012 that accepted the premise that all new consumptive uses of water are obligated to mitigate that use. The LLWG also supported the Dungeness Water Exchange as the mechanism for new users to acquire groundwater mitigation credits. The report did not discuss what happened to the "bulk water" proposal; evidently it did not prove to be a viable option.

Mitigation of permit-exempt withdrawals 2005 – 2015

SB 5965 called for:

> *A description of mitigation techniques the department of ecology has employed in the last ten years to mitigate the impacts of permit-exempt groundwater withdrawals on base flows and minimum instream flows, including the location, cost, and legal authority for each type of mitigation technique.*[28]

This section describes the mitigation programs for permit exempt withdrawals adopted through rules for the Walla Walla, Yakima, and Dungeness watersheds and for the Spokane River.

Walla Walla – WRIA 32

The Walla Walla Basin poses unique water management challenges. The basin has limited water resources; it has been over-appropriated since the early 1900s (that is, more water has been distributed on paper, as water rights, than actually exists in the streams). As early as the 1880s, parts of the Walla Walla River were seasonally dried up, seriously impacting salmon and other fish. Water withdrawals intensify the natural low flow conditions that occur in the late summer and early fall.

In 2007 Ecology amended the instream flow rule for the Walla Walla Basin, Chapter 173-532 WAC – Water Resources Program for the Walla Walla River Basin, WRIA 32. The amended rule requires new uses from the shallow aquifer, located on land zoned for parcels that are 10 acres or less, to mitigate for all outdoor water use. Mitigation is required for the period between May 1 and November 30. Metering of the new use is also required. The mitigation requirement became effective on May 1, 2008.

Individuals can opt to find their own mitigation or purchase mitigation from the program administered by the Partnership. The Partnership purchases water rights, stores them in the Water Bank, and divides them into Exempt Well Mitigation Credits for sale to prospective water users. State funding provided the seed money to purchase the initial water rights for the Water Bank. Community outreach to inform prospective home builders that mitigation is required is an important part of the program.

New home builders requesting mitigation water must pay a one-time fee of approximately $2,000 to the Water Bank. Ecology then issues a legal document certifying that the home builder has fulfilled the mitigation requirement. Mitigation certificates are issued for .55 acre feet/year per residence. This amount provides about 1,000 gallons per day through the irrigation season, enough to irrigate about 1/12 acre (3,600 square feet).

A total of four homeowners have purchased outdoor use mitigation certificates from the Walla Walla Water Bank. The need for mitigation in this area is small because only a small portion of rural areas in the watershed are zoned “high density” (parcels 10 acres or smaller). Most rural areas are zoned for 20 or 40-acre lots. Also, much of this area was previously in irrigated

[28] SB 5965 Section 2(1)(c).

agriculture. When residential lots are created, the irrigation water right carries along with the property.

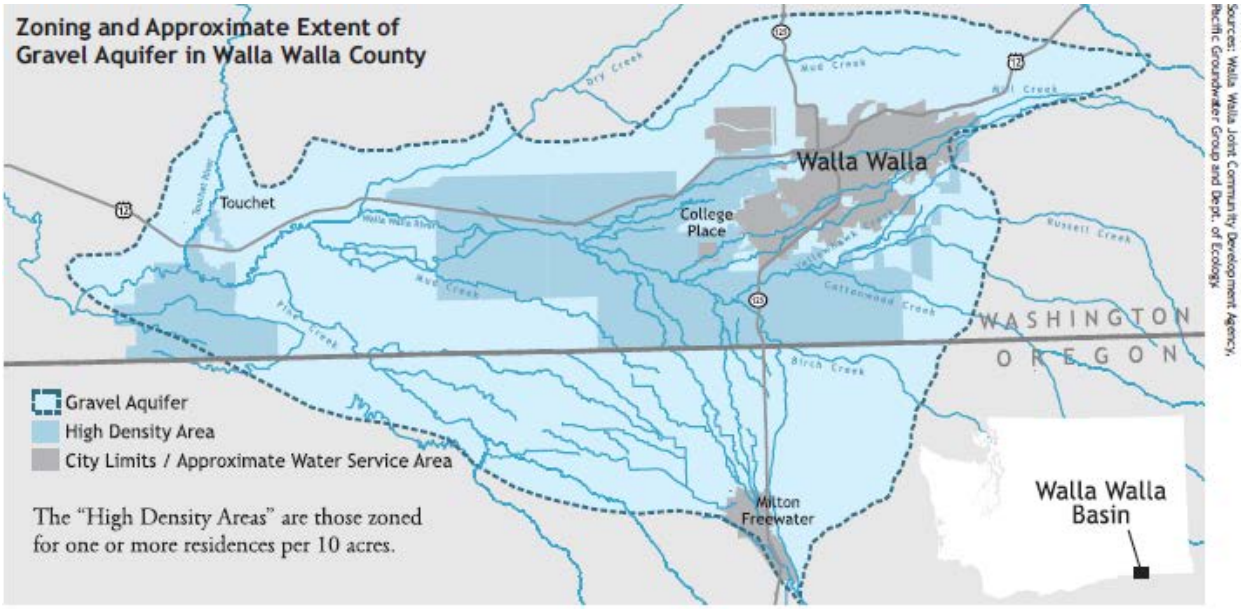


Figure 8. Zoning and Approximate Extent of the Gravel Aquifer in Walla Walla County

Yakima Basin – WRIAs 37, 38 & 39

The Yakima basin has the most intensive use of water in the state of Washington. The basin consists of three Water Resource Inventory Areas, the Lower Yakima (WRIA 37), the Naches (WRIA 38), and the Upper Yakima (WRIA 39). The naturally available summer flow in the Yakima basin was spoken for more than a century ago. Increased demands from population growth, declining groundwater levels, endangered fish species, and impacts from climate change are adding to the challenge of meeting existing demands in the Yakima Basin, especially during the summer months.

Surface waters in the Yakima Basin are under adjudication and are not available for new uses without water budget neutral mitigation. The Yakima adjudication has affirmed very early priority date water rights held by the Yakama Nation for both on-reservation irrigation uses and on- and off-reservation instream flows. Several thousand state-issued water rights have also been confirmed. Water rights associated with a U.S. Bureau of Reclamation water project serving irrigation districts have a priority date of May 10, 1905. May 10, 1905 irrigation rights, which include several major irrigation districts, are prorated (i.e. receive a prorata share of water remaining after senior rights are met).

Surface waters in the Yakima Basin are managed under the ongoing adjudication to protect senior water rights. Junior surface water rights in the basin, with priority dates after May 10, 1905, are shut off during droughts per court order.

There are no WAC based adopted instream flows in the Yakima Basin, but there are instream flow Treaty Rights and federal target flows maintained by operations of the Bureau of Reclamation Yakima Project.

Reports issued by the USGS conclude that existing groundwater pumping and consumption, most of it under rights established after 1905, reduces flows in the Yakima River and tributaries by up to 200 cubic feet per second at the mouth of the Yakima River.[29] These findings suggest that further groundwater development would impact surface waters. Although groundwater is not a part of the adjudication, parties in the basin have discussed the possibility and necessity to also adjudicate groundwater rights.

In the upper Yakima Basin, the Upper Kittitas Groundwater Rule, Chapter 173-539A WAC, requires mitigation for new permit-exempt groundwater uses. To ensure compliance with the rule and provide dependable water supplies to rural domestic water users, water exchanges have been established in the Upper Kittitas, Lower Kittitas, Central Yakima, and Lower Yakima basins. As of the date of this publication total of nine water banks serving different portions of the basins are selling mitigation credits to new and existing permit-exempt well users. In addition, Kittitas County has formed a water bank to provide mitigation in Lower Kittitas County, beyond the area covered under the Upper Kittitas groundwater rule. More information about Yakima water exchanges is available on Ecology's webpage at: http://www.ecy.wa.gov/programs/wr/market/waterbank.html

The mitigation provided by these water banks is almost exclusively through the purchase and transfer into the State Water Trust of senior (pre 1905) water rights, providing in-kind water budget neutral mitigation. The cost of purchasing mitigation is set by the entity owning and managing the water bank. Ecology is gathering information about mitigation costs as part of implementing SB6179, adopted during the 2016 legislative session. This new legislation calls for Ecology maintaining and making available information about water banks. Cost information should be available on Ecology's Water Resources webpage by July 1, 2016. http://www.ecy.wa.gov/programs/wr/wrhome.html

Two mitigation projects are currently underway in the Yakima Basin that benefit water banks operating in the Teanaway River and in Tillman Creek. These mitigation banks fully offset consumptive use impacts through retirement of pre-1905 water rights and fallowing of irrigated land. In each case, the water right retired by the bank does not effectively offset all of the adverse flow related impacts to fish habitat that would be expected from development of the new groundwater uses. Additional projects rely on instream habitat enhancement or restoration to provide in-kind mitigation in tributary streams.

- In the Teanaway River basin, a project on Indian Creek will reconnect the historic floodplain and the creek by placement of large woody debris with the objective of improving storage

[29] Ely, D.M., Bachmann, M.P., and Vaccaro, J.J., 2011, Numerical simulation of groundwater flow for the Yakima River basin aquifer system, Washington: U.S. Geological Survey Scientific Investigations Report 2011-5155, 90 p. Gendaszek, A.S., Ely, D.M., Hinkle, S.R., Kahle, S.C., and Welch, W.B., 2014, Hydrogeologic framework and groundwater/surface-water interactions of the upper Yakima River Basin, Kittitas County, central Washington: U.S. Geological Survey Scientific Investigations Report 2014–5119, 66 p., http://dx.doi.org/10.3133/sir20145119.

capacity within the floodway. This project includes extensive monitoring to evaluate effects on stream flow and groundwater levels. This project is considered to provide in-kind, in-time and in-place mitigation.

- The second project, in the Tillman Creek subbasin in the Upper Yakima Valley, involves reconnecting a small unnamed non fish-bearing tributary to the main channel of Tillman Creek. The small unnamed tributary was cut off from Tillman Creek by construction of the railroad long ago. Reconnecting the small tributary increased flows in Tillman Creek, aiding fish passage.

As these examples demonstrate, projects beyond relying on acquiring senior water rights can provide water-for-water mitigation with a positive impact on stream flows, as well as improving the quality and quantity of instream habitat. (More information on both supplemental mitigation projects is in Attachment A.)

Dungeness – WRIA 18

Located in the rain shadow of the Olympic Peninsula, the Dungeness watershed is the only coastal watershed in Washington where an irrigation distribution system is necessary for agricultural crops. The irrigation system, the river and many small streams interact with the groundwater system that supplies domestic water for rural residences and the City of Sequim. The Dungeness River is fully appropriated, and water rights for the Dungeness area irrigators were adjudicated in 1924.

The Dungeness water management rule (Chapter 173-518 WAC) took effect January 2, 2013. The rule requires mitigation of all new uses of water, including permit-exempt withdrawals. Individuals can choose to find their own mitigation or purchase mitigation from the Dungeness Water Exchange.

The Dungeness Water Exchange was created through collaboration between Ecology, Clallam County, the Dungeness Water Users Association, the Jamestown S'Klallam Tribe, City of Sequim, Clallam PUD No.1, Clallam Conservation District, Washington Department of Fish and Wildlife, and Washington Water Trust. The Dungeness Water Exchange is operated by Washington Water Trust (WWT), a third party, non-regulatory nonprofit, dedicated to improving and protecting stream flows and water quality throughout Washington State.

The mitigation framework for the Dungeness is unique. A groundwater model provides a high level of understanding of the groundwater – surface water interactions in this watershed. Each new withdrawal impacts the Dungeness River and the small streams in the watershed. Therefore the mitigation requirement for each parcel is distributed across the watershed.

WWT purchased 175 acre feet per year of water rights from the Dungeness Water Users Association to provide the initial mitigation water for use in the Exchange, using seed money provided by the State. The water rights acquired are from the Dungeness River mainstem. Impacts to the Dungeness River downstream from the irrigators' diversions are fully mitigated in-kind by the water right purchased for the Exchange. However, mitigation is also needed in the

small streams throughout the watershed. The water right purchase included an agreement between the Dungeness Water Users Association and WWT to work together to deliver water to aquifer recharge projects that will provide comprehensive mitigation across the Dungeness watershed to benefit the small streams.

The impacts to the small streams in the watershed will be mitigated through shallow aquifer recharge (SAR) projects. It will take several years to locate, design, and construct these SAR projects so small reserves of water were developed for domestic use. New water users must purchase mitigation credits from the Exchange, and the impacts of each new use will be tracked and debited from the reserves (and equivalent maximum depletion amounts). As SAR projects are constructed, mitigation will replenish the reserves. If a reserve (and maximum depletion amount) for a specific stream becomes fully depleted, new uses of water are prohibited until mitigation is provided to replenish that reserve.

The Exchange offers three indoor and outdoor mitigation packages, described in the table below. Separate stockwater mitigation packages are also available.

Table 1. Domestic mitigation packages offered by the Dungeness Water Exchange

Mitigation Package Descriptions				
Package Description	**Average Amount of Indoor Use** (Gallons/Day)	**Average Amount of Outdoor Use** (Gallons/Day)	**Amount of Irrigated Lawn Area** (Square Feet)	**Amount of Irrigated Lawn Area** (Acres)
Indoor Only Package (minimal incidental outdoor use only) $1,000	150* (average)	0	0	0
Indoor with Basic Outdoor Package $2,000	150* (average)	89	2,500 sq. ft. (approx. 50 x 50 ft.)	.06 acres
Indoor with Extended Outdoor Package $3,000	150* (average)	200	5,625 sq. ft. (approx. 75 x 75 ft.)	.13 acres

*Note: The Exchange accounts for domestic mitigation using a standard average daily amount of 150 gallons (WAC 173-518-080 (b). This is the annual amount of water that the Exchange and the mitigation certificate purchaser agree upon as the basis for their transaction.

Currently outdoor use mitigation is not available for parcels located at a higher elevation than the diversions and irrigation distribution system from the Dungeness River. Ecology is working with local partners and resource co-managers to develop mitigation solutions for outdoor water use in the upper watershed.

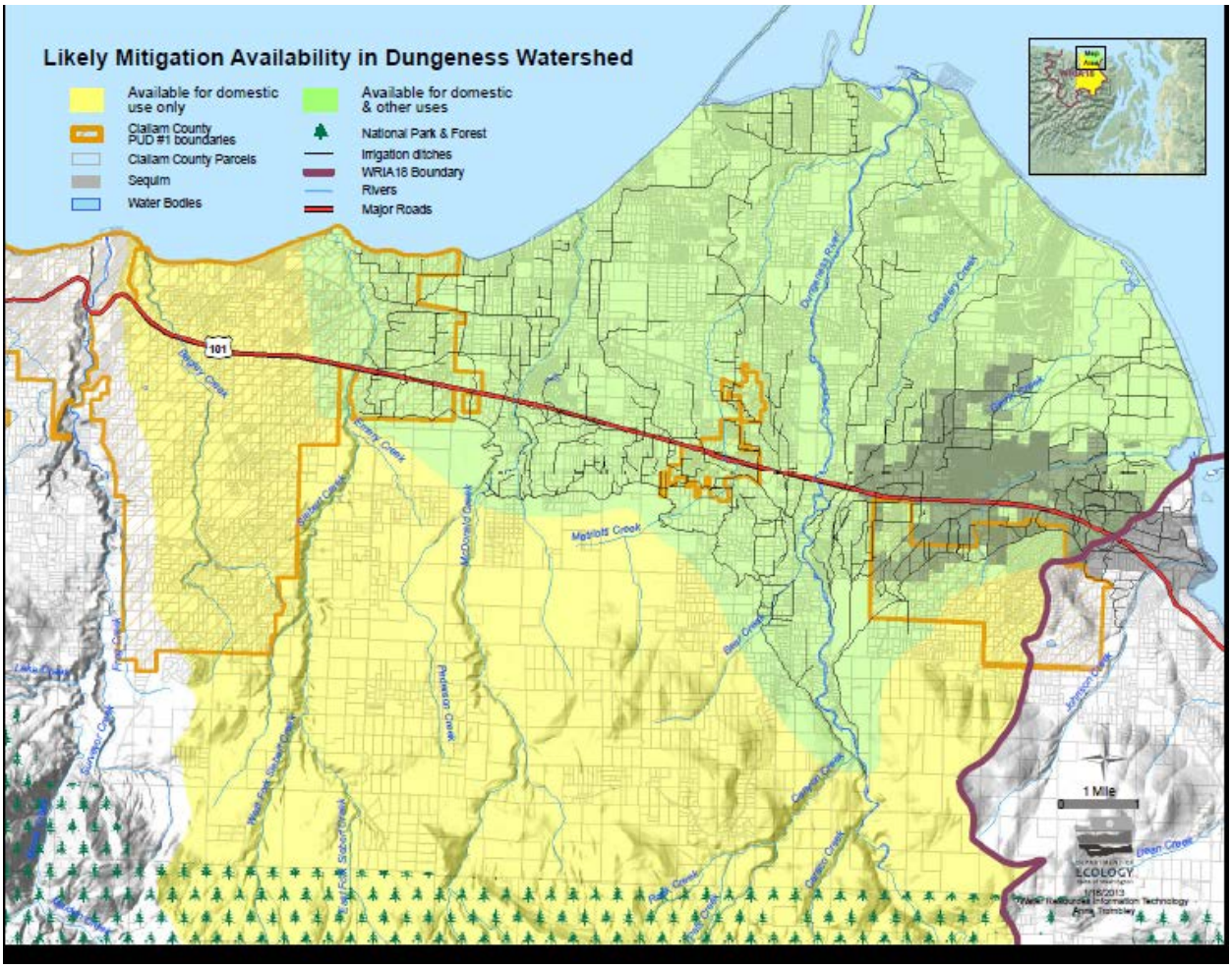


Figure 9. Likely mitigation availability in the Dungeness Watershed

Spokane River and Spokane Valley Rathdrum Prairie (SVRP) Aquifer

On January 27, 2015 Ecology adopted an instream flow rule - Chapter 173-557 WAC, Water Resources Management Program (WRMP) - for the Spokane River and Spokane Valley Rathdrum Prairie (SVRP) Aquifer. The rule became effective February 27, 2015.

Within the area regulated under the rule, municipal water suppliers are the primary sources of water for new uses. If water is not available in a timely and reasonable manner from a municipal water supplier, the consumptive use impacts to surface water from new permit-exempt groundwater withdrawals must be interrupted when stream flow is below the instream flows established in this rule, unless those impacts are mitigated.

For the few parcels that may not be able to obtain water from an existing provider in a reasonable and timely manner, Ecology has set up the SVRP Aquifer Bank to provide mitigation water. The mitigation water comes from a 153 acre foot senior water right acquired and placed in trust by Ecology, with help from Washington Water Trust.

Each project is limited to a maximum of one acre-foot of water within a given year, for the four uses allowed under the groundwater permit exemption:

- Single or group domestic uses not to exceed 5,000 gallons per day.
- Non-commercial irrigation of up to ½ acre of lawn and garden.
- Industrial uses not to exceed 5,000 gallons per day.
- Stockwater not to exceed 5,000 gallons per day.

No fee is currently required for mitigation water from the SVRP Aquifer Bank. However, the Certificate of Mitigation must be recorded with the County Auditor's Office, which requires a fee set by statute. The Certificate of Mitigation remains until the permit-exempt well use is discontinued or the well is abandoned. In such cases the mitigation credit will automatically revert back to the water bank. This mitigation water can then be reissued for future new permit-exempt uses.

Skagit Basin Water Supply Options

SB 5965 stated the report would include:

> *An evaluation of all mitigation options that may be available for permit-exempt groundwater withdrawals in the areas covered under the instream resources protection program for the lower and upper Skagit river basin, water resource inventory areas 3 and 4, and a discussion of the advantages and disadvantages of employing each type of mitigation technique in those areas*[30]

The Skagit River Instream Flow Rule (WAC 173-503) went into effect April 14, 2001. The rule established instream flows to protect flow levels in the Skagit River and its tributaries. The rule was amended in 2006 to establish 25 surface and groundwater "reservations," to allow future uninterruptible out-of-stream water uses.

On October 3, 2013, the Washington Supreme Court ruled that Ecology exceeded its authority in setting aside reservations of water where water was previously set aside to support stream flows for fish in the Skagit River basin (*Swinomish* Indian Tribal Community v. Department of Ecology). Without water reservations, all water uses, including permit-exempt withdrawals, established after the 2001 rule took effect, could be curtailed when stream flows fall below the adopted instream flow levels. Prior to the *Swinomish* decision, approximately 475 homes and businesses had been built that relied on the reservations for their water supplies.

To address current and future water resource needs in the Skagit basin, Ecology is working with local governments, Tribes, water utilities, and landowners to develop sustainable water supply

[30] SB 5965 Section 2 (1)(g)

solutions in the Skagit basin. This section of the report summarizes the status of current efforts to address water supply needs in the Skagit basin. Where cost estimates are available that information is provided, but no additional cost analyses were conducted to prepare this report.

Today, even where there aren't mitigation options broadly available in the Skagit Basin there are water supply options available to for new water users in the Skagit. The following water supply options are currently available to property owners in the Skagit Basin:

- Connect to a public water supply where available in a timely and reasonable manner
- Rainwater collection and/or trucking water, with a cistern for storage
- Build in areas where the well will not be in hydraulic continuity with the Skagit River and not impact Skagit River flows (i.e. Padilla Bay area)
- Propose a mitigation plan for an individual site or group of sites (private mitigation plan)

While water supply solutions for the whole basin are being developed, water supply proposals for several individual residences have been approved by Ecology. All approvals have included consultation with Skagit County and Tribal governments. Some home owners have also chosen to tear down an existing house and rebuild. The water supply for the older home becomes available for the new home.

Water Supply Options that Don't Require Mitigation

Connecting to existing Public Water Supply
Portions of rural Skagit County are served by public water purveyors that have water rights that are senior to the Skagit River Instream Flow Rule (WAC 173-503) that went into effect April 14, 2001. These include the Skagit PUD, local government purveyors, and some small water associations. Parcels that can receive water from these purveyors have a source of water that is not subject to regulation by the rule. A study commissioned by Ecology in 2015 identified small scale water systems are capable of supplying water to an additional 633 connections within their existing service areas. (This study by RH2 titled "Skagit Basin Municipal Water Right Assessment," is discussed below.)

Expanding Public Water Supply
There are a number of municipal water systems in the Skagit basin that have water rights senior to the instream flows established in 2001. Ecology has commissioned two in-depth studies of existing municipal water systems in the Skagit basin to determine if they could help provide water solutions. These studies assess the status and availability of water rights owned by water purveyors, and investigated possible water supply or mitigation options. (Using municipal water rights as a source of mitigation water is discussed below.)

The first study commissioned by Ecology is a feasibility report, "Water System Evaluation in the Carpenter-Fisher, Upper Nookachamps and East Nookachamps Subbasins" to identify if existing public water systems could provide water solutions. RH2 Engineering, Inc., (RH2) completed

the feasibility report in January 2014, evaluating nine public water systems in the region and identifying five potential projects that could provide water.

The projects identified include:

- Direct water service expansion in the upper reaches of the Nookachamps and Carpenter-Fisher.

- Piping water into the upper reaches of Fisher, Carpenter, and Nookachamps creeks, to augment flows and mitigate the use of wells downstream.

Preliminary cost estimates for these projects range from $500,000 to $12,000,000. The total project cost estimates (including operations and maintenance costs) indicate the lowest cost projects in both the Upper Nookachamps and Carpenter-Fisher subbasins are the mitigation-centered options. These options, if implemented, would provide relief to some, but not all, property owners within these subbasins.

The primary driver for capital costs is the length of water main needed. Due to the dispersed nature of the potential lots that need water, creating or expanding a municipal distribution system to serve them will always be more costly than providing mitigation water to a few stream channels and having the benefits carry all the way to the mouth of the stream. (Another study, evaluating costs of water supply options in the Skagit included preliminary cost estimates for water service expansion that range from approximately $48,000 to $55,000 per household.[31])

The second study, a "Skagit Basin Municipal Water Right Assessment," was completed by RH2 in February 2015. This study assessed municipal water rights upstream of Sedro-Woolley to determine if and how any of the water right holders might be able to help meet growth in the watershed through direct water service or through donation or sale of a portion of their water rights to provide mitigation. This study focused on the status and availability of water rights for further consideration and did not identify potential projects.

This study recommended further discussion with three municipal water right holders with historically perfected water rights in excess of projected demand at full build-out in their current service area. These excess perfected water rights are due to changes in water use within their community, such as the loss of a large industrial use. Two other municipal water systems with similar excess water rights indicated they preferred to retain all their water rights for future growth and were unwilling to provide a portion for mitigation of permit-exempt uses.

Five water systems were identified that might be capable of expanding their service area to include adjacent properties, based on their inchoate water rights and willingness to update their water system plans. However, substantial infrastructure upgrades may be needed to actually serve that water to particular parcels.

Fifteen smaller scale water systems were identified that will likely not be able to provide water outside of their original service areas or original places of use. However, based on current

[31] Ecosystem Economics, DRAFT Strategy Paper for the Skagit Water Exchange, July 2015

numbers, these systems are capable of supplying water to an additional 633 connections within their existing service areas.

Cost is the major consideration for water service expansion, but there are other significant considerations. Extending water service lines outside of existing service areas will require Department of Health approval of an amended Water Supply Plan. If service is being extended beyond the Urban Growth Area (UGA) boundary, compliance with Growth Management requirements, and possibly an amendment of the UGA boundary is needed. Some community members have expressed concern that extending water service will result in much higher growth levels in these areas and loss of the rural character of the Skagit watershed.

In 2015, in response to legislative inquiry, Ecology and Skagit PUD analyzed the cost of possible waterline extensions into the watershed. A total of 21 projects were identified with draft planning-level cost estimates ranging from $600,000 to $12.3 million. The grand total amounted to $108 million and 105 miles of waterline.

The number of potential households served varied widely for each project. As an example, the South Conway extension project has an $8 million cost estimate and could serve a higher density of parcels than most of the projects. 139 parcels needing water are within 200 feet of the possible main line extension (17 homes that relied on the invalidated reservation, and 122 parcels without homes). Simple division puts the cost per parcel at approximately $57,500. This analysis did not consider whether sufficient water rights are available for a full "build-out" of these areas. These estimates did not include costs of other requirements such as storage and booster pump stations, permitting, land acquisition, improvements to the existing water system, or use of existing interties with the city of Anacortes water system. So, actual costs are likely to be much higher than the $57,500 per parcel for the water line extensions.

Advantage:

- Provides reliable water supply to new users without increasing consumptive use impacts to flow sensitive tributary streams.

Disadvantages:

- Costs are very high and the source of funding for these projects is not known.
- The low density for new hookups and resulting lack of positive return on capital investment gives direct water service expansion little appeal as an alternative.
- Getting the necessary permits and approvals is uncertain.
- There would likely be some community opposition to this approach.

Cisterns: Rainwater collection and/or trucking water as alternative supply

Rainwater collection

Rainwater collection is a feasible domestic water supply alternative in the Skagit watershed. In 2015 Skagit County Public Health began approving rainwater harvesting for potable use.

At its most basic, a rainwater collection system consists of a roof, gutters, and related plumbing, piping, filtration, and treatment mechanisms for collecting and transporting water to and from the storage cistern, and a pump/distribution system for moving water throughout the building.

The single largest fixed cost is the cost of a storage tank. Capital cost estimates for rainwater harvesting systems range from $25,000 for an indoor only system, to over $260,000 for a system capable of irrigating up to 10,000 square feet. This suggests that rainwater harvesting is either not a cost-effective solution for outdoor watering or that a dual indoor/outdoor system would be needed (tank materials for potable use are more expensive than for irrigation use[32]). These estimates also assume complete reliance on rainwater for potable and irrigation purposes and therefore very large collection and storage capacity. A smaller cistern with water supply augmented by hauling water would reduce up-front costs. Cost estimates for a hybrid rainwater/hauled water system are not available.

In limited circumstances, the state Department of Health (DOH) may approve a new Group A public water system (15 or more connections) with rainwater collection as source of supply, and would designate it as a surface water source subject to reliability and treatment requirements. Local governments that have adopted their own Group B regulations may allow rainwater as a water supply. Local government may also adopt regulations to allow individual homes to be permitted using rainwater as the building's water supply.

Hauling water

There are private companies that will deliver water. The primary fixed cost for a trucked in water system is the storage cistern. The largest recurring cost is water delivery with separate charges for the water and the delivery. Economic analysis estimates the cost per household of trucking water for a twenty- year period ranges from $50,000 for an indoor only system, to $115,000 for a system capable of irrigating up to 10,000 square feet.[33] The DOH will only approve hauled water for temporary or emergency supply for public water systems. Local governments that have adopted their own Group B regulations may allow hauled water as a permanent water supply for Group B water systems. Skagit and Snohomish counties could adopt regulations to allow individual homes to be permitted using hauled water as the building's water supply.

Skagit PUD, with funding assistance from Ecology, has installed two self-serve bulk water filling stations where customers can get large volumes of water. The filling stations are located in Conway and on Bow-Hill Road.

[32, 23] Ecosystem Economics, DRAFT Strategy Paper for the Skagit Water Exchange, July 2015

Advantages:

- Rainwater harvesting and/or hauling water are water supply options that are not restricted by the rule and could be immediately available to property owners in the Skagit watershed.

- Depending on the scale of intended water use, the cost of these systems can be comparable to drilling and pumping from a well.

Disadvantages:

- Homeowners are unfamiliar with these systems so there is a learning curve, particularly with respect to ensuring safety of potable water.

- Banks are also unfamiliar with cistern-based water systems and might be reluctant to loan money for these systems.

- Irrigation of a full ½ acre of non-commercial lawn or garden, as allowed with a permit-exempt well, is likely to be cost prohibitive with this alternative.

- DOH regulations limit use of hauled water.

- Skagit and Snohomish Counties would need to adopt regulations to allow hauled water as a primary water source.

Wells not in hydraulic continuity with the Skagit River

A number of residences have been approved where it was demonstrated that groundwater withdrawals were not in hydraulic continuity with the Skagit River or its tributaries. Typically these homes are located very low in the watershed and the groundwater in these areas is flowing directly to Puget Sound. Ecology is preparing a map showing the area where it is most likely withdrawals will not impact instream flows.

Individual site mitigation

Ecology is open to considering site-specific mitigation proposals for residences in the Skagit basin and encourages public and private entities to submit proposals. Projects must be water budget neutral to the Skagit River when instream flows are not met, and protect instream resources in tributaries. They would also have to provide appropriate provisions for monitoring to ensure the mitigation will remain effective for the duration of the new water use (in perpetuity).

Ecology has received two types of proposals for site-specific mitigation for new residential water use:

- The first type of proposal would rely on a permit-exempt well withdrawal, and pumping only during high-flow periods, when instream flows are met in the river. During high-flow periods pump excess water into a storage system. Cease pumping and rely on stored water during dry periods when instream flows are not met.

- The second type of proposal would rely on a permit-exempt well withdrawal year round, with on-site mitigation provided by rainfall collection. Rainfall would be collected into a non-potable storage system and discharged into surface water during low flow periods.

Ecology identified challenges that must be resolved before these projects could be approved:

- Both proposals would require a detailed hydrogeologic analysis of site-specific conditions to determine either: the timing for when pumping is allowed or not allowed for the first proposal; or to determine when and how much water must be discharged to offset impacts.

- The interaction and impact of multiple site specific mitigation projects is not yet understood and may have to be addressed in the hydrogeologic analysis.

- If there are drought conditions and instream flows are not met for extended periods, a contingency water supply (e.g. hauled water) would be needed.

- Assurance of long-term compliance, in perpetuity, of such a mitigation strategy for a single household is needed.

Regional Mitigation Strategies Being Evaluated by Ecology

Ecology has contracted with Washington Water Trust (WWT), a non-profit organization with experience in developing and administering water banks, to help with developing regional mitigation options for the Skagit basin. Ecology and WWT are exploring all possible mitigation strategies to offset the impacts of new permit-exempt well withdrawals, including a potential water exchange that could purchase water rights and develop mitigation projects. A potential Skagit water exchange could implement mitigation strategies in different stream reaches throughout the basin, making it possible for property owners to purchase mitigation credits for new uses that would have otherwise impacted those specific stream reaches. However, there is no guarantee that a mitigation option will be found for every reach.

Acquisition of senior water rights

On October 11, 2013, Ecology completed the purchase of three water rights from the Big Lake Water Association, a public water system near Mount Vernon. Ecology acquired approximately 15 acre-feet of water for mitigation purposes and 18.56 acre-feet of water for stream flow enhancement. This is an amount of water sufficient to mitigate for approximately 70 to 160 residences in the Nookachamps subbasin. The actual number of residences mitigated will depend on the number of homes located in the area that can benefit from the mitigation water, and the amount of water that will be used by each homeowner.

Ecology is developing a mitigation plan, designating the area served by the mitigation and the process for obtaining mitigation credits. Ecology will seek public input on the proposal before finalizing the mitigation project.

Discussions are underway with public utilities that own senior water rights on the main stem of the Skagit River. Ecology is optimistic that sufficient water rights may be acquired to offset the impacts of permit-exempt withdrawals with a high degree of hydraulic continuity with the mainstem of the Skagit River. Ecology is working on a hydrogeological analysis to determine how many parcels could benefit from this mitigation water.

Advantages:

- Where this type of in-kind mitigation is available, it provides a direct offset for the consumptive use impacts of new permit exempt withdrawals.

- This approach has broad support from stakeholders in the area.

Disadvantages:

- This type of in-kind mitigation is limited to places where senior water rights exist and are available for purchase. In the portion of the Skagit basin upstream from Sedro Woolley, few large year-round water rights exist, and those that do exist are generally not available for sale.

- These water rights must be drawing from the source water bodies that will be impacted by permit-exempt withdrawals needing mitigation.

Shallow Aquifer Recharge (SAR)

SAR projects have been considered in the Skagit Basin. Suitable sites are a possibility in Lower Skagit subbasins. Subbasins located in the Upper Skagit watershed are generally dominated by bedrock in their upper reaches, which limits the likelihood of suitable sites. In addition, the land must be available for lease or purchase so that it can remain committed to this use for as long as mitigation is required, typically in perpetuity.

Water availability is another constraint. Senior water rights are generally unavailable in tributary subbasins where mitigation is most needed. Depending on the specific surface water source, some SAR projects may be able to rely on high flow events or stormwater runoff to provide water for recharge. However, where high flows can provide water for recharge, the water will very likely only be available in limited amounts at very specific times of year. Availability will also vary from year to year depending on normal climate variation. Therefore, reliance on high flows will likely constrain both the timing and amount of water available for recharge and, as a result, limit its viability as mitigation under current law.

A reliable entity for operation and maintenance is necessary to operate the SAR facility in perpetuity. This entity, such as a local or tribal government, PUD, or non-profit, must be

committed to running the facility and have enough permanence to ensure mitigation in perpetuity.

In 2014 the Upper Skagit Tribe proposed a 0.1 cfs wetland recharge SAR project in the Fisher Creek sub-basin.[34] The feasibility study indicated there would not likely be sufficient water captured to meet property owner needs during years of low precipitation. After three public meetings, property owners of prospective sites did not express an interest in selling their property, the proposal failed to gather community support, and the project proponents decided not to pursue the project.
In addition, economic analysis of the Fisher Creek SAR project estimated the cost per homeowner would likely be higher than for other mitigation options. The analysis also noted that SAR might only be a reasonable investment in a small number of tributary subbasins that have a higher concentration of potential mitigation sites.[35]

Advantages:

- Analyses show that in some areas SAR projects are potentially feasible from a technical and legal standpoint.

- SAR projects could work in locations where senior water rights are not available.

Disadvantages:

- Employing SAR as mitigation will require detailed upfront hydrogeologic analysis and on-site testing to ensure mitigation is effective. This means SAR projects might require significant time and resources before they can be put to use as mitigation.

- Not all subbasins could benefit from SAR.

- Water to supply a SAR project must come from a source that is legally available under the instream flow rule, such as: a senior water right, or water during the rainy season when instream flow levels met in the river. It is unclear to what extent water and/or water rights are available as sources of water to fully supply the projects.

- Entities that could operate SAR facilities have not been identified.

- Initial feasibility studies have indicated that these projects may not be cost-competitive with other mitigation or alternative water supply options.

Mitigation relying on public water supply as a source of water

There are two ways that public water supply could enable mitigation of new permit exempt withdrawals: by placing senior water rights into trust or by piping water into the upper reaches of creeks to augment flows. Placing a senior water right into trust can provide a fairly straight

[35] Ecosystem Economics, DRAFT Strategy Paper for the Skagit Water Exchange, July 2015

forward offset for new uses that will affect instream flows downstream from the point of withdrawal of the original water right. Discussions are underway with public utilities that own senior water rights on the main stem of the Skagit River. Ecology is optimistic that sufficient water rights may be acquired to offset the impacts of permit-exempt withdrawals in hydraulic continuity with the mainstem of the Skagit River.

Piping water to augment flows will require funding to cover construction of the pipeline and an entity to operate the flow augmentation system. It is also important to address water quality considerations and how this might affect the homing and imprinting on juvenile fish for returning to their natal stream.

Advantage:

- Where available it provides a direct offset for the consumptive use impacts of new permit exempt withdrawals.

Disadvantages:

- The source of funding and a reliable operator for a piped flow augmentation project are not known and would be essential to ensure operational success in perpetuity.

Out-of-kind mitigation

Under the recent Supreme Court decision in *Foster* out of kind mitigation is not a legal source of water to mitigate for impairment of the instream flows in the Skagit River.

Instream Flow Setting Methods

Evaluation of instream flow methods

SB 5965 stated the report would include:
An examination of scientific methodologies for establishing base flows and minimum instream flows, including a discussion of methodologies regularly used by the department of ecology.

The purposes of instream flow methods include: (i) to identify flow levels which either maximize or provide some other acceptable level of benefit, or (ii) to determine change in benefit with a change in flow. Methods in the first category (i) are called standard-setting methods, and those in the second category (ii) are incremental.

The choice of instream flow method depends on the question to be addressed and the cost—in both time and money—to use the method. Fish and fish habitat are often used as the measure of instream benefit, and most instream flow methods address fish habitat. Fish are more dependent on flow than many other instream values because their use of flow is not discretionary; it is a necessity. Although there are ways to assess instream flows needed to meet various aspects of water quality, recreation, aesthetics, and navigation, the following discussion focuses on fish.

Many, but not all, instream flow methods for fish are discussed in Instream Flows for Riverine Resource Stewardship,[36] and global instream flow method use was enumerated and discussed by Tharme.[37] New approaches are being developed frequently, usually as amendments to existing methods. Direct relationships between flow and numbers of fish are rarely determined in instream flow studies, but a few cases allow cross-assessment of different methods.[38]

Incremental instream flow methods attempt to assess the product of habitat quantity and quality at different flows in the same channel. Habitat quantity is usually measured as area (surface area or plane view of stream) or as volume of habitat. Habitat quality is a product of spatial distribution of hydraulic variables (depth and current velocity) in relation to stream bed material (substrate), stream channel form (e.g., undercut banks, pools, riffles, cascades, and waterfalls), and objects in the stream channel (boulders, logs, log jams). A given fish species and life stage prefers or avoids different depths and velocities, and other channel features; and these preferences are part of habitat quality. Stream habitat quality is also influenced by water quality (temperature, turbidity, and chemical content, including dissolved oxygen), and many aspects of water quality are themselves influenced by flow. Habitat quality strongly influences how many fish can be produced in a given quantity of habitat.

No instream flow method models all the potential components of fish habitat, although Instream Flow Incremental Methodology (IFIM) is a framework for considering all of these components.

[36] Annear, et al. 2004
[37] 2003
[38] Relationships between flow and fish have been extensively studied, and partial reviews are available in Beecher 1990, Annear et al. 2004, Locke et al. 2008, and Arthington 2012.

According to Professor Angela H. Arthington,[39] "The IFIM … is still considered by many practitioners to be the most scientifically and legally defensible suite of methods available for assessing environmental flows (Gore and Nestler 1988; Dunbar et al. 1998)." IFIM, with Physical HABitat SIMulation (PHABSIM) as a primary component, is the preferred method for the departments of Ecology and Fish and Wildlife, but the cost in time and effort makes it less suitable for multiple concurrent assessments.

Most instream flow methods involve hydraulic components and fish habitat components. Hydraulic components (depths, current velocities, widths, wetted area, and volume) are related to flow in a given channel. Habitat is then related to one or more hydraulic components. Habitat is estimated by measuring what ranges of hydraulic components are selected.[40] Recently, Rosenfeld, and Ptolemy[41] have explored incorporation of physiology (bioenergetics) into habitat suitability to give a more accurate indication of the influence of flow on fish. Although, their investigations have not yet been developed to the stage of a usable method, their findings generally agree that flow is a limiting factor for fish.

Some relatively low cost instream flow methods use general trends in the relationships between hydrology, hydraulics, and fish habitat. These include the toe-width method [42]and the Tennant method[43]. Tharme found the Tennant method to be most-used worldwide.[44] Ronald Ptolemy also found the Tennant Method to have strong support for British Columbia salmon and trout.[45]

In Washington State, the two most commonly used stream flow study methods are:

- Instream Flow Incremental Methodology (IFIM)/Physical Habitat SIMulation (PHABSIM)
- Toe-Width

Other instream flow study methods have been used at the request of the local planning unit or for site specific reasons. More often, WDFW uses these alternative methods to inform water right processing decisions or SWSL recommendations. These other instream flow study methods include:

- Wetted Width
- Hatfield and Bruce
- Tennant
- Tidal Distributary/Estuary Method

Below, we provide further details on each of the instream flow methods mentioned above.

[39] 2012: 142
[40] e.g., Beecher et al. 1993, 1995
[41] 2012
[42] Swift 1976, 1979
[43] 1976
[44] 2003
[45] British Columbia Ministry of Environment, personal communication

Instream Flow Incremental Methodology (IFIM)/Physical Habitat Simulation (PHABSIM)

The Instream Flow Incremental Methodology[46] considers multiple aspects of stream fish ecology and hydrology and is generally founded on PHABSIM. IFIM is used nationwide. Most water resource managers consider IFIM as the best available tool for determining the relationship between stream flows and fish habitat (living space). The method is relatively time-consuming and expensive, and is therefore best used for rivers with a high potential for controversy.

IFIM uses computer modeling to calculate the volume of fish habitat available at various stream flow levels. It is based on the understanding that fish prefer water with a certain depth and velocity (how fast the water is flowing), as well as other habitat features, such as cover, bed material, and so on. These preferences vary for different species of fish, and for each of their life stages.

PHABSIM relates stream channel hydraulics at a specific stream reach to flow, then uses this relationship to calculate habitat. Habitat suitability criteria is based on what habitats are available and what habitats are actually used;[47] this may be done concurrently with a PHABSIM study or independently.[48]

Steps in a typical PHABSIM study include:

(i) Identifying a study site that represents typical or most flow-sensitive areas in a stream reach of interest;

(ii) Determining hydraulic condition distribution around the study site at different flows (usually three) through direct measurements;

(iii) Hydraulic modeling and model calibration to ensure that the computer model produces hydraulic results that are similar to what was actually measured;

(iv) Calculating habitat quantity as Weighted Usable Area (WUA) by combining the hydraulic model with habitat suitability criteria; and

(v) Interpreting WUA vs. flow in light of life history, hydrology, season, and temperature to recommend instream flows by season. WUA is actually an index of habitat quantity x quality.

[46] IFIM; Bovee 1982, 1995, Stalnaker et al. 1995, Bovee et al. 1998
[47] e.g., Beecher et al. 1993, 1995
[48] In the early history of PHABSIM – 1970s and 1980s – there was debate about whether use [frequency distribution] or preference [accounting for availability] was more appropriate, but Beecher [1995] resolved this debate in favor of preference.

Toe-width

The Toe-width method is based on the relationship between the stream flow that produces the most fish habitat[49] and a simple measurement of stream width at the toe of each stream bank (toe-width or toe-of-bank width). The "toe-of-the-bank" is the point where the stream bed or bottom meets the stream bank. This quick method uses measured stream channel width and species-specific preferences to calculate a stream flow level to effectively protect salmon and steelhead spawning and rearing.

Most of the over 250 instream flows set by rule in Washington State were done with Toe-width. Toe-width estimates have compared well with IFIM results and so are generally adequate for management purposes.

For more information, refer to these two scientific references on how the Toe-width method was created:

- Preferred Stream Discharges for Salmon Spawning and Rearing in Washington
- Estimation of Stream Discharges Preferred by Steelhead Trout for Spawning and Rearing in Western Washington

Wetted Width

The Wetted Width method is used to help determine instream flow recommendations for low flow periods, based on adequate fish rearing and migration flows. The method assumes a connection between the wetted width and of the quantity of fish habitat (living space). It involves measuring from water's edge to water's edge over a number of site visits at different flows.

Graphs are developed to show the relationship between actual stream flow and wetted width. There can be a clear point where the graph levels out – when you're no longer rapidly gaining width with increases in flow. This point is referred to as the breakpoint or "inflection point." It indicates the stream flow above which habitat does not increase as rapidly with increasing flow, although it is not assumed to be an optimal flow or habitat quantity.

Aquatic insects are a major food source for fish, and they are produced on the stream bed. When wetted width reaches the inflection point on the flow vs. wetted width graph, the production area for aquatic insects is maximized and therefore the stream's capacity to provide this food source may be fully realized. This point becomes the stream flow recommendation for rearing (feeding and growing) fish.

The technique was modified by Dr. Hal Beecher (Washington Department of Fish & Wildlife) who added a measurement of width where depth is at least 6 inches, the minimum depth for yearling and older trout and salmon. Plotting width over which depth is at least 6 inches as a

[49] Calculated from field measurements and fish preferences similar to those used in a PHABSIM study

function of flow provides an indication of rearing habitat (living space, rather than just food production). Young salmon and trout are seldom found in water shallower than 6 inches.[50]

Hatfield and Bruce

Hatfield and Bruce developed a series of equations to estimate the stream flow that maximizes the weighted usable area (WUA) based on previous IFIM studies, for up to four life stages of certain salmonids (such as salmon and trout). This method can be done entirely from the office; no field work is required. The user looks up the yearly average stream flow, longitude and latitude for the river, and enters these into equations on a calculator or computer.

This method is a quick, high-level technique using IFIM study results. It does not replace a detailed analysis of a watershed and river.

Tennant

The Tennant Method (sometimes erroneously called the Montana Method) uses hydrological gage data and seasonal percentages of mean annual discharge as an instream flow. It is one of the earliest and most widely used methods worldwide[51], and intensively validated throughout British Columbia.[52] Mr. Ptolemy's validation is based on salmon and steelhead production in relation to seasonal flows as a percentage of mean annual flows.

Tidal Distributary/Estuary Method

Instream flows in the Skagit River were based on results of IFIM/PHABSIM studies integrated with use of the Tidal Distributary/Estuary Method (Annear, et al. 2004: 182-183; Duke Engineering & Services, Inc. 1999). Extensive monitoring data collected and presented by Swinomish fishery biologists made clear that the estuary was essential to salmon production in the Skagit River and that flow influences estuarine rearing habitat. Using this method in conjunction with IFIM/PHABSIM best integrates these values into the flow recommendations. It has not been used elsewhere in Washington.

[50] Beecher, et al. 2002, 1995, 1993. Campbell and Eddy. 1988
[51] Tharme 2003
[52] Ron Ptolemy, BC Ministry of Environment, personal communication

References

2012 Stormwater Management Manual for Western Washington, as Amended in December 2014 (The 2014 SWMMWW). December 2014. Ecology publication no. 14-10-055. http://www.ecy.wa.gov/programs/wq/stormwater/manual.html

Annear, T., I. Chisholm, H. Beecher, A. Locke, P. Aarrestad, C. Coomer, C. Estes, J. Hunt, R. Jacobson, G. Jobsis, J. Kauffman, J. Marshall, K. Mayes, G. Smith, R. Wentworth, and C. Stalnaker. 2004. Instream Flows for Riverine Resource Stewardship - Revised Edition. Instream Flow Council, Cheyenne, WY.

Arthington, A.H. 2012. Environmental Flows: Saving Rivers in the Third Millennium. University of California Press. 424 pp.

Associated Earth Sciences. "Fisher Creek Basin Mitigation Program: Technical Report, Pilot Project Conceptual Design." Prepared for Upper Skagit Indian Tribe. Everett WA: Associated Earth Sciences, Inc. 2014.

Beecher, H.A. 1981. Instream flows and steelhead production in western Washington. Proceedings of the Western Association of Fish and Wildlife Agencies: 395-410. Kalispell, Montana.

Beecher, H.A. 1990. Standards for instream flow. Rivers 1 (2): 97-109.

Beecher, H.A. 1995. Comparison of preference curves and habitat utilization curves based on simulated habitat use. Rivers 5 (2): 109 120.

Beecher, H.A., B.A. Caldwell, and S.B. DeMond. 2002. Evaluation of depth and velocity preferences of juvenile coho salmon in Washington streams. North American Journal of Fisheries Management 22 (3): 785-795.

Beecher, H.A., B.A. Caldwell, S.B. DeMond, D. Seiler, and S.N. Boessow. 2010. An empirical assessment of PHABSIM using long-term monitoring of coho salmon smolt production in Bingham Creek, Washington. North American Journal of Fisheries Management 30 (6): 1529-1543. Doi: 10.1577/M10-020.1

Beecher, H.A., J.P. Carleton, and T.H. Johnson. 1995. Utility of depth and velocity preferences for predicting steelhead parr distribution at different flows. Transactions of the American Fisheries Society 124: 935 938.

Beecher, H.A., T.H. Johnson, and J.P. Carleton. 1993. Predicting microdistributions of steelhead parr from depth and velocity criteria: Test of an assumption of the Instream Flow Incremental Methodology. Canadian Journal of Fisheries and Aquatic Sciences 50 (11): 2380-2387

Booth, D.B. (1991), "Urbanization and the Natural Drainage System-Impacts, Solutions and Prognoses," The Northwest Environmental Journal, 7:93-118, University of Washington.

Booth, D.B. and Jackson, C.R. (1997), "Urbanization of Aquatic Systems: Degradation Thresholds, Stormwater Detention, and the Limits of Mitigation," Journal of the American Water Resources Association, Vol. 22 No. 5, 20 pp.

Booth, D.B., Hartley, D. and Jackson, R. (2002), "Forest Cover, Impervious-Surface Area, and the Mitigation of Stormwater Impacts," Journal of the American Water Resources Association, Vol. 38 No. 3, 11 pp.

Bovee, K.D. 1978. The incremental method of assessing habitat potential for coolwater species, with management implications. American Fisheries Society Special Publication 11: 340-346.

Bovee, K.D. 1982. A guide to stream habitat analysis using the instream flow incremental methodology. Instream Flow Information Paper No. 12. U.S. Fish and Wildlife Service, FWS/OBS 82/26, Washington, D.C.

Bovee, K.D. 1995. A comprehensive overview of the Instream Flow Incremental Methodology. National Biological Service, Fort Collins, Colorado. 322 pp.

Bovee, K.D., B.L. Lamb, J.M. Bartholow, C.D. Stalnaker, J. Taylor, and J. Henriksen. 1998. Stream habitat analysis using the Instream Flow Incremental Methodology. U.S. Geological Survey, Biological Resources Division, Information and Technical Report USGS/BRD-1998-0004. viii+131 pp.

Campbell, R.F., and B.R. Eddy. 1988. Verification of habitat utilization criteria for juvenile fall chinook in the North Fork of the Lewis River, Washington. Pages 364 389 in: K. Bovee and J.R. Zuboy, editors. Proceedings of a workshop on the development and evaluation of habitat suitability criteria. U.S. Fish and Wildlife Service Biological Report 88 (11). 407 pp.

Culhane, T., and Nazy, D. February 2015. Permit-Exempt Domestic Well Use in Washington State. Ecology publication no. 15-11-006

Duke Engineering & Services, Inc. 1999. Final Technical Report Lower Skagit River Instream Flow Studies prepared for Public Utility District No. 1 of Skagit County and City of Anacortes. Bellingham.

Dunbar, M.J., J.A. Gustard, M.C. Acreman, and C.R.N. Elliott. 1998. Review of overseas approaches to setting river flow objectives. Environmental Agency Research and Development Technical Report W145. Institute of Hydrology: Wallingford, United Kingdom.

Ecosystem Economics, Erik Borgen, Bruce Aylward, and Davíd Pilz; Skagit Demand Analysis, Technical Memorandum. July 17, 2015.

Ecosystem Economics, Erik Borgen, Bruce Aylward, and Davíd Pilz; DRAFT Strategy Paper for the Skagit Water Exchange: Avoidance Options and Mitigation Alternatives. July 2015.

Frenette, M., M. Caron, and P. Julien. 1984. Interaction entre le debit et les populations de tacons (Salmo salar) de la riviere Matamec. Canadian Journal of Fisheries and Aquatic Sciences 41: 954 963.

Gore, J.A., and J.M. Nestler. 1988. Instream flow studies in perspective. Regulated Rivers: Research & Management 2: 93-101.

Hatfield, T. and J. Bruce. 2000. Predicting salmon habitat-flow relationship for streams from western North America. North American Journal of Fisheries Management 20 (4): 1005-1015.

http://www.ecy.wa.gov/programs/wq/stormwater/easternmanual/manual.html

John Rose, Ecology NWRO, lead hydrogeologist for Skagit watershed water management, personal communication, August 26, 2015.

Lane, R.C. 2009. Estimated Water Use in Washington, 2005. U.S. Geological Survey, Scientific Investigations Report 2009–5128. Available at:
http://pubs.usgs.gov/sir/2009/5128/pdf/sir20095128.pdf

Locke, A., C. Stalnaker, S. Zellmer, K. Williams, H. Beecher, T. Richards, C. Robertson, A. Wald, A. Paul, and T. Annear. 2008. Integrated approaches to riverine resource stewardship: Case studies, science, law, people, and policy. Instream Flow Council, Cheyenne, WY. 430 pp.
Mathews, S.B., and F.W. Olson. 1980. Factors affecting Puget Sound coho salmon (Oncorhynchus kisutch) runs. Canadian Journal of Fisheries and Aquatic Sciences 37 (9): 1373 1378.

May, C.W., R. Horner, J. Karr, B. Mar, and E. Welch (1996), Effects of Urbanization on Small Streams in the Puget Sound Lowland Ecoregion, Watershed Protection Techniques, 2(4): 483-494.

McKernan, D.L., D.R. Johnson, and J.I. Hodges. 1950. Some factors influencing the trends of salmon populations in Oregon. Transactions of the North American Wildlife Conference 15: 427 449.

Mentor Law Group. “Draft Mitigation Plan: Fisher Creek Basin Mitigation Program.” Program Sponser Upper Skagit Tribe. Seattle: Mentor Law Group. 2014.

Neave, F. 1949. Game fish populations of the Cowichan River. Fisheries Research Board of Canada Bulletin 84.

Nelson, F.A. 1984. Some trout-flow relationships in Montana. Pages 122-126 in: F. Richardson and R.H. Hamre, editors. Wild Trout III-Proceedings of symposium. Trout Unlimited, Vienna, VA.

Pacific Groundwater Group. 2003. Technical Memorandum 11 (Task 8b) WRIA 27/28 Watershed Plan; Effect of exempt wells on baseflow Washougal River Watershed.

RH2 Engineering, Inc., Feasibility Report: Water System Evaluation Carpenter-Fisher, Upper Nookachamps, and East Nookachamps Subbasins. Draft. December 2012.

RH2 Engineering, Inc., Skagit Basin Municipal Water Right Assessment. February 2015.

Rosenfeld, J.S., and R. Ptolemy. 2012. Modelling available habitat versus available energy flux: do PHABSIM applications that neglect prey abundance underestimate optimal flows for juvenile salmonids? Canadian Journal of Fisheries and Aquatic Sciences 69 (12): 1920-1934. doi: 10.1139/f2012-115.

Smoker, W.A. 1953. Stream flow and silver salmon production in western Washington. Washington Department of Fisheries, Fisheries Research Papers 1 (1): 5-12.

Smoker, W.A. 1955. Effects of streamflow on silver salmon production in western Washington. Doctoral dissertation. University of Washington, Department of Fisheries, Seattle.

Spokane County Water Resources. 2011. Spokane County Water Demand Forecast Model. Obtained April 24, 2014 at: http://www.spokanecounty.org/1446/Water-Demand-Forecast-Model

Spokane County Water Resources. 2013. Spokane County Water Demand Forecast Model, Model 3.0 & 2013 Forecast Update. Obtained August 21, 2014 at: http://www.spokanecounty.org/1446/Water-Demand-Forecast-Model

Stalnaker, C.B., B.L. Lamb, J. Henriksen, K. Bovee, and J. Bartholow. 1995. The instream flow incremental methodology: a primer for IFIM. National Biological Service Biological Report 29. 45 pp.

Stormwater Management Manual for Eastern Washington. September 2004. Ecology Publication no. 04-10-076

Swift, C.H., III. 1976. Estimation of stream discharges preferred by steelhead trout for spawning and rearing in western Washington. U.S. Geological Survey Open-File Report 75-155, Tacoma.

Swift, C.H., III. 1979. Preferred stream discharges preferred for salmon spawning and rearing in Washington. U.S. Geological Survey Open-File Report 77-422, Tacoma. 51 pp.

Tennant, D.L. 1976. Instream flow regimes for fish, wildlife, recreation and related environmental resources. Fisheries 1 (4): 6-10. Doi: 10.1577/1548-8446(1976)001<0006:IFRFFW>2.0.CO;2.

Tharme, R.E. 2003. A global perspective on environmental flow assessment: emerging trends in the development and application of environmental flow methodologies for rivers. Rivers Research and Applications 19: 397-441. Doi: 10.1002/rra.736

Washington State Department of Ecology: Skagit River Basin webpage.

Washington State Department of Health, (DOH), DOH 331-063, Revised; Brochure: Trucked Transportation, Emergency water supply for public use. October 2012.

Zillges, G. 1977. Methodology for determining Puget Sound coho escapement goals, escapement estimates, 1977 preseason run size prediction and in season run assessment. Washington Department of Fisheries Technical Report 28. Olympia.

Attachment A. Yakima Basin Supplemental Mitigation Projects

Indian Creek Large Woody Debris/Floodplain Restoration

The SwiftWater and Masterson Ranch mitigation banks sell mitigation certificates to new groundwater users located within the Teanaway River basin. In addition to offsetting the consumptive use of each new groundwater use, the mitigation banks need to prevent local flow reduction that would be adverse to fish. The Teanaway is one of the more important salmon recovery areas within the Yakima basin. Salmon, steelhead, and bull trout spawning, incubation, rearing, and migration have been at least partially restored since the first flow recovery efforts were initiated by USBR in 2000. Prior to 2000, water diversions created a physical barrier to passage in August and September in almost all years.

The Teanaway can be characterized as follows:

Limiting Factors
In decreasing order of importance, the main factors limiting production of anadromous salmonids in the Teanaway have been identified as:

- Low flows and associated high water temperatures during the summer and fall in the lower mainstem, the Middle Fork, and the West Fork;

- Loss of natural floodplain function through the lower watershed; and,

- A "flashy" runoff pattern (the Teanaway has a naturally high flow variation due to extent of watershed that is in the rain-on-snow zone; flow variation has been exacerbated by extensive logging in the upper watershed.

Flow and habitat restoration priorities
- Improve streamflow in the lower Teanaway River through water efficiency improvements and purchases that provide permanent flow improvements that reduce water temperature and provide habitat for all life stages of anadromous and resident fish.

- Improve floodplain function and habitat to reduce water temperatures and provide base flow improvement later in the year.

- Improve watershed hydrologic function.

The irrigation season for Teanaway river water rights ends September 15. The irrigation season is based on a court decree from the early 1900s that first confirmed the Teanaway River water rights for the original pre-code water users. The irrigation season was also adopted by the Acquavella adjudication court.

Considering the flow and habitat restoration priorities, Ecology reviewed streamflow data for the Teanaway River near Forks to determine when the lowest daily average flow occurs. Based on

the 2000-2010 water years, the lowest daily flow occurred between August 21 (earliest) and October 6 (latest). Four years had the lowest flow occur after the Sept 15 end of the irrigation season.

Table 2. Flows in the Teanaway River near Forks

Year	Day	Avg. Daily Flow, cfs
2001	Oct 6	11.00
2002	Sept 16	16.00
2003	Oct 6	9.00
2004	Aug 21	12.00
2005	Aug 29	9.00
2006	Sept 9	11.00
2007	Sept 14	13.00
2008	Oct 1	12.52
2009	Sept 2	18.65
2010	Aug 26	25.92

From the preceding table, one can see that retiring water rights alone in the hope that relying only on that action to mitigate September 15 to November 15 flow reductions, would be ineffective. The flow restoration community had done sufficient assessment work to know their goal was to achieve a target flow of 20 cfs. The conclusion reached by WDFW, YN, and Ecology reviewers was that it would be appropriate to develop a supplemental mitigation program that facilitated offsetting the late-season impacts of year round domestic water use and would be likely to improve both late-season flows and water temperatures.

Supplemental Mitigation Project Description

Yakama Nation, using BPA funds, will construct a large woody debris (LWD) project within the geomorphic floodplain of Indian Creek on a section of land owned by WADNR. This land has been managed to generate revenue for the School Trust, but will soon be incorporated into the new Teanaway Community Forest Trust. This monitoring project will serve as a model or demonstration project to show what landscape and hydrologic changes result from alteration of the floodplain.

Project Goals:

- To identify changes in floodplain connectivity and the surface water-groundwater relationship within the LWD project site

- To identify and record changes in the floodplain landscape, riparian habitat, and aquatic habitat within the LWD project site

- To identify changes in the base flow of Indian Creek

- To identify changes in water temperature associated with the expected habitat, floodplain, and hydrologic changes

Project Objectives:
Collect stream flows and shallow groundwater elevations, surface- and groundwater thermal data, physical measurements of the floodplain cross section and fish habitat, and photographs depicting the landscape at prescribed intervals.

This project will primarily rely on the data generated to assess whether the expected landscape changes, floodplain reconnection, and hydrologic benefits result from the LWD project. There are no specific performance objectives. It will be done within the context of a much larger effort to restore flow and habitat in the Teanaway River basin and the Teanaway Community Forest landscape. The objective is to better understand the quantitative performance of the LWD project with respect to each project goal.

Tillman Creek Flow Augmentation

New Suncadia LLC (Suncadia) operates the most active water bank marketing mitigation certificates to 3rd party purchasers in Kittitas County.

Tillman Creek
Tillman Creek is one of several tributaries to the upper Yakima River that drain the north-facing slope of South Cle Elum Ridge, east of Peoh Point and southwest of the City of South Cle Elum to the confluence with the Yakima River. Most of the upper watershed tributaries appear to go dry after mid-summer. According to WDFW observations made in July 2010, Tillman Creek surface flows above the Moher Road and Westside Road intersection were estimated to be about 2.0 cfs. There was sufficient flow and instream habitat to support cutthroat trout and other small resident species. Anadromous fish are prevented from upstream passage at the KRD – Westside Road crossing (estimated stream mile 1.3) because of a nearly 4 foot vertical drop at a culvert. The only other fish passage obstruction is caused by poor hydrologic connectivity at the mouth of Tillman Creek during the summer low flow period.

Above the John Wayne Trail Bridge, 20 acres of riparian wetlands has a direct surface water connection to Tillman Creek. This is the same wetland and stream channel complex that would receive supplemental flow from the unnamed stream.

The Tillman Creek channel meanders through the land and through a series of instream wetlands and beaver ponds for 0.5 mile before entering the Yakima River. The mouth of Tillman Creek has a direct surface flow connection with the mainstem Yakima River. Due to low flows, hydrologic and habitat connectivity between Tillman Creek and the Yakima River can be poor. WDFW biologists estimated flow at the mouth of Tillman Creek in May 2011 to be 0.2 cfs (LaRiviere, personal communication).

WDFW and Yakama Nation (YN) fish biologists have observed juvenile O. mykiss, coho, and spring Chinook within the Tillman Creek drainage (LaRiviere personal communication). Cutthroat trout and other resident species are assumed to be present throughout the drainage, even above the blockage culvert on Westside Road.

Unnamed Tributary

The unnamed tributary adjacent to the western margin of the Tillman Creek northwestern watershed boundary drains a small subbasin 1.1 square miles in area. Surface water flows originate in small stream channels near the Kittitas Reclamation District (KRD) canal. Channel reaches are steep (greater than 20% slope) in the lower 300 meters of the stream, including immediately upstream of its confluence with the Yakima River. It is very difficult for small and large fish to swim up the steep slope (LaRiviere, personal communication). Additionally a perched culvert with a 12-inch vertical drop results in a severe passage obstruction within 5 meters of the Yakima River. WDFW conducted visual surveys and found no fish or shellfish in the unnamed drainage.

At its mouth, the unnamed stream flows through a culvert under the John Wayne Trail and then immediately into the Yakima River. A small gravel berm separates the Tillman Creek and Unnamed tributary watersheds. The berm functions as the right bank of the unnamed stream and as a portion of the western boundary for the Tillman Creek drainage. A small stream channel is situated within a few hundred feet of the berm. The channel enters into a large wetland complex. The wetland is connected to, and functions as, a left bank riparian area for lower Tillman Creek. There is a defined channel in the wetland that drains directly into Tillman Creek immediately upstream of the John Wayne Trail Bridge crossing.

The unnamed stream is about one-half mile west of Tillman Creek and currently flows directly into the Yakima River. The stream begins just below the KRD canal and flows north-northeast to the Yakima River. It appears that the unnamed stream was channeled and re- routed directly to the Yakima River through a culvert when the railroad grade was installed more than a century ago.

Supplemental Mitigation Project Description

This flow augmentation project was suggested by fishery biologists from the Washington Department of Fish and Wildlife and Yakama Nation.

Re-route a fishless stream from its current location to a new channel that would join Tillman Creek upstream of the John Wayne Trail. Water will be conveyed from the unnamed stream through a locking headgate with bypass, through a flume into an existing constructed ditch for approximately 50 to 100 yards, across an easement to a wetland that flows into Tillman Creek. The wetland that will receive the diverted stream flow is pre-existing and the existing ditch already discharges to this site.

Project Goals:

- Offset predicted flow reductions to lower Tillman Creek caused by new consumptive use resulting from construction of up to 50 homes upstream of the KRD canal within the Tillman Creek watershed.

- Restore up to 3 cfs to lower Tillman Creek that was lost by the century old realignment of the unnamed creek.

Project Objectives:

- Install a flow splitting structure in the unnamed stream at the bermed channel section of the unnamed creek upstream from the John Wayne Trail.

- Operate the gate structure to ensure the mitigation flow (5 gpm) is re-routed at all times. Set the gate structure to deliver up to 3 cfs when it is determined to be beneficial to fisheries and habitat in lower Tillman Creek.

Suncadia entered into an easement and agreement with Washington State Parks to convey the mitigation water. State Parks entered into a separate agreement (also facilitated by Suncadia) with WDFW and Ecology to re-route up to 3.0 cfs to improve the flow and fish rearing and passage conditions in lower Tillman Creek.

The long-term financial obligations associated with maintenance and operation of the flow splitting structure for rerouting the mitigation flow are the responsibility of the mitigation certificate purchasers. Covenants and conditions water right permits provide for perpetuation of the new water users' responsibilities. Ecology and WDFW, as provided in the State Park's easement agreement, have assigned their obligations for operations and maintenance to Kittitas Conservation Trust.

Attachment B. Ecology Water Resources Program Policy 2035

POL-2035 WATER RESOURCES PROGRAM

POLICY EVALUATING MITIGATION PLANS

Contact: Program Development and Operations Support Section

Effective Date: February/20/2013

References: RCW 90.03.255, RCW 90.03.290, RCW 90.03.380, RCW 90.42.100, RCW 90.44.055, RCW 90.44.060, RCW 90.44.100, RCW 90.46, RCW 90.54.010, RCW 90.54.020, RCW
90.74, WAC 173-152, and Appendix H of the DOH/DOE Joint Review Procedures
Memorandum of Understanding.

Purpose: It is Department of Ecology's (Ecology) policy that adverse effects to the state's water resources are best mitigated in-kind, in-time, and in-place. In certain situations, Ecology may accept mitigation that is out-of-kind, out-of-time, or out-of-place. This policy informs water right applicants about the requirements for mitigation plans, and guides Water Resources Program staff in evaluating mitigation plans submitted with applications for new water rights or changes to existing water rights.

Application: This policy describes procedures used to evaluate mitigation plans, the parameters of mitigation proposals, and the types of acceptable mitigation. This policy applies to all mitigation plans related to the approval or denial of water right applications under existing statutes and rules, and does not address the use of permit-exempt wells. Watershed plans that contain provisions for providing water and habitat-related offsets to streamflow depletions have been adopted in some Water Resource Inventory Areas (WRIAs), and in some instances Ecology has incorporated these provisions into instream flow and water management rules. Prospective water users in those WRIAs should consult those WRIA-specific guidance documents and rules.

Definitions

"Adaptive management" means a systematic approach for maintaining or improving resource conditions by observation and monitoring, then applying that knowledge to modify water use or mitigation actions.

"Consumptive use" of water is a use that diminishes the water source,[1] and includes such uses as:

- Transpiration by plants and animals.
- Evaporation that occurs after water has been diverted or pumped from the source.
- Conveyance losses from a reasonably efficient distribution system that do not become return flows.
- Water contained within a product or byproduct.

"Impair" or "Impairment" means to interrupt or interfere with the physical availability of water, or degrade the quality of the water, that would:

1) Prevent an existing water right holder from fully beneficially using the water right;
2) Require an existing groundwater right holder or surface water right holder to make significant modifications in order to beneficially use the water right;
3) For an instream flow water right established by rule, cause the flow of the stream to fall below the instream flow more frequently, for a longer duration, or by a greater amount than was previously the case; or
4) As provided in WAC 173-150, interrupt or interfere with a groundwater right that is withdrawn from a qualifying withdrawal facility (see WAC 173-150-030(7) and (8), 173-150-040, and 173-150-060).

"In-kind" mitigation or "water-for-water" mitigation refers to offsetting the adverse effects of a new diversion or withdrawal with an equal quantity of suitable quality water, such as through retiring or placing into the Trust Water Rights Program an existing water right with comparable consumptive quantity; discharging reclaimed water; through a stream augmentation scheme; or through cessation of a use.

"In-place" mitigation refers to measures whose benefits occur at the same location as the adverse effects of a proposal.

"In-time" mitigation refers to measures whose benefits closely mimic the quantity and timing of the adverse effects of a proposal on a water source. Staff making determinations on the adequacy of the timing of mitigation must consider the existing management framework of the watershed or basin and the effects of timing on a source.

"Mitigation" means measures that offset adverse effects on a water source to eliminate impairment and/or detriment to the public interest.

"Mitigation plan" is a written document developed by the water right applicant or through joint discussions between a water right applicant and Ecology. A mitigation plan describes the effects of a proposed water use and presents a proposal to alleviate those effects. This plan should also include any assurances needed to ensure the effectiveness of the proposed mitigation.

[1]WAC 173-500-050

"Out-of-kind mitigation" refers to mitigating for a new water use by making water quality or habitat improvements, removing fish barriers, or providing other "non-water" improvements as opposed to physically replacing the water lost through the new proposed use.

"Performance based permits" are those that outline specific goals and include conditions or criteria that must be met in order to maintain permit validity under the statutory criteria.

"Pumped flow augmentation" refers to mitigating for a new water use by augmenting streamflow with groundwater that is pumped from a nearby aquifer.

"Reclaimed water" is water derived in any part from wastewater with a domestic wastewater component that has been adequately and reliably treated, so that it can be used for beneficial purposes. Reclaimed water is not considered wastewater.

"Resource management techniques" are enhancements to the natural environment that make water available or offset the impact of a diversion or withdrawal. Creating, restoring, or enlarging ponds, wetlands, and reservoirs, or artificially recharging aquifers, are examples of resource management techniques. Resource management techniques can be acceptable forms of mitigation.

"Return flow" is water diverted or withdrawn for irrigation or other use that returns to the stream or aquifer from which it is diverted or withdrawn, or to some other stream or aquifer, or that would do so if not intercepted by some obstacle.

"Stormwater" is snow melt and rainfall that runs off surfaces such as rooftops, paved streets, highways, and parking lots.

"Stream Augmentation" refers to increasing the quantity of streamflow above what would otherwise occur.

"Wastewater" means water-carried wastes from residences, buildings, industrial and commercial establishments, or other places, together with such groundwater infiltration and inflow as may be present.

"Water banks" are a mechanism to market the transfer of surface water, groundwater, and water storage entitlements that makes water available for new uses.

Background

Water Resources Program staff frequently evaluate mitigation plans submitted with applications for new water rights or changes to existing water rights. Mitigation plans may allow Ecology to approve applications that otherwise would be denied for failure to meet statutory or permitting requirements. This policy provides guidance on evaluating and implementing mitigation plans, as well as the monitoring and reporting associated with these plans, and clarifies how Ecology reviews mitigation plans in the context of specific statutory permitting requirements.

Mitigation plans can be submitted at the same time that a new water right application or a water right change application is filed. Plans can also be submitted later if the applicant is notified that water is not available or impairment would cause denial of the application. The Washington Water Code currently allows Ecology to approve, but not to impose mitigation for a new water right or & change to an existing water right unless agreed to or proposed by the applicant.[2] Water right applicants may submit mitigation proposals to support an application, such as to avoid impairment or when water would otherwise not be available. In both these cases, Ecology would be required to deny the application if an adequate mitigation plan was not proposed by the applicant and approved by Ecology.

In some areas of the state, specific rules apply with respect to the evaluation and consideration of mitigation. Some Water Resource Inventory Areas (WRIAs) have adopted watershed plans that contain provisions for providing water and habitat-related offsets to streamflow depletions. Ecology has incorporated these provisions into instream flow and water management rules *(see* WAC 173-500). Technical guidance to develop mitigation that is proportionate to the adverse effects of a proposed appropriation has been developed in some watersheds. Prospective water users in areas with adopted watershed plans should consult those WRIA-specific guidance documents and rules.

Although this policy addresses mitigation under the four part test for issuing a water right, other situations may require mitigation. For example, under WAC 173-152-050, some applications may receive priority processing if the proposed use will be nonconsumptive and substantially enhance or protect the quality of the natural environment. The nonconsumptive prong of this two-part test must be met with water-for-water mitigation, but the substantial enhancement prong may be met by other means.

Authority to Evaluate Mitigation Plans

Ecology's authority to accept mitigation plans developed in support of water right applications is found in case law and statute.[55]

- Mitigation plans may be submitted to propose compensatory mitigation within a watershed under RCW90.74.

- Ecology must consider both the benefits and costs, including environmental effects, of any water impoundment or other resource management technique that is included as a component of the application under RCW 90.03.255 or RCW 90.44.055.

- Facilities that reclaim water under RCW 90.46.130 may be required to provide compensation or otherwise mitigate impairment of any existing water rights downstream from any former freshwater discharge point.

[2]See RCW 90.03.255 and 90.44.055.

[3]Case Law includes:
PCHB 05-137 Squaxin Island Tribe v Miller Land & Timber; PCHB 97-146 OHA v. DOE and Battle Mt Gold Company; PCHB NO. 03-155 Burke and Coe v. DOE; and Mountainstar Resort Development LLC; PCHB NO. 01-160 Airport Communities Coalition v. Ecology & Port of Seattle; PCHB NO. 02-037 Pacific Land Partners LLC v. DOE; PCHB 03-030 Yakama Nation v DOE; PCHB 03-155 Mountainstar v DOE; PCHB 96-102 Manke Lumber Co v DOE. Statutes include RCW 90.03.255 and RCW 90.44.055.

- Under SEPA substantive authority, Ecology may require mitigation to avoid adverse environmental impacts (see RCW 43.21C).

- In 2009, Ecology and the Department of Health (DOH) modified the Memorandum of Understanding (MOU) for coordinating review and permitting procedures for public water systems. Appendix H of the MOU outlines how mitigation can be provided that meets public water system reliability criteria.

- Ecology may issue preliminary permits under RCW 90.03.290(2)(a) to require an applicant to provide information on which to base a mitigation plan.

- Mitigation plans may be offered as evidence of a water budget neutral project proposed for priority processing under WAC 173-152-050(2)(g).

- Water rights deposited in the trust water program can be used to mitigate for water resource impacts under RCW 90.42.100(2)(a).

Mitigation Plan Requirements

Mitigation plans must include a structured approach for implementing, monitoring, and maintaining the mitigation for as long as water is withdrawn or diverted. Provisions of the water right authorization will stipulate that it is the water right holder's responsibility to implement, maintain, monitor, and report on the effectiveness of the mitigation proposal.

Mitigation plans must:

- Identify the source(s) of supply for the proposed use and for the proposed mitigation water, if applicable.

- Estimate the consumptive quantity of water that will be depleted by the proposed use from the source requiring mitigation. In the case of a change application, the quantity diverted or withdrawn and used consumptively by the existing use must be established.

- Identify water rights that will be affected by the proposed diversion or withdrawal.

- Be based on a detailed hydrological analysis, which may include an analytical or numerical model.

- Evaluate the reliability of the mitigation proposal, including identification of the sources of uncertainty and how any uncertainties were accounted for.

- Provide a plan for measuring, monitoring, and reporting to ensure compliance with all permit conditions.

- Have contingency measures or an adaptive management plan that will be followed if the mitigation is determined to be inadequate following implementation.

- Identify other permits required to put the mitigation plan into effect.

Evaluation of Mitigation Plans

Ecology evaluates mitigation proposals on a case-by-case basis, relying on the information and analysis provided by the applicant and best professional judgment.

However, other factors must also be considered when deciding if a mitigation plan fully addresses statutory requirements for permitting. For example, new water rights for either surface water or groundwater must meet the four-part test of water availability, beneficial use, public interest (also referred to as being non-detrimental to the public welfare), and impairment.[4]

Ecology considers that water is not available for further appropriations when:

- Water is physically not available, including circumstances where the proposed source does not produce enough water to reliably meet the needs of the proposed beneficial use.

- Water is not legally available at a particular time or place, such as where proposed withdrawals will capture water from surface or groundwater sources that have been closed to new appropriations, or from streams where instream flows are not being met.

- Proposed diversions or withdrawals will cause impairment.

Ecology must deny an application for a new water right when water is not physically available, not legally available, or when a proposed withdrawal or diversion would cause impairment of existing water rights or be detrimental to the public interest. These same tests apply to groundwater changes and transfers, but for surface water changes and transfers the public interest test does not apply. For water right applications that are not exempt from the State Environmental Policy Act (SEPA) process, Ecology may also require mitigation to address identified environmental impacts through SEPA substantive authority. The "State

[4]RCW 90.03.290(3) The department shall make and file as part of the record in the matter, written findings of fact concerning all things investigated, and if it shall find that there is water available for appropriation for a beneficial use, and the appropriation thereof as proposed in the application will not impair existing rights or be detrimental to the public welfare, it shall issue a permit stating the amount of water to which the applicant shall be entitled and the beneficial use or uses to which it may be applied: PROVIDED, That where the water applied for is to be used for irrigation purposes, it shall become appurtenant only to such land as may be reclaimed thereby to the full extent of the soil for agricultural purposes. But where there is no unappropriated water in the proposed source of supply, or where the proposed use conflicts with existing rights, or threatens to prove detrimental to the public interest, having due regard to the highest feasible development of the use of the waters belonging to the public, it shall be duty of the department to reject such application and to refuse to issue the permit asked for.

Environmental Policy Act" heading below provides more detail on SEPA and the water right application process.

In certain situations, Ecology may accept mitigation that is out-of-kind, out-of-time, or out-of-place. If an existing water right may be impaired by the proposed new use or change, the owner of the potentially impaired water right can waive claims of impairment or otherwise help shape the form of mitigation. If Ecology determines an application for a water right will not impair another's right, Ecology may issue that water right even if another water right holder does not agree.

The following table indicates the types of mitigation that might be appropriate for given situations.

Table 1: Types of Mitigation Appropriate for Given Situations

Impairment or Circumstance	Is In-Kind, In-Time, or In-Place Mitigation Appropriate?
Impairment - to an existing Water Right	Generally in-kind, in-time, and in-place mitigation is necessary. Mitigation may not be required if water right holders that may be potentially affected waive claims of impairment of their water rights through an agreement with the project proponent.
Impairment - to a State Instream Flow Water Right	Generally, in-kind, in-time, and in-place mitigation is necessary, but in appropriate circumstances involving a benefit to the public, the state may waive impairment to an instream flow through a determination of an overriding consideration of the public interest (OCPI) determination *(See* RCW 90.54.020).
Impairment - to a State-Held Trust Water Right	The terms of the trust agreement determine the state's ability to accept out-of-kind, out-of-time, or out-of-place mitigation for impacts to a trust water right.
Failure of the Public Interest test	Taken as a whole the project must be in the public interest. However, there may be instances where some aspect of a project may be contrary to the public interest, and in those instances Ecology may require mitigation for those effects. There is opportunity for out-of-kind, out-of-time, or out-of-place mitigation to meet the public interest test. In appropriate circumstances involving a benefit to the public, Ecology may make a determination of OCPI.
Failure of the Water Physically or Legally Available tests	When water is not physically and/or legally available, in-kind, in-time, and in-place mitigation must generally be provided. In appropriate circumstances involving a benefit to the public, Ecology may make a determination of OCPI.
To address adverse environmental impacts under SEPA substantive authority	Ecology may require mitigation for identified impacts through SEPA substantive authority.
To qualify as a substantial enhancement or protection of the quality of the natural environment	Some applications may be priority processed if the proposed use will be nonconsumptive and substantially enhance or protect the quality of the natural environment *(see* WAC 173-152-050(2)(c)). The nonconsumptive prong of this two-part test must be met with water-for-water mitigation, but the substantial enhancement prong may be met by other means.

To achieve Water Budget Neutral status	Some applications may be priority processed if impacts are offset by an equal amount of water *(see* WAC 173-152-050(2)(g) and WAC 173-152-020(18)).

Factors to consider when evaluating mitigation plans include:

- Effectiveness of the proposed mitigation
  - Will the mitigation completely offset adverse effects?
  - Will water rights provided for mitigation be protected by placing water into the Trust Water Program?
  - Does the circumstance require in-kind mitigation?

- Timing and/or quantities of mitigation
  - Will the timing and/or quantities of mitigation water eliminate impairment of existing water rights and offset adverse effects during a time of year when water is not available from surface or groundwater sources that have been closed to new appropriations, or from streams where instream flows are not being met?
  - Will the mitigation quantities be sufficient and will the mitigation be effective in-time?

- Location of mitigation
  - Will the plan mitigate where the impairment occurs?
  - Will the mitigation be effective in-place?

- Uncertainty and reliability
  - What assumptions and sources of data were used to estimate quantities, locations and timing of adverse effects of the new water use?
  - How representative are any models and assumptions used of actual site conditions?
  - How has uncertainty been accounted for to ensure the mitigation plan is successful?

- Water quality
  - Will the mitigation water be the same or better quality than the water appropriated for the proposed use?
  - Will the mitigation increase the likelihood of adverse water quality effects?

- Sustainability
  - Will mitigation schemes be self-sustaining?
  - If maintenance will be required, will an appropriate management and maintenance plan be in place?
  - Will monitoring plans, performance bonds, or assurances be in place to ensure sustainability of the mitigation?
  - What resources will be available to the applicant to ensure mitigation is maintained?

- Enforceability of the mitigation
    - Will assurances be in place in order for the mitigation to continue during the duration of the proposed water use?
    - What will be the consequences of failure of the mitigation plan?
    - Will agreements, land covenants, or other legal instruments be in place?

- Ecology workload considerations
    - What resources would Ecology require to ensure mitigation is maintained?

- Existing laws, rules, and plans
    - Are there adopted instream flows, closures, or WRIA or Watershed Plans affecting the watershed that need to be considered?
    - Are fish listed under state or federal Endangered Species Act present?
    - Will measures be in place that prohibit water provided for mitigation to be used for any other purpose?

- Review of the mitigation plan by interested parties
    - Have interested parties, such as tribes or other water right holders, had an opportunity to review and provide input on the proposed mitigation plan?
    - Was the mitigation plan adequately described in any required SEPA documentation?

Mitigation Strategies

The following are examples of mitigation strategies that may allow a new permit or change authorization to proceed. In some cases, combinations of these strategies may be necessary.

Water Right Management Strategies

- Transferring a senior water right(s) to offset approval of a junior water right.
- Placing water rights in the State Trust Water Program to offset the proposed use's effects to stream flows or to groundwater levels.
- Using permanent split-season lease agreements with an upstream water right holder to supply instream flows during dry or low flow seasons.
- Acquiring a water right(s) in exchange for approval of another water right.

If a water right or rights are acquired for use as mitigation, the mitigation plan should outline a method of protecting those rights for the duration of the proposed water use. Water rights that are acquired to offset adverse effects or in exchange for approval of a new or changed water right should be placed into the Trust Water Rights Program whenever possible to preserve the priority date and ensure protection. Generally, placing a valid water right used at the same location and at the same time of year (in-kind, in- place, and in-time) into the Trust Water Rights Program is preferred because these measures require active management only to ensure that the water is not taken without authorization. If an acquired water right cannot be protected, it may be necessary to acquire additional rights, develop an adaptive management strategy, or use a combination of other methods.

Not all water rights are equivalent, which may affect their ability to be used as mitigation. The usefulness or suitability of acquired water rights in a mitigation plan can be diminished or eliminated by many factors including:

- If the water right is an undeveloped permit or claim.
- If the water right is subject to a Family Farm Water Act provision.
- If the water right has quantities that are non-additive.
- If the water right is interruptible or has a junior priority date.

Physical Construction Strategies

- Permanent system changes that redistribute water.
- Constructing infiltration pond(s) or subsurface infiltration galleries.
- Putting augmentation facilities in place (such as constructing a pumped flow augmentation project).
- Storing surface water or groundwater for release during low flow periods.
- Removing fish barriers.

Monetary Investment Strategies

- Conservation fund to buy water rights (privately funded).
- Habitat preservation easements.

Acceptable Mitigation

A hierarchy of effectiveness influences Ecology's acceptance of various forms of mitigation. Those forms having the greatest chance of offsetting the effects from the proposed water use require the least amount of justification and analysis. Conversely, those proposals with the greatest uncertainty regarding the methods of analyses, long-term effectiveness, comparable benefits, and so on (identified under the heading "Other potential types of mitigation" below), will require greater amounts of justification and analysis and may not be acceptable.

The following list of mitigation strategies is in approximate order of acceptability (the first three preferred) and must be coupled with Ecology's authority in Table 1:

Preferred types of mitigation:

1. In-kind, in-time, and in-place mitigation is always preferred. If the estimated volume or timing or location of the adverse effects is uncertain, the applicant may propose water-for-water mitigation that replaces more than predicted effects. For example, the applicant could propose year-round mitigation when adverse effects may only occur seasonally. Where physical construction is involved (e.g. storage), mitigation of instream effects may be maximized out-of-time in consultation with Ecology and external stakeholders. However, if existing water rights are affected, in-time releases may be required.

2. Water bank mitigation and other forms of pooled mitigation may be considered for out-of-priority water use (i.e. senior rights acquired to serve junior rights). This type

of mitigation can also be used to offset adverse effects of permit-exempt well use. Due to the basin-wide changes that occur with this type of mitigation, sophisticated analyses and extensive mitigation plans are typically required.

3. Out-of-time or out-of-place mitigation can be acceptable if it provides an equal or greater benefit to the environment (e.g. a more critical stream reach will have increased flow) than would be achieved through water-for-water or pooled mitigation. If there is uncertainty in the comparability between historical use and the new use, this uncertainty may be managed by the applicant providing a safety factor whereby more water rights than the proposed water use are acquired, or a development schedule with an adaptive management strategy that allows the applicant to prove that the mitigation works through actual implementation. Out-of-time and out-of-place mitigation plans should also be acceptable to the state Department of Fish and Wildlife (WDFW), and the concerns of other interested parties such as affected tribes or senior water right holders should be taken into account.

Other potential types of mitigation:

4. Reclaimed water or return flows (wastewater or storm water) can be used to augment streamflow. The effectiveness of this type of mitigation depends on the artificial maintenance of stream flows and, in the case of reclaimed water, assurances that the reclaimed water will continue to be treated to reclaimed water standards and be of appropriate quality for augmentation purposes. Therefore, it is allowed only where the water budget is well-defined, the risk of failure is very low, and there are sufficient control measures to ensure compliance as long as water is withdrawn or diverted. Wastewater or storm water releases can be considered where properly permitted and where control measures are in place to protect water quality. Reports of Examination, and water right permits and certificates should contain provisions to ensure water withdrawals stop whenever mitigation flows are unavailable.

5. Out-of-kind mitigation could be a "Monetary Investment" strategy. Examples of this sort of mitigation include habitat restoration or enhancement that is protected through a restrictive covenant or easements, for as long as water is withdrawn or diverted. Because of the uncertainty regarding tradeoffs involved in this type of mitigation, the action(s) or investment(s) being offered must represent a clear and substantial benefit to the environment. Ecology should also take into account the potential cumulative impact of additional out-of-kind mitigation proposals affecting the same source. Due to the challenges in evaluating these proposals, Water Resource Program staff should consult with WDFW to seek their agreement. The concerns of other interested parties such as affected tribes or senior water right holders should be taken into account. Use of out-of-kind mitigation likely must be coupled with in-kind mitigation to be acceptable. In appropriate circumstances involving a benefit to the public, Ecology may make a determination of OCPI.

6. Pumped flow augmentation as mitigation is least preferred. First, because pumping the augmentation water itself typically also reduces streamflow, it is more difficult to achieve a true gain. Second, as this type of mitigation depends on a very artificial means of stream flow maintenance, and always includes long term maintenance and operation requirements, there are significant risks that this augmentation will not occur for as long as water is withdrawn or diverted. Pumped flow augmentation must not threaten the sustainable yield of the aquifer or impair other water rights, and is more acceptable as a seasonal, rather than continuous form of mitigation. Pumped flow augmentation can be allowed only where the water budget is well defined, the risk of failure is very low, and there are sufficient control measures to ensure compliance for as long as water is withdrawn or diverted. As effects to streamflow are hard to predict and difficult to measure, proposals should include recommendations to augment streamflow in quantities greater than the estimated effects, especially if the effects are very small.

Some mitigation proposals may involve mixing and matching more than one type of mitigation. Out-of-time, out-of-place, or out-of-kind mitigation may be coupled with water-for-water mitigation to avoid detriment to the public interest or perceived effects under substantive authority of the State Environmental Policy Act (SEPA). When combining different types of mitigation, the applicant may need to submit multiple applications for water right permits, applications to change existing water rights, amendments to pending applications, and SEPA studies or documents, as appropriate.

When evaluating mitigation plans it also must be recognized that some Water Resource Inventory Areas (WRIAs) have rules that differ. Specifically, where Instream Resource Protection Plans (IRPPs) have been established, requirements for issuing permits vary. "Out-of-kind" mitigation may not be an option in some basins. Due to the site specific nature of this issue, Ecology staff will need to provide specific guidance to applicants in WRIAs with adopted IRPPs.

Mitigating Impairment of Existing Water Rights

In its findings for a new water right or change authorization, Ecology will make decisions regarding the adequacy of a mitigation plan's ability to prevent impairment of existing rights. Mitigation may not be required if the owner of the potentially impaired water right waives claims of impairment or otherwise helps shape the form of mitigation. An applicant may consult directly with potentially affected water right holders and negotiate agreements to secure their consent to a proposed project. If an applicant pursues such negotiations, and an agreement is relied upon for issuance of a new use of water or change of use of water, Ecology will require written confirmation from the affected water right holder.

Consultations

Ecology will not render decisions on the adequacy of proposed mitigation plans until all required consultations with external stakeholders have been completed. Water Resources Program staff will consult with other agencies or entities with permitting authority or relevant expertise. Ecology will also consult with tribes in accordance with established policies and

procedures and intergovernmental agreements. While acceptance of a mitigation plan by other entities is not a legal requirement for Ecology, it is preferred.

For proposals that affect instream flows, staff will consult with WDFW and affected parties and tribes. In evaluating mitigation for effects on adopted instream flows, Ecology will consider the:

- Particular instream flow.
- Quantity and location of stream reaches affected.
- Quality of the fish habitat affected.
- Fish species affected.
- Water quality effects.
- Volumes affected.
- Timing and frequency of changes to flow regimens.
- Existing watershed agreements.
- Potential reduction in flow, or losses from use of water reserved for future public water supply.
- Instream biological needs.
- Other factors as appropriate.

For proposals concerning public water systems, Ecology will consult with the Departme1:1t of Health (DOH) consistent with Appendix H of the MOU between Ecology and DOH, and coordinate permitting decisions as appropriate.

For proposals where reclaimed water is proposed for mitigation purposes, the Water Resources Program will consult internally with Ecology's Water Quality Program, and externally with the generator of the reclaimed water and DOH.

Ecology will document the results of its consultations in writing, typically in its permitting decision and in its SEPA threshold determination.

Dealing With Risk and Uncertainty

Before a mitigation plan can be approved, Ecology must be confident that the plan will meet the stated objectives. Many mitigation proposals will involve some degree of uncertainty. Identifying, assessing, acknowledging, and accounting for uncertainty often will'dictate what must be included in a mitigation plan and what qualifies as acceptable mitigation. Ecology must take into account whether the mitigation actually offsets adverse effects and how easily the plan can be implemented. Ecology may deny mitigation plans that are contrary to the public interest, or that would impair existing water rights, or adversely affect water resources of the state. Where risks and uncertainty are elevated, the applicant may propose higher mitigation ratios (e.g. cessation/retirement of historical water use in an amount that is more than the full measure of the new proposed use).

Water right permitting requires managing for risk to resources and other water rights, and managing for uncertainty in the analysis of those risks and the effectiveness of proposed mitigation. For example, in many areas of the state Endangered Species Act-listed fish

species are threatened, and the risks to these resources must be taken into account under the impairment or public interest tests. Various methods of analyses offer different degrees of certainty. For example, many mitigation schemes will be based on conceptual, analytical, or numeric groundwater modeling. Using models to predict the extent and timing of potential adverse effects includes some level of uncertainty. The effectiveness of a given mitigation technique or strategy can also vary. The applicant bears the responsibility of adapting their proposed project to address uncertainty.

In addition, Ecology will consider the:

- Extent and validity of water rights used for mitigation.
- Accuracy of the methods used to measure quantities of water or effects.
- Adequacy of site characterization.
- Completeness and validity of data.
- Long-term effectiveness of the mitigation.
- . Concerns expressed by interested parties.
- Adequacy of financial assurances.

Adaptive Management

Due to the uncertainty inherent in mitigating water right impairment, every mitigation plan must identify actions to be taken if monitoring shows failure of any aspect of the mitigation. An adaptive management strategy that allows an applicant to prove that mitigation works during actual implementation may be appropriate when changing conditions could affect a mitigation plan. When designing an adaptive management process, observation and monitoring is essential to guide actions and produce changes to a mitigation plan. Reactions to adaptive management will typically be specific to a proposal, but may include reduction or termination of water use under specific conditions, or consideration of substitute or different mitigation methods. Formal requests to substitute different mitigation methods can be considered, however Ecology is under no obligation to approve a new or modified mitigation plan.

Financial Assurances

The objective of financial assurances is to ensure operational mitigation over the life of the project. If necessary to address uncertainty and risk, the applicant must provide financial assurances to guarantee that the applicant will have the funds to continue the mitigation in the event of a default. Financial assurances are expected to be in place as long as the underlying water right is in use, but may be required for a time frame determined by Ecology based on adaptive management or documented reduced risk(s) over time. Acceptable mechanisms may include trust funds, bonds guaranteeing performance, irrevocable letters of credit, government securities, or other proof of financial responsibility. The applicant must provide an acceptable level of financial assurance, and the water use documents must contain provisions allowing Ecology to terminate the water use if Ecology determines that mitigation is at risk due to failure to maintain financial assurances.

Performance Based Permits

To address uncertainty and risk associated with mitigated water rights, Ecology may issue performance based permits. Such permits can authorize phasing of a project or tie development

limits with proof of mitigation implementation. Ecology will not issue a certificate of water right until satisfied that the mitigation is successful.

State Environmental Policy Act

As a general rule, Ecology's decisions on water right permit applications are subject to the SEPA process, though appropriations of one cubic-foot per second or less of surface water, or of 2,250 gallons per minute or less of groundwater, for any purpose, are categorically exempt from a SEPA threshold determination. This SEPA exemption covers the permit and certain activities related to the water diversion and distribution system *(see e.g.* WAC 197-11-800(4)). In addition, the legislature has enacted a substantial exemption for certain irrigation projects diverting 50 cubic feet per second or less *(see* RCW 43.21C.035).

Ecology will consider both the benefits and costs to the existing environment when evaluating an application for a new water right, water right transfer, or change to an existing water right that includes a mitigation plan or a resource management technique.[5]

To address environmental impacts for projects that are not categorically exempt from the SEPA process, Ecology may use SEPA to shape mitigation strategies, and solicit comments on mitigation plans. When not the SEPA lead agency, Ecology can submit comments to the lead agency on the adequacy of a mitigation plan. All agencies with jurisdiction may choose to require mitigation for identified impacts through their SEPA substantive authority.

If an applicant proposes a mitigation plan associated with the water right application following approval of SEPA when Ecology is not lead agency, Ecology will contact the lead agency, provide the new information, and request additional environmental review. Ecology may supplement the SEPA record if new environmental impacts are found and mitigation is proposed to address them. Ecology may use SEPA substantive authority to condition the water right decision based on the SEPA document and any comments received whether or not Ecology is the lead agency for the proposal.

Permit Provisions

Ecology will establish provisions based on the required elements of a mitigation plan and include those provisions in any Report of Examination, permit, certificate, or change authorization. These elements must address all actions necessary to implement, maintain, monitor, and report on the effectiveness of a mitigation proposal for as long as water is withdrawn or diverted. These documents must also contain conditions to terminate or suspend a proposed water use if a mitigation plan ends or fails to be effective, or if there is a failure to maintain financial assurances for the mitigation. If a water use is suspended, it may not

[5]As required in RCW 90.03.255 and RCW 90.44.055, Ecology will "take into consideration the benefits and costs, including environmental effects, of any water impoundment or other resource management technique that is included as a component of the application. The department's consideration shall extend to any increased water supply that results from the impoundment or other resource management technique, including but not limited to any recharge of groundwater that may occur, as a means of making water available or otherwise offsetting the impact of the diversion of surface water (or withdrawal of groundwater-RCW 90.44.055) proposed in the application for the water right (or amendment in the same water resource inventory area-RCW 90.44.055), transfer, or change."

resume until the mitigation plan can be rendered effective and/or financial assurances are restored.

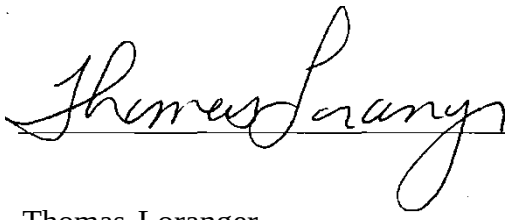
Every mitigation plan places some burden on Ecology to track, coordinate, and enforce the mitigation to ensure that water is available and existing water rights are not impaired. Therefore, provisions should be tailored to reduce effects on staff resources to the greatest extent possible. Some examples of provisions include:

- Stream flow measurement or groundwater level data coordinated with annual metering data submittals due on January 31st of each year.

- Periodic evaluation of mitigation adequacy and compliance with consumptive use limits for public water systems coordinated with water system plan updates due every six years.

- A structured approach for implementing, maintaining, monitoring, and reporting on the effectiveness of a mitigation proposal for as long as water is withdrawn or diverted.

- One-time performance standards (such as submittal of agreements, covenants, and trust water conveyances) under mitigation plans coordinated with permit maintenance schedules already tracked by Ecology, such as Beginning of Construction, Completion of Construction, and Proof of Appropriation, or Project Completion steps.



Thomas Loranger
Acting Program Manager
Water Resources Program

Special Note: These policies and procedures illustrate existing law and encourage consistency to guide water resources program staff in administrating laws and regulations. These policies and procedures are not formal administrative regulations adopted through a rule-making process. Therefore, while this policy provides general guidance, it is not intended to supersede the applicable statutes and rules or control in all situations where staff may exercise discretion as to how best to apply the law.

The policies indicate Ecology's practices and interpretations of laws and regulations at the time they are adopted and may not reflect later changes in statute or judicial findings. If you have any questions regarding a policy or procedure, please contact the department.