Appendix 4

Summary of results by Water Resource Inventory Area (WRIA)

This appendix provides a basic summary of information on ecosystem and salmonid scoring to aid interpretation of compiled scores for each Water Resource Inventory Area (WRIA). Narratives were prepared from inspection of the scores shown in Appendices 2 and 3. To orient readers, this appendix also identifies major cities or towns, and major river systems within each WRIA.

WRIA 1 - Nooksack

Cities: Bellingham
Major river systems: Nooksack River

Ecosystem Scoring:

The Nooksack WRIA received favorable ratings for intact estuarine and nearshore marine areas, amount of WRIA in protected land status (16 percent) and the low amount of WRIA area in urban development (3.9 percent). Low overall road density and low level of hydrological modification were also factors that rated favorably. Channel gradient and forage fish rated moderate. A number of factors rated poorly. These are: low percent of mid-to-late seral stage riparian areas along salmon streams (8.7 percent - one of the lowest levels for Western Washington), population growth, water quality, amount of WRIA in agricultural status (13 percent) and WSDOT fish passage barriers (36 - this is the second highest amount per WRIA in Western Washington). In addition water availability for fish rated poorly: Instream flows have been set but not enforced, water is overappropriated, and there is significant growth pressure and expected need for more water.

Salmonid Scoring:

The Nooksack WRIA received favorable ratings for production type, the low percentage of stocks overfished and genetic diversity present within and among salmonid populations in this WRIA. Unfavorable ratings occurred for total healthy stock significance, knowledge of natural juvenile production, the ratio of hatchery to natural production, and spawner numbers.

WRIA 2 - San Juan

Cities: No major cities.
Major river systems: None.

Ecosystem Scoring:

The San Juan WRIA has six factors that rated favorably, five medium and three with no data available. Especially important is the favorable rating for nearshore marine condition. Although the San Juan Islands do not have large freshwater spawning and rearing areas, the islands' nearshore habitats are of importance to salmonids originating in other WRIAs. Also with favorable ratings are estuary development, percent urban land use, population growth, water quality and road density. Hydrologic modification, forage fish, percent agricultural land use, water availability and protected lands rated medium. Gradient, seral stage along salmon streams, and WSDOT passage barriers were factors with no data to allow rating.

Salmonid Scoring:

The San Juan WRIA received favorable ratings for production type, low unhealthy stock status, the low percentage of stocks overfished, and sufficient spawner numbers within salmonid populations in this WRIA. Unfavorable ratings occurred for total healthy stock significance, stock origin, and knowledge of natural juvenile production. Data were not available to assess the importance of the genetic diversity contained within and among salmonid populations in this WRIA.

WRIA 3 - Lower Skagit - Samish

Cities: Mount Vernon
Major river systems: Lower portions of the Skagit River.

Ecosystem Scoring:

For the Lower Skagit and Samish WRIA, forage fish and water quality rated favorably. Nine of the fourteen factors rated medium (nearshore marine condition, percent urban land use (6.9), gradient, hydrologic modification, population growth, road density, WSDOT passage barriers (24), water availability (no instream flows, significant development pressure) and extent of protected lands (1.6 percent of WRIA). Factors that rated poorly are estuary development, amount of mid-to-late seral stage along salmon streams (1.6 percent), and percent agricultural land use (18.8). This WRIA has the lowest Western Washington percentage of mid-to-late seral stage along salmon streams. It also has the greatest Western Washington percent of land use in agriculture.

Salmonid Scoring:

The Lower Skagit and Samish WRIA received favorable ratings for production type, the low percentage of stocks overfished, knowledge of natural juvenile production, the ratio

of hatchery to natural production, and genetic diversity present within and among salmonid populations in this WRIA. Unfavorable ratings occurred for only the stock origin measure.

WRIA 4 - Upper Skagit

Cities: No major cities.
Major river systems: Upper tributaries of the Skagit River.

Ecosystem Scoring:

Upper Skagit is one of the five Western Washington WRIAs with the highest/most favorable overall ecosystem scores. (The others are Hood Canal, Lyre-Hoko, Sol Duc-Hoh and Queets-Quinault.) Urban and agricultural areas of the Skagit watershed predominantly fall within WRIA 3. Upper Skagit favorable ratings are: percent urban (0.3) and percent agricultural land use (0.3), forage fish, population growth, water quality, amount of mid-to-late seral stage along salmon streams (55.0 percent), road density, WSDOT fish barriers (5), water availability (flows not set, limited growth), and amount of land in protected status (52.7 percent). Nearshore marine condition and hydrologic modification are rated medium. Estuary development (from Lower Skagit) and channel gradient are rated unfavorably.

Salmonid Scoring:

The Lower Skagit WRIA received many favorable ratings. These included: stock origin, production type, the low percentage of stocks overfished, knowledge of natural juvenile production, the ratio of hatchery to natural production, total unhealthy stock significance, and genetic diversity present within and among salmonid populations. Unfavorable ratings occurred for only the total healthy stock significance measure.

WRIA 5 - Stillaguamish

Cities: Arlington
Major river systems: Stillaguamish River

Ecosystem Scoring:

Estuary development, percent urban land use (3.1) and hydrologic modification are rated favorably. Ten factors rated medium. They are: nearshore marine condition, channel gradient, forage fish, population growth, water quality, percent land use in agriculture (5.6), forest seral stage along salmon streams (26), road density, water availability (flows not set, growth pressure) and amount of WRIA in protected land status (10.1 percent). Only one factor rated poorly. This is fish passage at WSDOT sites (30 sites in this WRIA).

Salmonid Scoring:

The Stillaguamish WRIA received many favorable ratings. These included: stock origin, production type, the low percentage of stocks overfished, the ratio of hatchery to natural production, and genetic diversity present within and among salmonid populations. No unfavorable ratings occurred.

WRIA 6 - Island

Cities: No major cities.
Major river systems: None.

Ecosystem Scoring:

As with the San Juan WRIA, a major importance of the Island WRIA to salmon protection and recovery is for its nearshore habitat. Factors rating favorably are: estuary development, hydrologic modification, water quality and road density. Medium rated factors are: nearshore marine condition, urban land use percent, forage fish, population growth, agricultural land use percent and water availability. Amount of protected land rated poorly. Three factors were not able to be rated due to lack of data. They are: gradient, seral stage along salmon streams, and WSDOT passage barriers.

Salmonid Scoring:

The Island WRIA is a very minor producer of salmonids due to the natural lack of suitable spawning and freshwater rearing habitat. There was not any information on many salmonid scoring measures. The only favorable rating was the unhealthy stock significance.

WRIA 7 - Snohomish

Cities: Everett
Major river systems: Snohomish, Skykomish, and Snoqualmie Rivers.

Ecosystem Scoring:

Most factors (nine of fourteen) rated medium. These are: nearshore marine condition, percent of WRIA in urban condition (5.6), channel gradient, hydrologic modification, forage fish abundance, percentage of land in agricultural use (4.4), forest seral stage along salmon streams (29.0 percent in mid-to-late seral stages), road density and WSDOT passage barriers. Protected lands rated favorably (18 percent of WRIA). Unfavorable ratings were for estuary development, population growth, water quality and water availability (overappropriated and instream flows are often not met).

Salmonid Scoring:

The Snohomish WRIA received favorable ratings for production type, the low percentage of stocks overfished, the ratio of hatchery to natural production, and the genetic diversity present within and among salmonid populations. No unfavorable ratings occurred for salmonid factors in this WRIA.

WRIA 8 - Cedar-Sammamish

Cities: Seattle and Edmonds
Major river systems: Lakes Washington and Sammamish and the Cedar River

Ecosystem Scoring:

This is one of three WRIAs with poorest total ecosystem scores. The Green-Duwamish and Chambers-Clover also had poor total scores. Driving this score for the Cedar-Sammamish are unfavorable ratings for eight of the fourteen factors. They are: estuary development, nearshore marine condition, percent urban land use (38.9), gradient, hydromodification, population growth, road density (7.02 road miles per square mile) and water availability (overappropriated). Medium scores are for: forage fish, water quality, seral stage along salmon streams, WSDOT passage barriers (23) and amount of land in protected status (2.7 percent). Amount of agricultural land use rated favorably.

Salmonid Scoring:

The Cedar-Sammamish WRIA received favorable ratings for production type, the low percentage of stocks overfished, knowledge of natural juvenile production, and genetic diversity present within and among salmonid populations. Unfavorable ratings occurred for the total healthy stock significance, stock origin, high ratio of hatchery to wild production, and spawner numbers.

WRIA 9 - Green-Duwamish

Cities: Kent and Federal Way
Major river systems: Green River

Ecosystem Scoring:

The Green-Duwamish WRIA has the poorest total ecosystem score for the Western Washington WRIAs. As with WRIA 8, this is driven by unfavorable ratings for eight of the fourteen factors. These factors are: estuary development, nearshore marine condition, percent urban land use (23.6), gradient, population growth, road density (6.8 road miles per square mile), water availability (overappropriated) and amount of protected lands (0.7 percent). Hydrologic modification, forage fish, water quality, percent agricultural land use and mid-to-late seral stage along salmon streams rate medium. One factor, WSDOT passage barriers rates favorably.

Salmonid Scoring:

The Duamish-Green WRIA received favorable ratings for only the total unhealthy stock significance. production type, the low percentage of stocks overfished, knowledge of natural juvenile production, and genetic diversity present within and among salmonid populations. Unfavorable ratings occurred for, stock origin, production type, high ratio of hatchery to wild production, and spawner numbers.

WRIA 10 - Puyallup

Cities: Tacoma, Sumner and Puyallup
Major river systems: Puyallup River

Ecosystem Scoring:

The Puyallup WRIA has three factors which rate favorably. These are: forest seral stage along salmon streams (40.4 percent is in mid-to-late seral stages), WDSOT barriers (15) and protected lands (24.2 percent of the WRIA). Four factors are in the medium category: percent of land use in urban development (9.4), and agricultural (3.7 percent), hydrologic modification and water quality. One half of all factors (seven) are rated unfavorably. They are: estuary development, nearshore marine condition, forage fish, population growth, channel gradient, road density and water availability (overappropriated, low flows declining due to water use and land use changes).

Salmonid Scoring:

The Puyallup WRIA received favorable ratings for the total unhealthy stock significance and genetic diversity present within and among salmonid populations. Unfavorable ratings occurred for the high ratio of hatchery to wild production, and spawner numbers.

WRIA 11 - Nisqually

Cities: Fort Lewis Army Base
Major river systems: Nisqually River

Ecosystem Scoring:

The Nisqually received favorable ratings for low level of estuary development, urban development (2.9 percent of WRIA in this land use), water quality and water availability (flows are set, but adequacy is unknown, low to moderate growth pressure). Seven factors rated medium. They are nearshore marine condition, gradient, population growth, percent agricultural use (6.3 percent of WRIA), seral stage along salmon streams (25.1 percent in mid-to-late seral stage), fish passage at WSDOT sites (22 sites), and amount of land in protected status (7.5 percent of WRIA). Hydrologic modification, forage fish and road density are factors that rated poorly.

Salmonid Scoring:

The Nisqually WRIA received favorable ratings for stock origin, production type, unhealthy stock significance and genetic diversity present within and among salmonid populations. Unfavorable ratings occurred for total healthy stock significance and spawner numbers.

WRIA 12 - Chambers-Clover

Cities: Tacoma and takes in McChord Air Force Base.
Major river systems: Chambers and Clover Creeks, but no major rivers.

Ecosystem Scoring:

The total ecosystem score for this WRIA placed it among the three WRIAs with the poorest ecosystem scores. Others with the same or similar scores are the Cedar-Sammamish and Duwamish-Green. Chambers-Clover WRIA is smaller than most, and does not include a large upper watershed giving it a more pronounced evaluation of it's urbanized features. At the WRIA scale that this rating is being accomplished for, larger WRIAs tend to have a score that blends their urbanized characteristics with upper watershed less developed characteristics. This is not the case for WRIA 12.

WSDOT barriers are rated favorably. This is the only Western Washington WRIA with no WSDOT fish passage barriers. Estuary development, nearshore marine condition, hydrologic modification, water quality and percent agricultural land use (3) all rated medium. Poor ratings are for: percent urban land use (48.3 - the highest of all Western Washington WRIAs), gradient, forage fish, population growth, forest mid-to-late seral stage along salmon streams (12.9 percent), road density, water availability (overappropriated) and amount of watershed in protected land status (0.3 percent).

Salmonid Scoring:

The Chambers-Clover WRIA received favorable ratings for only unhealthy stock significance. and genetic diversity present within and among salmonid populations. Unfavorable ratings occurred for total healthy stock significance and spawner numbers.

WRIA 13 - Deschutes

Cities: Olympia
Major river systems: Deschutes River

Ecosystem Scoring:

Two factors for the Deschutes WRIA rated favorably. These are water quality and WSDOT fish passage barriers. All other factors rated either medium or unfavorably. Medium factors are nearshore marine condition, amount of channel with less than four

percent gradient, hydrologic modification, amount of WRIA in agricultural use (6.2 percent), mid-late seral stage forest along salmon streams (24.9 percent) and water availability (no instream flows have been set, flow adequacies are unknown, and there is high growth pressure). Factors with unfavorable ratings are: percent urban land use, estuary development, forage fish abundance, population growth, road density and protected lands.

Salmonid Scoring:

The Deschutes WRIA received favorable ratings for stocks overfished and knowledge of natural juvenile production, unhealthy stock significance and genetic diversity present within and among salmonid populations. Unfavorable ratings occurred for total healthy stock significance, stock origin (because the anadromous salmonid populations were started from nonlocal hatchery strains after fish ladders were built at natural blockages at the mouth of the stream), hatchery-natural ratio and spawner numbers.

WRIA 14 - Kennedy-Goldsborough

Cities: Shelton
Major river systems: Goldsborough and Kennedy Creeks

Ecosystem Scoring:

Eight of fourteen factors rated medium. They are: estuary development, nearshore marine condition, percent urban development (7), channel gradient, hydrologic modification, population growth, mid-to-late seral stage along salmon streams (29.7 percent), and WSDOT passage barriers (23). Water quality, percent agricultural land use, and water availability rated favorable. Forage fish, road density and amount of protected lands (0.2 percent) have unfavorable ratings.

Salmonid Scoring:

The Kennedy-Goldsborough WRIA received favorable ratings for stock origin, production type, stocks overfished, unhealthy stock significance and genetic diversity present within and among salmonid populations. No unfavorable ratings occurred.

WRIA 15 - Kitsap

Cities: Bremerton
Major river systems: many small tributaries such as Minter Creek, Big Beef Creek, Dewatto River, Union River, Mission Creek, and Tahuya River

Ecosystem Scoring:

Kitsap WRIA has favorable ratings for forage fish (this represents the highest Western Washington rating), percent agricultural land use and amount of mid-to-late seral stage

along salmon streams (40.0 percent). Factors with medium ratings are: estuary development, nearshore marine condition, channel gradient, hydrologic modification, water quality and road density. Percent urban development (12.5), population growth, WSDOT passage barriers (30), water availability and amount of protected lands (0.3 percent) have unfavorable ratings.

Salmonid Scoring:

The Kitsap WRIA received favorable ratings for knowledge of juvenile natural production and genetic diversity present within and among salmonid populations. No unfavorable ratings occurred. Many scores were average, in part because this WRIA contains many streams that flow east into western Puget Sound and also many streams that flow west into eastern Hood Canal. The fish management practices and their impacts on salmonids have differed among the watersheds.

WRIA 16 - Hood Canal

Cities: Port Townsend
Major river systems: Skokomish, Hamma Hamma, Duckabush, and the Dosewallips River

Ecosystem Scoring:

Hood Canal WRIA is among the five Western Washington WRIAs with highest overall ecosystem scores. (The others are Upper Skagit, Lyre-Hoko, Sol Duc-Hoh and Queets-Quinault.) Ten of fourteen factors rated favorable. They are: estuary development, percent urban development (1), population growth, water quality, percent agricultural land use, mid-to-late seral stage along salmon streams (59.7 percent, this is the highest Western Washington value), road density, WSDOT passage barriers (13), water availability and amount of protected lands (18.6 percent). Factors with medium ratings are nearshore marine condition and hydrologic modification. Channel gradient and forage fish have unfavorable ratings.

Salmonid Scoring:

The Hood Canal WRIA received favorable ratings for stocks overfished and genetic diversity present within and among salmonid populations. The only unfavorable rating occurred for the ratio of hatchery to natural production.

WRIA 17 - Quilcene

Cities: town of Quilcene
Major river systems: Quilcene River and Snow Creek

Ecosystem Scoring:

Factors with favorable ratings are: percent urban development (3.1), forage fish, percent agricultural land use, road density and WSDOT passage barriers (8). One half of all factors are rated medium. They are: estuary development, nearshore marine condition, hydrologic modification, population growth, water quality, mid-to-late seral stage along salmon streams (30.9 percent), and amount of protected lands (4.3 percent). Channel gradient and water availability (overappropriated) have unfavorable ratings.

Salmonid Scoring:

The Quilcene WRIA received favorable ratings for production type, the low percentage of stocks overfished, knowledge of natural juvenile production, total unhealthy stock significance, and genetic diversity present within and among salmonid populations. Unfavorable ratings occurred for the total healthy stock significance and the ratio of hatchery to natural production measures.

WRIA 18 - Elwha-Dungeness

Cities: Port Angeles and Sequim
Major river systems: Elwha and Dungeness Rivers

Ecosystem Scoring:

Most factors in the Elwha-Dungeness WRIA were rated favorably or medium with only three of the fourteen factors rated unfavorable. Nearshore marine condition, percent urban area (1.6), mid-to-late seral stage along salmon streams (39.4 percent), road density, fish passage (WSDOT), and amount of watershed in protected status (44.7 percent) were all rated favorably. Water availability was among factors with poor ratings. In the Dungeness flows are overappropriated and instream flow rules are underway.

Salmonid Scoring:

The Elwha-Dungeness WRIA received favorable ratings for the low percentage of stocks overfished, knowledge of natural juvenile production, and genetic diversity present within and among salmonid populations. Unfavorable ratings occurred for the total healthy stock significance, the ratio of hatchery to natural production, total unhealthy stock significance, and spawner numbers.

WRIA 19 - Lyre-Hoko

Cities: No major cities.
Major river systems: Lyre, Sekieu, and Hoko Rivers

Ecosystem Scoring:

Lyre-Hoko is one of the five Western Washington WRIAs with highest overall ecosystem scores. The others are Upper Skagit, Hood Canal, Sol Duc-Hoh and Queets-Quinault. Only forage fish rated unfavorably. Gradient, water quality, WSDOT fish passage (26 sites) and amount of WRIA in protected status (5.3 percent) rated medium. All other factors (nine), rated favorably. These are: estuary development, nearshore marine condition, percent urban land use, hydromodification, population growth, percent agricultural land use, mid-to-late seral stage along salmon streams (44.2 percent), road density and water availability.

Salmonid Scoring:

The Lyre-Hoko WRIA received favorable ratings for production type, the low percentage of stocks overfished, knowledge of natural juvenile production, total unhealthy stock significance, and genetic diversity present within and among salmonid populations. No unfavorable ratings occurred.

WRIA 20 - Sol Duc-Hoh

Cities: town of Forks
Major river systems: Quilleyute, Sol Duc, Bogachiel, and Hoh Rivers

Ecosystem Scoring:

Sol Duc-Hoh is one of the five Western Washington WRIAs with highest overall ecosystem scores. The others are Upper Skagit, Hood Canal, Lyre-Hoko, and Queets-Quinault. Forage fish rated unfavorably as did WSDOT barrier sites. This WRIA has 45 locations which is the greatest number within any Western Washington WRIA. In addition, water quality rated unfavorably with the greatest Western Washington value for amount of stream miles on the state impaired water quality list for stream temperature and/or dissolved oxygen. Gradient and road density are factors that rated medium. All other factors (nine) rated favorably. They are: estuary development, nearshore marine condition, percent urban land use, hydromodification, population growth, percent agricultural land use, mid-to-late seral stage along salmon streams (44.9 percent), water availability and amount of WRIA in protected land status (33.4 percent).

Salmonid Scoring:

The Sol Duc-Hoh WRIA received many favorable ratings: total healthy stock significance, stock origin, production type, the low percentage of stocks overfished, the ratio of

hatchery to natural production, and genetic diversity present within and among salmonid populations. An unfavorable rating occurred for the knowledge of juvenile production.

WRIA 21 - Queets Quinault

Cities: No major cities.
Major river systems: Queets and Quinault Rivers

Ecosystem Scoring:

Queets-Quinault had the highest overall ecosystem score of the Western Washington WRIAs. Ten factors rated favorably. These are: estuary development, nearshore marine condition, percent urban land use, hydromodification, population growth, percent agricultural land use, mid-to-late seral stage along salmon streams (44.0 percent), road density, water availability and amount of WRIA in protected land status (33.5 percent). Gradient, water quality and WSDOT passage barriers (29) rated medium. Forage fish rated unfavorably.

Salmonid Scoring:

The Queets-Quinault WRIA received many favorable ratings: total healthy stock significance, stock origin, production type, the low percentage of stocks overfished, the ratio of hatchery to natural production, knowledge of natural juvenile production, and genetic diversity present within and among salmonid populations. No unfavorable ratings occurred.

WRIA 22 - Lower Chehalis

Cities: Aberdeen and Hoquiam
Major river systems: Chehalis, Wynochee, and Satsop Rivers

Ecosystem Scoring:

The Lower Chehalis has four favorable ratings, seven medium and three unfavorable. Estuary development level, percent urban land use, gradient and hydrologic modification are factors that rated as favorable. Nearshore marine condition, population growth, percent agricultural land use (3.3 percent), forest seral stage along salmon streams (34.9 percent of these riparian areas are in mid-to-late seral stages), road density, WSDOT barrier sites (23) and water availability rated medium. Forage fish, water quality and amount of WRIA in protected land status (1.3 percent) rated unfavorably.

Salmonid Scoring:

The Lower Chehalis WRIA received many favorable ratings. Only one rating was in the medium class – stock origin. This was the WRIA that received the greatest number of favorable scores.

WRIA 23 - Upper Chehalis

Cities: Centralia and Chehalis
Major river systems: Chehalis River

Ecosystem Scoring:

Upper Chehalis scores were evenly distributed between favorable, medium and unfavorable ratings. Factors rating favorable are: estuary development, percent urban land use, gradient and WSDOT barrier sites (15). Nearshore marine condition, hydrologic modification, population growth, water quality and water availability rated medium. Forage fish, percent agricultural land use (13), forest seral stage along salmon streams (16.6 percent in mid-to-late seral stages), road density and amount of WRIA in protected land status (0.2 percent) rated poorly.

Salmonid Scoring:

The Upper Chehalis WRIA received many favorable ratings: production type, the low percentage of stocks overfished, identification of hatchery production, knowledge of natural juvenile production, total unhealthy stock significance, and genetic diversity present within and among salmonid populations. No unfavorable ratings occurred.

WRIA 24 - Willapa

Cities: No major cities.
Major river systems: North, Willapa, and Nemah Rivers

Ecosystem Scoring:

Percent urban land use, gradient, hydrologic modification, population growth and water availability rated favorably. Estuary development, nearshore marine condition, percent agricultural land use (2.6 percent), forest seral stage along salmon streams and road density rated medium. Forage fish, water quality, WSDOT barrier sites (32, one of the highest numbers of barriers in Western Washington) and amount of WRIA in protected land status (1.1 percent) rated poorly.

Salmonid Scoring:

The Willapa WRIA received favorable ratings for stock origin, production type, identification of hatchery production, and total unhealthy stock significance. Unfavorable ratings occurred for the number of stocks overfished and spawner numbers.

WRIA 25 - Grays-Elochoman

Cities: no major cities.
Major river systems: Grays and Elochoman Rivers feed into the Columbia River.

Ecosystem Scoring:

This WRIA has four factors rated favorably, six medium, and four unfavorably. Those rated favorable are: amount of WRIA in urban land use (3.7 percent), channel gradient, low WSDOT fish passage barrier amount, and water availability (flows not set, studies underway, limited development pressure). Medium rated factors are nearshore marine condition, hydrologic modification, population growth, water quality, amount of WRIA in agricultural land use (4.3 percent), and seral stage of forests along salmon streams (20.6 percent mid to late seral stage). Those factors with poor ratings are estuary development (Columbia River estuary), forage fish abundance, road density (5.19 miles per square mile in the WRIA), and amount of protected lands (0.1 percent).

Salmonid Scoring:

The Grays-Elochoman WRIA received a favorable rating for identification of hatchery production, but had unfavorable ratings for total healthy stock significance, stocks overfished, high ratio of hatchery to wild production, total unhealthy stock significance, and spawner numbers.

WRIA 26 - Cowlitz

Cities: Longview and Kelso
Major river systems: Cowlitz, Toutle, and Coweeman Rivers feed into the Columbia River.

Ecosystem Scoring:

The amount of the Cowlitz WRIA in urban land use (1.3 percent), and the amount in protected status (12 percent) received favorable ratings. Nearshore marine condition, gradient, population growth, percent of WRIA in agricultural land use, road density and WSDOT passage barriers have medium ratings. Unfavorable ratings are for: estuary development (Columbia River), hydrologic modification, forage fish, water quality, amount of mid-to-late seral stage forest along salmon streams (19.8 percent), and water availability (no instream flows, significant development pressure).

Salmonid Scoring:

The Cowlitz WRIA received a favorable rating for identification of hatchery production, but had unfavorable ratings for total healthy stock significance, stocks overfished, knowledge of natural juvenile production, high ratio of hatchery to wild production, total unhealthy stock significance, and spawner numbers.

WRIA 27 - Lewis-Kalama

Cities: no major cities.
Major river systems: Lewis and Kalama Rivers feed into the Columbia River.

Ecosystem Scoring:

The level of urban land use rated favorable for this WRIA. All other factors were rated medium or unfavorable. Nearshore marine condition, gradient, population growth, water quality, percent of WRIA in agricultural land use, amount of mid-to-late seral stage forest along salmon streams (26.5 percent), WSDOT passage barriers and amount of WRIA in protected status have medium ratings. Estuary development (Columbia River), hydrologic modification, forage fish, road density and water availability (no instream flows, significant development pressure) rated poorly.

Salmonid Scoring:

The Lewis-Kalama WRIA received favorable ratings for production type, identification of hatchery production, knowledge of natural production, and genetic diversity. Unfavorable ratings occurred for the total healthy stock significance, the number of stocks overfished and spawner numbers.

WRIA 28 - Salmon-Washougal

Cities: Vancouver and Camas
Major river systems: Salmon Creek and the Washougal River feed into the Columbia River.

Ecosystem Scoring:

WSDOT fish barriers rated favorably (seven locations). Nearshore marine condition, gradient, hydrologic modification, water quality, and the amount of the WRIA in protected status are rated medium.. Unfavorable ratings are for: estuary development (Columbia River), urban land use (22.6 percent of the WRIA), forage fish, population growth, agricultural land use (14 percent - the second highest percent for a Western Washington WRIA), amount of mid-to-late seral stage forest along salmon streams (18.8 percent), road density WDOT passage barriers and water availability (no instream flows, significant development pressure).

Salmonid Scoring:

The Salmon-Washougal WRIA received favorable ratings for stock origin, production type, identification of hatchery production, and genetic diversity. Unfavorable ratings occurred for the total healthy stock significance, the high ratio of hatchery to natural production, and spawner numbers.

WRIA 29 - Wind-White Salmon

Cities: no major cities.
Major river systems: Wind and White Salmon Rivers feed into the Columbia River.

Ecosystem Scoring:

Percent of WRIA in urban development (1.1), population growth, WSDOT passage barriers, and water availability are factors that rated favorably. Medium factors are: nearshore marine condition, channel gradient, water quality, percent of WRIA in agricultural use (2.4), road density, and amount of WRIA in protected land status (7 percent). Estuary development and marine forage fish abundance (Columbia estuary ratings used for both of these factors) rated poorly as did hydrologic modification. Data did not exist to rate the percent of salmon stream with mid-to-late seral stage riparian area. Note that the lack of this rating does not affect the location on the expected efficiency axis.

Salmonid Scoring:

The Wind-White Salmon WRIA received favorable ratings for identification of hatchery production, knowledge of natural juvenile production and genetic diversity. Unfavorable ratings occurred for the total healthy stock significance, stock origin, the high ratio of hatchery to natural production, and spawner numbers.