State of Washington
REPORT OF EXAMINATION
FOR TRUST WATER RIGHT

File NR CS4-00648(AB)sb4-b
WR DOC ID 4717258

Add or Change Purpose of Use **Change Place of Use**

PRIORITY DATE	WATER RIGHT NUMBER	TRUST TERM
November 2, 1877	Yakima Adjudication Court Claim No. 00648	Permanent

APPLICANT
SUNCADIA LLC, Member of the First Creek Water User's Association (FCWUA)
4244 BULLFROG RD STE 1, CLE ELUM WA 98922-8717

Purpose and Quantity

This right[1] is for the purpose of instream flows and mitigation from October 16 to March 31, with quantities allocated to a primary reach in the following table. "Primary reach" means that portion of a water body that benefits from both the former consumptive use and former return flow waters of a water right.

	Primary Reach	
Period	**Flow (cfs)**	**Acre-feet**
10/15-10/31	0.034	1.09
11/01-11/30	0.034	2.04
12/01-12/31	0.034	2.11
01/01-01/31	0.034	2.11
02/01-02/29	0.034	1.98
03/01-03/31	0.034	2.12
ANNUAL TOTAL		**11.45**

Trust Water Right Place of Use (Appendix A)

COUNTY	WATERBODY	WATER RESOURCE INVENTORY AREA
Kittitas	First Creek, Swauk Creek and Yakima River	39-Upper Yakima

Datum: NAD83/WGS84

REACH	WATERBODY	RIVER MI	TWN	RNG	SEC	QQ Q	LATITUDE	LONGITUDE
Begin Primary Reach	First Creek		20N	18E	30	NW NE	47.20247	-120.62997
End Primary Reach	Yakima River	154	17N	18E	3	NW		

The primary reach begins at the original point of diversion on First Creek and extends downstream to the confluence of First Creek and Swauk Creek, downstream to the confluence of Swauk Creek and the Yakima River, and extends to the point where Reecer Creek enters the Yakima River.

[1] This Instream Flow Water Right may become a trust water right upon execution of a Trust Water Right Agreement between Ecology, Mr. Roan, and Suncadia, LLC.

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Provisions

Monitoring and management of the 11.45 acre-feet of water associated with this authorization will be integrated into Suncadia's water monitoring and management program established in 2003. Its purpose is to ensure the amount of water used at Suncadia Resort is consistent with the water available under its portfolio of water right change authorizations and that the use of water under this authorization is protective of the water rights of other water users on the mainstem of the Yakima River and its tributary streams. The Water Monitoring and Management Plan may be modified from time to time, upon agreement between Suncadia and the Department of Ecology after informal consultation with USBR. Modifications to the plan must be agreed to in writing, signed by authorized representatives of Suncadia and the Department of Ecology (Ecology).

Findings of Facts and Decisions

Upon reviewing the investigator's report, I find all facts relevant and material to the subject application have been thoroughly investigated. Furthermore, I find the change of water right as recommended will not be detrimental to existing rights.

Therefore, I ORDER the requested change under Trust Water Application No. CS4-00648(AB)sb4-b be approved subject to existing rights.

This Decision may be appealed pursuant to RCW 34.05.514(3), RCW 90.03.210(2), and Pretrial Order No. 12 entered in *State of Washington, Department of Ecology v. James Acquavella, et al.*, Yakima County Superior Court No. 77-2-01484-5 (the general adjudication of surface water rights in the Yakima River Basin). The person to whom this Decision is issued, if he or she wishes to file an appeal, must file the notice of appeal with the Yakima County Superior Court **within <u>thirty</u> (30) days of receipt of this Decision**. Appeals must be filed with the Superior Court Clerk's Office, Yakima County Superior Court, 128 North 2nd Street, Yakima WA 98901, RE: Yakima River Adjudication. Appeals must be served in accordance with Pretrial Order No. 12, Section III ("Appeals Procedures"). The content of the notice of appeal must conform to RCW 34.05.546. Specifically, the notice of appeal must include:

The name and mailing address of the appellant;
Name and address of the appellant's attorney, if any;
The name and address of the Department of Ecology;
The specific application number of the decision being appealed;
A copy of the decision;
A brief explanation of Ecology's decision;
Identification of persons who were parties in any adjudicative proceedings that led to Ecology's decision;
Facts that demonstrate the appellant is entitled to obtain judicial review;
The appellant's reasons for believing that relief should be granted; and
A request for relief, specifying the type and extent of relief requested.

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The “parties of record” who must be served with copies of the notice of appeal under RCW 34.05.542(3) are limited to the applicant of the decision subject to appeal, Ecology and the Office of the Attorney General.

All others receiving notice of this Decision, who wish to file an appeal, must file the appeal with the Yakima County Superior Court within **thirty** (**30) days of the date the Order was mailed.** The appeal must be filed in the same manner as described above.

Signed at Yakima, Washington, this _____ day of _____ 2011.

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Mark C. Schuppe, Section Manager
Water Resources Program
Central Region Office

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INVESTIGATOR'S REPORT

BACKGROUND

This report of examination addresses two applications proposing to change portions of Court Claim No. 00648, with a priority date of 1877 (see Appendix B). The applications request to transfer portions of Claim No. 00648 to instream flows for mitigation and water banking. Suncadia, LLC (Suncadia) has requested to transfer their 11.45 acre-feet per year (ac-ft/yr) consumptive winter stock water right under Application No. CS4-00648(AB)sb4-b. J.P. Roan has requested to transfer 22.81 ac-ft/yr consumptive use from his irrigation season right under Application No. CS4-00648(AA)sb4-b. These applications are associated with the *First Creek Restoration Project.*

History of Court Claim No. 00648

Yakima Adjudication Court Claim No. 00648 was filed by the First Creek Water Users Association (FCWUA) and confirmed in the Conditional Final Order for the Swauk Creek Subbasin No. 4 issued on January 9, 2003. Court Claim No. 00648 is comprised of two different water rights with priority dates of November 2, 1877 and June 1, 1881. Both water rights authorize use of the same diversion point on the north fork of First Creek, and each water right describes discrete quantities and appurtenant lands.

In 1998, Trendwest, a predecessor to Suncadia LLC, acquired FCWUA water rights for irrigation and stock watering. In 2003, the Department of Ecology (Ecology) changed the purpose of use for a portion of Suncadia's irrigation rights to instream flow purposes. This instream flow water right has been managed by Suncadia to improve flows in First Creek and Swauk Creek as part of Suncadia Resort's water supply and mitigation program. Ultimately, the instream flow right now held by Suncadia will be transferred to Ecology to be managed as a trust water right. The First Creek General Report from Ecology's 2003 Reports of Examination (ROE's) provides substantial background information.

In 2008, Yakima Superior Court issued an order of partition for the FCWUA. The order divides the 1877 and 1881 rights among the three shareholders: J.P. Roan, Suncadia, LLC, and Jack White, Jr. (See Appendix B.)

In 2008, Suncadia began negotiations with J.P. Roan and Jack White, Jr., to change ditch operations to eliminate diversion at the current headworks in the winter months and create additional flow benefits in the late summer, which would reduce the costs of screening and fish passage structures. In 2009, Washington Water Trust, on behalf of Ecology, entered into an agreement to purchase most of the winter stock water held by Suncadia, Roan, and White. These negotiations led to the development of the *First Creek Restoration Project.*

First Creek Restoration Project Description

The *First Creek Restoration Project* is made up of many moving parts that are in various stages of completion. Applications have been filed to facilitate restoration of First Creek and alter operation of the FCWUA ditch (See Table 1). Objectives of the project and the relevant applications for change of water right are outlined below.

1. **Winter (October 16 through March 31) Instream Flow Restoration**: Ecology would acquire most of the winter stock water owned by Suncadia, Roan, and White, for environmental benefits. In February of 2011, Ecology posted draft ROEs recommending approval of three applications; Suncadia: CS4-00648(AB)sb4-a, Roan: CS4-00648(AA)sb4-a, and White: CS4 00648(AC)sb4-a.

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Add Points of Diversion: The winter stock water rights for Mr. Roan and Mr. White would be supplied solely by the middle and south forks of First Creek. The FCWUA ditch intercepts these tributaries and their use would negate the need for Roan and White to divert from the historic POD on the north fork of First Creek. The FCWUA would no longer divert water from the north fork diversion from October 16 through March 31. The middle and south forks have historically been intercepted by the ditch, but their use was neither claimed nor confirmed by the CFO. The FCWUA proposes to effectuate this practice by adding the intercepts as authorized points of diversion. Application Nos. CS4-00648(AA)sb4-c, CS4-00648(BA)sb4-c, CS4-00648(AC)sb4-c, CS4-00648(BC)sb4-c, address this portion of the project.

2. **Swauk Creek Water Bank (this report)**: The FCWUA members are all in various stages of considering transferring their consumptive water rights to trust for the purpose of instream flows to be used for mitigation/water banking in the Swauk Subbasin. So far, Suncadia has committed its 11.45 ac-ft/yr consumptive use from winter stock water under Application No. CS4-00648(AB)sb4-b; and Roan has committed 22.81 ac-ft/yr consumptive use from summer time irrigation and stock watering under Application No. CS4-00648(AA)sb4-b).

3. **Summer Flow Restoration (Summer Swap)**: Suncadia and Roan have agreed to redistribute their summertime portions of Court Claim No. 00648 (relative to Suncadia's 1998 purchase of the FCWUA right). The agreement would allow Roan to use his own and Suncadia's rights until June 30th. Then, Suncadia would have use of both Roan's and its own rights in the second half of the irrigation season. This arrangement would maximize the late irrigation season instream flow benefits, simplify management of the headworks, and maximize the benefits to water banking and continuing irrigation and stock watering use by FCWUA. This swap of water rights does not affect the above mentioned agreements that have already pledged or changed portions of Court Claim No. 00648 for other purposes.

4. **Replace- Headworks**: FCWUA would construct a new headgate, fish screen(s), and fish bypass at the north fork and middle, and south fork diversions.

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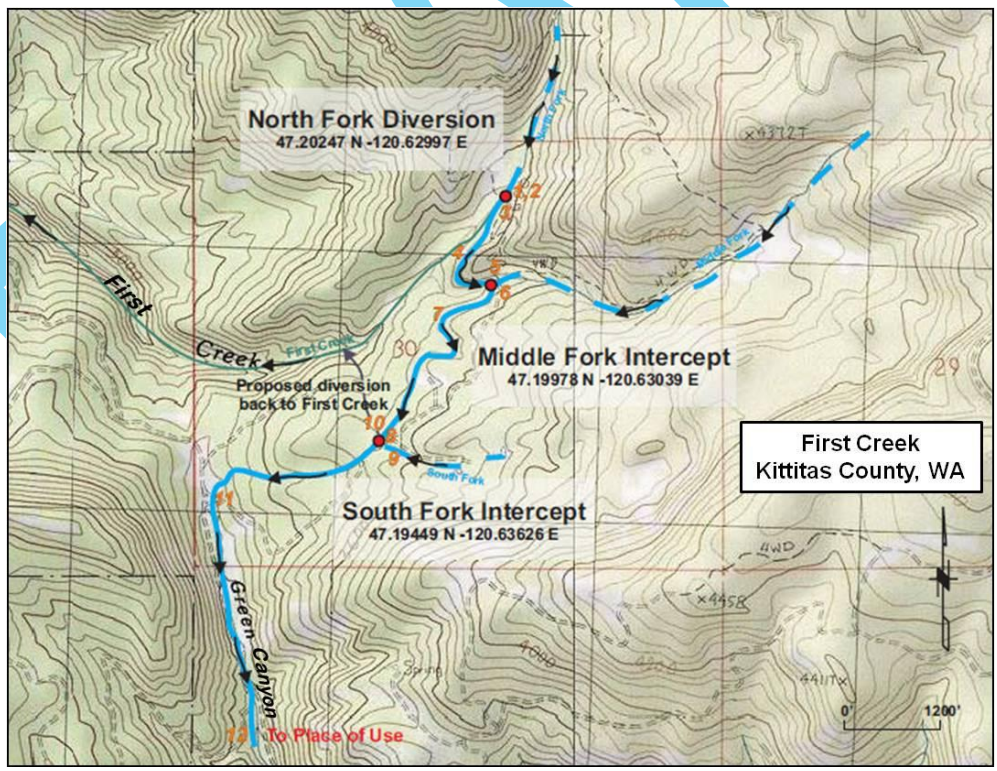
Table 1
Summary of Applications for Change on Court Claim No. 00648

First Creek Water User[2]	Transfer Request	Priority Date[3]	Application No.
Suncadia, LLC	Winter stock water to instream flows for stream enhancement	1877	CS4-00648(AB)sb4-a
Suncadia, LLC (this report)	Instream flows for mitigation	1877	CS4-00648(AB)sb4-b
J.P. Roan	Winter stock water to instream flows for stream enhancement	1877	CS4-00648(AA)sb4-a
J.P. Roan (this report)	Irrigation season water to instream flows for mitigation	1877	CS4-00648(AA)sb4-b
J.P. Roan	Add 2 Points of Diversion	1877	CS4-00648(AA)sb4-c
J.P. Roan	Add 2 Points of Diversion	1881	CS4-00648(BA)sb4-c
Jack White, Jr.	Winter stock water to instream flows for stream enhancement	1877	CS4-00648(AC)sb4-a
Jack White, Jr.	Add 2 Points of Diversion	1877	CS4-00648(AC)sb4-c
Jack White, Jr.	Add 2 Points of Diversion	1881	CS4-00648(BC)sb4-c

Figure 1:
Proposed additional points of diversion for Roan and White



[2] The First Creek Water Users are represented in the Application No. by the second letter in parenthesis, A=Roan, B=Suncadia, and C=White, as designated in the 2008 *Order for Partition* (see Appendix B).
[3]The Priority date is represented in the Application No. by the first letter in parenthesis, A=1877 and B=1881.

Legal Requirements for Proposed Change
The following is a list of requirements that are applicable to the proposed changes of Court Claim No. 00648.

Public Notice

- Ecology prepared a public notice and sent it to WWT and Mentor Law Group representing Suncadia LLC for review prior to publication to ensure that it adequately described all parts of the *First Creek Restoration Project*. The notice was published in the Ellensburg Record on August 19 and 26, 2010. The notice described the following application types: 1) change the purpose of use to instream flows for environmental benefit, 2) change the purpose of use to instream flows for mitigation/water banking, and 3) add points of diversions. One protest letter was received during the 30-day protest period. See the *Consideration of Protests and Comments* section below.
- On February 26 and March 5, 2011, Ecology published another notice that included: 1) Roan's request to transfer 22.81 ac-ft/yr instream flows for mitigation, 2) an acknowledgement that Ecology received an updated SEPA checklist from the applicants and addressed the protest received during the first public notice period, and 3) Advertisement of the Draft Trust Water Right Agreement that was posted on an Ecology website for public review and comment.

State Environmental Policy Act (SEPA)

- WWT submitted an Environmental Checklist (WAC 197-11-960) on June 29, 2010 describing the transfer of winter stock water to instream flows and adding points of diversion in the First Creek Basin. Based on this checklist, Ecology acted as lead agency and issued a Determination of Non-Significance (DNS) on June 29, 2010 and published a notice on July 2, 2010 in the Ellensburg Record with a 14 day comment period that ended on July 13, 2010. No protest letters were received during the SEPA comment period.
- Ecology's SEPA checklist and threshold determination for the Upper Kittitas Ground Water Withdrawal Rule was published on June 16, 2010.
- On January 5, 2011, Mentor Law Group submitted an updated SEPA checklist on behalf of Suncadia and J.P. Roan to reflect changes to the *First Creek Restoration Project*. The checklist described changing a portion of their rights to instream flows for mitigation and water banking purposes which may be used to offset out of priority water users in the Yakima Basin. These updates had been considered and described in Ecology's earlier DNS, therefore, no additional action was taken.

Water Resources Statutes and Case Law

- The change applications are subject to RCW 90.03.380 and RCW 90.42. Ecology must issue written findings of fact and determine that:
  - The proposed change would not *impair existing water* rights; and
  - The proposed change would not be detrimental to the *public interest*.
- The Washington State Supreme Court held that Ecology must make a tentative determination of the extent and validity of the right to be changed (R.D. Merrill v. PCHB and Okanogan Wilderness League v. Town of Twisp)

Expedited Processing

- The applications requesting to transfer rights to instream flows qualify for expedited processing under WAC 173-152-050(3)(a) whereby water right change applications may be processed prior to applications submitted at an earlier date when the proposed water use, if approved, would substantially enhance or protect the quality of the natural environment.

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INVESTIGATION

The FCWUA's authorized point of diversion (POD) is roughly 15 miles north of Ellensburg, WA, on the north fork of First Creek approximately 800 feet south and 1000 feet east of the north quarter corner of Section 30, T. 20 N., R. 18 E.W.M. Water from First Creek that enters the FCWUA ditch continues from the POD in a south, southwest trend intercepting the middle and south forks of First Creek before entering Green Canyon (Appendix A). The middle fork intercept is located approximately 0.5 mile south of the POD, and the south fork intercept is located approximately 1.5 miles southwest of the POD. The FCWUA ditch users have not been metering, measuring, or reporting their diversionary quantities.

Hydrologic Considerations

Swauk and First Creeks do not have a long history of measurement. That is why extensive data collection and modeling for First and Swauk Creeks was completed as part of Suncadia's 2002 SEPA review and water right transfers. This information is provided in Appendix C.

In January of 2002, Pacific Groundwater Group provided Ecology with a technical memorandum: *First and Swauk Creek Basin Hydrologic Analysis* that is part of the Master Planned Resort Final Environmental Impact Statement for Treadwest (Suncadia). This analysis is an estimation of how transfers to instream flows will affect streamflow. Lower First Creek seepage losses were estimated to be roughly 35% on the upper range. However their model predicted that losses to alluvial subflow quickly return to Swauk Creek due to hydraulic continuity in the reach just downstream of the First/Swauk Creek confluence.

Table 3:
First Creek Flows and corresponding readings of Swauk Gage at Lauderdale Junction taken by WDFW

Date	First Creek at Hwy 97	Swauk Creek Gage
05/13/2007	21.31	102
06/19/2007	22.88	20.8
05/13/2008	5.75	99
06/24/2008	8.81	21
06/02/2009	50.2	-
07/02/2010	12.61	-
07/15/2010	4.39	-
07/27/2010	2.35	-
08/04/2010	1.12	-
08/17/2010	0.63	-
08/27/2010	0.95	-
09/02/2010	0.75	-
09/09/2010	1.34	-
09/17/2010	1.22	-
09/24/2010	1.33	-
09/29/2010	3.20	-

From 2006 to 2010, flow measurements in the First Creek, Swauk Creek, and Green Canyon drainages were taken by Washington Department of Fish and Wildlife (WDFW, Table 3) and Ecology's Ryan Murphy (Table 4). Flows in the FCWUA Ditch were measured at the north fork point of diversion recognized by the Court in its Conditional Final Order (Table 4: "FCWUA Ditch at POD"). A corresponding measurement of First Creek immediately below the POD was taken to determine how much water remained in the natural channel (Table 4: "First Creek at POD"). The middle and south fork Intercepts, and several weirs lower in the system were also measured.

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Table 4
Ecology's Flow Measurements (in CFS) Associated with the FCWUA Ditch.

Date	First Creek at Hwy 97	Middle Fork Intercept	South Fork Intercept	Log Channel	First Creek at POD	FCWUA Ditch at POD	Total First Creek Flow near POD[4]
10/05/2006	-	-	-	-	1.69	1.84	3.53
04/25/2007	-	1.51	-	-	-	-	13.65
05/18/2009	26.71	0.40	2.50	6.00		2.20	>2.20
06/02/2009	50.2	1.40	0.85	5.50	N/A	2.25	>2.25
06/15/2009	15.75	0.90	0.75	7.00	N/A	5.00	>5.00
06/29/2009	5.61	0.45	0.60	4.50	5.89	3.10	8.99
07/13/2009	2.08	0.25	0.40	4.00	2.39	3.25	5.64
07/27/2009	1.20	0.15	0.30	2.80	1.53	2.25	3.78
08/11/2009	0.71	0.10	0.30	2.30	1.28	1.75	3.03
08/24/2009	0.63	0.10	0.25	1.90	1.29	1.30	2.59
09/08/2009	0.85	0.10	0.20	1.80	1.49	1.25	2.74
09/22/2009	0.47	0.08	0.20	1.45	0.64	1.00	1.64
10/06/2009	0.61	0.05	0.20	1.40	0.84	0.85	1.69
10/19/2009	0.61	0.08	0.18	1.45	1.13	0.90	2.03
11/03/2009	1.86	0.12	0.15	0.68	2.01	0.10	2.11
11/18/2009	0.67	0.09	0.14	1.40	0.77	0.90	1.67
12/01/2009	0.98	0.10	0.15	1.45	0.88	0.90	1.78
02/09/2010	2.85	N/A	N/A	1.25	N/A	NA	N/A
03/18/2010	-	0.14	0.05	1.75	N/A	0.85	0.85
04/07/2010	3.11	0.20	0.05	2.00	N/A	1	>1.00
04/22/2010	8.34	~1.50	0.11	~5	5.70	2.5	8.20
10/21/2010	0.77	0.1	0.1	1.6	-	1.1	-

The middle and south forks are small intermittent streams that flow into the FCWUA ditch, and though they aren't managed, they contribute to the ditch's total flow. Farther down the ditch, Mr. Murphy identified a point in Green Canyon where the ditch's flow is channelized by logs set in the stream bank Table 4: "Log Channel"). Flows measured at this point provide an estimate of the total ditch flow that includes the middle and south forks and any diffuse contribution along the upper portion of the ditch.

Precipitation data from the National Oceanic and Atmospheric Administration's (NOAA) Ellensburg gage (station index 82505), indicates that 2009 and early 2010 rank slightly higher than average, suggesting that the measured flows in First Creek during 2009 and 2010 approximate average conditions.

Extent and Validity

Court Claim No. 00648 was confirmed in the Conditional Final Order for the Swauk Creek Subbasin No. 4, issued on January 9, 2003. In 2009 and 2010, Mr. Murphy from Ecology witnessed that the ditch was in working condition and continuously diverting water throughout those years. Flows measured at the FCWUA POD were less than the maximum instantaneous flow authorized for Court Claim No. 00648. Less flows going down the ditch during the irrigation season reflects Suncadia's transfer of irrigation rights to instream flows. However Mr. Murphy witnessed that attempts had been made to berm up the channel leading to the gravity flow ditch to capture most of the flow in First Creek. Nonuse of the full amount of the water right when the supply is <u>not</u> available is a sufficient cause for nonuse as defined in RCW 90.14.140(1)(a).

[4] The total flow of First Creek near the POD was calculated by adding the ditch flow measured at the POD plus the flow remaining in First Creek measured near the POD.

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Monthly Instream Flow Calculations
Mr. Roan has proposed to transfer 22.81 ac-ft/yr of his consumptive irrigation season water to instream flows. The land to be fallowed has been historically irrigated for pasture. The crop irrigation requirement for pasture/turf in the Ellensburg area is 31.46 in/yr, or 2.63 ft/yr (Washington Irrigation Guide). In addition to crop transpiration, Ecology estimates that the water lost to evaporation associated with conveyance and application to have been 5% of the total amount applied. The 2nd Supplemental Report of Referee identifies the maximum amount of water applied under the FCWUA Court Claim to be 4.2 ac-ft/yr. The total consumptive use per acre of land irrigated using the FCWUA irrigation right is, therefore, 2.84 ft/yr, and the acreage necessary to be fallowed to produce 22.81 ac-ft/yr of consumptive use reduction is 8.33 acres. This method of distributing consumptive use is based on Ecology's Guidance 1210.

Suncadia has proposed to transfer 11.45 ac-ft/yr their consumptive winter stock water to instream flows. Distributing 11.45 ac-ft evenly over the winter season equates to an instantaneous rate of 0.0346 cfs (11.45 ac-ft ÷ 167 days ÷ 1.9833 ac-ft/day). The monthly quantities identified on the first page of Suncadia's ROE were calculated using the same formula (0.346 cfs × days in the month × 1.9833 ac-ft/day).

Public Interest Considerations
The *First Creek Restoration Project* provides an environmental benefit to the Swauk basin. It also will provide an opportunity for existing junior surface water and ground water users to reduce the risk of potential interruption of their domestic water use. Without mitigation, new ground water users would be precluded from obtaining a building permit. Purchasing mitigation allows new users to demonstrate that they are water budget neutral under WAC 173-539A-050. This change of water right will slightly improve flows in First Creek from the First Creek POD downstream to Swauk Creek. Depending on the location of new or existing uses, the mitigation benefit will then steadily decrease downstream along Swauk Creek. Flow improvements provide cold water moderation benefits to the stream and directly respond to recommended actions in the Mid-Columbia Spring Chinook ESU biological opinion and the NPCC Sub-basin plan.

Consideration of Protests and Comments
On September 24, 2010 Ecology received a protest letter from Mr. Pat Deneen, who is the manager of The Ranch on Swauk Creek, LLC. Mr. Deneen holds water rights authorizing diversions from Swauk Creek. Mr. Deneen expressed many concerns, questions, and statements related to the use of First Creek water rights as mitigation for future uses within the Swauk Creek basin. The primary subjects Mr. Deneen referred to in his protest letter are summarized below, followed by a response:

1. **Ecology's administration of water rights, lack of measurements of First and Swauk Creek flows, and the need for hydrologic studies.** Ecology's evaluation in 2002 included extensive analyses of the hydrogeology and hydrology of the First Swauk and Swauk Creek drainages to understand what the effects of retaining water instream would be compared to the pre-transfer conditions (see Appendix C). The two pending applications addressed in this report would add 34.26 ac-ft yr (22.81 from Roan and 11.45 from Suncadia) to the much larger volumes of water changed to instream flow purposes by Suncadia in 2002. The consequences of these transfers are no different than the 2002 changes; except they would ultimately be used to offset impacts of new ground water development within the Swauk Creek basin.

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Ecology must make a water budget neutral determination for any new uses that would rely on Suncadia's and Roan's rights as mitigation. This process is governed by the Kittitas Ground Water Rule and requires an impairment analysis. Draft reports of examination and final water budget neutral determinations are posted on Ecology's website and final decisions may be appealed by third parties such as Mr. Deneen.

2. **Ecology's SEPA determination was based on a checklist that did not include a discussion of future ground water withdrawals.** Ecology's SEPA threshold determination includes the following description of the proposal:

> "Washington Water Trust (WWT) has signed a contract to permanently transfer winter stock watering rights in the amount of 5.97 cfs and up to 1978.29 ac-ft/yr (24.324 ac-ft/yr consumptive) of Yakima Adjudication Court Claim No. 00648 into the Trust Water Right Program. The trust water held in First Creek, Swauk Creek, and the Yakima River is intended to be used for mitigation of future out of priority water use in the Yakima Basin. The applicant also proposes to add two points of diversion to Court Claim No. 00648. This project is addressed in Application Nos. CS4-00648CTCL(A)@4 (Suncadia), CS4-00648CTCL(A)@7 (Roan), CS4-00648CTCL(B)@4 (Roan), CS4-00648CTCL(A)@6 (White), CS4-00648CTCL(B)@6 (White)."

3. **How do the applications requesting to add points of diversion to Mr. Roan and Mr. White's rights meet the Hillis Rule for priority processing?** The additional points of diversion are a key part of the project that enables Roan and White to cease their north fork diversion and free up conveyance water that can be left in First Creek for flow enhancement. Eliminating the use of the north fork diversion in the winter will also make fish screening and fish passage simpler and more effective.

   Yakima County Superior Court stipulated in its Report of Referee that non-diversionary stock and wildlife rights up to 0.25 cfs take first priority in natural water ways. Since the construction of the FCWUA ditch in the 1800's, the middle and south forks of First Creek have flowed into the ditch. This issue of stream capture by this and other ditches in the Swauk basin was not addressed by the Court. Neither the court nor any third party objected to this issue prior to the Conditional Final Order being issued. One of the objectives of the *First Creek Restoration Project* is to remedy this issue.

   First Creek may go dry before its confluence with Swauk Creek and First Creek should be measured at this point to ensure mitigation water is delivered to Swauk Creek. Ecology staff has not observed First Creek going completely dry, however, in some years First Creek is predicted to be nearly dry. The losing characteristic of the lowermost portion of First Creek means that the trust water right would be more likely to directly offset the aquifer impacts resulting from the future withdrawals. Even if no flow enters Swauk Creek, the water infiltrating through the bed of First Creek would replace the consumptive loss extracted from the aquifer and mitigate for impacts on Swauk Creek at the downstream location where the Hidden Valley aquifer intercepts lower Swauk Creek.

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First and Swauk Creek water used to mitigate for Suncadia's golf course irrigation is being diverted instead of remaining in the First and Swauk drainages. Water that would be used for mitigation of new uses would not be authorized for any purpose other than instream flow as required by WAC 173-539A-050.

A ground water study should be done prior to any mitigation approvals. A hydrologic analysis was completed for First and Swauk Creek in 2002 by Pacific Ground Water Group as part of the Environmental Impact Statement for the MountainStar (Suncadia) Master Planned Resort. Additionally, streamflow data has been collected by Suncadia and Ecology in the decade since.

Impairment Considerations

First Creek streamflow in both winter and summer will be increased by the reduction of the historic diversion into the Reecer Creek drainage via the FCWUA ditch.

Water budget neutral determinations for new ground water uses seeking to rely on these water rights are required by WAC 173-539A-060(4)(a)-(d) to include a specific evaluation of the potential for impairment of existing water rights. As presented in Hydrologic Setting portions of Appendix C, approval of these change applications would, in general, result in increased instream flows on First Creek and Swauk Creek. The increase at any location along First and Swauk Creek depends on the streams' gaining and losing behavior and the location of the future uses that would seek mitigation. Water budget neutral determinations would not be approved in excess of the amount of water held in trust as mitigation.

CONCLUSIONS

Changing the purpose of use to instream flows for mitigation would not impair existing rights within First or Swauk Creek. No Reecer Creek water user is entitled to the continued diversion of the Roan or Suncadia portions of the FCWUA right, nor any return flow that may be associated with it. The primary reach for this water right would begin at the FCWUA point of diversion and end at the confluence of Swauk Creek and the Yakima River. There is no secondary reach beyond the USBR's Parker gage on the Yakima River because the right proposed for change would be water budget neutral to Parker once the mitigation credits are fully committed. The proposed change from stock water or irrigation to instream flow purposes will not impair existing Yakima River mainstem rights.

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RECOMMENDATIONS

Based on the information presented above, the author recommends that:

Mr. Roan's request to change 22.81 ac-ft/yr of his 1877 irrigation season right under Court Claim No. 00648 to instream flow purposes be approved in the amounts, and subject to the provisions, described in the Order for Report of Examination CS4-00648(AA)sb4-b, page 1-3.

Suncadia's request to change 11.45 ac-ft/yr of its 1877 winter stock right under Court Claim No. 00648 to instream flow purposes be approved in the amounts, and subject to the provisions, described in the Order for Report of Examination CS4-00648(AB)sb4-b, page 1-3.

Report by: _____ _____

Kelsey Collins, Water Resources Program Date

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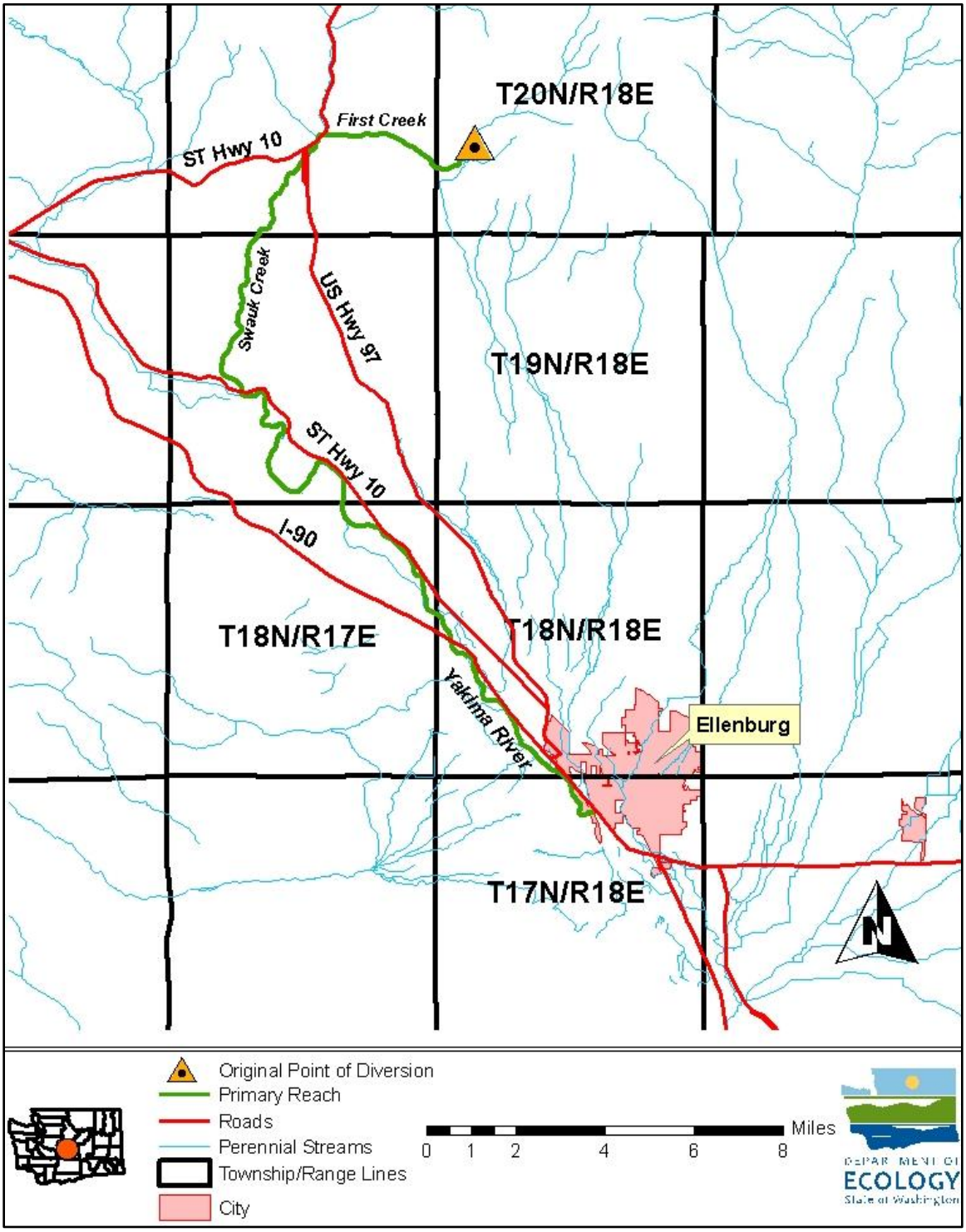
APPENDIX A:


T20N/R18E
First Creek
ST Hwy 10
Swauk Creek
US Hwy 97
T19N/R18E
ST Hwy 10
I-90
T18N/R17E
T18N/R18E
Yakima River
Ellenburg
T17N/R18E
N
Original Point of Diversion
Primary Reach
Roads
Perennial Streams
Township/Range Lines
City
Miles
0 1 2 4 6 8
DEPARTMENT OF
ECOLOGY
State of Washington

APPENDIX B:

Summary of Court Claim No. 00648 as modified by the November 13, 2008 *Order for Partition of Water Right and Substitution of Parties* which specified the following partitions:

J.P. Roan	**1877 Priority Date**	**1881 Priority Date**
Purpose of Use	Irrigation of 37.92 acres and stock water	Irrigation of 5.08 acres and stock water
Period of Use	April 1 through October 15 for irrigation, continuous for stock water	April 1 through October 15 for irrigation, continuous for stock water
Quantity	0.977 cfs; 208.5 acre-feet per year for irrigation and stock watering during the irrigation season; 0.527[5] cfs for conveyance loss; 1.911 cfs, 7.9 acre-feet per year (consumptive) for stock watering from October 16 through March 31.	0.131 cfs and 27.94 ac-ft/yr for irrigation and stock water during the irrigation season; 0.071 cfs for conveyance loss.
Point of Diversion on First Creek	Beginning of FCWUA Ditch: 800 ft south and 100 ft east from the north quarter corner of Section 30, within Government Lot 1, Section 30, T. 20 N., R. 18 E.W.M.	Beginning of FCWUA Ditch: 800 ft south and 100 ft east from the north quarter corner of Section 30, within Government Lot 1, Section 30, T. 20 N., R. 18 E.W.M.
Place of Use*	The SE¼ of Section 17, the W½E½ of Section 20; the NE¼SW¼, N½N½SE¼SW¼, and portions of the N ½ of Section 21; ALL in T. 19 N., R. 18 E.W.M.	The NE¼SW¼, N½N½SE¼SW¼, and portions of the N ½ of Section 21; ALL in T. 19 N., R. 18 E.W.M.
Suncadia, LLC	**1877 Priority Date**	**1881 Priority Date**
Purpose of Use	Irrigation of 89.83 acres and stock water	Irrigation of 95.17 acres and stock water
Period of Use	April 1 through October 15 for irrigation, continuous for stock watering	April 1 through October 15 for irrigation, continuous for stock watering
Quantity	2.315 cfs; 493.9 acre-feet per year for irrigation and stock watering during the irrigation season; 1.247 cfs for conveyance loss; 2.761 cfs, 11.45 acre-feet per year (consumptive) for stock watering from October 16 through March 31.	2.453 cfs and 523.44 ac-ft/yr for irrigation and stock water during the irrigation season; 1.321 cfs for conveyance loss.
Point of Diversion	Beginning of FCWUA Ditch, same as above	Beginning of FCWUA Ditch, same as above
Place of Use*	The S½SE¼SW¼, SW¼SW¼, W½SE¼, and the S½N½SE¼SW¼ of Section 21, and the N½NW¼, and NW¼NE¼ of Section 28, ALL in T. 19 N., R. 18 E.W.M.	The S½N½SE¼SW¼, SW¼SW¼, W½SE¼, and the S½SE¼SW¼, of Section 21, ALL in T. 19 N., R. 18 E.W.M.
Jack White, Jr	**1877 Priority Date**	**1881 Priority Date**
Purpose of Use	Irrigation of 36.75 acres and stock water	Irrigation of 85.75 acres and stock water
Period of Use	April 1 through October 15 for irrigation, continuous for stock watering	April 1 through October 15 for irrigation, continuous for stock watering
Quantity	0.947 cfs; 202.06 acre-feet per year for irrigation and stock watering during the irrigation season; 0.509 cfs for conveyance loss; 1.851 cfs, 7.65 acre-feet per year (consumptive) for stock watering from October 16 through March 31.	2.211 cfs and 471.63 ac-ft/yr for irrigation and stock water during the irrigation season; 1.190 cfs for conveyance loss.
Point of Diversion	Beginning of FCWUA Ditch, same as above	Beginning of FCWUA Ditch, same as above
Place of Use*	SW¼ Section 17; W½ of Section 20; and the NE¼ and E½NW¼ of Section 29; ALL T. 19 N. R. 18 E.W.M.	SW¼ Section 17; W½ of Section 20; and the NE¼ and E½NW¼ of Section 29; ALL T. 19 N. R. 18 E.W.M.
Total Quantities Authorized from First Cr	**4.24 cfs and 904.45 ac-ft/yr for irrigation and stock water during the irrigation season; 2.283 cfs for conveyance loss; 6.523 cfs and 27 ac-ft/yr (consumptive) for stock water from Oct 16 to Mar 31.**	**4.795 cfs and 1023 ac-ft/yr for irrigation and stock water during the irrigation season with 2.582 cfs for conveyance loss.**

[5]This instantaneous quantity for Roan was incorrectly listed as 0.0527 cfs in the Order of Partition.

*Legal descriptions were abbreviated. A complete description is available upon request.

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APPENDIX C:

Hydrologic Modeling for the 2002 Trendwest (Suncadia) Instream Flow Water Right Transfers

The following was excerpted[6] from Ecology's 2003 First Creek and Swauk Creek Basin General Reports:

Historic Streamflow Availability

Analyses to determine the historic availability of water for this water right claim [No. 00648] was performed using a hydrologic model developed by Brown & Caldwell as part of the "Trendwest Properties: Cle Elum UGA Final EIS", City of Cle Elum, March 2002. A description of the model is contained in the technical memorandum entitled "Water Supply Technical Report Supplement" of the Final EIS. For the EIS, the model was developed to reflect conservative estimates of low flow conditions in the tributaries and main stem of the Yakima River. The model was modified slightly for this analysis by including return flows due to seepage from the irrigation ditches. Pacific Groundwater Group (PGG) used a groundwater model of the individual basins combined with results of seepage tests to predict the location and timing of groundwater return flow. Following the issuance of the Second Supplemental Report of Referee for Subbasin No. 4 (Swauk) dated March 10, 2002, the models for First and Swauk Creeks were revised to reflect water duty and acreage allocations revised in that report. The next section gives a brief description of the water balance model, which is summarized from the Brown & Caldwell report.

Hydrologic Model

Hydrologic analyses were prepared using separate water availability models for each of the Yakima River tributaries where Suncadia acquired water right claims. The tributary models were then linked to a model developed for the main stem of the upper Yakima River in order to perform water balance calculations that reflect hydrologic changes on the tributaries. The water availability models compare on a daily basis the diversion demand, which are based upon consumptive use associated with acquired water right claims (crop water needs) and canal and on-farm efficiencies. Crop water needs were calculated using the Blaney-Criddle method. The models were run using real streamflows for Teanaway River and synthetic streamflows generated for Big Creek, First Creek and Swauk Creek. When sufficient streamflow is not available to meet the water demand the model will divert as much water as it can and record the percentage of the water demand that was met. The resulting model output provides a count of the number of days that 100% of the demand was not met and the percent of demand that was satisfied.

[6] The sections presented here were not changed, but reorganized and consolidated where duplicate language was encountered in Ecology's 2003 First and Swauk Creek Basin General Reports. Language specific to Suncadia's 1881 right was deleted since it does not pertain to the current change requests. "Suncadia" has been substituted for "Trendwest" for consistency.

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The Bureau of Reclamation, U.S. Department of the Interior (USBR) operates and maintains continuous streamflow monitoring stations on the Teanaway River at the Forks and above Lambert Road. Streamflow data for Big Creek, First Creek and Swauk Creek were not continuously monitored until the streamflow monitoring program implemented in summer 2001, in support of Suncadia's applications for change. A regression analysis comparing the 2001 flow data from Teanaway River to those measured at Big, Swauk & First Creeks produced synthetic hydrographs for Big Creek, First Creek and Swauk Creek. The synthetic flows were compared to actual flow measurements taken on these creeks from the monitoring program. The comparison showed actual flows fell between a central value and lower 90% confidence bound of the regression equation during the latter part of the irrigation season. The late irrigation season flows predicted with the model in other years will likely fall within that range. The hydrologic model was run for Big Creek, First Creek and Swauk Creek using the synthetic central values and 90% low confidence flows and for Teanaway River the actual measured flows were used. Six years of flow data was selected from the 31 year record (1971 – 2001) to run the model. The years selected to run the model are 1991 – 1995 & 2001.

For each of the water right claims acquired by Suncadia, the water availability models track natural streamflow at the former point of diversion, the diversion and return flows associated with former irrigation use and existing senior users on the same water course, and assesses the extent to which sufficient water is available for withdrawal under the water right claim each day during the irrigation season. The model did not limit a daily withdrawal by the instantaneous withdrawal (Qi) limitation imposed by the water right claim itself. This feature of the model may result in higher than expected withdrawals by senior water right claim holders that reduces available water supply for downstream and/or junior water right claim holders. The result is a more conservative estimate of water availability.

Given that synthetic hydrographs were used for three of the four tributaries and maximum instantaneous diversions (Qi) could be exceeded in the model, there is a degree of uncertainty introduced into this analysis. While results from the model may not reflect actual flow conditions in the Yakima River system they do show the trends and probable patterns of water availability.

The following discussions of hydrogeologic and hydrologic settings are summarized from a Pacific Groundwater Group technical memoranda entitled "First and Swauk Creek Basin Hydrologic Analysis" prepared under contract to Ecology for SEPA review of the proposed Suncadia water right claim transfers dated January 24, 2002.

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FIRST CREEK BASIN

First Creek Hydrogeologic Setting

First Creek predominantly flows through a narrow, bedrock-confined valley eroded into conglomerate, sandstone and basalt (and crossed in one location by landslide debris). In the lower mile above its mouth, the valley widens and the creek flows over alluvial sediments. Alluvial sediments along lower First Creek can be fairly coarse grained, but can also include fractions of lower permeability silty materials. First Creek flows into Swauk Creek, and the alluvial deposits are most extensive near this confluence. Therefore, in this location, the alluvial deposits likely have the highest capacity to conduct shallow groundwater along the creek. Existing alluvium is likely to be thinner and more confined by the bedrock in the upper reaches of First Creek, where the narrow valley likely limits the amount of water that can be lost from the stream to alluvial subflow.

First Creek Hydrologic Setting

Available flow data from First Creek are limited to monthly spot measurements between 1998 and 2000, and both spot and continuous measurements during the summer of 2001. First Creek has only one diversion, managed by the FCWUA. Spot data were collected at a variety of locations, including: downstream of the FCWUA diversion, at the head of the FCWUA diversion ditch, upstream of Highway 97, and at the confluence of First and Swauk Creeks. Continuous data were collected both downstream of the FCWUA diversion and approximately 0.5 miles upstream of the confluence with Swauk Creek. While limited over time, the data show that flows above the FCWUA diversion ranged from a maximum of almost 50 cfs during the Spring freshet, to a minimum of approximately 1 cfs in August and September.

Based on the available flow data, streamflow gains were noted during the winter and spring (through April and May), and streamflow losses were noted during the summer and fall. The streamflow gains likely result from shallow groundwater and small tributaries exhibiting more water availability during the wetter months. During the drier summer and fall, the available data show losing conditions downstream of the lower continuous gaging site and no discernable gain or loss between the two continuous gaging sites. Given the amount of bedrock confinement and the limited extent of alluvial deposits between the two sites, it is reasonable to expect that loss to alluvial subflow will not have an appreciable effect on the water budget for this reach. Below the lower continuous gage, seepage losses have been estimated to range from 0.3 cfs (at a flow of 0.5 cfs) to 0.6 cfs (at a flow of 1.5 cfs) to 1.8 cfs (at a flow of 25 cfs).

First Creek Hydrologic Model

First Creek flows through a narrow, bedrock lined channel that has little flow gain or loss downstream of the diversion until just upstream of its confluence with Swauk Creek. Analysis by Pacific Groundwater Group[7] shows that there is a loss of flow to groundwater where First Creek enters an alluvial valley near the creek's mouth. The First Creek water availability model computes the amount of water available to Suncadia on a daily basis, both "before" and "after" the transfer of the water right claims. The increase in flow in First Creek resulting from the transfer of the water right claims was added to the Trust and not available for withdrawal by junior water right claims holders on Swauk Creek.

Discussion of First Creek Model Results

The model predicts a range of potential availability based upon the central value and low 90% confidence bounds for Suncadia's First Creek water right claim change applications with priority dates of November 2, 1877 and June 1, 1881. Table 5 presents the model output, showing the relative availability of water for each year the model was run.

[7] Pacific Groundwater Group. Draft November 28, 2001 First and Swauk Creek Basin Hydrologic Analysis.

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Table 5
Predicted First Creek Annual Water Availability

Year	Nov 2, 1877 Water Right Claim		June 1, 1881 Water Right Claim	
	No. of Days of Interruptions	Avg % of Demand Met	No. of Days of Interruptions	Avg % of Demand Met
1991	61-90	63-67%	96-106	5-13%
1992	95-125	61-63%	134-157	12-15%
1993	101-109	59-69%	115-131	14-22%
1994	90-98	51-53%	108-127	16%
1995	91-102	44-76%	95-121	24-27%
2001	102-117	55-73%	126-136	13-19%

The model predicts that there is not enough streamflow to meet the water demand for all six years in the study period for both the 1877 and 1881 water right claims. For the 1877 water right claim the model predicts that the greatest shortfall would occur in 1992, with up to 125 days of shortfall relative to the water demands for this water right claim. The 1881 water right claim is predicted to have up to 157 days of shortfall in 1992. Water year 1992 is considered a dry year with the magnitude of shortfall predicted by the model to be up to 39% of the annual demand for the 1877 claim and 88% of the annual demand for the 1881 claim.

The discussion below looks at each water right claim individually, analyzing model results for monthly total discharge volume for average and dry years. A statistical analysis was performed on monthly total discharge volumes on the Teanaway River for the 31-year period of record. The statistics were assumed to be relevant to First Creek also because of the similarity of the two basins hydrology.

Table 6 gives the predicted monthly total discharge volumes for average (1991 & 1995) and dry (1992) streamflow years for the 1877 water right claim. The shortfall in 1991 occurred from July to October and for 1995 from July to September. The July to October monthly discharge volumes were ranked from the lowest to highest. It was estimated the 1991 monthly total discharge volumes were equaled or exceeded 31% for July and 84% for October, in comparison to the same months over the period of record. This results in a probability that the July 1991 flows occur once every 1.4 years and October 1991 flows occur once every 6.3 years. It was estimated the 1995 monthly total discharge volumes were equaled or exceeded 47% for July and 72% for September. This results in a probability that the July 1995 flows occur once every 2 years and the September 1995 flows occur once every 3.6 years. These probabilities are more reflective of average conditions.

The predicted shortfall in 1992 occurred in the months of June to October. The June to October monthly discharge volumes were ranked from the lowest to highest. It was estimated the 1992 monthly total discharge volumes were equaled or exceeded 97% for June and 77% for October. This results in a probability that the June 1992 flows occur once every 33.3 years and the October 1992 flows occur once every 4.3 years. These probabilities are reflective of dry conditions.

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Table 6
Predicted First Creek Monthly Water Availability for Average & Dry Years
for November 2, 1877 Water Right Claim

Month	Water Available	No. of Days of Interruptions	% of Demand Met	Range of %	Monthly Exceedance for Period of Record	Recurrence Interval, yr [1]
Average Year, 1991						
Apr	Yes	0	100%	100%	44%	1.8
May	Yes	0	100%	100%	38%	1.6
Jun	Yes	0	100%	100%	34%	1.5
Jul	Not Always	3-15	78-94%	0-97%	31%	1.4
Aug	Not Always	28-31	50-68%	36-91%	34%	1.5
Sep	Not Always	30	47-66%	39-81%	53%	2
Oct	Not Always	0-14	78-100%	77-100%	84%	6.3
Dry Year, 1992						
Apr	Yes	0	100%	100%	94%	16.7
May	Yes	0	100%	100%	94%	16.7
Jun	Not Always	1-20	77-97%	59-98%	97%	33.3
Jul	Not Always	31	54-73%	43-90%	88%	8.3
Aug	Not Always	31	34-53%	28-85%	84%	6.3
Sep	Not Always	29-30	48-50%	36-81%	63%	2.7
Oct	Not Always	9-14	91-92%	84-99%	77%	4.3
Average Year, 1995						
Apr	Yes	0	100%	100%	59%	2.4
May	Yes	0	100%	100%	31%	1.4
Jun	Yes	0	100%	100%	53%	2
Jul	Not Always	14-30	72-82%	47-99%	47%	2
Aug	Not Always	31	46-66%	39-81%	56%	2.3
Sep	Not Always	28-30	58-79%	50-98%	72%	3.6
Oct	Yes	0	100%	100%	6%	1

[1] Statistical analysis based on 31-year Period of Record

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SWAUK CREEK BASIN

Swauk Creek Hydrogeologic Setting

Available geologic mapping shows that upper Swauk Creek flows through a narrow alluvial valley underlain by sandstone, conglomerate, and conglomeratic sandstones from the Wenatchee Mountains until approximately 1.5 miles above its confluence with First Creek. From this point down to First Creek, the stream's alluvium is underlain mostly by the Teanaway Basalts. Below the First Creek confluence, Swauk Creek is no longer confined by bedrock. At this point, Swauk Creek opens out into the wide alluvial floodplain of Hidden Valley. Within Hidden Valley, PGG observed exposures of coarse-grained sediments in the near surface layer overlain by several feet of finer-grained soil. At the lower end of the valley, Swauk Creek is again confined to a narrow bedrock canyon where the creek flows through basalt bedrock (Yakima subgroup of the Columbia River Flood Basalts). This canyon (herein referred to as "Swauk Canyon") is about 4 miles long and opens out just above the confluence of the Yakima River. Based on the topographic map, the width of the floodplain within Swauk Canyon varies from approximately 50 to 750 feet.

Limited well logs are available to provide information about the hydrogeology of Hidden Valley, where the proposed water right claim transfers would occur. There is evidence of several shallow hand dug wells along the creek, which suggests a relatively shallow depth to groundwater and the potential for a saturated hydraulic connection between Swauk Creek and an alluvial aquifer. Driller's well logs from Hidden Valley, as well as conversations with a local driller, suggest that permeable water-bearing zones are present within the shallow alluvial deposits. The alluvial deposits are underlain by less permeable, clay-rich glacial deposits, which are further underlain by consolidated sedimentary rocks or basaltic bedrock. A saturated hydraulic connection between the alluvial aquifer and Swauk Creek likely occurs in the vicinity of the First Creek confluence; however, Hidden Valley widens farther downstream and the hydraulic connection appears to be lost (at least during some times of the year) in the middle portion of the valley. During the summer of 2001, this lack of saturated hydraulic connection was determined from a test pit located along the creek approximately 2000 feet downstream from Highway 97. Farther downstream Hidden Valley again becomes narrow and feeds into the bedrock-dominated Swauk Canyon. A hydraulic connection is postulated in this vicinity due to the likelihood that the shallow bedrock poses an obstruction to groundwater flow.

In the areas upstream and downstream of Hidden Valley, Swauk Creek and its associated alluvium are confined by bedrock, limiting the potential for an extensive alluvial aquifer. As a result, groundwater levels in the alluvium (where present) are likely close to the surface in these reaches.

Swauk Creek Hydrologic Setting

The Swauk Creek basin drains approximately 100 square miles. In the area of the proposed water right claim transfer, significant tributaries include First Creek and a small, un-named stream immediately downstream of First Creek. Available stream flow data from Swauk Creek suggest that typical flows upstream of the confluence with First Creek can exceed 100 cfs during the spring freshet, but generally drop to 1-2 cfs in the late summer. Flows then recover during the late autumn and winter with the onset of winter storms. However, flow data have only been collected from late 1998 through summer 2001, far too short a period to determine long term average flow conditions. Available flow data include monthly spot measurements collected between 1998 and 2000, and both spot and continuous measurements collected during the summer of 2001.

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Although limited in time, the data collected above the confluence with First Creek reveal that flows in Swauk Creek exhibit significant variation. Flows during the spring freshet in 1999 were estimated as high as 225 cfs, whereas flows during the 2000 freshet were considerably lower. Flows during the dry summer months were more consistent between the three years of data collection. From late July through early September, flows in Swauk Creek (below the confluence with First Creek) were generally in the 2-5 cfs range. As stated above, Swauk Creek flows above the confluence of First Creek are generally 1-2 cfs in late summer, which suggests that during the period of low summer flows, discharge from First Creek may account for a significant portion of the flow in Swauk Creek. As a result, flow patterns in both creeks must be evaluated to determine water availability in the Swauk Creek basin.

Gains and losses to flows along Swauk Creek were evaluated to assess if a saturated hydraulic connection between the creek and the groundwater system is present in portions of the basin. Available gaging data suggest that the stream gains baseflow immediately downstream of First Creek, but may begin to lose some flow prior to reaching the "Martin Property" gaging site used in 2001 for data collection (located about 0.8 miles downstream of First Creek). Below the Martin Property gage, further losses are noted down to the Yakima River confluence; however, gaining conditions could occur locally (e.g. as postulated immediately upstream of Swauk Canyon). A portion of the flow loss on Swauk Creek is attributable to six irrigation diversions associated with four confirmed Court Claims. Of the remaining natural seepage loss, little is likely to occur within Swauk Canyon due to bedrock confinement. More likely locations for seepage loss occur near the mouth (where the creek flows over permeable Yakima River Alluvium) and local portions of Hidden Valley.

Swauk Creek Hydrologic Model

The Swauk Creek water availability model allocated water to the irrigators, based on the priority date of the water rights using the assumptions that: (1) a hydraulic connection exists between the creek and its floodplain so subsurface irrigation return flows re-enter Swauk Creek at nearby locations; and (2) that the water lost to streambed seepage between the Hartman property and the downstream irrigators is insignificant. Field investigations and modeling supported the assumption of hydraulic connectivity within Hidden Valley, although areas without hydraulic continuity were noted during field investigation. Field investigations also estimated streambed seepage losses at flows typical of the irrigation season. Through a process of field investigation, geological inference, and groundwater modeling, it was determined that the Hartman property return flow entered the alluvial aquifer and discharged back to Swauk Creek both locally and throughout adjacent portions of Hidden Valley (upstream of Swauk Canyon). The consultant team developed a return flow schedule for Swauk Creek that was incorporated into the Swauk Creek water availability model.[8]

Discussion of Swauk Creek Model Results

The model predicts a range of potential availability based upon the central value and low 90% confidence bounds for Suncadia's Swauk Creek water right claim change applications with priority dates of June 30, 1878 and September 20, 1889. Table 5 presents the model output, showing the relative availability of water for each year the model was run.

[8] Pacific Groundwater Group. Draft November 28, 2001 First and Swauk Creek Basin Hydrologic Analysis

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Table 5
Predicted Swauk Creek Annual Water Availability

Year	June 30, 1878 Water Right Claim		Sept 20, 1889 Water Right Claim	
	No. of Days of Interruptions	Avg % of Demand Met	No. of Days of Interruptions	Avg % of Demand Met
1991	70-93	21-49%	79-100	2-8%
1992	89-132	20-48%	113-138	7-12%
1993	84-115	22-40%	103-124	3%
1994	83-106	19-26%	91-134	4-9%
1995	65-92	31-55%	76-108	6-14%
2001	87-125	17-35%	112-131	1-10%

The model predicts that there is not enough stream flow to meet the water demand for all six years in the study period for both the 1878 and 1889 water right claims. For the 1878 water right claim the model predicts that the greatest shortfall would occur in 1992 with up to 132 days of shortfall relative to the water demands for this water right claim. The 1889 water right claim is predicted to have up to 138 days of shortfall in 1992. 1992 is considered a dry year with the magnitude of shortfall predicted by the model to be up to 80% of the annual demand for 1878 claim and 93% of the annual demand for the 1889 claim.

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