OREGON DEPARTMENT OF FISH AND WILDLIFE

Fish Passage EXEMPTION Application

• Use this form if a waiver has already been granted for the artificial obstruction for which an Exemption is being requested, fish passage mitigation has already been provided for the artificial obstruction, or if there would be no appreciable benefit for native migratory fish if passage were provided at the artificial obstruction.

• Use the "Fish Passage WAIVER Application" if providing fish passage at the artificial obstruction would benefit native migratory fish.

• If you unlock and re-lock this Form, information already entered may be lost in certain versions of MS Word.

APPLICANT INFORMATION

The Applicant must be the owner or operator of the artificial obstruction for which an Exemption is sought.

ORGANIZATION/APPLICANT: Silvies Valley Ranch LLC
CONTACT: Dr. Scott Campbell **TITLE:** Member
ADDRESS: [redacted]
CITY: Portland **STATE:** OR **ZIP:** 97236
PHONE: [redacted]
FAX:
E-MAIL ADDRESS: [redacted]

SIGNATURE: Scott Campbell DVM **DATE:** Sept 28, 2020

OWNER *(if different than Applicant)*:
CONTACT: **TITLE:**
ADDRESS:
CITY: **STATE:** **ZIP:**
PHONE:
FAX:
E-MAIL ADDRESS:

SIGNATURE: ______________________ **DATE:** __________
Signature indicates that you understand and do not dispute this request.

APPLICATION COMPLETED BY *(if different than Applicant)*:
TITLE: Attorney
ORGANIZATION: Schwabe Williamson & Wyatt
ADDRESS: 1211 SW 5th Ave, Ste 1900
CITY: Portland **STATE:** OR **ZIP:** 97204
PHONE: 503-796-2093
FAX:
E-MAIL ADDRESS: ehoward@schwabe.com

SIGNATURE: ______________________ **DATE:** __________

To Be Completed by ODFW Fish Passage Coordinator

APPLICATION #: **DATE RECEIVED:**

FILE NAME:

APPROVED ☐ **SIGNATURE:** ______________________ **DATE:** __________
DENIED ☐ **TITLE:**

OREGON Fish & Wildlife	**OREGON DEPARTMENT OF FISH AND WILDLIFE** Fish Passage EXEMPTION Application

• Use this form if a waiver has already been granted for the artificial obstruction for which an Exemption is being requested, fish passage mitigation has already been provided for the artificial obstruction, or if there would be no appreciable benefit for native migratory fish if passage were provided at the artificial obstruction.

• Use the "Fish Passage WAIVER Application" if providing fish passage at the artificial obstruction would benefit native migratory fish.

• If you unlock and re-lock this Form, information already entered may be lost in certain versions of MS Word.

APPLICANT INFORMATION

The Applicant must be the owner or operator of the artificial obstruction for which an Exemption is sought.

ORGANIZATION/APPLICANT: Silvies Valley Ranch LLC
CONTACT: Dr. Scott Campbell **TITLE:** Member
ADDRESS: [redacted]
CITY: Portland **STATE:** OR **ZIP:** 97236
PHONE: [redacted]
FAX:
E-MAIL ADDRESS: [redacted]

SIGNATURE: ______________________ **DATE:** __________

OWNER *(if different than Applicant)*:
CONTACT: **TITLE:**
ADDRESS:
CITY: **STATE:** **ZIP:**
PHONE:
FAX:
E-MAIL ADDRESS:

SIGNATURE: ______________________ **DATE:** __________
Signature indicates that you understand and do not dispute this request.

APPLICATION COMPLETED BY *(if different than Applicant)*:
TITLE: Attorney
ORGANIZATION: Schwabe Williamson & Wyatt
ADDRESS: 1211 SW 5th Ave, Ste 1900
CITY: Portland **STATE:** OR **ZIP:** 97204
PHONE: 503-796-2093
FAX:
E-MAIL ADDRESS: ehoward@schwabe.com

SIGNATURE: [signature] **DATE:** 09-28-2020

To Be Completed by ODFW Fish Passage Coordinator

APPLICATION #: **DATE RECEIVED:**

FILE NAME:

APPROVED ☐ **SIGNATURE:** ______________________ **DATE:** __________
DENIED ☐ **TITLE:**

ARTIFICIAL OBSTRUCTION *(for which an Exemption is being requested)*

1. TYPE OF ARTIFICIAL OBSTRUCTION:

☐ Dam
☐ Culvert/Bridge
☐ Tidegate
x Other (describe): Artificial Beaver Dams ("ABD")

New ☐
Existing ☐

2. PLEASE PROVIDE A BACKGROUND AND DESCRIPTION OF THE PROPOSED ACTION TRIGGERING THE NEED TO ADDRESS FISH PASSAGE: *See* Attachment 1.

3. PASSAGE WILL NOT BE PROVIDED FOR THE FOLLOWING REASON(S):

☐ Already Mitigated**
☐ Already Granted a Waiver**
X No Appreciable Benefit for Native Migratory Fish*

** *Attach supporting documentation, a description of mitigation, and past ODFW approvals. The description of mitigation should include information detailed in the "Fish Passage WAIVER Application".*

***See* Attachment 2**

4. DATE THE TRIGGER ACTION IS SCHEDULED TO BEGIN *(a minimum of one month should be planned for the exemption process after ODFW receives your application; requests that require detailed ODFW review or must go before the Commission will take longer)*: n/a. *See* Attachment 1.

5. LOCATION SEE ATTACHMENT 3

COUNTY:	Harney	
ROAD CROSSING (if applicable):	n/a	
RIVER/STREAM:	Jump Creek	
TRIBUTARY OF:	Silvies River	
BASIN:	Malheur Lake Basin	
COORDINATES[a]:	Longitude: 118°59'34.31" W	Latitude: 44°01'22.76"N

[a] *Geographic projection using NAD_83 and formatted as decimal degrees to at least 4 places.*

6. STREAM DESCRIPTION - SEE ATTACHMENT 3

6A. BARRIER TABLE *(please provide the following information for barriers, which will help determine the benefit of providing passage at the Artificial Obstruction; indicate measurement units if applicable)*:

	DOWNSTREAM					**UPSTREAM**			
Locations	3	C/N	2	1	AO	1	2	E	*example*
Type				D	O				C
Length				300 ft					80 ft
Distance				~ 2500 ft					1,200 ft
Level				5					5

Type = C (culvert/bridge), D (dam), T (tide gate), N (natural; *describe below*), O (other; *describe below*)
Length = length of the barrier in the stream (e.g., culvert's length, dam's width/footprint)
Distance = distance from the Artificial Obstruction (to closest point of other barriers)
Level = amount of passage at the barrier using the following codes:
5 - barrier to all native migratory fish
4 - barrier to some native migratory fish adults and/or species
3 - barrier to some native migratory fish adults and/or species for only part of migration period
2 - barrier to all native migratory fish juveniles

1 - barrier to some native migratory fish juveniles and/or for only part of migration period LOCATIONS: AO = the existing or proposed Artificial Obstruction 1,2 = other barriers in the same stream as the Artificial Obstruction 3 = downstream barrier outside the immediate stream in which the Artificial Obstruction is located (*only needed if C/N is a confluence rather than a complete natural barrier*) E = end of historic native migratory fish use, including all tributaries (i.e., potential range without any artificial barriers in place) C/N = first downstream confluence or complete natural barrier, whichever comes first NOTE: The *example* indicates that there is culvert which is 80 feet long, is located 1,200 feet from the Artificial Obstruction in question, and is a complete fish passage barrier.

PLEASE PROVIDE ADDITIONAL DESCRIPTIONS FOR THOSE BARRIERS INCLUDED IN THE BARRIER TABLE OR FOR OTHER BARRIERS AFFECTING NATIVE MIGRATORY FISH MOVEMENT TO OR FROM THE ARTIFICIAL OBSTRUCTION: *See* Attachment 2 for additional information on the Elk Lake impoundment and bog area upstream of the upper ABD. See Attachment 3 for specifics on each of the ten ABDs.

6B. SUMMARY TABLE (*please provide the following information relative to the Artificial Obstruction, which will help determine the benefit of providing passage at it*)**:**

	DOWNSTREAM	UPSTREAM
NMF Species Present Currently	n/a	n/a
NMF Species Present Historically	n/a	n/a
Habitat Quality	absent due to lack of flow	no channel is present
Flows	ephemeral	ephemeral
Water Quality	no water is present	no channel is present
Water Right Availability	water is diverted under an 1800s decreed water right during the irrigation season; no other surface water is available during the irrigation season	none
Land Use/Zoning	EFU	EFU
NMF = native migratory fish		

PLEASE PROVIDE ADDITIONAL DETAILS REGARDING THE INFORMATION PROVIDED IN THE SUMMARY TABLE (*such as species listed under the state or federal ESA and descriptions of the stream channel and riparian habitat*)**:**

Data is not available for water quality in this small, ephemeral to intermittent stream. Based on observations, we expect it to be comparable to other similarly situated second order streams in the area. Habitat restoration is occurring in the middle part of Jump Creek, where the ABDs are present. The ABDs are located between a bog area that lacks any channel presence immediately upstream of the uppermost ABD (Irene) and an impassible fish barrier (Elk Lake impoundment) at the lower end. The lower end impoundment is approximately ½ mile below the most downstream ABD. No water would be naturally present from June through mid-March in a median year within the stretch where ABDs are present.

ODFW previously reported that habitat conditions on Jump Creek are degraded due to historic land use management and practices. Riparian vegetation would have been restricted to a narrow down-cut channel under pre-ABD conditions, and ditch-like characteristics of the channel would have moved water quickly downstream. Existing hydrology and geomorphology are also substantial contributors to the lack of flows throughout the system and the absence of riparian vegetation, particularly in lower Jump Creek where already minimal flows come into contact with a wide, highly permeable fan. In this area, any flows that may present themselves quickly seep into the ground and are insufficient to sustain riparian vegetation or surface water expression. The limited flows within the entire system, and the geomorphology and stratigraphy of lower Jump Creek, preclude a hydraulic connection between Jump Creek and Silvies River. Moreover, Elk Lake is an impassible fish passage barrier and substantially all to all of the water that may be present in Jump Creek in any given year is authorized for diversion during the irrigation season.

Photo 1. Photograph from September 2020 depicting conditions, including the near absence of riparian vegetation and limited channel expression in wide, highly permeable fan located in the lower part of the Jump Creek drainage. No ABDs are present in this area.

Photo 2. Photograph of Jump Creek in the area where ABDs were installed. This 2020 photograph taken from one of the road crossings shows the riparian vegetation and wetland restoration occurring in the mid-upper drainage. ABDs were installed on Jump Creek in 2009.

6C. PROVIDE THE SOURCE FOR INFORMATION CONTAINED IN THE BARRIER AND SUMMARY TABLES: Information was gathered in multiple site visits, from the Oregon Water Resources Department's water rights and water availability records, from the Oregon Department of Fish & Wildlife's October 2019 Jump Creek Exemption Notice for the Oregon Fish Passage Task Force October 18, 2019 meeting, surveys and other ODFW' publications, and from Google Earth Pro.

MAP(S)

- *Please attach one or more maps indicating the Artificial Obstruction, the stream on which it is located, and other barriers in the stream. A 7.5 minute USGS quad map is sufficient.*

x -- Map(s) included

PHOTOS

- *Please include photographs of the following (.JPG files are preferred):*

x-- Artificial Obstruction
x-- up- and downstream habitat at the Artificial Obstruction
x-- other barriers up- and downstream of the Artificial Obstruction

Please submit this application electronically to the ODFW Fish Passage Coordinator at greg.d.apke@state.or.us and send one signed original paper copy of the application to the ODFW Fish Passage Coordinator at 4034 Fairview Industrial Dr. SE, Salem, OR 97302.

For ODFW Use Only

PRELIMINARY BENEFIT ANALYSIS

	True	False
1. The information contained in this application is accurate:	☐	☐
2. State or federal ESA-listed fish species can NOT currently access the site:	☐	☐
3. One or more of the following situations exist for the site (*check those that apply*):	☐	☐
a. a complete downstream barrier (artificial or natural) prevents access to the site and there are no resident native migratory fish which currently have access to the site:	☐	
b. a complete downstream barrier (artificial or natural) prevents access to the site and is within 100 feet of the site:	☐	
c. total distance of habitat (including tributaries) upstream of the site to another complete barrier (artificial or natural) or up to the end of historic fish use is less than 100 feet in length:	☐	
d. all habitat upstream of the site will not be utilized by any native migratory fish because of its poor or degraded condition:	☐	
4. The artificial obstruction (absent passage) will NOT preclude access to any "Habitat Category I" (as defined in OAR 635-415-0025(1)) habitat for native migratory fish:	☐	☐
5. Based on distances with which you concur in **6A. Barrier Table**, one of the following is true: a. the distance "E" is less than 1 mile from the artificial obstruction, or b. if "C/N" is a complete natural barrier, the distance to it is less than 1 mile from the artificial obstruction	☐	☐

- If all answers are "True", this suffices as the Final Benefit Analysis when filled in below.
- If any answers are "False" or you wish to provide further information, please provide a full Benefit Analysis and do not fill in below.
- Electronically return this form and a full Benefit Analysis, if needed, to the Fish Passage Coordinator when completed.

By filling in the following information, I determine that under the current conditions there is "no appreciable benefit" for native migratory fish by providing passage at this Artificial Obstruction.

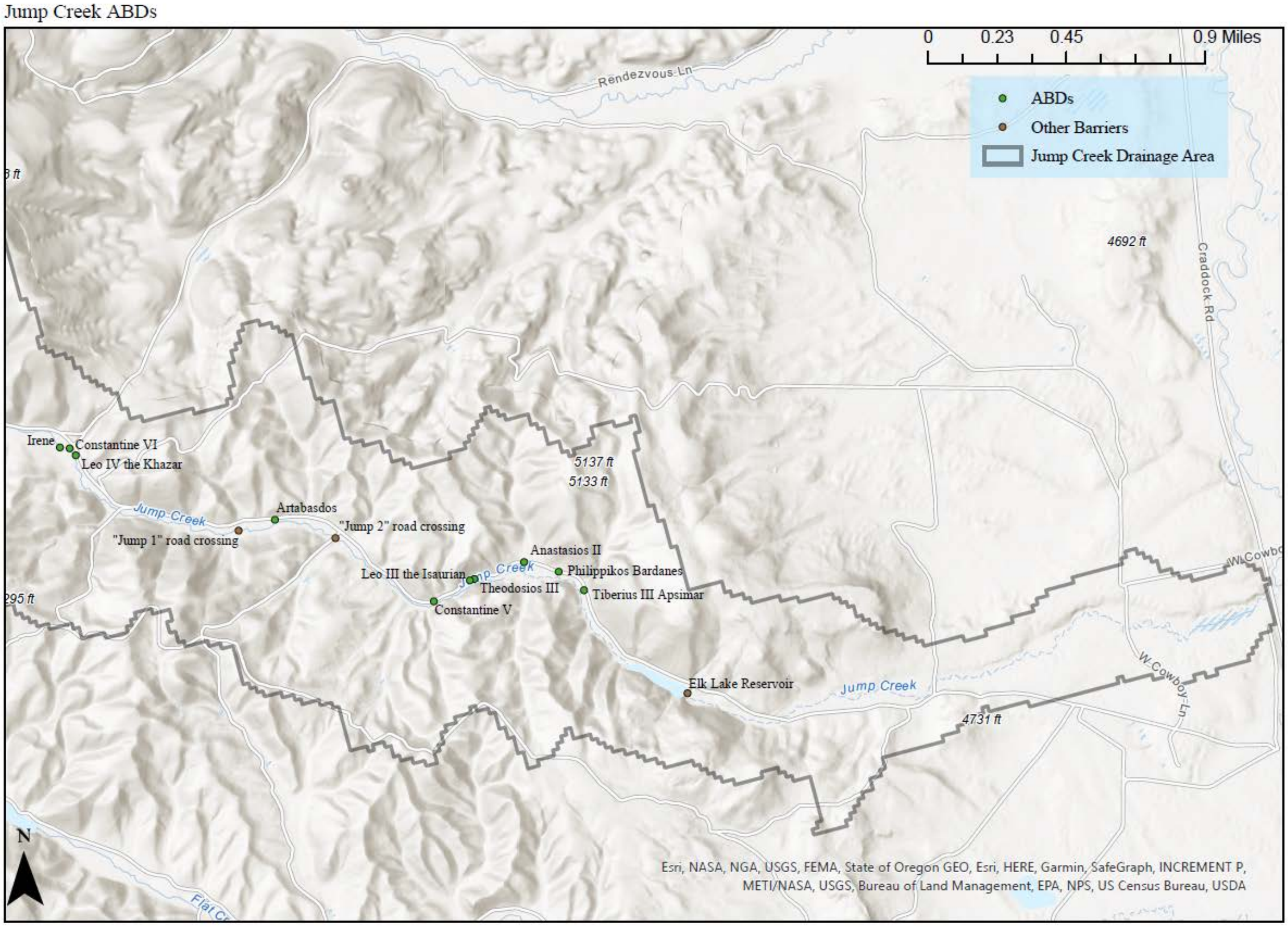
Name:

Title:

ODFW Office:

Date:

Map of Jump Creek ABDs



*Hydrography symbology after US Geological Survey (USGS) topographic standards. Dashed line indicates intermittent/ephemeral conditions based on aerial photo interpretation.

ATTACHMENT 1

Type of Artificial Obstructions

This exemption application is submitted pursuant to a Consent Agreement (Agreement) entered into between the applicant, Silvies Valley Ranch (SVR) and Scott and Sandra Campbell, and the Oregon Department of State Lands (DSL). The Agreement stems from work done by SVR during an approximately 10-year period to construct stream restoration projects on small, highly eroded and degraded washes and streams located on the SVR property. The projects utilize artificial beaver dams (ABDs) as a means of slowing short-duration, high intensity streamflow as a way to reduce erosion and stimulate natural restoration of the historic floodplain. Over time, SVR has documented extensive improvements in stream conditions as a result of its restoration work.

The Agreement requires SVR to address issues raised by DSL regarding jurisdiction under the state removal-fill law, requiring permits for jurisdictional filling and removal of materials in state waters. The Oregon Department of Fish and Wildlife (ODFW) was involved in developing the Consent Agreement and is involved in the Remedial Action Plan required by the Agreement, from the standpoint of addressing fish passage concerns. ODFW staff have made multiple site visits to the SVR property since 2013.

Under the Agreement, SVR was asked to either provide for passage or obtain exemptions at certain other streams identified by ODFW as being potentially subject to fish passage requirements. Based upon SVR’s conferral with ODFW, this application requests an exemption to fish passage for one of those drainages, Jump Creek.

ABD Identifier	Latitude	Longitude	Northing	Easting	Stream Name
Tiberius III Apsimar	44.02616309	-118.990824	4876501	340537	Jump Creek
Philippikos Bardanes	44.02705873	-118.9924513	4876604	340409	Jump Creek
Anastasios II	44.02754099	-118.9946986	4876662	340230	Jump Creek
Theodosios III	44.02678853	-118.9979693	4876585	339966	Jump Creek
Leo III the Isaurian	44.02672857	-118.9982588	4876578	339942	Jump Creek
Constantine V	44.02577211	-119.0006352	4876477	339749	Jump Creek
Artabasdos	44.02975094	-119.0109008	4876939	338938	Jump Creek
Leo IV the Khazar	44.0329619	-119.0238176	4877321	337911	Jump Creek
Constantine VI	44.0332934	-119.0242093	4877358	337881	Jump Creek
Irene	44.03334615	-119.0248452	4877365	337830	Jump Creek

Table 1. Artificial Beaver Dams constructed on Jump Creek in 2009.

Additional information regarding each individual ABD is provided in Attachment 3.

In total, there are ten (10) ABDs on Jump Creek (Table 1, Figure 1). The uppermost ABD is located immediately downstream of an extended, nearly half mile long boggy area that lacks any channel presence. The further downstream ABD is approximately one-half mile above the historic Elk Lake diversion and impoundment, a long-standing artificial barrier that prevents fish access to part of Jump Creek where ABDs were installed. In other words, the ABDs are located in an isolated area of Jump Creek that is disconnected from other parts of the drainage by natural and artificial fish passage barriers. The total length of valley floor between the impoundment at Elk Lake and the uppermost ABD (Irene) is approximately 2.5 miles.

Figure 1. Image showing ten ABDs bounded by boggy, channeless area at the upper end and the impassible fish passage barrier Elk Lake impoundment at the lower end (Google Earth Pro 2020).

Figure 2. Upper and lower ABD locations on Jump Creek (figure obtained from ODFW Jump Creek Exemption Notice, 2019).

ATTACHMENT 2
Supporting Information and Documentation

<u>Hydrology</u>

Jump Creek is an intermittent and ephemeral drainage, with minimal surface flow resulting from spring runoff between mid-March and late May/early June in a median year. The flow characteristics of this drainage are a result of its small drainage area, limited precipitation, relatively low elevation, and geomorphology. Though listed as a tributary to Silvies River, it does not have a hydrological connection to the Silvies River. This is due to the hydrology and geomorphology of the drainage, as discussed further below.

Timing of Flows

Jump Creek is an ungauged tributary that, at base of Elk Lake, drains 5.37 square miles of mostly sage-steppe ground in the Silvies River Basin (Figure 3).

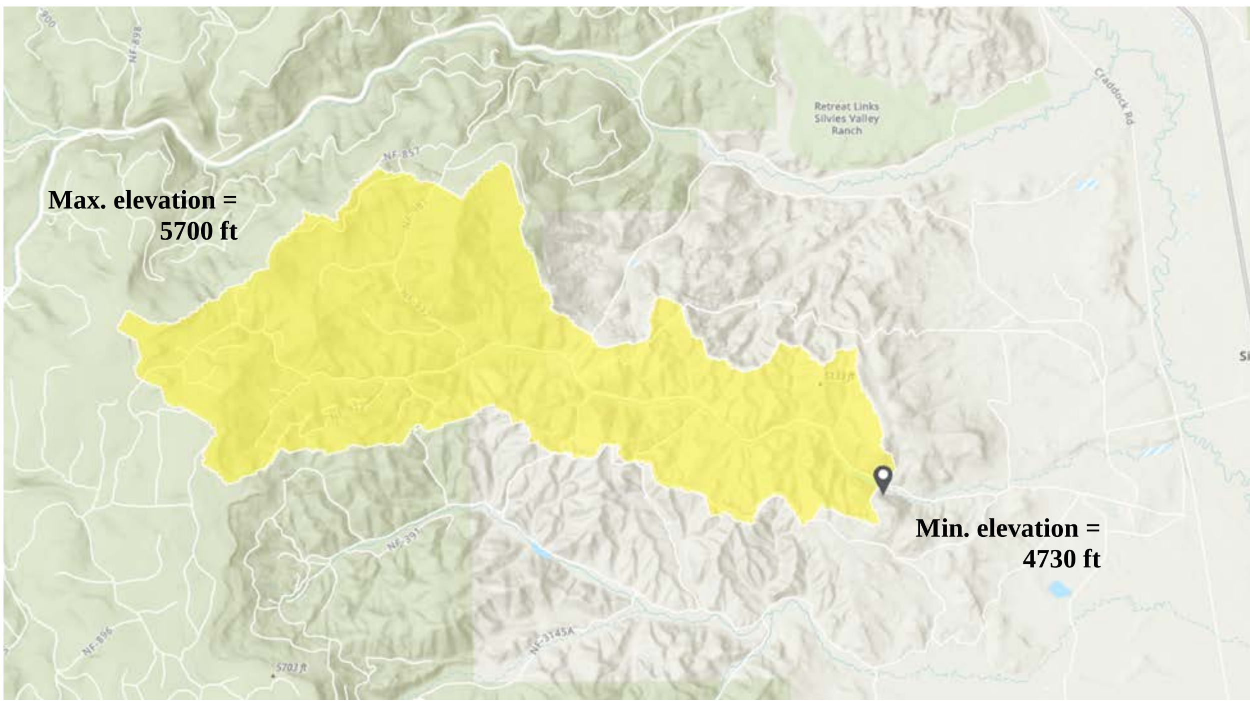


Figure 3. StreamStats generated map of Jump Creek drainage area.

The subsequent modeling is based off the drainage area upstream of Elk Lake, as this provides a conservative approximation of the magnitude of streamflow that the reach treated with ABDs would experience. It is important to note, however, that drainage-area based flow models, as are used here due to the absence of data, can only provide a conservative idea of the timing and magnitude of flow. In locations where these models have been compared against on the-ground evidence in Eastern Oregon, modelled flows consistently overestimated both duration and magnitude of streamflow, particularly through the summertime. The overestimations for summer streamflow were, in some locations, 3 cfs higher than what was documented on the ground

(Risley et al. 2008). Drainage-area based flow models also predict streamflow in locations where none were documented on the ground.

Large, spatially aggregated datasets indicate that Jump Creek's drainage area receives, on average, 17.93 inches of precipitation a year – with the majority as snow - and has an average soil permeability of 1.03 inches per hour, estimated water holding capacity of 0.15 inches per inch, and area-weighted average soil depth of 46.2 inches (U.S. Geological Survey 2016). The soil permeability (1.03 inches per hour) is sufficiently high relative to typical monthly precipitation values (Table 2, units in inches per month) as to cause most precipitation or melt events to percolate to soil or groundwater, where most water is either evaporated or transpired by vegetation.

Water moving through the drainage is often of insufficient rate or velocity to mobilize root-bound sediment to carve a channel. Instead, the water moves as shallow interflow and, during intense precipitation or snowmelt events as limited-duration sheet flow. This water supports small, discrete grassy areas on hillslopes and in small tributaries and comparatively broader, gently sloping, valley-spanning meadows on main valley floors of varying widths. On Jump Creek, the difference in groundwater discharge may account for the striking discontinuities in woody plant cover on valley floors (Figure 4).

Figure 4. Aerial imagery dated August 2006, showing discontinuous woody plant cover on valley floor, Jump Creek drainage, before ABDs were installed in 2009 (Google Earth Pro).

Temperatures in the Jump Creek drainage area must rise sufficiently to cause precipitation to fall as rain and/or to cause accumulated snow to melt. When snowmelt and incoming precipitation exceed the infiltration capacity of soils and/or water-holding capacity of soils, which is approximately 6.93 inches in Jump Creek based on average soil thickness and water holding capacity (U.S. Geological Survey, 2016), surface water discharges either as overland flow or increased spring/seep discharge.

	Snow Water Equivalent (SWE)(in)	**Average Monthly Precipitation (in)**	**Average Daily Temperature (degF)**	**Average Minimum Temperature (degF)**	**Reference ET*$_r$ (in)**
Jan	3.13	2.50	27.05	20.52	0.60
Feb	4.65	2.10	29.04	21.37	1.10
Mar	4.09	1.97	34.60	25.71	2.30
Apr	0.78	1.83	39.47	29.49	3.44
May	0.01	1.67	47.34	35.58	5.21
Jun	0.00	1.65	54.75	41.44	6.57
Jul	0.00	0.71	64.90	49.11	8.54
Aug	0.00	0.44	62.68	47.82	7.23
Sep	0.00	0.61	55.47	42.01	4.60
Oct	0.01	0.46	42.60	33.04	2.30
Nov	0.17	1.47	32.32	25.60	0.89
Dec	1.27	2.43	25.77	19.19	0.44
Data Source	*NRCS SNOTEL*	*NRCS SNOTEL*	*NRCS SNOTEL*	*NRCS SNOTEL*	*USBR AgriMet*
Location	*Rock Springs, OR (SID 721)*	*Rock Springs, OR (SID 721)*	*Rock Springs, OR (SID 721)*	*Rock Springs, OR (SID 721)*	*Prairie City (PYCO)*

Table 2. Monthly hydrometeorological statistics for the Upper Silvies River Basin.

*In Table 2, the evapotranspiration (ET) data was collected from a well-irrigated field of alfalfa and is therefore higher than the evapotranspiration that will occur in the unirrigated plant communities in the Jump Creek drainage.

Once temperatures rise to the point that plants begin growing, much of the water held in soil storage, including any incoming precipitation is transpirated by plants or evaporates from the soil surface. The combination of leaf area expansion and warming air temperatures cause a dramatic increase in evapotranspiration starting later in March and peaking in July. Although the native vegetation will not have enough water to meet the level of evapotraspiration listed in the table, it will use all available water in the soil profile. This natural and annual event causes streamflow to dwindle and, through many reaches, completely disappear (note the lack of surface flow in the boggy area above Irene, Figure 1, for example) during the spring runoff period. These natural events and relationships are also responsible for the discontinuous surface expression of flow that typically only connects into longer, flowing reaches immediately following snowmelt or, later in the season, storm events (i.e. ephemeral flow following large convective storms).

To model the estimated timing of flow in Jump Creek, we look to the timing and magnitude of precipitation, snowmelt, and plant usage (Table 2). Forty years of data from the NRCS SNOTEL site nearest to Jump Creek indicate that, on average, peak snow-water equivalent (SWE) accumulation occurs in February, with 4.65 equivalent inches of water held in snowpack. On average, a small amount of melt occurs in February (0.54 inches, or ~12%) while nearly all snowpack is melted, on average, in March (3.31 inches, or 71%). The remaining 0.77 inches (~17%) melts, on average, in April. This corresponds to a shift from an average daily temperature in February of 29° F to 34.6° F in March.

The low density tree cover (approximately 44% forested) and cold winter temperatures (e.g. December-January-February temperatures < 30.2 F, per Lundquist et al., 2013) in the Jump Creek drainage area suggests that more snow may accumulate there, but that it melts earlier than more forested drainages elsewhere (Varhola et al., 2010a, Lundquist et al. 2013).

Plants in this region typically leaf out in late April or May and begin transpiring greater volumes of water (Table 2, Figure 5). Reference monthly evapotranspiration data from the nearest AgriMet Station to Jump Creek suggest that evapotranspiration typically peaks between July 1 and August 1 annually. A major slope-break in evapotranspiration values, likely corresponding to greenup, occurs between April 1 and May 1. This aligns with observations of a median mid greenup (when half of peak greenness has occurred) occurring mid-May for the region based on aggregated satellite imagery from 2001 to 2017 (Figure 5). As noted above, evapotranspiration in Table 2 was collected from a well-irrigated field of alfalfa, and thus the volumes listed are likely much higher than plant usage in Jump Creek, where plants will become water limited by mid-summer.

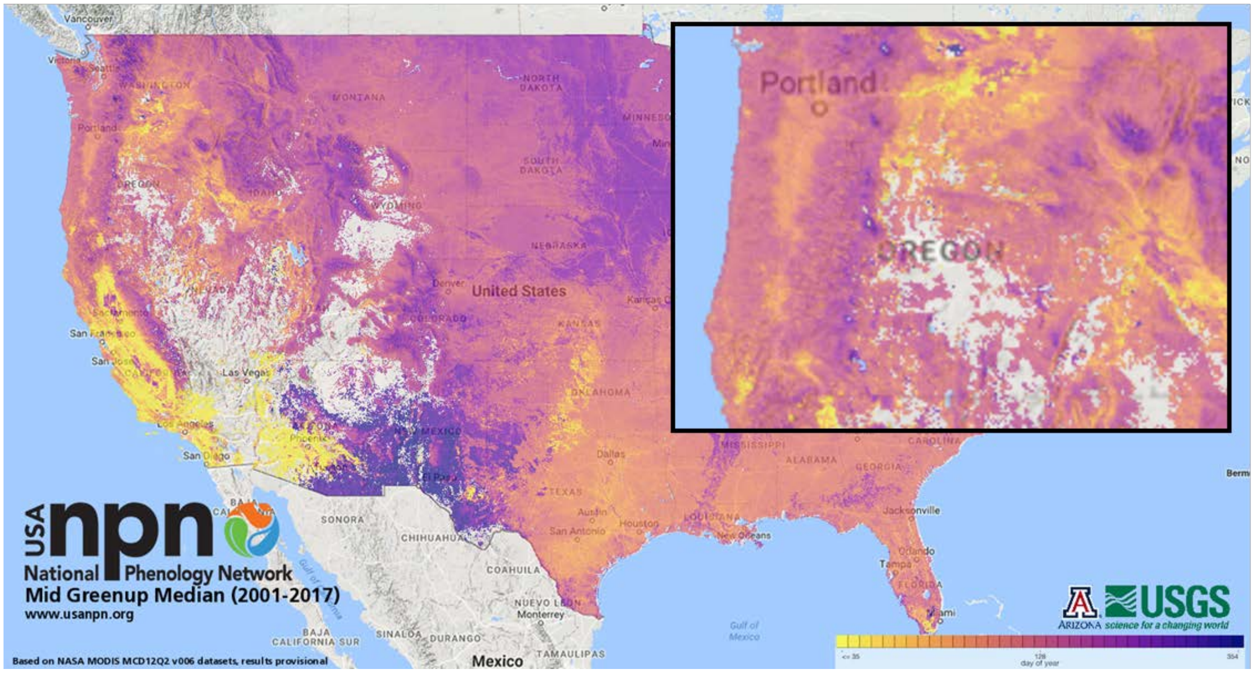


Figure 5. Mid Greenup Median from the National Phenology Network. Mid Greenup represents the day of year when a given pixel has achieved 50% of peak greenness.

Based on these data, a generalized average annual water budget for this region can be constructed to visualize the timing of inputs, outputs, and key ecological events (Figure 6). This is a semi-arid region, so potential evapotranspiration exceeds available water on an annual basis, as is evidenced by the area under the evapotranspiration curve compared to the area under the snow-water equivilent and precipitation curves (Figure 6). By June, more water has evapotranspired than has accumulated via snow-water equivalent and monthly precipitation combined (Table 2).

Jump Creek, being a small, lower-elevation watershed (4730 to 5700 feet) for Eastern Oregon, does not have persistent snowpack to feed streamflow later into the summer and streamflow will consequently diminish. As mentioned above, the evapotranspiration values included in these figures represent plant usage given access to unlimited water; in Jump Creek the plants will likely encounter water limitations by June, as precipitation drops off. Regardless, by early June, evaportranspiration is almost four times monthly precipitation. Thus, any precipitation is likely to be used by plants rather than contributing to stream flow.

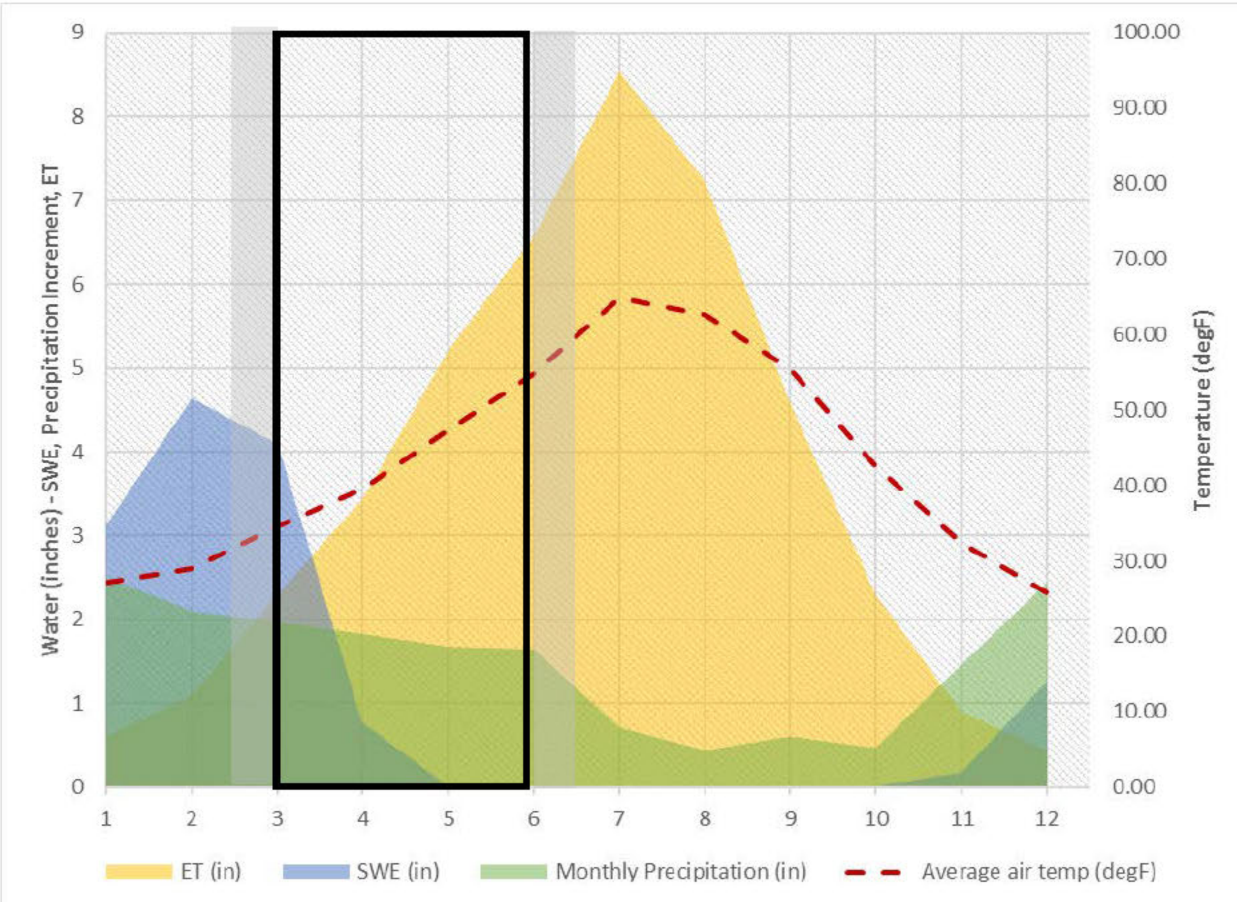


Figure 6. Average annual water budget for Silvies River Basin, Oregon (1980-2020), based on data from NRCS SNOTEL station 0731. The black box indicates estimated continuous flow duration on Jump Creek, with grey shaded areas representing expected interannual variability. The x-axis values of 1-12 represent months of the year.

Based on this information, we can estimate that typical flows on Jump Creek begin in early March – when most accumulated snow melts and before evapotransporation is high. Prior to this, the ground is likely frozen, as too is the water. Flows likely persist, on average, until late May – when plant water usage increases while moisture inputs, particularly from snowmelt, decrease. Precipitation, falling as rain, remains the same through May and June, but the small magnitude of rainfall (1.65 inches in a month) is likely able to soak into soils, where pore space has been made available due to transpiration of accumulated soil moisture during greenup. Additional incoming precipitation will likely only reach streams if it falls intensely (e.g. >1 inches/hr, as in convective storms) but will otherwise be transpired by plants.

The actual timing, of course, varies given inter annual variation in temperature and precipitation which are, themselves, subject to longer-term trends under a changing climate.

Magnitude of Flows

A simple, drainage-area ratio regression based on existing streamflow data available for the region is used to estimate the magnitude of flows between mid-March and late May. This method approximates streamflow for an ungauged stream system using a nearby location with a gauge and scaling the latter with a ratio of the two sites' drainage areas. It is a simplistic estimation technique but has proven relatively robust compared to more complicated models in certain locations (e.g., Emerson et al. 2005). As mentioned previously, these modeled flows are typically high relative to on-the-ground streamflow measurements in Eastern Oregon, particularly for summer streamflow (Risley et al. 2008). As such, the modeled flows must not be taken as firm guidance of expected streamflow statistics, but instead an upper bound on expected median flows.

There are three stream gauges maintained by the Oregon Water Resources Department on the main stem Silvies River--one in Burns, one at Silvies, and one near Seneca (Table 3). The Burns gauge has a period of record from 1903 to present, which provides a robust statistical sample from which to estimate median flow for a given day of the year (DOY) (Figure 7). The Silvies and Seneca gauges have been in operation since November 1, 2014, so do not yet cover a full decade. The data from those locations are therefore more influenced by the particularities of individual storms throughout this period and do not have a more typical "normal" distribution.

	Gauge Number	Latitude	Longitude	Elevation	Drainage Area	HUC	County	Period of Record	
				NAD88, ft	***mi^2***			***Start***	***End***
Silvies R. NR Seneca, OR	10392400	44° 5′ 17.862″	118° 58′ 17.479″	**4630**	**294**	17120002	GRANT	11/1/2014	Present
Silvies R. NR Silvies, OR	10392500	43° 55′ 21.817″	118° 57′ 29.383″	4500	510	17120002	HARNEY	11/1/2014	Present
Silvies R. NR Burns, OR	10393500	43° 42′ 57.373″	119° 10′ 36.678″	4200	913	17120002	HARNEY	6/1/1903	Present

Table 3. Metadata for stream gauges on Silvies River, from Oregon Water Resources Department Near Real Time Hydrographics Data (https://apps.wrd.state.or.us/apps/sw/hydro_near_real_time/.) Bold text indicates data missing from OWRD website that was filled in using data generated from StreamStats (USGS, 2016)

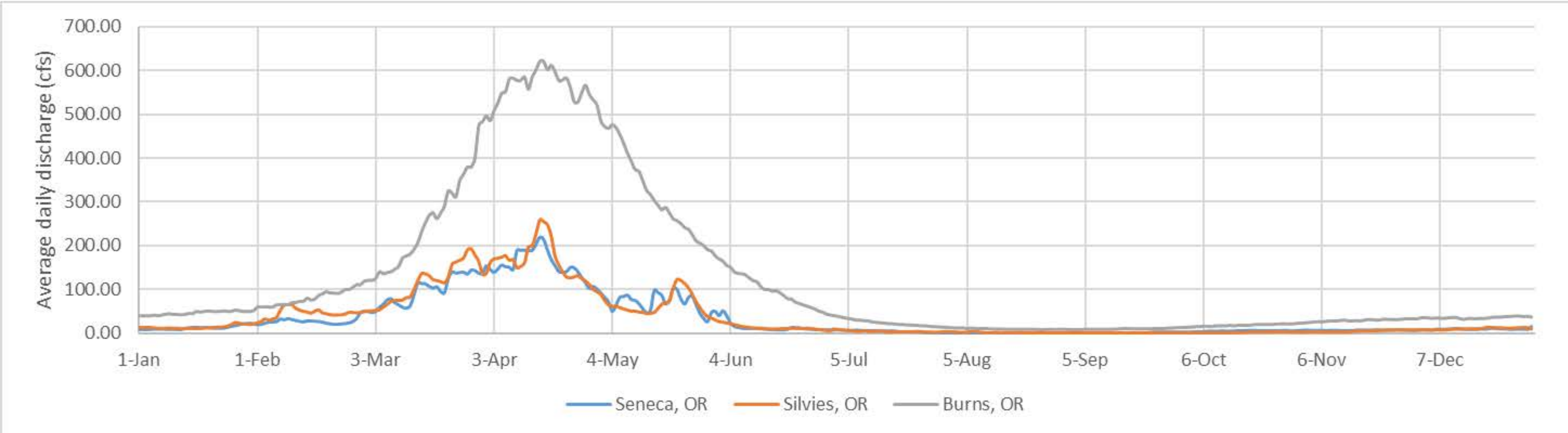


Figure 7. Median average daily discharge for each day of the year, over the period of record available, for the three stream gauges on the Silvies River. These data represent median flows experienced on each day of the year at each gauging site, based on a statistical analysis of the period of record (2014 to present for Seneca and Silvies).

We can quickly test the validity of this method in the Silvies Basin by comparing normalized median day of year hydrographs for each of the three gauging sites (Figure 8). Here, the median average discharge for each day of the year (Figure 8) has been divided by the drainage area of the given gauge site (Table 2). The lowest gauge site in the basin (Burns) and highest (Seneca) display similar magnitudes of basin-area scaled discharge. The values from the middle gauge (Silvies) are lower during irrigation season, but produce similar values to the other two sites between October and April. Though far from exhaustive, this lends some confidence to using this method to estimate discharge in the tributaries.

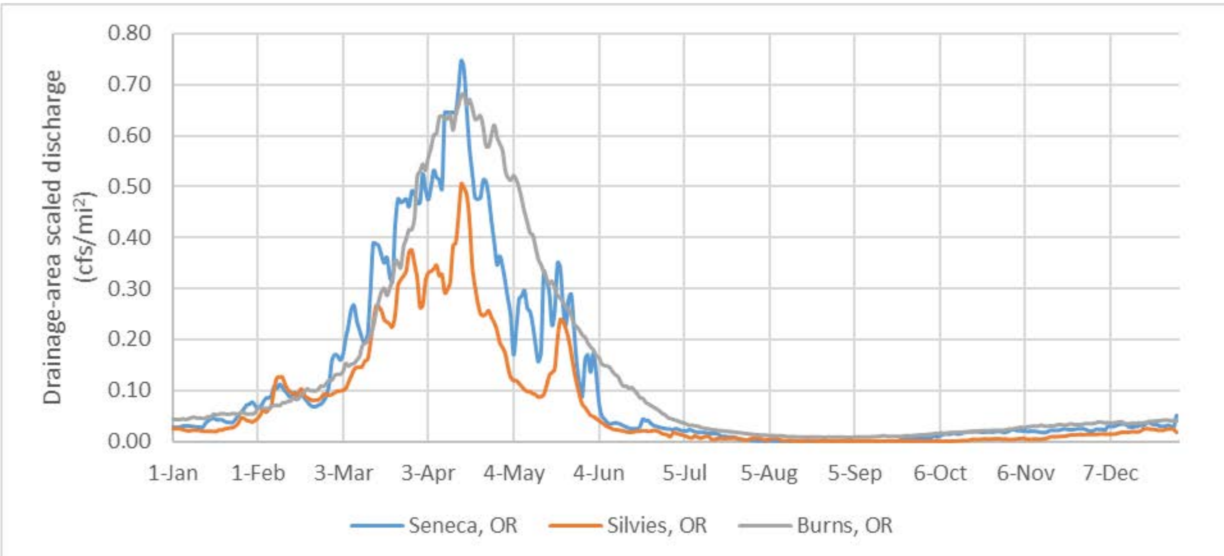


Figure 8. Median average DOY flow for the three gauges on the Silvies River, scaled by drainage area.

The hydrograph from the upstream-most gauge, Seneca, shows a slightly earlier rising and receding limb, and a slightly higher and sharper peak flow. This may be a result of the limited period of record, but also makes conceptual sense given that this gauge is higher in the watershed and receives runoff more quickly from its tributaries. The record from this site is used to model the Jump Creek hydrograph as it is both closer to Jump Creek and will generate the highest possible peak flow, which is consistent with the effort to understand upper maximum expected median streamflow (Figure 9). Note that the shape of the resulting modelled hydrograph will closely mirror that of the Seneca gauge. The small rise in discharge in February is likely due to the Seneca gauge receiving water from tributaries with less forest cover and more of a south-facing aspect, among other conditions causing it to melt earlier in the year than Jump Creek might be expected to.

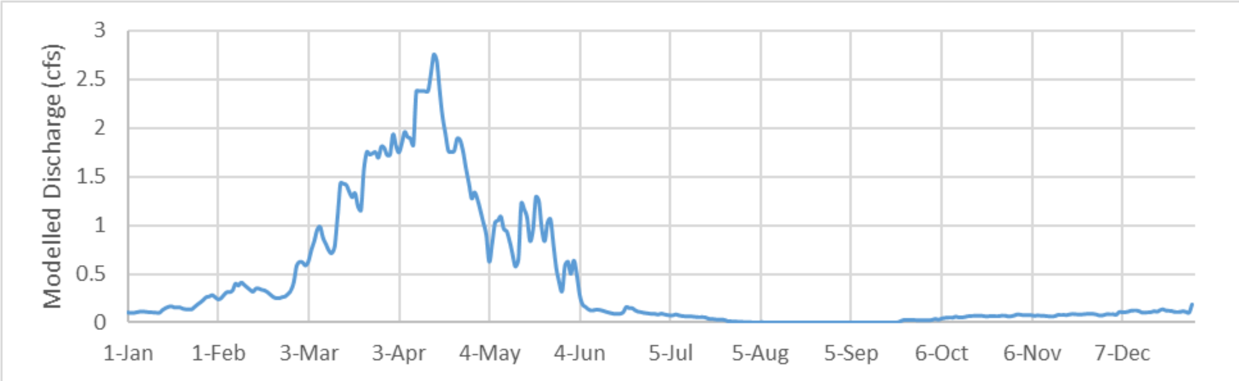


Figure 9. Modeled median average daily flows for each day of the year at Jump Creek, Oregon.

This analysis suggests that peak flows should be around 2.8 cfs and median flow during the typical period of run-off (mid-March to late May) would be approximately 1.3 cfs. Measured flow on April 17, 2020 was approximately 1 cfs (using velocity-area method). Though April 17 is, over the period of record on the Silvies River, the day of year when highest flows are most likely to occur, this particular year a considerable amount of snow persisted on hillslopes, and peak flows do not appear to have occurred until two weeks later, on May 2, 2020. This emphasizes the outside control of seasonal variation in climate patterns on the emergence of streamflow in these small, intermittent and ephemeral channels. Scaling just the data on the Seneca gauge from January 1, 2020 to May 6, 2020 suggests flows on Jump Creek on April 17th should have been approximately 1.9 cfs, and peak flows on May 2nd should have been 3.1 cfs.This nearly 100% overestimation is consistent with expected performance of drainage-area ratio modelling in nearby drainages (Risley et al. 2008).

Note, too, that the model predicts streamflow (less than 1 cfs) in October –early March, when in fact the measured flows are, except in rare circumstances, 0 cfs. And, even where some limited (less than 1 cfs) flows may occur, nighttime temperatures cause these small flows to freeze, eliminating flowing water within the channel.

These limited duration and magnitude of flows are insufficient to support the life history of redband trout in Jump Creek.

Redband Trout Surveys & Assessments

According to surveys and analyses by the Oregon Department of Fish and Wildlife (ODFW), that both pre- and post-date installation of the ABDs on Jump Creek, redband trout are not and have not been present in Jump Creek.

Before the ABDs were installed, the Oregon Department of Fish and Wildlife's 2001 Great Basin Redband Trout Stream Distribution Map: Malheur Lake Basin documents the agency's determination that no redband trout were present in Jump Creek. The map is based on 1999-2000 survey data and best professional judgment. In 2014, ODFW similarly determined that no redband trout were present in Jump Creek based on best professional judgment. Then, again, in

November 2019, an ODFW survey of the area of Jump Creek upstream of the uppermost ABD—in an area without ABDs—found no redband trout (or any fish) to be present in the creek. *See* ODFW Jump and Flat Creek Assessment, 11/5/2019 to 11/15/2019.

In addition, even if Jump Creek did at rare and exceptional times (i.e. in extreme flood events) have some surface connection to the Silvies River, ODFW has determined that the Silvies River is itself only marginal redband trout habitat. *See* Malheur Lakes Redband Trout Conservation Plan (Public Draft, April 13, 2018), pp. 48-49, 97-98. Therefore, it is not a highly viable source of redband trout to Jump Creek even assuming utopic conditions to support them there.

<u>Habitat Conditions</u>

There are likely multiple reasons for the absence of redband trout in Jump Creek, including the limited duration and magnitude of flow; warm summer temperatures and cold winter temperatures that warm any standing water in the summer and fall, and freeze the miniscule flows in the fall, winter and spring; and geomorphology, which creates conditions leading to the absence of any channel in parts of the drainage and precludes a surface water connection with the Silvies River.

In ODFW's Jump Creek Exemption Notice for the October 18, 2019 Fish Passage Task Force Meeting, the agency concluded that "there is no connectivity to a fish bearing stream that would benefit any native migratory fish, including redband trout, from utilizing available habitat upstream of the ABDs (sic) …." ODFW attributes this nearly entirely to degraded conditions caused by nearly 200 years of poor land management, starting with the removal of beaver dams in the early 1800s. This is probably too myopic of a perspective, though the removal of beaver dams and other poor land use practices over nearly two centuries in this area certainly did not improve conditions. As a result of such practices, where a stream channel did exist, it typically had a low width:depth ratio and was deeply entrenched, acting more like an irrigation ditch than a stream channel.

In Jack Creek, the primary sediment size is clay to silt, with no channel organization or development of regularly organized channel forms. This indicates both that streamflow is short-duration, infrequent, and typically high velocity. The beds of channels are often composed of cracked mud, unorganized silt, and discontinuous herbaceous species growing periodically. In locations where gravel is found, it is typically due to the channel undercutting adjacent colluvial deposits. Here, the channel may have a few large, angular gravel to cobble sized materials that are poorly sorted, unorganized, and can contribute to increased permeability and dewatering of the stream. These conditions are unlikely to to support redband trout spawning and other life stages even if flows were of a larger magnitude and duration.

These stream channel vegetation and wetland conditions are slowly reversing as a result of restoration work, including installation of ABDs in 2009, but there are other natural ecological and geological factors that preclude a connection to the Silvies River and the absence of redband trout in Jump Creek, as well.

Specifically, the lack of connectivity is as much due to hydology and geomorphology of this drainage as it is to any historic degraded conditions. No amount of restoration can restore stream flows that are simply not present due to the small drainage area, low precipitation, porous soils, etc. as described in the Hydrology discussion above.

The lack of connectivity is further explained by the geomorphology of the Jump Creek drainage. At its lower end, a marginally developed valley has cut through a large alluvial fan that is composed of coarse, highly permeable materials into which what little flow might reach this area under natural conditions would aborb.

Figure 10. Google Earth image depicting the alluvial fan into which a small valley has carved near the bottom end of the Jump Creek drainage. Silvies River is the meandering water feature on the far right of the image.

The following photograph provides an on-the-ground depiction of the wide, marginally developed valley bottom located in the lower area of the Jump Creek drainage. Upland species grow at similar densities in the channel and upland areas. The valley fill here is course and permeable, causing the limited streamflow in this area to soak into the valley fill rather than run over it.

Photo 3. September 2020 looking "upstream" and across the wide valley bottom in the area of lower Jump Creek denoted in Figure 10.

The absence of flows to create hydrologic connectivity was also readily evident near the bottom of Jump Creek on April 18, 2020, during the near-peak spring runoff (2020 was an unusually cool spring, delaying peak runoff by approximately 2 weeks into early May).

Photo 4. April 18, 2020 photograph documenting lack of flow at the lowest portion of Jump Creek near the Silvies River approximately two weeks prior to peak spring runoff. In upper Jump Creek, flows topped out at 1 cubic feet per second at this time. Due to the hydrology and geomorphology of the lower Jump Creek drainage, spring runoff would not have reached the lower end of Jump Creek even at peak flows.

According to ODFW, in November 2019, Jump Creek had about 1.7 km of wetted channel upstream of the SVR property boundary on the US Forest property, above the boggy area that separates the reach with ABDs from the tributaries to Jump Creek. This survey occurred immediately after a late season precipitation event. Even then, only about 1/5 of the area surveyed (1662 meters out of 5376 meters surveyed) was classified as wetted channel during the November 15, 2019 survey. In other words, there are multiple lines of evidence to support the lack of hydrology necessary to support redband trout in Jump Creek.

Fish Passage Barriers

Approximately one-half mile downstream from the lowest downstream ABD is Elk Lake, a feature created by the construction of an impoundment in the 1930s (circa) accordingly to local information and history. This impoundment is a historical and long-existing complete artificial barrier to any fish passage. It is used as a diversion structure for an 1888 water right authorized by the Silvies River Decree for nearly the entire flow of Jump Creek.

Photo 5. September 2020 photograph of the face of the Elk Lake impoundment, circa 1930s (note size of pine tree located on the impoundment). Alder and willow, and other riparian vegetation located downstream of dam face are supported by seepage from the impoundment and would be absent without it.

Photos 6 (above) and 7 (below). Elk Lake in mid-September 2020. This is the only water present this late in the year in the lower Jump Creek drainage. The lake is warm, supporting a population of perch. Note the riparian vegetation and wetland areas alongside this historical water feature. These would also be absent without the impoundment.

Jump Creek waters are diverted for irrigation pursuant to a water right established through the Silvies River Decree. The water right has a priority date of 1888 and is for the irrigation of up to 78 acres located south of Jump Creek, adjacent to the Silvies River. The water right authorizes use of up to 1.56 cfs throughout the irrigation season, which is more than the flow in Jump Creek except possibly at its peak. The irrigation season is March 20 to September 1 or at any other time that the water right holder can make beneficial use of the water on the land and crops grown thereon (i.e. when the ground is not frozen). *See* Silvies River Decree, 1926.

Above the uppermost ABDs, habitat conditions are limiting to fish presence due to limited hyrology and geomorphology. Immediately upstream of the uppermost ABD (Irene) there is a boggy area that presents no channel for an approximately 0.4 mile stretch (Figure 11). These conditions preclude connectivity between the middle portion of Jump Creek and the upper part of Jump Creek and its upper two forks (Figure 1). They are also a natural fish passage barrier.

Figure 11. Image of approximately 0.4 mile lenghty of boggy area immediately "upstream" of ABD Irene. There is no channel present in this part of Jump Creek due to small volumes of incoming water, all of which flows subsurface(Google Earth Pro). This boggy area is a natural complete barrier to fish passage, to/from the private and federal lands above the boggy area and to/from the stretch of Jump Creek where ABDs were installed.

Attachment 3 – Inventory of ABDs on Jump Creek

ABD Inventory on Silvies Valley Ranch

ABD Identifier: Tiberius II Apsimar

Creek: Jump Creek

Material: Dirt and Gravel

Year Constructed: 2009

ABD Dimensions:

Height (ft.)	Width (ft.)	Length (ft.)	Total Material Used (cu. yd.)
3	19	54	132

High Water Mark*:

Height (ft.)	Width (ft.)	Length (ft.)	Total Material w/n HW (cu. yd.)
0.6	2	ABD Width	1.11

**Note* - *The high water mark was estimated for most locations based on geomorphic and vegetative* evidence. Channels with ABDs were typically inundated, or had sufficient sediment deposition to make it difficult to ascertain pre-ABD high water mark locations. When not directly measured, these numbers represent conservative measurements.

Photo:

ABD Identifier: Philippikos Bardanes

Creek: Jump Creek

Material: Dirt and Gravel

Year Constructed: 2009

ABD Dimensions:

Height (ft.)	Width (ft.)	Length (ft.)	Total Material Used (cu. yd.)
3	22	65	181

High Water Mark*:

Height (ft.)	Width (ft.)	Length (ft.)	Total Material *win* HW (cu. yd.)
0.6	2	ABD Width	1.24

**Note - The high water mark was estimated for most locations based on geomorphic and vegetative* evidence. Channels with ABDs were typically inundated, or had sufficient sediment deposition to make it difficult to ascertain pre-ABD high water mark locations. When not directly measured, these numbers represent conservative measurements.

Photo:

ABD Identifier: Anastasios II

Creek: Jump Creek

Material: Dirt and Gravel

Year Constructed: 2009

ABD Dimensions:

Height (ft.)	Width (ft.)	Length (ft.)	Total Material Used (cu. yd.)
2	24	45	87

High Water Mark*:

Height (ft.)	Width (ft.)	Length (ft.)	Total Material w/n HW (cu. yd.)
0.6	2	ABD Width	1.24

**Note - The high water mark was estimated for most locations based on geomorphic and vegetative* evidence. Channels with ABDs were typically inundated, or had sufficient sediment deposition to make it difficult to ascertain pre-ABD high water mark locations. When not directly measured, these numbers represent conservative measurements.

Photo:

ABD Identifier: Theodosius III

Creek: Jump Creek

Material: Dirt and Gravel

Year Constructed: 2009

ABD Dimensions:

Height (ft.)	Width (ft.)	Length (ft.)	Total Material Used (cu. yd.)
2	18	42	62

High Water Mark*:

Height (ft.)	Width (ft.)	Length (ft.)	Total Material w/n HW (cu. yd.)
0.6	2.5	ABD Width	1.22

**Note - The high water mark was estimated for most locations based on geomorphic and vegetative* evidence. Channels with ABDs were typically inundated, or had sufficient sediment deposition to make it difficult to ascertain pre-ABD high water mark locations. When not directly measured, these numbers represent conservative measurements.

Photo:

ABD Identifier: Leo III

Creek: Jump Creek

Material: Dirt and Gravel

Year Constructed: 2009

ABD Dimensions:

'Height (ft.)	Width (ft.)	Length (ft.)	Total Material Used (cu. yd.)
2	15	37	47

High Water Mark*:

Height (ft.)	Width (ft.)	Length (ft.)	Total Material w/n HW (cu. yd.)
0.6	2.5	ABD Width	1.06

**Note - The high water mark was estimated for most locations based on geomorphic and vegetative* evidence. Channels with ABDs were typically inundated, or had sufficient sediment deposition to make it difficult to ascertain pre-ABD high water mark locations. When not directly measured, these numbers represent conservative measurements.

Photo:

ABD Identifier: Constantine V

Creek: Jump Creek

Material: Dirt and Gravel

Year Constructed: 2009

ABD Dimensions:

'Height (ft.)	Width (ft.)	Length (ft.)	Total Material Used (cu. yd.)
2	16	35	47

High Water Mark*:

Height (ft.)	Width (ft.)	Length (ft.)	Total Material w/n HW (cu. yd.)
0.6	2.5	ABD Width	1.11

**Note* - *The high water mark was estimated for most locations based on geomorphic and vegetative* evidence. Channels with ABDs were typically inundated, or had sufficient sediment deposition to make it difficult to ascertain pre-ABD high water mark locations. When not directly measured, these numbers represent conservative measurements.

Photo:

ABD Identifier: Artabasdos

Creek: Jump Creek

Material: Dirt and Gravel

Year Constructed: 2009

ABD Dimensions:

Height (ft.)	Width (ft.)	Length (ft.)	Total Material Used (cu. yd.)
4	15	42	118

High Water Mark*:

Height (ft.)	Width (ft.)	Length (ft.)	Total Material w/n HW (cu. yd.)
0.7	2	ABD Width	1.19

**Note - The high water mark was estimated for most locations based on geomorphic and vegetative* evidence. Channels with ABDs were typically inundated, or had sufficient sediment deposition to make it difficult to ascertain pre-ABD high water mark locations. When not directly measured, these numbers represent conservative measurements.

Photo:

ABD Identifier: Leo IV

Creek: Jump Creek

Material: Dirt and Gravel

Year Constructed: 2009

ABD Dimensions:

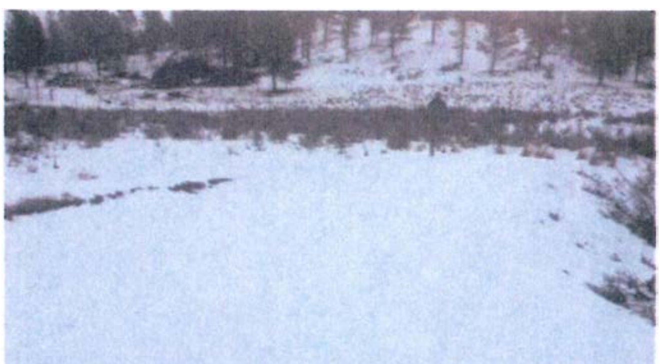
Height (ft.)	Width (ft.)	Length (ft.)	Total Material Used (cu. yd.)
5	16	84	327

High Water Mark*:

Height (ft.)	Width (ft.)	Length (ft.)	Total Material w/n HW (cu. yd.)
0.7	2.5	ABD Width	1.69

**Note - The high water mark was estimated for most locations based on geomorphic and vegetative* evidence. Channels with ABDs were typically inundated, or had sufficient sediment deposition to make it difficult to ascertain pre-ABD high water mark locations. When not directly measured, these numbers represent conservative measurements.

Photo:



ABD Identifier: Constantine VI

Creek: Jump Creek

Material: Dirt and Gravel

Year Constructed: 2009

ABD Dimensions:

Height (ft .)	Width (ft.)	Length (ft.)	Total Material Used (cu. yd.)
6	16	54	264

High Water Mark*:

Height (ft.)	Width (ft.)	Length (ft.)	Total Material w/n HW (cu. yd.)
0.7	2.5	ABD Width	1.81

**Note* - *The high water mark was estimated for most locations based on geomorphic and vegetative* evidence. Channels with ABDs were typically inundated, or had sufficient sediment deposition to make it difficult to ascertain pre-ABD high water mark locations. When not directly measured, these numbers represent conservative measurements.

Photo:

ABD Identifier: Irene

Creek: Jump Creek

Material: Dirt and Gravel

Year Constructed: 2009

ABD Dimensions:

Height (ft.)	Width (ft.)	Length (ft.)	Total Material Used (cu. yd.)
3	15	38	76

High Water Mark*:

Height (ft.)	Width (ft.)	Length (ft.)	Total Material w/n HW (cu. yd.)
0.6	2.5	ABD Width	1.17

**Note - The high water mark was estimated for most locations based on geomorphic and vegetative* evidence. Channels with ABDs were typically inundated, or had sufficient sediment deposition to make it difficult to ascertain pre-ABD high water mark locations. When not directly measured, these numbers represent conservative measurements.

Photo: