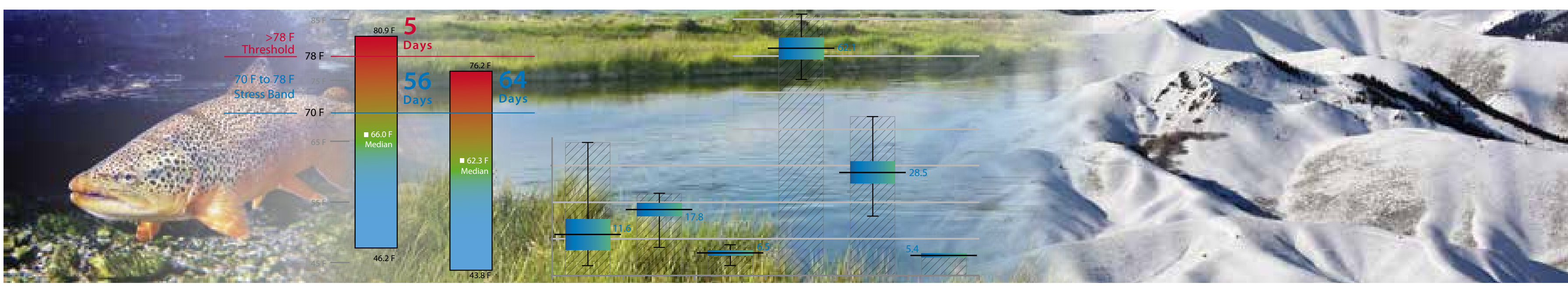
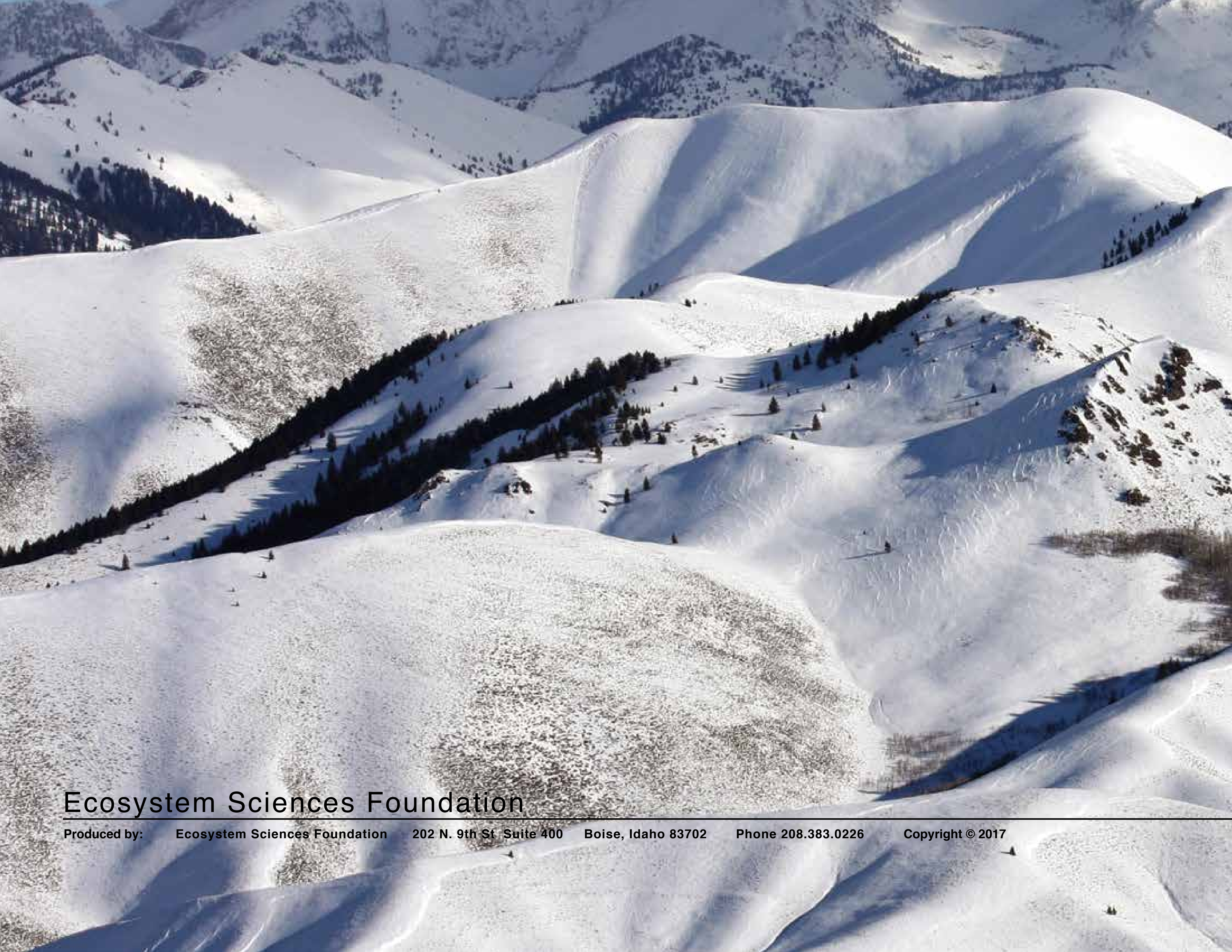
2016

Silver Creek Annual Report

Ecosystem Sciences Foundation





Ecosystem Sciences Foundation

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2016 Annual Report

Silver Creek Watershed

Photo: Shutterstock/ CSNafzger

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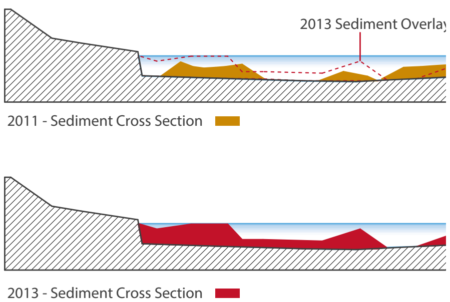
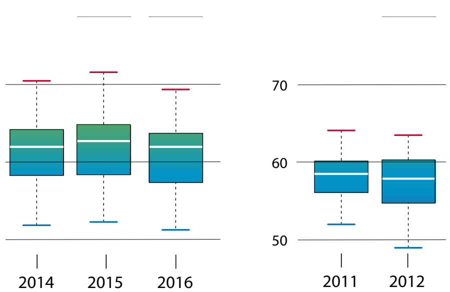

2013 Sediment Overlay
2011 - Sediment Cross Section
2013 - Sediment Cross Section


70
60
50
2014
2015
2016
2011
2012

Silver Creek Watershed

Ecosystem Sciences Foundation (ESF) has been working in the Silver Creek watershed since 2009, when it developed a Restoration and Enhancement Strategy for the Silver Creek watershed. The strategy identified numerous actions to be taken, including data gaps on streamflow, temperature and sediment conditions. To address these data gaps, ESF began its monitoring program in 2010 to increase our understanding of the Silver Creek system. This past year, ESF and its partners continued to gather critical data on streamflows, temperature, and sediment, and installed continuous monitoring loggers for dissolved oxygen. ESF conducted analyses of monitoring results and prepared in-depth reporting on issues affecting the watershed.

To date, our Silver Creek program enjoys support from numerous stakeholders. Most of the land within the watershed is privately owned; consequently, landowners in the watershed recognize the need to protect the ecological health of the watershed as well as their rights as landowners. Our Partners and stakeholders have been integral in helping us achieve our vision of providing direction for stewardship of the Silver Creek watershed and to design and promote appropriate stream restoration and enhancement actions.

The significant conclusions and findings from 2016 are:

- The three-year period of below average discharge within the system continued.
- Several creeks continued to exhibit temperatures that stress trout and other aquatic life. Mud Creek, Cain Creek and Lower Silver Creek had temperatures that stress trout for extended periods of time.
- Dissolved Oxygen monitoring indicated that in some areas of Silver Creek, Dissolved Oxygen concentrations become so low that they stress all life stages of trout. However, these conditions are generally limited to early morning hours. In the afternoon, Dissolved Oxygen levels rise rapidly. Cold tributary creeks like Grove and Chaney maintained higher Dissolved Oxygen levels than Loving Creek, Butte Creek and Lower Silver Creek.
- Silver Creek's connection with the Big Wood River and its aquifer continues to be a source of debate and data analysis. The Big Wood Groundwater Model's release has increased interest in this subject.
- Silt transects before and after a dredging project illustrate the effect of such a project on channel conditions and consequently, fish habitat.

For more details please visit: www.savesilvercreek.com

The information that is presented in this report reflects summarized analysis of all data. We are presenting the most important aspects of the past season's work in a way that tells a story of the stream system and watershed. The information presented here is a result of detailed, scientifically rigorous analysis, and reflects a considerable amount of field work to collect. The website has additional information on programs in the watershed, including raw and tabulated data.

Winter Snow + Water Year

2016 2017

Photo: Shutterstock/CSNafzger

The upcoming water year for 2017 will likely be exceptional after robust snow pack levels accumulated this past winter. This is good news for the Silver Creek system that relies almost entirely on groundwater levels within the Wood River Valley Aquifer system, in which three-quarters of inflow is received directly from tributaries and streamflow losses. According to the U.S. Department of Agriculture Natural Resources Conservation Service, current “snow water equivalent” levels within the Big Wood Basin are over 180% of median levels, as measured from 1981-2010. It will be interesting to see what, if any, changes will result in flow and temperature monitoring. Will spring and streamflow increase? Will stream temperatures decrease? Will monitoring results support our hypothesis that stream temperatures are most influenced by flow volume?

A reminder that this report covers the conditions during the 2016 water year. In 2016, the flow gauge for the USGS station at Hailey, Idaho measured higher average streamflows than the previous three monitoring years (2013-2015), in which drought conditions persisted. Subsequently, fewer springs dried up mid-summer and water temperatures were on average 1-2°F cooler than those measured from 2013 to 2015 at most locations. We are excited to see what this upcoming year brings to Silver Creek.

Streamflow forecasts reflect the record high snowpack this season; streamflow volumes are expected to be the highest seen in the Big Wood River and Silver Creek in the last twenty years.

April 1, 2017

Idaho Water Supply Outlook Report

Big Wood Basin **180%** of median snowpack

Big Wood Basin **195%** of average precipitation

Streamflows up to **270%** of average (forecast)

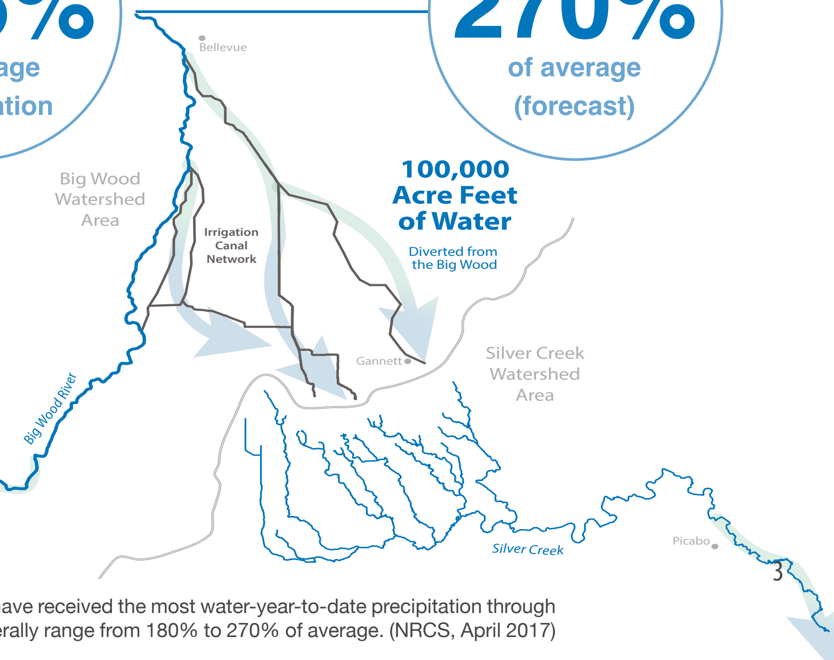
This winter the Big Wood basin received the most water-year-to-date precipitation through April 1 on record.

Snowpack conditions, forecast streamflow runoff and groundwater flows will all be significantly increased this season. Major Silver Creek water inflows or sources:

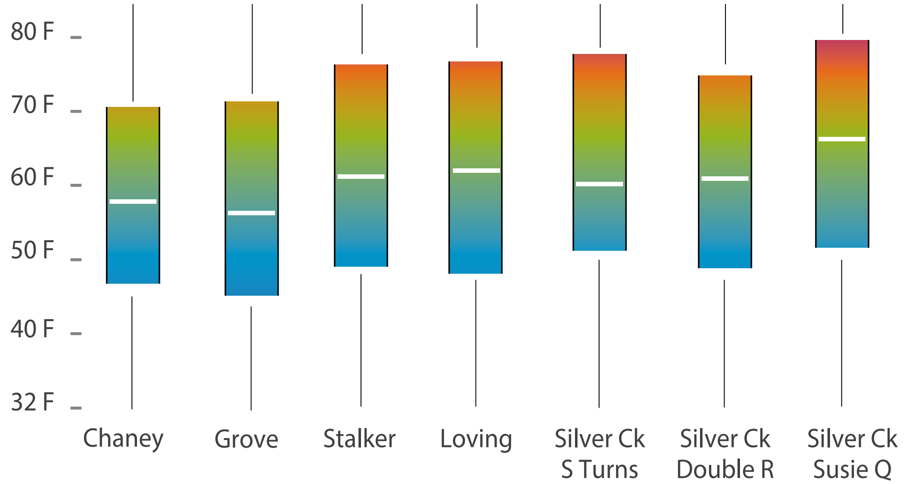
1) Groundwater inflows, Wood River Valley

2) Irrigation diversions from the Big Wood River

3) Precipitation and Snowmelt



Of the 15 SNOTEL sites in or near the Little Lost, Big Lost, Little Wood, Big Wood, and Camas Creek drainages, 14 sites have received the most water-year-to-date precipitation through April 1 on record. Streamflow forecasts mirror the record high snowpack in central Idaho and in the Big Wood basin generally range from 180% to 270% of average. (NRCS, April 2017)



Summer Stream Temperatures: The graph above indicates the maximum, average and minimum summer water temperatures on selected areas of Silver Creek over a four year period (2011-2016). This year, 58 stream temperature loggers and 13 springhead loggers were monitored throughout Silver Creek and on each tributary to record critical information and track changes in the system.

Stream Temperature

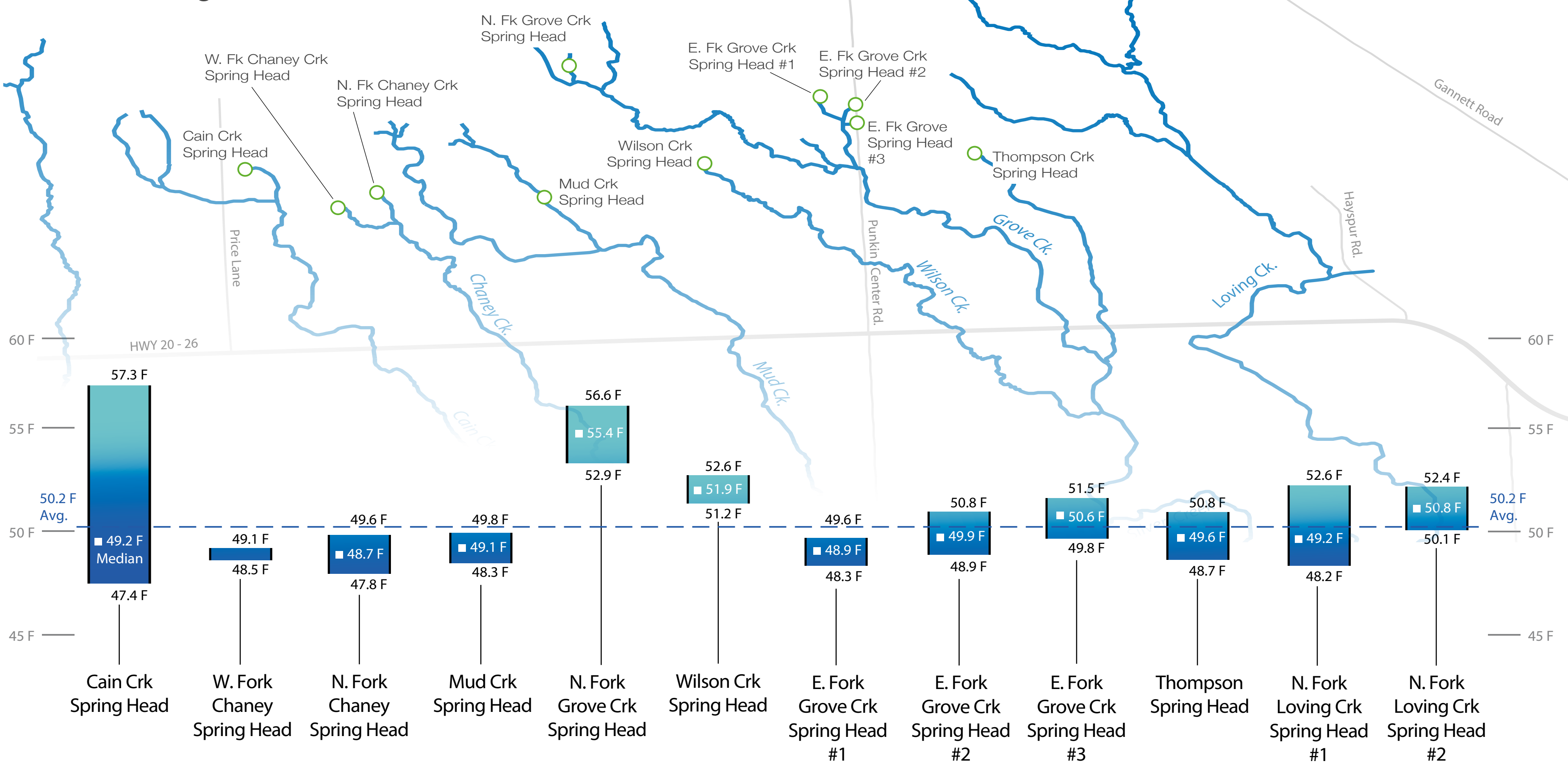
2016 marks our 6th year of monitoring stream temperatures within the Silver Creek watershed. Over the years, we have slowly increased the number of temperature loggers deployed; this year we added 4 stream temperature loggers along the mainstem of Silver Creek. While 2016 was a warm year compared to 2012 (coolest year on record), overall stream temperatures were a bit cooler than the previous few monitoring years. Cain Creek had a significant decrease in stream temperatures compared to the last two years, which is likely due to the fact that the spring dried up for a much shorter period of time. However, Cain Creek remains very warm, logging 56 days above the stress threshold of 70°F for fish.

Spring Driven Ecosystem

It is important to monitor the springs that feed Silver Creek and its tributaries as it is this unique spring-driven system that allows water temperatures to stay relatively constant despite changes in air temperatures or climatic conditions. For 10 of the 13 spring head loggers, average and median temperatures stayed at or below 50°F throughout the summer months of 2016. The spring heads on Cain and North Fork Loving creeks had small spikes in temperature in mid-August, but not enough to push median temperatures

Springs of Silver Creek

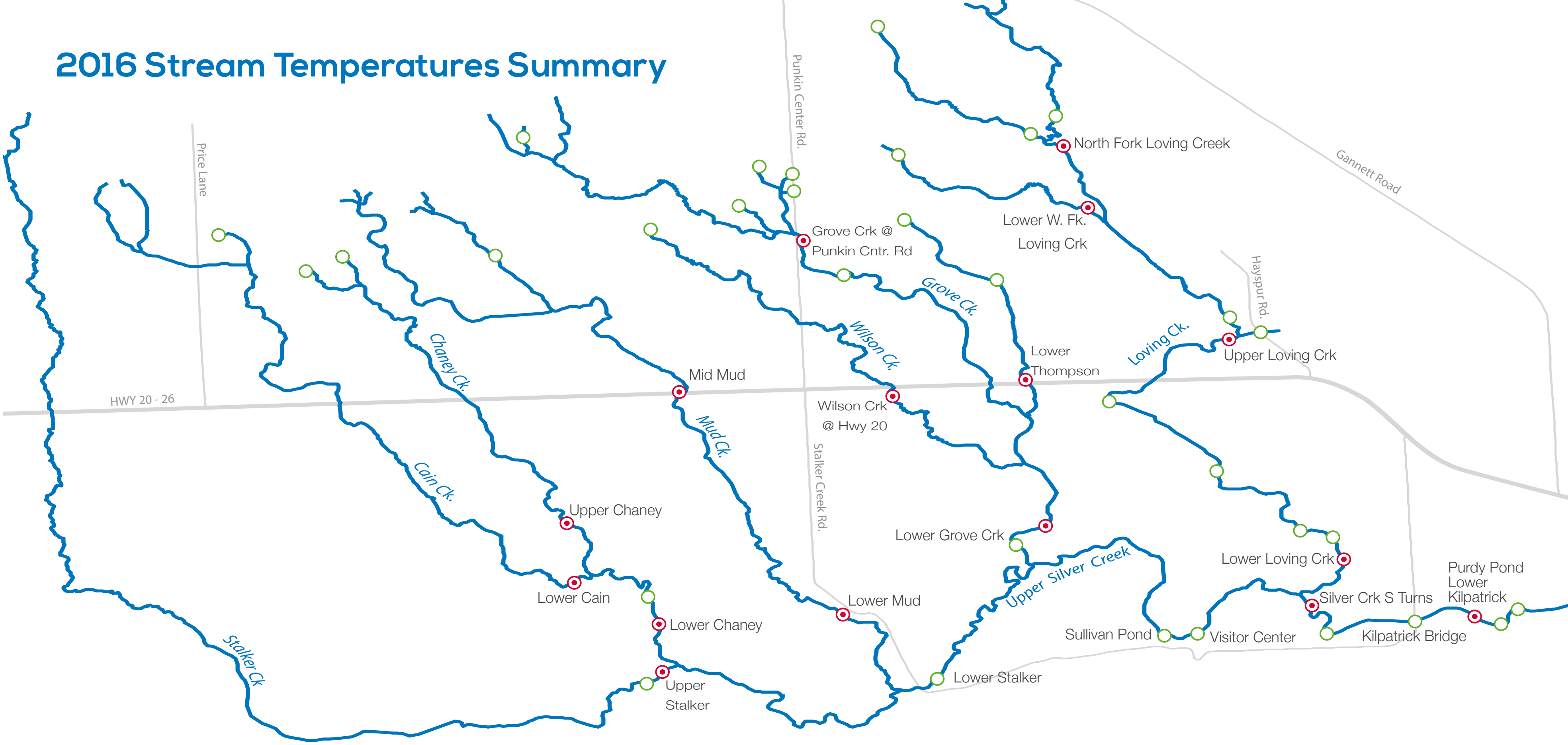
2016 Spring Head Temperatures

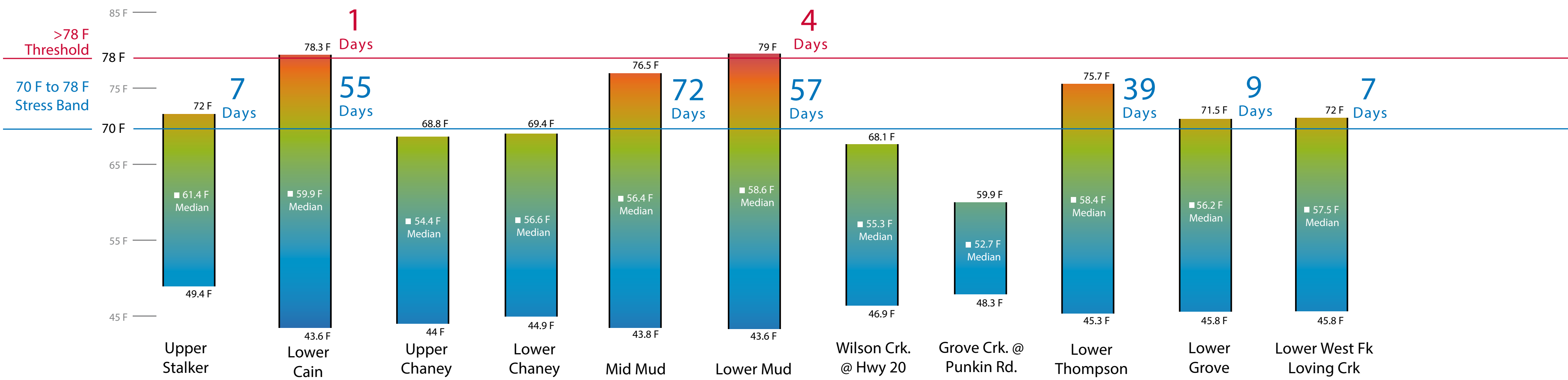


Stream temperature bands The above graphic depicts the summarized spring head temperature data for the entire summer season. The data were analyzed for the summer season to illustrate the spring temperatures that occurred for the period of June through September, 2016. Each graph displays the total temperature range from June 1 to September 30; the absolute high and low temperatures are given and the median water temperature is shown for that particular spring.

over 50.8°F (median temperatures were around 55°F in 2014 and 2015). The spring head at Wilson Creek did not have a spike in water temperature, though temperatures were consistently above 50°F. North Fork Grove spring had the highest temperatures overall, maintaining a constant median temperature of around 55°F; this differs from the prior two years in which North Fork Grove spiked to around 60°F mid-summer. These spikes in temperature are attributed to the springs drying up for a period of time, allowing water to sit in the springhead pool and consequently heat up. The cause of these flow reductions is not fully understood but could be attributed to changes in land use practices, changes in groundwater flow, or a combination of factors. As a spring-driven system, these springs are paramount to the health and persistence of Silver Creek.

2016 Stream Temperatures Summary





Stream temperature bands The above graphic depicts the summarized stream temperature data for the entire summer season for a selected group of data loggers and locations. The data were analyzed for the summer season to illustrate the high temperatures that occurred throughout the stream system for the period of June through the end of September, 2016. Each graph displays the total temperature range for the period of record; the absolute high and low temperatures are given and the median stream temperature is shown for that particular stream.

Locations of Stream Temperature Logger Array

The map illustrates the Silver Creek stream and tributary system with the locations of the stream temperature loggers. The temperature loggers are expressed in two categories for discussion and analysis purposes:

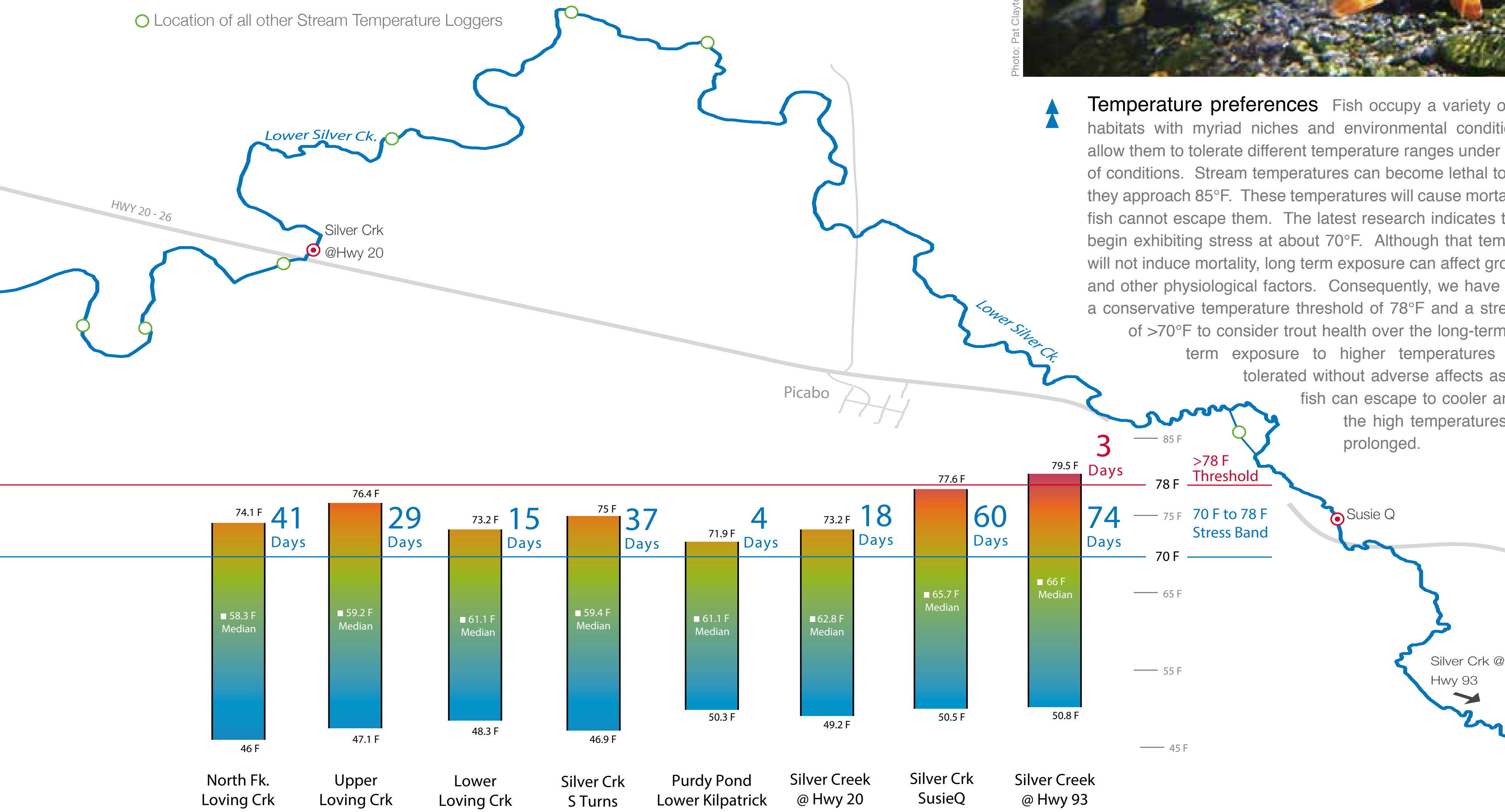
◉ Location of Stream Temperature Loggers illustrated in bottom graphic of seasonal temperatures

○ Location of all other Stream Temperature Loggers

Stream temperatures are logged at one hour intervals over a twenty four hour period for as long as the logger is left in place. The array of stream temperature loggers in the Silver Creek system is designed to capture temperature differences for each stream and tributary segment, from the spring source through to Lower Silver Creek at the Highway 93 crossing.

Photo: Pat Clayton

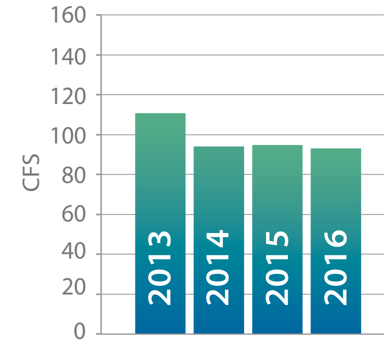
Temperature preferences Fish occupy a variety of stream habitats with myriad niches and environmental conditions that allow them to tolerate different temperature ranges under a variety of conditions. Stream temperatures can become lethal to trout as they approach 85°F. These temperatures will cause mortality if the fish cannot escape them. The latest research indicates that trout begin exhibiting stress at about 70°F. Although that temperature will not induce mortality, long term exposure can affect growth rate and other physiological factors. Consequently, we have selected a conservative temperature threshold of 78°F and a stress band of >70°F to consider trout health over the long-term. Short-term exposure to higher temperatures can be tolerated without adverse affects as long as fish can escape to cooler areas and the high temperatures are not prolonged.

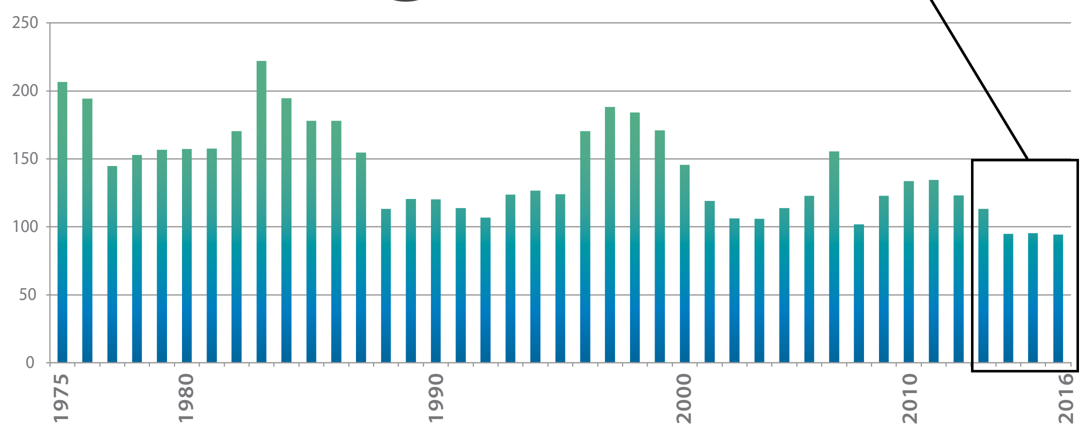


The overall median temperatures between night and day, throughout the summer, were within the preference range for trout (around 55-60 degrees) in Cain, Chaney, Mud, Wilson, Grove, Thompson, and Loving creeks. Stalker Creek, Lower Loving Creek and Silver Creek all had median temperatures above 60°F. All of the streams (except Chaney, Wilson, and Grove) had max temperatures within the stress range for fish (70°F-78°F) over long periods of time. However, this year, temperatures exceeded the threshold (78°F) only a few times.

Stream Hydrology

Annual average streamflows at USGS gage (Sportsmans Access) 1975 - 2016.





Monitoring streamflows is important, as it helps build our understanding of the volume and origin of water entering Silver Creek's tributaries and its potential influence on water temperature, dissolved oxygen and other water quality parameters.

Total annual discharge at Sportsman's Access in 2016 was very similar to 2014 and 2015: flows were well below the 30-year average. Silver Creek's tributaries had slightly more flow than 2014 and 2015. However, it was still a low water year for Silver Creek's tributaries. The Big Wood River had a larger increase in annual discharge in 2016 than Silver Creek (an average discharge of 406 cfs in 2016, vs. 309 and 311 in '14 and '15 respectively).

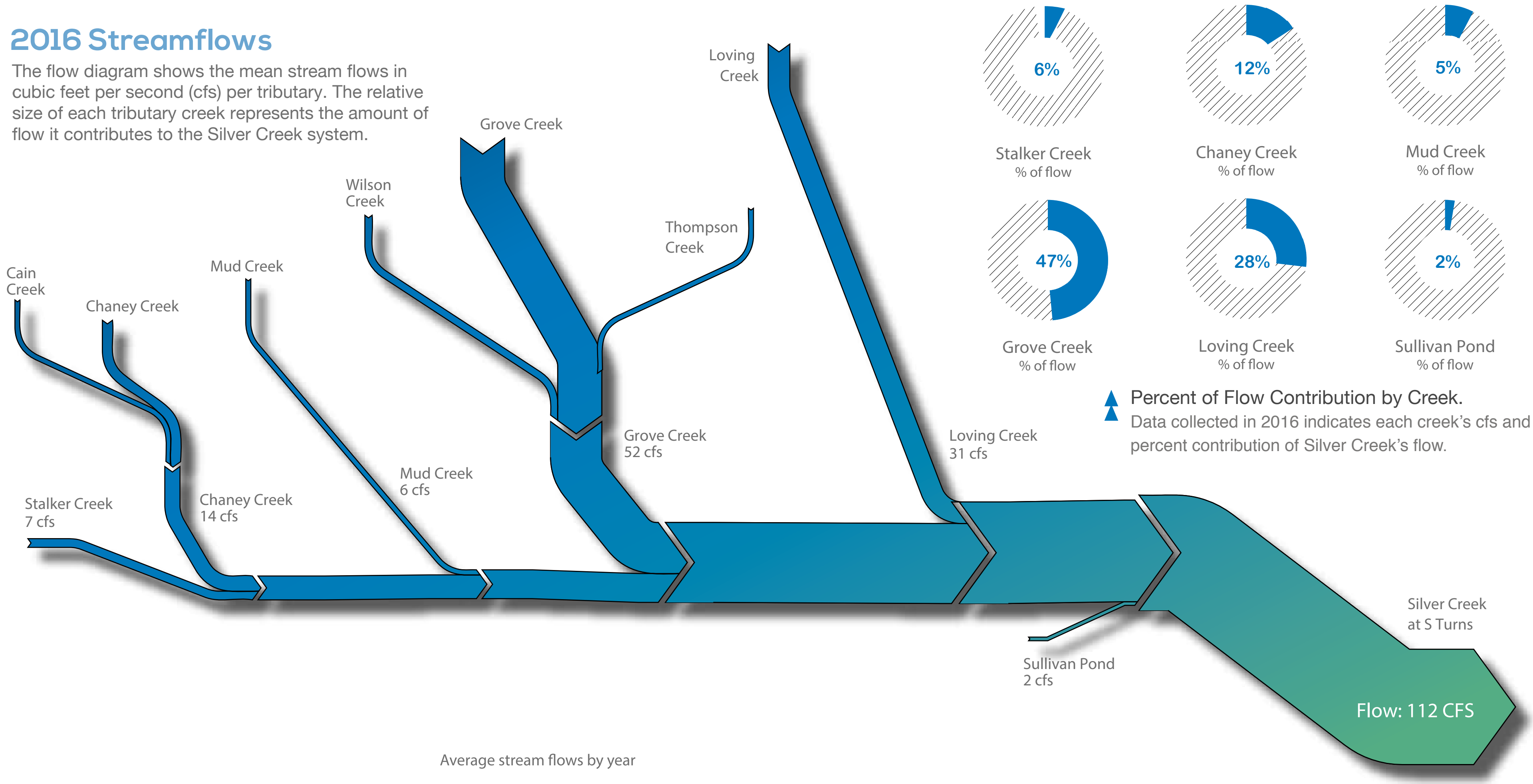
Big Wood Average Annual Discharge:

2013	**299.0**
2014	**309.7**
2015	**311.5**
2016	**406.4**

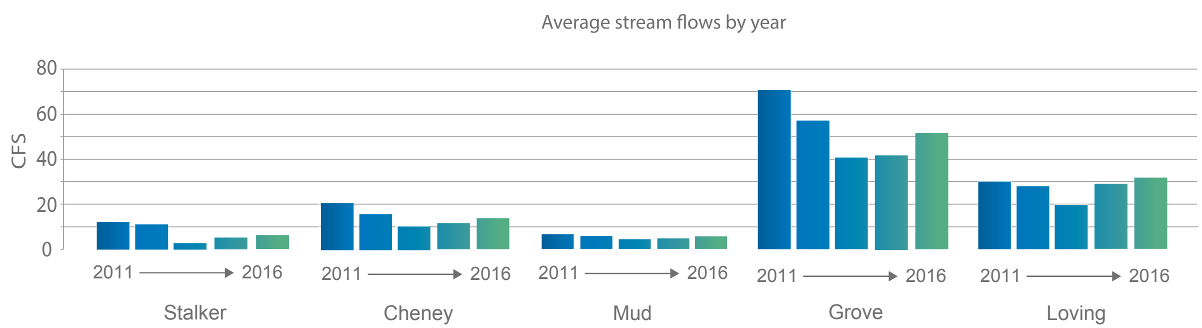
Because the Big Wood River and Silver Creek's tributaries had higher years while Sportsman's Access showed no increase, then another factor such as water diversion from Silver Creek must have increased. The system is a complex interaction of run-off from snow melt, water diversion into the basin (via diversions from the Big Wood), groundwater inflows, groundwater extraction, and water use (ET).

2016 Streamflows

The flow diagram shows the mean stream flows in cubic feet per second (cfs) per tributary. The relative size of each tributary creek represents the amount of flow it contributes to the Silver Creek system.



Percent of Flow Contribution by Creek. Data collected in 2016 indicates each creek's cfs and percent contribution of Silver Creek's flow.



Annual average streamflows by Creek for 2011-2016. Data collected from 2011 - 2016 indicates each creek's average flow. The overall reduction in streamflows effect many critical components of the aquatic ecosystem. Measurements were not continuous, but were distributed through the spring, summer and fall.

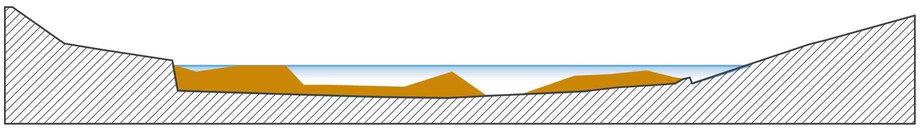
Stream Sediment

In 2016, we continued our sediment monitoring program at five sites in Lower Silver Creek. At each location, the depth and extent of sediment in the stream channel was surveyed. The focus on revisiting locations within Lower Silver Creek is three-fold: 1) Lower Silver Creek had the highest sediment load of all the creeks monitored in 2011 with an average of over 33 sq. feet per transect; 2) to monitor sediment post-implementation of the Kilpatrick Pond Restoration Project; and 3) to monitor before and after dredging was performed within the oxbow near Double RR ranch. Two new locations were surveyed at Kilpatrick Pond (#68 and #69) that will serve as a baseline dataset from which to monitor sediment conditions post restoration. Both locations show a significant amount of sediment build up within the pond. Further downstream at the Double RR Ranch (#63), sediment monitoring shows an increase in sediment levels from those surveyed in 2013.

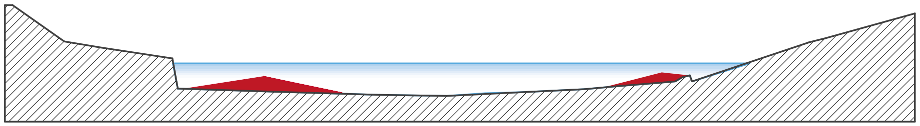
For two sites within the oxbow near Double RR Ranch (#36 and #66), the sites were surveyed in 2015 before dredging was performed and then revisited in 2016. Sediment monitoring shows that while some sediment was re-deposited over the year, both locations have significantly less sediment than was present before dredging was performed. Only two of the sites were revisited from the 2013 monitoring effort (#63 and #36), while the other three constitute new monitoring datasets.

Cross Channel Sediment Transect Comparison: #36

The graphic below depicts a cross-channel view of transect 36, which was surveyed in 2013 and 2016. It demonstrates a decrease of approximately 46 sq. ft. in the volume of sediment within the stream channel cross-section. This change is a result of dredging that recently took place within the reach.



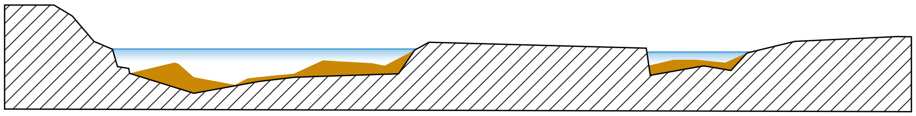
2013 - Sediment Cross Section



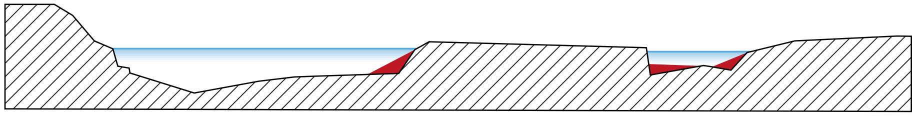
2016 - Sediment Cross Section

Cross Channel Sediment Transect Comparison: #66

The graphic below depicts a cross-channel view of transect 66, which was surveyed in 2015 and 2016. It demonstrates a decrease of approximately 82 sq. ft. in the volume of sediment within the stream channel cross-section. This change is a result of dredging that recently took place within the reach.



2015 - Sediment Cross Section



2016 - Sediment Cross Section

Water Quality

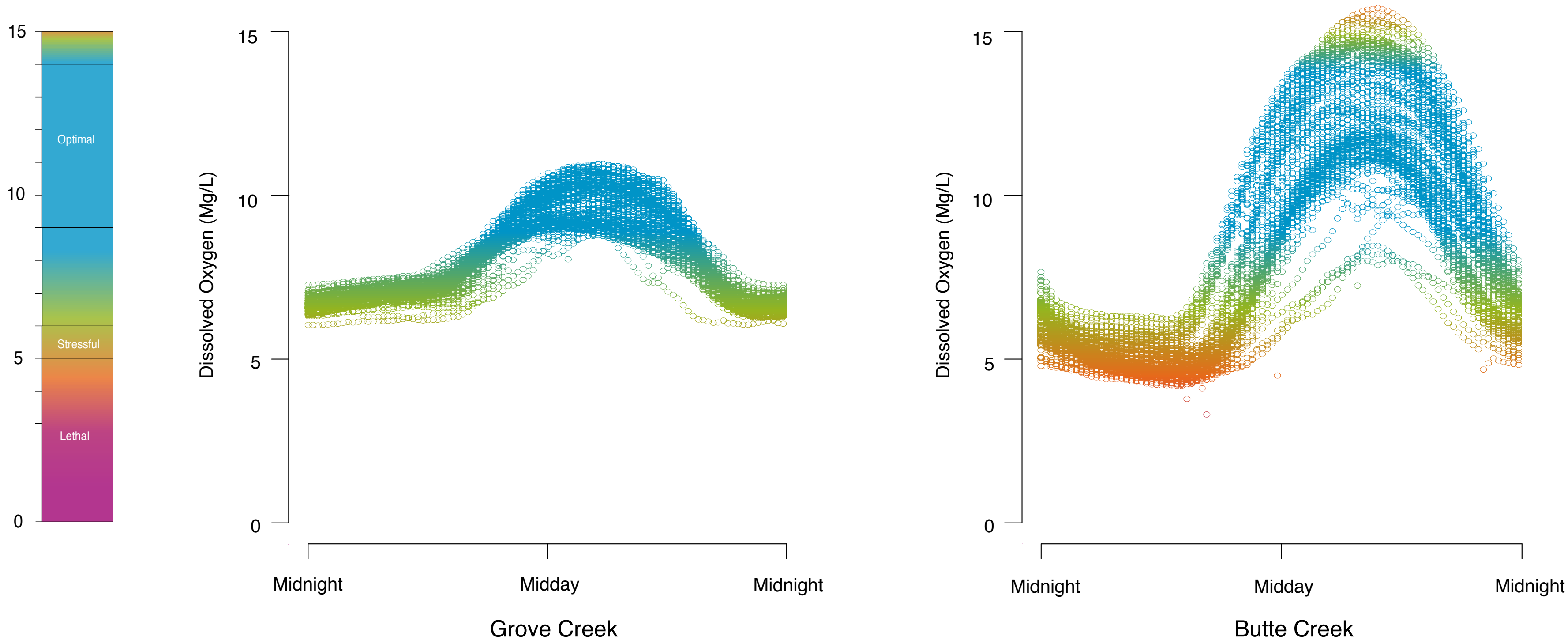
Dissolved Oxygen

During the summer of 2016 Dissolved oxygen (DO) was measured continuously from June through October at 6 sites. These data were recorded using optical DO sensors that record the DO and temperature value every 15 min.

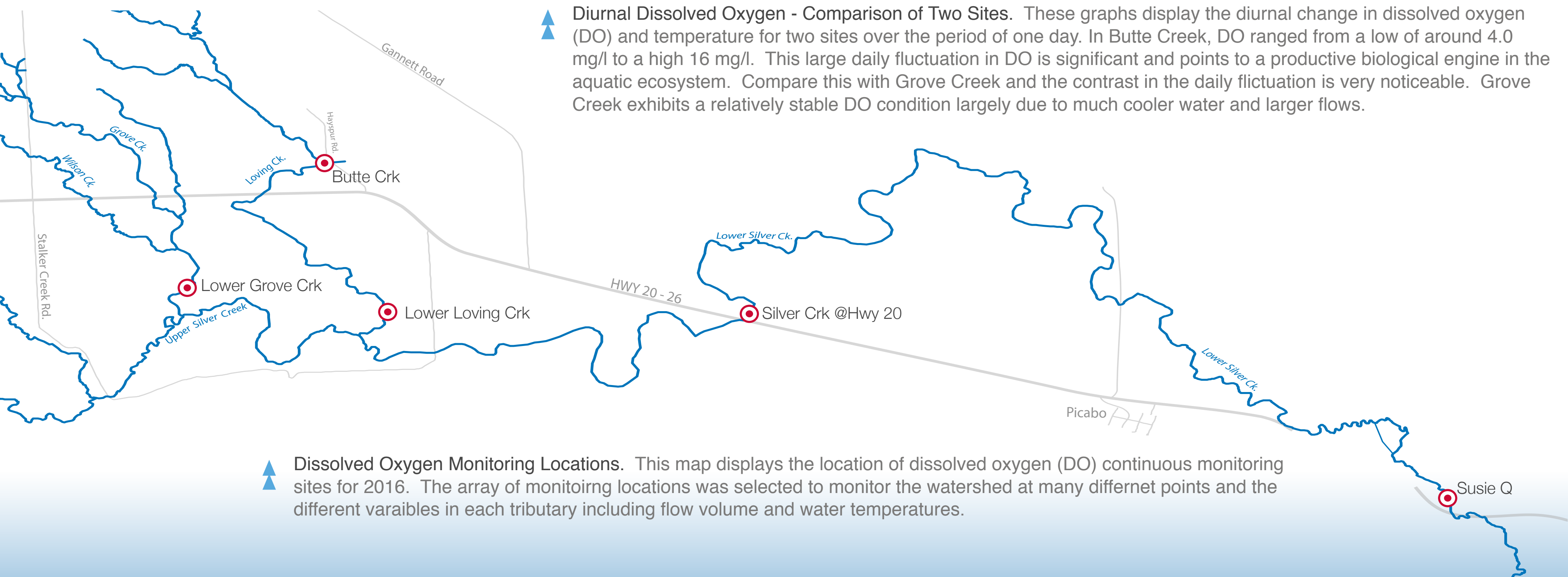
Results indicate that not all of Silver Creek's waterways exhibit the same pattern of DO values and that DO levels stress fish in certain locations at certain times of the day. Seasonal fluctuations also occur, as changes in sunlight, temperature, flow and aquatic plan growth vary throughout the year.

In many areas of the Silver Creek system the daily fluctuations in DO are significant, which points to a productive biological engine in the aquatic ecosystem. As aquatic plant life within the stream utilizes photosynthesis to create energy, they produce oxygen. This raises DO levels, which peak in the afternoon. Overnight, plants continue to respire, which requires oxygen (this demand is called biological oxygen demand) which they take from the water. This process causes DO levels to be lowest just before dawn and highest in the afternoon exhibiting a distinct diurnal cycle. As shown by the diurnal graphs presented, not all cycles are the same. Grove Creek's DO concentrations fluctuate on a diurnal cycle, but stay within a much tighter range than streams like Butte Creek (Loving Creek, and the main stem of Silver Creek have similar large diurnal fluctuations). This is due to a combination of factors, including volume, temperature, nutrient concentrations, and aquatic plant life, among others.

In recent years, low DO readings have been a cause for concern and have even lead to the closure of the fishery. The following pages show how DO fluctuates throughout the entire season. Some creeks, like Grove and Cheeny stay within a tight range, while more downstream areas experience wild fluctuations which vary throughout the season. The seasonal graphs present all data points taken during the 2016 season.

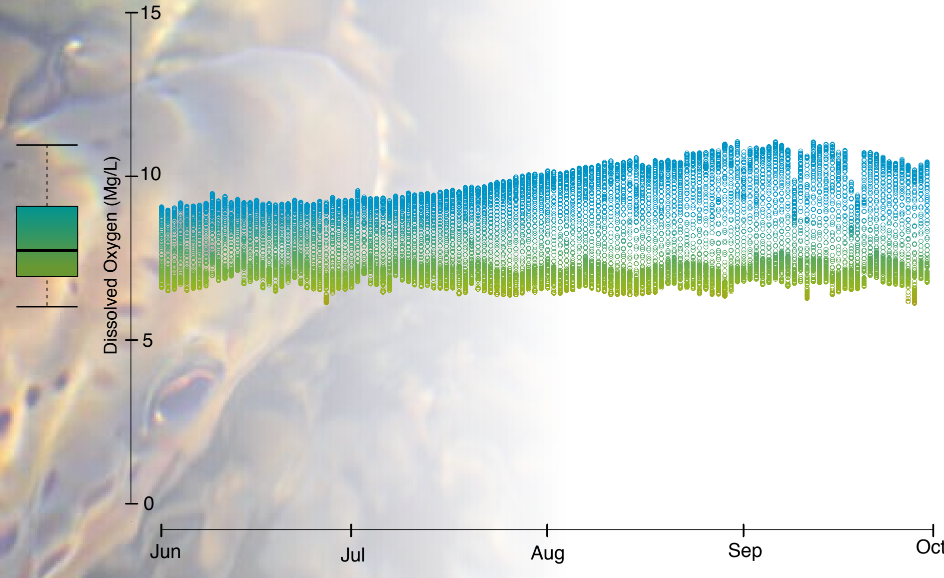


Diurnal Dissolved Oxygen - Comparison of Two Sites. These graphs display the diurnal change in dissolved oxygen (DO) and temperature for two sites over the period of one day. In Butte Creek, DO ranged from a low of around 4.0 mg/l to a high 16 mg/l. This large daily fluctuation in DO is significant and points to a productive biological engine in the aquatic ecosystem. Compare this with Grove Creek and the contrast in the daily fluctuation is very noticeable. Grove Creek exhibits a relatively stable DO condition largely due to much cooler water and larger flows.

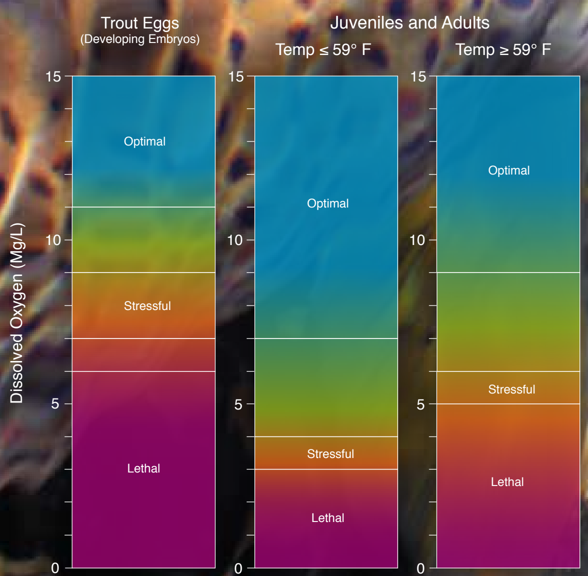


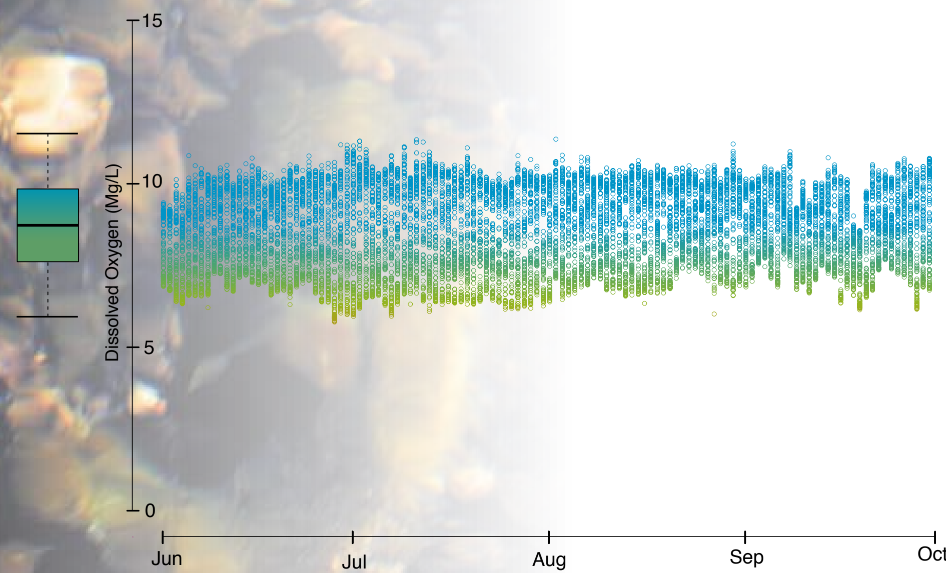
Dissolved Oxygen Monitoring Locations. This map displays the location of dissolved oxygen (DO) continuous monitoring sites for 2016. The array of monitoirng locations was selected to monitor the watershed at many differnet points and the different varaibles in each tributary including flow volume and water temperatures.

Dissolved Oxygen Results



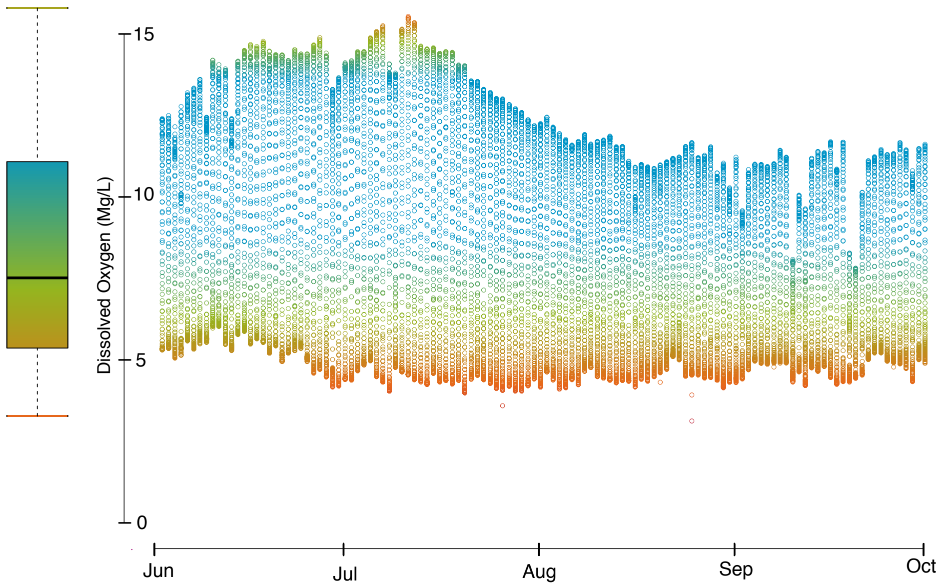
Lower Grove Creek



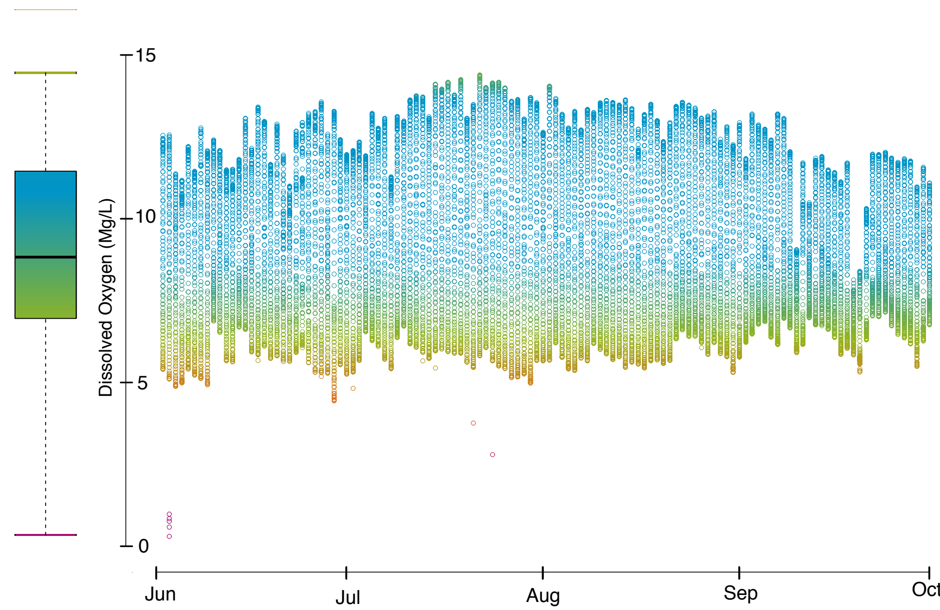


Lower Chaney Creek

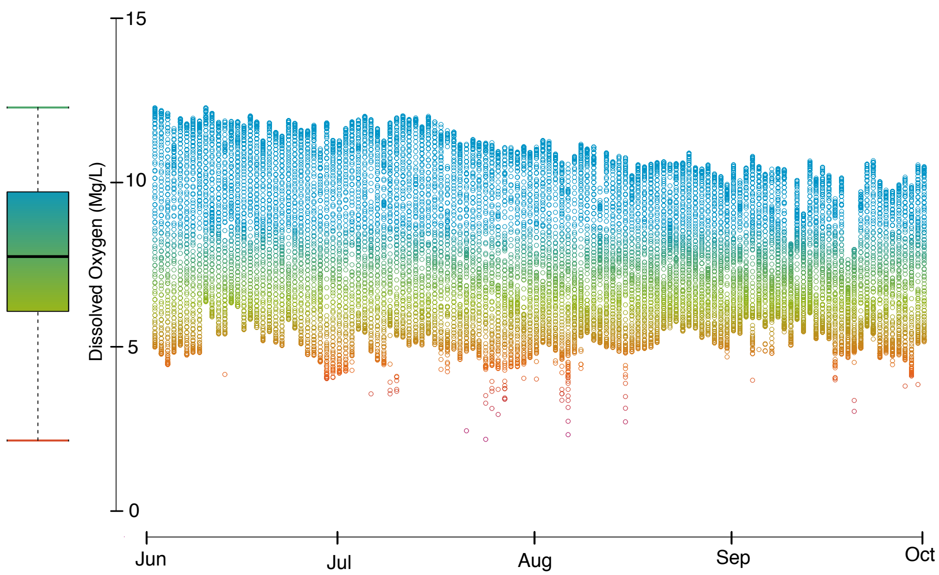
Average Dissolved Oxygen Requirements for Salmonids. Trout, depending on thier particular life stage (egg, Juvenile, Adult), have differing requirements and thresholds for dissolved oxygen levels. Water temperature also plays a major role in dissolved oxygen levels. (Adapted from EPA's Chapman, 1986, and USFWS's Raleigh et al 1984, and Raleigh et al 1996).



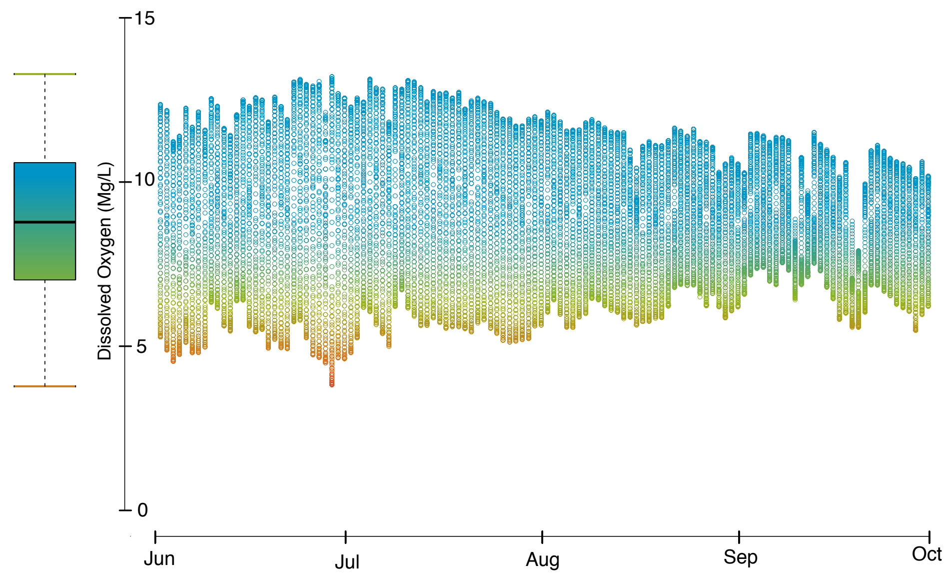
Butte Creek



Silver Creek at Highway 20



Lower Loving Creek



Susie Q

Groundwater Modeling

As a spring-driven system, the Silver Creek watershed is dependent upon groundwater from the Wood River Valley (WRV) Aquifer for an estimated 80% of the water that feeds the tributaries and main-stem. If groundwater levels drop, spring flows could diminish or stop entirely. This is concerning, as recent analysis[1] shows that depth-to-groundwater levels have been declining in the WRV Aquifer over the last 30 years. To better understand and manage this trend, the U.S. Geological Survey (USGS) and Idaho Department of Water Resources (IDWR) collaborated to construct a three-dimensional numerical model[2] of groundwater flow in the WRV Aquifer system. The model, finalized in 2016, can reasonably simulate water-table elevation, orientation, and gradients of the WRV Aquifer, as well as stream-aquifer flow exchange along river reaches.

The WRV Aquifer system is approximately 106 square miles in size and comprised of a single unconfined aquifer that underlies the narrow valley from Galena Summit (about 20 miles north of Ketchum) south to Bellevue, at which point it extends eastward and westward into what is termed the "Bellevue Fan". Timmerman and Picabo Hills represent the southernmost extent of the Bellevue Fan, and Stanton Crossing and Picabo represent roughly the western and eastern-most extent of the Bellevue Fan, respectively. There is also a confined aquifer underlying the unconfined aquifer present only in the southern Bellevue Fan area. Depth-to-groundwater north of the city of Bellevue ranges from 10 feet to 90 feet, while depth-to-groundwater ranges from 10 to 150 feet in the Bellevue Fan.

Groundwater flow in the WRV was simulated using the MODFLOW-USG three-dimensional numerical model. In general, the simulated pattern of horizontal groundwater movement in the WRV Aquifer is for water to move down valley within the

1 Skinner, K.D., Bartolino, J.R., and Tranmer, A.W. 2007. Water resource trends and comparisons between partial development and October 2006 hydrologic conditions, Wood River Valley, south-central Idaho. U.S. Geological Survey Scientific Investigations Report 2007-5258, 30 p.

2 Fisher, J.C., Bartolino, J.R., Wylie, A.H., Sukow, J. and McVay, M. 2016. Groundwater-flow model for the Wood River Valley Aquifer System, South-Central Idaho. U.S. Geological Survey Scientific Investigations Report 2016-2050, 84 p.

unconfined aquifer into the Bellevue fan, at which point the flow splits eastward towards Stanton Crossing or westward towards Picabo. As the water approaches the confining layer, some of the water will also enter the deep confined aquifer. Over 70% of the outflow from the WRV Aquifer is a result of streamflow gains along its course, while 17.7% is lost via production well pumping. The Silver Creek outlet boundary represents only 2.7% of the total outflow from the Aquifer. For most of the year, Silver Creek's tributaries are fed entirely from springs and seeps originating from the eastern portion of the Bellevue Fan. Silver Creek is also known to receive water from drains, diversions from the Big Wood River, and exchange wells.

This model was created using free, publicly available software so that anyone can run and improve on the model. Ultimately, the model could be used to examine potential anthropomorphic (i.e. increased or decreased groundwater pumping) and climatic effects on water resources, and inform appropriate management and recharge strategies to protect the WRV Aquifer resource. The USGS and IDWR plan to update the model in coming years with more recent groundwater data.

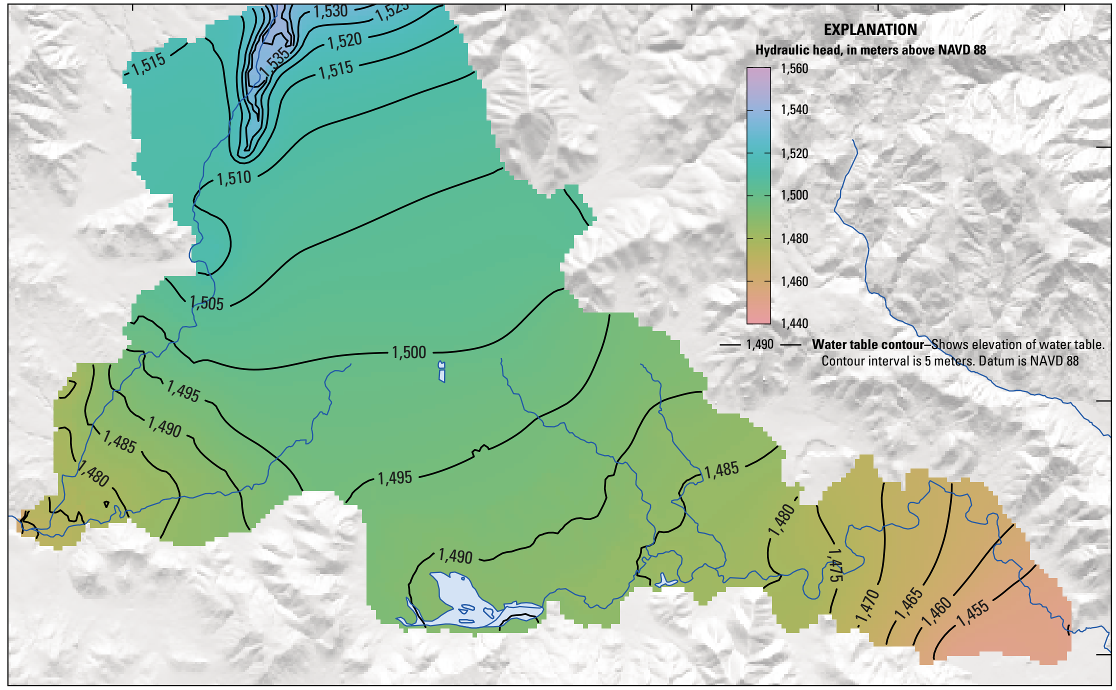


Illustration and table from *Groundwater-flow model of the Wood River Valley aquifer system, south-central Idaho.*[2] Table (below) water budget specified as volumetric flow rates averaged over 1995-2010, entire Wood River Valley aquifer system.

Water budget component in the groundwater-flow model	Mean volumetric flow rate		Percentage of total inflow or outflow
	cubic meters per day	acre-feet per year	
Inflow			
Areal recharge	444,902	131,738	37.3%
Streamflow losses	600,503	177,813	50.3%
Tributary basin underflow	148,737	44,042	12.5%
Outflow			
Areal discharge	96,952	28,708	8.1%
Streamflow gains	850,934	251,967	71.4%
Production well pumping	211,200	62,538	17.7%
Stanton Crossing outlet	958	284	0.1%
Silver Creek outlet	32,057	9,492	2.7%
Inflow - Outflow			
Change in aquifer storage	2,041	604	NA

New Imagery, Data and Tools

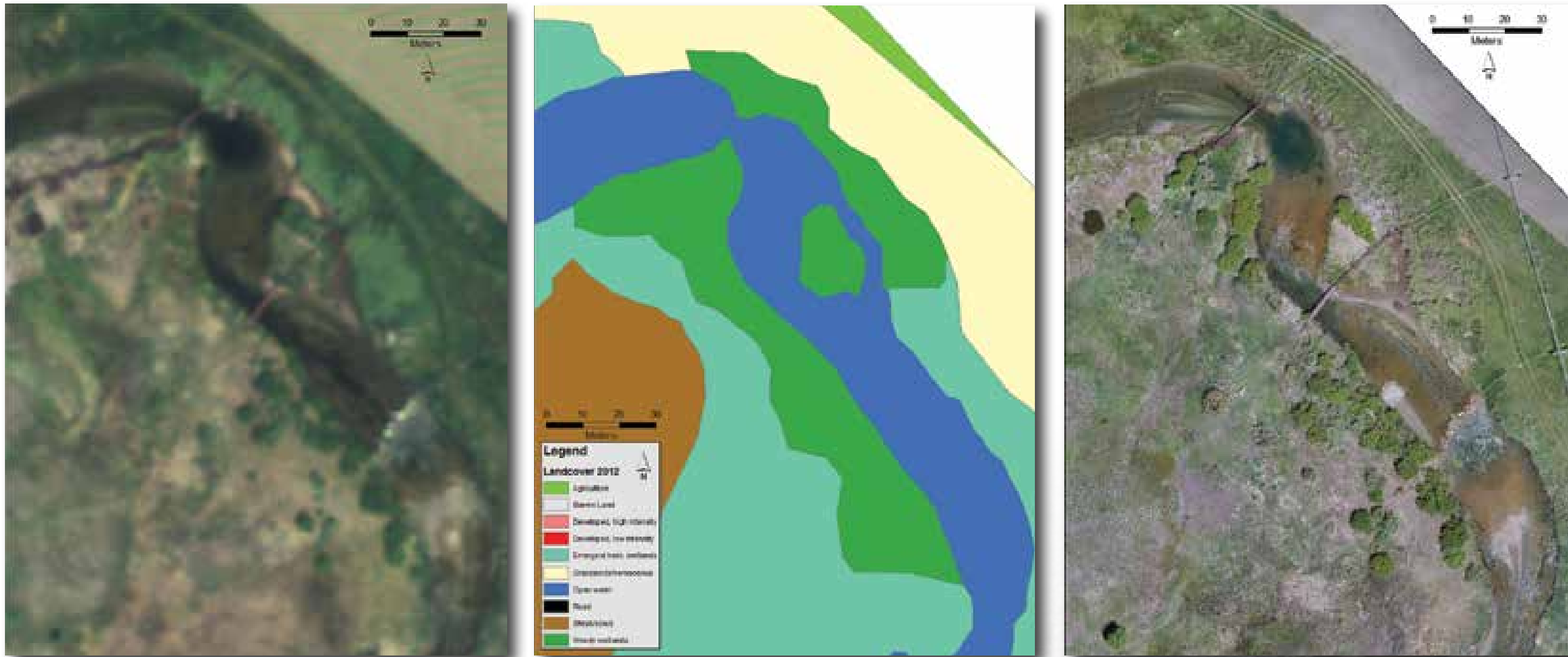
Photo: Leo Geis / Idaho Airships

In recent years, the field of remote sensing has dramatically improved the quality and quantity of data that is available to evaluate and monitor our surrounding environment. Different types of sensors that are now mounted to UAV (Unmanned Aerial Vehicles) or drones give us a variety of new perspectives and information about our world. The imagery from these new platforms is often much more accurate than previous data collection methods and as these technologies become more established, they become more accessible from a cost standpoint.

In 2016, a UAV was flown over a portion of Silver Creek. Very high-resolution imagery was collected and its potential benefits to existing monitoring efforts were analyzed. As seen on the following page, the drone-acquired imagery offers insights that publicly available imagery does not.

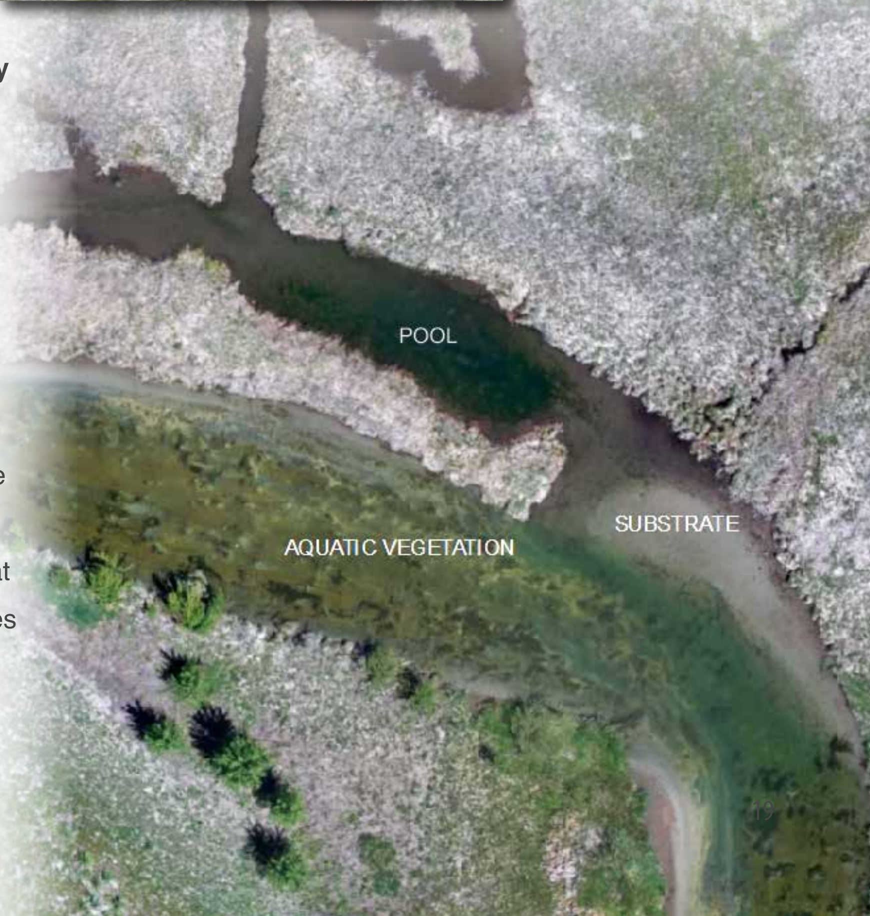
Using the highest-resolution publically available imagery (NAIP or National Agriculture Imagery Program) resulted in an overestimation of the extent of woody wetlands. With the use of two-centimeter resolution imagery the resulting land cover maps are much more accurate and representative of actual conditions on the ground.

This example is just one use of the 2016 high-resolution imagery that could benefit



2001 NAIP imagery (top left), 2012 Land Cover Mapping (top center), and 2016 High Resolution Imagery (top right) comparison. At right, high resolution imagery of the stream channel illustrating the ability to identify instream conditions such as deep pools, sediment zones and aquatic vegetation.

the Silver Creek monitoring program. There are many other potential benefits to using very high-resolution imagery. For example, one aspect of Ecosystem Sciences' Silver Creek Program is the mapping of fish habitat—primarily substrate and aquatic vegetation. The detail in the 2016 high-resolution imagery allows for accurate fish habitat mapping, whereas satellite-derived imagery lacks the resolution to map fish habitat. The 2016 high resolution imagery allows for easy delineation of aquatic vegetation and substrate (image to the right). In addition, other types of sensors, such as Near Infrared can be used to identify certain plant species. The mapping of noxious and invasive species is an important component of combating the deleterious effects of these plants, especially in agricultural and riverine landscapes. The NIR imagery that accompanied the other 2016 set of images appears to be an effective medium from which to perform noxious and invasive weed mapping.



Next Steps

Monitoring and Maintenance

Over the past 6 years, the Silver Creek Program has monitored stream hydrology, water temperature, sedimentation and most recently dissolved oxygen. Combined, these parameters are indicators of ecosystem health - much like checking our own body temperature and circulatory system. Monitoring is paramount to understanding ecological processes and relationships, identifying trends and establishing effective strategies for enhancement. However, monitoring is a long term scientific tool that must be done consistently over time; the more data collected, the more meaningful the results. As our monitoring program continues, it is necessary to periodically replace temperature sensors and redeploy DO sensors, which comes at a capital cost. Additional funding is needed to maintain our monitoring equipment, provide analysis and guidance and to continue these important programs.

Fish Habitat Analysis and Mapping

Fish habitat features and redd counts were surveyed on nearly all of the tributaries in Silver Creek during fall 2015 and spring 2016. To continue this effort, ESF is seeking funds to conduct redd counts during the spring and fall seasons on the main stem of Silver Creek. These data enable us to continue with the habitat analysis and mapping effort, which includes delineation of spawning areas, early rearing and nursery areas within Silver Creek and its tributaries. Our goal is to create a database with redd locations for brown trout and rainbow trout, as well as a map that identifies redd locations and delineates habitat such as: spawning areas, early rearing and nursery areas, side channels, pools, undercut banks, resting and feeding zones, and streambank conditions. Lastly, ESF is interested in working with Idaho Fish and Game and others to perform fish migration studies in the future.

Groundwater Protection

Recent modeling by the USGS and IDWR (see pages 18-19) shows that for most of the year, Silver Creek's tributaries are fed entirely from springs and seeps originating from groundwater within the Wood River Valley Aquifer. Thus, groundwater is the ecological driver for the entire watershed. If groundwater levels drop such that spring flows are diminished or stopped, the ecosystem faces collapse. Since we began monitoring spring heads in 2012, spring heads at three locations have temporarily dried up on numerous occasions. If more springs begin drying up, adverse ecological consequences will certainly follow. Consequently, establishing a program to protect the Wood River Valley Aquifer is of utmost importance. The groundwater model created by the USGS and IDWR will help assess how an increase or decrease in groundwater extraction affects groundwater levels, as well as, impact of climate change. This will help inform appropriate management and recharge strategies. However, we also recommend implementing shallow groundwater monitoring on a finer scale to better understand local groundwater dynamics. Currently, the South Valley Groundwater District and Galena Groundwater District are implementing monitoring and management efforts towards groundwater protection and recharge. We would like to support these efforts and design a local groundwater monitoring program that will help us better understand what is affecting spring heads within the Silver Creek system.

Funding

Continuing this important work and increasing our understanding of the Silver Creek system requires funding. Our program is heavily based on monitoring and data analysis; we have found that these activities are rarely funded through traditional grant programs alone. Please consider a donation to continue this important program. Without your contributions, this work cannot be done. Substantial volunteer effort goes into the Silver Creek program each year and your donations directly support the work. Your tax-deductable charitable donation is needed to continue this program.

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Photo: Leo Geis / Idaho Airships

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Silver Creek Annual Report

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