

SIGHTLINES

www.scawild.org

Fall 2017

Newsletter of the Selkirk Conservation Alliance

FEATURES

- 2 -FROM THE DIRECTOR
-WELCOME LISA ALKIRE
- 3 -U OF I LASES LAB,
COEUR D'ALENE
- 4 -REPORT: SCA BOARD
RETREAT 2017
- 5 -ECONOMIC IMPACT OF
WATER QUALITY
- 6 -INVASIVE SPECIES:
SPOTTED KNAPWEED
- 8 -EVOLUTION TODAY
-WATER DATA ANALYSIS
- 9 -JELLYFISH SIGHTING
-PATAGONIA GRANT
- 10 -WATER QUALITY DATA
PAST AND PRESENT
- 16 -SILICON SMELTER
PROPOSAL
- 17 -LICHEN COLLECTION
STILL UNDERWAY
- 18 -RESCUE! CROSSING
THE SELKIRKS PART II
- 24 -NELL SHIPMAN
PROJECT; CELEBASIN

www.scawild.org
phone: 208-448-1110
sca@scawild.org

Sightlines is the newsletter of the
**Selkirk Conservation Alliance
(SCA)**, a non-profit corporation
providing environmental
oversight and public information
for the Selkirk Mountains.

The SCA Year-End Match Campaign is Back!

BY CHERYL MOODY, SCA EXECUTIVE DIRECTOR

The SCA is again pleased to announce that long time supporter and Board Member, John Abelson, has once agreed to match our year-end fund raising campaign, up to \$20,000.

This year's match funds will be dedicated to our water quality monitoring programs, but you can also dedicate your contribution to our general operations, GIS/forest monitoring programs, environmental education, or endangered species recovery programs. Remember, if you work for a corporate employer who also offers a match, be sure to submit your donation to the SCA using their approved process – that way your gift be tripled!

The SCA is currently enrolled in the Benevity (Intel, Verizon, and others) and Boeing Corporate Match Programs.

To make a donation please visit our website, mail a check, or call the office during normal business hours (Tuesdays and Thursdays, 9-3PM PST) and Linda Check, our office manager, can process your credit card or Paypal donation. You will promptly receive a tax deductible receipt for your donation. Your gift will help ensure we remain a viable advocate for conservation in the Selkirks.

Show your support by January 15, 2018, to have your gift matched!



The SCA water quality monitoring program is vital to protecting our lakes' waters and its inhabitants—aquatic, animal, and human.

Selkirk Conservation Alliance
P.O. Box 1809
Priest River, ID 83856

NON PROFIT ORG
U.S. POSTAGE
PAID
PRIEST RIVER, ID
PERMIT NO. 27

Steve Booth
Chair
James Bellatty
Chairman-Elect
John Abelson
Betty Gardner
Eleanor (Hungate) Jones
Mark Kabush
James Lea
Sharon Sorby
Martin Stacey
Bruce Yocum

SCA Staff

Cheryl Moody
Executive Director
Linda Check
Office Manager
Tracey Morgan
GIS Support
Paul Sieracki
GIS Support

SCA Volunteer Coordinators

Bridget Gies
Arboreal Lichen Collection Coordinator
Sandra Mansfield
Education Program Coordinator
Rosemary Yocum
Highway 57 Clean-up Coordinator

Layout & Production
Swordfern Wordsmithing, Ink.
sarahjstoner@hotmail.com
Petroglyph Printing
509-447-2590

For more in-depth articles,
photographs and links,
go to our website
www.scawild.org

While I'm sorely tempted to get on my soapbox and vent a bit about the state of natural resource conservation in the age of Trump, I'm going to refrain. There is simply too much excellent content available from our growing membership to take up page space reiterating things you probably already know (or are happier not knowing at this juncture)...

So, with that said, as we begin to undertake preparations for our 30th anniversary year, please enjoy this amazing fall 2017 issue of *Sightlines* with content contributed by several new and long-term SCA members. Then, please take some time to do some serious soul searching about what your life would be like without this place as you currently love and remember it.

Next, make sure you closely follow our Facebook page postings to stay abreast of the many important issues that are, or likely to, affect the Priest Lake and greater Selkirk ecoregion. Things are happening at a tremendously fast pace both locally and nationally, and we can't get newsletters out fast enough to keep everyone informed.

It's very important that each of you get engaged and stay engaged with all the topics that resonate with you. The option of limiting your personal involvement to paying your annual dues to the SCA is no longer a sustainable strategy for "Keeping the Wild in the Selkirk Ecosystem" -- we're going to need all hands on deck for the reasonable foreseeable future.

The SCA Welcomes New Part-Time Contractor Lisa Alkire

Board members have recognized the need for the SCA to improve its messaging and better articulate to the public all the great things the organization has accomplished since its inception almost 30 years ago.

To that end we welcome new part-time communications specialist Lisa Alkire, who will work on the promotional campaign materials needed for our 30th Anniversary Membership

As promised we've centered much of this issue's content on water quality issues in our region. While the water clarity and quality around the lake is still excellent in most areas, changes are starting to occur in some shallower waters. In this issue, you'll learn what changes we're considering making to our monitoring programs to better quantify/understand these changes, and hopefully find ways to quickly mitigate them moving forward.

Meanwhile downstream, the state and federal regulatory agencies which promised a restoration plan for the Priest River over a decade ago, can show no real progress. Water quality downstream of the outlet dam continues to degrade. Regulators continue to look the other way, too busy with a myriad of issues at Lake Coeur d'Alene to focus any substantial resources here.

As these are the same agencies who are tasked to respond if problems develop in our lake, it seems pretty clear we'll be on our own when problems do develop --- unless you and your county and state tax paying neighbors start demanding that the legislature approved Priest Lake Management Plan gets the financial monitoring resources it was promised back in 1996 when it was adopted. Now is the time you must start to speak up if leaving future generations a Selkirk experience comparable to your own is important to you...

Until next time...

Cheryl Moody
Executive Director, SCA
moody@scawild.org

Drive and Gala, as well as help SCA to broaden its appeal to a younger generation (or two). Lisa is a resident of Newport, Washington and also works part-time for the Pend Oreille County. Welcome Lisa!



University of Idaho's Lake Social Ecological Systems Lab (LaSES) Opens in Coeur d'Alene

BY MARK SOLOMAN, INTERIM DIRECTOR
IDAHO WATER RESOURCES RESEARCH INSTITUTE

A lake is a great data repository, holding its watershed's history of natural and human activity in its waters, sediments, fish, and plants. At the University of Idaho's Lake Social Ecological Systems lab (LaSES), researchers are going deep to recover that record and find out what it can tell us about our lakes and the communities that depend on them - the lake social ecological system.

Human activity can force lake social ecological systems to change their steady state. Those changes may or may not be ones that the human community can easily live with or adapt to, including changes in trophic status, incidence of hazardous algae blooms, release of legacy toxics from lake sediments, spread of invasive species, timing and intensity of flood events, and more. It can be said that we are now living in a new era, the Anthropocene epoch, where human activity is the primary driver of geologic and biologic change.

The opening of the Anthropocene drives LaSES to confront the reality of human impact on the natural world at the ecosystem level: direct disturbance (e.g., land use and resource extraction) and indirect disturbance (e.g., climate change) have stressed lake ecosystems, with many experiencing—from the human perspective—an undesired change in state manifested as loss of ecosystem services.

Restoration of lost ecosystem services in a perturbed system is sometimes not possible or even desirable, entailing a reversal of existing system dynamics. Maintaining remaining ecosystem services in the Anthropocene requires a clear understanding of natural and human system vulnerabilities and the ability of those systems to balance, mitigate, or overcome residual social and ecological legacy effects. This is the mission of LaSES.

LaSES is a new facility, established in 2016 at UI's Coeur d'Alene Center by UI's Idaho Water Resources Research Institute (IWRRI). IWRRI invested \$120,000 to purchase equipment and upgrade infrastructure, including a new dock, 22' research vessel, and various field and lab equipment needed to convert an existing multi-purpose laboratory to a world-class lake research facility. Building on decades of lake research mobilized from the UI-Moscow main campus 80 miles to the south, LaSES places lake scientists where they can operate at maximum advantage and efficiency – on and by north Idaho's lakes.

LaSES currently collaborates in research with scientists from the Coeur d'Alene Tribe (CDAT), North Idaho College (NIC), and Idaho Department of Environmental Quality (IDEQ), and is expanding its research collaborations to include the U.S. Environmental Protection Agency (EPA), Idaho Department of Fish and Game (IDFG) and the Kalispel Tribe. Lakes within the LaSES northern Idaho research area include: Coeur d'Alene Lake, the physical and spiritual heart of the Coeur d'Alene Tribe, with its 75 million tonne trace metal benthic burden; Lake Pend Oreille, the nation's fifth deepest lake, critical habitat for bull trout, and home to the U.S. Navy's acoustic research submarine base; Priest Lake, Idaho's crown jewel; and numerous smaller lakes (Hayden, Fernan, Twin, Spirit, Hauser) with high recreational value and vulnerability to harmful algae blooms (HABs).

LaSES's location presents unique research opportunities into Anthropocene epoch lake processes, their place within a framework of traditional indigenous knowledge, and how lake processes may respond to management prescriptions. Current research priorities include:



LaSES research vessel and dock

Legacy contaminants: A century of lead, cadmium, arsenic and zinc contamination of Coeur d'Alene Lake has degraded or destroyed many of the lake's native ecosystem services and perturbed lake ecosystem processes. High concentrations of dissolved Zn are entering the lake with discharge from the Coeur d'Alene River, suppressing high accrual of phytoplankton biomass through a toxicological effect that masks the presence of nutrients (nitrogen - N, and phosphorus - P) concurrently entering the lake. The absence of high phytoplankton biomass in surface waters (epilimnion) is mirrored by high oxygen concentrations in the lake's bottom waters (hypolimnion) because oxygen demand driven by biomass decomposition in the hypolimnion is low. Reductions of dissolved metals, especially Zn, through Superfund remediation of upstream sources, could allow the phytoplankton community to reach its full growth potential given available nutrients. This could transition the lake towards a more phytoplankton rich, i.e., meso/eutrophic state. The subsequent decomposition of high phytoplankton biomass is expected to reduce water column oxygen concentrations, allowing the stored legacy heavy metals to mobilize in aqueous ionic form, presenting a hazard to the ecosystem,

LaSES,
CONTINUED, PAGE 4

SCA Board of Directors Meets at Priest Lake for a Facilitated Board Retreat, September 8-9, 2017

With so many new board members starting terms in 2017, it became clear that having a facilitated retreat would be helpful in reviewing not only where we've been as an organization, but how best to set a course for more success in the years to come. Cheryl sweet-talked her dear friend and former business advisor to come visit Priest Lake as the retreat facilitator, expecting the lake and mountains to shine in all their normal glory. Unfortunately, just as Phil Casciotti (pronounced ka-shot-tea, like biscotti) arrived in Nordman, the smoke worsened to the point one could hardly tell there was a lake, much less the stunning crest of the Selkirk Mountains...

We started the smoke filled retreat at John and Christine Abelson's beautiful

home near Beaver Creek, and finished at Cheryl's not so beautiful home (a work in progress) on the northwest side of the narrows.

Happily, the smoke finally lifted as we fixed lunch on the 2nd day – and Phil was finally able to see the lake and mountains we'd been talking about. Phil assures me he'll be back for another visit, but meanwhile the board has a long list of "to dos" and is infused



SCA board members at the 2017 working retreat.

with a much higher level of energy. Don't be surprised if you hear directly from a board member soon!

LaSES, CONTINUED FROM PAGE 3

human health, and the social systems dependent on the lake.

Harmful Algae Blooms: HABs are increasing in number, frequency, and duration worldwide. HABs are present to some extent in most lakes within the LaSES study area, diminishing the value of the region's primary economic engine, lake-based ecosystem services. LaSES researchers have intensively studied one small northern Idaho lake – Fernan Lake – to identify the primary drivers of HABs in the lake. As part of the research, LaSES has established a high-fidelity lake ecosystem model for several area lakes to model how changes in runoff nutrient loads could affect HABs.

Phosphorus cycling: The trophic status of lakes in the LaSES study area is at a critical point due to increased phosphorus (P) loading. To prevent eutrophication, phosphorus must be managed properly. Recent evidence suggests that soluble reactive phosphorus loading from undisturbed forested ecosystems in the Coeur d'Alene basin has been

steadily increasing for the past twenty years after normalizing for identifiable anthropogenic sources. Soil sampling in two LaSES watersheds indicates total soil P varies spatially and is closely linked to dense old growth positions. Fire suppression over the last 100 years has altered natural return intervals between wildfires, decreasing the overall amount of P-sorbing biochar in forest soils. Thus, reintroducing fire to the landscape via controlled burns may reduce the P exported to the area lakes and re-emphasizes our focus epistemology: All are connected.

Dams and lake processes: Pleistocene flood outburst deposits (Glacial Lake Missoula) or human-constructed dams control all of the lake elevations in the LaSES study area. For the lakes controlled by glacial sediment dams, lake elevation and wetted area follows a hydrograph typical of a snow-melt dominated system with an extended peak elevation reflective of lake water release through coarse sediments rather than a defined stream outlet. Constructed dams, on the other hand, extend peak elevation and wetted area as an equation of dam height and dam purpose. For the dam-impounded lakes

in the study area, artificially maintained lake elevations have altered primary productivity, dissolved oxygen concentrations, benthic biogeochemistry, and myriad other lake process factors.

Environmental indicators and economic valuation: Improving or maintaining a lake's trophic status and suite of ecosystem services, typically requires change in human behavior. Such change comes with an economic or political cost, or both. As an example, LaSES researchers used existing water quality and real estate sales data to assess the impact of water quality in lakeshore residential property values, determining that poorer water quality depressed actual sale prices by an average of 13% around Coeur d'Alene Lake.

Dr. Mark Solomon is associate director of the Idaho Water Resources Research Institute at the University of Idaho. His research focuses on managing water resources in complex jurisdictional environments. He received his PhD in Water Resources from the University of Idaho in 2011. In past lives, he has been a blacksmith, a welder, a logger, an environmental activist, and a county commissioner.

Economic Impact of Water Quality and Aquatic Vegetation

BY JAMES LEA, SCA BOARD MEMBER

Most of us who have been on and around Priest Lake for several decades have noticed a significant increase in aquatic vegetation, whether algae on docks or seaweed growing from the lake bed. Standing on our docks, instead of seeing crystal clear water down to the bottom, we see weeds and algae. Kalispell Bay has been particularly hard hit. One of my neighbor's adult children said she won't even go swimming in the lake anymore because of the unsightly tangle of vegetation which she equates with water pollution. Some of this vegetation is native but some is invasive. Both eurasian milfoil and curly leaf pond weed are now present in Priest Lake¹. The Idaho Department of Agriculture has been active with an abatement program for several years utilizing both mechanical removal and herbicide.

Not only is this vegetation unsightly it sullies the reputation of Priest Lake as a pristine body of water. The economic impact of unsightly aquatic vegetation and water clarity on property values was recently described in a paper by University of Idaho researchers². This study examined lakefront properties on Lake Coeur d'Alene specifically. The presence of watermilfoil was related to a 13% reduction in mean property value, corresponding to \$64,255 on average. There is little doubt that these findings will extrapolate to Priest Lake.

Although this study specifically examined milfoil, I don't think any of us take into account the species of seaweed when we are looking at the lake. Either there is a lot of ugly seaweed and algae or not. That is what matters aesthetically.

The paper did not go into the causes of the aquatic vegetation problem. Longer summers, warmer water temperatures, and climate change could be factors. Those phenomena are beyond our control, but one thing we all can do is deprive the vegetation of nutrients.

The limiting factor for aquatic vegetation growth is phosphorus, much of it available as PO₄. Phosphate can be found in soap and fertilizers. So it goes without saying that we should not wash our boats, dogs, or selves in the lake.

Likewise boaters should dump their gray water (soapy water from sinks) into a holding tank. Actually it is not only wrong to dump gray water, it is illegal. Since most boats do not have gray water holding tanks, the soapy water could be dumped into the marine toilet which goes to the blackwater tank for pump out.

The one use I can think of for paper plates is to avoid the need for washing dishes on a boat. Instead of washing your hands in soap and water, use Purel. Fertilizers should not be used on lakeshore yards. If you want green grass, you're going to get green water.



Eurasian milfoil likes phosphorus, commonly found in soap and fertilizers.

For those of us on or near Kalispell Bay we need to understand that we are living above an aquifer, an underground river, that dumps 1.5 million cubic feet of water into the lake every day³. The ground water table is no more than a few feet below ground level. Anything dumped on the ground will be rapidly absorbed into the sandy soil and then be carried to the lake at an estimated 9 feet per day. If you dump soapy water or fertilizer on the ground, you are essentially dumping the stuff into the lake. Even in prime farm country with many feet of topsoil the utilization rate of fertilizer is no more than 50%. In our sandy soil with very little topsoil, the utilization rate is much less. Most of it ends up in the lake chemically unchanged.

For nearly 30 years the Citizen Volunteer Monitoring Program sponsored in part by the SCA has been obtaining data at Mosquito Bay, Kalispell Bay and other open water areas in the north and south regions of Priest Lake. It is clear that both bays have significantly increased levels of total phosphorus compared to the 1990s. The SCA hopes to be pursuing a more aggressive water quality management program to deal with these and other issues. Hopefully we can identify causes of the increased aquatic vegetation problem and ameliorate, if not reverse, the present unsightly conditions. Your ongoing financial support and volunteer hours will make such programs possible.

Citations

¹ Personal communication, Tom Woolf, Idaho State Department of Agriculture.

² Liao, Wilhelm and Solomon. The effects of ambient water quality and eurasian watermilfoil on lakefront property values in the Coeur d'Alene area of northern Idaho, USA. Sustainability, 8, 44, 2016.

³ Kevin Freeman. An evaluation of ground water nutrient loading to Priest Lake, Bonner County, Idaho. Master's Thesis University of Idaho. 1995.

Get to Know an Invasive Species: Spotted Knapweed

BY SHARON SORBY, SCA BOARD SECRETARY

Many people view spotted knapweed (*Centaurea stoebe*) as a pretty purple wildflower. It is rather, a heinous noxious weed. It grows to the preclusion of desirable vegetation that wildlife and farmers depend upon for their livelihoods and it diminishes soil and water quality.

Spotted knapweed is a short-lived perennial, about 20 years, starting its first year as a rosette. In the ensuing years, it sends up multiple branched stems with flower-heads on the end. A member of the composite family, the seed-heads are composed of discoid flowers, pink to lavender, sometimes white in color, with falsely sub-radiate corolla and those along the edge being enlarged.

Knapweed species are identified by the involucre bracts that hold the flowers. The bracts on spotted knapweed are triangular with a short fringe along the upper edges and a black or darkened tip. Seeds are large and heavy. The fringe that rings them is not designed to carry them on the wind, it serves to orient the seed and move it into the ground. Each mature plant is capable of producing in excess of 25,000 seeds that at last count, can survive 20 years in the soil.

What changes to our forest does the ubiquitous spotted knapweed bring? It readily invades into the forest along roads, slowly encroaching into the surrounding openings, even into areas with healthy native cover of grasses and forbs. It does not readily invade under a closed forest canopy as it is somewhat light limited, although it will invade under a partial canopy.

While knapweed can increase erosion and decrease wildlife forage and habitat, it does provide an alternate food source for our chickadees in the insects harbored in the knapweed seed-heads. This may be a good thing; however, is this easy food source distracting these important foragers of tree insect pest species from doing their forest protection job?

A study from Montana shows that knapweed infestations can suppress seedling establishment of Ponderosa pine (*Pinus ponderosa*) and interfere with its continued survival (Bedunah, Carpenter 1991). In considering goals to restore our forest tree species composition to historical levels, knapweed poses a risk to success.

Although long-term and anecdotal observations of wildlife and habitat degradation abound in the soft or gray literature of managers' field notes and agency reports, such damage is sparsely documented by quantitative studies (Blossey 2000). Some of the wildlife studies that have been conducted well illustrate the damage so long observed. In Montana, Celestine Duncan's (1997) work shows that spotted knapweed invasions reduce available elk winter forage between 50-90%.

All weeds can cause problems for the native

Tips for Removing Spotted Knapweed

1. Wear gloves as the plant is believed to have allelopathic compounds thought to be carcinogenic in large quantities.
2. Handpulling or digging with a spade works in less dense areas.
3. Repeated spot burning by trained individuals will likely be most effective and efficient.
4. Please don't use toxic herbicides near our shorelines. Our soils are typically very porous and these will quickly migrate into our waters.

www.invasive.org/gist/moredocs/cenmac02.pdf

plant communities, even jeopardizing rare and endangered plant species. In Glacier National Park, a spotted knapweed invasion was documented to have caused six native plants to be classified as rare and extirpated seven species previously designated as rare. Weeds pose the risk of permanently altering the native plant communities of Wilderness Areas.

The soil ecosphere, an incredibly diverse web of microscopic organisms in relationship with nutrients, plant roots, macro-arthropods and inorganic soil components engaged in incredibly complex nutrient and energy exchanges, provides the basis of life on our planet.

Beneficial soil microbes create soil structure and pore spaces allowing for water and air infiltration and plant root penetration as well as perform significant services by breaking down organic pollutants, binding heavy metals into immobile forms, endlessly recycling nutrients, converting them to bioavailable forms for root up-take, and competing with and parasitizing pests and diseases that attack plants. Physical soil disturbances can disrupt these processes



Centaurea stoebe – spotted knapweed

and services as well as outright kill the macroscopic beneficial organisms.

Mycorrhizal fungi, including both ectomycorrhizae and endomycorrhizae fungus or vesicular-arbuscular mycorrhizae (VAM), colonize roots increasing their efficiency at absorbing nutrients and water, as well as provide protection from root rot fungi and root-feeding nematodes. Trees and shrubs planted or sprouted into soil lacking in one of these organisms will fail to thrive and often eventually die.

How does spotted knapweed effect change in the soil ecosystem? If you compare equal sized samples of any local bunchgrass with its root structure, to a spotted knapweed with its root structure, you can see that the root habitat for the organisms of the soil ecosystem offered by the grass is a much greater mass than that offered by the spotted knapweed. A decrease in habitat decreases the number of organisms that the same amount of soil can support. The health of the soil, in structure and life forms, changes, becoming diminished.

Two studies from Montana show us more detailed changes to the soil structure and foodweb interactions. Marilyn Marler (1999) conducted studies to show the relationship of the VAM as-

sociated with grass roots in areas invaded by spotted knapweed and the VAM associated with its roots. What she found was that the VAM of the spotted knapweed intermingled with the grass VAM and actively stole carbon from the grass community, giving the advantage to the spotted knapweed in greater vigor and plant biomass.

What changes does a spotted knapweed infestation bring to water quality and quantity? Dr. Lacey (1989) performed an experiment comparing water run-off from an uninfested bunchgrass covered area and an equal area covered with spotted knapweed. The knapweed infested area produced 56% more water run-off, and 120% more sediment loss. This change leads to higher spring run-offs, resulting in greater stream sedimentation, which



reduces water quality and fish habitat. The early high run-off also reduces water retention within the plant community, lowering summer water flows. Lastly, spotted knapweed infestations do not provide a significant vegetative canopy over the soil that native grasses and forbs do, causing reduced moisture retention by exposing the soil between plants to increased evaporation.

Placing a value judgement on these changes is a human trait, but as I referred to spotted knapweed as a "heinous" noxious weed from the start, I've tipped my hand in that debate.



SCA newest board member James Bellatty is an avid rower and can often be found fishing the shores of the Upper Lake.

The SCA Welcomes New Board Member James Bellatty

You never know what will happen when you strike up a conversation with someone at Upper Priest. SCA board member Mark Kabush used the opportunity to recruit a new member to the SCA, James Bellatty.

James is recently retired from the Washington Department of Ecology. He has also worked for IDEQ. After learning about his background with water quality, we convinced him to start on the SCA board effective January 1, 2018. Naively, he then joined the September board retreat where he was promptly elected (or was it coerced?) to take over as the Chairman of the Board in 2018. James is a resident of Spokane, but also spends a fair bit of time in the Palouse.

Welcome James -- SCA needs you and we're not afraid to admit it!

Evolution Today: Priest Lake Eyewitness to Kokanee Salmon Spawning Changes

BY FRANK HUNGATE, LONG TERM SCA MEMBER & SUPPORTER

I first came to Priest Lake in 1918 as a baby so I have seen many changes. I would like to describe one change I've seen and my interpretation of it.

My father Joseph Hungate enjoyed fishing for the Kokanee as well as fly fishing for cutthroat trout. In the 1930s, he taught biology at Cheney Normal School (now Eastern Washington University). We spent his month of vacation at our place at Canoe Point, initially in tents, then in a log cabin which we built in 1924.

We often heard the year-round locals describe the spawning run of whitefish in October but school and work commitments in Cheney prevented our observing it. I especially recall the comment about a run in the 1940s with so many fish that were so thick the Davenport Hotel in Spokane sent a truck to Lion Head Creek at the north end of the lake to dip a load for their own use.

With memories of those fish-run stories in mind, when I moved to Richland in 1952 to participate in studies of the biological effects of radiation, my wife and I scheduled a weekend in October to come to the lake. We did see the run at Lion Head. The creek bottom was black with whitefish running upstream to spawn. They were so thick that I caught one with my bare hands—truly a spectacular.

We did not stay in our unwinterized cabin but instead rented a cabin at Steven's by Granite Creek. One of those October evenings near Granite Creek, my wife Mollie and I were enjoying an evening stroll along the planks at the boat docks and observed a pair of Kokanee spawning in the shallows. At the time, I told Mollie, "What a shame," as I knew that in a very short time the lake water level was to be lowered, leaving those eggs high and dry.

Some years later, I learned that fishing for Kokanee had been closed as there were so few in the lake. And recently I was pleased to learn that there are now enough Kokanee to resume fishing.

My interpretation of this sequence is that not all individual fish spawned at the same time. The eggs that spawned after the lake lowered survived and those genes—the genes that led to late spawning—passed on to their progeny so that more and more fish reproduced. This evolutionary progress gradually led to increased numbers permitting the reopening of fishing rights.

I have also seen evolutionary progress in my lifetime with the Canadian goose. In the early 1900s I never saw a Canadian goose near a town. The geese would stop to eat on their migratory flights in wheat fields or sites remote from people. Canadian geese now commonly use lawns as migratory stopping places, so much so these days that many of us consider their droppings to be reason enough to banish them.

Since the Kokanee and Canadian goose behavior has adapted to man-made changes—the artificial lowering of lake levels, and diminishing open spaces... maybe the next evolutionary challenge will be for humans as we, too, are evolving but cannot observe it because of the very nature of evolution. Happy fishing!

Water Quality Data Analysis for Three Sites Around Priest Lake

BY JAMES LEA,
SCA BOARD MEMBER.

*BASED ON DATA PROVIDED BY
BOB STEED*

Based on the historical data provided there were only three sites where data have been consistently obtained over the last 25+ years. These are KALI (Kallispell Bay), MOSQ (Mosquito Bay), and PLNO (Priest Lake North). I analyzed only Total Phosphorus (TP) since at first glance it does not appear that other values have changed much. Prior to 2010 TP values of less than 6 were not reliable since 6 was the practical quantitative limit. For this reason all values less than 6 were considered to be 6 for purposes of calculation.

Parametric statistics are not useful for analysis of total phosphorus since the distribution of values is not normally distributed.

For KALI, the average value of TP, taking into account the limitations mentioned above, was 6.2 prior to 2000. For values of TP obtained on 2010 and thereafter the average was 11.4. There were 1/15 values less than 6.2. The probability of this occurring by chance is 0.00049.

For MOSQ, the average TP prior to 2000 was 6.1. Since 2010 the average was 9.6 with 16 measurement, 2/16 less than 6.1. The probability of this occurring by chance is 0.008.

For PLNO, the average TP prior to 2000 was 6.6. Since 2010 the average was 11.2 with 15 measurements, 3/15 less than 6.6. The probability of this occurring by chance is 0.11.

Freshwater Jelly Fish Sighting (*Craspedacusta sowerbyi*)

BY CHERYL MOODY, SCA EXECUTIVE DIRECTOR

This hydromedusa, which is most readily observed when it takes the form of a small, bell-shaped jellyfish, was observed by several Celebasin 2017 guests along their shoreline in Shoshone Bay of Priest Lake this past summer. Thomas Herron, another Celebasin guest and the regional water quality manager for IDEQ, quickly confirmed they are quite common now in sewage lagoons and other ponds across north Idaho, and migrate as a wind born spore-type body known as a microscopic podocysts.

Never having heard of such a thing before, it seemed time to see what one could gleam off the internet and other sources. Here's what I learned:

First, they are not considered dangerous to humans though there are some references to people claiming to be stung by them, so best not to pick them up for a closer look. Although their stings can paralyze macroinvertebrates

and small fish, the small nematocysts these creatures possess are not likely to penetrate human skin (Peard, 2002). The Indiana Department of Natural Resources indicate they are about the size of a quarter and can look like small floating bags when fully grown, but according to the USGS, they can range from 5-25mm in diameter. When they surface in large numbers they are referred to as a bloom, just like algae. They prefer calm freshwater lakes, ponds, and reservoirs. They are most likely to be sighted during August and September when the water is warmest and zooplankton populations are at their peaks.

Originally from China, their common name there is the peach blossom fish. The number of tentacles can vary from 50 to 500 (Pennak, 1989). The readily visible form are only produced sporadically, and there may be several years between blooms (Peard, 2002). Blooms are most likely to occur when

water temperatures are at least 25 degrees Celsius (77 degrees F.) according to several studies. The SCA recorded multiple water temperatures near 24 degrees C. in our nearshore water quality monitoring sites this past summer, so the shoreline sightings of these creatures appear consistent with these prior scientific observations and studies.

Citations:

Peard, T. 2002. Freshwater Jellyfish! Indiana University of Pennsylvania, Indiana, PA. 25 pp. <http://www.jellyfish.iup.edu/>

Pennak, R.W. 1989. Coelentera. In: Fresh-water Invertebrates of the United States: Protozoa to Mollusca, 3rd edition. John Wiley & Sons, New York, pp. 110-127.

To Learn More Visit the USGS website at nas.er.usgs.gov/queries/FactSheet.aspx?SpeciesID=1068

SCA Awarded \$5,000 Grant from Patagonia for Selkirk Mountain Caribou Support Work

All systems appear to be go for the maternal pen project we told you about last spring. While we've been actively collecting lichens needed to transition the captive caribou to a zoo feed, Patagonia has stepped up to provide the funds needed (\$5,000) to buy the pelleted food ration.

Further, another long term supporting foundation of the SCA, the Fanwood Foundation, provided \$1,000 in additional funding in support of our caribou work. These funds will be used to pay for the shipping of the feed to the pen site and support additional lichen collection work by the SCA. We hope to share more about the Fanwood Foundation in the Spring 2018 *SightLines*.

To learn more about the overall status of the maternal pen project and our small herd, please see this comprehensive Facebook posting:

facebook.com/notes/save-the-last-mountain-caribou-from-extinction/its-a-big-year-ahead-for-saving-the-last-mountain-caribou-from-extinction/1969403626674098/.

Finally, to learn more about all the great work that Patagonia does across the world – please visit their website and be sure to leave them a comment thanking them for supporting the SCA.

Boeing Corporation becomes an SCA Corporate Match Partner

Special thanks to SCA member John Hungate for nominating the SCA to be one of Boeing's corporate match partners. Not only does Boeing match their employee's cash donations to the SCA, they also provide cash compensation for their logged volunteer efforts. Further, Boeing's program extends to retirees from Boeing, not just active employees!

Do you work for a corporation that matches your contribution?

Please contact us at sca@scawild.org if we can provide information to get us set up with your employer's match program.

Priest Lake Water Quality Data, Past and Present

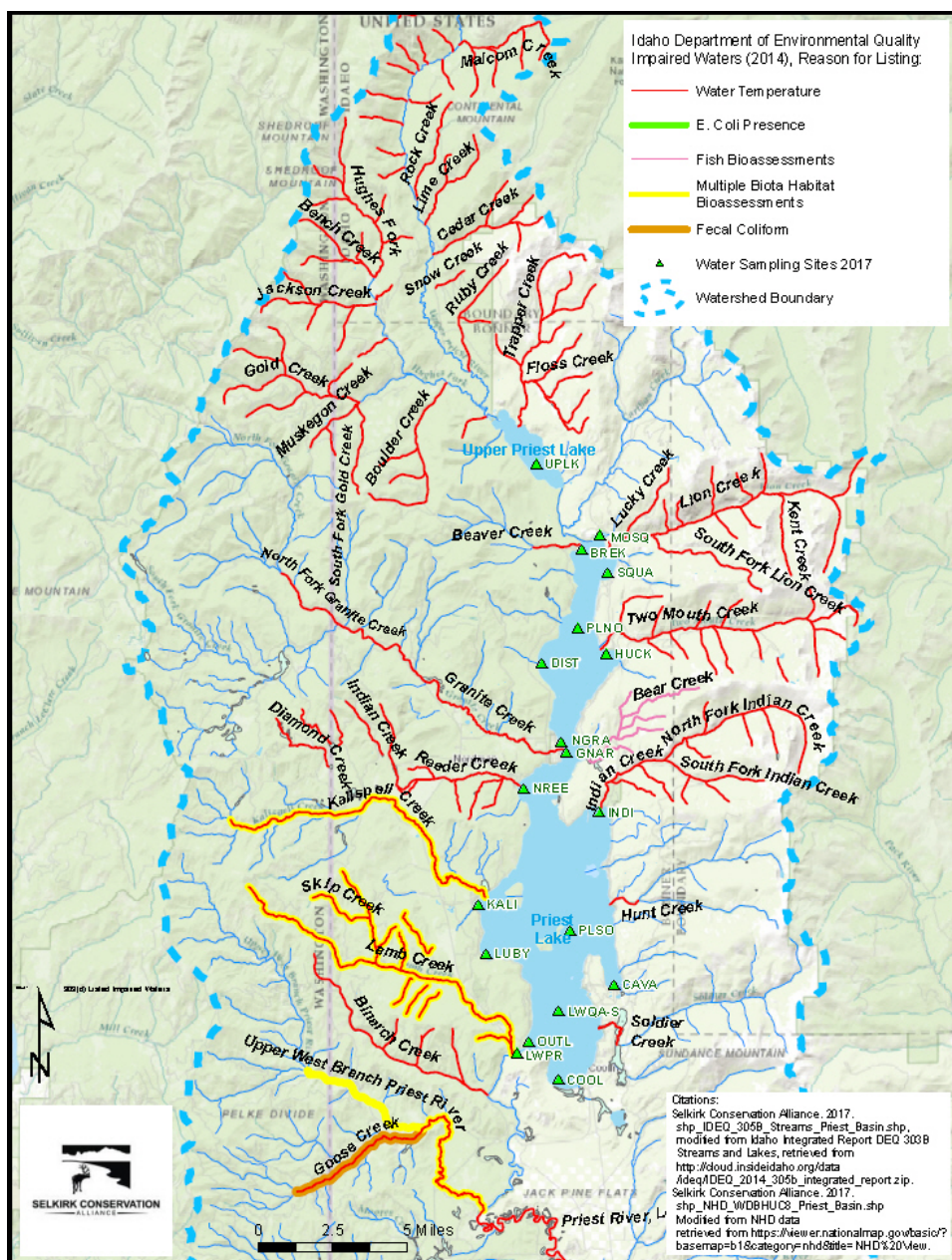
BY CHERYL MOODY, SCA EXECUTIVE DIRECTOR

First off, a few disclaimers:

- 1) I am not a limnologist, nor have I ever played one on TV.
- 2) Chemistry remains my nemesis – so if your take on these data is different than mine, follow your gut or the intel from a limnologist or water quality scientist near you!

You've been duly warned. That said, armed with a few borrowed text books, the internet, some GIS layers, and a nearly complete audit of all the past and present (though September, 2017) data – here's what I think we know...

Figure 1: SCA Water Sampling Site Location Map with IDEQ Impaired Waters Listings.



FINDING NO. 1: PRIEST LAKE HAS BEEN MONITORED HAPHAZARDLY SINCE THE EARLY 1990s

Water quality data has been collected by state scientists and volunteer groups like the SCA since 1993 (and in a few spots perhaps since 1988). In the early 1990s, each site was typically sampled over at least a 6-month time period (typically May-October). We are still searching for the original analytical data from many of these studies, and in many cases have not yet obtained copies of them.

Therefore, we are currently confined to comparing the seasonal averages (May-July, Aug-Oct) compiled in the 1997 Phase I Diagnostic Analysis Report¹ to current conditions (spring through Sept 2017).

Table 1 shows the sites sampled and the years where we believe data has either been located or is expected based on notes or lab forms found in our files or at IDEQ. You'll note there are 19-21 sites, depending on whether or not two sites have been renamed over the course of these studies. Within each year, the number shown is our current understanding of the number of months data were collected. Any data type counts, with often one or more of the following data types being available for any given month: Secchi disk measurements, analytical samples collected, and/or temperature and dissolved oxygen profiles completed.

Since the first well published studies were done in the early 90s, there have been ~19 water quality sampling sites established around the lake (Figure 1). During the summer of 2017, we have

Did you know...

You can view this figure, and the entire *SightLines* issue, in full color by logging in to the Members Only section of the SCA website.

Contact sca@scawild.org if you need login help or have access questions.

Members Only scawild.org

TABLE 1: SAMPLING EVENTS BY YEAR, PRIEST LAKE WATER QUALITY MONITORING PROGRAMS

SITE NAME	1993	1994	1995	2008	2010	2011	2012	2013	2014	2015	2016	2017
BREK			4									6
CAVA	6			4							2	6
COOL	6			4								6
DIST	6											
GNAR	5		6	4								6
HUCK	6	6	6	4							2	6
INDI	6											6
KALI	6	6	6	1	6	5	4	3	2	1	3	6
LUBY												5
LWPR		6	6									
LWQA-S										1	3	6
MOSQ		6		2	6	5	5	3	2	1	4	6
NGRA (or GRAN)	5											
NREE (or PLMD)	5											
OUTL	6			4								6
PLNO	6	6	6	4	6	5	4	3	5	5	4	6
PLSO	6	6	6						5	5	4	6
SQUA	6											6
UPLK	6	6	6								3	6

or will collect a complete set of analytical data at: 13 of the original sites, 1 site established in 2015 in support of the cold water return/siphon study, and 1 new site (Luby Bay). Next summer, if funding allows, we will endeavor to collect a complete set of samples at the 4-6 remaining historical sites, as well as any of the other sites which are showing any significant signs of degradation (unless we adopt a different sampling protocol for these areas, which is also a possibility). Moving forward, it is extremely unlikely we will have the funds or manpower to sample all 19-21 sites annually, unless the state, county, or local residents start contributing substantially more financial resources and manpower.

It is important to note that unfortunately, the type of samples and analyses run have varied from year to year even when data sets are more complete (like KALI, MOSQ, and PLNO). Perhaps limnologists routinely work this way, but wetland scientists (like myself) consistently collect the same data at each site sampled – it's part of the approved regulatory process. So, personally, I find this disconcerting and don't know if the sporadic samples should simply be ignored or incorporated into each site's analysis. Stay tuned for what we hope will be updates on this and other issues by University of Idaho Limnologists and students.

FINDING NO. 2: PRIEST LAKE'S WATER CLARITY HAS, FOR THE MOST PART, IMPROVED OR STAYED STABLE MAY-JULY, BUT HAS DEGRADED AUG-OCT

One of the primary recommendations in the approved Priest Lake Management Plan was that developed shoreline properties (cabins, campgrounds, etc.) should be put on a sewer system with water treatment plants, etc. As many of you know, this happened in the late 1990s, though many of the USFS campgrounds have apparently not yet been connected to the systems. Not surprisingly, it appears that water clarity at many of the established sites has improved since the sewer system was developed.

Water clarity has only decreased slightly in the spring off one of the USFS campgrounds (Outlet Bay). However, once the busy recreational season got underway, water clarity decreased at all of the sites with historic data except for Mosquito Bay. Water clarity is measured by means of a Secchi Disk, a device which is lowered into the water until it can no longer be seen. Results in Table 2 are those recorded without the use of a view tube, something that is used in modern limnological studies, but was not available at the time the original studies were completed in the early 1990s.

It is important to note that weather, glare, and wave action can affect Secchi disk readings when a view tube is not used. Historically, limnologists made detailed weather observations along with the conditions of the water at the time of observation. Now, we routinely record Secchi disk readings both with and without a view tube. The tube mostly eliminates glare, weather challenges, and wave action discrepancies from the observations. That said, the data collected without the tube are the only comparative data we have to work with at this time.

Table 2 shows that most of the May-July sampling sites have improved visual clarity since the sewer systems were installed. Where improvement occurred, the average increase in clarity is 1 meter (range from 0.4 meters to 2.0 meters). Since both Cavanaugh Bay and Outlet Bay bucked the general trend of improvement (staying the same or decreasing in clarity). These are two bays which should likely be further evaluated for sources of sediment, and other water quality parameters which impact water clarity. It's possible that the other bays showing smaller increases in spring clarity should also be watched. However, nearly all the sites showed degradation during the August-October season. Adverse changes in clarity ranged from .5M to 1.6M. While this is discouraging, it's important to remember that these numbers are still very good when compared to many lakes in the U.S.

WATER QUALITY DATA,

CONTINUED FROM PAGE 11

Of particular interest, however, is that spring water clarity in Kalispell Bay improved the most of all the bays and degraded minimally in the fall, yet this is the bay that we hear continuous complaints from members that aquatic plant growth is affecting their ability to swim and enjoy their beaches. This too is an important finding, in that it tells us that Secchi disk readings alone will not provide an adequate baseline to monitor water quality at Priest Lake moving forward.

FINDING NO. 3: HISTORIC & CURRENT TOTAL NITROGEN/TOTAL PHOSPHORUS RATIOS

While data on Total Phosphorus (TP) or Total Nitrogen (TN) are of interest to limnologists, it appears that the

ratio between the two is now considered a better indicator of overall water quality/lake health than one or the other (Downing & McCauley, 1992). The ratio can also provide information on whether or not P or N is the limiting nutrient in a lake. Unfortunately, many of the sites where we have good TP data historically have no TN data (or vice versa). This is why our Board of Directors voted to continue to complete the data set through October of this year, so we have a complete data set for comparison moving forward.

TN:TP is typically high in oligotrophic lakes (like Priest) and lower in eutrophic lakes, declining as TP increases. The ratio is high in oligotrophic lakes because they typically receive their N and P from natural, undisturbed watersheds which characteristically export less P than N. However, as development increases around the tributaries which feed into Priest Lake, these inputs could presumably change.

TABLE 2: CHANGES TO WATER CLARITY SINCE PRIEST LAKE MANAGEMENT PLAN STUDIES

SITE NAME Only Includes sites sampled at least one season from 1993-1995 and again in 2017)	Secchi May-July Average 1993-1995	Secchi May-July Average 2017	Spring Change From Past to Present (22-24 years)	Secchi Aug-Oct Average 1993-1995	Secchi Aug-Oct Average 2017	Fall Change Past to Present (22-24 years)
BREK	6.1	5.3	Degraded	5.1	N/A	N/A
CAVA	7.6	7.6	No Change	11.9	10.8	Degraded
COOL	7.7	8.2	Improved	N/A (~10 in 2008)	8.5	Degraded Since 2008
GNAR	7.2	8.0	Improved	11.3	9.7	Degraded
HUCK	7.9	8.3	Improved	11.6	10.6	Degraded
INDI	7.6	8.8	Improved	12.1	11.0	Degraded
KALI	7.3	9.3	Improved	11.9	11.3	Degraded
MOSQ	6.3	8.2	Improved	9.3	9.8	Improved
OUTL	7.9	7.8	Degraded ²	N/A	7.5	N/A
PLNO	7.3	8.2	Improved	11.5	10.7	Degraded
PLSO	8.3	9.8	Improved	12.2	11.3	Degraded
SQUA	6.8	7.2	Improved	N/A	10.8	N/A
UPLK	5.5	6.3	Improved	9.6	8.3	Degraded

TABLE 3: Historical vs. Present TN:TP Ratios for 10 PL Water Quality Monitoring Stations

SITE NAME (Only includes historic sites where TN/TP Ratios Available)	Historical Range from 199-2002, Current = 2017	MAY	JUNE	JULY	AUG	SEPT	OCT
BREK	Historical	43	19	11	N/A	N/A	N/A
	Current	43	28	32	20	24	31
COOL	Historical	11	10	30	18	14	21
	Current	51	26	11	14	16	20
GNAR	Historical	30	N/A	13	28	69	22
	Current	41	33	37	21	8	36.3CMo1
HUCK	Historical	32	19	16	43	12	20
	Current	41	25	22	16	22	31.5CMo2
KALI	Historical	44	15	29	29	16	18
	Current	45	37	14	10	8	25
MOSQ	Historical	61	23	36	17	23	18
	Current	44	28	31	31	28	33CMo3
OUTL	Historical	3	17	6	6	8	9
	Current	19	21	28	20	16	34
PLNO	Historical	50	25	19	28	31	28
	Current	Pending	31	41	19	8	33CMo4
PLSO	Historical	26	23	16	36	15	24
	Current	31	42	11	17	10	18
UPLK	Historical	35	43	31	26	25	29
	Current	55	34	56	19	23	37CMo5

Therefore, as changes to this ratio are observed, when lowered, they could indicate adverse changes in the water quality of the streams which feed into Priest Lake. If I'm understanding the literature correctly, higher ratios numbers are associated with fewer water quality challenges. For example, runoff from an unfertilized field could support TN:TP ratios as high as 247. Naturally forested areas support ratios in the low 70s, while export from rural areas and croplands is typically in the low 60s. Precipitation typically ranges in the 23-28 range. Raw sewage, fertilizers, and septic tank effluent range from 2.8 to 10 (Downing & McCauley, 1992).

So, per Table 3, we are mostly seeing upward trending numbers, which presumably then mean that overall water quality is improving in many bays. However, we do see some downward trends (shaded for your convenience). Most of these are in July - September, and may also be those areas where we are also seeing significant aquatic plant growth. Coincidence? Well, the same paper(Downing & McCauley, 1992) also provides the TN:TP ratios of several aquatic organisms and the TN:TP ratios expected during algae blooms. For example, Cyanobacteria (in bloom) has a TN:TP ratio of 16.3. Macrophytes in an oligotrophic lake typically support a TN:TP ratio of 13.6. Algae in general has a TN:TP ratio of 10. Presumably, the closer your water ratio mimics these numbers, the happier these plants would be – but again, expert analysis is needed.

Further, if I'm understanding these data correctly, scientists do see a correlation between water TN:TP ratios and aquatic organism growth. The paper also emphasizes that studies where N was increased as part of experiments typically resulted in algal blooms. So, at the very least it will behoove us to identify any sources of N in these affected waters and mitigate them before they trigger additional aquatic growth or algal blooms. While in some years degradation of water quality in late summer could be attributed to rains, we certainly can't blame our decreased August-October readings on that factor in 2017.

While these data are potentially helpful in understanding the aquatic vegetation changes some Priest Lake residents are noting, other factors, like Chlorophyll A and phytoplankton production will also be important to consider when predicting if blooms are likely to occur, etc. While we had been under the impression that IDEQ was evaluating our water quality data as it is reported from the labs, we now understand that they are too short-staffed to even look at our data until the following winter (or later). This means that local residents will need to pressure our elected officials to better fund IDEQ, or we have to develop the capability in-house to do this modeling ourselves. We're anticipating the later is the more likely pathway to success, but this too will require significantly more funding, volunteer hours, and dedicated SCA staff.

FINDING NO. 4: OUR BIGGEST BATTLE MAY BE KEEPING THE LAKE'S TEMPERATURE STABLE

Temperature impacts both the chemical and biological

characteristics of surface water. It affects the dissolved oxygen level in the water, photosynthesis of aquatic plants, metabolic rates of aquatic organisms, and the sensitivity of these organisms to pollution, parasites and disease.

cotf.edu/ete/modules/waterq3/WQassess4h.html

Water temperature is one of the most important characteristics of an aquatic system, affecting:

- Dissolved oxygen levels. The solubility of oxygen decreases as water temperature increases.
- Chemical processes. Temperature affects the solubility and reaction rates of chemicals. In general, the rate of chemical reactions increases with increasing water temperature.
- Biological processes. Temperature affects metabolism, growth, and reproduction.
- Species composition of the aquatic ecosystem. Many aquatic species can survive only within a limited temperature range.
- Water density and stratification. Water is most dense at 4°C. Differences in water temperature and density between layers of water in a lake leads to stratification and seasonal turnover.
- Environmental cues for life-history stages. Changes in water temperature may act as a signal for aquatic insects to emerge or for fish to spawn.

www.ramp-alberta.org/river/water+sediment+quality/chemical/temperature+and+dissolved+oxygen.aspx

Water temperature can be affected by many ambient conditions. These elements include sunlight/solar radiation, heat transfer from the atmosphere, stream confluence and turbidity.

Shallow and surface waters are more easily influenced by these factors than deep water.

www.fondriest.com/environmental-measurements/.../water-quality/water-temperature/

Many of you who own property around Priest Lake have or will receive letters from the SCA soliciting funding for our water program. These letters were prompted after rumors of impaired water listings for streams around Priest Lake reached our ears. Further, members who live along the river have observed steady declines in their water quality year to year.

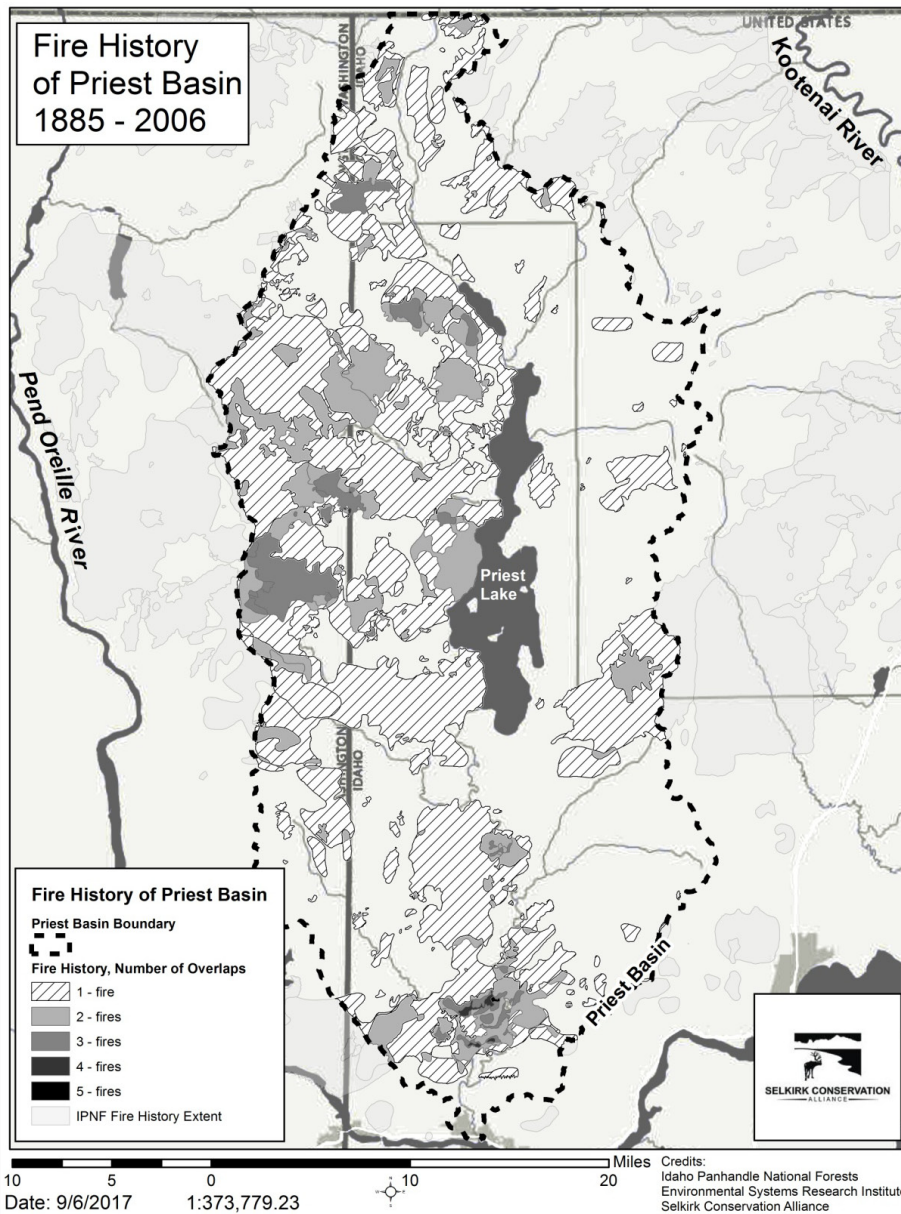
Luckily, with our GIS team already at work, Paul Sieracki was able to download the applicable data and provide a map that showed exactly that – a high number of streams flowing into Priest Lake are now listed as temperature impaired (Figure 1) as well as most reaches of Priest River. This means that water in these streams exceeds the expected temperature required to maintain their native aquatic species. It also means that warmer water is now

WATER QUALITY DATA, CONTINUED FROM PAGE 13

routinely flowing into Priest Lake. While your first reaction might be one of joy (imagining an expanded swimming and boating season), the reality is these increases are likely already influencing the rapid expansion of aquatic growth around the shorelines and may eventually lead to water quality degradation.

Figure 1 is a copy of the map that was sent to many shoreline property owners. While climate change is arguably one reason streams are warmer coming into Priest, we would expect all the streams to be impacted if that were the only reason. While it's likely that all our streams are warming, it's also probable that those that have also seen significant decreases in vegetative cover/shading have warmed faster, achieving their impaired status. But, how will we know?

FIGURE 2: FIRE HISTORY OF THE PRIEST BASIN 1885-2006



Well, we should be able to use our historical water temperature data collected at sites where local streams converge with the lake, IDEQ temperature log data where available, and other historic studies. We'll also likely need to gauge and add additional data loggers in streams that IDEQ is not currently observing. Perhaps we will find that the bays fed by temperature impaired streams are warming faster than the bays without impaired streams. Even so, a recent climate change study reports that high alpine lake temperatures in the Rocky Mountains are expected to rise almost .5 degrees C. per decade through the 2080s (Roberts, et al 2017). Further, the study reports that ice free days may increase almost 6 days/decade during this same period. These changes also have the potential to adversely affect our water quality.

Moving forward, we'll continue to refine our GIS layers and look at historical stand/vegetation cover vs. current conditions. Shading is hugely important to maintaining

stream temperatures, so as stream reaches with insufficient cover are identified we can pursue grants for streamside restoration projects, etc. An understanding what role fires have played in the loss of cover around our streams is also important. Figure 2, also recently completed by Paul Sieracki of our GIS team, shows this history of fires around the Priest Lake area. Forest fires can have delayed effects on the water environment beyond the loss of vegetation cover; including increased erosion from rainfall, flooding/runoff, and increased wind and solar radiation.

Where we can go to develop or support stream restoration projects will also be heavily influenced by land ownership. Developing a cooperative relationship with the federal, state, and private landowners who control the lands around the impaired reaches will be imperative. Figure 3, prepared by Tracey Morgan of our GIS team, shows the status of land ownership around Priest Lake and across our greater advocacy area.

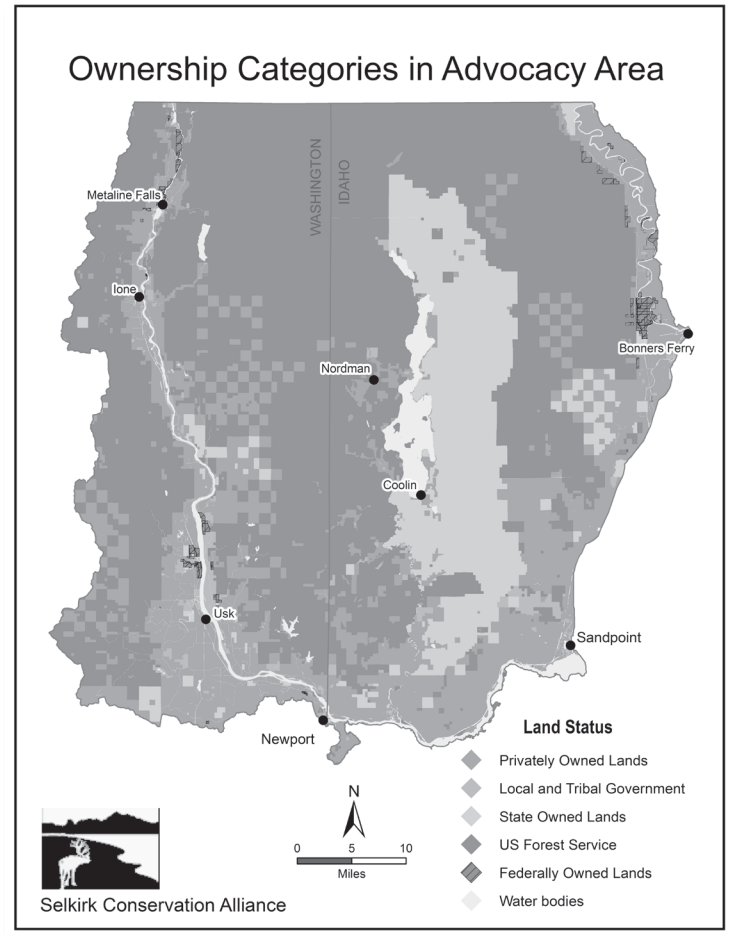
In summary I leave you with the following recommendations:

- The SCA should no longer expend manpower or financial resources on sporadic water quality monitoring programs unless they are being fully reimbursed (and have the staff time/resources to expend). For the data to be useful, Secchi readings, Temp/Dissolved Oxygen Profiles, TN, and TP are needed; while Chlorophyll-A and Phytoplankton results are also very helpful. The laboratory analysis costs for a 6 event sampling season (May-Oct) at each sample site is over \$2500, \$4,000+ when you include

labor, boat maintenance/fuel, insurance, and marina/storage fees (not including data analysis).

- Drop the deep water sites unless the agencies who asked for them are willing to pay all those costs. These sites will only tell us there is a problem, but not provide any real data as to where its originating. We are better off sampling more of the shallow water sites than the 3 deep water ones.
- Develop a 3-5 year sampling protocol which samples a percentage of each of the historical sites annually, only sampling yearly at sites where known water quality issues have or are developing. IDEQ should be paying substantially more of our costs than they are, but face budget cutbacks almost annually. Political pressure may change this, but won't happen overnight. Meanwhile, looking at other options for increasing funding for monitoring and enforcement work would be prudent.
- Invest in a faster motor for the SCA boat if more than 6 sites are to be sampled in a single-day lake-wide event. We were able to sample 7-8 sites/sample day this year by splitting the lake into north and south sites. While 1 sample day/month is easier to staff and less expensive overall, we won't be able to go from Coolin to the Upper Lake and back and hit 5 or more sites with our current equipment. Splitting the event into two days doubles our labor and lab trip expenses.
- Invest in a high quality mapping depth finder. We could be gathering important information about the bathymetry of the lake as we move from station to station. For example there is some evidence that substantial infilling has occurred in the Beaver Creek bay, and perhaps also in the Coolin Bay area. Being able to document these changes and others over time could be important to our monitoring programs.
- Once the basic GIS layers for our advocacy area have been developed, start shifting resources to stream sampling programs, and/or get a commitment in place to support undergraduate or graduate limnology and water quality programs with the University of Idaho or Washington State University. Priest Lake can provide an excellent learning laboratory for natural resource students, and they can provide us with the analysis support and extra staff depth we'll need moving forward.
- Pressure the Idaho State Legislature to fully fund the recommendations and commitments of the adopted Priest Lake Management Plan. If IDEQ funds continue to only be expended in Coeur d'Alene and its surrounding small lakes, it won't take but another decade or two before we're in crisis mode vs. preventive maintenance. The already impaired Priest River should be getting much more attention than it is, and it's time the SCA also starts applying some of its resources to solving those issues as well.

FIGURE 3: LAND OWNERSHIP IN THE SCA ADVOCACY AREA



Nearshore periphyton studies, like the pilot project SCA Board Member James Lea is running this summer in Kalispell Bay, may be less expensive and a better predictor of water quality changes than our current program. We need to be open to trying new technologies and methods when they are recommended by limnologists as the best available science for oligotrophic lakes like Priest.

(Endnotes)

¹ This report is essentially the data appendix to the adopted 1996 Priest Lake Management Plan, you can review it by logging into the members only section of our website library.

² This is not likely a statistically significant decrease considering the low number of samples and the challenge of sampling stations moving slightly with weather and wind conditions. However, of note is that this site is directly off one of the campgrounds that may not yet be connected to its local sewer system.

Citations

Downing j, McCauley E (1992). The nitrogen: phosphorus relationship in lakes. *Limnol. Oceanogr.*, 37(5) 1992. 936-945

Roberts JJ, Fausch KD, Schmidt TS, Walters DM (2017) Thermal regimes of Rocky Mountain lakes warm with climate change. *PLoS ONE* 12(7): e0179498. <https://doi.org/10.1371/journal.pone.0179498>

Teclé A, Neary D (2015) Water Quality Impacts of Forest Fires. *J Pollut Eff Cont* 3:140. doi:10.4172/2375-4397.1000140

Silicon Smelter Proposal for Newport, Washington

BY CHERYL MOODY, SCA EXECUTIVE DIRECTOR

As we go to press, the office phone lines are ringing frequently with calls from concerned citizens and members in the Newport, Washington area. HiTest Sand (out of Edmondton, Alberta, Canada) has proposed a smelter site off the Highway 41 access road to the local dump.

- 60 tons of silicon produced annually
- \$3,000 a ton current price for silicon
- 8,000 gallons of water used daily to cool and prevent dust, 300 gallons of process water to be discharged daily
- 150 workers to operate the plant, \$70,000 average annual salary for hourly workers

Ray Pierre - Pend Oreille County Economic Development Council. There are no members of the public on the executive committee.

Reportedly, in the smelting process, wood chips and "clean, metallurgical coal" are combined with high purity hard rock quartz and heated in a submerged arc furnace to a temperature of 3,000 degrees F. The coal and woodchips reportedly vaporize. The product is cooled in a closed loop system, leading to less water consumption than a similar plant in Mississippi.

There are "no heavy metals or hazardous chemicals used in the production process, nor does the process produce any," said company officials. It was reportedly said that "All materials required during the production process and consumed leave the smelter as a saleable product." Of course if this were entirely true, there would be no emissions to model nor water to discharge.

The SCA Board of Directors will meet in early December of 2017 to further discuss our involvement in this issue. Currently, the SCA has 10 members with Newport, WA mailing addresses. The extent of our involvement will likely come down to how much effort these members can personally contribute



Image from the hitestsand.com website homepage.

Most of what we know about the project comes from a Don Gronning report in *The Miner* (October 4, 2017) and the company's website:

the project consisting of a representative from the PUD, Bob Shanklin - Port of Pend Oreille, Manus - Pend Oreille County, Newport Mayor Shirley Sands, Bonner County Commissioner Jeff Connolly, a Kalispel Tribe representative, and

Travel trailer or RV at the lake, or have friends who visit you with one...?

Please encourage visitors at the lake to empty their grey water at the USFS station at the visitor's center, not empty it going down Highway 57 like this vehicle - who drove right by it pouring out grey water for miles.

Nitrates and other chemicals that wash off the roadway will someday enter our creeks and end up in the lake or the river.



2017 Arboreal Lichen Collection Still Underway

BY CHERYL MOODY, SCA EXECUTIVE DIRECTOR

Last spring *SightLines* readers learned about our program to collect arboreal lichens. These lichens will be used to transition pregnant Selkirk Mountain Caribou to a pelleted zoo feed during their first few weeks of captivity.

While we set an ambitious goal of 200 pounds of dried lichens, we're just now closing in on the 60 pound mark as of mid October 2017. At a minimum, we need to collect another 30 pounds before March, so this really is an all hands on deck call for help at this time.

How can you help?

1. Walk your neighborhoods after storms and collect the lichens which blow off the trees and land on the ground. Store these in old pillow cases or clean open lidded trash cans out of the elements until you have a substantial volume, then contact us to arrange pick up or drop off locations, or
2. Download copies of the IDL or USFS permits from our website (scawild.org/2017/04/17/come-collect-lichens-with-us/), review the stipulations carefully, and find a place in the forest near you that is authorized for collection.

Some tips for individual collection:

1. Gloves that are smooth on the palms are easier to work with than textured materials that the lichens tend to cling to,

2. If you can hang a cloth bag around your neck, waist, or shoulder to free both hands, it tends to go faster,
3. Wad the lichens up into a small ball before trying to stuff into a bag – this makes them less likely to stick to the cloth and fight going in. It also allows the compression process to start, which is helpful in storing the lichens long term,
4. If you are planning on collecting above your head, wearing safety or sun glasses will keep the fragments from getting in your eyes.

I'll be doing some additional fall collecting all fall and early winter so if you are up at the lake and want to help out, please shoot me an email at moody@scawild.org and we can rendezvous. I may even feed you some home baked goods for your efforts!



Antlers up for Selkirk Mountain Caribou Recovery!

Thank you to the following SCA Volunteers for helping with lichen collection this past summer:

Steve Booth, Heather & Ramsey Ferrie, Betty Gardner, Bridget Gies, Eleanor Hungate-Jones, Lydia & John Hungate, Jackie Siebert, Bob & Sandy Mansfield, Heidi Rogers, Paul Sieracki, Bruce & Rosemary Yocum.

The Mansfield family wins our contest for the most lichens collected this past summer by a family. They win a free family membership to the SCA in 2018!

Rescue! Crossing the Selkirks: Part II

BY JOHN ABELSON, SCA BOARD MEMBER EXTRAORDINAIRE

[Introduction from Cheryl

Moody]. *As we left John last spring he was sleepless in the Selkirks, cold, cramping, and possibly hallucinating... We know this story ends well because thankfully, John is still with us. But what of the adventure? Will they stick with the plan to drop down into Lions Head? Will they backtrack to Ball Creek or end up in Myrtle Creek? Will the satellite phone battery hold up? Will our hungry John resort to cannibalism? Read on...*

The sun went down and it was a beautiful sunset. Sarah took pictures. There was still time before it got dark which we spent talking about our recent trip to Australia and Erik's participation in the National Geographic Quiz. Then I had to get on my warmer clothes for the night. This brought on more cramps. I decided at first to wear everything on top but to take off my jeans and wear just the fleece and snow pants on the bottom, the two pairs of socks, the stocking cap and my opossum gloves.

The Hammarlunds had all lain down and so did I. I could immediately tell that the ground was a source of cold. Mary Rutherford had suggested bringing plastic garbage sacks and I had put in two. I put those down and immediately saw this was a good idea. It was 8PM and we could not begin our trip again until at least 5:30AM I would have to lie there for 9.5 hours. It grew darker but seemed an endless amount of time until 10PM. I quickly decided that leaving the jeans off was a mistake so I had to take off the snow pants and put the jeans back on, then finally the snow pants – again causing more cramps.

Finally I settled down for the routine of the endless night. All positions were uncomfortable but at the beginning I felt warm enough. I switched from my left side to on my back to the right side, being careful

not to cause cramps while switching positions. Sometimes there were cramps though. I used the pack for a pillow but most things in it now were lumpy except for the rope, so I tried to arrange the pack so my head was on the rope. As it got dark the stars began to come out. I have cataracts in my left eye and this causes all point sources of light to appear as five or six points. Before I found out about the cataracts I thought my eyesight was improving because I could see all of Jupiter's moons. Eventually I could see the Big Dipper directly in front of me to the west, pointing the way to the north star. Finally about 10PM the moon began to rise and most of the stars faded out. Then it began to get cold, but I knew it would be colder still by 2 or 3AM.

I thought a lot about starting a fire but it looked like the Hammarlunds were asleep and I didn't know what the fire rules were. We were in direct line of site to the Lookout Mountain lookout,

manned at this time of the year. Also, I imagined that moving around to find wood for the fire would have caused a lot of cramps so I just lay there. I did a lot of deep breathing exercises – in through the nose and out through the mouth to 50. My ex-wife claimed that no one could do this 50 times without falling asleep. I also did the "filled with loving kindness" mantra a lot. These things seemed to help me relax. Then, at some point I began to make lists. The longest list I made was the places I have lived, all 34 of them. This list was long and should have taken up a lot of time what with the associations and the wanderings that a list like this can bring. It seemed, however, not to take so much time and now I wonder whether this list isn't the life movie that plays back as you are drowning.

At some point I got up to pee and I got cramps not only in my legs but all over. When I lay back down I wondered (yet again) how I was ever going to make it down to Lion Creek over at least as much rough terrain as we had already come through – and with the steepness, a much more dangerous hike.

But by this time it was still only 2AM. I was very cold and it occurred to me that I needed calories to get warm. There was still the chocolate almond cake. I ate the whole thing. It was wonderful. Ellen Daniels made the cake and she is not only a member of Chris's women's group, but my first graduate student. That was in the wonderful summer of my life, 1972, when I moved into the Beach Comber apartments. We worked hard in the lab and body surfed every morning.

I thought of all things warm. In the sleigh bed in Osprey House snuggling with Chris under the down comforter. Hot showers. The hot tub. I did deep breathing and loving kindness and though I don't think I could have slept for long the hours



Sara and Eric Hammarlund doing a selfie before they were even a thing.



A rescue helicopter adapted for high-altitude flying saves the day.

between 2 and 4 seemed to go by fast. I had dream like visions of large log structures in some cases cantilevered over the cliffs below me. But by 4AM the moon went down and I just waited it out watching to the east for the faint light to appear. I opened my eyes and was surprised to see Mark doing Pilates exercises. Obviously he wasn't getting leg cramps. He kept doing them for a long time, perfect leg lifts. Later he reported that he went to sleep for the first time after he warmed up doing the exercises.

No one stirred until 5:30AM and then we all got up. I walked around for awhile and surprisingly stopped getting cramps. I was even able to put on my boots without getting cramps – significant because I had been worried in the night that I would have to get help to put them on. The sun came up – even more glorious than the sunset and as the sun came up a warm breeze appeared. The endless night was over. I ate my late Clementine for breakfast.

We started down the ridge—no alder brush up here—a natural trail and downhill at this point. I actually felt pretty good and was optimistic that I could make it down, but still with a tight

feeling in my stomach. Incipient cramps I wondered but then I realized what it was. Fear.

By now I was leaving it up to Mark to find the route down. At several points we went over the edge to get a better view of the terrain. At one point we came to a ledge above a rock slide. Though one could not have gone down from there it did look as though one could reach the rock slide from a point further north on the ridge and negotiate it from there. Mark elected to look for a safer route. Then we started back up to the ridge again and I realized I was just as tired as before. After several up and down excursions I began to think about the events of my 70th birthday to come. Friends coming to Osprey House. A family dinner in San Francisco. A geology symposium in my honor in Pasadena, a lecture in Rome at the Vatican (not part of my birthday). I wanted to do all these things.

The day before Mark had mentioned the possibility of a helicopter. I imagine a situation in which the Forest Service would be asked to rescue some hikers who had put themselves in a foolish position. A cost of \$15,000 I imagined, but now \$15,000 seemed like a pretty

good bargain. I called ahead to Mark: "I'm out of my league here Mark. Let's call a helicopter." No one disagreed. Sarah handled the phone and called her mother at home. It was about 7:30AM. Jan had worried all night about us and she had a plan. She called 911. It was still too early to call the Forest Service. Eventually she was put in touch with the Bonner County Sheriff. He was discouraging. Nothing could be done today he said. But then it was decided that we were actually in Boundary County and the Boundary County Sheriff was very helpful. The Forest Service could not send their helicopter because it was too high and the day too warm. It had to be a high altitude helicopter and the Sheriff found one in Coeur d'Alene – Panhandle Helicopters. They had to wake up the pilot and find out if he would do it.

We waited. I sat in the sun and got warm. I took off my parka. Mark scouted around for a good helicopter landing pad. It was further up the ridge and I slowly made my way up there. Mark used Chris's knife to remove the only small tree in the way making a 35' x 35' flat landing pad. We waited. Finally Sarah called again and we found that the helicopter would be able to start out in an hour. We should start looking for the helicopter at 10:45AM. Mark laid out our largest map in the middle of the landing pad and made a cross with our walking sticks. At 10:45 we got up and looked but no helicopter. Finally, in about 20 minutes we could hear the helicopter but he was flying along Lion Head Ridge several miles away. It turned out that Sarah and Mark had estimated our coordinates from a large-scale map and been wrong. I had not been able to obtain coordinates from my GPS, only directions and altitude, perhaps because it was an early version, perhaps because I didn't know how to use it.

After what seemed like an eternity he headed our way but went the wrong way on the ridge, towards Myrtle Lake. Then he turned around and started our way. I waved my shirt. Mark waved the map. We jumped in the air. We shouted (no use of course). And then it was clear that he spotted us. He sat the helicopter down. We knew to get out of

CONTINUED ON PAGE 20

Lessons Learned

MARK HAMMARLUND, SCA MEMBER & 'CROSSING THE SELKIRKS' TRIP PARTICIPANT WITH JOHN ABELSON

1. Don't be too eager to do a hike. Make certain that everyone participating really knows what they are facing. It turns out that John wasn't expecting alder brush – something Mark was shocked to learn later.
2. Don't count on a rescue helicopter specialized to fly at high altitudes in order to save the day.
3. Hike the way Seattle Mountaineers do, with a formal leader whose job it is to check every person's supplies, including extra water and food. Before leaving the vehicle, check everyone's supplies once again.
4. Be prepared to cancel the hike if members of the group came along without proper, ample supplies. It needs to be okay to step on someone's toes, even if that person is a senior emeritus professor. In John's case, he wouldn't have been offended. Disappointed? Yes. But he would have been grateful if I had spoken up.
5. Check with all members of the group throughout the hike to ascertain their physical and psychological condition. John was experiencing a lot of fear on the first morning. Sarah, Erik, and I knew nothing about his initial concerns until much later. Bushwhacking through alder on a steep slope is an activity better-suited for 30-year olds than 70-year olds.

RESCUE!

CONTINUED FROM PAGE 19

the way. Chunks of granite hit us in the back. He idled the blades but did not stop them and got out. He was a burly man in coveralls but did not say much.

Two of us could go at a time and we would go the several miles to the Bonner's Ferry airstrip and then he would return for the other two. Sarah and I went first – she in the front and I in the back. We could look down on the terrain we had walked up through the day before. The spruces were well separated and the green alder brush looked like a lawn. From this vantage we had had a stroll through a park. He skimmed the ridges and flew into the beautiful valley of the Clarks Fork River and set us down gently on the airstrip in front of the office. A young man watched us land and wanted to know what we had been doing. We were rescued, answered Sarah. Yes, I said, we started a hike that we couldn't finish. That must have been an expensive hike he said. It depends on how you look at it, I answered.

We went inside and I quickly drank two ice-cold diet Pepsis. But the feeling did not leave my stomach until the helicopter returned with Mark and Erik. Then it went away. We waited for Jan to come. We stopped at the Subway in Bonner's Ferry and had lunch. I drank another liter of cold water. No more cramps.

By 3:30 we were home. Chris was waiting. I took off my dirty clothes and did something I thought I would never do again the night before. I had a swim in the cold lake. Then we sat down for a second lunch, this time with white wine on the terrace. I had a long shower, fell into the sleigh bed and slept dreamlessly until 8PM.

It turned out the helicopter cost \$2,800. In the afternoon as predicted there was a storm. Even if we had made it down the cliff we might have been in for a bad time.

Prologue: One of the longer term projects the SCA is considering is development of a hut to hut system that enables

hikers to cross the Selkirks in at least two places, and perhaps connect to the Pacific Ridge Trail. We'll need supporters with experience in these valleys to participate in conceptual alternative design and planning. Please email us at sca@scawild.org if this is something you'd like to be involved with.

Advertising Opportunities in SightLines?

To offset increasing printing and production costs, and hopefully again be able to print your *Sightlines* newsletters in color, we are offering SCA supporting businesses the opportunity to advertise in the newsletter. While we hope to move to a digital newsletter format in the next few years, many of our long-term members prefer paper newsletters.

A business card advertisement is now available at \$35/year, a quarter page for \$75, half-page for \$150, and full page for \$300. If sufficient advertising revenue is obtained, future newsletters will be printed in color, but we cannot guarantee that so recommend submitting your copy in both color and black and white formats.

Digital submissions of advertisements should be sent via email to sca@scawild.org no later than October 1 for our fall edition and April 1 for our spring newsletter. Each ad will run for two consecutive newsletters.

We will contact you for payment upon receipt, review, and acceptance of your print copy. The SCA reserves the right to reject advertising that is not consistent with our mission or is deemed otherwise inappropriate by our Board of Directors.

MEMBER CORNER

Meet the Ferries!

HEATHER FERRIE, SCA MEMBER & VOLUNTEER

Met Heather and Ramsey Ferrie and their dogs Lillee and Kluane. They currently live on the road full-time. They left a traditional sedentary lifestyle, trading modern “luxuries” for more time, adventure and happiness together. They now have very few “things” but enjoy life to a deeper and more authentic level than ever before.

They built a bed into the back of their Ford Escape and with a tent, backpacks, and few belongings they took to the road and spend most of their time in the wild. They’ve been from Arizona to Alaska.

They care tremendously for the beautiful wild places they explore and have vowed to contribute to the conservation of these fragile gems. Heather formally studied biogeosciences in graduate school, but the learning experiences gained on the road prove to be unmatched. Altogether, their simplistic lifestyle helps them leave a smaller footprint but they also directly volunteer time to conservation.



Heather and Ramsey Ferrie with their dogs Lillee and Kluane

2018 Membership Rates are Going Up!

Effective January 1, 2018, membership rates to the SCA will increase, in part a reflection of growing printing and mailing expenses.

We will have to consider going to purely electronic newsletters soon if we can't get our membership level back over 300 soon, so please encourage your friends and neighbors who love Priest Lake to join today, or gift them with memberships this holiday season.

New members who join (or renew) for 2017 now will pay 2018 rates, but have the remainder of 2017 included in their membership. Remember, as of 2016, all memberships are based on the calendar year, not when you renew. 2018 membership rates will be:

Individual	\$45
Couple	\$75
Family	\$100
Small Business	\$100
Sustaining	\$250
Chimney Rock Club	\$1,000+

Along their journey, while living in Idaho, they began volunteering time with the SCA. The peaks, waters, & unique wildlife of the Selkirk region gained a special place in their hearts. Heather helped

to build the new web layout and the whole family joins lichen collection events when they're in Idaho.

You can find and follow their adventures here:

Website:
ParadiseOnPennies.com

Facebook.com/
[ParadiseOnPennies](https://www.facebook.com/ParadiseOnPennies)

YouTube: [youtube.com/ParadiseOnPennies](https://www.youtube.com/ParadiseOnPennies)

If you have an SCA member you would like to see featured, please write us at sca@scawild.org.

Short of Cash but Still Want to Help?

Hey, we've all been there... and there are still several ways you can help the SCA

- Like, follow, and share our news on Facebook, and indicate you are “interested” in all our events.
- Follow us on Instagram (@scawild) and share our photos and posts.
- Submit your amazing photos of the Selkirks for use on our website or social media pages.
- If you shop Amazon, use Amazon Smile and designate the SCA as your charity of choice. A percentage of every purchase you make will be contributed to us.
- Encourage your friends and neighbors who also love the Selkirks to join today!
- We're always looking for interesting articles to print in our newsletter? Submit one today!
- Volunteer your time on one of our water sampling trips, lichen collections, liter patrols, or sign up to lead a hike, paddle, or other activity in 2018.
- Are you crafty? We'll be looking for silent auction items for our 30th Anniversary Gale in August of 2018.
- Are you handy? We often have things that need assembling, items to go to recycling, etc. Call Linda at our office (208-448-1110) and let her know how you can help.

SCA Welcomes Two Small Business Members in 2017

A special welcome to Adam Kress of Firlake Realty and Traci Crabtree of the Naughty Bear Nook, our first small business members (at least in recent history!).

Please thank them by patronizing their businesses should you have the opportunity to.

Celebasin 2017

BY CHERYL MOODY, SCA EXECUTIVE DIRECTOR

On August 12th, SCA members and their guests enjoyed a lovely afternoon and evening at the beautiful Squaw Valley farmstead of SCA members Bruce and



Rosemary Yocum. Wonderful live music was provided by SCA member and supporter Dr. Scott (Ira Scott Strongin), while guests enjoyed farm tours, camaraderie, an amazing banquet of food and beverages, and a bevy of raffle prizes.



Guests at several tables enjoying an amazing banquet of delicious foods. Approximately 65 people attended this year's event.

After dinner, we were treated to the first caribou country premier of "The Last Stand" film documentary, introduced by director and filmmaker David Moskowitz. The film includes amazing footage of our last Selkirk Mountain Caribou herd, stunning scenery, and a wealth of information about the challenges facing

mountain caribou recovery in both the U.S. and Canada. We encourage everyone who missed the film to see it this winter as it visits many local theatres in the U.S. and Canada. David will also be releasing a book about his experiences making this film in the near future.



SCA Board Member Sharon Sorsby, SCA Office Manager Linda Check, and Celebasin Guest Speaker David Moskowitz at the Annual Meeting Sign-In Desk

After the movie Thomas Herron of IDEQ provide an update on Priest Lake Water Quality, concluding that chemical changes between the north and south end of the lakes are being noted by IDEQ, and that plans to siphon cold water from Priest Lake into Priest River needed further study.



Beardmore Holiday Open House

**DECEMBER 7, 2017
4 PM - 7 PM**

If you find yourself in or near Priest River during the Beardmore Holiday Open House on December 7, please be sure and stop by!

Many of the SCA Board Members will be there and we'll have sweet treats and raffle drawings too.

Hope to see you there!

A special thanks to Bruce and Rosemary Yocum for hosting this year's event, and their support crew Dan Noren, Doug Baker, and Kermit Jacobson for their grilling magic!



SCA 30th Anniversary Gala

AUGUST 2018

Oh, get ready to celebrate 30 years of the Selkirk Conservation Alliance!

Nell Shipman Project

BETTY GARDNER, SCA BOARD MEMBER

Nell Shipman (1892-1970) lived at Priest Lake from 1922 to 1925. While there she produced, wrote, acted, directed, filmed and edited silent movies using beautiful Priest Lake as the backdrop for several epic movies.

Nell did her own stunts and trained/co-starred with over 70 animals that often roamed free at Lion Head Lodge where she set up a compound for herself and film crew. Once the films were completed she performed vaudeville shows around the Idaho Panhandle to fund trips to New York to sell these classic films.

The intention of the Nell Shipman Project is to have a life sized 5'8" bronze sculpture of Nell created, cast, and placed at Priest Lake at Lion Head State Park. To fund the life sized 5'8" statue, a limited edition of 22" smaller bronze statues are available for sale. All profits go towards the permanent monument. To view the smaller versions please visit the Priest Lake Library or Autumn's Loft at the lake.

The project's vision brings long-overdue acknowledgement to an incredible, amazing woman who like so many artists were forgotten and died in obscurity. Nell Shipman was unconventional, unquestionably non-conformist and in every respect totally in control of her artistic authenticity which cost her dearly. Her refusal to

conform to Hollywood's rising male powerheads left her blackballed. Few women played any major role in the rising film industry dominated by males well into the 1970s.

Nell was decades ahead of her time working at tasks, totally unfathomable by most women and men of her day. She was human, vulnerable, and imperfect but she was unwavering and beyond compromise in her resolve as an artist.

Nell is one of a select few historically significant women of North Idaho in the early 20th century.



Nell Shipman and her film crew, Lion Head Lodge 1923.

Please visit the Priest Lake Library to borrow a copy of her autobiography or to view the DVD collection of her films and documentary about her life.

For more information. If you would like to assist the project in any capacity please contact Betty Gardner 208-448-2700.

Look for These Items Next Issue:

- Hanna Flats GNA Project Update
- 2018 Activities Calendar
- SCA 30th Anniversary Gala Plans
- Selkirk Mountain Caribou Maternal Pen & Arboreal Lichen Collection Update
- Robert & Georgene Bond's Memories of Life at a Remote Fire Lookout Tower
- And more...

Notes on the back cover...

Summer 2017

THANK YOU to all the folks who helped and worked with the SCA this year. We had a busy summer in 2017.

- arboreal lichen collection
- highway cleanups
- water quality sampling;

and who participated in our

- bird walk
- Celebasin celebration
- mushroom ID and
- wildlife tracking clinics

We'd love to hear your ideas for 2018 activities!

