Sightlines

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Newsletter of the Selkirk Conservation Alliance

FEATURES

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

Sailing Priest Lake

BY JON MILLER, SCA BOARD MEMBER

Priest Lake is not really a sailing lake. Don't get me wrong, in many ways, it's a great place to sail, and as I will mention below, I've done a lot of it.

North of the Narrows there's a lot of wind. In the south, the winds are somewhat calmer, but the variety of islands makes for interesting, sometimes challenging routes. Everywhere, especially when viewed from a sailboat, it's great to experience the spectacular beauty of the mountains, forests, sandy beaches, and unmatched water quality, and the serenity of the sail. My reason for concluding that Priest is not a sailing lake is more about the lack of a sailing culture, and the lack of amenities and services that come from that lack of culture. So, I'm reaching out to you, members of SCA, in a small attempt to bolster this culture, one that is very consistent with the mission of SCA. I want to hear of your sailing experiences and suggestions for ways we can encourage and improve sailing on the Lake.

I first started sailing on Priest Lake in the 1970s when my wife's uncle purchased an 18 ft. Hobie Cat. We were young then, and speed was exhilarating, not terrifying, and capsizing was not a problem; it was even a goal in some cases. We had loads of fun sailing out of Sandpiper Shores on Mosquito Bay (Yes, there were shores, then, at Sandpiper Shores, where you could beach a Hobie.) The standard sail was south, beyond Canoe point toward Huckleberry Bay, then return. My most vivid memory of this phase of our sailing life was retrieval of the Hobie after a microburst in 1976 tumbled it 300 yards down the beach and wrapped the mast around a pine tree. Priest Lake sailors know that it's wise to keep your eyes to the south for signs of a nasty blowup.

Jon Miller sails Priest Lake.
photo by Solveig Miller

In the 80s, sailboards arrived at the family cabin. We all started on a small Bic and then graduated to a large Hi Fly. The real windsurfers in the family soon tired of the 11 foot buoyant Hi Fly. It was big, stable and slow, kind of like me. Soon the Hi Fly was my exclusive craft. The hotshots had graduated to boards that sunk if you were not under sail. A boat that sinks when you are just sitting there never seemed like a good idea to me. I let the young and old youngsters do their imitations of Hood River windsurfing. Instead, I invented a new sport, destination sailboarding. I'd don a huge life jacket, lash

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

PRESIDENT'S MESSAGE

Welcome to the Spring 2020 edition of *Sightlines*! The timing of this newsletter coincides with a heightened concern for not only the health of our watershed, but an immediate threat to our personal health and safety and that of our families and friends. On behalf of the SCA Board and staff, we certainly hope that our SCA membership and supporters are doing well and able to enjoy the fresh air and the natural beauty of this special place.

Although I expect that 2020 will be a unique and challenging year for everyone, including SCA, we will do our best to maintain good communication with you and continue to have a voice and a seat-at-the-table on high priority environmental issues in the Priest River Basin. Please let us know via phone, email, etc… if you have a thought, an idea or other input which you want the SCA Board to consider and we will follow up with you!

This edition of *Sightlines* has a great mix of articles which I believe you will find to be informative and interesting. I would like to thank all of those who took the time and made effort to prepare these newsletter articles. This is not easy. I appreciate your willingness to share your perspectives and to stay in touch on issues which are relevant to our SCA mission and important to the SCA membership. Acknowledging the uncertainties associated with of our current health situation, we have not scheduled any SCA group activities or face-to-face meetings in 2020 (eg. SCA annual membership meeting), but please check the SCA web page (scawild.org) for any updates.

On a personal note, I recently had an opportunity to travel to central Mexico and to see for myself what happens when the air, the water and the land are not adequately managed or protected from excess pollution. At a place east of Mexico City, we hiked to a wonderful, cascading waterfall. Despite the beauty of this natural setting, we quickly realized there was the odor of untreated sewage emanating from the mist below. Yuck! I never thought I would "smell" a waterfall, but that is what happens when you have inadequate wastewater treatment and management. Mexico is a beautiful place and well worth a visit – especially when you get off the beaten path – but I was reminded of an important lesson: do not take our clean air and water for granted!

Last, the SCA Board is considering a proposal to publish an electronic version of *Sightlines* beginning in 2021. We would like to know your opinion about this proposed change to *Sightlines* and we will be soliciting your input during the next SCA membership renewal process. Admittedly, this might be difficult for some SCA members – especially since we have been delivering paper copies for the past 30 years.

An important consideration is the SCA budget and the need for us to be careful and creative with managing the costs associated this publication. Other factors include the reality that online access is relatively common and going mostly paperless is consistent with our SCA mission and vision.

Ultimately, the SCA Board will be listening to SCA members and taking your input in to consideration before making any decisions. Please share your perspective on this proposal. FYI, each issue of *Sightlines* - going back 30 years - is posted on the SCA web page at scawild.org, so check it out!

Thank you to all SCA members for your ongoing support of this organization and our mission. My hope is that you and your family have a safe and healthy spring and summer at Priest Lake and in the Priest River Basin.

Jim Bellatty, SCA Board President
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Selkirk Conservation Alliance

Mission
Engage the public in southern Selkirk resource and land management issues through cooperation, scientific inquiry, education and economic diversity.

Vision: The Selkirk Conservation Alliance is the leading and faithful advocate to all who live, love and benefit from Priest Lake and its surroundings. We are committed to understanding, supporting and protecting the environment and all living beings found here. We are dedicated to the educational programs and scientific research that support and maintain this rare and exceptional environment for future generations.

Report: Issues Committee

BY JAMES LEA, SCA BOARD MEMBER, ISSUES COMMITTEE CHAIR

Updates on high priority issues which the SCA Issues Committee has been engaged:

Bog Creek

The SCA, together with the Center for Biological Diversity, the Lands Council, the WildEarth Guardians and the Idaho Conservation League, has sued the United States Forest Service and the United States Customs and Border Patrol to stop the rebuilding of the Bog Creek road along the Canadian Border.

As previously discussed in Sightlines, the Bog Creek road project is a bureaucratic boondoggle, a waste of taxpayer money and a potential environmental disaster. The rebuilt road would threaten the recovering grizzly population and the potential reintroduction of a sustainable woodland caribou herd. Although we have joined the suit, we have made it crystal clear to the other parties that we are not in a financial position to help in that regard. What we bring to the table is legal standing since the SCA has been the faithful advocate for the Southern Selkirks for more than 30 years.

Idaho Department of Lands Permit Violation

Last year, a guide from the Selkirk Powder Company directed a helicopter to land on Keokee Peak. This was observed by a backcountry skier. The guide removed several trees to build a landing zone and then skied down into the basin. This was reported to the Idaho Department of Lands (IDL) and the Idaho Outfitters organization. The guide was in violation of his IDL permit because he was out of bounds and he also illegally cut down trees. The guide received reprimands but no fines. The SCA was approached to investigate this infraction. We contacted Robert Funk, IDL senior forester, on several occasions and he regrets not being more forceful. However, it seems unlikely that this event will occur again. I do not think we have to be terribly worried about a squadron of helicopters landing on Selkirk peaks, but the incident did raise a concern about ongoing motorized vehicle use on IDL lands. These lands are constitutionally set aside for the school endowment fund of Idaho and are meant to provide support in perpetuity. As we see more and more off-road vehicles, snow bikes, etc… there will be increased pressure on these lands to the point where the soils, streams and forest may be placed at risk. SCA communicated our concerns to the Idaho Land Board since they are the trustees of this sacred trust.

Hanna Flats Timber Sale

The Hanna Flats timber sale was approved last year by the United States Forest Service, but the Alliance for the Wild Rockies filed suit to stop this sale. Included in the suit were other sales in Montana where the lands involved are adjacent to grizzly bear recovery zones (known as BORZ or bears out of recovery zone). I contacted Felipe (Phil) Cano, Priest Lake District Ranger, and he is unaware of any legal determination. Stay tuned.

SCA Roadside Cleanup Postponed

BY BETTY GARDNER,
SCA BOARD MEMBER, HIGHWAY 57 CLEANUP COORDINATOR

In response to the COVID-19 virus, SCA regretfully is postponing our May roadside trash pick up until further notice. Thank you for understanding this delay.

Please look at SCA's website or call the office later in the season for a fall date for pick up.

SCA appreciates that folks have made this semi-annual event a success for so many years.

SCA looks forward to being with you, our friends, again in the not too distant future. Postponing the spring pickup will make the fall pickup a bit more challenging with the potential build-up of trash so please consider joining us.

Take care, be safe and healthy.

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a waterproof pack with some snacks and a couple of malt beverages to the board, and sail off to Beaver Creek, Tripod Point, Canoe Point, Squaw Bay, the mouth of Lion Creek, the Mosquito Bay beach, and up the Thorofare to the sand spit. I could go anywhere, if my legs and back held out.

In the 90s, getting older, the idea of SITTING, while sailing, in an actual boat, started to make a lot of sense. Three couples went together and bought a very used 12 ft. Snark Mayflower, a large Styrofoam beer cooler of a boat covered with a thin sheathing of plastic. We beefed up the mast base, patched her up with fiberglass, fixed sails with duct tape, and off we went. With a Latine rig, retractable dagger board, and kick-up rudder, it was easy to sail and could handle the shallowest water. She beached easily. While thankful for the cost sharing on the family purchase, I sailed 99% of the hours in the Snark for a decade. The Snark could sail with almost no wind. “Anybody can sail if there’s wind,” I’d say to skeptics, as I walked her out into the calm shallows. I once set the family distance record in the Snark, to the southern shores of Huckleberry Bay and back. We turned her over at a cut in the bulkhead for the winter, which was the reason for her final demise. A moose stepped through the hull which was buried under the snow.

While owning a sailboat has advantages, perhaps the best way to sail is on a friend’s boat, especially if it’s better than yours. My wife Solveig and I had the great good fortune to have longtime friends who owned a J-40 on Chesapeake Bay. We made several hearty trips with them in the Bay, and once from Annapolis to Newport, R.I. and back. These adventures led us to think that maybe we could handle a bigger boat ourselves. In 2006, we experienced the first of the two great days in a sailboat owner’s life, the day you buy your boat. Of course, you know what the other great day is; the day you sell your boat. Sailors, and all boat owners really, are a stoic bunch. A former colleague of mine, who sailed out of Bitter End Marina on Lake Pend Oreille, had a placard on his office wall which said, “Don’t Despair, Repair.” Another sailing friend often remarked, “A sailboat is a hole in the water into which you throw money,” or “Owning a sailboat is like standing in a cold shower ripping up $100 bills.” Our Chesapeake buddies even had a term “boat bucks,” which were denominated in units of 100. You get the point.

We bought a Catalina 250, a trailerable, ramp-launchable 25 ft. sloop with water ballast. The latter feature was a little disconcerting at first. It seems wrong, somehow, to let water into your boat on purpose, but it worked great and was essential for the launching and trailering. She sailed like a dream, nearing 7.5 knots with a 10-m.p.h. breeze on the quarter. The other great feature was that it had a queen-size V-berth and a small galley. We could sleep on it. This solved one of our other problems, a way to spend more time at the Lake, when the 900 square ft. family cabin became even more over-subscribed by a family growing into the third and fourth cabin generations. It turned out that it was more difficult to step the mast and launch and retrieve than we thought, so we rented a slip at Blue Diamond Marina in Cavanaugh Bay for seven years. We launched in the spring and pulled her out in the fall, and trailered to Moscow, where we stored her in our barn.

Marina life was a blast. There was always a party going on, and there were a couple of other sailboats, a Sabre 27 and a Catalina 30. I asked the Sabre 27 owner how he launched it and he told me they did it at the state launch in Kalispell Bay. He said, “It was basically OK, although my wife got a little concerned when the water reached the door handles on the pickup.” Yikes! This is one of the problems of sailing a big boat on Priest Lake; There is no “sling” to place your boat in the water. These big boats wintered over at the marina.

We loved learning about the southern parts of the Lake. Circumnavigating Kalispell Island was one of our favorite sails, even though it challenged us to the max at times. To this day, my sister-in-law will not get on any sailboat after one incident involving, charitably stated, a less than fully-controlled jibe. Nothing is more exciting than sailing out of the lee of the island when a stiff wind hits your sails rounding the northern point. We never really mastered the art of anchoring out. Once we sailed from Cavanaugh bay to Mosquito Bay and anchored in the inlet just north of the Lionhead launch site. We were feeling pretty cocky, having managed the Narrows and other challenges on our approach. “We’ll be OK as long as we don’t get a strong north wind,” I said. The sailing gods, adhering to Murphy’s Law, brought us just that. In the darkest of dark nights, Solveig said, “Those bushes on the bank seem a lot closer than they did before.” “Oh, go back to sleep,” I said. A few minutes later we heard the telltale thumping of the lake bottom hitting the boat. We managed to get out of the shallows and use our “local knowledge” to make it to the, then, decrepit dock at the launch. In the morning, motoring back down the Lake, the air was so full of electricity that small electric shocks were coming off anything metal. We tied up at a “guest dock” for a while to get our lightening rod craft closer to shore. At least it would be easier for others to find our charred bodies. We day-sailed mostly after that.

We sold the Catalina 250 in 2013, our second happiest day with this boat. We were without a boat for a few years, then started looking for something smaller and easier to manage. We owned a Catalina Capri 14.2 for a year, but it didn’t have the stability I desired. It seemed that half the owner’s manual was about righting it after capsizing. We’re now the owners of a 1998 West Wight Potter. I think I’ve found our final sailboat, one built for ease, not for speed.

These are our sailing escapades on the Lake. Please let me know of yours. Send me an email at sca@scawild.org about your sailing experiences on the Lake. Also send your suggestions for how we might make this environmentally friendly form of water recreation more common and more supported here.

Happy sailing!

Report: Finance Committee

BY JON QUINN-HURST, SCA BOARD MEMBER, FINANCE COMMITTEE CHAIR

The Finance Committee developed a working budget for 2020 which was approved by the SCA Board of Directors at the February 2020 board meeting. The budget meets the goals of continuing to fulfill the mission and support the projects of the Selkirk Conservation Alliance.

The main goals are to:

- Increase member donations and general donations.
- Increase memberships.
- Maintain the grants for water testing, invasive aquatic vegetation, and GIS projects.

The Finance Committee discussed pursuing grant opportunities and funding. Although everyone agrees that grants can be a good source of funding, they also come with restrictions, deliverables and expectations. At this point, we have three major projects: ongoing support of the water quality testing at Priest Lake, water quality and invasive aquatics in Kalispell Bay, and the conclusion of Phase II of the GIS grant project.

Many grant criteria present a challenge for SCA because it precludes us from spending funds on any overhead expenses. Some grants are very specific, i.e. grant funding limits general administrative expenses, such as salaries, stipends, wages, honorariums, rent, and overhead expense.

We were fortunate to participate in the Patagonia Matching Fund Campaign 2019. Because of Patagonia's generosity and the support of our members and donors, SCA received 28 donations for a total of $6,825.00 in matching funds! Thank you! Currently we don't know if the campaign will happen in 2020 and will keep you informed.

The SCA Board of Directors has chosen to focus first on increasing membership income and donations. We continue the effort to build bridges with other organizations in the Selkirk Basin, ie: a recent presentation to the Priest River Chamber of Commerce and developing connections with other groups and businesses in the area to increase awareness of the mission of the SCA.

The SCA has a volunteer Board of Directors. SCA has one paid employee, Robin Maloney, our Office Manager. Robin works diligently two days a week in the office located in the Beardmore Building, Priest River. Robin ably assists the Board in all aspects of the work done by SCA.

The annual budget is shared here, as the Board of Directors are committed to transparency of SCA finances. Please feel free to email the Finance Committee Chairman, Jon Quinn-Hurst, at jquinnhurst@gmail.com if you have any comments or questions.

2020 SCA BUDGET

Accounts	Budget 2020
INCOME	
Ads in Sightlines	200
Donation income	12,000
Grant income	42,000
Interest income	0
Membership dues	20,000
Income to pay ED	0
TOTAL INCOME	**74,200**
EXPENSES	
Advertising & outreach	500
Bank and CC fees	350
Fundraising expenses	0
GIS Phase 2	7,000
Insurance	3,000
Mileage reimbursement	250
Office expense	3,500
Postage & mailing	500
Professional services (CPA)	750
Rent	4,800
Sightlines printing & mailing	2,500
Telephone	850
Utilities - Internet & Electric	1,500
Wages and PR taxes - ED	0
Wages & PR tax - Secretary/bookkeeper	23,000
Water testing expenses	12,000
Web design/computer maintenance	3,000
TOTAL EXPENSES	**63,500**
Surplus/Contingency	**10,700**

In summary, we have a tight balanced budget that we are closely monitoring, and our goal is to continue to fund the research, education and advocacy work of the SCA.

We rely on member support and donations, so please keep SCA in mind as we continue to strive to Keep the Wild in the Selkirk Ecosystem.

Opinion: Euthanasia for the Forest

BY BARRY ROSENBERG, SCA MEMBER

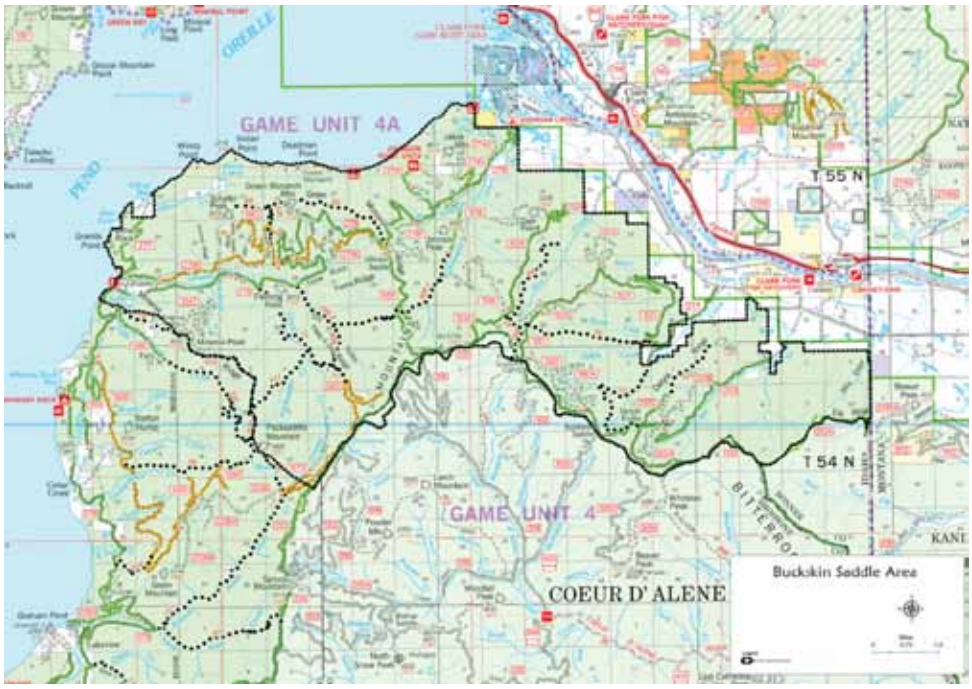
While the world is confronted with a pandemic and we can choose to take unprecedented measures to avoid becoming a victim of the Covid-19 virus, tens of thousands of healthy trees in one of the United States Forest Service (USFS) Sandpoint Ranger District's largest-ever timber sales cannot protect themselves.

The Buckskin Saddle Integrated Restoration Project proposes to kill/log these trees because the USFS considers them 'undesirable.' These 'undesirables' are Douglas fir, western red cedar, hemlock, grand fir, lodgepole pine.

If this seems eerily familiar, it should, given the discriminatory and anti-environmental agenda of the Trump administration, which includes an increase of destructive logging on national forests.

The Buckskin Saddle draft Environmental Assessment (EA) calls for 12,596 acres of clear-cut type logging of "undesirables" and replacing them with 12,773 acres of nursery raised "desirable" seedlings: western larch, western white pine and ponderosa pine. The agency's highly disputed claim is that this species conversion would "…improve resistance and resilience to fire, insects and disease." The reality is that it would reduce the forest's genetic and species diversity, increase the risk of fire, spread noxious weeds and change what is currently a forest to a tree farm.

The undesirable trees currently reside on the proposed 50,000 acre Buckskin Saddle timber sale that is located to the southeast of Sandpoint on the east side of Lake Pend Oreille and to the south of the Clark Fork River, bordering the town of Clark Fork, Idaho. The area, as seen on the map, includes the Green Monarch Mountains, Schafer Peak and Packsaddle Mountain. The proposed logging will occur mainly in the Granite, Johnson, and Twin Creek drainages—all listed by the state of Idaho as impaired streams because they exceed either



Buckskin Saddle area (map by US Forest Service)

sediment and/or temperature limits. The USFS, in the Buckskin Saddle draft EA, is assuming the role of physician and proposes to "restore" forest health by prescribing logging of 13,400 acres of "undesirable" trees - the equivalent of 24,000 logging truck loads - and constructing 95 miles of roads. It includes 12,596 acres of clear-cut type logging which consists of: seed tree cutting, leaving about 5 trees per acre; and shelterwood cutting, leaving 10-20 trees per acre.

Large trees greater than 15" in diameter will be cut on 10,490 of those acres. Logging of 332 acres of trees in the Schafer Peak Inventoried Roadless Area is also proposed. It is acknowledged that large trees sequester a lot more carbon than the seedings that will replace them.

The USFS calls for many of these clear-cuts/openings to exceed 40 contiguous acres. To legally do so it must get special permission from the Regional Forester. No problem. Permission was granted to create 51 of these very large openings in the timber sale ranging in size from 41 acres (31 football fields) to 2,256 acres (1,706 football fields). Many of these incredibly large openings will get drier due to increased wind and sun exposure, thus increasing the risk of fire. Those areas that are prone to mid-winter rain on snow events could result in flows exceeding the capacity of project area streams and increasing the possibility of road failures—both of which could add large amounts of sediment to the affected streams. The draft EA states it cannot estimate the amount of sediment produced from these events. Spring snow runoff in these large openings occur earlier, often reducing late season steam flows that fish and people depend upon.

To access the "undesirable" trees the timber sale will add 80% (95 miles) of sediment producing roads to the 120 miles of existing roads in the project area. Proposed are 30.4 miles of new roads with 11 stream crossings and the reconstruction of 65 miles of densely vegetated, currently "stored" roads with 14 stream crossings. These stored

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Forest Bathing: Fresh-Air Therapy

BY ELEANOR HUNGATE JONES, SCA BOARD MEMBER

The first time I saw this 'forest bathing' term, images of walking the forest in a swimsuit - or less - came into mind. Let me assure you, forest bathing is done clothed just as you would dress for a walk in the woods, and it involves no water or getting wet. And I'd bet that most of you have already 'forest bathed' - you just don't know it.

Have you taken a leisurely stroll through a wooded area to soak in the quiet atmosphere and scents of the forest? That is forest bathing.

This proven branch of therapy originated in Japan and is known as Shinrin-yoku. While as a concept forest bathing is rather new, in 1982 Japan recognized and urged their citizens to make use of 62 designated therapeutic woods. Studies have recognized the health benefits. One Philadelphia hospital tracked for more than 10 years that patients with 'a green view' window had less depression and recovered sooner than those with 'a building view' window. Other studies indicate that Forest Bathing reduces stress, increases energy and focus, and reduces blood pressure even after you leave the forest.

Another often-quoted study indicates that forest airborne oils (phytoncides) strengthen your immune system. The natural oils are part of the trees' defense system against bacteria, insects and fungi. Each tree species has a different smell with the greatest concentration of phytoncides being found in conifers--pine, spruce and cedar.

Forest bathing is different than going into the woods for a hike or a brisk walk. A forest bath means to meander, to move with minimal effort and to let your gaze be drawn to whatever. It is to listen well - birdsong, wind in the trees, bubbling water, your shoe crunch on the path and to soak in the beauty of silence.

Forest bathing is a time to see forest delicacies - thimbleberries, blackcaps and of course, huckleberries. It is a time to observe various grasses, mosses, differing needle and leaf shapes, and interesting fungus growths.

Forest bathing is not a destination - it is to follow your nose, savor the sounds, look at the colors and patterns of light, touch the tree bark, breathe deep and absorb all the wondrous beauty of the forest.

After your forest bathing experience, I cannot recommend a scientific test to take but I'm fairly certain that you will feel different - more relaxed and perhaps more contemplative than before the forest experience. Perhaps your focus and energy are strengthened so that the rest of your day has little or no stress. And, forest bathing experience or not, at least you got outside into a beautiful forest with lots of fresh air.

EUTHANASIA, FROM PAGE 6

roads were beginning a decades long healing process. Reopening them is like pulling a scab off a wound.
The draft EA claims that the risk of road failures and increased sediment delivery would last up to 15 years. Sediment does not magically disappear but accumulates in the streams and could further degrade the habitat for westslope cutthroat and the endangered bull trout.

And then there is the USFS cavalier attitude to its contribution the Earth's number one health problem—climate change.

The draft EA's Climate Report states that, "The Buckskin Saddle project would affect only a tiny percentage of the forest carbon stocks of the Idaho Panhandle National Forests, and an infinitesimal amount of the total forest carbon stocks of the United States."
It also states that the timber sale "… would not have a discernible impact on atmospheric concentration of greenhouse gases or global warming."

While most of the world is concerned about the logging in the Amazon and its effect on climate change, there is more logging in the United States than any other country in the world. The USFS needs to acknowledge its cumulative contribution to the problem.

It defies logic that the USFS can make our forests "healthy" again by clear-cut type logging 12,596 acres, creating thousands of acres of contiguous openings, building 95 miles of roads, and focus on cutting "undesirable" tree species. 'Logging the forest to save it' is the prevalent management scheme on the Idaho Panhandle and other regional National Forests.

All this forest destruction is done under the cover of the USFS endlessly promoting fear of wildfires, insects and diseases. Repetition and fear tactics work. It has much of the public and many politicians believing the myth that logging will reduce these perceived problems. Corporate profits and agency job security is the real reason that the USFS abuses the public trust. Follow the money.

The Phosphorus Story at Priest Lake

BY JAMES LEA, SCA BOARD MEMBER, ISSUES COMMITTEE CHAIR

What makes Priest Lake so special? Yes, it's surrounded by beautiful mountains and forests, but what is truly unique is that Priest Lake water is clear and pure. That is because it is relatively poor in nutrients or oligotrophic (from Greek, όλιγοσ meaning little and τρόφικοσ meaning feeding). The waters of oligotrophic lakes are clean and clear because there is little or no growth of vegetation such as algae or aquatic weeds. Oligotrophic lakes are relatively abundant in the alpine zone, but large oligotrophic lakes are rare in the lower 48. Here you can name only a few such as Lake Tahoe, Crater Lake, Lake Chelan and Yellowstone Lake. In Idaho, there are Pend Oreille and Priest Lakes. It is the water that makes Priest Lake so alluring and consequently drives the local economy.

Oligotrophic lakes have one thing in common. They are deficient in phosphorus (P) which is the limiting nutrient for algae and plant growth. No P, no plants. When I bought my cabin 33 years ago, there was very little algae growth in the nearshore of my property and no evident growth in the little spring that runs by the cabin. Over the years this has changed dramatically.

Over the last three years my neighbor, Dr. Jan Boll has looked at this problem systematically. As luck would have it, Dr. Boll is professor of environmental engineering at WSU with a special interest in hydrology. As discussed in the Spring 2019 edition of Sightlines, we did a study looking at algae growth along the shores of southern Kalispell Bay. In brief, we found that wherever there was a significant inflow of groundwater there was a substantial increase in algae growth. This observation was corroborated by Idaho State Department of Agriculture when divers noted an increased concentration of aquatic vegetation, particularly invasive milfoil and curly leaf pond weed, where cold groundwater was entering the lake.

We then did some preliminary investigation of the groundwater that flows out in great abundance along the bay. We found that there were areas of substantially increased P concentration, up to 30 or 40 micrograms per liter (ug/L). A concentration of 20 ug/L or higher is considered to be in a range that would contribute to algae growth, a condition known as eutrophication.

Based on this preliminary investigation, Dr. Boll was able to obtain a grant from the Agouron Foundation to fund a graduate student for two years. The grant was administered by the Selkirk Conservation Alliance (SCA); moreover, without the SCA this study would never have been done. The results are now in and it is clear that there is an area in the southern part of the bay where there are significant and persistent increased concentrations of P in the groundwater, up to 90 ug/L compared to a background level of 10 ug/L in the upgradient aquifer. Several of these are from shallow test wells that have no housing upstream. Not only is there increased P in the groundwater there is evidence of caffeine. Unless the bears have picked up the coffee habit, this is strong evidence of human impact.

In 2000, the Kalispell Bay Sewer District was able to fund a new state of the art sewage treatment facility. Prior to this, the old lagoon, lined with bentonite clay, was found to be leaking sewage as demonstrated in a University of Idaho study of 1993 with measurable effects in the groundwater of the northern part of the bay. With the new sewage lagoon the Idaho Department of Environmental Quality (IDEQ) was reasonably assured that the lake would be protected from excess nutrient loading, such as P for a variety of reasons. In the first place the new high-tech liner is very effective, especially when compared to bentonite clay which was used in the old lagoon.

Secondly the amount of P in the irrigation applied wastewater was relatively low such that they reasoned that the native trees would take up the P and lock it away. This concept was supported by a 1998 National Resource and Conservation Service (NRCS) document. In addition, the soil has a volcanic ash cap from eruptions of Cascade volcanoes. Volcanic ash is high in iron and aluminum cations which can bind with negatively charged orthophosphate. IDEQ cited a University of Hawaii Maui County Extension paper to support this idea. Finally, IDEQ knew that the depth to groundwater was 70 feet but they could find no documented evidence of groundwater connecting with the surface waters of the surrounding streams or the lake itself.

As evidence emerged of unexpectedly high levels of P in the groundwater near the lake, we began to question some of the assumptions IDEQ had made initially. In the first place the United States Geological Service was aware of an extensive aquifer system located to the west side of the lake. This is a common type of aquifer found in the glacier carved valleys of the inland Northwest. The glacial outwash and till are saturated with water from precipitation. This water naturally finds its way into the streams and to the lake. Also, a 1993 University of Idaho thesis characterized this aquifer specifically as it relates to Kalispell Bay. It is clear that the lagoon and irrigation zone are located over the aquifer and that the direction of flow is toward the lake.

We also looked at the NRCS paper from 1998. This was a document written to inform farmers of how much manure to apply to their crops. This was broken down into how much nitrogen and phosphorus should be applied to various agronomic crops. As an afterthought they included a brief appendix on how much to apply to "nongrazed woodlands". The value listed is 20 lb/acre of P. This is the value then that IDEQ has utilized as a guideline for application of waste water to native vegetation. I discussed this issue with Dana Ashford, who at the time was acting director of the Ecologi-

cal Sciences Division of NRCS and a nutrient specialist. She looked into it and found that the 1998 document was revised in 2000 and the appendix referencing woodlands was removed. No one currently at NRCS knows why.

My own investigation also showed that some deciduous trees such as poplar do require about 20 lb/acre P annually; however, conifers require only about 5 lb/acre. Furthermore, conifers are largely unable to absorb P applied as fertilizer. They get their P through mycorhyzal associations with soil fungi. The native vegetation located in the Kalispell Bay application site is about an equal amount of lodgepole pine, ponderosa pine and larch. In the Priest Lake area sewer districts apply between 5 and 18 lb/acre of P. Currently at the Kalispell Bay Sewer District about 12 lb/acre of P are applied annually for a total of 180 lb.

If the trees do not take up the P, then the last defense against P getting into the groundwater is the soil. Dr. Boll's graduate student, Galen Kornowske, studied this question by obtaining soil cores of the surrounding area and subjecting them to application of wastewater. He determined that the soil was quickly saturated and unable to hold any further P. Furthermore, the soil appears to have what he describes as macropores which allow short cuts through the soil. Whenever he applied wastewater to the soil cores, almost immediately water was found at the bottom. Basically, there was little time for any chemical reaction to take place between soil and phosphorus. Once below the volcanic soil cap there is only neutrally charged sand and gravel which does not provide a barrier to P migration.

Finally, the lagoon liner is good but not perfect. Leak testing in 2016 demonstrated a loss of 50 grams of P per day. This sounds insignificant, but multiplied by 365 days you end up with 18 kg or 40 lb of elemental P each year. Since the lagoon is 15 feet deep, the leakage would be directly into the gravel and sand where there would be no opportunity of adsorption. Potentially 180 lb of P are applied annually to the application zone and 40 lb leak through directly to the sands overlying the aquifer.

We do not know how much P has been fixed but it could be very little. Adding the two sources of P we come up with 220 lb per year which does not sound like much, but this is elemental P. As P_2O_5, which is how it is found in fertilizer, we come up with 504 lb. As commonly available fertilizer (10-10-10) the amount would be 5004 lb or 2 ½ tons per year. Over the lagoon's lifetime to date that amount would be 50 tons applied to 15 acres.

The mission of the sewer districts is two-fold, protection of public health and protection of the environment. First and foremost, sewage treatment is designed to protect public health. This is being done appropriately by our district and all the other districts around Priest Lake. Bacteria are being killed and nitrate levels are very low.

The second goal is to protect the environment. The current sewage treatment methodology at Priest Lake is one that is utilized in rural areas throughout the US. With this methodology, P is only partially removed, about 40% at a maximum, and the remaining P laden wastewater is irrigated out onto native vegetation. The levels of N and P are measured periodically. An annual report is issued so we are able to obtain very accurate information about the quantity of P applied to the irrigated zone.

Unlike bacteria and nitrates, P is not a public health hazard, but it is a nutrient that does not belong in an oligotrophic lake. Preservation of one of the few large oligotrophic lakes in the country should be reason enough to address this problem, but there is also an economic incentive. The excess aquatic plant growth along the nearshore is not only unsightly, it affects property values by reducing lakeshore property values as much as 13%.

Fortunately, there are solutions. One simple solution for the Coolin Sewer District, located on the Jackpine Flats, is to utilize an agronomic crop such as alfalfa or timothy to produce hay that can then be physically removed from the environment. This is a method that is successfully utilized by the Hayden Lake Sewer District (HLSD). HLSD even makes a profit on the hay that is sold. The other sewer districts do not have land that is suitable for agriculture or is in close proximity to the lake. These sewer districts can utilize a technique called nutrient polishing wherein the P is eliminated by the additional step of adding aluminum or iron salts. The generated biosolids are periodically removed and utilized as fertilizer elsewhere. By my calculation the combined sewer districts in 2018 produced about 1000 lb of elemental P annually. This is the equivalent of 11 tons of 10-10-10 fertilizer. This is then applied to the same small 150 acres year after year, decade after decade. Currently P is physically removed from the environment by our lake and river and in so doing produces eutrophication. It would be far better for the environment and the economy to re-export the P as fertilizer or hay.

It is instructive to think of the Priest River Basin ecosystem since the last glaciation. Prior to human activity the watershed was in a phosphorus equilibrium with P cycling endlessly with minimal losses of P replenished by small quantities of P from weathering bedrock and rotting vegetation. Later the Kalispel Tribe of Indians began to utilize the basin for hunting and fishing.

Each summer and fall the tribe would migrate over the Shedroof Divide to Kalispell Creek to net the spawning mountain whitefish. The fish were dried and transported back to the tribe's winter settlement on the Pend Oreille River. By doing this the tribe was actively exporting P out of the Priest Lake basin and thereby preserving the oligotrophic environment. Subsequently along came the settlers, loggers and later home owners and tourists. Most of the food, which naturally contains P, had to be imported since the climate at Priest is only marginal for agriculture. For the last 100+ years every delivery of food or box of groceries from Costco imports P that remains in the environment until it slowly leaches out into the groundwater, lake and river.

At this juncture, Dr. Boll is currently en-

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Grow a Salad Garden in Northern Idaho

BY BETTY GARDNER, SCA BOARD MEMBER

I don't have a crystal ball, but I bet after the dust settles from the COVID-19 pandemic more than a few will decide that their getaway in North Idaho is more inviting than ever.

Epiphanies may blossom for some who might think it's time to slow down and move to that piece of paradise on the lake. From one big city refugee to another, "Welcome!" I've been gardening here for forty-two years and would enjoy sharing some of my experience with you. Gardening is a great stress releaser and for many just as enlightening as meditation.

Growing a garden in North Idaho is challenging but the rewards are worth every drop of perspiration. Few things are as fulfilling as serving food you have raised with those you love. It tastes better and you have control of growing it organically fresh. As you "break bread," together you share a bonding tradition that human beings have long cherished. Mealtime is time to talk and tell stories with loved ones. A family garden is fun. This is a great way to get a picky eater to try veggies, especially if they choose the seeds themselves. Gardening teaches kids to savor the process, create something that does not happen instantly and experience fruits of their labor. We need more of that in today's instant gratification world.

A small beginner's garden is a fifteen foot by four-foot rectangle. Pick a sunny spot free from shade four or more hours a day. Gardens should be set back from the edge of the lake as far as possible. Even organic fertilizer is bad for the lake. Put in four corner stakes and stretch a string around the perimeter. Remove rocks and wild shrubs. Turn the plot with pitch fork. Remove grass and weeds. Shake the soil from roots and return it to the plot. You want to dig the soil a minimum of 10 inches. Deeper is better.

Dig a ten-inch-deep, two-foot by two-foot section of the plot and put this soil in a wheel barrow. After removing the top soil, take your pitch fork and loosen another six inches of the subsoil. You won't have to go this deep the second year. Go to the next two-foot section further along the bed. Turn the first top ten inches, shovel this on to the first spot and turn subsoil as before. Repeat the process until you get to the end of the bed. Take the soil in the wheel barrow and dump it upon the last spot.

North Idaho soil is not very productive without help, especially the first year. Add a four cubic foot bale of peat moss to aerate dense soil. This will also bind sandy soil so it holds water better. With research you will find numerous other organic additives. Stay away from phosphates and wood ash since these can cause water quality problems. Please, never use weed killer near food or water or frankly ever at all in my estimation. I fertilize with liquid fish emulsion, manure and compost.

Once your bed is ready you can plant after June 1st through 15th. The veggies I recommend are: two different types of lettuce, arugula, cilantro, radish, spinach. You can direct-sow all of these. One pack of each will be enough for multiple plantings this or next year. Follow seed packet instruction for depth and spacing for seeds. Plant sparingly. Overcrowding causes poor production. Water two to three times a week for 30 minutes. You will be eating salads in five or six weeks. You can add four parsley plants to your plot but purchase seedling starts. These are slow and won't be ready to pick for 10 weeks if you start from seed. The Newport Farmers market on Saturdays from 9AM until 1PM is a good place to purchase seedlings and favorites that grow this far north.

Plant one row of lettuce and of spinach leaving space for a second row of each planted three weeks later. When first planting gets picked out, replant for a late batch. Other veggies that may do well in Priest Lake are early varieties of broccoli, cauliflower and cabbage. Stay away from tomatoes, squash, corn, cucumbers and eggplant. It is too cold this far north for any of these to be successful. Have fun and go get dirty!

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gaging with IDEQ to determine if there is a way to address our phosphorus problem. Our hope and expectations are the experts will follow up on the results of this study and implement some effective solutions. SCA is proud to have played an important role in this study and we are willing to listen and to work with the communities to protect the lake and groundwater quality.

Making Waves: Shedding New Light on the Wake Boat Debate in Idaho

SUBMITTED BY CHERYL MOODY, SCA MEMBER | WRITTEN BY JESSICA ARCHIBALD

A recent conflict facing lake communities across the world has come to a head in Idaho. At the root of this conflict is damage caused by boats that utilize Wave Enhancement Technology (WET), an advanced ballasting system which increases vessels' weight thus amplifying the size and power of the wake they produce. Wake boats are popular with water sports enthusiasts, but they can also harm fragile aquatic ecosystems, threaten boater and recreationist safety, and damage public and private property.

In the Summer of 2019, the controversy concerning these boats peaked in the community of McCall, Idaho. The Valley County Commissioners, in response to regulatory discontent and citizens' concerns for safety, property damage, and lake health set a 1000 foot no-wake zone from the shore of Payette Lake. While some heralded this decision as a win for shoreline property owners, the environment, and recreationists, others declared it excessive and discriminatory against wake boat owners.

Debates about the impact of these boats and the best way to manage them continue, but there are very few cohesive collections of unbiased scientific information on the topic. For this reason, we at the Eiguren Ellis Public Policy Firm endeavored to compile this missing data as a resource to offer to all interested parties.

To achieve this goal, we developed a compendium of materials relating to wake boats. We conducted an extensive literature review to find the most relevant information, representing all sides of this issue, to develop a key source of unbiased information for those with a vested interest in wake boat policy.

The compendium relating to the effects of wake boats on Idaho Lakes is broken into seven major sections. The first three include scientific reports and studies that have been done on the impact of WET boats. The fourth section is a collection of statutes, rules, and ordinances that have been passed or proposed nationally and that address one or more aspects of wake boat policy. The fifth and sixth sections are collections of media and public comments about this issue. The final section contains current and proposed studies relevant to wake boats in Valley County specifically. The online version of this compendium can be found here:

https://drive.google.com/drive/folders/1UlgmwdvXIIpsFznhNAHllTxrNcyP0eo6?usp=sharing

The first section relates to boat and wake characteristics. The key findings of these 10 studies suggest that recreational boat characteristics are indeed related to the type of wake created and its power. Furthermore, these studies assert that the types of wakes produced by WET technology are larger and hold more energy. Finally, they make it clear that recreational boating and water sports are important industries for the economy and are valued by Idahoans. The second section includes studies that analyze sediment suspension and shoreline erosion due to all wakes, but more specifically due to those from WET boats. The 16 studies suggest that erosion rates from boat wake energy are generally much higher than the erosion rates from natural wind wave energy. For example, research demonstrated that in some waterways, boat wave energy is the predominant eroding force. Additionally, the wakes associated with wake-surfing are 1.7 times higher than the waves of a normal moving boat and can impact the water column up to 5 meters in depth and take up to 300 meters to dissipate (1,2,3)These studies demonstrate that WET boats exacerbate the issue of anthropogenic wakes as a major source of erosion and sediment disturbance.

The third section contains studies that relate to the potential spread of invasive species by wake boats. The findings indicate that through their use of ballast, wake boats have a higher chance of spreading invasive species through waterways because they are more difficult to dry and nearly impossible to drain completely. It was also demonstrated that a single boat left undrained after use in Lake Mead could transport up to 32,240 mussel larvae to another body of water (4). Furthermore, they assert that mussel larvae, such as the notorious invasive zebra mussel, can reside within ballast tanks for up to 30 days highlighting the potential for the catastrophic spread of such a species to Idaho lakes (5).

The fourth section focuses on statutes, ordinances, and rules that regulate wake or wake boats. We found 14 such documents from the United States at the state and local level which vary significantly in the policies that they enforce. Some of the policies that we found include the mandatory cleaning of WET boats before entry into waterways, establishment of no wake zones ranging from just 100 feet and up to 700 feet, creation of wake hour restrictions or "no wake" or "no ballast" bodies of water for sensitive ecosystems, the development of mandatory education programs, and the implementation of research commissions to study wake boat disturbance. These documents demonstrate the wide variety of policy options available to public officials should they choose to pursue them.

The fifth and sixth compendium sections include media and public comments that reflect the wide variety of opinions on this issue. The media section includes an array of documents such as articles from newspapers, magazines, blogs, and even govern-

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Update: 2019 Priest Lake Water Quality Report

BY CHERYL MOODY, SCA MEMBER, FORMER SCA EXECUTIVE DIRECTOR

This article provides an update since my last water quality newsletter summary (Sightlines, Spring 2019). For more background on each of these data types, and a map of sampling site locations, please refer to prior articles (including the fall of 2017). Before getting into the results, I'd like to give a shout out to the following volunteers/board members who contributed a significant amount of time to our 2019 sampling program: Captain Jonathon Quinn-Hurst, Curtis Wickre, James Bellatty.

Table 1 provides a summary of the total recorded number of sampling events by monitoring site.

PRIEST LAKE WATER CLARITY

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 the table below 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 at this time. Because a higher number means we could see deeper into the water, higher numbers are better than lower numbers when it comes to Secchi Disk readings.

Table 2 shows that most of the May-July sampling sites have improved visual clarity since the sewer systems were installed (late 1990s). Both Cavanaugh Bay and Outlet Bay bucked the general trend of spring improvement in 2017 (staying the same or decreasing in clarity) but are not scheduled to be sampled again until more funds are obtained. Most sites showed degradation during the August-October season. While this is discouraging, it is important to remember that these numbers are still very good when compared to many lakes in the U.S.

HISTORIC & CURRENT TOTAL NITROGEN/TOTAL PHOSPHORUS RATIOS (TN:TP)

While data on Total Phosphorus (TP) or Total Nitrogen (TN) are of interest to

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ment issued informational pamphlets. The public comment section includes several comments that were submitted to the Valley County Commission expressing concerns of property damage, spread of invasive species, safety, lack of access to the lake for other forms of recreation, and shoreline erosion.

The final section of the compendium regards past, current, and future studies in Valley County about water quality and wake boat disturbance. There are reports from a current investigation at Payette Lake regarding wake boat impacts, monitoring results from Idaho Department of Environmental Quality from Payette Lake, and a brief proposal of a study to analyze the effects of wake boat disturbance specific to Lake Cascade and Big Payette Lake.

The compendium suggests that there is substantial evidence that Idaho lakes likely have, and will continue to, face severe environmental and social consequences from the unmonitored use of WET boats. Despite this evidence, House Bill 397 is under consideration which would prevent local governments from establishing no-wake zones beyond 200 feet for motorboats, a limit that many studies suggest would not be sufficient to mitigate the impacts of WET boats. Our research suggests that an Idaho specific study to analyze the impact of WET boats is needed for public officials to make informed decisions about wake restrictions moving forward. Currently, a world-renowned University of Idaho limnologist, Dr. Frank Wilhelm, is organizing such a study. He is proposing an investigation that would analyze the impact of these boats specific to Idaho lakes, with an emphasis on Payette Lake and Lake Coeur d'Alene, and that could potentially establish an unbiased scientific formula that county commissioners could use to establish appropriate no wake zones and restrictions for the bodies of water they have jurisdiction over. We at the Eiguren Public Policy firm hope that our efforts to compile the literature related to wake boat use in global lake ecosystems will shed some light on the best regulatory policies that can help optimize recreational enjoyment and mitigate ecological damage.

Jessica Archibald is a Boise native and the research assistant for Eiguren Ellis Public Policy Firm. She recently graduated with her Bachelor of Science in Environmental Studies and her Bachelor of Arts in Spanish from Northern Arizona University and intends to pursue a Master's degree to further education in environmental policy.

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

SITE NAME	'93	'94	'95	'08	'10	'11	'12	'13	'14	'15	'16	'17	'18	'19	TOTALS
BREK			4									6	4		14
CAVA	6			4							2	6			18
COOL	6			4								6	4		20
DIST	6												4	4	14
GNAR	5		6	4								6	4	1	26
HUCK	6	6	6	4							2	6	4	4	38
INDI	6											6		1	13
KALI	6	6	6	1	6	5	4	3	2	1	3	6	4	4	57
LUBY												5		1	6
LWPR		6	6										3		13
LWQA-S										1	3	6	4	4	18
MOSQ		6		2	6	5	5	3	2	1	4	6	4	4	48
NGRA (or GRAN)	5														5
NREE (or PLMD)	5														5
OUTL	6			4								6			16
PLNO	6	6	6	4	6	5	4	3	5	5	4	6	4	4	68
PLSO	6	6	6						5	5	4	6			38
SQUA	6											6			12
UPLK	6	6	6								3	6	4	2	33

TABLE 2: CHANGES TO WATER CLARITY SINCE PRIEST LAKE MANAGEMENT PLAN STUDIES (Depth in Meters) ***Not an average, one reading.**

SITE NAME (Only includes sites where historic TN/TP Ratios Available)	Historical Data from 1993-1995 in most cases	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER
BREK	Historical	43	19	11	N/A	N/A	N/A
	2017	43	28	32	20	24	31
	2018	N/A	9.4	18.6	7.9	17.9	N/A
	2019	N/A	N/A	N/A	N/A	N/A	N/A
COOL	Historical	11	10	30	18	14	21
	2017	51	26	11	14	16	20
	2018	N/A	10	21.9	12.1	20.9	N/A
	2019	N/A	N/A	N/A	N/A	N/A	N/A
GNAR	Historical	30	N/A	13	28	69	22
	2017	41	33	37	21	8	36.3
	2018	N/A	15.7	15.6	15.8	17.7	N/A
	2019	N/A	37.0	N/A	N/A	N/A	N/A
HUCK	Historical	32	19	16	43	12	20
	2017	41	25	22	16	22	31.5
	2018	N/A	16.1	17.5	8.8	19.3	N/A
	2019	N/A	0.3	36.1	40.0	31.1	N/A
KALI	Historical	44	15	29	29	16	18
	2017	45	37	14	10	8	25
	2018	N/A	16.7	20.9	10.1	29.3	N/A
	2019	N/A	32.5	37.5	35.7	17.0	N/A
MOSQ	Historical	61	23	36	17	23	18
	2017	44	28	31	31	28	33
	2018	N/A	18.9	16.6	10.6	15.9	N/A
	2019	N/A	34.3	39.5	35.5	39.0	N/A
PLNO	Historical	50	25	19	28	31	28
	2017	53.9	31	41	19	8	33
	2018	N/A	11.2	15.6	8.0	17.3	N/A
	2019	N/A	26.7	52.5	26.4	26.0	N/A
UPLK	Historical	35	43	31	26	25	29
	2017	55	34	56	19	23	37
	2018	N/A	21.9	21.0	11.4	25.6	N/A
	2019	N/A	31.3	N/A	51.0	N/A	N/A

limnologists, 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 P or N is the limiting nutrient in a lake. Historically, many of the sites where we have good TP data have no TN data (or vice versa). Moving forward, as funds allow, we will continue to collect samples for TN analysis as well as TP. Table 3 summarizes our historical vs. recent (2017-2019) TN:TP ratios.

TABLE 3: Historical vs. Present TN:TP Ratios for Eight Priest Lake Monitoring Stations

SITE NAME (Sampled at least one season from 1993-1995 and again in 2017-2019)	Secchi May-July Ave 1993-1995	Secchi May-July Ave 2017	Secchi June-July Ave 2018	Secchi June-July Ave 2019	Spring Change From Past to Present (22-26 years)	Secchi Aug-Oct Ave 1993-1995	Secchi Aug-Oct Ave 2017	Secchi Aug-Sept Ave 2018	Secchi Aug-Sept Ave 2019	Fall Change Past to Present (22-26 years)
BREK	6.1	5.3	7.0	N/A	Mixed	5.1	N/A	7.0	N/A	Improved
CAVA	7.6	7.6	N/A	N/A	No Change	11.9	10.8	N/A	N/A	Degraded
COOL	7.7	8.2	6.5	N/A	Mixed	N/A (~10 in 2008)	8.5	8.5	N/A	Degraded Since 2008
DIST	6.2	N/A (10 in 2008)	8.0	9.25	Improved	N/A (~11.2 in 2008)	N/A	8.75	8.5	Degraded Since 2008
GNAR	7.2	8.0	7.5	6.5*	Mixed	11.3	9.7	11.5	N/A	Mixed
HUCK	7.9	8.3	8.25	9.0	Improved	11.6	10.6	9.25	9.25	Degraded
INDI	7.6	8.8	N/A	7.0*	Mixed	12.1	11.0	N/A	N/A	Degraded
KALI	7.3	9.3	7.4	7.25	Mixed	11.9	11.3	10.5	9.0	Degraded
MOSQ	6.3	8.2	7.5	7.25	Improved	9.3	9.8	9.0	9.0	Mixed
OUTL	7.9	7.8	N/A	N/A	Degraded	N/A	7.5	N/A	N/A	N/A
PLNO	7.3	8.2	8.75	10.0	Improved	11.5	10.7	9.0	8.5	Degraded
PLSO	8.3	9.8	N/A	N/A	Improved	12.2	11.3	N/A	N/A	Degraded
SQUA	6.8	7.2	N/A	N/A	Improved	N/A	10.8	N/A	N/A	N/A
UPLK	5.5	6.3	7.25	6.0*	Improved	9.6	8.3	9.0	12.0*	Mixed

The TN:TP ratio 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 are expected to change.

In their paper The nitrogen: phosphorus relationship in lakes (1992, Limnology Oceanography 37(5)), John Downing and Edward McCauley provide summary data and discuss the typical ratios from different land-types, submerged sediments, and geologic types. Their paper indicates that ratios from undisturbed forestlands could be as high as 70, precipitation values (at least in the 1960s) were typically in the low 20s, while sediments below oligotrophic lakes like Priest were as low as 3.3.

Values below 10 are mostly associated with runoff from things most people probably wouldn't be delighted to recreate in, but that doesn't mean our waters are polluted, just simply that our water quality is degrading over time in some areas.

In closing, it seems clear that the downward trend in TN:TP ratios noted in in the late summer months 2017 (a very warm summer), and again in late summer 2018 (a more typical summer) continued to a lesser degree in 2019 (a cooler summer). However, Huckleberry Bay (HUCK) and the deep water site Priest Lake North (PLNO) still showed continued degradation in late summer/fall when water temperatures are at their warmest in 2019. In my opinion, seeing this trend at the deep water site is probably the most disconcerting of all the 2019 findings.

While we had again hoped to complete a detailed analysis of historic vs. current temperature data by depth, the original data sheets completed in the early 1990s have finally been located, and are now (fingers crossed) being entered into the State of Idaho's water quality database, where limnologists from the University of Idaho can compare them to the current temperature and dissolved oxygen profiles we complete at each sampling site/event.

Maybe next year?

The SCA Water Quality Monitoring program continues to be in need of volunteers. The SCA boat typically leaves the Granite Creek Marina at 8AM on sampling days and returns late afternoon. If you can volunteer this summer, please contact Captain Jonathan Quinn-Hurst at jquinnhurst@gmail.com.

Patagonia Grant Application to Monitor East Side Streams

BY JAMES LEA, SCA BOARD MEMBER, ISSUES COMMITTEE CHAIR

Historically, the Idaho Department of Environmental Quality (IDEQ) did extensive water quality monitoring of the Priest Lake in the 1980's and 90's, but in the early 2000's their interests seemed to turn elsewhere. In 2008 SCA determined to carry on the water testing through our Citizens Volunteer Monitoring Program (CVMP). For the most part the open waters of the lake remain pure with relatively little evidence of nutrients such as nitrogen or phosphorus. However, we have discovered that there is evidence of groundwater loading of phosphorus which contributes to aquatic vegetation growth (see accompanying article, The Phosphorus Story).

This year we have decided to expand our citizen monitoring to incorporate the streams feeding into Priest Lake, specifically those on the east side of the lake. We have been compelled to do this largely because of the Idaho Department of Lands (IDL) more recent aggressive logging practices. Those of you who live on the east side know exactly what I am talking about. The accompanying figure shows Landsat photos from 2016. It is useful to compare the west and east sides which illustrate the differences in silvicultural practices occurring in the last few decades. The yellow line demonstrates extensive logging at lower elevations occurring in the southern part of IDL properties mostly in the last decade. More recently IDL has begun logging at higher elevations and also has plans to log further north, including in the Trapper Creek drainage of Upper Priest.

IDL does no water quality monitoring. IDEQ does sporadic monitoring of streams with remote logging devices but importantly does not measure turbidity or nutrient loading. This winter SCA approached the Kalispel Tribe of Indians to propose a collaborative effort to collect and expand data collection. Since 2005 the tribe has done extensive monitoring of streams in their aboriginal territory which includes the entire Priest Lake/River watershed. Granite Creek and Priest River at the Outlet are monitored every year. Every three years Soldier, Hunt and Indian Creeks are monitored for pH, dissolved oxygen (DO), conductivity, temperature and turbidity. Examination of their data demonstrates a persistent trend for increased pH in the east side streams. This may suggest increased nutrient loading, possibly from soil erosion leading in turn to increased aquatic vegetation.

Figure 2

Our goal is to monitor the above mentioned streams on the years that the tribe does not and also to expand monitoring to North Hunt, South Hunt, Two Mouth, Lion, Caribou and Trapper Creeks. This will then encompass the entire east side drainage. In addition to the parameters mentioned above we will also be monitoring the major nutrients (N and P). We may also add artificial substrates to measure chlorophyll accumulation as we have done historically in the lake. By monitoring these streams we may be able to identify whether IDL logging practices are having a deleterious effect on stream water quality.

In order to accomplish this task we have applied to Patagonia Action Works for a grant of $15000 to purchase a multiparameter probe and for funds to pay for the analysis of nutrients. We have just recently submitted our application and will receive a determination in August. In the meantime this summer our volunteers will accompany the Kalispel Tribe of Indians water technician to learn the techniques required to utilize the instrument and learn appropriate sample collection protocols.

IDL is constitutionally mandated to maximize the economic benefit of their trust lands; however, they cannot violate the Clean Water Act. If we discover issues that appear to be related to ongoing logging activity, we may be able to exert pressure on IDL to modify their silvicultural practices.

Combatting Invasive Weeds in the Shadow of the Novel Coronavirus

SUBMITTED BY SHARON SORBY, SCA BOARD MEMBER | ADAPTED FROM SAM LEININGER

Here at the Weed Board,we are all too familiar with the science and strategies behind stopping and slowing the spread of harmful threats to our communities. Topics such as prevention, early detection, rapid response, containment, exclusion, and the disruption of vector pathways are not only familiar to us but are also daily discussion topics within the Weed Board's function. In many ways, we are "ecological epidemiologists" trying to stop the unchecked spread of novel organisms to protect the ecological, economic, and cultural health of our communities.

When news reports started coming out about the novel coronavirus (COVID-19) we understood the importance of preventing its introduction. We also knew that if it was introduced, we would need to focus on its early detection and the rapid response of public health officials. We use this same approach as a foundation for our programs through our early detection and rapid response to managing novel and newly located weed infestations where the goal is the eradication of the threat before it can become established.

In the last few weeks, as reports started emerging about coronavirus cases that could not be readily traced back to recognizable introduction sources, we knew that this threat had likely spread beyond eradication and instead had shifted towards containment and exclusion.

As is the case with the introduced threats of invasive weeds, this transition is significant and requires a fundamental shift in management and strategy.

We now find ourselves in the containment area of the management curve, where we are focusing on the disruption of vector pathways to slow exponential growth. Public health officials began encouraging "social distancing" to prevent the transmission of the novel coronavirus, and now we have enforceable federal, state and local decrees making it mandatory.

We employ similar strategies in our work with invasive weeds, by focusing treatments on transmission pathways such as waterways, roads, or trails for some weeds to prevent their spread and redistribution. For others, we disrupt spread by prohibiting the sale and redistribution of invasive weeds through the retail trade. For many of our invasive weeds, we also focus on disrupting their spread by people through promoting prevention and sanitation. This is the foundation for national prevention campaigns like PlayCleanGo.org. Invasive Species Establishment and Management Curve

We understand the approaches being employed to combat the novel coronavirus because we employ them every day. So, we encourage all of you to follow public health guidelines to protect the health and safety of you and your loved ones.

If we all work together, we can minimize the impact of the coronavirus and protect the most vulnerable members of our communities. So please, take some time to educate yourselves about the coronavirus, (cdc.gov), take steps to protect you and your loved ones and as spring unfolds, enjoy the outdoors, taking time to inventory your property for the presence of invasive weeds and employ management practices to help break their spread vector pathways.

Your local weed boards are essential services and available to offer you their expert assistance.