Pigeon Lake Watershed Lands
Part of our Lake's Defense System

February 16, 2022

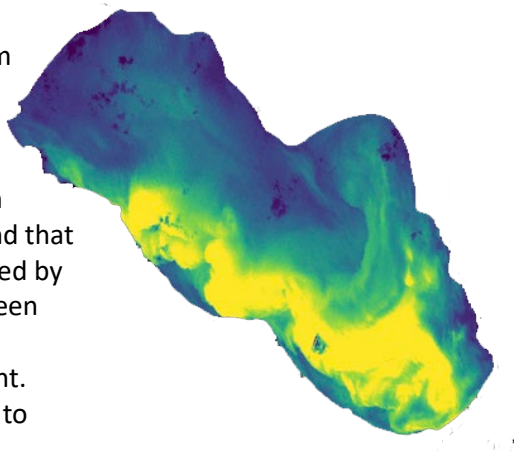
Attention: Robert Riddett, Community Planner, Terry Myers, Property Owner/Developer

Copies to: Rod Hawken, CAO, County of Wetaskiwin
Neal Sarnecki, Director of Planning and Economic Development, County of Wetaskiwin
Reeve and Council, County of Wetaskiwin
PLWA Board of Directors
Pigeon Lake Watershed Management Plan Steering Committee
Maskwacis Cree Tribal Council, via Samuel Minde, PLWA Director and Chair, Mamawo Mimiw Sakahikan Working Group
Sylvia Roy, CAO, for distribution to the seven Summer Village Councils
June Boyda, CAO, for distribution to the three Summer Village Councils
Duane Coleman, CAO Leduc County for distribution to Council

Regarding: **Village West Area Structure Plan SE 14-46-1-5 County of Wetaskiwin**
Comments from the Pigeon Lake Watershed Association

PLWA is pleased to provide comment on the proposed Village West Area Structure Plan. We have taken the opportunity to carefully review the proposed ASP documents, current and proposed planning policy documents, provincial legislation, and the comments of other municipalities. As a result, the PLWA has comments and considerations which are addressed to the proponent, and also to the County of Wetaskiwin Council and Administration, the south shore municipalities currently finalizing the Pigeon Lake South Intermunicipal Development Plan, the Maskwacis Cree Four Nations, and all the watershed municipalities.

While there may be significant regional economic benefits from the proposed development, the PLWA believes the environmental effects are not fully assessed nor is the development proposal balanced in terms of economic versus environmental quality trade-offs. The PLWA in this submission intends to better define the environmental stakes. Keep in mind that economic development in the Pigeon Lake region is underpinned by Pigeon Lake water quality and health. The outbreak of Blue Green algae blooms in the early 2000's has unfortunately impacted economic development prospects and stalled land development. We believe that new development needs to be highly adapted to this reality and needs to be very careful about the release of nutrients and pollutants resulting from land development.



Pigeon Lake Chlorophyll Levels on 2020-09-11
(Indicator of Blue Green Algae)
Sample from Appendix A

The proposed Village West ASP is not just a local matter--it's precedence, and cumulative effects are a cause of concern for the whole lake community, especially our municipal partners. Our level of concern is driven by public outcry and the severity of cyanobacteria over the past two decades. Just to underscore that concern we have included in ***Appendix A***, the record of satellite imagery for Pigeon Lake for the years 2017-2020. These images show that Pigeon Lake has been experiencing conditions that have the potential to produce blue green algae blooms. Here is a clear cause for concern. The PLWA supports and promotes a variety of actions, policies, and practices to combat blue green algae blooms. The advice from scientists[1] for a lake the size of Pigeon Lake is to reduce phosphorus runoff entering the lake from the watershed.

The concern for lake health has driven the formation of the PLWA in 2007. It has driven the PLWA to work closely with its municipal partners on the development of beneficial management practices and ultimately the Pigeon Lake Watershed Management Plan 2018 ("PLWMP"). [2] This concern has motivated Pigeon Lake municipalities to adopt the PLWMP and strive to incorporate the plan goals and recommendations into Statutory Plans. [3] Pigeon Lake municipalities have completed two Intermunicipal Development Plans (IDP) within the Pigeon Lake Watershed that embed PLWMP goals and strategies.[4] The next in the series of updated IDP's, the *Pigeon Lake South Intermunicipal Development Plan* (PLSIDP), is nearing completion and will closely follow the precedents of the other approved IDP's. This IDP will create a consistent watershed-based set of development policies and procedures for the entirety of Pigeon Lake.

The concern for lake health has motivated the four Maskwacis Cree Nation chiefs to endorse the PLWMP vision: *Working Together for a Healthy Watershed, Healthy Lake and Healthy Community.* The chiefs initiated the *Mamawo Mimiw Sakahikan Working Group* to explore how the First Nations may contribute to and participate in this regional concern around Pigeon Lake health.

In general, this shared concern for lake health will put this development and its development practices under the spotlight from a variety of stakeholders from around the lake. The proponent will need to carefully address how this development will avoid harming the lake.

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[1] Dr. Michael Paterson, Senior Research Scientist- Experimental Lakes Area (IISD-ELA) underscored the importance of managing phosphorous runoff in his presentation and the 2021 Pigeon Lake Watershed 101 Seminar

[2] Examples of beneficial management practices include the cosmetic fertilizer ban recommendation, Alberta Clean Runoff Action Guide, Lot Naturalization,

[3] On June 1, 2018, the County of Wetaskiwin Council adopted a resolution: to work collaboratively with other Pigeon Lake minimalities, the Pigeon Lake Watershed Association and the Pigeon Lake Watershed Management Plan Steering Committee to implement the Pigeon Lake Watershed Management Plan; to reference and consider the recommendations of the Pigeon Lake Watershed Management Plan – 2018 in the development of new and updated Statutory Plans required under the municipal government act and in the ordinary business of the municipality.

[4] Summer Villages and Leduc County Intermunicipal Development Plan 2019
and Pigeon Lake North Intermunicipal Development Plan

The PLWA also acknowledges the County of Wetaskiwin who independently created the County of Wetaskiwin Pigeon Lake Watershed Area Concept Plan (ACP) in 2014. The guiding vision of the ACP is: "*Our vision for the Pigeon Lake watershed is a healthy natural environment supporting sustainable development coexisting with the recreational value of the lake.*" We believe that parts of the Village West ASP proposal are not in alignment with the vision or spirit of the ACP.

The PLWA promotes responsible and responsive development. We promote collaborative approaches which produce acceptable solutions for Pigeon Lake. PLWA can be helpful and supportive in this regard. The efforts of the PLWA and our heathy lake partners in the development and implementation of the Pigeon Lake Watershed Management Plan 2018 has garnered two prestigious awards in 2021. In April the plan received and *Alberta Emerald Award* for Water resource projects. Later in the year, the plan and its writers received a *Planning Excellence Award* from the Alberta Professional Planners Institute (APPI). Collaboration and working together is one of the signature accomplishments of this watershed initiative.

In this submission, the PLWA acknowledges and supports the comments of nearby municipal partners. Rather than reiterate those concerns, we would like to outline our environmental and planning concerns and then provide our considerations for the ASP itself and then the related planning process.

PLWA CONCERNS

To understand PLWA concerns, it is first important to understand the context of this site in relation to the Pigeon Lake Watershed, the related sub-drainage basin and the site itself. This context is described in the accompanying ***Map 1 Watershed and Norris Basin Context*** and ***Map 2 Watershed Considerations***.

1. Norris Creek[5] Drainage Basin Size and Significance

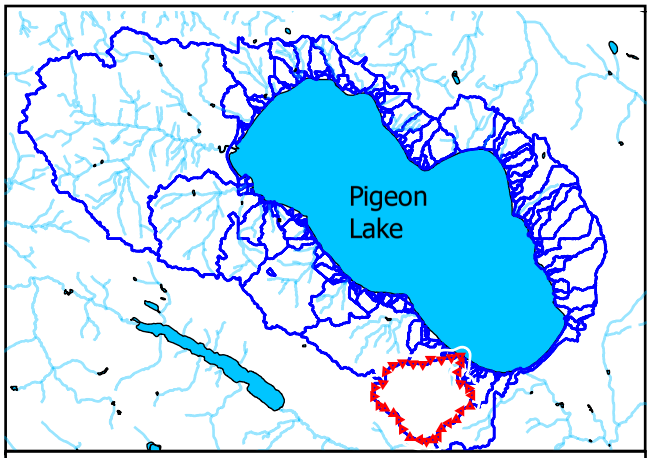
The Norris Creek basin is the third largest sub drainage basin of the Pigeon Lake Watershed. The basin drainage network extends across some 11 square kilometers of land, expanding to the east and south of the subject property. The character of the basin drainage network changes markedly just north of Highway 13 where runoff flows become concentrated in and funneled through a shallow valley that conveys surface drainage water a short distance to Pigeon Lake.

As a result of the sizable Norris Creek drainage basin, stream flow in Norris Creek is significant. Protecting and managing Norris Creek and its valley through the ASP area is critical for maintaining downstream water quality and water quality in Pigeon Lake near the Norris Creek outflow.

2. Norris Creek Valley Environmental Significance

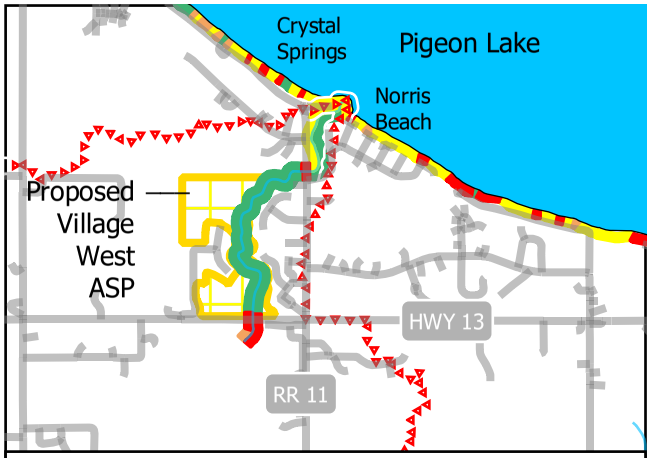
Norris Creek flows through the Norris Creek valley. Flow volumes vary significantly throughout each season and from year to year. Peak flows are often associated with early spring runoff events (freshets). An example spring flow was recorded in April of 2020 by PLWA volunteers (see Photo 1). High flow events brought on by extreme weather will likely flood portions of the Norris Valley, causing hazard conditions for property and human use.

[5] The name of the creek running through the ASP area was identified as "Norris Creek" in a 2013 Pigeon Lake water quality study authored by Alberta Environment and Parks.



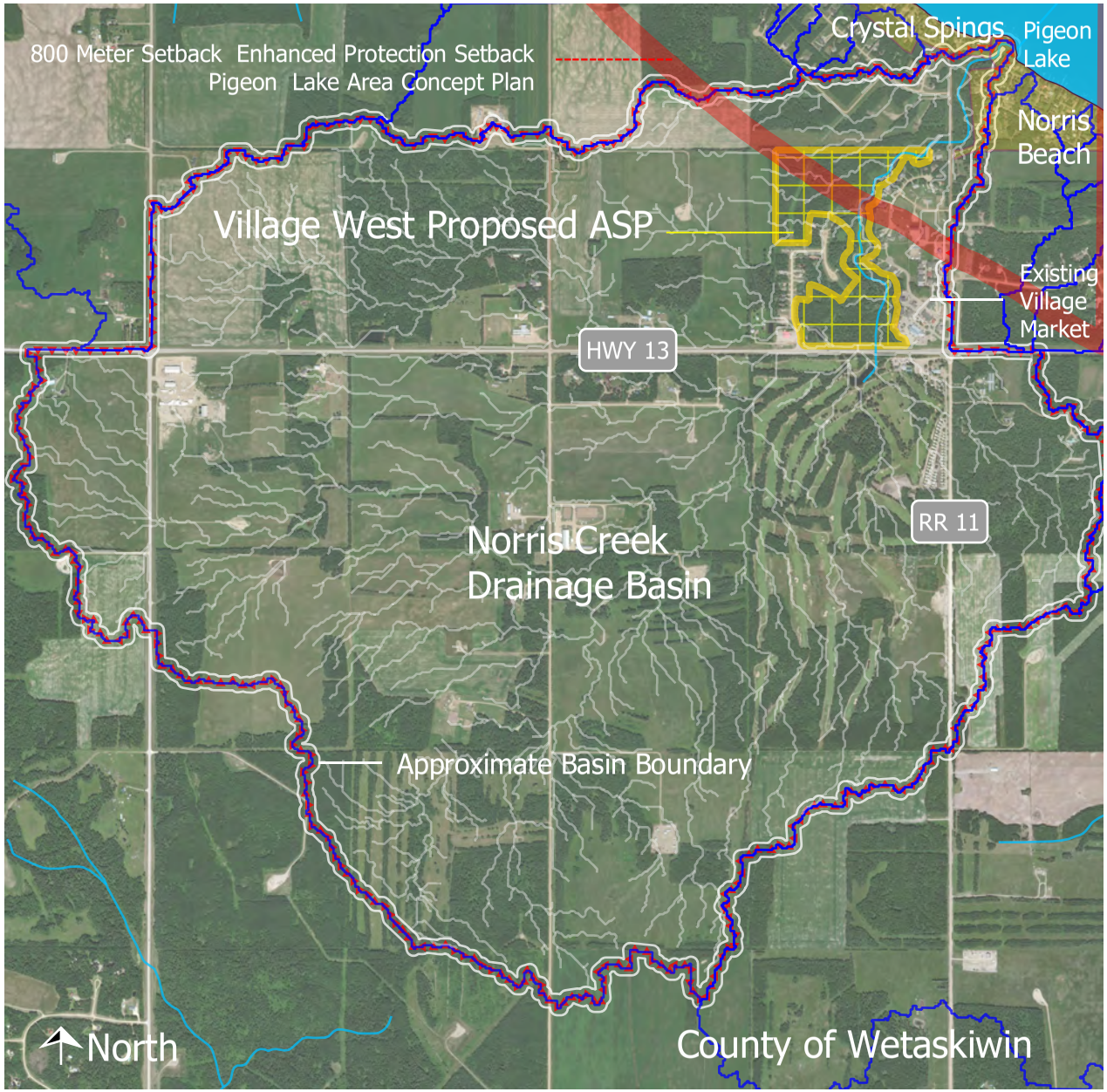
Pigeon Lake Watershed Drainage Basins

Drainage Sub Basins
Norris Creek Drainage Basin



Riparian Intactness Rating

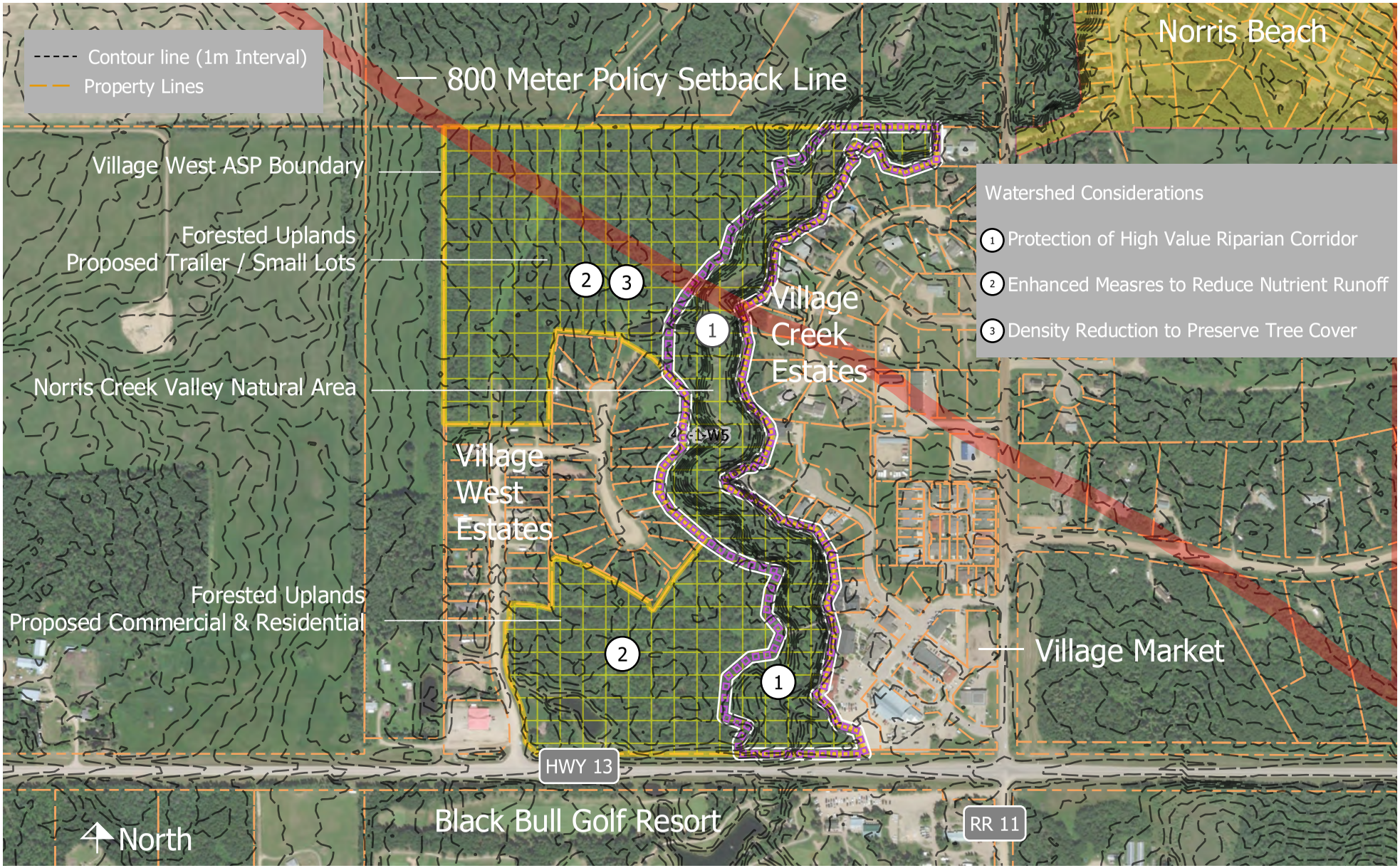
High Intactness
Modrate Intactness
Low Intactness
Very Low Intactness



PIGEON LAKE WATERSHED ASSOCIATION

Data Sources:
Licensed and Open Source Spatial Data: Government of Alberta
Earth Image: Bing Maps Sattelite
Basins and Drainage Lines: Generated from 7.5m LIDAR DEM
Riparian Intactness Ratings: Alberta Environment and Parks
800 Meter Setback: PLWA MLUB and PL Area Concept Plan
January, 2022

Map 1
Watershed and Norris Basin Context
Proposed Village West Area Structure Plan



PIGEON LAKE WATERSHED ASSOCIATION

Data Sources:
Licensed and Open Source Spatial Data: Government of Alberta
Earth Image: Bing Maps Sattelite
1m Contour Lines: Generated from 7.5m LIDAR DEM
800 Meter Setback: PLWA MLUB and PL Area Concept Plan
January, 2022

Map 2
Watershed Considerations
Proposed Village West Area Structure Plan

From north to south through the ASP lands, the Norris Creek natural area is a high value riparian corridor. It has a defined valley of 6-9 meters in depth, a width of 50-100 meters, including a flood plain and steep undevelopable valley side walls.

Photo 1: Norris Creek winter snow melt. April

Riparian health of the Norris Creek and valley is important to the watershed and lake health. A healthy riparian zone offers important benefits including trapping sediments, building banks and shores, storing water and energy, recharging aquifers, filtering and buffering nutrients, dissipating energy, supporting biodiversity and providing locations for nature appreciation. An assessment of riparian health for Pigeon Lake shorelands and tributaries was recently conducted which rated this section of Norris Creek as having a "High Intactness" rating (see Map 1). Essentially, the entirety of the Norris Creek valley – top of bank to top of bank and from north to south ASP extremities is a significant natural feature for the region and is an important part of the water quality defenses for Pigeon Lake. As proposed in the ASP, modifying the valley bottom and side walls to facilitate recreation development (including an outdoor amphitheater) risks flooding and erosion and undermines water quality natural defensive systems that filter drainage to the lake.

The proposed ASP justifies the utilization of the southern portion of the Norris Creek valley for recreation development based on a Wetlands Assessment report. The PLWA questions the limited scope that was given to the consultant, not the study result itself. The wetlands identified in the ASP report is only one component of a comprehensive environmental assessment. The PLWA, in this response, has identified other valued environmental components—water quality or pigeon lake and Norris Creek, flow and flooding of Norris Creek, Norris Creek Riparian Quality, Intact forest cover in the valley and uplands—that have been missed in this environmental assessment. Regardless of the scope and quality of the environmental study, the PLWA believes that the Municipal Government Action and County land use policy are clear—the Norris Creek Valley needs to be protected as Environmental Reserve.

Environmental Reserve (ER) dedication of the entire Norris Creek valley is justified in the Municipal Government Act MGA Section 664 (1) where the Norris Creek valley fits the general definitions for ER including ravine, coulee, drainage course and land that is subject to flooding or unstable. Section 6.5 of the County of Wetaskiwin Policy #61.1.6 concerning rules for area structure plans is clear that Environmental Reserve Dedication applies to sensitive lands that need to be protected from development including …. steep slopes, gullies, or ravines; and floodplains. Section 5.5.5 of the ACP identifies that land adjacent to creeks are to be dedicated as Environmental Reserve or in limited circumstances, an Environmental Reserve Easement. Finally, protecting high quality priority landscapes that benefit the lake is Recommendation 1a of the PLWMP-2018.

3. Proximity to Pigeon Lake and Norris Creek

Noted in the ASP document and our Maps 1 and 2 is the fact that the development is transected by the 800-meter Lakeside Environmental land use policy boundary identified in the County of Wetaskiwin Pigeon Lake Watershed Area Concept Plan (2014) and the PLWMP 2018. A short separation in time and distance from a sensitive feature such as Pigeon Lake, limits the effectiveness of intervening natural

defenses which filter, absorb and process nutrients. Therefore, in these close proximity zones, enhanced mitigation measures are needed to effectively counteract nutrient releases from land development. The proximity to Norris Creek is also significant because the creek becomes a short-cut to the lake for pollution and nutrient releases. Due to the proximity to Pigeon Lake and Norris Creek plus the scale of the development, the PLWA is of the opinion that that the entire Village West ASP should fall under the enhanced environmental protection standards, designed to reduce nutrient runoff.

Our concerns are supported in the policy precedence. Section 5.6 Land Near the Lake of the ACP identifies elevated development standards including MR/ER requirements, preference for higher densities, demonstrated access to Pigeon Lake, walking trails, tie-ins to regional wastewater and stormwater management employing Low Impact Development (LID) Strategies. Recommendation 1a of the PLWMP-2018 states "*Adopt an 800 metre "Lakeside Environmental Area" as per the Model Land Use Bylaw, that gives priority to land uses, policies, and environmental provisions designed to protect the lake from nutrient runoff*". Again, the PLWA advocates that the enhanced development standards should apply to the entire ASP area.

4. Loss of upland forest cover and increased nutrient release

The forested land around Norris Creek and Pigeon Lake has a significant benefit for Norris Creek and Pigeon Lake in that forest cover produces less runoff and releases less nutrients than the contemplated forms of development. Displacement of forest cover is a consequence of the approximately 47 acres of development in two zones:

- North Development Zone: approximately 27 acres of largely Aspen dominated forest is proposed for two hundred and seventy lots intended for a condominium style RV park with a central recreation site. RV lot sizes are proposed on average to be 40 x 70 feet. We are of the opinion that there will be little opportunity to retain trees within those RV lots.

- South Development Zone: approximately 20 acres of largely Aspen dominated forest is proposed for a resort development including hotel, convention center, spa, wedding pavilion, rental cottages, greenhouse, and market garden. An amphitheater and recreation area are proposed in the adjacent Norris Creek valley.

Managing nutrient releases from new development is a policy concern for the County of Wetaskiwin. In ACP Section 5.4 Reconciling Economic and Environmental Goals, forests are identified as releasing 10 kg/km2/year of phosphorus as compared to 100 kg/km2/year for urban type development. The ACP, in Section 5 Planning Principles sets out a number of policies to permit development while still protecting the environment. Pertinent sections include:

- Section 5.5.3 Protection of Environmentally Sensitive Areas: includes guidance for avoidance of tree removal, protection of trees, and compensation (when unavoidable) to produce no net loss of tree cover in the Pigeon Lake Watershed.
- Section 5.5.4 Cleaning up Inflows: guidance on nutrient and sediment removal at or near stormwater release point.
- Section 5.5.5 Sewer Service: guidance on wastewater requirements.

The PLWA believes that the Pigeon Lake Watershed needs a solution that delivers no net increase in nutrients from new development including the proposed Village West ASP lands. We hope that this development will take up our challenge. A variety of strategies need to be considered including low

impact development, tree retention, ER/MR protection of sensitive lands and tree cover, stormwater retention and treatment, sewer tie-ins, cosmetic fertilizer bans. These ideas are discussed in the next section.

5. Impact on the Pigeon Lake South Intermunicipal Development Plan (PLSIDP) Completion

Completion of the Pigeon Lake South Intermunicipal Development Plan is an important milestone for the whole Pigeon Lake watershed. Around Pigeon Lake, the Summer Villages and two counties will be operating under a watershed-motivated regional planning framework. A formal draft has not yet been released pending further discussion between the County and Summer Villages but an update was presented to County Council at their December 2021 Council meeting.

With active efforts to complete the PLSIDP, the spirit of regional collaboration and direction of enhanced environmental measures must be fully realized in the proposed ASP.

PLWA CONSIDERATIONS

PLWA has considerations/suggestions/challenges for both the developer and County with respect to the Village Creek ASP. Our underlying concerns are the health of Norris Creek, the watershed and Pigeon Lake -- and ultimately the health of the communities around the lake. We believe that engagement and planning process needs to involve the broader watershed community to achieve the right project and development standards for Pigeon Lake. We draw these recommendations from provincial legislation, County policy, and the Pigeon Lake Watershed Management Plan.

1. Norris Creek Valley Natural Area

Protection of the Norris Creek Valley with flood plain, steep valley side walls, tree cover and an intact riparian zone is very important in reducing nutrient flows to Pigeon Lake and maintaining diverse habitats. Under the Municipal Government Act Section 664.1 and County land use policy, it is quite clear is that this entire landscape unit qualifies as Environmental Reserve as opposed to a Municipal Reserve. Municipal Reserves and intensive recreation land uses do not belong in the Norris Creek Valley.

2. Norris Creek Valley Top of Bank Setbacks

Further top-of-bank set back (min. 6-10 m) of naturally vegetated cover should flank Norris Valley ER lands to provide vegetative filters and to separate adjacent recreational and commercial development from Norris Creek Valley Natural Area. These lands should be protected in ER or MR designations as deemed appropriate by the County. These lands are highly suited to top of bank recreational trails.

3. Upland Development and Pigeon Lake Enhanced Environmental Development Standards

Given the proximity to Norris Creek and Pigeon Lake, we believe that all development in the Village West ASP should be subject to enhanced environmental development standards, focused on the protection of Pigeon Lake. We ask the developer and the County to consider the challenge of delivering a development that champions no net increase in nutrients to Norris Creek and Pigeon Lake. Potential measures to consider may include:

a. **Native Forest Cover Retention Strategies:** A variety of strategies could be considered in the ASP development including adopting larger lot formats which permit the trees to remain inside each lot or allocating MR (including MR from Stage 1) to retaining bands of native forest that separate development zones.

b. **Low Impact Development and Clean Runoff:** clean runoff can be achieved by employing a series of strategies. Common Low Impact Development (LID) strategies slow runoff flow and utilize natural processes to buffer and treat nutrients. These strategies are deployed on lots, in the use of permeable surfaces and local depressions, in the conveyance systems (ditches and swales) and at the discharge points to receiving water bodies. Alberta is fortunate in having strong industry expertise for LID practices and a strong industry voice in the form of the Alberta Low Impact Development Partnership (alidp.org) We would like to see your creativity regarding LID implementation and offer our support and assistance.
c. **Pre-Release Treatment of Stormwater and Safe Discharge:** part of any modern development is a stormwater management plan that limits peak discharge to predevelopment rates. May we suggest that stormwater quality goals include nutrient mitigation strategies for treatment. Also, we would like a commitment to design the conveyance of stormwater from top of bank treatment facilities down the 6-9 meter valley wall to Norris Creek, in a manner that avoids erosion and sedimentation for Norris Creek.
d. **Construction Sediment and Erosion Control:** phosphorus often moves through the watershed attached to soil particles. We would appreciate that the developer and County adopt a robust Sediment and Erosion control protocol for all phases of construction and development. An example guideline is found in the Construction Section of the Alberta Clean Runoff Action Guide
e. **Cosmetic Fertilizer Prohibition:** the County of Wetaskiwin has a fertilizer ban bylaw in place for a the immediate shore of the lake. We recommend that the ban be extended to include the proposed ASP area. The PLWA is prepared support local lot owners in alternative landscape practices for healthy lake side landscapes.
f. **Wastewater and Greywater:** the ASP commits to a full tie-in to the regional wastewater system for the entire development -- which we applaud. Please ensure that grey water from trailers or other facilities is not permitted to be discharged onto the ground.

ENGAGEMENT AND PLANNING PROCESS

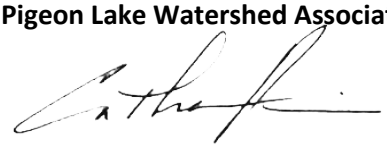
- Full regional engagement is required in keeping with the spirit of the current draft South Intermunicipal Development Plan.
- Responsiveness to regional concerns is required to ensure the ASP is appropriate for Pigeon Lake and its watershed.
- The ASP must be fully included and part of the forthcoming South Pigeon Lake Intermunicipal Development Plan
- PLWA requests to be included in any engagement process to ensure environmental considerations are clarified and incorporated in the final plan.

CONCLUSION

Once again, thank you for the opportunity to provide our comments on the proposed Village West ASP. The PLWA's comments are intended to give voice to the environmental concerns of the lake and watershed. Keep in mind that the social and economic health of the region is dependent on the health of the lake and watershed. The PLWA is available to participate in the planning process as deemed appropriate. We offer our trove of information, beneficial practices and technical expertise to support planning and development appropriate to the Pigeon Lake watershed. Feel free to contact me at any time.

Yours truly,

Pigeon Lake Watershed Association



Catherine Peirce, Executive Director

Attachments:

Map 1 Watershed Context
Map 2 Watershed Considerations
Appendix A: Pigeon Lake Satellite Chlorophyll Monitoring (2017 to 2020)

Appendix A

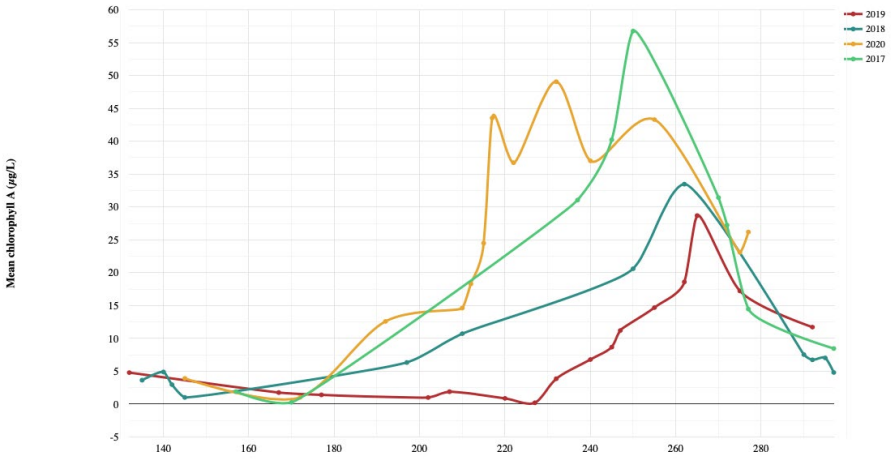
Pigeon Lake Satellite Chlorophyll Monitoring (2017 to 2020)
Time Lapse Chlorophyll Intensity and Distribution
February 2022

The satellite image galleries on the following pages present a snapshot of chlorophyll intensity, duration, and distribution for the Pigeon Lake Alberta open water seasons of 2017, 2018, 2019 and 2020. Chlorophyll has a distinctive pigment that is associated with Cyanobacteria (Blue Green Algae) and other phytoplankton species. This pigment intensity is considered a good representation a cyanobacteria intensity. The pigmentation of lakes by chlorophyll is observable and measurable from satellites in space.

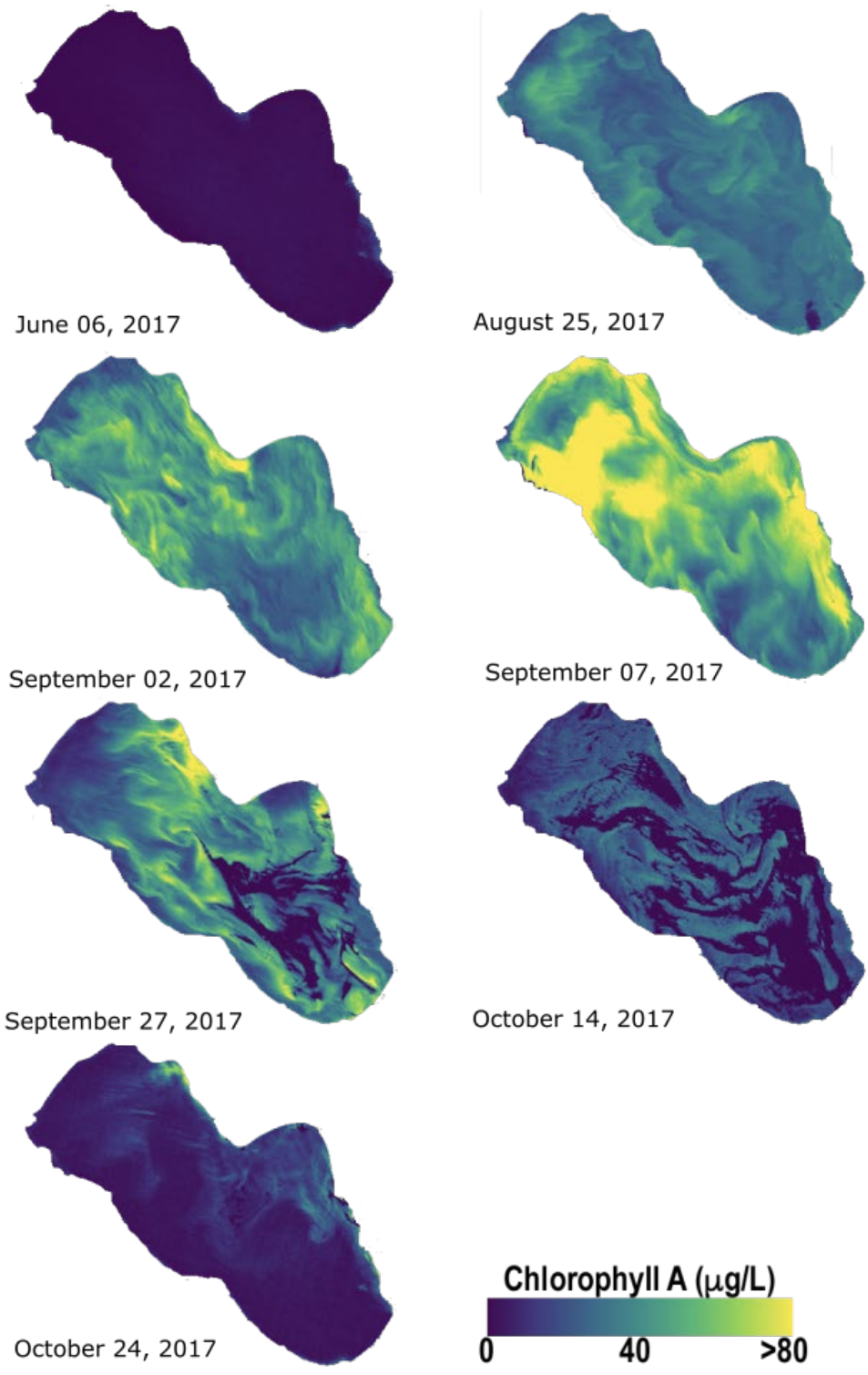
Development of a satellite image tool and library was a collaborative project of the Alberta Biomonitoring Institute (ABMI), Rolf Vinebrooke UofA Lab, the Alberta Lake Management Society (ALMS), Alberta Environment and Parks and the Pigeon Lake Watershed Association (PLWA.ca). Project funding came from Alberta Health Services which is responsible for monitoring lakes for adverse public health conditions.

The images showing chlorophyll levels were created by ABMI on the Google Earth Engine App server using European Sentinel 2 and 3 satellite imagery. Raw satellite images are processed to categorize chlorophyll levels by color bands. The processing is customized for Pigeon Lake based on extensive calibration testing during the summer of 2019. The image data is available to the public at: https://abmigc.users.earthengine.app/view/pigeonlake-monitoring

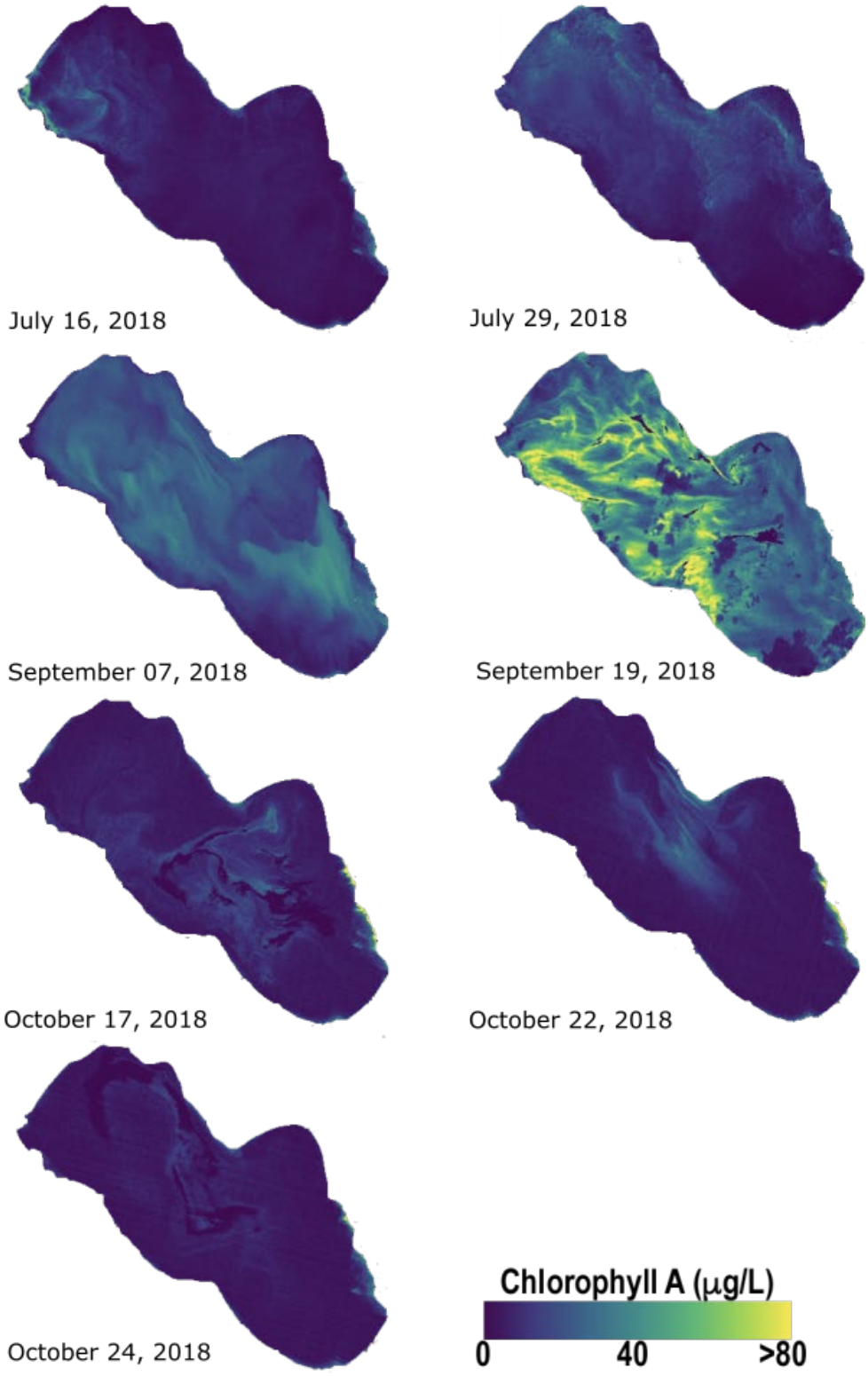
The following pages are galleries of images throughout each of four open water seasons. Satellite time-lapse imagery has some great advantages including clear visualization of cyanobacteria and its spatial dynamics each season. The tool has limitations in that the lake can be obscured for periods of time due to clouds and haze. This tool provides denser spatial and temporal empirical measures of cyanobacteria and bloom intensity and frequency- see below.



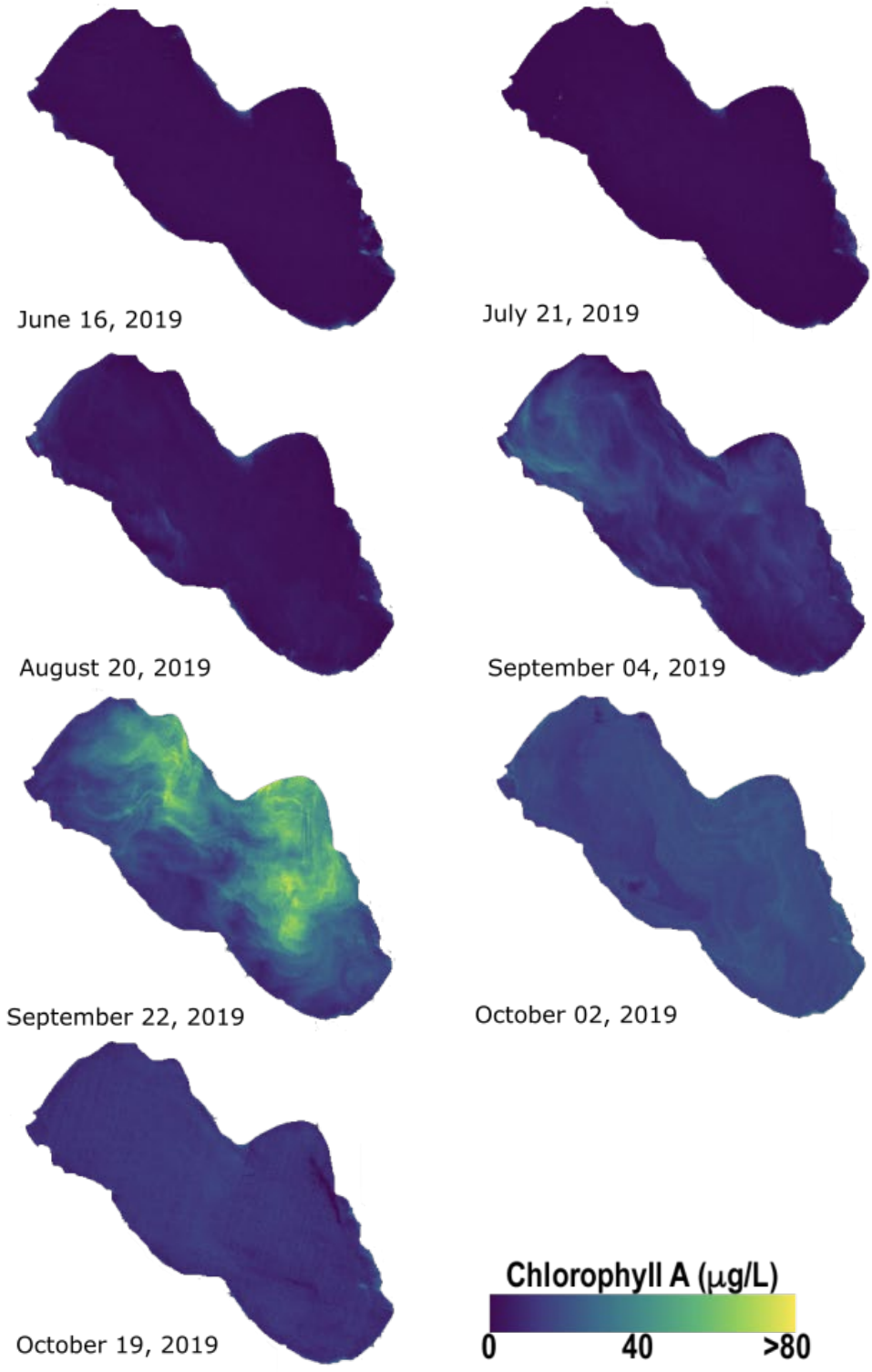
2017


June 06, 2017
August 25, 2017
September 02, 2017
September 07, 2017
September 27, 2017
October 14, 2017
October 24, 2017
Chlorophyll A (µg/L)
0
40
>80

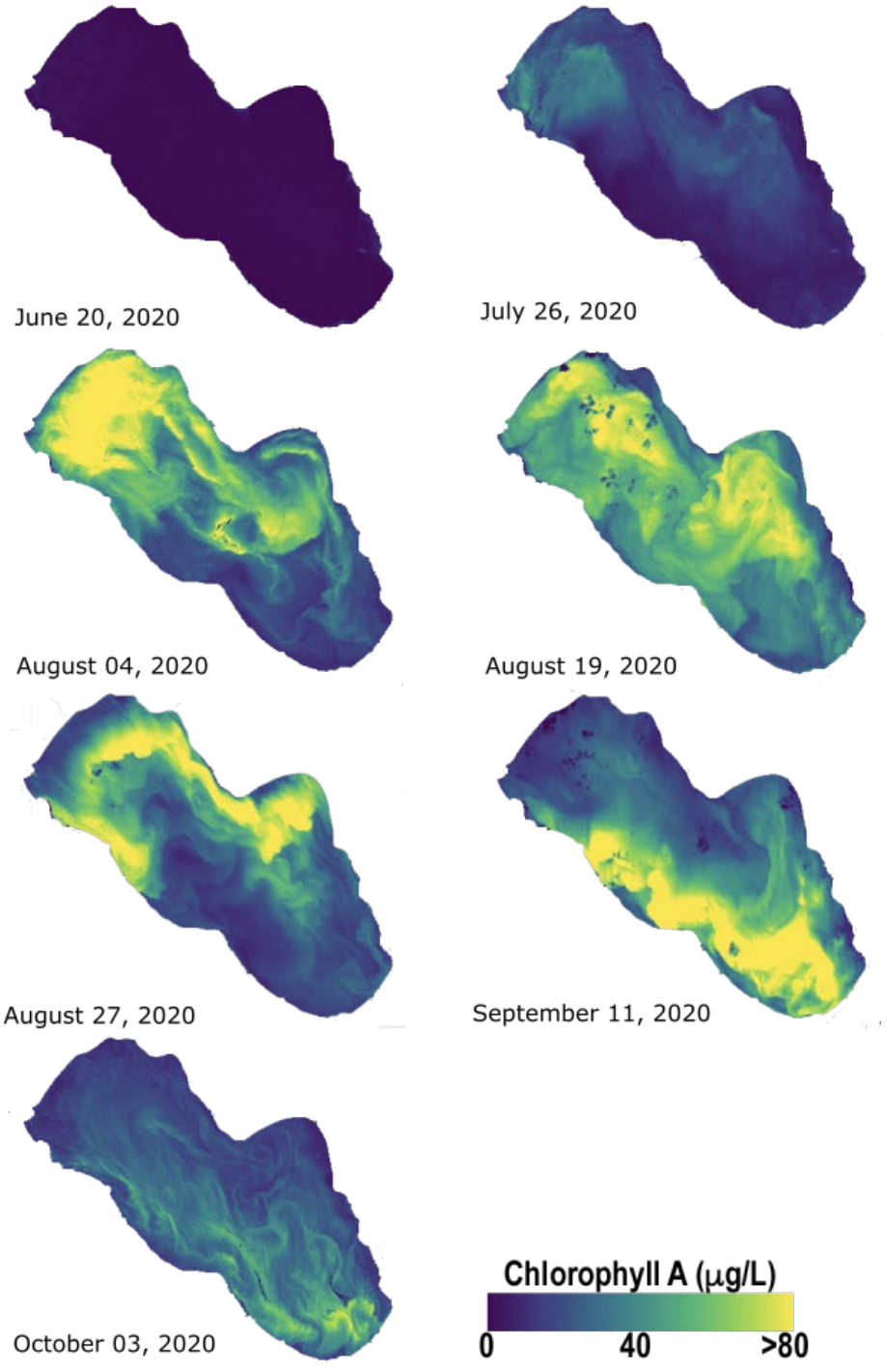
2018


July 16, 2018
July 29, 2018
September 07, 2018
September 19, 2018
October 17, 2018
October 22, 2018
October 24, 2018
Chlorophyll A (µg/L)
0
40
>80

2019


June 16, 2019
July 21, 2019
August 20, 2019
September 04, 2019
September 22, 2019
October 02, 2019
October 19, 2019
Chlorophyll A (µg/L)
0
40
>80

2020


June 20, 2020
July 26, 2020
August 04, 2020
August 19, 2020
August 27, 2020
September 11, 2020
October 03, 2020
Chlorophyll A (µg/L)
0
40
>80