Aquatechnex, LLC

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Erie and Campbell Lakes Aquatic Plant Management Year End Report

Skagit County and the Erie and Campbell Lake Management District

Clear and Beaver Lake Aquatic Plant Management Program

Year End Report

Introduction

Erie and Campbell Lakes are located just south of Anacortes, WA in Skagit County and are hydrolically connected. Erie Lake is the upper lake in this system draining downstream to Campbell Lake. Drainage from Campbell Lake moves to the Puget Sound after a short distance down the outlet creek. These lakes have been subject to management for a number of years to combat the effects of Eutrophication. In the 1980's a EPA Clean Lakes Restoration Project was conducted on these two water bodies. This involved an intensive study, a large scale Alum Treatment to remove phosphorus from the water column and the purchase and operation of an aquatic weed harvester to manage noxious plant growth in the lakes. Both of these lakes became impacted with Eurasian Milfoil in the 1990's and the community turned to Skagit County for assistance in the formation of a treatment plan. The County developed an Integrated Aquatic Vegetation Management Plan (IAVMP) in the early 2000's and Aquatechnex was selected to help implement this plan.

The first phases of this operation were to perform herbicide treatments to target this growth. A whole lake Sonar treatment was performed on Lake Erie as that lake was nearly totally impacted by this noxious weed. Areas of Campbell Lake were also targeted with systemic herbicides selective for Eurasian Milfoil. The second phase of this project was to introduce triploid grass carp. Aquatechnex secured the necessary permits and install fish screens at the outlet of both lakes. Fish were then stocked.

Since that time, Campbell Lake has required the addition of some additional fish and treatments for Eurasian Milfoil and noxious water lily growth. Erie Lake has exhibited different conditions in each of the past five years. Plant growth was light after the Sonar treatment and initial stocking. Over time, the plant species have shifted somewhat and become more problematic.

The key component of this program remains the use of biological control agents, triploid grass carp, to manage these populations. When using a biological tool, there is a lag time between stocking and results. Once results are gained, the problem plants can begin to recover as there is mortality in the population of the biological control agent. Ideally, fish would be introduced each year to maintain a more stable population of aquatic weeds. The State of Washington permitting process does not often allow for that to occur however. The Department of Fish and Wildlife is responsible for the issuance of permits to perform this work. They have strict policies they adhere to with respect to the number of fish allowed over a given time period. These policies have had some impact on the use of this tool at these two lakes over the years. There is potentially significant mortality of grass carp in these systems as they are subject to predatory pressures from birds of prey and river otters. Both of these are voracious consumers of fish.

2008 Management Efforts

Spring Meetings

Aquatechnex biologists met with County Lake Management Staff and members of the Steering Committee in the spring of 2008 to begin this year's efforts. The County had hired a new lake management staff person so this meeting served to introduce the parties and agree on the framework for the season's activities.

As the grass carp stocking permit had expired, the Steering Committee requested we apply for another permit to continue the process of managing weed growth with this tool. We also agreed to get the survey started as plant conditions were right. Lastly, the County had a legal need to re-issue our contract for this and the other lake management district work. We developed and supplied a permit application to the Washington Department of Fish and Wildlife by mailing it to their Mill Creek office as is required.

Early Summer Survey

Normally aquatic vegetation starts to emerge from lake sediments in mid May in this region. This summer, conditions are such that plant growth has been delayed somewhat. The very cool and overcast spring and early summer delayed normal aquatic plant growth throughout the area. We did visit these lakes in May and determined it was too early to effectively survey them. A survey provides an indication of the conditions present on that day. As the primary objective of this survey was to determine if Eurasian Milfoil remained in the lakes and to document any recovery of native aquatic plants, performing this work at this point would have probably missed some vegetation that had not yet emerged.

Aquatechnex biologists performed aquatic plant mapping efforts on both Erie and Campbell Lakes in late June. We mobilized a mapping vessel to the lake equipped with a Trimble ProXT GPS system and data logger. This system links to ArcGIS mapping software on a Panasonic Toughbook computer system. We used this technology to record our findings on the water with submeter accuracy.

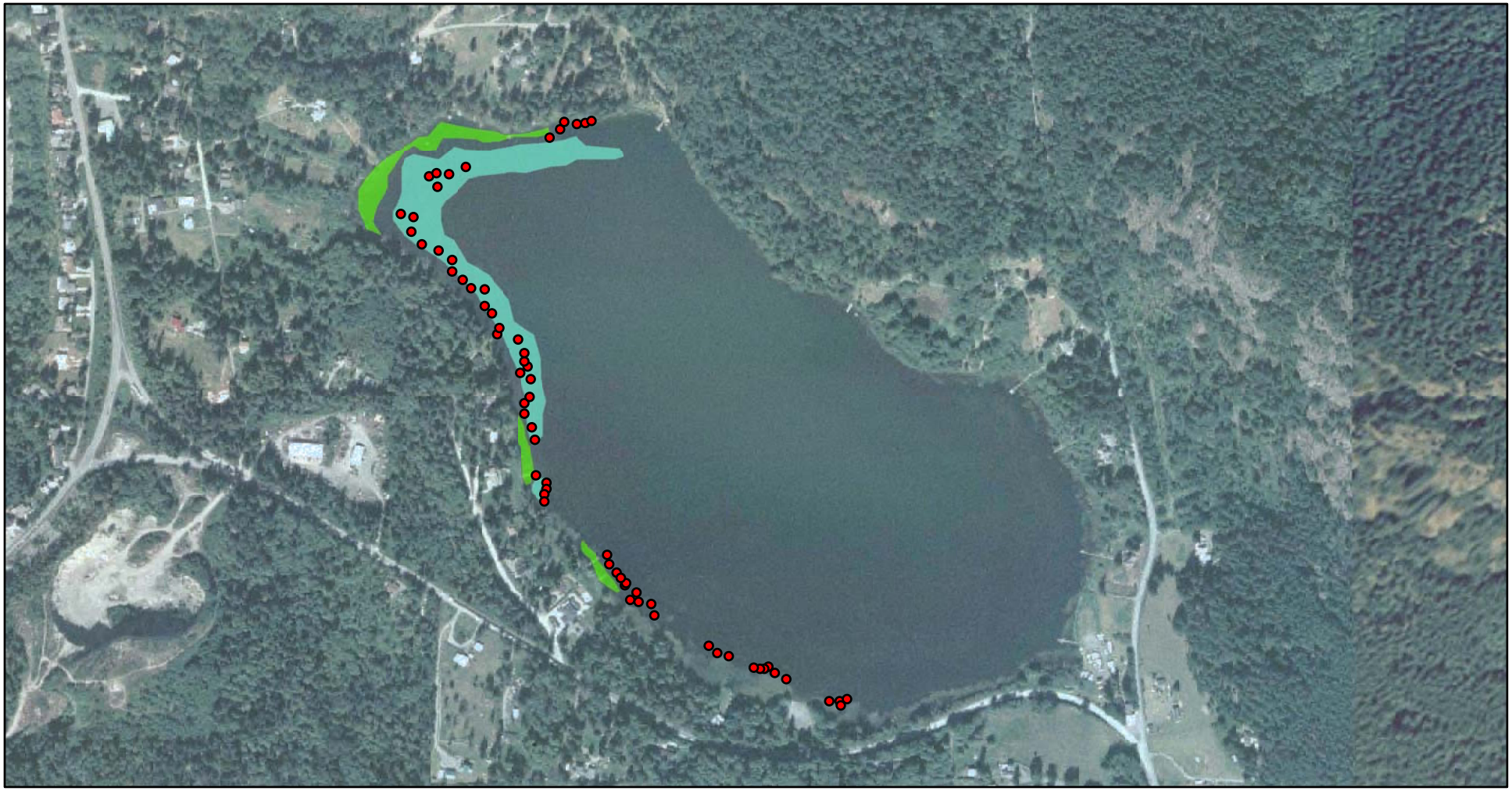
We used a combination of point intercept sampling to document species present at these locations and a littoral visual and diver survey where we mapped the plants and beds observed from the boat between sampling stations. This information was brought back to our Bellingham office for processing. A brief discussion of the conditions in the lake is presented here.

Noxious Water Lily Growth

Noxious water lily growth in both lakes has been very effectively suppressed as of the time of this survey. *Nymphaea odorata* or White/Fragrant Water Lily has been subject of regular treatments for the past few seasons. This growth was reduced to a few plant here and there at the time of this survey in both lakes. There is a considerable amount of the native lily *Nuphar sp.* or Spatterdock in both lakes. This growth is generally considered good habitat. There has been some concern about the density of this species around the Lake Erie public access site however. The Steering Committee has expressed a need to move this growth back away from the ramp to some degree.

Eurasian Milfoil and Aquatic Plant Communties, June 2008

Erie Lake, Washington



The primary aquatic weed issue present at this time is Northern Milfoil.
Eurasian Milfoil plants are pioneering at the locations noted.

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Legend

- Eurasian Milfoil
- Eurasian Milfoil
- Dense Native Plants
- Northern Milfoil

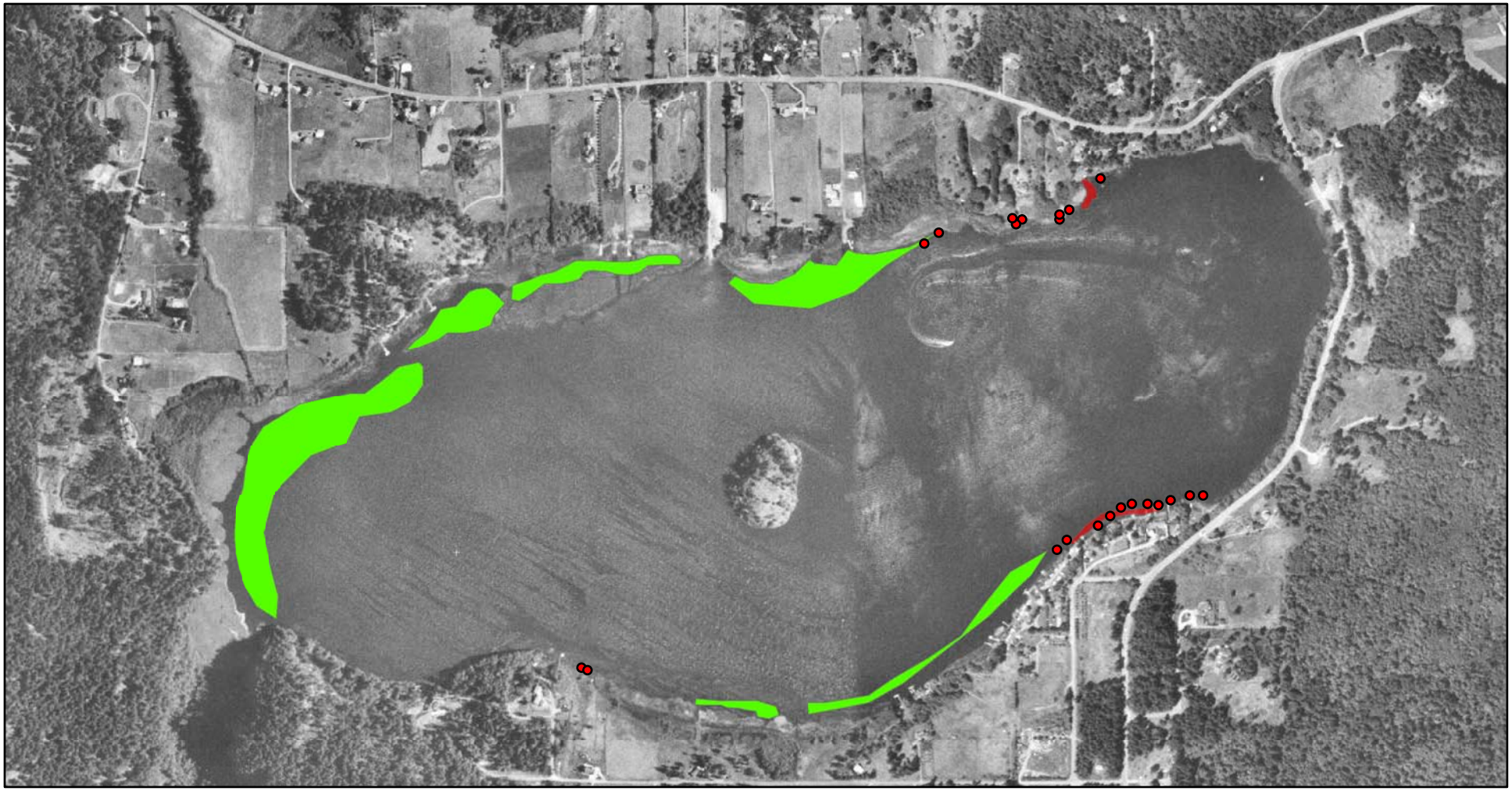
naip_1-1_2n_s_wa057_2004_1.sid

RGB

- Red: Band_1
- Green: Band_2
- Blue: Band_3

Campbell Lake Eurasian Milfoil Infestation, June 2008

Campbell Lake, Washington



Status of Aquatic Plant Growth in Campbell Lake from June 12th Survey. Eurasian Milfoil was present at mapped. Dense native plant beds were located as mapped.

<Double-click to enter source information>

Legend

- Eurasian Milfoil
- Eurasian Milfoil
- Dense Native Plants

Submerged Aquatic Plant Growth

Our biologists also repeated the point intercept sampling and visual inspections of the littoral areas of the lakes.

Campbell Lake had a few scattered *Myriophyllum spicatum* or Eurasian Milfoil plants as shown on the attached map. There were two areas on the lake that exhibited enough growth in one location to be mapped as polygons. There were also areas mapped in green that contained dense growth of native aquatic plants. The dominant species were *Ruppia maratima* or Widgeon Grass, *Ceratophyllum demersum* or Coontail and *Potamogeton illinoensis* or Illinois Pondweed. There was approximately 2.5 acres of Eurasian Milfoil that was recommended for treatment based on this survey.

Erie Lake exhibited a bit more milfoil growth. There were scattered Eurasian Milfoil plants along the western shoreline from the public access site as mapped. There were also larger polygons of *Myriophyllum sibericum* or Northern Milfoil throughout the northwest corner of the lake. This Northern Milfoil growth was approaching problem proportions. In addition, many areas on the western shoreline were starting to develop dense beds of *Najas sp.* or Naiad/Water Nymph. This species is one of the only aquatic plants that are annual species. They regrow from seed each year. Approximately 4 acres of Eurasian Milfoil was present and recommended for control based on it's status as a noxious weed.

Recommendations to the County and Treatment Performed

Based on these conditions, we recommended treating the Eurasian Milfoil present in both lakes at the time of this survey. We delivered a public notice to the residents of both lakes that were affected by this treatment 10 days prior to application. We then followed the direction in the NPDES permit to make that application.

Aquatechnex made the application to both lakes on July 16th using Dow DMA4 herbicide. This is a selective herbicide for Eurasian Milfoil and a systemic product.

Later Season Issues

The balance of the work for 2008 was compromised by the lack of a completed contract with the County. There were additional questions from the lake residents regarding an later summer increase in aquatic plant growth primarily in Erie Lake. We made additional trips outside the scope of the contract to review this situation and recommended we hold a meeting with the Steering Committee to discuss issues.

Since the June survey, the plant growth in Erie Lake had expanded fairly dramatically. This is probably due to the late summer and the fading pressure of the remaining grass carp in the lake. The primary problem was Naiad, this annual plant often takes off later in the growing season.

The meeting was held and a number of issues were discussed. The situation with the Contract was resolved by the County. The commissioners signed this agreement in September, but it was also felt that herbicide treatments at that point would not be fiscally responsible. The aquatic plant growth in the lake had started to die back for the winter at that point and the types of herbicides that would be used would not provide any decrease in the plant populations the following year because of the mode of action of that product. We also discussed the status of the grass carp and the need to focus more on using that tool. To that point we had not received a permit back from

our May application to the Department. After leaving the meeting, we spent a considerable amount of time tracking that down and determined like a number of our other clients that the Department had not processed it or cashed our check. We resubmitted this application and payment by Federal Express so we would have a record of receipt from the Department and it would be in their hands rapidly. We will present additional information on this subject below.

Thoughts for 2009

There should continue to be a program of monitoring and mapping aquatic vegetation in both of these lakes in the coming year.

The growth patterns in these lakes next summer should be more normally. The spring of 2008 was very unusual in terms of growth of aquatic vegetation. The growth spurts we generally see in late May were weeks late. We would recommend selecting a survey date that is late enough to document Naiad growth in Erie Lake and early enough to make treatment decisions.

With respect to control efforts, the herbicide budget from 2008 largely carried over so there is some room to make decisions regarding the scope of treatments and fish next year. A meeting with the Steering Committee should be held just after the survey and mapping work is completed and a recommendation would be made for treatments as necessary. These would then be performed as approved.

The Grass Carp permit remains an issue. While we have a record that the Department of Fish and Wildlife received this permit application in early October, as of the week of Thanksgiving, the Regional Biologist that processes the permit had not seen it. We were able to establish voice communication on that subject and learned that the person that should have sent it to him was on vacation that week and they would pursue finding it the first week in December. We have not heard back from the Biologist in that regard.

The Regional Biologist also mentioned that they didn't know what would happen when they receive the application. They indicated that they will only allow a certain number of fish per five year period in any lake as is there policy and they would have to consider the application in that regard when it does arrive. We expect to receive an update on this issue the first week in January from the Department. At that time we will develop a memo to the County and the LMD as to the status and probable outcome of this process.

Using a biological control agent requires frequent addition of the agent if control is not being achieved. The potential problem with using this tool on these lakes in the future remains the regimented permitting and regulatory guidelines that the Department uses to allow the introduction of fish. They are trying to balance control with the non desired result of removing all vegetation from a lake. Their current procedure to accomplish that may not allow us to use this tool effectively to manage aquatic weed growth however. It is clear that the biological control populations at least in Erie Lake is not pressuring the weed populations to the point necessary to protect beneficial use of that waterway from the residents perspective. After we get a clear picture of what their position is on this renewal, we should meet to develop contingency plans should the permit not provide an avenue of effective stocking and control. This could involve asking for a variance from their policy if that becomes an issue or shifting to other control methods as necessary. It may also be time to meet with others in the

Department and try to get the regulations adjusted so that control programs such as this one can be more effective.

At this point, it is premature to determine the best methods for control for this coming year. The conditions in the lakes may or may not change and the survey will determine that. The control options may include Grass Carp if the permit is renewed, but the stocking level allowed will have a lot to do with the results that will occur. Fish may need to be augmented by herbicide or other control methods in 2009 and we will have a clearer picture in a month or so.

Cabela's Lake Mapping Program

Aquatechnex has been applied as the Cabela's Lake Mapping Partner for this region. This process involves travel to collect data from the lake and processing that information to create extremely accurate lake maps.

Aquatechnex biologists would travel to the lake with our bathymetry mapping vessel. The Cabela's system links a Trimble GPS data logger with sub foot accuracy with a hydro acoustic depth sounding system with 0.2 cm accuracy. This system is calibrated to collect a GPS location and depth attribute every two seconds. A sampling protocol is followed, we travel on transects with approximately 20 foot spacing. On a project this size, this generates over 5,000 data points.

This data is then shipped back to Cabela's geographers for processing. They use ArcGIS mapping software and other technology to develop extremely accurate bathymetry maps and 3D models of the lake. They will also calculate the exact water volume for this system. Other measurements are also possible based on the needs of the client. The maps and a report will be created and supplied to the Community by Aquatechnex as the regional mapping partner. This process can be repeated at intervals that make sense to the community and the change of depths or sediment loading rate are then obvious and can be measured.

These maps have value to lake managers to calculate exact water volume and to track sedimentation. They may also have value to lake residents to help them understand structure and habitat to increase their enjoyment while fishing.

This mapping is something that is available and could be considered by the community.