2001 SUMMARY REPORT
of
SUN LAKE

Lake County, Illinois

Prepared by the

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EXECUTIVE SUMMARY

Sun Lake, located in Lake Villa Township, is a glacial lake with characteristics very similar to a bog system. The lake is surrounded by undeveloped shoreline and is managed by the Lake County Forest Preserve District. Sun Lake is an oval shaped lake with a surface area of 24.5 acres and mean and maximum depths of 9.6 and 19.2 feet, respectively. Although no boats of any kind are allowed on the lake, it is used by the public for shoreline fishing.

Water quality parameters, such as nutrients, suspended solids, oxygen, temperature and water clarity were measured and the plant community was assessed each month from May-September 2001. Sun Lake was thermally stratified all summer, but it could not be determined how much of the lake volume remained oxygenated and could be inhabited by aquatic life due to the lack of a bathymetric map. Phosphorus levels in both the epilimnion and hypolimnion were well below the County medians. Hypolimnetic concentrations were almost twice as high as the epilimnetic concentrations, but this phosphorus remained isolated in the hypolimnion throughout the summer, preventing planktonic algae blooms in the surface waters. As a result of the low phosphorus concentrations and high plant diversity and density, total suspended solid concentrations were very low and Secchi depths (water clarity) were higher than average all summer.

Sun Lake had a diverse and healthy plant community, with 15 different plant species observed. Only two exotic species (Eurasian watermilfoil and curly leaf pondweed) were present among these and the Eurasian watermilfoil was being moderately damaged by the milfoil weevil. This very healthy plant community provided Sun Lake with excellent fish habitat and kept water clarity high by reducing sediment resuspension and competing with planktonic algae for resources.

Because 100% of the shoreline along Sun Lake is undeveloped and dominated by wetland, none of the shoreline exhibited erosion. The wetland and woodland surrounding the lake provided good wildlife habitat and state threatened and endangered bird species were observed during the summer. The wetland around Sun Lake should be maintained as much as possible so as to continue to provide shoreline stabilization and wildlife habitat. The only negative aspect of the shoreline was that purple loosestrife and reed canary grass were present along 100% of the shoreline. This problem should be addressed soon.

Lake Name: Sun Lake

State: IL

County: Lake

Nearest Municipality: Lake Villa

Township/Range: T 46N, R 20E, S 28, 33

Basin Name: Fox River Watershed

Subbasin Name: Sequoit Creek Watershed

Major Tributaries: Sequoit Creek

Receiving Water Bodies: East Loon Lake

Surface Area: 24.5 acres

Shoreline Length: 0.9 miles

Maximum Depth: 19.2 feet

Mean Depth: 9.6 feet (estimated LCHD)

Storage Capacity: 235.2 acre-feet (estimated LCHD)

Lake Type: Glacial

Sun Lake lies completely within Forest Preserve property and is solely owned by the Lake County Forest Preserve District. The lake is a pothole slough that was carved out over ten thousand years ago during the last ice age. The lake is and probably always has been surrounded by a flat, wetland area dominated by emergent vegetation. The decomposition of this emergent vegetation (which ended up in the lake) over thousands of years has resulted in the dominance of peat along the bottom of Sun Lake, and the lake and surrounding shoreline are very similar to a bog system. In fact, large peat mats were observed floating on the water surface as the summer of 2001 progressed as gas emissions from the lake bottom caused the peat to rise. As is true on nearly all Forest Preserve lakes, no boating (i.e., canoes, etc.) is permitted on Sun Lake and only bank fishing is allowed.

LIMNOLOGICAL DATA – WATER QUALITY

Water samples collected from Sun Lake were analyzed for a variety of water quality parameters (See *Appendix B* for methodology). Samples were collected at a depth of 3 feet and 14-16 feet (depending on water level) from the deep hole location in the lake (Figure 1). Sun Lake thermally stratified in 2001. Thermal stratification occurs when a lake divides into an upper, warm water layer (epilimnion) and a lower, cold water layer (hypolimnion). When stratified, the epilimnetic and hypolimnetic waters do not mix, and the hypolimnion typically becomes anoxic (DO=0 mg/l) by mid-summer. This phenomenon is a natural occurrence in deep lakes and is not necessarily a bad thing if enough of the lake volume remains oxygenated. During most of the summer, anoxia did not begin to occur until a depth of 10-14 feet. Typically, if a lake has 25% of its volume below a depth of 10 feet, winter fish kills from low DO levels are not usually a threat. The lack of a quality bathymetric map for Sun Lake prevents the determination of the volume below 10 feet or the volume that was anoxic during the summer, and the creation of a map is recommended. The near surface waters of Sun Lake were well oxygenated during the summer and DO concentrations did not fall below 5.0 mg/l (concentration below which aquatic organisms become stressed) at any time during the study period. Hypolimnetic DO concentrations were very near 0 mg/l from May-August, which (as mentioned above) is typical for a deep lake. Lake turnover had occurred by the September sampling date, resulting in whole-lake mixing and higher hypolimnetic DO levels (Table 1, Appendix A).

Phosphorus is a nutrient that can enter lakes through runoff or be released from lake sediment, and high levels of phosphorus typically trigger algal blooms or produce high plant density. The average near surface total phosphorus (TP) concentration in Sun Lake was 0.041 mg/l, while the hypolimnetic average phosphorus concentration was 0.070 mg/l (Table 1, Appendix A). Both were below the County median epilimnetic and hypolimnetic phosphorus concentrations of 0.047 mg/l and 0.165 mg/l, respectively. This means that Sun Lake phosphorus concentrations were lower than the majority of the lakes studied in Lake County since 1995. The low epilimnetic TP concentrations in Sun Lake were likely the result of relatively high quality sources of water to the lake. Deep Lake Drain is the major inflow to Sun Lake. The average epilimnetic TP concentration in Deep Lake in 1998 (the most recent study conducted by the Lakes Management Unit) was 0.023 mg/l. This is a very low phosphorus concentration, especially for Lake County lakes, where the majority of the lakes have average TP concentrations near 0.050 mg/l. Additionally, the entire shoreline of Sun Lake is surrounded by wetland, which can serve to filter phosphorus and soil particles before they enter the lake. Very peaty sediment is the likely reason for low hypolimnetic TP concentrations in Sun Lake. This type of sediment has a very different chemistry as compared to sediment containing a mixture of clay and organic matter. Low pH levels in peaty sediment can prevent high bacterial densities, which prevent quick decomposition of the organic material on the lake bottom. As a result, phosphorus is not released from this material as quickly as in a more alkaline (higher pH) lakes with high levels of bacterial decomposition.

Regardless of the relatively low hypolimnetic TP levels, the hypolimnetic phosphorus concentration was almost twice as high as the epilimnetic concentration. This is expected in a stratified lake. During stratification, oxygen is depleted in the hypolimnion, triggering chemical reactions at the sediment surface. These reactions result in the release of phosphorus from the sediment into the water column, known as internal phosphorus loading. Since the hypolimnion is thermally isolated from the epilimnion during the summer, phosphorus builds up in the bottom waters and does not reach the sunlit surface waters of the epilimnion until fall turnover. The August hypolimnetic TP concentration was nearly three times as high as the epilimntic TP that same month, but by September, the lake had turned over and epi- and hypolimnetic phosphorus concentrations were virtually identical.

Epilimnetic TP concentrations have increased gradually since 1991 (Table 2, Appendix A). Hypolimnetic TP concentrations have increased since 1993, as have hypolimnetic soluble reactive phosphorus (SRP) concentrations. SRP is a form of phosphorus that is readily available to algae for uptake, and high SRP levels in the photic zone can lead to algae blooms. It does not appear that external sources of phosphorus have increased. There has been little new development in the watershed (a new subdivision east of the lake drains into an area north of the lake) and the average TP concentration of the water entering from Deep Lake has not increased significantly since 1992. Internal nutrient loading appears to have increased, since hypolimnetic TP concentrations have increased. This relatively small increase in TP over the past 10 years may simply be due to yearly variability in non-point TP sources or internal loading. Phosphorus concentrations should continue to be monitored to determine if TP increases are becoming more frequent in the future.

Total suspended solids (TSS) is a measure of the amount of suspended material, such as algae or sediment, in the water column. High TSS values are typically correlated with poor water clarity and can be detrimental to many aspects of the lake ecosystem such as the plant and fish communities. A large amount of material in the water column can inhibit successful predation by sight-feeding fish, such as bass and pike, or settle out and smother fish eggs. High turbidity caused by sediment or algae can shade out native aquatic plants, resulting in their reduction or disappearance from the littoral zone. The average epilimnetic TSS concentration in Sun Lake (2.4 mg/l) was well below the County median concentration of 5.7 mg/l and has remained unchanged since 1991 (Tables 1 & 2, Appendix A). A strong relationship existed between TSS and TP concentrations (Figure 2). Since total volatile solids (TVS), a measure of organic solids such as algae, also coincided with TSS concentrations, the majority of the detectable TSS in the water column likely consisted of algae. In addition to low algae densities as a result of low TP concentrations, TSS concentrations may have also been kept low by the high plant density in Sun Lake. Fifteen different species of plants covered approximately 65% of the surface area of the lake, stabilizing bottom sediment and competing with algae for resources.

The very low TSS concentrations in 2001 resulted in high water clarity throughout the summer, which was illustrated by higher than average Secchi depth measurements that coincided with low TSS concentrations (Figure 3). Secchi depth (water clarity) on Sun Lake was higher than the County average (5.12 feet) every month during the summer of 2001, and was nearly double the County average in May, June and September (Table 1, Appendix A). This high water clarity contributed to the healthy plant community observed, which provided many benefits to the lake ecosystem. Average Secchi depth measurements have changed very little since 1991, remaining between seven and eight feet each year.

Although 2001 total Kjeldahl Nitrogen (TKN), ammonia-nitrogen (NH_3-N) and nitrate-nitrogen (NO_3-N) concentrations were lower than the County averages, TKN has increased slightly since 1993 (Table 2, Appendix A). Since nitrogen can enter a lake through numerous sources, including septic systems, watershed runoff, soils and the atmosphere, it may be very difficult to determine the exact reason for this increase. However, this is something that should be noted and compared in future studies to ensure that nitrogen levels do not increase substantially enough to cause problems in the lake.

Typically, lakes are either phosphorus (P) or nitrogen (N) limited. This means that one of these nutrients is in short supply relative to the other and that any addition of phosphorus or nitrogen to the lake might result in an increase of plant or algal growth. Other resources necessary for plant and algae growth include light or carbon, but these are typically not limiting. Most lakes in Lake County are phosphorus limited, but to compare the availability of nitrogen and phosphorus, a ratio of total nitrogen to total phosphorus (TN:TP) is used. Ratios less than or equal to 10:1 indicate nitrogen is limiting. Ratios greater than or equal to 15:1 indicate that phosphorus is limiting. Ratios greater than 10:1, but less than 15:1 indicate that there are enough of both nutrients to facilitate excess algal or plant growth. Sun Lake had an average TN:TP ratio of 27:1. This indicates that the lake is phosphorus limited and that the addition of phosphorus to the lake may eventually result in increased algae or nuisance plant densities. In highly nutrient-enriched lakes, high phosphorus levels have often reached the point where either very large increases or very large decreases in phosphorus would be necessary to trigger changes in algae density. On the other hand, less enriched lakes, such as Sun Lake, are typically more sensitive to increases or decreases in phosphorus, and algae could become a problem with a relatively small increase in TP. The average TN:TP ratio has remained virtually unchanged since the last study performed in 1993, when it was 26:1.

Phosphorus levels can also be used to indicate the trophic state (productivity level) of a lake. The Trophic State Index (TSI) uses phosphorus, chlorophyll *a* (algae biomass) and Secchi depth to classify and compare lake trophic states using just one value. The TSI is set up so that an increase in phosphorus concentration is related to an increase in algal biomass and a corresponding decrease in Secchi depth. A moderate TSI value (TSI=40-49) indicates mesotrophic conditions, typically characterized by relatively low nutrient concentrations, low algae biomass, adequate DO concentrations and relatively good water clarity. High TSI values indicate eutrophic (TSI=50-69) to hypereutrophic (TSI $\geq$70) lake conditions, typically characterized by high nutrient concentrations, high algal biomass, low DO levels, a rough fish population, and low water clarity. Sun Lake had an average phosphorus TSI (TSIp) value of 57.7, indicating slightly eutrophic conditions. Sun Lake has relatively high water quality compared to many other lakes that fall into the eutrophic category, and does not have many of the characteristics of eutrophic lakes (listed above). This is most likely the result of high percent plant coverage. Typically, a lake is either plant or algae dominated and the TSIp index does not always apply when a lake is plant dominated. Plants serve to stabilize bottom sediment and compete with algae, reducing or eliminating the typical characteristics of an algae dominated eutrophic lake. When the Secchi depth TSI (TSIsd) for Sun Lake (46.7) is used, the lake is classified as mesotrohic, indicating a moderately enriched system with good water quality. Sun Lake ranked 27th out of 102 lakes in Lake County and its average TSIp was similar to many glacial lakes in the County (Table 3).

Most of the water quality parameters just discussed can be used to analyze the water quality of Sun Lake based on use impairment indices established by the Illinois Environmental Protection Agency (IEPA). According to this index, Sun Lake provides *Full* support of aquatic life and *Partial* support of swimming and recreational activities (such as boating) as a result of a high percent plant coverage. The lake provides *Partial* overall use.

LIMNOLOGICAL DATA – AQUATIC PLANT ASSESSMENT

Aquatic plant surveys were conducted every month for the duration of the study (See Appendix B for methodology). Shoreline plants of interest were also recorded. However, no quantitative surveys were made of these shoreline plant species and these data are purely observational. Light level was measured at one-foot intervals from the water surface to the lake bottom. When light level falls below 1% of the amount at the water surface, plants are no longer able to grow. Using this information, along with a bathymetric map, it can be determined how much of the lake has the potential to support aquatic plant growth. Since Sun Lake does not have a bathymetric map, potential plant coverage based on 1% light level could not be determined. However, according to the 1% light level and plant survey data, it was determined that plants nearly grew to the maximum depth determined by 1% light level (approximately 10 feet) during every month. In August and September, maximum plant depth fell short by about 3 feet, failing to cover the potential maximum surface area. The inability of aquatic plants to grow in all areas they could have during these months, as determined by light level, may be explained by the presence of inadequate substrate in various parts of the lake. By the end of the summer, gases in the sediment had caused many sections of the lake bottom to float to the surface, forming peat mats. These areas, obviously, could not be inhabited by submersed aquatic plants, reducing their ability to cover all possible areas.

Fifteen aquatic plant species were observed in Sun Lake during the summer of 2001. Eurasian watermilfoil (EWM), common bladderwort and coontail dominated the plant community, while floating leaf pondweed and large leaf pondweed were also found in relatively high densities (Tables 4 & 5). EWM and curly leaf pondweed were the only exotic species present. The plant community in 1991 contained some of the same plants, including curly leaf pondweed, coontail, common bladderwort, and northern watermilfoil. At that time, EWM had not yet invaded the lake. The appearance of EWM occurred after 1993 and has likely increased the percent plant coverage, which was 65% of the lake area in 2001.

As mentioned above, EWM was the dominant plant in the lake, occurring at 74% of the plant sampling sites throughout the summer. This exotic plant species invaded Sun Lake sometime after 1993. Although it is quantitatively the dominant species, it has not taken over the lake as a result of competition from many other plant species. Additionally, in 2001, the milfoil weevil (*Euhrychiopsis lecontei*) was observed in the lake during plant sampling. *E. lecontei* is a native insect that has shown some success as a biological control for EWM. When present in large enough numbers, it can cause significant damage to milfoil beds. The weevil was not found in high densities, and a moderate amount of weevil-induced damage was observed on the plants. However, the presence of *E. lecontei* is encouraging and, in future years, the weevil population could begin to naturally decrease the density of EWM in Sun Lake.

Of the fourteen emergent plant species observed along the shoreline of Sun Lake, two (purple loosestrife and reed canary grass) are invasive species that do not provide ideal wildlife habitat and have the potential to dominate the emergent plant community.

FQI (Floristic Quality Index) is a rapid assessment tool designed to evaluate the closeness of the flora of an area to that of undisturbed conditions. It can be used to: 1) identify natural areas, 2) compare the quality of different sites or different locations within a single site, 3) monitor long-term floristic trends, and 4) monitor habitat restoration efforts (Nichols, 1999). Each floating or submersed aquatic plant is assigned a number between 1 and 10 (10 indicating the plant species most sensitive to disturbance). An FQI is calculated by multiplying the average of these numbers by the square root of the number of these plant species found in the lake. A high FQI number indicates that there are a large number of sensitive, high quality plant species present in the lake. Non-native species were also included in the FQI calculations for Lake County lakes. The average FQI for 2000-2001 Lake County lakes is 14.0. Sun Lake had an FQI of 22.7, and ranked 9th out of all lakes in Lake County studied in 2000 and 2001. Sun Lake's FQI is well above the County average as a result of its high plant diversity.

Table 4. Aquatic and shoreline plants on Sun Lake, May-September 2001.

Aquatic Plants	
Coontail	*Ceratophyllum demersum*
American Elodea	*Elodea canadensis*
Water Stargrass	*Heteranthera dubia*
Small Duckweed	*Lemna minor*
Eurasian Watermilfoil	*Myriophyllum spicatum*
Northern Watermilfoil	*Myriophyllum sibiricum*
Slender Naiad	*Najas flexilis*
Yellow Pond Lily	*Nuphar advena*
Largeleaf Pondweed	*Potamogeton amplifolius*
Curlyleaf Pondweed	*Potamogeton crispus*
Threadleaf Pondweed	*Potamogeton filaformus*
Floatingleaf Pondweed	*Potamogeton natans*
Flatstem Pondweed	*Potamogeton zosterifomis*
Sago Pondweed	*Stuckenia pectinatus*
White Water Crowsfoot	*Ranunculus longirostris*
Common Bladderwort	*Utricularia vulgaris*
Shoreline Plants	
New England Aster	*Aster novae-angliae*
Tall Bur-Marigold	*Bidens coronata*
Lamb's Quarters	*Chenopodium album*
Hedge Bindweed	Convolvulus sepium
Marsh Shield Fern	Dryopteris thelypteris
Joe-Pye Weed	*Eupatorium maculatum*
Boneset	*Eupatorium perfoliatum*
Jewelweed	*Impatiens pallida*
Ivy-Leaved Morning-Glory	*Ipomoea hederacea*
Purple Loosestrife	*Lythrum salicaria*
Reed Canary Grass	*Phalaris arundinacea*
Swamp Smartweed	*Polygonum coccineum*
Lean Sedge	*Scirpus americanus*
Common Cattail	*Typha latifolia*

LIMNOLOGICAL DATA – SHORELINE ASSESSMENT

A shoreline assessment was conducted at Sun Lake on September 18, 2001. The shoreline was assessed for a variety of criteria (See Appendix B for methods), and based on these assessments, several important generalizations could be made. One hundred percent of Sun Lake's shoreline consists of wetland. There is no development around the lake and no erosion was occurring along any part of the shoreline. The only negative aspect to the shoreline around the lake was that invasive plant species (purple loosestrife and reed canary grass) were present in areas around 100% of the shoreline. This does not mean that the shoreline is made up solely of these plants, but that they are present among native plants around the entire shoreline of the lake. These plants are extremely invasive and exclude native plants from the areas they inhabit. Reed canary grass and purple loosestrife are common to wetland areas and can easily outcompete native plants. Additionally, they do not provide the quality wildlife habitat or shoreline stabilization that native plants provide. The relative densities of purple loosestrife and reed canary grass were high along the wetland areas of Sun Lake and steps to eliminate these plants should be carried out before they take over these areas.

Dramatic water level fluctuation can increase shoreline erosion, especially if the fluctuations occur over short periods of time. The water level in Sun Lake dropped by a little over one foot from June to July, but was virtually unchanged for the rest of the summer. The low occurrence of water fluctuation in Sun Lake helped to reduce the likelihood of shoreline erosion, as evidenced by the lack of erosion around the lake.

LIMNOLOGICAL DATA – WILDLIFE ASSESSMENT

Wildlife observations were made on a monthly basis during water quality and plant sampling activities (See *Appendix A* for methodology). All observations were either visual or audible and many types of waterfowl and songbirds were observed over the course of the study (Table 6). Wildlife habitat in the form of wetland and woodland was abundant around Sun Lake, and the abundance and diversity of waterfowl observed during the 2001 study was proof of that. In fact, both state threatened and state endangered birds were observed on and around the lake during the summer. It is, therefore, very important that the natural areas be maintained to provide the appropriate habitat for these wildlife species in the future.

Table 6. Wildlife species observed at Sun Lake, May-September 2001.

Birds	
Mallards	*Anas platyrhnchos*
Great Egret	*Casmerodius albus*
Great Blue Heron	*Ardea herodias*
Green Heron	*Butorides striatus*
Sandhill Crane+	*Grus canadensis*
Osprey*	*Pandion haliaetus*
Belted Kingfisher	*Megaceryle alcyonc*
Barn Swallow	*Hirundo rustica*
American Crow	*Corvus brachyrhynchos*
Blue Jay	*Cyanocitta cristata*
Marsh Wren	*Cistothorus palustris*
American Robin	*Turdus migratorius*
Red-winged Blackbird	*Agelaius phoeniceus*
Amphibians	
Bull Frog	*Rana catesbeiana*
Reptiles	
Painted Turtle	*Chrysemys picta*
Insects	
Milfoil Weevil	*Euhrychiopsis lecontei*

+Threatened in Illinois
***Endangered in Illinois**

EXISTING LAKE QUALITY PROBLEMS

Highpoints of the lake:

A. Low TP and TSS concentrations
B. High water clarity
C. High plant density and diversity
D. Milfoil weevil present in the lake
E. Wetlands dominate the entire shoreline
F. No erosion present along shoreline
G. State threatened and endangered bird species observed

- *Lack of a Quality Bathymetric Map*

A bathymetric (depth contour) map is an essential tool in effective lake management, especially if the long term lake management plan includes intensive treatments, such as fish stocking, dredging, chemical application or aeration. Morphometric data, such as depth, surface area, volume, etc., obtained in the creation of a bathymetric map are necessary for calculation of equations for correct application of these types of techniques. Maps can be created by the Lake County Health Department – Lake Management Unit or other agencies for costs that vary from $3,000-$10,000, depending on lake size.

- *Exotic Aquatic Vegetation*

One key to a healthy lake is a healthy aquatic plant community. Although plant diversity is relatively high in Sun Lake, Eurasian watermilfoil (EWM) dominates the plant community. This plant species was introduced into the lake sometime in the past eight years and has quickly become abundant. The presence of a large number of other plant species and the milfoil weevil (*Euhrychiopsis lecontei*) in Sun Lake has kept the EWM from reaching nuisance levels. However, the density of EWM should be monitored closely in order to determine if intervention is necessary to reduce the plant's density. At this time, no action is recommended regarding the removal of EWM from Sun Lake. As mentioned above, the plant has not reached nuisance levels and an herbicide application would also affect many of the beneficial native plants in the lake. The Forest Preserve District may want to consider supplementing the existing weevil population with additional weevils. However, it may be worthwhile to wait and see if the population increases on its own before adding more. *E. lecontei* is a biological control organism used to control EWM. *E. lecontei* is a native weevil, which feeds exclusively on milfoil species. It was originally discovered while investigating declines of EWM in a Vermont lake in the early 1990's and was first discovered in northeastern Illinois lakes by 1995. *E. lecontei* is stocked as a biocontrol and is commonly referred to as the Eurasian water milfoil weevil.

Weevils are stocked in known quantities to achieve a density of 1-4 weevils per stem. As weevil populations expand, EWM populations may decline. After EWM declines, weevil populations decline and do not feed on any other aquatic plants. When EWM starts to grow again in the spring, the weevil populations respond by keeping the increasing milfoil under control before it becomes a problem. Once the weevil is established, EWM should no longer reach nuisance proportions and begins to become more sparse. Best results are achieved in lakes that have shallow EWM infestations in areas where it is undisturbed by recreational and management actives. Weevils need proper overwintering habitat such as leaf litter and mud, which are typically found on naturalized shorelines or shores with good buffer strips. Additionally, water temperatures need to be 68-70^{o}F for maximum weevil activity. For this reason, weevils are typically stocked in late spring/early summer. Currently only one company, EnviroScience Inc., has a stocking program (called the MiddFoil® process). The program includes evaluation of EWM densities, of current weevil populations (if any), stocking, monitoring, and restocking as needed. One prohibitive aspect to weevil use is price. Typically weevils are stocked to achieve a density of 1-4 weevils per stem. This translates to 500-3000 weevils per acre of EWM. At a cost of $1 per weevil plus labor, a EWM management program using weevils can be expensive. The cost of the weevils does not include the labor involved in initial surveys, stocking, and monitoring, which typically run an additionally $3,500-$4,500. Additionally, there is no guarantee that weevils will provide long term control or even produce any results at all. The weevils can be obtained from:

EnviroScience, Inc.
3781 Darrow Road
Stow, Ohio 44224
1(800) 940-4025

- *Invasive Shoreline Plant Species*

Numerous exotic plant species have been introduced into our local ecosystems. Some of these plants are aggressive, quickly out-competing native vegetation and flourishing in an environment where few natural predators exist. The outcome is a loss of plant and animal diversity. Purple loosestrife is responsible for the “sea of purple” seen along roadsides and in wetlands during summer. It can quickly dominate a wetland or shoreline. Due in part to an extensive root system, large seed production (estimates range from 100,000 to 2.7 million per plant), and high seed germination rate, purple loosestrife spreads quickly. Reed canary grass is an exotic plant species that was introduced as a shoreline stabilizer. It is found on lakeshores, streambanks, marshes and exposed moist ground. Although it does serve to stabilize shorelines to some extent, it has low food value and does not provide winter habitat for wildlife. It is very successful in taking over disturbed areas. Purple loosestrife and reed canary grass are present along the shoreline of Sun Lake. The presence of exotic species along a lakeshore is by no means a death sentence for the lake or other plant and animal life. If controlled, many exotic species can perform many of the original functions that they were brought here for. One isolated plant along a shoreline will probably not create a problem by itself. However, problems arise when plants are left to spread, many times to the point where treatment is difficult or cost prohibitive. A monitoring program should be established, problem areas identified, and control measures taken when appropriate. This is particularly important in remote areas of lake shorelines where the spread of exotic species may go unnoticed for some time.

Biological control (bio-control) is a means of using natural relationships already in place to limit, stop, or reverse an exotic species' expansion. In most cases, insects that prey upon the exotic plants in its native ecosystem are imported. Since there is a danger of bringing another exotic species into the ecosystem, state and federal agencies require testing before any bio-control species are released or made available for purchase. Recently two beetles (*Galerucella pusilla* and *G. calmariensis*) and two weevils (*Hylobius transversovittatus* and *Nanophyes marmoratus*) have offered some hope to control purple loosestrife by natural means. These insects feed on either the leaves or juices of purple loosestrife, eventually weakening or killing the plant. In large stands of loosestrife, the beetles and weevils naturally reproduce and in many locations, significantly retard plant densities. The insects are host specific, meaning that they will attack no other plant but purple loosestrife. The Lake County Forest Preserve District has taken steps to address the purple loosestrife problem in several areas of the County by introducing the bio-control beetle and may want to consider this action around Sun Lake. No costs were associated with purchase of the beetles for other projects, as the Forest Preserve District obtained the beetles from the Illinois Natural History Survey at no charge.