

THE SHAWNIGAN BASIN SOCIETY

WORKING TO PROTECT THE LONG-TERM HEALTH AND SAFETY
OF THE SHAWNIGAN LAKE COMMUNITY WATERSHED AND THE
DRINKING WATER IT PROVIDES.



Shawnigan
Basin Society



SEPTEMBER 20, 2018

HIGH POTENTIAL OF GROWTH 1-4
METERS (PHOTOSYNTHESIS)

MODERATE POTENTIAL 4-10 METERS

ESTIMATED 75-80% COVERAGE

RECREATION RD, GOVERNMENT
DOCK, AND CLEARHUE RD = CLEAN
DRAIN AND DRY STATIONS (COASTAL
INVASIVE SPECIES COMMITTEE, 2012)

NO GARBAGE CANS OR HOSES TO
CLEAN BOAT HULLS/PROPELLERS

INACCURATE SIGNAGE



WHAT IS IT?

- PERENNIAL AND UNDER WATER
- BOTH NATIVE AND INVASIVE VARIETIES
- HYBRID MORE RESISTANT THAN INVASIVE
- HUMAN INTRODUCED I.E. FISH TANK OR THE BOTTOM OF A CONTAMINATED BOAT
- FORMS DENSE UNDERWATER MATS OF LONG-STEMMED PLANTS
- FEATHERY LEAVES WITH 12 OR MORE SEGMENTS
- REDDISH FLOWERS THAT GROW ABOVE THE WATER
- BLOOMS AND SEEDS MID SUMMER

EURASIAN WATER-MILFOIL



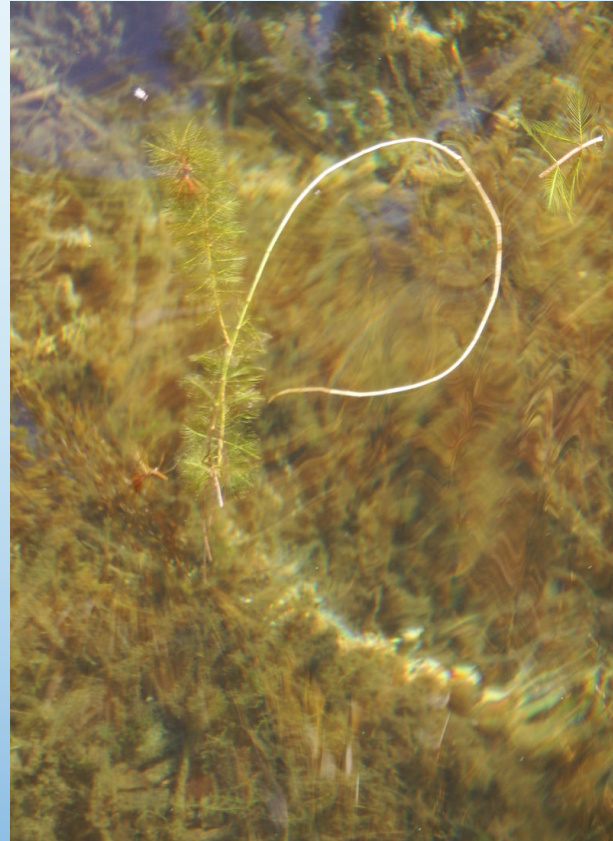
A SECOND OBSERVATIONAL SURVEY : TWO YEARS LATER

OCTOBER 22, 2018

AT THE WATER'S SURFACE



BELOW THE WATER'S SURFACE



OCTOBER 22, 2018

- STARTED AT THE NORTH END JUST WEST OF MASON'S BEACH
- KAYAKED WEST PAST SHAWNIGAN LAKE SCHOOL
- PAST THE MOUTH OF THE WEST ARM
- TO THE END OF THE WEST ARM
- FOUND: 100% MILFOIL COVERAGE
- EXCEPT: WHERE IT WAS TOO ROCKY, TOO DENSE A LAYER OF SILT/SEDIMENT, OR WHERE OBVIOUS HUMAN GROOMING OCCURRED
- MILFOIL DENSITY WAS LIKE A CARPET COVERING SEVERAL HUNDREDS OF SQUARE FEET



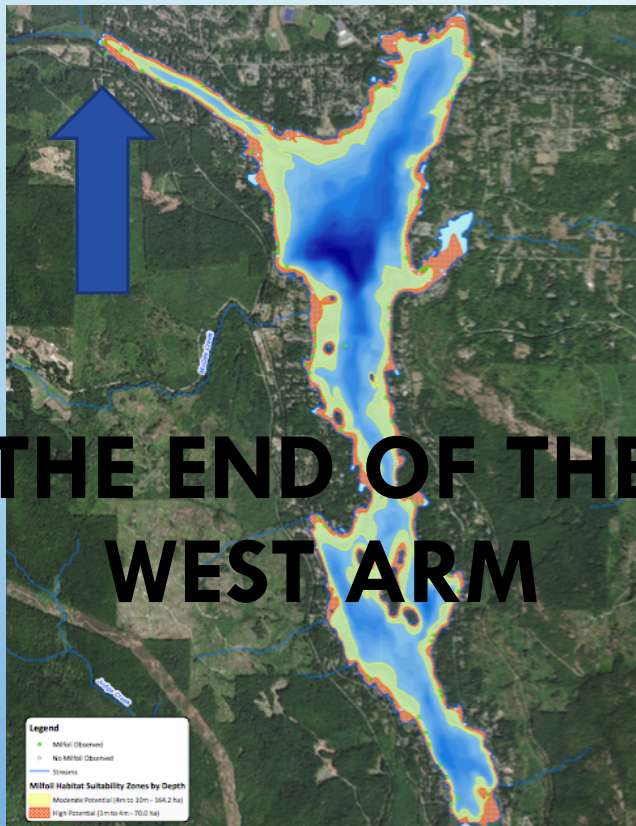
MADRONE REPORT, MARCH 5, 2018
EURASIAN WATER-MILFOIL MANAGEMENT PLAN FOR
SHAWNIGAN LAKE, BC (PG. 12/13)
SEE: WWW.SHAWNIGANBASINSOCIETY.ORG

**Human impacts or stressors contributing to growth and
dispersal of EWM in Shawnigan Lake:**

- 1) Motorized recreation on the lake (wave energy, propellers)
- 2) Fragmentation of plants (the principal means of propagation)
- 3) Nutrient loading from septic systems, fertilizers, and pesticides
- 4) Climate Change – longer, dryer, hotter summers ie. Increased H₂O temp.
- 5) Removal of riparian vegetation and deciduous trees (seasonally shed)
- 6) Introduction of non-native fish (small-mouth bass, which eat crayfish)

A PICTURE IS WORTH A 1000 WORDS

A MILFOIL CARPET



THE END OF THE
WEST ARM



IMPACTS OF MILFOIL

PHYSICAL

HINDERS SWIMMING,
BOATING, WATERSKIING, AND
FISHING

INTERFERES WITH AND CLOGS
WATER INTAKES

REDUCES WATER FLOW AND
CREATES STRATIFIED WATER
COLUMNS

UNATTRACTIVE TO LAKE USERS

BIOLOGICAL

GROWS AND SPREADS RAPIDLY
FOUL SMELL WHEN THE PLANT
DECOMPOSES IN COLD WEATHER

REDUCES OXYGEN LEVELS (AT LOW
LEVEL OF STRATIFIED LAYER)

REDUCES WATER
ABSORPTION/PREVENTS WIND
FROM MIXING WATER LAYERS
OVERTAKES NATIVE PLANT SPECIES
REDUCES FORESHORE HABITAT AND
FOOD FOR FISH

LONG-TERM

CREATES STAGNATE WATER,
IDEAL HABITAT FOR
MOSQUITOES

REDUCES PROPERTY VALUES
REDUCES VISITORS

CAUSES OF DROWNING IN BC
REQUIRES AN ONGOING AND
COLLABORATIVE EFFORT TO
MANAGE AND CONTROL

METHODS OF CONTROL

PHYSICAL

1) ROTOTILLING AND HARVESTING (LARGE SCALE))

- CHALLENGES ALONG SHAWNIGAN SHORELINE/PHYSICAL LIMITATIONS
- LABOUR AND COST INTENSIVE

2) DIVERS TO HAND PICK PLANT FROM LAKE BOTTOM

- CHRISTINA LAKE \$300K ANNUAL LOCAL TAXATION

3) BENTHIC BARRIERS (SMALL SCALE) – CREATING SHADE

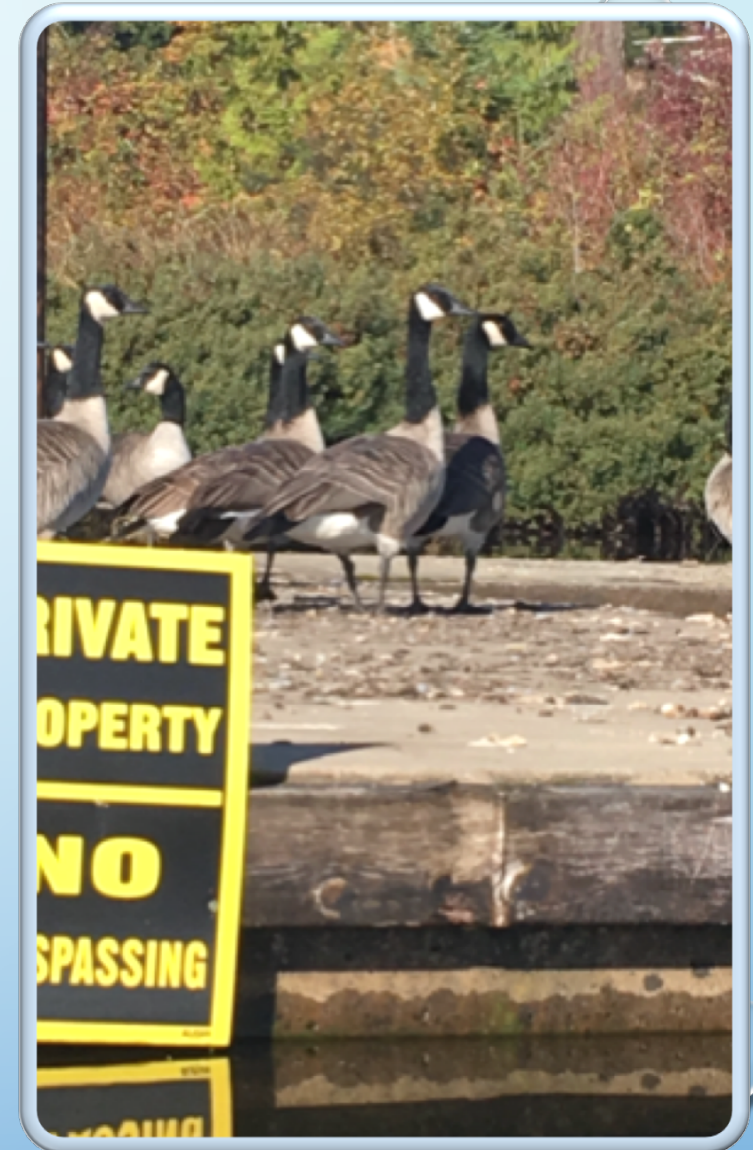
- REQUIRES APPROPRIATE TIMING AND REMOVAL EFFORTS

BIOLOGICAL

- MILFOIL WEEVIL, PATHOGENIC FUNGUS OR CRAYFISH

CHEMICAL

- USING HERBICIDES OR CHEMICALS – NO!



ACTION!

- ✓ REMOVE ALL VEGETATION FROM YOUR WATERCRAFT IF MOVING TO ANOTHER BODY OF WATER
- ✓ USE CLEAN, DRAIN, AND DRY STATIONS (ENSURE SUITABLE EQUIPMENT FOR DOING SO)
- ✓ DISPOSE HARVESTED PLANT AWAY FROM SHORELINE (COMPOST)
 - ✓ MILFOIL VACUUM PROTOTYPE
- ✓ DEVELOP AN ORGANIZED SCIENCE-BASED FIELD STUDY APPROACH



NON-INVASIVE TECHNOLOGY: THE NANO OXYGEN SYSTEM

- MECHANISM OF ACTION IS RELATED TO THE MANIPULATION OF PHOSPHORUS (P)
- UNDER ANAEROBIC CONDITIONS ARISING FROM DECAY OF DETRITUS ACCUMULATED IN THE SEDIMENTS, P APPEARS TO BE UNLOCKED, BECOMING AVAILABLE IN THE BOTTOM LAYER OF THE WATER COLUMN FOR MILFOIL TO RECYCLE
- P IS AT LEAST PARTIALLY BEING RELEASED IN SOLUBLE FORM FROM REDUCED IRON (FE) RELATED COMPOUNDS
- UNDER HYPEROXYGENATION BY NANO BUBBLES, AEROBIC CONDITIONS ARE CREATED THAT BIND P AND FE RELATED COMPOUNDS
- THUS PHOSOPHORUS IS NO LONGER AVAILALBLE TO THE MILFOIL AT ITS ROOT SOURCE
- REGULAR AIR BUBBLES PUSH HUGE VOLUMES OF ATMOSHERIC NITROGEN (N) INTO WATER (WHICH CAN BE USED BY CYANOBACERTIA IN ALGAE BLOOMS)
- THE GAIA UNIT REMOVES N GAS ENABLING A 93% OXYGEN INJECTION INTO NANO SIZE BUBBLES (WHICH ARE TOO SMALL TO HAVE BUOYANCY)
- AND THE NANO BUBBLES STAY IN THE WATER FOR WEEKS AFTER A SYSTEM STOPS OPERATION

NANO OXYGEN SYSTEM: SPIDER LAKE SPRINGS RESORT, QUALICUM BEACH, BC (300 RV PADS)

FROM GREEN UNDER WATER ... TO BROWN FLOATING... TO DRIED AT SHORE.



A SIMULTANEOUS SCIENCE-BASED FIELD TRIAL

- CAPITAL REGIONAL DISTRICT WILL USE THIS SYSTEM TO TREAT BEAVER LAKE (EUTROPHIC)
- THE SHAWNIGAN BASIN SOCIETY IS SEEKING SUPPORT TO TREAT SHAWNIGAN LAKE (OLIGOTROPHIC)
- DATA COLLECTION AND MONITORING WILL BE SUPPORTED BY THE SHAWNIGAN RESEARCH GROUP
- A \$5000 UNIT WILL TREAT 150,000 GALLONS OF WATER PER DAY
- ALSO REQUIRES A SMALL SHED WHERE THE OXYGEN GENERATOR CAN BE KEPT
- THE PUMP IS CLAMPED TO A POST AT THE END OF A DOCK, ABOUT 2 M BELOW THE SURFACE (HAS A 15 FOOT POWER CORD, WHICH PLUGS INTO THE GFI POWER STRIP LOCATED AT THE SHED)
- THE OXYGEN GENERATOR ALSO PLUGS INTO THE GFI STRIP AND USES 6 AMPS, WHEREAS THE PUMP USES 5 AMPS, THEREFORE, A TOTAL OF 12 AMPS IS NEEDED
- THE SBS WILL CONDUCT COMMUNITY INFORMATION WORKSHOPS (JAN. 23, FEB. 20, AND MAR. 20)
- SUGGESTED THAT MID APRIL IS A GOOD TIME TO START (LOCATION TBA)
- ORGANIZE A JUNE MILFOIL CLEAN UP PARTY

LETTERS OF SUPPORT FOR THE SHAWNIGAN BASIN SOCIETY'S SCIENCE-BASED PILOT PROJECT

- ✓ TIMBERWEST
 - ✓ DFO
 - ✓ CVRD
- ✓ MILL BAY AND DISTRICT CONSERVATION SOCIETY
- ✓ SHAWNIGAN RESEARCH GROUP
- ✓ SHAWNIGAN BIOREMEDIATION SOCIETY
 - ✓ HOMEPORT SOLUTIONS
 - ✓ GAIA WATER LTD
- SEEKING SUPPORT FROM:
 - MOE (DOCUMENTED SUPPORT GIVEN IN 2016 TO GAIA FOR PROJECT ON QUAMICHAN LAKE)
 - FLNRO (VERBAL SUPPORT RECEIVED)
 - INVASIVE SPECIES COUNCIL OF BC
 - THE COASTAL INVASIVE SPECIES COMMITTEE
- ✓ APPLYING TO THE ECOACTION COMMUNITY GRANTING PROGRAM FOR FUNDS (DEADLINE JANUARY 16, 2019 FOR UP TO \$100,000!)

SUCCESS STORIES!

GAIA

WWW.GAIAWATER.COM



- IDA ANNE LAKE IN LANGFORD, BC
- SPIDER LAKE, QUALICUM BEACH, BC
- FISH FARMS IN BRITISH COLUMBIA
- CURRENTLY TREATING LAKES IN DUBAI
- GANGES RIVER IN INDIA
- LAKES IN THE USA
- REFER TO LICENSEE - HOMEPORT
- [HTTPS://WWW.HOMEPORT-WATER.SOLUTIONS/](https://www.homeport-water.solutions/)
- COMMERCIAL POOLS IN THE USA
- REFER TO LICENSEE - PURE VISION TECHNOLOGIES
- [HTTP://WWW.PUREVTECH.COM/](http://www.purevtech.com/)

THE SHAWNIGAN BASIN SOCIETY

PROMOTING A HOLISTIC APPROACH TOWARD
ENVIRONMENTAL SOLUTIONS, COMMUNITY
ENGAGEMENT, AND LOCAL STEWARDSHIP

QUESTIONS?

