(MUSIC)

JOAN CARTAN-HANSEN, REPORTER: THE SPARKLING WATERS OF NORTHERN IDAHO’S LAKES ATTRACT THOUSANDS TO LIVE ALONG THEIR SHORES AND THOUSANDS MORE ENJOY THE AREA’S BEAUTY AND RECREATION.

BUT A MICROSCOPIC ORGANISM THREATENS THE WATER QUALITY OF THESE LAKES AND THAT, IN TURN PUTS THE ECONOMY OF THE ENTIRE REGION AT RISK.

(WATER LAPPING)

THE MICROSCOPIC LIFE IN A LAKE LIVES OFF A COMBINATION OF NUTRIENTS, LIKE NITROGEN AND PHOSPHOROUS.

SOME NUTRIENTS COME FROM THE AIR.

OTHERS ARE RELEASED WHEN ROADS, LOGGING AND OTHER ACTIVITIES DISTURB THE SOIL.

THAT SOIL AND THE NUTRIENTS ARE CARRIED FROM STREAMS INTO LAKES.

CHEMCALS LIKE FERTILIZER RUN OFF AND ALSO ADD TO A LAKE’S NUTRIENT LOAD.

THE LAKE’S WATER QUALITY IS ENDANGERED WHEN THESE NUTRIENTS GET OUT OF BALANCE.

MARK SOLOMON IS THE ASSOCIATE DIRECTOR OF THE IDAHO WATER RESOURCE RESEARCH INSTITUTE AT THE UNIVERISTY OF IDAHO.

MARK SOLOMON, ASSOCIATE DIRECTOR: ALGAE ARE SIMPLE PLANT ORGANISMS THAT HAVE BEEN AROUND FOR BILLIONS OF YEARS.

THEY’VE PLAYED A VERY KEY ROLE IN OUR WORLD BECAUSE PRIOR TO THEIR EXISTENCE THERE WASN’T ENOUGH OXYGEN IN THE ATMOSPHERE TO SUSTAIN ANIMAL LIFE.

CYANOBACTERIA OR BLUE-GREEN ALGAE ARE THE REASON WHY WE HAVE AN ATMOSPHERE THAT WE CAN LIVE AND BREATHE WITH.

CARTAN-HANSEN: THESE SINGLE CELLED ORGANISMS ARE THE BOTTOM OF THE FOOD WEB.

IN A HEALTHY ENVIRONMENT, BLUE-GREEN ALGAE ARE KEPT IN CHECK.

SOLOMON: THEY’RE TAKING THE MINERALS FROM THE EARTH AND TRANSFORMING THEM INTO NUTRIENTS AND FOOD THAT EVERYBODY ELSE CAN USE.

BUT ALONG THE WAY, THEY HAVE TO SPIT THINGS OUT.

AND WHAT THEY’RE SPITTING OUT ARE TOXINS THAT CAN BE DANGEROUS TO PLANT LIFE AND TO ANIMAL LIFE.

CARTAN-HANSEN: BLUE-GREEN ALGAE OR CYANOBACTERIA CAN BE SO TOXIC THAT BLOOMS IN A WATERING HOLE IN NEW MEXICO KILLED MORE THAN A HUNDRED ELK.

AND TOXIC BLOOMS THREATENED PARTICIPANTS TRAINING FOR AN IRON MAN COMPETITION IN OHIO.

AS BLUE-GREEN ALGAE GROWS, IT CAUSES A GREEN SCUM TO FORM ON THE SURFACE AND LOWER IN THE WATER COLUMN.

SOLOMON: THE ACT OF GROWING AND DYING AND DECOMPOSING CREATES A FEEDBACK LOOP IN THE LAKE THAT CONTINUES TO STRIPS THE OXYGEN OUT OF IT, CREATING AN EVEN BETTER ENVIRONMENT FOR THOSE ALGAE TO KEEP GROWING.

CARTAN-HANSEN: AND IF BLUE-GREEN ALGAE GROWTH CONTINUES UNCHECKED, FISH AND PLANTS EVENTUALLY DIE.

RECREATIONAL WATERS BECOME UNUSABLE AND SURFACE DRINKING WATER SUPPLIES BECOME CONTAMINATED.

AND THE COST TO DEAL WITH TOXIC BLUE-GREEN ALGAE IS NOT CHEAP.

ONE ESTIMATE SUGGESTS THESE ALGAE BLOOMS COST THE U-S ECONOMY MORE THAN TWO BILLION DOLLARS A YEAR.

TO A DEGREE, BLUE-GREEN ALGAE BLOOMS CAN BE FOUND IN ALL OF THE NORTHERN IDAHO LAKES.

BUT THE HARDEST HIT IS FERNAN LAKE, JUST OUTSIDE OF COEUR D’ALENE.

IT’S SO BAD THAT FERNAN LAKE RESIDENTS SUSAN AND MARC ANDREWS FEAR THESE MICROSCOPIC ORGANISMS COULD COST THEM THEIR WAY OF LIFE.

MARC ANDREWS, FERNAN LAKE RESIDENT: YOU COULD SEE THE LAKE, IN A SENSE, TURNING COLOR.

IT’S LIKE YOU’RE LOOKING AT IT AND YOU COULD SEE IT GETTING THICKER, AND IT’S STARTING TO LOOK MORE LIKE PEA SOUP INSTEAD OF WATER.

CARTAN-HANSEN: THE ANDREWS AND OTHER AREA RESIDENTS ORGANIZED.

THEY WANTED TO FIND OUT WHY THEIR LAKE WAS IN TROUBLE.

SUSAN ANDREWS, FERNAN LAKE RESIDENT: I BELIEVE THE ALGAE BLOOM HAS CAUSED US TO TAKE A SECOND LOOK AT WHAT’S HAPPENING AND TO WANT TO DO ALL THAT WE CAN TO KEEP THE LAKE PRISTINE.

CARTAN-HANSEN: FERNAN LAKE’S DYNAMICS-- HOW WATER MOVE IN AND OUT AND FROM WHERE NUTRIENTS COME AND GO --ARE NOT WELL UNDERSTOOD.

SO LAKE MANAGERS AND FERNAN LAKE RESIDENTS REACHED OUT FOR HELP.

SUSAN ANDREWS: IT WAS THE UNIVERSITY OF IDAHO WHO TOOK THE INTEREST THROUGH THE MILES PROJECT*.*

CARTAN-HANSEN: FRANK WILHELM IS A LIMNOLOGIST, A SCIENTIST THAT STUDIES INLAND WATERS.

HE AND HIS TEAM OF GRADUATE STUDENTS ARE HERE TO TEST THE WATERS IN FERNAN LAKE.

SCIENTIST: “THAT’S A DEAD CATFISH RIGHT THERE OR BULL HEAD, SOMETHING.”

SCIENTIST: “AND THEY’RE LABELED?”

TREA LACROIX, GRADUATE STUDENT: “YUP, THEY’RE ALL LABELED.”

WILHELM: “AND WE HAVE ACQUIRED A POSITION AND WE’RE READY TO GO.”

CARTAN-HANSEN: FERNAN LAKE IS SMALL BY NORTH IDAHO STANDARDS, AT ABOUT 380 ACRES.

IT FEEDS INTO NEARBY LAKE COEUR D’ ALENE.

FERNAN LAKE IS PRIZED FOR BOATING, SWIMMING

AND IT’S THE MOST HEAVILY FISHED LAKE PER UNIT IN THE STATE.

TOXIC BLUE-GREEN ALGAE NOW BLOOM IN THE LAKE UPWARDS OF ONE HUNDRED DAYS A YEAR.

WILHELM: THE CONTACT LIMIT FOR DRINKING WATER IS 0.3 MICROGRAMS PER LITER. WE’RE AT 7 POINT 6.

NOBODY SHOULD BE DRINKING THIS WATER.

CARTAN-HANSEN: WHEN A BLOOM IS ON, RECREATIONISTS CAN STILL USE THE LAKE, BUT THEY HAVE TO BE CAREFUL.

THEY SHOULD WASH THEIR SKIN AFTER CONTACT.

PEOPLE SHOULDN’T WATER-SKI BECAUSE THEY MIGHT BREATHE THE TOXINS INTO THEIR LUNGS.

AND PETS ARE PARTICULARLY IN DANGER BECAUSE THE ALGAE STICKS TO THEIR FUR AND THEY ARE MORE LIKELY TO GET A TOXIC DOSE.

LACROIX: WE HAVE LAKES LIKE THIS THAT ARE BASICALLY BECOMING TOXIC BECAUSE OF THE ALGAE.

WE REALLY HAVE TO FIND OUT HOW TO STOP IT.

CARTAN-HANSEN: GRADUATE STUDENT TREA LACROIX IS TRYING TO ANSWER A KEY QUESTION.

LACROIX: I AM LOOKING AT THE AMOUNT OF PHOSPHOROUS THAT HAS ENTERED AND LEFT THE LAKE OVER THE COURSE OF ONE CALENDAR YEAR.

CARTAN-HANSEN: SHE’S TAKING SAMPLES FROM THE TOP, MIDDLE AND BOTTOM OF THE WATER COLUMN.

LACROIX: SIX POINT TWO.SO WE’LL DO ABOUT FIVE POINT FIVE?

PERFECT.

WHAT WE THINK IS THAT FERNAN PROBABLY DOESN’T HAVE TOO MUCH OF A DIFFERENCE BECAUSE OF THE FREQUENT WIND EVENTS THAT IT EXPERIENCES.

AND IN THEORY, THE WIND IS CONSTANTLY MAKING THE LAKE MIX AND SO THE PHOSPHORUS SHOULD BE PRETTY EVENLY DISTRIBUTED.

CARTAN-HANSEN: LA CROIX TAKES A WATER SAMPLE WITH A VAN DORN WATER SAMPLER.

IT’S BASICALLY A CLEAR TUBE WITH TWO RUBBERS ENDS AND A REMOTE TRIGGER.

WHEN SHE DROPS IT TO THE RIGHT DEPTH IN THE WATER, SHE SENDS A BRASS WEIGHT DOWN THE LINE.

AND THAT SETS OFF THE TRIGGER THAT SNAPS THE ENDS SHUT, CAPTURING THE WATER SAMPLE.

WILHELM: WE’RE LOOKING AT ESTABLISHING A REALLY DETAILED WATER BUDGET SO WE CAN FIGURE OUT EXACTLY WHAT STREAMS AND TRIBUTARIES ARE CONTRIBUTING, HOW MUCH WATER AND HOW MUCH SEDIMENT AND HOW MUCH PHOSPHOROUS.

WE’RE ALSO MEASURING THE LAKE OUTLET, HOW MUCH LEAVES THE LAKE.

SO WE’RE BASICALLY DOING A MASS BALANCE: HOW MUCH COMES IN, HOW MUCH LEAVES AND HOW MUCH IS LEFT IN THE LAKE ITSELF.

CARTAN-HANSEN: THE CREW DOES TWO SAMPLES AT EACH DEPTH.

ONE SAMPLE LOOKS FOR TOTAL PHOSPHORUS, SO THEY’LL BE TESTING FOR EVERYTHING IN THE WATER.

AND THE SECOND SAMPLE IS FILTERED, SO ALL THAT IS LEFT IS THE WATER ITSELF AND THE DISSOLVED PHOSPHORUS.

THE SAMPLES ARE THEN SENT TO A LAB FOR ANALYSIS.

WILHELM: RESEARCH ON CYNOBACTERIA IS RELATIVELY IN ITS INFANCY, SO WE’RE JUST DISCOVERING WHAT THE TOXINS ARE.

WE KNOW HOW TO ANALYZE FOR THEM, BUT THE TESTS ARE STILL RELATIVELY EXPENSIVE.

SCIENTIST: “FIVE POINT EIGHT”

LACROIX: “ALSO WE’D LIKE A POINT AND A SURFACE GRAB.”

SCIENTIST: “I GOT YA.”

CARTAN-HANSEN: OVER THE COURSE OF A DAY, THE TEAM TAKES 188 SAMPLES.

LACROIX: I’VE DISCOVERED THAT QUITE A BIT OF PHOSPHOROUS WAS STORED, ABOUT 88 PERCENT OF WHAT CAME IN REMAINED IN THE LAKE OVER THE COURSE OF A YEAR.

CARTAN-HANSEN: AND THAT’S NOT GOOD NEWS, BECAUSE IT SHOWS AS MORE AND MORE PHOSPHOROUS COMES INTO THE LAKE, IT’S NOT BEING SWEPT OUT.

AND THAT MEANS PHOSPHOROUS LEVELS ARE BUILDING UP YEAR AFTER YEAR.

AND THAT MEANS BETTER GROWING CONDITIONS FOR BLUE-GREEN ALGAE.

BUT THIS RESEARCH WILL STILL HELP LAKE MANAGERS LOOK FOR SOLUTIONS IN THE FUTURE.

LACROIX: WHENEVER YOU GO OUT, YOU WANT TO FIGURE OUT HOW MANY SAMPLES YOU NEED TO TAKE TO GET AN ACCURATE VIEW OF WHAT’S GOING ON IN THE LAKE.

SO IF YOU CAN TAKE ONE SAMPLE AT ONE DEPTH AND GET AN ACCURATE VIEW OF THE ENTIRE LAKE, IT’S WAY MORE EFFICIENT.

CARTAN-HANSEN: WILHELM HOPES HIS TEAM’S RESEARCH WILL EVENTUALLY MAKE A DIFFERENCE.

BUT FOR FERNAN LAKE, THE ANSWERS AREN’T COMING ANYTIME SOON.

WILHELM: WELL, IT BEEN A HUNDRED YEARS IN THE MAKING AND IT’S GOING TO BE A TOUGH SOLUTION.

CARTAN-HANSEN: FOR IDAHO SCIENCE JOURNAL, I’M JOAN CARTAN-HANSEN.

(MUSIC)

ANNOUNCER: Funding for Idaho Science Journal was provided by the National Science Foundation Idaho EPSCoR Program and by the National Science Foundation.